

# GENERAL CATALOGUE

Components for Pneumatic Automation

## 2018 Edition

PNEUMAX GREEN LINE: TECHNOLOGY & INNOVATION



[www.pneumaxspa.com](http://www.pneumaxspa.com)







The components illustrated and described in the present catalogue are sold under the trademark **PNEUMAX**. Sales in Italy and abroad are handled through the organization indicated in the "**Sales network pages**". The overall dimensions and technical information are provided solely for information reasons and may be subject to change without notice.

PNEUMAX

# Warnings

PNEUMAX GREEN LINE: technology & innovation

Pneumax reserves the right to modify the dimensions or technical characteristics of any of its products contained within this catalogue without prior notice.

The products included in this catalogue should only be used in applications for which they were originally intended and should only be used by personnel with adequate technical knowledge, PLEASE NOTE: That the misuse of this product could cause serious injury.

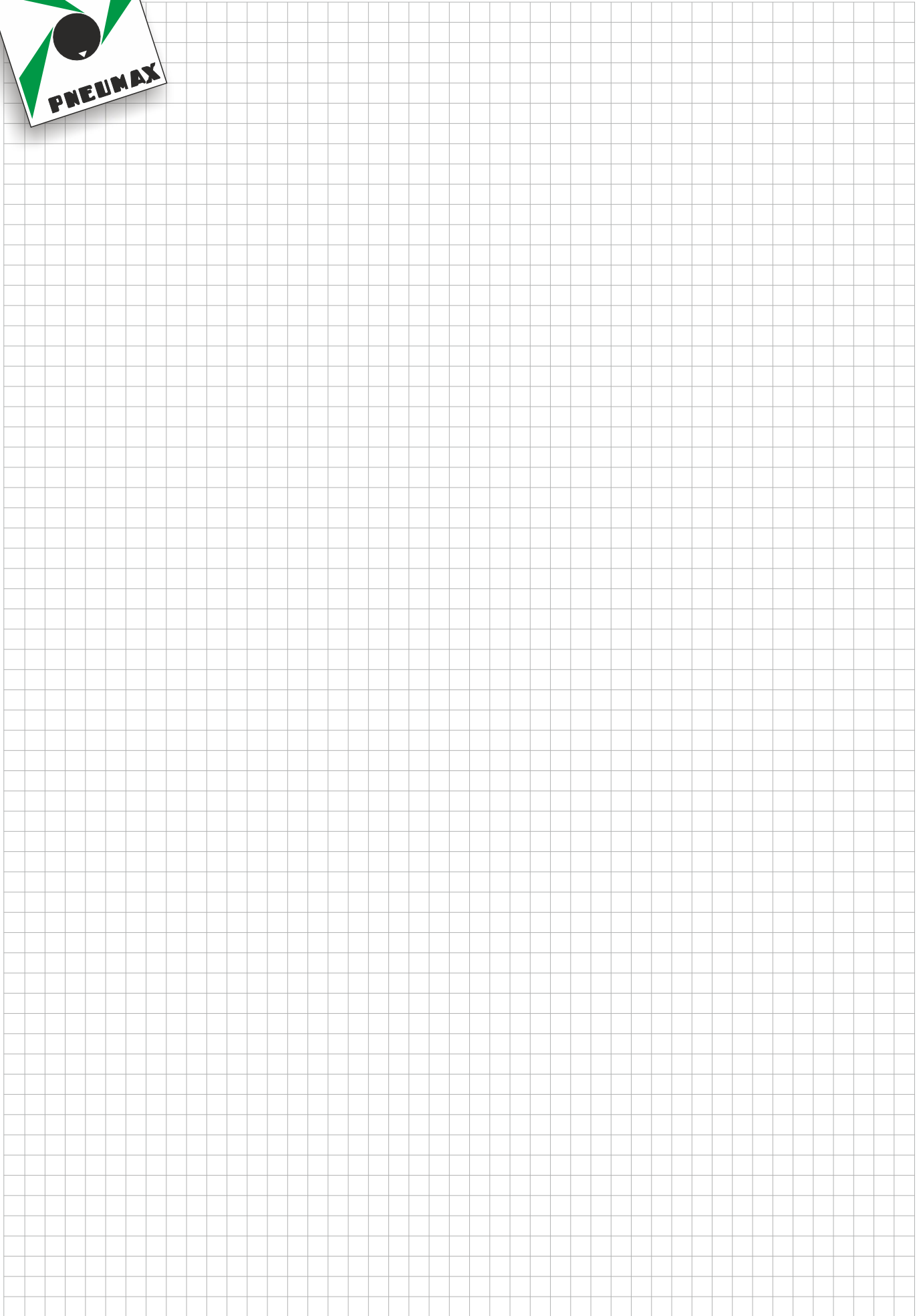
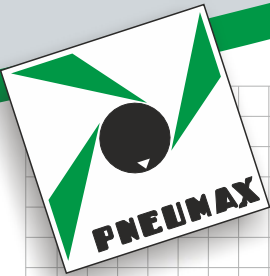
The user should ensure that the product is installed and operated within the operating characteristics shown and that this complies with any health and safety requirements, however should you require any further information please do not hesitate to contact our Technical office.

**Pneumax S.p.A.** accepts no liability for damage or injury arising from the error, misuse or omission in the data provided.

**Pneumax S.p.A.** accepts no liability from third parties in the form of consequential losses.

It is the responsibility and duty of the client/user to ensure that all operating requirements are carried out and that the products are used safely.

The application is always the responsibility of the client/user.



# company

PNEUMAX GREEN LINE: technology & innovation



Established in 1976 Pneumax has, over the years, achieved a role of primary importance in the pneumatic and automation world. Its strength is, and always has been, the capacity to offer innovative, modern products supported by great productive power.

The head office is situated in Lurano in the Bergamo province and covers an area of 94,000 square meters, 54,000 of which are office and manufacturing facilities. The machining departments are equipped with the latest design machine tools, which enable Pneumax to produce, with extreme ease and flexibility, all components needed for production processes.

Pneumax employees now number more than 370 between offices and production departments, operating in a stimulating, modern and comfortable environment. All processes are integrated with a company Quality Management System, operating in accordance with ISO 9001:2008 - 14001:2004 (Environmental Management System), and OHSAS 18001:2007 (Occupational Health and Safety Management System).

Most of the company's resources are invested in the commercial expansion and strengthening of our productive capabilities, both of which are key aspects of our management policy.

The company is owned by two families and the proprietors are active within the company, ensuring continuity over time and focus on the set objectives.

growth



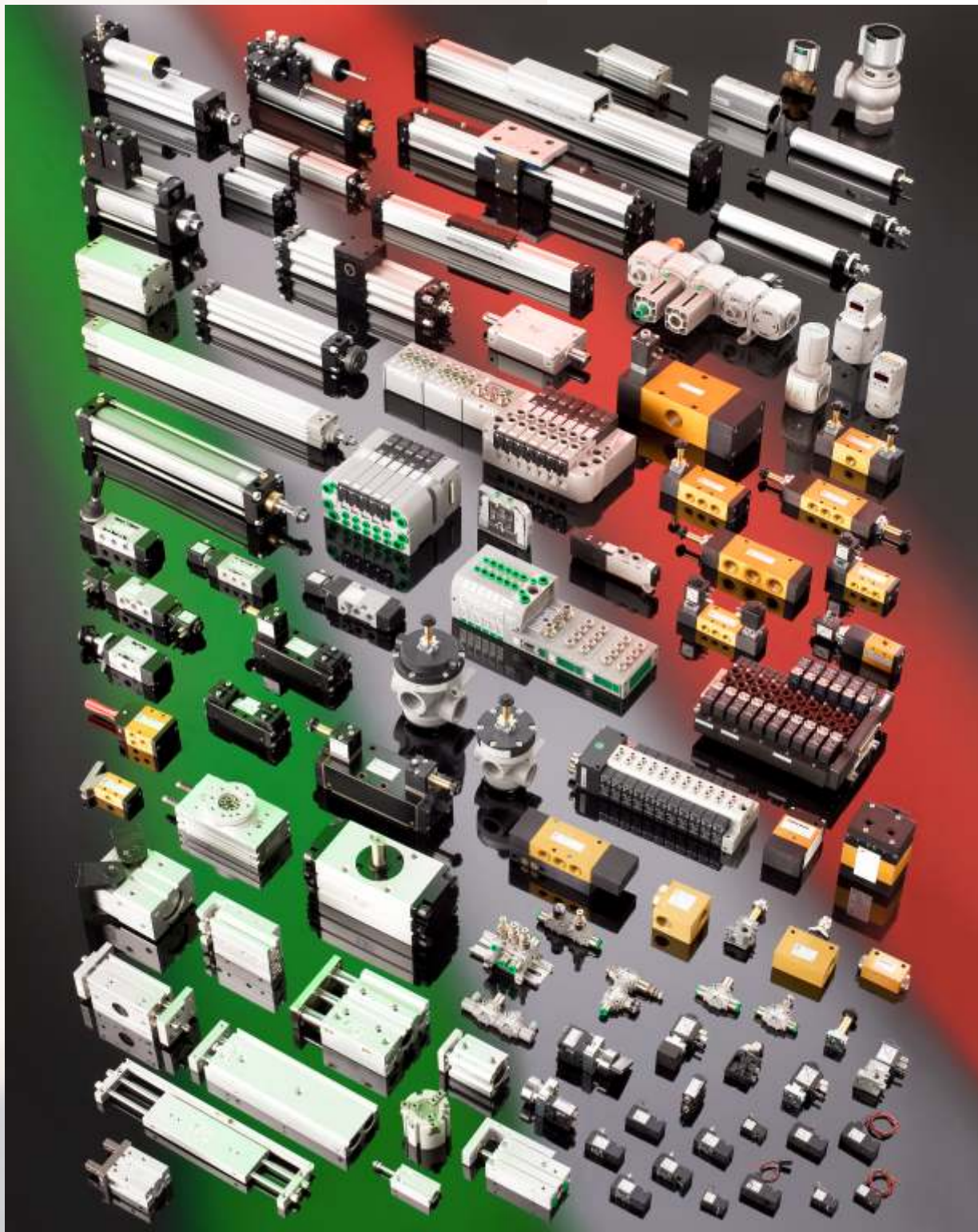


# products

The complete and innovative product range offered by Pneumax offers intelligent solutions to all application problems.

Beginning with air preparation units, moving on to air management devices such as manual and solenoid operated valves and finally through to actuators, cylinders and handling equipment; Pneumax can always offer the right product.

The range is complemented by the most advanced electronic components, in the form of serial communication modules, which can be integrated, with most ranges of valves, helping reduce and optimise wiring procedures. Accessories, such as fittings, cylinder mountings, sensors, flow regulators, check valves, timers, pressure boosters, etc. complete the range. Special care has been taken in the design and manufacturing of the latest series of products; by selecting innovative and technologically advanced materials, high performance and long life are guaranteed.





# branches

PNEUMAX GREEN LINE: technology & innovation



# SUPERMECCANICA - TITAN

Pneumax S.p.A. is the mother company of 21 branches, of which 3 are dedicated to manufacturing, with the balance mainly involved in sales activities; all operations are co-ordinated by Pneumax headquarters.

The role of the 3 manufacturing units is to provide special products or services.

This is the case with Supermeccanica who specialize in a variety of machining processes.

Titan Engineering distribute fittings, plastic tubing and accessories.

Their experience is in providing quality performance at competitive prices, which allows the mother company to co-ordinate these skills into continuous market development.



# sales network

PNEUMAX GREEN LINE: technology & innovation



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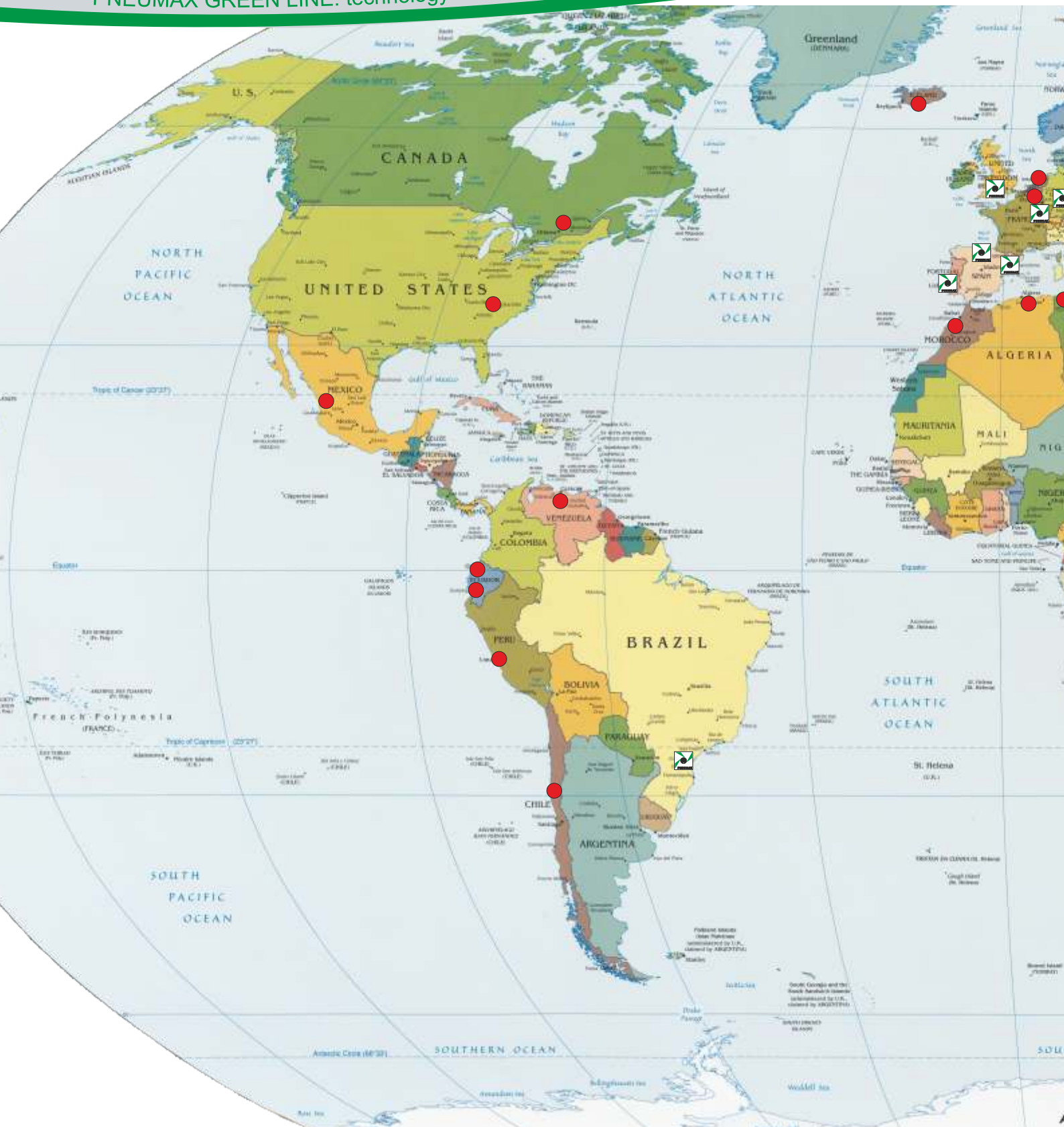
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# sales network

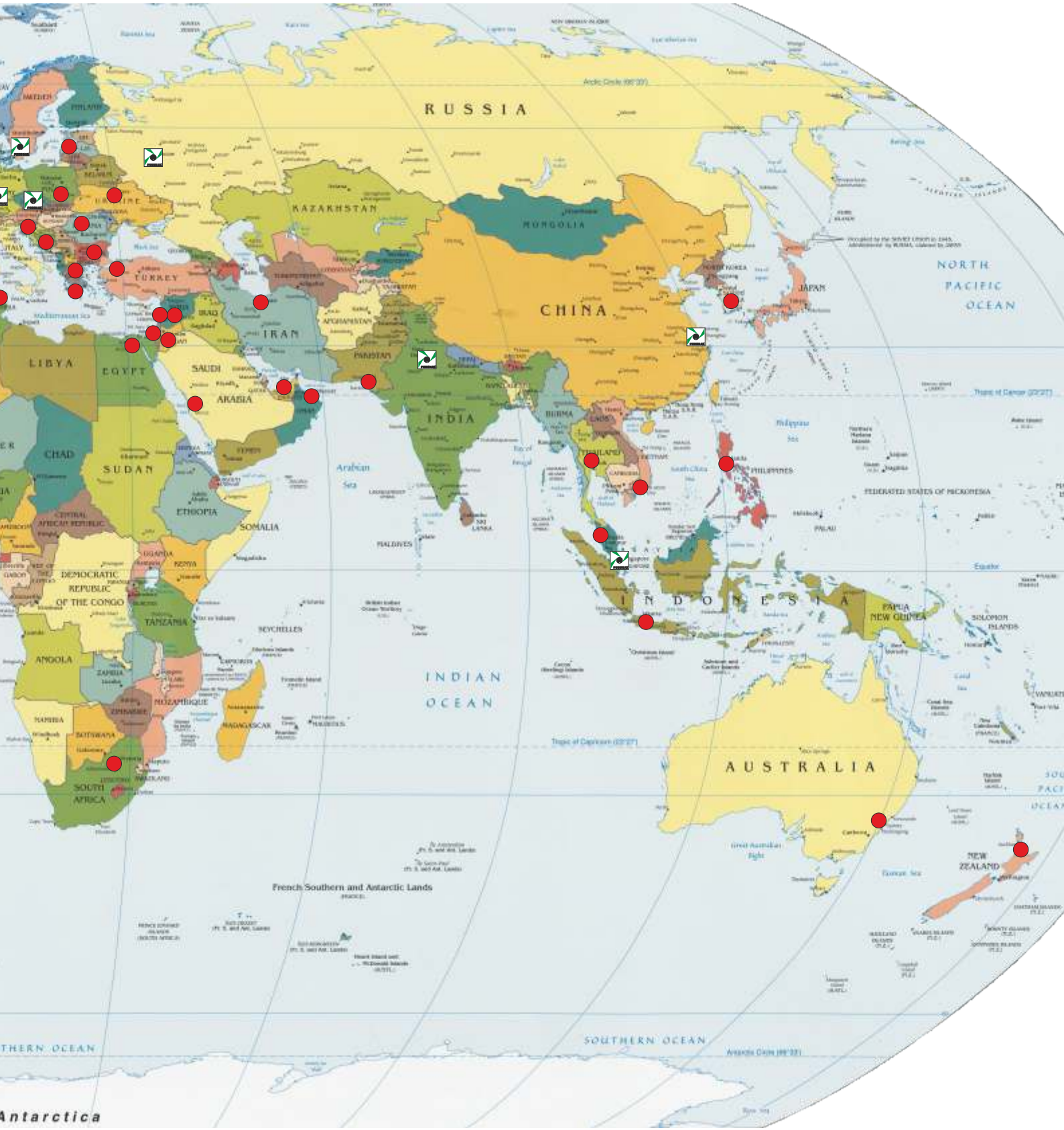
PNEUMAX GREEN LINE: technology & innovation



PNEUMAX S.p.A. has a direct presence in the most important markets and the Pneumax Holding group now controls 21 companies (18 trading, 3 manufacturing) with more than 550 employees .



# World



# sales network

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World


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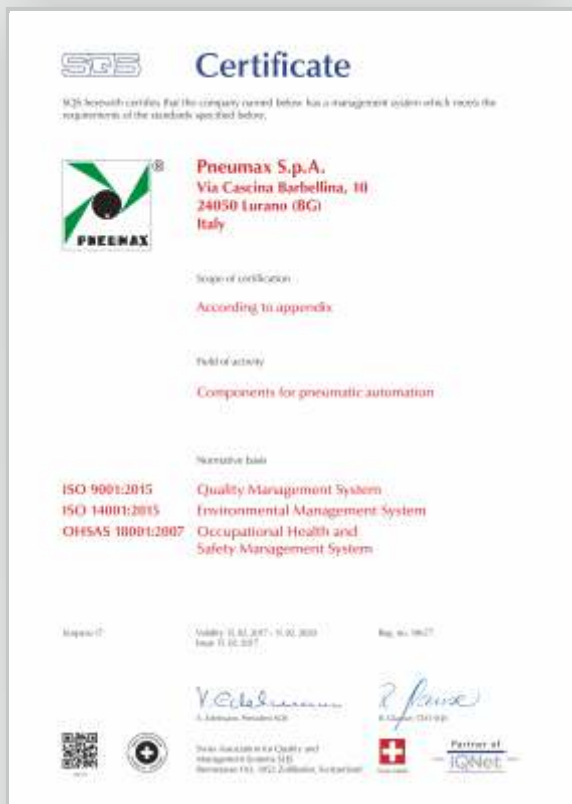
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# certifications

PNEUMAX S.p.A. is pursuing total quality in full respect of  
 ambience and security conditions in work ambience, for this we  
 work in full respect of ISO9001 : 2008, ISO 14001 :  
 2004 and OHSAS : 18001 : 2007





# General index

PNEUMAX GREEN LINE: technology & innovation

## General technical information

Pneumatic principles  
Standards  
Measures, conversion tables  
Pneumatic symbols  
Materials  
Air treatment units  
Valves  
Cylinders  
Sizing: how to choose the correct cylinder and valve  
Electrotechnics and electronics

## Mechanical - manual valves and accessories

## Pneumatic and solenoid valves

## Air service units



Miniature valves 2/2, 3/2, 5/2, 5/3 tube  $\varnothing 4$   
**(Series 104)**

Miniature valves 3/2, 5/2, M5  
**(Series 105)**

Valves 3/2, 5/2, 5/3 - G1/8" - G1"  
**(Series 200 - T200 - T400)**

Valves 3/2 - 5/2 - G1/4" - G1/8"  
**(Series 800)**

### Accessories

Pneumatic circuit devices, M5 - G1"  
**(Series 600)**

Complementary valves  
**(Series 900)**

Blocking valves  
**(Series 50 - T50)**

Function fittings  
**(Series 55)**

Miniaturised pressure regulators  
**(Series 1750-1760)**

Compact fittings for lubrication  
**(Series Mini-RAP)**

Direct operated solenoid valves 2/2, 3/2  
**(Series 300)**

Solenoid valves 3/2, 5/2, 5/3, G1/8" - G1/4" - G1/2" - G1"

**(Series 400 - Series T400)**

Valves and Solenoid valves Poppet system, for compressed air & vacuum 3/2, 5/2, 5/3, G3/8" - G1-1/2"

Pad Valves 2/2 for Air

**(Series 700 - T700 - T771 - N776)**

Distributors and electro distributors 3/2, 5/2, 5/3 - M5 - G1/8", G1/8" - G1/4"

**(Series 800 - 888)**

Distributors and electro distributors ISO 5599/1, 5/2 - 5/3, Size 1, 2 and 3

**(Series 1000 - 1000M12)**

Distributors and electro distributors 5/2, 5/3 Size 10, 18 and 26 mm (LINE, FLAT, VDMA or BASE)

**(Series 2000)**

Electro distributors ISO 15407-2

**(Series 2700)**

Electro distributors 5/2 - 5/3 - 2x3/2 - 2x2/2 Size 12,5

**(Series Enova)**

Solenoid valves 5/2 - 5/3 - 2x3/2 - 2x2/2 Size 12,5 18,8

**(Series OPTYMA)**

FRL Size 1

FRL Size 2

FRL Size 3

FRL Size 4

Air service units series **Steel Line**  
**FRL Size 2 - 3 - 4**

Electronic proportional regulators available also with **CANopen** protocol  
**Size 0 - 1 - 3**

Miniaturized proportional regulators  
**Size 0 - 1 - 3**

Pressure Booster

Pressure Booster series **P+**

Air service units series **AIRPLUS**  
**FRL Size 1 - 2 - 3 - 4**

## Cylinder



Microcylinders accor. to standard ISO 6432  
Special performance microcylinders  
Threaded end covers version  
Rolled end covers version "MIR"  
Rolled end covers version "MIR-INOX"  
Microcylinders "TECNO-MIR"  
Stainless steel AISI 316 microcylinders  
Series Steel line

Cylinders according to standard  
CNOMO - CETOP - ISO  
(tye rods cylinders)  
- series 1303 - 1308  
- series 1315 (Ø250 - Ø320)

Cylinders according to standard ISO 15552  
VDMA 24562 profile tube  
- series 1319 - 1321  
Twin rod cylinder  
- series 1325 - 1326 - 1345 - 1347  
Non rotating cylinder  
- series 1348 - 1350

Rotary actuators  
- series 1330 - 1333  
Profile tube cylinders  
- series 1386 - 1388, 1396 - 1398 ECOPLUS  
Profile tube cylinders  
- series 1390 - 1392 ECOLIGHT  
Stainless steel AISI 316 cylinders  
- Series Steel line

Linear control units, piston rod lock  
Profile tube cylinders  
- series 1370 - 1373 ECOFLAT

Hydraulic speed controll check cylinders

Hydro-Pneumatic cylinders

Short stroke compact cylinders

Compact cylinders "Europe"

Compact cylinders ECOMPACT

Compact cylinders ECOMPACT-S

Rodless cylinders

Cable cylinders

Rodless cylinders Ø16

## Manipulation



Guided compact cylinder  
- series 6100  
- series 6101

Twin rod slide units  
- series 6200

Twin rod slide units  
- series 6210

Pneumatic grippers  
Version grippers, angular:  
- Standard version (series 6301)  
- 180° angular (series 6302)  
- 180° angular gripper rack & pinion style  
(series 6303)  
Version Parallel style  
- Standard version (series 6310)  
- Wide opening (series 6311)  
- 3 Finger parallel style (series 6312)

Rotary actuators  
- Double rack Rotary actuators  
with turn table (series 6400)  
- Single rack Rotary actuators (series 6411)  
- Van type Rotary actuators (series 6420)

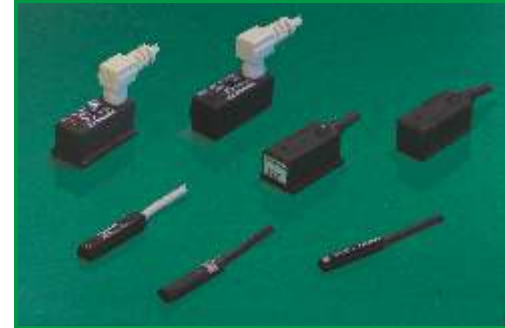
Arbitrary mount cylinders (series 6500)

Slide cylinders (series 6600)

Guide cylinders (series 6700)

Dampers (series 6900)

## Sensors



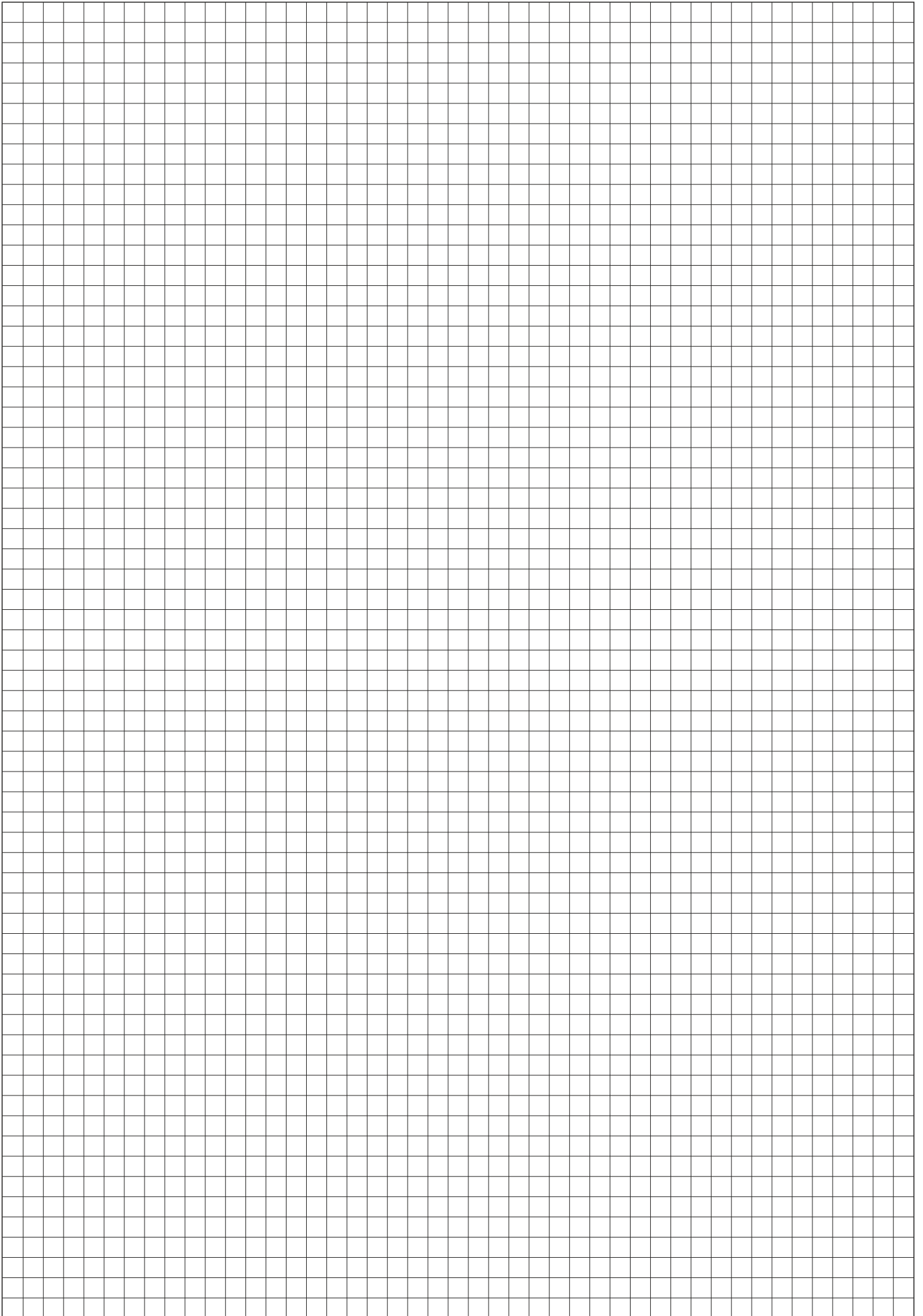
Magnetic sensors REED type with cable

Magnetic sensors REED type for connector

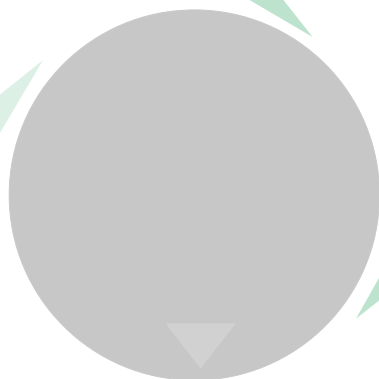
Magnetic sensors Hall effect with cable

Magnetic sensors Hall effect for connector

Miniaturized magnetic sensors  
- rectangular profile  
- oval profile  
- round profile  
- round section 90° cable

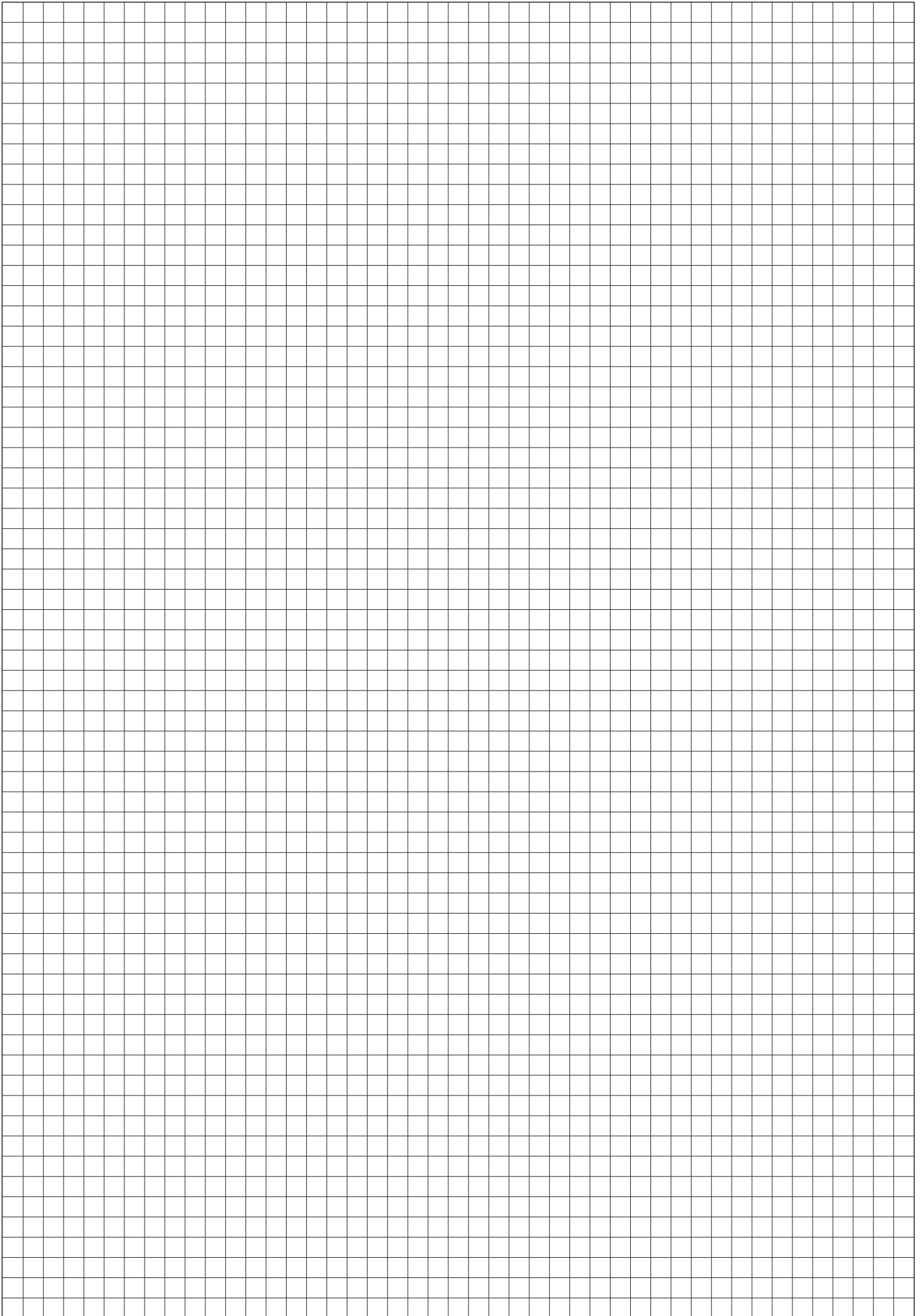






## General technical information

- ✓ 01 - Pneumatic principles
- ✓ 02 - Measures, conversion tables
- ✓ 03 - Pneumatic symbols
- ✓ 04 - Materials
- ✓ 05 - Air treatment units
- ✓ 06 - Valves
- ✓ 07 - Cylinders
- ✓ 08 - Sizing:  
how to choose the correct cylinder and valve
- ✓ 09 - Electrotechnics and electronics





## 01 - Pneumatic basic principles

- Pressure and vacuum
- Boyle - Mariotte law
- Gay - Lussac law
- Flow characteristics
- Coefficient "C" and "b"
- Coefficient Kv
- Nominal flow rate Q.Nn

## PRESSURE

Pressure is defined as the ratio between force and the surface area upon which it acts

$$P = \frac{F}{S}$$

International system measurement unit:  $P = \frac{N \text{ (Newton)}}{m^2} = Pa \text{ (Pascal)}$

As a Pa is a very small unit, it is preferred to use bar: **1bar = 10<sup>5</sup>Pa (100kPa)**

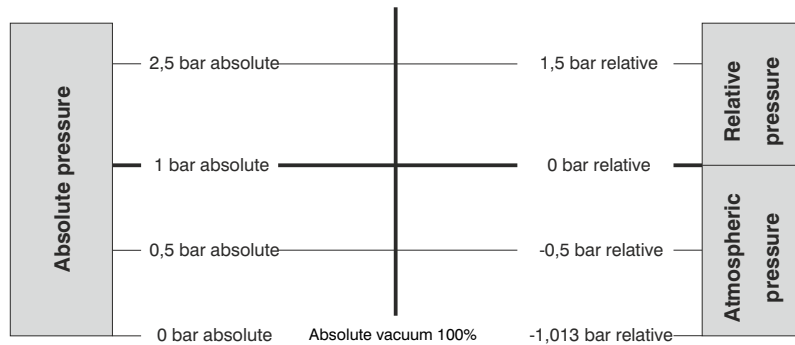
(For pressure conversion tables from bar to other units, see section 3),

**Atmospheric pressure:** is the pressure that the air in the atmosphere applies to the earth's surface.

At 20°C, with 65% humidity, at sea level the atmospheric pressure corresponds to 1,013 bar and varies according to height above sea level. During calculations this value is normally rounded to 1 bar regardless of height.

**Relative pressure:** is the value of pressure measured by instruments in pneumatic circuits.

**Absolute pressure:** is the sum of the atmospheric and relative pressure (normally used to calculate cylinder's air consumption)



## VACUUM:

Is a space with no or very little gas pressure. We talk about vacuum when the pressure is lower than the atmospheric pressure, and about absolute vacuum when absolute and atmospheric pressure are equal to zero.

Measurement unit: indicated as negative pressure calculated in: bar, Pa, Torr, mmHg, % of vacuum.

Application field: - up to 20% of vacuum for ventilation, cooling and cleaning purposes

- between 20% and 99% "Industrial vacuum" for handling, lifting and automation

- above 99% "Process vacuum" for laboratories, microchip production, molecular deposit coating...

## BOYLE - MARIOTTE Law

When an elastic fluid is subject to compression, and kept at a constant temperature, the product of the pressure and volume is constant.

$$P_1 \times V_1 = P_2 \times V_2 = P_3 \times V_3 = \text{etc.}$$

## GAY-LUSSAC Law

- At constant **pressure**

$$V_1 : V_2 = T_1 : T_2$$

the volume of a given quantity of gas

is directly proportional to the **temperature\***.

- at constant **volume**

$$P_1 : P_2 = T_1 : T_2$$

the pressure of a given quantity of gas

is directly proportional to the **temperature\***

(\* absolute temperature in Kelvin: 0°C = 273°K)

Based on the above, it emerges that in order to **fill a cylinder chamber** (at constant temperature) **we require as many liters as the chamber can contain, multiplied by the pressure.**

Should a variation in temperature take place during the filling process, the result obtained (V-P) would not change significantly. For example if we consider a 20 C° difference between the temperature of the air in the line and the temperature of the air in the cylinder; applying the Gay - Lussac law would result:

· Assuming a cylinder chamber volume of 100 l.

$$V_1 : V_2 = T_1 : T_2$$

· Air line temperature 30°C at 6 bar pressure

$$V_2 = \frac{100 \times 283}{303} = 93,4l.$$

· Air temperature in the cylinder chamber 10°C (final)

$$100 : V_2 = 273 + 30 : 273 + 10$$

In the same way the pressure:

$$P_1 : P_2 = T_1 : T_2$$

$$P_2 = \frac{6 \times 283}{303} = 5,6 \text{ bar}$$

$$6 : P_2 = 273 + 30 : 273 + 10$$

As we can see from these results the variation is only 6.6% in both cases.

In order to calculate a cylinder air consumption in liter per minutes please refer to section 8.

## Flow characteristics

Each cylinder requires, in order to generate specific forces and operate at the needed speed, specific air flow through the control valve.

It is therefore necessary to know and understand the laws that regulate the flow through a valve; and therefore the relation between pressure, pressure drop and flow rate. Only by doing so is it possible to determine whether a valve is capable of supplying the required flow rate to a cylinder at a given inlet pressure and with a reasonable pressure drop.

In order to carry out these analyses it is necessary to work with precise functional data; it is not sufficient to know the valve port size.

This data is presented in different ways depending on the different applicable standards and various experimental measurements methods. The figures are mainly coefficients which must be used in specific equations, with which we can estimate the valve flow rate.

In order to understand the meaning of these equations it is necessary to examine the flow inside a pneumatic valve.

For example, let us consider the following conditions: a valve supplied with an absolute pressure  $P_1$  and with a flow regulator connected downstream.

### Starting condition - flow regulator closed

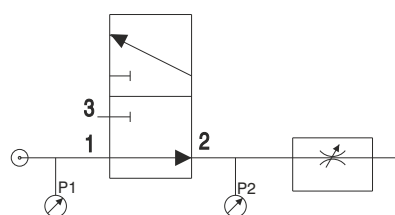
- no flow rate ( $Q=0$ )

- Upstream and downstream pressure are identical ( $P_2=P_1$ )

### Intermediate conditions - opening flow regulator

By progressively opening the flow regulator the pressure  $P_2$  will decrease and the flow rate increase up to a critical point at which the flow rate becomes constant even if the flow regulator is opened further..

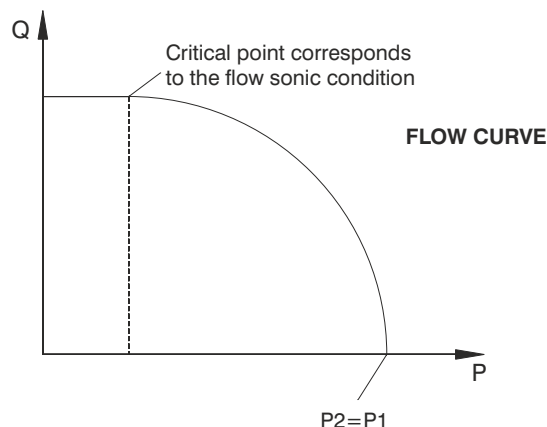
This critical point corresponds to the sonic condition of the flow.



### Final condition - flow regulator completely open

- maximum flow rate (constant from critical point)

- downstream pressure  $P_2=0$



On a varying  $P_1$  the curves maintain the same form and only shift into a higher or lower flow rate area depending on whether  $P_1$  has increased or decreased. The area of interest in pneumatic valve applications is the subsonic zone, just before the critical flow point is reached. This zone is expressed in a number of different ways which average the effective flow pattern enabling simple description of the flow using experimental coefficients.

## VALVE COEFFICIENTS "C" e "B"

CETOP RP50P recommendation (derived from ISO 6358 standard) expresses flow rate in function of two experimental coefficients:

- conductance **C**
- critical pressure ratio **b**.

**Conductance C** =  $Q^*/P_1$  is the ratio between maximum flow rate  $Q^*$  and absolute inlet pressure  $P_1$  under sonic flow condition at a temperature of 20°C.

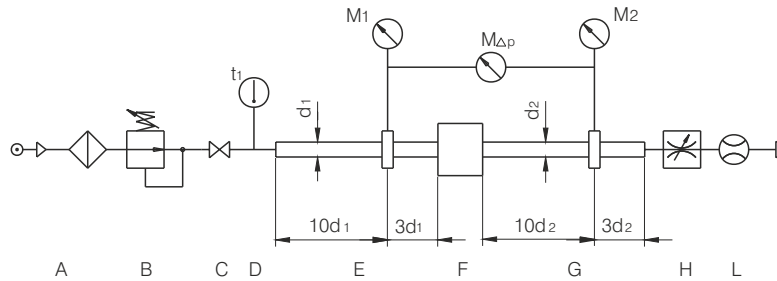
**Critical ratio b** =  $P^*/P_1$  is the ratio between the output absolute pressure  $P_2$  and the inlet absolute pressure  $P_1$  at which the flow becomes sonic.

The expression that represents an elliptic approximation of the relationship between pressure and flow follows:

$$Q_N = C \cdot P_1 \cdot K_t \cdot \sqrt{1 - \left(\frac{r - b}{1 - b}\right)^2} \quad [1]$$

Where:	$Q_N$ (dm <sup>3</sup> /s)	is the flow rate in dm <sup>3</sup> /s at normal condition : 1,013 bar and 20°C;
	$C$ ( $\frac{dm^3}{s \cdot bar}$ )	is the valve conductance
	$P_1$ (bar)	is the inlet absolute pressure;
	$r$	is the ratio between downstream and upstream pressure ( $P_2/P_1$ );
	$b$	is the pressures critical ratio;
	$K_t = \sqrt{293/T_1}$	is a corrective factor that consider the absolute inlet temperature $T_1$ ;
	$T_1 = 273 + t_1$ (°K)	is the absolute temperature ( $t_1$ is the temperature in °C).

The experimental determination of the valve coefficient **C** & **b** is carried out with compressed air following standardised procedures and according to the scheme below.



CETOP test circuit

- A Compressed air generator.
- B Pressure regulator to set upstream pressure  $P_1$ .
- C Shut off valve.
- D Temperature sensor to check upstream temperature  $t_1$ , positioned in a low velocity area.
- E Pipe where the upstream pressure is measured
- F Test valve.
- G Pipe where the downstream pressure is measured .
- H Flow regulator to adjust the downstream pressure  $P_2$ .
- L Flow meter.
- M1,M2 Pressure measuring equipment for upstream and downstream .
- MΔP Pressure drop measuring equipment assuming  $P_1 - P_2 < 1$  bar.

Pipes E & G, used to measure the valve upstream and downstream pressure, must be sized according to the standard's specifications and change in size depending on the valve port sizes; the position of the connection at which the measurements are taken depends on the pipe's inner diameter.

Conductance **C** is determined with the following equation, measuring the critical flow rate  $Q^*$  through the valve, where upstream pressure  $P_1$  is constant and greater than 3 bar.

$$C = \frac{Q^*}{P_1 \cdot K_t} \quad [2]$$

Pressure critical ration **b** can be calculated using the following equation:

$$b = 1 - \frac{\Delta P}{P_1 \left[ 1 - \sqrt{1 - \left( \frac{Q'}{Q^*} \right)^2} \right]} \quad [3]$$

Considering a given constant pressure  $P_1$  it is necessary to proceed measuring the flow rate  $Q'$  corresponding to a pressure drop  $DP = P_1 - P_2 = 1 \text{ bar}$ .

Equation 3 is used to calculate the critical ratio as it is difficult to experimentally identify the exact pressure  $P^*$  at which the flow becomes sonic.

The values of both the conductance  $C$  and the critical ratio  $b$  are experimentally calculated and are the average of the results obtained.

Equation [1] is used to calculate the flow in subsonic conditions  $P_2 > b \cdot P_1$  when values  $C$ ;  $b$  and the valve working conditions ( $P_1, P_2, T_1$ ) are known.

Under sonic conditions,  $P_2 \leq b \cdot P_1$  the equation can be simplified and the maximum flow rate can be calculated as follows:

$$Q^* = C \cdot P_1 \cdot kt \quad [4]$$

## HYDRAULIC COEFFICIENT $K_v$

The hydraulic coefficient allows, using the equation  $Q = K_v \sqrt{\frac{Dp}{\rho}}$  (l/min) [5]

The calculation of the flow rate of a fluid through a valve

Where:  $Q$  is the fluid flow rate in l/min

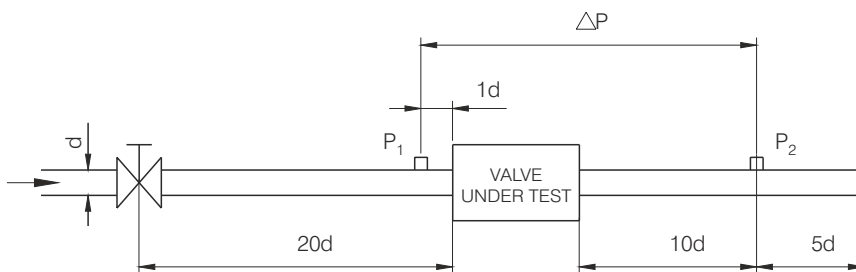
$Dp$  is the pressure drop inside the valve calculated in bar ( $P_1 - P_1$ )

$\rho$  is the fluid density calculated in  $\text{Kg}/\text{dm}^3$

$K_v$  is the hydraulic coefficient calculated in  $\frac{\text{l}}{\text{min}} \left( \frac{\text{kg}}{\text{dm}^3 \cdot \text{bar}} \right)^{1/2}$

Using these measurement units the flow rate coefficient  $K_v$  represents the flow rate (in liters) of water across the valve with a pressure drop of 1 bar.

The measurement are carried out using the standardised circuit below on which the connection ports are positioned according to the pipe inner bore size (norm VDE/VDI 2173).



Hydraulic circuit

In some cases flow rate is measured in  $\text{m}^3/\text{h}$  which correspond a  $K_v$  measured

To obtain  $K_v$  expressed in  $\frac{\text{l}}{\text{min}} \left( \frac{\text{kg}}{\text{dm}^3 \cdot \text{bar}} \right)^{1/2}$  it is sufficient to multiply the  $K_v$  value expressed in  $\frac{\text{m}^3}{\text{h}} \left( \frac{\text{kg}}{\text{dm}^3 \cdot \text{bar}} \right)^{1/2}$

By the coefficient 16,66.

The coefficient  $k_v$  is perfectly suitable to express the flow rate of fluids but only gives approximate values in case of compressed air.

Experiences gained in hydraulic environments can be inferred in the pneumatic field, bearing in mind the difference in density, and assuming that the air flow will generate the same pressure drops and flow reductions as water. It is therefore possible to calculate reliable values for compressed air using flow coefficients  $K_v$  obtained from experiments with water.

To define the flow rate  $Q_n$  through a valve at a given constant absolute inlet pressure  $P_1$ , regardless of fluctuations of the downstream absolute pressure  $P_2$ , refer to the equation below :

$$Q_N = 28,6 \cdot K_v \cdot \sqrt{P_2 \cdot \Delta P} \cdot \sqrt{\frac{T_n}{T_1}} \quad [6]$$

- where:
- $Q_n$  is the flow rate in volume l/min;
  - $K_v$  is the hydraulic coefficient  $\frac{l}{min} \left( \frac{kg}{dm^3 \cdot bar} \right)^{1/2}$
  - $T_n$  is the absolute reference temperature;
  - $T_1$  is the inlet absolute temperature in °K;
  - $P_2$  is the downstream absolute pressure in bar;
  - $DP$  is the pressure drop  $P_1 - P_2$  in bar.

Equation [6] is real up to  $\Delta P = \frac{P_1}{2}$  therefore  $P_2 = \frac{P_1}{2}$

For lower  $P_2$  values the flow rate is considered to be constant, corresponding to the sonic flow rate  $Q^*n$  given by the following equation:

$$Q^*_N = 14,3 \cdot K_v \cdot P_1 \sqrt{\frac{T_n}{T_1}} \quad [7]$$

## THE NOMINAL FLOW RATE $Q_{Nn}$

The nominal flow rate is the flow volume (at normal conditions) that passes through a valve with an upstream pressure  $P_1=6bar$  (7 bar absolute pressure) and a pressure drop of 1 bar, corresponding to a downstream relative pressure  $P_2$  of 5bar (6 bar absolute pressure).

Normally the nominal flow rate is expressed in l/min and can be easily deduced from an experimental flow curve drawn for a upstream pressure of 6 bar (relative).

Nominal flow rate can be useful for a preliminary assesment of the performances of different valves but in reality can be used only if the working conditions are the same as those mentioned before.

In order to be able to compare valve characteristics which are expressed in different coefficients it is possible to use conversion equations.

Given the  $C$  and  $b$  coefficient, it is possible to determine the nominal flow rate using the following equation:

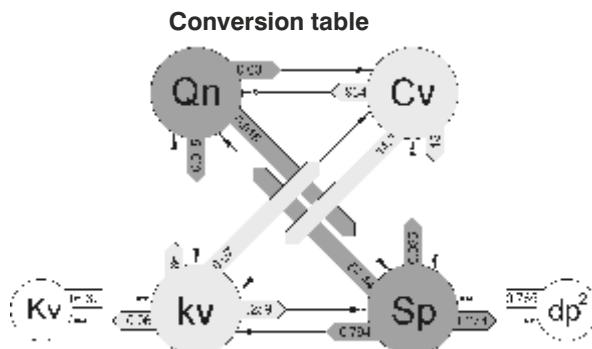
$$Q_{Nn} = 420 \cdot C \sqrt{1 - \left( \frac{0,857 - b}{1 - b} \right)^2} \quad [8]$$

Where :  $Q_{Nn}$  is in l/min and  $C$  in  $\frac{dm^3}{s \cdot bar}$

The correlation between the hydraulic coefficient  $KV$  and the corresponding nominal flow rate is as follows:

$$Q_{Nn} = 66 K_v$$

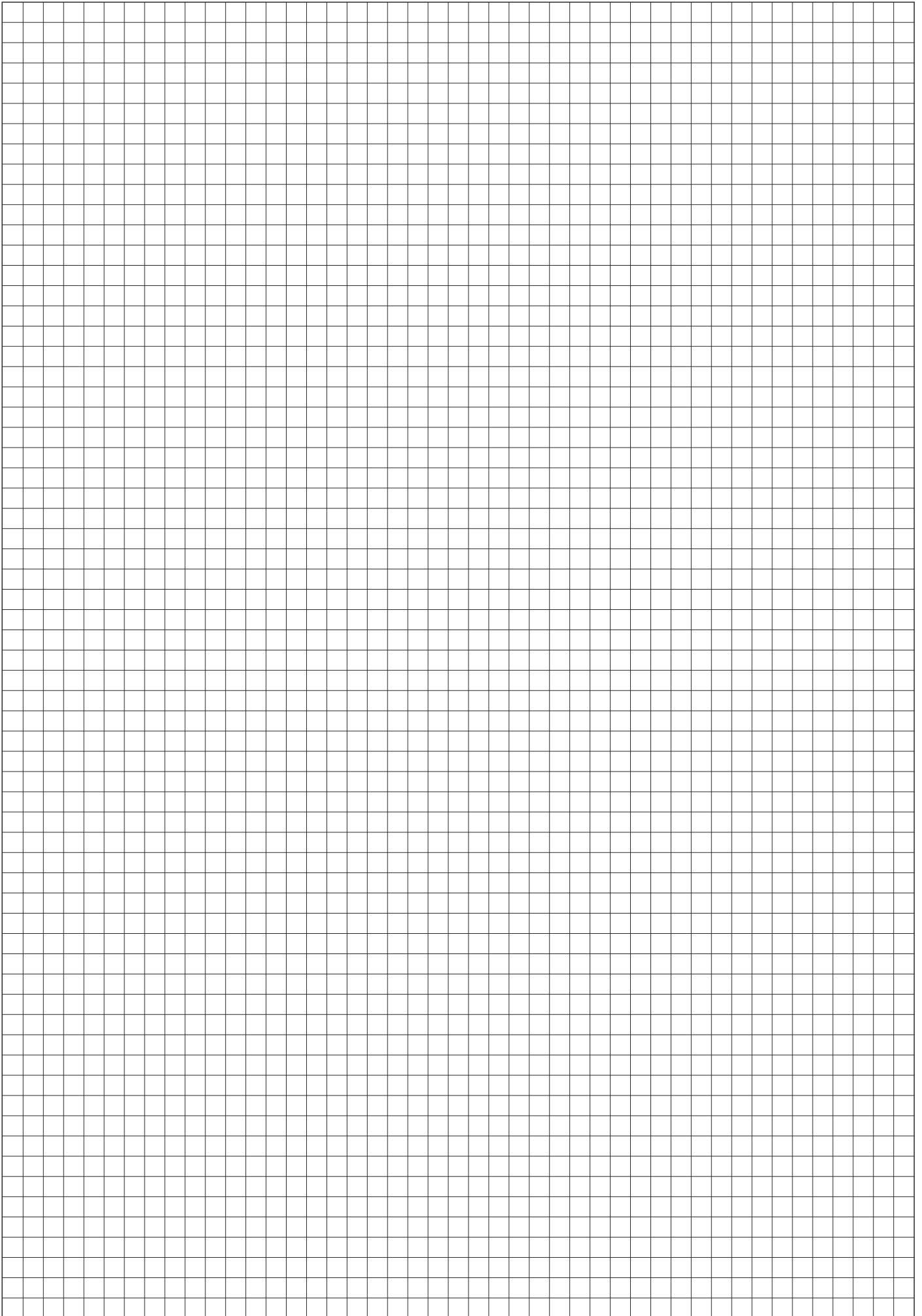
where:  $Q_{Nn}$  is in l/min and  $K_v$  in  $\frac{l}{min} \left( \frac{kg}{dm^3 \cdot bar} \right)^{1/2}$  [9]

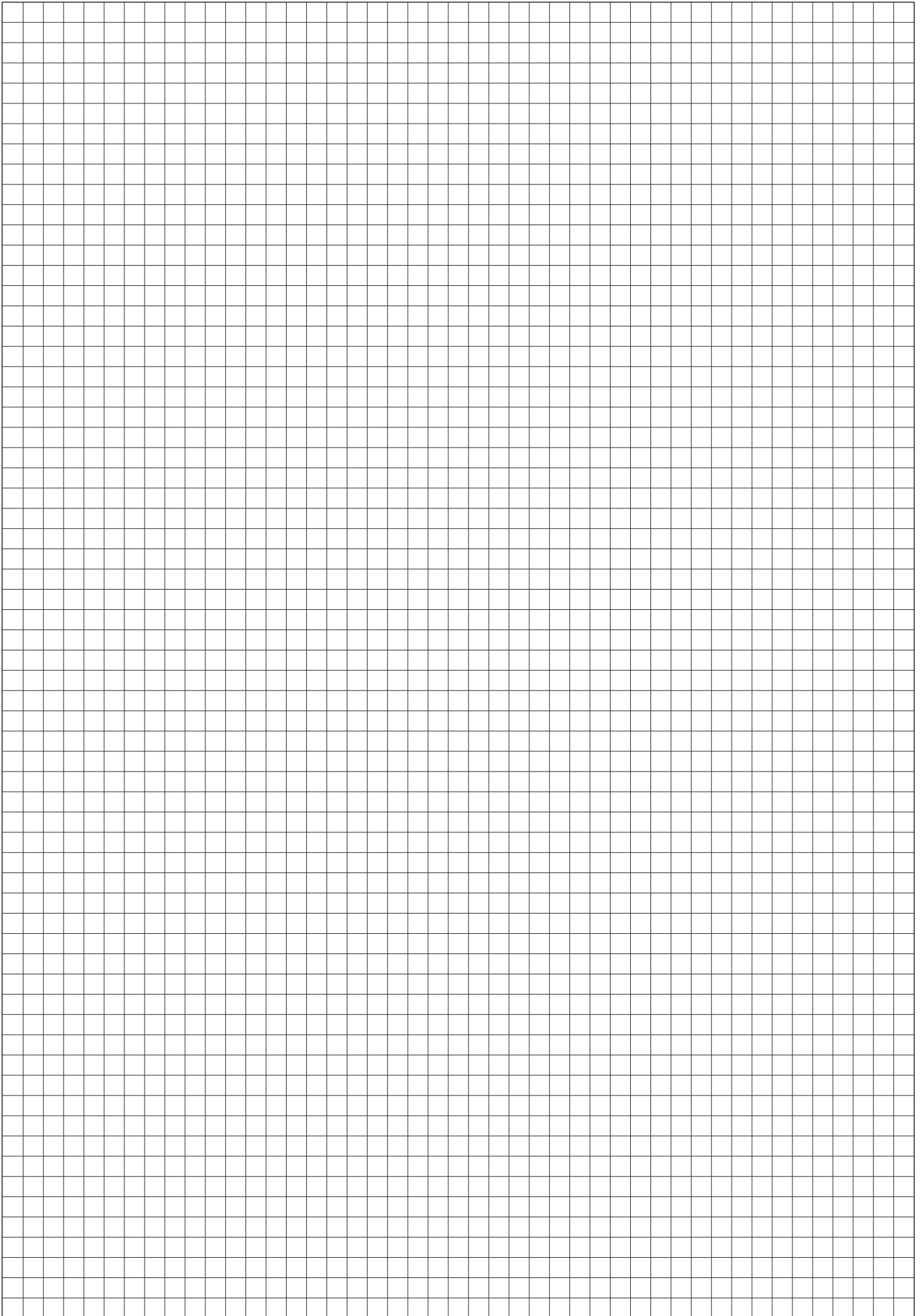


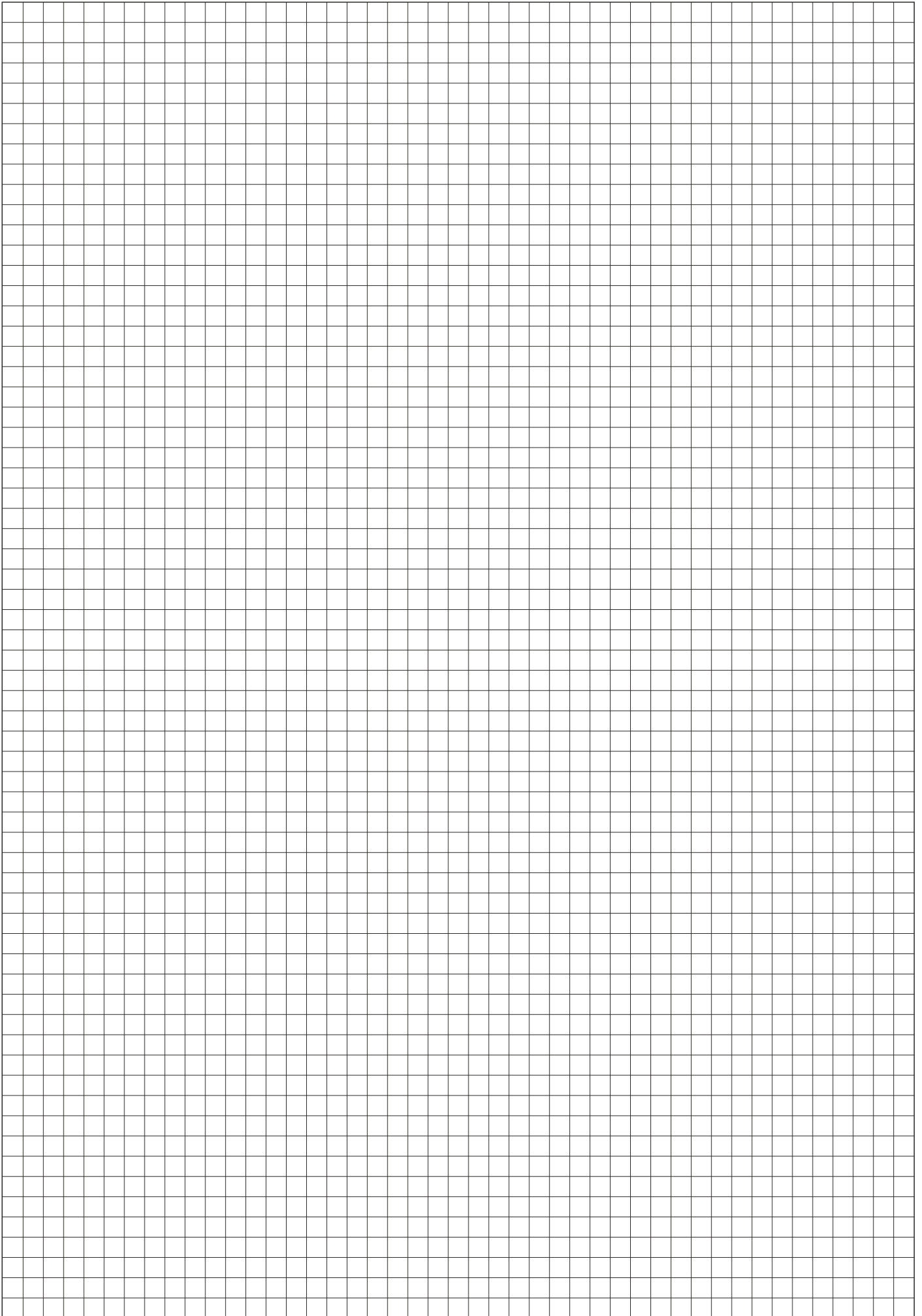
<b>Qn</b>	Nominal flow rate	l/min
<b>kv</b>		l/min
<b>Kv</b>	Hydraulic coefficient	m <sup>3</sup> /hours
<b>Cv</b>		USA gallons/min
<b>Sp</b>	Nominal inner section area	mm <sup>2</sup>
<b>dp<sup>2</sup></b>	Nominal diameter <sup>2</sup>	mm <sup>2</sup>

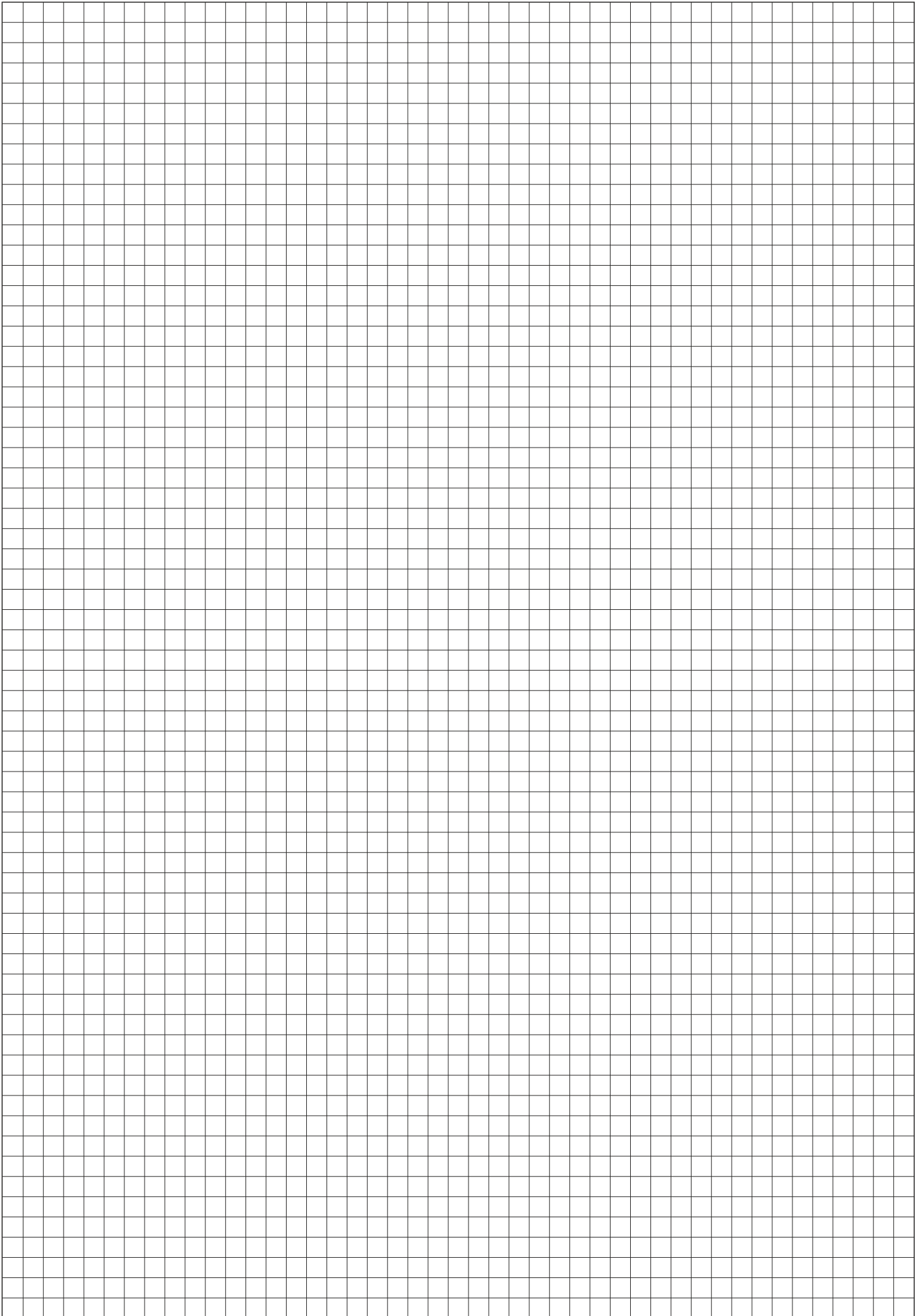
\* to calculate the diameter  $dp$  (mm<sup>2</sup>) square root of  $dp^2$

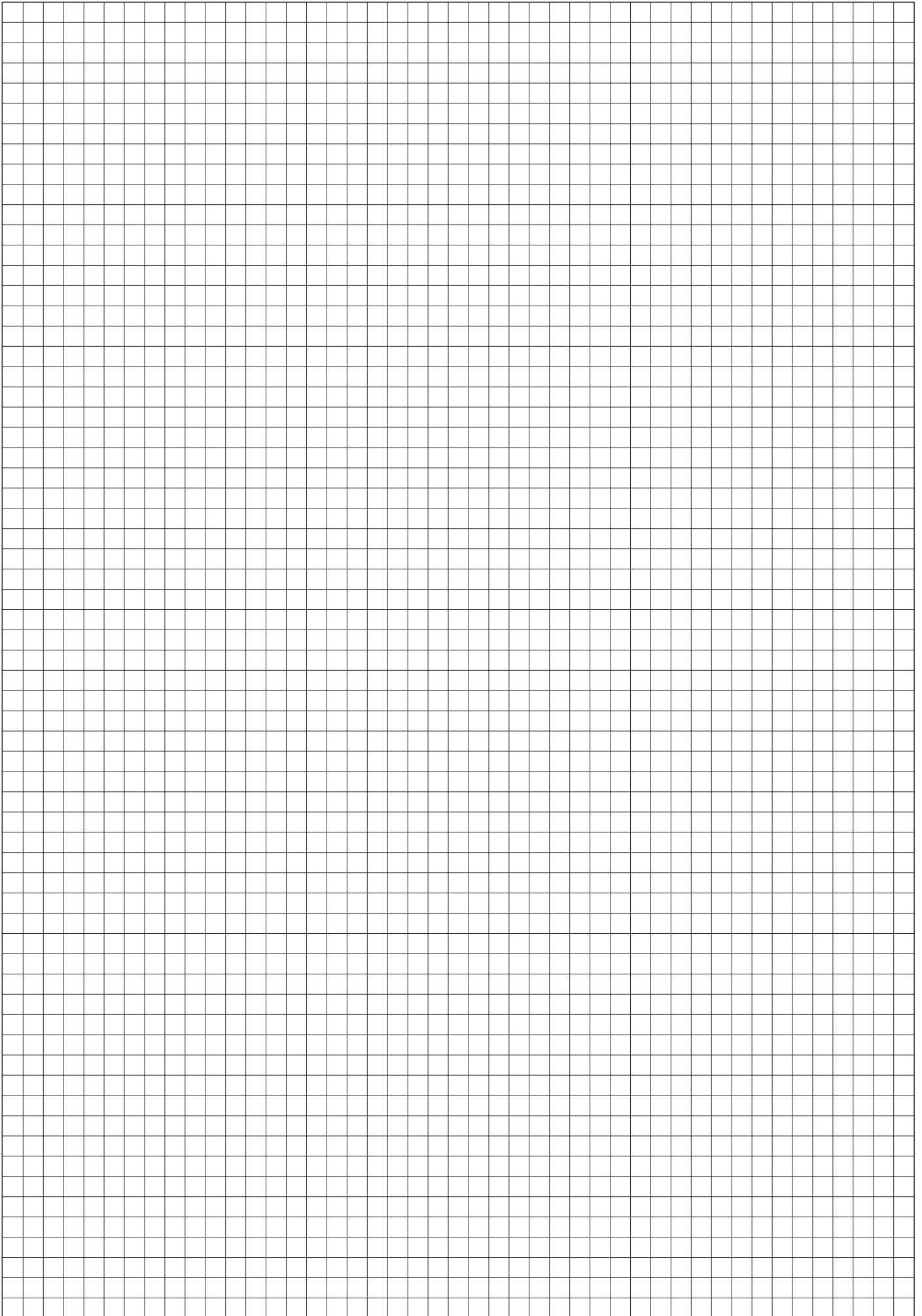


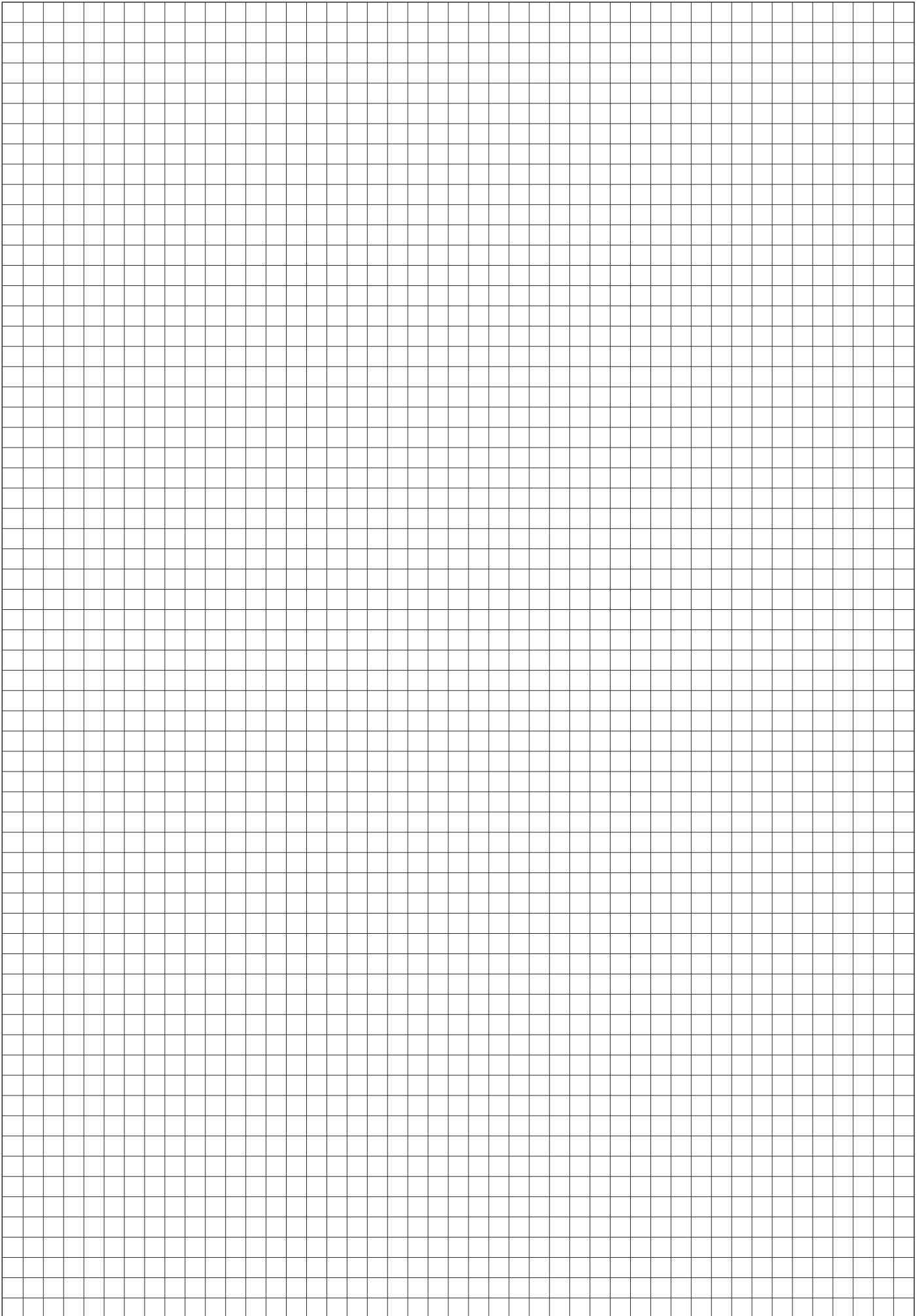














## 02 - measures, conversion tables

- International system of units- tables
- Conversion tables
- Specific weights and melting points tables
- Thread tables
- Weight tables

## INTERNATIONAL SYSTEM OF UNITS - TABLE

Size	Name	Symbol
<b>Lenght</b>	Meter	m
<b>Area</b>	square meter	m <sup>2</sup>
<b>Volume</b>	cubic meter	m <sup>3</sup>
<b>Force</b>	Newton	N
<b>Mass</b>	kilogram	Kg
<b>Pressure</b>	Pascal	Pa (N/m <sup>2</sup> )
<b>Work and Energy</b>	Joule	J (Nm)
<b>Power</b>	Watt	W (J/s)
<b>Time</b>	Second	s
<b>Speed</b>	meter / second	m/s
<b>Acceleration</b>	meter / second <sup>2</sup>	m/s <sup>2</sup>
<b>Flow rate</b>	meter <sup>3</sup> /second	m <sup>3</sup> /s
<b>Temperature</b>	Kelvin	°K
<b>Frequency</b>	Hertz	Hz (1/s)
<b>Electric current</b>	Ampere	A
<b>Voltage</b>	Volt	V (W/A)
<b>Electrical resistance</b>	Ohm	Ω (V/A)
<b>Electric power</b>	Volt Ampere	VA (VA)



# Measures, conversion tables



## MEASURE AND CONVERSION UNITS

<b>Length</b>	centimetre (cm)	meter (m)	inch (ln)	Foot (ft)	yard (yd)
1 meter (m)	100	1	39,37	3,281	1,094
1 inch (ln)	2,54	2,54x10 <sup>-2</sup>	1	8,33x10 <sup>-2</sup>	0,028
1 foot (ft)	30,48	0,3048	12	1	0,333
1 yard (yd)	91,44	0,9144	36	3	1

<b>Area</b>	square centimetre (cm <sup>2</sup> )	square meter (m <sup>2</sup> )	square inch (sq in)	square foot (sq ft)	square yard (sq yd)
1 square centimetre (cm <sup>2</sup> )	1	1x10 <sup>-4</sup>	0,155	1,08x10 <sup>-3</sup>	1,2x10 <sup>-4</sup>
1 square meter (m <sup>2</sup> )	1x10 <sup>4</sup>	1	1.550	10,764	1,2
1 square inch (sq in)	6,452	6,45x10 <sup>-4</sup>	1	6,95x10 <sup>-3</sup>	7,72x10 <sup>-4</sup>
1 square foot (sq ft)	929	9,29x10 <sup>-2</sup>	144	1	0,111
1 square yard (sq yd)	8.361	0,8361	1.296	9	1

<b>Volume</b>	Litre (l = dm <sup>3</sup> )	cubic metre (m <sup>3</sup> )	cubic inch (cu in)	cubic foot (cu ft)	Gallon (gal - USA)	Gallon (gal -GB)
1 liter (l) = 1dm <sup>3</sup>	1	1x10 <sup>-3</sup>	61,02	3,53x10 <sup>-2</sup>	0,2642	0,22
1 cubic meter (m <sup>3</sup> )	1.000	1	6,102x10 <sup>4</sup>	35,31	264,2	220
1 cubic inch (cu in)	1,64x10 <sup>-2</sup>	1,64x10 <sup>-5</sup>	1	5,8x10 <sup>-4</sup>	4,33x10 <sup>-3</sup>	3,6x10 <sup>-3</sup>
1 cubic foot (cu ft)	28,317	2,83x10 <sup>-2</sup>	1.728	1	7,48	6,23
1 Gallon (gal -USA)	3,785	3,79x10 <sup>-3</sup>	231	0,1337	1	0,8327
1 Gallon (gal -GB)	4,546	4,55x10 <sup>-3</sup>	277,4	0,1605	1,2	1

<b>Mass (Weight)</b>	kilogram (Kg)	Pound (lb)	hundred-weight USA	hundred-weight GB
1 kilogram (Kg)	1	2,205	1,102x10 <sup>-3</sup>	9,842x10 <sup>-4</sup>
1 pound (lb)	0,4536	1	5x10 <sup>-4</sup>	4,464x10 <sup>-4</sup>
1 hundred-weight USA	907,2	2.000	1	0,8929
1 hundred-weight GB	1.016	2.240	1,12	1

<b>Force</b>	Newton (N)	Kilopound (kgp)	Poundal (pdl)
1 Newton (N)	1	0,102	7,23
1 Kilopound (kgp)	9,807	1	70,93
1 Poundal (pdl)	0,1383	0,0141	1

<b>Pressure</b>	Pascal (Pa)	Bar (bar)	Poundal/pollice <sup>2</sup> (psi)	Technical atmosphere (at = kg/cm <sup>2</sup> )	Atmosphere (atm)	Column of Mercury (mmHg = Torr)	Column of water (mH <sub>2</sub> O)
1 Pascal (Pa)	1	1x10 <sup>-5</sup>	1,45x10 <sup>-4</sup>	1,02x10 <sup>-5</sup>	9,87x10 <sup>-6</sup>	7,5x10 <sup>-3</sup>	1,02x10 <sup>-4</sup>
1 Bar (bar)	1x10 <sup>5</sup>	1	14,50	1,02	0,9869	750	10,2
1 Poundal/pollice <sup>2</sup> (psi)	6.895	0,069	1	7,03x10 <sup>-2</sup>	0,06805	51,72	0,703
1 Technical atmosphere (at = kg/cm <sup>2</sup> )	9,807x10 <sup>4</sup>	0,9807	14,22	1	0,9678	735,6	10
1 Atmosphere (atm)	1,013x10 <sup>5</sup>	1,013	14,70	1,033	1	760	10,33
1 millimetre of mercury (mmHg = Torr)	133,32	1,34x10 <sup>-3</sup>	1,934x10 <sup>-2</sup>	1,36x10 <sup>-3</sup>	1,316x10 <sup>-3</sup>	1	1,36x10 <sup>-2</sup>
1 metre of water (mH <sub>2</sub> O)	9.810	9,81x10 <sup>-2</sup>	1,423	0,1	9,682x10 <sup>-2</sup>	73,6	1

<b>Work and Energy</b>	Kilocalorie (kcal)	Kilogrammetre (kgm)	Kilowatt (kWh)	Horse power / hr (Hph) - non Metric	Joule (J)
1 Kilocalorie (kcal)	1	427	1,163x10 <sup>-3</sup>	1,561x10 <sup>-3</sup>	4.190
1 Kilogrammetre (kgm)	2,34x10 <sup>-3</sup>	1	2,724x10 <sup>-6</sup>	3,653x10 <sup>-6</sup>	9,806
1 kilowatt-hour (kWh)	860	367.122	1	1,341	3,6x10 <sup>5</sup>
1 Horsepower/hour-non metric (hph)	641	273.761	0,7457	1	2,685x10 <sup>6</sup>
1 Joule (J)	2,39x10 <sup>-4</sup>	0,102	2,78x10 <sup>-7</sup>	3,725x10 <sup>-7</sup>	1

<b>Temperature</b>	Kelvin (K)	Celsius (°C)	Fahrenheit (°F)
Kelvin (K)	/	K-273 = °C	(K-273)x1,8 = °F
Celsius (°C)	°C+273 = K	/	(°Cx1,8)+32 = °F
Fahrenheit (°F)	273+[(°F-32):1,8] = K	(°F-32):1,8 = °C	/

## SPECIFIC GRAVITY AND FUSION TEMPERATURE

### SOLID Substances

Substance	Chemical abbreviation	Specific gravity (Kg/dm <sup>3</sup> )	Fusion temperature (°C)
Unalloyed steel		7,8	1480
Stainless steel		7,8	1450
Tungsten steel		8,7	1450
Aluminium	Al	2,7	660
Nickel silver		8,6	1050
Antimony	Sb	6,67	630
Silver	Ag	10,5	960
Bronze	94 Cu 6 Sn	7,4- 8,9	900
Antiacid Bronze		8,78	990
Cadmium	Cd	8,64	321
Calcium	Ca	1,55	851
Cement		1,65	-
Cobalt		8,9	1490
Corundum		3,9 - 4,0	2050
Chromium	Cr	7,1	1890
Diamond	C	3,51	~ 3500
Iron	Fe	7,86	1539
Cast iron		7,25	1150 - 1250
Rubber		1,1	-
Manganese	Mn	7,3	1260
Magnesium	Mg	1,75	650
White metal		7,5 - 10,1	300 ... 400
Hard metal K10		14,7	> 2000
Hard metal P10		11,1	> 2000
Mica		2,6 - 3,6	~ 1300
Molybdenum	Mo	10,2	2600
Nichel	Ni	8,85	1450
Gold	Au	19,83	1063
Iron oxide		5,1	1565
Brass 63/37		8,5	900 - 1000
Paraffin		0,92	54
Lead	Pb	11,34	327
Synthetic plastic		1,4 - 1,5	-
Platinum		21,45	1775
Copper	Cu	8,93	1085
Emery		4	2200
Tin	Sn	7,28	232
Titanium	Ti	4,6	3380
Tungsten	W	19,3	3370
Vanadium	V	6,1	1800
Zinco	Zn	7,15	420
Die-cast zinc		6,8	390

### LIQUID Substances

Substance	Chemical abbreviation	Specific gravity (Kg/dm <sup>3</sup> )	Fusion temperature (°C)
Distilled water		1	0
Ethanol		0,79	-117
Gasoline		0,68 - 0,75	-30 - -50
Pure benzol		0,88	64
Gas oil		0,88 - 1	-5
Mercury	Hg	13,59	-38,9
Lube oil		0,91	-20
Machine oil		0,91	-5
Petroleum		0,81	-70
Perchloroethylene		1,62	

### GASEOUS Substances

Substance	Chemical abbreviation	Specific gravity (Kg/dm <sup>3</sup> )	Fusion temperature (°C)
Acetylene	C <sub>2</sub> H <sub>2</sub>	0,91	-81
Carbon dioxide	CO <sub>2</sub>	1,53	-57
Air		1	-220
Nitrogen	N <sub>2</sub>	0,97	-210
Illumination gas		0,47	-230
Hydrogen	H <sub>2</sub>	0,07	-257
Neon	Ne	0,69	-249
Carbon monoxide	CO	0,97	-205
Oxygen	O <sub>2</sub>	1,1	-218
Water vapor 100°C		0,62	0

## ISO METRIC THREAD UNI 4535-64

### Coarse ISO metric thread

Thread	Pitch (mm)	Ø Drilling (mm)	Ø Drill point (mm)
M 1,6	0,35	1,321	1,20
M 1,8	0,35	1,521	1,45
M 2	0,40	1,679	1,60
M 2,2	0,45	1,838	1,75
M 2,5	0,45	2,138	2,05
M 3	0,50	2,599	2,5
M 3,5	0,60	3,010	2,9
M 4	0,70	3,422	3,3
M 4,5	0,75	3,878	3,7
M 5	0,80	4,334	4,2
M 6	1	5,153	5
M 7	1	6,153	6
M 8	1,25	6,912	6,8
M 9	1,25	7,912	7,8
M 10	1,5	8,676	8,5
M 11	1,5	9,676	9,5
M 12	1,75	10,441	10,2
M 14	2	12,210	12
M 16	2	14,210	14
M 18	2,5	15,744	15,5
M 20	2,5	17,744	17,5
M 22	2,5	19,744	19,5
M 24	3	21,252	21
M 27	3	24,252	24
M 30	3,5	26,771	26,5
M 33	3,5	29,771	29,5
M 36	4	32,270	32
M 39	4	35,270	35
M 42	4,5	37,799	37,5
M 45	4,5	40,799	40,5
M 48	5	43,297	43
M 52	5	47,297	47
M 56	5,5	50,796	50,5
M 60	5,5	54,796	54,5
M 64	6	58,305	58
M 68	6	62,305	62

### Fine ISO metric thread

Thread	Pitch (mm)	Ø Drilling (mm)	Ø Drill point (mm)
M 3	0,35	2,721	2,65
M 4	0,50	3,599	3,5
M 5	0,50	4,599	4,5
M 6	0,75	5,378	5,2
M 7	0,75	6,378	6,2
M 8	0,75	7,378	7,2
M 8	1	7,153	7
M 9	1	8,153	8
M10	0,75	9,378	9,2
M 10	1	9,153	9
M 10	1,25	8,912	8,8
M 11	1	10,153	10
M 12	1	11,153	11
M 12	1,25	10,912	10,8
M 12	1,5	10,676	10,5
M 14	1	13,153	13
M 14	1,25	12,912	12,8
M 14	1,5	12,676	12,5
M 15	1	14,153	14
M 15	1,5	13,676	13,5
M 16	1	15,153	15
M 16	1,5	14,676	14,5
M 18	1	17,153	17
M 18	1,5	16,676	16,5
M 18	2	16,210	16
M 20	1	19,153	19
M 20	1,5	18,676	18,5
M 20	2	18,210	18
M 22	1	21,153	21
M 22	1,5	20,676	20,5
M 21	2	20,210	20
M 24	1	23,153	23
M 24	1,5	22,676	22,5
M 24	2	22,210	22
M 24	1	24,153	24
M 25	1,5	23,676	23,5
M 26	1,5	24,676	24,5
M 27	1,5	25,676	25,5
M 27	2	25,210	25
M 28	1,5	26,676	26,5
M 30	1,5	28,676	28,5
M 30	2	28,210	28
M 32	1,5	30,676	30,5
M 33	2	31,210	31
M 35	1,5	33,676	33,5
M 36	1,5	34,676	34,5
M 36	2	34,210	34
M 36	3	33,252	33
M 38	1,5	36,676	36,5
M 39	3	36,252	36
M 40	1,5	38,676	38,5
M 42	1,5	40,676	40,5
M 45	1,5	43,676	43,5
M 50	1,5	48,676	48,5

## WHITWORTH THREAD UNI 2709

### «W»

Thread	Ø External (mm)	Ø Drilling (mm)	Ø Drill point (mm)
W 1/16" - 60	1,588	1,18	1,2
W 3/32" - 48	2,381	1,87	1,9
W 1/8" - 40	3,175	2,56	2,6
W 5/32" - 32	3,969	3,21	3,2
W 3/16" - 24	4,762	3,74	3,8
W 7/32" - 24	5,556	4,54	4,6
W 1/4" - 20	6,350	5,13	5,2
W 5/16" - 18	7,938	6,58	6,6
W 3/8" - 16	9,525	8,01	8,0
W 7/16" - 14	11,112	9,37	9,4
W 1/2" - 12	12,700	10,66	10,5
W 9/16" - 12	14,288	12,25	12,0
W 5/8" - 11	15,875	13,66	13,5
W 3/4" - 10	19,050	16,61	16,5
W 7/8" - 9	22,225	19,51	19,5
W 1" - 8	25,400	22,35	22,5
W 1 1/8" - 7	28,575	25,09	25,0
W 1 1/4" - 7	31,750	28,26	28,0
W 1 3/8" - 6	34,925	30,86	31,0
W 1 1/2" - 6	38,100	34,03	34,0
W 1 5/8" - 5	41,275	36,39	36,5
W 1 3/4" - 5	44,450	39,56	39,5
W 1 7/8" - 4,5	47,625	42,20	42,0
W 2" - 4,5	50,800	45,37	45,5
W 2 1/4" - 4	57,150	51,04	51,0
W 2 1/2" - 4	63,500	57,39	57,5
W 2 3/4" - 3,5	69,850	62,87	63,0
W 3" - 3	76,200	69,22	69,5

### «BSF»

Thread	Ø External (mm)	Ø Drilling (mm)	Ø punta (mm)
W 3/16" - 32	4,762	4,00	4,0
W 7/32" - 28	5,556	4,69	4,7
W 1/4" - 26	6,350	5,41	5,4
W 5/16" - 22	7,938	6,83	6,8
W 3/8" - 20	9,525	8,30	8,3
W 7/16" - 18	11,113	9,76	9,8
W 1/2" - 16	12,700	11,17	11,0
W 9/16" - 16	14,288	12,76	12,5
W 5/8" - 14	15,875	14,13	14,0
W 3/4" - 12	19,050	17,01	17,0
W 7/8" - 11	22,225	20,00	20,0
W 1" - 10	25,400	22,96	23,0
W 1 1/8" - 9	28,575	25,86	26,0
W 1 1/4" - 9	31,750	29,04	29,0
W 1 3/8" - 8	34,925	31,87	32,0
W 1 1/2" - 8	38,100	35,05	35,0
W 1 5/8" - 8	41,275	38,22	38,0
W 1 3/4" - 7	44,450	40,96	41,0
W 1 7/8" - 7	47,625	44,14	44,0
W 2" - 7	50,800	47,31	47,5
W 2 1/4" - 6	57,150	53,08	53,0
W 2 1/2" - 6	63,500	59,43	59,5
W 2 3/4" - 6	69,850	65,78	66,0
W 3" - 5	76,200	71,32	71,5

## GAS THREAD

### «G» UNI 338-66

Thread	Ø External (mm)	Ø Drilling (mm)	Ø Drill point (mm)
G 1/8" - 28	9,73	8,68	8,70
G 1/4" - 19	13,16	11,62	11,75
G 3/8" - 19	16,66	15,12	15,25
G 1/2" - 14	20,95	18,86	19,00
G 5/8" - 14	22,91	20,82	21,00
G 3/4" - 14	26,44	24,35	24,50
G 7/8" - 14	30,20	28,11	28,25
G 1" - 11	33,25	30,59	30,50
G 1 1/8" - 11	37,90	35,24	35,50
G 1 1/4" - 11	41,91	39,25	39,50
G 1 3/8" - 11	44,32	41,66	41,50
G 1 1/2" - 11	47,80	45,14	45,00
G 1 5/8" - 11	51,32	48,67	48,50
G 1 3/4" - 11	53,75	51,08	51,00
G 2" - 11	59,61	56,95	57,00
G 2 1/4" - 11	65,71	63,05	63,00
G 2 1/2" - 11	75,18	72,52	72,50
G 2 3/4" - 11	81,53	78,87	79,00
G 3" - 11	87,88	85,22	85,50
G 3 1/4" - 11	93,98	91,32	91,50
G 3 1/2" - 11	100,33	97,67	97,50
G 3 3/4" - 11	106,68	104,02	104,00
G 4" - 11	113,03	110,37	110,50

### «Gc» UNI 339-66

Thread	Ø External (mm)	Ø Drilling (mm)	Ø punta (mm)
Gc 1/8"-28	8,5	4,9	3,1
Gc 1/4"-19	11,5	7,3	4,7
Gc 3/8"-19	15,0	7,7	5,1
Gc 1/2"-14	18,5	10,0	6,4
Gc 3/4"-14	23,5	11,3	7,7
Gc 1"-11	30,0	12,7	8,1
Gc 1 1/4"-11	38,0	15,0	10,4
Gc 1 3/8"-11	41,0	15,0	10,4
Gc 1 1/2"-11	44,5	15,0	10,4
Gc 2"-11	56,0	18,2	13,6
Gc 2 1/2"-11	72,0	21,0	14,0
Gc 3"-11	85,0	24,1	17,1
		<b>max</b>	<b>min</b>

## AMERICAN THREAD

### Standard «NC» and «UNC»

Thread	Ø External (mm)	Ø Drilling (mm)	Ø Drill point (mm)
UNC No. 1-64	1,854	1,425	1,582
UNC No. 2-56	2,184	1,694	1,872
UNC No. 3-48	2,515	1,941	2,136
UNC No. 4-40	2,845	2,156	2,383
UNC No. 5-40	3,175	2,487	2,697
UNC No. 6-32	3,505	2,647	2,909
UNC No. 8-32	4,166	3,307	3,515
UNC No. 10-24	4,826	3,680	3,960
UNC No. 12-24	5,486	4,341	4,575
UNC 1/4"-20	6,350	4,976	5,232
UNC 5/16"-18	7,938	6,411	6,680
UNC 3/8"-16	9,525	7,805	8,087
UNC 7/16"-14	11,112	9,149	9,451
UNC 1/2"-13	12,700	10,584	10,896
UNC 9/16"-12	14,288	11,996	12,319
UNC 5/8"-11	15,875	13,376	13,709
UNC 3/4"-10	19,050	16,299	16,644
UNC 7/8"-9	22,225	19,169	19,530
UNC 1"-8	25,400	21,963	22,339
UNC 1 1/8"-7	28,575	24,648	25,039
UNC 1 1/4"-7	31,750	27,823	28,214
UNC 1 3/8"-6	34,925	30,343	30,800
UNC 1 1/2"-6	38,100	33,518	33,975

### fine «NF» and «UNF»

Thread	Ø External (mm)	Ø Drilling (mm)		Ø Drill point (mm)
		max	min	
UNF No. 0-80	1,524	1,181	1,306	1,3
UNF No. 1-72	1,854	1,473	1,613	1,6
UNF No. 2-64	2,184	1,755	1,913	1,9
UNF No. 3-56	2,515	2,024	2,174	2,1
UNF No. 4-48	2,845	2,271	2,438	2,35
UNF No. 5-44	3,175	2,550	2,713	2,65
UNF No. 6-40	3,505	2,817	2,995	2,9
UNF No. 8-36	4,166	3,401	3,561	3,5
UNF No. 10-32	4,826	3,967	4,125	4
UNF No. 12-28	5,486	4,503	4,466	4,6
UNF 1/4"-28	6,350	5,367	5,519	5,4
UNF 5/16"-24	7,938	6,792	6,957	6,7
UNF 3/8"-24	9,525	8,379	8,545	8,4
UNF 7/16"-20	11,112	9,738	9,921	9,8
UNF 1/2"-20	12,700	11,326	11,509	11,4
UNF 9/16"-18	14,288	12,761	12,954	12,8
UNF 5/8"-18	15,875	14,348	14,542	14,4
UNF 3/4"-16	19,050	17,330	17,534	17,4
UNF 7/8"-14	22,225	20,261	20,477	20,3
UNF 1"-12	25,400	23,109	23,338	23,2
UNF 1 1/8"-12	28,570	26,284	26,513	26,4
UNF 1 1/4"-12	31,750	29,459	29,688	29,6
UNF 1 3/8"-12	34,920	32,634	32,863	32,7
UNF 1 1/2"-12	38,100	35,809	36,038	35,9
		<b>max</b>	<b>min</b>	

### «NPS» Pipe thread

Thread	Ø External (mm)	Ø Drilling (mm)	Ø Drill point (mm)
NPS 1/8"-27	10,27	8,92	8,9
NPS 1/4"-18	13,57	11,54	11,5
NPS 3/8"-18	17,05	15,03	15,0
NPS 1/2"-14	21,22	18,61	18,5
NPS 3/4"-14	26,56	23,95	24,0
NPS 1"-11½	33,22	30,05	30,0
NPS 1¼"-11½	41,98	38,80	39,0
NPS 1½"-11½	48,05	44,87	45,0
NPS 2"-11½	60,09	56,91	57,0
NPS 2½"-8	72,70	68,13	68,0
NPS 3"-8	88,60	84,04	84,0

### «NPT» Taper thread

Thread	Ø Drilling (mm)
NPS 1/8"-27	8,5
NPS 1/4"-18	11,0
NPS 3/8"-18	14,5
NPS 1/2"-14	18,0
NPS 3/4"-14	23,0
NPS 1"-11½	29,0
NPS 1¼"-11½	38,0
NPS 1½"-11½	44,0
NPS 2"-11½	56,0
NPS 2 1/2"-8	67,0
NPS 3"-8	83,0

## WEIGHT in Kg per meter

STEEL (specific gravity 7,85 Kg/dm<sup>3</sup>)

Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■
2	0.024	0.027	0.031	22	2.98	3.29	3.80	46	12.93	14.40	16.60	100	61.62	67.98	78.50
2,5	0.038	0.042	0.049	23	3.26	3.57	4.12	48	14.20	15.67	18.09	110	74.60	82.26	94.99
3	0.055	0.061	0.070	24	3.55	3.92	4.52	50	15.40	17.00	19.60	120	88.80	97.90	113
3,5	0.075	0.083	0.096	25	3.85	4.21	4.91	52	16.70	18.51	21.22	130	104	114.9	132.7
4	0.098	0.109	0.126	26	4.17	4.60	5.26	53	17.30	19.10	22.05	140	121	133.3	153.9
4,5	0.125	0.138	0.159	27	4.49	4.96	5.72	54	17.96	19.81	22.89	150	139	153	176.6
5	0.154	0.170	0.196	28	4.83	5.29	6.10	55	18.70	20.60	23.70	160	158	174	201
6	0.222	0.245	0.283	29	5.14	5.67	6.54	56	19.30	21.31	24.62	170	178	196.5	226.9
7	0.302	0.333	0.385	30	5.55	6.12	7.06	58	20.70	22.87	26.41	180	200	220.3	254.3
8	0.395	0.435	0.502	31	5.87	6.46	7.54	60	22.20	24.47	28.30	190	223	245.4	283.4
9	0.499	0.551	0.636	32	6.31	6.96	8.04	62	23.69	26.13	30.17	200	247	271.9	314
10	0.617	0.680	0.785	33	6.71	7.32	8.55	64	25.24	27.84	32.15	210	272	299.8	346.2
11	0.746	0.823	0.950	34	7.06	7.86	9.07	65	26.00	28.72	33.20	220	298	329	379.9
12	0.888	0.979	1.130	35	7.55	8.33	9.62	66	26.84	29.61	34.19	230	326	359.6	415.3
13	1.04	1.140	1.33	36	7.99	8.81	10.20	68	28.50	31.43	36.30	240	355	391.6	452.2
14	1.21	1.33	1.54	37	8.37	9.30	10.75	70	30.20	33.30	38.50	250	385	424.9	490.6
15	1.39	1.52	1.77	38	8.90	9.81	11.34	72	31.84	35.24	40.69	260	417	459.6	430.7
16	1.58	1.73	2.01	39	9.38	10.34	11.94	74	33.74	37.23	42.98	270	449	495.6	572.3
17	1.78	1.96	2.27	40	9.86	10.88	12.60	75	34.70	38.20	44.20	280	483	533	615.4
18	2.00	2.18	2.54	41	10.28	11.40	13.20	76	35.60	39.26	45.34	300	554.8	611.8	706.5
19	2.23	2.45	2.83	42	10.91	12.00	13.85	78	37.50	41.36	47.75				
20	2.47	2.70	3.14	44	11.83	13.16	15.20	80	39.50	43.50	50.20				
21	2.72	3.00	3.44	45	12.50	13.77	15.90	90	49.90	55.07	63.58				

## ALUMINIUM (specific gravity 2,7 Kg/dm<sup>3</sup>)

Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■
2	0.008	0.009	0.011	22	1.026	1.131	1.307	46	4.487	4.947	5.715	100	21.206	23.384	27.000
2,5	0.013	0.014	0.016	23	1.122	1.237	1.429	48	4.886	5.387	6.224	110	25.659	28.294	32.670
3	0.019	0.021	0.024	24	1.223	1.347	1.555	50	5.302	5.845	6.570	120	30.536	33.672	38.900
3,5	0.025	0.028	0.031	25	1.326	1.462	1.689	52	5.734	6.322	7.304	130	35.810	39.488	45.617
4	0.034	0.037	0.043	26	1.434	1.581	1.826	53	5.957	6.568	7.588	140	41.564	45.833	52.947
4,5	0.043	0.047	0.054	27	1.546	1.704	1.968	54	6.184	6.819	7.877	150	47.712	52.612	60.800
5	0.053	0.058	0.068	28	1.663	1.833	2.118	55	6.415	7.069	8.168	160	54.300	59.877	69.171
6	0.077	0.084	0.097	29	1.783	1.966	2.271	56	6.650	7.333	8.471	170	61.300	67.596	78.089
7	0.104	0.115	0.132	30	1.909	2.104	2.430	58	7.134	7.866	9.087	180	68.700	75.756	87.480
8	0.136	0.150	0.173	31	2.038	2.247	2.596	60	7.634	8.420	9.720	190	76.600	84.468	97.579
9	0.172	0.189	0.219	32	2.171	2.394	2.765	62	8.152	8.989	10.384	200	84.800	93.510	108.000
10	0.212	0.234	0.270	33	2.309	2.546	2.941	64	8.686	9.578	11.064	210	93.500	103.104	119.108
11	0.257	0.283	0.327	34	2.451	2.702	3.122	65	8.960	9.880	11.414	220	102.600	113.138	130.700
12	0.306	0.337	0.389	35	2.598	2.864	3.308	66	9.237	10.185	11.766	230	112.200	123.724	142.929
13	0.358	0.395	0.456	36	2.748	3.029	3.500	68	9.806	10.813	12.491	240	122.150	134.696	155.605
14	0.416	0.458	0.529	37	2.903	3.201	3.698	70	10.391	11.458	13.230	250	132.600	146.220	168.917
15	0.477	0.526	0.608	38	3.062	3.376	3.900	72	10.933	12.056	13.927	260	143.350	158.074	182.611
16	0.543	0.599	0.691	39	3.226	3.557	4.109	74	11.612	12.804	14.792	270	154.600	170.480	196.942
17	0.613	0.675	0.780	40	3.393	3.736	4.320	75	11.928	13.153	15.194	280	166.250	183.326	211.783
18	0.687	0.757	0.865	41	3.565	3.930	4.541	76	12.249	13.507	15.603	300	190.900	210.508	243.184
19	0.766	0.844	0.975	42	3.741	4.125	4.765	78	12.902	14.227	16.435				
20	0.848	0.935	1.080	44	4.105	4.526	5.229	80	13.572	14.966	17.280				
21	0.935	1.031	1.191	45	4.294	4.735	5.468	90	17.177	18.941	21.870				

## BRASS (specific gravity 8,5 Kg/dm<sup>3</sup>)

Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■	Size (mm)	●	⬡	■
2	0.026	0.028	0.034	22	3.231	3.564	4.114	46	14.126	15.585	17.988	100	66.759	73.658	85.011
2,5	0.041	0.045	0.052	23	3.532	3.897	4.497	48	15.385	16.974	19.591	110	80.829	88.587	102.928
3	0.060	0.066	0.076	24	3.845	4.242	4.896	50	16.690	18.414	21.253	120	96.135	106.070	122.419
3,5	0.081	0.089	0.103	25	4.173	4.604	5.313	52	18.051	19.916	22.986	130	112.820	124.479	143.665
4	0.106	0.116	0.134	26	4.513	4.979	5.746	53	18.752	20.689	23.878	140	130.849	144.371	166.165
4,5	0.135	0.148	0.159	27	4.867	5.369	6.197	54	19.466	21.455	24.788	150	150.203	165.725	191.269
5	0.167	0.184	0.212	28	5.234	5.774	6.665	55	20.196	22.283	25.717	160	170.901	188.562	217.626
6	0.240	0.264	0.305	29	5.614	6.194	7.148	56	20.935	23.098	26.658	170	192.933	212.871	245.682
7	0.327	0.360	0.416	30	6.009	6.629	7.651	58	22.457	24.777	28.596	180	216.299	238.652	275.436
8	0.428	0.472	0.545	31	6.416	7.079	8.170	60	24.033	26.516	30.603	190	241.000	265.906	306.891
9	0.542	0.598	0.690	32	6.835	7.541	8.703	62	25.662	28.314	32.627	200	270.036	294.632	340.045
10	0.667	0.735	0.849	33	7.270	8.021	9.257	64	27.344	30.169	34.820	210	294.406	324.831	374.899
11	0.809	0.892	1.030	34	7.717	8.514	9.826	65	28.205	31.119	35.916	220	323.110	356.501	411.450
12	0.963	1.062	1.226	35	8.178	9.023	10.413	66	29.080	32.085	37.030	230	353.464	389.992	450.103
13	1.128	1.244	1.436	36	8.652	9.546	11.017	68	30.869	34.059	39.308	240	384.561	424.270	489.664
14	1.308	1.443	1.665	37	9.139	10.083	11.637	70	32.716	36.097	41.660	250	417.239	460.358	531.315
15	1.502	1.657	1.912	38	9.639	10.635	12.274	72	34.607	38.183	44.068	260	451.290	497.928	574.676
16	1.709	1.885	2.176	39	10.154	11.203	12.930	74	36.556	40.333	46.550	270	486.676	536.971	619.737
17	1.929	2.128	2.456	40	10.684	11.788	13.605	75	37.553	41.433	47.820	280	523.387	577.476	665.992
18	2.163	2.386	2.754	41	11.222	12.381	14.290	76	38.560	42.544	49.102	300	600.831	662.923	765.103
19	2.410	2.659	3.068	42	11.776	12.992	14.995	78	40.616	44.813	51.708				
20	2.670	2.946	3.400	44	12.924	14.259	16.457	80	42.725	47.140	54.406				
21	2.944	3.248	3.748	45	13.518	14.915	17.213	90	54.074	59.662	68.858				



## 03 - Pneumatic symbols

- FRL
- Valves and Solenoid valves,
- Auxiliary valves,
- Connectors and pipe
- Cylinders

## AIR SERVICE UNITS

Air treatment mechanisms		Other mechanisms	
Pneumatic accumulator (capacity)		Pressure gauge	
Automatic drain air		Shut-off valve	
Automatic drain air			
Lubricator		Progressive start-up valve With Electric control	
Air filter			
Filter - with manual drain			
Filter - with automatic drain			
Pressure control valves		Progressive start-up valve With Pneumatic control	
Pressure switch			
Free discharge pressure relief valve			
Free discharge pilot-operated pressure relief valve			
Sequence valve			
Pressure regulator			
Pressure regulator without exhaust valve			
Pilot-operated pressure regulator without exhaust valve			
Pressure regulator without exhaust valve (free)			
Differential pressure regulator			
Assembled units			
Filter pressure regulator			
Filter pres. reg. + lubricator Filter + pres. reg. + lubricator			



## VALVES AND SOLENOID VALVES

### - Terms and descriptions -

The connections to the inlet and outlets of the valves can be of two types:

**- main connections:**

- supply connection identified with number 1
- consumption connection identified with number 2 and 4
- exhaust connection identified with number 3 and 5

**- Pilot connections:**

- repositioning connection on 2/2 & 3/2 ways valves identified with number 10
- switching connection on 2/2 & 3/2 ways valves and repositioning connection on 5/2 & 5/3 ways valves identified with number 12
- switching connection on 5/2 & 5/3 ways valve identified with number 14

**Switching** : is the process that changes the state of a valve from rest position to actuated position and is achieved by means of a mechanical, pneumatic or electric signal

**Repositioning**: is the process that changes the valve state from actuated back to rest position and is achieved by means of an external mechanical (spring), pneumatic (differential) or electric signal

**Ways**: indicated the number of connections on the valve body and on the pneumatic diagram

**Positions**: indicates the number of positions achieved by the valve and corresponds to the number of squares on the pneumatic simple.

**Function**: indicates the valve working diagram at rest condition and corresponds to the right square in the pneumatic scheme.

### Valves symbols

Way	Pos.	Function	Symbol
2	2	Normally closed	
2	2	Normally open	
3	2	Normally closed	
3	2	Normally open	
5	2	Separated exhaust connections	
5	3	Closed centres	
5	3	Open centres	
5	3	Pressured centres	

### Switching and Repositioning

Mechanical		Pneumatics	
Plunger		Pneumatic	
Sensitive plunger		Pneumatic - return to center	
Roller		Pneumatic - depressurised	
Unidirectional roller		Differential (pneumatic spring)	
Sensitive roller		Differential external pilot	
Pedal		Sensitive differential	
Pedal - spring return		<b>Electrical</b>	
Push Button		Solenoid	
Sensitive push button		Bistable solenoid	
Push button - two positions-		Solenoid (internal pilot)	
Lever		Solenoid (external pilot)	
Lever - spring to center		Solenoid - spring to center	
Sensitive lever		Solenoid with suppl. pilot	
Two position mechanical stop			
Three position mechanical stop			
Spring			

### Complementary valves

Throttle valve		Silencer	
Bidirectional flow regulator		Non-return valve without spring	
Unidirectional flow regulator		Non-return valve with spring	
Quick exhaust valve		Non-return valve controlled during closing	
Shuttle valve		Non-return valve controlled during opening	

### Piping and connections

Pressure line		One-way rotating intake	
Control line		Three-way rotating intake	
Exhaust line		Closed air intake	
Flexible line		Air intake with connection	
Electric line		Quick coupling connection without non-return valve	
Piping connections		Quick coupling connection with non-return valve	
Piping intersection		Air exhaust unthreaded connection	
Main air connection		Air exhaust threaded connection	

## CYLINDERS

### Single acting cylinders

with external return	
with spring return	

### Cylinders for piston rod lock

With magnetic piston with adjustable cushioning	
With non magnetic piston with adjustable cushioning	

### Double acting cylinders

Standard rod	
Double rod (push/pull version)	
With non adjustable cushioning	
With adjustable cushioning	
With magnetic piston	
With magnetic piston with adjustable cushioning	

### Rodless cylinders

With magnetic piston With adjustable cushioning	
Cable cylinders with magnetic piston	
Cable cylinders with non magnetic piston	

### Telescopic cylinders

Single acting	
Double acting	

### Tandem cylinders

In tandem, common rod	
In tandem, independant rods	
In tandem, opposite rods	
Opposed, common rod	

### Various cylinders

Rotating cylinders	
Rotating cylinder	
Bellows cylinder	

### Non rotating cylinders

Standard rod / double acting	
Twin rod / double acting	
Twin rod / double acting push/pull rod	
Push/pull twin rod double acting	
Guided compact cylinders	

### Pressure boosters

Air-Air intensifier	
Air-oil intensifier	
Hydropneumatic accumulator	



## 04 - Materials - technical features

- Elastomer and plastic materials table

## ELASTOMER AND PLASTIC MATERIALS

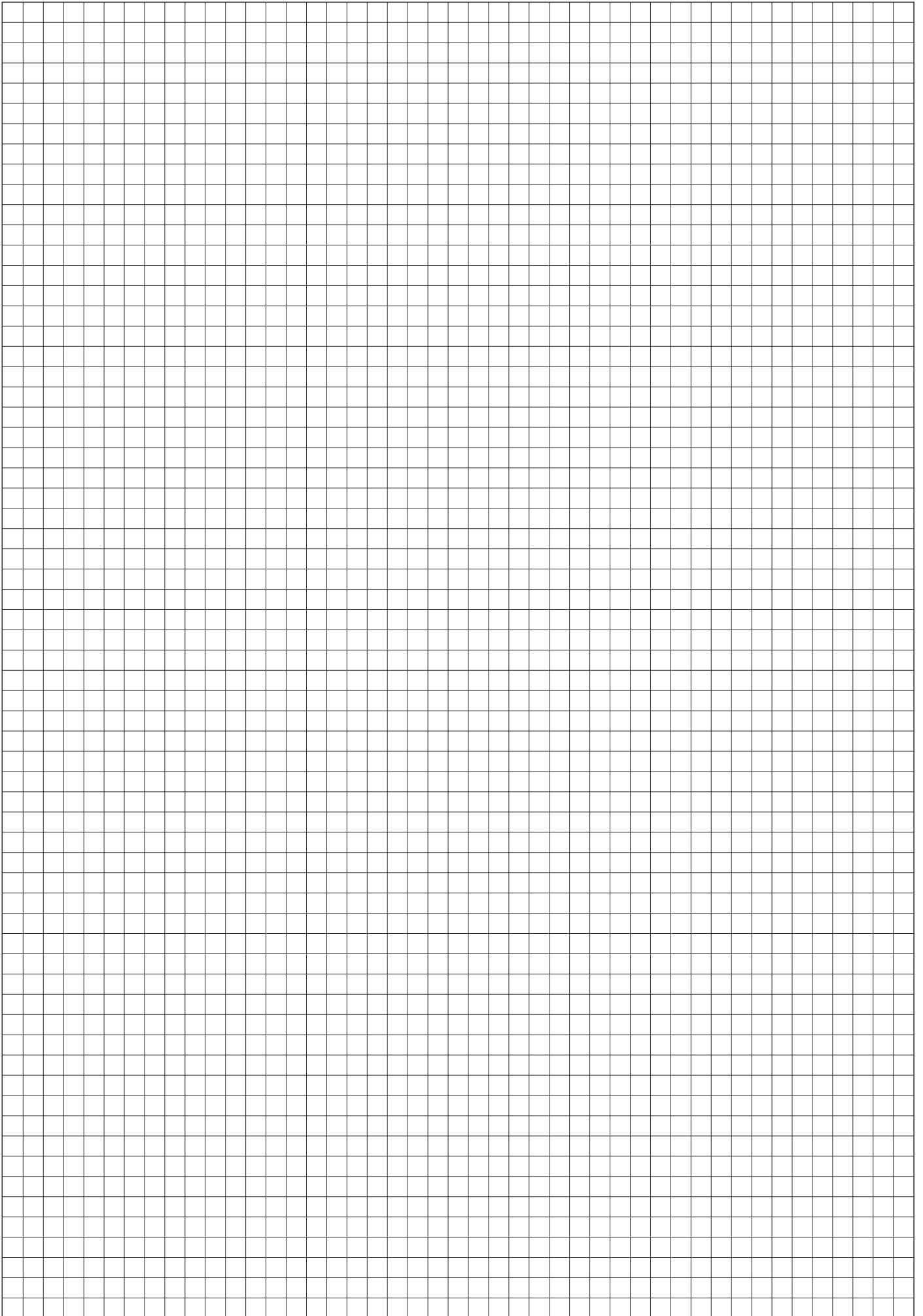
CODE (According to ISO 1629)	Working temperature	Chemical description
<b>ELASTOMERS</b>		
<b>EPDM</b>	-40°C ÷ +100°C	ethylene propylene diene monomer
<b>FFPM - FFKM</b>	-5°C ÷ +200°C	Elastomero perfluorurato
<b>FPM - FKM</b>	-5°C ÷ +150°C	Fluoro rubber
<b>HNBR</b>	-5°C ÷ +120°C	Hydrogenated acrylonitrille butadiene
<b>NBR</b>	-5°C ÷ +70°C	Nitrile rubber
<b>PUR</b>	-30°C ÷ +80°C	Polyurethan
<b>EU</b>	-30°C ÷ +80°C	Injection molding polyurethan
<b>PLASTIC MATERIALS</b>		
<b>PTFE</b>	-150°C ÷ +200°C	Polytetrafluoroethylene
<b>POM</b>	-40°C ÷ +110°C	Acetalic resin
<b>PA</b>	-40°C ÷ +120°C	Polyamide (Nylon)
<b>PC</b>	-100°C ÷ +130°C	Polycarbonate
<b>PBT</b>	-40°C ÷ +130°C	Polybutylene terephthalate



## 05 - FRL units

05

- General information
- FRL units
- Flow rate curves





Once air is compressed it is necessary to process it in order to improve its quality. The air quality is measured in classes according to ISO 8573-1 standard, where the three types of contaminants that could effect pneumatic equipment life:

- quantity of water particles dissolved in the air
- quantity of oil particles dissolved in the air
- quantity of solid particles in the air

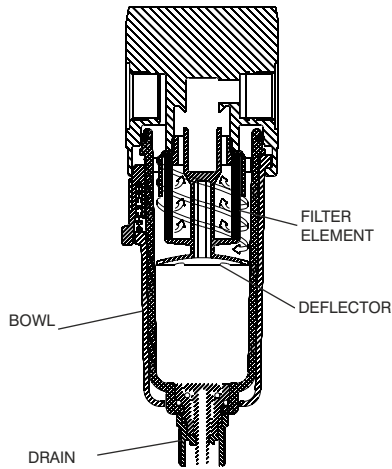
	<b>WATER QUANTITY</b>	<b>OIL QUANTITY</b>
<b>CLASS</b>	Maximum dew point under pressure (C°)	Maximum oil concentration (mg/m <sup>3</sup> )
1	-70	0,01
2	-40	0,1
3	-20	1
4	+3	5
5	+7	>5
6	+10	/
7	/	/

<b>QUANTITY OF SOLID PARTICLES</b>					
<b>Particle size (d) [µm]</b>					
	≤ 0,10	0,10 < d ≤ 0,5	0,5 < d ≤ 1,0	1,0 < d ≤ 5,0	5,0 < d ≤ 50
<b>CLASS</b>	<b>Maximum number of particles for m<sup>3</sup></b>				
1	Not specified	100	1	0	0
2	Not specified	100 000	1 000	10	1
3	Not specified	Not specified	10 000	500	10
4	Not specified	Not specified	Not specified	1 000	100
5	Not specified	Not specified	Not specified	20 000	1 000
6	Not specified	Not specified	Not specified	Not specified	20 000

The correct functioning of a pneumatic plant is also maintained through the use of FRL units, comprising a filter, a pressure regulator and a lubricator positioned before the pneumatic equipment.

## FILTER

This component is used to eliminate vapour particles, dust, solid particles, corrosive gasses, oil vapours etc from the air.



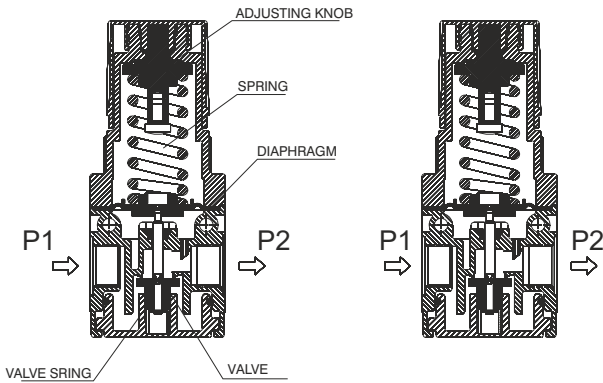
In the bottom of the bowl there is a device which is used to drain the particles which have been extracted from the air. This device can be automatic or manually operated, in case of the manual version it is important to ensure that the condensate level does not reach the deflector as it would be sucked back into the air line.

Subsequently the dried air goes through a filter element which blocks further particles; the element is made of a porous material which, depending on the size of the particles it blocks, can be classified as a  $5\mu\text{m}$  -  $20\mu\text{m}$  -  $50\mu\text{m}$  element.

Another type of filter is based on a double filtering action system (**called a two stage system**) and is capable of removing up to 99.7% of the organic and inorganic solid particles from the air and facilitates the agglomeration of liquid particles into drops that subsequently fall to the bottom of the bowl. Such units are called coalescing filters.

## PRESSURE REGULATOR

Enables the regulation, reduction and stabilization of the air pressure in the pneumatic circuit; adapting it to the requirements of the equipment to be supplied.



Compressed air pressure, both in reservoir and pipe lines, is continuously subjected to variation and fluctuation caused by inconsistencies in consumption and by irregular operation of compressors. Therefore, it is always necessary to regulate the air pressure in order to reduce it to the required values and to level it to a more constant supply.

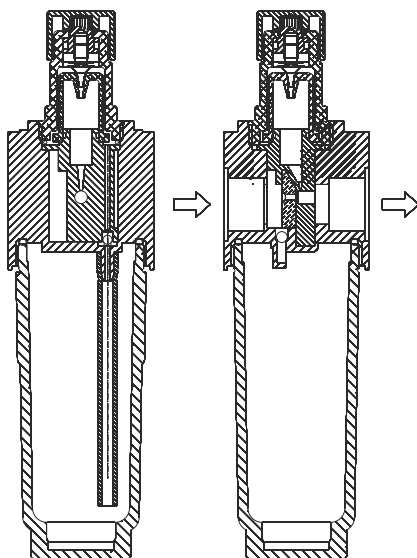
Screwing and unscrewing the adjusting knob generates an increase or reduction of the regulated pressure.

**RELIEVING:** pressure regulators normally incorporate what is called the RELIEVING function, a system that exhausts any over pressure (pressure above the regulated pressure) that might build up (for example under the force generated by an external actuator) in the down stream part

of the circuit. All regulators are fitted with a threaded connection for a pressure gauge to indicate the regulated pressure level. Pneumax Spa's product range also includes a pressure regulator which integrates the gauge directly in the regulating knob, thus reducing envelope size and assembly costs when compared to a traditional regulator & gauge assembly. Furthermore Pneumax has designed a dedicated bayonet coupling system which enables the assembly of a series of regulators (both traditional and with integrated gauge) which can thereby be supplied with a single air supply.

## LUBRICATOR

Under normal working conditions Pneumax equipment does not require additional lubrication. Only in specific conditions, and in cases where the prelubrication applied to the sliding components during production is removed, is it necessary to use additional lubrication.

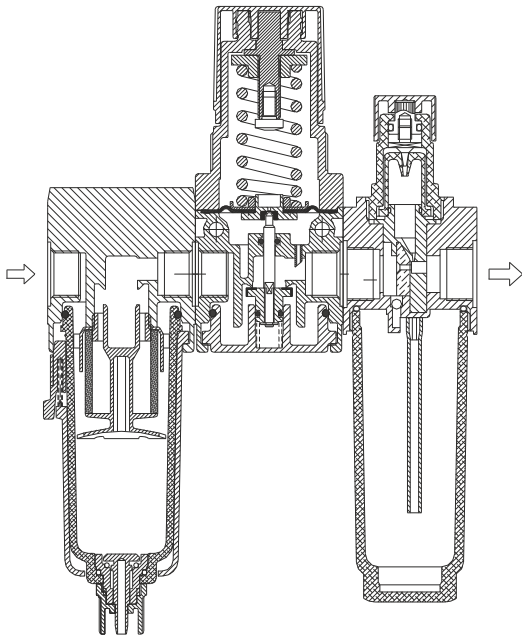


The air that passes through the lubricator automatically draws nebulised oil, via a venturi, which subsequently deposit on the pneumatic equipment internals.

The lubricator is ideally mounted as close as possible to the components which require lubrication in order to prevent oil deposits in the air lines.

## FRL GROUPS

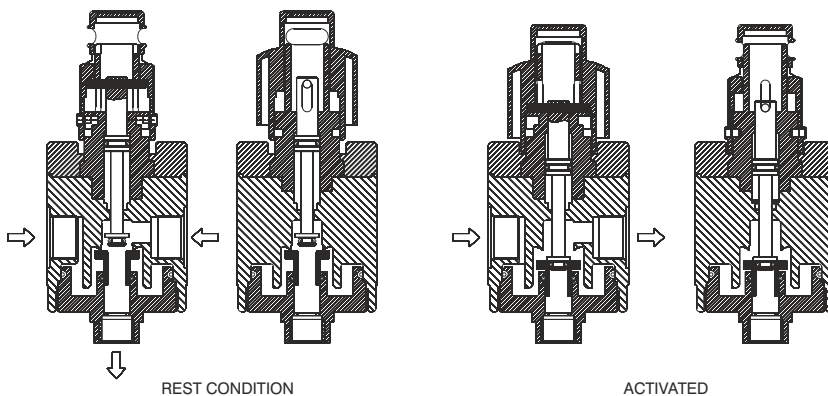
The FRL group includes the three items described earlier assembled in sequence; Filter, regulator, lubricator.



## SHUT OFF VALVE

A 3/2 way N/C poppet valve, normally manually operated, which is used to allow or block air flow into the FRL group (always fitted before an FRL group).

A lockable version, to be used with a pad lock, is available in order to prevent accidental operation.

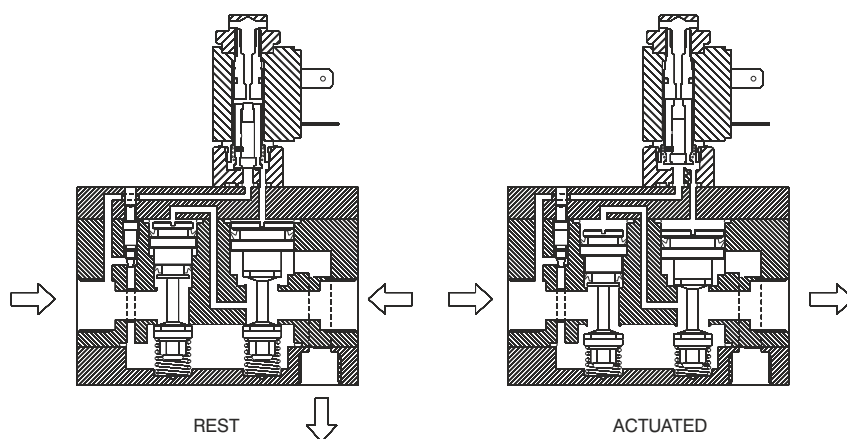


## SOFT START VALVE

When compressed air is supplied to a circuit there is a short period of time during which the pressure level in the different components connected to the circuit is uneven and needs to be stabilised. This difference in pressure can generate sudden and unforeseen cylinder movements which can be dangerous or damage the machine.

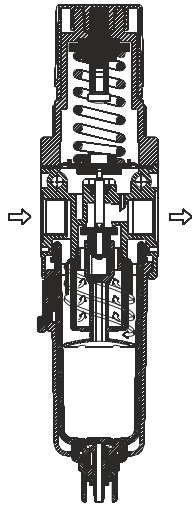
In order to prevent this occurring it is necessary to progressively supply the air into the circuit, at least until a pressure of 3bar has been reached. Above this value it is possible to rapidly increase the pressure.

The soft start valve, which can be pneumatically or electrically operated, fitted at the end of the FRL group accomplishes this task.



## FILTER-REGULATOR

This unit integrates, in one single component the functions of a filter and a pressure regulator.

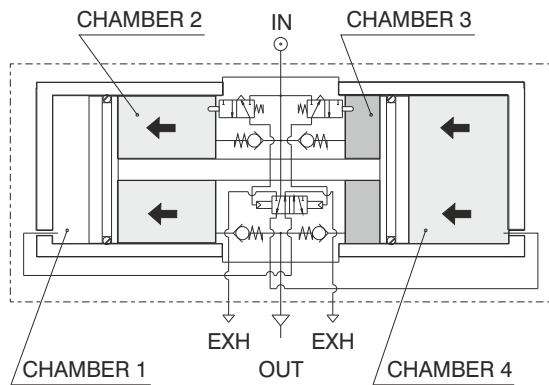


The technical features of this unit combine the features of the two individual components.

As shown below the lower part of the unit resembles a conventional filter and offers the same filtration performance as an equivalent stand alone unit. The air then enters the pressure regulator at the top of the unit, where the pressure is regulated and sent downstream. This unit is dimensionally and economically more convenient.

## PRESSURE BOOSTER

The pressure booster is designed to continuously pump air into the downstream part of the circuit until the pressure reaches a value which doubles the inlet pressure. When this value is reached the unit is balanced and stops pumping. When the downstream pressure drops the booster re-starts, and operates until the balance condition is reached.



Pressure boosters can also be fitted with a pressure regulator fitted directly to the inlet connection in order to better regulate the output pressure.

It is important to remember that the pressure booster reaches the 1:2 ratio only when the air consumption is zero, which means that it is possible to put under pressure a reservoir. When there is air consumption the boost ratio varies depending on the flow rate and pressures required.

Pressure boosters are normally used on application where it is necessary increase the force from a cylinder that can not be replaced with a larger bore. It is therefore necessary to supply the actuator with a higher pressure than the standard line pressure in order to generate a greater force.

This solution allows the use of a single line pressure to the whole machine, increasing it only where necessary.

The pressure booster compression ratio is 1:2



## 06 - Valves and solenoid valves

- Basic principles, working diagram
- Flow rate curves

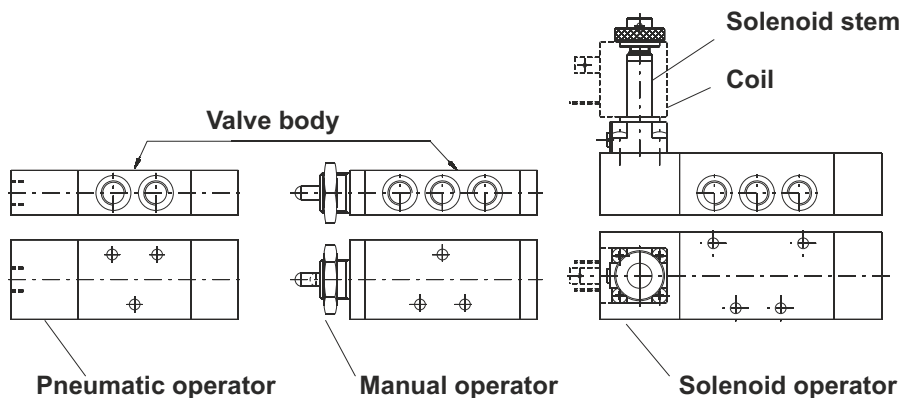
## GENERAL INFORMATION

In pneumatic applications the valve is the component that manages the compressed air, diverting and regulating the flow.

It is possible to distinguish three main categories:

- **logic elements**: block or redirect the compressed air flow depending on requirements (e.g. logic elements such as OR & AND)
- **regulation valves**: adjust the compressed air flow or pressure **depending on** requirements (e.g. flow regulators)
- **distribution valves**: redirect the compressed air flow without affecting flow rate or pressure.

Distribution valves are made by two main parts: a functional part that physically diverts the air flow (the main **body**), and a control part (the **operator**) that actuates the main valve and interfaces between the operator and the powersource (such as an actuator).



## VALVE BODY

This is the functional part of the valve and includes the air connections, the mounting holes, and the moving parts needed to divert the air flow.

Two main constructive systems are available: poppet system and spool system.

### Poppet system

This principle is based on two rubber poppets which move inside the valve main body and directly seal on the inner bore section.

#### Advantages

- the moving parts only travel short distances: fast response times
- Limited pressure drop
- large air passage sections: high flow rate

#### Disadvantages

- only available in monostable configuration: the control signal must stay on during operation: repositioning can only be achieved via a spring
- unbalanced system; pressure acts directly on the poppet and therefore requires strong springs to counteract it, as a consequence minimum working pressure is high.
- 5/3 function not available

### Spool system

This principle is based on the spool which moves inside the seals which are fixed in the valve body. The spool is profiled so that during the movement it opens and closes air passages.

#### Advantages

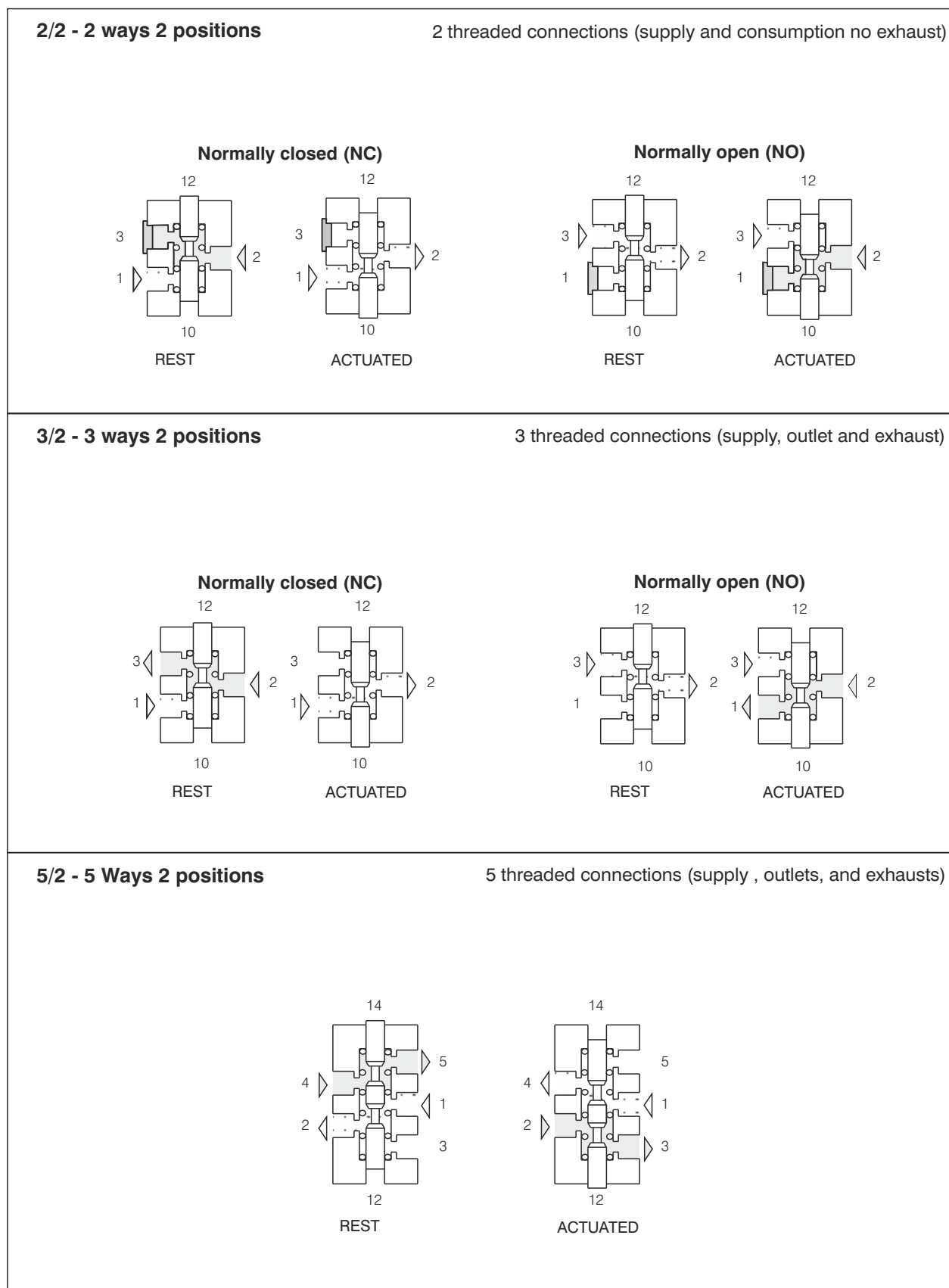
- easy to assemble and maintain
- 5/3 functions available
- compact dimensions
- Possibility of using different type of operators on the same valve body
- Possibility of assembly on manifolds

#### Disadvantages

- moving parts have to travel longer distances: longer response times
- smaller air passages / lower flow rate



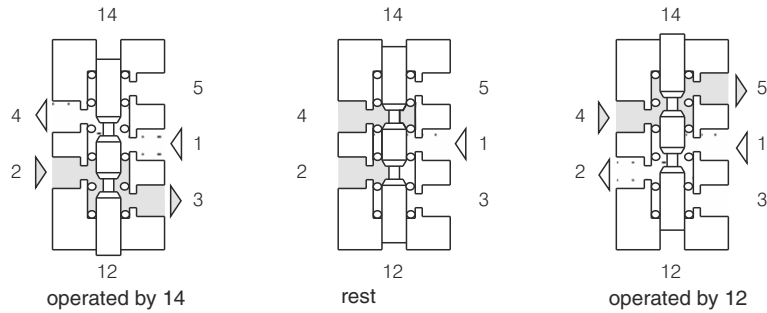
Various valve functions are available depending on the valve type. Listed below are some examples of the spool system.



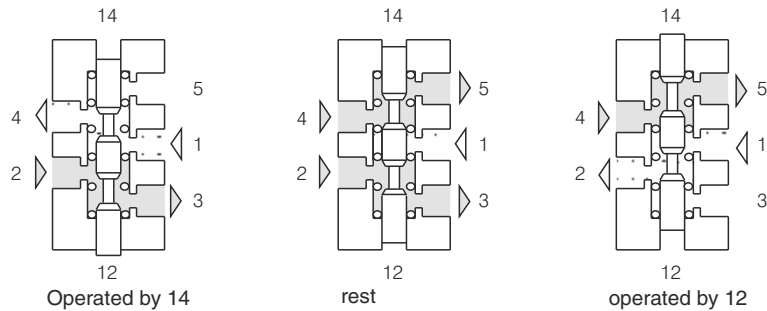
## 5/3 - 5 ways 3 positions

5 threaded connections (supply, outlets and exhausts)

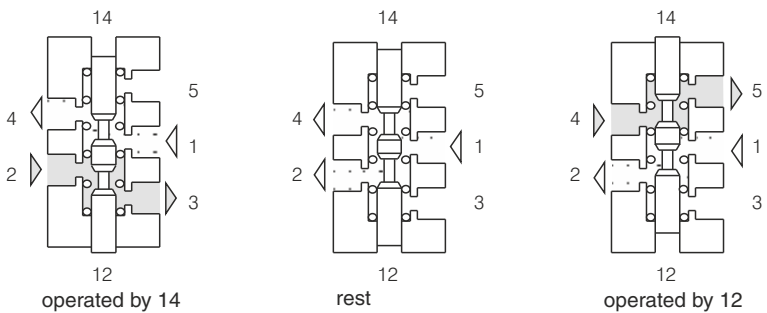
### Closed centers (CC) (rest condition: all ports closed)



### Open centers (CA) (rest conditions: port 1 closed, port 4 connected to port 5 and port 2 connected to port 3)



### Pressurised centers (CP) (rest conditions: port one connected to 2 and 4 ,connections 5 and 3 closed)



## OPERATORS

The part dedicated to the control of the valve and can be used to actuate ( switch) the valve or to reposition it ( return the valve into the rest position) .

If the operator is manually or mechanically piloted we are talking about a valve , if it is electrically piloted we are talking about a solenoid valve.

### Manual/mechanical operators

Include lever, rollers, buttons, pedals etc.... And act directly on the valve internal air distribution system (spool).

### Pneumatic operators

Normally used when it is not possible to directly operate the valve; it comprises a piston which, upon receipt of an air signal, operates the valve internal air distribution system (spool) .

### Electropneumatic operators

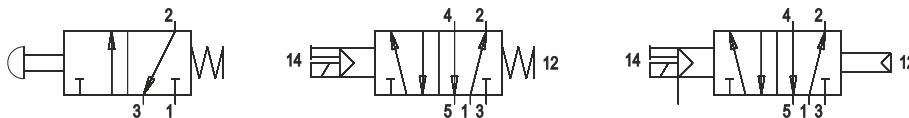
These operators transform an electrical signal into a pneumatic signal.

## MONOSTABLE AND BISTABLE VALVES

Depending on the number of signals needed to operate them, valves can be classed as monostable or bistable

**Monostable valves and solenoid valves:** only require one external signal to operate.

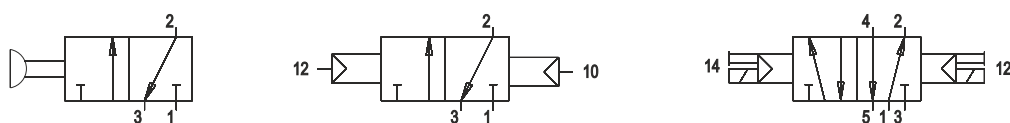
On these valves the repositioning operator is unstable and does not require an external signal to switch; reset is automatic as soon as the opposing signal is removed.



The most common unstable operators are mechanical (spring) or pneumatic (differential). The first is simply a spring that moves the spool longitudinally. The second is based on a piston which has a smaller diameter than the opposite pneumatic operator and therefore generates a smaller force. From the pneumatic symbols shown below when the signal 12 is not present the valve switches back to the rest position.



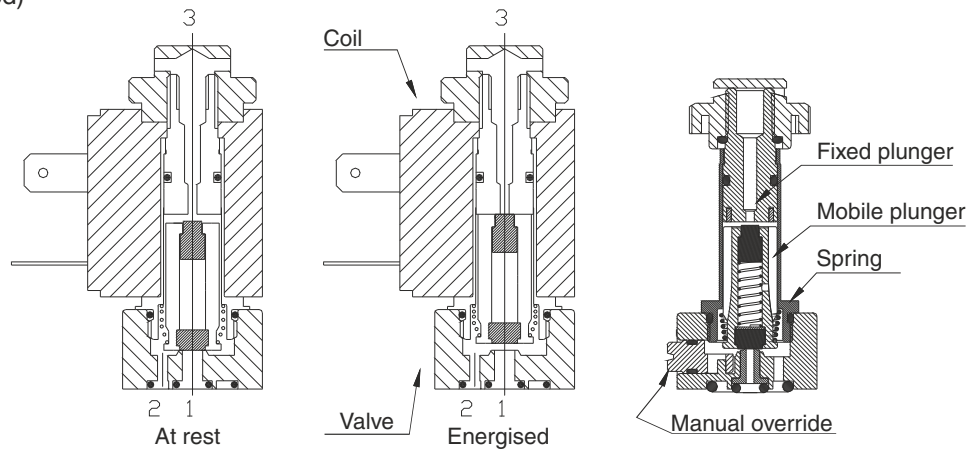
**Bistable valves and solenoid valves:** require two external signals in order to operate. These are valves with stable operators, such as pneumatic or 2 position buttons, which remain in position until the opposite signal is received.



## SOLENOID VALVES

**Directly operated solenoid valves:** these valves directly control the compressed air flow from inlet to the outlet port and can also be defined as poppet valves. The construction is based on a hollow stem, normally made of brass or stainless steel, which is fitted at one end with a fixed plunger. Inside the stem there is a moving plunger which also carries the poppets, which is moved the magnetic field generated by the solenoid which fits onto the stem's outer diameter. The fixed plunger is normally made of a low magnetically retentive steel which acts as a magnetic field intensifier; on application with AC current the plunger is fitted with a copper ring called displacement ring, which helps to reduce vibrations generated by this type of current.

These solenoid valves are normally equipped with an additional manual override which can be used to activate the valve at any time (for example during maintenance or inspection) and can only be 2/2 or 3/2 (normally open or normally closed)



**Indirectly operated valves:** these valves are fitted with a directly operated valve which upon receipt of an electric signal, actuates a pneumatic operator.

It is possible to distinguish two main categories:

- **servo assisted** (internal feeding): the operator receives the air supply directly from the valve supply port "1"; when the solenoid is activated the air passes from the valve port "1" into the pneumatic operator that actuates the valve. The valve supply pressure is the same as the operator pressure.
- **externally supplied:** basic working principle common to the servo assisted version but with the operator externally fed.

The valve and operator working pressure can be different.

## TERMS

**Minimum switching pressure:** indicates the minimum pressure needed to switch the valve, below that value the valve does not operate.

**Minimum switching force:** for mechanically operated indicates the minimum mechanical or manual force needed to switch the valve.

**Minimum working pressure:** is the maximum pressure value at which the pneumatic device can operate in safe conditions.

**Nominal orifice size:** correspond to the connection minimum passage size.

**Minimum and maximum temperature:** indicates the temperature range within which the component can operate safely



## 07 - Cylinders

- Basic information
- Cylinder operation diagram
- Air consumption
- Axial load
- End of stroke damping properties
- Pull/Push force
- Single acting cylinders spring forces
- End cap screws - maximum torque

## Base principles

### - Function

Cylinders are, together with some other items, the components of an automatic system that transform the pneumatic energy in labour

$$L = F \times s$$

(Labour=Force x movement)

The theoretical force of a cylinder is directly proportional to the supply pressure and the surface upon which it acts (piston surface).

$$F = P \times S$$

(Force=Pression x Superface)

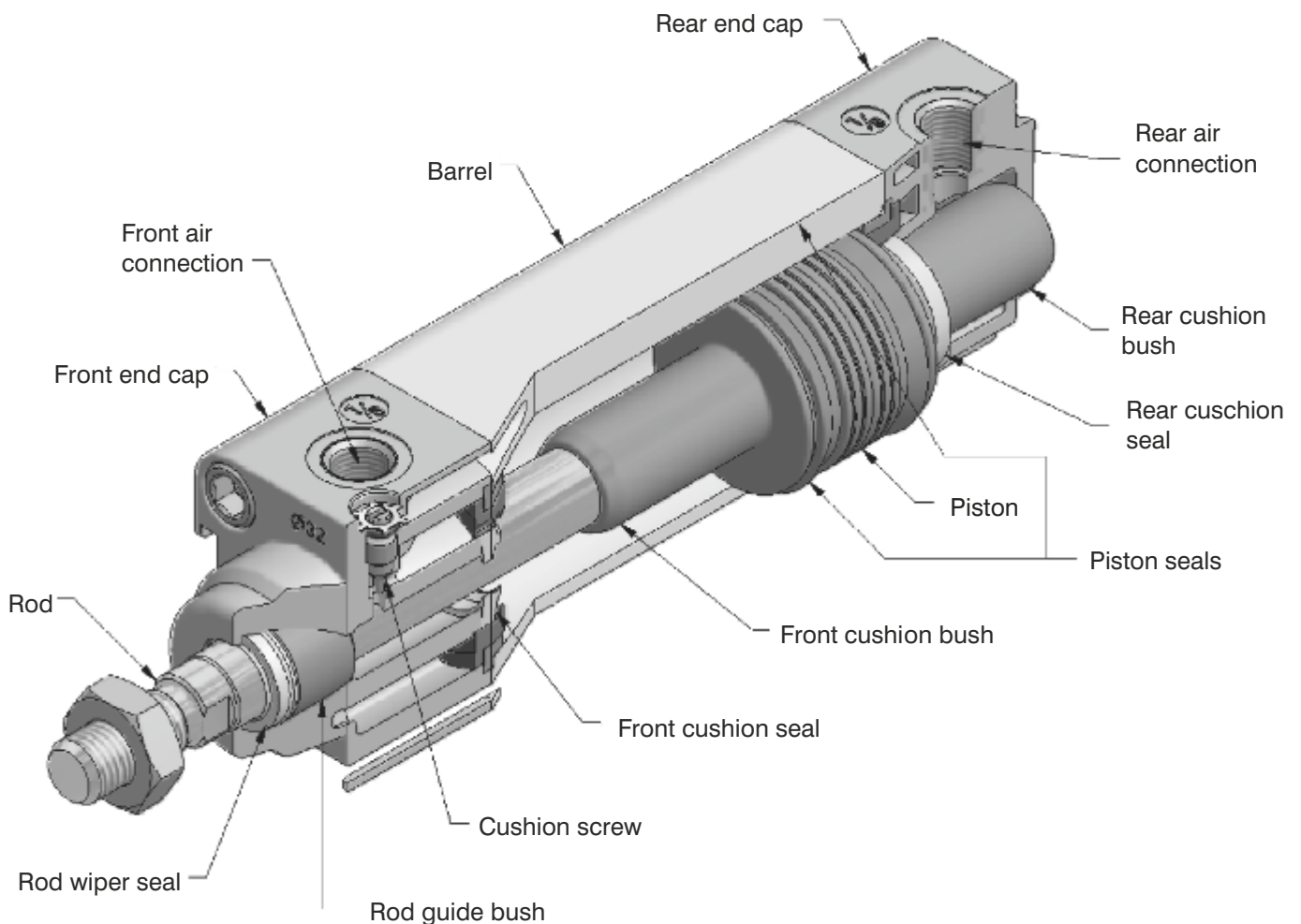
(On the inwards stroke the area on which the pressure acts is reduced by the area of the piston rod)

The true force fo the cylinder has to be calculated, bearing in mind :

- the friction of the seals during operation.
- the cylinder has to overcome the static friction generated by the seals before it can actually start moving. When a piston does not move for some time, the compression between the seals and barrel forces away the pre lubricating grease. When the cylinder is then operated it will therefore encounter a dry spot which will further increase breakaway friction.

Therefore, the real force is roughly 10-15% lower than the theoretical force

## Construction design

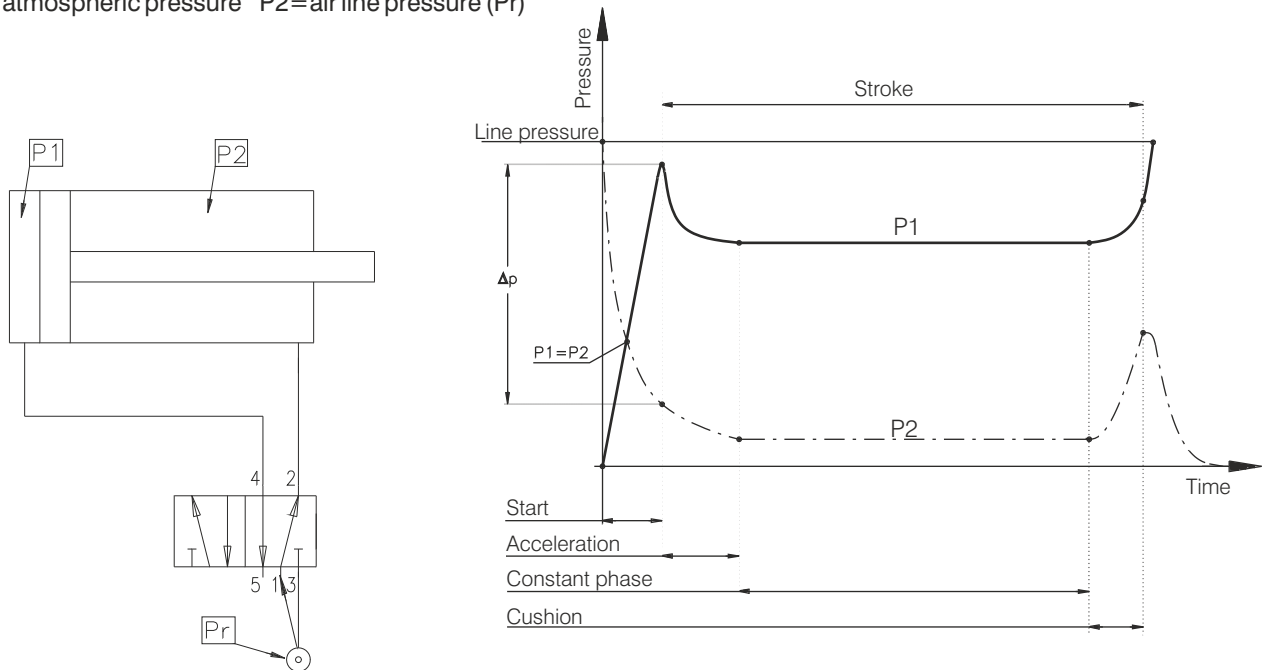


## CYLINDER OPERATION DIAGRAM

A cylinder working cycle can be divided into 4 phases: start, acceleration, constant phase and cushioning.

Consider the diagram below showing a cylinder in rest position (piston rod IN) connected to a 5/2 valve (also in rest position (port 1 connected to port 2)):

$P_1$  = atmospheric pressure  $P_2$  = air line pressure ( $P_r$ )



### Start:

- actuating the 5/2 valve port 1 is connected to port 4 pressurizing the cylinder rear chamber ; in this conditions  $P_1$  increases while the front chamber exhaust the pressure through port 3 (port 2 connected to port 3) and therefore  $P_2$  decreases.

- theoretically when  $P_1$  reaches the same value of  $P_2$  the cylinder could start moving but in reality it still need to overcome friction and the load applied. When the  $\Delta p$  between the two pressures overcomes friction and load the cylinder will start moving

### Acceleration:

The maximum speed is achieved at approximately 15 -30% of the unit stroke and is inversely proportional to the exhaust chamber volume and thereby the stroke; therefore considering units with the same bore the shorter the stroke the greater the acceleration will be.

### Constant phase:

The translation speed is not always constant and is effected by many factors such as friction, load applied, mounting position, valve flow rate etc... The cylinder speed can be controlled by regulating the exhaust flow rate, always considering that it is important to use a valve with the highest possible flow rate ( see section 09 "sizing and choosing a cylinder and valve) as the regulated speed would be lower than the maximum speed given by the valve.

### Cushioning:

Is the final stage of the stroke when the front chamber exhaust flow is regulated. Under these conditions  $P_2$  grows and counteracts  $P_1$  reducing the unit speed until the end of stroke where  $P_1$  reaches the maximum value given by the air supply and  $P_2$  equals the atmospheric pressure.



## CYLINDER AIR CONSUMPTION

The air consumption corresponds to the volume of air that the cylinder uses in a complete cycle (stroke out and back in) at a specific pressure.

$$\text{Consumption} = P_a \times C \times (A + b)$$

- P<sub>a</sub>**= Absolute pressure (bar)  
**C**= Cylinder stroke (dm)  
**A**= see tab. 1 (dm<sup>2</sup>)  
**b**= see tab. 2 (dm<sup>2</sup>)

Air consumption is measured in Normal-liters (NI) which correspond to the volume that a specific quantity (mass) of gas would fill at atmospheric pressure.

Calculation example:

ISO 15552 cylinder - 1319 series:

- Supply pressure 6 bar (P<sub>a</sub>=7 bar)  
 stroke 50mm (C=0,5 dm)  
 Ø63 (A=0,31157 dm<sup>2</sup>)  
 Rod Ø=20 mm (b=0,28017 dm<sup>2</sup>)

$$\text{Consumption} = 7 \text{ (bar)} \times 0,5 \text{ (dm)} \times (0,31157 + 0,28017) = 2,072 \text{ NI}$$

(In order to calculate the air consumption for a specific number of cycles it is sufficient to multiply the above value for the number of cycles)

**Piston surface area**

Ø cylinder	A
Ø 8	0,00502 dm <sup>2</sup>
Ø 10	0,00785 dm <sup>2</sup>
Ø 12	0,01130 dm <sup>2</sup>
Ø 16	0,02010 dm <sup>2</sup>
Ø 20	0,03140 dm <sup>2</sup>
Ø 25	0,04906 dm <sup>2</sup>
Ø 32	0,08038 dm <sup>2</sup>
Ø 40	0,12560 dm <sup>2</sup>
Ø 50	0,19625 dm <sup>2</sup>
Ø 63	0,31157 dm <sup>2</sup>
Ø 80	0,50240 dm <sup>2</sup>
Ø 100	0,78500 dm <sup>2</sup>
Ø 125	1,22656 dm <sup>2</sup>
Ø 160	2,00960 dm <sup>2</sup>
Ø 200	3,14000 dm <sup>2</sup>

tab.1

**Surface difference  
Cylinder piston / rod Ø**

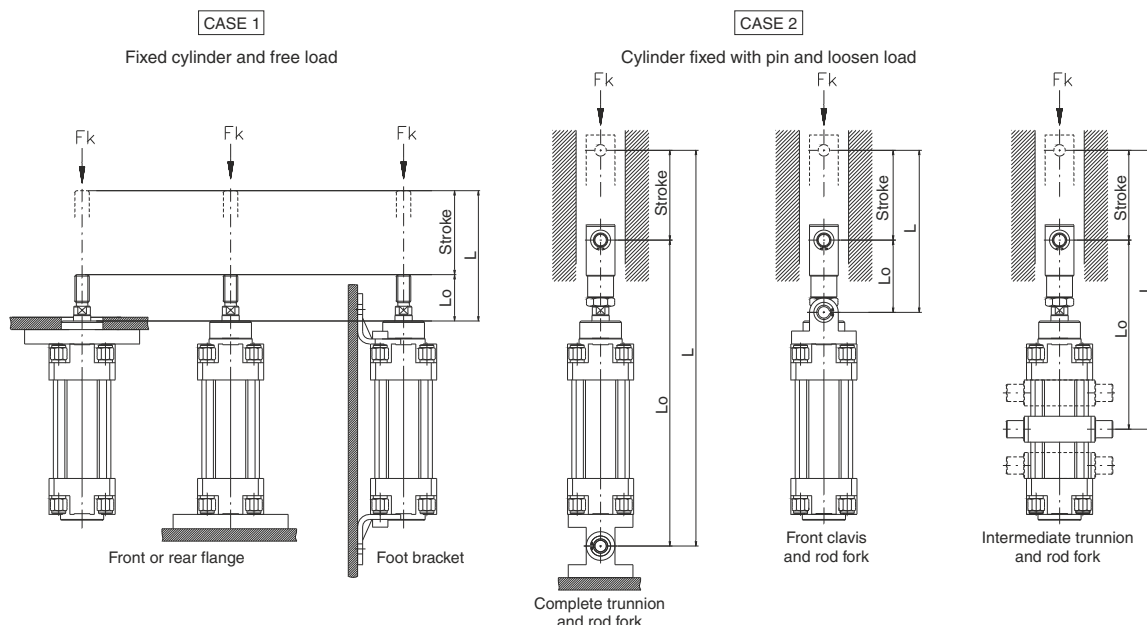
Ø cylinder - Ø rod	b
Ø 8 - Ø 4	0,00377 dm <sup>2</sup>
Ø 10 - Ø 4	0,00659 dm <sup>2</sup>
Ø 12 - Ø 6	0,00848 dm <sup>2</sup>
Ø 16 - Ø 6	0,01727 dm <sup>2</sup>
Ø 20 - Ø 8	0,02638 dm <sup>2</sup>
Ø 25 - Ø 10	0,04121 dm <sup>2</sup>
Ø 32 - Ø 12	0,06908 dm <sup>2</sup>
Ø 40 - Ø 14	0,11021 dm <sup>2</sup>
Ø 40 - Ø 16	0,10550 dm <sup>2</sup>
Ø 40 - Ø 18	0,10017 dm <sup>2</sup>
Ø 50 - Ø 14	0,18086 dm <sup>2</sup>
Ø 50 - Ø 18	0,17082 dm <sup>2</sup>
Ø 50 - Ø 20	0,16485 dm <sup>2</sup>
Ø 63 - Ø 20	0,28017 dm <sup>2</sup>
Ø 63 - Ø 22	0,27357 dm <sup>2</sup>
Ø 80 - Ø 22	0,46441 dm <sup>2</sup>
Ø 80 - Ø 25	0,45334 dm <sup>2</sup>
Ø 100 - Ø 25	0,73594 dm <sup>2</sup>
Ø 100 - Ø 30	0,71435 dm <sup>2</sup>
Ø 125 - Ø 30	1,15591 dm <sup>2</sup>
Ø 125 - Ø 32	1,14618 dm <sup>2</sup>
Ø 160 - Ø 40	1,88400 dm <sup>2</sup>
Ø 200 - Ø 40	3,01440 dm <sup>2</sup>

tab.2

## Allowed axial load (combined bending and compressing load)

This is the maximum load that can be applied axially on the rod tip. Above this value the rod might bend under compression. This value depends on a number of factors such as load size, rod diameter, the distance at which the load is applied (bending and compressing length L) and the conditions under which the load is applied (cylinder mountings).

Among the possible conditions, the following three are the most common.



The maximum axial load can be calculated in two ways:

In an empirical way (see equations) or by checking the following diagram which shows the worst possible conditions (case 1 & 2) For all other possible mountings alternatives the axial load will surely be higher.

$$F_k = \frac{p^3 \times E \times d^4}{64 \times L^2 \times C} \quad (N)$$

$$d = \sqrt[4]{\frac{F_k \times 64 \times L^2 \times C}{p^3 \times E}} \quad (cm)$$

$$L = \sqrt[4]{\frac{p^3 \times E \times d^4}{F_k \times 64 \times C}} \quad (cm)$$

### Example: Axial load verification

Cylinder  $\varnothing 80$  mm  
 Rod diameter  $\varnothing 20$  mm  
 Stroke 600 mm  
 Mounting CASE 2 intermediate trunnion:  $L_0 = 290$  mm  
 Carico 2000 N  
 $L$  (distance) =  $29 + 60 = 89$  cm  
 $F_k = (p^3 \times 2,1 \times 10^7 \times 2^4) : (64 \times 89^2 \times 5) = 4104$  N  
 (Above the 2000 N applied)

The same result can be obtained using the below diagram: following the bending and compression distance line relative to 900mm up to the intersection with the 20mm  $\varnothing$  line we obtain 4000N.

### Example: rod diameter sizing

$E$  = rod material coefficient of elasticity ( $N/cm^2$ )  
 (steel =  $2,1 \times 10^7$   $N/cm^2$ )

$d$  = rod diameter (cm)

$L$  = bending and compression distance (cm)

$C$  = safety factor (da 2,5 a 5)

Considering the same conditions as in the above case we need to determinate the rod diameter suitable to withstand a 4000N load

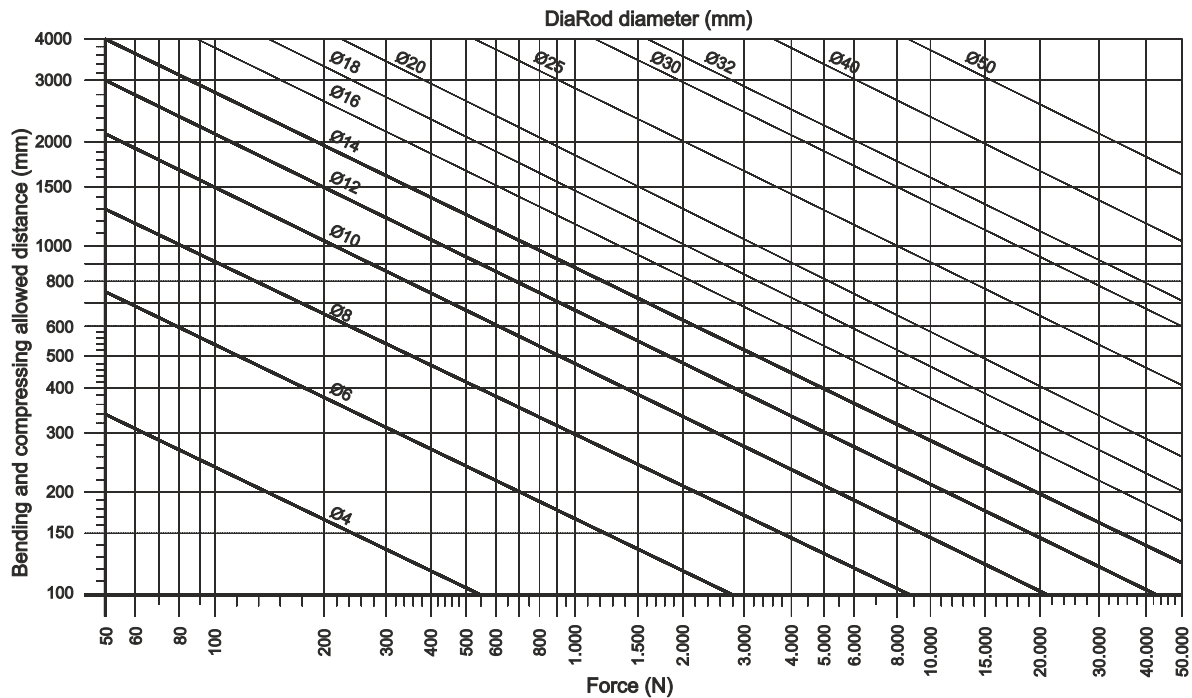
$$d = \sqrt[4]{(4000 \times 64 \times 89^2 \times 5) / (p^3 \times 2,1 \times 10^7)} = 2 \text{ cm}$$

The diameter to choose is the next one up:  $\varnothing 25$  mm

Also this second example can be resolved using the below diagram: following the bending and compression distance line relative to 900mm up to the intersection with the 4000N maximum load we obtain  $\varnothing 20$  mm.

With the third equation or using the diagram it is possible to calculate the bending and compression distance.

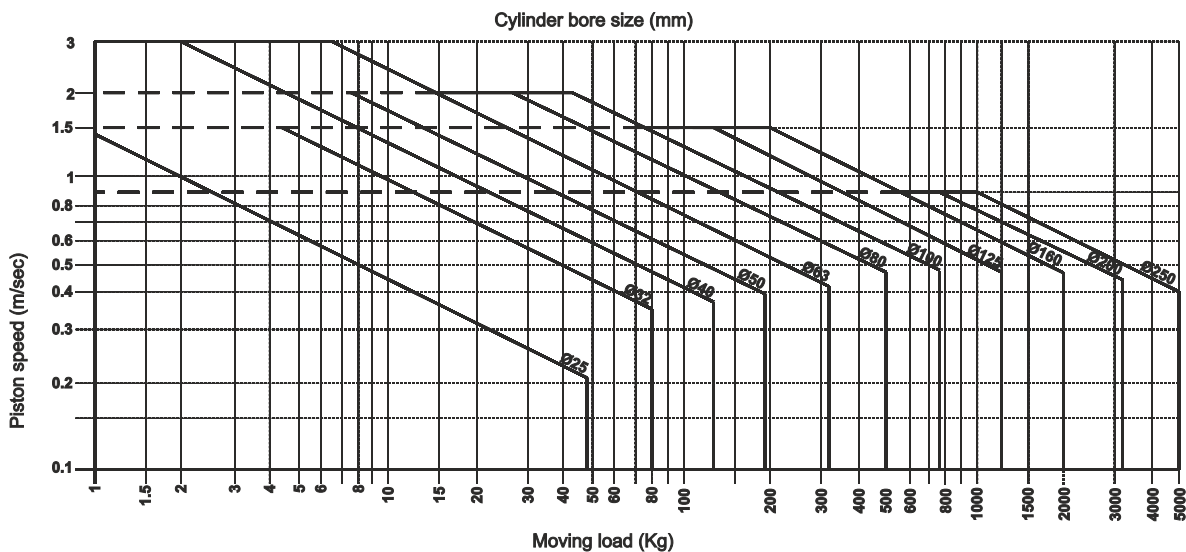
Axial load diagram



## END OF STROKE CUSHIONING CAPABILITY

The function of the end of stroke cushioning is to reduce the kinetic energy generated by movement of the load and to prevent high speed impact between the piston and end caps that could compromise the unit functionality. The use of non-cushioned cylinders is not recommended on high speed applications unless external means of deceleration (such as dampers) are used.

The maximum load that can be cushioned depends on the speed of the unit and the cylinder cushioning capacity. The chart below shows the values relative to the ISO 15552 series cylinders considering the out stroke movement and a supply pressure of 6 bar. The acceptable values for any diameter are those found below each size line.



## THEORETICAL FORCE -PUSH- (N) - rod moving out

Bore (mm)	Push area (mm <sup>2</sup> )	Feeding pressure (bar)									
		1	2	3	4	5	6	7	8	9	10
Ø6	28	2,5	5,5	8	11	13,5	16,5	19	22	24,5	27,5
Ø8	50	4,5	9,5	14,5	19,5	24,5	29,5	34	39	44	49
Ø10	79	7,5	15	23	30,5	38	46	53,5	61,5	69	76,5
Ø12	113	11	22	33	44	55	66	77	88	99	110
Ø16	201	19	39	59	78	98	118	137	157	177	197
Ø20	314	30	61	92	123	153	184	215	246	277	307
Ø25	491	48	96	144	192	240	288	336	384	433	481
Ø32	804	78	157	236	315	394	472	551	630	709	788
Ø40	1.256	123	246	369	492	615	739	862	985	1.108	1.231
Ø50	1.963	192	384	577	769	962	1.154	1.347	1.539	1.732	1.924
Ø63	3.116	305	611	916	1.222	1.527	1.833	2.138	2.444	2.749	3.055
Ø80	5.024	492	985	1.478	1.970	2.463	2.956	3.448	3.941	4.434	4.926
Ø100	7.850	769	1.539	2.309	3.079	3.849	4.618	5.388	6.158	6.928	7.698
Ø125	12.266	1.202	2.405	3.608	4.811	6.014	7.217	8.419	9.622	10.825	12.028
Ø160	20.096	1.970	3.941	5.912	7.882	9.853	11.824	13.795	15.765	17.736	19.707
Ø200	31.400	3.079	6.158	9.237	12.317	15.396	18.475	21.555	24.634	27.713	30.792
Ø250	49.063	4.811	9.622	14.434	19.245	24.056	28.868	33.679	38.491	43.302	48.113

The following equations is used to calculate the force generated in the return stroke (rod moving back in)  
**F [N] = (Cylinder area - Rod area) [mm<sup>2</sup>] x Pressure [bar] x 9,81**

In order to obtain the cylinder real force, reduce the theoretical value by 10-15%

### Surface difference - Cylinder piston / rod Ø

Ø cylinder - Ø rod	b
Ø 8 - Ø 4	0,377 cm <sup>2</sup>
Ø 10 - Ø 4	0,659 cm <sup>2</sup>
Ø 12 - Ø 6	0,848 cm <sup>2</sup>
Ø 16 - Ø 6	1,727 cm <sup>2</sup>
Ø 20 - Ø 8	2,638 cm <sup>2</sup>
Ø 25 - Ø 10	4,121 cm <sup>2</sup>
Ø 32 - Ø 12	6,908 cm <sup>2</sup>
Ø 40 - Ø 14	11,021 cm <sup>2</sup>
Ø 40 - Ø 16	10,550 cm <sup>2</sup>
Ø 40 - Ø 18	10,017 cm <sup>2</sup>
Ø 50 - Ø 14	18,086 cm <sup>2</sup>
Ø 50 - Ø 18	17,082 cm <sup>2</sup>
Ø 50 - Ø 20	16,485 cm <sup>2</sup>
Ø 63 - Ø 20	28,017 cm <sup>2</sup>
Ø 63 - Ø 22	27,357 cm <sup>2</sup>
Ø 80 - Ø 22	46,441 cm <sup>2</sup>
Ø 80 - Ø 25	45,334 cm <sup>2</sup>
Ø 100 - Ø 25	73,594 cm <sup>2</sup>
Ø 100 - Ø 30	71,435 cm <sup>2</sup>
Ø 125 - Ø 30	115,591 cm <sup>2</sup>
Ø 125 - Ø 32	114,618 cm <sup>2</sup>
Ø 160 - Ø 40	188,400 cm <sup>2</sup>
Ø 200 - Ø 40	301,440 cm <sup>2</sup>

tab.2

## SINGLE ACTING CYLINDER SPRING INITIAL AND FINAL LOAD CHARACTERISTICS.

			Bore						
	front spring	rear spring	Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50
Initial load (N) external spring			9,9	10,8	10,8	7,9	19,7	39,3	39,3
Final load (N) compressed load			26,5	22,6	22,6	49,1	53,0	106,0	106,0

(stroke 0-40 mm)

			Bore						
	front spring	rear spring	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Initial load (N) external spring			2,2	2,2	4,0	7,5	11,0	16,5	23,0
Final load (N) compressed load			4,2	4,2	8,7	21,0	22,0	30,7	52,5

(stroke 0-50 mm)

			Bore					
	front spring	rear spring	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Initial load (N) external spring			17,2	24,6	51,0	51,0	98,1	98,1
Final load (N) compressed load			41,7	83,4	114,8	114,8	194,2	194,2

(stroke 0-50 mm)

			Bore							
	front spring	rear spring	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Initial load (N) external spring			7,9	9,9	34,4	34,4	50,1	54,0	117,7	108,9
Final load (N) compressed load			27,5	26,5	59,9	63,8	79,5	85,4	157,0	134,4

(stroke 0-10 mm)

			Bore									
	front spring	rear spring	Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Initial load (N) external spring			3,9	4,4	4,9	9,8	12,3	16,7	27,5	37,3	59,4	101,3
Final load (N) compressed load			9,3	17,7	18,1	25,5	34,3	44,1	51,0	63,8	99,4	141,9

(Ø12 stroke 0-10 mm - Ø16-100 stroke 0-25 mm)

## CYLINDER NUTS RECOMMENDED TIGHTENING TORQUE

Bore size	Torque (Nm)
Ø32	8
Ø40	8
Ø50	16
Ø63	16
Ø80	22
Ø100	22
Ø125	30
Ø160	85
Ø200	85



## **08 - Choosing /sizing a cylinder and valve**

- Pipe flow resistance
- Valve sizing
- Cylinder sizing

## PIPE FLOW RESISTANCE

### Flow rate Qn

Flow rate is calculated as the volume at normal conditions ( atmospheric pressure, 20° C temperature) in relation to time. The measurement unit is the normal litre per minute (NI/min)

The normal litre is the specific quantity of compressed air, and corresponds to the volume that it would fill at atmospheric pressure

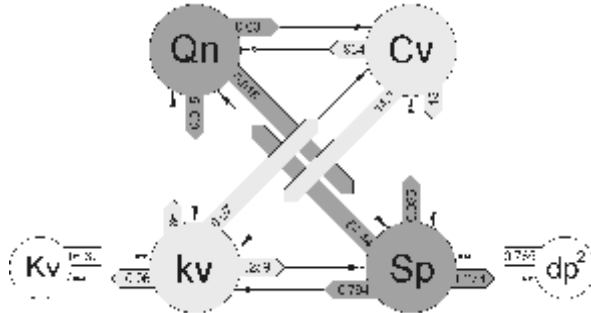
Flow rate is measured with standardised measuring equipment and, as previously explained, defines parameters such as:

kv (l/min) measured with water  $\Delta P = 1 \text{ bar}$

Kv ( m<sup>3</sup>/ora) measured with water  $\Delta P = 1 \text{ bar}$

Cv ( USA gallons/min) measured with water  $\Delta P = 1 \text{ psi (0,07 bar)}$

The chart below shows some of the conversion coefficients (see also pag. IX)



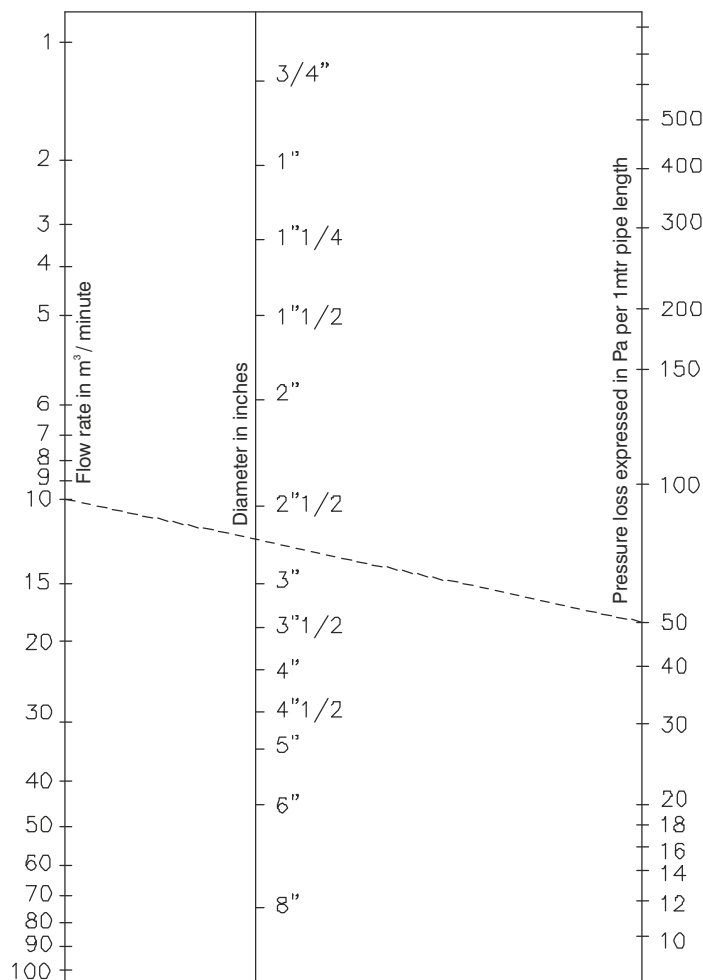
<b>Qn</b>	Nominal flow rate	NI/min
<b>kv</b>		l/min
<b>Kv</b>	Hydraulic coefficient	m <sup>3</sup> /hours
<b>Cv</b>		USA gallons/min
<b>Sp</b>	Nominal inner section area	mm <sup>2</sup>
<b>dp<sup>2</sup></b>	Nominal diameter <sup>2</sup>	mm <sup>2</sup>

\* to calculate the diameter dp (mm<sup>2</sup>) square root of dp<sup>2</sup>

### Pipes flow resistance

The C factor (l/sec) indicates the pipe flow capacity and is the ratio between the maximum flow rate and absolute pressure (ISO 6358). The flow capacity progressively decreases with increasing pipe length, due to the air friction on the pipe inner surface increasing the pressure drop. Therefore the longer the pipe the smaller the flow rate.

The chart below shows the flow rate characteristics of different pipe sizes (i/d and o/d) in function of the length.



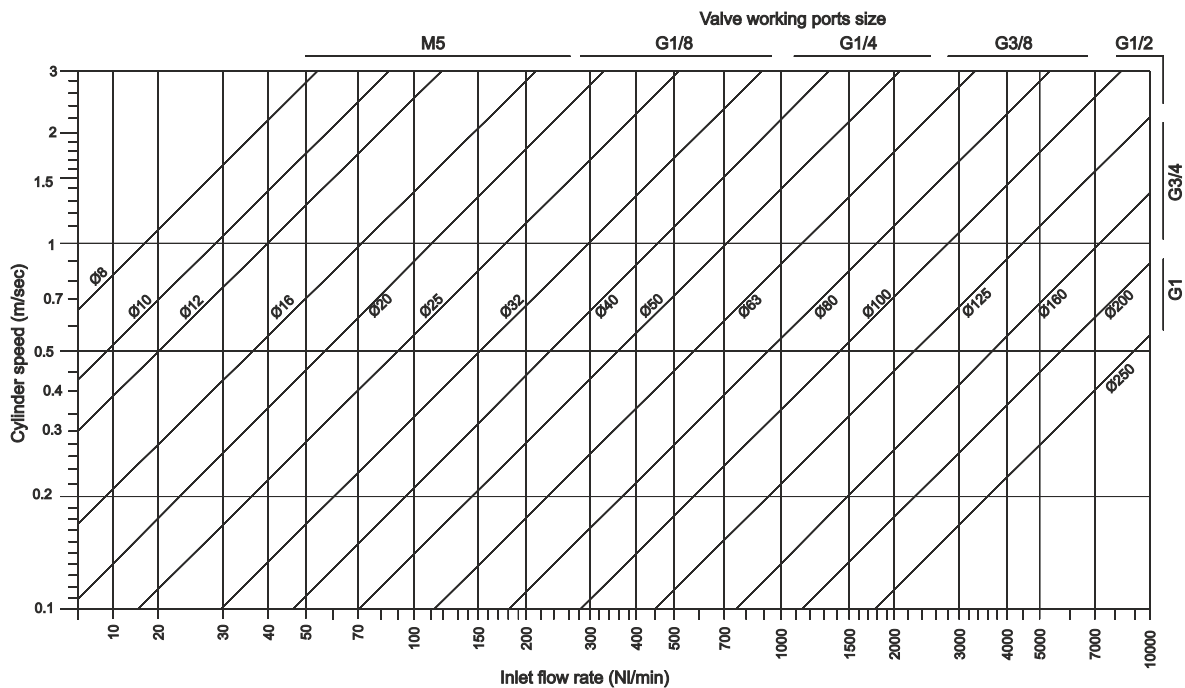


## VALVE SIZING

The choice of the correct size valve is essential in order to ensure that the cylinder to be controlled will perform as expected. It is therefore necessary to know the cycle time to be achieved and to calculate the coefficient T which will be used as multiplier for the air consumption value previously calculated. The result of this equation, expressed in NI/min and multiplied by a safety factor of 1.2, corresponds to the minimum flow rate needed (at standard conditions 6 bar supply and 5 bar on the consumption connection) to operate the cylinder at the required rate.

$$T = \frac{60}{\text{Cycle time}} \quad Q_n = T \times \text{Consumption}$$

It is also important to ensure that the pipes used to connect the valve to the air supply and to the cylinder do not affect the flow rate in any way. The pipe inner bore must therefore be at least 1.5 times the diameter of the valve nominal orifice size. The choice of the fittings is also very important, the inner bore must be equal or greater than the pipe I/D. The diagram below shows the flow rate required to operate different size cylinders at varying speeds and also the valve connection sizes.



## CYLINDER SIZING

In order to properly size a cylinder it is necessary to consider the following parameters:

**Force generated** : calculated in function of the piston area and of the pressure that acts upon it.

$$F = \text{area} \times \text{pressure} \quad (\text{daN}) = (\text{cm}^2) \times (\text{bar})$$

The value is theoretical and needs to be reduced by approximately 10-15% in order to compensate for the effects of friction. We must also consider that the force generated during the return stroke (traction) is lower, as the area on which the pressure acts is reduced by the presence of the rod.

**Weight of the load** : the force generated by the cylinder must be sufficient to move the load in the desired direction within the specified time (cycle time). The load ratio (RdC) must not exceed 70%.

$$\frac{\text{Needed force (load weight)}}{\text{Available force (generated)}} \times 100 = \text{RdC}$$

## LOAD POSITION

**Vertical lift** (pull upwards): the real force generated by the cylinder must be sufficient to counterbalance the load and to accelerate it

Example:

Weight to be lifted 120Kg

Working pressure 6 bar

Load ratio 70%

Using the load ratio equation it is possible to calculate the force needed to lift the load:

$$\text{Available force} = \frac{\text{Load}}{\text{Rdc}} \times 100 \quad \text{the result is } 171,4 \text{ daN}$$

A 63 bore cylinder which generates a theoretical force of 187 daN is suitable for the application.

A similar load ratio allows, using unidirectional flow regulators, good speed control.

When the speed is below 20mm/sec. It is difficult to properly control the movement.

The load ratio must be reduced to 50% on slow speed applications. In these conditions, or where constant movement is required, the use of a hydraulic speed control unit is recommended.

On applications where the load is moving downwards, thereby increasing the force generated by the actuator, it is usually necessary to use flow regulators.

**Horizontal or inclined movement:** If the load is supported and the working position is horizontal, it is necessary to multiply the needed force by the coefficient of friction.

The coefficient of friction  $m$  varies according to the material.

For example considering  $m = 0.4$

Weight to be moved 120Kg

Pressure 6 bar

Load ratio 70%

Solving the load ratio equation it is possible to calculate the available force:

$$\text{Available force} = \frac{\text{Load}}{\text{RdC}} \times 100 \times m \quad \text{which, in the above conditions is } 68,57 \text{ daN}$$

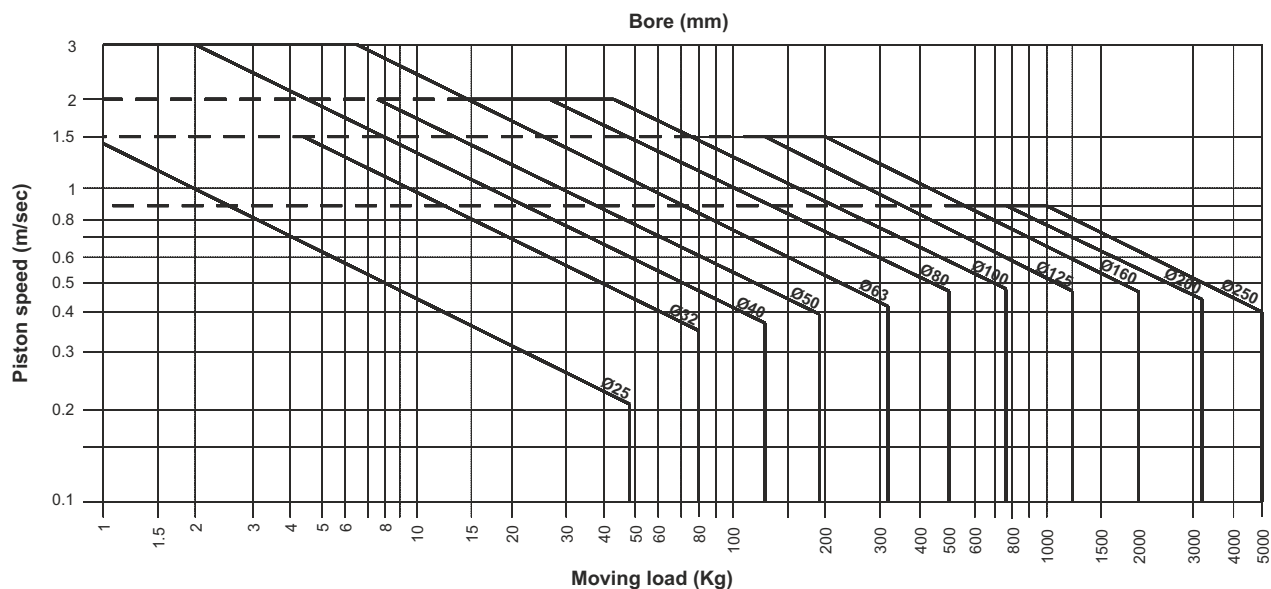
A Ø40 bore cylinder that generates a theoretical force of 75.4 daN is suitable for the application.

In cases of inclined application the required force increases according to the angle.

Also in these conditions it is necessary to multiply the needed force by a coefficient of friction.

## End of stroke cushioning

The air cushion damping function is to absorb the kinetic energy in order to prevent end of stroke impacts which could damage the unit. Once the cylinder has been chosen, based on the parameters previously described, it is necessary to verify its capacity to absorb the kinetic energy. Using the chart below it is possible to verify, for each diameter and combination of speed/load, the suitability of the cylinder. The pressure value considered is 6 bar.



## Axial load

Is a load that is applied axially to the rod tip. Under the action of axial load the rod can flex. The amount of flexion depends on the following factors:

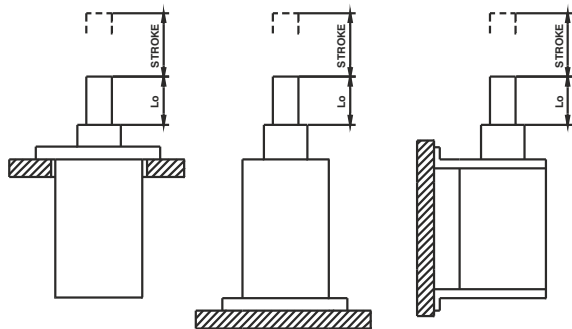
- load applied
- rod size and length
- mountings used to hold the cylinder in position.

The worst case scenario is when the cylinder is fixed at both ends; on all other conditions the load allowed can be up to 50% greater.

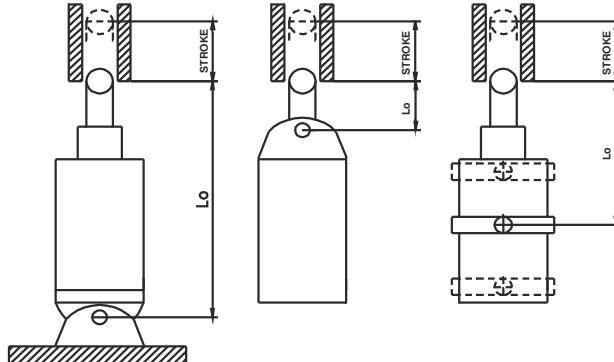
The dimension to be considered is::

$$L_{tot} = L_0 + \text{stroke}$$

CASE "A"



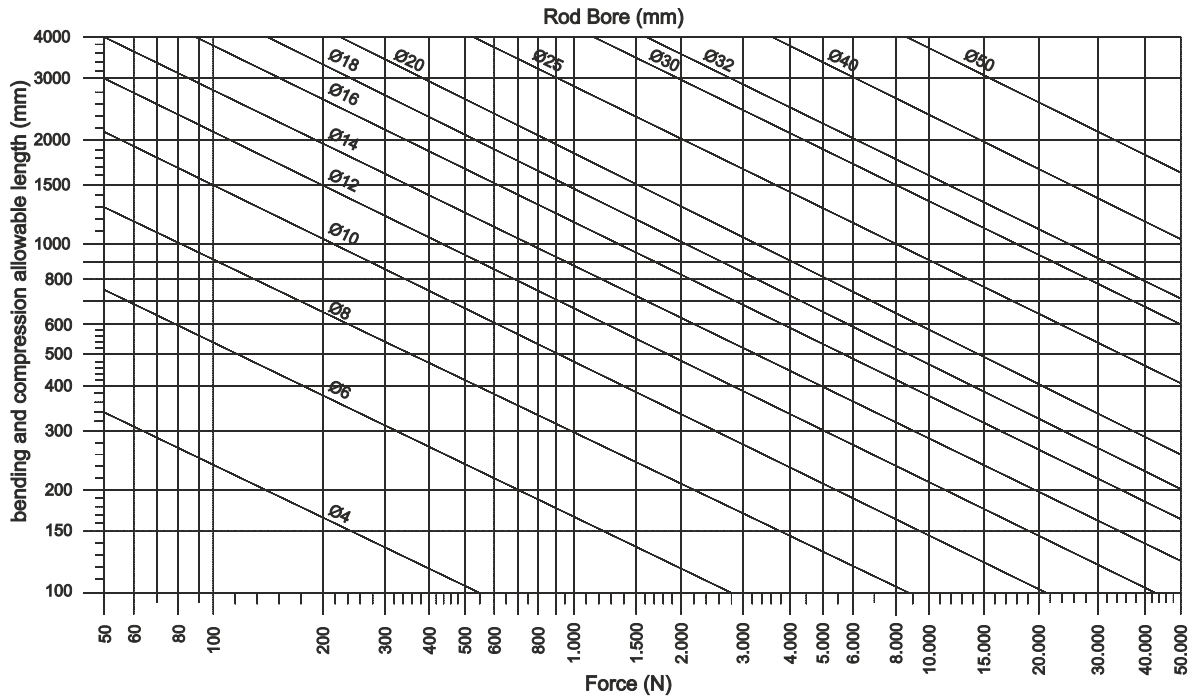
CASE "B"





# Choosing/sizing a cylinder and valve

The below chart shows the values relative to the ISO 15552 series cylinders considering the out stroke movement and a supply pressure of 6 bar. The acceptable value for each diameters are those found below each size line.





## 09 - Electrical current - basic principles and nomenclature

**Voltage:** is the difference of electrical potential between two points of an electronic circuit, expressed in volts (V). It is a measure of the capacity (not the technical meaning) of an electric field to cause an electric current in an electrical conductor. Depending on the difference of electrical potential it is called extra low voltage, low voltage, high voltage or extra high voltage. Voltage is measured with the voltmeter connected in parallel to the electric circuit.

**Current:** is by definition the flow of electric charge in an electrical conductor, expressed in ampere (A). Current is measured with the amperometer connected in series to the electric circuit.

**Power:** measured in Watt (W) is the product between current and voltage .  $W = V \times I$

For example a 15 mm valve power is 2,3W at 24 VDC  
 Current =  $2,3 / 24 = 0,095 \text{ A} = 95\text{mA}$   
 Power =  $24 \times 0,095 = 2,3\text{W}$

**Frequency:** is the measurement of the number of times that a repeated event occurs per unit of time. It is also defined as the rate of change of phase of a sinusoidal waveform. Is measured in Hertz (Hz). In Europe the frequency is 50Hz, In the USA is 60Hz.

In order to use a 50Hz coil on a 60Hz application it is necessary to compensate the voltage by a 60/50 factor and vice-versa

$$V(60\text{Hz}) = V(50\text{Hz}) \cdot (60/50) \quad V(50\text{Hz}) = V(60\text{Hz}) \cdot (50/60)$$

**Alternating current (AC)** is an electrical current whose magnitude and direction vary cyclically, as opposed to direct current, whose direction remains constant. The usual waveform of an AC power circuit is a sine wave. The number of repetitions per second is the frequency

**Direct current (DC)** is an electrical current whose magnitude and direction remain constant in time. In a Direct current system it is important to observe the current direction, or the polarity.

**Resistance (R):** is a measure of the degree to which an object opposes the passage of an electric current, measured in ohm (Ω).

The quantity of resistance in an electric circuit determines the amount of current flowing in the circuit for any given voltage applied to the circuit.

In a long wire with small section the resistance will be greater than in a short wire with a larger section. This is similar to what happens in pneumatic applications where with a long and small bore pipe, the flow is smaller than in a shorter pipe with larger bore.

## Coils

The coil working principle is based on a conductor (usually copper wire) wound around a cylindrically shaped support manufactured in a non-magnetic material. When energised the conductor generates a magnetic field which passes through the centre of the coil itself. If a metallic object is positioned in the centre of the support, the magnetic field strength is increased. The two points where the magnetic field enters the coils represent its magnetic poles as in a magnet.

## Magnetic gap

In an electromagnetic system the magnetic gap is the distance between the moving metal core and the fixed armature. When working with alternating current the impedance is maximum when the magnetic gap is nil and vice versa (impedance is minimum when the magnetic gap is maximum). As a consequence, according to Ohm's law, the current consumption is higher at start up and lower during the holding condition.

## Shading ring

The magnetic field generated by an alternating current coil periodically fluctuates from a maximum value to zero which generates vibration of the moving core. The solution to this phenomenon is the "shading ring" which is a small copper ring positioned at the end of the fixed armature. The shading ring generates an out of phase current which prevents the magnetic field from reaching zero, such that the vibration is not longer perceptible

## Equations

Voltage	$V = R \times I$	Volt (V)	Product of resistance and current
Current	$I = V / R$	Ampere (A)	Voltage / resistance ratio
Power	$W = V \times I$	Watt (W)	Product of voltage and current
	$W = R \times I^2$		Product of resistance and current <sup>2</sup>
	$W = V^2 / R$		Voltage <sup>2</sup> / resistance ratio
Resistance	$R = V / I$	Ohm (Ω)	Voltage / current ratio
	$R = V^2 / W$		Voltage <sup>2</sup> / power ratio



## MECHANICAL-MANUAL AND PNEUMATIC VALVES

**Miniature valves 2/2, 3/2, 5/2-5/3-and  
tube ø4 (Series 104)**

**Miniature valves 3/2, 5/2, M5 (Series 105)**

Tappet / Pneumatic / Push button / Switch

Lever roller / Accessories / Lever button

Lever panel / Push button / Switch / Whisker / Handle

**Valvole 3/2, 5/2, 5/3-G1/8" ÷ G1"**  
**(Serie 200)**

Tappet / Lever roller / Lever button / Lever sensitive

Lever panel / Lever front / Push button / Switch

Lever lateral / Pedal



## General

New 104 micro valves series have been realized as an economic version to complete the range of 105 valves version. With their small overall dimensions it makes easy installation and operation.

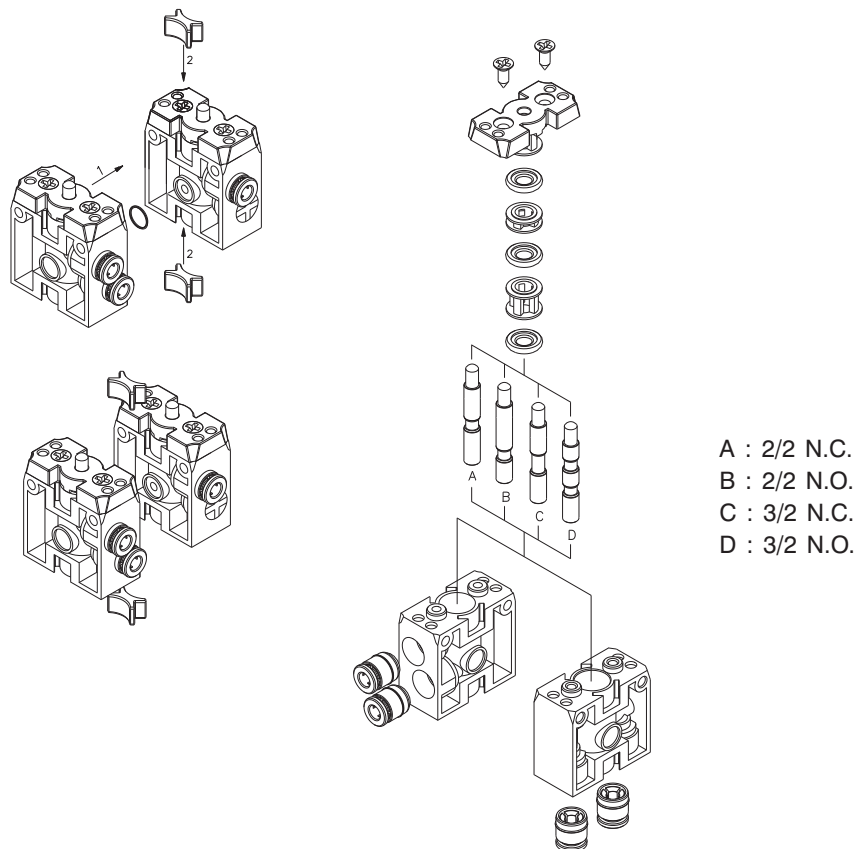
Their main characteristic is the possibility to choose between the version with lateral or rear pneumatic connections realized with quick fitting for  $\varnothing 4$  mm. tube included.

The valves are available with 2 or 3 ways versions, normally closed or open, 5 ways and 5 ways 3 positions open centres and pressured centres.

The 5 ways version is made with two 3 ways valves placed side by side with common inlet.

The operators available for this valve are push button (different versions), selector (key, short and long lever), lever (lever roller or lever unidirectional) and pneumatic.

It is also possible to combine the 2 and 3 ways valves with electrical switches, normally closed or open.



## Construction characteristics

Body and cover	Technopolymer
Actuators	Plastic material for buttons and switches
Seals	NBR
Spacer	Acetal resin
Spool	Steel
Spring	Spring steel

## Use and maintenance

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.


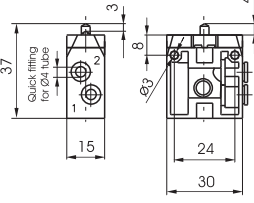

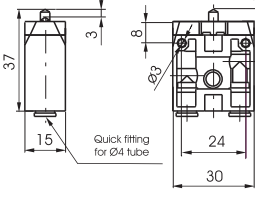

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.


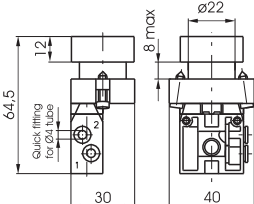

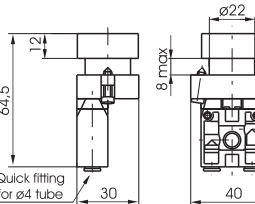

**ATTENTION:** use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).




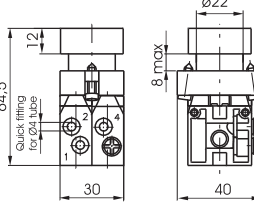

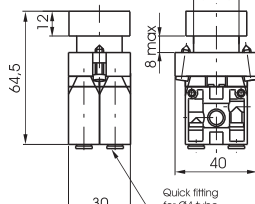
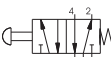
1

<b>Tappet - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Tappet - Spring</b>
<i>Lateral connections</i>		<b>104.1.0.1.P.F</b>		<i>Rear connections</i>
 		TYPE <b>T</b> 22 = 2 ways 32 = 3 ways CONNECTION TYPE <b>P</b> L = Lateral P = Rear FUNCTION <b>F</b> A = Normally Open C = Normally Closed		 
Weight gr. 20 Operating force 13 N				Weight gr. 20 Operating force 13 N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Push button - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Push button - Spring</b>
<i>Lateral connections</i>		<b>104.1.6.22/C.P.F</b>		<i>Rear connections</i>
 		TYPE <b>T</b> 22 = 2 ways 32 = 3 ways BUTTON COLOR <b>C</b> 1 = Red 2 = Black 3 = Green 4 = Yellow CONNECTION TYPE <b>P</b> L = Lateral P = Rear FUNCTION <b>F</b> A = Normally Open C = Normally Closed		 
Weight gr. 50 Operating force 18 N				Weight gr. 50 Operating force 18 N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Push button - Spring</b>	5/2	<b>Ordering code</b>	5/2	<b>Push button - Spring</b>
<i>Lateral connections</i>		<b>104.52.6.22/C.P</b>		<i>Rear connections</i>
 		BUTTON COLOR <b>C</b> 1 = Red 2 = Black 3 = Green 4 = Yellow CONNECTION TYPE <b>P</b> L = Lateral P = Rear		 
Weight gr. 105 Operating force 30 N				Weight gr. 105 Operating force 30 N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

1

<b>Push button 2 positions (step - step)</b>	2/2 3/2	<b>Ordering code</b> <b>104.T.6.31.PF</b>	2/2 3/2	<b>Push button 2 positions (step - step)</b>						
<i>Lateral connections</i>				<i>Rear connections</i>						
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>T</b> 22 = 2 ways 32 = 3 ways</td></tr> <tr><td>CONNECTION TYPE</td></tr> <tr><td><b>P</b> L = Lateral P = Rear</td></tr> <tr><td>FUNCTION</td></tr> <tr><td><b>F</b> A = Normally Open C = Normally Closed</td></tr> </table>	TYPE	<b>T</b> 22 = 2 ways 32 = 3 ways	CONNECTION TYPE	<b>P</b> L = Lateral P = Rear	FUNCTION	<b>F</b> A = Normally Open C = Normally Closed		
TYPE										
<b>T</b> 22 = 2 ways 32 = 3 ways										
CONNECTION TYPE										
<b>P</b> L = Lateral P = Rear										
FUNCTION										
<b>F</b> A = Normally Open C = Normally Closed										
Weight gr. 60 Operating force 18N				Weight gr. 60 Operating force 18N						

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Push button 2 positions (step - step)</b>	5/2	<b>Ordering code</b> <b>104.52.6.31.P</b>	5/2	<b>Push button 2 positions (step - step)</b>		
<i>Lateral connections</i>				<i>Rear connections</i>		
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CONNECTION TYPE						
<b>P</b> L = Lateral P = Rear						
Weight gr. 110 Operating force 30N				Weight gr. 110 Operating force 30N		

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Raised Push button - Spring</b>	2/2 3/2	<b>Ordering code</b> <b>104.T.6.23/C.PF</b>	2/2 3/2	<b>Raised Push button - Spring</b>								
<i>Lateral connections</i>				<i>Rear connections</i>								
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>T</b> 22 = 2 ways 32 = 3 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><b>C</b> 1 = Red 2 = Black 3 = Green 4 = Yellow</td></tr> <tr><td>CONNECTION TYPE</td></tr> <tr><td><b>P</b> L = Lateral P = Rear</td></tr> <tr><td>FUNCTION</td></tr> <tr><td><b>F</b> A = Normally Open C = Normally Closed</td></tr> </table>	TYPE	<b>T</b> 22 = 2 ways 32 = 3 ways	BUTTON COLOR	<b>C</b> 1 = Red 2 = Black 3 = Green 4 = Yellow	CONNECTION TYPE	<b>P</b> L = Lateral P = Rear	FUNCTION	<b>F</b> A = Normally Open C = Normally Closed		
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CONNECTION TYPE												
<b>P</b> L = Lateral P = Rear												
FUNCTION												
<b>F</b> A = Normally Open C = Normally Closed												
Weight gr. 50 Operating force 18N				Weight gr. 50 Operating force 18N								

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube



1

<b>Raised Push button - Spring</b>	5/2	<b>Ordering code</b>	5/2	<b>Raised Push button - Spring</b>										
<i>Lateral connections</i>		<b>104.52.6.23/C.P</b>		<i>Rear connections</i>										
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">BUTTON COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> <tr><td>4 = Yellow</td></tr> <tr><td colspan="2">CONNECTION TYPE</td></tr> <tr><td>L = Lateral</td></tr> <tr><td>P = Rear</td></tr> </table>	BUTTON COLOR		1 = Red	2 = Black	3 = Green	4 = Yellow	CONNECTION TYPE		L = Lateral	P = Rear		
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1 = Red														
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CONNECTION TYPE														
L = Lateral														
P = Rear														
Weight gr. 105 Operating force 30N				Weight gr. 105 Operating force 30N										

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Palm button 2 position</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Palm button 2 position</b>												
<i>Lateral connections</i>		<b>104.1.6.25.P.F</b>		<i>Rear connections</i>												
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">TYPE</td></tr> <tr><td>22 = 2 ways</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td colspan="2">CONNECTION TYPE</td></tr> <tr><td>L = Lateral</td></tr> <tr><td>P = Rear</td></tr> <tr><td colspan="2">FUNCTION</td></tr> <tr><td>A = Normally Open</td></tr> <tr><td>C = Normally Closed</td></tr> </table>	TYPE		22 = 2 ways	32 = 3 ways	CONNECTION TYPE		L = Lateral	P = Rear	FUNCTION		A = Normally Open	C = Normally Closed		
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22 = 2 ways																
32 = 3 ways																
CONNECTION TYPE																
L = Lateral																
P = Rear																
FUNCTION																
A = Normally Open																
C = Normally Closed																
Weight gr. 65 Operating force 19N Emergency - Rotate to unlock				Weight gr. 65 Operating force 19N Emergency - Rotate to unlock												

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Palm button 2 position</b>	5/2	<b>Ordering code</b>	5/2	<b>Palm button 2 position</b>				
<i>Lateral connections</i>		<b>104.52.6.25.P</b>		<i>Rear connections</i>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">CONNECTION TYPE</td></tr> <tr><td>L = Lateral</td></tr> <tr><td>P = Rear</td></tr> </table>	CONNECTION TYPE		L = Lateral	P = Rear		
CONNECTION TYPE								
L = Lateral								
P = Rear								
Weight gr. 120 Operating force 32N Emergency - Rotate to unlock				Weight gr. 120 Operating force 32N Emergency - Rotate to unlock				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

1

<b>Switch - short lever</b>	2/2 3/2	<b>Ordering code</b> <b>104.1.6.30.PF</b>	2/2 3/2	<b>Switch - short lever</b>	
<i>Lateral connections</i>				<i>Rear connections</i>	
<p>Weight gr. 65 Switch 2 positions stable</p>		<p>Weight gr. 65 Switch 2 positions stable</p>			

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar ith Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Switch - short lever</b>	5/2	<b>Ordering code</b> <b>104.52.6.30.P</b>	5/2	<b>Switch - short lever</b>	
<i>Lateral connections</i>				<i>Rear connections</i>	
<p>Weight gr. 120 Switch 2 positions stable</p>		<p>Weight gr. 120 Switch 2 positions stable</p>			

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Switch - short lever</b>	5/3	<b>Ordering code</b> <b>104.53.F.6.30.S.P</b>	5/3	<b>Switch - short lever</b>	
<i>Lateral connections</i>				<i>Rear connections</i>	
<p>Weight gr. 120</p>		<p>Weight gr. 120</p>			

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube



1

<b>Switch - long lever</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Switch - long lever</b>
<i>Lateral connections</i>		<b>104.1.6.27.P.F</b>		<i>Rear connections</i>
		TYPE T 22 = 2 ways 32 = 3 ways CONNECTION TYPE P L = Lateral P = Rear FUNCTION F A = Normally Open C = Normally Closed		
Weight gr. 65 Switch 2 positions stable				Weight gr. 65 Switch 2 positions stable

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Switch - long lever</b>	5/2	<b>Ordering code</b>	5/2	<b>Switch - long lever</b>
<i>Lateral connections</i>		<b>104.52.6.27.P</b>		<i>Rear connections</i>
		CONNECTION TYPE P L = Lateral P = Rear		
Weight gr. 120 Switch 2 positions stable				Weight gr. 120 Switch 2 positions stable

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Switch - long lever</b>	5/3	<b>Ordering code</b>	5/3	<b>Switch - long lever</b>
<i>Lateral connections</i>		<b>104.53.F.6.27.S.P</b>		<i>Rear connections</i>
		FUNCTION F 32 = Open centres 33 = Pressured centres SWITCH POSITIONS S 0 = 3 pos. instable 1 = 3 pos. stable CONNECTION TYPE P L = Lateral P = Rear		
Weight gr. 120 Switch 2 positions stable				Weight gr. 120 Switch 2 positions stable

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

1

<b>Key switch</b>	2/2 3/2	<b>Ordering code</b> <b>104.T.6.28.P.F</b>	2/2 3/2	<b>Key switch</b>						
<i>Lateral connections</i>				<i>Rear connections</i>						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>T</b> 22 = 2 ways 32 = 3 ways</td></tr> <tr><td>CONNECTION TYPE</td></tr> <tr><td><b>P</b> L = Lateral P = Rear</td></tr> <tr><td>FUNCTION</td></tr> <tr><td><b>F</b> A = Normally Open C = Normally Closed</td></tr> </table>	TYPE	<b>T</b> 22 = 2 ways 32 = 3 ways	CONNECTION TYPE	<b>P</b> L = Lateral P = Rear	FUNCTION	<b>F</b> A = Normally Open C = Normally Closed		
TYPE										
<b>T</b> 22 = 2 ways 32 = 3 ways										
CONNECTION TYPE										
<b>P</b> L = Lateral P = Rear										
FUNCTION										
<b>F</b> A = Normally Open C = Normally Closed										
Weight gr. 100 Switch 2 positions stable				Weight gr. 100 Switch 2 positions stable						

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Key switch</b>	5/2	<b>Ordering code</b> <b>104.52.6.28.P</b>	5/2	<b>Key switch</b>		
<i>Lateral connections</i>				<i>Rear connections</i>		
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>CONNECTION TYPE</td></tr> <tr><td><b>P</b> L = Lateral P = Rear</td></tr> </table>	CONNECTION TYPE	<b>P</b> L = Lateral P = Rear		
CONNECTION TYPE						
<b>P</b> L = Lateral P = Rear						
Weight gr. 155 Switch 2 positions stable				Weight gr. 155 Switch 2 positions stable		

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Key switch</b>	5/3	<b>Ordering code</b> <b>104.53.F.6.28.S.P</b>	5/3	<b>Key switch</b>						
<i>Lateral connections</i>				<i>Rear connections</i>						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>FUNCTION</td></tr> <tr><td><b>F</b> 32 = Open centres 33 = Pressured centres</td></tr> <tr><td>SWITCH POSITIONS</td></tr> <tr><td><b>S</b> 0 = 3 pos. instable 1 = 3 pos. stable</td></tr> <tr><td>CONNECTION TYPE</td></tr> <tr><td><b>P</b> L = Lateral P = Rear</td></tr> </table>	FUNCTION	<b>F</b> 32 = Open centres 33 = Pressured centres	SWITCH POSITIONS	<b>S</b> 0 = 3 pos. instable 1 = 3 pos. stable	CONNECTION TYPE	<b>P</b> L = Lateral P = Rear		
FUNCTION										
<b>F</b> 32 = Open centres 33 = Pressured centres										
SWITCH POSITIONS										
<b>S</b> 0 = 3 pos. instable 1 = 3 pos. stable										
CONNECTION TYPE										
<b>P</b> L = Lateral P = Rear										
Weight gr. 155 Switch 2 positions stable				Weight gr. 155 Switch 2 positions stable						

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube





<b>Lever roller - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Lever roller - Spring</b>
<i>Lateral connections</i>		<b>104.T.2.1.P.F</b>		<i>Rear connections</i>
		<p>TYPE</p> <p><b>T</b> 22 = 2 ways 32 = 3 ways</p> <p>CONNECTION TYPE</p> <p><b>P</b> L = Lateral P = Rear</p> <p>FUNCTION</p> <p><b>F</b> A = Normally Open C = Normally Closed</p>		
Weight gr. 31 Operating force 9N				Weight gr. 31 Operating force 9N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Lever roller ball bearing - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Lever roller ball bearing - Spring</b>
<i>Lateral connections</i>		<b>104.T.2.1/1.P.F</b>		<i>Lateral connections</i>
		<p>TYPE</p> <p><b>T</b> 22 = 2 ways 32 = 3 ways</p> <p>CONNECTION TYPE</p> <p><b>P</b> L = Lateral P = Rear</p> <p>FUNCTION</p> <p><b>F</b> A = Normally Open C = Normally Closed</p>		
Weight gr. 46 Operating force 9N				Weight gr. 46 Operating force 9N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube

<b>Lever unidirectional - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Lever unidirectional - Spring</b>
<i>Lateral connections</i>		<b>104.T.3.1.P.F</b>		<i>Lateral connections</i>
		<p>TYPE</p> <p><b>T</b> 22 = 2 ways 32 = 3 ways</p> <p>CONNECTION TYPE</p> <p><b>P</b> L = Lateral P = Rear</p> <p>FUNCTION</p> <p><b>F</b> A = Normally Open C = Normally Closed</p>		
Weight gr. 31 Operating force 9N				Weight gr. 31 Operating force 9N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 - +70	90 NI/min	mm 2,5	ø4 tube



1

**Complete lever roller operator**

Ordering code	
<b>104.2.1</b>	

**Complete lever roller ball bearing operator**

Ordering code	
<b>104.2.1/1</b>	

**Complete lever unidirectional**

Ordering code	
<b>104.3.1</b>	


**Fixing plate**

Ordering code	
<b>104.00</b>	
Complete with fixing screws	

**Push button**

Ordering code	
<b>104.6.22/Ⓢ</b>	
BUTTON COLOR	
1 = Red	
Ⓢ 2 = Black	
3 = Green	
4 = Yellow	

**Raised Push button**

Ordering code	
<b>104.6.23/Ⓢ</b>	
BUTTON COLOR	
1 = Red	
Ⓢ 2 = Black	
3 = Green	
4 = Yellow	

**Push button 2 positions**

Ordering code	
<b>104.6.31</b>	
(step - step)	

**Palm button 2 position**

Ordering code	
<b>104.6.25</b>	
Emergency - Rotate to unlock	

**Switch - short lever**









Ordering code	
<b>104.6.30.Ⓢ</b>	
SWITCH POSITIONS	
Ⓢ 0 = 3 pos. instable	
1 = 3 pos. stable	
Switch 3 positions	

**Switch - short lever**

Ordering code	
<b>104.6.30</b>	
Switch 2 positions stable	



1

<b>Switch - long lever</b>		<b>Switch - long lever</b>	
Ordering code		Ordering code	
<b>104.6.27. S</b>		<b>104.6.27</b>	
SWITCH POSITIONS			
0 = 3 pos. instable 1 = 3 pos. stable			
Switch 3 positions		Switch 2 positions stable	
<b>Key switch</b>		<b>Key switch</b>	
Ordering code		Ordering code	
<b>104.6.28. S</b>		<b>104.6.28</b>	
SWITCH POSITIONS			
0 = 3 pos. instable 1 = 3 pos. stable			
Switch 3 positions		Switch 2 positions stable	
<b>Joystick selector switch</b>		<b>Complete Pneumatic Operator</b>	
Ordering code		Ordering code	
<b>104.6.39. S</b>		<b>104.11</b>	
SWITCH POSITIONS			
0 = 3 pos. instable			
<b>Contact electric element</b>		<b>Push button protection cover</b>	
Ordering code		Ordering code	
<b>104. F</b>		<b>104.02</b>	
FUNCTION			
F NA = Normally Open NC = Normally Closed			

## General

The series 105 consist of a broad range of miniature valves and valves with various type of actuation. The connections are M5 for this series.

Due to their special construction with a balanced spool, these valves can be used interchangeably as 3 ways or 5 ways as can be seen in the functional schematics in section 0. This is important because, for example, the 3 ways can be used normally closed or normally open and the 5 ways can be fed through the exhausts 3 and 5 with different pressures according to the need. The spool, as it is moving, isolates the connections without being effected by the inlet pressure.

## Construction characteristics

	M5	G 1/8" - G 1/4" - G 1/2" - G 1"
Body	Aluminium	Aluminium
Actuators	Nickel plated brass Stainless steel for roller levers and button levers. Zinc plated steel for side levers Plastic material for handles, buttons, switches	Aluminium
Seals	NBR	NBR
Spacer	Acetal resin	Technopolymer (Aluminium for G 1")
Spool	Stainless steel	Stainless steel / Technopolymer
Bottom plates		Technopolymer
Spring	Spring steel	Spring steel

## Use and maintenance

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

**ATTENTION:** use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).



1

<b>Tappet panel - Spring</b>	3/2	Ordering code <b>105.1.0.1</b>	5/2	<b>Tappet panel - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 70 Operating force 14 N				Weight gr. 87 Operating force 14 N				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Lever roller - Spring</b>	3/2	Ordering code <b>105.1.2.1</b>	5/2	<b>Lever roller - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 85 Operating force 6 N				Weight gr. 102 Operating force 6 N				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Lever roller ball bearing - Spring</b>	3/2	Ordering code <b>105.1.2.1/1</b>	5/2	<b>Lever roller ball bearing - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 100 Operating force 6 N				Weight gr. 177 Operating force 6 N				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

1

Lever button - Spring

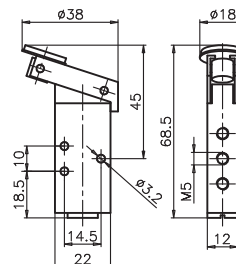
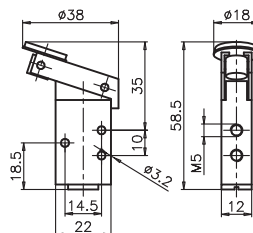
3/2

Ordering code

105.1.2.6/C

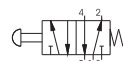
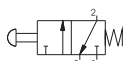
5/2

Lever button - Spring



- TYPE
- 32 = 3 ways
  - 52 = 5 ways
- BUTTON COLOR
- 1 = Red
  - 2 = Black
  - 3 = Green

Weight gr. 85  
Operating force 6 N



Weight gr. 102  
Operating force 6 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Lever unidirectional - Spring

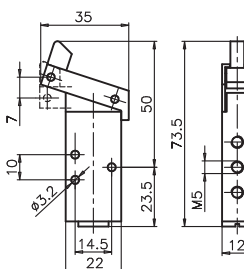
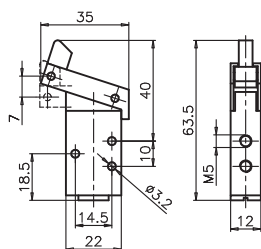
3/2

Ordering code

105.1.3.1

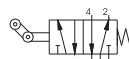
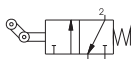
5/2

Lever unidirectional - Spring



- TYPE
- 32 = 3 ways
  - 52 = 5 ways

Weight gr. 85  
Operating force 6 N



Weight gr. 102  
Operating force 6 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Lever panel Ø22 - 2 positions

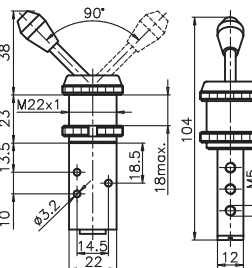
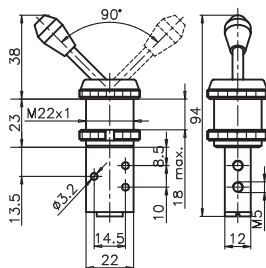
3/2

Ordering code

105.1.4/C

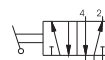
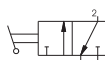
5/2

Lever panel Ø22 - 2 positions



- TYPE
- 32 = 3 ways
  - 52 = 5 ways
- BUTTON COLOR
- 1 = Red
  - 2 = Black
  - 3 = Green

Weight gr. 125




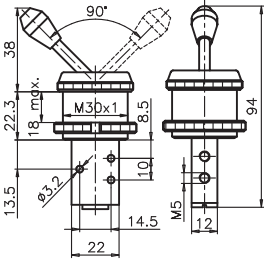
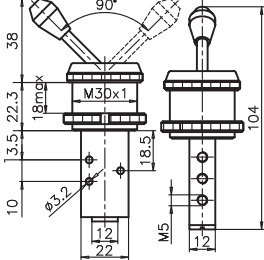

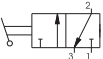
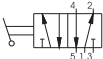
Weight gr. 142

Operational characteristic


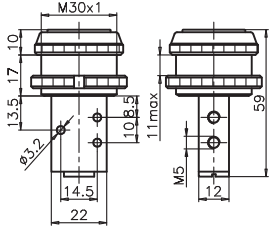
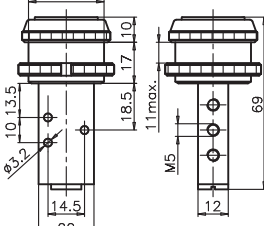

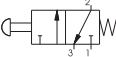
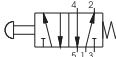
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5




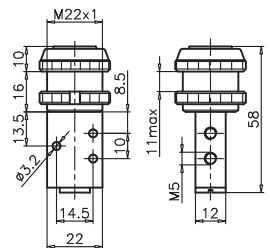
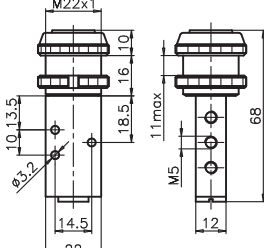

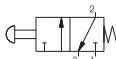

1

<b>Lever panel Ø30 - 2 positions</b>	3/2	<b>Ordering code</b> <b>105.1.5/C</b>	5/2	<b>Lever panel Ø30 - 2 positions</b>
		<p><b>TYPE</b></p> <p><b>T</b> 32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b> 1 = Red 2 = Black 3 = Green</p>		
Weight gr. 165				Weight gr. 182

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Push button Ø30 - Spring</b>	3/2	<b>Ordering code</b> <b>105.1.6.1/C</b>	5/2	<b>Push button Ø30 - Spring</b>
		<p><b>TYPE</b></p> <p><b>T</b> 32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b> 1 = Red 2 = Black 3 = Green</p>		
Weight gr. 123 Operating force 14 N				Weight gr. 140 Operating force 14 N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Push button Ø22 - Spring</b>	3/2	<b>Ordering code</b> <b>105.1.6.2/C</b>	5/2	<b>Push button Ø22 - Spring</b>
		<p><b>TYPE</b></p> <p><b>T</b> 32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b> 1 = Red 2 = Black 3 = Green</p>		
Weight gr. 102 Operating force 14 N				Weight gr. 119 Operating force 14 N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

1

Push button - Spring

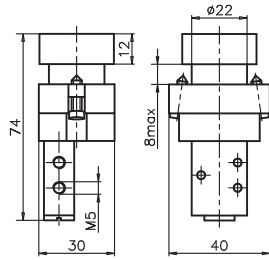
3/2

Ordering code

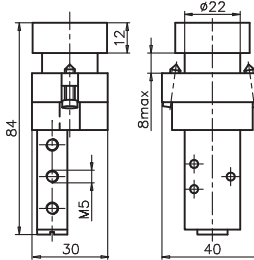
105. **T**.6.22/ **C**

5/2

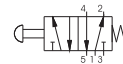
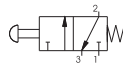
Push button - Spring



- TYPE  
**T** 32 = 3 ways  
 52 = 5 ways  
 BUTTON COLOR  
**C** 1 = Red  
 2 = Black  
 3 = Green  
 4 = Yellow



Weight gr. 165  
 Operating force 14 N



Weight gr. 182  
 Operating force 14 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Raised Push button - Spring

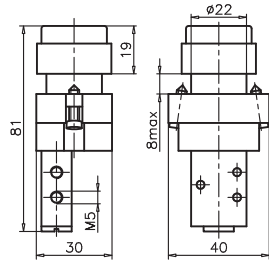
3/2

Ordering code

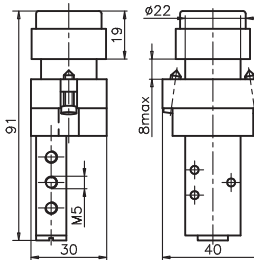
105. **T**.6.23/ **C**

5/2

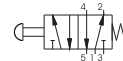
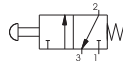
Raised Push button - Spring



- TYPE  
**T** 32 = 3 ways  
 52 = 5 ways  
 BUTTON COLOR  
**C** 1 = Red  
 2 = Black  
 3 = Green  
 4 = Yellow



Weight gr. 170  
 Operating force 14 N



Weight gr. 187  
 Operating force 14 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Switch 2 positions

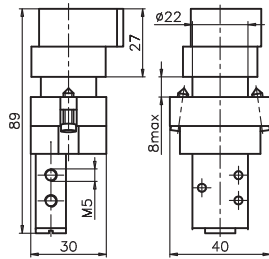
3/2

Ordering code

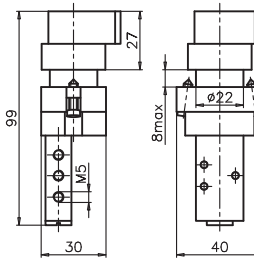
105. **T**.6.27

5/2

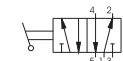
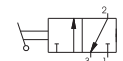
Switch 2 positions



- TYPE  
**T** 32 = 3 ways  
 52 = 5 ways



Weight gr. 185





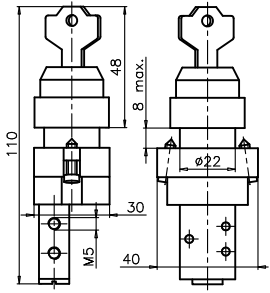
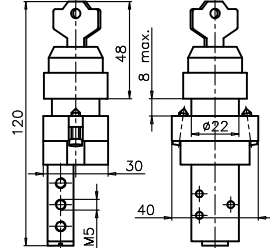
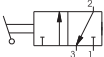

Weight gr. 202

Operational characteristic



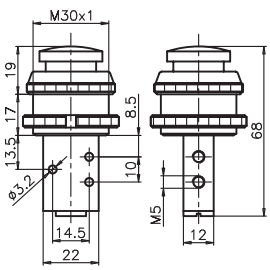
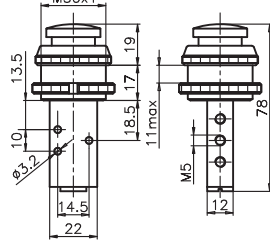
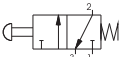
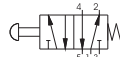
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5





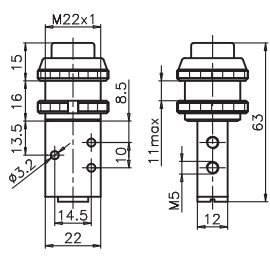
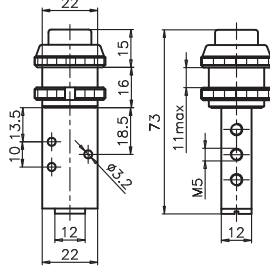
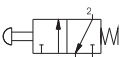
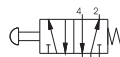
1

<b>Key switch 2 positions</b>	3/2	Ordering code <b>105.1.6.28</b>	5/2	<b>Key switch 2 positions</b>
		TYPE <b>1</b> 32 = 3 ways 52 = 5 ways		
				
Weight gr. 215				Weight gr. 232
				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Palm pushbutton Ø30 - Spring</b>	3/2	Ordering code <b>105.1.7.1/C</b>	5/2	<b>Palm pushbutton Ø30 - Spring</b>
		TYPE <b>1</b> 32 = 3 ways 52 = 5 ways BUTTON COLOR <b>C</b> 1 = Red 2 = Black 3 = Green		
				
Weight gr. 126 Operating force 14 N				Weight gr. 143 Operating force 14 N
				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

<b>Palm pushbutton Ø22 - Spring</b>	3/2	Ordering code <b>105.1.7.2/C</b>	5/2	<b>Palm pushbutton Ø22 - Spring</b>
		TYPE <b>1</b> 32 = 3 ways 52 = 5 ways BUTTON COLOR <b>C</b> 1 = Red 2 = Black 3 = Green		
				
Weight gr. 103 Operating force 14 N				Weight gr. 120 Operating force 14 N
				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5



1

Push button - Spring

3/2

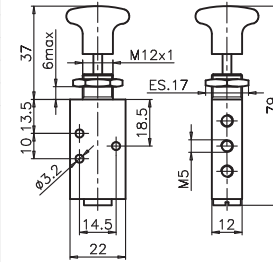
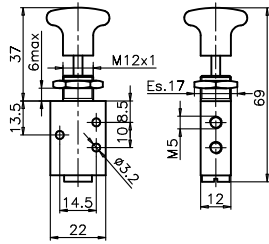
Ordering code

105. **T.8.1/C**

- TYPE
- T** 32 = 3 ways
  - 52 = 5 ways
- BUTTON COLOR
- C** 1 = Red
  - 2 = Black
  - 3 = Green

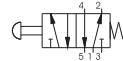
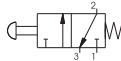
5/2

Push button - Spring



Weight gr. 75  
Operating force 14 N

Weight gr. 92  
Operating force 14 N



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Push button 2 positions

3/2

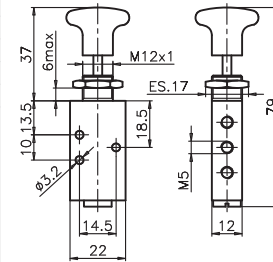
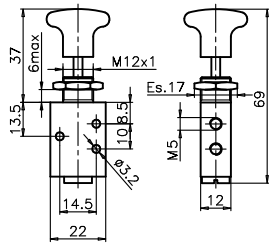
Ordering code

105. **T.8/C**

- TYPE
- T** 32 = 3 ways
  - 52 = 5 ways
- BUTTON COLOR
- C** 1 = Red
  - 2 = Black
  - 3 = Green

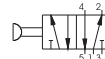
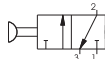
5/2

Push button 2 positions



Weight gr. 75  
Operating force 14 N

Weight gr. 92  
Operating force 14 N



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5

Whisker - Spring

3/2

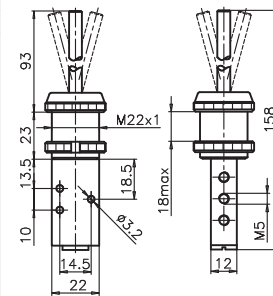
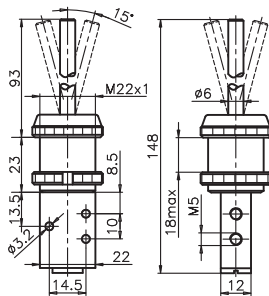
Ordering code

105. **T.9.1**

- TYPE
- T** 32 = 3 ways
  - 52 = 5 ways

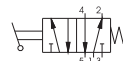
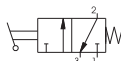
5/2

Whisker - Spring



Weight gr. 136

Weight gr. 153



Operational characteristic

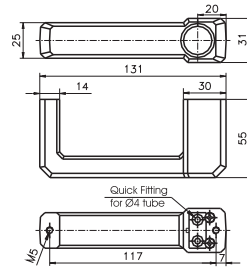
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5



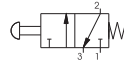
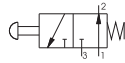
3/2

Handle with valve

Ordering code
<b>105.32.6.40</b>
FUNCTION
<b>F</b> A = Normally Open
C = Normally Closed



Weight gr. 165  
Operating force 14 N



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5 - Quick Fitting for Ø4 tube

Handle with valve

5/2

Ordering code

5/2

Handle with valve

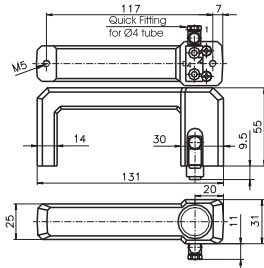
Left feeding

Right feeding

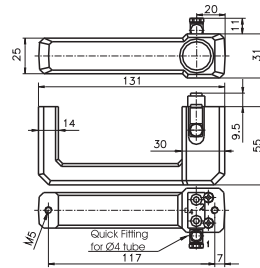
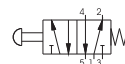
**105.52.6.**

TYPE

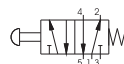
- T** 40 = Left feeding
- 40D = Right feeding



Weight gr. 190  
Operating force 14 N



Weight gr. 190  
Operating force 14 N



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5 - Quick Fitting for Ø4 tube



1

## General

The series 200 consist of a broad range of valves with various type of actuation. The connections for this series are from G 1/8" to G 1".

Due to their special construction with a balanced spool, these valves can be used interchangeably as 3 ways or 5 ways as can be seen in the functional schematics in section 0. This is important because, for example, the 3 ways can be used normally closed or normally open and the 5 ways can be fed through the exhausts 3 and 5 with different pressures according to the need. The spool, as it is moving, isolates the connections without being effected by the inlet pressure.

The main components constituting the valves of the Tecno228 series are manufactured with high performance technopolymer. The use of technopolymer has resulted in a light weight product which can be offered to the market at very interesting prices. This valve series is manufactured with 1/8" connections, 3 and 5 ways function, mechanical or pneumatically operated, monostable spring or pneumatic return, bistable and in 5 ways 3 positions version with closed, open and pressured centres. This series is completely interchangeable with the standard 228 series (with alluminium body).

## Construction characteristics

	G 1/8" - G 1/4" - G 1/2" - G 1"	G 1/8" (in Technopolymer T228 Series)
Body	Aluminium	Technopolymer
Actuators	Aluminium Technopolymer	Technopolymer
Spool	Stainless steel Technopolymer	Technopolymer (5/2 version) Nickel plated steel (5/3 version)
Seals	NBR	NBR
Spacers	Technopolymer (Aluminium for G 1")	Technopolymer
Spring	Spring steel	Spring steel
Pistons	Technopolymer	Technopolymer

## Maximum fitting torque (for T228 Series)

Thread	Maximum Torque (Nm)
G 1/8"	4

## Use and maintenance

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

**ATTENTION:** use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).



1

<b>Tappet - Spring</b>	3/2	Ordering code <b>228.1.0.1</b>	5/2	<b>Tappet - Spring</b>				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>1 32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	1 32 = 3 ways	52 = 5 ways		
				TYPE				
1 32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 85 Operating force 33 N</p>				<p>Weight gr. 105 Operating force 33 N</p>				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"

<b>Tappet panel - Spring</b>	3/2	Ordering code <b>228.1.1.1</b>	5/2	<b>Tappet panel - Spring</b>				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>1 32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	1 32 = 3 ways	52 = 5 ways		
				TYPE				
1 32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 102 Operating force 33 N</p>				<p>Weight gr. 122 Operating force 33 N</p>				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"

<b>Lever roller - Spring</b>	3/2	Ordering code <b>228.1.2.V</b>	5/2	<b>Lever roller - Spring</b>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>1 32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> <tr> <td style="text-align: center;">VERSION</td> </tr> <tr> <td>1 = Plastic roller</td> </tr> <tr> <td>1/2 = Metal roller</td> </tr> </table>		TYPE	1 32 = 3 ways	52 = 5 ways	VERSION	1 = Plastic roller	1/2 = Metal roller		
				TYPE							
1 32 = 3 ways											
52 = 5 ways											
VERSION											
1 = Plastic roller											
1/2 = Metal roller											
<p>Weight gr. 115 Operating force 15 N</p>				<p>Weight gr. 135 Operating force 15 N</p>							

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"

1

Lever roller ball bearing - Spring

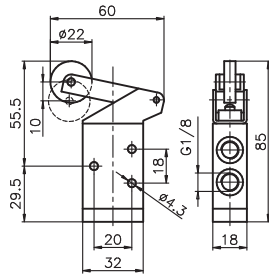
3/2

Ordering code

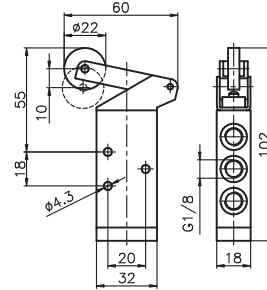
228.1.2.1/1

5/2

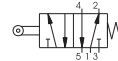
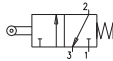
Lever roller ball bearing - Spring



TYPE
32 = 3 ways
52 = 5 ways



Weight gr. 130  
Operating force 15 N



Weight gr. 150  
Operating force 15 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

Lever button - Spring

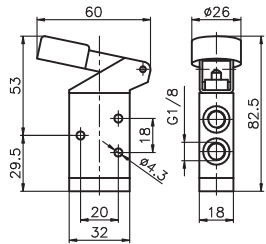
3/2

Ordering code

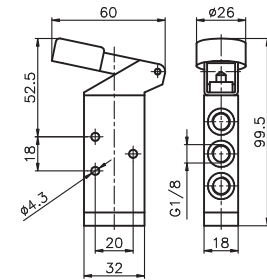
228.1.2.6/C

5/2

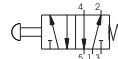
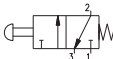
Lever button - Spring



TYPE
32 = 3 ways
52 = 5 ways
BUTTON COLOR
1 = Red
2 = Black
3 = Green



Weight gr. 120  
Operating force 15 N



Weight gr. 120  
Operating force 15 N

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

Switch lateral 2 positions

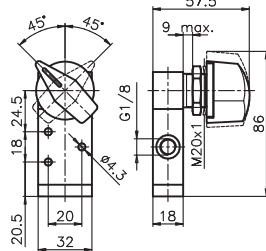
3/2

Ordering code

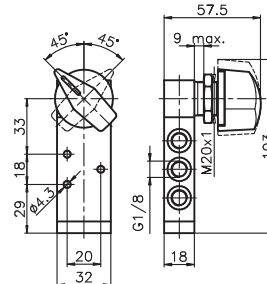
228.1.27

5/2

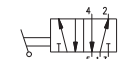
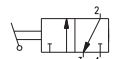
Switch lateral 2 positions



TYPE
32 = 3 ways
52 = 5 ways



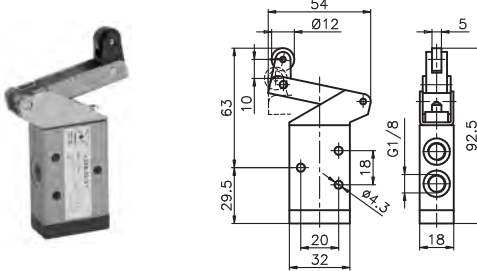
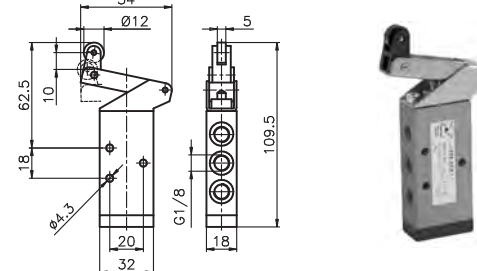
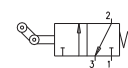
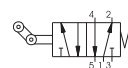
Weight gr. 190

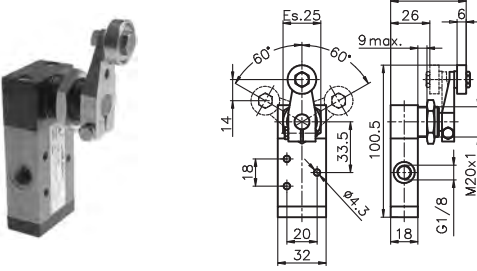
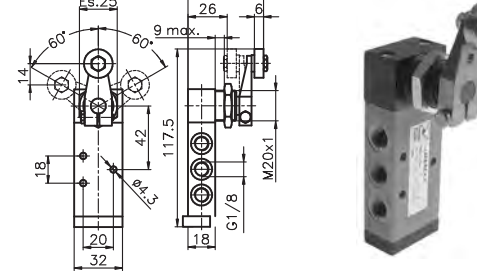
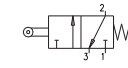
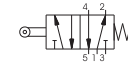


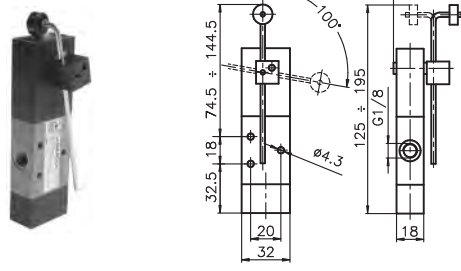
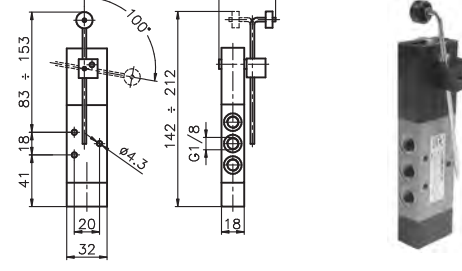
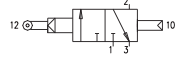
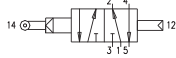
Weight gr. 210

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

<b>Lever roller unidirectional - Spring</b>	3/2	<b>Ordering code</b>	5/2	<b>Lever roller unidirectional - Spring</b>	
		<b>228.1.3.V</b>			
		TYPE 1 32 = 3 ways 52 = 5 ways VERSION 1 = Plastic roller 1/2 = Metal roller			
Weight gr. 110					
<b>Operational characteristic</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

<b>Lever roller lateral bidirectional - Spring</b>	3/2	<b>Ordering code</b>	5/2	<b>Lever roller lateral bidirectional - Spring</b>	
		<b>228.1.4.1</b>			
		TYPE 1 32 = 3 ways 52 = 5 ways			
Weight gr. 180					
<b>Operational characteristic</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

<b>Lever sensitive - differential</b>	3/2	<b>Ordering code</b>	5/2	<b>Lever sensitive - differential</b>	
		<b>228.1.4.13</b>			
		TYPE 1 32 = 3 ways 52 = 5 ways			
Weight gr. 200 Minimum rotation angle 11° Minimum working pressure 2,5 bar					
<b>Operational characteristic</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

Weight gr. 220  
Minimum rotation angle 11°  
Minimum working pressure 2,5 bar

1

<b>Lever panel Ø30 - 2 positions</b> 	<b>3/2</b> <b>Ordering code</b> <b>228.1.5/C</b> TYPE 32 = 3 ways 52 = 5 ways BUTTON COLOR 1 = Red 2 = Black 3 = Green	<b>5/2</b> <b>Lever panel Ø30 - 2 positions</b> 
Weight gr. 198 		Weight gr. 218 

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

<b>Lever front - 2 positions</b> 	<b>3/2</b> <b>Ordering code</b> <b>228.1.55/C</b> TYPE 32 = 3 ways 52 = 5 ways BUTTON COLOR 1 = Red 2 = Black 3 = Green	<b>5/2</b> <b>Lever front - 2 positions</b> 
Weight gr. 115 		Weight gr. 135 

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"


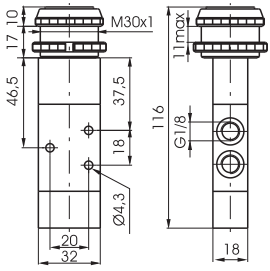
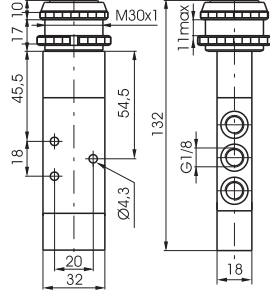

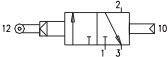
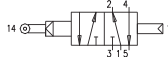
<b>Push button Ø30 - Spring</b> 	<b>3/2</b> <b>Ordering code</b> <b>228.1.6.1/C</b> TYPE 32 = 3 ways 52 = 5 ways BUTTON COLOR 1 = Red 2 = Black 3 = Green	<b>5/2</b> <b>Push button Ø30 - Spring</b> 
Weight gr. 155 Operating force 33 N 		Weight gr. 175 Operating force 33 N 

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"


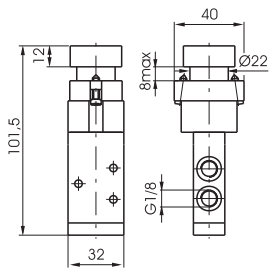
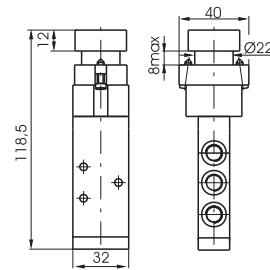






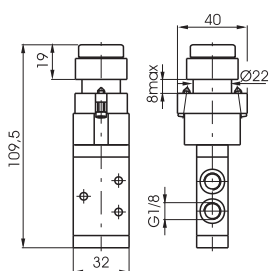
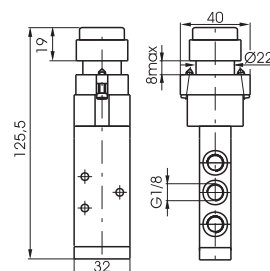

1

<b>Sensitive pushbutton Ø30 - differential</b>	3/2	<b>Ordering code</b> <b>228.1.6.13/C</b>	5/2	<b>Sensitive pushbutton Ø30 - differential</b>
		<p><b>TYPE</b></p> <p><b>T</b></p> <p>32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b></p> <p>1 = Red 2 = Black 3 = Green</p>		
Weight gr. 197 Operating force 18,5N (at 6 bar)				Weight gr. 217 Operating force 18,5N (at 6 bar)

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"

<b>Push button - Spring</b>	3/2	<b>Ordering code</b> <b>228.1.6.22/C</b>	5/2	<b>Push button - Spring</b>
		<p><b>TYPE</b></p> <p><b>T</b></p> <p>32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b></p> <p>1 = Red 2 = Black 3 = Green 4 = Yellow</p>		
Weight gr. 225 Operating force 33N				Weight gr. 245 Operating force 33N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"

<b>Raised pushbutton Ø22 - Spring</b>	3/2	<b>Ordering code</b> <b>228.1.6.23/C</b>	5/2	<b>Raised pushbutton Ø22 - Spring</b>
		<p><b>TYPE</b></p> <p><b>T</b></p> <p>32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b></p> <p>1 = Red 2 = Black 3 = Green 4 = Yellow</p>		
Weight gr. 230 Operating force 33N				Weight gr. 250 Operating force 33N

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"



1

Push button Ø22 - 2 positions

3/2

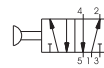
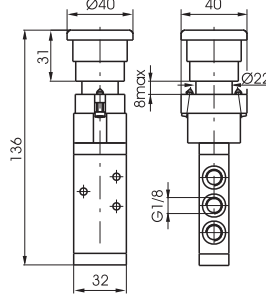
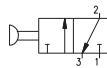
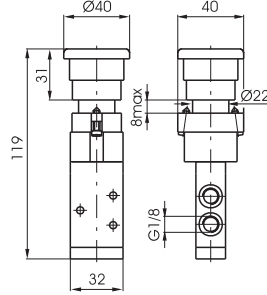
Ordering code

**228. 6.25**

TYPE  
32 = 3 ways  
52 = 5 ways

5/2

Push button Ø22 - 2 positions



Weight gr. 235  
Operating force 33N  
Emergency - Rotate to unlock

Weight gr. 235  
Operating force 33N  
Emergency - Rotate to unlock

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

Switch 2 positions

3/2

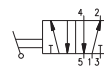
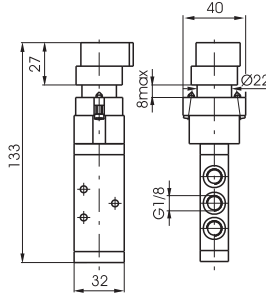
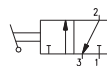
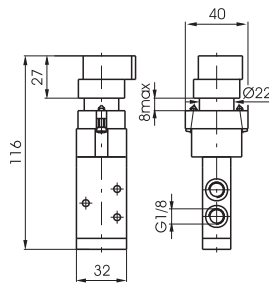
Ordering code

**228. 6.27**

TYPE  
32 = 3 ways  
52 = 5 ways

5/2

Switch 2 positions



Weight gr. 230

Weight gr. 250

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

Key switch 2 positions

3/2

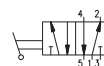
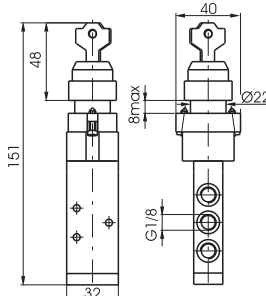
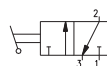
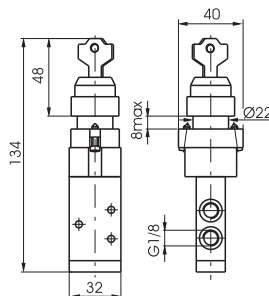
Ordering code

**228. 6.28**

TYPE  
32 = 3 ways  
52 = 5 ways

5/2

Key switch 2 positions



Weight gr. 230

Weight gr. 250

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"



1

<b>Palm pushbutton Ø30 2 positions</b>	3/2	<b>Ordering code</b> <b>228.1.7.1/C</b>	5/2	<b>Palm pushbutton Ø30 2 positions</b>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>1</b> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><b>C</b> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<b>1</b> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<b>C</b> 1 = Red	2 = Black	3 = Green		
TYPE											
<b>1</b> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<b>C</b> 1 = Red											
2 = Black											
3 = Green											
<p>Weight gr. 148 Operating force 33N</p>				<p>Weight gr. 168 Operating force 33N</p>							

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"


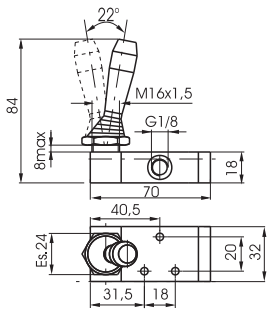

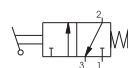
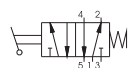
<b>Push button - Spring</b>	3/2	<b>Ordering code</b> <b>228.1.8.1/C</b>	5/2	<b>Push button - Spring</b>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>1</b> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><b>C</b> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<b>1</b> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<b>C</b> 1 = Red	2 = Black	3 = Green		
TYPE											
<b>1</b> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<b>C</b> 1 = Red											
2 = Black											
3 = Green											
<p>Weight gr. 120 Operating force 33N</p>				<p>Weight gr. 140 Operating force 33N</p>							

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"


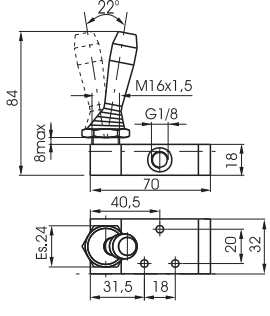

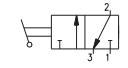
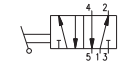
<b>Push button 2 positions</b>	3/2	<b>Ordering code</b> <b>228.1.8/C</b>	5/2	<b>Push button 2 positions</b>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><b>1</b> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><b>C</b> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<b>1</b> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<b>C</b> 1 = Red	2 = Black	3 = Green		
TYPE											
<b>1</b> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<b>C</b> 1 = Red											
2 = Black											
3 = Green											
<p>Weight gr. 120 Operating force 10N</p>				<p>Weight gr. 140 Operating force 10N</p>							

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 Nl/min	mm 6	G 1/8"


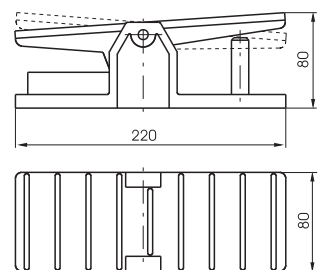
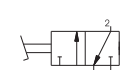
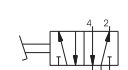
1

<b>Lever lateral - Spring</b>	3/2	Ordering code <b>228.1.9.1/C</b>	5/2	<b>Lever lateral - Spring</b>
				
		<p><b>T</b> TYPE</p> <p>32 = 3 ways 52 = 5 ways</p> <p><b>C</b> BUTTON COLOR</p> <p>1 = Red 2 = Black 3 = Green</p>		
Weight gr. 140				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

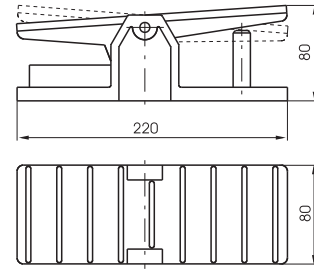
<b>Lever lateral 2 positions</b>	3/2	Ordering code <b>228.1.9/C</b>	5/2	<b>Lever lateral 2 positions</b>
				
		<p><b>T</b> TYPE</p> <p>32 = 3 ways 52 = 5 ways</p> <p><b>C</b> BUTTON COLOR</p> <p>1 = Red 2 = Black 3 = Green</p>		
Weight gr. 140				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

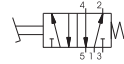
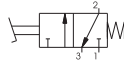
<b>Pedal aluminium 2 positions</b>					3/2 5/2
Ordering code <b>228.1.10</b>					
<p><b>T</b> TYPE</p> <p>32 = 3 ways 52 = 5 ways</p>					
Weight gr. 790 (3/2) Weight gr. 810 (5/2)					
Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Pedal aluminium - Spring**

Ordering code
<b>228.10.1</b>
TYPE
<b>T</b> 32 = 3 ways
52 = 5 ways



Weight gr. 790 (3/2)  
Weight gr. 810 (5/2)

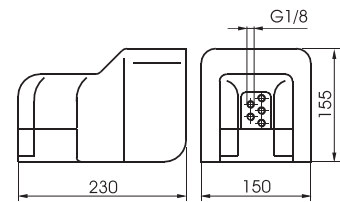


**Operational characteristic**

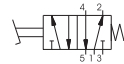
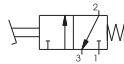
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Pedal protected - Spring**

Ordering code
<b>228.10.V</b>
TYPE
<b>T</b> 32 = 3 ways
52 = 5 ways
VERSION
<b>V</b> 1/1 = Standard version
2/1 = without safety device



Weight gr. 1.120

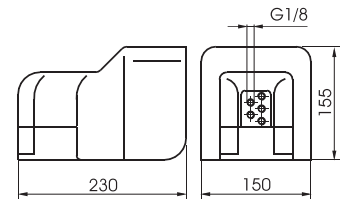


**Operational characteristic**

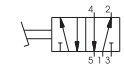
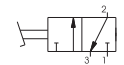
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Pedal protected 2 positions**

Ordering code
<b>228.10/1</b>
TYPE
<b>T</b> 32 = 3 ways
52 = 5 ways



Weight gr. 1.120

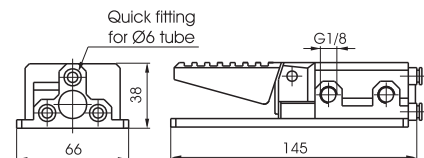


**Operational characteristic**

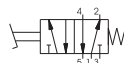
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Pedal plastic miniaturized - Spring**

Ordering code
<b>228.52.10.F</b>
FUNCTION
<b>F</b> 1P = Standard version
1PX = Stainless steel spool



Weight gr. 230

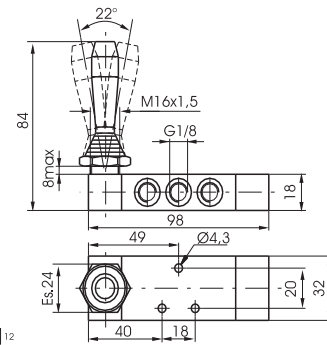
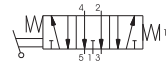
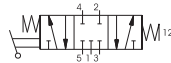


**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Lever lateral spring centre 3 positions**

Ordering code	
<b>228.53.F.9.1/C</b>	
FUNCTION	
<b>F</b>	31 = Closed centres
	32 = Open centres
BUTTON COLOR	
<b>C</b>	1 = Red
	2 = Black
	3 = Green
Weight gr. 190	

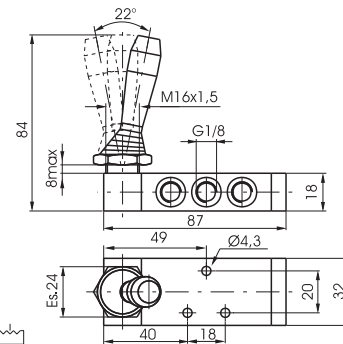
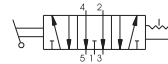
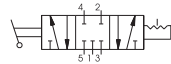


**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	410 NI/min	mm 6	G 1/8"

**Lever lateral 3 positions detent**

Ordering code	
<b>228.53.F.9/C</b>	
FUNCTION	
<b>F</b>	31 = Closed centres
	32 = Open centres
BUTTON COLOR	
<b>C</b>	1 = Red
	2 = Black
	3 = Green
Weight gr. 160	

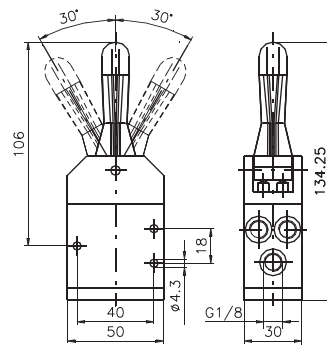


**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	410 NI/min	mm 6	G 1/8"

**Lever central (spring 3 pos.) Operator, Levar, Spole in Technopolymer**

Ordering code	
<b>228.53.32.99P/C</b>	
LEVER COLOR	
<b>C</b>	1 = Red
	2 = Black
Weight gr. 140	

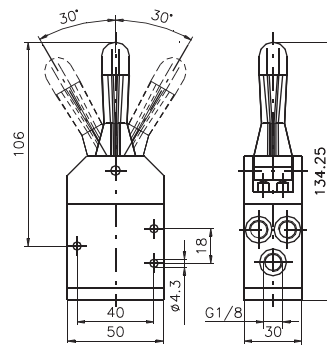
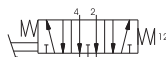


**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +70	410	6	G 1/8"

**Lever central (spring 3 pos.) Levar in Technopolymer**

Ordering code	
<b>228.53.32.99/C</b>	
LEVER COLOR	
<b>C</b>	1 = Red
	2 = Black
Weight gr. 140	



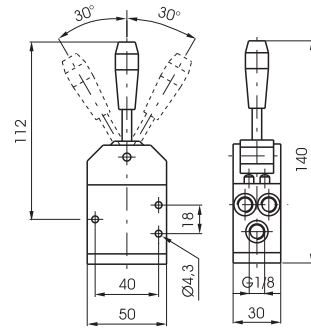
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +70	410	6	G 1/8"

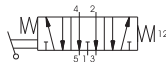
**Lever central Metal (spring 3 pos.) One position stable**

5/3

Ordering code
<b>228.53.32.99/CS</b>
LEVER COLOR
1 = Red
2 = Black



Weight gr. 140



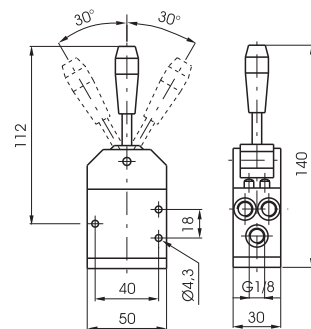
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +70	410	6	G 1/8"

**Lever central Metal**

5/3

Ordering code
<b>228.53.32.99.F/C</b>
FUNCTION
2 = 2 Stable positions
3 = 3 Stable positions
LEVER COLOR
1 = Red
2 = Black



Weight gr. 140



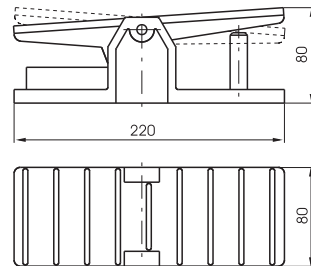
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +70	410	6	G 1/8"

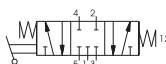
**Pedal - Spring 3 positions**

5/3

Ordering code
<b>228.53.F.10.1</b>
FUNCTION
31 = Closed centres
32 = Open centres



Weight gr. 810



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	410 NI/min	mm 6	G 1/8"

1

<b>Plunger - Spring</b>	3/2	Ordering code <b>T228.1.0.1</b>	5/2	<b>Plunger - Spring</b>
		<b>T</b> TYPE 32 = 3 ways 52 = 5 ways		
Weight gr. 60 Operating force 33 N				Weight gr. 72 Operating force 33 N

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Plunger - Spring</b>	3/2	Ordering code <b>T228.1.1.1</b>	5/2	<b>Plunger - Spring</b>
<i>for panel mounting</i>		<b>T</b>		<i>for panel mounting</i>
		TYPE 32 = 3 ways 52 = 5 ways		
Weight gr. 77 Operating force 33 N				Weight gr. 90 Operating force 33 N

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Roller lever - Spring</b>	3/2	Ordering code <b>T228.1.2.V</b>	5/2	<b>Roller lever - Spring</b>
		<b>T</b>		
		TYPE 32 = 3 ways 52 = 5 ways  VERSION 1 = Plastic roller 1/2 = Ball bearing		
Weight gr. 90 Operating force 15 N				Weight gr. 102 Operating force 15 N

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"



<b>Roller lever (ball bearings) - Spring</b>	3/2	<b>Ordering code</b> <b>T228.1.2.1/1</b>	5/2	<b>Roller lever (ball bearings) - Spring</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"><b>TYPE</b></td> </tr> <tr> <td style="text-align: center;">1</td> <td>32 = 3 ways</td> </tr> <tr> <td style="text-align: center;">2</td> <td>52 = 5 ways</td> </tr> </table>		<b>TYPE</b>		1	32 = 3 ways	2	52 = 5 ways		
				<b>TYPE</b>							
1	32 = 3 ways										
2	52 = 5 ways										
Weight gr. 105 Operating force 15 N				Weight gr. 117 Operating force 15 N							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Button lever - Spring</b>	3/2	<b>Ordering code</b> <b>T228.1.2.6/C</b>	5/2	<b>Button lever - Spring</b>															
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"><b>TYPE</b></td> </tr> <tr> <td style="text-align: center;">1</td> <td>32 = 3 ways</td> </tr> <tr> <td style="text-align: center;">2</td> <td>52 = 5 ways</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>BUTTON COLOR</b></td> </tr> <tr> <td style="text-align: center;">1</td> <td>Red</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Black</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Green</td> </tr> </table>		<b>TYPE</b>		1	32 = 3 ways	2	52 = 5 ways	<b>BUTTON COLOR</b>		1	Red	2	Black	3	Green		
				<b>TYPE</b>															
1	32 = 3 ways																		
2	52 = 5 ways																		
<b>BUTTON COLOR</b>																			
1	Red																		
2	Black																		
3	Green																		
Weight gr. 95 Operating force 15 N				Weight gr. 87 Operating force 15 N															

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>One way Roller lever - Spring</b>	3/2	<b>Ordering code</b> <b>T228.1.3.V</b>	5/2	<b>One way Roller lever - Spring</b>													
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"><b>TYPE</b></td> </tr> <tr> <td style="text-align: center;">1</td> <td>32 = 3 ways</td> </tr> <tr> <td style="text-align: center;">2</td> <td>52 = 5 ways</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>VERSION</b></td> </tr> <tr> <td style="text-align: center;">1</td> <td>Plastic roller</td> </tr> <tr> <td style="text-align: center;">1/2</td> <td>Ball bearing</td> </tr> </table>		<b>TYPE</b>		1	32 = 3 ways	2	52 = 5 ways	<b>VERSION</b>		1	Plastic roller	1/2	Ball bearing		
				<b>TYPE</b>													
1	32 = 3 ways																
2	52 = 5 ways																
<b>VERSION</b>																	
1	Plastic roller																
1/2	Ball bearing																
Weight gr. 85				Weight gr. 97													

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"



1

<b>Toggle Lever (for panel mounting) Ø 30</b> 2 positions	3/2	<b>Ordering code</b> <b>T228.1.5/C</b>	5/2	<b>Toggle Lever (for panel mounting) Ø 30</b> 2 positions
		<ul style="list-style-type: none"> <li><b>T</b> TYPE</li> <li>32 = 3 ways</li> <li>52 = 5 ways</li> <li><b>C</b> BUTTON COLOR</li> <li>1 = Red</li> <li>2 = Black</li> <li>3 = Green</li> </ul>		
Weight gr. 168				Weight gr. 180

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Toggle Lever - 2 positions</b>	3/2	<b>Ordering code</b> <b>T228.1.55/C</b>	5/2	<b>Toggle Lever - 2 positions</b>
		<ul style="list-style-type: none"> <li><b>T</b> TYPE</li> <li>32 = 3 ways</li> <li>52 = 5 ways</li> <li><b>C</b> BUTTON COLOR</li> <li>1 = Red</li> <li>2 = Black</li> <li>3 = Green</li> </ul>		
Weight gr. 84				Weight gr. 96

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Push button Ø 30 - spring</b>	3/2	<b>Ordering code</b> <b>T228.1.6.1/C</b>	5/2	<b>Push button Ø 30 - spring</b>
		<ul style="list-style-type: none"> <li><b>T</b> TYPE</li> <li>32 = 3 ways</li> <li>52 = 5 ways</li> <li><b>C</b> BUTTON COLOR</li> <li>1 = Red</li> <li>2 = Black</li> <li>3 = Green</li> </ul>		
Weight gr. 125 Operating force 33 N				Weight gr. 137 Operating force 33 N

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"



1

<b>Push button - spring</b>	3/2	<b>Ordering code</b>	5/2	<b>Push button - spring</b>							
		<b>T228.1.6.22/C</b>									
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>1 32 = 3 ways</td></tr> <tr><td>2 52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> <tr><td>4 = Yellow</td></tr> </table>			TYPE	1 32 = 3 ways	2 52 = 5 ways	BUTTON COLOR	1 = Red	2 = Black	3 = Green
TYPE											
1 32 = 3 ways											
2 52 = 5 ways											
BUTTON COLOR											
1 = Red											
2 = Black											
3 = Green											
4 = Yellow											
Weight gr. 200 Operating force 33N				Weight gr. 212 Operating force 33N							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Raised Push button - spring</b>	3/2	<b>Ordering code</b>	5/2	<b>Raised Push button - spring</b>							
		<b>T228.1.6.23/C</b>									
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>1 32 = 3 ways</td></tr> <tr><td>2 52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> <tr><td>4 = Yellow</td></tr> </table>			TYPE	1 32 = 3 ways	2 52 = 5 ways	BUTTON COLOR	1 = Red	2 = Black	3 = Green
TYPE											
1 32 = 3 ways											
2 52 = 5 ways											
BUTTON COLOR											
1 = Red											
2 = Black											
3 = Green											
4 = Yellow											
Weight gr. 205 Operating force 33N				Weight gr. 217 Operating force 33N							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Palm button - 2 positions</b>	3/2	<b>Ordering code</b>	5/2	<b>Palm button - 2 positions</b>		
emergency - Rotate to unlock 		<b>T228.1.6.25</b>		emergency - Rotate to unlock 		
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>1 32 = 3 ways</td></tr> <tr><td>2 52 = 5 ways</td></tr> </table>			TYPE	1 32 = 3 ways
TYPE						
1 32 = 3 ways						
2 52 = 5 ways						
Weight gr. 210 Operating force 33N				Weight gr. 202 Operating force 33N		

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

1

<b>Switch - 2 positions</b>	3/2	Ordering code <b>T228.1.6.27</b>	5/2	<b>Switch - 2 positions</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
<p>Weight gr. 205 Operating force 33N</p>				<p>Weight gr. 217 Operating force 33N</p>			


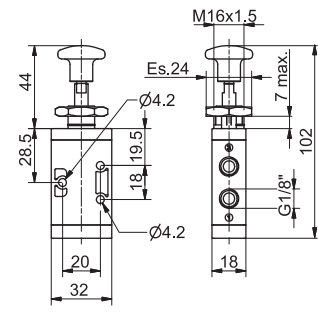

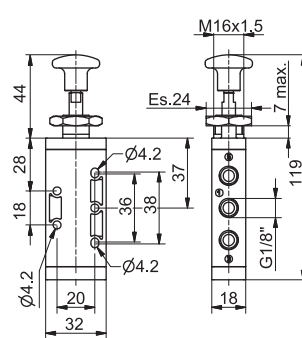
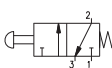
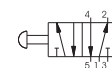
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Key switch - 2 positions</b>	3/2	Ordering code <b>T228.1.6.28</b>	5/2	<b>Key switch - 2 positions</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
<p>Weight gr. 205 Operating force 33N</p>				<p>Weight gr. 217 Operating force 33N</p>			


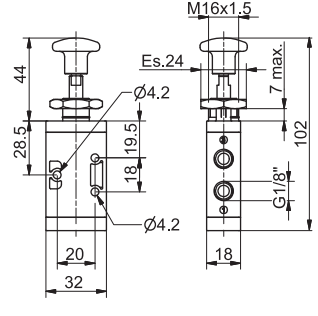

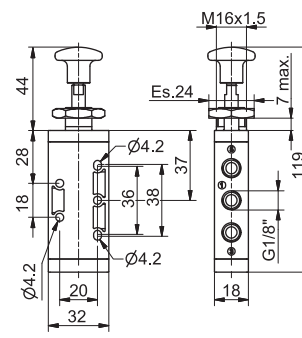
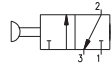
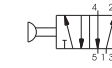
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Palm Push button Ø 30</b>	3/2	Ordering code <b>T228.1.7.1/C</b>	5/2	<b>Palm Push button Ø 30</b>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways	BUTTON COLOR	1 = Red	2 = Black	3 = Green		
TYPE											
32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
1 = Red											
2 = Black											
3 = Green											
<p>Weight gr. 118 Operating force 33N</p>				<p>Weight gr. 130 Operating force 33N</p>							


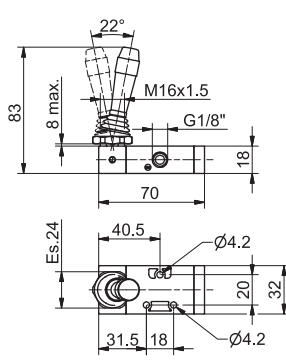

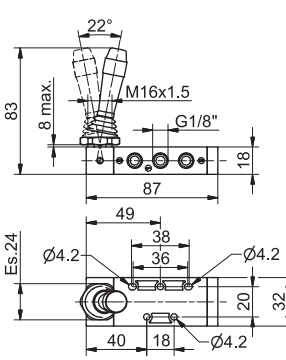
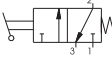
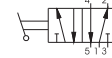
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Push button - Spring</b>	3/2	<b>Ordering code</b> <b>T228. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span>.8.1/ <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span></b>	5/2	<b>Push button - Spring</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red	2 = Black	3 = Green		
TYPE											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red											
2 = Black											
3 = Green											
Weight gr. 95 Operating force 33N			Weight gr. 107 Operating force 33N								

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Push button - 2 positions</b>	3/2	<b>Ordering code</b> <b>T228. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span>.8/ <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span></b>	5/2	<b>Push button - 2 positions</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red	2 = Black	3 = Green		
TYPE											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red											
2 = Black											
3 = Green											
Weight gr. 95 Operating force 10N			Weight gr. 107 Operating force 10N								

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

<b>Lever lateral - Spring</b>	3/2	<b>Ordering code</b> <b>T228. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span>.9.1/ <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span></b>	5/2	<b>Lever lateral - Spring</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>BUTTON COLOR</td></tr> <tr><td><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways	52 = 5 ways	BUTTON COLOR	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red	2 = Black	3 = Green		
TYPE											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">T</span> 32 = 3 ways											
52 = 5 ways											
BUTTON COLOR											
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> 1 = Red											
2 = Black											
3 = Green											
Weight gr. 100			Weight gr. 110								

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

Lateral lever - 2 positions

3/2

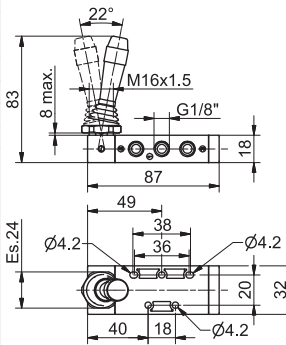
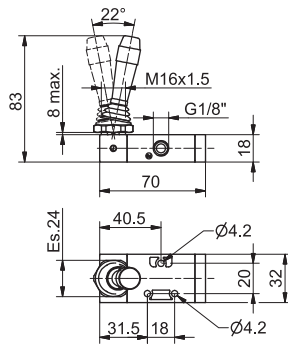
Ordering code

**T228.1.9/C**

- T** TYPE  
32 = 3 ways  
52 = 5 ways
- C** BUTTON COLOR  
1 = Red  
2 = Black  
3 = Green

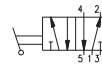
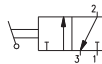
5/2

Lateral lever - 2 positions



Weight gr. 100

Weight gr. 110



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min. Max.	620 NI/min	mm 6	G 1/8"

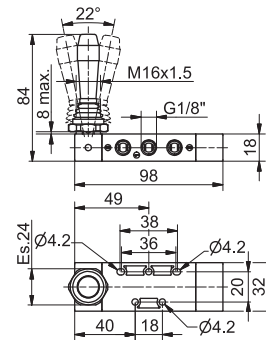
Lateral Lever spring - 3 positions

5/3

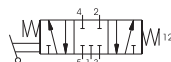
Ordering code

**T228.53.F.9.1/C**

- F** FUNCTION  
31 = Closed Centres  
32 = Open Centres
- C** BUTTON COLOR  
1 = Red  
2 = Black  
3 = Green



Weight gr. 140



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min. Max.	410 NI/min	mm 6	G 1/8"

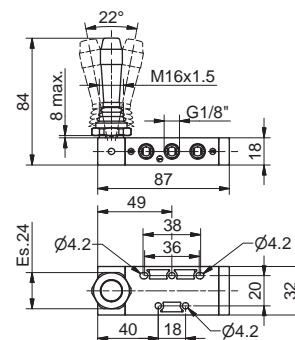
Lateral lever - 3 positions detent

5/3

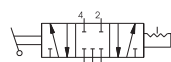
Ordering code

**T228.53.F.9/C**

- F** FUNCTION  
31 = Closed Centres  
32 = Open Centres
- C** BUTTON COLOR  
1 = Red  
2 = Black  
3 = Green



Weight gr. 110



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min. Max.	410 NI/min	mm 6	G 1/8"



1

<b>Tappet panel - Spring</b>	3/2	Ordering code <b>224.1.1</b>	5/2	<b>Tappet panel - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 370 Operating force 71,5N</p>				<p>Weight gr. 455 Operating force 71,5N</p>				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Lever roller - Spring</b>	3/2	Ordering code <b>224.2.1</b>	5/2	<b>Lever roller - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 510 Operating force 35N</p>				<p>Weight gr. 595 Operating force 35N</p>				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Lever roller unidirectional - Spring</b>	3/2	Ordering code <b>224.3.1</b>	5/2	<b>Lever roller unidirectional - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 525 Operating force 35N</p>				<p>Weight gr. 610 Operating force 35N</p>				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"



1

<b>Push button - Spring</b>	3/2	Ordering code <b>224.1.8.1</b>	5/2	<b>Push button - Spring</b>
Weight gr. 395 Operating force 71,5N				Weight gr. 480 Operating force 71,5N


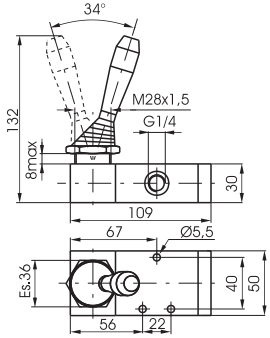

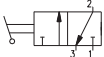
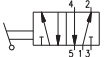
Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Push button 2 positions</b>	3/2	Ordering code <b>224.1.8</b>	5/2	<b>Push button 2 positions</b>
Weight gr. 385 Operating force 105N				Weight gr. 470 Operating force 10N


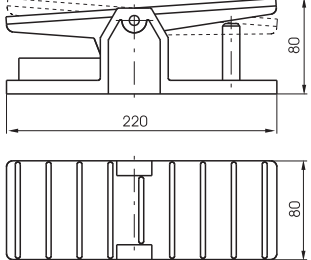
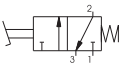
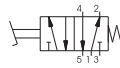
Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Lever lateral - Spring</b>	3/2	Ordering code <b>224.1.9.1/C</b>	5/2	<b>Lever lateral - Spring</b>
Weight gr. 520				Weight gr. 605


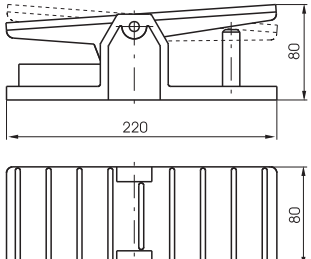
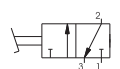
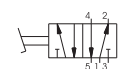
Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Lever lateral 2 positions</b>	3/2	Ordering code <b>224.1.9/C</b>	5/2	<b>Lever lateral 2 positions</b>
				
		<p><b>TYPE</b></p> <p><b>1</b> 32 = 3 ways 52 = 5 ways</p> <p><b>BUTTON COLOR</b></p> <p><b>C</b> 1 = Red 2 = Black 3 = Green</p>		
Weight gr. 510				Weight gr. 595
				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Pedal aluminium - Spring</b>	
<p style="text-align: center;">Ordering code <b>224.1.10.1</b></p> <p><b>TYPE</b></p> <p><b>1</b> 32 = 3 ways 52 = 5 ways</p>	
<p>Weight gr. 1.070 (3/2)</p> <p>Weight gr. 1.155 (5/2)</p>	
	 

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

<b>Pedal aluminium 2 positions</b>	
<p style="text-align: center;">Ordering code <b>224.1.10</b></p> <p><b>TYPE</b></p> <p><b>1</b> 32 = 3 ways 52 = 5 ways</p>	
<p>Weight gr. 1.060 (3/2)</p> <p>Weight gr. 1.145 (5/2)</p>	
	 

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

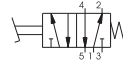
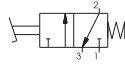
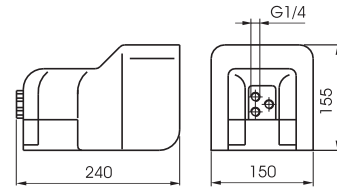


**Pedal protected - Spring**

Ordering code

**214.10.V**

- TYPE
- T** 32 = 3 ways
- 52 = 5 ways
- VERSION
- V** 1/1 = Standard version
- 2/1 = without safety device



Weight gr. 1.730

**Operational characteristic**

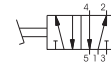
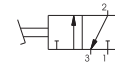
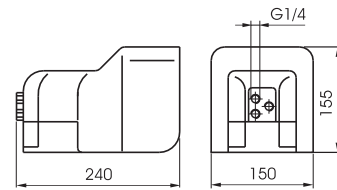
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

**Pedal protected 2 positions**

Ordering code

**214.10/1**

- TYPE
- T** 32 = 3 ways
- 52 = 5 ways



Weight gr. 1.730

**Operational characteristic**

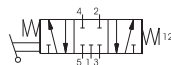
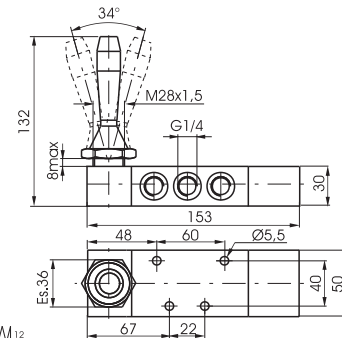
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"

**Lever lateral spring 3 positions**

Ordering code

**224.53.F.9.1/C**

- FUNCTION
- F** 31 = Closed centres
- 32 = Open centres
- BUTTON COLOR
- C** 1 = Red
- 2 = Black
- 3 = Green



Weight gr. 745

**Operational characteristic**

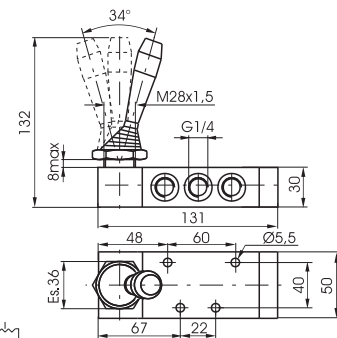
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1280 NI/min	mm 8	G 1/4"

**Lever lateral 3 positions**

Ordering code

**224.53.F.9/C**

- FUNCTION
- F** 31 = Closed centres
- 32 = Open centres
- BUTTON COLOR
- C** 1 = Red
- 2 = Black
- 3 = Green



Weight gr. 605

**Operational characteristic**

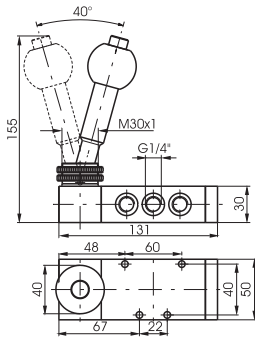
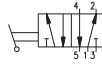
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1280 NI/min	mm 8	G 1/4"

**Lever lateral with locking device - 2 positions**

Ordering code
<b>224.52.9.2</b>



Weight gr. 825



**Operational characteristic**

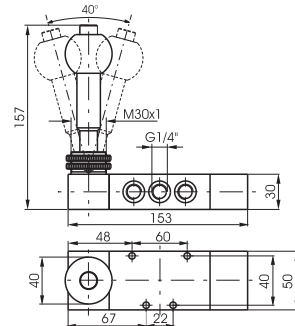
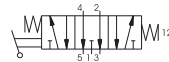
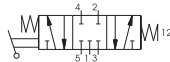
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1020 NI/min	mm 8	G 1/4"

**Lever lateral with locking device - Spring 3 positions**

Ordering code
<b>224.53.F.9.2</b>
FUNCTION
<b>F</b> 31 = Closed centres
32 = Open centres



Weight gr. 965



**Operational characteristic**

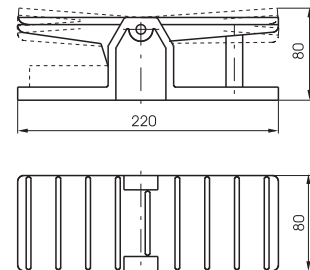
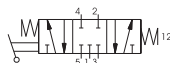
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1020 NI/min	mm 8	G 1/4"

**Pedal - Spring 3 positions**

Ordering code
<b>224.53.F.10.1</b>
FUNCTION
<b>F</b> 31 = Closed centres
32 = Open centres



Weight gr. 1.285



**Operational characteristic**

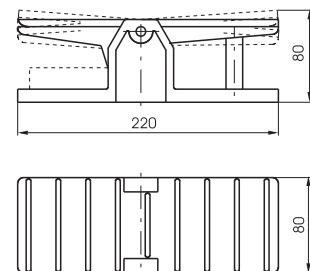
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1280 NI/min	mm 8	G 1/4"

**Pedal 3 positions**

Ordering code
<b>224.53.F.10</b>
FUNCTION
<b>F</b> 31 = Closed centres
32 = Open centres



Weight gr. 1.145



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	1280 NI/min	mm 8	G 1/4"

1

<b>Push button - Spring</b>	3/2	Ordering code <b>T224.1.8.1</b>	5/2	<b>Push button - Spring</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 170 Operating force 50N				Weight gr. 200 Operating force 50N			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"

<b>Push button 2 positions</b>	3/2	Ordering code <b>T224.1.8</b>	5/2	<b>Push button 2 positions</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 170 Operating force 13N				Weight gr. 200 Operating force 13N			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"

<b>Lever lateral - Spring</b>	3/2	Ordering code <b>T224.1.9.1/C</b>	5/2	<b>Lever lateral - Spring</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>LEVER COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways	LEVER COLOR	1 = Red	2 = Black	3 = Green		
TYPE											
32 = 3 ways											
52 = 5 ways											
LEVER COLOR											
1 = Red											
2 = Black											
3 = Green											
Weight gr. 220				Weight gr. 250							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"

<b>Lever lateral 2 positions</b>	3/2	Ordering code <b>T224.1.9/C</b>	5/2	<b>Lever lateral 2 positions</b>							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>1 32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>LEVER COLOR</td></tr> <tr><td>1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	TYPE	1 32 = 3 ways	52 = 5 ways	LEVER COLOR	1 = Red	2 = Black	3 = Green		
TYPE											
1 32 = 3 ways											
52 = 5 ways											
LEVER COLOR											
1 = Red											
2 = Black											
3 = Green											
Weight gr. 220				Weight gr. 250							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"

<b>Lever lateral spring centre - 3 positions</b>	5/3										
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Ordering code</td></tr> <tr><td><b>T224.53.F.9.1/C</b></td></tr> <tr><td>FUNCTION</td></tr> <tr><td>F 31 = Closed centres</td></tr> <tr><td>32 = Open centres</td></tr> <tr><td>33 = Pressured centres</td></tr> <tr><td>LEVER COLOR</td></tr> <tr><td>C 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	Ordering code	<b>T224.53.F.9.1/C</b>	FUNCTION	F 31 = Closed centres	32 = Open centres	33 = Pressured centres	LEVER COLOR	C 1 = Red	2 = Black	3 = Green	
Ordering code											
<b>T224.53.F.9.1/C</b>											
FUNCTION											
F 31 = Closed centres											
32 = Open centres											
33 = Pressured centres											
LEVER COLOR											
C 1 = Red											
2 = Black											
3 = Green											
Weight gr. 270											

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	900 NI/min	mm 8,5	G 1/4"

<b>Lever lateral - 3 positions detent</b>	5/3										
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Ordering code</td></tr> <tr><td><b>T224.53.F.9/C</b></td></tr> <tr><td>FUNCTION</td></tr> <tr><td>F 31 = Closed centres</td></tr> <tr><td>32 = Open centres</td></tr> <tr><td>33 = Pressured centres</td></tr> <tr><td>LEVER COLOR</td></tr> <tr><td>C 1 = Red</td></tr> <tr><td>2 = Black</td></tr> <tr><td>3 = Green</td></tr> </table>	Ordering code	<b>T224.53.F.9/C</b>	FUNCTION	F 31 = Closed centres	32 = Open centres	33 = Pressured centres	LEVER COLOR	C 1 = Red	2 = Black	3 = Green	
Ordering code											
<b>T224.53.F.9/C</b>											
FUNCTION											
F 31 = Closed centres											
32 = Open centres											
33 = Pressured centres											
LEVER COLOR											
C 1 = Red											
2 = Black											
3 = Green											
Weight gr. 270											

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	Min.	Max.	900 NI/min	mm 8,5	G 1/4"

1

<b>Lever lateral - Spring</b>	3/2	Ordering code <b>212.1.9.1</b>	5/2	<b>Lever lateral - Spring</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td style="text-align: center;">TYPE</td></tr> <tr><td style="text-align: center;">32 = 3 ways</td></tr> <tr><td style="text-align: center;">52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 1.480							
<b>Operational characteristic</b>							
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size		
Filtered and lubricated air	10 bar	-5 - +70	3500 NI/min	mm 15	G 1/2"		

<b>Lever lateral - 2 positions</b>	3/2	Ordering code <b>212.1.9</b>	5/2	<b>Lever lateral - 2 positions</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td style="text-align: center;">TYPE</td></tr> <tr><td style="text-align: center;">32 = 3 ways</td></tr> <tr><td style="text-align: center;">52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 1.460							
<b>Operational characteristic</b>							
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size		
Filtered and lubricated air	10 bar	-5 - +70	3500 NI/min	mm 15	G 1/2"		

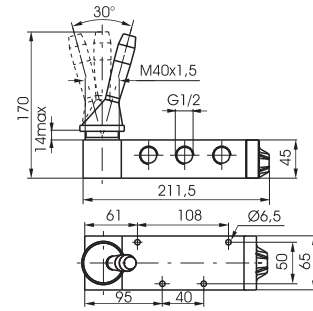
<b>Lever lateral - Spring 3 positions</b>					5/3			
Ordering code <b>212.53.1.9.1</b>								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td style="text-align: center;">FUNCTION</td></tr> <tr><td style="text-align: center;">31 = Closed centres</td></tr> <tr><td style="text-align: center;">32 = Open centres</td></tr> </table>	FUNCTION	31 = Closed centres	32 = Open centres					
FUNCTION								
31 = Closed centres								
32 = Open centres								
Weight gr. 2.100								
<b>Operational characteristic</b>								
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size			
Filtered and lubricated air	10 bar	-5 - +70	3000 NI/min	mm 15	G 1/2"			



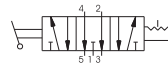
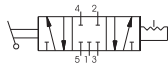
Lever lateral Ø40 - 3 positions

5/3

Ordering code
<b>212.53.F.9</b>
FUNCTION
F 31 = Closed centres
32 = Open centres



Weight gr. 1.765



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (l/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	3000 l/min	mm 15	G 1/2"



1

<b>Lever lateral - Spring</b>	3/2	Ordering code <b>211.1.9.1</b>	5/2	<b>Lever lateral - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;"> </td> <td style="width:50%; text-align: center;"> </td> </tr> </table>								
Weight gr. 4.300				Weight gr. 4.900				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"

<b>Lever lateral 2 positions</b>	3/2	Ordering code <b>211.1.9</b>	5/2	<b>Lever lateral 2 positions</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;"> </td> <td style="width:50%; text-align: center;"> </td> </tr> </table>								
Weight gr. 4.300				Weight gr. 4.900				

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"

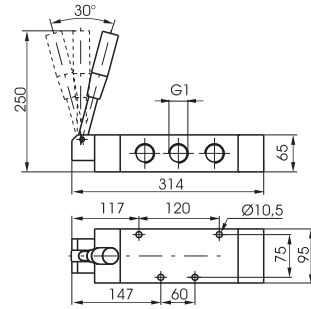
<b>Lever lateral - Spring 3 positions</b>					5/3						
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Ordering code											
<b>211.53.F.9.1</b>											
FUNCTION											
31 = Closed centres											
32 = Open centres											
Weight gr. 5.000		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;"> </td> <td style="width:50%; text-align: center;"> </td> </tr> </table>									
Operational characteristic											
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size						
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"						



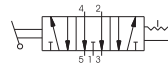
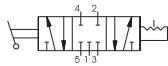
Lever lateral - 3 positions

5/3

Ordering code
<b>211.53.F.9</b>
FUNCTION
F 31 = Closed centres
32 = Open centres



Weight gr. 5.000



Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (l/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 l/min	mm 20	G 1"







1

## General

The pneumatic actuated valves are grouped in this part of catalogue because they have similar operating conditions of the solenoid valves. In fact the commutation signal is remote as it is for the manual and mechanical actuated valves.

In the first part of these catalogues are listed the pneumatic actuated valves for single use not suitable to be assembled on bases but eventually on manifold with one inlet port only.

The valves series 800 are suitable for both single and ganged applications. These valves have a diversified use of 3-ways and 5-ways based on balanced spool as shown on functional symbols. The repositions are made by spring, differential pneumatic spring or pneumatic for the bistable and centre spring return.

## Construction characteristics

	Body	Actuators	Bottom plates	Pistons	Spacers	Seals	Spools	Springs
<b>Series 104</b>	Technopolymer		/	Aluminium	Technopolymer	NBR	Steel	Stainless steel
<b>Series 105</b>	Aluminium		/					Spring steel
<b>Series 805</b>	Aluminium				/	HNBR	Aluminium	Stainless steel
<b>Series 808</b>								Spring steel
<b>Series 228</b>	Aluminium	Aluminium Technopolymer	Technopolymer			NBR	Steel	Spring steel
<b>Series T228</b> (Ver. 3/2-5/2)	Technopolymer					NBR	Technopolymer	Spring steel
<b>Series T228</b> (Ver.5/3)							Steel	
<b>Series 488</b>	Aluminium	Technopolymer				NBR	Steel	Stainless steel
<b>Series T488</b> (Ver. 3/2- 5/2)	Technopolymer					NBR	Technopolymer	
<b>Series T488</b> (Ver. 5/3)							Steel	
<b>Series 224</b>	Aluminium	Technopolymer	Aluminium	Technopolymer	NBR	Steel	Spring steel	
<b>Series T224</b> (Ver. 3/2-5/2)	Technopolymer					NBR	Technopolymer	Spring steel
<b>Series T224</b> (Ver. 5/3)							Steel	Stainless steel
<b>Series 212</b>	Aluminium			Technopolymer	NBR	Steel	Spring steel	
<b>Series 212/2</b>				/	PUR	Aluminium		
<b>Series 211</b>	Aluminium					NBR		Steel

## Use and maintenance

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

**ATTENTION:** use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).



1

<b>Pneumatic - Spring</b>	2/2 3/2	<b>Ordering code</b>	2/2 3/2	<b>Pneumatic - Spring</b>	
<i>Lateral connections</i>		<b>104.1.11.1.C.F</b>		<i>Rear connections</i>	
		TYPE 22 = 2 ways 32 = 3 ways CONNECTION TYPE L = Lateral P = Rear FUNCTION A = Normally Open C = Normally Closed			
				Weight gr. 25 Minimum piloting pressure 2,5 bar	

Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered air, with or without lubrication	10 bar	Min.	Max.	90 NI/min	mm 2,5	ø4 tube	M5

<b>Pneumatic - Spring</b>	3/2	<b>Ordering code</b>	5/2	<b>Pneumatic - Spring</b>	
		TYPE 32 = 3 ways 52 = 5 ways			
				Weight gr. 100 Minimum piloting pressure 2,5 bar	

Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5	+70	120 NI/min	mm 2,5	M5	M5

<b>Pneumatic - Differential external</b>	3/2	<b>Ordering code</b>	5/2	<b>Pneumatic - Differential external</b>	
		TYPE 32 = 3 ways 52 = 5 ways			
				Weight gr. 120 Minimum piloting pressure 2,5 bar	

Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5	+70	120 NI/min	mm 2,5	M5	M5



1

Pneumatic - Pneumatic

3/2

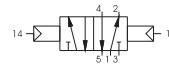
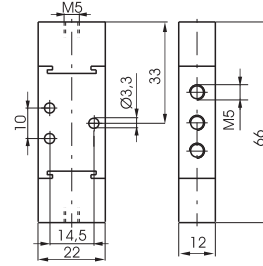
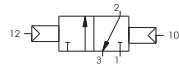
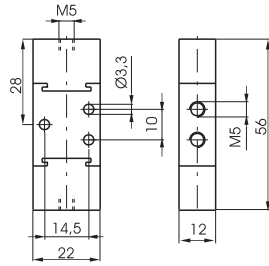
Ordering code

**105.1.11.11**

5/2

Pneumatic - Pneumatic

TYPE
32 = 3 ways
52 = 5 ways



Weight gr. 110  
Minimum piloting pressure 2,5 bar

Weight gr. 120  
Minimum piloting pressure 2,5 bar

**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	120 NI/min	mm 2,5	M5	M5



1

<b>Pneumatic - Spring</b>	3/2	<b>Ordering code</b> <b>805.11.1</b>	5/2	<b>Pneumatic - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 45 Minimum piloting pressure 2 bar				Weight gr. 50 Minimum piloting pressure 2 bar				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	160 NI/min	mm 2,5	M5	M5

<b>Pneumatic - Differential</b>	3/2	<b>Ordering code</b> <b>805.11.12</b>	5/2	<b>Pneumatic - Differential</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 50 Minimum piloting pressure 2 bar				Weight gr. 55 Minimum piloting pressure 2 bar				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	160 NI/min	mm 2,5	M5	M5

<b>Pneumatic - Pneumatic</b>	3/2	<b>Ordering code</b> <b>805.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
Weight gr. 55 Minimum piloting pressure 1,5 bar				Weight gr. 60 Minimum piloting pressure 1,5 bar				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	160 NI/min	mm 2,5	M5	M5

1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>228.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 110 Minimum piloting pressure 2,5 bar				Weight gr. 130 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"	G 1/8"

<b>Pneumatic - Differential external</b>	3/2	Ordering code <b>228.11.12</b>	5/2	<b>Pneumatic - Differential external</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 140 Minimum piloting pressure 2,5 bar				Weight gr. 160 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"	G 1/8"

<b>Pneumatic - Differential self aligned</b>	3/2	Ordering code <b>228.11.12/1</b>	5/2	<b>Pneumatic - Differential self aligned</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 130 Minimum piloting pressure 2,5 bar				Weight gr. 150 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"	G 1/8"



1

<b>Pneumatic - Pneumatic</b>	3/2	<b>Ordering code</b> <b>228.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>
TYPE 32 = 3 ways 52 = 5 ways				
Weight gr. 140 Minimum piloting pressure 2 bar		Weight gr. 160 Minimum piloting pressure 2 bar		

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"	G 1/8"

<b>Amplified pneumatic - Spring</b>	3/2	<b>Ordering code</b> <b>228.13.1</b>	5/2	<b>Amplified pneumatic - Spring</b>
TYPE 32 = 3 ways 52 = 5 ways				
Weight gr. 260 Minimum piloting pressure 0,5 bar		Weight gr. 290 Minimum piloting pressure 0,5 bar		

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"	G 1/8"

<b>Pneumatic - Pneumatic</b>				5/3		
ORDERING CODE <b>228.53.F.11.11</b>						
FUNCTION F 31 = Closed centres 32 = Open centres 33 = Pressured centres						
Weight gr. 180 Minimum piloting pressure 3 bar						
OPERATIONAL CHARACTERISTIC						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	410 NI/min	mm 6	G 1/8"	G 1/8"

1

**Pneumatic - Spring**

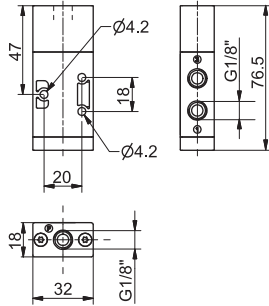
3/2

**Ordering code**

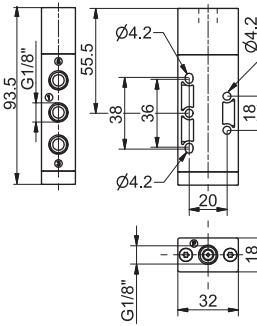
**T228.11.1**

5/2

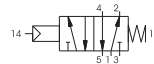
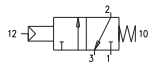
**Pneumatic - Spring**



TYPE  
32 = 3 ways  
52 = 5 ways



Weight gr. 65  
Minimum operating pressure 2,5 bar



Weight gr. 78  
Minimum operating pressure 2,5 bar

**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Min.	Max.				
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"	G 1/8"

**Pneumatic - Differential (external)**

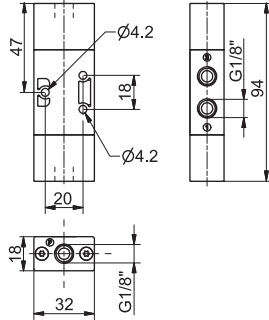
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**Ordering code**

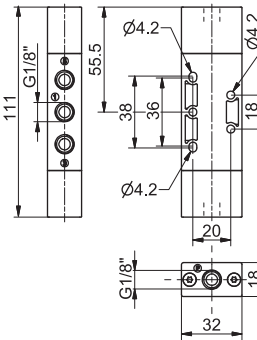
**T228.11.12**

5/2

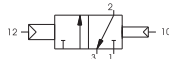
**Pneumatic - Differential (external)**



TYPE  
32 = 3 ways  
52 = 5 ways



Weight gr. 74  
Minimum operating pressure 2,5 bar



Weight gr. 86  
Minimum operating pressure 2,5 bar

**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Min.	Max.				
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"	G 1/8"

**Pneumatic - Differential self-feeding**

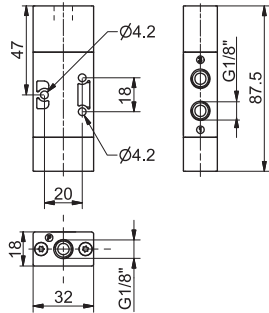
3/2

**Ordering code**

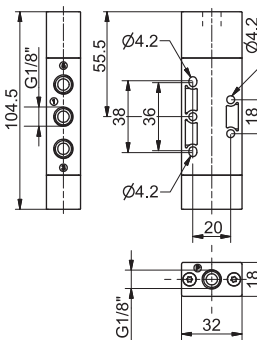
**T228.11.12/1**

5/2

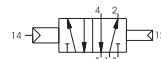
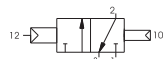
**Pneumatic - Differential self-feeding**



TYPE  
32 = 3 ways  
52 = 5 ways



Weight gr. 70  
Minimum operating pressure 2,5 bar



Weight gr. 82  
Minimum operating pressure 2,5 bar

**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Min.	Max.				
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"	G 1/8"

Pneumatic - Pneumatic	3/2	Ordering code <b>T228.1.11.11</b>	5/2	Pneumatic - Pneumatic
		TYPE <b>1</b> 32 = 3 ways 52 = 5 ways		
Weight gr. 77 Minimum operating pressure 2 bar				Weight gr. 90 Minimum operating pressure 2 bar

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	620 NI/min	mm 6	G 1/8"

Pneumatic - Pneumatic 3 positions		Ordering code <b>T228.53.F.11.11</b>		5/3
FUNCTION <b>F</b> 32 = Open Centres 33 = Pressured Centres				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	410 NI/min	mm 6	G 1/8"



1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>T488.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							

Weight gr. 75  
Minimum operating pressure 2,5 bar

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +50	620	6	G 1/8"

<b>Pneumatic - Differential (external)</b>	3/2	Ordering code <b>T488.11.12</b>	5/2	<b>Pneumatic - Differential (external)</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +50	620	6	G 1/8"

<b>Pneumatic - Pneumatic</b>	3/2	Ordering code <b>T488.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>			
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							

Minimum operating pressure 2 bar (for Pneumatic-Pneumatic version)

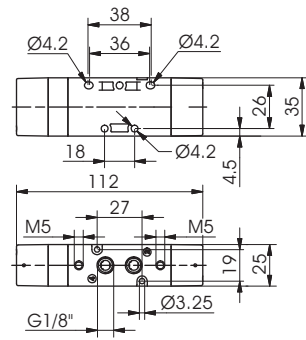
Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +50	620	6	G 1/8"



Pneumatic - Pneumatic

5/3

Ordering code
<b>T488.53.F.11.11</b>
FUNCTION
<b>F</b> 32 = Open Centres
33 = Pressured Centres




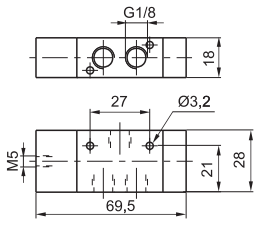

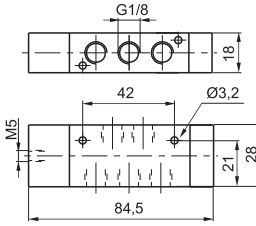
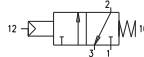
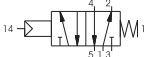
Weight gr. 140  
Minimum operating pressure 3 bar




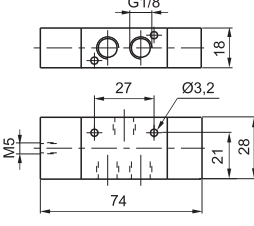

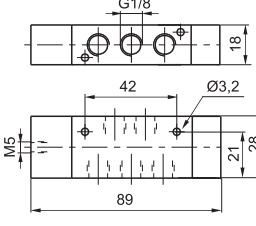
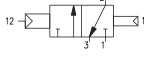

Operational characteristic					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (l/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 - +50	410	6	G 1/8"




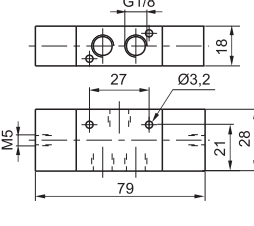

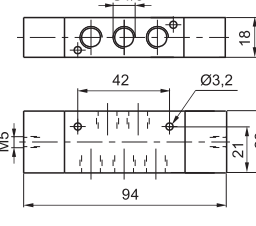


1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>808.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
							
Weight gr. 95 Minimum piloting pressure 2 bar				Weight gr. 100 Minimum piloting pressure 2 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	520 NI/min	mm 4	G 1/8"	M5

<b>Pneumatic - Differential</b>	3/2	Ordering code <b>808.11.12</b>	5/2	<b>Pneumatic - Differential</b>			
							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
							
Weight gr. 105 Minimum piloting pressure 2 bar				Weight gr. 110 Minimum piloting pressure 2 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	520 NI/min	mm 4	G 1/8"	M5

<b>Pneumatic - Pneumatic</b>	3/2	Ordering code <b>808.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>			
							
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
							
Weight gr. 115 Minimum piloting pressure 1,5 bar				Weight gr. 120 Minimum piloting pressure 1,5 bar			

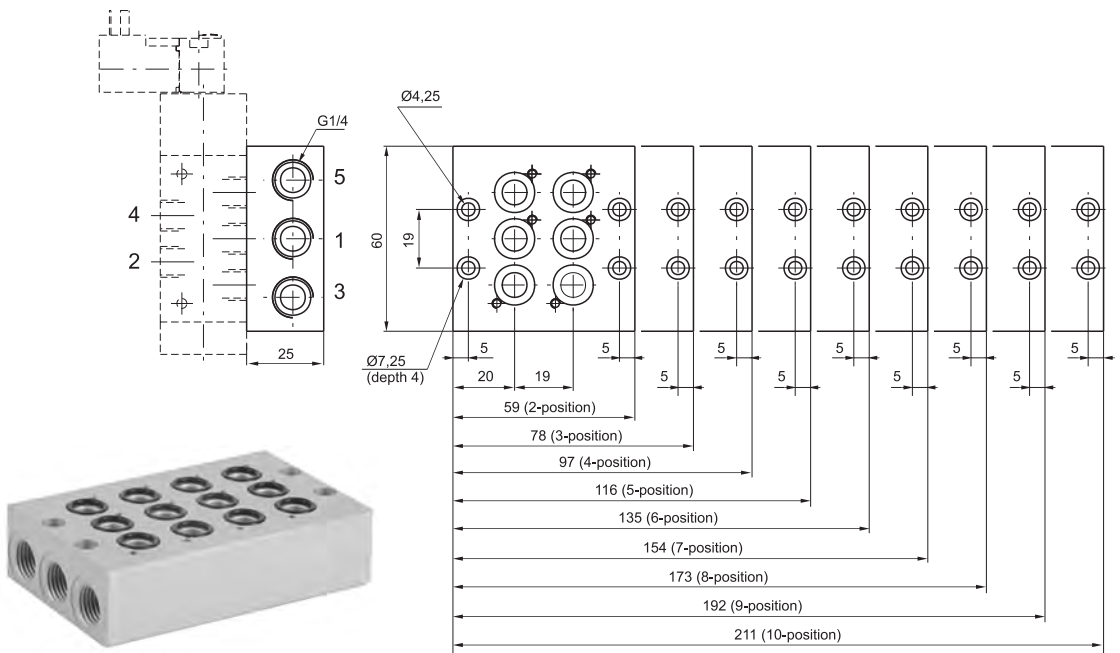
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	520 NI/min	mm 4	G 1/8"	M5



1

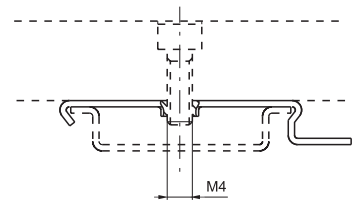
**Manifolds**

Ordering code
<b>808.N</b>
N. POSITIONS
02 = 2 pos. (weight gr. 180)
03 = 3 pos. (weight gr. 245)
04 = 4 ports (weight gr. 310)
05 = 5 pos. (weight gr. 375)
<b>N</b> 06 = 6 pos. (weight gr. 440)
07 = 7 pos. (weight gr. 500)
08 = 8 pos. (weight gr. 560)
09 = 9 pos. (weight gr. 620)
10 = 10 pos. (weight gr. 680)



**Clip**

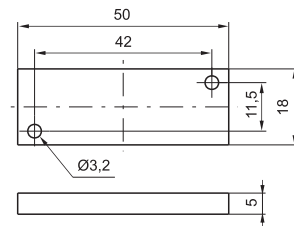
Ordering code
<b>800.00</b>



Weight gr. 5  
(for mounting the distributors groups on guide DIN 46277/3)

**Closing plate**

Ordering code
<b>808.00</b>



Weight gr. 65

1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>224.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 370 Minimum piloting pressure 2,5 bar				Weight gr. 450 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"	G 1/8"

<b>Pneumatic - Differential external</b>	3/2	Ordering code <b>224.11.12</b>	5/2	<b>Pneumatic - Differential external</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 480 Minimum piloting pressure 2,5 bar				Weight gr. 550 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"	G 1/8"

<b>Pneumatic - Pneumatic</b>	3/2	Ordering code <b>224.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 470 Minimum piloting pressure 2 bar				Weight gr. 540 Minimum piloting pressure 2 bar			

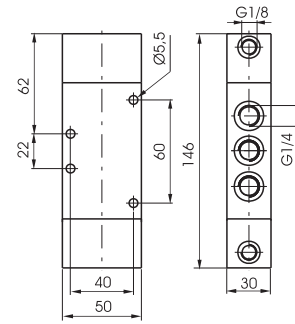
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	1360 NI/min	mm 8	G 1/4"	G 1/8"



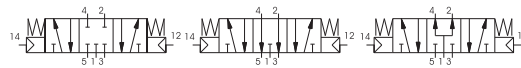
Pneumatic - Pneumatic

5/3

Ordering code
<b>224.53.F.11.11</b>
FUNCTION
F 31 = Closed centres
32 = Open centres
33 = Pressured centres



Weight gr. 550  
Minimum piloting pressure 3 bar



Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (l/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	1280 l/min	mm 8	G 1/4"	G 1/8"



1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>T224.1.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 110 Minimum operating pressure 2,5 bar							

Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"	G 1/8"

<b>Pneumatic - Differential (external)</b>	3/2	Ordering code <b>T224.1.11.12</b>	5/2	<b>Pneumatic - Differential (external)</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 110 Minimum operating pressure 2 bar							

Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"	G 1/8"

<b>Pneumatic - Pneumatic</b>	3/2	Ordering code <b>T224.1.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
TYPE							
32 = 3 ways							
52 = 5 ways							
Weight gr. 110 Minimum operating pressure 2 bar							

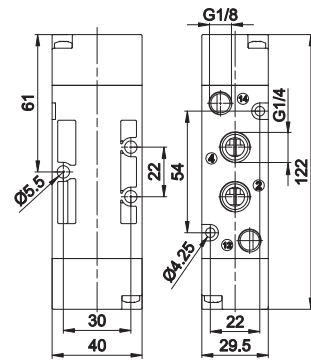
Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	1050 NI/min	mm 8,5	G 1/4"	G 1/8"



Pneumatic - Pneumatic 3 positions

5/3

Ordering code
<b>T224.53.F.11.11</b>
FUNCTION
<b>F</b> 31 = Closed centres
32 = Open centres
33 = Pressured centres



Weight gr. 160  
Minimum operating pressure 3 bar



Operational characteristic							
Fluid	Max working pressure (bar)	Temperature °C		Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	Min.	Max.	900 Nl/min	mm 8,5	G 1/4"	G 1/8"





1

<b>Pneumatic - Spring</b>	3/2	<b>Ordering code</b> <b>212.11.1</b>	5/2	<b>Pneumatic - Spring</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 1110 Minimum piloting pressure 2,5 bar</p>		<p>Weight gr. 1390 Minimum piloting pressure 2,5 bar</p>						

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3500 NI/min	mm 15	G 1/2"	G 1/8"

<b>Pneumatic - Differential external</b>	3/2	<b>Ordering code</b> <b>212.11.12</b>	5/2	<b>Pneumatic - Differential external</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 1380 Minimum piloting pressure 2,5 bar</p>		<p>Weight gr. 1660 Minimum piloting pressure 2,5 bar</p>						

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3500 NI/min	mm 15	G 1/2"	G 1/8"

<b>Pneumatic - Pneumatic</b>	3/2	<b>Ordering code</b> <b>212.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>				
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td>32 = 3 ways</td> </tr> <tr> <td>52 = 5 ways</td> </tr> </table>		TYPE	32 = 3 ways	52 = 5 ways		
				TYPE				
32 = 3 ways								
52 = 5 ways								
<p>Weight gr. 1350 Minimum piloting pressure 2 bar</p>		<p>Weight gr. 1630 Minimum piloting pressure 2 bar</p>						

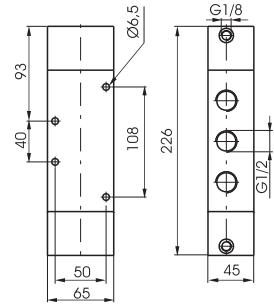
Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3500 NI/min	mm 15	G 1/2"	G 1/8"



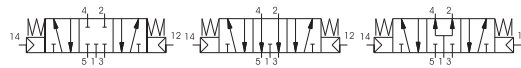
Pneumatic - Pneumatic

5/3

Ordering code
<b>212.53.1.11.11</b>
FUNCTION
31 = Closed centres
32 = Open centres
33 = Pressured centres



Weight gr. 1650  
Minimum piloting pressure 3 bar



Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3000 Nl/min	mm 15	G 1/2"	G 1/8"





1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>212/2.11.11</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							
Weight gr. 524 Minimum piloting pressure 2,5 bar			Weight gr. 644 Minimum piloting pressure 2,5 bar				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3600 NI/min	mm 15	G 1/2"	G 1/8"

<b>Pneumatic - Differential</b>	3/2	Ordering code <b>212/2.11.12</b>	5/2	<b>Pneumatic - Differential</b>			
<i>Diff. external - Normally closed</i>				<i>Diff. external</i>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							
Weight gr. 464 Minimum piloting pressure 2,5 bar			Weight gr. 586 Minimum piloting pressure 2,5 bar				

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3600 NI/min	mm 15	G 1/2"	G 1/8"

<b>Pneumatic - Differential</b>	3/2	Ordering code <b>212/2.11.12/F</b>	5/2	<b>Pneumatic - Differential</b>							
<i>Diff. self aligned</i>				<i>Diff. self aligned</i>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> <tr><td>FUNCTION</td></tr> <tr><td>1.C = 3 ways Normally Closed</td></tr> <tr><td>1.A = 3 ways Normally Open</td></tr> <tr><td>1 = 5 ways diff. self aligned</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways	FUNCTION	1.C = 3 ways Normally Closed	1.A = 3 ways Normally Open	1 = 5 ways diff. self aligned		
			TYPE								
32 = 3 ways											
52 = 5 ways											
FUNCTION											
1.C = 3 ways Normally Closed											
1.A = 3 ways Normally Open											
1 = 5 ways diff. self aligned											
Weight gr. 466 Minimum piloting pressure 2,5 bar			Weight gr. 588 Minimum piloting pressure 2,5 bar								

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3600 NI/min	mm 15	G 1/2"	G 1/8"



1

Pneumatic - Pneumatic	3/2	Ordering code <b>212/2.1.11.11</b>	5/2	Pneumatic - Pneumatic			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TYPE</td> </tr> <tr> <td> <b>1</b>                      32 = 3 ways                      52 = 5 ways                 </td> </tr> </table>		TYPE	<b>1</b> 32 = 3 ways 52 = 5 ways		
				TYPE			
<b>1</b> 32 = 3 ways 52 = 5 ways							
Weight gr. 518 Minimum piloting pressure 2,5 bar				Weight gr. 640 Minimum piloting pressure 2,5 bar			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3600 NI/min	mm 15	G 1/2"	G 1/8"

Pneumatic - Pneumatic		Ordering code <b>212/2.53.F.11.11</b>		5/3			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">FUNCTION</td> </tr> <tr> <td> <b>F</b>                      31 = Closed centres                      32 = Open centres                      33 = Pressured centres                 </td> </tr> </table>		FUNCTION	<b>F</b> 31 = Closed centres 32 = Open centres 33 = Pressured centres		
				FUNCTION			
<b>F</b> 31 = Closed centres 32 = Open centres 33 = Pressured centres							
Weight gr. 684 Minimum piloting pressure 3 bar							

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	3300 NI/min	mm 15	G 1/2"	G 1/8"

1

<b>Pneumatic - Spring</b>	3/2	Ordering code <b>211.11.1</b>	5/2	<b>Pneumatic - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							
<p>Weight gr. 3330 Minimum piloting pressure 2,5 bar</p>				<p>Weight gr. 4200 Minimum piloting pressure 2,5 bar</p>			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"	G 1/8"

<b>Pneumatic - Differential external</b>	3/2	Ordering code <b>211.11.12</b>	5/2	<b>Pneumatic - Differential external</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							
<p>Weight gr. 3330 Minimum piloting pressure 2,5 bar</p>				<p>Weight gr. 4200 Minimum piloting pressure 2,5 bar</p>			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"	G 1/8"

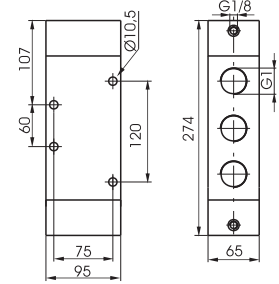
<b>Pneumatic - Pneumatic</b>	3/2	Ordering code <b>211.11.11</b>	5/2	<b>Pneumatic - Pneumatic</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32 = 3 ways</td></tr> <tr><td>52 = 5 ways</td></tr> </table>	TYPE	32 = 3 ways	52 = 5 ways		
			TYPE				
32 = 3 ways							
52 = 5 ways							
<p>Weight gr. 3330 Minimum piloting pressure 2 bar</p>				<p>Weight gr. 4200 Minimum piloting pressure 2 bar</p>			

Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 NI/min	mm 20	G 1"	G 1/8"

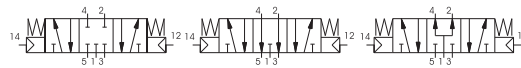


**Pneumatic - Pneumatic**

Ordering code
<b>211.53.F.11.11</b>
FUNCTION
F 31 = Closed centres
32 = Open centres
33 = Pressured centres

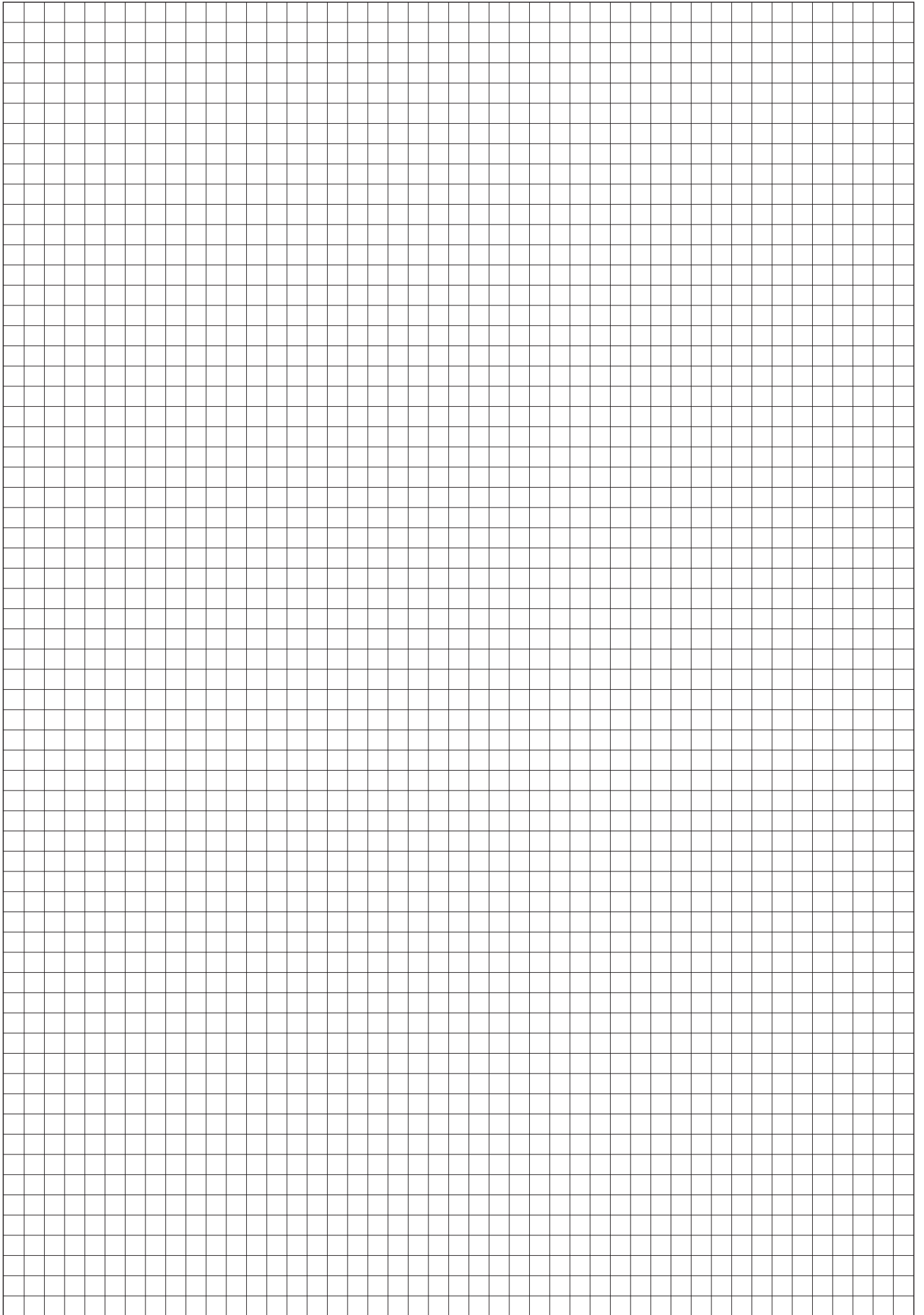


Weight gr. 4200  
Minimum piloting pressure 3 bar



Operational characteristic						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (l/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	6500 l/min	mm 20	G 1"	G 1/8"







## ACCESSORIES

### Accessories M5 - G1" (Series 600)

Flow control valves / Quick exhaust valves / Exhaust flow control valves  
Shuttle valves / Silencers / Check valves / Manifolds / Block valves /  
Gang mounting manifolds / Economizers

### Complementary valves (Series 900)

Pressure switches / Impulse generators / Timers / Two hands safety  
valve / Valve / Oscillator valve / Signal amplifier / Progressive start up  
valve

### Blocking valves G1/8" ÷ G1/2" (Series 50 - T50)

#### Function Fittings (Series 55)

Flow regulator / In line pressure regulator / Pressure regulator / Blo-  
cking valve / Circuit selector valve - OR - AND / Quick exhaust valve /  
Pressure indicator / In line progressive star-up valve / 90° progressive  
star-up valve / In line blocking valve + flow control valve / 90° blocking  
valve + flow control valve / In line blocking valve + quick exhaust valve  
/ In line pressure regulator + pressure indicator / 90° pressure regula-  
tor + pressure indicator / Accessories / Connections

### Miniaturised pressure regulators (Series 1750-1760)

#### Compact fittings for lubrication (Series Mini-RAP)

RDR Straight male adaptor (parallel) / RDR Straight male adaptor (pa-  
rallel) / RGR Complete single banjo with stem / RGR Complete single  
banjo with stem





## General

These accessories are a range of devices for completing a pneumatic circuit. These valves, with their special functions, are inserted between two valves, between a valve and a cylinder, or following a cylinder.

One of the particular characteristic of these accessories is that they are automatically actuated without the need for external commands. Usually, operation and idle are controlled by the presence or absence of pressure as, for example, in the case of quick exhaust valves which pilots itself as a selector, changing the flow direction as the signal goes off and on.

On the other hand, other components are inert. That is, they do not have any internal variable function which is sensitive to pressure. Among these components are silencers, manifolds and flow regulators.

There are also the flow regulators, which like electronic components, can be defined as variable resistances. They are fundamental in regulating the flow rate, provide precise timings and regulate the cylinders' speed.

The selector valves, with "AND" and "OR" functions, are logic functions components which often are an essential element. Furthermore, they are built to allow high flow rate which cannot be obtained by classic pneumatic logic.

The block valves lock the cylinder in a position, avoiding unexpected depressurization of the cylinder's chamber due to lack of compressed air at the inlet port. Practically, it is a piloted unidirectional valve that blocks the exhaust port when there is no air in the pilot circuit.

Finally the economizer valves are in fact a pressure reducer valves installed between valve and cylinder for reducing the air consumption. For example this is applicable on the cylinder return stroke without penalizing the exhaust as happens with FRL pressure regulator.

## Construction characteristics

We have not listed all different materials used for the construction of these components because the list would be too the long. We use corrosion proof material, brass or anodized aluminium and the most appropriate specific mixture for seals. If more information is required please contact our technical department.

## Use and maintenance

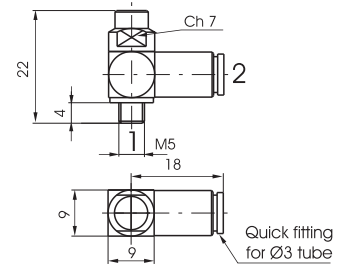
In operation pay attention to the minimum and maximum criteria for temperature and pressure, and ensure good quality compressed air. In a dirty environment, protect the exhaust ports. In this case, maintenance is minimal and is necessary only if the air is particularly dirty. The components most subject to damage by the accumulation of dirt are flow regulators with fine regulation and silencers. As for regulators, follow the normal procedure for disassembling, washing with non-chemical cleaning agents and remounting. The silencers need only to be rinsed in petrol or solvent and blown dry with compressed air.

The number of requests for spare seals for flow regulators and shuttle valves are statistically irrelevant. More often, it is necessary to replace the lining of the quick exhaust because of the wear it undergoes due to the particular conditions of operating.

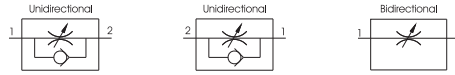
**ATTENTION:** for lubrication use class H hydraulic oils, for example Castrol MAGNA GC 32.

**Miniature flow control valve M5 - Ø3 tube**

Ordering code	<b>6.01.305.F</b>
FUNCTION	
1.2 = Unidirectional	
2.1 = Unidirectional	
1.1 = Bidirectional	



Weight gr. 14

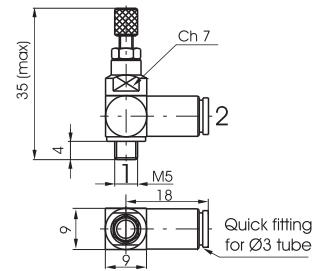


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

**Miniature flow control valve M5 - Ø3 tube, with adjustment knob**

Ordering code	<b>6.01.305.FP</b>
FUNCTION	
1.2 = Unidirectional	
2.1 = Unidirectional	
1.1 = Bidirectional	



Weight gr. 16

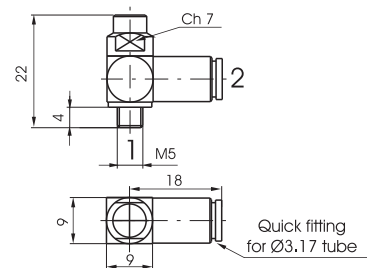


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

**Miniature flow control valve M5 - Ø3,17 tube**

Ordering code	<b>6.01.315.F</b>
FUNCTION	
1.2 = Unidirectional	
2.1 = Unidirectional	
1.1 = Bidirectional	



Weight gr. 14

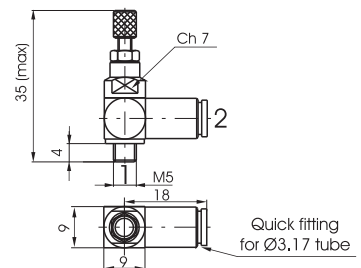


**Operational characteristics**

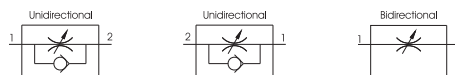
Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

**Miniature flow control valve M5 - Ø3,17 tube, with adjustment knob**

Ordering code	<b>6.01.315.FP</b>
FUNCTION	
1.2 = Unidirectional	
2.1 = Unidirectional	
1.1 = Bidirectional	



Weight gr. 16



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

1

**Miniature flow control valve M5 - Ø4 tube**

Ordering code

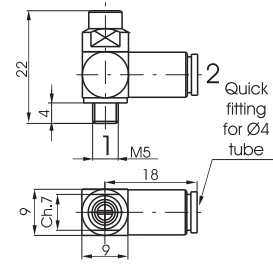
**6.01.45.F**

FUNCTION

1.2 = Unidirectional

2.1 = Unidirectional

1.1 = Bidirectional



Weight gr. 14



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

**Miniature flow control valve M5 - Ø4 tube, with adjustment knob**

Ordering code

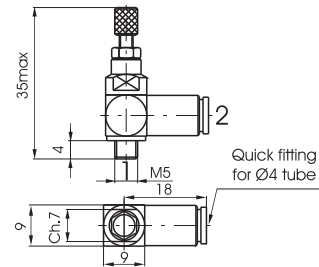
**6.01.45.FP**

FUNCTION

1.2 = Unidirectional

2.1 = Unidirectional

1.1 = Bidirectional



Weight gr. 16



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 1,5

**Flow control valve M5 - in line ports**

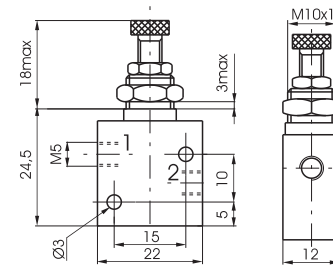
Ordering code

**6.01.F**

FUNCTION

05 = Unidirectional

05/2 = Bidirectional



Weight gr. 48



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 2

**Flow control valve M5 - port at 90°**

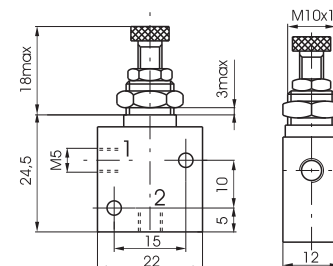
Ordering code

**6.01.05.F**

FUNCTION

90 = Unidirectional

90/2 = Bidirectional



Weight gr. 48

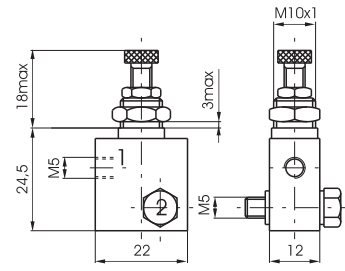


**Operational characteristics**

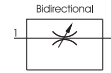
Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 2

**Flow control valve M5 - with a through bolt**

Ordering code	<b>6.01.05.F</b>
FUNCTION	
<b>F</b> 180 = Unidirectional	
180/2 = Bidirectional	



Weight gr. 52

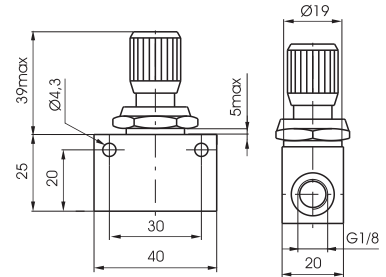


**Operational characteristics**

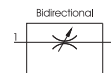
Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 2

**Flow control valve G1/8" - ultrasensitive**

Ordering code	<b>6.01.18/F</b>
FUNCTION	
<b>F</b> 4 = Unidirectional	
5 = Bidirectional	



Weight gr. 100

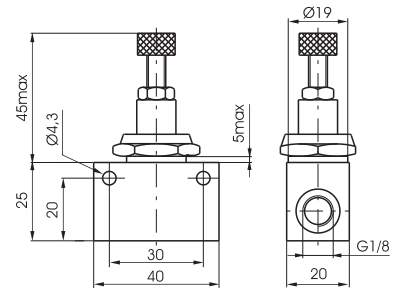


**Operational characteristics**

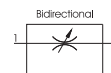
Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 3

**Flow control valve G1/8" - ultrasensitive with lock nut**

Ordering code	<b>6.01.18/F</b>
FUNCTION	
<b>F</b> 6 = Unidirectional	
7 = Bidirectional	



Weight gr. 105

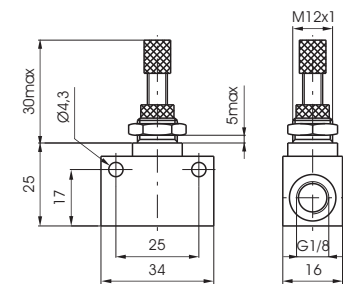


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 3

**Flow control valve G1/8"**

Ordering code	<b>6.01.F</b>
FUNCTION	
<b>F</b> 18N = Unidirectional	
18NE = Unidir. economic vers.	
18/1N = Bidirectional	
18/1NE = Bidir. economic vers.	



Weight gr. 50



**Operational characteristics**

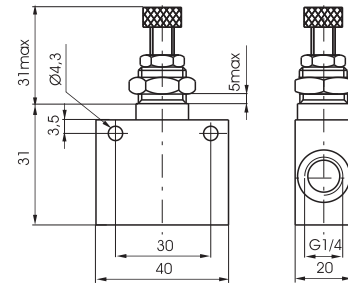
Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 4

1

**Flow control valve G1/4" - compact type - unidirectional**

Ordering code

**6.01.14/1**



Weight gr. 100



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 5,5

**Flow control valve G1/4"**

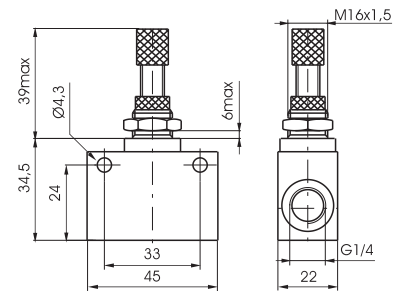
Ordering code

**6.01.F**

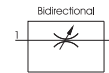
FUNCTION

14N = Unidirectional

14/1N = Bidirectional



Weight gr. 105



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 7

**Flow control valve G1/2"**

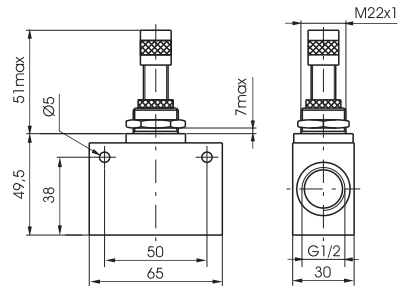
Ordering code

**6.01.F**

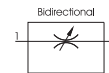
FUNCTION

12N = Unidirectional

12/1N = Bidirectional



Weight gr. 290



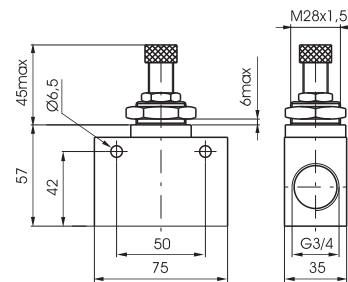
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 12

**Flow control valve G3/4" - unidirectional**

Ordering code

**06:01:34**



Weight gr. 500

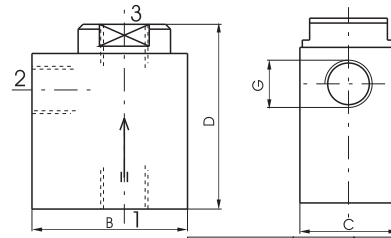


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered air	10 bar	-5 - +70	mm. 12

**Quick exhaust valve**

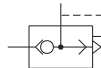
Ordering code	<b>6.02.1</b>
CONNECTION	05 = M5
18 = G 1/8"	
14 = G 1/4"	
12 = G 1/2"	



G	M5	1/8"	1/4"	1/2"
B	22	32	35	52
C	12	20	25	37
D	28	38	50	62
Weight gr.	50	62	112	310

Flow rate NI/min at 6 bar with $\Delta p = 1$	from 1 to 2	120	480	960	3300
Flow rate NI/min at 6 bar on free exhaust	from 2 to 3	220	1100	1930	6500

Weight "see table"

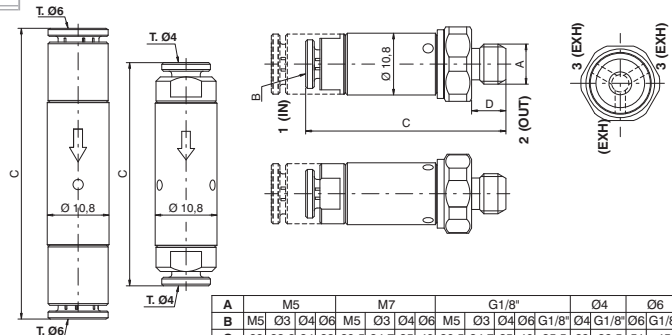


**Operational characteristics**

Fluid	Working pressure (bar)	Temperature °C
Filtered air	0,5 ÷ 10	-5 - +70

**Quick exhaust in line valve**

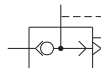
Ordering code	<b>6.02.1.C.L</b>
CONNECTION (IN)	M5 = M5
03 = tube Ø3	
04 = tube Ø4	
06 = tube Ø6	
CONNECTION (OUT)	M5 = M5
M7 = M7	
18 = G1/8"	
04 = tube Ø4	
06 = tube Ø6	



A	M5			M7			G1/8"			04	06		
B	M5	Ø3	Ø4	Ø6	M5	Ø3	Ø4	Ø6	M5	Ø3	Ø4	Ø6	G1/8"
C	29	33,2	34	39	30,5	34,7	35	40	30,5	34,7	35	40	35,5
D	4,5						6			-	5,5	-	5,5

Weight (gr.)	17			18			17			20		
Flow rate NI/min at 6 bar with $\Delta p = 1$ (from 1 to 2)	90			110			90			110		
Flow rate NI/min at 6 bar on free exhaust (from 2 to 3)	240			350			240			350		

Weight "see table"

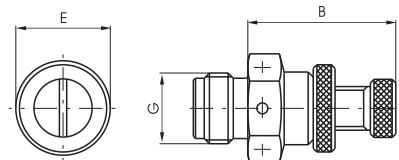


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70

**Exhaust flow control**

Ordering code	<b>6.03.1</b>
CONNECTION	05 = M5
18 = G 1/8"	
14 = G 1/4"	
12 = G 1/2"	



G	M5	1/8"	1/4"	1/2"
B	21	18	22	39
E	9	13	16	25
Weight gr.	10	18	32	155

Weight "see table"



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70

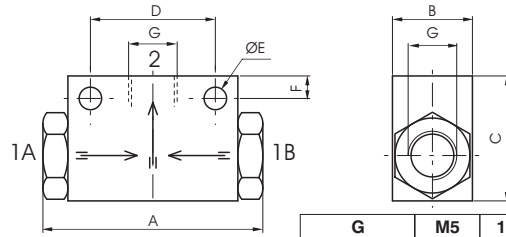
**Shuttle valve "OR"**

Ordering code

**6.04.1**

CONNECTION

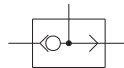
- 05 = M5
- 18 = G 1/8"
- 14 = G 1/4"



	M5	1/8"	1/4"
G			
A	27	44	62
B	12	16	22
C	17	25	30
D	15	25	35
E	3,5	4,5	5,5
F	3,5	4,5	5,5
Weight g.	33	50	110
Flow rate at 6 bar with $\Delta p = 1$ NI/min.	110	700	2200

Flow rate at 6 bar with  $\Delta p = 1$  NI/min.

Weight "see table"



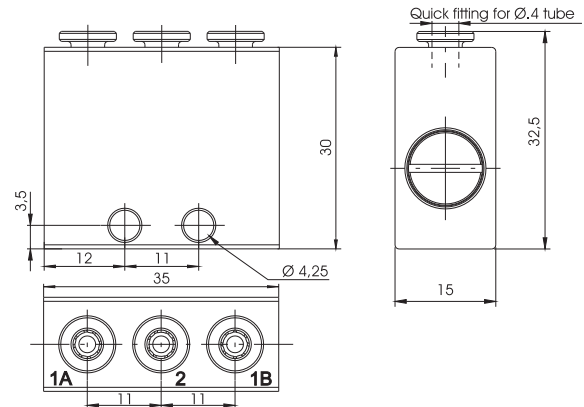
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70

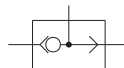
**Shuttle valve "OR" - T=4**

Ordering code

**6.04.04**



Weight gr. 50



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Connections
Filtered and lubricated air	10 bar	-5 - +70	105 NI/min	mm. 2,5	Fitting T=4

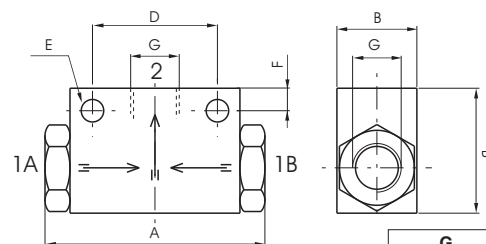
**Shuttle valve "AND"**

Ordering code

**6.04.1/1**

CONNECTION

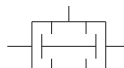
- 05 = M5
- 18 = G 1/8"



	M5	1/8"
G		
A	36	44
B	12	16
C	22	45
D	20	25
E	3,2	4,5
F	3,5	4,5
Weight gr.	30	50
Flow rate at 6 bar with $\Delta p = 1$ NI/min.	100	480

Flow rate at 6 bar with  $\Delta p = 1$  NI/min.

Weight "see table"

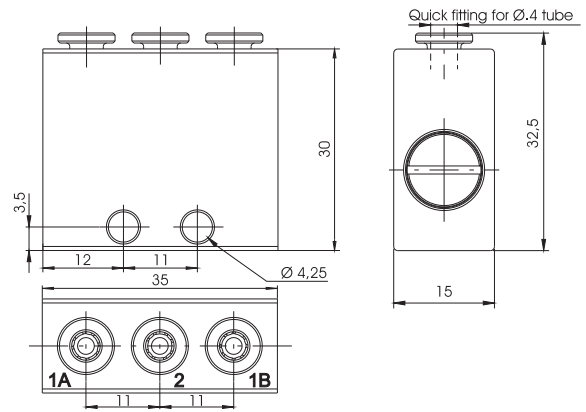


**Operational characteristics**

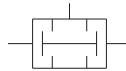
Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70

**Shuttle valve "AND" - T=4**

Ordering code
<b>6.04.04/1</b>



Weight gr. 50

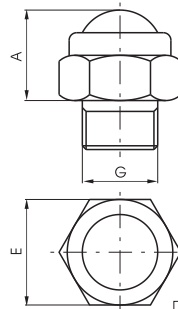


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Connections
Filtered air	10 bar	-5 - +70	105 Nl/min	mm. 2,5	Fitting T=4

**Silencers steel wool**

Ordering code
<b>6.05.1</b>
CONNECTION
18 = G 1/8"
14 = G 1/4"
38 = G 3/8"
12 = G 1/2"



G	1/8"	1/4"	3/8"	1/2"
A	12	13	15	17
E	14	17	22	27
Weight gr.	8	16	32	44

Weight "see table"

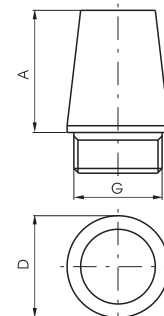


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70

**Silencers brass**

Ordering code
<b>6.06.1</b>
CONNECTION
05 = M5
18 = G 1/8"
14 = G 1/4"
38 = G 3/8"
12 = G 1/2"
34 = G 3/4"
01 = G 1"



G	M5	1/8"	1/4"	3/8"	1/2"	3/4"	1"
A	17	15	18	28	32	40	50
D	8	12	15	19	23	29	38
Weight gr.	4	8	15	35	50	92	182

Weight "see table"



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	10 bar	-5 - +70



**G 1/8" compact check valves**

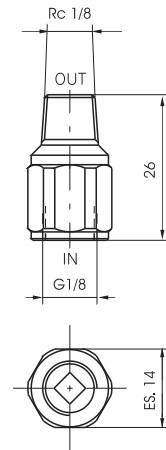
Ordering code

**6.07.18.ⓐ**

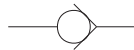
SEALS

R = NBR

VR = FPM



Weight gr. 50



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered air	Min.	-5 - +70	100 NI/min

**Check valves**

Ordering code

**6.07.ⓧ**

POPPET

05 = NBR - M5

18 = NBR - G 1/8"

14 = NBR - G 1/4"

38 = NBR - G 3/8"

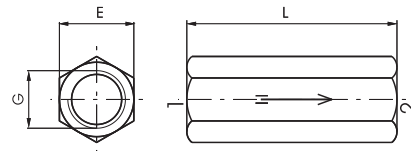
12 = NBR - G 1/2"

18V = FPM - G 1/8"

14V = FPM - G 1/4"

38V = FPM - G 3/8"

12V = FPM - G 1/2"



G	M5	1/8"	1/4"	3/8"	1/2"
E	10	14	17	21	25
L	21	37	48	50	60
Weight gr.	14	35	60	85	136
Flow rate at 6 bar with Δp = 1 NI/min.	160	650	1150	2600	3500

Flow rate at 6 bar with Δp = 1

Weight "see table"



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered and lubricated air	10 bar	-5 ÷ +70 (+150°C FPM)

**Manifold 4 ports**

Ordering code

**6.08.ⓐ/4**

CONNECTION

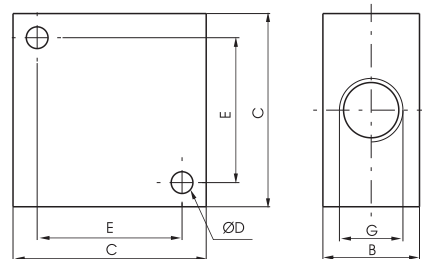
05 = M5

18 = G 1/8"

14 = G 1/4"

38 = G 3/8"

12 = G 1/2"



G	M5	1/8"	1/4"	3/8"	1/2"
B	10	16	20	20	30
C	20	32	40	40	50
D	3,3	4,5	4,5	5,5	6,5
E	14	22	30	30	38
Weight gr.	28	38	68	54	135

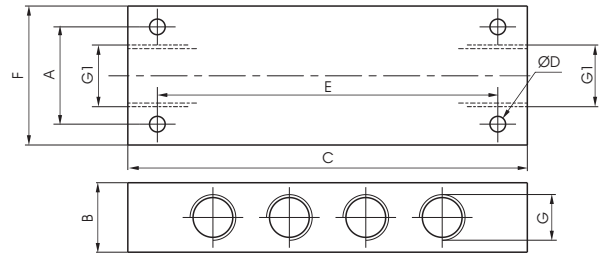
Weight "see table"

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	20 bar	-5 - +70

**Manifold 10 ports**

Ordering code	<b>6.08.0/8</b>
CONNECTION	05 = M5
<b>0</b>	18 = G 1/8"
	14 = G 1/4"
	38 = G 3/8"
	12 = G 1/2"



G	M5	1/8"	1/4"	3/8"	1/2"
G1	G1/8"	1/8"	1/4"	3/8"	1/2"
A	16	20	28	28	36
B	12	18	20	20	30
C	60	90	115	130	170
ØD	3,3	4,5	4,5	5,5	5,5
E	50	75	98	112	150
F	22	32	40	40	50
Weight gr.	92	110	185	165	460

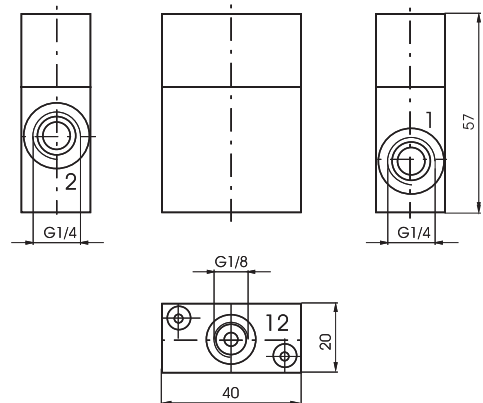
Weight "see table"

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C
Filtered air	20 bar	-5 - +70

**Block valve G1/4"**

Ordering code	<b>6.09.14.F</b>
FUNCTION	
<b>F</b>	UN = Unidirectional
	BN = Bidirectional



Weight gr. 122

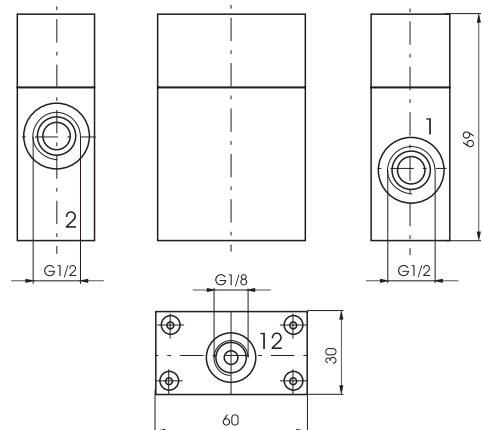


**Operational characteristics**

Fluid	Max working pressure (bar)	Min. piloting pressure	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
Filtered and lubricated air	10 bar	4 bar	-5 - +70	700 NI/min	mm. 7

**Block valve G1/2"**

Ordering code	<b>6.09.12.F</b>
FUNCTION	
<b>F</b>	UN = Unidirectional
	BN = Bidirectional



Weight gr. 305



**Operational characteristics**

Fluid	Max working pressure (bar)	Min. piloting pressure	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
Filtered and lubricated air	10 bar	4 bar	-5 - +70	2000 NI/min	mm. 12

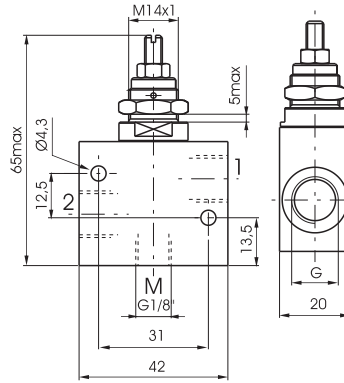
**Economizer G1/8" - G1/4"**

Ordering code

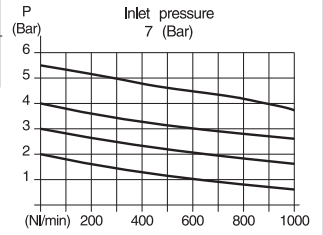
**6.11.Ⓢ**

CONNECTION

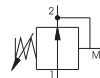
- 18 = G 1/8"
- 14 = G 1/4"



FLOW RATE CURVES FROM 1 TO 2



Weight gr. 85



**Operational characteristics**

Fluid	Max working pressure (bar)	Pressure range	Temperature °C	Flow rate from port 2 to 1 at 6 bar with Δp=1	Orifice size (mm)
Filtered and lubricated air	10 bar	0 - 5,5 bar	-5 - +70	860 NI/min	mm. 6

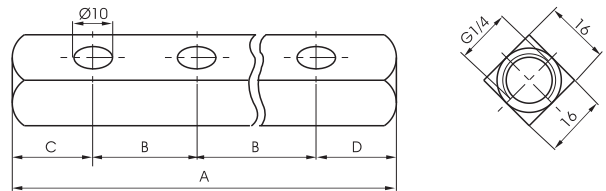
**Gang mounting manifold for valves and solenoid valves G 1/8"**

Ordering code

**6.10.18.18/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	58	76	94	112	130	148	166	184	202	
B	18	18	18	18	18	18	18	18	18	
C	20	20	20	20	20	20	20	20	20	
D	20	20	20	20	20	20	20	20	20	
Weight gr.	55	80	105	130	155	180	205	230	255	

Weight "see table"

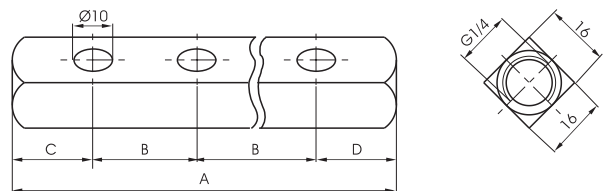
**Gang mounting manifold for valves and solenoid valves G 1/8"**

Ordering code

**6.10.18.25/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	70	95	120	145	170	195	220	245	270	
B	25	25	25	25	25	25	25	25	25	
C	20	20	20	20	20	20	20	20	20	
D	25	25	25	25	25	25	25	25	25	
Weight gr.	80	115	150	185	220	255	290	325	360	

Weight "see table"

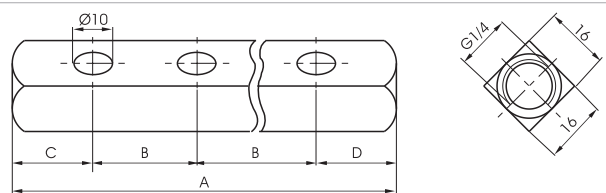
**Gang mounting manifold for valves and solenoid valves G 1/8"**

Ordering code

**6.10.18.26/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	66	92	118	144	170	196	222	248	274	
B	26	26	26	26	26	26	26	26	26	
C	20	20	20	20	20	20	20	20	20	
D	20	20	20	20	20	20	20	20	20	
Weight gr.	70	110	145	185	220	260	300	340	375	

Weight "see table"

**Gang mounting manifold for valves and solenoid valves G 1/8"**

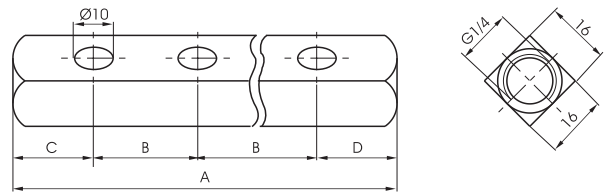
Ordering code

**6.10.18.30/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions

Weight "see table"



N. OF POSITIONS

	2	3	4	5	6	7	8	9	10
A	80	110	140	170	200	230	260	290	320
B	30	30	30	30	30	30	30	30	30
C	25	25	25	25	25	25	25	25	25
D	25	25	25	25	25	25	25	25	25
Weight gr.	100	140	180	220	260	300	340	380	420

**Gang mounting manifold for valves and solenoid valves G 1/8"**

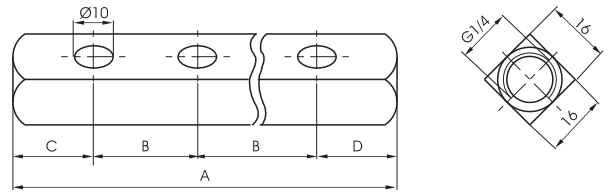
Ordering code

**6.10.18.32/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions

Weight "see table"



N. OF POSITIONS

	2	3	4	5	6	7	8	9	10
A	82	114	146	178	210	242	274	306	338
B	32	32	32	32	32	32	32	32	32
C	25	25	25	25	25	25	25	25	25
D	25	25	25	25	25	25	25	25	25
Weight gr.	100	145	190	235	280	325	370	415	460

**Gang mounting manifold for valves and solenoid valves G 1/8"**

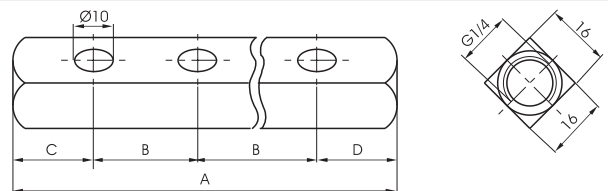
Ordering code

**6.10.18.35/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions

Weight "see table"



N. OF POSITIONS

	2	3	4	5	6	7	8	9	10
A	89	124	159	194	229	264	299	334	369
B	35	35	35	35	35	35	35	35	35
C	27	27	27	27	27	27	27	27	27
D	27	27	27	27	27	27	27	27	27
Weight gr.	110	160	210	260	310	360	410	460	510

**Gang mounting manifold for valves and solenoid valves G 1/4"**

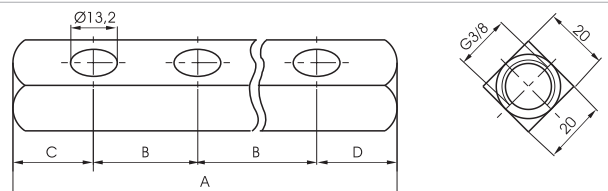
Ordering code

**6.10.14.20/N**

N. OF POSITIONS

- 2 = N. 2 positions
- 3 = N. 3 positions
- 4 = N. 4 positions
- 5 = N. 5 positions
- 6 = N. 6 positions
- 7 = N. 7 positions
- 8 = N. 8 positions
- 9 = N. 9 positions
- 10 = N. 10 positions

Weight "see table"



N. OF POSITIONS

	2	3	4	5	6	7	8	9	10
A	65	85	105	125	145	165	185	205	225
B	20	20	20	20	20	20	20	20	20
C	22,5	22,5	22,5	22,5	22,5	22,5	22,5	22,5	22,5
D	22,5	22,5	22,5	22,5	22,5	22,5	22,5	22,5	22,5
Weight gr.	130	150	190	190	210	230	250	270	290

**Gang mounting manifold for valves and solenoid valves G 1/4"**

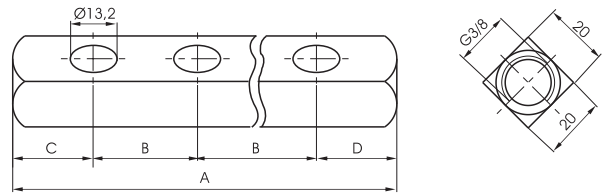
Ordering code

**6.10.14.25/N**

- N. OF POSITIONS
- 2 = N. 2 positions
  - 3 = N. 3 positions
  - 4 = N. 4 positions
  - 5 = N. 5 positions
  - 6 = N. 6 positions
  - 7 = N. 7 positions
  - 8 = N. 8 positions
  - 9 = N. 9 positions
  - 10 = N. 10 positions

**N**

Weight "see table"



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	75	100	125	150	175	200	225	250	275	
B	25	25	25	25	25	25	25	25	25	
C	25	25	25	25	25	25	25	25	25	
D	25	25	25	25	25	25	25	25	25	
Weight gr.	140	170	200	230	260	290	320	350	380	

**Gang mounting manifold for valves and solenoid valves G 1/4"**

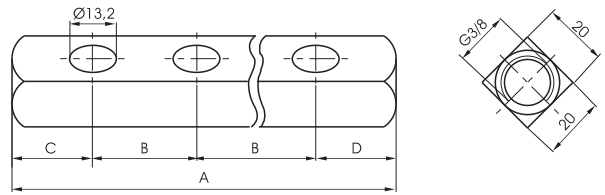
Ordering code

**6.10.14.30/N**

- N. OF POSITIONS
- 2 = N. 2 positions
  - 3 = N. 3 positions
  - 4 = N. 4 positions
  - 5 = N. 5 positions
  - 6 = N. 6 positions
  - 7 = N. 7 positions
  - 8 = N. 8 positions
  - 9 = N. 9 positions
  - 10 = N. 10 positions

**N**

Weight "see table"



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	80	110	140	170	200	230	260	290	320	
B	30	30	30	30	30	30	30	30	30	
C	25	25	25	25	25	25	25	25	25	
D	25	25	25	25	25	25	25	25	25	
Weight gr.	150	190	230	270	310	350	390	430	470	

**Gang mounting manifold for valves and solenoid valves G 1/4"**

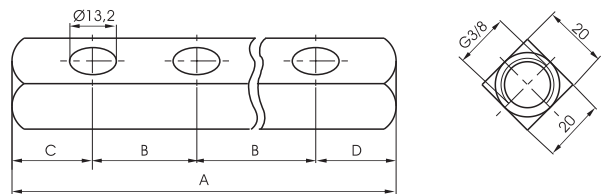
Ordering code

**6.10.14.35/N**

- N. OF POSITIONS
- 2 = N. 2 positions
  - 3 = N. 3 positions
  - 4 = N. 4 positions
  - 5 = N. 5 positions
  - 6 = N. 6 positions
  - 7 = N. 7 positions
  - 8 = N. 8 positions
  - 9 = N. 9 positions
  - 10 = N. 10 positions

**N**

Weight "see table"



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	85	120	155	190	225	260	295	335	365	
B	35	35	35	35	35	35	35	35	35	
C	30	30	30	30	30	30	30	30	30	
D	20	20	20	20	20	20	20	20	20	
Weight gr.	160	210	260	310	360	410	460	510	560	

**Gang mounting manifold for valves and solenoid valves G 1/4"**

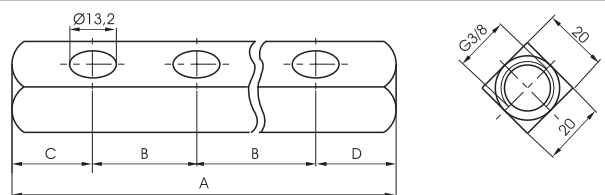
Ordering code

**6.10.14.45/N**

- N. OF POSITIONS
- 2 = N. 2 positions
  - 3 = N. 3 positions
  - 4 = N. 4 positions
  - 5 = N. 5 positions
  - 6 = N. 6 positions
  - 7 = N. 7 positions
  - 8 = N. 8 positions
  - 9 = N. 9 positions
  - 10 = N. 10 positions

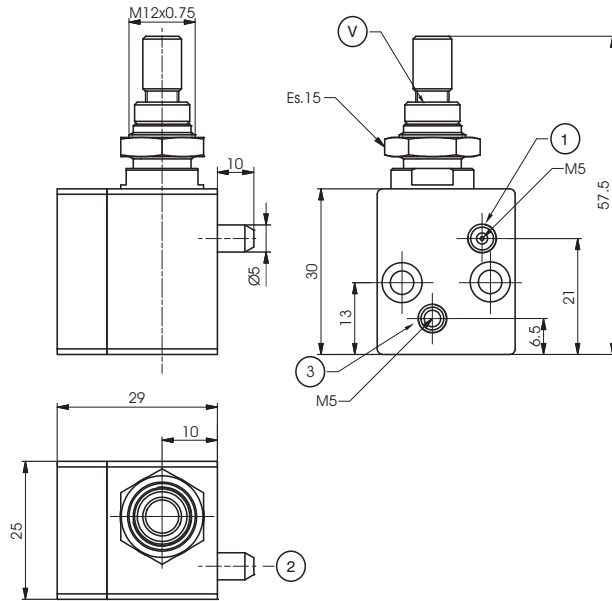
**N**

Weight "see table"



	N. OF POSITIONS									
	2	3	4	5	6	7	8	9	10	
A	115	160	205	250	295	340	385	430	475	
B	45	45	45	45	45	45	45	45	45	
C	35	35	35	35	35	35	35	35	35	
D	35	35	35	35	35	35	35	35	35	
Weight gr.	200	275	350	425	500	575	650	725	800	

Spry valves

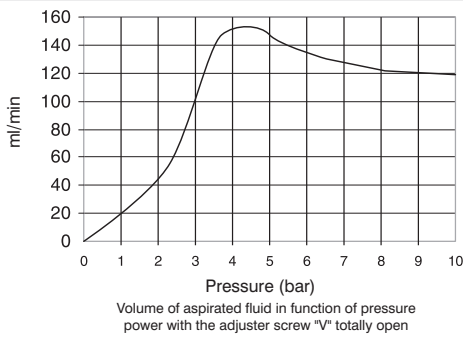


Ordering code

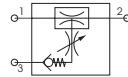
06.13.00

Supply air : Connection 1  
Output (air and nebulized liquid) : Connection 2  
Supply liquid : Connection 3

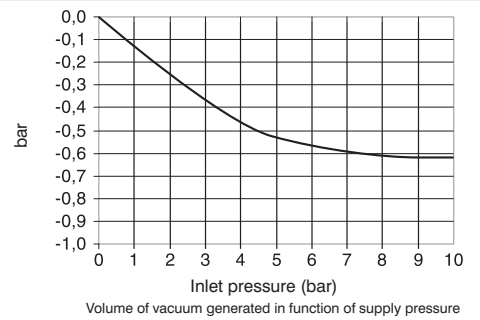
Liquid consumption diagram



Pneumatics symbol



Vacuum diagram



Operational characteristics

- This valve, is based on the Venturi principle, and it is used to spray and nebulize a liquid.
- Useful in all applications where is needed a continuous lubrication and / or refrigeration.
- Incoming air (connection 1) sucks the liquid through the venturi principle (connection 3) to obtain a continuous spray output (connection 2).

Technical characteristic

Fluid	Filtered and lubricated air
Liquid	Water and oil (Liquid viscosity 3°E-5°E)
Working pressure	3 - 10 bar
Temperature °C	-5 - +70
Weight	85gr.



## General

When building automated pneumatic circuits, it is sometimes necessary to alter or modify the various signals. There can be, for instance, a permanent signal coming from a limit switch that needs to be terminated, or there may be a need to modify a pneumatic signal into an electric one, etc. While this can be accomplished by using commercially available components, the process is tedious and expensive. We have therefore developed a number of components to facilitate this task resulting in a consistent saving of time, space and money.

The 900 series consist of the following components:

- Pressure switch, which transforms a pneumatic signal into an electric one.
- Impulse generator, which transforms a permanent pneumatic signal into an adjustable impulse from 0 to 10 seconds.
- Pneumatic timer (N.C. or N.O.), which cuts or releases a pneumatic signal within an adjustable time.
- Two hands safety valve, which allows a safety use of two hands pneumatic controls (for example two push-button 3/2 N.C. to a certain distance) excluding false signals in case of push-button or valve malfunction.
- Flip - Flop: 5/2 ways valve, single signal actuated, commutes the outlet from 2 to 4 and vice versa at each puls.

For a correct functioning it's important that inlet pressure be the same or lower than pilot pressure.

- Oscillator valve, 5/2 - G 1/8" with two logic functions "NOT" mounted on board, switches when the pressure in the connected cylinder exhaust chamber is reaching the threshold of "NOT".
- Signal amplifier, 3/2 - G 1/8" N.C. valve actuated by weak signals but higher than 0.05 bar.
- Progressive start-up valve, which is a device that is fitted in between valve or solenoid valve and cylinder allows a gradual filling of the chamber providing a low power cylinder movement. The progressive start-up valve is made of a flow control valve and a 2/2 N.C. valve with 6 mm nominal orifice. The valve is totally open when the pressure in the cylinder reaches 50% of inlet pressure.
- High-low pressure devices, located in the pneumatic circuit between valve and cylinder, allow the function of the cylinder with two different pressures. Example: in case of a locking action, it is possible to approach the required position at a low pressure, then increase to its maximum value in the circuit with the use of an electric signal. They are practically made of a piloted pressure regulator without relieving.

## Construction characteristics

We have not listed all different materials used for the construction of these components because the list would be too long. We use corrosion proof material, brass or anodized aluminium and the most appropriate specific mixture for seals. If more information is required please contact our technical department.

## Use and maintenance

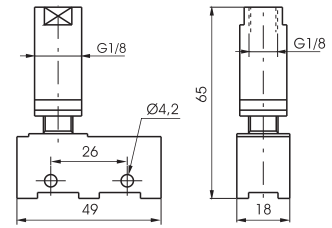
In use pay attention to the minimum and maximum criteria for temperature and pressure, checking and ensure good quality compressed air. In a dirty environment, protect the exhaust ports. In this case, maintenance is minimal and is necessary only if the air is particularly dirty. The components most subject to damage by the accumulation of dirt are flow regulators with fine regulation and silencers. As for regulators, follow the normal procedure for disassembling, washing with non-chemical cleaning agents and re-mounting. The silencers need only to be rinsed in petrol or solvent and blown dry with compressed air.

The number of requests for spare seals for flow regulators and shuttle valves are statistically irrelevant. More often, it is necessary to replace the lining of the quick exhaust because of the wear it undergoes due to the particular conditions of operating.

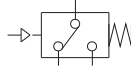
**ATTENTION:** for lubrication use class H hydraulic oils, for example Castrol MAGNA GC 32.

**Pressure switch G 1/8" - screw connections**

Ordering code
<b>900.18.1-P</b>
PRESSURE
<b>P</b> 1 = Min. switch pressure 1 bar
4 = Min. switch pressure 4 bar



Weight gr. 75

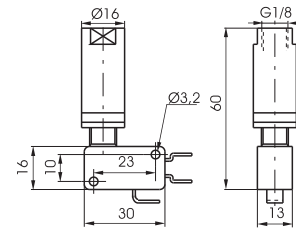


**Operational characteristics**

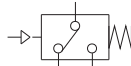
Fluid	Max working pressure (bar)	Temperature °C	Flow rate microswitch	Working Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	13 (3) A - 230V~	G 1/8"

**Pressure switch G 1/8" - spade connections**

Ordering code
<b>900.18.1/P</b>
PRESSURE
<b>P</b> 1 = Min. switch pressure 1 bar
4 = Min. switch pressure 4 bar



Weight gr. 60

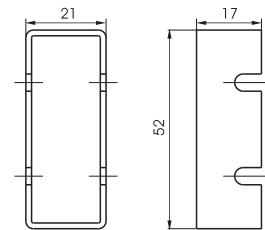


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate microswitch	Working Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	16 (5) A - 230V~	G 1/8"

**Switch protection**

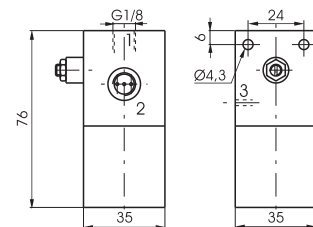
Ordering code
<b>900.18.0</b>



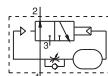
Weight gr. 6

**Impulse generator**

Ordering code
<b>900.18.2N</b>



Weight gr. 235



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Orifice size (mm)
Filtered and lubricated air	10 bar	-5 - +70	mm 2



1

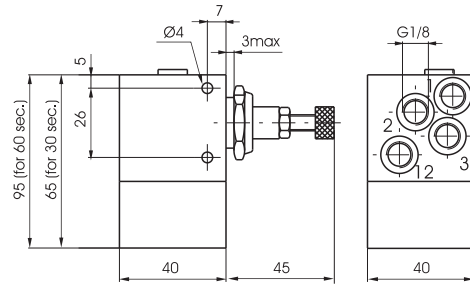
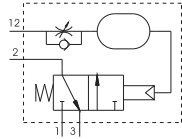
**Pneumatic timer N.C. - G 1/8"**

Ordering code

**900.18.1**

TIME

3 = 0 - 30 sec.  
3-60 = 0 - 60 sec.



Weight gr. 290 (30 sec.)  
Weight gr. 350 (60 sec.)

**Operational characteristics**

Fluid	Working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
Filtered and lubricated air	3 - 10 bar	-5 - +70	130 NI/min	mm 2,5

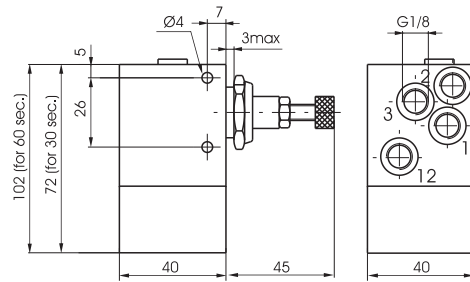
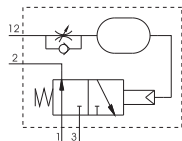
**Pneumatic timer N.O. - G 1/8"**

Ordering code

**900.18.1**

TIME

4 = 0 - 30 sec.  
4-60 = 0 - 60 sec.



Weight gr. 320 (30 sec.)  
Weight gr. 380 (60 sec.)

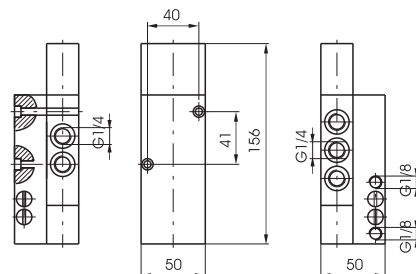
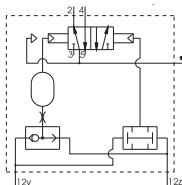
**Operational characteristics**

Fluid	Working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
Filtered and lubricated air	4 - 10 bar	-5 - +70	130 NI/min	mm 2,5

**Two hands safety valve G 1/4"**

Ordering code

**900.52.1.1**



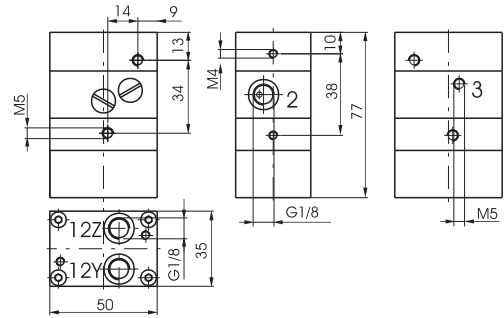
Weight gr. 780

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Working pilot size
Filtered and lubricated air	10 bar	-5 - +70	1030 NI/min	mm 7	G 1/4"	G 1/8"

**Two hands safety valve III A class certification (according to EN 574 standard)**

Ordering code  
**900.18.9**

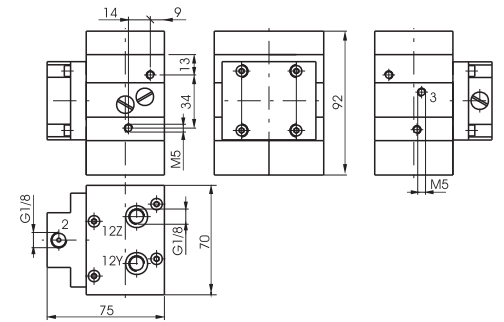


Weight gr. 340

Operational characteristics						
Fluid	Working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size	Working pilot size
Filtered and lubricated air	3 - 8 bar	-5 - +70	40 Nl/min	mm 2,5	G 1/8"	G 1/8"

**Two hands safety valve III B class certification (according to EN 574 standard)**

Ordering code  
**900.18.10**

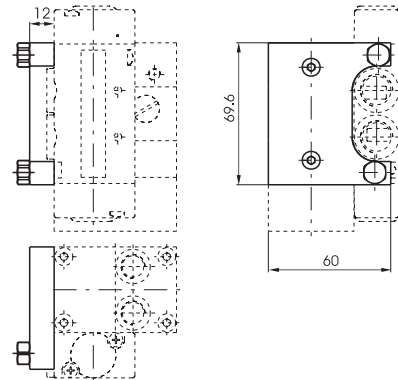


Weight gr. 980

Operational characteristics						
Fluid	Working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size	Working pilot size
Filtered and lubricated air	3 - 8 bar	-5 - +70	40 Nl/min	mm 2,5	G 1/8"	G 1/8"

**Power valve adaptor (Series 2400)**

Ordering code  
**900.18.11**

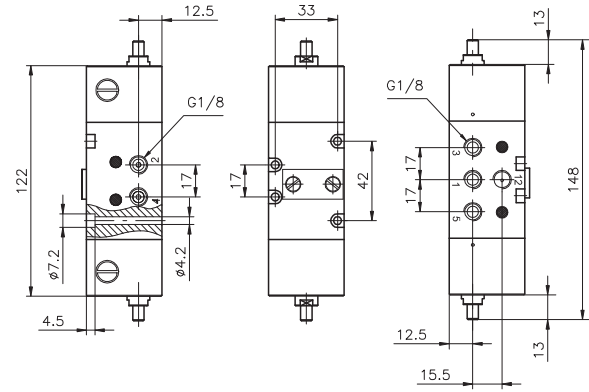
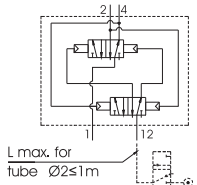


Weight gr. 75

**Flip-flop valve G 1/8" - Pneumatic command**

Ordering code

**900.52.1.3**



Weight gr. 550

Attention: pressure of signal "12" must be the same or higher than device inlet pressure. The maximum distance between the pilot valve and the device must not exceed 1Mtr. ( see pneumatic scheme). Should be necessary to work at a greater distance it is advisable to use a pneumatic-spring shut-off valve positioned at the recommended distance.

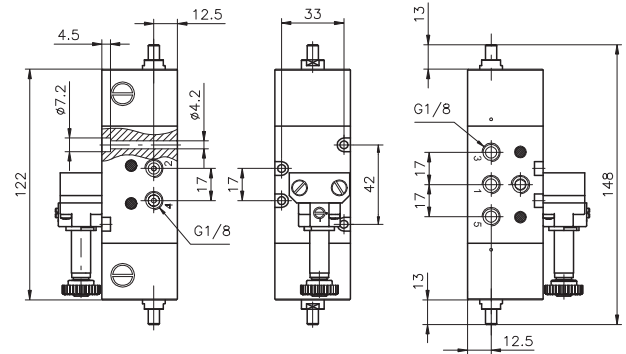
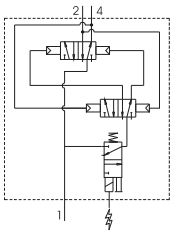
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Flip-flop valve - Electric command with M2 mechanic**

Ordering code

**900.52.1.4**



Weight gr. 660

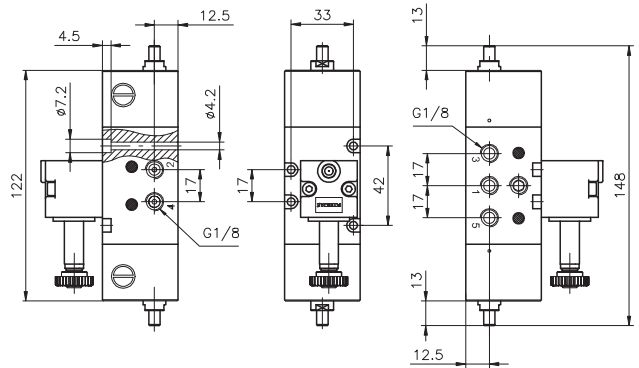
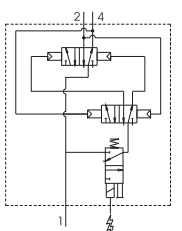
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Flip-flop valve - Electric command with M3P CNOMO**

Ordering code

**900.52.1.5**



Weight gr. 600

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

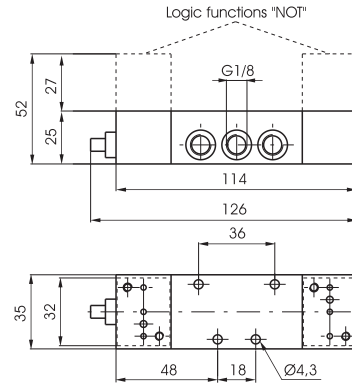


1

**Oscillator valve G 1/8"**

Ordering code  
**900.52.N**

FUNCTION  
N = without logic functions NOT  
5C = with logic functions NOT



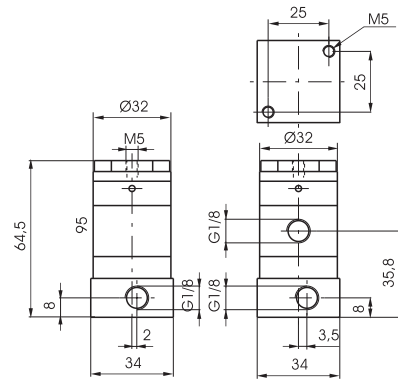
Weight gr. 600

**Operational characteristics**

Fluid	Max working pressure (bar)	Min working pressure	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	8 bar	2 bar	-5 - +70	540 NI/min	mm 6	G 1/8"

**Signal amplifier G 1/8"**

Ordering code  
**900.32.6**



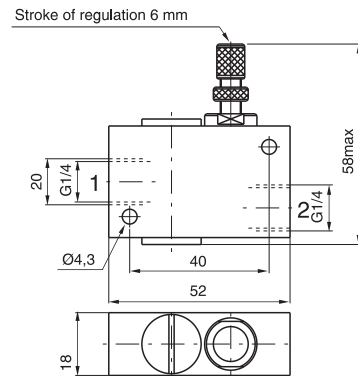
Weight gr. 170

**Operational characteristics**

Fluid	Max working pressure (bar)	Min working pressure	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	0,05 bar	-5 - +70	130 NI/min	mm 3	G 1/8"

**Progressive start-up valve G 1/4"**

Ordering code  
**900.14.7**



Weight gr. 100  
Flow rate needle fully open from port 1 to 2 (NI/min.) = 200

Portata a 6 bar scarico libero (NI/min.) = 1100

**Operational characteristics**

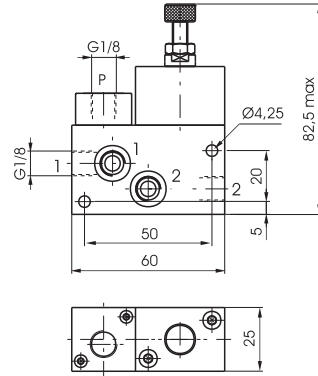
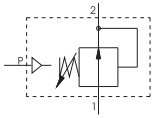
Fluid	Working pressure (bar)	Temperature °C	Flow rate from 1 to 2	Flow rate from 2 to 1	Orifice size (mm)
Filtered and lubricated air	2,5 bar10 bar	-5 - +70	760 NI/min	900 NI/min	mm. 6

1

**High-low pressure device with pneumatic pilot**

Ordering code

**900.18.8P**



Weight gr. 240  
With pneumatic commande

1 = Inlet / pressure gauge  
2 = Outlet / pressure gauge  
P = Piloting

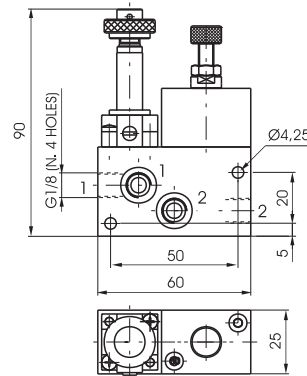
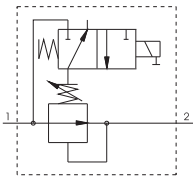
**Operational characteristics**

Fluid	Max working pressure (bar)	Pressure range (bar)	Temperature °C	Max flow 6 bar Δp=1	Working ports size
Filtered air, with or without lubrication	10 bar	1 - 4 bar	Min. Max.	650 NI/min	G 1/8"

**High-low pressure device with M2 mechanic**

Ordering code

**900.18.8E**



Weight gr. 280  
With M2 mechanic

1 = Inlet / pressure gauge  
2 = Outlet / pressure gauge

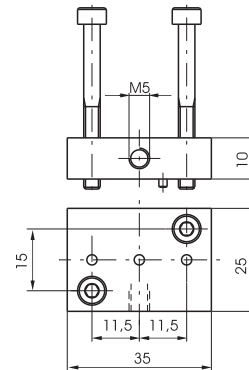
**Operational characteristics**

Fluid	Max working pressure (bar)	Pressure range (bar)	Temperature °C	Max flow 6 bar Δp=1	Working ports size
Filtered air, with or without lubrication	10 bar	1 - 4 bar	Min. Max.	650 NI/min	G 1/8"

**External feeding base "NOT" logical element**

Ordering code

**900.005**



Weight gr. 35

**Description**

The blocking valves are used to maintain pressure in the downstream part of the pneumatic circuit even when the pressure supply is shut down.

Blocking valves are normally assembled directly on cylinders ports in order to maintain the position even in cases of accidental loss of the pilot pressure by preventing a sudden loss of pressure in the cylinder chambers.

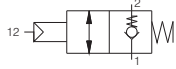
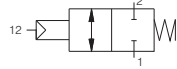
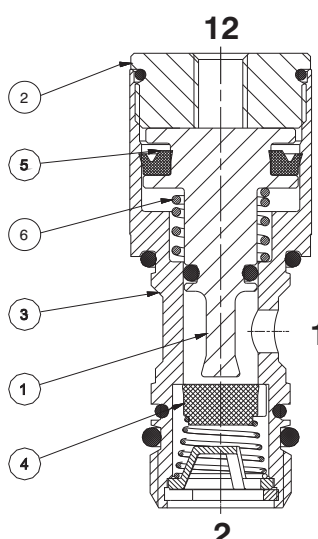
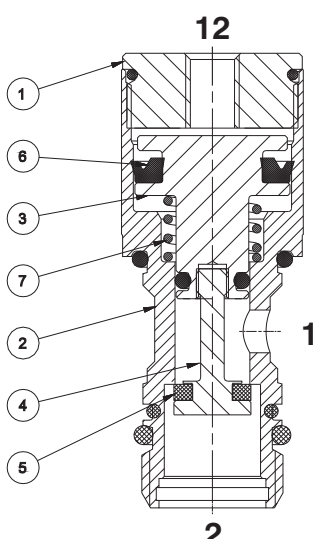
Unidirectional and bidirectional version are both available.

The unidirectional version allows free air to flow in one direction while requires a pneumatic signal to allow air flow in the opposite direction.

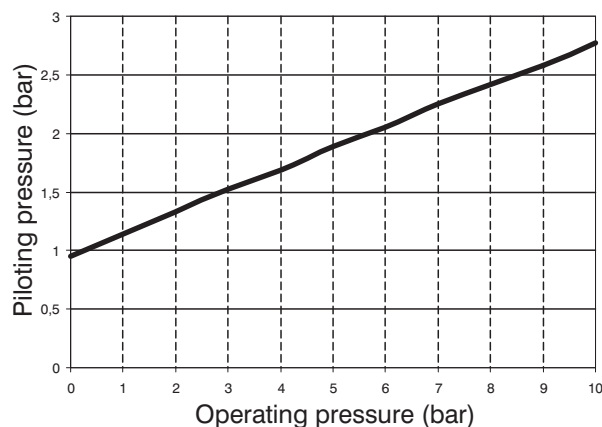
The bidirectional version requires a pressure signal to allow air flow in both of the two directions.

**The blocking valve cannot be used as safety device.**

**Constructive features**

<p><b>UNIDIRECTIONAL VERSION</b></p> 	<p><b>BIDIRECTIONAL VERSION</b></p> 
 <ul style="list-style-type: none"> <li>1 - Aluminium piston</li> <li>2 - Brass plug</li> <li>3 - Brass body</li> <li>4 - FPM poppet (1/8" and 1/4" version) PUR poppet (3/8" and 1/2" version)</li> <li>5 - NBR seal</li> <li>6 - Steel spring</li> </ul>	 <ul style="list-style-type: none"> <li>1 - Brass plug</li> <li>2 - Brass body</li> <li>3 - Aluminium piston</li> <li>4 - Steel piston extension</li> <li>5 - PUR poppet</li> <li>6 - NBR seal</li> <li>7 - Steel spring</li> </ul>

**Working curves**



**Blocking valves metal type - Size 1/8"**

Ordering code

**50T18V**

METAL TYPE

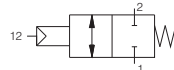
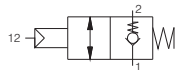
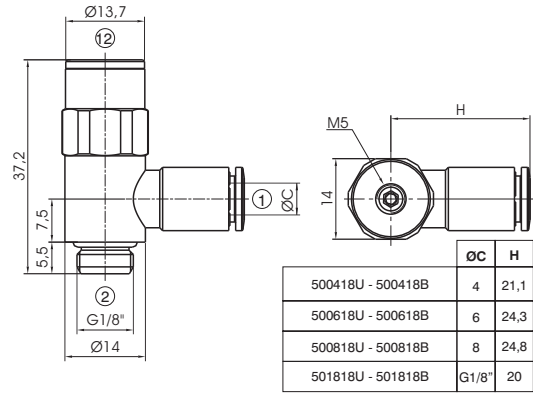
- A = Banjo only
- 04 = Banjo Ø4
- 06 = Banjo Ø6
- 08 = Banjo Ø8
- 18 = Banjo G1/8"

T

VERSION

- U = Unidirectional
- B = Bidirectional

V



**Operational characteristics**

Fluid	Pressure range (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	285	450	-5 - +50

**Blocking valves technopolymer type - Size 1/8"**

Ordering code

**T50T18V**

TECHNOPOLYMER TYPE

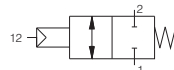
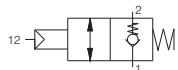
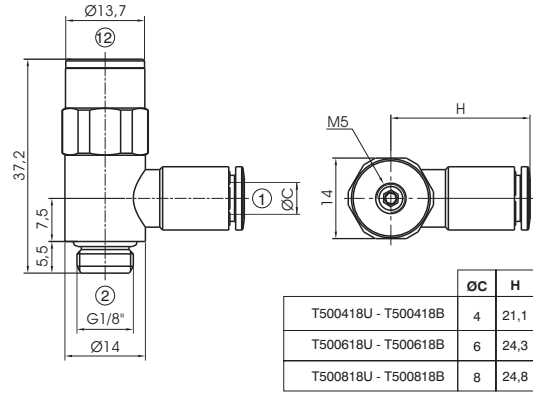
- A = Banjo only
- 04 = Banjo Ø4
- 06 = Banjo Ø6
- 08 = Banjo Ø8

T

VERSION

- U = Unidirectional
- B = Bidirectional

V



**Operational characteristics**

Fluid	Pressure range (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	285	450	-5 - +50

**Blocking valves metal type - Size 1/4"**

Ordering code

**50T14V**

METAL TYPE

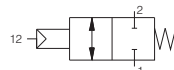
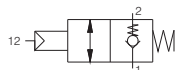
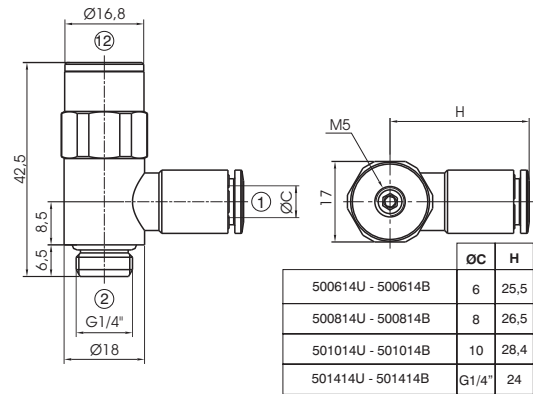
- A = Banjo only
- 06 = Banjo Ø6
- 08 = Banjo Ø8
- 10 = Banjo Ø10
- 14 = Banjo G1/4"

T

VERSION

- U = Unidirectional
- B = Bidirectional

V

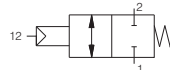
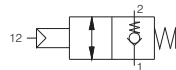
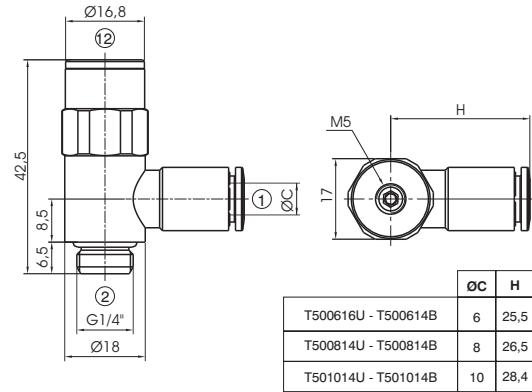


**Operational characteristics**

Fluid	Pressure range (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	530	800	-5 - +50

**Blocking valves technopolymer type - Size 1/4"**

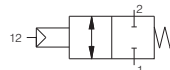
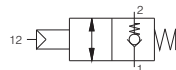
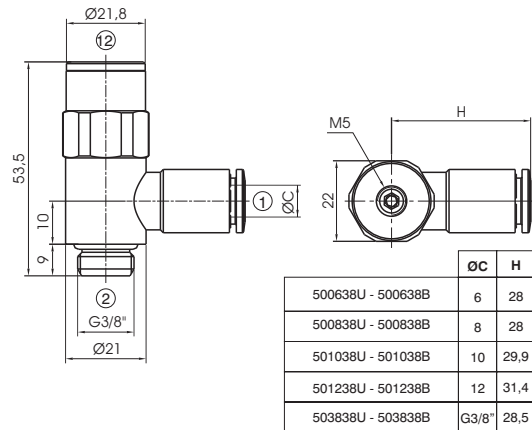
Ordering code	
<b>T50T14V</b>	
TECHNOPOLYMER TYPE	
A = Banjo only	
<b>T</b>	06 = Banjo Ø6
	08 = Banjo Ø8
	10 = Banjo Ø10
VERSION	
<b>V</b>	U = Unidirectional
	B = Bidirectional



Operational characteristics				
Fluid	Pressure range (bar)	Flow rate at 6 bar with Δp=1	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	530	800	-5 - +50

**Blocking valves metal type - Size 3/8"**

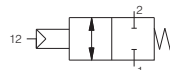
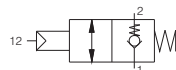
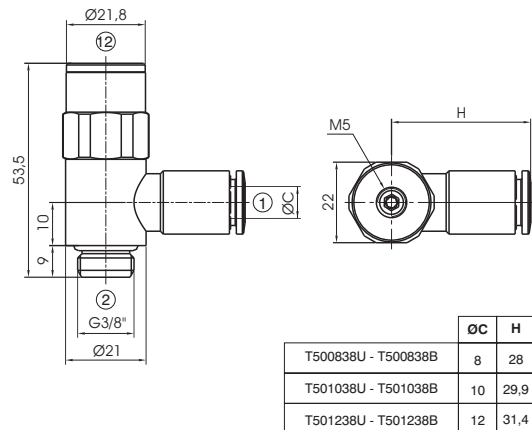
Ordering code	
<b>50T38V</b>	
METAL TYPE	
A = Banjo only	
<b>T</b>	06 = Banjo Ø6
	08 = Banjo Ø8
	10 = Banjo Ø10
	12 = Banjo G1/2"
	38 = Banjo G3/8"
VERSION	
<b>V</b>	U = Unidirectional
	B = Bidirectional



Operational characteristics				
Fluid	Pressure range (bar)	Flow rate at 6 bar with Δp=1 (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	1000	1600	-5 - +50

**Blocking valves technopolymer type - Size 3/8"**

Ordering code	
<b>T50T38V</b>	
TECHNOPOLYMER TYPE	
A = Banjo only	
<b>T</b>	08 = Banjo Ø8
	10 = Banjo Ø10
	12 = Banjo G1/2"
VERSION	
<b>V</b>	U = Unidirectional
	B = Bidirectional



Operational characteristics				
Fluid	Pressure range (bar)	Flow rate at 6 bar with Δp=1 (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	1000	1600	-5 - +50



**Blocking valves metal type - Size 1/2"**

Ordering code

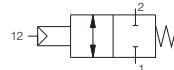
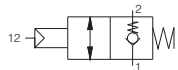
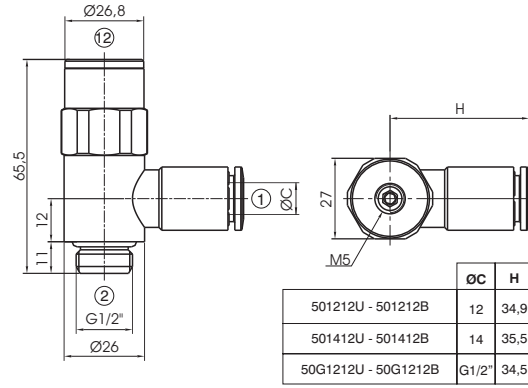
**50T12V**

METAL TYPE

- A = Banjo only
- 12 = Banjo G1/2"
- 14 = Banjo Ø14
- G12 = Banjo G1/2"

VERSION

- U = Unidirectional
- B = Bidirectional



**Operational characteristics**

Fluid	Pressure range (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	1300	2600	-5 - +50

**Blocking valves technopolymer type - Size 1/2"**

Ordering code

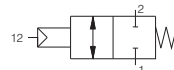
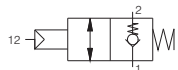
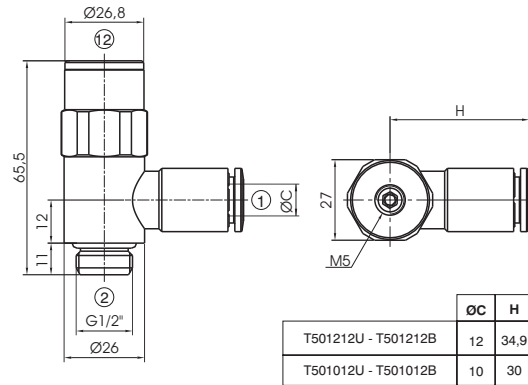
**T50T12V**

TECHNOPOLYMER TYPE

- A = Banjo only
- 10 = Banjo Ø10
- 12 = Banjo G1/2"

VERSION

- U = Unidirectional
- B = Bidirectional



**Operational characteristics**

Fluid	Pressure range (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Flow rate with free exhaust (NI/min)	Temperature °C
Filtered air, with or without lubrication	0,5 - 10	1300	2600	-5 - +50

# Tecno FUN

## General



New compact line of different logic functions that can be used in any place of the secondary pneumatic circuit, developed to be installed directly onto the main pneumatic components (distributors or cylinders). Thanks to the modular design it is possible to easily join together multiple logic functions without the need of using pipes to connect them; it is also possible to choose the type and style of each connection. The connections available are the following: straight cartridge; Banjo PL cartridge; male cartridge threaded 1/8" or 1/4" and female cartridge threaded 1/8".

Function fittings can also be assembled side by side in order to be assembled on the DIN EN 50022 rail (using the relevant kit).

### Other characteristics:

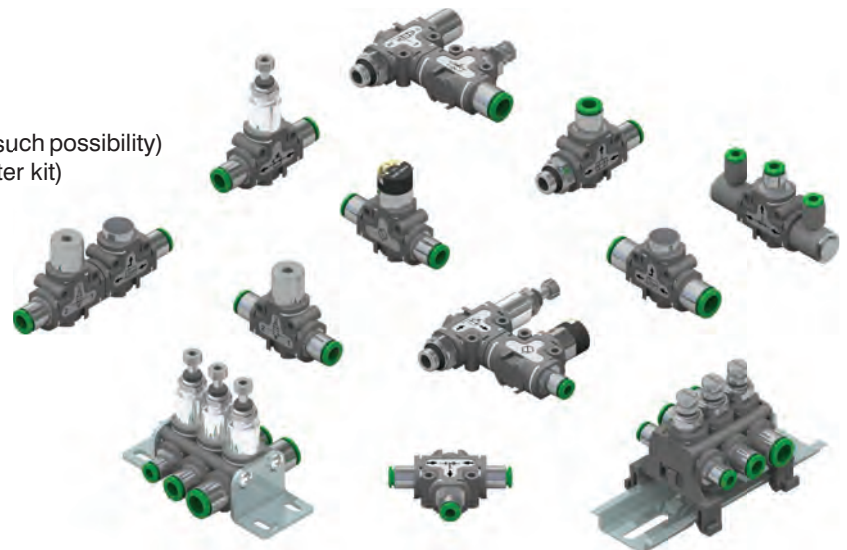
Technopolymer body  
Input/output connection directly integrated into the body  
In line or 90° connection  
Possibility to build a manifold -parallel mounting-  
Different connection options:  
Tube Ø4 Ø6 Ø8 (elbow version as well)  
G1/8" G1/4" male straight cartridge  
G1/8" female cartridge, in line or 90°

### Different mounting options:

- Wall fixing through the holes in the body
- By means of the fixing bracket
- Panel mounting (for those function that include such possibility)
- On DIN rail EN 50022 (using the DIN rail adapter kit)

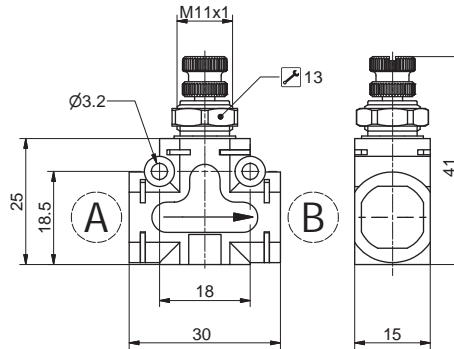
### Available functions:

- Flow control valve (FCV)
- pressure regulator (PR)
- block valve (BV)
- quick exhaust valve (QEV)
- OR gate (CSV-OR)
- AND gate (CSV-AND)
- pressure gauge (PI)
- pressure regulator + pressure gauge (PR+PI)
- block valve + Flow control valve (BV+FCV)
- block valve + quick exhaust valve (BV+QEV)



1

Flow regulator

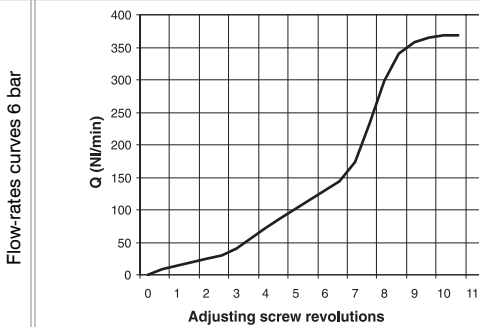


Ordering code

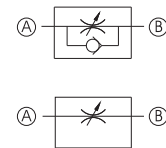
**551.11 T.A.B.XX**

VERSION	
T	1 = Unidirectional
	2 = Bidirectional
Connection A see CONNECTIONS LIST	
Connection B see CONNECTIONS LIST	
CONNECTIONS LIST	
	00 = None
	D4 = Straight Ø4
	D6 = Straight Ø6
	D8 = Straight Ø8
L	L1 = Female banjo G1/8"
	G4 = Rotating banjo Ø 4
	G6 = Rotating banjo Ø 6
	G8 = Rotating banjo Ø 8
	M1 = G1/8 male
	M2 = G1/4 male
	F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.111.D6.D6.XX  
 Flow control valve, unidirectional, CONNECTIONS "A" and "B" Tube Ø6



Pneumatic Symbol



Operational characteristics

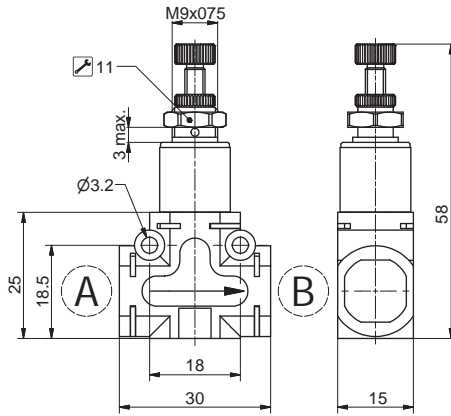
- The flow control valve is normally used to regulate the air flow and, as a consequence, for example, the speed of a cylinder. Two types of flow control valves are available: unidirectional and bidirectional. In the unidirectional valve the flow is regulated only in one direction while is free to move in the opposite direction; in the bidirectional valve the flow is regulated in both directions.
- Mounting options:
  - panel mounting using the lock nut supplied as standard
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
- directly on the support plate thanks to two through holes on the body

Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	26 gr.
Ø Orifice size (mm)	Ø3 mm
Free exhaust flow rate in the opposite side of the regulation (for unidirectional version)	800 NI/min.



**In line pressure regulator**



**Ordering code**

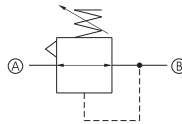
**551.12T.A.B.XX**

VERSION	
T	2 = 0 - 2 bar 4 = 0 - 4 bar 8 = 0 - 8 bar
A	Connection A see CONNECTIONS LIST
B	Connection B see CONNECTIONS LIST
CONNECTIONS LIST	
00 = None	
D4 = Straight Ø4	
D6 = Straight Ø6	
D8 = Straight Ø8	
L	L1 = Female banjo G1/8" G4 = Rotating banjo Ø 4 G6 = Rotating banjo Ø 6 G8 = Rotating banjo Ø 8 M1 = G1/8 male M2 = G1/4 male F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS

Example: 551.128.D8.D8.XX : In line pressure regulator, Pressure range (bar) 0 - 8 bar. CONNECTIONS "A" and "B" Tube Ø8

Pneumatic Symbol



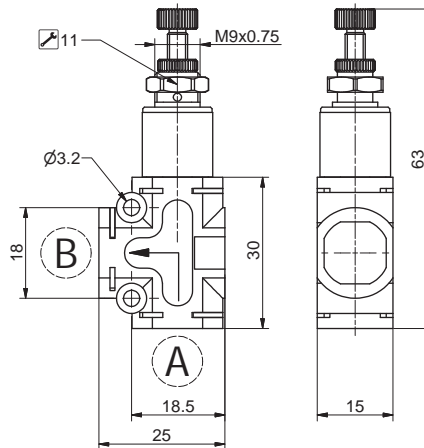
**Operational characteristics**

- The pressure regulator is a device which is used to reduce, regulate and stabilize the air pressure in a conduit in order to adapt it to the needs of the equipments to be supplied. The pressure regulator incorporates the relieving function.
- Mounting options:
  - panel mounting using the lock nut supplied as standard
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
  - directly on the support plate thanks to two through holes on the body

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	31 gr.
Flow rate at 6 bar with Δp=1 (NI/min)	180 NI/min
Regulated Pressure range (bar)	0 - 2 bar / 0 - 4 bar / 0 - 8 bar

**90° pressure regulator**



**Ordering code**

**551.22T.A.B.XX**

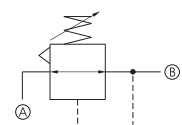
VERSION	
T	2 = 0 - 2 bar 4 = 0 - 4 bar 8 = 0 - 8 bar
A	Connection A see CONNECTIONS LIST
B	Connection B see CONNECTIONS LIST
CONNECTIONS LIST	
00 = None	
D4 = Straight Ø4	
D6 = Straight Ø6	
D8 = Straight Ø8	
L	L1 = Female banjo G1/8" G4 = Rotating banjo Ø 4 G6 = Rotating banjo Ø 6 G8 = Rotating banjo Ø 8 M1 = G1/8 male M2 = G1/4 male F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS

Example: 551.224.M1.D6.XX

90° pressure regulator, Pressure range (bar) 0 - 4 bar. CONNECTIONS "A" Male G1/8 and "B" Tube Ø6

Pneumatic Symbol



**Operational characteristics**

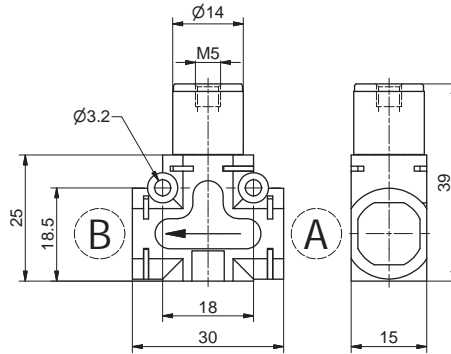
- The pressure regulator is a device which is used to reduce, regulate and stabilize the air pressure in a conduit in order to adapt it to the needs of the equipments to be supplied. The pressure regulator incorporates the relieving function.
- Mounting options:
  - panel mounting using the lock nut supplied as standard
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
  - directly on the support plate thanks to two through holes on the body

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	31 gr.
Flow rate at 6 bar with Δp=1 (NI/min)	180 NI/min
Regulated Pressure range (bar)	0 - 2 bar / 0 - 4 bar / 0 - 8 bar

1

**Blocking valve**



**Ordering code**

**551.13T.A.B.XX**

VERSION

- T 1 = Unidirectional
- 2 = Bidirectional

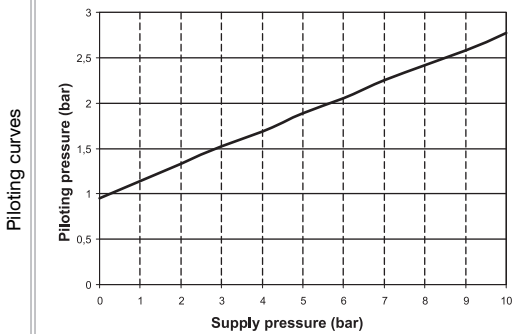
A Connection A see CONNECTIONS LIST

B Connection B see CONNECTIONS LIST

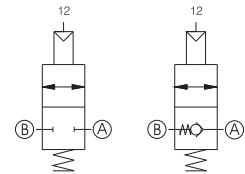
CONNECTIONS LIST

- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L1 = Female banjo G1/8"
- L4 = Rotating banjo Ø 4
- L6 = Rotating banjo Ø 6
- L8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.131.D4.D4.XX  
 In line blocking valve, unidirectional, CONNECTIONS "A" and "B" Tube Ø4



Pneumatic Symbol



**Operational characteristics**

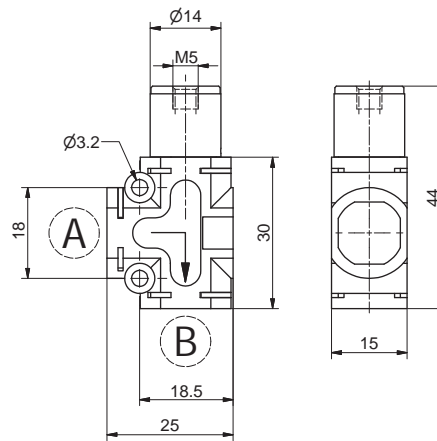
- The blocking valve function is to maintain the circuit downstream pressure in the event of loss of supply pressure. It is normally fitted directly onto the cylinder connections ports in order to ensure that, in case of accidental loss of the supply pressure, the units positions is maintained. This is achieved as the blocking valve preserves the pressure inside the pressurised chamber. Blocking valves can be unidirectional or bidirectional. In the unidirectional version the air flow is free in one direction while in order to allow the flow in the opposite direction is necessary to send a pneumatic signal to the unit connection 12. The bidirectional version requires a pneumatic signal on connection 12 to allow the flow in any of the two directions.
- Mounting options:
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
  - directly on the support plate thanks to two through holes on the body

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Working pressure	0,5 - 10 bar
Temperature °C	-5 - +50
Weight without connections	26 gr.
Flow rate at 6 bar with Δp=1 (NI/min) Unidirectional and bidirectional version	285 NI/min
Flow rate at 6 bar with free exhaust Unidirectional and bidirectional version	450 NI/min



90° blocking valve

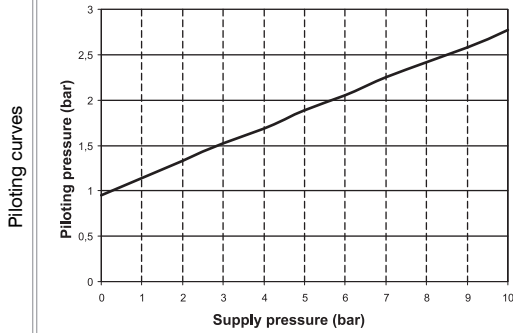


Ordering code

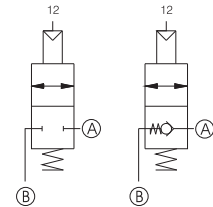
551.231.A.B.XX

VERSION	
T	1 = Unidirectional 2 = Bidirectional
A	Connection A see CONNECTIONS LIST
B	Connection B see CONNECTIONS LIST
CONNECTIONS LIST	
00 = None	
D4 = Straight Ø4	
D6 = Straight Ø6	
D8 = Straight Ø8	
L	L1 = Female banjo G1/8"
G4 = Rotating banjo Ø 4	
G6 = Rotating banjo Ø 6	
G8 = Rotating banjo Ø 8	
M1 = G1/8 male	
M2 = G1/4 male	
F1 = G1/8 female	

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.231.M1.D6.XX  
 90° blocking valve, unidirectional, CONNECTIONS "A" Male G1/8 and "B" Tube Ø6



Pneumatic Symbol



Operational characteristics

- The blocking valve function is to maintain the circuit downstream pressure in the event of loss of supply pressure. It is normally fitted directly onto the cylinder connections ports in order to ensure that, in case of accidental loss of the supply pressure, the units positions is maintained. This is achieved as the blocking valve preserves the pressure inside the pressurised chamber. Blocking valves can be unidirectional or bidirectional. In the unidirectional version the air flow is free in one direction while in order to allow the flow in the opposite direction is necessary to send a pneumatic signal to the unit connection 12. The bidirectional version requires a pneumatic signal on connection 12 to allow the flow in any of the two directions.
- Mounting options:
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
  - directly on the support plate thanks to two through holes on the body

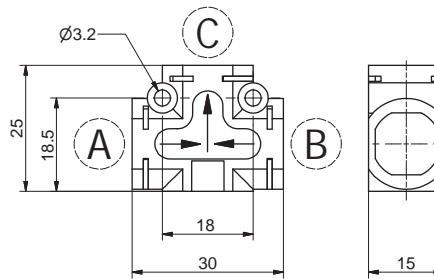
Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Working pressure	0,5 - 10 bar
Temperature °C	-5 - +50
Weight without connections	26 gr.
Flow rate at 6 bar with Δp=1 (NI/min) Unidirectional and bidirectional version	285 NI/min
Flow rate at 6 bar with free exhaust Unidirectional and bidirectional version	450 NI/min



1

**Circuit selector valve - OR**



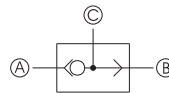
**Ordering code**

**551.141.A.B.C**

- A** Connection A  
see CONNECTIONS LIST
  - B** CONNECTIONS B  
see CONNECTIONS LIST
  - C** Connection C  
see CONNECTIONS LIST
- CONNECTIONS LIST
- 00 = None
  - D4 = Straight Ø4
  - D6 = Straight Ø6
  - D8 = Straight Ø8
  - L** L1 = Female banjo G1/8"
  - G4 = Rotating banjo Ø 4
  - G6 = Rotating banjo Ø 6
  - G8 = Rotating banjo Ø 8
  - M1 = G1/8 male
  - M2 = G1/4 male
  - F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.141.D8.D8.D8  
 Circuit selector valve OR, CONNECTIONS "A", "B" and "C" Tube Ø8

Pneumatic Symbol



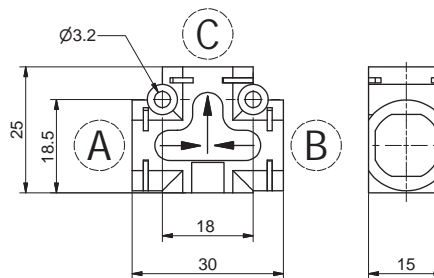
**Operational characteristics**

- These valves have two inlets and one output connection and are normally called high pressure selector valves as, when receiving two separate pressure supply, only allow the passage of the highest pressure. The most common application is to operate a component from two separate positions.
- Mounting options:
- on DIN rail using the relevant adaptor kit (see accessories)
- with 90° bracket (see accessories)
- directly on the support plate thanks to two through holes on the body

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	10 gr.
Flow rate at 6 bar with Δp=1 (NI/min)	600 NI/min

**Circuit selector valve - AND**



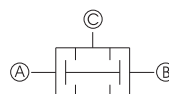
**Ordering code**

**551.151.A.B.C**

- A** Connection A  
see CONNECTIONS LIST
  - B** CONNECTIONS B  
see CONNECTIONS LIST
  - C** Connection C  
see CONNECTIONS LIST
- CONNECTIONS LIST
- 00 = None
  - D4 = Straight Ø4
  - D6 = Straight Ø6
  - D8 = Straight Ø8
  - L** L1 = Female banjo G1/8"
  - G4 = Rotating banjo Ø 4
  - G6 = Rotating banjo Ø 6
  - G8 = Rotating banjo Ø 8
  - M1 = G1/8 male
  - M2 = G1/4 male
  - F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.151.D6.D6.D6  
 Circuit selector valve AND, CONNECTIONS "A", "B" and "C" Tube Ø6

Pneumatic Symbol



**Operational characteristics**

- These valves have two inlets and one output connection and are normally called low pressure selector valves as, when receiving two separate pressure supply, only allow the passage of the lowest pressure. The most common application is to operate a component from two separate positions.
- Mounting options:
- on DIN rail using the relevant adaptor kit (see accessories)
- with 90° bracket (see accessories)
- directly on the support plate thanks to two through holes on the body

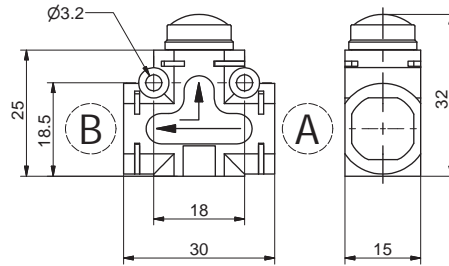
**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	10 gr.
Flow rate at 6 bar with Δp=1 (NI/min)	550 NI/min





**Quick exhaust valve**



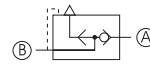
**Ordering code**

**551.161.A.B.XX**

- A** Connection A see CONNECTIONS LIST
- B** Connection B see CONNECTIONS LIST
- CONNECTIONS LIST
- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L** L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.161.D8.D8.XX  
 Quick exhaust valve, CONNECTIONS "A" and "B" Tube Ø8

Pneumatic Symbol



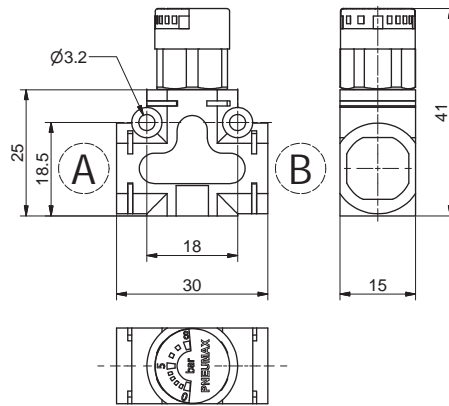
**Operational characteristics**

- These are 3 ways, two positions valves which can be directly mounted onto the actuator or between the actuator and the control valve. Their function is to discharge the air directly into the atmosphere without going through the pneumatic circuit enabling the actuator to reach the maximum speed.
- Mounting options:
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
- directly on the support plate thanks to two through holes on the body

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	10 bar
Temperature °C	-5 - +50
Weight without connections	15 gr.
Flow rate at 6 bar with Δp=1 (NI/min) (from 1 to 2)	250 NI/min
Flow rate at 6 bar with free exhaust (from 2 to 3)	500 NI/min

**Pressure indicator**



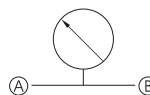
**Ordering code**

**551.178.A.B.XX**

- A** Connection A see CONNECTIONS LIST
- B** Connection B see CONNECTIONS LIST
- CONNECTIONS LIST
- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L** L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.178.D6.D4.XX  
 Pressure indicator, CONNECTIONS "A" Tube Ø6, "B" Tube Ø4

Pneumatic Symbol



**Operational characteristics**

- The pressure visual indicator is a device which measures the pressure inside a pneumatic circuit. The 0 to 8 bar visual indicator makes very easy to monitor the pressure state inside the circuit. It can be use on its own or can be coupled with another device.
- Mounting options:
  - on DIN rail using the relevant adaptor kit (see accessories)
  - with 90° bracket (see accessories)
- directly on the support plate thanks to two through holes on the body

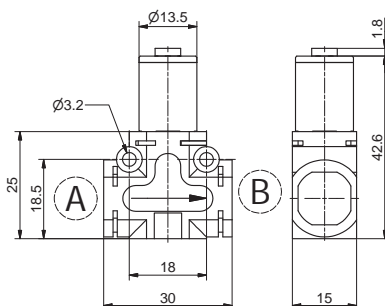
**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	8 bar
Visualization scale	0 - 8 bar
Temperature °C	-5 - +50
Weight without connections	20,5 gr.



1

**In line progressive start-up valve**



**Ordering code**

**551.181.A.B.XX**

**A** Connection A see CONNECTIONS LIST

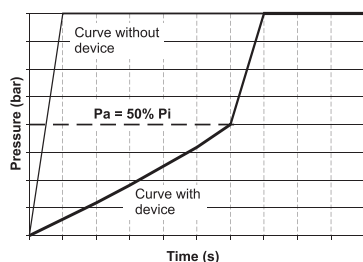
**B** Connection B see CONNECTIONS LIST

**CONNECTIONS LIST**

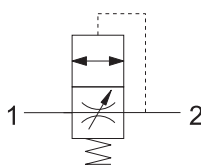
- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L** L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS / Example: 551.181.D6.D4.XX : Progressive start-up, CONNECTIONS "A" Tube Ø6, "B" Tube Ø4

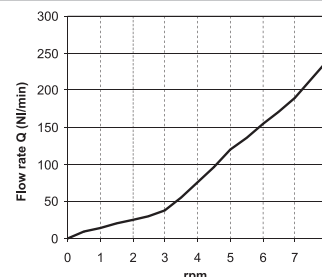
Piloting curves



Pneumatic Symbol



Adjustment curve



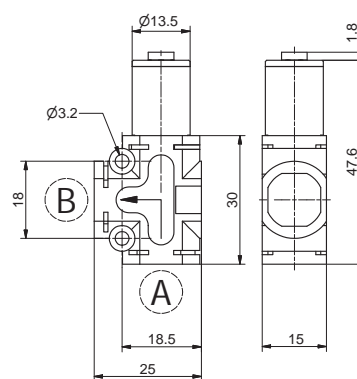
**Operational characteristics**

- The soft start valve is a device designed to gradually pressurise the downstream circuit until 50% of the upstream pressure value is reached.
- Once the 50% of the upstream pressure value is reached in the down stream circuit the valve fully opens allowing full air passage.
- The filling time can be adjusted thanks to the built in flow regulator.
- This device is used in order to ensure that during the pneumatic circuit start up the cylinders will return to their home position slowly avoiding collisions or sudden movements.

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Working pressure (bar)	2 - 10 bar
Opening pressure (Pa)	50% of the inlet pressure (Pi)
Flow rate at 6 bar with free exhaust (NI/min)	650 NI/min (from 1 to 2 with opening circuit)
Flow rate at 6 bar with Δp=1 (NI/min)	350 NI/min (from 1 to 2 with opening circuit)
Flow rate at 6 bar with Δp=1 (NI/min)	600 NI/min (from 2 to 1 with opening pin)
Temperature °C	-5 - +50
Weight without connections	31 gr.

**90° progressive start-up valve**



**Ordering code**

**551.281.A.B.XX**

**A** Connection A see CONNECTIONS LIST

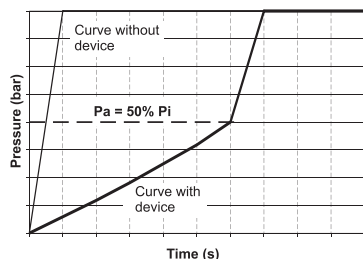
**B** Connection B see CONNECTIONS LIST

**CONNECTIONS LIST**

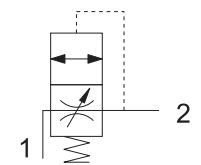
- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L** L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS / Example: 551.281.M1.D4.XX: Progressive start-up, CONNECTIONS "A" Tube Ø6, "B" Tube Ø4

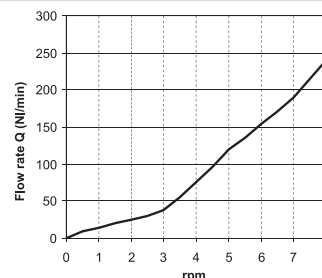
Piloting curves



Pneumatic Symbol



Adjustment curve



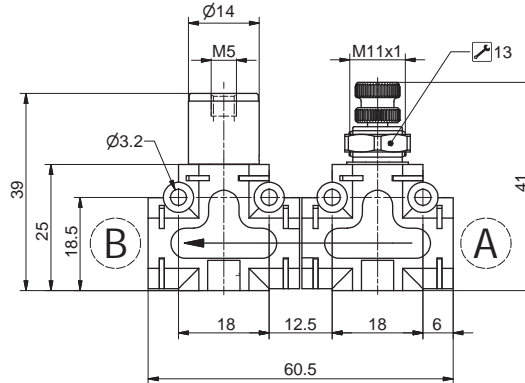
**Operational characteristics**

- The soft start valve is a device designed to gradually pressurise the downstream circuit until 50% of the upstream pressure value is reached.
- Once the 50% of the upstream pressure value is reached in the down stream circuit the valve fully opens allowing full air passage.
- The filling time can be adjusted thanks to the built in flow regulator.
- This device is used in order to ensure that during the pneumatic circuit start up the cylinders will return to their home position slowly avoiding collisions or sudden movements.

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	2 - 10 bar
Opening pressure (Pa)	50% of the inlet pressure (Pi)
Flow rate at 6 bar with free exhaust (NI/min)	650 NI/min (from 1 to 2 with opening circuit)
Flow rate at 6 bar with Δp=1 (NI/min)	350 NI/min (from 1 to 2 with opening circuit)
Flow rate at 6 bar with Δp=1 (NI/min)	600 NI/min (from 2 to 1 with opening pin)
Temperature °C	-5 - +50
Weight without connections	31 gr.

In line blocking valve + flow control valve



Ordering code

551.1F1.A.B.XX

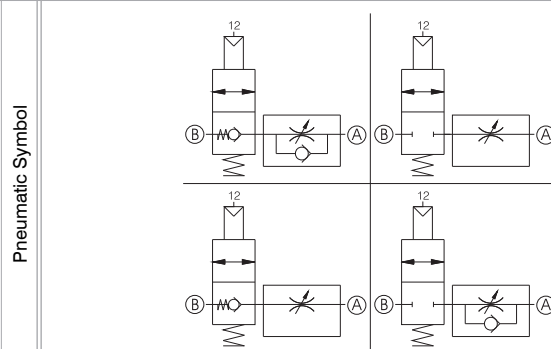
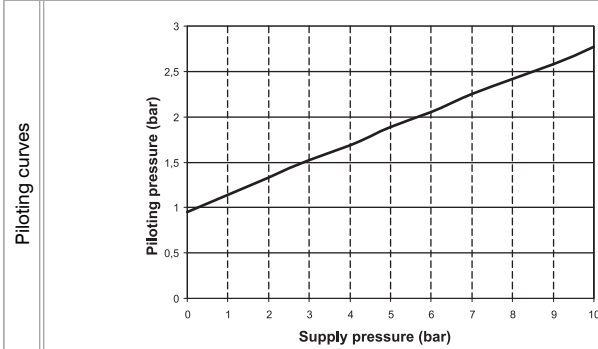
VERSION

- 1 = Unidirectional blocking valve + Unidirectional flow control valve
  - 2 = Bidirectional blocking valve + Bidirectional flow control valve
  - 3 = Unidirectional blocking valve + Bidirectional flow control valve
  - 4 = Bidirectional blocking valve + Unidirectional flow control valve
- T see CONNECTIONS LIST A  
B see CONNECTIONS LIST B
- CONNECTIONS LIST
- 00 = None
  - D4 = Straight Ø4
  - D6 = Straight Ø6
  - D8 = Straight Ø8
  - L L1 = Female banjo G1/8"  
 G4 = Rotating banjo Ø 4  
 G6 = Rotating banjo Ø 6  
 G8 = Rotating banjo Ø 8  
 M1 = G1/8 male  
 M2 = G1/4 female  
 F1 = G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS

Example: 551.1F1.00.00.XX

In line unidirectional blocking valve + unidirectional flow control valve, without CONNECTIONS "A" and "B"



Operational characteristics

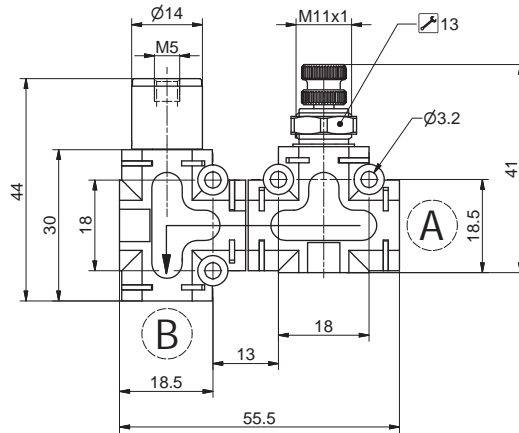
- The combination of this two functions ensures that the downstream pressure is maintained in case of accidental loss of supply pressure and at the same time grants the possibility to regulate the circuit flow rate. A typical application of this combination is close to or directly assembled onto the actuator connection ports. This allows to keep pressurised the cylinder chamber in case of accidental loss of supply pressure and to regulate the exhaust flow rate when the blocking valve is actuated.
- The possible combinations are the following:
  - unidirectional blocking valve + unidirectional flow control valve.
  - bidirectional blocking valve + bidirectional flow control valve
  - bidirectional blocking valve + unidirectional flow control valve
  - unidirectional blocking valve + bidirectional flow control valve

Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	0,5 - 10 bar
Temperature °C	-5 - +50
Ø Orifice size (mm)	Ø3 mm
Flow rate at 6 bar with Δp=1 (NI/min)	285 NI/min
Weight without connections	62 gr.

1

90° blocking valve + flow control valve



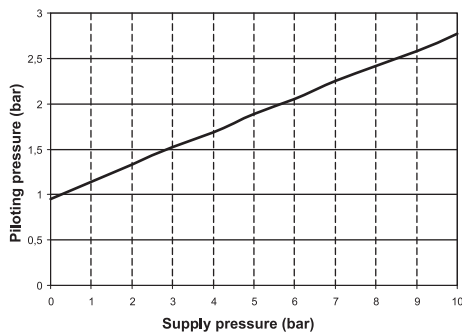
Ordering code	
<b>551.2F<sup>T</sup>.A.B.XX</b>	
VERSION	
1	Unidirectional blocking valve + Unidirectional flow control valve
2	Bidirectional blocking valve + Bidirectional flow control valve
3	Unidirectional blocking valve + Bidirectional flow control valve
4	Bidirectional blocking valve + Unidirectional flow control valve
A	see CONNECTIONS LIST A
B	see CONNECTIONS LIST B
CONNECTIONS LIST	
00	None
D4	Straight Ø4
D6	Straight Ø6
D8	Straight Ø8
L1	Female banjo G1/8"
G4	Rotating banjo Ø 4
G6	Rotating banjo Ø 6
G8	Rotating banjo Ø 8
M1	G1/8 male
M2	G1/4 male
F1	G1/8 female

NOTE : For the dimension including cartridges see page CONNECTIONS

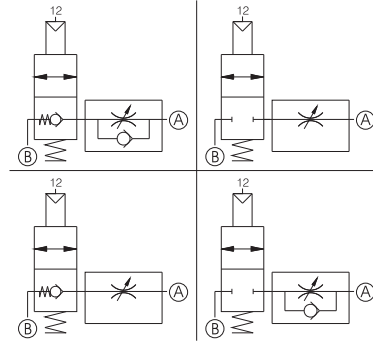
Example: 551.2F1.00.00.XX

90° unidirectional blocking valve + unidirectional flow control valve, without CONNECTIONS "A" and "B"

Piloting curves



Pneumatic Symbol



Operational characteristics

- The combination of this two functions ensures that the downstream pressure is maintained in case of accidental loss of supply pressure and at the same time grants the possibility to regulate the circuit flow rate. A typical application of this combination is close to or directly assembled onto the actuator connection ports. This allows to keep pressurised the cylinder chamber in case of accidental loss of supply pressure and to regulate the exhaust flow rate when the blocking valve is actuated.
- The possible combinations are the following:
  - 90° unidirectional blocking valve + unidirectional flow control valve.
  - 90° bidirectional blocking valve + bidirectional flow control valve
  - 90° bidirectional blocking valve + unidirectional flow control valve
  - 90° unidirectional blocking valve + bidirectional flow control valve

Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	0,5 - 10 bar
Temperature °C	-5 - +50
Ø Orifice size (mm)	Ø3 mm
Flow rate at 6 bar with Δp=1 (NI/min)	285 NI/min
Weight without connections	62 gr.



In line blocking valve + quick exhaust valve

Ordering code

551.1G1.A.B.XX

VERSION

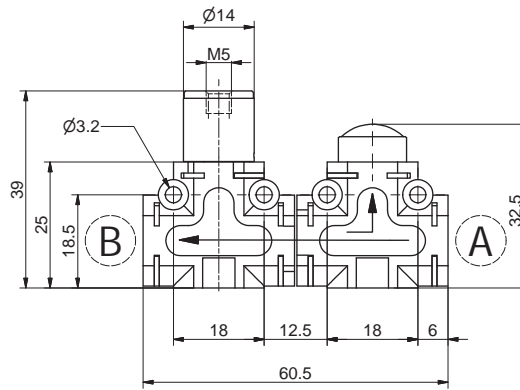
- 1 = Unidirectional blocking valve + quick exhaust valve
- 2 = Bidirectional blocking valve + quick exhaust valve

A Connection A see CONNECTIONS LIST

B Connection B see CONNECTIONS LIST

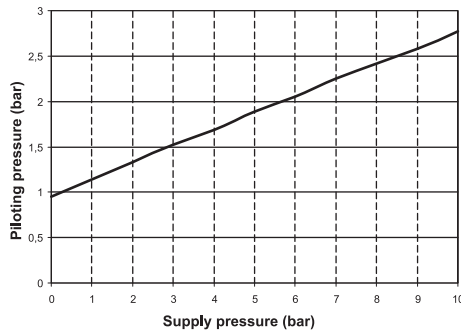
CONNECTIONS LIST

- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8male
- M2 = G1/4 male
- F1 = G1/8 female

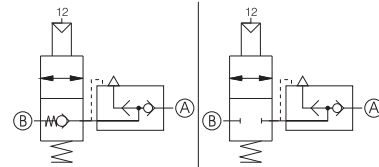


NOTE : For the dimension including cartridges see page CONNECTIONS  
 Example: 551.1G1.00.00.XX  
 In line unidirectional blocking valve + quick exhaust valve, without CONNECTIONS "A" and "B"

Piloting curves



Pneumatic Symbol



Operational characteristics

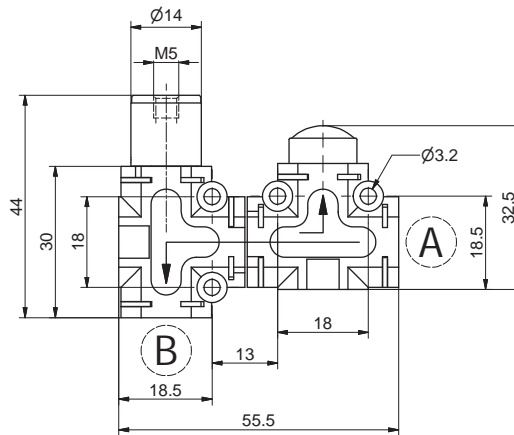
- The combination of this two functions ensures that the downstream pressure is maintained in case of accidental loss of supply pressure and at the same time allows for the air to be directly discharged into the atmosphere without going through the pneumatic circuit. A typical application of this combination is close to or directly assembled onto the actuator connection ports. This allows to keep pressurised the cylinder chamber in case of accidental loss of supply pressure and to quickly discharge the same chamber when the blocking valve is actuated.
- The possible combination are the following:
  - unidirectional blocking valve + quick exhaust valve
  - bidirectional blocking valve + quick exhaust valve.

Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	0,5 - 10 bar
Temperature °C	-5 - +50
Weight without connections	51 gr.
Flow rate at 6 bar with Δp=1 (NI/min)	285 NI/min

1

90° blocking valve + quick exhaust valve



Ordering code

**551.2G1.A.B.XX**

VERSION

- T** 1 = 90° Unidirectional blocking valve + quick exhaust valve
- 2 = 90° Bidirectional blocking valve + quick exhaust valve

**A** Connection A see CONNECTIONS LIST

**B** Connection B see CONNECTIONS LIST

CONNECTIONS LIST

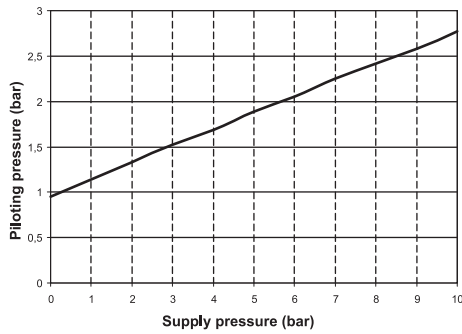
- 00 = None
- D4 = Straight Ø4
- D6 = Straight Ø6
- D8 = Straight Ø8
- L** L1 = Female banjo G1/8"
- G4 = Rotating banjo Ø 4
- G6 = Rotating banjo Ø 6
- G8 = Rotating banjo Ø 8
- M1 = G1/8 male
- M2 = G1/4 male
- F1 = G1/8female

NOTE : For the dimension including cartridges see page CONNECTIONS

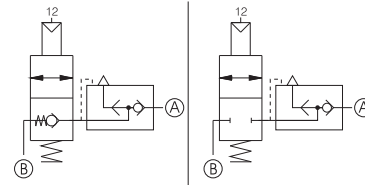
Example: 551.2G1.00.00.XX

90° unidirectional blocking valve + quick exhaust valve, without CONNECTIONS "A" and "B"

Piloting curves



Pneumatic Symbol



Operational characteristics

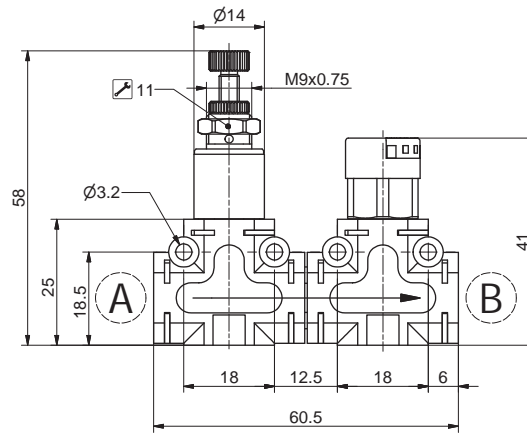
- The combination of this two functions ensures that the downstream pressure is maintained in case of accidental loss of supply pressure and at the same time allows for the air to be directly discharged into the atmosphere without going through the pneumatic circuit. A typical application of this combination is close to or directly assembled onto the actuator connection ports. This allows to keep pressurised the cylinder chamber in case of accidental loss of supply pressure and to quickly discharge the same chamber when the blocking valve is actuated.
- The possible combination are the following:
  - 90° unidirectional blocking valve + quick exhaust valve
  - 90° bidirectional blocking valve + quick exhaust valve.

Technical characteristics

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	0,5 - 10 bar
Temperature °C	-5 - +50
Weight without connections	51 gr.
Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	285 Nl/min



**In line pressure regulator + pressure indicator**



**Ordering code**

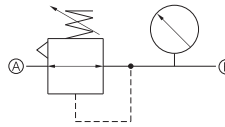
**551.1H T A B XX**

VERSION	
T	2 = 0 - 2 bar 4 = 0 - 4 bar 8 = 0 - 8 bar
A	Connection A see CONNECTIONS LIST
B	Connection B see CONNECTIONS LIST
CONNECTIONS LIST	
00 = None	
D4 = Straight Ø4	
D6 = Straight Ø6	
D8 = Straight Ø8	
L	L1 = Female banjo G1/8"
G4 = Rotating banjo Ø 4	
G6 = Rotating banjo Ø 6	
G8 = Rotating banjo Ø 8	
M1 = G1/8 male	
M2 = G1/4 male	
F1 = G1/8 female	

NOTE : For the dimension including cartridges see page CONNECTIONS

Example: 551.1H2.M1.D4.XX: In line pressure regulator, adjusting range 0 - 2 bar + pressure indicator, CONNECTIONS "A" Male G 1/8 and "B" Tube Ø4

Pneumatic Symbol



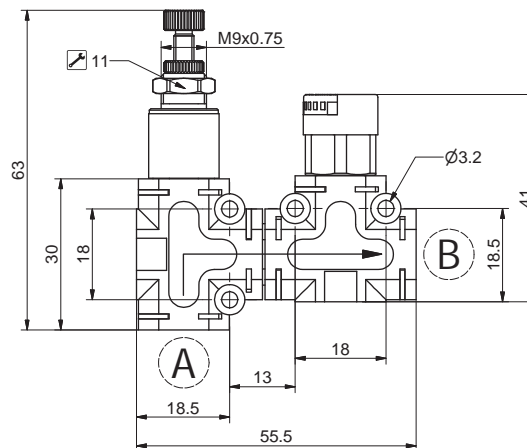
**Operational characteristics**

- The combination of this two functions ensures the possibility to regulate the downstream pressure while directly visualising the adjusted pressure value.
- The possible combinations are the following:
- 0 to 2 bar pressure regulator + pressure visual indicator
- 0 to 4 bar pressure regulator + pressure visual indicator
- 0 to 8 bar pressure regulator + pressure visual indicator
- the visual indicator Pressure range (bar) is always 0 to 8 bar

**Technical characteristics**

Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	8 bar
Temperature °C	-5 - +50
Visualization scale	0 - 8 bar
Regulated Pressure range (bar)	0 - 2 bar / 0 - 4 bar / 0 - 8 bar
Weight without connections	62 gr.

**90° pressure regulator + pressure indicator**



**Ordering code**

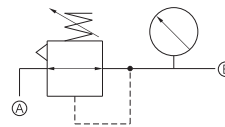
**551.2H T A B XX**

VERSION	
T	2 = 0 - 2 bar 4 = 0 - 4 bar 8 = 0 - 8 bar
A	Connection A see CONNECTIONS LIST
B	Connection B see CONNECTIONS LIST
CONNECTIONS LIST	
00 = None	
D4 = Straight Ø4	
D6 = Straight Ø6	
D8 = Straight Ø8	
L	L1 = Female banjo G1/8"
G4 = Rotating banjo Ø 4	
G6 = Rotating banjo Ø 6	
G8 = Rotating banjo Ø 8	
M1 = G1/8 male	
M2 = G1/4 male	
F1 = G1/8 female	

NOTE : For the dimension including cartridges see page CONNECTIONS

Example: 551.2H2.M1.D4.XX: 90° pressure regulator, adjusting range 0 - 2 bar + pressure indicator, CONNECTIONS "A" Male G 1/8 and "B" Tube Ø4

Pneumatic Symbol



**Operational characteristics**

- The combination of this two functions ensures the possibility to regulate the downstream pressure while directly visualising the adjusted pressure value.
- The possible combinations are the following:
- 0 to 2 bar pressure regulator + pressure visual indicator
- 0 to 4 bar pressure regulator + pressure visual indicator
- 0 to 8 bar pressure regulator + pressure visual indicator
- the visual indicator Pressure range (bar) is always 0 to 8 bar

**Technical characteristics**

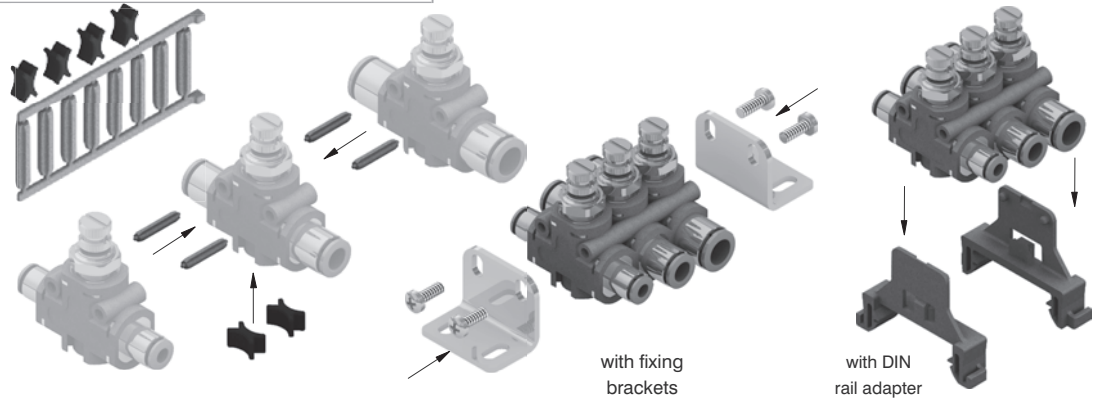
Fluid	Filtered air, with or without lubrication
Connections	See CONNECTIONS LIST
Max working pressure (bar)	8 bar
Temperature °C	-5 - +50
Visualization scale	0 - 8 bar
Regulated Pressure range (bar)	0 - 2 bar / 0 - 4 bar / 0 - 8 bar
Weight without connections	62 gr.

1

**Coupling kit (pins and forks)**

Ordering code

**55160**



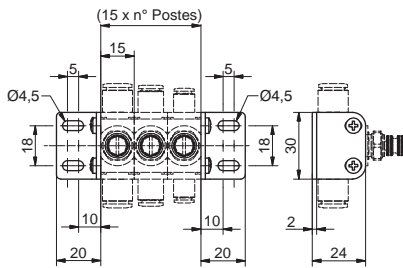
with fixing brackets

with DIN rail adapter

Weight 2,5 gr. - The kit, which includes a series of pins and forks, enables to join together in a fast and safe way the function fittings. The pins, once inserted in the front holes, ensure resistance against forces applied perpendicularly and sideways (for example the insertion of the tube in the cartridges). The forks, once located in the profiled housing ensures that the parts are held together tightly. The kit allows for 5 function fittings to be mounted together.

**Fixing brackets**

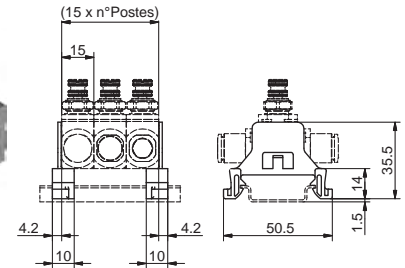
**DIN rail adapter**



Ordering code

**55150**

Weight gr. 18  
The kit comprises two fixing brackets and the screws



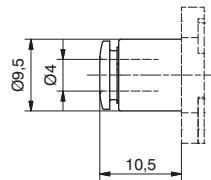
Ordering code

**55116**

Weight gr. 4  
The kit comprises two adapters

**Ø4 straight cartridge**

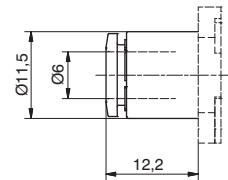
**Ø6 straight cartridge**



Ordering code

**551KD4**

Weight 7,5 gr.



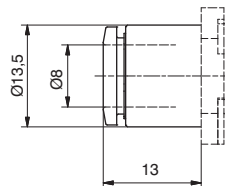
Ordering code

**551KD6**

Weight 7,3 gr.

**Ø8 straight cartridge**

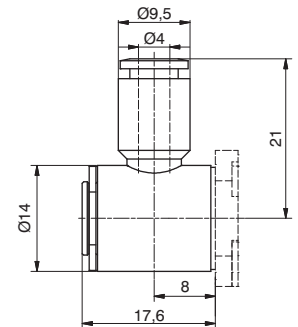
**Ø4 banjo PL cartridge**



Ordering code

**551KD8**

Weight 7 gr.



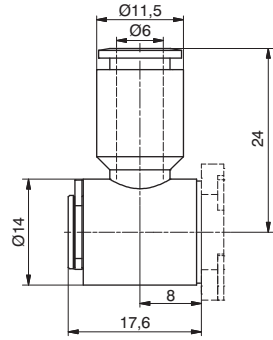
Ordering code

**551KG4**

Weight 13,6 gr.



Ø6 banjo PL cartridge

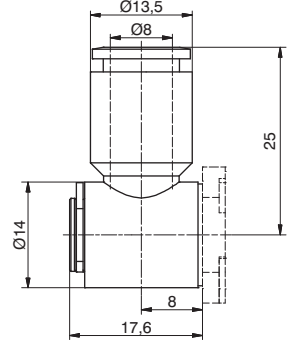


Ordering code

**551KG6**

Weight 14 gr.

Ø8 banjo PL cartridge

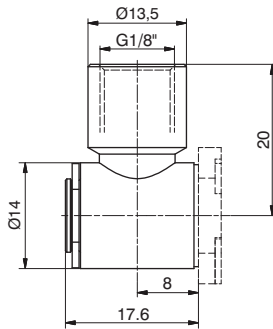


Ordering code

**551KG8**

Weight 14,3 gr.

G1/8" banjo female cartridge

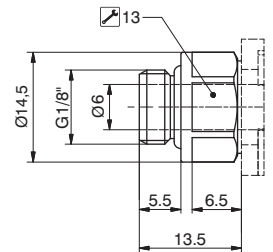


Ordering code

**551KL1**

Weight 30 gr.

G1/8" male straight cartridge

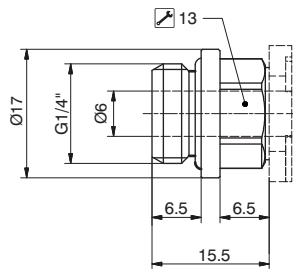


Ordering code

**551KM1**

Weight 14 gr.

G1/4" male straight cartridge

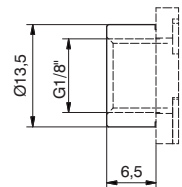


Ordering code

**551KM2**

Weight 20 gr.

G1/8" female straight cartridge



Ordering code

**551KF1**

Weight 9 gr.

Connection for multiple function



Ordering code

**551KUU**

Weight 14 gr.

Ordering code

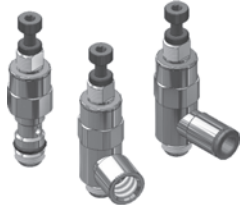


## General

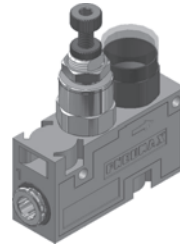
This new type of miniaturised pressure regulators are mostly indicated for the use on the secondary level of the pneumatic circuits.

Thanks to the contained dimensions are particularly indicated to be used very closely or directly mounted onto the consumption.

Three versions are available.



Version rod G1/8" swivel ring with female thread G 1/8" and G 1/4" or push-in fitting for tube Ø4, Ø6 and Ø8



model with body in technopolymer integrated gauge and quick coupling fittings for tube Ø4 and Ø6.

### G1/8" model to be directly mounted onto the valve

Compact design to be directly mounted onto the valves uses standard swivel rings with G1/8" female thread (ref 41218) or quick coupling fittings for tube sizes.

It is also possible to supply the regulating shaft without the swivel ring.

### Model with body in technopolymer and integrated gauge

is the more complete solution, comprises a movable gauge which enables to check the regulated pressure

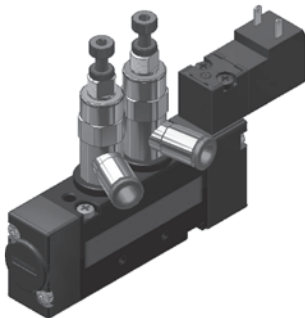
Is manufactured using the same regulating unit as the base model fitted into a technopolymer body on which are inserted two quick coupling cartridges, 4mm or 6mm tube for inlet and outlet connections; two side plates lock the cartridges and gauge in position.

It is possible to join together more than one regulator by means of a dedicated adaptor made of technopolymer which must be inserted in the appropriate slot. (the air must be supplied independently to each regulator.)

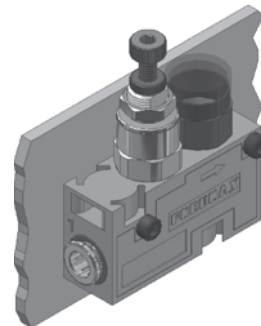
Several mounting solutions are available: wall mounting via two mounting holes, on DIN rail using the specific accessories or on panels.

## Mounting solutions

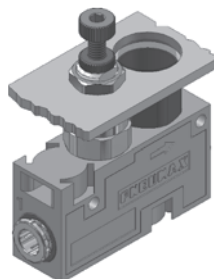
Several mounting solution are available:



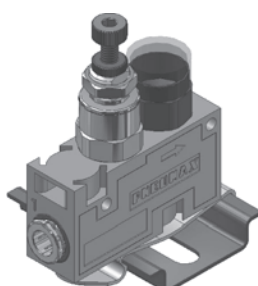
G1/8" model to be directly mounted onto the valve:  
Directly mounted onto the valves threaded connections (consumptions)



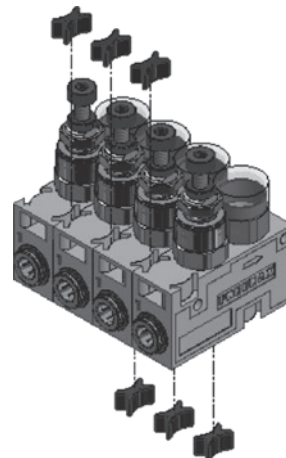
Model with body in technopolymer and integrated gauge:  
Wall mounting via the mounting holes on the body



Model with body in technopolymer and integrated gauge:  
Panel mounting via the locking nut



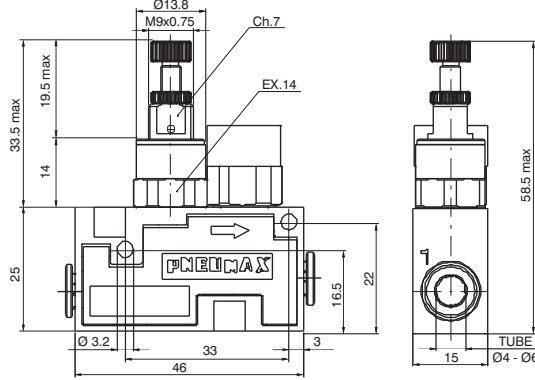
Model with body in technopolymer and integrated gauge:  
On DIN rail using the specific accessories



Model with body in technopolymer and integrated gauge:  
In batteries using the appropriate "X" shaped connecting insert.



Miniaturised pressure regulators



Ordering code

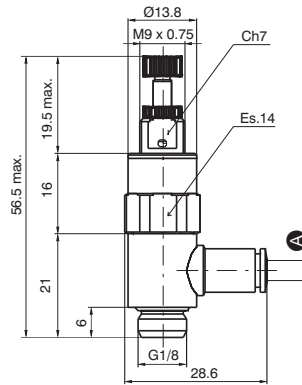
**17522A<sup>C</sup>R**

CONNECTIONS	
<sup>C</sup>	4= Tube Ø4mm 6= Tube Ø6mm
REGULATION RANGE	
<sup>R</sup>	C = 0 - 8 bar B = 0 - 4 bar A = 0 - 2 bar

Example: Miniaturised pressure regulators with technopolymer body and integrated gauge, with quick coupling cartridges for tube Ø6 mm and tube Ø4 mm, pressure regulation range 0 - 8 bar

Operational characteristics	Technical characteristic	
- Regulating cartridge = Nickel-plated brass	Max working pressure (bar)	10 bar
- Regulator body = Technopolymer	Temperature °C	-5 - + 50
- Seals = Oil resistant nitrilic rubber (NBR)	Flow rate at 6 bar with Δp=1 (NI/min)	120 NI/min.
- Plunger spring = AISI 302	Inlet connections sizes	Ø4 - Ø6
- Regulating spring = Spring suitable steel	Consumption connection sizes	Ø4 - Ø6
- Plunger = Oil resistant nitrilic rubber (NBR)	Mounting positioning	Any
- Other parts = Brass		

Miniaturised pressure regulators



Ordering code

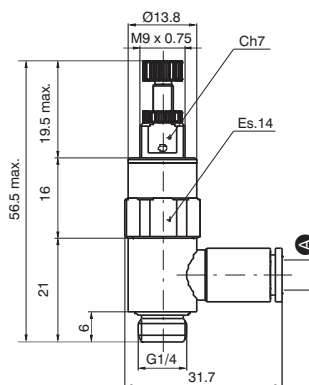
**17602A<sup>A</sup>R**

SWIVEL RING	
0= None	
<sup>A</sup>	1= Swivel ring G1/8" female 4= Tube Ø4mm 6= Tube Ø6mm 8= Tube Ø8mm
REGULATION RANGE	
<sup>R</sup>	C = 0 - 8 bar B = 0 - 4 bar A = 0 - 2 bar

Example: Miniaturised pressure regulators, version rod G1/8" swivel ring with female thread G1/8", pressure regulation range 0 - 8 bar

Operational characteristics	Technical characteristic	
- Regulating cartridge = Nickel-plated brass	Max working pressure (bar)	10 bar
- Regulator body = Nickel-plated brass	Temperature °C	-5 - + 50
- Seals = Oil resistant nitrilic rubber (NBR)	Flow rate at 6 bar with Δp=1 (NI/min)	120 NI/min.
- Plunger spring = AISI 302	Inlet connections sizes	G1/8"
- Regulating spring = Spring suitable steel	Consumption connection sizes	G1/8" - Ø4 - Ø6 - Ø8
- Plunger = Oil resistant nitrilic rubber (NBR)	Mounting positioning	Any
- Other parts = Brass		

Miniaturised pressure regulators



Ordering code

**17602B<sup>A</sup>R**

SWIVEL RING	
0= None	
<sup>A</sup>	1= Swivel ring G1/4" female 6= Tube Ø6mm 8= Tube Ø8mm
REGULATION RANGE	
<sup>R</sup>	C = 0 - 8 bar B = 0 - 4 bar A = 0 - 2 bar

Example: Miniaturised pressure regulators, version rod G1/8" swivel ring with female thread G1/8", pressure regulation range 0 - 8 bar

Operational characteristics	Technical characteristic	
- Regulating cartridge = Nickel-plated brass	Max working pressure (bar)	10 bar
- Regulator body = Nickel-plated brass	Temperature °C	-5 - + 50
- Seals = Oil resistant nitrilic rubber (NBR)	Flow rate at 6 bar with Δp=1 (NI/min)	120 NI/min.
- Plunger spring = AISI 302	Inlet connections sizes	G1/4"
- Regulating spring = Spring suitable steel	Consumption connection sizes	G1/4" - Ø4 - Ø6 - Ø8
- Plunger = Oil resistant nitrilic rubber (NBR)	Mounting positioning	Any
- Other parts = Brass		

## Technical data for push-in fittings

### TECHNICAL DATA

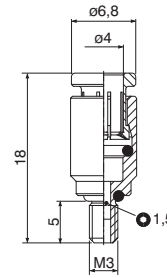
Working temperature:	-20°C +70°C
Maximum working pressure:	10 bar
Fluid:	Compressed air (others fluids on request)
Materials:	Nichel-plated brass body Brass grip Silicone free NBR gaskets
Thread:	Cylindrical with O-Ring
Maximum torque	
Thread: M3:	0,4 Nm
Thread: M6 and M6x0,75:	1,3 Nm

### MAIN FEATURES

- 1 Can be inserted and extracted with one hand
- 2 Suitable for tube Rilsan, Polyurethane, Nylon, Polyethylene
- 3 Supercompact
- 4 Extremely lightweight yet sturdy
- 5 O-Ring provided with his own seat to ensure seal with polished surface
- 6 Suitable for vacuum application

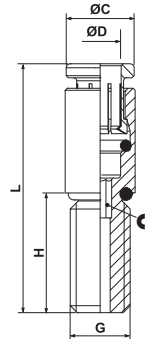
RDR Straight male adaptor (parallel)

Ordering code
<b>RDR3.40-MH05</b>



RDR Straight male adaptor (parallel)

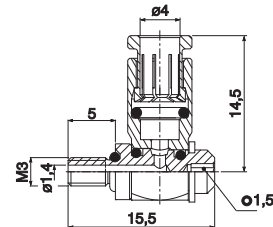
Ordering code
<b>RDR6.40-<math>\nabla</math></b>
VERSION
$\nabla$ MH12=M6, H=12mm
FH12=M6x0,75, H=12mm



CODE	$\varnothing D$	G	$\varnothing C$	H	L	$\bullet$
RDR6.40-MH12	4	M6	6,8	12	25	2
RDR6.40-FH12	4	M6x0,75	6,8	12	25	2

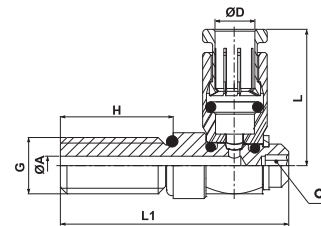
RGR Complete single banjo with stem

Ordering code
<b>RGR3.40-MH05</b>

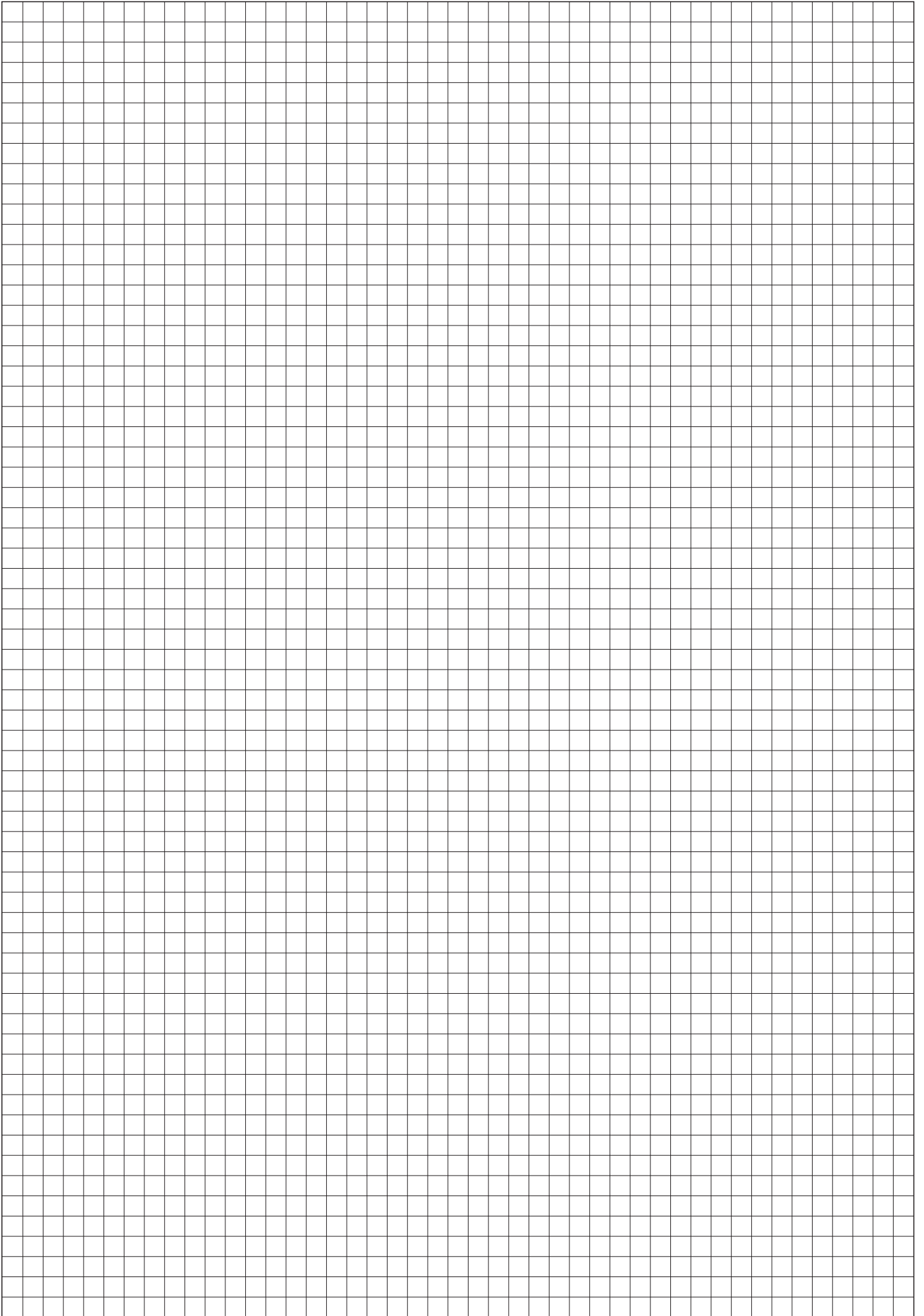


RGR Complete single banjo with stem

Ordering code
<b>RGR6.40-<math>\nabla</math></b>
VERSION
$\nabla$ MH12=M6, H=12mm
FH12=M6x0,75, H=12mm



CODE	$\varnothing D$	G	$\varnothing A$	H	L1	L	$\bullet$
RGR6.40-MH12	4	M6	2	12	24,3	14,5	2
RGR6.40-FH12	4	M6x0,75	2	12	24,3	14,5	2





## SOLENOID VALVES

### Direct operated solenoid valves (Series 300)

Miniature solenoid valves 10-15-22 mm modular and Bistable  
Electric pilot CNOMO 30 mm / Solenoid valves 32 mm / "CURUS" homologated.

### Electrodistributors (Series 800)

M5 compact (series 805) - G 1/8" (series 808) individual, for manifold - (Series 888), G 1/8" - G 1/4"

### Solenoid valves 3/2, 5/2, 5/3, G1/8" ÷ G1" (Series 400)

G 1/8" ECO and TECNO-ECO G 1/8"  
G 1/4" compact series and TECNO-ECO G1/4"  
G 1/2" compact series  
G 1"

### Pneumatic actuated valves and solenoid valves - poppet system 2/2, 3/2, 5/2 - M5" ÷ G1" (Series 700 - T700 - N776)

Valves and solenoid valves G 3/8" / G 3/4" / G 1" for compressed air and vacuum  
Valves and solenoid valves G 3/8" / G 3/4" / G 1" for compressed air and vacuum in Technopolymer  
Valves and solenoid valves G 1-1/2" for compressed air and vacuum  
2/2 Pad Valves, for compressed air

### Solenoid valves NAMUR Interface 3/2, 4/2, 5/2 (Series 514 and T514)

G 1/4" NAMUR interface

### Distributors and electro distributors ISO 5599/1

5/2, 5/3 - Size 1, 2 and 3 (Series 1000-1010)  
ISO 5599/1 electro distributors (Series 1000 M12) - 5/2 with M12 connector - Size 1, 2 and 3  
Modular bases / Inlet blocks / Single use bases

### Distributors and electro distributors 5/2, 5/3 - Size 10, 18 and 26 mm (LINE, FLAT, VDMA or BASE) (Series 2000)

10-18-26 mm (LINE / FLAT) Sizes - 10 mm (BASE) Size - 18-26 mm (VDMA 24563-02) Sizes  
ISO15407-2 Electro distributors (Series 2700), 5/2 - 2 x 3/2

### Electrodistributors 5/2 - 5/3 - 2x3/2 - 2x2/2, 12,5 Size - Series ENMA<sup>®</sup>


### Electrodistributors 5/2 - 5/3 - 2x3/2 - 2x2/2, 18,8 Size - Series OPTYMA<sup>32</sup>

## General

The direct operated solenoid valve is the interface between pneumatic and electronic. In fact, it is actuated by an electrical signal and in turn gives a pneumatic signal directly available for small users or for actuating bigger pneumatic distributors.

A wide range of valves are needed for satisfying various applications. For this need we have available miniature components with very low volume and electrical impute as well as solenoid valves with large flow rate and power for heavy duty operations. These solenoid valves are usually 3/2, normally closed or normally open, but there are available the 2/2, closed or open, for vacuum and others.

Note that the direct operated valves can only be used with bases, individual or multiple with M5 or G 1/8" thread or with connections.

Some PNEUMAX solenoid valves are  homologated valid for USA and Canada (file n. VAIU2.E206325, VAIU8.E206325). For more details, refer to the coding, in the following pages.

The 10mm and 15mm solenoid valves are certified by UL in compliance with both Canadian and USA safety requirements as recognized component and included in the **UL file E206325** and bear the "UL Recognized Component" marking.

The 10mm and 15mm solenoid valves, since they are devices for "class 2 circuits", according with UL standard UL 429/CSA C22.2 N°139, are not considered dangerous for electric shock or fire and thus a **UL certification is not required for cables and connectors.**

Some solenoid valves, since they are devices for "class 2 circuits", according with UL standard UL 429/CSA C22.2 N°139, are not considered dangerous for electric shock or fire and thus a **UL certification is not required for cables and connectors.**

## Use and maintenance

Maintenance is normally not required for these components therefore the spare parts list is not provided.

Their construction complexity and low cost do not make repair economically viable. It's easier and more economic to replace the complete valve in case of malfunction.

For proper lubrication use only hydraulic oil class H such as Castrol type MAGNA GC 32.



**General**

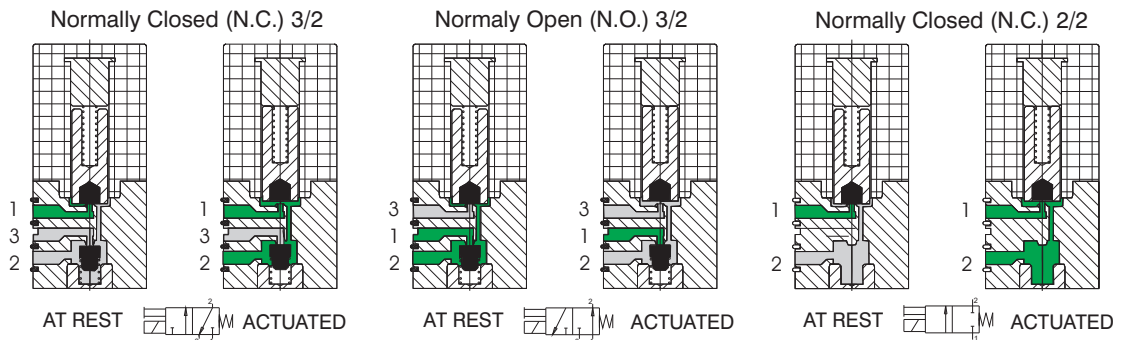
This series of directly operated vales is characterized by its reduced dimensions. They are designed to be mounted individually or on manifold. The high operating speed and high flow rate in consideration of the reduced dimensions, in combination with the high compatibility of the material used to manufacture them ensure a high variety of possible application fields.

All valves have manual override as standard and are available in 3/2 configuration N.O. and N.C. as well as 2/2 N.C. both 12 or 24 V DC or AC. Electrical connection can be via co moulded cables or via connector, in this configuration a LED indicates the coil status. Ensure that the fixing screws are tightened with 0.15Nm maximum.

The 10mm Speed-up version are built in accordance to the ISO 15218-2003 standard with a flow rate of 24NI/min. The coil integrates a dedicated circuit board which enables to contain the power consumption to 0.35W in case of the high flow rate version and to 0.1W in case of the standard flow rate version.

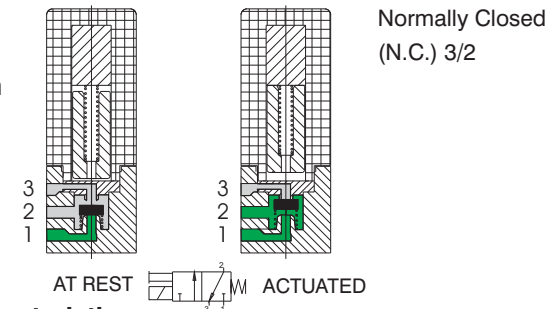
**Functional schematics for standard version**

- 1 = SUPPLY PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT



**Functional schematics for Speed-up version**

- 1 = SUPPLY PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT



**Construction characteristics:**

**Electrical part:**

Miniature solenoid consisting of a coil made of copper wire of different diameters depending on voltage, isolated according to "F" class standard, with injection-moulded nylon-glass application. All parts forming the cladding, the electrical connections and the pole pieces are protected against corrosion.

**Mechanical part:**

Stainless steel 430F armatures FPM poppets body in thermoplastic material and manual override and plug in nickel plated brass. Valves must be mounted on single or multiple manifold to be used.

**Technical characteristics**

		Standard Version	Speed-Up Version
<b>Pneumatic:</b>	Working pressure	0 - 7 bar	
	Nominal diameter	0,7 mm	1,1 mm
	Temperature	-5° - +50°C	
	Maximun flow rate at 6 bar with Δp 1 bar	14 NI/min	24 NI/min
	Exhaust flow	22 NI/min	29 NI/min
	Max number of cycles per minute	2.700	
	Life	50 million	
<b>Electric:</b>	Voltages	12 - 24 Volt D.C.	
	Power	1,3 Watt	0,35 Watt <sup>(1)</sup>
	Voltage tollerance	-5% - +10%	
	Response time when energized *	8 ms	
	Response time when de-energized *	10 ms	
	Copper wire isolation class	F (155°C)	
Protection degree	IP65 (with cables) IP40 (with connectors) IP00 (with Faston)		

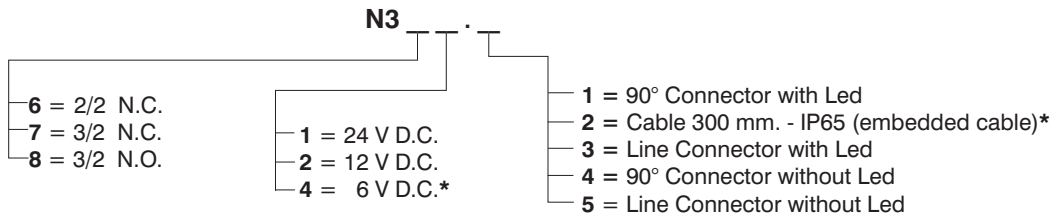
(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

(1) = consumption wrapping in opening phase 3, 5W (10 ms), consumption wrapping in maintenance phase 0.35 W.





**10 mm Standard miniature solenoid ordering codes**

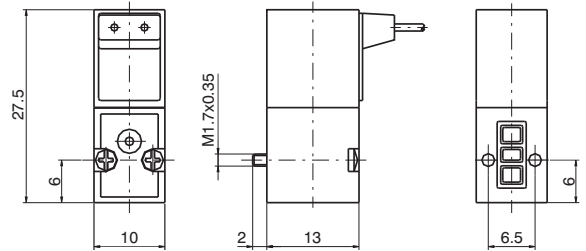


\* = The cEUs Directive does not apply to these versions

**Miniature solenoid valve with cable**



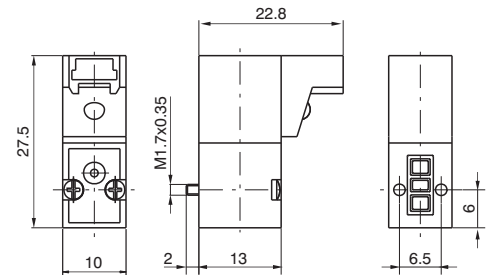
Weight 12 gr.



**Miniature solenoid valve with 90° connector**



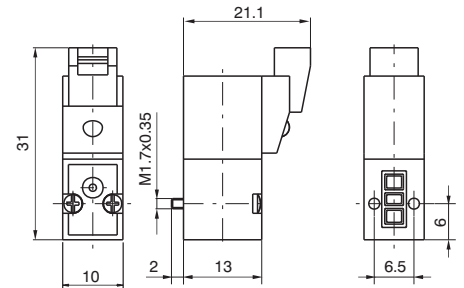
Weight 12 gr.



**Miniature solenoid valve with line connector**



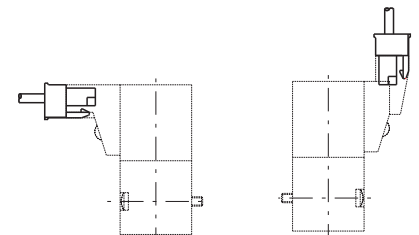
Weight 12 gr.



**Connector**

Ordering codes

- 371 .
- 300 : Cable L = 300 mm
  - 600 : Cable L = 600 mm
  - 1000 : Cable L = 1000 mm

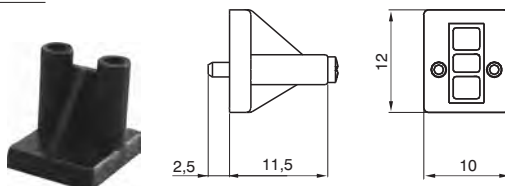


Weight 3 gr.

**Closing plate**

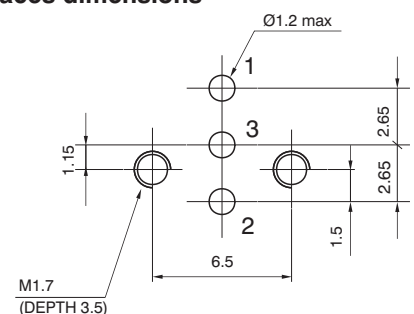
Ordering codes

395.00



Weight 5 gr.

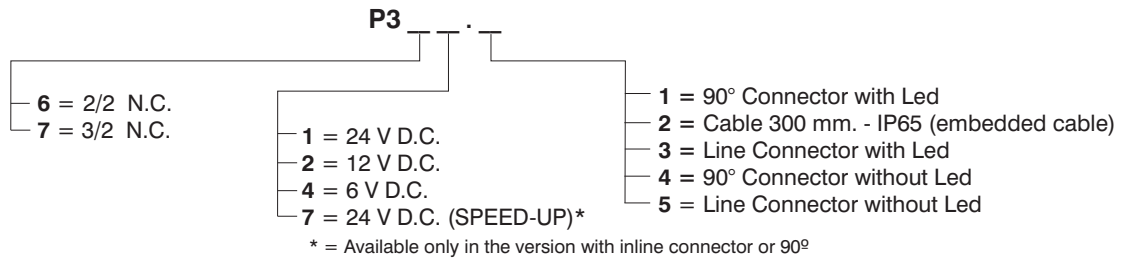
**Interfaces dimensions**





**10 mm - ISO 15218-2003 miniature solenoid ordering codes**

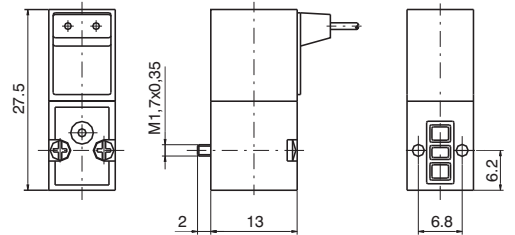
The versions are not contemplated by the CE Directive



**Miniature solenoid valve with cable**



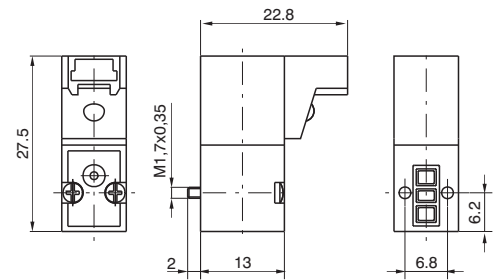
Weight 12 gr.



**Miniature solenoid valve with 90° connector**



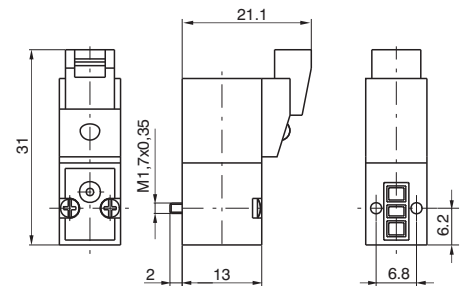
Weight 12 gr.



**Miniature solenoid valve with line connector**



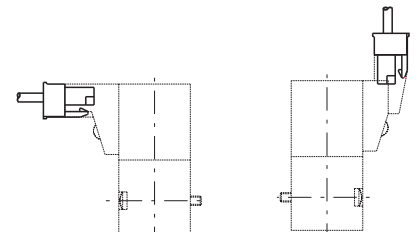
Weight 12 gr.



**Connector**

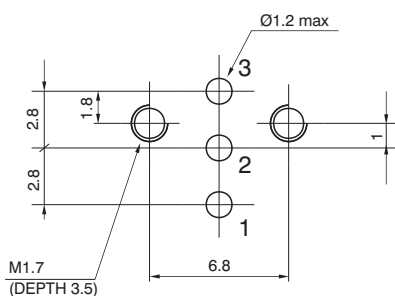
Ordering codes

- 371 .**
- 300 : Cable L = 300 mm
  - 600 : Cable L = 600 mm
  - 1000 : Cable L = 1000 mm



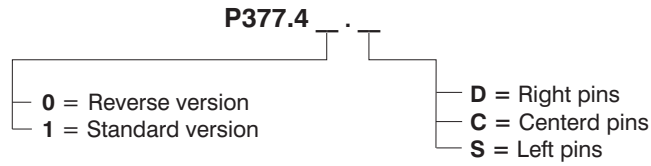
Weight 3 gr.

**Interfaces dimensions 10 mm - ISO 15218**

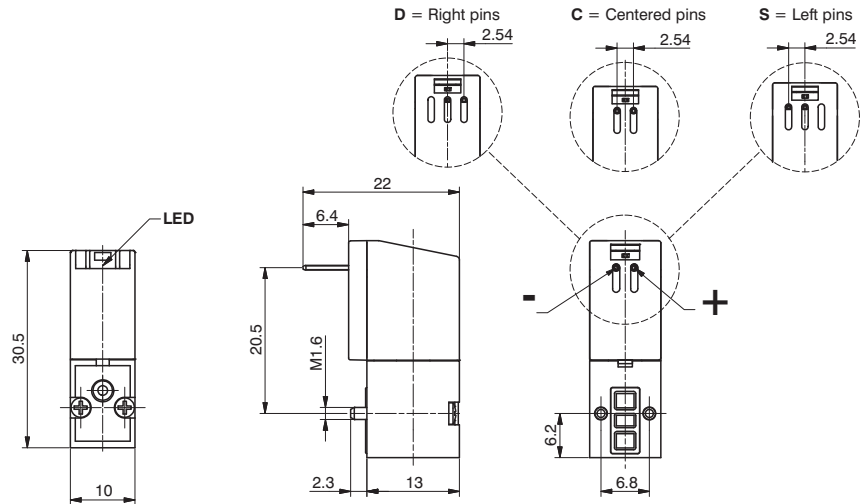


**10 mm - ISO SPEED-UP miniature solenoid ordering codes**

(The versions are not contemplated by the CE Directive)



Weight 14 gr.



**Technical characteristics**

Working pressure	0 - 7 bar
Nominal diameter	1,1 mm
Temperature	-5° - +50°C
Maximun flow rate at 6 bar with Δp 1 bar	24 NI/min
Exhaust flow	40 NI/min
Voltages	24 Volt D.C. -5% - +10%
Power	0,35 Watt (1)
Response time when energized *	4 ms
Response time when de-energized *	5 ms

(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

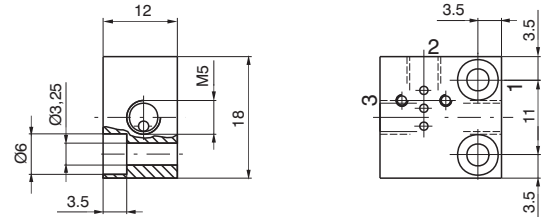
(1) = consumption wrapping in opening phase 3, 5W (10 ms), consumption wrapping in maintenance phase 0.35 W.



**Standard version  
Individual base**

Ordering code

**395.01**



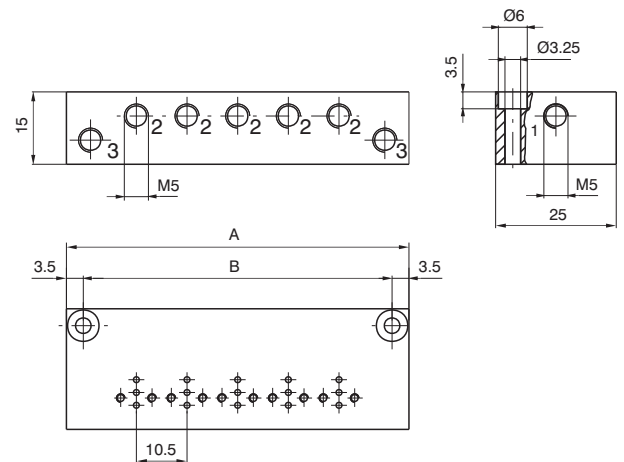
Weight 10 gr.

**Standard version  
multiple bases**

Ordering code

**395 .**

N° Places

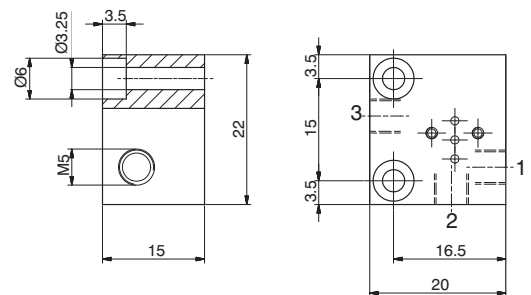
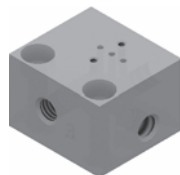


N° Places	02	03	04	05	06	07	08	09	10
A	39.5	50	60.5	71	81.5	92	102.5	113	123.5
B	32.5	43	53.5	64	74.5	85	95.5	106	116.5
Weight (gr.)	43	54	65	76	87	98	109	120	131

**Individual base for  
ISO 15218-2003 version**

Ordering code

**P395.01**



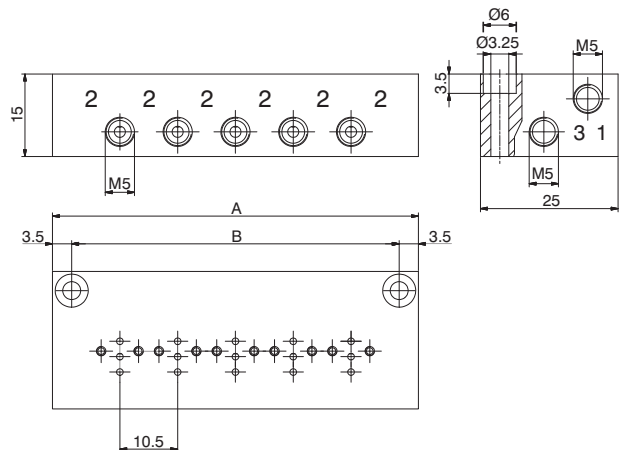
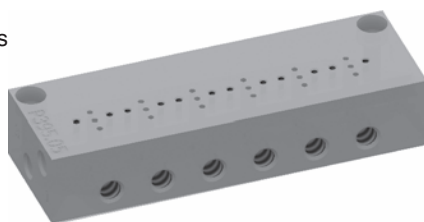
Weight 10 gr.

**Multiple base for  
ISO 15218-2003 version**

Ordering code

**P395 .**

N° Places



N° Places	02	03	04	05	06	07	08	09	10
A	35	45.5	56	66.5	77	87.5	98	108.5	119
B	28	38.5	49	59.5	70	80.5	91	101.5	112
Weight (gr.)	43	54	65	76	87	98	109	120	131



**General**

This direct operated solenoid valve has minimum overall dimensions (15 mm wide). Its construction method is same as 10 mm valve, of course.

It is suitable to be single or gang mounted or as electro-operator for larger air flow distributors.

Can be utilized with compressed air and other fluids compatible with material used to build the solenoid valve.

The available versions, all equipped with manual override, are 3 ways, normally closed and normally open with DC and AC 50/60 Hz.

It's possible to install the N.O. valve on N.C. interface by using the registered reverse system included in the valve body.

The electrical connection is made with cables (300 mm.), FASTON or with connector.

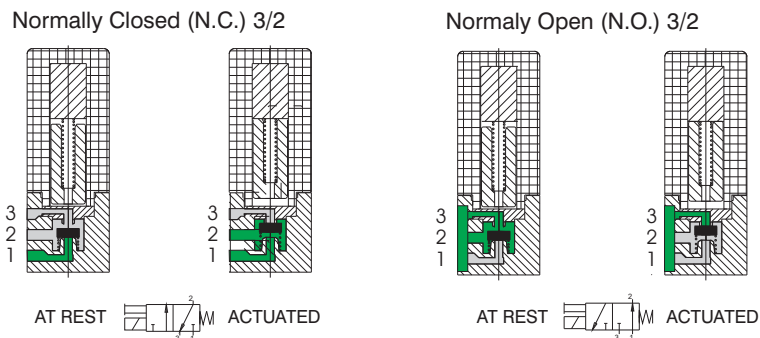
This type of miniature solenoid valve is interchangeable with most of the same products available on the market.

Coil be can also positioned at 180° to get the electrical connection located on the opposite side than override.

Make sure that the fastening screws are tightened with maximum torque of 0,75 Nm.

**Functional schematics**

- 1 = SUPPLY PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT



**Construction characteristics**

**Electrical part**

Miniature solenoid consisting of a coil made of copper wire of different diameters depending on voltage, isolated according to "F" class standard, with injection-moulded nylon-glass application. All parts forming the cladding, the electrical connections and the pole pieces are protected against corrosion.

**Mechanical part**

AISI 430F cores, AISI 302 return springs, FPM poppets, thermoplastic polyester body.

**Technical characteristics**

**Pneumatics**

Nominal diameter	0.8	1,1 mm	1,5 mm (only D.C.)
Maximum flow rate at 6 bar with Δp 1 bar	20 NI/min	30 NI/min	50 NI/min
Working pressure for N.C.	0 - 10 bar		0 - 7 bar
Working pressure for N.O.	/	0 - 8 bar	0 - 5 bar
Temperature	-5° +50°C		
Life expectancy	50 million cycles (with standard working conditions)		

**Electrical**

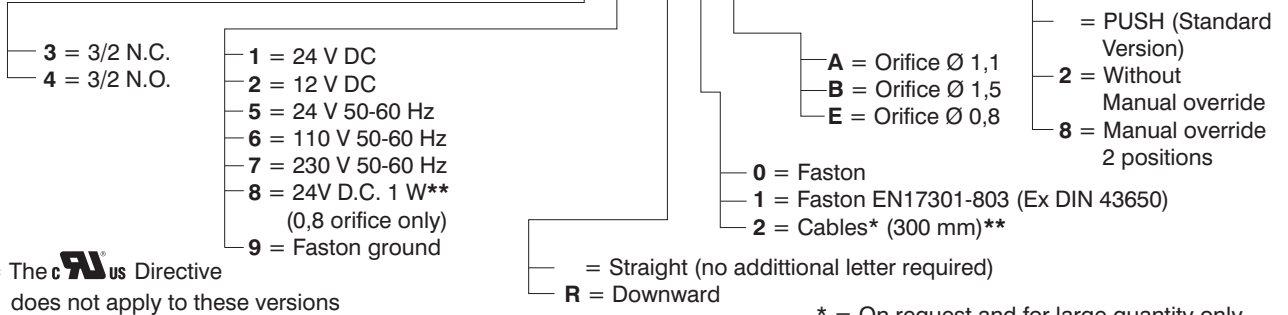
Voltage D.C.	24 V DC	12-24 V DC	
Voltage A.C.	/	24-110-230 Volt 50/60 Hz	/
Power consumption D.C.	1 Watt	2,3 Watt	
Power consumption A.C.	/	2,8 VA (at starting) 2,5 VA (at speed)	/
Voltage tolerance	-5% - +10%		
Response time *	10-12 ms		
Isolating class	F (155°C)		
Protection degree	IP65 (with cables) IP40 (with connectors) IP00 (with faston)		

(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"



15 mm miniature solenoid ordering codes

N3



\*\* = The CE Directive does not apply to these versions

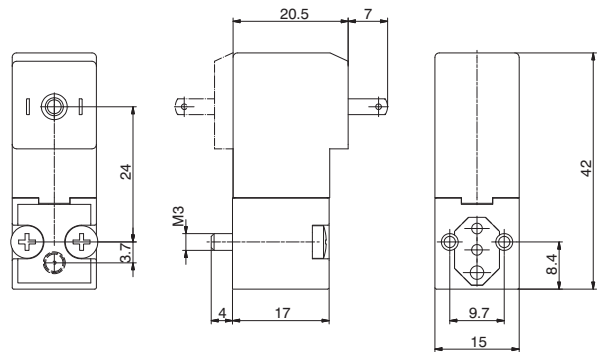
See previous page for available versions

\* = On request and for large quantity only (only 24 V D.C., 2.3 W)

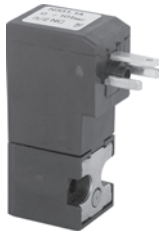
With Faston



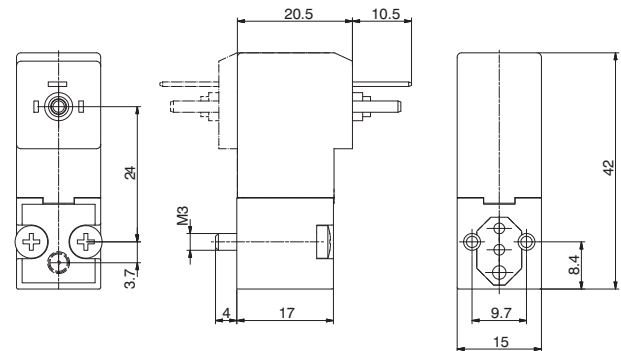
Weight 36 gr.



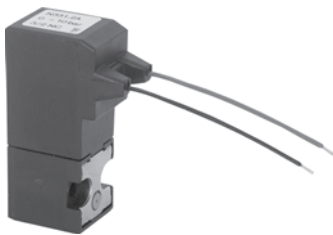
With Faston EN17301-803 (Ex DIN 43650)



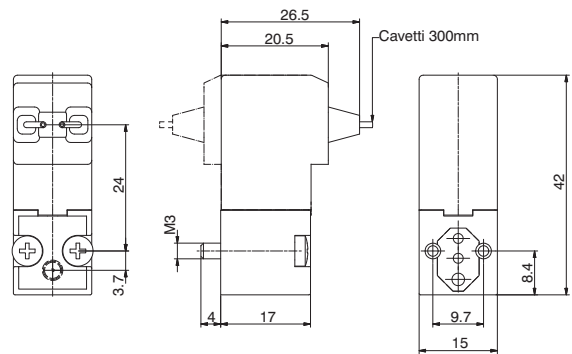
Weight 36 gr.



With Cables (300 mm)



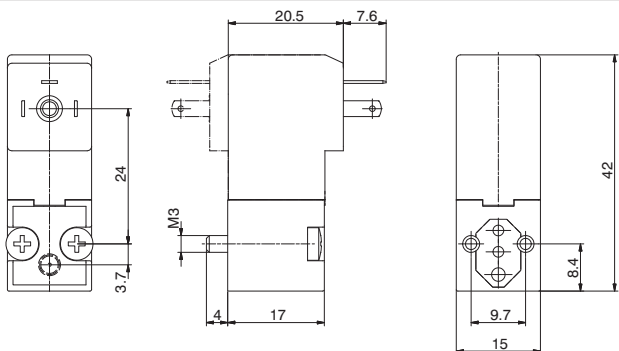
Weight 38 gr.



With Faston ground



Weight 38 gr.







### 15mm Solenoid valves Manifold with electric multipoint connection

#### General

Also for this 15mm solenoid valves series we have realized the possibility of the assembling on the base with multipoint connection, this for making faster the connection and the harness of them.

Realized from a shaped outline, it results compact because it uses a relevant multipoint connection available only with a 37 poles connector from 10 to 32 solenoid valves (with steps of 2), available in line or at 90° and IP40 protection. On the base it is possible to put some threaded cartridges with push-in fittings for Ø3 – Ø3,17 Ø4 tube or M5 threaded.

The application field of these new configurations is the standard of 3/2 valves, where it is needed to realize groups or Manifolds provided with integrated electric connection to make easier and faster the connection and the harness of them (control of single acting cylinders with small dimensions, pilot system of valves with bigger dimensions etc..).

#### Constructive characteristics:

##### Constructive principle:

From 10 up to 32 solenoid valves (with steps of 2)

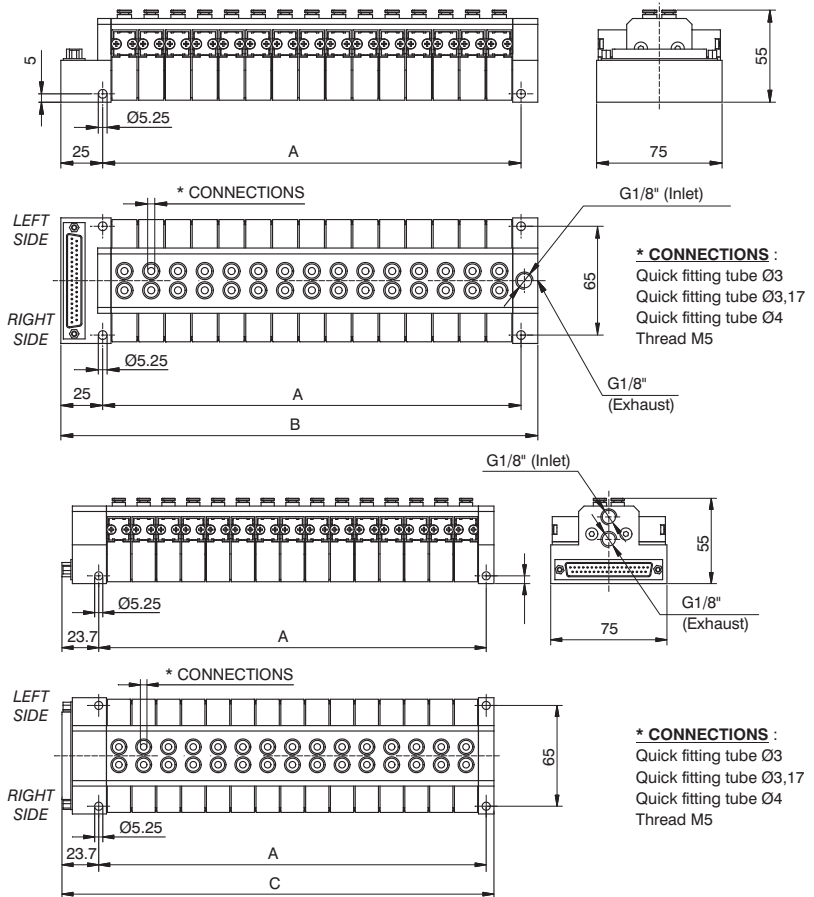
Extremely compact solution

IP40 protection (without visualisation led)

Possibility of having different working connections (Ø3, Ø3,17, Ø4 tubes, M5)

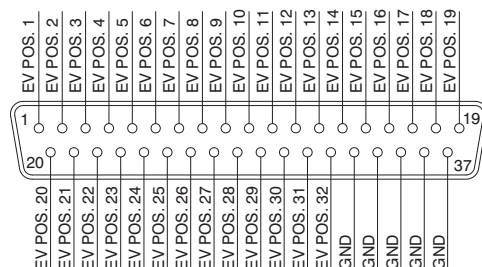
The new coding key requires the use of the same type of solenoid valves (there aren't codes for groups with a mixed configuration).

#### Overall dimensions



N° places	A	B	C
10	90	125	118,7
12	106	141	134,7
14	122	157	150,7
16	138	173	166,7
18	154	189	182,7
20	170	205	198,7
22	186	221	214,7
24	202	237	230,7
26	218	253	246,7
28	234	269	262,7
30	250	285	278,7
32	266	301	294,7

#### SUB-D 37 POLES CONNECTORS



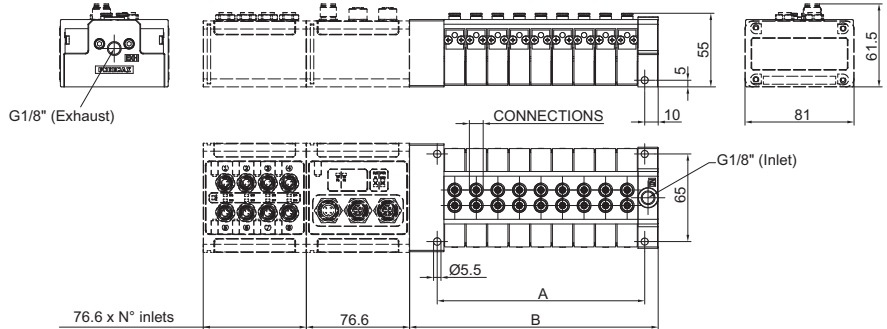






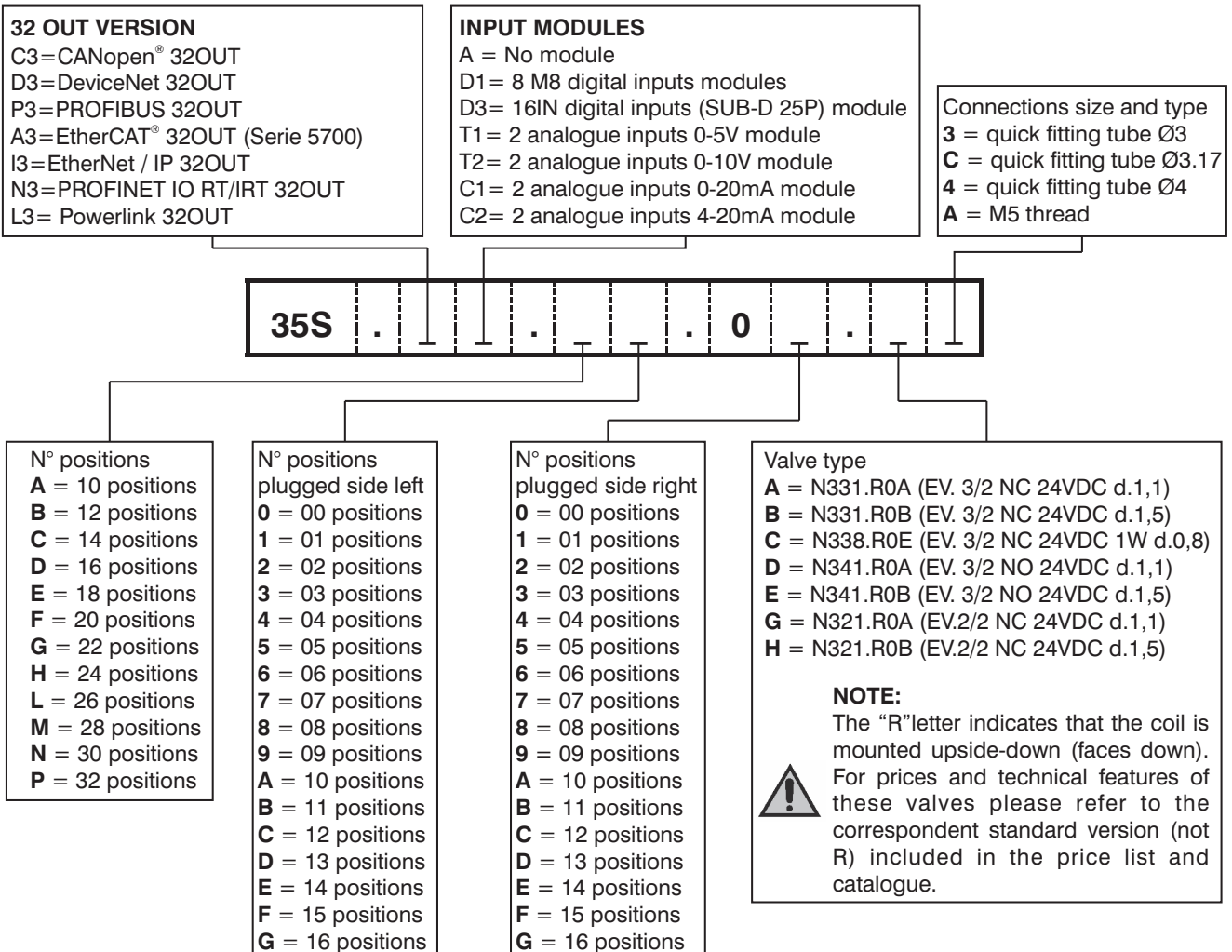
**Overall dimensions**

**Manifold with Optyma-F serial system (slave + input modules)**



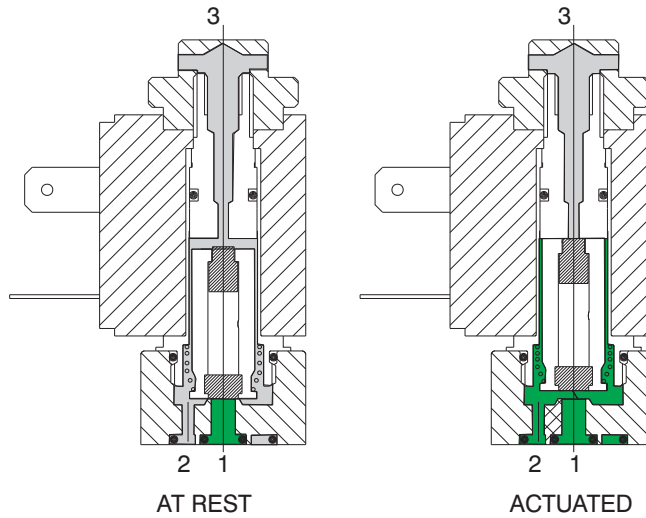
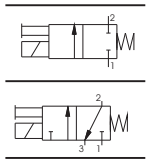
N° positions	A	B
10	90	120,50
12	106	136,50
14	122	152,50
16	138	168,50
18	154	184,50
20	170	200,50
22	186	216,50
24	202	232,50
26	218	248,50
28	234	264,50
30	250	280,50
32	266	296,50

**Manifold layout configuration with Optyma-F serial system (slave + input modules)**



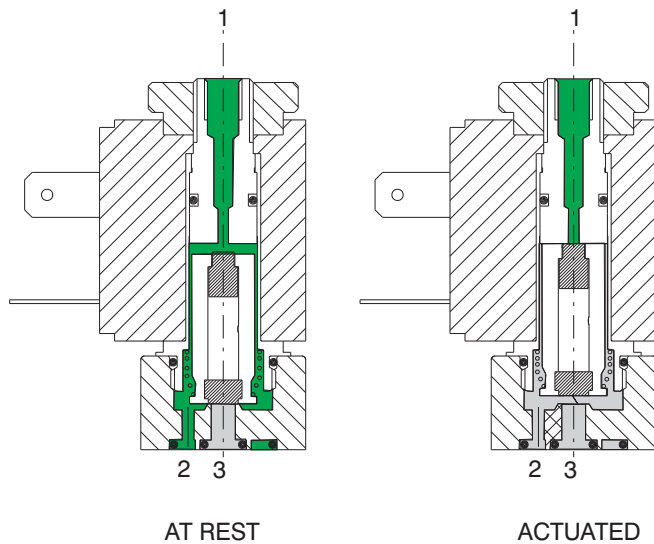
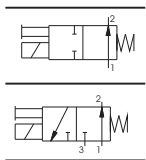
Functional schematics

Normally Closed (N.C.) 3/2 or 2/2



- 1 = INLET PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT  
(Plugged if 2/2)

Normally Open (N.O.) 3/2 or 2/2



Construction characteristics

**Electrical parts:** Solenoids: the solenoid consist of coils having different diameter copper wire windings insulated according standards "H"; they are encased in a nylon-glass compound. All parts are corrosion resistant.

**Mechanical parts:** Nickel plated brass tube nitrile viton seals stainless steel plunger (AISI 430F), stainless steel adjusted springs, viton poppet seals, tropicalized zinc alloy interface plate, nickered brass manual override, nickel steel coil lock nut, zinc steel mounting screw. To be usable, the solenoids and microsolenoids have to be attached either to a base or directly to the distributor's operators by means of connectors M5 or G 1/8". These solenoids are available in all voltages and frequencies used in the world. The following are the technical characteristics of the solenoid.



### Technical characteristics

<b>Pneumatic</b>	Working pressure	0 - 10 bar	
	Orifice size	1,3 mm	(0,9 mm for 2 W)
	Maximum fluid temperature	50°C	
	Maximum ambient temperature	50°C	
	Maximum flow rate at 6 bar with $\Delta p$ 1 bar	53 NI/min	(20NI/min. for 2 W)
	Cycles/minute	700	
	Fluids	Air-vacuum-inert gases	
	Lubrication	non required	
Life	45 to 50 million cycles		
<b>Electrical</b>	Power consumption holding - D.C	5 W	(2.5 W) low consumption
	Power consumption holding - A.C	9 VA	(6 VA) low consumption
	Operating voltage tolerance	$\pm 10\%$	
	Response time opening *	8 ms	
	Response time closing *	6 ms	
	Insulation of the copper wire	H	
	Insulation of the coil	F	
	Connector protection	IP 65	
	Cable protection	DIN 43650 INDUSTRIAL FORM	

(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

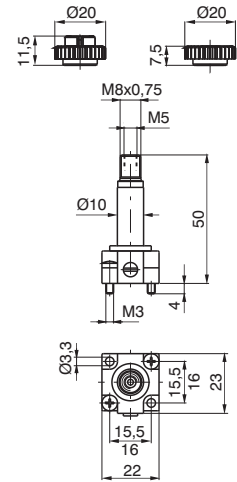
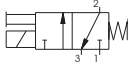
### Maintenance and replacement parts

Maintenance practices for these valves are similar to those already detailed for other products- replacement of the plunger or poppet is not advisable since the new replacement would not provide the best fit with the rest of the already used valve. Special care should be taken that no dirt is accumulated between the working surface of fixed core and the plunger which would result in vibrations and overheating of the solenoid. In the case of microsolenoid it must be assured that the alternate current coil is not charged when the mechanical part is not mounted to avoid destruction of the coil. The electrical connections have to be perfect, especially where low currents are used (12-24V). Oxidation of contacts between the connector and the coil can lead to intermittent malfunctions which are difficult to trace. Oxidation of contacts due to humidity or corrosive atmosphere are one of the most common causes of false alarms. Clean the contacts with appropriate spray.

**Mechanical actuator for miniature solenoid valve**

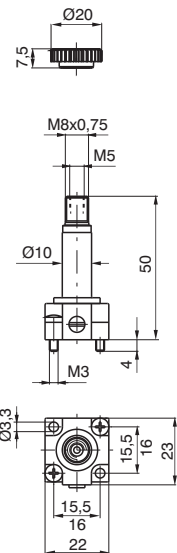
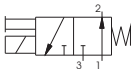
Ordering code

- M 2** Normally Closed (N.C.)
- M 2P** Normally Closed (N.C.) threaded lock nut
- M 2/9** Normally Closed (N.C.) 2 W 24 VDC



Weight 51 gr.

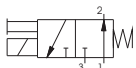
- M 2/1** Normally Open (N.O.) air feeding through fix flunger



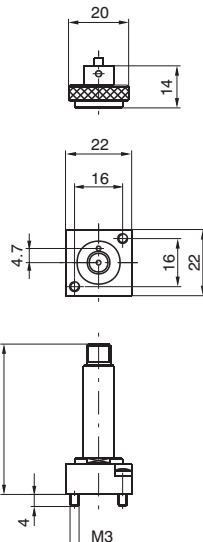
Weight 48 gr.

- Normally Open (N.O.) air feeding through base

**MM 7**



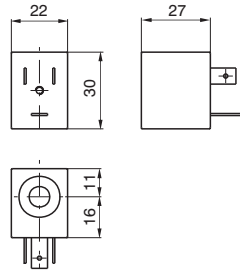
Weight 46 gr.



Ordering code	Available voltages Coil	
N.O.		
<b>MB10/1</b>	24 D.C. (8 Watt)	Direct current
<b>MB17/1</b>	24/50	Alternating current 50 Hz
<b>MB21/1</b>	48/50	
<b>MB22/1</b>	110/50	
<b>MB24/1</b>	230/50	
<b>MB37/1</b>	24/60	Alternating current 60 Hz
<b>MB39/1</b>	110/60	
<b>MB41/1</b>	230/60	
<b>MB56/1</b>	24/50-60	Alternating current 50/60 Hz
<b>MB57/1</b>	110/50-60	
<b>MB58/1</b>	230/50-60	



**Coil**

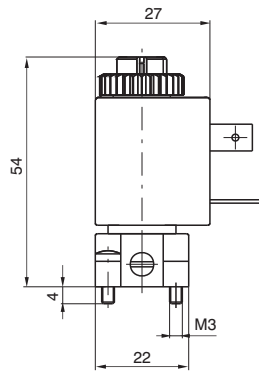
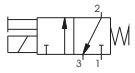


Weight 54 gr.

\* Use only with M2/9

Ordering code	Available voltages Coils
<b>MB 4</b> <b>MB 5</b> <b>MB 6</b>	12 D.C. 24 D.C. 48 D.C. Direct current
<b>MB 9*</b>	24 D.C. (2 Watt) (Direct current, low consumption)
<b>MB 17</b> <b>MB 21</b> <b>MB 22</b> <b>MB 24</b>	24/50 48/50 110/50 230/50 Alternating current 50 Hz
<b>MB 37</b> <b>MB 39</b> <b>MB 41</b>	24/60 110/60 230/60 Alternating current 60 Hz
<b>MB 56</b> <b>MB 57</b> <b>MB 58</b>	24/50-60 110/50-60 230/50-60 Alternating current 50/60 Hz
<b>MB 66</b> <b>MB 67</b> <b>MB 68</b>	24/50-60 110/50-60 230/50-60 Alternating current (low consumption) 50/60 Hz

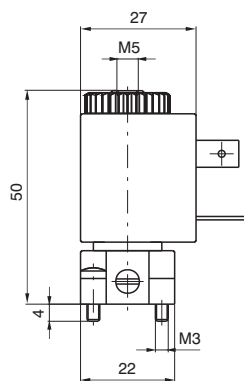
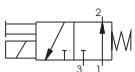
**Miniature solenoid valve Normally Closed (N.C.)**



Weight 100 gr.

Ordering code	Available voltages Miniature solenoid valve N.C.
<b>M 2.4</b> <b>M 2.5</b> <b>M 2.6</b> <b>M 2.9</b>	12 D.C. 24 D.C. 48 D.C. 24 D.C. (2 Watt) Direct current
<b>M 2.17</b> <b>M 2.21</b> <b>M 2.22</b> <b>M 2.24</b>	24/50 48/50 110/50 230/50 Alternating current 50 Hz
<b>M 2.37</b> <b>M 2.39</b> <b>M 2.41</b>	24/60 110/60 230/60 Alternating current 60 Hz
<b>M 2.56</b> <b>M 2.57</b> <b>M 2.58</b>	24/50-60 110/50-60 230/50-60 Alternating current 50/60 Hz
<b>M 2.66</b> <b>M 2.67</b> <b>M 2.68</b>	24/50-60 110/50-60 230/50-60 Alternating current (low consumption) 50/60 Hz

**Miniature solenoid valve Normally Open (N.O.)**



Weight 103 gr.

Ordering code	Available voltages Miniature solenoid valve N.O.
<b>M 2/1.4</b> <b>M 2/1.5</b> <b>M 2/1.6</b> <b>M 2/1.9</b>	12 D.C. 24 D.C. 48 D.C. 24 D.C. (2 Watt) Direct current
<b>M 2/1.17</b> <b>M 2/1.21</b> <b>M 2/1.22</b> <b>M 2/1.24</b>	24/50 48/50 110/50 230/50 Alternating current 50 Hz
<b>M 2/1.37</b> <b>M 2/1.39</b> <b>M 2/1.41</b>	24/60 110/60 230/60 Alternating current 60 Hz
<b>M 2/1.56</b> <b>M 2/1.57</b> <b>M 2/1.58</b>	24/50-60 110/50-60 230/50-60 Alternating current 50/60 Hz

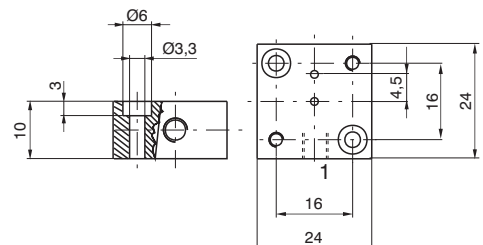
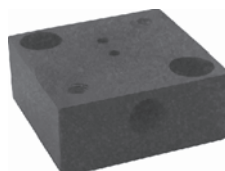
**External feeding base**

Use with solenoid valves for piloting pressure different from the using pressure

Ordering code

**305.10.05**

Weight 18 gr.



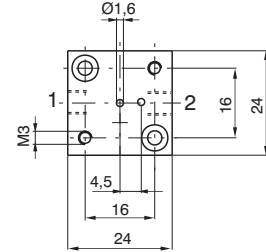
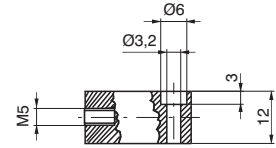
**Individual base**



In line ports - thread M5

1 = INLET PORT (N.C.)  
2 = OUTLET PORT

With a N.O. miniature solenoid valve  
1 = EXHAUST  
2 = OUTLET PORT

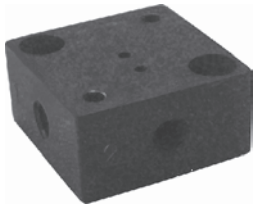


Ordering code

**305.00.00**

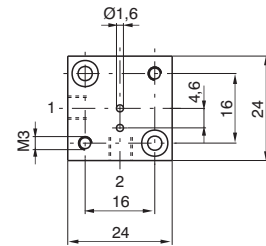
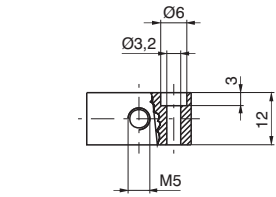
Weight 56 gr.

90° Port - thread M5



1 = INLET PORT (N.C.)  
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve  
1 = EXHAUST  
2 = OUTLET PORT

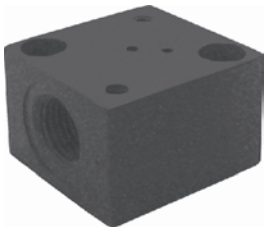


Ordering code

**305.90.00**

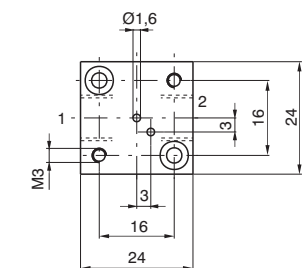
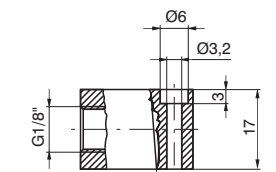
Weight 56 gr.

In line ports - thread G 1/8"



1 = INLET PORT (N.C.)  
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve  
1 = EXHAUST  
2 = OUTLET PORT



Ordering code

**305.00.18**

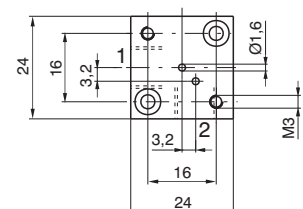
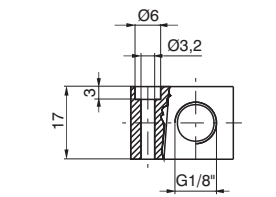
Weight 75 gr.

90° Port - thread G 1/8"



1 = INLET PORT (N.C.)  
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve  
1 = EXHAUST  
2 = OUTLET PORT



Ordering code

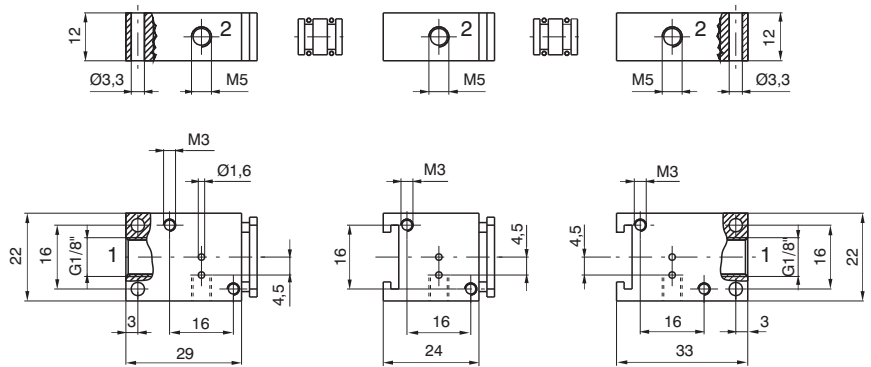
**305.90.18**

Weight 75 gr.





**Modular bases for series mounting**



Ordering code

*Initial base*  
**305.05.00**  
 Weight 57 gr.

*Intermediate base*  
**305.06.00**  
 Weight 44 gr.

*Last base*  
**305.07.00**  
 Weight 53 gr.

*Bored spacer*  
**305.05.01**  
 Weight 3 gr.

*Solid spacer*  
**305.05.02**  
 Weight 4 gr.

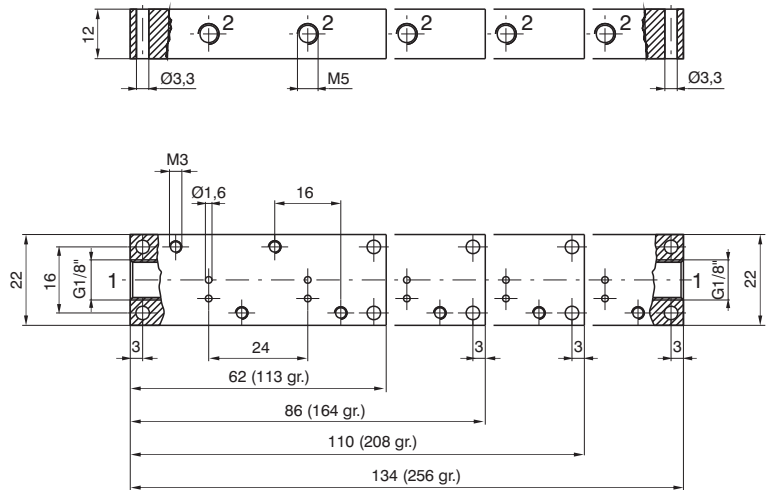
*Initial base*

*Intermediate base*

*Last base*

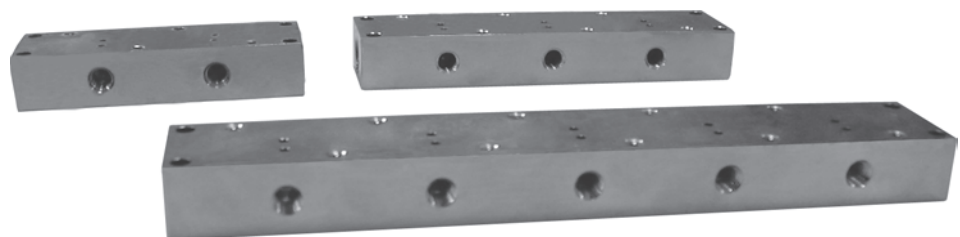


**Multiple integral bases for series mounting**



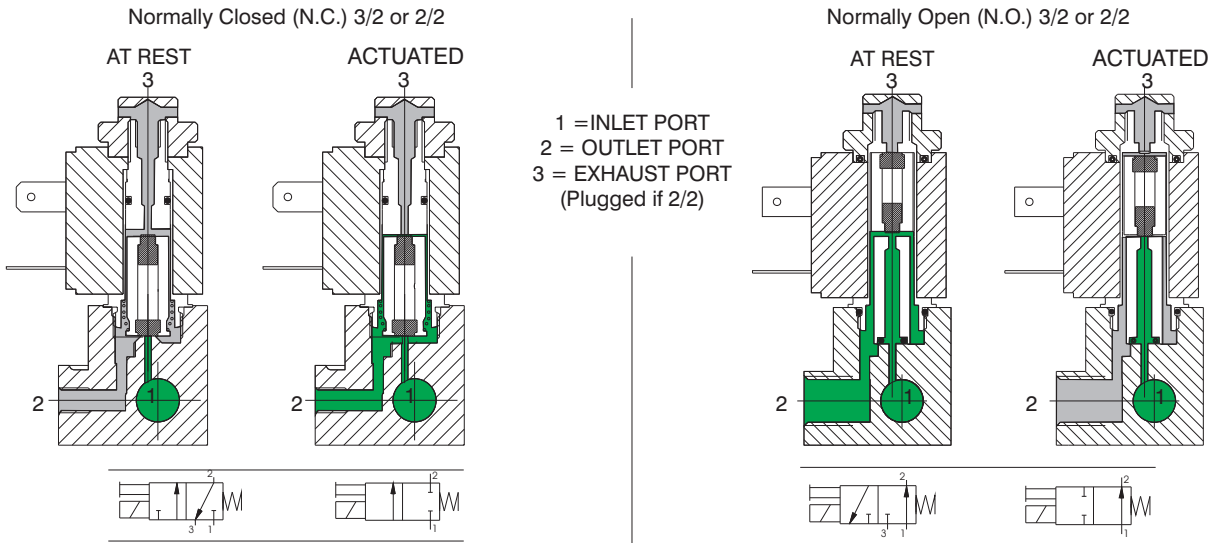
Ordering code

- 305.08.02** 2 positions
- 305.08.03** 3 positions
- 305.08.04** 4 positions
- 305.08.05** 5 positions





**Functional schematic**



**Construction characteristics**

**Electrical parts:** Solenoids: the solenoid consist of coils having different diameter copper wire windings insulated according standards "H"; they are encased in a nylon-glass compound. All parts are corrosion resistant.

**Mechanical parts:** Nickel plated brass tube nitrile (NBR) stainless steel plunger (AISI 430F), stainless steel adjusted springs, viton poppet seals, tropicalized zinc alloy interface plate, nickered brass manual override, nickel steel coil lock nut, zinc steel mounting screws. Electrical connectors are standard.

**Technical characteristics**

<b>Pneumatic</b>	Working pressure	0 - 10 bar	
	Orifice size	1,3 mm	(1,1 mm for 2 W)
	Maximum fluid temperature	50°C	
	Maximum ambient temperature	50°C	
	Maximum flow rate at 6 bar with $\Delta p = 1$	53 NI/min	(35 NI/min. for 2 W)
	Cycles/minute	700	
	Fluids	Air-Vacuum-Inert gases	
	Lubrication	Non needed	
	Life	40 to 50 million cycles	
	<b>Electrical</b>	Power consumption holding - D.C	5 W
Power consumption holding - A.C		8 VA	(6 VA) low consumption
Operating voltage tolerance		$\pm 10\%$	
Response time opening *		8 ms	
Response time closing *		6 ms	
Insulation of the copper wire		H	
Insulation of the coil		F	
Connector protection		IP 65	
Cable protection		DIN 43650 INDUSTRIAL FORM	

(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

**Maintenance and replacement parts**

Maintenance practices for these valves are similar to those already detailed for other products - replacement of the plunger or poppet is not advisable since the new replacement would not provide the best fit with the rest of the already used valve.

Special care should be taken that no dirt is accumulated between the working surface of fixed core and the plunger which would result in vibrations and overheating of the solenoid. In the case of microsolenoid it must be assured that the alternate current coil is not charged when the mechanical part is not mounted to avoid destruction of the coil.

The electrical connections have to be perfect, especially where low currents are used (12-24 V). Oxidation of contacts between the connector and the coil can lead to intermittent malfunctions which are difficult to trace. Oxidation of contacts due to humidity or corrosive atmosphere are one of the most common causes of false alarms. Clean the contacts with appropriate spray.



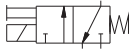
**Mechanical actuator for Normally Closed (N.C.)  
Miniature solenoid valve**

Normally Closed (N.C.)

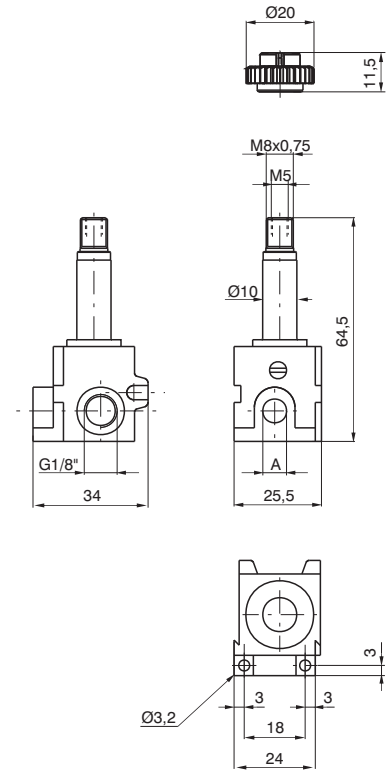
Ordering code

- 305.M1 A = G 1/8"
- 355.M1 A = M5
- 345.M1 A = Push in fitting for 4 mm tube

- 305.M1/9 A = G 1/8"
- 355.M1/9 A = M5
- 345.M1/9 A = Push in fitting for 4 mm tube



2 W  
24 DC

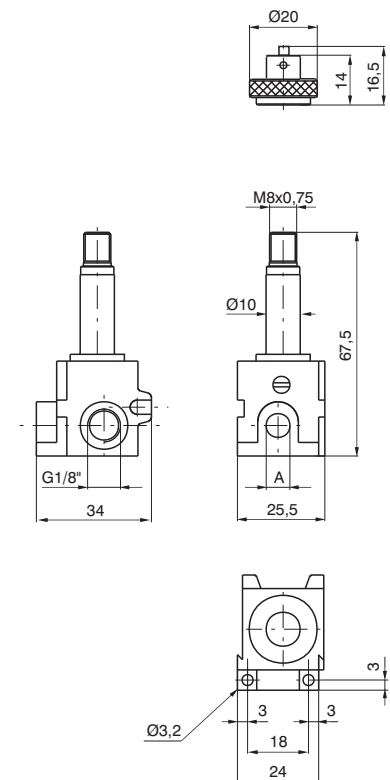


Weight 95 gr.

Normally Open (N.O.)

Ordering code

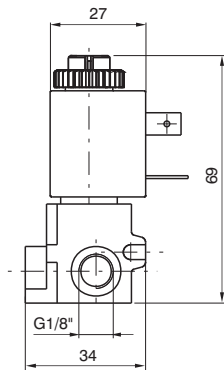
- 305.M1/1 A = G 1/8"
- 355.M1/1 A = M 5
- 345.M1/1 A = Push in fitting for 4 mm tube



Weight 106 gr.

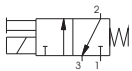
2

**Miniature solenoid valve**

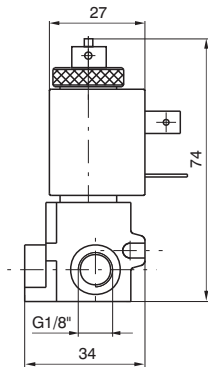


Normally Closed (N.C.)

Weight 149 gr.

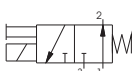


Ordering code			Available voltage miniature solenoid
G 1/8"	M5	TUBE Ø4 mm	
<b>305.M4</b>	<b>355.M4</b>	<b>345.M4</b>	12 D.C. 24 D.C. 48 D.C. 24 D.C. (2 Watt)  Direct current
<b>305.M5</b>	<b>355.M5</b>	<b>345.M5</b>	
<b>305.M6</b>	<b>355.M6</b>	<b>345.M6</b>	
<b>305.M9</b>	<b>355.M9</b>	<b>345.M9</b>	
<b>305.M17</b>	<b>355.M17</b>	<b>345.M17</b>	24/50 48/50 110/50 230/50  Alternating current 50 Hz
<b>305.M21</b>	<b>355.M21</b>	<b>345.M21</b>	
<b>305.M22</b>	<b>355.M22</b>	<b>345.M22</b>	
<b>305.M24</b>	<b>355.M24</b>	<b>345.M24</b>	
<b>305.M37</b>	<b>355.M37</b>	<b>345.M37</b>	24/60 110/60 230/60  Alternating current 60 Hz
<b>305.M39</b>	<b>355.M39</b>	<b>345.M39</b>	
<b>305.M41</b>	<b>355.M41</b>	<b>345.M41</b>	
<b>305.M56</b>	<b>355.M56</b>	<b>345.M56</b>	24/50-60 110/50-60 230/50-60  Alternating current 50/60 Hz
<b>305.M57</b>	<b>355.M57</b>	<b>345.M57</b>	
<b>305.M58</b>	<b>355.M58</b>	<b>345.M58</b>	
<b>305.M66</b>	<b>355.M66</b>	<b>345.M66</b>	24/50-60 110/50-60 230/50-60  Alternating current low consumption 50/60 Hz
<b>305.M67</b>	<b>355.M67</b>	<b>345.M67</b>	
<b>305.M68</b>	<b>355.M68</b>	<b>345.M68</b>	



Normally Open (N.O.)

Weight 165 gr.



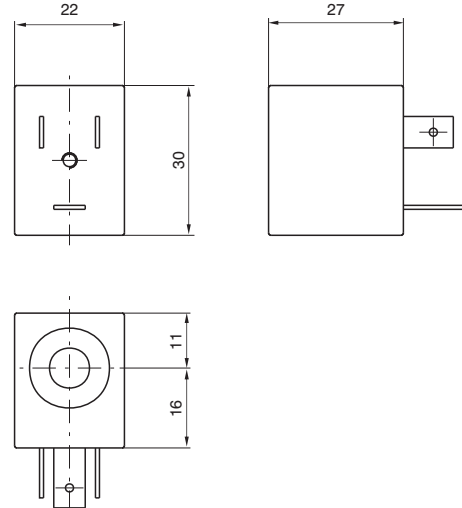
Ordering code			Available voltages miniature solenoid
G 1/8"	M5	TUBE Ø4 mm	
<b>305.M10/1</b>	<b>355.M10/1</b>	<b>345.M10/1</b>	24 D.C. (8 Watt)  Direct current
<b>305.M17/1</b>	<b>355.M17/1</b>	<b>345.M17/1</b>	24/50 48/50 110/50 230/50  Alternating current 50 Hz
<b>305.M21/1</b>	<b>355.M21/1</b>	<b>345.M21/1</b>	
<b>305.M22/1</b>	<b>355.M22/1</b>	<b>345.M22/1</b>	
<b>305.M24/1</b>	<b>355.M24/1</b>	<b>345.M24/1</b>	
<b>305.M37/1</b>	<b>355.M37/1</b>	<b>345.M37/1</b>	24/60 110/60 230/60  Alternating current 60 Hz
<b>305.M39/1</b>	<b>355.M39/1</b>	<b>345.M39/1</b>	
<b>305.M41/1</b>	<b>355.M41/1</b>	<b>345.M41/1</b>	
<b>305.M56/1</b>	<b>355.M56/1</b>	<b>345.M56/1</b>	24/50-60 110/50-60 230/50-60  Alternating current 50/60 Hz
<b>305.M57/1</b>	<b>355.M57/1</b>	<b>345.M57/1</b>	
<b>305.M58/1</b>	<b>355.M58/1</b>	<b>345.M58/1</b>	



**Coil**



Weight 54 gr.



Ordering code		Available voltages Coil
N.C.	N.O.	
<b>MB4</b> <b>MB5</b> <b>MB6</b> <b>MB9</b>	<b>MB10/1</b>	12 D.C. 24 D.C. 48 D.C. 24 D.C. (2 Watt) 24 D.C. (8 Watt)  Direct current
<b>MB17</b> <b>MB21</b> <b>MB22</b> <b>MB24</b>	<b>MB17/1</b> <b>MB21/1</b> <b>MB22/1</b> <b>MB24/1</b>	24/50 48/50 110/50 230/50  Alternating current 50 Hz
<b>MB37</b> <b>MB39</b> <b>MB41</b>	<b>MB37/1</b> <b>MB39/1</b> <b>MB41/1</b>	24/60 110/60 230/60  Alternating current 60 Hz
<b>MB56</b> <b>MB57</b> <b>MB58</b>	<b>MB56/1</b> <b>MB57/1</b> <b>MB58/1</b>	24/50-60 110/50-60 230/50-60  Alternating current 50/60 Hz
<b>MB66</b> <b>MB67</b> <b>MB68</b>	/	24/50-60 110/50-60 230/50-60  Alternating current (low consumption) 50/60 Hz

**Electrical connector**

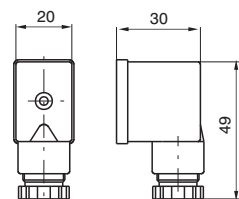
Ordering code

**305.11.00** Normal

**305.11.0 L** with Led  
 1 = 24 V D.C. / A.C.  
 2 = 110 V 50/60 Hz  
 3 = 230 V 50/60 Hz



Weight 19 gr.



2

## BISTABLE

### General

The most interesting aspects of this bi-stable miniature solenoid valve operating with D.C. only, is that it can be commuted with a simple electric impulse and stay commuted till an inverted polarity impulse deactivates it. It means that the valve is not automatically deactivated if current fail as happens with normal solenoid valves.

The applications differ but are all based on above mentioned feature.

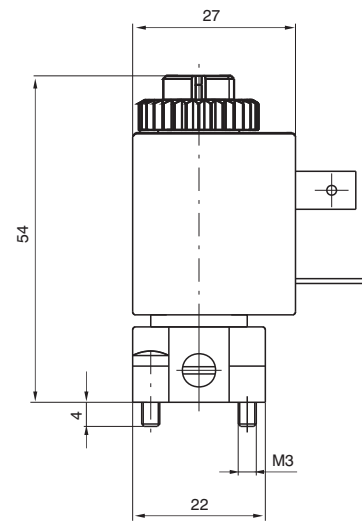
The internal construction is relatively special. The fix plunger is equipped with a permanent magnet that hold or release the mobile plunger according to the magnetic field generated by the coil.

A specific coil is used for this application and it cannot be replaced by the standard ones.

Ordering code is **MBB5**.

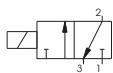
2

### Miniature solenoid valve for distributors and bases



Ordering code

**M5/B**



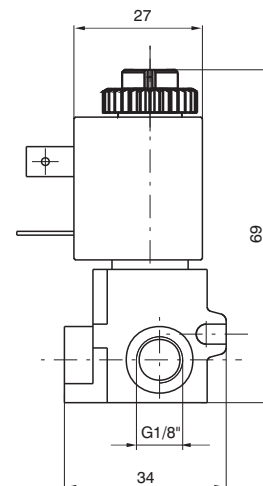
### Miniature solenoid valve with inseries mounting base

Ordering code

**305.M5/B** = G 1/8"

**355.M5/B** = M5

**345.M5/B** = Fitting for 4 mm tube





**Electric pilot CNOMO (coil not included)**

Mechanics with base for solenoid to be used where an electric pilot system is required. May be used on all sizes and is standardized as an interface on the distributor.

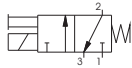
The base is fitted with a manual control which is pulse actuated, without check, or with two stable positions, actuated by means of a screwdriver (pressing down and turning clockwise by 90°). Two different types of solenoids can be mounted on the stem, one in conformity with ISO standard size 30x38 and ISO 4400 (DIN 43650) electrical connection, and a compact one size 22x27, having the same performance but at lower price. The technical characteristics of the latter are described in the catalogue, series 300, and refer to MB solenoids. The base is fitted with screws (M4x30) for fastening to the distributor.

Ordering code

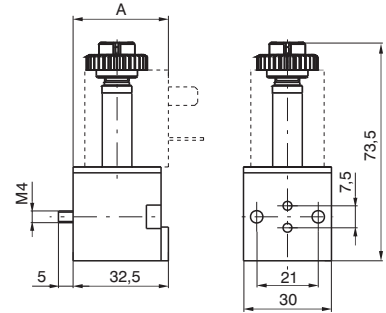


**P** = Manual 1 position  
**R** = Manual 2 positions

**3** = Mechanics CNOMO  
**4** = 2-W Mechanics CNOMO



Weight 49 gr.



**A = 33** (with MB solenoid)  
**A = 38** (with MC solenoid)

**General characteristics**

<b>Structural</b>	Body	Thermoplastic polyester	
	Stem	Nickel-plated brass	
	Cores	AISI 430F stainless steel	
	Springs	AISI 302 stainless steel	
	Shutters	FPM	
	Other seals	NBR	
	Manual control	Nickel-plated brass	
	<b>Pneumatic</b>	Fluid	Air, Neutral gases
Working pressure		0-10 bar	
Fluid ambient temperature		-5°C - +50°C	
Flow rate at 6 bar with Δp 1 bar		53 NI/min	(20 NI/min for 2 W)
Nominal flow cross section		1,3 mm	(0,9 mm for 2 W)
<b>Electric</b>	Power consumption (inrush) - A.C.	13 VA	
	Power consumption holding - D.C.	4 W	(2 W)
	Power consumption holding - A.C.	8,5 VA	
	Operating voltage tolerance	±10%	
	Response time opening *	13 ms	
	Response time closing *	5 ms	
	Insulation of the copper wire	H	
	Insulation of the coil	F	
	Connector protection	IP 65	
Cable protection	DIN 43650 "A" FORM		

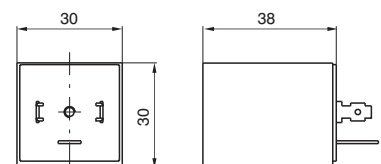
(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

**Coil**

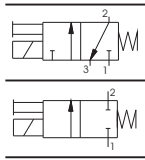
Ordering code	Available voltages
	Coil
<b>MC5</b>	24 D.C.
<b>MC9</b>	24 D.C. (2 Watt)
<b>MC56</b>	24/50-60 Hz
<b>MC57</b>	110/50-60 Hz
<b>MC58</b>	230/50-60 Hz



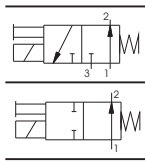
Weight 110 gr.



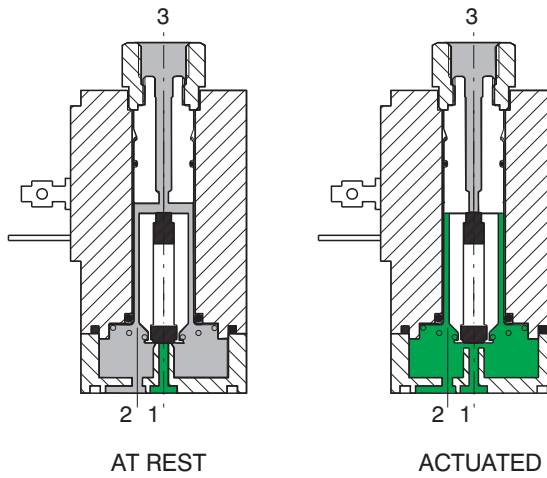
**Functional schematic**



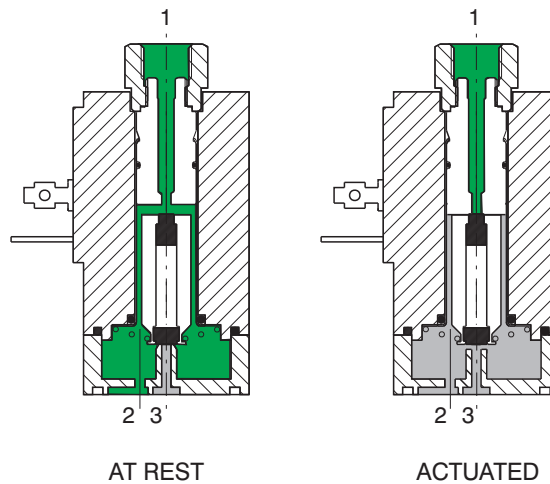
- 1 = INLET PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT  
(Plugged if 2/2)



Normally Closed (N.C.) 3/2 or 2/2



Normally Open (N.O.) 3/2 or 2/2



**Construction characteristics**

*Electrical parts:*

Solenoids: the solenoid consists of coils having different diameter copper wire windings insulated according standards "H"; they are encased in a nylon-glass compound. All parts are corrosion resistant.

*Mechanical parts:*

Stainless steel tube and plunger (AISI 430F), stainless steel adjusted springs, viton poppet seals, tropicalized zinc alloy interface plate, nitrile (NBR) seal nicked brass manual override, nickel steel coil lock nut, zinc steel mounting screws. To be usable, the solenoids have to be attached either to a base or directly to the distributor's operators by means of connectors G 1/8". Electrical connectors are standard. These solenoid are available in all voltages and frequencies used in the world. The following are the technical characteristics of the solenoid.

## Technical characteristics

<b>Pneumatic</b>	Working pressure	0 - 10 bar
	Orifice size	1,8 mm
	Maximum fluid temperature	50°C
	Maximum ambient temperature	50°C
	Maximum flow rate at 6 bar with $\Delta p = 1$	80 NI/min
	Cycles/minute	700
	Fluids	Air-Vacuum-Inert gases
	Lubrication	Not required
	Life	40 to 50 millions
<b>Electric</b>	Power consumption (inrush) - D.C.	-
	Power consumption (inrush) - A.C.	19,5 VA
	Power consumption holding - D.C.	8,2 W
	Power consumption holding - A.C.	9 VA
	Operating voltage tolerance	$\pm 10\%$
	Response time opening *	15 ms
	Response time closing *	30 ms
	Insulation of the copper wire	H
	Insulation of the coil	F
	Connector protection	IP 65
	Cable protection	DIN 43650 "A" FORM

(\*) "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"

## Maintenance and replacement parts

Maintenance practices for these valves are similar to those already detailed for other products - replacement of the plunger or poppet is not advisable since the new replacement would not provide the best fit with the rest of the already used valve.

Special care should be taken that no dirt is accumulated between the working surface of fixed cores 3 and the plunger 2 which would result in vibrations and overheating of the solenoid. In the case of microsolenoid it must be assured that the alternate current coil is not charged when the mechanical part is not mounted to avoid destruction of the coil.

The electrical connections have to be perfect, especially where low currents are used (12-24 V). Oxidation of contacts between the connector and the coil can lead to intermittent malfunctions which are difficult to trace. Oxidation of contacts due to humidity or corrosive atmosphere are one of the most common causes of false alarms. Clean the contacts with appropriate spray.

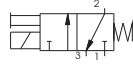


**Solenoid valve S and S/1**

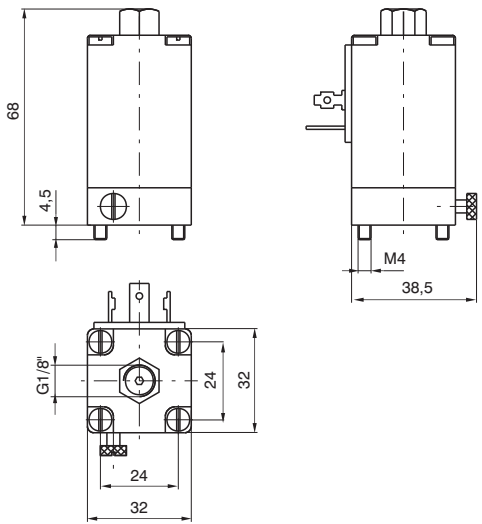
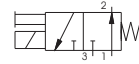


Weight 220 gr.

Normally Closed  
(N.C.) - **S**



Normally Open  
(N.O.) - **S/1**



Ordering code		Available voltages Coil	
<b>S 2</b>	<b>S 2/1</b>	6 D.C.	Direct current
<b>S 4</b>	<b>S 4/1</b>	12 D.C.	
<b>S 5</b>	<b>S 5/1</b>	24 D.C.	
<b>S 6</b>	<b>S 6/1</b>	48 D.C.	
<b>S 16</b>	<b>S 16/1</b>	12/50	Alternating current 50 Hz
<b>S 17</b>	<b>S 17/1</b>	24/50	
<b>S 19</b>	<b>S 19/1</b>	32/50	
<b>S 20</b>	<b>S 20/1</b>	42/50	
<b>S 21</b>	<b>S 21/1</b>	48/50	
<b>S 22</b>	<b>S 22/1</b>	110/50	
<b>S 23</b>	<b>S 23/1</b>	115/50	
<b>S 24</b>	<b>S 24/1</b>	230/50	
<b>S 36</b>	<b>S 36/1</b>	12/60	Alternating current 60 Hz
<b>S 37</b>	<b>S 37/1</b>	24/60	
<b>S 38</b>	<b>S 38/1</b>	48/60	
<b>S 39</b>	<b>S 39/1</b>	110/60	
<b>S 40</b>	<b>S 40/1</b>	115/60	
<b>S 41</b>	<b>S 41/1</b>	230/60	
<b>S 56</b>	<b>S 56/1</b>	24/50-60	Alternating current 50/60 Hz
<b>S 57</b>	<b>S 57/1</b>	110/50-60	
<b>S 58</b>	<b>S 58/1</b>	230/50-60	

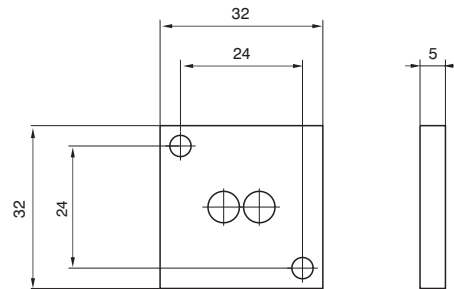
**Closing plate**

Ordering code

**300.12.00**



Weight 14 gr.



**External feeding base**

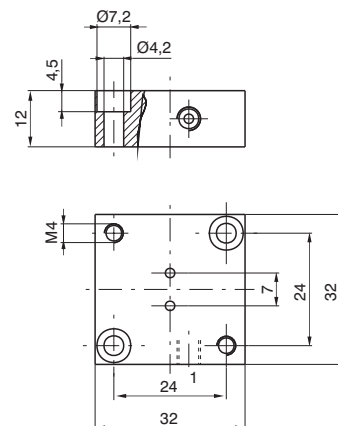
To be used with electrodistributeurs to get a different piloting pressure from the line one.

Ordering code

**300.10.05**



Weight 35 gr.





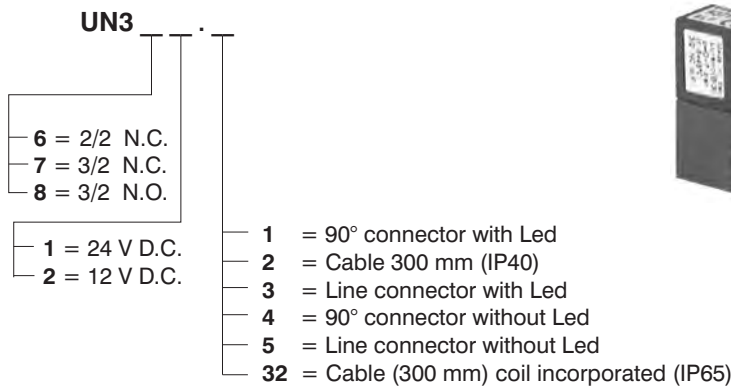
**General**

The series **UL** homologated solenoid valves (valid for USA and Canada file n. E206325-VAIU2, VAIU8) are different from the standard ones for microsolenoid made with an injected RYNITE embedded copper wire (they are included in class "F" insulation).

Refer to standard versions as for as other details and accessories to be used with solenoid valves.

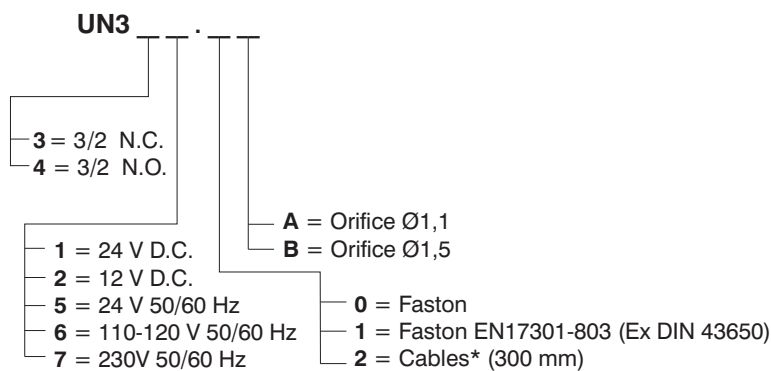
**Miniature solenoid valve 10mm**

Ordering code



**Miniature solenoid valve 15mm**

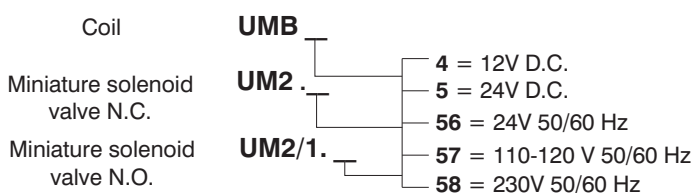
Ordering code



\* On request and for large quantity only (only 24 V D.C. 2,3 W)

**Miniature solenoid valve 22mm**

Ordering code





**Miniature solenoid valve 22mm for series mounting**

Ordering code

- Coil N.C. **UMB**
  - 4 = 12 V D.C.
  - 5 = 24 V D.C.
  - 56 = 24 V 50/60 Hz
  - 57 = 110-120 V 50/60 Hz
  - 58 = 230 V 50/60 Hz
- Coil N.O. **UMB** /1
  - 10 = 24 V D.C. 8W
  - 56 = 24 V 50/60 Hz
  - 57 = 110-120 V 50/60 Hz
  - 58 = 230 V 50/60 Hz
- Solenoid valve N.C. **U3** **5.M**
  - 0 = G1/8"
  - 5 = M5
  - 4 = fitting for 4mm tube
  - 4 = 12 V D.C.
  - 5 = 24 V D.C.
  - 56 = 24 V 50/60 Hz
  - 57 = 110-120 V 50/60 Hz
  - 58 = 230 V 50/60 Hz
- Solenoid valve N.O. **U3** **5.M** /1
  - 0 = G1/8"
  - 5 = M5
  - 4 = fitting for 4mm tube
  - 10 = 24 V D.C. 8W
  - 56 = 24 V 50/60 Hz
  - 57 = 110-120 V 50/60 Hz
  - 58 = 230 V 50/60 Hz



**Bi-stable miniature solenoid valve 22mm**

Ordering code

- Coil **UMBB5**
- Miniature solenoid valve for distributors and bases (N.C.) **UM5/B**
- Miniature solenoid valve with inseries mounting base (N.C.) **U3** **5.M5/B**
  - 0 = G1/8"
  - 5 = M5
  - 4 = fitting for 4mm tube



**Solenoid valve 30 mm (for mechanics M3 and M4)**

Ordering code

- UMC5** = 24 V D.C.
- UMC56** = 24 V 50/60 Hz
- UMC57** = 110÷120 V 50/60 Hz
- UMC58** = 230 V 50/60 Hz



**Solenoid valve 32 mm**

Ordering code

- Solenoid valve N.C. **US**
- Solenoid valve N.O. **US** /1
  - 4 = 12 V D.C.
  - 5 = 24 V D.C.
  - 56 = 24 V 50/60 Hz
  - 57 = 110-120 V 50/60 Hz
  - 58 = 230 V 50/60 Hz



**General**

The trend towards the miniaturization of components has been consolidated. The use of new technologies makes it possible to manufacture components with high flow rates but extremely compact sizes.

Electric piloting is by means of low-absorption miniature solenoids which are easily connected to the electronic control systems of machines (PLC). Another object of study have been manifolds and multiple bases for ganged assembly of valves or solenoid valves with option for having outlets 2 and 4 either on the valve body or on the base through threaded holes or integrated quick connections provided.

Versions 3/2 and 5/2 are fitted with pneumatic and electropneumatic controls with resetting by mechanically or pneumatically operated spring, or by pneumatic or electropneumatic operation on the bistable versions.

The basic difference between this type of distributors and the others we produce, based on the spool system, lies in the fact that the seals rest on the spool and are dynamic, instead of being locked into the spool the valve body by means of spacers. By this means a compact size is obtained and the distributors can be slotted into bases and manifolds by means of two screws.

**Structural characteristics**

Body	Aluminium
Operators	Aluminium
Spool	Aluminium
Pistons	Aluminium
Seals	HNBR
Spring	Stainless steel

**Use and maintenance**

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

ATTENTION: use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).

**How to order the electro distributors**

Example:

**805.52.0.1.01** Electro distributor with miniature solenoid 12 V D.C.

List of codes for tensions:

**01** = miniature solenoid 12 V D.C.

**02** = miniature solenoid 24 V D.C.

**05** = miniature solenoid 24 V A.C.


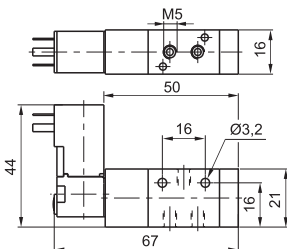

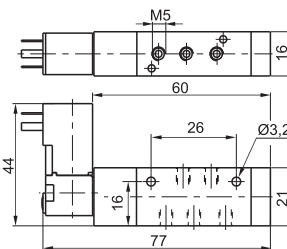

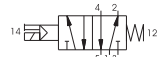
**06** = miniature solenoid 110 V A.C.


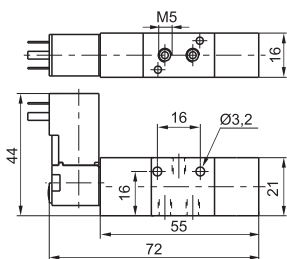

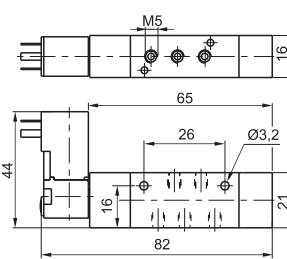
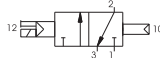
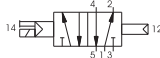
**07** = miniature solenoid 230 V A.C.


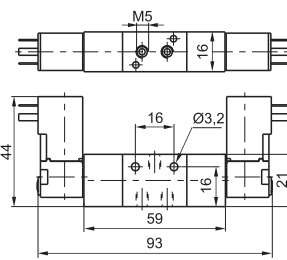

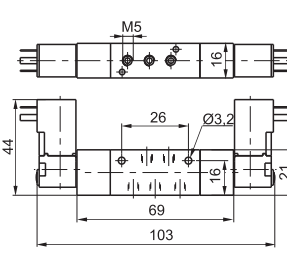
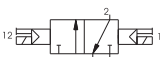

The electropilot utilized is a 15 mm 3/2 N.C. miniature solenoid with faston and 1.1 mm orifice (see Series 300).

Miniature solenoid  homologated are available (see series 300)

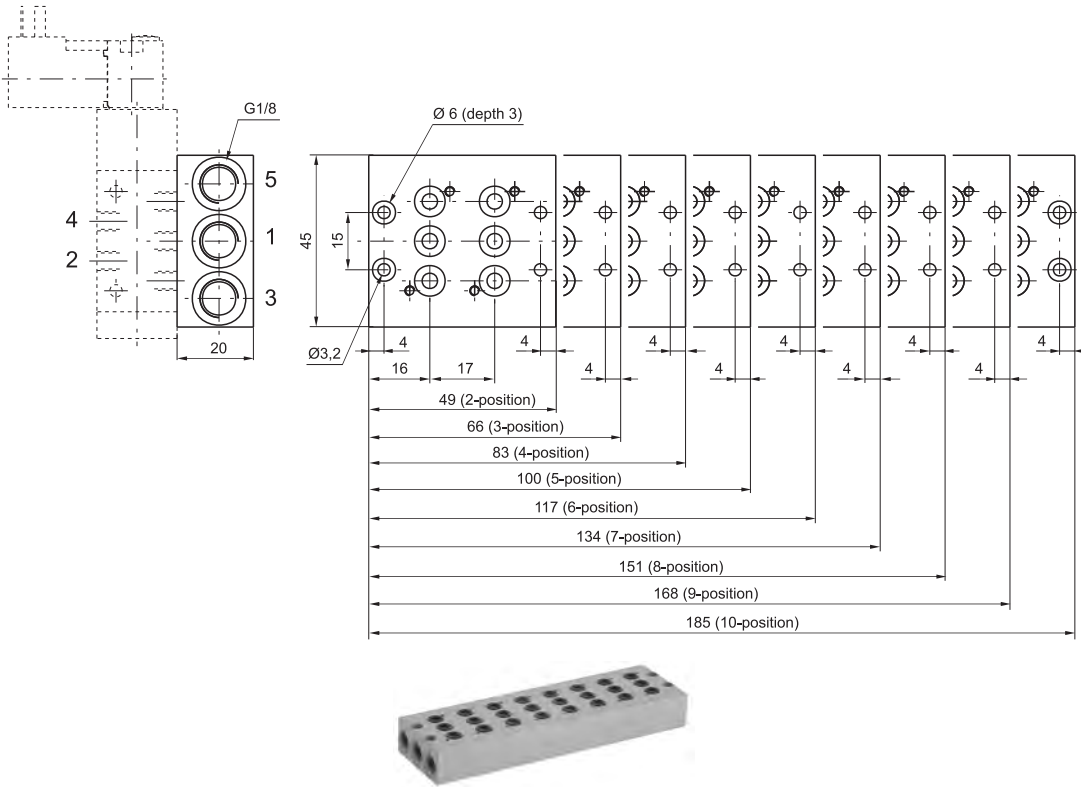


3/2	<b>Solenoid - Spring</b>	<b>Ordering code</b>	<b>Solenoid - Spring</b>	5/2	
  Weight gr. 80 Minimum working pressure 2 bar		<b>805.T.0.1.V</b>	  Weight gr. 85 Minimum working pressure 2 bar		
		TYPE T 32=3 ways 52=5 ways VOLTAGE 01=12V D.C. 02=24V D.C. 05=24V A.C. 06=110V A.C. 07=230V A.C.			
 					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	160 NI/min	mm 2,5	M5

3/2	<b>Solenoid - Differential</b>	<b>Ordering code</b>	<b>Solenoid - Differential</b>	5/2	
  Weight gr. 85 Minimum working pressure 2 bar		<b>805.T.0.12.V</b>	  Weight gr. 90 Minimum working pressure 2 bar		
		TYPE T 32=3 ways 52=5 ways VOLTAGE 01=12V D.C. 02=24V D.C. 05=24V A.C. 06=110V A.C. 07=230V A.C.			
 					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	160 NI/min	mm 2,5	M5

3/2	<b>Solenoid - Solenoid</b>	<b>Ordering code</b>	<b>Solenoid - Solenoid</b>	5/2	
  Weight gr. 120 Minimum working pressure 1,5 bar		<b>805.T.0.0.V</b>	  Weight gr. 125 Minimum working pressure 1,5 bar		
		TYPE T 32=3 ways 52=5 ways VOLTAGE 01=12V D.C. 02=24V D.C. 05=24V A.C. 06=110V A.C. 07=230V A.C.			
 					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	160 NI/min	mm 2,5	M5

Manifolds



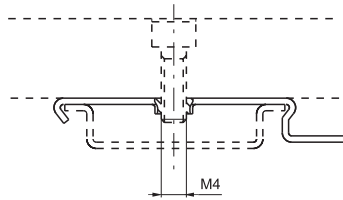
Ordering code

**805.P**

N. POSITIONS	
02	= 2 pos. (weight gr. 95)
03	= 3 pos. (weight gr. 130)
04	= 4 pos. (weight gr. 160)
05	= 5 pos. (weight gr. 190)
06	= 6 pos. (weight gr. 225)
07	= 7 pos. (weight gr. 260)
08	= 8 pos. (weight gr. 290)
09	= 9 pos. (weight gr. 325)
10	= 10 pos. (weight gr. 365)

Clip

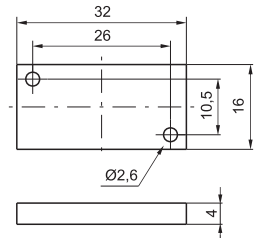
Closing plate



Ordering code

**800.00**

Weight gr. 5 - (for mounting the distributors groups on guide DIN 46277/3)



Ordering code

**805.00**

Weight gr. 15

## General

These are 2 stage valves actuated electro-pneumatically. A serie 300 directly operated solenoid valve actuates pneumatically the principal power distributor. This integrated system allows configurations of systems requiring very little space. The pilot air is normally taken from the inlet port (autofeed) and the only actuating signal is electric. The range of the solenoid valves, as far as dimensions and mechanical construction, is similar to series 200. We have therefore solenoid valves G 1/8", G 1/4", G 1/2" and G 1" with identical pneumatic characteristics that are, however, actuated electrically. They have a balanced spool, insensitive to presence or absence of pressure. They are constructed in 3 and 5 way with 1 solenoid (monostable) or 2 solenoids (bistable) and also 5 ways 3 positions with closed centres, open centres and pressured centres.

If should be noted that the autofeed of the electric pilot requires always inlet through port 1 and if a 3 ways normally open configuration is desired, it is necessary to switch the operators.

In the tables showing individual valves, the quick reference tables show the output in NI/min at a inlet pressure of 6 bar and a pressure drop of 1 bar. All information was obtained using standards CETOP RP 50P.

Solenoid valves G 1/8" and G 1/4" can be equipped with microsolenoids as well as standard solenoids and they can be mounted in line or in 90 degrees on distributors. Please note that while the microsolenoid can be mounted in any direction, standard solenoid requires mounting as inticated in the photographs and diagrams.

**The order codes pertain only to the solenoid valve with mechanical actuator "M2" or solenoid "S\*" already assembled (see Series 300, section 1). (M2 coils are not included and have to be ordered separately).**

**Coils for M2 and solenoids "S"  homologated are available (see Series 300).**

## Construction characteristics

Body	Aluminium
Operators	Aluminium Technopolymer for spring botton plate G 1/8", G1/4", G 1/2" and aluminium for G 1"
Spools	Stainless steel / Technopolymer fpt Series T488
Seals	NBR Polyurethane compound for oil free applications G 1/8", G 1/4" and G 1/2"
Spacers	Technopolymer (aluminium for G1")
Spring	Stainless steel or spring steel

## Use and maintenance

These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

**ATTENTION:** use hydraulic oil class H for lubrication such as MAGNA GC 32 (Castrol).



2

<b>Solenoid - Spring</b>	3/2	Ordering code <b>468.1.0.1.M2</b>	5/2	<b>Solenoid - Spring</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32=3 ways</td></tr> <tr><td>52=5 ways</td></tr> </table>	TYPE	32=3 ways	52=5 ways		
			TYPE				
32=3 ways							
52=5 ways							
<p>Weight gr. 240 Minimum working pressure 2,5 bar</p>				<p>Weight gr. 240 Minimum working pressure 2,5 bar</p>			

Operational characteristics					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

<b>Solenoid - Differential</b>	3/2	Ordering code <b>468.1.0.12.M2</b>	5/2	<b>Solenoid - Differential</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32=3 ways</td></tr> <tr><td>52=5 ways</td></tr> </table>	TYPE	32=3 ways	52=5 ways		
			TYPE				
32=3 ways							
52=5 ways							
<p>Weight gr. 280 Minimum working pressure 2,5 bar</p>				<p>Weight gr. 320 Minimum working pressure 2,5 bar</p>			

Operational characteristics					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

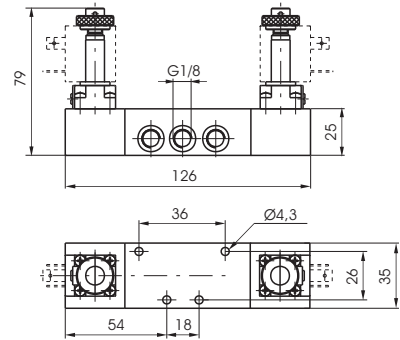
<b>Solenoid - Solenoid</b>	3/2	Ordering code <b>468.1.0.0.M2</b>	5/2	<b>Solenoid - Solenoid</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TYPE</td></tr> <tr><td>32=3 ways</td></tr> <tr><td>52=5 ways</td></tr> </table>	TYPE	32=3 ways	52=5 ways		
			TYPE				
32=3 ways							
52=5 ways							
<p>Weight gr. 370 Minimum working pressure 2 bar</p>				<p>Weight gr. 410 Minimum working pressure 2 bar</p>			

Operational characteristics					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

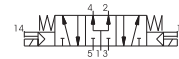
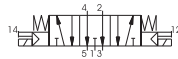
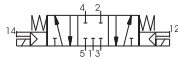
5/3

**Solenoid - Solenoid**

Ordering code
<b>468.53.0.0.M2</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 420  
Minimum working pressure 3 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	410 NI/min	mm 6	G 1/8"

**3/2 Solenoid - Spring**

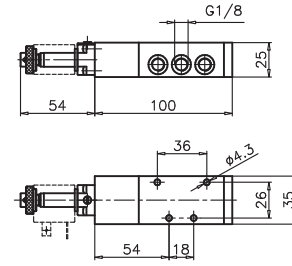
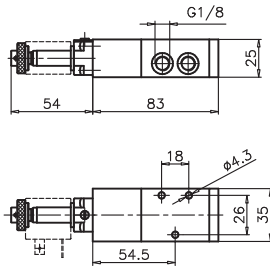
Ordering code

**Solenoid - Spring**

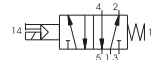
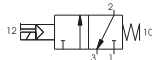
5/2

**468/1.0.0.1.M2**

TYPE
<b>T</b> 32=3 ways
52=5 ways



Weight gr. 240  
Minimum working pressure 2,5 bar



Weight gr. 280  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

**3/2 Solenoid - Differential**

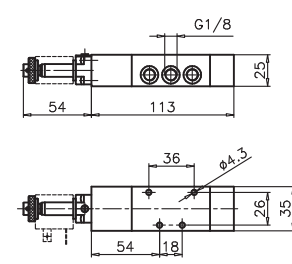
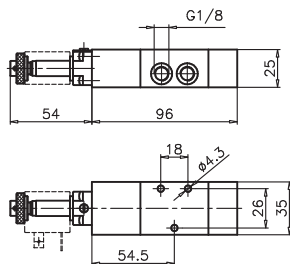
Ordering code

**Solenoid - Differential**

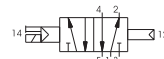
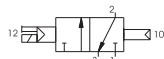
5/2

**468/1.0.0.12.M2**

TYPE
<b>T</b> 32=3 ways
52=5 ways



Weight gr. 280  
Minimum working pressure 2,5 bar



Weight gr. 320  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

2

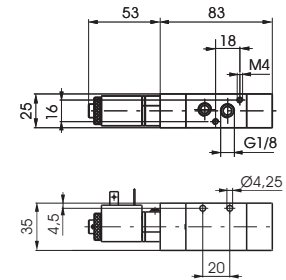
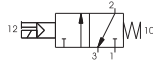
2

3/2 Solenoid - Solenoid		Ordering code		Solenoid - Solenoid	
		<b>468/1.1.0.0.M2</b>		5/2	
  		<p><b>T</b> TYPE</p> <p>32=3 ways</p> <p>52=5 ways</p>		  	
Weight gr. 370 Minimum working pressure 2 bar		 		Weight gr. 410 Minimum working pressure 2 bar	
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	540 NI/min	mm 6	G 1/8"

Solenoid - Solenoid						5/3
Ordering code						
<b>468/1.53.F.0.0.M2</b>						
FUNCTION						
31=Closed centres						
32=Open centres						
33=Pressured centres						
Weight gr. 420 Minimum working pressure 3 bar		  				
<b>Operational characteristics</b>						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	
Filtered and lubricated air	10 bar	-5 ÷ +50	410 NI/min	mm 6	G 1/8"	

**Solenoid - Spring**

Ordering code	
<b>488.32.0.1.Ⓢ</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
Ⓢ	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 220  
Minimum working pressure 2,5 bar

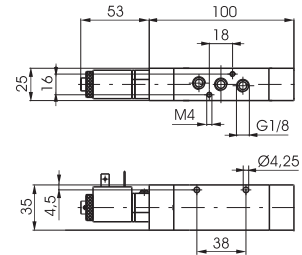
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	20,3	44,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Spring**

Ordering code	
<b>488.52.0.1.Ⓢ</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
Ⓢ	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 260  
Minimum working pressure 2,5 bar

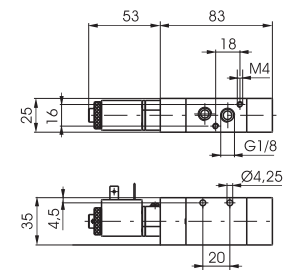
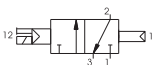
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	22,5	47,0	10	6	G1/8"	-5 ÷ +50

**Solenoid - Differential**

Ordering code	
<b>488.32.0.12.Ⓢ</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
Ⓢ	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 220  
Minimum working pressure 2,5 bar

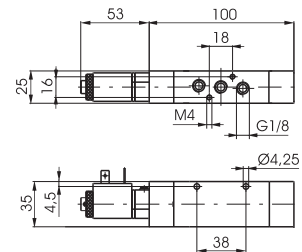
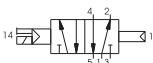
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	28,0	34,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Differential**

Ordering code	
<b>488.52.0.12.Ⓢ</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
Ⓢ	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 260  
Minimum working pressure 2,5 bar

**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	28,3	35,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid**

Ordering code

**488.32.0.0**

VOLTAGE

M11=24V D.C. (rating power 3,8W)

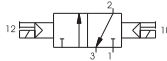
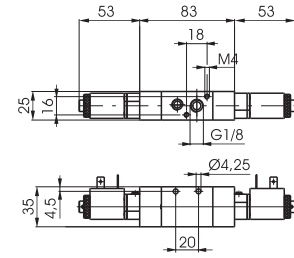
M56=24V 50/60Hz (starting power 9VA, rating power 6VA)

M57=110V 50/60Hz (starting power 9VA, rating power 6VA)

M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 320

Minimum working pressure 2 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	19,0	21,1	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid**

Ordering code

**488.52.0.0**

VOLTAGE

M11=24V D.C. (rating power 3,8W)

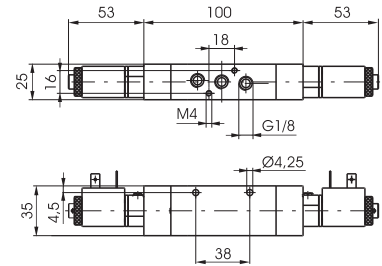
M56=24V 50/60Hz (starting power 9VA, rating power 6VA)

M57=110V 50/60Hz (starting power 9VA, rating power 6VA)

M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 360

Minimum working pressure 2 bar



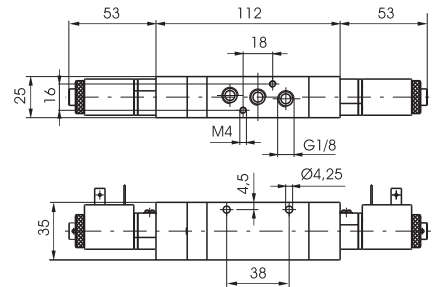
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

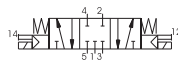
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	18,2	18,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid (Closed centres)**

Ordering code	
<b>488.53.31.0.0.S</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
S	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 400  
Minimum working pressure 3 bar



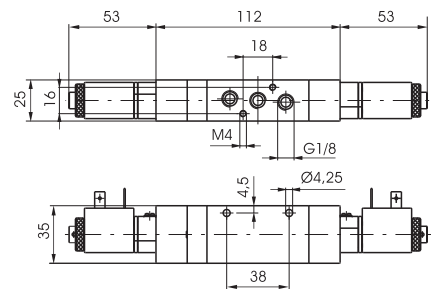
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

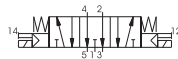
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	23,0	41,0	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid (Open centres)**

Ordering code	
<b>488.53.32.0.0.S</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
S	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 400  
Minimum working pressure 3 bar



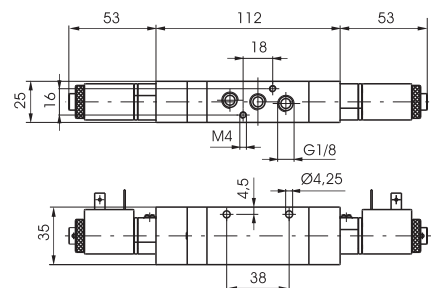
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

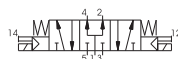
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	21,5	38,0	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid (Pressured centres)**

Ordering code	
<b>488.53.33.0.0.S</b>	
VOLTAGE	
M11=24V D.C. (rating power 3,8W)	
S	M56=24V 50/60Hz (starting power 9VA, rating power 6VA)
	M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
	M58=230V 50/60Hz (starting power 9VA, rating power 6VA)



Weight gr. 400  
Minimum working pressure 3 bar



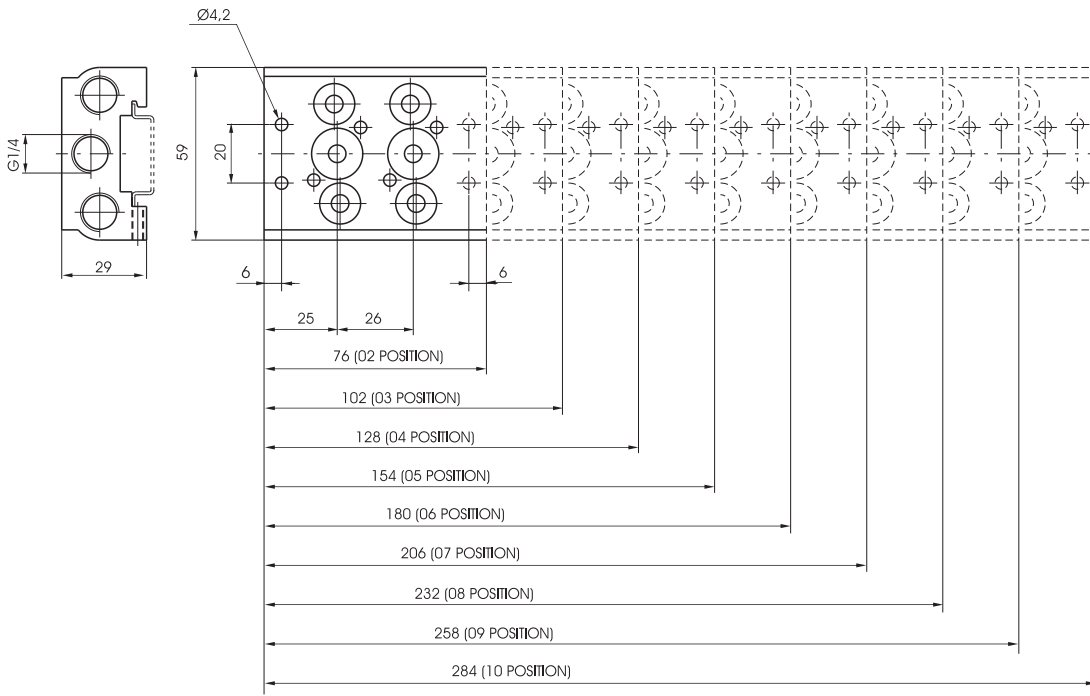
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	18,9	40,2	10	6	G1/8"	-5 ÷ +50



Manifolds



Ordering code

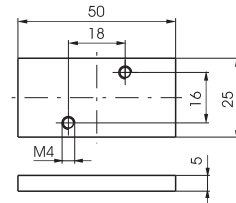
**488.P**

POSITION
02=2 pos. (220 gr)
03=3 pos. (290 gr)
04=4 pos. (360 gr)
<b>P</b> 05=5 pos. (430 gr)
06=6 pos. (500 gr)
07=7 pos. (570 gr)
08=8 pos. (640 gr)
09=9 pos. (710 gr)
10=10 pos. (780 gr)

Closing plate

Ordering code

**488.00**

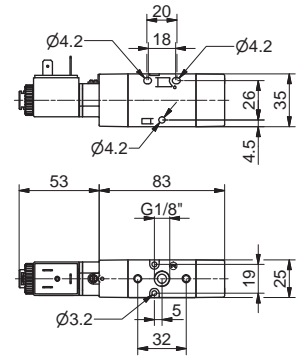
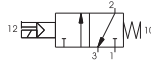


Weight gr. 25

**Solenoid - Spring (Self-feeding)**

Ordering code	
<b>T488.32.0.1</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 160  
Minimum working pressure 2,5 bar



**Operational characteristics**

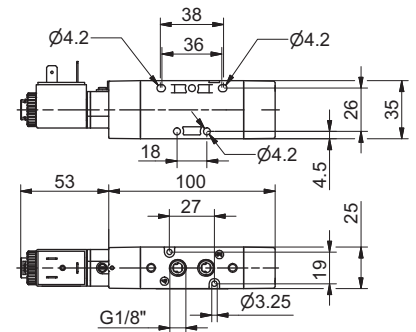
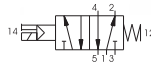
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	23,4	41,0	10	6	G1/8"	-5 ÷ +50

**Solenoid - Spring (Self-feeding)**

Ordering code	
<b>T488.52.0.1</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 190  
Minimum working pressure 2,5 bar



**Operational characteristics**

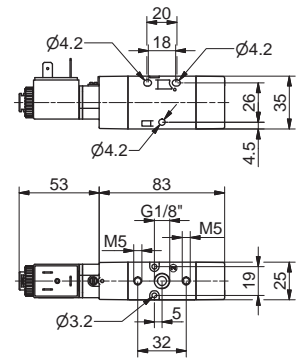
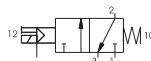
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	22,8	44,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Spring (External feeding)**

Ordering code	
<b>T488.32.0.1E</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 160  
Minimum working pressure 2,5 bar



**Operational characteristics**

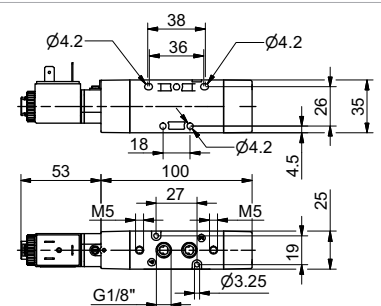
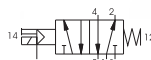
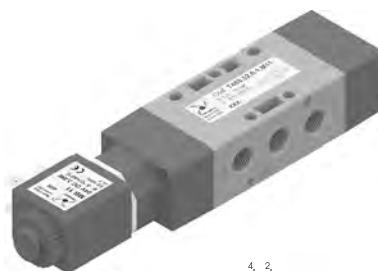
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	620	23,4	41,0	10	6	G1/8"	M5	-5 ÷ +50

**Solenoid - Spring (External feeding)**

Ordering code	
<b>T488.52.0.1E</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 190  
Minimum working pressure 2,5 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	620	22,8	44,5	10	6	G1/8"	M5	-5 ÷ +50



**Solenoid - Differential (Self-feeding)**

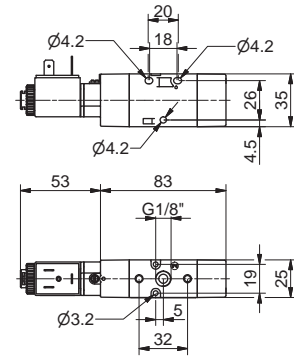
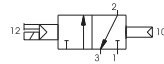
Ordering code

**T488.32.0.12.✓**

VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 160  
Minimum working pressure 2,5 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	31,1	35,0	10	6	G1/8"	-5 ÷ +50

**Solenoid - Differential (Self-feeding)**

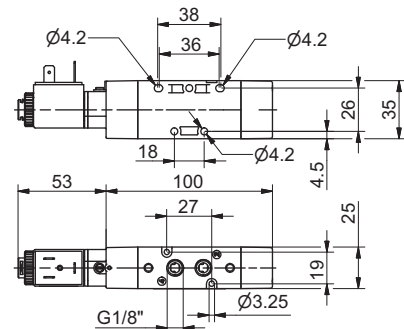
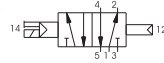
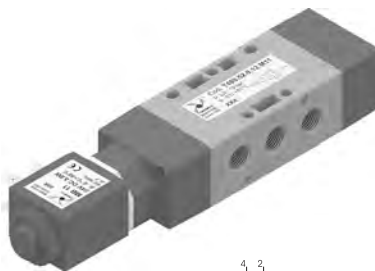
Ordering code

**T488.52.0.12.✓**

VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 190  
Minimum working pressure 2,5 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	620	27,9	34,5	10	6	G1/8"	-5 ÷ +50

**Solenoid - Differential (External feeding)**

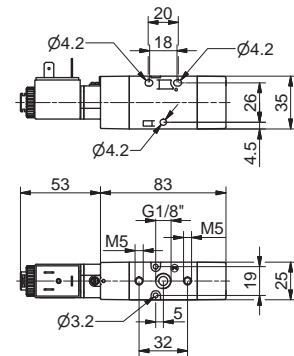
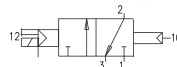
Ordering code

**T488.32.0.12E.✓**

VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 160  
Minimum working pressure 2,5 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	620	31,1	35,0	10	6	G1/8"	M5	-5 ÷ +50

**Solenoid - Differential (External feeding)**

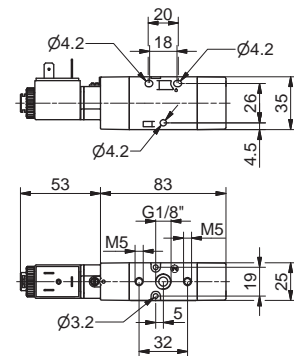
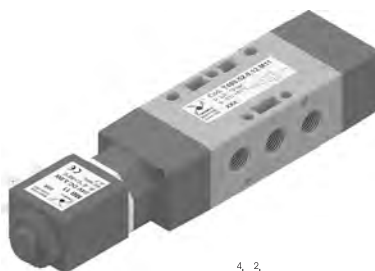
Ordering code

**T488.52.0.12E.✓**

VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60Hz (starting power 9VA, rating power 6VA)

Weight gr. 190  
Minimum working pressure 2,5 bar



**Operational characteristics**

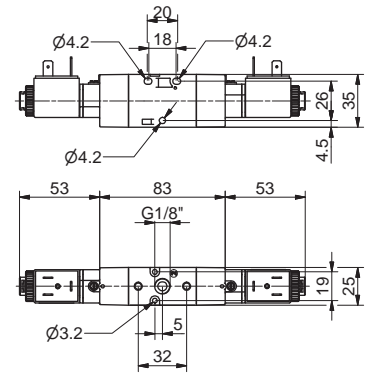
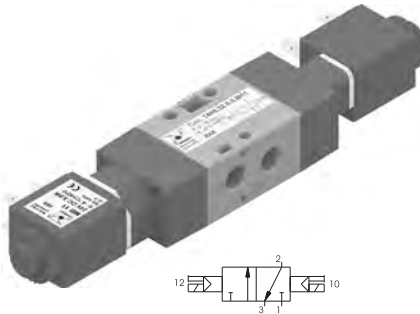
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	620	27,9	34,5	10	6	G1/8"	M5	-5 ÷ +50

**Solenoid - Solenoid (Self-feeding)**

Ordering code	
<b>T488.32.0.0.▼</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 250  
Minimum working pressure 2 bar

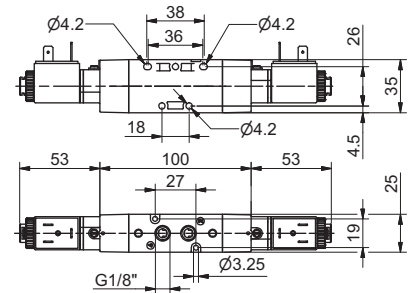
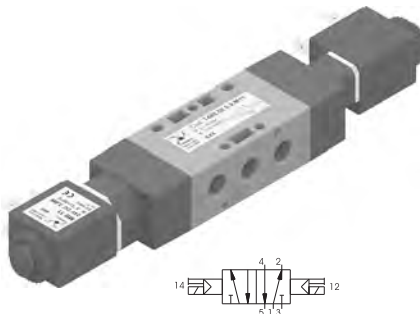


<b>Operational characteristics</b>								Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001	
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C		
Filtered and lubricated air	620	18,8	18,0	10	6	G1/8"	-5 ÷ +50		

**Solenoid - Solenoid (Self-feeding)**

Ordering code	
<b>T488.52.0.0.▼</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 290  
Minimum working pressure 2 bar

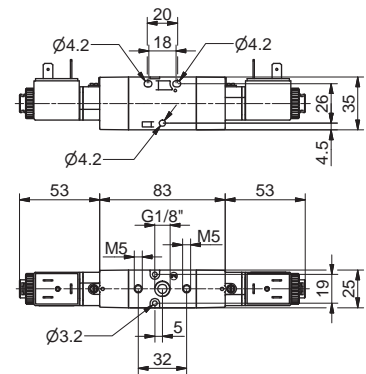
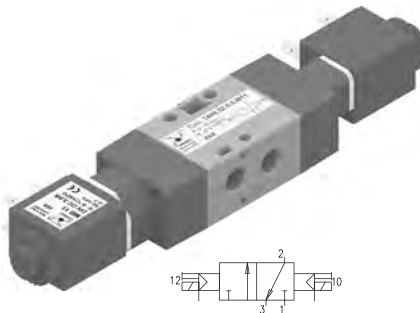


<b>Operational characteristics</b>								Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001	
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C		
Filtered and lubricated air	620	18,2	19,1	10	6	G1/8"	-5 ÷ +50		

**Solenoid - Solenoid (External feeding)**

Ordering code	
<b>T488.32.0.0.E.▼</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 250  
Minimum working pressure 2 bar

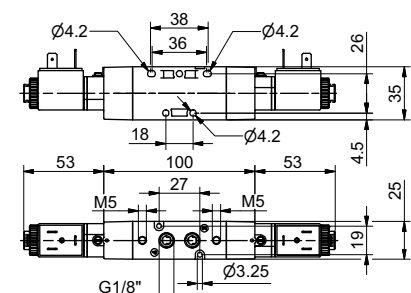
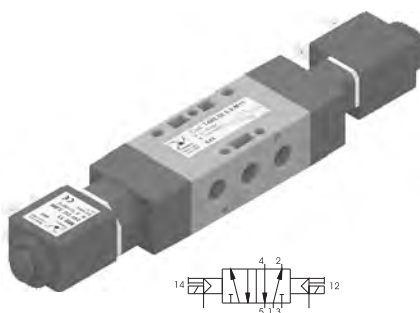


<b>Operational characteristics</b>								Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001	
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C	
Filtered and lubricated air	620	18,8	18,0	10	6	G1/8"	M5	-5 ÷ +50	

**Solenoid - Solenoid (External feeding)**

Ordering code	
<b>T488.52.0.0.E.▼</b>	
VOLTAGE	
M9=24V D.C. (rating power 2W)	
M11=24V D.C. (rating power 3,8W)	
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)	
M57=110 V 50/60 Hz (starting power 9VA, rating power 6VA)	
M58=230V 50/60Hz (starting power 9VA, rating power 6VA)	

Weight gr. 290  
Minimum working pressure 2 bar



<b>Operational characteristics</b>								Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001	
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C	
Filtered and lubricated air	620	18,2	19,1	10	6	G1/8"	M5	-5 ÷ +50	

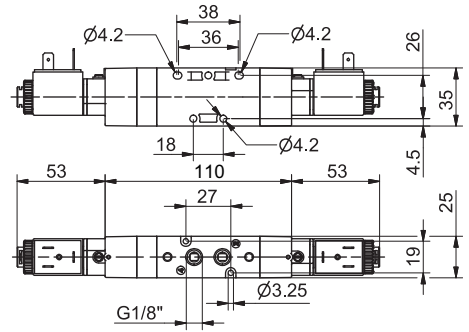
**Solenoid - Solenoid / Closed centres (Self-feeding)**

Ordering code

**T488.53.31.0.0.ⓧ**

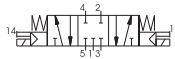
VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- ⓧ M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330

Minimum working pressure 3 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	21,3	37,0	10	6	G1/8"	-5 ÷ +50

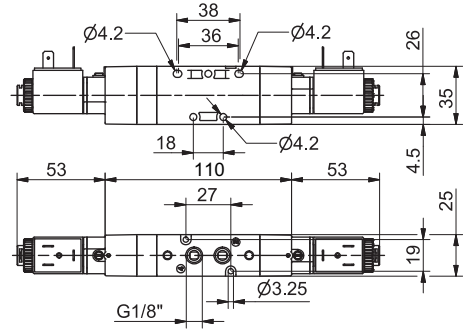
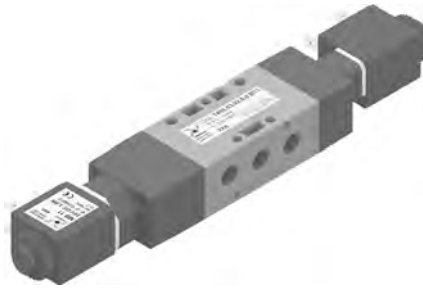
**Solenoid - Solenoid / Open Centres (Self-feeding)**

Ordering code

**T488.53.32.0.0.ⓧ**

VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- ⓧ M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330

Minimum working pressure 3 bar



**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	21,5	34,5	10	6	G1/8"	-5 ÷ +50

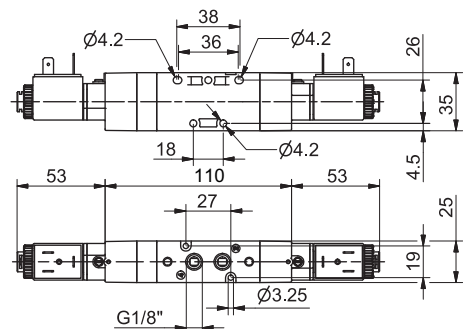
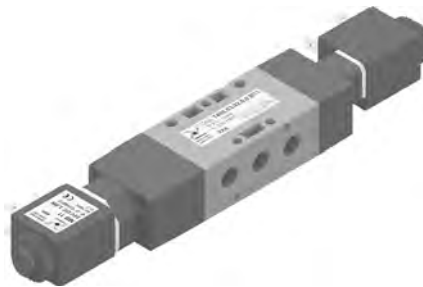
**Solenoid - Solenoid / Pressured centres (Self-feeding)**

Ordering code

**T488.53.33.0.0.ⓧ**

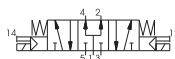
VOLTAGE

- M9=24V D.C. (rating power 2W)
- M11=24V D.C. (rating power 3,8W)
- ⓧ M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
- M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
- M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330

Minimum working pressure 3 bar



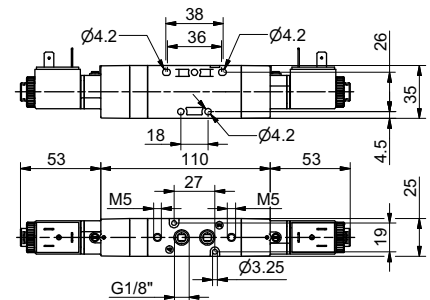
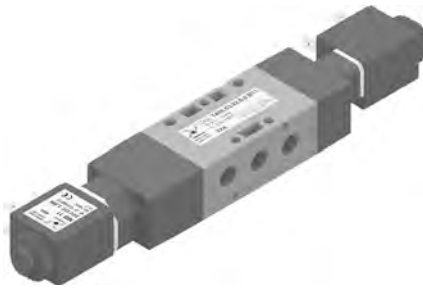
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Temperature °C
Filtered and lubricated air	410	19,5	37,3	10	6	G1/8"	-5 ÷ +50

**Solenoid - Solenoid / Closed centres (External feeding)**

Ordering code
<b>T488.53.31.0.0E.V</b>
VOLTAGE
M9=24V D.C. (rating power 2W)
M11=24V D.C. (rating power 3,8W)
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330  
Minimum working pressure 3 bar



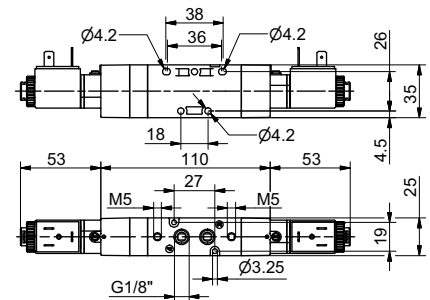
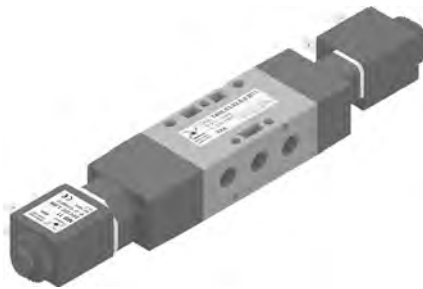
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

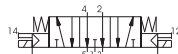
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	410	21,3	37,0	10	6	G1/8"	M5	-5 ÷ +50

**Solenoid - Solenoid / Open Centres (External feeding)**

Ordering code
<b>T488.53.32.0.0E.V</b>
VOLTAGE
M9=24V D.C. (rating power 2W)
M11=24V D.C. (rating power 3,8W)
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330  
Minimum working pressure 3 bar



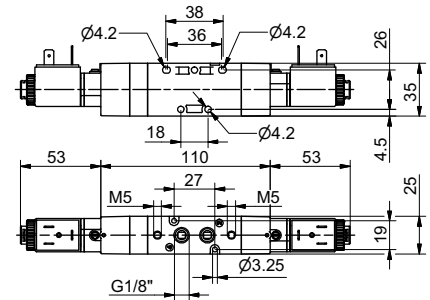
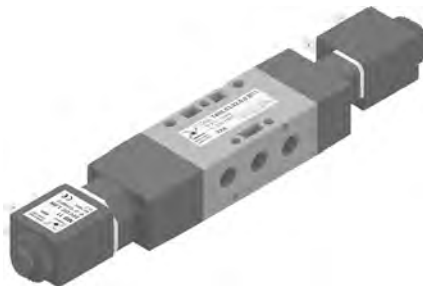
**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

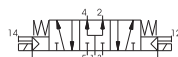
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	410	21,5	34,5	10	6	G1/8"	M5	-5 ÷ +50

**Solenoid - Solenoid / Pressured centres (External feeding)**

Ordering code
<b>T488.53.33.0.0E.V</b>
VOLTAGE
M9=24V D.C. (rating power 2W)
M11=24V D.C. (rating power 3,8W)
M56=24V 50/60 Hz (starting power 9VA, rating power 6VA)
M57=110V 50/60Hz (starting power 9VA, rating power 6VA)
M58=230V 50/60 Hz (starting power 9VA, rating power 6VA)



Weight gr. 330  
Minimum working pressure 3 bar

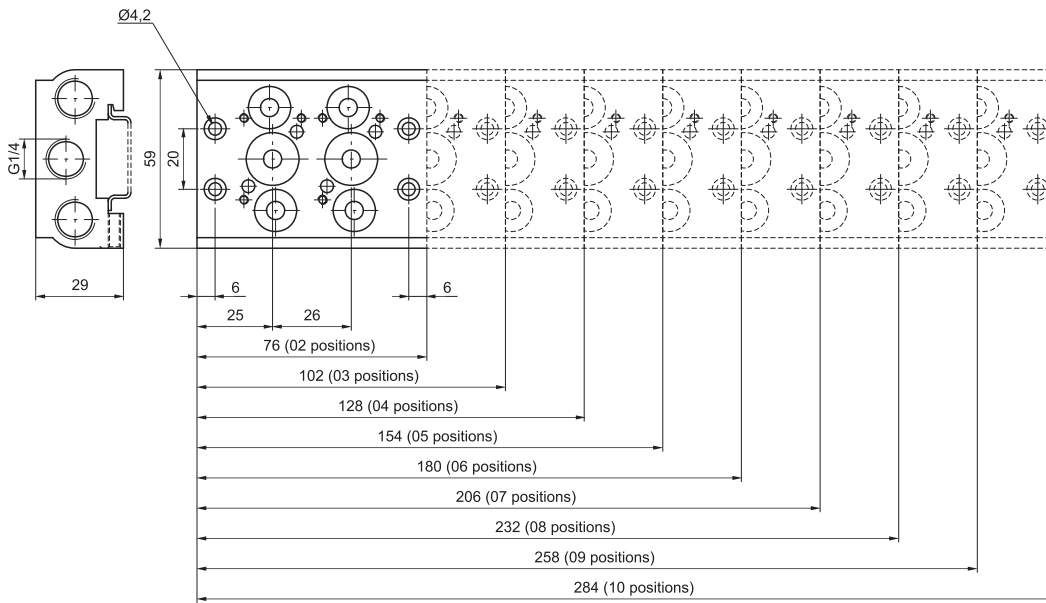


**Operational characteristics**

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time	Max working pressure (bar)	Orifice size (mm)	Working ports size	Pilot port size	Temperature °C
Filtered and lubricated air	410	19,5	37,3	10	6	G1/8"	M5	-5 ÷ +50

**Collectors**



Ordering code

**T488.P**

N. POSITIONS

- 02=2 pos. (Weight 220 gr.)
- 03=3 pos. (Weight 290 gr.)
- 04=4 pos. (Weight 360 gr.)
- 05=5 pos. (Weight 430 gr.)
- 06=6 pos. (Weight 500 gr.)
- 07=7 pos. (Weight 570 gr.)
- 08=8 pos. (Weight 640 gr.)
- 09=9 pos. (Weight 710 gr.)
- 10=10 pos. (Weight 780 gr.)

**P**

**Modular collectors**

Ordering code

**T488.T**

TYPE

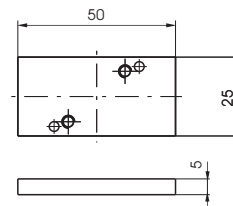
- 01=Single complete base
- 01K=Complete modular bases (batches of 20 pieces)
- 30K=Hollow bush, complete with O-rings (Nr. 50 pieces)
- 31K=Blank bush, complete with O-rings (Nr. 50 pieces)
- T** 32K=Intermediate air intake with screw (Nr. 5 pieces)
- 33=Screw to suite solenoid valves (Nr. 50 pieces)
- 34=Screw for joining bases (Nr. 50 pieces)
- 35=Washer for screw for joining bases (Nr. 50 pieces)
- 36=O-ring seal (Nr. 50 pieces)



**Closing plate**

Ordering code

**T488.00**



Weight gr. 25

**Pneumatic - Pneumatic**

Ordering code  
**808.53.1.11.11**

TYPE  
 1 31=Closed centres  
 32=Open centres

Weight gr. 125  
Minimum piloting pressure 3 bar

Operational characteristics						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 - +70	520 NI/min	mm 4	G 1/8"	M5

2

**3/2 Solenoid - Spring**

Ordering code  
**808.1.0.1.V**

TYPE  
 1 32=3 ways  
 52=5 ways  
 VOLTAGE  
 01=12V D.C.  
 02=24V D.C.  
 05=24V A.C.  
 06=110V A.C.  
 07=230V A.C.

Weight gr. 130  
Minimum working pressure 2 bar

**Solenoid - Spring** 5/2

Weight gr. 135  
Minimum working pressure 2 bar

Operational characteristics					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	520 NI/min	mm 4	G 1/8"

**3/2 Solenoid - Differential**

Ordering code  
**808.1.0.12.V**

TYPE  
 1 32=3 ways  
 52=5 ways  
 VOLTAGE  
 01=12V D.C.  
 02=24V D.C.  
 05=24V A.C.  
 06=110V A.C.  
 07=230V A.C.

Weight gr. 140  
Minimum working pressure 2 bar


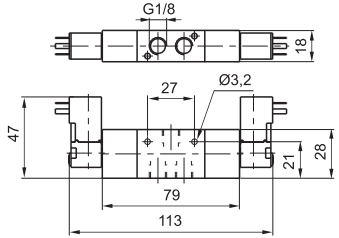

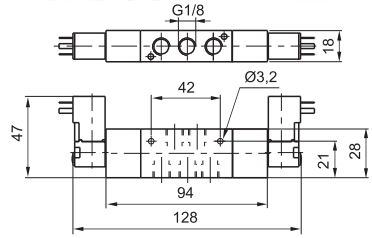
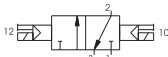
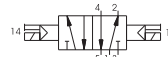
**Solenoid - Differential** 5/2


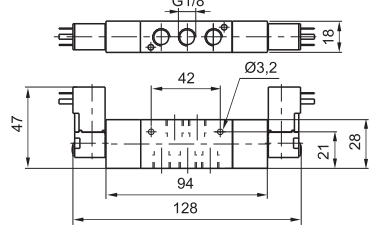
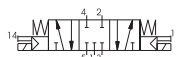
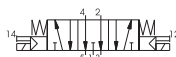
Weight gr. 145  
Minimum working pressure 2 bar

Operational characteristics					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	520 NI/min	mm 4	G 1/8"



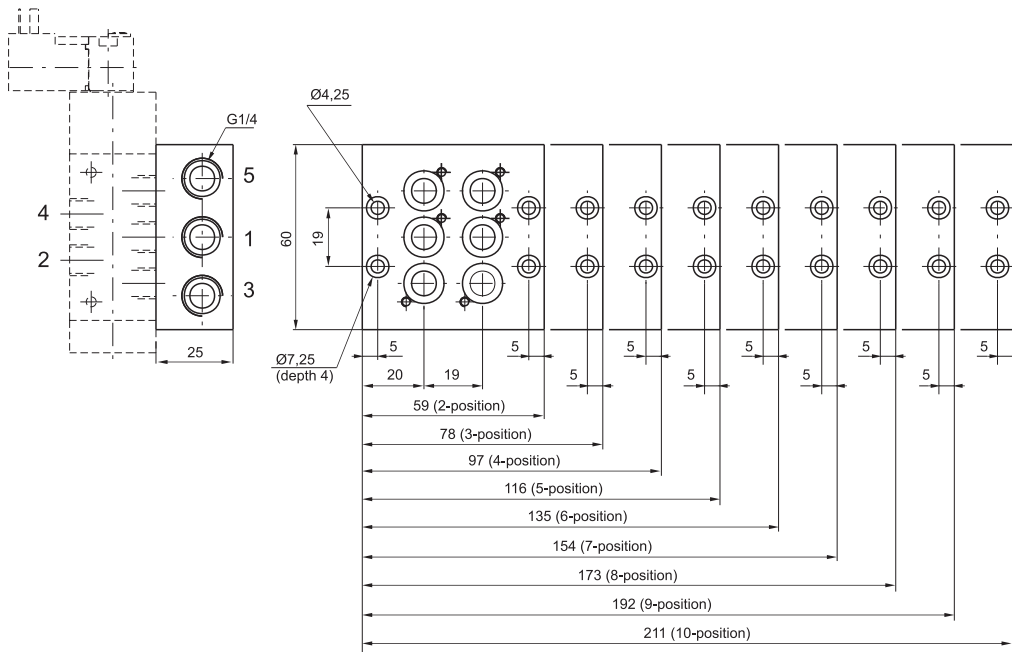
2

3/2	<b>Solenoid - Solenoid</b>	Ordering code <b>808. T. 0. 0. V</b>		<b>Solenoid - Solenoid</b>	5/2
 		<p><b>T</b> TYPE</p> <p>32=3 ways 52=5 ways</p> <p><b>V</b> VOLTAGE</p> <p>01=12V D.C. 02=24V D.C. 05=24V A.C. 06=110V A.C. 07=230V A.C.</p>		 	
Weight gr. 185 Minimum working pressure 1,5 bar				Weight gr. 190 Minimum working pressure 1,5 bar	
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	520 NI/min	mm 4	G 1/8"

<b>Solenoid - Solenoid</b>					5/3
Ordering code <b>808.53. T. 0. 0. V</b>					
<p><b>T</b> TYPE</p> <p>31=Closed centres 32=Open centres</p> <p><b>V</b> VOLTAGE</p> <p>01=12V D.C. 02=24V D.C. 05=24V A.C. 06=110V A.C. 07=230V A.C.</p>					
Weight gr. 190 Minimum working pressure 3 bar					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	520 NI/min	mm 4	G 1/8"



**Manifolds**



**Ordering code**

**808.P**

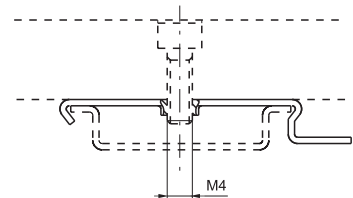
**N. POSITIONS**

- 02=2 pos.(weight gr. 180)
- 03=3 pos.(weight gr. 245)
- 04=4 pos.(weight gr. 310)
- P** 05=5 pos.(weight gr. 375)
- 06=6 pos.(weight gr. 440)
- 07=7 pos.(weight gr. 500)
- 08=8 pos.(weight gr. 560)
- 09=9 pos.(weight gr. 620)
- 10=10 pos.(weight gr. 680)

2

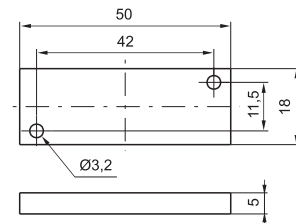
**Clip**

Ordering code
<b>800.00</b>



**Closing Plate**

Ordering code
<b>800.00</b>





**General**

Competitively priced, good performance and versatility combined with a compact design are the main characteristics of this new series of valves. The aluminium valve body and spool/seal arrangement optimize both the flow rate and the valve switching time.

This new series of valves are available with G1/8" and G1/4" ports in 3/2, 5/2 and 5/3 versions. Monostable or bistable versions are available and include an integrated technopolymer solenoid operator with 9mm stem and built in manual override

The valves can be supplied with or without the solenoid coil, however, if the solenoid coil is required please refer to the following table:

Voltages		Coil Code	Voltage Code
Direct current DC	12V (3,5W)	<b>MF4</b>	<b>F04</b>
	24V (3,5W)	<b>MF5</b>	<b>F05</b>
Alternating current AC 50 Hz	24V (3,7W)	<b>MF56</b>	<b>F56</b>
	110V (3,7W)	<b>MF57</b>	<b>F57</b>
	230V (3,7W)	<b>MF58</b>	<b>F58</b>

Connectors Ordering codes		
Voltages		Kit 100 pieces
DC/AC	24V	<b>888.11.01L-K</b>
Alternating current AC 50 - 60 Hz	110V	<b>888.11.02L-K</b>
	230V	<b>888.11.03L-K</b>

**Construction characteristics**

Body	Aluminium
Operators	Technopolymer
	Aluminium for spring bottom plates
Spools	Aluminium
Seals	NBR
Pistons	Technopolymer
Springs	Spring steel

**Use and maintenance**

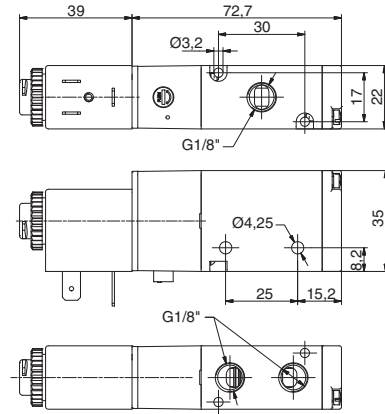
These valves have an average life of 15 million cycles depending on the application and air quality, filtered and lubricated air using specified lubricants will dramatically reduce the wear of the seals and ensures long and trouble free operation.

Please ensure that the valve is being used according with the manufacturers specification, such as air pressure and temperature and that exhaust ports 3 & 5 are protected against the possible ingress of dirt or debris.

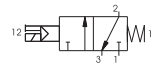
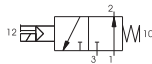
Repair kits including the spool complete with seals are available for overhauling the valves; however, although this is a simple operation it should be carried out by a competent person.

**Solenoid - Spring - 3/2 (Self-feeding)**

Ordering code	
<b>8880.32.F.39.V</b>	
FUNCTION	
F	A=Normally Open C=Normally Closed
VOLTAGE	
F05	=24 V DC
V	F56=24 V (50-60 Hz) F57=110 V (50-60 Hz) F58=230V (50-60 Hz) F00=Without coil



Weight gr. 210  
Minimum working pressure 2 bar

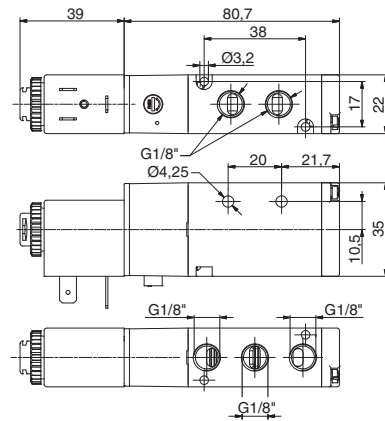


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Spring - 5/2 (Self-feeding)**

Ordering code	
<b>8880.52.00.39.V</b>	
VOLTAGE	
F05	=24 V DC
V	F56=24 V (50-60 Hz) F57=110 V (50-60 Hz) F58=230V (50-60 Hz) F00=Without coil



Weight gr. 220  
Minimum working pressure 2 bar

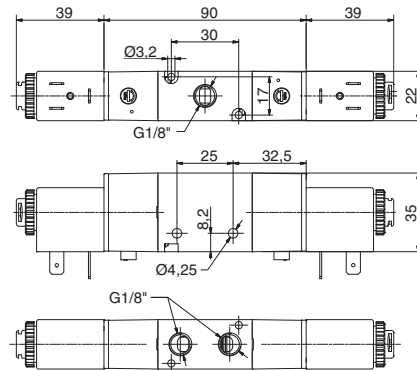


**Operational characteristics**

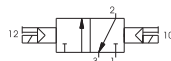
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Solenoid - 3/2**

Ordering code	
<b>8880.32.00.35.V</b>	
VOLTAGE	
F05	=24 V DC
V	F56=24 V (50-60 Hz) F57=110 V (50-60 Hz) F58=230V (50-60 Hz) F00=Without coil



Weight gr. 310  
Minimum working pressure 2 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

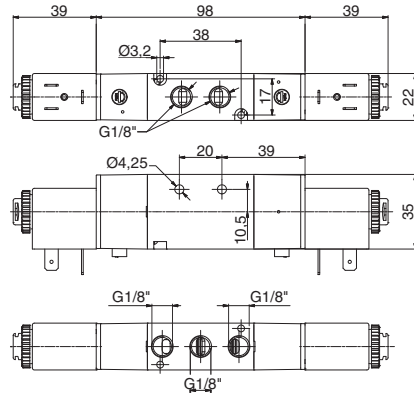
**Solenoid - Solenoid - 5/2**

Ordering code

**8880.52.00.35.V**

VOLTAGE

- F05=24 V DC
- F56=24 V (50-60 Hz)
- F57=110 V (50-60 Hz)
- F58=230V (50-60 Hz)
- F00=Without coil



Weight gr. 320  
Minimum working pressure 2 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Solenoid - 5/3**

Ordering code

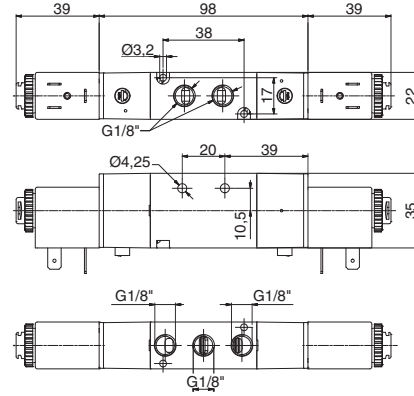
**8880.53.F.35.V**

FUNCTION

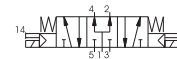
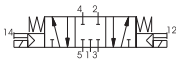
- F31=Closed centres
- F32=Open centres
- F33=Pressured centres

VOLTAGE

- F05=24 V DC
- F56=24 V (50-60 Hz)
- F57=110 V (50-60 Hz)
- F58=230V (50-60 Hz)
- F00=Without coil



Weight gr. 330  
Minimum working pressure 2,5 bar

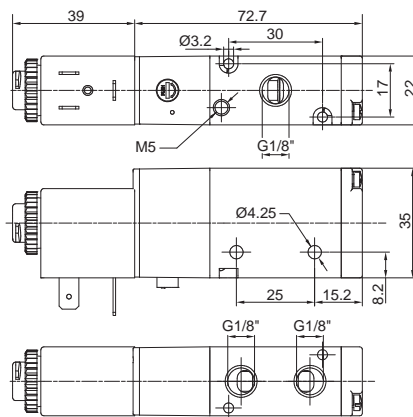


**Operational characteristics**

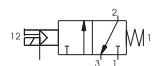
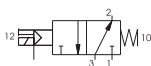
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	440	5,8	G 1/8"

**Solenoid - Spring - 3/2 (Self-feeding)**

Ordering code
<b>888E.32.F.39.V</b>
FUNZIONE
F A=3/2 Normalmente Aperta C=3/2 Normalmente Chiusa
VOLTAGE
F04=12 V DC
F05=24 V DC
V F56=24 V (50-60 Hz)
F57=110 V (50-60 Hz)
F58=230 V (50-60 Hz)
F00=Senza bobina



Weight gr. 210  
Minimum working pressure 2 bar

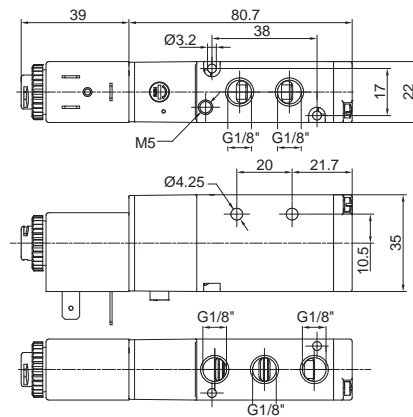


**Operational characteristics**

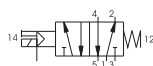
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Spring - 5/2 (Self-feeding)**

Ordering code
<b>888E.52.00.39.V</b>
VOLTAGE
F04=12 V DC
F05=24 V DC
V F56=24 V (50-60 Hz)
F57=110 V (50-60 Hz)
F58=230 V (50-60 Hz)
F00=Senza bobina



Weight gr. 220  
Minimum working pressure 2 bar

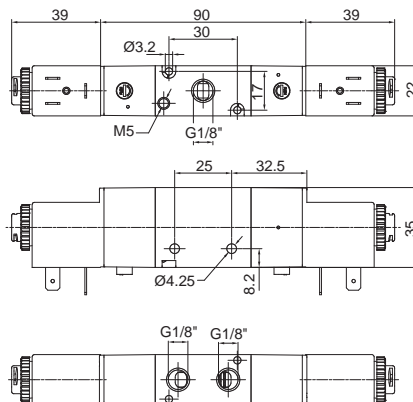


**Operational characteristics**

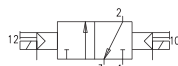
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Solenoid - 3/2 (External-feeding)**

Ordering code
<b>888E.32.00.35.V</b>
VOLTAGE
F04=12 V DC
F05=24 V DC
V F56=24 V (50-60 Hz)
F57=110 V (50-60 Hz)
F58=230 V (50-60 Hz)
F00=Senza bobina



Weight gr. 310  
Minimum working pressure 2 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Solenoid - 5/2 (External-feeding)**

Ordering code

**888E.52.00.35.V**

VOLTAGE

F04=12 V DC

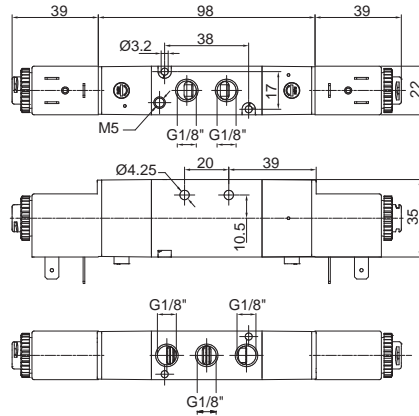
F05=24 V DC

**V** F56=24 V (50-60 Hz)

F57=110 V (50-60 Hz)

F58=230 V (50-60 Hz)

F00=Senza bobina



Weight gr. 320  
Minimum working pressure 2 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	790	5,8	G 1/8"

**Solenoid - Solenoid - 5/3 (External-feeding)**

Ordering code

**888E.53.F.35.V**

FUNZIONE

**F** 31=Closed centres

32=Open centres

33=Pressured centres

VOLTAGEpos.

F04=12 V DC

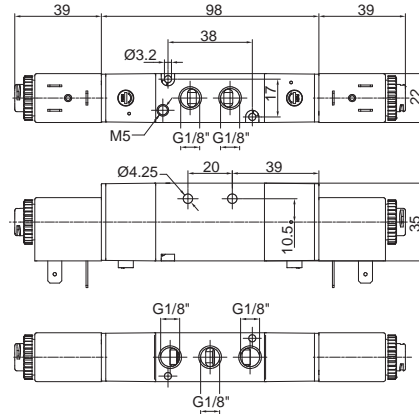
F05=24 V DC

**V** F56=24 V (50-60 Hz)

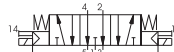
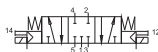
F57=110 V (50-60 Hz)

F58=230 V (50-60 Hz)

F00=Senza bobina



Weight gr. 330  
Minimum working pressure 2,5 bar

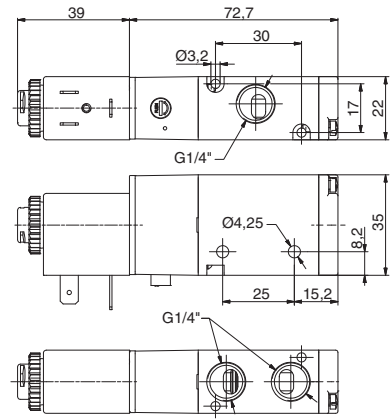


**Operational characteristics**

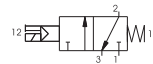
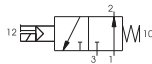
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	440	5,8	G 1/8"

**Solenoid - Spring - 3/2 (Self-feeding)**

Ordering code	
<b>8884.32.F.39.V</b>	
FUNCTION	F = Normally Open C = Normally Closed
VOLTAGE	F05 = 24 V DC F56 = 24 V (50-60 Hz) F57 = 110 V (50-60 Hz) F58 = 230V (50-60 Hz) F00 = Without coil



Weight gr. 210  
Minimum working pressure 2 bar

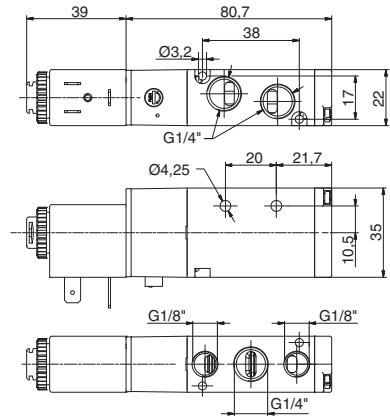


**Operational characteristics**

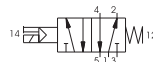
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	890	6,5	G 1/4"

**Solenoid - Spring - 5/2 (Self-feeding)**

Ordering code	
<b>8884.52.00.39.V</b>	
VOLTAGE	F05 = 24 V DC F56 = 24 V (50-60 Hz) F57 = 110 V (50-60 Hz) F58 = 230V (50-60 Hz) F00 = Without coil



Weight gr. 220  
Minimum working pressure 2 bar

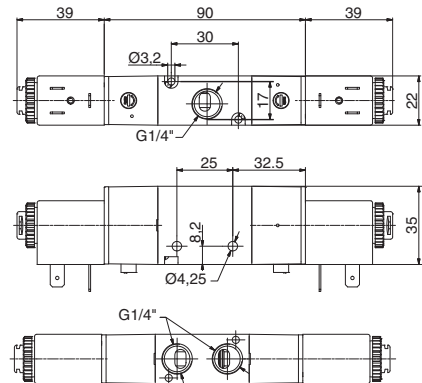


**Operational characteristics**

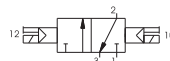
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	890	6,5	G 1/4"

**Solenoid - Solenoid - 3/2**

Ordering code	
<b>8884.32.00.35.V</b>	
VOLTAGE	F05 = 24 V DC F56 = 24 V (50-60 Hz) F57 = 110 V (50-60 Hz) F58 = 230V (50-60 Hz) F00 = Without coil



Weight gr. 310  
Minimum working pressure 2 bar

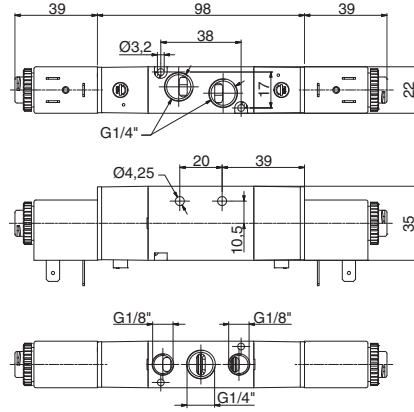


**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	890	6,5	G 1/4"

**Solenoid - Solenoid - 5/2**

Ordering code
<b>8884.52.00.35.V</b>
VOLTAGE
F05=24 V DC
F56=24 V (50-60 Hz)
F57=110 V (50-60 Hz)
F58=230V (50-60 Hz)
F00=Without coil



Weight gr. 320  
Minimum working pressure 2 bar

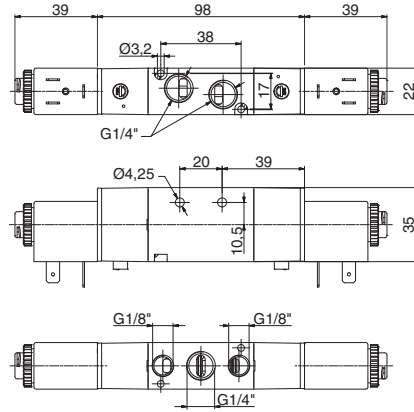


**Operational characteristics**

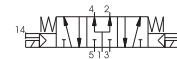
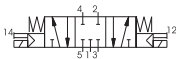
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	890	6,5	G 1/4"

**Solenoid - Solenoid - 5/3**

Ordering code
<b>8884.53.F.35.V</b>
FUNCTION
F31=Closed centres
F32=Open centres
F33=Pressured centres
VOLTAGE
F05=24 V DC
F56=24 V (50-60 Hz)
F57=110 V (50-60 Hz)
F58=230V (50-60 Hz)
F00=Without coil



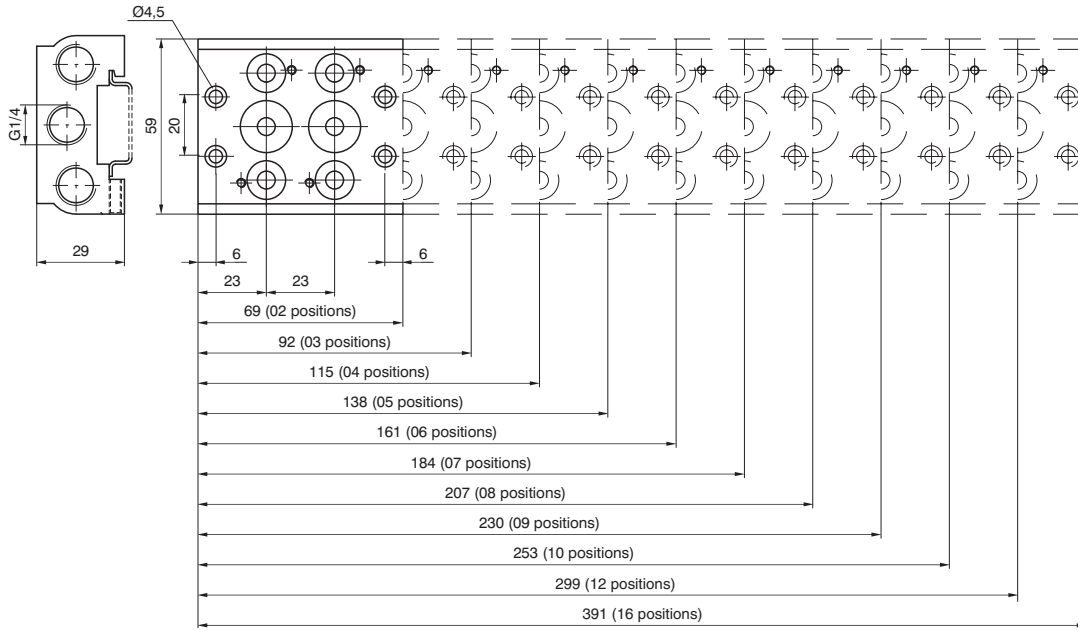
Weight gr. 330  
Minimum working pressure 2,5 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working port size
Filtered and lubricated air	8	-5 ÷ +50	540	6,5	G 1/4"

**Manifold (Valves 5/2 - 5/3)**



**Ordering code**

**888.P**

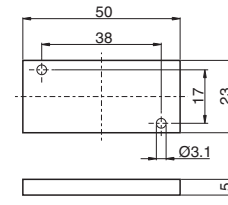
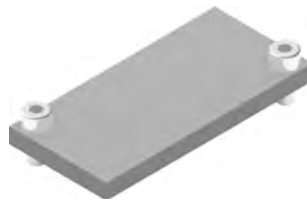
N. POSITIONS	
02=nr.	2 pos. (270 gr)
03=nr.	3 pos. (335 gr)
04=nr.	4 pos. (400 gr)
05=nr.	5 pos. (465 gr)
06=nr.	6 pos. (530 gr)
07=nr.	7 pos. (595 gr)
08=nr.	8 pos. (660 gr)
09=nr.	9 pos. (725 gr)
10=nr.	10 pos. (790 gr)
12=nr.	12 pos. (920 gr)
16=nr.	16 pos. (1180 gr)



Manifold supplied complete with Seals, Valve fixing screws and DIN rail fixing pin

**Closing plate**

Ordering code
<b>888.00</b>

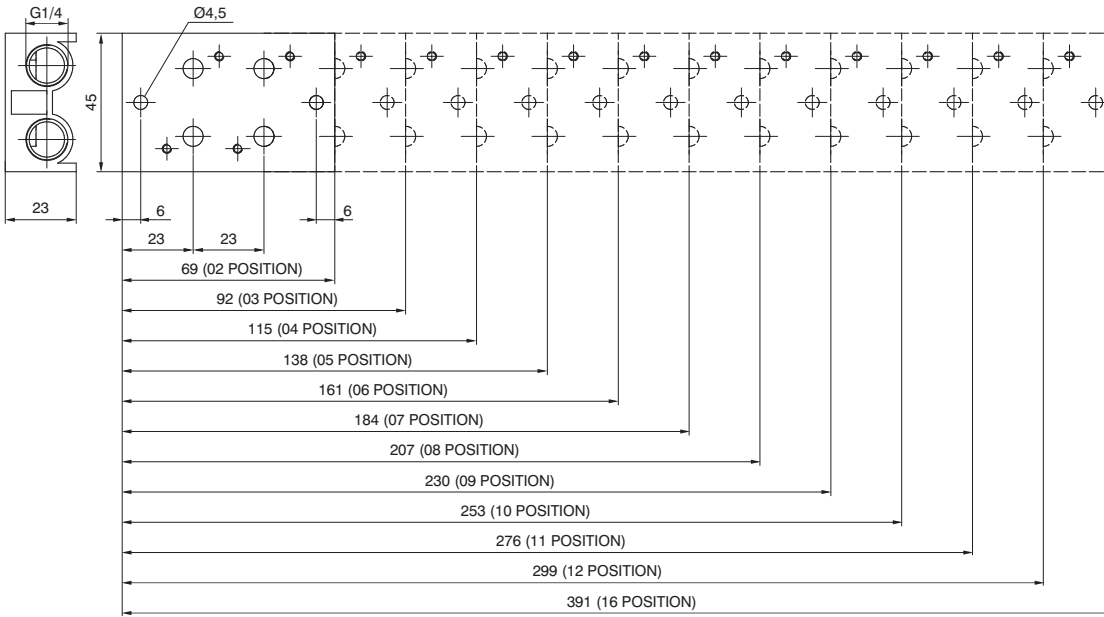


Weight gr. 18  
Closing plate supplied complete with 2 fixing screws to the manifold and 2 fixing screws to the multi-polar base

2



**Manifold (Valves 3/2)**



Ordering code

**8883.P**

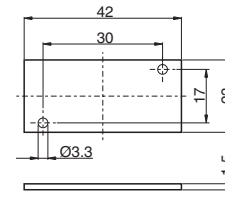
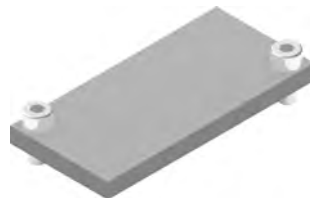
POSIZIONE
02=nr. 2 pos. (112 gr)
03=nr. 3 pos. (149 gr)
04=nr. 4 pos. (186 gr)
05=nr. 5 pos. (223 gr)
06=nr. 6 pos. (260 gr)
07=nr. 7 pos. (297 gr)
08=nr. 8 pos. (334 gr)
09=nr. 9 pos. (371 gr)
10=nr. 10 pos. (408 gr)
12=nr. 12 pos. (482 gr)
16=nr. 16 pos. (630 gr)

Manifold supplied complete with Seals and Valve fixing screws.

**Closing plate**

Ordering code

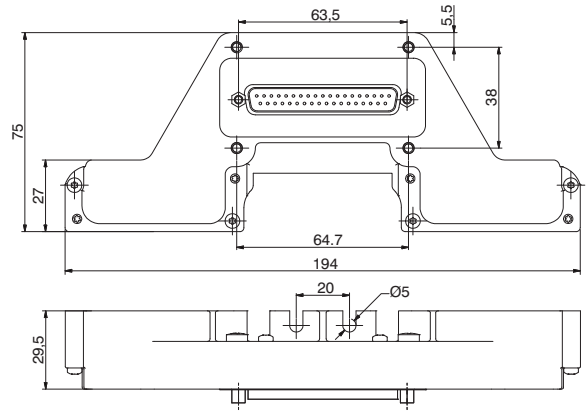
**8883.00**



Weight gr. 10 - Closing plate supplied complete with 2 fixing screws to the manifold

**Endplate, 37 Poles IP65**

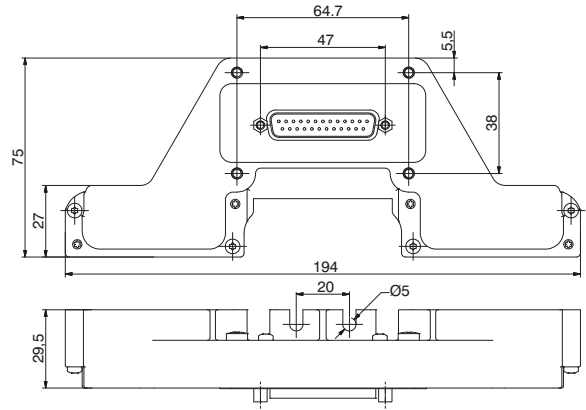
Ordering code
<b>888M.37.10</b>



Weight gr. 186  
The IP65 protection is obtained by IP65 Pneumax cable  
Code complete with assembled endplate and 4 manifold fixing screws, previously mounted on the Manifold.

**Endplate, 25 Poles IP65**

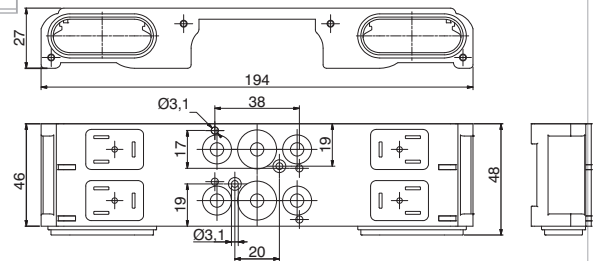
Ordering code
<b>888M.25.10</b>



Weight gr. 181  
The IP65 protection is obtained by IP65 Pneumax cable  
Code complete with assembled endplate and 4 manifold fixing screws, previously mounted on the Manifold.

**Modular base, 2 positions IP65**

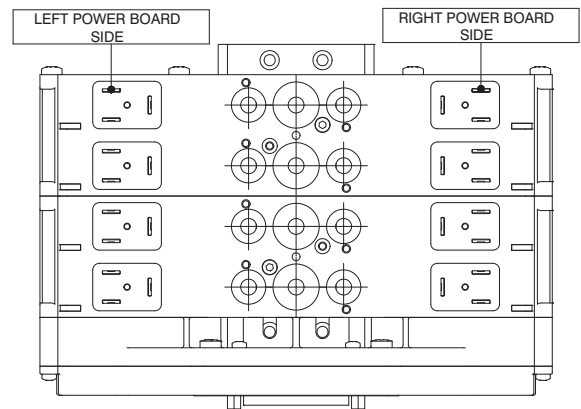
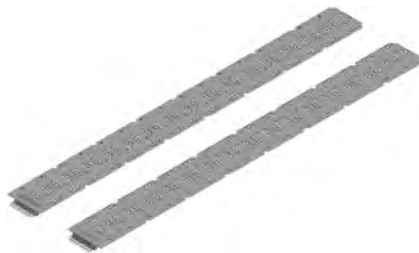
Ordering code
<b>888M.02.BM</b>



Weight gr. 220  
Complete with seals and fixing screws  
Usable only for 5/2 and 5/3 Distributors

**Left and Right Power board PNP 24 VDC**

Ordering code
<b>888M.P.T</b>
N. POSITIONS
04=nr. 4 pos. (11,2 gr.)
<b>P</b> 08=nr. 8 pos. (22,4 gr.)
12=nr. 12 pos. (33,6 gr.)
16=nr. 16 pos. (44,8 gr.)
TYPE
<b>T</b> 00=Left side
01=Right side



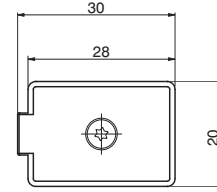
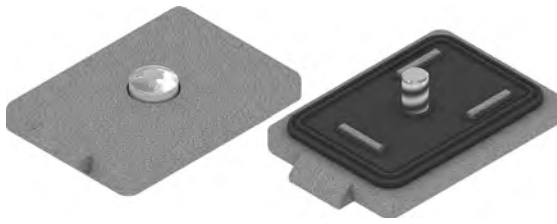
The IP65 protection degree is guaranteed if assembled by Pneumax

2

**Closing plate**

Ordering code

**888M.22.PC**

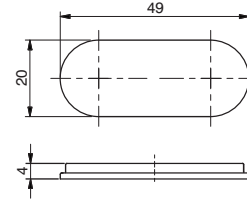


Weight gr. 3  
Closing plate supplied complete with 1 Seal and fixing screw with O ring

**Multipolar base plug**

Ordering code

**888M.T**

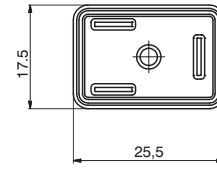


Weight gr. 2,6  
Complete with: Nr. 1 Plug, Nr. 2 Fixing screws

**Seals**

Ordering code

**888M.22.G**



Weight gr. 0,52

**In line cable complete with connector IP40**

Ordering code

**2400.T.L.00**

- T** CONNECTORS  
25=25 poles  
37=37 poles
- L** CABLE LENGHT  
03=3 meters  
05=5 meters  
10=10 meters



**Cable complete with connector, 25 Poles IP65**

Ordering code

**2300.25.L.C**

- L** CABLE LENGHT  
03=3 meters  
05=5 meters  
10=10 meters
- C** CONNECTORS  
10=In line  
90=90° Angle



**Cable complete with connector, 37 Poles IP65**

Ordering code

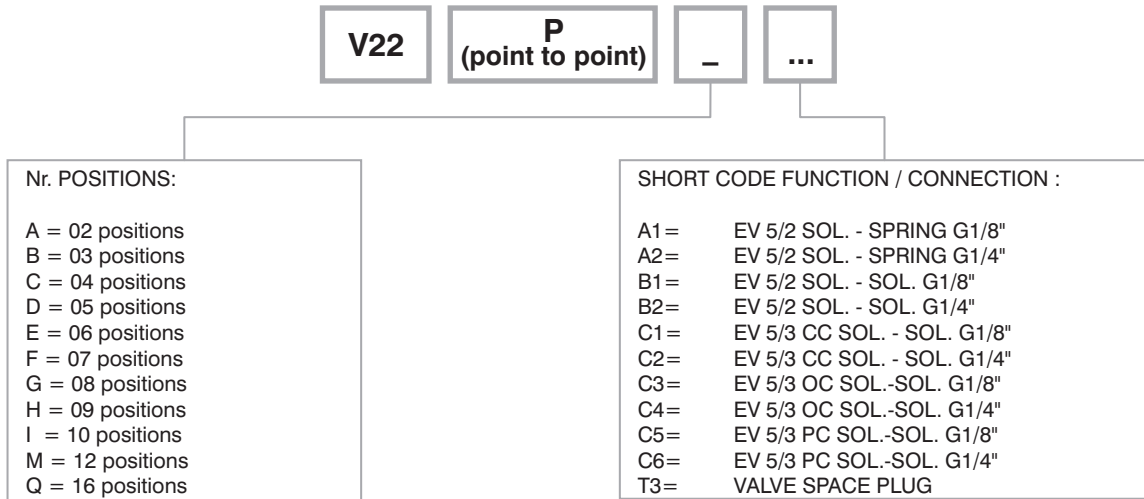
**2400.37.L.C**

- L** CABLE LENGHT  
03=3 meters  
05=5 meters  
10=10 meters
- C** CONNECTORS  
10=In line  
90=90° Angle

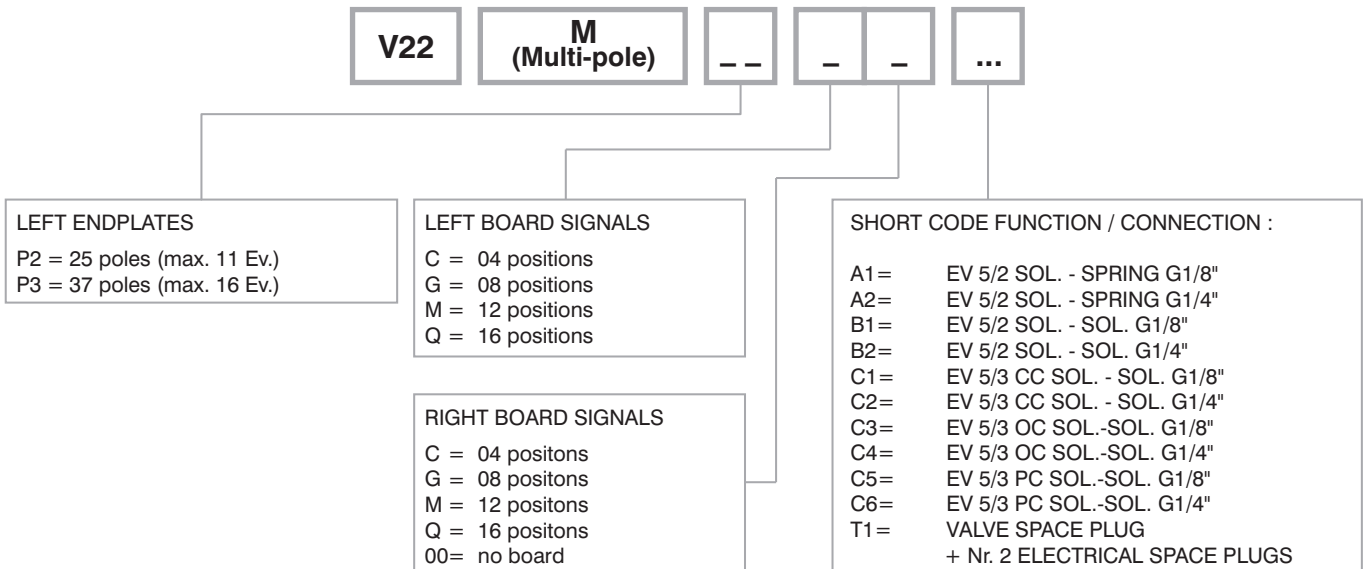




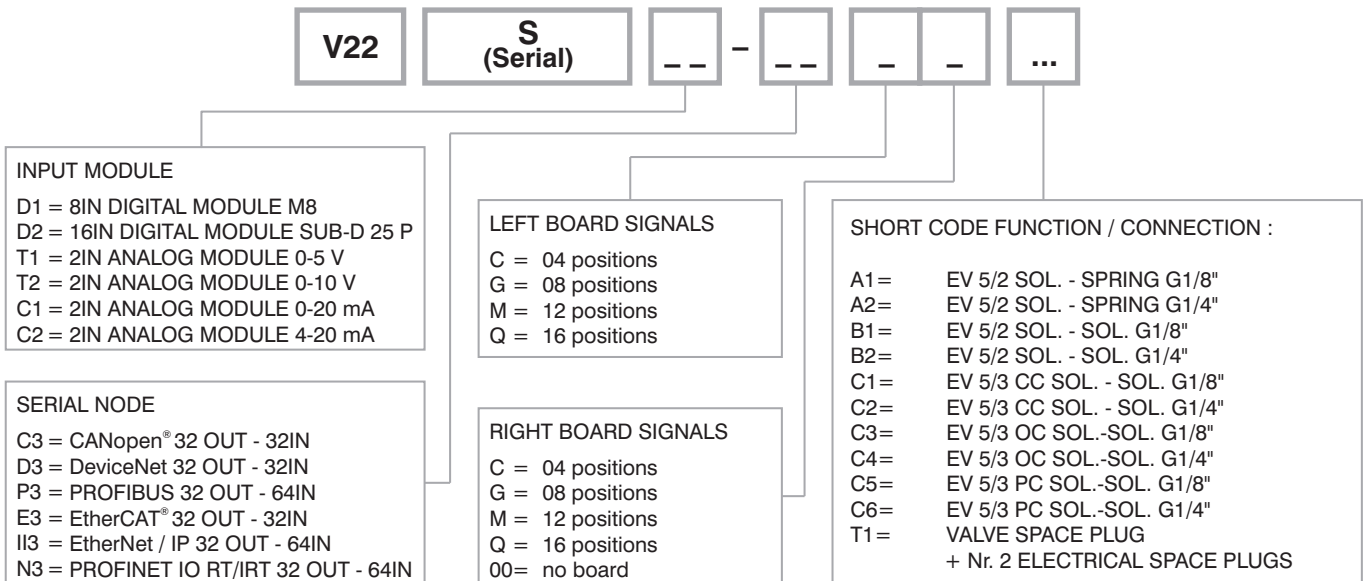
**Manifold layout Configuration Point to Point**



**Manifold layout Configuration Multi-pole**



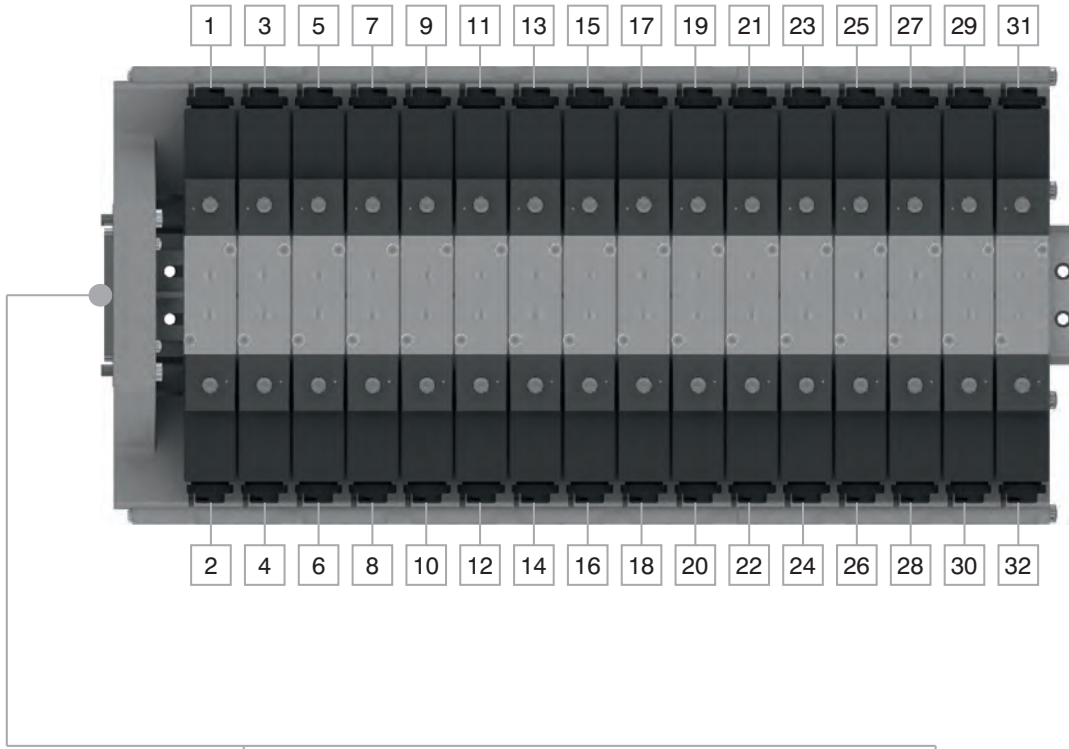
**Serial manifold layout (for the serial system node, see the Optyma-F Series)**



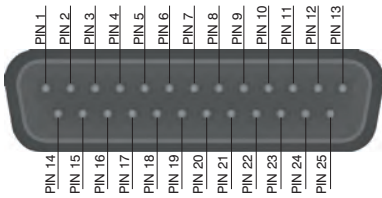
**NOTE:**

When constructing the configuration, please consider that the maximum number of valves that can be mounted on the manifold is 16, regardless of the valve type. Any valve position presents two electrical connections: in case of use of monostable valves (A1-A2) it will be necessary to assemble a plug to protect the unused electrical connection.

The correspondence between the electrical signal and its location on the manifold is showed in the following diagrams.

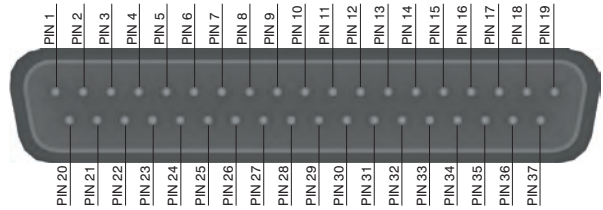


Connector 25 Poles from 1 to 11  
Positions E.V. Bistable / Monostable



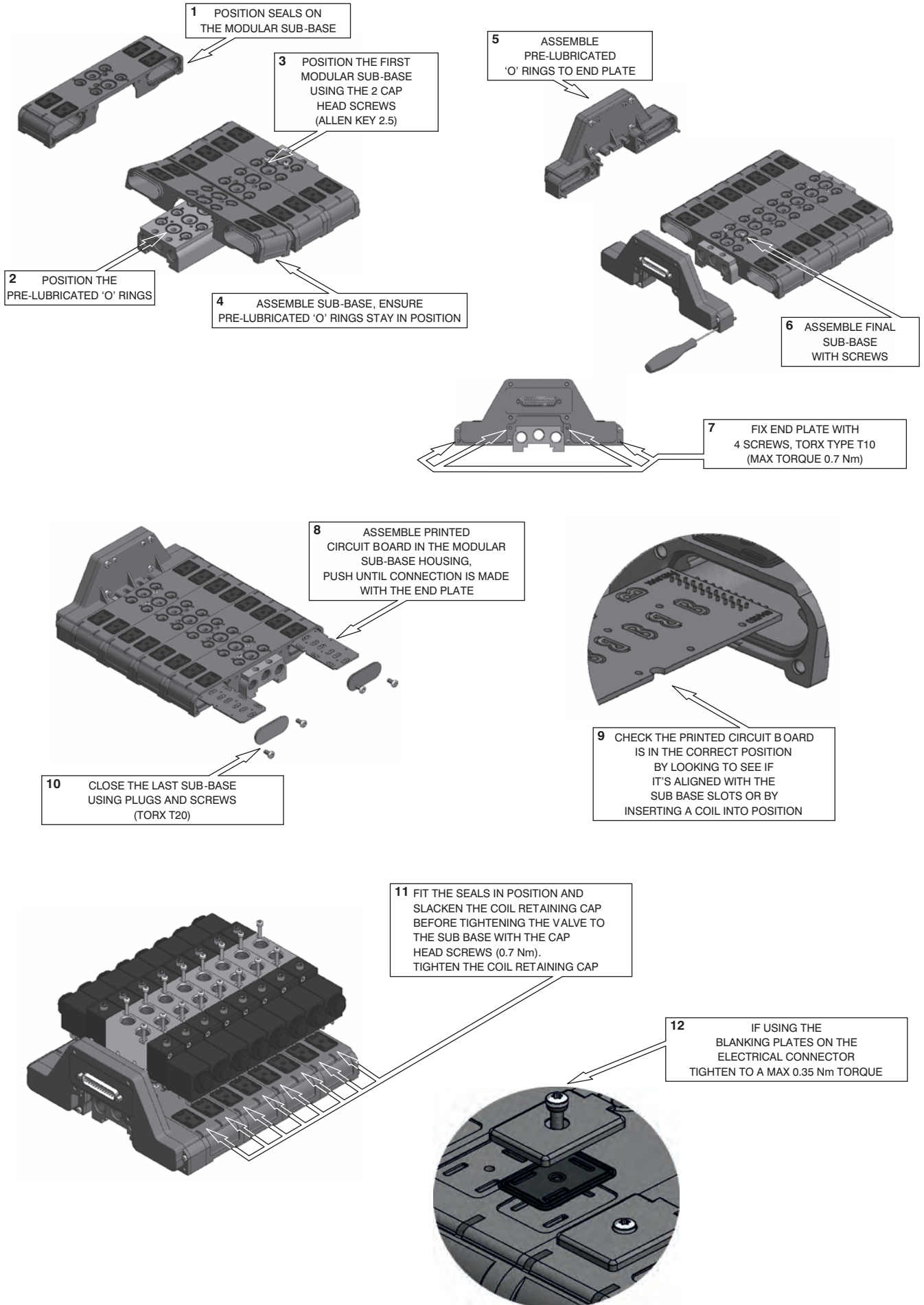
1 - 22 = SIGNALS  
23 - 24 = GND  
25 = NC

Connector 37 Poles from 1 to 16  
Positions E.V. Bistable / Monostable



1 - 32 = SIGNALS  
33 - 35 = GND  
36 - 37 = NC

**Assembly sequence**



2



Solenoid - Spring

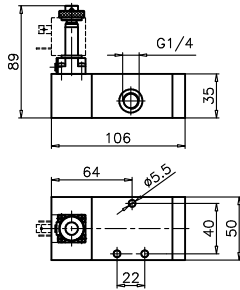
3/2

Ordering code

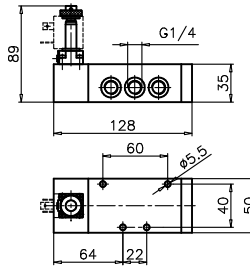
**464.1.0.1.M2**

5/2

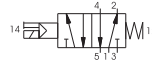
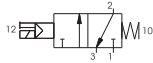
Solenoid - Spring



TYPE  
32=3 ways  
52=5 ways



Weight gr. 530  
Minimum working pressure 2,5 bar



Weight gr. 625  
Minimum working pressure 2,5 bar

Operational characteristics

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"

Solenoid - Differential

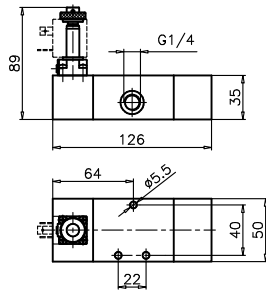
3/2

Ordering code

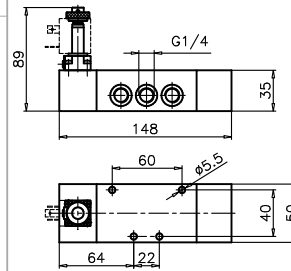
**464.1.0.12.M2**

5/2

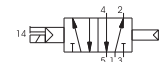
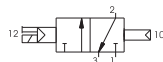
Solenoid - Differential



TYPE  
32=3 ways  
52=5 ways



Weight gr. 650  
Minimum working pressure 2,5 bar



Weight gr. 740  
Minimum working pressure 2,5 bar

Operational characteristics

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"

Solenoid - Solenoid

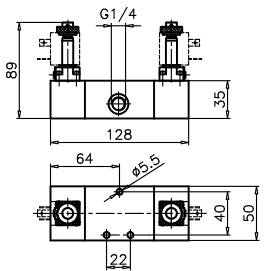
3/2

Ordering code

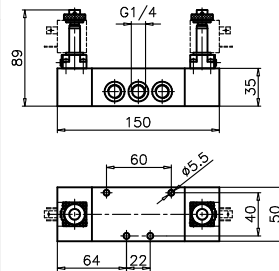
**464.1.0.0.M2**

5/2

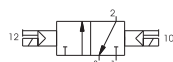
Solenoid - Solenoid



TYPE  
32=3 ways  
52=5 ways



Weight gr. 730  
Minimum working pressure 2 bar



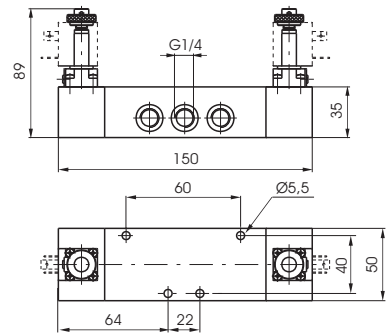
Weight gr. 820  
Minimum working pressure 2bar

Operational characteristics

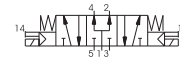
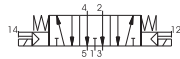
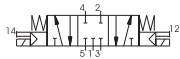
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"

**Solenoid - Solenoid**

Ordering code
<b>464.53.ⓕ.0.0.M2</b>
FUNCTION
ⓕ=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 820  
Minimum working pressure 3 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10	-5 ÷ +50	1280 NI/min	mm 8	G 1/4"

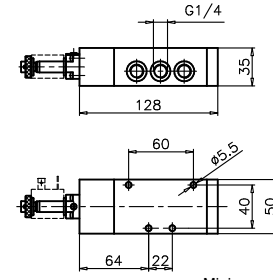
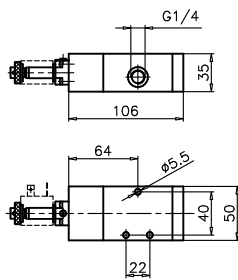
**3/2 Solenoid - Spring**

**Ordering code**

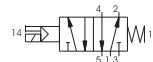
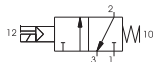
**Solenoid - Spring**

**464/1.Ⓡ.0.1.M2**

TYPE
Ⓡ=3 ways
52=5 ways



Weight gr. 530  
Minimum working pressure 2,5 bar



Weight gr. 625  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"

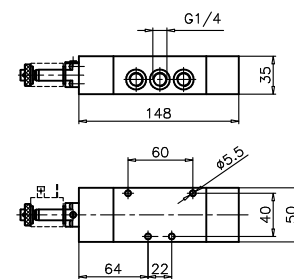
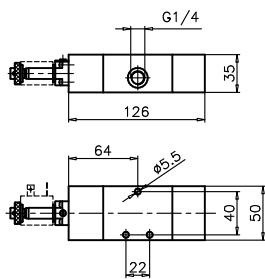
**3/2 Solenoid - Differential**

**Ordering code**

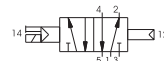
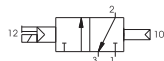
**Solenoid - Differential**

**464/1.Ⓡ.0.12.M2**

TYPE
Ⓡ=3 ways
52=5 ways



Weight gr. 650  
Minimum working pressure 2,5 bar



Weight gr. 740  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"



2

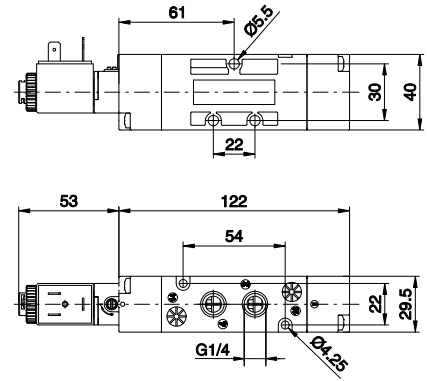
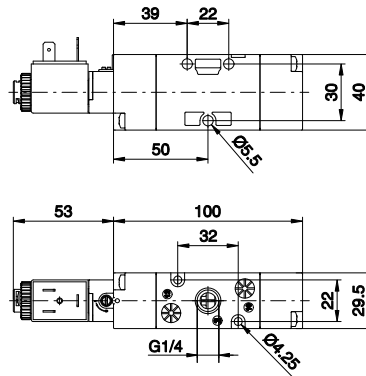
3/2	<b>Solenoid - Solenoid</b>	Ordering code <b>464/1.1.0.0.M2</b>	<b>Solenoid - Solenoid</b>	5/2	
		<p><b>T</b> TYPE</p> <p>32=3 ways</p> <p>52=5 ways</p>			
<p>Weight gr. 730</p> <p>Minimum working pressure 2 bar</p>				<p>Weight gr. 820</p> <p>Minimum working pressure 2 bar</p>	
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1360 NI/min	mm 8	G 1/4"

<b>Solenoid - Solenoid</b>				5/3	
Ordering code <b>464/1.53.F.0.0.M2</b>					
<p><b>F</b> FUNCTION</p> <p>31=Closed centres</p> <p>32=Open centres</p> <p>33=Pressured centres</p>					
<p>Weight gr. 820</p> <p>Minimum working pressure 3 bar</p>					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1280 NI/min	mm 8	G 1/4"

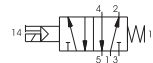
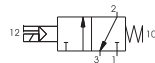
3/2  
5/2

**Solenoid - Spring (self-feeding)**

Ordering code	
<b>T424.1.0.1.V</b>	
TYPE	
1	32=3 ways 52=5 ways
VOLTAGE	
	B04=12 V DC B05=24 V DC
V	B09=24 V DC (2W) B56=24 V 50-60 Hz B57=110 V 50-60 Hz B58=230V 50-60 Hz



Weight gr. 205  
Minimum operating pressure 2,5 bar



Weight gr. 235  
Minimum operating pressure 2,5 bar

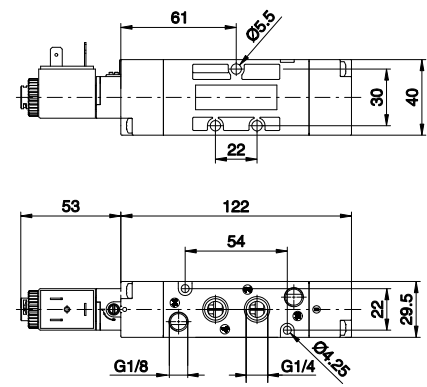
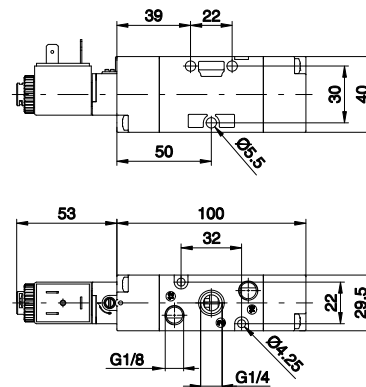
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"

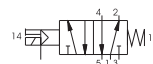
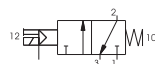
**Solenoid - Spring (external feeding)**

3/2  
5/2

Ordering code	
<b>T424.1.0.1.E.V</b>	
TYPE	
1	32=3 ways 52=5 ways
VOLTAGE	
	B04=12 V DC B05=24 V DC
V	B09=24 V DC (2W) B56=24 V 50-60 Hz B57=110 V 50-60 Hz B58=230V 50-60 Hz



Weight gr. 205  
Minimum operating pressure 2,5 bar



Weight gr. 235  
Minimum operating pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"	G 1/8"

**Solenoid - Differential (self-feeding)**

3/2  
5/2

Ordering code

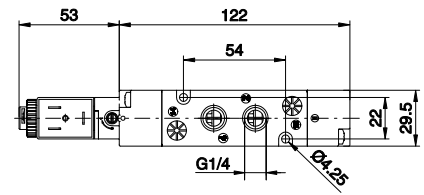
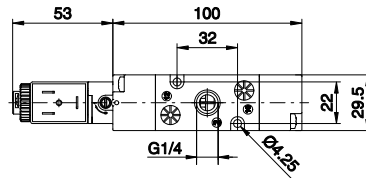
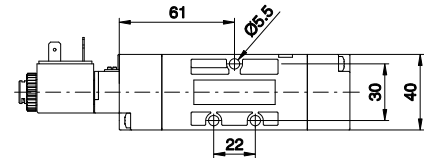
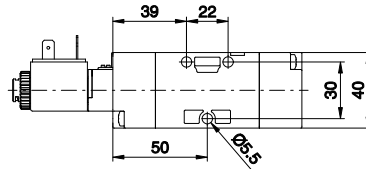
**T424.T.0.12.V**

TYPE

32=3 ways  
52=5 ways

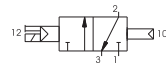
VOLTAGE

B04=12 V DC  
B05=24 V DC  
B09=24 V DC (2W)  
B56=24 V 50-60 Hz  
B57=110 V 50-60 Hz  
B58=230V 50-60 Hz



Weight gr. 205  
Minimum operating pressure 2 bar

Weight gr. 235  
Minimum operating pressure 2 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"

**Solenoid - Differential (external feeding)**

3/2  
5/2

Ordering code

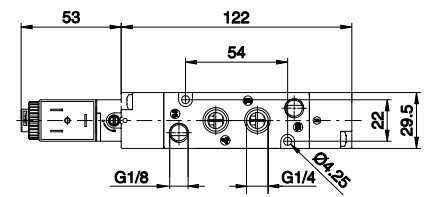
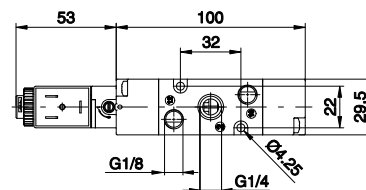
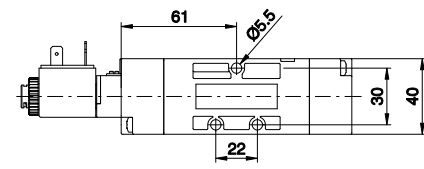
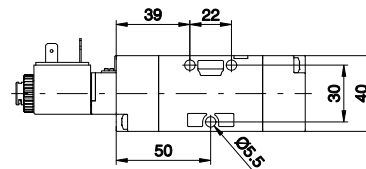
**T424.T.0.12.E.V**

TYPE

32=3 ways  
52=5 ways

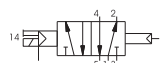
VOLTAGE

B04=12 V DC  
B05=24 V DC  
B09=24 V DC (2W)  
B56=24 V 50-60 Hz  
B57=110 V 50-60 Hz  
B58=230V 50-60 Hz



Weight gr. 205  
Minimum operating pressure 2 bar

Weight gr. 235  
Minimum operating pressure 2 bar



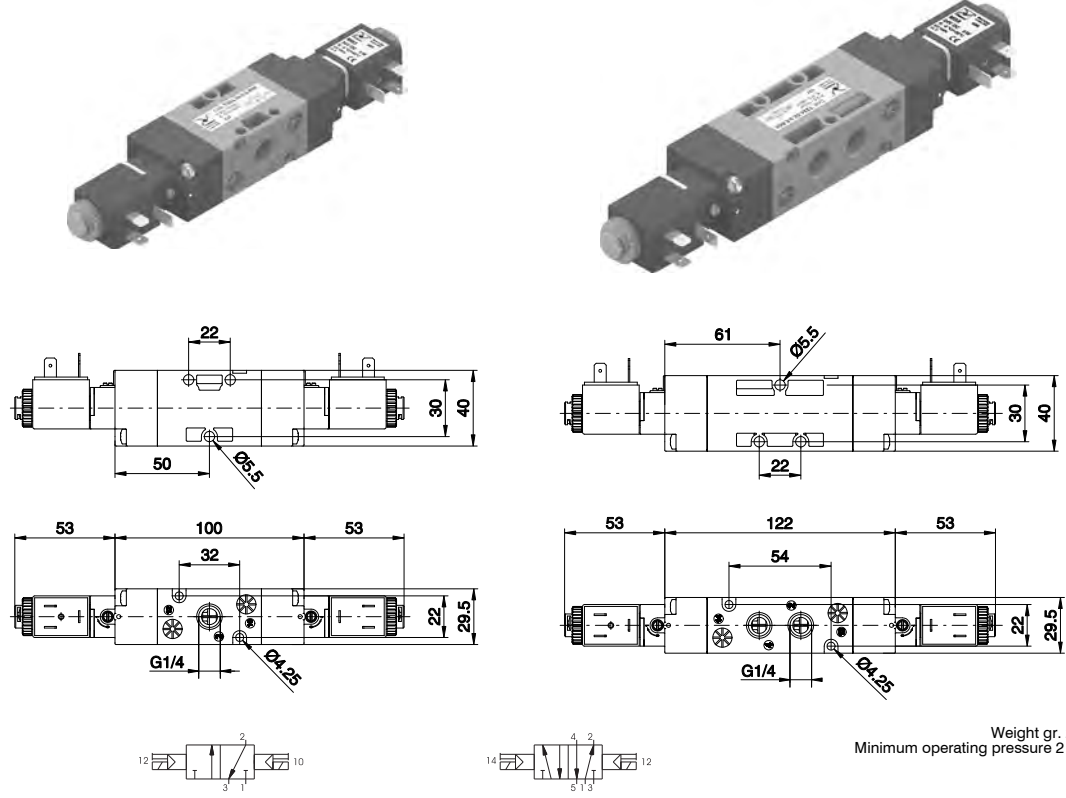
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"	G 1/8"

**Solenoid - Solenoid (self-feeding)**

3/2  
5/2

Ordering code	
<b>T424.Ⓜ.0.0.Ⓥ</b>	
TYPE	
Ⓜ	32=3 ways 52=5 ways
VOLTAGE	
	B04=12 V DC B05=24 V DC
Ⓥ	B09=24 V DC (2W) B56=24 V 50-60 Hz B57=110 V 50-60 Hz B58=230V 50-60 Hz



Weight gr. 240  
Minimum operating pressure 2 bar

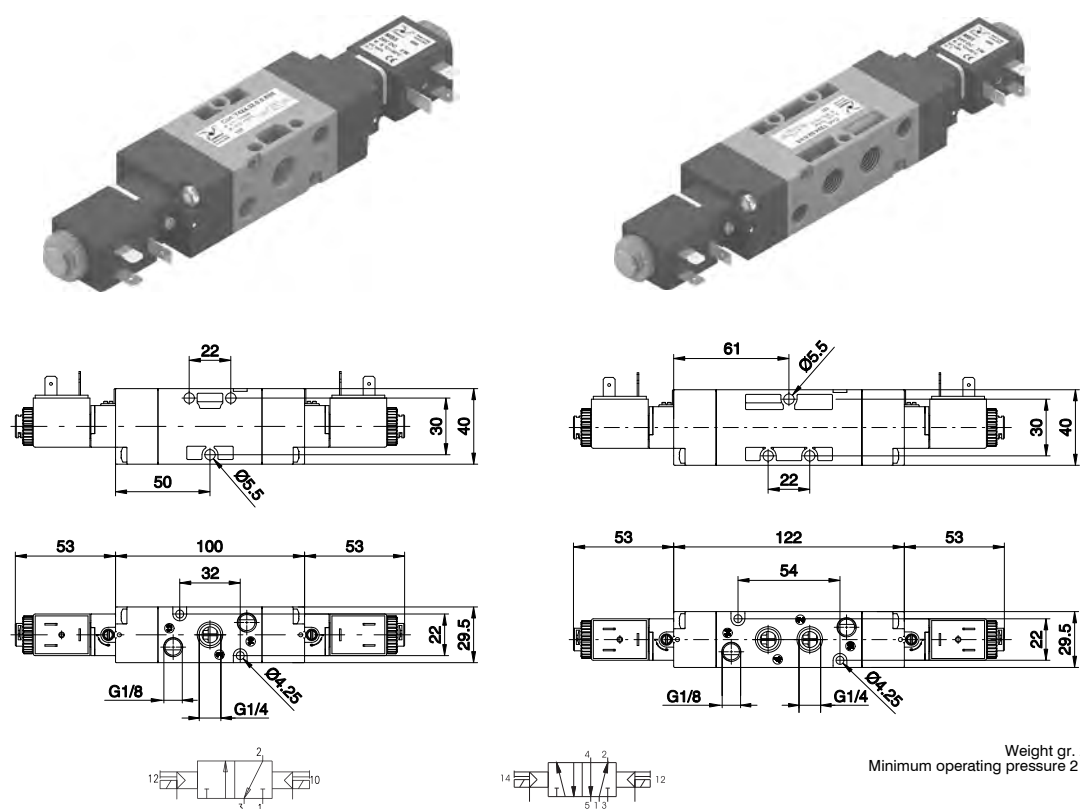
Weight gr. 270  
Minimum operating pressure 2 bar

Operational characteristics						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size	
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"	

**Solenoid - Solenoid (external feeding)**

3/2  
5/2

Ordering code	
<b>T424.Ⓜ.0.0.E.Ⓥ</b>	
TYPE	
Ⓜ	32=3 ways 52=5 ways
VOLTAGE	
	B04=12 V DC B05=24 V DC
Ⓥ	B09=24 V DC (2W) B56=24 V 50-60 Hz B57=110 V 50-60 Hz B58=230V 50-60 Hz



Weight gr. 240  
Minimum operating pressure 2 bar

Weight gr. 270  
Minimum operating pressure 2 bar

Operational characteristics						
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	1050 NI/min	mm 8,5	G 1/4"	G 1/8"

**Solenoid - Solenoid (self-feeding)**

5/3

Ordering code

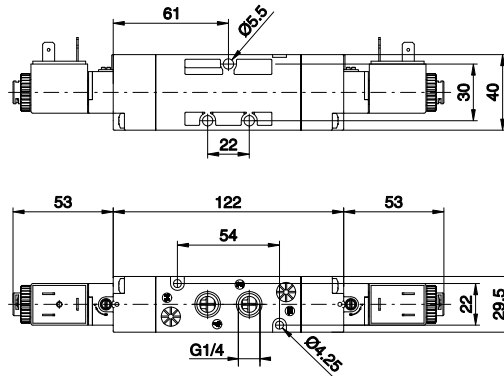
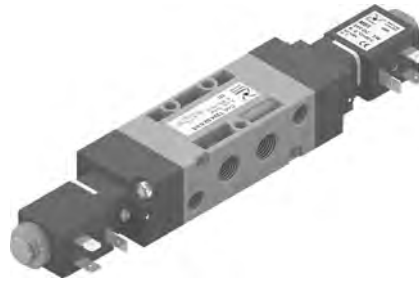
**T424.53.F.0.0.V**

FUNCTION

- F** 31 = Closed centres
- 32 = Open centres
- 33 = Pressured centres

VOLTAGE

- V** B04 = 12 V DC
- B05 = 24 V DC
- B09 = 24 V DC (2W)
- B56 = 24 V 50-60 Hz
- B57 = 110 V 50-60 Hz
- B58 = 230V 50-60 Hz



Weight gr. 295  
Minimum operating pressure 3 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	900 NI/min	mm 8,5	G 1/4"

**Solenoid - Solenoid (external feeding)**

5/3

Ordering code

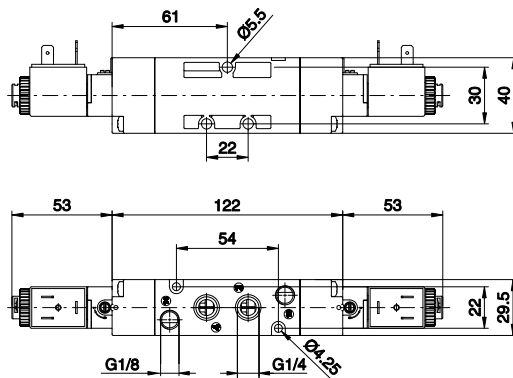
**T424.53.F.0.0.E.V**

FUNCTION

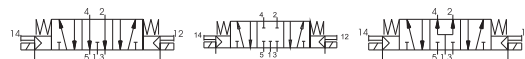
- F** 31 = Closed centres
- 32 = Open centres
- 33 = Pressured centres

VOLTAGE

- V** B04 = 12 V DC
- B05 = 24 V DC
- B09 = 24 V DC (2W)
- B56 = 24 V 50-60 Hz
- B57 = 110 V 50-60 Hz
- B58 = 230V 50-60 Hz



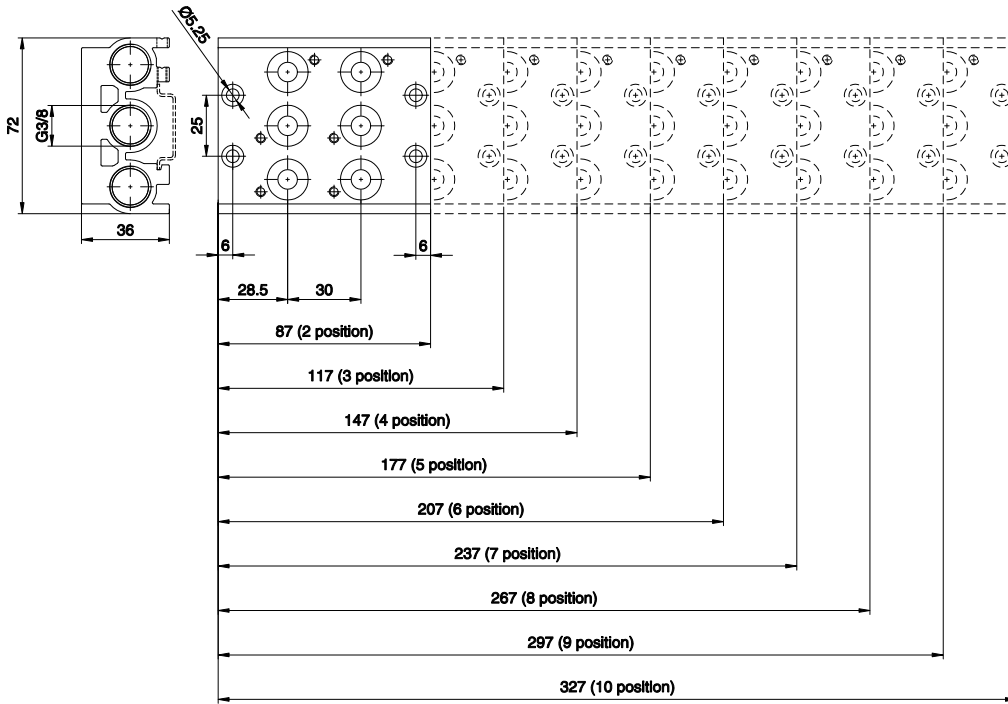
Weight gr. 295  
Minimum operating pressure 3 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Ø Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	900 NI/min	mm 8,5	G 1/4"	G 1/8"

Manifold



Ordering code

**T424.P**

N. POSITIONS

- 02=2 pos. (weight 350 gr.)
- 03=3 pos. (weight 420 gr.)
- 04=4 pos. (weight 560 gr.)
- P** 05=5 pos. (weight 670 gr.)
- 06=6 pos. (weight 770 gr.)
- 07=7 pos. (weight 880 gr.)
- 08=8 pos. (weight 980 gr.)
- 09=9 pos. (weight 1090 gr.)
- 10=10 pos. (weight 1200 gr.)



Modular collectors

Ordering code

**T424.1**

TYPE

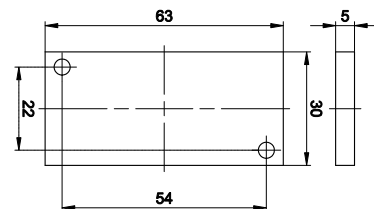
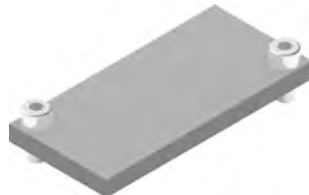
- 01=Single complete base
- 01K=Complete modular bases (batches of 15 pieces)
- 30K=Hollow bush, complete with O-rings (Nr. 50 pieces)
- 31K=Blank bush, complete with O-rings (Nr. 50 pieces)
- 1** 32K=Intermediate air intake with screw (Nr. 5 pieces)
- 33=Screw to suite solenoid valves (Nr. 50 pieces)
- 34=Screw for joining bases (Nr. 50 pieces)
- 35=Washer for screw for joining bases (Nr. 50 pieces)
- 36=O-ring seal (Nr. 50 pieces)



Closing plate

Ordering code

**T424.00**



Weight gr. 25

**Solenoid - Spring**

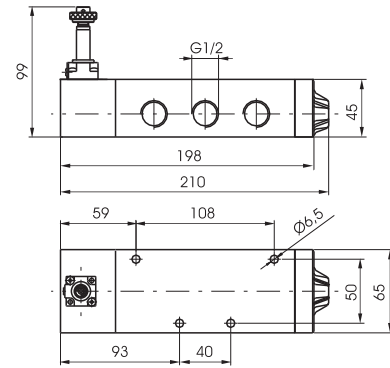
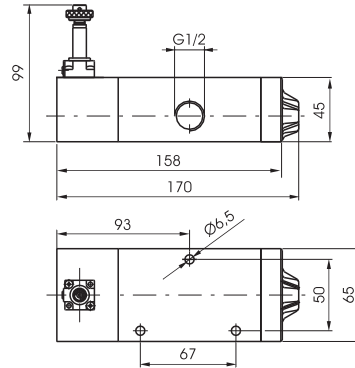
3/2  
5/2

Ordering code

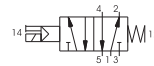
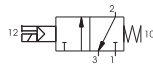
**452.1.0.1.M2**

TYPE

- 32=3 ways
- 52=5 ways



Weight gr. 1152  
Minimum working pressure 2,5 bar



Weight gr. 1422  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

**Solenoid - Differential**

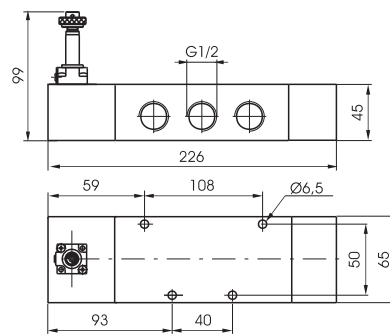
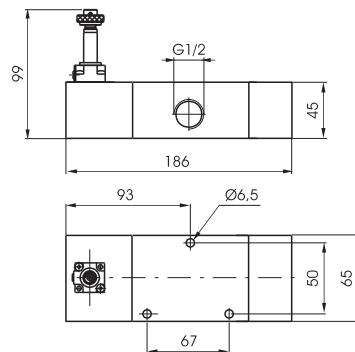
3/2  
5/2

Ordering code

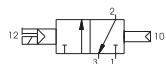
**452.1.0.12.M2**

TYPE

- 32=3 ways
- 52=5 ways



Weight gr. 1422  
Minimum working pressure 2,5 bar



Weight gr. 1692  
Minimum working pressure 2,5 bar

**Operational characteristics**

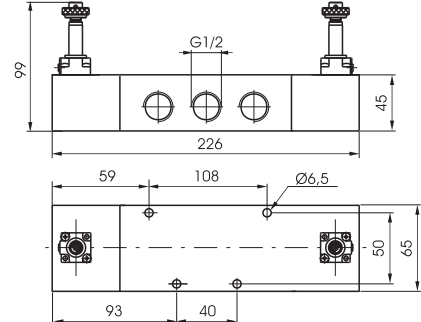
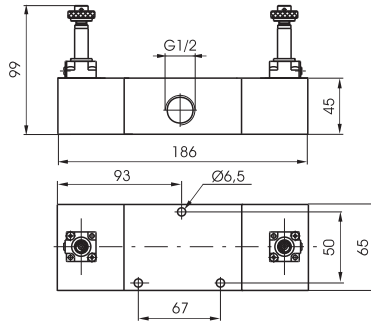
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

3/2  
5/2

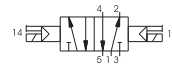
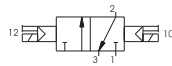
2

**Solenoid - Solenoid**

Ordering code	
<b>452.1.0.0.M2</b>	
TYPE	
32=3 ways	
52=5 ways	



Weight gr. 1474  
Minimum working pressure 2 bar



Weight gr. 1744  
Minimum working pressure 2 bar

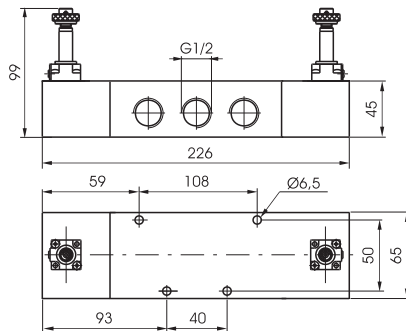
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

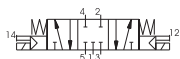
**Solenoid - Solenoid**

5/3

Ordering code	
<b>452.53.0.0.M2</b>	
FUNCTION	
31=Closed centres	
32=Open centres	
33=Pressured centres	



Weight gr. 1744  
Minimum working pressure 3 bar



**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"



**Solenoid - Spring**

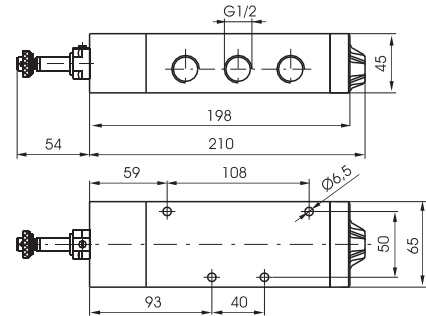
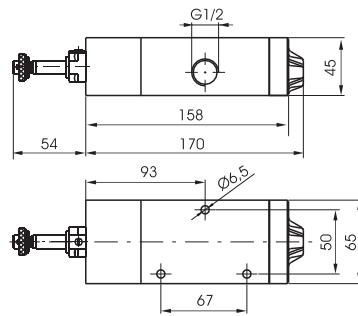
3/2  
5/2

Ordering code

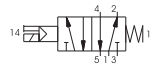
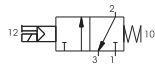
**452/1.0.1.M2**

TYPE

32=3 ways  
52=5 ways



Weight gr. 1330  
Minimum working pressure 2,5 bar



Weight gr. 1600  
Minimum working pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

**Solenoid - Differential**

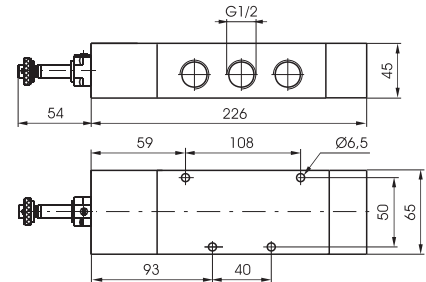
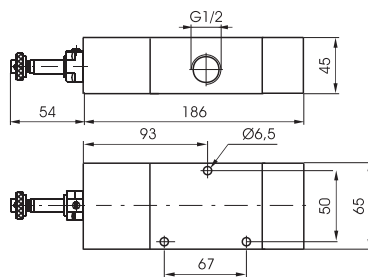
3/2  
5/2

Ordering code

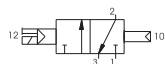
**452/1.0.12.M2**

TYPE

32=3 ways  
52=5 ways



Weight gr. 1600  
Minimum working pressure 2,5 bar



Weight gr. 1870  
Minimum working pressure 2,5 bar

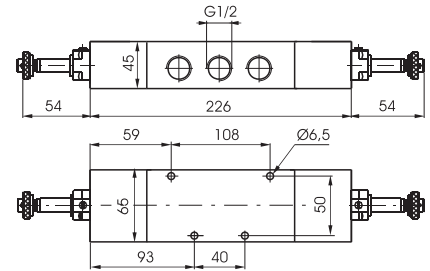
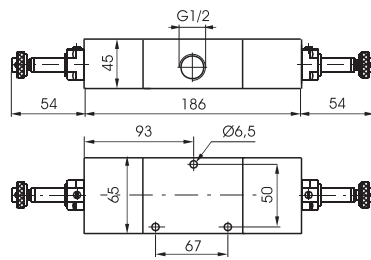
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

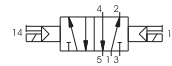
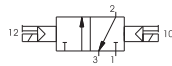
3/2  
5/2

Solenoid - Solenoid

Ordering code
<b>452/1.1.0.0.M2</b>
TYPE
32=3 ways
52=5 ways



Weight gr. 1830  
Minimum working pressure 2 bar



Weight gr. 2100  
Minimum working pressure 2 bar

Operational characteristics

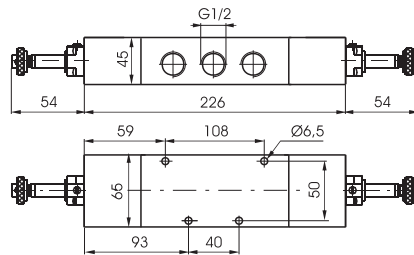
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"

2

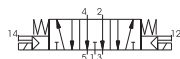
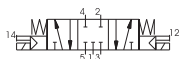
Solenoid - Solenoid

5/3

Ordering code
<b>452/1.53.F.0.0.M2</b>
FUNCTION
31=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 2100  
Minimum working pressure 3 bar



Operational characteristics



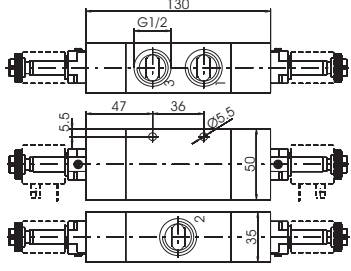
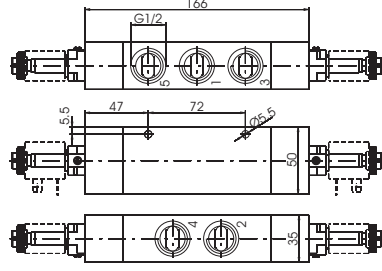



Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	3500 NI/min	mm 15	G 1/2"


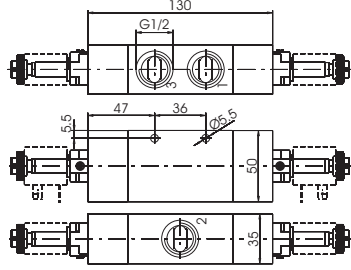

2

3/2	<b>Solenoid - Spring</b>	Ordering code	<b>Solenoid - Spring</b>	5/2	
		<b>412/2T.0.1.V</b>			
		<p><b>T</b> TYPE</p> <p>32=3 ways 52=5 ways</p> <p>VARIANT</p> <p><b>V</b> C.M2=3 ways Normally Closed A.M2=3 ways Normally Open M2=5 ways</p>			
<p>Weight gr. 578 Minimum working pressure 2,5 bar</p>		<p>Weight gr. 700 Minimum working pressure 2,5 bar</p>			
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 ÷ +50	3600 NI/min	mm 15	G 1/2"

3/2	<b>Solenoid - Differential external</b>	Ordering code	<b>Solenoid - Differential external</b>	5/2	
		<b>412/2T.0.12.V</b>			
		<p><b>T</b> TYPE</p> <p>32=3 ways 52=5 ways</p> <p>VARIANT</p> <p><b>V</b> C.M2=3 ways Normally Closed A.M2=3 ways Normally Open M2=5 ways</p>			
<p>Weight gr. 522 Minimum working pressure 2,5 bar</p>		<p>Weight gr. 644 Minimum working pressure 2,5 bar</p>			
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 ÷ +50	3600 NI/min	mm 15	G 1/2"

3/2	<b>Pneumatic - Differential self aligned</b>	Ordering code	<b>Pneumatic - Differential self aligned</b>	5/2	
		<b>412/2T.0.12/1.V</b>			
		<p><b>T</b> TYPE</p> <p>32=3 ways 52=5 ways</p> <p>VARIANT</p> <p><b>V</b> C.M2=3 ways Normally Closed A.M2=3 ways Normally Open M2=5 ways</p>			
<p>Weight gr. 526 Minimum working pressure 2,5 bar</p>		<p>Weight gr. 648 Minimum working pressure 2,5 bar</p>			
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 ÷ +50	3600 NI/min	mm 15	G 1/2"

3/2	<b>Solenoid - Solenoid</b>	<b>Ordering code</b>	<b>Solenoid - Solenoid</b>		
		<b>412/2.T.0.0.M2</b>	5/2		
		<b>T</b> TYPE 32=3 ways 52=5 ways			
					
Weight gr. 612 Minimum working pressure 2 bar		  	Weight gr. 732 Minimum working pressure 2 bar		
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 ÷ +50	3600 NI/min	mm 15	G 1/2"

<b>Solenoid - Solenoid</b>					5/3
<b>Ordering code</b>					
<b>412/2.53.T.0.0.M2</b>					
FUNCTION 31=Closed centres 32=Open centres 33=Pressured centres					
Weight gr. 794 Minimum working pressure 3 bar					
					
<b>Operational characteristics</b>					
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered air, with or without lubrication	10 bar	-5 ÷ +50	3300 NI/min	mm 15	G 1/2"

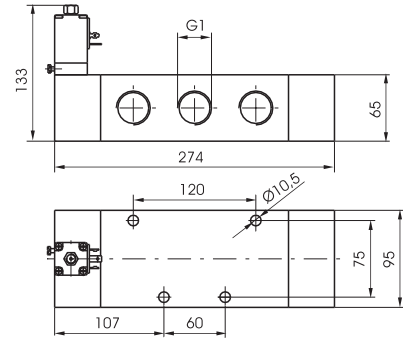
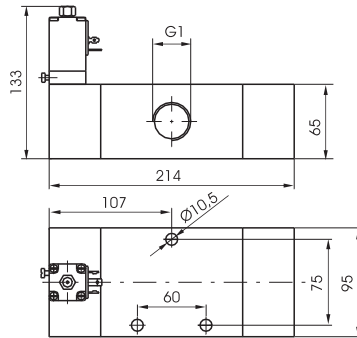
**Solenoid - Spring**

3/2  
5/2

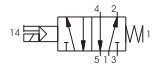
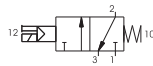
Ordering code

**411.T.0.1.S**

- T** TYPE  
32=3 ways  
52=5 ways
- S** SOLENOID CODE  
S=See Solenoid valves "S" type,  
Series 300



Weight gr. 3400  
Minimum piloting pressure 2,5 bar



Weight gr. 4300  
Minimum piloting pressure 2,5 bar

**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	6500 NI/min	mm 20	G 1"

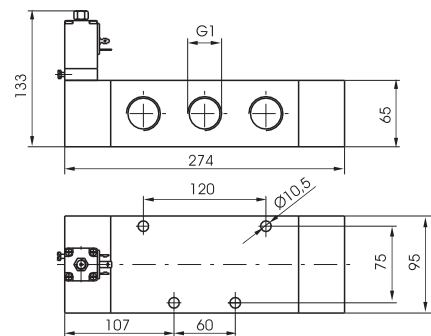
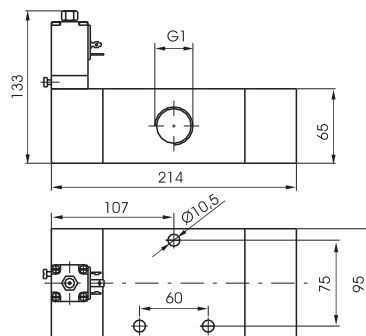
**Solenoid - Differential**

3/2  
5/2

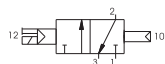
Ordering code

**411.T.0.12.S**

- T** TYPE  
32=3 ways  
52=5 ways
- S** SOLENOID CODE  
S=See Solenoid valves "S" type,  
Series 300



Weight gr. 3400  
Minimum piloting pressure 2,5 bar



Weight gr. 4300  
Minimum piloting pressure 2,5 bar

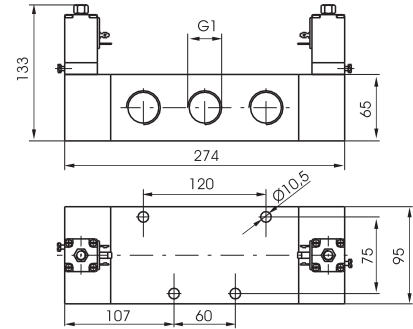
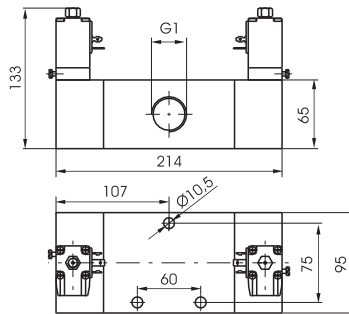
**Operational characteristics**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	6500 NI/min	mm 20	G 1"

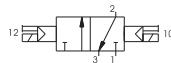
3/2  
5/2

**Solenoid - Solenoid**

Ordering code	
<b>411.1.0.0.S</b>	
TYPE	
<b>1</b>	32=3 ways
	52=5 ways
SOLENOID CODE	
<b>S</b>	S=See Solenoid valves "S" type, Series 300



Weight gr. 3700  
Minimum piloting pressure 2 bar



Weight gr. 4600  
Minimum piloting pressure 2 bar

**Operational characteristics**

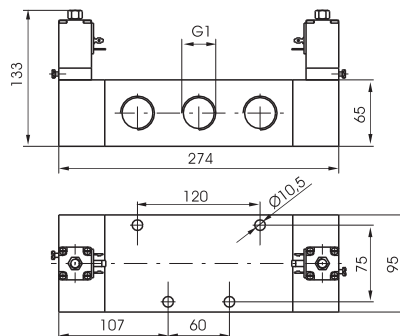
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	6500 NI/min	mm 20	G 1"

2

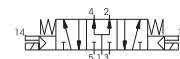
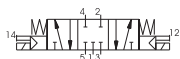
**Solenoid - Solenoid**

5/3

Ordering code	
<b>411.53.F.0.0.S</b>	
FUNCTION	
<b>F</b>	31=Closed centres
	32=Open centres
	33=Pressured centres
SOLENOID CODE	
<b>S</b>	S=See Solenoid valves "S" type, Series 300



Weight gr. 4700  
Minimum piloting pressure 3 bar



**Operational characteristics**


Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-5 ÷ +50	6500 NI/min	mm 20	G 1"

### General

The large flow valves and solenoid poppet valves for compressed air and vacuum are manufactured for 3/2 and 2/2 versions only, either normally close and normally open.

For the compressed air operation, the application is similar to the equivalent spool valves while for the vacuum operation a particular attention should be paid to the valve selected and its connection to the pump. For the electric pilot it is used a normal miniature solenoid M2 with pneumatic actuator and the special miniature solenoid M2/V with vacuum.

**The ordering code are referring to the solenoid valves with mechanics "M2" or "M2/V" assembled (see Series 300). (Coil are not included and have to be ordered separately).**

Coil  homologated are available (see 300 Series).

### Construction characteristics

	G 3/8"	G 1/2" - G 3/4"	G 1"	G 1 1/2"
Body	Aluminium	Zinc alloy	Aluminium	Aluminium
Bottom plates	Aluminium			
Actuators	NBR			
Pistons	Aluminium			
Actuators rod	Stainless steel			
Spring	Stainless steel			
Piston seals	NBR			

### Use and maintenance

These valves have a mean life of 10 to 15 million cycles under normal operating conditions.

Lubrication is not required for good operation but we recommend good filtration to avoid dirty deposit causing malfunction.

Check that the operating conditions: pressure, temperature and so on are as suggested.

The exhaust port of the distributor has to be protected in a dusty and dirty environment.

For these products, according to the construction technique and special application, is not required any maintenance with parts replacement. When necessary it is sufficient to clean the internal parts.

When it is used the solenoid valves with internal pilot, either for air or vacuum, inlet flow rate must be equal or higher that the required consumption flow rate, otherwise is better choose the external pilot version.

### Vacuum valves connections

#### NORMALLY CLOSED INTERNAL PILOT

779/V.32.0.1AC

773/V.32.0.1AC P = 1 = EXHAUST

771/V.32.0.1AC A = 2 = OUTLET

R = 3 = PUMP

#### NORMALLY OPEN INTERNAL PILOT

779/V.32.0.1AA

773/V.32.0.1AA P = 1 = PUMP

771/V.32.0.1AA A = 2 = OUTLET

R = 3 = EXHAUST

#### NORMALLY CLOSED EXTERNAL PILOT

779/V.32.0.1C

773/V.32.0.1C

771/V.32.0.1C

P = 1 = PUMP

A = 2 = OUTLET

R = 3 = EXHAUST

779/V.32.11.1C

773/V.32.11.1C

771/V.32.11.1C

#### NORMALLY OPEN EXTERNAL PILOT

779/V.32.0.1A

773/V.32.0.1A

771/V.32.0.1A

P = 1 = EXHAUST

A = 2 = OUTLET

R = 3 = PUMP

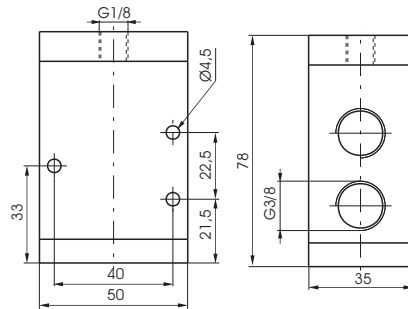
779/V.32.11.1A

773/V.32.11.1A

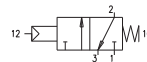
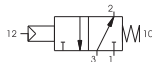
771/V.32.11.1A

**Pneumatic - Spring**

Ordering code
<b>779.32.11.F</b>
FUNCTION
<b>F</b> 1C=Normally Closed
1A=Normally Open



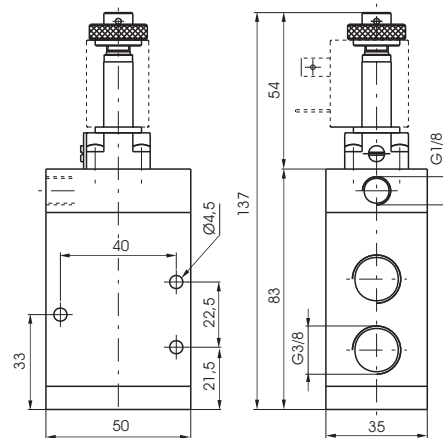
Weight gr. 360  
Attention : for the Normally open version, connect the inlet port to the exhaust port No "3".  
Minimum piloting pressure 2,5 bar



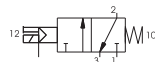
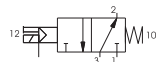
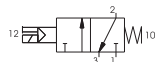
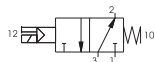
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-10 - +70	1800	10	G 3/8"

**Solenoid - Spring**

Ordering code
<b>779.32.0.F.M2</b>
FUNCTION
1AC=Internal Pilot N.C.
<b>F</b> 1C=External Pilot Normally Closed
1AA=Internal Pilot N.A.
1A=External Pilot Normally Open



Weight gr. 420  
Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-10 - +50	1800	10	G 3/8"



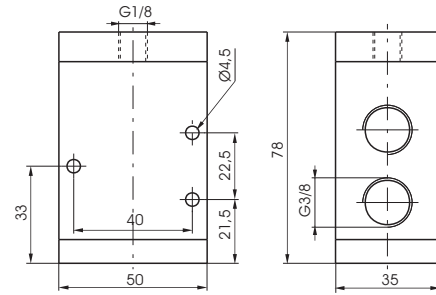
**Pneumatic - Spring**

Ordering code

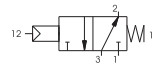
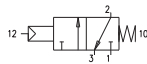
**779/V.32.11.F**

FUNCTION

- 1C=Normally Closed
- 1A=Normally Open



Weight gr. 360  
Minimum piloting pressure 2 bar



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-10 - + 70	10	G 3/8"	G 1/8"

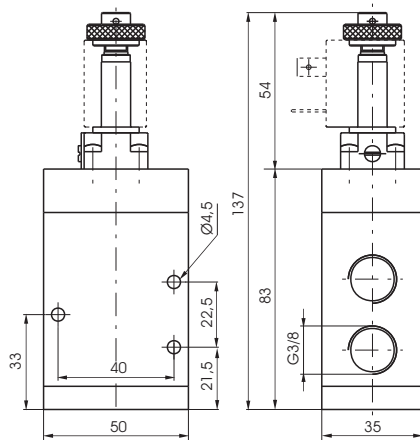
**Solenoid - Spring - Internal Pilot**

Ordering code

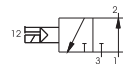
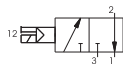
**779/V.32.0.F.M2/V**

FUNCTION

- 1AA=Normally Open
- 1AC=Normally Closed



Weight gr. 420



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-10 - + 50	10	G 3/8"	G 1/8"

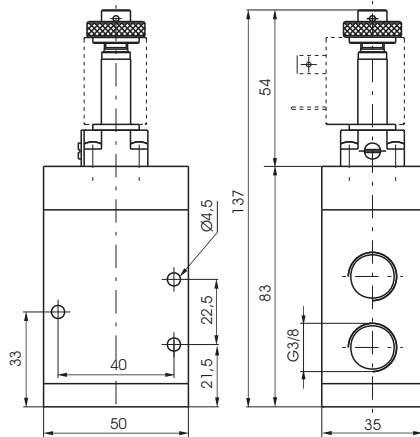
**Solenoid - Spring - External Pilot**

Ordering code

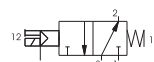
**779/V.32.0.F.M2**

FUNCTION

- 1A=Normally Open
- 1C=Normally Closed



Weight gr. 420  
Minimum piloting pressure 2 bar (External Pilot)

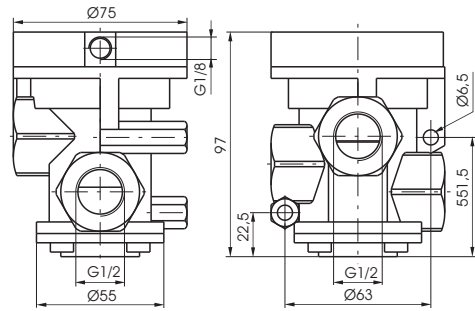


**Operational characteristic**

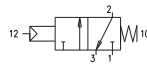
Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-10 - + 50	10	G 3/8"	G 1/8"

**Pneumatic - Spring**

Ordering code
<b>772.32.11.1C</b>



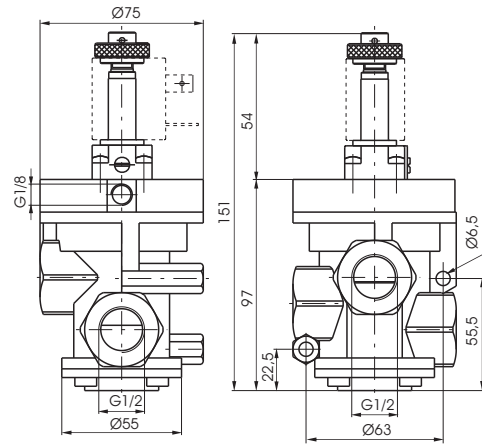
Weight gr. 1100  
Normally Closed  
Minimum piloting pressure 2,5 bar



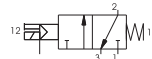
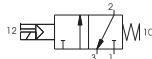
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +70	4800	15	G 1/2"

**Solenoid - Spring**

Ordering code
<b>772.32.0.F.M2</b>
FUNCTION
<b>F</b> 1AC=Internal Pilot Normally Closed
1C=External Pilot Normally Closed



Weight gr. 1160  
Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +50	4800	15	G 1/2"

2

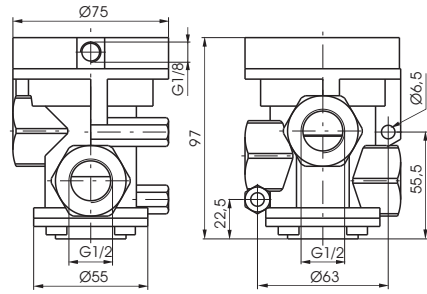
**Pneumatic - Spring**

Ordering code

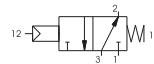
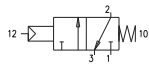
**772/V.32.11.F**

FUNCTION

- F 1C=Normally Closed
- 1A=Normally Open



Weight gr. 1100  
Minimum piloting pressure 2 bar



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +70	15	G 1/2"	G 1/8"

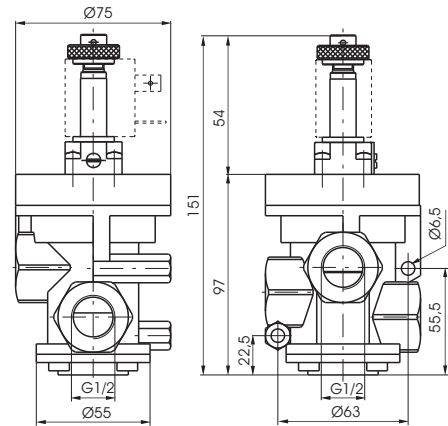
**Solenoid - Spring - Internal Pilot**

Ordering code

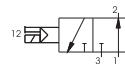
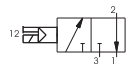
**772/V.32.0.F.M2/V**

FUNCTION

- F 1AA=Normally Open
- 1AC=Normally Closed



Weight gr. 1160



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +50	15	G 1/2"	G 1/8"

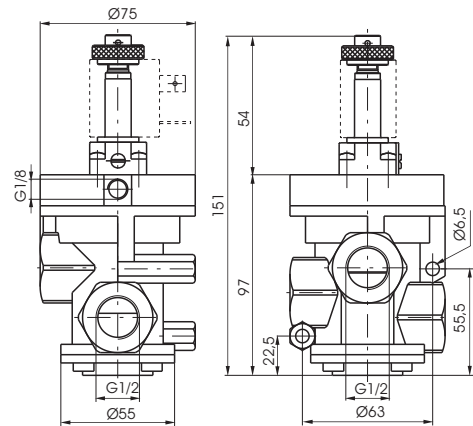
**Solenoid - Spring - External Pilot**

Ordering code

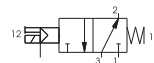
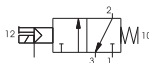
**772/V.32.0.F.M2**

FUNCTION

- F 1A=Normally Open
- 1C=Normally Closed



Weight gr. 1160  
Minimum piloting pressure 2 bar (External Pilot)

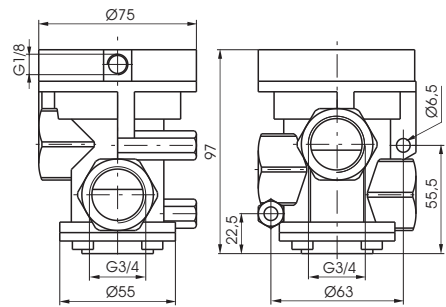


**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +50	15	G 1/2"	G 1/8"

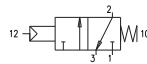
**Pneumatic - Spring**

Ordering code
<b>773.32.11.1C</b>



Weight gr. 990

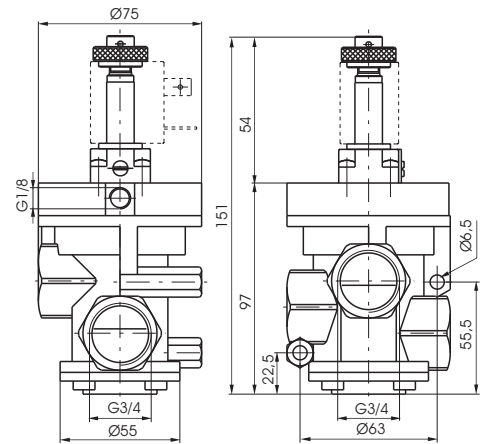
Normally Closed  
Minimum piloting pressure 2,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +70	6100	20	G 3/4"

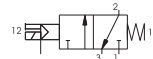
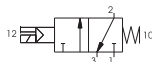
**Solenoid - Spring**

Ordering code
<b>773.32.0.F.M2</b>
FUNCTION
<b>F</b> 1AC=Internal Pilot Normally Closed
1C=External Pilot Normally Closed



Weight gr. 1050

Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)

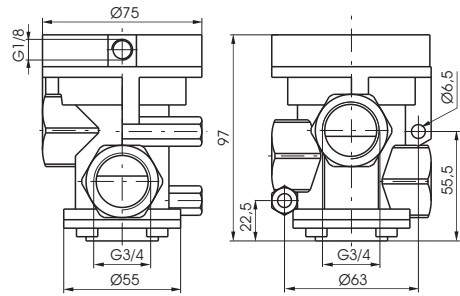


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +50	6100	20	G 3/4"

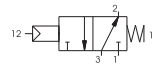
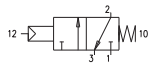
2

**Pneumatic - Spring**

Ordering code
<b>773/V.32.11.F</b>
FUNCTION
<b>F</b> 1C=Normally Closed
1A=Normally Open



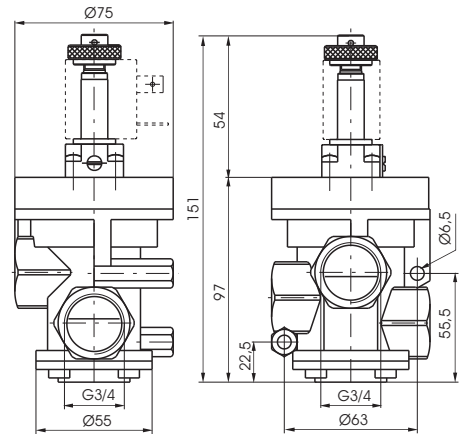
Weight gr. 990  
Minimum piloting pressure 2 bar



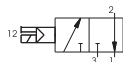
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +70	20	G 3/4"

**Solenoid - Spring - Internal Pilot**

Ordering code
<b>773/V.32.0.F.M2/V</b>
FUNCTION
<b>F</b> 1AA=Normally Open
1AC=Normally Closed



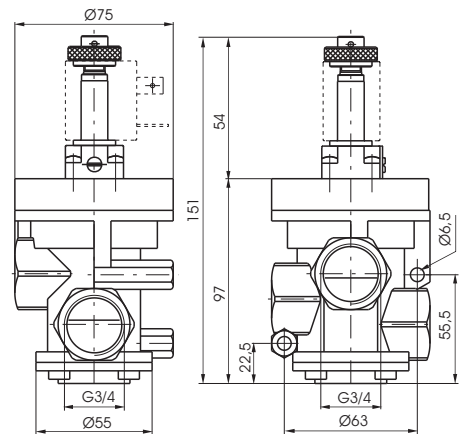
Weight gr. 1050



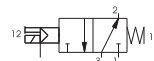
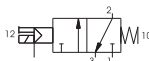
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +50	20	G 3/4"

**Solenoid - Spring - External Pilot**

Ordering code
<b>773/V.32.0.F.M2</b>
FUNCTION
<b>F</b> 1A=Normally Open
1C=Normally Closed



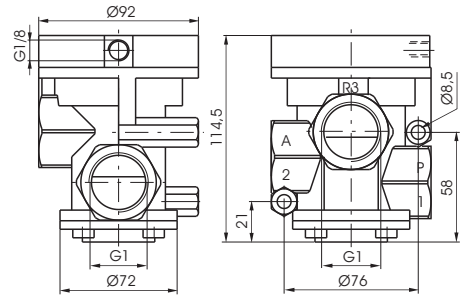
Weight gr. 1050  
Minimum piloting pressure 2 bar (External Pilot)



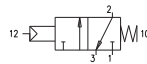
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +50	20	G 3/4"

**Pneumatic - Spring**

Ordering code
<b>771.32.11.1C</b>



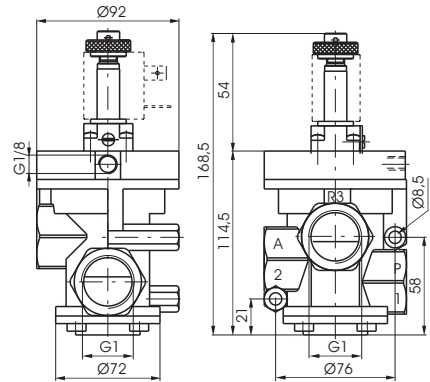
Weight gr. 1060  
Normally Closed  
Minimum piloting pressure 2,5 bar



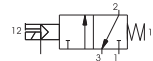
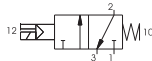
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +70	12000	25	G 1"

**Solenoid - Spring**

Ordering code
<b>771.32.0.F.M2</b>
FUNCTION
<b>F</b> 1AC=Internal Pilot Normally Closed
1C=External Pilot Normally Closed



Weight gr. 1120  
Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +50	12000	25	G 1"

2

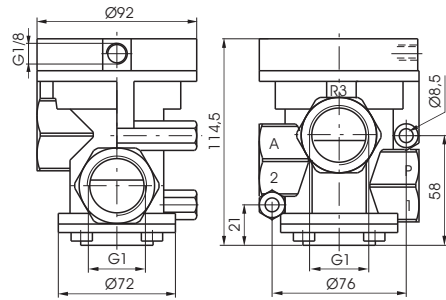
**Pneumatic - Spring**

Ordering code

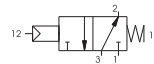
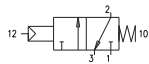
**771/V.32.11.F**

FUNCTION

- F 1C=Normally Closed
- 1A=Normally Open



Weight gr. 1060  
Minimum piloting pressure 2 bar



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +70	25	G 1"	G 1/8"

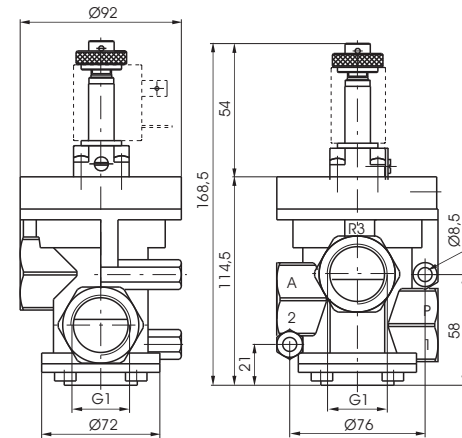
**Solenoid - Spring - Internal Pilot**

Ordering code

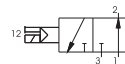
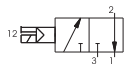
**771/V.32.0.F.M2/V**

FUNCTION

- F 1AA=Normally Open
- 1AC=Normally Closed



Weight gr. 1120



**Operational characteristic**

Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +50	25	G 1"	G 1/8"

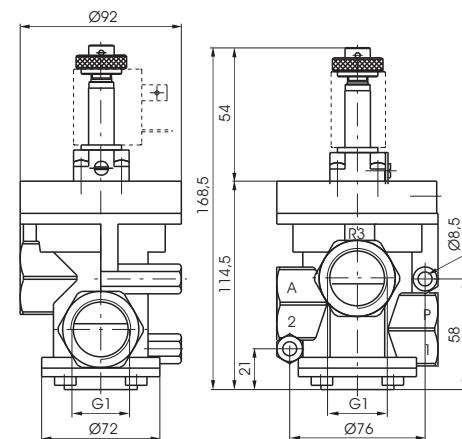
**Solenoid - Spring - External Pilot**

Ordering code

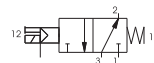
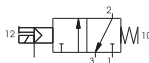
**771/V.32.0.F.M2**

FUNCTION

- F 1A=Normally Open
- 1C=Normally Closed



Weight gr. 1120  
Minimum piloting pressure 2 bar (External Pilot)


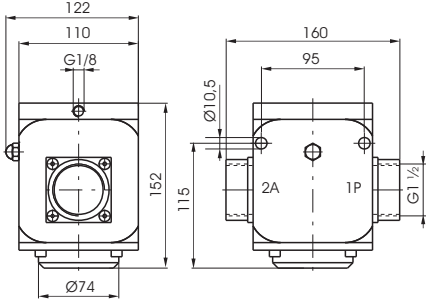


**Operational characteristic**

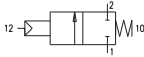
Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
Vacuum	-5 - +50	25	G 1"	G 1/8"

**Pneumatic - Spring**

Ordering code							
<b>776.22.11.1C</b>							


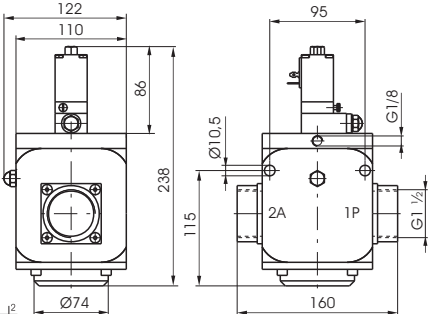
Weight gr. 3950  
Normally Closed  
Minimum piloting pressure 2,5 bar



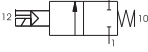
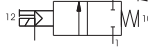
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +70	33500	38	G1 1/2"

**Solenoid - Spring**

Ordering code							
<b>776.22.0.F.S</b>							
FUNCTION							
<b>F</b> 1AC=Internal Pilot Normally Closed							
1C=External Pilot Normally Closed							
<b>S</b> SOLENOID CODE							
See Valves Series 300 Type "S"							


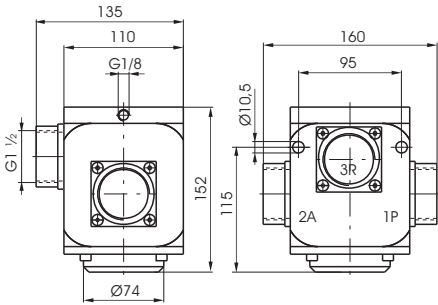
Weight gr. 4450  
Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)

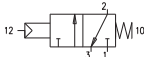
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +50	33500	38	G1 1/2"

**Pneumatic - Spring**

Ordering code							
<b>776.32.11.1C</b>							


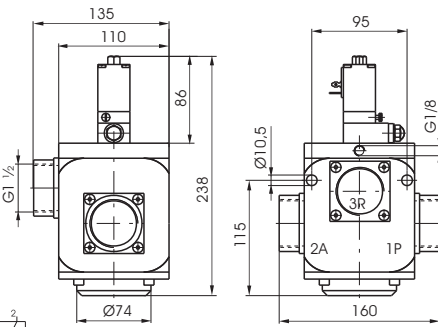
Weight gr. 3900  
Normally Closed  
Minimum piloting pressure 2,5 bar




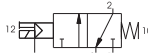
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +70	33500	38	G1 1/2"

**Solenoid - Spring**

Ordering code							
<b>776.32.0.F.S</b>							
FUNCTION							
<b>F</b> 1AC=Internal Pilot Normally Closed							
1C=External Pilot Normally Closed							
<b>S</b> SOLENOID CODE							
See Valves Series 300 Type "S"							

Weight gr. 4450  
Minimum piloting pressure 2,5 bar (External Pilot) - 3 bar (Internal Pilot)

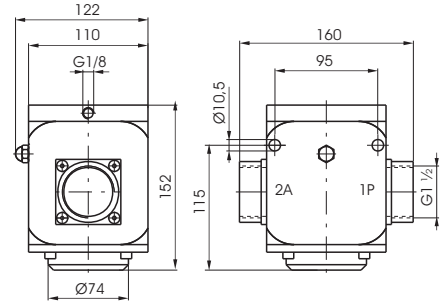



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air	10	-5 - +50	33500	38	G1 1/2"

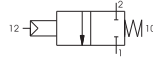


**Pneumatic - Spring**

Ordering code
<b>776/V.22.11.1C</b>



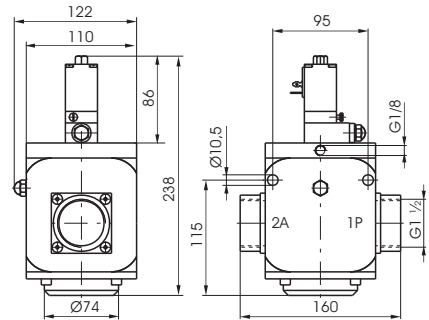
Weight gr. 3950  
Normally Closed  
Minimum piloting pressure 2 bar



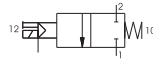
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +70	38	G1 1/2"

**Solenoid - Spring**

Ordering code
<b>776/V.22.0.1C.S</b>
<b>S</b> SOLENOID CODE
See Valves Series 300 Type "S"



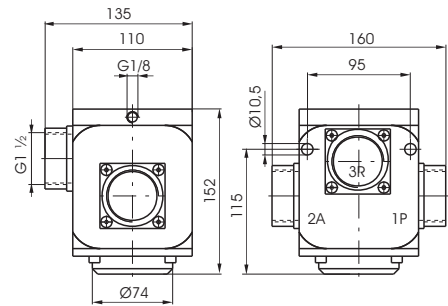
Weight gr. 4450  
External Pilot Normally Closed  
Minimum piloting pressure 2 bar



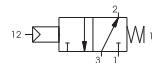
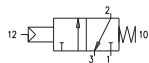
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +50	38	G1 1/2"

**Pneumatic - Spring**

Ordering code
<b>776/V.32.11.F</b>
<b>F</b> FUNCTION
1C=Normally Closed
1A=Normally Open



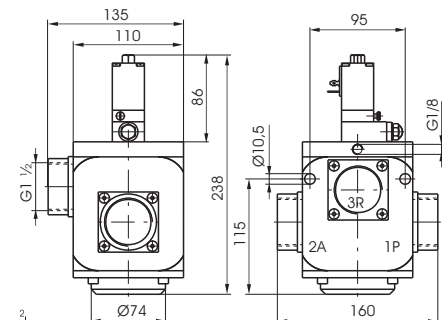
Weight gr. 3900  
Minimum piloting pressure 2 bar



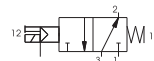
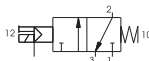
Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +70	38	G1 1/2"

**Solenoid - Spring**

Ordering code
<b>776/V.32.0.F.S</b>
<b>F</b> FUNCTION
1C=External Pilot Normally Closed
1A=External Pilot Normally Open
<b>S</b> SOLENOID CODE
See Valves Series 300 Type "S"



Weight gr. 4500  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum		-5 - +50	38	G1 1/2"




**General**

This new range of G1/2" and G3/4" pilot and solenoid operated poppet valves represents an evolution of the current popular Zama series. The main feature of this new series is the high impact resistant thermoplastic used to mould the valve components.

The use of this material results in a versatile, lightweight and economical valve. The new series also has other technical and functional enhancements over the existing range. Firstly, the traditional piston lip seal has been replaced with a rolling diaphragm, thereby eliminating frictional wear and tear to this seal. The new series (with the exception of certain vacuum models) also features a seal, which separates port 3 from the piston head. The inclusion of this seal has enhanced the valve's performance and allows the valve to be used as normally open (a configuration not possible in the Zama series).

Solenoid operated valves (both internal and external pilot versions) are fitted with a quick exhaust unit, which reduces the return stroke operating time by 60%. The bulk of the valves in this series use the MP type operator, the exception being internally piloted vacuum models, which use the MV operator. These operators differ from the M2 type in that they have self-tapping mounting screws for use in plastics.

**Coils are not included and have to be ordered separately (series 300, Section 1, General Catalogue), with the exception of the bistable versions which already include 24V Dc Coils (N331.0A).**

Coils  homologated are also available. (see series 300).

**Construction characteristics**

Body, operator and end cover	High resistance technopolymer
Seals and poppets	Oil resistant rubber (NBR)
Piston and shaft	Acetal resin
Springs	AISI 302 stainless steel
Diaphragm	Oil resistant rubber coated (NBR)

**Use and maintenance**

These valves have a mean life of 10 to 15 million cycles under normal operating conditions. Lubrication is not required for good operation but we recommend good filtration to avoid dirty deposit causing malfunction.

Check that the operating conditions: pressure, temperature and so on are as suggested.

The exhaust port of the distributor has to be protected in a dusty and dirty environment.

For these products, according to the construction technique and special application, is not required any maintenance with parts replacement. When necessary it is sufficient to clean the internal parts.

When it is used the solenoid valves with internal pilot, either for air or vacuum, inlet flow rate must be equal or higher that the required consumption flow rate, otherwise is better choose the external pilot version.

**Air valve port layout:**

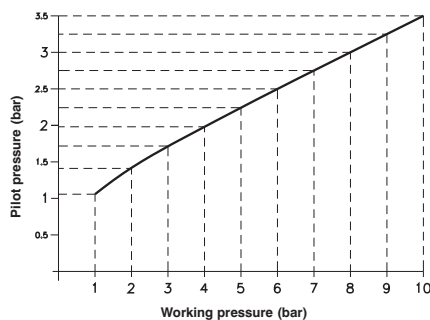
- Normally closed: 1 = LINE IN  
2 = CONSUMPTION  
3 = EXHAUST
- Normally open: 1 = EXHAUST  
2 = CONSUMPTION  
3 = LINE IN

**Vacuum valve port layout:**

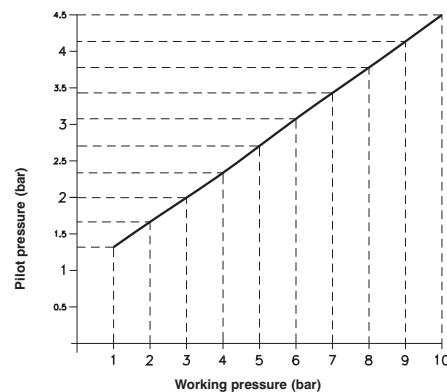
- Normally closed internal pilot 1 = EXHAUST  
Normally open (servoassisted) external pilot 2 = CONSUMPTION  
3 = PUMP
- Normally open internal pilot 1 = PUMP  
Normally closed (servoassisted) external pilot 2 = CONSUMPTION  
3 = EXHAUST

**MINIMUM WORKING PRESSURE DIAGRAM (Valves for compressed air)  
PNEUMATIC/SRING AND EXTERNAL SOLENOID PILOT VERSION**

NORMALLY CLOSED VALVE



NORMALLY OPEN VALVE

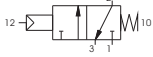


**Valve  
Pneumatic spring**

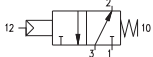
Ordering code

**T772.32.11.1**

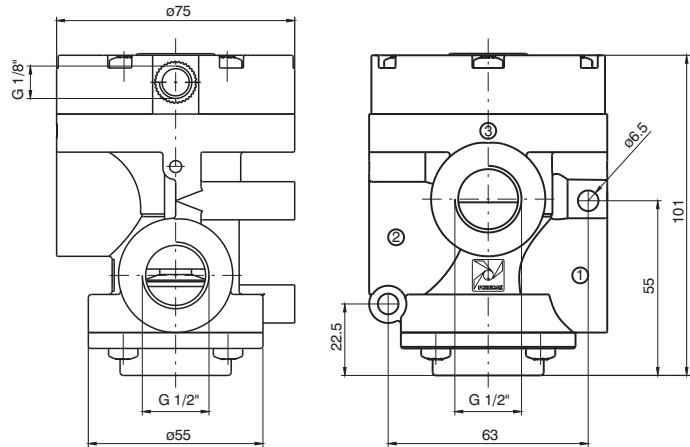
*Normally closed*



*Normally open*



Weight gr. 350

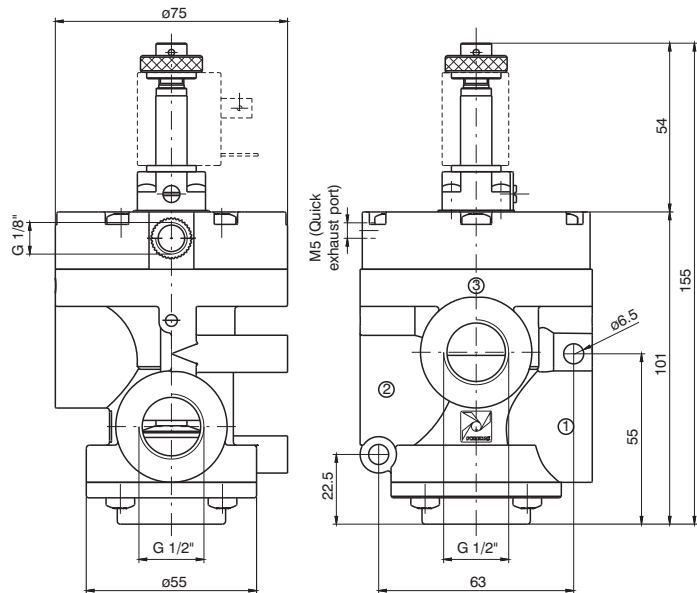


Minimum piloting pressure: see diagram at General page

**Solenoid valve  
Solenoid spring**



Weight gr. 390



Ordering code

Internal pilot	Servoassisted external pilot	Internal pilot with quick exhaust	Servoassisted external pilot with quick exhaust
<p><b>T772.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T772.32.0.1.MP</b> <i>Normally closed</i></p>	<p><b>T772S.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T772S.32.0.1.MP</b> <i>Normally closed</i></p>
<p><b>T772.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>	<p><b>T772S.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>
<p>Minimum piloting pressure: 2.5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>	<p>Minimum piloting pressure: 2.5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>

Operational characteristics	Fluid	Max working pressure	Operating temperature		Flow rate at 6 bar with $\Delta p = 1$ bar	Orifice size	Inlet port size	Pilot ports size
	Filtered and lubricated or non lubricated air	10 bar	min. -5° C	max. +50°C	4100 NI/min	mm 15	G 1/2"	G 1/8"

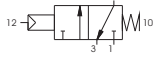
3/2

**Valve  
Pneumatic spring**

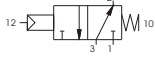
Ordering code

**T772/V.32.11.1**

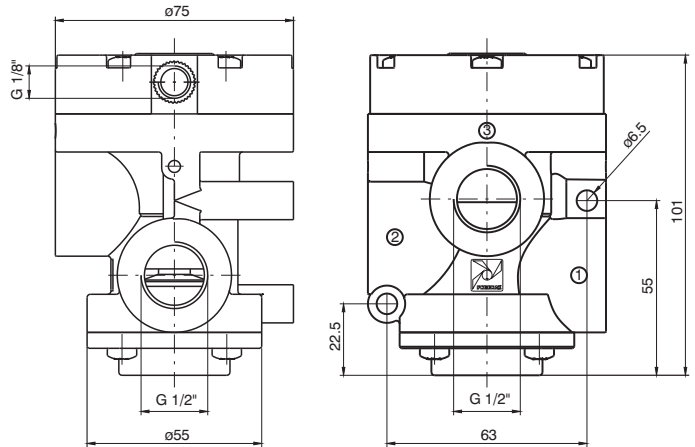
*Normally open*



*Normally closed*



Weight gr. 350



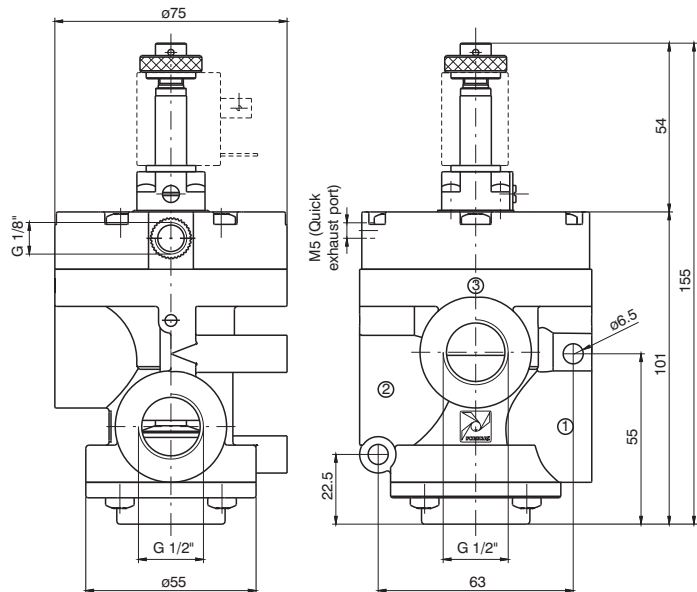
Minimum piloting pressure: 2,5 bar

**Solenoid valve  
Solenoid spring**

3/2



Weight gr. 390



Ordering code

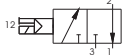
*Internal pilot*

*Servoassisted external pilot*

*Servoassisted external pilot  
with quick exhaust*

**T772/V.32.0.1AA.MV**

*Normally open*



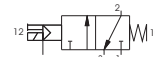
**T772/V.32.0.1.MP**

*Normally open*



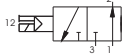
**T772/VS.32.0.1.MP**

*Normally open*

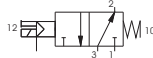


**T772/V.32.0.1AC.MV**

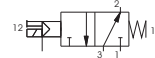
*Normally closed*



*Normally closed*



*Normally closed*



Minimum piloting pressure: 2.5 bar

Operational characteristics	Fluid	Operating temperature		Orifice Size	Inlet port size	Pilot ports size
	Vacuum	min.	max.			
		-5°C	+50°C	mm 15	G 1/2"	G 1/8"

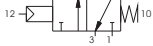
3/2

**Valve**  
**Pneumatic spring**

Ordering code

**T773.32.11.1**

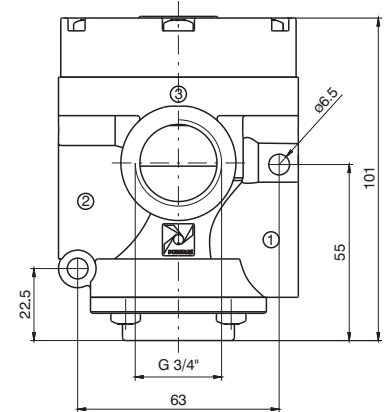
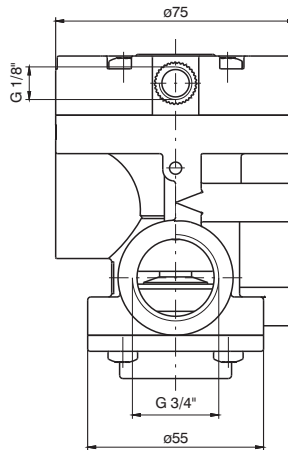
*Normally closed*



*Normally open*



Weight gr. 330



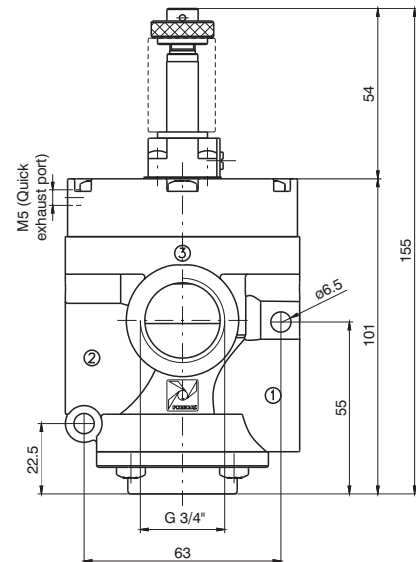
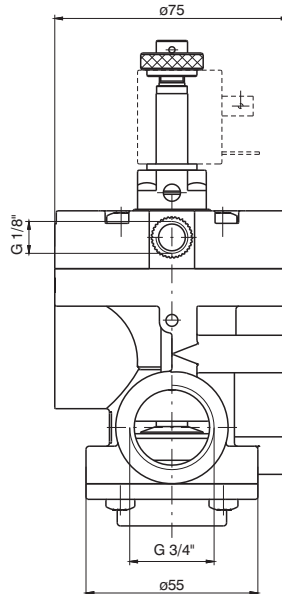
Minimum piloting pressure: see diagram at General page

3/2

**Solenoid valve**  
**Solenoid spring**



Weight gr. 370



Ordering code

Internal pilot	Servoassisted external pilot	Internal pilot with quick exhaust	Servoassisted external pilot with quick exhaust
<p><b>T773.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T773.32.0.1.MP</b> <i>Normally closed</i></p>	<p><b>T773S.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T773S.32.0.1.MP</b> <i>Normally closed</i></p>
<p><b>T773.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>	<p><b>T773S.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>
<p>Minimum piloting pressure: 2.5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>	<p>Minimum piloting pressure: 2.5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>

Operational characteristics	Fluid	Max piloting pressure	Operating temperature		Flow rate at 6 bar with Δp = 1 bar	Orifice size	Inlet port size	Pilot ports size
	Filtered and lubricated or non lubricated air	10 bar	min. -5° C	max. +50°C	6400 NI/min	mm 20	G 3/4"	G 1/8"

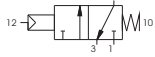
3/2

**Valve**  
**Pneumatic spring**

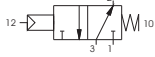
Ordering code

**T773/V.32.11.1**

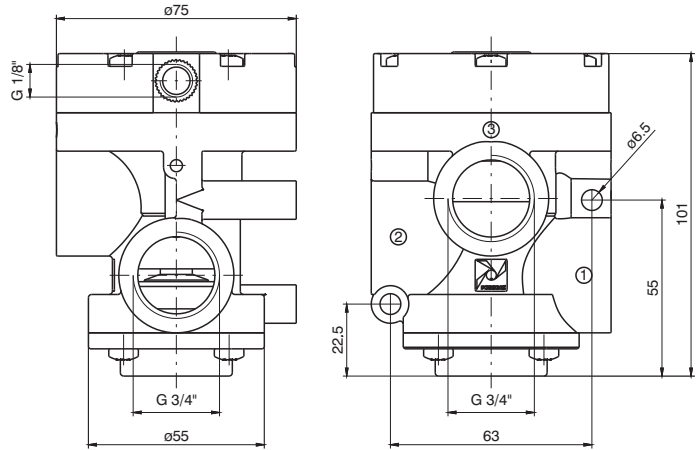
*Normally open*



*Normally closed*



Weight gr. 330



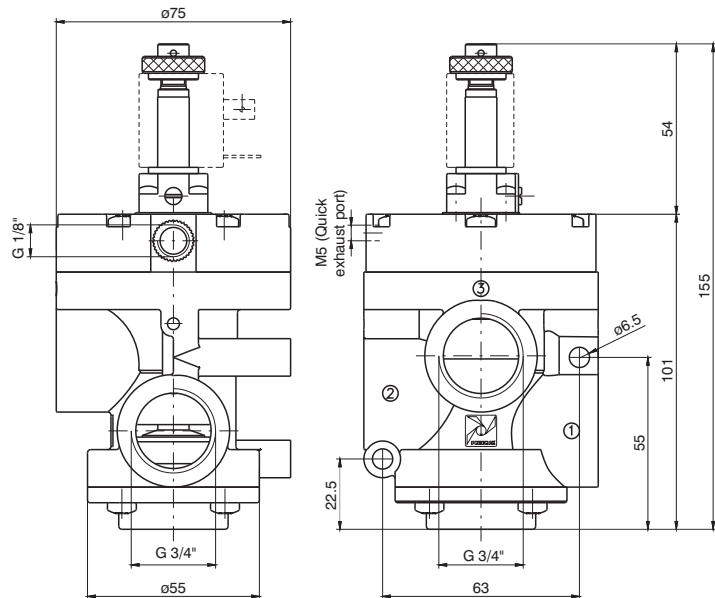
Minimum piloting pressure: 2,5 bar

**Solenoid valve**  
**Solenoid spring**

3/2



Weight gr. 370



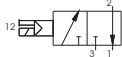
Ordering code

*Internal pilot*

*Servoassisted external pilot*

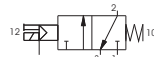
*Servoassisted external pilot  
with quick exhaust*

**T773/V.32.0.1AA.MV**  
*Normally open*



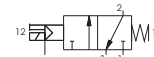
**T773/V.32.0.1.MP**

*Normally open*

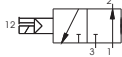


**T773/VS.32.0.1.MP**

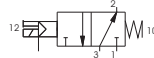
*Normally open*



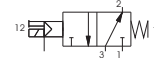
**T773/V.32.0.1AC.MV**  
*Normally closed*



*Normally closed*



*Normally closed*



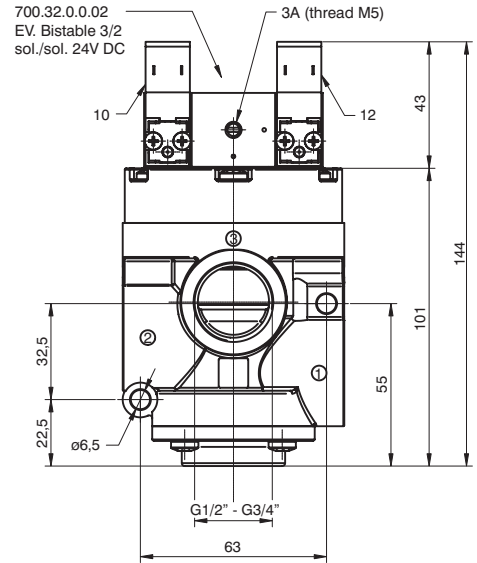
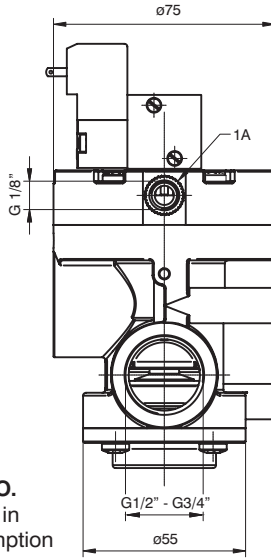
Minimum piloting pressure: 2.5 bar

Operational characteristics	Fluid	Operating temperature		Orifice Size	Inlet port size	Pilot ports size
	Vacuum	min.	max.			
		-5°C	+50°C	mm 20	G 3/4"	G 1/8"



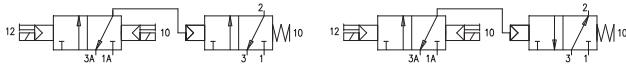
**Bistable version for Compressed air**

3/2



**Air - N.C.**  
 1 = line in  
 2 = consumption  
 1 = exhaust

**Air - N.O.**  
 3 = line in  
 2 = consumption  
 1 = exhaust



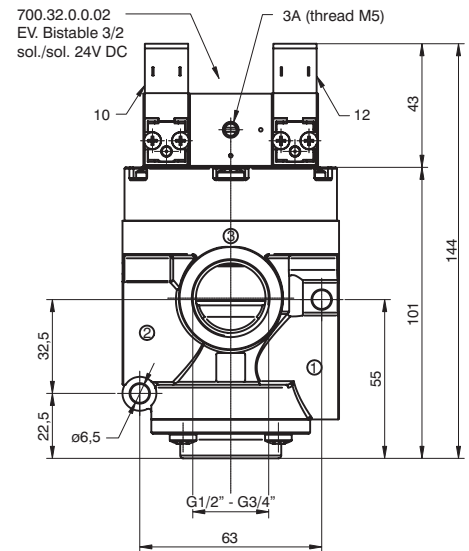
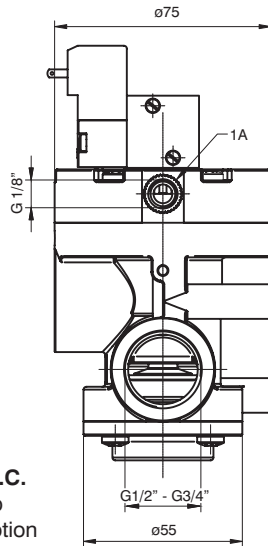
Weight gr. 550

Ordering code

		G 1/2"	G 3/4"	G 1/2" (with quick exhaust)		G 3/4" (with quick exhaust)			
		<b>T772.32.0.1BP</b> Normally closed Normally open	<b>T773.32.0.1BP</b> Normally closed Normally open	<b>T772S.32.0.1BP</b> Normally closed Normally open		<b>T773S.32.0.1BP</b> Normally closed Normally open			
Operational characteristics	Fluid	Max piloting pressure	Min. Pilot pressure	Temperature min.	Temperature max.	Flow rate at 6 bar with Δp = 1 bar	Orifice Size	piloting port size	Pilot ports size
	Filtered and lubricated or non lubricated air	10 bar	2 bar	-5° C	+50° C	G1/2": 4100 NI/min G3/4": 6400 NI/min	mm 15	G 1/2" G 3/4"	G 1/8"

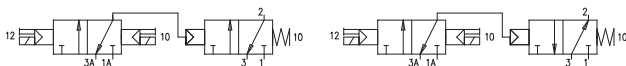
**Bistable version for Vacuum**

3/2



**Vacuum - N.O.**  
 3 = pump  
 2 = consumption  
 1 = exhaust

**Vacuum - N.C.**  
 1 = pump  
 2 = consumption  
 3 = exhaust



Weight gr. 550

Ordering code

		G 1/2"	G 3/4"	G 1/2" (with quick exhaust)		G 3/4" (with quick exhaust)	
		<b>T772/V.32.0.1BP</b> Normally closed Normally open	<b>T773/V.32.0.1BP</b> Normally closed Normally open	<b>T772/VS.32.0.1BP</b> Normally closed Normally open		<b>T773/VS.32.0.1BP</b> Normally closed Normally open	
Operational characteristics	Fluid	Min. Pilot pressure	Temperature min.	Temperature max.	Orifice Size	Inlet port size	Pilot ports size
	Vacuum	2,5 bar	-5° C	+50° C	mm 15	G 1/2" G 3/4"	G 1/8"



**General**

This new range of G1” pilot and solenoid operated poppet valves represents an evolution of the current popular Zama series and of the series T772-T773 (G1/2" - 3/4").


Also for this series the main feature is the technopolimer material used to mould most of its components. The use of this material results in a versatile, lightweight and economical valve.

The new series also has other technical and functional enhancements over the existing range. Firstly, the traditional piston lip seal has been replaced with a rolling diaphragm, thereby eliminating frictional wear and tear to this seal. The new series (with the exception of certain vacuum models) also features a seal, which separates port 3 from the piston head. The inclusion of this seal has enhanced the valve’s performance and allows the valve to be used as normally open (a configuration not possible in the Zama series).

Solenoid operated valves (both internal and external pilot versions) are fitted with a quick exhaust unit, which reduces the return stroke operating time by 80%. The bulk of the valves in this series use the MP type operator, the exception being internally piloted vacuum models, which use the MV operator. These operators differ from the M2 type in that they have self-tapping mounting screws for use in plastics.

Bistable versions are also available, both for air or for vacuum. These valves are fitted with a 3/2 sol-sol valve (instead of the standard pilot valve) fitted with two 15mm 24V Dc microvalves (N331.0A). Ordering codes refer to solenoid valves with MP or MV assembled on them.

**Coils are not included and have to be ordered separately (series 300, Section 1, General Catalogue), with the exception of the bistable versions which already include 24V Dc Coils (N331.0A).**

Coils  US homologated are also available (see series 300).

**Construction characteristics**

Body, operator and end cover	High resistance technopolymer
Seals and poppets	NBR
Piston and shaft	Acetal resin
Springs	AISI 302 stainless steel
Diaphragm	NBR

**Use and maintenance**

These valves have a mean life of 10 to 15 million cycles under normal operating conditions.

Lubrication is not required for good operation but we recommend good filtration to avoid dirty deposit causing malfunction.

Check that the operating conditions: pressure, temperature and so on are as suggested.

The exhaust port of the distributor has to be protected in a dusty and dirty environment.

For these products, according to the construction technique and special application, is not required any maintenance with parts replacement. When necessary it is sufficient to clean the internal parts.

When it is used the solenoid valves with internal pilot, either for air or vacuum, inlet flow rate must be equal or higher that the required consumption flow rate, otherwise is better choose the external pilot version.

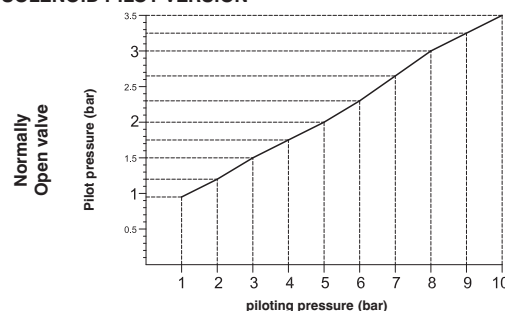
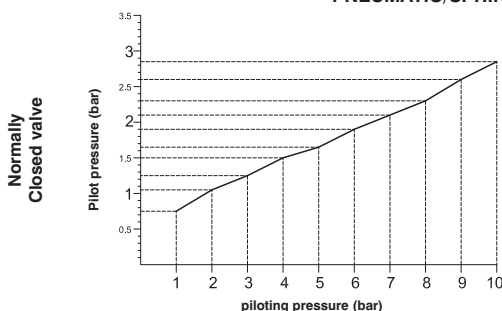
**Air valve port layout:**

- Normally closed: 1 = LINE IN  
2 = CONSUMPTION  
3 = EXHAUST
- Normally open: 1 = EXHAUST  
2 = CONSUMPTION  
3 = LINE IN

**Vacuum valve port layout:**

- Normally closed internal pilot 1 = EXHAUST
- Normally open (servoassisted) external pilot 2 = CONSUMPTION  
3 = PUMP
- Normally open internal pilot 1 = PUMP
- Normally closed (servoassisted) external pilot 2 = CONSUMPTION  
3 = EXHAUST

**MINIMUM piloting PRESSURE DIAGRAM (Valves for compressed air)  
PNEUMATIC/SRING AND EXTERNAL SOLENOID PILOT VERSION**





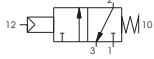
3/2

**Valve  
Pneumatic spring**

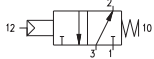
Ordering code

**T771.32.11.1**

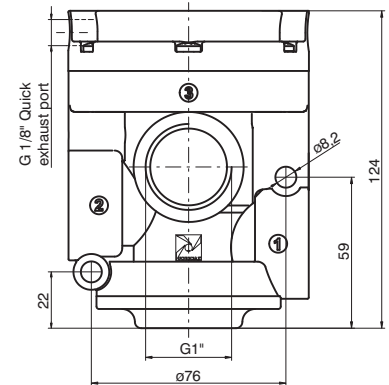
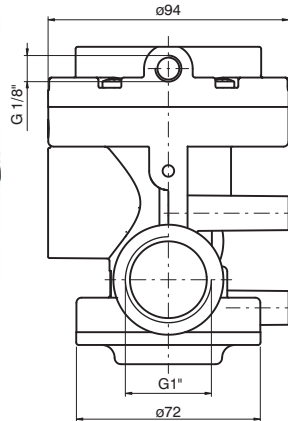
*Normally closed*



*Normally open*



Weight gr. 480



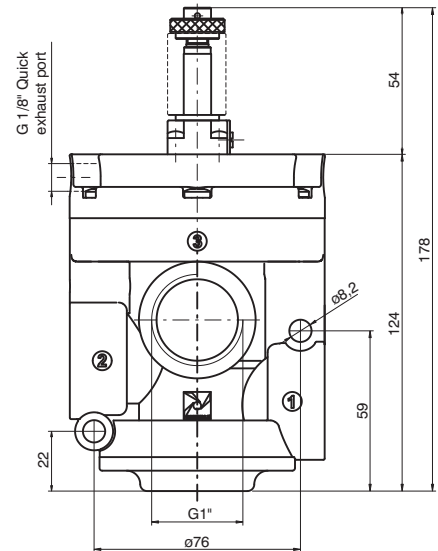
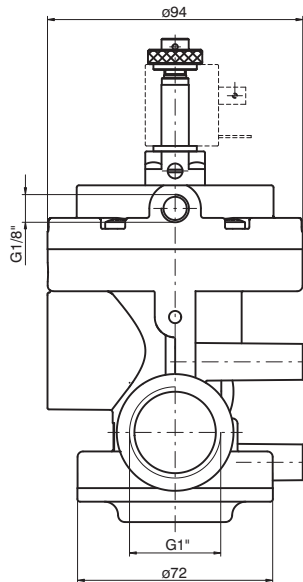
Minimum piloting pressure: see diagram at General page

**Solenoid valve  
Solenoid spring**

3/2



Weight gr. 520



Ordering code

<i>Internal pilot</i>	<i>Servoassisted external pilot</i>	<i>Internal pilot with quick exhaust</i>	<i>Servoassisted external pilot with quick exhaust</i>
<p><b>T771.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T771.32.0.1.MP</b> <i>Normally closed</i></p>	<p><b>T771S.32.0.1AC.MP</b> <i>Normally closed</i></p>	<p><b>T771S.32.0.1.MP</b> <i>Normally closed</i></p>
<p><b>T771.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>	<p><b>T771S.32.0.1AA.MP</b> <i>Normally open</i></p>	<p><i>Normally open</i></p>
<p>Minimum piloting pressure: 2,5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>	<p>Minimum piloting pressure: 2,5 bar</p>	<p>Minimum piloting pressure: see diagram at General page</p>

Operational characteristics	Fluid	Max piloting pressure	Operating temperature		Flow rate at 6 bar with Δp = 1 bar	Orifice size	Inlet port size	Pilot ports size
	Filtered and lubricated or non lubricated air	10 bar	min.	max.				
			-5° C	+50° C	12.000 NI/min	mm 25	G 1"	G 1/8"

**Valve**  
**Pneumatic spring**

3/2

Ordering code

**T771/V.32.11.1**

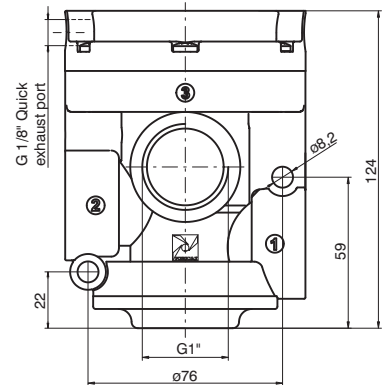
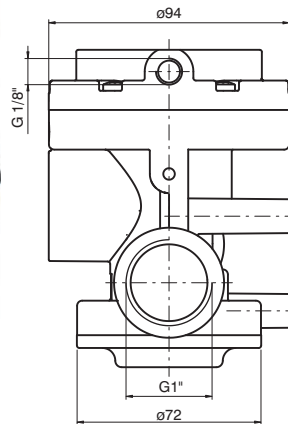
*Normally open*



*Normally closed*



Weight gr. 480



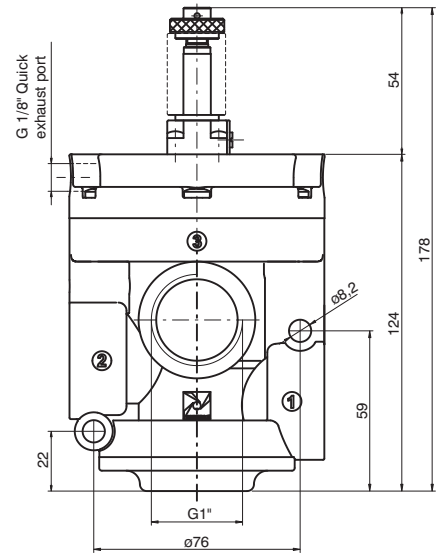
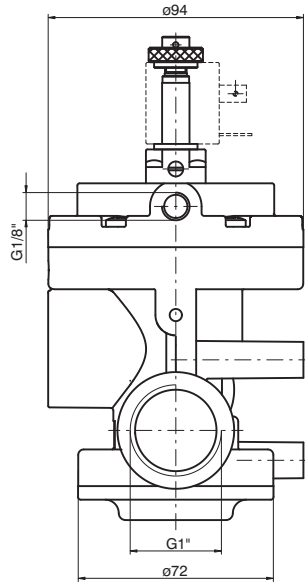
Minimum piloting pressure: 2 bar

**Solenoid valve**  
**Solenoid spring**

3/2



Weight gr. 520



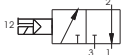
Ordering code

*Internal pilot*

*Servoassisted external pilot*

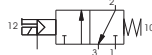
*Servoassisted external pilot  
with quick exhaust*

**T771/V.32.0.1AA.MV**  
*Normally open*



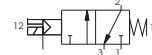
**T771/V.32.0.1.MP**

*Normally open*

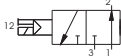


**T771/VS.32.0.1.MP**

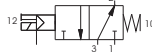
*Normally open*



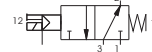
**T771/V.32.0.1AC.MV**  
*Normally closed*



*Normally closed*



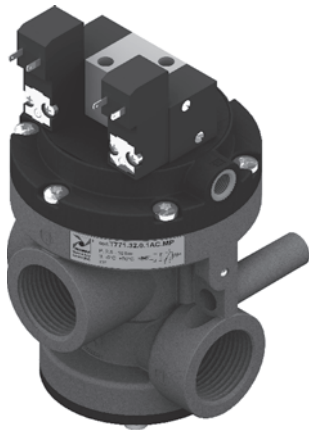
*Normally closed*



Minimum piloting pressure: 2 bar

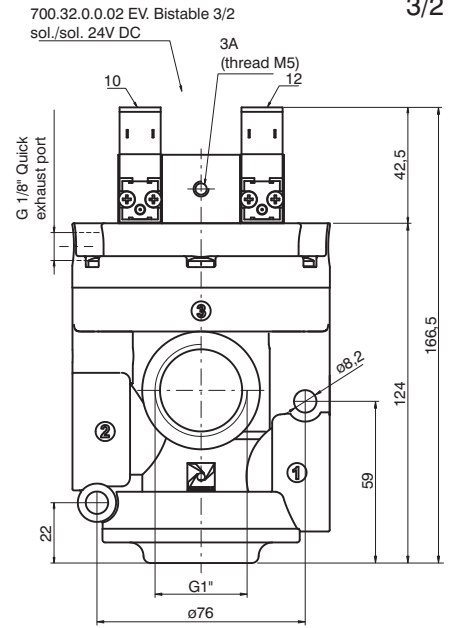
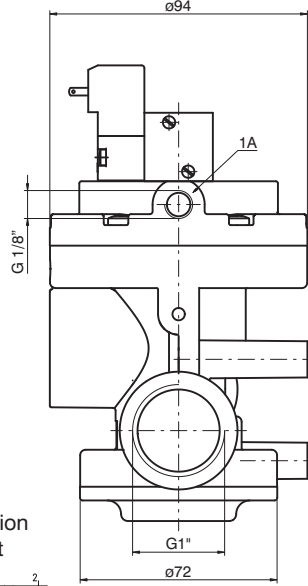
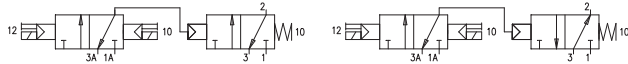
Operational characteristics	Fluid	Temperature		Orifice size	Inlet port size	Pilot ports size
	Vacuum	min.	max.			
		-5°C	+50°C	mm 25	G 1"	G 1/8"

**Bistable version for Compressed air**



**Air - N.C.**  
 1 = line in  
 2 = consumption  
 3 = exhaust

**Air - N.O.**  
 3 = line in  
 2 = consumption  
 1 = exhaust



Weight gr. 680

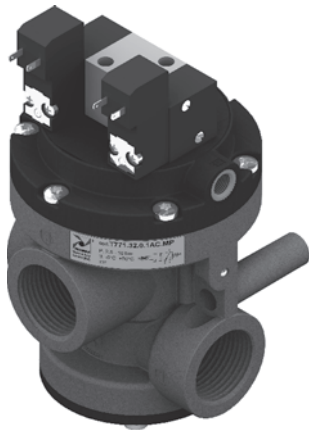
Ordering code

**T771.32.0.1BP**  
*Normally closed / Normally open*

*with quick exhaust*  
**T771S.32.0.1.BP**  
*Normally closed / Normally open*

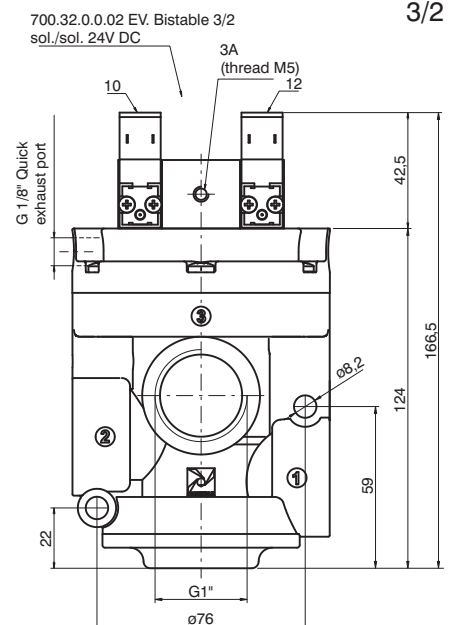
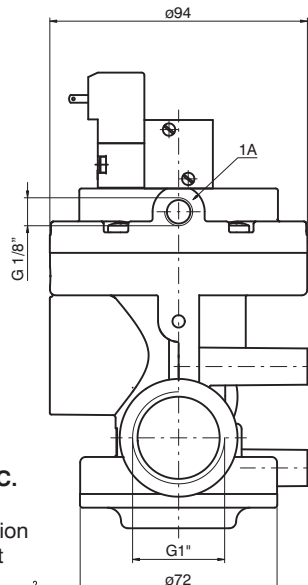
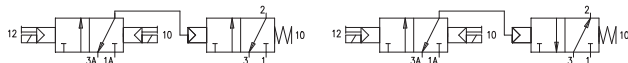
Operational characteristics	Fluid	Max piloting pressure	Minumum piloting pressure	Operating temperature		Flow rate at 6 bar with $\Delta p = 1\ bar$	Orifice size	inlet port size	Pilot ports size
	Filtered and lubricated air	10 bar	2,5 bar	min.	max.	12.000 NI/min	mm 25	G 1"	G 1/8"
				-5° C	+50° C				

**Bistable version for Vacuum**



**Vacuum - N.O.**  
 3 = pump  
 2 = consumption  
 1 = exhaust

**Vacuum - N.C.**  
 1 = pump  
 2 = consumption  
 3 = exhaust



Weight gr. 680

Ordering code

**T771/V.32.0.1BP**  
*Normally closed / Normally open*

*with quick exhaust*  
**T771/VS.32.0.1.BP**  
*Normally closed / Normally open*

Operational characteristics	Fluid	Minumum piloting pressure	Temperature		Orifice size	Inlet port size	Pilot ports size
	Vacuum	2,5 bar	min.	max.	mm 25	G 1"	G 1/8"
			-5° C	+50° C			



**General**

The N776 G1.1/2" series of valves and solenoid operated poppet valves is the result of the technical evolution of the 776 series. A rolling diaphragm construction has replaced the previously used piston design ensure lower frictions and longer life. Connection 3 is isolated via a dedicated seal which allow to have the N.O. version as well as the self feed for vacuum which was not available on the 776 series.

The pilot valves are the M3R (CNOMO Stile) with bistable manual override.

**Coils are not included and have to be ordered separately (see 300 series, 22mm MB coils and 30mm CNOMO MC coils).**

**Coils C RU US homologated are also available. (series 300).**

**Construction characteristics**

Body, operator and end cover:	Die casting Aluminium
Seals and poppets:	NBR oil resistant rubber
Piston:	Aluminium (for Air) - Acetylic resin (for Vacuum)
Pin guide:	Nickel plated steel
Spring:	Steel
Diaphragm:	NBR oil resistant rubber

**Use and maintenance**

These valves have a mean life of 10 to 15 million cycles under normal operating conditions.

Lubrication is not required for good operation but we recommend good filtration to avoid dirty deposit causing malfunction.

Check that the operating conditions: pressure, temperature and so on are as suggested.

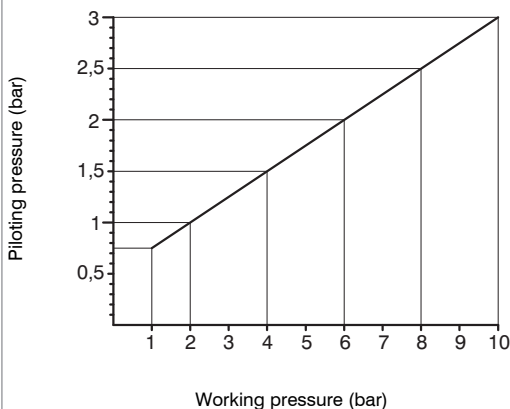
The exhaust port of the distributor has to be protected in a dusty and dirty environment.

For these products, according to the construction technique and special application, is not required any maintenance with parts replacement. When necessary it is sufficient to clean the internal parts.

When it is used the solenoid valves with internal pilot, either for air or vacuum, inlet flow rate must be equal or higher that the required consumption flow rate, otherwise is better choose the external pilot version.

<b>Air valves port layout:</b>		<b>Vacuum valves port layout:</b>	
Normally Closed:	1=LINE IN 2=CONSUMPTION 3=EXHAUST	Normally Closed internal Pilot	1=EXHAUST
		Normally Open (servoassisted) external pilot	2=CONSUMPTION 3=PUMP
Normally Open:	1=EXHAUST 2=CONSUMPTION 3=LINE IN	Normally Open internal Pilot	1=PUMP
		Normally Closed servoassisted) external pilot	2=CONSUMPTION 3=EXHAUST

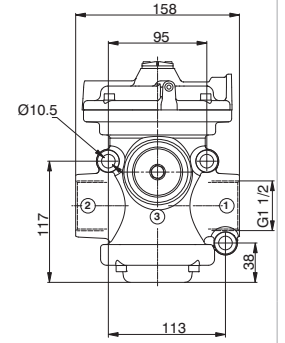
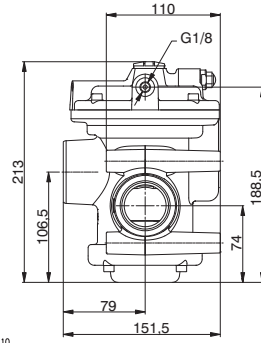
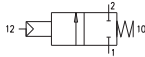
**Minumum working pressure diagram  
for external pilot versions  
Normally Closed & Normally Open**



**Pneumatic - Spring**

Ordering code

**N776.22.11.1C**



Weight gr.3560  
Normally Closed  
Minimum piloting pressure "See diagram on the General page"

**Operational characteristics**

Fluid	Temperature °C	Max working pressure (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air or non	-5 ÷ +70	10	33500	38	G1 1/2"	G1/8"

**Solenoid - Spring**

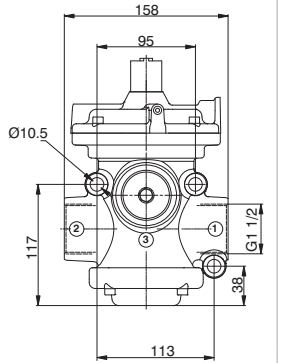
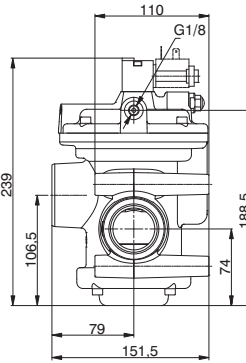
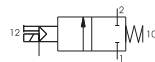
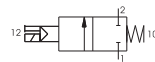
Ordering code

**N776.22.0.F.M3R**

FUNCTION

1AC=Internal Pilot Normally Closed

1C=External Pilot Normally Closed



Weight gr.3620  
Minimum piloting pressure: Servoassisted external pilot version, "See diagram on the General page" / 3.5 bar Internal pilot version,

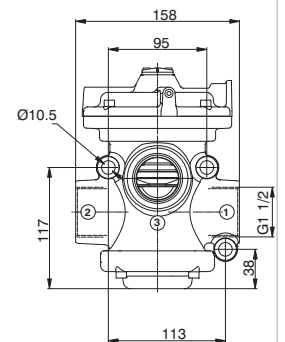
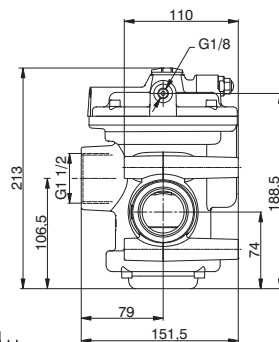
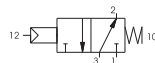
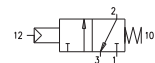
**Operational characteristics**

Fluid	Temperature °C	Max working pressure (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air or non	-5 ÷ +50	10	33500	38	G1 1/2"	G1/8"

**Pneumatic - Spring**

Ordering code

**N776.32.11.1**



Weight gr.3550  
Normally Closed / Normally open  
Minimum piloting pressure "See diagram on the General page"

**Operational characteristics**

Fluid	Temperature °C	Max working pressure (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air or non	-5 ÷ +70	10	33500	38	G1 1/2"	G1/8"

**Solenoid - Spring**

Ordering code

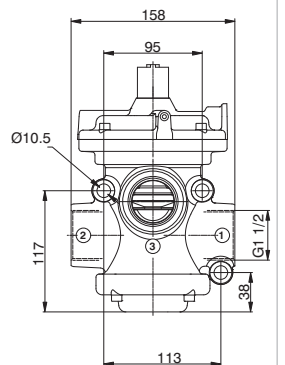
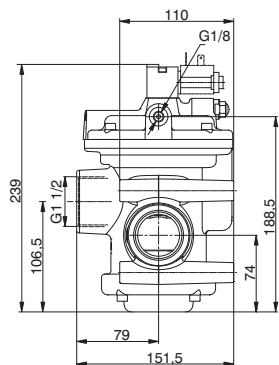
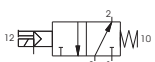
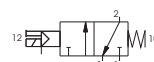
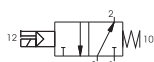
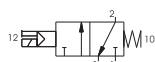
**N776.32.0.F.M3R**

FUNCTION

1AC=Internal Pilot Normally Closed

1AA=Internal Pilot Normally Open


1=External Pilot Normally Closed-Normally Open

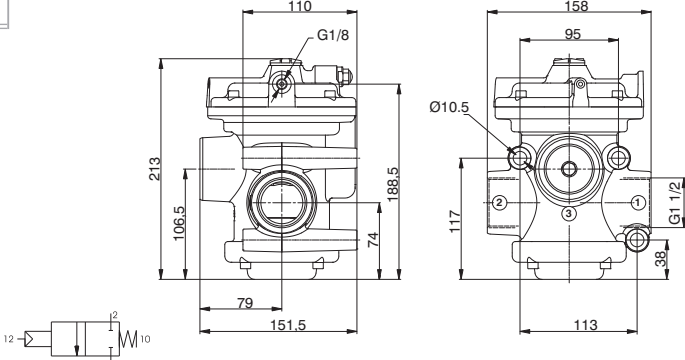



Weight gr.3610  
Minimum piloting pressure: Servoassisted external pilot "See diagram on the General page" / 3.5 bar Internal pilot version,

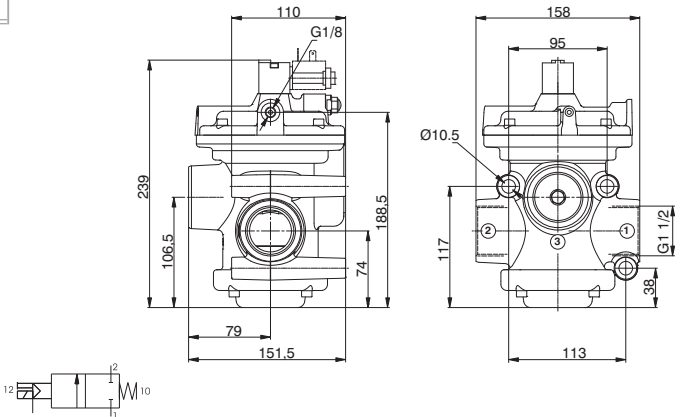
**Operational characteristics**


Fluid	Temperature °C	Max working pressure (bar)	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
Filtered and lubricated air or non	-5 ÷ +50	10	33500	38	G1 1/2"	G1/8"

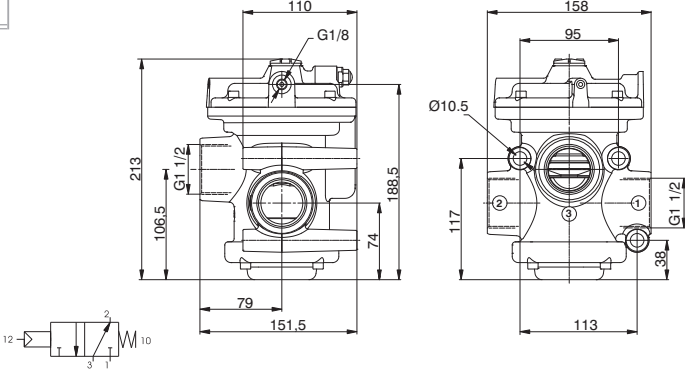
<b>Pneumatic - Spring</b>					
Ordering code					
<b>N776/V.22.11.1C</b>					
Weight gr.3178 Normally Closed Minimum piloting pressure 2 bar					
<b>Operational characteristics</b>	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum	-5 ÷ +70	38	G1 1/2"	G1/8"




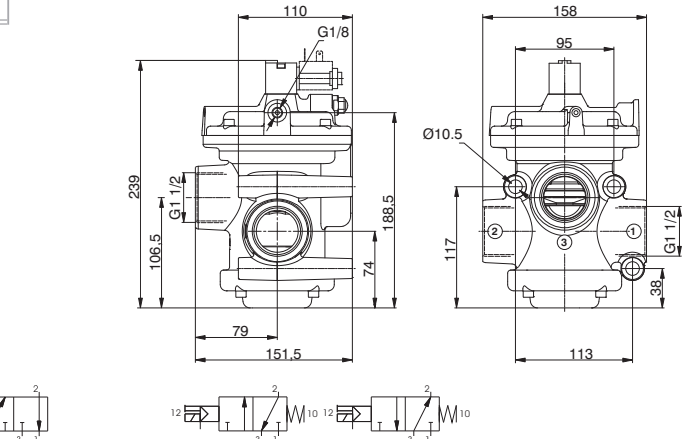
<b>Solenoid - Spring</b>					
Ordering code					
<b>N776/V.22.0.F.M3R</b>					
FUNCTION 1AC=Internal Pilot Normally Closed 1C=External Pilot Normally Closed					
Weight gr.3238 Minimum piloting pressure 2 bar					
<b>Operational characteristics</b>	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum	-5 ÷ +50	38	G1 1/2"	G1/8"



<b>Pneumatic - Spring</b>					
Ordering code					
<b>N776/V.32.11.1</b>					
Weight gr.3168 Normally Closed / Normally open Minimum piloting pressure 2 bar					
<b>Operational characteristics</b>	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum	-5 ÷ +70	38	G1 1/2"	G1/8"



<b>Solenoid - Spring</b>					
Ordering code					
<b>N776/V.32.0.F.M3R</b>					
FUNCTION 1AC=Internal Pilot Normally Closed 1AA=Internal Pilot Normally Open 1=External Pilot Normally Closed-Normally Open					
Weight gr.3228 Minimum piloting pressure 2 bar					
<b>Operational characteristics</b>	Fluid	Temperature °C	Orifice size (mm)	Working ports size	Pilot ports size
	Vacuum	-5 ÷ +50	38	G1 1/2"	G1/8"





## General

Pad Valves offer a reliable and economic solution to fluid control.

The valve is manufactured with a 2 way Bronze body and actuated pneumatically using either a single or double acting compact cylinder which can be rotated 360°.

Versions are available with NBR, FPM or PTFE valve seals.

The barrel profile allows the use of magnetic sensors code "1500.\_", "RS.\_", "HS.\_", for slots "A" type. (see the Pneumax General catalogue, chapter 4).

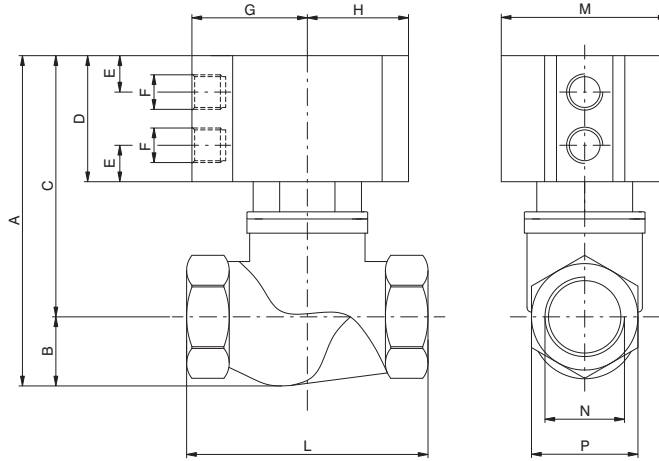
## Construction characteristics

Rear eye, Piston and Rod bushing	Anodized aluminium
Cylinder	Aluminium alloy Anodized
Spring	Zinc plated steel
Pneumatic cylinder seals	NBR (FPM for variants with seals in contact with fluid in FPM or PTFE)
Seals in contact with fluid	NBR, FPM, PTFE
Piston rod	Chromed stainless steel
Bushing, Bushing pad, Nut pad	Brass

## Working characteristics

Pneumatic cylinder fluid	Filtered and lubricated air or non
Valve fluid	Fluid compatible with gasket compounds available
Maximum working pressure (bar)	10
Temperature °C, non magnetic piston, NBR seals	-10 / + 70
non magnetic piston, FPM seals	-10 / + 150
non magnetic piston, PTFE seals	-10 / + 150
magnetic piston, NBR, FPM, PTFE seals	-10 / + 70

"T" body version Pad valves



Ordering code

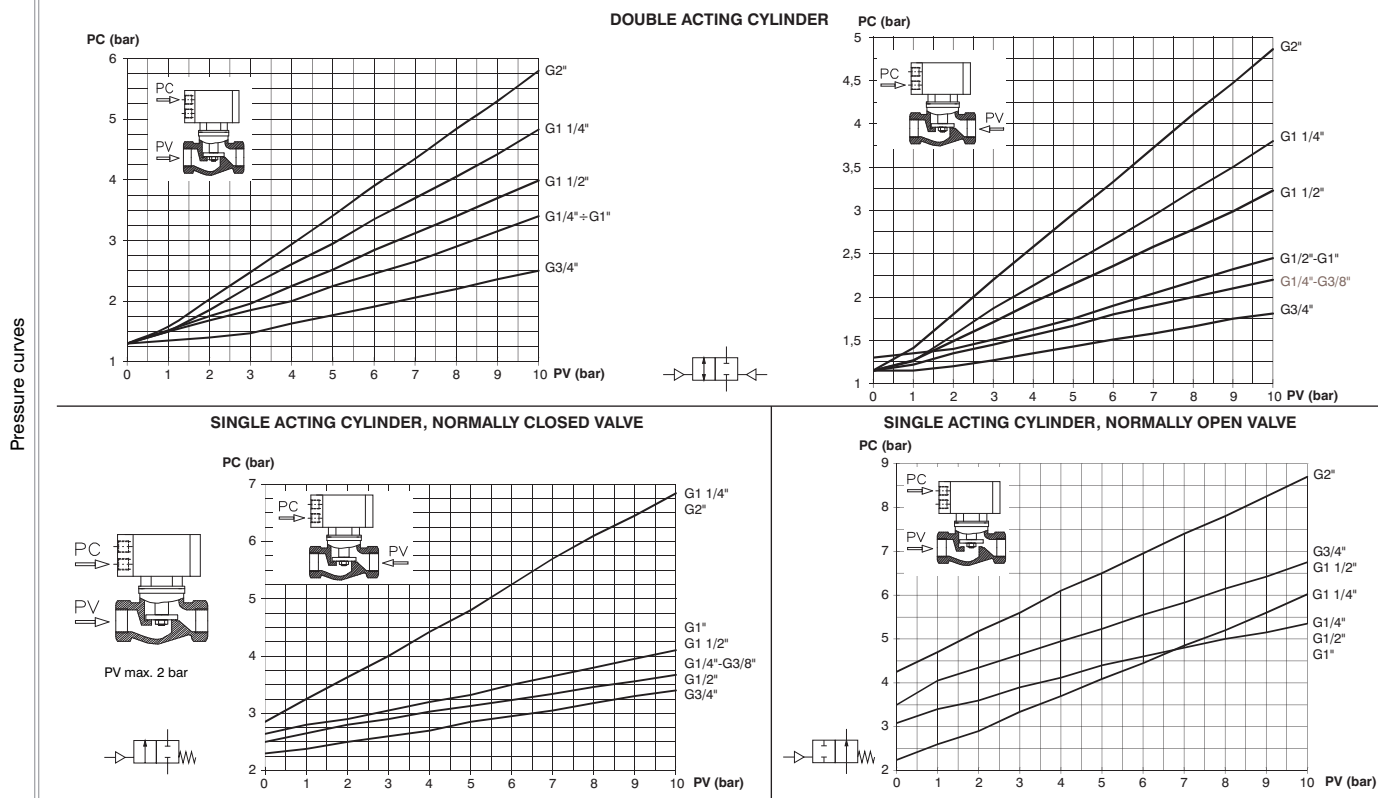
PVA.B.A.P.T.C.S

- ACTING
- A** DE=Double acting
- SC=Normally closed
- SA=Normally open
- PISTON
- P** N=Non magnetic
- M= Magnetic
- CONNECTIONS
- A=G1/4"
- B=G3/8"
- C=G1/2"
- C** D=G3/4"
- E=G1"
- F=G1 1/4"
- G=G1 1/2"
- H=G2"
- SEALS
- S** N=NBR
- V=FPM
- F=PTFE

TABLE OF DIMENSIONS

Connection (N)	Non magnetic version			Magnetic version			TECHNICAL DATA												
	A	C	D	A	C	D	B	E	F	G	H	L	M	P	Actuator (Ø)	Nominal Valve (Ø)	Weight (gr.)		
G1/4"	93,5	77,5	41	97,5	81,5	45	16	10,25	G1/8"	32,5	28,5	64	47	25	Ø40	Ø13,5	350		
G3/8"	93,5	77,5	41	97,5	81,5	45	16	10,25	G1/8"	32,5	28,5	64	47	25	Ø40	Ø13,5	350		
G1/2"	93,5	78	41	99,5	82	45	17,5	10,25	G1/8"	32,5	28,5	68	47	30	Ø40	Ø15	400		
G 3/4"	105	83	41	113	90	48	22	11,25	G1/8"	44	40	79	70	36	Ø63	Ø20,5	850		
G1"	117	89	41	125	101	53	28	11,25	G1/8"	44	40	94	70	44	Ø63	Ø25	1100		
G1 1/4"	131	103	48	136	108	53	28	11,25	G1/8"	44	40	110	70	55	Ø63	Ø30	1400		
G1 1/2"	154	118	57	166	130	69	36	13,75	G1/8"	56	49	120	90	60	Ø80	Ø38	2100		
G2"	169	124	57	181	136	69	45	13,75	G1/8"	56	49	140	90	73	Ø80	Ø49,5	3000		

Pad valves, 2-ways, are a reliable and economic solution to control fluid. Pneumatically actuated by a compact double or single acting cylinder with 360° revolving connections. Standard seals in contact with fluid are made in NBR, FPM or PTFE. The barrel profile allows the use of Pneumax magnetic sensors series 1500 (see the Pneumax General catalogue, chapter 4).



Operational characteristics

- Rear eye, Piston and Rod bushing=Anodized aluminium
- Cylinder=Aluminium alloy Anodized
- Spring=Zinc plated steel
- Seals=NBR, FPM, PTFE
- Piston rod=Chromed stainless steel
- Bushing, Bushing pad, Nut pad=Brass

Technical characteristics

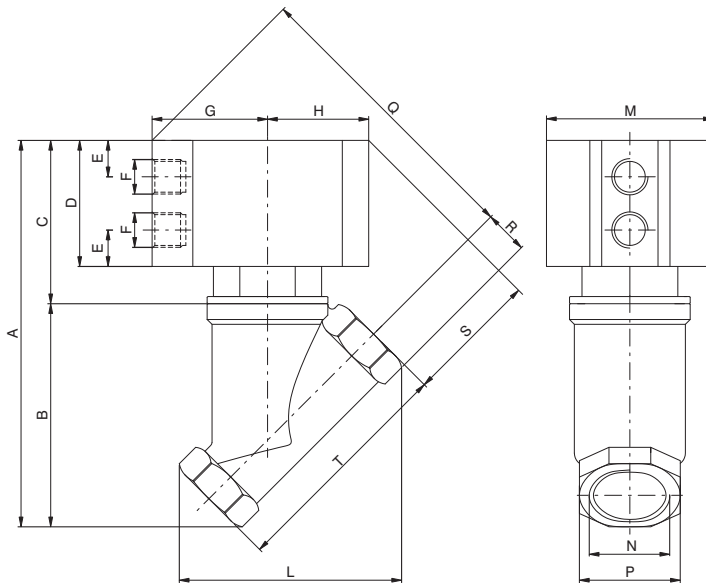
Fluid	Filtered and lubricated air or non
Maximum working pressure (bar)	10
Temperature °C (non magnetic piston, NBR seals)	-10 / + 70
Temperature °C (non magnetic piston, FPM seals)	-10 / + 150
Temperature °C (non magnetic piston, PTFE seals)	-10 / + 150
Temperature °C (magnetic piston, NBR, FPM, PTFE seals)	-10 / + 70







"Y" body version Pad valves

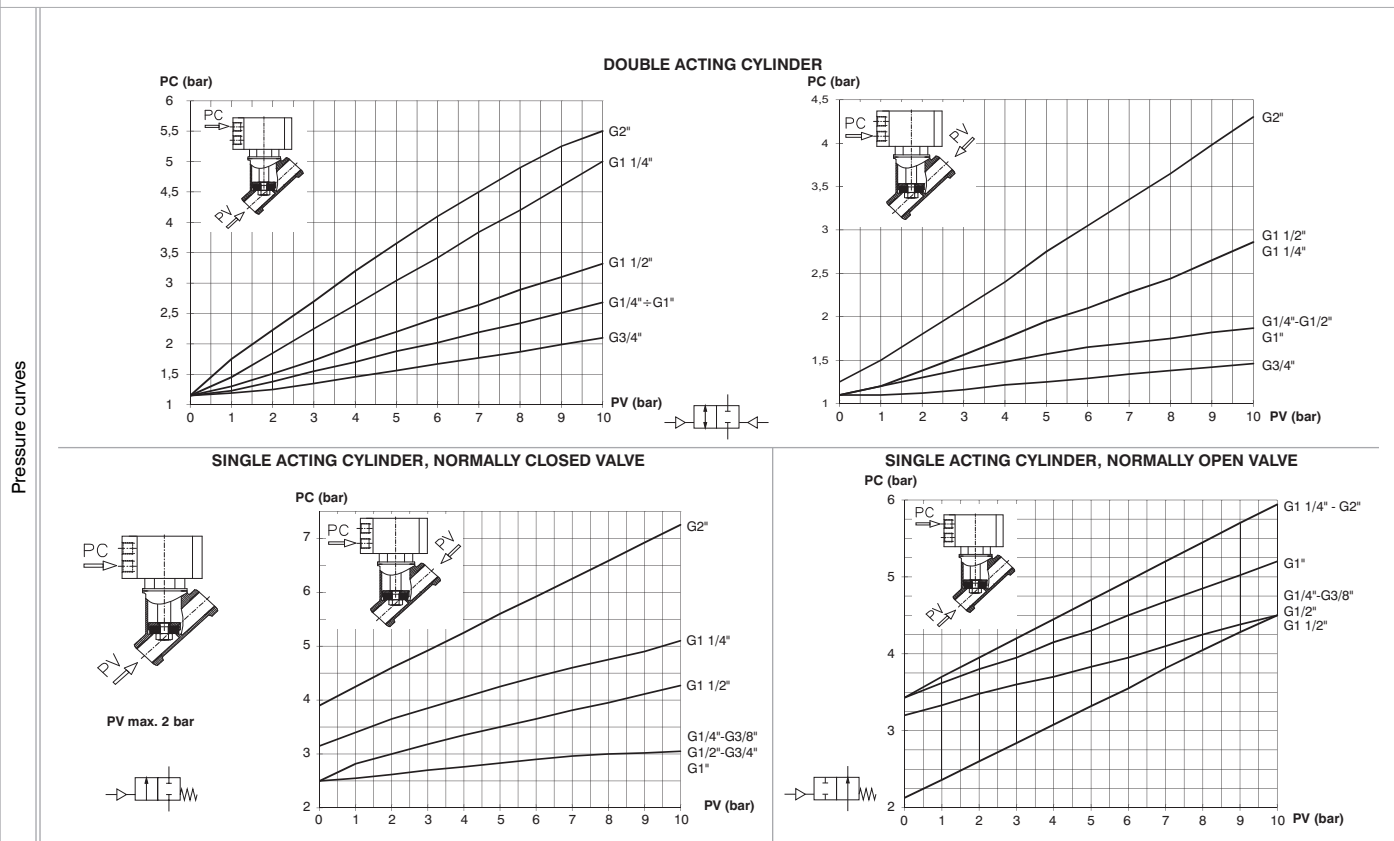


- Ordering code  
**PVA.B.A.P.Y.C.S**
- ACTING
  - DE=Double acting
  - SC=Normally closed
  - SA=Normally open
  - PISTON
  - N=Non magnetic
  - M= Magnetic
  - CONNECTIONS
  - A=G1/4"
  - B=G3/8"
  - C=G1/2"
  - D=G3/4"
  - E=G1"
  - F=G1 1/4"
  - G=G1 1/2"
  - H=G2"
  - SEALS
  - N=NBR
  - V=FPM
  - F=PTFE


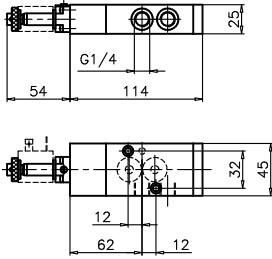

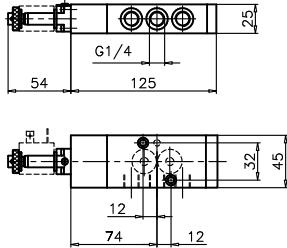
TABLE OF DIMENSIONS


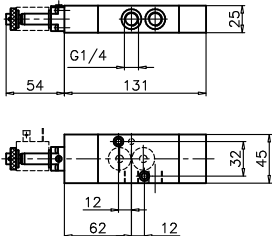

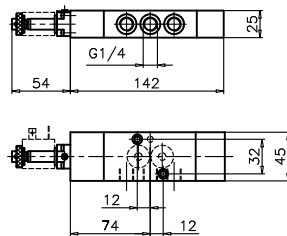
Connection (N)	Non magnetic version					Magnetic version					TECHNICAL DATA												
	A	C	D	Q	S	A	C	D	Q	S	B	E	F	G	H	L	M	P	R	T	Actuator (Ø)	Nominal Valve (Ø)	Weight (gr.)
G1/4"	121	71	45	95	51	124	74	48	97	53	50	10,3	G1/8"	32,5	28,5	52	47	21	10,5	50	Ø40	Ø13	350
G3/8"	121	71	45	95	51	124	74	48	97	53	50	10,3	G1/8"	32,5	28,5	52	47	21	10,5	50	Ø40	Ø13	350
G1/2"	127	71	45	97	54	130	74	48	99	56	56	10,3	G1/8"	32,5	28,5	57	47	27	13,5	56	Ø40	Ø13	400
G 3/4"	148	80	48	119	66	201	133	104	175	92	68	11,3	G1/8"	44	40	70	70	32	16	66	Ø63	Ø18	850
G1"	159	75	48	123	75	215	131	104	175	92	84	11,3	G1/8"	44	40	82	70	38	19	78	Ø63	Ø21,5	850
G1 1/4"	184	91	65	140	70	231	138	112	172	96	93	11,3	G1/8"	44	40	105	70	47	23,5	101	Ø63	Ø30	1200
G1 1/2"	180	99	81	173	85	255	129	111	187	107	126	13,8	G1/8"	56	49	125	90	55	27,5	113	Ø80	Ø36	2000
G2"	246	106	88	182	88	269	129	111	203	109	140	13,8	G1/8"	56	49	136	90	68	34	125	Ø80	Ø46	2300


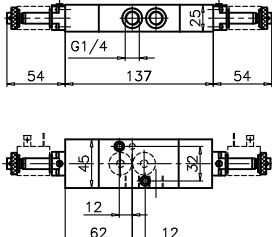

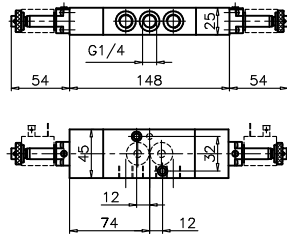
Pad valves, 2-ways, are a reliable and economic solution to control fluid. Pneumatically actuated by a compact double or single acting cylinder with 360° revolving connections. Standard seals in contact with fluid are made in NBR, FPM or PTFE. The barrel profile allows the use of Pneumax magnetic sensors series 1500 (see the Pneumax General catalogue, chapter 4).



Operational characteristics	Technical characteristics
- Rear eye, Piston and Rod bushing=Anodized aluminium	Fluid
- Cylinder=Aluminium alloy Anodized	Maximum working pressure (bar)
- Spring=Zinc plated steel	Temperature °C (non magnetic piston, NBR seals)
- Seals=NBR, FPM, PTFE	Temperature °C (non magnetic piston, FPM seals)
- Piston rod=Chromed stainless steel	Temperature °C (non magnetic piston, PTFE seals)
- Bushing, Bushing pad, Nut pad=Brass	Temperature °C (magnetic piston, NBR, FPM, PTFE seals)
	Filtered and lubricated air or non
	10
	-10 / + 70
	-10 / + 150
	-10 / + 150
	-10 / + 70

3/2 Solenoid - Spring		Ordering code			Solenoid - Spring 5/2	
  Weight gr. 390 Minimum working pressure 2,5 bar		<b>514/N.0.1.M2</b> TYPE 32=3 ways 52=5 ways			  Weight gr. 450 Minimum working pressure 2,5 bar	
<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air	10 bar	-10 - +50	1030 Nl/min	mm 7	G 1/4"

3/2 Solenoid - Differential		Ordering code			Solenoid - Differential 5/2	
  Weight gr. 390 Minimum working pressure 2,5 bar		<b>514/N.0.12.M2</b> TYPE 32=3 ways 52=5 ways			  Weight gr. 450 Minimum working pressure 2,5 bar	
<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air	10 bar	-10 - +50	1030 Nl/min	mm 7	G 1/4"

3/2 Solenoid - Solenoid		Ordering code			Solenoid - Solenoid 5/2	
  Weight gr. 390 Minimum working pressure 2,5 bar		<b>514/N.0.0.M2</b> TYPE 32=3 ways 52=5 ways			  Weight gr. 450 Minimum working pressure 2,5 bar	
<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air	10 bar	-10 - +50	1030 Nl/min	mm 7	G 1/4"

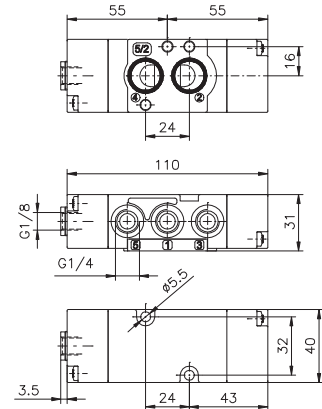
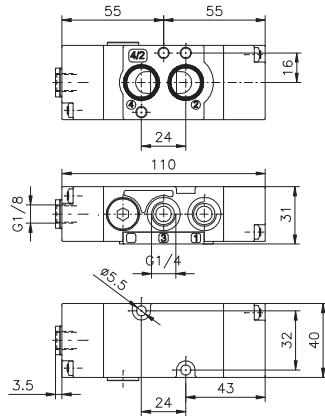
Pneumatic - Differential / Pneumatic - Pneumatic / Pneumatic - Spring

4/2  
5/2

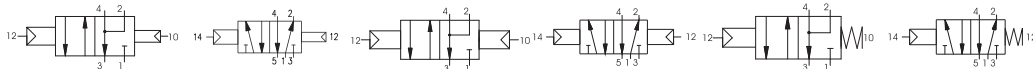
Ordering code

**T514.T.00.F**

- T** TYPE  
42=4 ways  
52=5 ways
- F** FUNCTION  
16=Pneumatic - Differential  
18=Pneumatic - Pneumatic  
19=Pneumatic - Spring



Weight gr. 140  
Minimum pilot pressure 2,5 bar



Maximum fixing torque for fittings 9 N/m

Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-10 - +50	1100 NI/min	mm 8	G 1/4"

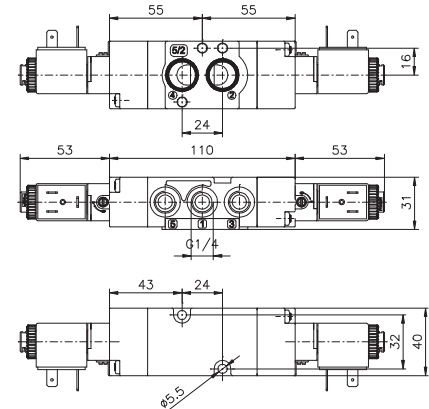
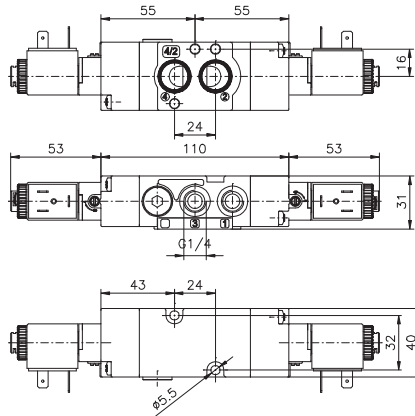
Solenoid - Solenoid

4/2  
5/2

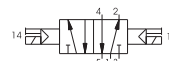
Ordering code

**T514.T.00.35.V**

- T** TYPE  
42=4 ways  
52=5 ways
- V** VOLTAGE  
B04=12 VDC  
B05=24 VDC  
B09=24 VDC (2W)  
B56=24V (50-60 Hz)  
B57=110V (50-60 Hz)  
B58=230V (50-60 Hz)



Weight gr. 250  
Minimum pilot pressure 2,5 bar  
Maximum fixing torque for fittings 9 N/m

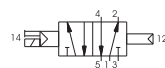
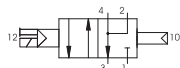
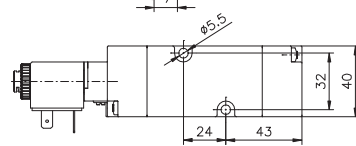
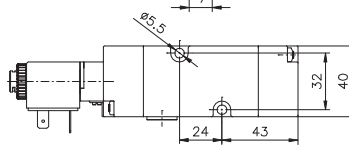
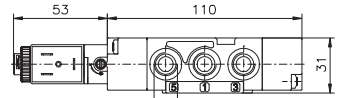
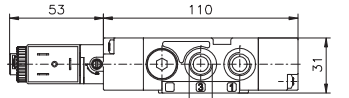
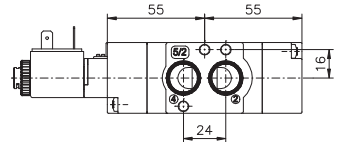
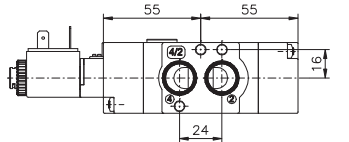


Operational characteristic

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air	10 bar	-10 - +50	1100 NI/min	mm 8	G 1/4"

Solenoid - Differential / Solenoid - Spring

Ordering code	
<b>T514.1.00.F.V</b>	
TYPE	
1 42=4 ways	
52=5 ways	
FUNCTION	
F 36=Solenoid - Differential	
39=Solenoid - Spring	
VOLTAGE	
B04=12 VDC	
B05=24 VDC	
V B09=24 VDC (2W)	
B56=24V (50-60 Hz)	
B57=110V (50-60 Hz)	
B58=230V (50-60 Hz)	

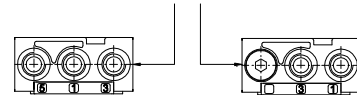
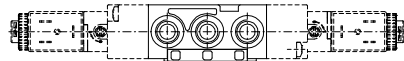
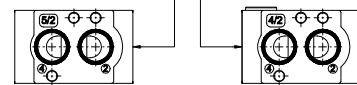
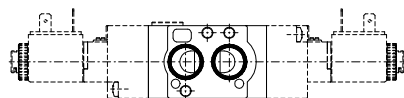


Weight gr. 200  
Minimum pilot pressure 2,5 bar  
Maximum fixing torque for fittings 9 N/m

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air	10 bar	-10 - +50	1100 NI/min	mm 8	G 1/4"

Universal kit

Ordering code	
<b>T514.92.00.F.V</b>	
FUNCTION	
16=Pneumatic - Differential	
18=Pneumatic - Pneumatic	
F 19=Pneumatic - Spring	
35=Solenoid - Solenoid	
36=Solenoid - Differential	
39=Solenoid - Spring	
VOLTAGE	
B04=12 VDC	
B05=24 VDC	
V B09=24 VDC (2W)	
B56=24V (50-60 Hz)	
B57=110V (50-60 Hz)	
B58=230V (50-60 Hz)	



Weight gr. 170  
Minimum pilot pressure 2,5 bar  
Maximum fixing torque for fittings 9 N/m



To change a 5/2 valve into a 4/2:  
Simply replace the bottom plate with the one included in the universal kit (cod. T514.92....) and by plugging port 5

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air	10 bar	-10 - +50	1100 NI/min	mm 8	G 1/4"

**General**

5 ways 2 or 3 positions distributors and electric distributors can be used mounted on individual or ganged bases. A special feature of these devices is that some of their dimensional and functional characteristics comply with international standards, which require that distributors manufactured by different makers be interchangeable. These standards are ISO 5599/1, according to which certain dimensions are mandatory, namely, the mounting surface, the pitch of the fastening screws, the characteristic of the electric pilot, the flow rate, the pneumatic connections, and so on. The design is based on the balanced spool principle with pneumatic or electropneumatic actuators and resetting by mechanically or pneumatically operated spring. The 3 position closed centres, are obtained by spring operation. The feed to the actuators on the distributors can be provided either by pressure intake from inlet 1 (autofeed) or through the base from inlets 12 and 14 (external feed); there are two separate types of these distributors: one is the Series 1000 and the other is the Series 1010. The Serie 1000 includes size 1 and 2 and are built of die-cast aluminium. The selection is made by turning a seal fitted between body and operator by 180°, so to utilize external-feed pilot or with internal feed. **Ordering codes are referring to distributors with "M2" mechanics or solenoid valves "S" mounted (see Series 300). (M2 coil are not included and have to be ordering separately).**

**Coil for M2 and solenoid "S" C  US homologated are available (see Series 300).**

The series 1010 includes 3 sizes: 1, 2 and 3. The body and operators of distributor size 1 and 2 are built of acetal resin protected by an anodized aluminium cap, while size 3 is made of die-cast aluminium with protection cap as well. The selection is made as above. For the electro-distributors it is used the electro-pilots CNOMO Series M with possibility to instal the coils ISO 4400 (DIN 43650) or the coil MB 22x22.

**Use and maintenance**

These distributors have an average life span ranging between 10 and 15 million cycles, depending on operating conditions. Proper lubrication cuts down the wear of the seals drastically, in the same way as proper filtering prevents the build-up of dirt and consequent malfunctioning of the distributors. Make sure that the conditions of use comply with the pressure, temperature etc. limits indicated and that the fastening screws are tightened with the following maximum torques on distributors Serie 1010.

**Size 1 = 4 Nm                      Size 2 = 5 Nm                      Size 3 = 8 Nm**

Assembly kits, including the spool and seals subject to wear, are available for servicing, which can be carried out by anyone provided proper care is taken when reassembling the distributors.

ATTENTION : use only class H Hydraulic oils for lubrication. e.g. MAGNA GC 32 (CASTROL).

**Construction characteristics**

Series 1000	Size 1	Size 2
Body	Zinc alloy	Aluminium
Operators	Zinc alloy	Aluminium
Spools	Stainless steel	Steel
Seals	NBR	NBR
Spacers	Technopolymer	Aluminium
Springs	Spring steel	Spring steel
Selectors	NBR	NBR

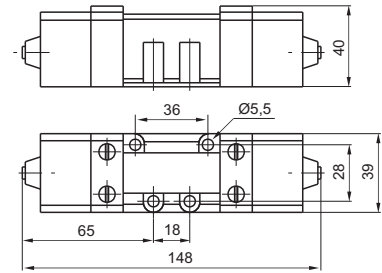
Series 1010	Size 1	Size 2	Size 3
Body	Technopolymer	Technopolymer	Technopolymer
Operators	Technopolymer	Technopolymer	Technopolymer
Spools	Steel	Steel	Steel
Seals	NBR	NBR	NBR
Spacers	Technopolymer	Technopolymer	Technopolymer
Control pistons	Aluminium	Aluminium	Aluminium
Springs	Spring steel	Spring steel	Spring steel

**Pneumatic - Spring - 5/2**

Ordering code
<b>1001.52.1.9</b>



Weight gr. 780  
Minimum operating pressure 2,5 bar



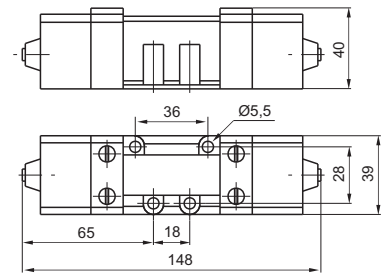
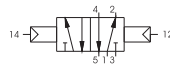
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	840

**Pneumatic - Differential - 5/2**

Ordering code
<b>1001.52.1.6</b>



Weight gr. 790  
Minimum operating pressure 2 bar



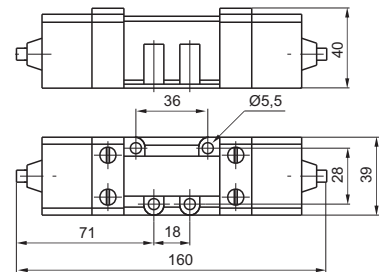
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	840

**Pneumatic - Pneumatic - 5/2**

Ordering code
<b>1001.52.1.8</b>



Weight gr. 800  
Minimum operating pressure 1,5 bar



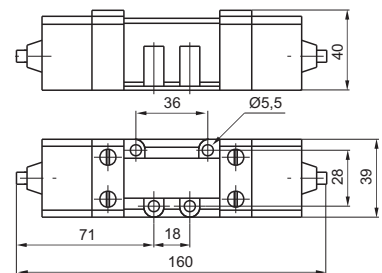
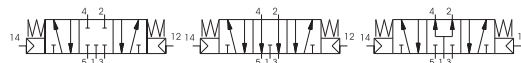
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	840

**Pneumatic - Pneumatic - 5/3**

Ordering code
<b>1001.53.Ⓡ.1.8</b>
FUNCTION
Ⓡ 31=Closed centres
Ⓡ 32=Open centres
Ⓡ 33=Pressured centres



Weight gr. 800  
Minimum operating pressure 3 bar



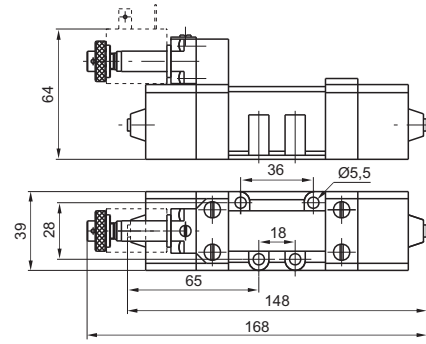
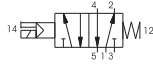
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	720

**Solenoid - Spring - 5/2**

Ordering code
<b>1051.52.3.9.M2</b>



Weight gr. 890  
Minimum operating pressure 2,5 bar



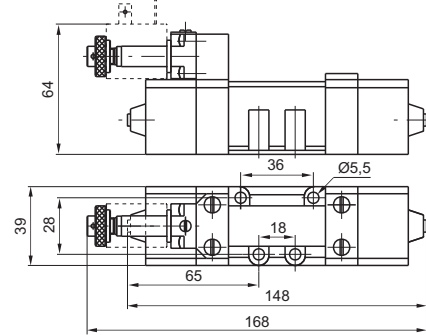
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	840

**Solenoid - Differential - 5/2**

Ordering code
<b>1051.52.3.6.M2</b>



Weight gr. 900  
Minimum operating pressure 2 bar



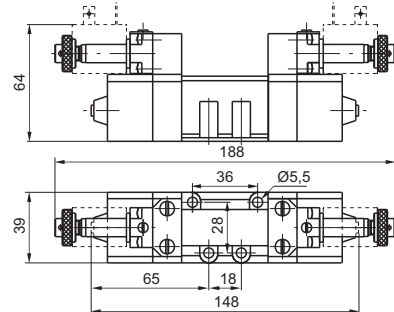
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	840

**Solenoid - Solenoid - 5/2**

Ordering code
<b>1051.52.3.5.M2</b>



Weight gr. 1040  
Minimum operating pressure 1,5 bar



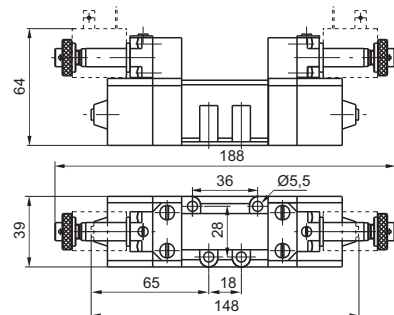
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	840

**Solenoid - Solenoid - 5/3**

Ordering code
<b>1051.53.3.5.M2</b>
FUNCTION
31 = Closed centres
32 = Open centres
33 = Pressured centres



Weight gr. 1040  
Minimum operating pressure 3 bar

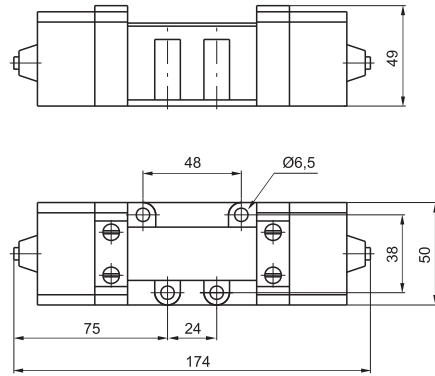


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	720

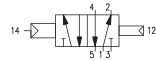


**Pneumatic - Differential - 5/2**

Ordering code
<b>1002.52.1.6</b>



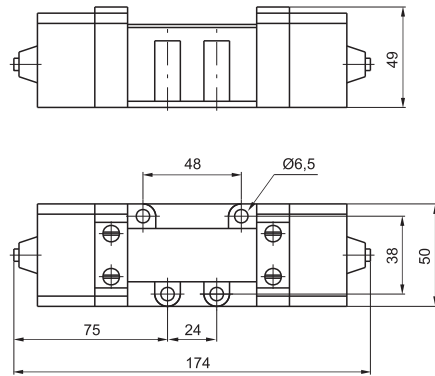
Weight gr. 730  
Minimum operating pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	1700

**Pneumatic - Pneumatic - 5/2**

Ordering code
<b>1002.52.1.8</b>



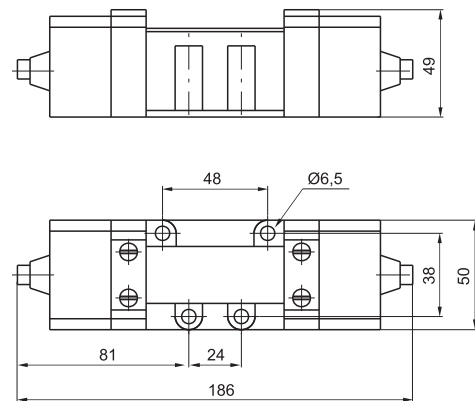
Weight gr. 800  
Minimum operating pressure 1,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	1700

**Pneumatic - Pneumatic - 5/3**

Ordering code
<b>1002.53.F.1.8</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 740  
Minimum operating pressure 3 bar



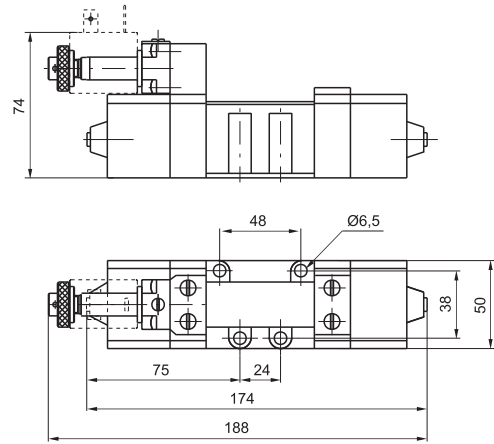
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +70	1700



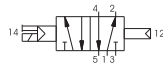
**Solenoid - Differential - 5/2**

Ordering code

**1052.52.3.6.M2**



Weight gr. 850  
Minimum operating pressure 2 bar



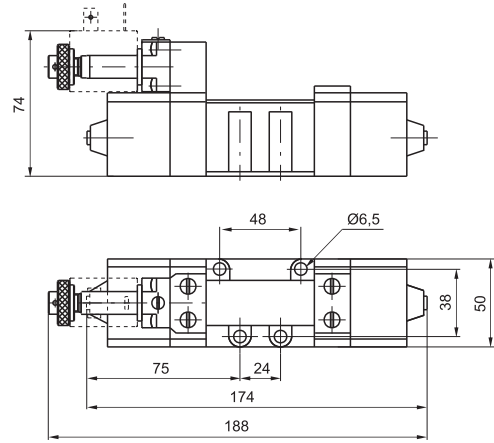
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1700

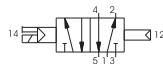
**Solenoid - Solenoid - 5/2**

Ordering code

**1052.52.3.5.M2**



Weight gr. 980  
Minimum operating pressure 1,5 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1700

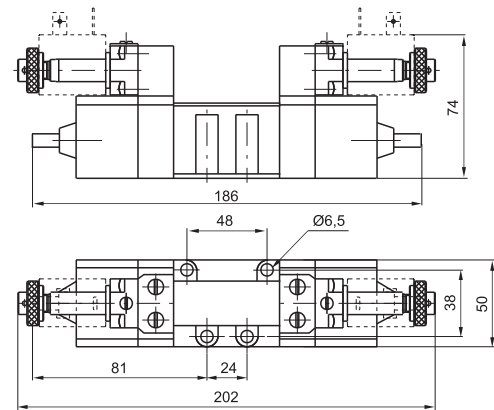
**Solenoid - Solenoid - 5/3**

Ordering code

**1052.53.ⓕ.3.5.M2**

FUNCTION

- ⓕ 31 = Closed centres
- 32 = Open centres
- 33 = Pressured centres



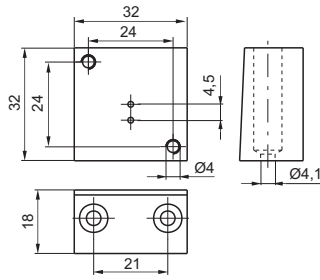
Weight gr. 980  
Minimum operating pressure 3 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1700

Base CNOMO for 32 mm Solenoid valve

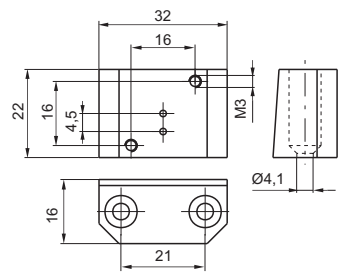


Ordering code

**1001.04**

Weight gr. 90

Base for 32 mm Solenoid valve

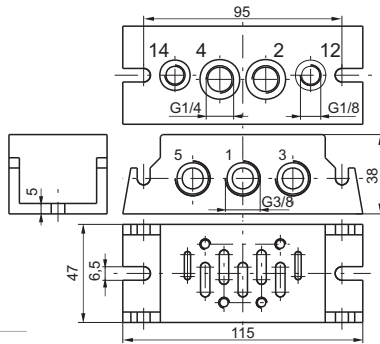


Ordering code

**1001.05**

Weight gr. 60

Base with bottom connections size 1

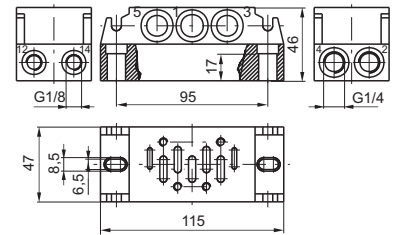


Ordering code

**1001.00**

Weight gr. 320  
1=INLET PORT 2-4=OUTLET PORTS  
3-5=EXHAUST PORTS 12-14=PILOT PORTS

Base with side connections size 1

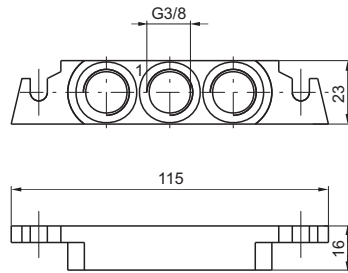


Ordering code

**1001.01**

Weight gr. 445  
1=INLET PORT 2-4=OUTLET PORTS  
3-5=EXHAUST PORTS 12-14=PILOT PORTS

Inlet blocks

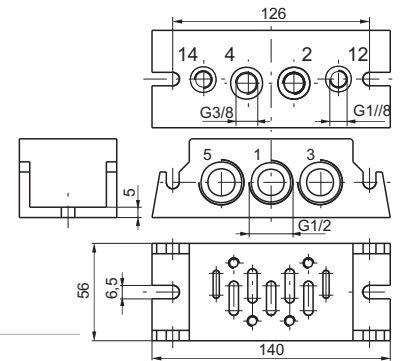


Ordering code

**1001.02**

Weight gr. 55

Base with bottom connections size 2



Ordering code

**1002.00**

Weight gr. 520  
1=INLET PORT 2-4=OUTLET PORTS  
3-5=EXHAUST PORTS 12-14=PILOT PORTS

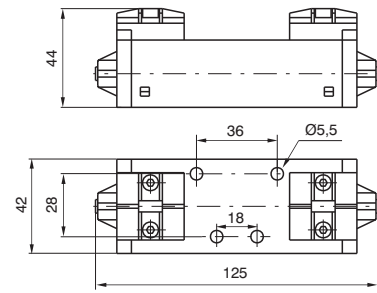
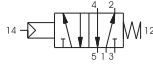
2

**Pneumatic - Spring - 5/2**

Ordering code
<b>1011.52.1.9</b>



Weight gr. 230  
Minimum operating pressure 2,5 bar



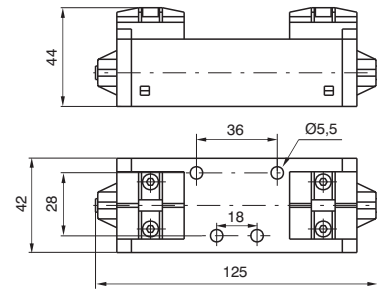
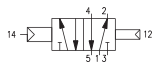
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Pneumatic - Differential - 5/2**

Ordering code
<b>1011.52.1.6</b>



Weight gr. 240  
Minimum operating pressure 2 bar



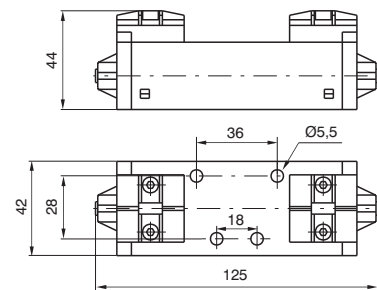
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Pneumatic - Pneumatic - 5/2**

Ordering code
<b>1011.52.1.8</b>



Weight gr. 240  
Minimum operating pressure 1,5 bar



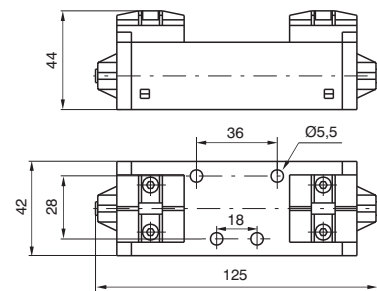
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Pneumatic - Pneumatic - 5/3**

Ordering code
<b>1011.53.F.1.8</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 240  
Minimum operating pressure 3 bar



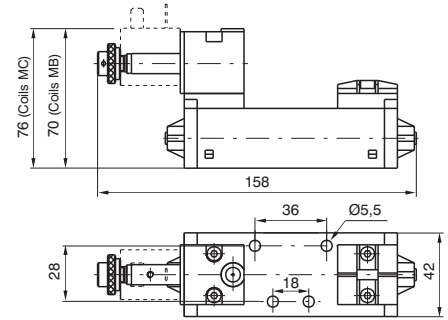
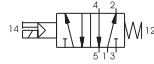
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900



**Solenoid - Spring - 5/2**

Ordering code
<b>1011.52.3.9.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 290  
Minimum operating pressure 2,5 bar

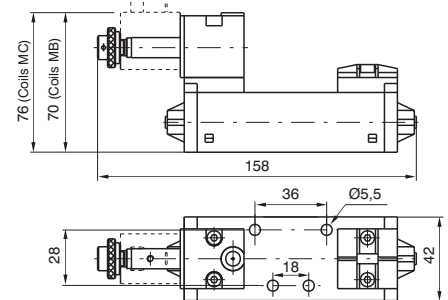


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Solenoid - Differential - 5/2**

Ordering code
<b>1011.52.3.6.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 290  
Minimum operating pressure 2 bar

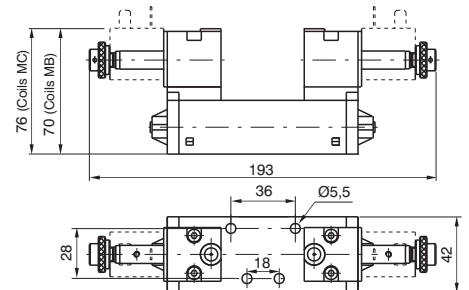


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Solenoid - Solenoid - 5/2**

Ordering code
<b>1011.52.3.5.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 350  
Minimum operating pressure 1,5 bar

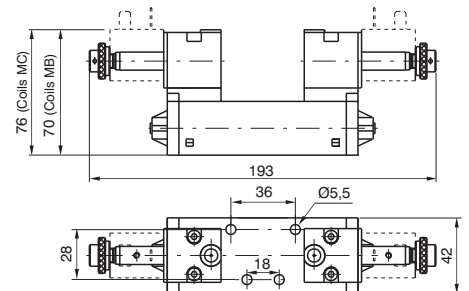


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

**Solenoid - Solenoid - 5/3**

Ordering code
<b>1011.53.F.3.5.M</b>
<b>F</b> FUNCTION
31 = Closed centres
32 = Open centres
33 = Pressured centres
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 350  
Minimum operating pressure 3 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	900

2

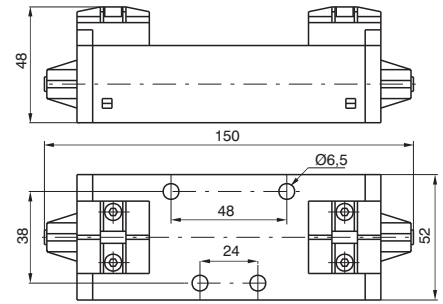
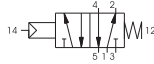
**Pneumatic - Spring - 5/2**

Ordering code

**1012.52.1.9**



Weight gr. 300  
Minimum operating pressure 2,5 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1600

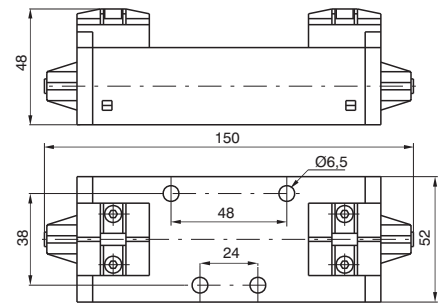
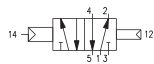
**Pneumatic - Differential - 5/2**

Ordering code

**1012.52.1.6**



Weight gr. 310  
Minimum operating pressure 2 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1600

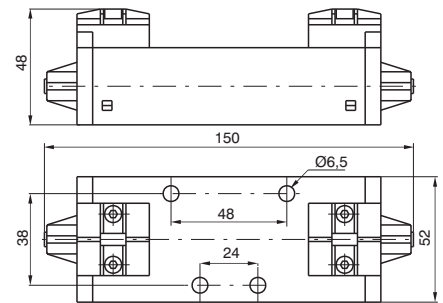
**Pneumatic - Pneumatic - 5/2**

Ordering code

**1012.52.1.8**



Weight gr. 310  
Minimum operating pressure 1,5 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1600

**Pneumatic - Pneumatic - 5/3**

Ordering code

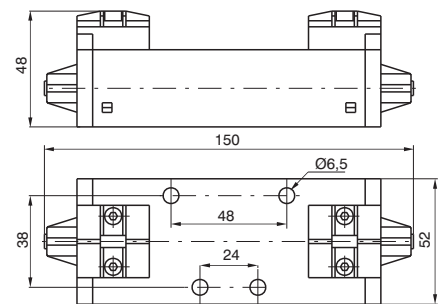
**1012.53.F.1.8**

**FUNCTION**

- 31=Closed centres
- 32=Open centres
- 33=Pressured centres



Weight gr. 310  
Minimum operating pressure 3 bar



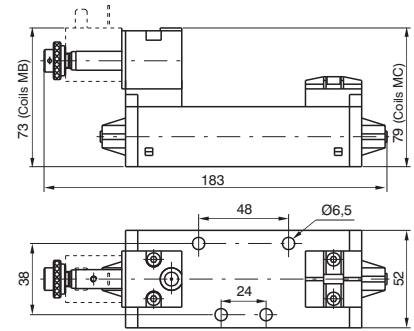
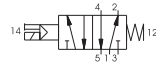
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
Filtered and lubricated air	10	-5 - +50	1600

**Solenoid - Spring - 5/2**

Ordering code
<b>1012.52.3.9.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 360  
Minimum operating pressure 2,5 bar

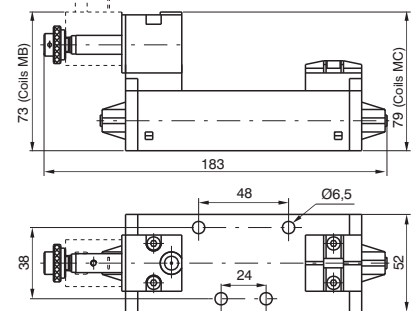
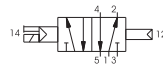


<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)
	Filtered and lubricated air	10	-5 - +50	1600

**Solenoid - Differential - 5/2**

Ordering code
<b>1012.52.3.6.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 360  
Minimum operating pressure 2 bar

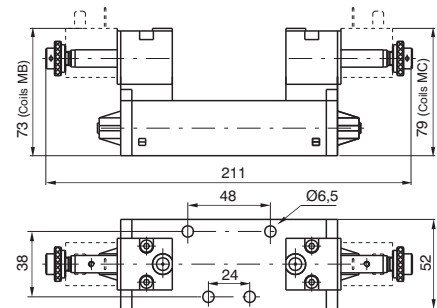
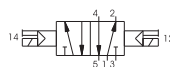


<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)
	Filtered and lubricated air	10	-5 - +50	1600

**Solenoid - Solenoid - 5/2**

Ordering code
<b>1012.52.3.5.M</b>
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 420  
Minimum operating pressure 1,5 bar

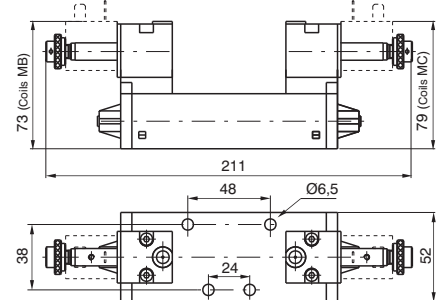


<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)
	Filtered and lubricated air	10	-5 - +50	1600

**Solenoid - Solenoid - 5/3**

Ordering code
<b>1012.53.F.3.5.M</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres
<b>M</b> MECHANICAL CODE
See Valves Series 300 CNOMO

Weight gr. 420  
Minimum operating pressure 3 bar



<b>Operational characteristic</b>	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)
	Filtered and lubricated air	10	-5 - +50	1600

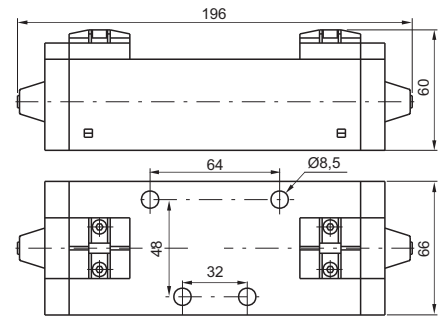
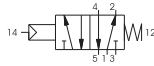
**Pneumatic - Spring - 5/2**

Ordering code

**1013.52.1.9**



Weight gr. 1000  
Minimum operating pressure 2,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
		Filtered and lubricated air	10	-5 - +50

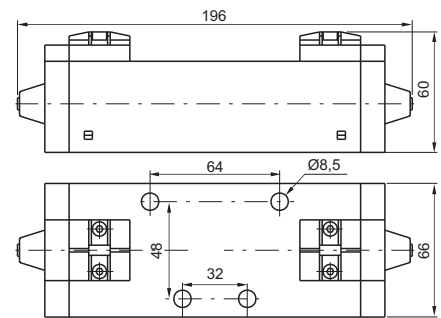
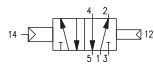
**Pneumatic - Differential - 5/2**

Ordering code

**1013.52.1.6**



Weight gr. 1020  
Minimum operating pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
		Filtered and lubricated air	10	-5 - +50

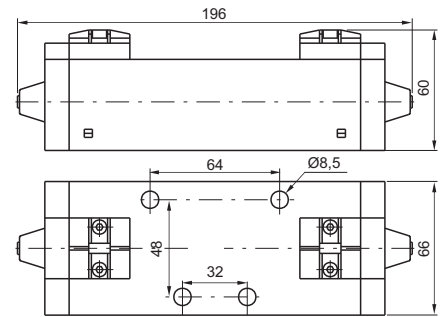
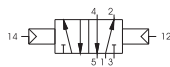
**Pneumatic - Pneumatic - 5/2**

Ordering code

**1013.52.1.8**



Weight gr. 1050  
Minimum operating pressure 1,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
		Filtered and lubricated air	10	-5 - +50

**Pneumatic - Pneumatic - 5/3**

Ordering code

**1013.53.F.1.8**

FUNCTION

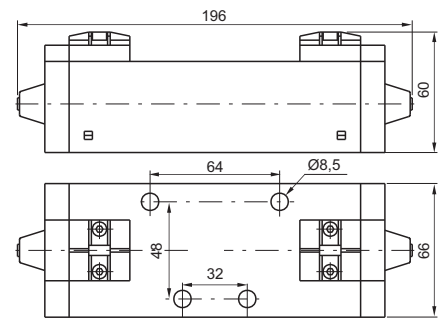
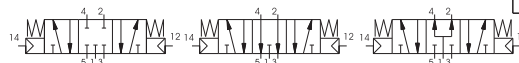
31 = Closed centres

32 = Open centres

33 = Pressured centres



Weight gr. 1050  
Minimum operating pressure 3 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
		Filtered and lubricated air	10	-5 - +50

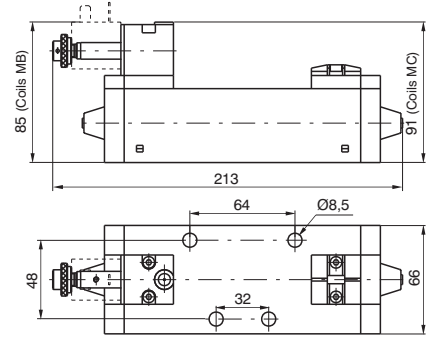


**Solenoid - Spring - 5/2**

Ordering code
<b>1013.52.3.9.M</b>
<b>M</b> MECHANICAL CODE See Valves Series 300 CNOMO



Weight gr. 1060  
Minimum operating pressure 2,5 bar



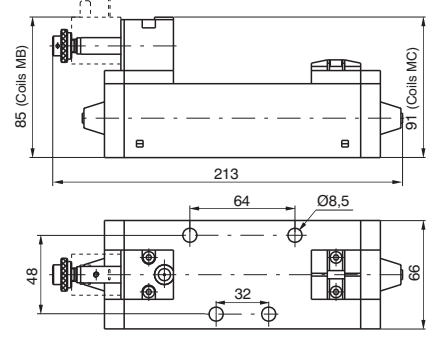
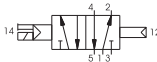
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	3600

**Solenoid - Differential - 5/2**

Ordering code
<b>1013.52.3.6.M</b>
<b>M</b> MECHANICAL CODE See Valves Series 300 CNOMO



Weight gr. 1080  
Minimum operating pressure 2 bar



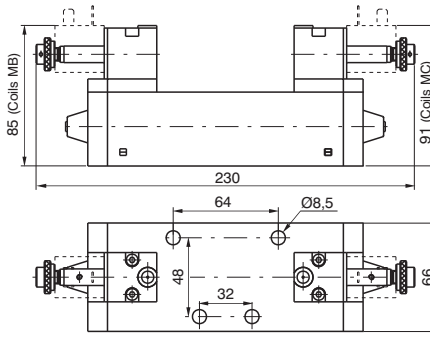
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	3600

**Solenoid - Solenoid - 5/2**

Ordering code
<b>1013.52.3.5.M</b>
<b>M</b> MECHANICAL CODE See Valves Series 300 CNOMO



Weight gr. 1170  
Minimum operating pressure 1,5 bar



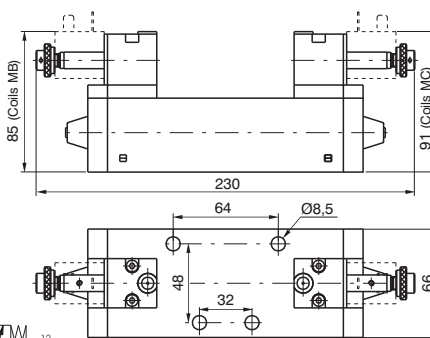
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	3600

**Solenoid - Solenoid - 5/3**

Ordering code
<b>1013.53.F.3.5.M</b>
<b>F</b> FUNCTION 31=Closed centres 32=Open centres 33=Pressured centres
<b>M</b> MECHANICAL CODE See Valves Series 300 CNOMO



Weight gr. 1170  
Minimum operating pressure 3 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)
	Filtered and lubricated air	10	-5 - +50	3000



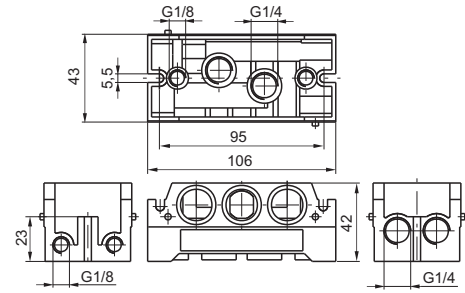


These bases are manufactured with the outlet and pilot ports on both the sides and the bottom faces giving the option for use with any application. Unused ports must be blanked off using threaded plugs which are not included in the part number or price. To isolate bases from each other for use with different supply pressures ports 1, 3 & 5 should be plugged underneath the seal.

The codes are:

**1101.17** (size 1) - **1102.17** (size 2) - **1103.17** (size 3)

Size 1

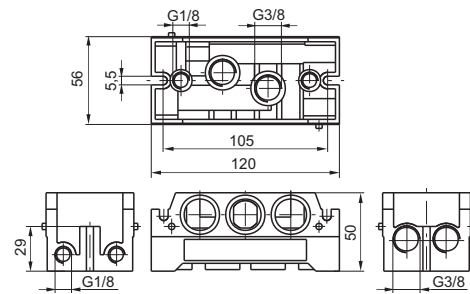


Ordering code

**1101.00**

Weight gr. 240

Size 2

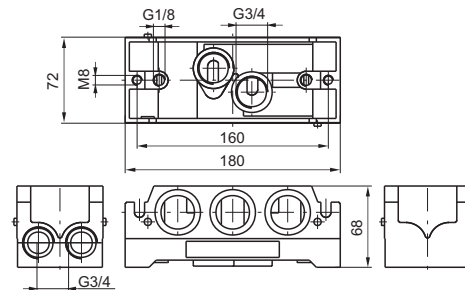


Ordering code

**1102.00**

Weight gr. 340

Size 3



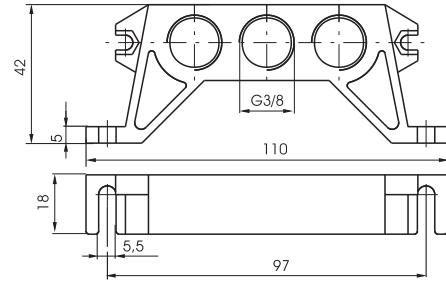
Ordering code

**1103.00**

Weight gr. 950

2

Size 1



Ordering code

**1101.09**

Weight gr. 100

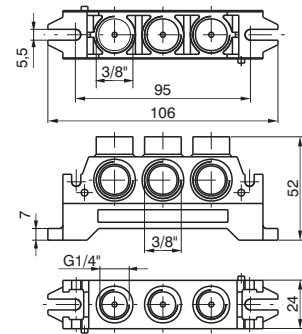
Size 1

Ordering code

**1101.C**

CONNECTIONS

- 10=Universal
- C** 11=Aligned connections
- 12=Top connections
- 13=Bottom connections



Weight gr. 160

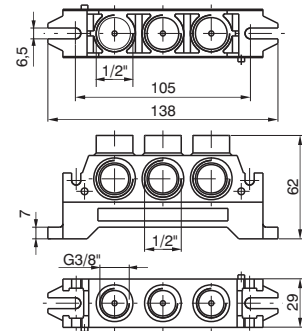
Size 2

Ordering code

**1102.C**

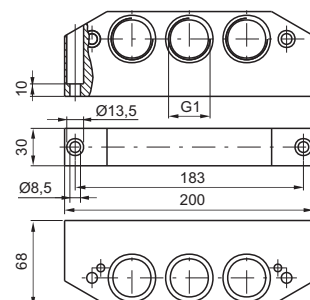
CONNECTIONS

- 10=Universal
- C** 11=Aligned connections
- 12=Top connections
- 13=Bottom connections



Weight gr. 230

Size 3



Ordering code

**1103.11**

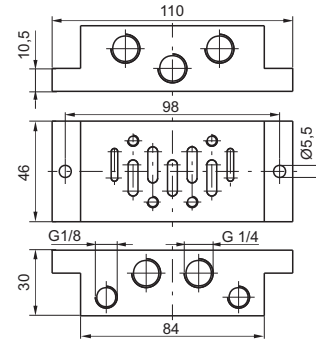
Weight gr. 840

**Size 1 - shape "A"**

Ordering code
<b>1101.14</b>



Weight gr. 160

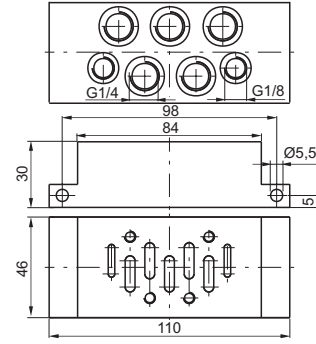


**Size 1 - shape "B"**

Ordering code
<b>1101.15</b>

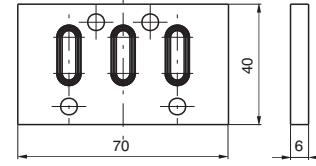


Weight gr. 190



**Size 1 - closing plate**

Ordering code
<b>1101.16</b>

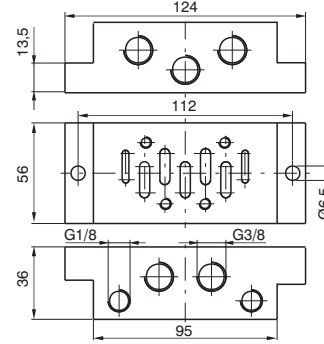


**Size 2 - shape "A"**

Ordering code
<b>1102.14</b>



Weight gr. 190

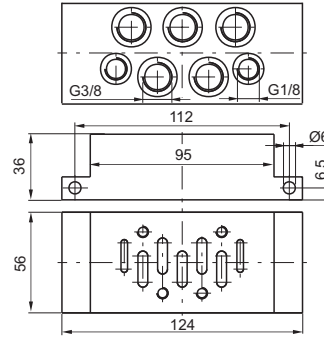


**Size 2 - shape "B"**

Ordering code
<b>1102.15</b>



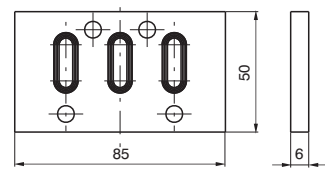
Weight gr. 220



**Size 2- closing plate**

Ordering code

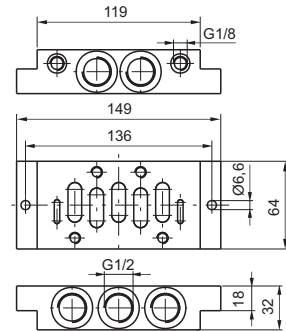
**1102.16**



**Size 3 - shape "A"**

Ordering code

**1103.14**

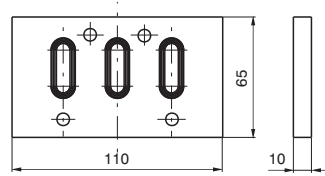


Weight gr. 600

**Size 3- closing plate**

Ordering code

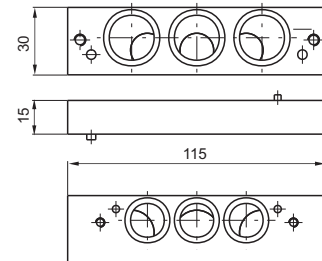
**1103.16**



**Base adaptor Size 2-1**

Ordering code

**1100.2-1**

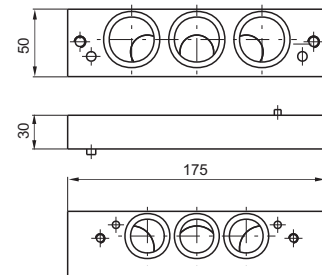


Weight gr. 110

**Base adaptor Size 3-2**

Ordering code

**1100.3-2**



Weight gr. 590

2

## General

To Increase the range of ISO 5599/1 Solenoid valves, we have added the new ISO-M12 series.

These are available in three sizes, size 1, size 2 and size 3 with flow rates from 900 NI/min for size 1 up to the 3600 NI/min for size 3.

The standard features of the ISO valves are still included, however, they are now combined with a M12 electrical connector located in the middle of the valve to manage the electrical signals.

Versions are available to suit valves with both single and double 24VDC solenoids complete with IP65 protection, in addition all version are supplied with LED indicators

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"**

## Electrical characteristics

Electrical connector M12x1

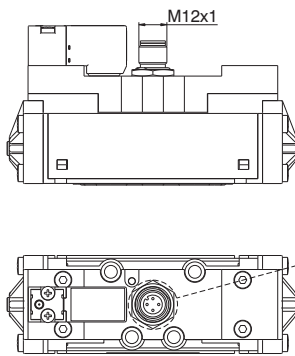
Protection degree IP65

Input voltage 24VDC

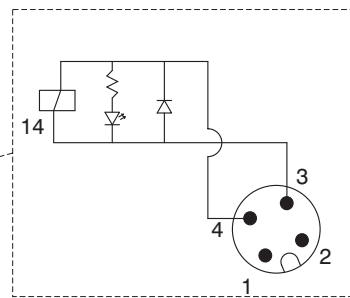
Nominal power 2,3W

LED identification

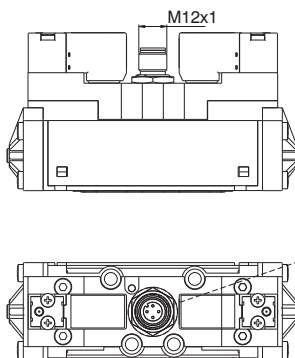
### Monostable version



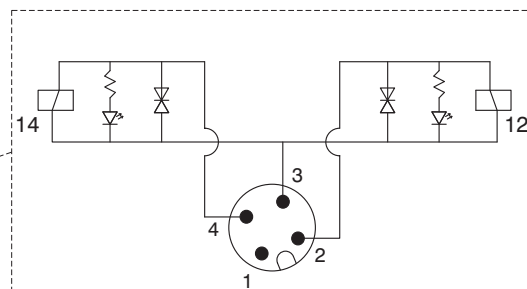
### Electrical diagram



### Bistable version



### Electrical diagram

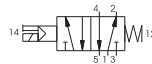
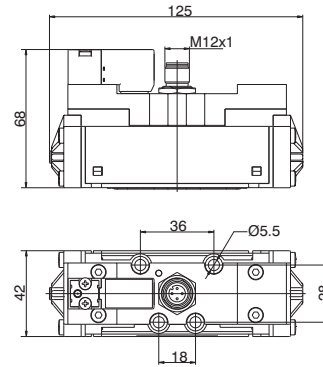


**Solenoid - Spring-5/2**

Ordering code

**1111.52.3.9.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

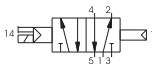
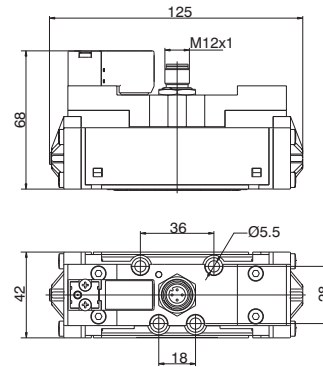
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	16	122	10	2,5	350	-5 ÷ +50

**Solenoid - Differential-5/2**

Ordering code

**1111.52.3.6.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

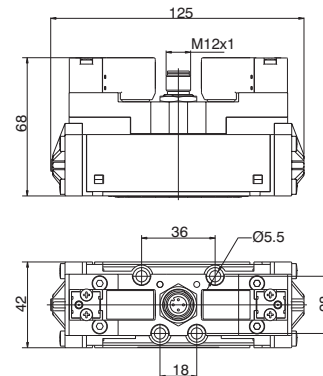
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	32	51	10	2	356	-5 ÷ +50

**Solenoid-Solenoid-5/2**

Ordering code

**1111.52.3.5.1**

**T** COIL VOLTAGE  
12P=24VDC



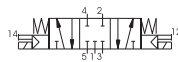
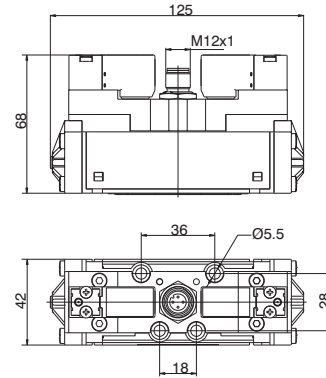
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	13	14	10	1,5	390	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Closed centres)**

Ordering code
<b>1111.53.31.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

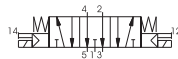
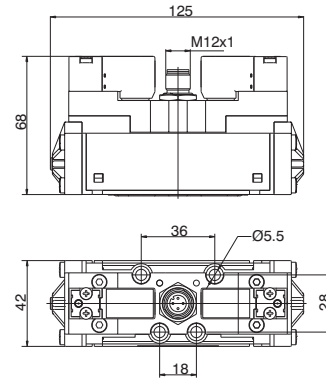


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	18	19	10	3	392	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Open centres)**

Ordering code
<b>1111.53.32.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

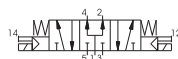
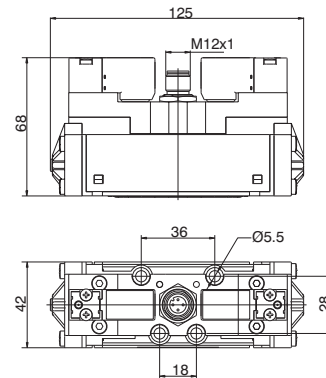


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	18	20	10	3	392	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Pressured centres)**

Ordering code
<b>1111.53.33.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	900	19	18	10	3	392	-5 ÷ +50

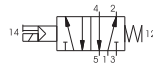
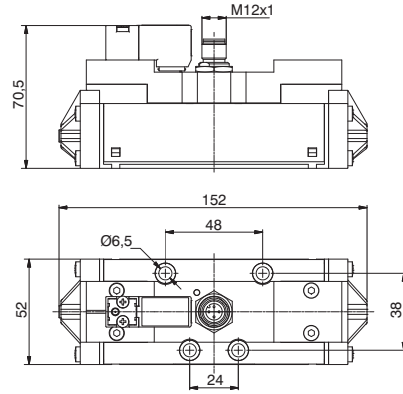


**Solenoid - Spring-5/2**

Ordering code

**1112.52.3.9.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

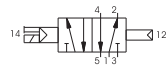
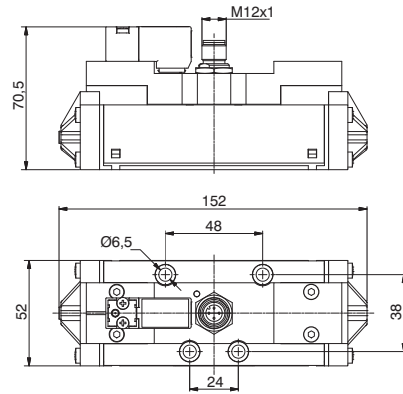
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	24	124	10	2,5	510	-5 ÷ +50

**Solenoid - Differential-5/2**

Ordering code

**1112.52.3.6.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

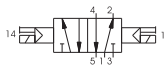
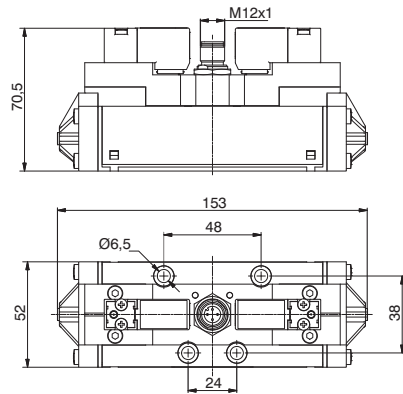
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	37	90	10	2	515	-5 ÷ +50

**Solenoid-Solenoid-5/2**

Ordering code

**1112.52.3.5.1**

**T** COIL VOLTAGE  
12P=24VDC



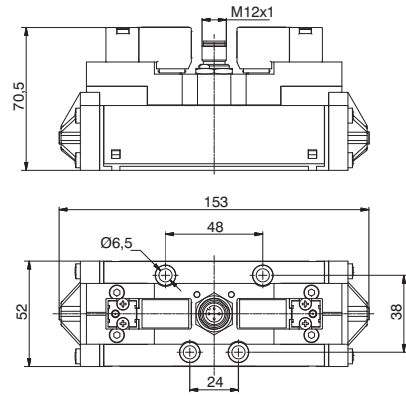
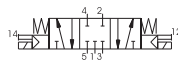
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	17	20	10	1,5	550	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Closed centres)**

Ordering code
<b>1112.53.31.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

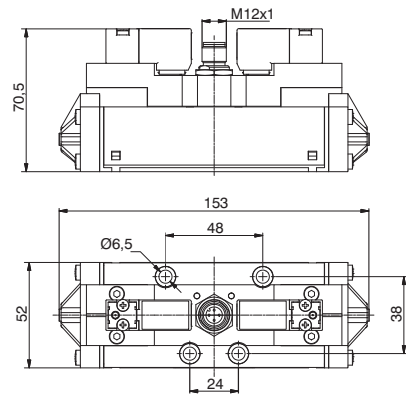
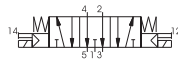


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	18	112	10	3	560	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Open centres)**

Ordering code
<b>1112.53.32.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

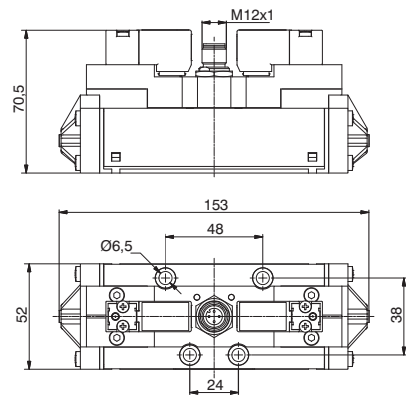
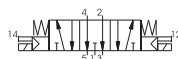


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	18	106	10	3	560	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Pressured centres)**

Ordering code
<b>1112.53.33.3.5.1</b>
<b>T</b> COIL VOLTAGE 12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

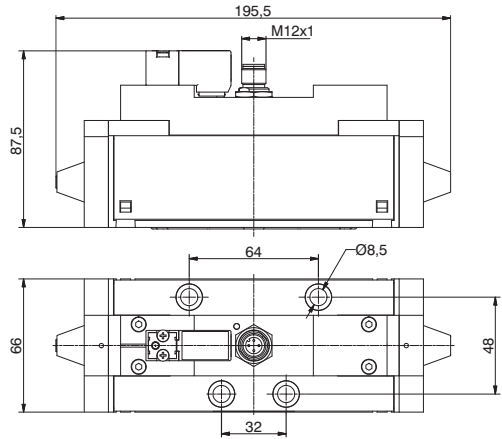
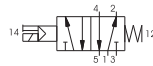
Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	1600	20	118	10	3	560	-5 ÷ +50

**Solenoid - Spring-5/2**

Ordering code

**1113.52.3.9.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

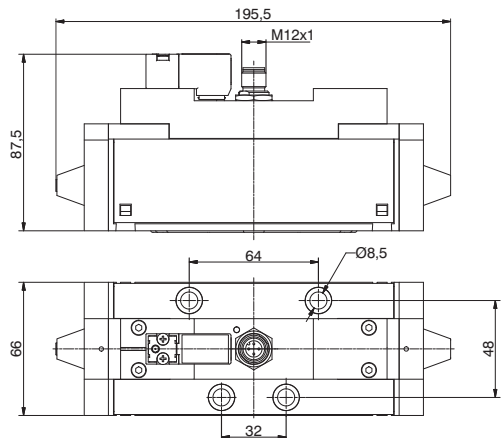
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	46	254	10	2,5	1360	-5 ÷ +50

**Solenoid - Differential-5/2**

Ordering code

**1113.52.3.6.1**

**T** COIL VOLTAGE  
12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

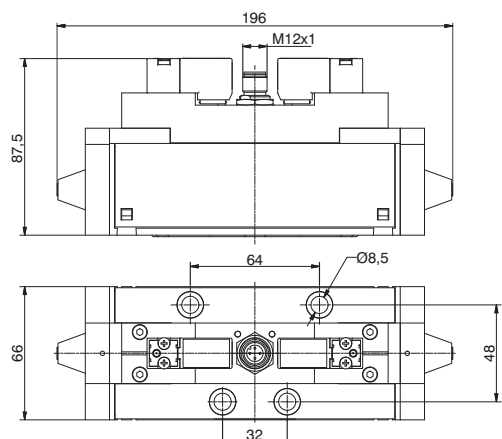
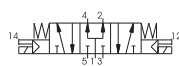
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	78	180	10	2	1360	-5 ÷ +50

**Solenoid-Solenoid-5/2**

Ordering code

**1113.52.3.5.1**

**T** COIL VOLTAGE  
12P=24VDC



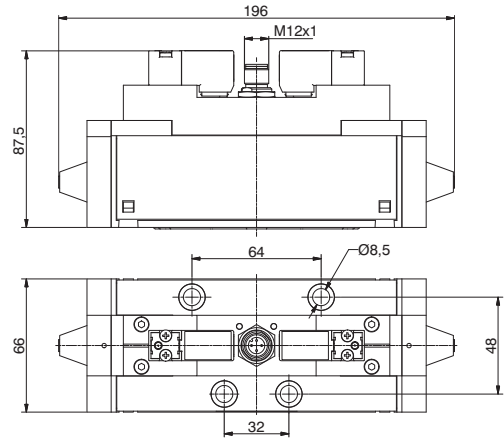
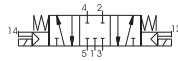
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	32	37	10	1,5	1370	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Closed centres)**

Ordering code
<b>1113.53.31.3.5.T</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

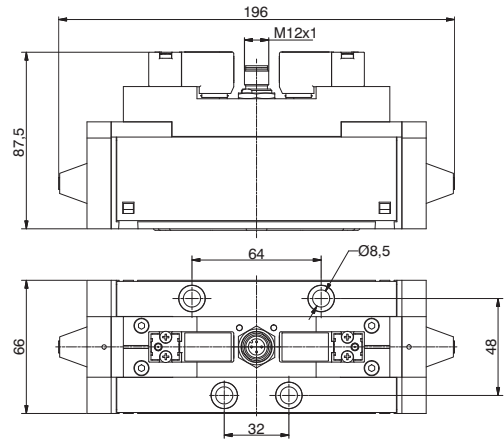
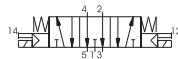


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	30	305	10	3	1380	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Open centres)**

Ordering code
<b>1113.53.32.3.5.T</b>
<b>T</b> COIL VOLTAGE 12P=24VDC

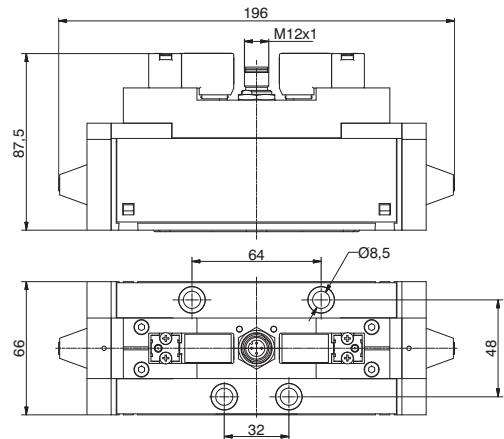
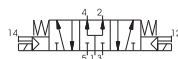


Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	30	230	10	3	1380	-5 ÷ +50

**Solenoid-Solenoid-5/3 (Pressured centres)**

Ordering code
<b>1113.53.33.3.5.T</b>
<b>T</b> COIL VOLTAGE 12P=24VDC



Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Max working pressure (bar)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered and lubricated air	3600	32	270	10	3	1380	-5 ÷ +50

**General**

The 2000 series solenoid valves have been developed to meet requirements for electronically controlled pneumatic systems and / or serial control systems already used in all manufacturing sectors.

They have been designed to be easily assembled into groups or manifolds and include integral electrical connection to facilitate simple and speedy integration into a control system. The series comprises a range of products classified according to type, size and performance. There are three main sizes, 10mm., 18 mm. and 26 mm., with each size further divided into 3 types "LINE", "FLAT" and "VDMA" or "BASE".

The 10mm. and 18 mm. 24 VDC range of valves includes a range of accessories for the production of manifolded valve assemblies with integral electrical connections. Modules are available in two or four station variants for flexibility and are supplied to IP40 or alternatively IP65 environmental protection.

**Construction characteristics**

	2100	2400	2600
Central body	Extruded aluminium bar with chemical nickel treatment and PTFE (polytetrafluorethylene)		
Connection plates	Technopolymer	Zincalloy	Die-cast aluminium
Operators	Technopolymer		
Spool	Aluminium 2011		
Piston seals	Oil resistant nitrile rubber - NBR		
Spool seals	Oil resistant nitrile rubber - HNBR		
Springs	Stainless steel AISI 302		
Piston	Aluminium 2011	Technopolymer	

**Use and maintenance**

The average life of the valve exceeds 50.000.000 cycles when used under optimum conditions.

Adequate lubrication reduces seals wear, just as proper filtering of supply air prevents the build-up of dirt that can cause malfunction. Ensure the valve is used within our recommended criteria for pressure and temperature. In dirty or dusty environments, the exhaust ports should be protected.

A seal kit including the spool is available for overhauling the valve. This operation does not require a skilled worker, although a particular care should be taken when reassembling the valve.

**Ordering codes for miniature solenoid valves**

**Series 2100:**

The 10 mm. miniature solenoid valve with 0,7 mm. orifice has been selected for piloting this series of valves (see Series 300). This results in low response times and reduced power consumption. The valve can be supplied with the coil upward or downward depending on the application.

Codes are as follows:

**Coil upward code**

- 01 = miniature sol. 12 VDC 90°conn. with led
- 21 = miniature sol. 12 VDC line conn. with led
- 02 = miniature sol. 24 VDC 90°conn. with led
- 22 = miniature sol. 24 VDC line conn. with led

**Coil downward code**

- 11 = miniature sol. 12 VDC 90° conn. with led
- 31 = miniature sol. 12 VDC line conn. with led
- 12 = miniature sol. 24 VDC 90°conn. with led
- 32 = miniature sol. 24 VDC line conn. with led
- 91 = miniature sol. 12 VDC for integral electrical connections
- 92 = miniature sol. 24 VDC for integral electrical connections

**Serie 2400/2600:**

The 15 mm miniature solenoid valve with 1,1 mm. orifice has been selected for piloting this series of valves (see Series 300). This results in low response times and reduced power consumption. The valve can be supplied with the coil upward or downward depending on the application.

Codes are as follows:

**Coil upward code**

- 01 = miniature sol. 12 VDC
- 02 = miniature sol. 24 VDC
- 05 = miniature sol. 24 VAC
- 06 = miniature sol. 110 VAC
- 07 = miniature sol. 230 VAC
- 08 = miniature sol. 24 VDC 1W
- 09 = miniature sol. 24 VDC Earth faston

**Coil downward code**

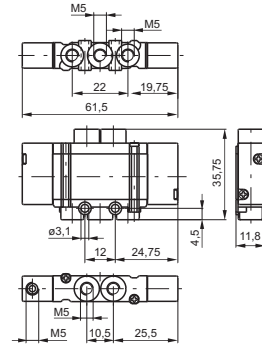
- 11 = miniature sol. 12 VDC
- 12 = miniature sol. 24 VDC
- 15 = miniature sol. 24 VAC
- 16 = miniature sol. 110 VAC
- 17 = miniature sol. 230 VAC
- 18 = miniature sol. 24 VDC 1W Downward
- 19 = miniature sol. 24 VDC Earth faston Downward

	<b>Well-tryed component</b>	<ul style="list-style-type: none"> <li>- The product is a well-tryed product for a safety-related application according to ISO 13849-1.</li> <li>- The relevant basic and well-tryed safety principles according ISO 13849-2 for this product are fulfilled.</li> <li>- The suitability of the product for a precise application must be verified and confirmed by the user.</li> </ul>
<b>B<sub>10d</sub></b>	50.000.000	

**Miniature solenoid C US homologated are available (see Series 300).**

**Pneumatic - Spring**

Ordering code
<b>2115.52.00.19</b>



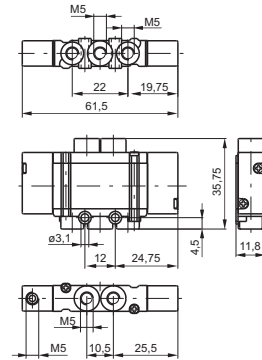
Weight gr. 30  
Minimum piloting pressure 2 bar



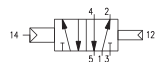
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

**Pneumatic - Differential**

Ordering code
<b>2115.52.00.16</b>



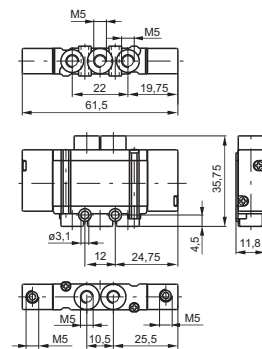
Weight gr. 28  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

**Pneumatic - Pneumatic**

Ordering code
<b>2115.52.00.18</b>



Weight gr. 30  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

2

**Solenoid - Spring / Solenoid - Differential**

Ordering code

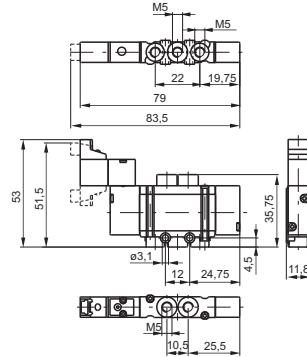
**2115.52.00.P.V**

PILOTING

- P** 39=Solenoïd - Spring
- 36=Solenoïd - Differential

COIL VOLTAGE

- V** 01=12 VDC 90°conn. with led
- 21=12 VDC line conn. with led
- 02=24 VDC 90°conn. with led
- 22=24 VDC line conn. with led
- 11=12 VDC 90°conn. with led downward
- 31=12 VDC line conn. with led downward
- 12=24 VDC 90° conn. with led downward
- 32=24 VDC line conn. with led downward



Weight gr. 42  
Minimum working pressure 2 bar



Weight gr. 40  
Minimum operating pressure 2 bar

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

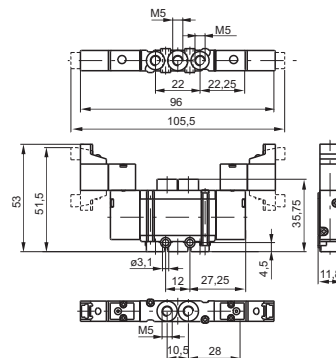
**Solenoid - Solenoid**

Ordering code

**2115.52.00.35.V**

COIL VOLTAGE

- V** 01=12 VDC 90°conn. With led
- 21=12 VDC line conn. with led
- 02=24 VDC 90°conn. with led
- 22=24 VDC line conn. with led
- 11=12 VDC 90°conn. with led downward
- 31=12 VDC line conn. with led downward
- 12=24 VDC 90° conn. with led downward
- 32=24 VDC line conn. with led downward



Weight gr. 52  
Minimum working pressure 2 bar

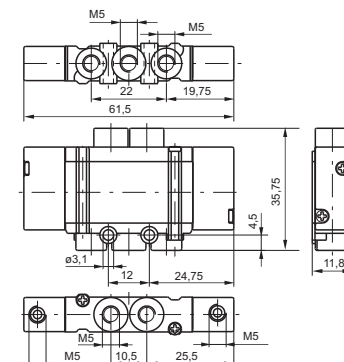


Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

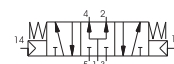


**Pneumatic - Pneumatic**

Ordering code	
<b>2115.53.F.18</b>	
FUNCTION	
<b>F</b> 31=Closed centres	
32=Open centres	
33=Pressured centres	



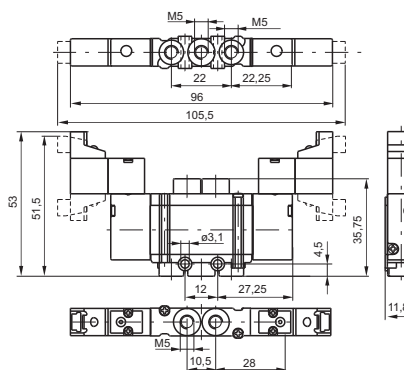
Weight gr. 32  
Minimum working pressure 2,5 bar



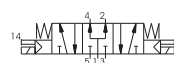
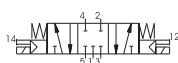
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	180 NI/min	mm 2,5

**Solenoid - Solenoid**

Ordering code	
<b>2115.53.F.35.V</b>	
FUNCTION	
<b>F</b> 31=Closed centres	
32=Open centres	
33=Pressured centres	
COIL VOLTAGE	
01=12 VDC 90° conn. with led	
21=12 VDC line conn. with led	
02=24 VDC 90° conn. with led	
22=24 VDC line conn. with led	
<b>V</b> 11=12 VDC 90° conn. whit led downward	
31=12 VDC line conn. with led downward	
12=24 VDC 90° conn. with led downward	
32=24 VDC line conn. with led downward	



Weight gr. 54  
Minimum working pressure 2,5 bar



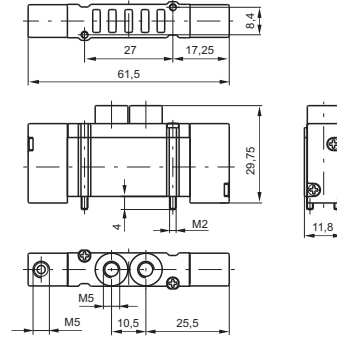
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	180 NI/min	mm 2,5



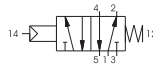
**Pneumatic - Spring**

Ordering code

**2135.52.00.19**



Weight gr. 32  
Minimum piloting pressure 2 bar



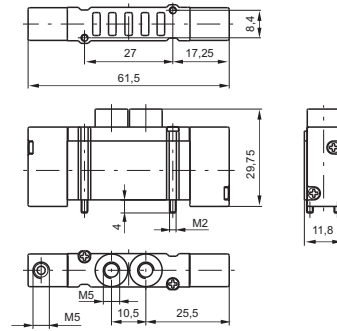
**Operational characteristic**

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

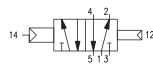
**Pneumatic - Differential**

Ordering code

**2135.52.00.16**



Weight gr. 30  
Minimum piloting pressure 2 bar



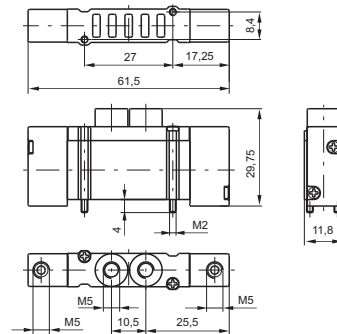
**Operational characteristic**

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

**Pneumatic - Pneumatic**

Ordering code

**2135.52.00.18**



Weight gr. 32  
Minimum piloting pressure 2,5 bar

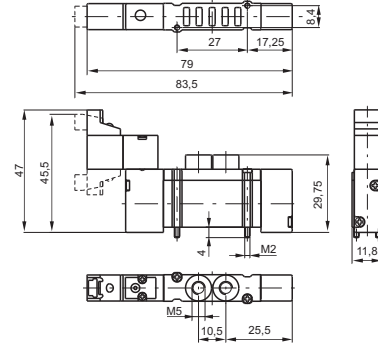


**Operational characteristic**

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5	M5

**Solenoid - Spring / Solenoid - Differential**

Ordering code
<b>2135.52.00.P.V</b>
PILOTING
<b>P</b> 39= Solenoid - Spring 36= Solenoid - Differential
COIL VOLTAGE
01=12 VDC 90°conn. with led
21=12 VDC line conn. with led
02=24 VDC 90°conn. with led
22=24 VDC line conn. with led
11=12 VDC 90°conn. with led downward
<b>V</b> 31=12 VDC line conn. with led downward
12=24 VDC 90° conn. with led downward
32=24 VDC line conn. with led downward
91=12 VDC for integral electrical connections downward
92=24 VDC for integral electrical connections downward



Weight gr. 38  
Minimum working pressure 2 bar

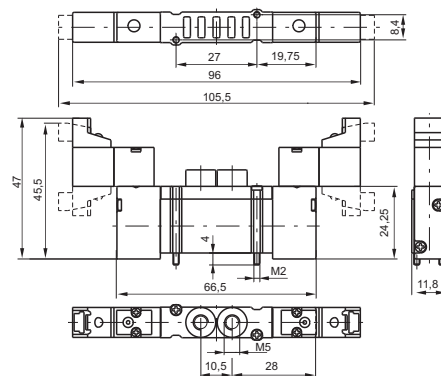


Weight gr. 36  
Minimum operating pressure 2 bar

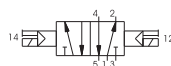
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

**Solenoid - Solenoid**

Ordering code
<b>2135.52.00.35.V</b>
COIL VOLTAGE
01=12 VDC 90°conn. with led
21=12 VDC line conn. with led
02=24 VDC 90°conn. with led
22=24 VDC line conn. with led
11=12 VDC 90°conn. with led downward
<b>V</b> 31=12 VDC line conn. with led downward
12=24 VDC 90°conn. with led downward
32=24 VDC line conn. with led downward
91=12 VDC for integral electrical connections downward
92=24 VDC for integral electrical connections downward



Weight gr. 50  
Minimum working pressure 1,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

2

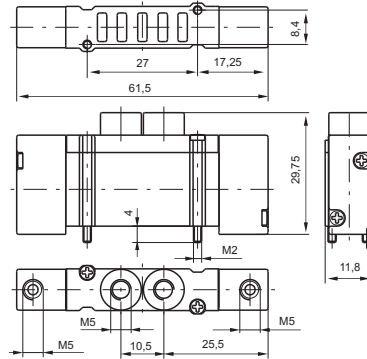
**Pneumatic - Pneumatic**

Ordering code

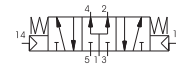
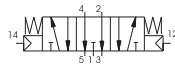
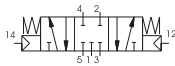
**2135.53.F.18**

FUNCTION

- F** 31 = Closed centres
- 32 = Open centres
- 33 = Pressured centres



Weight gr. 28  
Minimum working pressure 2 bar



For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	180 Nl/min	mm 2,5

**Solenoid - Solenoid**

Ordering code

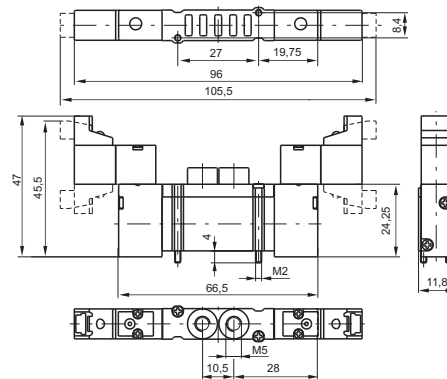
**2135.53.F.35.V**

FUNCTION

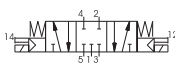
- F** 31 = Closed centres
- 32 = Open centres
- 33 = Pressured centres

COIL VOLTAGE

- 01 = 12 VDC 90° conn. with led
- 21 = 12 VDC line conn. with led
- 02 = 24 VDC 90° conn. with led
- 22 = 24 VDC line conn. with led
- 11 = 12 VDC 90° conn. with led downward
- V** 31 = 12 VDC line conn. with led downward
- 12 = 24 VDC 90° conn. with led downward
- 32 = 24 VDC line conn. with led downward
- 91 = 12 VDC for integral electrical connections downward
- 92 = 24 VDC for integral electrical connections downward



Weight gr. 52  
Minimum operating pressure 2,5 bar

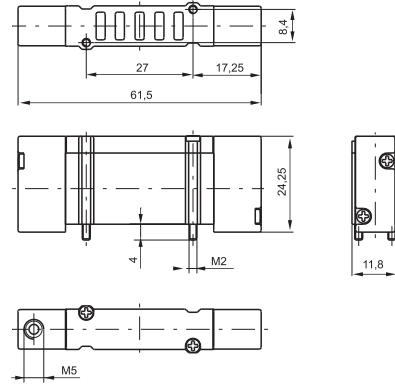


For dimension "A" see ordering code

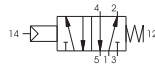
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	7 bar	-5 - +50	180 Nl/min	mm 2,5

**Pneumatic - Spring**

Ordering code
<b>2141.52.00.19</b>



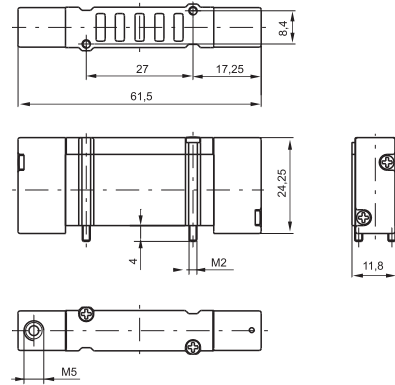
Weight gr. 24  
Minimum piloting pressure 2 bar



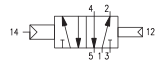
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

**Pneumatic - Differential**

Ordering code
<b>2141.52.00.16</b>



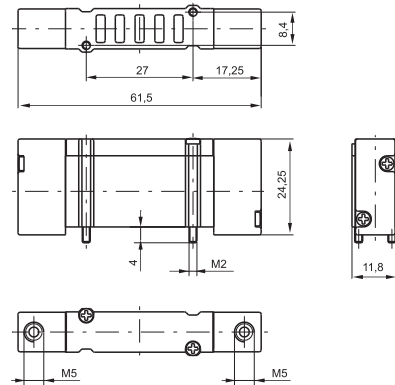
Weight gr. 22  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

**Pneumatic - Pneumatic**

Ordering code
<b>2141.52.00.18</b>



Weight gr. 26  
Minimum piloting pressure 1,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

2

**Solenoid - Spring / Solenoid - Differential**

Ordering code

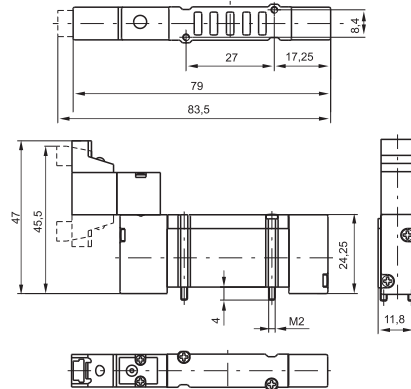
**2141.52.00.P.V**

PILOTING

- P** 39=Solenoïd - Spring
- 36=Solenoïd - Differential

COIL VOLTAGE

- 01=12 VDC 90°conn. with led
- 21=12 VDC line conn. with led
- 02=24 VDC 90°conn. with led
- 22=24 VDC line conn. with led
- 11=12 VDC 90°conn. with led downward
- 31=12 VDC line conn. with led downward
- 12=24 VDC 90° conn. with led downward
- 32=24 VDC line conn. with led downward
- 91=12 VDC for integral electrical connections downward
- 92=24 VDC for integral electrical connections downward



Weight gr. 38  
Minimum working pressure 2 bar



Weight gr. 36  
Minimum working pressure 2 bar

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

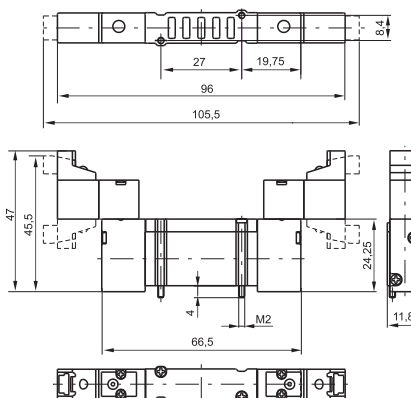
**Miniature solenoid - Miniature solenoid**

Ordering code

**2141.52.00.35.V**

COIL VOLTAGE

- 01=12 VDC 90°conn. with led
- 21=12 VDC line conn. with led
- 02=24 VDC 90°conn. with led
- 22=24 VDC line conn. with led
- 11=12 VDC 90°conn. with led downward
- 31=12 VDC line conn. with led downward
- 12=24 VDC 90° conn. with led downward
- 32=24 VDC line conn. with led downward
- 91=12 VDC for integral electrical connections downward
- 92=24 VDC for integral electrical connections downward



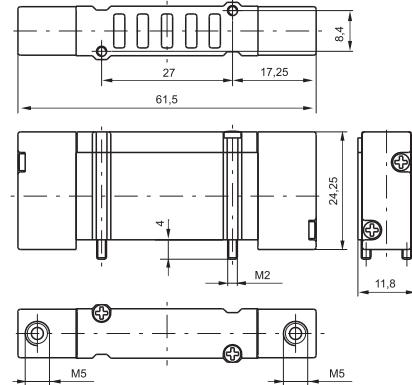
Weight gr. 48  
Minimum working pressure 1,5 bar



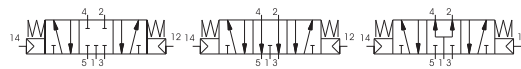
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	7 bar	-5 - +50	250 NI/min	mm 2,5

**Pneumatic - Pneumatic**

Ordering code
<b>2141.53.F.18</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres



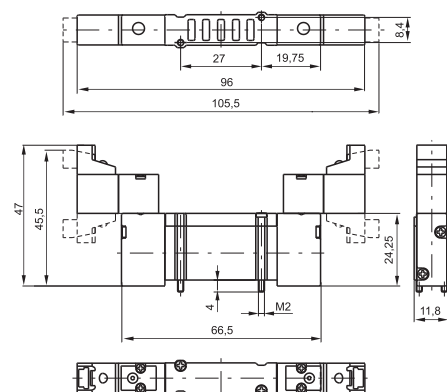
Weight gr. 28  
Minimum working pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
		Filtered and lubricated air or not	7 bar	-5 - +50	180 NI/min

**Solenoid - Solenoid**

Ordering code
<b>2141.53.F.35.V</b>
FUNCTION
<b>F</b> 31=Closed centres
32=Open centres
33=Pressured centres
COIL VOLTAGE
01=12 VDC 90° conn. with led
21=12 VDC line conn. with led
02=24 VDC 90° conn. with led
22=24 VDC line conn. with led
11=12 VDC 90° conn. with led downward
<b>V</b> 31=12 VDC line conn. with led downward
12=24 VDC 90° conn. with led downward
32=24 VDC line conn. with led downward
91=12 VDC for integral electrical connections downward
92=24 VDC for integral electrical connections downward



Weight gr. 52  
Minimum working pressure 2,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
		Filtered and lubricated air or not	7 bar	-5 - +50	180 NI/min

2

**Modular base for "BASE" version**

Ordering code

**2140.01**

TYPE

0=modular BASE without cartridges

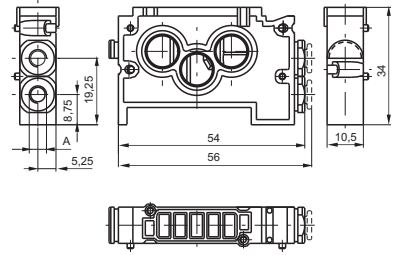
**T** 4=modular BASE c/w with 4 mm tube cartridges

5=modular BASE c/w with M5 cartridges

7=modular BASE c/w with M7x1 cartridges

Weight gr. 22

For dimension "A" see ordering code



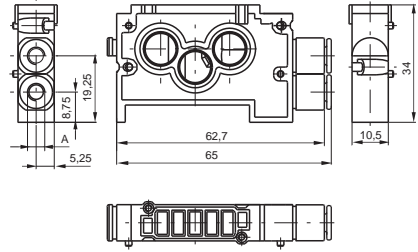
**Modular base for "BASE" version, with 6mm tube cartridges**

Ordering code

**2146.01**

Weight gr. 22

For dimension "A" see ordering code

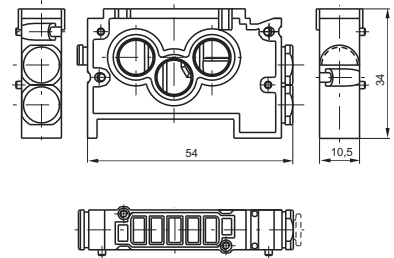


**Modular base for "FLAT" version**

Ordering code

**2130.01**

Weight gr. 28

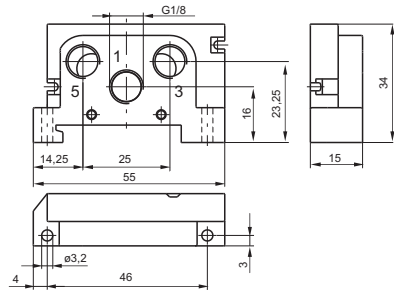


**Right inlet base**

Ordering code

**2140.02**

Weight gr. 18

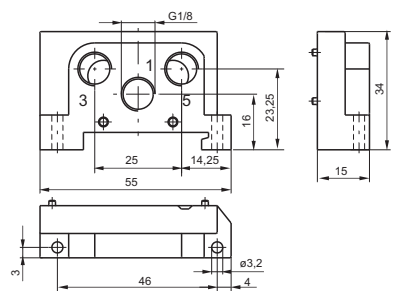


**Left inlet base**

Ordering code

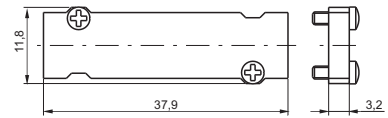
**2140.03**

Weight gr. 18



**Closing plate**

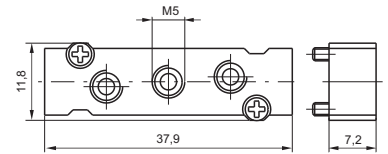
Ordering code
<b>2130.00</b>



Weight gr. 7

**Intermediate air intake**

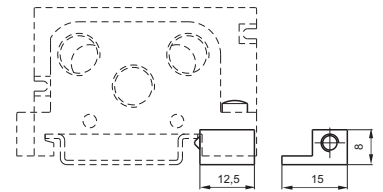
Ordering code
<b>2130.10</b>



Weight gr. 12  
to be assembled of a valve

**DIN rail adapter**

Ordering code
<b>2130.16</b>



Weight gr. 6

**Modular base cartridge**

Ordering code
<b>2100.Ⓡ</b>
TYPE
031M=4mm tube cartridges
Ⓡ 033M=M5 cartridges
034M=M7x1 cartridges
035M=lock cartridges
036M=6mm tube cartridges



Weight gr. 5

**Diaphragm plug**

Ordering code
<b>2130.17</b>



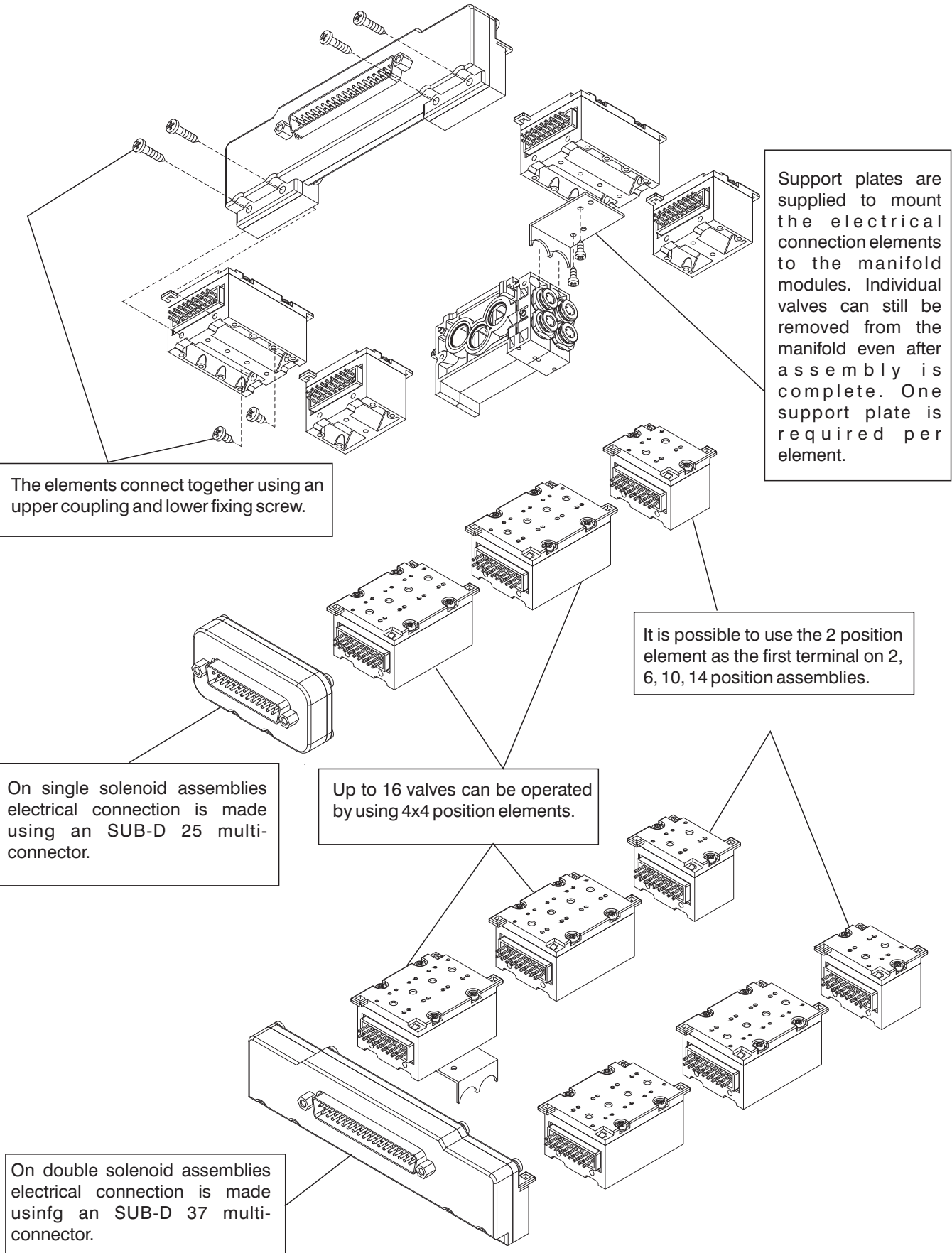
Weight gr. 6



The integral electrical design for the series 2400 valve is extremely flexible, allowing the production of pre-wired solenoid valve manifolds, the configuration of which can be determined at the point of assembly. The 24 VDC, 12 VDC (equivalent PNP) modules are available with 2 or 4 positions. The system assembled is designed for an IP40 - IP65 protection.

Coil type 91 or 92 is required for the multipin electrical connection (see valve ordering codes).

2



The elements connect together using an upper coupling and lower fixing screw.



Support plates are supplied to mount the electrical connection elements to the manifold modules. Individual valves can still be removed from the manifold even after assembly is complete. One support plate is required per element.

It is possible to use the 2 position element as the first terminal on 2, 6, 10, 14 position assemblies.



On single solenoid assemblies electrical connection is made using an SUB-D 25 multi-connector.

Up to 16 valves can be operated by using 4x4 position elements.

On double solenoid assemblies electrical connection is made using an SUB-D 37 multi-connector.

4 positions module	Ordering code	2 positions module												
	<b>2100.P.T</b>													
	<table border="1"> <tr><td>PLACES</td></tr> <tr><td><b>P</b> 04=4 Places</td></tr> <tr><td>02=2 Places</td></tr> <tr><td>TYPE</td></tr> <tr><td>00=left IP40-PNP</td></tr> <tr><td>02=left IP40-PNP with protection diode</td></tr> <tr><td>10=left IP65-PNP</td></tr> <tr><td><b>T</b> 12=left IP65-PNP with protection diode</td></tr> <tr><td>01=right IP40-PNP</td></tr> <tr><td>03= right IP40-PNP with protection diode</td></tr> <tr><td>11=right IP65-PNP</td></tr> <tr><td>13=right IP65-PNP with protection diode</td></tr> </table>	PLACES	<b>P</b> 04=4 Places	02=2 Places	TYPE	00=left IP40-PNP	02=left IP40-PNP with protection diode	10=left IP65-PNP	<b>T</b> 12=left IP65-PNP with protection diode	01=right IP40-PNP	03= right IP40-PNP with protection diode	11=right IP65-PNP	13=right IP65-PNP with protection diode	
PLACES														
<b>P</b> 04=4 Places														
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01=right IP40-PNP														
03= right IP40-PNP with protection diode														
11=right IP65-PNP														
13=right IP65-PNP with protection diode														
Weight gr. 35		Weight gr. 20												

2

Front connector IP65 - 37 poles	Ordering code	Front connector IP65 - 25 poles								
	<b>2100.37.10</b>									
<table border="1"> <tr><td>Ordering code</td></tr> <tr><td><b>2100.37.10</b></td></tr> <tr><td>Weight gr. 120</td></tr> <tr><td>The IP65 protection is obtained by IP65 Pneumax cable</td></tr> </table>	Ordering code	<b>2100.37.10</b>	Weight gr. 120	The IP65 protection is obtained by IP65 Pneumax cable		<table border="1"> <tr><td>Ordering code</td></tr> <tr><td><b>2100.25.10</b></td></tr> <tr><td>Weight gr. 40</td></tr> <tr><td>The IP65 protection is obtained by IP65 Pneumax cable</td></tr> </table>	Ordering code	<b>2100.25.10</b>	Weight gr. 40	The IP65 protection is obtained by IP65 Pneumax cable
Ordering code										
<b>2100.37.10</b>										
Weight gr. 120										
The IP65 protection is obtained by IP65 Pneumax cable										
Ordering code										
<b>2100.25.10</b>										
Weight gr. 40										
The IP65 protection is obtained by IP65 Pneumax cable										

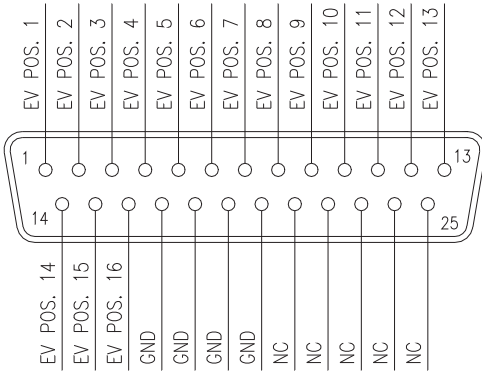
Plug	Ordering code	FLAT support plate
	<b>2100.00</b>	
Weight gr. 4		Weight gr. 5

In line cable complete with connector IP40									
									
<table border="1"> <tr><td>Ordering code</td></tr> <tr><td><b>2400.T.L.00</b></td></tr> <tr><td>CONNECTOR TYPE</td></tr> <tr><td><b>T</b> 25=25 contacts</td></tr> <tr><td>37=37 contacts</td></tr> <tr><td>CABLE LENGTH</td></tr> <tr><td><b>L</b> 03=3 meters</td></tr> <tr><td>05=5 meters</td></tr> <tr><td>10=10 meters</td></tr> </table>	Ordering code	<b>2400.T.L.00</b>	CONNECTOR TYPE	<b>T</b> 25=25 contacts	37=37 contacts	CABLE LENGTH	<b>L</b> 03=3 meters	05=5 meters	10=10 meters
Ordering code									
<b>2400.T.L.00</b>									
CONNECTOR TYPE									
<b>T</b> 25=25 contacts									
37=37 contacts									
CABLE LENGTH									
<b>L</b> 03=3 meters									
05=5 meters									
10=10 meters									

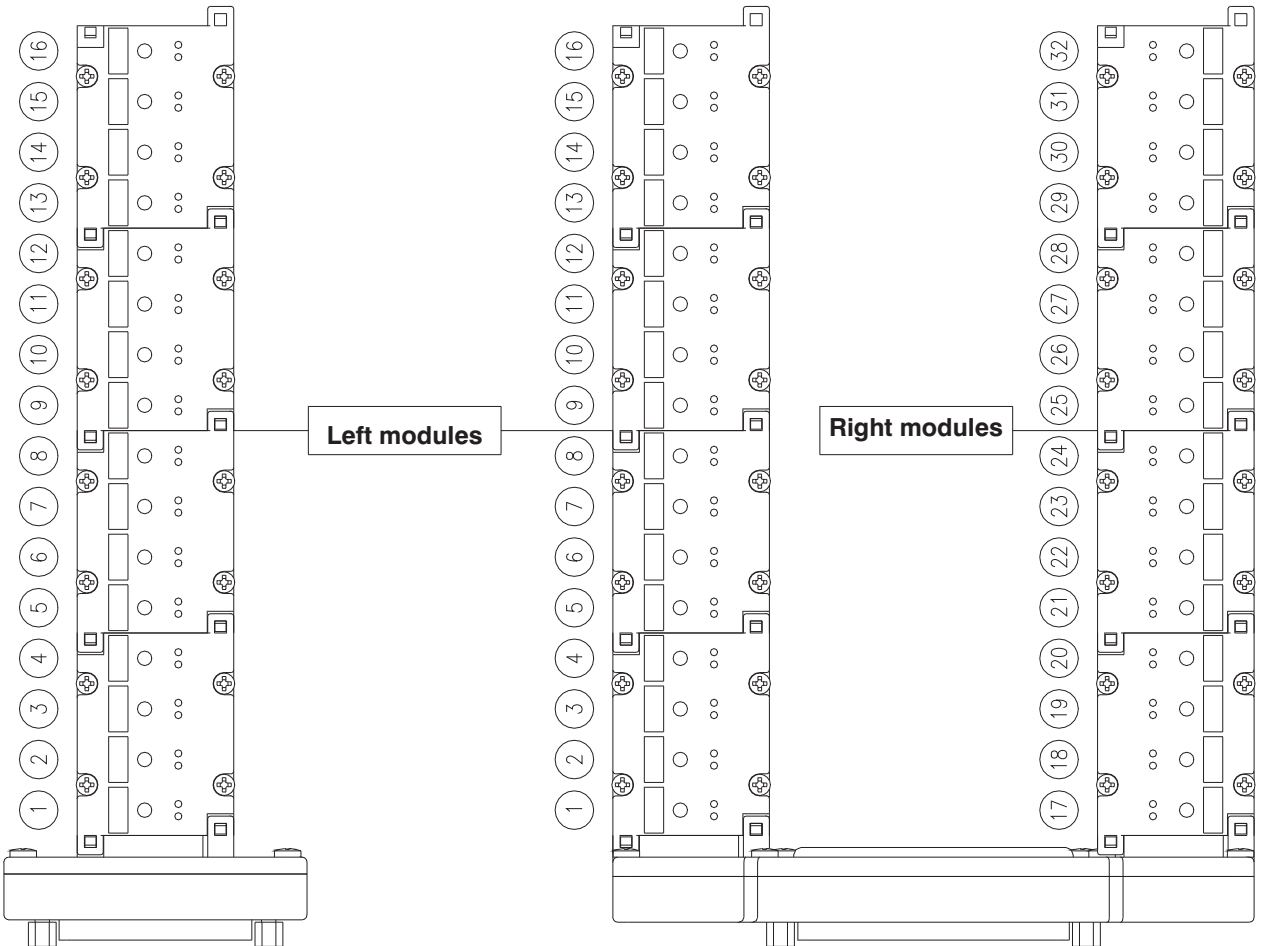
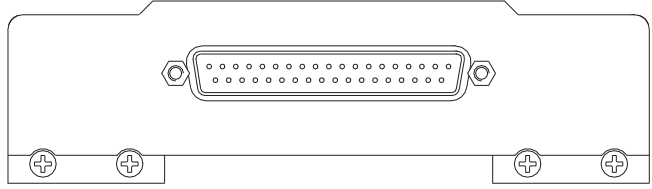
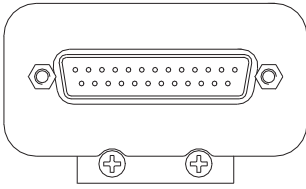
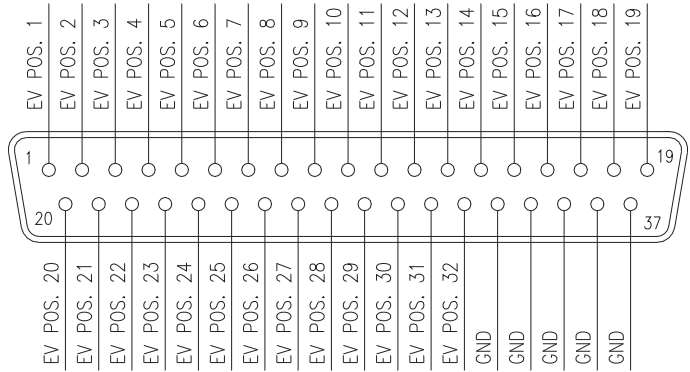
Cable complete with connector, 25 Poles IP65									
									
<table border="1"> <tr><td>Ordering code</td></tr> <tr><td><b>2300.25.L.C</b></td></tr> <tr><td>CABLE LENGTH</td></tr> <tr><td><b>L</b> 03=3 meters</td></tr> <tr><td>05=5 meters</td></tr> <tr><td>10=10 meters</td></tr> <tr><td>CONNECTOR</td></tr> <tr><td><b>C</b> 10=In line</td></tr> <tr><td>90=a 90°</td></tr> </table>	Ordering code	<b>2300.25.L.C</b>	CABLE LENGTH	<b>L</b> 03=3 meters	05=5 meters	10=10 meters	CONNECTOR	<b>C</b> 10=In line	90=a 90°
Ordering code									
<b>2300.25.L.C</b>									
CABLE LENGTH									
<b>L</b> 03=3 meters									
05=5 meters									
10=10 meters									
CONNECTOR									
<b>C</b> 10=In line									
90=a 90°									

Cable complete with connector, 37 Poles IP65									
									
<table border="1"> <tr><td>Ordering code</td></tr> <tr><td><b>2400.37.L.C</b></td></tr> <tr><td>CABLE LENGTH</td></tr> <tr><td><b>L</b> 03=3 meters</td></tr> <tr><td>05=5 meters</td></tr> <tr><td>10=10 meters</td></tr> <tr><td>CONNECTOR</td></tr> <tr><td><b>C</b> 10=In line</td></tr> <tr><td>90=a 90°</td></tr> </table>	Ordering code	<b>2400.37.L.C</b>	CABLE LENGTH	<b>L</b> 03=3 meters	05=5 meters	10=10 meters	CONNECTOR	<b>C</b> 10=In line	90=a 90°
Ordering code									
<b>2400.37.L.C</b>									
CABLE LENGTH									
<b>L</b> 03=3 meters									
05=5 meters									
10=10 meters									
CONNECTOR									
<b>C</b> 10=In line									
90=a 90°									

**SUB-D 25 CONTACTS CONNECTOR**



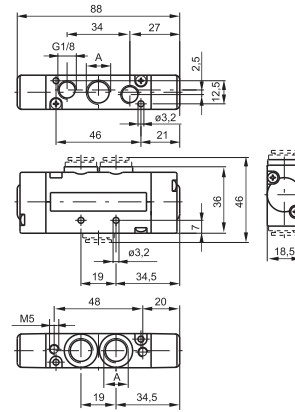
**SUB-D 37 CONTACTS CONNECTOR**



2

**Pneumatic - Spring**

Ordering code
<b>241 A.52.00.19</b>
CONNECTIONS
1 = G1/4"
5 = G1/8"
6 = quick fitting tube Ø6
8 = quick fitting tube Ø8

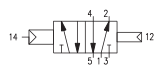
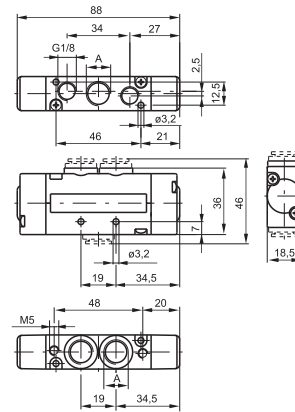


For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	155	-5 ÷ +50

**Pneumatic - Differential / Differential external**

Ordering code
<b>241 A.52.00.V</b>
CONNECTIONS
1 = G1/4"
5 = G1/8"
6 = quick fitting tube Ø6
8 = quick fitting tube Ø8
VERSION
V 16 = Pneumatic - Differential
V 17 = Pneumatic - Differential ext.

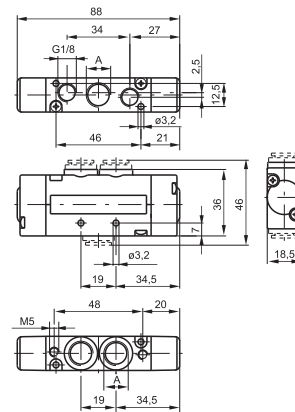


For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	155	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code
<b>241 A.52.00.18</b>
CONNECTIONS
1 = G1/4"
5 = G1/8"
6 = quick fitting tube Ø6
8 = quick fitting tube Ø8



For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	1,5	155	-5 ÷ +50

**Miniature solenoid - Spring / Differential**

Ordering code

**241A.52.00.V.T**

CONNECTIONS

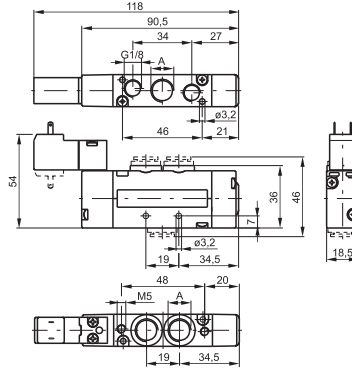
- 1 = G1/4"
- 5 = G1/8"
- 6 = quick fitting tube Ø6
- 8 = quick fitting tube Ø8

VERSION

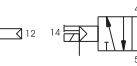
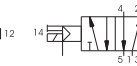
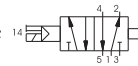
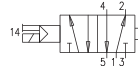
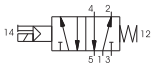
- 39 = Sv. - Spring
- 29 = Sv. ext. - Spring
- 36 = Sv. - Diff./al
- 37 = Sv. ext. - Diff./al ext.
- 26 = Sv. ext. - Diff./al
- 27 = Sv. ext. - Diff./al ext.

COIL VOLTAGE

- 01 = 12V DC
- 02 = 24V DC
- 05 = 24V AC
- 06 = 110V AC
- 07 = 230V AC
- 08 = 24V DC 1 Watt
- 09 = 24V DC Earth Faston
- 11 = 12V DC Downward
- 12 = 24V DC Downward
- 15 = 24V AC Downward
- 16 = 110V AC Downward
- 17 = 230V AC Downward
- 18 = 24V DC 1 Watt Downward
- 19 = 24V DC Earth Faston Downward



For dimension "A" see ordering code



**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	195	-5 ÷ +50

**Miniature solenoid - Miniature solenoid**

Ordering code

**241A.52.00.V.T**

CONNECTIONS

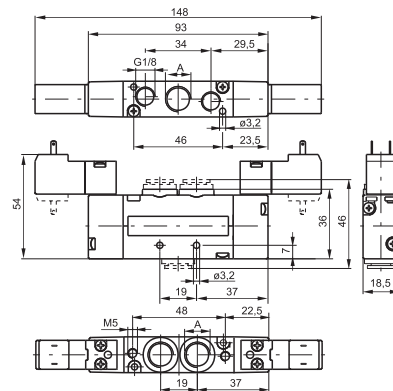
- 1 = G1/4"
- 5 = G1/8"
- 6 = quick fitting tube Ø6
- 8 = quick fitting tube Ø8

VERSION

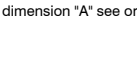
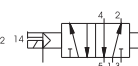
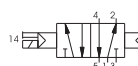
- 35 = Sol. - Sol.
- 24 = Sol. ext. - Sol. ext.

COIL VOLTAGE

- 01 = 12V DC
- 02 = 24V DC
- 05 = 24V AC
- 06 = 110V AC
- 07 = 230V AC
- 08 = 24V DC 1 Watt
- 09 = 24V DC Earth Faston
- 11 = 12V DC Downward
- 12 = 24V DC Downward
- 15 = 24V AC Downward
- 16 = 110V AC Downward
- 17 = 230V AC Downward
- 18 = 24V DC 1 Watt Downward
- 19 = 24V DC Earth Faston
- 19 = 24V DC Earth Faston



For dimension "A" see ordering code

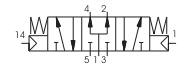
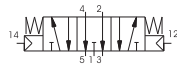
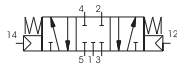
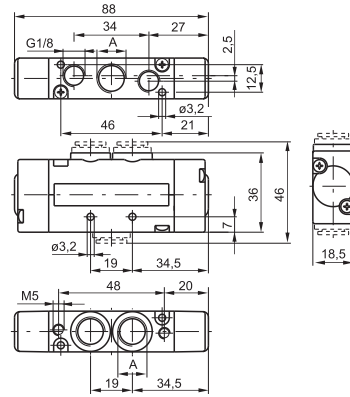


**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	1,5	225	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code	<b>241 A.53.F.18</b>
CONNECTIONS	1=G1/4" 5=G1/8" 6=quick fitting tube Ø6 8=quick fitting tube Ø8
FUNCTION	31=Closed centres 32=Open centres 33=Pressured centres



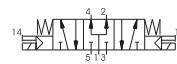
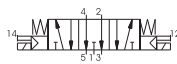
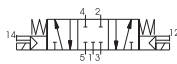
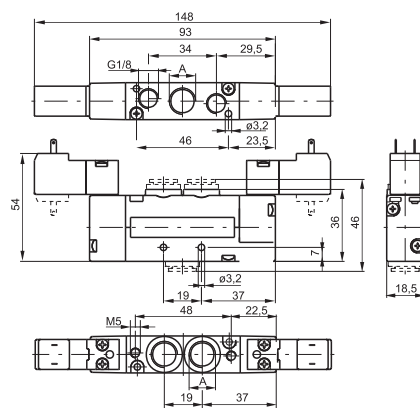
For dimension "A" see ordering code

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	650	10	7	M5	3	165	-5 ÷ +50

**Miniature solenoid - Miniature solenoid**

Ordering code	<b>241 A.53.F.V.T</b>
CONNECTIONS	1=G1/4" 5=G1/8" 6=quick fitting tube Ø6 8=quick fitting tube Ø8
FUNCTION	31=Closed centres 32=Open centres 33=Pressured centres
VERSION	24=Sol. ext. - Sol. ext. 35=Sol. - Sol.
COIL VOLTAGE	01=12V DC 02=24V DC 05=24V AC 06=110V AC 07=230V AC 08=24V DC 1 Watt
	09=24V DC Earth Faston 11=12V DC Downward 12=24V DC Downward 15=24V AC Downward 16=110V AC Downward 17=230V AC Downward 18=24V DC 1 Watt Downward 19=24V DC Earth Faston Downward



For dimension "A" see ordering code

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	650	10	7	M5	3	235	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code

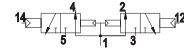
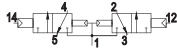
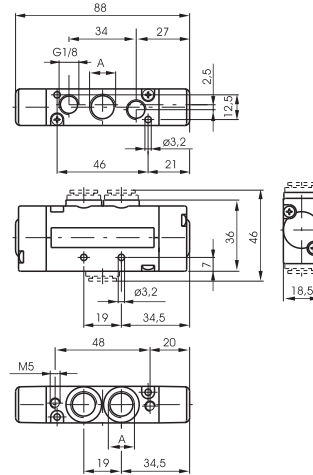
**241A.62.F.18**

CONNECTIONS

- 1=G1/4"
- 5=G1/8"
- 6=quick fitting tube Ø6
- 8=quick fitting tube Ø8

FUNCTION

- 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)



**Operational characteristic**

Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=1,5+(0,2*5)=2,5$ bar

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)	For dimension "A":
Filtered air, with or without lubrication	450	10	7	-5 ÷ +50	$\geq 1,5+(0,2xP_{aim.})$	170	see ordering code

**Miniature solenoid - Miniature solenoid**

Ordering code

**241A.62.F.35.T**

CONNECTIONS

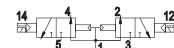
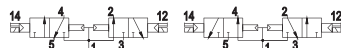
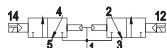
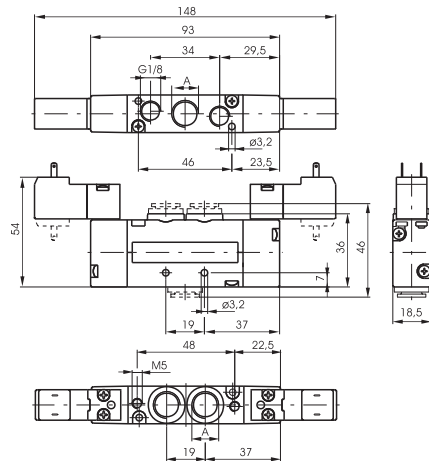
- 1=G1/4"
- 5=G1/8"
- 6=quick fitting tube Ø6
- 8=quick fitting tube Ø8

FUNCTION

- 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)

COIL VOLTAGE

- 01=12V DC
- 02=24V DC
- 05=24V AC
- 06=110V AC
- 07=230V AC
- 08=24V DC 1 Watt
- 09=24V DC Earth Faston
- 11=12V DC Downward
- 12=24V DC Downward
- 15=24V AC Downward
- 16=110V AC Downward
- 17=230V AC Downward
- 18=24V DC 1 Watt Downward
- 19=24V DC Earth Faston Downward



**Operational characteristic**

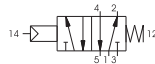
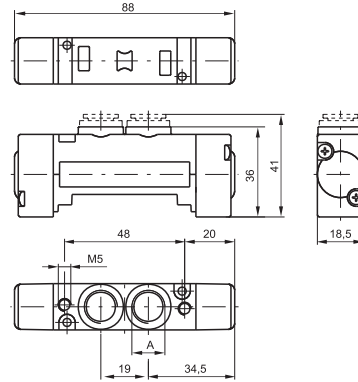
Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=1,5+(0,2*5)=2,5$ bar

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)	For dimension "A":
Filtered air, with or without lubrication	450	10	7	-5 ÷ +50	$\geq 1,5+(0,2xP_{aim.})$	250	see ordering code



**Pneumatic - Spring**

Ordering code
<b>243A.52.00.19</b>
CONNECTIONS
1=G1/4"
5=G1/8"
6=quick fitting tube Ø6
8=quick fitting tube Ø8

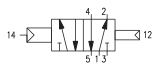
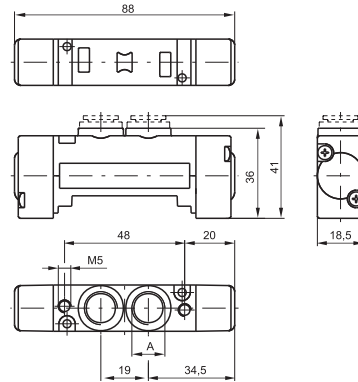


For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	105	-5 ÷ +50

**Pneumatic - Differential / Differential external**

Ordering code
<b>243A.52.00.V</b>
CONNECTIONS
1=G1/4"
5=G1/8"
6=quick fitting tube Ø6
8=quick fitting tube Ø8
VERSION
16=Pneumatic - Differential
17=Pneumatic Differential ext.

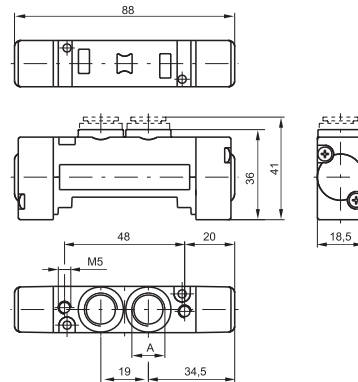


For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	105	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code
<b>243A.52.00.18</b>
CONNECTIONS
1=G1/4"
5=G1/8"
6=quick fitting tube Ø6
8=quick fitting tube Ø8



For dimension "A" see ordering code

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	1,5	105	-5 ÷ +50



**Miniature solenoid - Spring / Differential**

Ordering code

**243A.52.00.V.T**

CONNECTIONS

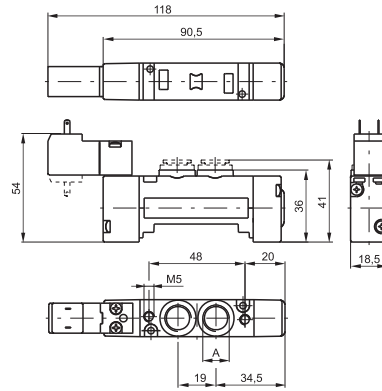
- 1 = G1/4"
- 5 = G1/8"
- 6 = quick fitting tube Ø6
- 8 = quick fitting tube Ø8

VERSION

- 39 = Sol. - Spring
- 29 = Sol. ext. - Spring
- 36 = Sol. - Differ.
- 37 = Sol. ext. - Differ. ext.
- 26 = Sol. ext. - Differ.
- 27 = Sol. ext. - Differ. ext.

COIL VOLTAGE

- 01 = 12V DC
- 02 = 24V DC
- 05 = 24V AC
- 06 = 110V AC
- 07 = 230V AC
- 08 = 24V DC 1 Watt
- 09 = 24V DC Earth Faston
- 11 = 12V DC Downward
- 12 = 24V DC Downward
- 15 = 24V AC Downward
- 16 = 110V AC Downward
- 17 = 230V AC Downward
- 18 = 24V DC 1 Watt Downward
- 19 = 24V DC Earth Faston Downward



For dimension "A" see ordering code



**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	2	140	-5 ÷ +50

**Miniature solenoid - Miniature solenoid**

Ordering code

**243A.52.00.V.T**

CONNECTIONS

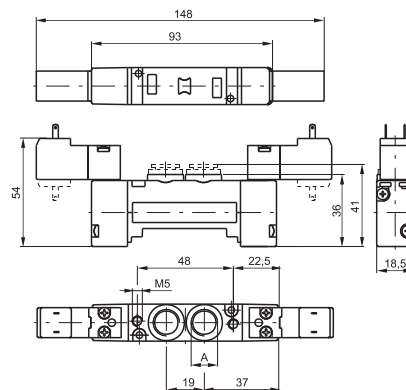
- 1 = G1/4"
- 5 = G1/8"
- 6 = quick fitting tube Ø6
- 8 = quick fitting tube Ø8

VERSION

- 35 = Sol. - Sol.
- 24 = Sol. ext. - Sol. ext.

COIL VOLTAGE

- 01 = 12V DC
- 02 = 24V DC
- 05 = 24V AC
- 06 = 110V AC
- 07 = 230V AC
- 08 = 24V DC 1 Watt
- 09 = 24V DC Earth Faston
- 11 = 12V DC Downward
- 12 = 24V DC Downward
- 15 = 24V AC Downward
- 16 = 110V AC Downward
- 17 = 230V AC Downward
- 18 = 24V DC 1 Watt Downward
- 19 = 24V DC Earth Faston Downward



For dimension "A" see ordering code

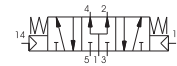
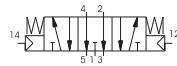
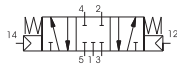
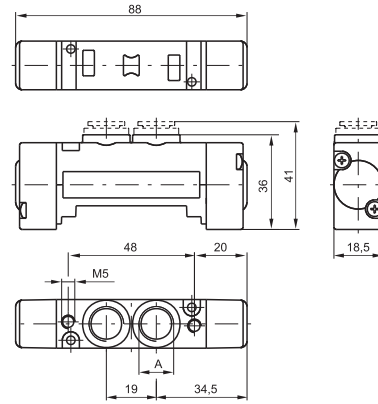


**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	800	10	7	M5	1,5	175	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code	
<b>243A.53.F.18</b>	
CONNECTIONS	
1 = G1/4"	
<b>A</b> 5 = G1/8"	
6 = quick fitting tube Ø6	
8 = quick fitting tube Ø8	
FUNCTION	
<b>F</b> 31 = Closed centres	
32 = Open centres	
33 = Pressured centres	



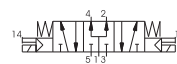
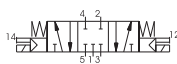
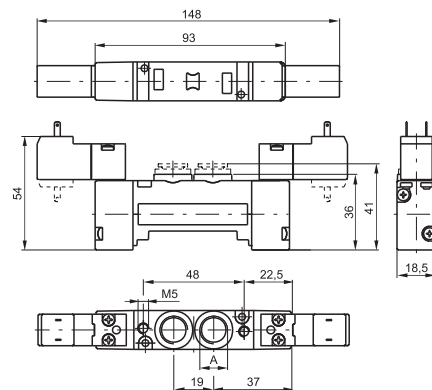
For dimension "A" see ordering code

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	650	10	7	M5	3	115	-5 ÷ +50

**Miniature solenoid - Miniature solenoid**

Ordering code	
<b>243A.53.F.V.1</b>	
CONNECTIONS	
1 = G1/4"	
<b>A</b> 5 = G1/8"	
6 = quick fitting tube Ø6	
8 = quick fitting tube Ø8	
FUNCTION	
<b>F</b> 31 = Closed centres	
32 = Open centres	
33 = Pressured centres	
VERSION	
<b>V</b> 24 = Sol. ext. - Sol. ext.	
35 = Sol. - Sol.	
COIL VOLTAGE	
01 = 12V DC	
02 = 24V DC	
05 = 24V AC	
06 = 110V AC	
07 = 230V AC	
08 = 24V DC 1 Watt	
<b>1</b> 09 = 24V DC Earth Faston	
11 = 12V DC Downward	
12 = 24V DC Downward	
15 = 24V AC Downward	
16 = 110V AC Downward	
17 = 230V AC Downward	
18 = 24V DC 1 Watt Downward	
19 = 24V DC Earth Faston Downward	



For dimension "A" see ordering code

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Pilot ports size	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	650	10	7	M5	3	185	-5 ÷ +50



**Pneumatic - Pneumatic**

Ordering code

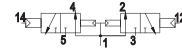
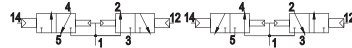
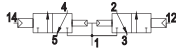
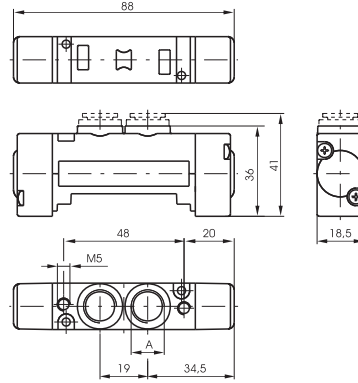
**243A.62.V.18**

CONNECTIONS

- 1=G1/4"
- 5=G1/8"
- 6=quick fitting tube Ø6
- 8=quick fitting tube Ø8

VERSION

- 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)



**Operational characteristic**

Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=1,5+(0,2*5)=2,5$ bar

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)	For dimension "A":
Filtered air, with or without lubrication	450	10	7	-5 ÷ +50	$\geq 1,5+(0,2xP_{aim.})$	110	see ordering code

**Miniature solenoid - Miniature solenoid**

Ordering code

**243A.62.V.35.T**

CONNECTIONS

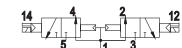
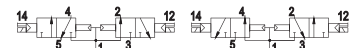
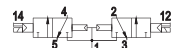
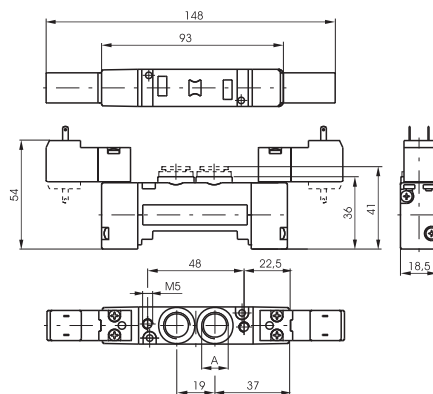
- 1=G1/4"
- 5=G1/8"
- 6=quick fitting tube Ø6
- 8=quick fitting tube Ø8

VERSION

- 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)

COIL VOLTAGE

- 01=12V DC
- 02=24V DC
- 05=24V AC
- 06=110V AC
- 07=230V AC
- 08=24V DC 1 Watt
- 09=24V DC Earth Faston
- 11=12V DC Downward
- 12=24V DC Downward
- 15=24V AC Downward
- 16=110V AC Downward
- 17=230V AC Downward
- 18=24V DC 1 Watt Downward
- 19=24V DC Earth Faston Downward



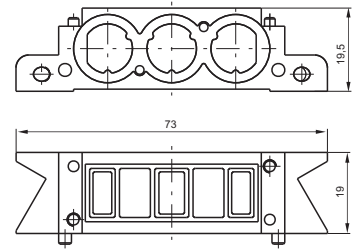
**Operational characteristic**

Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=1,5+(0,2*5)=2,5$ bar

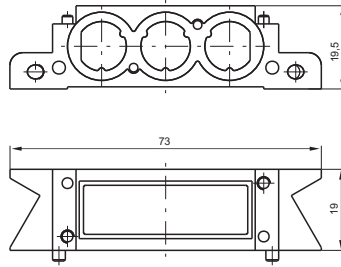
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)	For dimension "A":
Filtered air, with or without lubrication	450	10	7	-5 ÷ +50	$\geq 1,5+(0,2xP_{aim.})$	190	see ordering code

**Modular base**

Ordering code
<b>2430.V</b>
VERSION
01=Modular base
V 06=Supply and exhaust closed
07=Supply closed
08=Exhaust closed



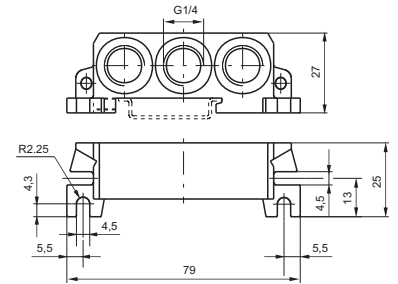
**Blank base**



Ordering code  
**2430.05**

Weight gr. 85

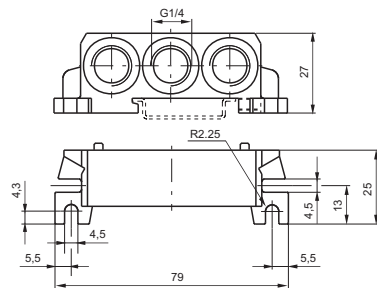
**Right inlet base**



Ordering code  
**2430.02**

Weight gr. 120

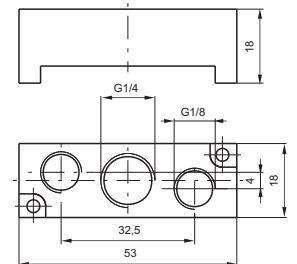
**Left inlet base**



Ordering code  
**2430.03**

Weight gr. 125

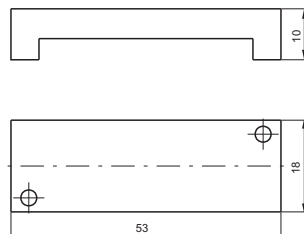
**Intermediate air intake**



Ordering code  
**2430.10**

Weight gr. 30  
to be assembled of a valve

**Closing plate**



Ordering code  
**2430.00**

Weight gr. 20

**Diaphragm plug**



Ordering code  
**2430.17**

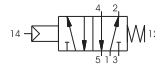
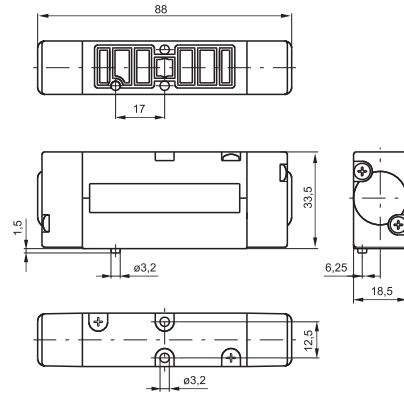
Weight gr. 5

2

**Pneumatic - Spring**

Ordering code

**2445.52.00.19**



**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	550	10	5	2	155	-5 ÷ +50

**Pneumatic - Differential / Differential external**

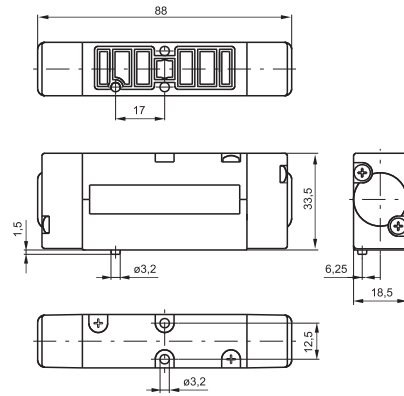
Ordering code

**2445.52.00.V**

VERSION

16=Pneum. - Diff./al

17=Pneum. - Diff./al ext.



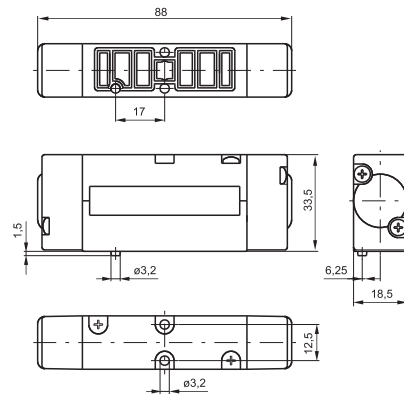
**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	550	10	5	2	155	-5 ÷ +50

**Pneumatic - Pneumatic**

Ordering code

**2445.52.00.18**



**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	500	10	5	1,5	155	-5 ÷ +50



**Pneumatic - Pneumatic**

Ordering code

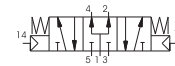
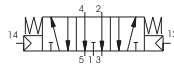
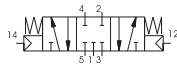
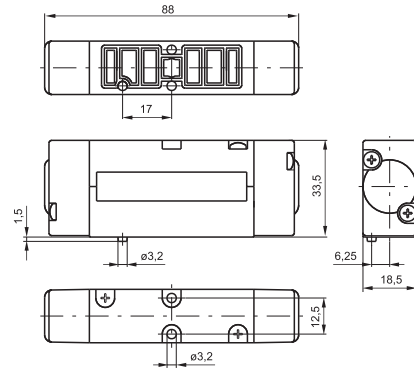
**244E.53.F.18**

TYPE ELECTROPILOT EXHAUST

**E** 1=on base (only for self feeding valves)  
5=on pilot (for all version)

FUNCTION

**F** 31=Closed centres  
32=Open centres  
33=Pressured centres



**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	550	10	5	3	165	-5 ÷ +50

**Miniature solenoid - Miniature solenoid**

Ordering code

**244E.53.F.V.T**

TYPE ELECTROPILOT EXHAUST

**E** 1=on base (only for self feeding valves)  
5=on pilot (for all version)

FUNCTION

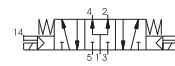
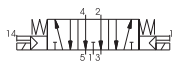
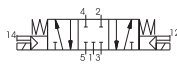
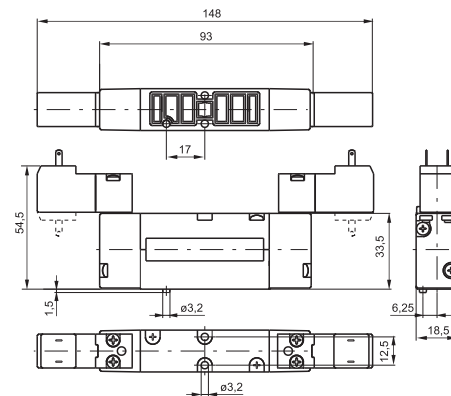
**F** 31=Closed centres  
32=Open centres  
33=Pressured centres

VERSION

**V** 35=Sv. - Sv.  
24=Sv. ext. - Sv. ext.

COIL VOLTAGE

**T** 01=12V DC  
02=24V DC  
05=24V AC  
06=110V AC  
07=230V AC  
08=24V DC 1 Watt  
09=24V DC Earth Faston  
11=12V DC Downward  
12=24V DC Downward  
15=24V AC Downward  
16=110V AC Downward  
17=230V AC Downward  
18=24V DC 1 Watt Downward  
19=24V DC Earth Faston Downward

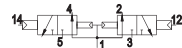
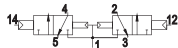
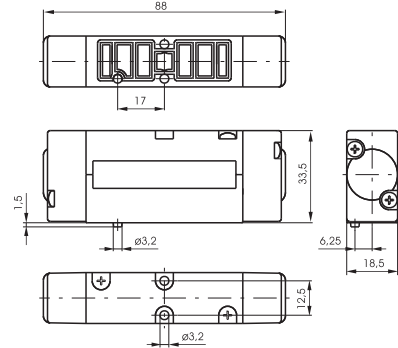


**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Minimum piloting pressure (bar)	Weight (gr.)	Temperature °C
Filtered air, with or without lubrication	550	10	5	3	235	-5 ÷ +50

**Pneumatic - Pneumatic**

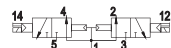
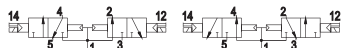
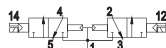
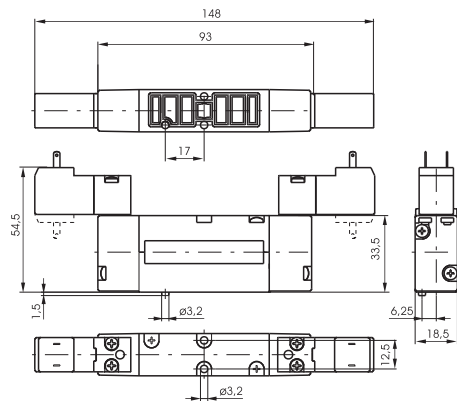
Ordering code	
<b>2445.62.F.18</b>	
FUNCTION	
44=2 Coils 3/2 NC	
45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)	
55=2 Coils 3/2 NO	
54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)	



<b>Operational characteristic</b>		Example: if inlet pressure is set at 5bar then pilot pressure must be at least $P_p=1,5+(0,2*5)=2,5bar$				
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)
Filtered air, with or without lubrication	550	10	5	-5 ÷ +50	$\geq 1,5+(0,2xP.alim.)$	170

**Miniature solenoid - Miniature solenoid**

Ordering code	
<b>2445.62.F.35.T</b>	
FUNCTION	
44=2 Coils 3/2 NC	
45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)	
55=2 Coils 3/2 NO	
54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)	
COIL VOLTAGE	
01=12V DC	
02=24V DC	
05=24V AC	
06=110V AC	
07=230V AC	
08=24V DC 1 Watt	
09=24V DC Earth Faston	
11=12V DC Downward	
12=24V DC Downward	
15=24V AC Downward	
16=110V AC Downward	
17= 230V AC Downward	
18=24V DC 1 Watt Downward	
19=24V DC Earth Faston Downward	



<b>Operational characteristic</b>		Example: if inlet pressure is set at 5bar then pilot pressure must be at least $P_p=1,5+(0,2*5)=2,5bar$				
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Max working pressure (bar)	Orifice size (mm)	Temperature °C	Minimum piloting pressure (bar)	Weight (gr.)
Filtered air, with or without lubrication	550	10	5	-5 ÷ +50	$\geq 1,5+(0,2xP.alim.)$	250



**Modular base**

Ordering code

**2440.V**

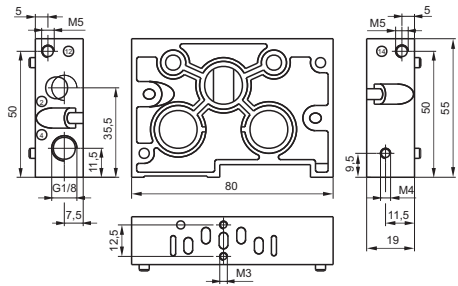
VERSION

01 = standard base

**V** 11 = Modular base for single separate inlet

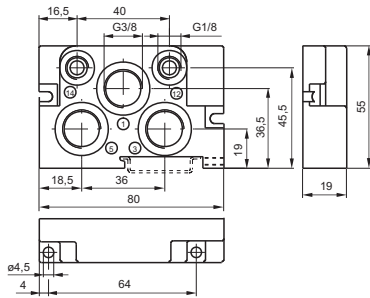


Weight gr. 110



\* Used to supply a single spool valve with an external pilot signal. Threaded ports 12 and 14 are connected to the valve via the base / valve interface, while the cross sectional drillings in the base are blanked off.\*

**Right inlet base**

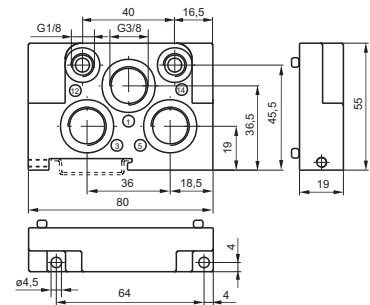


Ordering code

**2440.02**

Weight gr. 110

**Left inlet base**

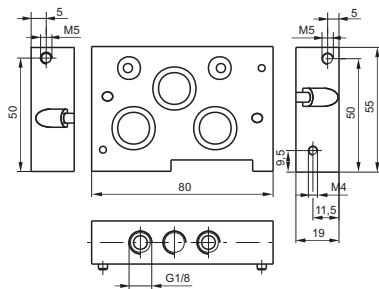


Ordering code

**2440.03**

Weight gr. 110

**Intermediate air intake**

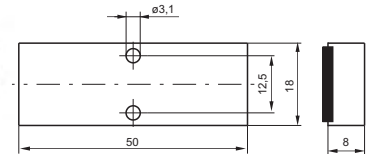


Ordering code

**2440.10**

Weight gr. 185

**Closing plate**



Ordering code

**2440.00**

Weight gr. 185

**Diaphragm plug**

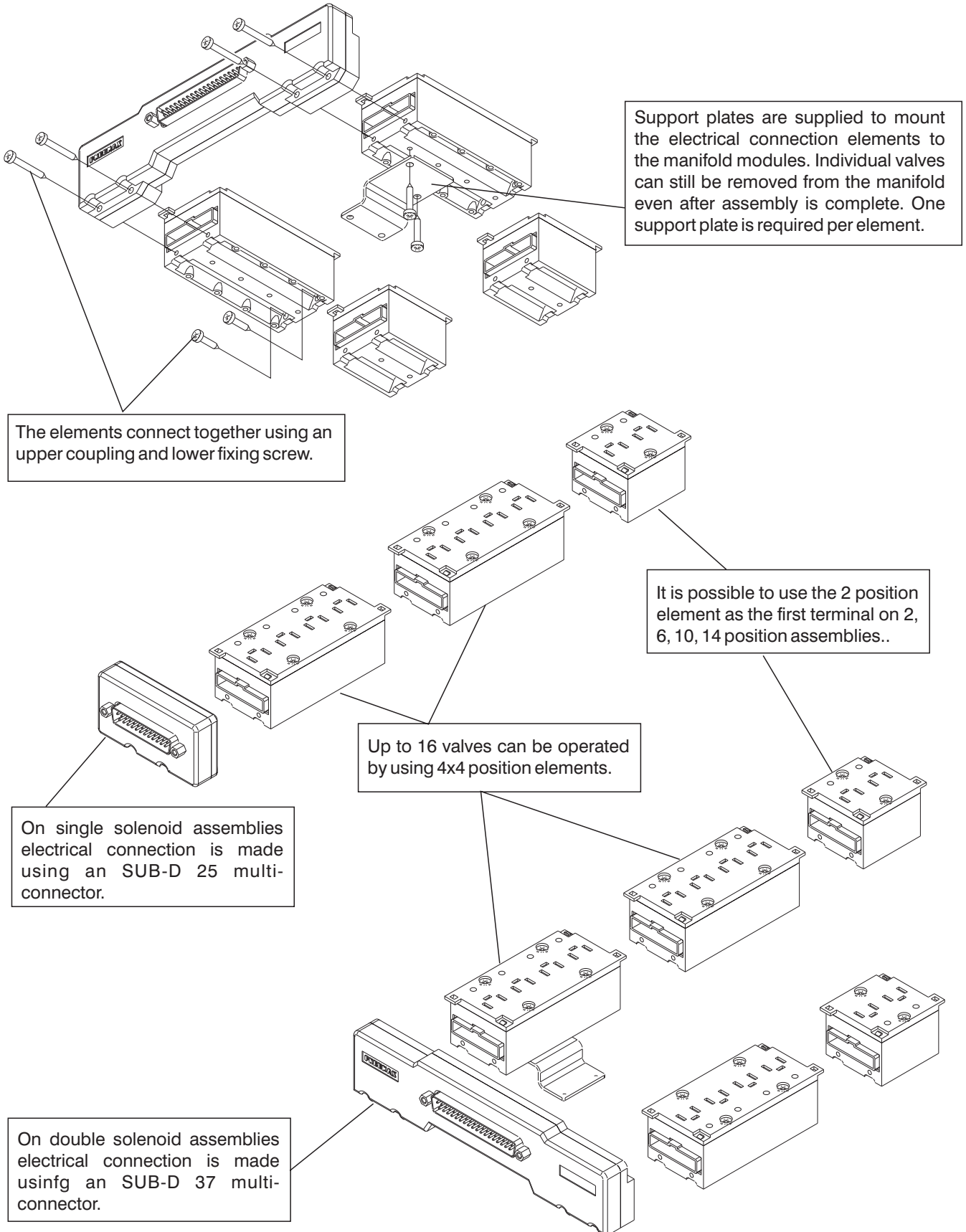
Ordering code

**2440.17**





The integral electrical design for the series 2400 valve is extremely flexible, allowing the production of pre-wired solenoid valve manifolds, the configuration of which can be determined at the point of assembly. The 24 VDC, 12 VDC (equivalent PNP) and 24 VAC\* modules are available with 2 or 4 positions. The system assembled is designed for an IP40 protection. IP65 is available on request.

\* Attention : If the working tension is 24 VAC DO NOT using modules with protection diode




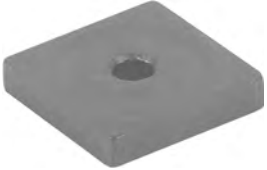
2

<b>4 positions module</b>	<b>Ordering code</b>	<b>2 positions module</b>
	<b>2400.P.T</b>	
	<b>P</b> PLACES	
	04=4 Places	
	02=2 Places	
	<b>T</b> TYPE	
	00=Left IP40-PNP	
	02=Left IP40-PNP with protection diode PNP*	
	10=Left IP65-PNP	
	12=Left IP65-PNP with protection diode*	
	01=Right IP40-PNP	
03=Right IP40-PNP with protection diode*		
11=Right IP65-PNP		
13=Right IP65-PNP with protection diode*		



Weight gr. 50  
\* only for VDC

Weight gr. 30  
\* only for VDC

<b>37 contacts front connector IP65</b>		<b>25 contacts front connector IP65</b>	
<b>Ordering code</b> <b>2400.37.10</b>		<b>Ordering code</b> <b>2400.25.10</b>	
Weight gr. 120 - IP 65 protection grade is achieved using the IP65 Pneumax Cable		Weight gr. 40 - IP 65 protection grade is achieved using the IP65 Pneumax Cable	

<b>Plug</b>		<b>Closing plate electrical positions</b>	
<b>Ordering code</b> <b>2400.00</b>		<b>Ordering code</b> <b>2400.15.00</b>	
Weight gr. 5		Weight gr. 2	

<b>VDMA support plate</b>		<b>FLAT support plate</b>	
<b>Ordering code</b> <b>2440.50</b>		<b>Ordering code</b> <b>2430.50</b>	
Weight gr. 20		Weight gr. 20	

<b>4 positions box with 25 contacts connector</b>		<b>15mm male connector with 2 metres cable</b>	
<b>Ordering code</b> <b>2400.04.25</b>		<b>Ordering code</b> <b>2400.15.02</b>	
Weight gr. 65		Weight gr. 98	

In line cable complete with connector IP40

Ordering code	
<b>2400.T.L.00</b>	
CONNECTOR TYPE	
<b>T</b>	25=25 contacts
	37=37 contacts
CABLE LENGTH	
<b>L</b>	03=3 meters
	05=5 meters
	10=10 meters



Cable complete with connector, 25 Poles IP65

Ordering code	
<b>2300.25.L.C</b>	
CABLE LENGTH	
<b>L</b>	03=3 meters
	05=5 meters
	10=10 meters
CONNECTOR	
<b>C</b>	10=In line
	90=a 90°

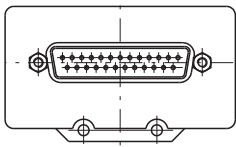
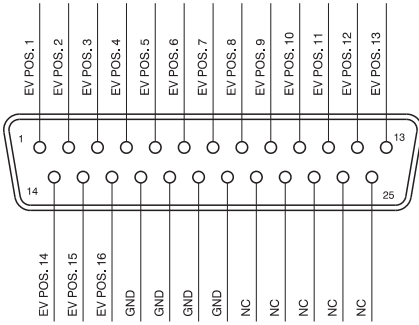


Cable complete with connector, 37 Poles IP65

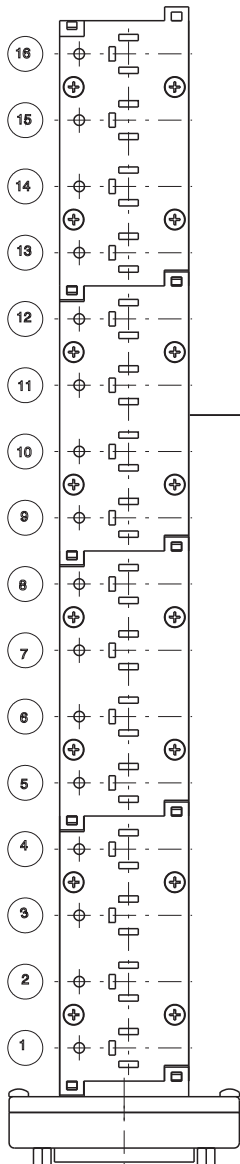
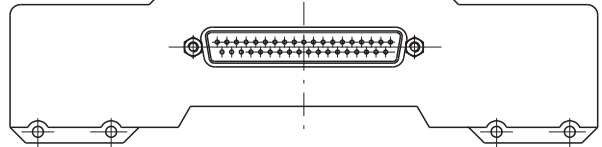
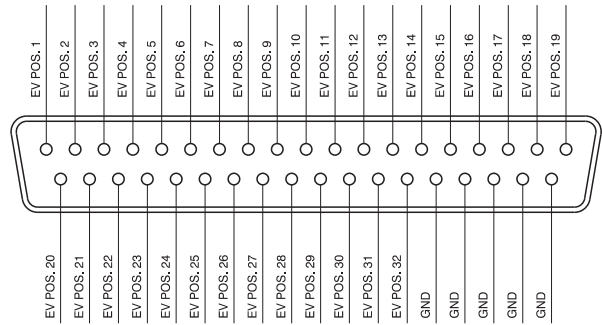
Ordering code	
<b>2400.37.L.C</b>	
CABLE LENGTH	
<b>L</b>	03=3 meters
	05=5 meters
	10=10 meters
CONNECTOR	
<b>C</b>	10=In line
	90=a 90°



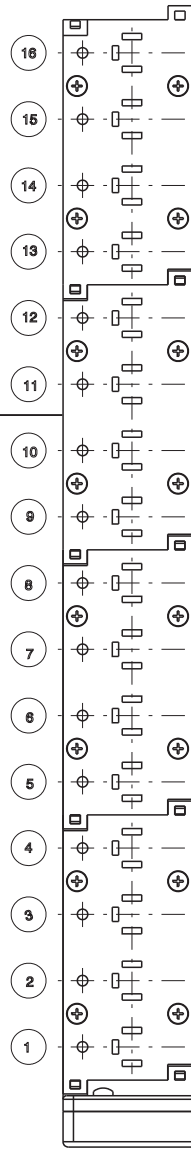
**SUB-D 25 CONTACTS CONNECTOR**



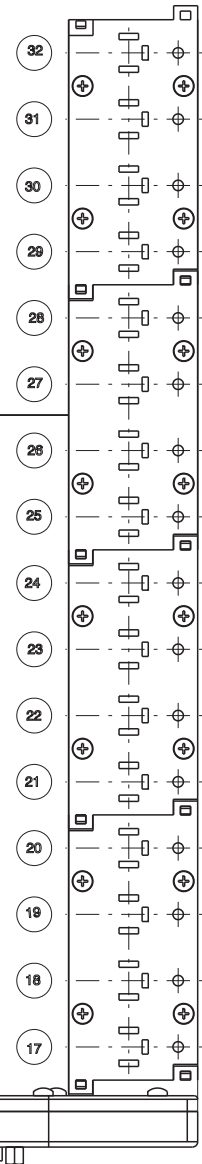
**SUB-D 37 CONTACTS CONNECTOR**



Left modules

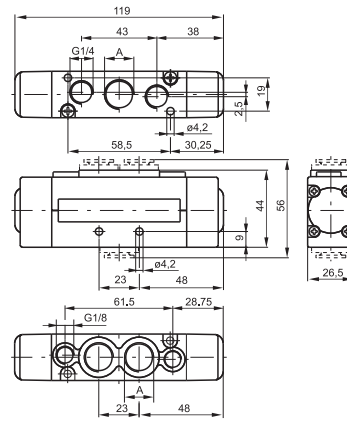


Right modules



**Pneumatic - Spring**

Ordering code
<b>261 A.52.00.19</b>
CONNECTIONS
A 1 = G3/8"
5 = G1/4"
8 = quick fitting tube Ø10



Weight gr. 235  
Minimum piloting pressure 2 bar

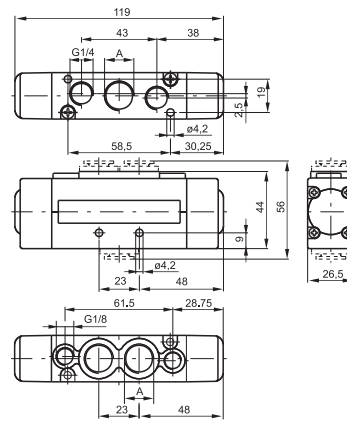


For dimension "A" see ordering code

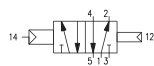
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	G1/8"

**Pneumatic - Differential / Differential external**

Ordering code
<b>261 A.52.00.V</b>
CONNECTIONS
A 1 = G3/8"
5 = G1/4"
8 = quick fitting tube Ø10
VERSION
V 16 = Pneum. - Diff./al
17 = Pneum. - Diff./al ext.



Weight gr. 235  
Minimum piloting pressure 2 bar

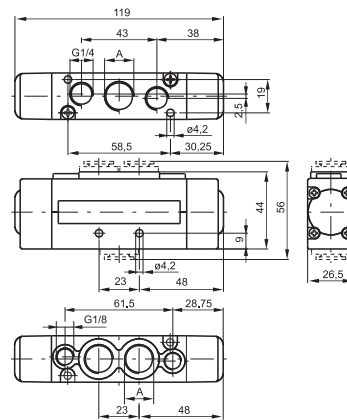


For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	G1/8"

**Pneumatic - Pneumatic**

Ordering code
<b>261 A.52.00.18</b>
CONNECTIONS
A 1 = G3/8"
5 = G1/4"
8 = quick fitting tube Ø10



Weight gr. 235  
Minimum piloting pressure 1,5 bar



For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	G1/8"

**Miniature solenoid - Spring / Differential**

Ordering code

**261 A.52.00. V. T**

CONNECTIONS

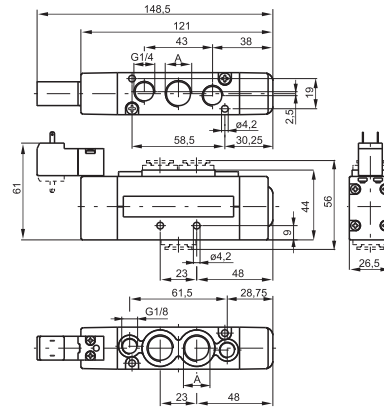
- A 1=G3/8"
- 5=G1/4"
- 8=quick fitting tube Ø10

VERSION

- V 39=Sv. - Spring
- 29=Sv. ext. - Spring
- 36=Sv. - Diff./al
- 37=Sv. ext. - Diff./al ext.
- 26=Sv. ext. - Diff./al
- 27=Sv. ext. - Diff./al ext.

COIL VOLTAGE

- T 01=12V DC
- 02=24V DC
- 05=24V AC
- 06=110V AC
- 07=230V AC
- 08=24V DC 1 Watt
- 09=24V DC Earth Faston
- 11=12V DC Downward
- 12=24V DC Downward
- 15=24V AC Downward
- 16=110V AC Downward
- 17=230V AC Downward
- 18=24V DC 1 Watt Downward
- 19=24V DC Earth Faston Downward



Weight gr. 275  
Minimum working pressure 2 bar - For dimension "A" see ordering code



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10

**Miniature solenoid - Miniature solenoid**

Ordering code

**261 A.52.00. V. T**

CONNECTIONS

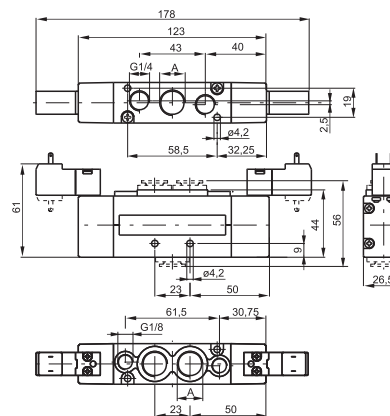
- A 1=G3/8"
- 5=G1/4"
- 8=quick fitting tube Ø10

VERSION

- V 35=Sv. - Sv.
- 24=Sv. ext. - Sv. ext.

COIL VOLTAGE

- T 01=12V DC
- 02=24V DC
- 05=24V AC
- 06=110V AC
- 07=230V AC
- 08=24V DC 1 Watt
- 09=24V DC Earth Faston
- 11=12V DC Downward
- 12=24V DC Downward
- 15=24V AC Downward
- 16=110V AC Downward
- 17=230V AC Downward
- 18=24V DC 1 Watt Downward
- 19=24V DC Earth Faston Downward



Weight gr. 295  
Minimum working pressure 1,5 bar - For dimension "A" see ordering code

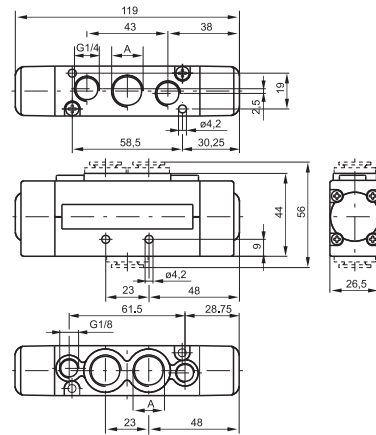


**Operational characteristic**

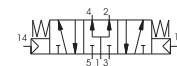
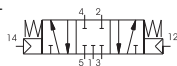
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10

**Pneumatic - Pneumatic**

Ordering code
<b>261 A.53.F.18</b>
CONNECTIONS
A 1=G3/8"
5=G1/4"
8=quick fitting tube Ø10
FUNCTION
F 31=Closed centres
32=Open centres
33=Pressured centres



Weight gr. 245 - Minimum working pressure 3 bar

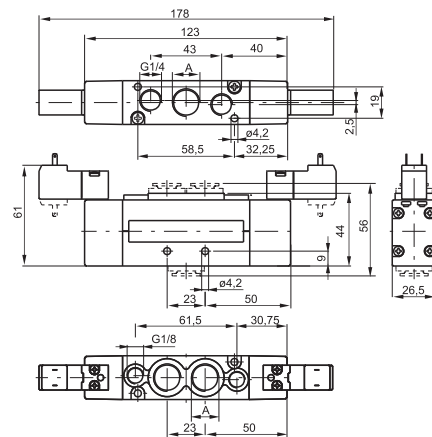


For dimension "A" see ordering code

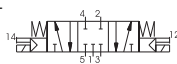
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not		10 bar	-5 - +50	1350 NI/min	mm 9	G1/8"-G1/4" tube Ø6-tube Ø8

**Miniature solenoid - Miniature solenoid**

Ordering code
<b>261 A.53.F.V.T</b>
CONNECTIONS
A 1=G3/8"
5=G1/4"
8=quick fitting tube Ø10
FUNCTION
F 31=Closed centres
32=Open centres
33=Pressured centres
VERSION
V 24=Sv. ext. - Sv. ext.
35=Sv. - Sv.
COIL VOLTAGE
01=12V DC
02=24V DC
05=24V AC
06=110V AC
07=230V AC
08=24V DC 1 Watt
T 09=24V DC Earth Faston
11=12V DC Downward
12=24V DC Downward
15=24V AC Downward
16=110V AC Downward
17=230V AC Downward
18=24V DC 1 Watt Downward
19=24V DC Earth Faston Downward



Weight gr. 245 - Minimum working pressure 3 bar



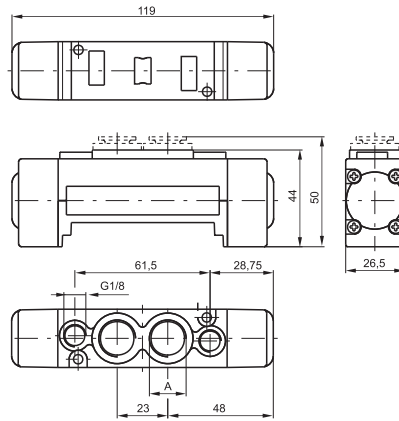
For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
	Filtered and lubricated air or not		10 bar	-5 - +50	1350 NI/min	mm 9



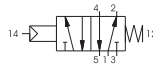
**Pneumatic - Spring**

Ordering code
<b>263(A).52.00.19</b>
CONNECTIONS
1=G3/8"
5=G1/4"
8=quick fitting tube Ø10



For dimension "A" see ordering code

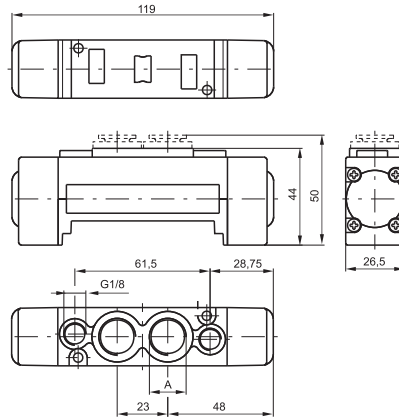
Weight gr. 185  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	M5

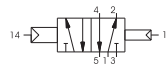
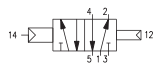
**Pneumatic - Differential / Differential external**

Ordering code
<b>263(A).52.00.V</b>
CONNECTIONS
1=G3/8"
5=G1/4"
8=quick fitting tube Ø10
VERSION
16=Pneum. - Diff./al
17=Pneum. - Diff./al ext.



For dimension "A" see ordering code

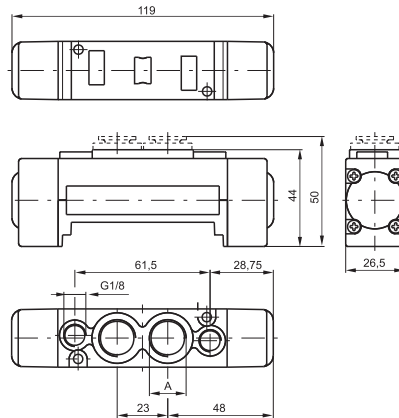
Weight gr. 185  
Minimum piloting pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	M5

**Pneumatic - Pneumatic**

Ordering code
<b>263(A).52.00.18</b>
CONNECTIONS
1=G3/8"
5=G1/4"
8=quick fitting tube Ø10



For dimension "A" see ordering code

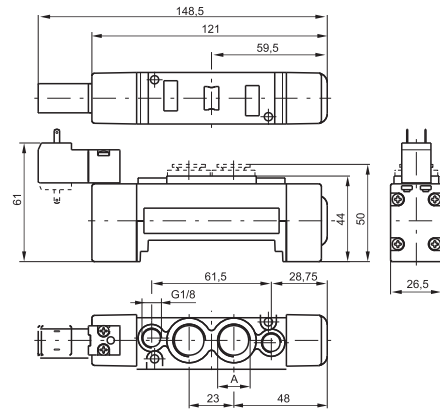
Weight gr. 185  
Minimum piloting pressure 1,5 bar



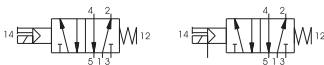
Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size	Pilot ports size
	Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9	G1/4" - G3/8" tube Ø10	M5

**Miniature solenoid - Spring / Differential**

Ordering code	
<b>263A.52.00.V.T</b>	
CONNECTIONS	
<b>A</b>	1 = G3/8" 5 = G1/4" 8 = quick fitting tube Ø10
VERSION	
	39 = Sv. - Spring 29 = Sv. ext. - Spring
<b>V</b>	36 = Sv. - Diff./al 37 = Sv. ext. - Diff./al ext. 26 = Sv. ext. - Diff./al 27 = Sv. ext. - Diff./al ext.
COIL VOLTAGE	
	01 = 12V DC 02 = 24V DC 05 = 24V AC 06 = 110V AC 07 = 230V AC 08 = 24V DC 1 Watt
<b>T</b>	09 = 24V DC Earth Faston 11 = 12V DC Downward 12 = 24V DC Downward 15 = 24V AC Downward 16 = 110V AC Downward 17 = 230V AC Downward 18 = 24V DC 1 Watt Downward 19 = 24V DC Earth Faston Downward



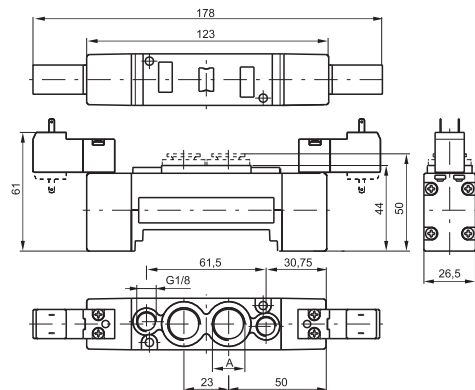
Weight gr. 220  
Minimum working pressure 2 bar - For dimension "A" see ordering code



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9

**Miniature solenoid - Miniature solenoid**

Ordering code	
<b>263A.52.00.V.T</b>	
CONNECTIONS	
<b>A</b>	1 = G3/8" 5 = G1/4" 8 = quick fitting tube Ø10
VERSION	
<b>V</b>	35 = Sv. - Sv. 24 = Sv. ext. - Sv. ext.
COIL VOLTAGE	
	01 = 12V DC 02 = 24V DC 05 = 24V AC 06 = 110V AC 07 = 230V AC 08 = 24V DC 1 Watt
<b>T</b>	09 = 24V DC Earth Faston 11 = 12V DC Downward 12 = 24V DC Downward 15 = 24V AC Downward 16 = 110V AC Downward 17 = 230V AC Downward 18 = 24V DC 1 Watt Downward 19 = 24V DC Earth Faston Downward



Weight gr. 250  
Minimum working pressure 1,5 bar - For dimension "A" see ordering code



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	10 bar	-5 - +50	1500 NI/min	mm 9

**Pneumatic - Pneumatic**

Ordering code

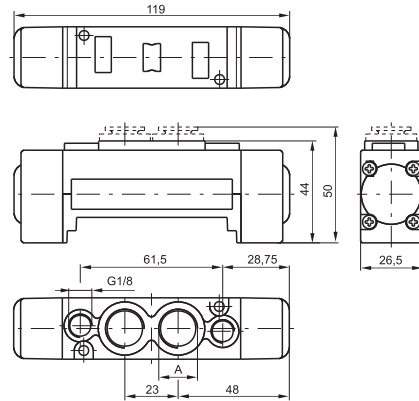
**263A.53.F.18**

CONNECTIONS

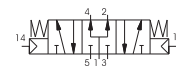
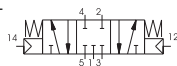
- A** 1=G3/8"
- 5=G1/4"
- 8=quick fitting tube Ø10

FUNCTION

- F** 31=Closed centres
- 32=Open centres
- 33=Pressured centres



Weight gr. 195 - Minimum working pressure 3 bar



For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size	Pilot ports size
		Filtered and lubricated air or not	10 bar	-5 - +50	1350 Nl/min	mm 9	G1/8"-G1/4" tube Ø6-tube Ø8

**Miniature solenoid - Miniature solenoid**

Ordering code

**263A.53.F.V.T**

CONNECTIONS

- A** 1=G3/8"
- 5=G1/4"
- 8=quick fitting tube Ø10

FUNCTION

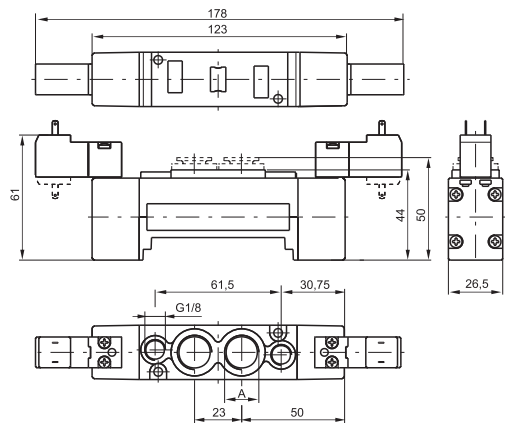
- F** 31=Closed centres
- 32=Open centres
- 33=Pressured centres

VERSION

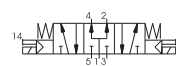
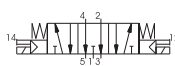
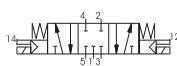
- V** 24=Sv. ext. - Sv. ext.
- 35=Sv. - Sv.

COIL VOLTAGE

- 01=12V DC
- 02=24V DC
- 05=24V AC
- 06=110V AC
- 07=230V AC
- 08=24V DC 1 Watt
- T** 09=24V DC Earth Faston
- 11=12V DC Downward
- 12=24V DC Downward
- 15=24V AC Downward
- 16=110V AC Downward
- 17=230V AC Downward
- 18=24V DC 1 Watt Downward
- 19=24V DC Earth Faston Downward



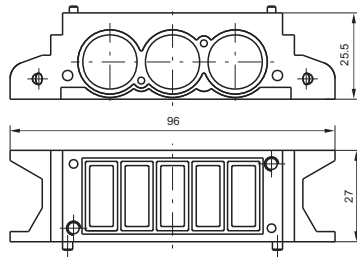
Weight gr. 270 - Minimum working pressure 3 bar



For dimension "A" see ordering code

Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (Nl/min)	Orifice size (mm)	Working ports size
		Filtered and lubricated air or not	10 bar	-5 - +50	1350 Nl/min	mm 9

**Modular base**

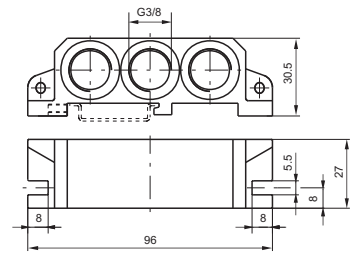


Ordering code

**2630.01**

Weight gr. 80

**Right inlet base**

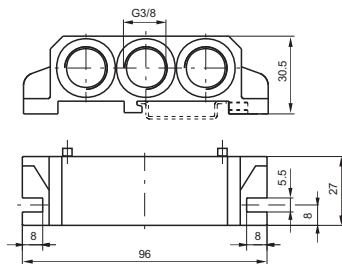


Ordering code

**2630.02**

Weight gr. 80

**Left inlet base**

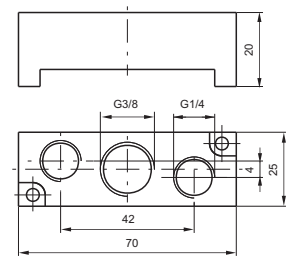


Ordering code

**2630.03**

Weight gr. 100

**Intermediate air intake**

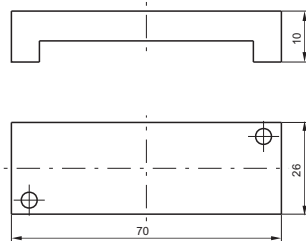


Ordering code

**2630.10**

Weight gr. 60  
to be assembled of a valve

**Closing plate**



Ordering code

**2630.00**

Weight gr. 20

**Diaphragm plug**



Ordering code

**2630.17**

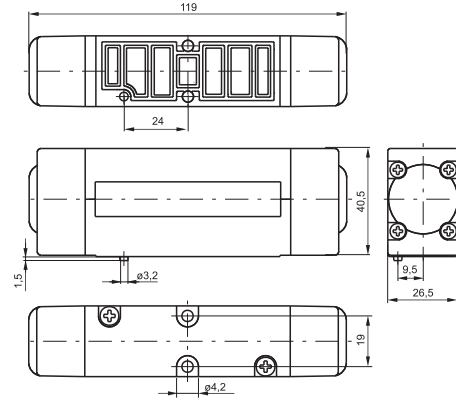
Weight gr. 5

2

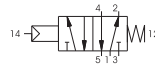
**Pneumatic - Spring**

Ordering code

**2645.52.00.19**



Weight gr. 235  
Minimum piloting pressure 2 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
Filtered and lubricated air or not	10 bar	-5 - +50	1100 NI/min	mm 7,5

**Pneumatic - Differential / Differential external**

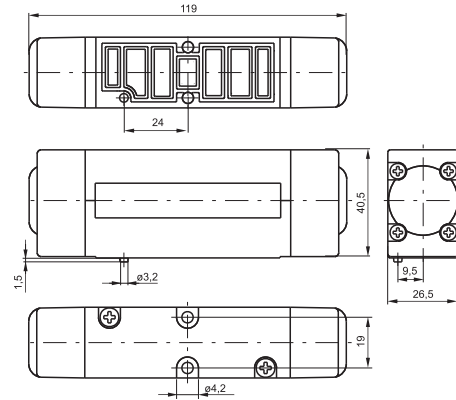
Ordering code

**2645.52.00.V**

VERSION

16=Pneumatic - Differential

17=Pneumatic - Differential external



Weight gr. 235  
Minimum piloting pressure 2 bar



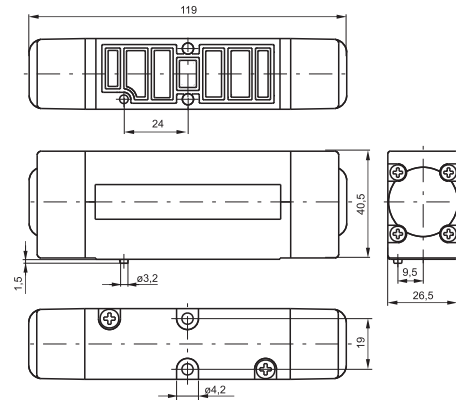
**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
Filtered and lubricated air or not	10 bar	-5 - +50	1100 NI/min	mm 7,5

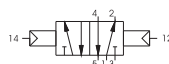
**Pneumatic - Pneumatic**

Ordering code

**2645.52.00.18**



Weight gr. 255  
Minimum piloting pressure 1,5 bar

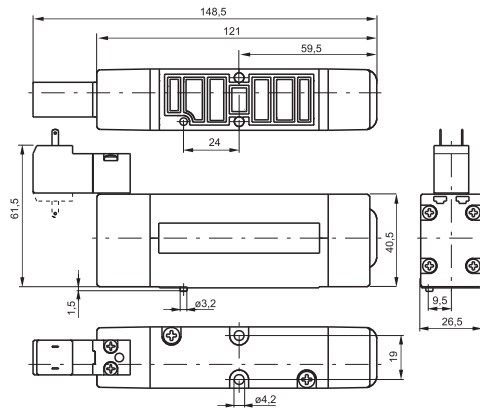


**Operational characteristic**

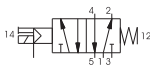
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Orifice size (mm)
Filtered and lubricated air or not	10 bar	-5 - +50	1100 NI/min	mm 7,5

**Miniature solenoid - Spring / Differential**

Ordering code	
<b>264</b> <b>.52.00.</b>	
TYPE ELECTROPILOT EXHAUST	
	1=on base (only for self feeding valves)
	5=on pilot (for all version)
VERSION	
	39=Sv. - Spring
	29=Sv. ext. - Spring
	36=Sv. - Diff./al
	37=Sv. ext. - Diff./al ext.
	26=Sv. ext. - Diff./al
	27=Sv. ext. - Differ. ext.
COIL VOLTAGE	
	01=12V DC
	02=24V DC
	05=24V AC
	06=110V AC
	07=230V AC
	08=24V DC 1 Watt
	09=24V DC Earth Faston
	11=12V DC Downward
	12=24V DC Downward
	15=24V AC Downward
	16=110V AC Downward
	17=230V AC Downward
	18=24V DC 1 Watt Downward
	19=24V DC Earth Faston Downward



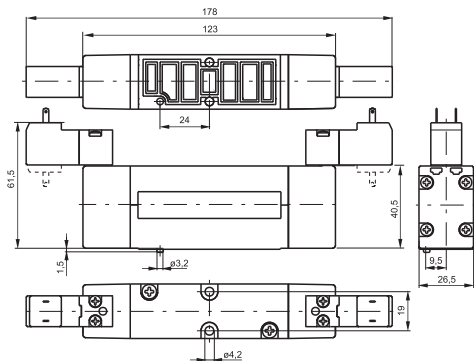
Miniature solenoid - Spring / Differenzial: Weight gr. 270 - Minimum working pressure 2 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	10 bar	-5 - +50	1100 NI/min	mm 7,5

**Miniature solenoid - Miniature solenoid**

Ordering code	
<b>264</b> <b>.52.00.</b>	
TYPE ELECTROPILOT EXHAUST	
	1=on base (only for self feeding valves)
	5=on pilot (for all version)
VERSION	
	35=Sv. - Sv.
	24=Sv. ext. - Sv. ext.
COIL VOLTAGE	
	01=12V DC
	02=24V DC
	05=24V AC
	06=110V AC
	07=230V AC
	08=24V DC 1 Watt
	09=24V DC Earth Faston
	11=12V DC Downward
	12=24V DC Downward
	15=24V AC Downward
	16=110V AC Downward
	17=230V AC Downward
	18=24V DC 1 Watt Downward
	19=24V DC Earth Faston Downward



Miniature solenoid - Miniature solenoid: Weight gr. 305 - Minimum working pressure 1,5 bar



Operational characteristic	Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
	Filtered and lubricated air or not	10 bar	-5 - +50	1100 NI/min	mm 7,5

**Pneumatic - Pneumatic**

Ordering code

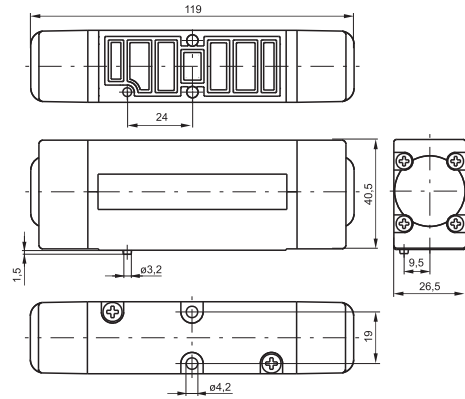
**264E.53.F.18**

TYPE ELECTROPILOT EXHAUST

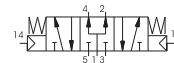
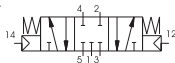
**E** 1=on base (only for self feeding valves)  
5=on pilot (for all version)

FUNCTION

**F** 31=Closed centres  
32=Open centres  
33=Pressured centres



Weight gr. 245 - Minimum working pressure 3 bar



**Operational characteristic**

Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
Filtered and lubricated air or not	10 bar	-5 - +50	1000 NI/min	mm 7,5

**Miniature solenoid - Miniature solenoid**

Ordering code

**264E.53.F.V.T**

TYPE ELECTROPILOT EXHAUST

**E** 1=on base (only for self feeding valves)  
5=on pilot (for all version)

FUNCTION

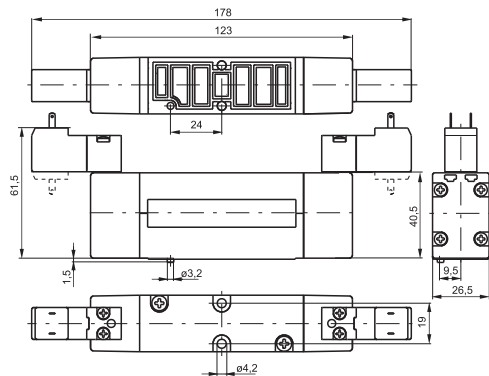
**F** 31=Closed centres  
32=Open centres  
33=Pressured centres

VERSION

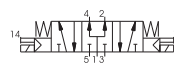
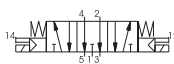
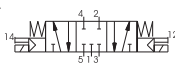
**V** 24=Sv. ext. - Sv. ext.  
35=Sv. - Sv.

COIL VOLTAGE

01=12V DC  
02=24V DC  
05=24V AC  
06=110V AC  
07=230V AC  
08=24V DC 1 Watt  
**T** 09=24V DC Earth Faston  
11=12V DC Downward  
12=24V DC Downward  
15=24V AC Downward  
16=110V AC Downward  
17= 230V AC Downward  
18=24V DC 1 Watt Downward  
19=24V DC Earth Faston Downward



Weight gr. 315 - Minimum working pressure 3 bar



**Operational characteristic**

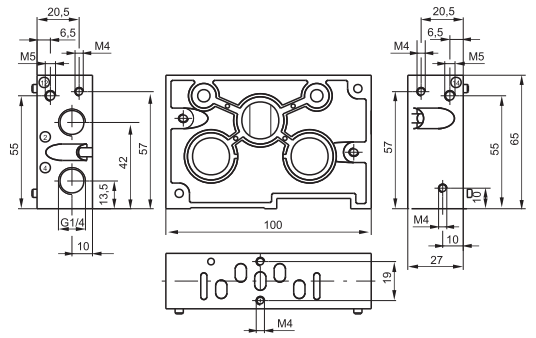
Fluid	Max working pressure (bar)	Temperature °C	Flow rate at 6 bar with Δp=1 (NI/min)	Orifice size (mm)
Filtered and lubricated air or not	10 bar	-5 - +50	1000 NI/min	mm 5

**Modular base**

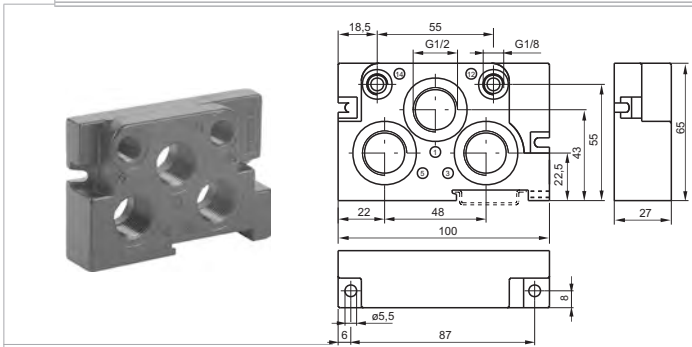
Ordering code
<b>2640.V</b>
VERSION
V 01 = standard base
11 = for single separate inlet



Weight gr. 220



**Right inlet base**

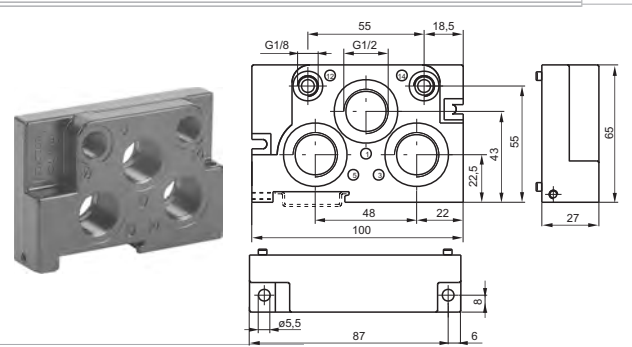


Ordering code

**2640.02**

Weight gr. 200

**Left inlet base**



Ordering code

**2640.03**

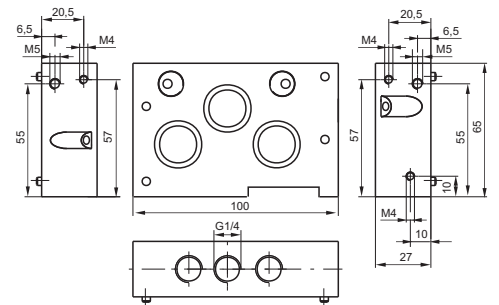
Weight gr. 200

**Intermediate air intake**

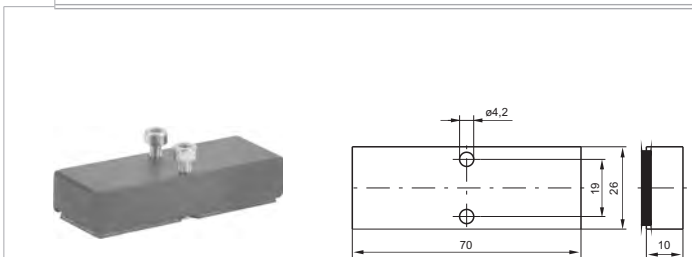
Ordering code
<b>2640.10</b>



Weight gr. 380



**Closing plate**



Ordering code

**2640.00**

Weight gr. 50

**Diaphragm plug**



Ordering code

**2640.17**

Weight gr. 10

2



**General**

The new 2700 Series of Solenoid operated valves conform to ISO 15407, a standard for both pneumatic and electrical layout.

This series of valves have a 27mm valve body width and a nominal flow rate of 1000 NI/Min.

The solenoid valves are mounted upon a modular sub-base with G1/4" pneumatic connections and built in electrical connection. Another feature of the 2700 series is that it can be equipped with the serial bus modules currently being used with our Optyma-T valve series, thus offering an extremely flexible product that can be integrated with standard communication protocols (CAN-Open®, Profibus, Device-Net, Ethernet IP, Profinet and EtherCAT®).

In addition to the serial bus modules, the valves manifolds can also be used with either a 25 or 37 pin SUB-D connectors offering control of up to a maximum of 32 electrical signals.

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time"**

**Main characteristics**

- Integrated and optimized electrical connection system.
- IP65 protection degree.
- Only one 26mm size.
- Monostable and bistable solenoid valves with the same size dimensions.
- G1/4" quick coupling connections.
- Easy and fast manifold assembling.

**Construction characteristics**

Body	Aluminium
Operators	Technopolymer
Spools	Aluminium
Seals	HNBR 75-80 Shore A
Piston seals	NBR
Springs	AISI 302 stainless steel
Pistons	Technopolymer

**Functions**

- EV 5/2 MONOSTABLE SOLENOID-SPRING
- EV 5/2 MONOSTABLE SOLENOID-DIFFERENTIAL
- EV 5/2 BISTABLE SOLENOID-SOLENOID
- EV 5/3 CC SOLENOID-SOLENOID
- EV 2x3/2 NC-NC (= 5/3 CO) SOLENOID-SOLENOID
- EV 2x3/2 NO-NO (= 5/3 CP) SOLENOID-SOLENOID
- EV 2x3/2 NC-NO SOLENOID-SOLENOID

**Technical characteristics**

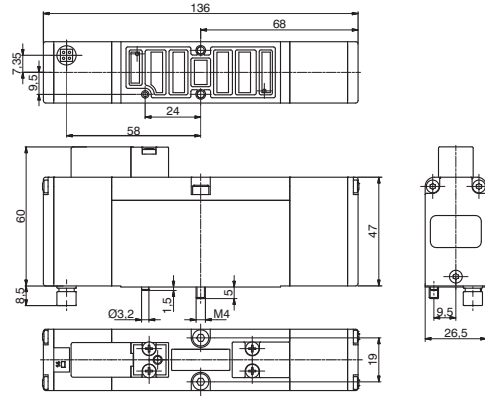
Voltage	24 VDC ± 10% PNP
Power Consumption	1 Watt - 2,3 Watt
Valve working pressure [1]	from vacuum to 10 bar max.
Operating temperature	-5°C +50°C
Life (standard operating conditions)	50.000.000
Fluid	Filtered air, with or without lubrication (if lubricated air, the lubrication must be continuous)



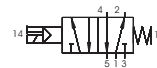


**Solenoid-Spring**

Ordering code
<b>2741.52.00.P.V</b>
PILOTING
<b>P</b> 39=Self feeding
29=External feeding
VOLTAGE
<b>V</b> 01=12V DC
02=24V DC
08=24V DC 1W



SHORT FUNCTION CODE (Self feeding) "AA"  
SHORT FUNCTION CODE (External feeding) "AE"



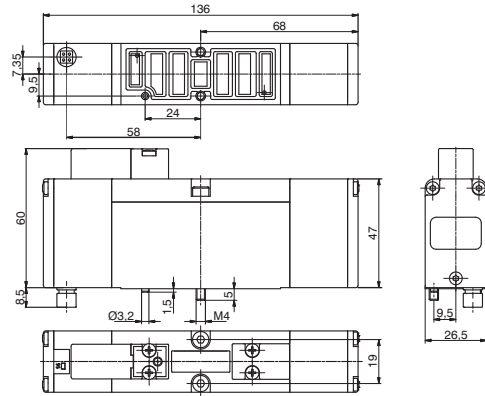
Note:  
The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operating Characteristics**

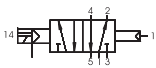
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	20	38	From vacuum to 10	2	-5 ÷ +50	280

**Solenoid-Differential**

Ordering code
<b>2741.52.00.P.V</b>
PILOTING
<b>P</b> 36=Self feeding
26=External feeding
VOLTAGE
<b>V</b> 01=12V DC
02=24V DC
08=24V DC 1W



SHORT FUNCTION CODE (Self feeding) "BA"  
SHORT FUNCTION CODE (External feeding) "BE"



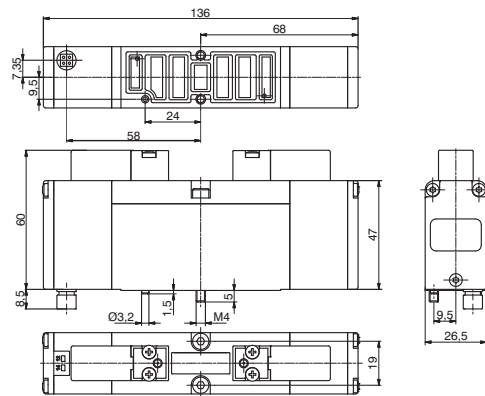
Note:  
The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operating Characteristics**

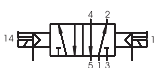
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	20	38	From vacuum to 10	2	-5 ÷ +50	280

**Solenoid-Solenoid**

Ordering code
<b>2741.52.00.P.V</b>
PILOTING
<b>P</b> 35=Self feeding
24=External feeding
VOLTAGE
<b>V</b> 01=12V DC
02=24V DC
08=24V DC 1W



SHORT FUNCTION CODE (Self feeding) "CA"  
SHORT FUNCTION CODE (External feeding) "CE"



Note:  
The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operating Characteristics**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	12	14	From vacuum to 10	2	-5 ÷ +50	310



**Solenoid-Solenoid**

Ordering code

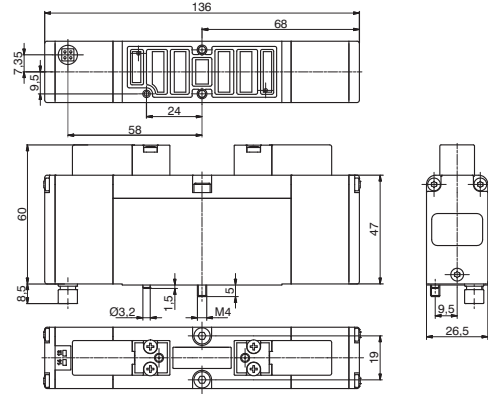
**2741.53.31.P.V**

PILOTING

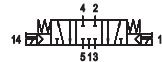
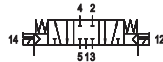
- P** 35=Self feeding
- 24=External feeding

VOLTAGE

- V** 01=12V DC
- 02=24V DC
- 08=24V DC 1W



SHORT FUNCTION CODE (Self feeding) "EA"  
SHORT FUNCTION CODE (External feeding) "EE"



Note:  
The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operating Characteristics**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	660	12	60	From vacuum to 10	3	-5 ÷ +50	310

**Solenoid-Solenoid (Self feeding)**

Ordering code

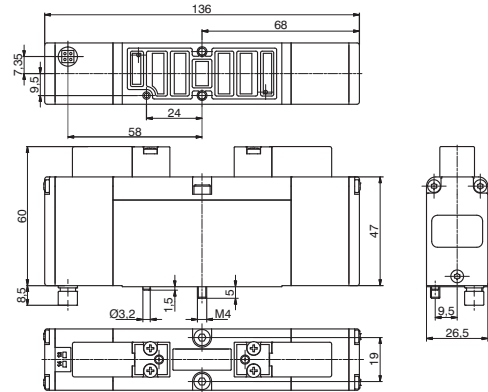
**2741.62.F.35.V**

FUNCTION

- F** 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)

VOLTAGE

- V** 01=12V DC
- 02=24V DC
- 08=24V DC 1 Watt



SHORT FUNCTION CODE:  
2 3/2 NC="FA"  
1 3/2 NC (14) + 1 3/2 NO (12)="HA"  
2 3/2 NO="GA"  
1 3/2 NO (14) + 1 3/2 NC (12)="IA"



Note: The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operating Characteristics**

Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=2+(0,3*5)=3,5\text{bar}$

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	15	15	From vacuum to 10	$\geq 2+(0,3P.\text{alim.})$	-5 ÷ +50	310

**Solenoid-Solenoid (External feeding)**

Ordering code

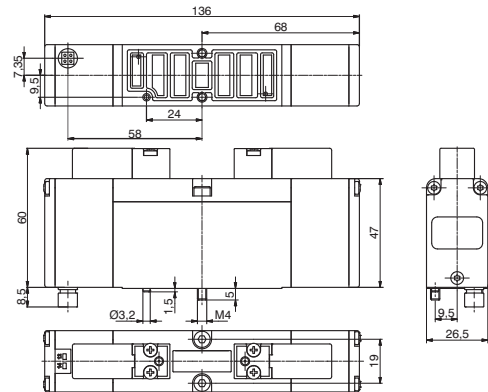
**2741.62.F.24.V**

FUNCTION

- F** 44=2 Coils 3/2 NC
- 45=1 Coil 3/2 NC (14) + 1 Coil 3/2 NO (12)
- 55=2 Coils 3/2 NO
- 54=1 Coil 3/2 NO (14) + 1 Coil 3/2 NC (12)

VOLTAGE

- V** 01=12V DC
- 02=24V DC
- 08=24V DC 1 Watt



SHORT FUNCTION CODE:  
2 3/2 NC="FE"  
1 3/2 NC (14) + 1 3/2 NO (12)="HE"  
2 3/2 NO="GE"  
1 3/2 NO (14) + 1 3/2 NC (12)="IE"



Note: The "Activations time" values, are valid only for the 2,3W versions  
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

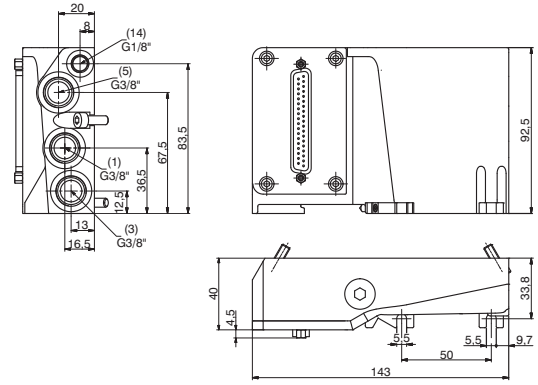
**Operating Characteristics**

Example: if inlet pressure is set at 5bar then pilot pressure must be at least  $P_p=2+(0,3*5)=3,5\text{bar}$

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time (ISO12238), activation time (ms)	Response time (ISO12238), deactivation time (ms)	Working pressure (bar)	Minimum piloting pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	12	60	From vacuum to 10	$\geq 2+(0,3P.\text{alim.})$	-5 ÷ +50	310

**Left Endplates**

Ordering code
<b>2740.02.Ⓢ</b>
CONNECTIONS
Ⓢ 37P=Connectors 37 poles PNP
Ⓢ 25P=Connectors 25 poles PNP
Ⓢ 37N=Connectors 37 poles NPN
Ⓢ 25N=Connectors 25 poles NPN

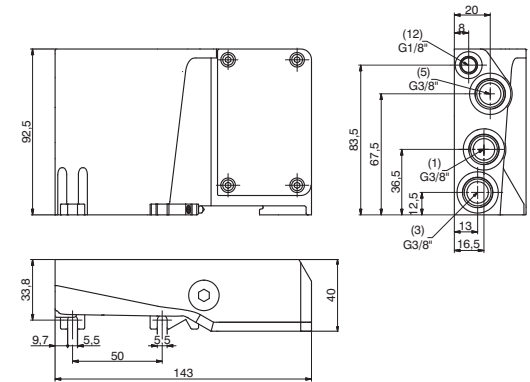


**Operating Characteristics**

Fluid	Working pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	From vacuum to 10	-5 ÷ +50	600

**Right Endplates**

Ordering code
<b>2740.03.Ⓢ</b>
CONNECTIONS
Ⓢ 00=Exhaust electrical connection closed
Ⓢ 25P=Connectors 25 poles

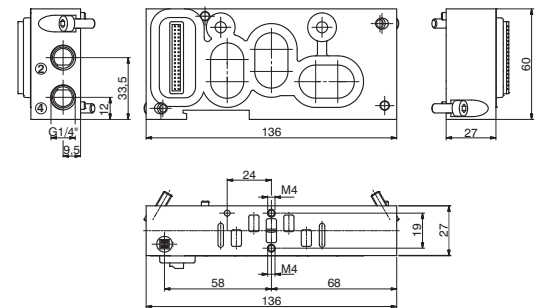


**Operating Characteristics**

Fluid	Working pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	From vacuum to 10	-5 ÷ +50	600

**Modular base**

Ordering code
<b>2740.01.Ⓜ</b>
VERSION
Ⓜ M=Monostable
B=Bistable



**Operating Characteristics**

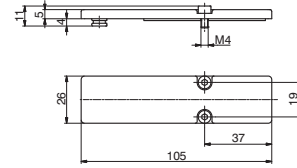
Fluid	Working pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	From vacuum to 10	-5 ÷ +50	330



**Closing plate**

Ordering code

**2740.00**



SHORT FUNCTION CODE: "T"

**Operating Characteristics**

Fluid	Working pressure (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	From vacuum to 10	-5 ÷ +50	100

**Cable complete with connector, 25 Poles IP65**

Ordering code

**2300.25.L.C**

CABLE LENGTH

03=3 meters

05=5 meters

10=10 meters

CONNECTOR

10=In line

90=90° Angle



**Cable complete with connector, 37 Poles IP65**

Ordering code

**2400.37.L.C**

CABLE LENGTH

03=3 meters

05=5 meters

10=10 meters

CONNECTOR

10=In line

90=90° Angle



**Cable complete with connector, 25 Poles IP65**

Ordering code

**2400.25.L.25**

CABLE LENGTH

03=3 meters

05=5 meters

10=10 meters



**Diaphragm plug**

Ordering code

**2740.17**



**Constructions characteristics**

Weight (gr.)

65

The electrical connection is achieved by a 37 pin connector and can manage up to 32 solenoid pilots. It is also possible use a 25 sub-D pin connector and, in this case, it is possible to manage a maximum of 22 outputs. The management and distribution of the electrical signals between each valve is obtained thanks to an electrical connector which receives the signals from the previous module, uses one, two or none depending on the type, and carries forward to the next module the remaining.

Bistable valves, 5/3 and 2x3/2 valves which have two solenoid pilots built in, use two signals; the first is directed to the pilot side 14 the second to the pilot side 12. Modular bases can be fitted with two type of electrical connector: the monostable version uses only one signal (connected to the pilot side 14) and carries forward the remaining, the bistable version which always uses two signals.

This solution allows the modification of the manifold (replacement of monostable valves without bistable for example) without having to reset the PLC output layout.

On other hand this solution limits the maximum number of valves to 16 when it is used a 37 pin connector or 11 when it is used a 25 pin connector.

Intermediate supply/exhaust module uses an electrical connector directly forwarding signals to the next one without any kind of modification.

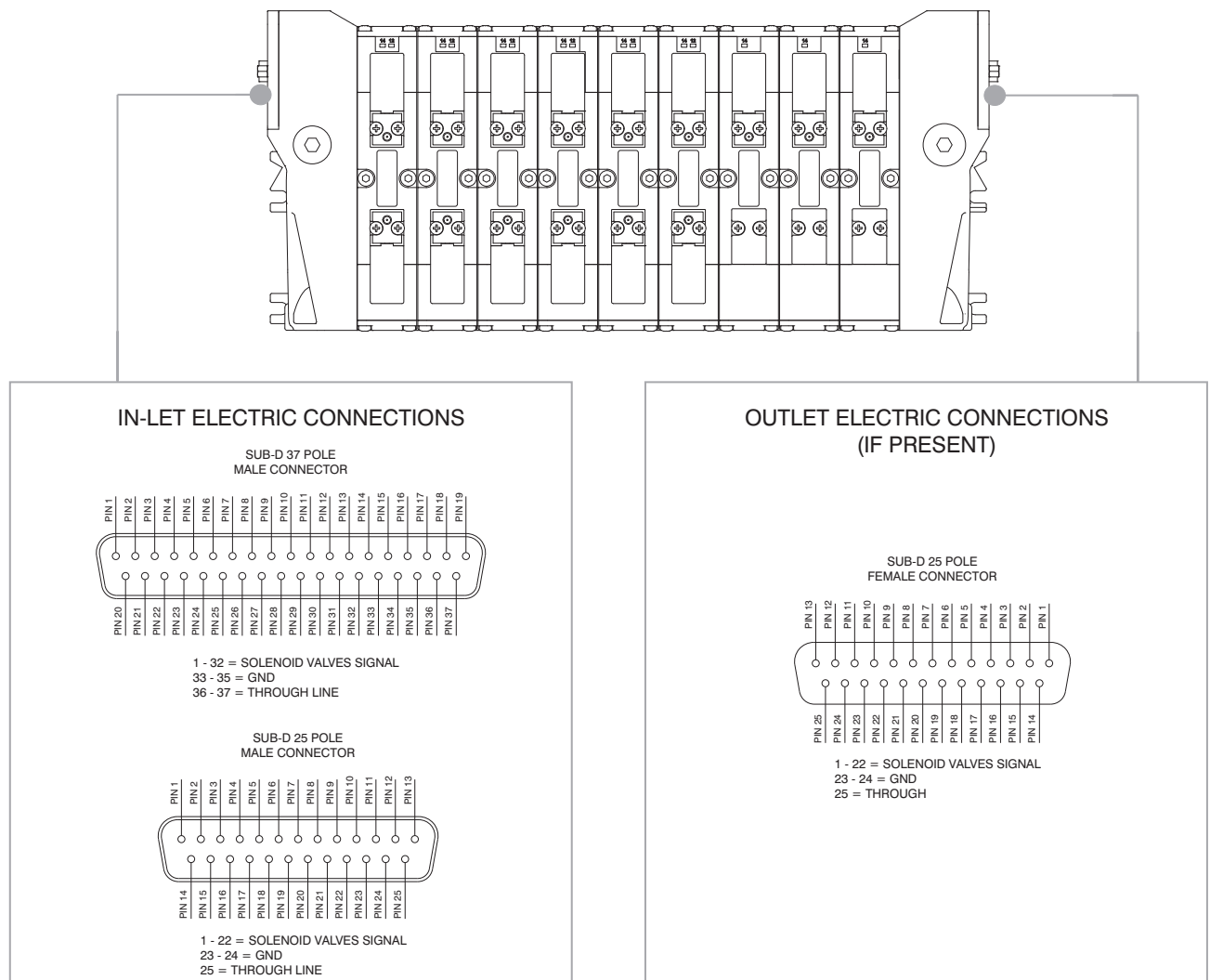
This allows the use of intermediate modules in any position of the manifold.

All the electrical signals that have not been used on the manifold can be used placing at the end of the manifold the end plate complete with the 25 sub-D female connector.

The number of available signals depends of the connector used to the type of the left end plate and by the total signals used along the manifold:

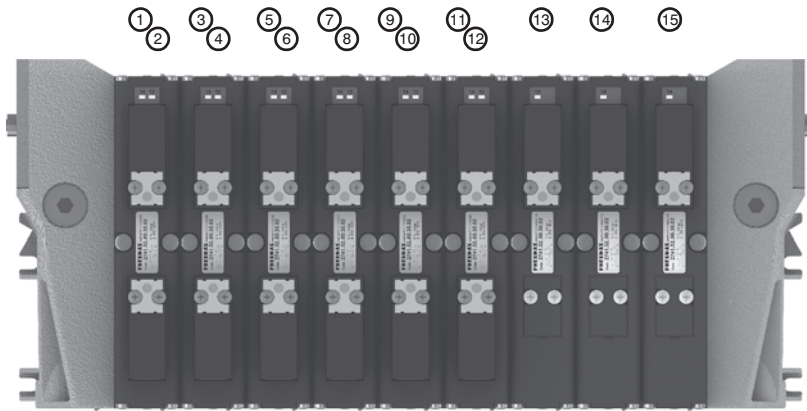
37 pin connector	nr of output = 32 – (total of used signals)
25 pin connector	nr of output = 22 – (total of used signals)

Following we show some examples of possible combination and the relative pin assignment.





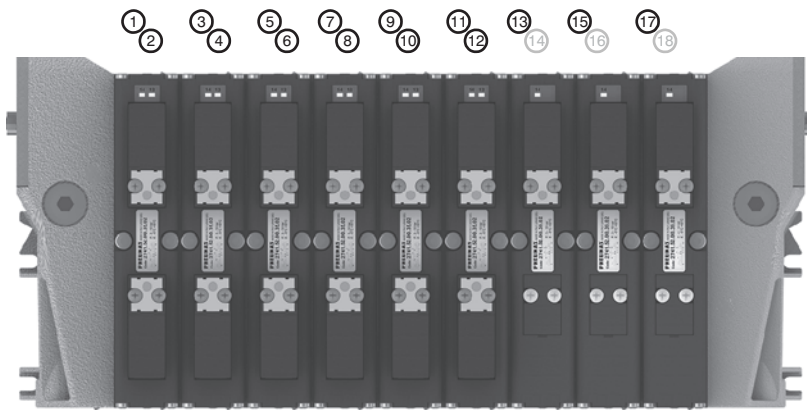
**37 PIN Connector correspondence for valves assembled on mixed bases**



- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 12 EV POS.2
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = PILOT 12 EV POS.3
- PIN 7 = PILOT 14 EV POS.4
- PIN 8 = PILOT 12 EV POS.4
- PIN 9 = PILOT 14 EV POS.5
- PIN 10 = PILOT 12 EV POS.5
- PIN 11 = PILOT 14 EV POS.6
- PIN 12 = PILOT 12 EV POS.6
- PIN 13 = PILOT 14 EV POS.7
- PIN 14 = PILOT 14 EV POS.8
- PIN 15 = PILOT 14 EV POS.9

POS.	1	2	3	4	5	6	7	8	9
------	---	---	---	---	---	---	---	---	---

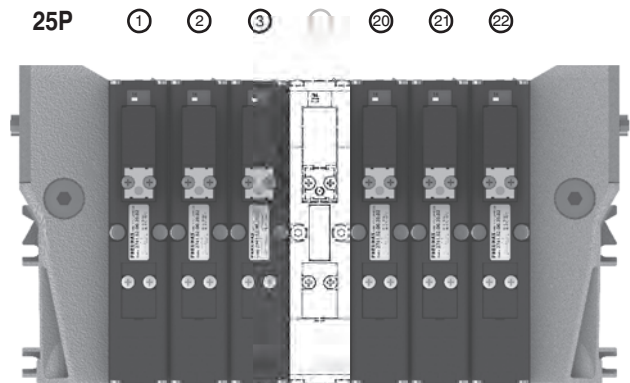
**37 PIN Connector correspondence for manifold mounted on bases for bistable valves**



- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 12 EV POS.2
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = PILOT 12 EV POS.3
- PIN 7 = PILOT 14 EV POS.4
- PIN 8 = PILOT 12 EV POS.4
- PIN 9 = PILOT 14 EV POS.5
- PIN 10 = PILOT 12 EV POS.5
- PIN 11 = PILOT 14 EV POS.6
- PIN 12 = PILOT 12 EV POS.6
- PIN 13 = PILOT 14 EV POS.7
- PIN 14 = NOT CONNECTED
- PIN 15 = PILOT 14 EV POS.8
- PIN 16 = NOT CONNECTED
- PIN 17 = PILOT 14 EV POS.9
- PIN 18 = NOT CONNECTED

POS.	1	2	3	4	5	6	7	8	9
------	---	---	---	---	---	---	---	---	---

**37 PIN Connector correspondence for manifold for 32 position manifold with monostable valves on base**



POS.	1	2	3	...	30	31	32
------	---	---	---	-----	----	----	----

POS.	1	2	3	...	20	21	22
------	---	---	---	-----	----	----	----

**General :**

Using the 2740.03.25P output terminal it is possible to make any electrical signals not used by valves available on a 25 sub-D female connector at the right end of the manifold.  
It is possible to then join a multi-core cable to link to the next manifold, or connect directly to one or two I/O modules.  
The I/O modules can accept input or output signals, depending upon what is connected.

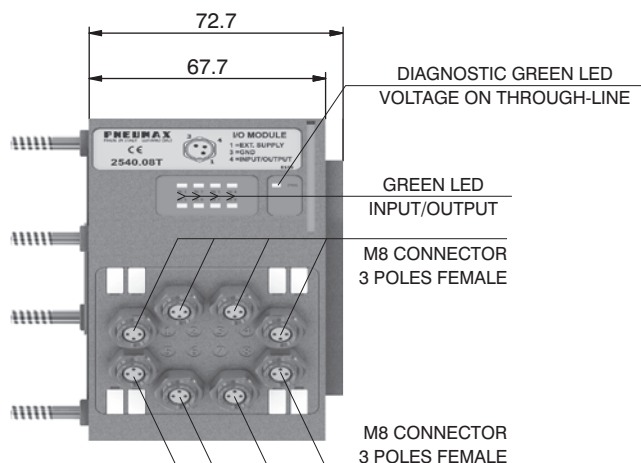
**Please note:** If the manifold is connected by a multi-core connection, each connection can be used as either an input or an output, while if the manifold is connected to a serial node the connections can only be used as an output.

It is possible to connect the manifold to up to two I/O modules.

Each I/O module includes 8 diagnostic LEDs which indicate the presence of an Input / Output signal for each connector.

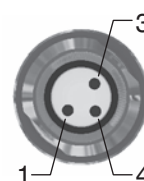
**Please note:** For an LED to function, a signal of at least +15VDC must be present on pin 4 of the connector. If this signal is lower, the LED will not light, this does not compromise the normal Input / Output function of the unit.

**Overall dimensions and I/O layout :**



**Ordering code**

**2540.08T**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT/OUTPUT
3	GND

**Input features:**

Each connection can accept either two wire (switches, magnetic switches, pressure switches, etc.) or three wire connections (photocells, electronic end of stroke sensors, etc.) If +24VDC is required on at Pin 1 of each connector, it is possible to provide this via the through-line pin of the multi-pole connector.

I.E :

Pin 25 of the 25 pin multi-pole connector (code 2740.02.25P or 2740.12.25P)

Pin 36-37 of the 37 pin multi-pole connector (code 2740.02.37P or 2740.12.37P)

**Output features:**



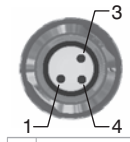
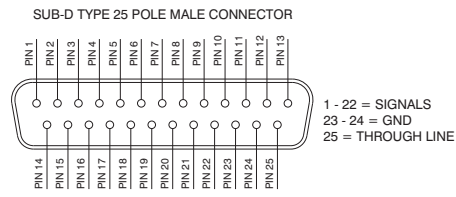
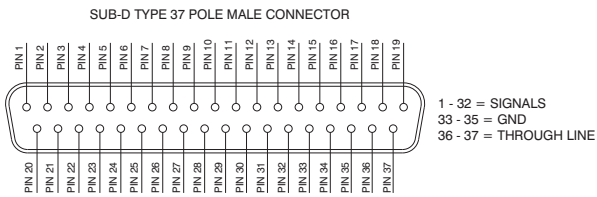
**Attention:** The output connections are not protected against short-circuit. Please pay attention when wiring (avoid Pin 4 being connected to Pin 3 or Pin 1).

**General characteristics**

Model	2540.08T
Case	Reinforced technopolymer
I/O Connector	M8 connector 3 poles female (IEC 60947-5-2)
PIN 1 voltage (connector used as Input)	By the user
PIN 4 voltage diagnosis	Green Led
Node consumption (Outlets excluded)	7mA per each LED with 24 VDC signal
Outlets voltage	+23,3 VDC (serial) /by the user (multipolar)
Input voltage	Depend by the using
Maximum outlet current	100 mA (serial) / 400 mA (multipolar)
Maximum Input/Output	8 per module
Multiconnector max. Current	100 mA
Connections to manifold	Direct connection to 25 poles connector
Maximum n. of moduls	2
Protection degree	IP65 when assembled
Ambient temperature	from -0° to +50° C



### CORRESPONDENCE BETWEEN MULTI-POLE SIGNAL AND CONNECTOR



PIN	DESCRIPTION
1	THROUGH LINE
4	SIGNAL
3	GND

#### Connection modes:

The I/O module changes its operation depending on the way the manifold is controlled. There are two possible modes:

- A) Control via multi-pole connection
- B) Control via fieldbus

In order to use the I/O module, the correct right hand endplate with 25 pole female outlet connector must be used. (Code 2740.03.25P).



#### A) Control via multi-pole :

M8 connector used as Input:

M8 connector used as Output:



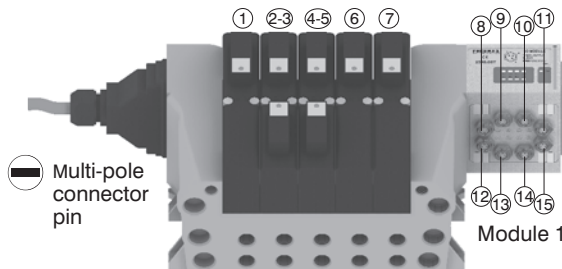
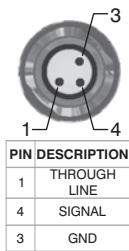
**Attention:** Voltage applied to each connector is passed to multi-pole connector pin.

Output voltage will be the same as is applied at the multi-pole connector pin.

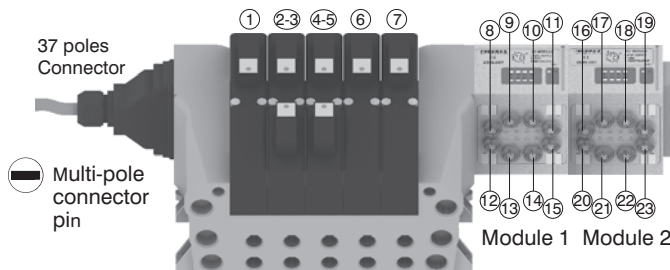
The maximum output current depends upon the power unit used, but we recommend no more than 250mA.



**Attention:** Since every cable has a degree of resistance, there will always be a voltage drop depending on the cable's length, sectional area and the current.

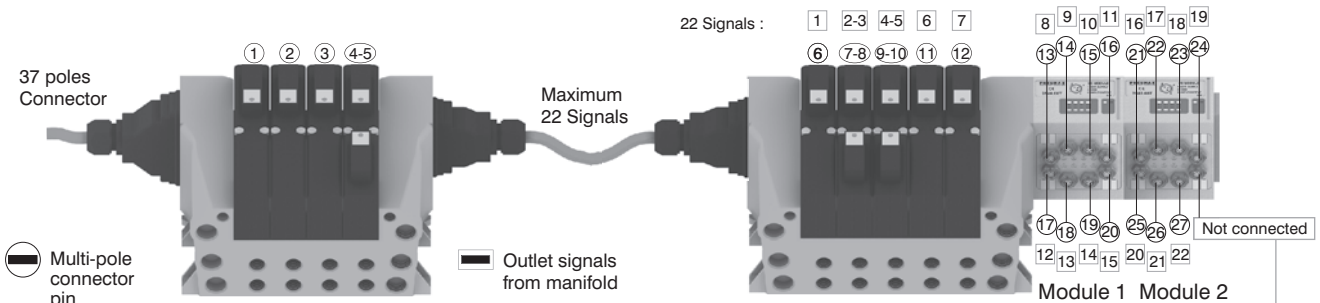


**Attention:** Only one more I/O module can be added.



**Attention:** No more additions are possible

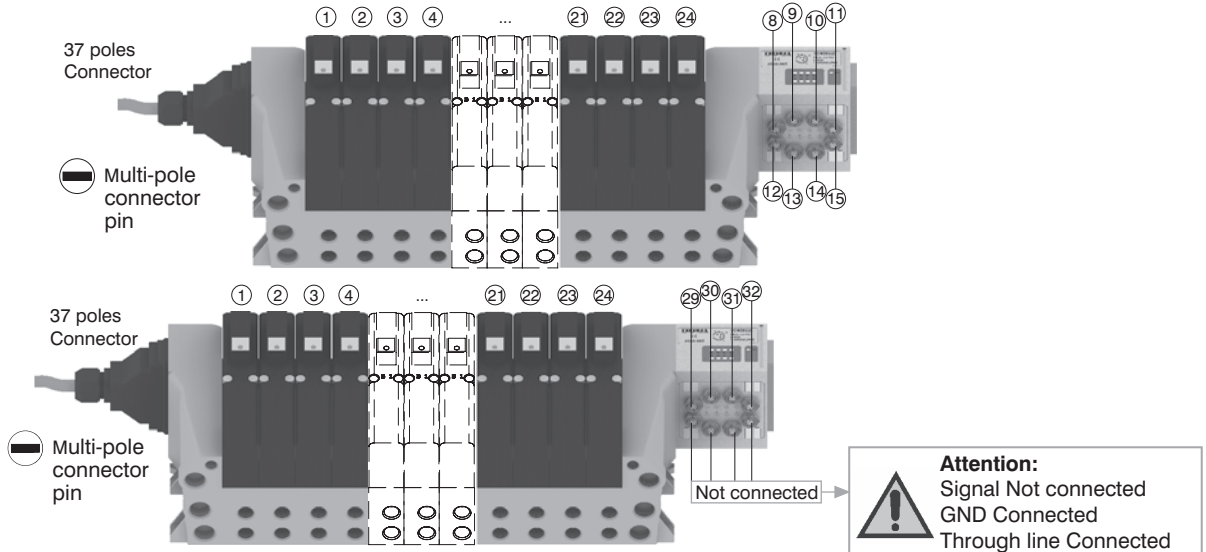
**Attention :** 2700 solenoid valve manifolds permit up to 22 electrical signals that are not used by manifolds to be made available: these signals can be managed by another manifold and / or by I/O modules. The I/O module will manage these unused signals. Connections that are not managing useful signals will remain unconnected.



**Attention:** Signal Not connected  
GND Connected  
Through line Connected

**Please note:** this example considers a 37 pin multi-pole connector. The same configuration managed by a 25 pin multi-pole connector will stop at number 22 of multi-pole connector and at number 17 of the manifold. 22 17

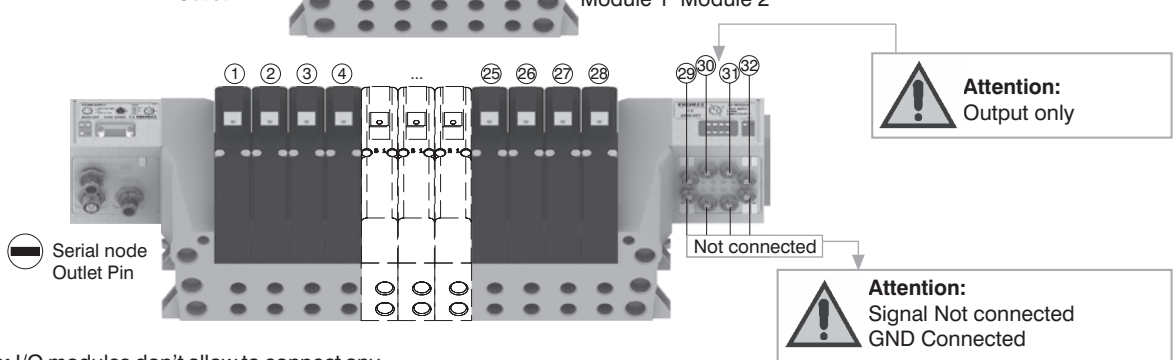
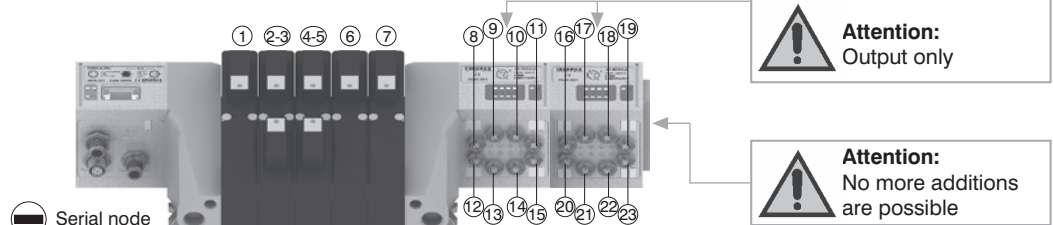
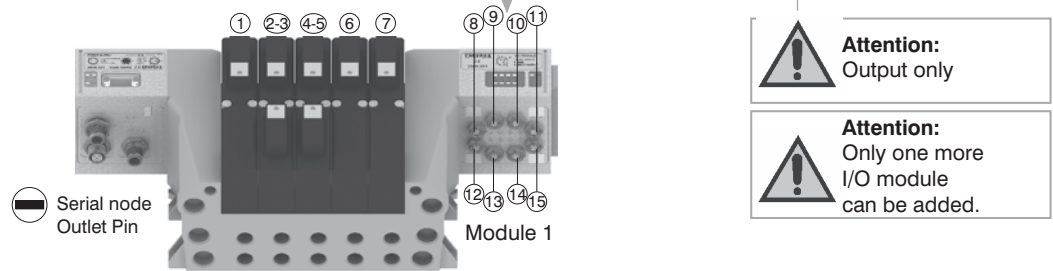
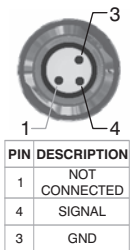
**Please note:** 2700 solenoid valve manifolds manage up to 32 signals. If the manifold uses more than 24 signals the I/O module will manage only the remainder. Connections that are not managing useful signals will remain unconnected.



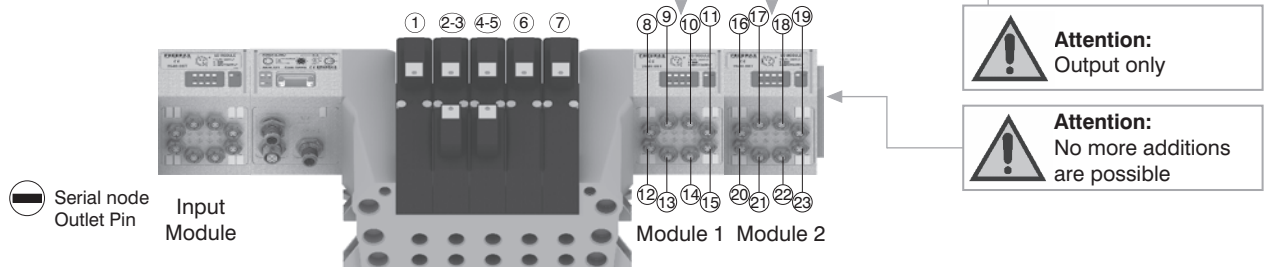
**B) Control via fieldbus:**

With this kind of control the I/O module can only be used as an output. Pin 1 of each connector is not connected. The output voltage will be 0.7V lower than that applied to Pin 4 of the connector.

The maximum output current for each output is 100mA. The correspondence between control byte and each single output depends on how many electrical signals are used by the manifold and by the relative position of the I/O module.

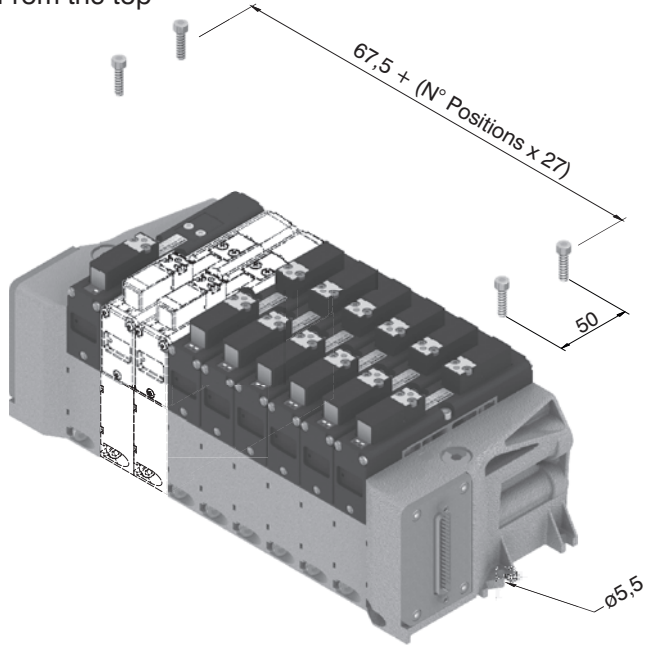


**Please note:** I/O modules don't allow to connect any additional valves manifold after them.

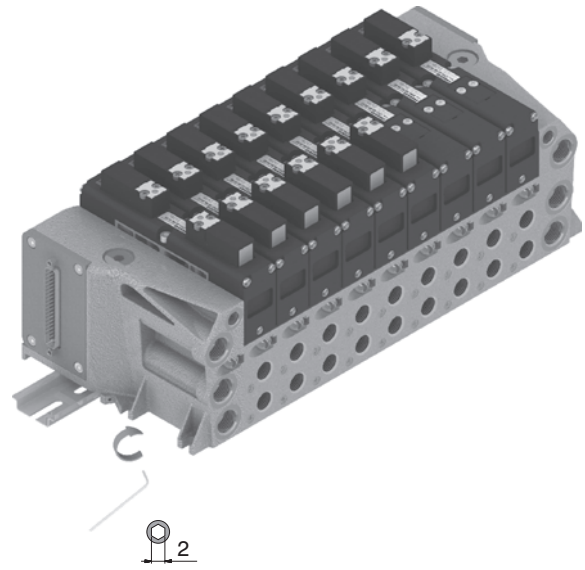


2

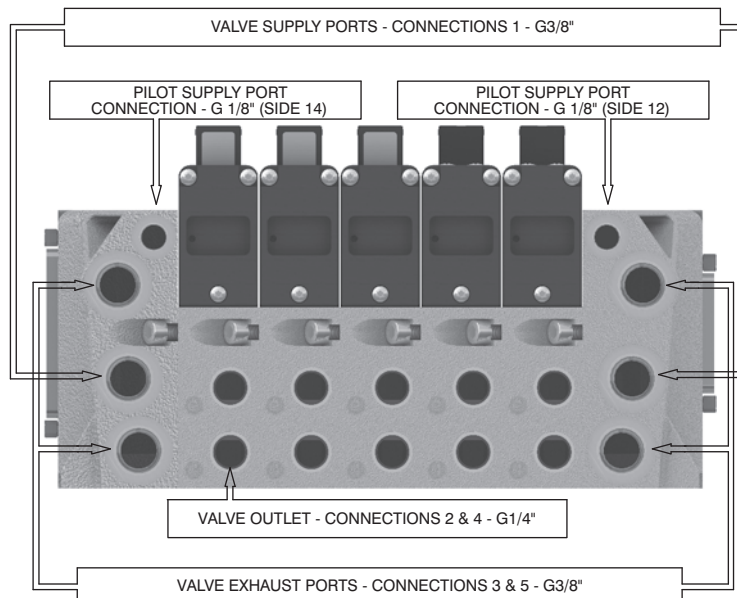
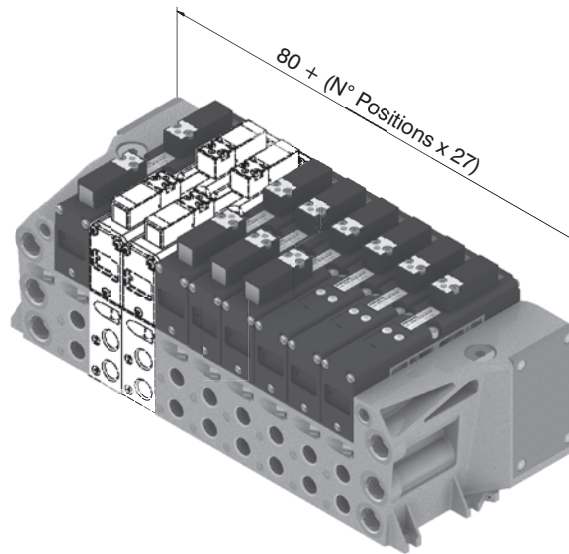
From the top



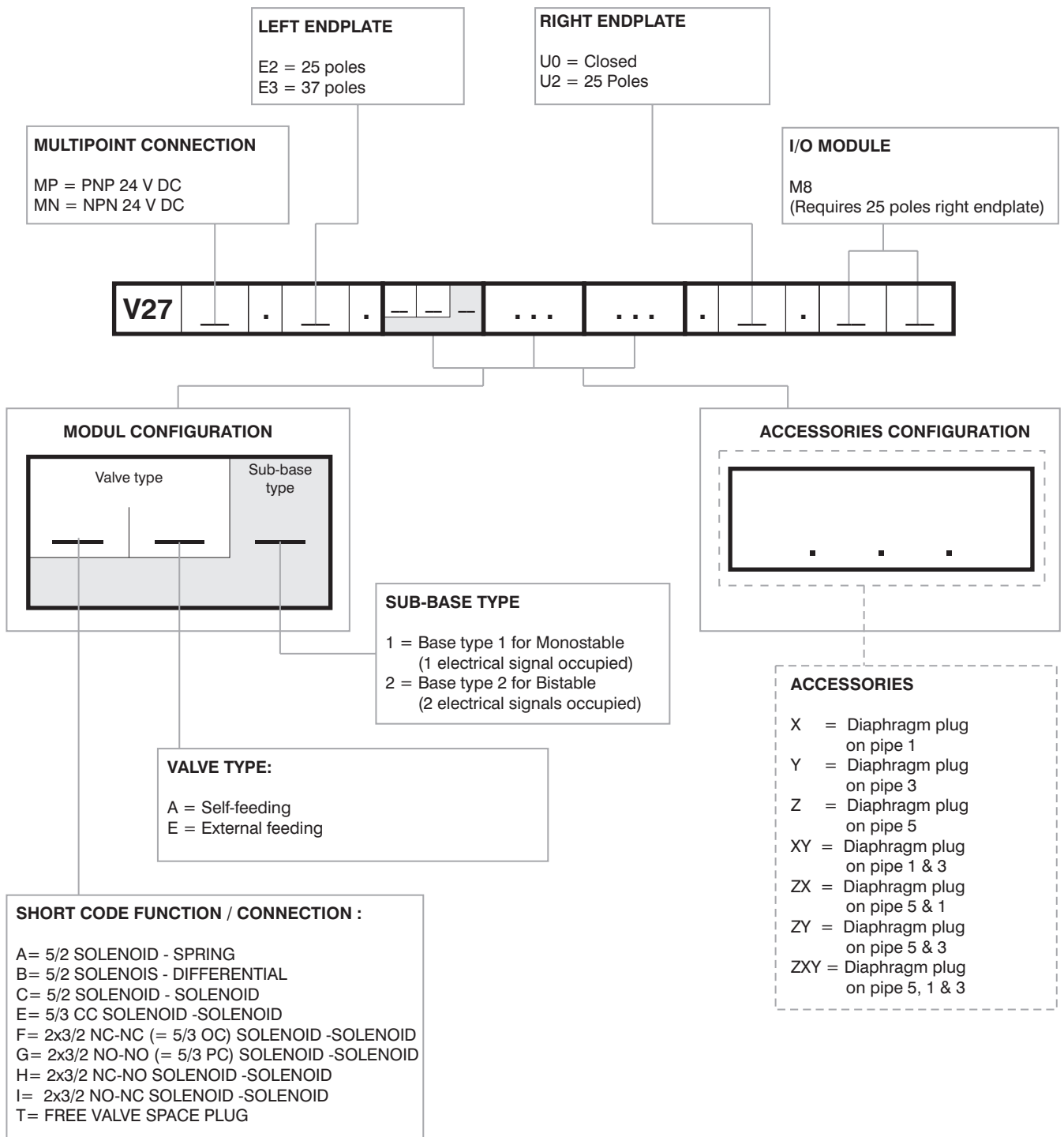
DIN rail fixing



Maximum possible size according to valves seats



Manifold Layout configuration



**NOTE:**

While configuring the manifold always be careful that the maximum number of electrical signals available is:

32 when an input 37 poles endplate is used.

22 when an input 25 poles endplate is used.

The use of monostable valve mounted on a base type 2 (2 electrical signals occupied) causes the loss of one electric signal.

In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for example : regarding the 3 & 5 conduits, put the Y & Z letters).

Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

**General:**

CANopen® module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.

CANopen® module recognizes automatically the presence of the Input modules on power on.

Regardless of the number of Input modules connected, the managable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.

Connection to Bus CANopen® is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to CiA Draft Recommendation 303-1 (V. 1.3 : 30 December 2004).

Transmission speed can be set by 3 dip-switches.

The node address can be set by 6 dip-switches using BCD numeration.

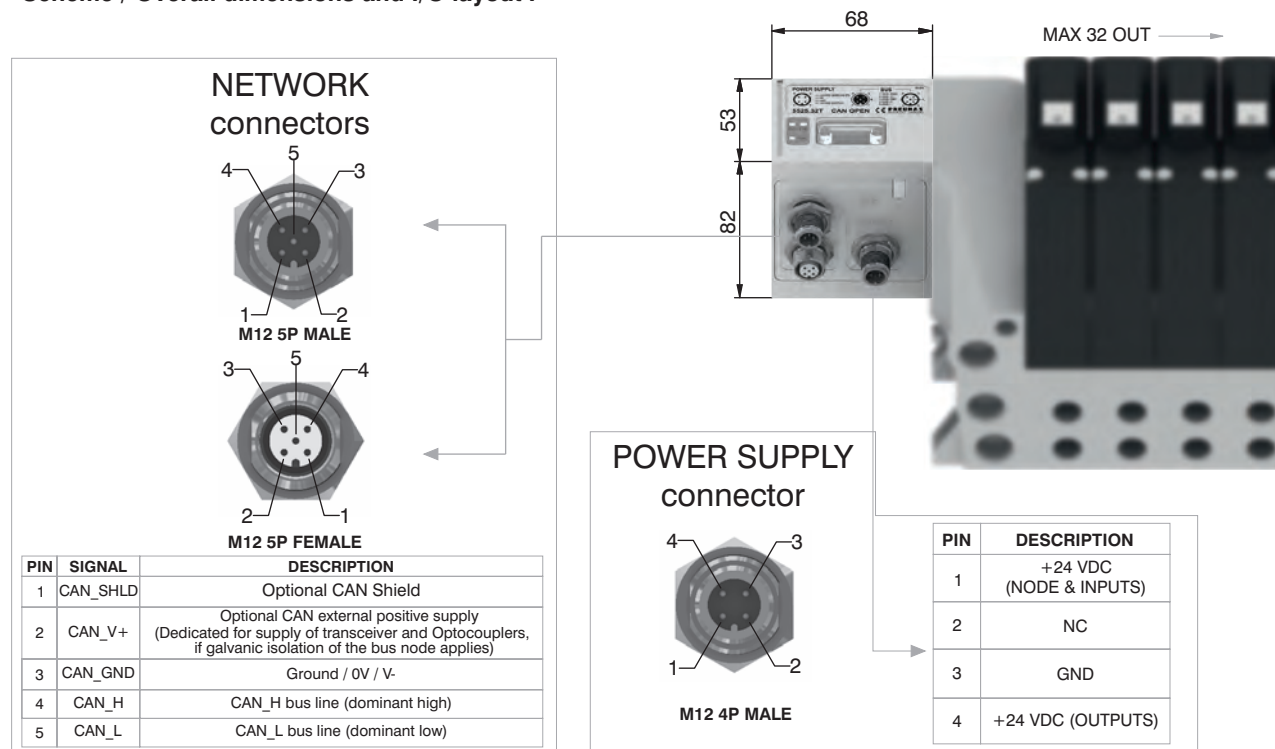
The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5525.32T**



**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**Technical characteristics**

Model	5525.32T	
Specifications	CiA Draft Standard Proposal 301 V 4.10 (15 August 2006)	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	30 mA
	Power supply diagnosis	Green LED PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P connectors male-female Type A (IEC 60947-5-2)
	Baud rate	10 - 20 - 50 - 125 - 250 - 500 - 800 - 1000 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m at 500 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C



**General:**

DeviceNet module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.  
DeviceNet module recognizes automatically the presence of the Input modules on power on.  
Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
Node power supply is made by a M12 4P male circular connector.  
The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
Connection to Bus DeviceNet is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to DeviceNet Specifications Volume I, release 2.0.  
Transmission speed can be set by 3 dip-switches.  
The node address can be set by 6 dip-switches using BCD numeration.  
The module includes an internal terminating resistance that can be activated by a dip-switch.

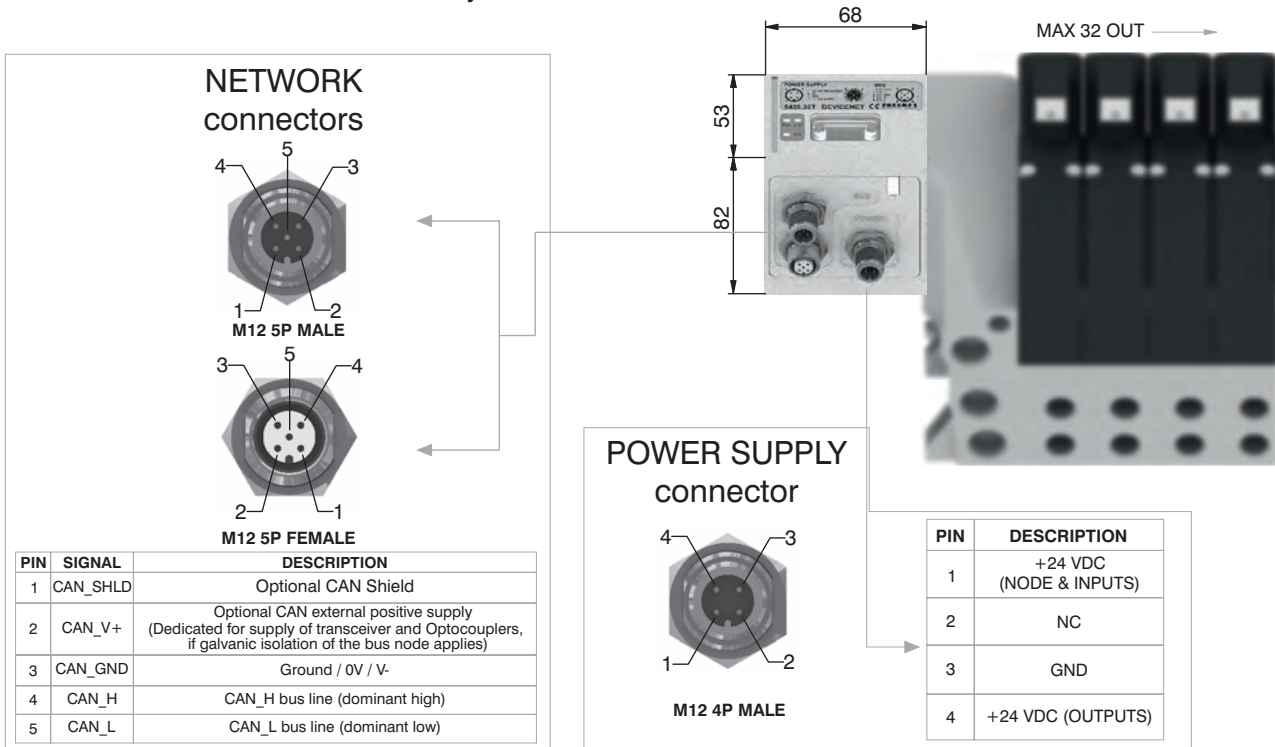
**Ordering code**

**5425.32T**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5425.32T
	Specifications	DeviceNet Specifications Volume I, release 2.0.
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	30 mA
	Power supply diagnosis	Green LED PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P connectors male-female Type A (IEC 60947-5-2)
	Baud rate	125 - 250 - 500 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m at 500 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

PROFIBUS DP module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.

PROFIBUS DP module recognizes automatically the presence of the Input modules on power on. Regardless of the number of Input modules connected, the managable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.

Connection to Bus PROFIBUS DP is possible via 2 M12 type B 5P male - female circular connectors; these two are connected in parallel and according to PROFIBUS Interconnection Technology (Version 1.1 : August 2001).

The node address can be set using BCD numeration: 4 dip-switches for the units and 4 dip-switches for the tens.

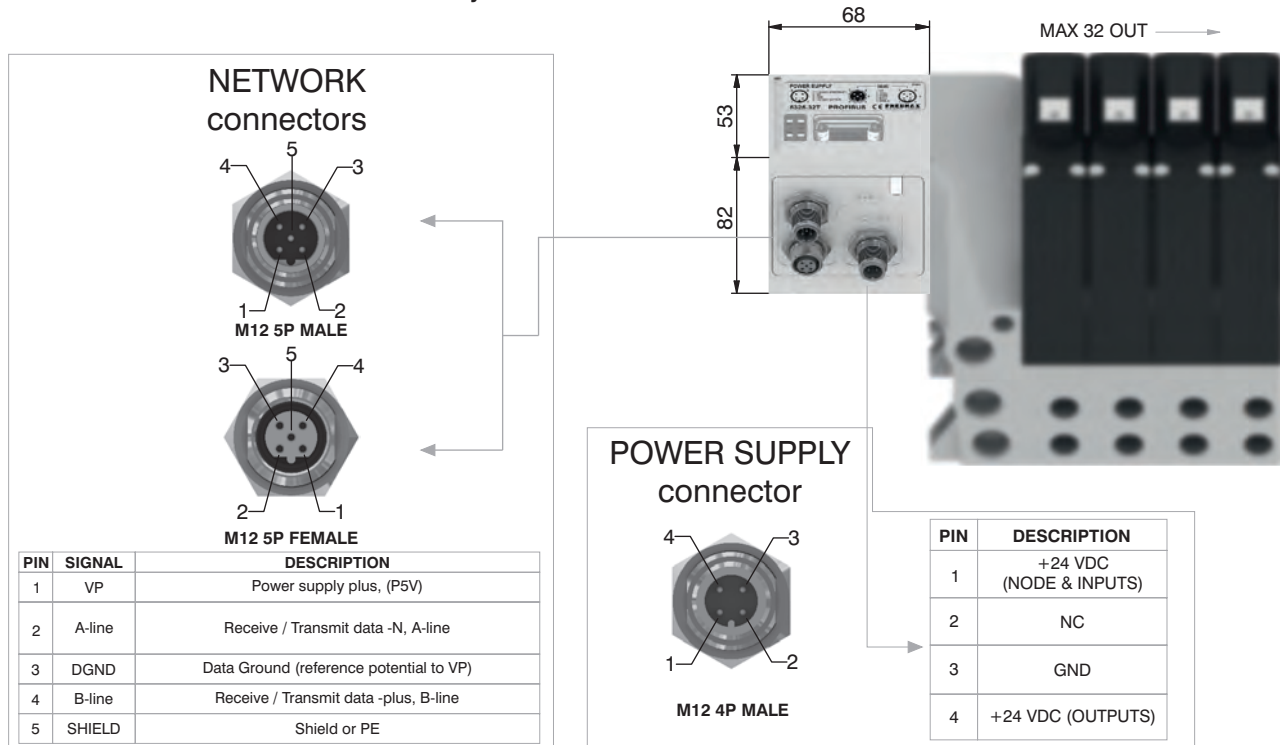
The module includes an internal terminating resistance that can be activated by 2 dip-switches.

**Ordering code**

**5325.32T**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5325.32T
Specifications	PROFIBUS DP
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 50 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for each output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 5P male-female connectors Type B
	Baud rate 9,6 - 19,2 - 93,75 - 187,5 - 500 - 1500 - 3000 - 6000 - 12000 Kbit/s
	Addresses, possible numbers From 1 to 99
	Max nodes in net 100 (slave + master)
	Bus maximum recommended length 100 m at 12 Mbit/s - 1200 m at 9,6 Kbit/s
	Bus diagnosis Green LED + Red LED
	Configuration file Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C

**General:**

EtherCAT® module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.

The EtherCAT® module, regardless the number of Input module connected, reports to have connected 4 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus EtherCAT® is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

The node address is assigned during configuration.

**Note: 5700 series has a different configuration file from series 5600.**

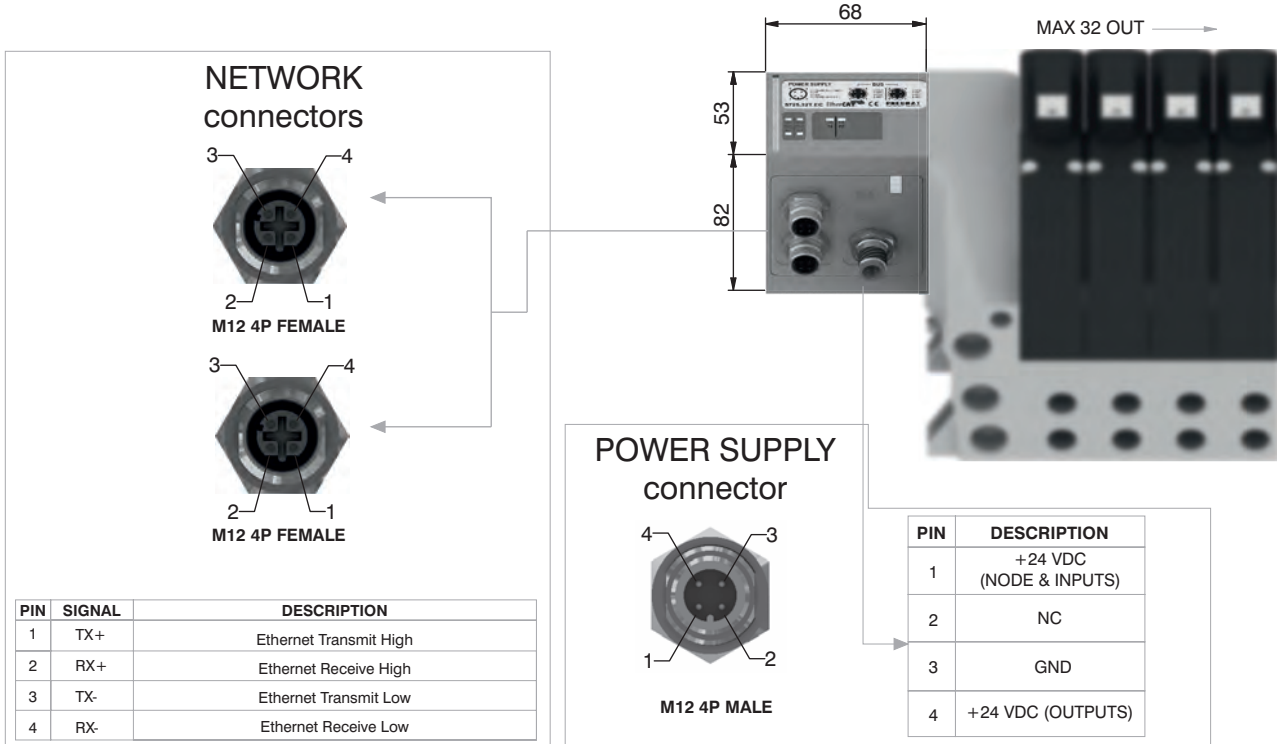
**Ordering code**

**5725.32T.EC**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32T.EC
	Specifications	EtherCAT® Specifications ETG.1000 series
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LEDPWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	From 1 to 65535
	Max nodes in net	65536 (Master + Slave)
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C



**General :**

PROFINET IO RT/IRT module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.

The PROFINET IO RT/IRT module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the managable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.

Connection to Bus PROFINET IO RT/IRT is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

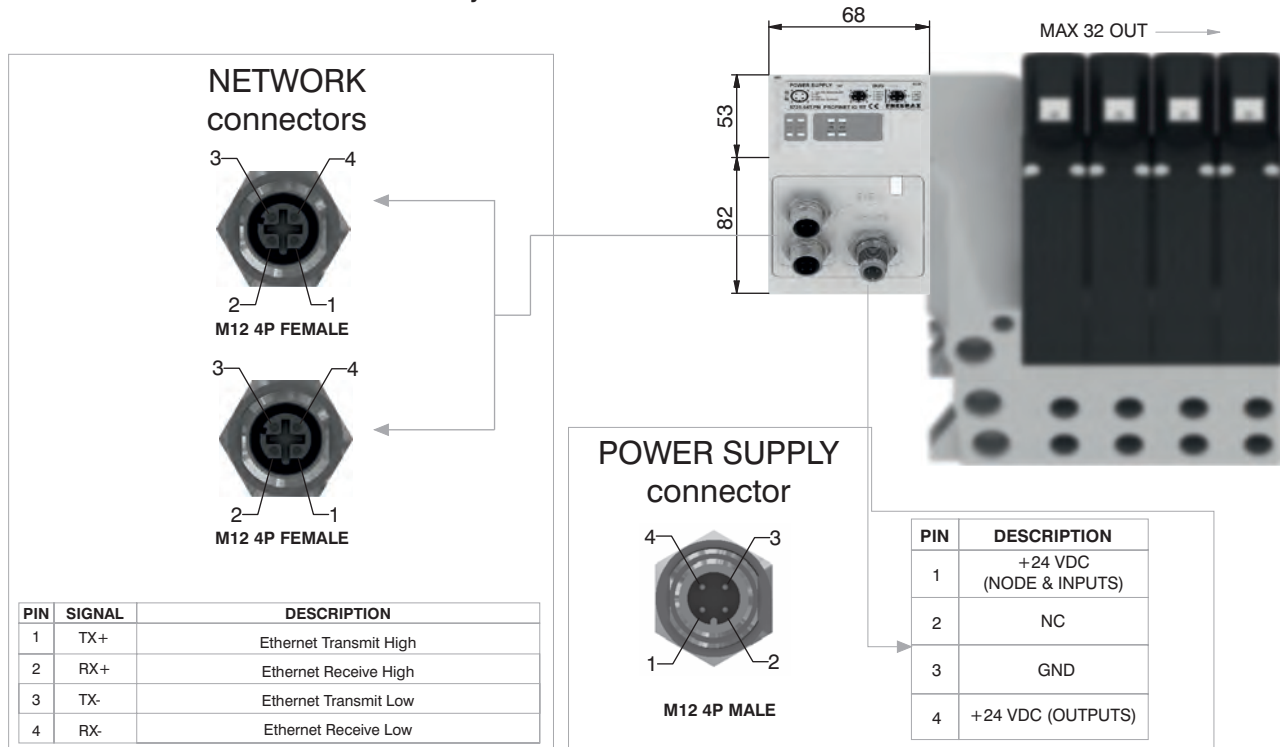
The node address is assigned during configuration.

**Ordering code**

**5725.32T.PN**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32T.PN	
Specifications	PROFINET IO RT/IRT	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

EtherNet/IP module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
The EtherNet/IP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
Node power supply is made by a M12 4P male circular connector.  
The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
Connection to Bus EtherNet/IP is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
The node address is assigned during configuration.

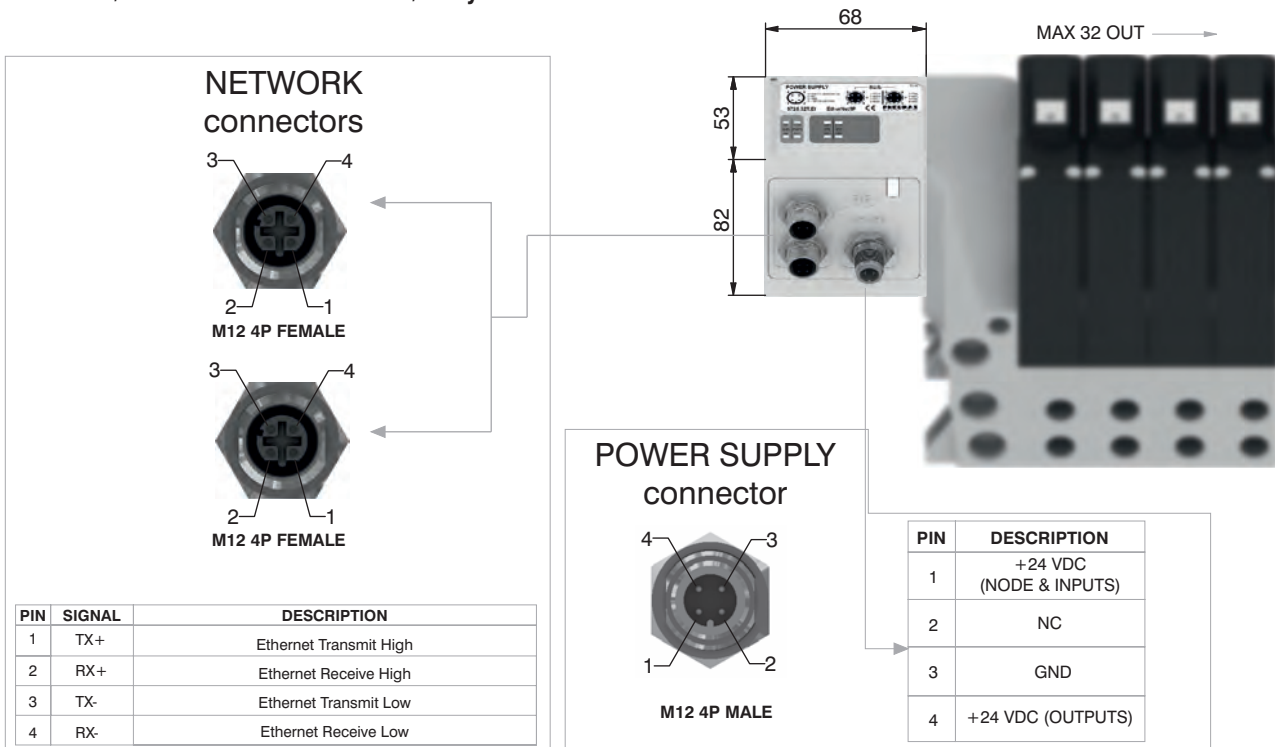
**Ordering code**

**5725.32T.EI**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32T.EI
	Specifications	The EtherNet/IP Specification
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

Powerlink module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.

The Powerlink module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the managable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.

Connection to Bus Powerlink is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

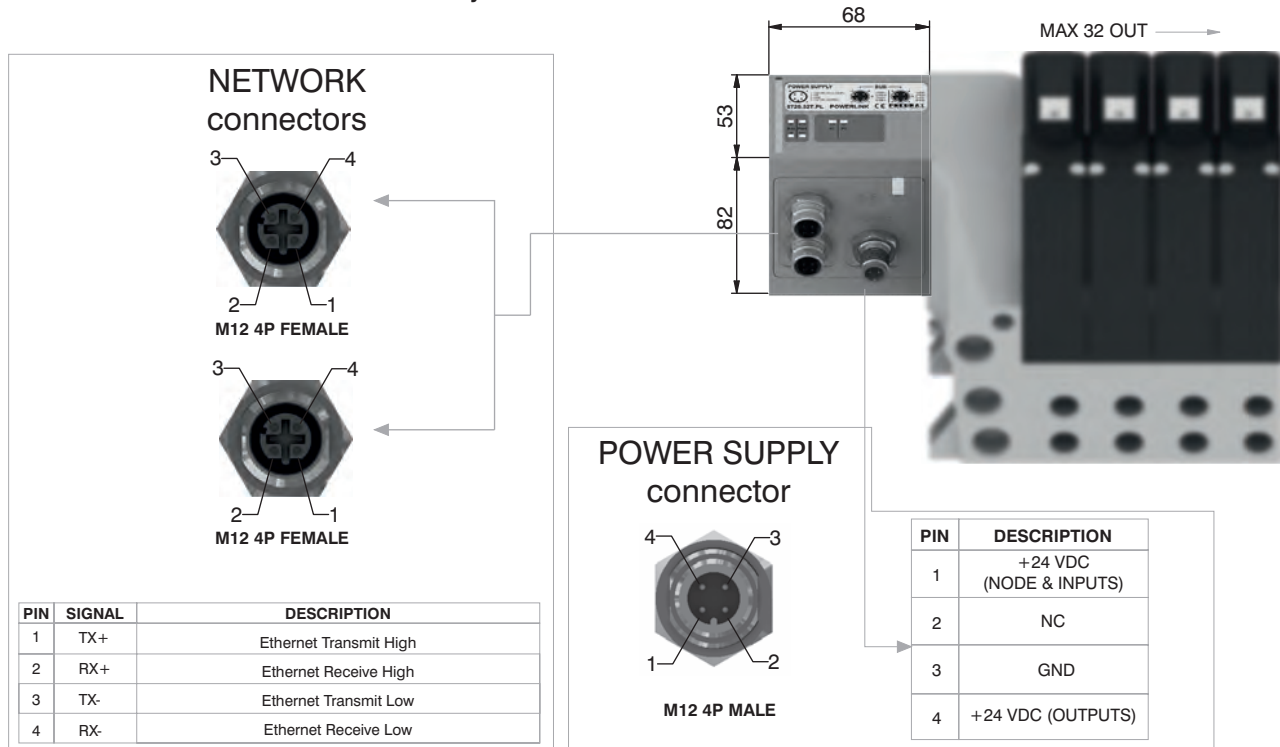
The node address is assigned during configuration.

**Ordering code**

**5725.32T.PL**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32T.PL
Specifications	Ethernet POWERLINK Communication Profile Specifications
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 400 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for each output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate 100 Mbit/s
	Addresses, possible numbers 239
	Max nodes in net 240
	Maximum distance between 2 nodes 100 m
	Bus diagnosis 1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C

**General :**

Modbus/TCP module is directly integrated on 2700 solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
2700 series solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
The Modbus/TCP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
Node power supply is made by a M12 4P male circular connector.  
The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
Connection to Bus Modbus/TCP is possible via 2 M12 4P type D female circular connectors.  
These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
The node address is assigned during configuration.

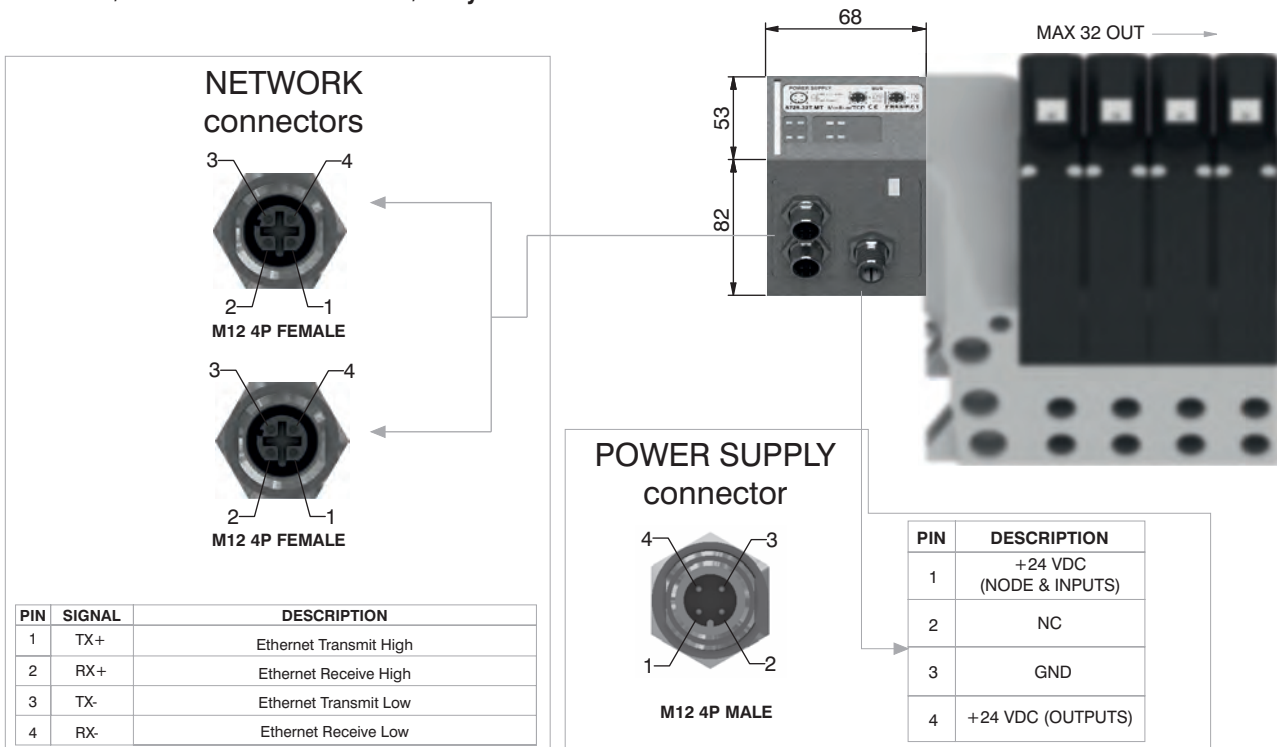
**Ordering code**

**5725.32T.MT**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32T.MT
	Specifications	MODBUS Application Protocol Specification V1.1a, June 4, 2004
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	248
	Max nodes in net	248
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Modbus/TCP nodes don't require configuration file
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C





**General :**

Modules have 8 connectors M8 3P female.

The Inputs are PNP equivalent 24 VDC  $\pm$ 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 300 mA.

Each module includes a 300 mA self-mending fuse. If a short circuit or a overcharge (overall current >300mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green led PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

The maximum number of Input modules supported is 4 for CANopen®, DeviceNet and EtherCAT®.

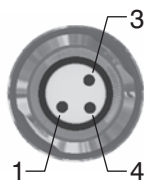
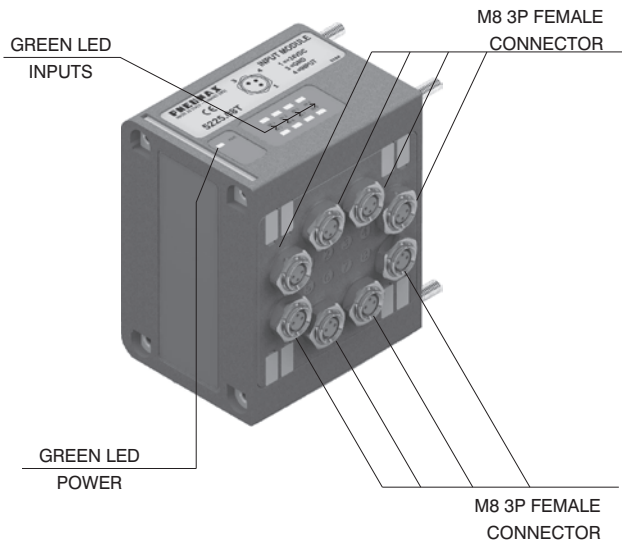
The maximum number of Input modules supported is 8 for PROFIBUS DP, PROFINET IO RT/IRT EtherNet/IP and Powerlink.

**Ordering code**

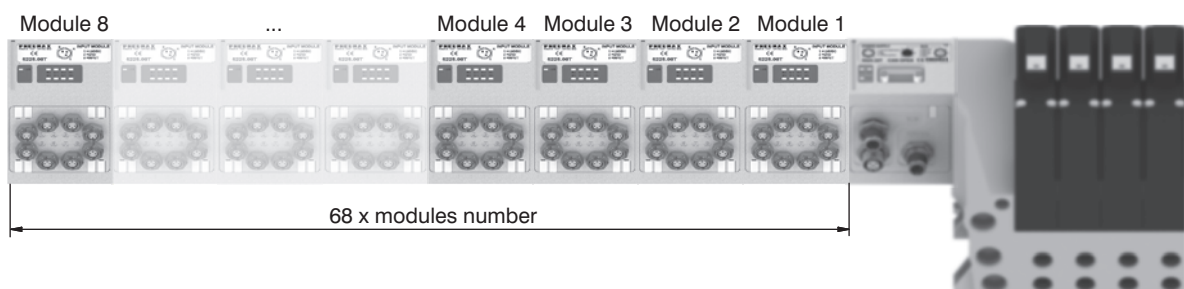
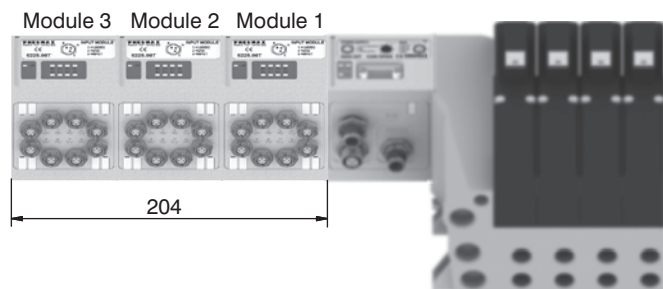
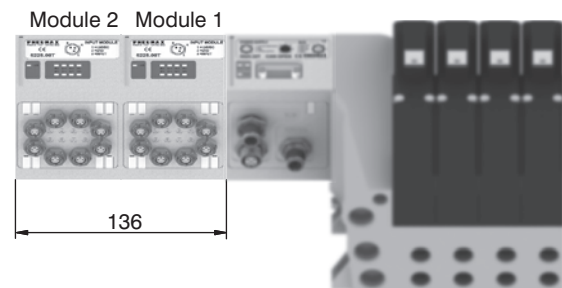
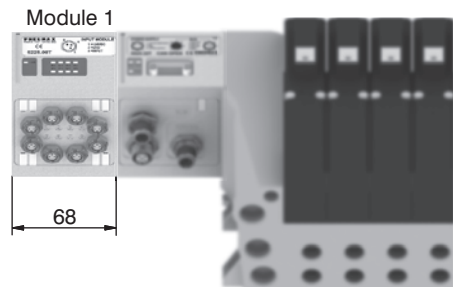
**5225.08T**



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND





**General :**

Modules have 4 connectors M12 5P female.

The Inputs are PNP equivalent 24 VDC ± 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 300 mA.

Each module includes a 300 mA self-mending fuse. If a short circuit or a overcharge (overall current >300mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green led PWR. Any other Input module connected to the node will remain powered and will function correctly.

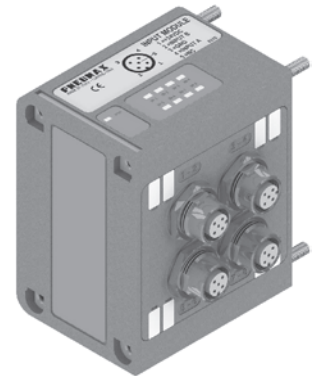
Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

The maximum number of Input modules supported is 4 for CANopen®, DeviceNet and EtherCAT®.

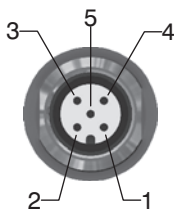
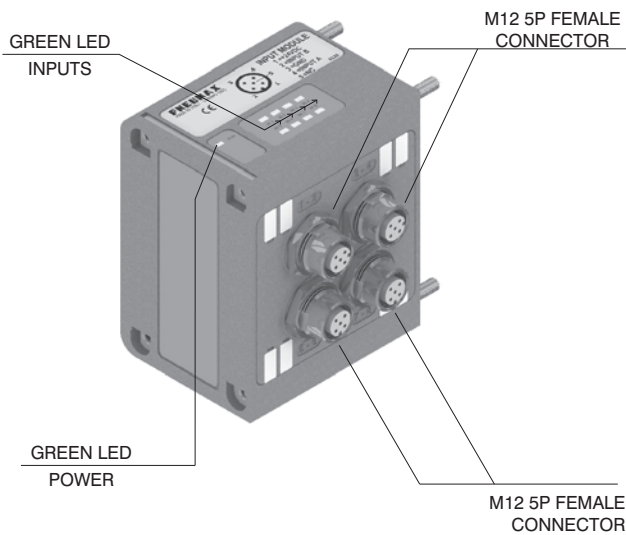
The maximum number of Input modules supported is 8 for PROFIBUS DP, PROFINET IO RT/IRT EtherNet/IP and Powerlink.

**Ordering code**

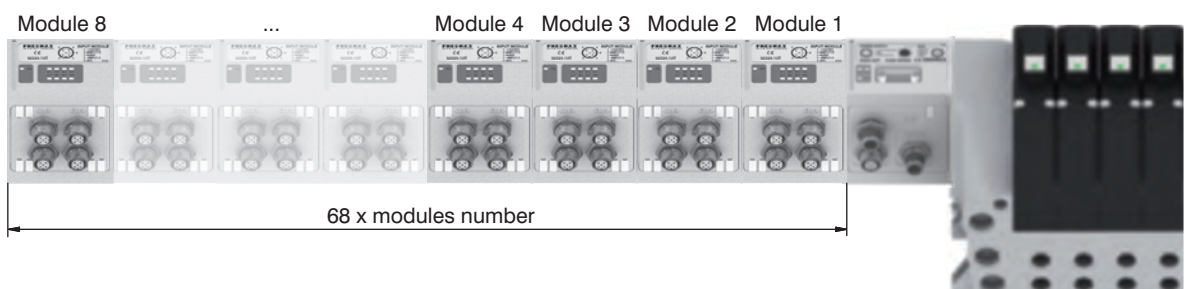
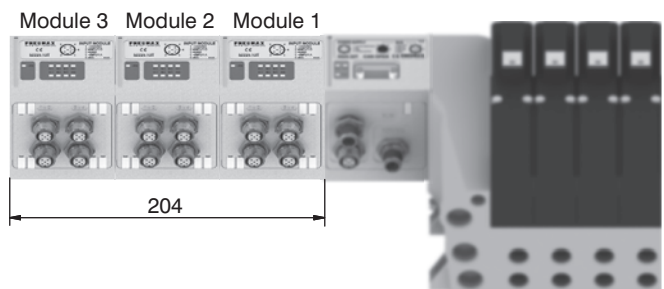
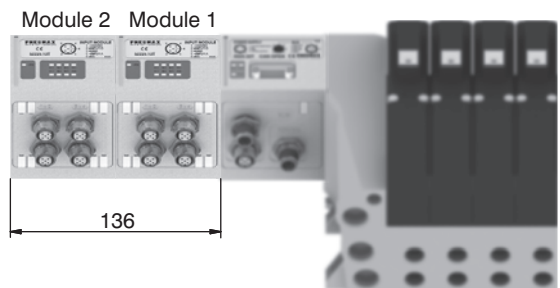
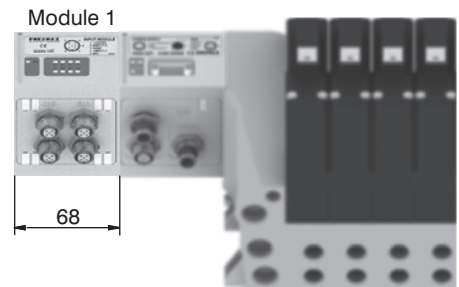
5225.12T



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
2	INPUT B
3	GND
4	INPUT A
5	NC



2

**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two analogue inputs (voltage or current).  
The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

Available models:

5225.2T.00T (voltage signal 0 - 10V);

5225.2T.01T (voltage signal 0 - 5V);

5225.2C.00T (current signal 4 - 20mA);

5225.2C.01T (current signal 0 - 20mA).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly. Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 analogue Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

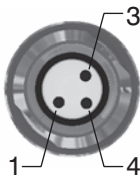
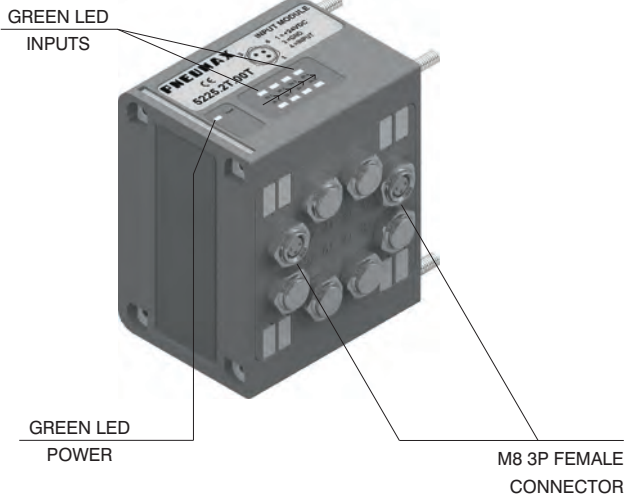
The Maximum number of 2 analogue Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Ordering code**

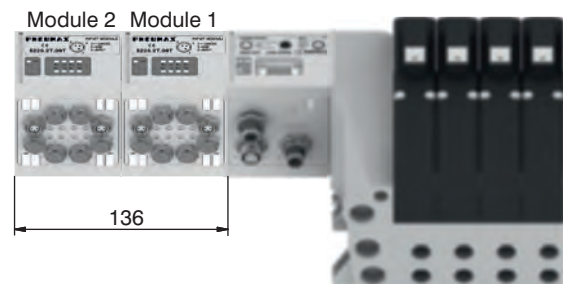
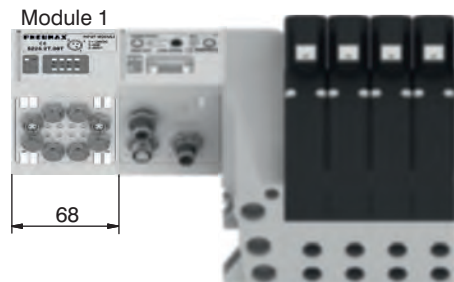
5225.2 \_ . \_ T



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND



**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two Pt100 probes.

The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

It is possible to plug 3-wires probes or 2-wires probes.

The temperature is expressed in tenths of degree.

The temperature range is 0 – 250°C, beyond which the green LED for probe presence doesn't light on.

The module returns a value correspondent to 250°C when the probe is not connected.

Available models:

5225.2P.00T (2-wires probes);

5225.2P.01T (3-wires probes).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 Pt100 Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

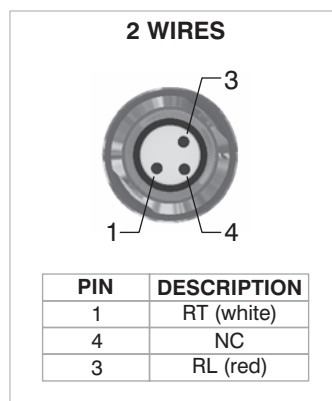
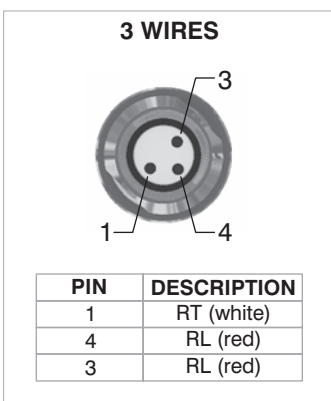
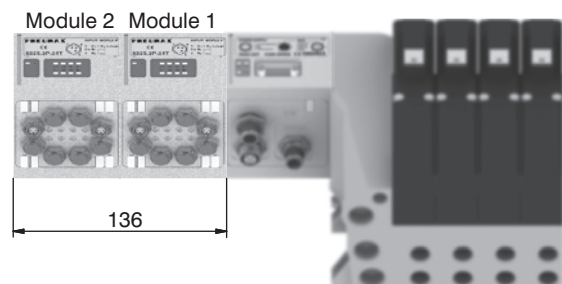
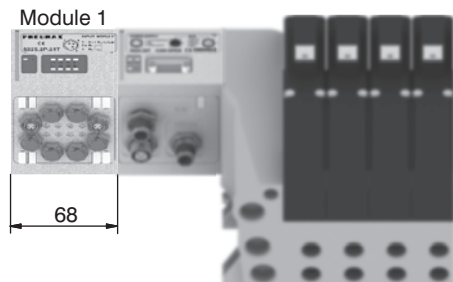
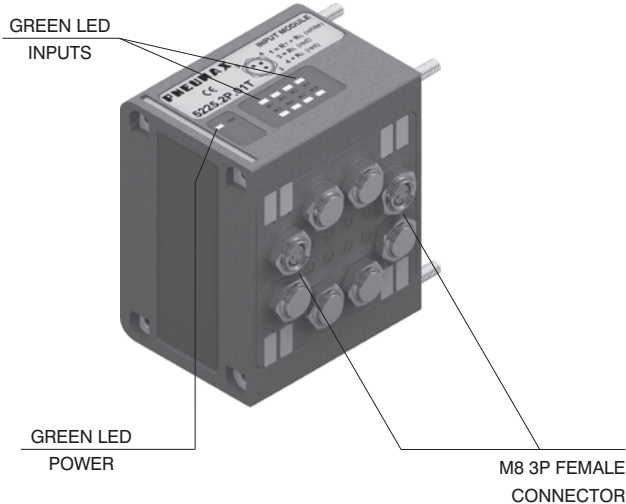
The Maximum number of 2 Pt100 Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Ordering code**

5225.2P . 0\_T



**Scheme / Overall dimensions and I/O layout :**





**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two Pt100 probes.

The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

It is possible to plug 3-wires probes or 2-wires probes.

The temperature is expressed in points according to the formula

$$\text{Temperature} = \left( \frac{\text{Points}}{4095} \times 600 \right) - 200$$

The temperature range is -200 to +400°C, beyond which the green LED for probe presence doesn't light on.

The module returns a value correspondent to 400°C when the probe is not connected.

Available models:

5225.2P.10T (2-wires probes);

5225.2P.11T (3-wires probes).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other INPUT module connected to the node will remain powered and will function correctly.

Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 Pt100 Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

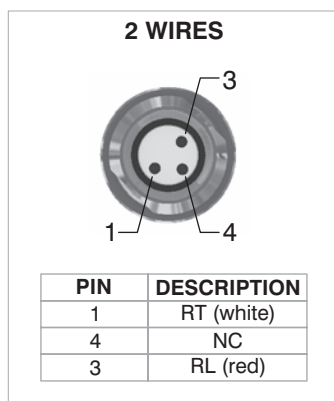
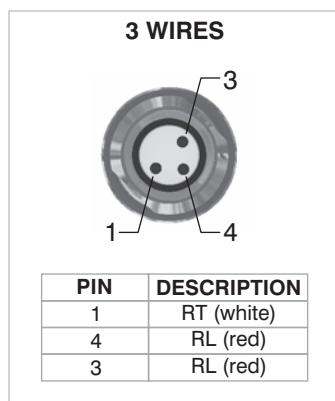
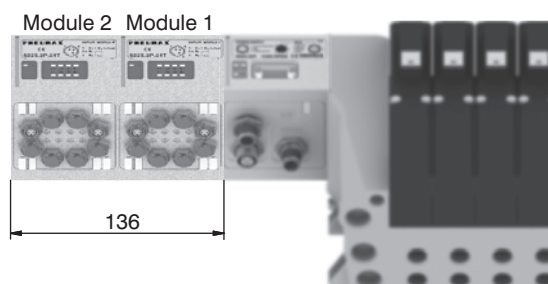
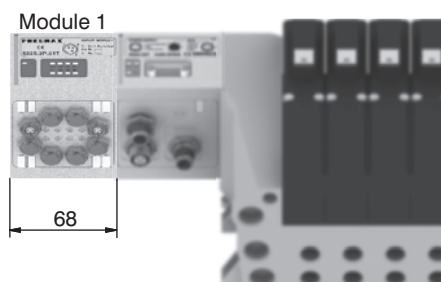
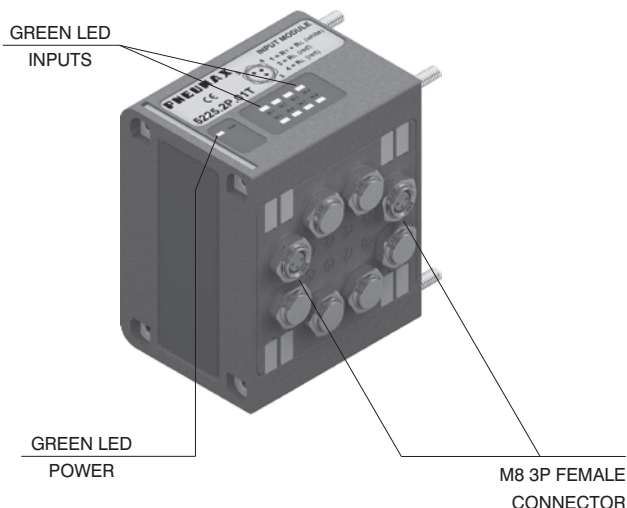
The Maximum number of 2 Pt100 Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.


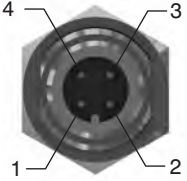

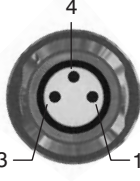
**Ordering code**


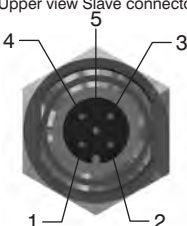

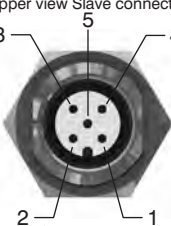
5225.2P . 1\_T


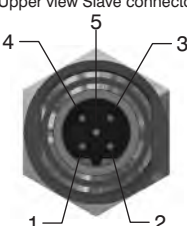

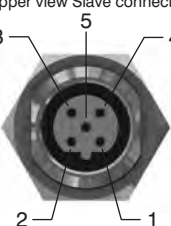



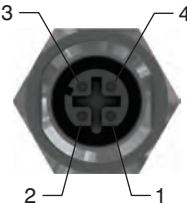

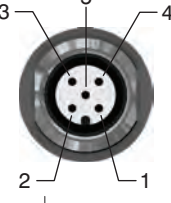
**Scheme / Overall dimensions and I/O layout :**





M12A 4P female Socket		M8 3P male Plug																			
Ordering code		Ordering code																			
<b>5312A.F04.00</b>		<b>5308A.M03.00</b>																			
Power supply straight connector.		Input straight connector.																			
	<p>Upper view Slave connector</p>  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>+24 VDC Node</td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td>0 V</td></tr> <tr><td>4</td><td>+24 VDC Output</td></tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC Node	2		3	0 V	4	+24 VDC Output		<p>Upper view Slave connector</p>  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>+24 VDC</td></tr> <tr><td>4</td><td>INPUT</td></tr> <tr><td>3</td><td>GND</td></tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC	4	INPUT	3	GND
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M12A 5P female Socket		M12A 5P male Plug																									
Ordering code		Ordering code																									
<b>5312A.F05.00</b>		<b>5312A.M05.00</b>																									
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M12B 5P female Plug		M12B 5P male Plug																									
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M12D 4P male Plug		M12 5P male Plug																												
Ordering code		Ordering code																												
<b>5312D.M04.00</b>		<b>5312A.M05.00</b>																												
Network straight connector: for EtherCAT®, PROFINET IO RT/IRT, EtherNet/Ip, Powerlink and Modbus/TCP		Input straight connector.																												
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M12 Plug		M8 Plug	
Ordering code		Ordering code	
<b>5300.T12</b>		<b>5300.T08</b>	

2

Manifold Layout configuration

**32 OUT VERSION**

- C3 = CANopen® 32OUT
- D3 = DeviceNet 32OUT
- P3 = PROFIBUS 32OUT
- A3 = EtherCAT® 32OUT (5700 Series)
- I3 = EtherNet / IP 32OUT
- N3 = PROFINET IO RT/IRT 32OUT
- L3 = Powerlink 32OUT
- M3 = Modbus/TCP 32OUT

**INPUT MODULES**

- A = No module
- D1= 8 M8 digital inputs module
- D2= 8 M12 digital inputs module
- T1= 2 analogue inputs 0-5V module
- T2= 2 analogue inputs 0-10V module
- C1= 2 analogue inputs 0-20mA module
- C2= 2 analogue inputs 4-20mA module
- P1= 2 Pt100 inputs 2 wires module
- P2= 2 Pt100 inputs 3 wires module
- E1= 2 Pt100 inputs 2 wires module extended range
- E2= 2 Pt100 inputs 3 wires module extended range

**RIGHT ENDPLATE**

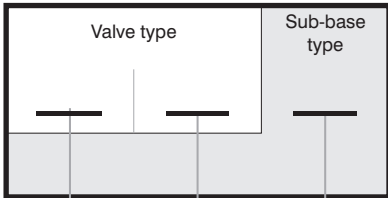
- U0 = Closed
- U2 = 25 Poles

**I/O MODULE**

M8  
(Requires 25 poles right endplate)



**MODUL CONFIGURATION**



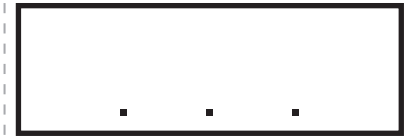
**SUB-BASE TYPE**

- 1 = Base type 1 for Monostable (1 electrical signal occupied)
- 2 = Base type 2 for Bistable (2 electrical signals occupied)

**VALVE TYPE:**

- A = Self-feeding
- E = External feeding

**ACCESSORIES CONFIGURATION**



**ACCESSORIES**

- X = Diaphragm plug on pipe 1
- Y = Diaphragm plug on pipe 3
- Z = Diaphragm plug on pipe 5
- XY = Diaphragm plug on pipe 1 & 3
- ZX = Diaphragm plug on pipe 5 & 1
- ZY = Diaphragm plug on pipe 5 & 3
- ZXY = Diaphragm plug on pipe 5, 1 & 3

**SHORT CODE FUNCTION / CONNECTION :**

- A= 5/2 SOLENOID - SPRING
- B= 5/2 SOLENOIS - DIFFERENTIAL
- C= 5/2 SOLENOID - SOLENOID
- E= 5/3 CC SOLENOID -SOLENOID
- F= 2x3/2 NC-NC (= 5/3 OC) SOLENOID -SOLENOID
- G= 2x3/2 NO-NO (= 5/3 PC) SOLENOID -SOLENOID
- H= 2x3/2 NC-NO SOLENOID -SOLENOID
- I= 2x3/2 NO-NC SOLENOID -SOLENOID
- T= FREE VALVE SPACE PLUG

**NOTE:**

While configuring the manifold always be careful that the maximum number of electrical signals available is 32. The use of monostable valve mounted on a base type 2 ( 2 electrical signals occupied ) causes the loss of one electric signal. In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for exemple : regarding the 3 & 5 conduits, put the Y & Z letters).

Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.



## General

Monostable Solenoid valve 5/2

Bistable Solenoid valve 5/2

Solenoid valve 5/3 closed centres

Solenoid valve 2x3/2 - 5/3

Solenoid valve 2x2/2

Left endplate 5 ports

Left endplate 3 ports

Right endplate closed

Intermediate Inlet/Exhaust module

## Accessories

Electrical Connection

Mounting

Settings/Connections

Manifold Lay-Out Configuration

Serial System

- CANopen®
- DEVICENET
- PROFIBUS
- I/O module
- Connectors

## General

Technical innovation, rational design, high performance and extremely compact size: these are the main features the ENOVA® series bring to the market. The ENOVA® series is the latest in a string of achievements made by the Pneumax Spa R&D Department in the last few years.

The ENOVA® series has been developed according to the latest market requirements. Each valve comprises all the necessary pneumatic and electrical functions needed to produce a solenoid valve assembly. There are no limits to the configuration of the solenoid valve island, as full priority has been given to the end user's needs; the addition or removal of modules is a simple operation that can be swiftly and easily achieved.

The management of the electrical signals through the valves is optimized through a patented dedicated connector in each valve.

Electrical connections are made via a twenty-five pin connector, which is capable of controlling up to twenty-two solenoids. Electrical and pneumatic connections are located on the same module at one end of the assembly. Serial bus nodes compatible with most common protocols are easily integrated.

Most widely used and known communication protocols, such as Profibus, Can-Open, Device-Net can be directly integrated with the valve manifold by simply plugging the necessary module onto the electrical connection, maintaining IP65 environmental protection. All electrical and pneumatic connections are positioned on one face of the assembly, simplifying system design, installation and commission. The management of inputs has also been foreseen, and can be achieved by adding one or more expansion modules directly to the serial module.

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power-Directional control valves-Measurement of shifting time"**

### MAIN CHARACTERISTICS :

- Clean profile prevents accumulation of dirt
- Compact size: modules of 12.5 mm
- Connections available: 4 , 6 , 8 mm
- IP65 protection grade
- Optimized electrical connection system
- Electrical and pneumatic line connections on one side
- Quick coupling connection system with visual indicator: locked/unlocked
- Freedom of configuration

### AVAILABLE CONFIGURATIONS:

- 5/2 monostable
- 5/2 bistable
- 5/3 closed centres
- 2x3/2 NC/NC (5/3 open centres)
- 2x3/2 NO/NO (5/3 pressured centres)
- 2x3/2 NC/NO
- 2x2/2 NC/NC
- 2x2/2 NO/NO
- 2x2/2 NC/NO

## Construction

Central body	Reinforced Technopolymer
Operators	Reinforced Technopolymer
External casing	Reinforced Technopolymer
Spool	Aluminium 2011
Spool seals	PUR
Piston seals	Oil resistant nitrile rubber - NBR
Spring	Spring steel with protective coating

## Technical characteristics

Voltage	24 VDC ± 10% PNP (NPN on request)
Pilot consumption	0,9 Watt
Valve working pressure (1-11)	from vacuum to 10 bar max.
Pilot working pressure (12-14)	from 2,5 to 7 bar max.
Operating temperature	-5°C +50°C
Protection degree	IP 65
Life (standard operating conditions)	50.000.000
Fluid	Filtered and lubricated air or no (if lubricated air, the lubrication must be continuous)

**"Attention:** dry air must be used for applications below 0°C"



5/2

**Solenoid - Differential (Monostable)**

Ordering code

**23E.C.52.00.36.V**

ELECTRICAL CONTACTS

**E** 0=STANDARD-only one electric signal

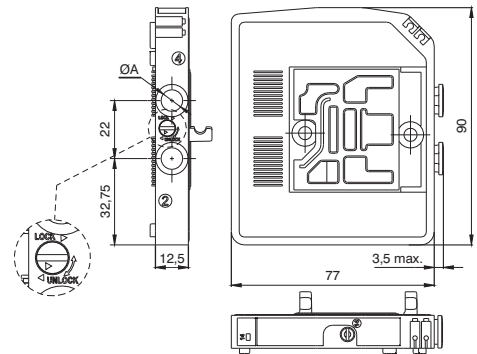
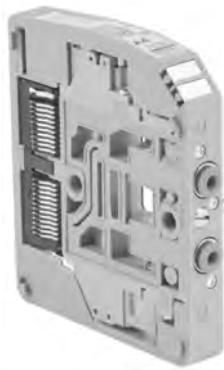
1=CEB (Bistable Electrical contacts)-(two electrical signals)

ELECTRICAL CONTACTS

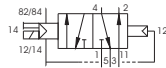
**C** 4=Quick connection for tube Ø4  
6=Quick connection for tube Ø6  
8=Quick connection for tube Ø8

VOLTAGE

**V** 02=24 VDC PNP  
12=24 VDC NPN



SHORT FUNCTION CODE B4  
SHORT FUNCTION CODE B6  
SHORT FUNCTION CODE B8  
SHORT FUNCTION CODE R4 (CEB)



SHORT FUNCTION CODE R6 (CEB)  
SHORT FUNCTION CODE R8 (CEB)  
\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	12	15	From vacuum to 10	2,5 to 7	-5 ÷ +50	115

2

**Solenoid - Spring (Monostable)**

5/2

Ordering code

**23E.C.52.00.39.V**

ELECTRICAL CONTACTS

**E** 0=STANDARD-only one electric signal

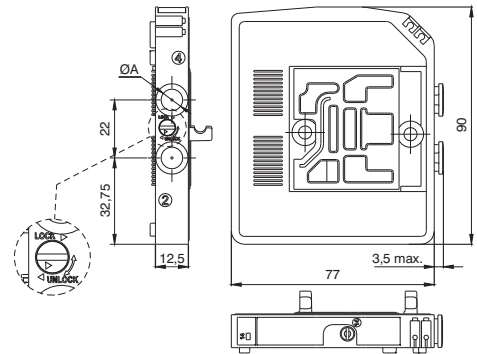
1=CEB (Bistable Electrical contacts)-(two electrical signals)

ELECTRICAL CONTACTS

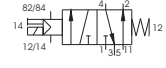
**C** 4=Quick connection for tube Ø4  
6=Quick connection for tube Ø6  
8=Quick connection for tube Ø8

VOLTAGE

**V** 02=24 VDC PNP  
12=24 VDC NPN



SHORT FUNCTION CODE A4  
SHORT FUNCTION CODE A6  
SHORT FUNCTION CODE A8  
SHORT FUNCTION CODE P4 (CEB)



SHORT FUNCTION CODE P6 (CEB)  
SHORT FUNCTION CODE P8 (CEB)  
\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	115

**Solenoid - Solenoid (Bistable)**

5/2

Ordering code

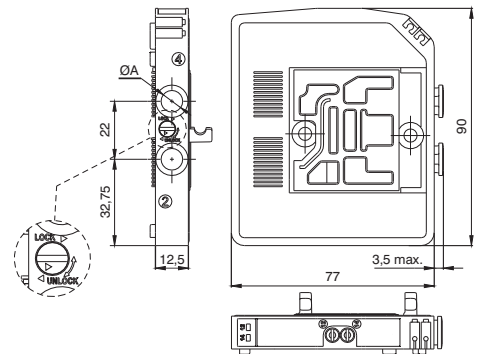
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ELECTRICAL CONTACTS

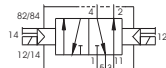
**C** 4=Quick connection for tube Ø4  
6=Quick connection for tube Ø6  
8=Quick connection for tube Ø8

VOLTAGE

**V** 02=24 VDC PNP  
12=24 VDC NPN



SHORT FUNCTION CODE C4  
SHORT FUNCTION CODE C6  
SHORT FUNCTION CODE C8



\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	7	7	From vacuum to 10	2,5 to 7	-5 ÷ +50	115

Solenoid - Solenoid (Bistable-Closed centres)

5/3

Ordering code

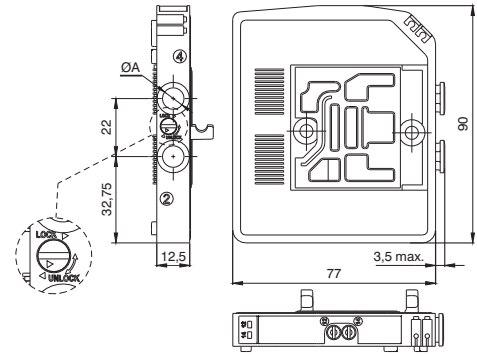
**230C.53.31.35.V**

ELECTRICAL CONTACTS

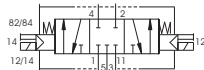
- C** 4=Quick connection for tube Ø4
- 6=Quick connection for tube Ø6
- 8=Quick connection for tube Ø8

VOLTAGE

- V** 02=24 VDC PNP
- 12=24 VDC NPN



SHORT FUNCTION CODE E4  
SHORT FUNCTION CODE E6  
SHORT FUNCTION CODE E8



"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	15	15	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

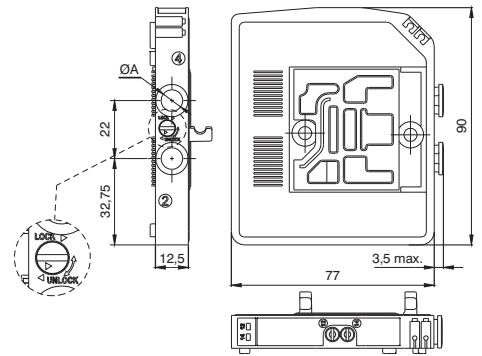




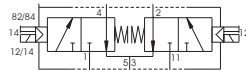
**Solenoid - Solenoid 2x3/2 Bistable-Normally Closed-Normally Closed (=5/3 Open centres)**

6/2

Ordering code	
<b>230</b> <b>.62.44.35</b>	
ELECTRICAL CONTACTS	
	4=Quick connection for tube Ø4
	6=Quick connection for tube Ø6
	8=Quick connection for tube Ø8
VOLTAGE	
	02=24 VDC PNP
	12=24 VDC NPN



\*5/3 Open Centres: Use the Solenoid valves with 2x3/2 NC-NC function  
 \*5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 NO-NO function  
 SHORT FUNCTION CODE F4  
 SHORT FUNCTION CODE F6



SHORT FUNCTION CODE F8

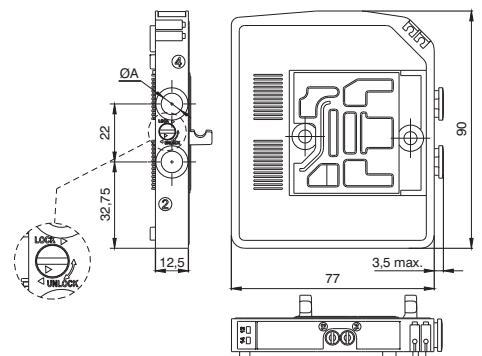
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

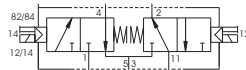
**Solenoid - Solenoid 2x3/2 Bistable-Normally Closed-Normally Open**

6/2

Ordering code	
<b>230</b> <b>.62.45.35</b>	
ELECTRICAL CONTACTS	
	4=Quick connection for tube Ø4
	6=Quick connection for tube Ø6
	8=Quick connection for tube Ø8
VOLTAGE	
	02=24 VDC PNP
	12=24 VDC NPN



\*5/3 Open Centres: Use the Solenoid valves with 2x3/2 NC-NC function  
 \*5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 NO-NO function  
 SHORT FUNCTION CODE H4  
 SHORT FUNCTION CODE H6i



SHORT FUNCTION CODE H8

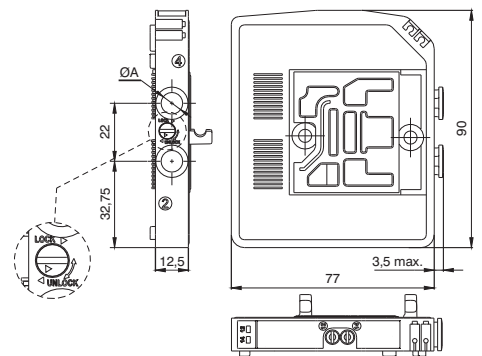
"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

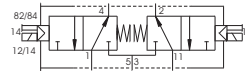
**Solenoid - Solenoid 2x3/2 Bistable-Normally Open-Normally Open (=5/3 Pressured centres)**

6/2

Ordering code	
<b>230</b> <b>.62.55.35</b>	
ELECTRICAL CONTACTS	
	4=Quick connection for tube Ø4
	6=Quick connection for tube Ø6
	8=Quick connection for tube Ø8
VOLTAGE	
	02=24 VDC PNP
	12=24 VDC NPN



\*5/3 Open Centres: Use the Solenoid valves with 2x3/2 NC-NC function  
 \*5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 NO-NO function  
 SHORT FUNCTION CODE G4  
 SHORT FUNCTION CODE G6



SHORT FUNCTION CODE G8

"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

2



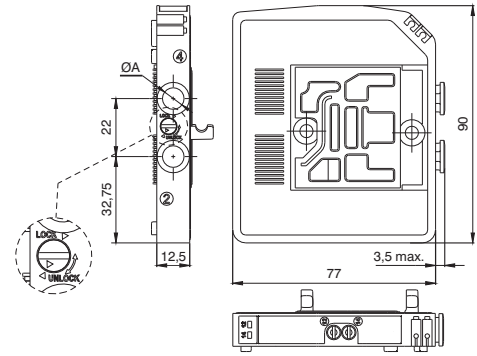
**Solenoid - Solenoid 2x2/2 Bistable-Normally Closed-Normally Closed**

4/2

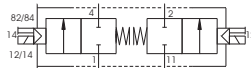
Ordering code  
**230C.42.44.35.V**

ELECTRICAL CONTACTS  
**C** 4=Quick connection for tube Ø4  
 6=Quick connection for tube Ø6  
 8=Quick connection for tube Ø8

VOLTAGE  
**V** 02=24 VDC PNP  
 12=24 VDC NPN



SHORT FUNCTION CODE L4  
 SHORT FUNCTION CODE L6  
 SHORT FUNCTION CODE L8



\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

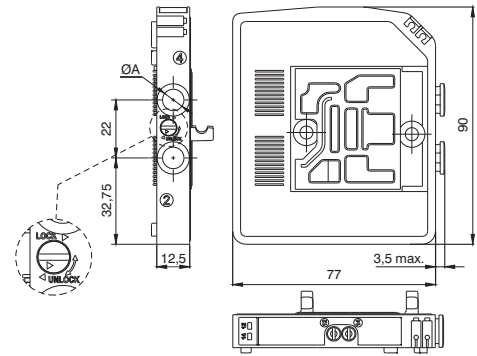
**Solenoid - Solenoid 2x2/2 Bistable-Normally Closed-Normally Open**

4/2

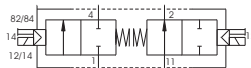
Ordering code  
**230C.42.45.35.V**

ELECTRICAL CONTACTS  
**C** 4=Quick connection for tube Ø4  
 6=Quick connection for tube Ø6  
 8=Quick connection for tube Ø8

VOLTAGE  
**V** 02=24 VDC PNP  
 12=24 VDC NPN



SHORT FUNCTION CODE N4  
 SHORT FUNCTION CODE N6  
 SHORT FUNCTION CODE N8



\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130

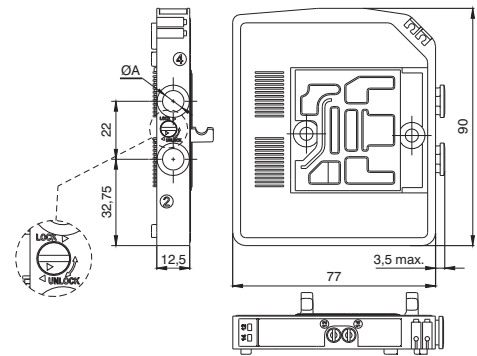
**Solenoid - Solenoid 2x2/2 Bistable-Normally Open-Normally Open**

4/2

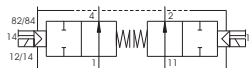
Ordering code  
**230C.42.55.35.V**

ELECTRICAL CONTACTS  
**C** 4=Quick connection for tube Ø4  
 6=Quick connection for tube Ø6  
 8=Quick connection for tube Ø8

VOLTAGE  
**V** 02=24 VDC PNP  
 12=24 VDC NPN



SHORT FUNCTION CODE M4  
 SHORT FUNCTION CODE M6  
 SHORT FUNCTION CODE M8



\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	9	30	From vacuum to 10	2,5 to 7	-5 ÷ +50	130



**Intermediate Inlet/Exhaust module**

Ordering code

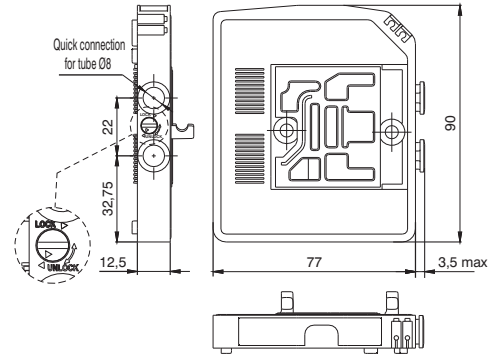
**2308.F**

FUNCTION

08=Exhaust module

12=Inlet module

20=Inlet-Exhaust module



SHORT FUNCTION CODE J  
SHORT FUNCTION CODE K  
SHORT FUNCTION CODE W

**Operational characteristic**

Fluid

Filtered air, with or without lubrication

Temperature °C

-5 ÷ +50

Weight (gr.)

90

**Through module**

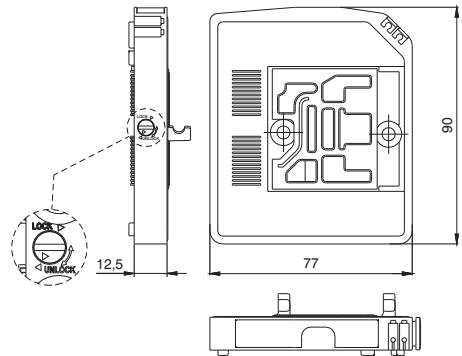
Ordering code

**2300.F**

FUNCTION

01=1 electric signal module

02=2 electric signals module



SHORT FUNCTION CODE T1  
SHORT FUNCTION CODE T2

**Operational characteristic**

Fluid

Filtered air, with or without lubrication

Temperature °C

-5 ÷ +50

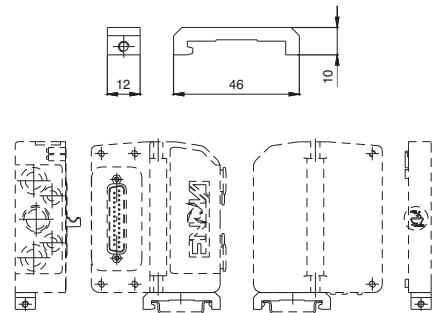
Weight (gr.)

90

**DIN rail adapter**

Ordering code

**2300.16**

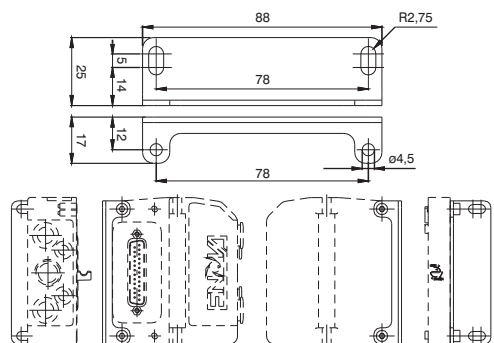


Weight gr. 12

**Fixing bracket**

Ordering code

**2300.50**



Weight gr. 45  
for fixing dimensions see the Left endplates 3 and 5 ports

**Exhaust Diaphragm**

Ordering code
<b>2317.08</b>



Weight gr. 5  
SHORT FUNCTION CODE Y

**Inlet Diaphragm**

Ordering code
<b>2317.12</b>



Weight gr. 5  
SHORT FUNCTION CODE X

**Inlet/Exhaust Diaphragm**

Ordering code
<b>2317.20</b>



Weight gr. 5  
SHORT FUNCTION CODE Z

**Cable complete with connector, 25 Poles IP65**

Ordering code
<b>2300.25.L.C</b>
CABLE LENGTH
<b>L</b> 03=3 meters
05=5 meters
10=10 meters
CONNECTORS
<b>C</b> 10=In line
90=90° Angle



The electrical connection is achieved via a 25 pin connector and can manage up to 22 solenoid pilots.

The management and distribution of the electrical signals between each valve is obtained thanks to a patented electrical connector which receives the signals from the previous module, uses one, two or none depending on the type, and carries forward to the next module the remaining. Bistable valves, 5/3 ; 2X3/2 e 2X2/2 valves which have two solenoid pilots built in, use two signals; the first is directed to the pilot side 14 the second to the pilot side 12.

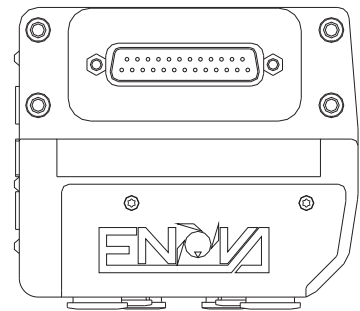
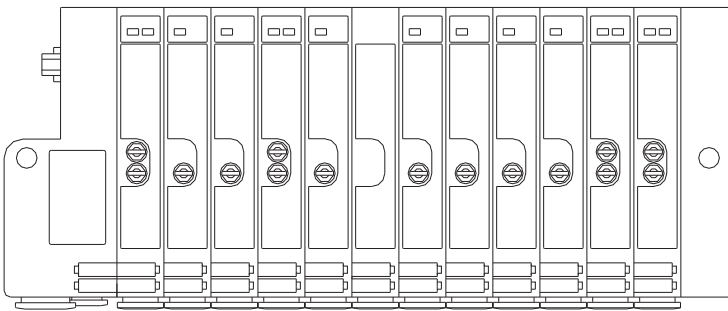
Mono-stable valves can be fitted with two type of electrical connector: one that uses only one signal (connected to the pilot side 14) and carries forward the remaining and one called CEB ( Electrical contact for bistable) which uses two signals, one is needed for the valve the other is not used.

This second solution (CEB) allows the modification of the manifold ( replacement of monostable valves with bistable for example) without the need of reconfiguring the PLC outputs layout. On the other hand this solution limits the maximum number of valves to 11 (two signals for each position).

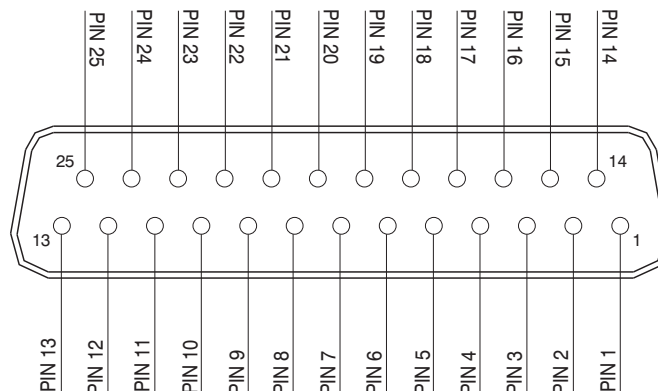
Intermediate supply / exhaust modules are fitted with a dedicated electrical connector which carries forward all electric signals without using any. This allows the use of intermediate modules in any position of the manifold.

Example of manifold samples with the corresponding pin layout.

2

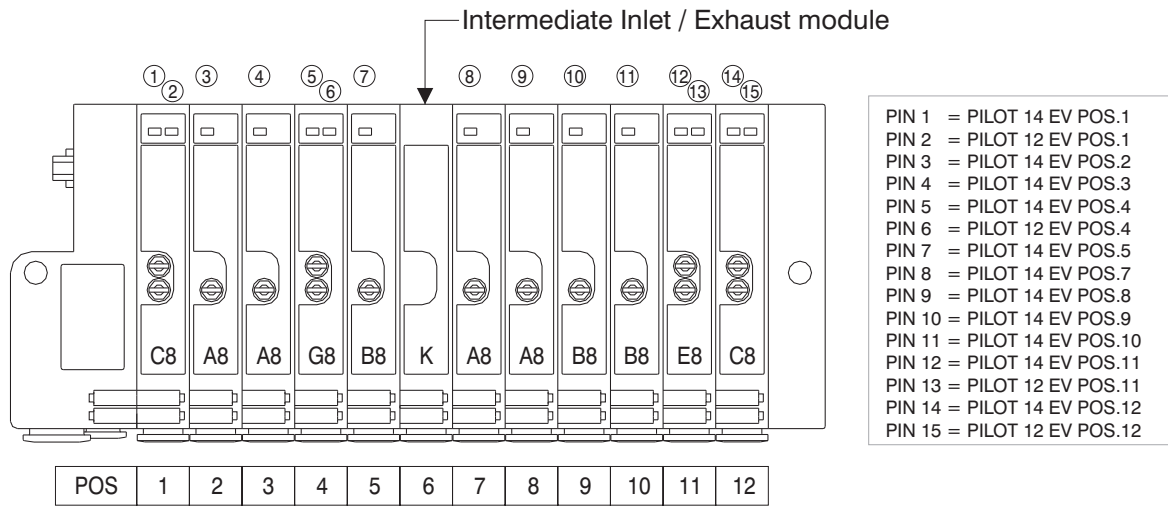


**ELECTRIC CONNECTOR  
SUB-D TYPE - 25 POLES**

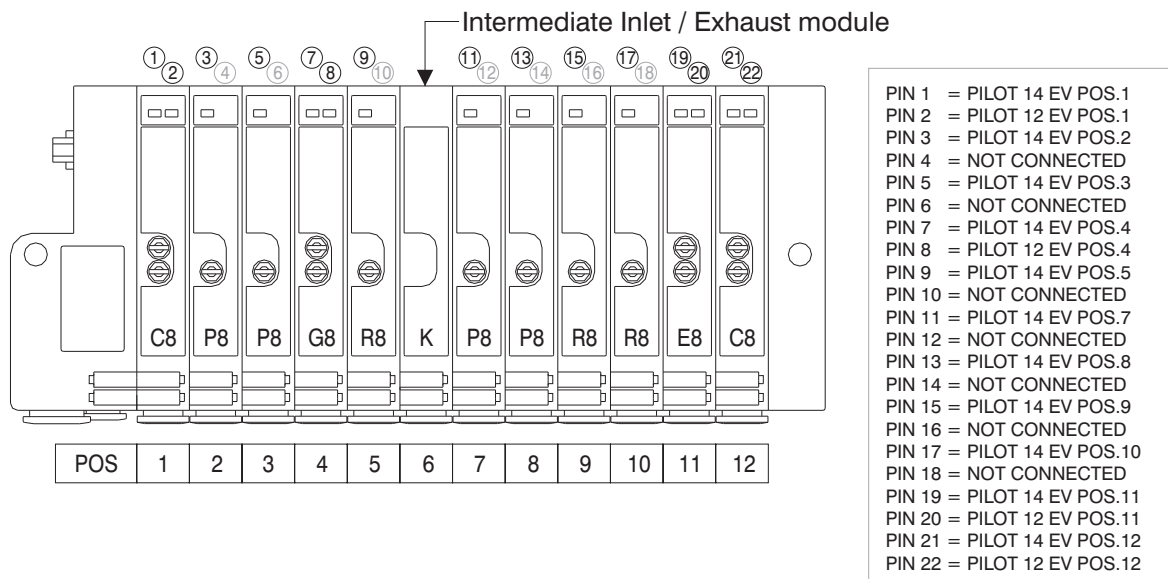


1 - 22 = Solenoid valves signals  
23 - 24 - 25 = Common

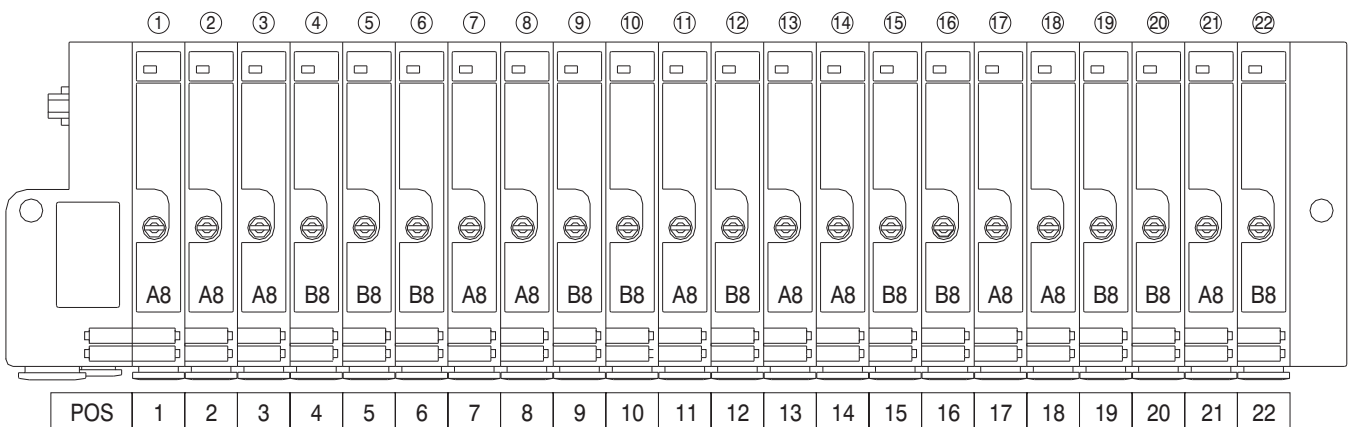
**25 PIN Connector correspondence for bistable, 2x3/2, 5/3 and standard monostable valves manifold**



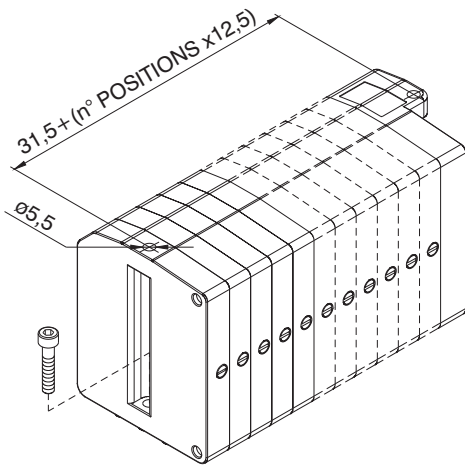
**25 PIN Connector correspondence for bistable, 2x3/2, 5/3 manifold and CEB monostable valves (electrical contact for bistable)**



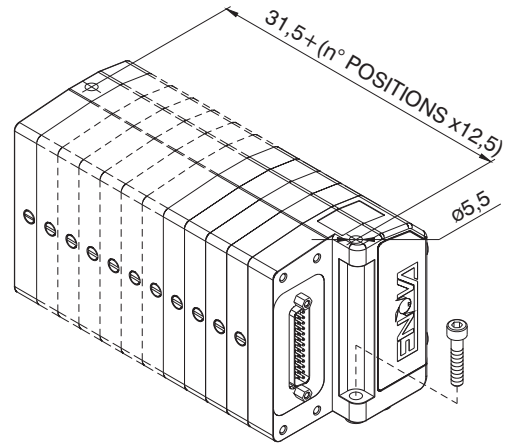
**25 PIN Connector correspondence for manifold for 22 position manifold with standard monostable valves**



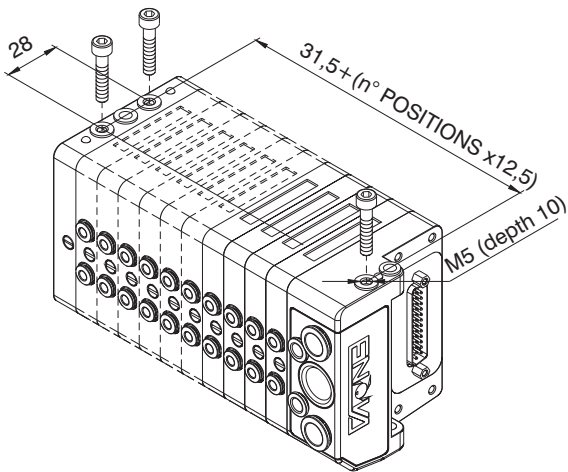
Mounting



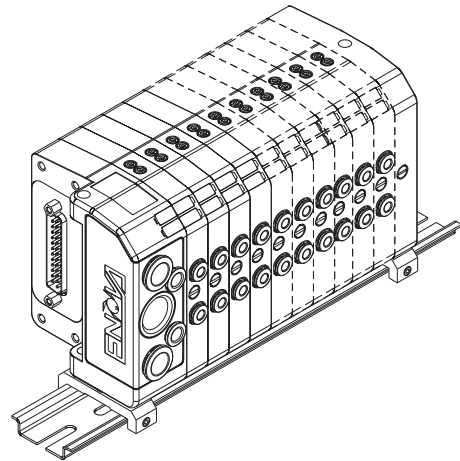
From the top



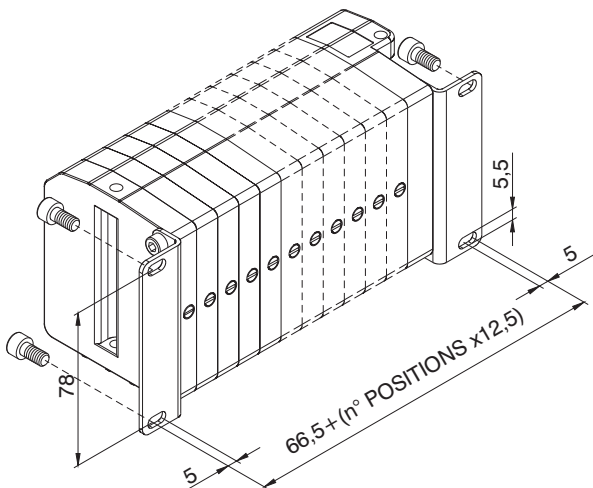
From the bottom



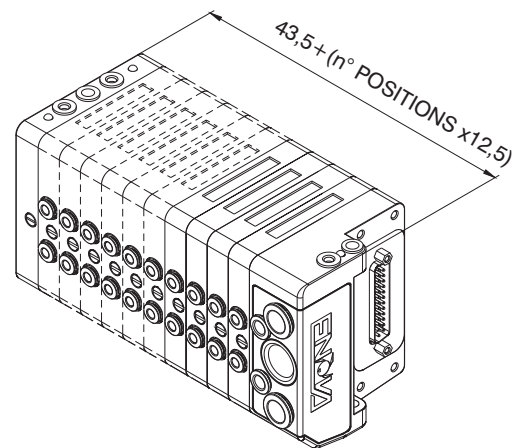
On DIN rail



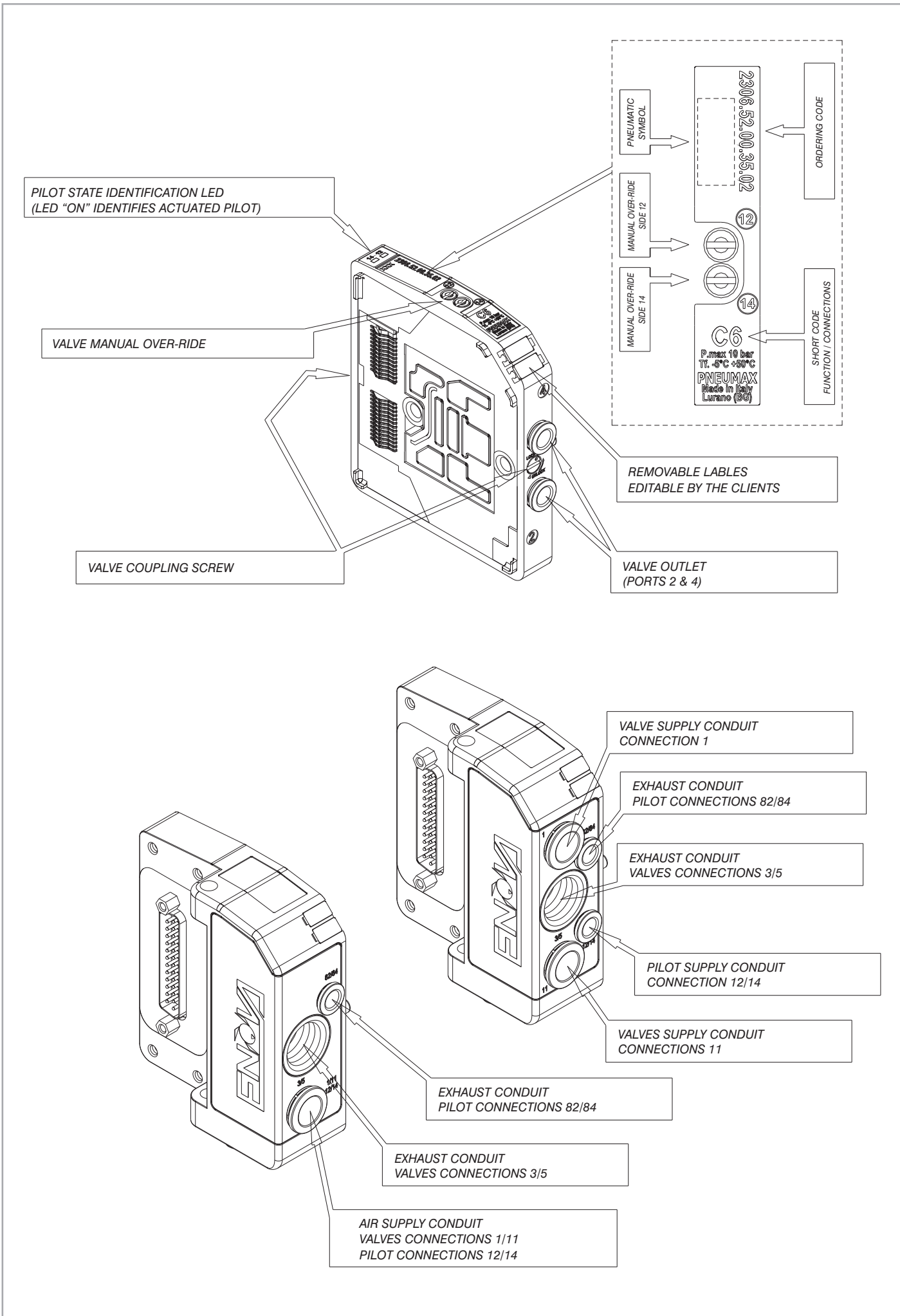
90° Bracket



Maximum envelop size based on the number of positions



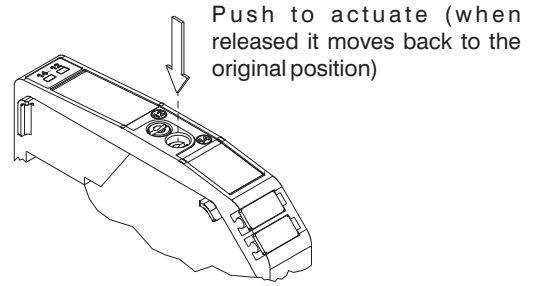
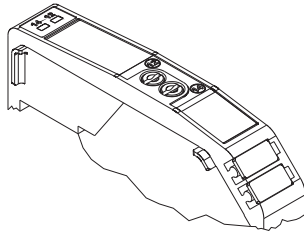




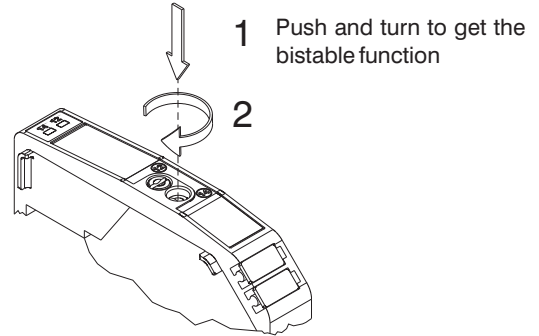
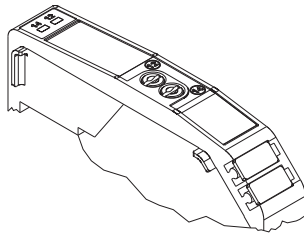


Manual over-ride function

Unstable function



Bistable function



NOTE: It is strongly suggested to replace the original position after using

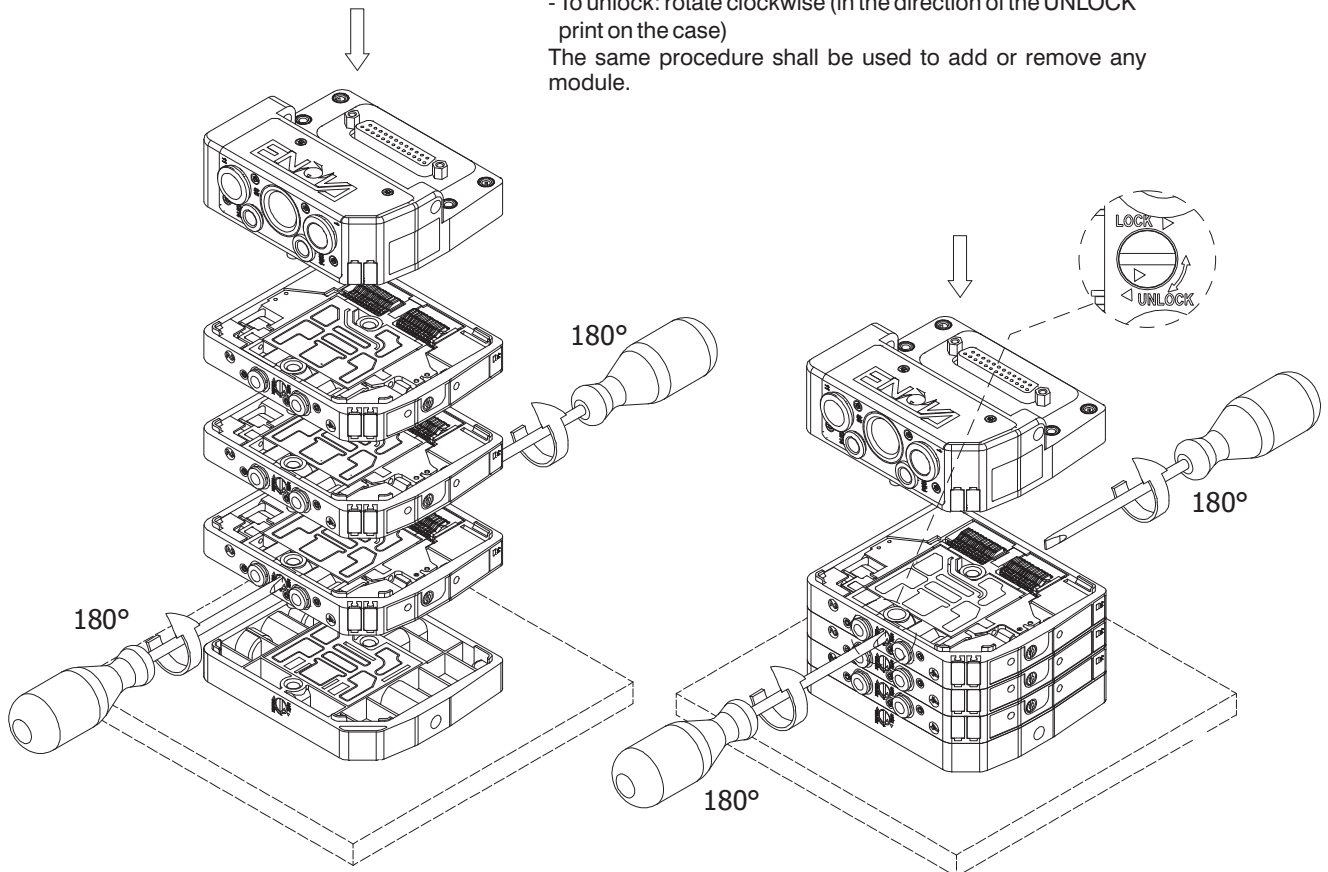
Manifold assembly

The assembly procedure should start from the end-plate which should be positioned on a flat surface. Add the requested modules by simply rotating by 180° the fastening pins by means of a 1x5.5 flat screw driver. The last module to be assembled shall be the inlet module

Fastening pins rotation direction:

- To lock: rotate anticlockwise (in the direction of the LOCK print on the case)
- To unlock: rotate clockwise (in the direction of the UNLOCK print on the case)

The same procedure shall be used to add or remove any module.



## Manifold Lay-Out configuration



## ACCESSORIES :

0= none  
D= DIN bar adapter  
S= 90° Fixing bracket

## ENDPLATES SELECTION :

A= 5 ports endplated left side plus right side endplated  
B= 3 ports endplated left side plus right side endplated

## ELECTRICAL CONNECTION:

MP= MULTIPOLAR PNP (standard)  
MN= MULTIPOLAR NPN  
CA= CANopen® 22 OUT  
CB= CANopen® 22 OUT + 8 IN  
CC= CANopen® 22 OUT + 16 IN  
CD= CANopen® 22 OUT + 24 IN  
DA= DeviceNet 22 OUT  
DB= DeviceNet OUT + 8 IN  
DC= DeviceNet 22 OUT + 16 IN  
DD= DeviceNet OUT + 24 IN  
PA= PROFIBUS 22 OUT  
PB= PROFIBUS 22 OUT + 8 IN  
PC= PROFIBUS 16 OUT + 16 IN

## SHORT CODE

## FUNCTION / CONNECTION:

A4= EV 5/2 MONOST. SOL.-SPRING Ø4  
A6= EV 5/2 MONOST. SOL.-SPRING Ø6  
A8= EV 5/2 MONOST. SOL.-SPRING Ø8  
B4= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø4  
B6= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø6  
B8= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø8  
C4= EV 5/2 BISTABLE SOL.-SOL. Ø4  
C6= EV 5/2 BISTABLE SOL.-SOL. Ø6  
C8= EV 5/2 BISTABLE SOL.-SOL. Ø8  
E4= EV 5/3 CC SOL.-SOL. Ø4  
E6= EV 5/3 CC SOL.-SOL. Ø6  
E8= EV 5/3 CC SOL.-SOL. Ø8  
F4= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø4  
F6= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø6  
F8= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø8  
G4= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø4  
G6= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø6  
G8= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø8  
H4= EV 2x3/2 NC-NO SOL.-SOL. Ø4  
H6= EV 2x3/2 NC-NO SOL.-SOL. Ø6  
H8= EV 2x3/2 NC-NO SOL.-SOL. Ø8  
L4= EV 2x2/2 NC-NC SOL.-SOL. Ø4  
L6= EV 2x2/2 NC-NC SOL.-SOL. Ø6  
L8= EV 2x2/2 NC-NC SOL.-SOL. Ø8  
M4= EV 2x2/2 NO-NO SOL.-SOL. Ø4  
M6= EV 2x2/2 NO-NO SOL.-SOL. Ø6  
M8= EV 2x2/2 NO-NO SOL.-SOL. Ø8  
N4= EV 2x2/2 NC-NO SOL.-SOL. Ø4  
N6= EV 2x2/2 NC-NO SOL.-SOL. Ø6  
N8= EV 2x2/2 NC-NO SOL.-SOL. Ø8  
P4= EV 5/2 MONOST. SOL.-SPRING CEB Ø4  
P6= EV 5/2 MONOST. SOL.-SPRING CEB Ø6  
P8= EV 5/2 MONOST. SOL.-SPRING CEB Ø8  
R4= EV 5/2 MONOST. SOL.-DIFF. CEB Ø4  
R6= EV 5/2 MONOST. SOL.-DIFF. CEB Ø6  
R8= EV 5/2 MONOST. SOL.-DIFF. CEB Ø8  
T1 = 1 ELECTRIC SIGNAL THROUGH MODULE  
T2 = 2 ELECTRIC SIGNALS THROUGH MODULE

J= INTERMEDIATE EXHAUST MODULE Ø8  
K= INTERMEDIATE INLET MODULE Ø8  
W = INLET-EXHAUST MODULE Ø8

X= INLET DIAPHRAGM  
Y= EXHAUST DIAPHRAGM  
Z= INLET -EXHAUST DIAPHRAGM

## NOTE:

While configuring the manifold always bear in mind that the maximum number of electrical signals available is 22.

**N.B.** CEB = Electrical connector for bistable valves ( uses two electric signals)

Intermediate supply / exhaust modules require the same space as a valve but do not use any electric signals (as the electric connector carries forward all signals received from the module immediately before).

The separation diaphragms are positioned between two modules and replace the standard seal therefore do not increase the dimension of the assembly. When using a separation diaphragm of any type, it is necessary to add, in any position between diaphragm and the manifold and plate, an extra air supply / exhaust module depending on the type of diaphragm used.

**General:**

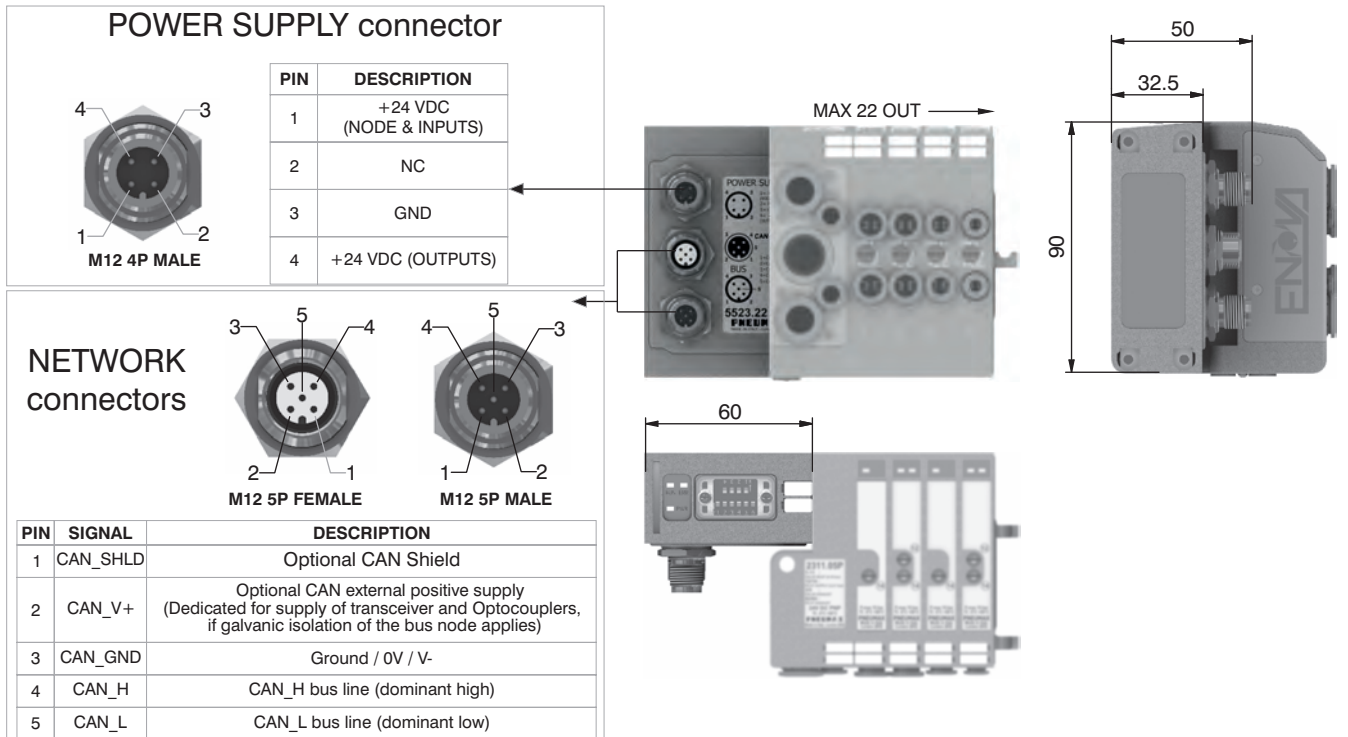
CANopen® module is directly integrated on Enova solenoid valves manifold via a 25 poles connector, normally used for multipolar cable connection.  
 Enova solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 22 solenoid valves, and, in the same time, a max number of 3 Input modules 5200.08.  
 CANopen® module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 22.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus CANopen® is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to CiA Draft Standard Proposal 301 V 4.10 (15 August 2006).  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5523.22**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5523.22
	Specifications	CiA Draft Standard Proposal 301 V 4.10 (15 August 2006)
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	25 mA
	Power supply diagnosis	Green led PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	22
	Max output simultaneously actuated	22
<b>Network</b>	Network connectors	2 M12 5P connectors male-female (IEC 60947-5-2)
	Baud rate	10 - 20 - 50 - 125 - 250 - 500 - 800 - 1000 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m a 500 Kbit/s
	Bus diagnosis	Green led + Red led
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From -0° to +50° C

**General:**

DeviceNet module is directly integrated on Enova solenoid valves manifold via a 25 poles connector, normally used for multipolar cable connection.  
 Enova solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 22 solenoid valves, and, in the same time, a max number of 3 Input modules 5200.08.  
 DeviceNet module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 22.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus DeviceNet is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to DeviceNet Specifications Volume I, release 2.0.  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5423.22**



**Scheme / Overall dimensions and I/O layout :**

**POWER SUPPLY connector**

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**NETWORK connectors**

PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

**Dimensions:** 50mm (width), 32.5mm (depth), 96mm (height), 60mm (width of terminal block).

**Technical characteristics**

	Model	5423.22
	Specifications	DeviceNet Specifications Volume I, release 2.0.
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	25 mA
	Power supply diagnosis	Green led PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	22
	Max output simultaneously actuated	22
<b>Network</b>	Network connectors	2 M12 5P connectors male-female (IEC 60947-5-2)
	Baud rate	125 - 250 - 500 Kbit/s
	Addresses, possibile numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m a 500 Kbit/s
	Bus diagnosis	Green led + Red led
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From -0° to +50° C



**General:**

PROFIBUS DP module is directly integrated on Enova solenoid valves manifold via a 25 poles connector, normally used for multipolar cable connection.  
 Enova solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 22 solenoid valves, when is connected 0 or 1 INPUT modules, or 16 if node is fitted with 2 INPUT modules. The max number of INPUT modules 5200.08, is 2.  
 PROFIBUS DP module recognizes automatically the presence of the Input modules on power on.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus PROFIBUS DP is possible via 2 M12 type B 5P male - female circular connectors; these two are connected in parallel and according to PROFIBUS Interconnection Technology (Version 1.1 : August 2001).  
 The node address can be set using BCD numeration: 4 dip-switches for the units and 4 dip-switches for the tens.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

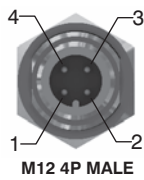
**Ordering code**

**5323.22**



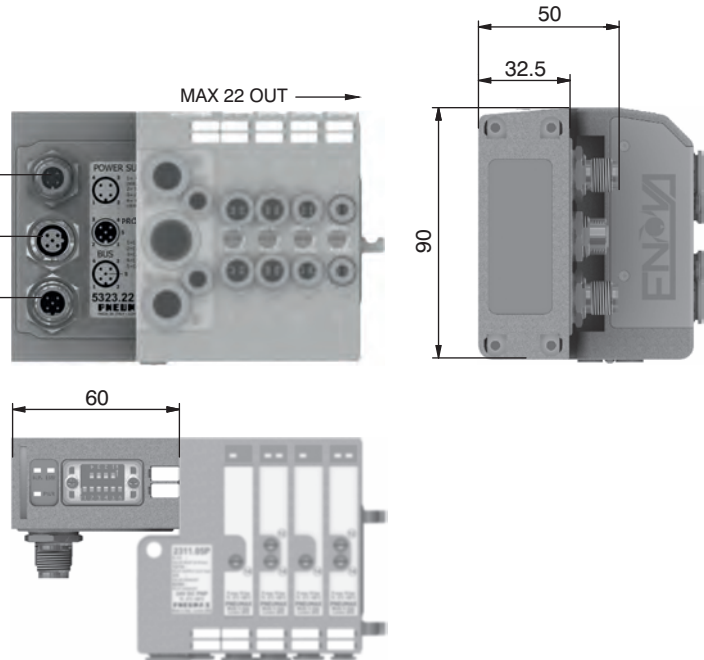
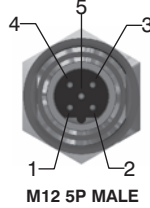
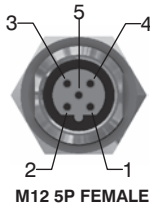
**Scheme / Overall dimensions and I/O layout :**

**POWER SUPPLY connector**



PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**NETWORK connectors**



PIN	SIGNAL	DESCRIPTION
1	VP	Power supply plus, (P5V)
2	A-line	Receive / Transmit data -N, A-line
3	DGND	Data Ground (reference potential to VP)
4	B-line	Receive / Transmit data -plus, B-line
5	SHIELD	Shield or PE

**Technical characteristics**

	Model	5323.22
	Specifications	PROFIBUS DP
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	50 mA
	Power supply diagnosis	Green led PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	22 or 16 if node is fitted with 2 INPUT modules
	Max output simultaneously actuated	22
<b>Network</b>	Network connectors	2 M12 5P connectors male-female (IEC 60947-5-2)
	Baud rate	125 - 250 - 500 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m a 500 Kbit/s
	Bus diagnosis	Green led + Red led
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From -0° to +50° C

**General:**

Modules have 8 connectors M8 3P female.

The Inputs are PNP equivalent 24 VDC ± 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 200 mA.

Each module includes a 200 mA resettable fuse. If a short circuit or a overcharge (overall current >200mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green led PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green led PWR light up indicating the ON state and the node will re-start to operate.

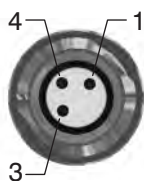
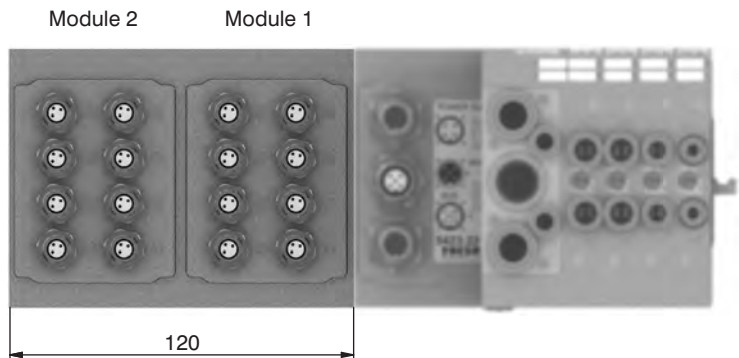
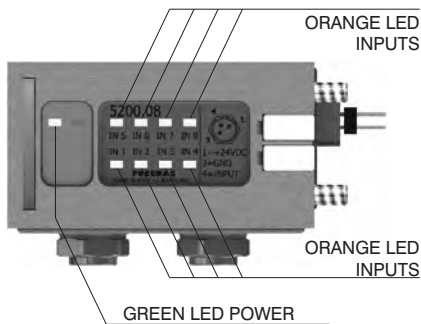
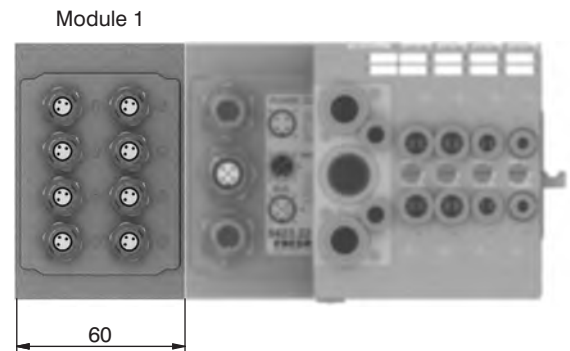
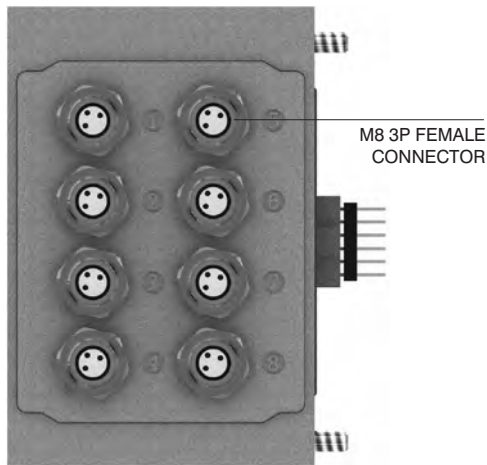
The Maximum number of Input modules supported is 3 for CANopen and DeviceNet, 2 for PROFIBUS DP.

**Ordering code**

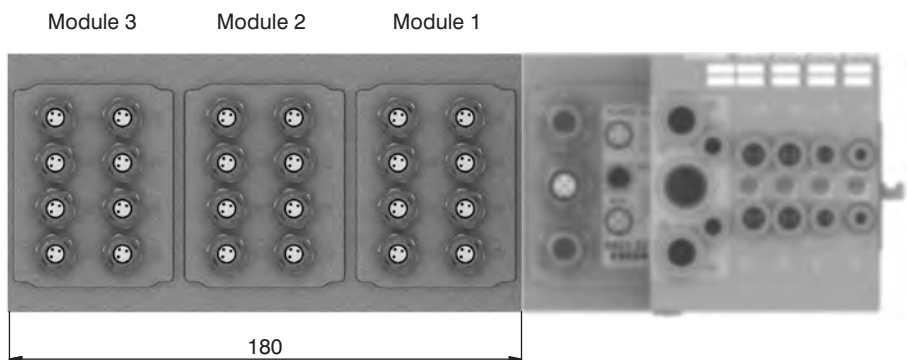
**5200.08**



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND



Manifold layout configuration complete with Serial systems



**ACCESSORIES :**

0= none  
D= DIN bar adapter  
S= 90° Fixing bracket

**ENDPLATES SELECTION :**

A= 5 ports endplated left side plus right side endplated  
B= 3 ports endplated left side plus right side endplated

**BUS CONFIGURATION :**

CA= CANopen® 22 OUT  
CB= CANopen® 22 OUT + 8 INPUTS  
CC= CANopen® 22 OUT + 16 INPUTS  
CD= CANopen® 22 OUT + 24 INPUTS  
DA= DeviceNet 22 OUT  
DB= DeviceNet 22 OUT + 8 INPUTS  
DC= DeviceNet 22 OUT + 16 INPUTS  
DD= DeviceNet 22 OUT + 24 INPUTS  
PA= PROFIBUS 22 OUT  
PB= PROFIBUS 22 OUT + 8 INPUTS  
PC= PROFIBUS 16 OUT + 16 INPUTS

**SHORT CODE**

**FUNCTION / CONNECTION:**

A4= EV 5/2 MONOST. SOL.-SPRING Ø4  
A6= EV 5/2 MONOST. SOL.-SPRING Ø6  
A8= EV 5/2 MONOST. SOL.-SPRING Ø8  
B4= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø4  
B6= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø6  
B8= EV 5/2 MONOST. SOL.-DIFFERENTIAL Ø8  
C4= EV 5/2 BISTABLE SOL.-SOL. Ø4  
C6= EV 5/2 BISTABLE SOL.-SOL. Ø6  
C8= EV 5/2 BISTABLE SOL.-SOL. Ø8  
E4= EV 5/3 CC SOL.-SOL. Ø4  
E6= EV 5/3 CC SOL.-SOL. Ø6  
E8= EV 5/3 CC SOL.-SOL. Ø8  
F4= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø4  
F6= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø6  
F8= EV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø8  
G4= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø4  
G6= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø6  
G8= EV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø8  
H4= EV 2x3/2 NC-NO SOL.-SOL. Ø4  
H6= EV 2x3/2 NC-NO SOL.-SOL. Ø6  
H8= EV 2x3/2 NC-NO SOL.-SOL. Ø8  
L4= EV 2x2/2 NC-NC SOL.-SOL. Ø4  
L6= EV 2x2/2 NC-NC SOL.-SOL. Ø6  
L8= EV 2x2/2 NC-NC SOL.-SOL. Ø8  
M4= EV 2x2/2 NO-NO SOL.-SOL. Ø4  
M6= EV 2x2/2 NO-NO SOL.-SOL. Ø6  
M8= EV 2x2/2 NO-NO SOL.-SOL. Ø8  
N4= EV 2x2/2 NC-NO SOL.-SOL. Ø4  
N6= EV 2x2/2 NC-NO SOL.-SOL. Ø6  
N8= EV 2x2/2 NC-NO SOL.-SOL. Ø8  
P4= EV 5/2 MONOST. SOL.-SPRING CEB Ø4  
P6= EV 5/2 MONOST. SOL.-SPRING CEB Ø6  
P8= EV 5/2 MONOST. SOL.-SPRING CEB Ø8  
R4= EV 5/2 MONOST. SOL.-DIFF. CEB Ø4  
R6= EV 5/2 MONOST. SOL.-DIFF. CEB Ø6  
R8= EV 5/2 MONOST. SOL.-DIFF. CEB Ø8  
T1 = 1 ELECTRIC SIGNAL THROUGH MODULE  
T2 = 2 ELECTRIC SIGNALS THROUGH MODULE

J= INTERMEDIATE EXHAUST MODULE Ø8  
K= INTERMEDIATE INLET MODULE Ø8  
W = INLET-EXHAUST MODULE Ø8

X= INLET DIAPHRAGM  
Y= EXHAUST DIAPHRAGM  
Z= INLET -EXHAUST DIAPHRAGM

**NOTE:**


While configuring the manifold always bear in mind that the maximum number of electrical signals available is 22.

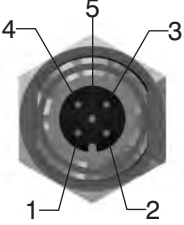
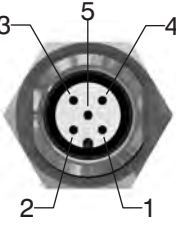


**N.B.** CEB = Electrical connector for bistable valves ( uses two electric signals)

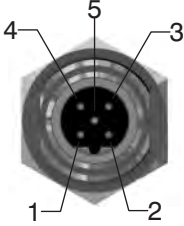
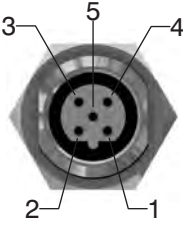


Intermediate supply / exhaust modules require the same space as a valve but do not use any electric signals (as the electric connector carries forward all signals received from the module immediately before).



The separation diaphragms are positioned between two modules and replace the standard seal therefore do not increase the dimension of the assembly. When using a separation diaphragm of any type, it is necessary to add, in any position between diaphragm and the manifold and plate, an extra air supply / exhaust module depending on the type of diaphragm used.



Socket for Power supply, M12A 4P Female		Plug for Input module, M8 3P Male															
Ordering code		Ordering code															
<b>5312A.F04.00</b>		<b>5308A.M03.00</b>															
Power supply straight connector Upper view slave connector		Input straight connector Upper view slave connector															
	<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>+24 VDC (Node &amp; Inputs)</td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td>0 V</td></tr> <tr><td>4</td><td>+24 VDC (Outputs)</td></tr> </table>	1	+24 VDC (Node & Inputs)	2		3	0 V	4	+24 VDC (Outputs)		<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>+24 VDC</td></tr> <tr><td>4</td><td>INPUT</td></tr> <tr><td>3</td><td>GND</td></tr> </table>	1	+24 VDC	4	INPUT	3	GND
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2																	
3	0 V																
4	+24 VDC (Outputs)																
1	+24 VDC																
4	INPUT																
3	GND																

Socket for BUS CANOpen, DeviceNet, M12A 5P Female		Plug for BUS CANOpen, DeviceNet, M12A 5P Male																					
Ordering code		Ordering code																					
<b>5312A.F05.00</b>		<b>5312A.M05.00</b>																					
Network straight connector Upper view slave connector		Network straight connector Upper view slave connector																					
	<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>(CAN_SHIELD)</td></tr> <tr><td>2</td><td>(CAN_V+)</td></tr> <tr><td>3</td><td>CAN_GND</td></tr> <tr><td>4</td><td>CAN_H</td></tr> <tr><td>5</td><td>CAN_L</td></tr> </table>	1	(CAN_SHIELD)	2	(CAN_V+)	3	CAN_GND	4	CAN_H	5	CAN_L		<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>(CAN_SHIELD)</td></tr> <tr><td>2</td><td>(CAN_V+)</td></tr> <tr><td>3</td><td>CAN_GND</td></tr> <tr><td>4</td><td>CAN_H</td></tr> <tr><td>5</td><td>CAN_L</td></tr> </table>	1	(CAN_SHIELD)	2	(CAN_V+)	3	CAN_GND	4	CAN_H	5	CAN_L
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Socket for BUS PROFIBUS DP, M12B 5P Female		Plug for BUS PROFIBUS DP, M12B 5P Male																					
Ordering code		Ordering code																					
<b>5312B.F05.00</b>		<b>5312B.M05.00</b>																					
Network straight connector Upper view slave connector		Network straight connector Upper view slave connector																					
	<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>Power Supply</td></tr> <tr><td>2</td><td>A-line</td></tr> <tr><td>3</td><td>DGND</td></tr> <tr><td>4</td><td>B-line</td></tr> <tr><td>5</td><td>SHIELD</td></tr> </table>	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD		<table border="1" style="border-collapse: collapse;"> <tr><td>1</td><td>Power Supply</td></tr> <tr><td>2</td><td>A-line</td></tr> <tr><td>3</td><td>DGND</td></tr> <tr><td>4</td><td>B-line</td></tr> <tr><td>5</td><td>SHIELD</td></tr> </table>	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD
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3	DGND																						
4	B-line																						
5	SHIELD																						

M12 Plug		M8 Plug	
Ordering code		Ordering code	
<b>5300.T12</b>		<b>5300.T08</b>	

Trademarks: EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



# OPTYMA<sup>32</sup>-S

## General characteristics

Optyma32-S has been designed in order to complete the Optyma series of valves.

Optyma -S , 12.5mm size, integrates all the technical features already developed and implemented on the Optima T & F such as the integrated electrical connection. Further technical specifications are:

- Flow rate: up to 550[Nl/min], using the modular base with Ø8 quick fitting tube
- Modular base available with Ø4, Ø6, Ø8 quick fitting tube
- The solenoid pilots are low consumption and fitted on the same side of the valve
- Mono and bi-stable valves have the same dimension
- Easy and fast assembly on the sub base thanks to the "one screw" mounting solution
- Possibility to replace a valve without the need of disconnecting the pneumatic pipes
- Electrical and pneumatic connections positioned on the same side
- Possibility to operate with different pressures and vacuum
- Quick coupling connections for consumption, exhaust and air supply all on the same side
- Management of 32electrical signals,(16 bi-stable or any combination off mono and bi-stable vales up to max 32 signals).
- The electrical connection is achieved thanks to a 37 pole connector, as an alternative it is possible to use a 25 pole connector which can handle a maximum of 22 electrical signals.
- The protection grade is IP65 directly integrated in the manifold components.
- Manifolds can be directly integrated with the most common field bus systems.

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power-Directional control valves-Measurement of shifting time"**

## Main characteristics

- One size: 12.5mm thick
- Monostable and bistable valves with same dimensions
- Modular subbase with two positions
- Modular subbases assembled via tie rods
- Quick coupling connections directly integrated in the sub base
- Integrated and optimized electrical connections as standard
- IP65 protection grade as standard

## Construction characteristics

Body	Technopolymer
Operators	Technopolymer
Spools	AISI 303 stainless steel
Spacers	Technopolymer
Seals	NBR
Piston seals	NBR
Springs	AISI 302 stainless steel
Pistons	Technopolymer

## Functions

EV 5/2 MONOST. SOL. SPRING
EV 5/2 MONOST. SOL. DIFFERENTIAL
EV 5/2 BISTABLE SOL. SOL.
EV 5/3 CC SOL. SOL.
EV 2x3/2 NC-NC (= 5/3 OC) SOL. SOL.
EV 2x3/2 NO-NO (= 5/3 PC) SOL. SOL.
EV 2x3/2 NC-NO SOL. SOL.
EV 2x3/2 NO-NC SOL. SOL.

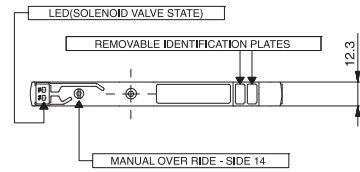
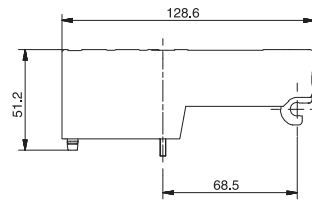
## Technical characteristics

Voltage	24 VDC ±10% PNP (NPN and AC on request)
Pilot consumption	0,5 Watt
Valve working pressure [1]	from vacuum to 10 bar max.
Pilot working pressure [12-14]	from 2,5 to 7 bar max.
Operating temperature	from -5°C to +50°C
Protection degree	IP65
Life (standard operating conditions)	50.000.000
Fluid	Filtered and lubricated air or not (if lubricated air, the lubrication must be continuous)

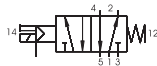


**Solenoid - Spring**

Ordering code
<b>2241.52.00.39. V</b>
VOLTAGE
02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=400$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=550$

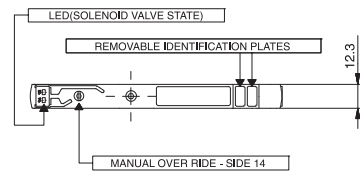
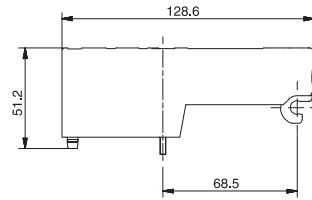
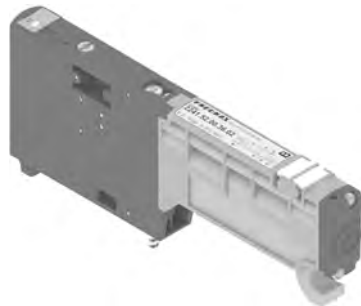


SHORT FUNCTION CODE "A"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	12	20	From vacuum to 10	2,5 - 7	-5° / +50°	67

**Solenoid - Differential**

Ordering code
<b>2241.52.00.36. V</b>
VOLTAGE
02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=400$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=550$

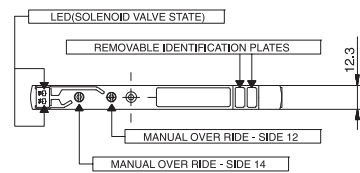
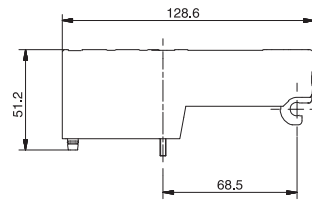
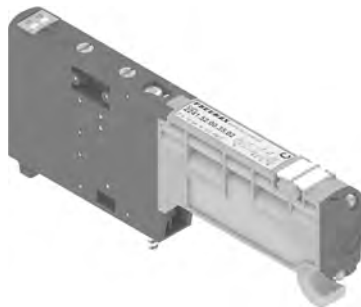


SHORT FUNCTION CODE "B"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	20	25	From vacuum to 10	2,5 - 7	-5° / +50°	67

**Solenoid - Solenoid**

Ordering code
<b>2241.52.00.35. V</b>
VOLTAGE
02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=400$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=550$



SHORT FUNCTION CODE "C"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

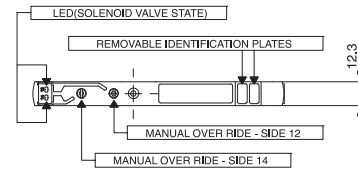
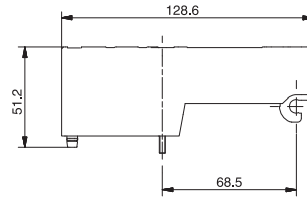
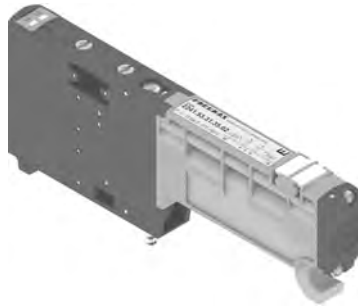
Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	550	10	10	From vacuum to 10	2,5 - 7	-5° / +50°	67

2

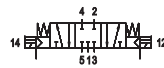
**Solenoid - Solenoid - (5/3 Closed centres)**

Ordering code  
**2241.53.31.35.V**

VOLTAGE  
 02 = 24 VDC PNP  
 12 = 24 VDC NPN  
 05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=300$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=400$



SHORT FUNCTION CODE "E"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

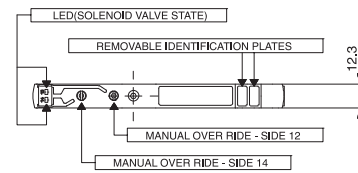
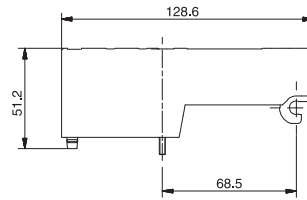
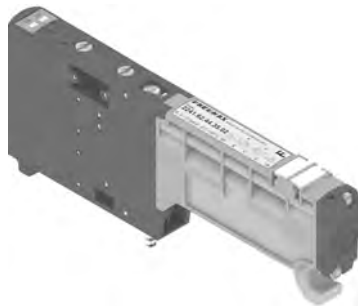
Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	400	15	20	From vacuum to 10	2,5 - 7	-5° / +50°	83

**Solenoid - Solenoid 2x3/2**

Ordering code  
**2241.62.F.35.V**

FUNCTION  
 44 = NC - NC (5/3 Open centres)  
 55 = NO - NO (5/3 Pressured centres)

VOLTAGE  
 02 = 24 VDC PNP  
 12 = 24 VDC NPN  
 05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=360$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=420$



SHORT FUNCTION CODE:  
 NC-NC (5/3 Open centres) = "F"  
 NO-NO (5/3 Pressured centres) = "G"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

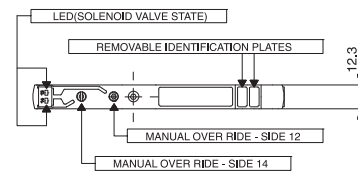
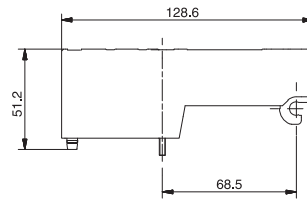
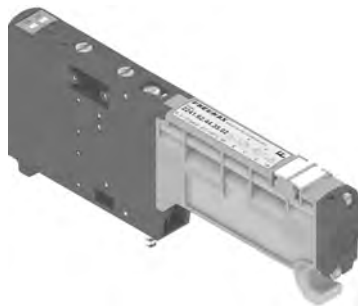
Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	420	15	25	From vacuum to 10	$\geq 3+(0,2xP.alim.)$	-5° / +50°	75

**Solenoid - Solenoid 2x3/2**

Ordering code  
**2241.62.F.35.V**

FUNCTION  
 45 = NC - NO (Normally Closed - Normally Open)  
 54 = NO - NC (Normally Open - Normally Closed)

VOLTAGE  
 02 = 24 VDC PNP  
 12 = 24 VDC NPN  
 05 = 24 VAC



Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2244.01 tube  $\varnothing 4=140$   
 Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2246.01 tube  $\varnothing 6=360$   
 \*Flow rate at 6 bar with  $\Delta p=1$  (NI/min) with Base cod. 2248.01 tube  $\varnothing 8=420$

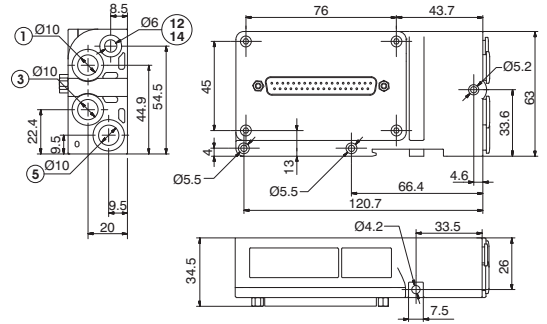


SHORT FUNCTION CODE:  
 NC-NA = "H"  
 NA-NC = "I"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

Operational characteristic							
Fluid	*Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar)	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	420	15	25	From vacuum to 10	$\geq 3+(0,2xP.alim.)$	-5° / +50°	75

**Left Endplates - External pilot base**

Ordering code	<b>2240.02.Ⓞ</b>
CONNECTIONS	37P = Connectors 37 poles PNP 25P = Connectors 25 poles PNP 37N = Connectors 37 poles NPN 25N = Connectors 25 poles NPN 37A = Connectors 37 poles AC 25A = Connectors 25 poles AC

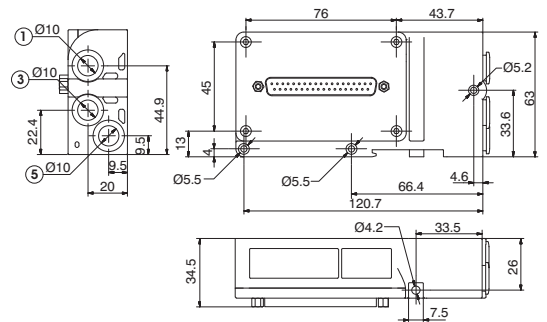


12/14 separated from port 1

Operational characteristic	Fluid	Pressure range (bar)	Pilot working pressure (bar)	Temperature °C	Weight (gr.)
	Filtered air, with or without lubrication	From vacuum to 10	2,5 - 7	-5 - +50	174

**Left Endplates - Self-feeding base**

Ordering code	<b>2240.12.Ⓞ</b>
CONNECTIONS	37P = Connectors 37 poles PNP 25P = Connectors 25 poles PNP 37N = Connectors 37 poles NPN 25N = Connectors 25 poles NPN 37A = Connectors 37 poles AC 25A = Connectors 25 poles AC

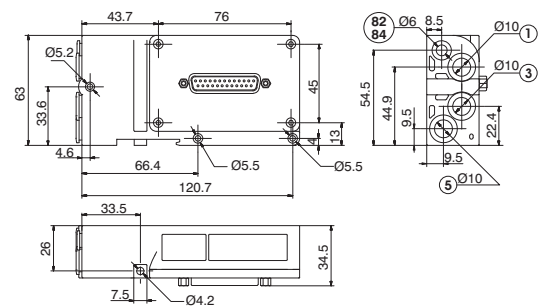


12/14 connected to port 1

Operational characteristic	Fluid	Pressure range and pilot working pressure (bar)	Temperature °C	Weight (gr.)
	Filtered air, with or without lubrication	2,5 - 7	-5 - +50	174

**Right Endplates**

Ordering code	<b>2240.03.Ⓞ</b>
CONNECTIONS	00 = Exhaust electrical connection closed 25P = Connectors 25 poles PNP

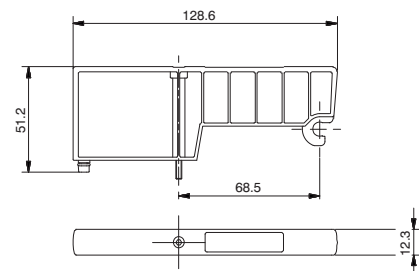


PORT 82/84 = DO NOT PRESSURIZE, SOLENOID PILOTS EXHAUST

Operational characteristic	Fluid	Pressure range (bar)	Temperature °C	Weight (gr.)
	Filtered air, with or without lubrication	From vacuum to 10	-5 - +50	174

**Closing plate**

Ordering code	<b>2240.00</b>
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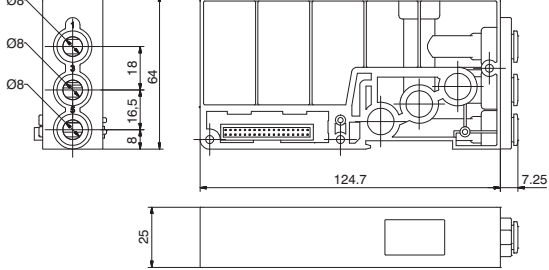


SHORT FUNCTION CODE "T"


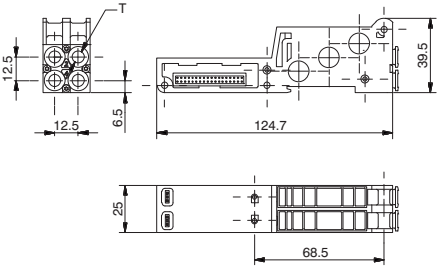
Operational characteristic	Fluid	Pressure range (bar)	Temperature °C	Weight (gr.)
	Filtered air, with or without lubrication	From vacuum to 10	-5 - +50	30




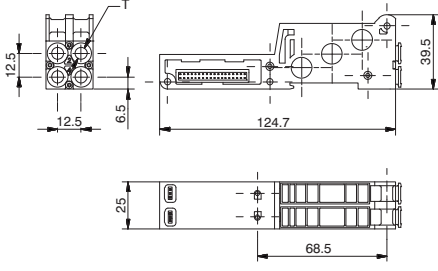
**Intermediate Inlet/Exhaust module**

Ordering code						
<b>2240.10</b>						
SHORT FUNCTION CODE "W"						
<b>Operational characteristic</b>	Fluid	Pressure range (bar)	Temperature °C	Weight (gr.)		
	Filtered air, with or without lubrication	From vacuum to 10	-5 - +50	105		


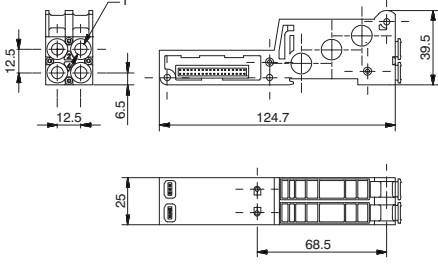
**Modular base (2 places) Quick fitting tube Ø4**

Ordering code						
<b>2244.FV</b>						
FUNCTION	01 = Opened port 06 = Separated ports 07 = Port 1 separated 08 = Ports 3-5 separated					
VERSION	M = Monostable B = Bistable					
SHORT FUNCTION CODE "3" (Monostable) Opened ports	SHORT FUNCTION CODE "4" (Bistable) Opened ports					
SHORT FUNCTION CODE "36" (Monostable) Separated ports	SHORT FUNCTION CODE "46" (Bistable) Separated ports					
SHORT FUNCTION CODE "37" (Monostable) port 1 separated	SHORT FUNCTION CODE "47" (Bistable) Port 1 separated					
SHORT FUNCTION CODE "38" (Monostable) Ports 3-5 separated	SHORT FUNCTION CODE "48" (Bistable) Ports 3-5 separated					
<b>Operational characteristic</b>	Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Pressure range (bar)	Temperature °C	Weight (gr.)	
	Filtered air, with or without lubrication	140	From vacuum to 10	-5 - +50	75	

**Modular base (2 places) Quick fitting tube Ø6**

Ordering code						
<b>2246.FV</b>						
FUNCTION	01 = Opened port 06 = Separated ports 07 = Port 1 separated 08 = Ports 3-5 separated					
VERSION	M = Monostable B = Bistable					
SHORT FUNCTION CODE "5" (Monostable) Opened ports	SHORT FUNCTION CODE "6" (Bistable) Opened ports					
SHORT FUNCTION CODE "56" (Monostable) Separated ports	SHORT FUNCTION CODE "66" (Bistable) Separated ports					
SHORT FUNCTION CODE "57" (Monostable) Port 1 separated	SHORT FUNCTION CODE "67" (Bistable) Port 1 separated					
SHORT FUNCTION CODE "58" (Monostable) Ports 3-5 separated	SHORT FUNCTION CODE "68" (Bistable) Ports 3-5 separated					
<b>Operational characteristic</b>	Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Pressure range (bar)	Temperature °C	Weight (gr.)	
	Filtered air, with or without lubrication	400	From vacuum to 10	-5 - +50	75	

**Modular base (2 places) Quick fitting tube Ø8**

Ordering code						
<b>2248.FV</b>						
FUNCTION	01 = Opened port 06 = Separated ports 07 = Port 1 separated 08 = Ports 3-5 separated					
VERSION	M = Monostable B = Bistable					
SHORT FUNCTION CODE "7" (Monostable) Opened ports	SHORT FUNCTION CODE "8" (Bistable) Opened ports					
SHORT FUNCTION CODE "76" (Monostable) separated ports	SHORT FUNCTION CODE "86" (Bistable) Separated ports					
SHORT FUNCTION CODE "77" (Monostable) Port 1 separated	SHORT FUNCTION CODE "87" (Bistable) Port 1 separated					
SHORT FUNCTION CODE "78" (Monostable) Ports 3-5 separated	SHORT FUNCTION CODE "88" (Bistable) Ports 3-5 separated					
<b>Operational characteristic</b>	Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Pressure range (bar)	Temperature °C	Weight (gr.)	
	Filtered air, with or without lubrication	550	From vacuum to 10	-5 - +50	75	

**Cable complete with connector, 25 Poles IP65**

Ordering code	
<b>2300.25.L.P</b>	
CABLE LENGTH	
<b>L</b> 03 = 3 meters 05 = 5 meters 10 = 10 meters	
CONNECTORS	
<b>P</b> 10 = In line 90 = 90° Angle	

**Cable complete with connector, 37 Poles IP65**

Ordering code	
<b>2400.37.L.P</b>	
CABLE LENGTH	
<b>L</b> 03 = 3 meters 05 = 5 meters 10 = 10 meters	
CONNECTORS	
<b>P</b> 10 = In line 90 = 90° Angle	

**Cable complete with connector, 25 Poles IP65**

Ordering code	
<b>2400.25.L.25</b>	
CABLE LENGTH	
<b>L</b> 03 = 3 meters 05 = 5 meters 10 = 10 meters	

**Polyethylene Silencer Series SPL-R**

Ordering code	
<b>SPLR.F</b>	
TUBE DIAMETER	
<b>F</b> 6 = 6 mm 10 = 10 mm	

**Diaphragm plug**

	Ordering code
	<b>2230.17</b>

Weight gr. 6,5

**Nut**

	Ordering code
	<b>2240.KD.00</b>

The Kit includes 6 pieces

**Tie-rod M3**

Ordering code	
<b>2240.KT.P</b>	
N. POSITIONS	
02=Nr. 2 Position 04=Nr. 4 Positions 06=Nr. 6 Positions 08=Nr. 8 Positions 10=Nr. 10 Positions 12=Nr. 12 Positions 14=Nr. 14 Positions 16=Nr. 16 Positions 18=Nr. 18 Positions 20=Nr. 20 Positions 22=Nr. 22 Positions 24=Nr. 24 Positions 26=Nr. 26 Positions 28=Nr. 28 Positions 30=Nr. 30 Positions 32=Nr. 32 Positions	
<b>P</b> The Kit includes 3 pieces	

$L = 43mm + (N. pos. \times 12,5mm)$

CODE LIST	Description	L* Dimension
	2240.KT.02	68 mm
	2240.KT.04	93mm
	2240.KT.06	118mm
	2240.KT.08	143mm
	2240.KT.10	168mm
	2240.KT.12	193mm
	2240.KT.14	218mm
	2240.KT.16	243mm
	2240.KT.18	268mm
	2240.KT.20	293mm
	2240.KT.22	318mm
	2240.KT.24	343mm
	2240.KT.26	368mm
	2240.KT.28	393mm
	2240.KT.30	418mm
	2240.KT.32	443mm

**Accessories table for manifolds**

Set of N° positions	Ordering code	
		2240.KD.00
		Nr. 6 pieces
2	2240.KD.00 + 2240.KT.02	
4	2240.KD.00 + 2240.KT.04	
6	2240.KD.00 + 2240.KT.06	
8	2240.KD.00 + 2240.KT.08	
10	2240.KD.00 + 2240.KT.10	
12	2240.KD.00 + 2240.KT.12	
14	2240.KD.00 + 2240.KT.14	
16	2240.KD.00 + 2240.KT.16	
18	2240.KD.00 + 2240.KT.18	
20	2240.KD.00 + 2240.KT.20	
22	2240.KD.00 + 2240.KT.22	
24	2240.KD.00 + 2240.KT.24	
26	2240.KD.00 + 2240.KT.26	
28	2240.KD.00 + 2240.KT.28	
30	2240.KD.00 + 2240.KT.30	
32	2240.KD.00 + 2240.KT.32	
		2240.KT.XX
		Nr. 3 pieces



**General :**

Using the 2240.03.25P output terminal it is possible to make any electrical signals not used by valves available on a 25 sub-D female connector at the right end of the manifold.  
It is possible to then join a multi-core cable to link to the next manifold, or connect directly to one or two I/O modules.  
The I/O modules can accept input or output signals, depending upon what is connected.

**Please note:** If the manifold is connected by a multi-core connection, each connection can be used as either an input or an output, while if the manifold is connected to a serial node the connections can only be used as an output.

It is possible to connect the manifold to up to two I/O modules.

Each I/O module includes 8 diagnostic LEDs which indicate the presence of an Input / Output signal for each connector.

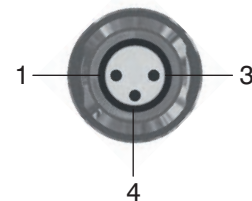
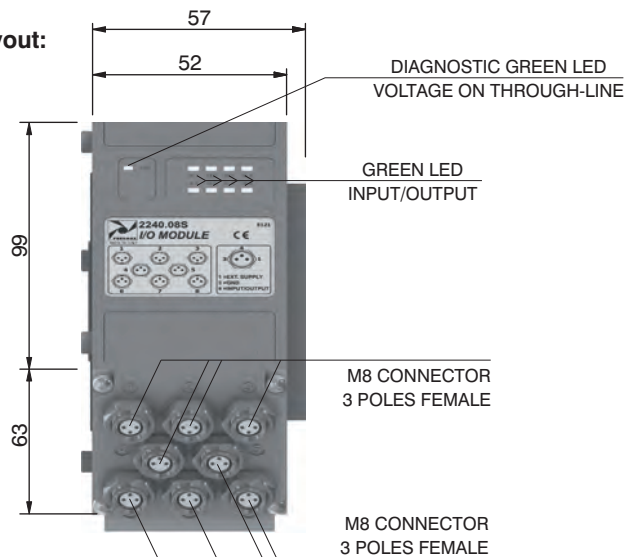
**Please note:** For an LED to function, a signal of at least +15VDC must be present on pin 4 of the connector. If this signal is lower, the LED will not light, this does not compromise the normal Input / Output function of the unit.

**Ordering code**

**2240.08S**



**Overall dimensions and I/O layout:**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT/OUTPUT
3	GND

**Input features:**

Each connection can accept either two wire (switches, magnetic switches, pressure switches, etc.) or three wire connections (photo-cells, electronic end of stroke sensors, etc.) if +24VDC is required on at Pin 1 of each connector, it is possible to provide this via the through-line pin of the multi-pole connector.

I.E :

Pin 25 of the 25 pin multi-pole connector (code 2240.02.25P or 2240.12.25P)

Pin 36-37 of the 37 pin multi-pole connector (code 2240.02.37P or 2240.12.37P)

**Output features:**

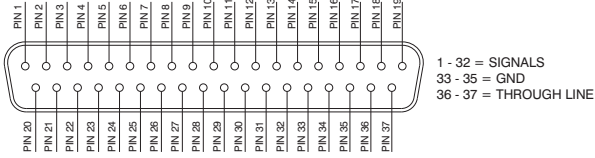


**Attention:** The output connections are not protected against short-circuit. Please pay attention when wiring (avoid Pin 4 being connected to Pin 3 or Pin 1).

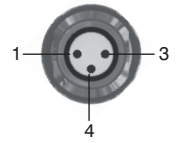
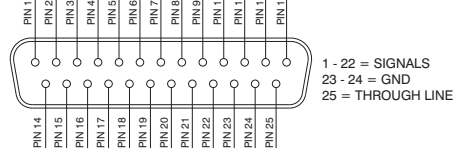
<b>General characteristics</b>	Model	2240.08S
	Case	Reinforced technopolymer
	I/O Connector	M8 connector 3 poles female (IEC 60947-5-2)
	PIN 1 voltage (connector used as Input)	by the user
	PIN 4 voltage diagnosis	Green Led
	Node consumption (Outlets excluded)	7mA per each LED with 24 VDC signal
	Outlets voltage	+23,3 VDC (serial) /by the user (multipolar)
	Input voltage	Depend by the using
	Maximum outlet current	100 mA (serial) / 400 mA (multipolar)
	Maximum Input/Output	8 per module
	Multiconnector max. Current	100 mA
	Connections to manifold	Direct connection to 25 poles connector
	Maximum n. of moduls	2
	Protection degree	IP65 when assembled
Ambient temperature	from -0° to +50° C	

CORRESPONDENCE BETWEEN MULTI-POLE SIGNAL AND CONNECTOR

SUB-D TYPE 37 POLE MALE CONNECTOR



SUB-D TYPE 25 POLE MALE CONNECTOR



PIN	DESCRIPTION
1	THROUGH LINE
4	SIGNAL
3	GND

Connection modes:

The I/O module changes its operation depending on the way the manifold is controlled. There are two possible modes:

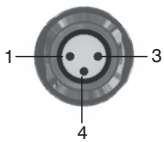
- A) Control via multi-pole connection
- B) Control via fieldbus

A) Control via multi-pole :

M8 connector used as Input:



**Attention:** Voltage applied to each connector is passed to multi-pole connector pin.



PIN	DESCRIPTION
1	THROUGH LINE
4	SIGNAL
3	GND

In order to use the I/O module, the correct right hand endplate with 25 pole female outlet connector must be used. (Code 2240.03.25P).

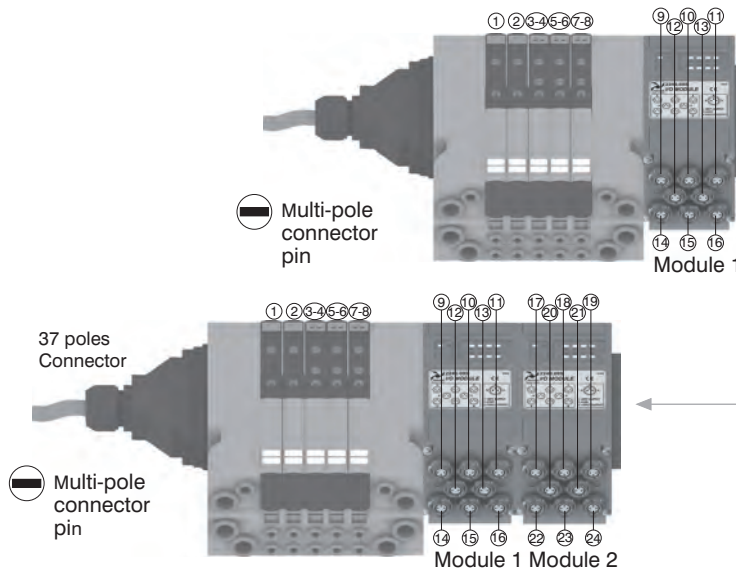


M8 connector used as Output:

Output voltage will be the same as is applied at the multi-pole connector pin. The maximum output current depends upon the power unit used, but we recommend no more than 250mA.



**Attention:** Since every cable has a degree of resistance, there will always be a voltage drop depending on the cable's length, sectional area and the current.

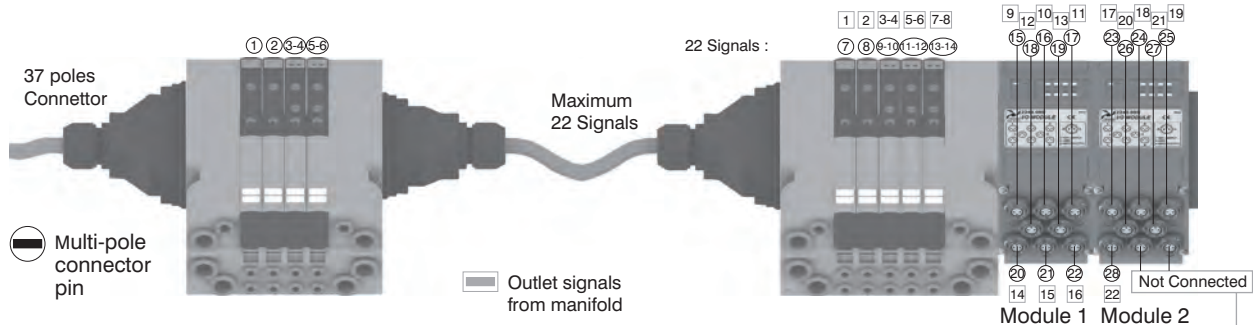


**Attention:** Only one more I/O module can be added.

**Attention:** No more additions are possible

**Attention :** Optyma 32-S solenoid valve manifolds permit up to 22 electrical signals that are not used by manifolds to be made available: these signals can be managed by another manifold and / or by I/O modules.

The I/O module will manage these unused signals. Connections that are not managing useful signals will remain unconnected.

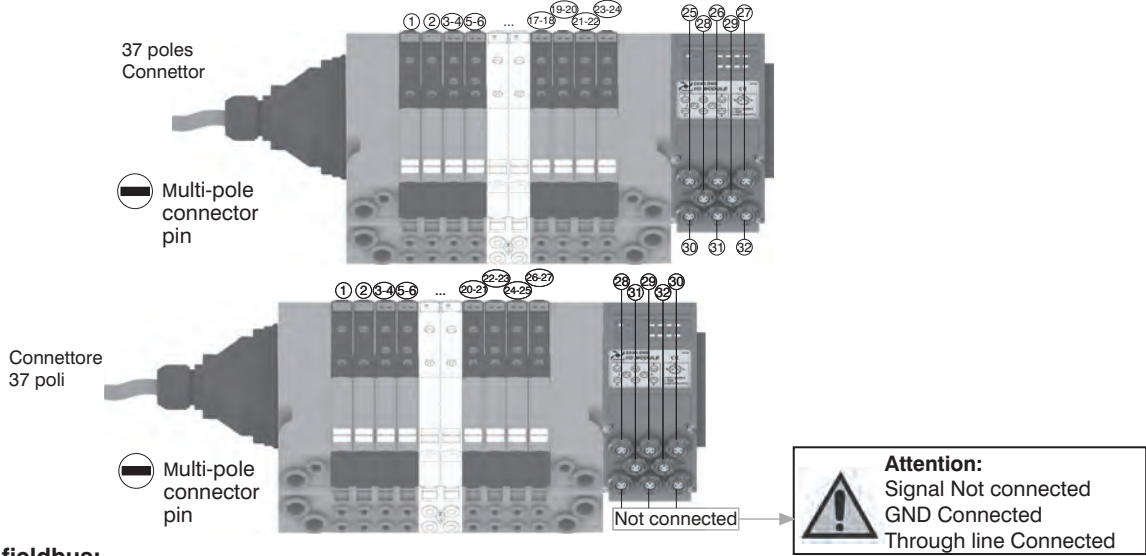


**Attention:** Signal Not connected  
GND Connected  
Through line Connected

**Please note:** this example considers a 37 pin multi-pole connector. The same configuration managed by a 25 pin multi-pole connector will stop at number 22 of multi-pole connector and at number 17 of the manifold. 22 16

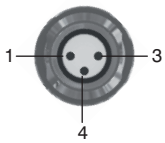


**Please note:** Optyima 32-S solenoid valve manifolds manage up to 32 signals. If the manifold uses more than 24 signals the I/O module will manage only the remainder. Connections that are not managing useful signals will remain unconnected.

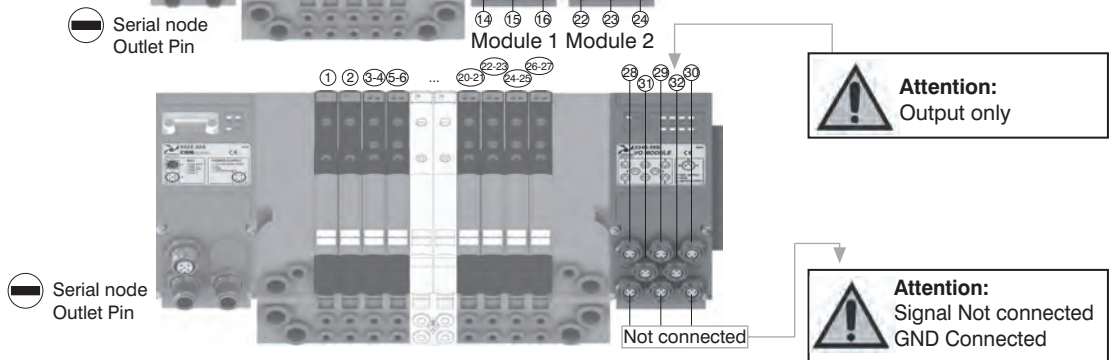
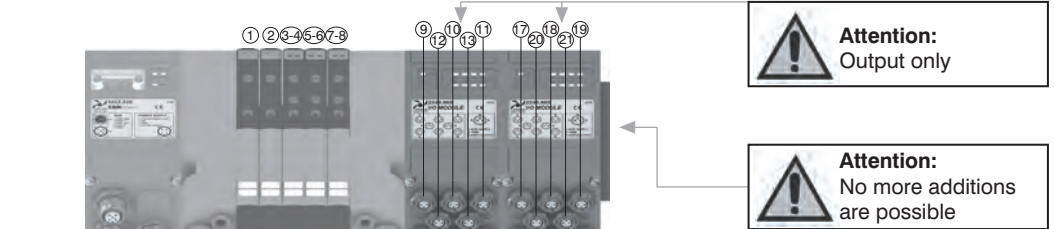
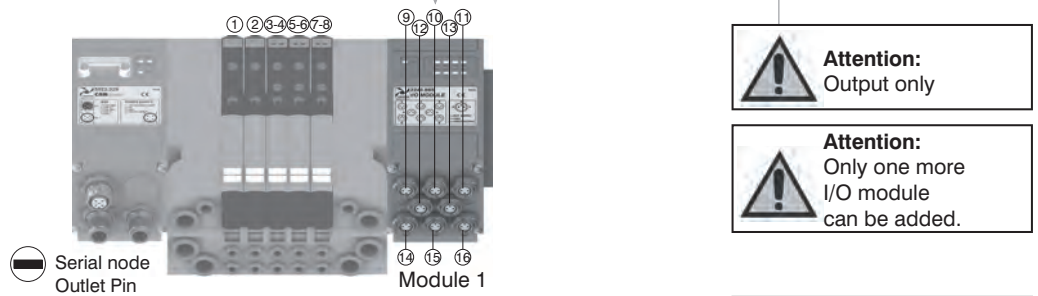


**B) Control via fieldbus:**

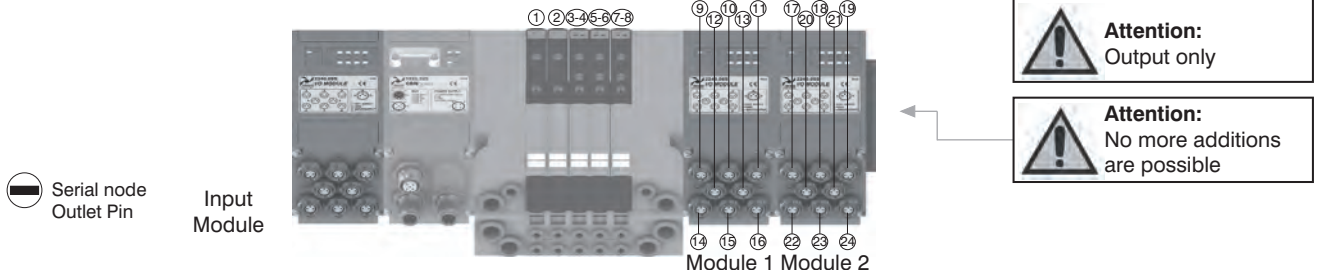
With this kind of control the I/O module can only be used as an output. Pin 1 of each connector is not connected. The output voltage will be 0.7V lower than that applied to Pin 4 of the connector. The maximum output current for each output is 100mA. The correspondence between control byte and each single output depends on how many electrical signals are used by the manifold and by the relative position of the I/O module.



PIN	DESCRIPTION
1	NOT CONNECTED
4	SIGNAL
3	GND



**Please note:** I/O modules don't allow to connect any additional valves manifold after them.



## Electrical connection

The electrical connection is made using a 37 pin connector and can manage up to 32 electrical signals. Alternatively a 25 pin connector can be used which is suitable for up to 22 electrical signals. The distributions of the electrical signals between sub-bases achieved thanks to a dedicated electrical connector positioned in each sub-base which diverts the signals needed to operate the solenoid pilots of the valve mounted on the sub-base and passing unused signals forward to the next base.

The Optyma-S sub-bases are designed to carry two valves and are available in the following configurations:

Sub-base configurations	Signals used for the single position	Total number of used signal
Sub-base for 2 bistable valves	2 signals used for the first position	4
	2 signals used for the second position	
Sub-base for 2 monostable valves	1 signal used for the first position	2
	1 signal used for the second position	

### Sub-base for 2 bistable valves

On the sub base for 2 bistable valves the first electrical signal is used to actuate the solenoid pilot on side 14 of the first position, the second signal is used to actuate the solenoid pilot on side 12 of the first position. Each sub base uses 4 electric signals. The same layout applies to the following position therefore the third signal is used to actuate the solenoid pilot on side 14 of the second position and the fourth signal is used to actuate the solenoid pilot on side 12 of the second position.

The remaining signals are transferred downstream.

On a bistable sub base it is possible to mount both bistable or monostable valves (in the second case 1 electrical signal for each valve is wasted). This solutions enables the user to change the manifold layout without the need to re-configure the output correspondence on the PLC. The use of bistable sub-bases reduces the maximum number of valves that can be mounted on the manifold: If the 37 pole connector is used the maximum number of valves is 16 If the 25 pole connector is used the maximum number of valves is 10.

### Sub-base for 2 monostable valves

On the sub base for 2 monostable valves the first electrical signal is used to actuate the solenoid pilot on side 14 of the first position, the second signal is used to actuate the solenoid pilot on side 12 of the second position. Each sub base uses 2 electric signals.

The remaining signals are transferred downstream. On a monostable sub base it is possible to mount only monostable valves (shoud a bistable valve be mounted on a monostable sub base it will not be possible to actuate the solenoid pilot on side 12). This solutions enables the user to maximise the manifold lay out using all the electrical signals available.

If the 37 pole connector is used the maximum number of valves is 32

If the 25 pole connector is used the maximum number of valves is 22



**Note:**

Monostable valves, which are fitted with only one solenoid pilot can be mounted on both monostable or bistable sub bases.

Bistable valves ,5/3; 2x3/2;2x2/2, which are fitted with 2 solenoid pilots and therefore always use two electrical signals must always be mounted on bistable subbases.

### Additional exhaust and air supply modules:

The Additional exhaust and air supply module is fitted with a dedicated electrical connector which does not use any electric signal but simply carries forward all signals which have not been used by the valves mounted before it.

This enables its use in any position of the manifold.

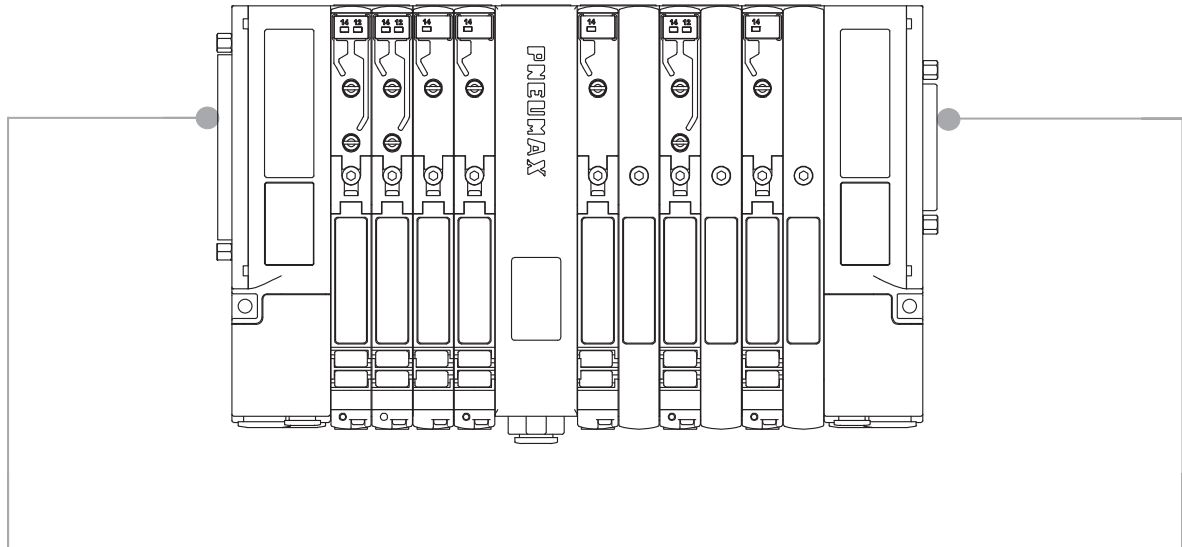
**Unused electrical signals**

The electrical signals which have not been used in the manifold can be made available by using the end plate fitted with the 25 pole connector.

The number of electric signals available depends on the type of connector mounted on the inlet plate and on the number of signals used in the manifold:

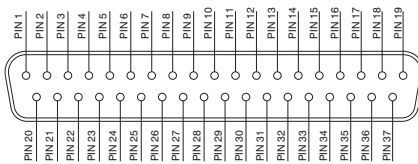
- 37 pole Inlet connector : N. of outputs= 32 – used signals (max 22)
- 25 pole Inlet connector : N. of outputs= 22 – used signals

Here are some examples of possible configurations and the corresponding pin layout both on the inlet and end plate :



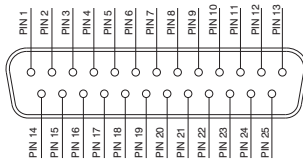
**INLET ELECTRIC CONNECTIONS**

**SUB-D 37 POLE MALE CONNECTOR**



- 1 - 32 = Solenoid valves signals
- 33 - 35 = GND
- 36 - 37 = Through line

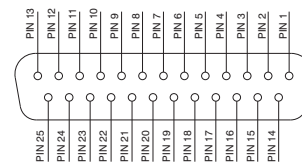
**SUB-D 25 POLE MALE CONNECTOR**



- 1 - 22 = Solenoid valves signals
- 23 - 24 = GND
- 25 = Through line

**OUTLET ELECTRIC CONNECTIONS (IF PRESENT)**

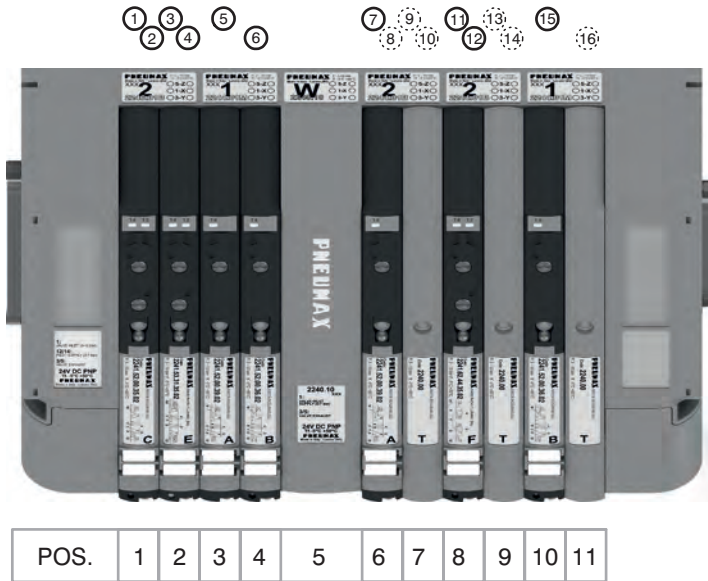
**SUB-D 25 POLE FEMALE CONNECTOR**



- 1 - 22 = Solenoid valves signals
- 23 - 24 = GND
- 25 = Through line

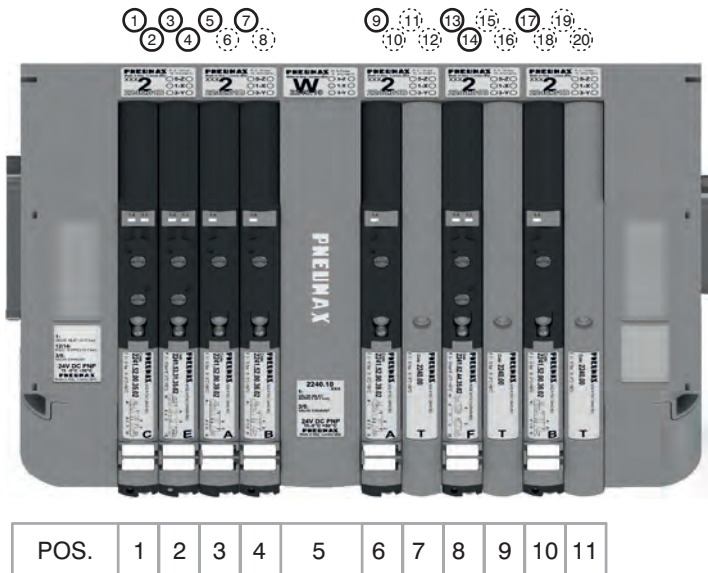


**37 PIN Connector correspondence for valves assembled on mixed bases**



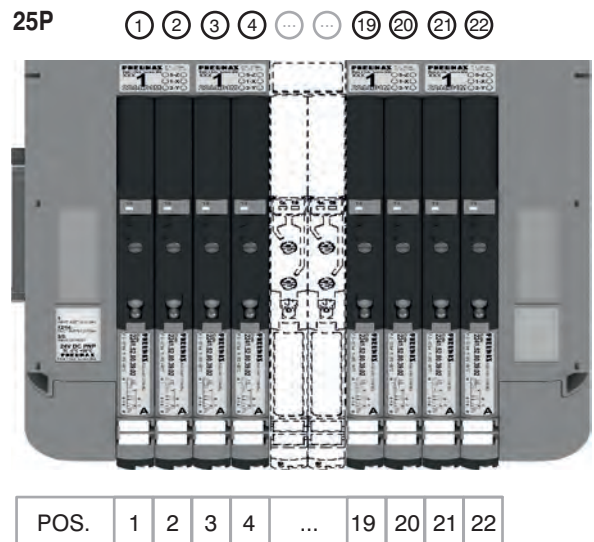
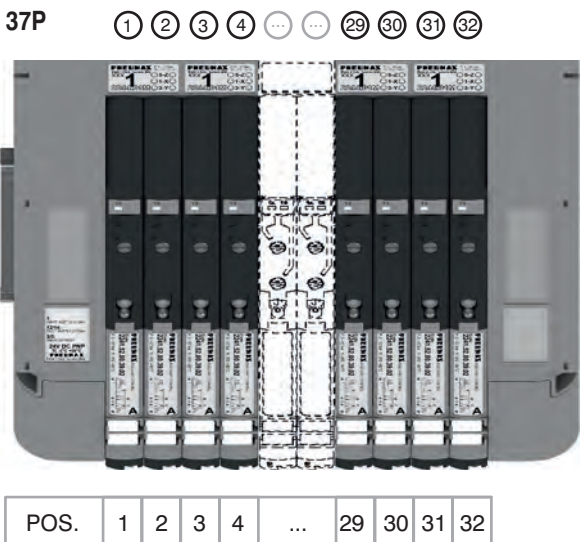
- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 12 EV POS.2
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = PILOT 14 EV POS.4
- PIN 7 = PILOT 14 EV POS.6
- PIN 8 = NOT CONNECTED
- PIN 9 = NOT CONNECTED
- PIN 10 = NOT CONNECTED
- PIN 11 = PILOT 14 EV POS.8
- PIN 12 = PILOT 12 EV POS.8
- PIN 13 = NOT CONNECTED
- PIN 14 = NOT CONNECTED
- PIN 15 = PILOT 14 EV POS.10
- PIN 16 = NOT CONNECTED

**37 PIN Connector correspondence for manifold mounted on bases for bistable valves**



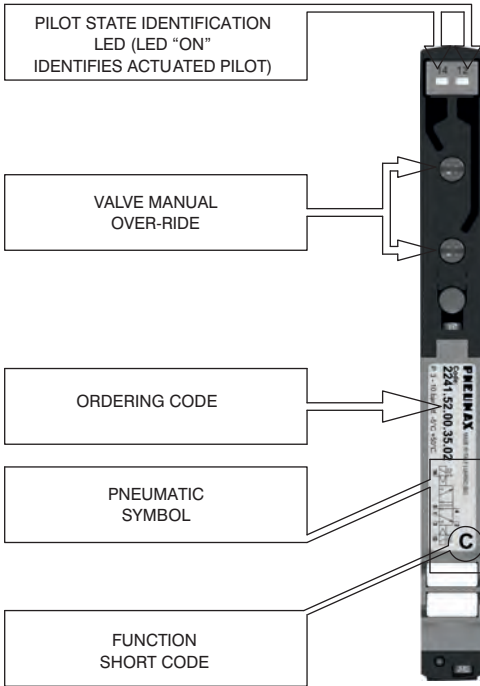
- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 12 EV POS.2
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = NOT CONNECTED
- PIN 7 = PILOT 14 EV POS.4
- PIN 8 = NOT CONNECTED
- PIN 9 = PILOT 14 EV POS.6
- PIN 10 = NOT CONNECTED
- PIN 11 = NOT CONNECTED
- PIN 12 = NOT CONNECTED
- PIN 13 = PILOT 14 EV POS.8
- PIN 14 = PILOT 12 EV POS.8
- PIN 15 = NOT CONNECTED
- PIN 16 = NOT CONNECTED
- PIN 17 = PILOT 14 EV POS.10
- PIN 18 = NOT CONNECTED
- PIN 19 = NOT CONNECTED
- PIN 20 = NOT CONNECTED

**37 PIN Connector correspondence for manifold for 32 position manifold with monostable valves on double bases**

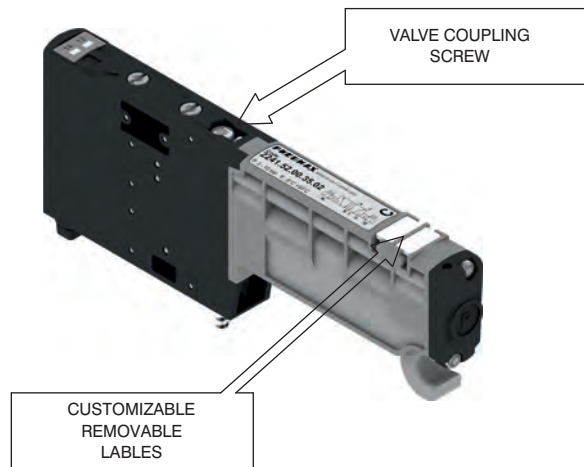
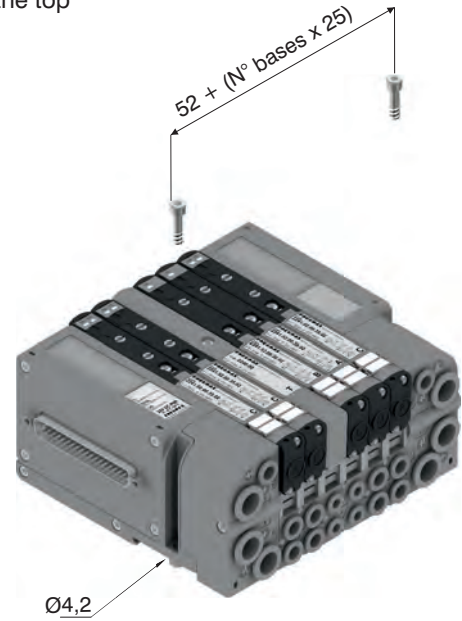




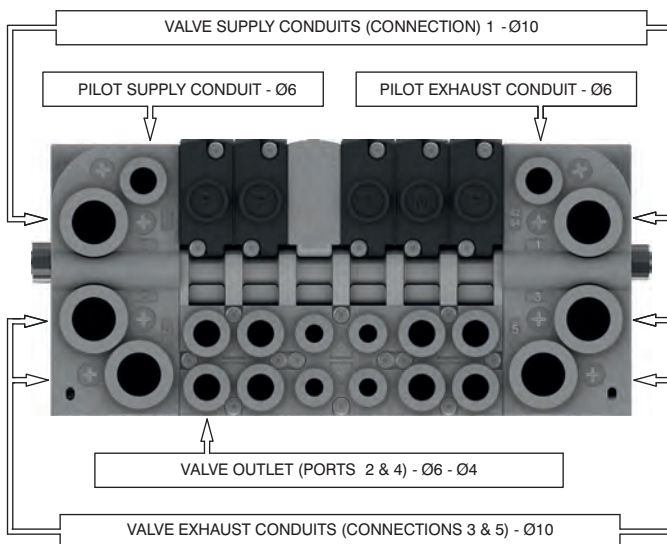
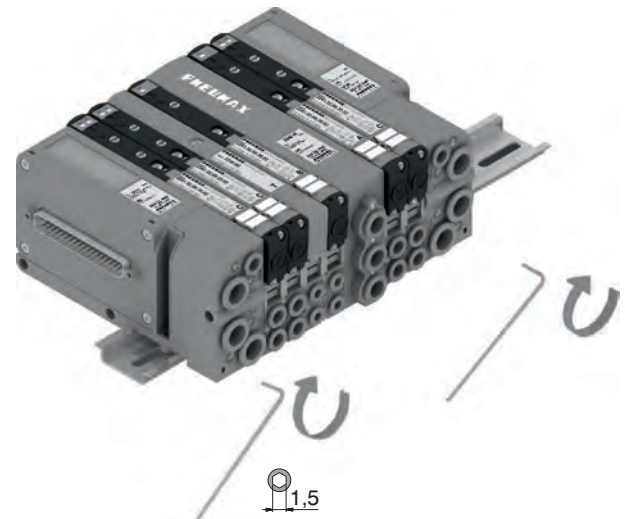
2



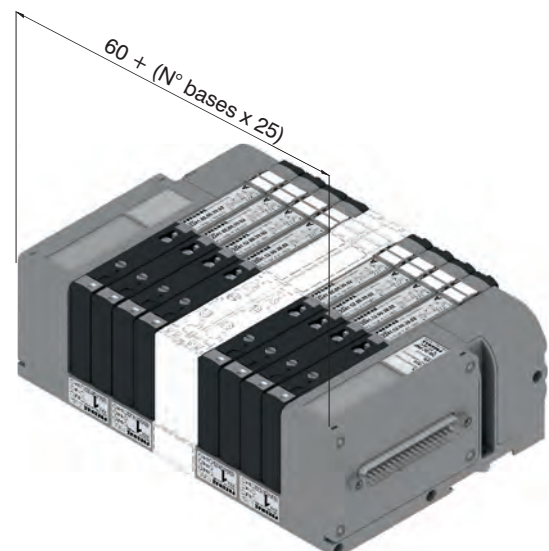
From the top



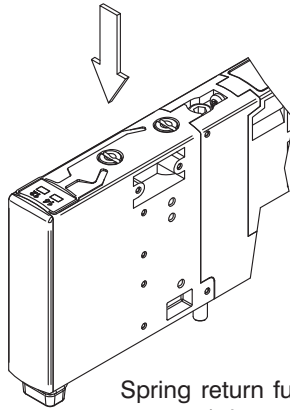
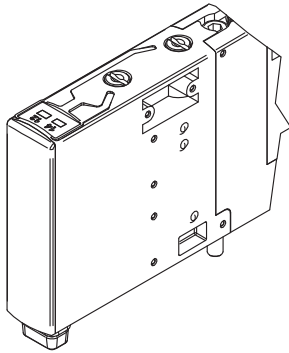
DIN rail fixing



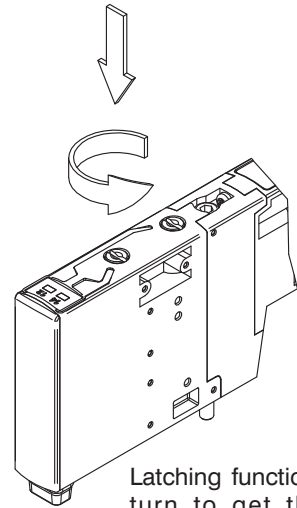
Maximum possible size  
According to valves used



Manual override actuation



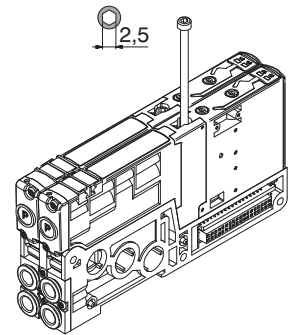
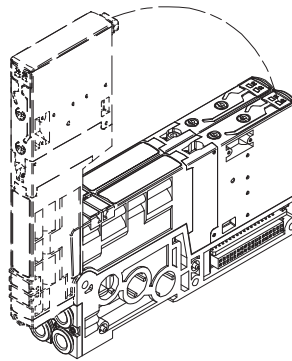
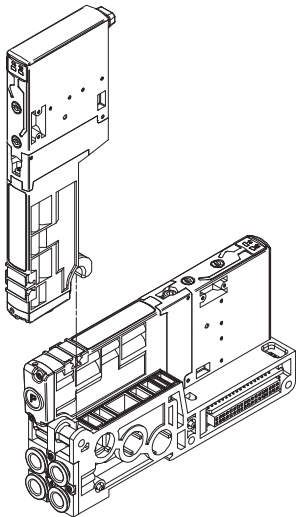
Spring return function: push to actuate (when released it moves back to the original position).



Latching function: push and turn to get the latching function

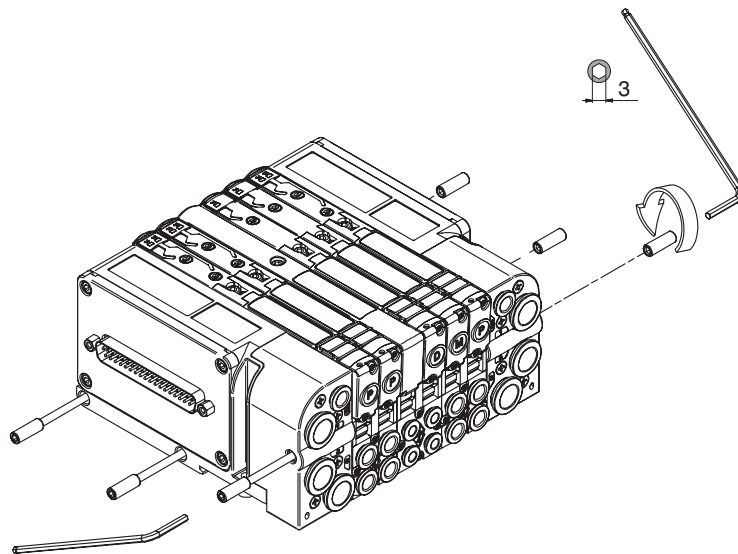
NOTE : It is strongly suggested to replace the original position after using

Valve Installation



Torque moment (Nm) : 0,8

Manifold assembly



Min. torque moment : 2 Nm  
Max. torque moment: 2,5 Nm

Manifold Layout configuration

**MULTIPOINT CONNECTION**

MP = PNP 24 V DC  
 MN = NPN 24 V DC  
 MA = 24 V AC

**LEFT ENDPLATE**

A2 = 25 poles - Self feeding  
 A3 = 37 poles - Self feeding  
 E2 = 25 poles - External feeding  
 E3 = 37 poles - External feeding

**RIGHT ENDPLATE**

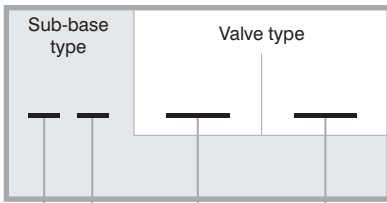
U0 = Closed  
 U2 = 25 Poles  
 U3 = 37 Poles

**I/O MODULE**

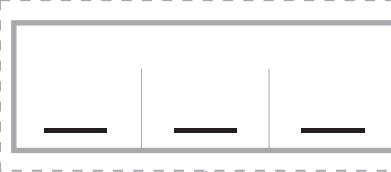
M8  
 (Requires 25 poles right endplate)



**MODUL CONFIGURATION**



**ACCESSORIES CONFIGURATION**



**SUB-BASE TYPE**

- 3 = 2 Position Monostable sub base ø4 (2 electric signal used)
- 4 = 2 Position Bistable sub base ø4 (4 electric signals used)
- 5 = 2 Position Monostable sub base ø6 (2 electric signal used)
- 6 = 2 Position Bistable sub base ø6 (4 electric signals used)
- 7 = 2 Position Monostable sub base ø8 (2 electric signal used)
- 8 = 2 Position Bistable sub base ø8 (4 electric signals used)

**VALVES TYPE**

- A = 5/2 Solenoid - Spring
- B = 5/2 Solenoid - Differential
- C = 5/2 Solenoid - Solenoid
- E = 5/3 CC Solenoid - Solenoid
- F = 2x3/2 NC-NC (= 5/3 OC) Solenoid - Solenoid
- G = 2x3/2 NO-NO (= 5/3 PC) Solenoid - Solenoid
- H = 2x3/2 NC-NO Solenoid - Solenoid
- I = 2x3/2 NO-NC Solenoid - Solenoid
- T = Free valve space plug

**ACCESSORIES**

- W00 = Intermediate supply & exhaust module
- 0X0 = Diaphragm plug on pipe 1
- 00Y = Diaphragm plug on pipe E 3
- Z00 = Diaphragm plug on pipe 5
- 0XY = Diaphragm plug on pipe 1 & 3
- ZX0 = Diaphragm plug on pipe 5 & 1
- Z0Y = Diaphragm plug on pipe 5 & 3
- ZXY = Diaphragm plug on pipe 5,1 & 3

**SUB-BASE VARIANTS**

- EMPTY = No variants (SUB-BASE STANDARD)
- 6 = Diaphragm Plug on pipe 1, 3 and 5
- 7 = Diaphragm Plug on pipe 1
- 8 = Diaphragm Plug on pipe 3 and 5

**NOTE:**

While configuring the manifold always be careful that the maximum number of electrical signals available is 32  
 The use of monostable valve mounted on a bistable base ( 2 electrical signals occupied for each position) causes the loss of one electric signal.  
 In this case the monostable valve can be replaced by a bistable valve without reconfiguring the PLC.  
 The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base.  
 Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

Series 2200 OPTYMA-S solenoid valve manifolds managed by multipoint connection are "well tried components"

	<b>Well-tryed component</b>	<ul style="list-style-type: none"> <li>- The product is a well-tryed product for a safety-related application according to ISO 13849-1.</li> <li>- The relevant basic and well-tryed safety principles according ISO 13849-2 for this product are fulfilled.</li> <li>- The suitability of the product for a precise application must be verified and confirmed by the user.</li> </ul>
<b>B<sub>10d</sub></b>	50.000.000	

**General:**

CANopen® module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.  
 CANopen® module recognizes automatically the presence of the Input modules on power on. Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus CANopen® is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to CiA Draft Recommendation 303-1 (V. 1.3 : 30 December 2004).  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

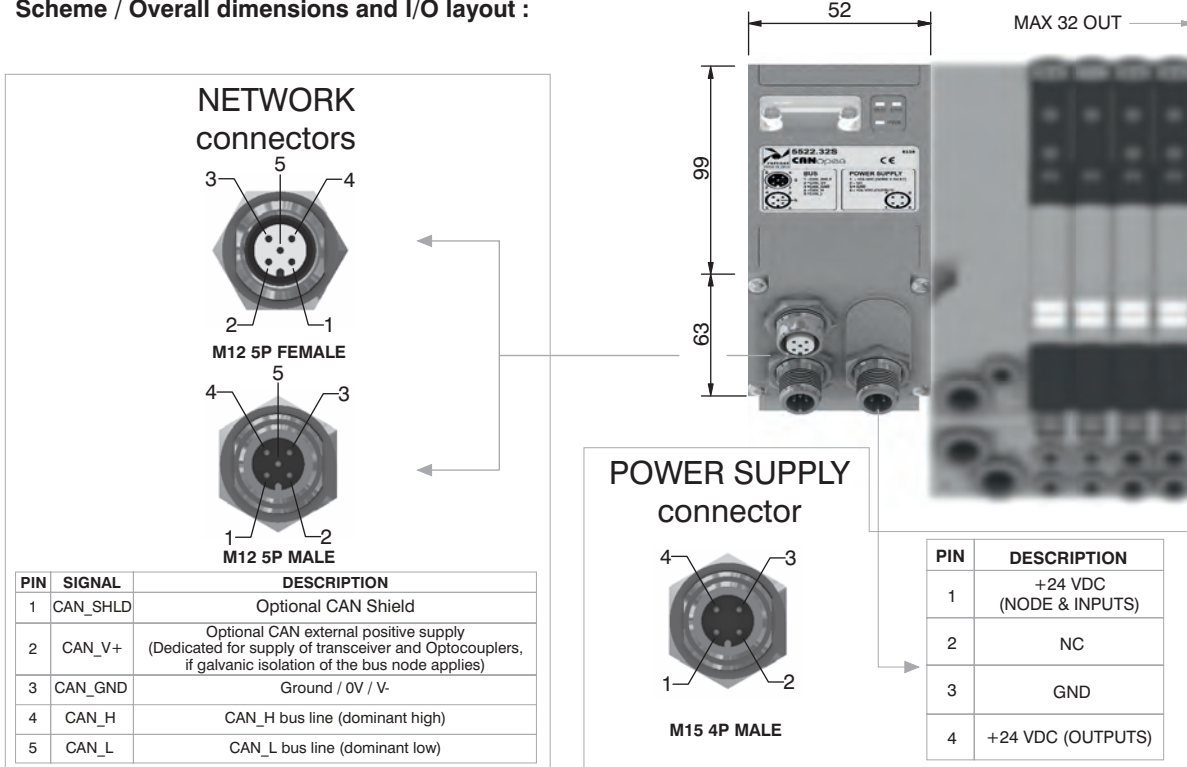
**Ordering code**

**5522.32S**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5522.32S
Specifications	CiA Draft Standard Proposal 301 V 4.10 (15 August 2006)
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection: M12 4P male connector (IEC 60947-5-2)
	Power supply voltage: +24 VDC +/- 10%
	Node consumption (without inputs): 30 mA
	Power supply diagnosis: Green LED PWR
<b>Outputs</b>	PNP equivalent outputs: +24 VDC +/- 10%
	Maximum current for each output: 100 mA
	Maximum output number: 32
	Max output simultaneously actuated: 32
<b>Network</b>	Network connectors: 2 M12 5P connectors male-female Type A (IEC 60947-5-2)
	Baud rate: 10 - 20 - 50 - 125 - 250 - 500 - 800 - 1000 Kbit/s
	Addresses, possible numbers: From 1 to 63
	Max nodes in net: 64 (slave + master)
	Bus maximum recommended length: 100 m at 500 Kbit/s
	Bus diagnosis: Green LED + Red LED
	Configuration file: Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade: IP65 when assembled
	Temperature range: From 0° to +50° C



**General:**

DeviceNet module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.

DeviceNet module recognizes automatically the presence of the Input modules on power on.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus DeviceNet is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to DeviceNet Specifications Volume I, release 2.0.

Transmission speed can be set by 3 dip-switches.

The node address can be set by 6 dip-switches using BCD numeration.

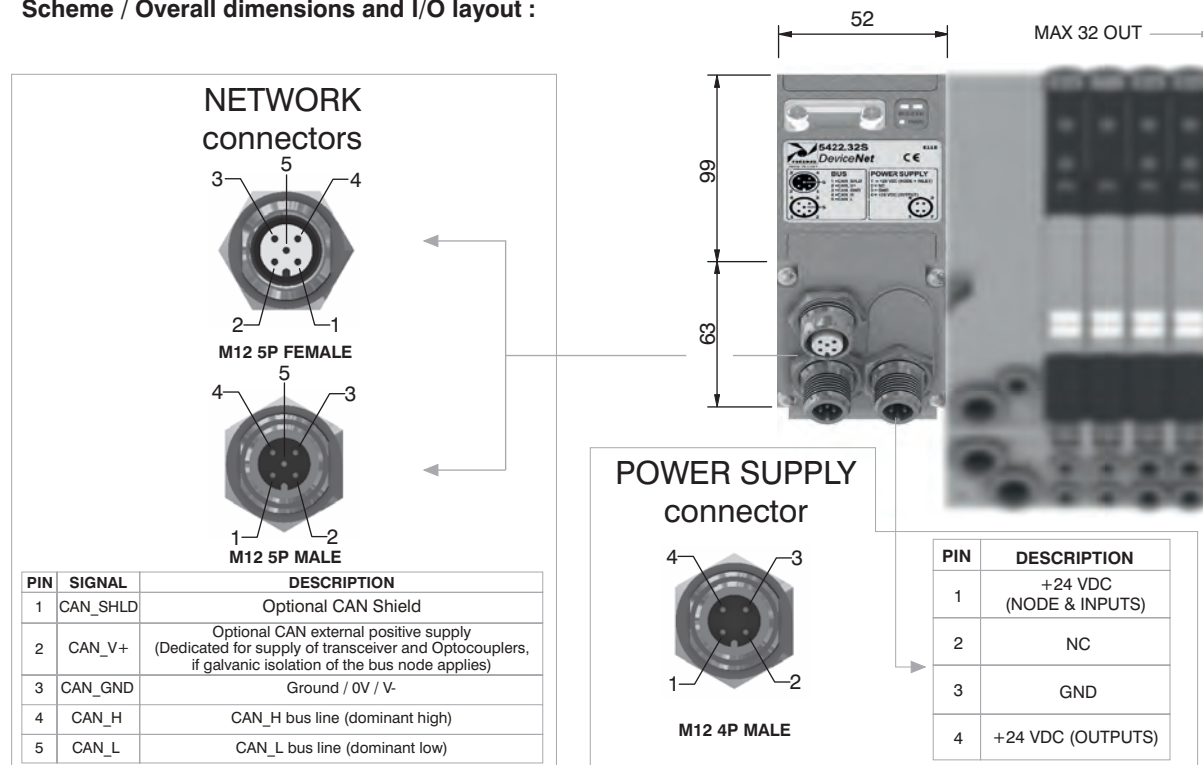
The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5422.32S**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5422.32S
Specifications	DeviceNet Specifications Volume I, release 2.0.
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 30 mA
	Power supply diagnosis Green LED PWR
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for each output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 5P connectors male-female Type A (IEC 60947-5-2)
	Baud rate 125 - 250 - 500 Kbit/s
	Addresses, possible numbers From 1 to 63
	Max nodes in net 64 (slave + master)
	Bus maximum recommended length 100 m at 500 Kbit/s
	Bus diagnosis Green LED + Red LED
	Configuration file Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C

**General:**

PROFIBUS DP module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.  
 PROFIBUS DP module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus PROFIBUS DP is possible via 2 M12 type B 5P male - female circular connectors; these two are connected in parallel and according to PROFIBUS Interconnection Technology (Version 1.1 : August 2001).  
 The node address can be set using BCD numeration: 4 dip-switches for the units and 4 dip-switches for the tens.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

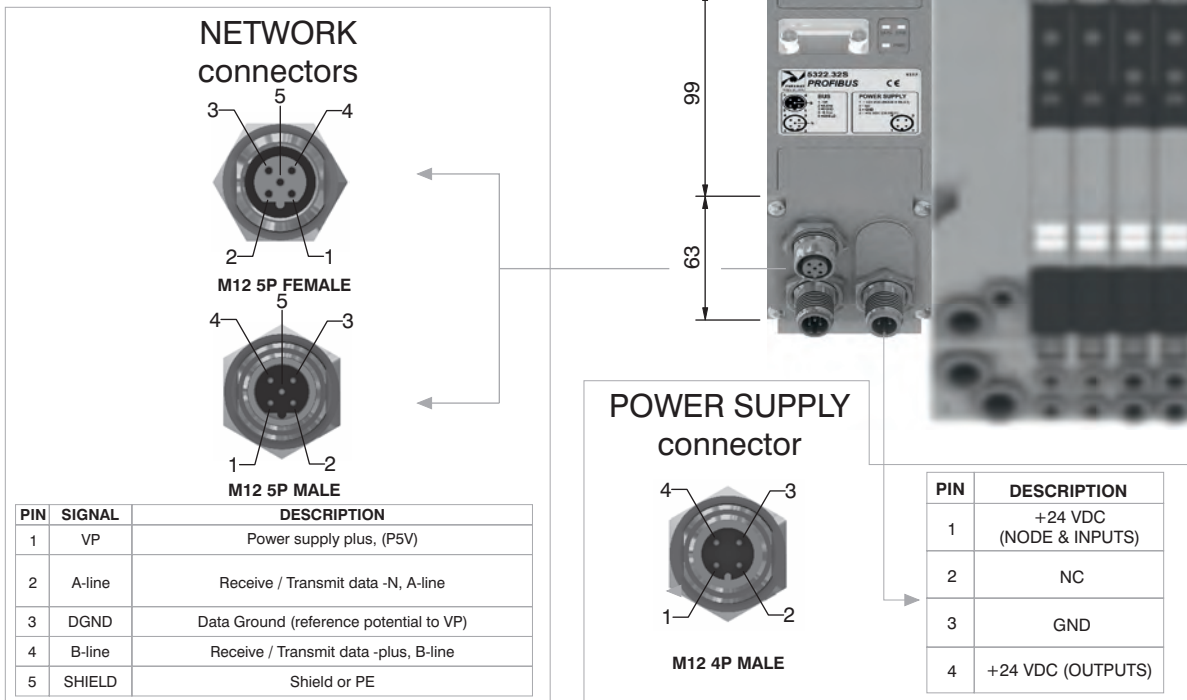
**Ordering code**

**5322.32S**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5322.32S
	Specifications	PROFIBUS DP
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	50 mA
	Power supply diagnosis	Green LED PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P male-female connectors Type B
	Baud rate	9,6 - 19,2 - 93,75 - 187,5 - 500 - 1500 - 3000 - 6000 - 12000 Kbit/s
	Addresses, possible numbers	From 1 to 99
	Max nodes in net	100 (slave + master)
	Bus maximum recommended length	100 m at 12 Mbit/s - 1200 m at 9,6 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

EtherCAT® module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.

The EtherCAT® module, regardless the number of Input module connected, reports to have connected 4 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus EtherCAT® is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

The node address is assigned during configuration.

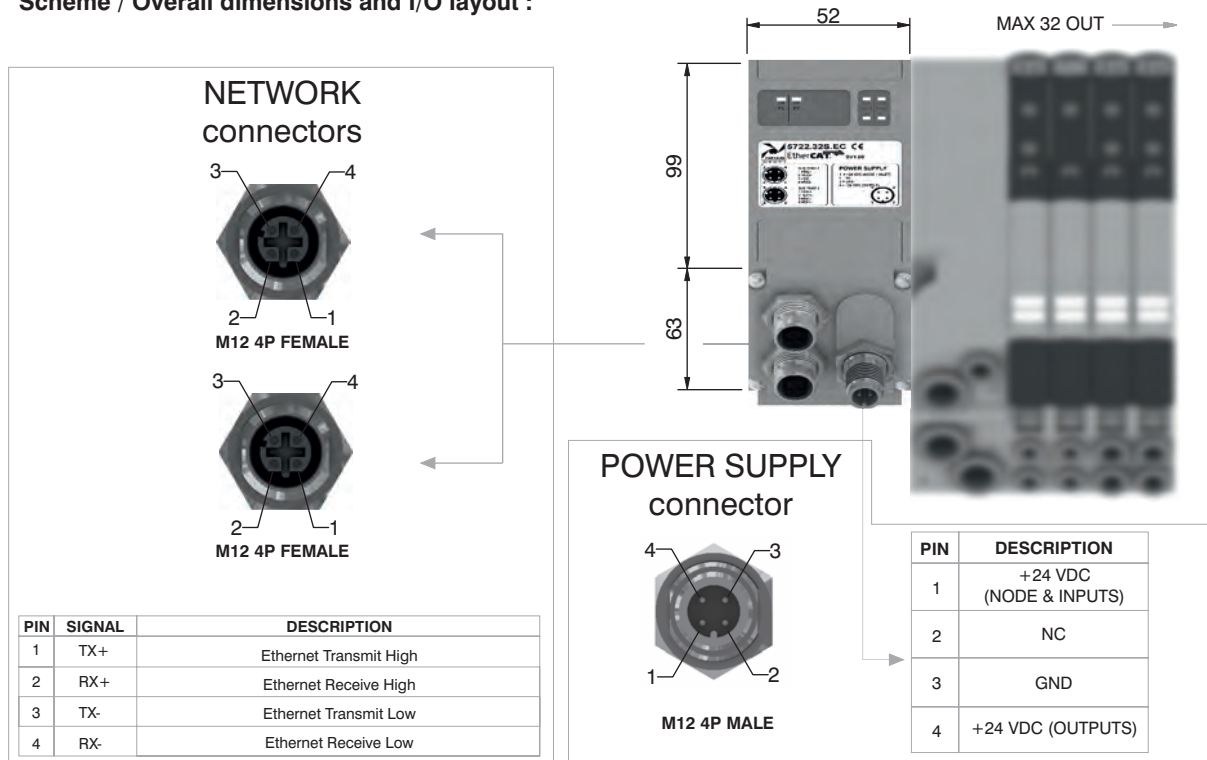
**Note: 5700 series has a different configuration file from series 5600.**

**Ordering code**

**5722.32S.EC**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5722.32S.EC	
Specifications	EtherCAT® Specifications ETG.1000 series	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	From 1 to 65535
	Max nodes in net	65536 (Master + Slave)
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

PROFINET IO RT/IRT module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.  
The PROFINET IO RT/IRT module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
Node power supply is made by a M12 4P male circular connector.  
The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
Connection to Bus PROFINET IO RT/IRT is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
The node address is assigned during configuration.

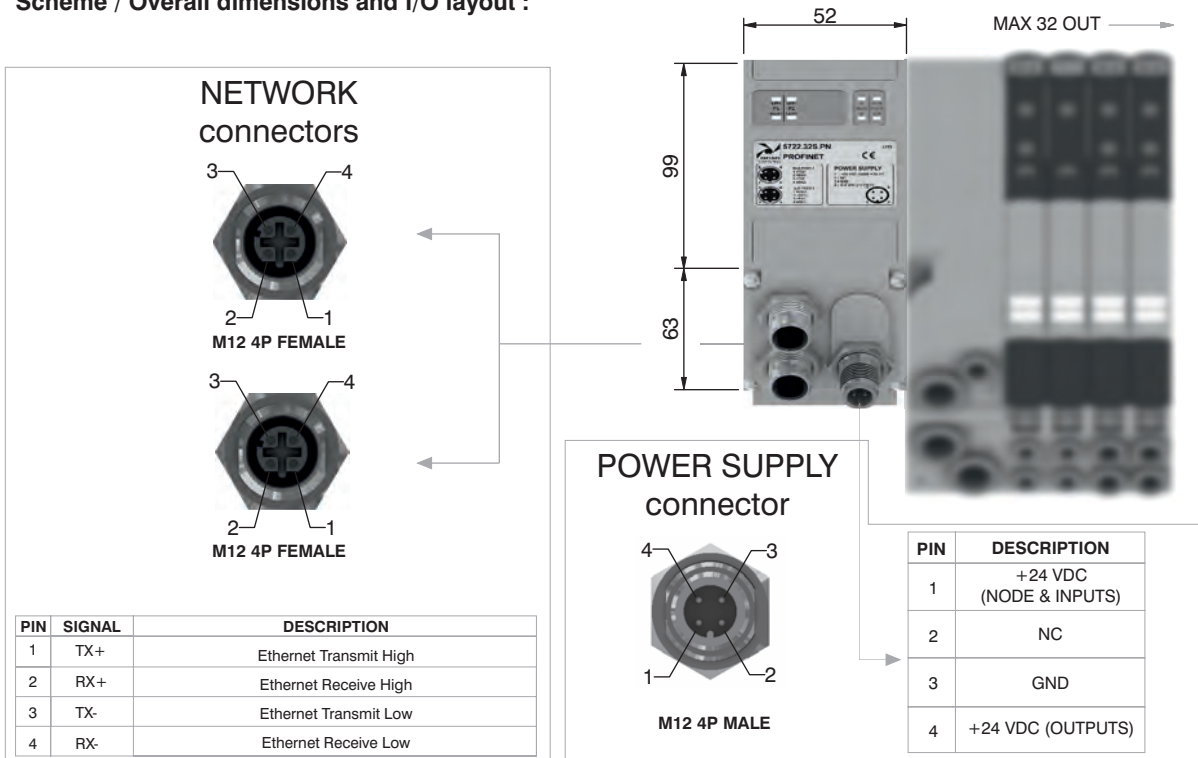
**Ordering code**

**5722.32S.PN**



2

**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	TX+	Ethernet Transmit High
2	RX+	Ethernet Receive High
3	TX-	Ethernet Transmit Low
4	RX-	Ethernet Receive Low

**Technical characteristics**

	Model	5722.32S.PN
	Specifications	PROFINET IO RT/IRT
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C



**General:**

EtherNet/IP module is directly integrated on Optyima-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyima-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.

The EtherNet/IP module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus EtherNet/IP is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

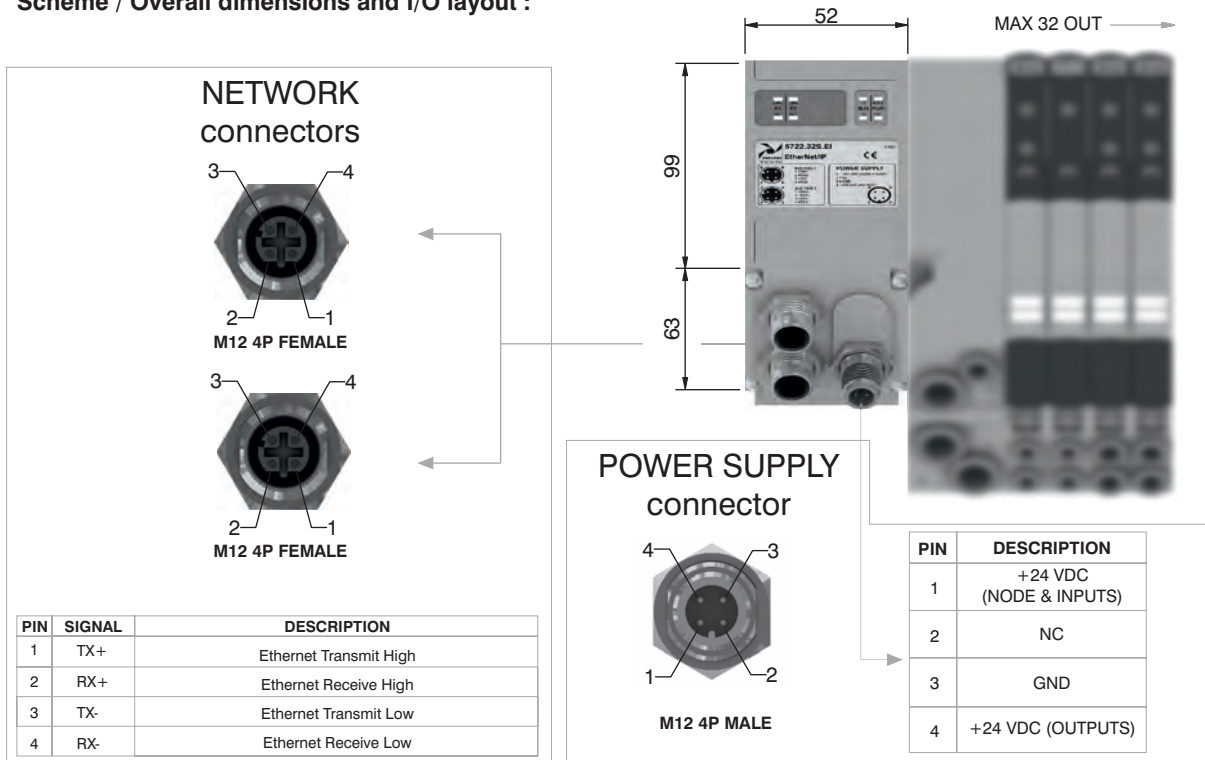
The node address is assigned during configuration.

**Ordering code**

**5722.32S.EI**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5722.32S.EI	
Specifications	The EtherNet/IP Specification	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
Temperature range	From 0° to +50° C	

**General:**

Powerlink module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.  
 The Powerlink module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus Powerlink is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
 The node address is assigned during configuration.

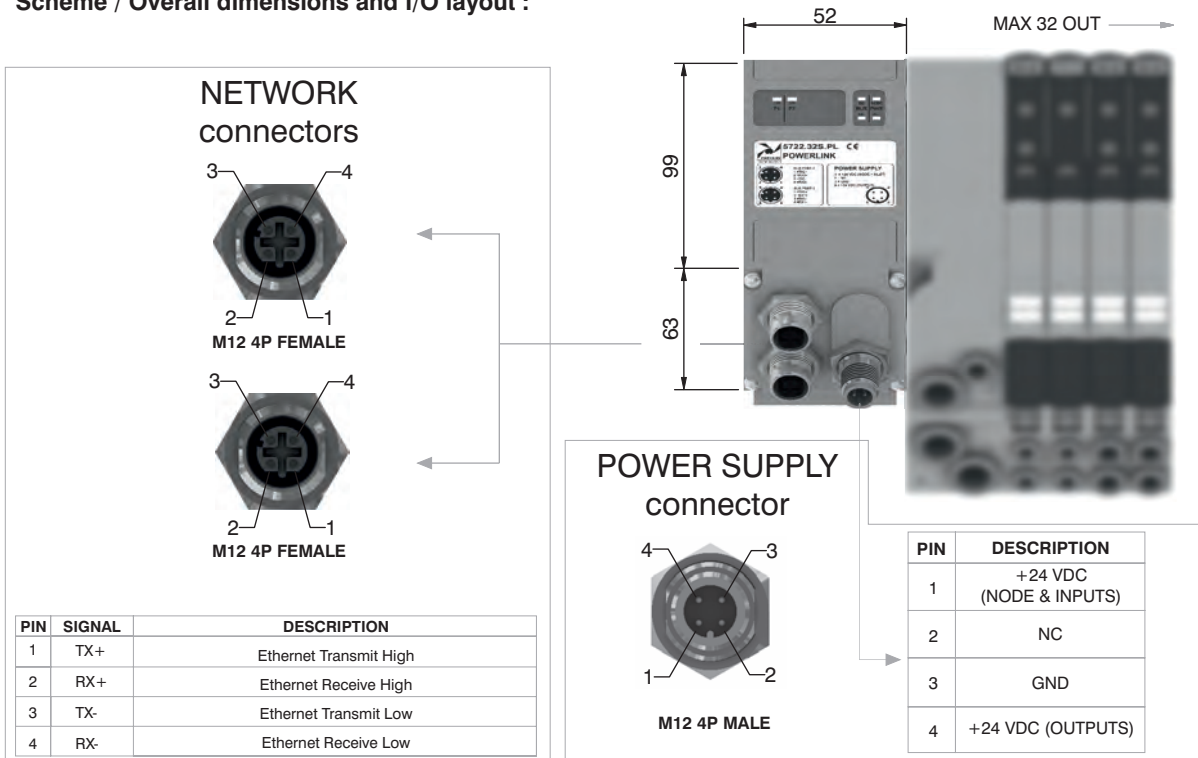
**Ordering code**

**5722.32S.PL**



2

**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	TX+	Ethernet Transmit High
2	RX+	Ethernet Receive High
3	TX-	Ethernet Transmit Low
4	RX-	Ethernet Receive Low

**Technical characteristics**

	Model	5722.32S.PL
	Specifications	Ethernet POWERLINK Communication Profile Specifications
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	239
	Max nodes in net	240
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

Modbus/TCP module is directly integrated on Optyma-S solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-S solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5222.08S.

The Modbus/TCP module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus Modbus/TCP is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

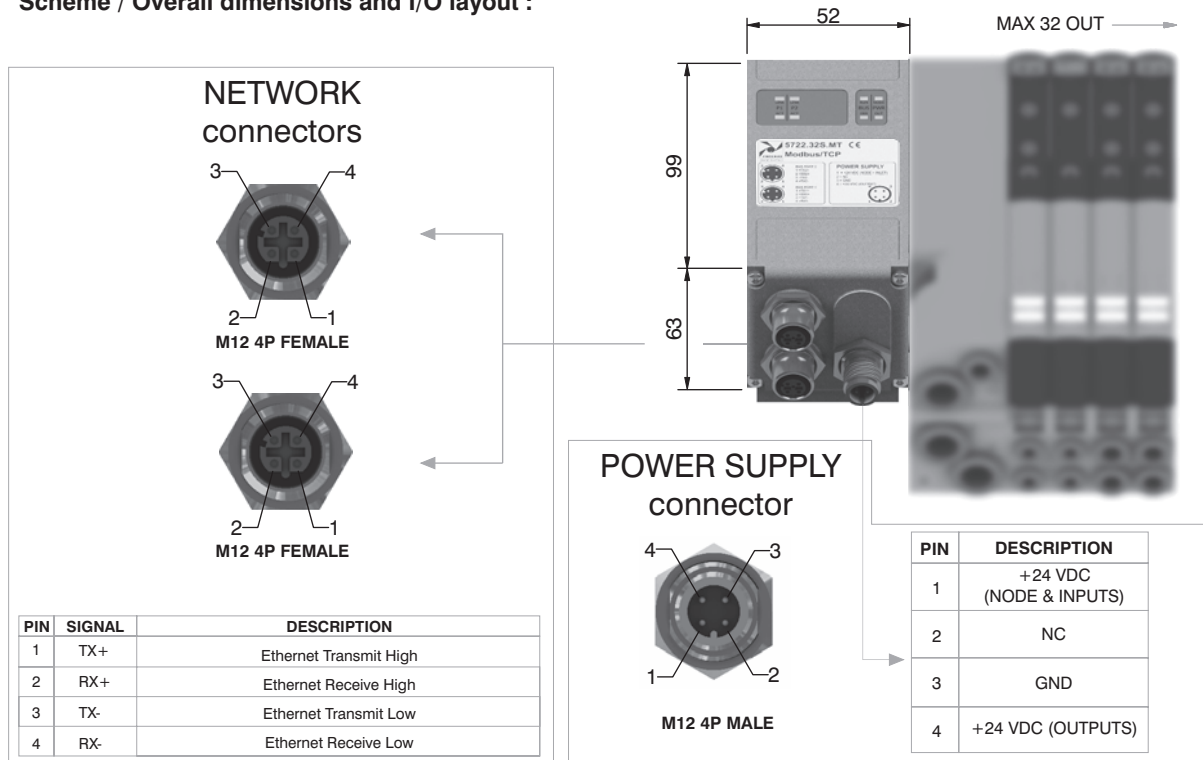
The node address is assigned during configuration.

**Ordering code**

**5722.32S.MT**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5722.32S.MT
Specifications	MODBUS Application Protocol Specification V1.1a, June 4, 2004
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 400 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for each output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate 100 Mbit/s
	Addresses, possible numbers 248
	Max nodes in net 248
	Maximum distance between 2 nodes 100 m
	Bus diagnosis 1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file Modbus/TCP nodes don't require configuration file
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C



**General:**

Modules have 8 connectors M8 3P female.

The Inputs are PNP equivalent 24 VDC ± 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 300 mA.

Each module includes a 300 mA self-mending fuse. If a short circuit or a overcharge (overall current >300mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

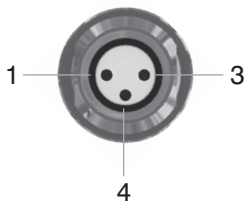
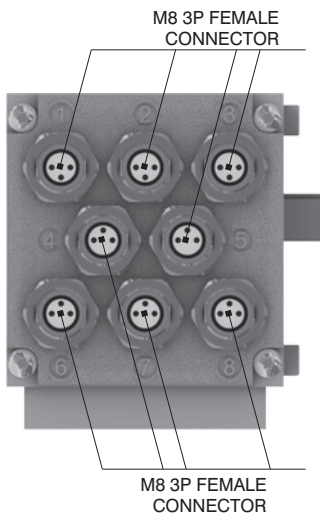
The maximum number of Input modules supported is 4.

**Ordering code**

5222.08S

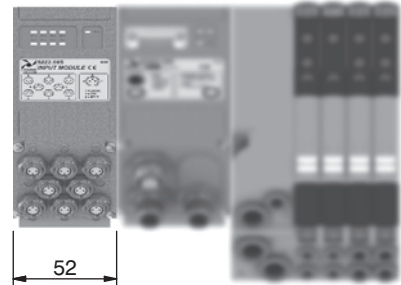


**Scheme / Overall dimensions and I/O layout :**

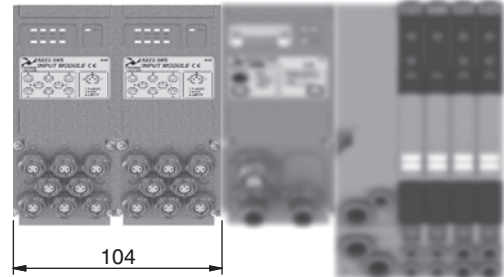


PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND

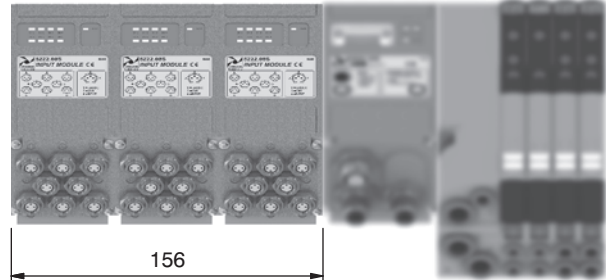
Module 1



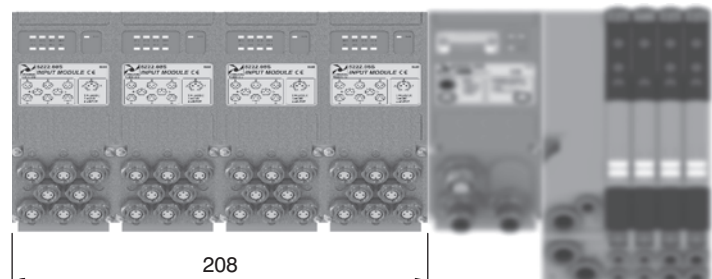
Module 2 Module 1



Module 3 Module 2 Module 1



Module 4 Module 3 Module 2 Module 1



**M12A 4P female Socket**

Ordering code	Upper view Slave connector										
<b>5312A.F04.00</b>											
Power supply straight connector.											
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC Node</td> </tr> <tr> <td>2</td> <td></td> </tr> <tr> <td>3</td> <td>0 V</td> </tr> <tr> <td>4</td> <td>+24 VDC Output</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC Node	2		3	0 V	4	+24 VDC Output
PIN	DESCRIPTION										
1	+24 VDC Node										
2											
3	0 V										
4	+24 VDC Output										

**M8 3P male Plug**

Ordering code	Upper view Slave connector								
<b>5308A.M03.00</b>									
Input straight connector.									
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC</td> </tr> <tr> <td>4</td> <td>INPUT</td> </tr> <tr> <td>3</td> <td>GND</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC	4	INPUT	3	GND
PIN	DESCRIPTION								
1	+24 VDC								
4	INPUT								
3	GND								

**M12A 5P female Socket**

Ordering code	Upper view Slave connector												
<b>5312A.F05.00</b>													
Network straight connector: for Bus CANOpen®, DeviceNet.													
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>(CAN_SHIELD)</td> </tr> <tr> <td>2</td> <td>(CAN_V+)</td> </tr> <tr> <td>3</td> <td>CAN_GND</td> </tr> <tr> <td>4</td> <td>CAN_H</td> </tr> <tr> <td>5</td> <td>CAN_L</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	(CAN_SHIELD)	2	(CAN_V+)	3	CAN_GND	4	CAN_H	5	CAN_L
PIN	DESCRIPTION												
1	(CAN_SHIELD)												
2	(CAN_V+)												
3	CAN_GND												
4	CAN_H												
5	CAN_L												

**M12A 5P male Plug**

Ordering code	Upper view Slave connector												
<b>5312A.M05.00</b>													
Network straight connector: for BUS CANOpen®, DeviceNet.													
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>(CAN_SHIELD)</td> </tr> <tr> <td>2</td> <td>(CAN_V+)</td> </tr> <tr> <td>3</td> <td>CAN_GND</td> </tr> <tr> <td>4</td> <td>CAN_H</td> </tr> <tr> <td>5</td> <td>CAN_L</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	(CAN_SHIELD)	2	(CAN_V+)	3	CAN_GND	4	CAN_H	5	CAN_L
PIN	DESCRIPTION												
1	(CAN_SHIELD)												
2	(CAN_V+)												
3	CAN_GND												
4	CAN_H												
5	CAN_L												

**M12B 5P female Plug**

Ordering code	Upper view Slave connector												
<b>5312B.F05.00</b>													
Network straight connector: for Bus PROFIBUS DP.													
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Supply</td> </tr> <tr> <td>2</td> <td>A-line</td> </tr> <tr> <td>3</td> <td>DGND</td> </tr> <tr> <td>4</td> <td>B-line</td> </tr> <tr> <td>5</td> <td>SHIELD</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD
PIN	DESCRIPTION												
1	Power Supply												
2	A-line												
3	DGND												
4	B-line												
5	SHIELD												

**M12B 5P male Plug**

Ordering code	Upper view Slave connector												
<b>5312B.M05.00</b>													
Network straight connector: for BUS PROFIBUS DP.													
	<table border="1"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Supply</td> </tr> <tr> <td>2</td> <td>A-line</td> </tr> <tr> <td>3</td> <td>DGND</td> </tr> <tr> <td>4</td> <td>B-line</td> </tr> <tr> <td>5</td> <td>SHIELD</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD
PIN	DESCRIPTION												
1	Power Supply												
2	A-line												
3	DGND												
4	B-line												
5	SHIELD												

**M12D 4P male Plug**

Ordering code	Upper view Slave connector															
<b>5312D.M04.00</b>																
Network straight connector: for EtherCAT®, PROFINET IO RT/IRT, EtherNet/Ip, Powerlink and Modbus/TCP.																
	<table border="1"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX+</td> <td>Ethernet Transmit High</td> </tr> <tr> <td>2</td> <td>RX+</td> <td>Ethernet Receive High</td> </tr> <tr> <td>3</td> <td>TX-</td> <td>Ethernet Transmit Low</td> </tr> <tr> <td>4</td> <td>RX-</td> <td>Ethernet Receive Low</td> </tr> </tbody> </table>	PIN	SIGNAL	DESCRIPTION	1	TX+	Ethernet Transmit High	2	RX+	Ethernet Receive High	3	TX-	Ethernet Transmit Low	4	RX-	Ethernet Receive Low
PIN	SIGNAL	DESCRIPTION														
1	TX+	Ethernet Transmit High														
2	RX+	Ethernet Receive High														
3	TX-	Ethernet Transmit Low														
4	RX-	Ethernet Receive Low														

**M12 Plug**

Ordering code	
<b>5300.T12</b>	

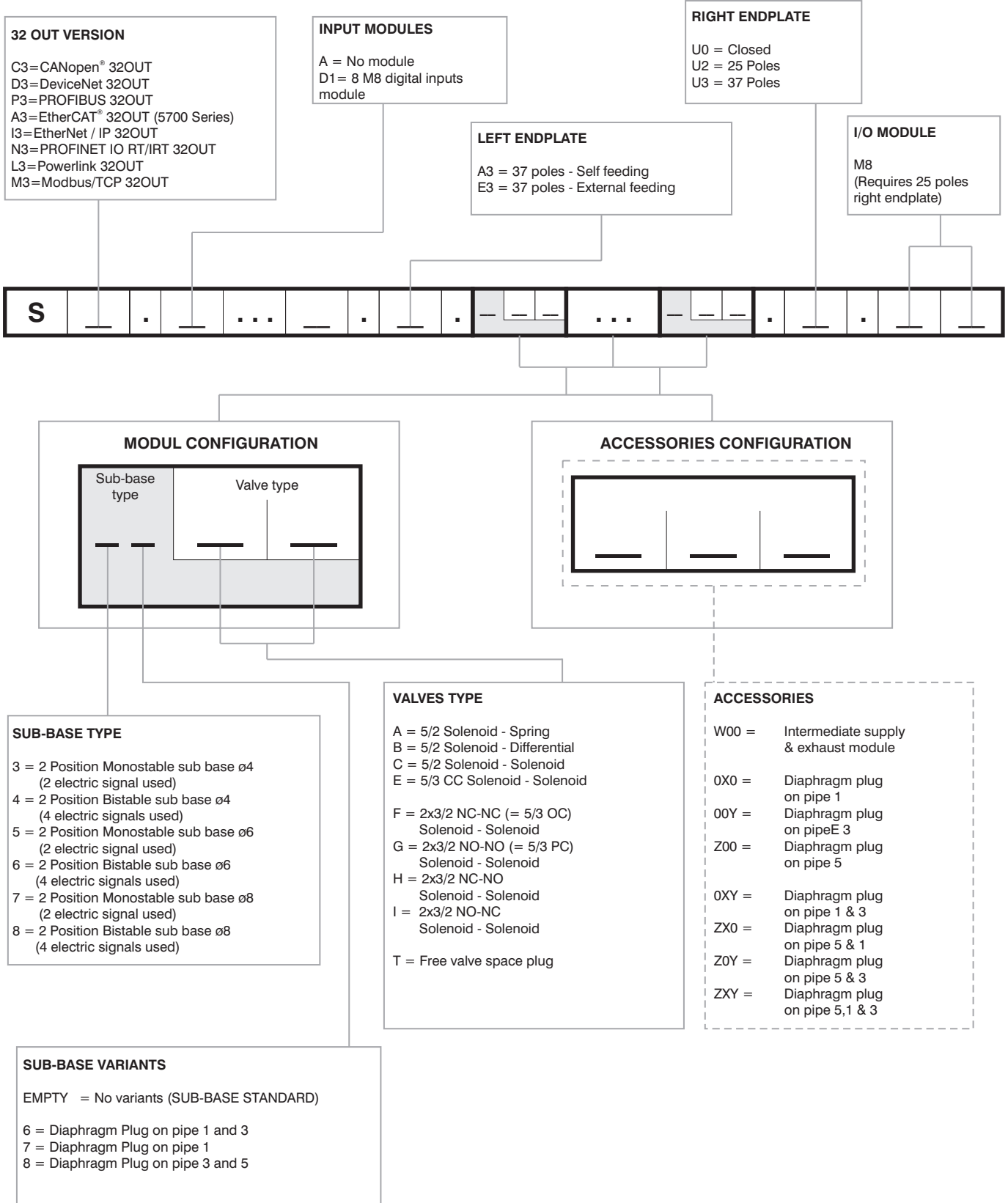
**M8 Plug**

Ordering code	
<b>5300.T08</b>	

Trademarks: EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



Manifold Layout configuration with serial systems



**NOTE:**  
 While configuring the manifold always be careful that the maximum number of electrical signals available is 32  
 The use of monostable valve mounted on a bistable base ( 2 electrical signals occupied for each position) causes the loss of one electric signal.  
 In this case the monostable valve can be replaced by a bistable valve without reconfiguring the PLC.  
 The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base.  
 Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

# OPTYMA<sup>32</sup>-F

## General characteristics

Pneumax is introducing the latest evolution of the 2400 series, new base mounted line including electrical connection into the manifold.

Many technical features make the new product interesting:

- Flow rate of 1000 NI/min
- Low consumption coils placed all in one side of the valve
- Quick mounting of the valve to the base using just one screw
- Quick connection of the bases thanks to 180 degree rotating pins
- Possibility to use different pressures along the manifold (including vacuum)
- IP65 environmental protection
- Electrical connection directly integrated into the base, 32 electrical signals available (can be used to build up a manifold of 32 monostable valves, 16 bistable valves or any combination within that limit).

The electrical connection is made via 37 pin SUB-D connector.

Possibility to integrate with Field Bus modules (all the most common protocols will be available).

Possibility to connect input modules (even on the base that does not have the Field Bus module).

Large use of technopolymer material reduces the overall weight of the manifold.

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power-Directional control valves-Measurement of shifting time".**

## Main characteristics

Integrated and optimized electrical connection system

IP65 protection degree

Only one 19mm size

Electrical line connections on one side

Monostable and bistable solenoid valves with the same size dimensions

Easy and fast manifold assembly

## Construction characteristics

Body	Technopolymer
Operators	Technopolymer
Spools	Nikel plated steel / Technopolymer
Spacers	Technopolymer
Seals	NBR
Piston seals	NBR
Springs	AISI 302 stainless steel
Pistons	Technopolymer

## Functions

5/2 MONOST. SOL. SPRING
5/2 MONOST. SOL. DIFFERENTIAL
5/2 BISTABLE SOL. SOL.
5/3 CC SOL. SOL.
2x3/2 NC-NC (= 5/3 OC) SOL. SOL.
2x3/2 NO-NO (= 5/3 PC) SOL. SOL.
2x3/2 NC-NO SOL. SOL.

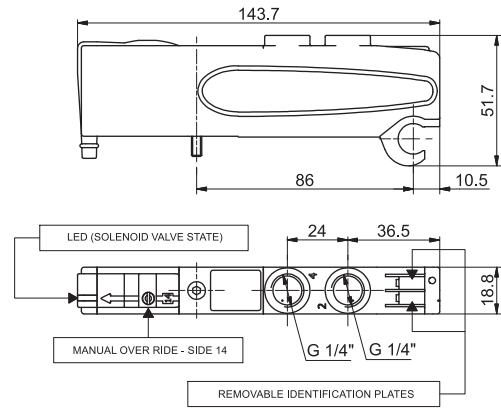
## Technical characteristics

Voltage	24 VDC ±10% PNP (NPN and AC on request)
Pilot consumption	1,3 Watt
Valve working pressure [1]	from vacuum to 10 bar max.
Pilot working pressure [12-14]	From 3 to 7 bar max.
Operating temperature	-5°C +50°C
Protection degree	IP65
Life (standard operating conditions)	50.000.000
Fluid	Filtered and lubricated air or not (if lubricated air, the lubrication must be continuous)



**Solenoid - Spring**

Ordering code
<b>2531.52.00.39. ✓</b>
VOLTAGE
✓ 02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC

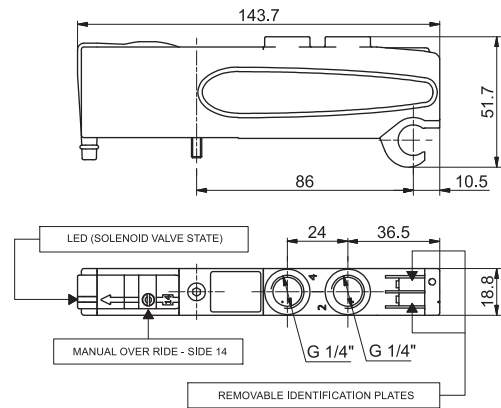
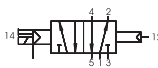


SHORT FUNCTION CODE "A"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	14	40	From vacuum to 10	3 - 7 bar	-5° / +50°	123

**Solenoid - Differential**

Ordering code
<b>2531.52.00.36. ✓</b>
VOLTAGE
✓ 02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC

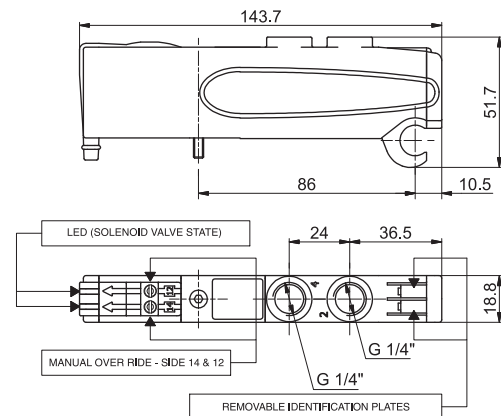
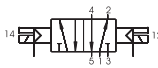


SHORT FUNCTION CODE "B"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	20	29	From vacuum to 10	3 - 7 bar	-5° / +50°	120

**Solenoid - Solenoid**

Ordering code
<b>2531.52.00.35. ✓</b>
VOLTAGE
✓ 02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC



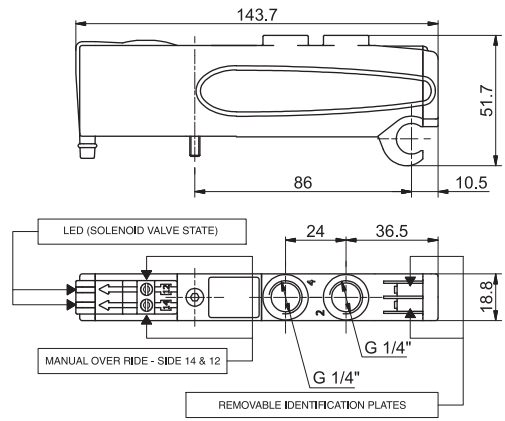
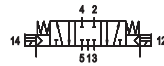
SHORT FUNCTION CODE "C"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	1000	10	14	From vacuum to 10	3 - 7 bar	-5° / +50°	128



**Solenoid - Solenoid - (5/3 Closed centres)**

Ordering code	
<b>2531.53.31.35.V</b>	
VOLTAGE	
02 = 24 VDC PNP	
12 = 24 VDC NPN	
05 = 24 VAC	

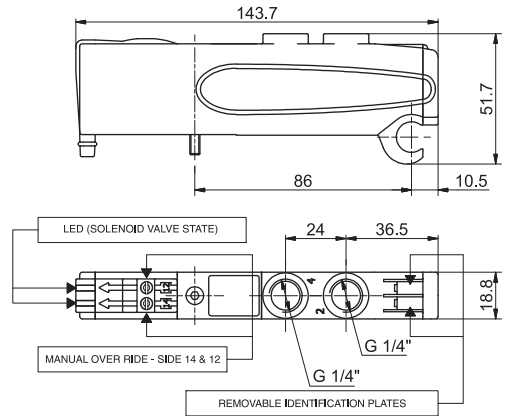


SHORT FUNCTION CODE "E"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	600	15	20	From vacuum to 10	3 - 7 bar	-5° / +50°	126

**Solenoid - Solenoid 2x3/2**

Ordering code	
<b>2531.62.F.35.V</b>	
FUNCTION	
44 = NC - NC (5/3 Open centres)	
55 = NO - NO (5/3 Pressured centres)	
45 = NC - NO (Normally Closed - Normally Open)	
54 = NO - NC (Normally Open - Normally Closed)	
VOLTAGE	
02 = 24 VDC PNP	
12 = 24 VDC NPN	
05 = 24 VAC	



SHORT FUNCTION CODE :  
 NC-NC (5/3 Open centres) = "F"  
 NO-NO (5/3 Pressured centres) = "G"  
 NC-NO = "H"  
 NO-NC = "I"

\*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

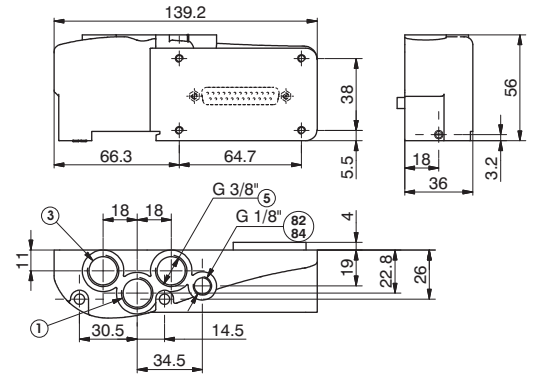
Operational characteristic							
Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	700	15	25	From vacuum to 10	$\geq 2,5 + (0,2 \times P_{alim})$	-5° / +50°	115,5

"Example: If inlet pressure is set at 5bar then pilot pressure must be at least  $P_p = 2,5 + (0,2 \times 5) = 3,5 \text{ bar}$ "



**Right Endplates**

Ordering code
<b>2530.03.Ⓢ</b>
CONNECTOR TYPE
Ⓢ 00 = Exhaust electrical connection closed
25P=Connector 25 poles



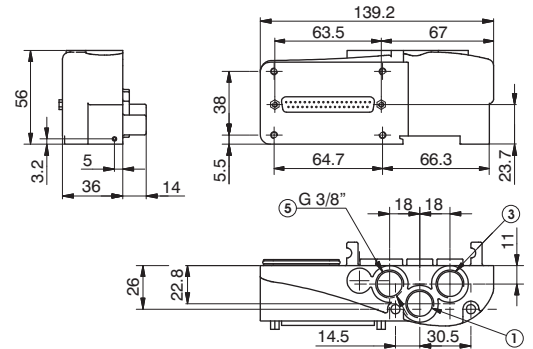
CONDUIT 82/84= DO NOT PRESSURIZE, SOLENOID PILOTS EXHAUST

Weight gr. 181,5

Operational characteristic		
Fluid	Pressure range (bar)	Temperature °C
Filtered air, with or without lubrication	From vacuum to 10	-5 to +50

**Left Endplates - External feeding base**

Ordering code
<b>2530.02.Ⓢ</b>
CONNECTOR TYPE
37P=Connector 37 poles PNP
25P=Connector 25 poles PNP
37N=Connector 37 poles NPN
Ⓢ 25N = Connector 25 poles NPN
37A = Connector 37 poles AC
25A = Connector 25 poles AC
C16 = Terminal 16 signals PNP

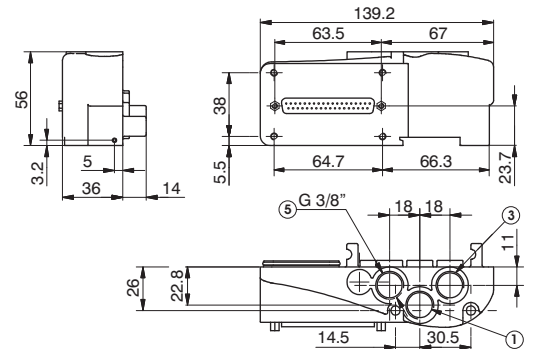


Weight gr. 206

Operational characteristic			
Fluid	Pressure range (bar)	Pilot working pressure (bar)	Temperature °C
Filtered air, with or without lubrication	From vacuum to 10	3 - 7	-5 to +50

**Left Endplates - Self-feeding base**

Ordering code
<b>2530.12.Ⓢ</b>
CONNECTOR TYPE
37P=Connector 37 poles PNP
25P=Connector 25 poles PNP
Ⓢ 37N=Connector 37 poles NPN
25N = Connector 25 poles NPN
37A = Connector 37 poles AC
25A = Connector 25 poles AC
C16 = Terminal 16 signals PNP



Weight gr. 206

Operational characteristic		
Fluid	Pilot working pressure (bar)	Temperature °C
Filtered air, with or without lubrication	3 - 7	-5 to +50

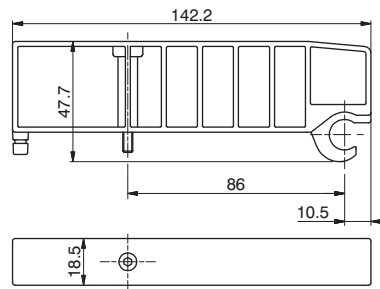




**Closing plate**

Ordering code

**2530.00**



Weight gr. 53,5  
SHORT FUNCTION CODE "T"

**Operational characteristic**

Fluid	Pressure range (bar)	Temperature °C
Filtered air, with or without lubrication	From vacuum to 10	-5 to +50

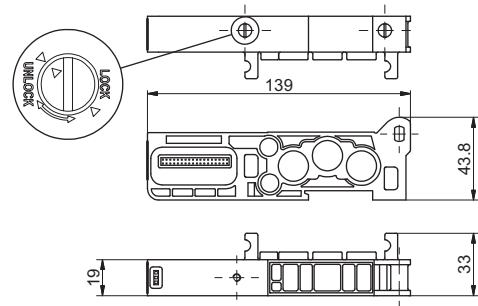
**Modular base**

Ordering code

**2530.01**

VERSION

- M=Monostable
- B=Bistable



Weight gr. 91,5  
SHORT FUNCTION CODE "1" (Monostable)  
SHORT FUNCTION CODE "2" (Bistable)

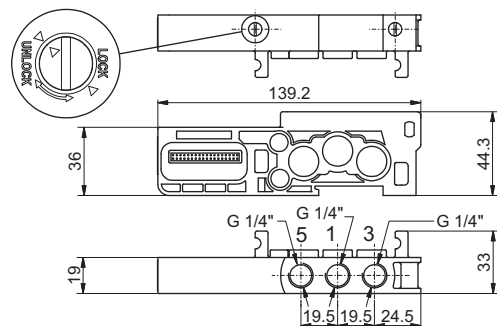
**Operational characteristic**

Fluid	Pressure range (bar)	Temperature °C
Filtered air, with or without lubrication	From vacuum to 10	-5 to +50

**Intermediate Inlet/Exhaust module**

Ordering code

**2530.10**



Weight gr. 110  
SHORT FUNCTION CODE "W"

**Operational characteristic**

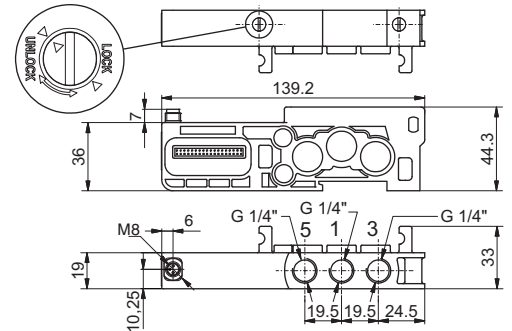
Fluid	Pressure range (bar)	Temperature °C
Filtered air, with or without lubrication	From vacuum to 10	-5 to +50

**General :**

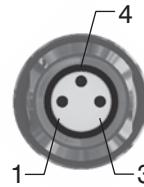
Each Optyma-F manifold lets to manage 32 command signals for the valves. Optyma-F serial nodes (CANopen®, DeviceNet, PROFIBUS DP, EtherCAT®, PROFINET IO RT/IRT, EtherNet/IP and Powerlink) have a single pin for the power supply of the solenoid valves. So if you want to interrupt the power supply of one valve it is necessary to interrupt all the valves. The additional power supply module lets to interrupt at the same time the first 2 available command signals for the valves after the module itself. The additional power supply module is particularly useful also when you use control signals that block the valves. This application is effective both with serial management and multi-pole connection of the manifolds. This module is inserted directly into the Optyma-F solenoid valves manifold.

**Ordering code**

**2530.10.2A**



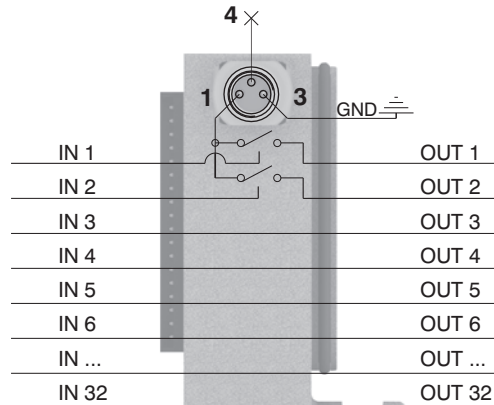
In particular this module is fitted with a M8 3 pins connector: +24V, not connected, GND.



PIN	DESCRIPTION
1	+24 VDC
4	NOT CONNECTED
3	GND

**WORKING PRINCIPLE / SIMPLIFIED FUNCTIONAL DIAGRAM**

This module uses an external power supply (+24VDC) to manage the solenoid valves.



The output signal from serial node / multi-pole connection is used as command signal: when it is high the +24VDC will be present at the module output.

If you want to cut off the power supply to a group of 2 valves it is sufficient to take away the +24VDC provided to the module by the M8 connector.

**Please note:** It is possible to use more modules to interrupt all the command signals, simply by inserting them before the signals to interrupt and after the signals already interrupted.

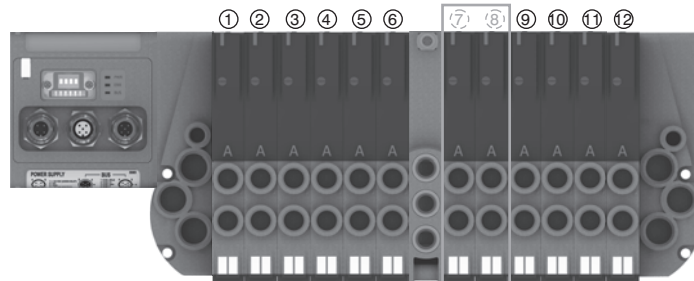
**Usage examples:**

**EXAMPLE 1:**

Manifold of 12 monostable valves on which you want to interrupt signals 7-8

**Assembly:**

- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves. Please note: the first 2 monostable of these are interruptible by the module, while the following 4 will work correctly managed directly by the corresponding command signals.

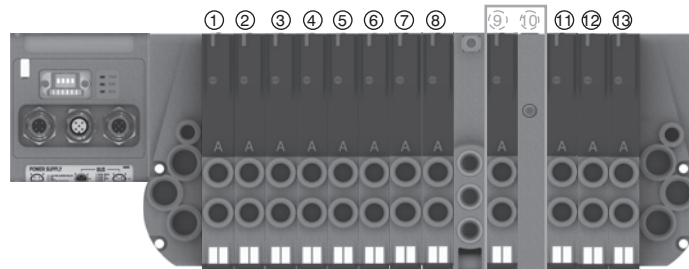


**EXAMPLE 2:**

Manifold of 12 monostable valves on which you want to interrupt signal 9

**Assembly:**

- 8 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 1 monostable valve (interruptible),
- 1 closing plate mounted on a monostable base,
- 3 monostable valves (work correctly managed directly by the corresponding command signals).



**Please note:** Each additional power supply module interrupts always 2 electrical signals.



If you need to interrupt less than 2 signals you can:

- assemble the valves to interrupt in the last positions of the manifold, so you don't need to worry about the interrupted exceeding signals;
- use a bistable base and mount a monostable valve (for each signal less than the 2 standard);
- use a monostable base and mount a closing plate (for each signal less than the 2 standard).

**EXAMPLE 3:**

Manifold of 7 monostable e 3 bistable valves on which you want to interrupt signals 2-3 and 8-9.

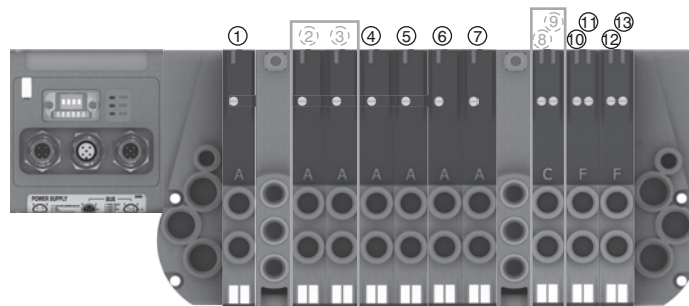
**Assembly:**

- 1 monostable valve (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves.

Please note: the first 2 monostable of these are interruptible by the module, while the following 4 will work correctly managed directly by the corresponding command signals.

- 1 additional power supply module,
- 3 bistable valves.

**Please note:** the first bistable of these valves is interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.

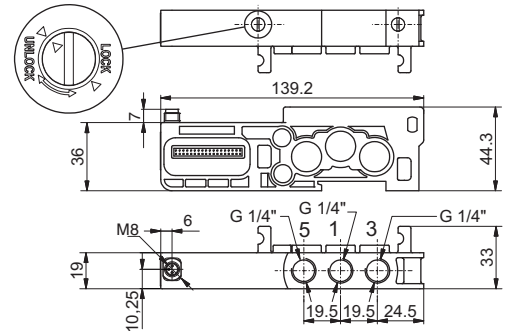


**General :**

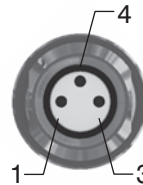
Each Optyma-F manifold lets to manage 32 command signals for the valves. Optyma-F serial nodes (CANopen®, DeviceNet, PROFIBUS DP, EtherCAT®, PROFINET IO RT/IRT, EtherNet/IP and Powerlink) have a single pin for the power supply of the solenoid valves. So if you want to interrupt the power supply of one valve it is necessary to interrupt all the valves. The additional power supply module lets to interrupt at the same time the first 4 available command signals for the valves after the module itself. The additional power supply module is particularly useful also when you use control signals that block the valves. This application is effective both with serial management and multi-pole connection of the manifolds. This module is inserted directly into the Optyma-F solenoid valves manifold.

**Ordering code**

**2530.10.4A**



In particular this module is fitted with a M8 3 pins connector: +24V, not connected, GND.

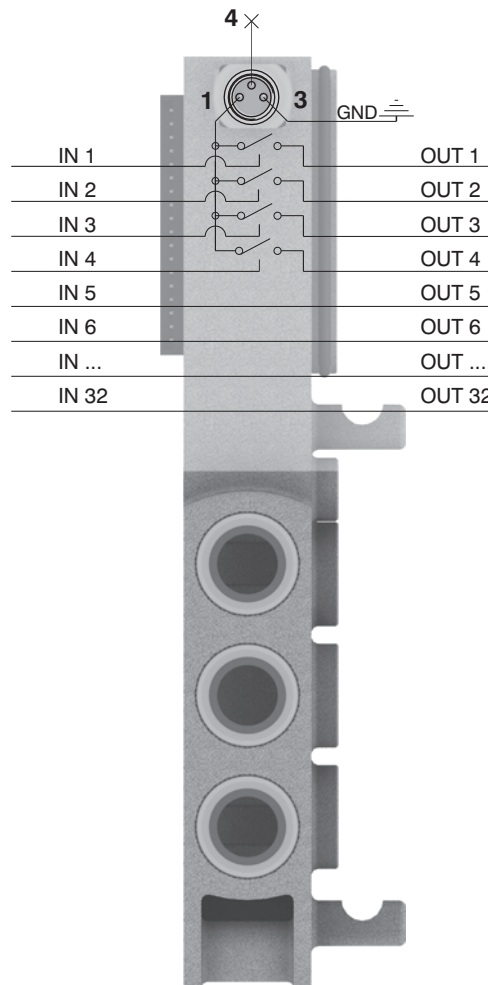


PIN	DESCRIPTION
1	+24 VDC
4	NOT CONNECTED
3	GND

**WORKING PRINCIPLE / SIMPLIFIED FUNCTIONAL DIAGRAM**

This module uses an external power supply (+24VDC) to manage the solenoid valves.

The output signal from serial node / multi-pole connection is used as command signal: when it is high the +24VDC will be present at the module output.



If you want to cut off the power supply to a group of 4 valves it is sufficient to take away the +24VDC provided to the module by the M8 connector.

**Please note:** It is possible to use more modules to interrupt all the command signals, simply by inserting them before the signals to interrupt and after the signals already interrupted.

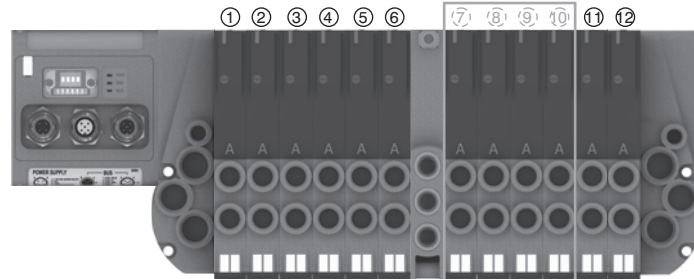
**Usage examples:**

**EXAMPLE 1:**

Manifold of 12 monostable valves on which you want to interrupt signals 7-8-9-10

**Assembly:**

- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves. Please note: the first 4 monostable of these are interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.

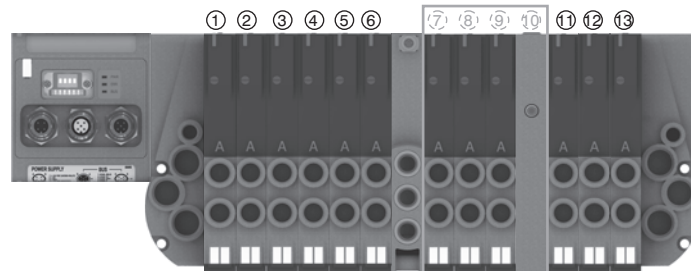


**EXAMPLE 2:**

Manifold of 12 monostable valves on which you want to interrupt signals 7-8-9

**Assembly:**

- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 3 monostable valves (interruptible),
- 1 closing plate mounted on a monostable base,
- 3 monostable valves (work correctly managed directly by the corresponding command signals).



**Please note:** Each additional power supply module interrupts always 4 electrical signals.

☛ If you need to interrupt less than 4 signals you can:

- assemble the valves to interrupt in the last positions of the manifold, so you don't need to worry about the interrupted exceeding signals;
- use a bistable base and mount a monostable valve (for each signal less than the 4 standard);
- use a monostable base and mount a closing plate (for each signal less than the 4 standard).

**EXAMPLE 3:**

Manifold of 7 monostable e 3 bistable valves on which you want to interrupt signals 2-3-4-5 and 8-9-10-11.

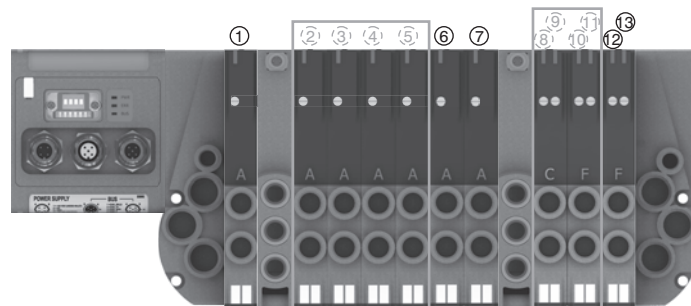
**Assembly:**

- 1 monostable valve (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves.

Please note: the first 4 monostable of these are interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.

- 1 additional power supply module,
- 3 bistable valves.

**Please note:** the first 2 bistable of these valves are interruptible by the module, while the following will work correctly managed directly by the corresponding command signals.



**Polyethylene Silencer Series SPL-P**

Ordering code	
<b>SPLP.F</b>	
TUBE DIAMETER	
<b>F</b> 18=1/8"	
14=1/4"	
38=3/8"	



**Diaphragm plug**

Ordering code	
<b>2530.17</b>	



Weight gr. 6,5

**Cable complete with connector, 25 Poles IP65**

Ordering code	
<b>2300.25.L.F</b>	
CABLE LENGHT	
<b>L</b> 03 = 3 metres	
05 = 5 metres	
10 = 10 metres	
CONNECTOR TYPE	
<b>F</b> 10 = In line	
90 = 90° Angle	



**Cable complete with connector, 37 Poles IP65**

Ordering code	
<b>2400.37.L.F</b>	
CABLE LENGHT	
<b>L</b> 03 = 3 metres	
05 = 5 metres	
10 = 10 metres	
CONNECTOR TYPE	
<b>F</b> 10 = In line	
90 = 90° Angle	



**Cable complete with connector, 25 Poles IP65**

Ordering code	
<b>2400.25.L.25</b>	
CABLE LENGHT	
<b>L</b> 03 = 3 metres	
05 = 5 metres	
10 = 10 metres	





The electrical connection is achieved by a 37 pin connector and can manage up to 32 solenoid pilots. It is also possible use a 25 sub-D pin connector and, in this case, it is possible to manage a maximum of 22 outputs. It is also available a terminal, able to manage a maximum of 16 outputs.

The management and distribution of the electrical signals between each valve is obtained thanks to an electrical connector which receives the signals from the previous module, uses one, two or none depending on the type, and carries forward to the next module the remaining.

Bistable valves, 5/3 and 2x3/2 valves which have two solenoid pilots built in, use two signals; the first is directed to the pilot side 14 the second to the pilot side 12. Modular bases can be fitted with two type of electrical connector: the monostable version uses only one signal (connected to the pilot side 14) and carries forward the remaining, the bistable version which always uses two signals.

This solution allows the modification of the manifold (replacement of monostable valves without bistable for example) without having to reset the PLC output layout.

On other hand this solution limits the maximum number of valves to 16 when it is used a 37 pin connector or 11 when it is used a 25 pin connector. When using a Endplates with terminal, the maximum number of valves are 8.

Intermediate supply/exhaust module uses an electrical connector directly forwarding signals to the next one without any kind of modification.

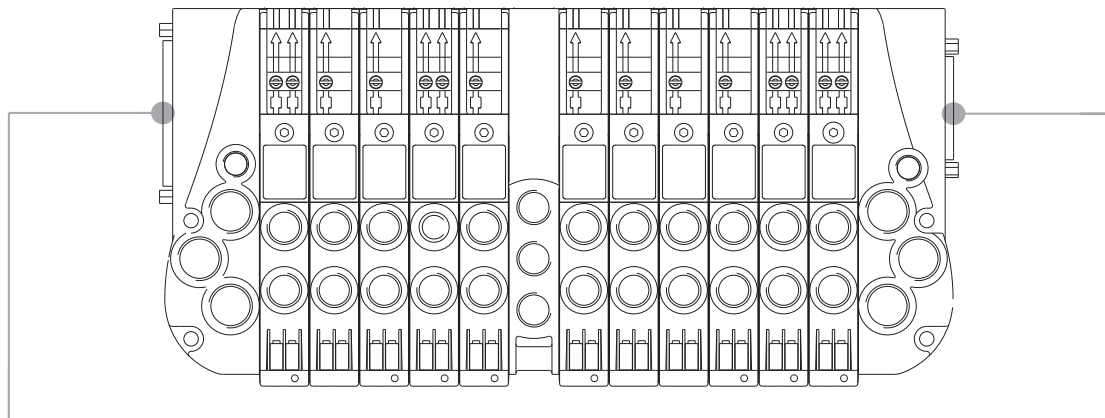
This allows the use of intermediate modules in any position of the manifold.

All the electrical signals that have not been used on the manifold can be used placing at the end of the manifold the end plate complete with the 25 sub-D female connector.

The number of available signals depends of the connector used to the type of the left end plate and by the total signals used along the manifold:

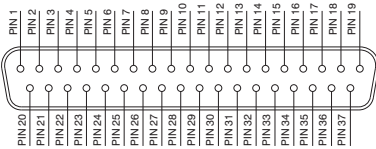
37 pin connector	nr of output = 32 – (total of used signals)
25 pin connector	nr of output = 22 – (total of used signals)
Terminal	nr of output = 16 – (total of used signals)

Following we show some examples of possible combination and the relative pin assignment.



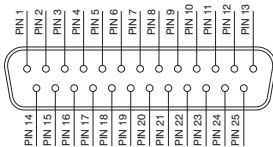
**IN-LET ELECTRIC CONNECTIONS**

**SUB-D 37 POLE MALE CONNECTOR**



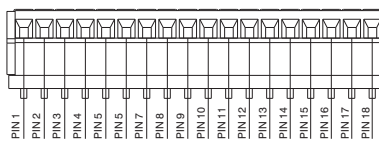
1 - 32 = Solenoid valves signals  
33 - 35 = GND  
36 - 37 = Through line

**SUB-D 25 POLE MALE CONNECTOR**



1 - 22 = Solenoid valves signals  
23 - 24 = GND  
25 = Through line

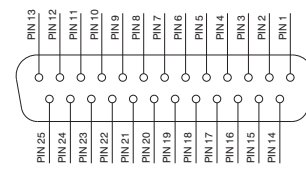
**TERMINAL 16 SIGNALS**



POS. 1-16 = SIGNALS  
POS. 17 = GND  
POS. 18 = THROUGH LINE

**OUTLET ELECTRIC CONNECTIONS (IF PRESENT)**

**SUB-D 25 POLE FEMALE CONNECTOR**

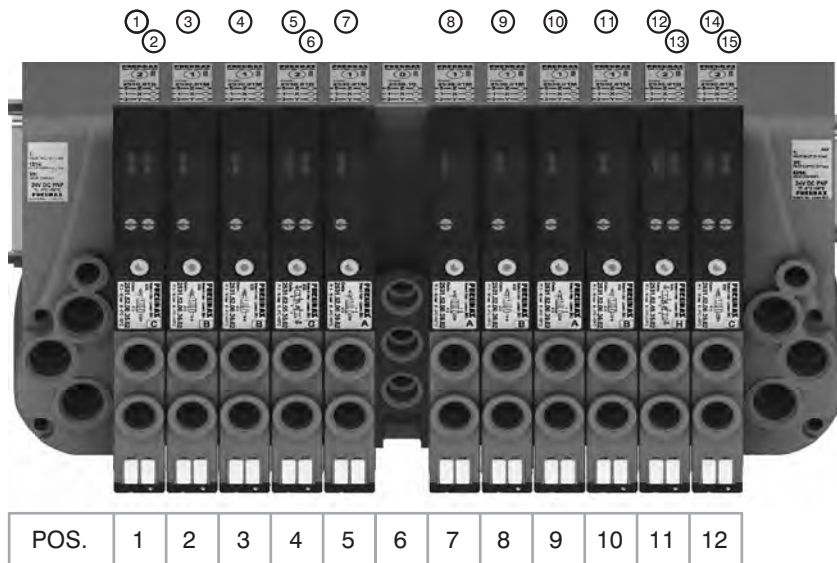


1 - 22 = Solenoid valves signals  
23 - 24 = GND  
25 = Through line



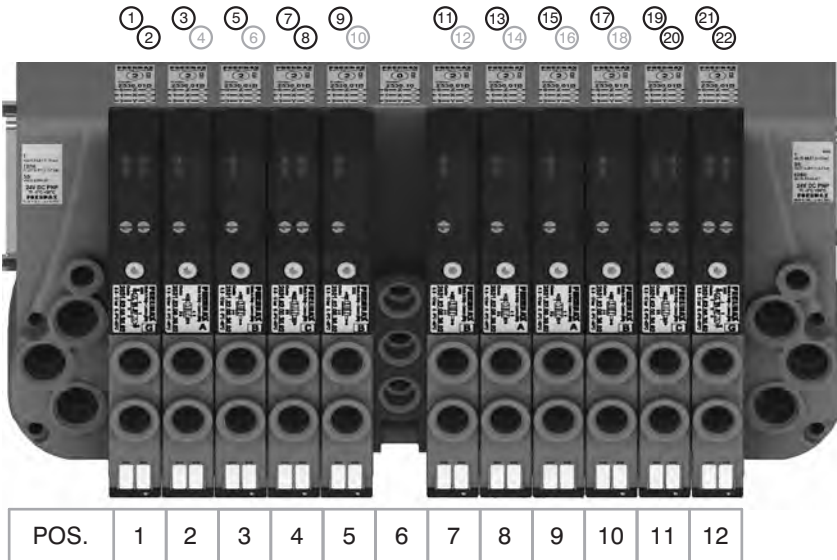


**37 PIN Connector correspondence for valves assembled on mixed bases**



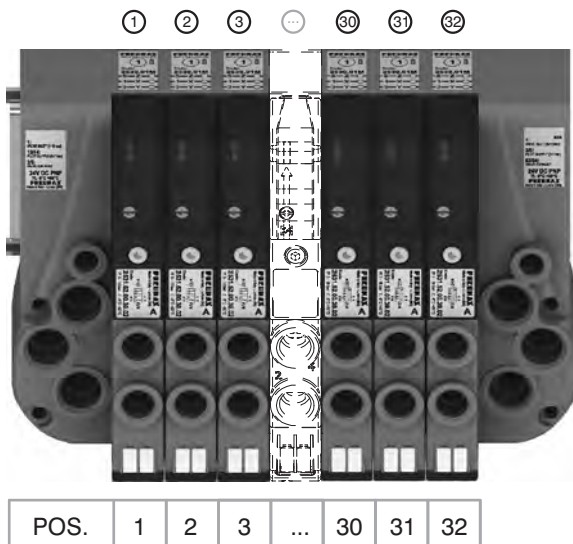
- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 14 EV POS.3
- PIN 5 = PILOT 14 EV POS.4
- PIN 6 = PILOT 12 EV POS.4
- PIN 7 = PILOT 14 EV POS.5
- PIN 8 = PILOT 14 EV POS.7
- PIN 9 = PILOT 14 EV POS.8
- PIN 10 = PILOT 14 EV POS.9
- PIN 11 = PILOT 14 EV POS.10
- PIN 12 = PILOT 14 EV POS.11
- PIN 13 = PILOT 12 EV POS.11
- PIN 14 = PILOT 14 EV POS.12
- PIN 15 = PILOT 12 EV POS.12

**37 PIN Connector correspondence for manifold mounted on bases for bistable valves**

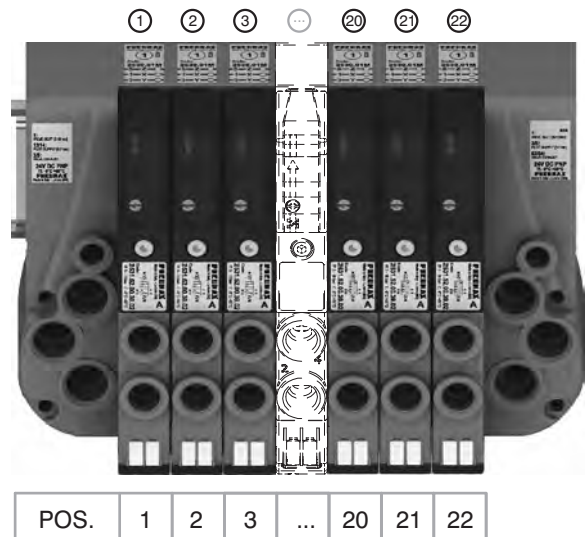


- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = NOT CONNECTED
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = NOT CONNECTED
- PIN 7 = PILOT 14 EV POS.4
- PIN 8 = PILOT 12 EV POS.4
- PIN 9 = PILOT 14 EV POS.5
- PIN 10 = NOT CONNECTED
- PIN 11 = PILOT 14 EV POS.7
- PIN 12 = NOT CONNECTED
- PIN 13 = PILOT 14 EV POS.8
- PIN 14 = NOT CONNECTED
- PIN 15 = PILOT 14 EV POS.9
- PIN 16 = NOT CONNECTED
- PIN 17 = PILOT 14 EV POS.10
- PIN 18 = NOT CONNECTED
- PIN 19 = PILOT 14 EV POS.11
- PIN 20 = PILOT 12 EV POS.11
- PIN 21 = PILOT 14 EV POS.12
- PIN 22 = PILOT 12 EV POS.12

**37 PIN Connector correspondence for manifold for 32 position manifold with monostable valves on base**



**25 PIN Connector correspondence for manifold for 22 position manifold with monostable valves on base**

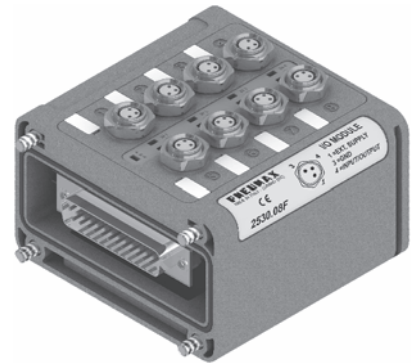


**General :**

Using the 2530.03.25P output terminal it is possible to make any electrical signals not used by valves available on a 25 sub-D female connector at the right end of the manifold. It is possible to then join a multi-core cable to link to the next manifold, or connect directly to one or two I/O modules. The I/O modules can accept input or output signals, depending upon what is connected.

**Ordering code**

**2530.08F**



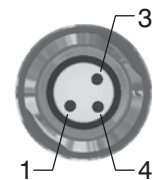
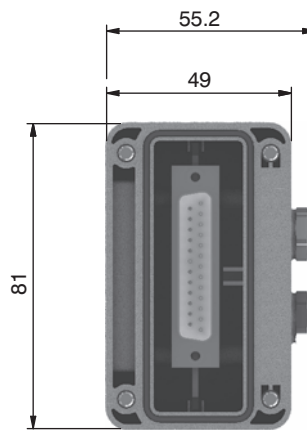
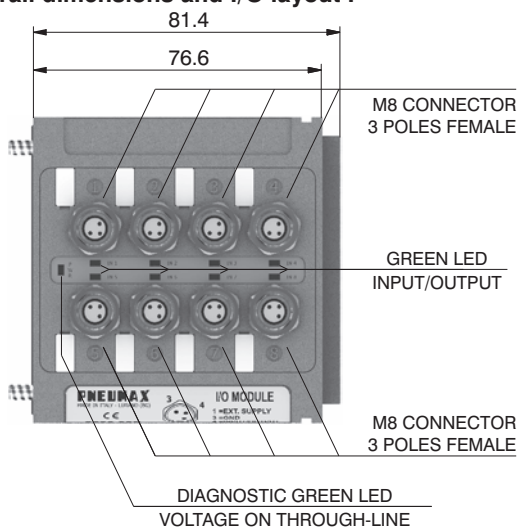
**Please note:** If the manifold is connected by a multi-core connection, each connection can be used as either an input or an output, while if the manifold is connected to a serial node the connections can only be used as an output.

It is possible to connect the manifold to up to two I/O modules.

Each I/O module includes 8 diagnostic LEDs which indicate the presence of an Input / Output signal for each connector.

**Please note:** For an LED to function, a signal of at least +15VDC must be present on pin 4 of the connector. If this signal is lower, the LED will not light, this does not compromise the normal Input / Output function of the unit.

**Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT/OUTPUT
3	GND

**Input features:**

Each connection can accept either two wire (switches, magnetic switches, pressure switches, etc.) or three wire connections (photocells, electronic end of stroke sensors, etc.) If +24VDC is required on at Pin 1 of each connector, it is possible to provide this via the through-line pin of the multi-pole connector.

I.E :

Pin 25 of the 25 pin multi-pole connector (code 2530.02.25P or 2530.12.25P)

Pin 36-37 of the 37 pin multi-pole connector (code 2530.02.37P or 2530.12.37P)

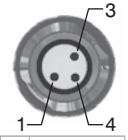
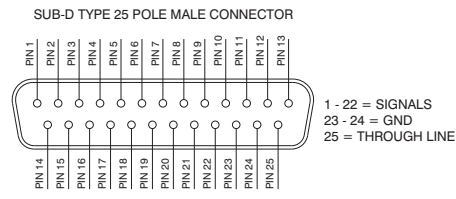
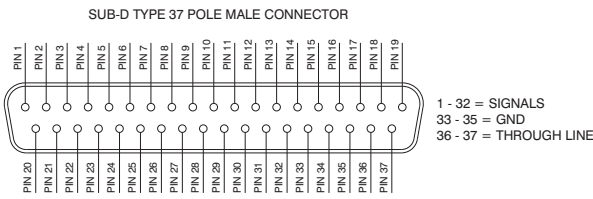
**Output features:**



**Attention:** The output connections are not protected against short-circuit. Please pay attention when wiring (avoid Pin 4 being connected to Pin 3 or Pin 1).

<b>General characteristics</b>	Model	2530.08F
	Case	Reinforced technopolymer
	I/O Connector	M8 connector 3 poles female (IEC 60947-5-2)
	PIN1 voltage (connector used as Input)	By the user
	PIN 4 voltage diagnosis	Green LED
	Node consumption (Outlets excluded)	7mA per each LED with 24 VDC signal
	Outlets voltage	+23,3 VDC (serial) /by the user (multipolar)
	Input voltage	Depend by the using
	Maximum outlet current	100 mA (serial) / 400 mA (multipolar)
	Maximum Input/Output	8 per module
	Multiconnector max. Current	100 mA
	Connections to manifold	Direct connection to 25 poles connector
	Maximum n. of moduls	2
	Protection degree	IP65 when assembled
Ambient temperature	from -0° to +50° C	

CORRESPONDENCE BETWEEN MULTI-POLE SIGNAL AND CONNECTOR



PIN	DESCRIPTION
1	THROUGH LINE
4	SIGNAL
3	GND

Connection modes:

The I/O module changes its operation depending on the way the manifold is controlled. There are two possible modes:

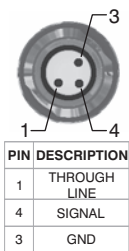
- A) Control via multi-pole connection
- B) Control via fieldbus

A) Control via multi-pole :

M8 connector used as Input:



**Attention:** Voltage applied to each connector is passed to multi-pole connector pin.



In order to use the I/O module, the correct right hand endplate with 25 pole female outlet connector must be used. (Code 2530.03.25P).

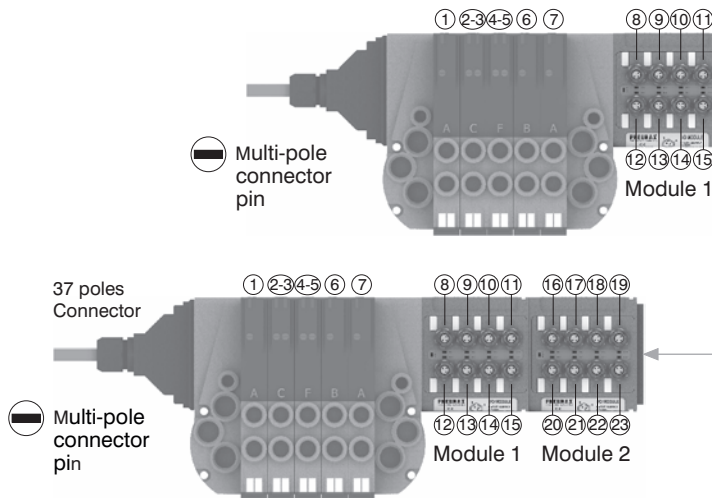


M8 connector used as Output:

Output voltage will be the same as is applied at the multi-pole connector pin. The maximum output current depends upon the power unit used, but we recommend no more than 250mA.



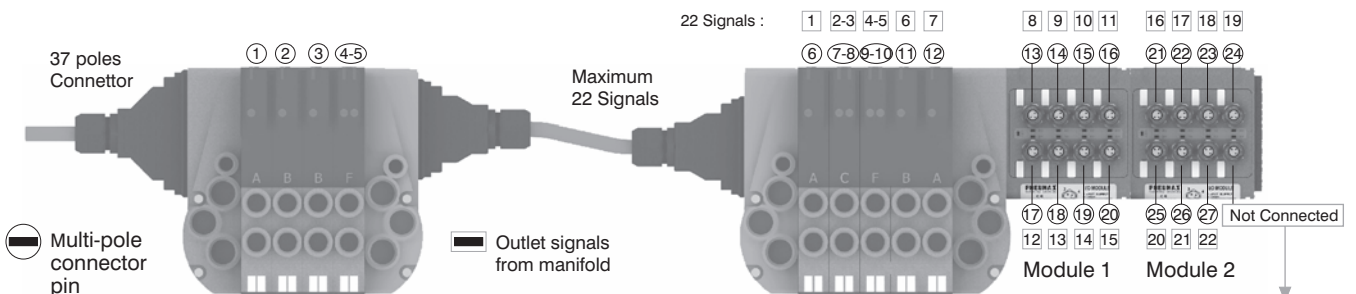
**Attention:** Since every cable has a degree of resistance, there will always be a voltage drop depending on the cable's length, sectional area and the current.



**Attention:** Only one more I/O module can be added.

**Attention:** No more additions are possible

**Attention :** Optyma 32-F solenoid valve manifolds permit up to 22 electrical signals that are not used by manifolds to be made available: these signals can be managed by another manifold and / or by I/O modules. The I/O module will manage these unused signals. Connections that are not managing useful signals will remain unconnected.

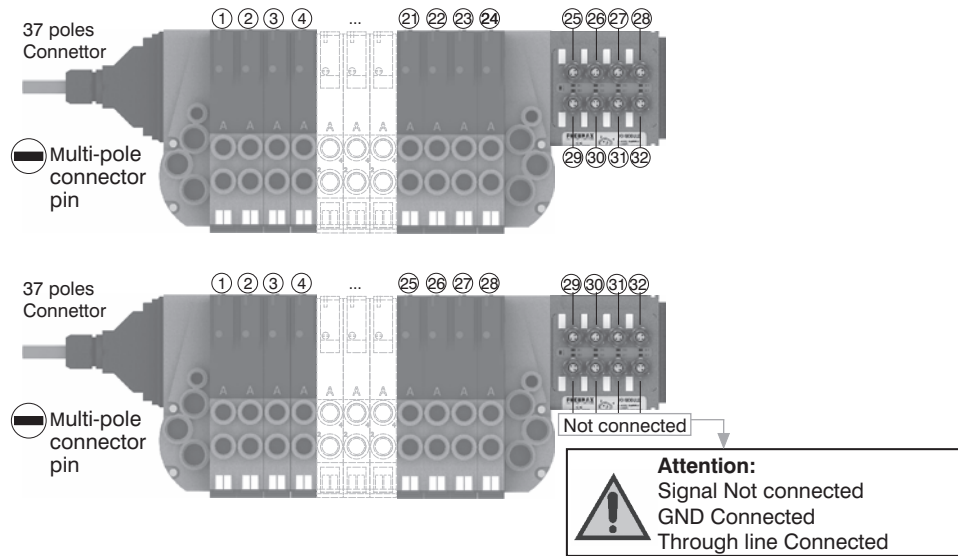


**Attention:** Signal Not connected  
GND Connected  
Through line Connected

**Please note:** this example considers a 37 pin multi-pole connector. The same configuration managed by a 25 pin multi-pole connector will stop at number 22 of multi-pole connector and at number 17 of the manifold. 22 17

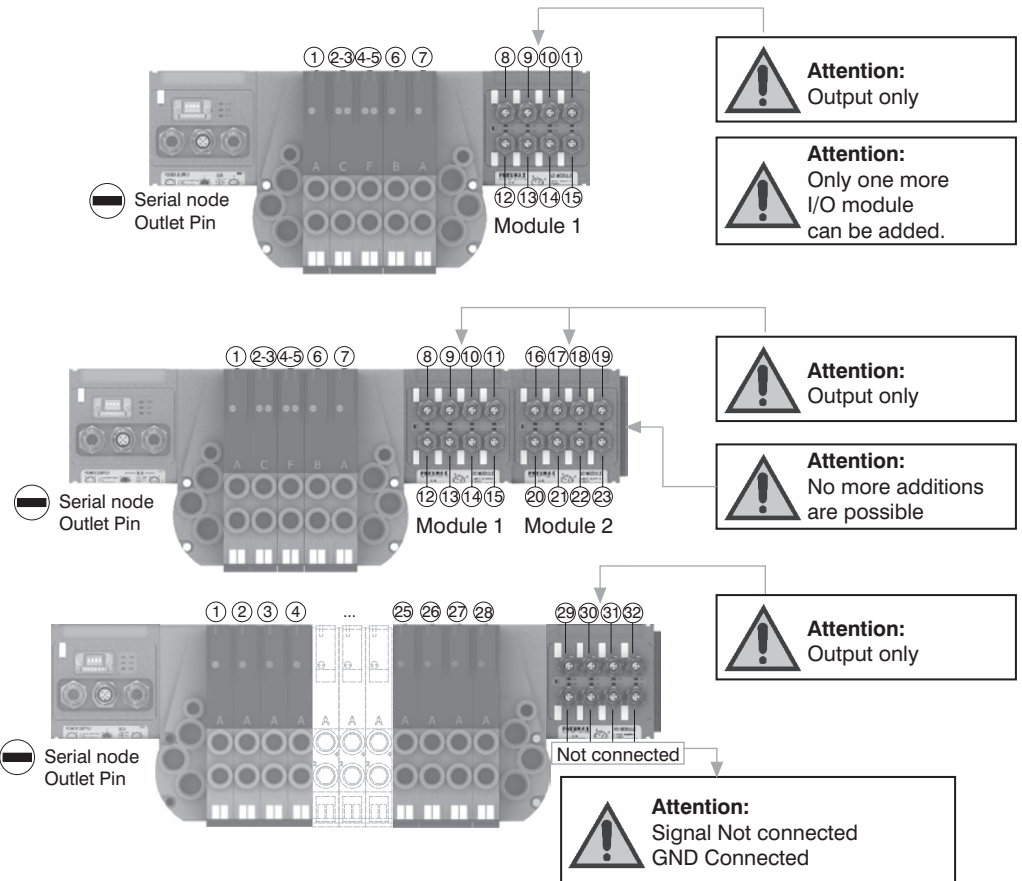
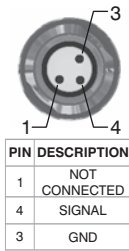


**Please note:** Optyima 32-F solenoid valve manifolds manage up to 32 signals. If the manifold uses more than 24 signals the I/O module will manage only the remainder. Connections that are not managing useful signals will remain unconnected.

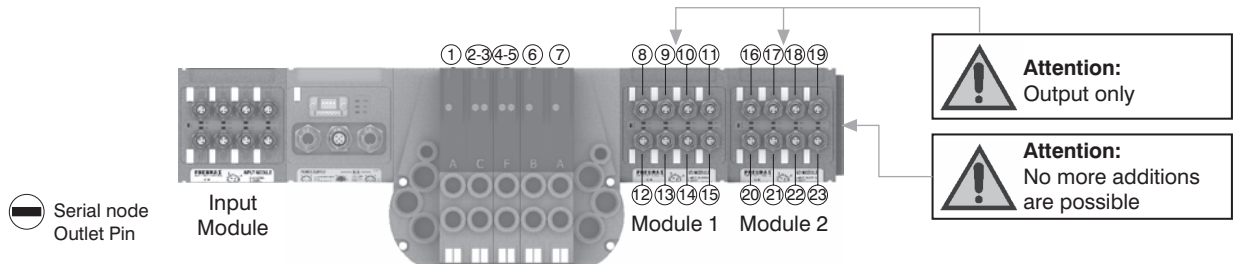


**B) Control via fieldbus:**

With this kind of control the I/O module can only be used as an output. Pin 1 of each connector is not connected. The output voltage will be 0.7V lower than that applied to Pin 4 of the connector. The maximum output current for each output is 100mA. The correspondence between control byte and each single output depends on how many electrical signals are used by the manifold and by the relative position of the I/O module.

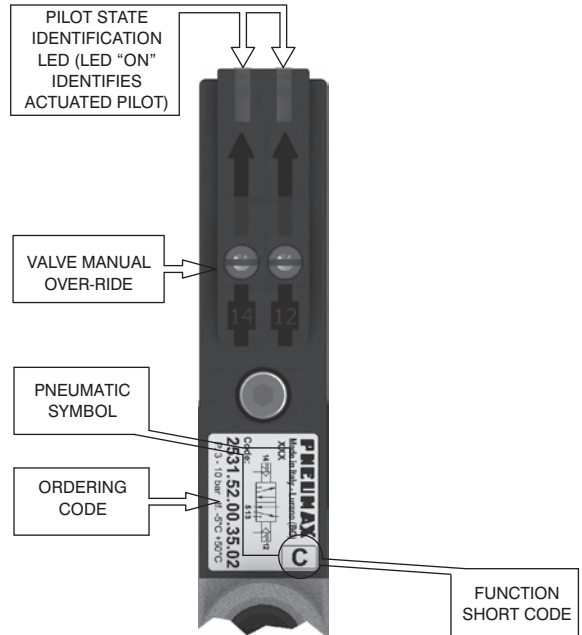
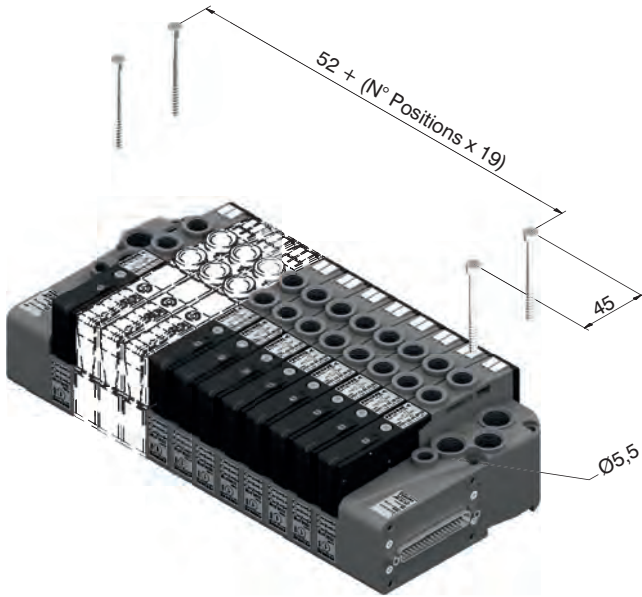


**Please note:** I/O modules don't allow to connect any additional valves manifold after them.

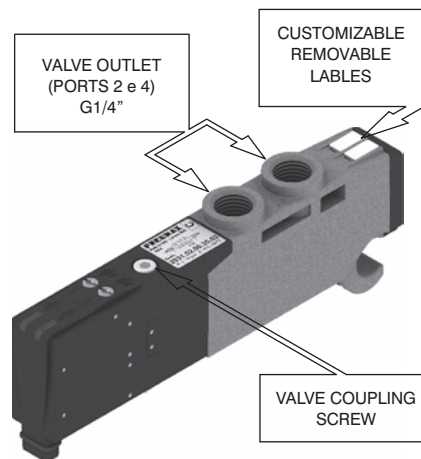
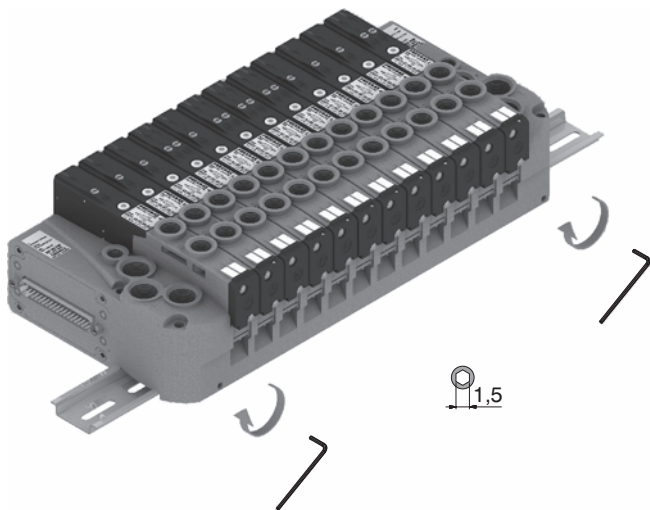




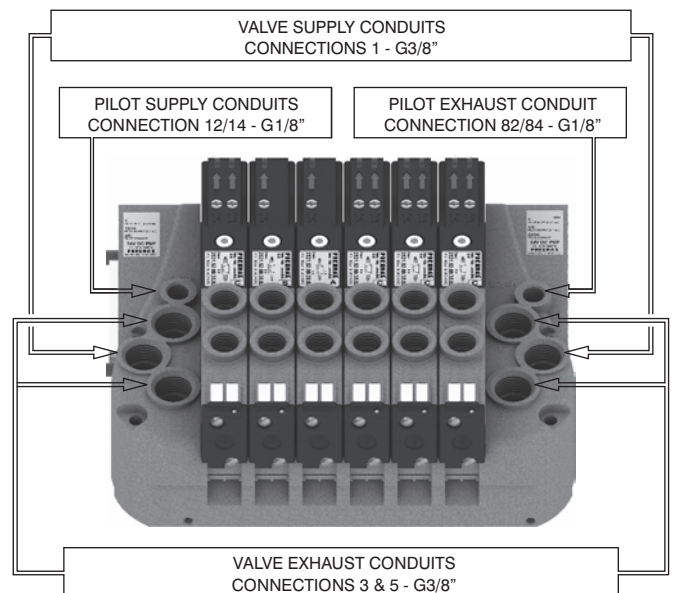
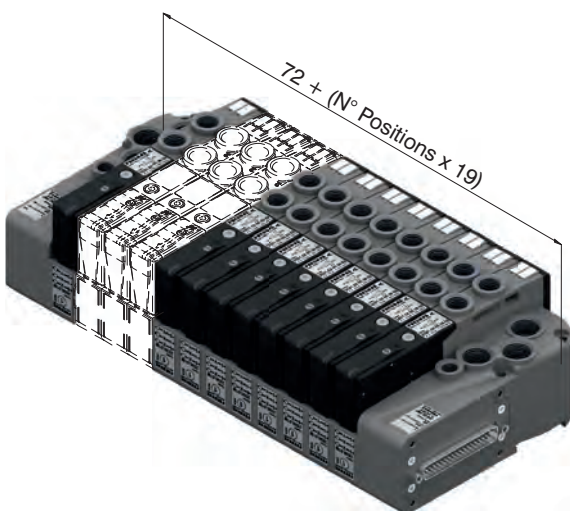
From the top



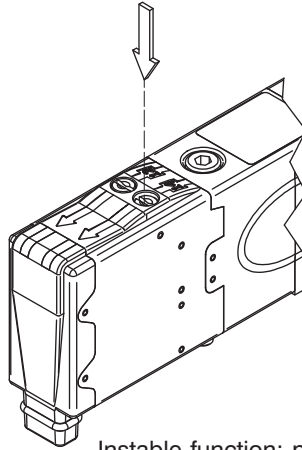
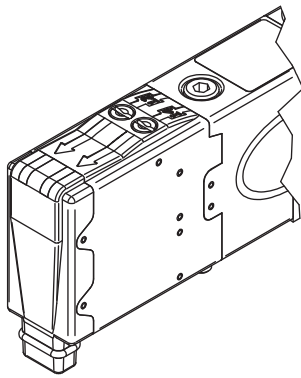
DIN rail fixing



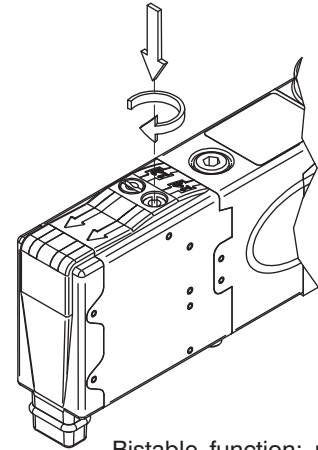
Maximum possible size according to valves seats



## Manual override actuation



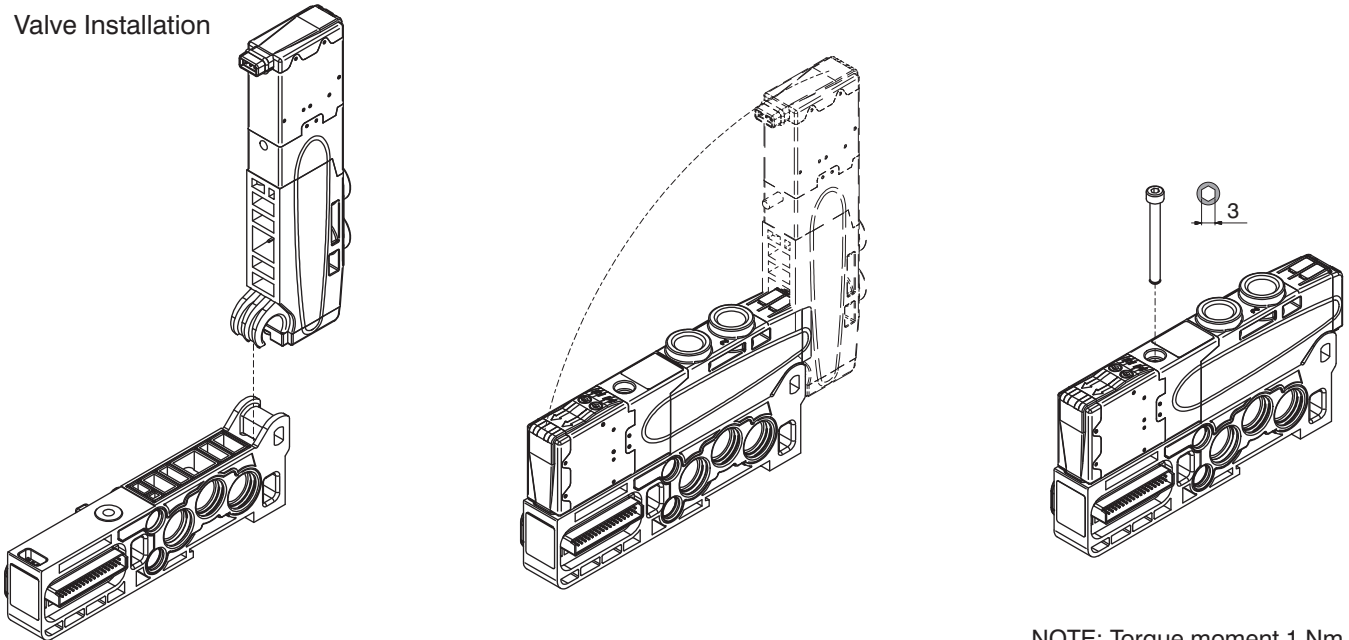
Instable function: push to actuate  
(when released it moves back to  
the original position).



Bistable function: push and  
turn to get the bistable  
function

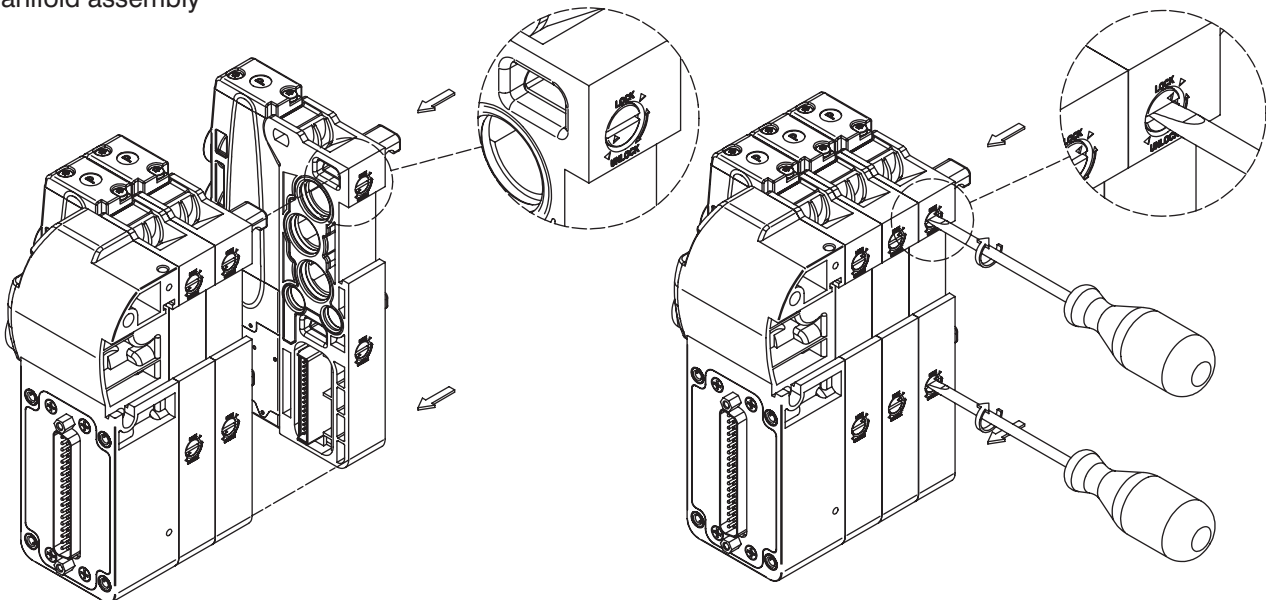
NOTE : It is strongly suggested to replace the original position after using

## Valve Installation

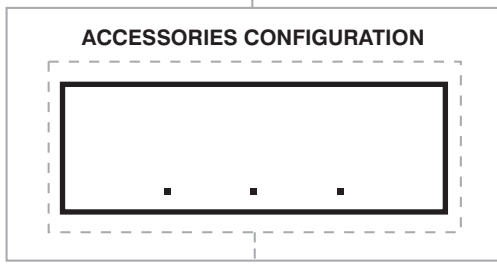
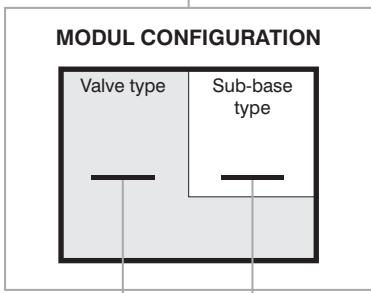
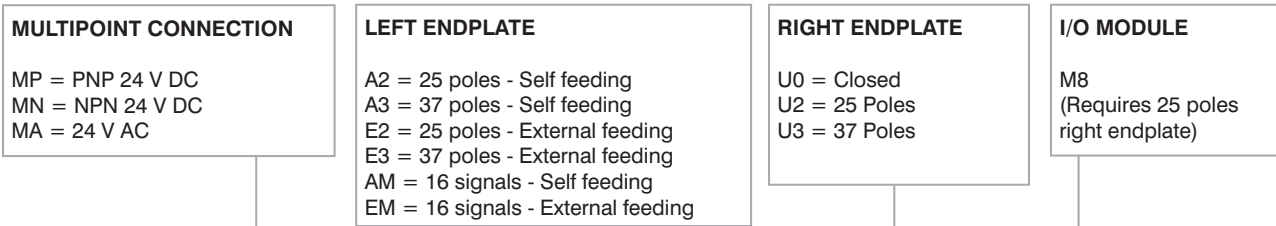


NOTE: Torque moment 1 Nm

## Manifold assembly



Manifold Layout configuration



**SHORT CODE FUNCTION / CONNECTION :**

A1= 5/2 SOL.-SPRING + BASE TYPE 1 (1 electrical signal occupied)  
 A2= 5/2 SOL.-SPRING + BASE TYPE 2 (2 electrical signals occupied)  
 B1= 5/2 SOL.-DIFFERENTIAL + BASE TYPE 1 (1 electrical signal occupied)  
 B2= 5/2 SOL.-DIFFERENTIAL + BASE TYPE 2 (2 electrical signals occupied)  
 C2= 5/2 SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
 E2= 5/3 CC SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
 F2= 2x3/2 NC-NC (= 5/3 OC) SOL.-SOL.+BASE TYPE 2 (2 electrical signals occupied)  
 G2= 2x3/2 NO-NO (= 5/3 PC) SOL.-SOL.+BASE TYPE 2 (2 electrical signals occupied)  
 H2= 2x3/2 NC-NO SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
 I2= 2x3/2 NO-NC SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
 T1= FREE VALVE SPACE PLUG + BASE FOR MONOSTABLE VALVE  
 T2= FREE VALVE SPACE PLUG + BASE FOR BISTABLE VALVE

**ACCESSORIES**

U2 = Power supply 2 positions module  
 U4 = Power supply 4 positions module  
 W = Intermediate supply & exhaust module  
 X = Diaphragm plug on pipe 1  
 Y = Diaphragm plug on pipe 3  
 Z = Diaphragm plug on pipe 5  
 XY = Diaphragm plug on pipe 1 & 3  
 ZX = Diaphragm plug on pipe 5 & 1  
 ZY = Diaphragm plug on pipe 5 & 3  
 ZXY = Diaphragm plug on pipe 5, 1 & 3

**NOTE:**  
 While configuring the manifold always be careful that the maximum number of electrical signals available is:  
 32 when an input 37 poles endplate is used.  
 22 when an input 25 poles endplate is used.  
 The use of monostable valve mounted on a base type 2 ( 2 electrical signals occupied ) causes the loss of one electric signal.  
 In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for exemple : regarding the 3 & 5 conduits, put the Y & Z letters).  
 Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

Series 2500 OPTYMA-F solenoid valve manifolds managed by multipoint connection are "well tried components"

	<b>Well-ried component</b>	<ul style="list-style-type: none"> <li>- The product is a well-ried product for a safety-related application according to ISO 13849-1.</li> <li>- The relevant basic and well-ried safety principles according ISO 13849-2 for this product are fulfilled.</li> <li>- The suitability of the product for a precise application must be verified and confirmed by the user.</li> </ul>
<b>B<sub>10d</sub></b>	50.000.000	



**General:**

CANopen® module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 2 Input modules 5225.25F.  
 CANopen® module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaining powered the node and inputs, if present.  
 Connection to Bus CANopen® is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to CiA Draft Recommendation 303-1 (V. 1.3 : 30 December 2004).  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5525.32F**



**Scheme / Overall dimensions and I/O layout :**

**POWER SUPPLY connector**

**M12 4P MALE**

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**NETWORK connectors**

**M12 5P FEMALE**

**M12 5P MALE**

PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

**Technical characteristics**

Model	5525.32F	
Specifications	CiA Draft Standard Proposal 301 V 4.10 (15 August 2006)	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	30 mA
	Power supply diagnosis	Green LED PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P connectors male-female type A (IEC 60947-5-2)
	Baud rate	10 - 20 - 50 - 125 - 250 - 500 - 800 - 1000 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m at 500 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

DeviceNet module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 2 Input modules 5225.25F.  
 DeviceNet module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus DeviceNet is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to DeviceNet Specifications Volume I, release 2.0.  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

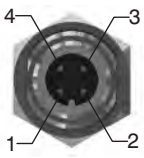
**5425.32F**



2

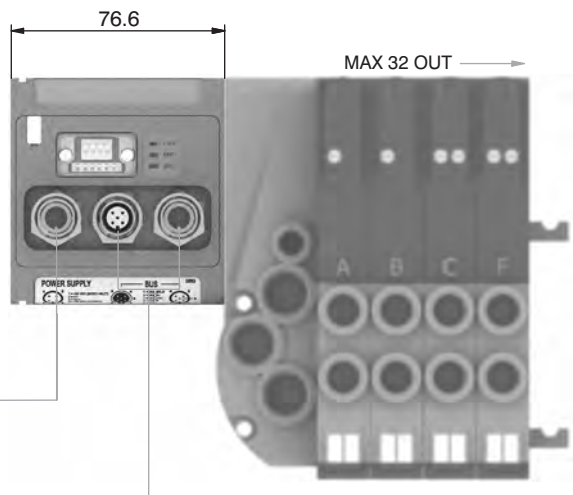
**Scheme / Overall dimensions and I/O layout :**

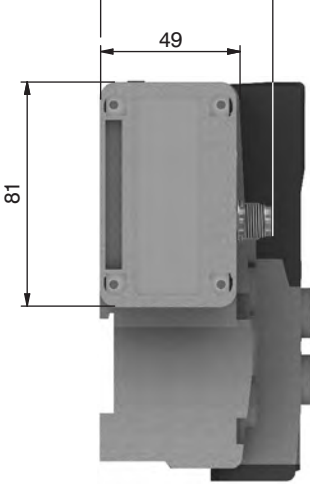
**POWER SUPPLY connector**



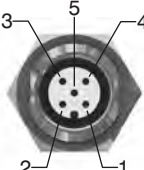
**M12 4P MALE**

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

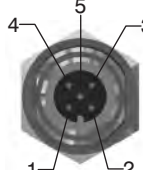




**NETWORK connectors**



**M12 5P FEMALE**



**M12 5P MALE**

PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

**Technical characteristics**

	Model	5425.32F
	Specifications	DeviceNet Specifications Volume I, release 2.0.
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	30 mA
<b>Outputs</b>	Power supply diagnosis	Green LED PWR
	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P connectors male-female type A (IEC 60947-5-2)
	Baud rate	125 - 250 - 500 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m at 500 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

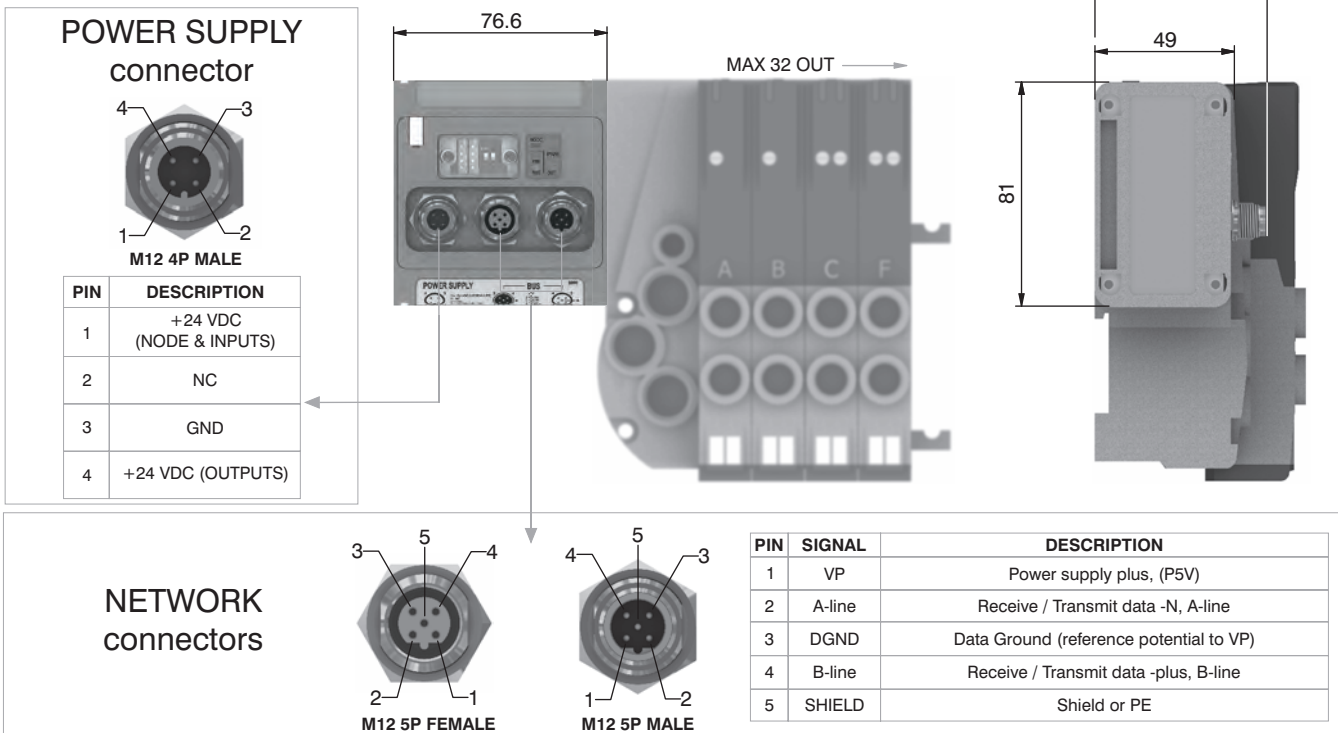
PROFIBUS DP module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 4 Input modules 5225.25F.  
 PROFIBUS DP module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaining powered the node and inputs, if present.  
 Connection to Bus PROFIBUS DP is possible via 2 M12 type B 5P male - female circular connectors; these two are connected in parallel and according to PROFIBUS Interconnection Technology (Version 1.1 : August 2001).  
 The node address can be set using BCD numeration: 4 dip-switches for the units and 4 dip-switches for the tens.  
 The module includes an internal terminating resistance that can be activated by 2 dip-switches.

**Ordering code**

**5325.32F**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5325.32F
Specifications	PROFIBUS DP
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection Power supply voltage Node consumption (without inputs) Power supply diagnosis
	M12 4P male connector (IEC 60947-5-2) +24 VDC +/- 10% 50 mA Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs Maximum current for output Maximum output number Max output simultaneously actuated
	+24 VDC +/- 10% 100 mA 32 32
<b>Network</b>	Network connectors Baud rate Addresses, possible numbers Max nodes in net Bus maximum recommended length Bus diagnosis Configuration file IP protection grade Temperature range
	2 M12 5P male-female connectors type B 9,6 - 19,2 - 93,75 - 187,5 - 500 - 1500 - 3000 - 6000 - 12000 Kbit/s From 1 to 99 100 (slave + master) 100 m at 12 Mbit/s - 1200 m at 9,6 Kbit/s Green LED + Red LED Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a> IP65 when assembled From 0° to +50° C

**General:**

EtherCAT® module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code). The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 2 Input modules 5225.25F.

The EtherCAT® module, regardless the number of Input module connected, reports to have connected 4 Input modules.

Regardless of the number of Input modules connected, the managable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus EtherCAT® is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

The node address is assigned during configuration.

**Note: 5700 series has a different configuration file from series 5600.**

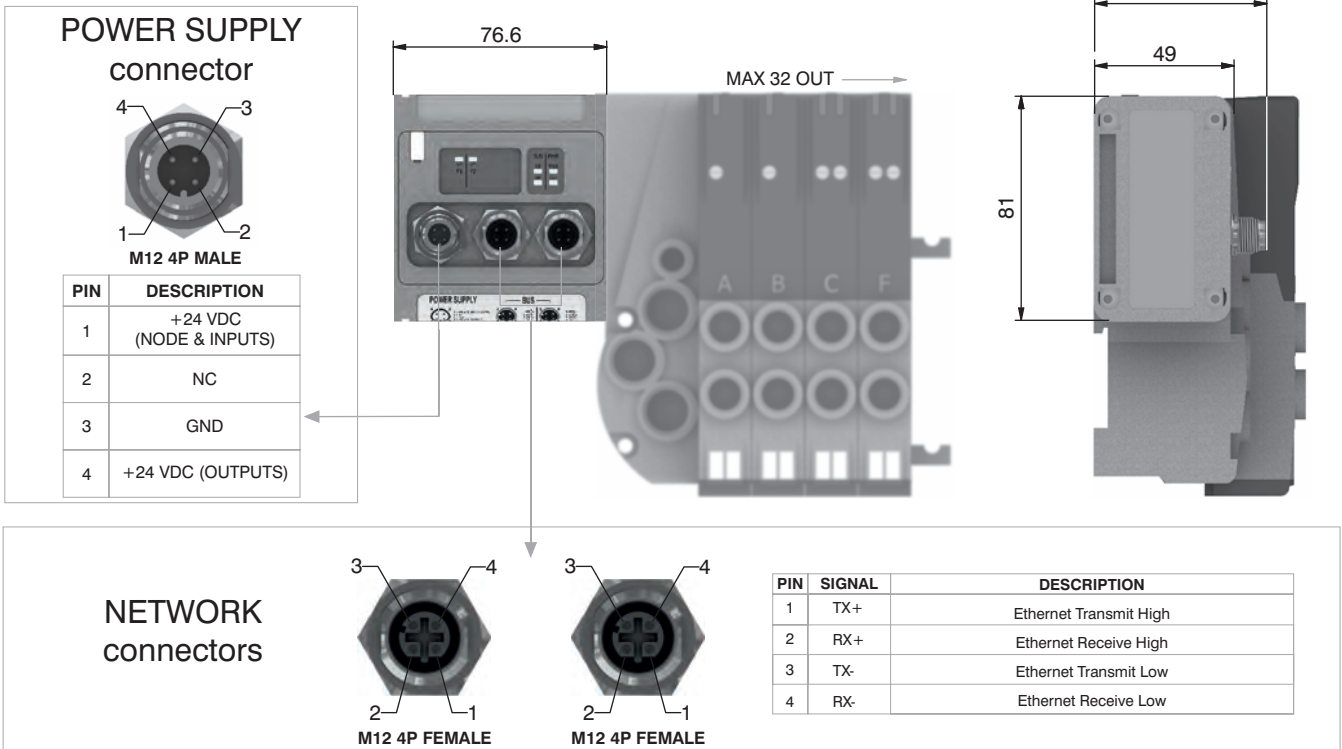
**Ordering code**

**5725.32F.EC**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32F.EC
	Specifications	EtherCAT® Specifications ETG.1000 series
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	From 1 to 65535
	Max nodes in net	65536 (slave + master)
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C



**General:**

PROFINET IO RT/IRT module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 4 Input modules 5225.25F.

The PROFINET IO RT/IRT module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus PROFINET IO RT/IRT is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

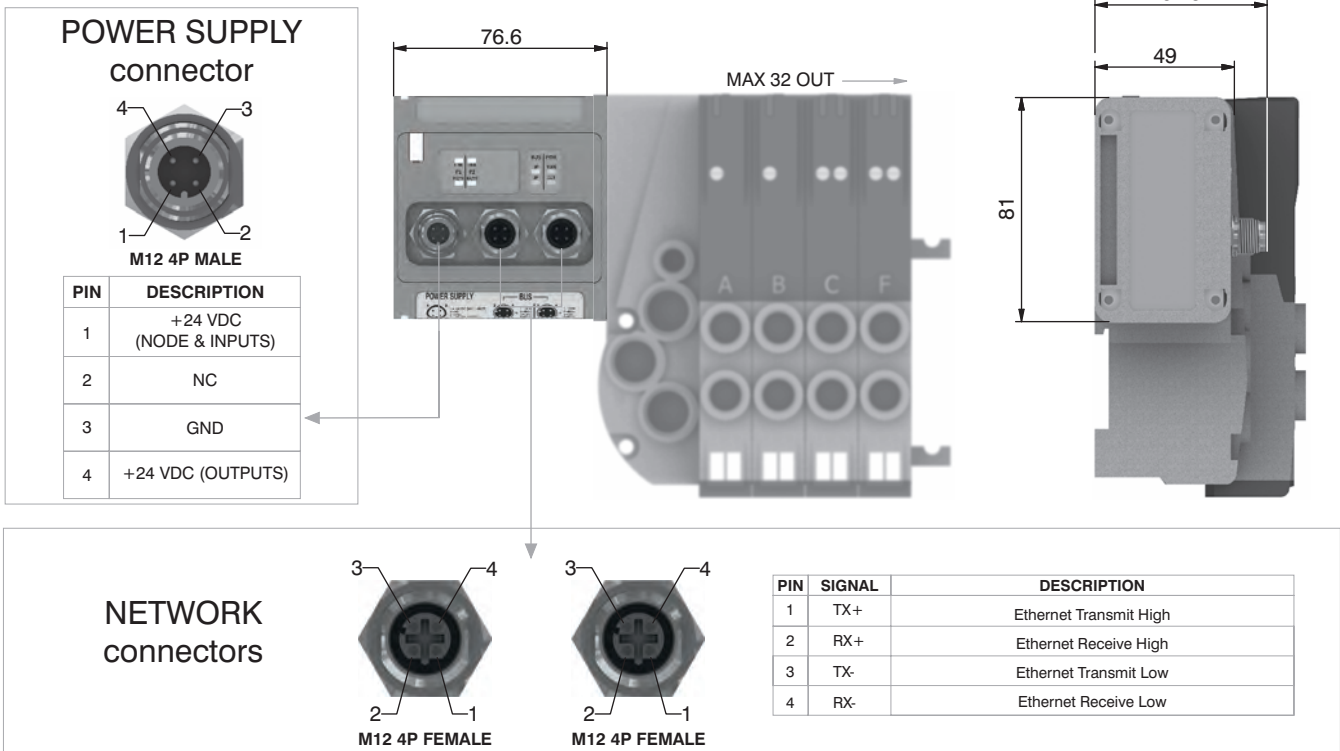
The node address is assigned during configuration.

**Ordering code**

**5725.32F.PN**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32F.PN
	Specifications	PROFINET IO RT/IRT
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

EtherNet/IP module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 4 Input modules 5225.25F.  
 The EtherNet/IP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus EtherNet/IP is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
 The node address is assigned during configuration.

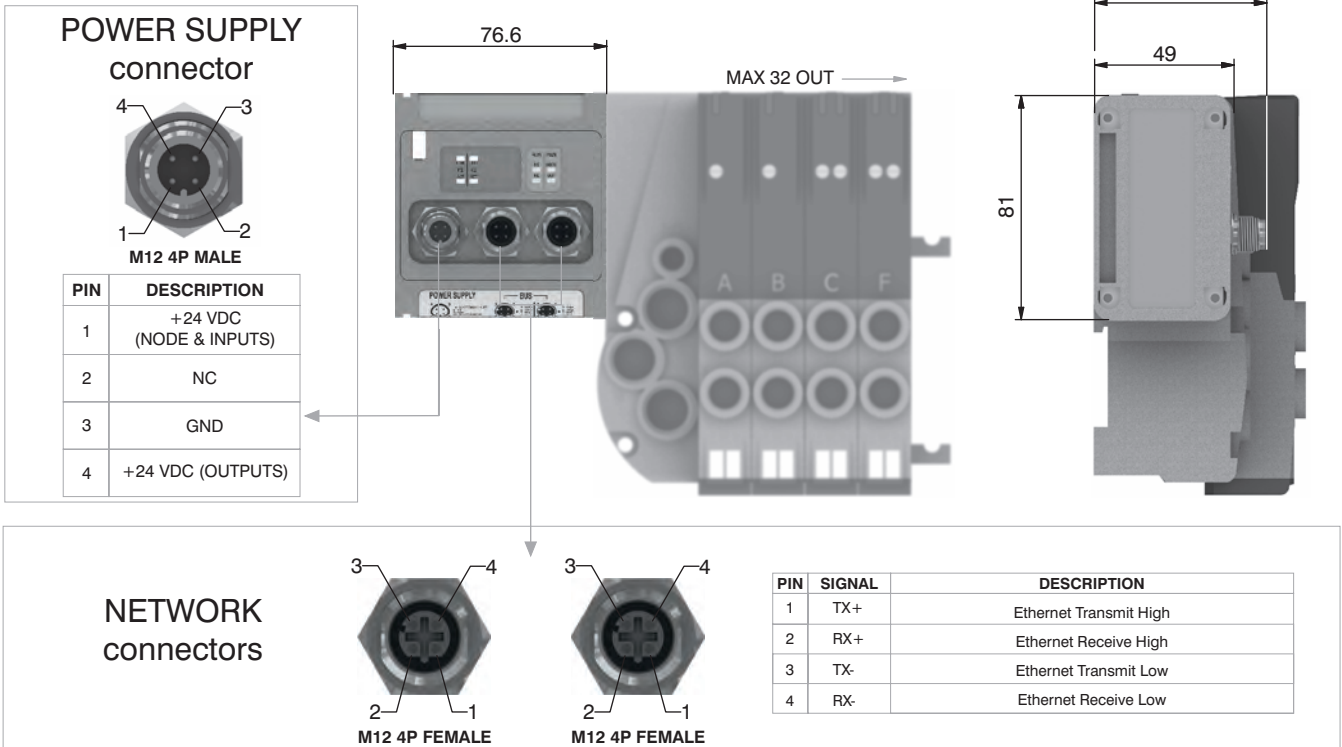
**Ordering code**

**5725.32F.EI**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32F.EI
	Specifications	The EtherNet/IP Specification
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
<b>Outputs</b>	Power supply diagnosis	Green LED PWR / Green LED OUT
	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

Powerlink module is directly integrated on Optyima-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyima-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 4 Input modules 5225.25F.

The Powerlink module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus Powerlink is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

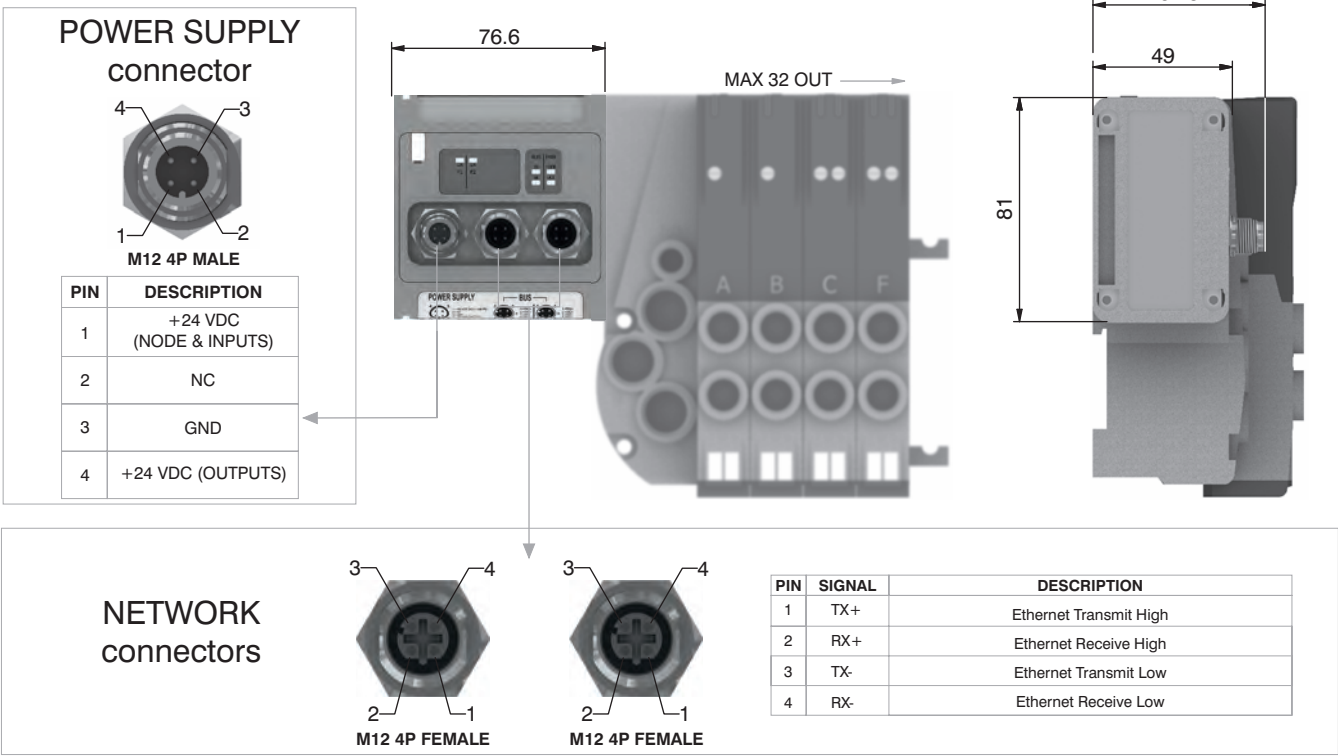
The node address is assigned during configuration.

**Ordering code**

**5725.32F.PL**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32F.PL
Specifications	Ethernet POWERLINK Communication Profile Specifications
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 400 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 4P female connectors type D (IEC 61076-2-101)
	Baud rate 100 Mbit/s
	Addresses, possible numbers 239
	Max nodes in net 240
	Maximum distance between 2 nodes 100 m
	Bus diagnosis 1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C





**General:**

Modbus/TCP module is directly integrated on Optyma-F solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-F solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08F or a max number of 4 Input modules 5225.25F.  
 The Modbus/TCP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus Modbus/TCP is possible via 2 M12 4P type D female circular connectors.  
 These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
 The node address is assigned during configuration.

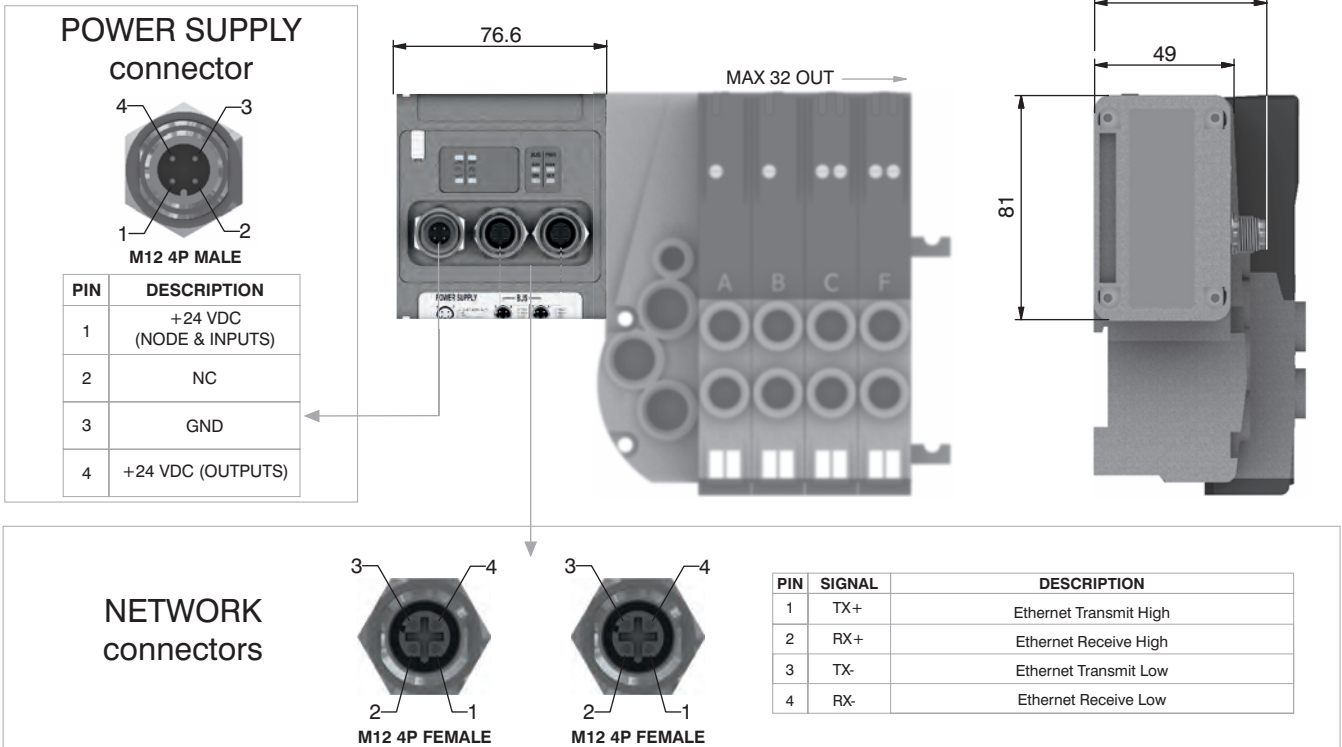
**Ordering code**

**5725.32F.MT**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32F.MT
Specifications	MODBUS Application Protocol Specification V1.1a, June 4, 2004
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 400 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 4P female connectors type D (IEC 61076-2-101)
	Baud rate 100 Mbit/s
	Addresses, possible numbers 248
	Max nodes in net 248
	Maximum distance between 2 nodes 100 m
	Bus diagnosis 1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file Modbus/TCP nodes don't require configuration file
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C

**General:**

Modules have 8 connectors M8 3P female.

The Inputs are PNP equivalent 24 VDC ±10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc.) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 200 mA.

Each module includes a 200 mA self-mending fuse. If a short circuit or a overcharge (overall current >200mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

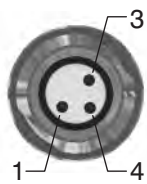
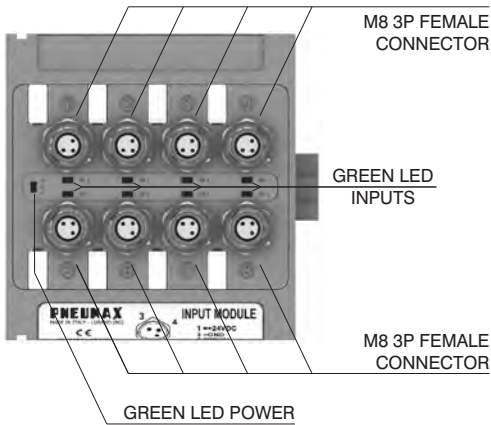
The maximum number of Input modules supported is 4.

**Ordering code**

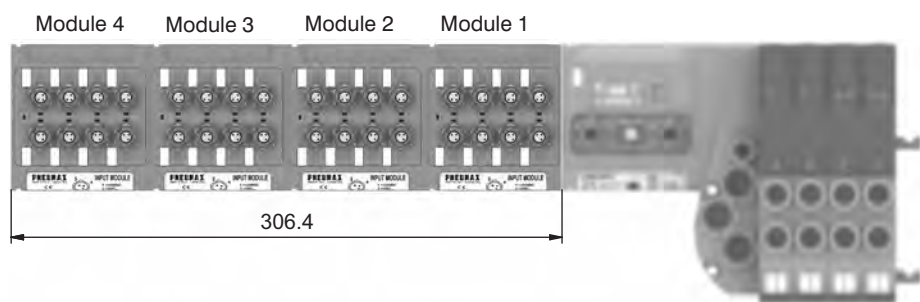
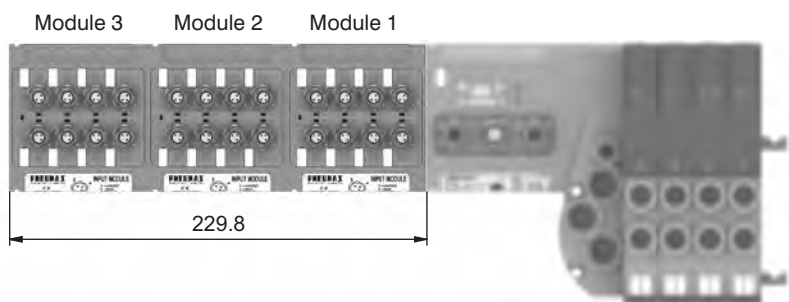
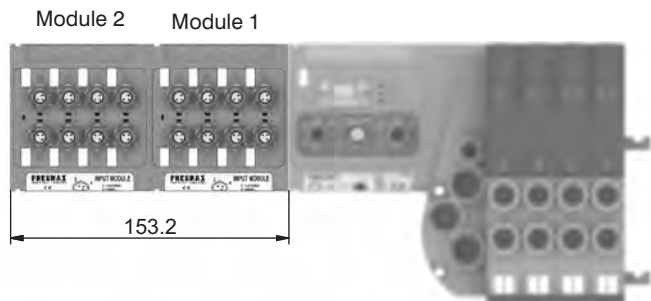
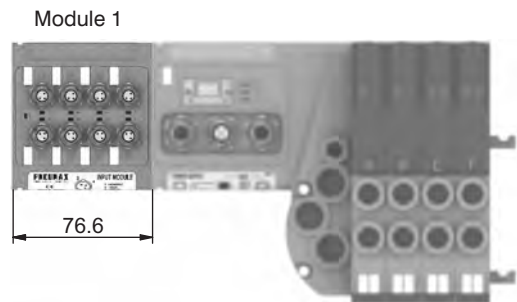
**5225.08F**



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND



**General :**

Modules are fitted with SUB-D 25 pin female connector.

The Inputs are PNP equivalent 24VDC ± 10%.

To the connector it is possible to connect both 2 wires Inputs (switches, magnetic switches pressure switches etc.) or 3 wires (proximity, photocells, electronic end of stroke sensors etc).

The maximum current available for all 16 Inputs is 750 mA.

Each module includes a 750 mA self-mending fuse. Should a short circuit or a overcharge (overall current > 750mA) occur the safety device intervenes cutting the 24VDC power supply to all pins and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate. This 16 Inputs module is counted as two 8 Inputs modules.

The Maximum number of 16 Inputs modules supported is 2 for CANopen®, DeviceNet and EtherCAT®.

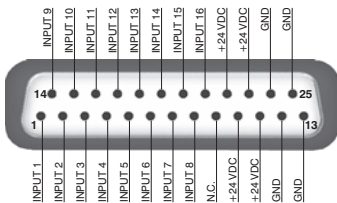
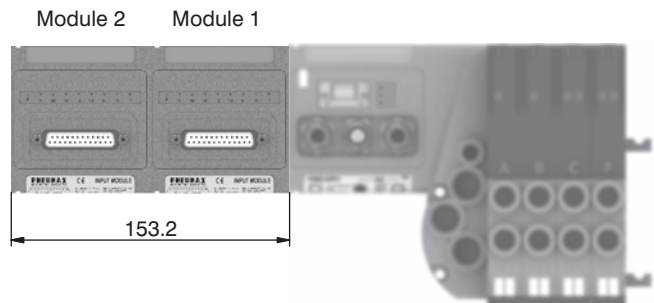
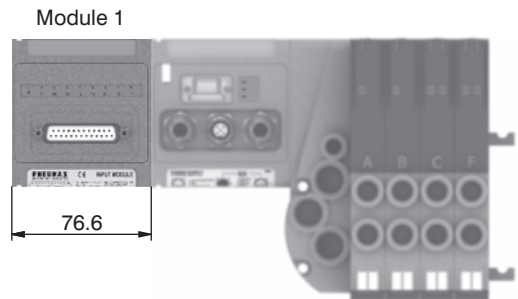
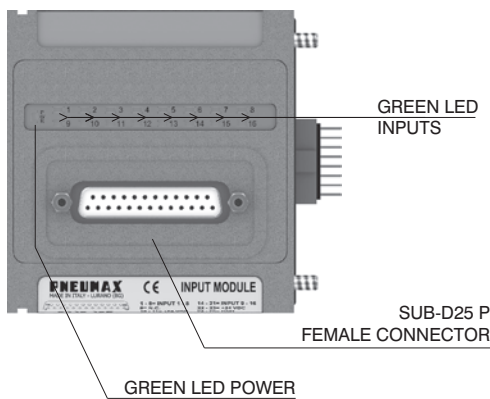
The Maximum number of 16 Inputs modules supported is 4 for PROFIBUS DP, PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Ordering code**

**5225.25F**



**Scheme / Overall dimensions and I/O layout :**



**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two analogue inputs (voltage or current).  
The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

Available models:

5225.2T.00F (voltage signal 0 - 10V);

5225.2T.01F (voltage signal 0 - 5V);

5225.2C.00F (current signal 4 - 20mA);

5225.2C.01F (current signal 0 - 20mA).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

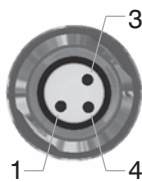
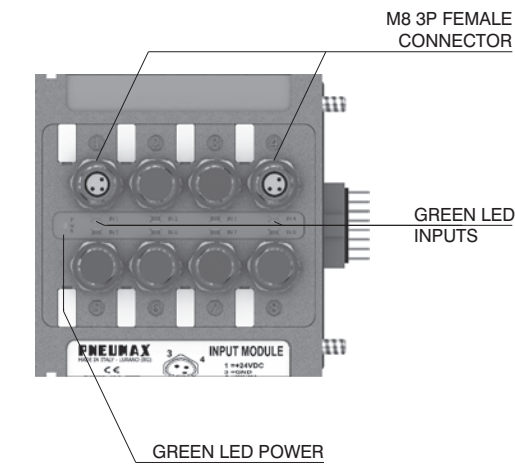
Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 analogue Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

The Maximum number of 2 analogue Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

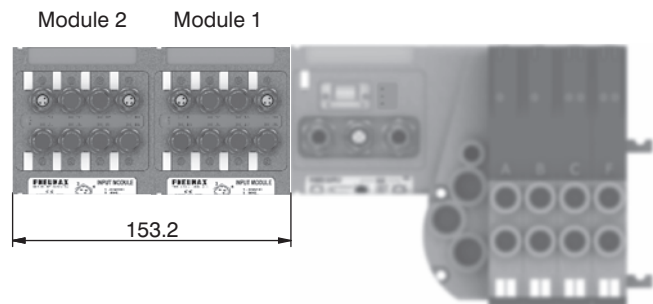
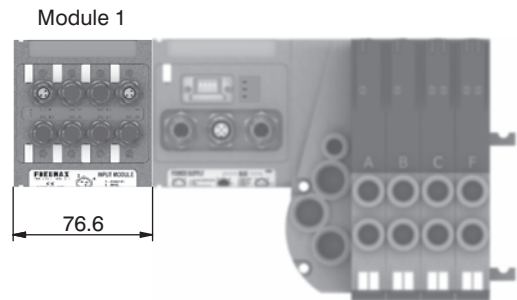
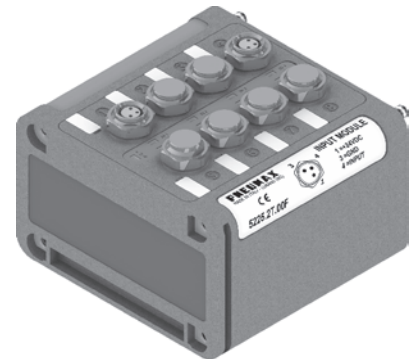
**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND

**Ordering code**

5225.2 \_ . \_ \_ F



M12A 4P female Socket		M8 3P male Plug																			
<p>Ordering code</p> <p><b>5312A.F04.00</b></p> <p>Power supply straight connector.</p>	<p>Upper view Slave connector</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC Node</td> </tr> <tr> <td>2</td> <td></td> </tr> <tr> <td>3</td> <td>0 V</td> </tr> <tr> <td>4</td> <td>+24 VDC Output</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC Node	2		3	0 V	4	+24 VDC Output	<p>Ordering code</p> <p><b>5308A.M03.00</b></p> <p>Input straight connector.</p>	<p>Upper view Slave connector</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC</td> </tr> <tr> <td>4</td> <td>INPUT</td> </tr> <tr> <td>3</td> <td>GND</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC	4	INPUT	3	GND
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M12B 5P female Plug		M12B 5P male Plug																									
<p>Ordering code</p> <p><b>5312B.F05.00</b></p> <p>Network straight connector: for Bus PROFIBUS DP.</p>	<p>Upper view Slave connector</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Supply</td> </tr> <tr> <td>2</td> <td>A-line</td> </tr> <tr> <td>3</td> <td>DGND</td> </tr> <tr> <td>4</td> <td>B-line</td> </tr> <tr> <td>5</td> <td>SHIELD</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD	<p>Ordering code</p> <p><b>5312B.M05.00</b></p> <p>Network straight connector: for Bus PROFIBUS DP.</p>	<p>Upper view Slave connector</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Supply</td> </tr> <tr> <td>2</td> <td>A-line</td> </tr> <tr> <td>3</td> <td>DGND</td> </tr> <tr> <td>4</td> <td>B-line</td> </tr> <tr> <td>5</td> <td>SHIELD</td> </tr> </tbody> </table>	PIN	DESCRIPTION	1	Power Supply	2	A-line	3	DGND	4	B-line	5	SHIELD
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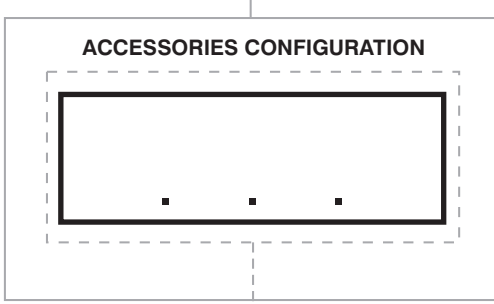
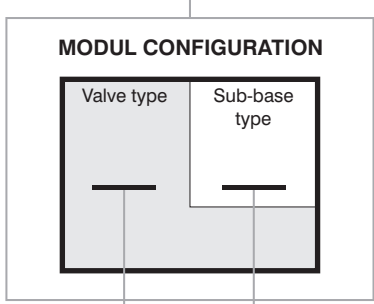
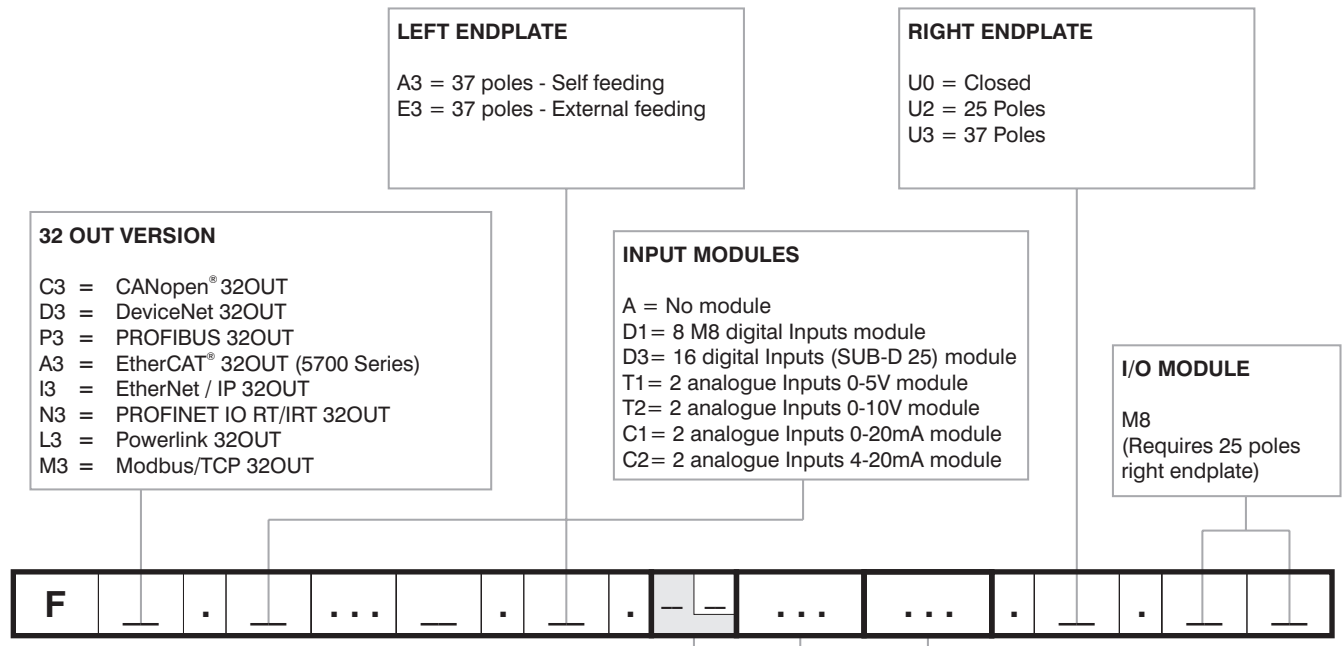
M12D 4P male Plug																
<p>Ordering code</p> <p><b>5312D.M04.00</b></p> <p>Network straight connector: for EtherCAT®, PROFINET IO RT/IRT, EtherNet/IP Powerlink, and Modbus/TCP.</p>	<p>Upper view Slave connector</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX+</td> <td>Ethernet Transmit High</td> </tr> <tr> <td>2</td> <td>RX+</td> <td>Ethernet Receive High</td> </tr> <tr> <td>3</td> <td>TX-</td> <td>Ethernet Transmit Low</td> </tr> <tr> <td>4</td> <td>RX-</td> <td>Ethernet Receive Low</td> </tr> </tbody> </table>	PIN	SIGNAL	DESCRIPTION	1	TX+	Ethernet Transmit High	2	RX+	Ethernet Receive High	3	TX-	Ethernet Transmit Low	4	RX-	Ethernet Receive Low
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4	RX-	Ethernet Receive Low														

M12 Plug	M8 Plug
<p>Ordering code</p> <p><b>5300.T12</b></p>	<p>Ordering code</p> <p><b>5300.T08</b></p>

Trademarks: EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



Manifold Layout configuration



**SHORT CODE FUNCTION / CONNECTION :**

A1= 5/2 SOL.-SPRING + BASE TYPE 1 (1 electrical signal occupied)  
A2= 5/2 SOL.-SPRING + BASE TYPE 2 (2 electrical signals occupied)  
B1= 5/2 SOL.-DIFFERENTIAL + BASE TYPE 1 (1 electrical signal occupied)  
B2= 5/2 SOL.-DIFFERENTIAL + BASE TYPE 2 (2 electrical signals occupied)  
C2= 5/2 SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
E2= 5/3 CC SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
F2= 2x3/2 NC-NC (= 5/3 OC) SOL.-SOL. +BASE TYPE 2 (2 electrical signals occupied)  
G2= 2x3/2 NO-NO (= 5/3 PC) SOL.-SOL. +BASE TYPE 2 (2 electrical signals occupied)  
H2= 2x3/2 NC-NO SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
I2= 2x3/2 NO-NC SOL.-SOL. + BASE TYPE 2 (2 electrical signals occupied)  
T1= FREE VALVE SPACE PLUG + BASE FOR MONOSTABLE VALVE  
T2= FREE VALVE SPACE PLUG + BASE FOR BISTABLE VALVE

**ACCESSORIES**

U2 = Power supply 2 positions module  
U4 = Power supply 4 positions module  
W = Intermediate supply & exhaust module  
X = Diaphragm plug on pipe 1  
Y = Diaphragm plug on pipe 3  
Z = Diaphragm plug on pipe 5  
XY = Diaphragm plug on pipe 1 & 3  
ZX = Diaphragm plug on pipe 5 & 1  
ZY = Diaphragm plug on pipe 5 & 3  
ZXY = Diaphragm plug on pipe 5, 1 & 3

**NOTE:**  
While configuring the manifold always be careful that the maximum number of electrical signals available is 32.  
The use of monostable valve mounted on a base type 2 ( 2 electrical signals occupied ) causes the loss of one electric signal. In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for exemple : regarding the 3 & 5 conduits, put the Y & Z letters).  
Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.



# OPTYMA<sup>32</sup>-T

## General characteristics

With the introduction of the "T" configuration of solenoid valves with integrated pneumatic connections fitted directly on the sub base the 2500 series (called OPTYMA) is now richer than ever.

Many technical features make the new product interesting:

- Flow rate of 800 NI/min
- Low consumption coils placed all in one side of the valve
- Quick mounting of the valve to the base using just one screw
- Possibility to use different pressures along the manifold (including vacuum)
- Possibility to replace the valve without the need to disconnect the connections
- IP65 environmental protection
- Electrical connection directly integrated into the base, 32 electrical signals available (can be used to build up a manifold of 32 monostable valves, 16 bistable valves or any combination within that limit).

The electrical connection is made via 37 pin SUB-D connector.

Possibility to integrate with Field Bus modules (all the most common protocols will be available).

Possibility to connect input modules (even on the base that does not have the Field Bus module).

Large use of technopolymer material reduces the overall weight of the manifold.

**"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power-Directional control valves-Measurement of shifting time".**

## Main characteristics

Integrated and optimized electrical connection system

IP65 protection degree

Only one 19mm size

Electrical line connections on one side

Monostable and bistable solenoid valves with the same size dimensions

Easy and fast manifold assembly - tie rod system to hold the sub bases together

All pneumatic connections (push-in) on the same side of the manifold

## Construction characteristics

Body	Technopolymer
Operators	Technopolymer
Spools	Nikel plated steel / Technopolymer
Spacers	Technopolymer
Seals	NBR
Piston seals	NBR
Springs	AISI 302 stainless steel
Pistons	Technopolymer

## Functions

5/2 MONOST. SOL. SPRING

5/2 MONOST. SOL. DIFFERENTIAL

5/2 BISTABLE SOL. SOL.

5/3 CC SOL. SOL.

2x3/2 NC-NC (= 5/3 OC) SOL. SOL.

2x3/2 NO-NO (= 5/3 PC) SOL. SOL.

2x3/2 NC-NO SOL. SOL.

## Technical characteristics

Voltage	24 VDC $\pm$ 10% PNP (NPN and AC on request)
Pilot consumption	1,3 Watt
Valve working pressure [1]	from vacuum to 10 bar max.
Pilot working pressure [12-14]	From 3 to 7 bar max.
Operating temperature	-5°C+50°C
Protection degree	IP65
Life (standard operating conditions)	50.000.000
Fluid	Filtered and lubricated air or not (if lubricated air, the lubrication must be continuous)



**Solenoid - Spring**

Ordering code

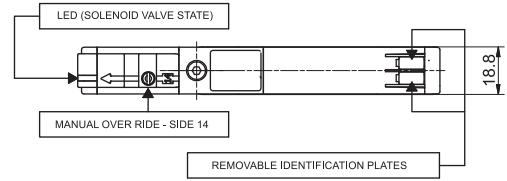
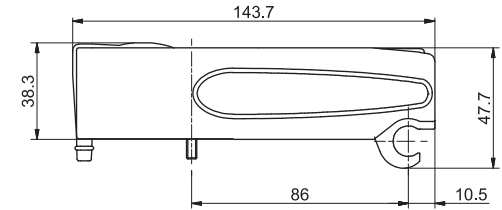
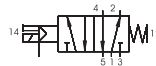
**2541.52.00.39. V**

VOLTAGE

02 = 24 VDC PNP

12 = 24 VDC NPN

05 = 24 VAC



SHORT FUNCTION CODE "A"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	750	14	40	From vacuum to 10	3 - 7 bar	-5° / +50°	129

**Solenoid - Differential**

Ordering code

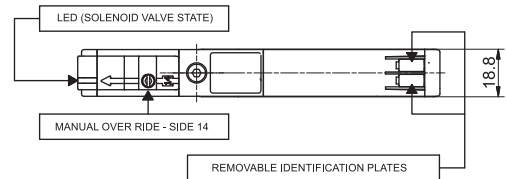
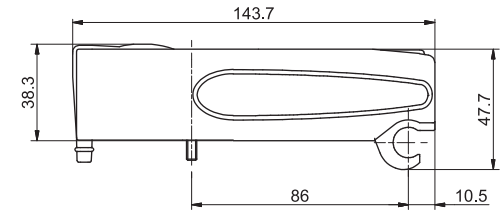
**2541.52.00.36. V**

VOLTAGE

02 = 24 VDC PNP

12 = 24 VDC NPN

05 = 24 VAC



SHORT FUNCTION CODE "B"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	750	20	29	From vacuum to 10	3 - 7 bar	-5° / +50°	126

**Solenoid - Solenoid**

Ordering code

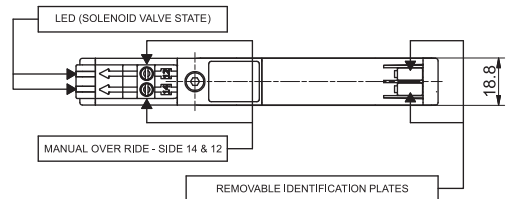
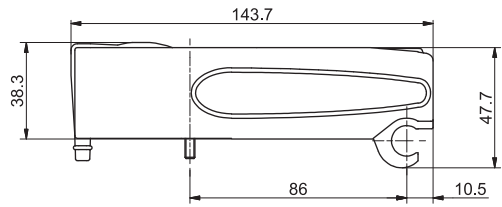
**2541.52.00.35. V**

VOLTAGE

02 = 24 VDC PNP

12 = 24 VDC NPN

05 = 24 VAC



SHORT FUNCTION CODE "C"  
 \*Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time.\*

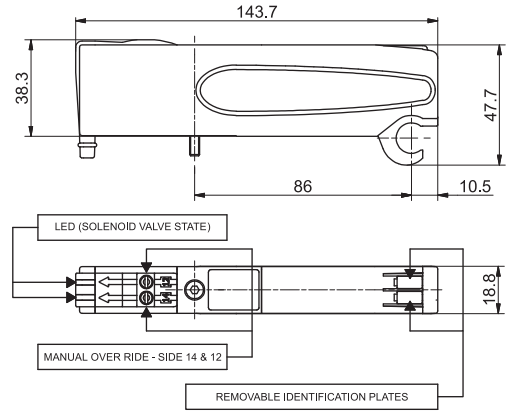
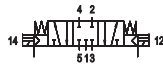
**Operational characteristic**

Fluid	Flow rate at 6 bar with $\Delta p=1$ (NI/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Filtered air, with or without lubrication	750	10	14	From vacuum to 10	3 - 7 bar	-5° / +50°	134



**Solenoid - Solenoid - (5/3 Closed centres)**

Ordering code
<b>2541.53.31.35.V</b>
VOLTAGE
V 02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC

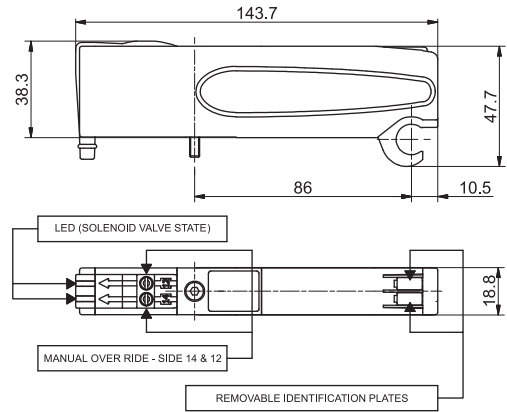


SHORT FUNCTION CODE "E"  
 "Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic		Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)			From vacuum to 10	3 - 7 bar	-5° / +50°	132
Filtered air, with or without lubrication	600	15	20				

**Solenoid - Solenoid 2x3/2**

Ordering code
<b>2541.62.F.35.V</b>
FUNCTION
44 = NC - NC (5/3 Open centres)
55 = NO - NO (5/3 Pressured centres)
F 45 = NC - NO (Normally Closed - Normally Open)
54 = NO - NC (Normally Open - Normally Closed)
VOLTAGE
V 02 = 24 VDC PNP
12 = 24 VDC NPN
05 = 24 VAC



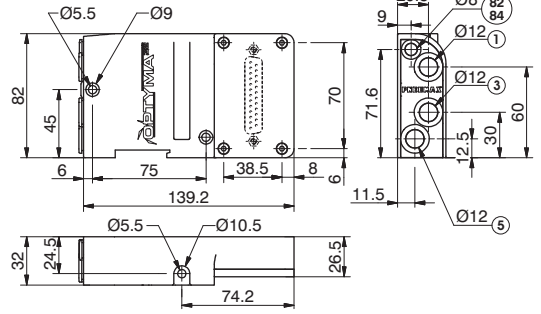
SHORT FUNCTION CODE:  
 NC-NC (5/3 Open centres) = "F"  
 NO-NC (5/3 Pressured centres) = "G"  
 NC-NO = "H"

"Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power - Directional control valves - Measurement of shifting time."

Operational characteristic		"Example: If inlet pressure is set at 5bar then pilot pressure must be at least $P_p=2,5+(0,2*5)=3,5bar$ "		Working pressure (bar)	Pressure range (bar) pilots 12-14	Temperature °C	Weight (gr.)
Fluid	Flow rate at 6 bar with $\Delta p=1$ (Nl/min)	Response time according to ISO 12238, activation time (ms)	Response time according to ISO 12238, deactivation time (ms)	From vacuum to 10	$\geq 2,5+(0,2xP_{alim.})$	-5° / +50°	122
Filtered air, with or without lubrication	700	15	25				

**Right Endplates**

Ordering code
<b>2540.03.C</b>
CONNECTOR TYPE
00 = Exhaust electrical connection closed
25P = Connectors 25 poles



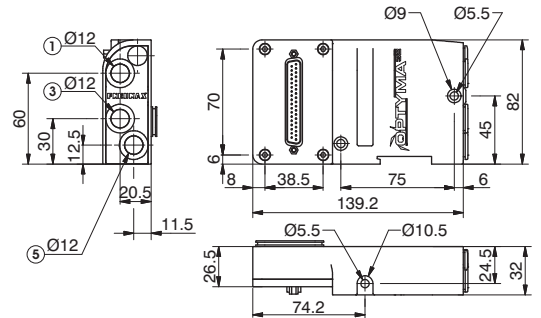
Weight gr. 274

CONDUIT 82/84 = DO NOT PRESSURIZE, SOLENOID PILOTS EXHAUST

<b>Operating Characteristics</b>	Fluid	Pressure range (bar)	Temperature °C
	Filtered and lubricated air or not	From vacuum to 10	-5 - +50

**Left Endplates - External feeding base**

Ordering code
<b>2540.02.C</b>
CONNECTOR TYPE
37P = Connector 37 poles PNP
25P = Connector 25 poles PNP
37N = Connector 37 poles NPN
25N = Connector 25 poles NPN
37A = Connector 37 poles AC
25A = Connector 25 poles AC



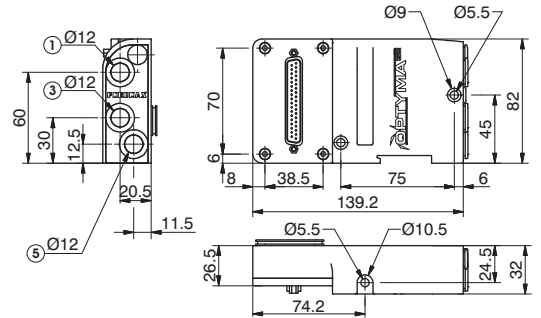
Weight gr. 300

12/14 divided from conduct 1

<b>Operating Characteristics</b>	Fluid	Pressure range (bar)	Pilot working pressure (bar)	Temperature °C
	Filtered and lubricated air or not	From vacuum to 10	3 - 7	-5 - +50

**Left Endplates - Self-feeding Base**

Ordering code
<b>2540.12.C</b>
CONNECTOR TYPE
37P = Connector 37 poles PNP
25P = Connector 25 poles PNP
37N = Connector 37 poles NPN
25N = Connector 25 poles NPN
37A = Connector 37 poles AC
25A = Connector 25 poles AC



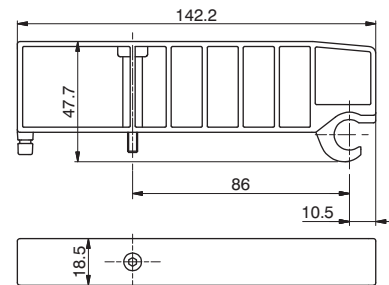
Weight gr. 300

12/14 connected with conduct 1

<b>Operating Characteristics</b>	Fluid	Pilot working pressure (bar)	Temperature °C
	Filtered and lubricated air or not	3 - 7	-5 - +50

**Closing plate**

Ordering code
<b>2530.00</b>

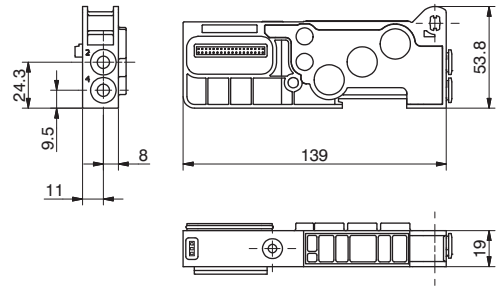


Weight gr. 53,5  
SHORT FUNCTION CODE "T"

<b>Operating Characteristics</b>	Fluid	Pressure range (bar)	Temperature °C
	Filtered and lubricated air or not	From vacuum to 10	-5 - +50

**Modular base**

Ordering code
<b>254C.01V</b>
CONNECTIONS
1 = G1/8" Female
4 = Cartridge Ø 4
6 = Quick fitting tube Ø 6
8 = Quick fitting tube Ø 8
VERSION
V = Monostable
B = Bistable

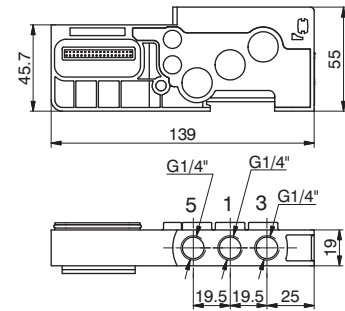


Weight gr. 96,5

<b>Operating Characteristics</b>	Fluid	Pressure range (bar)	Temperature °C
	Filtered and lubricated air or not	From vacuum to 10	-5 - +50

**Intermediate Inlet/Exhaust module**

Ordering code
<b>2540.10</b>

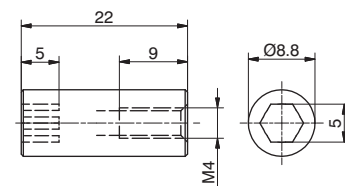


Weight gr. 115  
SHORT FUNCTION CODE "W"

<b>Operating Characteristics</b>	Fluid	Pressure range (bar)	Temperature °C
	Filtered and lubricated air or not	From vacuum to 10	-5 - +50

**Nut**

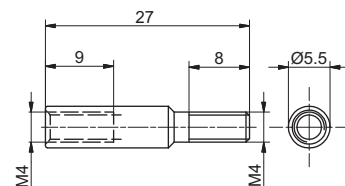
Ordering code
<b>2540.KD.00</b>



Weight gr. 10  
The Kit includes 4 pieces

**Extension (1 Position)**

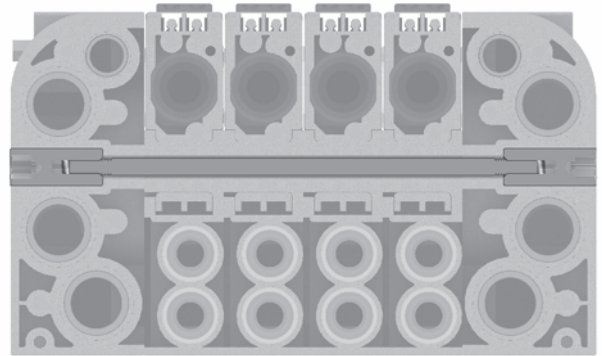
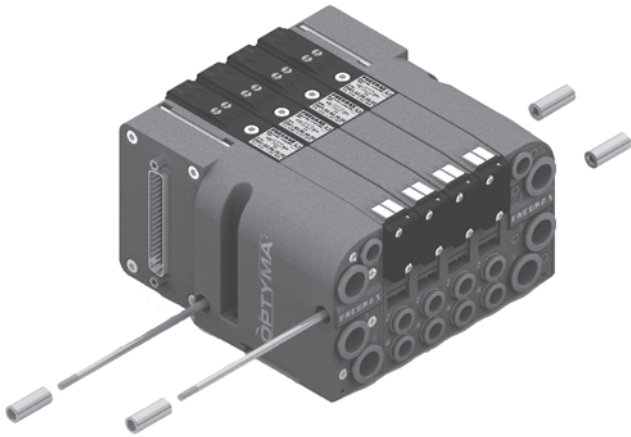
Ordering code
<b>2540.KP.01</b>



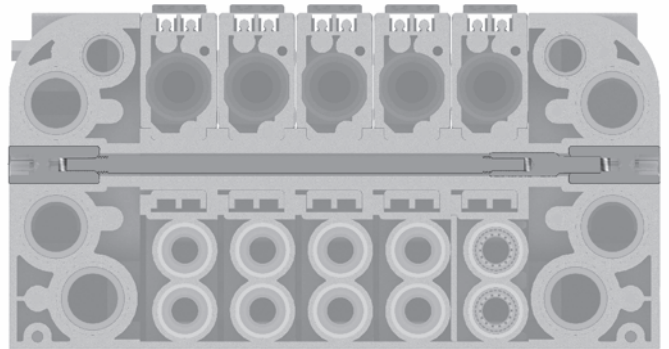
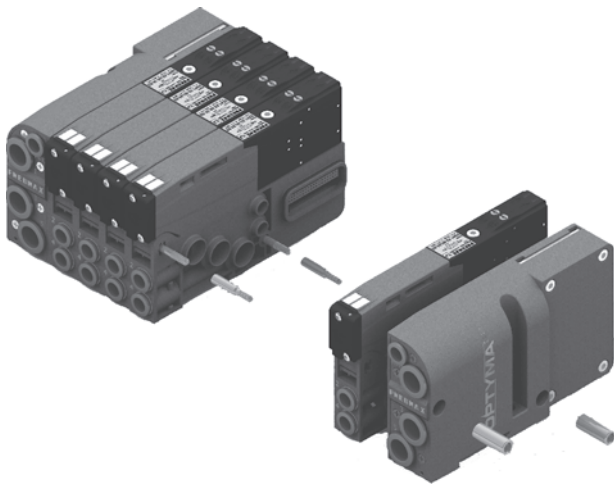
Weight gr. 3,5  
The Kit includes 2 pieces

2

**Set with single tie-rod (max. 32 Solenoid valves)**



**Set with tie-rod, more extension adding a valve**

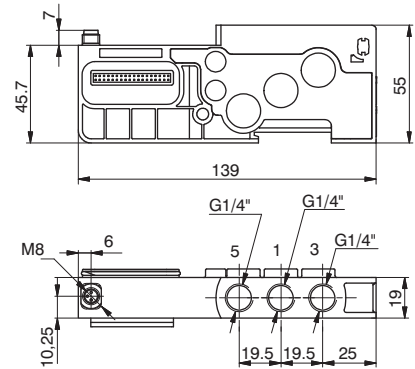
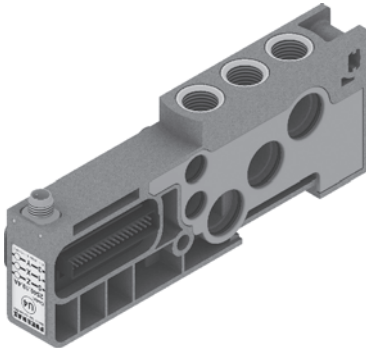


**General :**

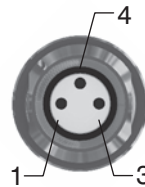
Each Optyma-T manifold lets to manage 32 command signals for the valves. Optyma-T serial nodes (CANopen®, DeviceNet, PROFIBUS DP, EtherCAT®, PROFINET IO RT/IRT, EtherNet/IP and Powerlink) have a single pin for the power supply of the solenoid valves. So if you want to interrupt the power supply of one valve it is necessary to interrupt all the valves. The additional power supply module lets to interrupt at the same time the first 2 available command signals for the valves after the module itself. The additional power supply module is particularly useful also when you use control signals that block the valves. This application is effective both with serial management and multi-pole connection of the manifolds. This module is inserted directly into the Optyma-T solenoid valves manifold.

**Ordering code**

**2540.10.2A**



In particular this module is fitted with a M8 3 pins connector:  
 +24V, not connected, GND.



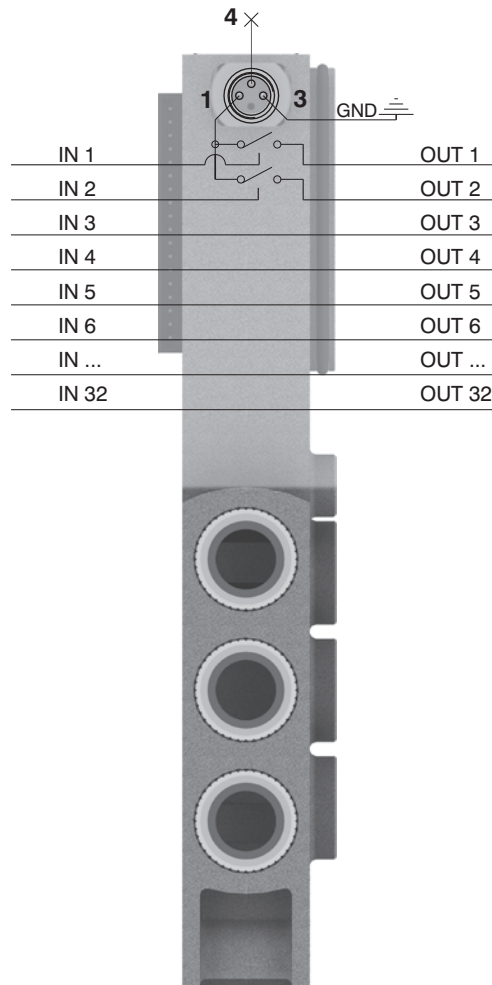
PIN	DESCRIPTION
1	+24 VDC
4	NOT CONNECTED
3	GND

**WORKING PRINCIPLE / SIMPLIFIED FUNCTIONAL DIAGRAM**

This module uses an external power supply (+24VDC) to manage the solenoid valves.

The output signal from serial node / multi-pole connection is used as command signal: when it is high the +24VDC will be present at the module output.

If you want to cut off the power supply to a group of 2 valves it is sufficient to take away the +24VDC provided to the module by the M8 connector.



**Please note:** It is possible to use more modules to interrupt all the command signals, simply by inserting them before the signals to interrupt and after the signals already interrupted.



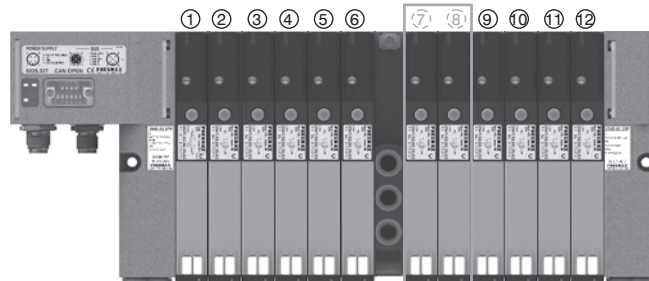
**Usage examples:**

**EXAMPLE 1:**

Manifold of 12 monostable valves on which you want to interrupt signals 7-8

**Assembly:**

- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves. Please note: the first 2 monostable of these are interruptible by the module, while the following 4 will work correctly managed directly by the corresponding command signals.

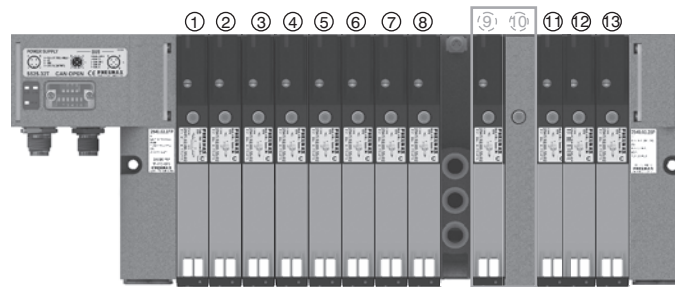


**EXAMPLE 2:**

Manifold of 12 monostable valves on which you want to interrupt signal 9

**Assembly:**

- 8 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 1 monostable valve (interruptible),
- 1 closing plate mounted on a monostable base,
- 3 monostable valves (work correctly managed directly by the corresponding command signals).



**Please note:** Each additional power supply module interrupts always 2 electrical signals.



If you need to interrupt less than 2 signals you can:

- assemble the valves to interrupt in the last positions of the manifold, so you don't need to worry about the interrupted exceeding signals;
- use a bistable base and mount a monostable valve (for each signal less than the 2 standard);
- use a monostable base and mount a closing plate (for each signal less than the 2 standard).

**EXAMPLE 3:**

Manifold of 7 monostable e 3 bistable valves on which you want to interrupt signals 2-3 and 8-9.

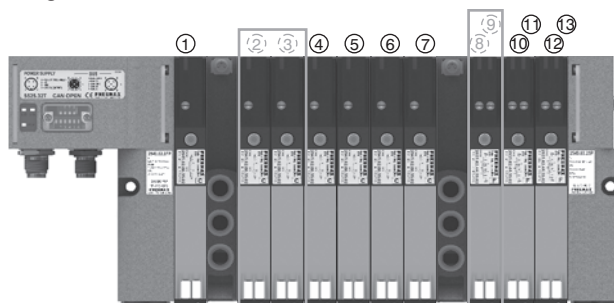
**Assembly:**

- 1 monostable valve (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves.

Please note: the first 2 monostable of these are interruptible by the module, while the following 4 will work correctly managed directly by the corresponding command signals.

- 1 additional power supply module,
- 3 bistable valves.

**Please note:** the first bistable of these valves is interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.



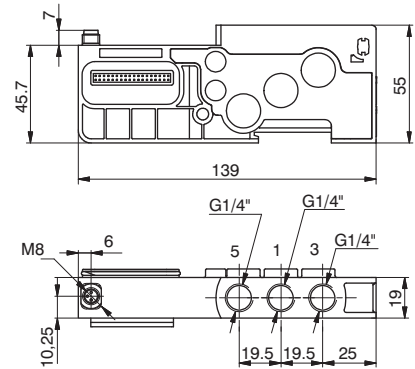
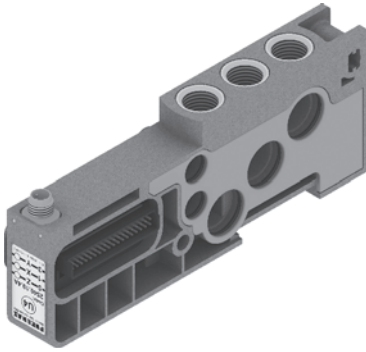


**General :**

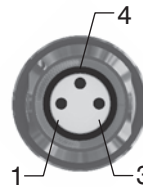
Each Optyma-T manifold lets to manage 32 command signals for the valves. Optyma-T serial nodes (CANopen®, DeviceNet, PROFIBUS DP, EtherCAT®, PROFINET I/O RT/IRT, EtherNet/IP and Powerlink) have a single pin for the power supply of the solenoid valves. So if you want to interrupt the power supply of one valve it is necessary to interrupt all the valves. The additional power supply module lets to interrupt at the same time the first 4 available command signals for the valves after the module itself. The additional power supply module is particularly useful also when you use control signals that block the valves. This application is effective both with serial management and multi-pole connection of the manifolds. This module is inserted directly into the Optyma-T solenoid valves manifold.

**Ordering code**

**2540.10.4A**



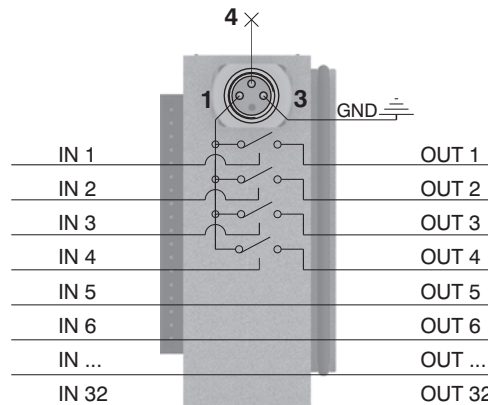
In particular this module is fitted with a M8 3 pins connector: +24V, not connected, GND.



PIN	DESCRIPTION
1	+24 VDC
4	NOT CONNECTED
3	GND

**WORKING PRINCIPLE / SIMPLIFIED FUNCTIONAL DIAGRAM**

This module uses an external power supply (+24VDC) to manage the solenoid valves.



The output signal from serial node / multi-pole connection is used as command signal: when it is high the +24VDC will be present at the module output.

If you want to cut off the power supply to a group of 4 valves it is sufficient to take away the +24VDC provided to the module by the M8 connector.

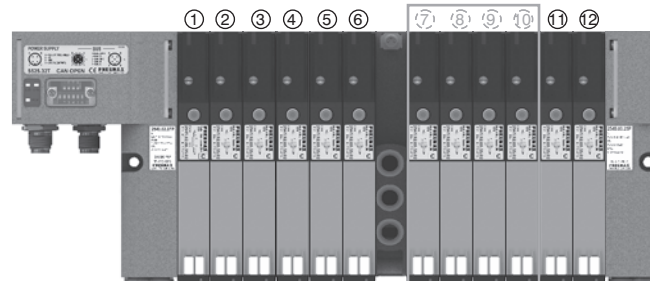
**Please note:** It is possible to use more modules to interrupt all the command signals, simply by inserting them before the signals to interrupt and after the signals already interrupted.

**Usage examples:**

**EXAMPLE 1:**  
Manifold of 12 monostable valves on which you want to interrupt signals 7-8-9-10

**Assembly:**

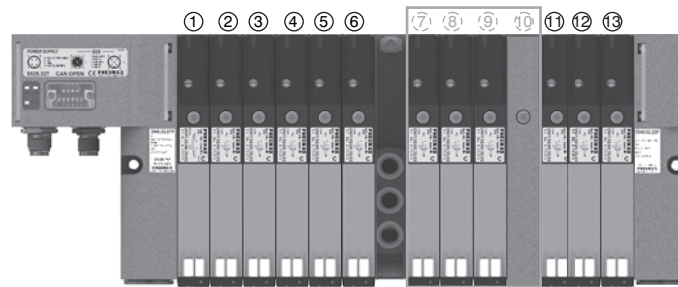
- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 6 monostable valves. Please note: the first 4 monostable of these are interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.



**EXAMPLE 2:**  
Manifold of 12 monostable valves on which you want to interrupt signals 7-8-9

**Assembly:**

- 6 monostable valves (not interruptible because before the module),
- 1 additional power supply module,
- 3 monostable valves (interruptible),
- 1 closing plate mounted on a monostable base,
- 3 monostable valves (work correctly managed directly by the corresponding command signals).



**Please note:** Each additional power supply module interrupts always 4 electrical signals.



If you need to interrupt less than 4 signals you can:

- assemble the valves to interrupt in the last positions of the manifold, so you don't need to worry about the interrupted exceeding signals;
- use a bistable base and mount a monostable valve (for each signal less than the 4 standard);
- use a monostable base and mount a closing plate (for each signal less than the 4 standard).

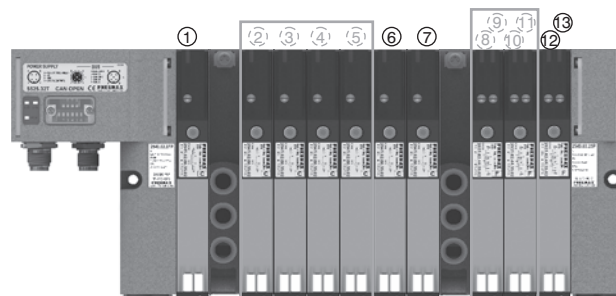
**EXAMPLE 3:**  
Manifold of 7 monostable e 3 bistable valves on which you want to interrupt signals 2-3-4-5 and 8-9-10-11.

**Assembly:**

- 1 monostable valve (not interruptible because before the module),
  - 1 additional power supply module,
  - 6 monostable valves.
- Please note: the first 4 monostable of these are interruptible by the module, while the following 2 will work correctly managed directly by the corresponding command signals.

- 1 additional power supply module,
- 3 bistable valves.

**Please note:** the first 2 bistable of these valves are interruptible by the module, while the following will work correctly managed directly by the corresponding command signals.



Tie-rod M4		Accessories table for manifolds																																																																								
<p>Ordering code</p> <p><b>2540.KT.Ⓟ</b></p> <p>N. POSITIONS</p> <p>01=Nr. 1 Position</p> <p>02=Nr. 2 Positions</p> <p>03=Nr. 3 Positions</p> <p>04=Nr. 4 Positions</p> <p>05=Nr. 5 Positions</p> <p>06=Nr. 6 Positions</p> <p>07=Nr. 7 Positions</p> <p>08=Nr. 8 Positions</p> <p>09=Nr. 9 Positions</p> <p>10=Nr. 10 Positions</p> <p>11=Nr. 11 Positions</p> <p>12=Nr. 12 Positions</p> <p>13=Nr. 13 Positions</p> <p>14=Nr. 14 Positions</p> <p>...</p> <p>32=Nr. 32 Positions</p>	 <p style="font-size: 8px;">L=36mm+ (N. pos. x 19mm)</p> <p style="font-size: 8px;">M4</p>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>CODE</th> <th>"L" DIMENSION</th> </tr> </thead> <tbody> <tr><td>2540.KT.01</td><td>55</td></tr> <tr><td>2540.KT.02</td><td>74</td></tr> <tr><td>2540.KT.03</td><td>93</td></tr> <tr><td>2540.KT.04</td><td>112</td></tr> <tr><td>2540.KT.05</td><td>131</td></tr> <tr><td>2540.KT.06</td><td>150</td></tr> <tr><td>2540.KT.07</td><td>169</td></tr> <tr><td>2540.KT.08</td><td>188</td></tr> <tr><td>2540.KT.09</td><td>207</td></tr> <tr><td>2540.KT.10</td><td>226</td></tr> <tr><td>2540.KT.11</td><td>245</td></tr> <tr><td>2540.KT.12</td><td>264</td></tr> <tr><td>2540.KT.13</td><td>283</td></tr> <tr><td>2540.KT.14</td><td>302</td></tr> <tr><td>2540.KT. ...</td><td>...</td></tr> <tr><td>2540.KT.32</td><td>644</td></tr> </tbody> </table>	CODE	"L" DIMENSION	2540.KT.01	55	2540.KT.02	74	2540.KT.03	93	2540.KT.04	112	2540.KT.05	131	2540.KT.06	150	2540.KT.07	169	2540.KT.08	188	2540.KT.09	207	2540.KT.10	226	2540.KT.11	245	2540.KT.12	264	2540.KT.13	283	2540.KT.14	302	2540.KT. ...	...	2540.KT.32	644	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>Set of N° positions</th> <th>Ordering code</th> </tr> </thead> <tbody> <tr><td>1</td><td>2540.KD.00 + 2540.KT.01</td></tr> <tr><td>2</td><td>2540.KD.00 + 2540.KT.02</td></tr> <tr><td>3</td><td>2540.KD.00 + 2540.KT.03</td></tr> <tr><td>4</td><td>2540.KD.00 + 2540.KT.04</td></tr> <tr><td>5</td><td>2540.KD.00 + 2540.KT.05</td></tr> <tr><td>6</td><td>2540.KD.00 + 2540.KT.06</td></tr> <tr><td>7</td><td>2540.KD.00 + 2540.KT.07</td></tr> <tr><td>8</td><td>2540.KD.00 + 2540.KT.08</td></tr> <tr><td>9</td><td>2540.KD.00 + 2540.KT.09</td></tr> <tr><td>10</td><td>2540.KD.00 + 2540.KT.10</td></tr> <tr><td>11</td><td>2540.KD.00 + 2540.KT.11</td></tr> <tr><td>12</td><td>2540.KD.00 + 2540.KT.12</td></tr> <tr><td>13</td><td>2540.KD.00 + 2540.KT.13</td></tr> <tr><td>14</td><td>2540.KD.00 + 2540.KT.14</td></tr> <tr><td>15</td><td>2540.KD.00 + 2540.KT.15</td></tr> <tr><td>16</td><td>2540.KD.00 + 2540.KT....</td></tr> <tr><td>32</td><td>2540.KD.00 + 2540.KT.32</td></tr> </tbody> </table>	Set of N° positions	Ordering code	1	2540.KD.00 + 2540.KT.01	2	2540.KD.00 + 2540.KT.02	3	2540.KD.00 + 2540.KT.03	4	2540.KD.00 + 2540.KT.04	5	2540.KD.00 + 2540.KT.05	6	2540.KD.00 + 2540.KT.06	7	2540.KD.00 + 2540.KT.07	8	2540.KD.00 + 2540.KT.08	9	2540.KD.00 + 2540.KT.09	10	2540.KD.00 + 2540.KT.10	11	2540.KD.00 + 2540.KT.11	12	2540.KD.00 + 2540.KT.12	13	2540.KD.00 + 2540.KT.13	14	2540.KD.00 + 2540.KT.14	15	2540.KD.00 + 2540.KT.15	16	2540.KD.00 + 2540.KT....	32	2540.KD.00 + 2540.KT.32	<p>2540.KD.00</p> <p style="text-align: center;">N° 4 pieces</p> <hr/> <p>2540.KT.XX</p> <p style="text-align: center;">N° 2 pieces</p>
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Polyethylene Silencer Series SPL-R		Diaphragm plug	
<p>Ordering code</p> <p><b>SPLR.Ⓟ</b></p> <p>TUBE DIAMETER</p> <p>8=8 mm</p> <p>12=12 mm</p>		<p>Ordering code</p> <p><b>2530.17</b></p>	
		Weight gr. 6,5	

Cable complete with connector, 25 Poles IP65	
<p>Ordering code</p> <p><b>2300.25.Ⓛ.Ⓒ</b></p> <p>CABLE LENGHT</p> <p>03 = 3 meters</p> <p>05 = 5 meters</p> <p>10 = 10 meters</p> <p>CONNECTORS</p> <p>10 = In line</p> <p>90 = 90° Angle</p>	

Cable complete with connector, 37 Poles IP65	
<p>Ordering code</p> <p><b>2400.37.Ⓛ.Ⓒ</b></p> <p>CABLE LENGHT</p> <p>03 = 3 meters</p> <p>05 = 5 meters</p> <p>10 = 10 meters</p> <p>CONNECTORS</p> <p>10 = In line</p> <p>90 = 90° Angle</p>	

Cable complete with connector, 25 Poles IP65	
<p>Ordering code</p> <p><b>2400.25.Ⓛ.25</b></p> <p>CABLE LENGHT</p> <p>03 = 3 meters</p> <p>05 = 5 meters</p> <p>10 = 10 meters</p>	

The electrical connection is achieved by a 37 pin connector and can manage up to 32 solenoid pilots. It is also possible use a 25 sub-D pin connector and, in this case, it is possible to manage a maximum of 22 outputs. The management and distribution of the electrical signals between each valve is obtained thanks to an electrical connector which receives the signals from the previous module, uses one, two or none depending on the type, and carries forward to the next module the remaining.

Bistable valves, 5/3 and 2x3/2 valves which have two solenoid pilots built in, use two signals; the first is directed to the pilot side 14 the second to the pilot side 12. Modular bases can be fitted with two type of electrical connector: the monostable version uses only one signal (connected to the pilot side 14) and carries forward the remaining, the bistable version which always uses two signals.

This solution allows the modification of the manifold (replacement of monostable valves without bistable for example) without having to reset the PLC output layout.

On other hand this solution limits the maximum number of valves to 16 when it is used a 37 pin connector or 11 when it is used a 25 pin connector.

Intermediate supply/exhaust module uses an electrical connector directly forwarding signals to the next one without any kind of modification.

This allows the use of intermediate modules in any position of the manifold.

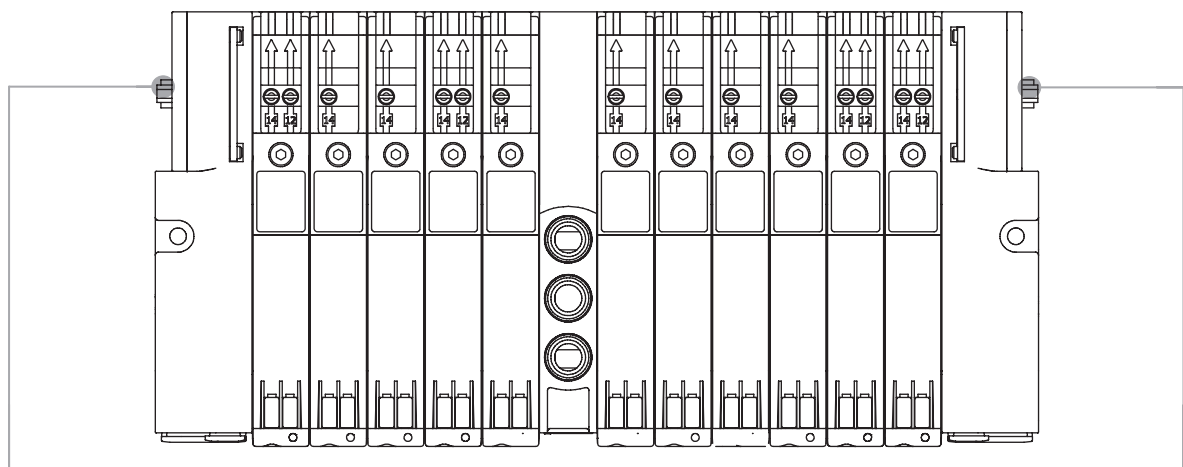
All the electrical signals that have not been used on the manifold can be used placing at the end of the manifold the end plate complete with the 25 sub-D female connector.

The number of available signals depends of the connector used to the type of the left end plate and by the total signals used along the manifold:

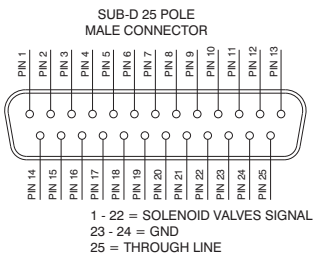
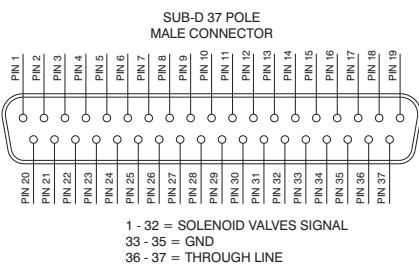
37 pin connector            nr of output = 32 – (total of used signals)

25 pin connector            nr of output = 22 – (total of used signals)

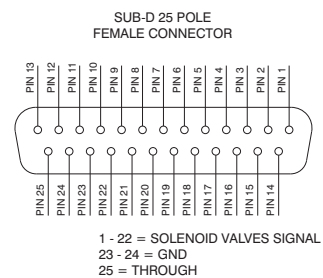
Following we show some examples of possible combination and the relative pin assignment.



**IN-LET ELECTRIC CONNECTIONS**

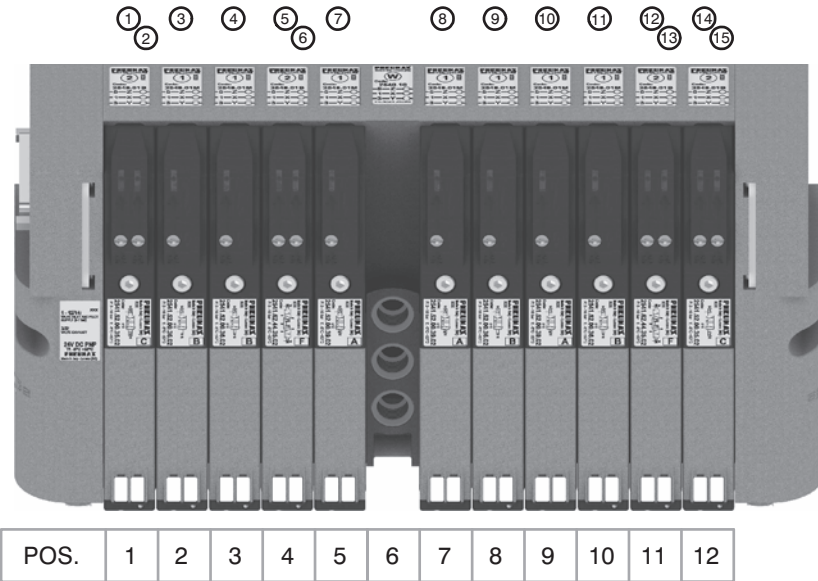


**OUTLET ELECTRIC CONNECTIONS (IF PRESENT)**



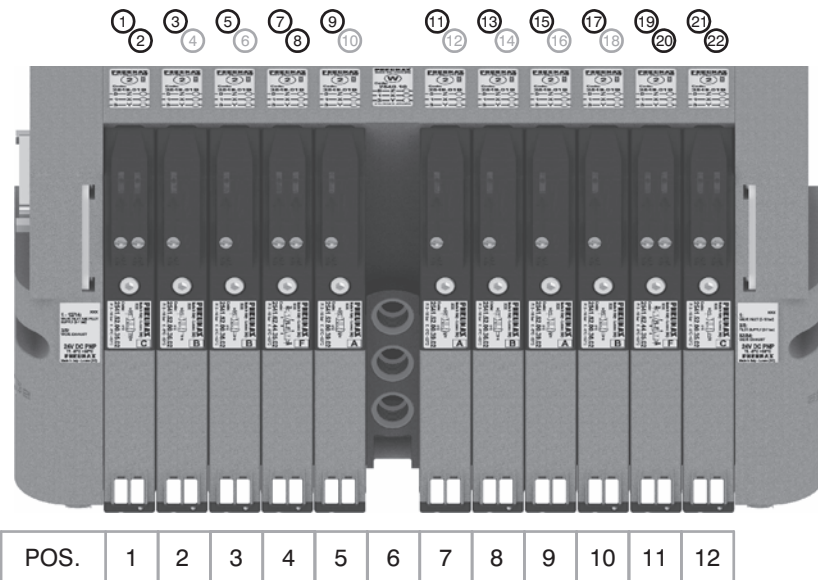


**37 PIN Connector correspondence for valves assembled on mixed bases**



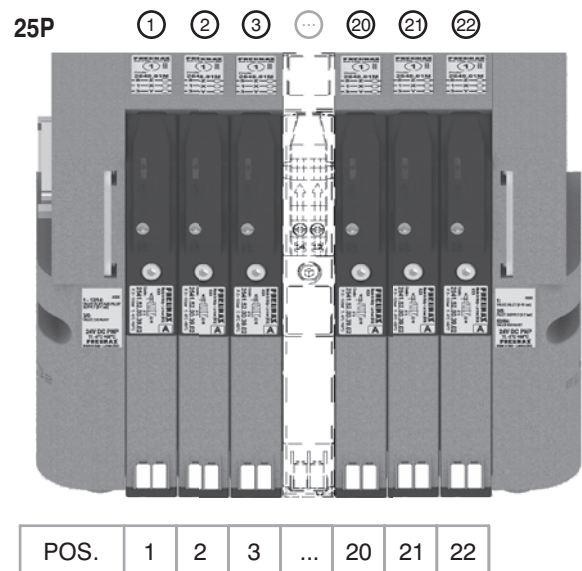
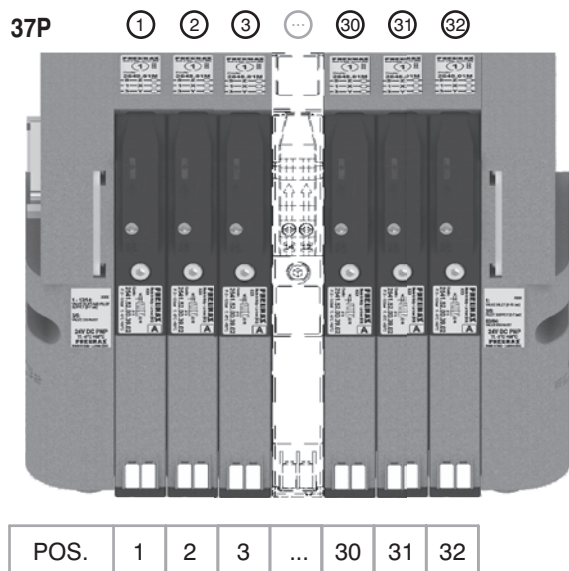
- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = PILOT 14 EV POS.3
- PIN 5 = PILOT 14 EV POS.4
- PIN 6 = PILOT 12 EV POS.4
- PIN 7 = PILOT 14 EV POS.5
- PIN 8 = PILOT 14 EV POS.7
- PIN 9 = PILOT 14 EV POS.8
- PIN 10 = PILOT 14 EV POS.9
- PIN 11 = PILOT 14 EV POS.10
- PIN 12 = PILOT 14 EV POS.11
- PIN 13 = PILOT 12 EV POS.11
- PIN 14 = PILOT 14 EV POS.12
- PIN 15 = PILOT 12 EV POS.12

**37 PIN Connector correspondence for manifold mounted on bases for bistable valves**



- PIN 1 = PILOT 14 EV POS.1
- PIN 2 = PILOT 12 EV POS.1
- PIN 3 = PILOT 14 EV POS.2
- PIN 4 = NOT CONNECTED
- PIN 5 = PILOT 14 EV POS.3
- PIN 6 = NOT CONNECTED
- PIN 7 = PILOT 14 EV POS.4
- PIN 8 = PILOT 12 EV POS.4
- PIN 9 = PILOT 14 EV POS.5
- PIN 10 = NOT CONNECTED
- PIN 11 = PILOT 14 EV POS.7
- PIN 12 = NOT CONNECTED
- PIN 13 = PILOT 14 EV POS.8
- PIN 14 = NOT CONNECTED
- PIN 15 = PILOT 14 EV POS.9
- PIN 16 = NOT CONNECTED
- PIN 17 = PILOT 14 EV POS.10
- PIN 18 = NOT CONNECTED
- PIN 19 = PILOT 14 EV POS.11
- PIN 20 = PILOT 12 EV POS.11
- PIN 21 = PILOT 14 EV POS.12
- PIN 22 = PILOT 12 EV POS.12

**37 PIN Connector correspondence for manifold for 32 position manifold with monostable valves on base**





**General :**

Using the 2540.03.25P output terminal it is possible to make any electrical signals not used by valves available on a 25 sub-D female connector at the right end of the manifold. It is possible to then join a multi-core cable to link to the next manifold, or connect directly to one or two I/O modules. The I/O modules can accept input or output signals, depending upon what is connected.

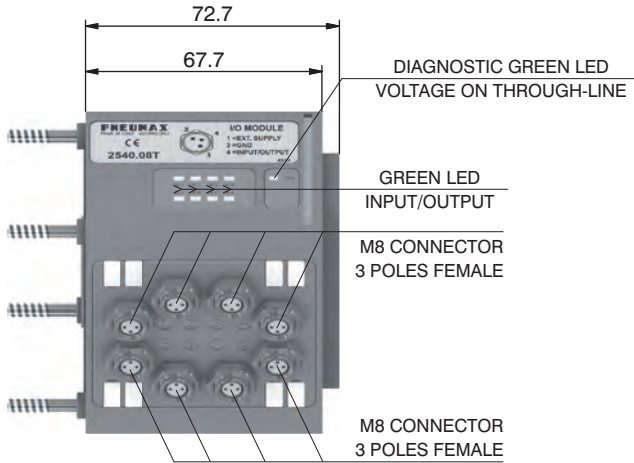
**Please note:** If the manifold is connected by a multi-core connection, each connection can be used as either an input or an output, while if the manifold is connected to a serial node the connections can only be used as an output.

It is possible to connect the manifold to up to two I/O modules.

Each I/O module includes 8 diagnostic LEDs which indicate the presence of an Input / Output signal for each connector.

**Please note:** For an LED to function, a signal of at least +15VDC must be present on pin 4 of the connector. If this signal is lower, the LED will not light, this does not compromise the normal Input / Output function of the unit.

**Overall dimensions and I/O layout :**



**Ordering code**

**2540.08T**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT/OUTPUT
3	GND

**Input features:**

Each connection can accept either two wire (switches, magnetic switches, pressure switches, etc.) or three wire connections (photo-cells, electronic end of stroke sensors, etc.). If +24VDC is required on at Pin 1 of each connector, it is possible to provide this via the through-line pin of the multi-pole connector.

I.E :

Pin 25 of the 25 pin multi-pole connector (code 2540.02.25P or 2540.12.25P)

Pin 36-37 of the 37 pin multi-pole connector (code 2540.02.37P or 2540.12.37P)

**Output features:**

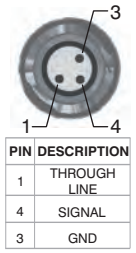
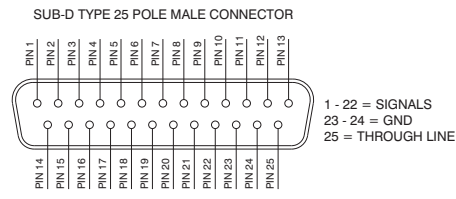
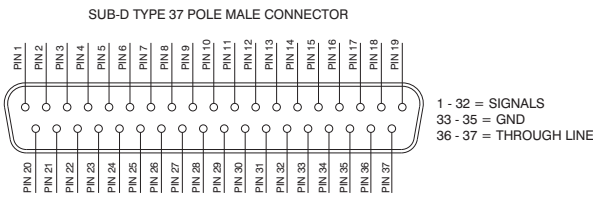


**Attention:** The output connections are not protected against short-circuit. Please pay attention when wiring (avoid Pin 4 being connected to Pin 3 or Pin 1).

<b>General characteristics</b>	Model	2540.08T
	Case	Reinforced technopolymer
	I/O Connector	M8 connector 3 poles female (IEC 60947-5-2)
	PIN 1 voltage (connector used as Input)	By the user
	PIN 4 voltage diagnosis	Green Led
	Node consumption (Outlets excluded)	7mA per each LED with 24 VDC signal
	Outlets voltage	+23,3 VDC (serial) /by the user (multipolar)
	Input voltage	Depend by the using
	Maximum outlet current	100 mA (serial) / 400 mA (multipolar)
	Maximum Input/Output	8 per module
	Multiconnector max. Current	100 mA
	Connections to manifold	Direct connection to 25 poles connector
	Maximum n. of moduls	2
	Protection degree	IP65 when assembled
Ambient temperature	from -0° to +50° C	



CORRESPONDENCE BETWEEN MULTI-POLE SIGNAL AND CONNECTOR



Connection modes:

The I/O module changes its operation depending on the way the manifold is controlled. There are two possible modes:

- A) Control via multi-pole connection
- B) Control via fieldbus

A) Control via multi-pole :

M8 connector used as Input:



**Attention:** Voltage applied to each connector is passed to multi-pole connector pin.

In order to use the I/O module, the correct right hand endplate with 25 pole female outlet connector must be used.  
(Code 2540.03.25P).

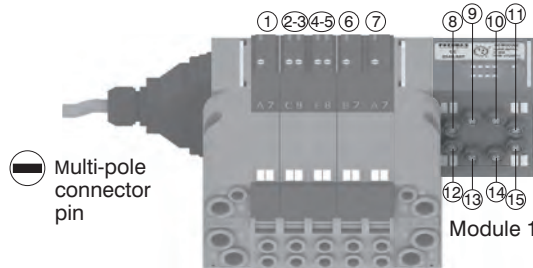
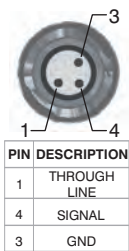


M8 connector used as Output:

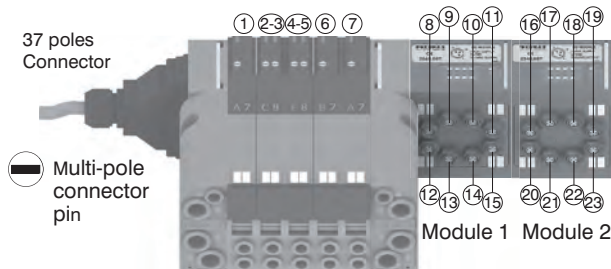
Output voltage will be the same as is applied at the multi-pole connector pin.  
The maximum output current depends upon the power unit used, but we recommend no more than 250mA.



**Attention:** Since every cable has a degree of resistance, there will always be a voltage drop depending on the cable's length, sectional area and the current.

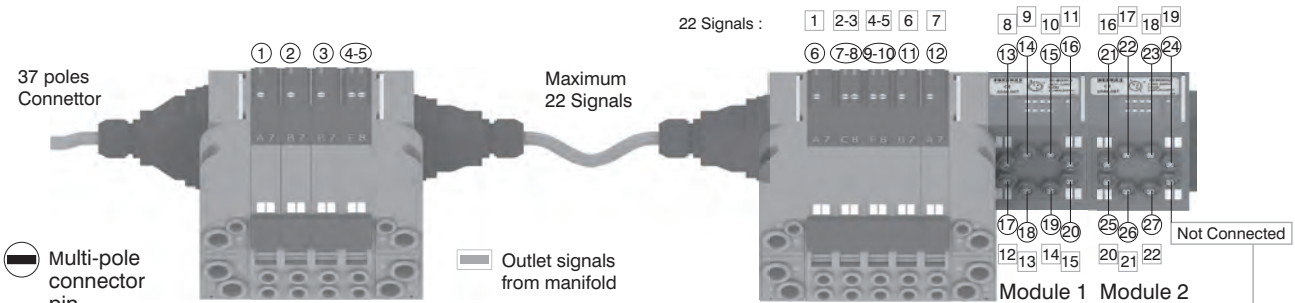


**Attention:** Only one more I/O module can be added.



**Attention:** No more additions are possible

**Attention :** Optyma 32-T solenoid valve manifolds permit up to 22 electrical signals that are not used by manifolds to be made available: these signals can be managed by another manifold and / or by I/O modules. The I/O module will manage these unused signals. Connections that are not managing useful signals will remain unconnected.



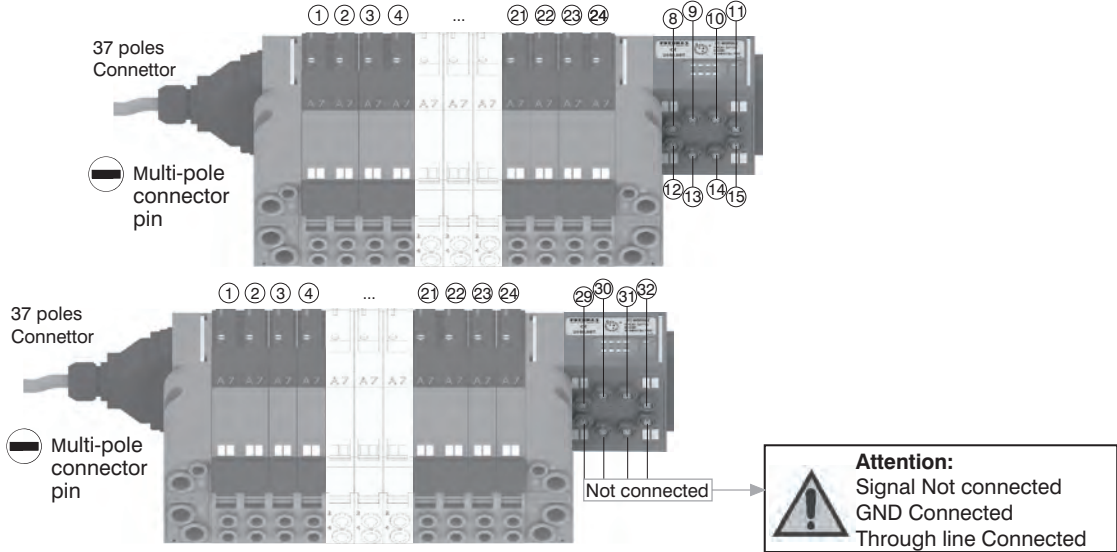
**Attention:** Signal Not connected  
GND Connected  
Through line Connected

**Please note:** this example considers a 37 pin multi-pole connector. The same configuration managed by a 25 pin multi-pole connector will stop at number 22 of multi-pole connector and at number 17 of the manifold. 22 17





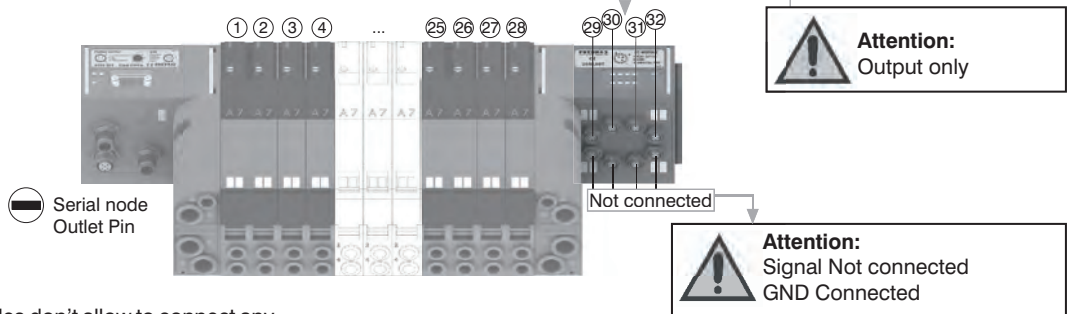
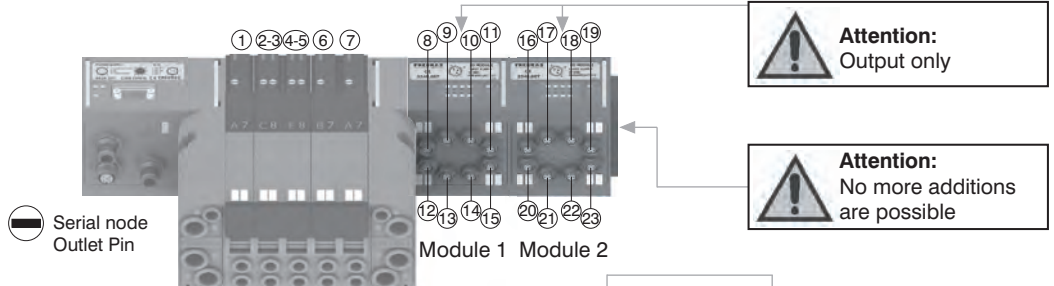
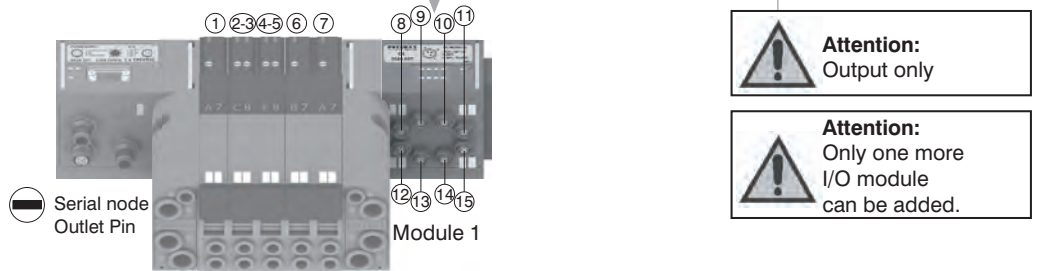
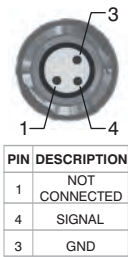
**Please note:** Optyima 32-T solenoid valve manifolds manage up to 32 signals. If the manifold uses more than 24 signals the I/O module will manage only the remainder. Connections that are not managing useful signals will remain unconnected.



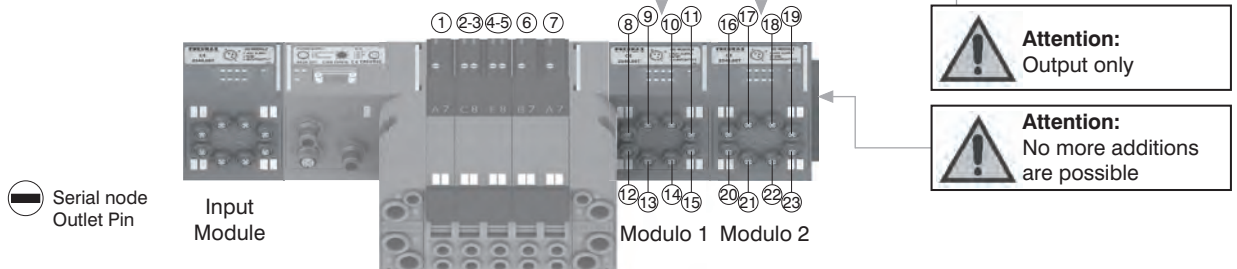
**B) Control via fieldbus:**

With this kind of control the I/O module can only be used as an output. Pin 1 of each connector is not connected. The output voltage will be 0.7V lower than that applied to Pin 4 of the connector.

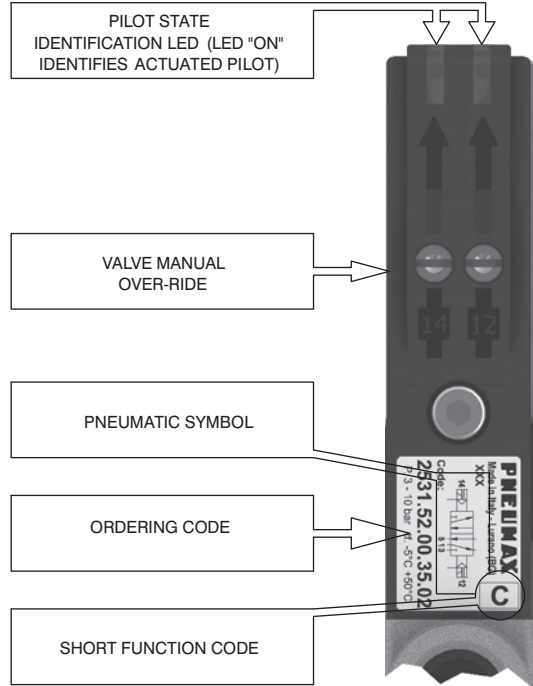
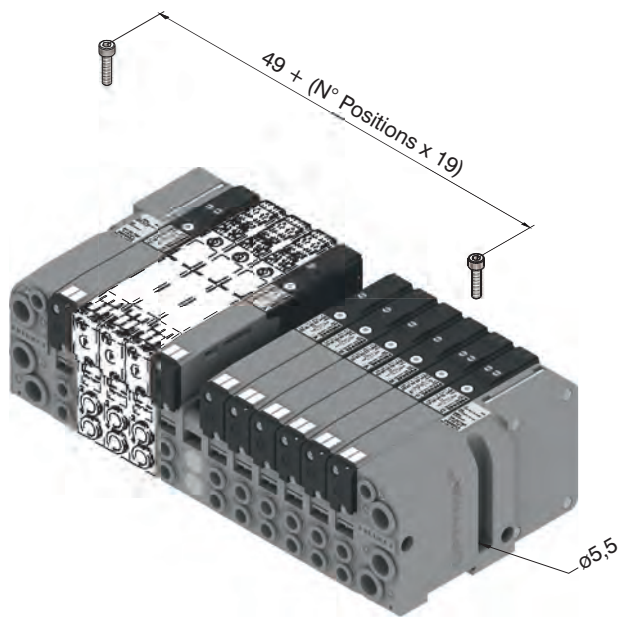
The maximum output current for each output is 100mA. The correspondence between control byte and each single output depends on how many electrical signals are used by the manifold and by the relative position of the I/O module.



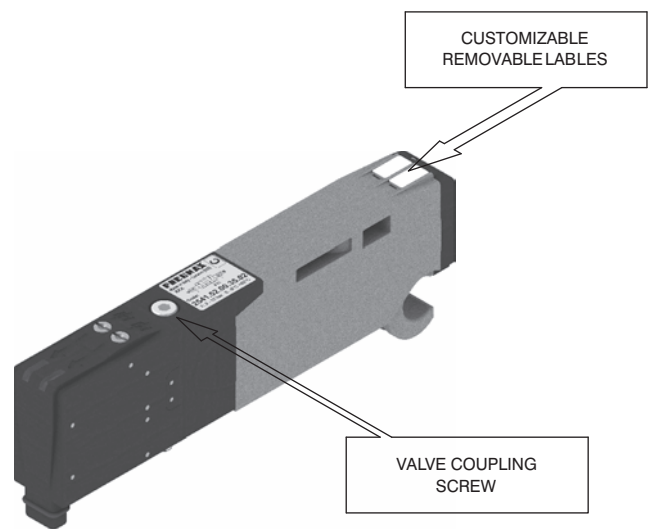
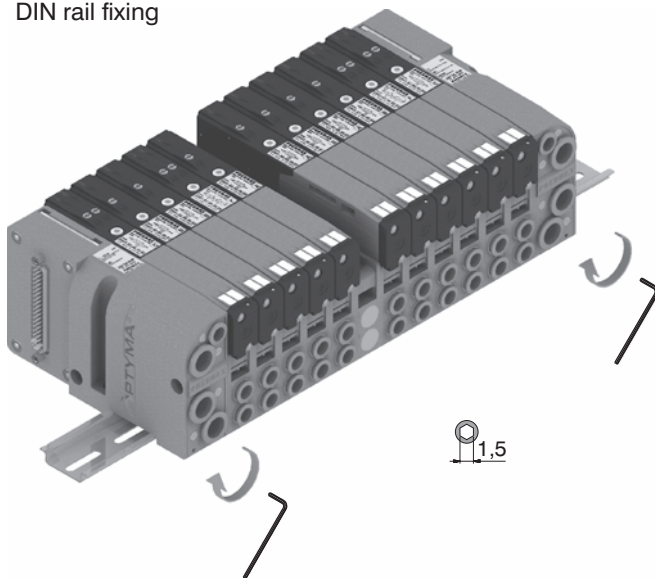
**Please note:** I/O modules don't allow to connect any additional valves manifold after them.



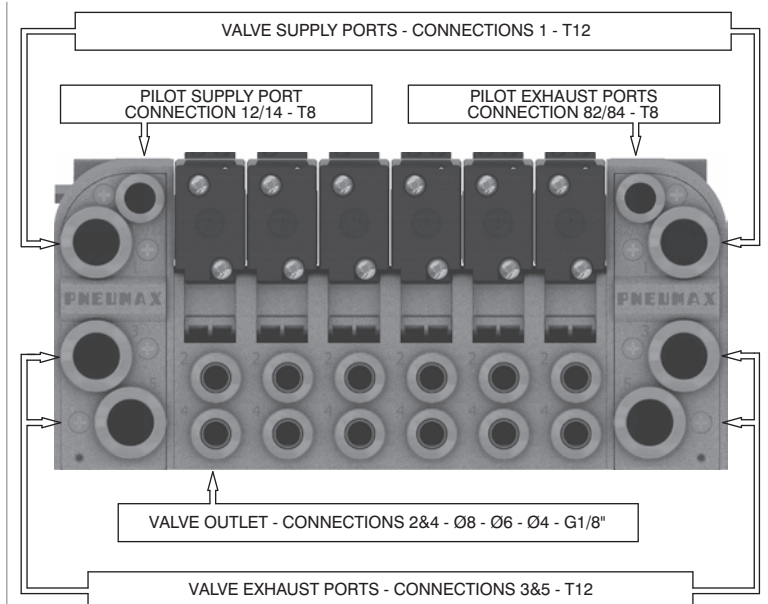
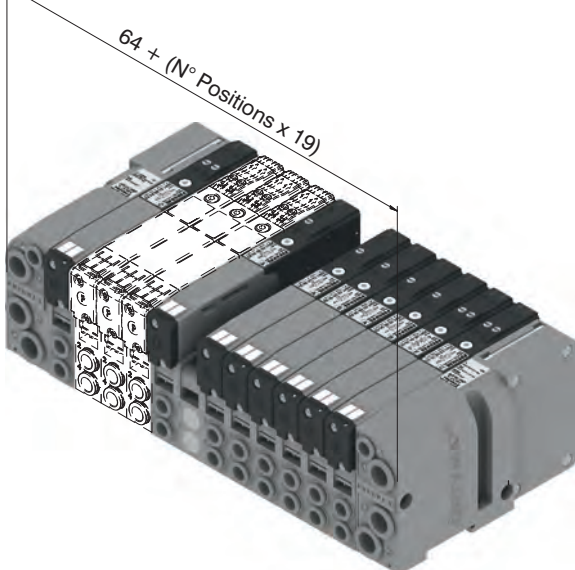
From the top



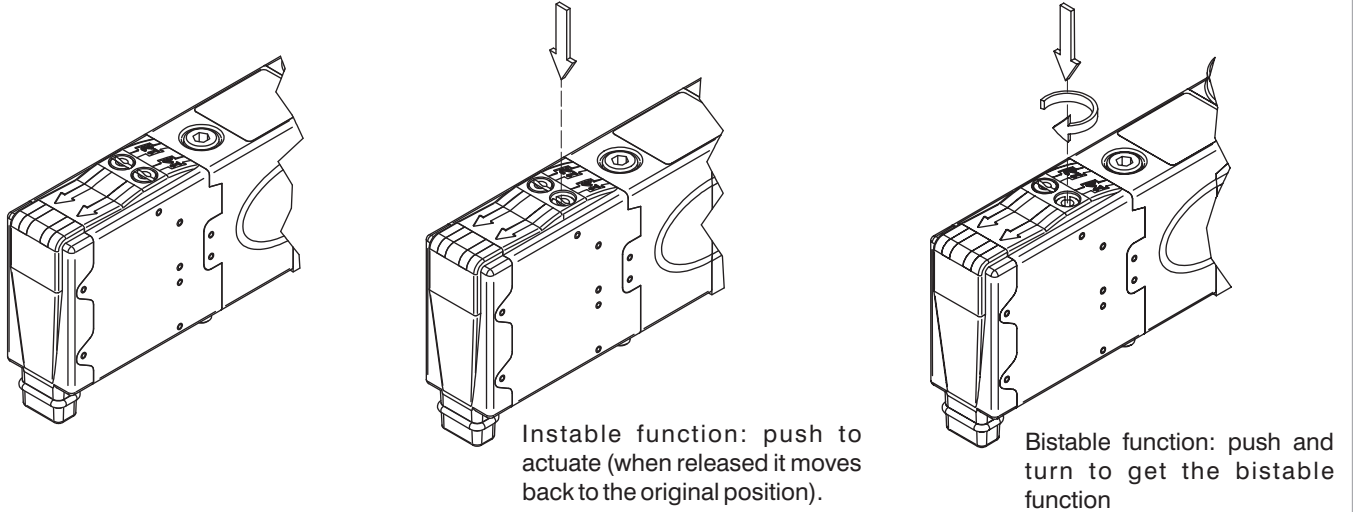
DIN rail fixing



Maximum possible size according to valves seats

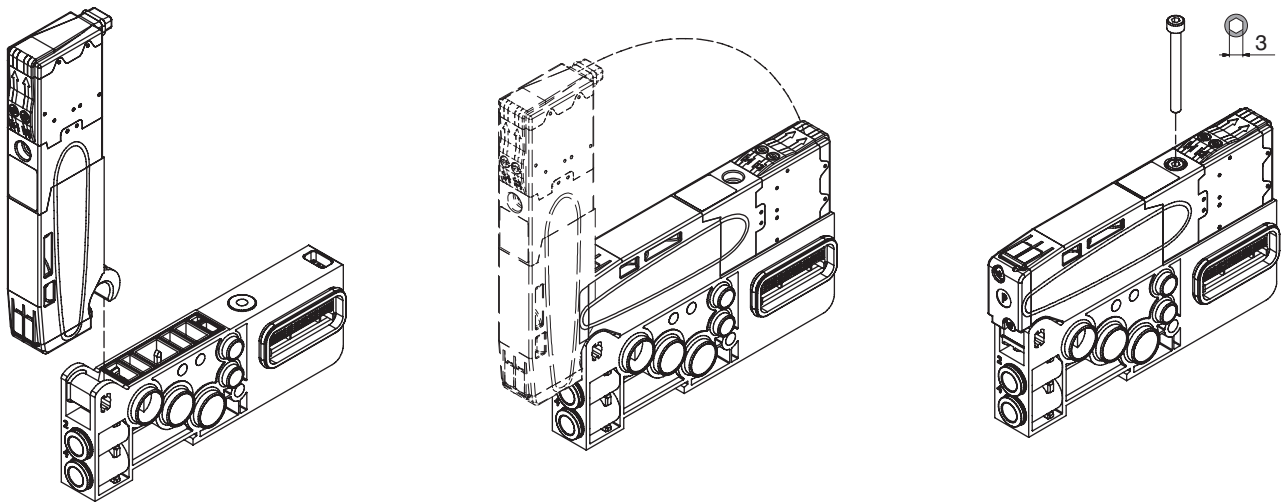


Manual override actuation



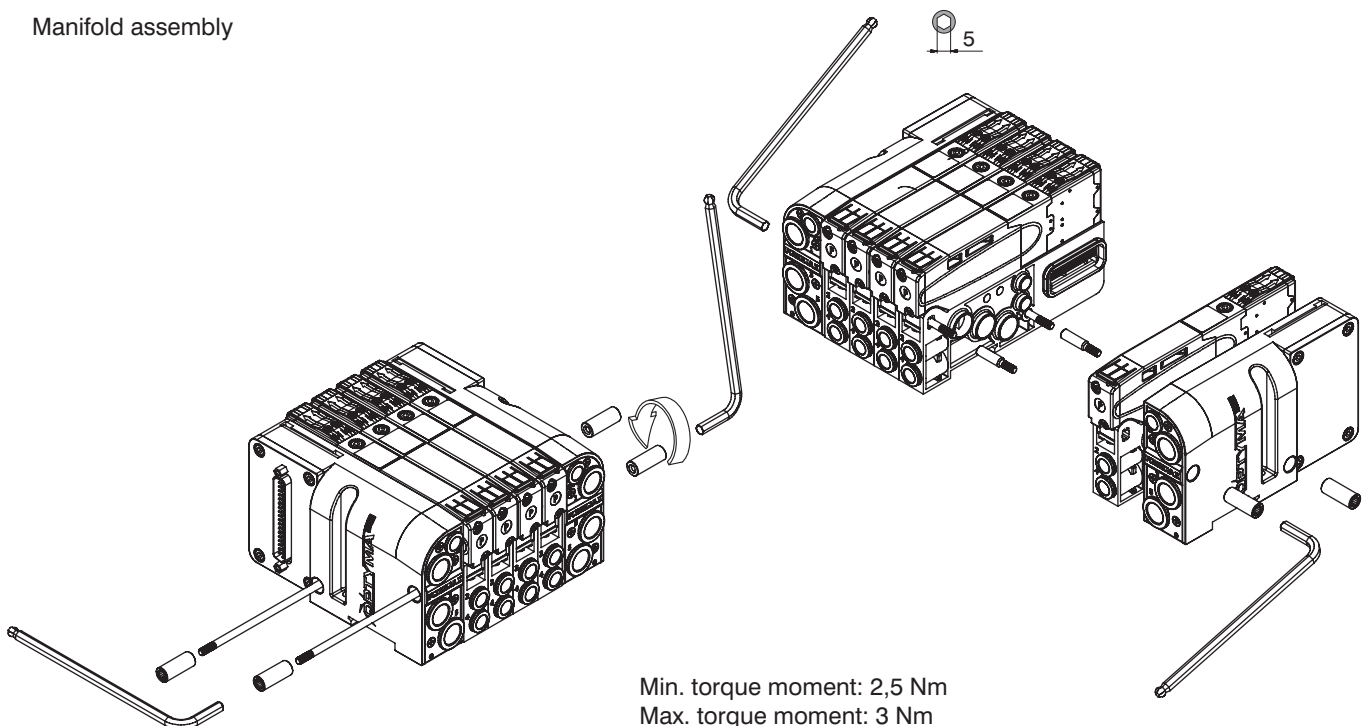
NOTE : It is strongly suggested to replace the original position after using

Valve Installation



NOTE: Torque moment 1 Nm

Manifold assembly

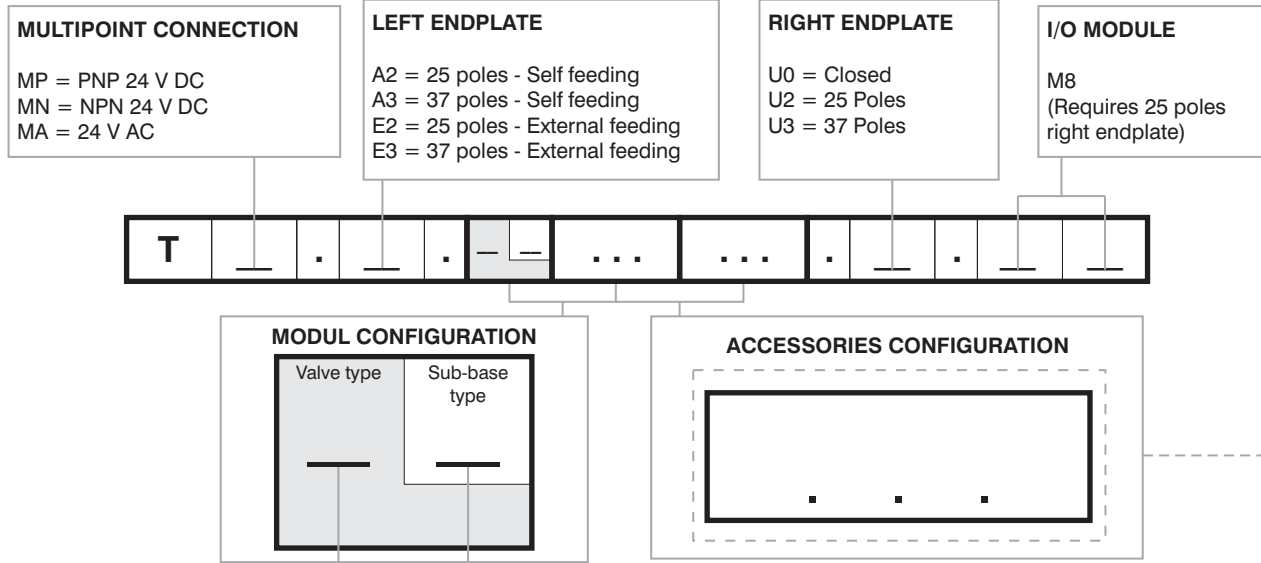


Min. torque moment: 2,5 Nm  
Max. torque moment: 3 Nm





Manifold Layout configuration



**SHORT CODE FUNCTION / CONNECTION :**

- |  |  |
|--|--|
| A1= 5/2 Sol.-Spring + BASE 1 - CARTR. G1/8" GAS  | F2= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS |
| A2= 5/2 Sol.-Spring + BASE 2 - CARTR. G1/8" GAS  | F4= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø4        |
| A3= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø4         | F6= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø6        |
| A4= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø4         | F8= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø8        |
| A5= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø6         | G2= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS |
| A6= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø6         | G4= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø4        |
| A7= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø8         | G6= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø6        |
| A8= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø8         | G8= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø8        |
| B1= 5/2 Sol.-Diff. + BASE 1 - CARTR. G1/8" GAS   | H2= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS            |
| B2= 5/2 Sol.-Diff. + BASE 2 - CARTR. G1/8" GAS   | H4= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø4                   |
| B3= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø4          | H6= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø6                   |
| B4= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø4          | H8= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø8                   |
| B5= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø6          | I2= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS            |
| B6= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø6          | I4= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø4                   |
| B7= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø8          | I6= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø6                   |
| B8= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø8          | I8= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø8                   |
| C2= 5/2 Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS    | T1= Free valve space plug + BASE 1 - CARTR. G1/8" GAS            |
| C4= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø4           | T2= Free valve space plug + BASE 2 - CARTR. G1/8" GAS            |
| C6= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø6           | T3= Free valve space plug + BASE 1 - CARTR. Ø4                   |
| C8= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø8           | T4= Free valve space plug + BASE 2 - CARTR. Ø4                   |
| E2= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS | T5= Free valve space plug + BASE 1 - CARTR. Ø6                   |
| E4= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø4        | T6= Free valve space plug + BASE 2 - CARTR. Ø6                   |
| E6= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø6        | T7= Free valve space plug + BASE 1 - CARTR. Ø8                   |
| E8= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø8        | T8= Free valve space plug + BASE 2 - CARTR. Ø8                   |

**NOTE:**

While configuring the manifold always be careful that the maximum number of electrical signals available is 32.  
 The use of monostable valve mounted on a base type 2 ( 2 electrical signals occupied ) causes the loss of one electric signal. In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for exemple : regarding the 3 & 5 conduits, put the Y & Z letters).  
 Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

**ACCESSORIES**

- |   |  |
|---|--|
| U2 = Power supply<br>2 positions module     | Z = Diaphragm plug<br>on pipe 5          |
| U4 = Power supply<br>4 positions module     | XY = Diaphragm plug<br>on pipe 1 & 3     |
| W = Intermediate supply<br>& exhaust module | ZX = Diaphragm plug<br>on pipe 5 & 1     |
| X = Diaphragm plug<br>on pipe 1             | ZY = Diaphragm plug<br>on pipe 5 & 3     |
| Y = Diaphragm plug<br>on pipe 3             | ZXY = Diaphragm plug<br>on pipe 5, 1 & 3 |

Series 2500 OPTYMA-T solenoid valve manifolds managed by multipoint connection are "well tried components"

	<b>Well-ried component</b>	- The product is a well-ried product for a safety-related application according to ISO 13849-1. - The relevant basic and well-ried safety principles according ISO 13849-2 for this product are fulfilled. - The suitability of the product for a precise application must be verified and confirmed by the user.
B <sub>10d</sub>	50.000.000	



**General:**

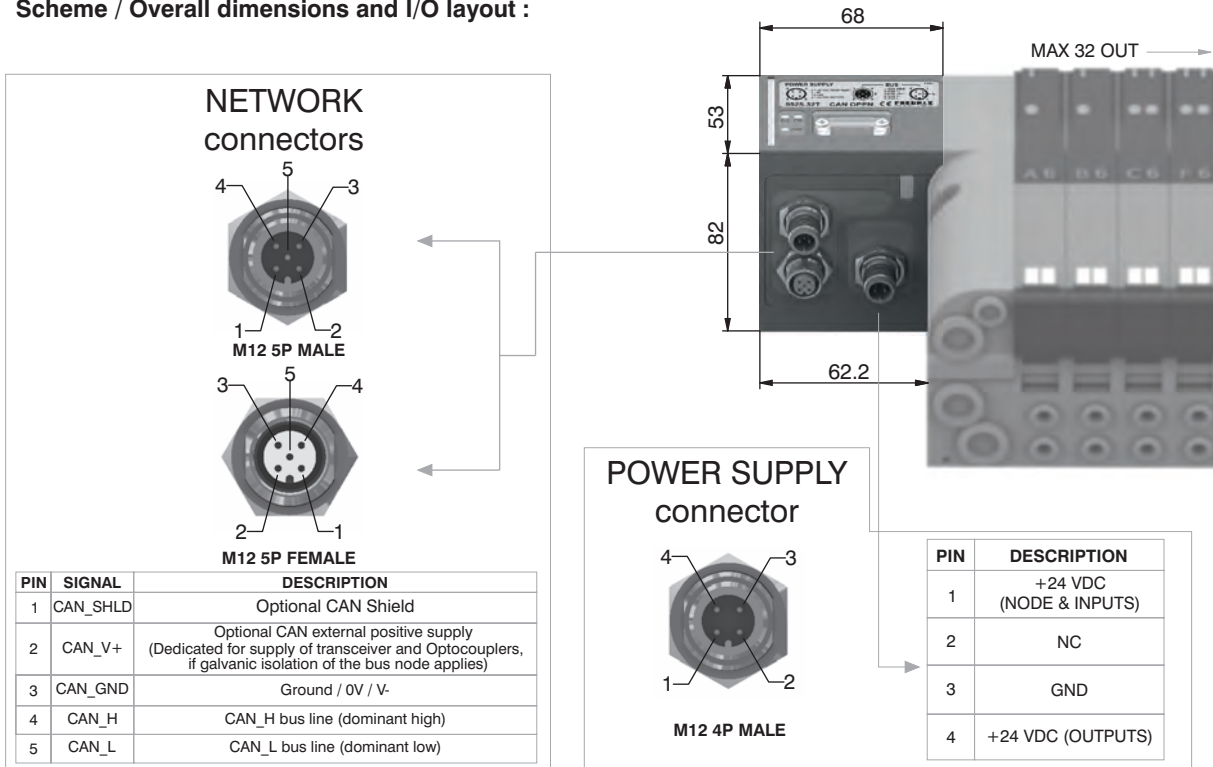
CANopen® module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.  
 CANopen® module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.  
 Connection to Bus CANopen® is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to CiA Draft Recommendation 303-1 (V. 1.3 : 30 December 2004).  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

**Ordering code**

**5525.32T**



**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**Technical characteristics**

Model	5525.32T
Specifications	CiA Draft Standard Proposal 301 V 4.10 (15 August 2006)
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection Power supply voltage Node consumption (without inputs) Power supply diagnosis
	M12 4P male connector (IEC 60947-5-2) +24 VDC +/- 10% 30 mA Green LED PWR
<b>Outputs</b>	PNP equivalent outputs Maximum current for each output Maximum output number Max output simultaneously actuated
	+24 VDC +/- 10% 100 mA 32 32
<b>Network</b>	Network connectors Baud rate Addresses, possible numbers Max nodes in net Bus maximum recommended length Bus diagnosis Configuration file IP protection grade Temperature range
	2 M12 5P connectors male-female Type A (IEC 60947-5-2) 10 - 20 - 50 - 125 - 250 - 500 - 800 - 1000 Kbit/s From 1 to 63 64 (slave + master) 100 m at 500 Kbit/s Green LED + Red LED Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a> IP65 when assembled From 0° to +50° C

**General:**

DeviceNet module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.  
 DeviceNet module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus DeviceNet is possible via 2 M12 5P male - female circular connectors; these two are connected in parallel and according to DeviceNet Specifications Volume I, release 2.0.  
 Transmission speed can be set by 3 dip-switches.  
 The node address can be set by 6 dip-switches using BCD numeration.  
 The module includes an internal terminating resistance that can be activated by a dip-switch.

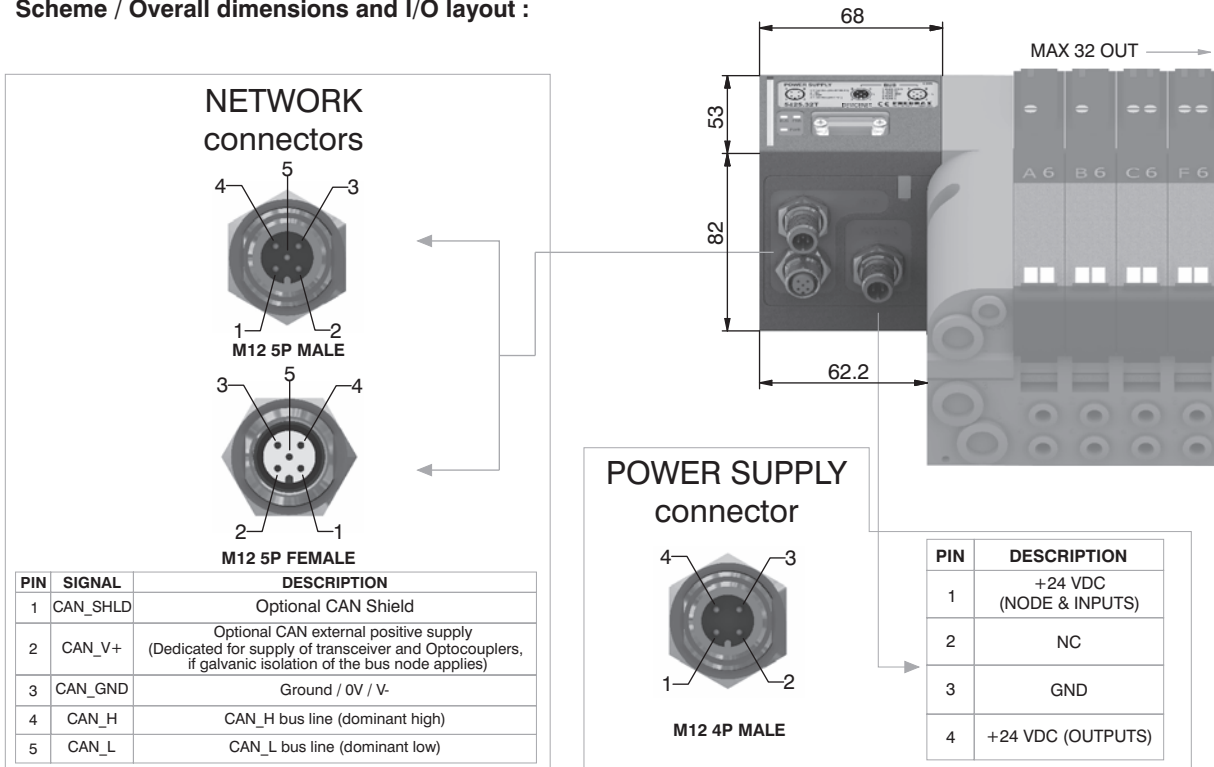
**Ordering code**

**5425.32T**



2

**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (Dedicated for supply of transceiver and Optocouplers, if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V / V-
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

PIN	DESCRIPTION
1	+24 VDC (NODE & INPUTS)
2	NC
3	GND
4	+24 VDC (OUTPUTS)

**Technical characteristics**

	Model	5425.32T
	Specifications	DeviceNet Specifications Volume I, release 2.0.
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	30 mA
	Power supply diagnosis	Green LED PWR
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 5P connectors male-female Type A (IEC 60947-5-2)
	Baud rate	125 - 250 - 500 Kbit/s
	Addresses, possible numbers	From 1 to 63
	Max nodes in net	64 (slave + master)
	Bus maximum recommended length	100 m at 500 Kbit/s
	Bus diagnosis	Green LED + Red LED
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General:**

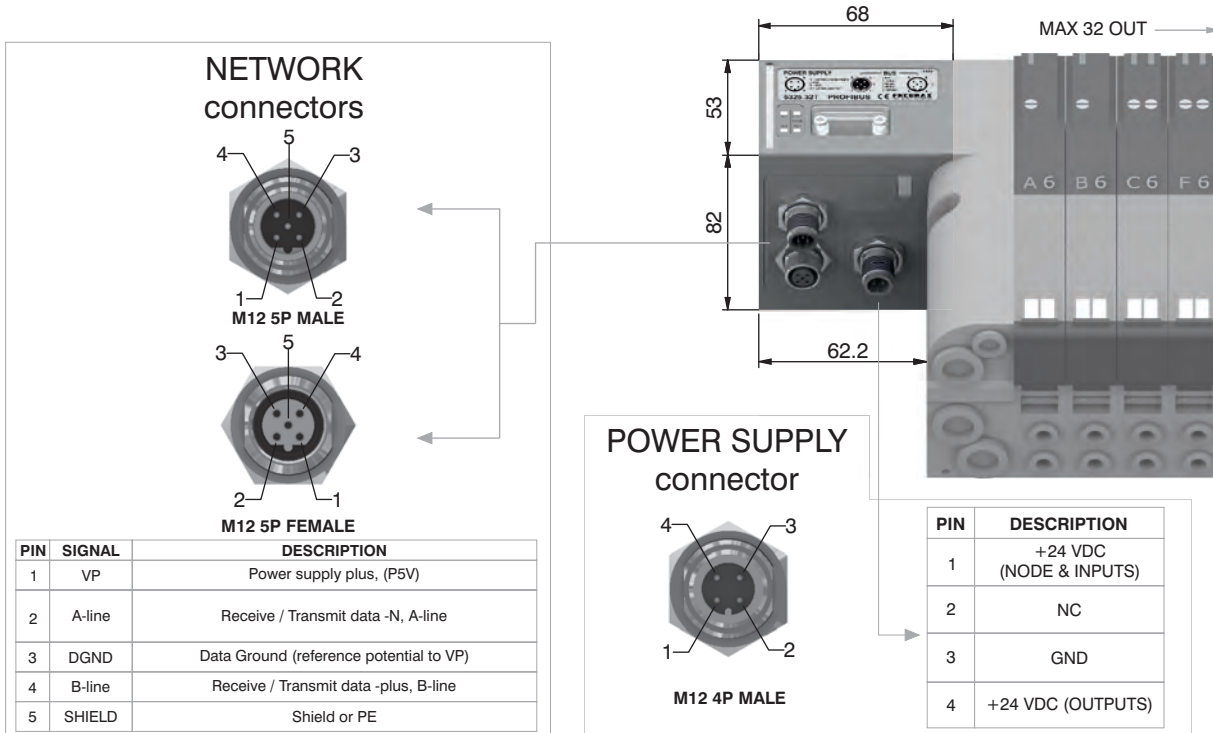
PROFIBUS DP module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
 PROFIBUS DP module recognizes automatically the presence of the Input modules on power on.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.  
 Connection to Bus PROFIBUS DP is possible via 2 M12 type B 5P male - female circular connectors; these two are connected in parallel and according to PROFIBUS Interconnection Technology (Version 1.1 : August 2001).  
 The node address can be set using BCD numeration: 4 dip-switches for the units and 4 dip-switches for the tens.  
 The module includes an internal terminating resistance that can be activated by 2 dip-switches.

**Ordering code**

**5325.32T**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5325.32T
Specifications	PROFIBUS DP
Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection M12 4P male connector (IEC 60947-5-2)
	Power supply voltage +24 VDC +/- 10%
	Node consumption (without inputs) 50 mA
	Power supply diagnosis Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs +24 VDC +/- 10%
	Maximum current for each output 100 mA
	Maximum output number 32
	Max output simultaneously actuated 32
<b>Network</b>	Network connectors 2 M12 5P male-female connectors Type B
	Baud rate 9,6 - 19,2 - 93,75 - 187,5 - 500 - 1500 - 3000 - 6000 - 12000 Kbit/s
	Addresses, possible numbers From 1 to 99
	Max nodes in net 100 (slave + master)
	Bus maximum recommended length 100 m at 12 Mbit/s - 1200 m at 9,6 Kbit/s
	Bus diagnosis Green LED + Red LED
	Configuration file Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade IP65 when assembled
	Temperature range From 0° to +50° C



**General:**

EtherCAT® module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 4 Input modules 5225.08T or a max number of 4 Input modules 5225.12T.

The EtherCAT® module, regardless the number of Input module connected, reports to have connected 4 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus EtherCAT® is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

The node address is assigned during configuration.

**Note: 5700 series has a different configuration file from series 5600.**

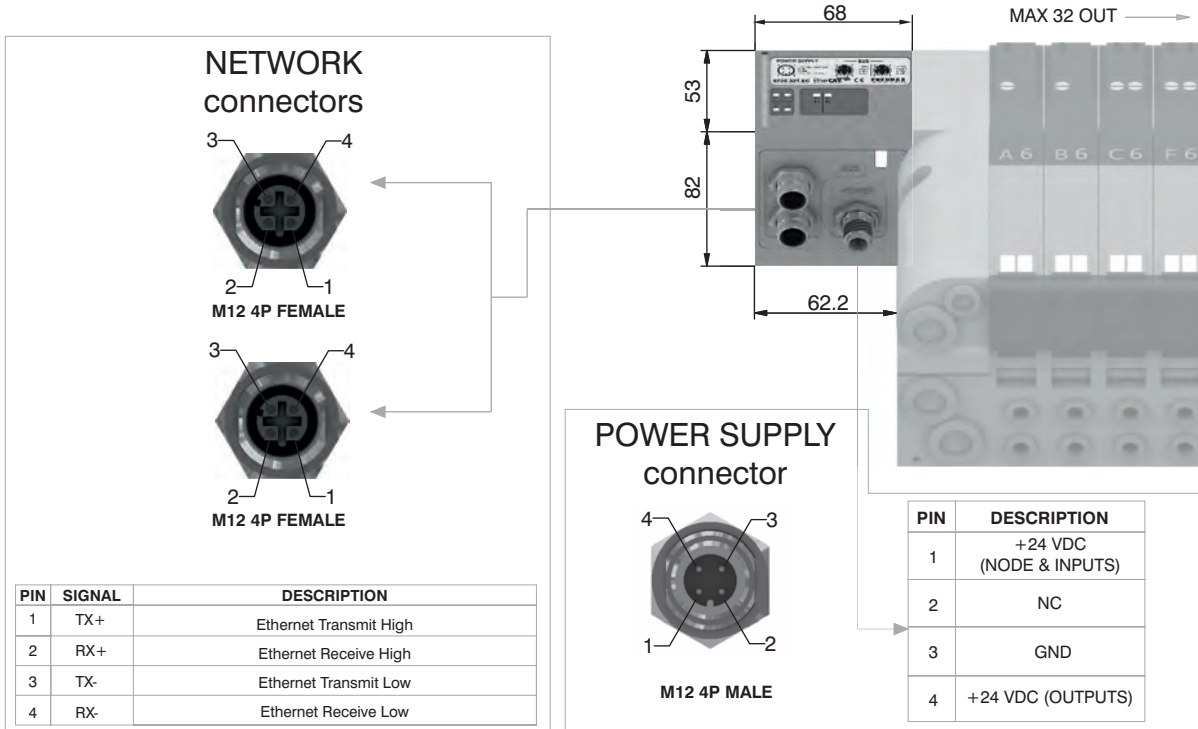
**Ordering code**

**5725.32T.EC**



2

**Scheme / Overall dimensions and I/O layout :**



PIN	SIGNAL	DESCRIPTION
1	TX+	Ethernet Transmit High
2	RX+	Ethernet Receive High
3	TX-	Ethernet Transmit Low
4	RX-	Ethernet Receive Low

**Technical characteristics**

	Model	5725.32T.EC
	Specifications	EtherCAT® Specifications ETG.1000 series
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LEDPWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	From 1 to 65535
	Max nodes in net	65536 (Master + Slave)
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

PROFINET IO RT/IRT module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.

Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).

The node can be easily installed also on solenoid valves manifold already mounted on equipment.

Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.

The PROFINET IO RT/IRT module, regardless the number of Input module connected, reports to have connected 8 Input modules.

Regardless of the number of Input modules connected, the manageable solenoid valves are 32.

Node power supply is made by a M12 4P male circular connector.

The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.

Connection to Bus PROFINET IO RT/IRT is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.

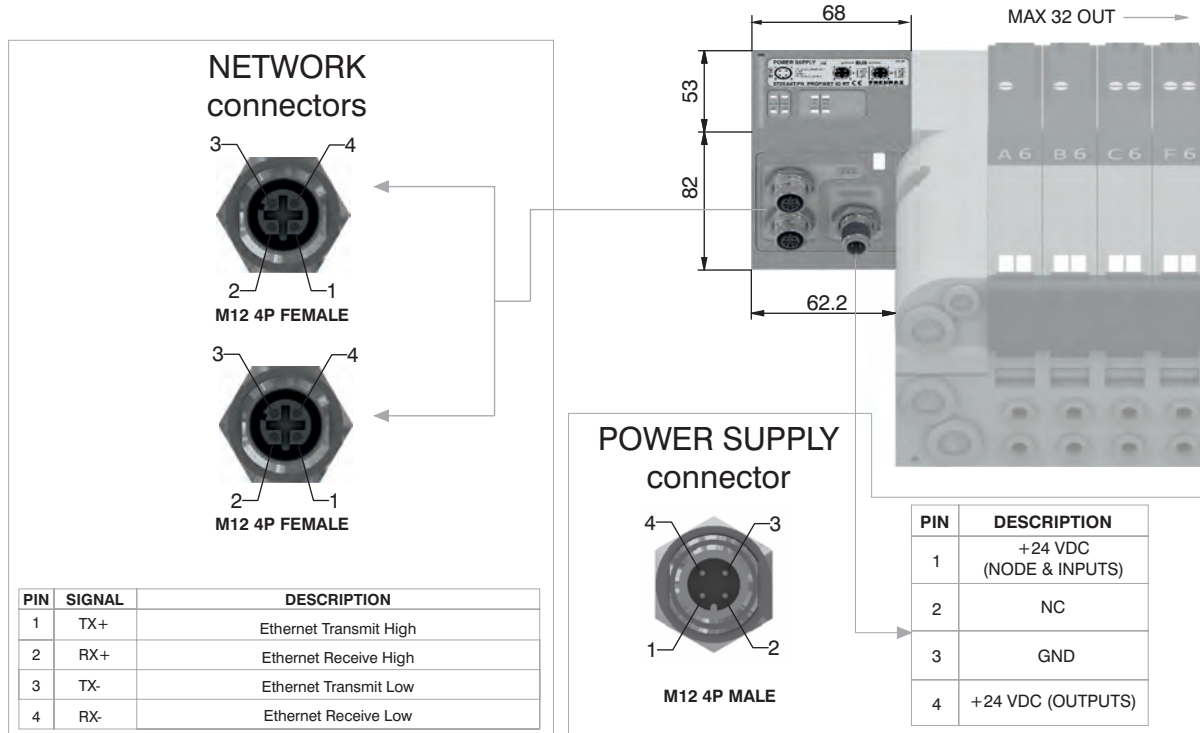
The node address is assigned during configuration.

**Ordering code**

**5725.32T.PN**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32T.PN	
Specifications	PROFINET IO RT/IRT	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

EtherNet/IP module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
The EtherNet/IP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
Node power supply is made by a M12 4P male circular connector.  
The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
Connection to Bus EtherNet/IP is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
The node address is assigned during configuration.

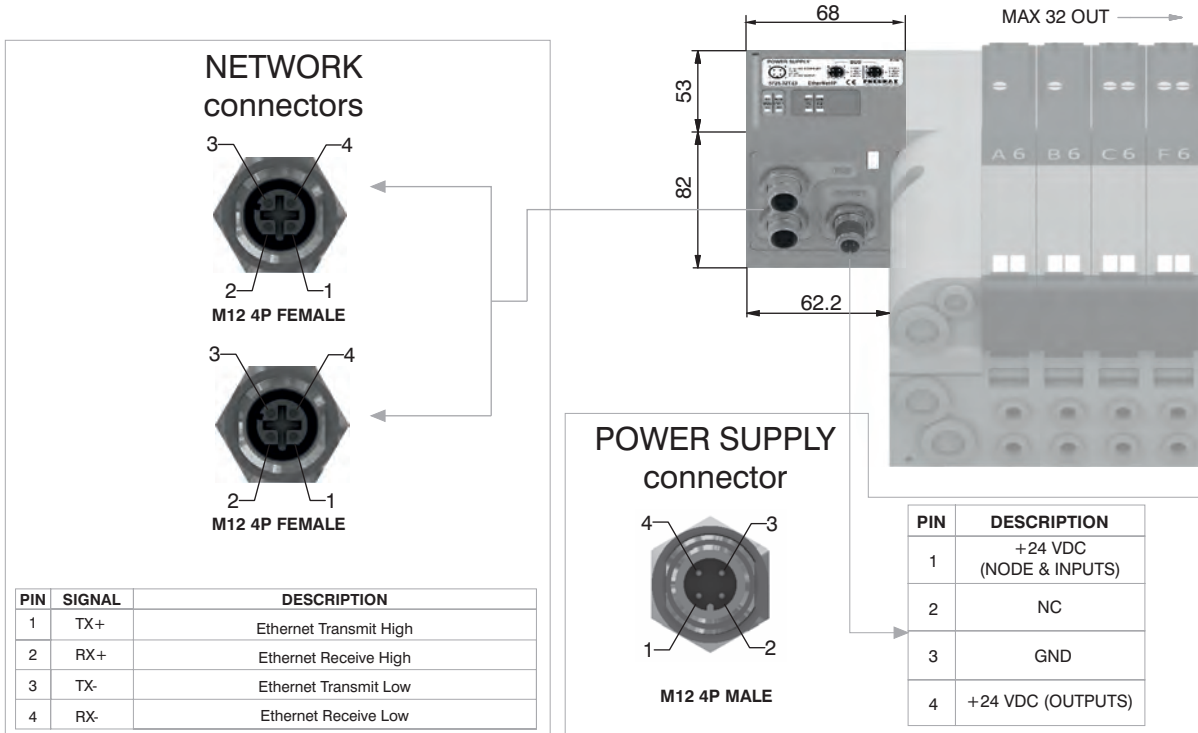
**Ordering code**

**5725.32T.EI**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

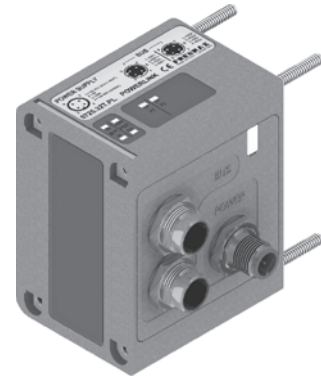
	Model	5725.32T.EI
	Specifications	The EtherNet/IP Specification
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	As an IP address
	Max nodes in net	As an Ethernet Network
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 4 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

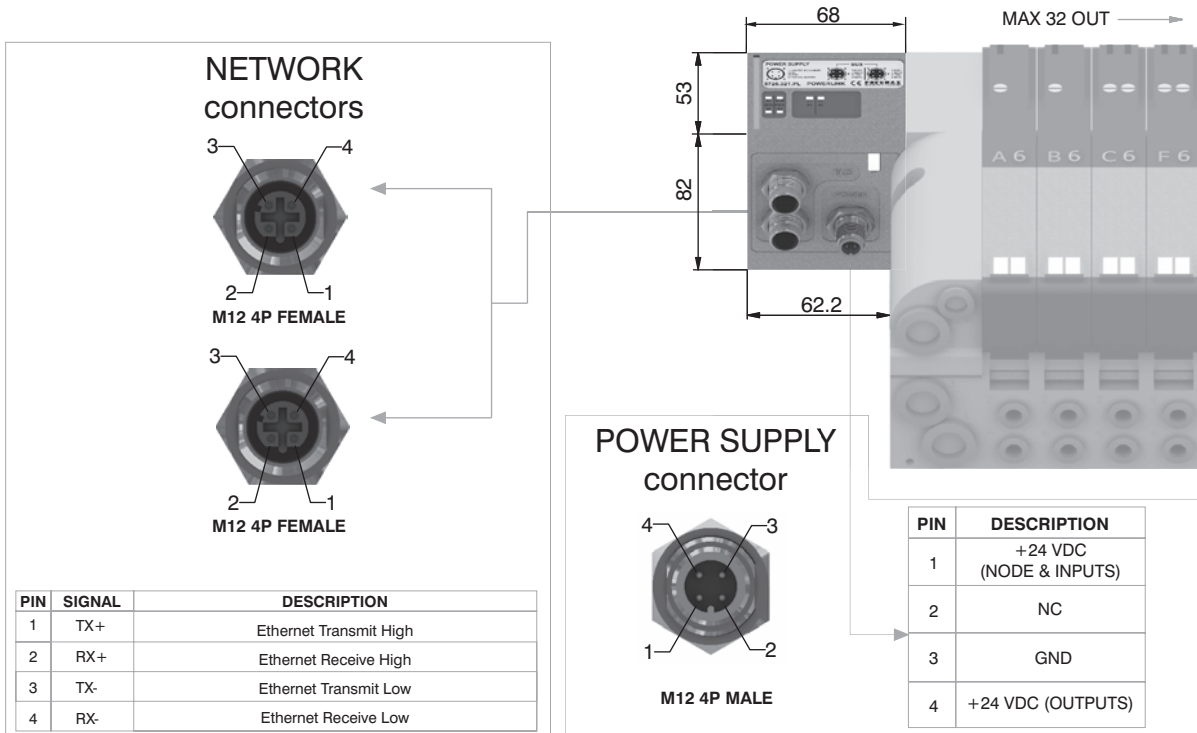
Powerlink module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
 The Powerlink module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
 Regardless of the number of Input modules connected, the managable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs mantaning powered the node and inputs, if present.  
 Connection to Bus Powerlink is possible via 2 M12 4P type D female circular connectors. These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
 The node address is assigned during configuration.

**Ordering code**

**5725.32T.PL**



**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

Model	5725.32T.PL	
Specifications	Ethernet POWERLINK Communication Profile Specifications	
Case	Reinforced technopolymer	
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	239
	Max nodes in net	240
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Available from our web site: <a href="http://www.pneumaxspa.com">http://www.pneumaxspa.com</a>
	IP protection grade	IP65 when assembled
Temperature range	From 0° to +50° C	



**General :**

Modbus/TCP module is directly integrated on Optyma-T solenoid valves manifold via a 37 poles connector, normally used for multipolar cable connection.  
 Optyma-T solenoid valves connected to node must be PNP equivalent (final 02 in ordering code).  
 The node can be easily installed also on solenoid valves manifold already mounted on equipment.  
 Module can manage up to 32 solenoid valves, and, in the same time, a max number of 8 Input modules 5225.08T or a max number of 8 Input modules 5225.12T.  
 The Modbus/TCP module, regardless the number of Input module connected, reports to have connected 8 Input modules.  
 Regardless of the number of Input modules connected, the manageable solenoid valves are 32.  
 Node power supply is made by a M12 4P male circular connector.  
 The separation between node 24 VDC Power supply and outputs 24 VDC allows to switch off the outputs maintaining powered the node and inputs, if present.  
 Connection to Bus Modbus/TCP is possible via 2 M12 4P type D female circular connectors.  
 These two connectors lead the signal to two different communication ports, so they are not connected in parallel.  
 The node address is assigned during configuration.

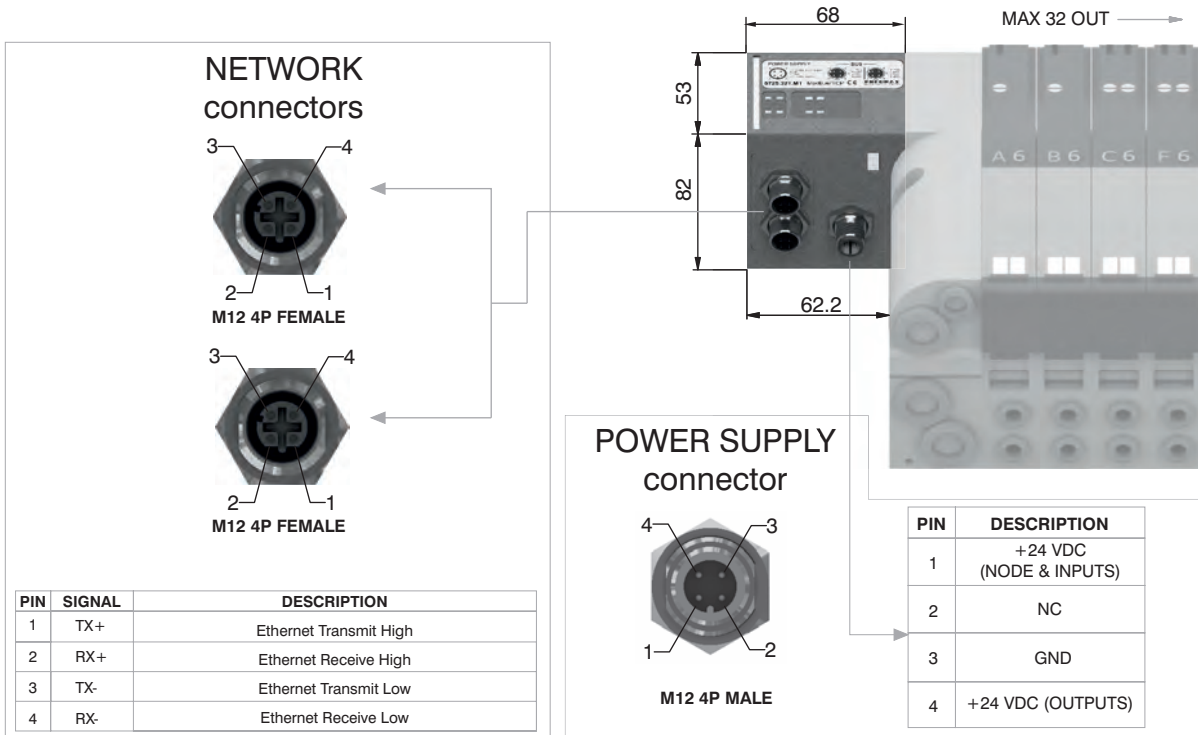
**Ordering code**

**5725.32T.MT**



2

**Scheme / Overall dimensions and I/O layout :**



**Technical characteristics**

	Model	5725.32T.MT
	Specifications	MODBUS Application Protocol Specification V1.1a, June 4, 2004
	Case	Reinforced technopolymer
<b>Power supply</b>	Power supply connection	M12 4P male connector (IEC 60947-5-2)
	Power supply voltage	+24 VDC +/- 10%
	Node consumption (without inputs)	400 mA
	Power supply diagnosis	Green LED PWR / Green LED OUT
<b>Outputs</b>	PNP equivalent outputs	+24 VDC +/- 10%
	Maximum current for each output	100 mA
	Maximum output number	32
	Max output simultaneously actuated	32
<b>Network</b>	Network connectors	2 M12 4P female connectors Type D (IEC 61076-2-101)
	Baud rate	100 Mbit/s
	Addresses, possible numbers	248
	Max nodes in net	248
	Maximum distance between 2 nodes	100 m
	Bus diagnosis	1 green and 1 red LED for status + 2 LEDs for link & activity
	Configuration file	Modbus/TCP nodes don't require configuration file
	IP protection grade	IP65 when assembled
	Temperature range	From 0° to +50° C

**General :**

Modules have 8 connectors M8 3P female.

The Inputs are PNP equivalent 24 VDC  $\pm$ 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 300 mA.

Each module includes a 300 mA self-mending fuse. If a short circuit or a overcharge (overall current >300mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green led PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

The maximum number of Input modules supported is 4 for CANopen®, DeviceNet and EtherCAT®.

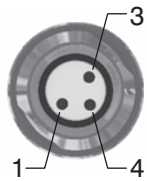
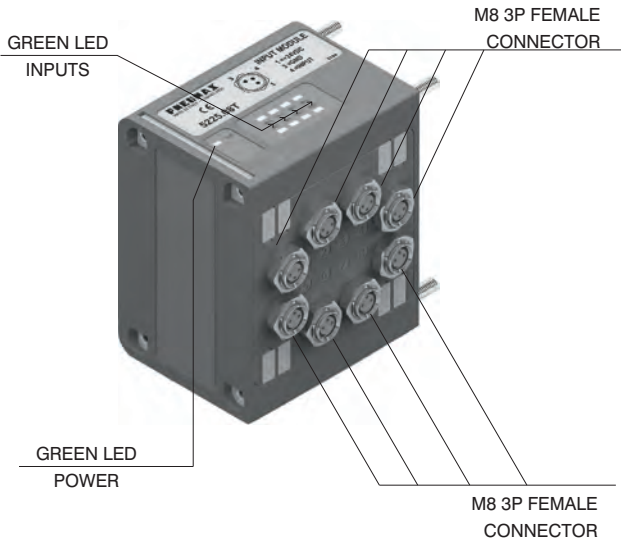
The maximum number of Input modules supported is 8 for PROFIBUS DP, PROFINET IO RT/IRT EtherNet/IP and Powerlink.

**Ordering code**

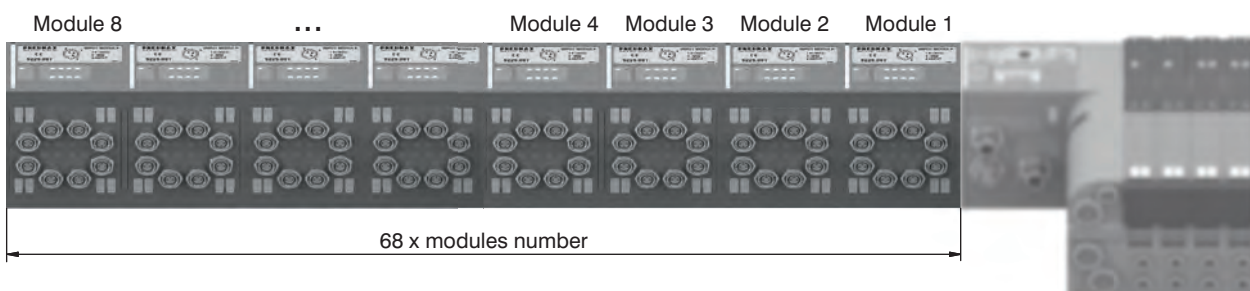
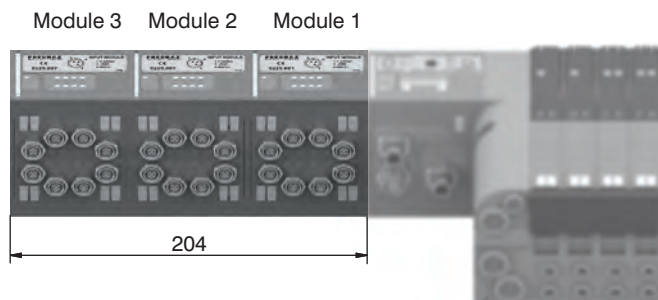
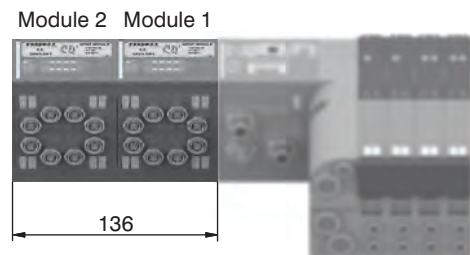
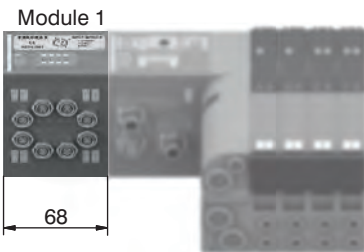
5225.08T



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND



2

**General :**

Modules have 4 connectors M12 5P female.

The Inputs are PNP equivalent 24 VDC ± 10%.

To each connector it is possible to plug both 2 wires Inputs (switches, magnetic switches pressure switches, etc) or 3 wires Inputs (proximity, photocells, electronic sensors, etc).

The maximum current available for all 8 Inputs is 300 mA.

Each module includes a 300 mA self-mending fuse. If a short circuit or a overcharge (overall current >300mA) occur the safety device acts cutting the 24 VDC power supply to all M8 connectors on the module and switching off the green led PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault disappears the green LED PWR lights up indicating the ON state and the node will re-start to operate.

The maximum number of Input modules supported is 4 for CANopen®, DeviceNet and EtherCAT®.

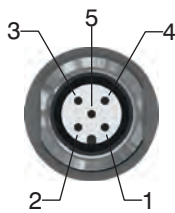
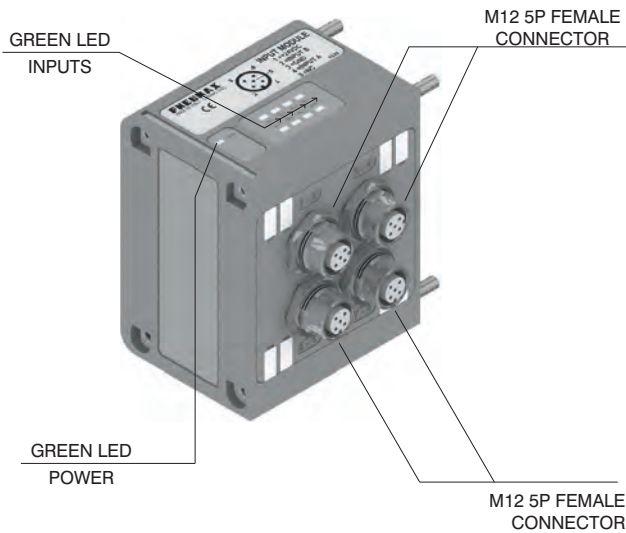
The maximum number of Input modules supported is 8 for PROFIBUS DP, PROFINET IO RT/IRT EtherNet/IP and Powerlink.

**Ordering code**

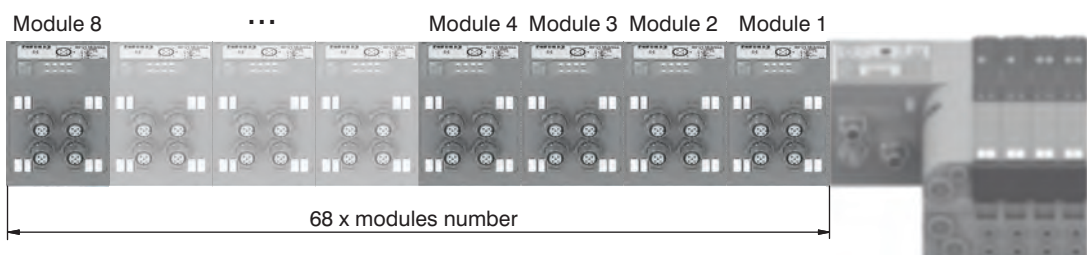
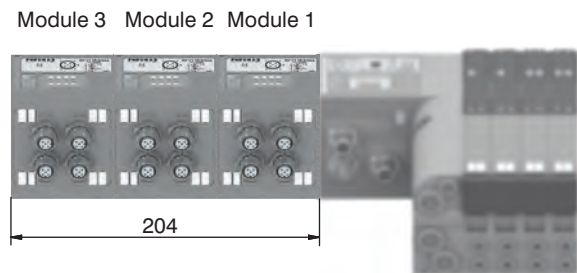
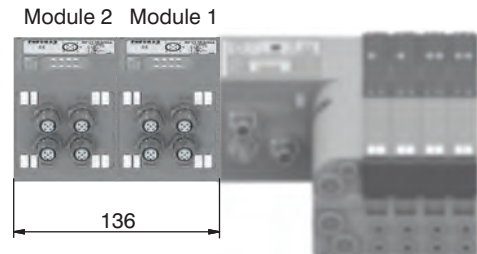
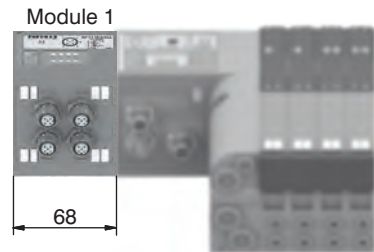
5225.12T



**Scheme / Overall dimensions and I/O layout :**



PIN	DESCRIPTION
1	+24 VDC
2	INPUT B
3	GND
4	INPUT A
5	NC





**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two analogue inputs (voltage or current).  
The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

Available models:

5225.2T.00T (voltage signal 0 - 10V);

5225.2T.01T (voltage signal 0 - 5V);

5225.2C.00T (current signal 4 - 20mA);

5225.2C.01T (current signal 0 - 20mA).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly. Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 analogue Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

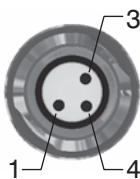
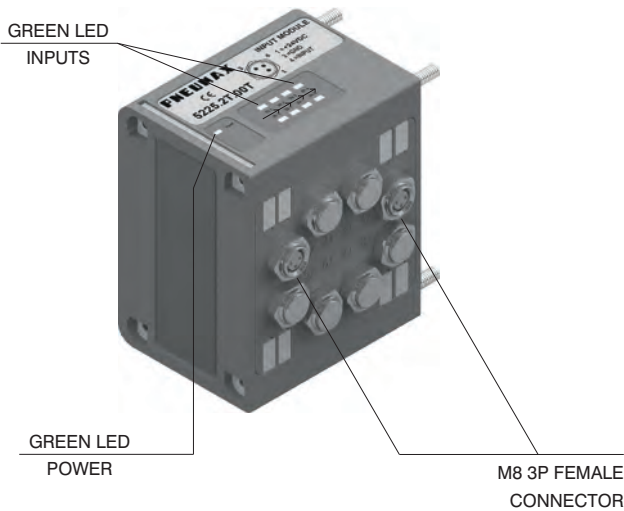
The Maximum number of 2 analogue Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Ordering code**

5225.2 \_ . \_T

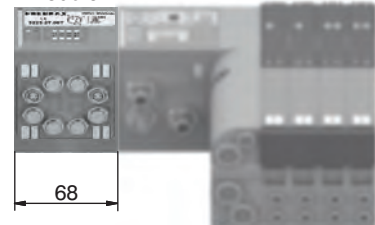


**Scheme / Overall dimensions and I/O layout :**

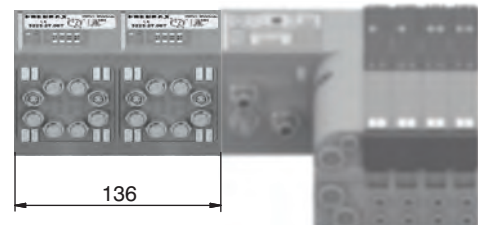


PIN	DESCRIPTION
1	+24 VDC
4	INPUT
3	GND

Module 1



Module 2 Module 1



**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two Pt100 probes.

The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

It is possible to plug 3-wires probes or 2-wires probes.

The temperature is expressed in tenths of degree.

The temperature range is 0 – 250°C, beyond which the green LED for probe presence doesn't light on.

The module returns a value correspondent to 250°C when the probe is not connected.

Available models:

5225.2P.00T (2-wires probes);

5225.2P.01T (3-wires probes).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other Input module connected to the node will remain powered and will function correctly.

Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 Pt100 Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

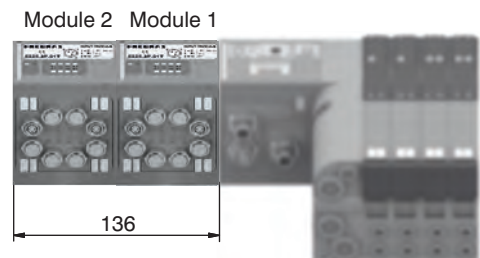
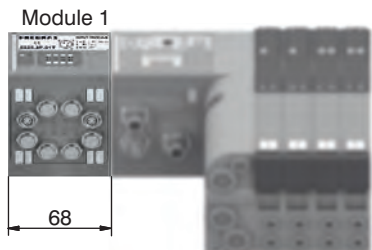
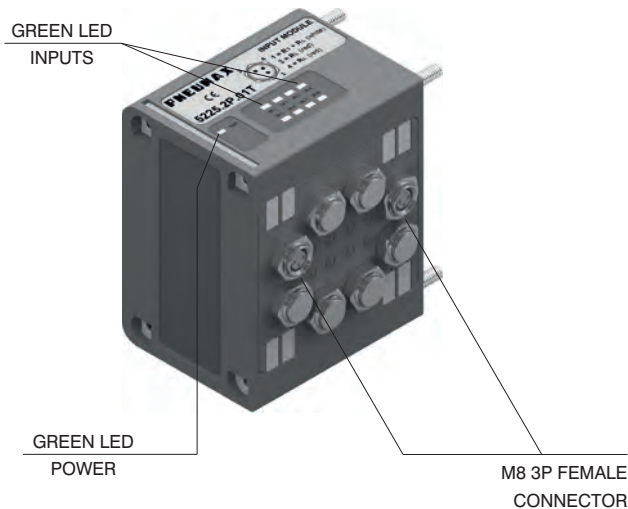
The Maximum number of 2 Pt100 Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Ordering code**

5225.2P . 0\_T



**Scheme / Overall dimensions and I/O layout :**



**3 WIRES**

PIN	DESCRIPTION
1	RT (white)
4	RL (red)
3	RL (red)

**2 WIRES**

PIN	DESCRIPTION
1	RT (white)
4	NC
3	RL (red)

**General :**

This module is fitted with two M8 3 pin female connectors.

With this module is possible to read two Pt100 probes.

The inputs are sampled at 12 bit.

For practicality the sampled value is transmitted with 16 bit, of which the four less significant are fixed at zero.

It is possible to plug 3-wires probes or 2-wires probes.

The temperature is expressed in points according to the formula

$$\text{Temperature} = \left( \frac{\text{Points}}{4095} \times 600 \right) - 200$$

The temperature range is -200 to +400°C, beyond which the green LED for probe presence doesn't light on.

The module returns a value correspondent to 400°C when the probe is not connected.

Available models:

5225.2P.10T (2-wires probes);

5225.2P.11T (3-wires probes).

Each module includes a 300 mA self-mending fuse. Should a short circuit or a overcharge (overall current >300mA) occur the safety device intervenes cutting the 24VDC power supply to all M8 connectors on the module and switching off the green LED PWR. Any other INPUT module connected to the node will remain powered and will function correctly.

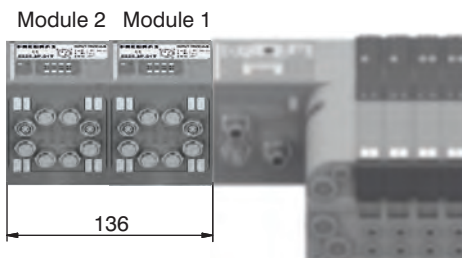
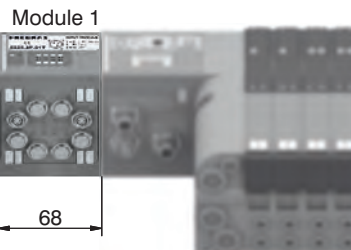
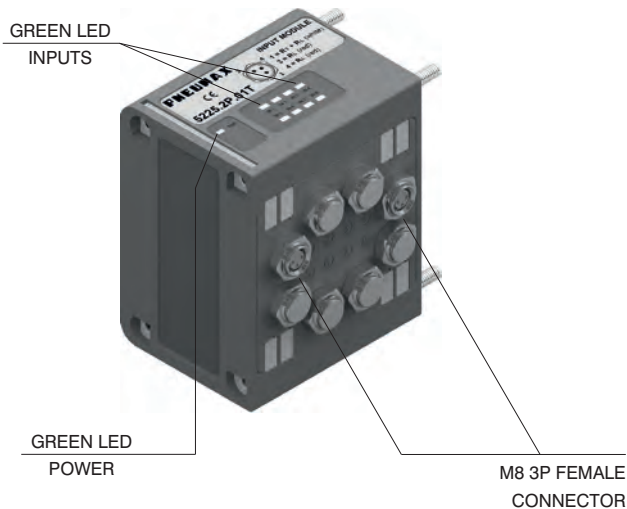
Once the cause of the fault is removed the green LED lights up indicating the ON state and the node will re-start to operate.

This module is counted as four 8 digital Inputs modules.

The Maximum number of 2 Pt100 Inputs modules supported is 1 for CANopen®, DeviceNet, PROFIBUS DP and EtherCAT®.

The Maximum number of 2 Pt100 Inputs modules supported is 2 for PROFINET IO RT/IRT, EtherNet/IP and Powerlink.

**Scheme / Overall dimensions and I/O layout :**



**3 WIRES**

PIN	DESCRIPTION
1	RT (white)
4	RL (red)
3	RL (red)

**2 WIRES**


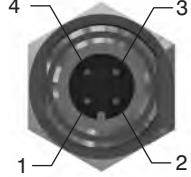

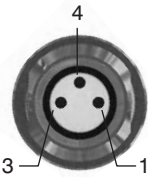
PIN	DESCRIPTION
1	RT (white)
4	NC
3	RL (red)


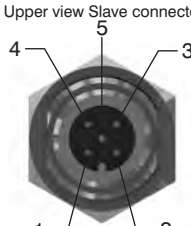

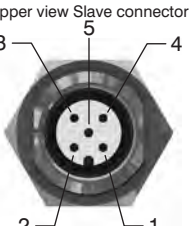
2


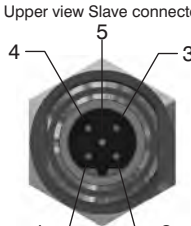

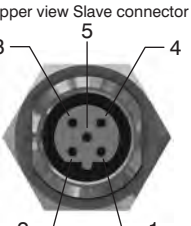
**Ordering code**


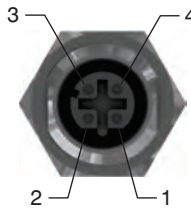

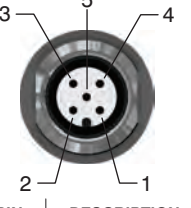
**5225.2P . 1\_T**





M12A 4P female Socket		M8 3P male Plug																			
Ordering code		Ordering code																			
<b>5312A.F04.00</b>		<b>5308A.M03.00</b>																			
Power supply straight connector.	Upper view Slave connector	Input straight connector.	Upper view Slave connector																		
																					
	<table border="1" style="font-size: small;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>+24 VDC Node</td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td>0 V</td></tr> <tr><td>4</td><td>+24 VDC Output</td></tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC Node	2		3	0 V	4	+24 VDC Output		<table border="1" style="font-size: small;"> <thead> <tr> <th>PIN</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>+24 VDC</td></tr> <tr><td>4</td><td>INPUT</td></tr> <tr><td>3</td><td>GND</td></tr> </tbody> </table>	PIN	DESCRIPTION	1	+24 VDC	4	INPUT	3	GND
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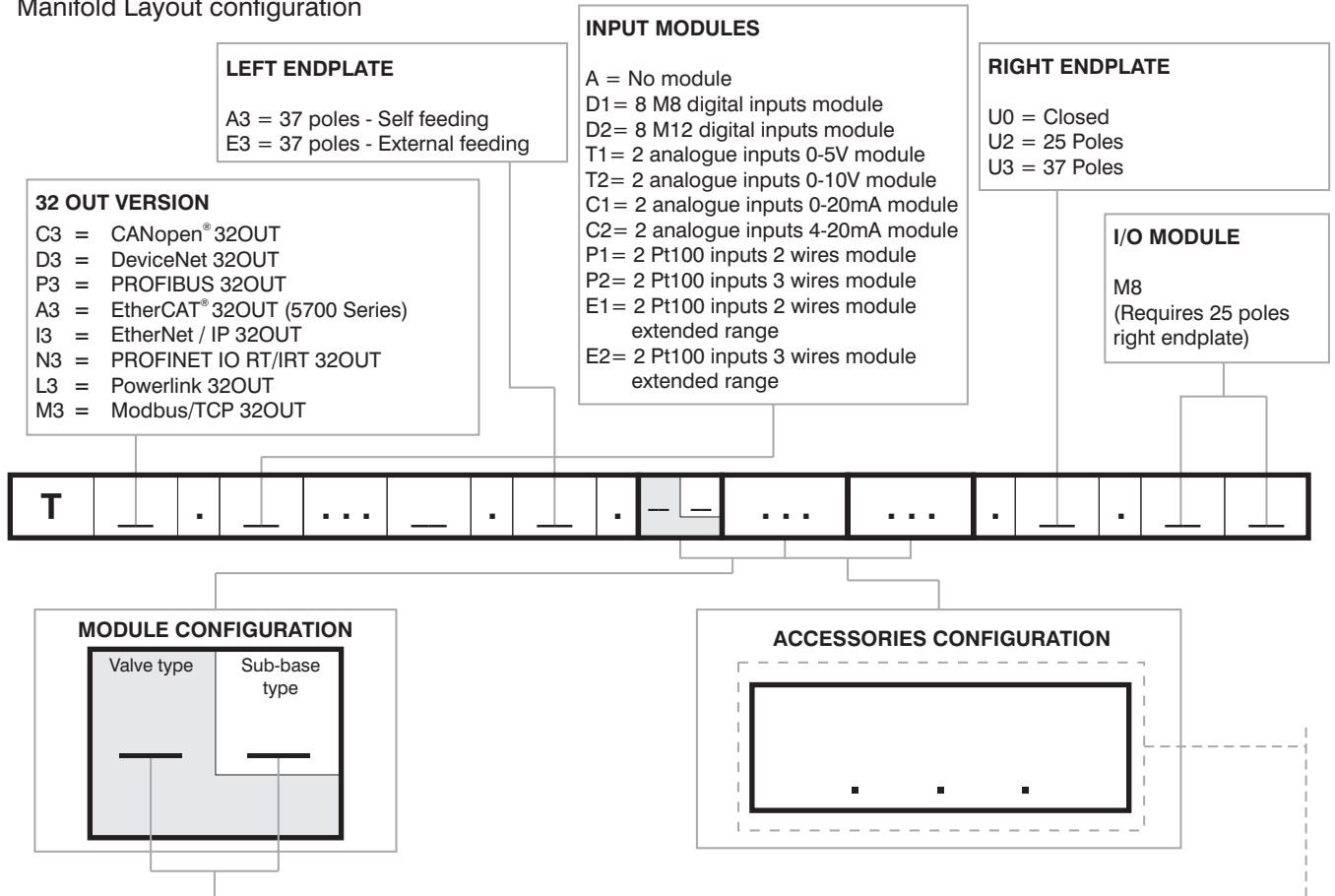
M12A 5P female Socket		M12A 5P male Plug																									
Ordering code		Ordering code																									
<b>5312A.F05.00</b>		<b>5312A.M05.00</b>																									
Network straight connector: for Bus CANOpen®, DeviceNet.	Upper view Slave connector	Network straight connector: for BUS CANOpen®, DeviceNet.	Upper view Slave connector																								
																											
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M12B 5P female Plug		M12B 5P male Plug																									
Ordering code		Ordering code																									
<b>5312B.F05.00</b>		<b>5312B.M05.00</b>																									
Network straight connector: for Bus PROFIBUS DP.	Upper view Slave connector	Network straight connector: for BUS PROFIBUS DP.	Upper view Slave connector																								
																											
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M12D 4P male Plug		M12 5P male Plug																												
Ordering code		Ordering code																												
<b>5312D.M04.00</b>		<b>5312A.M05.00</b>																												
Network straight connector: for EtherCAT®, PROFINET IO RT/IRT, EtherNet/IP Powerlink and Modbus/TCP.	Upper view Slave connector	Input straight connector.	Upper view Slave connector																											
																														
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M12 Plug		M8 Plug	
Ordering code		Ordering code	
<b>5300.T12</b>		<b>5300.T08</b>	
Trademarks: EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.			

Manifold Layout configuration



**SHORT CODE FUNCTION / CONNECTION :**

- |  |  |
|--|--|
| A1= 5/2 Sol.-Spring + BASE 1 - CARTR. G1/8" GAS  | F2= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS |
| A2= 5/2 Sol.-Spring + BASE 2 - CARTR. G1/8" GAS  | F4= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø4        |
| A3= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø4         | F6= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø6        |
| A4= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø4         | F8= 2x3/2 NC-NC (= 5/3 OC) Sol.-Sol. + BASE 2 - CARTR. Ø8        |
| A5= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø6         | G2= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS |
| A6= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø6         | G4= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø4        |
| A7= 5/2 Sol.-Spring + BASE 1 - CARTR. Ø8         | G6= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø6        |
| A8= 5/2 Sol.-Spring + BASE 2 - CARTR. Ø8         | G8= 2x3/2 NO-NO (= 5/3 PC) Sol.-Sol. + BASE 2 - CARTR. Ø8        |
| B1= 5/2 Sol.-Diff. + BASE 1 - CARTR. G1/8" GAS   | H2= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS            |
| B2= 5/2 Sol.-Diff. + BASE 2 - CARTR. G1/8" GAS   | H4= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø4                   |
| B3= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø4          | H6= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø6                   |
| B4= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø4          | H8= 2x3/2 NC-NO Sol.-Sol. + BASE 2 - CARTR. Ø8                   |
| B5= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø6          | I2= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS            |
| B6= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø6          | I4= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø4                   |
| B7= 5/2 Sol.-Diff. + BASE 1 - CARTR. Ø8          | I6= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø6                   |
| B8= 5/2 Sol.-Diff. + BASE 2 - CARTR. Ø8          | I8= 2x3/2 NO-NC Sol.-Sol. + BASE 2 - CARTR. Ø8                   |
| C2= 5/2 Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS    | T1= Free valve space plug + BASE 1 - CARTR. G1/8" GAS            |
| C4= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø4           | T2= Free valve space plug + BASE 2 - CARTR. G1/8" GAS            |
| C6= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø6           | T3= Free valve space plug + BASE 1 - CARTR. Ø4                   |
| C8= 5/2 Sol.-Sol. + BASE 2 - CARTR. Ø8           | T4= Free valve space plug + BASE 2 - CARTR. Ø4                   |
| E2= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. G1/8" GAS | T5= Free valve space plug + BASE 1 - CARTR. Ø6                   |
| E4= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø4        | T6= Free valve space plug + BASE 2 - CARTR. Ø6                   |
| E6= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø6        | T7= Free valve space plug + BASE 1 - CARTR. Ø8                   |
| E8= 5/3 CC Sol.-Sol. + BASE 2 - CARTR. Ø8        | T8= Free valve space plug + BASE 2 - CARTR. Ø8                   |

**NOTE:**

While configuring the manifold always be careful that the maximum number of electrical signals available is 32.  
The use of monostable valve mounted on a base type 2 ( 2 electrical signals occupied ) causes the loss of one electric signal. In this case the monostable valve can be replaced by a bistable valve. The diaphragms plugs are used to intercept the conduits 1,3 & 5 of the base. If it is necessary to interrupt more than one conduit in the same time then put in line the letters which identifies the position (for exemple : regarding the 3 & 5 conduits, put the Y & Z letters).  
Should one or more conduits be cut more than one time it is necessary to add the relevant intermediate Supply/Exhaust module.

**ACCESSORIES**

- |   |  |
|---|--|
| U2 = Power supply<br>2 positions module     | Z = Diaphragm plug<br>on pipe 5          |
| U4 = Power supply<br>4 positions module     | XY = Diaphragm plug<br>on pipe 1 & 3     |
| W = Intermediate supply<br>& exhaust module | ZX = Diaphragm plug<br>on pipe 5 & 1     |
| X = Diaphragm plug<br>on pipe 1             | ZY = Diaphragm plug<br>on pipe 5 & 3     |
| Y = Diaphragm plug<br>on pipe 3             | ZXY = Diaphragm plug<br>on pipe 5, 1 & 3 |





## AIR SERVICE UNITS

### Air Service Units - Size 1

Filter / Coalescing filter / Panel mounting pressure regulator / Panel mounting pressure regulator including manometer / Modular pressure regulator / Modular pressure regulator including manometer / Manifold pressure regulators / Lubricator / Filter - pressure regulator / Progressive start-up valve / Shut-off valve / Filter pressure regulator + Lubricator / Filter + Pressure regulator + Lubricator / High sensitive air pressure regulator with high flow rate relieving / Pressure Switch complete with adapter / Accessories

### Air Service Units - Size 2

Filter / Coalescing filter / Pressure regulator / Pressure regulator including manometer / Lubricator / Filter - pressure regulator / Progressive start-up valve / Shut-off valve / Filter pressure regulator + Lubricator / Filter + Pressure regulator + Lubricator / High sensitive air pressure regulator with high flow rate relieving / Pressure Switch complete with adapter / Accessories

### Air Service Units - Size 3

Filter / Coalescing filter / Pressure regulator / Pressure regulator including manometer / Lubricator / Filter - pressure regulator / Progressive start-up valve / Shut-off valve / Filter pressure regulator + Lubricator / Filter + Pressure regulator + Lubricator / High sensitive air pressure regulator with high flow rate relieving / Filter G 3/4" / Coalescing filter G 3/4" / Pressure regulator G 3/4" / Lubricator G 3/4" / Filter - pressure regulator G 3/4" / Filter pressure regulator + Lubricator G 3/4" / Filter + Pressure regulator + Lubricator G 3/4" / Pressure Switch complete with adapter / Accessories

### Air Service Units - Size 4

Filter / Coalescing filter / Pressure regulator / Lubricator / Progressive start-up valve / Filter + Pressure regulator + Lubricator / Shut-off valve / Pressure Switch complete with adapter / Accessories

### FRL INOX Steel line series, Sizes 2 - 3 - 4

### Electronic proportional regulator, Sizes 0 - 1 - 3

Standard version, ECONOMIC Version, Version with CANopen protocol and Version with CANopen protocol M12 connector. Size 0 / Size 1 / Size 3

### Miniaturized Electronic proportional regulator, Sizes 0 - 1 - 3

### Pressure booster

ø40 / ø40 complete with pressure regulator - ø63 / ø63 complete with pressure regulator - ø100 / ø100 complete with pressure regulator / Accessories

### Pressure booster Series P+

ø40 / ø40 complete with pressure regulator

## AIR SERVICE UNITS Series

Filter (F) / Coalescing filter (D) / Pressure regulator (R) and including gauge (RM) / Modular pressure regulator (B) and including gauge (M) - Manifold pressure regulator (*only for Size 1*) / Filter - regulator (E) and including gauge (EM) / Lubricator (L) / Shut-off valve (VL) / Electric Shut-off valve (VE) / Progressive start-up valve (AP) / Air intake (PA) / Pressure Switch (PP) / Accessories / 2 or more component service unit assembled.

## General

The operational safety and durability of a pneumatic circuit depends on the quality of the compressed air. The compressed air and the moisture increase the rate of wear of the surfaces and seals, reducing the efficiency and the life of the pneumatic components. Furthermore the pressure fluctuation due to a discontinuous demand of air, adversely effect the correct operation of the circuit. To eliminate these disadvantages it is essential to install the service units: filter, pressure regulator and lubricator.

## Construction and working characteristics

The great advantage of these Air Service Unit's components is their Modular Design which allows their assembly without the use of additional devices.

Two different version have been designed for this size: one made with zinc alloy body and the other with reinforced technopolymer body and threaded brass connections.

The bowls are made of transparent technopolymer and are also available with shock resistant technopolymer protection on request, always allowing the moisture and oil level control from any angle.

The filter can be equipped with manual or semiautomatic water drain valve; furthermore it's possible to install the automatic draining device inside the bowl.

The pressure regulator handle is lockable in the desired position by simply pressing it downwards.

The lubricator oil flow is adjustable with proper handle and it is visibly checked through the sight dome.

The shut-off valve can be equipped with pad-lock to prevent accidents or damages due to unauthorized operation.

The progressive start-up valve, pneumatically or electropneumatically controlled, allows air supply to the circuit progressively and with adjustable time.

The accessories like the wall fixing brackets, pressure gauges with different scales and diameters and the air intake blocks are completing the range. They are assembled between the elements to get filtered or filtered non-lubricated air in the system.

## Instruction for installation and operation

Pay attention to install a group or a single component with air flow direction according to the arrows and to the following sequence: filter, pressure regulator, lubricator and with bowls downwards. The group can be fixed to the wall by removing the covers, which can be installed again after fixing for covering the screws.

Do not exceed the recommended torque while assembling the connectors.

Do not exceed the recommended air pressure and temperature limits.

The moisture should not exceed the level marked on the bowl and it can be drawn off and carried by a flexible tube of  $\text{Ø } 6/4$  directly connected to the discharge valve handle. The pressure should be set from minimum to maximum, rotating the adjusting handle clockwise. As lubricant, we suggest to use oil class FD22 or HG32. Verify that the lubricator is not fed with a flow lower than the minimum operational.

To set the oil flow rotate the proper adjusting handle in order to get one drop of oil every 300-600 liters of air.

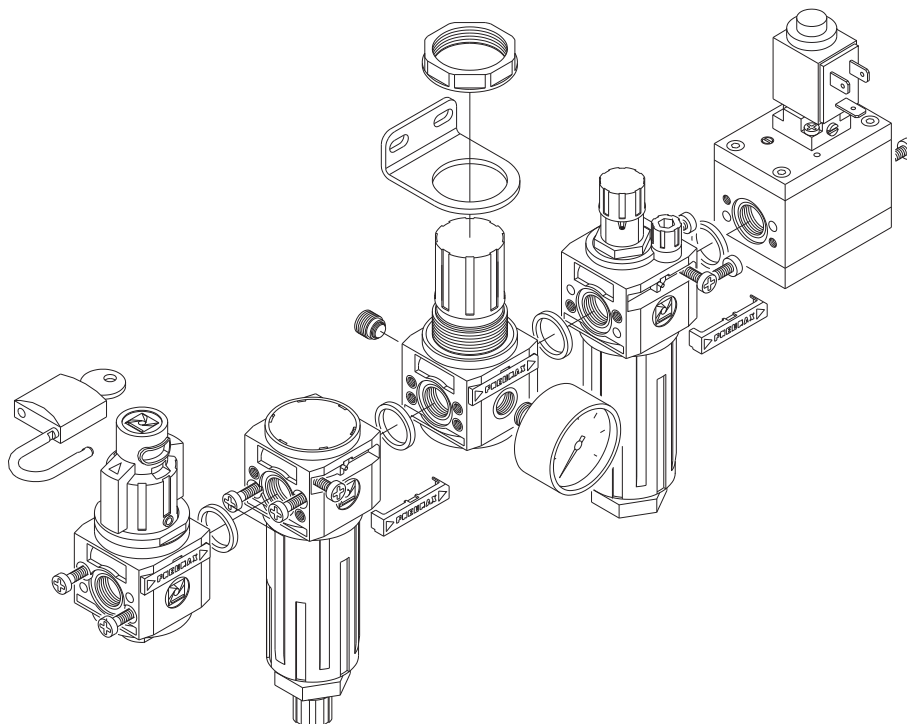
The oil flow will be kept automatically and proportionally to the air flow.

The oil can be refilled by mean of proper plug or directly into the bowl after having de-pressurized the system. Do not exceed the maximum level indicated on the bowl. For opening the shut-off valve push and rotate clockwise the operating handle. For closing it and consequently discharging the down stream line, rotate the handle counter-clockwise.

## Maintenance

Clean the bowls with water and detergent. Do not use alcohol. The filter element made with HPDE is reusable by blowing and cleaning it with proper detergent. For replacing or cleaning it, remove the bowl and unscrew the baffle spins. Replace the pressure regulator diaphragm whenever the operation is not correct or there is a continuous air leaking through the relieving (over pressure discharge); reinstall the adjusting mechanism support, locking it with about 8 Nm torque. In case it is necessary to replace the lubricator transparent dome, tight it at 5 Nm torque maximum.

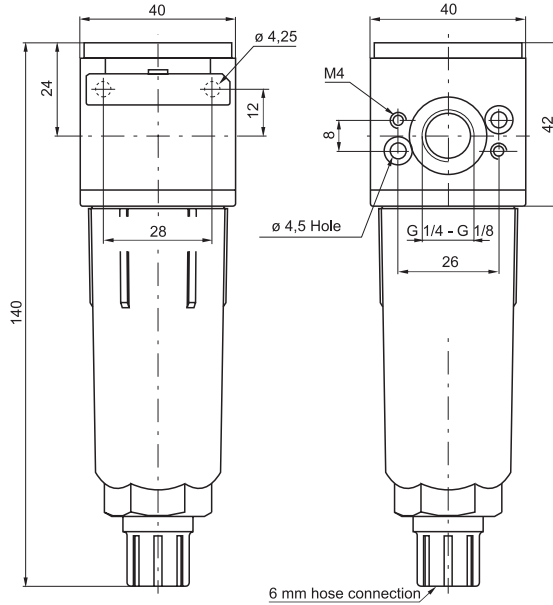
## Assembling







Filter



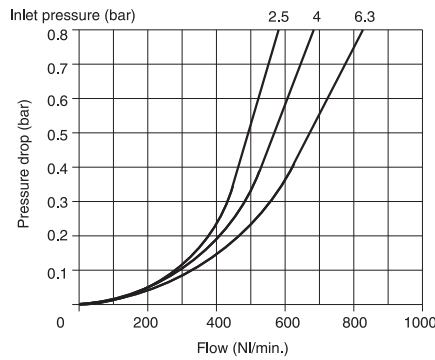
Ordering code

**17V01C.S.T**

VERSION	
V	0 = Zinc alloy body
	1 = Technopolymer body
CONNECTIONS	
C	A = G 1/8"
	B = G 1/4"
Filter pore size	
S	A = 5μ
	B = 20μ
	C = 50μ
TYPE	
P	Bowl protection
T	S = Automatic drain
	PS = Bowl protection and Automatic drain

Example: 17101A.B.P  
Filter size 1 with G 1/8" connections, filter pore size 20μ and bowl protection with technopolymer body.

Flow rate curves



Operational characteristic

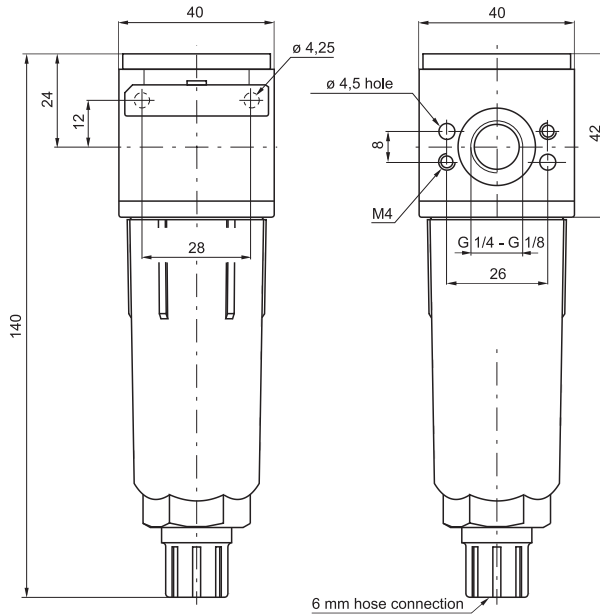
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.
- Wall mounting possibility with M4 screws protected by covers.
- Transparent technopolymer bowl screwed to the body.
- Shock resistant bowl technopolymer protection.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.

Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Weight with technopolymer body	gr. 103
Weight with zinc alloy body	gr. 218
Filter pore size	5μ - 20μ - 50μ
Bowl capacity	20 cm³
Assembly position	Vertical
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	30 Nm
Max. fittings torque on technopolymer body	15 Nm

3

Coalescing filter



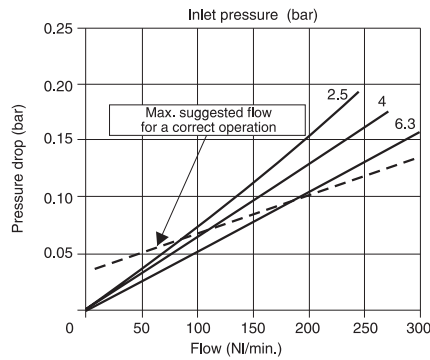
Ordering code

**17V08C.E.T**

<b>V</b>	VERSION
0	Zinc alloy body
1	Technopolymer body
<b>C</b>	CONNECTIONS
A	G 1/8"
B	G 1/4"
<b>E</b>	FILTER EFFICIENCY
E	99,97%
<b>T</b>	TYPE
P	Bowl protection
S	Automatic drain
PS	Bowl protection and Automatic drain

Example: 17108A.E.P  
Filter size 1 with G 1/8" connections. Filter efficiency 99,97% and bowl protection with technopolymer body.

Flow rate curves



Operational characteristic

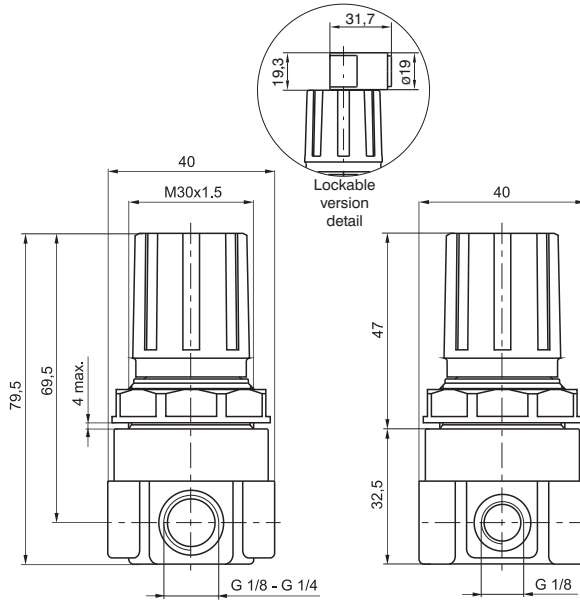
- Coalescing filter element remove  $0,01\mu$  particle equivalent to 99,97%.
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.
- Wall mounting possibility with M4 screws protected by covers.
- Transparent technopolymer bowl screwed to the body.
- Shock resistant bowl technopolymer protection.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.

Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Weight with technopolymer body	gr. 110
Weight with zinc alloy body	gr. 225
Filter efficiency with $0,01\mu$ particle	99,97%
Bowl capacity	20 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	30 Nm
Max. fittings torque on technopolymer body	15 Nm



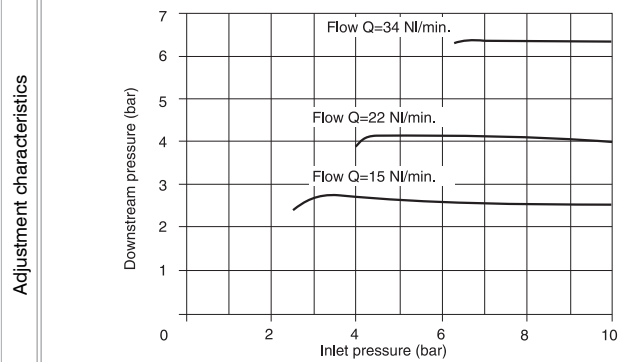
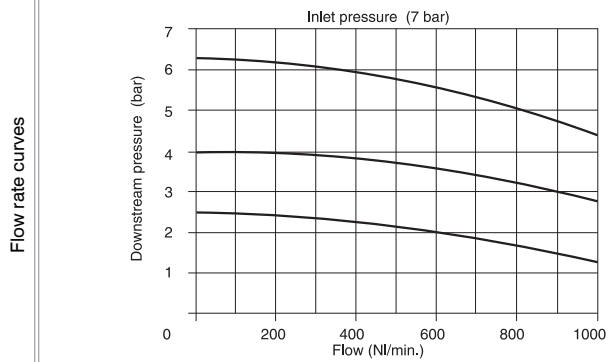
Panel mounting pressure regulator



Ordering code  
**17109C.C.T.O**

CONNECTIONS	
<b>C</b>	A = G 1/8"
	B = G 1/4"
ADJUSTING RANGE	
	A = 0 - 2 bar
<b>C</b>	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
	L = no Relieving
	SM = improved relieving
<b>T</b>	SR = Quick exhaust (Unbalanced poppet)
	SRM = Quick exhaust with improved relieving
	SMF = Improved relieving with controlled relief
OPTION	
<b>C</b>	= Standard (without options)
	K = Version with padlock

Example: 17109A.C  
Panel mounting pressure regulator size 1 with G 1/8" connections, 0 - 8 bar adjusting range with relieving.



Operational characteristic

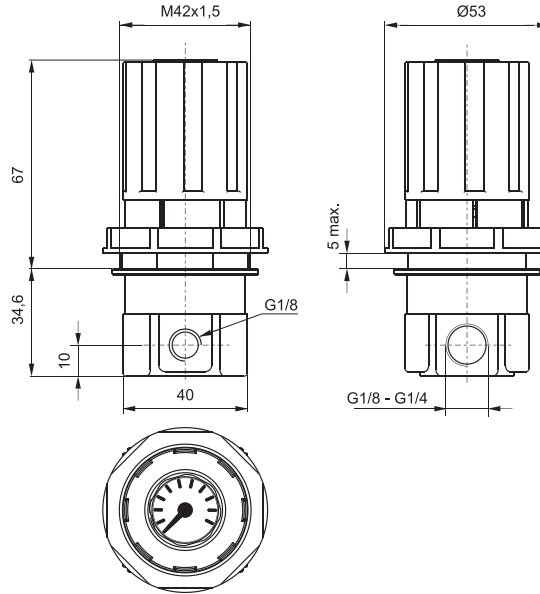
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Technopolymer body with aluminum reinforced threaded connections.
- Handle lockable in the desired position by simply pressing it downwards.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 110
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Max. fittings torque	15 Nm



Panel mounting pressure regulator including manometer

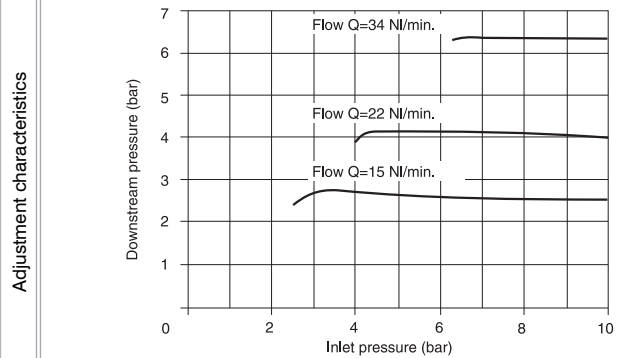
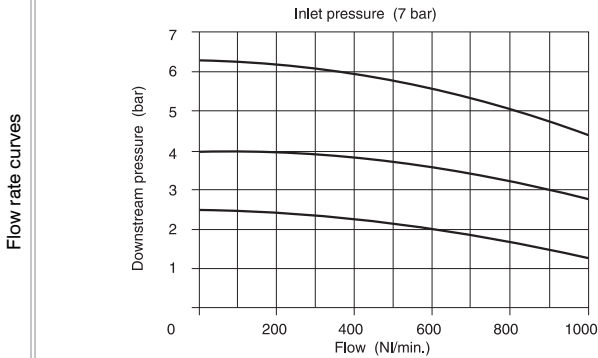


Ordering code

17129 **C**. **C**

CONNECTIONS	
<b>C</b>	A = G 1/8"
	B = G 1/4"
ADJUSTING RANGE	
	A = 0 - 2 bar
<b>C</b>	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar

Example: 17129A.C  
Panel mounting pressure regulator size 1 with G 1/8" connections, 0 - 8 bar.



**Operational characteristic**

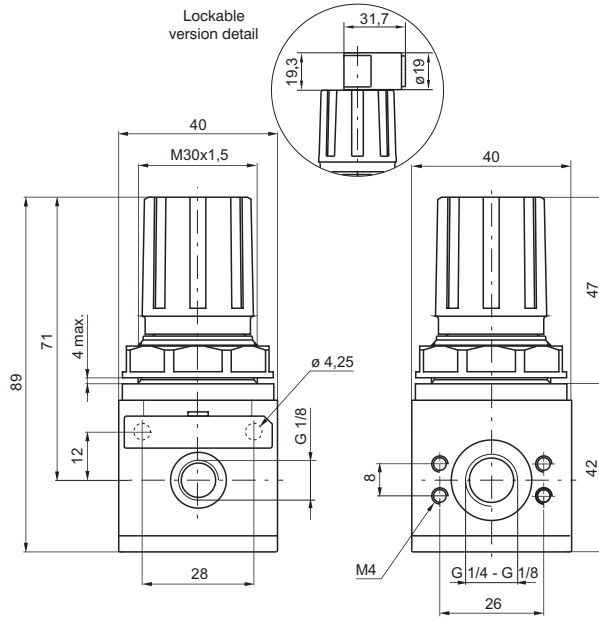
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Technopolymer body with aluminum reinforced threaded connections.
- Handle lockable in the desired position by simply pressing it downwards.
- Including manometer in the handle upper surface.
- Panel mounting bracket.

**Technical characteristic**

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 250
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Max. fittings torque	15 Nm



Modular pressure regulator

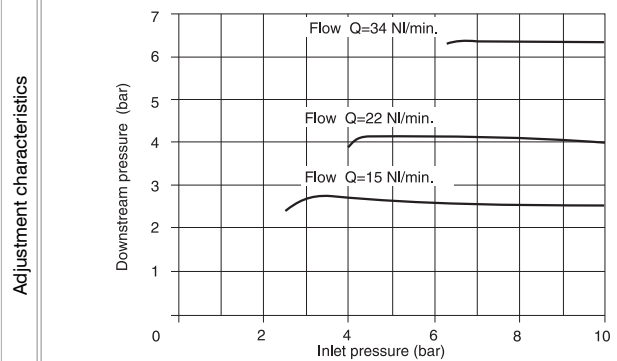
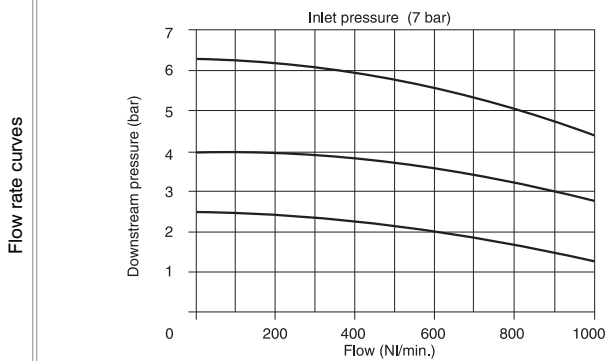


Ordering code

17V02C.G.T.O

VERSION	
V	0 = Zinc alloy body 1 = Technopolymer body
CONNECTIONS	
C	A = G 1/8" B = G 1/4"
ADJUSTING RANGE	
G	A = 0 - 2 bar B = 0 - 4 bar C = 0 - 8 bar D = 0 - 12 bar
TYPE	
T	L = no Relieving SM = improved relieving
OPTION	
O	= Standard (without options) K = Version with padlock

Example: 17102A.C  
Pressure regulator size 1 with G 1/8" connections and 0 - 8 bar adjusting range with relieving with technopolymer body.



Operational characteristic

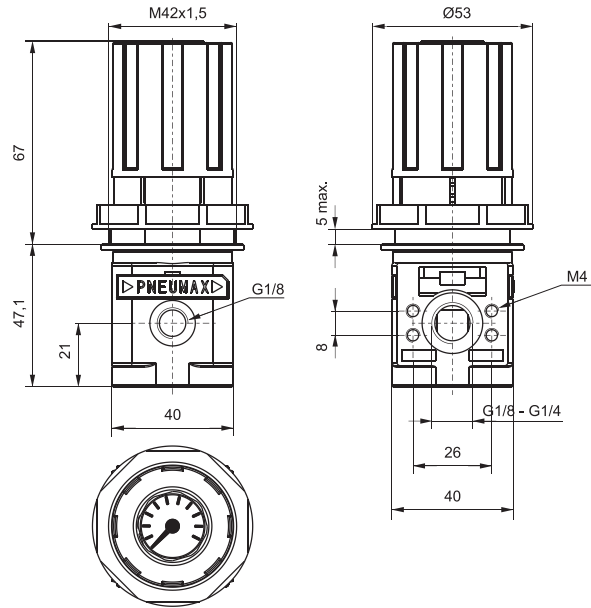
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.
- Wall mounting possibility with M4 screws protected by covers.
- Handle lockable in the desired position by simply pressing it downwards.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight with technopolymer body	gr. 135
Weight with zinc alloy body	gr. 250
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	25 Nm
Max. fittings torque on technopolymer body	15 Nm



Modular pressure regulator including manometer

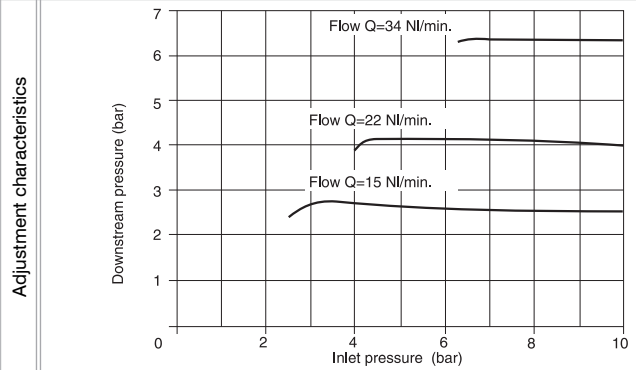
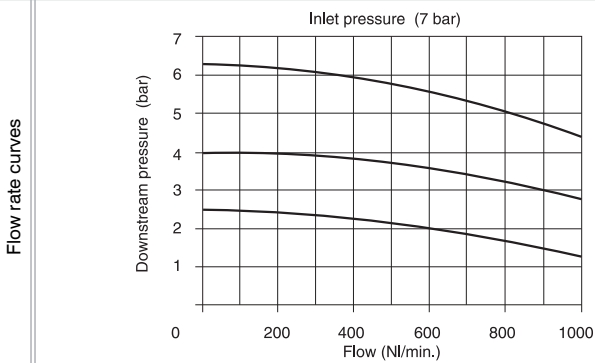


Ordering code

**17V22C.G**

VERSION	
0	Zinc alloy body
1	Technopolymer body
CONNECTIONS	
A	G 1/8"
B	G 1/4"
ADJUSTING RANGE	
A	0 - 2 bar
B	0 - 4 bar
C	0 - 8 bar
D	0 - 12 bar

Example: 17022A.C  
Pressure regulator size 1 with G 1/8" connections and 0 - 8 bar adjusting range with relieving with Zinc alloy body.



Operational characteristic

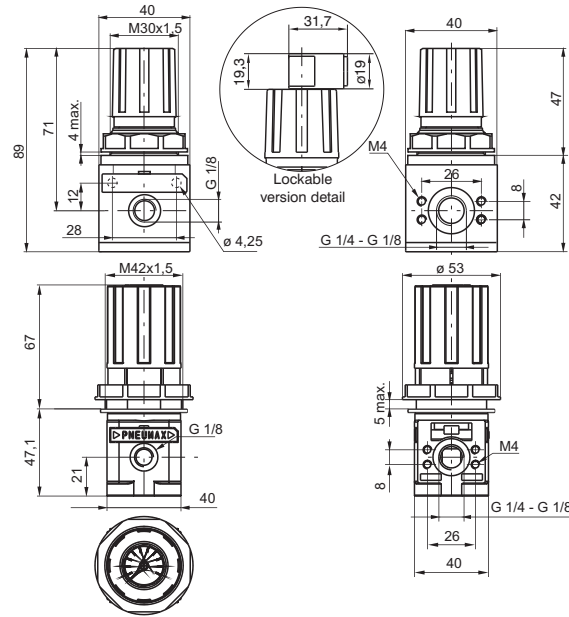
- Diaphragm pressure regulator with relieving.
- Pressure gauge included on the top of adjusting knob.
- Balanced poppet.
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.
- Wall mounting possibility with M4 screws protected by covers.
- Lockable handle by simply pressing it downwards in the desired position.
- Panel mounting bracket.

Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight with technopolymer body	gr. 250
Weight with zinc alloy body	gr. 380
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	25 Nm
Max. fittings torque on technopolymer body	15 Nm



Manifold pressure regulators



Ordering code

**170T2C.G.Ø**

TYPE

- Ⓐ = Standard regulator
- Ⓜ = Manifold press. reg. c/w manometer

CONNECTIONS

- Ⓐ = G 1/8"
- Ⓑ = G 1/4"

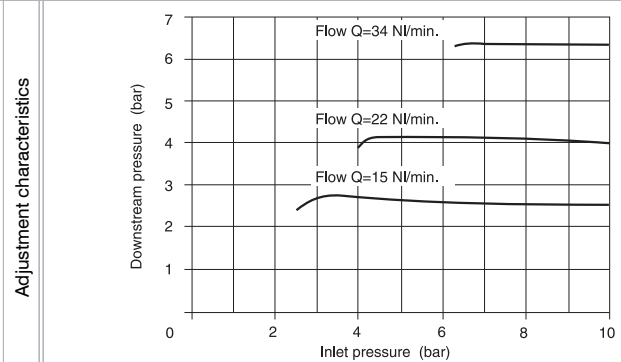
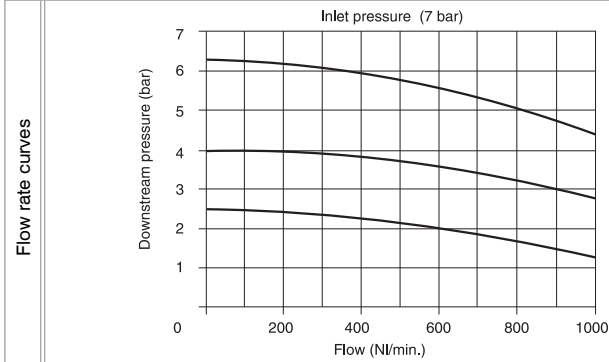
ADJUSTING RANGE

- Ⓐ = 0 - 2 bar
- Ⓑ = 0 - 4 bar
- Ⓒ = 0 - 8 bar
- Ⓓ = 0 - 12 bar

OPTION

- Ⓒ = Standard regulator TYPE "B" (without options)
- Ⓚ = Version with padlock (available only for Standard version TYPE "B")

Example: 170B2A.C  
Standard manifold pressure regulator with connections G1/8" and adjusting range 0-8 bar.



Operational characteristic

- Pneumax modular regulators have a common inlet for the whole manifold joined by a bayonet system.
- Alternatively to standard version it is also possible to use regulators with manometer included.
- This solution allows space savings on machine and avoids further pneumatic connections among regulators and manometers.

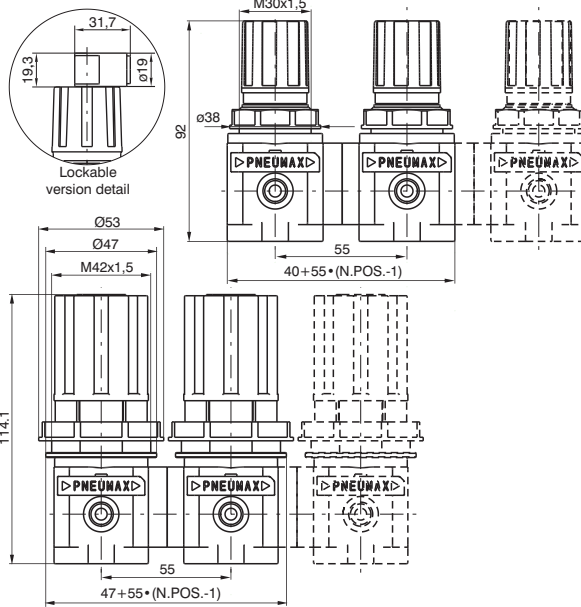
Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight with technopolymer body	gr. 235
Weight with zinc alloy body	gr. 380
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M4
Max. fittings torque	25 Nm





Manifold pressure regulators



**Ordering code**  
**17B12C.N.G.0**

**TYPE**  
**T** B = Standard regulator  
 M = vers. manometer included

**CONNECTIONS**  
**C** A = G 1/8"  
 B = G 1/4"

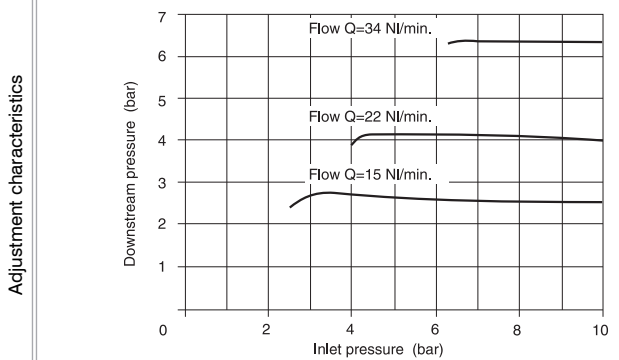
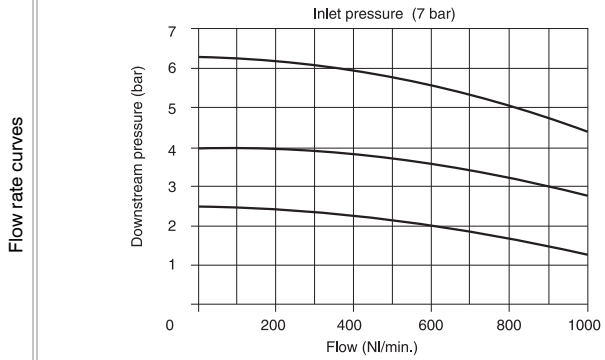
**POSITIONS N.**  
 2 = 2 regulators  
**N** 3 = 3 regulators  
 4 = 4 regulators  
 5 = 5 regulators  
 6 = 6 regulators

**ADJUSTING RANGE**  
**G** A = 0 - 2 bar  
 B = 0 - 4 bar  
 C = 0 - 8 bar  
 D = 0 - 12 bar

**OPTION**  
 Standard regulator TYPE "B" (without options)  
**0** K = Version with padlock (available only for Standard version TYPE "B")

Note: a special kit between pressure regulators is necessary for manifold mounting. Therefore regulators and kits must be ordered in same quantity less one kit. Code 170M6, see accessories page.

3



**Operational characteristic**

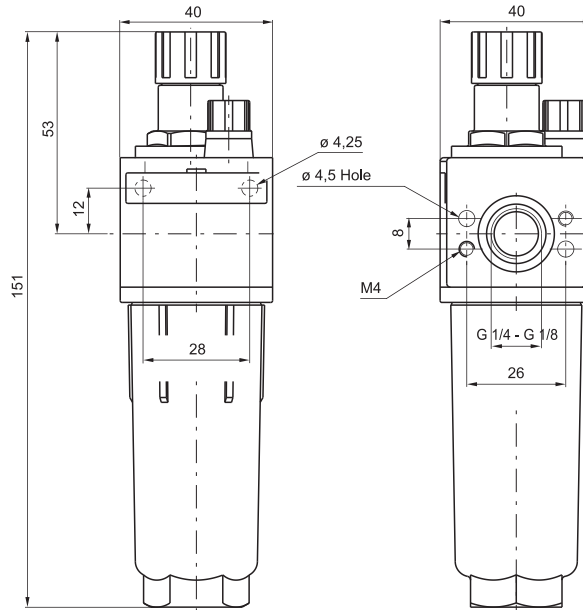
- Pneumax modular regulators have a common inlet for the whole manifold joined by a bayonet system.
- Alternatively to standard version it is also possible to use regulators with manometer included.
- This solution allows space savings on machine and avoids further pneumatic connections among regulators and manometers.

**Technical characteristic**

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 235
Weight	gr. 380
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M4
Max. fittings torque	25 Nm



Lubricator



Ordering code

**17V03C.T**

VERSION

- V 0 = Zinc alloy body
- 1 = Technopolymer body

CONNECTIONS

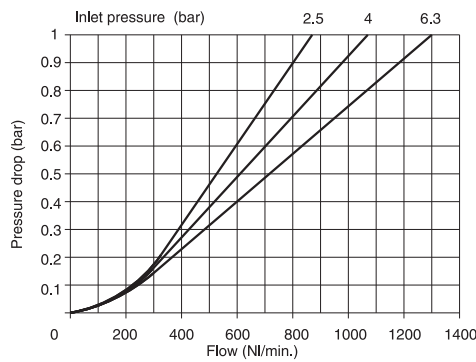
- C A = G 1/8"
- B = G 1/4"

TYPE

- T P = Bowl protection

Example: 17103A.P  
Lubricator size 1 with G 1/8" connections and bowl protection with technopolymer body.

Flow rate curves



Operational characteristic

- Fog type lubrication with variable section orifice according to the flow.
- Zinc alloy body or reinforced technopolymer body with threaded aluminum insert connections.
- Wall mounting possibility with M4 screws protected by covers.
- Transparent technopolymer bowl screwed to the body.
- Technopolymer shock resistant bowl protection.
- Possibility to see the min. and max. oil level on 360° also with bowl protection assembled.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug (Available only for technopolymer body versions).

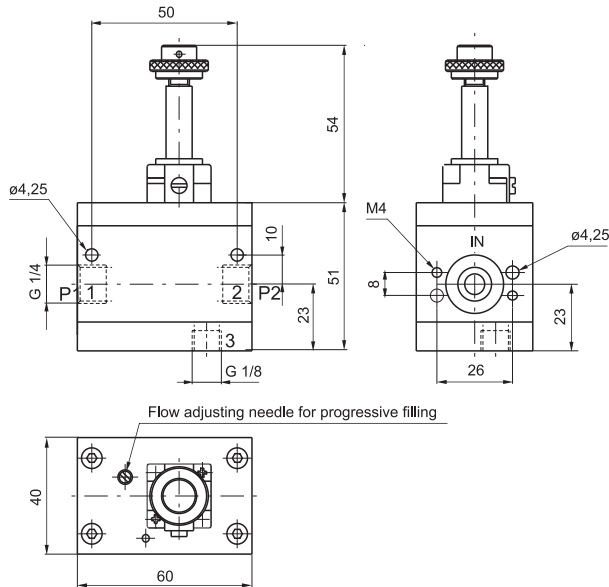
Technical characteristic

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Weight with technopolymer body	gr. 108
Weight with zinc alloy body	gr. 258
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	36 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	30 Nm
Max. fittings torque on technopolymer body	15 Nm
Min. operational flow at 6,3 bar	10 NI/min.





**Progressive start-up valve**



**Ordering code**

**171T**

**TYPE**

- T** 10.M2 = Electric control complete with M2 mechanic (see pag. 2.15)
- 20 = with pneumatic control

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

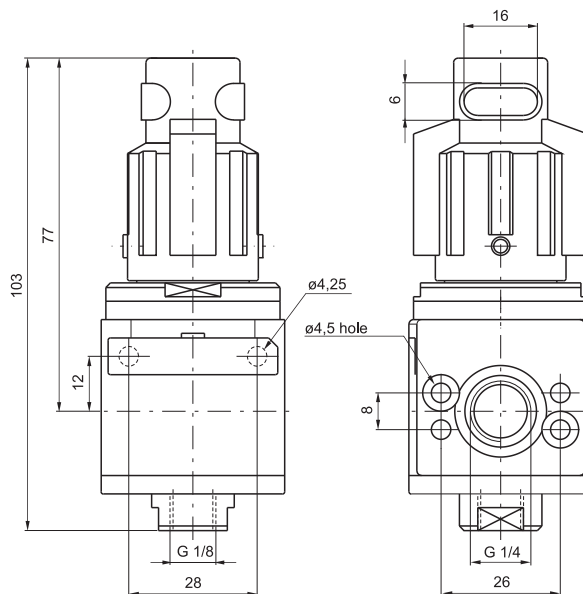
**Operational characteristic**

- 3 way valve with double poppet.
- Possibility to adjust the down stream circuit filling time by the enclosed adjustable metering screw.
- Quick down stream circuit discharge.
- Possibility for a pneumatic or electric piloting control.
- Body made with anodized 2011 aluminum alloy.
- Wall mounting possibility with M4 screws.

**Technical characteristic**

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	10 bar - 1 MPa
Temperature °C	50°C
Weight	gr. 365
Assembly position	Any
Min. operating pressure	2,5 bar - 0,25 MPa
Nominal flow at 6 bar with Δp=1	1000 NI/min.
Flow with adjustable metering screw fully open	150 NI/min.
Wall fixing screw	M4

**Shut-off valve**



**Ordering code**

**17V30.T**

**VERSION**

- V** 0 = Zinc alloy body
- 1 = Technopolymer body

**TYPE**

- T** A = Not lockable handle
- B = Lockable handle

Example: 17130.B : Shut-off valve size 1 complete with lockable handle with technopolymer body.

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

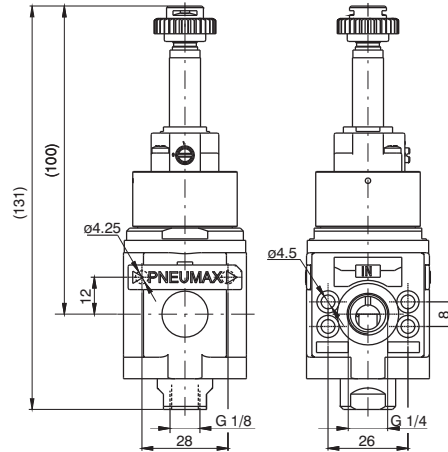
**Operational characteristic**

- 3 ways poppet valve.
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.
- Double handle action for valve opening: pushing and rotating (clockwise).
- Simply rotate the valve handle counter clockwise for valve closing and down stream circuit discharging.
- Possibility to lock the valve in the discharging position by fitting in a padlock in the proper seat.
- Wall mounting possibility with M4 screws protected by covers.

**Technical characteristic**

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	10 bar - 1,3 MPa
Temperature °C	50°C
Weight with technopolymer body	gr. 155
Weight with zinc alloy body	gr. 280
Assembly position	Any
Wall fixing screw	M4
Handle opening and closing angle	90°
Max. fittings torque on zinc alloy body	30 Nm
Max. fittings torque on technopolymer body	15 Nm

**Electrically operated shut-off valve**



**Ordering code**

**17V30.T**

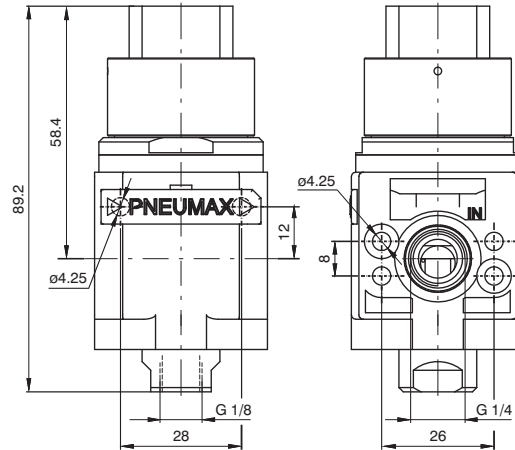
VERSION	
V	0 = Zinc alloy body
	1 = Technopolymer body
TYPE	
T	M2 = Electric with M2
	M2/9 = Electric with M2/9

Example: 17130.M2 : Shut-off valve size 1 with electric control complete with M2 mechanic.

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

Operational characteristic	Technical characteristic
- 3 ways poppet valve, electric control.	Inlet connections
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.	Exhaust connections
- Opening and closing of the valve via solenoid operator.	Temperature °C
- The correct flow direction is indicated by the arrows stamped on the valve body.	Weight with technopolymer body
- The supply pressure must be minimum 2 bars or higher for the solenoid operated version.	Weight with zinc alloy body
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).	Assembly position
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.	Wall fixing screw
- The air supply can only be done via port 1.	Max. fittings torque
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.	Min. working pressure
- Wall mounting possibility with M4 screws protected by covers.	Max working pressure (bar)
	Flow rate at 6 bar with $\Delta p=1$

**Pneumatically operated shut-off valve**



**Ordering code**

**17V30.PN**

VERSION	
V	0 = Zinc alloy body
	1 = Technopolymer body

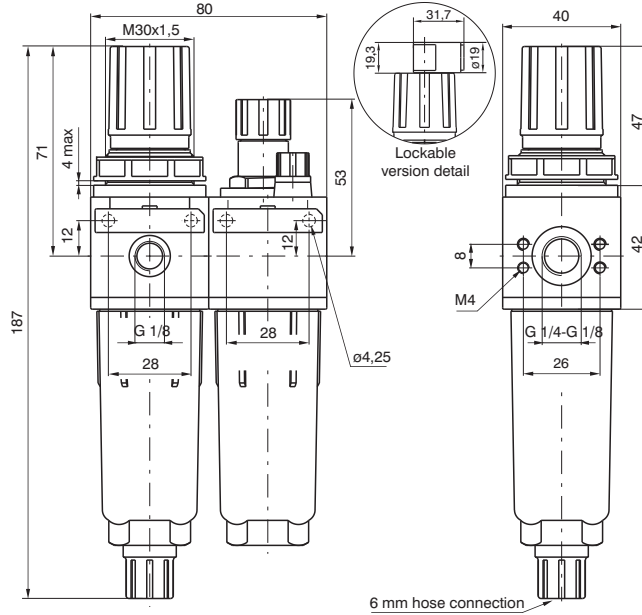
Example: 17130.PN : Shut-off valve size 1 with pneumatic pilot.

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

Operational characteristic	Technical characteristic
- 3 ways poppet valve, pneumatic pilot.	Piloting connections
- Zinc alloy body or reinforced technopolymer body with threaded aluminium insert connections.	Temperature °C
- Opening and closing of the valve via pneumatic operator	Weight with technopolymer body
- The correct flow direction is indicated by the arrows stamped on the valve body.	Weight with zinc alloy body
- The supply pressure must be minimum 2 bars or higher for the solenoid operated version.	Assembly position
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).	Wall fixing screw
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.	Max. fittings torque
- The air supply can only be done via port 1.	Min. working pressure
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.	Max working pressure (bar)
- Wall mounting possibility with M4 screws protected by covers.	Piloting pressure
	Flow rate at 6 bar with $\Delta p=1$



Filter pressure regulator + Lubricator

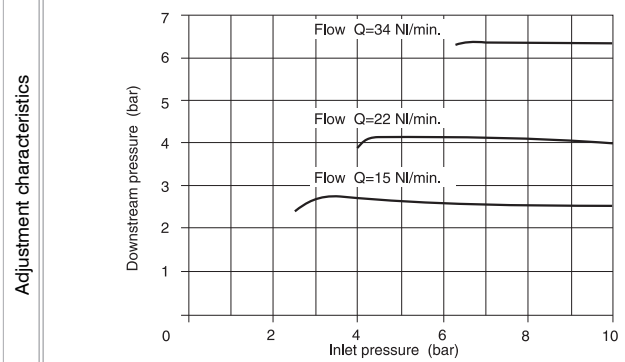
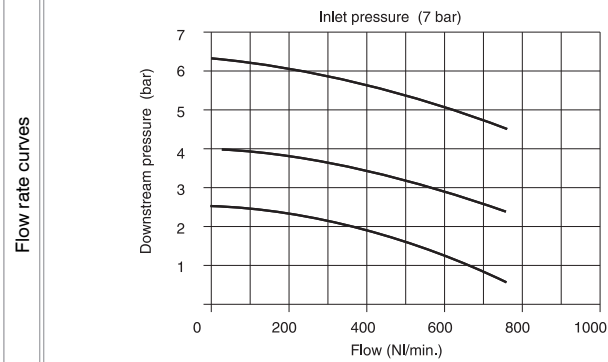


**Ordering code**  
**17V06C.S.G.T.O**

<b>VERSION</b>	
V	0 = Zinc alloy body
	1 = Technopolymer body
<b>CONNECTIONS</b>	
C	A = G 1/8"
	B = G 1/4"
<b>FILTER PORE SIZE</b>	
S	A = 5μ
	B = 20μ
	C = 50μ
<b>ADJUSTING RANGE</b>	
G	A = 0 - 2 bar
	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
<b>TYPE</b>	
P	= Bowl protection
T	= Automatic drain
PS	= Bowl protection and Automatic drain
<b>OPTION</b>	
O	= Standard (without options)
	K = Version with padlock

Example: 17106A.B.C.P

Service unit combination complete with filter - pressure regulator and lubricator size 1 G 1/8" connections, filter pore size 20μ, adjusting range 0-8 bar and bowl protections with technopolymer body.



**Operational characteristic**

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Zinc alloy body reinforced technopolymer body with threaded aluminum insert connections
- Wall mounting possibility with M4 screws protected by covers.
- Lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowls screwed to the body.
- Shock resistant bowl technopolymer protections.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.
- Automatic water drainage bowl available on request.
- Fog type lubrication with variable section orifice according to the flow.
- Possibility to see the min. and max. oil level on 360° also with bowl protection assembled.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

**Technical characteristic**

Connections	G 1/8" - G 1/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight with technopolymer body	gr. 295
Weight with zinc alloy body	gr. 560
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5μ - 20μ - 50μ
Bowl capacity	20 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	36 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M4
Max. fittings torque on zinc alloy body	30 Nm
Max. fittings torque on technopolymer body	15 Nm
Min. operational flow at 6,3 bar	10 NI/min.



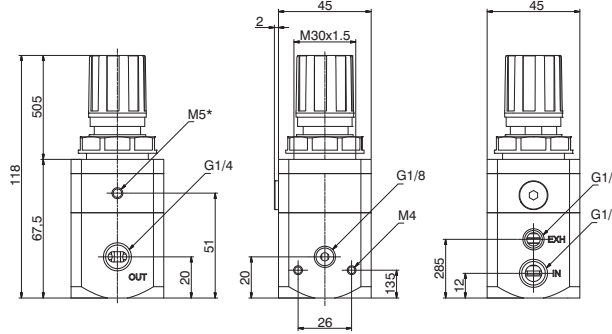
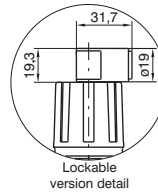




High sensitive air pressure regulator with high flow rate relieving



\* = Available only for the external feedback pressure version



Ordering code

**171S2B.C.T.O**

ADJUSTING RANGE

- 0002 = 0,1 - 2 bar
- 0004 = 0,1 - 4 bar
- 0007 = 0,1 - 7 bar
- 0010 = 0,1 - 10 bar



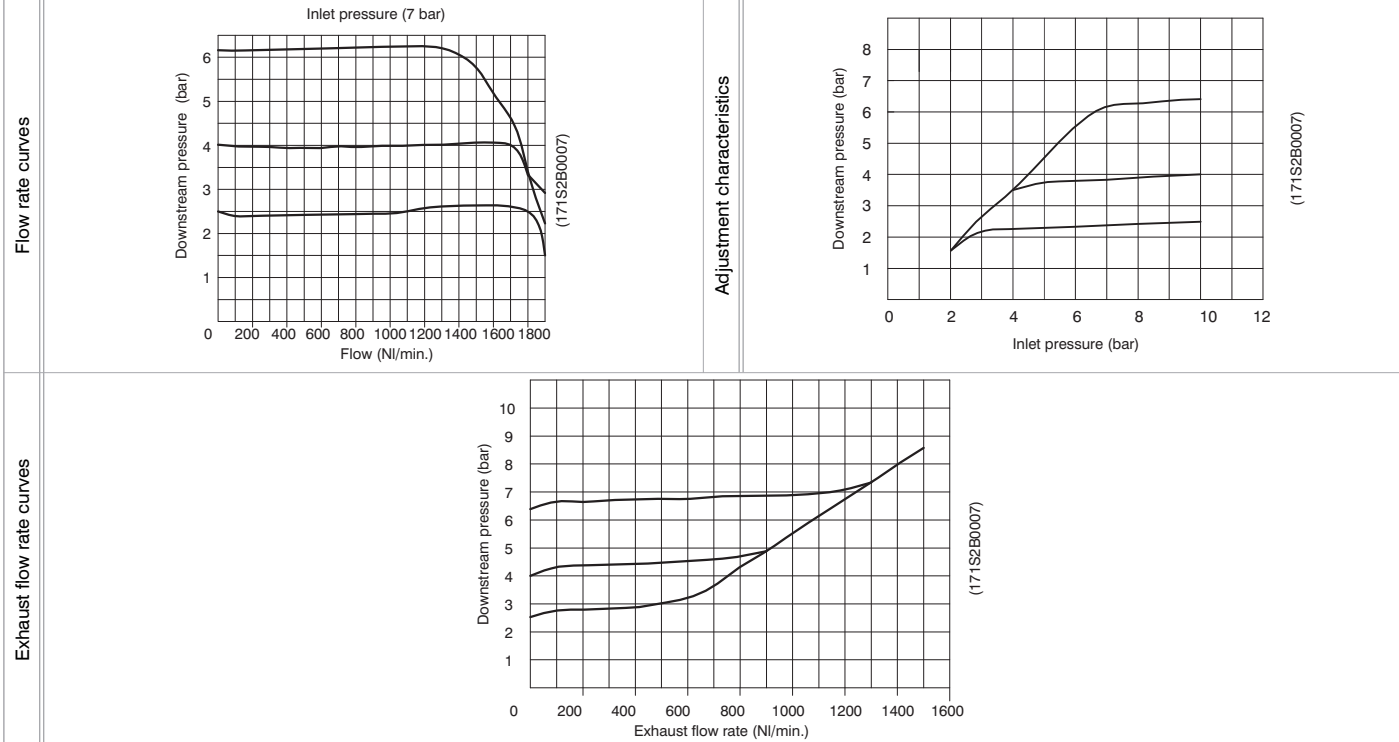
TYPE

- T = Standard (without options)
- E = External pressure feedback

OPTION

- O = Standard (without options)
- K = Version with padlock

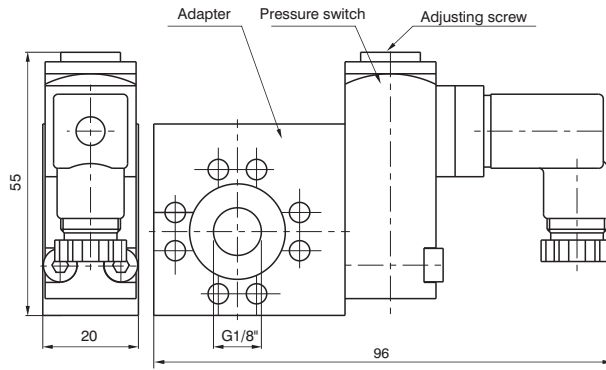
Example: 17112B.C  
Pressure regulator with G 1/4" 0,1 - 7 bar



Operational characteristic	Technical characteristic	
- Accurate capacity to maintain set pressure.	Connections	G 1/4"
- Sensitivity combined with high relieving rates.	Max working pressure (bar)	10 bar - 1 MPa
- High flow rate with extremely low pressure drop.	Temperature °C	50°C
- Pressure adjusting lockable handle by simply pressing it downwards in the desired position.	Pressure gauge connections	G 1/8"
- Body made with anodized zoll aluminium alloy	Weight	gr. 380
- Two pressure gauge connections with plug complete of seal.	Pressure range (bar)	0,1 - 2 bar / 0,1 - 4 bar 0,1 - 7 bar
- Ring nut for panel mounting.	Assembly position	Any
- Once set, a constant bleed of air maintains the accuracy of the regulator.	Air flow (inlet pressure 10 bar)	5 Nl/min
- This controlled release is a characteristic, not a fault.	Max. fittings torque	25 Nm
	Fluid	20µ filtered air and preferably non lubricated
	Mounting holes diameter for panel mounting	30 mm



**Pressure Switch complete with adapter**



**Ordering code**

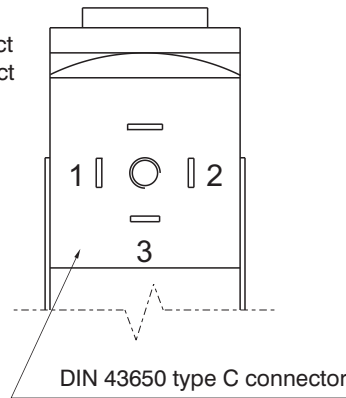
**170**

TYPE
14A = Pressure switch adapter
14B = Pressure switch
14C = Pressure switch complete with adapter

Example: 1714C  
Pressure switch complete with adapter.

Connection

- 1 = Neutral
- 2 = N.C contact
- 3 = N.O contact



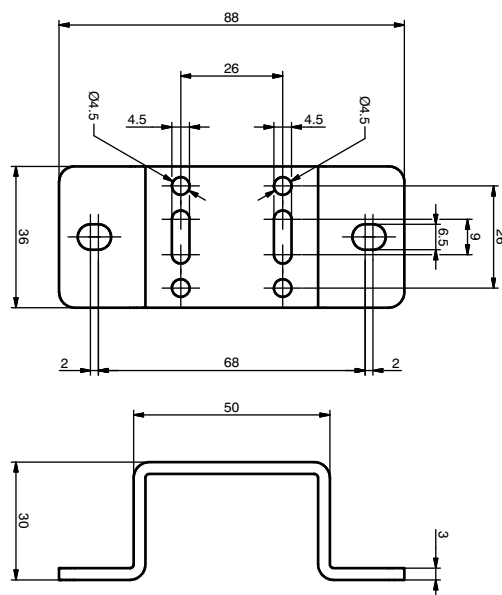
**Operational characteristic**

- The pressure switch complete with adapter has to be assembled between two elements of the FRL group. It cannot be utilized separately or at the end of the FRL group.
- The pressure switch can be set at desired pressure (Pressure range (bar) from 2 to 10 bar) by rotating the adjusting screw.
- The electrical connection is made by mean of a 15 mm connector DIN 43650 type C.
- The microswitch contact could be Normally Closed or open (change over switch).

**Technical characteristic**

Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Weight	gr. 160
Microswitch capacity	1A
Microswitch Maximum voltage	250 VAC
Grade of protection (with connector assembled)	IP 65
Adjusting range	2 - 10 bar
Assembly position	Any

**Fixing bracket for pressure regulator**



**Ordering code**

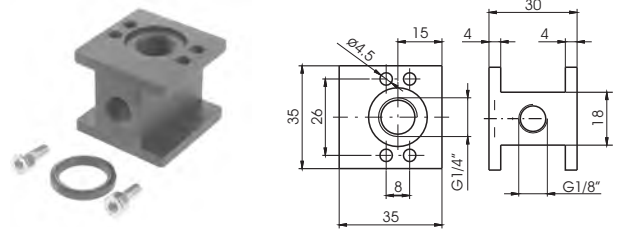
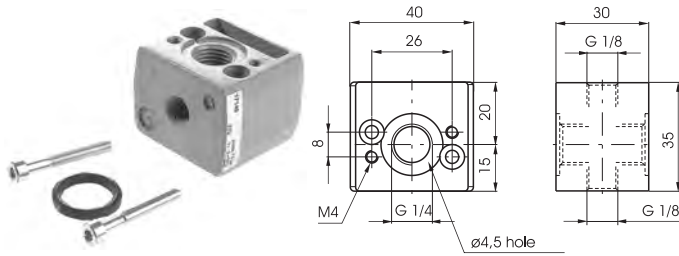
**17050**

Weight gr. 110



**Air Intake**

**Air Intake - "H" profile**



Ordering code

**17140**

Weight gr. 75

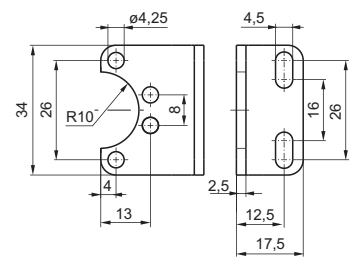
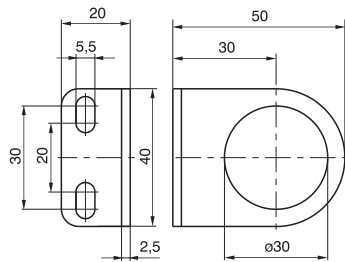
Ordering code

**17140H**

Weight gr. 50

**Fixing bracket**

**Fixing bracket**



Ordering code

**17150**

Weight gr. 32

Ordering code

**170M5**

Weight gr. 20

**Assembling kit**

**Assembling kit for manifold regulators**

Ordering code

**1716V**

VERSION  
V 0 = Standard  
5 = for progressive start-up valve

Weight gr. 15

Weight gr. 15



Ordering code

**170M6**

Weight gr. 20



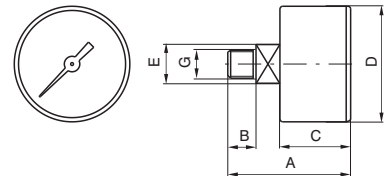
Weight gr. 20

**Pressure gauge**

Ordering code

**17070V.S**

VERSION  
V A = Dial ø40  
B = Dial ø50  
SCALE  
S A = Scale 0-4 bar  
B = Scale 0-6 bar  
C = Scale 0-12 bar



**DIMENSIONS**

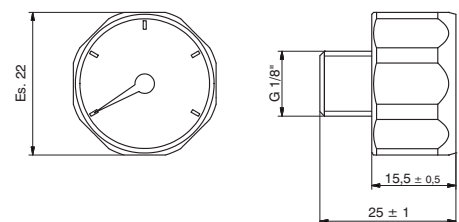
CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80

**Manometer diameter D.23 mm**

Ordering code

**17070M.S**

SCALE  
S A = Scale 0-4 bar  
B = Scale 0-6 bar  
C = Scale 0-12 bar



Weight gr. 20

### Construction and working characteristics

The modular air service units groups size 2, as the ones of size 1, allow a wide selection of combinations.  
 The threaded connections are machined directly on the valve body made with light alloy, so that each components can be used individually.  
 They can be wall mounted with head-guard screws masked by covers.  
 The bowls are made of transparent technopolymer, always supplied with shock resistant technopolymer protection, allowing the moisture and oil level control from any angle.  
 The filter can be equipped with manual or semiautomatic water drain valve; furthermore it's possible to install the automatic draining device inside the bowl.  
 The pressure regulator handle is lockable in the desired position.  
 The lubricator oil flow is adjustable with proper handle and it is visibly checked through the sight dome.  
 The shut-off valve can be equipped with pad-lock to prevent accidents or damages due to unauthorized operation.  
 The progressive start-up valve, pneumatically or electropneumatically controlled, allows air supply to the circuit progressively and with adjustable time.  
 Some accessories like the wall fixing bracket, pressure gauges with different scales and diameters, air intake block that assembled between the elements allows to get in the system filtered or filtered non-lubricated air, are completing the range.

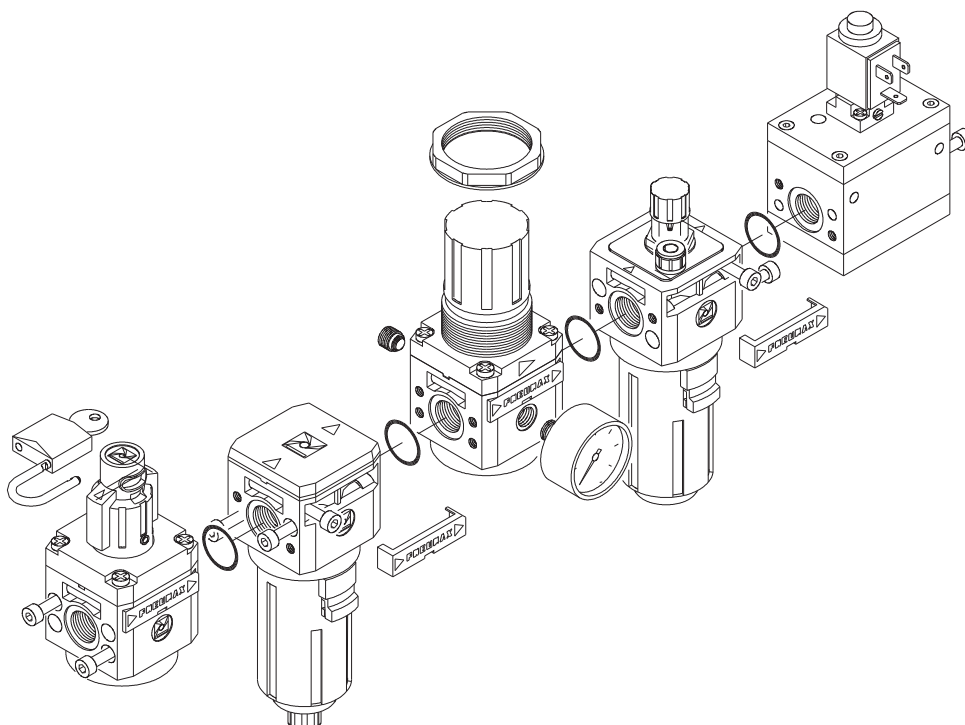
### Instruction for installation and operation

Pay attention to install a group or a single component with air flow direction according to the arrows and to the following sequence: filter, pressure regulator, lubricator and with bowls downwards. It's possible to fix the group to the wall by removing the covers, which can be installed again for covering the screw after fixing.  
 Do not exceed the recommended torque while assembling the connectors.  
 Do not exceed the recommended air pressure and temperature limits.  
 The moisture should not exceed the level marked on the bowl and it can be drawn off and carried away by a flexible tube of Ø 6/4 directly connected to the discharge valve handle.  
 The pressure should be set from minimum to maximum, rotating the adjusting handle clockwise.  
 As lubricant, we suggest to use oil class FD22 or HG32. Verify that the lubricator is not fed with a flow lower than the minimum operational.  
 To set the oil flow rotate the proper adjusting handle in order to get one drop of oil every 300-600 liters of air.  
 The oil flow will be kept automatically and proportionally to the air flow.  
 The oil can be refilled by mean of proper plug or directly into the bowl after having de-pressurized the system. Do not exceed the maximum level indicated on the bowl.  
 For opening the shut-off valve push and rotate clockwise the operating handle. For closing it and consequently discharging the down stream line, rotate the handle counter-clockwise.

### Manutenzione

Clean the bowls with water and detergent. Do not use alcohol.  
 The filter element made with HPDE is reusable by blowing and cleaning it with proper detergent. For replacing or cleaning it, remove the bowl and unscrew the baffle spins.  
 Replace the pressure regulator diaphragm whenever the operation is not correct or there is a continuous air leaking through the relieving (over pressure discharge); reinstall the adjusting mechanism support locking it with about 8 Nm torque.  
 In case it is necessary to replace the lubricator transparent dome, tight it at 5 Nm torque maximum.

### Assembling



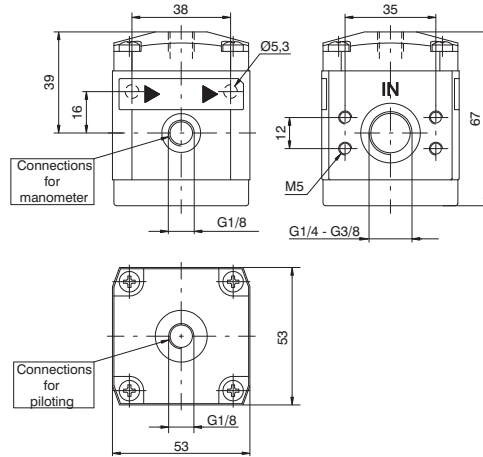








**Piloted pressure regulator**



Ordering code

**17202C.P.T**

CONNECTIONS

**C** A = G 1/4"

B = G 3/8"

TYPE

**T** \*Standard version

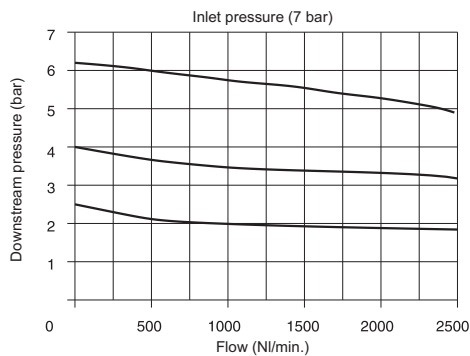
L = Without Relieving

\* No additional letters required

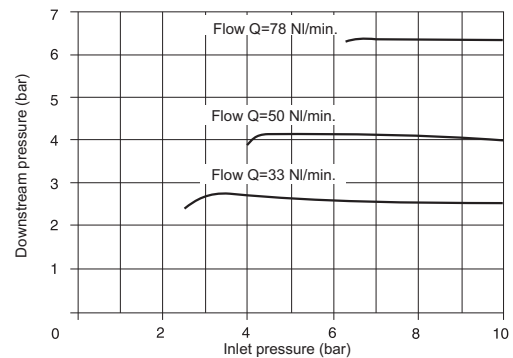
Example: 17202A.P

Piloted pressure regulator with G 1/4" connections

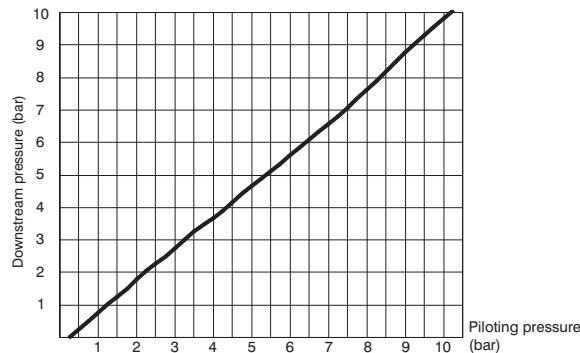
Flow rate curves



Adjustment characteristics



Adjustment characteristics



**Operational characteristic**

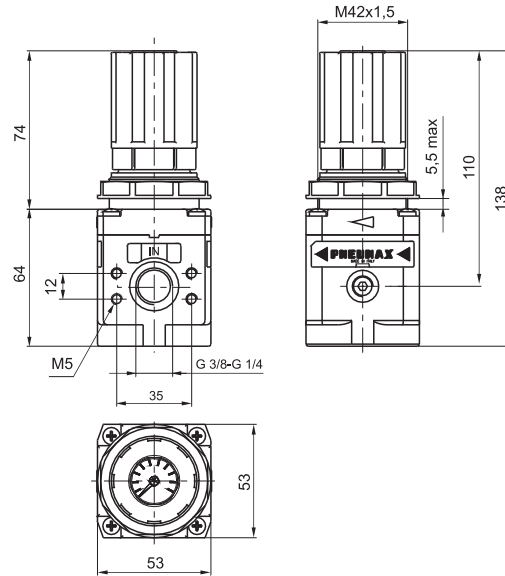
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

**Technical characteristic**

Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Assembly position	Any
Wall fixing screw	M5
Max. fittings torque	25 Nm
Weight	gr. 313



Pressure regulator including manometer



Ordering code

17222<sup>Ⓒ</sup>.<sup>Ⓒ</sup>

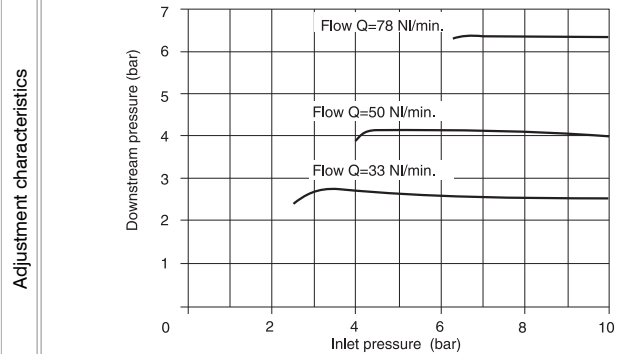
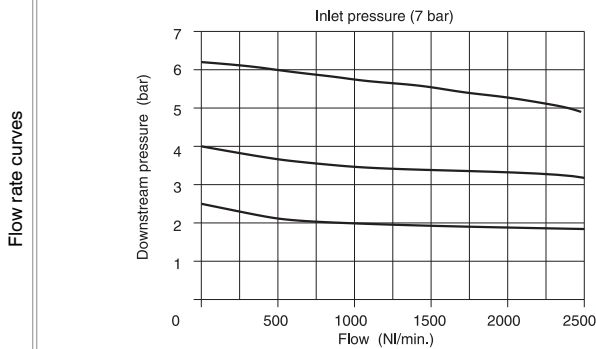
CONNECTIONS

- Ⓒ A = G 1/4"
- Ⓒ B = G 3/8"

ADJUSTING RANGE

- Ⓒ A = 0 - 2 bar
- Ⓒ B = 0 - 4 bar
- Ⓒ C = 0 - 8 bar
- Ⓒ D = 0 - 12 bar

Example: 17222A.C  
Pressure regulator with G 1/4" connections, adjusting range 0 - 8 bar with relieving.



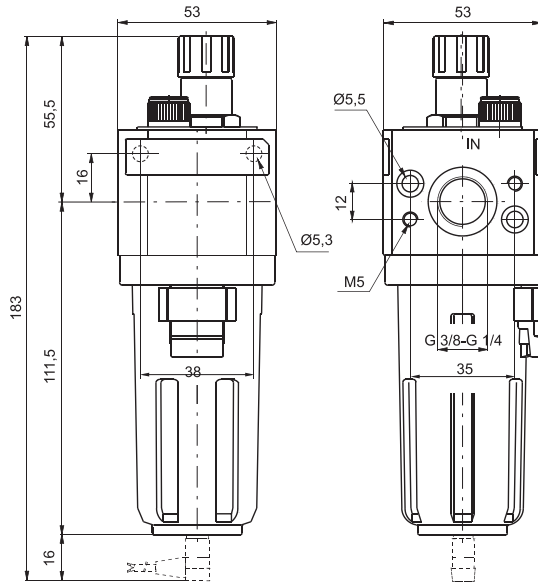
Operational characteristic

- Construction and working characteristics
- Diaphragm pressure regulator with relieving.
- Pressure gauge included on the top of adjusting knob.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Panel mounting bracket.

Technical characteristic

Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 440
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M5
Max. fittings torque	25 Nm

Lubricator



Ordering code

**17203C.T**

CONNECTIONS

- C** A = G 1/4"
- B = G 3/8"

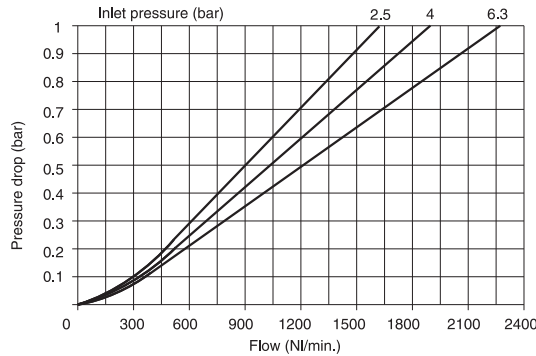
TYPE

- MA** = Min. oil level indicator N.O. with plug connector
- T** **MC** = Min. oil level indicator N.C. with plug connector

Example: 17203A : Lubricator with G 1/4" connections.

Note: on the MA version the contact is open when oil is present; on the MC version the contact is closed when oil is present

Flow rate curves



Operational characteristic

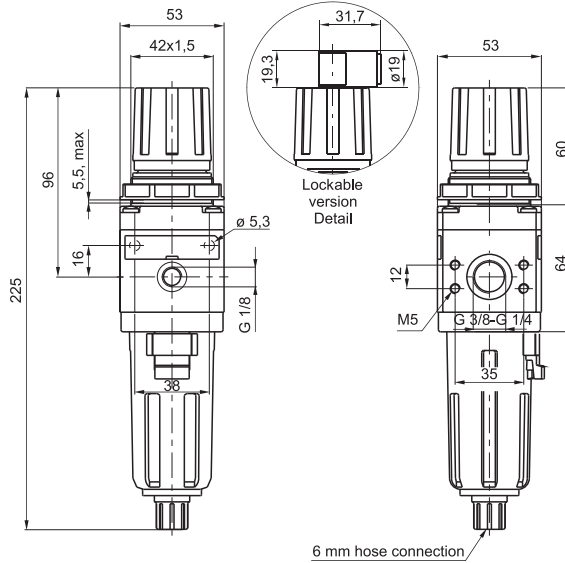
- Fog type lubrication with variable section orifice according to the flow.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Transparent technopolymer bowl with shock resistant technopolymer protection
- Possibility to see the min. and max. level on 360° also with bowl protection assembled.
- Bowl assembled to the body with bayonet cap and safety button.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.
- Electrical connector for low level indication.
- Use the C1, C2 or C3 lead for connection (see section 6 "Sensors").

Technical characteristic

Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 280
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	52 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M5
Min. operational flow at 6,3 bar	20 NI/min
Max. fittings torque	25 Nm



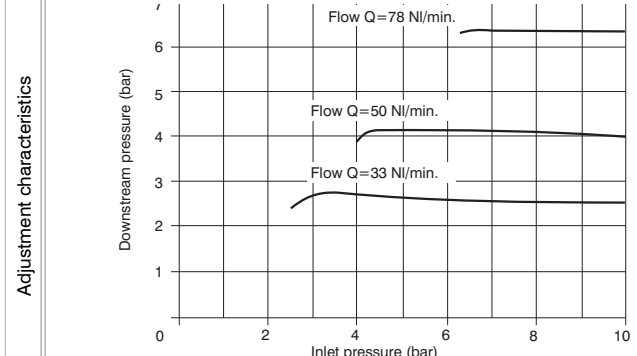
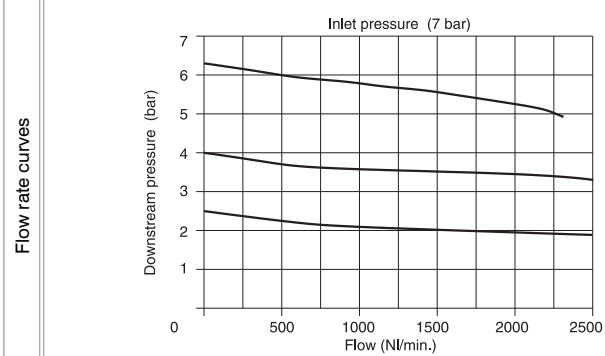
Filter - pressure regulator



Ordering code  
**17204C.S.C.T.O**

CONNECTIONS	
<b>C</b>	A = G 1/4"
	B = G 3/8"
FILTER PORE SIZE	
<b>S</b>	A = 5µ
	B = 20µ
	C = 50µ
ADJUSTING RANGE	
	A = 0 - 2 bar
<b>C</b>	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
<b>T</b>	S = Automatic drain
OPTION	
<b>O</b>	*Standard
	K = Lockable version
* No additional letters required	

Example: 17204A.B.C  
Filter - pressure regulator size 2 with G 1/4" connections, filter pore size 20µ and adjusting range 0-8 bar.



**Operational characteristic**

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.

**Technical characteristic**

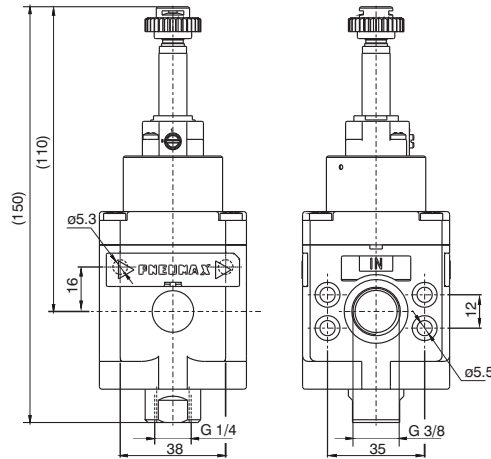
Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight with technopolymer body	gr. 450
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5µ - 20µ - 50µ
Bowl capacity	30 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M5
Max. fittings torque	25 Nm







**Electrically operated shut-off valve**



Ordering code

**17230.T**

TYPE

**T** M2 = Electric with M2

M2/9 = Electric with M2/9

Example: 17230.M2 : Shut-off valve size 2 with electric control complete with M2 mechanic

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

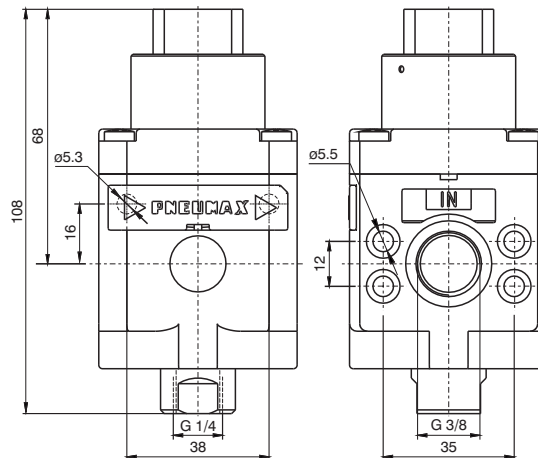
**Operational characteristic**

- 3 ways poppet valve, electric control.
- Zinc alloy body or reinforced technopolymer body with threaded brass insert connections.
- Opening and closing of the valve via solenoid operator.
- The correct flow direction is indicated by the arrows stamped on the valve body.
- The supply pressure must be minimum 2 bars or higher for the solenoid operated version.
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.
- The air supply can only be done via port 1.
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.
- Wall mounting possibility with M5 screws protected by covers.

**Technical characteristic**

Inlet connections	G 3/8"
Exhaust connections	G 1/4"
Temperature °C	-5 °C - 50°C
Weight with anodized aluminium alloy 2011 body	gr. 440
Assembly position	Any
Wall fixing screw	M5
Max. fittings torque	25 Nm
Min. working pressure	2 bar
Max working pressure (bar)	13 bar
Flow rate at 6 bar with Δp=1	2100 NI/min

**Pneumatically operated shut-off valve**



Ordering code

**17230.PN**

Example: 17230.PN : Shut-off valve size 2 with Pneumatic pilot.

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

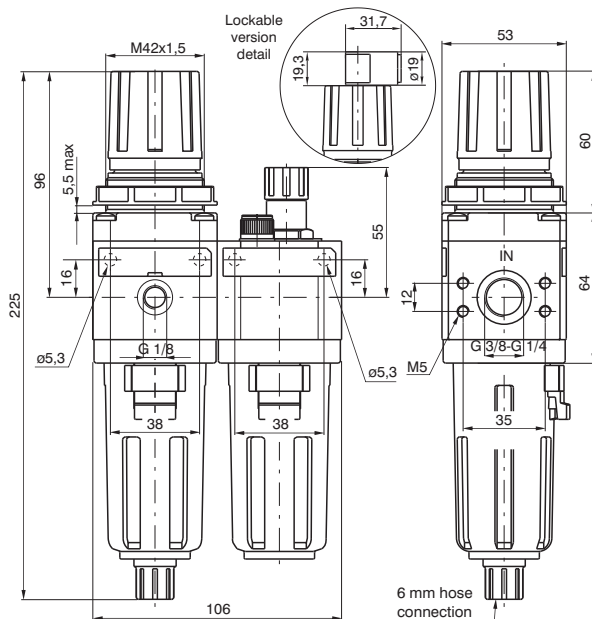
**Operational characteristic**

- 3 ways poppet valve, pneumatic pilot.
- Zinc alloy body or reinforced technopolymer body with threaded brass insert connections.
- Opening and closing of the valve via pneumatic operator
- The correct flow direction is indicated by the arrows stamped on the valve body.
- The supply pressure must be minimum 2 bars or higher for the pneumatic operated version.
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.
- The air supply can only be done via port 1.
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.
- Wall mounting possibility with M5 screws protected by covers.

**Technical characteristic**

Piloting connections	G 1/8"
Temperature °C	-5 - 50
Assembly position	Any
Weight with anodized aluminium alloy 2011 body	gr. 405
Wall fixing screw	M5
Max. fittings torque	25 Nm
Min. working pressure	2 bar
Max working pressure (bar)	13 bar
Piloting pressure	2 bar
Flow rate at 6 bar with Δp=1	2100 NI/min

Filter pressure regulator + Lubricator



Ordering code  
**17206C.S.G.T.O**

**CONNECTIONS**  
**C** A = G 1/4"  
 B = G 3/8"

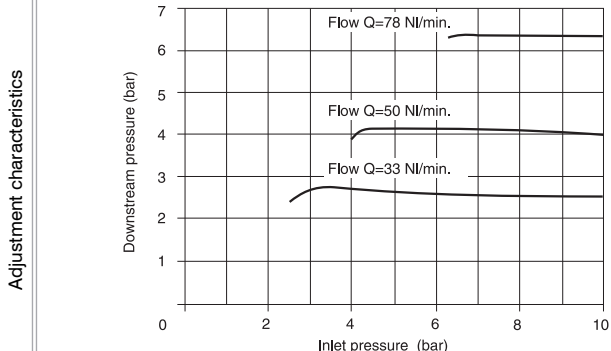
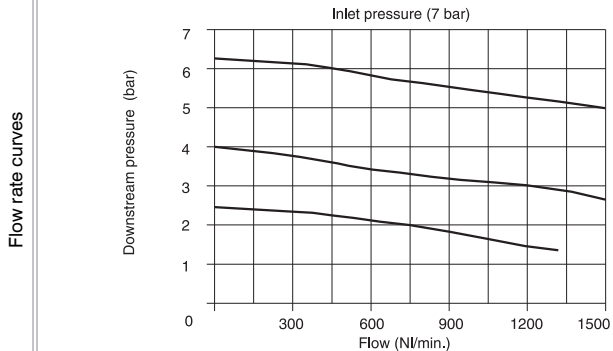
**FILTER PORE SIZE**  
**S** A = 5μ  
 B = 20μ  
 C = 50μ

**ADJUSTING RANGE**  
**G** A = 0 - 2 bar  
 B = 0 - 4 bar  
 C = 0 - 8 bar  
 D = 0 - 12 bar

**TYPE**  
**T** S = Automatic drain

**OPTION**  
**O** \*Standard  
 K = Lockable version  
 \* No additional letters required

Example: 17206A.B.C.S  
 Service unit combination complete with filter - pressure regulator and lubricator size 2, G 1/4" connections, filter pore size 20μ, adjusting range 0-8 bar and automatic drain.



**Operational characteristic**

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

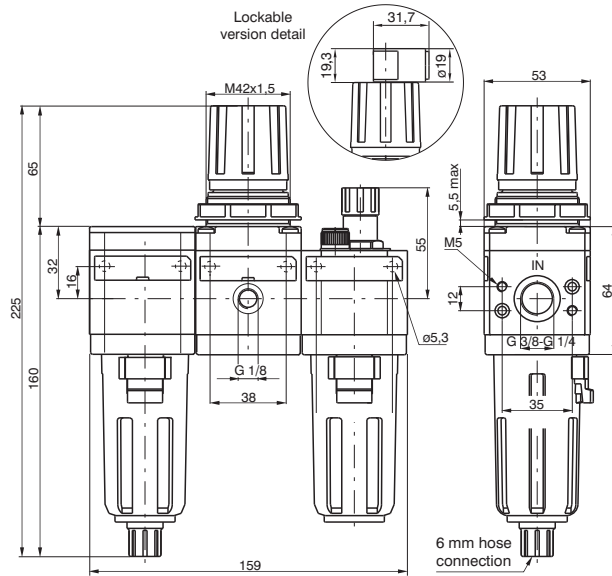
**Technical characteristic**

Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 750
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5μ - 20μ - 50μ
Bowl capacity	30 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	52 cm <sup>3</sup>
Min. operational flow at 6,3 bar	20 NI/min
Assembly position	Vertical
Wall fixing screw	M5
Max. fittings torque	25 Nm





**Filter + Pressure regulator + Lubricator**

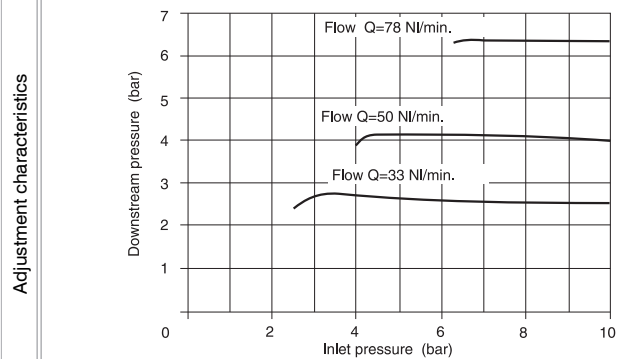
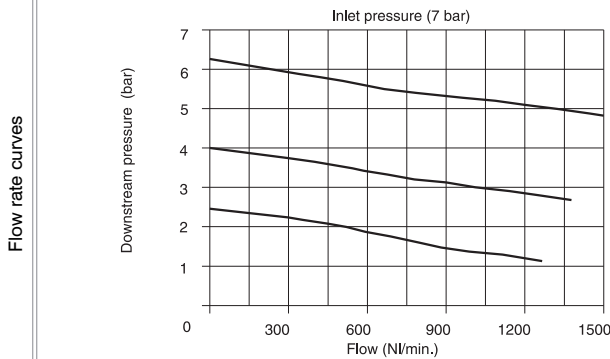


Ordering code  
**17207C.S.C.T.O**

- CONNECTIONS  
**C** A = G 1/4"  
 B = G 3/8"  
 FILTER PORE SIZE  
**S** A = 5µ  
 B = 20µ  
 C = 50µ  
 ADJUSTING RANGE  
 A = 0 - 2 bar  
**C** B = 0 - 4 bar  
 C = 0 - 8 bar  
 D = 0 - 12 bar  
 TYPE  
**T** S = Automatic drain  
 OPTION  
 \*Standard  
**O** K = Lockable version

Example: 17207A.B.C.S

Service unit combination complete with filter - pressure regulator and lubricator size 2, G 1/4" connections, filter pore size 20µ, adjusting range 0-8 bar and automatic drain.



**Operational characteristic**

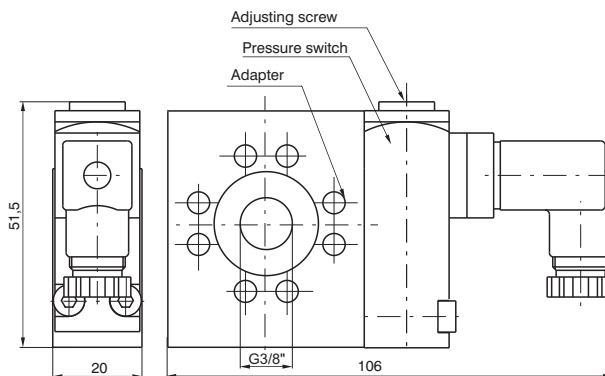
- Filter - diaphragm pressure regulator with relieving with balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Pressure adjusting lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Automatic water drainage bowl available on request.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

**Technical characteristic**

Connections	G 1/4" - G 3/8"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 960
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5µ - 20µ - 50µ
Bowl capacity	30 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	52 cm <sup>3</sup>
Min. operational flow at 6,3 bar	20 NI/min
Assembly position	Vertical
Wall fixing screw	M5
Max. fittings torque	25 Nm



**High sensitive air pressure regulator with adapter**

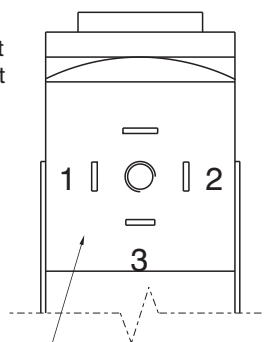


Ordering code
<b>170</b>
TYPE
24A = Pressure switch adapter
14B = Pressure switch
24C = Pressure switch complete with adapter

Example: 1724C  
Pressure switch complete with adapter.

Connection

- 1 = Neutral
- 2 = N.C contact
- 3 = N.O contact



DIN 43650 Type C connector

**Operational characteristic**

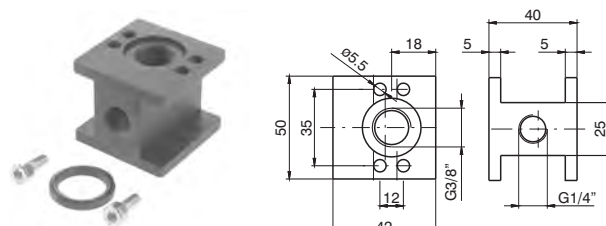
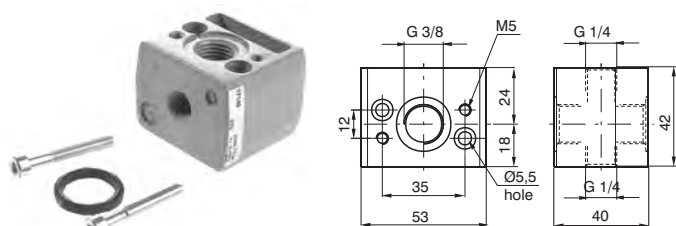
- The pressure switch complete of adapter has to be assembled between two elements of the FRL group.
- It cannot be utilized separately or at the end of the FRL group.
- The pressure switch can be set at desired pressure (Pressure range (bar) from 2 to 10 bar) by rotating the adjusting screw.
- The electrical connection is made by mean of a 15 connector DIN 43650 type C.
- The microswitch contact could be Normally Closed or open (change over switch).

**Technical characteristic**

Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Weight	gr. 200
Microswitch capacity	1A
Microswitch Maximum voltage	250 VAC
Grade of protection (with connector assembled)	IP 65
Pressure range (bar)	2 - 10 bar
Assembly position	Any

**Air Intake**

**Air Intake - "H" profile**



Ordering code

**17240**

Weight gr. 160

Ordering code

**17240H**

Weight gr. 116

**Assembling kit**

Ordering code

**1726**





- VERSION
- 0 = Standard
  - 5 = for progressive start-up valve

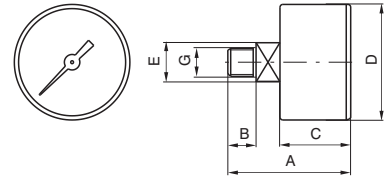
Weight gr. 20





**Pressure gauge**



Ordering code	
<b>17070</b>  	
VERSION	
 A = Dial ø40	
B = Dial ø50	
SCALE	
 A = Scale 0-4 bar	
B = Scale 0-6 bar	
C = Scale 0-12 bar	

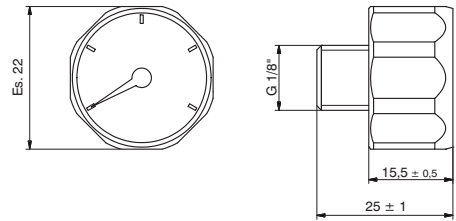


DIMENSIONS

CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80

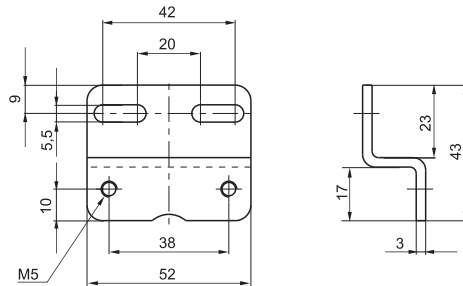
**Manometer diameter D. 23 mm**

Ordering code	
<b>17070M</b> 	
SCALE	
 A = Scale 0-4 bar	
B = Scale 0-6 bar	
C = Scale 0-12 bar	



**Fixing bracket**

Ordering code	
<b>17250</b>	
Weight gr. 65	



### Construction and working characteristics

The modular air service units groups of the size 3, as the ones of size 1 and 2, allow a wide selection of combinations.  
 The threaded connections are machined directly on the valve body made with light alloy, so that each components can be used individually.  
 They can be wall mounted with head-guard screws masked by covers.  
 The bowls are made of transparent technopolymer, always supplied with shock resistant technopolymer protection, allowing the moisture and oil level control from any angle.  
 The filter can be equipped with manual or semiautomatic water drain valve; furthermore it's possible to install the automatic draining device inside the bowl.  
 The pressure regulator handle is lockable in the desired position.  
 The lubricator oil flow is adjustable with proper handle and it is visibly checked through the sight dome.  
 The shut-off valve can be equipped with pad-lock to prevent accidents or damages due to unauthorized operation.  
 The progressive start-up valve, pneumatically or electropneumatically controlled, allows air supply to the circuit progressively and with adjustable time.  
 Some accessories like the wall fixing bracket, pressure gauges with different scales and diameters, air intake block that assembled between the elements allows to get in the system filtered or filtered non-lubricated air, are completing the range.

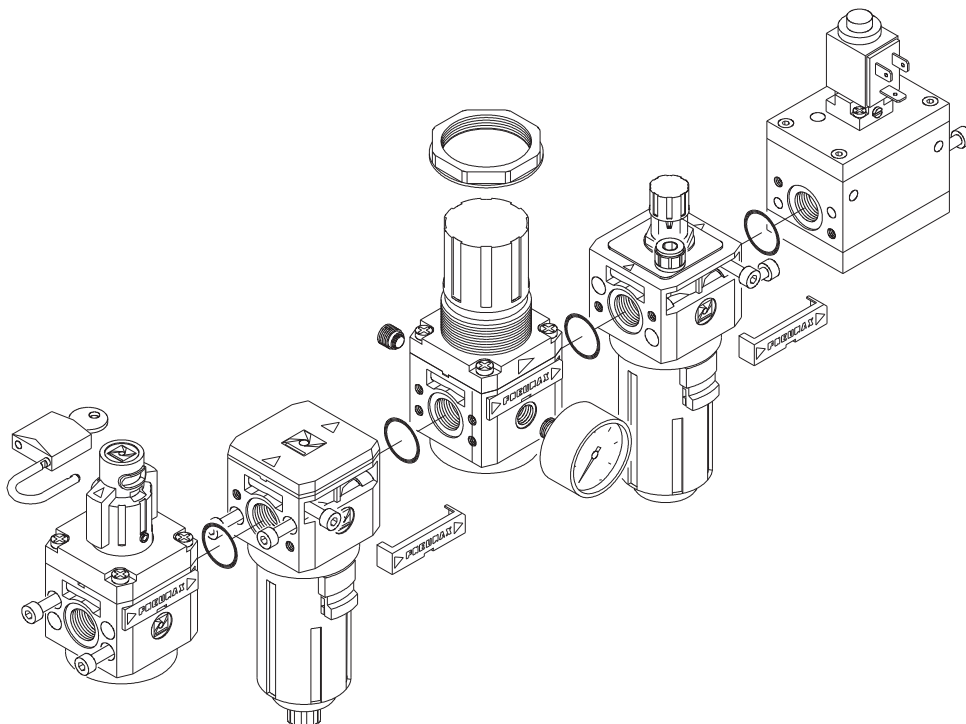
### Instruction for installation and operation

Pay attention to install a group or a single component with air flow direction according to the arrows and to the following sequence: filter, pressure regulator, lubricator and with bowls downwards. It's possible to fix the group to the wall by removing the covers, which can be installed again for covering the screw after fixing.  
 Do not exceed the recommended torque while assembling the connectors.  
 Do not exceed the recommended air pressure and temperature limits.  
 The moisture should not exceed the level marked on the bowl and it can be drawn off and carried away by a flexible tube of Ø 6/4 directly connected to the discharge valve handle.  
 The pressure should be set from minimum to maximum, rotating the adjusting handle clockwise.  
 As lubricant, we suggest to use oil class FD22 or HG32. Verify that the lubricator is not fed with a flow lower than the minimum operational.  
 To set the oil flow rotate the proper adjusting handle in order to get one drop of oil every 300-600 liters of air.  
 The oil flow will be kept automatically and proportionally to the air flow.  
 The oil can be refilled by mean of proper plug or directly into the bowl after having de-pressurized the system. Do not exceed the maximum level indicated on the bowl.  
 For opening the shut-off valve push and rotate clockwise the operating handle. For closing it and consequently discharging the down stream line, rotate the handle counter-clockwise.

### Maintenance

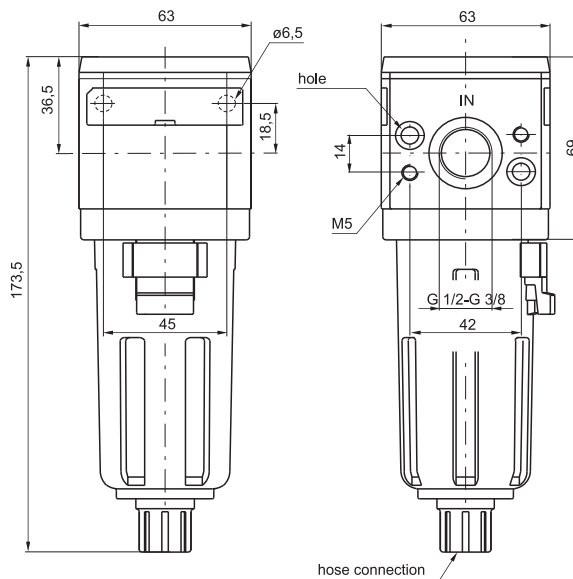
Clean the bowls with water and detergent. Do not use alcohol.  
 The filter element made with HPDE is reusable by blowing and cleaning it with proper detergent. For replacing or cleaning it, remove the bowl and unscrew the baffle spins.  
 Replace the pressure regulator diaphragm whenever the operation is not correct or there is a continuous air leaking through the relieving (over pressure discharge); reinstall the adjusting mechanism support locking it with about 8 Nm torque.  
 In case it is necessary to replace the lubricator transparent dome, tight it at 5 Nm torque maximum.

### Assembling





Coalescing filter



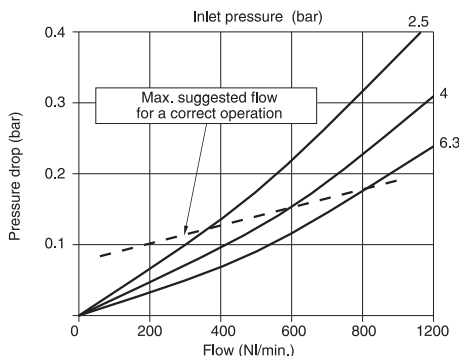
Ordering code

**17308C.E.T**

- CONNECTIONS  
**C** A = G 3/8"  
 B = G 1/2"  
**E** FILTER EFFICIENCY  
 E = 99,97%  
**T** TYPE  
 S = Automatic drain

Example: 17308A.E  
 Coalescing filter size 3 with G 3/8" connections and filter efficiency of 99,97%.

Flow rate curves



Operating Characteristics

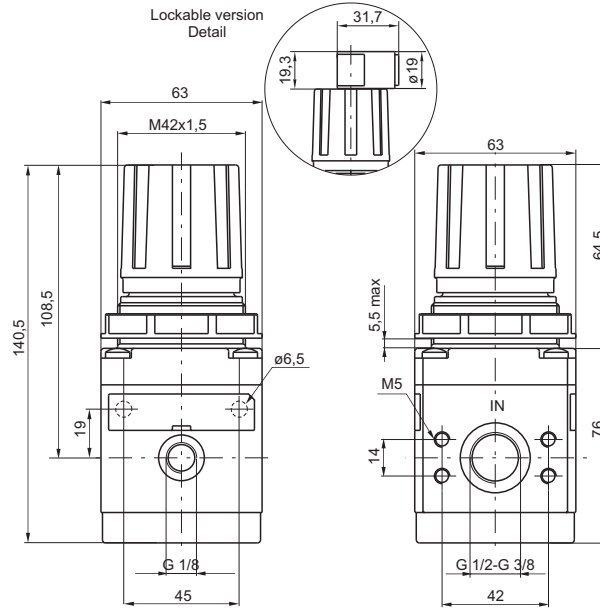
- Coalescing filter element remove  $0,01\mu$  particles equivalent to 99,97%.
- Body made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Weight	gr. 405
Filter efficiency with $0,01\mu$ particle	99,97%
Bowl capacity	48 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm



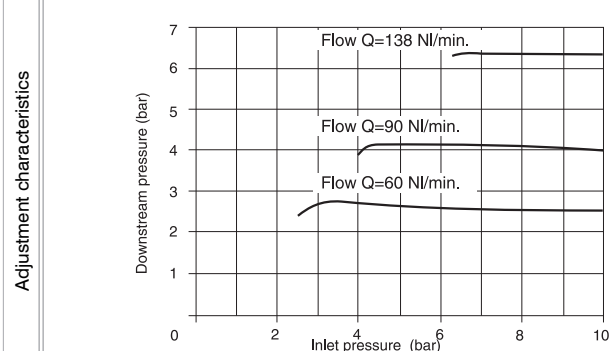
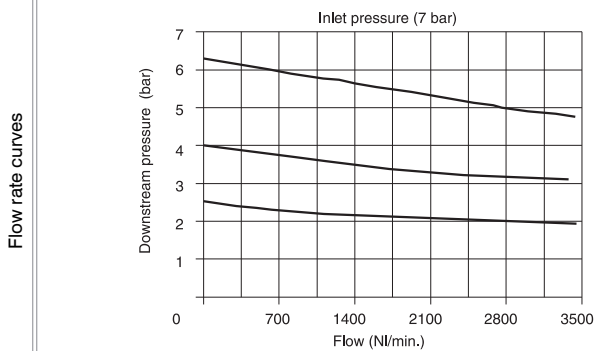
Pressure regulator



Ordering code  
**17302C.C.T.O**

CONNECTIONS	
<b>C</b>	A = G 3/8"
	B = G 1/2"
ADJUSTING RANGE	
<b>C</b>	A = 0 - 2 bar
	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
<b>T</b>	L = Without Relieving
	SM = improved relieving
OPTION	
<b>O</b>	*Standard
	K = Lockable version
* No additional letters required	

Example: 17302A.C  
Pressure regulator with G 3/8" connections, adjusting range 0 - 8 bar with relieving.



Operating Characteristics

- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

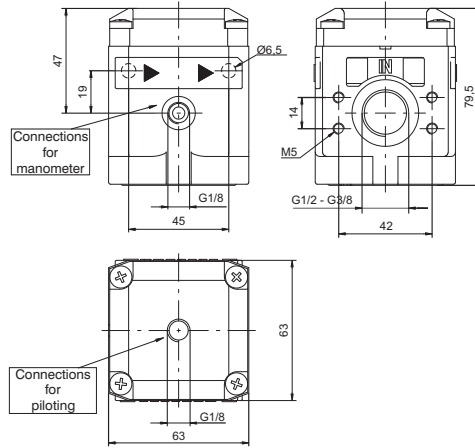
Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 550
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M6
Max. fittings torque	40 Nm





Piloted pressure regulator



Ordering code

17302<sup>C</sup>.P.<sup>T</sup>

CONNECTIONS

<sup>C</sup> A = G 3/8"

B = G 1/2"

TYPE

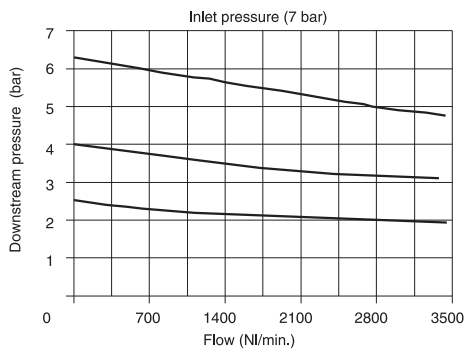
<sup>T</sup> \*Standard version

L = Without Relieving

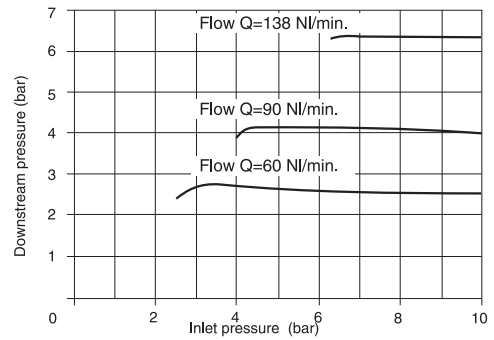
\* No additional letters required

Example: 17302A.P  
Piloted pressure regulator with G 3/8" connections

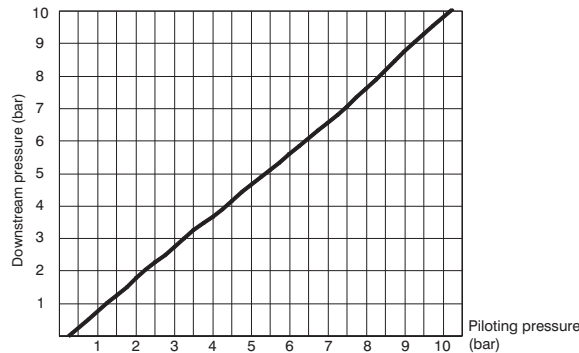
Flow rate curves



Adjustment characteristics



Piloting curves



Operating Characteristics

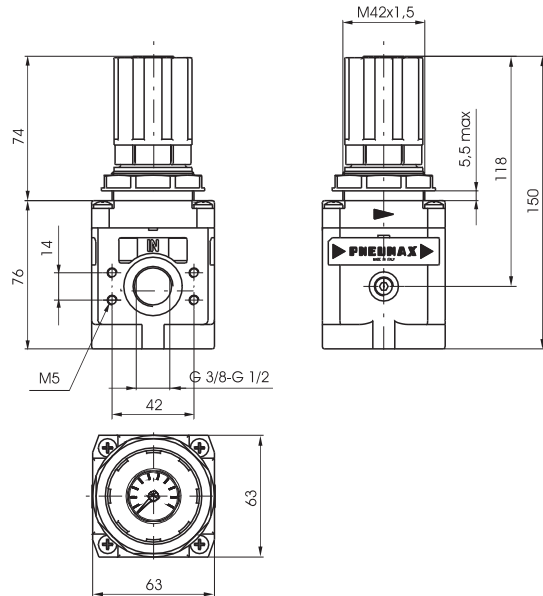
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Assembly position	Any
Wall fixing screw	M5
Max. fittings torque	25 Nm
Weight	gr. 510



Pressure regulator including manometer



Ordering code

17322<sup>Ⓒ</sup><sup>Ⓒ</sup>

CONNECTIONS

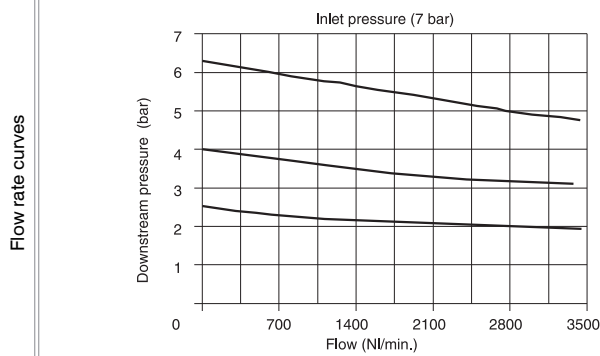
- Ⓒ A = G 3/8"
- B = G 1/2"

ADJUSTING RANGE

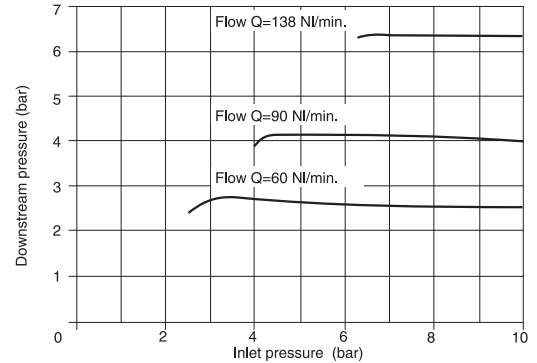
- Ⓒ A = 0 - 2 bar
- B = 0 - 4 bar
- C = 0 - 8 bar
- D = 0 - 12 bar

Example: 17322A.C

Pressure regulator with G 3/8" connections, adjusting range 0 - 8 bar with relieving.



Adjustment characteristics



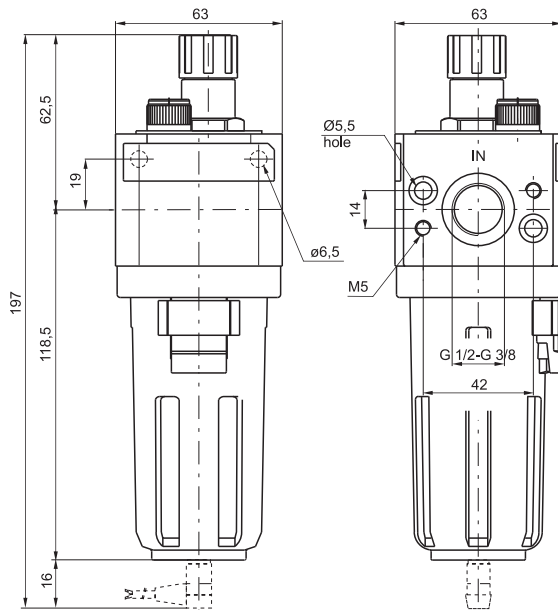
Operating Characteristics

- Diaphragm pressure regulator with relieving.
- Pressure gauge included on the top of adjusting knob.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Panel mounting bracket.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 600
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M6
Max. fittings torque	40 Nm

Lubricator



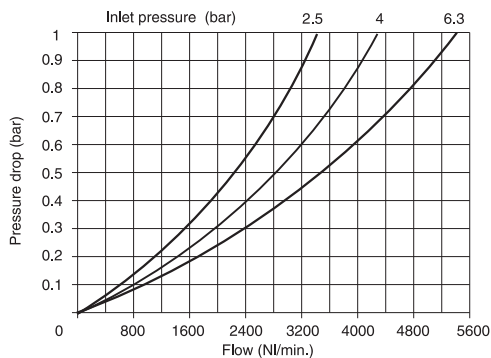
Ordering code

**17303C.T**

CONNECTIONS	
<b>C</b>	A = G 3/8"
	B = G 1/2"
TYPE	
<b>T</b>	MA = Min. oil level indicator N.O. with plug connector
	MC = Min. oil level indicator N.C. with plug connector

Example: 17303A  
Lubricator with G 3/8" connections.  
Note: on the MA version the contact is open when oil is present; on the MC version the contact is closed when oil is present

Flow rate curves



Operating Characteristics

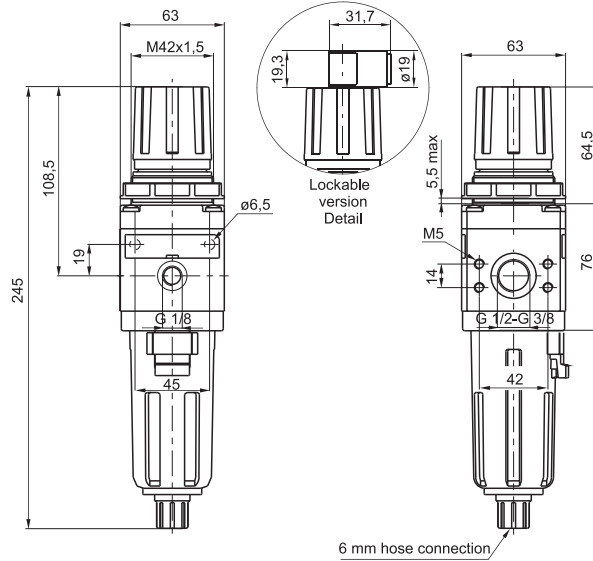
- Fog type lubrication with variable section orifice according to the flow.
- Body made with light alloy.
- Wall mounting possibility with M5 screws protected by covers.
- Transparent technopolymer bowl with shock resistant technopolymer protection
- Possibility to see the min. and max. level on 360° also with bowl protection assembled.
- Bowl assembled to the body with bayonet cap and safety button.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.
- Electrical connector for low level indication.
- Use the C1, C2 or C3 lead for connection (see chapter 6 "Sensors").

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Weight	gr. 435
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	62 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Min. operational flow at 6,3 bar	20 NI/min
Max. fittings torque	40 Nm



Filter - pressure regulator

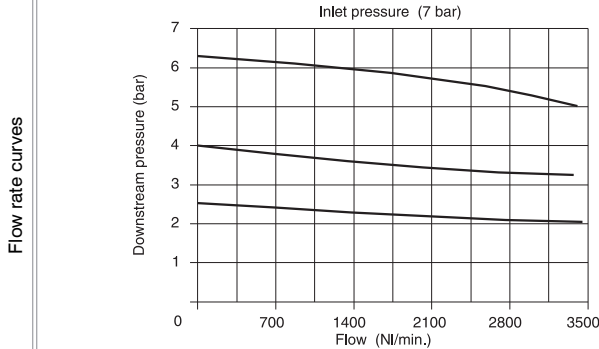


Ordering code

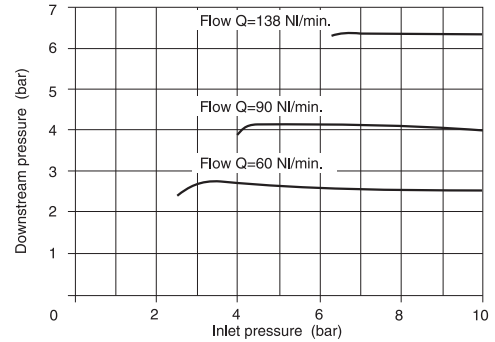
17304C.S.C.T.O

CONNECTIONS	
C	A = G 3/8"
	B = G 1/2"
FILTER PORE SIZE	
S	A = 5µ
	B = 20µ
	C = 50µ
ADJUSTING RANGE	
	A = 0 - 2 bar
C	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
T	S = Automatic drain
OPTION	
	*Standard
	K = Lockable version
* No additional letters required	

Example: 17304A.B.C  
Filter - pressure regulator size 3 with G 3/8" connections, filter pore size 20µ and adjusting range 0-8 bar.



Adjustment characteristics



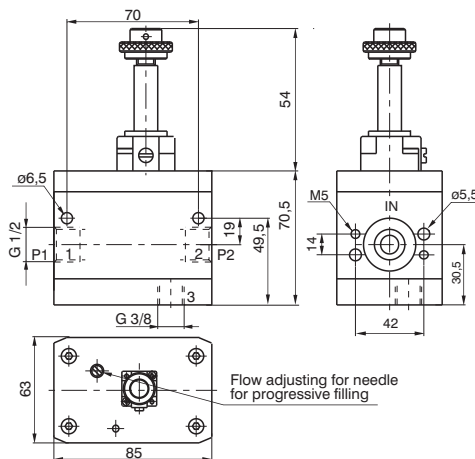
Operating Characteristics

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semiautomatic version the drainage happen when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 645
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5µ - 20µ - 50µ
Bowl capacity	48 cm³
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm

**Progressive start-up valve**



**Ordering code**

**1730T**

**TYPE**

- T** 10.M2 = Electric control complete with M2 mechanic (see pag. 2.15)
- 20 = with pneumatic control

Important note: the preventive or programmed Maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

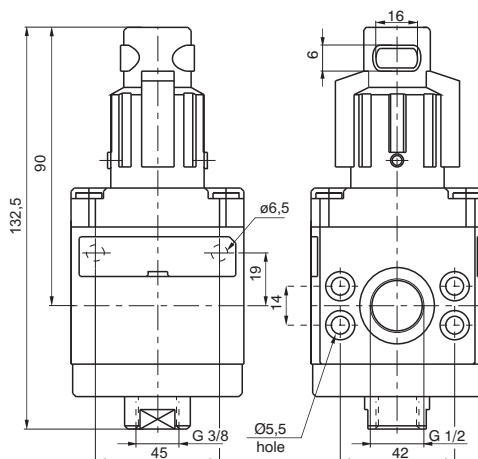
**Operating Characteristics**

- 3 way valve with double poppet.
- Possibility to adjust the down stream circuit filling time by the enclosed adjustable metering screw.
- Quick down stream circuit discharge.
- Possibility for a pneumatic or electric piloting control.
- Body made with anodized 2011 aluminum alloy.
- Wall mounting possibility with M6 screws.

**Technical characteristics**

Connections	G 1/2"
Max working pressure (bar)	10 bar - 1 MPa
Temperature °C	-5 °C - 50°C
Weight	gr. 1010
Assembly position	Any
Wall fixing screw	M6
Min. working pressure	2,5 bar - 0,25 MPa
Nominal flow at 6 bar with Δp=1	2500 NI/min.
Flow with adjustable metering screw fully open	340 NI/min.

**Shut-off valve**



**Ordering code**

**17330.T**

**TYPE**

- T** A = Not lockable handle
- B = Lockable handle

Example: 17330.B

Shut-off valve size 3 complete with lockable handle.

Important note: the preventive or programmed Maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

**Operating Characteristics**

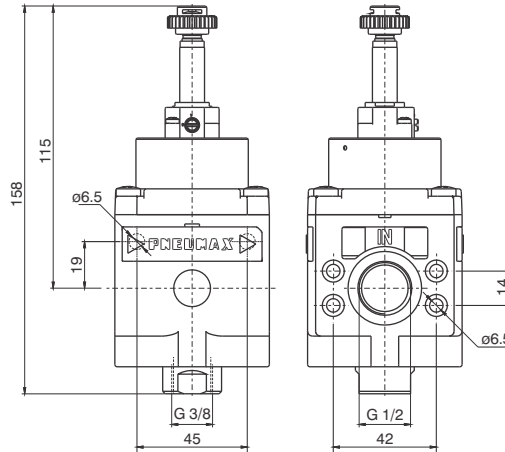
- 3 ways poppet valve.
- Body made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Double action handle for valve opening: pushing and rotating (clockwise).
- Simple rotate the valve handle counter clockwise for valve closing and down stream circuit discharging.
- Possibility to lock the valve in the discharging position by fitting in a padlock in the proper seat.

**Technical characteristics**

Connections	G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Weight	gr. 550
Assembly position	Any
Nominal flow at 6 bar with Δp=1	2500 NI/min.
Wall fixing screw	M6
Handle opening and closing angle	90°
Max. fittings torque	40 Nm



**Electrically operated shut-off valve**



Ordering code

**17330.T**

TYPE

**T**

M2 = Electric with M2

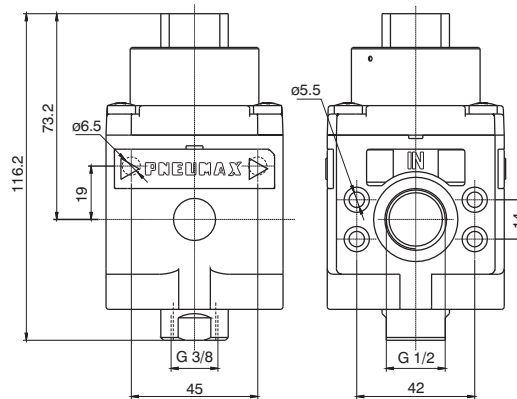
M2/9 = Electric with M2/9

Example: 17330.M2 : Shut-off valve size 3 with electric control complete with M2 mechanic.

Important note: the preventive or programmed Maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

Operating Characteristics	Technical characteristics	
- 3 ways poppet valve, electric control.	Inlet connections	G 1/2"
- Zinc alloy body or reinforced technopolymer body with threaded brass insert connections.	Exhaust connections	G 3/8"
- Opening and closing of the valve via solenoid operator.	Temperature °C	-5 °C - 50°C
- The correct flow direction is indicated by the arrows stamped on the valve body.	Weight with anodized aluminium alloy 2011 body	gr. 680
- The supply pressure must be minimum 2 bars or higher for the solenoid operated version.	Assembly position	Any
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).	Wall fixing screw	M6
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.	Max. fittings torque	40 Nm
- The air supply can only be done via port 1.	Min. working pressure	2 bar
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.	Max working pressure (bar)	13 bar
- Wall mounting possibility with M6 screws protected by covers.	Flow rate at 6 bar with $\Delta p=1$	3200 NI/min

**Pneumatically operated shut-off valve**



Ordering code

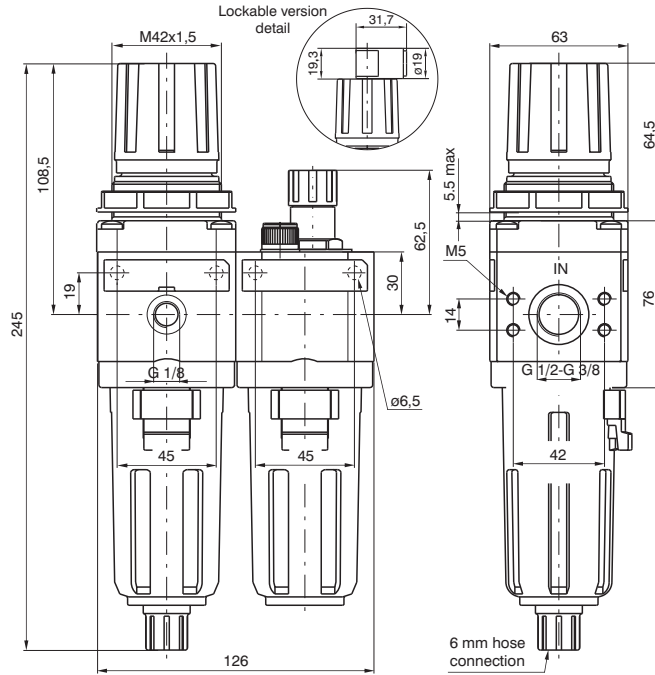
**17330.PN**

Example: 17330.PN : Shut-off valve size 3 with pneumatic pilot.

Important note: the preventive or programmed Maintenance of this product is not foreseen considering the elaborated assembling and the specific "PNEUMAX" testing; therefore, call the producer or its representative in case of necessity.

Operating Characteristics	Technical characteristics	
- 3 ways poppet valve, pneumatic pilot.	Piloting connections	G 1/2"
- Zinc alloy body or reinforced technopolymer body with threaded brass insert connections.	Temperature °C	-5 - + 50
- Opening and closing of the valve via pneumatic operator	Weight with anodized aluminium alloy 2011 body	gr. 645
- The correct flow direction is indicated by the arrows stamped on the valve body.	Assembly position	Any
- The supply pressure must be minimum 2 bars or higher for the solenoid operated version.	Wall fixing screw	M6
- The piloting pressure must be minimum 2bar or higher for the pneumatic operated version.(inlet pressure can be lower than 2 bar).	Max. fittings torque	40 Nm
- It is possible to produce the external supplied solenoid version by mounting the 305.10.05 between the valve main body and the solenoid pilot valve.	Min. working pressure	2 bar
- The air supply can only be done via port 1.	Max working pressure (bar)	13 bar
- Ensure that the downstream air consumption will not cause a pressure drop which could result in the pressure falling below the minimum operating values. If the pressure inside the valve falls below 2 bars , the valve might shut off.	Piloting pressure	2 bar
- Wall mounting possibility with M6 screws protected by covers.	Flow rate at 6 bar with $\Delta p=1$	3200 NI/min

Filter pressure regulator + Lubricator



**Ordering code**  
**17306C.S.G.T.O**

**CONNECTIONS**  
**C** A = G 3/8"  
 B = G 1/2"

**FILTER PORE SIZE**  
**S** A = 5µ  
 B = 20µ  
 C = 50µ

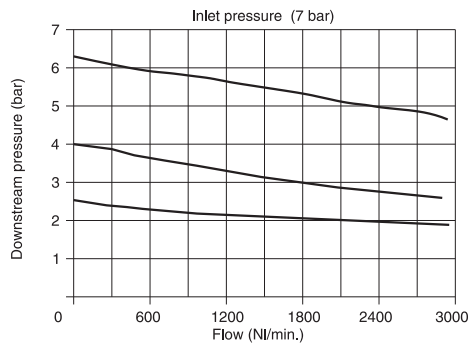
**ADJUSTING RANGE**  
**G** A = 0 - 2 bar  
 B = 0 - 4 bar  
 C = 0 - 8 bar  
 D = 0 - 12 bar

**TYPE**  
**T** S = Automatic drain

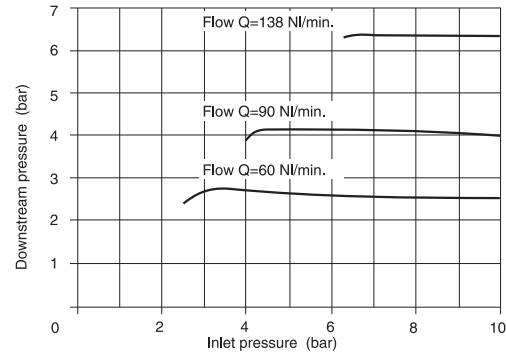
**OPTION**  
**O** \*Standard  
 K = Lockable version  
 \* No additional letters required

Example: 17306A.B.C.S  
 Service unit combination complete with filter - pressure regulator + lubricator size 3 G 3/8" connections, filter pore size 20µ, adjusting range 0-8 bar and automatic drain.

Flow rate curves



Adjustment characteristics



Operating Characteristics

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 1100
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5µ - 20µ - 50µ
Filter bowl capacity	48 cm³
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Lubricator bowl capacity	62 cm³
Min. operational flow at 6,3 bar	20 NI/min.
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm

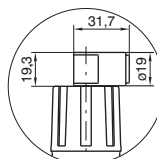




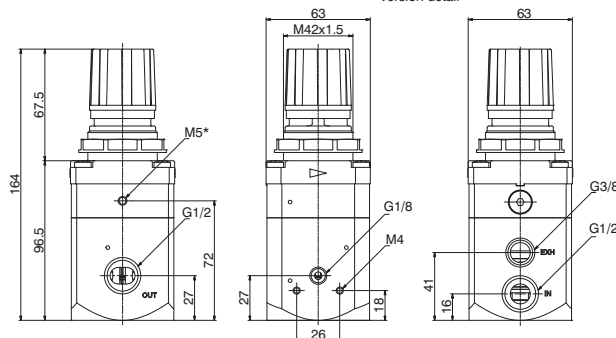
High sensitive air pressure regulator with high flow rate relieving



\* = Available only for the external feedback pressure version



Lockable version detail



Ordering code

**173S2B.G.T.O**

ADJUSTING RANGE

- 0002 = 0,1 - 2 bar
- 0004 = 0,1 - 4 bar
- 0007 = 0,1 - 7 bar
- 0010 = 0,1 - 10 bar

**G**

TYPE

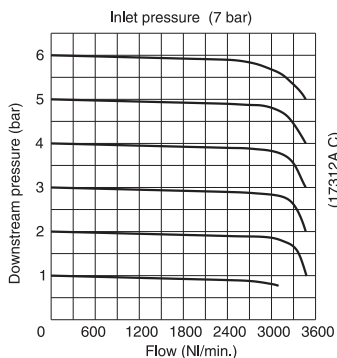
- T** = Standard (without options)
- E** = External pressure feedback

OPTION

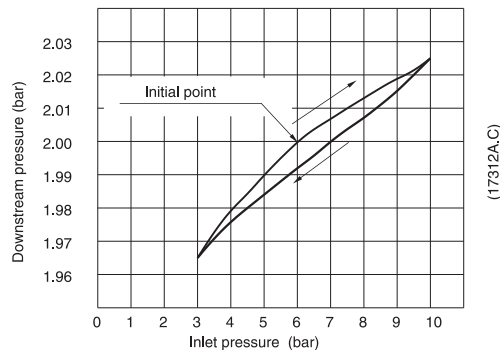
- O** \*Standard
  - K** = Lockable version
- \* No additional letters required

Example: 173S2B.C  
Pressure regulator G 1/2", with adjusting range from 0,1 at 7 bar.

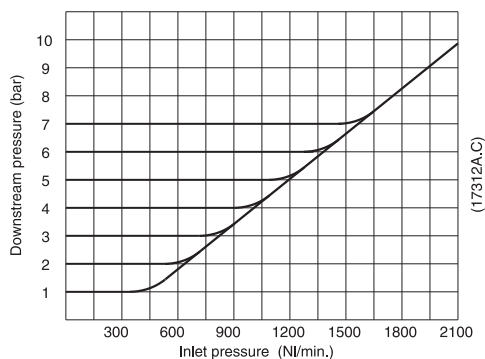
Flow rate curves



Adjustment characteristics



Exhaust flow rate curves



Operating Characteristics

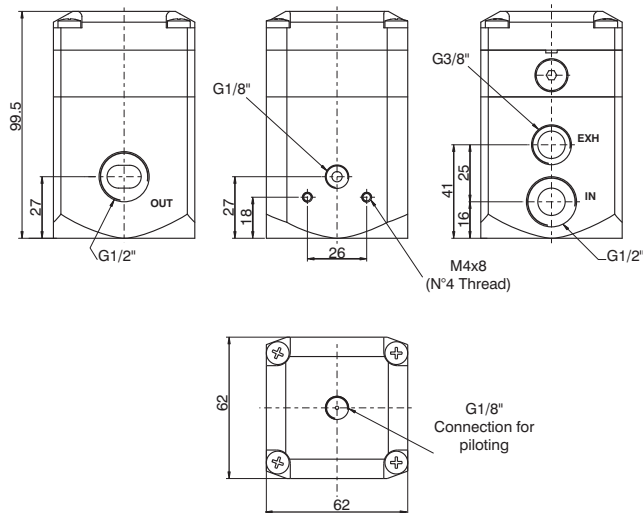
- Accurate capacity to maintain set pressure.
- Sensitivity combined with high relieving rates.
- High flow rate with extremely low pressure drop.
- Pressure adjusting lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Two pressure gauge connections with plug complete of seal.
- Ring nut for panel mounting.
- Once set, a constant bleed of air maintains the accuracy of the regulator. This controlled release is a characteristic, not a fault.

Technical characteristics

Connections	G 1/2"
Max working pressure (bar)	10 bar - 1 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 970
Pressure range (bar)	0,1 - 2 / 0,1 - 4 0,1 - 7 / 0,1 - 10
Assembly position	Any
Air flow (inlet pressure 10 bar)	5 NI/min
Max. fittings torque	40 Nm
Fluid	20µm filtered air and preferably non lubricated
Mounting holes diameter for panel mounting	42 mm



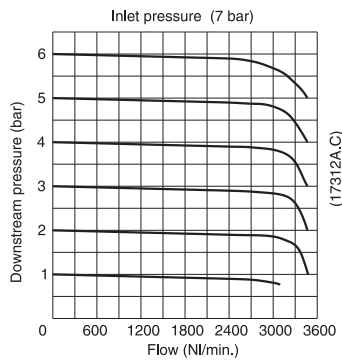
High sensitive air pressure regulator with high flow rate relieving



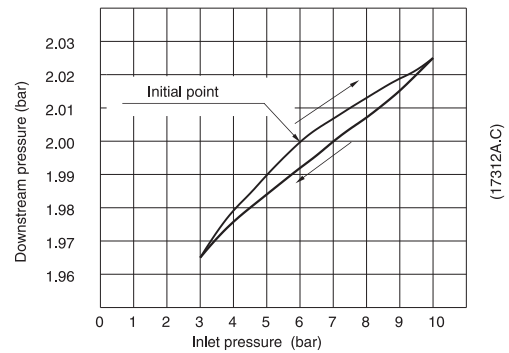
Ordering code  
**173P2B.0010**

Example: 173P2B.0010  
Pressure regulator G1/2", with pneumatically operated

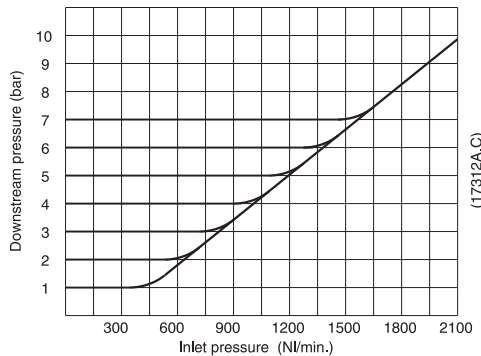
Flow rate curves



Adjustment characteristics



Exhaust flow rate curves



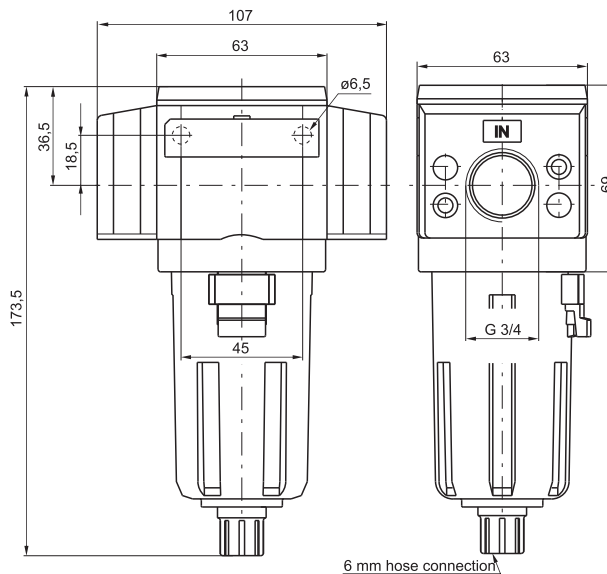
Operating Characteristics

- Accurate capacity to maintain set pressure.
- Sensitivity combined with high relieving rates.
- High flow rate with extremely low pressure drop.
- Two pressure gauge connections with plug complete of seal.
- Once set, a constant bleed of air maintains the accuracy of the regulator. This controlled release is a characteristic, not a fault.

Technical characteristics

Connections	G1/2"
Max working pressure (bar)	10
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G1/8"
Weight	gr. 970
Pressure (bar)	0,1 - 10
Assembly position	Any
Air consumption (NI/min) (10 bar air supply)	5
Max. fittings torque	40 Nm
Fluid	20µm filtered air preferably not lubricated

Filter ( G 3/4" )



Ordering code

**17301E.S.T**

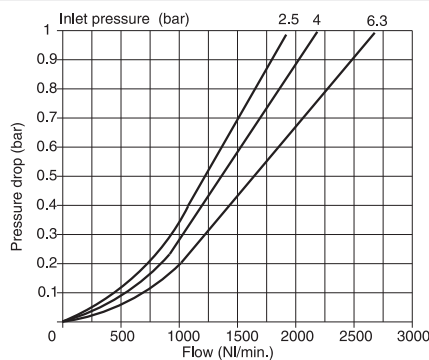
FILTER PORE SIZE

- S** A = 5 $\mu$
- B** B = 20 $\mu$
- C** C = 50 $\mu$

- T** TYPE
- S** = Automatic drain

Example: 17301E.B  
Filter size 3 with G 3/4" connection and filter pore size 20 $\mu$ .

Flow rate curves



Operating Characteristics

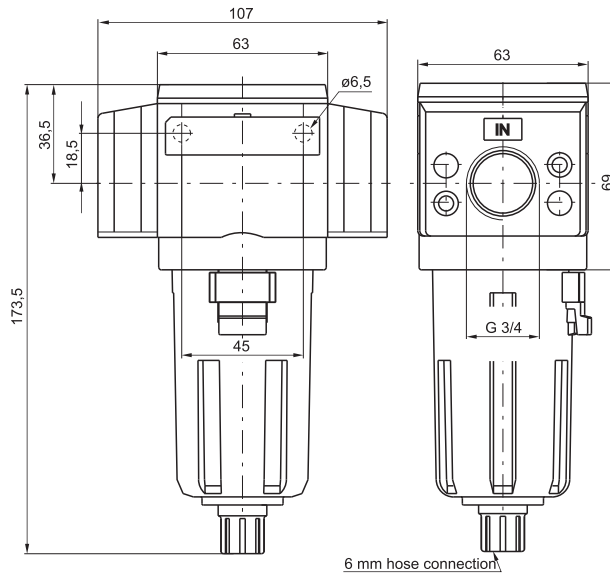
- Body made with light alloy.
- Flanges made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360°.
- Automatic water drainage bowl available on request.

Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	-5 °C - 50°C
Weight	gr. 405
Filter pore size	5 $\mu$ - 20 $\mu$ - 50 $\mu$
Bowl capacity	48 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm



Coalescing filter ( G 3/4" )



Ordering code

**17308E.E.T**

**E** FILTER EFFICIENCY

E = 99,97%

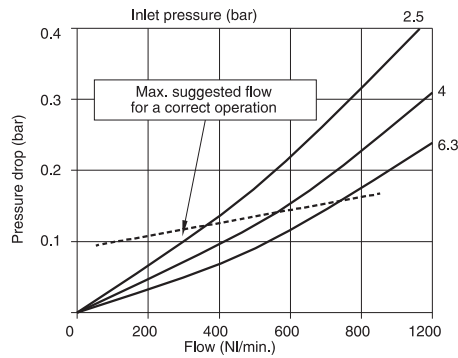
**T** TYPE

S = Automatic drain

Example: 17308E.E

Coalescing filter size 3 with G 3/4" connections and filter efficiency of 99,97%.

Flow rate curves



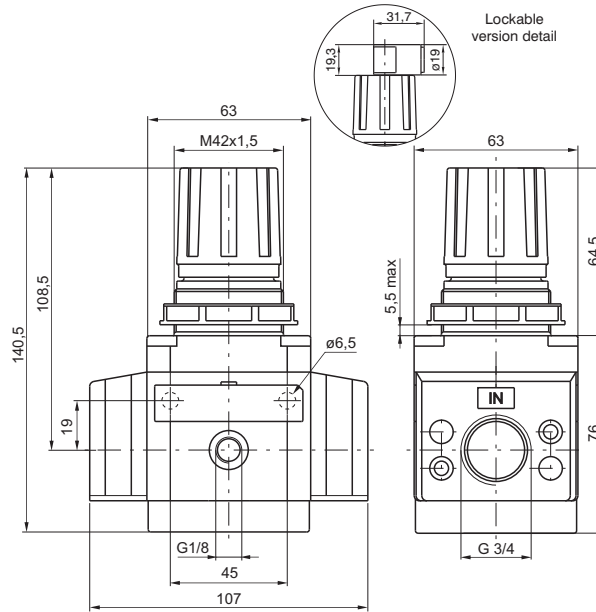
Operating Characteristics

- Coalescing filter element remove 0,01μ particles equivalent to 99,97%.
- Body made with light alloy.
- Flanges made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.

Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	-5 °C - 50°C
Weight	gr. 405
Filter efficiency with 0,01μ particle	99,97%
Bowl capacity	48 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm

Pressure regulator ( G 3/4" )



Lockable version detail

Ordering code

**17302E.C.T.O**

ADJUSTING RANGE

- A = 0 - 2 bar
- B** = 0 - 4 bar
- C = 0 - 8 bar
- D = 0 - 12 bar

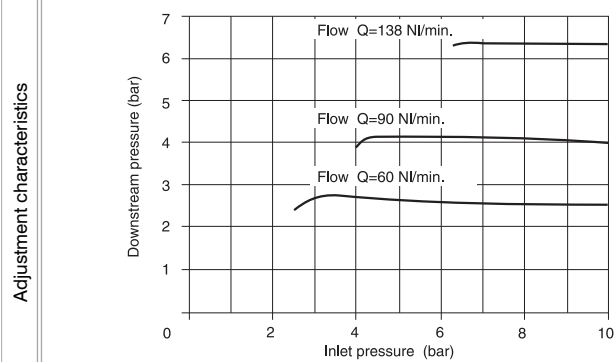
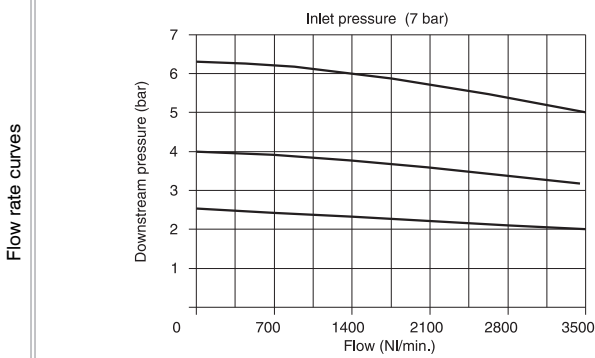
TYPE

- T** = without Relieving
- SM = improved relieving

OPTION

- O** \*Standard
- K = Lockable version
- \* No additional letters required

Example: 17302E.C  
Pressure regulator size 3 with G 3/4" connections, adjusting range 0 - 8 bar with relieving.



Operating Characteristics

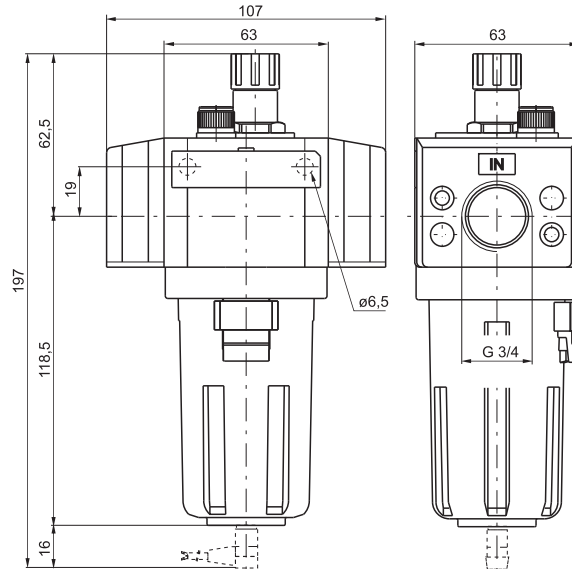
- Diaphragm pressure regulator with relieving.
- Balanced poppet.
- Lockable handle by simply pressing it downwards in the desired position.
- Body made with light alloy.
- Flange made with light alloy
- Wall mounting possibility with M6 screws protected by covers.
- Two pressure gauge connections with plug complete of seal.
- Panel mounting bracket.

Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 550
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M6
Max. fittings torque	40 Nm



Lubricator ( G 3/4" )



Ordering code

**17303E.T**

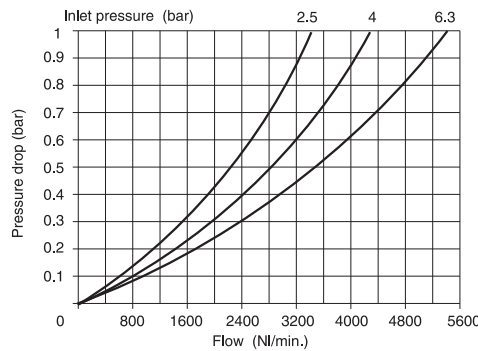
TYPE

- T** MA = Min. oil level indicator N.O. with plug connector
- MC = Min. oil level indicator N.C. with plug connector

Example: 17303E : Lubricator size 3 with G 3/4" connections.

Note: on the MA version the contact is open when oil is present; on the MC version the contact is closed when oil is present

Flow rate curves



Operating Characteristics

- Fog type lubrication with variable section orifice according to the flow.
- Body made with light alloy.
- Flange made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Transparent technopolymer bowl with shock resistant technopolymer protection.
- Possibility to see the min. and max. level on 360° also with bowl protection assembled.
- Bowl assembled to the body with bayonet cap and safety button.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.
- Electrical connector for low level indication.
- Use the C1, C2 or C3 lead for connection (see chapter 6 "Sensors").

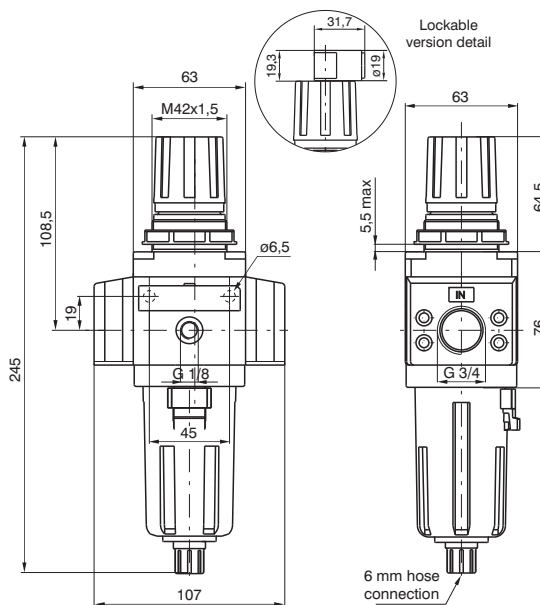
Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Weight	gr. 435
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	62 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Min. operational flow at 6,3 bar	20 NI/min
Max. fittings torque	40 Nm

3

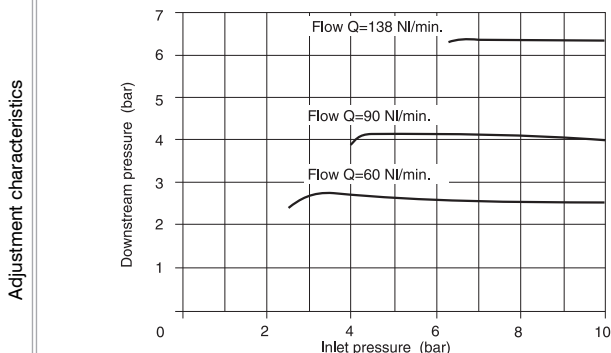
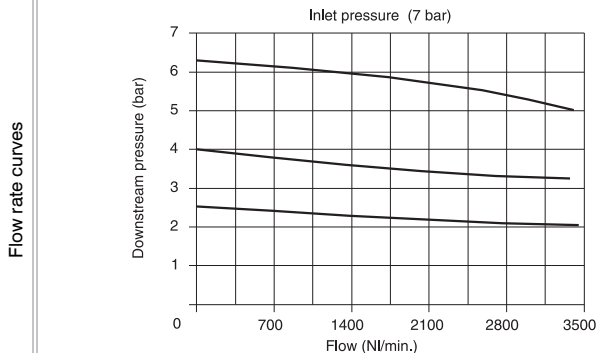


Filter - Pressure regulator ( G 3/4" )



Ordering code	
<b>17304E.S.G.T.O</b>	
FILTER PORE SIZE	
<b>S</b>	A = 5μ
	B = 20μ
	C = 50μ
ADJUSTING RANGE	
<b>G</b>	A = 0 - 2 bar
<b>B</b>	B = 0 - 4 bar
<b>C</b>	C = 0 - 8 bar
<b>D</b>	D = 0 - 12 bar
TYPE	
<b>S</b>	S = Automatic drain
OPTION	
<b>O</b>	*Standard
	K = Lockable version
* No additional letters required	

Example: 17304E.B.C  
Filter - pressure regulator size 3 with G 3/4" connections, filter pore size 20μ and adjusting range 0-8 bar.



Operating Characteristics

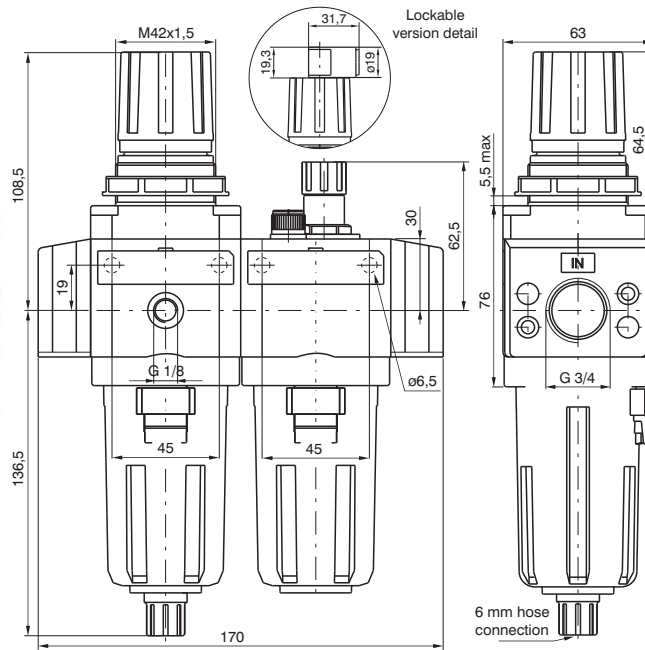
- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Body made with light alloy.
- Flange made with light alloy.
- Lockable handle by simply pressing it downwards in the desired position.
- Wall mounting possibility with M6 screws protected by covers.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semiautomatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.

Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 645
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5μ - 20μ - 50μ
Bowl capacity	48 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm



Filter pressure regulator + Lubricator ( G 3/4" )



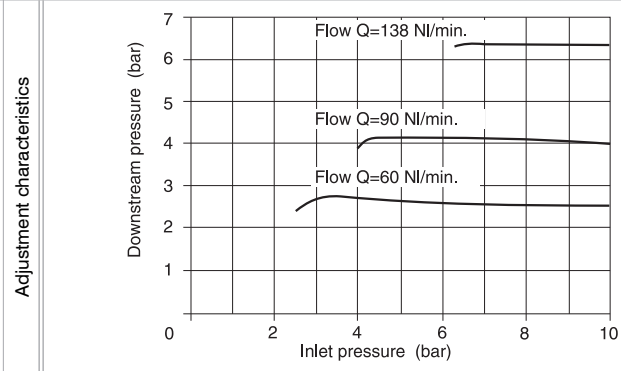
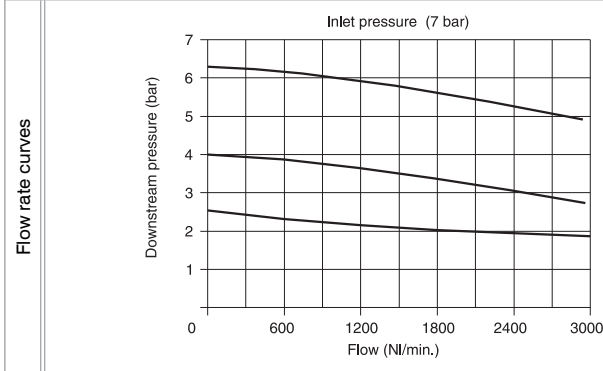
Ordering code

**17306E.S.G.T.O**

FILTER PORE SIZE	
<b>S</b>	A = 5μ
	B = 20μ
	C = 50μ
ADJUSTING RANGE	
<b>G</b>	A = 0 - 2 bar
	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
<b>T</b>	S = Automatic drain
OPTION	
<b>O</b>	*Standard
	K = Lockable version
* No additional letters required	

Example: 17306E.B.C.S

Service unit combination complete with filter - pressure regulator + lubricator size 3 G 3/4" connection, filter pore size 20μ, adjusting range 0-8 bar and automatic drain.



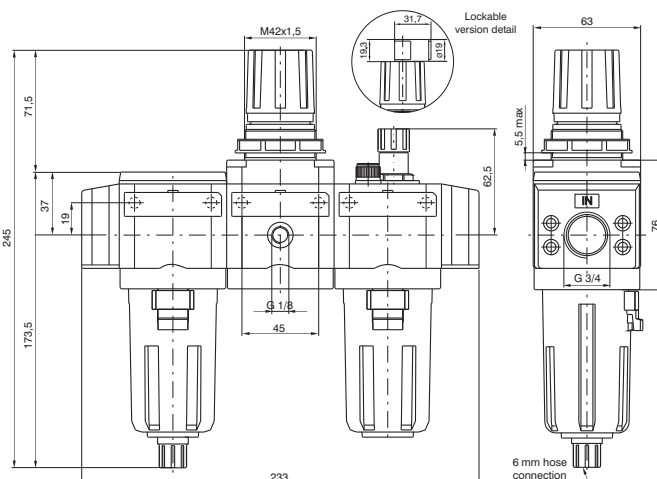
**Operating Characteristics**

- Filter - diaphragm pressure regulator with relieving.
- Balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Flange made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

**Technical characteristics**

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 1100
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5μ - 20μ - 50μ
Filter bowl capacity	48 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Lubricator bowl capacity	62 cm <sup>3</sup>
Min. operational flow at 6,3 bar	20 NI/min.
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm

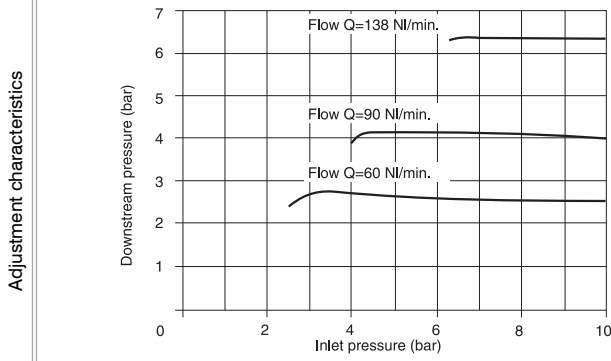
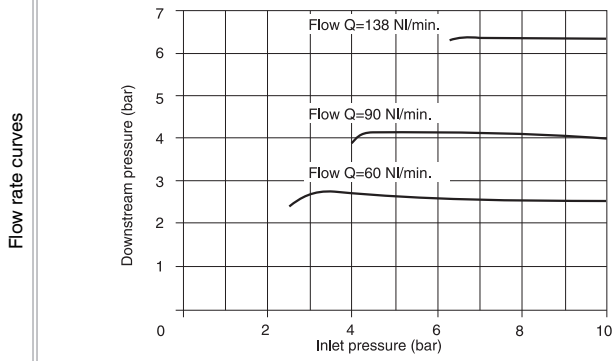
Filter + pressure regulator + Lubricator ( G 3/4" )



Ordering code	
<b>17307E.S.G.T.O</b>	
FILTER PORE SIZE	
<b>S</b>	A = 5μ
	B = 20μ
	C = 50μ
ADJUSTING RANGE	
	A = 0 - 2 bar
<b>G</b>	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
<b>T</b>	S = Automatic drain
OPTION	
<b>O</b>	*Standard
	K = Lockable version
* No additional letters required	

Example: 17307E.B.C.S

Service unit combination complete with filter, pressure regulator and lubricator G 3/4" connections, filter pore size 20μ, adjusting range 0-8 bar and automatic drain.



Operating Characteristics

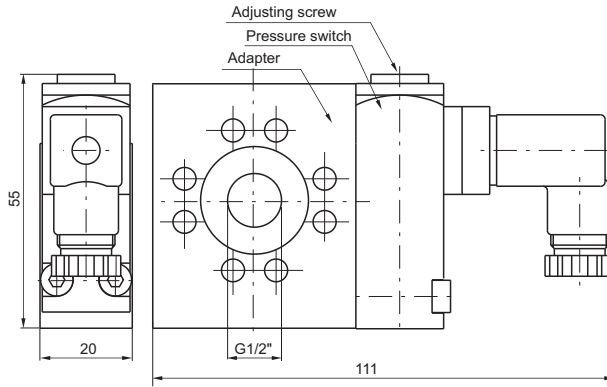
- Filter - diaphragm pressure regulator with relieving and balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Flange made with light alloy.
- Wall mounting possibility with M6 screws protected by covers.
- Pressure adjusting lockable handle by simply pressing it downwards in the desired position.
- Transparent technopolymer bowl with shock resistant technopolymer protection connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Automatic water drainage bowl available on request.
- Possibility to see the water level on 360° also with bowl protection assembled.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

Technical characteristics

Connections	G 3/4"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 °C - 50°C
Pressure gauge connections	G 1/8"
Weight	gr. 1430
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5μ - 20μ - 50μ
Filter bowl capacity	48 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Lubricator bowl capacity	62 cm <sup>3</sup>
Min. operational flow at 6,3 bar	20 NI/min.
Assembly position	Vertical
Wall fixing screw	M6
Max. fittings torque	40 Nm



**Pressure Switch complete with adapter**



**Ordering code**

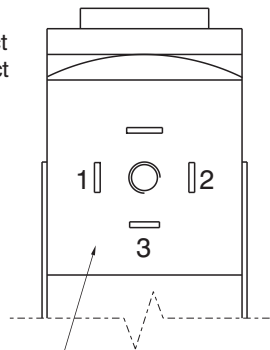
**17T**

TYPE	34A = Pressure switch adapter
14B = Pressure switch	
34C = Pressure switch complete with adapter	

Example: 1734C  
Pressure switch complete with adapter.

Connection

- 1 = Neutral
- 2 = N.C contact
- 3 = N.O contact



DIN 43650 Type C connector

**Operating Characteristics**

- The pressure switch complete of adapter has to be assembled between two elements of the FRL group.
- It cannot be utilized separately or at the end of the FRL group.
- The pressure switch can be set at desired pressure (Pressure range (bar) from 2 to 10 bar) by rotating the adjusting screw.
- The electrical connection is made by mean of a 15 connector DIN 43650 type C.
- The microswitch contact could be Normally Closed or open (change over switch).

**Technical characteristics**

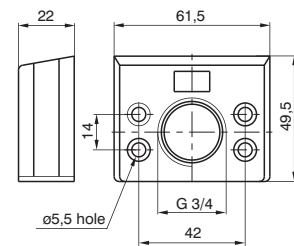
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	-5 - + 50
Weight	gr. 220
Microswitch capacity	1A
Microswitch Maximum voltage	250 VAC
Grade of protection (with connector assembled)	IP 65
Pressure range (bar)	2 - 10 bar
Assembly position	Any

**Flange G 3/4"**

**Ordering code**

**1738T**

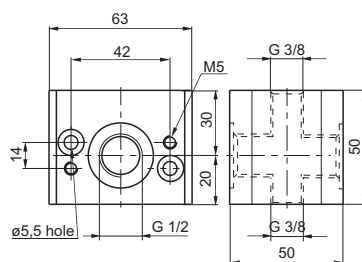
TYPE	
1E = Inlet flange	
2E = Outlet flange	



Weight gr. 105

**Air Intake**

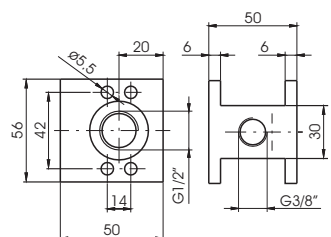
**Air Intake - "H" profile**



**Ordering code**

**17340**

Weight gr. 250



**Ordering code**

**17340H**

Weight gr. 192

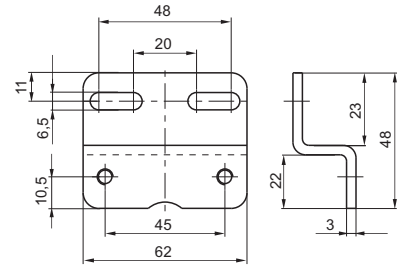
**Fixing bracket**

Ordering code

**1735**

TYPE

- 0 = Standard regulator
- 2 = Highsensitive air pressure regulator



Weight gr. 85

**Pressure gauge**

Ordering code

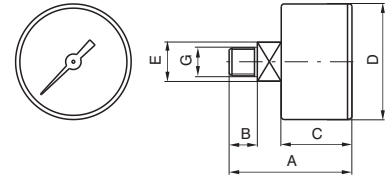
**17070**

VERSION

- A = Dial ø40
- B = Dial ø50

SCALE

- A = Scale 0-4 bar
- B = Scale 0-6 bar
- C = Scale 0-12 bar



DIMENSIONS

CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80

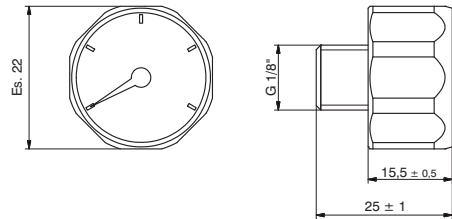
**Manometer diameter D.23 mm**

Ordering code

**17070M**

SCALE

- A = Scale 0-4 bar
- B = Scale 0-6 bar
- C = Scala 0-12 bar



**Assembling kit**

Ordering code

**1736**

VERSION

- 0 = Standard
- 5 = for progressive start-up valve



Weight gr. 25

### Construction and working characteristics

The modular air service units groups of the size 4, as the other size, allow a wide selection of combinations.

The threaded connections are machined directly on the valve body made with light alloy, so that each components can be used individually.

The wall fixing is done directly with screws through the holes on the body they can be wall mounted.

The bowls are made of transparent technopolymer, always supplied with shock resistant technopolymer protection, allowing the moisture and oil level control from any angle.

The filter can be equipped with manual or semiautomatic water drain valve; furthermore it's possible to install the automatic draining device inside the bowl.

The pressure regulator handle is lockable in the desired position.

The lubricator oil flow is adjustable with proper handle and it is visibly checked through the sight dome.

The shut-off valve can be equipped with pad-lock to prevent accidents or damages due to unauthorized operation.

The progressive start-up valve, pneumatically or electropneumatically controlled, allows air supply to the circuit progressively and with adjustable time.

### Instruction for installation and operation

Pay attention to install a group or a single component with air flow direction according to the arrows and to the following sequence: filter, pressure regulator, lubricator and with bowls downwards.

Do not exceed the recommended air pressure and temperature limits.

The moisture should not exceed the level marked on the bowl and it can be drawn off and carried away by a flexible tube of  $\varnothing 6/4$  directly connected to the discharge valve handle.

The pressure should be set from minimum to maximum, rotating the adjusting handle clockwise.

As lubricant, we suggest to use oil class FD22 or HG32. Verify that the lubricator is not fed with a flow lower than the minimum operational.

To set the oil flow rotate the proper adjusting handle in order to get one drop of oil every 300-600 liters of air.

The oil flow will be kept automatically and proportionally to the air flow.

The oil can be refilled by mean of proper plug or directly into the bowl after having de-pressurized the system. Do not exceed the maximum level indicated on the bowl.

For opening the shut-off valve push and rotate clockwise the operating handle. For closing it and consequently discharging the down stream line, rotate the handle counter-clockwise.

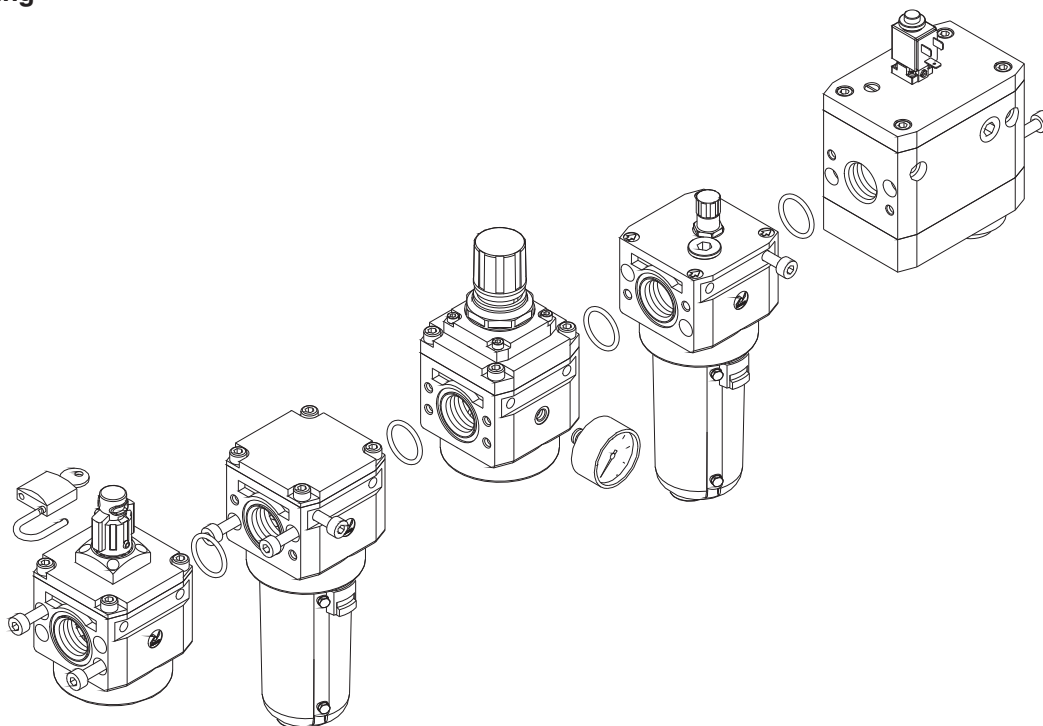
### Maintenance

Clean the bowls with water and detergent. Do not use alcohol.

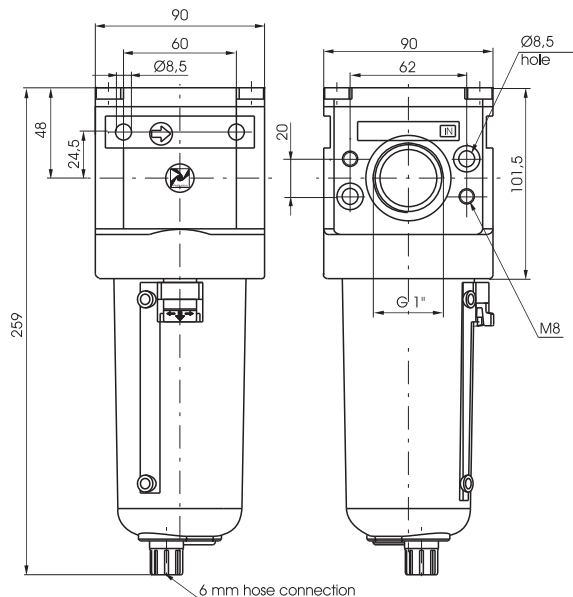
The filter element made with HPDE is reusable by blowing and cleaning it with proper detergent. For replacing or cleaning it, remove the bowl and unscrew the baffle spins.

In case it is necessary to replace the lubricator transparent dome, tight it at 5 Nm torque maximum.

### Assembling



Filter



Ordering code

**17401B.S.T**

FILTER PORE SIZE

**S** A = 5 $\mu$

B = 20 $\mu$

C = 50 $\mu$

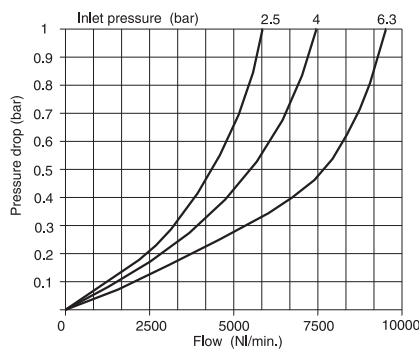
**T** TYPE

S = Automatic drain

Example: 17401B.B  
Filter with G 1" connections and filter pore size 20 $\mu$ .

3

Flow rate curves



Operational characteristic

- Body made with light alloy.
- Wall mounting possibility with M8 screws protected by covers.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Light alloy bowl c/w level indicator connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Automatic water drainage bowl available on request.

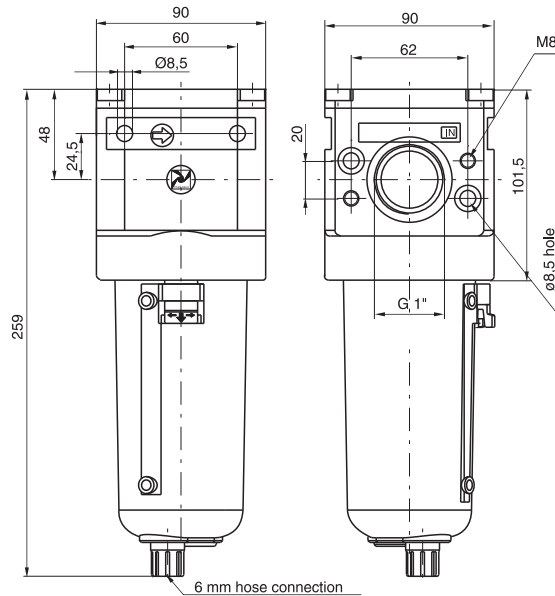
Technical characteristic

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Weight	gr. 1700
Filter pore size	5 $\mu$ - 20 $\mu$ - 50 $\mu$
Bowl capacity	178 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M8





Coalescing filter



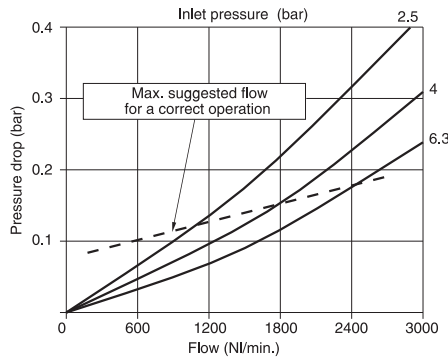
Ordering code

**17408B.E.T**

**T** TYPE  
S = Automatic drain

Example: 17408B.E  
Coalescing filter size 4 with G 1" connections and filter efficiency of 99,97%.

Flow rate curves



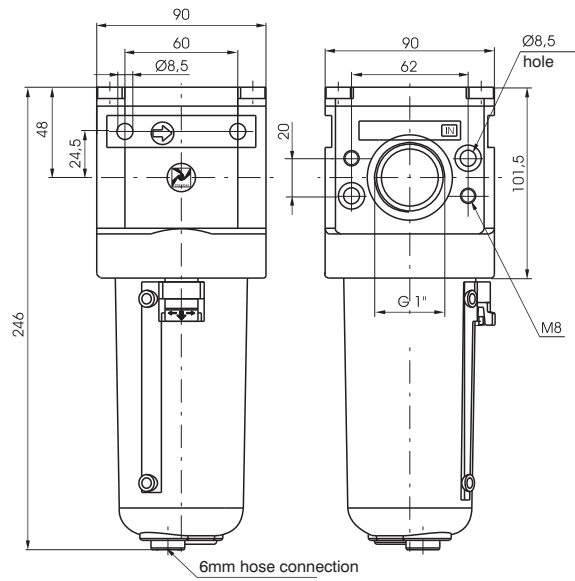
Operational characteristic

- Coalescing filter element remove 0,01μ particles equivalent to 99,97%.
- Body made with light alloy.
- Wall mounting possibility with M8 screws protected by covers.
- Light alloy bowl c/w level indicator connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Automatic water drainage bowl available on request.

Technical characteristic

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Minimum working pressure with automatic drain (bar)	0,5
Maximum working pressure with automatic drain (bar)	10
Temperature °C	50°C
Weight	gr. 1700
Filter efficiency with 0,01μ particle	99,97%
Bowl capacity	178 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M8

Dynamic drier



Ordering code

**1740EB.S.T**

FILTER PORE SIZE

- S** A = 5 $\mu$
- B** B = 20 $\mu$
- C** C = 50 $\mu$

- T** TYPE
- S** = Automatic drain

Example: 1740EB.A.S  
Dynamic drain size 4 with G 1" connections, filter pore size 20 $\mu$  and automatic drain.

3

**Operational characteristic**

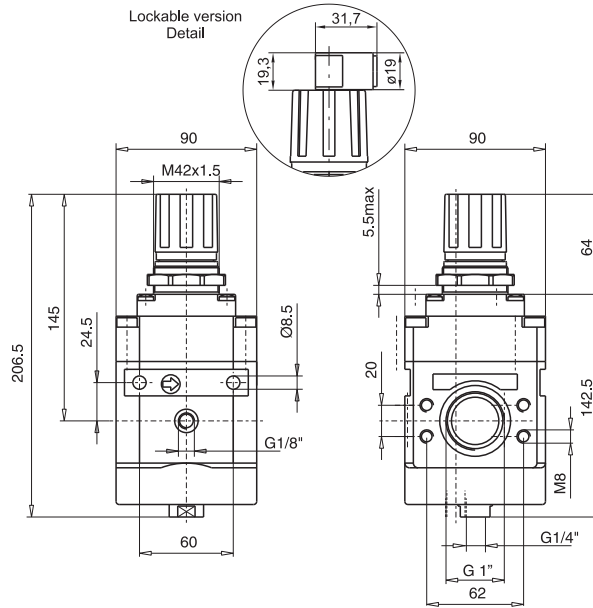
- Body made with light alloy.
- Wall mounting possibility with M8 screws.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Light alloy bowl c/w level indicator connected to the body with bayonet cap and safety button.
- Automatic water drain valve.

**Technical characteristic**

Connections	G 1"
Max inlet pressure (bar)	13
Flow rate at 6 bar with $\Delta p = 1$ (NI/min.)	2500
Bowl capacity (cm <sup>3</sup> )	160
Max. fittings torque (Nm)	40
Temperature °C	-5 to +50
Weight (g.)	1700
Filter efficiency at flow rate 1500 NI/min.	96%
Assembly position	Vertical
Wall fixing screw	M8



Pressure regulator



Ordering code

17402NB.C.C

ADJUSTING RANGE

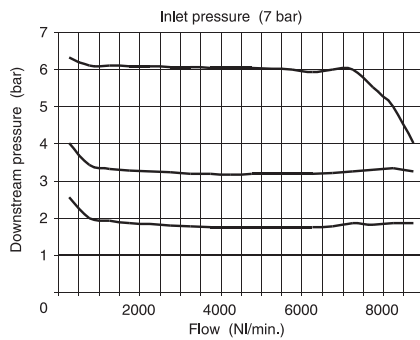
- A = 0 - 2 bar
- C** = 0 - 4 bar
- C = 0 - 8 bar
- D = 0 - 12 bar

OPTION

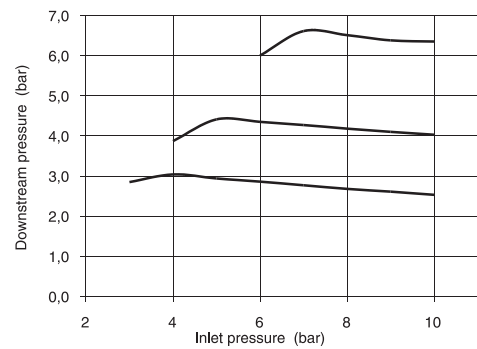
- C** = Standard (without options)
- K = Lockable version

Example: 17402NB.C  
Pressure regulator with G 1" connections, adjusting range 0 - 8 bar with relieving.

Flow rate curves



Adjustment characteristics



Operational characteristic

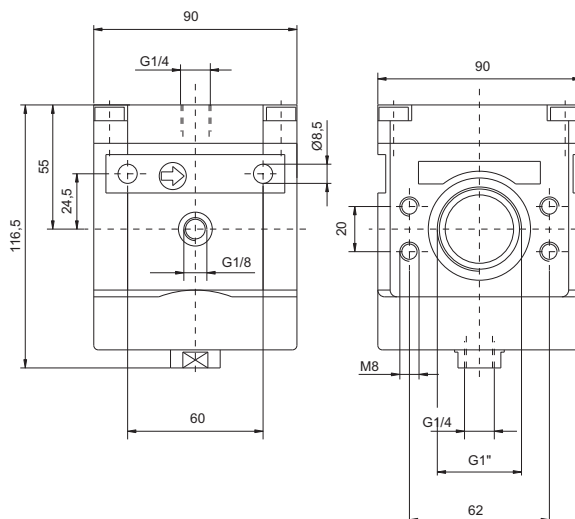
- Sensitivity combined with high relieving rates.
- High flow rate with extremely low pressure drop.
- Body made with light alloy.
- Two pressure gauge connections with plug complete of seal.
- Ring nut for panel mounting.

Technical characteristic

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 1900
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Assembly position	Any
Wall fixing screw	M8



Piloted pressure regulator

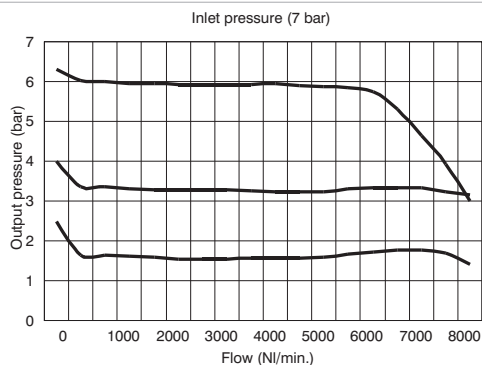


Ordering code

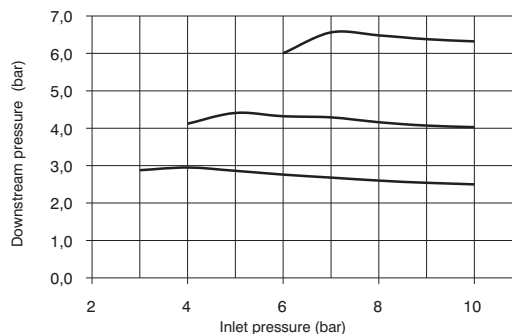
**17402NB.P**

Example: 17402NB.C  
Piloted pressure regulator with G 1" connection and adjusting range 0 - 8 bar with relieving

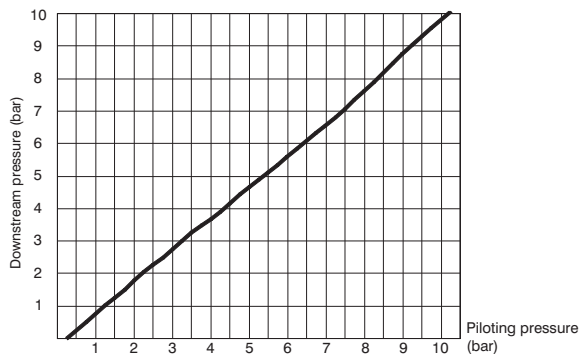
Flow rate curves



Adjustment characteristics



Piloting curves



**Operational characteristic**

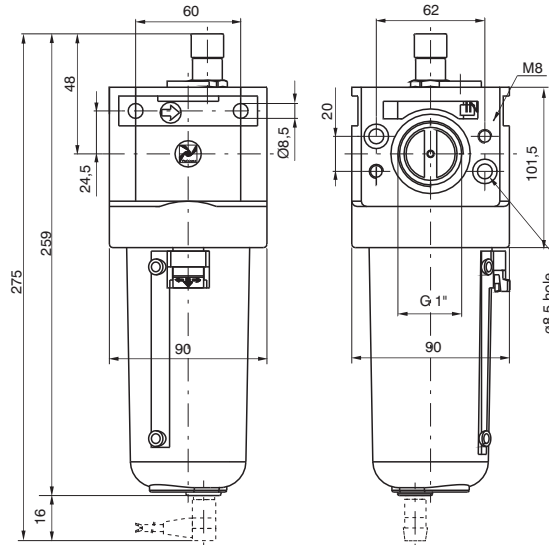
- Sensitivity combined with high relieving rates.
- High flow rate with extremely low pressure drop.
- Body made with light alloy.
- Two pressure gauge connections with plug complete of seal.
- Ring nut for panel mounting.

**Technical characteristic**

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 1638
Assembly position	Any
Wall fixing screw	M8



Lubricator



Ordering code

17403B.1

TYPE

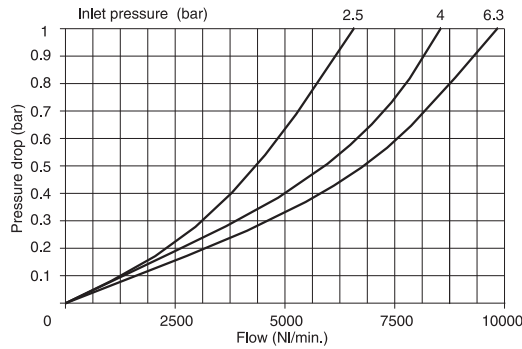
- MA = Min. oil level indicator N.O. with plug connector
- MC = Min. oil level indicator N.C. with plug connector

Example: 17403B

Lubricator size 4 with G 1" connections.

Note: on the MA version the contact is open when oil is present; on the MC version the contact is closed when oil is present

Flow rate curves



Operational characteristic

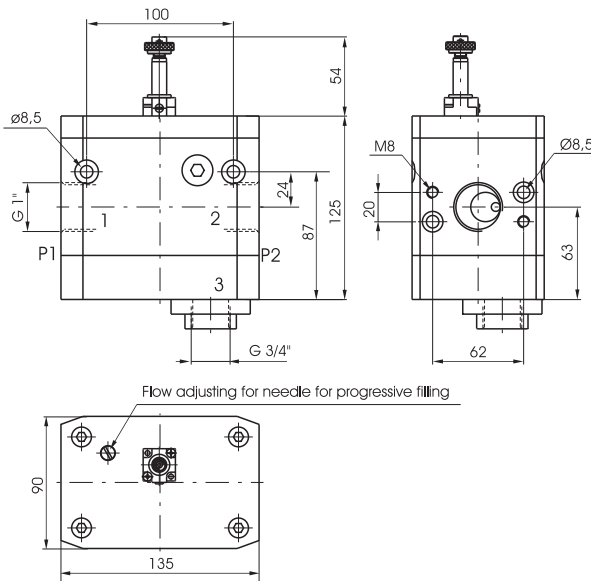
- Fog type lubrication with variable section orifice according to the flow.
- Body made with light alloy.
- Wall mounting possibility with M8 screws protected by covers.
- Light alloy bowl c/w level indicator connected to the body with bayonet cap and safety button.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.
- Electrical connector for low level indication. Use the C1, C2 or C3 lead for connection (see section 6 "Sensor").

Technical characteristic

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Weight	gr. 1500
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	300 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M8
Min. operational flow at 6,3 bar	100 NI/min



**Progressive start-up valve**



**Ordering code**

**174T**

**TYPE**

- T 10.M2 = Electric control complete with M2 mechanic (see page 2.13)
- 20 = with pneumatic control

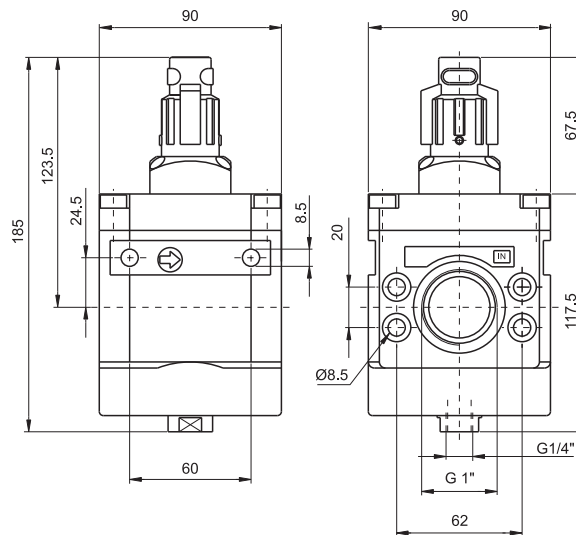
**Operational characteristic**

- 3 way valve with double poppet.
- Possibility to adjust the down stream circuit filling time by the enclosed adjustable metering screw.
- Quick down stream circuit discharge.
- Possibility for a pneumatic or electric piloting control.
- Body made with anodized 2011 aluminum alloy.
- Wall mounting possibility with M8 screws.

**Technical characteristic**

Connections	G 1"
Max working pressure (bar)	10 bar - 1 MPa
Temperature °C	50°C
Weight	gr. 2300
Assembly position	Any
Wall fixing screw	M8
Min. working pressure	2,5 bar - 0,25 MPa
Nominal flow at 6 bar with Δp=1	8000 NI/min.
Flow with adjustable metering screw fully open	3000 NI/min.

**Shut-off valve**



**Ordering code**

**17430.T**

**TYPE**

- T A = Not lockable handle
- B = Lockable handle

Example: 17430.B

Shut-off valve size 4 complete with lockable handle.

Important note: the preventive or programmed maintenance of this product is not foreseen considering the elaborated assembling and the specific PNEUMAX testing; therefore, call the producer or its representative in case of necessity.

**Operational characteristic**

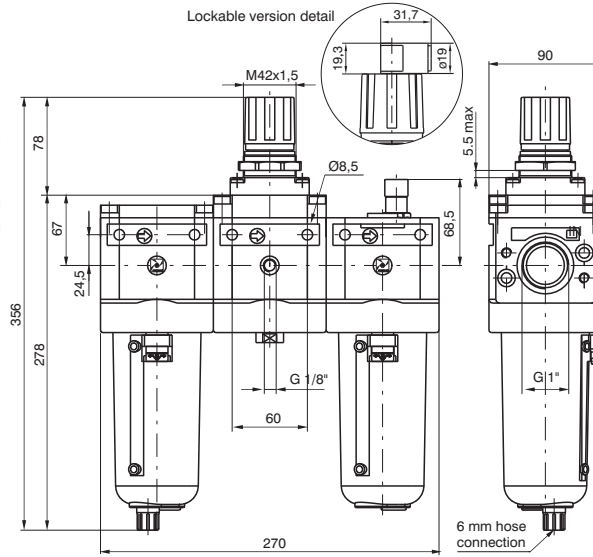
- 3 ways poppet valve.
- Body made with light alloy.
- Wall mounting possibility with M8 screws protected by covers.
- Double action handle for valve opening: pushing and rotating (clockwise).
- Simple rotate the valve handle counter clockwise for valve closing and down stream circuit discharging.
- Possibility to lock the valve in the discharging position by fitting in a padlock in the proper seat.

**Technical characteristic**

Connections	G 1"
Max working pressure (bar)	10 bar - 1 MPa
Temperature °C	50°C
Weight	gr. 1600
Assembly position	Any
Nominal flow at 6 bar with Δp=1	8000 NI/min.
Wall fixing screw	M8
Handle opening and closing angle	90°



**Filter + Pressure regulator + Lubricator**



**Ordering code**

**17407NB.S.G.T.O**

FILTER PORE SIZE	
<b>S</b>	A = 5µ
	B = 20µ
	C = 50µ
ADJUSTING RANGE	
	A = 0 - 2 bar
<b>G</b>	B = 0 - 4 bar
	C = 0 - 8 bar
	D = 0 - 12 bar
TYPE	
<b>T</b>	S = Automatic drain
OPTION	
<b>O</b>	=Standard (without options)
	K = Lockable version

**Operational characteristic**

- Filter - diaphragm pressure regulator with relieving with balanced poppet.
- Double filtering action: by air centrifuging and by replaceable and reusable HDPE porous filter element.
- Body made with light alloy.
- Wall mounting possibility with M8 screws protected by covers.
- Pressure adjusting lockable handle by simply pressing it downwards in the desired position
- Light alloy bowl c/w level indicator connected to the body with bayonet cap and safety button.
- Manual and semi-automatic water drain valve; in the semi-automatic version the drainage happens when there is no pressure or by pushing the valve up-wards.
- Automatic water drainage bowl available on request.
- Two pressure gauge connections with plug complete of seal.
- Fog type lubrication with variable section orifice according to the flow.
- Transparent technopolymer sight dome with adjusting handle.
- Oil filling plug.

**Technical characteristic**

Connections	G 1"
Max working pressure (bar)	13 bar - 1,3 MPa
Temperature °C	50°C
Pressure gauge connections	G 1/8"
Weight	gr. 5300
Pressure range (bar)	0 - 2 / 0 - 4 / 0 - 8 / 0 - 12
Filter pore size	5µ - 20µ - 50µ
Bowl capacity	178 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	300 cm <sup>3</sup>
Assembly position	Vertical
Wall fixing screw	M8
Min. operational flow at 6,3 bar	100 NI/min



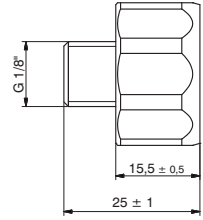
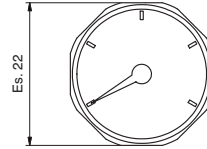






Manometer diameter D. 23

Ordering code
<b>17070M.S</b>
SCALE
<b>S</b> A = Scale 0-4 bar
B = Scale 0-6 bar
C = Scale 0-12 bar



Assembling kit

Ordering code
<b>1746V</b>
VERSION
<b>V</b> 0 = Standard
5 = for progressive start-up valve



**General**

The new stainless SS1700 air treatment series was created and developed specifically for the Oil & Gas and for all applications that require excellent corrosion resistance because of chemical and/or environmental corrosion.

**All external and internal parts (except for the automatic exhaust version), are made of AISI 316L stainless steel conforming to NACE standard MR0175 / ISO 15156/1.** The product range includes a FILTER, with filter elements of up to 3 filtration levels (5µm, 20µm, 50µm), available in AISI316 stainless steel or HDPE (high density polyethylene), and manual or automatic condensed exhaust; the PRESSURE REGULATOR is supplied in a series with low hysteresis rolling diaphragm and an over-pressure exhaust valve (RELIEVING), available in 4 different adjustment ranges from 0 to 12 bar. Finally, the FILTER-REGULATOR range, which combines the features of a filter and pressure regulator into a single component: The "CLEAN PROFILE" versions are available in all sizes, featuring a glossy finish on the exterior surfaces. Here, the over-pressure exhaust hole (RELIEVING) has a 1/8-NPT threading, and is protected by an AISI 316 sintered filter series. In CLEAN PROFILE versions, however, this is a simple hole without a thread.

**Construction and functional features**

Body, cup and adjustment mechanism	AISI 316L stainless steel
Caseback regulator	AISI 316L stainless steel
Adjustment screw, locking nut and fastening screws	AISI 316L stainless steel (stainless steel A4-70)
Internal components	AISI 316L stainless steel
Filtering elements	AISI 316 stainless steel or HDPE (High density polyethylene)
Spring	AISI 316 stainless steel
Seals	NBR (Standard version and Automatic exhaust) FPM - HNBR (H versions) NBR for low temperatures (L versions) EPDM-FDA (EF versions) Silicone - PU (Z versions)
Automatic drain	brass, stainless steel AISI 304 and AISI 302, sintered bronze acetal resin , NBR, FPM

**Terms of use**

Fluid	Filtered air, lubricated or non-lubricated (if lubricated, the lubrication must be continuous). Inert gases Natural gases
Temperature	-30°C - +70°C (standard version) -50°C - +70°C (low temperature (L) version) -60°C ÷ +70°C (low temperature (Z) version -60 °C) -5°C - +150°C (high temperature (H) version) -5°C - +50°C (automatic exhaust version) -40°C - +100°C (EPDM-FDA version)
Maximum working pressure	20bar (standard, low and high temperature versions) 16bar (automatic exhaust version)

**Instructions for installation and use**

Install the product as close to the point of use as possible. Observe the flow direction following the direction of the (arrow) located in front of the body. Place the cup equipped elements in a vertical position, keeping the condensed exhaust tap pointing downwards.

Use the devices within the temperature and pressure limits. In the regulator, the pressure must always be adjusted upwards and, for greater accuracy and sensitivity, it is recommended to use a reducer with a pressure range closest to the desired pressure.

The condensed exhaust in the manual version can only occur in the absence of pressure. To discharge liquid, turn the tap clockwise until the discharge of liquid is triggered, then tighten it all the way.

**The maintenance**



of filter elements and filter regulators is reusable through blowing and/or washing, and is made of stainless steel or HDPE (high density polyethylene). To replace, remove the cup, loosen the set screw of the support and replace the filter element with a new or refurbished one. Replace the regulator diaphragm whenever the performance is no longer correct or if there is a continuous discharge from the relieving hole (over-pressure exhaust). Fully discharge the adjustment spring before removing the adjustment mechanism. For other maintenance requirements, given the complexity of assembly and the need for a PNEUMAX testing, it is recommended that you contact the manufacturer.

**Certifications available**



: CE II 2 GD c IIC [ CE II 2G Ex h IIC Gb  
CE II 2D Ex h IIC Db ]



: Suitable up to SIL 3



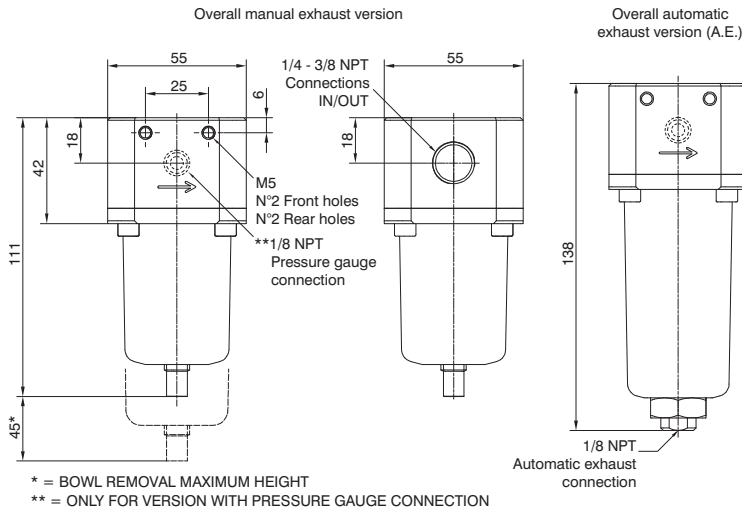
: CU - TR 012



Filter

Ordering code

**SV172CFSOZ**



VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 1/4 NPT
	B = 3/8 NPT
	C = G1/4"
FILTER PORE SIZE	
A	A = 5 µm - 316 stainless steel
B	B = 20 µm - 316 stainless steel
S	C = 50 µm - 316 stainless steel
D	D = 5 µm - HDPE
E	E = 20 µm - HDPE
F	F = 50 µm - HDPE
OPTIONS	
	= Standard*
L	L = Low temperature
Z	Z = Low temperature (-60 °C)
H	H = High temperature
S	S = Automatic exhaust
EF	EF = EPDM-FDA
ENCLOSURE OPTIONS	
Z	= Standard*
G	G = pressure gauge connection

\* no additional letter required

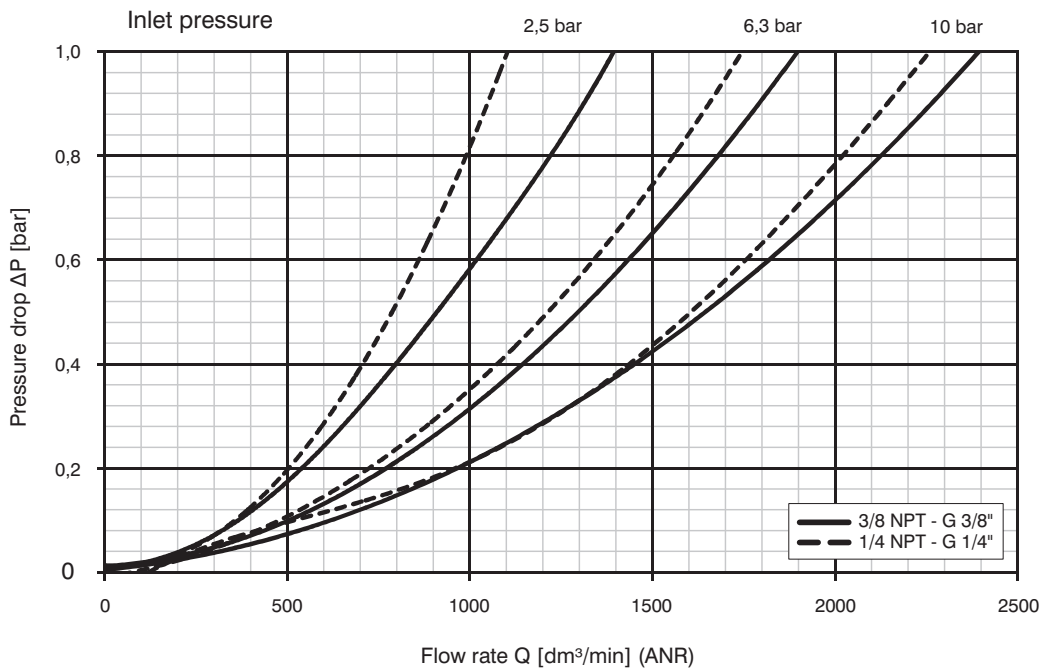
Operational characteristics

- Body, cup and internal components in AISI 316L stainless steel.
- A4 (AISI 316) Stainless steel fixing screws.
- Manual or automatic condensed exhaust

Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Weight	1070 (gr.)
Maximum condense capacity	15 cm <sup>3</sup>
Assembly position	Vertical

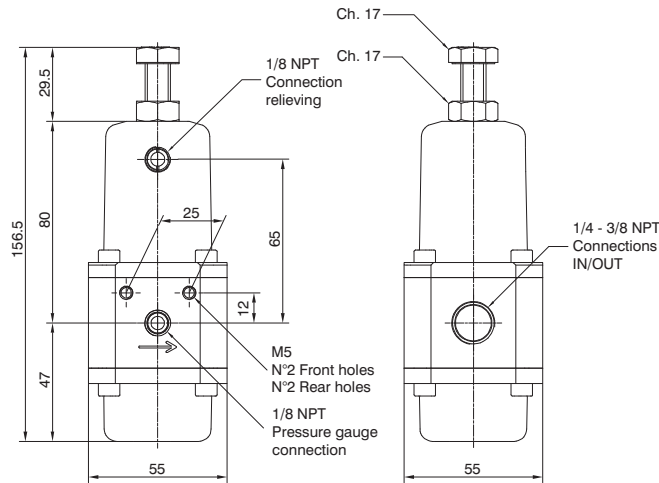
Flow rate curves



3

Regulator

Ordering code



SV172C R E T O

VERSION
✓ S = Standard surface finishing
F = Clean profile
CONNECTIONS
Ⓒ A = 1/4 NPT
B = 3/8 NPT
C = G1/4"
ADJUSTING RANGE
A = 0-2 bar
Ⓔ B = 0-4 bar
C = 0-8 bar
D = 0-12 bar
TYPE
Ⓘ = Standard*
N = Without relieving
OPTIONS
= Standard*
Ⓓ L = Low temperature
Z = Low temperature (-60 °C)
H = High temperature
EF = EPDM-FDA

\* no additional letter required

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback inter. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.

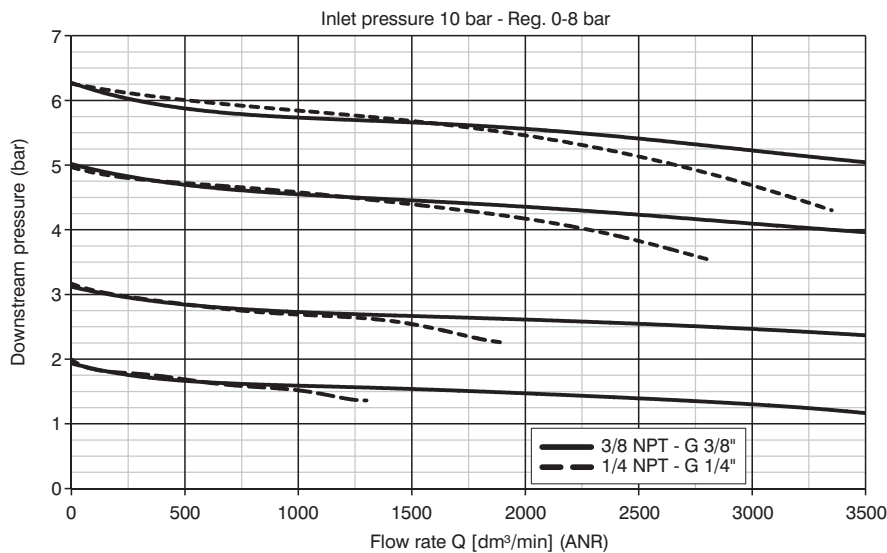
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight	1270 (gr.)
Assembly position	Indifferent

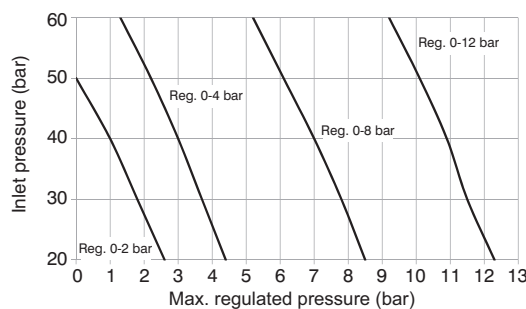
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Flow rate curves



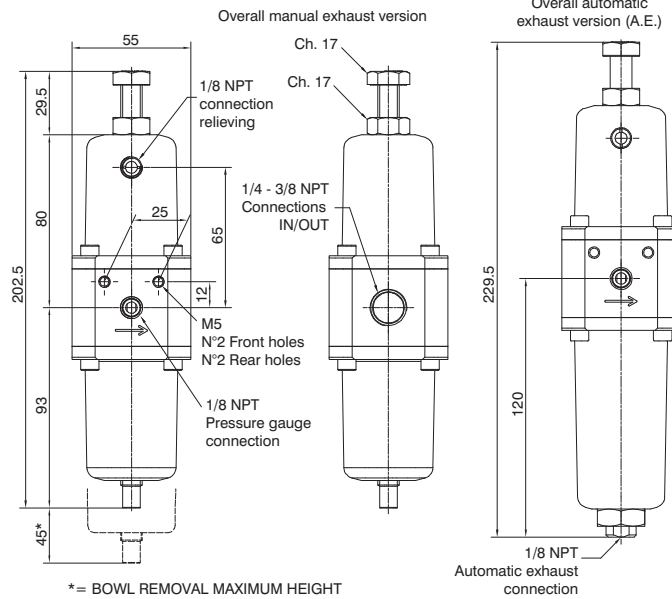
The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.





Filter - regulator

Ordering code



SV172CESGTO

VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 1/4 NPT
	B = 3/8 NPT
	C = G1/4"
FILTER PORE SIZE	
S	A = 5 µm - 316 stainless steel
	B = 20 µm - 316 stainless steel
	C = 50 µm - 316 stainless steel
	D = 5 µm - HDPE
	E = 20 µm - HDPE
	F = 50 µm - HDPE
ADJUSTING RANGE	
A	A = 0-2 bar
G	B = 0-4 bar
	C = 0-8 bar
	D = 0-12 bar
TYPE	
T	= Standard*
	N = Without relieving
OPTIONS	
	= Standard*
	L = Low temperature
Z	Z = Low temperature (-60 °C)
	H = High temperature
	S = Automatic drain
	EF = EPDM-FDA
* no additional letter required	

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback inter. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Filter-pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.
- Manual or automatic condensed exhaust.

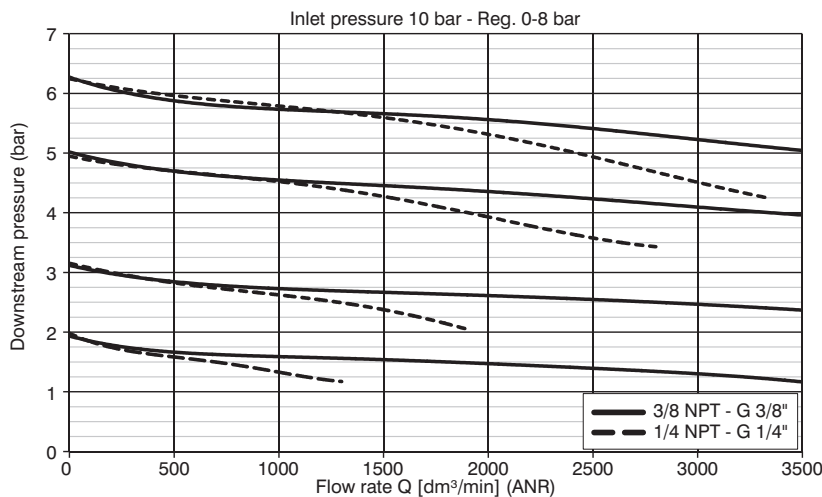
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight	1470 (gr.)
Max. bowl capacity	15 cm <sup>3</sup>
Assembly position	Vertical

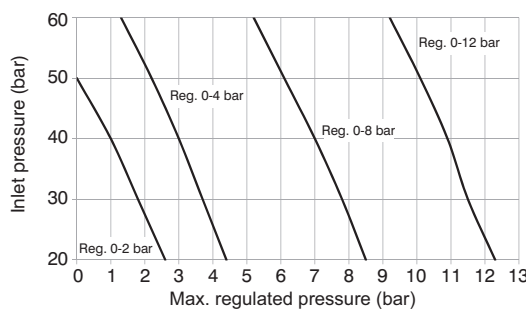
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Flow rate curves



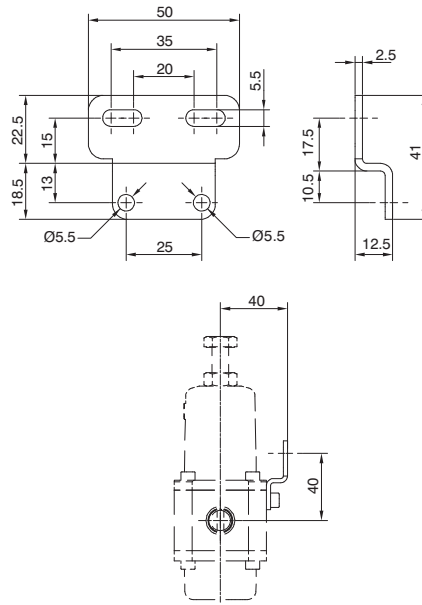
The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.



Fixing bracket

Ordering code

**SS17250**

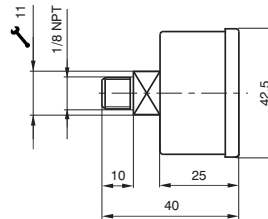


Weight 32 gr.  
AISI 316L stainless steel material.  
Allows wall fixing of individual products.

Pressure gauge

Ordering code

**SS17070A**



SCALE

- Ⓢ A = 0 - 4 bar
- B = 0 - 12 bar

Weight 60 gr.  
AISI 316 stainless steel material.  
Glass transparent part with an AISI 316 stainless steel retaining ring.  
Available with 0-4 bar and 0-12 bar scale.

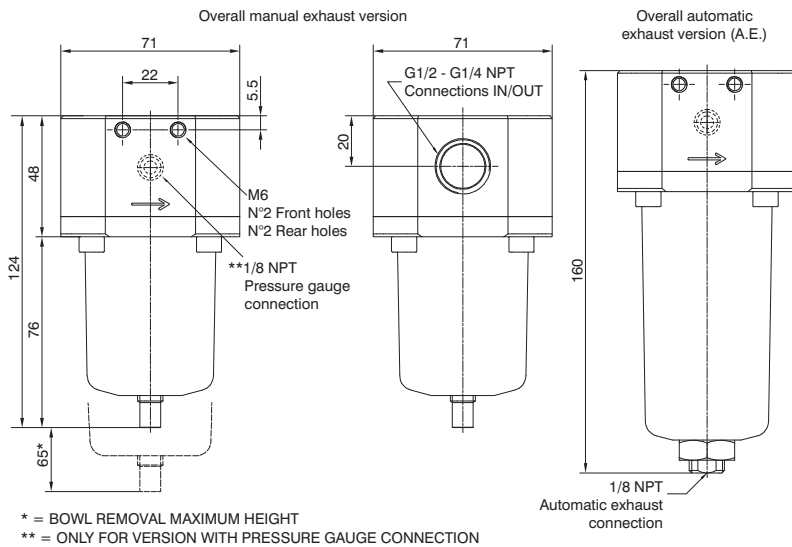




Filter

Ordering code

**SV173CFSOZ**



VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 1/4 NPT
	B = 1/2 NPT
	D = G1/2"
FILTER PORE SIZE	
A	A = 5 μm - inox 316
B	B = 20 μm - inox 316
S	C = 50 μm - inox 316
	D = 5 μm - HDPE
	E = 20 μm - HDPE
	F = 50 μm - HDPE
OPTIONS	
	= Standard*
	L = Low temperature
Z	Z = Low temperature (-60 °C)
	H = High temperature
	S = Automatic exhaust
	EF = EPDM-FDA
ENCLOSURE OPTIONS	
Z	= Standard*
	G = pressure gauge connection

\* no additional letter required

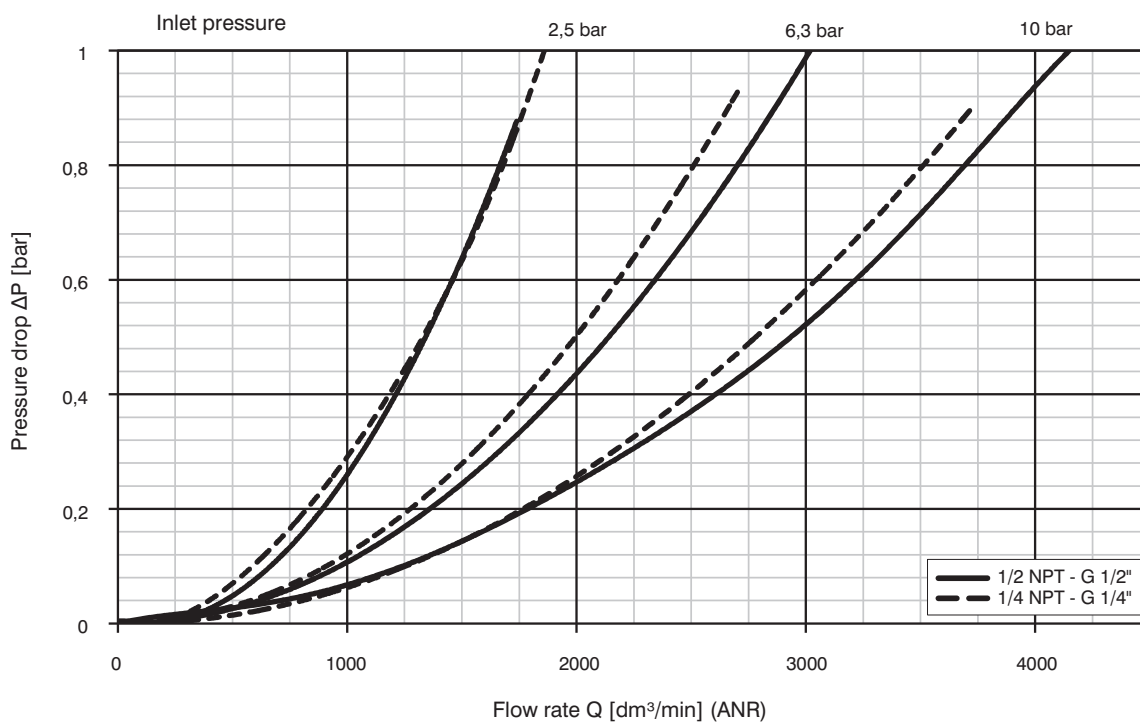
Operational characteristics

- Body, cup and internal components in AISI 316L stainless steel.
- A4 (AISI 316) Stainless steel fixing screws.
- Manual or automatic condensed exhaust.

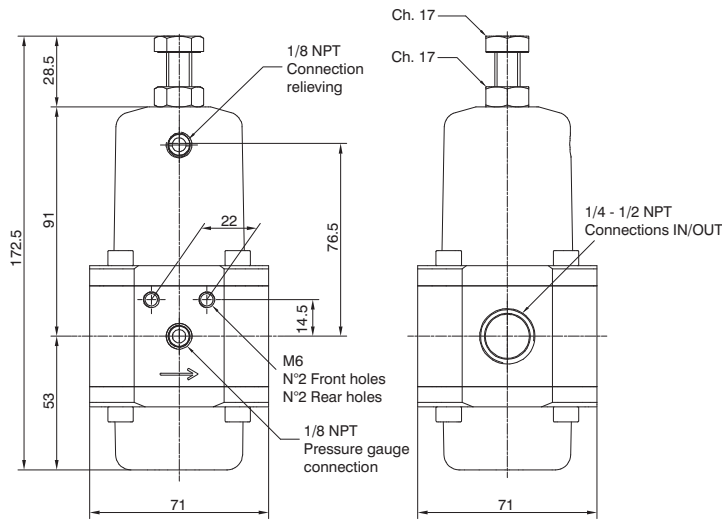
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Weight	1650 (gr.)
Maximum condense capacity	25 cm <sup>3</sup>
Assembly position	Vertical

Flow rate curves



Regulator



Ordering code

**SV173CREGTO**

VERSION	
✓	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
	A = 1/4 NPT
Ⓢ	B = 1/2 NPT
	D = G1/2"
ADJUSTING RANGE	
	A = 0-2 bar
Ⓢ	B = 0-4 bar
	C = 0-8 bar
	D = 0-12 bar
TYPE	
Ⓢ	= Standard*
	N = Without relieving
OPTIONS	
	= Standard*
	L = Low temperature
Ⓢ	Z = Low temperature (-60 °C)
	H = High temperature
	EF = EPDM-FDA

\* no additional letter required

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback inter. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.

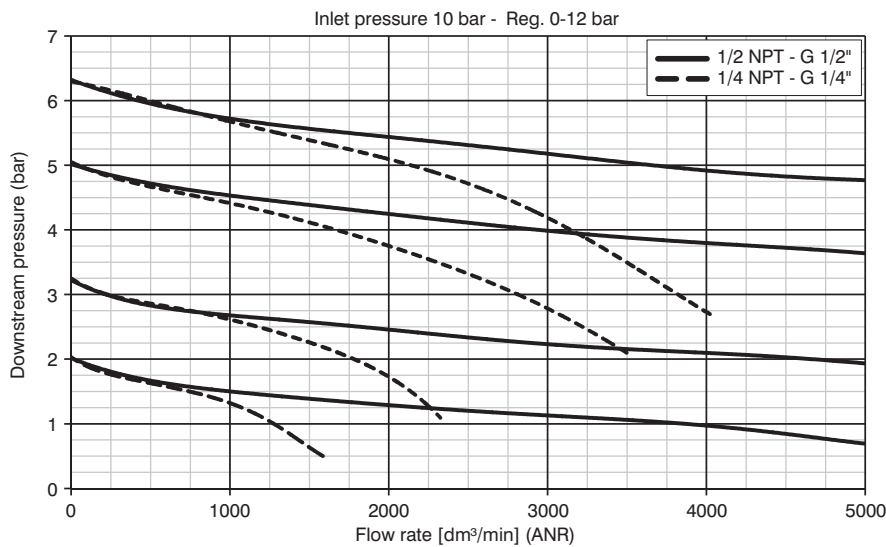
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

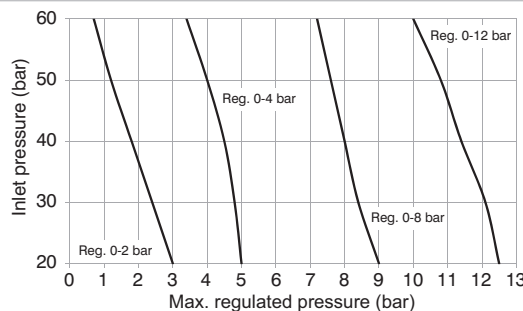
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight	1830 (gr.)
Assembly position	Indifferent

Flow rate curves

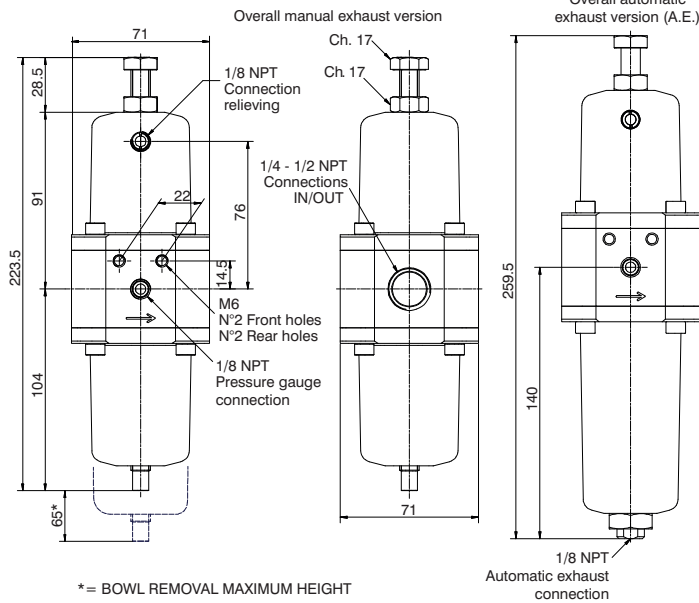


The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.





Filter - regulator



Ordering code

SV173CESGTO

VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 1/4 NPT
	B = 1/2 NPT
	D = G1/2"
FILTER PORE SIZE	
	A = 5 µm - 316 stainless steel
	B = 20 µm - 316 stainless steel
S	C = 50 µm - 316 stainless steel
	D = 5 µm - HDPE
	E = 20 µm - HDPE
	F = 50 µm - HDPE
ADJUSTING RANGE	
	A = 0-2 bar
G	B = 0-4 bar
	C = 0-8 bar
	D = 0-12 bar
TYPE	
T	= Standard*
	N = Without relieving
OPTIONS	
	= Standard*
	L = Low temperature
C	Z = Low temperature (-60 °C)
	H = High temperature
	S = Automatic exhaust
	EF = EPDM-FDA

\* no additional letter required

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback intern. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Filter-pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.
- Manual or automatic condensed exhaust.

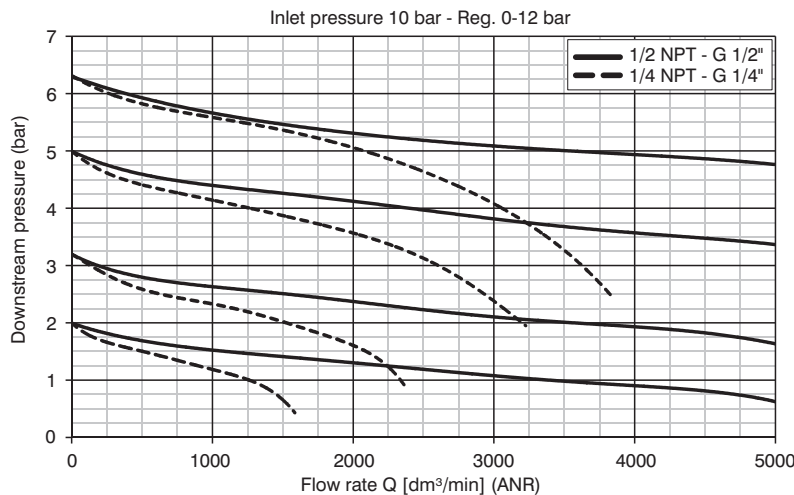
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

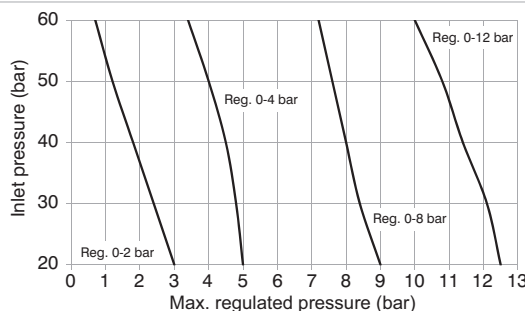
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight	2110 (gr.)
Max. bowl capacity	25 cm <sup>3</sup>
Assembly position	Vertical

Flow rate curves



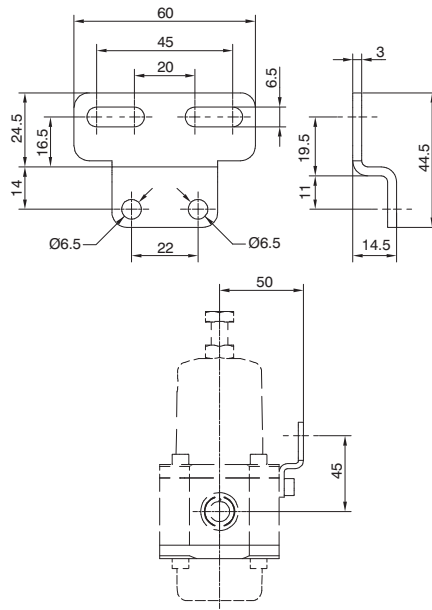
The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.



Fixing bracket

Ordering code

SS17350

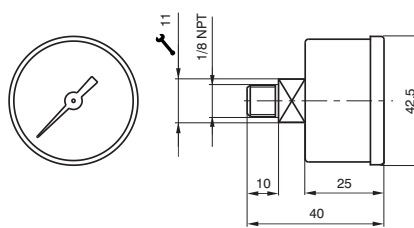


Weight 32 gr.  
AISI 316L stainless steel material.  
Allows wall fixing of individual products.

Pressure gauge

Ordering code

SS17070A<sup>Ⓢ</sup>



Weight 60 gr.  
AISI 316 stainless steel material.  
Glass transparent part with an AISI 316 stainless steel retaining ring.  
Available with 0-4 bar and 0-12 bar scale.

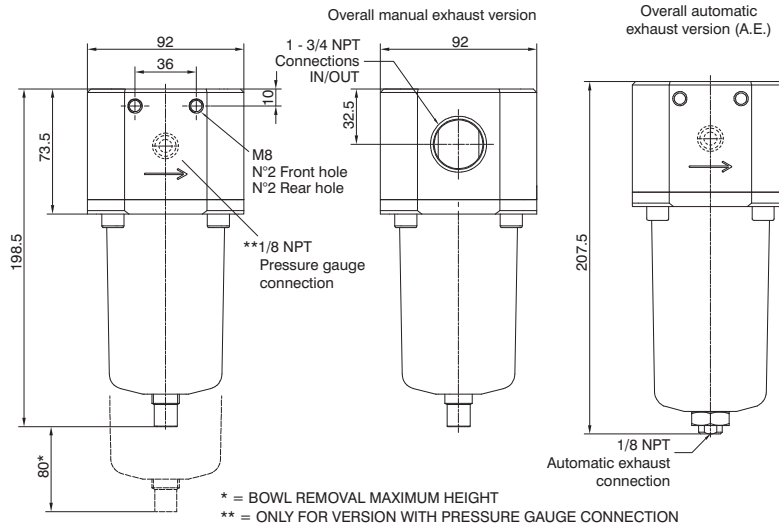
SCALE  
<sup>Ⓢ</sup> A = 0 - 4 bar  
 B = 0 - 12 bar



Filter

Ordering code

**SV174CFSSZ**



VERSION
V S = Standard surface finishing
F = Clean profile
CONNECTIONS
A = 3/4 NPT
B = 1 NPT
D = G1"
FILTER PORE SIZE
A = 5 μm - 316 stainless steel
B = 20 μm - 316 stainless steel
S C = 50 μm - 316 stainless steel
D = 5 μm - HDPE
E = 20 μm - HDPE
F = 50 μm - HDPE
OPTIONS
= Standard*
L = Low temperature
Z = Low temperature (-60 °C)
H = High temperature
S = Automatic exhaust
EF = EPDM-FDA
ENCLOSURE OPTIONS
Z = Standard*
G = pressure gauge connection

\* no additional letter required

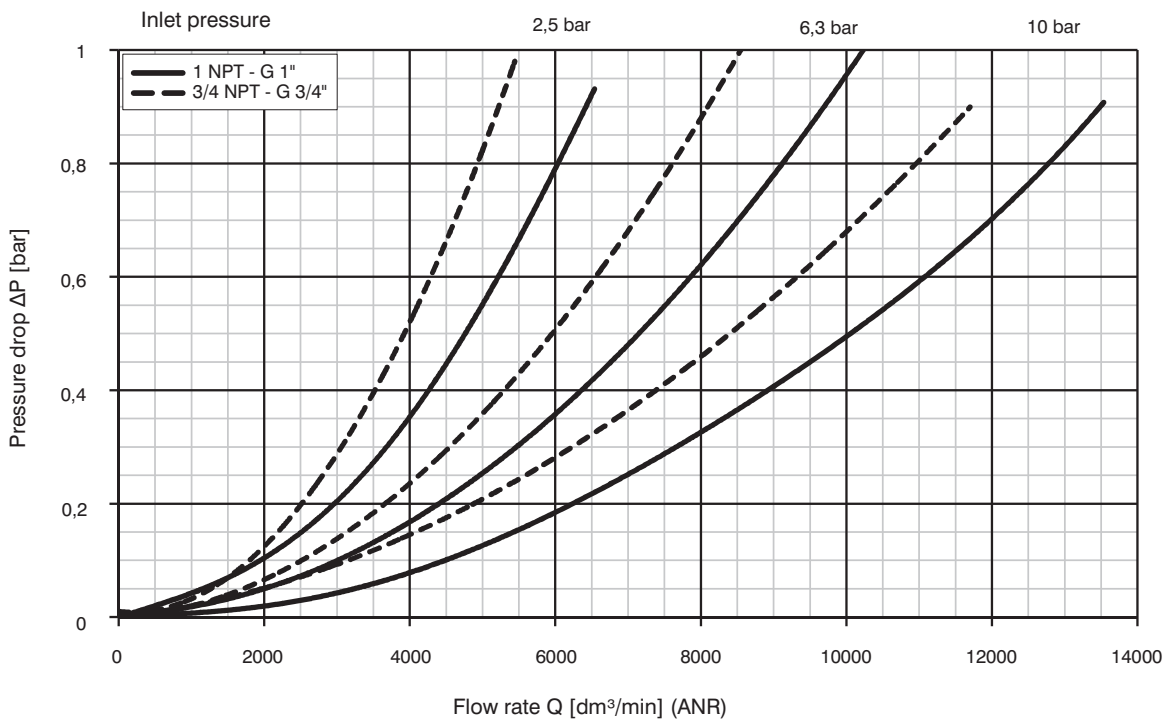
Operational characteristics

- Body, cup and internal components in AISI 316L stainless steel.
- A4 (AISI 316) Stainless steel fixing screws.
- Manual or automatic condensed exhaust.

Technical characteristics

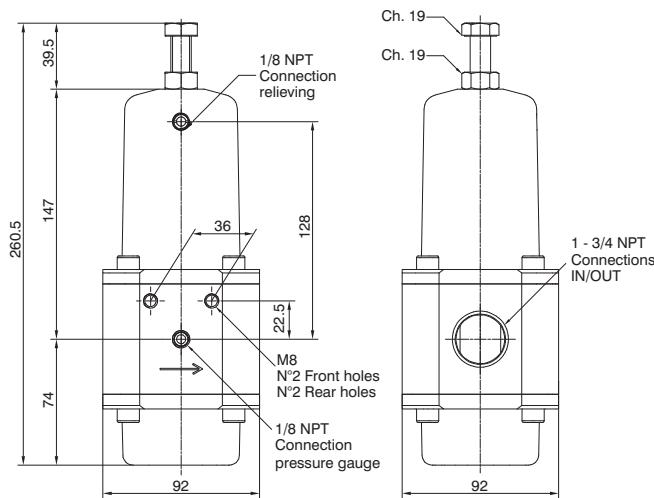
Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Weight 3/4 NPT - G 3/4"	4700 (gr.)
Weight 1 NPT - G 1"	4600 (gr.)
Maximum condense capacity	78 cm <sup>3</sup>
Assembly position	Vertical

Flow rate curves



3

Regulator



Ordering code

**SV174ORETO**

VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 3/4 NPT
	B = 1 NPT
	D = G1"
ADJUSTING RANGE	
	A = 0-2 bar
G	B = 0-4 bar
	C = 0-7 bar
	D = 0-10 bar
TYPE	
T	= Standard*
	N = Without relieving
OPTIONS	
	= Standard*
	L = Low temperature
O	Z = Low temperature (-60 °C)
	H = High temperature
	EF = EPDM-FDA
* no additional letter required	

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback inter. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.

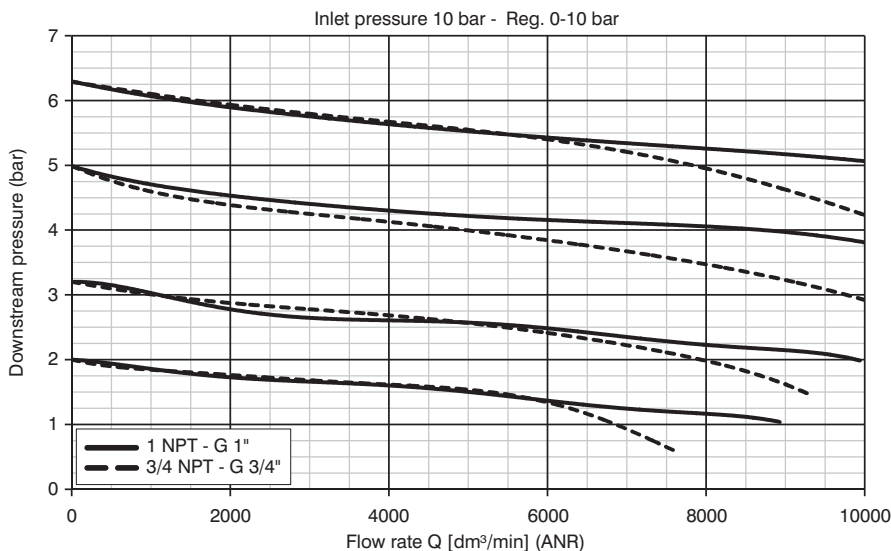
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight 3/4 NPT - G 3/4"	5500 (gr.)
Weight 1 NPT - G 1"	5400 (gr.)
Assembly position	Indifferent

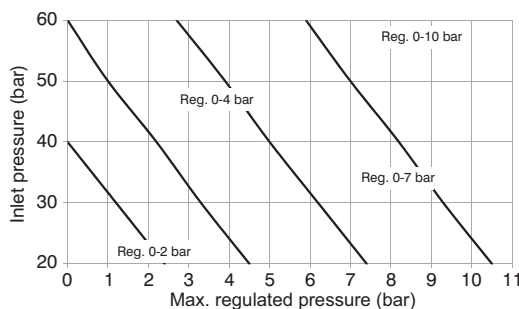
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Flow rate curves

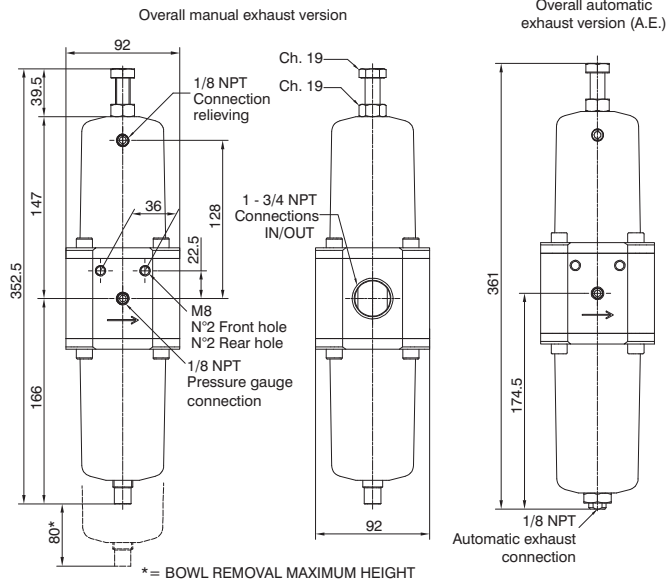


The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.





Filter - regulator



Ordering code

SV174CESGTO

VERSION	
V	S = Standard surface finishing
	F = Clean profile
CONNECTIONS	
C	A = 3/4 NPT
	B = 1 NPT
	D = G1"
FILTER PORE SIZE	
S	A = 5 µm - 316 stainless steel
	B = 20 µm - 316 stainless steel
	C = 50 µm - 316 stainless steel
	D = 5 µm - HDPE
	E = 20 µm - HDPE
	F = 50 µm - HDPE
ADJUSTING RANGE	
	A = 0-2 bar
G	B = 0-4 bar
	C = 0-7 bar
	D = 0-10 bar
TYPE	
T	= Standard*
	N = Without relieving
OPTIONS	
	= Standard*
	L = Low temperature
Z	= Low temperature (-60 °C)
	H = High temperature
	S = Automatic exhaust
	EF = EPDM-FDA

\* no additional letter required

Operational characteristics

- Body, adjust. mechanism, AISI 316L stainless steel and caseback inter. components
- AISI 316 Adjustment springs.
- Fixing screws, adjustment screws and locknut in A4 (AISI 316) stainless steel.
- Filter-pressure regulator diaphragm with over-pressure exhaust (Relieving).
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in 4 pressure ranges up to 10 bar.
- Manual or automatic condensed exhaust.

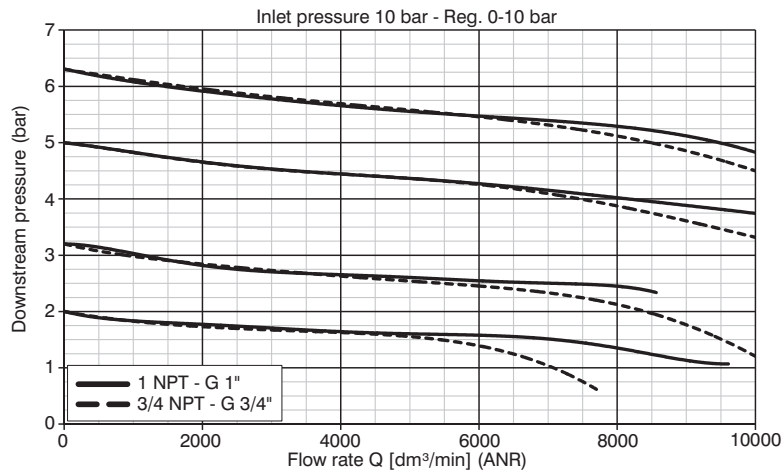
Technical characteristics

Maximum inlet pressure (Standard version)	20 bar
Maximum inlet pressure (Automatic exhaust version)	16 bar
Temperature (Standard version)	-30 °C - +70 °C
Temperature (Low temperature version)	-50 °C - +70 °C
Temperature (Low temperature version -60 °C)	-60 °C - +70 °C
Temperature (High temperature version)	-5 °C - +150 °C
Temperature (Automatic exhaust version)	-5 °C - +50 °C
Temperature (EPDM-FDA version)	-40 °C - +100 °C
Pressure gauge connections	1/8 NPT
Weight 3/4 NPT - G 3/4"	6300 (gr.)
Weight 1 NPT - G 1"	6200 (gr.)
Max. bowl capacity	78 cm <sup>3</sup>
Assembly position	Vertical

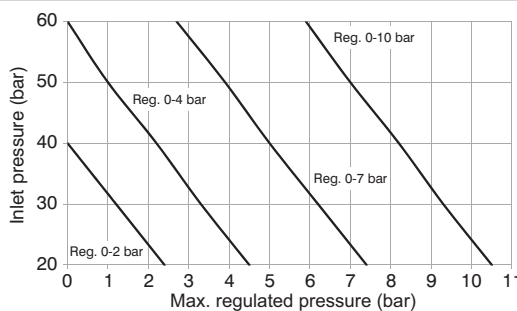
Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Flow rate curves



The Steel Line Series regulators are designed to withstand a maximum inlet pressure at 60 bar. However the units is designed to regulator to a maximum of 20 bar. Note the progress of the maximum regulated pressure as a function of the inlet pressure shown in the graph alongside.

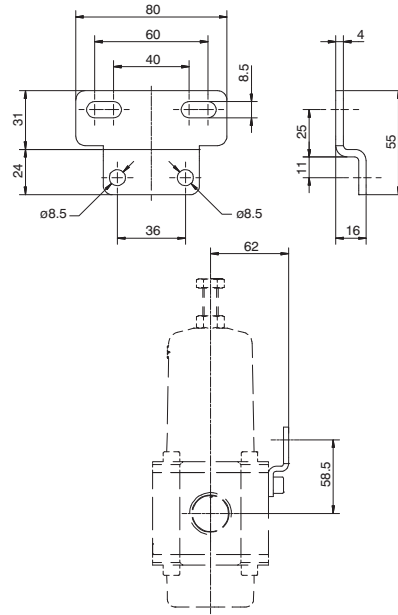




Fixing bracket

Ordering code

SS17450

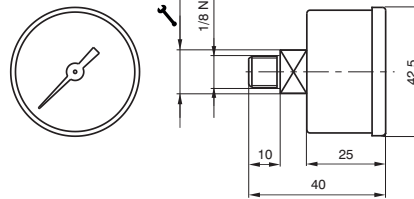


Weight 32 gr.  
AISI 316L stainless steel material.  
Allows wall fixing of individual products.

Pressure gauge

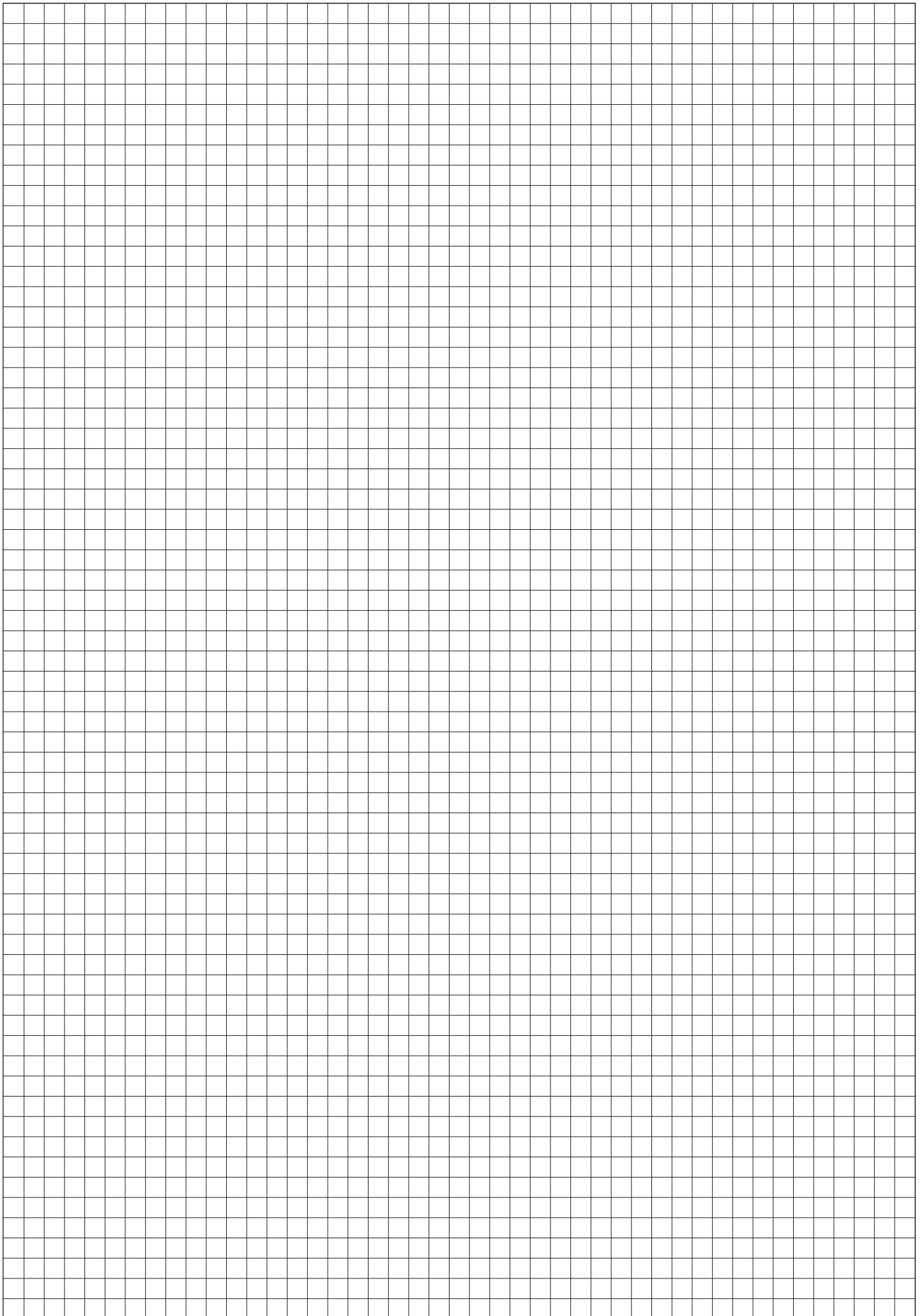
Ordering code

SS17070A<sup>Ⓢ</sup>



SCALE  
<sup>Ⓢ</sup> A = 0 - 4 bar  
 B = 0 - 12 bar

Weight 60 gr.  
AISI 316 stainless steel material.  
Glass transparent part with an AISI 316 stainless steel retaining ring.  
Available with 0-4 bar and 0-12 bar scale.



**General**

Modern industrial applications require increasingly high performances from their pneumatic components. For example, the speed and thrust of a pneumatic cylinder, or the torque of a rotary actuator may need to be varied. These parameters often need to be modified dynamically while an operation is running.

Traditional solutions based upon pneumatic valves supplied with different pressures often take up excessive amounts of space. An alternative solution is a regulator that can vary pressure over time. This type of regulator is known as an electronically controlled proportional regulator. Three sizes have been designed, with flow rates of 7, 1, 100 and 4,000 NI/min.

**Application fields.**

Typical applications will include the necessity to dynamically control the force of an actuator, be it thrust or torque.

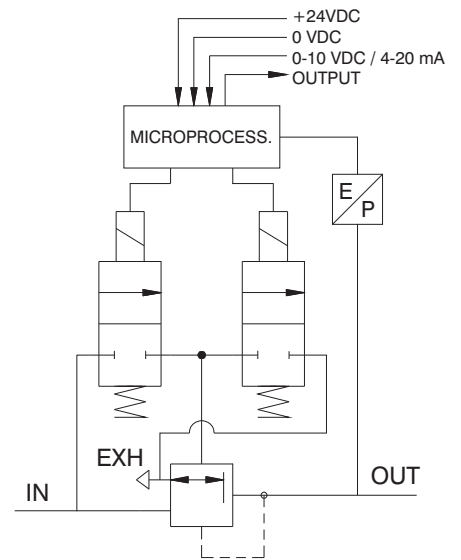
Examples include: Closing systems, painting systems, tensioning systems, packaging systems, pneumatic braking systems, force control for welding grippers, thickness compensation systems, balancing systems, laser cutting, pressure transducers for the control of modulating valves, test benches for system testing, force control for buffers on polishers, etc.

**Product presentation**

The supply and exhaust connections are on one side of the regulator and the working port is on the opposite side. The two remaining sides carry G1/8" ports that are blanked off with removable plugs, these can be used to connect a pressure gauge or as an outlet port. If you order the version with the external feedback there is a M5 threaded connection to which connect the feedback pressure (to the pressure transducer). This connection is placed on the outlet connection side. This option allows to take the signal from a remote point instead of directly from the outlet connection; this function is typically used when the regulated pressure is used far away to the regulator. The control solenoid valves, the pressure sensor, and the management electronics are placed in upper part of the regulator.

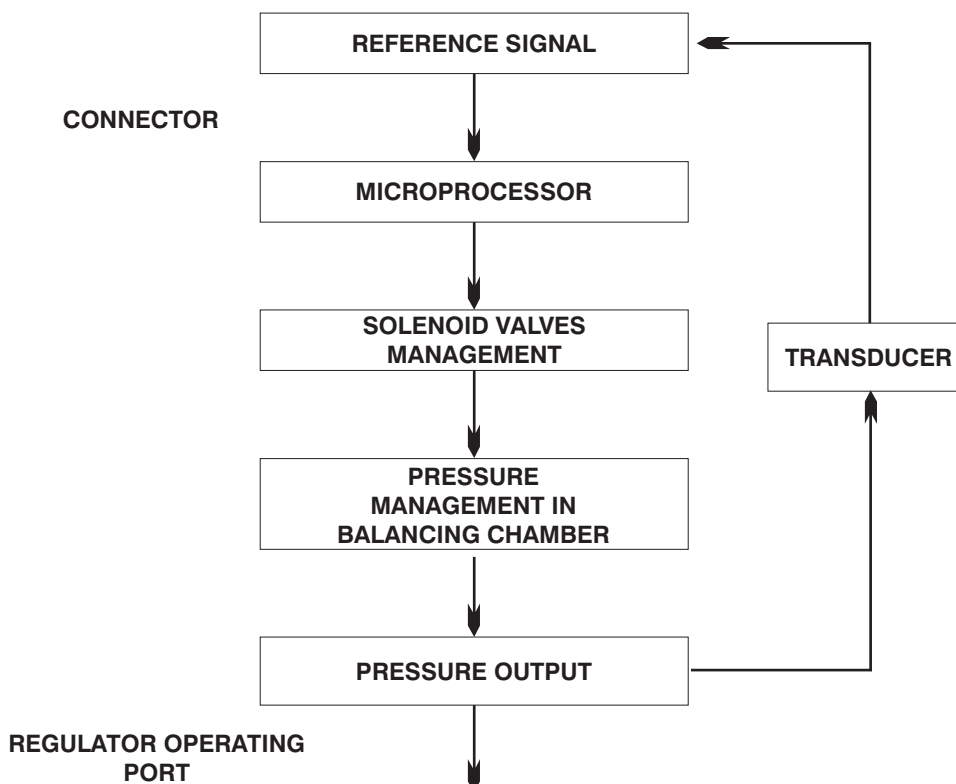
The electronic management system is the same for all the size 0, size 1 and size 3 regulators. The new proportional regulator range has all the features that were only optional on the previous model. When placing your order it is only necessary to specify the type of control signal, Voltage (T) or current (C), and the pressure range required.

**Functional diagram**



**CLOSED LOOP diagram (internal control circuit)**

The proportional regulator is known as a CLOSED LOOP regulator because a pressure transducer in the circuit transmits a continuous analog signal to the microprocessor, which compares the reference value with the detected value and supplies the control solenoid valves accordingly.



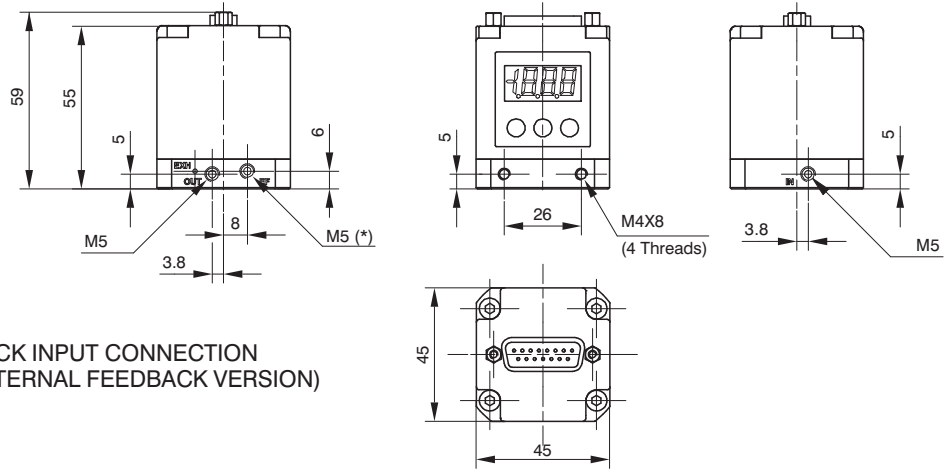


Features					
Pneumatic	Fluid	Air filtered at 5 micron and dehumidified			
	Minimum inlet pressure	Desired outlet pressure + 1 bar			
	Maximum inlet pressure	10 bar			
	Outlet pressure	Ordering code	0009	0005	0001
		Pressure value	0 - 9 bar	0 - 5 bar	0 - 1 bar
	Nominal flowrate from 1 to 2 (6 bar $\Delta p$ 1 bar)	<b>Size 0</b>	<b>Size 1</b>		<b>Size 3</b>
		7 NI /min	1.100 NI /min		4.000 NI/min
	Discharge flowrate (at 6 bar with 1 bar overpressure)	7 NI /min	1.300 NI /min		4.500 NI/min
	Air consumption	< 1 NI/min	< 1 NI/min		< 1 NI/min
	Supply connection	M5	G 1/4"		G 1/2"
Operating connection	M5	G 1/4"		G 1/2"	
Exhaust connection	Ø1,8	G 1/8"		G 3/8"	
Maximum fitting tightening	3 Nm	15 Nm		15 Nm	
Electric	Supply voltage	24VDC $\pm$ 10% (stabilised with ripple <1%)			
	Standby current consumption	55 mA			
	Current consumption with solenoid valves on	145 mA			
	Reference signal	Voltage	*0 - 10 V *0 - 5 V *1 - 5 V		
		Current	*4 - 20 mA *0 - 20 mA		
	Input impedance	Voltage	10 K $\Omega$		
		Current	250 $\Omega$		
	Voltage analog output	*0 - 10 V *0 - 5 V			
	Current analog output	*4 - 20 mA *0 - 20 mA			
	Digital inputs	24VDC $\pm$ 10%			
Digital outputs	24 VDC PNP (max current 50 mA)				
Connector	D-sub 15 poles				
Functional	Linearity	< $\pm$ 0,3 % F.S.			
	Hysteresis	< 0,3 % F.S.			
	Repeatability	< $\pm$ 0,3 % F.S.			
	Sensitivity	< $\pm$ 0,3 % F.S.			
	Assembly position	Indifferent			
	Protection grade	IP65 (with casing fitted)			
	Ambient temperature	-5° - 50°C / 23° - 122°F			
Constructional	Body	Anodised aluminium			
	Shutters	Brass with vulcanised NBR			
	Diaphragm	Cloth-covered rubber			
	Seals	NBR			
	Cover for electrical part	Technopolymer			
	Springs	AISI 302			
	Weight	<b>Size 0</b>	<b>Size 1</b>	<b>Size 3</b>	
168 gr.		360 gr.	850 gr.		

\* Selectable by keyboard or by RS-232

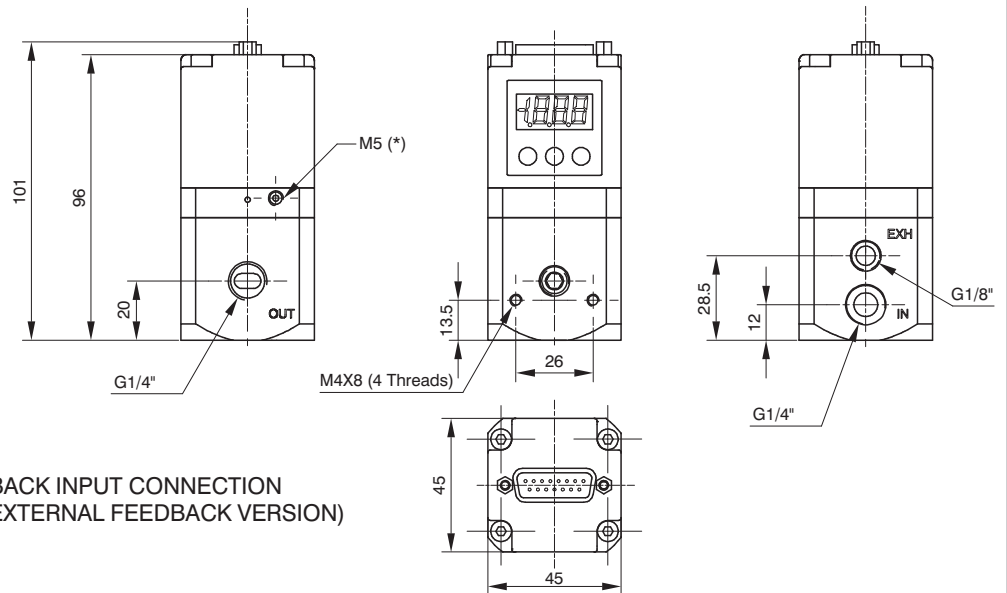
Overall dimensions (Standard version and CANopen version with SUB-D 15 poles)

SIZE 0



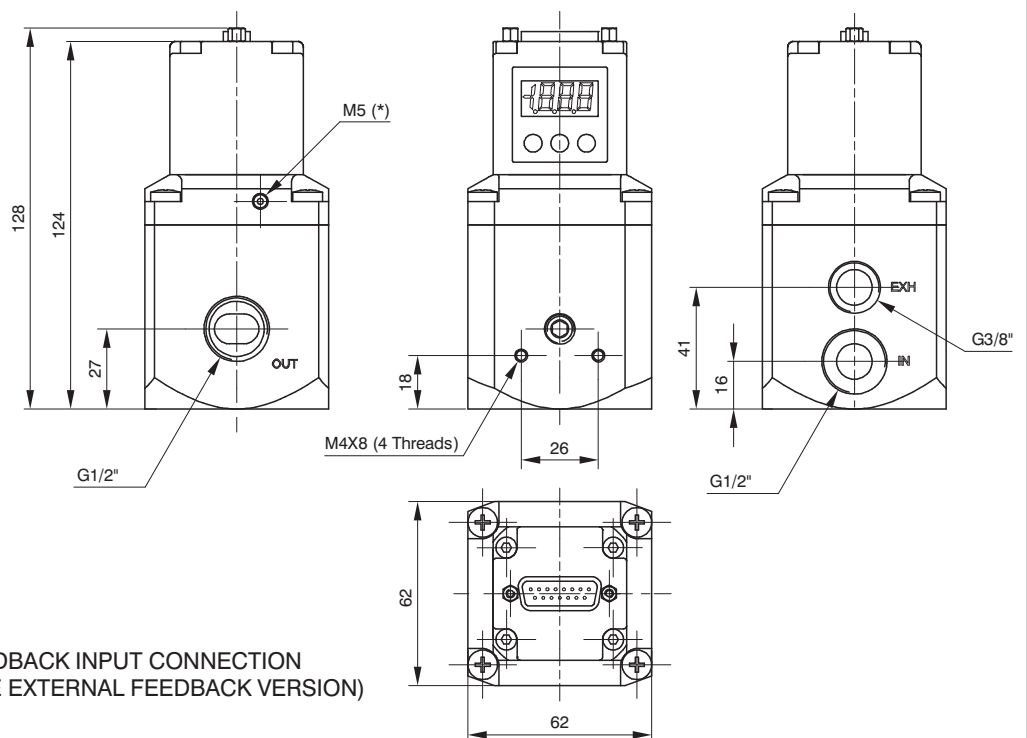
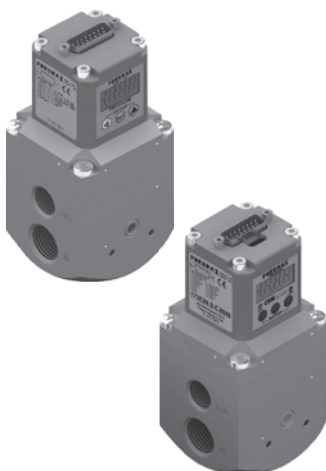
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 1



\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 3

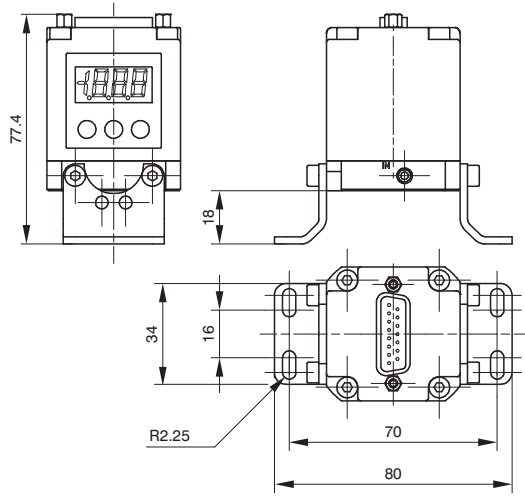


\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)



**Mounting options (Standard version and CANopen version with SUB-D 15 poles)**

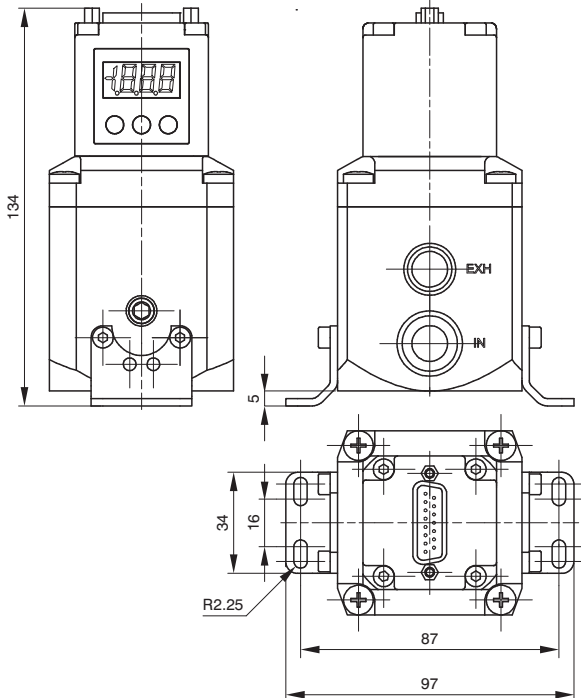
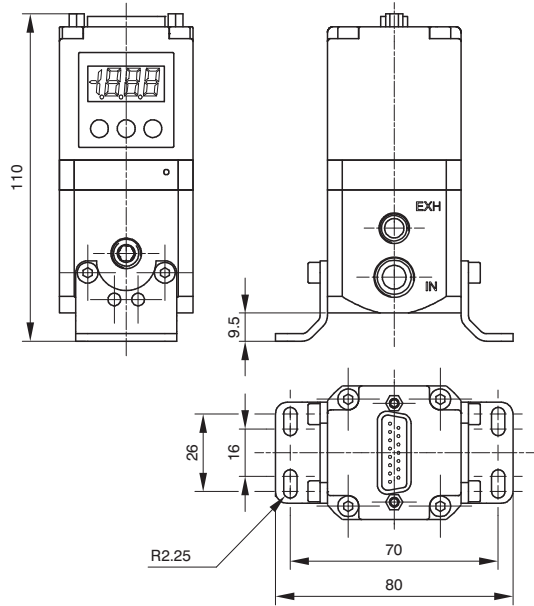
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



**SIZE 0**



**SIZE 1**

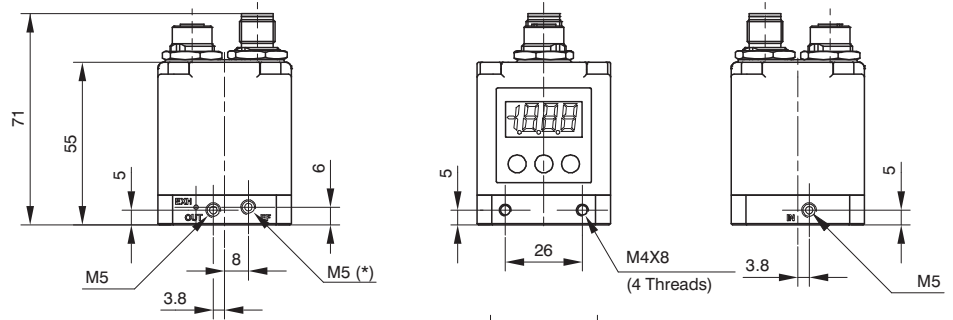


**SIZE 3**

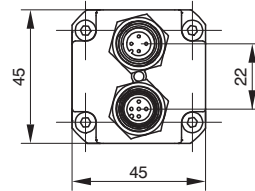


Overall dimensions (CANopen version with M12 connector)

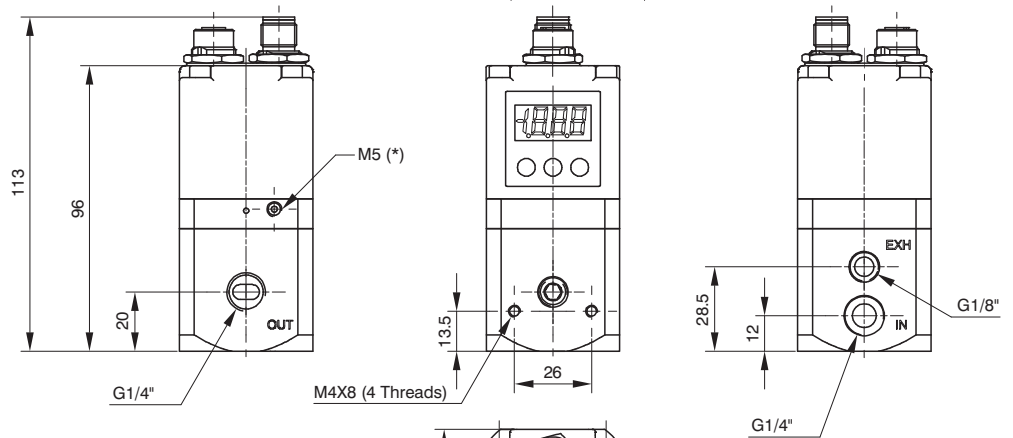
SIZE 0



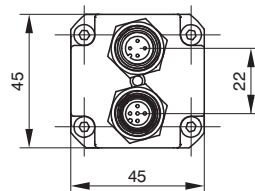
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)



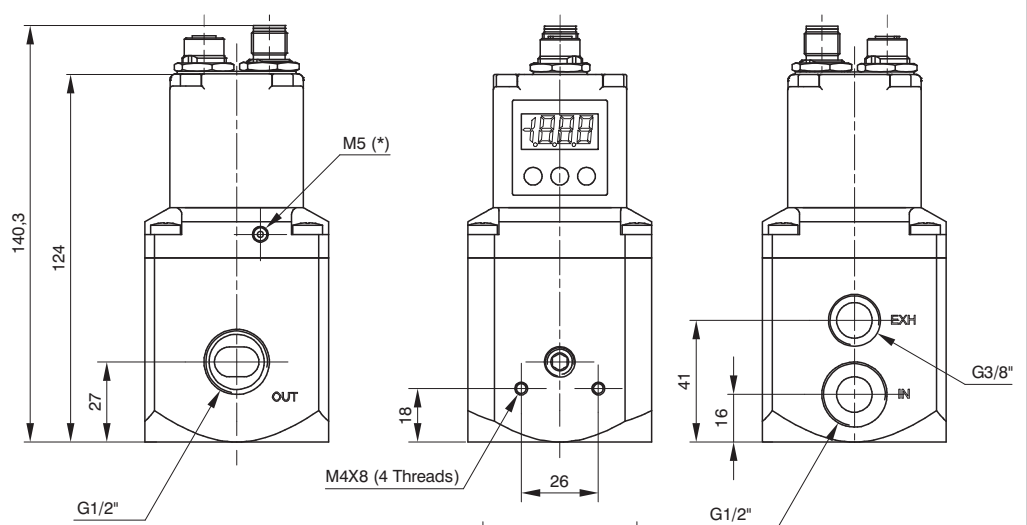
SIZE 1



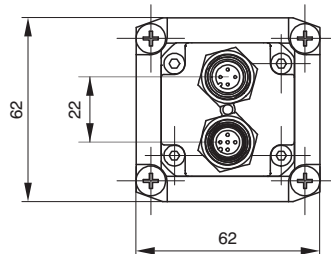
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)



SIZE 3



\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

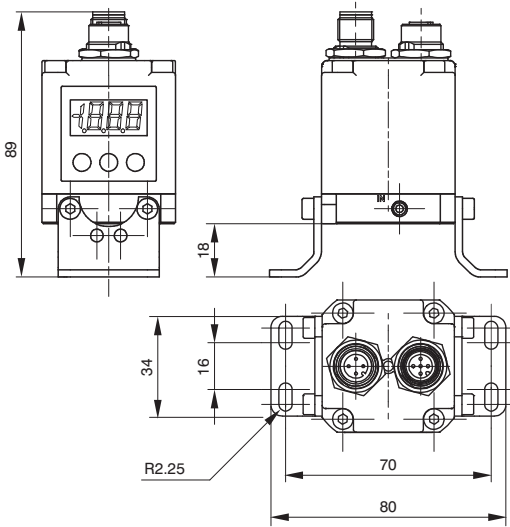






**Mounting options (CANopen version with M12 connector)**

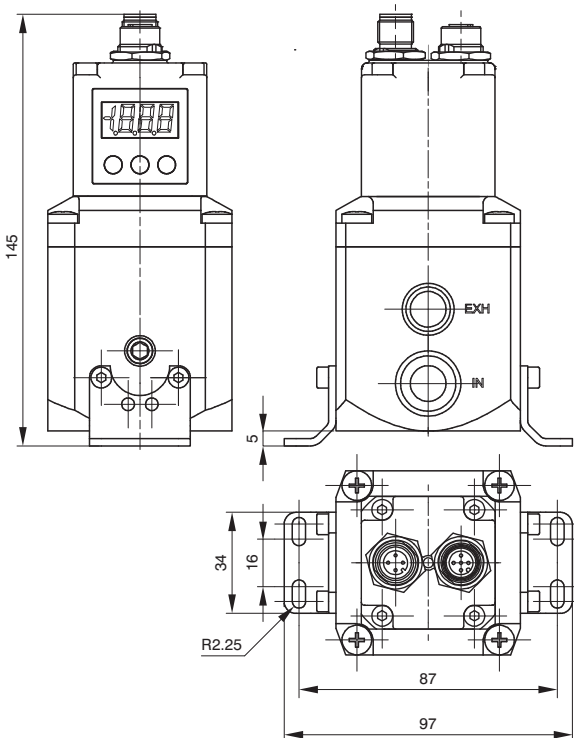
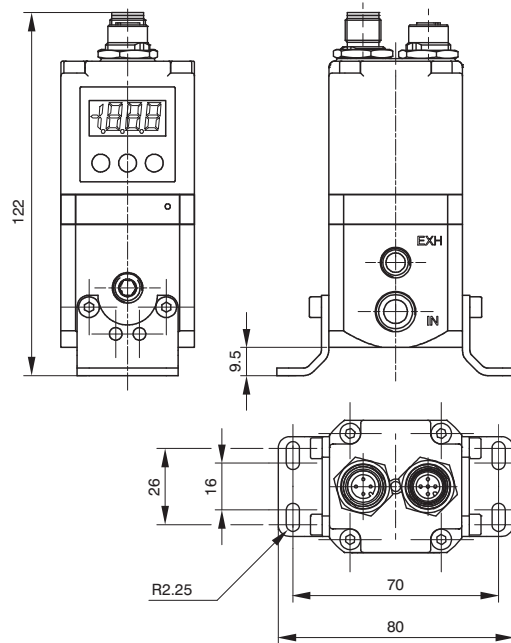
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



**SIZE 0**



**SIZE 1**



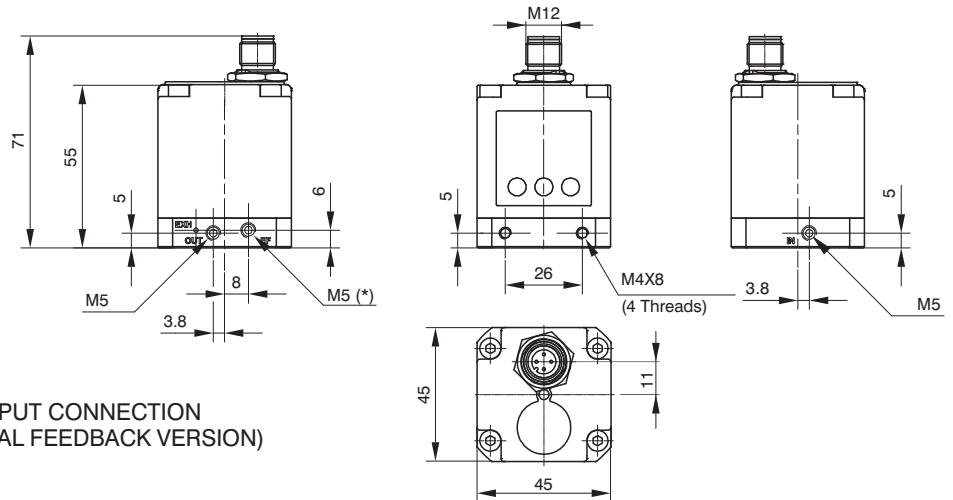
**SIZE 3**



3

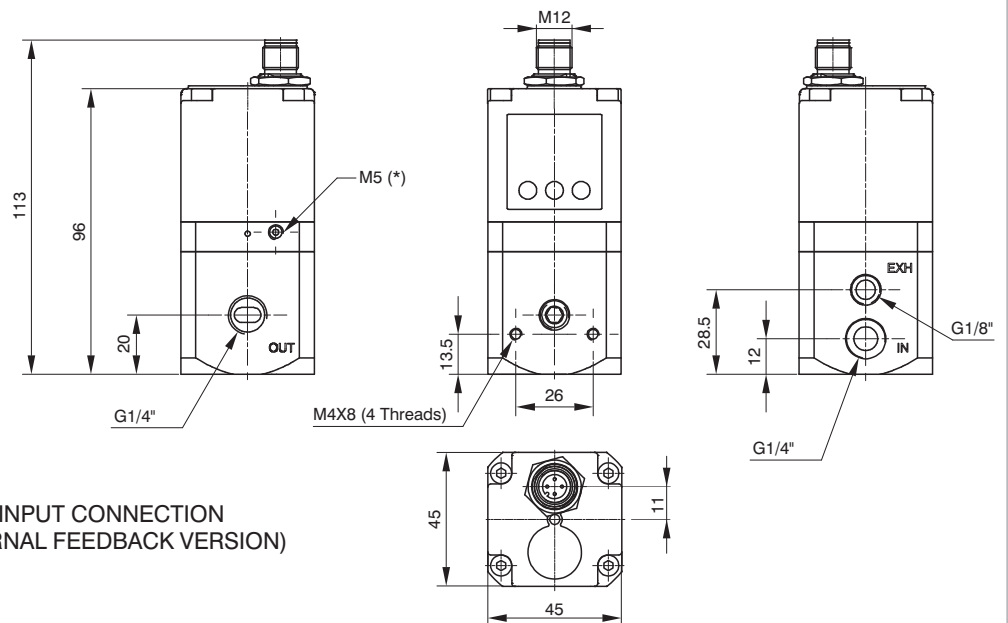
Overall dimensions (ECONOMIC version)

SIZE 0



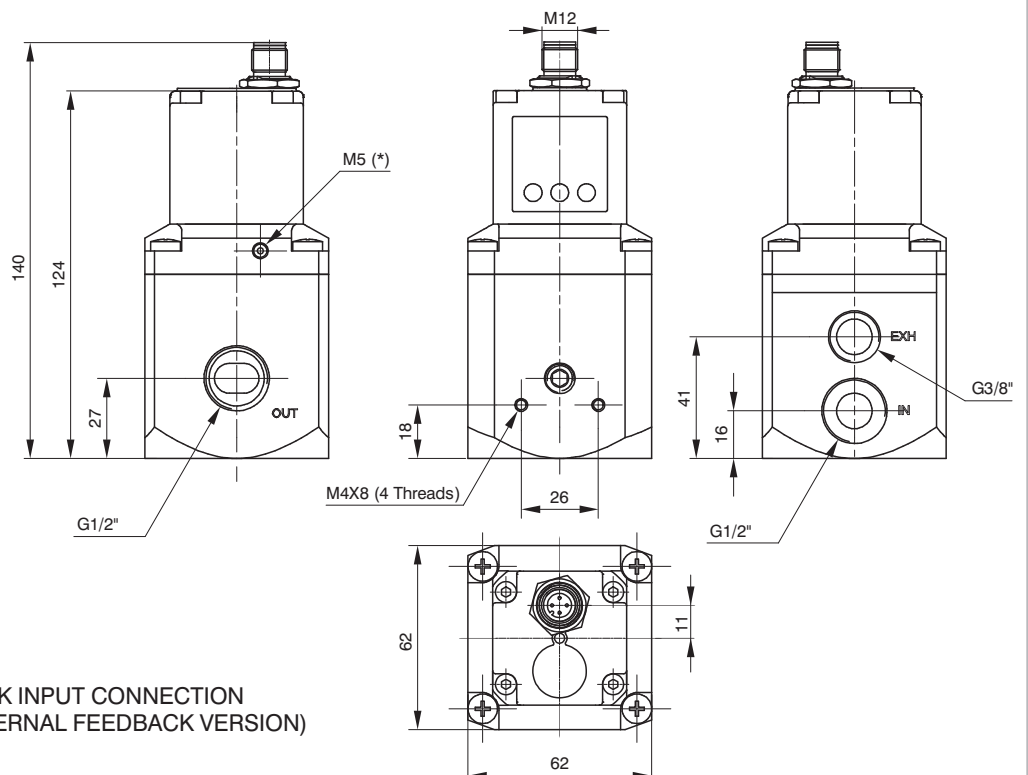
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 1



\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 3

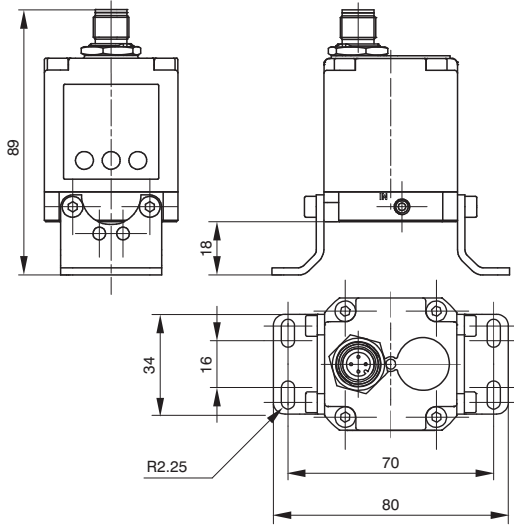


\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

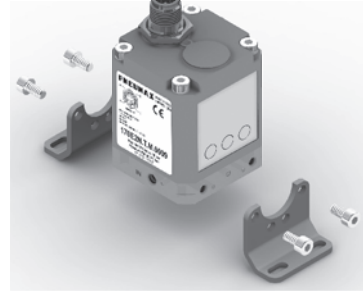


**Mounting options (ECONOMIC version)**

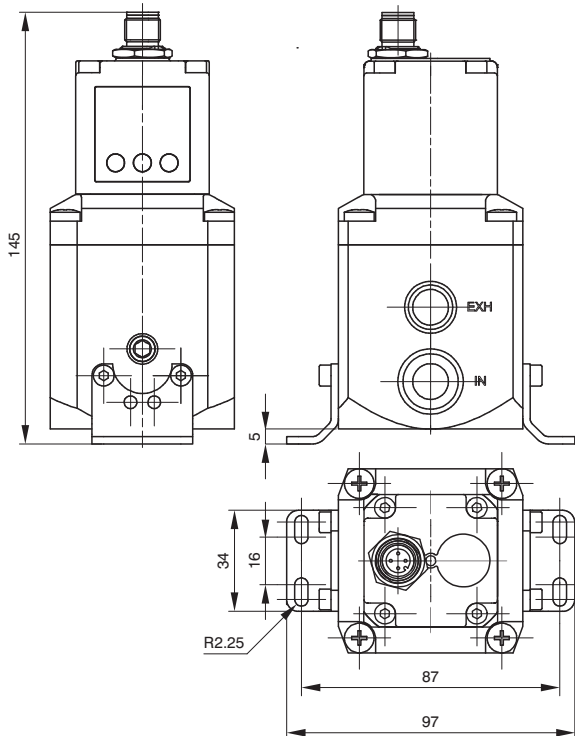
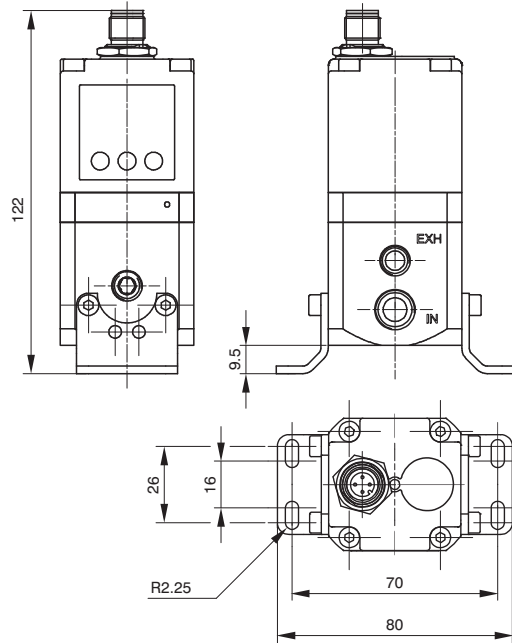
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



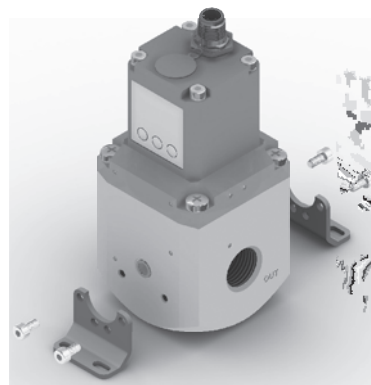
**SIZE 0**



**SIZE 1**

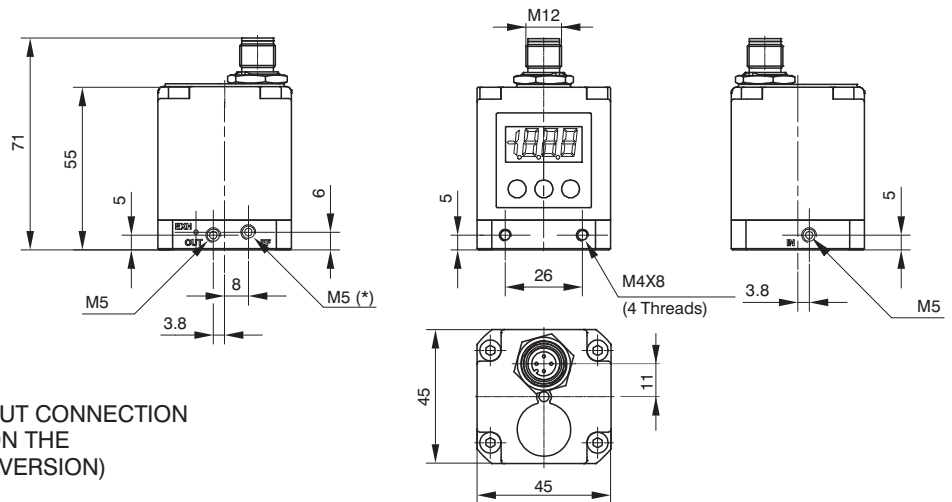


**SIZE 3**



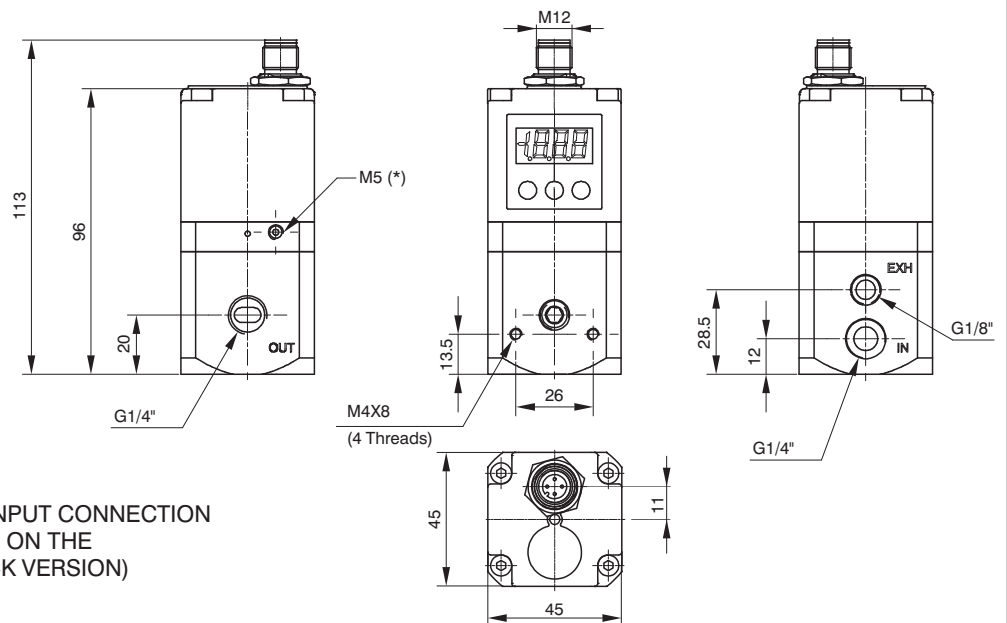
Overall dimensions (M12 Standard version)

SIZE 0



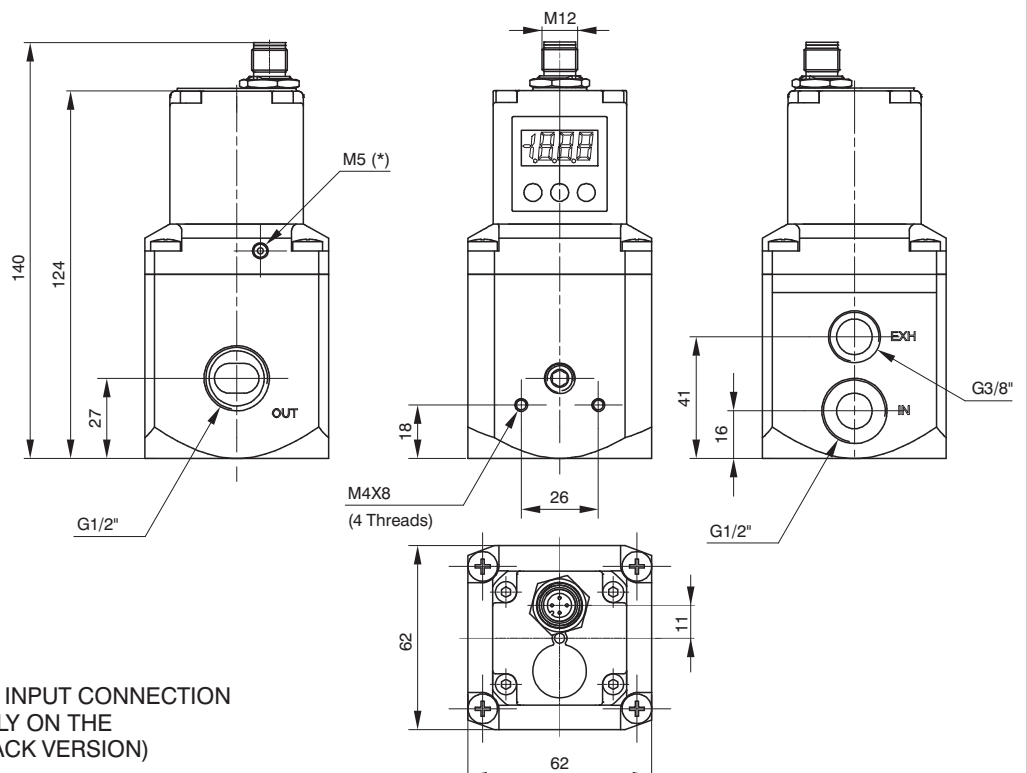
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE  
EXTERNAL FEEDBACK VERSION)

SIZE 1



\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE  
EXTERNAL FEEDBACK VERSION)

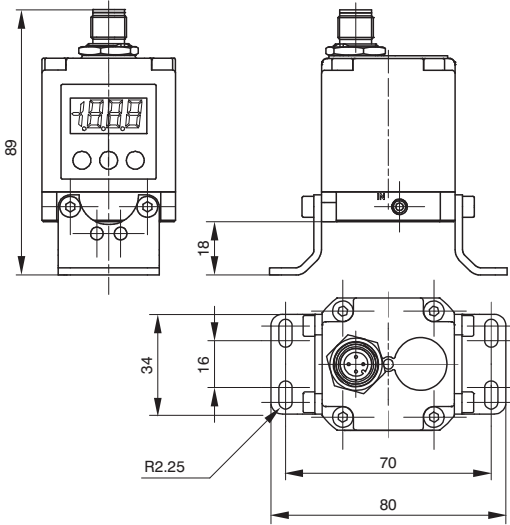
SIZE 3



\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE  
EXTERNAL FEEDBACK VERSION)

**Mounting options (M12 Standard version)**

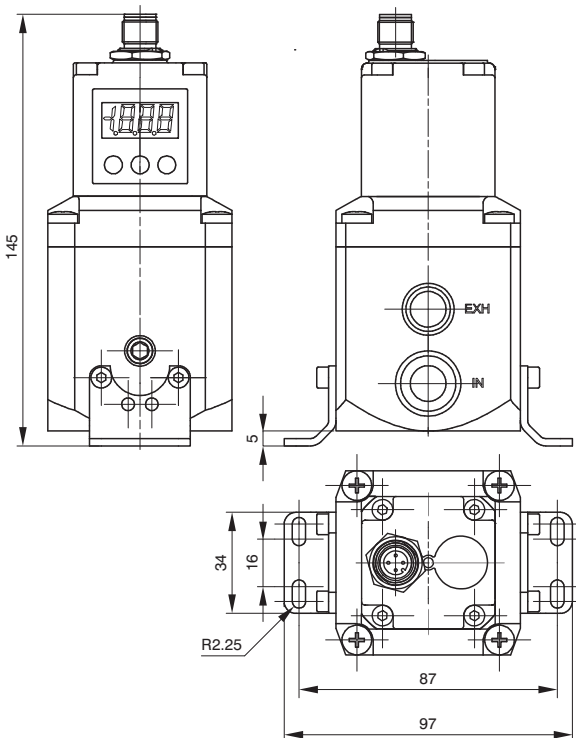
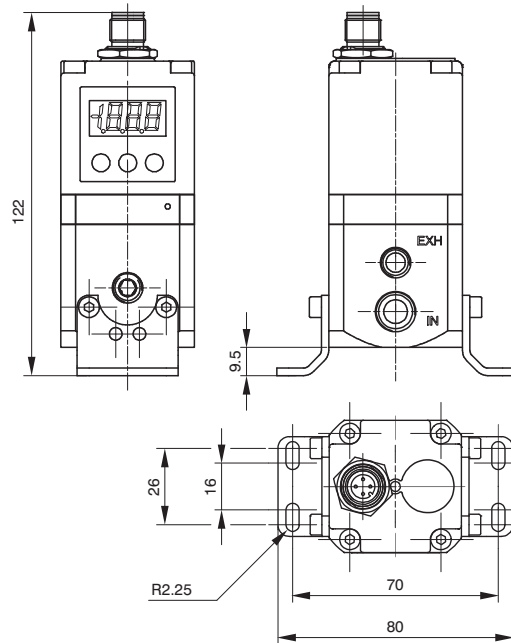
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



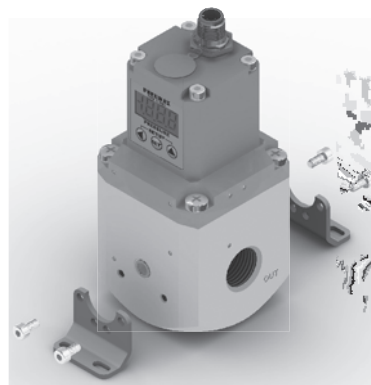
**SIZE 0**



**SIZE 1**



**SIZE 3**



## Installation/Operation

### PNEUMATIC CONNECTION



The compressed air is connected by means of M5 threaded holes (for size 0 regulators), G 1/4" threaded holes (for size 1 regulators) and G 1/2" threaded holes (for size 3 regulators) on the body.  
Before making the connections, eliminate any impurities in the connecting pipes to prevent chippings or dust entering the unit. Do not supply the circuit with more than 10 bar pressure and make sure that the compressed air is dried (excessive condensate could cause the appliance to malfunction) and filtered at 5 micron. The supply pressure to the regulator must always be at least 1 bar greater than the desired outlet pressure.  
If a silencer is applied to the discharge path the unit response time may change; periodically check that the silencer is not blocked and replace it if necessary.

### ELECTRICAL CONNECTION



For the electrical connection a SUB-D 15-pole female or a M12 connector is used (accordingly to the model, to be ordered separately). Wire in accordance with the wiring diagram shown below.

**Warning: INCORRECT CONNECTIONS MAY DAMAGE THE DEVICE**

### NOTES ON OPERATION



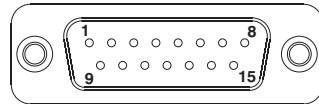
If the electric supply is interrupted, the outlet pressure is maintained at the set value. However, maintaining the exact value cannot be ensured as it is impossible to operate the solenoid valves.

In order to discharge the circuit downstream, zero the reference, make sure that the display shows a pressure value equal to zero and then disconnect the electric power supply.

A version of the device is available that exhausts the downstream circuit when the power supply is removed. (Option "A" at the end of the ordering code).

If the compressed-air supply is suspended and the electric power supply is maintained a whirring will be heard that is due to the solenoid valves; an operating parameter can be activated (P18) that triggers the regulator protection whenever the requested pressure is not reached within 4 seconds of the reference signal being sent. In this case the system will intervene to interrupt the control of the solenoid valves. Every twenty seconds, the unit will start the reset procedure until standard operating conditions have been restored.

### TOP VIEW OF THE REGULATOR CONNECTOR



#### CANopen version with SUB-D 15 poles

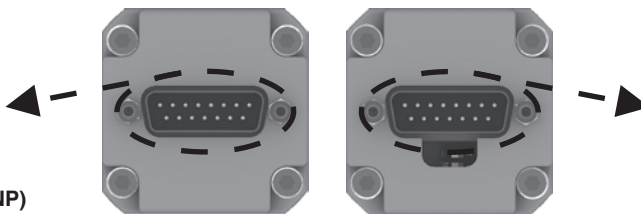
##### CONNECTOR PIN :

- 1 = CAN\_SHLD
- 2 = CAN\_V+
- 3 = CAN\_GND
- 4 = CAN\_H
- 5 = CAN\_L
- 6 = NC
- 7 = NC
- 8 = NC
- 9 = SUPPLY (24 VDC)
- 10 = CAN\_SHLD
- 11 = CAN\_V+
- 12 = CAN\_GND
- 13 = CAN\_H
- 14 = CAN\_L
- 15 = GND

#### Standard version

##### CONNECTOR PIN:

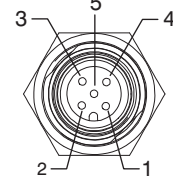
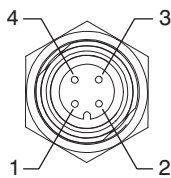
- 1 = DIGITAL INPUT 1
- 2 = DIGITAL INPUT 2
- 3 = DIGITAL INPUT 3
- 4 = DIGITAL INPUT 4
- 5 = DIGITAL INPUT 5
- 6 = DIGITAL INPUT 6
- 7 = DIGITAL INPUT 7
- 8 = ANALOG INPUT / DIGITAL INPUT 8
- 9 = SUPPLY (24 VDC)
- 10 = DIGITAL OUTPUT (24 VDC PNP)
- 11 = ANALOG OUTPUT (CURRENT)
- 12 = ANALOG OUTPUT (VOLTAGE)
- 13 = Rx RS-232
- 14 = Tx RS-232
- 15 = GND



#### ECONOMIC version

##### CONNECTOR PIN:

- 1 = SUPPLY (24 VDC)
- 2 = NC
- 3 = GND
- 4 = ANALOG INPUT



#### CANopen version with M12 connector

##### MALE CONNECTOR PIN :

- 1 = +24 VDC
- 2 = NC
- 3 = GND
- 4 = NC

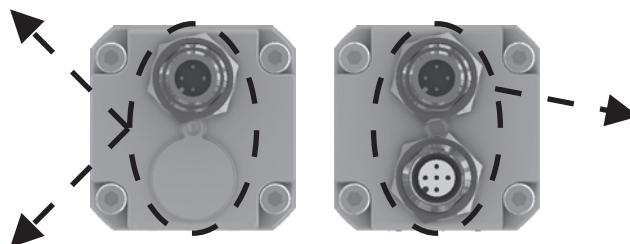
##### FEMALE CONNECTOR PIN :

- 1 = CAN\_SHLD
- 2 = CAN\_V+
- 3 = CAN\_GND
- 4 = CAN\_H
- 5 = CAN\_L

#### M12 Standard version

##### CONNECTOR PIN:

- 1 = SUPPLY (24 VDC)
- 2 = OUTPUT (according to the model)
- 3 = GND
- 4 = ANALOG INPUT





**ORDERING CODES**  
Standard version



**17 E2N. . D . .**

- VARIANT**
- = Standard Version  
(no additional letter required)
  - E** = External pressure feedback
  - A** = Exhaust downstream pressure  
when power supply is removed
  - AE** = A Variant + E Variant

- PRESSURE RANGE :**
- 0001** = Range 0 - 1 bar
  - 0005** = Range 0 - 5 bar
  - 0009** = Range 0 - 9 bar

- MANAGEMENT :**
- C** = Current signal (4-20 mA / 0-20 mA)
  - T** = Voltage signal (0-10 V / 0-5 V / 1-5 V)

- SIZE :**
- 0** = Size 0
  - 1** = Size 1
  - 3** = Size 3

**ORDERING CODES**  
Version with CANopen protocol



**17 E2N. S . C . .**

- VARIANT**
- = Standard Version  
(no additional letter required)
  - E** = External pressure feedback
  - A** = Exhaust downstream pressure  
when power supply is removed
  - AE** = A Variant + E Variant

- PRESSURE RANGE :**
- 0001** = Range 0 - 1 bar
  - 0005** = Range 0 - 5 bar
  - 0009** = Range 0 - 9 bar

- SIZE :**
- 0** = Size 0
  - 1** = Size 1
  - 3** = Size 3

**Accessories**

Model with SUB-D 15 poles connector	
	<b>5300.F15.00.00</b> : Straight connector + Casing IP65
	<b>5300.F15.00.03</b> : Straight connector + Cable 3 meters
	<b>5300.F15.00.05</b> : Straight connector + Cable 5 meters
	<b>5300.F15.90.00</b> : 90° connector + Casing IP65
	<b>5300.F15.90.03</b> : 90° connector + Cable 3 meters
	<b>5300.F15.90.05</b> : 90° connector + Cable 5 meters

\* Whitout cable

Fixing bracket
<b>170M5</b>



**ORDERING CODES**

Version with CANopen protocol M12 connector



**17 E2N. M . C .**

**SIZE :**  
 0 = Size 0  
 1 = Size 1  
 3 = Size 3


**VARIANT**  
 = Standard Version  
 (no additional letter required)  
**E** = External pressure feedback  
**A** = Exhaust downstream pressure  
 when power supply is removed  
**AE** = A Variant + E Variant


**PRESSURE RANGE :**  
 0001 = Range 0 - 1 bar  
 0005 = Range 0 - 5 bar  
 0009 = Range 0 - 9 bar

**Note:**  
 This model doesn't include the terminating resistor

**Accessories**

<b>Model with M12 connector</b>
<b>POWER SUPPLY connector</b>
Female straight connector M12A 4P
<b>5312A.F04.00</b>


<b>Model with M12 connector</b>
<b>NETWORK connector</b>
Male straight connector M12A 5P
<b>5312A.M05.00</b>


<b>Fixing bracket</b>
<b>170M5</b>


**ORDERING CODES**  
**ECONOMIC Version**



**17 E2N. . M .**

**SIZE :**  
 0 = Size 0  
 1 = Size 1  
 3 = Size 3

**VARIANT**  
 = Standard Version  
 (no additional letter required)  
**E** = External pressure feedback  
**A** = Exhaust downstream pressure  
 when power supply is removed  
**AE** = A Variant + E Variant


**PRESSURE RANGE :**  
 0001 = Range 0 - 1 bar  
 0005 = Range 0 - 5 bar  
 0009 = Range 0 - 9 bar

**MANAGEMENT :**  
**C** = Current signal (4-20 mA)  
**T** = Voltage signal (0-10 V)

**Note:**  
 This model doesn't include display a keyboard. Therefore it is not possible to set the parameters. Unless specifically requested it is provided with all parameters set with default values. Personalisations are available.

**Accessories**

<b>Model with M12 connector</b>
<b>POWER SUPPLY connector</b>
Female straight connector M12A 4P
<b>5312A.F04.00</b>

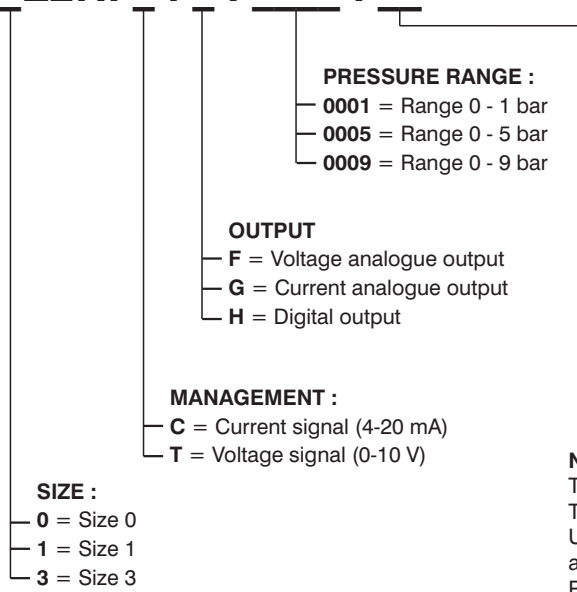

<b>Fixing bracket</b>
<b>170M5</b>




**ORDERING CODES**  
M12 Standard version



**17 E2N.**



**PRESSURE RANGE :**  
 — 0001 = Range 0 - 1 bar  
 — 0005 = Range 0 - 5 bar  
 — 0009 = Range 0 - 9 bar

**OUTPUT**  
 — F = Voltage analogue output  
 — G = Current analogue output  
 — H = Digital output

**MANAGEMENT :**  
 — C = Current signal (4-20 mA)  
 — T = Voltage signal (0-10 V)

**SIZE :**  
 — 0 = Size 0  
 — 1 = Size 1  
 — 3 = Size 3

**VARIANT**  
 = Standard Version  
 (no additional letter required)  
 — E = External pressure feedback  
 — A = Exhaust downstream pressure  
 when power supply is removed  
 — AE = A Variant + E Variant

**Note:**  
 This model doesn't include display and keyboard. Therefore it is not possible to set the parameters. Unless specifically requested it is provided with all parameters set with default values. Personalisations are available.

**Accessories**

Model with M12 connector
<b>POWER SUPPLY connector</b>
Female straight connector M12A 4P
<b>5312A.F04.00</b>

<b>Fixing bracket</b>
<b>170M5</b>

**General**

Modern industrial applications constantly require more sophisticated and better performing pneumatic components . Flexibility and adaptability are key factor when designing a machine. The possibility to change the application parameter during operation such as for example the speed of a cylinder or the force generated by a rotary actuator are beneficial to the designer. In the past it was necessary to design complicated pneumatic circuits based on pneumatic logic elements which required a lot of space and complicated set up, today, thanks to the electronic proportional regulators such operations are extremely easy to achieve and offer even more flexibility.

Pneumax miniaturized proportional regulators series integrates all the main features of the 521 series with the exclusion of the display and analogue/digital output. High precision in pressure regulation, fast response speed, assembling options and reduced dimensions are the main advantages.

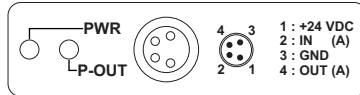
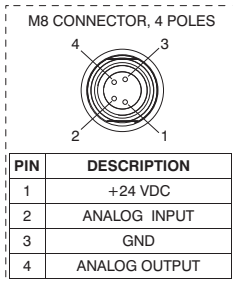
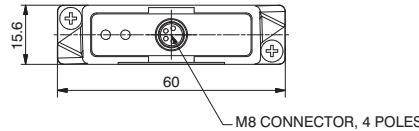
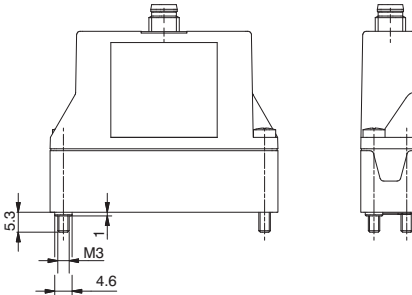
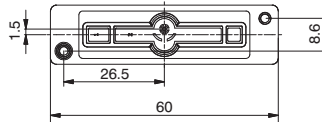
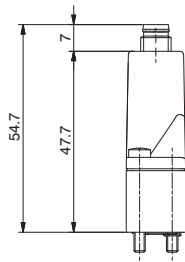
**Features**

Pneumatic	Fluid	Air filtered at 5 micron and dehumidified		
	Minimum inlet pressure	Desired outlet pressure + 1 bar		
	Maximum inlet pressure	10 bar		
	Outlet pressure	Ordering code	009	
		Pressure value	0 - 9 bar	
	Nominal flowrate from 1 to 2 (6 bar Δp 1 bar)	7 NI /min		
	Discharge flowrate (at 6 bar with 1 bar overpressure)	7 NI /min		
	Air consumption	M5 / Ø4		
	Operating connection	M5 / Ø4		
	Exhaust connection	M5 / Ø4		
Maximum fitting tightening	3 Nm			
Electric	Supply voltage	24VDC ± 10% (stabilised with ripple <1%)		
	Standby current consumption	55 mA		
	Current consumption with solenoid valves on	145 mA		
	Reference signal	Voltage*	0 - 10 V	
		Current*	4 - 20 mA	
	Input impedance	Voltage	10 KΩ	
		Current	250 Ω	
	Analog outputs voltage	0,2 - 10 V (10 V to 9 bar)		
Connector	M8 4 poles			
Functional	Linearity	< ± 0,3 % F.S.		
	Hysteresis	<0,3 % F.S.		
	Repeatability	< ± 0,5 % F.S.		
	Sensitivity	< ± 0,5 % F.S.		
	Assembly position	Indifferent		
	Protection grade	IP65 (with casing fitted)		
	Ambient temperature	-5° - 50°C / 23° - 122°F		
Constructional	Body	Technopolymer		
	Seals	NBR		
	Cover for electrical part	Technopolymer		
	Weight	60 gr.		

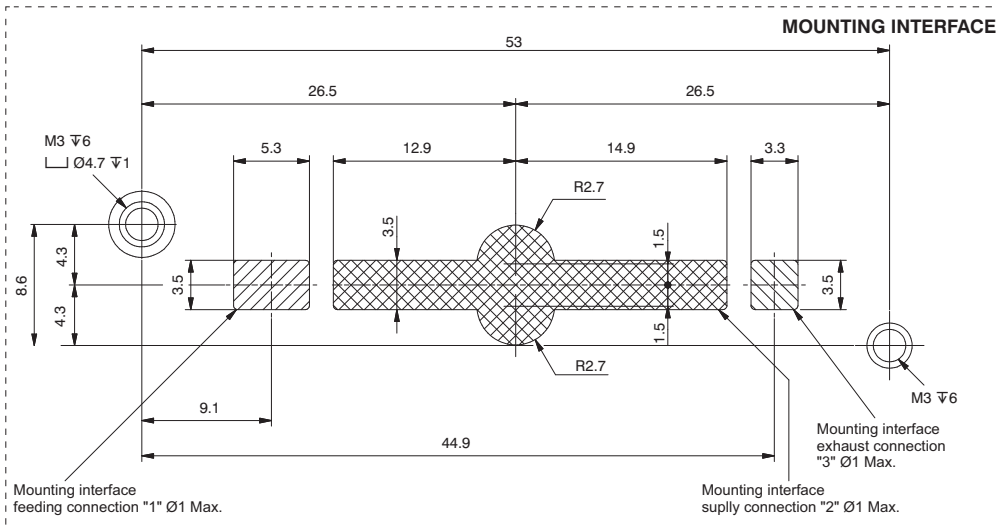
\* Request during ordering process



Proportional pressure regulator



<b>PWR</b>	Green Led: The regulator is properly powered
<b>P-OUT</b>	Green Led: lights up when the outlet pressure is higher than the desired pressure minus 0.2 bar and less than the desired pressure more 0.2 bar

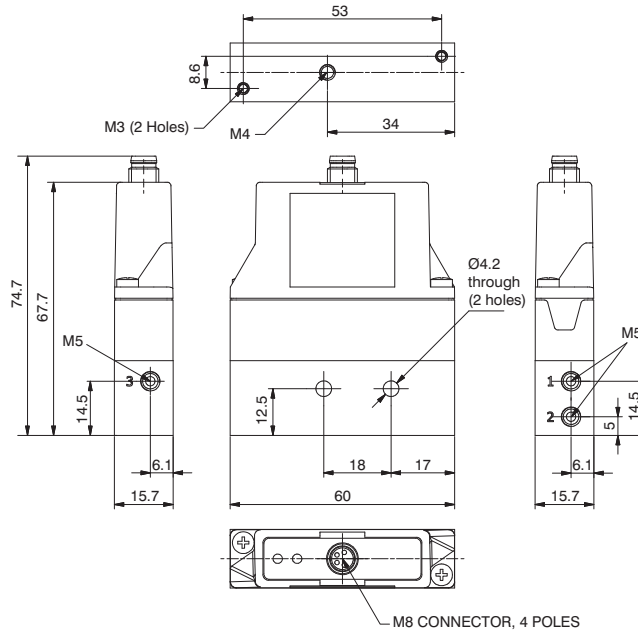


Ordering code

1700EM.V.M.Ⓞ

<b>P</b>	PROTECTION
0	Parameter 18 active
2	Parameter 18 not active
<b>V</b>	VERSION
C	Current signal
<b>G</b>	PRESSURE RANGE
001	Range 0 - 1 bar
005	Range 0 - 5 bar
009	Range 0 - 9 bar

Proportional Pressure Regulator c/w M5 In-Line Single Base



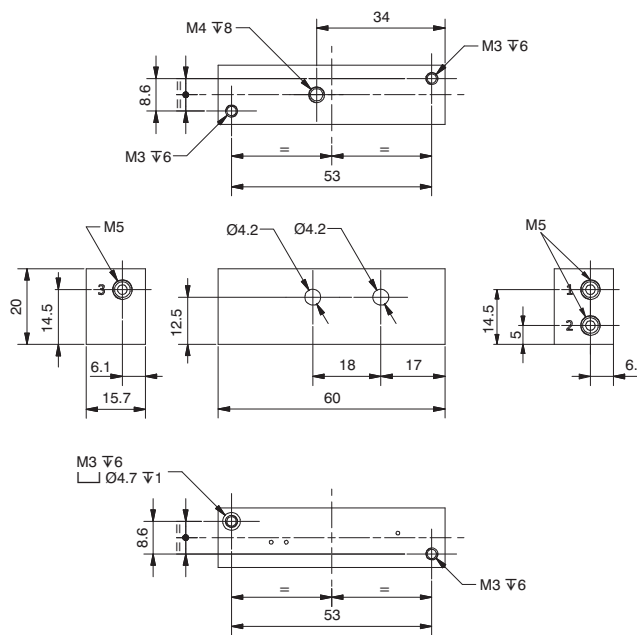
Ordering code

**170E2M.V.M.G.FO**

- P** PROTECTION
- 0 = Parameter 18 active
- 2 = Parameter 18 not active
- VERSION
- V** T = Voltage signal
- C = Current signal
- PRESSURE RANGE
- G** 001 = Range 0 - 1 bar
- 005 = Range 0 - 5 bar
- 009 = Range 0 - 9 bar

Weight: 110 gr.

M5 In-Line Single Base



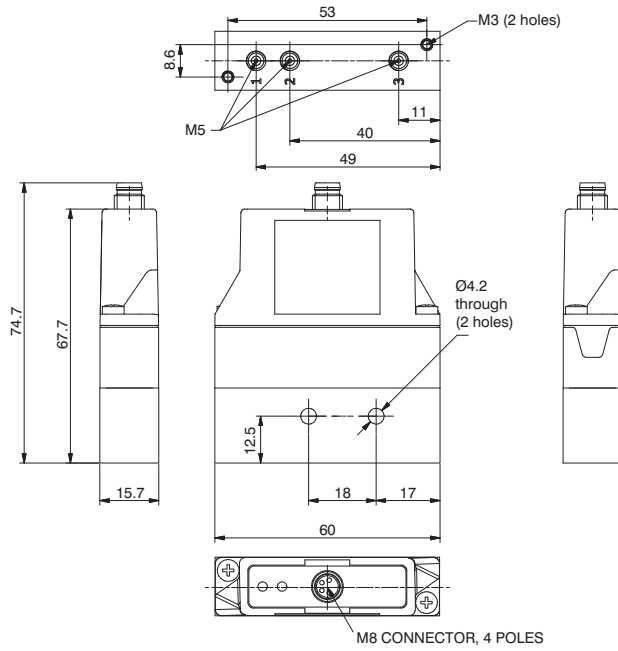
Ordering code

**170M1.FO**

Weight: 50 gr.

3

Proportional Pressure Regulator c/w M5 Bottom Entry Base



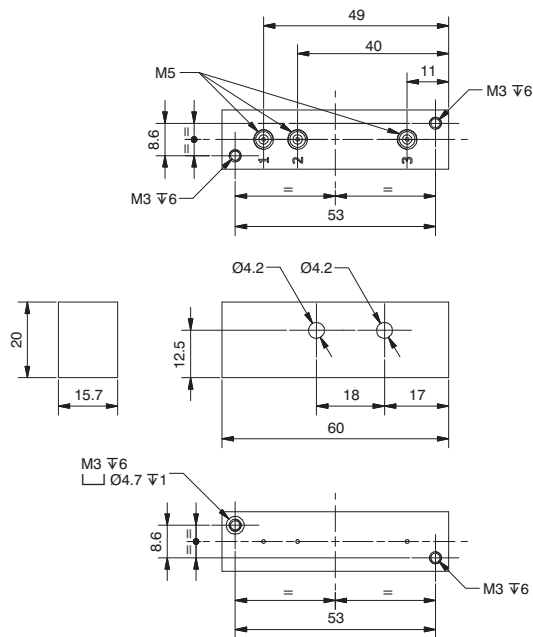
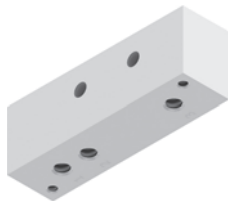
Ordering code

**170EPM.V.M.G.FV**

	PROTECTION
<b>P</b>	0 = Parameter 18 active 2 = Parameter 18 not active
	VERSION
<b>V</b>	T = Voltage signal C = Current signal
	PRESSURE RANGE
<b>G</b>	001 = Range 0 - 1 bar 005 = Range 0 - 5 bar 009 = Range 0 - 9 bar

Weight: 110 gr.

M5 Bottom Entry Single Base

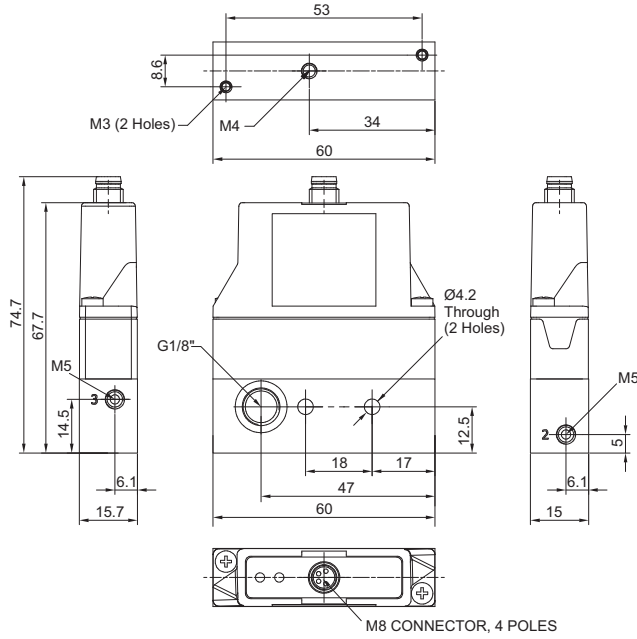


Ordering code

**170M1.FV**

Weight: 50 gr.

Proportional Pressure Regulator c/w Modular In-Line Base



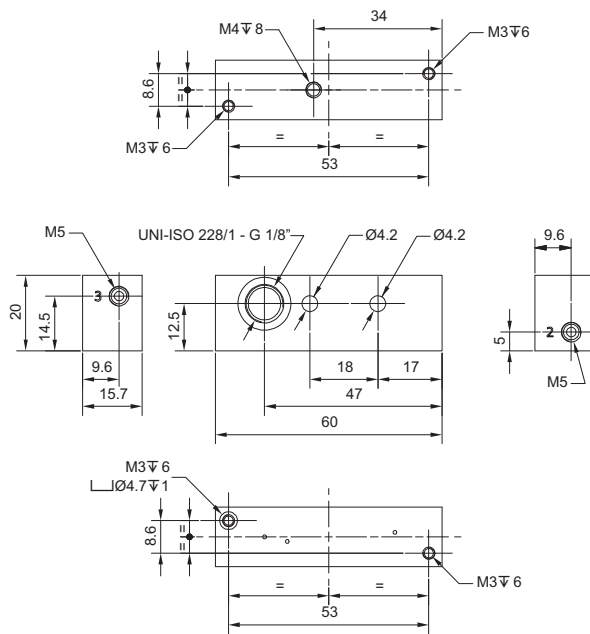
Ordering code

**170E2M.V.M.G.FP**

- PROTECTION  
**P** 0 = Parameter 18 active  
 2 = Parameter 18 not active  
 VERSION  
**V** T = Voltage signal  
 C = Current signal  
 PRESSURE RANGE  
**G** 001 = Range 0 - 1 bar  
 005 = Range 0 - 5 bar  
 009 = Range 0 - 9 bar

Weight: 110 gr.

Single Modular In-Line Base



Ordering code

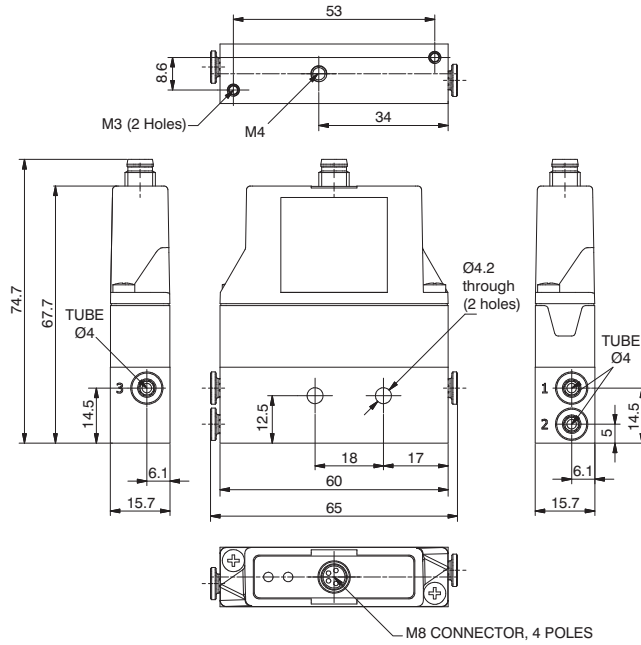
**170M1.FP**

Weight: 50 gr.

3



Proportional Pressure Regulator c/w 4mm In-Line Single base



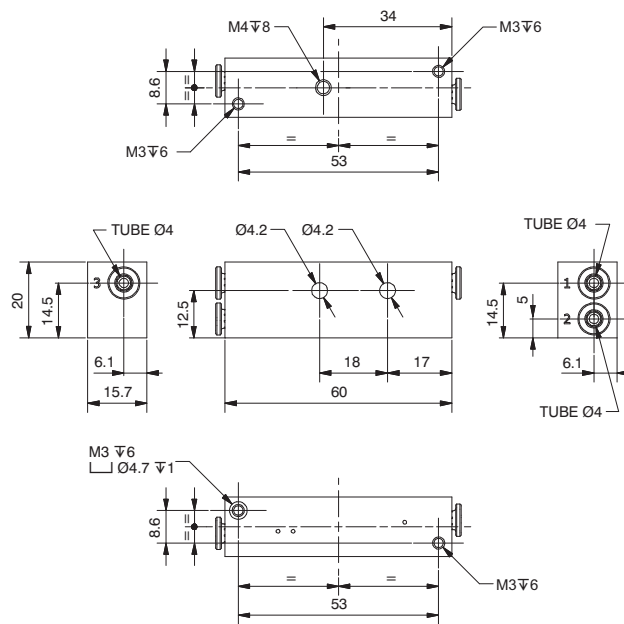
Ordering code

**170EM.V.M.0.T0**

	PROTECTION
<b>P</b>	0 = Parameter 18 active 2 = Parameter 18 not active
	VERSION
<b>V</b>	T = Voltage signal C = Current signal
	PRESSURE RANGE
<b>G</b>	001 = Range 0 - 1 bar 005 = Range 0 - 5 bar 009 = Range 0 - 9 bar

Weight: 110 gr.

Single 4mm In-Line Base

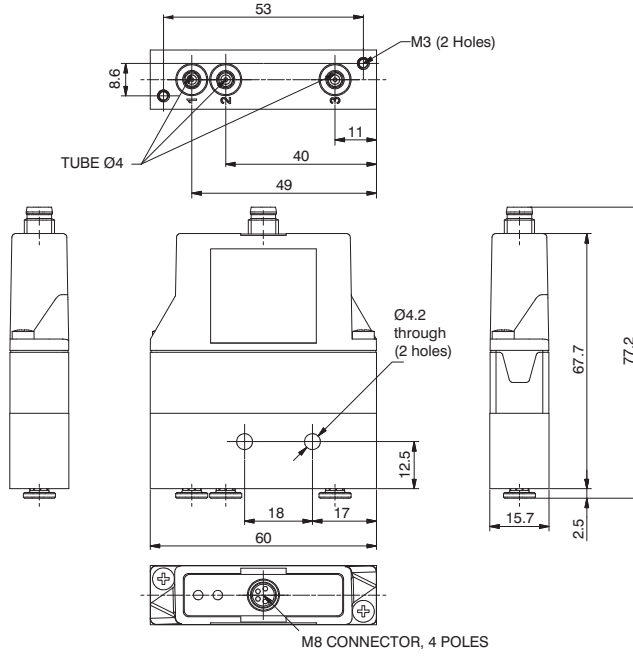
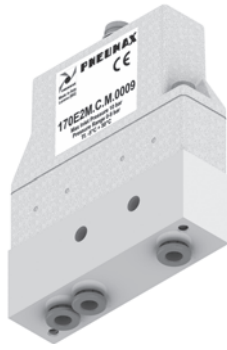


Ordering code

**170M1.T0**

Weight: 50 gr.

Proportional Pressure Regulator c/w 4mm Bottom Entry Single Base



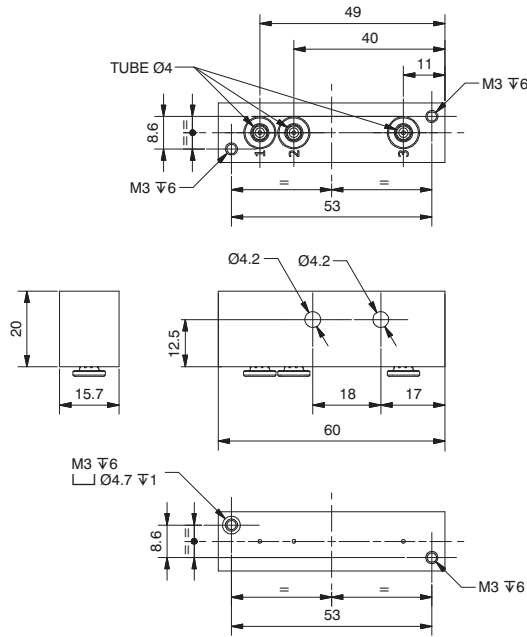
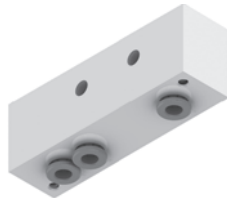
Ordering code

**170EPM.V.M.G.TV**

- P** PROTECTION
- 0 = Parameter 18 active
- 2 = Parameter 18 not active
- V** VERSION
- T = Voltage signal
- C = Current signal
- G** PRESSURE RANGE
- 001 = Range 0 - 1 bar
- 005 = Range 0 - 5 bar
- 009 = Range 0 - 9 bar

Weight: 110 gr.

Single 4mm Bottom Entry Base



Ordering code

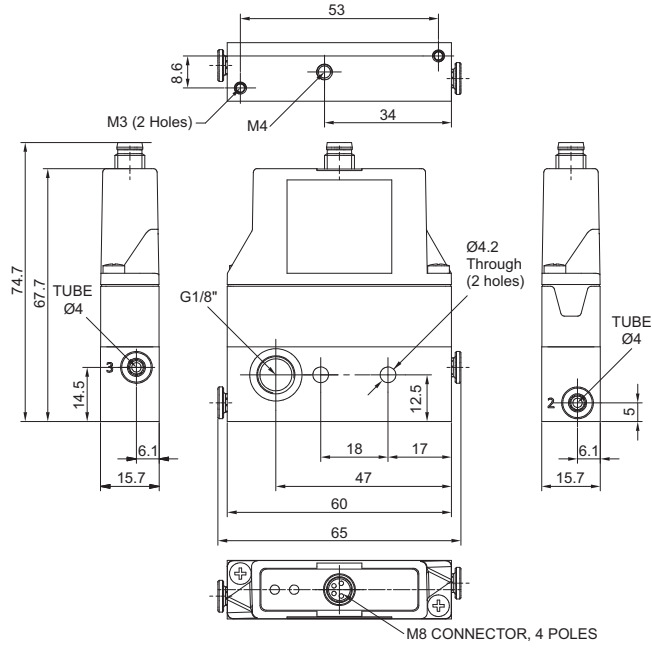
**170M1.TV**

Weight: 50 gr.

3



Proportional Pressure Regulator c/w 4mm In-Line Modular Base



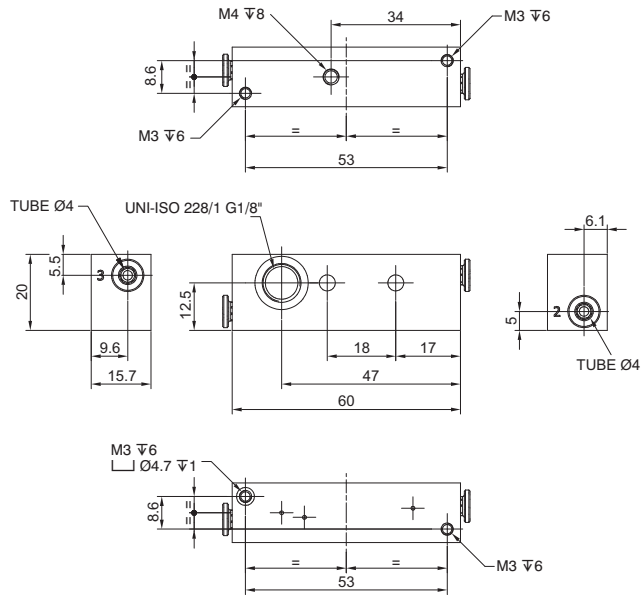
Weight: 110 gr.

Ordering code

**170EPM.V.M.G.TP**

PROTECTION	
<b>P</b>	0 = Parameter 18 active 2 = Parameter 18 not active
VERSION	
<b>V</b>	T = Voltage signal C = Current signal
PRESSURE RANGE	
<b>G</b>	001 = Range 0 - 1 bar 005 = Range 0 - 5 bar 009 = Range 0 - 9 bar

Single 4mm In-Line Modular Base



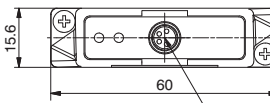
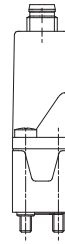
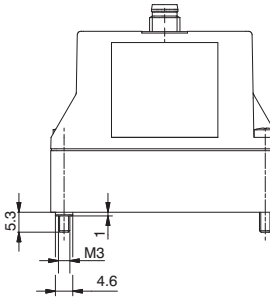
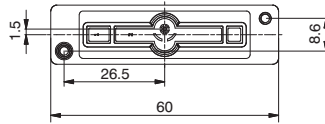
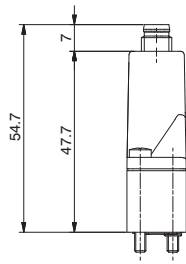
Weight: 50 gr.

Ordering code

**170M1.TP**

3

Proportional pressure regulator with external feedback



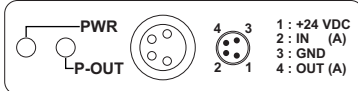
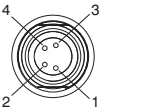
M8 CONNECTOR, 4 POLES

Ordering code

**170EPM.V.M.G.E**

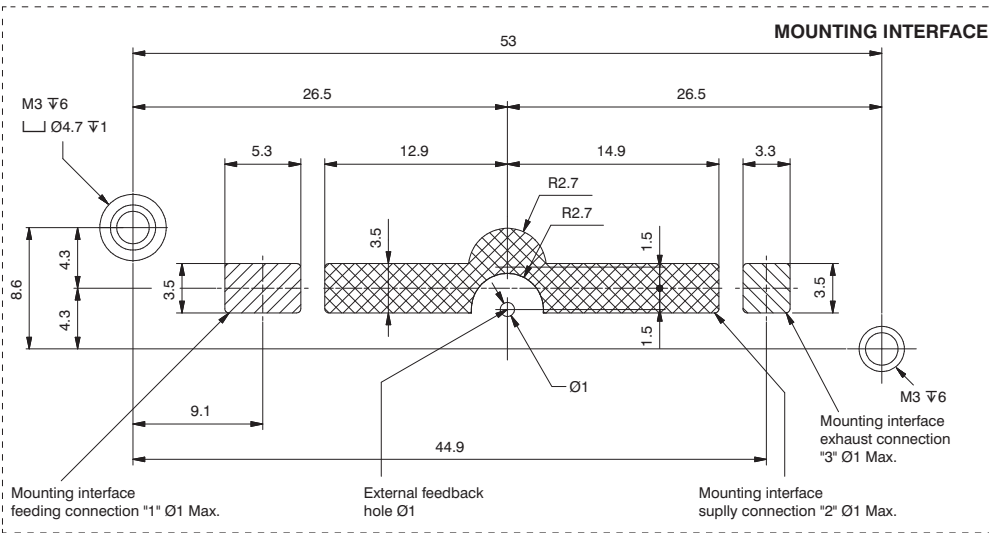
- P** PROTECTION
- 0 = Parameter 18 active
- 2 = Parameter 18 not active
- VERSION
- V** T = Voltage signal
- C = Current signal
- PRESSURE RANGE
- G** 001 = Range 0 - 1 bar
- 005 = Range 0 - 5 bar
- 009 = Range 0 - 9 bar

M8 CONNECTOR, 4 POLES

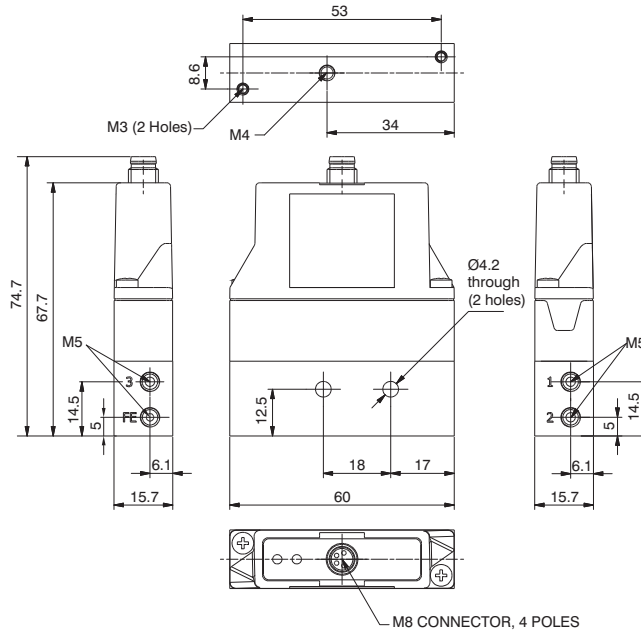


PIN	DESCRIPTION
1	+24 VDC
2	ANALOG INPUT
3	GND
4	ANALOG OUTPUT

<b>PWR</b>	Green Led: The regulator is properly powered
<b>P-OUT</b>	Green Led: lights up when the outlet pressure is higher than the desired pressure minus 0.2 bar and less than the desired pressure more 0.2 bar



**Proportional Pressure Regulator c/w M5 In-Line Single Base with External Feedback**



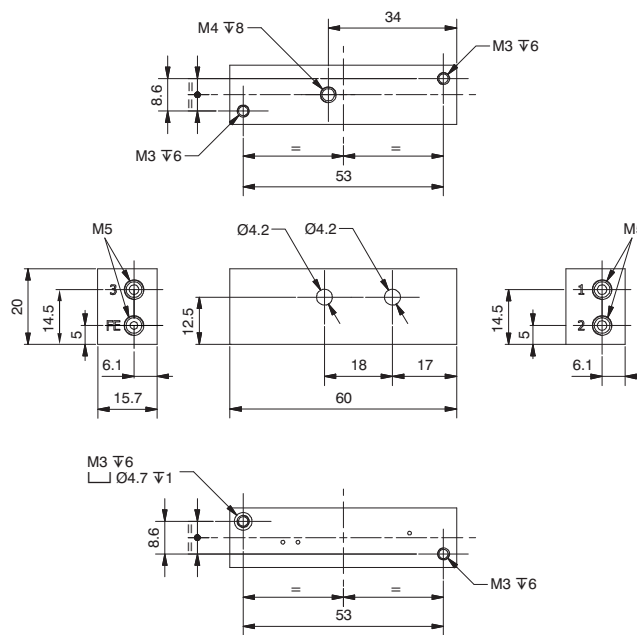
Ordering code

**170E2M.V.M.G.EFO**

<b>P</b>	PROTECTION
0	= Parameter 18 active
2	= Parameter 18 not active
<b>V</b>	VERSION
T	= Voltage signal
C	= Current signal
<b>G</b>	PRESSURE RANGE
001	= Range 0 - 1 bar
005	= Range 0 - 5 bar
009	= Range 0 - 9 bar

Weight: 110 gr.

**Single M5 In-Line Base with External Feedback**

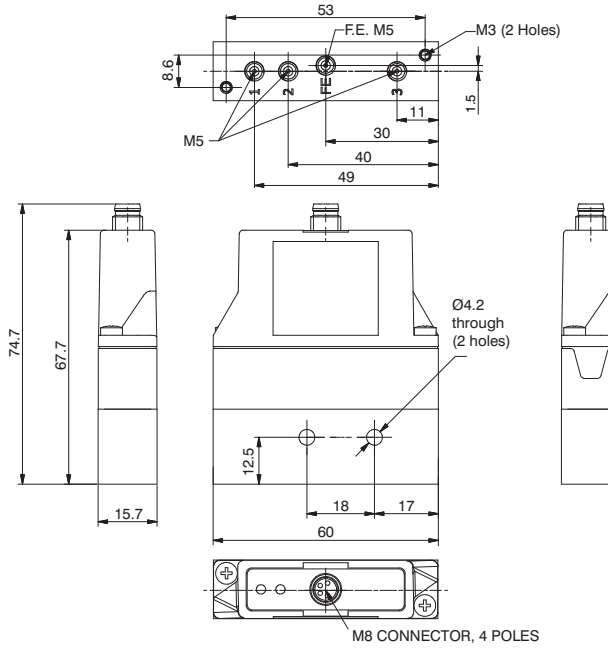


Ordering code

**170M1.EFO**

Weight: 50 gr.

**Proportional Pressure Regulator c/w M5 Bottom Entry Base with External Feedback**



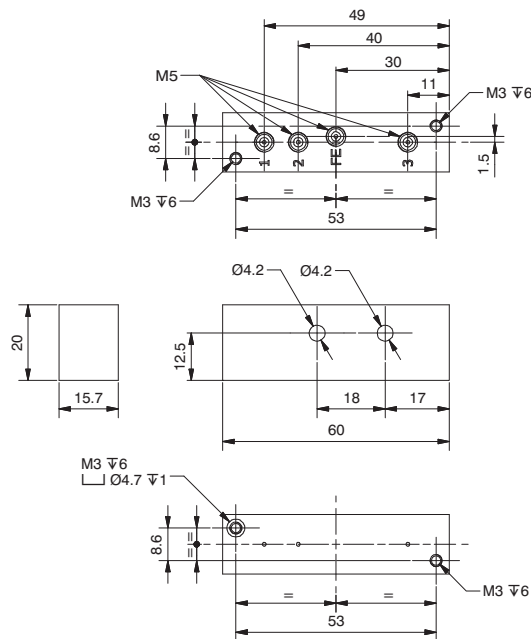
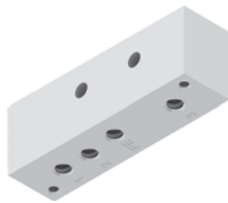
Ordering code

**170EPM.V.M.C.EFV**

- PROTECTION  
 P 0 = Parameter 18 active  
 2 = Parameter 18 not active  
 VERSION  
 V T = Voltage signal  
 C = Current signal  
 PRESSURE RANGE  
 G 001 = Range 0 - 1 bar  
 005 = Range 0 - 5 bar  
 009 = Range 0 - 9 bar

Weight: 110 gr.

**Single M5 Bottom Entry Base with External Feedback**



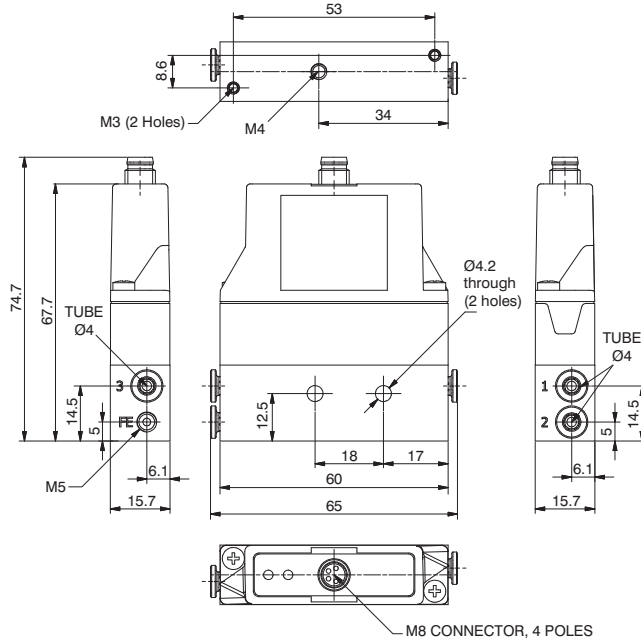
Ordering code

**170M1.EFV**

Weight: 50 gr.

3

Proportional Pressure Regulator c/w 4mm In-Line Single Base with External Feedback



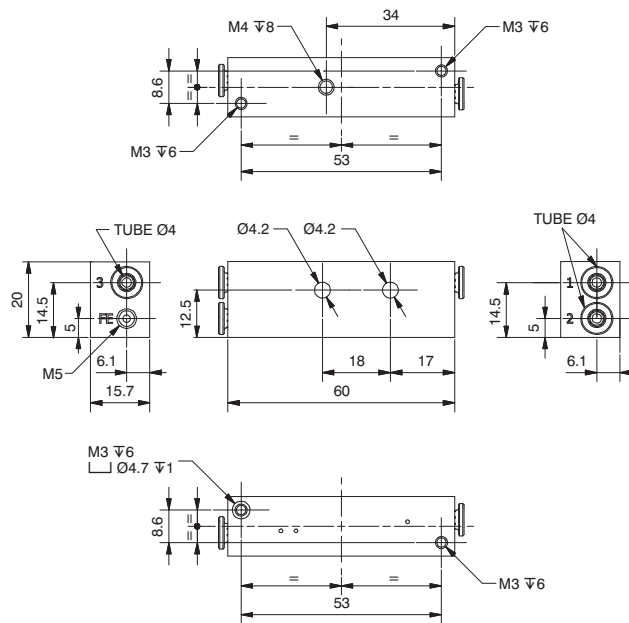
Ordering code

170E0M.V.M.G.ETO

<b>P</b>	PROTECTION
0	= Parameter 18 active
2	= Parameter 18 not active
<b>V</b>	VERSION
T	= Voltage signal
C	= Current signal
<b>G</b>	PRESSURE RANGE
001	= Range 0 - 1 bar
005	= Range 0 - 5 bar
009	= Range 0 - 9 bar

Weight: 110 gr.

Single 4mm In-Line Base with External Feedback



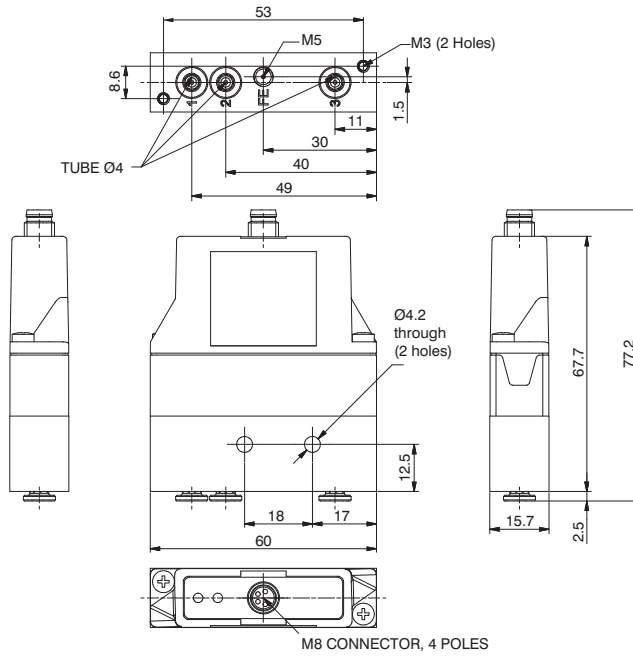
Ordering code

170M1.ETO

Weight: 50 gr.



**Proportional Pressure Regulator c/w 4mm Bottom Entry Single Base with External Feedback**



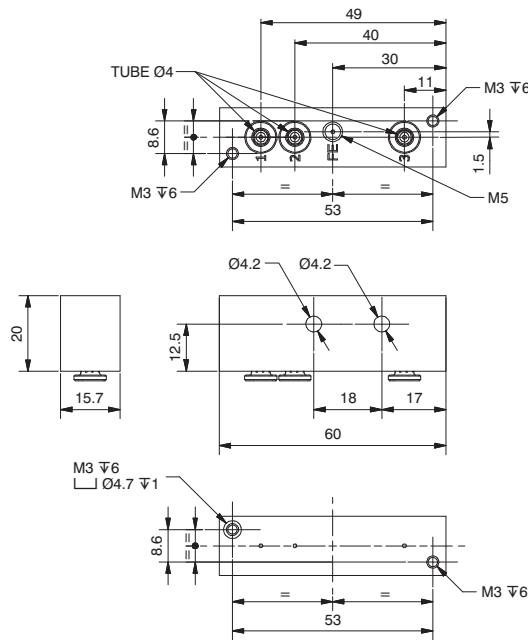
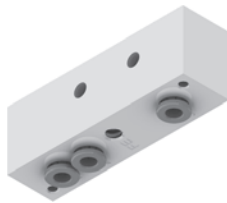
Ordering code

**1700PM.V.M.C.ETV**

- PROTECTION  
 P 0 = Parameter 18 active  
 2 = Parameter 18 not active  
 VERSION  
 V T = Voltage signal  
 C = Current signal  
 PRESSURE RANGE  
 G 001 = Range 0 - 1 bar  
 005 = Range 0 - 5 bar  
 009 = Range 0 - 9 bar

Weight: 110 gr.

**Single 4mm Bottom Entry Base with External Feedback**



Ordering code

**170M1.ETV**

Weight: 50 gr.

3

**Coding For Proportional Pressure Regulator Modular Manifold**

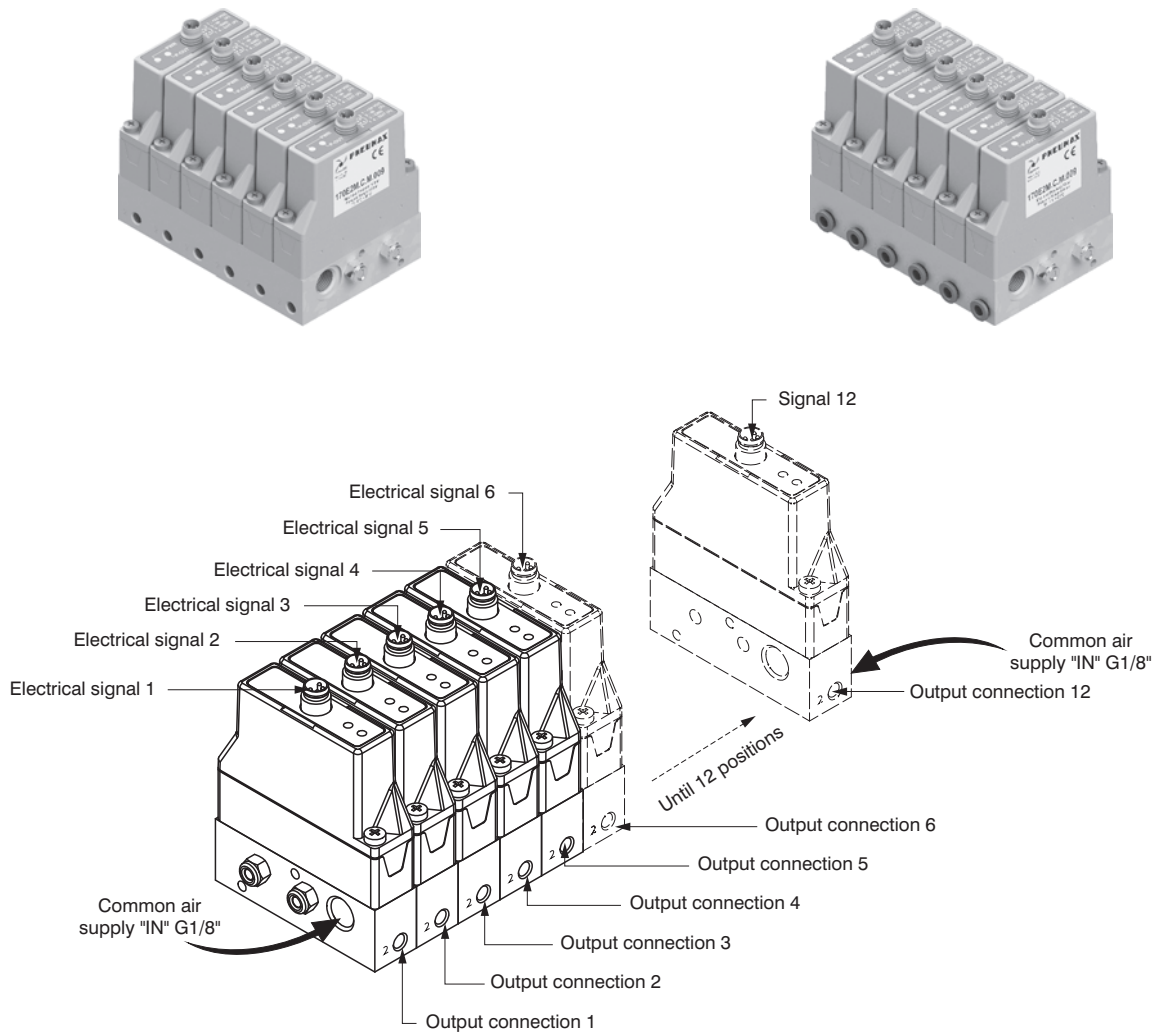
It is possible to assemble a manifold of Miniature Proportional Regulators to a maximum of 12 Regulators. For the coding of the Manifold, refer to the configuration Table below.

The Regulators are fed by a single supply pressure via the G1/8" connection. In the Manifold, the Pressure Regulators operate independently, the output pressure is supplied via the M5 or 4mm output connection depending on the model requested. The electrical signal is controlled via the M8 connector.

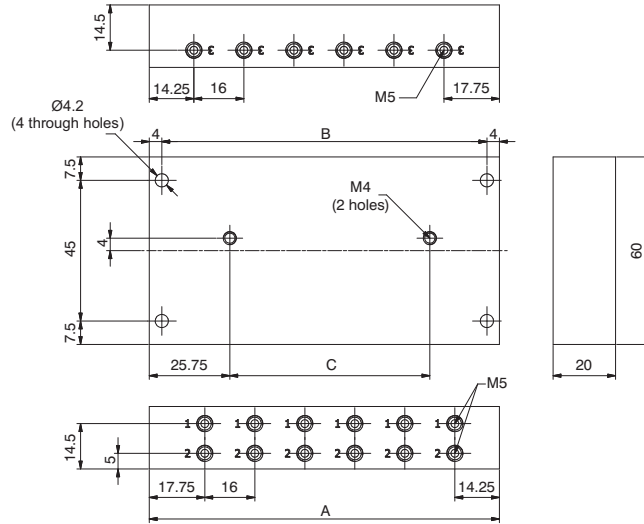
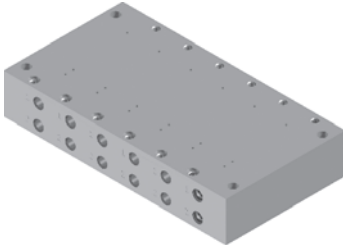
There are also configured single bases up to a maximum of 12 positions with power supplies and independent consumptions (See following pages).

G	1	7	0	-	-	-	M	-	-	-	P	-
Group	Series	Size	Parameter 18	N. Places	Control Type	Electrical connection	Pressure range	Connection	Version	Options		
			0=Eco P18 On	A=02	T=Voltage		001=0 - 1 bar	T=Tube Ø4		= Standard *		
			2=Eco P18 Off	B=03	C=Current		005=0 - 5 bar	F=M5 Thread		E= External feedback		
				C=04			009=0 - 9 bar			* no additional letter required		
				D=05								
				E=06								
				F=07								
				G=08								
				H=09								
				I=10								
				L=11								
				M=12								

Example	
Code	G1700ITM009FP
Description	10 Position Miniature Proportional Pressure Regulator, Voltage controlled with M5 Outputs



Multiple M5 In-Line Base



N° PLACES		2 PLA.	3 PLA.	4 PLA.	5 PLA.	6 PLA.	7 PLA.	8 PLA.	9 PLA.	10 PLA.
DIMEN.										
A		48	64	80	96	112	128	144	160	176
B		40	56	72	88	104	120	136	152	168
C		0	16	32	48	64	80	96	112	128

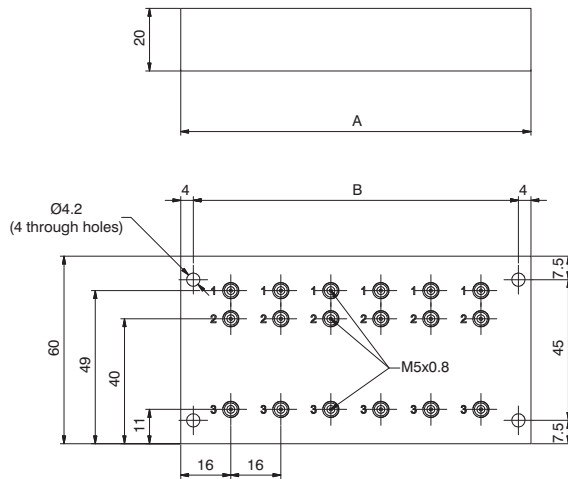
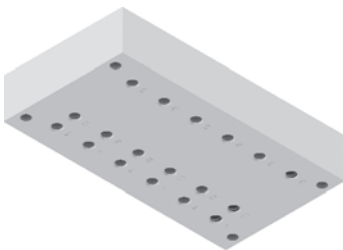
Ordering code

**170M<sup>N</sup>.FO**

N. PLACES

- 2=2 places (weight gr.100)
- 3=3 places (weight gr.150)
- 4=4 places (weight gr.200)
- 5=5 places (weight gr.250)
- N** 6=6 places (weight gr.300)
- 7=7 places (weight gr.350)
- 8=8 places (weight gr.400)
- 9=9 places (weight gr.450)
- 10=10 places (weight gr. 500)

Multiple M5 Bottom Entry Base



N° PLACES		2 PLA.	3 PLA.	4 PLA.	5 PLA.	6 PLA.	7 PLA.	8 PLA.	9 PLA.	10 PLA.
DIMEN.										
A		48	64	80	96	112	128	144	160	176
B		40	56	72	88	104	120	136	152	168

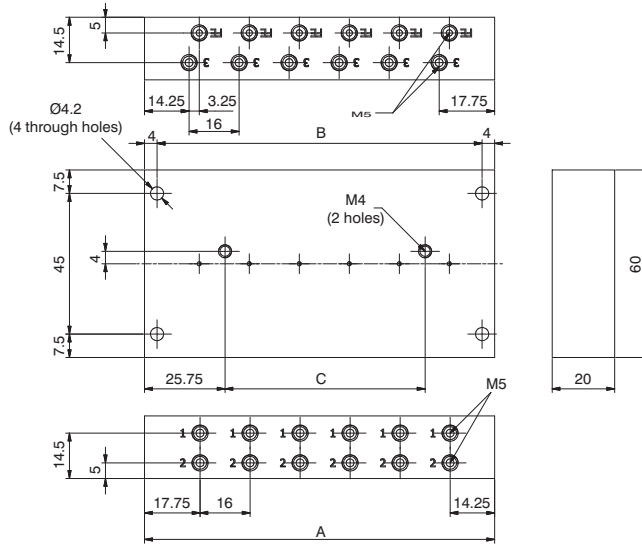
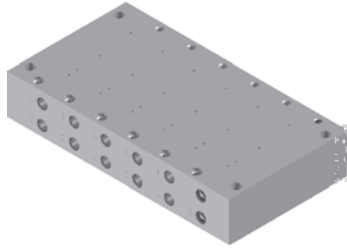
Ordering code

**170M<sup>N</sup>.FV**

N. PLACES

- 2=2 places (weight gr.100)
- 3=3 places (weight gr.150)
- 4=4 places (weight gr.200)
- 5=5 places (weight gr.250)
- N** 6=6 places (weight gr.300)
- 7=7 places (weight gr.350)
- 8=8 places (weight gr.400)
- 9=9 places (weight gr.450)
- 10=10 places (weight gr. 500)

**Multiple M5 In-Line Base with External Feedback**



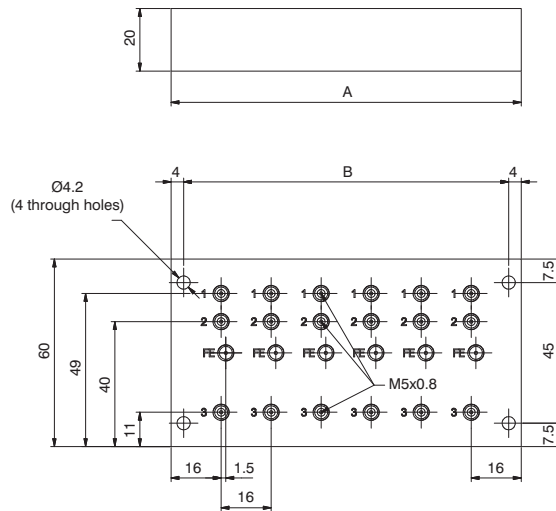
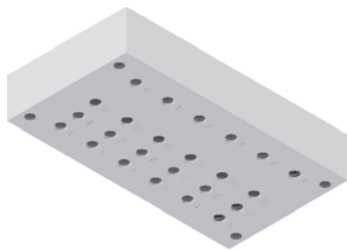
DIMEN.	N° PLACES									
	2 PLA.	3 PLA.	4 PLA.	5 PLA.	6 PLA.	7 PLA.	8 PLA.	9 PLA.	10 PLA.	
A	48	64	80	96	112	128	144	160	176	
B	40	56	72	88	104	120	136	152	168	
C	0	16	32	48	64	80	96	112	128	

Ordering code

**170M<sup>N</sup>.EFO**

- N. PLACES
- 2=2 places (weight gr.100)
  - 3=3 places (weight gr.150)
  - 4=4 places (weight gr.200)
  - 5=5 places (weight gr.250)
  - 6=6 places (weight gr.300)
  - 7=7 places (weight gr.350)
  - 8=8 places (weight gr.400)
  - 9=9 places (weight gr.450)
  - 10=10 places (weight gr. 500)

**Multiple M5 Bottom Entry Base with External Feedback**



DIMEN.	N° PLACES									
	2 PLA.	3 PLA.	4 PLA.	5 PLA.	6 PLA.	7 PLA.	8 PLA.	9 PLA.	10 PLA.	
A	48	64	80	96	112	128	144	160	176	
B	40	56	72	88	104	120	136	152	168	

Ordering code

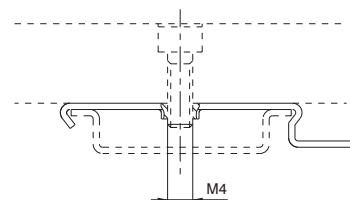
**170M<sup>N</sup>.EFV**

- N. PLACES
- 2=2 places (weight gr.100)
  - 3=3 places (weight gr.150)
  - 4=4 places (weight gr.200)
  - 5=5 places (weight gr.250)
  - 6=6 places (weight gr.300)
  - 7=7 places (weight gr.350)
  - 8=8 places (weight gr.400)
  - 9=9 places (weight gr.450)
  - 10=10 places (weight gr. 500)

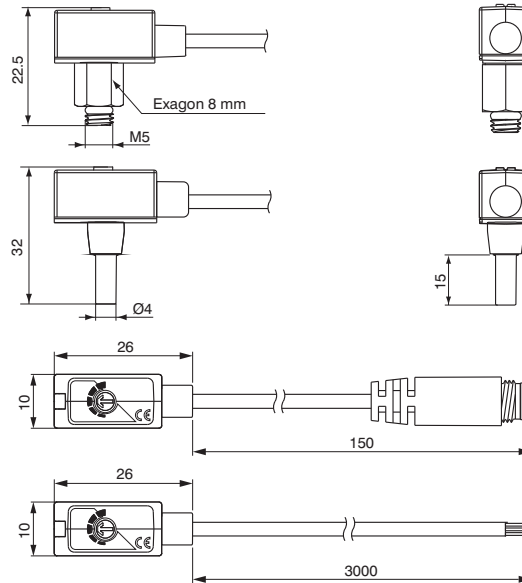
**Clip**

Ordering code

**800.00**



Weight gr. 5

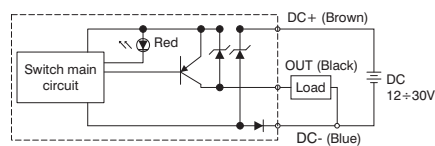
**Mini digital pressure switch**

**Ordering code**
**DS.10.P.B.ⓐ.Ⓛ.ⓐ**

CONNECTION	
ⓐ	F4=Male M5
R4=Plug-in connection Ø4	
CABLE LENGTH	
Ⓛ	A=150 mm *
	E=3000 mm **
OPTIONS	
ⓐ	0=Without connector
	1=With connector M8 male 3 Pin

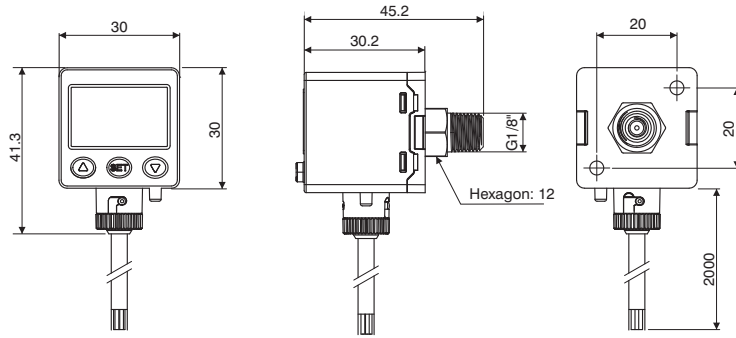
\* only with M8 connector  
\*\* only without connector

**Technical features**

Working pressure range	0 - 0.6 mPa
Regulation pressure range	0 - 0.6 mPa
Maximum supported pressure	1.5 mPa
Allowed fluids	Air, non-corrosive gases, non-combustible gases
Supply voltage	From 12 to 30 VDC ±10%
Current consumption	≤ 10mA
Digital output	PNP N.O. 1 outputs Maximum load current: 80mA Maximum supply voltage: 30VDC Voltage drop: ≤0.8V ± 1% Full Scale
Repeatability (Digital output)	fixed
Digital output	Type of hysteresis Hysteresis
Response time	3% Full Scale max.
Protection from short circuit at output	1 ms
Method of setting threshold	Present
Indicator	Adjustable, trimmer LED red (output)
Ingress protection rating	Protection class IP40
	Ambient temperature Operational: 0 - 60°C, Storage: -20 - 70°C (without ice or condensation)
	Ambient humidity Operational/Storage: 35 - 85% (without condensation)
	Vibration Total amplitude 1.5mm., 10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y and Z
	Impacts/shocks 980m/s <sup>2</sup> (100G), 3 times in each direction of X, Y and Z
Temperature characteristics	±2% Full Scale in a range between 0 - 50°C
Type of connection	Male M5x0.8, Plug-in connection Ø4
Electrical cable	Oilproof cable, 3 wires (0.18mm <sup>2</sup> ), Ø2.6mm
Weight	Approximately 50 gr. (with 3 metres of cable)

**Output circuit wiring scheme**


**Panel-mounted digital pressure switch**



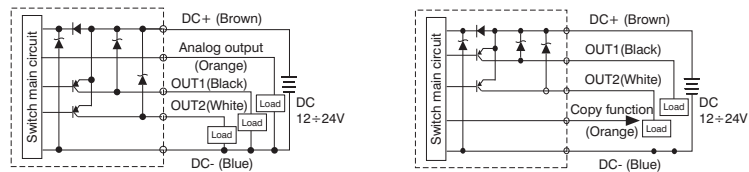
Ordering code  
**DS.45.P.U.F3.D.0**

OUTPUTS  
 E=2 PNP outputs + Analog output (4 / 20 mA)  
 L=2 PNP outputs + copy function

**Technical features**

Working pressure range	0.000 - 1.000 mPa	
Regulation pressure range	-0.100 - 1.000 mPa	
Maximum supported pressure	1.5 mPa	
Allowed fluids	Air, non-corrosive gases, non-combustible gases	
Pressure calibration sensitivity	kPa	0.1
	kgf/cm <sup>2</sup>	0.001
	bar	0.001
	psi	0.01
	InHg	0.1
Supply voltage	From 12 to 24 VDC	
Current consumption	≤40mA (without load) PNP N.O. 2 outputs	
Digital output	Maximum load current: 125mA Maximum supply voltage: 24VDC Voltage drop: ≤1.5V	
Repeatability (Digital output)	± 0.2% Full Scale ± 1 digit	
Digital output	Type of hysteresis: Settable Hysteresis: from 0.001 to 0.008 bar	
Response time	≤2.5 ms (anti-interference function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selectable)	
Protection from short circuit at output	Present	
Display	Display with 3 1/2 digits (red/Green)	
Indicator precision	±2% F. S. ±1 digit	
Indicator	LED Orange (output1) LED Orange (output2)	
Analog output	Output current: 4÷20mA ±2.5% F. S. Linearity: ±1% F. S. Maximum load resistance: 250Ω supply at 12V and 600Ω supply at 24V Minimum load resistance: 50Ω	
Ingress protection rating	Protection class	IP65
	Ambient temperature	Operational: 0 - 50°C, Storage: -10 - 60°C (without ice or condensation)
	Ambient humidity	Operation/Storage: 35 - 85% (without condensation)
	Supported voltage	1000VAC in 1 min. (between body and cable)
	Insulation resistance	50MΩ (at 500VDC, between body and cable)
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y and Z
Temperature characteristics	Impacts/shocks: 100m/s <sup>2</sup> (10G), 3 times in each direction of X, Y and Z	
Type of connection	±2.5% Full Scale in a range between 0 - 50°C G1/8" (BSPP), M5 female	
Electrical cable	Oil resistant cable (internal 0.15mm <sup>2</sup> )	
Weight	Approximately 86 gr. (with 2 metres of cable)	

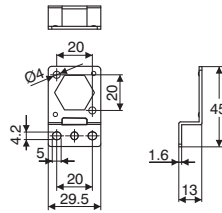
**Output circuit wiring scheme**



**Fastening bracket**



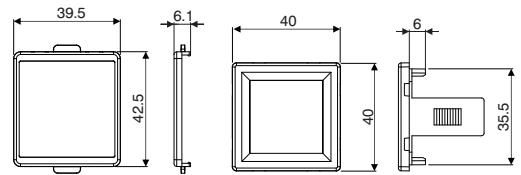
Ordering code  
**DS.BT10**



**Panel mount adapter**



Ordering code  
**DS.PAE**

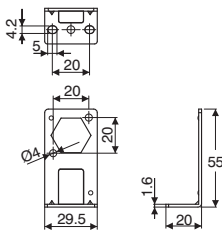


**Accessories**

**Fastening bracket**



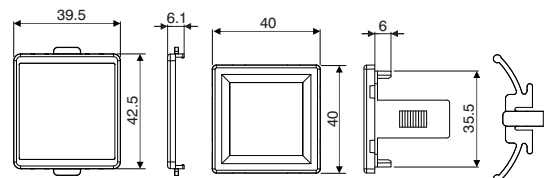
Ordering code  
**DS.BT11**

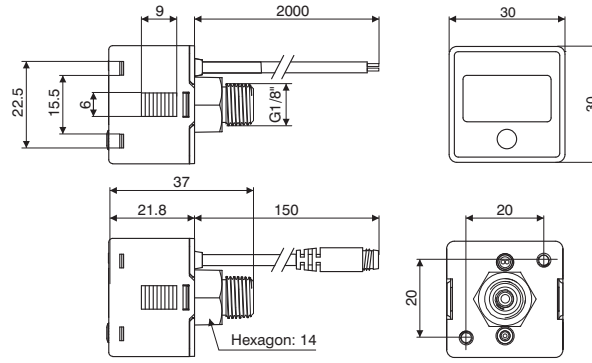


**Panel mount adapter with screen protection**



Ordering code  
**DS.PAF**



**Digital pressure gauge**

**Ordering code**
**DS.61.PI.F1.L.ⓐ**
**CABLE LENGTH**
**ⓐ** A=150 mm \*

D=2000 mm \*\*

**OPTIONS**
**ⓐ** 0=Without connector

**ⓐ** 2=With connector

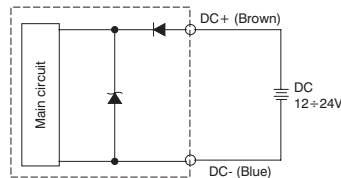
M8 male 4 Pin

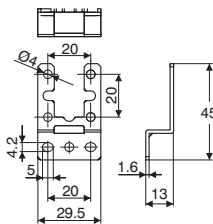
\* only with M8 connector

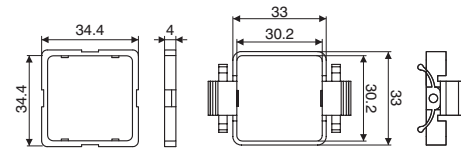
\*\* only without connector

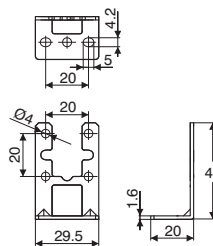
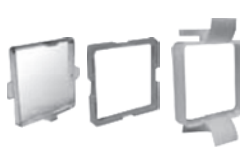
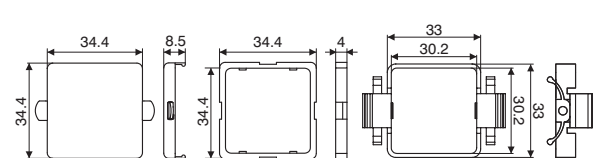
**Technical features**

Working pressure range	0.000 - 1.000 mPa	
Regulation pressure range	-0.100 - 1.000 mPa	
Maximum supported pressure	1.5 mPa	
Allowed fluids	Air, non-corrosive gases, non-combustible gases	
Pressure calibration sensitivity	kPa	1
	kgf/cm <sup>2</sup>	0.01
	bar	0.01
	psi	0.1
Supply voltage	From 12 to 24 VDC ± 10%	
Current consumption	10mA	
Repeatability	± 1% Full Scale ± 1 digit	
Display	Display with 3 1/2 digits (sampling 5 times per sec.)	
Indicator precision	±2% F. S. ± 1 digit (at ambient temperature of 25°C ± 3°C)	
Ingress protection rating	Protection class	IP65 (only with connected air pipe)
	Ambient temperature	Operational: 0 - 50°C, Storage: -10 - 60°C (without ice or condensation)
	Ambient humidity	Operation/Storage: 35 - 85% (without condensation)
	Supported voltage	1000VAC in 1 min. (between body and cable)
	Insulation resistance	50MΩ (at 500VDC, between body and cable)
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y and Z
Temperature characteristics	100m/s <sup>2</sup> (10G), 3 times in each direction of X, Y and Z	
Type of connection	±2% Full Scale in a range between 0 - 50°C	
Electrical cable	R1/8", M5 female	
Weight	Oil resistant cable (internal 0.15mm <sup>2</sup> )	
	Approximately 60 gr. (with 2 metres of cable) and Approximately 40 gr. (with M8 4 pin male connector)	

**Output circuit wiring scheme**

**Fastening bracket**

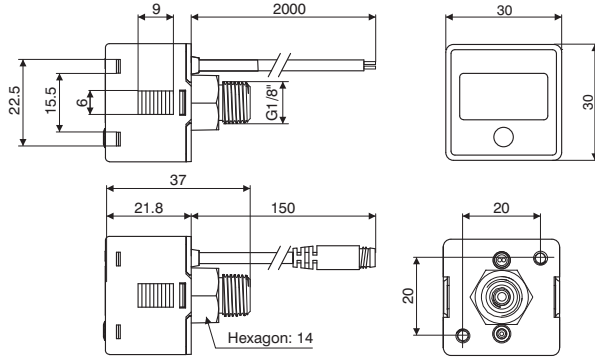
 Ordering code  
**DS.BT5**

**Panel mount adapter**

 Ordering code  
**DS.PAC**

**Accessories**
**Fastening bracket**

 Ordering code  
**DS.BT6**

**Panel mount adapter with screen protection**

 Ordering code  
**DS.PAD**




**Digital pressure gauge**



Ordering code

**DS.61.PI.F1.L.Ⓛ.Ⓞ**

CABLE LENGTH

Ⓛ A=150 mm \*

D=2000 mm \*\*

OPTIONS

Ⓞ 0=Without connector

Ⓛ 2=With connector

M8 male 4 Pin

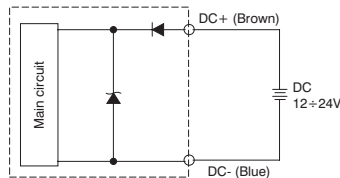
\* only with M8 connector

\*\* only without connector

**Technical features**

Working pressure range	0.000 - 1.000 mPa	
Regulation pressure range	-0.100 - 1.000 mPa	
Maximum supported pressure	1.5 mPa	
Allowed fluids	Air, non-corrosive gases, non-combustible gases	
Pressure calibration sensitivity	kPa	1
	kgf/cm <sup>2</sup>	0.01
	bar	0.01
	psi	0.1
Supply voltage	From 12 to 24 VDC ± 10%	
Current consumption	10mA	
Repeatability	± 1% Full Scale ± 1 digit	
Display	Display with 3 1/2 digits (sampling 5 times per sec.)	
Indicator precision	± 2% F. S. ± 1 digit (at ambient temperature of 25°C ± 3°C)	
Ingress protection rating	Protection class	IP65 (only with connected air pipe)
	Ambient temperature	Operational: 0 - 50°C, Storage: -10 - 60°C (without ice or condensation)
	Ambient humidity	Operation/Storage: 35 - 85% (without condensation)
	Supported voltage	1000VAC in 1 min. (between body and cable)
	Insulation resistance	50MΩ (at 500VDC, between body and cable)
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y and Z
Impacts/shocks	100m/s <sup>2</sup> (10G), 3 times in each direction of X, Y and Z	
Temperature characteristics	± 2% Full Scale in a range between 0 - 50°C	
Type of connection	R1/8", M5 female	
Electrical cable	Oil resistant cable (internal 0.15mm <sup>2</sup> )	
Weight	Approximately 60 gr. (with 2 metres of cable) and Approximately 40 gr. (with M8 4 pin male connector)	

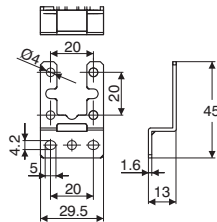
**Output circuit wiring scheme**



**Fastening bracket**



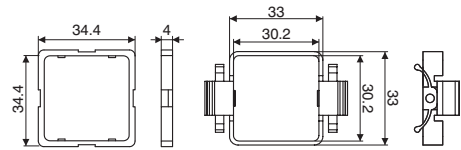
Ordering code  
**DS.BT5**



**Panel mount adapter**



Ordering code  
**DS.PAC**

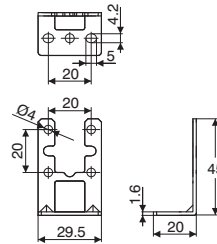


**Accessories**

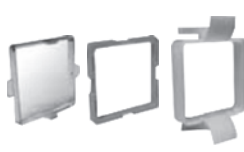
**Fastening bracket**



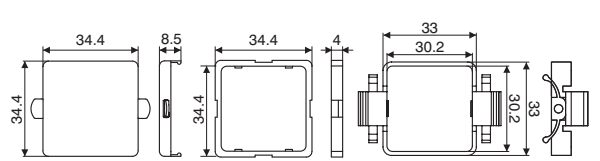
Ordering code  
**DS.BT6**



**Panel mount adapter with screen protection**



Ordering code  
**DS.PAD**

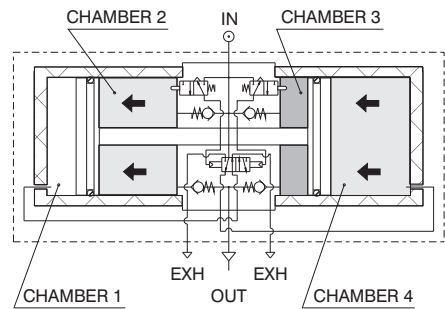


**General**

It is not unusual that, during some applications the thrust generated by a pneumatic cylinder is not sufficient for the specific purpose it has been designed for. In order to get over the problem, the working pressure may be increased to a maximum line pressure which normally is 6 - 7 bar; alternatively the problem is solved by an higher bore cylinder that suits the machine. Three size pressure boosters, with pressure ratio of 1 - 2, have been designed to avoid these problems. This device is utilizing the compressed air of the circuit where it is installed.

**Caratteristiche costruttive e funzionali**

The working method is based on the pump effect of the four chambers cylinder as shown in fig. 1. Two chambers are alternatively compressing the air in the boost one, while the fourth one is discharging. By means of an internal circuit, the pressure booster keeps on pumping air till the down stream pressure reaches a value double the inlet pressure. In these circumstances there is a balance condition.



When the down stream pressure decreases, the pressure booster starts again its alternating cycle till a new balance condition is restored. The pressure booster can be furnished complete with pressure regulator installed on the inlet port for getting an accurate outlet pressure value. A wall mounting plate is also available.

**Instructions for installation and use**

Do not exceed the suggested temperature and pressure values. It is advisable to install a small air tank after the pressure booster to avoid pressure pulsation effects. Discharge the down stream circuit before any maintenance operation as the inner circuit of the booster does not allow the down stream line discharge even if the inlet pressure drops down.

**Maintenance**

Pressure booster has an average life of about 20 millions of valve cycles, depending on working conditions (every back stroke corresponds to one valve cycles). A proper lubrication and filtration of air improve the life of pressure booster parts. It is advisable to protect the exhaust ports in environment. Replaceable spare seal kits are available.

**How to calculate the required time of pressure booster to increase the air pressure in a tank whose capacity is known.**

- Operating Data:
- P1 = Inlet pressure
  - P2' = Tank initial pressure
  - P2'' = Tank final pressure
  - V = Tank volume

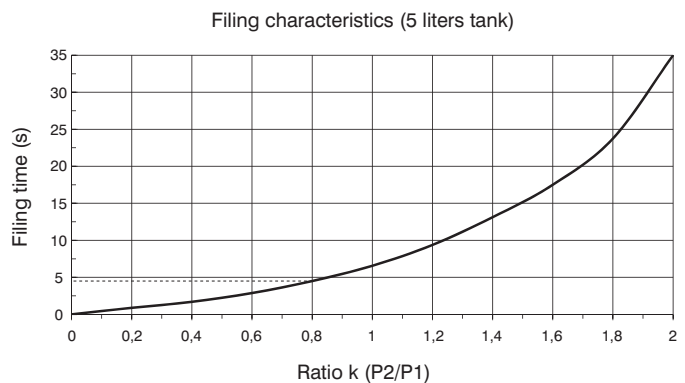
**PROCEDURE :**

- 1) Calculate the ratio K' between the initial pressure of the tank and the inlet pressure of the booster ( P2' / P1 ).
- 2) Calculate the ratio K'' between the final pressure of the tank and the inlet pressure of the booster ( P2'' / P1 ).
- 3) Locate the intersection point between the ratio K' and the curve on filling time diagram related to the specific booster. Trace a vertical line from the above point and read the correspondent time T' (the example shows the ratio K = 0.8 and correspondent time of about 4.8 seconds).

- 4) Repeat same procedure also for ratio K'' to get time T''.

5) Use the following formula  $T = \frac{V}{5} \cdot (T'' - T')$

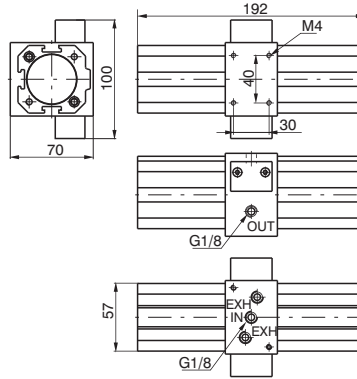
to obtain the total time required to move the pressure P2' to P2'' of tank volume V.



P1 = inlet pressure  
P2 = tank pressure



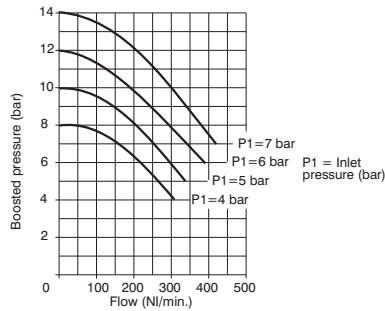
Pressure booster ø40



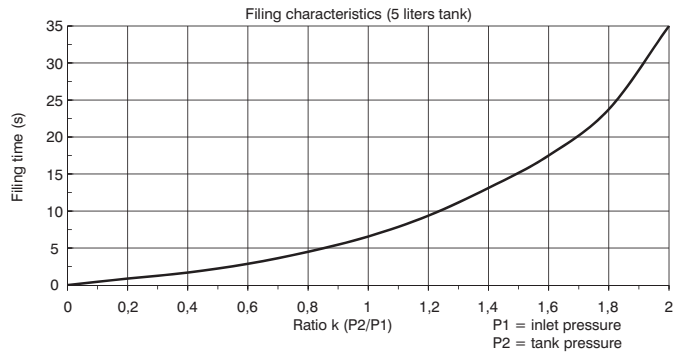
Ordering code

**1740.50N**

Flow rate curves



Filling curves



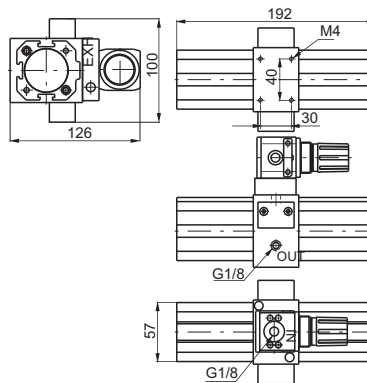
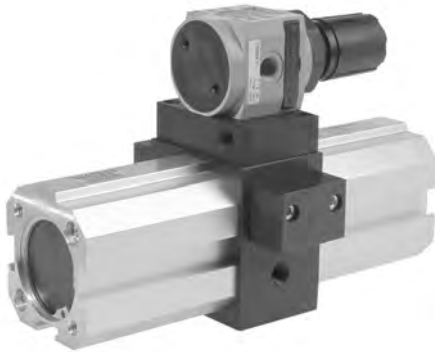
Operating Characteristics

- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.

Technical characteristics

Connections	G 1/8"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 5 mm
Weight	gr. 1500
Assembly position	Any
Max. fittings torque	15 Nm

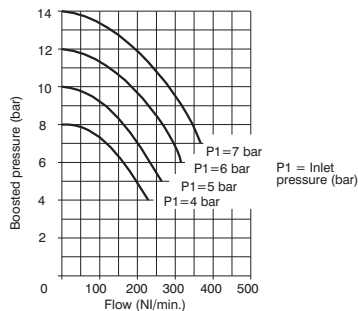
Pressure booster ø40 complete with pressure regulator



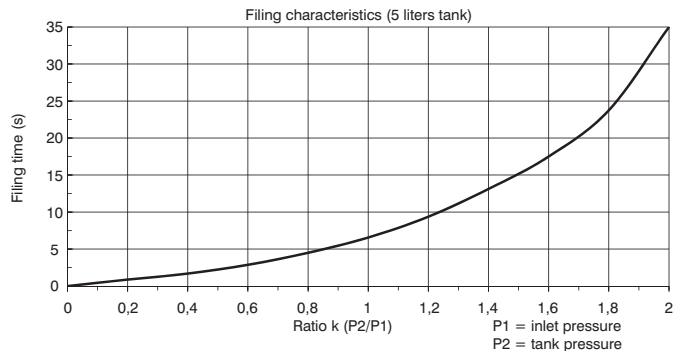
Ordering code

**1740.50.NR**

Flow rate curves



Filling curves



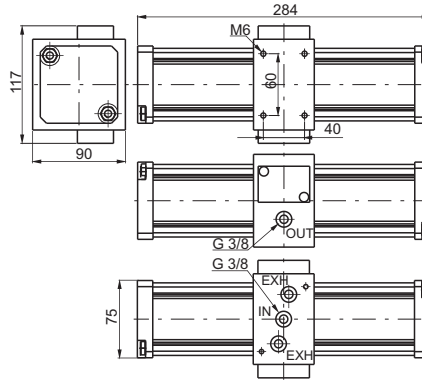
Operating Characteristics

- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.
- Regulation of the inlet pressure (and as a consequence regulation of the outlet pressure)

Technical characteristics

Connections	G 1/8"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 5 mm
Weight	gr. 1600
Assembly position	Any
Max. fittings torque	15 Nm

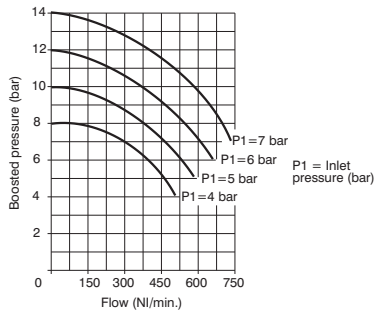
Pressure booster ø63



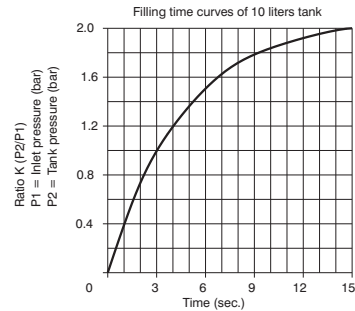
Ordering code

**1763.80N**

Flow rate curves



Filling curves



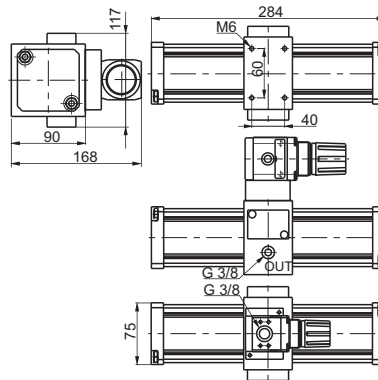
Operating Characteristics

- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.

Technical characteristics

Connections	G 3/8"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 7 mm
Weight	gr. 3000
Assembly position	Any
Max. fittings torque	15 Nm

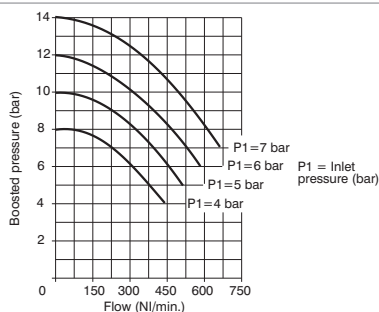
Pressure booster ø63 complete with pressure regulator



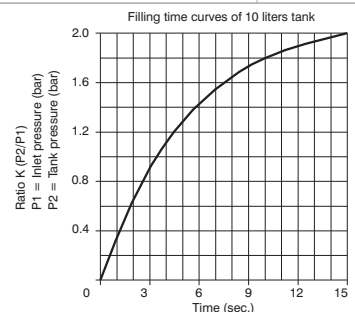
Ordering code

**1763.80.NR**

Flow rate curves



Filling curves



Operating Characteristics

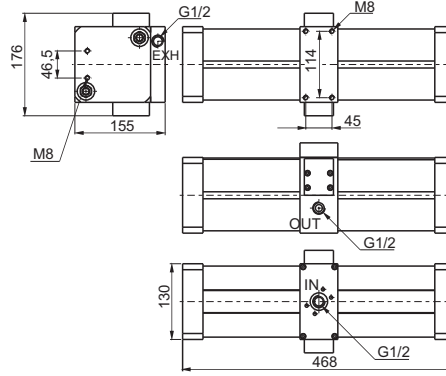
- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.
- Regulation of the inlet pressure (and as a consequence regulation of the outlet pressure)

Technical characteristics

Connections	G 3/8"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 7 mm
Weight	gr. 3200
Assembly position	Any
Max. fittings torque	15 Nm



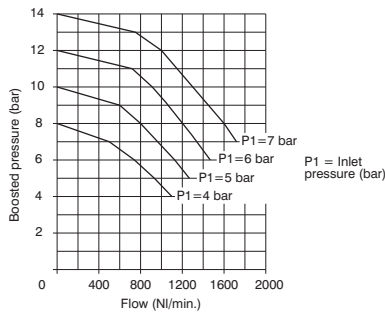
Pressure booster ø100



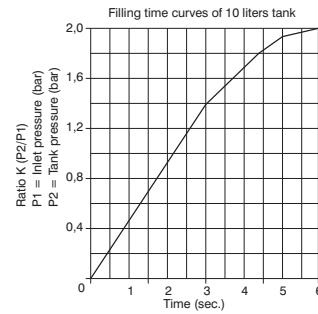
Ordering code

**17100.125N**

Flow rate curves



Filling curves



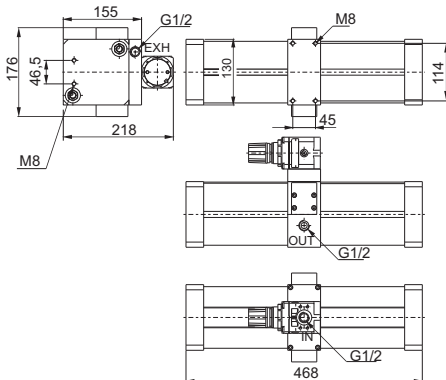
Operating Characteristics

- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.

Technical characteristics

Connections	G 1/2"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 12 mm
Weight	gr. 12000
Assembly position	Any
Max. fittings torque	40 Nm

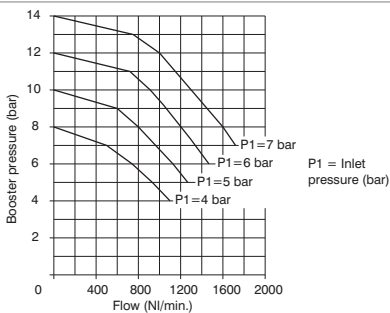
Pressure booster ø100 complete with pressure regulator



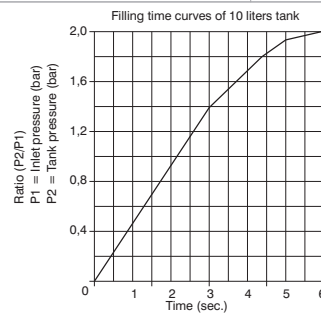
Ordering code

**17100.125.NR**

Flow rate curves



Filling curves



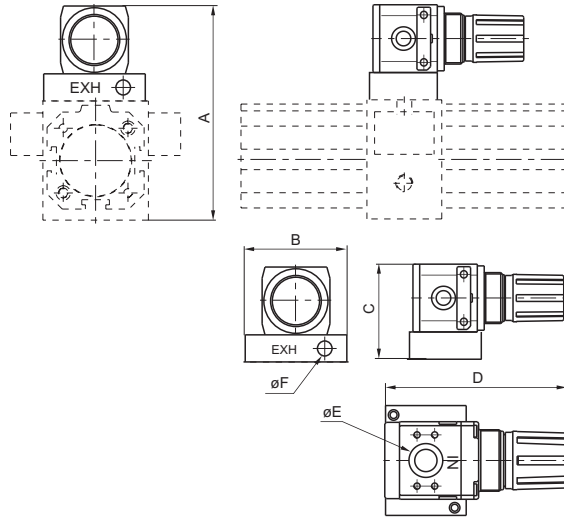
Operating Characteristics

- Self operating pressure booster with pressure ratio of 2:1.
- Automatic functioning: to operate the booster just connect it to compressed air line.
- Body made with light alloy.
- Barrel made of extruded and anodized aluminium.
- Downstream circuit pressure is kept under pressure even in absence of inlet pressure.
- Regulation of the inlet pressure (and as a consequence regulation of the outlet pressure)

Technical characteristics

Connections	G 1/2"
Max working pressure (bar)	2 - 8
Temperature °C	50°C
Nominal orifice diameter	ø 12 mm
Weight	gr. 12600
Assembly position	Any
Max. fittings torque	40 Nm

Base complete with pressure reducer



DIMENSIONS						
CODE	A	B	C	D	E	F
1740.BR	126	60	56	91	G1/8"	G1/8"
1763.BR	168	75	78	124	G3/8"	G3/8"

ø100 = Mount directly the pressure reducer Code 17302B.C

Ordering code

**17V.BR**

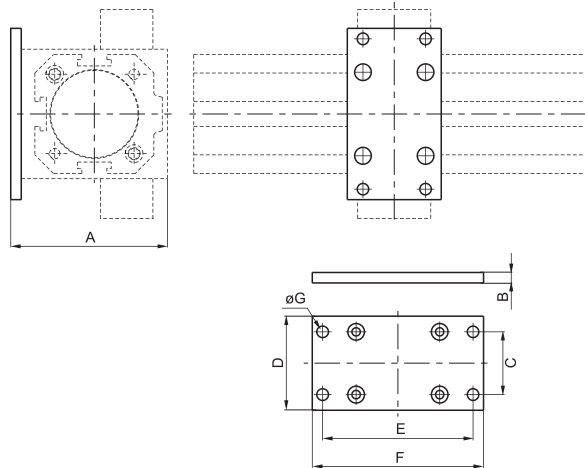
VERSION

40 = Base complete with pressure reducer for Ø40 booster

63 = Base complete with pressure reducer for Ø63 booster

3

Booster mounting plate



DIMENSIONS							
CODE	A	B	C	D	E	F	ØG
1740.02	75	5	30	45	72	82	5,5
1763.02	100	15	53	70	98	110	M8

ø100 = Use short foot bracket code 1320.50.05/1F

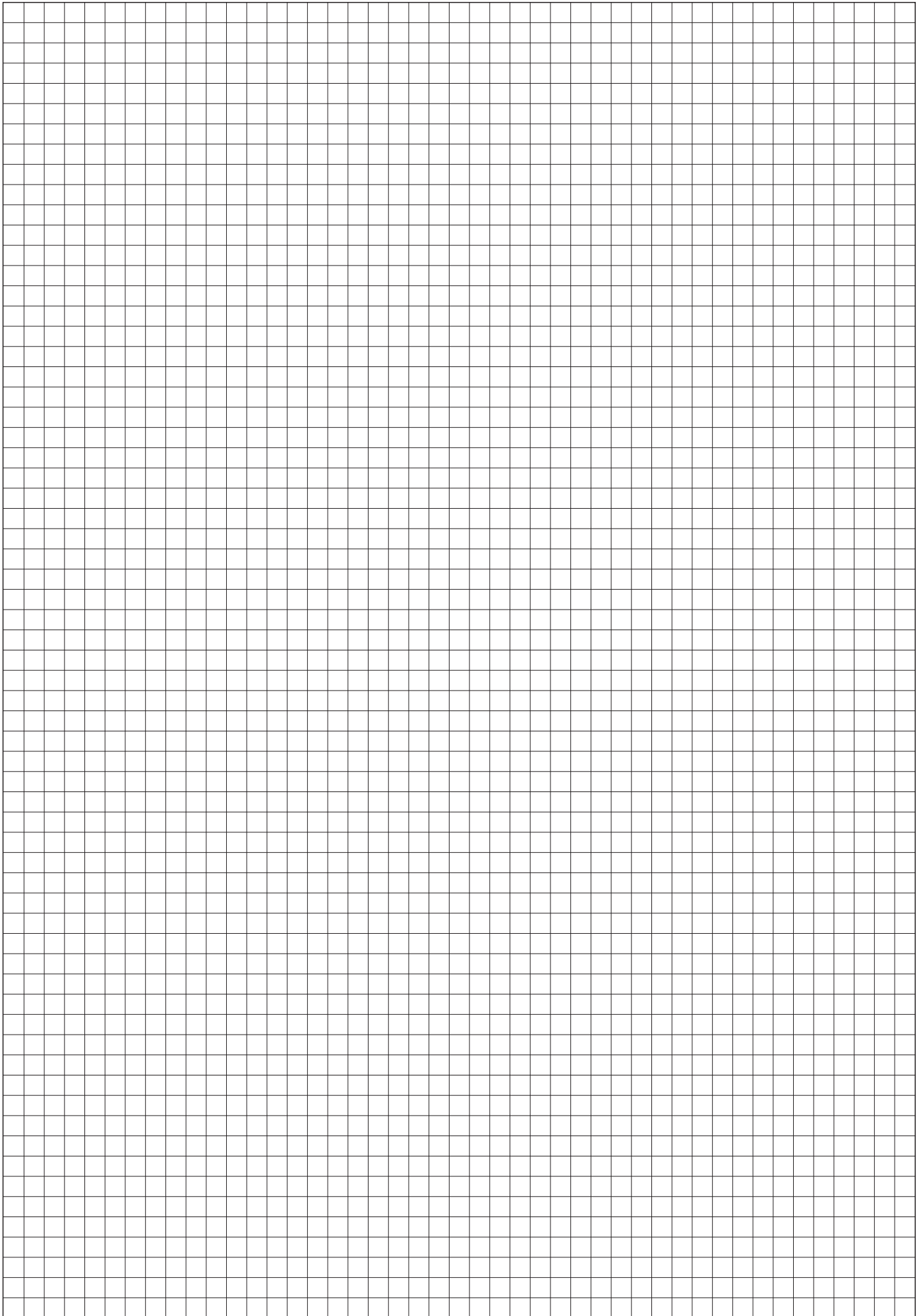
Ordering code

**17V.02**

VERSION

40 = Mounting plate for Ø40 booster

63 = Mounting plate for Ø63 booster





## Basic Information

In some cases the force generated by a pneumatic actuator is not sufficient to carry out its required function. To overcome this problem it is then necessary, where possible, to either increase the working pressure or use a larger bore actuator providing it will fit within the structure of the machine.

If you cannot fit a larger actuator, the solution is to use a pressure booster to increase the air pressure to that portion of the pneumatic circuit. The booster operates using the same compressed air used by the pneumatic system and does not require an external power supply. It is easy to install and can increase the working pressure in any part of the system where ever its needed, maintaining the normal working pressure in the rest of the system.

The new pressure booster **P+** is lightweight with a new compact and linear design, **P+** has an integrated pressure regulator that adjusts the setting of the output pressure  $P_2$  which is also fitted with a pressure relief valve. The design of the internal circuit provides high flow rates and fast filling times whilst the two G1/8" manometer connections built into the body of the booster allow monitoring of the input and output pressures.

## Operation

The operating principle of the device is based on a four chamber pump in which with a reciprocating movement, two chambers compress the air in the compression chamber whilst the fourth chamber is in the discharge phase. The incoming air passes through the non-return valves and supplies the compression chambers "A" and "B" at the same time.

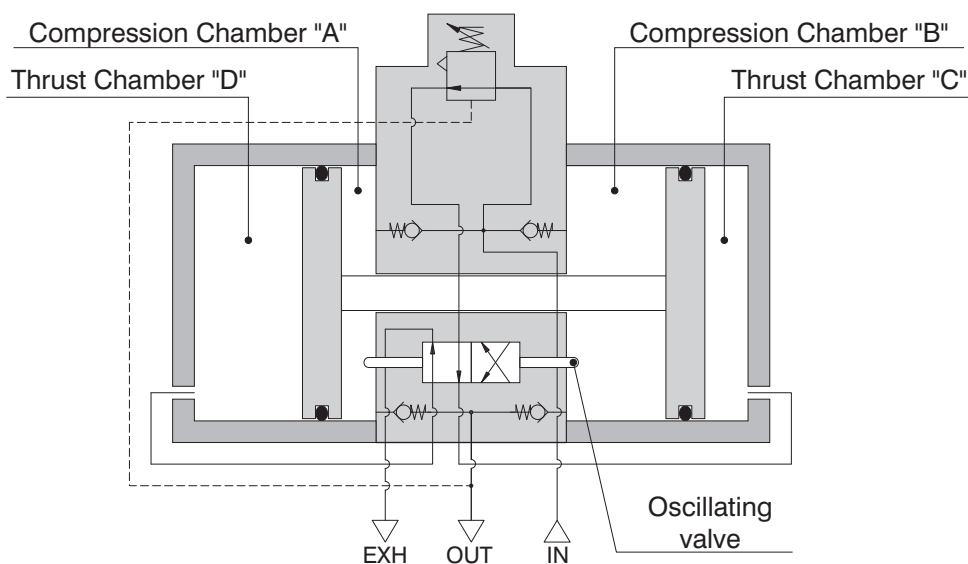
Meanwhile, the integrated pressure regulator feeds the thrust chamber "C" via the oscillating valve which in turn compresses the air in compression chamber "B", the air is then pushed through the non-return valve and exits through the outlet connection.

When the piston reaches the end of stroke the oscillating valve changes over and feeds chamber "D" putting chamber "C" into the discharge position, thus reversing the piston and compressing the air in compression chamber "A", pushing it through the non-return valve and out through the outlet connection.

The oscillating motion of the piston allows the pressure booster to pump intensified air into the downstream circuit until the chambers reach a state of equilibrium; this in turn stops the booster.

When the downstream pressure decays the booster restarts oscillating until the state of equilibrium is re-established.

Pneumatic Circuit



The **P+** pressure booster, is certified by ATEX:

CE II 3GD c T6 T85°C X 5°C ≤ Ta ≤ 50°C.



### General Warning

It is recommended you follow the instructions below in order to prevent personal injury or damage to the booster.

- The pressure booster is supplied as standard with the regulating spring completely unwound. In this condition it is possible to detect a leak of air from below the regulating knob or through the exhaust port. This condition is standard for the unit. When the spring is completely unwound the downstream pressure and the inlet pressure are the same. In order to increase the downstream pressure it is necessary to operate the regulation knob increasing the spring compression.
- Please apply the necessary safety measures to ensure that the booster only operates within the specified pressure range. Exceeding the maximum output pressure is dangerous.
- The booster is fitted with a non-return valve on the output which prevents discharge of the downstream pressure. It is recommended that a 3/2 valve be installed in the OUT connection if it is necessary to rapidly discharge the downstream pressure.
- When the booster is not in use it is recommended that the inlet pressure is removed to let the booster stop, thus avoiding unexpected operation or malfunction.
- If there is not downstream air consumption it is possible to register a leak through the exhaust port of the unit. This condition is normal and is the consequence of the internal design aimed at discharging any pressure building up in the unit in the rest condition.

### Use and maintenance



The pressure booster must always be used in accordance with the operating parameters and instruction; any improper use may cause injury or malfunction. The pressure booster is not an alternative to a compressor because continuous uninterrupted operation will greatly reduce the life of the unit.

- The operating life of the device depends mainly on the operational duty cycle. Prolonged uninterrupted use without pause may reduce the operating life of the booster.
- Ensure the unit is supplied with a suitable compressed air supply, please note: appropriate filtration and lubrication may help to increase the durability of the product.
- **The input flow value must be equal or greater than double the output flow value ( $Q1/Q2 > 2$ ).**
- **Ensure that the value of the output pressure is at least 1bar higher than the input pressure ( $P2 > P1 + 1$ ).**
- To avoid pulsation of the output pressure during operation, it is recommended that an accumulation tank (reservoir) is installed in the downstream circuit.
- Protect the booster exhaust ports from the ingress of dust or debris.
- To reduce the noise generated by the unit, install silencers into the exhaust ports.
- Pressure booster has an average life of about 20 millions of valve cycles, depending on working conditions (every back stroke corresponds to one valve cycle).

### Regolazione della pressione

The booster is fitted with an internal pressure regulator which allows regulation of the output pressure  $P2$  and is also fitted with pressure relief valve. For correct operation of the booster, please consider the following instructions:

- Air leaking from under the adjusting knob when the spring is decompressed is not a defect but a sign that the device is working correctly.
- In order to increase the regulated pressure, pull the knob upwards to unlock, then rotate the knob in the direction indicated by the arrow (+).
- To lock the knob after the adjustment has been made, push the knob downwards until it detents in the locked position.
- To reduce the output pressure, pull the knob upwards, rotate the knob indicated by the arrow (-), the built-in pressure relief valve will discharge the excess pressure from under the adjusting knob.
- Always regulate the rising pressure.



**Method of calculation of the time necessary to increase the pressure in a tank of a given volume using a pressure booster.**

**DATA:**

- P1 = Inlet pressure
- P2' = Initial tank pressure
- P2'' = Final tank pressure
- V = Tank volume

**PROCEDURE:**

- 1) Calculate the K' ratio between the initial tank pressure and the inlet booster pressure (P2'/P1).
- 2) Calculate the K'' ratio between the final tank pressure and the inlet booster pressure (P2''/P1).
- 3) Locate, on the chart illustrating, the booster filling time, the intersection point between the K' ratio and the curve, then trace a vertical line from the intersection point to the vertical axis and read the correspondent value T' (in the example chart, to a ratio of 0.8 corresponds a time value of about 3.6 seconds).
- 4) Repeat the operation for the K'' ratio, obtaining the T'' time.

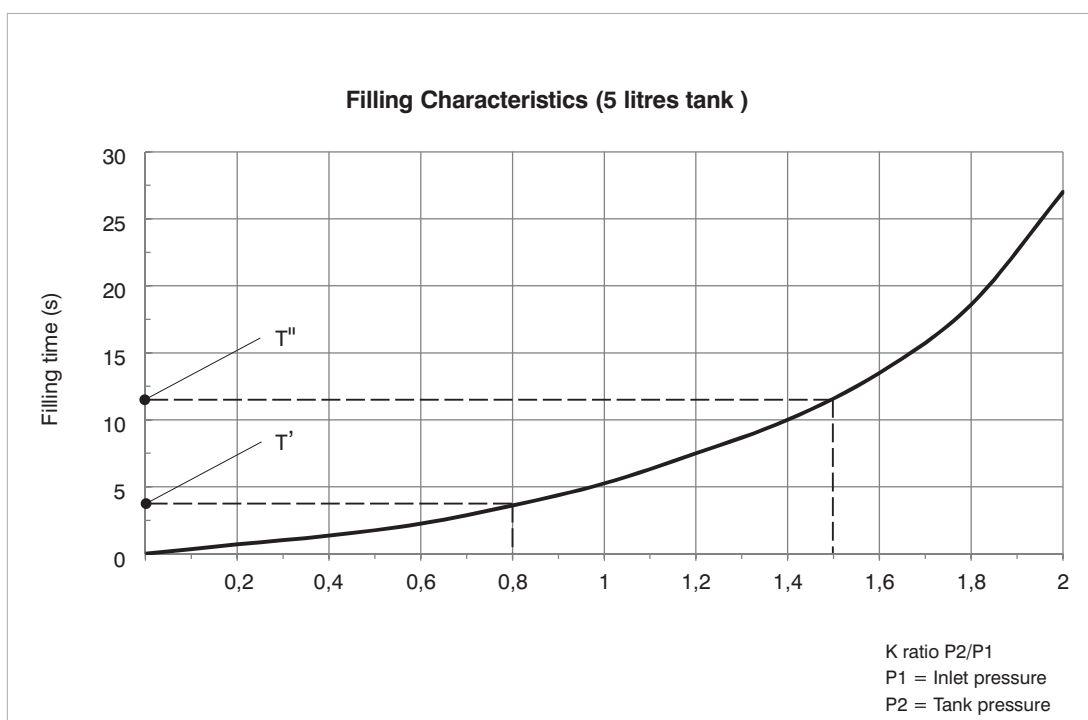
5) Apply the formula  $T = \frac{V}{5} \cdot (T'' - T')$

to obtain the total time needed to take the tank of volume V from the pressure value P2' to the pressure value P2''.

Example of calculation of the necessary time to take a 10L tank from the pressure value P2' to the value P2''

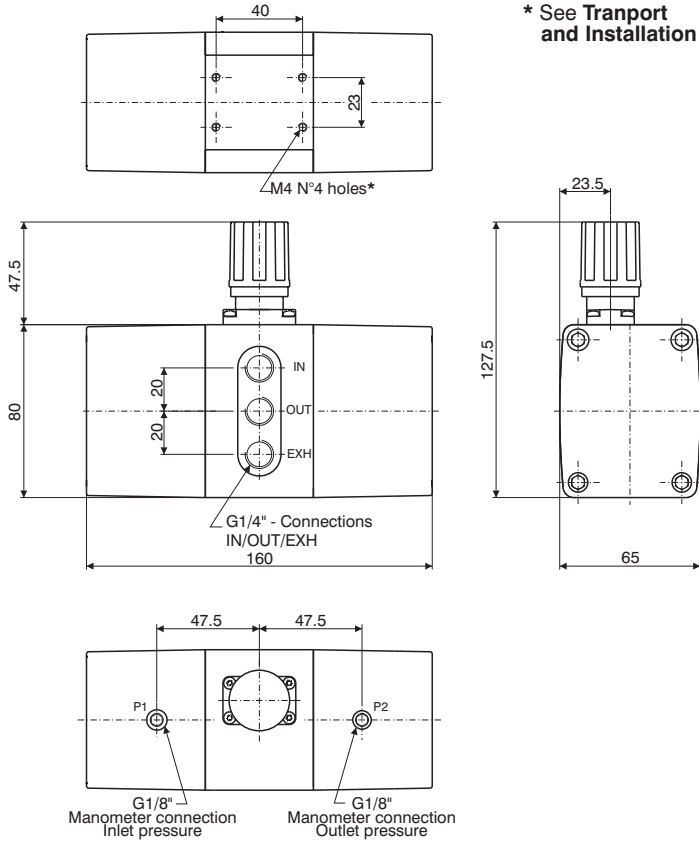
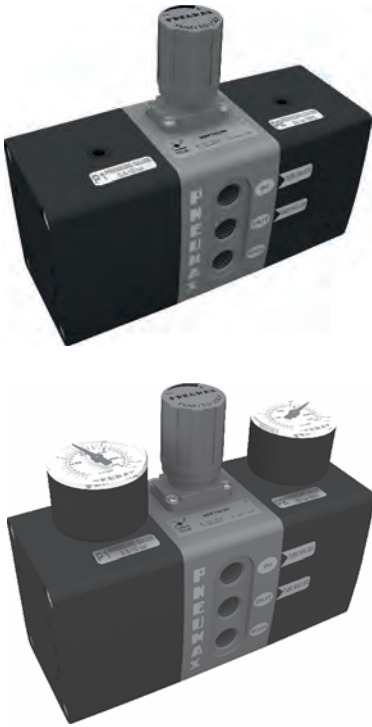
K' = 0,8    T' = 3,6 sec.    V = 5L.  
K'' = 1,5    T'' = 12 sec.

$T = \frac{5}{5} \cdot (12 - 3,6) = 8,4 \text{ sec.}$





Pressure booster in Technopolymer Ø40  
ATEX CE II 3GD



\* See Transport and Installation

Ordering code

**MDPT40.2R.⊙**

MANOMETER OPTIONS  
Without options = Standard without manometer

- A = Manometer P1 0-12 bar  
Manometer P2 0-20 bar
- ⊙** B = Manometer P1 0-12 bar  
Manometer P2 0-16 bar
- C = Manometer P1 0-12 bar  
Manometer P2 0-12 bar

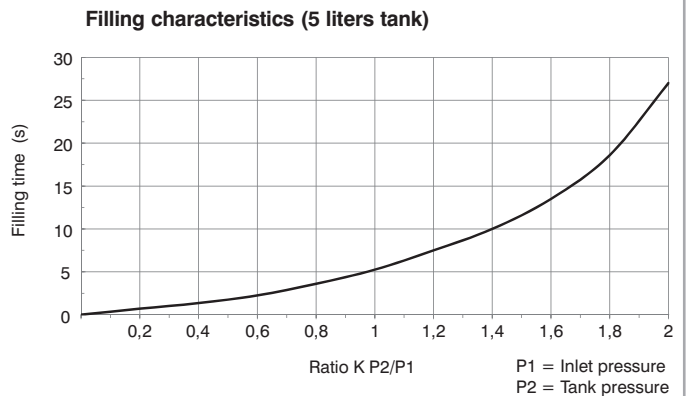
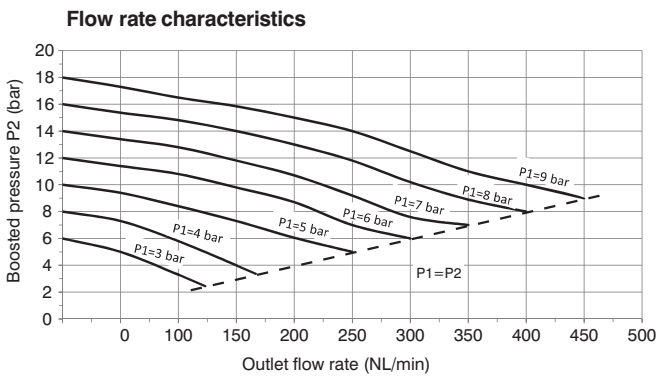
**Operational characteristics**

- Pressure Booster with max. 2:1 Compression ratio
- Automatic operation for use with compressed air only
- Maintains downstream air when the supply pressure fails (Providing the circuit has no leakage)
- Integrated regulator for output pressure control, with overpressure relief valve
- IN,OUT and EXH connections – G1/4” on the same side
- Manometer connections G1/8” to monitor and control the input and output pressures
- Body and cover in technopolymer
- Connections in technopolymer

**Technical characteristics**

Connections ( IN / OUT / EXT )	G1/4"
Manometer connections P1/P2	G1/8"
Working pressure ( bar ) [ Min. - Max. ]	2,5 ÷ 10
Working temperature ( °C ) [ Min. - Max. ]	-5 ÷ + 50
Multiplication ratio max.	2 : 1
Assembly position	Any
Pressure regulation	Manual with relieving
Weight	905 gr.
Max. fittings torque	G1/8 = 4 N/m G1/4 = 9 N/m

**Characteristics curves**



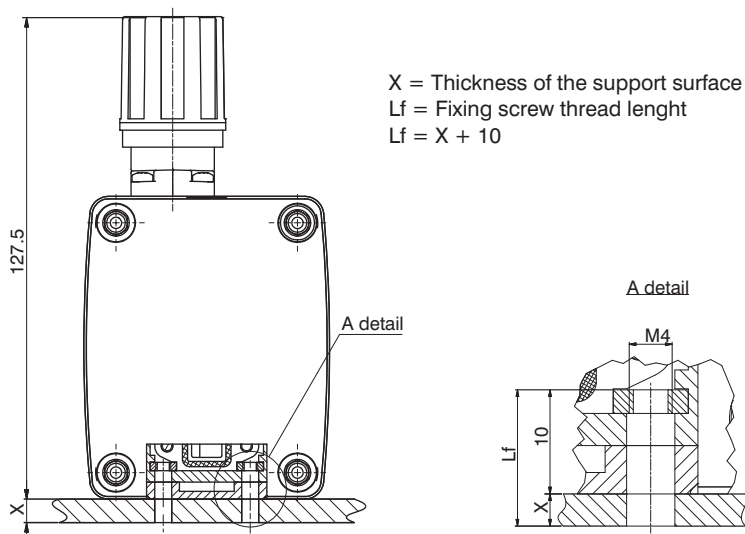
### Transport and Installation:

The installation and implementation of the device must be done by skilled personnel. Respecting the safety requirements specified in the UNI norm **UNI EN 983-97 Machinery Safety – Safety Requirements concerning oleo-hydraulic and pneumatic systems** and their components.

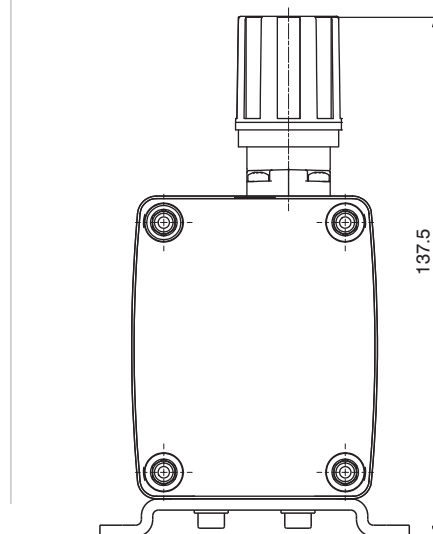
The following instructions are essential for a correct installation:

- Do not use the green knob to lift and transport the device, because it could rip off causing injuries or damaging objects..
- Install the booster by fixing it through the threaded M4 holes on the body of the machine or using the special accessories (see the "Accessories" chapter).

#### Direct Wall Fixing



#### Fixing with a steel plate fixing clamp.

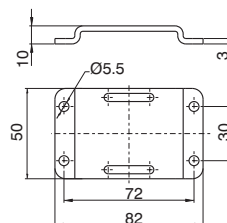
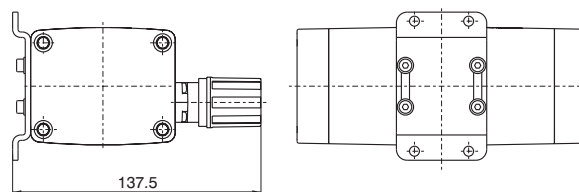


### Series P+ Accessories

#### Bracket

Ordering code

**T1740.01**



Weight gr. 94,5  
Complete with booster fixing screws

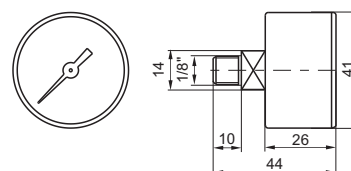
#### Manometer D.40

Ordering code

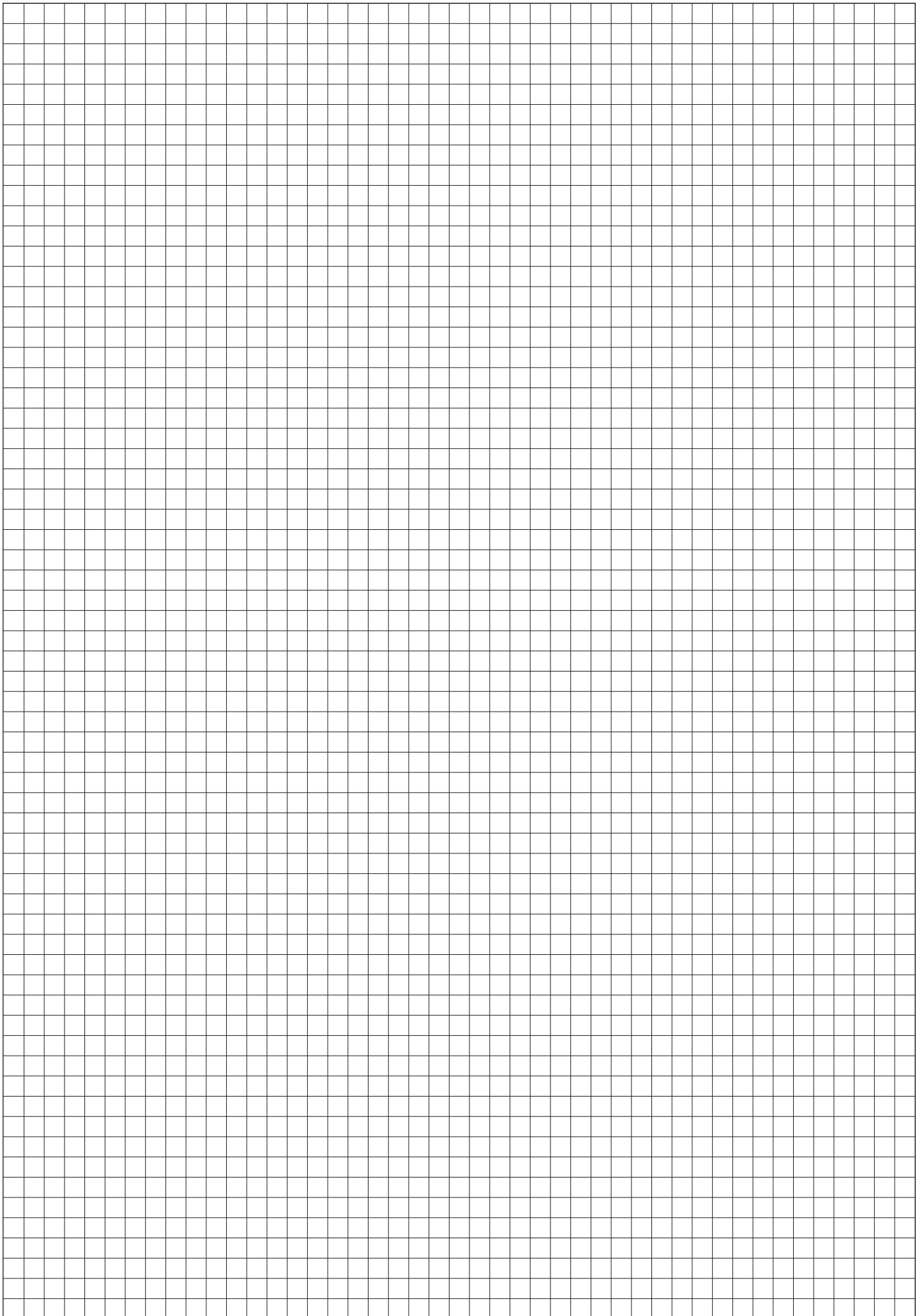
**17070A.Ⓢ**

SCALE  
A = 0-4 bar  
B = 0-6 bar  
C = 0-12 bar  
D = 0-16 bar  
E = 0-20 bar

Ⓢ

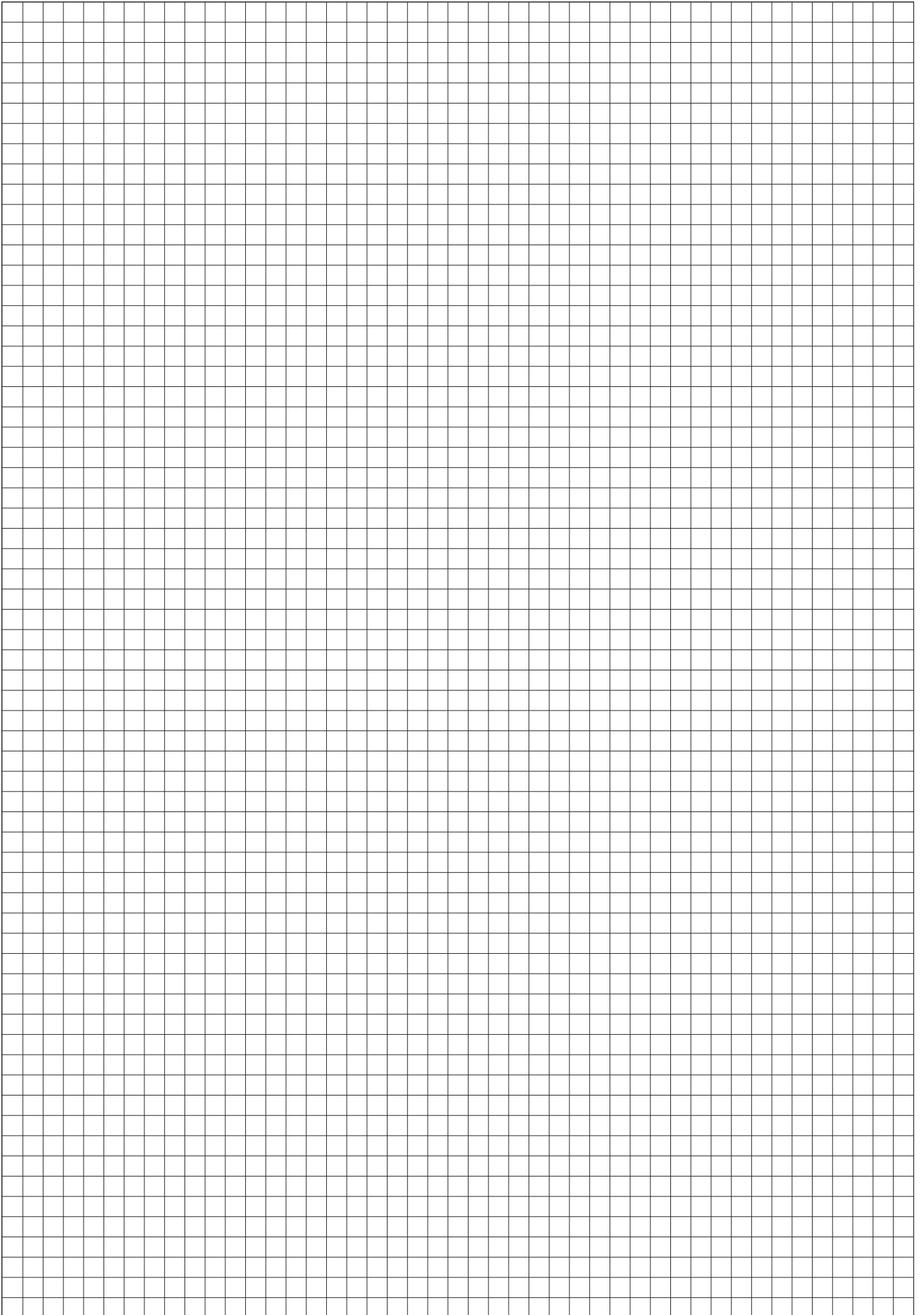


Weight gr. 85





3





## General

The operational safety and durability of a pneumatic circuit depends on the quality of the compressed air. The compressed air and the moisture increase the rate of wear of the surfaces and seals, reducing the efficiency and the life of the pneumatic components. Furthermore the pressure fluctuation due to a discontinuous demand of air, adversely effect the correct operation of the circuit. To eliminate these disadvantages it is essential to install the service unit: filter, presure regulator and lubricator.

## Construction and working characteristics

The new FRL units AIRPLUS series represents the evolution of the well known and consolidated 1700 series.

The main features are increased performances, reliability, easy and fast assembly and the introduction of the latest technical features.

With the exception of the air intake module and the pressure switch module all elements are available in two configurations: with technopolimer connections (IN and OUT) , (T series), or with metal threaded inserts , (N series).

Bowls made of transparent polycarbonate (PC) are fitted with a bowl protection guard which is assembled on the body via a quick coupling mechanism provided with a safety button. The filter, available with three filtration grades (5 $\mu$ m, 20 $\mu$ m and 50 $\mu$ m) is fitted as standard with a drain mechanism which can be operated manually or semi-automatically. The regulator is based on the rolling diaphragm technology with low hysteresis and the system is balanced. The unit can be fitted with integrated flush mounting pressure gauge (0 to 12 bar range).

4 pressure ranges are available going from 0 to 12 bar and the regulating knob can be blocked in position simply by pressing it down. A dedicated version is available for battery mounting , up to a maximum of 6 units. The lubricator is based on the Venturi principle and the oil quantity is regulated via the adjusting screw positioned don the transparent polycarbonate (PC) regulating dome which also ensure clear visibility of the oil flow and regulation. The oil suction pipe is fitted as standard with a sintered filter which ensures that any contaminant that should be present in the oil will reach the down stream circuit. Shoot off valve is available in two versions, one manually operated and one solenoid operated. In both cases the unit is fitted with a threaded connection for depressurising the downstream circuit. On the manually operated version, in the lock position, it is possible to fit up to three locks in order to prevent the accidental pressurization of the pneumatic circuit avoiding accidents or damages.

The solenoid operated version is available with a 15mm or with a 22mm solenoid valve. The soft start valve ensure a progressive pressurization of the down stream circuit avoiding sudden pressure surges which could be dangerous for the devices fitted on the down stream circuit. The filling time can be easily adjusted via a built in flow regulator. The full flow rate is allowed only once the down stream pressure has reached 50% of the value of the inlet pressure. The pressure switch module which can be set between 2 and 10 bar and the air intake module complete the range. The elements are joint together via dedicated quick coupling technopolimer flanges which allows for the units to be panel mounted moreover ensure the possibility to replace any component without disassembling the FRL group from its position.

90° mounting brackets and standard gauges are also available.

## Instruction for installation and operation

The FRL unit must be installed as close as possible to the application.

The air flow direction must follow the directions indicated on the single units in correspondance of the threaded connections. (IN and OUT)

Units provided with bowl must be mounted vertically with the bawl facing down. Single units or groups can be panel mounted via the Y type flanges, regulators and filter-regulators can be mounted via the 90° zinc plated steel bracket. In order to mount the 90° bracket it is necessary to remove the regulating knob and then the locking ring before positioning the bracket. All units must be operated according to the specified pressure and temperature ranges; fittings must be mounted without exciding the maximum torque allowed. Ensure that the units cover plates are in position before pressure is applied. The cover plates are needed to lock in position the top part of the unit. The condense level in filer and filter-regulators bowls must never exceed the maximum level indicated on the bowls. With manual or semi automatic drain the condense can be discharged via a 6/4mm tube directly connected to the drain tap. On the pressure regulator the pressure value must always set wile pressure is rising and ideally the unit pressure range should be chosen based on the pressure value to be regulated. Lubricators must be filled with class FD22 and HG32 oils. Ensure, both on the inlet and on the outlet , that the flow rate is above the minimum flow rate required to operate the unit. Below this value the units does not operate.

The oil quantity can be regulated via the regulating screw on the transparent polycarbonate dome through which it is also clearly visible the oil flow. A drop every 300-600 litres should be allowed. The oil refill can take place only with the bowl not under pressure. This size does not have the dedicated oil re-fill plug.

The manual shot off valve needs, to be operated, a push and turn action (clockwise) in order to close it and discharge the down stream circuit it is necessary to turn anti clock wise the knob. The soft start valve is used to slowly and progressively pressurize the down stream circuit, the time needed to do so can be set by means of the built in flow regulator. The soft start valve on its own does not allow for the down stream circuit to be discharged, in order to do so it is necessary to combine it with a shot off valve ( to be mounted upstream).

## Maintenance



**For any maintenance which requires the removal of the top plugs/ supports from the body it is necessary to preventively remove the sides cover plates. If the top plugs/supports are removed with the sides plates still in their position the unit could be permanently damaged.**

Bowls , plugs and supports are assembled with a bayonet type mechanism. In order to remove them rotate anti clockwise until the mechanical stop is reached and than remove from the body (for the bowls firstly press down the green safety button).

Bowls and transparent parts can be cleaned with water and neutral soap. Do not use solvents or alcohol.

Filtering elements (from filters and filter regulators ) made of HDPE can be regenerated by washing and blowing them. In order to remove them it is necessary to remove the bowl unscrew the filter element and replace it with a new one or clean it.

The oil refill process can take place only if the bowl in not pressurized. The oil refill plug is not available on this size.

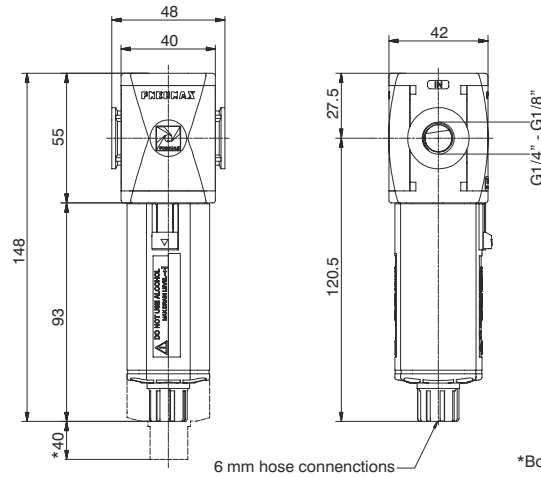
Should the pressure regulator not perform properly or should present a constant leakage from the relieving replaced the diaphragm by unloading completely the regulating spring before removing the regulation support.

Any other maintenance operation, in consideration of the complexity of the assembly, and the need of a through test according to the Pneumax spa specification, should be carried out by the manufacturer.

## Fittings maximum recommended torque applicable

THREAD	Technopolymer version (T)	Metal version (N)
G1/8"	4 Nm	15 Nm
G1/4"	9 Nm	20 Nm
G3/8"	16 Nm	25 Nm
G1/2"	22 Nm	30 Nm

Filter (F)

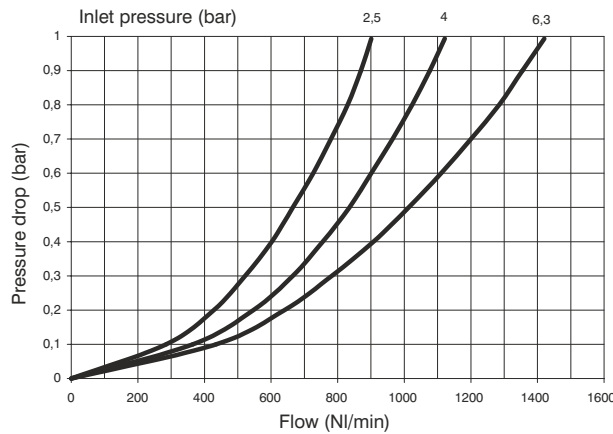


6 mm hose connections

\*Bowl removal maximum height

Example: T171BFB : size 1, Filter with Technopolymer threads, G1/4" connections, 20 µm filter pore size

3 Flow rate curves

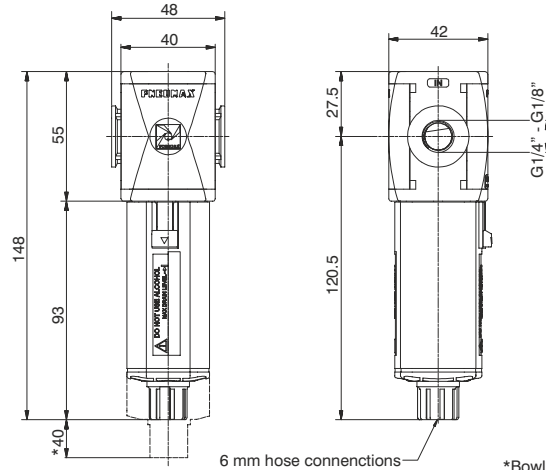


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Double filtering action: air flow centrifugation and filter element</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V171CF50Z</b>
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	<b>CONNECTIONS</b> A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	-5°C +50°C	<b>FILTER PORE SIZE</b> A = 5 µm B = 20 µm C = 50 µm
	Weight with Technopolymer threads	gr. 120	
	Weight with threaded inserts	gr. 130	<b>OPTIONS</b> = Standard * S = Automatic drain
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	18 cm <sup>3</sup>	<b>BOWL OPTIONS</b> = Standard * Z = Nylon bowl
	Assembly positions	Vertical	
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm		
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm		

**Note**  
In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

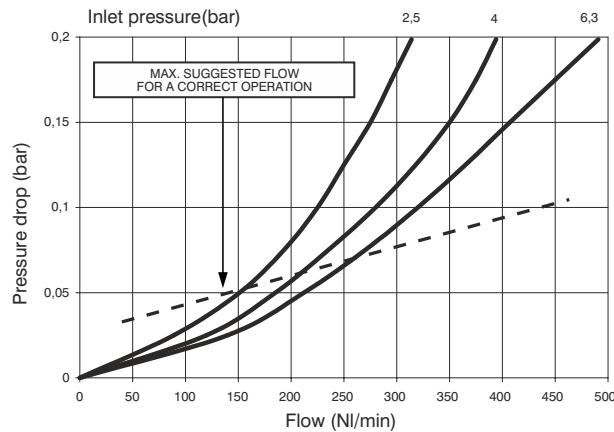
\* no additional letter required

Coalescing filter (D)



Example : T171BDA : Coalescing size 1, Filter with Technopolymer threads, G1/4" connections, filter efficiency 99,97%

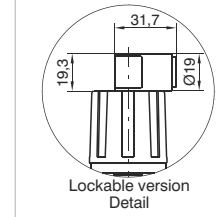
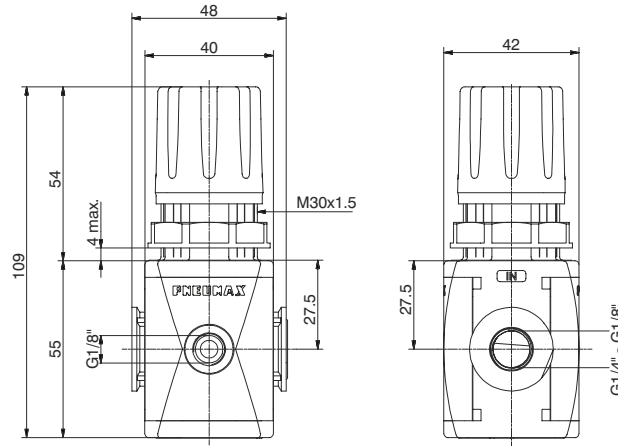
Flow rate curves



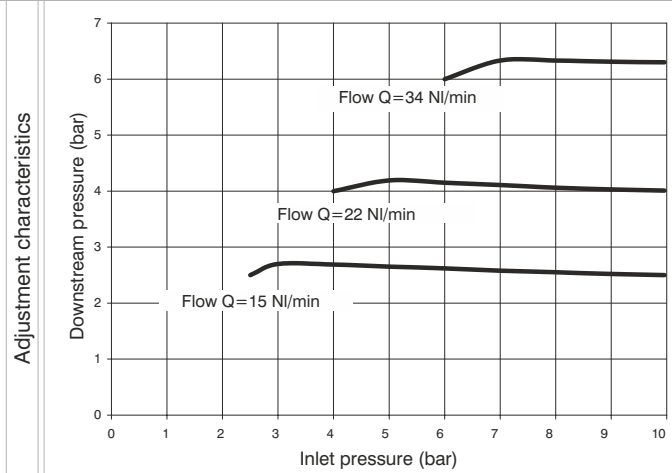
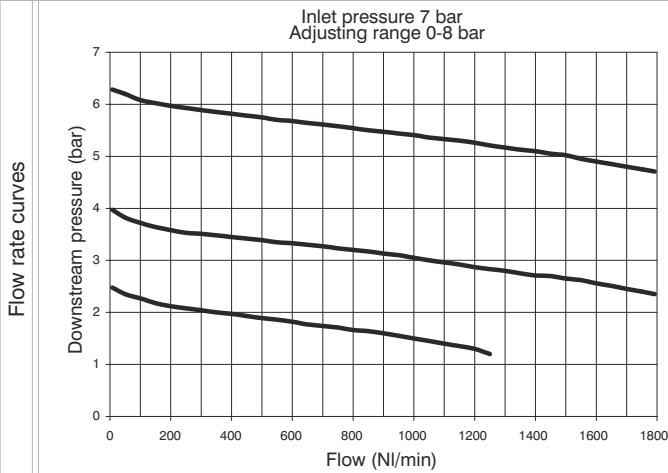
Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Coalescing filter element with filtration grade of 0.01µm</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V1710DE02</b>
	Max. inlet pressure	13 bar	
<p><b>Note</b></p> <p>In order to ensure a better grade of filtration it is recommended to use a 5 µm filter before the coalescing filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.</p>	Minimum working pressure with automatic drain	0,5 bar	VERSION V N = Metal inserts T = Technopolymer thread
	Maximum working pressure with automatic drain	10 bar	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Working temperature	-5°C +50°C	FILTER EFFICIENCY A = 99,97%
	Weight with Technopolymer threads	gr. 125	OPTIONS O = Standard * S = Automatic drain
	Weight with threaded inserts	gr. 135	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Filter efficiency with 0,01 µm particle	99,97%	
	Bowl capacity	18cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	

\* no additional letter required

Regulator (R)



Example: T171BRC : size 1, Regulator with Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range



**Operational characteristics**

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

**Note**

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

**Technical characteristics**

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight with Technopolymer threads	gr. 130
Weight with threaded inserts	gr. 140
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

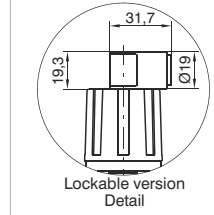
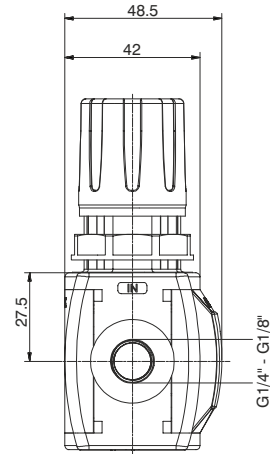
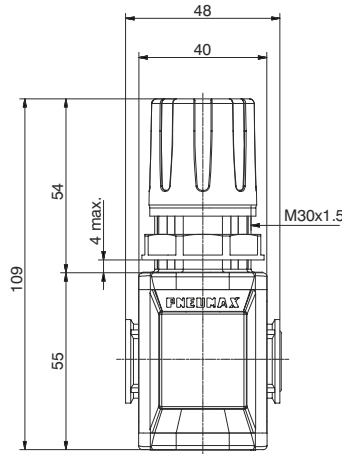
**Ordering code**

**V1710RGT0**

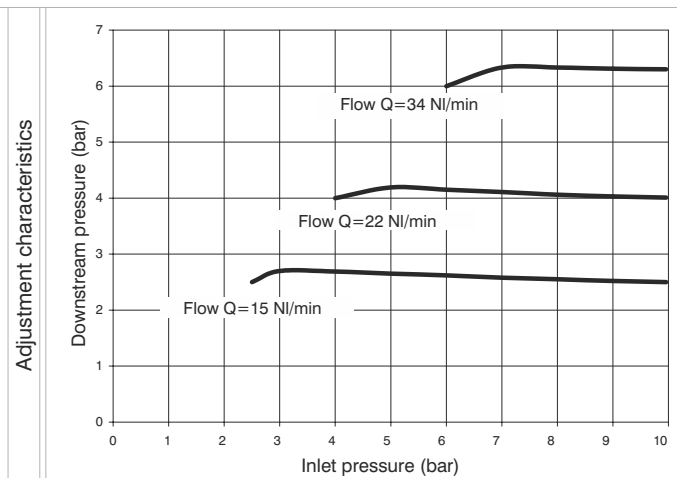
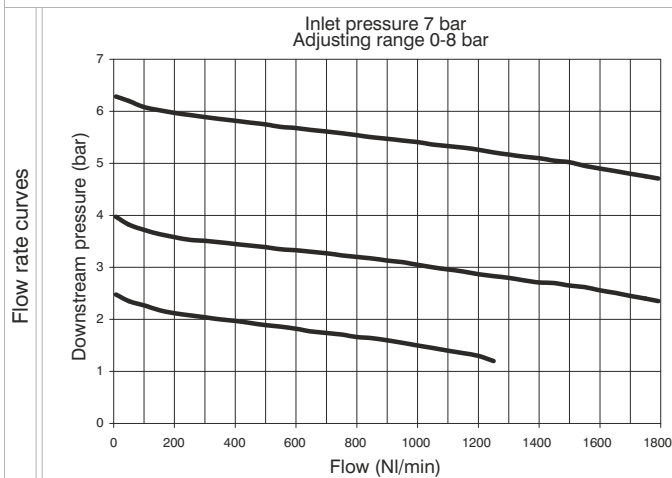
<b>VERSION</b>	
<b>V</b> N = Metal inserts	
T = Technopolymer thread	
<b>CONNECTIONS</b>	
<b>G</b> A = G1/8" (only for "N" version)	
B = G1/4"	
C = 1/4 NPT (only for "N" version)	
<b>ADJUSTING RANGE</b>	
A = 0-2 bar	
<b>G</b> B = 0-4 bar	
C = 0-8 bar	
D = 0-12 bar	
<b>TYPE</b>	
= Standard *	
<b>T</b> F = Controlled refill + improved relieving	
L = no relieving	
R = Improved relieving	
<b>OPTIONS</b>	
= Standard *	
<b>O</b> K = Lockable version	

\* no additional letter required

**Regulator including gauge (RM)(RW)**



Example : T171BRMC : size 1, Regulator including gauge with Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range



**Operational characteristics**

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

**Note**

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

**Technical characteristics**

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 140
Weight with threaded inserts	gr. 150
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

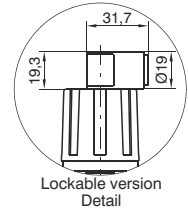
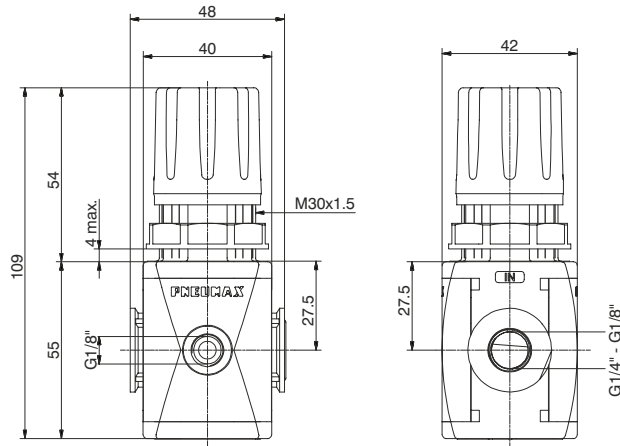
**Ordering code**

**V171CRDGT**

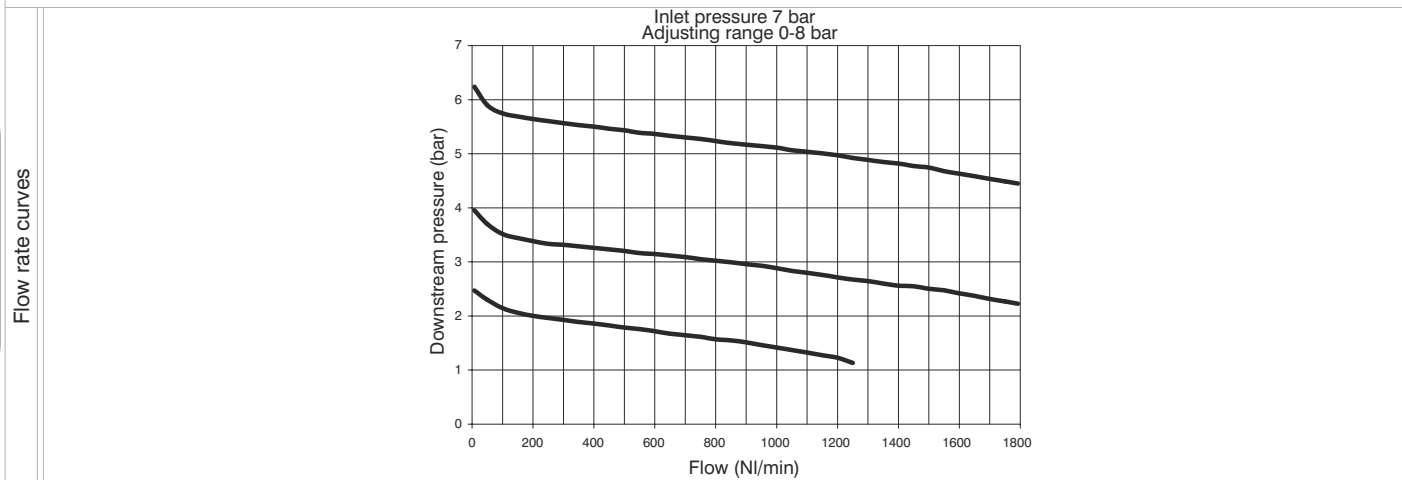
<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>C</b>	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
<b>D</b>	FLOW DIRECTION M = from left to right W = from right to left
<b>G</b>	ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
<b>T</b>	TYPE = Standard * F = Controlled relief + improved relieving L = no relieving R = Improved relieving
<b>O</b>	OPTIONS = Standard * K = Lockable version

\* no additional letter required

Modular pressure regulator (B)



Example: T171BBC : size 1, Regulator with Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range



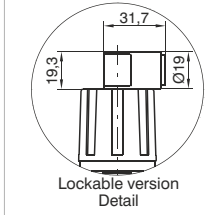
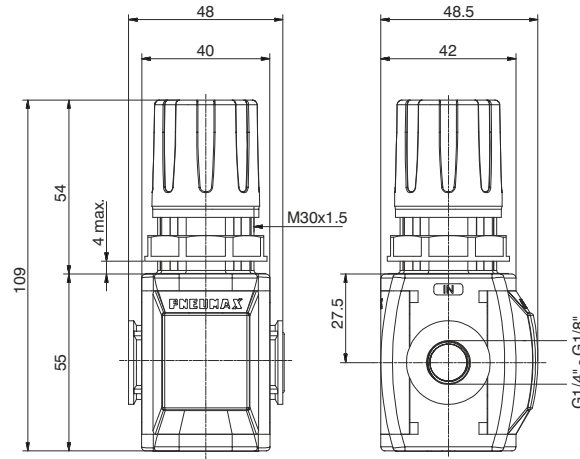
Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- G1/8" output front connection.</li> <li>- Air supply can be applied by both directions.</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V171BCTO</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version) ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar TYPE = Standard * F = Controlled refiel + improved relieving L = no relieving R = Improved relieving OPTIONS = Standard * K = Lockable version
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Pressure gauge connections	G 1/8"	
	Weight with Technopolymer threads	gr. 130	
	Weight with threaded inserts	gr. 140	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	

**Note**  
The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

\* no additional letter required

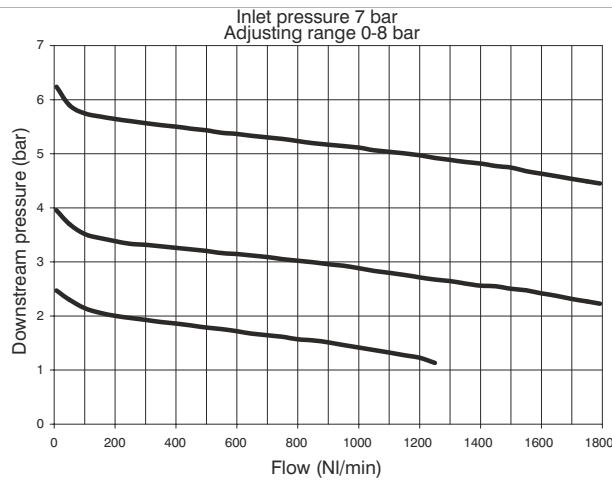
3  
Flow rate curves

**Modular pressure regulator including manometer (M)**



Example : T171BMC : size 1, Regulator including gauge with Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range

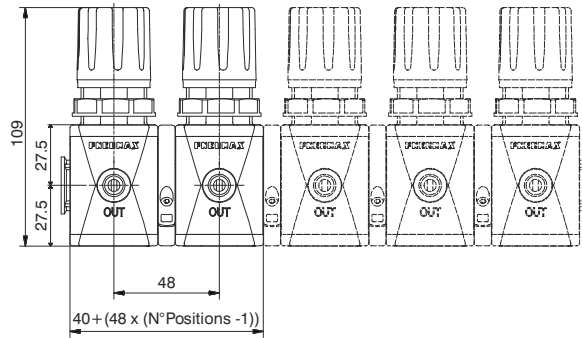
Flow rate curves



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- G 1/8" output connection positioned on the opposite side of the built in gauge.</li> <li>- Air supply can be applied by both directions.</li> <li>- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V171CMGT0</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version) ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar TYPE = Standard * F = Controlled relief + improved relieving L = no relieving R = Improved relieving OPTIONS = Standard * K = Lockable version
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 140	
	Weight with threaded inserts	gr. 150	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.		



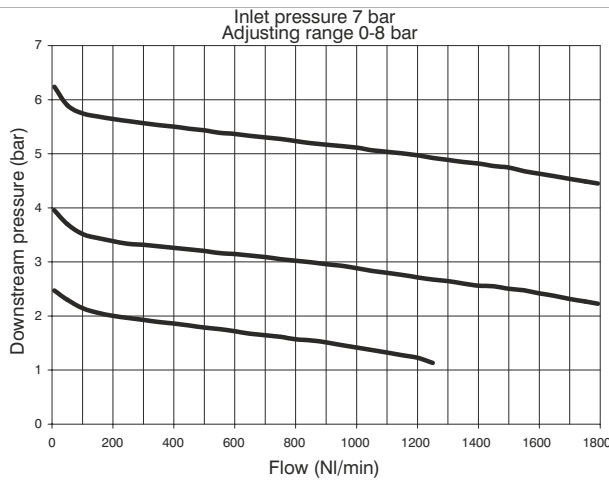
Manifold pressure regulators



Example: GT171BB4CCCC : Combined group comprising 4 size 1 Regulators Technopolymer threads, G1/4" connections and 0 to 8 bar adjusting range

3

Flow rate curves



Ordering code

**GV171CTNCGGGGGGG**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
TYPE	
T	B = Standard with flanges X M = Manometer included with flanges X W = Standard with flanges Y Z = Manometer included with flanges Y
NUMBER REGULATORS	
N	2 = 2 regulators 3 = 3 regulators 4 = 4 regulators 5 = 5 regulators 6 = 6 regulators
ADJUSTING RANGE 1	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
ADJUSTING RANGE 2	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
ADJUSTING RANGE 3	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
ADJUSTING RANGE 4	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
ADJUSTING RANGE 5	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
ADJUSTING RANGE 6	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar

Operational characteristics

- Inlet pressure common for the whole manifold of regulator.
- A maximum of 6 regulators can be mounted
- Air supply can be applied by both directions.

Note

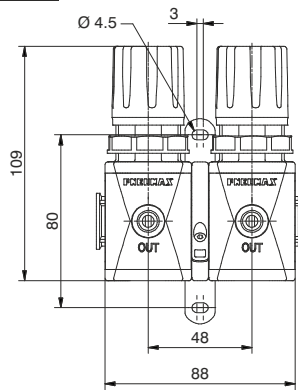
The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

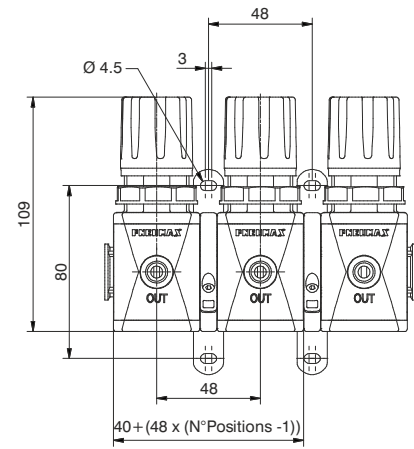
Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C + 50°C
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	indifferent
Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

Dimensions with Y type flanges

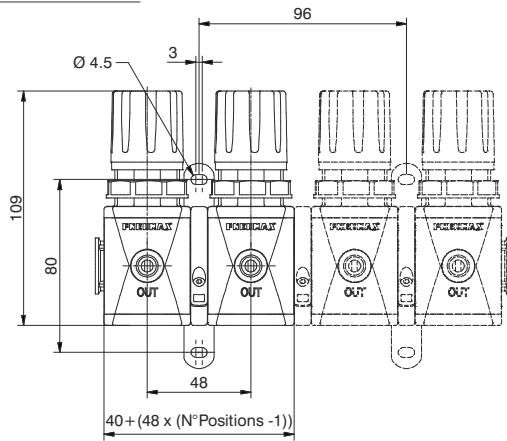
2 position manifold



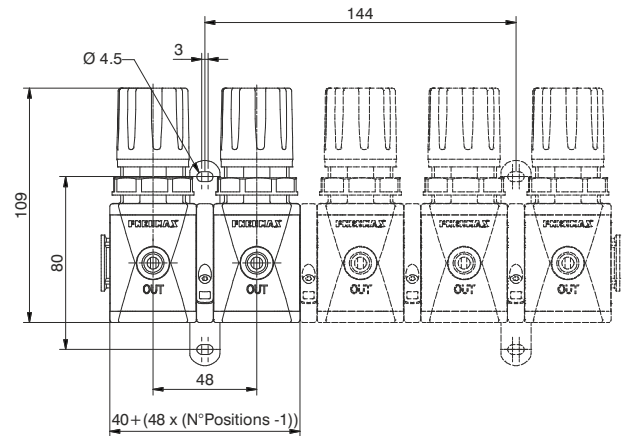
3 position manifold



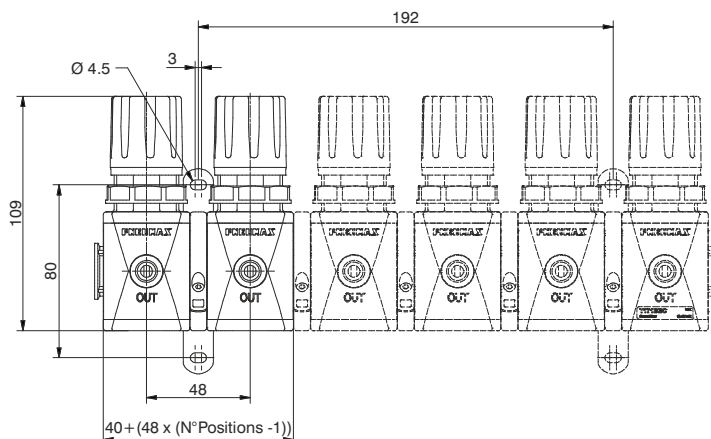
4 position manifold



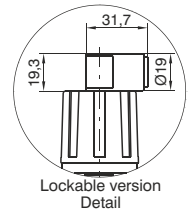
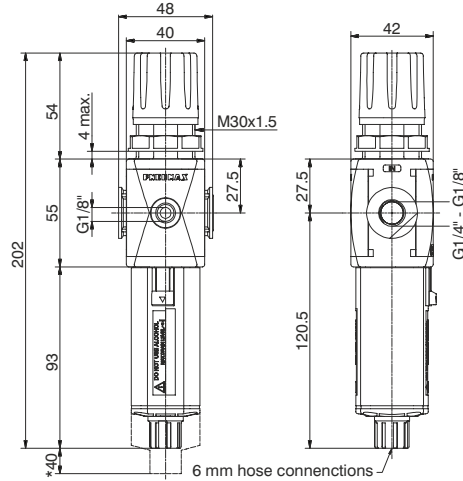
5 position manifold



6 position manifold

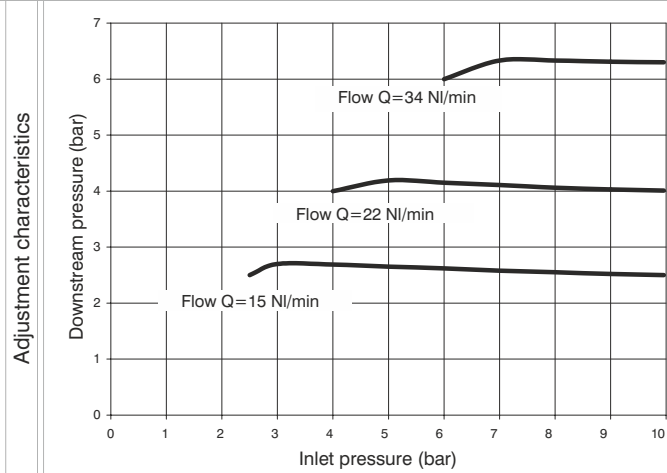
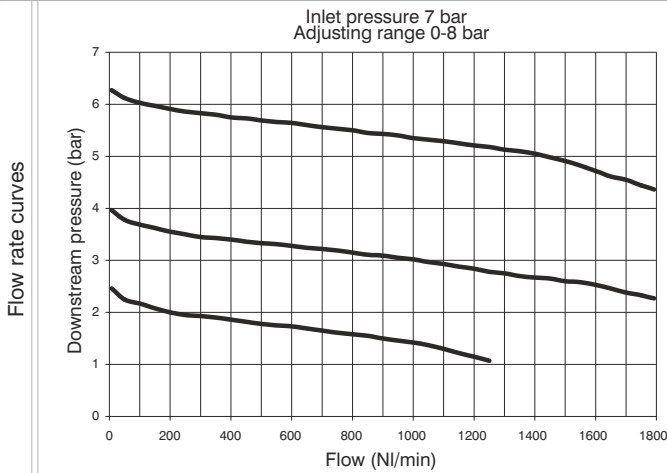


Filter-Regulator (E)



\*Bowl removal maximum height

Example : T171BEBC : size 1, Filter-regulator with Technopolymer threads, G1/4" connections, 20 µm filtering pore size, 0 to 8 bar adjusting range



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.
- Transparent bowl made of polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight with Technopolymer threads	gr. 190
Weight with threaded inserts	gr. 200
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	18 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

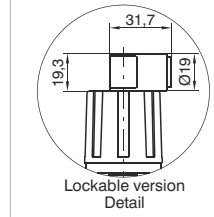
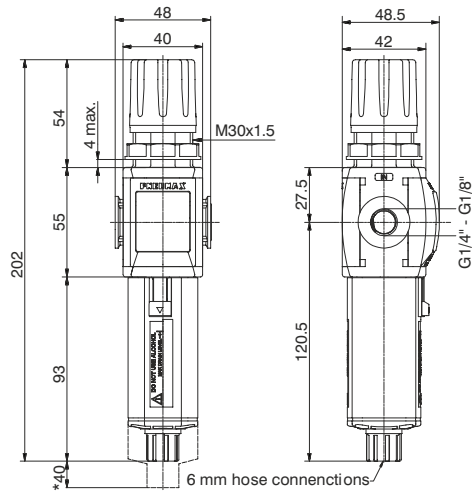
Ordering code

**V171CESGT0Z**

- VERSION
- V** N = Metal inserts
- T = Technopolymer thread
- CONNECTIONS
- C** A = G1/8" (only for "N" version)
- B = G1/4"
- C = 1/4 NPT (only for "N" version)
- FILTER PORE SIZE
- S** A = 5 µm
- B = 20 µm
- C = 50 µm
- ADJUSTING RANGE
- A = 0-2 bar
- G** B = 0-4 bar
- C = 0-8 bar
- D = 0-12 bar
- TYPE
- T** = Standard \*
- S = Automatic drain
- OPTIONS
- O** = Standard \*
- K = Lockable version
- BOWL OPTIONS
- Z** = Standard \*
- N = Nylon bowl

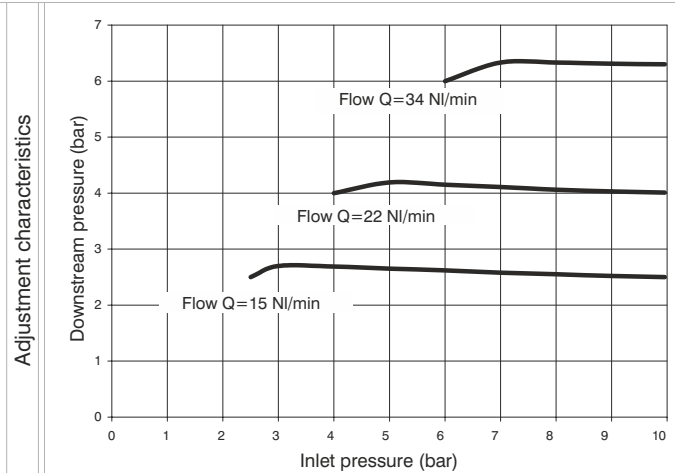
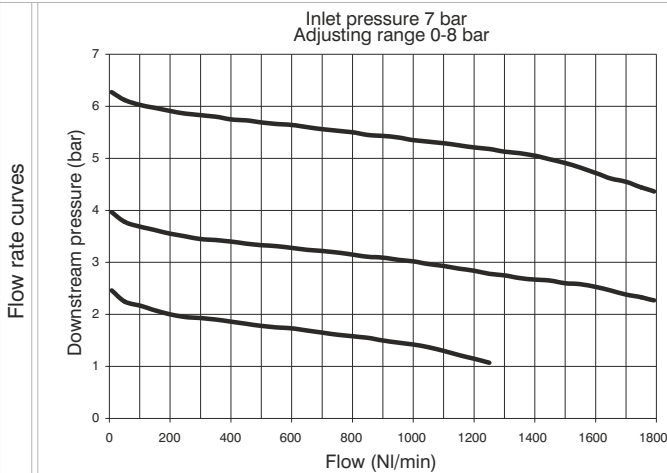
\* no additional letter required

**Filter-regulator including gauge (EM)(EW)**



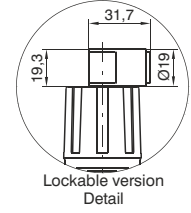
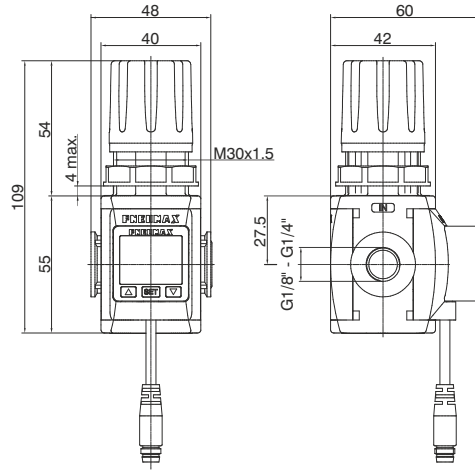
\*Bowl removal maximum height

Example: T171BEMBC : size 1, Filter-Regulator including gauge with Technopolymer threads, G1/4" connections, with 20 µm filtering pore size, 0 to 8 bar adjusting range

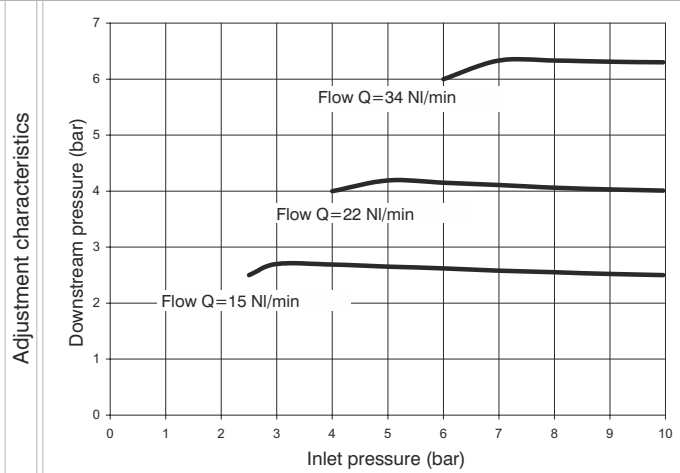
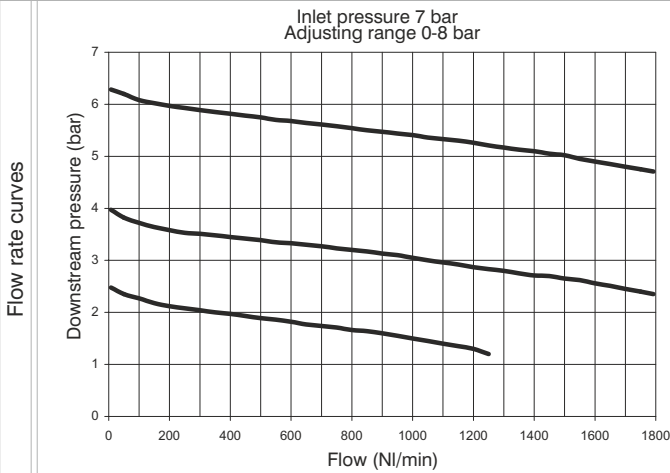


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V171CEDSGT0Z</b> VERSION V N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version) FLOW DIRECTION D M = from left to right W = from right to left FILTER PORE SIZE A = 5 µm B = 20 µm C = 50 µm ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar TYPE T = Standard * S = Automatic drain OPTIONS O = Standard * K = Lockable version BOWL OPTIONS Z = Standard * N = Nylon bowl * no additional letter required
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 200	
	Weight with threaded inserts	gr. 210	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	18 cm <sup>3</sup>	
Assembly positions	Vertical		
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm		
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm		
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.			

Regulator with pressure switch (RP)(RZ)



Example : T171BRPCA : size 1, Regulator with Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	0°C +50°C
Weight with Technopolymer threads	gr. 140
Weight with threaded inserts	gr. 150
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

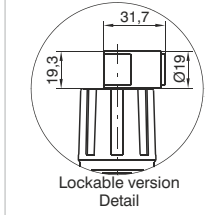
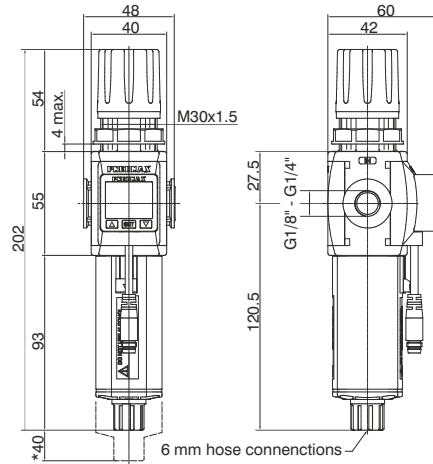
Ordering code

**V171OROGTOP**

<b>V</b>	VERSION
N	Metal inserts
T	Technopolymer thread
<b>CONNECTIONS</b>	
<b>G</b>	A = G1/8" (only for "N" version)
	B = G1/4"
	C = 1/4 NPT (only for "N" version)
<b>FLOW DIRECTION</b>	
<b>D</b>	P = from left to right
	Z = from right to left
<b>ADJUSTING RANGE</b>	
<b>G</b>	A = 0-2 bar
	B = 0-4 bar
	C = 0-8 bar
	D = 0-12 bar
<b>TYPE</b>	
	= Standard *
<b>T</b>	F = Controlled refill + improved relieving
	L = no relieving
	R = Improved relieving
<b>OPTIONS</b>	
<b>O</b>	= Standard *
	K = Lockable version
<b>PRESSURE SWITCH OPTION</b>	
<b>P</b>	A = Cable 150 mm + M8 PNP
	B = Cable 150 mm + M8 NPN
	C = Cable 2 mt. PNP
	D = Cable 2 mt. NPN

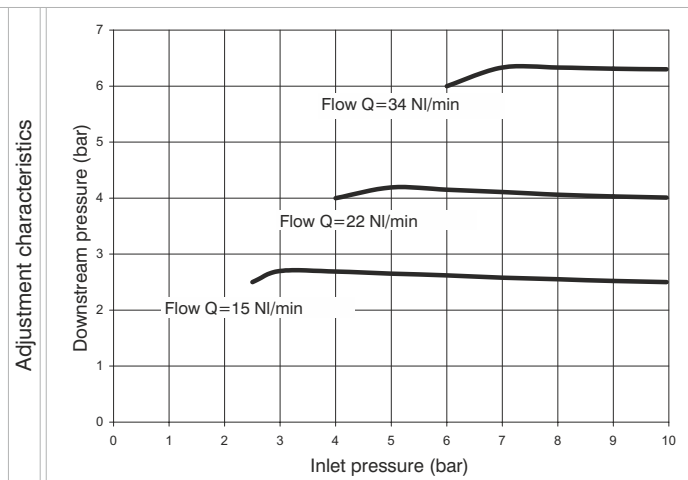
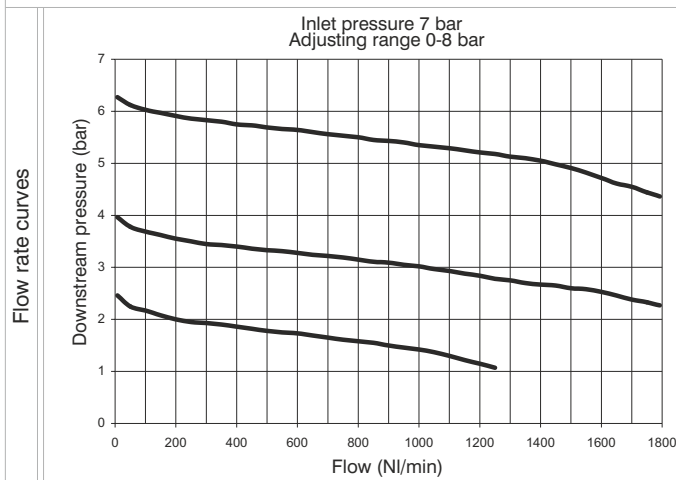
\* no additional letter required

Filter regulator with pressure switch (EP)(EZ)



\* Bowl removal maximum height

Example: T171BEPBCA : size 1, Filter-regulator with Technopolymer threads, G1/4" connections, 20 µm filtering pore size, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Pressure switch as standard</li> </ul>	<p>Connections</p> <p>Max. inlet pressure</p> <p>Minimum working pressure</p> <p>with automatic drain</p> <p>Maximum working pressure</p> <p>with automatic drain</p> <p>Working temperature</p> <p>Weight with Technopolymer threads</p> <p>Weight with threaded inserts</p> <p>Pressure range</p> <p>Filter pore size</p> <p>Bowl capacity</p> <p>Assembly positions</p> <p>Max. fitting torque</p> <p>(with Technopolymer threads)</p>	<p>G 1/8" - G 1/4"</p> <p>13 bar</p> <p>0,5 bar</p> <p>10 bar</p> <p>0°C +50°C</p> <p>gr. 200</p> <p>gr. 210</p> <p>0-2 bar / 0-4 bar</p> <p>0-8 bar / 0-12 bar</p> <p>5 µm - 20 µm - 50 µm</p> <p>18 cm<sup>3</sup></p> <p>Vertical</p> <p>G1/4" = 9 Nm</p>	<p><b>V171CEDSGTOPZ</b></p> <p>VERSION</p> <p>V N = Metal inserts</p> <p>T = Technopolymer thread</p> <p>CONNECTIONS</p> <p>A = G1/8" (only for "N" version)</p> <p>B = G1/4"</p> <p>C = 1/4 NPT (only for "N" version)</p> <p>FLOW DIRECTION</p> <p>D P = from left to right</p> <p>Z = from right to left</p> <p>FILTER PORE SIZE</p> <p>S A = 5 µm</p> <p>B = 20 µm</p> <p>C = 50 µm</p> <p>ADJUSTING RANGE</p> <p>G A = 0-2 bar</p> <p>B = 0-4 bar</p> <p>C = 0-8 bar</p> <p>D = 0-12 bar</p> <p>TYPE</p> <p>T = Standard *</p> <p>S = Automatic drain</p> <p>OPTIONS</p> <p>O = Standard *</p> <p>K = Lockable version</p> <p>PRESSURE SWITCH OPTION</p> <p>P A = Cable 150 mm + M8 PNP</p> <p>B = Cable 150 mm + M8 NPN</p> <p>C = Cable 2 mt. PNP</p> <p>D = Cable 2 mt. NPN</p> <p>BOWL OPTIONS</p> <p>Z = Standard *</p> <p>N = Nylon bowl</p>
<p><b>Note</b></p> <p>The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.</p>	<p>Max. fitting torque</p> <p>(with threaded inserts)</p>	<p>G1/8" = 15 Nm</p> <p>G1/4" = 20 Nm</p>	<p>* no additional letter required</p>

3

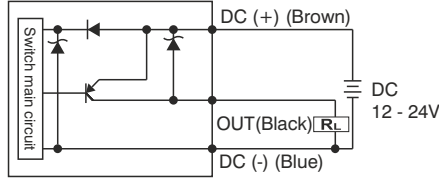


### CHARACTERISTICS

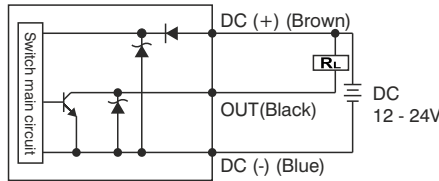
- 3 color digital LCD display, easy readout
- 4 units of measurement for pressure indication
- PNP and NPN output
- N.O. and N.C. output contact
- Not available individually, but only with a Regulator or a Filter-regulator

### OUTPUT CIRCUIT WIRING DIAGRAMS

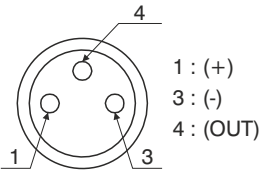
#### PNP output



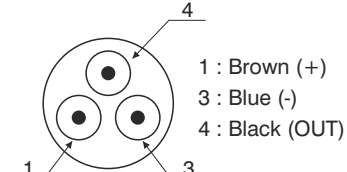
#### NPN output



#### M8 CONNECTOR PIN LAY OUT



#### 3 WIRES CABLE LAY OUT



### Cable ordering code

- MCH1** cable 3 wires l=2,5m with M8 connector  
**MCH2** cable 3 wires l=5m with M8 connector  
**MCH3** cable 3 wires l=10m with M8 connector

Connector



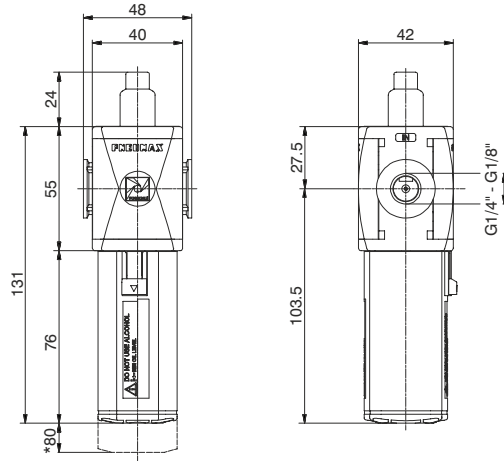
### TECHNICAL CHARACTERISTICS

Adjusting range	0 - 10 bar / 0 - 1MPa
Max. inlet pressure	15 bar / 1,5 MPa
Fluid	Filtered and dehumidified air
Display unit of measurement	MPa - kgf/cm <sup>2</sup> - bar - psi
Supply voltage	12 - 24 VDC
Current consumption	≤40mA (without load)
Digital output type	NPN - PNP
Type of contact	Normally Open - Normally Closed
Max. load current	125 mA
Digital output activation mode	single threshold with fixed hysteresis - window with fixed hysteresis - window without hysteresis
Digital output activation time	0.05s - 0.25s - 0.5s - 1s - 2s - 3s (selections for chattering-proof function)
Display characteristics	Double 3 1/2 digit display Digital output status indication Three-pushbuttons touchpad
Indicator accuracy	≤±2% F.S. ± 1 digit
Protection grade	IP 40
Temperature	0 - 50 °C
Cable section	3 x 0,129mm <sup>2</sup> , Ø4 mm, PVC





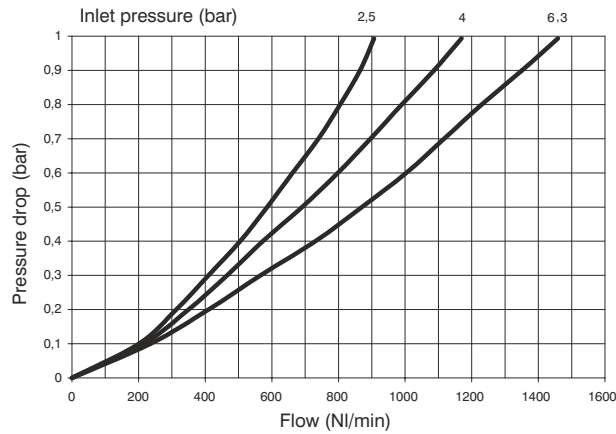
Lubricator (L)



\*Bowl removal maximum height

Example : T171BL : size 1, Lubricator with Technopolymer threads, G1/4" connections

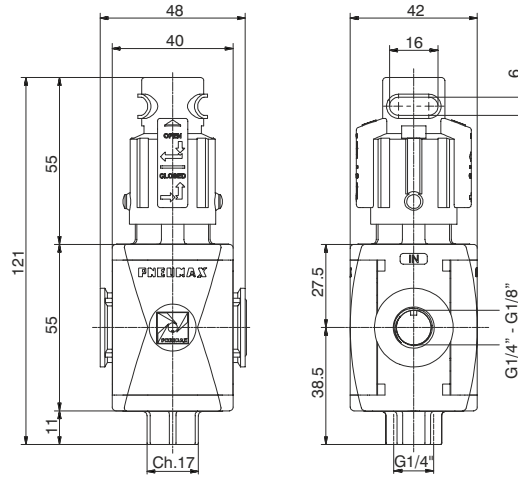
Flow rate curves



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Oil mist lubrication with variable orifice size in function of the flow rate</li> <li>- Oil quantity regulation mechanism and oil quantity visualization dome made of polycarbonate.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> </ul>	Connections	G 1/8" - G 1/4"	<b>V171CLZ</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	Weight with Technopolymer threads
<b>Note</b> Install as close as possible to the point o fuse Do not use alcohol , deterging oils or solvents.	Weight with threaded inserts	gr. 120	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Indicative oil drop rate	1 drop every 300/600 NI	* no additional letter required
	Oil type	FD22 - HG32	
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
Min. operational flow at 6,3 bar	40 NI/min.		

3

Shut-off valve (VL)



Example: T171BVL : size 1, Shut-off valve with Technopolymer threads, G1/4" connections

Operational characteristics

- Manual operated 3 ways poppet valve.
- Double handle action for valve opening: pushing and rotating (clockwise).
- The valve can be closed and the down stream circuit depressurized by rotating anticlockwise the knob.
- Knob lockable with three padlocks.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Discharge connection	G1/4"
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 100
Weight with threaded inserts	gr. 110
Assembly positions	Indifferent
Handle opening and closing angle	90°
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm
Nominal flow rate at 6 bar with Δp=1	1400 NI/min.
Exhaust nominal flow rate at 6 bar with Δp=1	550 NI/min.

Ordering code

**V171CVL**

VERSION

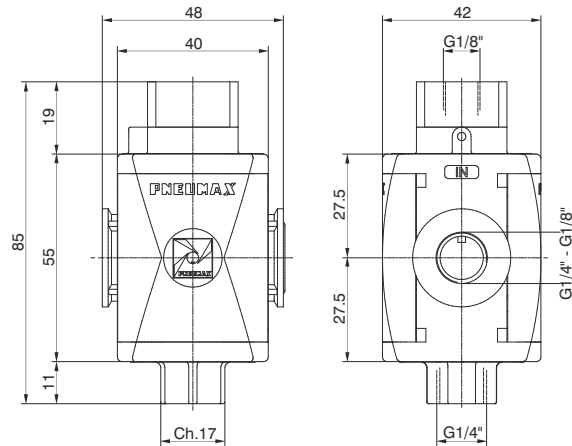
- N = Metal inserts
- T = Technopolymer thread

CONNECTIONS

- A = G1/8" (only for "N" version)
- B = G1/4"
- C = 1/4 NPT (only for "N" version)

3

## Pneumatic shut-off valve (VP)



Example: T171BVP : size 1, Pneumatic shut-off valve with Technopolymer threads, G1/4" connections

## Operational characteristics

- Pneumatic operated 3 ways poppet valve.
- When the pneumatic signal is removed the valves exhaust the pneumatic circuit

## Technical characteristics

Connections	G 1/8" - G 1/4"
Discharge connection	G1/4"
Pilot port size	G1/8"
Working temperature	-5°C +50°C
Weight with technopolymer threads	gr. 94
Weight with threaded inserts	gr. 99
Assembly positions	Indifferent
Min. pressure working	3 bar
Max. pressure working	10 bar
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm
Nominal flow rate at 6 bar with $\Delta p=1$	1400 NI/min.
Exhaust nominal flow rate at 6 bar with $\Delta p=1$	550 NI/min.

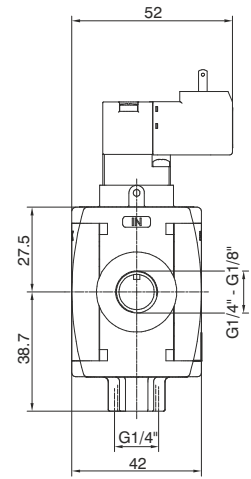
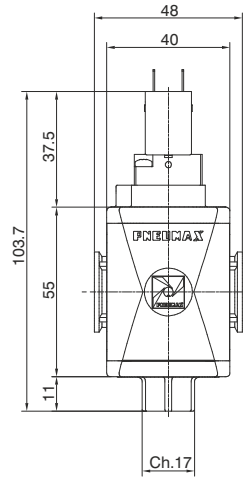
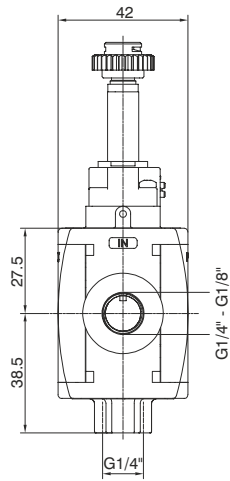
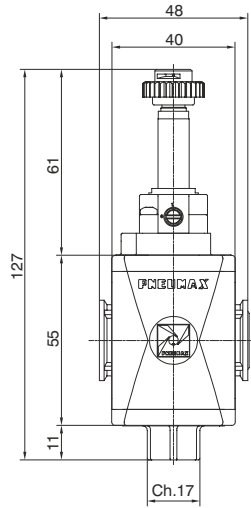
## Ordering code

**V171CVP**

<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>C</b>	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)

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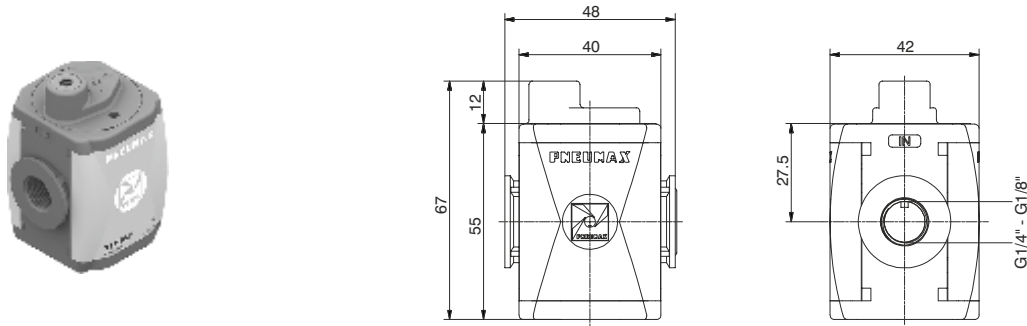
Electric shut-off valve (VE)



Example : T171BVEB2 : size 1, Electric shut-off valve, with M2 pilot without coil, Technopolymer threads, G1/4" connections

Operational characteristics	Technical characteristics		Ordering code
- Solenoid operated 3 ways poppet valve. - The model fitted with 15 mm pilots uses pilots series N33_0A and N33_0E (1 Watt)	Supply and operating connections	G 1/8" - G 1/4"	<b>V171CVEA</b>  VERSION N = Metal inserts T = Technopolymer thread  CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)  15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt)  22 mm COIL VOLTAGE B2 = Without coil M2 mechanic A B4 = 12 V DC B5 = 24 V DC B6 = 24 V AC (50-60 Hz) B7 = 110 V AC (50-60 Hz) B8 = 230 V AC (50-60 Hz) B9 = 24 V DC (2 Watt)  30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
	Discharge connections	G 1/4"	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	130 g	
	Weight with threaded inserts	140 g	
	Assembly positions	Indifferent	
	Min. Pressure working	3 bar	
	Max. Pressure working	10 bar	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
Nominal flow rate at 6 bar with Δp=1	1400 NI/min.		
Exhaust nominal flow rate at 6 bar with Δp=1	550 NI/min.		

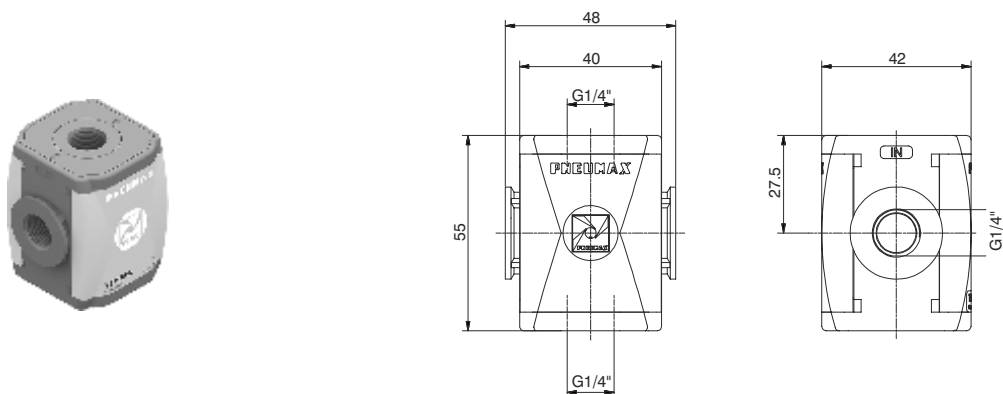
**Progressive start-up valve (AP)**



Example : T171BAP : size 1, Progressive start-up valve with Technopolymer threads, G1/4" connections

Operational characteristics	Technical characteristics		
- Down stream circuit filling time regulated via a built in flow regulator. - Full pressure is allowed once the down stream circuit pressure reaches 50% of the inlet pressure.	Connections	G 1/8" - G 1/4"	<b>Ordering code</b> <b>V171CAP</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 70	
	Weight with threaded inserts	gr. 80	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Assembly positions	Indifferent	
	Min. pressure working	2,5 bar	
	Nominal flow rate at 6 bar with Δp=1	1400 NI/min.	
	Fully open built in flow regulator flow rate	75 NI/min.	

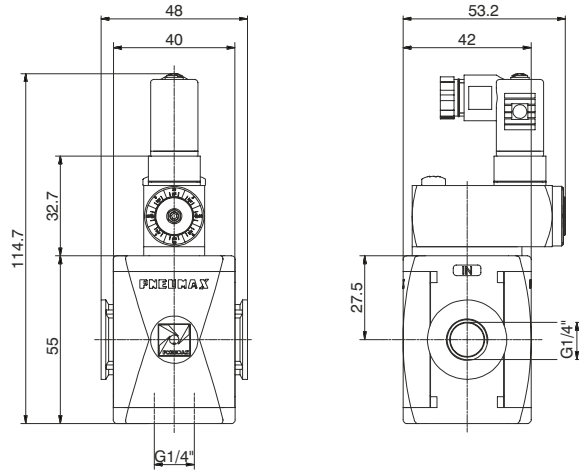
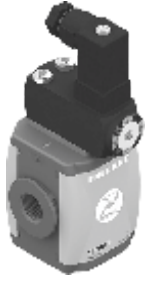
**Air intake (PA)**



Example : T171BPA : size 1, Air intake with Technopolymer threads, G1/4" connections

Operational characteristics	Technical characteristics		
- Available with two G1/4" threaded connections.  <b>Attention</b> For this product are available only Technopolymer connections	Connections	G 1/4"	<b>Ordering code</b> <b>T171BPA</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight	gr. 52	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	

**Pressure switch (PP)**



Example: T171BPP : Size 1, Pressure switch with Technopolymer threads, G1/4" connections

**Operational characteristics**

- Built in adjustable pressure switch (2 to 10 bar) with electrical connection.
- G1/4" threaded connection on the bottom face.
- The electrical connection is made by mean of a 15 mm connector DIN 43650 type C. The microswitch contact could be normally closed or open (change overswitch).

**Attention**

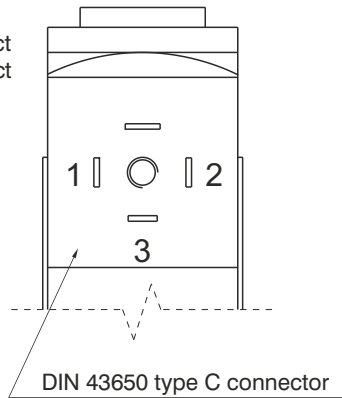
For this product are available only Technopolymer connections

**Technical characteristics**

Connections	G 1/4"	Ordering code
Max. inlet pressure	13 bar	
Working temperature	-5°C +50°C	<b>T171BPP</b>
Weight	gr. 138	
Microswitch capacity	1A	
Grade of protection (with connector assembled)	IP 65	
Adjusting range	2 - 10 bar	
Assembly positions	Indifferent	
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
Microswitch maximum tension	250 VAC	

Connection

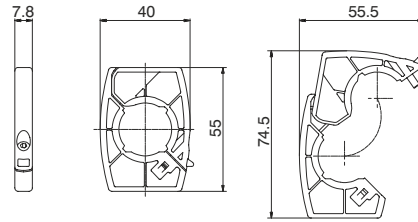
- 1 = neutral
- 2 = N.C. contact
- 3 = N.O. contact



**Flange X**

Ordering code

**T171X**

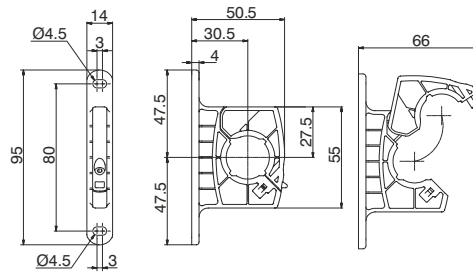


Weight 12 gr.  
Example : T171X : Size 1 coupling flange  
-Enables the quick connection of two functions

**Flange Y**

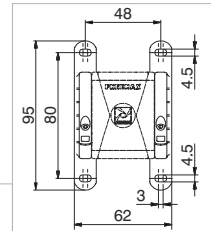
Ordering code

**T171Y**



Weight 18 gr.  
Example : T171Y : Size 1 coupling flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

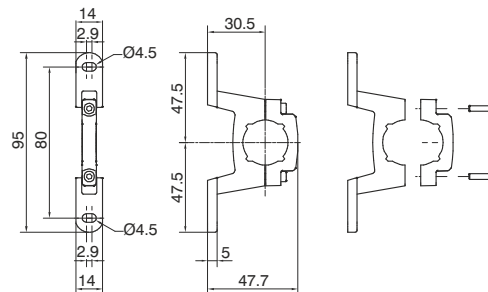
Single unit panel mounting dimensions



**Aluminium flange Y**

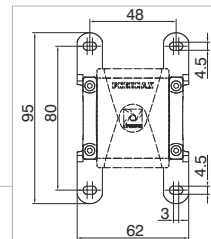
Ordering code

**N171Y**



Weight 27 gr.  
Example : N171Y : Size 1 coupling aluminium flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

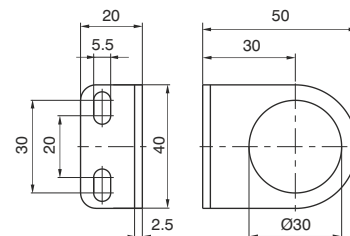
Single unit panel mounting dimensions



**Fixing bracket**

Ordering code

**17150**

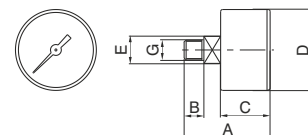


Weight 32 gr.  
- Allows for regulators and filter regulators to be panel mounted.

**Pressure gauge**

Ordering code

**17070**

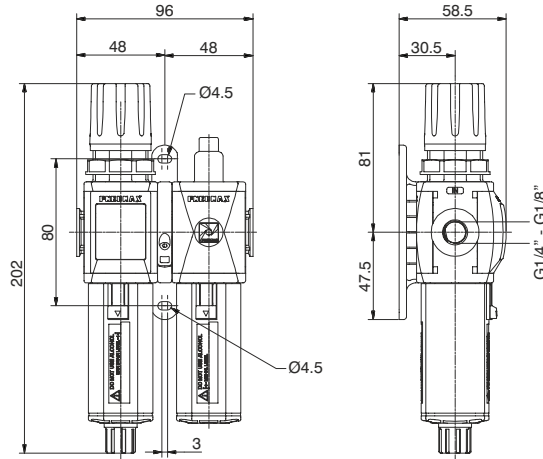


<b>V</b>	VERSION
	A = Dial Ø40
	B = Dial Ø50
	SCALE
<b>S</b>	A = Scale 0-4 bar
	B = Scale 0-6 bar
	C = Scale 0-12 bar

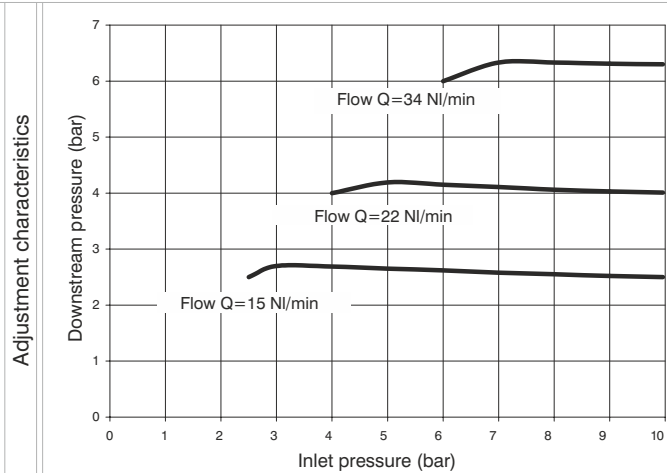
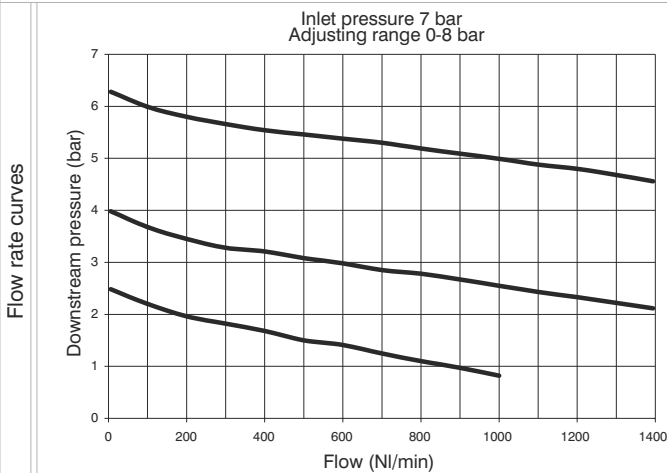
	DIMENSIONS						
CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80



Service unit assembled (EM+L) (E+L) (EW+L)



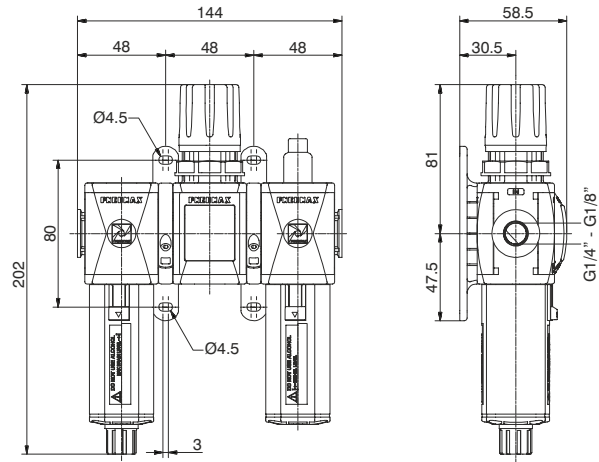
Example : GT171BHG : size 1, combined group comprising Filter-regulator and Lubricator, Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



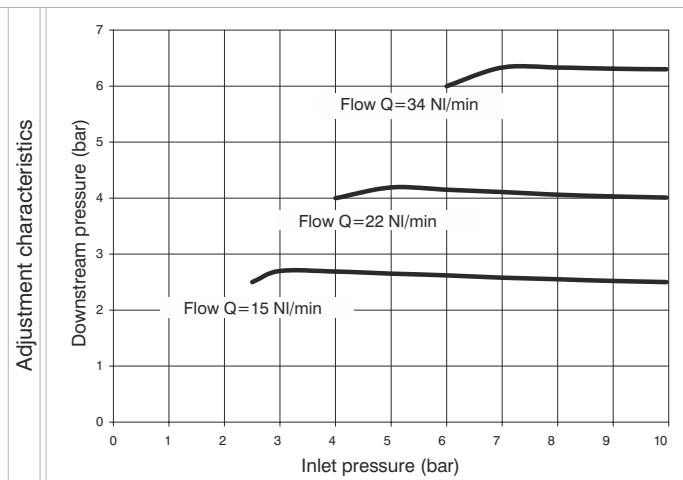
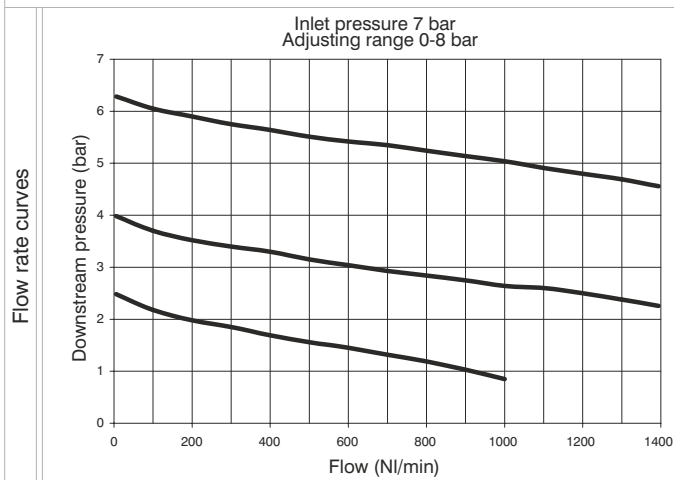
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer and Lubricator assembled with a (Y) type coupling kit for panel mounting.	Connections	G 1/8" - G 1/4"	<b>GV171CTSDZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 328	CONNECTIONS G A = G1/8" (only for "N" version) C = G1/4" C = 1/4 NPT (only for "N" version)
	Weight with threaded inserts	gr. 348	TYPE T H = Built in gauge J = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE S C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS O = Standard * S = Automatic drain
	Bowl capacity	18 cm <sup>3</sup>	FLOW DIRECTION D = Standard * (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	* no additional letter required
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Min. operational flow at 6,3 bar	40 NI/min.	

3

Service unit assembled (F+RM+L) (F+R+L) (F+RW+L)

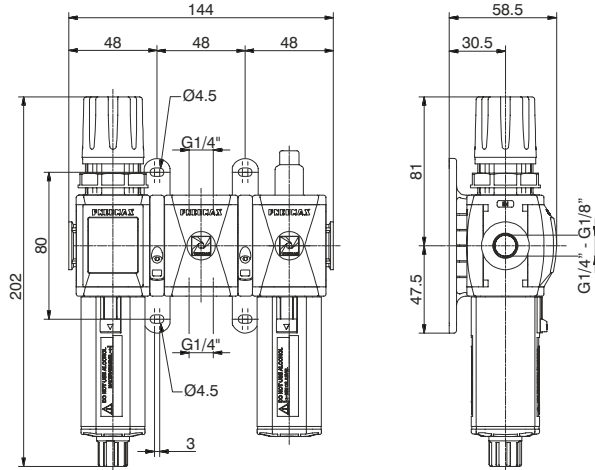


Example : GT171BKG : size 1 combined group comprising Filter, Regulator and Lubricator Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range and 20 µm filter pore size

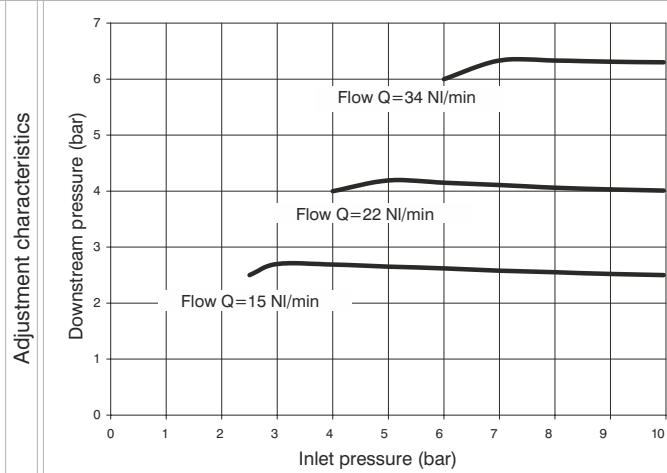
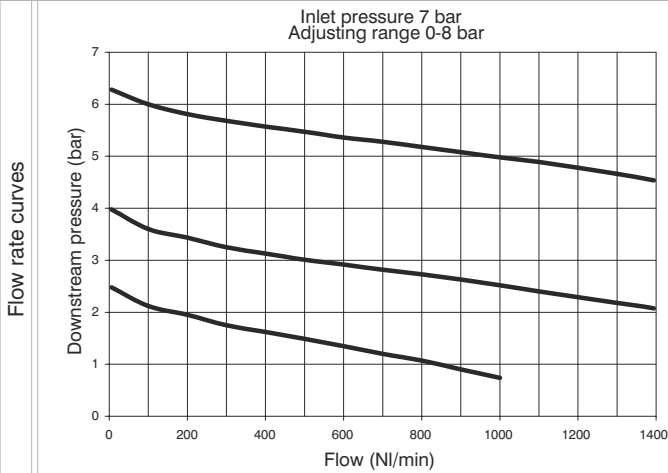


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter, Regulator with built in manometer and Lubricator assembled with two (Y) type coupling kits for panel mounting.	Connections	G 1/8" - G 1/4"	<b>GV171CTSDZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	<b>V</b> VERSION N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 406	<b>C</b> CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Weight with threaded inserts	gr. 436	<b>T</b> TYPE K = Built in gauge T = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>S</b> FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	<b>O</b> OPTIONS = Standard * S = Automatic drain
	Bowl capacity	18 cm <sup>3</sup>	<b>D</b> FLOW DIRECTION = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	* no additional letter required
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Min. operational flow at 6,3 bar	40 NI/min.	

Service unit assembled (EM+PA+L) (E+PA+L) (EW+PA+L)



Example : GT171BNG : size 1 combined group comprising Filter-regulator, Air intake and Lubricator Technopolymer threads, G1/4" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising Filter-regulator with built in manometer, Air intake and Lubricator assembled with two (Y) type coupling kits for panel mounting. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 398
Weight with threaded inserts	gr. 418
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	18 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	36 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm
Min. operational flow at 6,3 bar	40 NI/min.

Ordering code

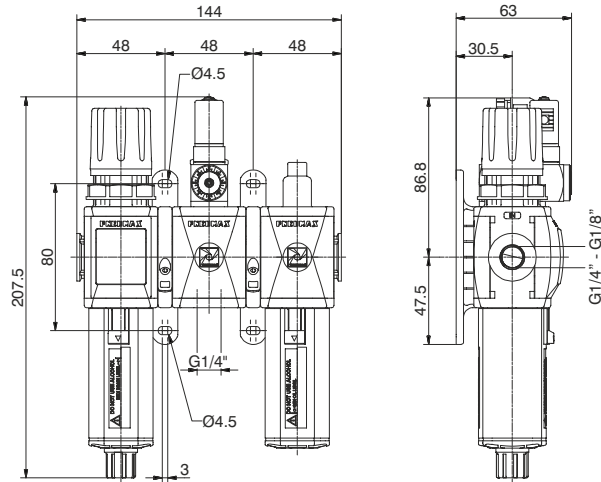
**GV171CTSDZ**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
TYPE	
T	N = Built in gauge P = G1/8" gauge connection
FILTER PORE SIZE ADJUSTING RANGE	
S	C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
OPTIONS	
O	= Standard *
S	= Automatic drain
FLOW DIRECTION	
D	= Standard (from left to right) W = from right to left
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

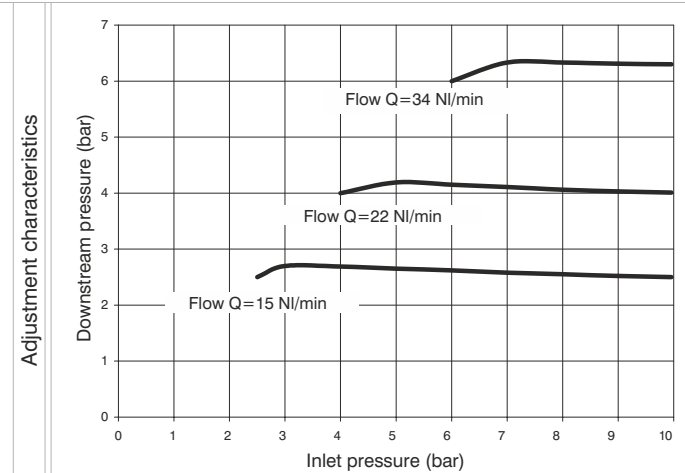
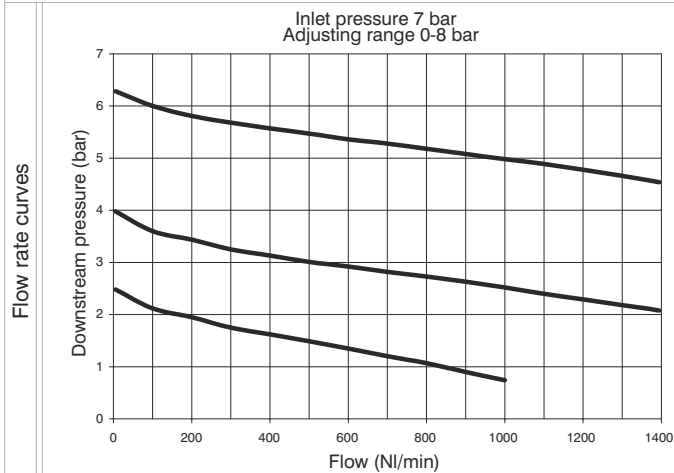
\* no additional letter required



Service unit assembled (EM+PP+L) (E+PP+L) (EW+PP+L)



Example : GT171BRG : size 1 combined group comprising Filter-Regulator, Pressure switch and Lubricator Technopolymer threads, G1/4" connections 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising Filter-regulator with built in manometer, Pressure switch and Lubricator assembled with two (Y) type coupling kits for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 484
Weight with threaded inserts	gr. 504
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	18 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	36 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm
Min. operational flow at 6,3 bar	40 NI/min.

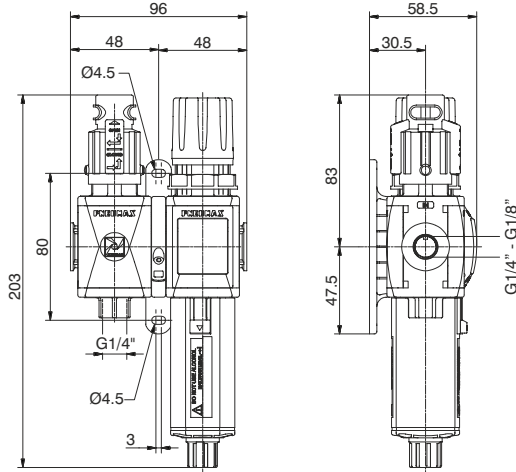
Ordering code

**GV171CTSDZ**

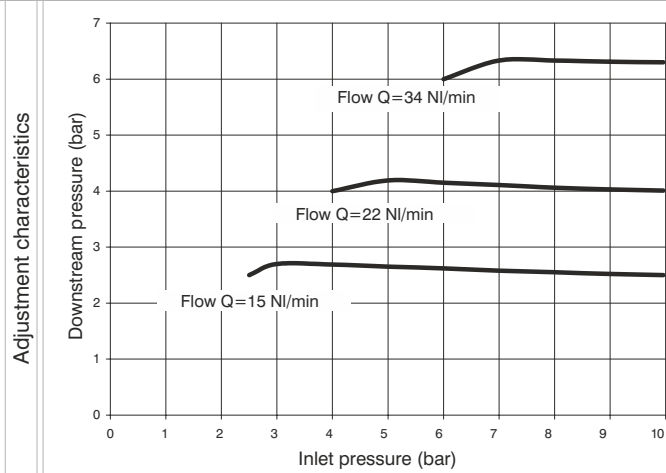
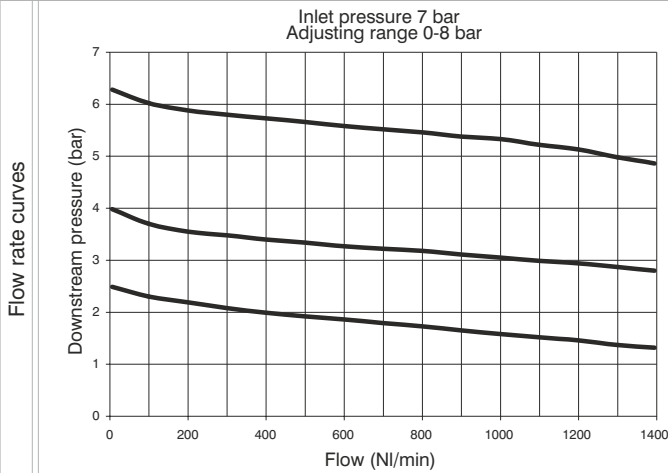
- VERSION
- V N = Metal inserts
- T = Technopolymer thread
- CONNECTIONS
- G A = G1/8" (only for "N" version)
- B = G1/4"
- C = 1/4 NPT (only for "N" version)
- TYPE
- T R = Built in gauge
- C = G1/8" gauge connection
- FILTER PORE SIZE
- ADJUSTING RANGE
- C = 5 µm / 0-8 bar
- S D = 5 µm / 0-12 bar
- G = 20 µm / 0-8 bar
- H = 20 µm / 0-12 bar
- N = 50 µm / 0-8 bar
- P = 50 µm / 0-12 bar
- OPTIONS
- O = Standard \*
- S = Automatic drain
- FLOW DIRECTION
- D = Standard
- (from left to right)
- W = from right to left
- BOWL OPTIONS
- Z = Standard \*
- N = Nylon bowl

\* no additional letter required

Service unit assembled (VL+EM) (VL+E) (VL+EW)



Example : GT171BVGG : size 1 combined group comprising Shut-off valve, Filter-regulator Technopolymer threads, G1/4\" connections 0 to 8 bar adjusting range and 20 µm filter pore size

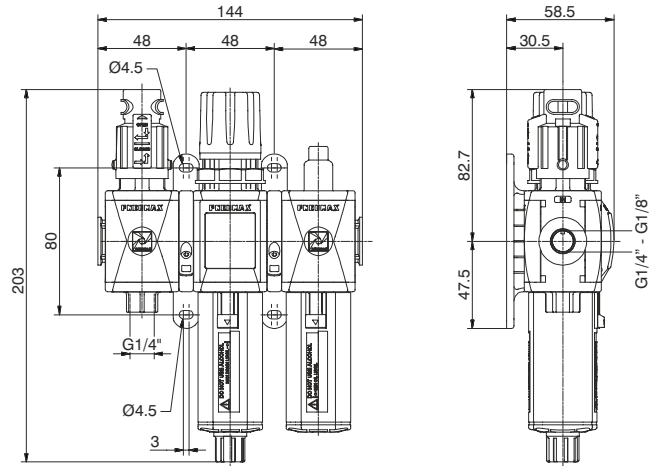


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, assembled with one (Y) type coupling kit for panel mountings.	Connections	G 1/8" - G 1/4"	<b>GV171CITSODZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION
	Weight with Technopolymer threads	gr. 318	V N = Metal inserts
	Weight with threaded inserts	gr. 338	T = Technopolymer thread
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	CONNECTIONS
	Filter pore size	5 µm - 20 µm - 50 µm	A = G1/8" (only for "N" version)
	Bowl capacity	18 cm <sup>3</sup>	B = G1/4"
	Indicative oil drop rate	1 drop every 300/600 NI	C = 1/4 NPT (only for "N" version)
	Oil type	FD22 - HG32	TYPE
	Bowl capacity	36 cm <sup>3</sup>	T VG = Built in gauge
	Assembly positions	Vertical	VU = G1/8" gauge connection
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	FILTER PORE SIZE
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	ADJUSTING RANGE
	Min. operational flow at 6,3 bar	40 NI/min.	C = 5 µm / 0-8 bar
			D = 5 µm / 0-12 bar
			G = 20 µm / 0-8 bar
			H = 20 µm / 0-12 bar
			N = 50 µm / 0-8 bar
			P = 50 µm / 0-12 bar
			OPTIONS
			= Standard *
			S = Automatic drain
			FLOW DIRECTION
			= Standard
			D (from left to right)
			W = from right to left
			BOWL OPTIONS
			= Standard *
			N = Nylon bowl

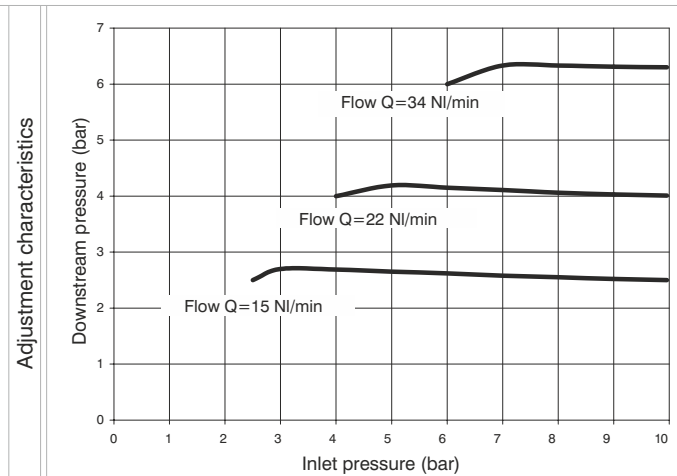
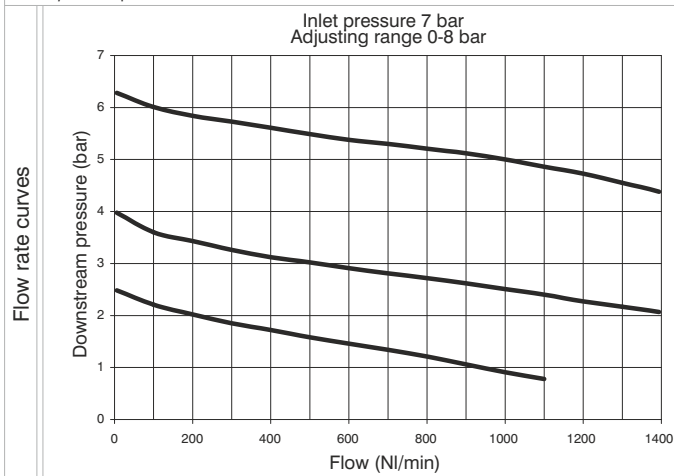
\* no additional letter required



Service unit assembled (VL+EM+L) (VL+E+L) (VL+EW+L)



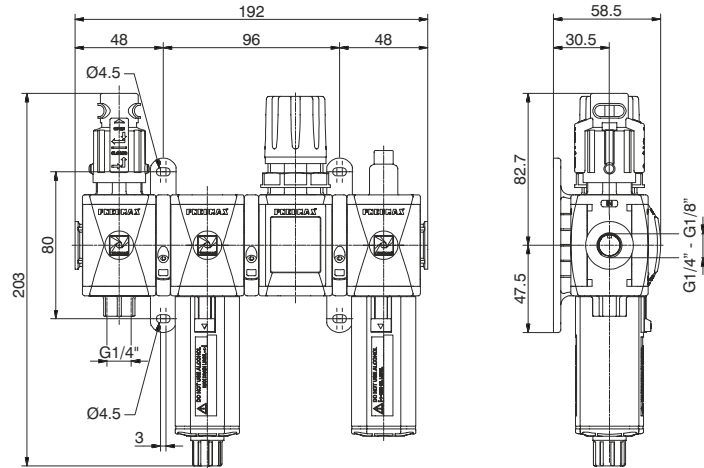
Example : GT171BVHG : size 1 combined group comprising Shut-off valve, Filter-regulator and Lubricator Technopolymer threads, G1/4" connections 0 to 8 bar adjusting range and 20 µm filter pore size



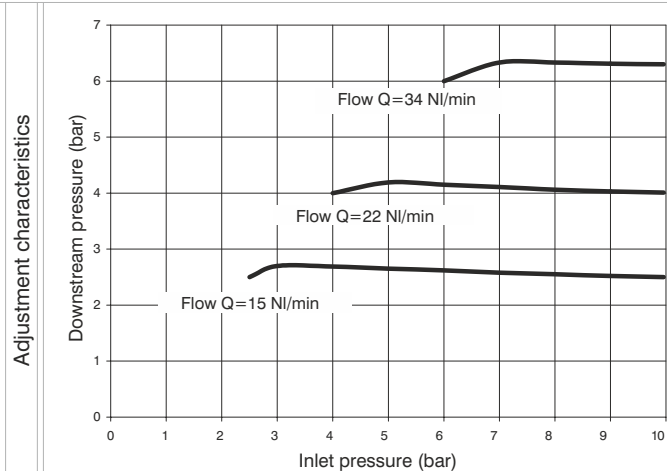
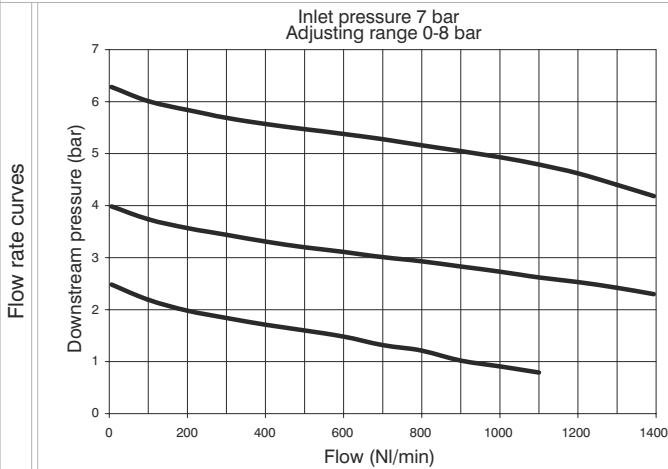
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer and Lubricator assembled with two(Y) type coupling kits for panel mountings.	Connections	G 1/8" - G 1/4"	<b>GV171CTSDZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 446	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Weight with threaded inserts	gr. 476	TYPE VH = Built in gauge VJ = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * S = Automatic drain
	Bowl capacity	18 cm <sup>3</sup>	FLOW DIRECTION = Standard D (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Min. operational flow at 6,3 bar	40 NI/min.	

\* no additional letter required

Service unit assembled (VL+F+RM+L) (VL+F+R+L) (VL+F+RW+L)



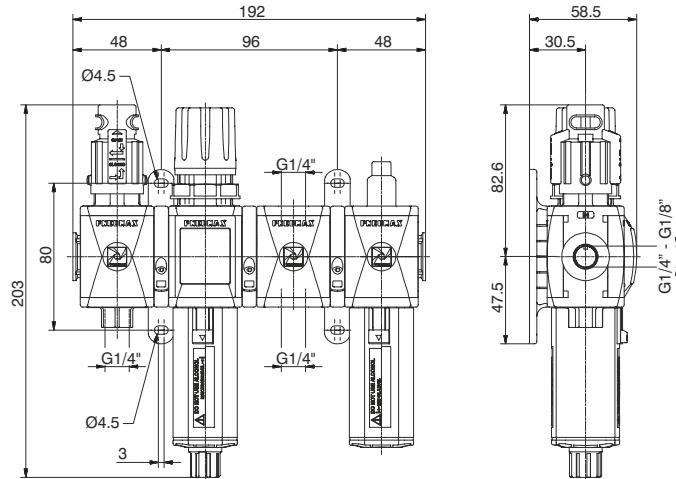
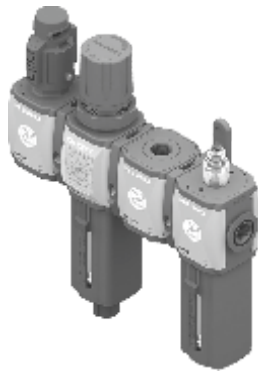
Example : GT171BVKG : size 1 combined group comprising Shut-off valve, Filter, Regulator and Lubricator Technopolymer threads, G1/4" connections 0 to 8 bar adjusting range and 20 µm filter pore size



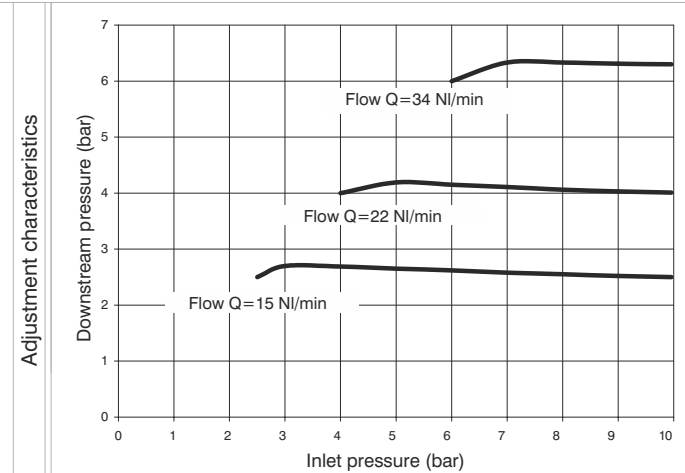
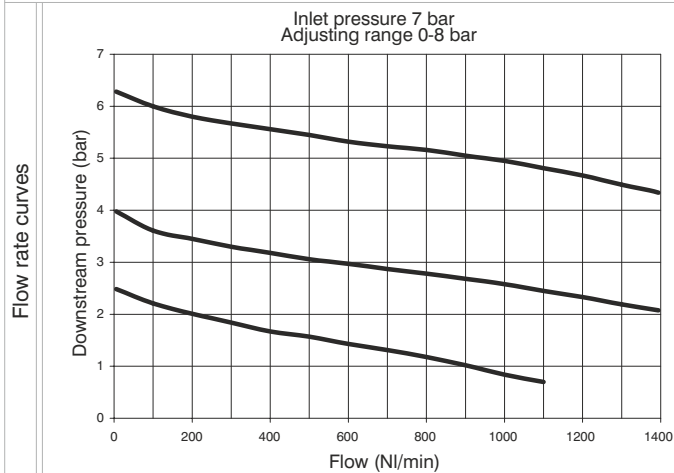
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut - off valve, Filter, Regulator with built in manometer and Lubricator , assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 1/8" - G 1/4"	<b>GV171CTSDZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 518	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Weight with threaded inserts	gr. 558	TYPE T VK = Built in gauge VT = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * S = Automatic drain
	Bowl capacity	18 cm <sup>3</sup>	FLOW DIRECTION = Standard D (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	* no additional letter required
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Min. operational flow at 6,3 bar	40 NI/min.	



Service unit assembled (VL+EM+PA+L) (VL+E+PA+L) (VL+EW+PA+L)



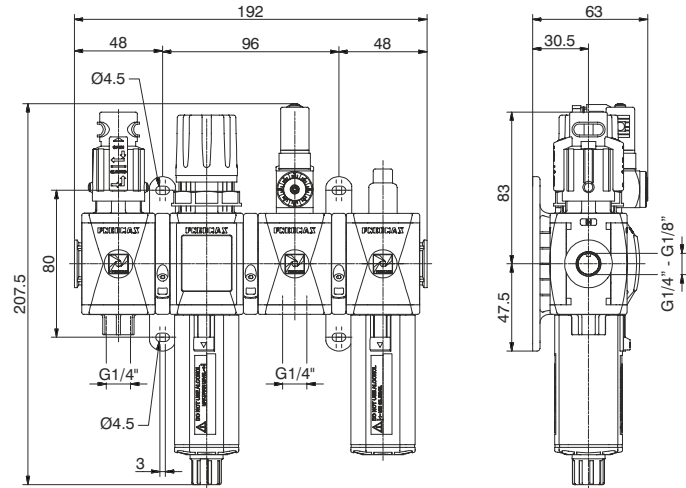
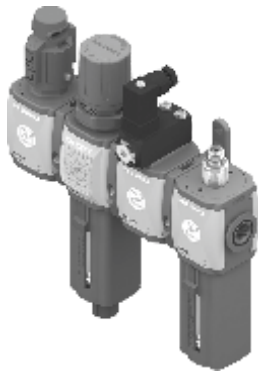
Example : GT171BVNG : size 1 combined group comprising Shut-off valve, Filter-regulator, Air intake and Lubricator Technopolymer threads, G1/4" connections 0 to 8 bar adjusting range and 20 µm filter pore size



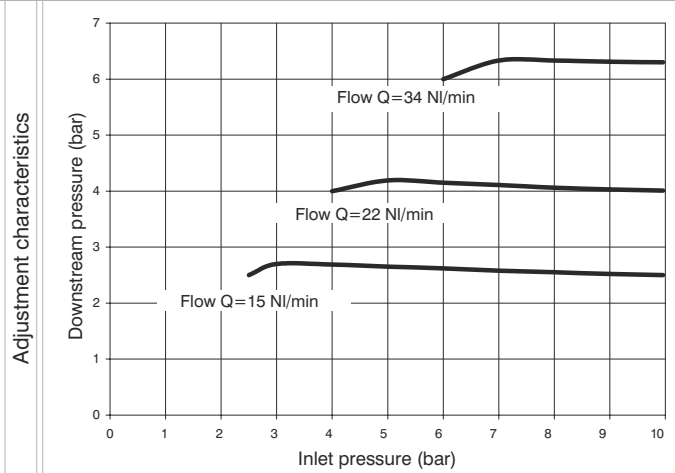
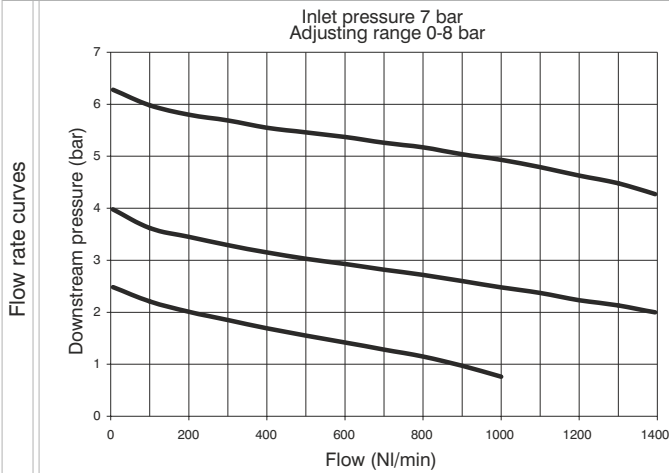
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Air intake and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 1/8" - G 1/4"	<b>GV171CTSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 510	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	Weight with threaded inserts	gr. 540	TYPE T VN = Built in gauge VP = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * S = Automatic drain
	Bowl capacity	18 cm <sup>3</sup>	FLOW DIRECTION = Standard D (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	36 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm	
	Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm	
	Min. operational flow at 6,3 bar	40 NI/min.	

\* no additional letter required

Service unit assembled (VL+EM+PP+L) (VL+E+PP+L) (VL+EW+PP+L)



Example : GT171BVRG : size 1 combined group comprising Shut-off valve, Filter-regulator, Pressure switch and Lubricator Technopolymer threads, G1/4" connections adjusting range 0 to 8 bar and 20 µm filter pore size



Operational characteristics

Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Pressure switch and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 596
Weight with threaded inserts	gr. 626
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	18 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	36 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm
Min. operational flow at 6,3 bar	40 NI/min.

Ordering code

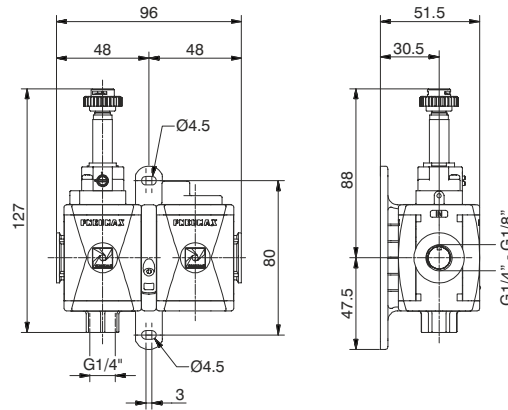
**GV171CTSDZ**

VERSION	
V N = Metal inserts	
T = Technopolymer thread	
CONNECTIONS	
A = G1/8" (only for "N" version)	
B = G1/4"	
C = 1/4 NPT (only for "N" version)	
TYPE	
T VR = Built in gauge	
VC = G1/8" gauge connection	
FILTER PORE SIZE	
ADJUSTING RANGE	
C = 5 µm / 0-8 bar	
D = 5 µm / 0-12 bar	
G = 20 µm / 0-8 bar	
H = 20 µm / 0-12 bar	
N = 50 µm / 0-8 bar	
P = 50 µm / 0-12 bar	
OPTIONS	
Standard *	
S = Automatic drain	
FLOW DIRECTION	
Standard	
D (from left to right)	
W = from right to left	
BOWL OPTIONS	
Standard *	
N = Nylon bowl	

\* no additional letter required



Service unit assembled (VE+AP)



Example : GT171BSB2 : size 1 combined group comprising Electric shut-off valve, Progressive start-up valve without coil with M2 pilot Technopolymer threads, G1/4" connections

Operational characteristics

Combined group comprising Electric shut-off valve and Progressive start-up valve assembled with a (Y) type coupling kit for panel mounting.

Technical characteristics

Connections	G 1/8" - G 1/4"
Max. inlet pressure	10 bar
Min. inlet pressure	3 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 218
Weight with threaded inserts	gr. 238
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/4" = 9 Nm
Max. fitting torque (with threaded inserts)	G1/8" = 15 Nm G1/4" = 20 Nm

Flow at 6 bar with Δp=1

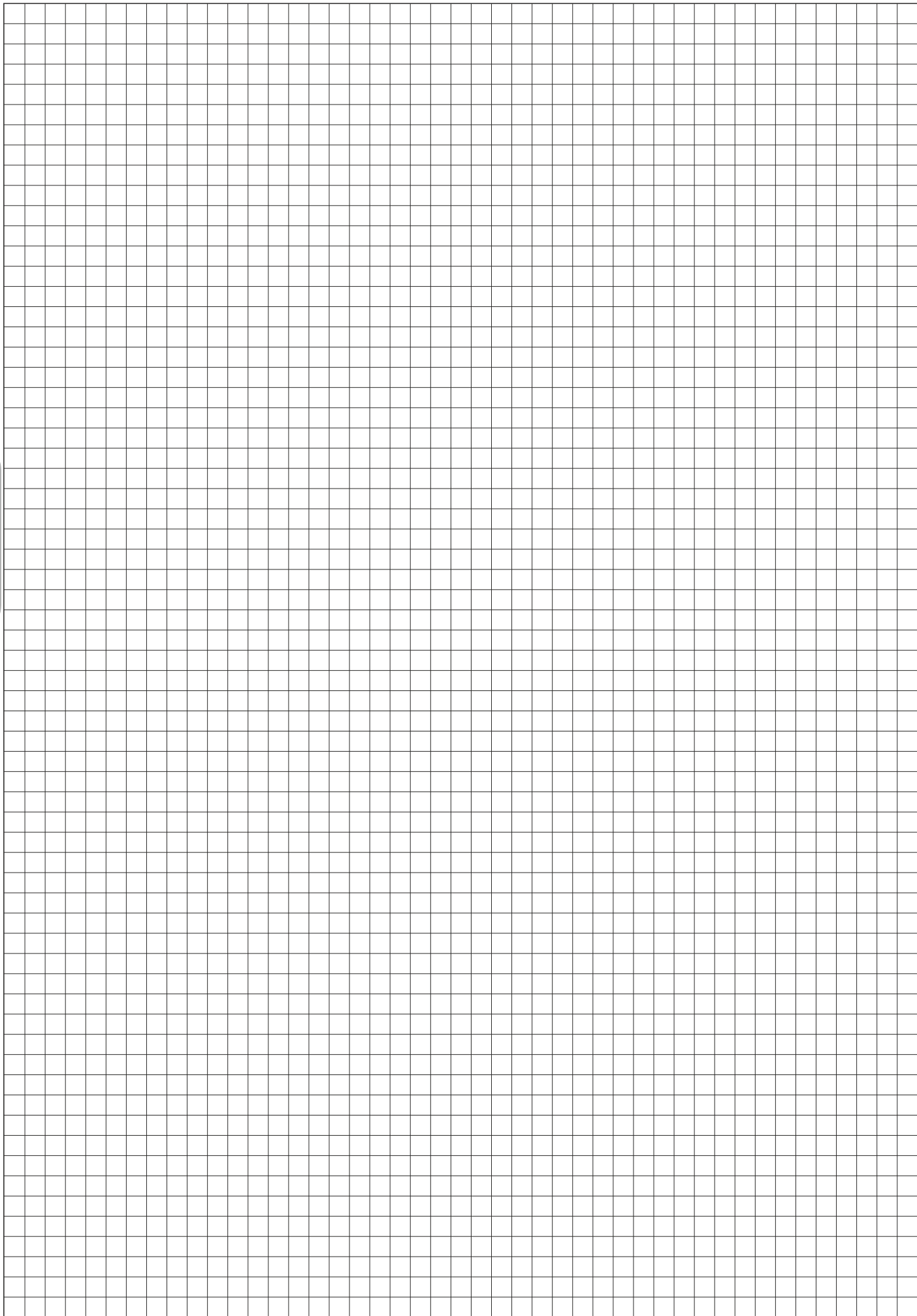
1200 NI/min.

Ordering code

**GV171CSA**

<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>C</b>	CONNECTIONS A = G1/8" (only for "N" version) B = G1/4" C = 1/4 NPT (only for "N" version)
	15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt)
	22 mm COIL VOLTAGE B2 = Without coil M2 mechanic
<b>A</b>	B4 = 12 V DC B5 = 24 V DC B6 = 24 V AC (50-60 Hz) B7 = 110 V AC (50-60 Hz) B8 = 230 V AC (50-60 Hz) B9 = 24 V DC (2 Watt)
	30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)

3



## Construction and working characteristics

The new FRL units AIRPLUS series represents the evolution of the well known and consolidated 1700 series.

The main features are increased performances, reliability, easy and fast assembly and the introduction of the latest technical features.

With the exception of the air intake module and the pressure switch module all elements are available in two configurations: with technopolymer connections (IN and OUT), (T series), or with metal threaded inserts, (N series). Bowls made of transparent polycarbonate (PC) are fitted with a bowl protection guard which is assembled on the body via a quick coupling mechanism provided with a safety button. The filter, available with three filtration grades (5 $\mu$ m, 20 $\mu$ m and 50 $\mu$ m) is fitted as standard with a drain mechanism which can be operated manually or semi-automatically. On request is available the auto-drain mechanism. The regulator is based on the rolling diaphragm technology with low hysteresis and the system is balanced. The unit can be fitted with integrated flush mounting pressure gauge (0 to 12 bar range). 4 pressure ranges are available going from 0 to 12 bar and the regulating knob can be blocked in position simply by pressing it down. A dedicated version is available for battery mounting, up to a maximum of 6 units. The lubricator is based on the Venturi principle and the oil quantity is regulated via the adjusting screw positioned on the transparent polycarbonate (PC) regulating dome which also ensure clear visibility of the oil flow and regulation. The oil suction pipe is fitted as standard with a sintered filter which ensures that any contaminant that should be present in the oil will reach the down stream circuit. Shoot off valve is available in two versions, one manually operated and one solenoid operated. In both cases the unit is fitted with a threaded connection for depressurising the downstream circuit. On the manually operated version, in the lock position, it is possible to fit up to three locks in order to prevent the accidental pressurization of the pneumatic circuit avoiding accidents or damages. The solenoid operated version is available with a 15mm or with a 22mm solenoid valve. The soft start valve ensure a progressive pressurization of the down stream circuit avoiding sudden pressure surges which could be dangerous for the devices fitted on the down stream circuit. The filling time can be easily adjusted via a built in flow regulator. The full flow rate is allowed only once the down stream pressure has reached 50% of the value of the inlet pressure. The pressure switch module which can be set between 2 and 10 bar and the air intake module complete the range.

The elements are joint together via dedicated quick coupling technopolymer flanges which allows for the units to be panel mounted moreover ensure the possibility to replace any component without disassembling the FRL group from its position. 90° mounting brackets and standard gauges are also available.

## Instruction for installation and operation

The FRL unit must be installed as close as possible to the application. The air flow direction must follow the directions indicated on the single units in correspondence of the threaded connections. (IN and OUT)

Units provided with bowl must be mounted vertically with the bowl facing down. Single units or groups can be panel mounted via the Y type flanges, regulators and filter-regulators can be mounted via the 90° zinc plated steel bracket. In order to mount the 90° bracket it is necessary to remove the regulating knob and then the locking ring before positioning the bracket. All units must be operated according to the specified pressure and temperature ranges; fittings must be mounted without exceeding the maximum torque allowed. Ensure that the units cover plates are in position before pressure is applied. The cover plates are needed to lock in position the top part of the unit.

The condense level in filter and filter-regulators bowls must never exceed the maximum level indicated on the bowls. With manual or semi automatic drain the condense can be discharged via a 6/4mm tube directly connected to the drain tap. On the pressure regulator the pressure value must always set while pressure is rising and ideally the unit pressure range should be chosen based on the pressure value to be regulated. Lubricators must be filled with class FD22 and HG32 oils. Ensure, both on the inlet and on the outlet, that the flow rate is above the minimum flow rate required to operate the unit. Below this value the units does not operate. The oil quantity can be regulated via the regulating screw on the transparent polycarbonate dome through which it is also clearly visible the oil flow. A drop every 300-600 litres should be allowed.

The oil can be re-filled while the pneumatic circuit is pressurized thanks to the exhaust valve which is built in the refill plug and allows for the bowl to be depressurized and the oil refill directly form in the bowl or from the plug. The manual shot off valve needs, to be operated, a push and turn action (clockwise) in order to close it and discharge the down stream circuit it is necessary to turn anti clock wise the knob. The soft start valve is used to slowly and progressively pressurize the down stream circuit, the time needed to do so can be set by means of the built in flow regulator. The soft start valve on its own does not allow for the down stream circuit to be discharged, in order to do so it is necessary to combine it with a shot off valve (to be mounted upstream).

## Maintenance



**For any maintenance which requires the removal of the top plugs/ supports from the body it is necessary to preventively remove the sides cover plates. If the top plugs\supports are removed with the sides plates still in their position the unit could be permanently damaged.**

Bowls, plugs and supports are assembled with a bayonet type mechanism. In order to remove them rotate anti clockwise until the mechanical stop is reached and than remove from the body (for the bowls firstly press down the green safety button). Bowls and transparent parts can be cleaned with water and neutral soap. Do not use solvents or alcohol.

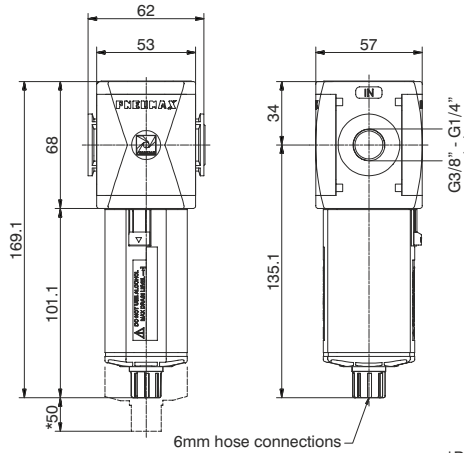
Filtering elements (from filters and filter regulators) made of HDPE can be regenerated by washing and blowing them. In order to remove them it is necessary to remove the bowl unscrew the filter element and replace it with a new one or clean it. The oil can be re-filled while the pneumatic circuit is pressurized thanks to the exhaust valve which is built in the refill plug and allows for the bowl to be depressurized. In order to be able to unmount the bowl it is necessary unscrew the refill plug positioned near the oil dome, once this operation has been carried out it is possible to remove the bowl to re fill it or to refill from the refill plug. Refilling directly the bowl is suggested.

Should the pressure regulator not perform properly or should present a constant leakage from the relieving replaced the diaphragm by unloading completely the regulating spring before removing the regulation support. Any other maintenance operation, in consideration of the complexity of the assembly, and the need of a through test according to the Pneumax spa specification, should be carried out by the manufacturer.

## Fittings maximum recommended torque applicable

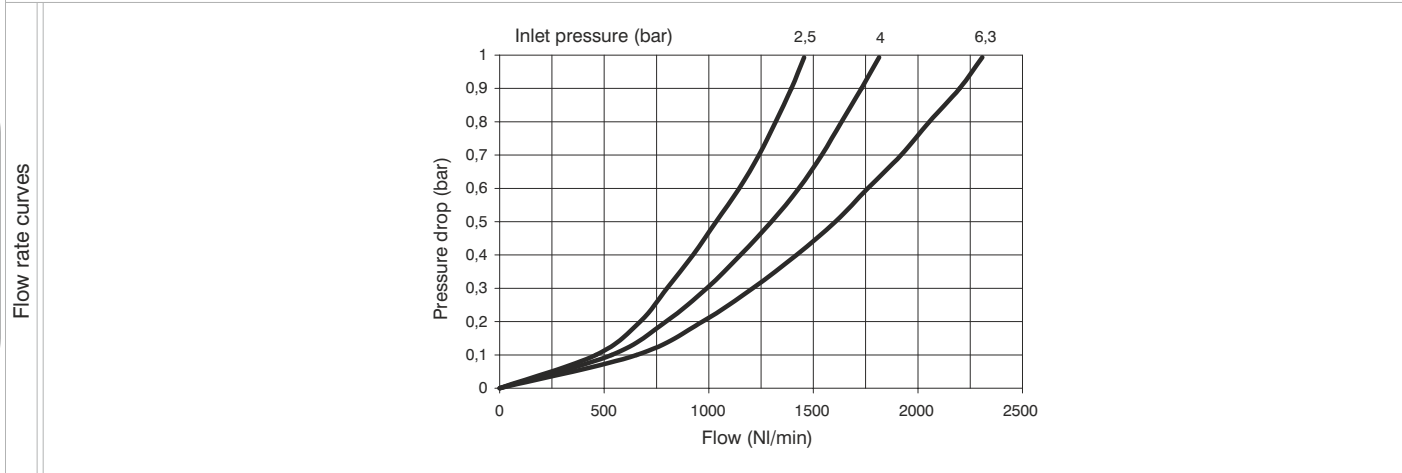
THREAD	Technopolymer version (T)	Metal version (N)
G1/8"	4 Nm	15 Nm
G1/4"	9 Nm	20 Nm
G3/8"	16 Nm	25 Nm
G1/2"	22 Nm	30 Nm

Filter (F)



\*Bowl removal maximum height

Example: T172BFB : size 2, Filter with Technopolymer threads, G3/8" connections, 20 µm filter pore size



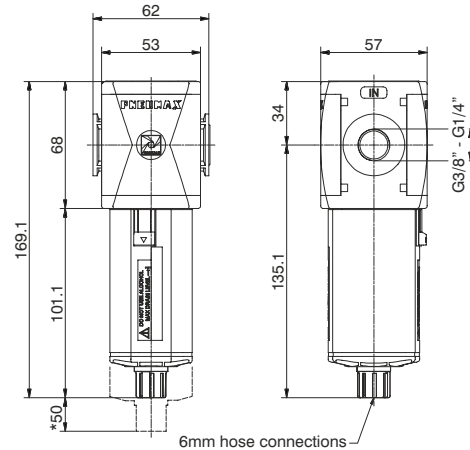
Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Double filtering action: air flow centrifugation and filter element</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> </ul>	Connections	G 1/4" - G 3/8"	<p><b>V172CFSS02</b></p> <p>VERSION</p> <p><b>V</b> N = Metal inserts T = Technopolymer thread</p> <p>CONNECTIONS</p> <p><b>G</b> A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)</p> <p>FILTER PORE SIZE</p> <p><b>S</b> A = 5 µm B = 20 µm C = 50 µm</p> <p>OPTIONS</p> <p><b>○</b> = Standard * S = Automatic drain</p> <p>BOWL OPTIONS</p> <p><b>Z</b> = Standard * N = Nylon bowl</p>
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 220	
	Weight with threaded inserts	gr. 230	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	34 cm <sup>3</sup>	
	Assembly positions	Vertical	
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm		
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm		

**Note**

In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

\* no additional letter required

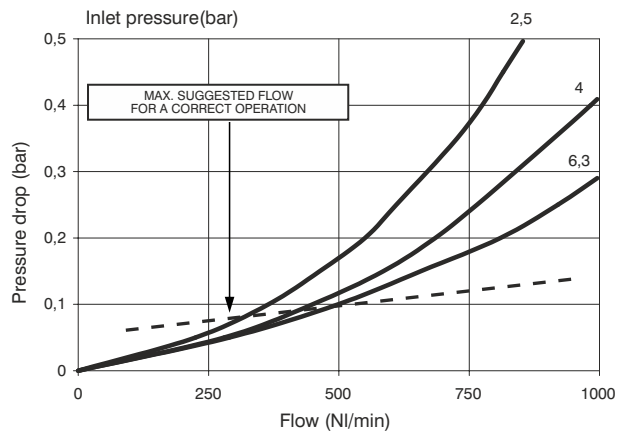
Coalescing filter (D)



\*Bowl removal maximum height

Example : T172BDA : Coalescing filter size 2, with Technopolymer threads, G3/8" connections, filter efficiency 99,97%

Flow rate curves

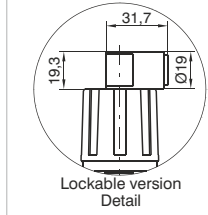
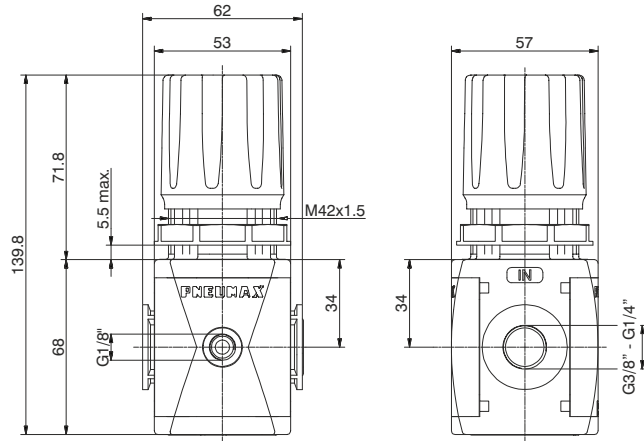


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Coalescing filter element with filtration grade of 0.01µm</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> </ul>	Connections	G 1/4" - G 3/8"	<b>V172DDE0Z</b>
	Max. inlet pressure	13 bar	
<p><b>Note</b></p> <p>In order to ensure a better grade of filtration it is recommended to use a 5 µm filter before the coalescing filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.</p>	Minimum working pressure with automatic drain	0,5 bar	VERSION V = Metal inserts T = Technopolymer thread
	Maximum working pressure with automatic drain	10 bar	CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Working temperature	-5°C +50°C	FILTER EFFICIENCY A = 99,97%
	Weight with Technopolymer threads	gr. 225	OPTIONS O = Standard * S = Automatic drain
	Weight with threaded inserts	gr. 235	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Filter efficiency with 0,01 µm particle	99,97%	
	Bowl capacity	34 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	

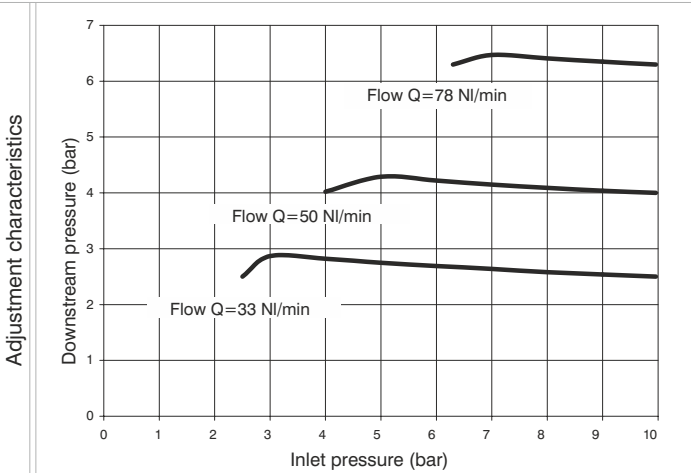
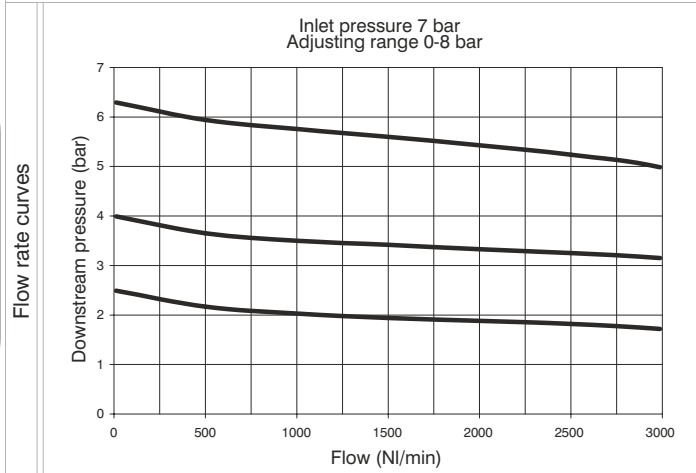
\* no additional letter required



Regulator (R)



Example: T172BRC : size 2, Regulator with Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/4" - G 3/8"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight with Technopolymer threads	gr. 300
Weight with threaded inserts	gr. 310
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G3/8" = 16 Nm
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm

Ordering code

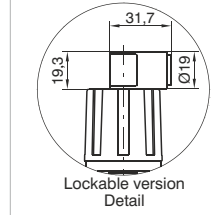
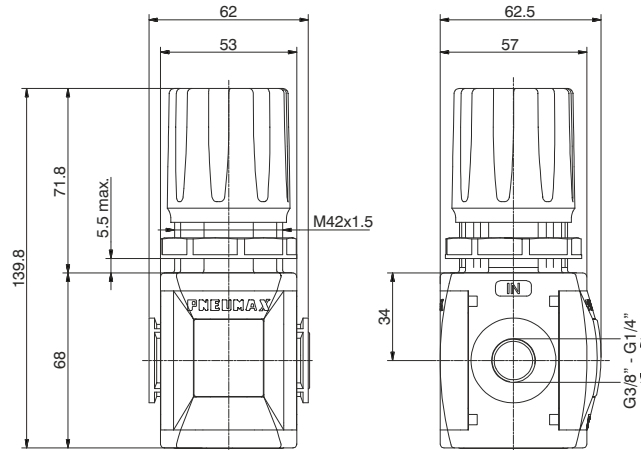
**V172CRGT0**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
ADJUSTING RANGE	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	
T	= Standard * F = Controlled relief + improved relieving L = no relieving R = Improved relieving
OPTIONS	
O	= Standard * K = Lockable version

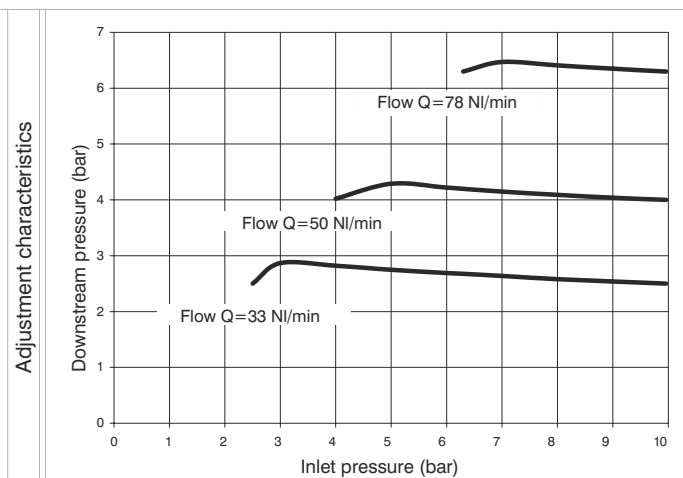
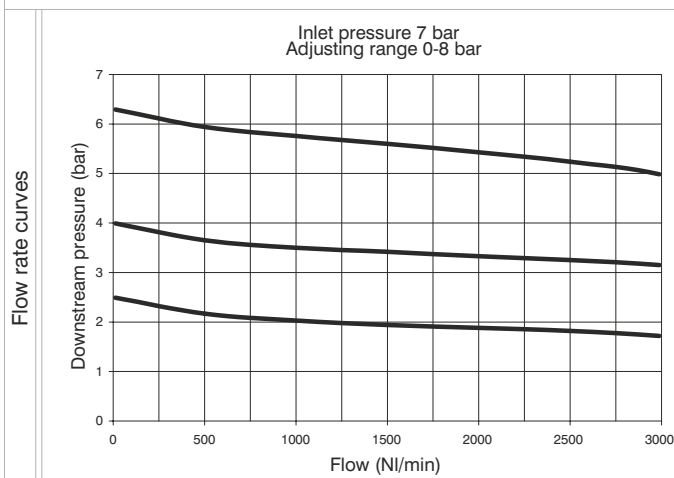
\* no additional letter required



Regulator including gauge (RM)(RW)

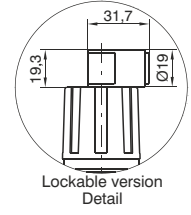
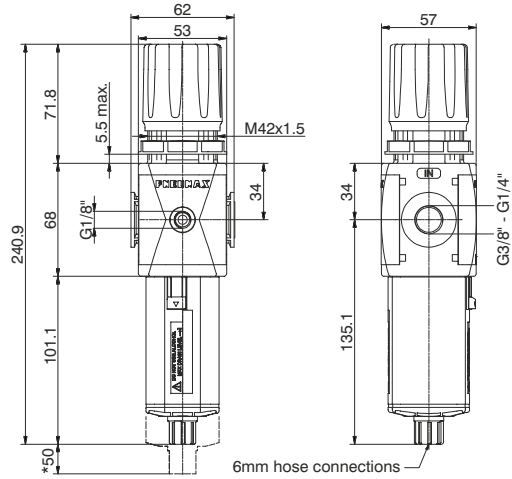


Example : T172BRMC : size 2, Regulator including gauge with Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range



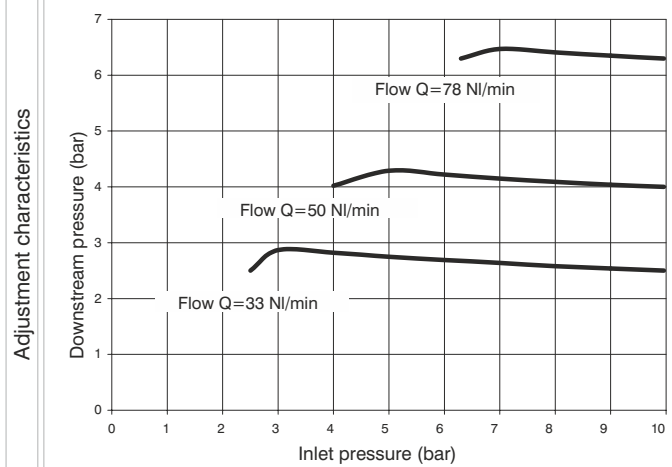
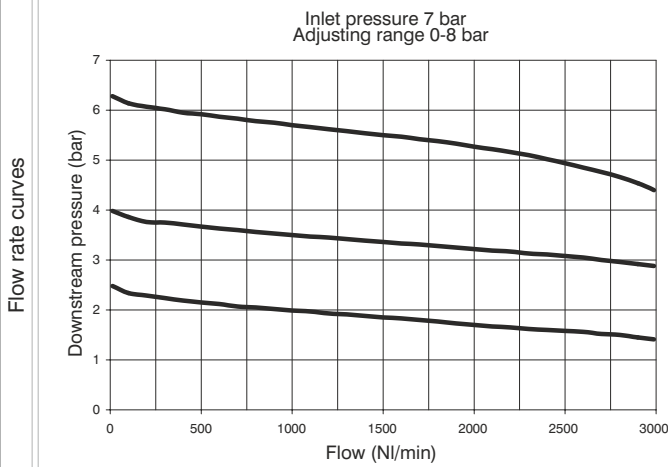
Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</li> </ul>	Connections	G 1/4" - G 3/8"	<b>V172CRDGT0</b> VERSION N = Metal inserts T = Technopolymer thread
	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	FLOW DIRECTION M = from left to right W = from right to left
	Weight with Technopolymer threads	gr. 300	
Weight with threaded inserts	gr. 310	TYPE = Standard * F = Controlled refiel + improved relieving	OPTIONS = Standard * K = Lockable version
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar		
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	Max. fitting torque (with threaded inserts) G1/4" = 20 Nm G3/8" = 25 Nm	* no additional letter required

Filter-Regulator (E)



\*Bowl removal maximum height

Example : T172BEBC : size 2, Filter-regulator with Technopolymer threads, G3/8" connections, 20 μm filtering pore size, 0 to 8 bar adjusting range



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5μm, 20μm and 50μm) can be regenerated by washing it or replaced.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G 1/4" - G 3/8"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight with Technopolymer threads	gr. 390
Weight with threaded inserts	gr. 400
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 μm - 20 μm - 50 μm
Bowl capacity	34 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G3/8" = 16 Nm
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm

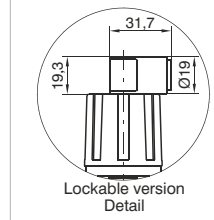
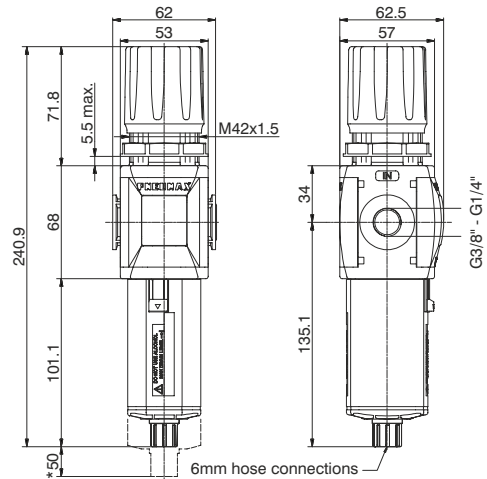
Ordering code

**V172CESGT0Z**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
FILTER PORE SIZE	
S	A = 5 μm B = 20 μm C = 50 μm
ADJUSTING RANGE	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	
T	= Standard *
S	= Automatic drain
OPTIONS	
O	= Standard *
K	= Lockable version
BOWL OPTIONS	
Z	= Standard *
N	= Nylon bowl

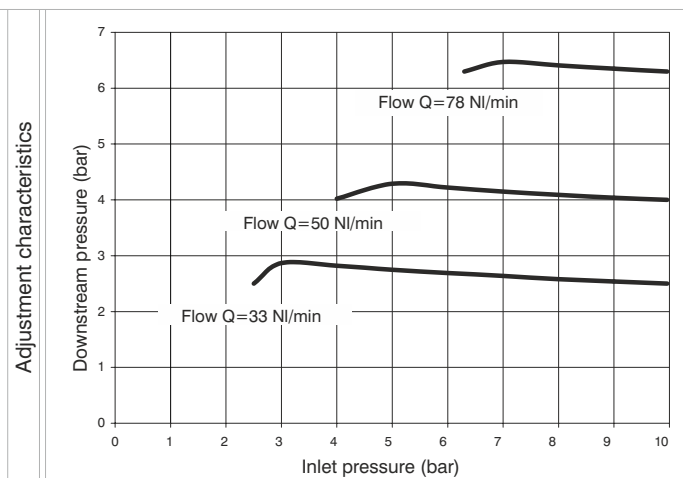
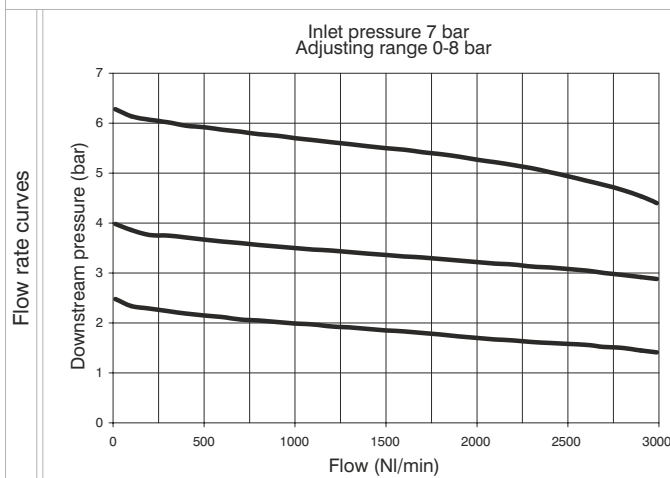
\* no additional letter required

**Filter-regulator including gauge (EM)(EW)**



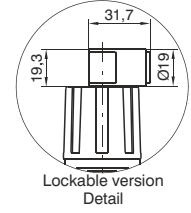
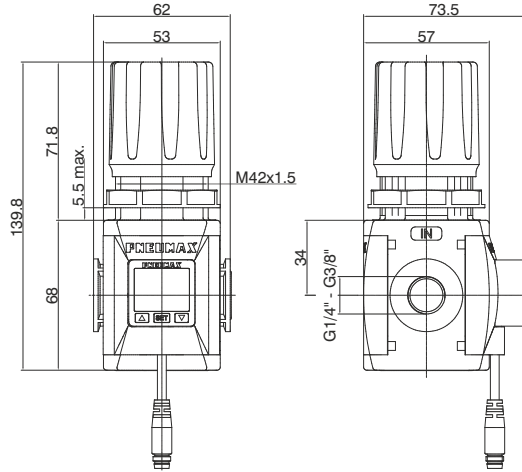
\*Bowl removal maximum height

Example: T172BEMBC : size 2, Filter-Regulator including gauge with Technopolymer threads, G3/8" connections, with 20 µm filtering pore size, 0 to 8 bar adjusting range

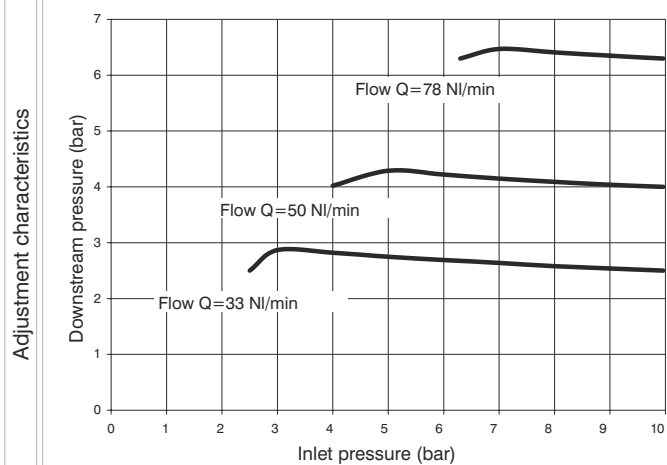
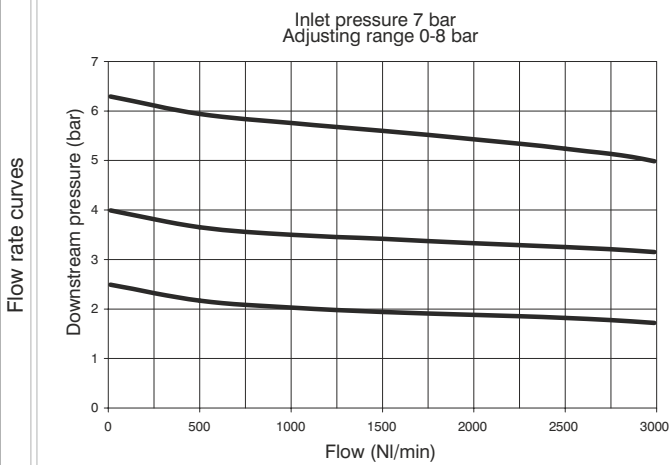


Operational characteristics	Technical characteristics	Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made of polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</li> </ul>	<p>Connections G 1/4" - G 3/8"</p> <p>Max. inlet pressure 13 bar</p> <p>Minimum working pressure 0,5 bar</p> <p>with automatic drain</p> <p>Maximum working pressure 10 bar</p> <p>with automatic drain</p> <p>Working temperature -5°C +50°C</p> <p>Weight with Technopolymer threads gr. 400</p> <p>Weight with threaded inserts gr. 410</p> <p>Pressure range 0-2 bar / 0-4 bar 0-8 bar / 0-12 bar</p> <p>Filter pore size 5 µm - 20 µm - 50 µm</p> <p>Bowl capacity 34 cm<sup>3</sup></p> <p>Assembly positions Vertical</p> <p>Max. fitting torque (with Technopolymer threads) G3/8" = 16 Nm</p> <p>Max. fitting torque (with threaded inserts) G1/4" = 20 Nm G3/8" = 25 Nm</p>	<p><b>V172CE0SGT0Z</b></p> <p>VERSION</p> <p>V N = Metal inserts T = Technopolymer thread</p> <p>CONNECTIONS</p> <p>A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)</p> <p>FLOW DIRECTION</p> <p>D M = from left to right W = from right to left</p> <p>FILTER PORE SIZE</p> <p>S A = 5 µm B = 20 µm C = 50 µm</p> <p>ADJUSTING RANGE</p> <p>G A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar</p> <p>TYPE</p> <p>T = Standard * S = Automatic drain</p> <p>OPTIONS</p> <p>O = Standard * K = Lockable version</p> <p>BOWL OPTIONS</p> <p>Z = Standard * N = Nylon bowl</p> <p>* no additional letter required</p>
<p><b>Note</b></p> <p>The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.</p>		

Regulator with pressure switch (RP)(RZ)



Example : T172BRPCA : size 2, Regulator with Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/4" - G 3/8"
Max. inlet pressure	13 bar
Working temperature	0°C +50°C
Weight with Technopolymer threads	gr. 300
Weight with threaded inserts	gr. 310
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm

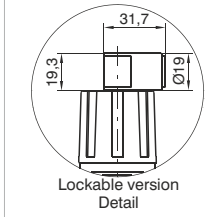
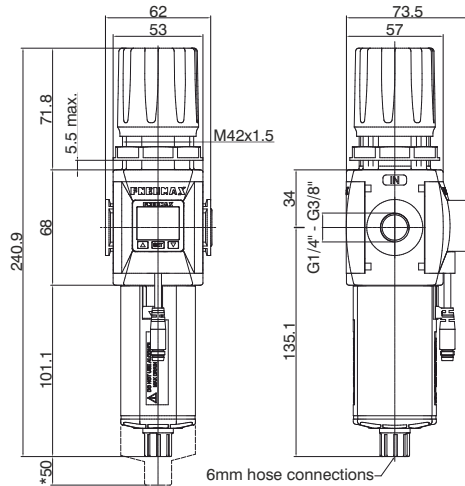
Ordering code

**V172CRDGTOP**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
FLOW DIRECTION	
D	P = from left to right Z = from right to left
ADJUSTING RANGE	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	
	= Standard *
T	F = Controlled refiel + improved relieving L = no relieving R = Improved relieving
OPTIONS	
O	= Standard *
	K = Lockable version
PRESSURE SWITCH OPTION	
P	A = Cable 150 mm + M8 PNP B = Cable 150 mm + M8 NPN C = Cable 2 mt. PNP D = Cable 2 mt. NPN

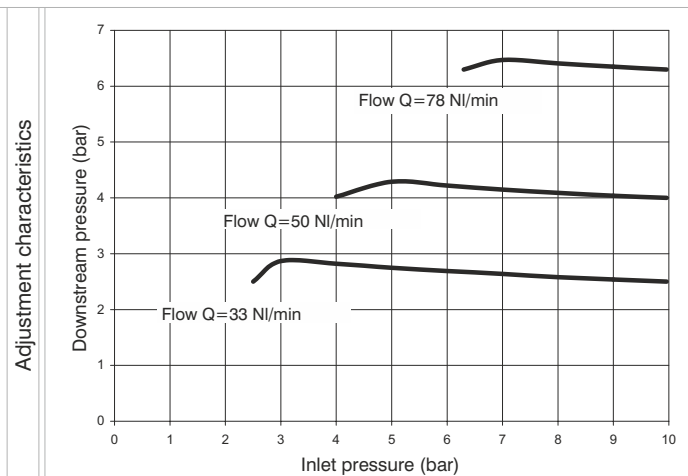
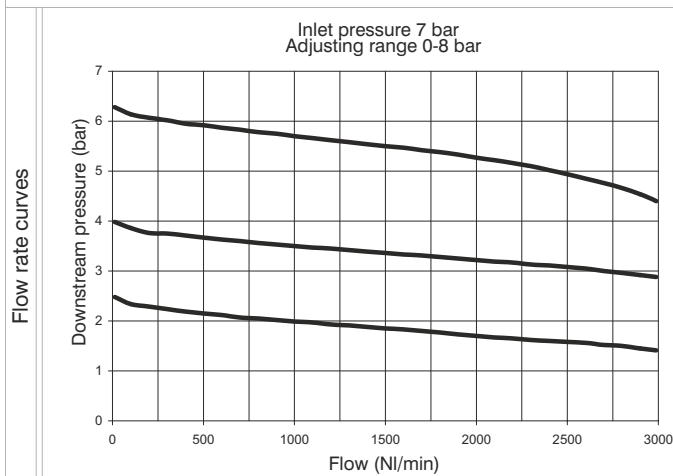
\* no additional letter required

**Filter regulator with pressure switch (EP)(EZ)**



\* Bowl removal maximum height

Example: T172BEPBCA : size 2, Filter-regulator with Technopolymer threads, G3/8" connections, 20 µm filtering pore size, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Pressure switch as standard</li> </ul>	Connections	G 1/4" - G 3/8"	<b>V172CEDSGTOPZ</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTION A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version) FLOW DIRECTION P = from left to right Z = from right to left FILTER PORE SIZE A = 5 µm B = 20 µm C = 50 µm ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar TYPE T = Standard * S = Automatic drain OPTIONS O = Standard * K = Lockable version PRESSURE SWITCH OPTION A = Cable 150 mm + M8 PNP P = Cable 150 mm + M8 NPN C = Cable 2 mt. PNP D = Cable 2 mt. NPN BOWL OPTIONS Z = Standard * N = Nylon bowl * no additional letter required
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	0°C +50°C	
	Weight with Technopolymer threads	gr. 400	
	Weight with threaded inserts	gr. 410	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	34 cm <sup>3</sup>	
Assembly positions	Vertical		
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm		
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm		
<b>Note</b>	The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.		

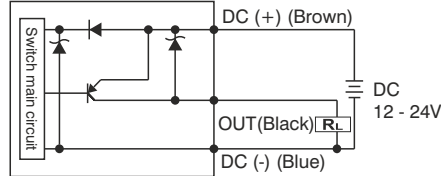


### CHARACTERISTICS

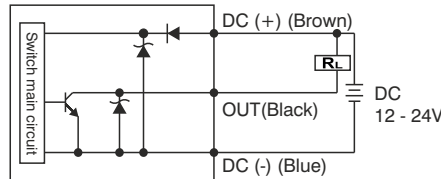
- 3 color digital LCD display, easy readout
- 4 units of measurement for pressure indication
- PNP and NPN output
- N.O. and N.C. output contact
- Not available individually, but only with a Regulator or a Filter-regulator

### OUTPUT CIRCUIT WIRING DIAGRAMS

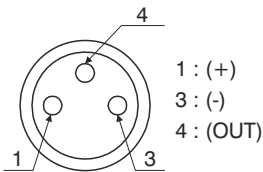
#### PNP output



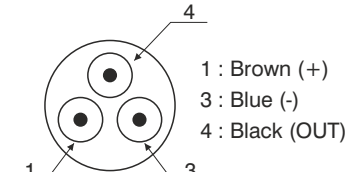
#### NPN output



#### M8 CONNECTOR PIN LAY OUT



#### 3 WIRES CABLE LAY OUT



### Cable ordering code

- MCH1** cable 3 wires l=2,5m with M8 connector  
**MCH2** cable 3 wires l=5m with M8 connector  
**MCH3** cable 3 wires l=10m with M8 connector

Connector

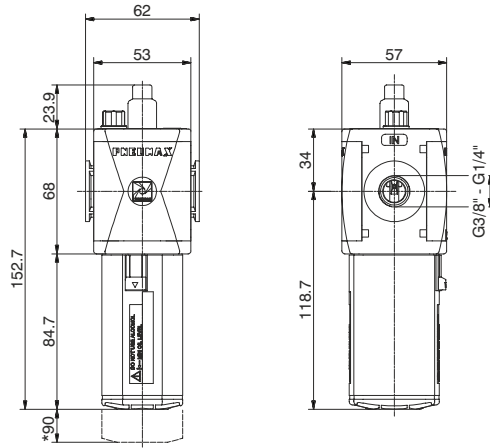


### TECHNICAL CHARACTERISTICS

Adjusting range	0 - 10 bar / 0 - 1MPa
Max. inlet pressure	15 bar / 1,5 MPa
Fluid	Filtered and dehumidified air
Display unit of measurement	MPa - kgf/cm <sup>2</sup> - bar - psi
Supply voltage	12 - 24 VDC
Current consumption	≤40mA (without load)
Digital output type	NPN - PNP
Type of contact	Normally Open - Normally Closed
Max. load current	125 mA
Digital output activation mode	single threshold with fixed hysteresis - window with fixed hysteresis - window without hysteresis
Digital output activation time	0.05s - 0.25s - 0.5s - 1s - 2s - 3s (selections for chattering-proof function)
Display characteristics	Double 3 1/2 digit display Digital output status indication Three-pushbuttons touchpad
Indicator accuracy	≤±2% F.S. ± 1 digit
Protection grade	IP 40
Temperature	0 - 50 °C
Cable section	3 x 0,129mm <sup>2</sup> , Ø4 mm, PVC



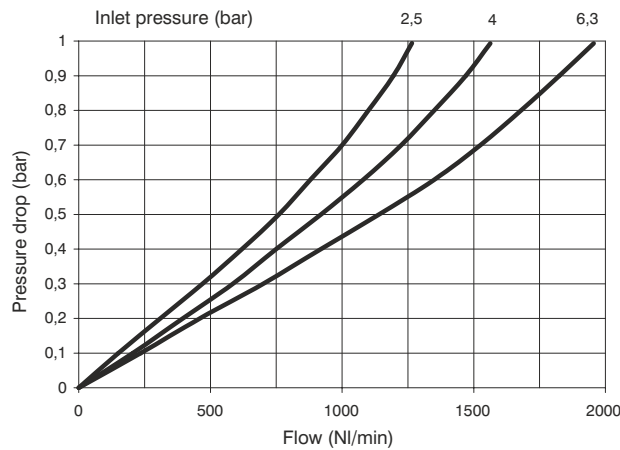
Lubricator (L)



\*Bowl removal maximum height

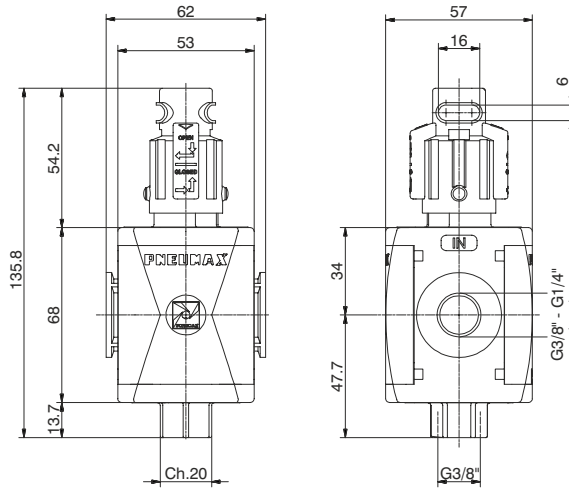
Example : T172BL : size 2, Lubricator with Technopolymer threads, G3/8" connections

Flow rate curves



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Oil mist lubrication with variable orifice size in function of the flow rate</li> <li>- Oil quantity regulation mechanism and oil quantity visualization dome made of polycarbonate.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Oil filling plug</li> <li>- Oil can be refilled with pressurized circuit.</li> <li>- Available with electric min-level sensor N.O. or N.C. with connection for connector.</li> <li>- For electrical connection use connectors type C1-C2-C3 (see sensors chapter in the catalogue).</li> </ul>	Connections	G 1/4" - G 3/8"	<b>V172CLOZ</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	<b>C</b> CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with Technopolymer threads	gr. 210	
	Weight with threaded inserts	gr. 220	<b>O</b> OPTIONS A = Min. Oil level indicator Normally open C = Min. Oil level indicator Normally closed
	Indicative oil drop rate	1 drop every 300/600 NI	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	70 cm <sup>3</sup>	* no additional letter required
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm		
<b>Note</b>	Min. operational flow at 6,3 bar	70 NI/min.	
Install as close as possible to the point of use Do not use alcohol, deterging oils or solvents.			

Shut-off valve (VL)



Example: T172BVL : size 2, Shut-off valve with Technopolymer threads, G3/8" connections

Operational characteristics

- Manual operated 3 ways poppet valve.
- Double handle action for valve opening: pushing and rotating (clockwise).
- The valve can be closed and the down stream circuit depressurized by rotating anticlockwise the knob.
- Knob lockable with three padlocks.

Technical characteristics

Connections	G 1/4" - G 3/8"
Max. inlet pressure	13 bar
Discharge connection	G3/8"
Working temperature	-5°C ÷ +50°C
Weight with Technopolymer threads	gr. 180
Weight with threaded inserts	gr. 190
Assembly positions	Indifferent
Handle opening and closing angle	90°
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm
Nominal flow rate at 6 bar with Δp=1	2200 NI/min.
Exhaust nominal flow rate at 6 bar with Δp=1	1500 NI/min.

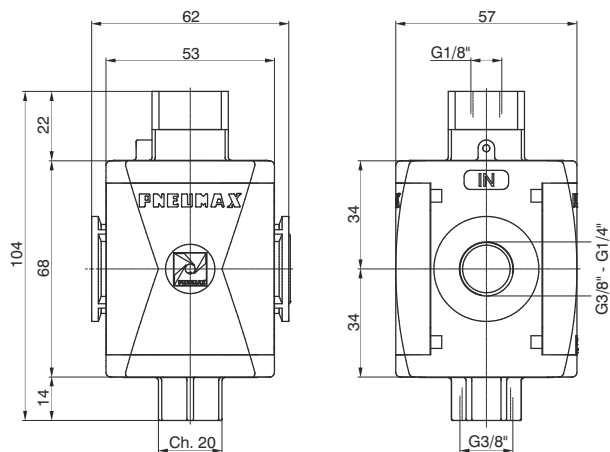
Ordering code

**V172CVL**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)

3

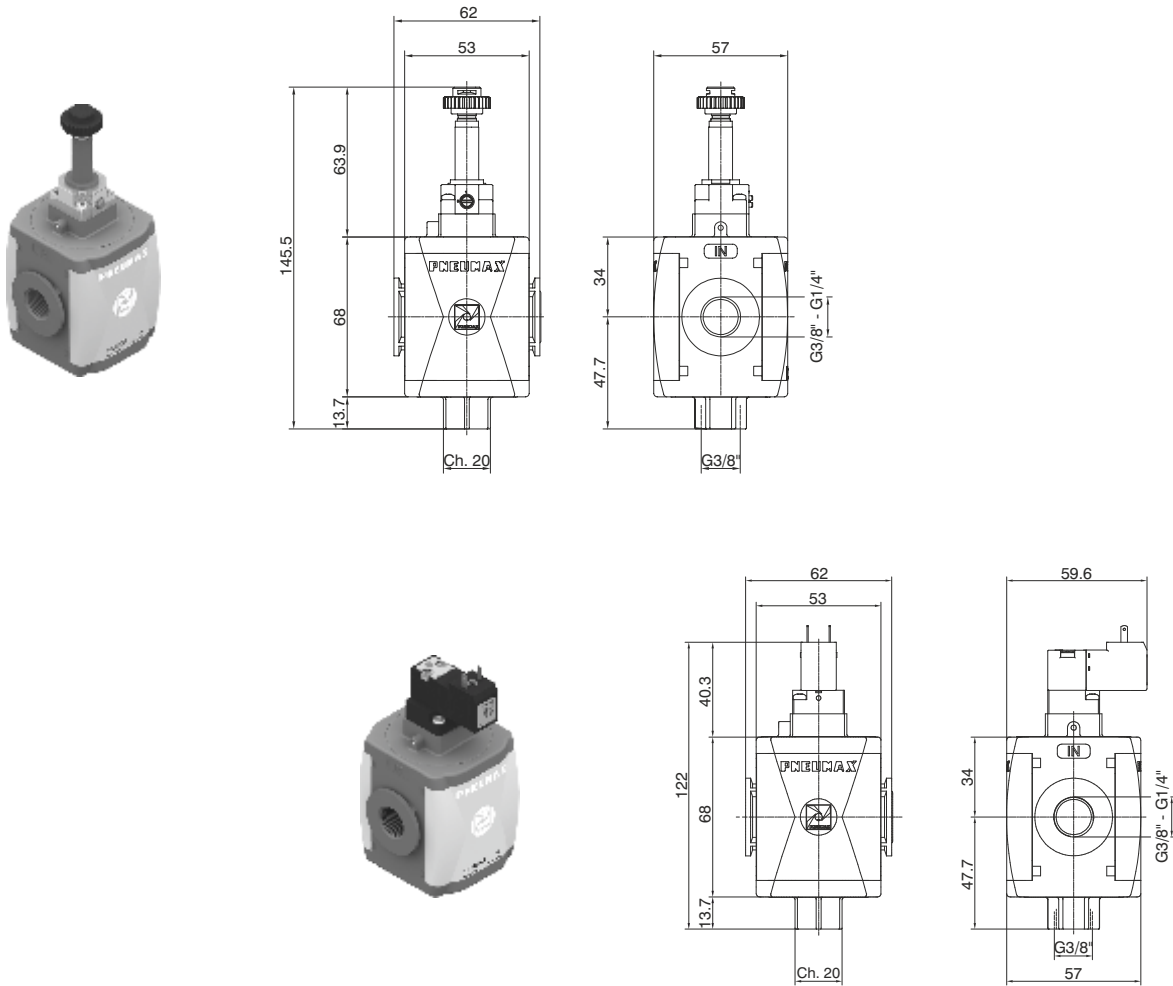
## Pneumatic shut-off valve (VP)



Example: T172BVP : size 2, Pneumatic shut-off valve with Technopolymer threads, G3/8" connections

Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Pneumatic operated 3 ways poppet valve.</li> <li>- When the pneumatic signal is removed the valves exhaust the pneumatic circuit</li> </ul>	Connections	G 1/4" - G 3/8"	<b>V172CVP</b>
	Discharge connection	G3/8"	
	Pilot port size	G1/8"	<b>V</b> VERSION
	Working temperature	-5°C +50°C	N = Metal inserts
	Weight with technopolymer threads	gr. 173	T = Technopolymer thread
	Weight with threaded inserts	gr. 181	<b>C</b> CONNECTIONS
	Assembly positions	Indifferent	A = G1/4" (only for "N" version)
	Min. pressure working	2,5 bar	B = G3/8"
	Max. pressure working	10 bar	C = 3/8 NPT (only for "N" version)
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Nominal flow rate at 6 bar with $\Delta p=1$	2200 NI/min.	
	Exhaust nominal flow rate at 6 bar with $\Delta p=1$	1500 NI/min.	

Electric shut-off valve (VE)

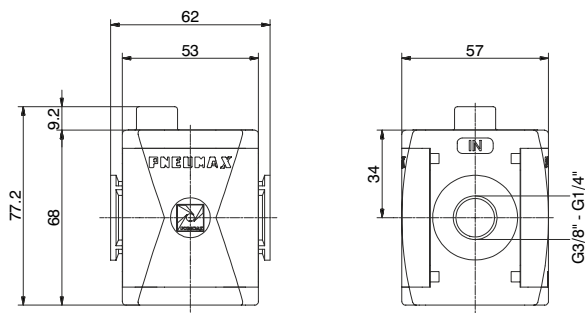


Example : T172BVEB2 : size 2, Electric shut-off valve, with M2 Pilot without coil, Technopolymer threads, G3/8" connections

Operational characteristics	Technical characteristics		Ordering code
- Solenoid operated 3 ways poppet valve. - The model fitted with 15 mm pilots uses pilots series N33_0A and N33_0E (1 Watt)	Supply and operating connections	G 1/4" - G 3/8"	<b>V172CVEA</b> VERSION N = Metal inserts T = Technopolymer thread
	Discharge connections	G 3/8"	
	Working temperature	-5°C +50°C	<b>C</b> CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with Technopolymer threads	200 g	
	Weight with threaded inserts	210 g	15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt)
	Assembly positions	Indifferent	
	Min. Pressure working	2,5 bar	22 mm COIL VOLTAGE B2 = Without coil M2 mechanic
	Max. Pressure working	10 bar	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	<b>A</b> B4 = 12 V DC B5 = 24 V DC B6 = 24 V AC (50-60 Hz) B7 = 110 V AC (50-60 Hz) B8 = 230 V AC (50-60 Hz) B9 = 24 V DC (2 Watt)
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Nominal flow rate at 6 bar with $\Delta p=1$	2200 NI/min.	30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
	Exhaust nominal flow rate at 6 bar with $\Delta p=1$	1500 NI/min.	

3

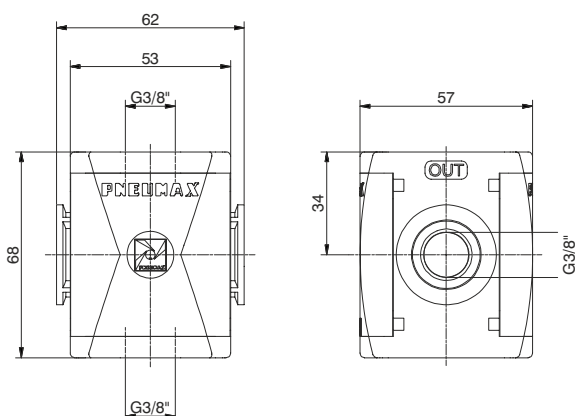
## Progressive start-up valve (AP)



Example : T172BAP : size 2, Progressive start-up valve with Technopolymer threads, G3/8" connections

Operational characteristics	Technical characteristics		Ordering code
- Down stream circuit filling time regulated via a built in flow regulator. - Full pressure is allowed once the down stream circuit pressure reaches 50% of the inlet pressure.	Connections	G 1/4" - G 3/8"	<b>V172CAP</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 140	
	Weight with threaded inserts	gr. 150	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Assembly positions	Indifferent	
	Min. pressure working	2,5 bar	
	Nominal flow rate at 6 bar with $\Delta p=1$	2200 NI/min.	
	Fully open built in flow regulator flow rate	200 NI/min.	

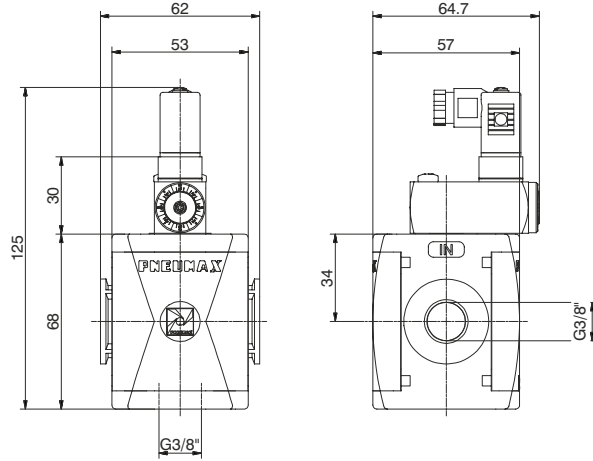
## Air intake (PA)



Example : T172BPA : size 2, Air intake with Technopolymer threads, G3/8" connections

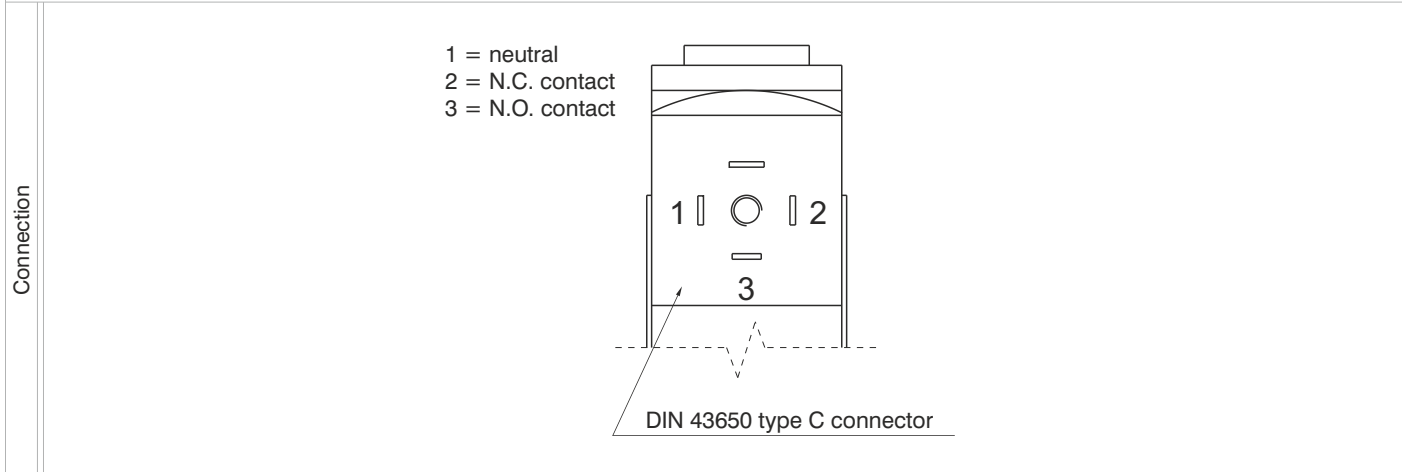
Operational characteristics	Technical characteristics		Ordering code
- Available with two G3/8" threaded connections.  <b>Attention</b> For this product are available only Technopolymer connections	Connections	G 3/8"	<b>T172BPA</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight	gr. 95,5	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	

**Pressure switch (PP)**



Example: T172BPP : Size 2, Pressure switch with Technopolymer threads, G3/8" connections

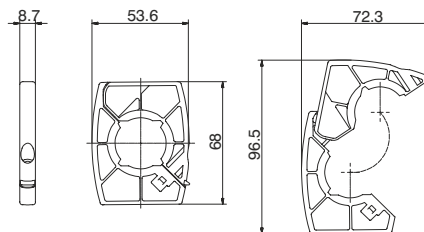
Operational characteristics	Technical characteristics		
<ul style="list-style-type: none"> <li>- Built in adjustable pressure switch (2 to 10 bar) with electrical connection.</li> <li>- G 3/8" threaded connection on the bottom face.</li> <li>- The electrical connection is made by mean of a 15 mm connector DIN 43650 type C. The microswitch contact could be normally closed or open (change overswitch).</li> </ul> <p><b>Attention</b> For this product are available only Technopolymer connections</p>	Connections	G 3/8"	Ordering code
	Max. inlet pressure	13 bar	<b>T172BPP</b>
	Working temperature	-5°C +50°C	
	Weight	gr. 179	
	Microswitch capacity	1A	
	Grade of protection (with connector assembled)	IP 65	
	Adjusting range	2 -10 bar	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Microswitch maximum tension	250 VAC	



**Flange X**

Ordering code

**T172X**

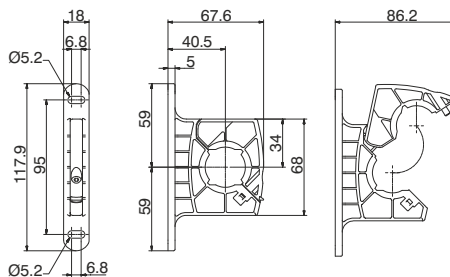


Weight 21 gr.  
Example : T172X : Size 2 coupling flange  
- Enables the quick connection of two functions.

**Flange Y**

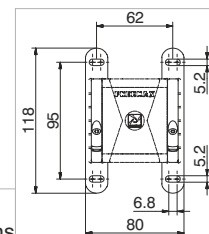
Ordering code

**T172Y**



Weight 33 gr.  
Example : T172Y : Size 2 coupling flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

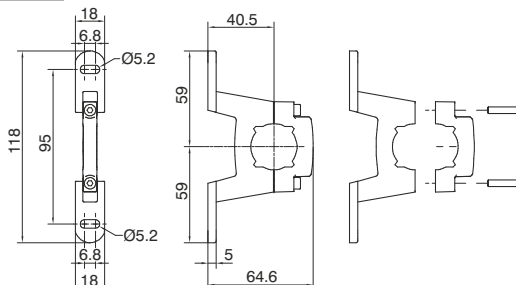
Single unit panel  
mounting dimensions



**Aluminium flange Y**

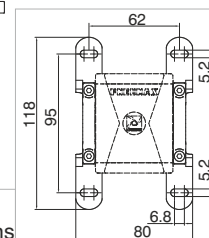
Ordering code

**N172Y**



Weight 54 gr.  
Example : N172Y : Size 2 coupling aluminium flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

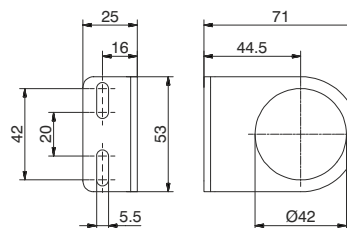
Single unit panel  
mounting dimensions



**Fixing bracket**

Ordering code

**T17250**



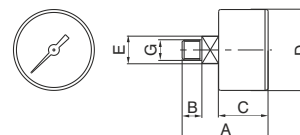
Weight 71 gr.  
- Allows for regulators and filter regulators to be panel mounted.

**Pressure gauge**

Ordering code

**17070**

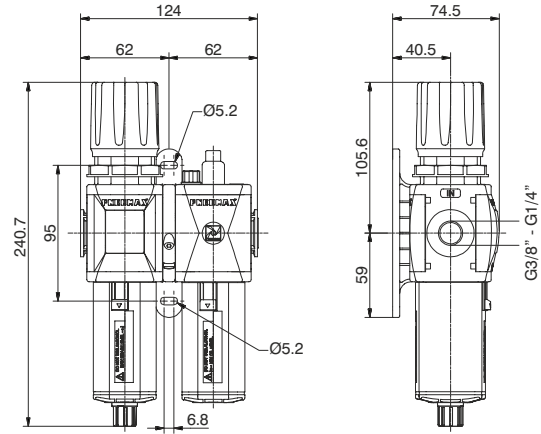
<b>V</b>	VERSION
	A = Dial Ø40 B = Dial Ø50
<b>S</b>	SCALE
	A = Scale 0-4 bar B = Scale 0-6 bar C = Scale 0-12 bar



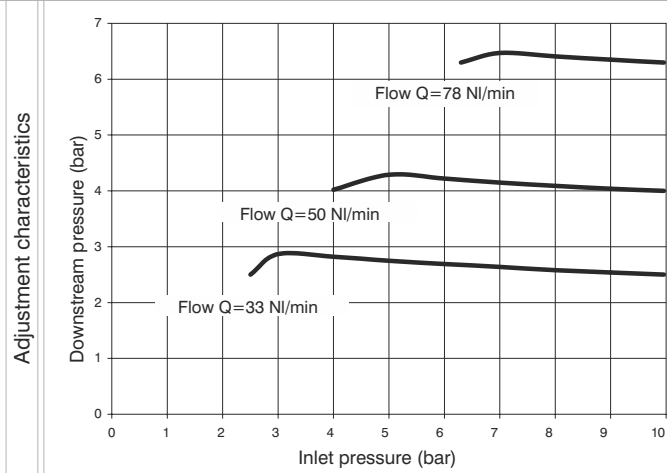
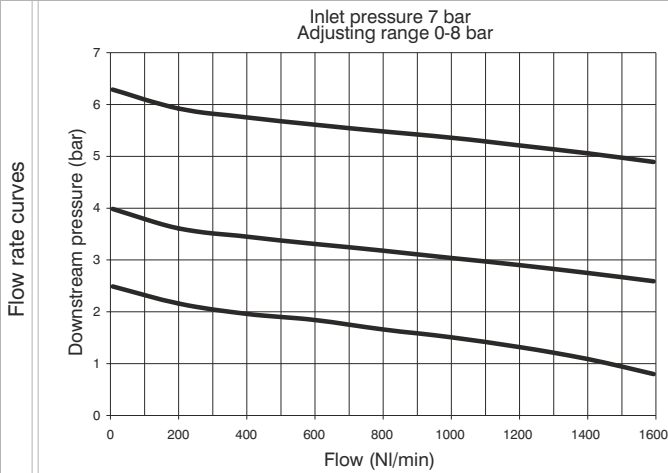
DIMENSIONS						
CODE	A	B	C	D	E	G
17070A	44	10	26	41	14	1/8"
17070B	45	10	27	49	14	1/8"



Service unit assembled (EM+L) (E+L) (EW+L)



Example : GT172BHG : size 2, combined group comprising Filter-regulator and Lubricator, Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising Filter-regulator with built in manometer and Lubricator assembled with a (Y) type coupling kit for panel mounting.  
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 1/4" - G 3/8"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 643
Weight with threaded inserts	gr. 663
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	34 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	70 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm
Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm

Min. operational flow at 6,3 bar

70 NI/min.

Ordering code

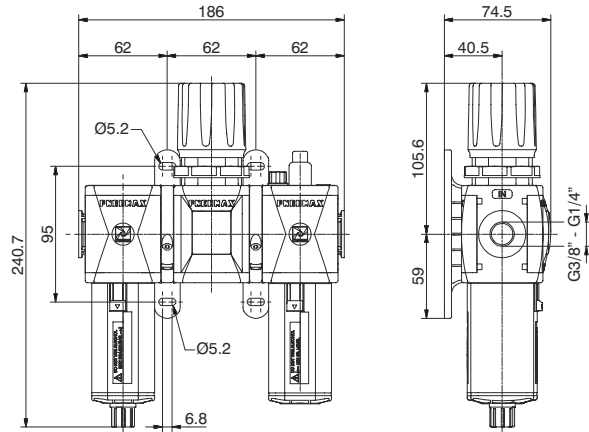
**GV172CITSODZ**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
TYPE	
T	H = Built in gauge J = G1/8" gauge connection
FILTER PORE SIZE	
ADJUSTING RANGE	
S	C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
OPTIONS	
= Standard *	
O	A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
FLOW DIRECTION	
D	= Standard (from left to right) W = from right to left
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

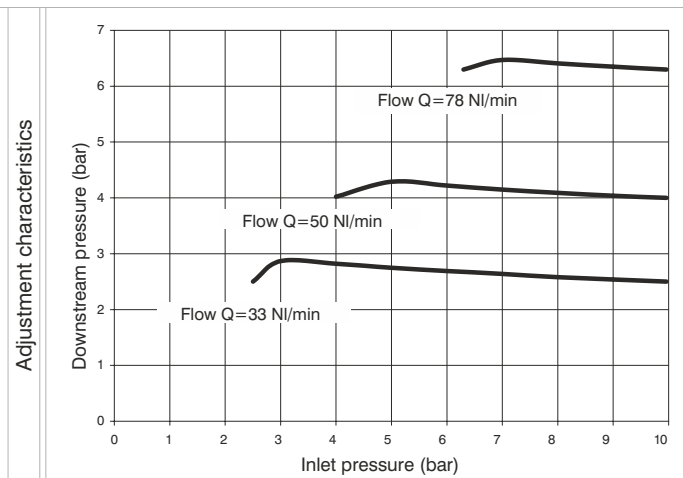
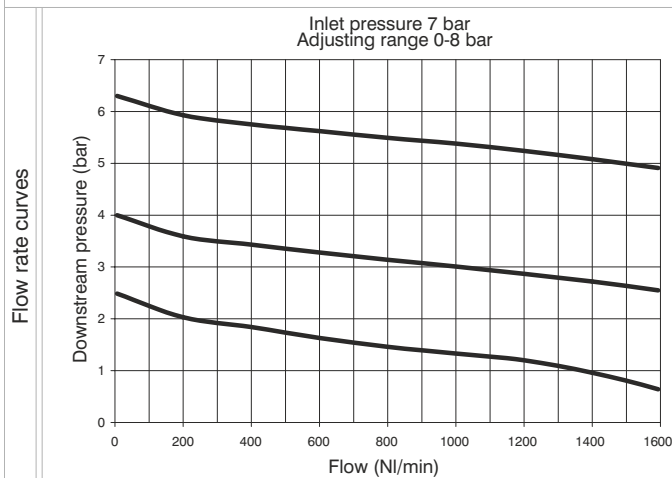
\* no additional letter required



Service unit assembled (F+RM+L) (F+R+L) (F+RW+L)



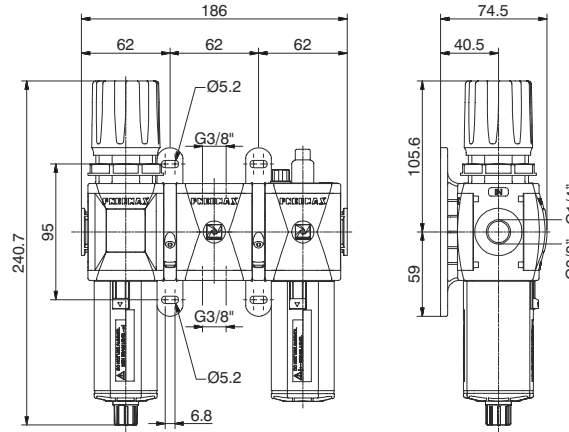
Example : GT172BKG : size 2 combined group comprising Filter, Regulator and Lubricator Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



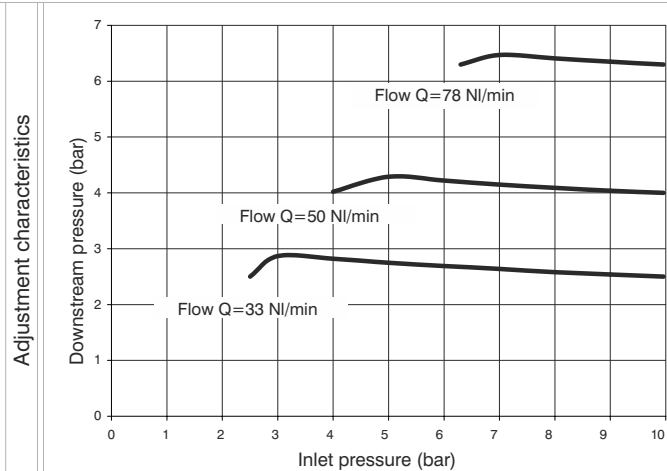
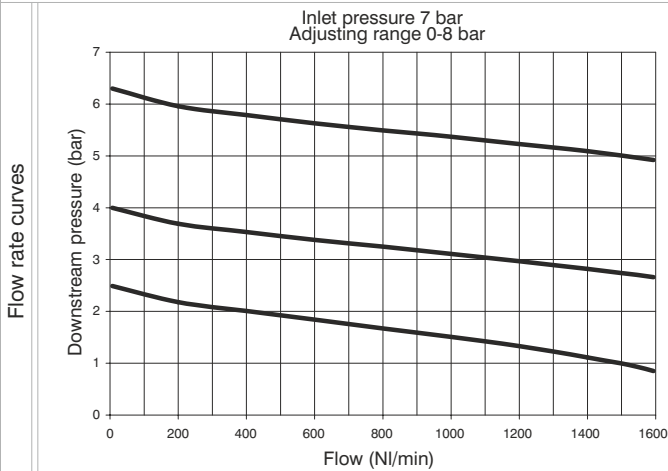
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter, Regulator with built in manometer and Lubricator assembled with two (Y) type coupling kits for panel mounting.	Connections	G 1/4" - G 3/8"	<b>GV172CTSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	<b>VERSION</b> N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 796	<b>CONNECTIONS</b> A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 826	<b>TYPE</b> K = Built in gauge T = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>FILTER PORE SIZE</b> C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	<b>ADJUSTING RANGE</b> C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Bowl capacity	34 cm <sup>3</sup>	<b>OPTIONS</b> = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Indicative oil drop rate	1 drop every 300/600 NI	<b>FLOW DIRECTION</b> = Standard (from left to right) W = from right to left
	Oil type	FD22 - HG32	<b>BOWL OPTIONS</b> = Standard * N = Nylon bowl
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	

\* no additional letter required

Service unit assembled (EM+PA+L) (E+PA+L) (EW+PA+L)



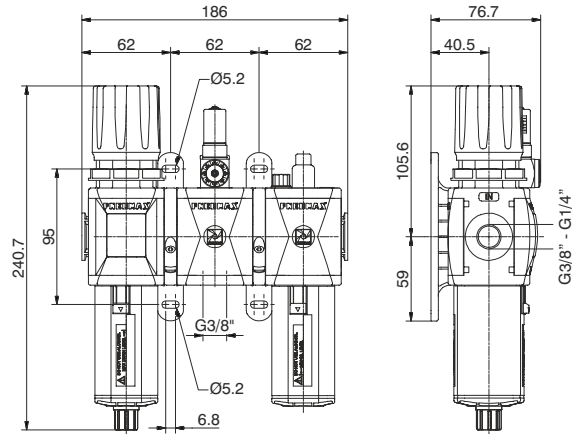
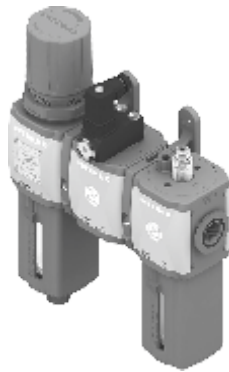
Example : GT172BNG : size 2 combined group comprising Filter-regulator, Air intake and Lubricator Technopolymer threads, G3/8" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



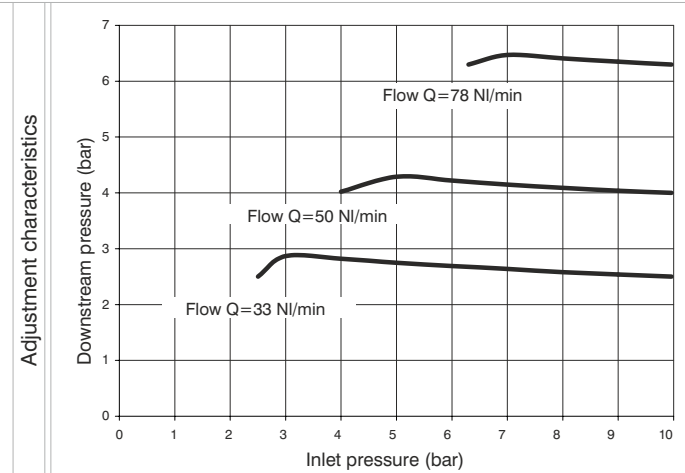
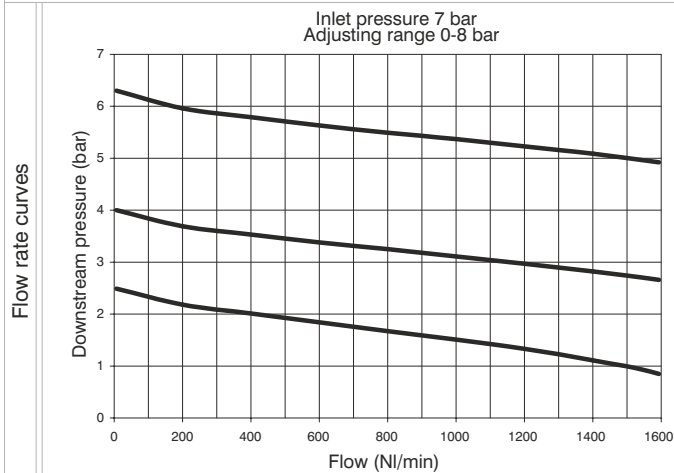
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer, Air intake and Lubricator assembled with two (Y) type coupling kits for panel mounting. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G 1/4" - G 3/8"	<b>GV172GTS0DZ</b>
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 771,5	CONNECTIONS G A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 791,5	TYPE T N = Built in gauge P = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE S D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	34 cm <sup>3</sup>	FLOW DIRECTION D = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	* no additional letter required



Service unit assembled (EM+PP+L) (E+PP+L) (EW+PP+L)

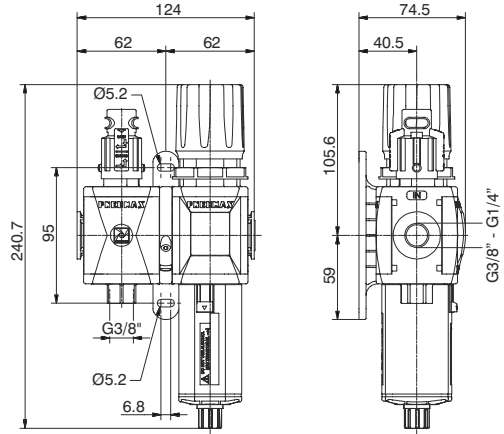


Example : GT172BRG : size 2 combined group comprising Filter-Regulator, Pressure switch and Lubricator Technopolymer threads, G3/8" connections 0 to 8 bar adjusting range and 20 µm filter pore size

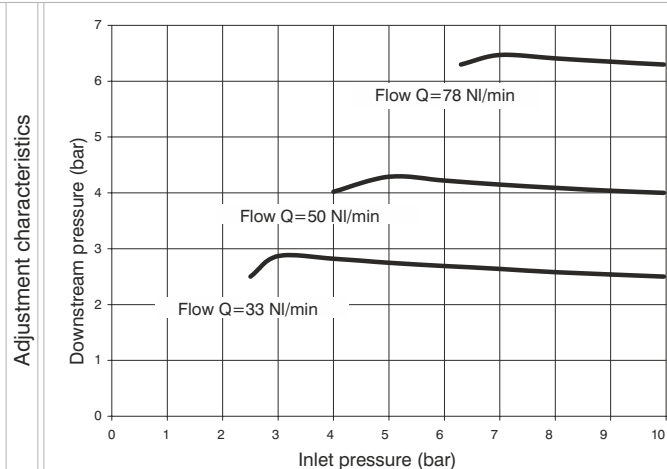
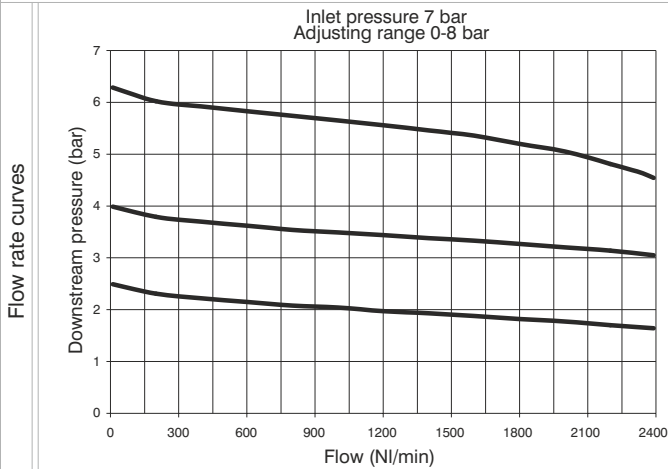


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer, Pressure switch and Lubricator assembled with two (Y) type coupling kits for panel mountings.	Connections	G 1/4" - G 3/8"	<b>GV172CTSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	<b>VERSION</b> N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 855	<b>CONNECTIONS</b> A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 875	<b>TYPE</b> R = Built in gauge C = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>FILTER PORE SIZE</b> C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	<b>ADJUSTING RANGE</b> C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Bowl capacity	34 cm <sup>3</sup>	<b>OPTIONS</b> = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Indicative oil drop rate	1 drop every 300/600 NI	<b>FLOW DIRECTION</b> = Standard (from left to right) W = from right to left
	Oil type	FD22 - HG32	<b>BOWL OPTIONS</b> = Standard * N = Nylon bowl
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	

Service unit assembled (VL+EM) (VL+E) (VL+EW)



Example : GT172BVGG : size 2 combined group comprising Shut-off valve, Filter-regulator Technopolymer threads, G3/8" connections 0 to 8 bar adjusting range and 20 µm filter pore size

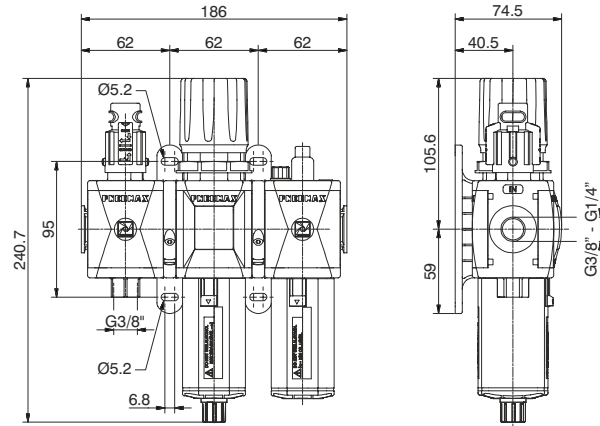


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, assembled with one (Y) type coupling kit for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G 1/4" - G 3/8"	<b>GV172GTS0DZ</b>
	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION
	Weight with Technopolymer threads	gr. 613	V N = Metal inserts
	Weight with threaded inserts	gr. 633	T = Technopolymer thread
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	CONNECTIONS
	Filter pore size	5 µm - 20 µm - 50 µm	A = G1/4" (only for "N" version)
	Bowl capacity	34 cm <sup>3</sup>	B = G3/8"
	Indicative oil drop rate	1 drop every 300/600 NI	C = 3/8 NPT (only for "N" version)
	Oil type	FD22 - HG32	TYPE
	Bowl capacity	70 cm <sup>3</sup>	T VG = Built in gauge
	Assembly positions	Vertical	VU = G1/8" gauge connection
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	FILTER PORE SIZE
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	ADJUSTING RANGE
	Min. operational flow at 6,3 bar	70 NI/min.	C = 5 µm / 0-8 bar
			D = 5 µm / 0-12 bar
			G = 20 µm / 0-8 bar
			H = 20 µm / 0-12 bar
			N = 50 µm / 0-8 bar
			P = 50 µm / 0-12 bar
			OPTIONS
			= Standard *
			S = Automatic drain
			FLOW DIRECTION
			= Standard
			D (from left to right)
			W = from right to left
			BOWL OPTIONS
			= Standard *
			N = Nylon bowl

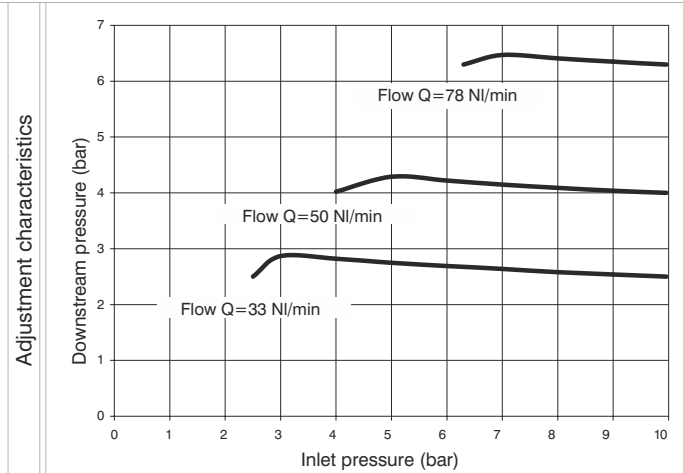
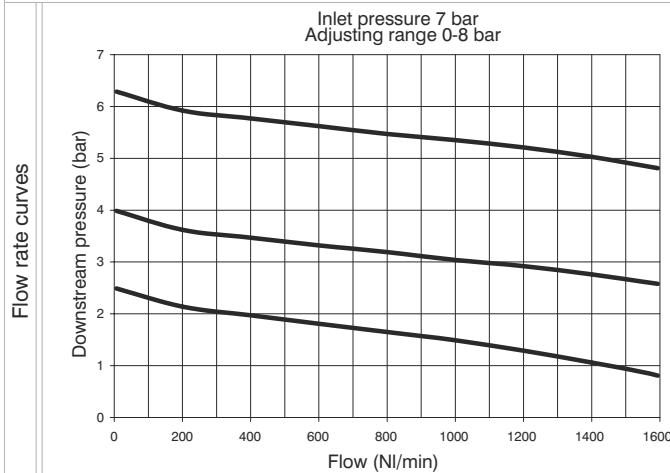
\* no additional letter required



Service unit assembled (VL+EM+L) (VL+E+L) (VL+EW+L)



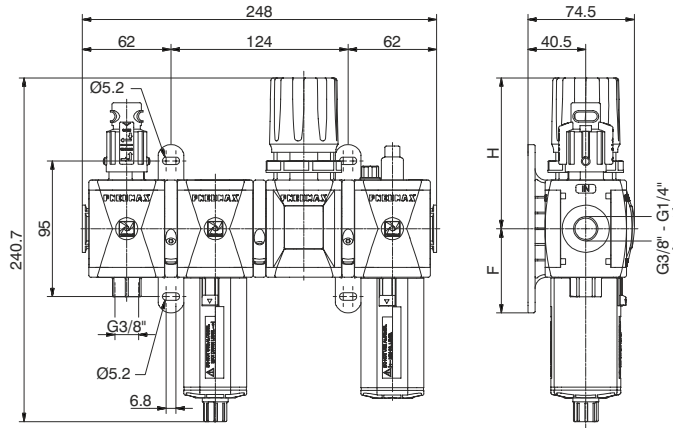
Example : GT172BVHG : size 2 combined group comprising Shut-off valve, Filter-regulator and Lubricator Technopolymer threads, G3/8" connections 0 to 8 bar adjusting range and 20 µm filter pore size



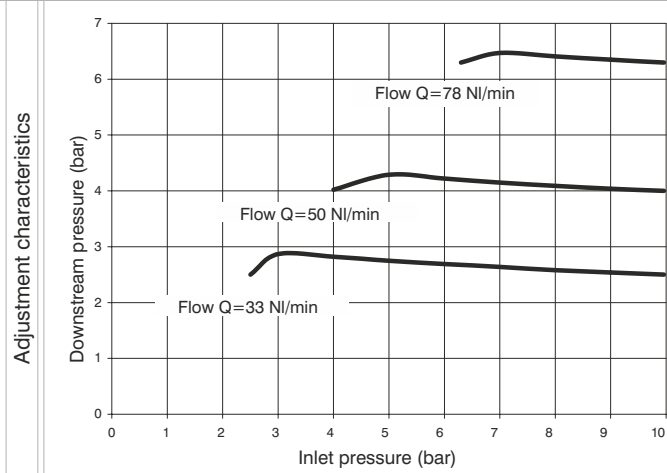
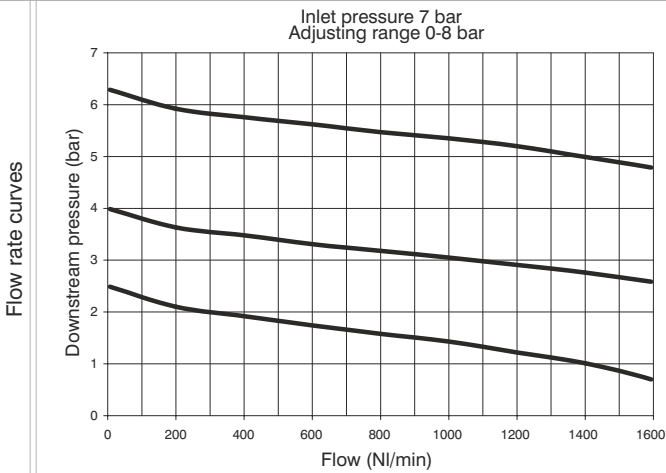
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer and Lubricator assembled with two(Y) type coupling kits for panel mountings.	Connections	G 1/4" - G 3/8"	<b>GV1720TSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	<b>V</b> VERSION N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 856	<b>C</b> CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 886	<b>T</b> TYPE VH = Built in gauge VJ = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>S</b> FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	<b>O</b> OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	34 cm <sup>3</sup>	<b>D</b> FLOW DIRECTION = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	

\* no additional letter required

Service unit assembled (VL+F+RM+L) (VL+F+R+L) (VL+F+RW+L)



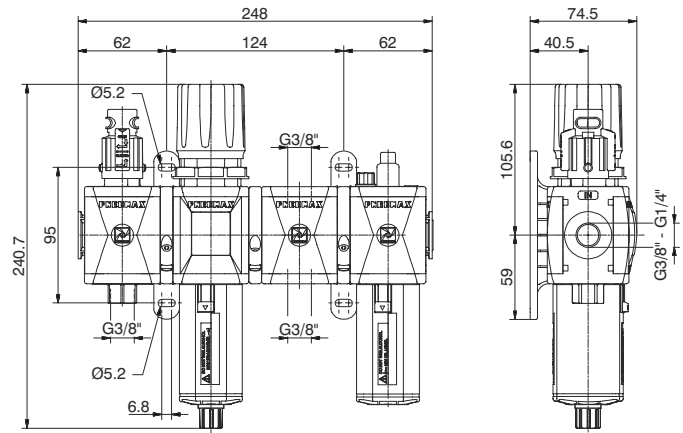
Example : GT172BVKG : size 2 combined group comprising Shut-off valve, Filter, Regulator and Lubricator Technopolymer threads, G3/8" connections 0 to 8 bar adjusting range and 20 µm filter pore size



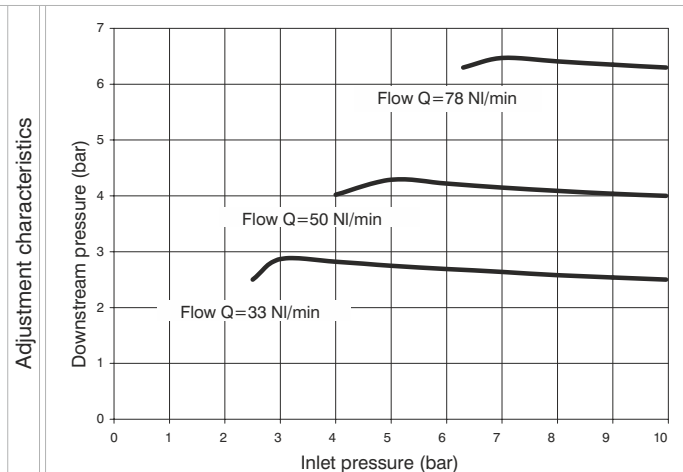
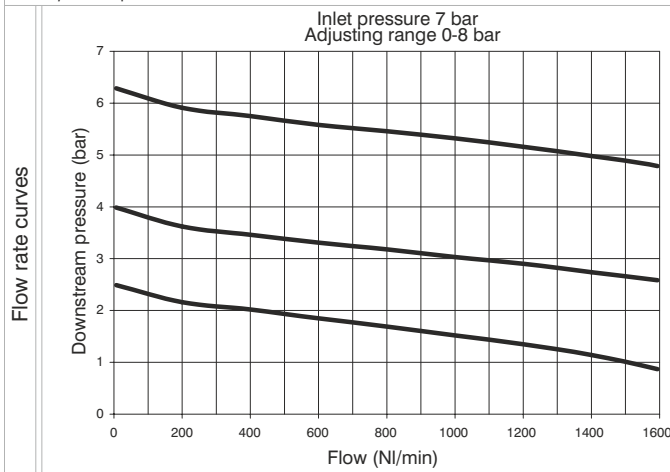
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut - off valve, Filter, Regulator with built in manometer and Lubricator , assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 1/4" - G 3/8"	<b>GV172GTS0DZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b>	Working temperature	-5°C +50°C	VERSION
The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Weight with Technopolymer threads	gr. 997	<input checked="" type="checkbox"/> N = Metal inserts <input type="checkbox"/> T = Technopolymer thread
	Weight with threaded inserts	gr. 1037	CONNECTIONS
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<input checked="" type="checkbox"/> A = G1/4" (only for "N" version) <input type="checkbox"/> B = G3/8" <input type="checkbox"/> C = 3/8 NPT (only for "N" version)
	Filter pore size	5 µm - 20 µm - 50 µm	TYPE
	Bowl capacity	34 cm <sup>3</sup>	<input checked="" type="checkbox"/> VK = Built in gauge <input type="checkbox"/> VT = G1/8" gauge connection
	Indicative oil drop rate	1 drop every 300/600 NI	FILTER PORE SIZE
	Oil type	FD22 - HG32	ADJUSTING RANGE
	Bowl capacity	70 cm <sup>3</sup>	<input type="checkbox"/> C = 5 µm / 0-8 bar <input checked="" type="checkbox"/> D = 5 µm / 0-12 bar <input type="checkbox"/> G = 20 µm / 0-8 bar <input type="checkbox"/> H = 20 µm / 0-12 bar <input type="checkbox"/> N = 50 µm / 0-8 bar <input type="checkbox"/> P = 50 µm / 0-12 bar
	Assembly positions	Vertical	OPTIONS
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	<input type="checkbox"/> = Standard * <input type="checkbox"/> A = Min.oil level indicator NO <input type="checkbox"/> C = Min.oil level indicator NC <input checked="" type="checkbox"/> S = Automatic drain <input type="checkbox"/> SA = Automatic drain + Min.oil level indicator NO <input type="checkbox"/> SC = Automatic drain + Min.oil level indicator NC
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	FLOW DIRECTION
	Min. operational flow at 6,3 bar	70 NI/min.	<input checked="" type="checkbox"/> = Standard (from left to right) <input type="checkbox"/> W = from right to left
			BOWL OPTIONS
			<input checked="" type="checkbox"/> = Standard * <input type="checkbox"/> N = Nylon bowl
			* no additional letter required



Service unit assembled (VL+EM+PA+L) (VL+E+PA+L) (VL+EW+PA+L)

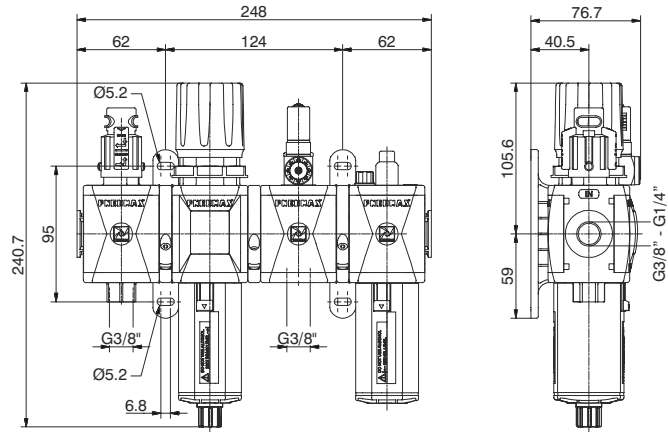
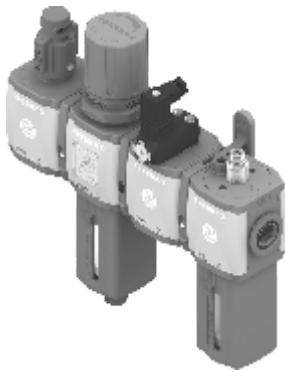


Example : GT172BVNG : size 2 combined group comprising Shut-off valve, Filter-regulator, Air intake and Lubricator Technopolymer threads, G3/8" connections 0 to 8 bar adjusting range and 20 µm filter pore size

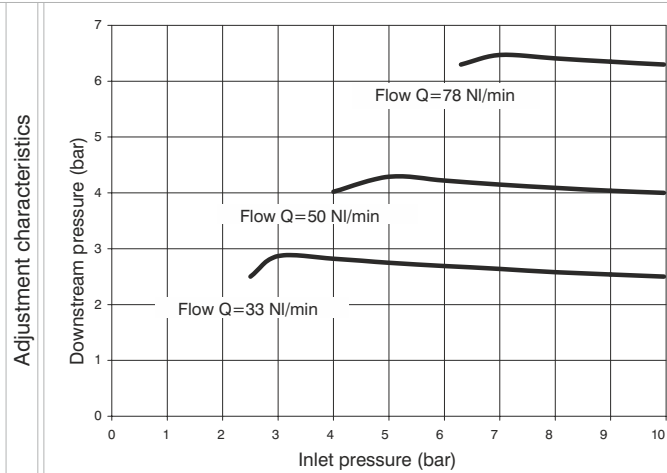
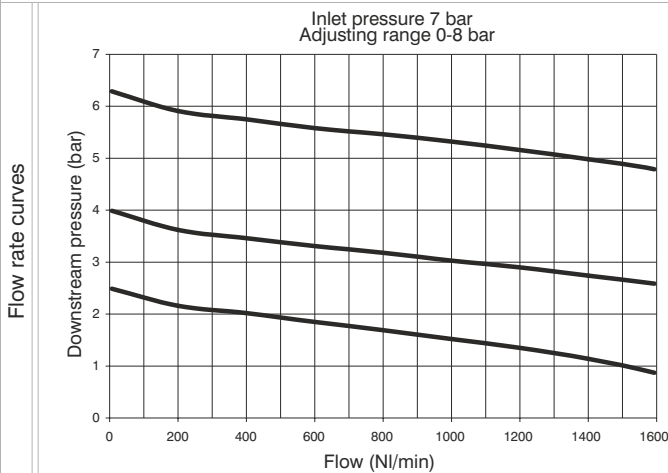


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter-regulator with built in manometer, Air intake and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 1/4" - G 3/8"	<b>GV172CTSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 972,5	CONNECTIONS A = G 1/4" (only for "N" version) B = G 3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 1002,5	TYPE T VN = Built in gauge VP = G 1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	34 cm <sup>3</sup>	FLOW DIRECTION D = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	

Service unit assembled (VL+EM+PP+L) (VL+E+PP+L) (VL+EW+PP+L)

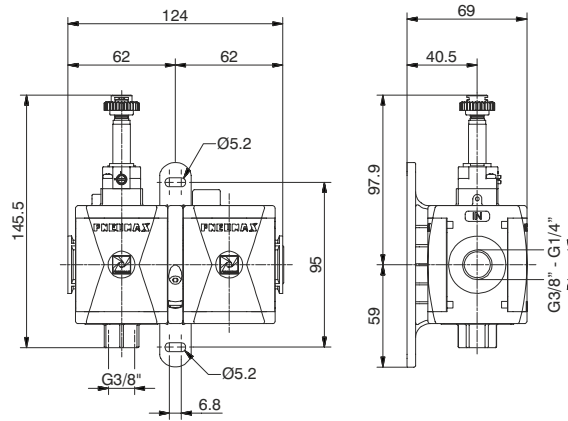


Example : GT172BVRG : size 2 combined group comprising Shut-off valve, Filter-regulator, Pressure switch and Lubricator Technopolymer threads, G3/8" connections adjusting range 0 to 8 bar and 20 µm filter pore size



Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Pressure switch and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 1/4" - G 3/8"	<b>GV172GTS0DZ</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 1056	CONNECTIONS G A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version)
	Weight with threaded inserts	gr. 1086	TYPE T VR = Built in gauge VC = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE S D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	ADJUSTING RANGE C = 5 µm / 0-8 bar
	Bowl capacity	34 cm <sup>3</sup>	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Indicative oil drop rate	1 drop every 300/600 NI	FLOW DIRECTION D = Standard (from left to right) W = from right to left
	Oil type	FD22 - HG32	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Bowl capacity	70 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Min. operational flow at 6,3 bar	70 NI/min.	

Service unit assembled (VE+AP)



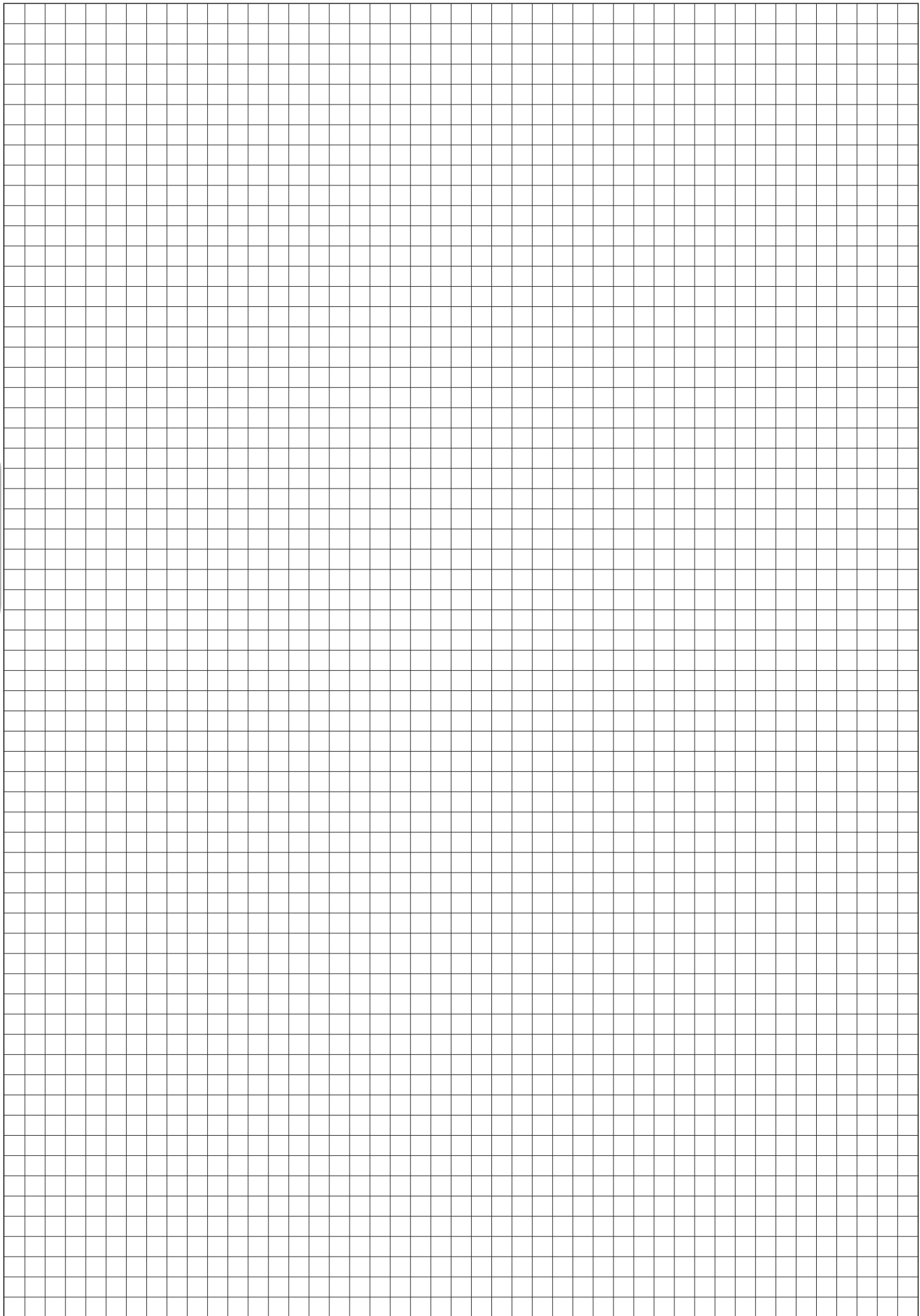
Example : GT172BSB2 : size 2 combined group comprising Electric shut-off valve, Progressive start-up valve without coil with M2 pilot Technopolymer threads, G3/8" connections

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Electric shut - off valve and Progressive start-up valve assembled with a (Y) type coupling kit for panel mounting.	Connections	G 1/4" - G 3/8"	<b>GV172CSA</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G1/4" (only for "N" version) B = G3/8" C = 3/8 NPT (only for "N" version) 15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt) 22 mm COIL VOLTAGE B2 = Without coil M2 mechanic 30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
	Max. inlet pressure	10 bar	
	Min. inlet pressure	2.5 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 373	
	Weight with threaded inserts	gr. 393	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G3/8" = 16 Nm	
	Max. fitting torque (with threaded inserts)	G1/4" = 20 Nm G3/8" = 25 Nm	
	Flow at 6 bar with Δp=1	1800 NI/min.	

3



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## Construction and working characteristics

The new FRL units AIRPLUS series represents the evolution of the well known and consolidated 1700 series.

The main features are increased performances, reliability, easy and fast assembly and the introduction of the latest technical features.

With the exception of the air intake module and the pressure switch module all elements are available in two configurations: with technopolymer connections (IN and OUT), (T series), or with metal threaded inserts, (N series). Bowls made of transparent polycarbonate (PC) are fitted with a bowl protection guard which is assembled on the body via a quick coupling mechanism provided with a safety button. The filter, available with three filtration grades (5 $\mu$ m, 20 $\mu$ m and 50 $\mu$ m) is fitted as standard with a drain mechanism which can be operated manually or semi-automatically. On request is available the auto-drain mechanism. The regulator is based on the rolling diaphragm technology with low hysteresis and the system is balanced. The unit can be fitted with integrated flush mounting pressure gauge (0 to 12 bar range). 4 pressure ranges are available going from 0 to 12 bar and the regulating knob can be blocked in position simply by pressing it down. A dedicated version is available for battery mounting, up to a maximum of 6 units. The lubricator is based on the Venturi principle and the oil quantity is regulated via the adjusting screw positioned on the transparent polycarbonate (PC) regulating dome which also ensure clear visibility of the oil flow and regulation. The oil suction pipe is fitted as standard with a sintered filter which ensures that any contaminant that should be present in the oil will reach the down stream circuit. Shoot off valve is available in two versions, one manually operated and one solenoid operated. In both cases the unit is fitted with a threaded connection for depressurising the downstream circuit. On the manually operated version, in the lock position, it is possible to fit up to three locks in order to prevent the accidental pressurization of the pneumatic circuit avoiding accidents or damages. The solenoid operated version is available with a 15mm or with a 22mm solenoid valve. The soft start valve ensure a progressive pressurization of the down stream circuit avoiding sudden pressure surges which could be dangerous for the devices fitted on the down stream circuit. The filling time can be easily adjusted via a built in flow regulator. The full flow rate is allowed only once the down stream pressure has reached 50% of the value of the inlet pressure. The pressure switch module which can be set between 2 and 10 bar and the air intake module complete the range.

The elements are joint together via dedicated quick coupling technopolymer flanges which allows for the units to be panel mounted moreover ensure the possibility to replace any component without disassembling the FRL group from its position. 90° mounting brackets and standard gauges are also available.

## Instruction for installation and operation

The FRL unit must be installed as close as possible to the application. The air flow direction must follow the directions indicated on the single units in correspondence of the threaded connections. (IN and OUT)

Units provided with bowl must be mounted vertically with the bowl facing down. Single units or groups can be panel mounted via the Y type flanges, regulators and filter-regulators can be mounted via the 90° zinc plated steel bracket. In order to mount the 90° bracket it is necessary to remove the regulating knob and then the locking ring before positioning the bracket. All units must be operated according to the specified pressure and temperature ranges; fittings must be mounted without exceeding the maximum torque allowed. Ensure that the units cover plates are in position before pressure is applied. The cover plates are needed to lock in position the top part of the unit.

The condense level in filter and filter-regulators bowls must never exceed the maximum level indicated on the bowls. With manual or semi automatic drain the condense can be discharged via a 6/4mm tube directly connected to the drain tap. On the pressure regulator the pressure value must always set while pressure is rising and ideally the unit pressure range should be chosen based on the pressure value to be regulated. Lubricators must be filled with class FD22 and HG32 oils. Ensure, both on the inlet and on the outlet, that the flow rate is above the minimum flow rate required to operate the unit. Below this value the units does not operate. The oil quantity can be regulated via the regulating screw on the transparent polycarbonate dome through which it is also clearly visible the oil flow. A drop every 300-600 litres should be allowed.

The oil can be re-filled while the pneumatic circuit is pressurized thanks to the exhaust valve which is built in the refill plug and allows for the bowl to be depressurized and the oil refill directly form in the bowl or from the plug. The manual shot off valve needs, to be operated, a push and turn action (clockwise) in order to close it and discharge the down stream circuit it is necessary to turn anti clock wise the knob. The soft start valve is used to slowly and progressively pressurize the down stream circuit, the time needed to do so can be set by means of the built in flow regulator. The soft start valve on its own does not allow for the down stream circuit to be discharged, in order to do so it is necessary to combine it with a shot off valve (to be mounted upstream).

## Maintenance



**For any maintenance which requires the removal of the top plugs/ supports from the body it is necessary to preventively remove the sides cover plates. If the top plugs\supports are removed with the sides plates still in their position the unit could be permanently damaged.**

Bowls, plugs and supports are assembled with a bayonet type mechanism. In order to remove them rotate anti clockwise until the mechanical stop is reached and than remove from the body (for the bowls firstly press down the green safety button). Bowls and transparent parts can be cleaned with water and neutral soap. Do not use solvents or alcohol.

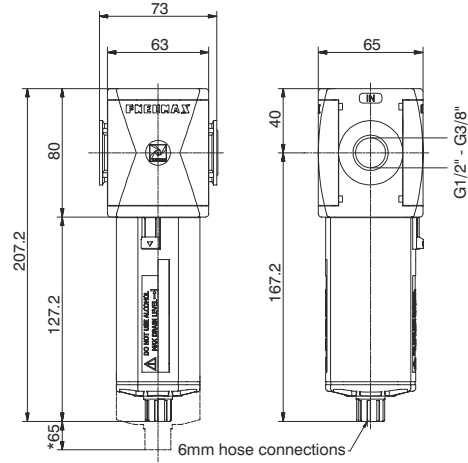
Filtering elements (from filters and filter regulators) made of HDPE can be regenerated by washing and blowing them. In order to remove them it is necessary to remove the bowl unscrew the filter element and replace it with a new one or clean it. The oil can be re-filled while the pneumatic circuit is pressurized thanks to the exhaust valve which is built in the refill plug and allows for the bowl to be depressurized. In order to be able to unmount the bowl it is necessary unscrew the refill plug positioned near the oil dome, once this operation has been carried out it is possible to remove the bowl to re fill it or to refill from the refill plug. Refilling directly the bowl is suggested.

Should the pressure regulator not perform properly or should present a constant leakage from the relieving replaced the diaphragm by unloading completely the regulating spring before removing the regulation support. Any other maintenance operation, in consideration of the complexity of the assembly, and the need of a through test according to the Pneumax spa specification, should be carried out by the manufacturer.

## Fittings maximum recommended torque applicable

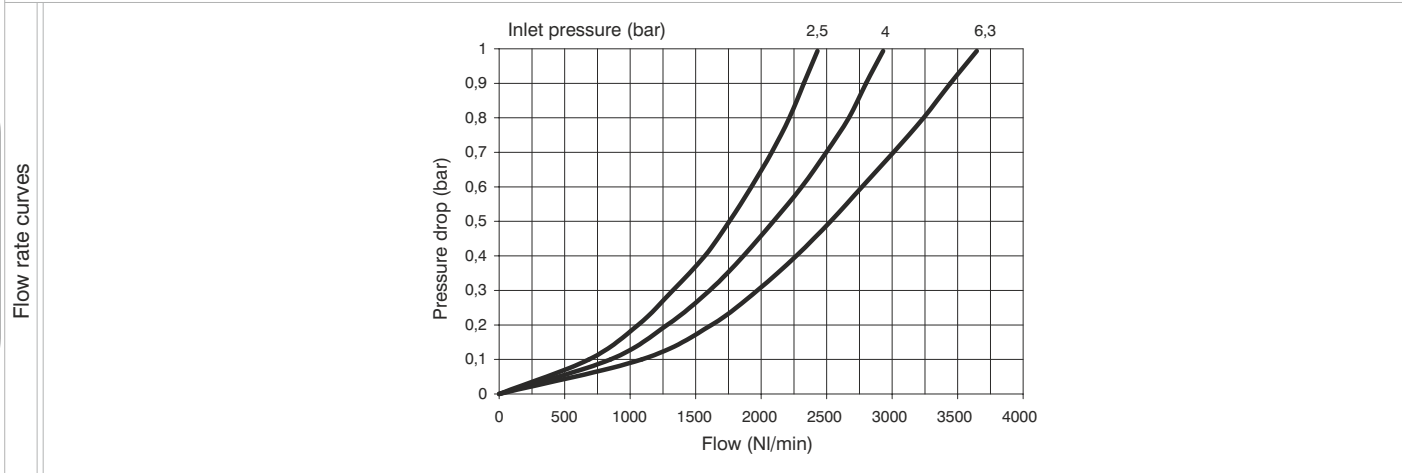
THREAD	Technopolymer version (T)	Metal version (N)
G1/8"	4 Nm	15 Nm
G1/4"	9 Nm	20 Nm
G3/8"	16 Nm	25 Nm
G1/2"	22 Nm	30 Nm

Filter (F)



\*Bowl removal maximum height

Example: T173BFB : size 3, Filter with Technopolymer threads, G1/2" connections, 20 µm filter pore size

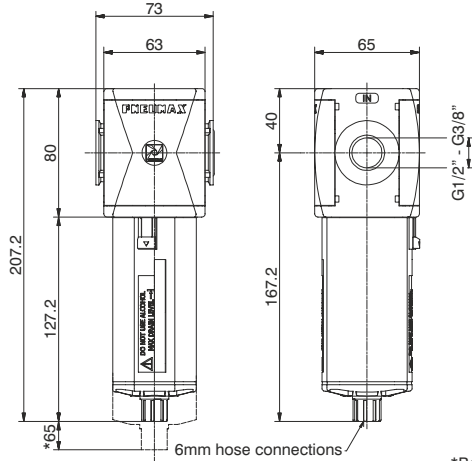


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Double filtering action: air flow centrifugation and filter element</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> </ul>	Connections	G 3/8" - G 1/2"	<b>V173CFSSZ</b>
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	<b>CONNECTIONS</b> A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Maximum working pressure with automatic drain	10 bar	<b>FILTER PORE SIZE</b> A = 5 µm B = 20 µm C = 50 µm
	Working temperature	-5°C +50°C	<b>OPTIONS</b> = Standard * S = Automatic drain
	Weight with Technopolymer threads	gr. 320	<b>BOWL OPTIONS</b> = Standard * Z = Nylon bowl
	Weight with threaded inserts	gr. 340	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	68 cm <sup>3</sup>	
	Note	Assembly positions	Vertical
In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	

\* no additional letter required



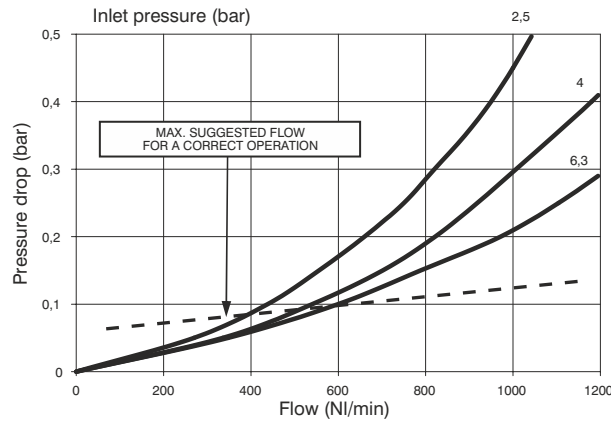
Coalescing filter (D)



\*Bowl removal maximum height

Example : T173BDA : Coalescing size 3, Filter with Technopolymer threads, G1/2" connections, filter efficiency 99,97%

Flow rate curves



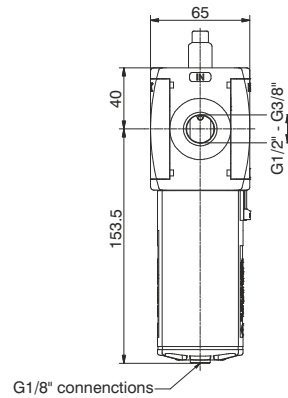
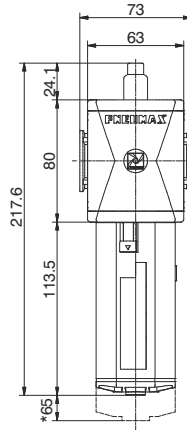
Operational characteristics	Technical characteristics		Ordering code
- Coalescing filter element with filtration grade of 0,01 $\mu\text{m}$	Connections	G 3/8" - G 1/2"	<b>V173DE0Z</b>
- Transparent bowl made off polycarbonate with bowl protection guard.	Max. inlet pressure	13 bar	
- Bowl assembly via bayonet type quick coupling mechanism with safety button.	Minimum working pressure with automatic drain	0,5 bar	<b>V</b> VERSION N = Metal inserts T = Technopolymer thread
- Semi-automatic drain mounted as standard; automatic drain upon request.	Maximum working pressure with automatic drain	10 bar	<b>C</b> CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
<b>Note</b> In order to ensure a better grade of filtration it is recommended to use a 5 $\mu\text{m}$ filter before the coalescing filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.	Working temperature	-5°C +50°C	<b>E</b> FILTER EFFICIENCY A = 99,97%
	Weight with Technopolymer threads	gr. 325	<b>O</b> OPTIONS = Standard * S = Automatic drain
	Weight with threaded inserts	gr. 345	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Filter efficiency with 0,01 $\mu\text{m}$ particle	99,97%	
	Bowl capacity	68cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	

\* no additional letter required

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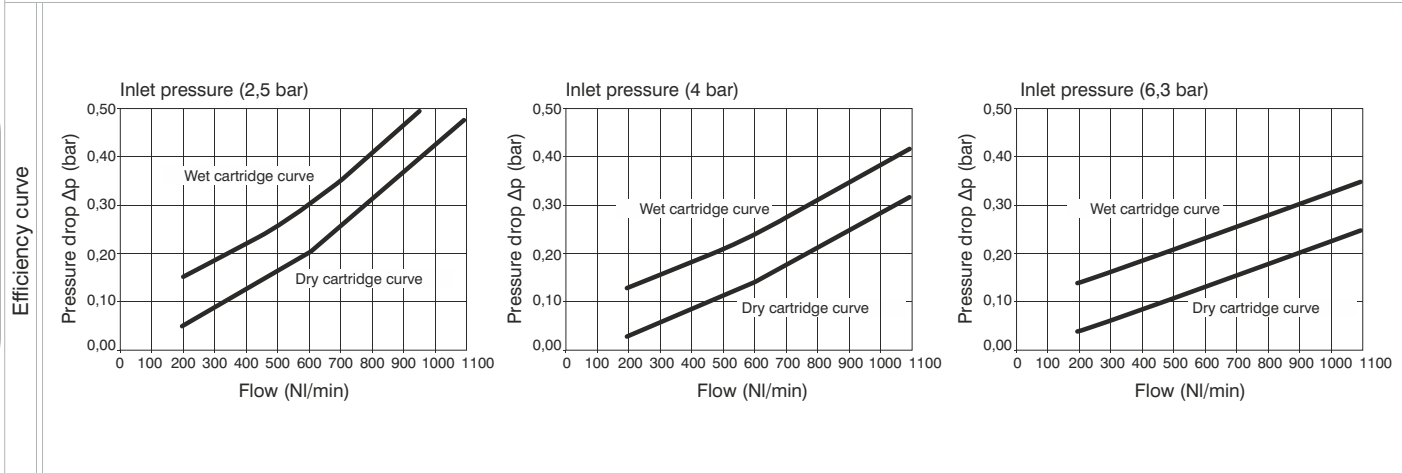


Oil removal filter (DB)



\*Bowl removal maximum height

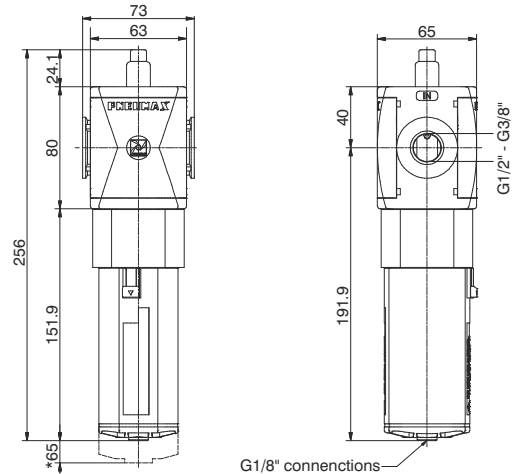
Example : T173BDBV : size 3 Oil removal filter, with clogging gauge, Technopolymer threads, G1/2" connections.



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Coalescing filtering cartridge particle removal 0,01 μm oil residual 0,01 ppm</li> <li>- Clogging gauge green: proper working red: clogged cartridge (Δp 0,5 bar) we recommend to change the cartridge</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Automatic drain mounted as standard.</li> </ul>	Connections	G 3/8" - G 1/2"	<b>V173DBVZ</b> VERSION V N = Metal inserts T = Technopolymer thread CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version) BOWL OPTIONS Z = Standard * N = Nylon bowl * no additional letter required
	Nominal flow at 6,3 bar	1100 NI/min	
	Filter efficiency	99,99%	
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 440	
	Weight with threaded inserts	gr. 460	
	Bowl capacity	30 cm <sup>3</sup>	
Note	Assembly positions	Vertical	
We recommend installing a 5 μm filter upstream of the oil removal filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	

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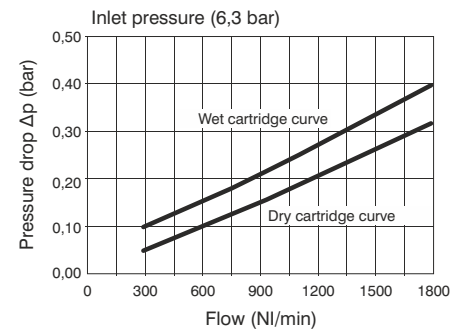
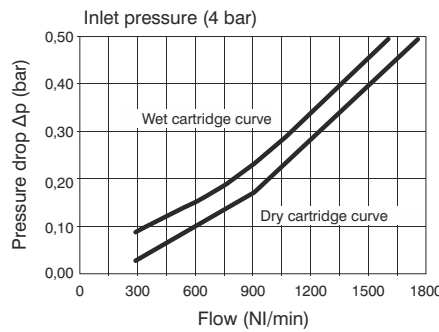
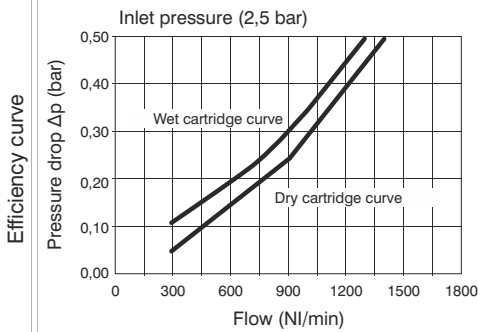
High efficiency oil removal filter (DC)



G1/8" connenctions

\*Bowl removal maximum height

Example: T173BDCV : size 3 High efficiency oil removal filter, with clogging gauge, Technopolymer threads, G1/2" connections.



Operational characteristics

- Coalescing filtering cartridge  
particle removal 0,01 μm  
oil residual 0,01 ppm
- Clogging gauge  
green: proper working  
red: clogged cartridge (Δp 0,5 bar)  
we recommend to change the cartridge
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Automatic drain mounted as standard.

Note

We recommend installing a 5 μm filter upstream of the oil removal filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G 3/8" - G 1/2"
Nominal flow at 6,3 bar	1800 NI/min
Filter efficiency	99,99%
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 640
Weight with threaded inserts	gr. 660
Bowl capacity	30 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

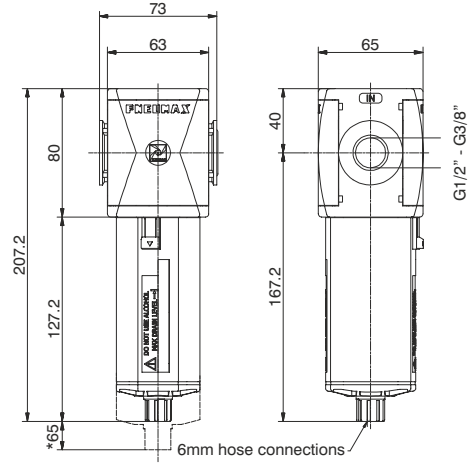
Ordering code

**V173C DCV Z**

- V** VERSION  
N = Metal inserts  
T = Technopolymer thread
- C** CONNECTIONS  
A = G3/8" (only for "N" version)  
B = G1/2"  
C = 1/2 NPT (only for "N" version)
- Z** BOWL OPTIONS  
= Standard \*  
N = Nylon bowl

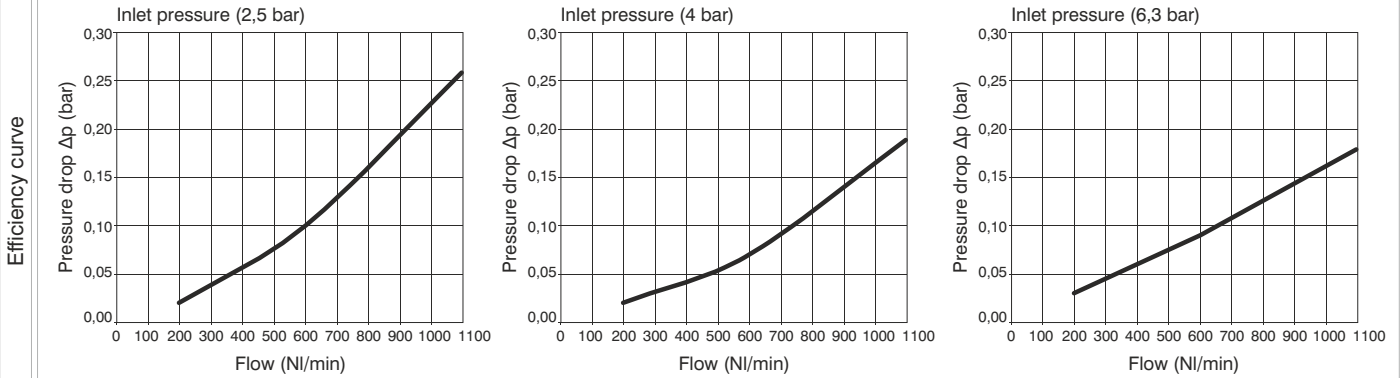
\* no additional letter required

Carbon filter (DD)



\*Bowl removal maximum height

Example : T173BDD : size 3 Carbon filter, Technopolymer threads, G1/2" connections.



Operational characteristics

- Active carbon cartridge with built in particulate filter. Used to remove oil vapours, hydrocarbons, odours and particles coming from the compressed air lines or gasses in industrial applications. Oil residue up to <0,003 ppm (max input aerosol 0.01ppm).
- Innovative filtering technology; high absorption capacity, with low differential pressure.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard.

Note

A 5 micron filter followed by a coalescing filter must be installed before the Oil removal filter in order to ensure the correct functionality of the unit and to safeguard the life of the active carbon cartridge. It is also necessary to preventively replace the cartridges at fixed intervals.

Technical characteristics

Connections	G 3/8" - G 1/2"
Nominal flow at 6,3 bar	1100 NI/min
Cartridge life	2000 hours
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 440
Weight with threaded inserts	gr. 460
Bowl capacity	30 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm

Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm
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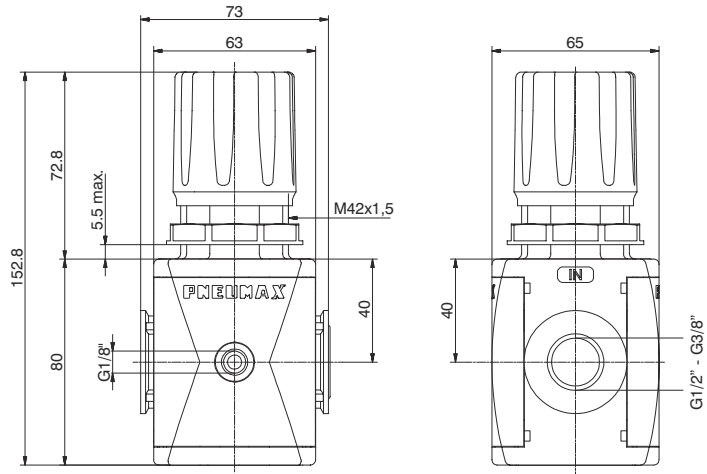
Ordering code

**V173DDZ**

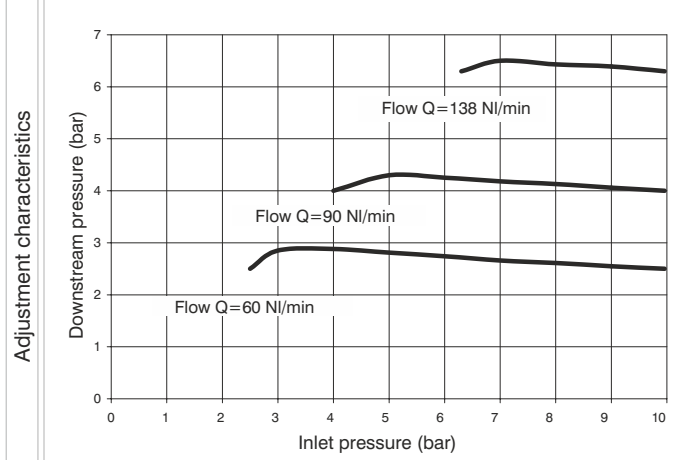
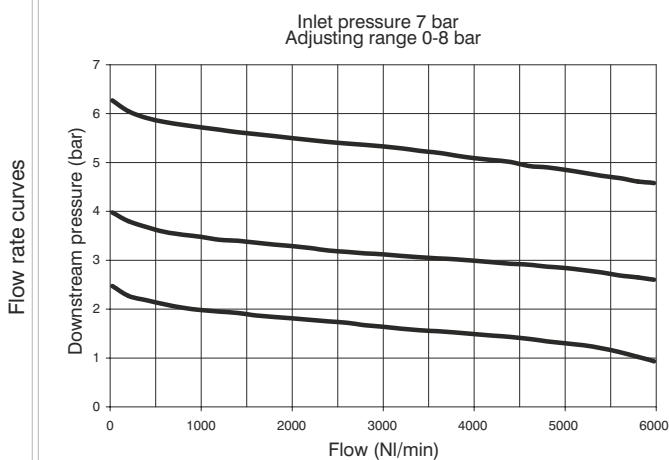
VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

\* no additional letter required

**Regulator (R)**



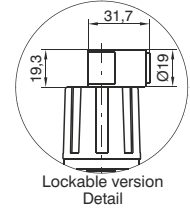
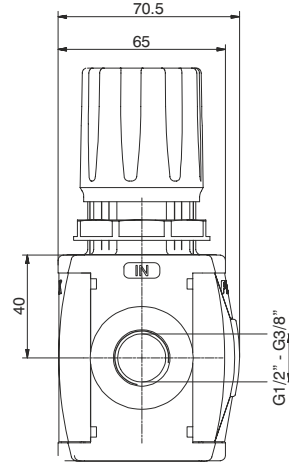
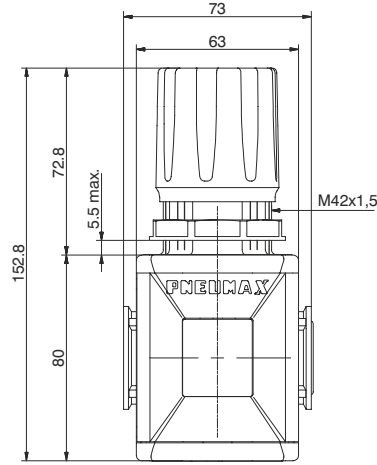
Example: T173BRC : size 3, Regulator with Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range



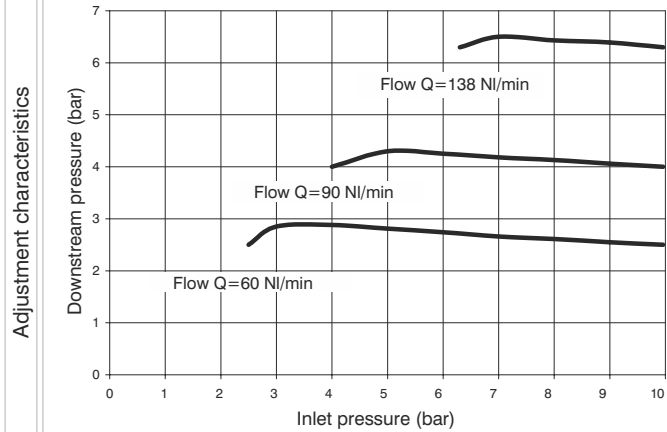
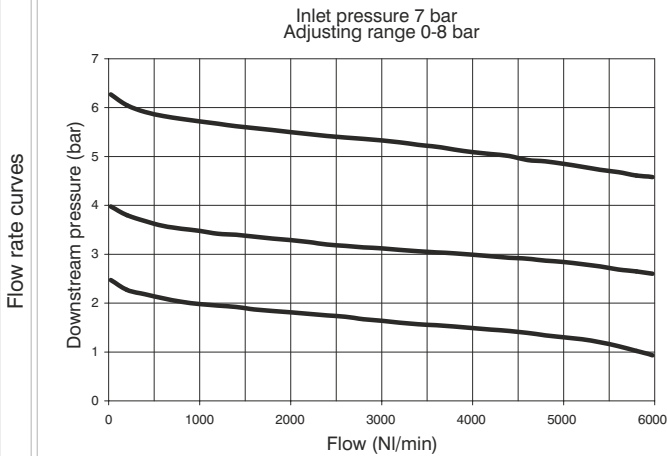
Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> </ul>	Connections	G 3/8" - G 1/2"	<b>V173RGT0</b>
	Max. inlet pressure	13 bar	
<p><b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.</p>	Working temperature	-5°C +50°C	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Pressure gauge connections	G 1/8"	ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
	Weight with Technopolymer threads	gr. 360	TYPE = Standard * F = Controlled relief + improved relieving
	Weight with threaded inserts	gr. 380	L = no relieving R = Improved relieving
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	OPTIONS = Standard * K = Lockable version
	Assembly positions	Indifferent	* no additional letter required
	Max. fitting torque (with Technopolymer threads)	G1/8" = 4 Nm G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	

3

Regulator including gauge (RM)(RW)



Example : T173BRMC : size 3, Regulator including gauge with Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 370
Weight with threaded inserts	gr. 390
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Ordering code

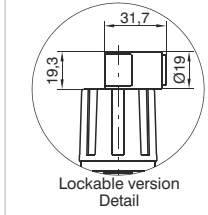
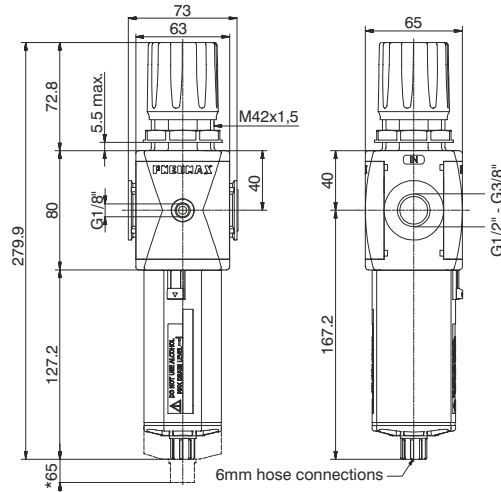
**V173CRDGT**

VERSION	N = Metal inserts T = Technopolymer thread
CONNECTIONS	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
FLOW DIRECTION	M = from left to right W = from right to left
ADJUSTING RANGE	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	= Standard *
	F = Controlled refill + improved relieving
	L = no relieving
	R = Improved relieving
OPTIONS	= Standard *
	K = Lockable version

\* no additional letter required

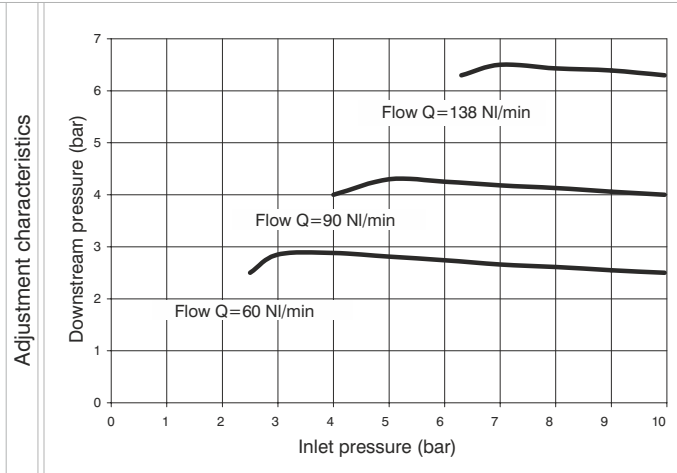
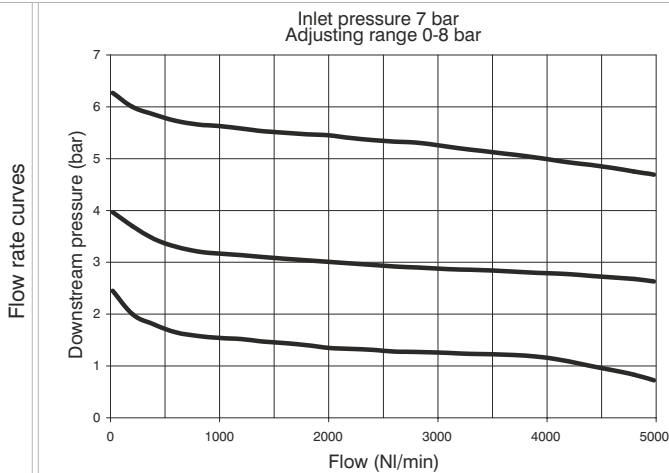


**Filter-Regulator (E)**



\*Bowl removal maximum height

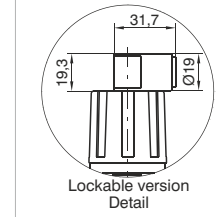
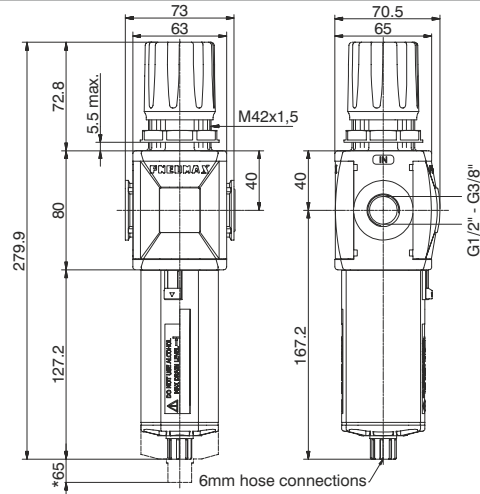
Example : T173BEBC : size 3, Filter-regulator with Technopolymer threads, G1/2" connections, 20 μm filtering pore size, 0 to 8 bar adjusting range



Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5μm, 20μm and 50μm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> </ul>	<p>Connections</p> <p>Max. inlet pressure</p> <p>Minimum working pressure</p> <p>with automatic drain</p> <p>Maximum working pressure</p> <p>with automatic drain</p> <p>Working temperature</p> <p>Pressure gauge connections</p> <p>Weight with Technopolymer threads</p> <p>Weight with threaded inserts</p> <p>Pressure range</p> <p>Filter pore size</p> <p>Bowl capacity</p> <p>Assembly positions</p> <p>Max. fitting torque</p> <p>(with Technopolymer threads)</p>	<p>G 3/8" - G 1/2"</p> <p>13 bar</p> <p>0,5 bar</p> <p>10 bar</p> <p>-5°C +50°C</p> <p>G 1/8"</p> <p>gr. 470</p> <p>gr. 490</p> <p>0-2 bar / 0-4 bar</p> <p>0-8 bar / 0-12 bar</p> <p>5 μm - 20 μm - 50 μm</p> <p>68 cm<sup>3</sup></p> <p>Vertical</p> <p>G1/8" = 4 Nm</p> <p>G1/2" = 22 Nm</p>	<p><b>V173CESG10Z</b></p> <p>VERSION</p> <p>V N = Metal inserts</p> <p>T = Technopolymer thread</p> <p>CONNECTIONS</p> <p>G A = G3/8" (only for "N" version)</p> <p>B = G1/2"</p> <p>C = 1/2 NPT (only for "N" version)</p> <p>FILTER PORE SIZE</p> <p>S A = 5 μm</p> <p>B = 20 μm</p> <p>C = 50 μm</p> <p>ADJUSTING RANGE</p> <p>G A = 0-2 bar</p> <p>B = 0-4 bar</p> <p>C = 0-8 bar</p> <p>D = 0-12 bar</p> <p>TYPE</p> <p>T = Standard *</p> <p>S = Automatic drain</p> <p>OPTIONS</p> <p>O = Standard *</p> <p>K = Lockable version</p> <p>BOWL OPTIONS</p> <p>Z = Standard *</p> <p>N = Nylon bowl</p> <p>* no additional letter required</p>
<p><b>Note</b></p> <p>The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.</p>	<p>Max. fitting torque</p> <p>(with threaded inserts)</p>	<p>G3/8" = 25 Nm</p> <p>G1/2" = 30 Nm</p>	

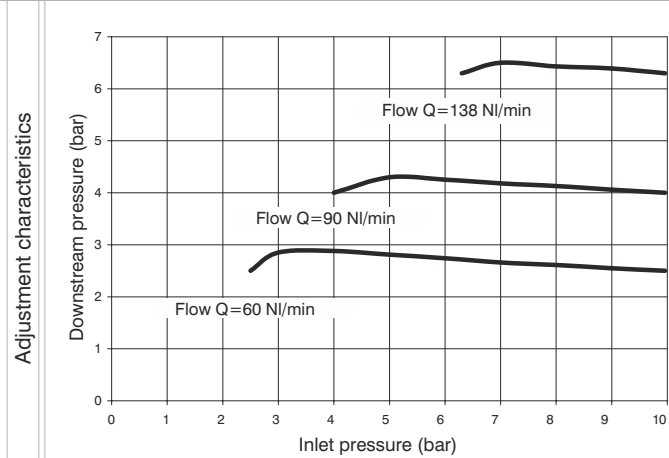
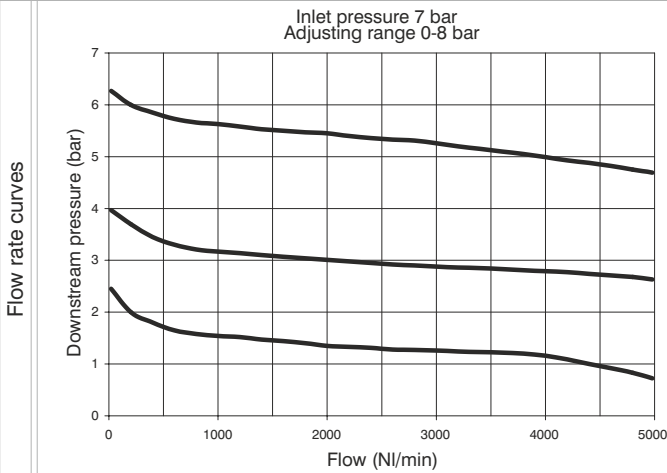
3

Filter-regulator including gauge (EM)(EW)



\*Bowl removal maximum height

Example: T173BEMBC : size 3, Filter-Regulator including gauge with Technopolymer threads, G1/2" connections, with 20 µm filtering pore size, 0 to 8 bar adjusting range



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.
- Transparent bowl made of polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 480
Weight with threaded inserts	gr. 500
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	68 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

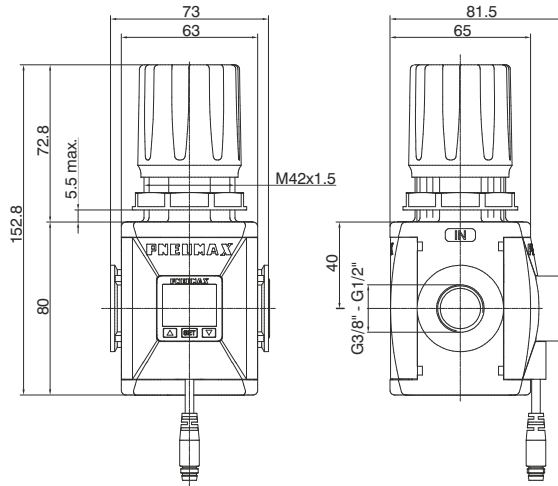
Ordering code

**V173CEDSGT0Z**

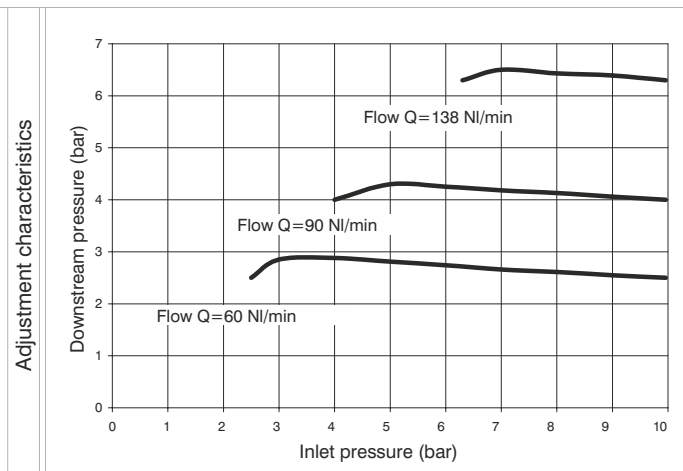
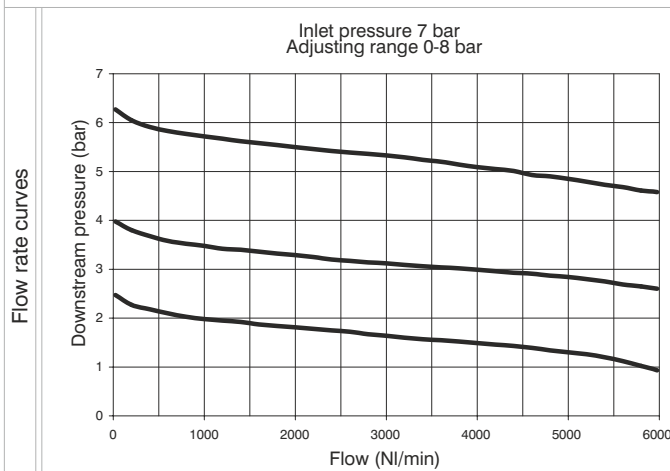
VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
FLOW DIRECTION	
D	M = from left to right W = from right to left
FILTER PORE SIZE	
S	A = 5 µm B = 20 µm C = 50 µm
ADJUSTING RANGE	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	
T	= Standard * S = Automatic drain
OPTIONS	
O	= Standard * K = Lockable version
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl
* no additional letter required	



**Regulator with pressure switch (RP)(RZ)**



Example : T173BRPCA : size 3, Regulator with Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



**Operational characteristics**

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

**Note**

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

**Technical characteristics**

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	0°C +50°C
Weight with Technopolymer threads	gr. 370
Weight with threaded inserts	gr. 390
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

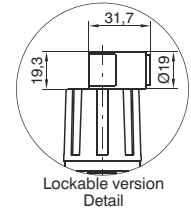
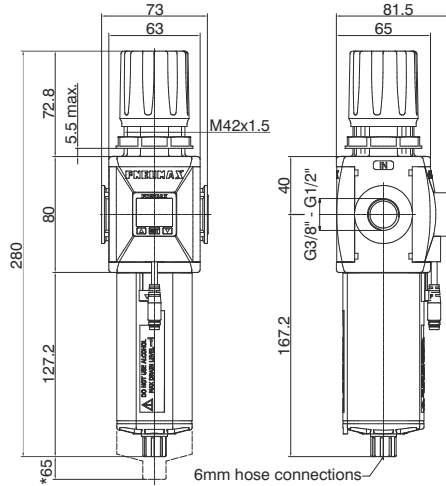
**Ordering code**

**V173ORDGTOP**

<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>G</b>	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
<b>D</b>	FLOW DIRECTION P = from left to right Z = from right to left
<b>G</b>	ADJUSTING RANGE A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
<b>T</b>	TYPE = Standard * F = Controlled relief + improved relieving L = no relieving R = Improved relieving
<b>O</b>	OPTIONS = Standard * K = Lockable version
<b>P</b>	PRESSURE SWITCH OPTION A = Cable 150 mm + M8 PNP B = Cable 150 mm + M8 NPN C = Cable 2 mt. PNP D = Cable 2 mt. NPN

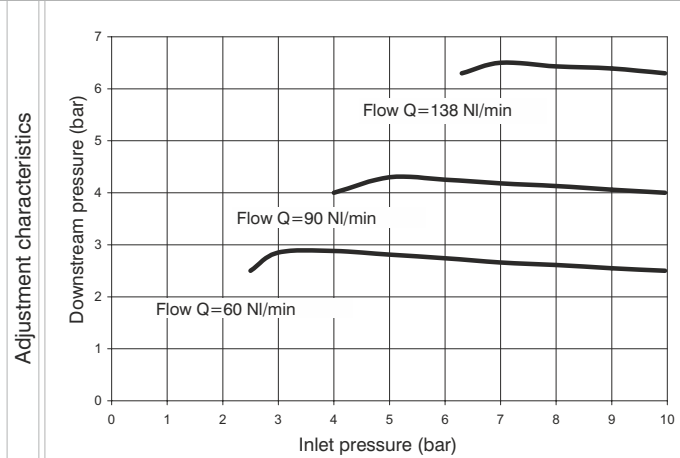
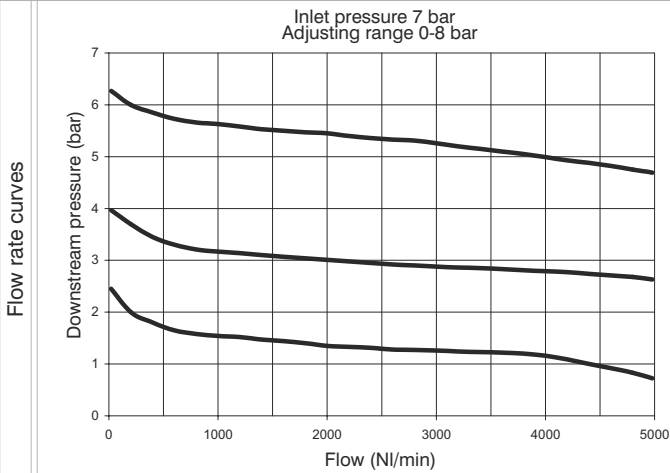
\* no additional letter required

Filter regulator with pressure switch (EP)(EZ)



\* Bowl removal maximum height

Example: T173BEPBCA : size 3, Filter-regulator with Technopolymer threads, G1/2" connections, 20 μm filtering pore size, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5μm, 20μm and 50μm) can be regenerated by washing it or replaced.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	0°C +50°C
Weight with Technopolymer threads	gr. 480
Weight with threaded inserts	gr. 500
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 μm - 20 μm - 50 μm
Bowl capacity	68 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Ordering code

**V173CEDSGTOPZ**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
FLOW DIRECTION	
D	P = from left to right Z = from right to left
FILTER PORE SIZE	
S	A = 5 μm B = 20 μm C = 50 μm
ADJUSTING RANGE	
G	A = 0-2 bar B = 0-4 bar C = 0-8 bar D = 0-12 bar
TYPE	
T	= Standard * S = Automatic drain
OPTIONS	
O	= Standard * K = Lockable version
PRESSURE SWITCH OPTION	
P	A = Cable 150 mm+M8 PNP B = Cable 150 mm+M8 NPN C = Cable 2 mt. PNP D = Cable 2 mt. NPN
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

\* no additional letter required

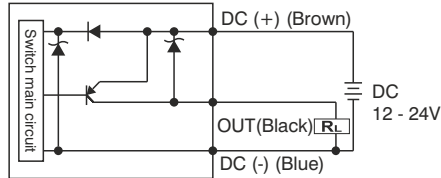


### CHARACTERISTICS

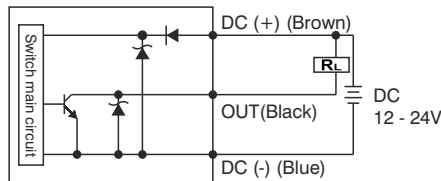
- 3 color digital LCD display, easy readout
- 4 units of measurement for pressure indication
- PNP and NPN output
- N.O. and N.C. output contact
- Not available individually, but only with a Regulator or a Filter-regulator

### OUTPUT CIRCUIT WIRING DIAGRAMS

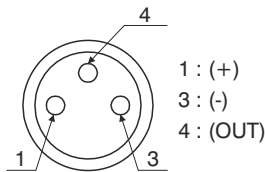
#### PNP output



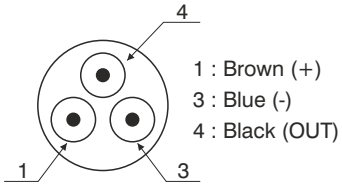
#### NPN output



#### M8 CONNECTOR PIN LAY OUT



#### 3 WIRES CABLE LAY OUT



### Cable ordering code

- MCH1** cable 3 wires l=2,5m with M8 connector  
**MCH2** cable 3 wires l=5m with M8 connector  
**MCH3** cable 3 wires l=10m with M8 connector

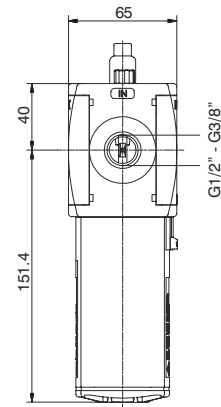
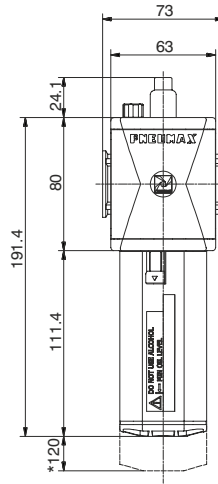
Connector



### TECHNICAL CHARACTERISTICS

Adjusting range	0 - 10 bar / 0 - 1MPa
Max. inlet pressure	15 bar / 1,5 MPa
Fluid	Filtered and dehumidified air
Display unit of measurement	MPa - kgf/cm <sup>2</sup> - bar - psi
Supply voltage	12 - 24 VDC
Current consumption	≤40mA (without load)
Digital output type	NPN - PNP
Type of contact	Normally Open - Normally Closed
Max. load current	125 mA
Digital output activation mode	single threshold with fixed hysteresis - window with fixed hysteresis - window without hysteresis
Digital output activation time	0.05s - 0.25s - 0.5s - 1s - 2s - 3s (selections for chattering-proof function)
Display characteristics	Double 3 1/2 digit display Digital output status indication Three-pushbuttons touchpad
Indicator accuracy	≤±2% F.S. ± 1 digit
Protection grade	IP 40
Temperature	0 - 50 °C
Cable section	3 x 0,129mm <sup>2</sup> , Ø4 mm, PVC

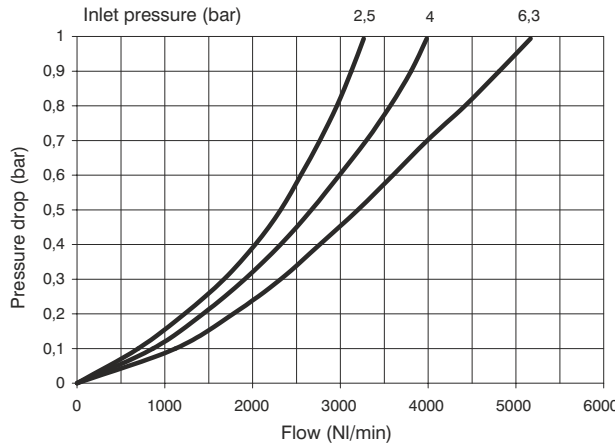
Lubricator (L)



\*Bowl removal maximum height

Example : T173BL : size 3, Lubricator with Technopolymer threads, G1/2" connections

Flow rate curves



Operational characteristics

- Oil mist lubrication with variable orifice size in function of the flow rate
- Oil quantity regulation mechanism and oil quantity visualization dome made of polycarbonate.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Oil filling plug
- Oil can be refilled with pressurized circuit.
- Available with electric min-level sensor N.O. or N.C. with connection for connector.
- For electrical connection use connectors type C1-C2-C3 (see sensors chapter in the catalogue).

Note

Install as close as possible to the point of use  
Do not use alcohol, deterging oils or solvents.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 290
Weight with threaded inserts	gr. 310
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	136 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Min. operational flow at 6,3 bar

100 NI/min.

Ordering code

**V173CLOZ**

VERSION

- V N = Metal inserts
- T = Technopolymer thread

CONNECTIONS

- C A = G3/8" (only for "N" version)
- B = G1/2"
- C = 1/2 NPT (only for "N" version)

OPTIONS

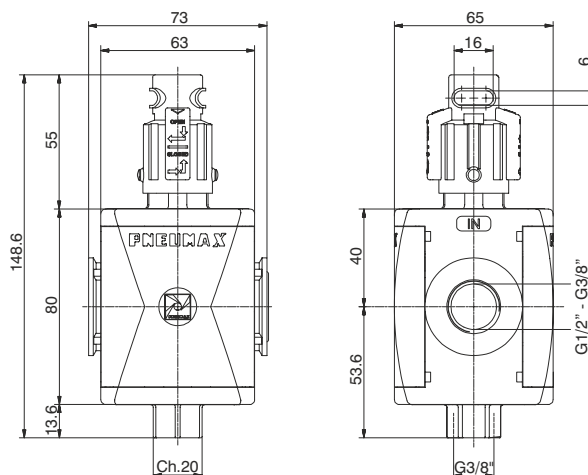
- A = Min. Oil level indicator Normally open
- C = Min. Oil level indicator Normally closed

BOWL OPTIONS

- Z = Standard \*
- N = Nylon bowl

\* no additional letter required

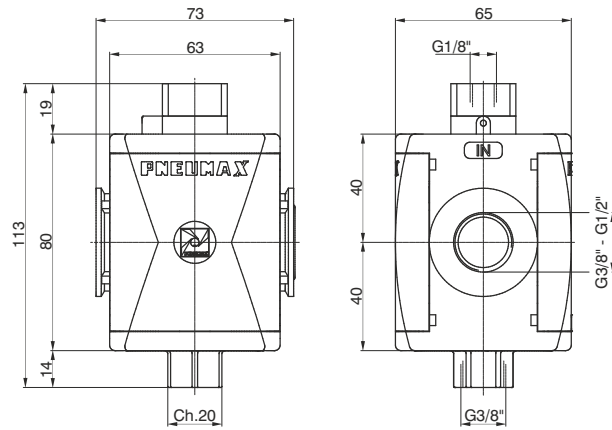
## Shut-off valve (VL)



Example: T173BVL : size 3, Shut-off valve with Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		
<ul style="list-style-type: none"> <li>- Manual operated 3 ways poppet valve.</li> <li>- Double handle action for valve opening: pushing and rotating (clockwise).</li> <li>- The valve can be closed and the down stream circuit depressurized by rotating anticlockwise the knob.</li> <li>- Knob lockable with three padlocks.</li> </ul>	Connections	G 3/8" - G 1/2"	Ordering code
	Max. inlet pressure	13 bar	
	Discharge connection	G3/8"	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 230	
	Weight with threaded inserts	gr. 250	
	Assembly positions	Indifferent	
	Handle opening and closing angle	90°	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
Nominal flow rate at 6 bar with Δp=1	3600 NI/min.		
Exhaust nominal flow rate at 6 bar with Δp=1	1500 NI/min.		

**Pneumatic shut-off valve (VP)**



Example: T173BVP : size 3, Pneumatic shut-off valve with Technopolymer threads, G1/2\" connections

**Operational characteristics**

- Pneumatic operated 3 ways poppet valve.
- When the pneumatic signal is removed the valves exhaust the pneumatic circuit

**Technical characteristics**

Connections	G 3/8\" - G 1/2\"
Discharge connection	G3/8\"
Pilot port size	G1/8\"
Working temperature	-5°C +50°C
Weight with technopolymer threads	gr. 254
Weight with threaded inserts	gr. 270
Assembly positions	Indifferent
Min. pressure working	2,5 bar
Max. pressure working	10 bar
Max. fitting torque (with Technopolymer threads)	G1/2\" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8\" = 25 Nm G1/2\" = 30 Nm
Nominal flow rate at 6 bar with $\Delta p=1$	3600 NI/min.
Exhaust nominal flow rate at 6 bar with $\Delta p=1$	1500 NI/min.

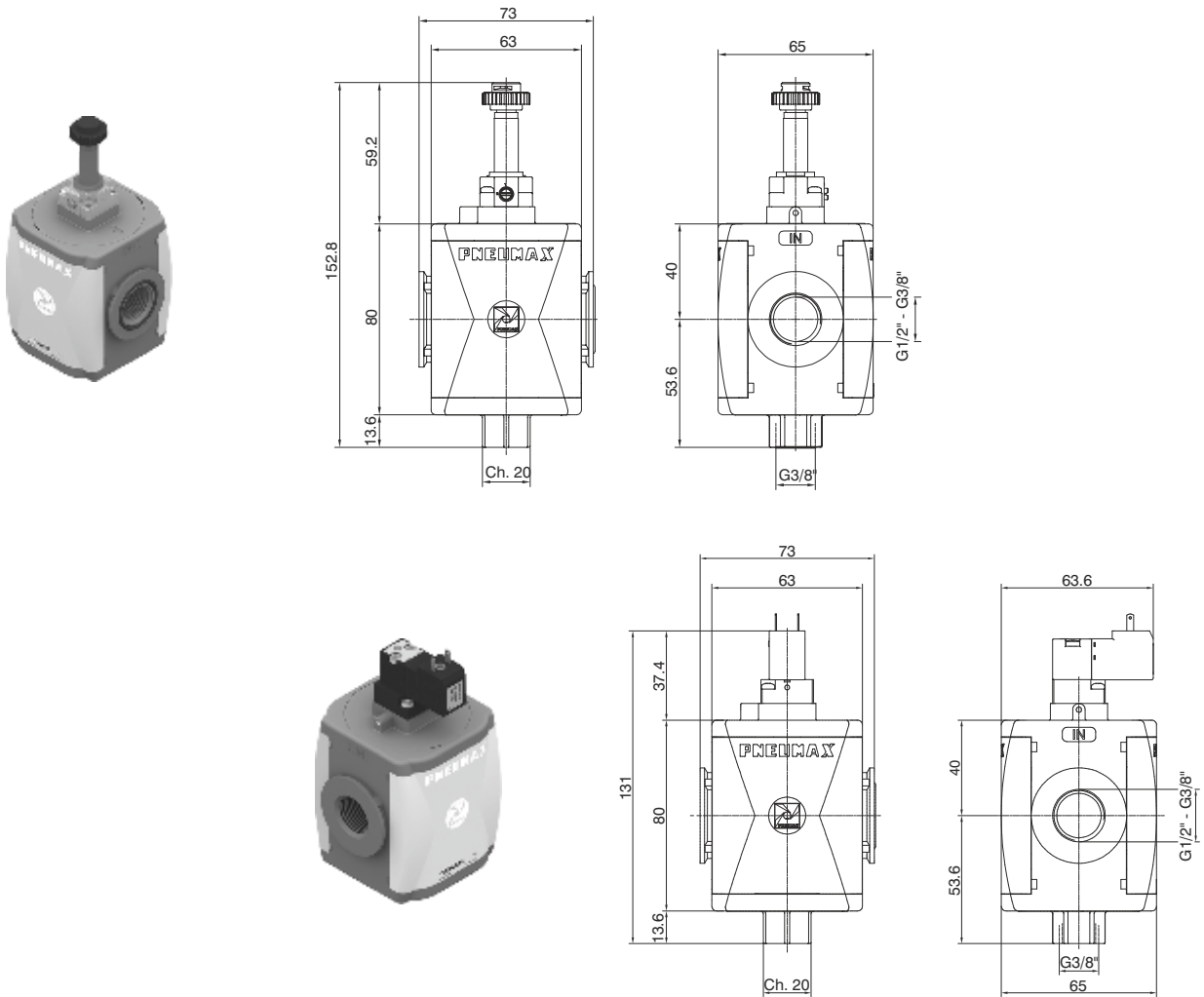
**Ordering code**

**V173CVP**

<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>C</b>	CONNECTIONS A = G3/8\" (only for \"N\" version) B = G1/2\" C = 1/2 NPT (only for \"N\" version)

3

Electric shut-off valve (VE)



Example : T173BVEB2 : size 3, Electric shut-off valve, with M2 Pilot without coil, Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		Ordering code
- Solenoid operated 3 ways poppet valve. - The model fitted with 15 mm pilots uses pilots series N33_0A and N33_0E (1 Watt)	Supply and operating connections	G 3/8" - G 1/2"	<b>V173CVEA</b> VERSION N = Metal inserts T = Technopolymer thread
	Discharge connections	G 3/8"	
	Working temperature	-5°C +50°C	15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt)
	Weight with Technopolymer threads	290 g	22 mm COIL VOLTAGE B2 = Without coil M2 mechanic
	Weight with threaded inserts	310 g	<b>A</b> B4 = 12 V DC B5 = 24 V DC B6 = 24 V AC (50-60 Hz) B7 = 110 V AC (50-60 Hz) B8 = 230 V AC (50-60 Hz) B9 = 24 V DC (2 Watt)
	Assembly positions	Indifferent	30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
	Min. Pressure working	2,5 bar	
	Max. Pressure working	10 bar	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 30 Nm G1/2" = 25 Nm	
	Nominal flow rate at 6 bar with Δp=1	3600 NI/min.	
	Exhaust nominal flow rate at 6 bar with Δp=1	1500 NI/min.	



### General

Upon implementation of the AIRPLUS TG3 series, air-treatment units, PNEUMAX develops a supply and discharge valve, with an electropneumatic control and spring-return, fitted with a diagnostic system regarding the state of the valve, with the possibility of creating a double channel to determine the system's redundancy. The valve, as a safety feature, provides the interruption of the air supply and the exhaust of the air circuit it is connected to. The version with one single channel emphasises the features of an EV 3/2 NC, monostable with electropneumatic control and spring-return, whose operation involves:

- condition of the VALVE AT REST, with a DE-ENERGISED coil; Port 1 (air supply) is not been connected to Port 2 (downstream air circuit). Port 2 is discharged out of Port 3;
- condition of the VALVE ACTIVATED, with an ENERGISED coil; Port 1 (air supply) is connected to Port 2 (downstream air circuit), with Port 3 (Discharge) closed.

By de-energising the coil, the system resets the condition of VALVE AT REST by means of the return spring, which repositions the spool. Once again Port 2 (downstream air circuit), discharges via Port 3. The state of the valve is constantly monitored by a diagnostic system, using a Hall effect sensor, which reads the position of the spool and consequently takes note of the valve's position.

The sensor is in the ON position when the valve is at rest (DE-ENERGISED coil), while it is in the OFF position when the valve is activated (ENERGISED coil). The sensor is in the OFF position under conditions of an activated valve (DE-ENERGISED coil), indicating a possible problem.

**The SAFELINE supply and discharge valve in the single version is a classified component in CATEGORY 2 according to ISO EN 13849 and is appropriate for use in safety circuits until PL=C.**

The version with a double redundant channel is made using two single solenoid valves 3/2 NC provided with diagnostics, mounted in series so that the Port 2 of the first solenoid valve is linked to the Port 1 of the second solenoid valve. It is sufficient that only one of the EV is de-energised to guarantee the discharge of the air circuit. If one of the two EV must remain blocked due to a malfunction, the other one ensures the discharge function of the pneumatic installation. Even in this case, the diagnostic system of both solenoid valves constantly monitors the state of the 2 single EV.

**The SAFELINE supply and discharge valve in the double version is a classified component in CATEGORY 4 according to ISO EN 13849 and is appropriate for use in safety circuits until PL=E.**

Both single and double solenoid valves are provided with the following certifications released by BUREAU VERITAS:

- TYPE APPROVAL certificate according to the EN ISO 13849 regulations
- certification of examination of compliance in accordance to the machinery directive 2006/42/CE

The AIRPLUS SAFELINE are solenoid valves marked as ATEX

II 3G Ex nA IIC T6 Gc (X)  
II 3D Ex tc IIIC T=80°C Dc (X) IP65

### Construction characteristics

Body	Aluminium
Solenoid Operator	Technopolymer
Rear end cap	Aluminium
Spool	Aluminium
Spool seals	Polyurethane
Piston	Aluminium
Spring	EN 10270-1 DH Steel
Electrical Interface	Male M12 4 PIN TYPE A Connector

### Operational characteristics

Fluid	filtered and lubricated or non-lubricated air; if lubricated it must be continuous
Working Temperature	-10°C ÷ +50°C
Working Pressure, MIN	2,5 bar
Working Pressure, MAX	10 bar

### Assembly and Installation:

Undertake the installation respecting the safety requirements with regards to the system and components for hydraulic and pneumatic transmissions. Install the device as close as possible to the point of use. Its assembly is possible in any position. Pay attention to the flow direction, indicated on the main body with the labels IN and OUT. During the components discharge, high levels of noise occur. The use of a silencer on the discharge port is recommended. Ensure there is sufficient space for assembly during the installation process. Please ensure that the discharge area is always clear, and in case a silencer is used, periodically verify that it is not obstructed. It is possible to integrate and install the device in an existing AIRPLUS group or in a new installation, or else to use the device individually attaching it by aligning the assembled unit with the relevant fastening flange for the supply and discharge valve, or to use the device individually attaching it by aligning the assembled unit with the type "Y" fastening flange for the double supply and discharge valve.



**WARNING!**

Pay particular attention to external factors such as the nearness of live wires, magnetic fields, metallic objects providing magnetic conduction very close to the device, which may influence and disturb the diagnostic system.



**WARNING!**

The electrical connection must be made exclusively by specialized personnel, using components that have no voltage present. Only use power supplies which can guarantee a safe electrical isolation of the working voltage in accordance to IEC/EN 60204-1. Additionally, observe the requirements anticipated by the PELV circuits in accordance to IEC/EN 60204-1.

### CARE AND MAINTENANCE:



**WARNING!**

Do not connect or disconnect the device when energised! Do not open and/or disassemble the parts that are included in the energised valve. Once the power supply is disconnected, wait for a few minutes before opening or disassembling parts of the valve that result in its disassembly.

Before carrying out any operation, it is essential to remove the pneumatic and power supply to the device and wait for the residual pressure to be completely discharged. Please ensure that the discharge is always clear, and in case a silencer is used, periodically verify that it is not obstructed. Periodically remove any dust deposits from the valve using a damp cloth. Use soapy water to clean the device. Do not use corrosive or alcohol-based products.

For maintenance operations on internal components, please consult with PNEUMAX SPA.



## Regulatory framework

The purpose of the EU's Machinery Directive is to define the health and safety requirements in the framework of designing and constructing machinery. Since 2009, the new Machinery Directive has become effective in the European Union. Member countries of the EU are required to implement this standard. The manufacturers of machinery can comply with the Machinery Directive applying the harmonised standards listed in the Official Journal of the European Union.

The design and manufacture of safety controls are developed in compliance with one of the two important harmonised standards:

<b>UNI EN ISO 13849-1</b>
Safety of machinery
Safety-related parts of control systems
Part 1: General design principles

<b>EN 62061</b>
Safety of machinery
Functional safety of electrical, electronic and programmable control systems regarding safety

The UNI EN ISO 13849-1 standard is one of the most important harmonised standards, which has been widely used; it is intended to provide a guide to principles for design and integration of safety-related parts of the control system.

Each safety-related control system must be designed and constructed in accordance with the principles of ISO 12100 and ISO 14121 by which the possible risks are considered and assessed, in view of the intended uses and the reasonably anticipated incorrect uses.

The parts of a machinery's control system are called "Safety-related parts of control systems". Their capacity to perform a safety function under predictable conditions is assigned by means of five possible levels called "**performance levels**" (PL). These levels are defined in terms of probability of dangerous malfunction per hour.

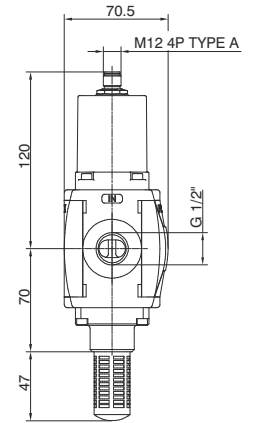
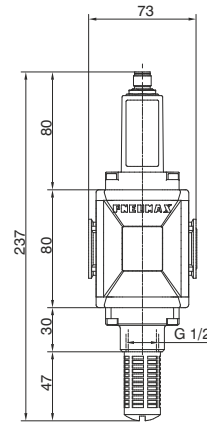
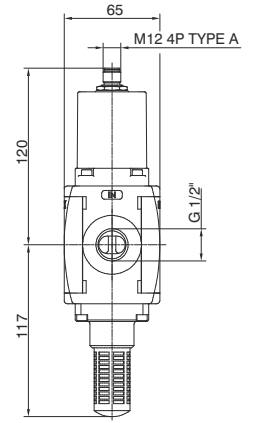
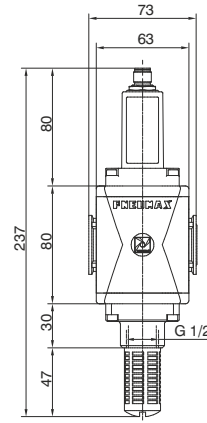
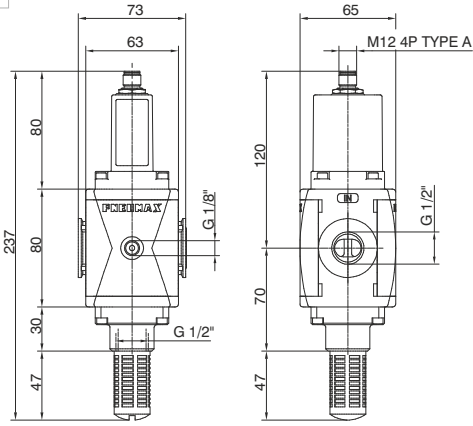
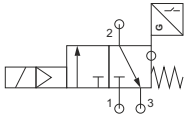
PL – Performance Level	Average probability of dangerous malfunction per hour (1/h)
a	$\geq 10^{-5}$ to $< 10^{-4}$
b	$\geq 3 \times 10^{-6}$ to $< 10^{-4}$
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$
d	$\geq 10^{-7}$ to $< 10^{-6}$
e	$\geq 10^{-8}$ to $< 10^{-10}$

The calculated PL must be greater or equal to the necessary value, which arises from the calculation of the risk correlated to one single function and to the need to reduce it to an acceptable level.

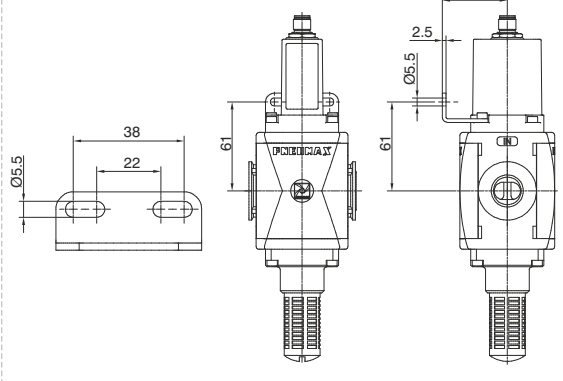
<b>S1</b> Slight danger	<b>F1</b> Occasional danger and brief exposure	<b>P1</b> – possibly avoidable danger	<b>PL = a</b>
	<b>F2</b> Frequent danger and long exposure	<b>P2</b> – largely unavoidable danger	<b>PL = b</b>
<b>S2</b> Serious danger	<b>F1</b> Occasional danger and brief exposure	<b>P1</b> – possibly avoidable danger	<b>PL = c</b>
	<b>F2</b> Frequent danger and long exposure	<b>P2</b> – largely unavoidable danger	<b>PL = d</b>
		<b>P1</b> – possibly avoidable danger	<b>PL = e</b>
		<b>P2</b> – largely unavoidable danger	<b>PL = e</b>

**ATEX**   
**II 3G Ex nA IIC T6 Gc (X)**  
**II 3D Ex tc IIIC T=80°C Dc (X) IP65**

**Pneumatic symbol**

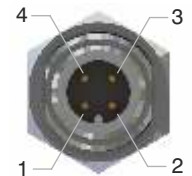


**Dimensions with fixing bracket mounted**



**Electrical Connection**

PIN	DESCRIPTION
1	+ 24 VDC (Sensor)
2	+ 24 VDC (EV)
3	GND (Sensor + EV)
4	SENSOR OUTPUT



Electrical Features		Technical Features		Ordering code
Electrical Connection	Male M12 4 PIN TYPE A Connector	Connections	G1/2" UNI-ISO 228/1 filtered and lubricated or non-lubricated air; if lubricated it must be continuous	<b>N173BVS</b>
Coil Features	24VDC, 1 Watt	Fluid		
Suppressor diode for coil reverse voltage spike	Present	Function	3/2 NC monostable	VERSIONS = Standard* (without connections)
Supply Voltage Allowance	-5% ÷ +10%	Working Pressure, MIN	2,5 bar	M = Incorporated pressure gauge
<b>Electrical features of sensor</b>		Working Pressure, MAX	10 bar	W = Incorporated pressure gauge (Right-Left)
Sensor Features	10 ÷ 30V DC	Working Temperature	-10°C ÷ +50°C	G = G1/8" pressure gauge Connection
Operating Principle	Hall effect	Flow rate at 6bar Δp1 (from 1 to 2)	3500 NL/min	<b>FIXINGS</b>
Contact Type	N.O.	Flow rate at 6bar Δp1 (from 2 to 3)	2000 NL/min	= Without fixing *
Output Type	PNP	Flow rate at 6bar (from 2 to 3) with free discharge	3800 NL/min	F 01 = Fixing bracket mounted (Left-Right)
Permanent Maximum Current	100 mA	Type of Installation	In line	02 = Fixing bracket mounted (Right-Left)
Permanent Maximum Power	3 Watt	Mounting Position	Indifferent	* no additional letter required
Voltage Drop, MAX	2 V	Noise Level	90 dB	
<b>Safety features</b>		Response Time ON ISO 12238	36 ms	
Regulatory Compliance	EN ISO 13849-1	Response Time OFF ISO 12238	76 ms	
Safety Function Fulfilled	Interruption of supply and unloading of the downstream pneumatic circuit	IP Rating	IP65 (with connector installed)	
Performance Level (PL)	c			
UNI EN 13849 Category	2			
Safety Integrity Level (SIL)	1			
PFH <sub>0</sub>	1,7*10 <sup>6</sup>			
CE Marking	In accordance with the EU Machinery Directive, annex V			

### Installation tip of a safety system by means of a Single valve

**Please note: the safety valve is not sufficient alone to guarantee the safety function. Its setup requires the use of a monitoring device.**

In this setup, the SIEMENS® 3SK1112-1BB40 monitoring device has been indicated, activated by an S2 start / reset pushbutton, blocked by an S1 emergency shutdown key.

Said monitoring device, by means of the readings of the sensor placed inside the valve (reading made by means of the K1 relay), operates the activation of the valve itself.

The monitoring device transmits the safety status as an output.

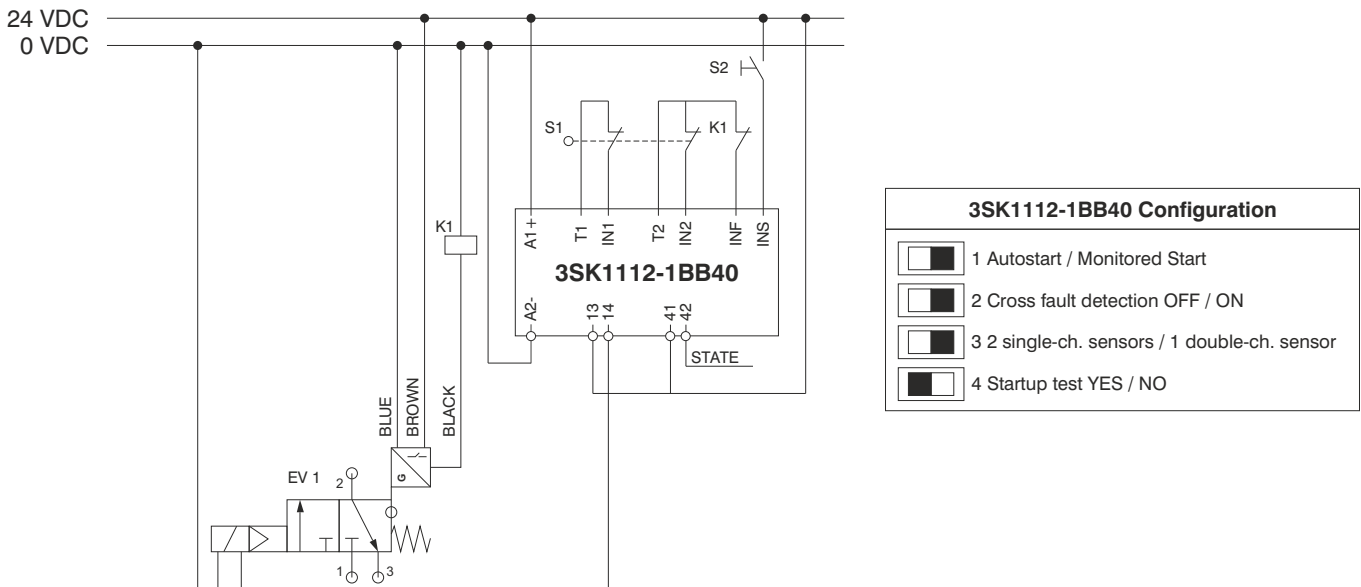
The preliminary estimate and the final verification of the achieved PL are the responsibility of the designer of the part of the system dedicated to providing the safety function.

**Note: with a single valve, it is not possible to obtain a PL greater than "c".**

#### Setup suggestions

- The double stop pushbutton is connected to clamps T1-IN1 and T2-IN2 of 3SK1112-1BB40.
- The start / reset pushbutton is connected between +24 V and the INS clamp of 3SK1112-1BB40.
- The valve is supplied between 0 V (Pin 3 of the supply connector) and the 14 clamp of 3SK1112-1BB40 (Pin 2 of the supply connector).
- The HALL effect sensor is supplied between 0 V (Pin 3 of the supply connector) and 24 V (Pin 1 of the supply connector).
- The HALL effect sensor drives (Pin 4 of the supply connector) the K1 relay, whose N.A. contact will be connected between the monitoring device's clamp T2 and INF.

The circuit diagram of the **suggested** configuration is provided, along with the configuration of 3SK1112-1BB40.

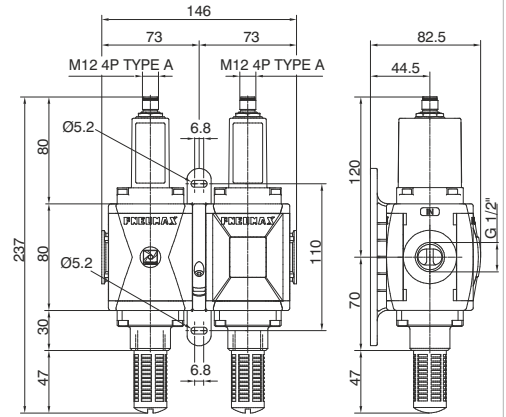
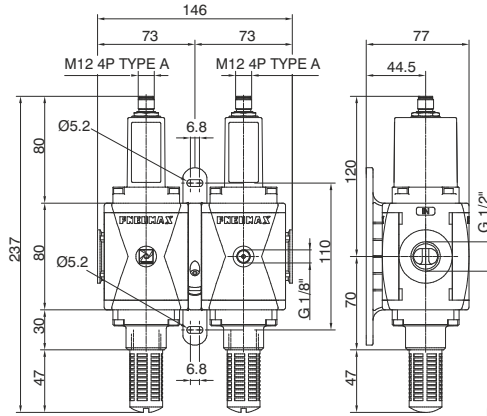
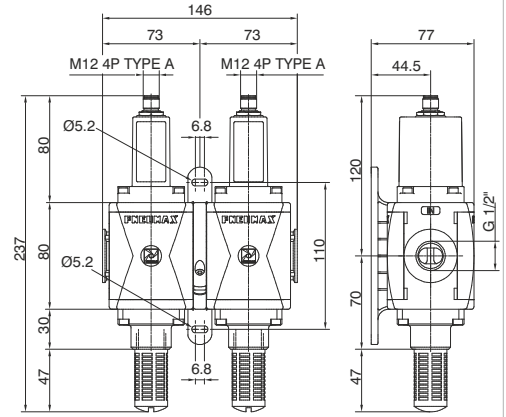
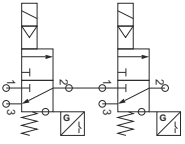


#### Analysis of malfunctions

The diagnostic system (monitoring device plus sensor) has the purpose of verifying the appearance of malfunctions within the valve that undermine the safety function. In particular, (with 3SK1112-1BB40 configured as in the illustration), the K1 relay prevents resetting the system by means of S2 when the coil is de-energised, but the sensor remains in the OFF position (K1 remains de-energised).

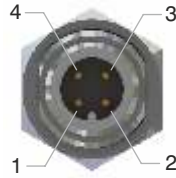
**ATEX**   
**II 3G Ex nA IIC T6 Gc (X)**  
**II 3D Ex tc IIIC T=80°C Dc (X) IP65**

**Pneumatic symbol**



**Electrical Connection**

PIN	DESCRIPTION
1	+ 24 VDC (Sensor)
2	+ 24 VDC (EV)
3	GND (Sensor + EV)
4	SENSOR OUTPUT



Electrical Features		Technical Features		Ordering code
Electrical Connection	Male M12 4 PIN TYPE A Connector	Connections	G1/2" UNI-ISO 228/1 filtered and lubricated or non-lubricated air; if lubricated it must be continuous	
Coil Features	24VDC, 1 Watt + 1 Watt	Fluid		
Suppressor diode for coil reverse voltage spike	Present	Function	3/2 NC monostable	<b>VERSIONS</b> = Standard* (without connections)
Supply Voltage Allowance	-5% ÷ +10%	Working Pressure, MIN	2,5 bar	<b>V</b> M = Incorporated pressure gauge
<b>Electrical features of sensor</b>		Working Pressure, MAX	10 bar	G = G1/8" pressure gauge Connection
Sensor Features	10 ÷ 30V DC	Working Temperature	-10°C ÷ +50°C	<b>FIXING</b>
Operating Principle	Hall effect	Flow rate at 6bar Δp1 (from 1 to 2)	2500 NL/min	<b>F</b> X = "X" Flange
Contact Type	N.O.	Flow rate at 6bar Δp1 (from 2 to 3)	2000 NL/min	Y = "Y" Flange
Output Type	PNP	Flow rate at 6bar (from 2 to 3) with free discharge	3800 NL/min	K = "Y" Aluminium flange
Permanent Maximum Current	100 mA + 100 mA	Type of Installation	In line	<b>FLOW RATE DIRECTION</b>
Permanent Maximum Power	3 Watt + 3 Watt	Mounting Position	Indifferent	= Standard (Left-Right)*
Voltage Drop, MAX	2 V + 2 V	Noise Level	90 dB	W = (Right-Left)
<b>Safety features</b>		Response Time ON ISO 12238	68 ms	* no additional letter required
Regulatory Compliance	EN ISO 13849-1	Response Time OFF ISO 12238	79 ms	
Safety Function Fulfilled	Interruption of supply and unloading of the downstream pneumatic circuit	IP Rating	IP65 (with connector installed)	
Performance Level (PL)	e			
UNI EN 13849 Category	4			
Safety Integrity Level (SIL)	3			
PFH <sub>0</sub>	4,7*10 <sup>-8</sup>			
CE Marking	In accordance with the EU Machinery Directive, annex V			

3

### Installation tip of a safety system by means of a Double valve

**Please note: the safety valve is not sufficient alone to guarantee the safety function. Its setup requires the use of a monitoring device.**

In this setup, the SIEMENS 3SK2112 monitoring device has been indicated, activated by an S2 start / reset pushbutton, blocked by an S1 emergency shutdown key.

Said monitoring device, by means of the readings of the sensors placed inside the double valve, operates the activation of the valve itself. The preliminary estimate and the final verification of the achieved PL are the responsibility of the designer of the part of the system dedicated to provide the safety function.

#### Setup suggestions

- The double stop pushbutton is connected to clamps T1-F-IN1 and T2-F-IN2 of 3SK2112.
- The start /reset pushbutton is connected between +24 V and the F-IN10 clamp of 3SK2112.

The double valve, for notation simplicity, is indicated as consisting of 2 valves: EV1 and Ev2

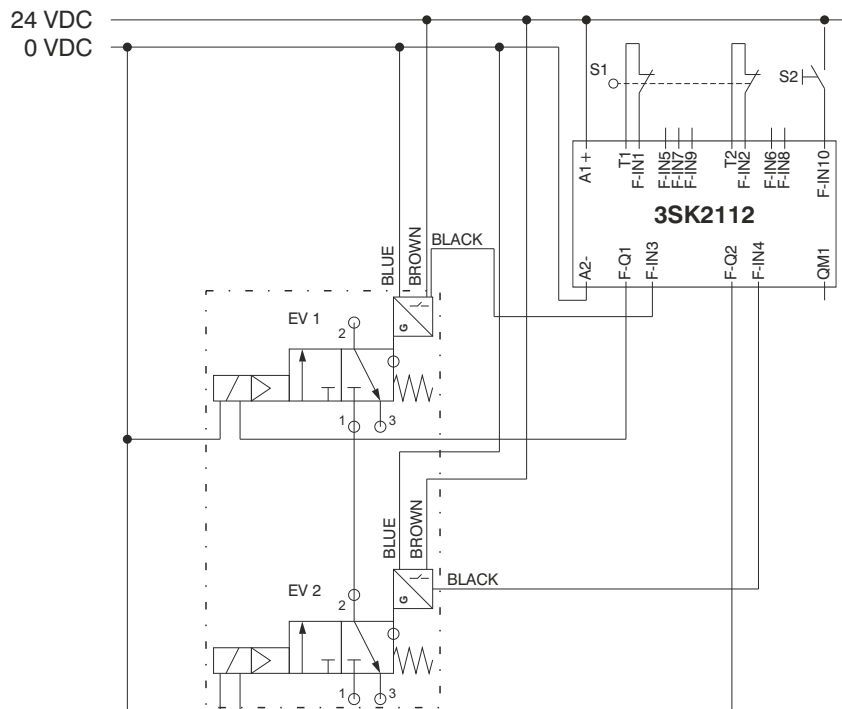
#### EV1

- The valve is supplied between 0 V (Pin 3 of the supply connector) and the F-Q1 clamp of 3SK2112 (Pin 2 of the supply connector).
- The HALL effect sensor is supplied between 0 V (Pin 3 of the supply connector) and 24 V (Pin 1 of the supply connector).
- The HALL effect sensor is attached (Pin 4 of the supply connector) to the monitoring device's F-IN3 clamp.

#### EV2

- The valve is supplied between 0 V (Pin 3 of the supply connector) and the F-Q2 clamp of 3SK2112 (Pin 2 of the supply connector).
- The HALL effect sensor is supplied between 0 V (Pin 3 of the supply connector) and 24 V (Pin 1 of the supply connector).
- The HALL effect sensor is attached (Pin 4 of the supply connector) to the monitoring device's F-IN4 clamp.

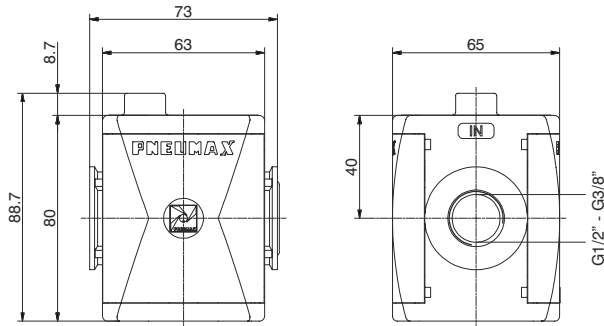
The circuit diagram of the **suggested** configuration is provided.



#### Analysis of malfunctions

The diagnostic system (monitoring device plus sensors) has the purpose of verifying the appearance of malfunctions within the valves, which undermine the safety function. In particular, the monitoring device must be appropriately programmed to avoid the system's reset by means of S2 when both coils are de-energised and at least one sensor remains in an OFF position.

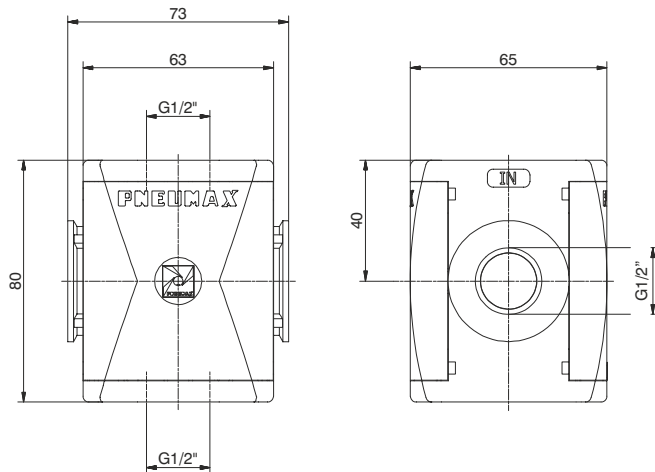
**Progressive start-up valve (AP)**



Example : T173BAP : size 3, Progressive start-up valve with Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		Ordering code
- Down stream circuit filling time regulated via a built in flow regulator. - Full pressure is allowed once the down stream circuit pressure reaches 50% of the inlet pressure.	Connections	G 3/8" - G 1/2"	<b>173CAP</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 220	
	Weight with threaded inserts	gr. 240	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Assembly positions	Indifferent	
	Min. pressure working	2,5 bar	
	Nominal flow rate at 6 bar with Δp=1	3600 NI/min.	
	Fully open built in flow regulator flow rate	200 NI/min.	

**Air intake (PA)**

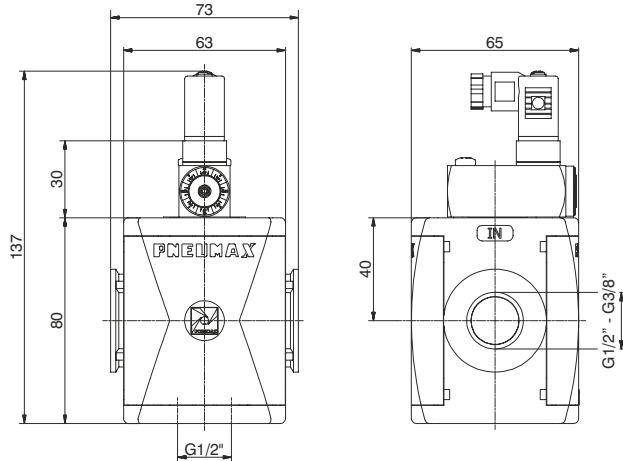


Example : T173BPA : size 3, Air intake with Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		Ordering code
- Available with two G1/2" threaded connections.  <b>Attention</b> For this product are available only Technopolymer connections	Connections	G 1/2"	<b>T173BPA</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight	gr. 151	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	

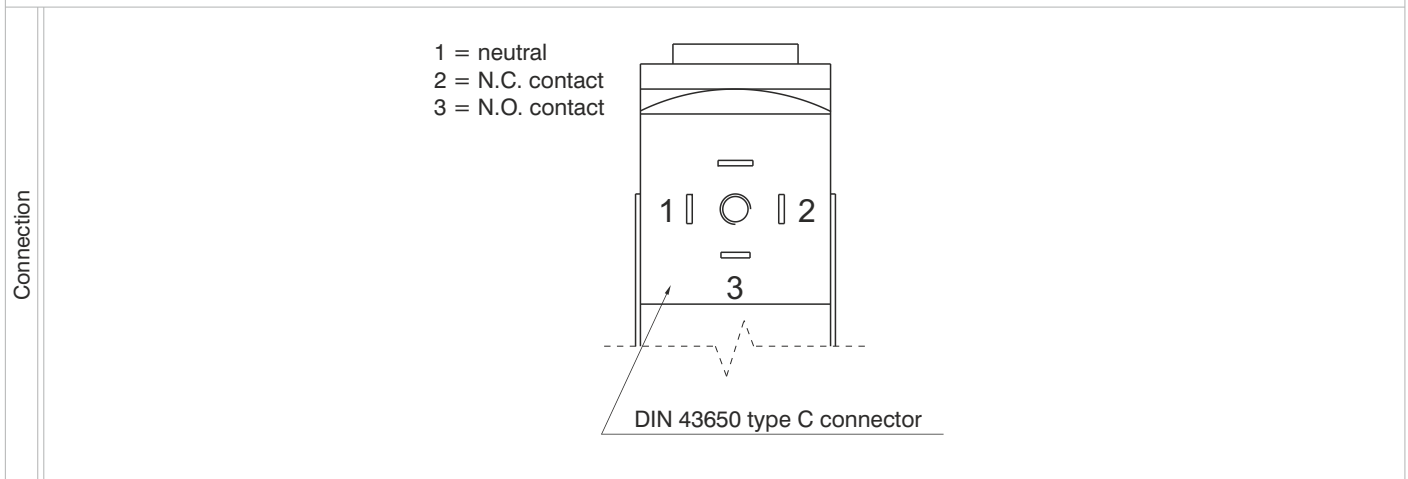


**Pressure switch (PP)**



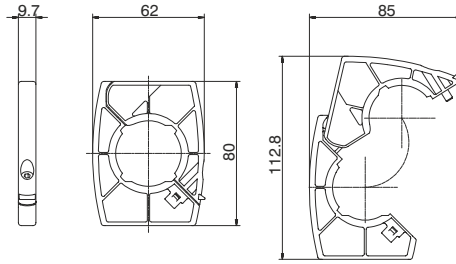
Example: T173BPP : Size 3, Pressure switch with Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		
- Built in adjustable pressure switch (2 to 10 bar) with electrical connection. - G 1/2" threaded connection on the bottom face. - The electrical connection is made by mean of a 15 mm connector DIN 43650 type C. The microswitch contact could be normally closed or open (change overswitch).  <b>Attention</b> For this product are available only Technopolymer connections	Connections	G 1/2"	Ordering code
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight	gr. 235	
	Microswitch capacity	1A	
	Grade of protection (with connector assembled)	IP 65	
	Adjusting range	2-10 bar	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Microswitch maximum tension	250 VAC	



**Flange X**

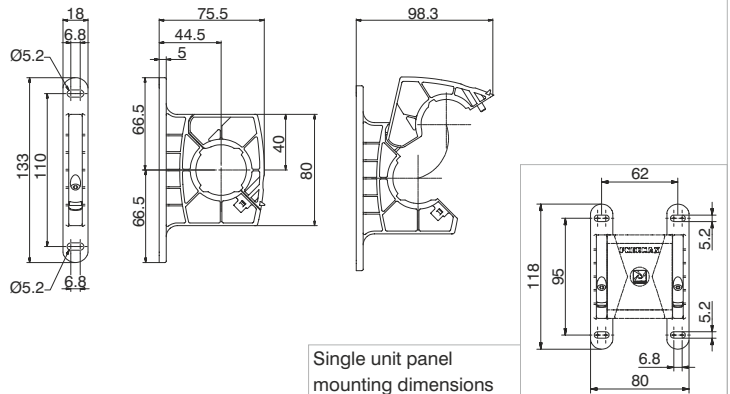
Ordering code
<b>T173X</b>



Weight 35 gr.  
Example : T173X : Size 3 coupling flange  
- Enables the quick connection of two functions.

**Flange Y**

Ordering code
<b>T173Y</b>

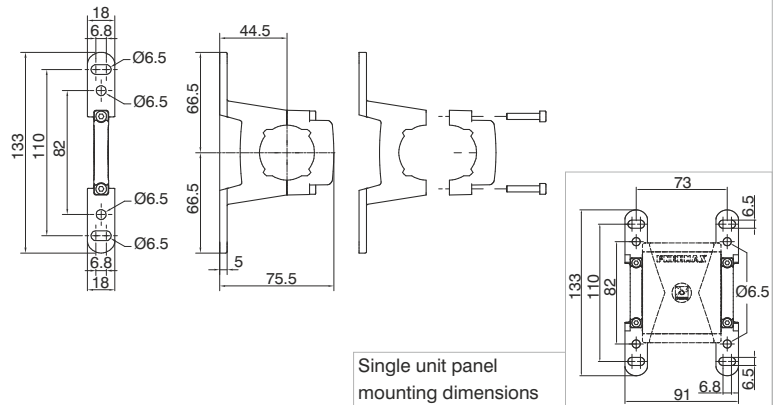


Weight 48 gr.  
Example : T173Y : Size 3 coupling flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

Single unit panel mounting dimensions

**Aluminium flange Y**

Ordering code
<b>N173Y</b>

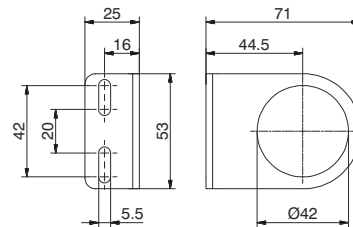


Weight 71 gr.  
Example : N173Y : Size 3 coupling aluminium flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

Single unit panel mounting dimensions

**Fixing bracket**

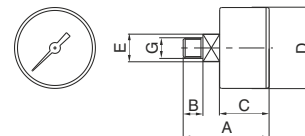
Ordering code
<b>T17250</b>



Weight 71 gr.  
- Allows for regulators and filter regulators to be panel mounted.

**Pressure gauge**

Ordering code
<b>17070</b>



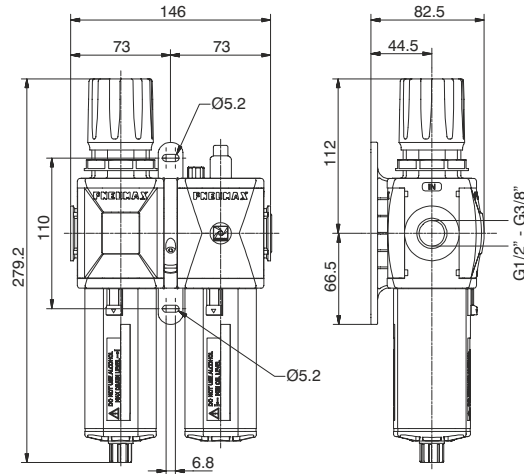
VERSION	
✓ A = Dial Ø40	
B = Dial Ø50	
SCALE	
✓ A = Scale 0-4 bar	
B = Scale 0-6 bar	
C = Scale 0-12 bar	

CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80

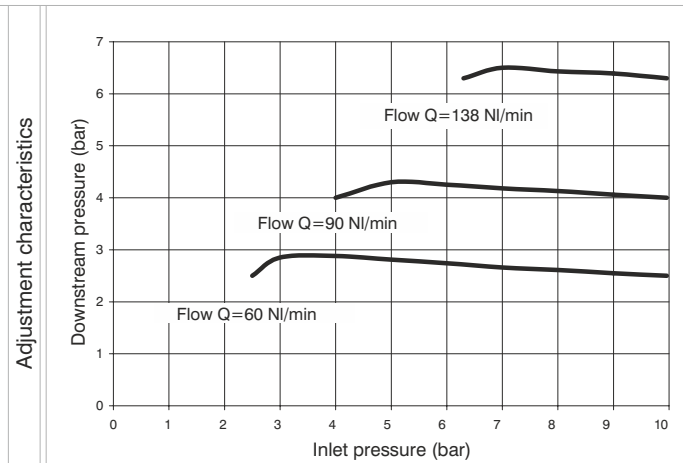
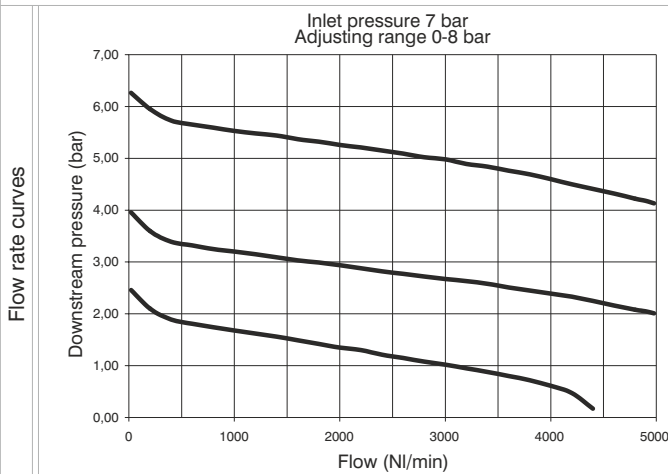
3



Service unit assembled (EM+L) (E+L) (EW+L)

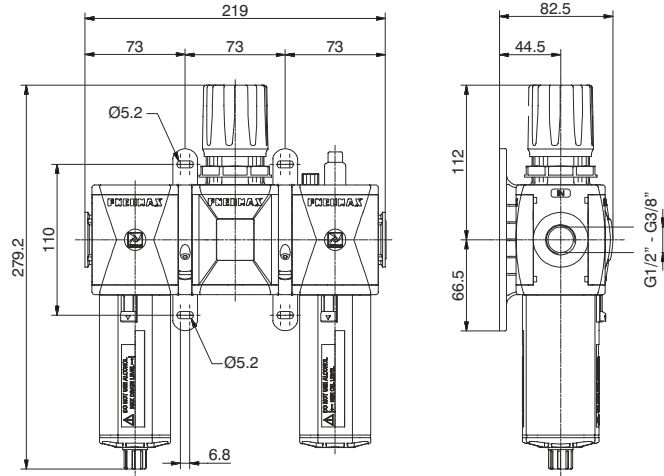


Example : GT173BHG : size 3, combined group comprising Filter-regulator and Lubricator, Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range and 20 µm filter pore size

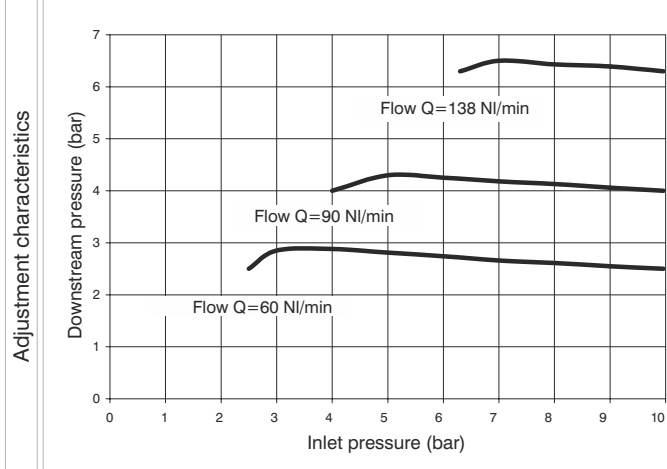
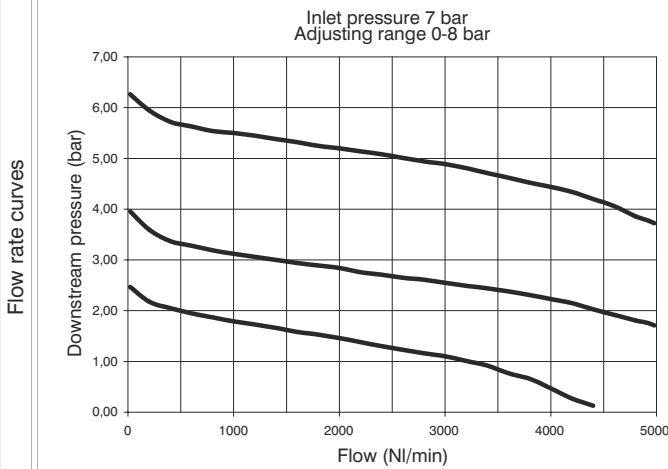


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer and Lubricator assembled with a (Y) type coupling kit for panel mounting.	Connections	G 3/8" - G 1/2"	<b>GV1730TSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 809	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Weight with threaded inserts	gr. 849	TYPE T H = Built in gauge J = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	68 cm <sup>3</sup>	FLOW DIRECTION D = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	* no additional letter required
	Bowl capacity	136 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	

Service unit assembled (F+RM+L) (F+R+L) (F+RW+L)



Example : GT173BKG : size 3 combined group comprising Filter, Regulator and Lubricator Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising Filter, Regulator with built in manometer and Lubricator assembled with two (Y) type coupling kits for panel mounting.  
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 1058
Weight with threaded inserts	gr. 1118
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	68 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	136 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Min. operational flow at 6,3 bar

100 NI/min.

Ordering code

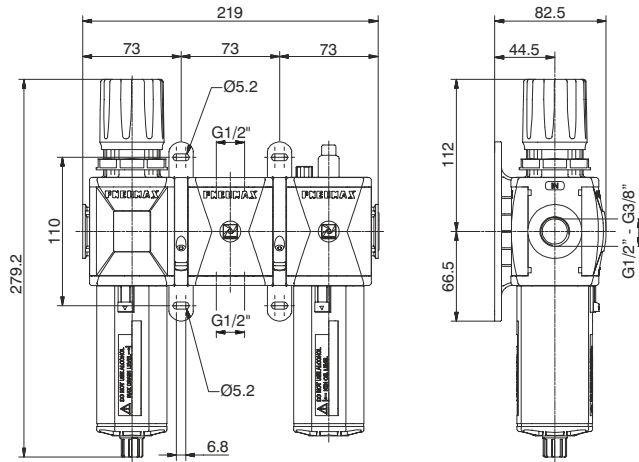
**GV173CITSODZ**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
C	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
TYPE	
T	K = Built in gauge T = G1/8" gauge connection
FILTER PORE SIZE	
ADJUSTING RANGE	
S	C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
OPTIONS	
= Standard *	
A	Min.oil level indicator NO
C	Min.oil level indicator NC
S	Automatic drain
SA	Automatic drain + Min.oil level indicator NO
SC	Automatic drain + Min.oil level indicator NC
FLOW DIRECTION	
D	= Standard (from left to right) W = from right to left
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

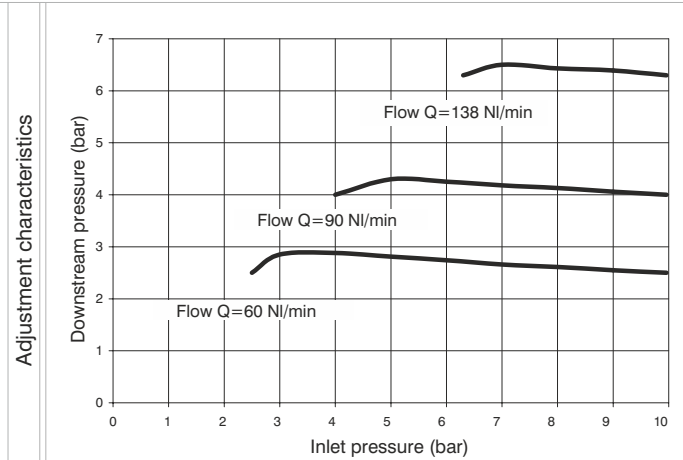
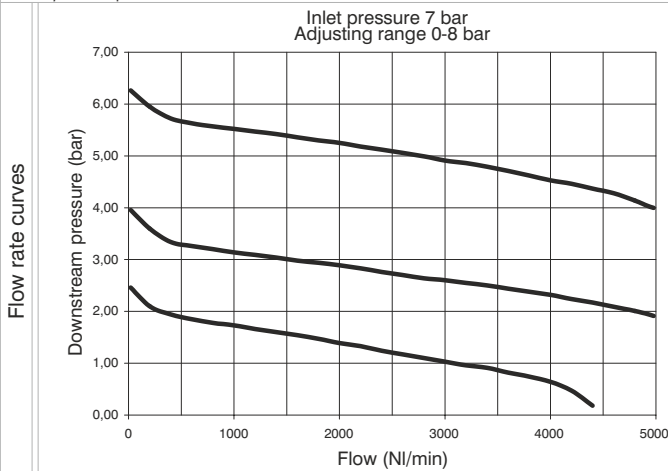
\* no additional letter required



Service unit assembled (EM+PA+L) (E+PA+L) (EW+PA+L)



Example : GT173BNG : size 3 combined group comprising Filter-regulator, Air intake and Lubricator Technopolymer threads, G1/2" connections, 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising Filter-regulator with built in manometer, Air intake and Lubricator assembled with two (Y) type coupling kits for panel mounting. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 999
Weight with threaded inserts	gr. 1039
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	68 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	136 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Min. operational flow at 6,3 bar 100 NI/min.

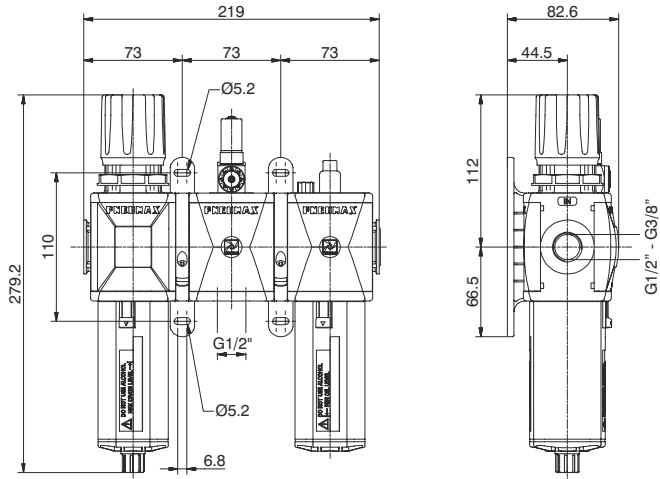
Ordering code

**GV173CTSDZ**

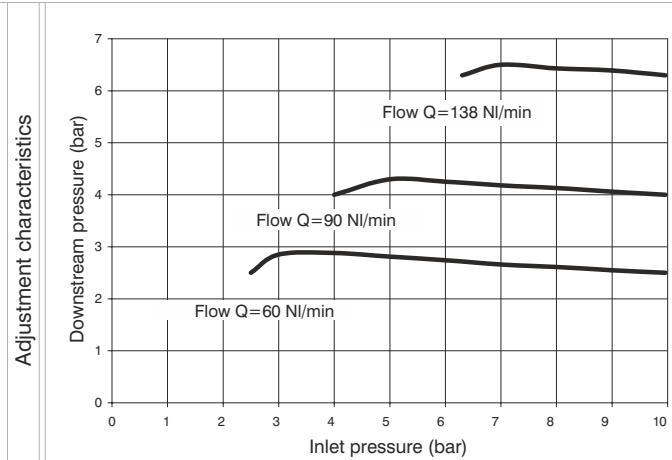
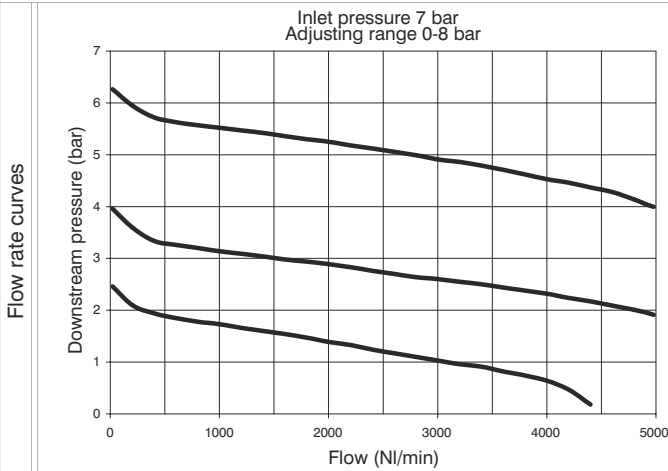
<b>V</b>	VERSION N = Metal inserts T = Technopolymer thread
<b>C</b>	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
<b>T</b>	TYPE N = Built in gauge P = G1/8" gauge connection
<b>S</b>	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
<b>O</b>	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
<b>D</b>	FLOW DIRECTION = Standard (from left to right) W = from right to left
<b>Z</b>	BOWL OPTIONS = Standard * N = Nylon bowl

\* no additional letter required

Service unit assembled (EM+PP+L) (E+PP+L) (EW+PP+L)

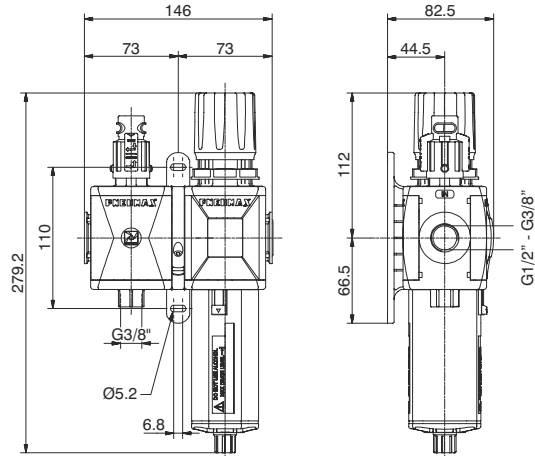


Example : GT173BRG : size 3 combined group comprising Filter-Regulator, Pressure switch and Lubricator Technopolymer threads, G1/2" connections 0 to 8 bar adjusting range and 20 µm filter pore size

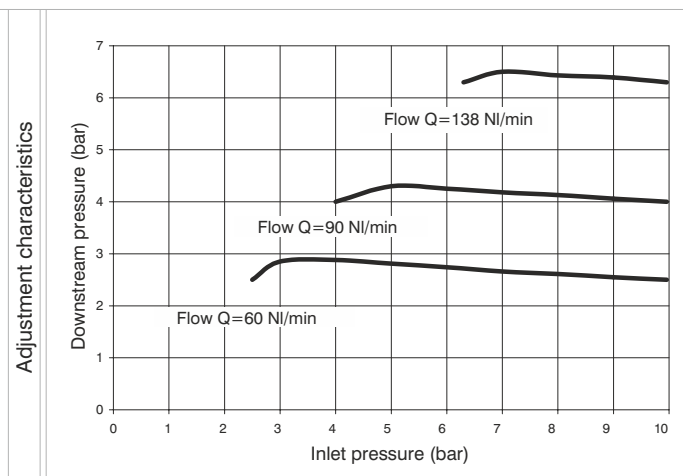
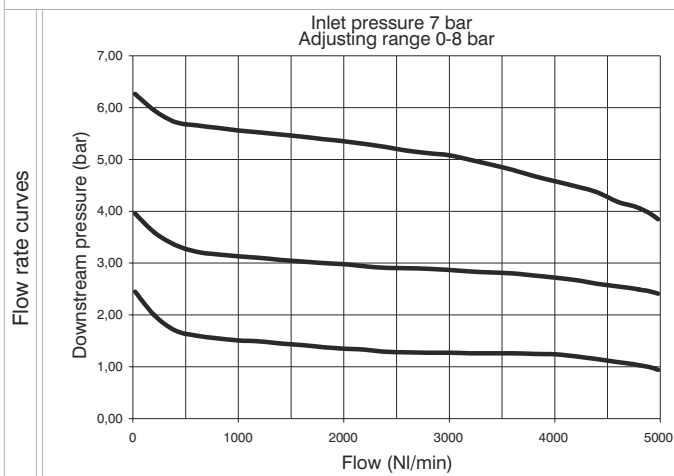


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer, Pressure switch and Lubricator assembled with two (Y) type coupling kits for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G 3/8" - G 1/2"	<b>GV173CTSDZ</b> VERSION V N = Metal inserts T = Technopolymer thread CONNECTIONS G A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version) TYPE T R = Built in gauge C = G1/8" gauge connection FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC FLOW DIRECTION D = Standard (from left to right) W = from right to left BOWL OPTIONS Z = Standard * N = Nylon bowl * no additional letter required
	Max. inlet pressure Working temperature Weight with Technopolymer threads Weight with threaded inserts	13 bar -5°C +50°C gr. 1083 gr. 1123	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Pressure range Filter pore size Bowl capacity	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar 5 µm - 20 µm - 50 µm 68 cm <sup>3</sup>	
	Indicative oil drop rate Oil type Bowl capacity Assembly positions	1 drop every 300/600 NI FD22 - HG32 136 cm <sup>3</sup> Vertical	
	Max. fitting torque (with Technopolymer threads) Max. fitting torque (with threaded inserts)	G1/2" = 22 Nm G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	

Service unit assembled (VL+EM) (VL+E) (VL+EW)



Example : GT173BVGG : size 3 combined group comprising Shut-off valve, Filter-regulator Technopolymer threads, G1/2" connections 0 to 8 bar adjusting range and 20 µm filter pore size

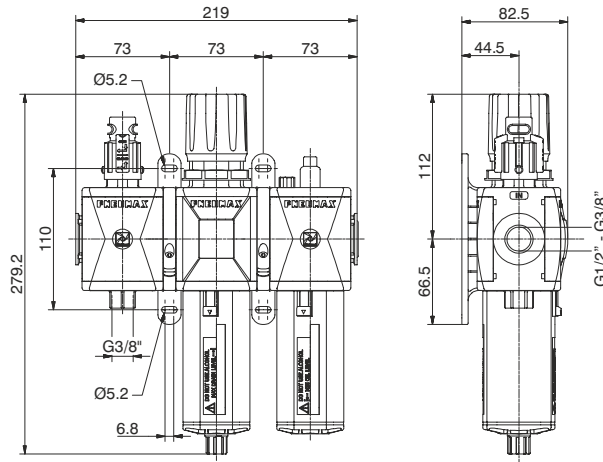


Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, assembled with one (Y) type coupling kit for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G 3/8" - G 1/2"	<b>GV173CTSDZ</b>
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	<b>V</b> VERSION N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 749	<b>C</b> CONNECTIONS A = G3/8" (only for "N" version) B = G1/2"
	Weight with threaded inserts	gr. 789	C = 1/2 NPT (only for "N" version)
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>T</b> TYPE VG = Built in gauge VU = G1/8" gauge connection
	Filter pore size	5 µm - 20 µm - 50 µm	<b>S</b> FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Bowl capacity	68 cm <sup>3</sup>	<b>O</b> OPTIONS = Standard * S = Automatic drain
	Indicative oil drop rate	1 drop every 300/600 NI	<b>D</b> FLOW DIRECTION = Standard (from left to right) W = from right to left
	Oil type	FD22 - HG32	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl
	Bowl capacity	136 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	

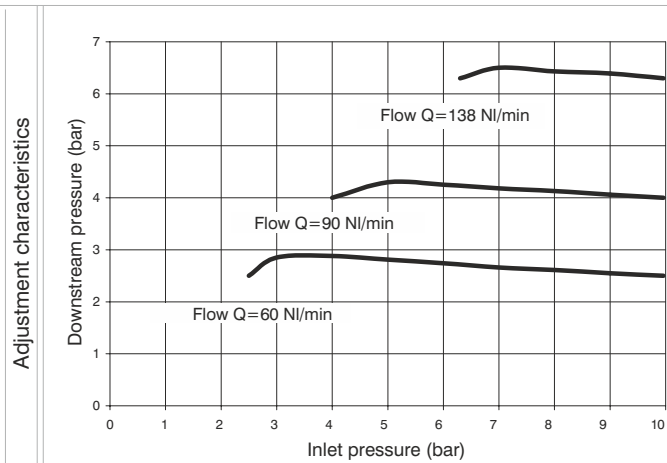
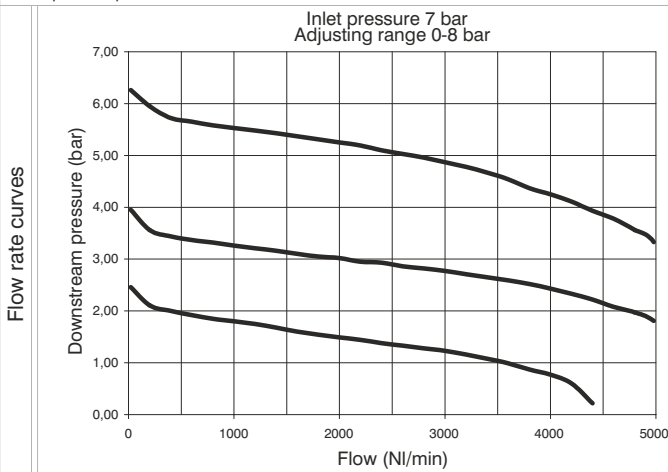
\* no additional letter required



Service unit assembled (VL+EM+L) (VL+E+L) (VL+EW+L)



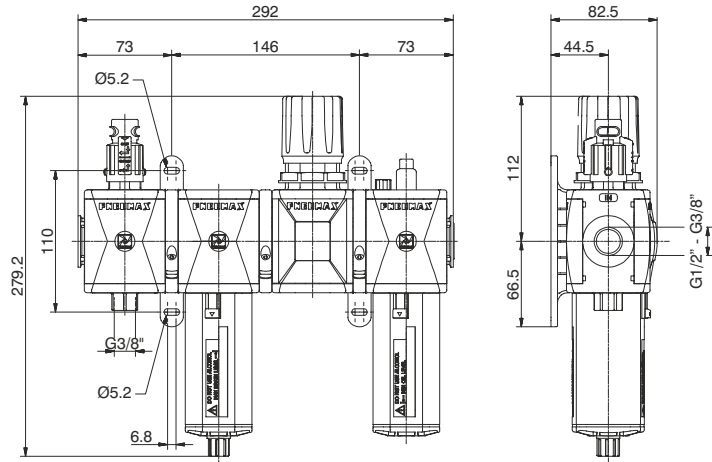
Example : GT173BVHG : Size 3 Combined group comprising Shut-off valve, Filter-regulator and Lubricator Technopolymer threads, G1/2" connections 0 to 8 bar adjusting range and 20 µm filter pore size



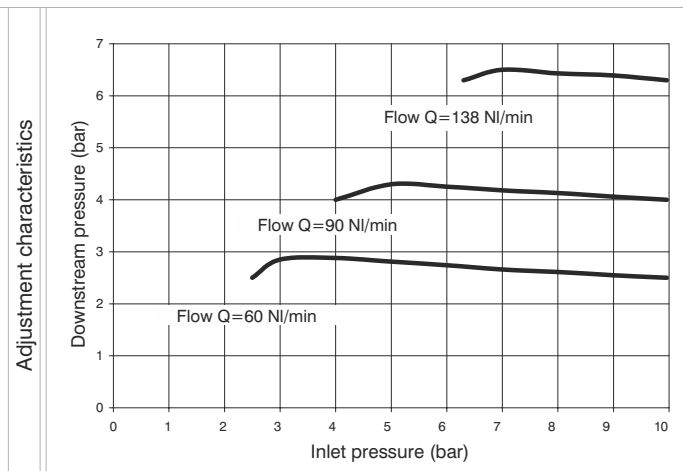
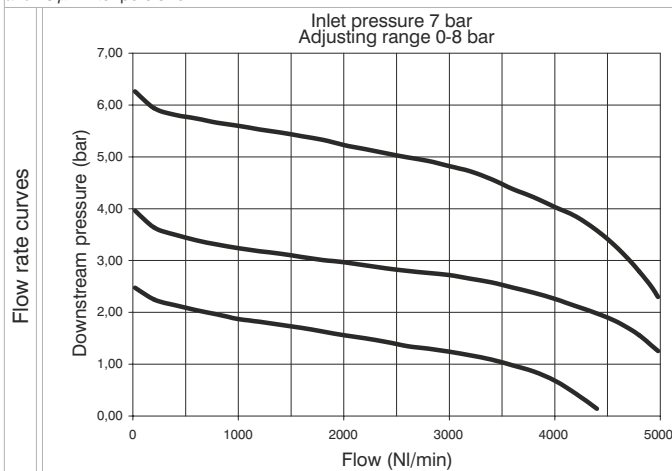
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer and Lubricator assembled with two(Y) type coupling kits for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G 3/8" - G 1/2"	<b>GV173CTSDZ</b>
	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 1078	CONNECTIONS G A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Weight with threaded inserts	gr. 1138	TYPE T VH = Built in gauge VJ = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE S ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC
	Bowl capacity	68 cm <sup>3</sup>	O S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Indicative oil drop rate	1 drop every 300/600 NI	FLOW DIRECTION D = Standard (from left to right) W = from right to left
	Oil type	FD22 - HG32	BOWL OPTIONS Z = Standard * N = Nylon bowl
	Bowl capacity	136 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	
			* no additional letter required



Service unit assembled (VL+F+RM+L) (VL+F+R+L) (VL+F+RW+L)



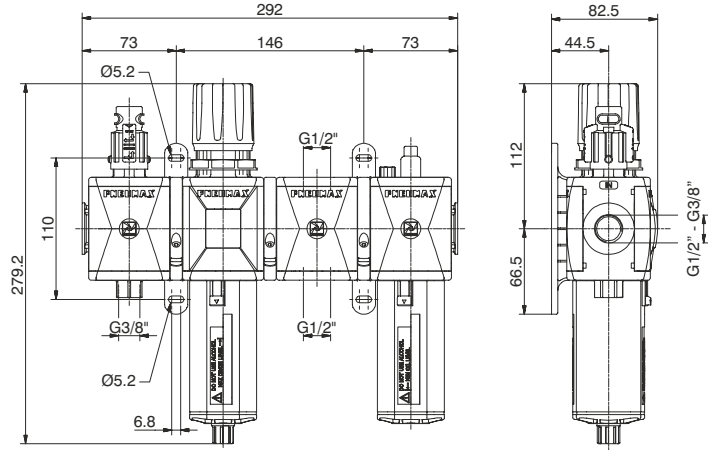
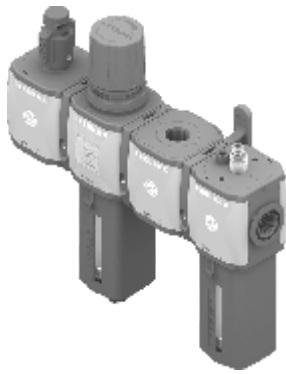
Example : GT173BVKG : size 3 combined group comprising Shut-off valve, Filter, Regulator and Lubricator Technopolymer threads, G1/2" connections 0 to 8 bar adjusting range and 20 µm filter pore size



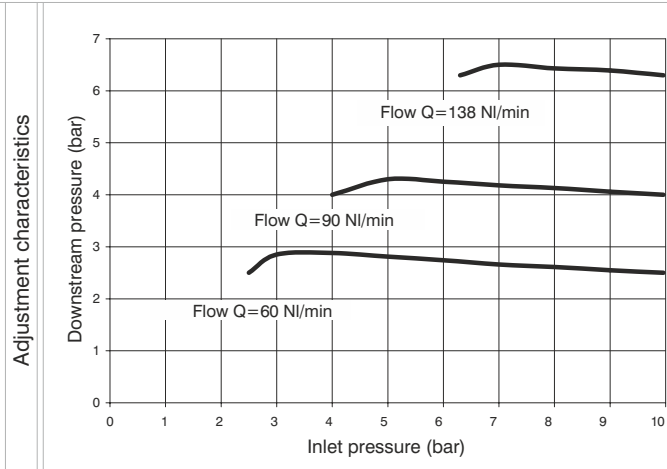
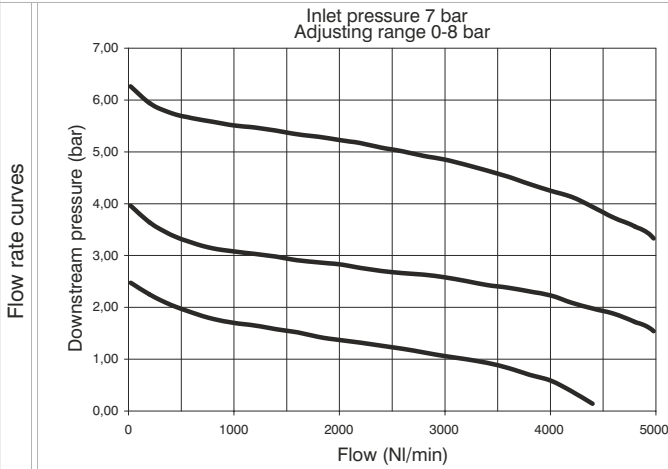
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Manual shut-off valve, Filter, Regulator with built in manometer and Lubricator , assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 3/8" - G 1/2"	<b>GV1730TSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION N = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 1308	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Weight with threaded inserts	gr. 1388	TYPE T = Built in gauge VT = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	68 cm <sup>3</sup>	FLOW DIRECTION = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	136 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	

3

Service unit assembled (VL+EM+PA+L) (VL+E+PA+L) (VL+EW+PA+L)



Example : GT173BVNG : size 3 combined group comprising Shut-off valve, Filter-regulator, Air intake and Lubricator Technopolymer threads, G1/2" connections 0 to 8 bar adjusting range and 20 µm filter pore size



Operational characteristics

Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Air intake and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.

Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G 3/8" - G 1/2"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight with Technopolymer threads	gr. 1249
Weight with threaded inserts	gr. 1309
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	68 cm <sup>3</sup>
Indicative oil drop rate	1 drop every 300/600 NI
Oil type	FD22 - HG32
Bowl capacity	136 cm <sup>3</sup>
Assembly positions	Vertical
Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm
Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm

Min. operational flow at 6,3 bar

100 NI/min.

Ordering code

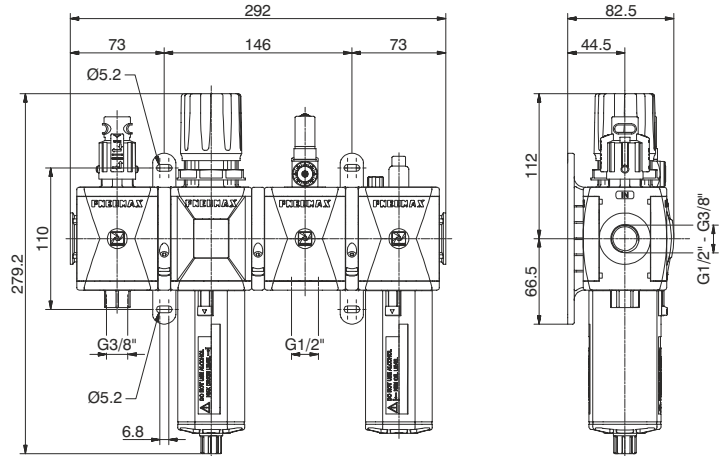
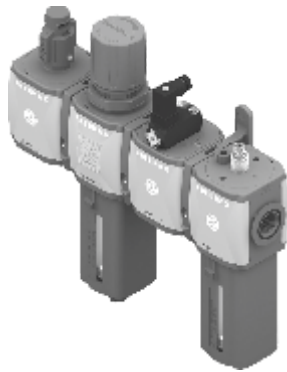
**GV173CTSDZ**

VERSION	
V	N = Metal inserts T = Technopolymer thread
CONNECTIONS	
G	A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
TYPE	
T	VN = Built in gauge VP = G1/8" gauge connection
FILTER PORE SIZE	
ADJUSTING RANGE	
S	C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
OPTIONS	
	= Standard *
	A = Min.oil level indicator NO C = Min.oil level indicator NC
O	S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
FLOW DIRECTION	
D	= Standard (from left to right) W = from right to left
BOWL OPTIONS	
Z	= Standard * N = Nylon bowl

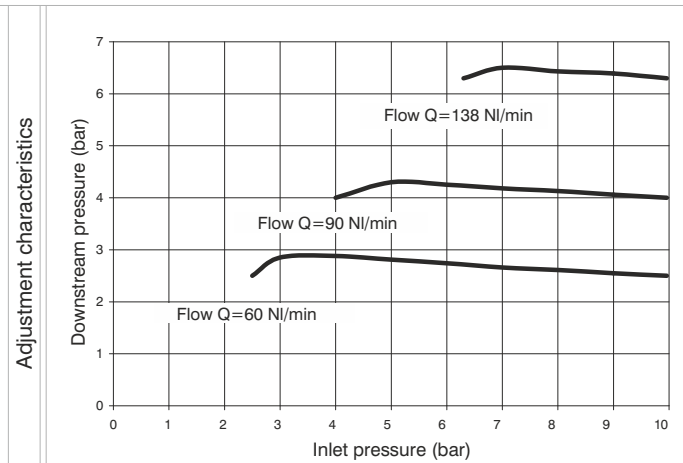
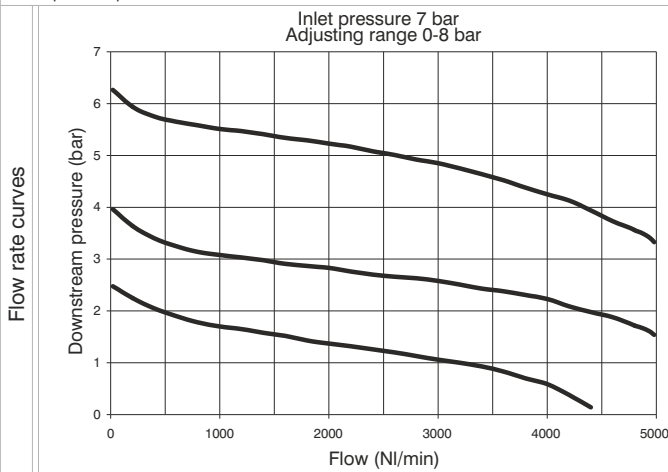
\* no additional letter required



Service unit assembled (VL+EM+PP+L) (VL+E+PP+L) (VL+EW+PP+L)

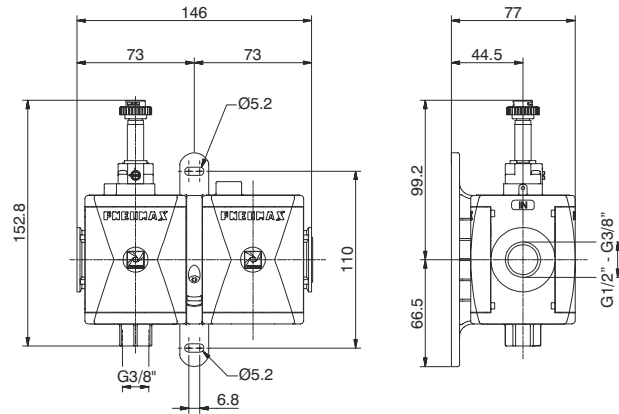


Example : GT173BVRG : size 3 combined group comprising Shut-off valve, Filter-regulator, Pressure switch and Lubricator Technopolymer threads, G1/2" connections adjusting range 0 to 8 bar and 20 µm filter pore size



Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter-regulator with built in manometer, Pressure switch and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit.	Connections	G 3/8" - G 1/2"	<b>GV1730TSD0Z</b>
Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	VERSION V = Metal inserts T = Technopolymer thread
	Weight with Technopolymer threads	gr. 1333	CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version)
	Weight with threaded inserts	gr. 1393	TYPE T = Built in gauge VC = G1/8" gauge connection
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	68 cm <sup>3</sup>	FLOW DIRECTION = Standard (from left to right) W = from right to left
	Indicative oil drop rate	1 drop every 300/600 NI	BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	* no additional letter required
	Bowl capacity	136 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Min. operational flow at 6,3 bar	100 NI/min.	

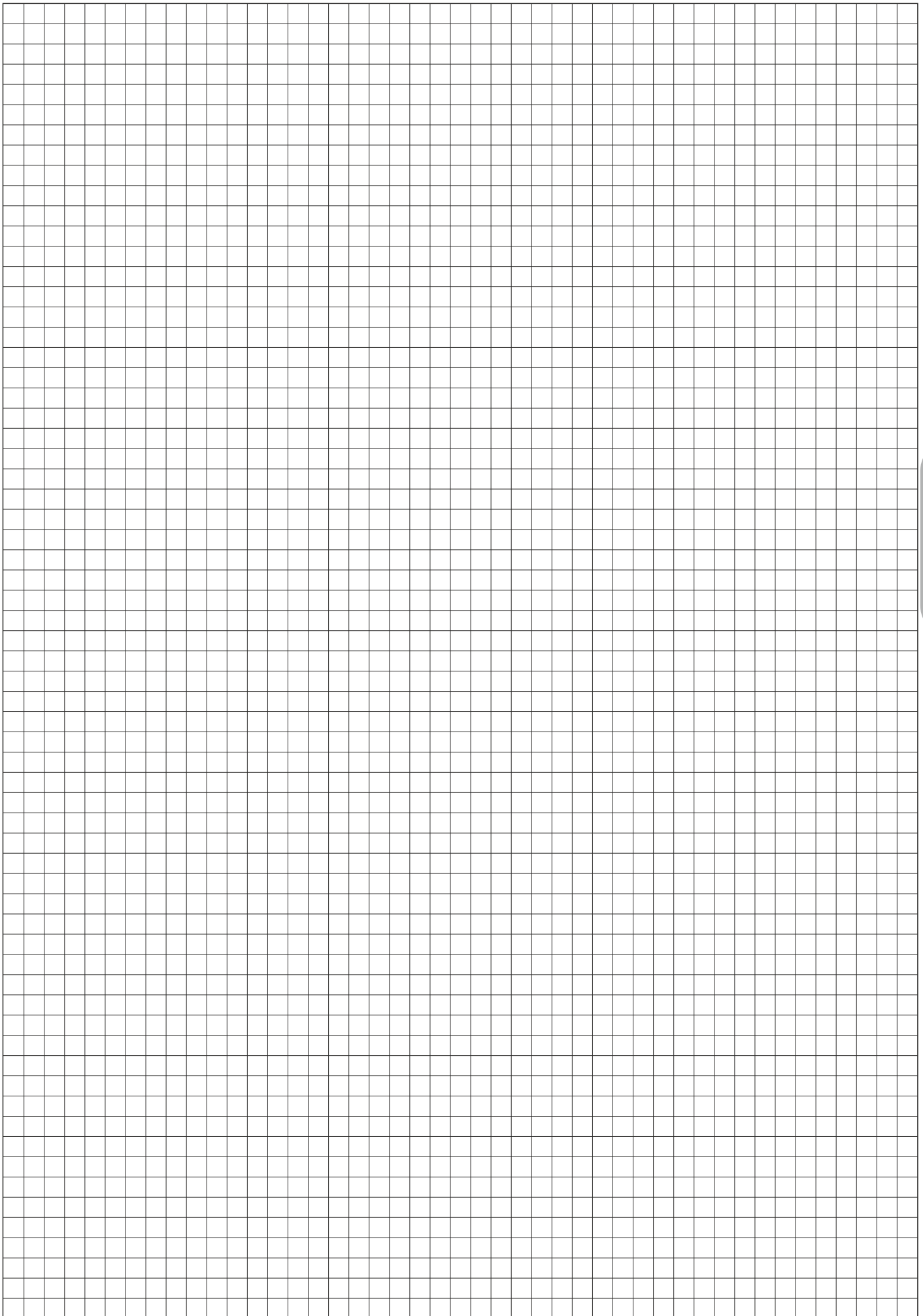
Service unit assembled (VE+AP)



Example : GT173BSB2 : size 3 combined group comprising Electric shut-off valve, Progressive start-up valve without coil with M2 pilot Technopolymer threads, G1/2" connections

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Electric shut - off valve and Progressive start-up valve assembled with a (Y) type coupling kit for panel mounting.	Connections	G 3/8" - G 1/2"	<b>GV173CSA</b> VERSION N = Metal inserts T = Technopolymer thread CONNECTIONS A = G3/8" (only for "N" version) B = G1/2" C = 1/2 NPT (only for "N" version) 15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt) 22 mm COIL VOLTAGE B2 = Without coil M2 mechanic 30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
	Max. inlet pressure	10 bar	
	Min. inlet pressure	2.5 bar	
	Working temperature	-5°C +50°C	
	Weight with Technopolymer threads	gr. 549	
	Weight with threaded inserts	gr. 589	
	Assembly positions	Indifferent	
	Max. fitting torque (with Technopolymer threads)	G1/2" = 22 Nm	
	Max. fitting torque (with threaded inserts)	G3/8" = 25 Nm G1/2" = 30 Nm	
	Flow at 6 bar with $\Delta p=1$	2800 NI/min.	

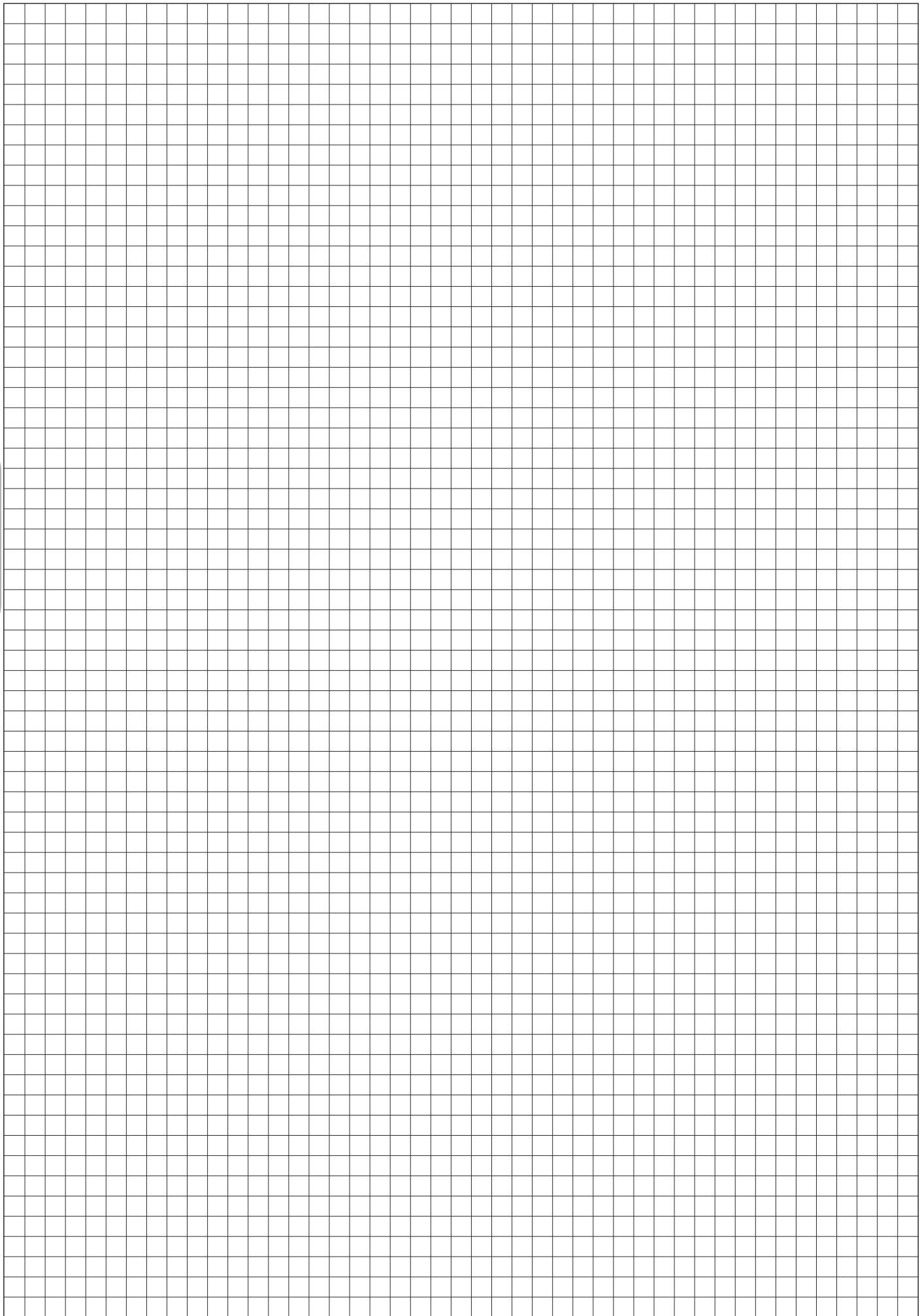
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## Construction and working characteristics

The new "AIRPLUS" range of FRL units represents an evolution of the original 1700 series.

The latest technical features include; Improved performance and reliability as well as quick and easy assembly. The transparent polycarbonate (PC) bowls are fitted with a bowl protection guard which is assembled on the component body via a quick coupling mechanism which also includes a safety release button. The filters are available with 3 grades of filtration (5µm, 20µm and 50µm) as standard and also include a manual/semi-automatic drain. An automatic drain is also available.

The regulators are based on the rolling diaphragm technology with a low hysteresis and a balanced system. They can be supplied with an integral flush mounted pressure gauge and are available in 4 different pressure ranges from 0 - 12 bar, the adjusting knob can be locked by depressing it into the lock position.

The lubricator has been designed using the venture principle and the amount of oil is regulated via the adjusting screw which is positioned on top of the unit on the polycarbonate (PC) dome which also provides a visual indication of the amount of oil being regulated. The oil suction pipe is fitted with a sintered filter as standard which helps prevent contaminants reaching the downstream circuit.

Two versions of the shut-off valve are available, one manual and one being solenoid operated, in both cases the units are fitted with a threaded connection for exhausting the air from the downstream circuit. On the manual version it's also possible to fit 3 padlocks whilst in the lock position in order to prevent accidental pressurization of the pneumatic system and avoid accidents or damage. The solenoid operated version is available with a 15mm solenoid operator.

The soft start valve provides a controlled progressive build-up of pressure downstream avoiding sudden pressure surges which could be dangerous for components fitted to the downstream circuit, the filling time can be adjusted via the built in flow regulator. The valve opens fully once the downstream pressure reaches 50% of the inlet pressure. The pressure switch module can be set between 2 - 10 bars and the intake module completes the range. All of the components are connected together using the technopolymer flange system which also allows the units to be panel mounted as well as the ability to replace components without having to disassemble the FRL from its position.

## Instructions for installation and operation

The FRL must be installed as close as possible to the application

The airflow must follow the direction as indicated on the FRL components or correspond with that indicated on the threaded connections (IN and OUT). All components fitted with a bowl must be mounted vertically with the bowl facing downwards. The FRL units can be wall mounted directly through the 8.5mm mounting holes or via the "Y" type quick coupling flange.

All units must be operated in according to the specified pressure and temperature ranges; fittings must be installed without exceeding the maximum torque allowed. The condensate level in both the filter and filter-regulator units must never exceed the maximum level indicated on the bowl. The condensate on the manual/semi-automatic drain unit can be discharged using 6/4mm tube fitted directly to the drain tap. The regulators pressure value must always be set whilst the pressure is rising ensuring the correct regulator and required pressure range have been selected. Lubricators must be filled with either FD22 or HG32 oils and the operator must ensure that the flow rate is above the minimum flow rate required to operate the unit. Below this value the unit does not operate correctly.

The oil quantity dispensed by the lubricator can be regulated by the adjusting the screw on the transparent polycarbonate dome through which the oil flow is visible. A drop of oil every 300 - 600 litres should be allowed and please note: The oil refill can take place only with the lubricator bowl NOT under pressure.

The lubricator can be refilled whilst the pneumatic circuit is pressurized thanks to the built in exhaust valve which allows the bowl to be depressurized and the oil refilled in the bowl.

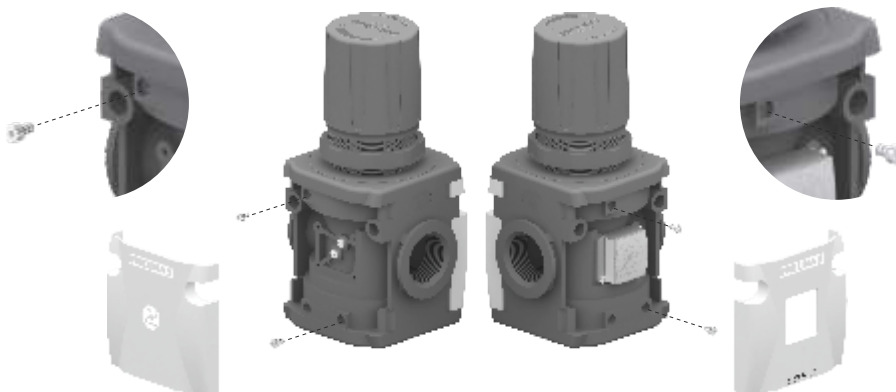
The manual shut off valve is operated (On) with two actions, firstly push the knob down and secondly turn the knob clockwise. To discharge the downstream air, turn the knob anti-clockwise.

The soft start valve is used to slowly and progressively pressurize the downstream circuit; the time needed is adjustable via the built in flow regulator. Please note: The soft start valve on its own does not allow for the discharge of the downstream circuit, in order to do this it is necessary to combine this unit with a shut off valve (To be mounted upstream)

## Maintenance



**For any maintenance that requires the removal of the top or bottom plug/supports from the main component body it is necessary to remove the side cover plates and retaining screws. If the top or bottom plugs/supports are removed with the retaining screws still in place the unit could be permanently damaged**



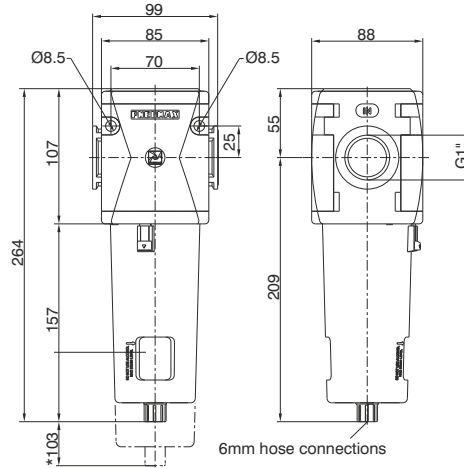
Bowls, plugs and supports are assembled with a bayonet type mechanism. In order to remove them rotate anti-clockwise until you reach a mechanical stop, then remove from the component body (For bowls, firstly press down the green safety button). Please note: Bowls and transparent parts can be cleaned with water and neutral soap. DO NOT USE SOLVENTS OR ALCOHOL

Filter elements (From filters and filter-regulators) made of HDPE can be regenerated by washing and blowing them. In order to remove the filter elements it is necessary to remove the bowl, unscrew the filter element, replace it with a new unit or clean the old one.

Lubricator oil can be refilled with the circuit pressurized thanks to the exhaust valve which is built and allows the bowl to be depressurized. Once this operation has been carried out it is possible to unscrew and remove the bowl to refill it or refill using the refill plug. Removing the bowl and refilling is preferred.

Should a pressure regulator not perform correctly or should a constant leak be detected from the relieving orifice beneath the adjusting knob it may be necessary to replace the diaphragm. Before attempting to replace the diaphragm unload the regulating spring before removing the regulator support. Due to the complexity of the regulator mechanism and the need to test the unit according to the Pneumax SpA specification any other repair should be carried out by the manufacturer.

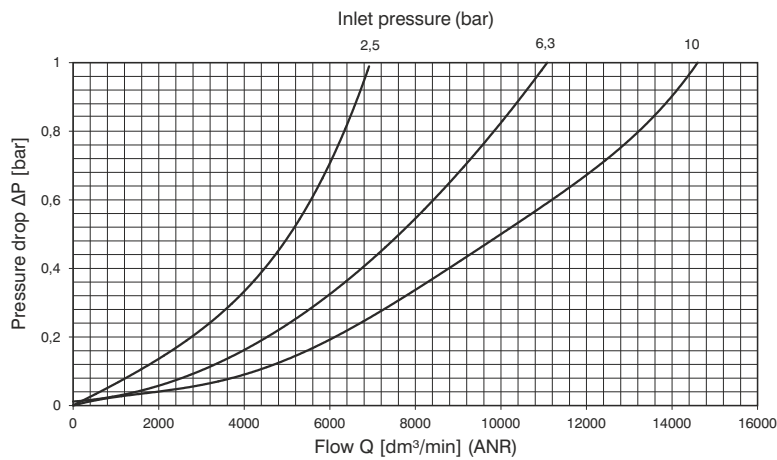
Filter (F)



\*Bowl removal maximum height

Example : N174BFB : size 4, Filter, G1" connections, 20  $\mu$ m filter pore size

3  
Flow rate curves

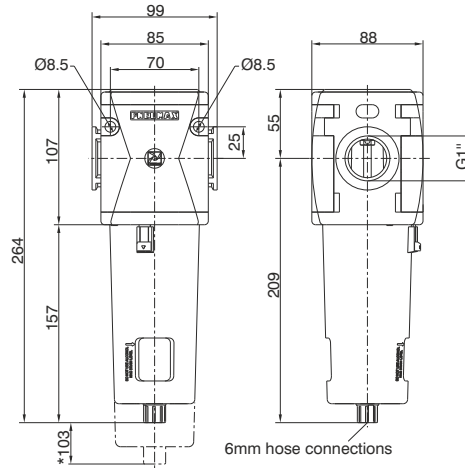


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Double filtering action: air flow centrifugation and filter element</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5<math>\mu</math>m, 20<math>\mu</math>m and 50<math>\mu</math>m) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made off polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> </ul>	Connections	G1"	<b>N174BFS02</b>
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	<input checked="" type="radio"/> A = 5 $\mu$ m <input type="radio"/> B = 20 $\mu$ m <input type="radio"/> C = 50 $\mu$ m
	Maximum working pressure with automatic drain	10 bar	<input checked="" type="radio"/> S = Automatic drain <input type="radio"/> = Standard *
	Working temperature	-5°C +50°C	<input checked="" type="radio"/> Z = Standard * <input type="radio"/> N = Nylon bowl
	Weight	1155 (gr)	
	Filter pore size	5 $\mu$ m - 20 $\mu$ m - 50 $\mu$ m	
	Bowl capacity	90 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Wall fixing screw	M8	

**Note**  
In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

\* no additional letter required

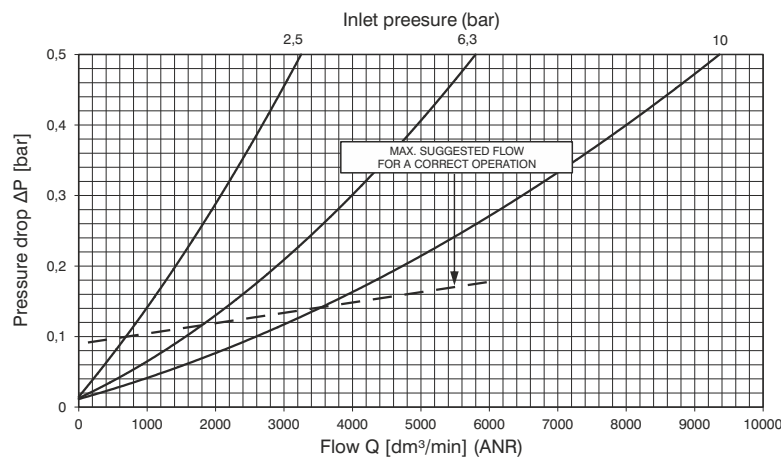
Coalescing filter (D)



\*Bowl removal maximum height

Example : N174BDA : size 4, Coalescing filter, G1" connections, filter efficiency 99,97%

Flow rate curves

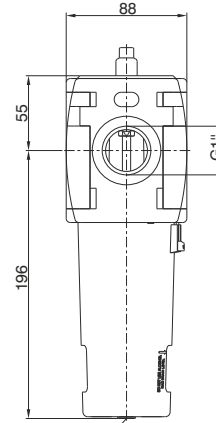
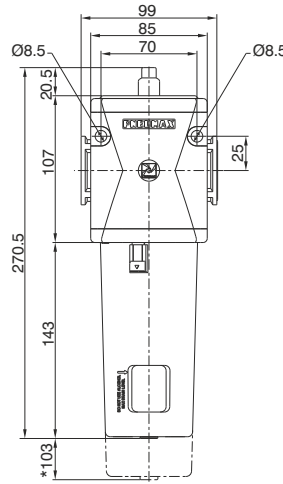


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Operational characteristics	Technical characteristics		Ordering code
- Coalescing filter element with filtration grade of 0,01 μm	Connections	G1"	<b>N174BDE00Z</b>
- Transparent bowl made off polycarbonate with bowl protection guard.	Max. inlet pressure	13 bar	
- Bowl assembly via bayonet type quick coupling mechanism with safety button.	Minimum working pressure with automatic drain	0,5 bar	<b>E</b> FILTER EFFICIENCY
- Semi-automatic drain mounted as standard; automatic drain upon request.	Maximum working pressure with automatic drain	10 bar	A = 99,97%
<b>Note</b>	Working temperature	-5°C +50°C	OPTIONS
In order to ensure a better grade of filtration it is recommended to use a 5 μm filter before the coalescing filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.	Weight	1235 (gr)	○ = Standard *
	Filter efficiency with 0,01 μm particle	99,97%	S = Automatic drain
	Bowl capacity	90 cm <sup>3</sup>	<b>BOWL OPTIONS</b>
	Assembly positions	Vertical	○ = Standard *
	Wall fixing screw	M8	<b>Z</b> N = Nylon bowl

\* no additional letter required

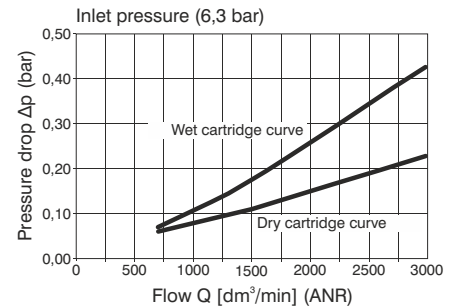
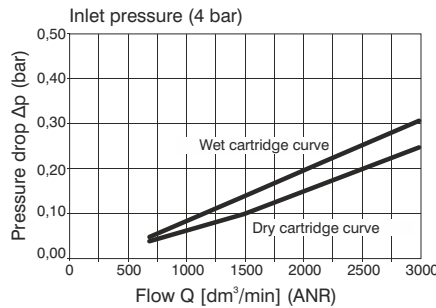
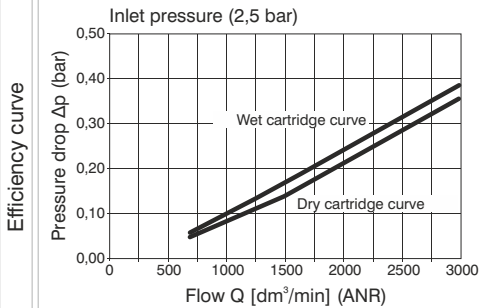
Oil removal filter (DAV)



G1/8" connections

\*Bowl removal maximum height

Example : N174BDV : size 4, Oil removal filter, with clogging gauge, G1" connections.



Operational characteristics

- Coalescing filtering cartridge particle removal 0,01  $\mu\text{m}$  oil residual 0,01 ppm
- Clogging gauge  
green: proper working  
red: clogged cartridge ( $\Delta p$  0,5 bar)  
we recommend to change the cartridge
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Automatic drain mounted as standard.

Note

It is recommended to use a 5  $\mu\text{m}$  filter before the oil removal filter. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G1"
Nominal flow at 6,3 bar	13 bar
Filter efficiency	3000 NI/min
Max. inlet pressure	99,99%
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Weight	1260 (gr)
Bowl capacity	90 $\text{cm}^3$
Assembly positions	Vertical
Wall fixing screw	M8

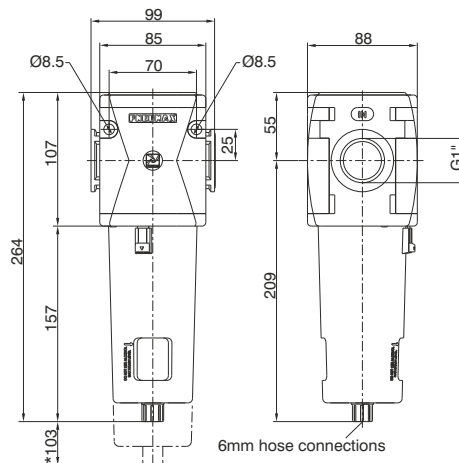
Ordering code

**N174BDV**

Z	BOWL OPTIONS
	= Standard *
	N = Nylon bowl

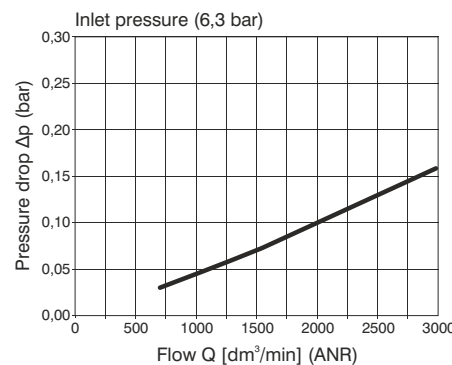
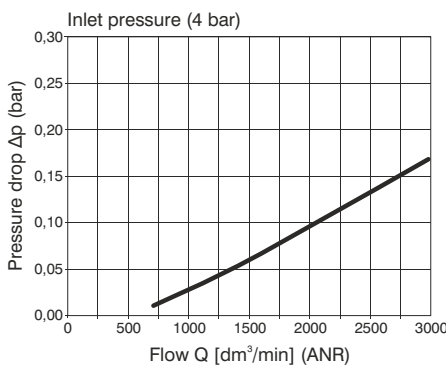
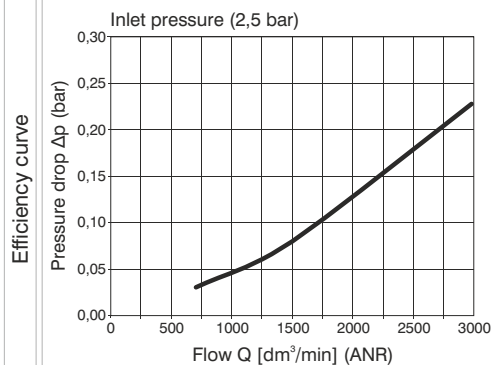
\* no additional letter required

**Carbon filter (DD)**



\*Bowl removal maximum height

Example : N174BDD : size 4, Carbon filter with Technopolymer threads, G1" connections.



**Operational characteristics**

- Active carbon cartridge with built in particulate filter. Used to remove oil vapours, hydrocarbons, odours and particles coming from the compressed air lines or gasses in industrial applications. Oil residue up to <0,003 ppm (max input aerosol 0.01ppm).
- Innovative filtering technology; high absorption capacity, with low differential pressure.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard.

**Note**

A 5 micron filter followed by a coalescing filter must be installed before the Oil removal filter in order to ensure the correct functionality of the unit and to safeguard the life of the active carbon cartridge. It is also necessary to preventively replace the cartridges at fixed intervals.

**Technical characteristics**

Connections	G 1"
Nominal flow at 6,3 bar	3000 NI/min
Cartridge life	2000 hours
Max. inlet pressure	13 bar
Working temperature	-5°C ÷ +50°C
Weight	gr. 1260
Bowl capacity	90 cm <sup>3</sup>
Assembly positions	Vertical

Wall fixing screw M8

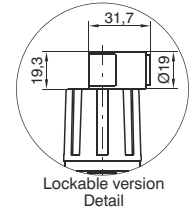
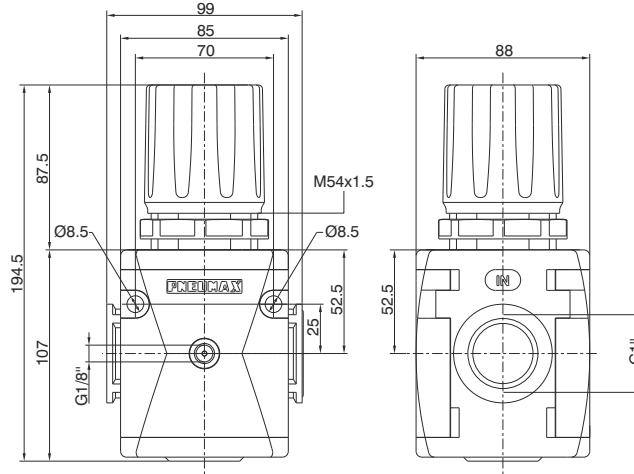
**Ordering code**

**N174BDD<sup>z</sup>**

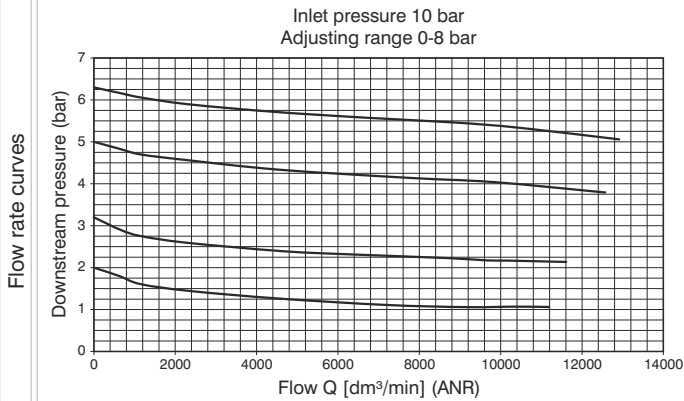
<b>Z</b>	BOWL OPTIONS
	= Standard *
	N = Nylon bowl

\* no additional letter required

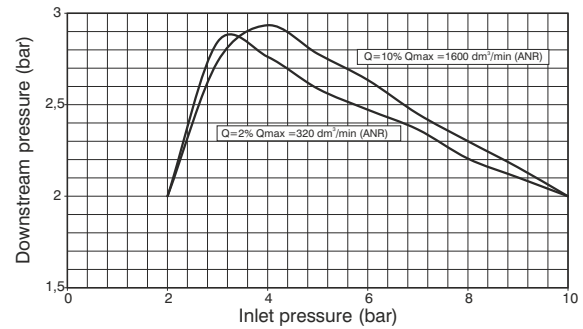
Regulator (R)



Example: N174BRC : size 4, Regulator, G1" connections, 0 to 8 bar adjusting range



Adjustment characteristics



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G1"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight	1225 (gr)
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Wall fixing screw	M8

Ordering code

**N174BR**

ADJUSTING RANGE

- A = 0-2 bar
- B = 0-4 bar
- C = 0-8 bar
- D = 0-12 bar

TYPE

- = Standard\*
- = no relieving
- = Improved relieving

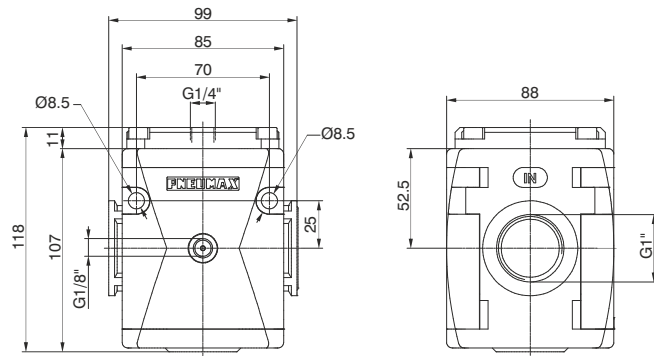
OPTIONS

- = Standard\*
- = Lockable version

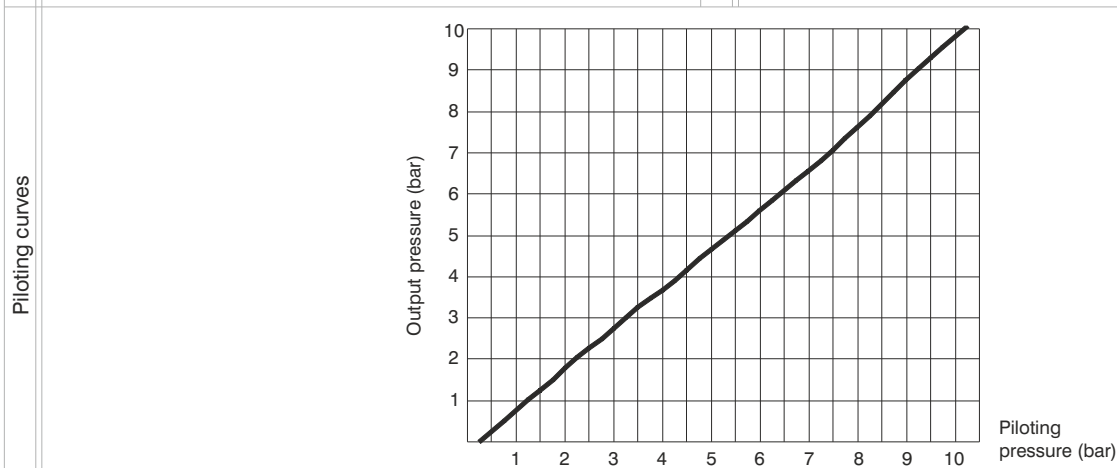
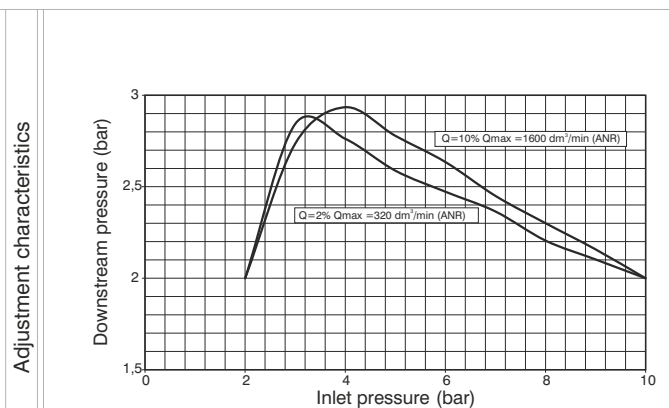
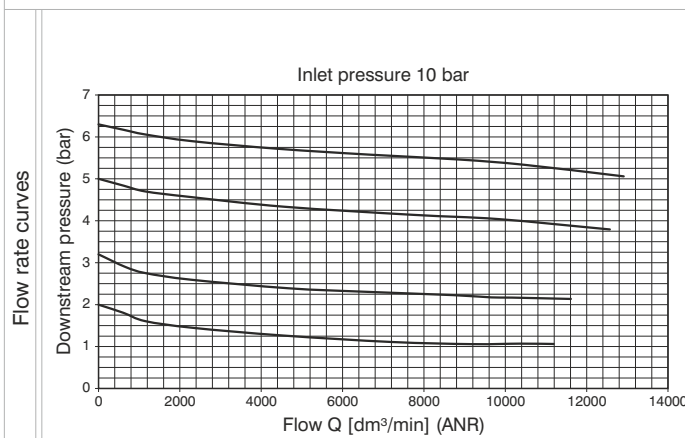
\* no additional letter required



Piloted pressure regulator (R)



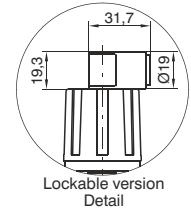
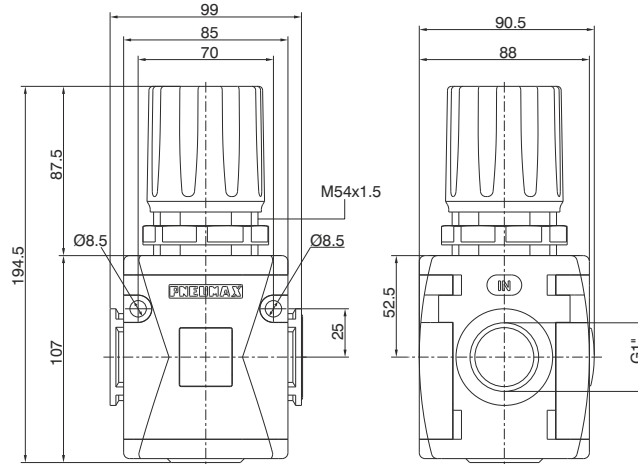
Example: N174BRP : size 4, Piloted pressure regulator with G1" connection



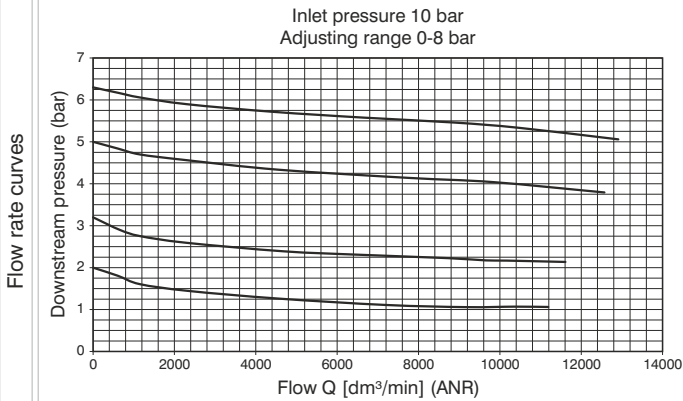
Operational characteristics		Technical characteristics	
- Piston pressure regulator with relieving		Connections	G1"
- Balanced system		Pilot port size	G1/4"
<b>Note</b>		Max. inlet pressure	13 bar
Always regulate the rising pressure.		Working temperature	-5°C +50°C
		Pressure gauge connections	G 1/8"
		Weight	1155 (gr)
		Assembly positions	Indifferent
		Wall fixing screw	M8
		Ordering code	<b>N174BRP</b>



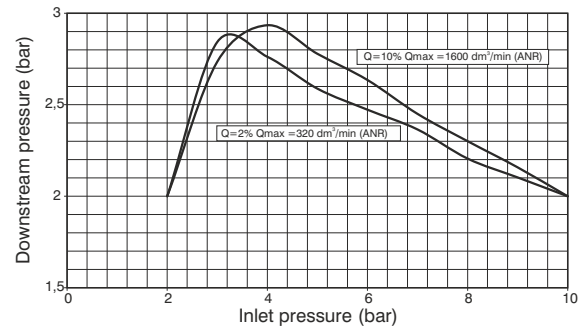
Regulator including gauge (RM)(RW)



Example : N174BRMC : size 4, Regulator including gauge, G1" connections, 0 to 8 bar adjusting range



Adjustment characteristics



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G1"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight	1220 (gr)
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Wall fixing screw	M8

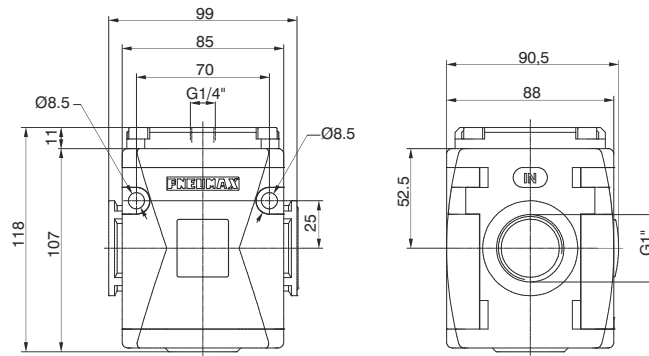
Ordering code

**N174BRDGT**

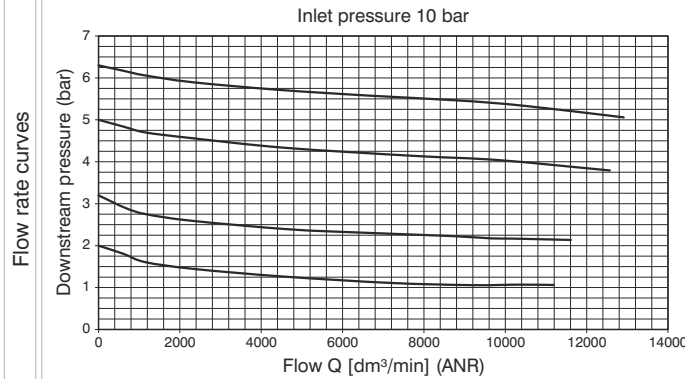
FLOW DIRECTION	
D	M = from left to right W = from right to left
ADJUSTING RANGE	
A	A = 0-2 bar
B	B = 0-4 bar
C	C = 0-8 bar
D	D = 0-12 bar
TYPE	
T	= Standard *
L	L = no relieving
R	R = Improved relieving
OPTIONS	
K	= Standard *
K	K = Lockable version

\* no additional letter required

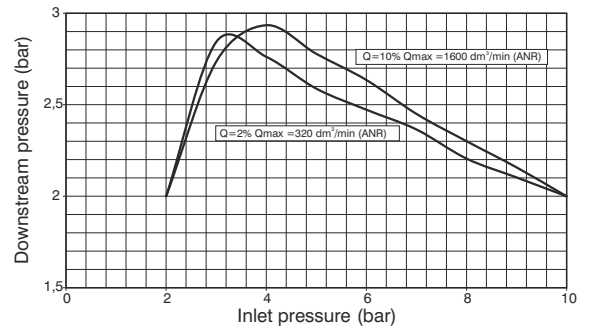
Piloted pressure regulator with integrated manometer (RM)(RW)



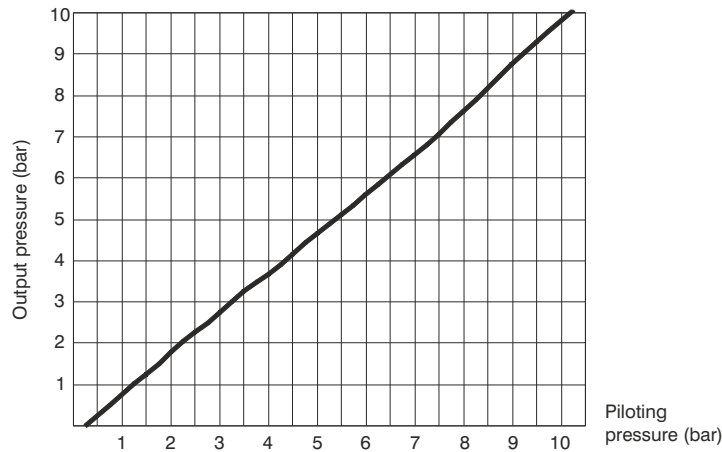
Example: N174BRMP : size 4, Piloted pressure regulator with integrated manometer with G1" connection



Adjustment characteristics



Piloting curves



Operational characteristics

- Piston pressure regulator with relieving
- Balanced system
- Built in gauge 0-12 bar range as standard.

Note

Always regulate the rising pressure.

Technical characteristics

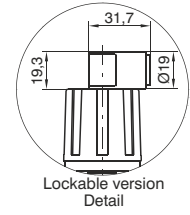
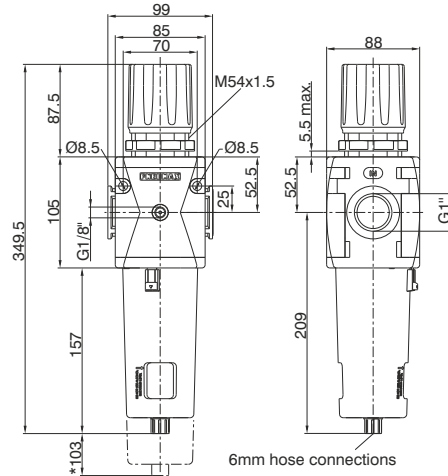
Connections	G1"
Pilot port size	G1/4"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight	1150 (gr)
Assembly positions	Indifferent
Wall fixing screw	M8

Ordering code

**N174BR0P**

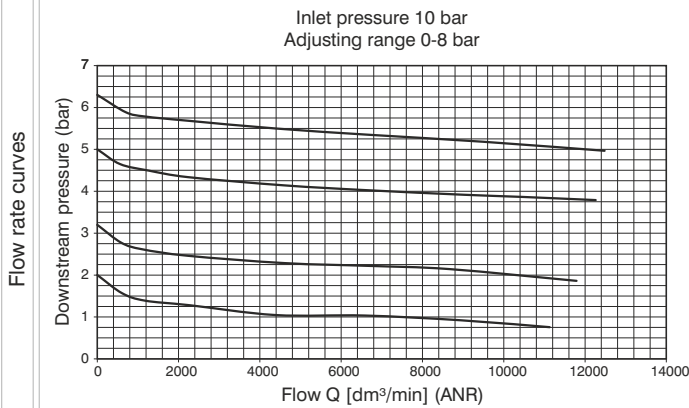
- FLOW DIRECTION
- M = from left to right
- W = from right to left

Filter-Regulator (E)

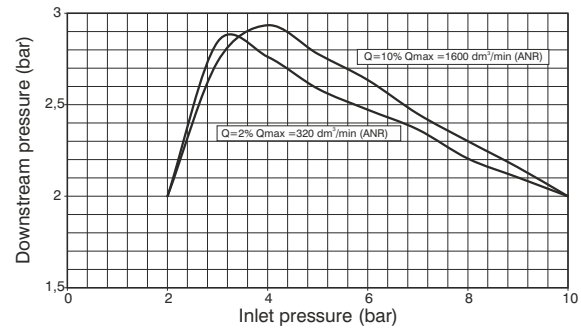


\*Bowl removal maximum height

Example : N174BEBC : size 4, Filter-regulator, G1" connections, 20 μm filtering pore size, 0 to 8 bar adjusting range



Adjustment characteristics



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5μm, 20μm and 50μm) can be regenerated by washing it or replaced.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G1"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	-5°C +50°C
Pressure gauge connections	G 1/8"
Weight	1450 (gr)
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 μm - 20 μm - 50 μm
Bowl capacity	90 cm <sup>3</sup>
Assembly positions	Vertical

Wall fixing screw

M8

Ordering code

**N174BE****S****G****10****Z**

FILTER PORE SIZE

- A = 5 μm
- B = 20 μm
- C = 50 μm

ADJUSTING RANGE

- A = 0-2 bar
- B = 0-4 bar
- C = 0-8 bar
- D = 0-12 bar

TYPE

- T = Standard \*
- S = Automatic drain

OPTIONS

- G = Standard \*
- K = Lockable version

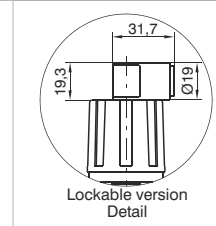
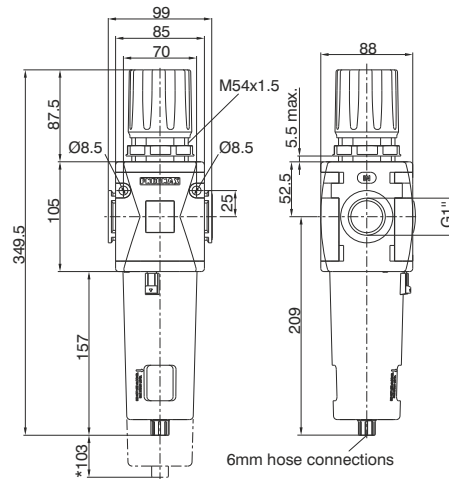
BOWL OPTIONS

- Z = Standard \*
- N = Nylon bowl

\* no additional letter required

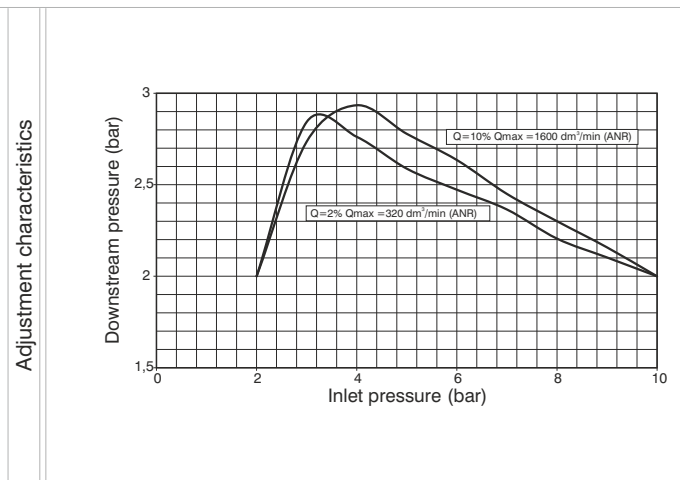
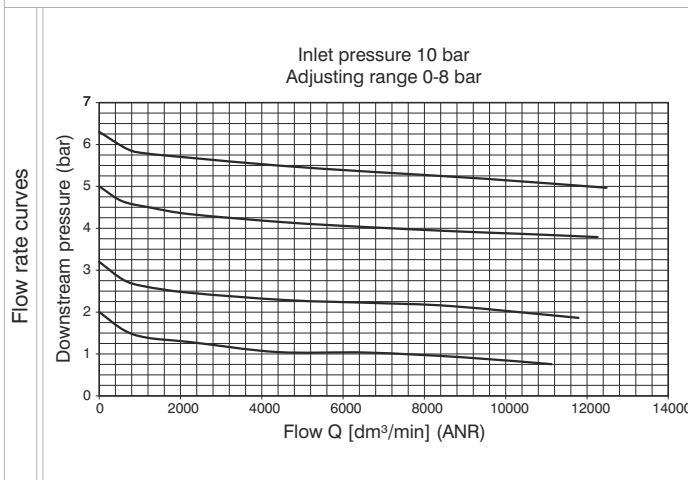


Filter-regulator including gauge (EM)(EW)



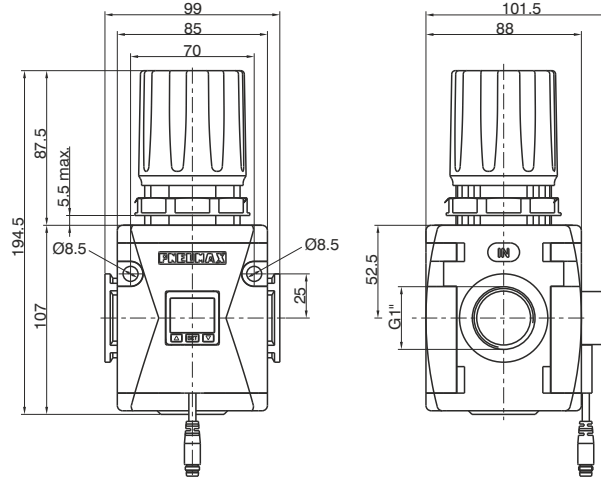
\*Bowl removal maximum height

Example: N174BEMBC : size 4, Filter-regulator including gauge, G1" connections, with 20 µm filtering pore size, 0 to 8 bar adjusting range

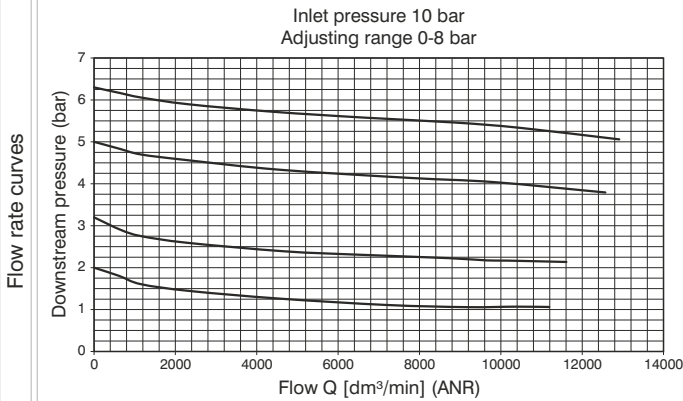


Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Filter - diaphragm pressure regulator with relieving.</li> <li>- Low hysteresis rolling diaphragm.</li> <li>- Balanced system.</li> <li>- Double filtering action: air flow centrifugation and filter element.</li> <li>- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.</li> <li>- Transparent bowl made of polycarbonate with bowl protection guard.</li> <li>- Bowl assembly via bayonet type quick coupling mechanism with safety button.</li> <li>- Semi-automatic drain mounted as standard; automatic drain upon request.</li> <li>- Available in four pressure ranges up to 12 bar.</li> <li>- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.</li> <li>- Fitted with panel mounting locking ring.</li> <li>- Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</li> </ul>	Connections	G1"	<p><b>N174BE0SG10Z</b></p> <p>FLOW DIRECTION                      D M = from left to right                      W = from right to left</p> <p>FILTER PORE SIZE                      S A = 5 µm                      B = 20 µm                      C = 50 µm</p> <p>ADJUSTING RANGE                      G A = 0-2 bar                      B = 0-4 bar                      C = 0-8 bar                      D = 0-12 bar</p> <p>TYPE                      T = Standard *                      S = Automatic drain</p> <p>OPTIONS                      O = Standard *                      K = Lockable version</p> <p>BOWL OPTIONS                      Z = Standard *                      N = Nylon bowl</p> <p>* no additional letter required</p>
	Max. inlet pressure	13 bar	
	Minimum working pressure with automatic drain	0,5 bar	
	Maximum working pressure with automatic drain	10 bar	
	Working temperature	-5°C +50°C	
	Weight	1440 (gr)	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	90 cm <sup>3</sup>	
	Assembly positions	Vertical	
Note	Wall fixing screw	M8	

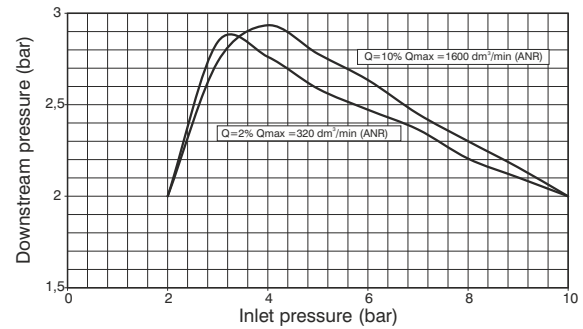
Regulator with pressure switch (RP)(RZ)



Example : N174BRPCA : size 4, Regulator, G1" connections, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Adjustment characteristics



Operational characteristics

- Diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.

Technical characteristics

Connections	G1"
Max. inlet pressure	13 bar
Working temperature	0°C +50°C
Weight	1260 (gr)
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Assembly positions	Indifferent
Wall fixing screw	M8

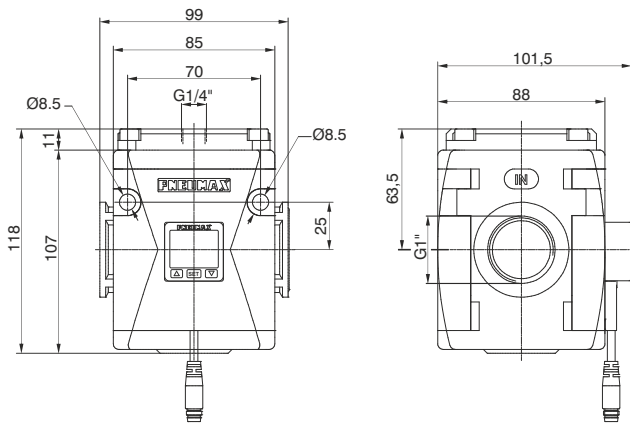
Ordering code

**N174BRDGP**

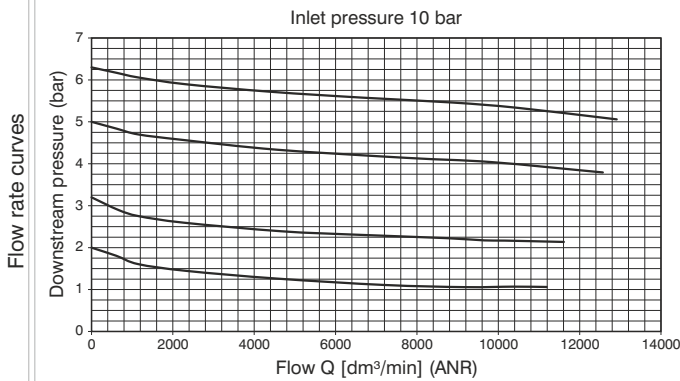
FLOW DIRECTION	
P	= from left to right
Z	= from right to left
ADJUSTING RANGE	
A	= 0-2 bar
B	= 0-4 bar
C	= 0-8 bar
D	= 0-12 bar
TYPE	
	= Standard *
L	= no relieving
R	= Improved relieving
OPTIONS	
	= Standard *
K	= Lockable version
PRESSURE SWITCH OPTION	
A	= Cable 150 mm+ M8 PNP
B	= Cable 150 mm+ M8 NPN
C	= Cable 2 mt. PNP
D	= Cable 2 mt. NPN

\* no additional letter required

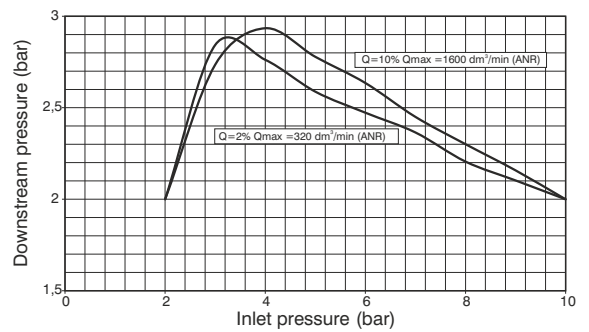
Piloted pressure regulator with digital pressure switch (RP)(RZ)



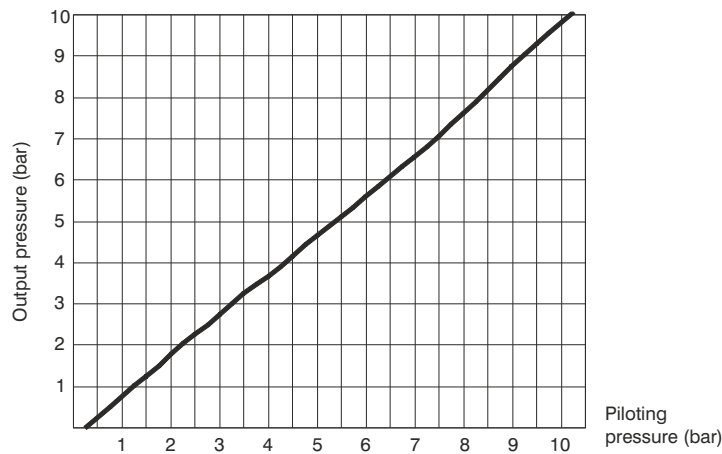
Example: N174BRPAP : size 4, Piloted pressure regulator, G1" connections, with pressure switch with M8 connector PNP



Adjustment characteristics

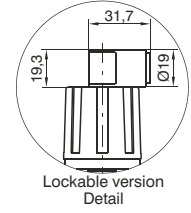
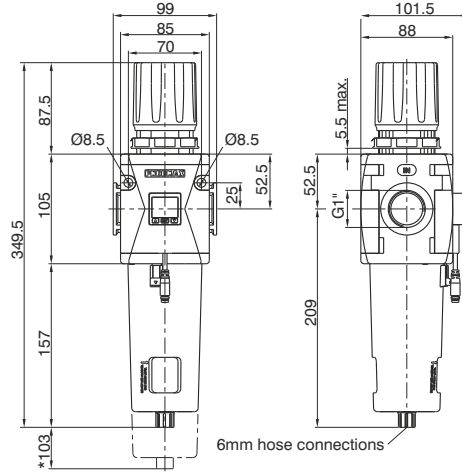


Piloting curves



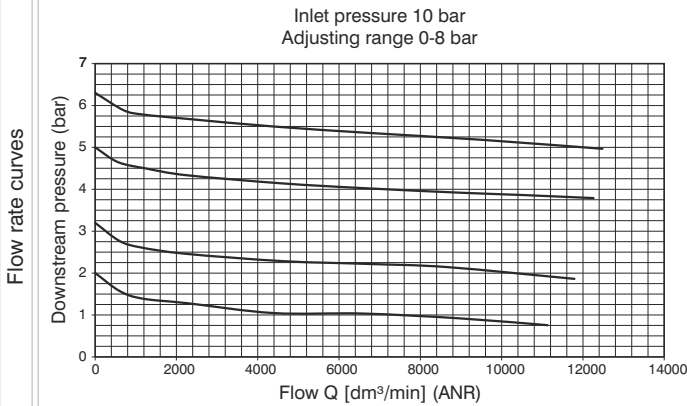
Operational characteristics	Technical characteristics		Ordering code
- Piston pressure regulator with relieving	Connections	G1"	<b>N174BR00P</b>
- Balanced system	Pilot port size	G1/4"	
- Pressure switch as standard	Max. inlet pressure	13 bar	
<b>Note</b>	Working temperature	-5°C +50°C	<b>D</b> FLOW DIRECTION
Always regulate the rising pressure.	Pressure gauge connections	G 1/8"	P = from left to right
	Weight	1190 (gr)	Z = from right to left
	Assembly positions	Indifferent	<b>P</b> PRESSURE SWITCH OPTION
	Wall fixing screw	M8	A = Cable 150 mm+M8 NPN
			B = Cable 150 mm+M8 NPN
			C = Cable 2 mt. PNP
			D = Cable 2 mt. NPN

Filter regulator with pressure switch (EP)(EZ)

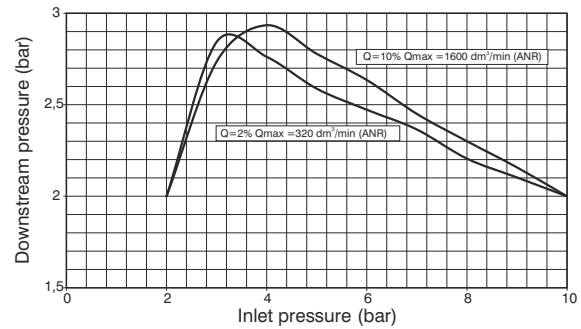


\*Bowl removal maximum height

Example: N174BEPBCA : size 4, Filter-regulator, G1" connections, 20 µm filtering pore size, 0 to 8 bar adjusting range, with pressure switch with M8 connector PNP



Adjustment characteristics



Operational characteristics

- Filter - diaphragm pressure regulator with relieving.
- Low hysteresis rolling diaphragm.
- Balanced system.
- Double filtering action: air flow centrifugation and filter element.
- Filtering element made of HDPE (high density polyethylene) available in three different filtration grades (5µm, 20µm and 50µm) can be regenerated by washing it or replaced.
- Transparent bowl made of polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Semi-automatic drain mounted as standard; automatic drain upon request.
- Available in four pressure ranges up to 12 bar.
- Operating knob can be locked in position by pressing it down once the desired P2 (regulated pressure) pressure value is achieved.
- Fitted with panel mounting locking ring.
- Pressure switch as standard

Note

The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended. In order to ensure adequate flow on the auto drain version it is recommended to use minimum a 6mm fitting.

Technical characteristics

Connections	G1"
Max. inlet pressure	13 bar
Minimum working pressure with automatic drain	0,5 bar
Maximum working pressure with automatic drain	10 bar
Working temperature	0°C +50°C
Weight	1490 (gr)
Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar
Filter pore size	5 µm - 20 µm - 50 µm
Bowl capacity	90 cm³
Assembly positions	Vertical

Wall fixing screw

M8

Ordering code

**N174BEDSGTOPZ**

D	FLOW DIRECTION
	P = from left to right
	Z = from right to left
	FILTER PORE SIZE
S	A = 5 µm
	B = 20 µm
	C = 50 µm
G	ADJUSTING RANGE
	A = 0-2 bar
	B = 0-4 bar
	C = 0-8 bar
T	D = 0-12 bar
	TYPE
O	= Standard *
	S = Automatic drain
P	OPTIONS
	= Standard *
Z	K = Lockable version
	PRESSURE SWITCH OPTION
	A = Cable 150 mm+M8 PNP
	B = Cable 150 mm+M8 NPN
N	C = Cable 2 mt. PNP
	D = Cable 2 mt. NPN
Z	BOWL OPTIONS
	= Standard *
N	N = Nylon bowl
	* no additional letter required



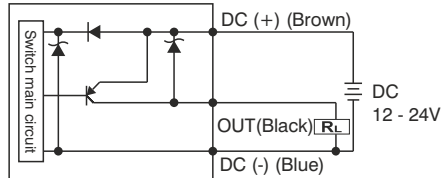


### CHARACTERISTICS

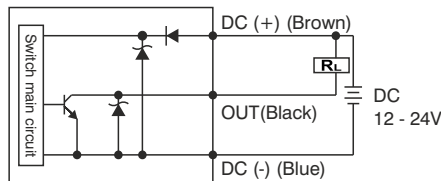
- 3 color digital LCD display, easy readout
- 4 units of measurement for pressure indication
- PNP and NPN output
- N.O. and N.C. output contact
- Not available individually, but only with a Regulator or a Filter-regulator

### OUTPUT CIRCUIT WIRING DIAGRAMS

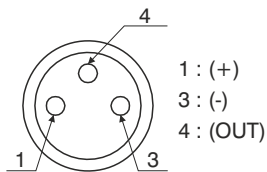
#### PNP output



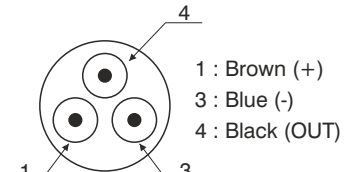
#### NPN output



#### M8 CONNECTOR PIN LAY OUT



#### 3 WIRES CABLE LAY OUT



### Cable ordering code

- MCH1** cable 3 wires l=2,5m with M8 connector  
**MCH2** cable 3 wires l=5m with M8 connector  
**MCH3** cable 3 wires l=10m with M8 connector

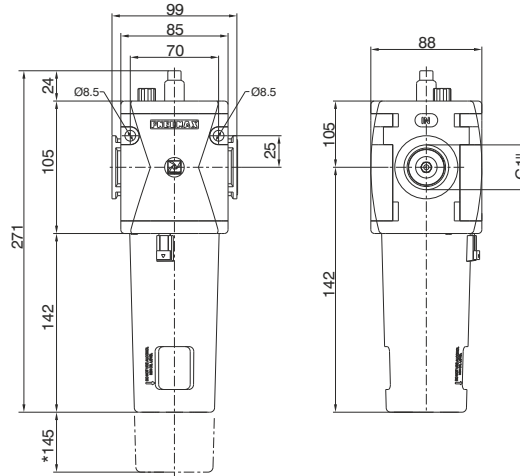
Connector



### TECHNICAL CHARACTERISTICS

Adjusting range	0 - 10 bar / 0 - 1MPa
Max. inlet pressure	15 bar / 1,5 MPa
Fluid	Filtered and dehumidified air
Display unit of measurement	MPa - kgf/cm <sup>2</sup> - bar - psi
Supply voltage	12 - 24 VDC
Current consumption	≤40mA (without load)
Digital output type	NPN - PNP
Type of contact	Normally Open - Normally Closed
Max. load current	125 mA
Digital output activation mode	single threshold with fixed hysteresis - window with fixed hysteresis - window without hysteresis
Digital output activation time	0.05s - 0.25s - 0.5s - 1s - 2s - 3s (selections for chattering-proof function)
Display characteristics	Double 3 1/2 digit display Digital output status indication Three-pushbuttons touchpad
Indicator accuracy	≤±2% F.S. ± 1 digit
Protection grade	IP 40
Temperature	0 - 50 °C
Cable section	3 x 0,129mm <sup>2</sup> , Ø4 mm, PVC

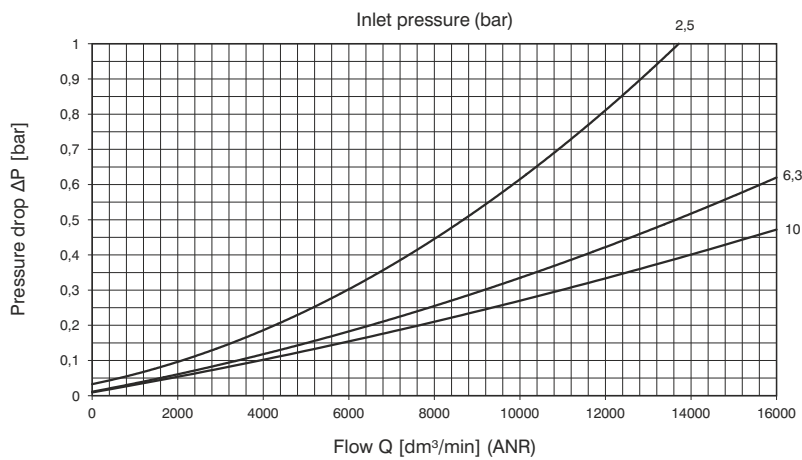
Lubricator (L)



\*Bowl removal maximum height

Example : N174BL : size 4, Lubricator, G1" connections

3  
Flow rate curves



Operational characteristics

- Oil mist lubrication with variable orifice size in function of the flow rate
- Oil quantity regulation mechanism and oil quantity visualization dome made of polycarbonate.
- Transparent bowl made off polycarbonate with bowl protection guard.
- Bowl assembly via bayonet type quick coupling mechanism with safety button.
- Oil filling plug
- Oil can be refilled with pressurized circuit.
- Available with electric min-level sensor N.O. or N.C. with connection for connector.
- For electrical connection use connectors type C1-C2-C3 (see sensors chapter in the catalogue).

Note

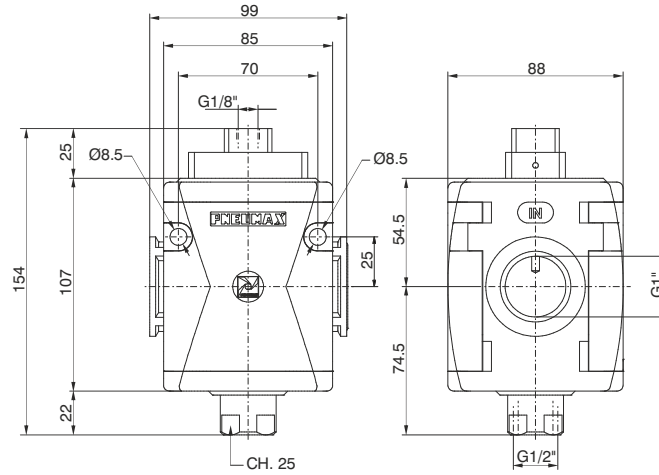
Install as close as possible to the point o fuse  
Do not use alcohol, deterging oils or solvents.

Technical characteristics

Connections	G1"	Ordering code
Max. inlet pressure	13 bar	
Working temperature	-5°C +50°C	<b>N174BL</b>
Weight	1025 (gr)	
Indicative oil drop rate	1 drop every 300/600 NI	OPTIONS
Oil type	FD22 - HG32	A = Min. Oil level indicator Normally open
Bowl capacity	360 cm <sup>3</sup>	C = Min. Oil level indicator Normally closed
Assembly positions	Vertical	BOWL OPTIONS
Min. operational flow at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	= Standard *
		N = Nylon bowl
Wall fixing screw	M8	* no additional letter required



**Pneumatic shut-off valve (VP)**



Example: N174BVP : size 4, Pneumatic shut-off valve with Technopolymer threads, G1" connections

**Operational characteristics**

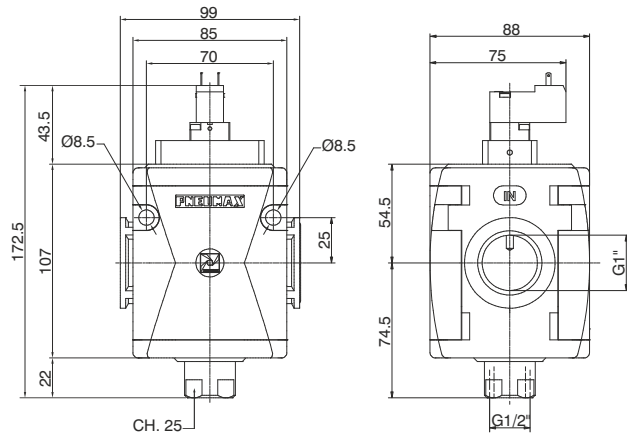
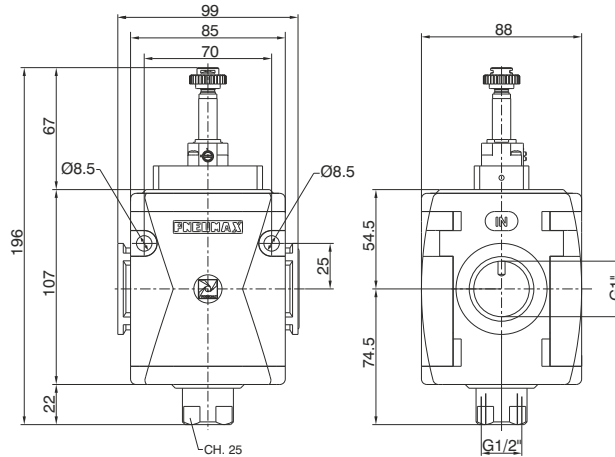
- Pneumatic operated 3 ways poppet valve.
- When the pneumatic signal is removed the valves exhaust the pneumatic circuit

**Technical characteristics**

Connections	G1"	Ordering code
Discharge connection	G1/2"	
Pilot port size	G1/8"	<b>N174BVP</b>
Working temperature	-5°C +50°C	
Weight	gr. 1.133	
Assembly positions	Indifferent	
Min. pressure working	2,5 bar	
Max. pressure working	10 bar	
Nominal flow rate at 6 bar with $\Delta p=1$ (from 1 to 2)	15000 dm <sup>3</sup> /min. (ANR)	
Exhaust nominal flow rate at 6 bar with $\Delta p=1$ (from 2 to 3)	3600 dm <sup>3</sup> /min. (ANR)	
Nominal flow rate with free exhaust at 6 bar (from 2 to 3)	5000 dm <sup>3</sup> /min. (ANR)	
Wall fixing screw	M8	

3

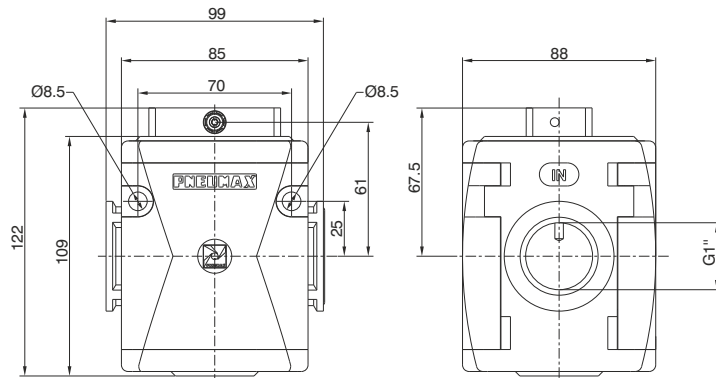
Electric shut-off valve (VE)



Example : N174BVEB2 : size 4, Electric shut-off valve, with M2 Pilot without coil, G1" connections

Operational characteristics	Technical characteristics		Ordering code
- Solenoid operated 3 ways poppet valve.	Supply and operating connections	G1"	<b>N174BVE<sup>A</sup></b> 15 mm COIL VOLTAGE A4 = 12 V DC A5 = 24 V DC A6 = 24 V AC (50-60 Hz) A7 = 110 V AC (50-60 Hz) A8 = 230 V AC (50-60 Hz) A9 = 24 V DC (1 Watt) 22 mm COIL VOLTAGE B2 = Without coil M2 mechanic <sup>A</sup> B4 = 12 V DC B5 = 24 V DC B6 = 24 V AC (50-60 Hz) B7 = 110 V AC (50-60 Hz) B8 = 230 V AC (50-60 Hz) B9 = 24 V DC (2 Watt) 30 mm COIL VOLTAGE C5 = 24 V DC C6 = 24 V AC (50-60 Hz) C7 = 110 V AC (50-60 Hz) C8 = 230 V AC (50-60 Hz) C9 = 24 V DC (2 Watt)
- The model fitted with 15 mm pilots uses pilots series N33_0A and N33_0E (1 Watt)	Discharge connections	G 1/2"	
	Working temperature	-5°C +50°C	
	Weight	1170 (gr)	
	Assembly positions	Indifferent	
	Min. Pressure working	2,5 bar	
	Max. Pressure working	10 bar	
	Nominal flow rate at 6 bar with $\Delta p=1$ (from 1 to 2)	15000 dm <sup>3</sup> /min. (ANR)	
	Exhaust nominal flow rate at 6 bar with $\Delta p=1$ (from 2 to 3)	3600 dm <sup>3</sup> /min. (ANR)	
	Nominal flow rate with free exhaust at 6 bar (from 2 to 3)	5000 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	

**Progressive start-up valve (AP)**



Example : N174BAP : size 4, Progressive start-up valve, G1" connections

**Operational characteristics**

- Down stream circuit filling time regulated via a built in flow regulator.
- Full pressure is allowed once the down stream circuit pressure reaches 50% of the inlet pressure.

**Technical characteristics**

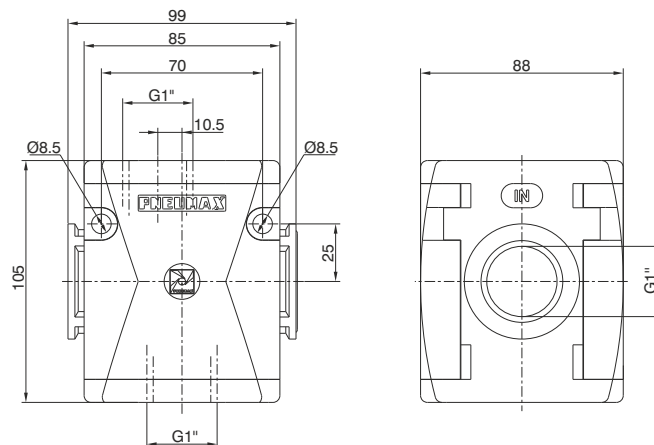
Connections	G1"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight	1100 (gr)
Assembly positions	Indifferent
Min. pressure working	2,5 (bar)
Nominal flow rate at 6 bar with Δp=1	15000 dm <sup>3</sup> /min. (ANR)
Fully open built in flow regulator flow rate	1000 dm <sup>3</sup> /min. (ANR)
Wall fixing screw	M8

**Ordering code**

**N174BAP<sup>Ⓟ</sup>**

- FLOW DIRECTION**
- D** = from left to right
  - W = from right to left

**Air intake (PA)**



Example : N174BPA : size 4, Air intake, G1" connections

**Operational characteristics**

- Available with two G1" threaded connections.

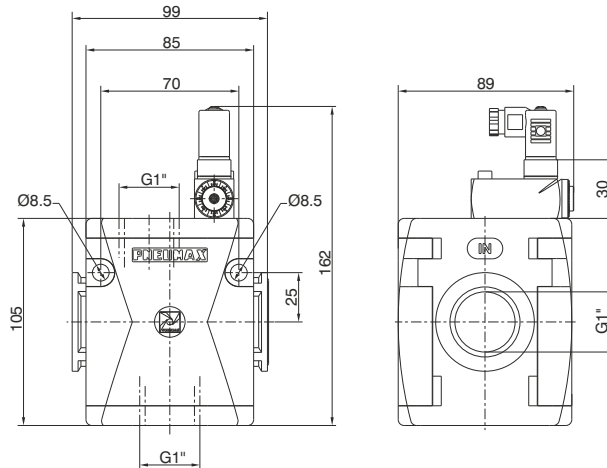
**Technical characteristics**

Connections	G1"
Max. inlet pressure	13 bar
Working temperature	-5°C +50°C
Weight	720 (gr)
Assembly positions	Indifferent
Wall fixing screw	M8

**Ordering code**

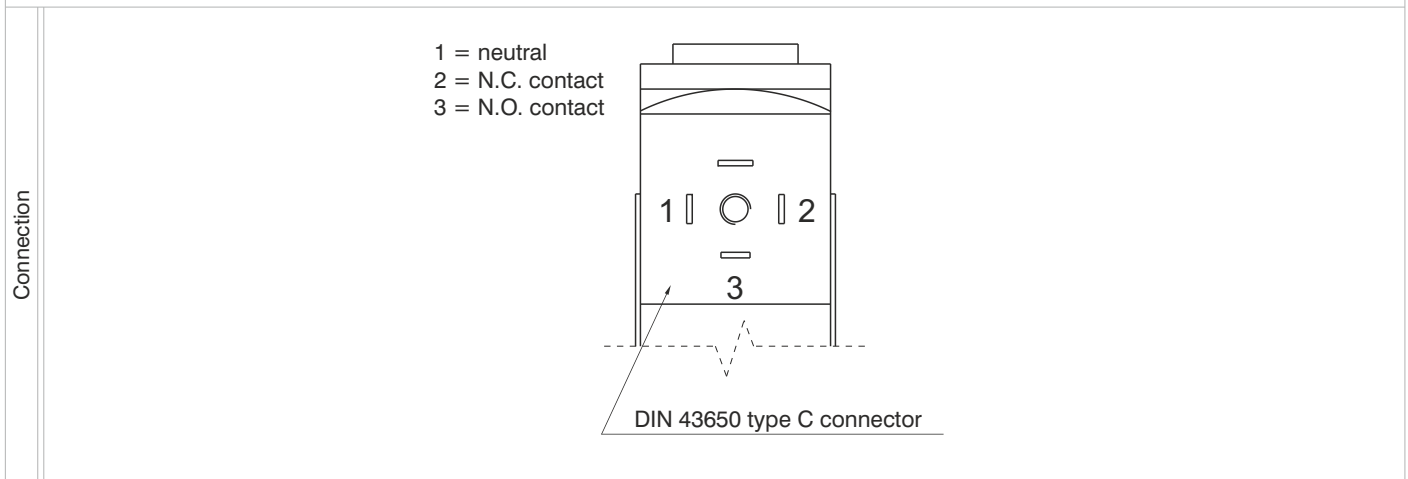
**N174BPA**

**Pressure switch (PP)**



Example: N174BPP : Size 4, Pressure switch, G1" connections

Operational characteristics	Technical characteristics		Ordering code
<ul style="list-style-type: none"> <li>- Built in adjustable pressure switch (2 to 10 bar) with electrical connection.</li> <li>- Available with two G1" threaded connections.</li> <li>- The electrical connection is made by mean of a 15 mm connector DIN 43650 type C. The microswitch contact could be normally closed or open (change overswitch).</li> </ul>	Connections	G1"	<b>N174BPP</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	W
	Weight	800 (gr)	D
	Microswitch capacity	1A	= from left to right
	Grade of protection (with connector assembled)	IP 65	W = from right to left
	Adjusting range	2 -10 bar	
	Assembly positions	Indifferent	
	Microswitch maximum tension	250 VAC	
Wall fixing screw	M8		

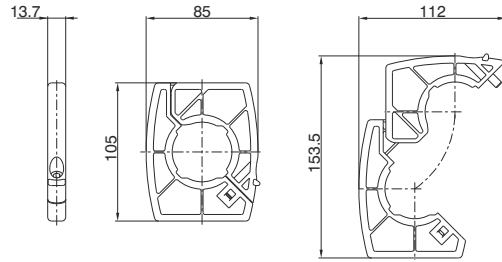




**Flange X**

Ordering code

**T174X**

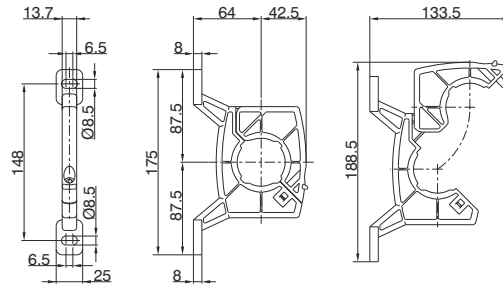


Weight 90 gr.  
Example : T174X : Size 4 coupling flange  
- Enables the quick connection of two functions.

**Flange Y**

Ordering code

**T174Y**



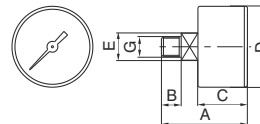
Weight 120 gr.  
Example : T174Y : Size 4 coupling flange with mounting holes  
- Used to couple together two elements and to panel mount them.  
- Used to panel mount one single element.

**Pressure gauge**

Ordering code

**17070**

VERSION	
✓	A = Dial Ø40
	B = Dial Ø50
SCALE	
Ⓢ	A = Scale 0-4 bar
	B = Scale 0-6 bar
	C = Scale 0-12 bar

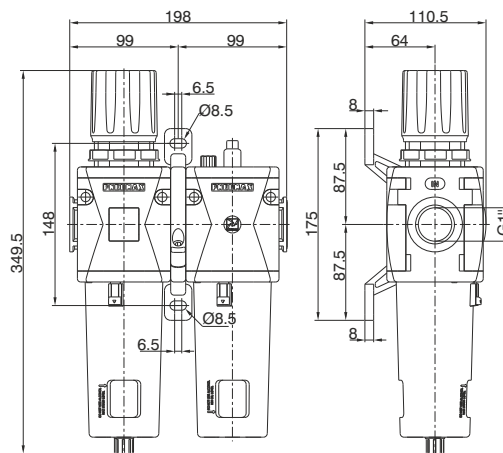
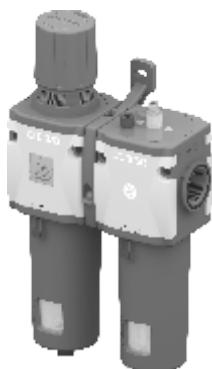


DIMENSIONS

CODE	A	B	C	D	E	G	Weight gr.
17070A	44	10	26	41	14	1/8"	60
17070B	45	10	27	49	14	1/8"	80

3

Service unit assembled (EM+L) (E+L) (EW+L)



Example : GN174BHG : size 4, combined group comprising Filter-regulator and Lubricator, G1" connections, 0 to 8 bar adjusting range and 20 µm filter pore size

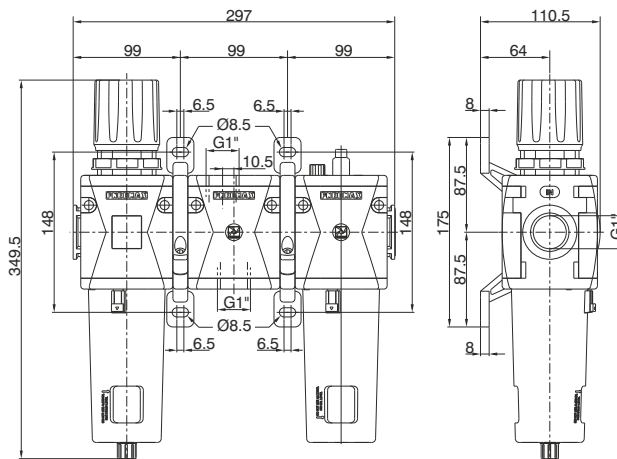
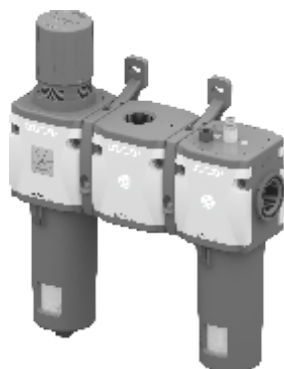
Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer and Lubricator assembled with a (Y) type coupling kit for panel mounting. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range) <b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Connections	G1"	<b>GN174B</b> <sup>T</sup> <b>S</b> <sup>00</sup> <b>Z</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	TYPE ① H = Built in gauge J = G1/8" gauge connection
	Weight	2585 (gr)	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Filter pore size	5 µm - 20 µm - 50 µm	FLOW DIRECTION = Standard * ① (from left to right) W = from right to left
	Bowl capacity	90 cm <sup>3</sup>	BOWL OPTIONS = Standard * ② Z = Nylon bowl
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	
	Bowl capacity	360 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	

\* no additional letter required

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Service unit assembled (EM+PA+L) (E+PA+L) (EW+PA+L)

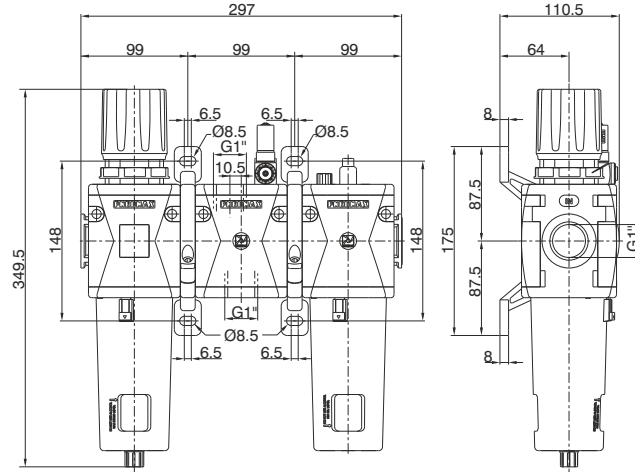
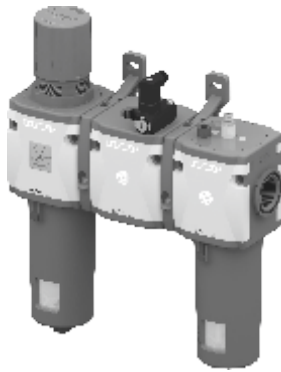


Example : GN174BNG : size 4 combined group comprising Filter-regulator, Air intake and Lubricator, G1" connections, 0 to 8 bar adjusting range and 20 µm filter pore size

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Filter-regulator with built in manometer, Air intake and Lubricator assembled with two (Y) type coupling kits for panel mounting. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G1"	<b>GN174BTS00Z</b>
	Max. inlet pressure	13 bar	
<b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	TYPE ① N = Built in gauge P = G1/8" gauge connection
	Weight	3425 (gr)	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Filter pore size	5 µm - 20 µm - 50 µm	⑤ FLOW DIRECTION = Standard * (from left to right) W = from right to left
	Bowl capacity	90 cm <sup>3</sup>	
	Indicative oil drop rate	1 drop every 300/600 NI	⑥ BOWL OPTIONS = Standard * N = Nylon bowl
	Oil type	FD22 - HG32	
	Bowl capacity	360 cm <sup>3</sup>	* no additional letter required
	Assembly positions	Vertical	
	Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	

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Service unit assembled (EM+PP+L) (E+PP+L) (EW+PP+L)

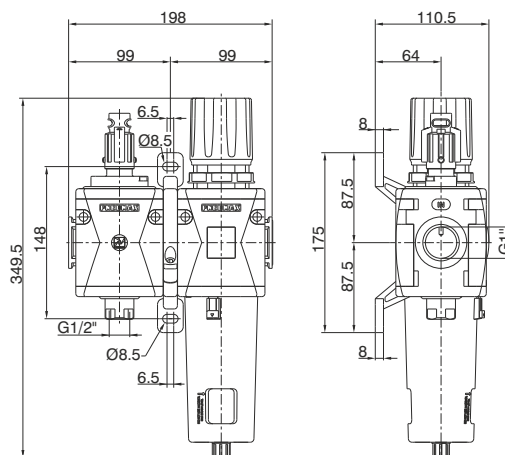


Example : GN174BRG : size 4 combined group comprising Filter-Regulator, Pressure switch and Lubricator, G1" connections 0 to 8 bar adjusting range and 20 µm filter pore size

Operational characteristics	Technical characteristics		Ordering code
<p>Combined group comprising Filter-regulator with built in manometer, Pressure switch and Lubricator assembled with two (Y) type coupling kits for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)</p> <p><b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.</p>	Connections	G1"	<b>GN174B</b> <b>T</b> <b>S</b> <b>O</b> <b>O</b> <b>Z</b>
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	<b>T</b> TYPE R = Built in gauge C = G1/8" gauge connection
	Weight	3505 (gr)	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	<b>S</b> FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	90 cm <sup>3</sup>	<b>O</b> OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	<b>D</b> FLOW DIRECTION = Standard * (from left to right) W = from right to left
	Bowl capacity	360 cm <sup>3</sup>	
Assembly positions	Vertical	<b>Z</b> BOWL OPTIONS = Standard * N = Nylon bowl	
Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)		
Wall fixing screw	M8		

\* no additional letter required

Service unit assembled (VL+EM) (VL+E) (VL+EW)



Example : GN174BVG : size 4 combined group comprising Shut-off valve and Filter-regulator, G1" connections 0 to 8 bar adjusting range and 20 µm filter pore size

Operational characteristics	Technical characteristics		
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, assembled with one (Y) type coupling kit for panel mountings. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range) <b>Note</b> The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Connections	G1"	
	Max. inlet pressure	13 bar	
	Working temperature	-5°C +50°C	
	Weight	2660 (gr)	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	90 cm <sup>3</sup>	
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	
	Bowl capacity	360 cm <sup>3</sup>	
Assembly positions	Vertical		
Wall fixing screw	M8		
		<b>Ordering code</b> <b>GN174B<sup>T</sup>S<sup>0</sup>0<sup>Z</sup></b> TYPE ① VG = Built in gauge VU = G1/8" gauge connection FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar OPTIONS ② = Standard * S = Automatic drain FLOW DIRECTION ③ = Standard * (from left to right) W = from right to left BOWL OPTIONS ④ = Standard * N = Nylon bowl	

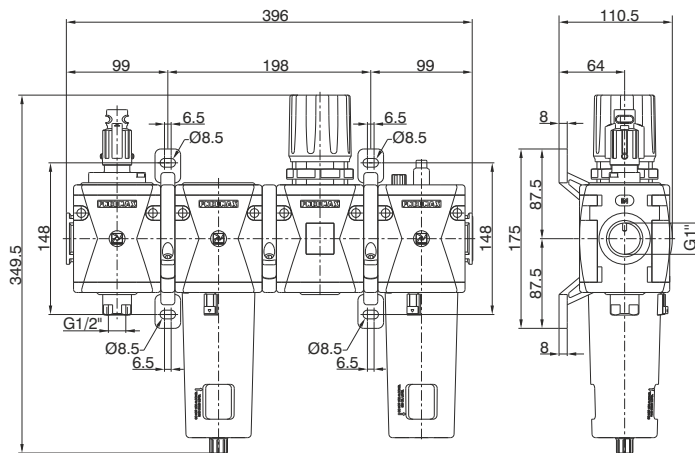
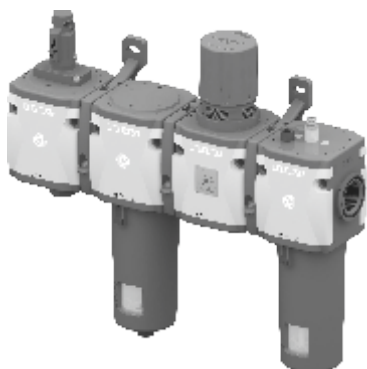
\* no additional letter required

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Service unit assembled (VL+F+RM+L) (VL+F+R+L) (VL+F+RW+L)



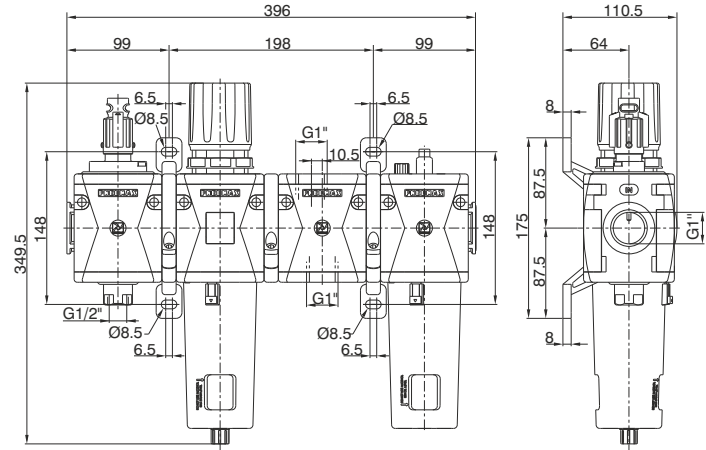
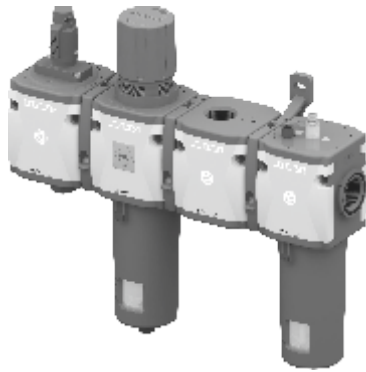
Example : GN174BVKG : size 4 combined group comprising Shut-off valve, Filter, Regulator and Lubricator, G1" connections 0 to 8 bar adjusting range and 20 µm filter pore size

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut - off valve, Filter, Regulator with built in manometer and Lubricator , assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G1"	<b>GN174B</b> <b>T</b> <b>S</b> <b>0</b> <b>0</b> <b>Z</b>
	Max. inlet pressure	13 bar	
Note The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	TYPE ① VK = Built in gauge VT = G1/8" gauge connection
	Weight	4830 (gr)	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC FLOW DIRECTION = Standard * ① (from left to right) W = from right to left BOWL OPTIONS = Standard * ② N = Nylon bowl
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	90 cm <sup>3</sup>	
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	
	Bowl capacity	360 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	

\* no additional letter required

3

Service unit assembled (VL+EM+PA+L) (VL+E+PA+L) (VL+EW+PA+L)



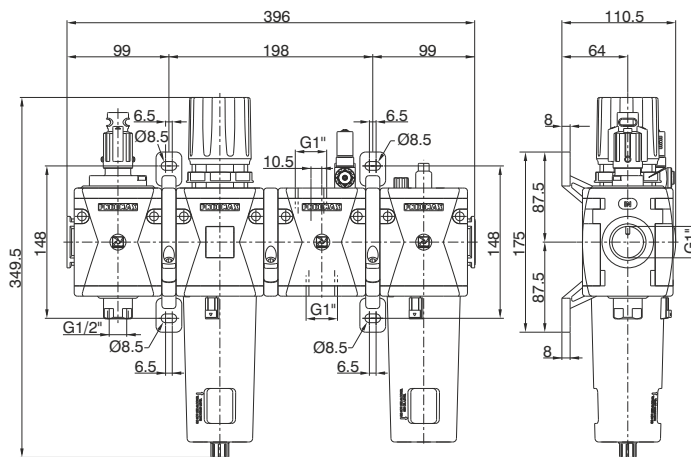
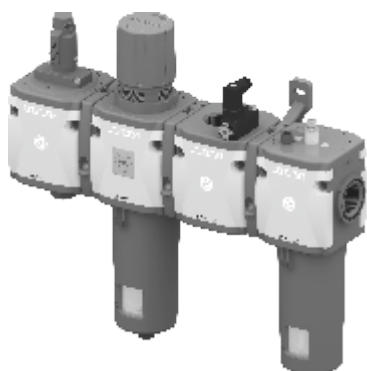
Example : GN174BVNG : size 4 combined group comprising Shut-off valve, Filter-regulator, Air intake and Lubricator, G1" connections 0 to 8 bar adjusting range and 20 µm filter pore size

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Air intake and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G1"	<b>GN174B</b> <b>T</b> <b>S</b> <b>O</b> <b>O</b> <b>Z</b>
	Max. inlet pressure	13 bar	
Note The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	TYPE ① VN = Built in gauge VP = G1/8" gauge connection
	Weight	4615 (gr)	
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	FILTER PORE SIZE ADJUSTING RANGE ⑤ C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Filter pore size	5 µm - 20 µm - 50 µm	
	Bowl capacity	90 cm <sup>3</sup>	OPTIONS = Standard *
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	⑥ A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Bowl capacity	360 cm <sup>3</sup>	
	Assembly positions	Vertical	FLOW DIRECTION = Standard * (from left to right) W = from right to left
	Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	BOWL OPTIONS = Standard * Z = Nylon bowl

\* no additional letter required



Service unit assembled (VL+EM+PP+L) (VL+E+PP+L) (VL+EW+PP+L)



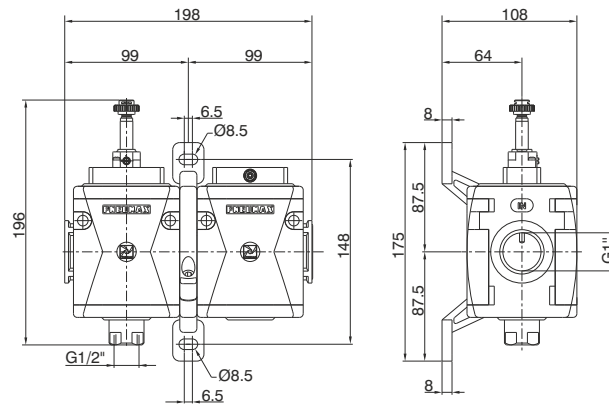
Example : GN174BVRG : size 4 combined group comprising Shut-off valve, Filter-regulator, Pressure switch and Lubricator, G1" connections adjusting range 0 to 8 bar and 20 µm filter pore size

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising manual shut-off valve, Filter - regulator with built in manometer, Pressure switch and Lubricator, assembled with two (Y) type coupling kits for panel mounting and one (X) type coupling kit. Integrated manometer 0-12 bar as standard (for 0-8 and 0-12 bar range) and 0-4 bar (for 0-2 and 0-4 range)	Connections	G1"	<b>GN174B</b> <b>T</b> <b>S</b> <b>O</b> <b>D</b> <b>Z</b>
	Max. inlet pressure	13 bar	
Note The pressure must be always regulating while increasing. For a more precise regulation and higher sensibility, the use of a regulator with a pressure range as close as possible to the regulated pressure is recommended.	Working temperature	-5°C +50°C	TYPE ① VR = Built in gauge VC = G1/8" gauge connection
	Weight	4695 (gr)	FILTER PORE SIZE ADJUSTING RANGE C = 5 µm / 0-8 bar D = 5 µm / 0-12 bar G = 20 µm / 0-8 bar H = 20 µm / 0-12 bar N = 50 µm / 0-8 bar P = 50 µm / 0-12 bar
	Pressure range	0-2 bar / 0-4 bar 0-8 bar / 0-12 bar	OPTIONS = Standard * A = Min.oil level indicator NO C = Min.oil level indicator NC S = Automatic drain SA = Automatic drain + Min.oil level indicator NO SC = Automatic drain + Min.oil level indicator NC
	Filter pore size	5 µm - 20 µm - 50 µm	FLOW DIRECTION = Standard * ① (from left to right) W = from right to left
	Bowl capacity	90 cm <sup>3</sup>	BOWL OPTIONS = Standard * ② N = Nylon bowl
	Indicative oil drop rate	1 drop every 300/600 NI	
	Oil type	FD22 - HG32	
	Bowl capacity	360 cm <sup>3</sup>	
	Assembly positions	Vertical	
	Min. operational flow rate at 6,3 bar	100 dm <sup>3</sup> /min. (ANR)	
	Wall fixing screw	M8	

\* no additional letter required

3

Service unit assembled (VE+AP)



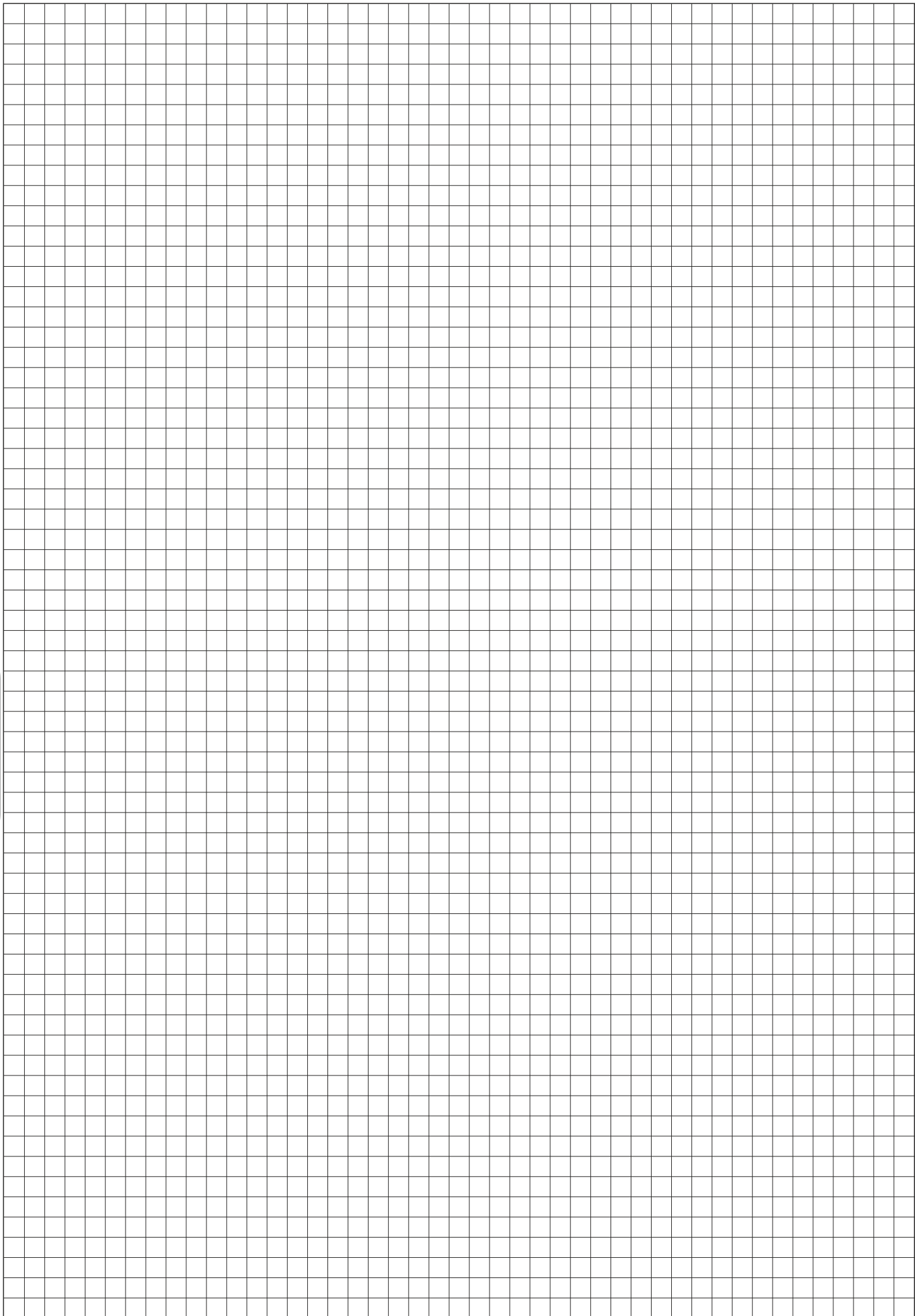
Example : GN174BSB2 : size 4 combined group comprising Electric shut-off valve and Progressive start-up valve without coil with M2 pilot, G1" connections

Operational characteristics	Technical characteristics		Ordering code
Combined group comprising Electric shut - off valve and Progressive start-up valve assembled with a (Y) type coupling kit for panel mounting.	Connections	G1"	
	Max. inlet pressure	10 bar	
	Min. inlet pressure	2,5 (bar)	
	Working temperature	-5°C +50°C	
	Weight	2390 (gr)	
	Assembly positions	Indifferent	
	Wall fixing screw	M8	
			<b>GN174BSA</b>
			15 mm COIL VOLTAGE
			A4 = 12 V DC
			A5 = 24 V DC
			A6 = 24 V AC (50-60 Hz)
			A7 = 110 V AC (50-60 Hz)
			A8 = 230 V AC (50-60 Hz)
			A9 = 24 V DC (1 Watt)
			22 mm COIL VOLTAGE
			B2 = Without coil M2 mechanic
			B4 = 12 V DC
			B5 = 24 V DC
			<b>A</b> B6 = 24 V AC (50-60 Hz)
			B7 = 110 V AC (50-60 Hz)
			B8 = 230 V AC (50-60 Hz)
			B9 = 24 V DC (2 Watt)
			30 mm COIL VOLTAGE
			C5 = 24 V DC
			C6 = 24 V AC (50-60 Hz)
			C7 = 110 V AC (50-60 Hz)
			C8 = 230 V AC (50-60 Hz)
			C9 = 24 V DC (2 Watt)
			FLOW DIRECTION
			= Standard *
			<b>D</b> (from left to right)
			W = from right to left

\* no additional letter required

3







# CYLINDERS

## Microcylinders according to standard ISO 6432

- special performance microcylinders
- threaded end cover version
- rolled end cover version "MIR"
- rolled end cover version "MIR-INOX"
- technopolymer version "TECNO-MIR"
- stainless steel AISI 316 Steel line series

## Cylinders according to standard CNOMO - CETOP - ISO (tie rods cylinders)

- series 1303 - 1308

## Cylinders according to standard ISO 15552 (tie rods cylinders)

- series 1315 (Ø250 and Ø320)

## Cylinders according to standard ISO 15552

- profile tube cylinders according to standard 1319-1321
- twin rod cylinders series 1325-1326-1345-1347
- non rotating cylinders series 1348-1350
- rotary actuators series 1330-1333
- profile tube cylinders ECOPLUS series 1386 - 1388 / 1396 - 1398
- profile tube cylinders ECOLIGHT series 1390 - 1392
- linear control units, piston rod lock
- stainless steel AISI 316 Steel line series
- profile tube cylinders ECOFLAT series 1370 - 1373

## Hydraulic speed control check cylinders

## Hydro-pneumatic cylinders

## Short stroke compact cylinders

## "Europe" compact cylinders

## Compact cylinders according to standard ISO 21287 ECOMPACT

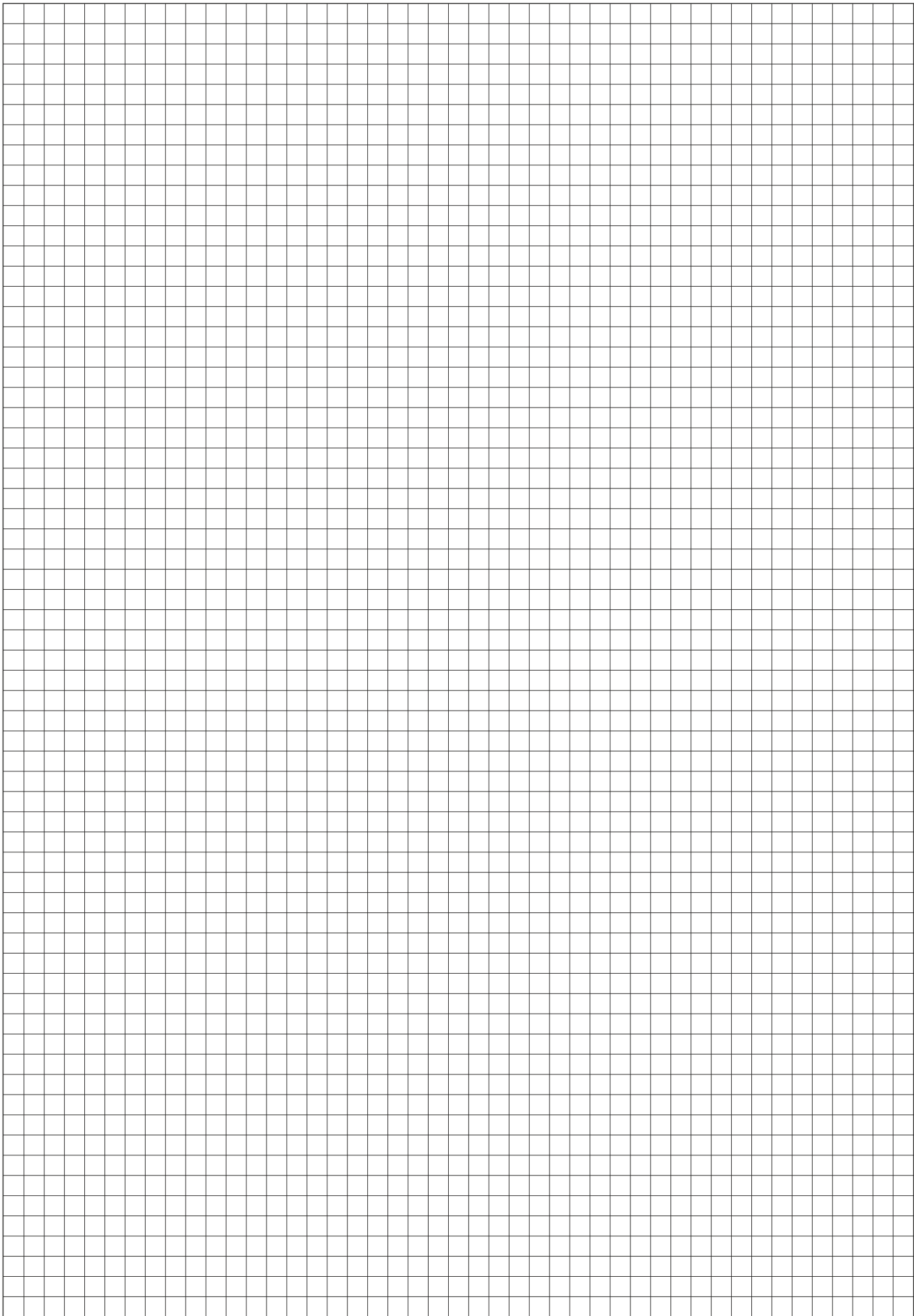
## Compact cylinders ECOMPACT-S

## Rodless cylinders

## Cable cylinders

## Rodless cylinders Ø16





4

## General

These microcylinders are not subject to a standard; they are single acting with a front spring, can be either hexagonal or round bodied and either completely threaded or threaded with a plain rod ending. They are available with M5 connections or with incorporated quick fittings

## Construction characteristics

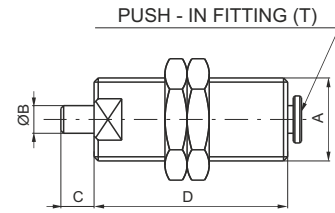
Body	nickel-plated brass
Rod / piston	stainless steel (C43 chromed)
Rod bushing	brass
Spring	stainless steel
Seal	NBR

## Technical characteristics

Fluid	filtered and lubricated air
Pressure	min. 3 bar - max. 7 bar
Temperature	min. -5°C - max. +70°C

"Attention: Dry air must be used for application below 0°C"

**Threaded body, round execution**

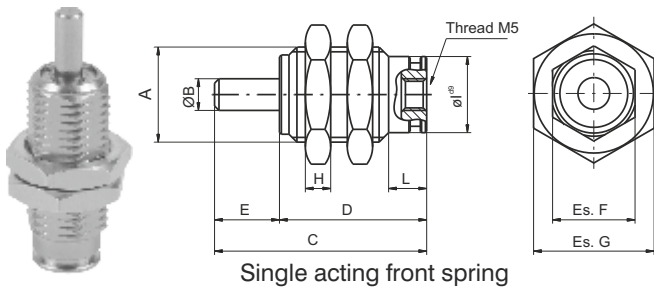


Ordering code	Bore	Stroke	A	B	C	D	T
<b>1213.6.5</b>	6	5	M10x1	3	5	30,5	4/2
<b>1213.6.10</b>	6	10	M10x1	3	5	35,5	4/2
<b>1213.6.20</b>	6	20	M10x1	3	5	49,5	4/2
<b>1213.8.5</b>	8	5	M12x1	3	6	28	4/2
<b>1213.10.3</b>	10	3	M15x1,5	5	1	44	4/2
<b>1213.10.5</b>	10	5	M15x1,5	5	5	40	4/2
<b>1213.10.10</b>	10	10	M15x1,5	5	12	44	4/2

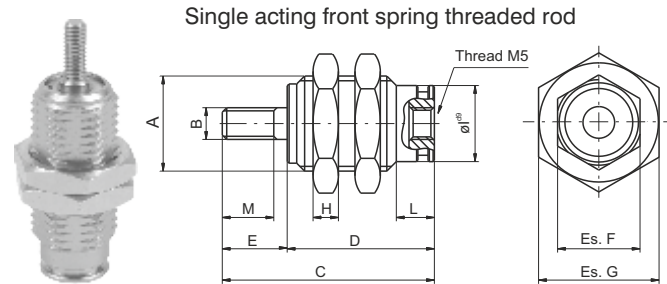


**Threaded body, hexagonal execution**

Ordering code	Description
<b>1213.Ø.stroke.C</b>	Single acting front spring
<b>1213.Ø.stroke.CF</b>	Single acting front spring threaded body



Single acting front spring

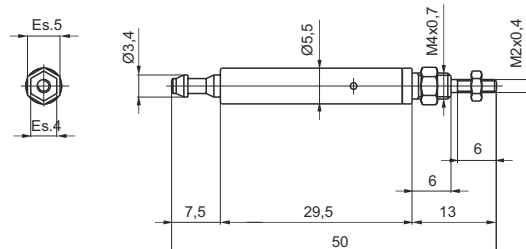


Single acting front spring threaded rod

Ø Cil.	Stroke	A	ØB	B	C	D	E	Es. F	Es. G	H	ØI	L	M
6	5	M10x1	Ø3	M3x0.5	27,5	18,5	9	9	12	3	Ø8,5	6	7
6	10	M10x1	Ø3	M3x0.5	34,5	25,5	9	9	12	3	Ø8,5	6	7
6	15	M10x1	Ø3	M3x0.5	41,5	32,5	9	9	12	3	Ø8,5	6	7
10	5	M15x1.5	Ø5	M4x0.7	32,5	20,5	12	13	19	4	Ø12	6	10
10	10	M15x1.5	Ø5	M4x0.7	39	27	12	13	19	4	Ø12	6	10
10	15	M15x1.5	Ø5	M4x0.7	46	34	12	13	19	4	Ø12	6	10
16	5	M22x1.5	Ø6	M5x0.8	37,5	23,5	14	20	27	5	Ø19	7	12
16	10	M22x1.5	Ø6	M5x0.8	43,5	29,5	14	20	27	5	Ø19	7	12
16	15	M22x1.5	Ø6	M5x0.8	50	36	14	20	27	5	Ø19	7	12

**Front fixing microcylinders**

Ordering code
<b>1273.4.10</b>



### Construction characteristics

End covers	hard anodised aluminum
Barrel	anodised aluminium (brass for Ø8 and Ø10)
Piston rod	non magnetic piston : Ø8 - Ø10: stainless steel / Ø12 - Ø50: C43 chromed magnetic piston: Ø10 - 20: stainless steel / Ø25 - 50: C43 chromed
Piston	aluminium
Seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (HNBR or FPM seals available upon request)
Mounting	steel painted in cathaphoresis
Forks	cadmium plated steel
Single-acting springs	steel for springs and stainless steel
Cushioning length	∅ 16 - 20 - 25 - 32 - 40 - 50 mm 15 - 18 - 18 - 18 - 22 - 22

### Technical characteristics

Fluid	filtered air, preferably lubricated
Max. pressure	10 bar
Working temperature	-5°C - +70°C with standard seals magnetic or non magnetic piston -5°C - +80°C with FPM seals magnetic piston -5°C - +80°C with HNBR seals magnetic piston -5°C - +120°C with HNBR seals non magnetic piston -5°C - +150°C with FPM seals non magnetic piston

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

### Standard strokes

#### Ø8 - Ø10 :

15 - 25 - 50 - 75 - 80 - 100 mm

#### Ø12 - Ø16 :

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 mm

#### Ø20 - Ø25 :

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 mm

#### Ø32 - Ø50 :

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 - 450 - 500 mm

### Minimum and maximum springs load

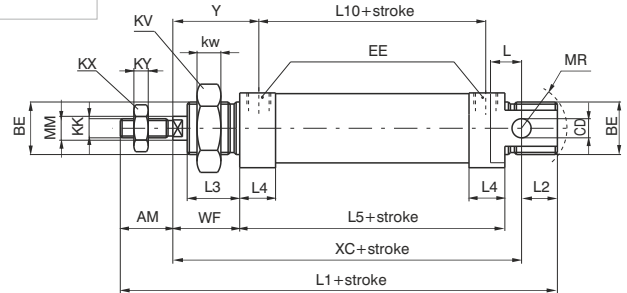
Bore	Ø12 - Ø20	Ø25	Ø32	Ø40 - Ø50
Min. load(N)	10	10	20	40
Max. load(N)	25	50	55	110

**Basic version**

Ordering code	Description
<b>1260.Ø.stroke</b>	Basic version
<b>1271.Ø.stroke</b>	Basic version front spring from Ø12 (max stroke 40 mm)
<b>1272.Ø.stroke</b>	Basic version rear spring from Ø12 (max stroke 40 mm)
<b>12--Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>12--Ø.stroke.M</b>	Magnetic piston (from Ø10)
<b>12--Ø.stroke.X</b>	Stainless steel rod
<b>12--Ø.stroke.A.M</b>	Cushioning with magnetic piston
<b>12--Ø.stroke.A.M.X</b>	Cushioning, magnetic piston and stainless steel piston rod
<b>12--Ø.stroke. . . .T</b>	HNBR seals version
<b>12--Ø.stroke. . . .V</b>	FPM seals version



Standard execution, fully complying with ISO standards from ø 8 to ø 25. BOREs 32, 40 and 50 not included in the standard, comply with our own specifications. Can use all available mountings. For single acting type, the maximum stroke is 40 mm., after which overall dimensions increase in length to an extent not proportional to the stroke (and in any case not longer than stroke 100).

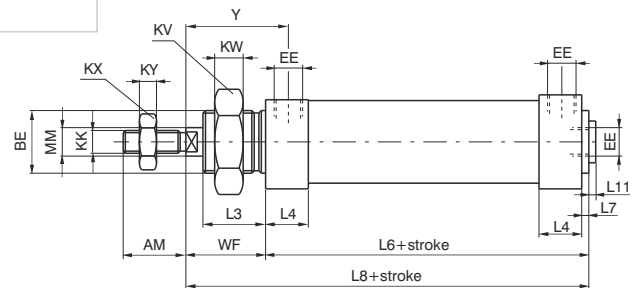
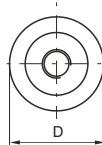


**Without rear eye version**

Ordering code	Description
<b>1261.Ø.stroke</b>	Without rear eye
<b>1273.Ø.stroke</b>	Without rear eye front spring from Ø12 (max stroke 40 mm)
<b>1274.Ø.stroke</b>	Without rear eye rear spring from Ø12 (max stroke 40 mm)
<b>12--Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>12--Ø.stroke.M</b>	Magnetic piston (from Ø10)
<b>12--Ø.stroke.X</b>	Stainless steel rod
<b>12--Ø.stroke.A.M</b>	Cushioning with magnetic piston
<b>12--Ø.stroke.A.M.X</b>	Cushioning, magnetic piston and stainless steel piston rod
<b>12--Ø.stroke. . . .T</b>	HNBR seals version
<b>12--Ø.stroke. . . .V</b>	FPM seals
<b>12--Ø.stroke. . . .L</b>	Air inlet at 90° version



Version derived from standard execution 1260 and not included in ISO standard. Not having a rear eye it is shorter and the air inlet is from the rear or at 90° like it is on the front. The considerations made for the basic type 1260 apply for all single-acting types.



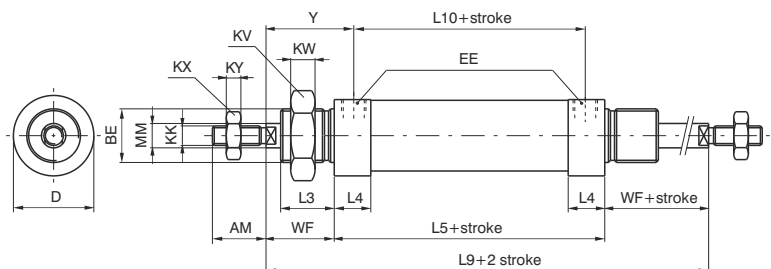
**Push/Pull rod version**

Ordering code	Description
<b>1262.Ø.stroke</b>	Push/pull rod
<b>1262.Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>1262.Ø.stroke.M</b>	Magnetic piston (from Ø10)
<b>1262.Ø.stroke.X</b>	Stainless steel rod
<b>1262.Ø.stroke.E</b>	Hexagonal piston rod (from Ø12)
<b>1262.Ø.stroke.A.M</b>	Cushioning with magnetic piston
<b>1262.Ø.stroke.A.M.X</b>	Cushioning, magnetic piston and stainless steel piston rod
<b>1262.Ø.stroke. . . .T</b>	HNBR seals version ★
<b>1262.Ø.stroke. . . .V</b>	FPM seals version ★

★ Excludes hexagonal rod version



Execution by rod coming out from both end plates, with overall dimensions, except for the rod, equal to 1260 version. Not available with Ø8 and 10).

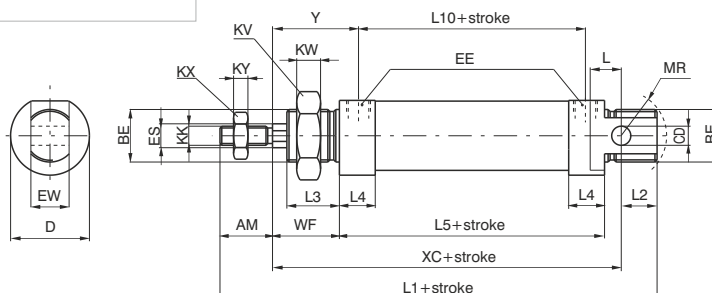


**Non rotating piston rod version**

Ordering code	Description
<b>1260.Ø.stroke.E</b>	Hexagonal piston rod (from Ø12)
<b>1271.Ø.stroke.E</b>	Hexagonal piston rod with front spring from Ø12 (max stroke 40 mm.)
<b>1272.Ø.stroke.E</b>	Hexagonal piston rod with rear spring from Ø12 (max stroke 40 mm.)
<b>12- -Ø.stroke.E.M</b>	Hexagonal piston rod with magnetic piston (from Ø12)
<b>12- -Ø.stroke.E.X</b>	Hexagonal stainless steel piston rod



Similar overall dimensions as 1260 basic type, it differs because of the hexagonal rod (instead of circular) to avoid the rotation. It is particularly suitable when it is used as a guide and support to the linked element. Not for use with high frequencies and long strokes. For which, whenever possible use front spring.



**Table of dimensions**

Bore		8	10	12	16	20	25	32	40	50
AM (-0,2)		12	12	16	16	20	22	20	25	25
BE		M12x1,25	M12x1,25	M16x1,5	M16x1,5	M22x1,5	M22x1,5	M30x1,5	M40x1,5	M40x1,5
CD (H9)		4	4	6	4	8	8	12	14	14
D (-0,3)		16	17	19	24	28	33	40	48	58
EE		M5	M5	M5	M5	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
ES		-	-	6	6	8	10	12	12	12
EW (d13)		8	8	12	12	16	16	26	30	30
KK (6g)		M4x0,7	M4x0,7	M6x1	M6x1	M8x1,25	M10x1,25	M10x1,25	M12x1,75	M12x1,75
KV		17	17	22	22	30	30	42	52	52
KW		5,5	5,5	6	6	7	7	8	9	9
KX		7	7	10	10	13	17	17	19	19
KY		3	3	4	4	5	6	6	7	7
L		6	6	9	9	12	13	13	16	16
L1 (±1)	★	85	85	105	111	130	141	139	164	167
L2		9	9	14	13	15	15	14	16	16
L3		11	11	17	17	18	22	22	25	25
L4		10	10	9,5	10,5	15	15	15	18	18
L5 (±1)	★	46	46	50	56	68	69	69	79	82
L6 (±1)	★	48	48	52	58	70,5	71,5	71,5	82	85
L7		2	2	2	2	2,5	2,5	2,5	3	3
L8 (±1)	★	64	64	74	80	94,5	99,5	99,5	117	120
L9 (±1,2)	★	78	78	94	100	116	125	125	149	152
L10 (±1)	★	35	35	40	45	52	53	53	60	63
L11		-	-	-	1,5	2	2	2	2	2
MM (f7)		4	4	6	6	8	10	12	14	14
MR (min.)		12	12	16	16	18	19	22	28	28
WF (±1,2)		16	16	22	22	24	28	28	35	35
XC (±1)	★	64	64	75	82	95	104	105	123	126
Y (±1,2)		21,5	21,5	27	27,5	32	36	36	44,5	44,5

STROKE TOLERANCE: until stroke 100 mm - 1,5, beyond + 2 mm.

Weight	stroke 0	55	60	80	100	175	240	365	610	790
gr.	every 10mm	6	7	5	5	8	11	15	19	21

Without rear eye version

Weight	stroke 0	50	55	75	95	170	230	345	570	750
gr.	every 10mm	6	7	5	5	8	11	15	19	21

Push/pull rod version

Weight	stroke 0	55	60	95	120	220	310	450	760	950
gr.	every 10mm	7	8	7	7	12	17	24	31	33

Hexagonal rod version

Weight	stroke 0	-	-	85	105	180	250	370	590	760
gr.	every 10mm	-	-	5	6	8	12	16	17	19

(★) These dimensions increase of 10 mm for microcylinders equipped with magnetic piston and spring return, and of 9 mm for microcylinders with 10 mm BORE magnetic piston

**Construction characteristics**

End covers	hard anodised aluminium																
Barrel	stainless steel AISI 304																
Piston rod	stainless steel																
Piston	brass (ø8-10-12) aluminium (ø16-20-25)																
Seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (HNBR or FPM seals available upon request)																
Mounting	steel painted in cataphoresis																
Forks	zinc plated steel																
Single-acting springs	C98 zinc plated steel for springs																
Cushioning length	<table border="0"> <tr> <td>ø</td> <td>16</td> <td>-</td> <td>20</td> <td>-</td> <td>25</td> <td>-</td> <td>32</td> </tr> <tr> <td>mm</td> <td>15</td> <td>-</td> <td>18</td> <td>-</td> <td>18</td> <td>-</td> <td>18</td> </tr> </table>	ø	16	-	20	-	25	-	32	mm	15	-	18	-	18	-	18
ø	16	-	20	-	25	-	32										
mm	15	-	18	-	18	-	18										

**Technical characteristics**

Fluid	filtered air and preferably lubricated
Maximum working pressure	10 bar
Working temperature	-5°C - +70°C with standard seals magnetic or non magnetic piston -5°C - +80°C with FPM seals magnetic piston -5°C - +80°C with HNBR seals magnetic piston -5°C - +120°C with HNBR seals non magnetic piston -5°C - +150°C with FPM seals non magnetic piston

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.  
Our Technical Department will be glad to help.

**Standard strokes**

**ø 8 and ø 10**

15 - 25 - 50 - 75 - 80 - 100 mm

**ø 12 and ø 16**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 mm

**ø 20 and ø 25**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 mm

**ø 32**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 - 450 - 500 mm

**Minimum and maximum springs load**

Bore	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Min. load(N)	2.2	2.2	4	7.5	11	16.5	23
Max. load(N)	4.2	4.2	8.7	21	22	30.7	52.5

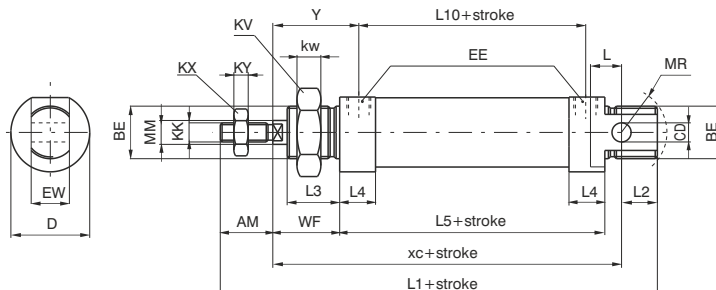


**Basic version**

Ordering code	Description
<b>1280.Ø.stroke</b>	Basic version
<b>1291.Ø.stroke</b>	Basic version front spring (max stroke 50 mm)
<b>1292.Ø.stroke</b>	Basic version rear spring from Ø16 (max stroke 50 mm)
<b>12- -Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>12- -Ø.stroke.M</b>	Magnetic piston
<b>12- -Ø.stroke.A.M</b>	Cushioning with magnetic piston (from Ø16)
<b>12- -Ø.stroke. . . .T</b>	HNBR seals version
<b>12- -Ø.stroke. . . .V</b>	FPM seals version



Standard version, fully compliant with ISO standards. Can use all available mountings. For single acting type, the maximum stroke is 50 mm., after which overall dimensions increase in length to an extent not proportional to the stroke (and in any case not longer than stroke 100).

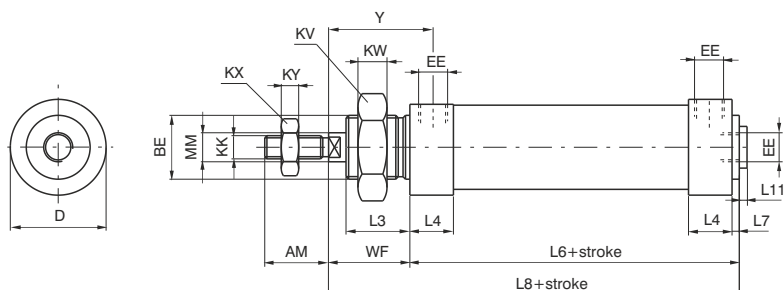


**Without rear eye version**

Ordering code	Description
<b>1281.Ø.stroke</b>	Without rear eye
<b>1293.Ø.stroke</b>	Without rear eye front spring (max stroke 50 mm)
<b>1294.Ø.stroke</b>	Without rear eye rear spring from Ø16 (max stroke 50 mm)
<b>12- -Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>12- -Ø.stroke.M</b>	Magnetic piston
<b>12- -Ø.stroke.A.M</b>	Cushioning with magnetic piston (from Ø16)
<b>12- -Ø.stroke. . . .T</b>	HNBR seals version
<b>12- -Ø.stroke. . . .V</b>	FPM seals version



Version derived from standard version 1260 and not included in ISO standard. Not having a rear eye it is shorter. Rear inlet connection is at 90 like the front one, in line and plugged. The considerations made for the basic type 1280 apply for all single-acting types.

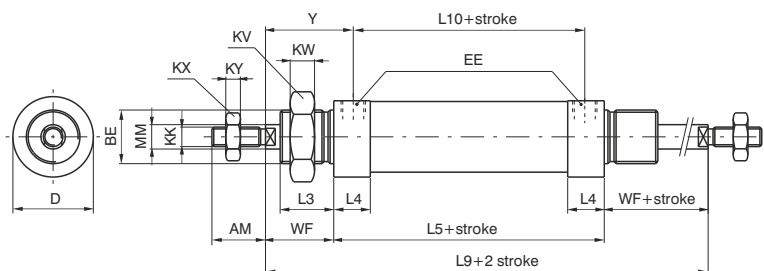


**Push/Pull rod version**

Ordering code	Description
<b>1282.Ø.stroke</b>	Push/pull rod version
<b>1282.Ø.stroke.M</b>	Magnetic piston
<b>1282.Ø.stroke.A</b>	Adjustable cushioning (from Ø16)
<b>1282.Ø.stroke.A.M</b>	Cushioning with magnetic piston (from Ø16)
<b>1282.Ø.stroke. . . .T</b>	HNBR seals version
<b>1282.Ø.stroke. . . .V</b>	FPM seals version



This version having rods coming out from both end plates with overall dimensions, except for the rod, equal to 1280 version. This version is not suitable for Ø8 and Ø10 due to difficulty in anchoring the pistons to rods.



**Table of dimensions**

		Bore						
		8	10	12	16	20	25	32
AM (-0,2)		12	12	16	16	20	22	20
BE		M12X1,25	M12X1,25	M16X1,5	M16X1,5	M22X1,5	M22X1,5	M30X1,5
CD (H9)		4	4	6	6	8	8	12
D (h11)		16	16	20	21	27	30	38
EE		M5	M5	M5	M5	G1/8"	G1/8"	G1/8"
EW (d13)		8	8	12	12	16	16	26
KK (6g)		M4X0,7	M4X0,7	M6X1	M6X1	M8X1,25	M10X1,25	M10X1,25
KV		17	17	22	22	30	30	42
KW		5,5	5,5	6	6	7	7	8
KX		7	7	10	10	13	17	17
KY		3	3	4	4	5	6	6
L		6	6	9	9	12	13	13
L1 (±1)	*	86	86	105	111	130	141	139
L2		10	10	14	13	15	15	14
L3		12	12	17	17	18	22	22
L4		9	9	9	11	15,5	15	14,5
L5 (±1)	*	46	46	50	56	68	69	69
L6	*	48	48	52	58	70,5	71,5	71,5
L7		2	2	2	2	2,5	2,5	2,5
L8	*	64	64	74	80	94,5	99,5	99,5
L9 (±1,2)	*	78	78	94	100	116	125	125
L10 (±1)	*	37	37	41	45	52,5	53	54,5
L11		1,5	1,5	1,5	1,5	2	2	2
MM (f7)		4	4	6	6	8	10	12
MR		12	12	16	16	18	19	22
WF (±1,2)		16	16	22	22	24	28	28
XC (±1)	*	64	64	75	82	95	104	105
Y (±1,2)		20,5	20,5	26,5	27,5	32	36	35
Stroke tolerance: until stroke 100 +1,5 mm, beyond +2 mm								
Weight	stroke 0	30	35	65	80	160	200	310
gr.	every 10mm	2	2,5	4	5	7,5	11,5	18
<b>Variations of the versions:</b>								
<i>without rear eye version</i>								
Weight	stroke 0	25	30	60	75	150	185	290
gr.	every 10mm	2	2,5	4	5	7,5	11,5	18
<i>Push/pull rod version</i>								
Weight	stroke 0	35	40	75	95	200	250	370
gr.	every 10mm	2,5	3	6	7	10,5	15,5	24

Dimensions marked with \* do not increase proportionally to stroke for rear spring version (over 25 mm stroke).

### Construction characteristics

End covers	stainless steel AISI 316
Barrel	stainless steel AISI 304
Piston rod	stainless steel
Piston	aluminium
Piston seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (FPM seals available upon request)
Mounting	stainless steel AISI 304
Forks	stainless steel AISI 304

### Technical characteristics

Fluid	filtered air and preferably lubricated
Maximum working pressure	10 bar
Working temperature	-5°C - +70°C with standard seals magnetic or non magnetic piston -5°C - +80°C with FPM seals magnetic piston -5°C - +150°C with FPM seals non magnetic piston

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

### Standard strokes

#### Ø 16

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 mm

#### Ø 20 and Ø 25

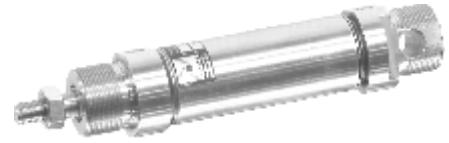
15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 mm

#### Ø 32

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 - 450 - 500 mm

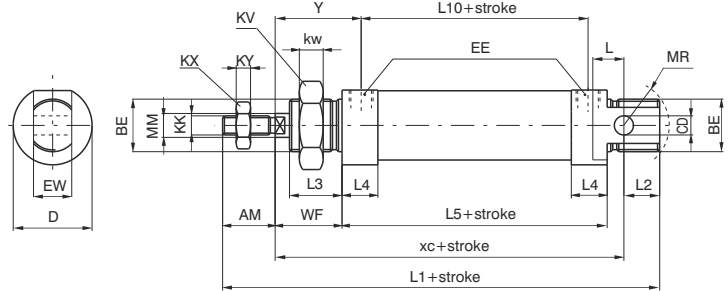
**Basic version**

Ordering code	Description
<b>1280.Ø.stroke.X</b>	Inox non-magnetic version, NBR seals
<b>1280.Ø.stroke.XV</b>	Inox non-magnetic, FPM seals
<b>1280.Ø.stroke.AX</b>	Inox non-magnetic version with cushions*, NBR seals
<b>1280.Ø.stroke.AXV</b>	Inox non-magnetic version with cushions*, FPM seals
<b>1280.Ø.stroke.MX</b>	Inox magnetic version, NBR seals
<b>1280.Ø.stroke.MXV</b>	Inox magnetic version, FPM seals
<b>1280.Ø.stroke.AMX</b>	Inox magnetic version with cushions*, NBR seals
<b>1280.Ø.stroke.AMXV</b>	Inox magnetic version with cushions*, FPM seals



\* no adjustable cushioning

Standard version, fully complying with ISO standards.



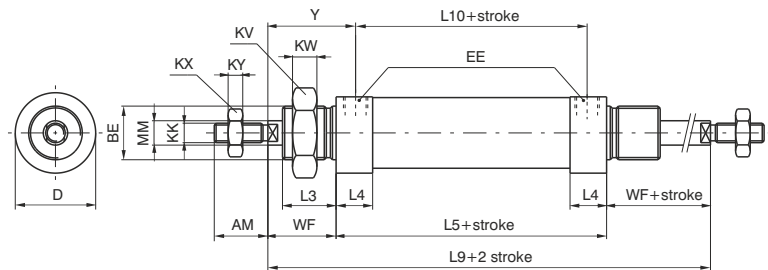
**Push/pull rod version**

Ordering code	Description
<b>1282.Ø.stroke.X</b>	Inox non-magnetic version, NBR seals
<b>1282.Ø.stroke.XV</b>	Inox non-magnetic, FPM seals
<b>1282.Ø.stroke.AX</b>	Inox non-magnetic version with cushions*, NBR seals
<b>1282.Ø.stroke.AXV</b>	Inox non-magnetic version with cushions*, FPM seals
<b>1282.Ø.stroke.MX</b>	Inox magnetic version, NBR seals
<b>1282.Ø.stroke.MXV</b>	Inox magnetic version, FPM seals
<b>1282.Ø.stroke.AMX</b>	Inox magnetic version with cushions*, NBR seals
<b>1282.Ø.stroke.AMXV</b>	Inox magnetic version with cushions*, FPM seals



\* no adjustable cushioning

This version having rods coming out from both end plates, with overall dimensions, except for the rod, equal to 1280 version.



**Table of dimensions**

Bore	AM	BE	CD	D	EE	EW	KK	KV	KW	KX	KY	L	L1	L2	L3	L4	L5	L9	L10	MM	MR	WF	XC	Y
16	16	M16X1,5	6	21	M5	12	M6X1	22	6	10	4	9	111	13	17	10,5	56	100	45	6	16	22	82	27,5
20	20	M22X1,5	8	27	G1/8"	16	M8X1,25	30	7	13	5	12	130	15	18	10,5	68	116	52,5	8	18	24	95	32
25	22	M22X1,5	8	30	G1/8"	16	M10X1,25	30	7	17	6	13	140	15	22	15,5	68	125	52,5	10	18	28	104	36
32	20	M30X1,5	12	38	G1/8"	26	M10X1,25	42	8	17	6	13	139	14	22	14,5	69	125	54,5	12	22	28	105	35

Bore	Standard weight (gr.)		Weight push-pull version (gr.)	
	Stroke 0	every 10 mm	Stroke 0	every 10 mm
16	145	5	180	7
20	280	8	330	11
25	370	12	440	16
32	580	18	660	24

### Construction characteristic

End covers	nylon 66 reinforced with glass fibres
Barrel	nylon 66 reinforced with glass fibres
Piston rod	C43 Chromed (non magnetic piston version) stainless steel (magnetic piston version)
Piston	aluminium
Seal	NBR oil-resistant rubber seal
Piston rod seal	PUR
Mounting	steel painted / stainless steel AISI 304
Forks	zinc plated steel / stainless steel AISI 304

### Technical characteristics

Fluid	filtered air and preferably lubricated
Maximum working pressure	8 bar
Working temperature	-5°C - +50°C

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

### Standard strokes

#### ø 12

15 - 25 - 50 - 75 - 80 - 100 - 125 - 150 - 160 - 200 mm

#### ø 16

15 - 25 - 50 - 75 - 80 - 100 - 125 - 150 - 160 - 200 - 250 mm

#### ø 20 - ø 25

15 - 25 - 50 - 75 - 80 - 100 - 125 - 150 - 160 - 200 - 250 - 300 mm

### Maximum tightening torque for fittings

Bore	Thread	Maximum torque (Nm)
Ø 12	M5	1
Ø 16	M5	1
Ø 20	G 1/8"	4
Ø 25	G 1/8"	4

**WEIGHT TABLE SERIES TECNO MIR 1230 - 1231**

	Bore	Ø12	Ø16	Ø20	Ø25
WEIGHT gr.	stroke 0	50 gr.	65 gr.	120 gr.	160 gr.
	every 10mm	3,75 gr.	4 gr.	6,5 gr.	9 gr.

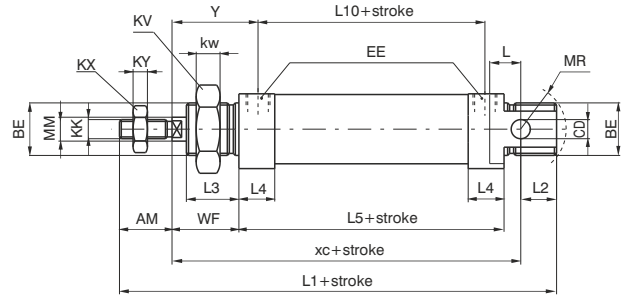
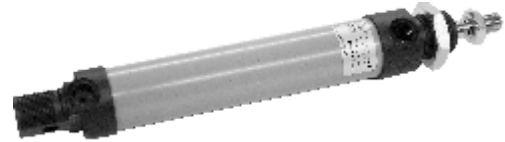
**WEIGHT TABLE SERIES TECNO MIR 1232**

	Bore	Ø12	Ø16	Ø20	Ø25
WEIGHT gr.	stroke 0	60 gr.	75 gr.	180 gr.	200 gr.
	every 10mm	7 gr.	8,5 gr.	10 gr.	20 gr.

**Basic version**

Ordering code	Description
<b>1230.Ø.stroke</b>	Basic version
<b>1230.Ø.stroke.M</b>	Basic version magnetic piston

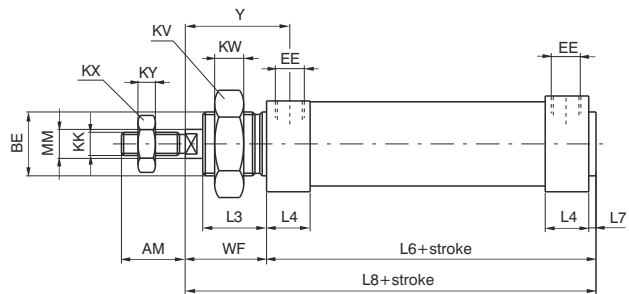
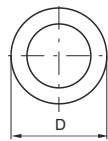
Standard version, fully complying with ISO standards. Can use all available mountings.



**Without rear eye version**

Ordering code	Description
<b>1231.Ø.stroke</b>	Without rear eye version
<b>1231.Ø.stroke.M</b>	Without rear eye version magnetic piston

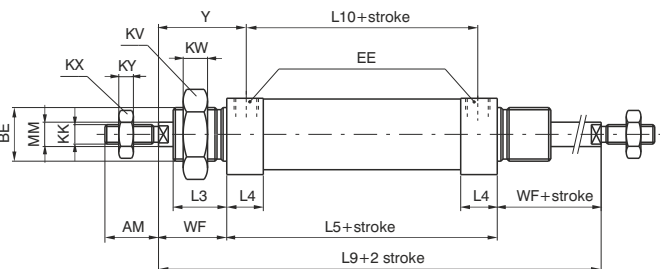
This version derived from standard version 1230 and not included in ISO standard. Not having a rear eye it is shorter. The inlet connection is lateral on the rear cover (like on the front cover).



**Push/Pull rod version**

Ordering code	Description
<b>1232.Ø.stroke</b>	Push/Pull rod version
<b>1232.Ø.stroke.M</b>	Push/Pull rod version magnetic piston

Through rod model, dimensions as for the 1230 (except the rod).

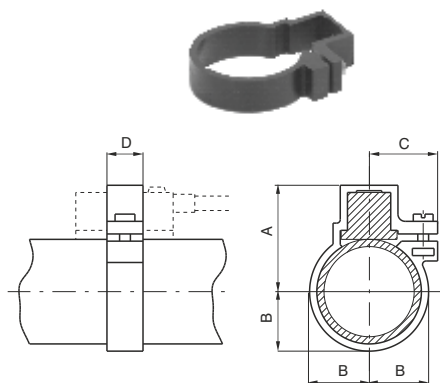


**Table of dimensions**

Bore	AM (-0,2)	BE	CD (H9)	D (h11)	EE	EW (d13)	KK (6g)	KV	KW	KX	KY	L	L1 (±1)	L2	L3	L4	L5 (±1)	L6	L7	L8	L9 (±1,2)	L10 (±1)	MM (f7)	WF (±1,2)	XC (±1)	Y (±1)
12	16	M16X1,5	6	19	M5	12	M6X1	22	6	10	4	9	105	14	17	13,5	50	52	2	74	94	41	6	22	75	26,5
16	16	M16X1,5	6	23	M5	12	M6X1	22	6	10	4	9	111	13	17	14,5	56	58	2	80	100	45	6	22	82	27,5
20	20	M22X1,5	8	28,5	G1/8"	16	M8X1,25	30	7	13	5	12	130	15	18	20,5	68	70,5	2,5	94,5	116	52	8	24	95	32
25	22	M22X1,5	8	31,5	G1/8"	16	M10X1,25	30	7	17	6	14	140	14	22	20	68	70,5	2,5	98,5	124	52	10	28	104	36

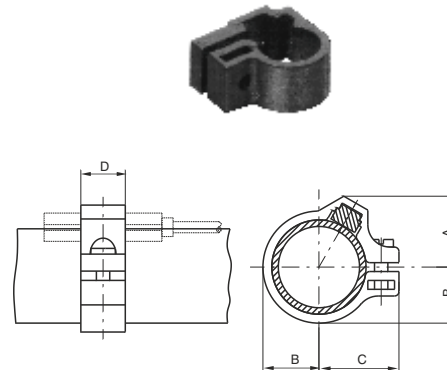
**Sensor clamps for microcylinders with threaded end covers and Technopolymer**

<b>Sensor clamps - codes 1500._, RS._, HS._</b>	<b>Sensor clamps - codes 1580._, MRS._, MHS._</b>
Ordering code	Ordering code
<b>1260.Ø.F</b>	<b>1260.Ø.FS</b>



**Table of dimensions**

Bore	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50
<b>A</b>	23	23	25	27	29,5	33	37	42
<b>B</b>	10	10	12	14	16,5	20	24	29
<b>C</b>	15	15	16,5	17,5	19	20	22	24
<b>D</b>	10	10	10	10	10	10	10	10
Weight (gr)	2	2	3	5	7	10	14	16

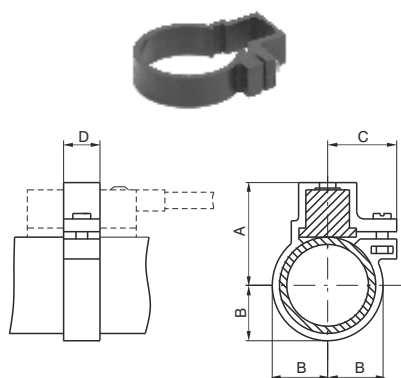


**Table of dimensions**

Bore	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50
<b>A</b>	13	14	15,4	17,2	19,3	20,5	22	29
<b>B</b>	9	10	12	14	16,5	20	24	29
<b>C</b>	16	16	18	19,5	22	26	30	35
<b>D</b>	10	10	10	10	10	10	10	10
Weight (gr)	2	2	3	5	7	8	10	11

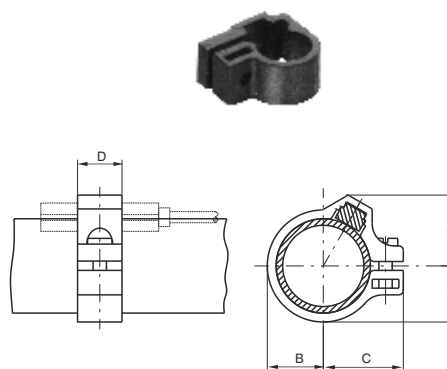
**Sensor clamps for microcylinders with rolled end covers "MIR" and "MIR-INOX"**

<b>Sensor clamps - codes 1500._, RS._, HS._</b>	<b>Sensor clamps - codes 1580._, MRS._, MHS._</b>
Ordering code	Ordering code
<b>1280.Ø.F - cylinders MIR</b> <b>1280.Ø.FX - cylinders MIR-INOX</b>	<b>1280.Ø.FS - cylinders MIR</b> <b>1280.Ø.FSX - cylinders MIR-INOX</b>



**Table of dimensions**

Bore	Ø16	Ø20	Ø25	Ø32
<b>A</b>	24	25,5	28,5	31,8
<b>B</b>	10,5	12,5	15,5	18,8
<b>C</b>	16,5	17,5	19	20
<b>D</b>	10	10	10	10
Weight (gr)	3	5	7	10



**Table of dimensions**

Bore	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
<b>A</b>	11	12	13	14,5	16	17,5	19,5
<b>B</b>	6,5	7,5	8,5	10,5	12,5	15,3	18,8
<b>C</b>	12,5	13,5	15	16	18	20,5	24
<b>D</b>	10	10	10	10	10	10	10
Weight (gr)	2	2	2	3	5	7	10

**Sensor for microcylinders**

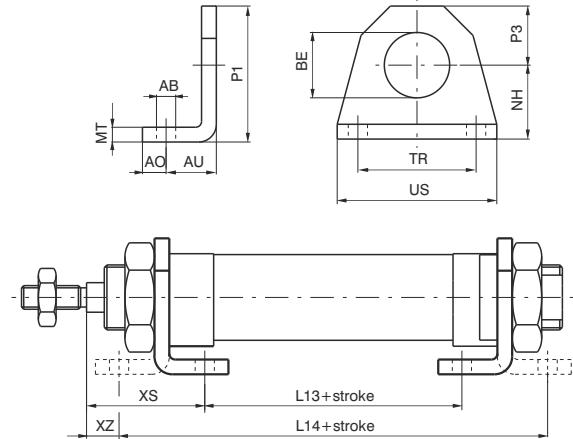
For technical characteristics and ordering codes see Chapter 6 (magnetic sensors)



**Foot**

Ordering code

**1200.0.01**  
( 1 piece )



Used to mount the cylinder on the mounting plane with the rod parallel to said plane. Use one for short strokes and two for long strokes. It is made of stamped steel, made corrosion resistant by cataphoresis treatment. Attached to the end plates by means of nuts (or lock nuts) 05.

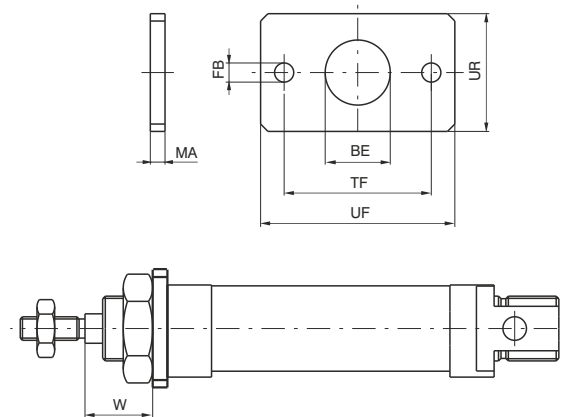
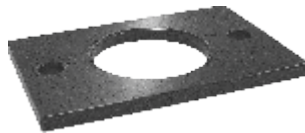
**Attention: the dimensions of microcylinders with threaded end covers (★) increase of 10 mm. for microcylinders equipped with magnetic piston and spring return, and of 9 mm. for microcylinders with 10 mm. BORE magnetic piston.**

Bore	8	10	12	16	20	25	32	40	50
AB (H13)	4,5	4,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5
AO	5	5	6	6	8	8	8	10	10
AU	11	11	14	14	17	17	17	20	20
BE	12	12	16	16	22	22	30	40	40
L13 (±1) ★	30	30	30	36	44	45	45	49	52
L14 (±1) ★	68	68	78	84	102	103	103	119	122
MT	3	3	4	4	5	5	5	5	5
NH (±0,3)	16	16	20	20	25	25	28	40	40
P1	26	26	33	33	45	45	50	70	70
P3	10	10	13	13	20	20	22	30	30
TR (JS14)	25	25	32	32	40	40	52	70	70
US	35	35	42	42	54	54	66	90	90
XS (±1,4)	24	24	32	32	36	40	40	50	50
XZ (±1,4)	5	5	8	8	7	11	11	15	15
Weight gr.	22	22	45	45	90	90	110	210	210

**Flange**

Ordering code

**1200.0.02**  
( 1 piece )



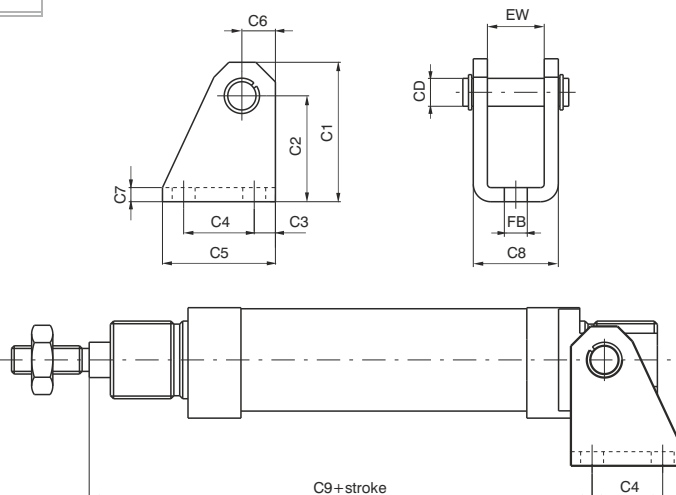
Used to mount the microcylinder at a right angle to the mounting plane. Attached to the front (or rear) endcap by a nut (or lock nut) 05. Made of extruded steel, made corrosion resistant by cataphoresis.

Bore	8	10	12	16	20	25	32	40	50
BE	12	12	16	16	22	22	30	40	40
FB (H13)	4,5	4,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5
UF	40	40	53	53	66	66	68	90	90
UR	25	25	30	30	40	40	50	60	60
MA	3	3	4	4	5	5	5	5	5
TF (JS14)	30	30	40	40	50	50	52	70	70
W (±1,4)	13	13	18	18	19	23	23	30	30
Weight gr.	20	20	40	40	85	85	100	150	150

**Rear eye**

Ordering code

**1200.Ø.03**  
(1 piece)



Use with the rear end cover to mount the cylinder either parallel or at a right-angle to the mounting plane. This allows the cylinder to oscillate and self-align with the linked element to the rod. This is necessary when the rod may be subject to lateral during travel.

**Attention: the dimensions of microcylinders with threaded end covers (\*) increase by 10mm for equipped with magnetic piston and spring return, and by 9mm for microcylinders with 10mm BORE magnetic piston.**

Bore	8	10	12	16	20	25	32	40	50
CD	4	4	6	6	8	8	12	14	14
C1	28,5	28,5	33,5	33,5	39,5	39,5	44,5	53,5	53,5
C2 (±0,3)	24	24	27	27	30	30	33	40	40
C3	3,5	3,5	5	5	6	6	7	10	10
C4	12,5	12,5	15	15	20	20	24	28	28
C5	20	20	25	25	32	32	38	45	45
C6	4,5	4,5	6,5	6,5	9,5	9,5	11,5	13,5	13,5
C7	2,5	2,5	3	3	4	4	4	4	4
C8	13	13	18	18	24	24	34	38	38
C9 (±0,4) *	63	63	73,5	80,5	91,5	100,5	100,5	119,5	122,5
EW	8,1	8,1	12,1	12,1	16,1	16,1	26,1	30,1	30,1
FB (H13)	4,5	4,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5
Weight gr.	20	20	35	35	75	75	135	180	180

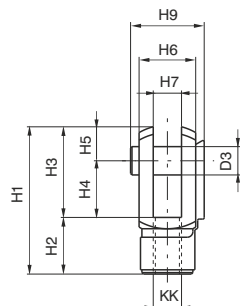
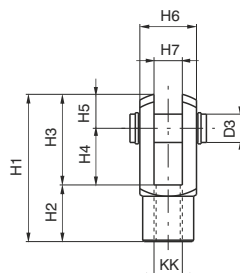
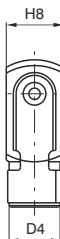
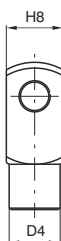
**Cylinder rod forks / Nut or lock nut for the endcaps**

Ordering code

**1200.Ø.04 \***  
(with pin)

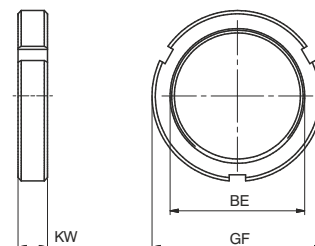
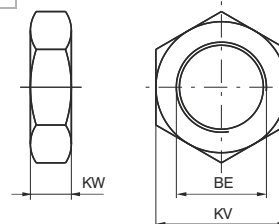
**1200.Ø.04/1**  
(with clips)

\*Available from bore Ø12



Ordering code

**1200.Ø.05**



**Forks:**

Similar to hinge 03, mounted on the rod thread, assures a regular operation even in the presence of significant forces to the linked element. Made of zinc plated steel.

**Nut:**

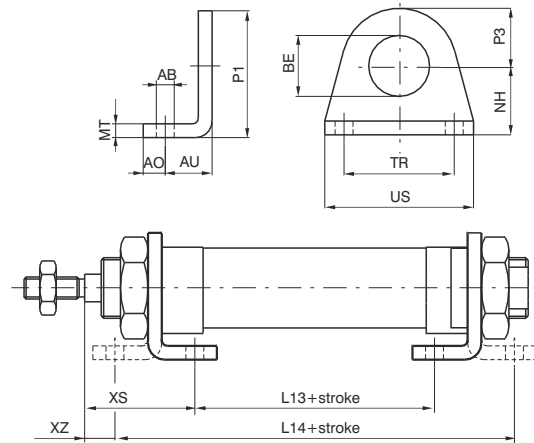
Used to fasten flanges or feet to the endcaps of the microcylinder. The nuts are mounted on BORES that go from 8 to 25, the lock nuts on 32, 40 and 50. Both are supplied (one piece) with the microcylinders.

Bore	D3	D4	H1	H2	H3	H4	H5	H6	H7 (B12)	H8	H9	KK	BE	KV	GF	KW	Forks weight gr.	Nut weight gr.
8	4	8	21	8	13	8	5	8	4	10	11	M4x0,7	M12x1,25	17	-	5,5	12	7
10	4	8	21	8	13	8	5	8	4	10	11	M4x0,7	M12x1,25	17	-	5,5	12	7
12	6	10	31	12	19	12	7	12	6	12	18	M6x1	M16x1,5	22	-	6	20	16
16	6	10	31	12	19	12	7	12	6	12	18	M6x1	M16x1,5	22	-	6	20	16
20	8	14	42	16	26	16	10	16	8	16	23	M8x1,25	M22x1,5	30	-	7	45	25
25	10	18	52	20	32	20	12	20	10	20	27	M10x1,25	M22x1,5	30	-	7	90	25
32	10	18	52	20	32	20	12	20	10	20	27	M10x1,25	M30x1,5	-	42	8	90	42
40	12	20	62	24	38	24	14	24	12	24	32	M12x1,75	M40x1,5	-	52	9	145	60
50	12	20	62	24	38	24	14	24	12	24	32	M12x1,75	M40x1,5	-	52	9	145	60

**Foot**

Ordering code

**1200.Ø.01X**  
( 1 piece )



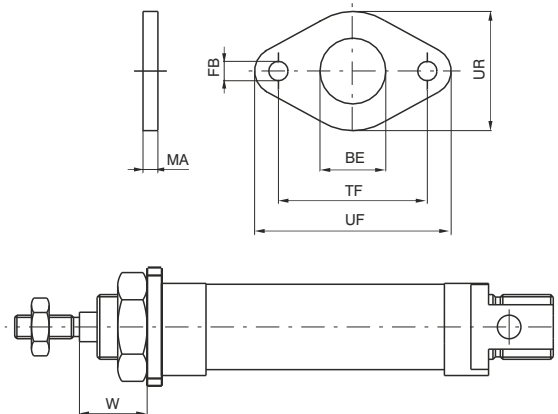
Used to mount the cylinder on the mounting plane with the rod parallel to said plane. Use one for short strokes and two for long strokes. It is made stamped stainless steel AISI 304. Attached to the end plates by means of nuts (or lock nuts) 05X.

Bore	16	20	25	32
AB (H13)	5,5	6,5	6,5	6,5
AO	6	8	8	8
AU	14	17	17	17
BE	16	22	22	30
L13 (±1)	36	44	44	45
L14 (±1)	84	102	102	103
MT	4	5	5	5
NH (±0,3)	20	25	25	28
P1	33	45	45	50
P3	13	20	20	22
TR (Js14)	32	40	40	52
US	42	54	54	66
XS (±1,4)	32	36	40	40
XZ (±1,4)	8	7	11	11
Weight gr.	45	90	90	110

**Flange**

Ordering code

**1200.Ø.02X**



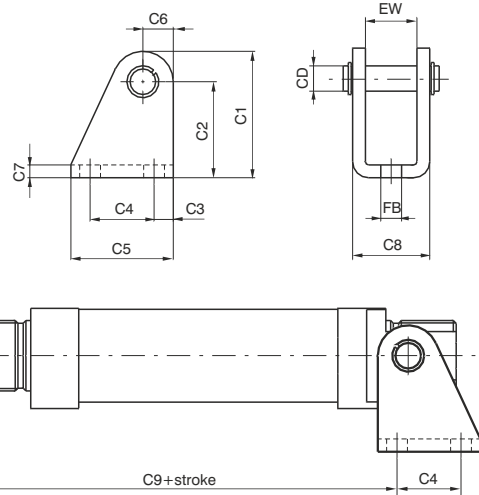
Use to mount the microcylinder at a right angle to the mounting plane. Attached to the front (or rear) endcap by a nut (or lock nut)05X. Made of stainless steel AISI 304.

Bore	16	20	25	32
BE	16	22	22	30
FB (H13)	5,5	6,5	6,5	6,5
UF	53	66	66	68
UR	30	40	40	50
MA	4	5	5	5
TF (JS14)	40	50	50	52
W (±1,4)	18	19	23	23
Weight gr.	40	85	85	100

**Rear eye**

Ordering code

**1200.Ø.03X**  
(1 piece)



Used to mount by using the rear end cover to mount either parallel or at a right angle to the mounting plane. Allows the cylinder to oscillate and self-align with the linked element to the rod. Necessary to use when the rod may be subject to lateral forces during travel. Made of stamped stainless steel AISI 304.

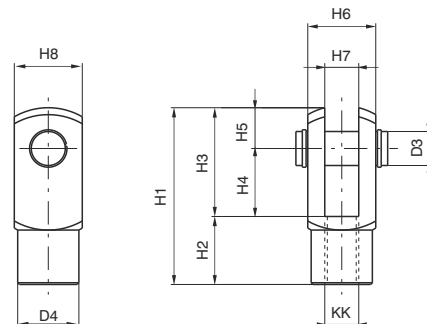
Bore	16	20	25	32
CD	6	8	8	12
C1	33,5	39,5	39,5	44,5
C2 (±0,3)	27	30	30	33
C3	5	6	6	7
C4	15	20	20	24
C5	25	32	32	38
C6	6,5	9,5	9,5	11,5
C7	3	4	4	4
C8	18	24	24	34
C9 (±0,4)	80,5	91,5	100,5	100,5
EW	12,1	16,1	16,1	26,1
FB (H13)	5,5	6,5	6,5	6,5
Weight gr.	35	75	75	135

**Cylinder rod fork / Nut or lock nut for the endcaps**

Ordering code

**1200.Ø.04X**  
(with pin)

**1200.Ø.05X**  
(1 piece)

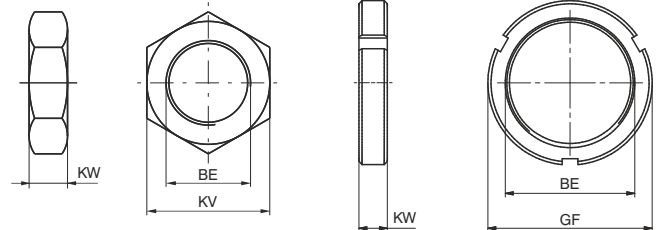


**Fork:**

Similar to hinge 03X, mounted on the rod thread, assures a regular operation even in the presence of significant forces to the linked element. Made of stainless steel AISI 304.

**Nut:**

Used to fasten flanges or feet to the endcaps of the microcylinder. The nuts are mounted on BORES that go from 16 to 25, the lock nuts on 32. Both are supplied (one piece) with the microcylinders.



Bore	Weight gr. forks	Weight gr. nut	D3	D4	H1	H2	H3	H4	H5	H6	H7 (B12)	H8	KK	BE	KV	GF	KW
16	20	16	6	10	31	12	19	12	7	12	6	12	M6X1	M16X1.5	22	-	6
20	45	25	8	14	42	16	26	16	10	16	8	16	M8X1.25	M22X1.5	30	-	7
25	90	25	10	18	52	20	32	20	12	20	10	20	M10X1.25	M22X1.5	30	-	7
32	90	42	10	18	52	20	32	20	12	20	10	20	M10X1.25	M30X1.5	-	42	8

**General**

The new 12X stainless steel ISO 6432 cylinders Series are designed for corrosion resistance application such as marine, pharmaceutical and food ambiances.

The pre lubrication grease used is NSF H1 certified for food application.

Specific care has been taken during the design stages and the result is a clean profile cylinder easy to clean and free from possible residue build-up areas. All parts in contact with the external environment are in Stainless steel 316L and the seals are available in three different compounds for different temperature applications:

PUR -30°C - +80°C, FPM -5°C - +150°C and NBR -5°C - +70°C.

The range starts from 16 bore up to 63 bore, double acting version standard or with through rod, magnetic or not magnetic piston available.

The end caps are crimped onto the barrel for bore sizes 16 to 25 and screwed on the barrel from 32 to 63 bore.

Depending on the type of mounting required it is possible to choose different end caps style.

The piston is aluminium and the sensor bracket, when required is in stainless steel 316 with plastic adaptor or in plastic material. The cylinder can be fixed with the wide range of stainless steel accessories.

**Construction characteristics**

End caps, barrel, piston rod	Stainless steel AISI 316
Piston	Aluminium
Seals	NBR (PUR piston rod seals) FPM PUR
Fixing / Accessories	AISI 316 / 304

**Technical characteristics**

Fluid	Filtered and preferably lubricated air
Max. pressure	10 bar
Bore	Ø 16 - 20 - 25 - 32 - 40 - 50 - 63
Cushioning lenght	mm 15 - 18 - 18 - 18 - 22 - 22 - 25

**Operating temperature**

Seals material	Operating temperature	Piston		Cushioning		Bores
		Magnetic	Non magnetic	Pneumatic adjustable	Pneumatic fix	
NBR	-5°C - +70°C	●	●	●	●	Ø16-Ø20-Ø25-Ø32-Ø40-Ø50-Ø63
	-5°C - +80°C	●		●	●	Ø16-Ø20-Ø25-Ø32-Ø40-Ø50-Ø63
FPM	-5°C - +150°C		●	●	●	Ø16-Ø20-Ø25-Ø32-Ø40-Ø50-Ø63
	-5°C - +70°C	●	●	●	●	Ø16-Ø20-Ø25-Ø32
PUR		●	●	●	●	Ø40-Ø50-Ø63
	-30°C - +80°C	●	●		●	Ø16-Ø20-Ø25-Ø32-Ø40-Ø50-Ø63

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Our Technical Department will be glad to help.

**Standard strokes**

**Ø16 :**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 mm

**Ø20 - Ø25 :**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 mm

**Ø32 - Ø63 :**

15 - 25 - 50 - 75 - 80 - 100 - 150 - 160 - 200 - 250 - 300 - 320 - 350 - 400 - 450 - 500 mm



Coding key

12X

FUNCTION	
<b>A</b>	Double acting 
<b>B</b>	Double acting cushioned 
<b>C</b>	Double acting through rod 
<b>D</b>	Double acting cushioned through rod 

BORE
016
020
025
032
040
050
063

STROKE
--------

MAGNETIC PISTON VARIANTS	
<b>M</b>	Magnetic piston max. temperature +80°C
<b>N</b>	Non magnetic piston

SEALS	
<b>N</b>	NBR
<b>V</b>	FPM
<b>P</b>	PUR

TYPE			
	FRONT END CAP	BASIC VERSION	REAR END CAP
<b>A</b>	CLEAN PROFILE		WITH INTEGRATED TRUNNION
<b>B</b>	CLEAN PROFILE		THREADED
<b>C</b>	THREADED		THREADED
<b>D</b>	THREADED		SHORT END CAP
<b>E*</b>	FOR PIN		SHORT END CAP

\* Available only for Ø32 - Ø40 - Ø50 - Ø63

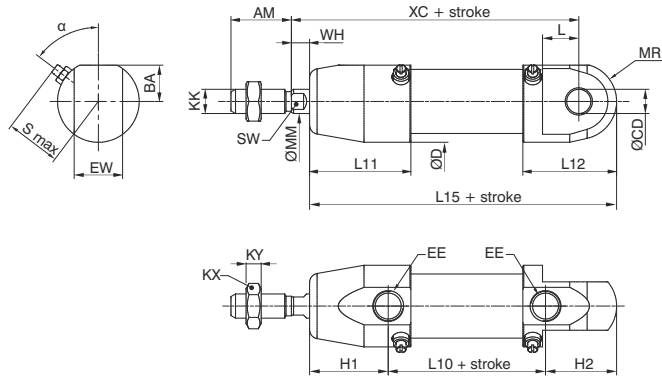
	END CAP	PUSH/PULL ROD VERSION	END CAP
<b>S</b>	THREADED		THREADED
<b>T</b>	THREADED		CLEAN PROFILE

4

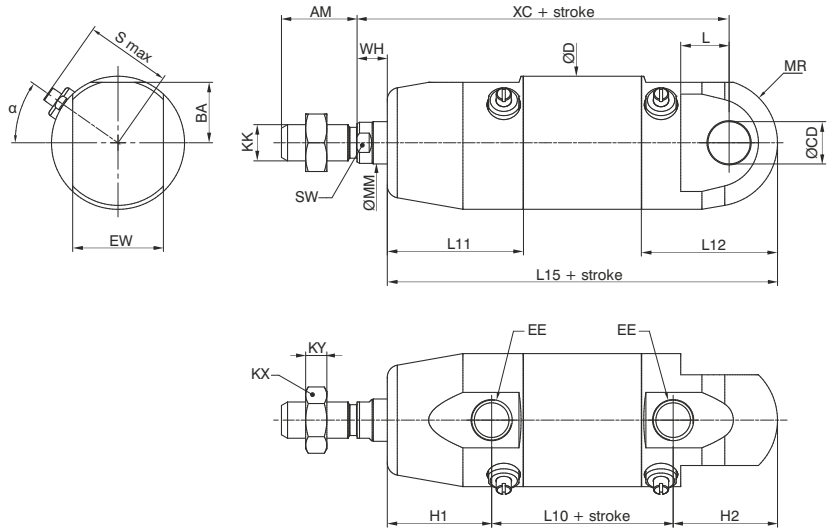
**Cylinder type "A"**



from Ø16 to Ø25



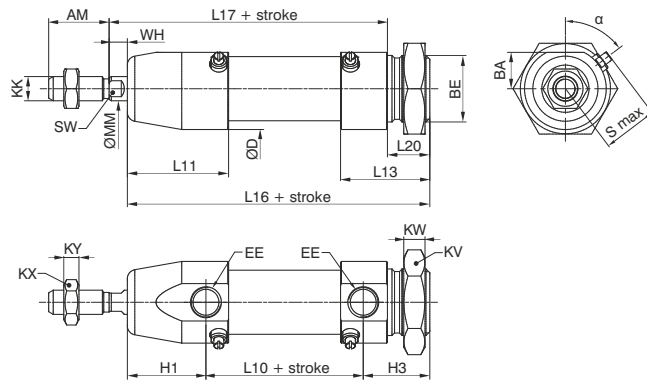
from Ø32 to Ø63



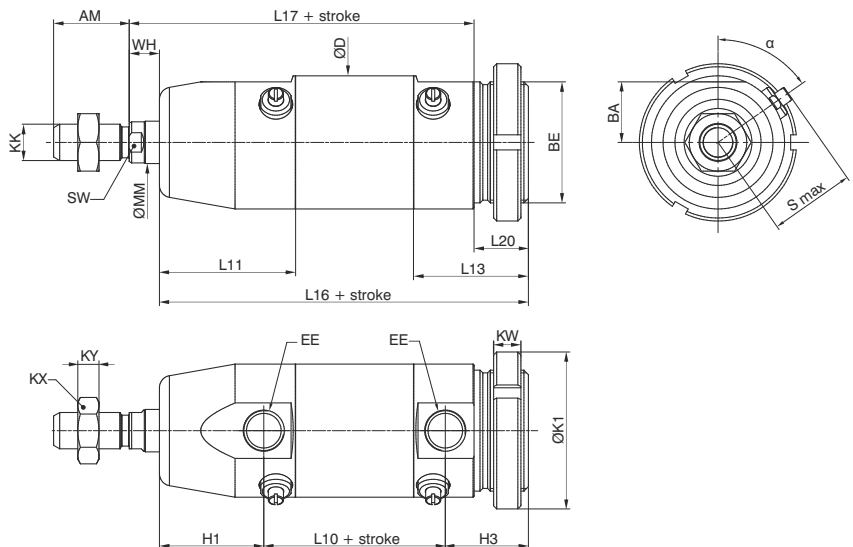
**Cylinder type "B"**



from Ø16 to Ø25



from Ø32 to Ø63

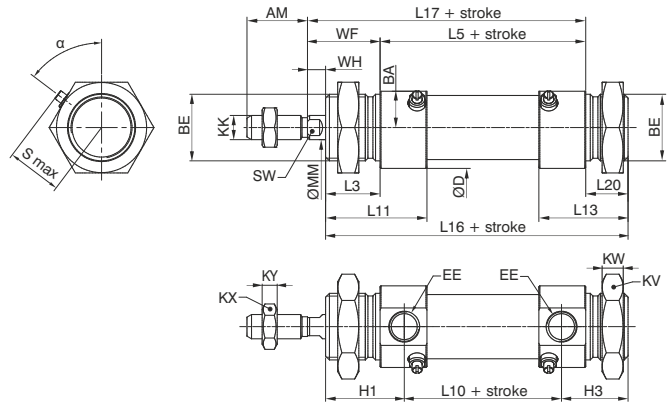




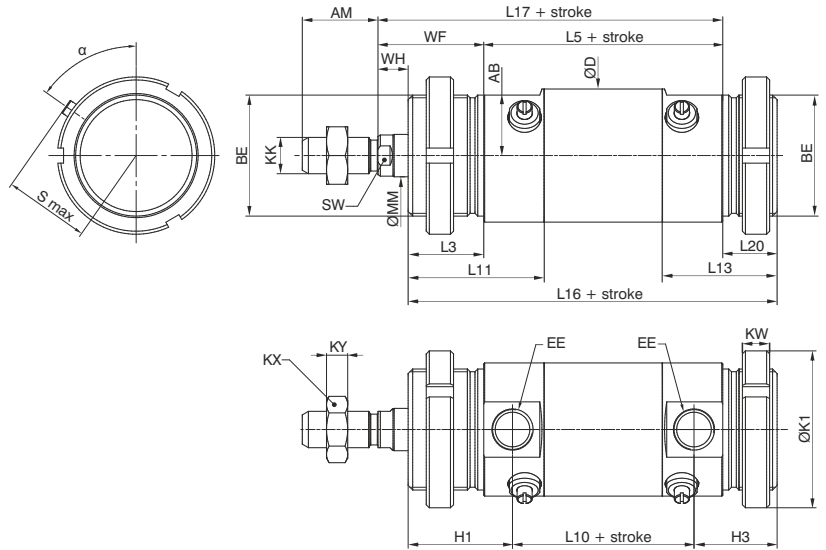
**Cylinder type "C"**



from Ø16 to Ø25



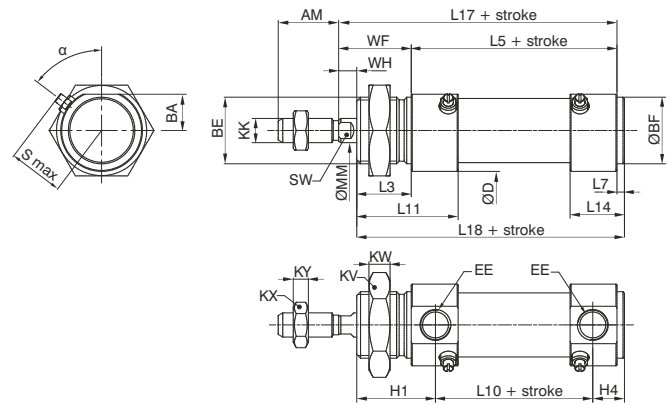
from Ø32 to Ø63



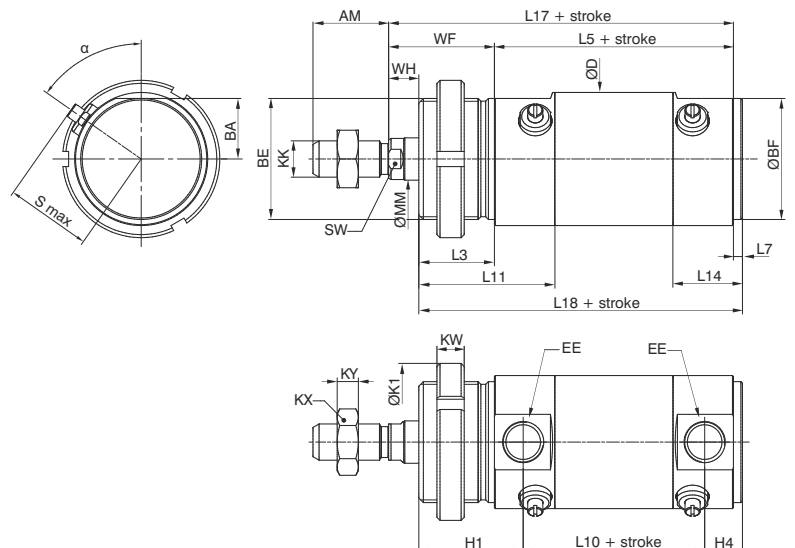
**Cylinder type "D"**



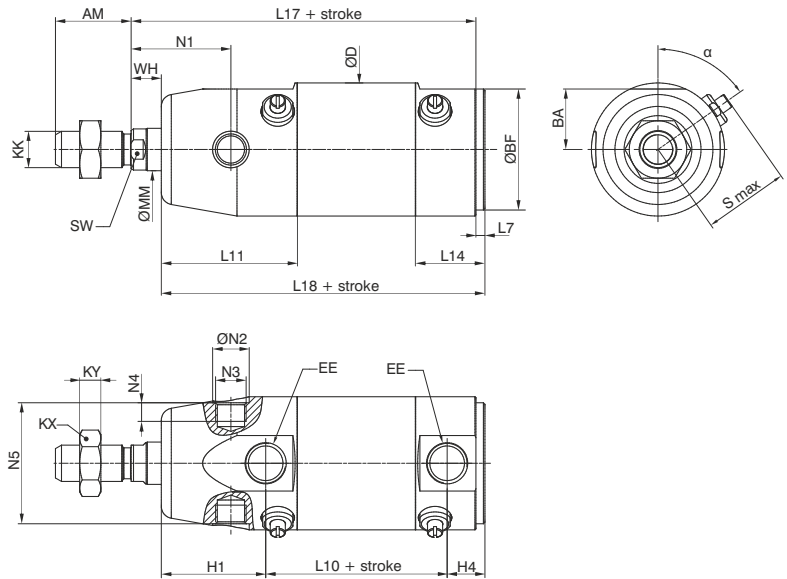
from Ø16 to Ø25



from Ø32 to Ø63

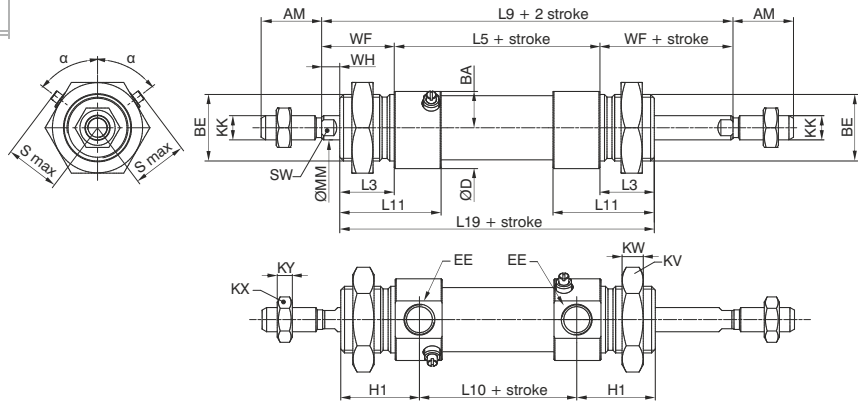


Cylinder type "E"

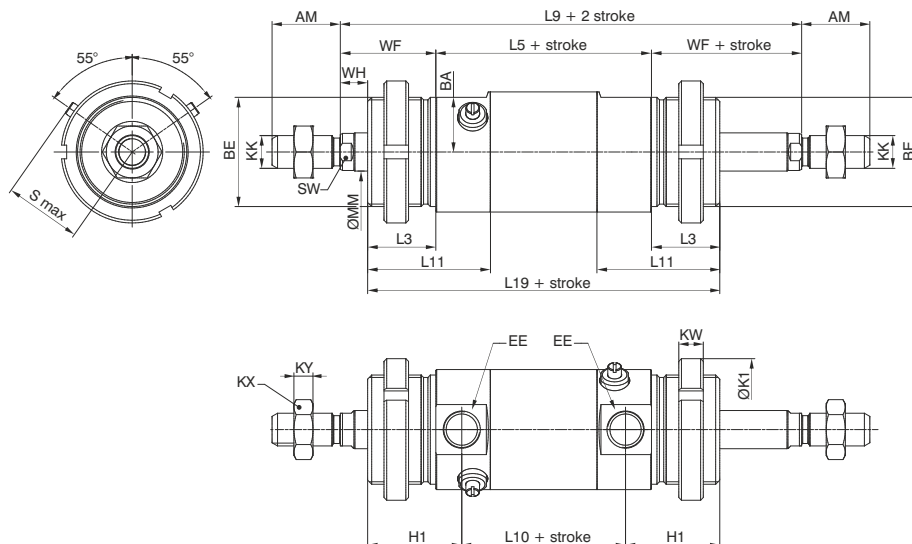


from Ø32 to Ø63

Cylinder type "S"



from Ø16 to Ø25

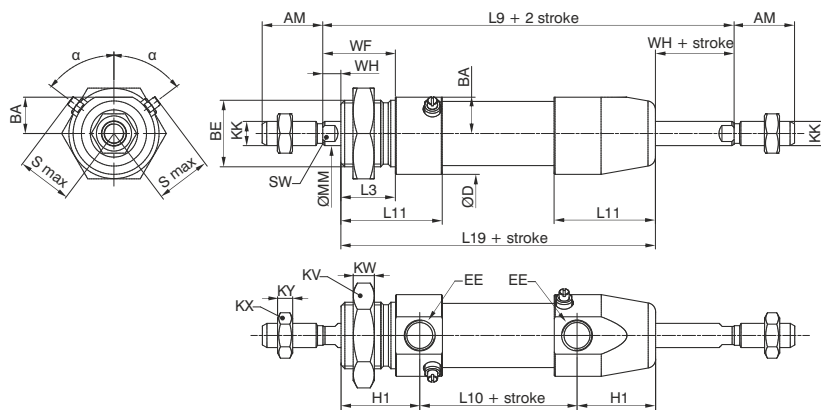


from Ø32 to Ø63

Cylinder type "T"



from Ø16 to Ø25



from Ø32 to Ø63

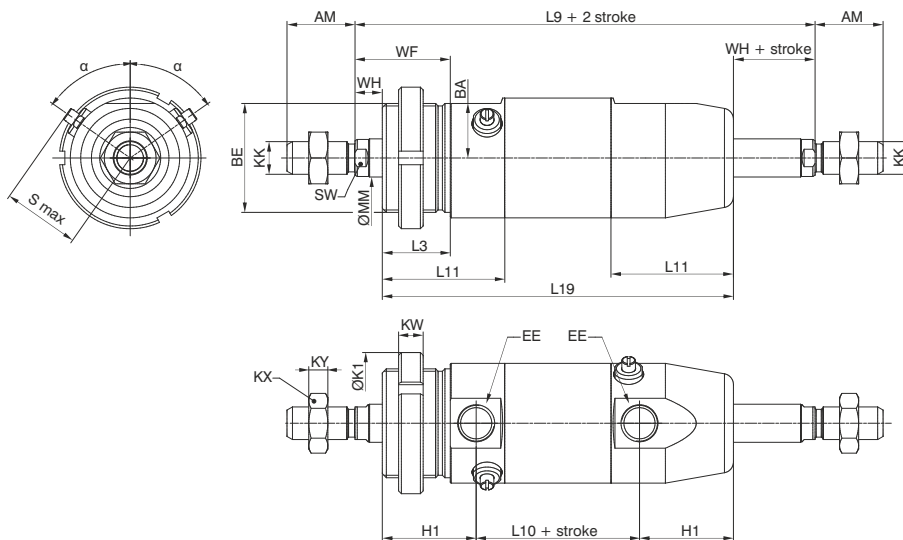
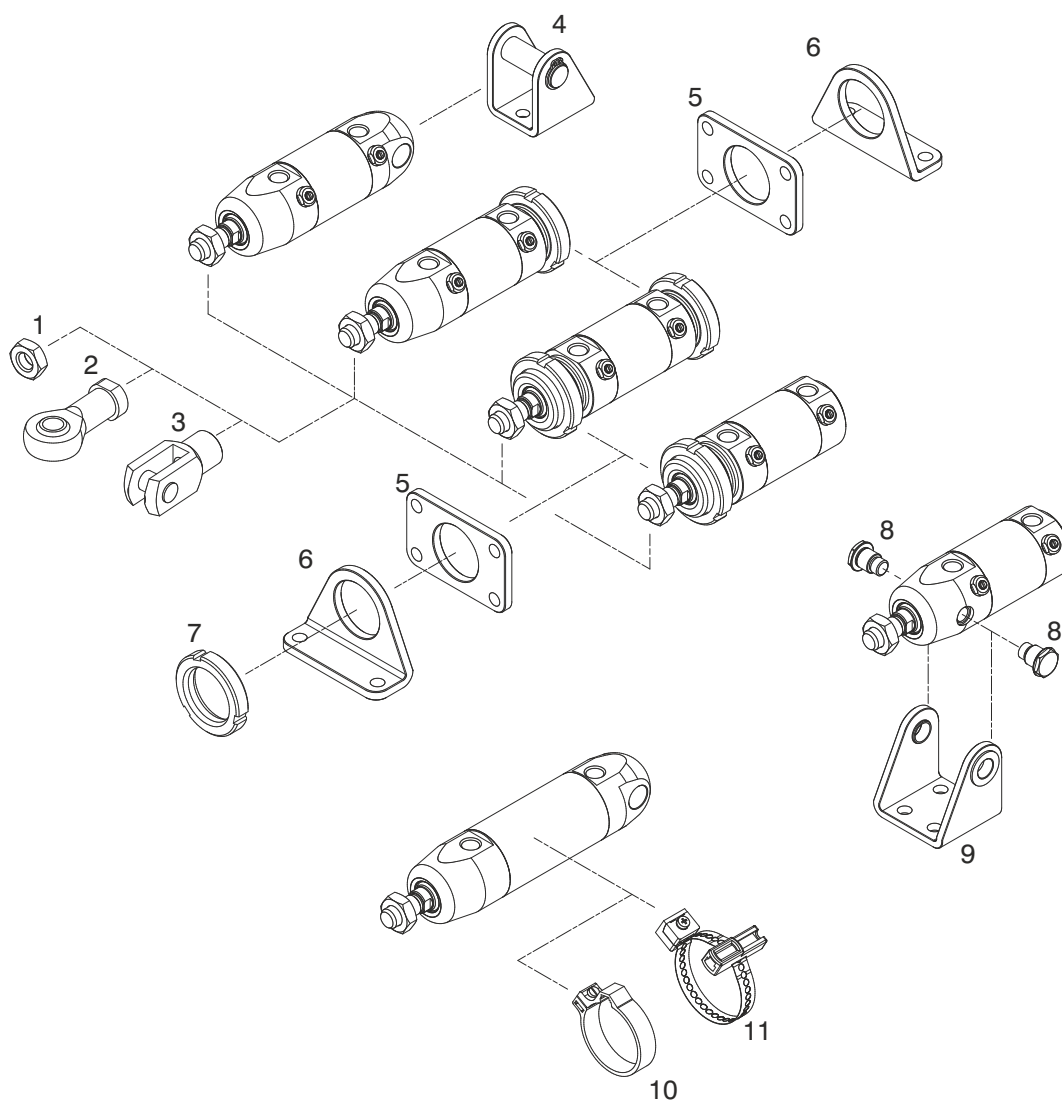


Table of dimensions

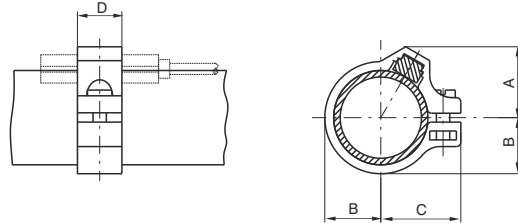
Bore	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63
α	53°	53°	53°	55°	55°	55°	55°
AM	16	20	22	20	25	25	32
BA	9	12	13,5	16	20	25	31
BE	M16x1,5	M22x1,5	M22x1,5	M30x1,5	M40x1,5	M40x1,5	M45x1,5
ØBF	16	22	22	30	40	40	45
EE	M5	G1/8	G1/8	G1/8	G1/4	G1/4	G3/8
EW	12	16	16	26	30	30	40
ØCD <sup>H9</sup>	6	8	8	12	14	14	16
ØD	21	27	30	36	44	54	68
H1	22,5	26	30	30	34,5	34,5	40
H2	17,5	23,5	27,5	30	34,5	34,5	40
H3	16,5	22	22	23	27,5	27,5	30
H4	7,5	10,5	10,5	10,5	12,5	12,5	16
ØK1	/	/	/	/	52	52	60
KK	M6x1	M8x1,25	M10x1,25	M10x1,25	M12x1,75	M12x1,75	M16x1,5
KX	10	13	17	17	19	19	24
KY	4	5	6	6	7	7	8
KV	22	30	30	42	/	/	/
KW	6	7	7	8	9	9	10
L	9	12	14	13	16	16	22
L3	17	18	22	22	25	25	28
L5	56	68	69	69	79	82	106
L7	2	2,5	2,5	2,5	3	3	4
L9	100	116	125	125	149	152	180
L10	45	52	53	53	60	63	82
L11	28	33,5	37	38,5	45	45	54
L12	23	31	34,5	38,5	45	45	54
L13	22	29,5	29	31,5	38	38	44
L14	12,8	18	17,5	19	23	23	30
L15	85	101,5	110,5	113	129	132	162
L16	84	100	105	106	122	125	152
L17	78	92	97	97	114	117	143
L18	75	88,5	93,5	93,5	107	110	138
L19	90	104	113	113	129	132	162
L20	11	14	14	15	18	18	18
ØMM	6	8	10	12	14	16	20
MR	8	12,5	12,5	17	21	26	34,5
N1	/	/	/	27	33	40	45
ØN2 <sup>+0/-0,05</sup>	/	/	/	10,1	12,1	14,1	16,1
N3	/	/	/	M8x0,75	M10x1	M12x1	M14x1
N4	/	/	/	5,5	6	8,7	11,7
N5 <sup>+0,1/-0</sup>	/	/	/	32	40	50	64
Smax	15,5	18,5	19,5	25	28,5	33,5	40
SW	5	6	8	10	12	12	17
WF	22	24	28	28	35	35	37
WH	5	6	6	6	10	10	9
XC	82	95	104	105	123	126	154



Position	Description	Ordering code	Materials
1	Rod lock nut	12X.Ø.11	Stainless steel AISI 316
2	Ball joint	12X.Ø.10	Stainless steel
3	Fork	12X.Ø.04	Stainless steel
4	Rear clevis	12X.Ø.03	Stainless steel
5	Flange	12X.Ø.02	Stainless steel AISI 316
6	Foot	12X.Ø.01	Stainless steel AISI 316
7	Nut or lock nut for the endcaps	12X.Ø.05	Stainless steel AISI 316
8	Pin for front clevis (Ø32 - Ø63)	12X.Ø.09	Stainless steel AISI 316
9	Front clevis (Ø32 - Ø63)	12X.Ø.08	Stainless steel AISI 316
10	Sensor clamp (Ø16 - Ø50)	12X.Ø.FS	Technopolymer
11	Sensor clamp (Ø16 - Ø63)	12X.Ø.FSX	Stainless steel Technopolymer

**Sensor clamps cod. 1580.\_, MRS.\_, MHS.\_**

Ordering code	The kit comprises: n° 1 clamp (Technopolymer) n° 1 screw (AISI 304) n° 1 nut (AISI 304)
<b>12X.Ø.FS</b>	

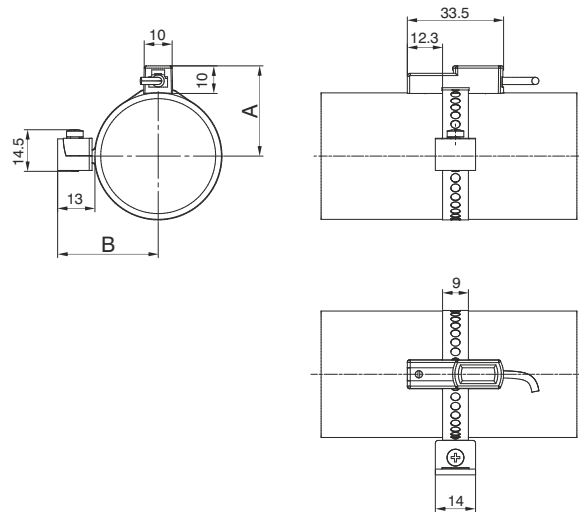


**Table of dimensions**

Bore	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50
<b>A</b>	14,5	16	17,5	20,5	22	29
<b>B</b>	10,5	12,5	15,3	20	24	29
<b>C</b>	16	18	20,5	26	30	35
<b>D</b>	10	10	10	10	10	10
Weight (gr.)	3	5	7	8	10	11

**Sensor clamps cod. 1580.\_, MRS.\_, MHS.\_**

Ordering code	The kit comprises: n° 1 clamp (AISI 304) n° 1 switch bracket + support (Technopolymer) n° 1 screw (AISI 304) n° 1 nut (AISI 304)
<b>12X.Ø.FSX</b>	



**Table of dimensions**

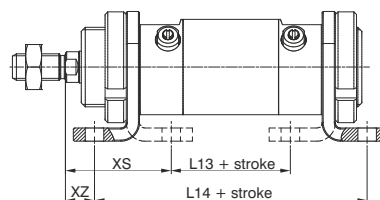
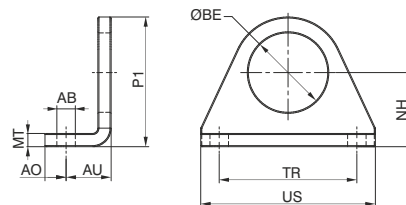
Bore	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63
<b>A</b>	19	21	23	28	32	37	44
<b>B</b>	22	24	26	31	35	40	47

**Foot**

Ordering code

**12X.Ø.01**

The kit comprises:  
n° 1 foot (AISI 316)



Used to mount the cylinder on the mounting plane with the rod parallel to said plane. Use one for short strokes and two for long strokes. It is made stamped stainless steel AISI 316.

Bore	16	20	25	32	40	50	63
AB (H13)	5,5	6,5	6,5	6,5	9	9	9
AO	6	8	8	8	10	10	10
AU	14	17	17	17	20	20	20
ØBE	16	22	22	30	40	40	45
L13 (±1)	36	44	44	45	49	52	78
L14 (±1)	84	102	102	103	119	122	146
MT	4	5	5	5	5	5	6
NH (±0.3)	20	25	25	28	40	40	50
P1	33	45	45	50	66,5	66,5	80
TR (Js14)	32	40	40	52	70	70	70
US	42	54	54	66	90	90	90
XS (±1.4)	32	36	40	40	50	50	51
XZ (±1.4)	8	7	11	11	15	15	17
Weight gr.	45	90	90	110	210	210	262

**Flange**

Ordering code

**12X.Ø.02**

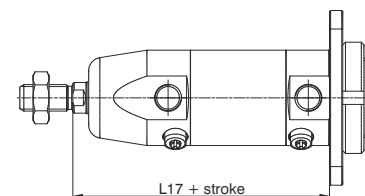
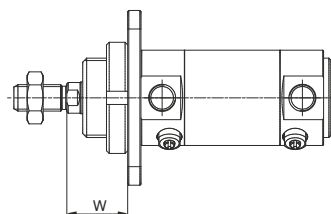
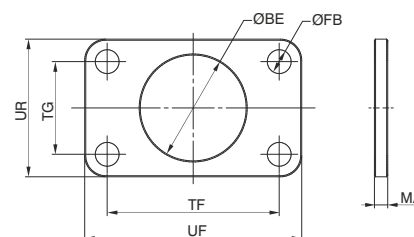
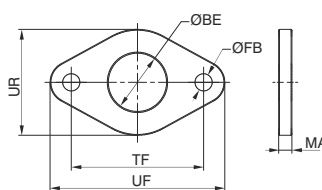
The kit comprises:  
n° 1 flange (AISI 316)



(For Ø16 - Ø20 - Ø25)



(For Ø32 - Ø40 - Ø50 - Ø63)



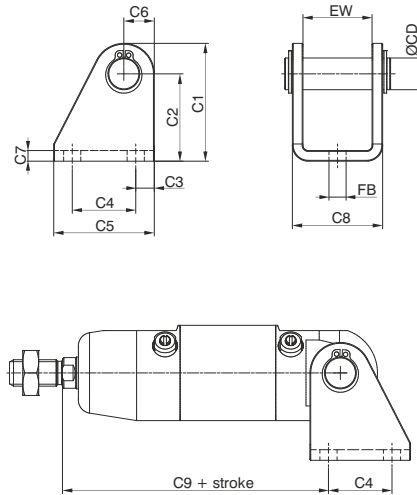
Use to mount the microcylinder at a right angle to the mounting plane. Made of stainless steel AISI 316.

Bore	16	20	25	32	40	50	63
ØBE	16	22	22	30	40	40	45
ØFB (H13)	5,5	6,5	6,5	6,5	9	9	9
UF	53	66	66	68	82	82	96
UR	30	40	40	50	52	52	70
MA	4	5	5	5	5	5	6
TF (JS14)	40	50	50	52	65	65	76
TG	/	/	/	/	35	35	50
W (±1.4)	18	19	23	23	30	30	31
L17	78	92	97	97	114	117	143
Weight gr.	40	85	85	100	105	105	225



**Rear clevis**

Ordering code	The kit comprises: n° 1 clevis (AISI 316) n° 1 pin (AISI 316) n° 2 circlips (AISI 420)
<b>12X.Ø.03</b>	

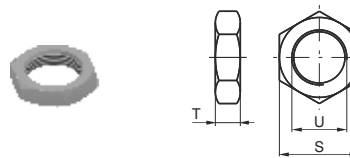


Used to mount by using the rear end cover to mount either parallel or at a right angle to the mounting plane. Allows the cylinder to oscillate and self-align with the linked element to the rod. Necessary to use when the rod may be subject to lateral forces during travel. Made of stamped stainless steel.

Bore	16	20	25	32	40	50	63
ØCD	6	8	8	12	14	14	16
C1	33,5	39,5	39,5	44,5	53,5	53,5	64
C2 (±0.3)	27	30	30	33	40	40	50
C3	5	6	6	7	10	10	8
C4	15	20	20	24	28	28	34
C5	25	32	32	38	45	45	50
C6	6,5	9,5	9,5	11,5	13,5	13,5	14
C7	3	4	4	4	4	4	6
C8	18	24	24	34	38	38	52
C9 (±0.4)	80,5	91,5	100,5	100,5	119,5	122,5	148
EW	12,1	16,1	16,1	26,1	30,5	30,5	40,5
FB (H13)	5,5	6,5	6,5	6,5	8,5	8,5	9
Weight gr.	35	75	75	135	138	138	284

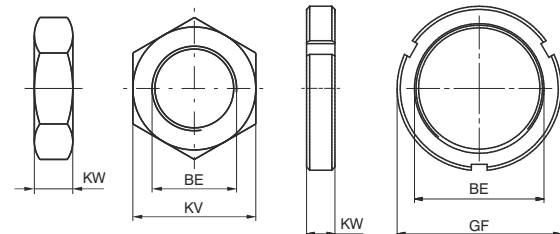
**Rod lock nut / Nut or lock nut for the end cap**

Ordering code	The kit comprises: n° 1 rod lock nut (AISI 316)
<b>Rod lock nut 12X.Ø.11</b>	
Nut / Lock nut for the end cap 12X.Ø.05	The kit comprises: n° 1 nut / lock nut for the end cap (AISI 316)



**Rod lock nut:**  
Mounted on the rod thread.  
Made of stainless steel AISI 316.

**Nut / Lock nut for the end cap:**  
Used to fasten flanges or feet to the endcaps of the microcylinder. The nuts are mounted on diameters that go from Ø16 to Ø25, the lock nuts from Ø32 to Ø63. Both are supplied with the microcylinders.



Bore	S	T	U	Rod lock nut weight (gr.)	BE	KV	GF	KW	Nut / Lock nut for the end caps weight (gr.)
16	10	4	M6X1	3	M16X1,5	22	-	6	16
20	13	5	M8X1,25	4	M22X1,5	30	-	7	25
25	17	6	M10X1,25	9	M22X1,5	30	-	7	25
32	17	6	M10X1,25	9	M30X1,5	-	42	8	42
40	19	7	M12X1,75	12	M40X1,5	-	52	9	62
50	19	7	M12X1,75	12	M40X1,5	-	52	9	62
63	24	8	M16X1,5	21	M45X1,5	-	60	10	100

**Front clevis**

Ordering code

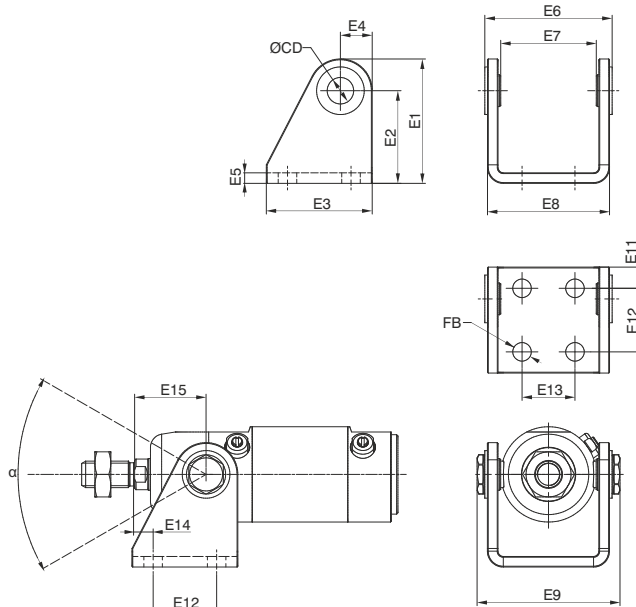
**12X.Ø.08**

The kit comprises:  
n° 1 clevis (AISI 316)  
n° 2 bushings (Technopolymer)



Used to mount by using the front end cap to mount parallel to the mounting plane. Allows the cylinder to oscillate and self-align with the linked element to the rod. Necessary to use when the rod may be subject to lateral forces during travel.

Made of stamped stainless steel AISI 316.



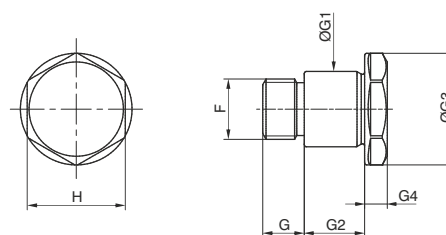
Bore	E1	E2 (±0,2)	E3	E4	E5	E6	E7	E8	E9	E11	E12	E13	E14	E15	FB (H13)	ØCD	α	Weight (gr.)
32	47	35	40	12	4	48	36	46	54	8	24	20	7	27	7	10	50°	121
40	53	40	50	13	4	60	49	58	68	10	30	28	6	33	9	12	50°	175
50	59	45	54	14	6	74	54	72	84	10	34	36	10	40	9	14	50°	330
63	65	50	65	16	6	88	72	86	98	15	35	42	11	45	9	16	40°	458

**Pin for front clevis**

Ordering code

**12X.Ø.09**

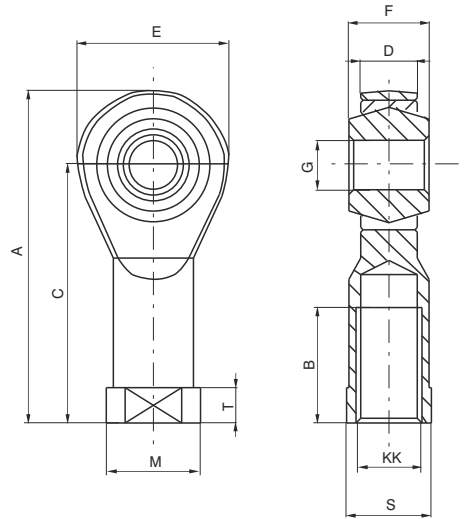
The kit comprises:  
n° 1 pin (AISI 316)



Bore	32	40	50	63
G	5,5	6	8,5	11
G1 (h7)	10	12	14	16
G2	8	10	12	12
G3	15	17	19	24
G4	3	4	5	5
F	M8X0,75	M10X1	M12X1	M14X1
H	13	15	17	21

**Ball joint**

Ordering code	The kit comprises: n° 1 ball joint (AISI 304 and 420)
<b>12X.Ø.10</b>	

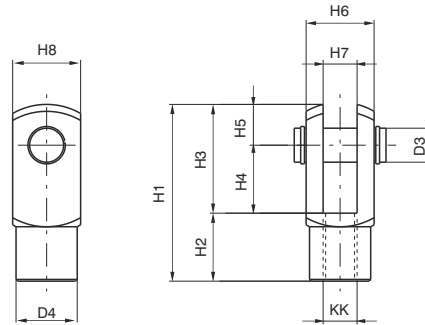


Mounted on the rod thread, assures a regular operation even in the presence of significant forces to the linked element. Made of stainless steel AISI 304 and 420.

Bore	16	20	25	32	40	50	63
A	40	48	57	57	66	66	85
B	12	16	20	20	22	22	28
C	30	36	43	43	50	50	64
D	6,75	9	10,5	10,5	12	12	15
E	20	24	28	28	32	32	42
F	9	12	14	14	16	16	21
G (H 7)	6	8	10	10	12	12	16
KK	M6	M8	M10X1,25	M10X1,25	M12X1,75	M12X1,75	M16X1,5
M	13	16	19	19	22	22	27
S	11	14	17	17	19	19	22
T	5	5	6,5	6,5	6,5	6,5	8
Weight gr.	25	25	75	75	112	112	222

**Cylinder rod fork**

Ordering code	The kit comprises: n° 1 fork (AISI 303) n° 1 pin (AISI 303) n° 2 circlips (AISI 420)
<b>12X.Ø.04</b>	



Mounted on the rod thread, assures a regular operation even in the presence of significant forces to the linked element. Made of stainless steel.

Bore	D3	D4	H1	H2	H3	H4	H5	H6	H7 (B12)	H8	KK	Weight gr.
16	6	10	31	12	19	12	7	12	6	12	M6X1	20
20	8	14	42	16	26	16	10	16	8	16	M8X1.25	45
25	10	18	52	20	32	20	12	20	10	20	M10X1.25	90
32	10	18	52	20	32	20	12	20	10	20	M10X1.25	90
40	12	20	62	18	38	24	14	24	12	24	M12X1.75	121
50	12	20	62	18	38	24	14	24	12	24	M12X1.75	121
63	16	26	83	32	51	32	19	32	16	32	M16X1.5	340

## General

They conform to CNOMO standards, fully complying with CETOP and ISO standards, with mounted fixing devices 32 to 100.

## Construction characteristic

End plates	solid aluminium bar up to Ø100, alloy aluminium from Ø125 to Ø200
Rod	C43 chromed steel, by thickness or stainless steel
Barrel	oxidised aluminium
Tie rods	steel with rolled threads
Cushion bearings	aluminium
Rod-guide bushing	brass (Ø32, 40, 50) in aluminium with self-lubricating bearings in sinterized bronze for the remaining BOREs
Piston	aluminium lathed from bar
Seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (FPM seals available upon request)

## Technical characteristic

Fluid	filtered and lubricated air - hydraulic oil (with special bushing)
Pressure	max. 12 bar (air) - 20 bar (oil)
Operating temperature	-5 °C - +70 °C with 1303-1308 standard seals -5 °C - +80 °C with FPM seals for 1306-1308 series (magnetic piston) -5 °C - +150 °C with FPM seals for 1303-1305 series (non magnetic piston)
Cushioning length	Ø 32 - 40 - 50 - 63 - 80 - 100 - 125 - 160 - 200 mm 20 - 20 - 22 - 24 - 24 - 25 - 27 - 35 - 35

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

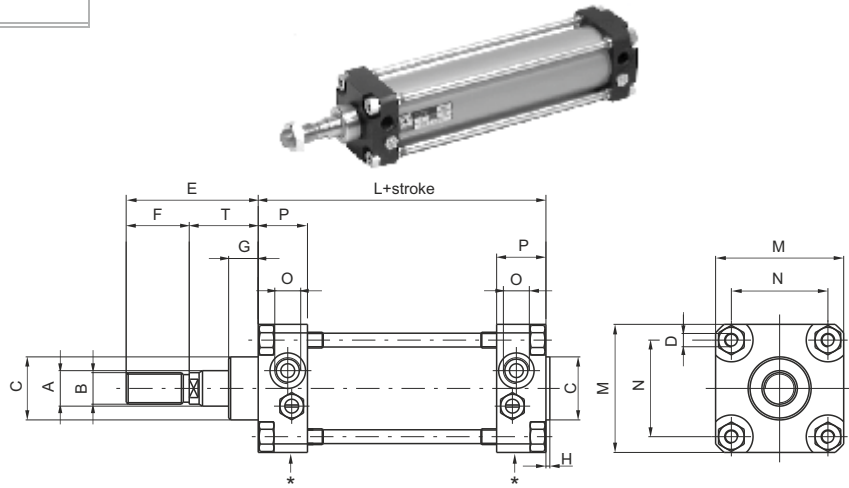
Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.  
Our Technical Department will be glad to help.

## Standard strokes

From 0 to 150 every 25 mm; from 150 to 500 every 50 mm; from 500 to 1000 every 100 mm. (for all BOREs)

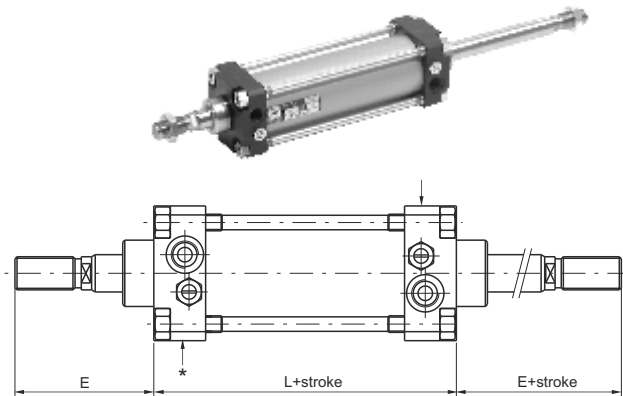
**Basic version**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.01A (CNOMO)
1304.Ø.stroke.01A (CETOP)
1305.Ø.stroke.01A (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.01A (CNOMO)
1307.Ø.stroke.01A (CETOP)
1308.Ø.stroke.01A (ISO)



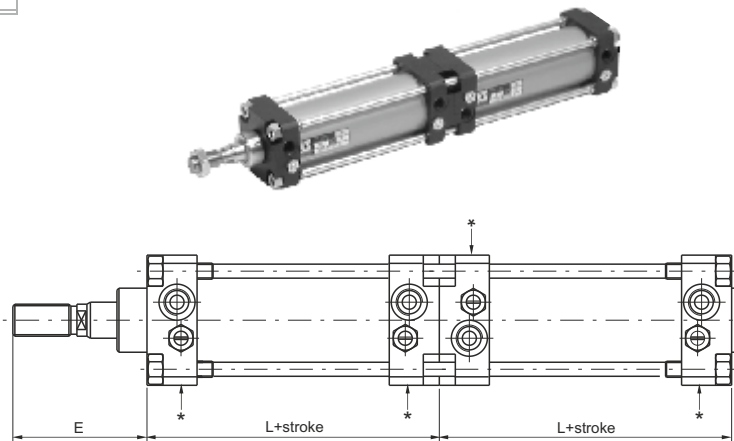
**Push/Pull version**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.02A (CNOMO)
1304.Ø.stroke.02A (CETOP)
1305.Ø.stroke.02A (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.02A (CNOMO)
1307.Ø.stroke.02A (CETOP)
1308.Ø.stroke.02A (ISO)



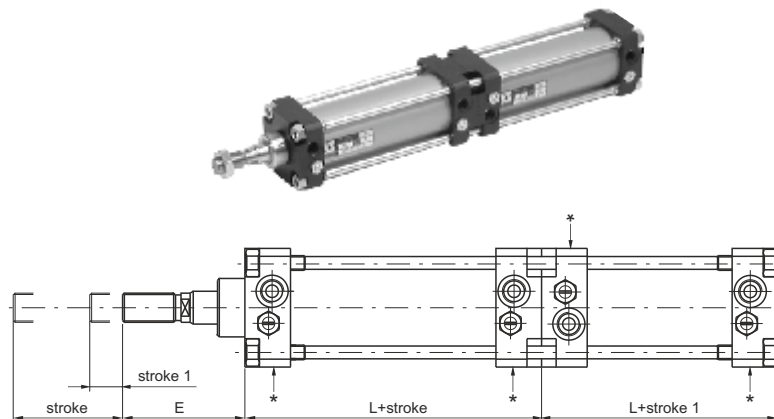
**Tandem push with a common rod**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.H (CNOMO)
1304.Ø.stroke.H (CETOP)
1305.Ø.stroke.H (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.H (CNOMO)
1307.Ø.stroke.H (CETOP)
1308.Ø.stroke.H (ISO)



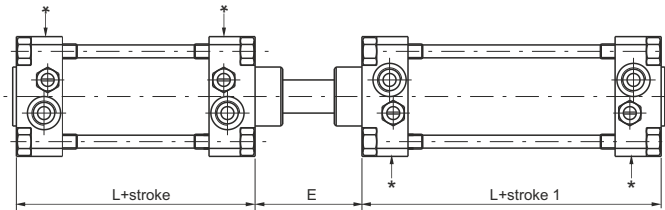
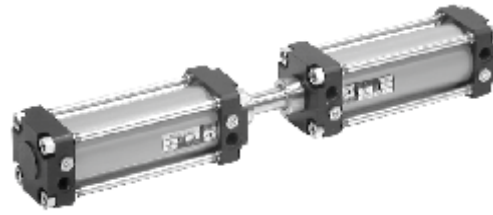
**Tandem push with independent rods**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.stroke1.N (CNOMO)
1304.Ø.stroke.stroke1.N (CETOP)
1305.Ø.stroke.stroke1.N (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.stroke1.N (CNOMO)
1307.Ø.stroke.stroke1.N (CETOP)
1308.Ø.stroke.stroke1.N (ISO)



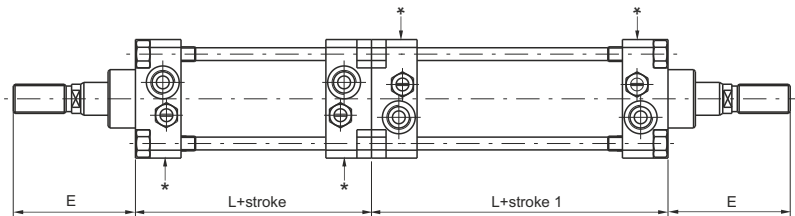
**Opposed tandem with common rods**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.stroke1.R (CNOMO)
1304.Ø.stroke.stroke1.R (CETOP)
1305.Ø.stroke.stroke1.R (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.stroke1.R (CNOMO)
1307.Ø.stroke.stroke1.R (CETOP)
1308.Ø.stroke.stroke1.R (ISO)



**Tandem with opposed rods**

Ordering code
<b>Non magnetic piston</b>
1303.Ø.stroke.stroke1.U (CNOMO)
1304.Ø.stroke.stroke1.U (CETOP)
1305.Ø.stroke.stroke1.U (ISO)
<b>Magnetic piston</b>
1306.Ø.stroke.stroke1.U (CNOMO)
1307.Ø.stroke.stroke1.U (CETOP)
1308.Ø.stroke.stroke1.U (ISO)



**Variants**

Add "X" to the cylinder code to order cylinders with STAINLESS STEEL rods. Example: **1303.32.250.01AX**.

Add "V" to the cylinder code to order cylinders with FPM seals. Example: **1303.32.250.01AV**.

Add "MA" to the cylinder code to order cylinders single acting front spring, with strokes not superior to 50. Example: **1303.32.50.01AMA**.

Add "MP" to the cylinder code to order cylinders single acting rear spring, with strokes not superior to 50. Example: **1303.50.25.01AMP**.

**Note:** Cushion adjustment (for Ø 32, Ø 40, Ø 125, Ø 160 and Ø 200) is on the side indicated by ★ (see drawings).

**Table of dimensions**

Bore	32	40	50	63	80	100	125	160	200
A (f7)	12	18	18	22	22	30	30	40	40
B - CNOMO (6g)	M10x1,5	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M27x2	M36x2	M36x2
B - CETOP (6g)	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M24x2	M36x2	M36x2
B - ISO (6g)	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2
C (d11)	25	32	32	45	45	55	55	65	65
H	2,5	2	2	2	2	2	3	3	3
D	M6	M6	M8	M8	M10	M10	M12	M16	M16
E - CNOMO	45	70	70	85	85	110	110	135	135
E - CETOP	44	52	67	67	82	87	109	152	162
E - ISO	46	52	67	67	82	87	115	152	162
F - CNOMO	20	36	36	46	46	63	63	85	85
F - CETOP	20	24	32	32	40	40	48	72	72
F - ISO	22	24	32	32	40	40	54	72	72
G	15	15	15	20	20	20	20	25	25
M	45	52	65	75	95	115	140	180	220
N	33	40	49	59	75	90	110	140	175
O	G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"	G 1/2"	G 3/4"	G 3/4"
P	16	23	25	31	31	35	36	45	45
T - CNOMO	25	34	34	39	39	47	47	50	50
T - CETOP-ISO	24	28	35	35	42	47	61	80	90
L - CNOMO (±1)	80	110	110	125	125	145	145	180	180
L - CETOP-ISO (±1)	98	110	110	125	136	145	168	180	190

STROKE TOLERANCE: + 2 mm.

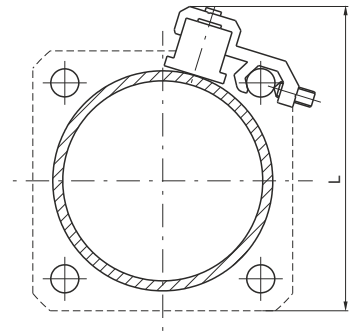
**WEIGHT IN gr. OF THE CYLINDERS WITH VARIOUS BARRELS (BASIC VERSION)**

Bore	32	40	50	63	80	100	125	160	200	
Aluminium	stroke 0	580	1010	1350	2110	3350	5400	7450	13300	18300
	every 10 mm	24	38	47	63	75	117	130	235	250

FOR CYLINDERS IN TANDEM THE WEIGHT IS APPROXIMATELY DOUBLE

**Sensor brackets codes - 1500., RS., HS.**

Ordering code	1306.A				1306.B				1306.C	
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Ø160	Ø200	
Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Ø160	Ø200	
L	59	65	76	87	103	121	144	179	215	

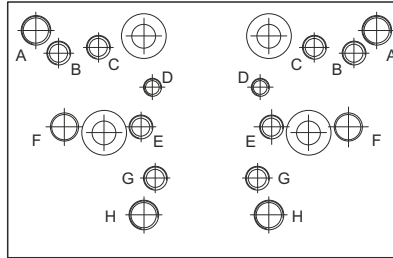


**Sensor for microcylinders**

For technical characteristics and ordering codes see Chapter 6 (magnetic sensors)

**Distributor supports**

This accessory allows valves or solenoid valves to mount on the side of the cylinder. Support should be anchored to the tie rods and on it either a threaded distributor can be mounted or a base upon which an ISO distributor can be mounted. Once installed the connections must be done with fittings and pipes. All of the threaded holes on the support plate are dedicated to different valves series as per attached drawing.

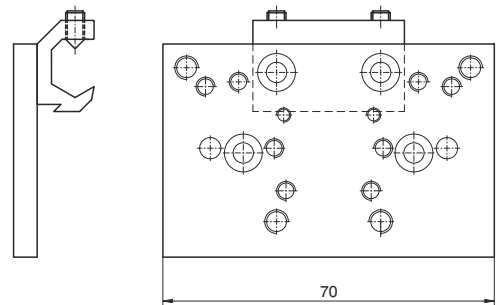
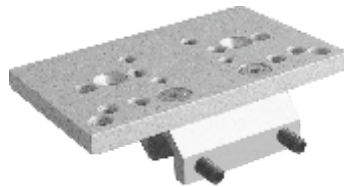


Fixing holes for valves series:

- A = 414/2
- B = 824
- C = 828, T488, 488, 484
- D = 2400
- E = 2600
- F = Bases for ISO distributors
- G = 858/2
- H = T424

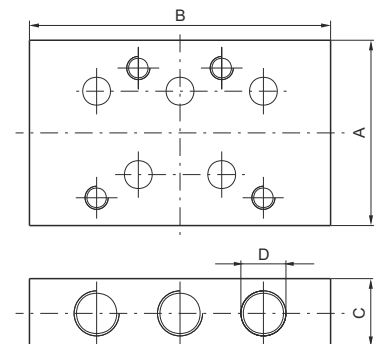
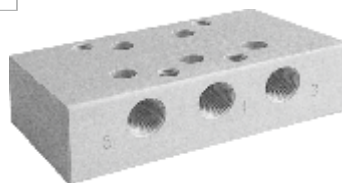
**Support**

Ordering code	<b>1306.15</b> (Ø32 - Ø100)
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**Bases for ISO distributors**

Ordering code	
<b>1320.21</b>	bases for ISO 1 electro distributor
<b>1320.22</b>	bases for ISO 2 electro distributor



	Dimensions			
	A	B	C	D
bases for ISO 1 electro distributor	40	75	15	G 1/8"
bases for ISO 2 electro distributor	50	95	20	G 1/4"



**Front and rear flanges**

Ordering code

**1303.Ø.03F**  
(CNOMO)  
**1304.Ø.03F**  
(CETOP - ISO)

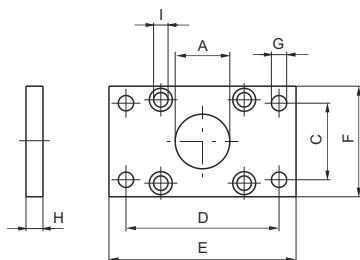
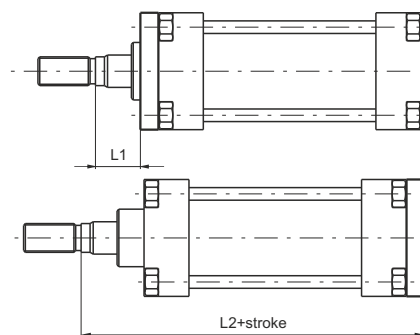


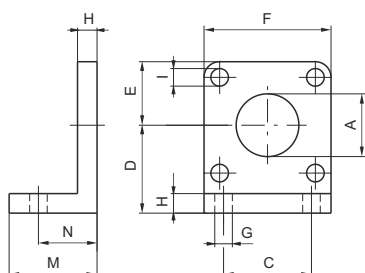
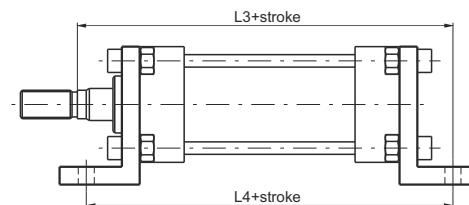
Plate which allows anchorage of the cylinder at a right angle to the plane. It is made of zinc-plated extruded steel.

Bore	32	40	50	63	80	100	125	160	200
A (H11)	25	32	32	45	45	55	55	65	65
C - CNOMO (JS 14)	33	40	49	59	75	90	110	140	175
C - CETOP ISO (JS 14)	32	36	45	50	63	75	90	115	135
D - CNOMO (JS 14)	68	78	94	104	130	150	180	228	268
D - CETOP - ISO (JS 14)	64	72	90	100	126	150	180	230	270
E	80	90	110	120	150	170	205	260	300
F	45	52	65	75	95	115	140	180	220
G - CNOMO (H13)	9	9	11	11	14	14	18	22	22
G - CETOP - ISO (H13)	7	9	9	9	12	14	16	18	22
H (JS 14)	8	8	10	10	12	12	16	20	20
I	6,5	6,5	9	9	10,5	10,5	13,5	16,5	16,5
L1 - CNOMO	17	26	24	29	27	35	31	30	30
L1 - CETOP - ISO	16	20	25	25	30	35	45	60	70
L2 - CNOMO	113	152	154	174	176	204	208	250	250
L2 - CETOP - ISO	130	145	155	170	190	205	245	280	300
Weight gr.	165	200	540	1060	1460	1510	3100	6400	9500

**Standard feet**

Ordering code

**1303.Ø.05F**  
(CNOMO)  
(1 piece)  
**1304.Ø.05F**  
(CETOP - ISO)  
(1 piece)



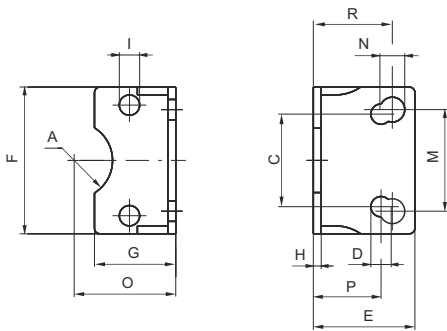
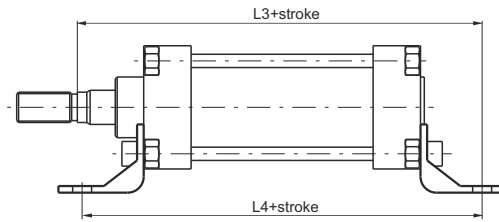
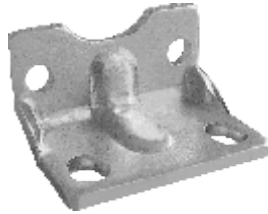
Elements used to anchor the cylinder parallel to the mounting plane. They are made of cast aluminium, painted black.

Bore	32	40	50	63	80	100	125	160	200
A (H11)	25	32	32	45	45	55	55	65	65
C - CNOMO (JS 14)	28	36	45	55	70	90	100	130	170
C - CETOP ISO (JS 14)	32	36	45	50	63	75	90	115	135
D - CNOMO (JS 15)	32	36	45	50	63	73	91	115	135
D - CETOP - ISO (JS 15)	32	36	45	50	63	71	90	115	135
E	22	26	32	37	47	57	70	90	110
F	45	52	65	75	95	115	140	180	220
G - CNOMO (H14)	9	9	11	11	14	14	18	22	22
G - CETOP (H14)	7	9	9	9	12	14	16	18	22
G - ISO (H14)	7	9	9	9	12	14	16	18	22
H	8	8	10	10	12	12	16	20	20
I	7	7	9	9	11	11	13	17	17
M	35	35	45	45	55	55	68	82	91
N - CNOMO (±0,2)	27	27	35	35	43	43	52	62	62
N - CETOP - ISO (±0,2)	22	25,5	30	30	37	37,5	41	60	65
L3 - CNOMO	132	171	179	199	207	235	244	292	292
L3 - CETOP - ISO	144	163	175	190	215	230	270	320	345
L4 - CNOMO	134	164	180	195	211	231	249	304	304
L4 - CETOP - ISO	142	161	170	185	210	220	250	300	320
Weight gr.	55	70	150	175	260	550	920	2200	3200

**Short sheet metal feet**

Ordering code

**1303.Ø.05/1F**  
(CNOMO - CETOP - ISO)  
(1 piece)



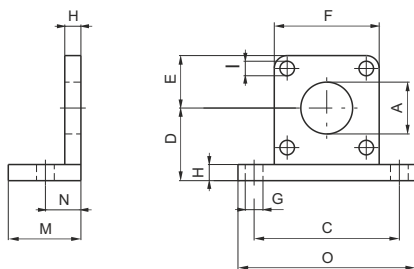
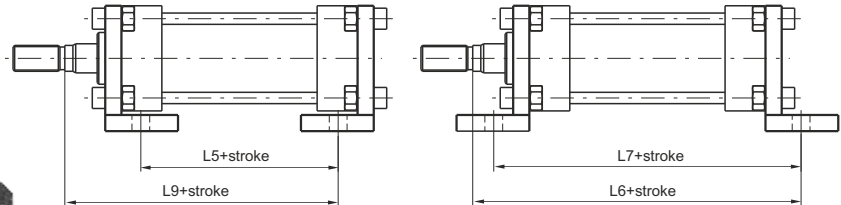
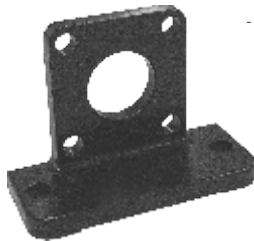
Elements used to anchor the cylinder parallel to the mounting plane. They are made of stamped and pierced sheet metal and painted in black. The mounting holes allow use with CNOMO, CETOP and ISO. Available up to 100 mm. BORE.

Bore	32	40	50	63	80	100
A	13	17	17	23,5	23,5	-
C - CETOP - ISO (JS 14)	32	36	45	50	63	75
D - CETOP - ISO (JS 15)	7	9	9	9	12	14
E	35	36	45	45	55	56
F	45	52	65	75	95	115
G	30	30	36	35	45	44
H	3,5	3,5	3,5	4,5	5	5
I	7	7	9	9	11	11
M - CNOMO (JS 14)	28	36	45	55	70	90
N - CNOMO (JS 15)	9	9	11	11	13	13
O - CNOMO (JS 15)	32	36	45	50	63	73
O - CETOP - ISO (JS 15)	32	36	45	50	63	71
P - CETOP - ISO (±0,2)	22	25,5	30	30	37	37,5
R - CNOMO (±0,2)	27	27	35	35	43	43
L3 - CNOMO	132	171	179	199	207	235
L3 - CETOP - ISO	144	163	175	190	215	230
L4 - CNOMO	134	164	180	195	211	231
L4 - CETOP - ISO	142	161	170	185	210	220
Weight gr.	58	70	118	184	305	385

**Large internal and external feet**

Ordering code

*Internal*  
**1303.Ø.06F**  
(CNOMO) (1 piece)  
(May be used with  
CETOP-ISO cylinders  
but are not specified  
in the standards)  
*External*  
**1303.Ø.07F**  
(CNOMO) (1 piece)



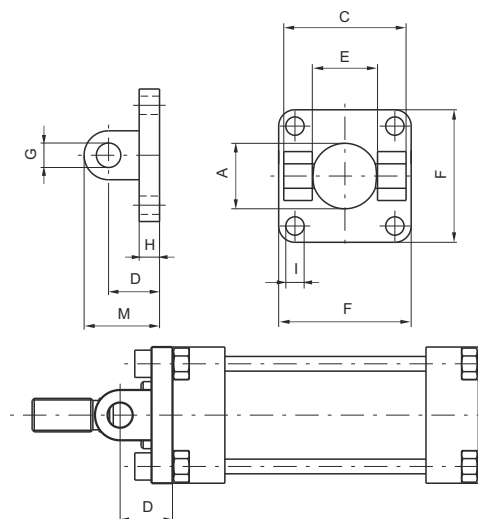
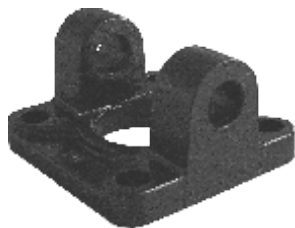
Elements used to anchor the cylinder parallel to the mounting plane. They are made of aluminium alloy and painted black.

Bore	32	40	50	63	80	100	125	160	200
A (H11)	25	32	32	45	45	55	55	65	65
C (JS 14)	65	72	90	100	126	148	180	230	270
D (JS 15)	32	36	45	50	63	73	91	115	135
E	22	26	32	37	47	57	70	90	110
F	45	52	65	75	95	115	140	180	220
G (H14)	9	9	11	11	14	14	18	22	22
H	8	8	10	10	12	12	16	20	20
I	7	7	9	9	11	11	13	17	17
M	35	35	45	45	55	55	67	80	80
N (±0,2)	18	18	22	22	28	28	32	40	40
O	82	90	110	120	155	180	215	275	315
L5 - CNOMO	60	90	86	101	93	113	113	140	140
L5 - CETOP - ISO	78	90	86	101	104	113	136	140	150
L6 - CNOMO	123	162	166	186	192	220	224	270	270
L6 - CETOP - ISO	141	162	166	186	203	220	247	270	280
L7 - CNOMO	116	146	154	169	181	201	209	260	260
L7 - CETOP - ISO	134	146	154	169	192	201	232	260	270
L9 - CNOMO	95	134	132	152	148	176	176	210	210
L9 - CETOP - ISO	112	128	133	148	162	176	213	240	250
Weight gr.	80	90	190	210	460	600	1080	2400	3100

**Front clevis**

Ordering code

*Front*  
**1303.Ø.08F**  
(CNOMO)  
**1304.Ø.08F**  
(CETOP - ISO)



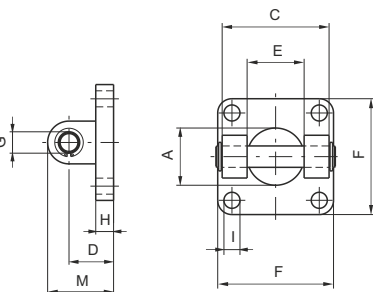
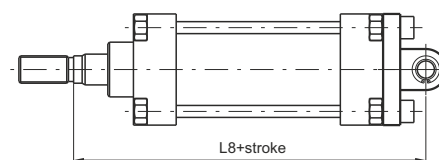
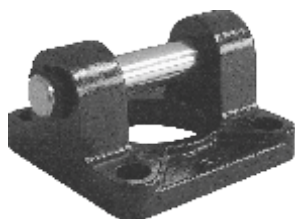
This type of mounting allows anchorage of the cylinder both parallel and at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary. It is made of aluminium alloy and painted black.

Bore	32	40	50	63	80	100	125	160	200
A	25	32	32	45	45	55	55	65	65
C - CNOMO (H1)	45	52	65	75	95	115	140	180	220
C - CETOP - ISO (H14)	45	52	60	70	90	110	130	170	170
D - CNOMO (±0,2)	18	24	26	30	32	37	41	55	55
D - CETOP (±0,2)	20	22	25	30	32	37	46	55	55
E - CNOMO (H14)	26	33	33	47	47	57	57	72	72
E - CETOP (H14)	26	28	32	40	50	60	70	90	90
F	45	52	65	75	95	115	140	180	220
G - CNOMO (H9)	8	12	12	16	16	20	20	25	25
G - CETOP - ISO (H9)	10	12	12	16	16	20	25	30	30
H	8	8	10	10	12	12	16	19	19
I	7	7	9	9	11	11	13	17	17
M - CNOMO	26	36	38	46	48	57	61	80	80
M - CETOP - ISO	30	35	37	46	48	57	71	85	85
Weight gr.	55	60	120	145	325	510	900	2080	3100

**Rear clevis complete with pin**

Ordering code

*Front*  
**1303.Ø.09F**  
(CNOMO)  
**1304.Ø.09F**  
(CETOP - ISO)



This type of mounting allows anchorage of the cylinder both parallel and at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary. It is made of aluminium alloy and painted black.

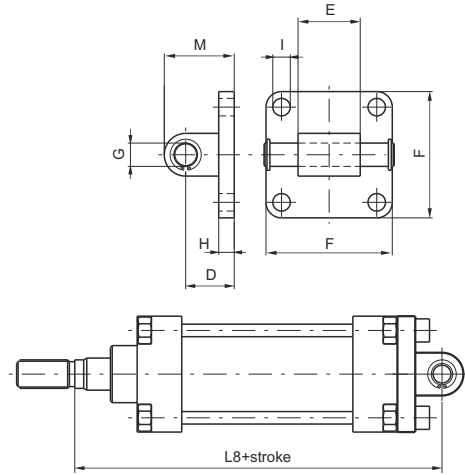
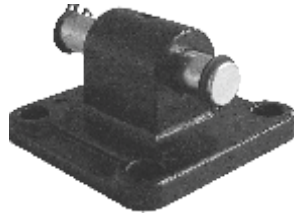
Bore	32	40	50	63	80	100	125	160	200
A	25	32	32	45	45	55	55	65	65
C - CNOMO (H1)	45	52	65	75	95	115	140	180	220
C - CETOP - ISO (H14)	45	52	60	70	90	110	130	170	170
D - CNOMO (±0,2)	18	24	26	30	32	37	41	55	55
D - CETOP - ISO (±0,2)	20	22	25	30	32	37	46	55	55
E - CNOMO (H14)	26	33	33	47	47	57	57	72	72
E - CETOP (H14)	26	28	32	40	50	60	70	90	90
F	45	52	65	75	95	115	140	180	220
G - CNOMO (H9)	8	12	12	16	16	20	20	25	25
G - CETOP - ISO (H9)	10	12	12	16	16	20	25	30	30
H	8	8	10	10	12	12	16	19	19
I	7	7	9	9	11	11	13	17	17
M - CNOMO	26	36	38	46	48	57	61	80	80
M - CETOP - ISO	30	35	37	46	48	57	71	85	85
L8 - CNOMO	123	168	170	194	196	229	233	285	285
L8 - CETOP - ISO	142	160	170	190	210	230	275	315	335
Weight gr.	75	110	190	280	490	820	1270	2800	3900

**Rear male clevis**

Ordering code

**1304.Ø.09/1F**

(For CETOP-ISO cylinders  
May be used with CNOMO  
cylinders but is not specified  
in the standards)



Similar to 09 clevis except for the connection, which is male rather than female. It can also be used as a counter clevis for type 10 (only CETOP - ISO). Allows mounting of cylinder at right angle to the plane of the cylinder rod.

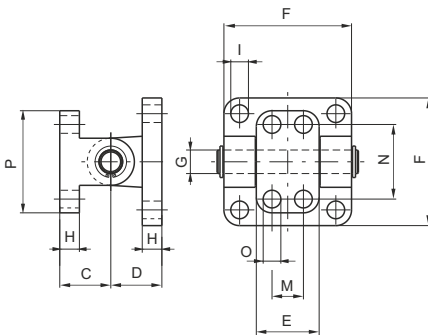
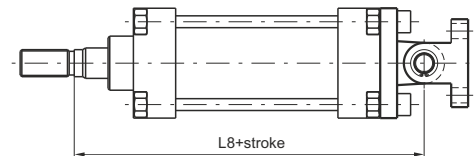
Bore	32	40	50	63	80	100	125	160	200
D (±0,2)	20	22	25	30	32	37	46	55	55
E (+0,2 / -0,6)	26	28	32	40	50	60	70	90	90
F	45	52	65	75	95	115	140	180	220
G (H 9)	10	12	12	16	16	20	25	30	30
H	8	8	8	10	12	12	16	20	20
I	7	7	9	9	11	11	14	18	18
M	30	35	36	45	47	57	71	80	80
L8 - CNOMO	125	166	169	194	196	229	233	285	285
L8 - CETOP - ISO	142	160	170	190	210	230	275	315	335
Weight gr.	50	80	110	185	325	460	1300	2850	3980

**Rear clevis bracket**

Ordering code

**1303.Ø.10F (CNOMO)**

(May be used with  
CETOP - ISO  
cylinders but is not  
specified in the standard)



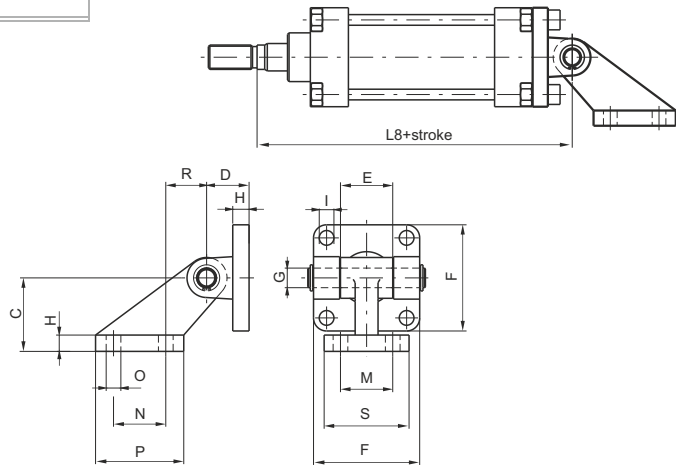
Mounting consists of clevis 09 and counter clevis. Used to mount cylinders at a right angle to the plane to which the counter clevis is attached. Allows self-alignment of the cylinder rod under load with an oscillation of ± 60 degrees.

Bore	32	40	50	63	80	100	125	160	200
C (±0,2)	18	26	26	34	34	41	41	55	55
D (±0,2)	18	24	26	30	32	37	41	55	55
E	25	32	32	46	46	56	56	71	71
F	45	52	65	75	95	115	140	180	220
G (H 9)	8	12	12	16	16	20	20	25	25
H	8	10	10	12	12	16	16	20	20
I	7	7	9	9	11	11	13	17	17
M (JS 14)	-	16	16	25	25	32	32	43	43
N (JS 14)	28	38	38	54	54	90	90	150	150
O (H 13)	7	9	9	11	11	14	14	18	18
P	40	52	52	75	75	115	115	180	180
L8 - CNOMO	123	168	170	194	196	229	233	285	285
L8 - CETOP - ISO	140	162	171	190	210	229	270	315	335
Weight gr.	90	165	240	470	665	1190	1660	3700	4700

**Trunnion with support bracket**

Ordering code

**1303.Ø.11F**  
(CNOMO)  
(May be used with  
CETOP - ISO  
cylinders but  
is not specified  
in the standards)



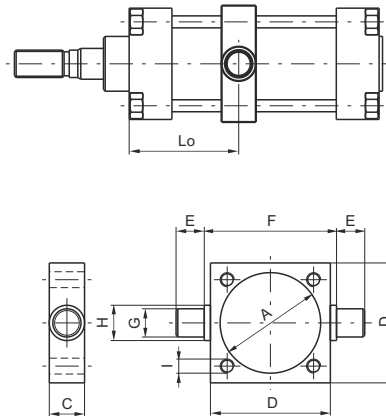
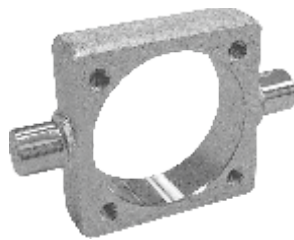
Mounting consists of clevis 09 and right angle counter clevis. Used to mount cylinders parallel to the plane to which the counterclevis is attached. Allows self-alignment of the cylinder rod under load with an oscillation up to 90 degrees from the mounting plane.

Bore	32	40	50	63	80	100	125	160	200
C (JS 15)	32	45	45	63	63	90	90	140	140
D (±0,2)	18	24	26	30	32	37	41	55	55
E	25	32	32	46	46	56	56	71	71
F	45	52	65	75	95	115	140	180	220
G (H9)	8	12	12	16	16	20	20	25	25
H	8	10	10	12	12	16	16	20	20
I	7	7	9	9	11	11	13	17	17
M (JS14)	25	32	32	40	40	50	50	63	63
N (Js14)	20	32	32	50	50	70	70	110	110
O (JS 13)	7	9	9	11	11	14	14	18	18
P	37	54	54	75	75	102	102	154	154
R	18	25	25	32	32	40	40	50	50
S	41	51	51	62	62	80	80	110	110
L8 - CNOMO	123	168	170	194	196	229	233	285	285
L8 - CETOP - ISO	140	162	171	190	210	229	270	315	335
Weight gr.	125	250	325	600	800	1570	2100	4600	5700

**Intermediate trunnion**

Ordering code

**1300.Ø.12F**



Clevis to be mounted between the endcaps of the cylinder allowing rotation at any point along the barrel. One piece construction from zinc-plated stamped steel. Can be mounted in fixed position or attached to adjustable tie rods.

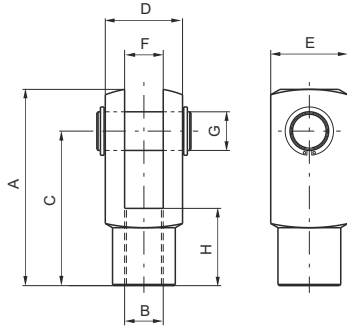
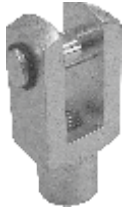
NOTE: Lo max means at stroke 0.

Bore	32	40	50	63	80	100	125	160	200
A	37	46	56	69	87	107	133	170	211
C	15	20	20	25	25	30	32	40	40
D	46	59	69	84	102	125	155	190	240
E (h 14)	12	16	16	20	20	25	25	32	32
F (h 14)	50	63	73	90	108	131	160	200	250
G (e 9)	12	16	16	20	20	25	25	32	32
H	15	20	20	25	25	30	30	40	40
I	M6	M6	M8	M8	M10	M10	M12	M16	M16
Lo min.	32	35	40	47	53	55	61	78	79
Lo max. +stroke - CNOMO	48	75	70	80	72	90	84	103	102
Lo max. + stroke - CETOP - ISO	67	75	70	80	84	90	107	103	112
Weight gr.	130	310	370	700	900	1590	2600	4300	7500

**Fork with pin**

Ordering code

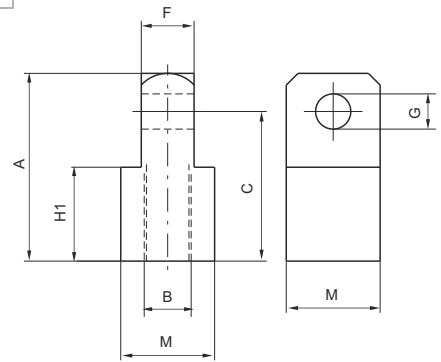
**1300.Ø.13F (CNOMO)**  
**1301.Ø.13F (CETOP)**  
**1302.Ø.13F (ISO)**



**Male fork**

Ordering code

**1300.Ø.14F**  
(only for CNOMO cylinders)

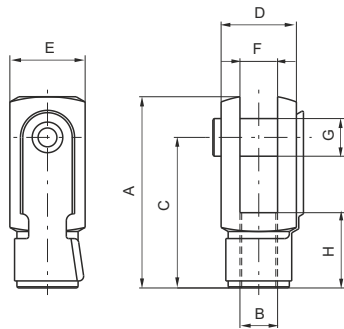
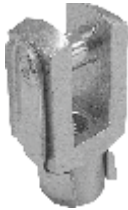


**Fork with clips**

Ordering code

**1300.Ø.13/1F (CNOMO)**  
**1301.Ø.13/1F (CETOP)**  
**1302.Ø.13/1F (ISO)**

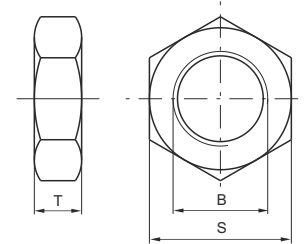
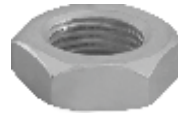
from Ø32 to Ø100



**Rod lock nut**

Ordering code

**1300.Ø.18F (CNOMO)**  
**1301.Ø.18F (CETOP)**  
**1302.Ø.18F (ISO)**



Bore	32	40	50	63	80	100	125	160	200
A - CNOMO	45	64	64	80	80	105	105	140	140
A - CETOP - ISO	51	62	82	82	105	105	132/148	188	188
B - CNOMO (6H)	M10x1,5	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M27x2	M36x2	M36x2
B - CETOP (6H)	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M24x2	M36x2	M36x2
B - ISO (6 H)	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2
C - CNOMO	36	51	51	63	63	85	85	115	115
C - CETOP - ISO	40	48	64	65	80	80	100/100	144	144
D - CNOMO	22	36	36	45	45	63	63	80	80
D - CETOP - ISO	20	24	32	32	40	40	50/55	70	70
E - CNOMO	22	26	26	34	34	42	42	50	50
E - CETOP - ISO	20	24	32	32	40	40	50/55	70	70
F - CNOMO (H 14)	11	18	18	22	22	30	30	40	40
F - CETOP - ISO (B 12)	10	12	16	16	20	20	25/30	35	35
G - CNOMO (H 9)	8	12	12	16	16	20	20	25	25
G - CETOP - ISO (H 9)	10	12	16	16	20	20	25/30	35	35
H - CNOMO	20	26	26	30	30	45	45	75	75
H - CETOP - ISO	20	24	32	32	40	40	50/56	72	72
H1 - CNOMO	20	32	32	40	40	55	55	75	75
M	22	32	32	36	36	45	45	70	70
S - CNOMO	17	24	24	30	30	41	41	55	55
S - CETOP	17	19	24	24	30	30	36	55	55
S - ISO	17	19	24	24	30	30	41	55	55
T - CNOMO	6	8	8	9	9	12	12	18	18
T - CETOP	6	7	8	8	9	9	10	18	18
T - ISO	6	7	8	8	9	9	12	18	18
Weight gr.	Fork	90	150	350	350	680	680	2500	4000
	Rod lock nut	10	20	20	35	35	80	80	210
	Male fork	110	30	330	500	500	1300	1300	3500

**Basic version**

Ordering code	
<b>1315.Ø.stroke.01A</b> magnetic, aluminium barrel	
<b>BORE</b>	
Ø	250 = 250 mm 320 = 320 mm

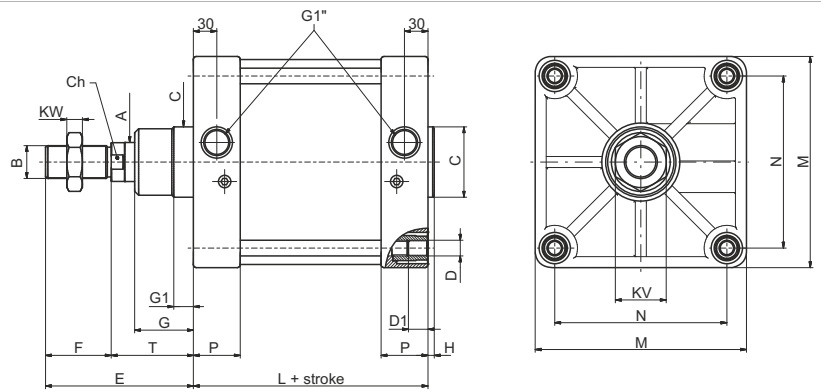


Table of dimensions

BORE	A	B	Ch	C	D	D1	E	F	G	G1	H	KW	KV	L	M	N	P	T	Weight gr.
250	Ø50	M42x2	46	Ø90	M20	25	189	84	75	25	8	21	Es64	200	270	220	60	105	28.170 (increase of 380 gr. each 10 mm stroke)
320	Ø63	M48x2	55	Ø110	M24	28	216	96	90	25	10	24	Es72	220	350	270	65	120	49.810 (increase of 616 gr. each 10 mm stroke)

**Front and rear flanges**

Ordering code	
<b>1315.Ø.03F</b> (Steel)	
<b>BORE</b>	
Ø	250 = 250 mm 320 = 320 mm

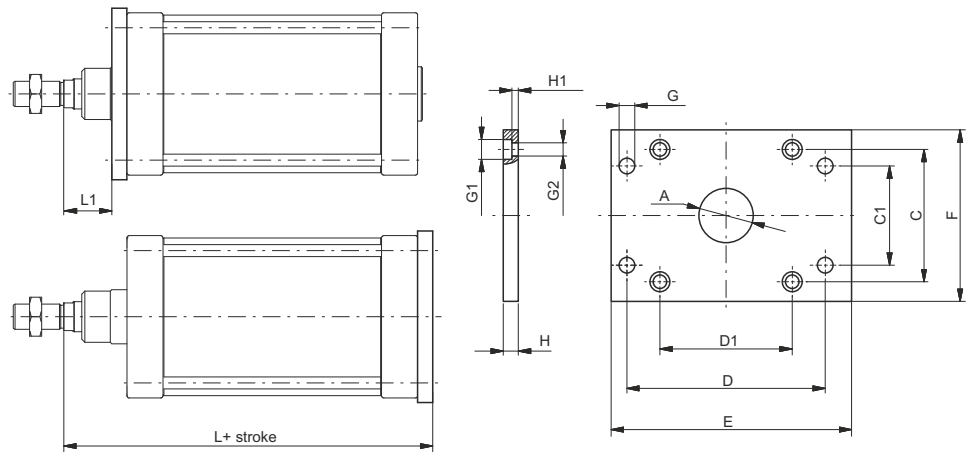


Table of dimensions

BORE	A(H11)	C	C1 (JS14)	D (JS14)	D1	E	F	G (H13)	G1 (H13)	G2 (H13)	H (±0,2)	H1 (+0,5 / -0,5)	L	L1	Weight gr.
250	90	220	165	330	220	400	285	26	33	22	25	10,5	330	80	20.150
320	110	270	200	400	270	470	350	33	39	26	30	15	370	90	34.000

**Rear clevis complete with pin**

Ordering code	
<b>1315.Ø.09F</b>	
<b>BORE</b>	
Ø	250 = 250 mm 320 = 320 mm

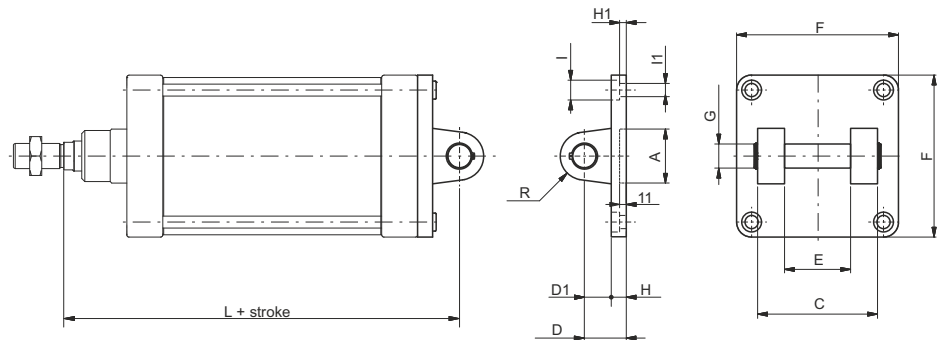


Table of dimensions

BORE	A	C (H14)	D (±0,2)	D1	E (H14)	F	G (H9)	H	H1	I	I1	L	R	Weight gr.
250	Ø90	200	70	45	110	270	40	25	11	33	22	375	40	7.800
320	Ø110	220	80	50	120	350	42,5	30	15	39	26	420	45	13.000

**Rear male clevis**

Ordering code	
<b>1315.Ø.09/1F</b>	
<b>BORE</b>	
Ø	250 = 250 mm 320 = 320 mm

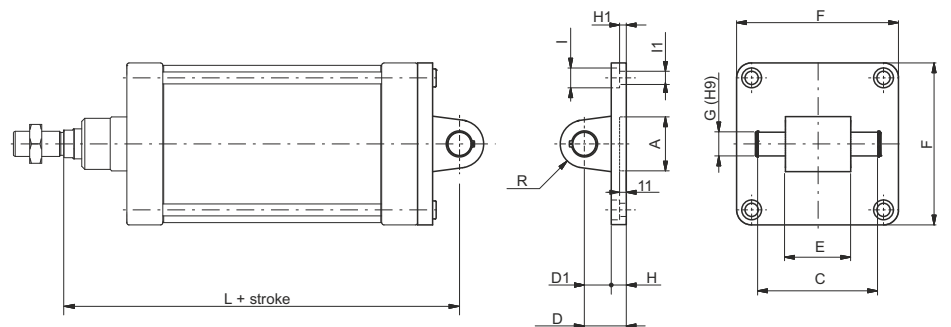
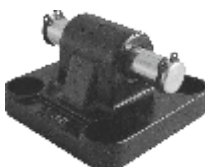


Table of dimensions

BORE	A	C (+0,3 / -0,3)	D (±0,2)	D1	E (-0,5 / -1,2)	F	G (H9)	H	H1	I	I1	L	R	Weight gr.
250	Ø90	202	70	45	110	270	40	25	11	33	22	375	40	8.300
320	Ø110	222	80	50	120	350	42,5	30	15	39	26	420	45	13.060



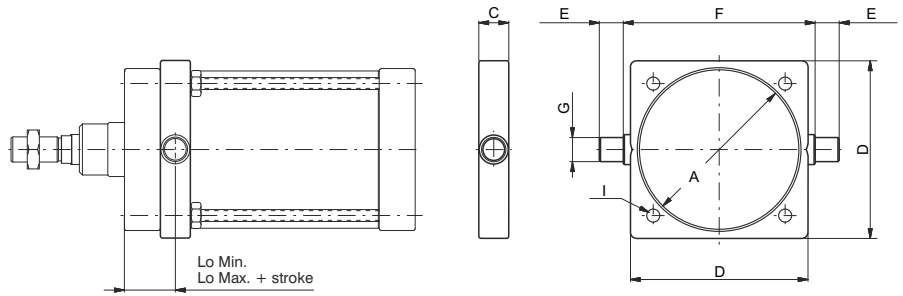
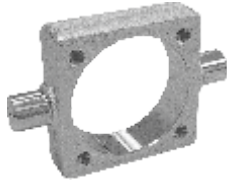
**Intermediate trunnion**

Ordering code

**1315.Ø.12F**  
(Steel)

**BORE**

250 = 250 mm  
320 = 320 mm



**Table of dimensions**

BORE	A	C	D	E (h14)	F (h14)	G (e9)	I	Lo Min.	Lo Max.	Weight gr.
250	Ø268	50	295	40	320	Ø40	Ø20,25	85	115 + stroke	10.500
320	Ø343	70	370	50	400	Ø50	Ø24,25	95	125 + stroke	25.300

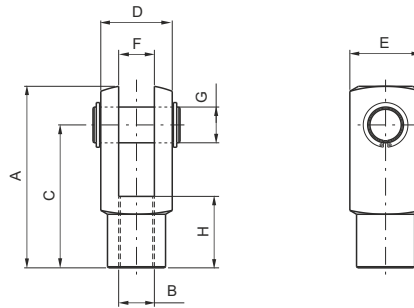
**Fork with pin**

Ordering code

**1302.Ø.13F**  
(Steel)

**BORE**

250 = 250 mm  
320 = 320 mm



**Table of dimensions**

BORE	A	B	C	D	E	F	G	H	Weight gr.
250	188	M42x2 (H8)	144	70	70	35 (B12)	Ø35 (H9)	72	3.700
320	265	M48x2	192	96	96	50	Ø50	96	9.700

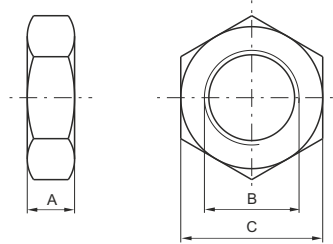
**Rod lock nut**

Ordering code

**1302.Ø.18F**  
(Steel)

**BORE**

250 = 250 mm  
320 = 320 mm



**Table of dimensions**

BORE	A	B	C	Weight gr.
250	21	M42x2	65	260
320	24	M48x2	72	580

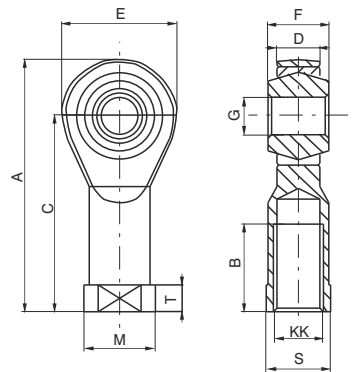
**Ball joint**

Ordering code

**1302.Ø.32F**  
(Steel)

**BORE**

250 = 250 mm  
320 = 320 mm



**Table of dimensions**

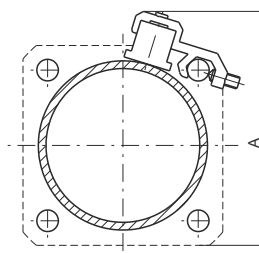
BORE	250	320
A	187	218
B	60	65
C	142	162
D (-0.1)	33	45
E	91	117
F	49	60
G (H 7)	40	50
KK	M42x2	M48x2
M	65	75
S	55	65
T	19	23
Weight gr.	2.400	5.000

**Sensor bracket - codes 1500.\_RS.\_HS.\_**

Ordering code

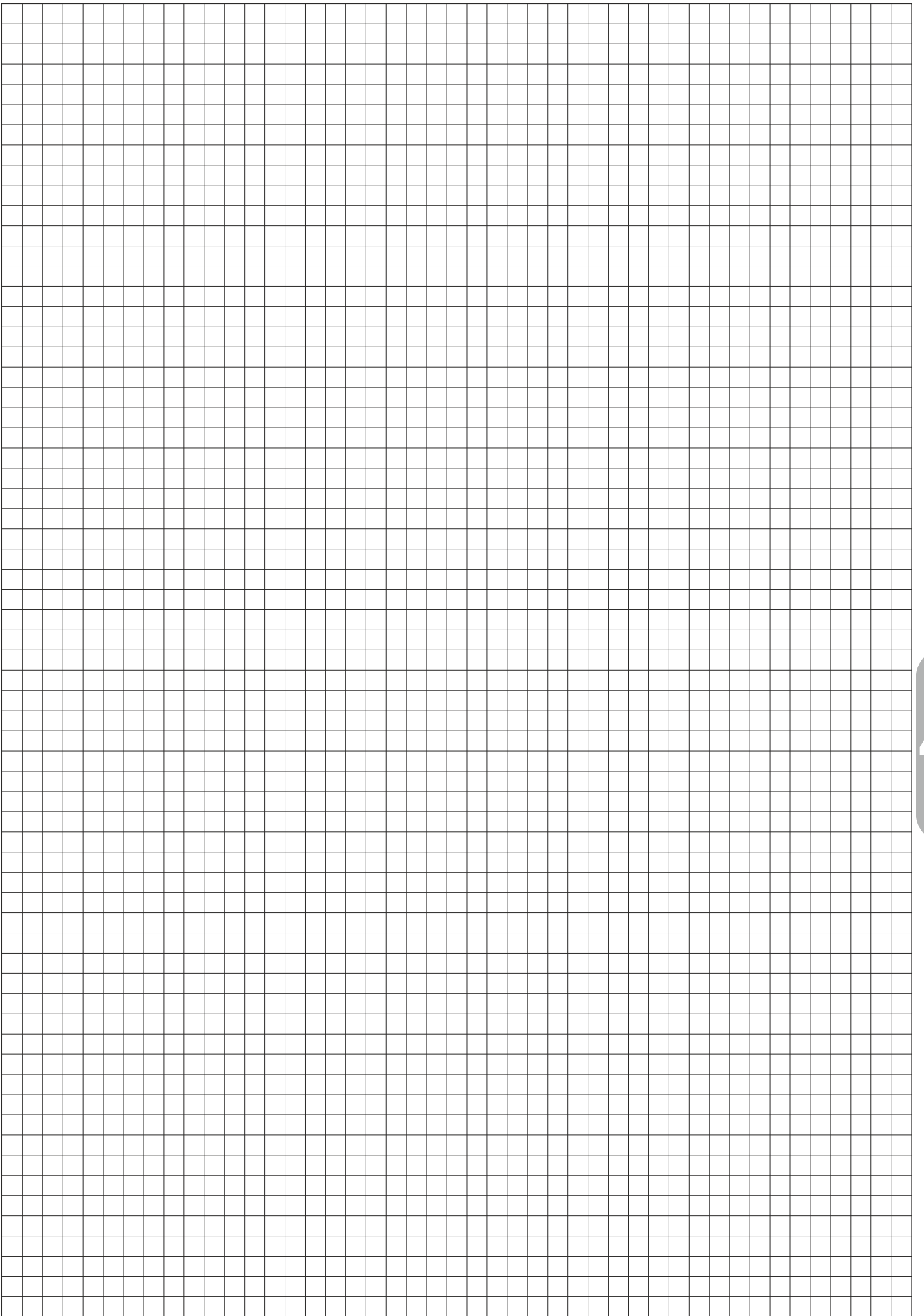
**1306.D (Ø250)**  
**1306.E (Ø320)**

For technical characteristics and Sensors ordering code see Chapter 6 "magnetic sensors"



**Table of dimensions**

BORE	A
250	250
320	365



**General**

This series of pneumatic cylinders is manufactured according to ISO 6431 standards adapted to VDMA 24562 and CNOMO/AFNOR 49003 that guarantee the interchangeability of the cylinders even without mounted anchoring.

**Construction characteristics**

End plates	from Ø32 to Ø125: UNI 5079 aluminium alloy casting painted black by cataphoresis from Ø160 to Ø200: UNI 3051 aluminium chilled painted black by cataphoresis
Rod	stainless steel or C43 chromed steel
Barrel	oxidised aluminium
Cushion bushings	hardened aluminium
Rod-guide bushing	self-lubricating sintered bronze
Piston	vulcanized rubber block on steel core with incorporated plastoferrite permanent magnet, or without magnet for non magnetic version (plus rear spacer).
Seals	standard: NBR Oil resistant rubber, PUR Piston rod and cushion seals (FPM seals available upon request)
Cushion adjustment screws	brass

**Technical characteristics**

Fluid	filtered and lubricated air
Pressure	10 bar
Operating temperature	-5 °C - +70 °C with standard seals (magnetic or non magnetic piston) -5 °C - +80 °C with FPM seals for 1319 and 1320 series (magnetic piston) -5 °C - +150 °C with FPM seals for 1321 series (non magnetic piston)
Cushioning length	Ø 32 - 40 - 50 - 63 - 80 - 100 - 125 - 160 - 200 mm 28 - 32 - 32 - 40 - 44 - 50 - 55 - 55 - 55

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

**Stroke tolerance (ISO 15552)**

**Standard strokes (for all diameters)**

from 0 to150, every 25 mm
over 150 up to 500, every 50 mm
over 500 up to 1000, every 100 mm

Bore	Stroke	Tolerance
32 - 40 - 50	up to 500	+2 0
	over 500 up to 1250	+3.2 0
63 - 80 - 100	up to 500	+2.5 0
	over 500 up to 1250	+4 0
125 - 160 - 200	up to 500	+4 0
	over 500 up to 1250	+5 0

**Minimum and maximum springs load (stroke 0 - 50mm)**

Bore	Ø32	Ø40	Ø50 - Ø63	Ø80 - Ø100	Ø125
Min. load(N)	15	25	50	100	150
Max. load(N)	40	80	115	200	250

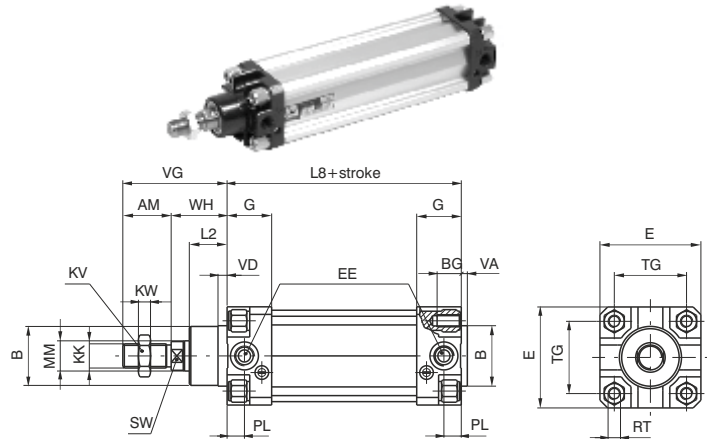
**Basic version "01"**

Ordering code

- 1319.Ø.stroke.01 magnetic chromed rod
- 1320.Ø.stroke.01 magnetic stainless steel rod
- 1321.Ø.stroke.01 non magnetic chromed rod
- 13- -Ø.stroke.01V FPM seals
- 13- -Ø.stroke.01MA Front springs (Ø32-Ø125)\*
- 13- -Ø.stroke.01MP Rear springs (Ø32-Ø125)\*

\* Max. stroke 50

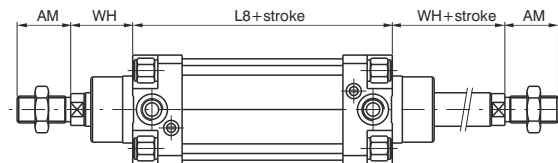
This is the configuration that represents the basic cylinder according to ISO-VDMA standards. It can be directly anchored on machine parts using the four thread on the end cover. For other applications see the following pages where different types of attachments are shown.



**Push/Pull version "02"**

Ordering code

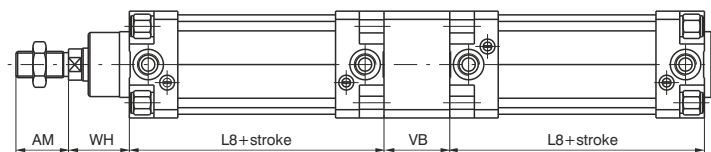
- 1319.Ø.stroke.02 magnetic chromed rod
- 1320.Ø.stroke.02 magnetic stainless steel rod
- 1321.Ø.stroke.02 non magnetic chromed rod
- 13- -Ø.stroke.02V FPM seals



**Tandem push with a common rods "G"**

Ordering code

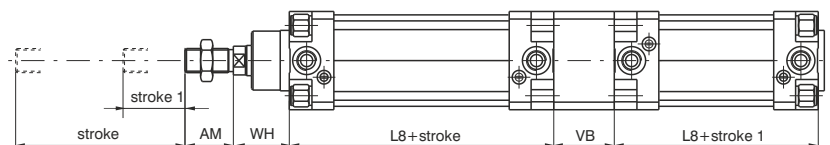
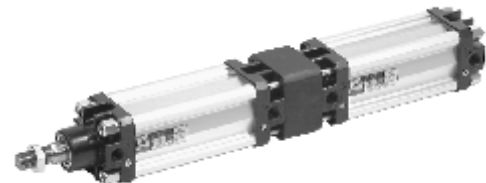
- 1319.Ø.stroke.G magnetic chromed rod
- 1320.Ø.stroke.G magnetic stainless steel rod
- 1321.Ø.stroke.G non magnetic chromed rod



**Tandem push with independent rods "F"**

Ordering code

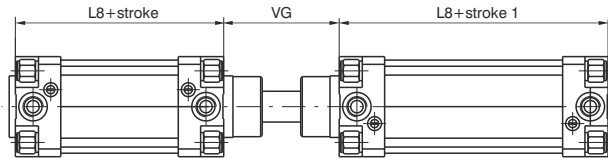
- 1319.Ø.stroke.stroke1.F magnetic chromed rod
- 1320.Ø.stroke.stroke1.F magnetic stainless steel rod
- 1321.Ø.stroke.stroke1.F non magnetic chromed rod



**Opposed tandem with common rod "D"**

Ordering code

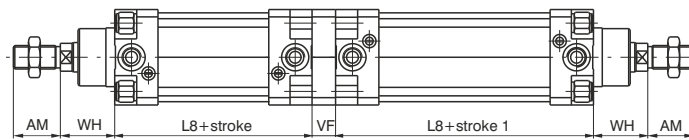
- 1319.Ø.stroke.stroke1.D magnetic chromed rod
- 1320.Ø.stroke.stroke1.D magnetic stainless steel rod
- 1321.Ø.stroke.stroke1.D non magnetic chromed rod



**Tandem with opposed rods "E"**

Ordering code

- 1319.Ø.stroke.stroke1.E magnetic chromed rod
- 1320.Ø.stroke.stroke1.E magnetic stainless steel rod
- 1321.Ø.stroke.stroke1.E non magnetic chromed rod



**Table of dimensions**

Bore	32	40	50	63	80	100	125	160	200	
AM	22	24	32	32	40	40	54	72	72	
B (d 11)	30	35	40	45	45	55	60	65	75	
BG	14	14	16	16	21	21	23	24	24	
E	46	52	65	75	95	115	140	180	220	
EE	G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"	G 1/2"	G 3/4"	G 3/4"	
G	25	29	29,5	36	36	40	45	49	49	
KK	M10X1,25	M12X1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2	
KV	17	19	24	24	30	30	41	55	55	
KW	6	7	8	8	9	9	12	18	18	
L2	16	20	25	25	32	35	45	50	60	
L8 *	94	105	106	121	128	138	160	180	180	
MM	12	16	20	20	25	25	32	40	40	
PL	9	11,5	13	14	16	18	19	24	25	
RT	M6	M6	M8	M8	M10	M10	M12	M16	M16	
SW	10	13	17	17	22	22	27	32	32	
TG	32,5	38	46,5	56,5	72	89	110	140	175	
VA	4	4	4	4	4	4	6	5	5	
VB	25	30	40	40	50	50	75	70	75	
VD	5	6	6	6	10	10	12	10	10	
VF	12	12	16	16	20	20	25	30	30	
VG	48	54	69	69	86	91	119	152	167	
WH	26	30	37	37	46	51	65	80	95	
Weight	Stroke 0	480	730	1150	1600	2800	3600	7800	15000	21500
gr.	every 10 mm	25	32	56	60	90	100	140	265	325

\*For strokes over 50mm, the length does not increase proportionally to the stroke, and allowance must be made for adequate spring allocation (see table of L8 dimensions).

**"L8" dimensions for "rear spring" and "front spring"**

Bore	32	40	50	63	80	100	125
L8 (Stroke 51 - 100)	134	150	151	166	183	193	230
L8 (Stroke 101 - 150)	174	195	196	211	238	248	300
L8 (Stroke 151 - 200)	214	240	241	256	293	303	370

### Construction characteristics

Front cover	anodised aluminium
Rear cover	UNI 5079 aluminium alloy casting
Rod	C43 chromed steel stainless steel
Barrel	RA=0.3-0.5 anodised aluminium
Cushion bushings	hard aluminium
Piston	vulcanized rubber block on steel core with incorporated permanent magnet, or without magnet for non magnetic version (plus spacer).
Flange	zinc plated steel
Rod seal	PUR
Other seals	NBR 80 shore rubber
Cushioning adjustment screw	nickel-plated steel

### Technical characteristics

Fluid	filtered and lubricated air
Max. pressure	10 bar
Working temperature	-5°C - +70°C

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

### Cushioning lengths

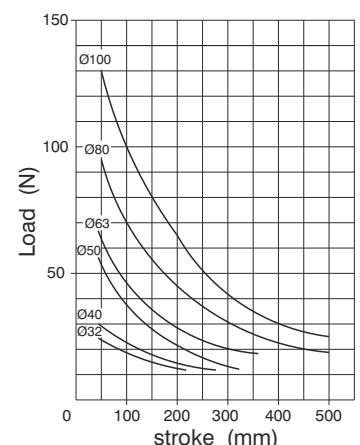
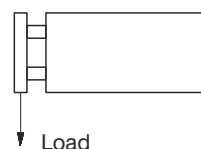
Bore	Ø	32	40	50	63	80	100
Front length	mm	22	22	24	32	32	32
Rear length	mm	28	32	32	40	44	50

### Standard strokes

<b>Ø32</b>	25 - 50 - 75 - 100 - 150 - 200 mm
<b>Ø40</b>	25 - 50 - 75 - 100 - 150 - 200 - 250 mm
<b>Ø50</b>	25 - 50 - 75 - 100 - 150 - 200 - 250 - 300 mm
<b>Ø63</b>	25 - 50 - 75 - 100 - 150 - 200 - 250 - 300 - 350 mm
<b>Ø80</b>	25 - 50 - 75 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 500 mm
<b>Ø100</b>	25 - 50 - 75 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 500 mm

### Stroke tolerance (ISO 15552)

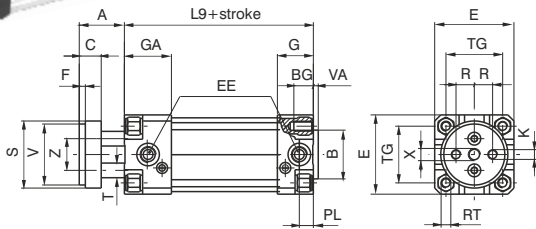
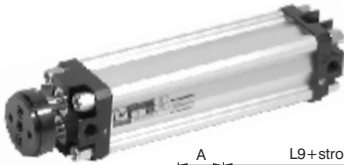
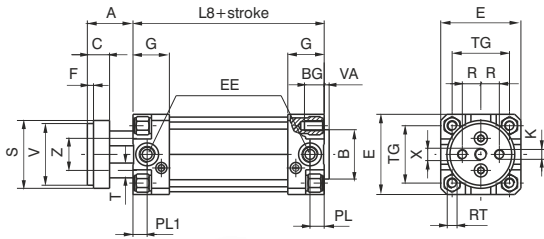
Bore	Stroke	Tolerance
32 - 40 - 50	up to 500 mm	+2
63 - 80 - 100		0



**Basic version**

Ordering code

- 1325.Ø.stroke.01 magnetic
- 1326.Ø.stroke.01 non magnetic
- 1325.Ø.stroke.01X magnetic stainless steel rod
- 1326.Ø.stroke.01X non magnetic stainless steel rod



**Extended front cover**

- 1345.Ø.stroke.01 magnetic
- 1347.Ø.stroke.01 non magnetic
- 1345.Ø.stroke.01X magnetic stainless steel rod
- 1347.Ø.stroke.01X non magnetic stainless steel rod

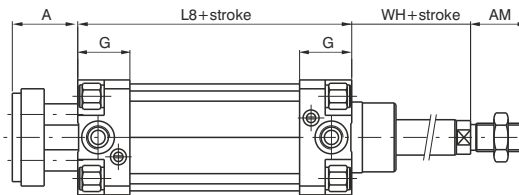
**Push-pull rod version with ISO standard**

Ordering code

- 1325.Ø.stroke.02 magnetic
- 1326.Ø.stroke.02 non magnetic

Ordering code

- 1325.Ø.stroke.02X magnetic stainless steel rod
- 1326.Ø.stroke.02X non magnetic stainless steel rod



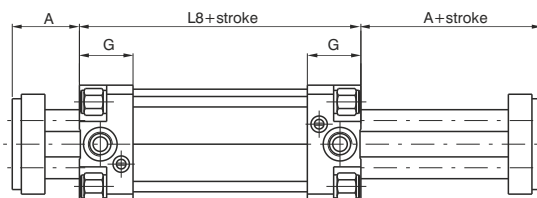
**Twin rods push-pull version**

Ordering code

- 1325.Ø.stroke.06 magnetic
- 1326.Ø.stroke.06 non magnetic

Ordering code

- 1325.Ø.stroke.06X magnetic stainless steel rod
- 1326.Ø.stroke.06X non magnetic stainless steel rod



Alesaggio	32	40	50	63	80	100		
A	26	30	37	37	46	51		
AM	22	24	32	32	40	40		
B	30	35	40	45	45	55		
BG	12	12	16	16	20	20		
C	15	15	18	22	22	22		
E	46	52	65	75	95	115		
EE	G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"		
F	4	4	5	5	5	5		
G	25	29	29,5	36	36	40		
GA	50	54	54,5	61	61	65		
K	M6	M8	M8	M10	M12	M12		
L8	94	105	106	121	128	138		
L9	119	130	131	146	153	163		
PL	9	11,5	13	14	16	18		
PL1	9,5	11	10,5	14	13	15		
R	9,5	11,25	15	19	25	35		
RT	M6	M6	M8	M8	M10	M10		
S	35	45	55	70	85	105		
T	8	10	12	16	20	20		
TG	32,5	38	46,5	56,5	72	89		
V	32	40	50	63	80	100		
VA	4	4	4	4	4	4		
Z	18	22	26	35	40	50		
WH	26	30	37	37	46	51		
X	M8	M10	M10	M12	M14	M14		
Weight	Stroke	Basic version	560	810	1380	2300	3680	5740
gr.	0	Extended ver.	650	950	1500	2500	4100	6300
	every 10 mm		20	26	30	40	80	90



### Magnetic sensors

For sensor and sensor support bracket please refer to the 1319 and 1320 series.

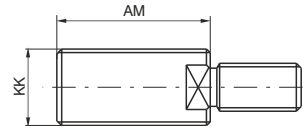
### Accessories

All of the attachments of the ISO 1552 can be mounted, with the exclusion of the front flange and the foot mounting bracket that, although they are part of the same series, need a small adjustment in the exit zone of the rods. For these there is a different code and the dimensions are indicated below.

#### Threaded Nipple

Ordering code

**1325.Ø.17F**

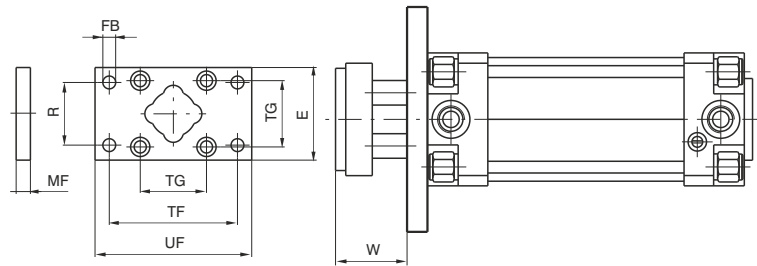
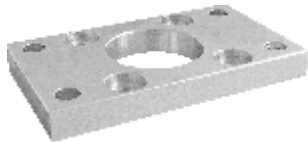


Bore	32	40	50	63	80	100
AM	22	24	32	35	40	40
KK	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5
Weight gr.	17	27	63	65	110	110

#### Front flange

Ordering code

**1325.Ø.03F**

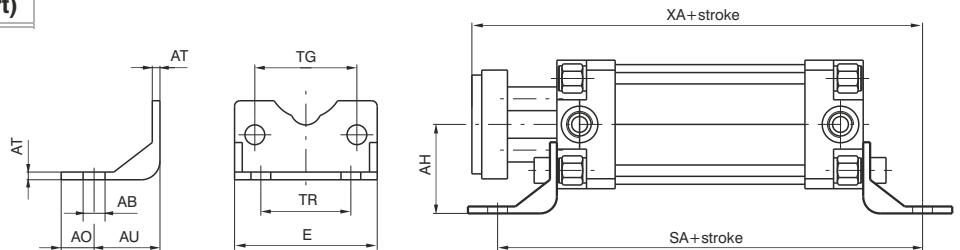
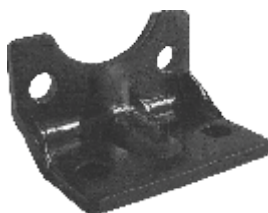


Bore	32	40	50	63	80	100
E	45	52	65	75	95	115
FB (H13)	7	9	9	9	12	14
MF (JS 14)	10	10	12	12	16	16
R (JS 14)	32	36	45	50	63	75
TF (JS 14)	64	72	90	100	126	150
TG	32,5	38	46,5	56,5	72	89
UF	80	90	110	120	150	170
W	16	20	25	25	30	35
Weight gr.	160	250	480	620	1430	3500

#### Front foot mounting bracket (short)

Ordering code

**1325.Ø.05/1F**  
(1 piece)



Bore	32	40	50	63	80	100
AB (H14)	7	9	9	9	12	14
AH (JS 15)	32	36	45	50	63	71
AO (± 0,2)	11	8	13	13	14	15
AT	3,5	3,5	3,5	4,5	5	5
AU	24	28	32	32	41	41
E	45	52	65	75	95	115
SA	142	161	170	185	210	220
TG	32,5	38	46,5	56,5	72	89
TR (JS 14)	32	36	45	50	63	75
XA	144	163	175	190	215	230
Weight gr.	50	70	120	180	320	400

**Construction characteristics**

End plates	UNI 5079 aluminium alloy casting painted black by cataphoresis
Rod	C43 chromed steel Ra = 0.2
Barrel	UNI 9006/1 aluminium alloy square section, hardened 30 micron oxidate
Cushion bushings	2011 UNI 9002/5 hardened alloy aluminium
Piston	polyacetal resin, self-lubricated and anti-wear, with plastroferrite rings in magnetic version
Piston seals	NBR oil-resistant rubber, PUR Piston rod and cushion seals
Cushioning adjustment screw	brass

**Technical characteristics**

Fluid	filtered and lubricated air
Pressure	10 bar
Operating temperature	-5°C - +70°C

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.  
Our Technical Department will be glad to help.

Bore	Usable surface (square profile) cm <sup>2</sup>	Max couple on the rod (max torque) Nm	Grade precision (rest rod, without load) anti-rotation	Cushion length mm.
32	8.31	0.5	12'	22
40	12.41	0.8	12'	27
50	18.41	1.1	12'	27
63	29.67	1.5	12'	32

**Standard strokes (for all diameters)**

from 0 to 150, every 25 mm
<b>Other stroke for these following bores:</b>
<p> <b>Ø 32</b> 80 mm  <b>Ø 40</b> 80 - 160 mm  <b>Ø 50</b> 80 - 160 - 200 - 250 mm  <b>Ø 63</b> 80 - 160 - 200 - 300 - 320 mm                 </p>

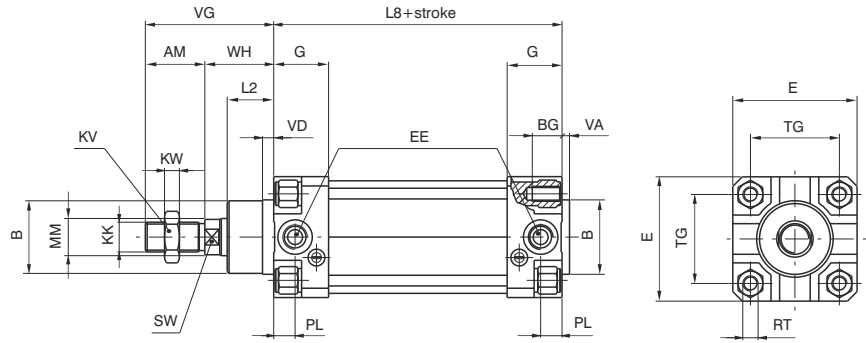
**Stroke Tolerance (ISO 15552)**

Bore	Stroke	Tolerance
32 - 40 - 50 - 63	up to 500	$\begin{matrix} +2 \\ 0 \end{matrix}$

**Basic version**

Ordering code

- 1348.Ø.stroke.01**  
magnetic chromed rod
- 1349.Ø.stroke.01**  
magnetic stainless steel rod
- 1350.Ø.stroke.01**  
non-magnetic chromed rod



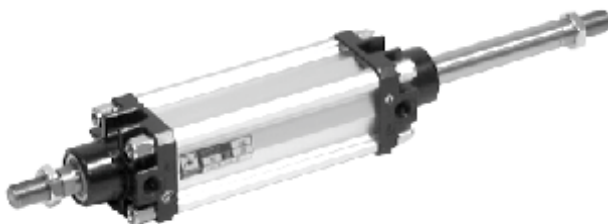
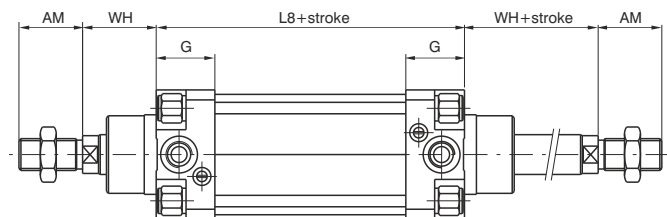
Bore	32	40	50	63	
AM	22	24	32	32	
B (d 11)	30	35	40	45	
BG	12	12	16	16	
E	46	52	65	75	
EE	G 1/8"	G 1/4"	G 1/4"	G 3/8"	
G	25	29	29.5	36	
KK	M10x1.25	M12x1.25	M16x1.5	M16x1.5	
KV	17	19	24	24	
KW	6	7	8	8	
L 2	16	20	25	25	
L 8	94	105	106	121	
MM	12	16	20	20	
PL	9	11.5	13	14	
RT	M6	M6	M8	M8	
SW	10	13	17	17	
TG	32.5	38	46.5	56.5	
VA	4	4	4	4	
VD	5	6	6	6	
VG	48	54	69	69	
WH	26	30	37	37	
Weight	stroke 0	505	705	1320	1710
gr.	every 10 mm	24	33	53	58

This is the configuration that represents the basic cylinder according to ISO standards. It can be directly anchored on machine parts using the four threads on the end cover. For other applications see the following pages where different types of attachments shown.

**Push/pull version**

Ordering code

- 1348.Ø.stroke.02**  
magnetic chromed rod
- 1349.Ø.stroke.02**  
magnetic stainless steel rod
- 1350.Ø.stroke.02**  
non-magnetic chromed rod



**Construction characteristics**

Cover plates	UNI 5079 aluminium alloy casting
Central body	oxidised aluminium
Pinion	18 NiCrMo4 cemented and tempered
Rack	C43
Barrel	anodised aluminium Ra=0.3-0.5
Sliding shoe	acetal resin
Cushion bushings	hardened aluminium
Piston	vulcanized rubber block on steel core with incorporated permanent magnet or without magnet plus rear spacer for non magnetic version
Seals	NBR 80 shore rubber
Cushion adjustment screw	nickel plated steel
Rotating angle adjustment assy	nickel plated brass

**Technical characteristics**

Fluid	filtered and preferably lubricated air
Max. pressure	10 bar
Working temperature	-5°C- +70°C
Standard rotation	90° - 180° - 270° - 360°(+1°)
Rotating angle adjustment assy	±10°

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

Bore	32	40	50	63	80	100
Torque moments Nm/bar	0.9	1.7	2.9	5.55	13.2	23.8
Axis load max. kg.	8	10	10	12	18	22
Cushioning angle	60°	60°	50°	50°	40°	40°

**Female pinion version**

Ordering code

**1330.Ø.\*.01**

magnetic

**1331.Ø.\*.01**

non magnetic

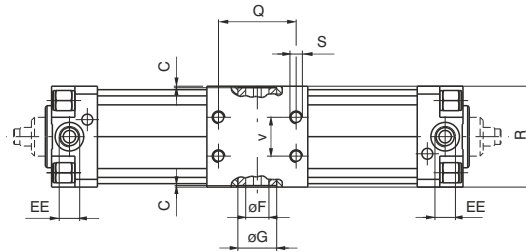
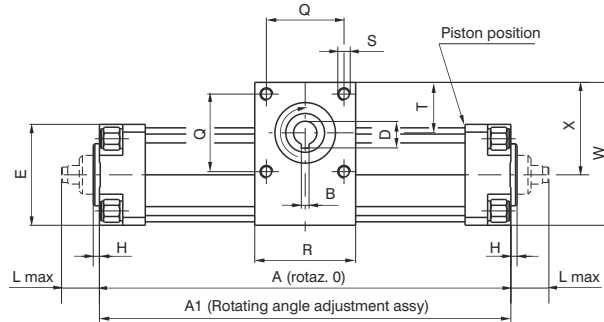
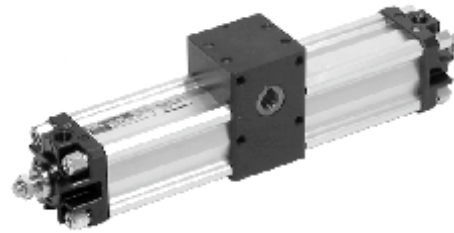
**1330.Ø.\*.01R**

magnetic with rotating adjustment angle

**1331.Ø.\*.01R**

non magnetic with rotating adjustment angle

\* = rotating angle



**Male pinion version**

Ordering code

**1332.Ø.\*.01**

magnetic

**1333.Ø.\*.01**

non magnetic

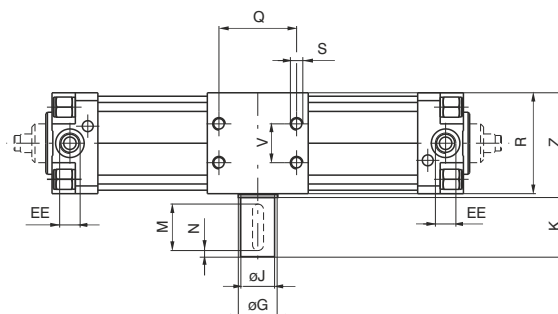
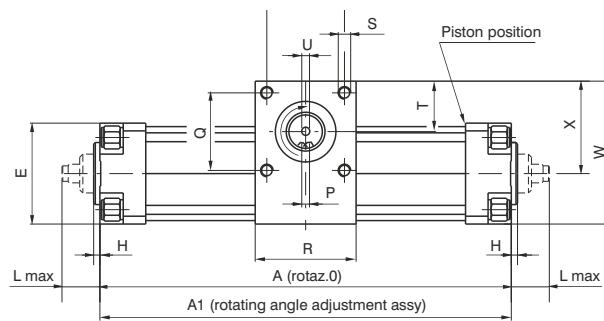
**1332.Ø.\*.01R**

magnetic with rotating adjustment angle

**1333.Ø.\*.01R**

non magnetic with rotating adjustment angle

\* = rotating angle



**Dimensions**

Bore	32	40	50	63	80	100	
A rot. 0°	171	195	202	233	268	300	
A rot. 90°	218	252	265	308	378	427	
A rot. 180°	265	308	328	382	488	555	
A rot. 270°	312	364	390	457	598	682	
A rot. 360°	359	421	453	531	708	809	
A1 rot. 0°	174	198	206	237	274	307	
A1 rot. 90°	221	255	269	312	384	434	
A1 rot. 180°	268	311	332	386	494	562	
A1 rot. 270°	315	367	394	461	604	689	
A1 rot. 360°	362	424	457	535	714	816	
B	5	5	5	6	6	8	
C	1	1	1	1	1	1	
D	17.3	17.3	17.3	20.8	22.8	28.3	
E	46	52	65	75	95	115	
Ø F (H 7)	15	15	15	18	20	25	
Ø G	25	25	25	30	40	55	
H	4	4	4	4	4	4	
Ø J (h 7)	14	14	22	25	30	35	
K	30	30	40	40	50	50	
L max.	23	23	28.5	28.5	34.5	34.5	
M	25	25	35	35	45	45	
N	2.5	2.5	2.5	2.5	2.5	2.5	
P	5	5	6	8	8	10	
Q	33	40	50	60	80	80	
R	50	60	65	75	100	115	
S	M6	M6	M8	M8	M10	M10	
T	27.5	35	32.5	35.5	50	54.5	
U	M5	M5	M6	M8	M8	M10	
V	18	22	25	35	50	60	
W	71	85	92	105	141	162	
X	48	59	59.5	67.5	93.5	104.5	
Z	51	61	66	76	101	116	
EE	G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"	
Piston stroke every 10 ° of rotation	2.61	3.14	3.49	4.14	6.11	7.07	
Female Pinion weight gr.	rot. 90°	1450	2020	3050	4850	10000	14900
	rot. 180°	1600	2240	3350	5350	11000	16350
	rot. 270°	1750	2460	3650	5850	12000	17800
	rot. 360°	1900	2680	3950	6350	13000	19250
Male Pinion weight gr.	rot. 90°	1550	2150	3280	5150	10500	15700
	rot. 180°	1700	2370	3580	5650	11500	17150
	rot. 270°	1850	2590	3880	6150	12500	18600
	rot. 360°	2000	2810	4180	6650	13500	20050

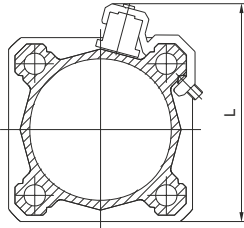
**Magnetic sensors**

Sensors 1500.\_, RS.\_, HS.\_ series  
 Mounting brackets codes 1320.\_(A, B, C)

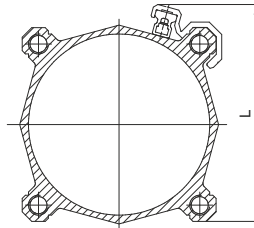
**Sensor brackets**

Sensor brackets codes 1500._, RS._, HS._	Sensor brackets codes 1595.HAP	Bore	L
Code	Code		
1320.A	1320.ASC	Ø32	60
		Ø40	65
1320.B	1320.BSC	Ø50	77
		Ø63	87
1320.C	1320.CSC	Ø80	105
		Ø100	125
1320.D	1320.DSC	Ø125	145
1320.E	1320.ESC	Ø160	184
1320.F	1320.FSC	Ø200	222

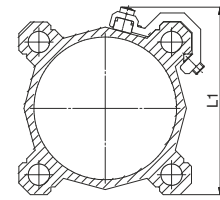
Sensor brackets codes 1580._, MRS._, MHS._		
Code	Bore	L1
1320.AS	Ø32	48
	Ø40	54
1320.BS	Ø50	66
	Ø63	76
1320.CS	Ø80	96
	Ø100	112
1320.DSC	Ø125	145
1320.ESC	Ø160	184
1320.FSC	Ø200	222



Sensors 1500.\_,RS.\_,HS.\_



Sensors 1595.HAP

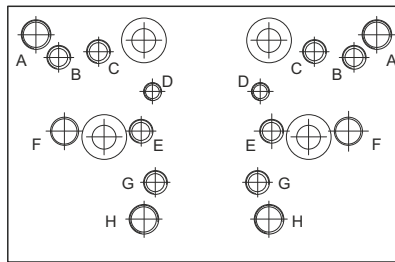


Sensors 1580.\_, MRS.\_, MHS.\_

**Sensors for microcylinders:** for technical characteristics and ordering codes see Chapter 6 "Magnetic sensors"

**Distributor supports**

This accessory permits to mount a valve or an electrovalve on a side of the cylinder. The plate can be fitted on the cylinder profiled barrel, and, on it, can be mounted either a threaded distributor or a base on which can be mounted an ISO distributor. Once installed the connections must be done with fittings and pipes. All of the threaded holes on the support plate are dedicated to different valves series as per attached drawing.

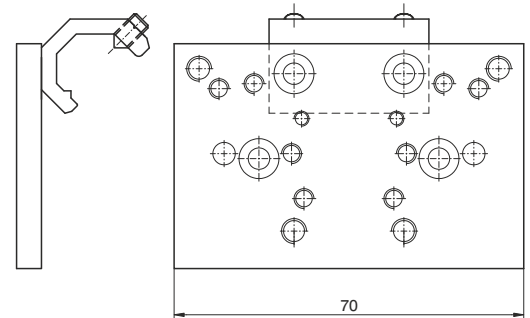


Fixing holes for valves series:

- A = 414/2
- B = 824
- C = 828, T488, 488, 484
- D = 2400
- E = 2600
- F = Bases for ISO distributors
- G = 858/2
- H = T424

Ordering code

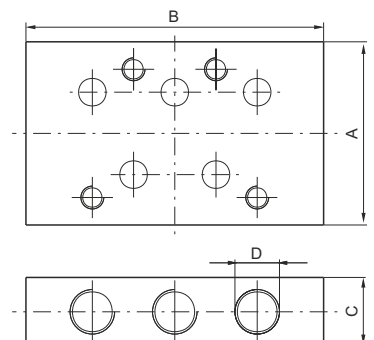
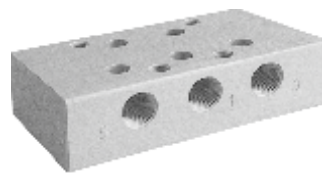
- 1320.15 (Ø32 - Ø40)
- 1320.16 (Ø50 - Ø63)
- 1320.17 (Ø80 - Ø100)
- 1320.18 (Ø125)
- 1320.19 (Ø160)
- 1320.20 (Ø200)



**Bases for ISO distributors**

Ordering code

- 1320.21 bases for ISO 1 electro distributor
- 1320.22 bases for ISO 2 electro distributor



Dimensions

		A	B	C	D
1320.21	bases for ISO 1 electro distributor	40	75	15	G 1/8"
1320.22	bases for ISO 2 electro distributor	50	95	20	G 1/4"



**General**

Profiled tube has two "T" slots on the three sides hosting sensors 1580.\_, MRS.\_, MHS.\_ without adaptors.

**Construction characteristics**

End plates	Series 1386 - 1388: high resistant thermoplastic material	Series 1396 - 1398: Die-casting aluminium
Rod	C43 chromed steel or stainless steel	
Barrel	anodised aluminium alloy	
Rod-guide bushing	self-lubricating sintered bronze	
Piston	acetal resin, aluminium on request	
Seal	standard: NBR Oil resistant rubber, PUR Piston rod seals (PUR seals available upon request)	
Cushion adjusting screws	brass	

**Technical characteristics**

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max. pressure	10 bar
Operating temperature	-5°C - +70°C with standard seals -30°C - +80°C with PUR seals
Bore	Ø 32 - 40 - 50 - 63 - 80 - 100
Cushioning lenght	mm 27 - 31 - 31 - 37 - 40 - 44
Cushioning lenght "K" and "PK" version	mm 20 - 20 - 22 - 22 - 32 - 32

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod;
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device and aluminium piston);
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

**Standard strokes** (for all diameters)

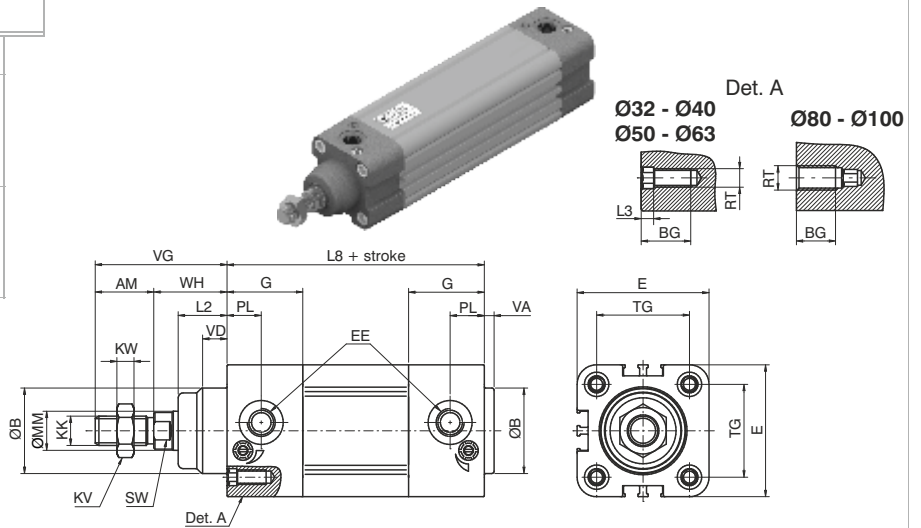
from 0 to 150, every 25 mm
from 150 to 500, every 50 mm
from 500 to 1000, every 100

**Stroke tolerance** (ISO 15552)

Bore	Stroke	Tolerance
32 - 40 - 50	up to 500	+2 0
	over 500 up to 1000	+3.2 0
63 - 80 - 100	up to 500	+2.5 0
	over 500 up to 1000	+4 0

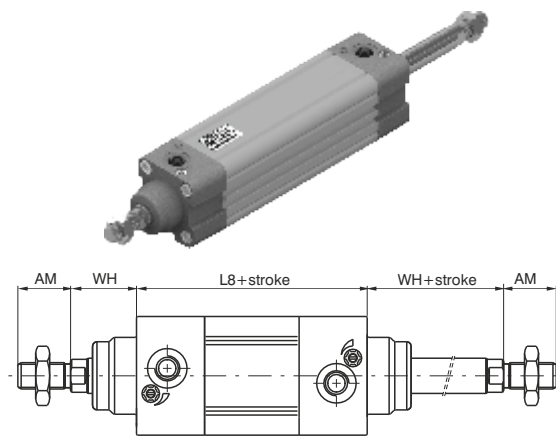
**Basic version "01"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.01 Magnetic chromed rod
1387.Ø.stroke.01 Magnetic stainless steel rod
1388.Ø.stroke.01 Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.01 Magnetic chromed rod
1397.Ø.stroke.01 Magnetic stainless steel rod
1398.Ø.stroke.01 Non magnetic chromed rod



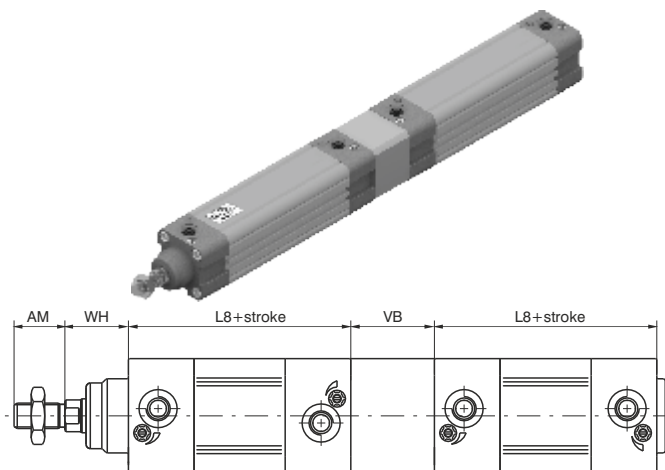
**Push/pull version "02"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.02 Magnetic chromed rod
1387.Ø.stroke.02 Magnetic stainless steel rod
1388.Ø.stroke.02 Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.02 Magnetic chromed rod
1397.Ø.stroke.02 Magnetic stainless steel rod
1398.Ø.stroke.02 Non magnetic chromed rod



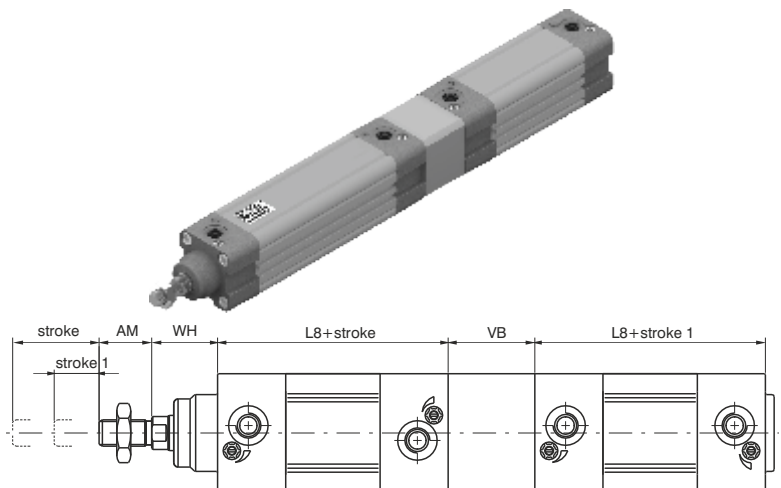
**Tandem push with common rods "G"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.G Magnetic chromed rod
1387.Ø.stroke.G Magnetic stainless steel rod
1388.Ø.stroke.G Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.G Magnetic chromed rod
1397.Ø.stroke.G Magnetic stainless steel rod
1398.Ø.stroke.G Non magnetic chromed rod



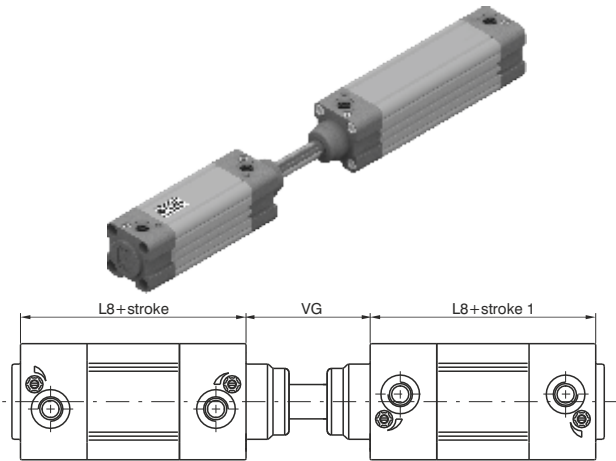
**Tandem push with independent rods "F"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.stroke1.F Magnetic chromed rod
1387.Ø.stroke.stroke1.F Magnetic stainless steel rod
1388.Ø.stroke.stroke1.F Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.stroke1.F Magnetic chromed rod
1397.Ø.stroke.stroke1.F Magnetic stainless steel rod
1398.Ø.stroke.stroke1.F Non magnetic chromed rod



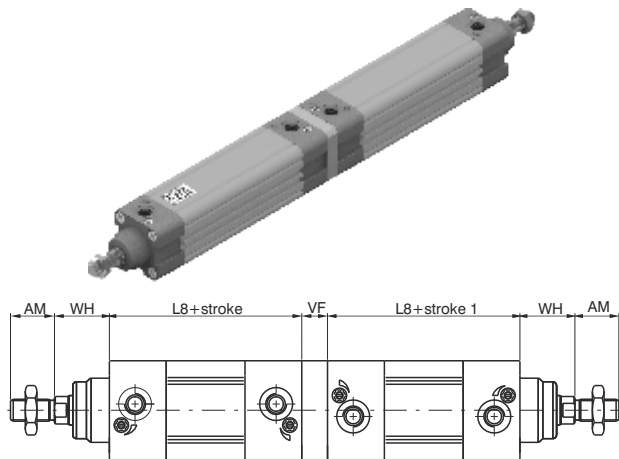
**Opposed tandem with common rod "D"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.stroke1.D Magnetic chromed rod
1387.Ø.stroke.stroke1.D Magnetic stainless steel rod
1388.Ø.stroke.stroke1.D Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.stroke1.D Magnetic chromed rod
1397.Ø.stroke.stroke1.D Magnetic stainless steel rod
1398.Ø.stroke.stroke1.D Non magnetic chromed rod



**Tandem with opposed rods "E"**

Ordering code
<b>TECHNOPOLYMER COVERS</b>
1386.Ø.stroke.stroke1.E Magnetic chromed rod
1387.Ø.stroke.stroke1.E Magnetic stainless steel rod
1388.Ø.stroke.stroke1.E Non magnetic chromed rod
<b>ALUMINIUM COVERS</b>
1396.Ø.stroke.stroke1.E Magnetic chromed rod
1397.Ø.stroke.stroke1.E Magnetic stainless steel rod
1398.Ø.stroke.stroke1.E Non magnetic chromed rod



**Variants**

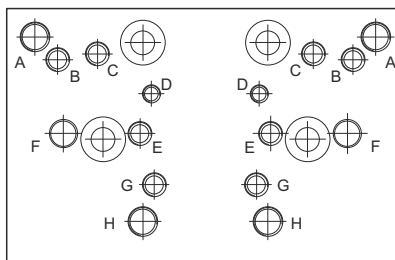
Ordering code
13_ _Ø.stroke._ _P = Version with PUR seals
13_ _Ø.stroke._ _K = Version with aluminium piston
13_ _Ø.stroke._ _PK = Version with PUR seals and aluminium piston

**Table of dimensions**

Bore			32	40	50	63	80	100
AM			22	24	32	32	40	40
B (d 11)			30	35	40	45	45	55
BG			16	16	18	18	16	16
E			46	54	65	77,5	95,5	115,5
EE			G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"
G			29	31	33	36	40	44
KK			M10X1,25	M12X1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5
KV			17	19	24	24	30	30
KW			6	7	8	8	9	9
L2			16	20	25	25	32	35
L3			4	4	5	5	/	/
L8			94	105	106	121	128	138
MM			12	16	20	20	25	25
PL			13	14	14	16	16	18
RT			M6	M6	M8	M8	M10	M10
SW			10	13	17	17	22	22
TG			32,5	38	46,5	56,5	72	89
VA			4	4	4	4	4	4
VB			33	41	51	51	65	71
VD			8	10	12	12	15	16
VF			12	12	16	16	20	20
VG			48	54	69	69	86	91
WH			26	30	37	37	46	51
Weight gr.	Aluminium covers	stroke 0	550	690	1200	1590	2500	3670
		every 10 mm	29	40	57	66	96	112
Weight gr.	Technopolymer covers	stroke 0	470	590	1020	1320	2090	3010
		every 10 mm	29	40	57	66	96	112

**Distributor supports**

This accessory permits to mount a valve or an electrovalve on a side of the cylinder. The plate can be fitted on the cylinder profiled barrel, and, on it, can be mounted either a threaded distributor or a base on which can be mounted an ISO distributor. Once installed the connections must be done with fittings and pipes. All of the threaded holes on the support plate are dedicated to different valves series as per attached drawing.

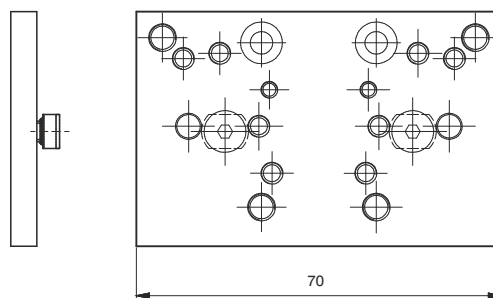
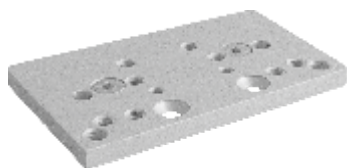


Fixing holes for valves series:

- A = 414/2
- B = 824
- C = 828, T488, 488, 484
- D = 2400
- E = 2600
- G = 858/2
- H = T424

Ordering code

**1386.15**

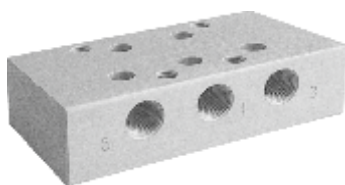
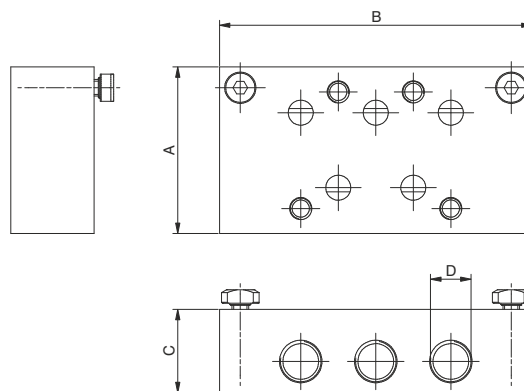


**Attention:** do not use ISO distributor for base mounting

**Bases for ISO distributors**

Ordering code

<b>1320.23</b>	bases for ISO 1 electro distributor
<b>1320.24</b>	bases for ISO 2 electro distributor



	Dimensions			
	A	B	C	D
bases for ISO 1 electro distributor	40	75	15	G 1/8"
bases for ISO 2 electro distributor	50	95	20	G 1/4"

**Construction characteristics**

End plates	die-casting aluminium
Rod	C43 chromed steel or stainless steel
Barrel	aluminium alloy anodised
Rod-guide bushing	spheroid bronze on steel band with P.T.F.E. coat
Piston	Ø32 - Ø100 acetal resin, aluminium on request Ø125 - Ø200 aluminium <b>V, Q, R, L</b> versions (Ø32 - Ø100): aluminium
Seals	standard: NBR oil resistant rubber, PUR piston rod seals <b>V</b> version: FPM <b>Q</b> version: NBR and PUR with plastic rod scraper with a high wear resistance <b>R</b> version: PUR with metallic rod scraper <b>L</b> version: special PUR
Cushion adjusting screws	brass

**Technical characteristics**

Fluid	filtered and preferably lubricated air or not (if lubricated the lubrication must be continuous) <b>L version</b> (for low temperature): dried air, guarantee a dew point lower than the minimum operating temperature
Max. pressure	10 bar
Operating temperature	-5°C - +70°C with standard seals -30°C - +80°C with PUR seals ( <b>P</b> version) -5°C - +80°C with FPM seals for 1390 and 1391 series (magnetic piston) ( <b>V</b> version) -5°C - +150°C with FPM seals for 1392 series (no magnetic piston) ( <b>V</b> version) -20°C - +80°C ( <b>Q</b> version) -10°C - +80°C ( <b>R</b> version) -50°C - +80°C ( <b>L</b> version)
Bore	Ø 32 - 40 - 50 - 63 - 80 - 100 - 125 - 160 - 200
Cushioning length	mm 27 - 31 - 31 - 37 - 40 - 44 - 44 - 50 - 55
Cushion length version with aluminum piston	mm 20 - 20 - 22 - 22 - 32 - 32 - / - / - /

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod;
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device and the aluminium piston);
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

#### VERSIONS WITH ADDITIONAL ROD SCRAPER

##### Version with plastic rod scraper (Q)

The pneumatic seal is manufactured using a special NBR seal material, with the rod scraper that comes in contact with the external environment made of a plastic material with a high wear resistance. The geometric shape with its excellent scraping capacity guarantees additional protection of the piston rod and nose seal against the impurities, liquids, water, and debris.

##### Version with metallic rod scraper (R)

The pneumatic seal is manufactured using a special FPM seal material with its own scraping lip with the additional rod scraper that comes into contact with the external environment made of metal. This combination of scraping lip and metal rod scraper enable these actuators to be used in particularly extreme environments.

Here are some examples:

**Aluminum foundries:** To remove the residues of alumina or fluorine compounds that are deposited on the piston rod during the preparation phase of aluminum casting.

**Automotive:** To prevent debris which has collected on the piston rod damaging the nose seal during operation especially waste produced during the welding process.

**Industrial ovens:** To eliminate cement powders or those produced during the manufacture of bricks/tiles

Thanks to the high-performance nose seal and scraper protection of the piston rod, the cylinder will be protected against premature wear that you would normally experience using standard cylinders in these harsh environments.

**Low temperature version (L):** The special seals compound allows the use of the cylinders up to a temperature of -50°C. The rod scraper seal is equipped with a metallic scraper which removes ice crystals which might form at minus temperature

#### Please note: air must be dry for applications with lower temperature.

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

#### Standard strokes (for all diameters)

from 0 to 150, every 25 mm
from 150 to 500, every 50 mm
from 500 to 1000, every 100 mm

#### Stroke tolerance (ISO 15552)

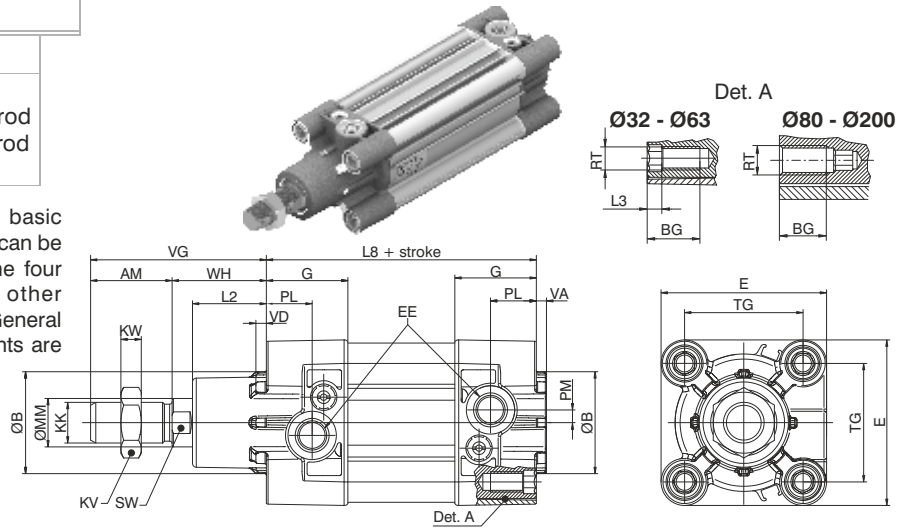
Alesaggio	Stroke	Tolerance
32 - 40 - 50	up to 500	+2 0
	over 500 up to 1250	+3.2 0
63 - 80 - 100	up to 500	+2.5 0
	over 500 up to 1250	+4 0
125 - 160 - 200	up to 500	+4 0
	over 500 up to 1250	+5 0

**Basic version "01"**

Ordering code

- 1390.Ø.stroke.01** Magnetic chromed rod
- 1391.Ø.stroke.01** Magnetic stainless steel rod
- 1392.Ø.stroke.01** Non magnetic chromed rod

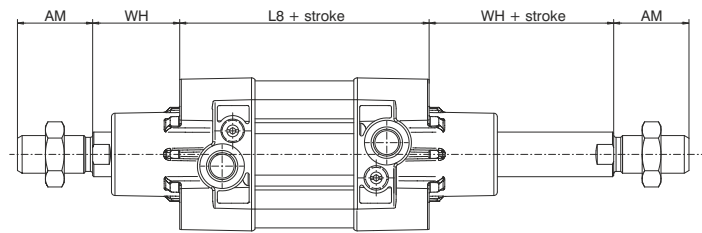
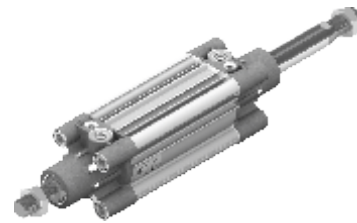
This is the configuration representing the basic cylinder according to ISO-VDMA standards. It can be directly anchored on machine parts using the four threads on the end cover screws. For other applications see "Cylinder section" on the General Catalogue, where different types of attachments are shown.



**Push/pull version "02"**

Ordering code

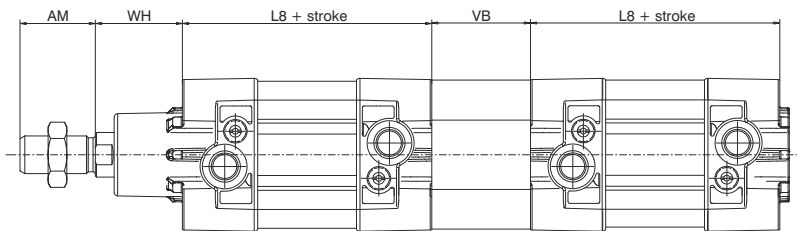
- 1390.Ø.stroke.02** Magnetic chromed rod
- 1391.Ø.stroke.02** Magnetic stainless steel rod
- 1392.Ø.stroke.02** Non magnetic chromed rod



**Tandem push with common rods "G"**

Ordering code

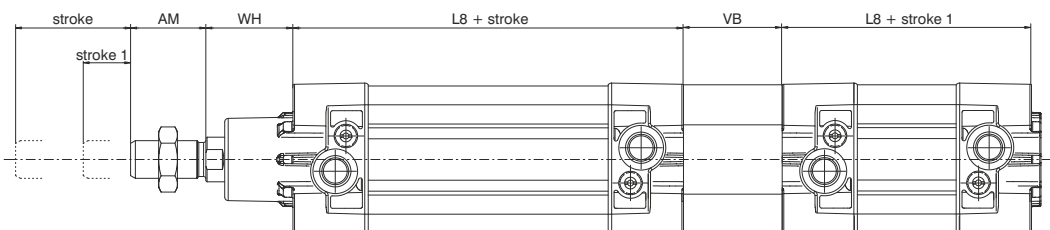
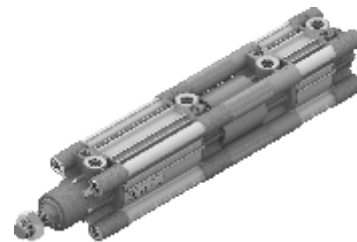
- 1390.Ø.stroke.G** Magnetic chromed rod
- 1391.Ø.stroke.G** Magnetic stainless steel rod
- 1392.Ø.stroke.G** Non magnetic chromed rod



**Tandem push with independent rods "F"**

Ordering code

- 1390.Ø.stroke.stroke1.F** Magnetic chromed rod
- 1391.Ø.stroke.stroke1.F** Magnetic stainless steel rod
- 1392.Ø.stroke.stroke1.F** Non magnetic chromed rod

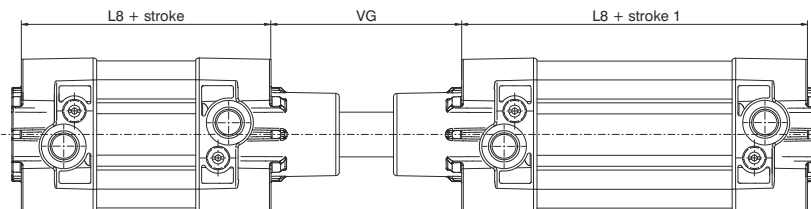
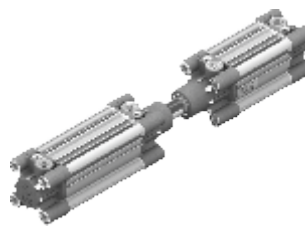




**Opposed tandem with common rod "D"**

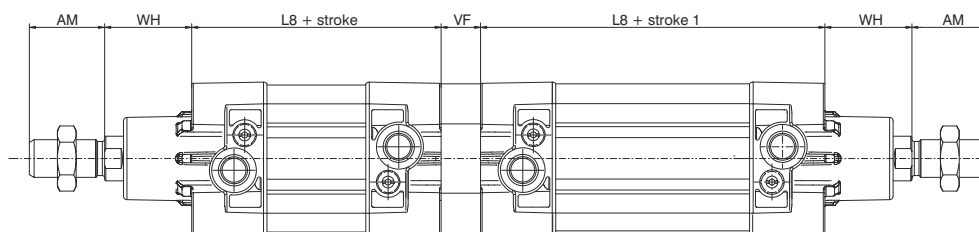
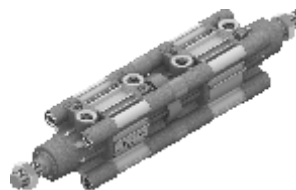
Ordering code

1390.Ø.stroke.stroke1.D Magnetic chromed rod  
 1391.Ø.stroke.stroke1.D Magnetic stainless steel rod  
 1392.Ø.stroke.stroke1.D Non magnetic chromed rod

**Tandem with opposed rods - "E"**

Ordering code

1390.Ø.stroke.stroke1.E Magnetic chromed rod  
 1391.Ø.stroke.stroke1.E Magnetic stainless steel rod  
 1392.Ø.stroke.stroke1.E Non magnetic chromed rod

**Variants**

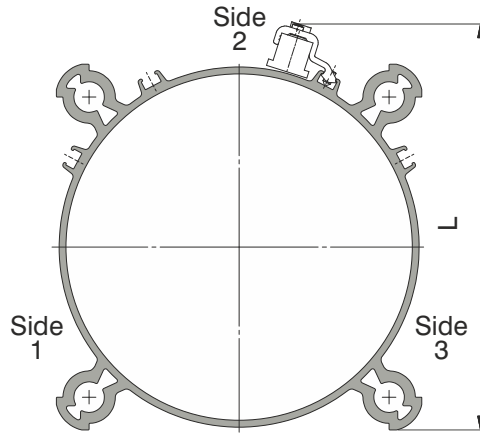
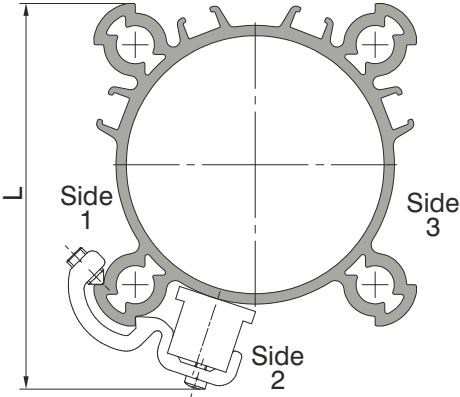
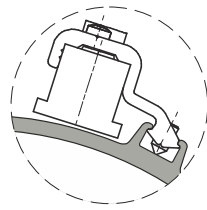
Ordering code

139\_Ø.stroke.\_.P = Version with PUR seals  
 139\_Ø.stroke.\_.K = Version with aluminium piston (from Ø32 to Ø100)  
 139\_Ø.stroke.\_.PK = Version with PUR seals and aluminium piston (from Ø32 to Ø100)  
 139\_Ø.stroke.\_.V = Version with FPM seals and aluminium piston  
 139\_Ø.corsa.\_.R = Version with metallic rod scraper and aluminium piston (Ø32-Ø100)  
 139\_Ø.corsa.\_.Q = Version with plastic rod scraper and aluminium piston (Ø32-Ø100)  
 139\_Ø.corsa.\_.L = Version for low temperature and aluminium piston (-50°C) (Ø32-Ø100)

**Table of dimensions**

Bore	32	40	50	63	80	100	125	160	200	
AM	22	24	32	32	40	40	54	72	72	
B (d 11)	30	35	40	45	45	55	60	65	75	
BG	16	16	18	18	16	16	21	25	25	
E	47	54	65	76	95	113	138	180	216	
EE	G 1/8"	G 1/4"	G 1/4"	G 3/8"	G 3/8"	G 1/2"	G 1/2"	G 3/4"	G 3/4"	
G	29.5	33	32	36	38.5	41.5	48	49	49	
KK	M10X1.25	M12X1.25	M16x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M36x2	M36x2	
KV	17	19	24	24	30	30	41	55	55	
KW	6	7	8	8	9	9	12	18	18	
L2	19	22	29	29	35	36	45	50	60	
L3	4	4	5	5	/	/	/	/	/	
L8	94	105	106	121	128	138	160	180	180	
MM	12	16	20	20	25	25	32	40	40	
PL	13	16	18	18	16	18	25	26	25	
PM	3	4	5	4.5	2.5	6	8	11	11	
RT	M6	M6	M8	M8	M10	M10	M12	M16	M16	
SW	10	13	17	17	22	22	27	36	36	
TG	32.5	38	46.5	56.5	72	89	110	140	175	
VA	4	4	4	4	4	4	6	6	6	
VB	33	41	51	51	65	71	75	70	75	
VD	4	4	4	4	4	4	6	6	6	
VF	12	12	16	16	20	20	25	30	30	
VG	48	54	69	69	86	91	119	152	167	
WH	26	30	37	37	46	51	65	80	95	
Weight gr.	stroke 0	460	650	1030	1360	2180	2890	5700	11200	14900
	every 10 mm	23	32	45	49	75	81	130	195	245

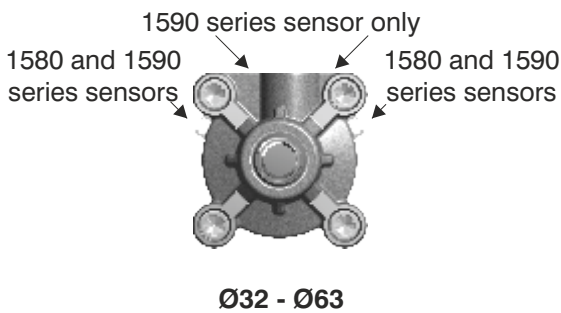
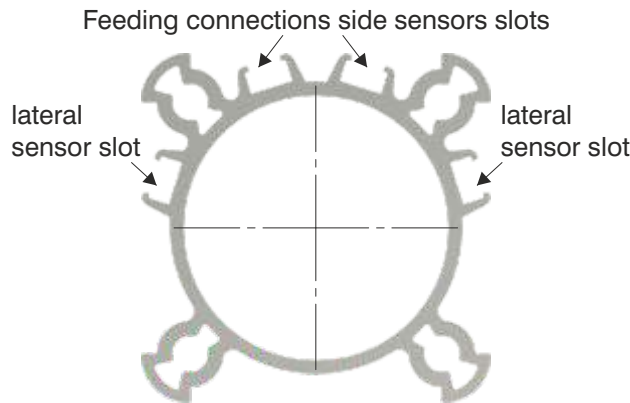
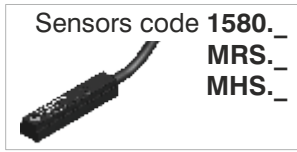
On the ECOLIGHT series it is possible to use three sensor types, according to bore, as indicated below:



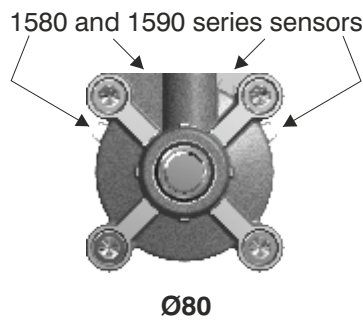
Code	Bore	L
1390.A	Ø32	58
	Ø40	65
1390.B	Ø50	75
	Ø63	86
1390.C	Ø80	105
	Ø100	122
1390.D	Ø125	150
	Ø160	190
	Ø200	225

Ø32 - Ø100: the sensors can be fixed on the three sides as indicated in the drawing, by using suitable brackets (except for Ø32 on side 2)

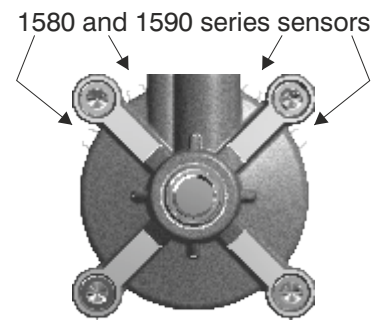
Ø125 - Ø200: the sensors can be fixed on the three sides as indicated in the drawing, by using suitable bracket



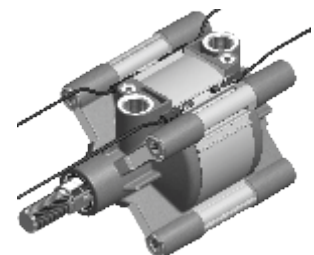
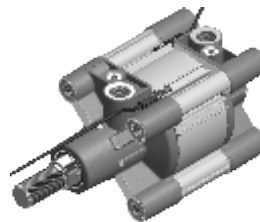
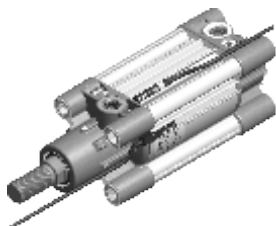
Ø32 - Ø63



Ø80



Ø100 - Ø200



**CYLINDERS - BORE SIZES Ø32 to Ø63:**

The two slots on connection side are plugged, therefore only sensor 1590 can be used. Suitable for top housing and once placed by means of its screw, it can be fixed in desired position.

**CYLINDERS - BORE SIZE Ø80:**

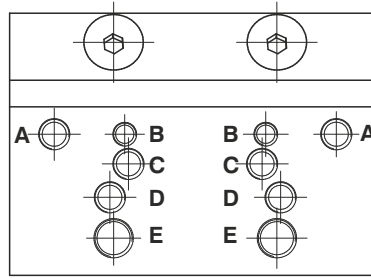
The two top housing can be accessed from the front of the unit, one housing can be accessed from the front end cap and the opposite housing from the rear end cap. It is therefore possible to use both type of sensors: 1580 - 1590.

**CYLINDERS - BORE SIZE Ø100-Ø200:**

All four housings can be accessed from the front of the unit. It is therefore possible to use both type of sensors: 1580 - 1590.

### Distributor supports

This accessory permits to mount a valve or an electrovalve on a side of the cylinder. The plate can be fitted on the cylinder profiled barrel. Once installed the connections must be done with fittings and pipes. All of the threaded holes on the support plate are dedicated to different valves series as per attached drawing.

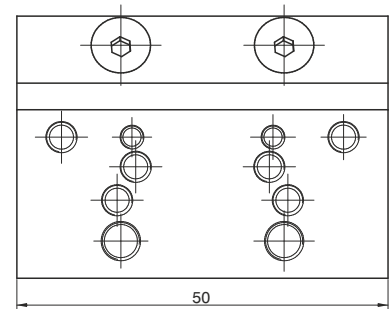
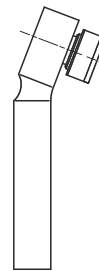
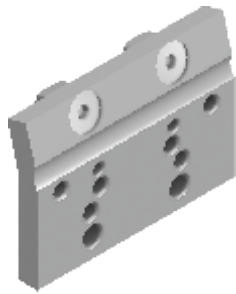


Fixing holes for valves series:

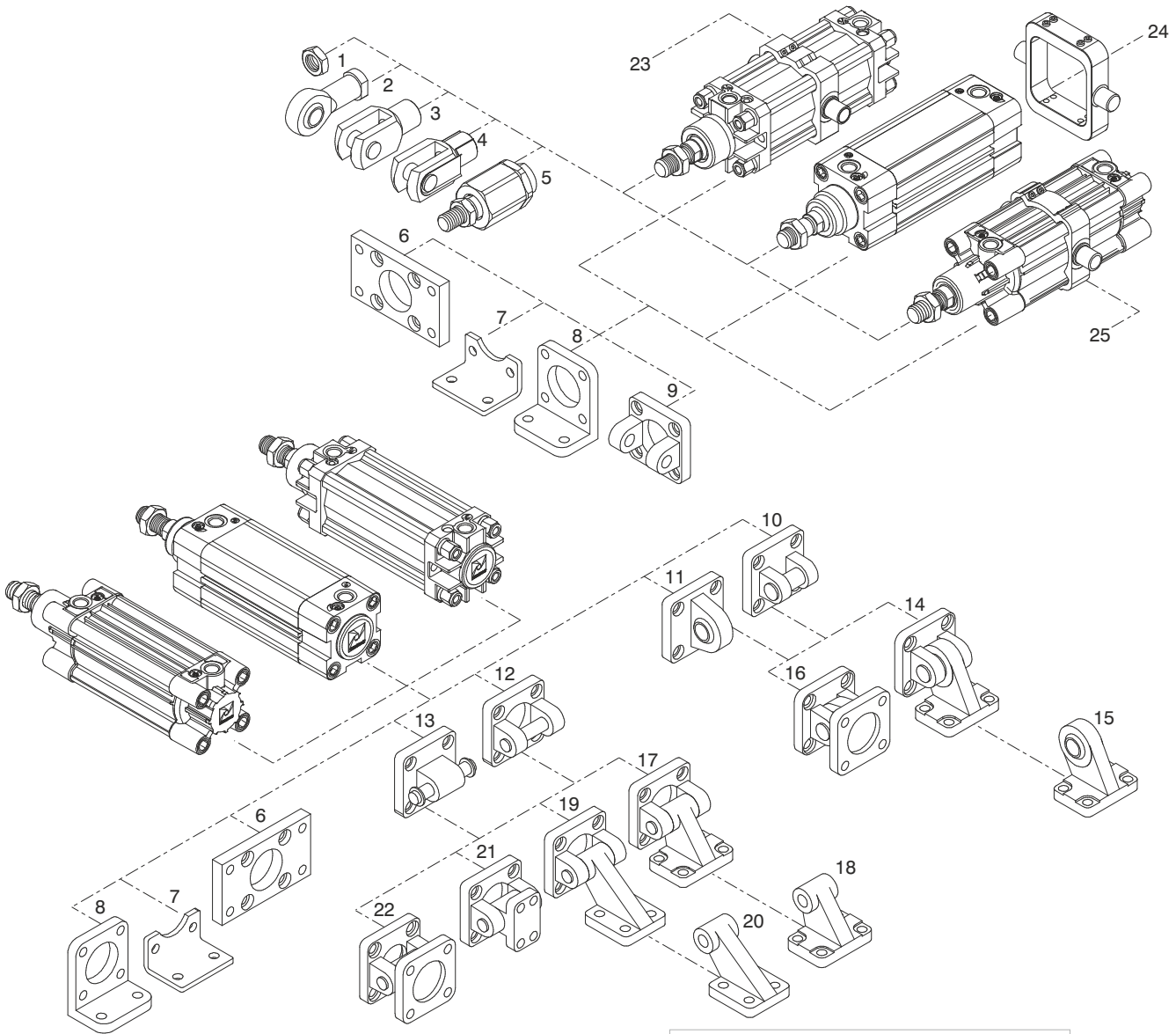
A = 488 / 484  
 B = 2400  
 C = T488  
 D = 2600  
 E = T424

#### Ordering code

**1390.25** (for Ø32)  
**1390.26** (for Ø40)  
**1390.27** (for Ø50)  
**1390.28** (for Ø63)  
**1390.29** (for Ø80)  
**1390.30** (for Ø100)



**Attention:** do not use ISO distributor for base mounting



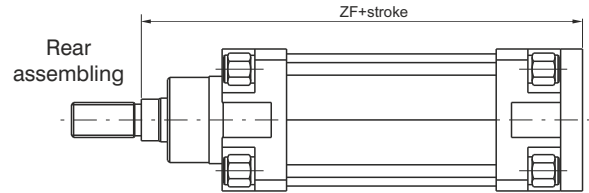
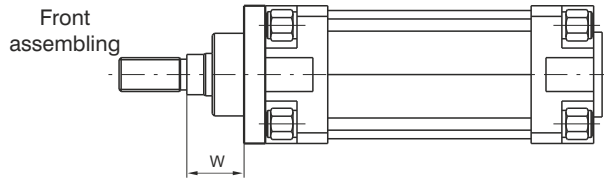
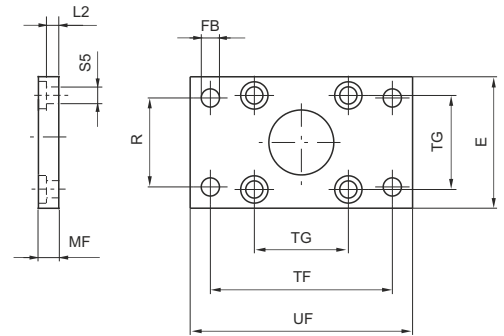
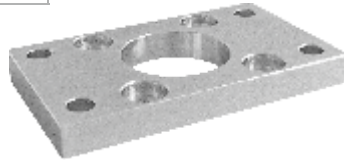
Pos.	Description	Ordering code	
		Aluminium	Steel
1	Rod nut	/	1320.Ø.18F
2	Ball joint	/	1320.Ø.32F
3	Forks	/	1320.Ø.13F
4	Fork with clips	/	1320.Ø.13/1F
5	Self-aligning joint	/	1320.Ø.33F
6	Flange (MF1-MF2)	1390.Ø.03F 1390.Ø.03FP	1380.Ø.03F
7	Short mounting foot brackets (in sheet metal MS1)	/	1320.Ø.05/1F
8	Standard mounting foot brackets	1320.Ø.05F	/
9	Front clevis	1380.Ø.08F	1320.Ø.19F
10	Rear narrow clevis (AB6)	1380.Ø.30F	1320.Ø.29F
11	Rear male clevis (with jointed head according to DIN 648K standard)	1380.Ø.15F	1320.Ø.25F
12	Rear female clevis (MP2)	1380.Ø.09F	1320.Ø.20F
13	Rear male clevis (MP4)	1380.Ø.09/1F	1320.Ø.21F
14	Complete square angle trunnion (pos.10 + pos.15)	/	1320.Ø.27F
15	Simple square counter clevis (pos.14)	/	1320.Ø.28F
16	Square angle trunnion with jointed head (pos.10 + pos.11)	1380.Ø.36F	1320.Ø.26F
17	Square angle trunnion (AB7) (pos.18 + pos.12)	1380.Ø.35F	1320.Ø.23F
18	Simple square counter clevis (pos.17)	1320.Ø.11/2F	1320.Ø.24F
19	Simple rear trunnion with support brackets (pos.20 + pos.12)	1380.Ø.11F	/
20	Simple square counter clevis (pos.19)	1320.Ø.11/1F	/
21	Standard trunnion	1380.Ø.10F	/
22	Standard complete trunnion (pos.12 + pos.13)	1380.Ø.22F	1320.Ø.22F
23	1319 - 1321 cylinders series Intermediate trunnion	1320.Ø.12BF	1320.Ø.12F
24	1386 - 1388 / 1396 - 1398 EcoPlus series Intermediate trunnion	/	1386.Ø.12F
25	1390 - 1392 EcoLight series Intermediate trunnion	1390.Ø.12F	/

**Front and rear flanges (MF1 - MF2)**

Ordering code

Steel : **1380.Ø.03F** (Ø32 - Ø200)  
Aluminium : **1390.Ø.03F** (Ø32 - Ø100)  
Die-casting aluminium: **1390.Ø.03FP** (Ø32 - Ø100)

Plate which allows anchorage of the cylinder at a right angle to the plane. It is made of zinc-plated extruded steel.

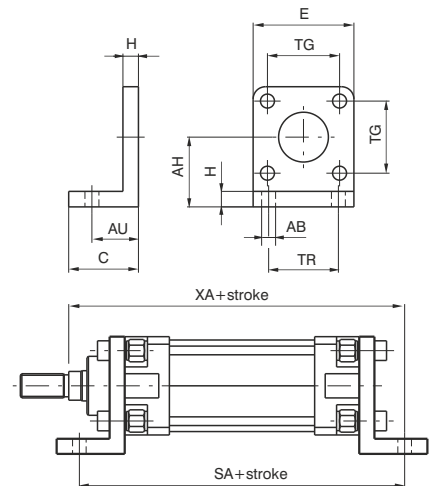


Bore	E	FB (H 13)	MF (JS 14)	R (JS 14)	TF (JS 14)	TG	UF	ZF	W	L2	S5	Weight(gr.) steel	Weight(gr.) aluminium	Weight(gr.) Die-casting aluminium
32	45	7	10	32	64	32,5	80	130	16	5	6,6	190	65	60
40	52	9	10	36	72	38	90	145	20	5	6,6	250	90	69
50	65	9	12	45	90	46,5	110	155	25	6,5	9	480	170	130
63	75	9	12	50	100	56,5	120	170	25	6,5	9	620	220	170
80	95	12	16	63	126	72	150	190	30	8	11	1430	500	345
100	115	14	16	75	150	89	170	205	35	8	11	1990	690	485
125	140	16	20	90	180	110	205	245	45	10,5	14	3750	/	/
160	180	18	20	115	230	140	260	280	60	9,5	18	6350	/	/
200	220	22	25	135	270	175	300	300	70	12,5	18	11350	/	/

**Standard mounting foot brackets**

Ordering code

Aluminium: **1320.Ø.05F**  
(1 piece)

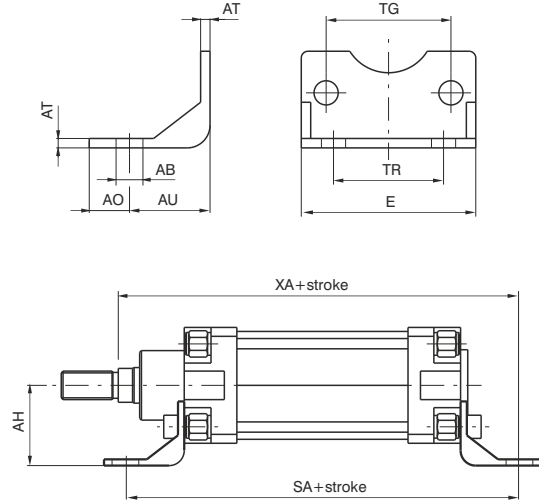


Elements used to anchor the cylinder parallel to the mounting plane. They are made of cast aluminium, painted black.

Bore	32	40	50	63	80	100	125	160	200
AB (H 14)	7	9	9	9	12	14	16	18	22
AH (JS 15)	32	36	45	50	63	71	91	115	135
AU (±0,2)	24	28	32	32	41	41	45	60	70
C	35	35	45	45	55	56	68	82	90
E	45	52	65	75	95	115	140	180	220
H	8	8	10	10	12	12	16	20	20
SA	142	161	170	185	210	220	250	300	320
TG	32,5	38	46,5	56,5	72	89	110	140	175
TR (JS 14)	32	36	45	50	63	75	90	115	135
XA	144	163	175	190	215	230	270	320	345
Weight gr.	45	65	140	175	380	470	920	2300	3200

**Short mounting foot brackets (in sheet metal MS1)**

Ordering code
Steel: <b>1320.Ø.05/1F</b> (1 piece)

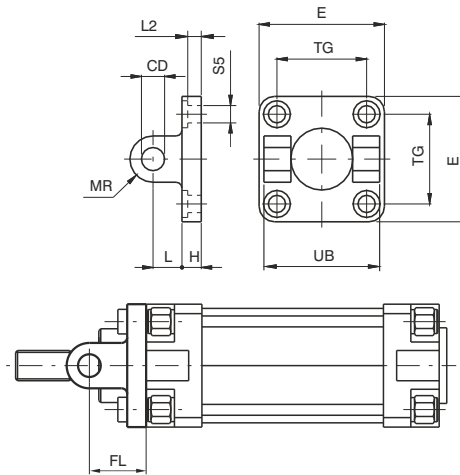
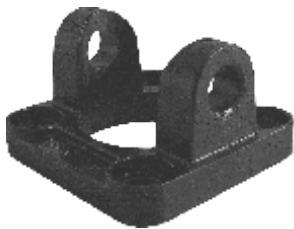


Elements used to anchor the cylinder parallel to the mounting plane. They are made of steel, and painted black.

Bore	32	40	50	63	80	100	125	160	200
AB (H 14)	7	9	9	9	12	14	16	18	22
AH (JS 15)	32	36	45	50	63	71	90	115	135
AU (± 0.2)	24	28	32	32	41	41	45	60	70
AO (± 0.2)	11	8	15	13	14	16	25	15	30
E	45	52	65	75	95	115	140	180	220
AT	4	4	5	5	6	6	8	9	12
SA	142	161	170	185	210	220	250	300	320
TG	32,5	38	46,5	56,5	72	89	110	140	175
TR (JS 14)	32	36	45	50	63	75	90	115	135
XA	144	163	175	190	215	230	270	320	345
Weight gr.	65	80	170	190	380	452	1090	1190	3450

**Front clevis (not specified by ISO-VDMA standards)**

Ordering code
Aluminium: <b>1380.Ø.08F</b>
Steel: <b>1320.Ø.19F</b>



Used to mount the cylinder either parallel or at a right angle to the mounting plane; allows the cylinder to self-align under load. Made of aluminium alloy or steel (see ordering code) and painted black.

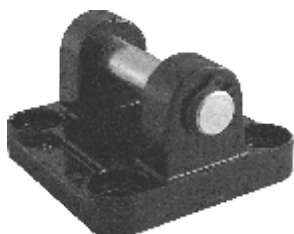
Bore	32	40	50	63	80	100	125	160	200
CD (H9)	10	12	12	16	16	20	25	30	30
E	Aluminium	45	52	65	75	95	115	140	220
	Steel	45	55	65	75	95	115	140	220
FL (±0,2)	22	25	27	32	36	41	50	55	60
H	Aluminium	9	9	11	11	14	14	20	25
	Steel	10	10	10	12	14	16	20	20
L	Aluminium	13	16	16	21	22	27	30	35
	Steel	12	15	17	20	22	25	30	40
MR	10	12	12	16	16	20	25	25	25
TG	32,5	38	46,5	56,5	72	89	110	140	175
UB (h14)	45	52	60	70	90	110	130	170	170
L2(±0,5)	5,5	5,5	6,5	6,5	10	10	10	10	11
S5 (H13)	6,6	6,6	9	9	11	11	14	18	18
Weight gr.	Aluminium	50	75	125	190	380	620	1180	2900
	Steel	150	235	340	550	1010	1710	3360	8960



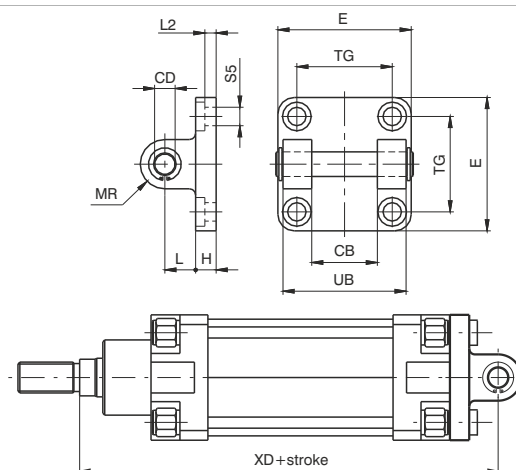
**Rear clevis (MP2)**

Ordering code

Aluminium: **1380.Ø.09F**  
Steel: **1320.Ø.20F**



Similar to type 08 but includes a hinge pin. This type of mounting allows anchorage of the cylinder either parallel or right angle to plane; the cylinder rod can oscillate and self-align as necessary when under load. Made of aluminium alloy or steel (see ordering code) and painted black.

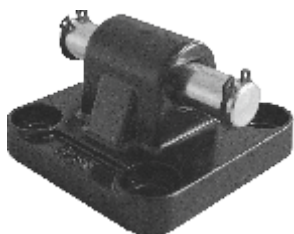


Bore		32	40	50	63	80	100	125	160	200
CB (H 14)		26	28	32	40	50	60	70	90	90
CD		10	12	12	16	16	20	25	30	30
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
H	Aluminium	9	9	11	11	14	14	20	20	25
	Steel	10	10	10	12	14	16	20	20	20
L	Aluminium	13	16	16	21	22	27	30	35	35
	Steel	12	15	17	20	22	25	30	35	40
MR		10	12	12	16	16	20	25	25	25
TG		32,5	38	46,5	56,5	72	89	110	140	175
UB (h14)		45	52	60	70	90	110	130	170	170
XD		142	160	170	190	210	230	275	315	335
L2(±0,5)		5,5	5,5	6,5	6,5	10	10	10	10	11
S5		6,6	6,6	9	9	11	11	14	18	18
Weight	Aluminium	80	130	185	310	530	910	1710	2760	3820
	Steel	180	290	400	670	1160	2000	3890	6730	9880

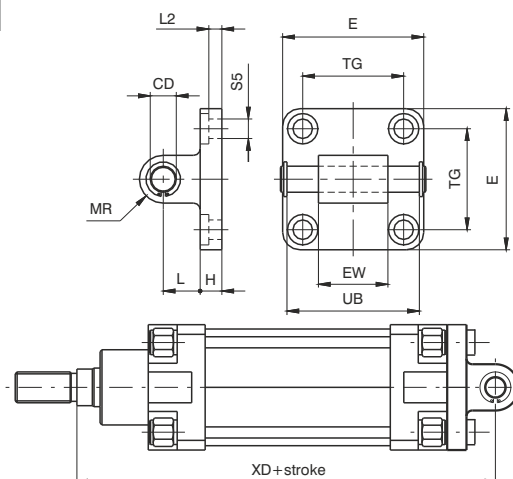
**Rear male clevis (MP4)**

Ordering code

Aluminium: **1380.Ø.09/1F**  
Steel: **1320.Ø.21F**



Similar to 09 clevis except for the connection, which is male rather than female. Used to mount the cylinder either parallel or at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary when under load. Made of aluminium alloy or steel (see ordering code) and painted black.



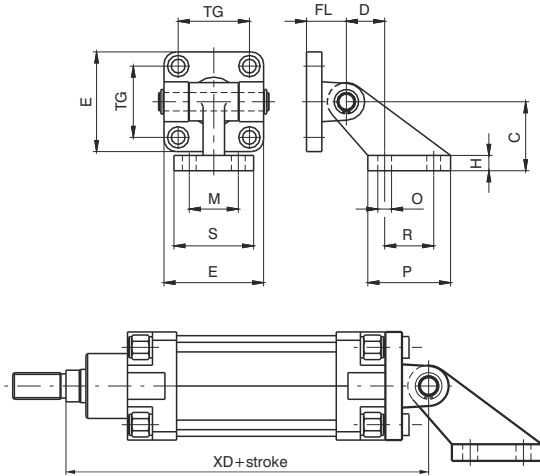
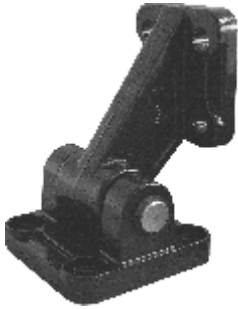
Bore		32	40	50	63	80	100	125	160	200
CD		10	12	12	16	16	20	25	30	30
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
EW		26 <sup>(-0,2/-0,6)</sup>	28 <sup>(-0,2/-0,6)</sup>	32 <sup>(-0,2/-0,6)</sup>	40 <sup>(-0,2/-0,6)</sup>	50 <sup>(-0,2/-0,6)</sup>	60 <sup>(-0,2/-0,6)</sup>	70 <sup>(-0,5/-1,2)</sup>	90 <sup>(-0,5/-1,2)</sup>	90 <sup>(-0,5/-1,2)</sup>
H	Aluminium	9	9	11	11	14	14	20	20	25
	Steel	10	10	10	12	14	16	20	20	20
L	Aluminium	13	16	16	21	22	27	30	35	35
	Steel	12	15	17	20	22	25	30	35	40
MR		10	12	12	16	16	20	25	25	25
TG		32,5	38	46,5	56,5	72	89	110	140	175
UB (3,5)		46	53	61	71	91	111	132	171,5	171,5
XD		142	160	170	190	210	230	275	315	335
L2 (±0,5)		5,5	5,5	6,5	6,5	10	10	10	10	11
S5		6,6	6,6	9	9	11	11	14	18	18
Weight	Aluminium	90	130	190	340	580	960	1890	2830	3940
	Steel	210	330	430	810	1350	2400	4300	6880	8560



**Simple rear trunnion with support brackets** (not specified by ISO-VDMA standards)

Ordering code

Aluminium: **1380.Ø.11F**  
Counter clevis can be ordered separately with code 1320.Ø.11/1F



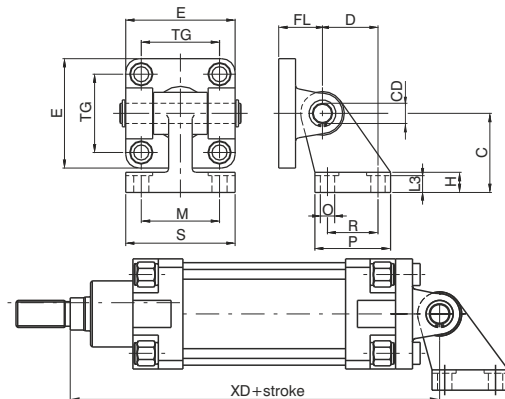
Used to mount cylinders parallel to the plane to which the counter clevis is attached. Allows self-alignment of the cylinder rod under load with an oscillation up to 90 degrees from the mounting plane.

Bore	32	40	50	63	80	100	125	160	200
C (±0,2)	32	45	45	63	63	90	90	140	140
D (±0,5)	18	25	25	32	32	40	40	50	50
E	45	52	65	75	95	115	140	180	220
H	8	10	10	12	12	17	17	20	20
FL	22	25	27	32	36	41	50	55	60
M (JS 14)	25	32	32	40	40	50	50	63	63
TG	32,5	38	46,5	56,5	72	89	110	140	175
O (H 13)	7	9	9	11	11	14	14	18	18
P	37	54	54	75	75	103	103	154	154
R (JS 14)	20	32	32	50	50	70	70	110	110
S	41	52	52	63	63	80	80	110	110
XD	142	160	170	190	210	230	275	315	335
Weight gr.	130	260	330	600	820	1560	2530	4735	5795

**Square angle trunnion**

Ordering code

Aluminium: **1380.Ø.35F**  
Counter clevis can be ordered separately with code 1320.Ø.11/2F  
Steel: **1320.Ø.23F** (Ø32-Ø100)  
Counter clevis can be ordered separately with code 1320.Ø.24F

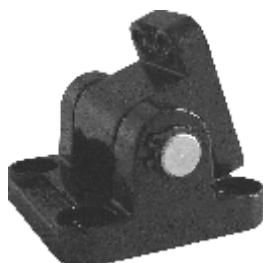


Bore		32	40	50	63	80	100	125	160	200
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
TG		32,5	38	46,5	56,5	72	89	110	140	175
FL		22	25	27	32	36	41	50	55	60
D (JS14)		21	24	33	37	47	55	70	97	105
CD		10	12	12	16	16	20	25	30	30
C (JS15)		32	36	45	50	63	71	90	115	135
H	Aluminium	8	10	12	14	14	17	20	25	30
	Steel	8	10	12	12	14	15	/	/	/
L3	Aluminium	6,4	8,4	10,4	12,4	11,5	14,5	16,8	21	26
	Steel	6,5	8,5	10,5	10,5	11,5	12,5	/	/	/
R (JS14)		18	22	30	35	40	50	60	88	90
P		31	35	45	50	60	70	90	126	130
O (H13)		6,6	6,6	9	9	11	11	14	14	18
S		51	54	65	67	86	96	124	156	162
M (JS14)		38	41	50	52	66	76	94	118	122
XD		142	160	170	190	210	230	275	315	335
Weight gr.	Aluminium	120	180	225	435	730	1220	2325	3780	4950
	Steel	340	500	640	1250	2100	3500	/	/	/

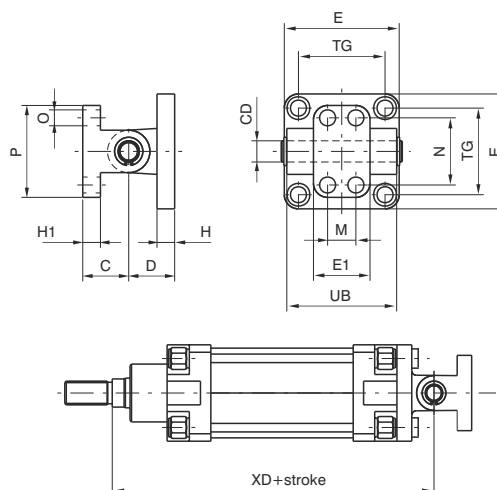
**Standard trunnion** (not specified by ISO-VDMA standards)

Ordering code

Aluminium: **1380.Ø.10F**



Mounting consists of clevis 09 and counter clevis. Used to mount cylinders at a right angle to the plane to which the counter clevis is attached. Allows self-alignment of the cylinder rod under load with an oscillation of  $\pm 60$  degrees.

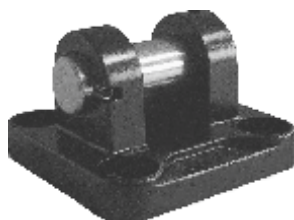


Bore	32	40	50	63	80	100	125	160	200
C ( $\pm 0.2$ )	18	26	26	34	34	41	41	55	55
CD	10	12	12	16	16	20	25	30	30
D	22	25	27	32	36	41	50	55	60
E	45	52	65	75	95	115	140	180	220
E1	25	32	32	46	46	56	56	71	71
H	10	10	12	12	16	16	20	20	25
H1	8	10	10	12	12	16	16	20	20
M ( $\pm 0.2$ )	-	16	16	25	25	32	32	43	43
N ( $\pm 0.2$ )	28	38	38	54	54	90	90	150	150
O	7	9	9	11	11	14	14	18	18
P	40	52	52	75	75	115	115	180	180
TG	32.5	38	46.5	56.5	72	89	110	140	175
UB	45	52	60	70	90	110	130	170	170
XD	142	160	170	190	210	230	275	315	335
Weight gr.	110	190	240	490	710	1290	2090	3690	4810

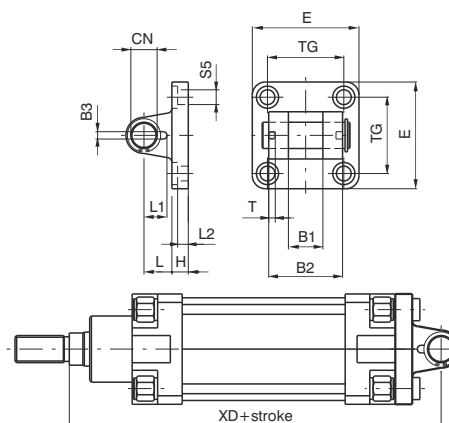
**Rear narrow clevis**

Ordering code

Aluminium: **1380.Ø.30F**  
Steel: **1320.Ø.29F** ( $\text{Ø}32\text{-}\text{Ø}125$ )



Utilised with clevis 15F allows the cylinder to oscillate in all directions. Made of aluminium alloy or steel (see ordering code) and painted black.

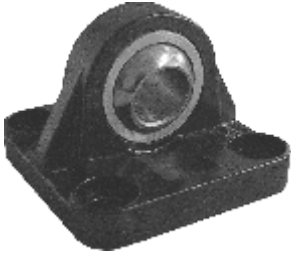


Bore	32	40	50	63	80	100	125	160	200	
B1 (H 14)	14	16	21	21	25	25	37	43	43	
B2 (d 12)	34	40	45	51	65	75	97	122	122	
B3 ( $\pm 0.2$ )	3,3	4,3	4,3	4,3	4,3	6,3	6,3	6,3	6,3	
CN	10	12	16	16	20	20	30	35	35	
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
H	Aluminium	9	9	11	11	14	14	20	20	25
	Steel	10	10	10	12	14	16	20	/	/
L	Aluminium	13	16	16	21	22	27	30	35	35
	Steel	12	15	17	20	22	25	30	/	/
L1	11,5	12	14	14	16	16	24	26,5	26,5	
L2 ( $\pm 0,5$ )	5,5	5,5	6,5	6,5	10	10	10	10	11	
S5	6,6	6,6	9	9	11	11	14	18	18	
T	3	4	4	4	4	4	6	6	6	
TG	32,5	38	46,5	56,5	72	89	110	140	175	
XD	142	160	170	190	210	230	275	315	335	
Weight gr.	Aluminium	70	115	200	290	570	820	1710	3010	4380
	Steel	160	270	370	670	1110	2100	4150	/	/

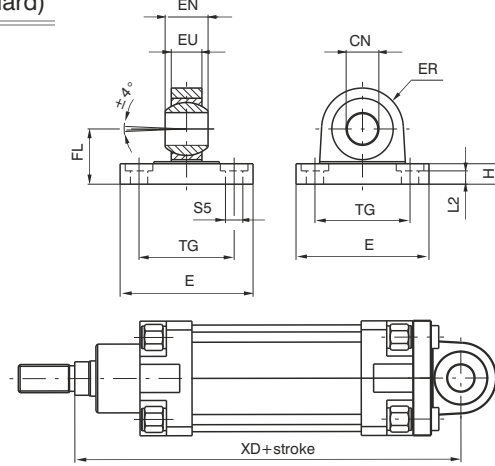
**Rear male clevis (with jointed head according to DIN 648K standard)**

Ordering code

Aluminium: **1380.Ø.15F**  
Steel: **1320.Ø.25F(Ø32-Ø125)**



Utilised with clevis 30F allows the cylinder to oscillate in all directions. Made of aluminium alloy or steel (see ordering code) and painted black.



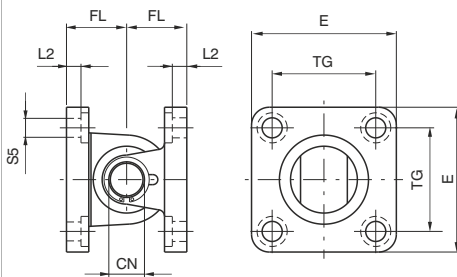
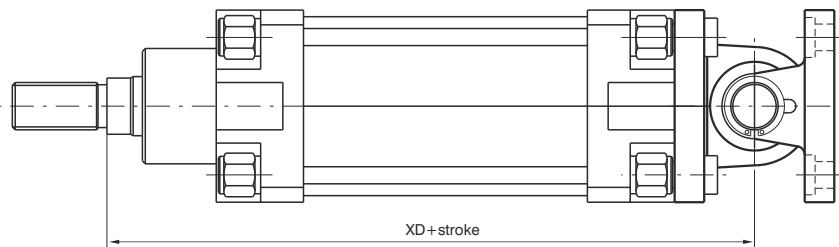
Bore		32	40	50	63	80	100	125	160	200
CN (H 7)		10	12	16	16	20	20	30	35	35
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
EN (-0.1)		14	16	21	21	25	25	37	43	43
ER	Aluminium	16	19	21	24	28.5	30	40	45	48
	Steel	15	18	20	23	27	30	40	/	/
EU		10.5	12	15	15	18	18	25	28	28
FL (JS 15)		22	25	27	32	36	41	50	55	60
H	Aluminium	9	9	11	11	14	14	20	20	25
	Steel	10	10	10	12	14	16	20	/	/
L2 (±0.5)		5.5	5.5	6.5	6.5	10	10	10	10	11
S5		6.6	6.6	9	9	11	11	14	18	18
TG		32.5	38	46.5	56.5	72	89	110	140	175
XD		142	160	170	190	210	230	275	315	335
Weight gr.	Aluminium	60	100	180	245	480	650	1410	2420	3840
	Steel	210	310	400	710	1350	2400	4000	/	/

**Complete standard trunnion (with jointed head according to DIN 648K standards)**

Ordering code

Aluminium: **1380.Ø.36F**  
Counter clevis can be ordered separately with code 1380.Ø.15F

Steel: **1320.Ø.26F (Ø32-Ø125)**  
Counter clevis can be ordered separately with code 1320.Ø.25F



Bore		32	40	50	63	80	100	125	160	200
CN		10	12	16	16	20	20	30	35	35
E	Aluminium	45	52	65	75	95	115	140	180	220
	Steel	45	55	65	75	95	115	140	180	220
FL (JS 15)		22	25	27	32	36	41	50	55	60
L2 (±0.5)		5.5	5.5	6.5	6.5	10	10	10	10	11
S5		6.6	6.6	9	9	11	11	14	18	18
TG		32.5	38	46.5	56.5	72	89	110	140	175
XD		142	160	170	190	210	230	275	315	335
Weight gr.	Aluminium	130	215	380	535	1050	1470	3120	5430	8220
	Steel	380	580	770	1380	2460	4500	8150	/	/

**Standard complete trunnion**

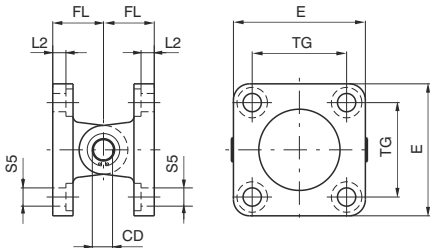
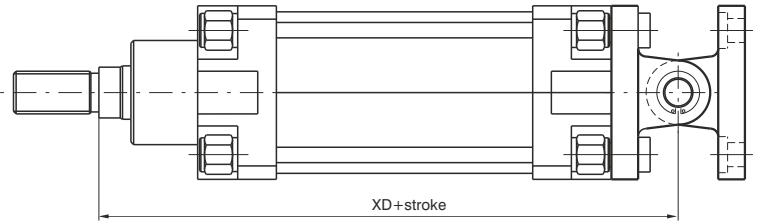
Ordering code

Aluminium: **1380.Ø.22F**

Mounting consists of rear clevis code 1380.Ø.09F  
+ rear male clevis code 1380.Ø.09/1F  
(ordering separately)

Steel: **1320.Ø.22F**

Mounting consists of rear clevis code 1320.Ø.20F  
+ rear male clevis code 1320.Ø.21F  
(ordering separately)



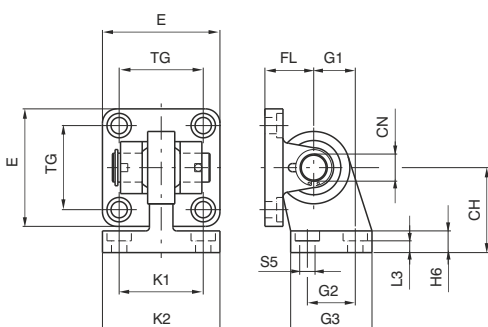
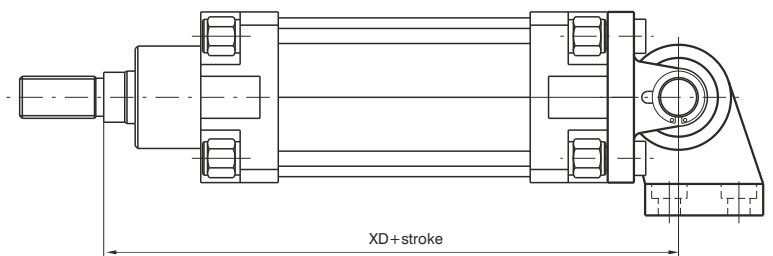
Bore	32	40	50	63	80	100	125	160	200
CD	10	12	12	16	16	20	25	30	30
E	45	55	65	75	95	115	140	180	220
FL	22	25	27	32	36	41	50	55	60
L2 (±0.5)	5,5	5,5	6,5	6,5	10	10	10	10	11
S5	6,6	6,6	9	9	11	11	14	18	18
TG	32,5	38	46,5	56,5	72	89	110	140	175
XD	142	160	170	190	210	230	275	315	335
Weight gr.	360	580	780	1370	2370	4110	7670	12650	17480

**Complete square angle trunnion (with joined head according to DIN 648K standards)**

Ordering code

Steel: **1320.Ø.27F**

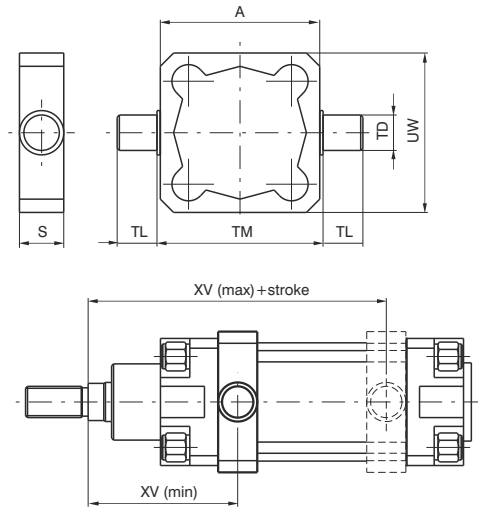
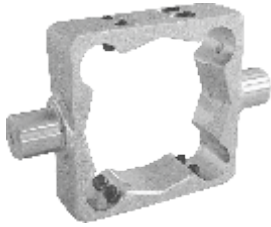
Mounting consists of rear clevis narrow code 1320.Ø.29F  
+ simple counter clevis code 1320.Ø.28F  
(ordering separately)



Bore	32	40	50	63	80	100	125
CH (JS 15)	32	36	45	50	63	71	90
CN	10	12	16	16	20	20	30
E	45	55	65	75	95	115	140
FL (JS 15)	22	25	27	32	36	41	50
G1 (JS 15)	21	24	33	37	47	55	70
G2 (JS 14)	18	22	30	35	40	50	60
G3	31	35	45	50	60	70	90
H6	10	10	12	12	14	15	20
K1 (JS 14)	38	41	50	52	66	76	94
K2	51	54	65	67	86	96	124
L3 (*0,5)	8,5	8,5	10,5	10,5	11,5	12,5	17
S5	6,6	6,6	9	9	11	11	14
TG	32,5	38	46,5	56,5	72	89	110
XD	142	160	170	190	210	230	275
Weight gr.	330	480	830	1220	2100	3580	7000

**Intermediate trunnion Series 1319 - 1321**

Ordering code  
Steel: **1320.Ø.12F**



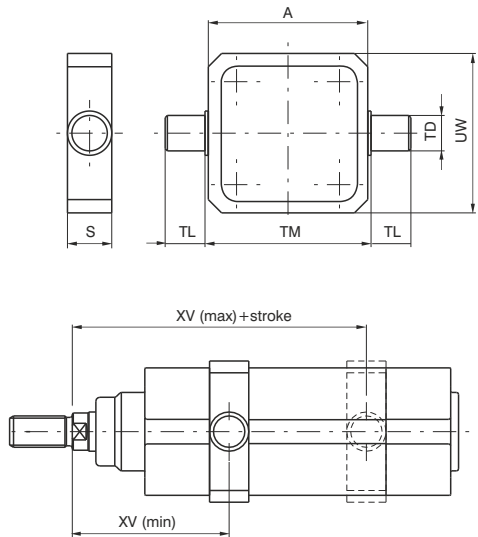
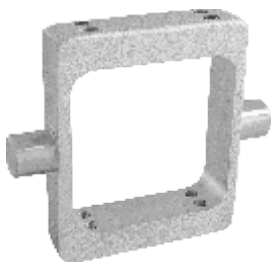
Clevis to be mounted on the barrel to have the centre of rotation of the hinge pin at a point between the end plates of the cylinder. It is attached to the barrel by means of eight pointed grains that block in the "V" groove of the four protruding shapes. In the case of anchorage subject to heavy use, it is recommended to connect the clevis once the right position has been found.

**Attention:** mounting of the clevis with contact to the end plates does not allow the use of the magnetic sensors as the switch limits.

Bore	32	40	50	63	80	100	125	160	200
A	49	62	73	87	109	130	155	190	240
S	18	21	21	27	27	32	32	40	40
TD (e9)	12	16	16	20	20	25	25	32	32
TL (h14)	12	16	16	20	20	25	25	32	32
TM (h14)	50	63	75	90	110	132	160	200	250
UW	59	62	73	87	109	130	155	190	240
XV (max.)	85	96	102	109	123.5	131.5	162	193	204
XV (min.)	61	69	78	86	96.5	108.5	128	150	168
Weight gr.	180	270	330	650	890	1550	1950	3580	5850

**Intermediate trunnion Series 1386 - 1388 - 1396 - 1398**

Ordering code  
Steel: **1386.Ø.12F**



Clevis to be mounted on the barrel to have the centre of rotation of the hinge pin at a point between the end plates of the cylinder. It is attached to the barrel by means of eight pointed grains. In the case of anchorage subject to heavy use, it is recommended to connect the clevis once the right position has been found.

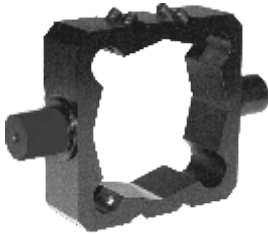
**Attention:** mounting of the clevis with contact to the end plates does not allow the use of the magnetic sensors as the switch limits.

Bore	32	40	50	63	80	100
A	49.8	62.6	74.1	89.1	109.1	130.1
S	18	21	21	27	27	30
TD (e 9)	12	16	16	20	20	25
TL (h 14)	12	16	16	20	20	25
TM (h 14)	50	63	75	90	110	132
UW	70	78	91	94	130	145
XV (max.)	80	91.5	97.5	106.5	118.5	127
XV (min.)	66	73.5	82.5	88.5	101.5	113
Weight gr.	195	350	430	565	1035	1450

**Intermediate trunnion Series 1319 - 1321**

Ordering code

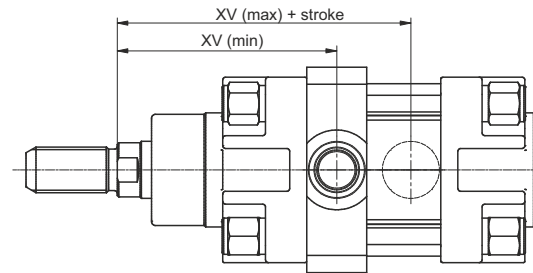
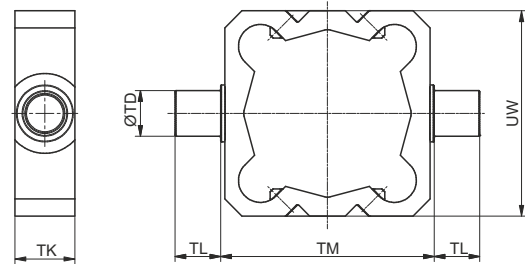
**1320.Ø.12BF**  
(Aluminium with  
steel bushes)



**Aluminium Intermediate Trunnion with steel bushes** to be mounted on the barrel. This solution allows the cylinder to rotate around the hinge which can be mounted in any position between the end caps. It is attached to the barrel by means of 8 grub screws which secure the Trunnion to the extruded barrel. In the case of heavy duty applications it is recommended that the Trunnion is secured using expansion pins.

In case off applications with high speed, high load and high pressure please contact our technical office.

**Please note:** If the Trunnion is mounted in direct contact with the cylinder end cap, it will not be possible to fit magnetic sensors at the end of stroke.

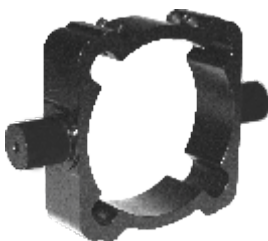


Bore	32	40	50	63	80	100
TD	Ø12	Ø16	Ø16	Ø20	Ø20	Ø25
TL	12	16	16	20	20	25
TM	50	63	75	90	110	132
TK	18	21	21	27	27	32
UW	54	60	72	87	109	130
XV min.	61	69	78	86	96.5	108.5
XV max.	85	96	102	109	123.5	131.5
Weight gr.	70	110	140	280	370	630

**Intermediate trunnion Series 1390 - 1392**

Ordering code

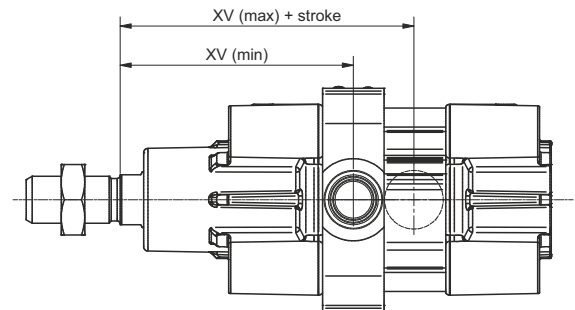
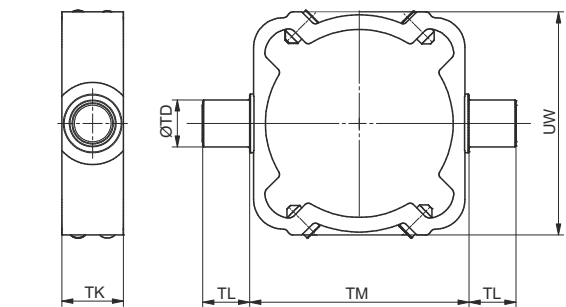
**1390.Ø.12F**  
(Aluminium with  
steel bushes)



**Aluminium Intermediate Trunnion with steel bushes** to be mounted on the barrel. This solution allows the cylinder to rotate around the hinge which can be mounted in any position between the end caps. It is attached to the barrel by means of 8 grub screws which secure the Trunnion to the extruded barrel. In the case of heavy duty applications it is recommended that the Trunnion is secured using expansion pins.

In case off applications with high speed, high load and high pressure please contact our technical office.

**Please note:** If the Trunnion is mounted in direct contact with the cylinder end cap, it will not be possible to fit magnetic sensors at the end of stroke 1500.\_, RS.\_, HS.\_ series.



Bore	32	40	50	63	80	100
TD	Ø12	Ø16	Ø16	Ø20	Ø20	Ø25
TL	12	16	16	20	20	25
TM	53*	63	75	90	110	132
TK	18	21	21	27	27	32
UW	56	64	76	92	112	134
XV min.	65	74	80	87	99	109
XV max.	81	91	100	108	121	130.5
Weight gr.	60	100	125	240	320	540

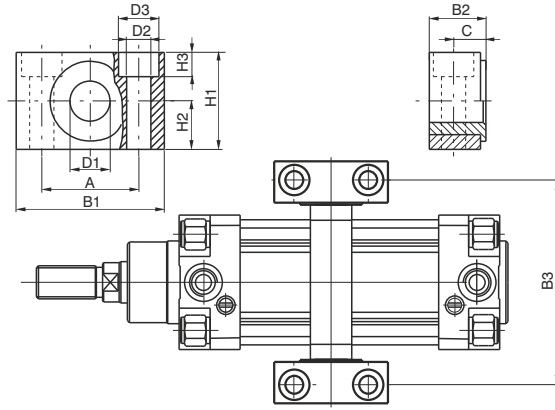
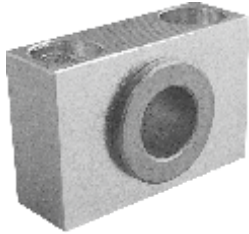
\* (Ø32, TM: not according to standard ISO 15552)



**Support for intermediate trunnion**

Ordering code

**1320.Ø.12/1F**  
(1 piece)



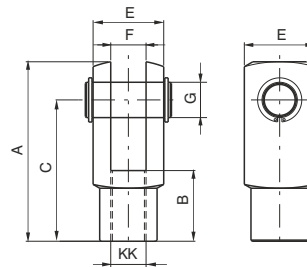
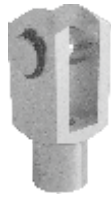
Combining two supports to the intermediate trunnion it is possible to fix the cylinder on plane surface.

Bore	32	40	50	63	80	100	125	160	200
A (±0.2)	32	36	36	42	42	50	50	60	60
B1	46	55	55	65	65	75	75	92	92
B2	18	21	21	23	23	28.5	28.5	40	40
B3	71	87	99	116	136	164	192	245	295
C	10.5	12	12	13	13	16	16	22.5	22.5
D1 (F7)	12	16	16	20	20	25	25	32	32
D2	6.6	9	9	11	11	14	14	18	18
D3	11	15	15	18	18	20	20	26	26
H1	30	36	36	40	40	50	50	60	60
H2 (±0.1)	15	18	18	20	20	25	25	30	30
H3	7	9	9	11	11	13	13	17	17
Weight gr. (1 piece)	100	150	150	235	235	435	435	850	850

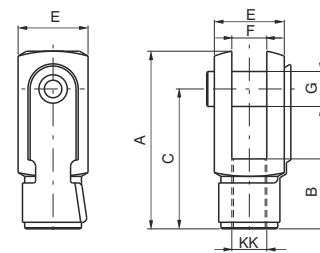
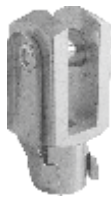
**Rod forks and nuts**

Ordering code

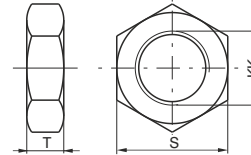
**1320.Ø.13F**



**1320.Ø.13/1F**  
(from ø32 to ø100)



**1320.Ø.18F**



Bore	32	40	50	63	80	100	125	160	200	
A	52	62	83	83	105	105	148	188	188	
B	20	24	32	32	40	40	56	72	72	
C	40	48	64	64	80	80	110	144	144	
E	20	24	32	32	40	40	55	70	70	
F(B12)	10	12	16	16	20	20	30	35	35	
G	10	12	16	16	20	20	30	35	35	
S	17	19	24	24	30	30	41	55	55	
T	6	7	8	8	9	9	12	18	18	
KK	M10X1.25		M12X1.25	M16X1.5	M16X1.5	M20X1.5	M20X1.5	M27X2	M36X2	M36X2
Weight	forks	100	140	340	340	680	680	2500	4000	4000
gr.	nut	15	20	20	20	40	40	100	210	210

**Fork:**  
Element that when screwed to the rod consents a regular functioning even when there are significant lateral forces as the connection point. Made of zinc-plated steel.

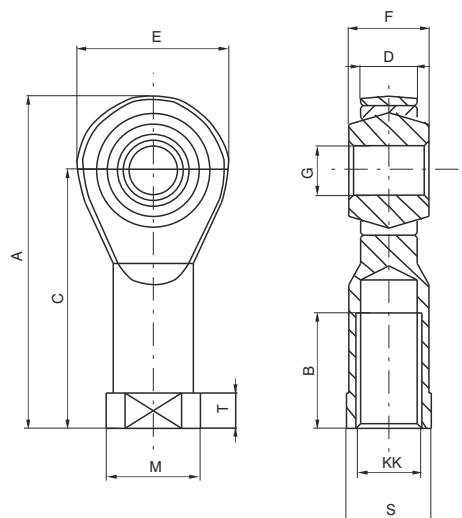
**Nut:**  
Used to block the position of the fork.



**Ball joint**

Ordering code

**1320.Ø.32F**

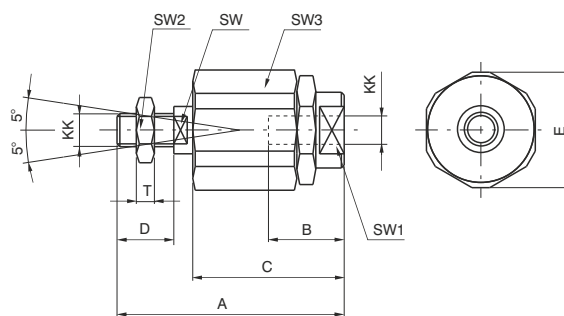


Bore	32	40	50	63	80	100	125	160	200
A	57	66	85	85	102	102	145	165	165
B	20	22	28	28	33	33	51	56	56
C	43	50	64	64	77	77	110	125	125
D (-0.1)	10.5	12	15	15	18	18	25	28	28
E	28	32	42	42	50	50	70	80	80
F	14	16	21	21	25	25	37	43	43
G (H 7)	10	12	16	16	20	20	30	35	35
KK	M10x1.25	M12x1.25	M16x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M36x2	M36x2
M	19	22	27	27	34	34	50	58	58
S	17	19	22	22	30	30	41	50	50
T	6.5	6.5	8	8	10	10	15	17	17
Weight gr.	76	110	220	220	410	410	1200	1600	1600

**Self-aligning joint**

Ordering code

**1320.Ø.33F**



Bore	32	40	50	63	80	100
A	71	75	103	103	119	119
B	20	20	32	32	40	40
C	46	46	63	63	71	71
D	20	24	32	32	40	40
E	32	32	45	45	45	45
KK	M10x1.25	M12x1.25	M16x1.5	M16x1.5	M20x1.5	M20x1.5
SW	12	12	20	20	20	20
SW1	19	19	27	27	27	27
SW2	17	19	24	24	30	30
SW3	30	30	41	41	41	41
T	6	7	8	8	9	9
Weight gr.	220	230	660	660	700	700

### Construction characteristics

Body	extruded shape anodized aluminium alloy 6060
Bushings	sintered bronze
Wiper	oil resitant NBR rubber
Rods	chromed C43 steel
Plate	plated zinc steel
Mounting block	plated zinc steel

### Technical characteristics

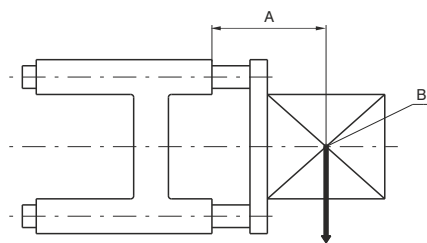
Max. suggested strokes for 1200 series:

Diameter	20	25
Stroke mm	200	250

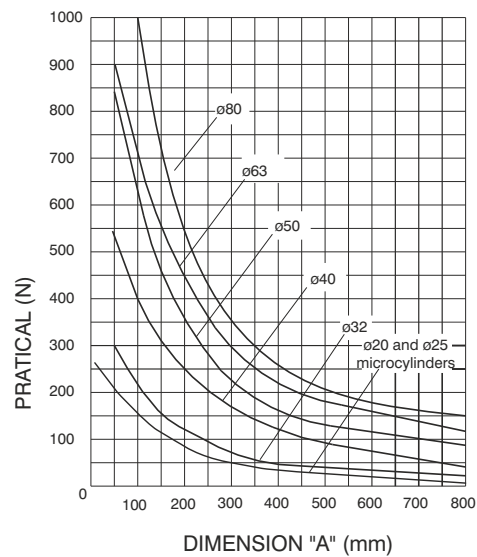
Max. suggested strokes for 1320 series:

Diameter	32	40	50	63	80
Stroke mm	300	350	450	500	550

Loading diagram based on dimension "A"



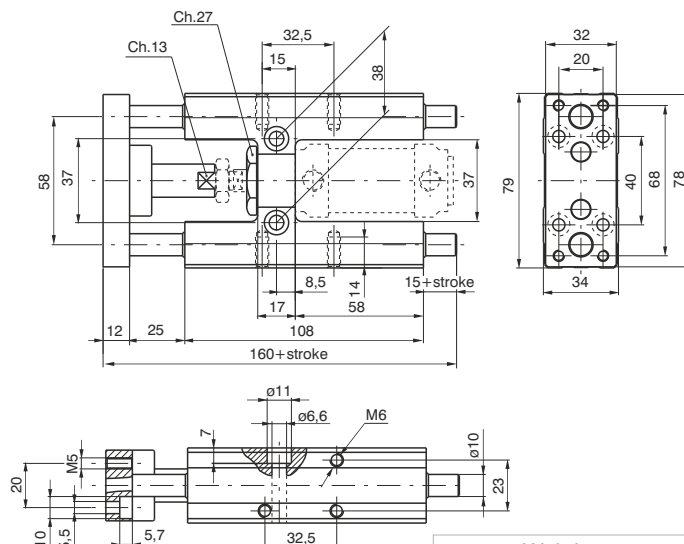
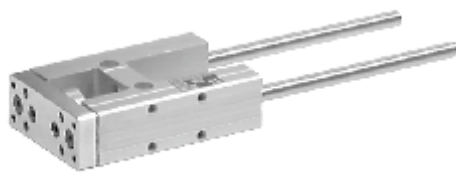
A = Protusion  
B = Load centre of gravity



### Use and maintenance

Follow the indication of the above diagram as far as loads are concerned. A large quantity of grease is placed between the two wipers during assembly, therefore the linear control units should not require special maintenance.

### Dimensions for microcylinders ISO 6432



Weight gr.	
stroke 100	every 50 mm
970	60

Ordering code

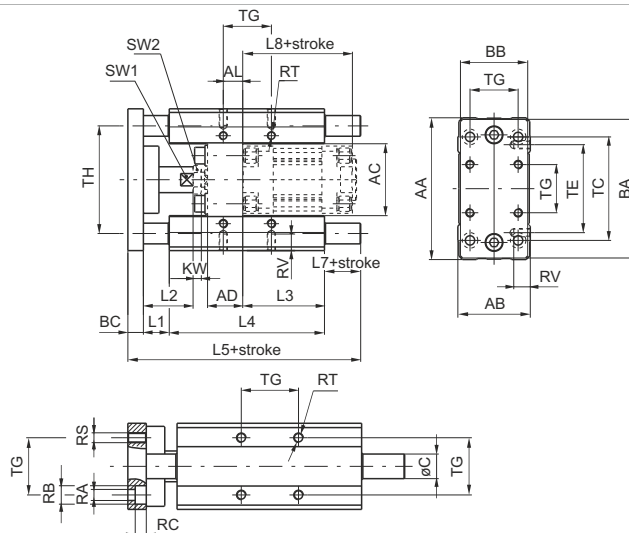
**1260.Ø.stroke.GLB**  
(Microcylinders ISO 6432 must be ordered separately)

**Standard strokes**

- Ø 20 100 - 150 - 200 mm
- Ø 25 100 - 150 - 200 - 250 mm

**Sensors and sensor clamps:** Use standard sensors and clamps.

### Dimensions for microcylinders ISO 15552



Ordering code

**1320.Ø.stroke.GLB**  
(Cylinders must be ordered separately)

Bore	Ø32	Ø40	Ø50	Ø63	Ø80
stroke 100	1720	2900	4700	6000	11300
every 50 mm	91	159	159	250	380

Bore	AA	AB	AC	AD	AL	BA	BB	BC	C	KW	L1	L2	L3	L4	L5
32	97	49	50	24	4.3	93	45	12	12	6	25	39	76	125	187
40	115	58	57.5	28	11	112	55	12	16	7	25	44	81	140	207
50	137	70	69.5	34	18.8	134	65	15	20	8	25	48	79	150	225
63	152	85	84.5	34	15.3	149	80	15	20	8	25	48	111	182	242
80	189	105	106	34	21	180	100	20	25	9	25	53	128	215	302

Bore	L7	L8	RA	RB	RC	RS	RT	RV	SW1	SW2	TC	TE	TG	TH
32	25	94	6.6	11	6.5	M6	M6	12	15	17	78	61	32.5	74
40	30	105	6.6	11	6.5	M6	M6	14	15	19	84	69	38	87
50	35	106	9	15	9	M8	M8	16	22	24	100	85	46.5	104
63	20	121	9	15	9	M8	M8	16	22	24	105	100	56.5	119
80	42	128	11	18	11	M10	M10	20	27	24	130	130	72	148

**Standard strokes**

- Ø 32 100 - 150 - 200 - 250 - 300 mm
- Ø 40 100 - 150 - 200 - 250 - 300 - 350 mm
- Ø 50 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 mm
- Ø 63 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 mm
- Ø 80 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 550 mm

**Sensor clamps and brackets for 1319-1320 series**

Use standard sensors and brackets on the rear and following special brackets on front of cylinders for use sensors codes 1500.\_, RS.\_, HS.\_ which have the following ordering codes:

- 1320.AGL** sensor bracket for cylinders Ø32 and Ø40
- 1320.BGL** sensor bracket for cylinders Ø50 and Ø63
- 1320.CGL** sensor bracket for cylinders Ø80

**General**

The 1393-1394 stainless steel ISO 15552 cylinders series are designed for corrosion resistance application such as marine, pharmaceutical and food ambiances.

The pre lubrication grease used is NSF H1 certified for food application.

Specific care has been taken during the design stages and the result is a clean profile cylinder easy to clean and free from possible residue build-up areas.

All parts in contact with the external environment are in Stainless steel 316L and the seals are available in two different compounds for different temperature applications: PUR -30°C - +80°C and FPM -5°C - +150°C.

The range starts from 32 bore up to 100 bore, round barrel and tie rods design. Double acting version standard or with through rod, magnetic or not magnetic piston available.

The piston is aluminium and the sensor bracket, when required is in stainless steel 316.

The cylinder can be fixed via the threaded holes in the tie rod nuts or with the wide range of stainless steel accessories.

**Construction characteristics**

End caps, piston rod, barrel, cushion screws	Stainless steel AISI 316
Rod-guide bushings	Stainless steel AISI 316 with P.T.F.E. coat
Half-pistons	Aluminium
Seals	PUR or FPM on request
Lubricating grease	NSF-H1 certified grease for incidental contact with food

**Technical characteristics**

Fluid	Filtered and preferably lubricated air or not (if lubricated the lubrication must be continuous)
Max. pressure	10 bar
Operating temperature	-30° C - +80°C with PUR seals -5° C - +150°C with FPM seals and non magnetic piston -5° C - +80°C with FPM seals and magnetic piston
Bore	Ø 32 - 40 - 50 - 63 - 80 - 100
Cushioning lenght	mm 20 - 20 - 22 - 22 - 32 - 32

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Our Technical Department will be glad to help.

**Standard strokes (for all diameters)**

from 0 to 150, every 25 mm
over 150 up to 500, every 50 mm
over 500 up to 1000, every 100

**Stroke tolerance (ISO 15552)**

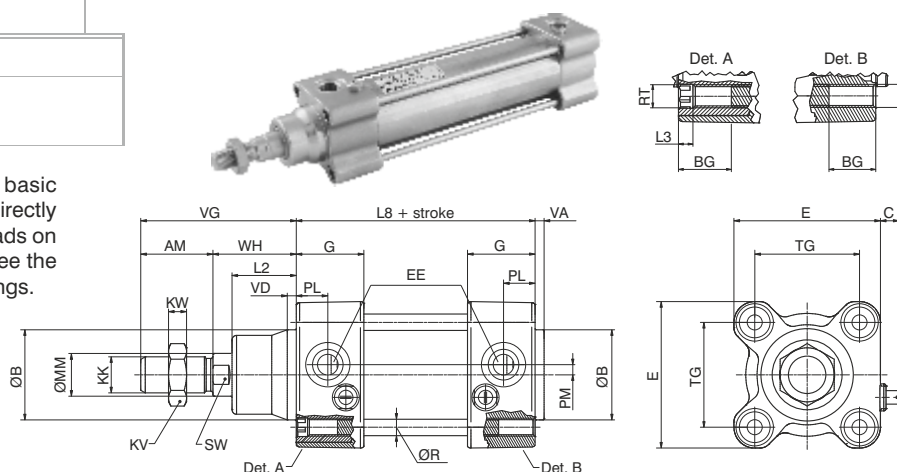
Bore	Stroke	Tolerance
32 - 40 - 50	up to 500	+2 0
	over 500 up to 1250	+3.2 0
63 - 80 - 100	up to 500	+2.5 0
	over 500 up to 1250	+4 0

**Basic version "01"**

Ordering code

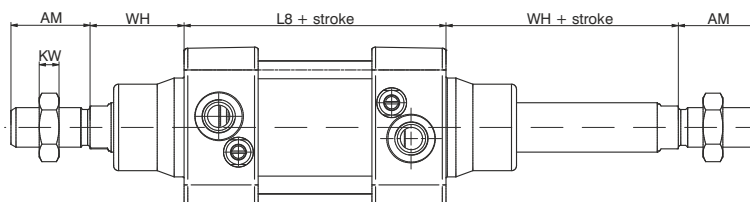
1393.Ø.stroke.01 Magnetic  
1394.Ø.stroke.01 Non magnetic

This is the configuration representing the basic cylinder according to ISO standards. It can be directly anchored on machine parts using the four threads on the end cover screws. For other applications see the pages about different types of stainless steel fixings.

**Push/pull version - "02"**

Ordering code

1393.Ø.stroke.02 Magnetic  
1394.Ø.stroke.02 Non magnetic

**Variants**

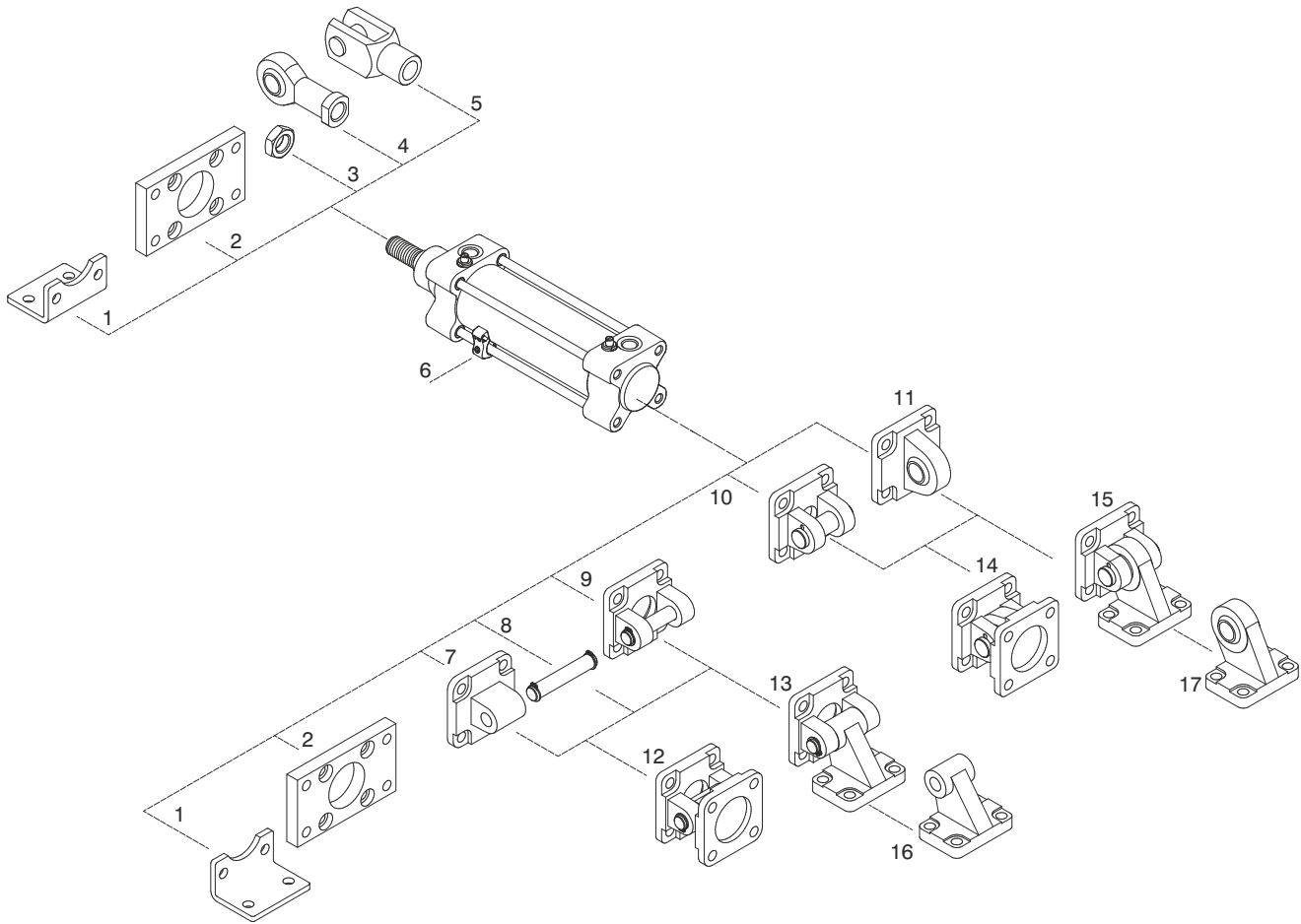
Version with FPM seals

Ordering code

139\_(93.94) Ø.stroke.\_ \_ V

**Table of dimensions**

Bore		32	40	50	63	80	100
AM		22	24	32	32	40	40
ØB (d 11)		30	35	40	45	45	55
BG min.		16	16	16	16	18	17
C	min.	4	4	4	4	3,5	3,5
	max.	7,5	7,5	8,5	8,5	9	9
E		47	52	65	76	95	113
EE		G1/8"	G1/4"	G1/4"	G3/8"	G3/8"	G1/2"
G		29	31	30	34	36	40,5
KK		M10X1,25	M12X1,25	M16X1,5	M16X1,5	M20x1,5	M20X1,5
KV		17	19	24	24	30	30
KW		16	7	8	8	9	9
L2		20	22	28,5	29	35	36
L3		4,5	4,5	5	5	6	6
L8		94	105	106	121	128	138
ØMM		12	16	20	20	25	25
PL		13	14	14	16	16	18
PM		3	3,5	4,5	7	8	8
ØR		Ø5,2	Ø5,2	Ø7,1	Ø7,1	Ø8,9	Ø8,9
RT		M6	M6	M8	M8	M10	M10
SW		10	13	17	17	22	22
TG		32,5	38	46,5	56,5	72	89
VA		4	4	4	4	4	4
VD		4	4	4	4	4	4
VG		48	54	69	69	86	91
WH		26	30	37	37	46	51
Weight	stroke 0	1000	1430	2150	3000	4400	6400
	gr. every 10 mm	35	45	63	80	120	135



Position	Description	Ordering code	Materials
1	Short mounting foot brackets (MS1)	1393.0.05/1F	Stainless steel AISI 316
2	Flange (MF1-MF2)	1393.0.03F	Stainless steel AISI 316
3	Rod nut	1393.0.18F	Stainless steel AISI 316
4	Ball joint	1393.0.32F	Stainless steel
5	Fork	1393.0.13F	Stainless steel
6	Sensor bracket	1393._	Stainless steel AISI 316
7	Rear male clevis (MP4)	1393.0.09/1F	Stainless steel AISI 316
8	Pin (AA4) with circlips for rear clevis (MP2) (pos. 9)	1393.0.37F	Stainless steel AISI 316
9	Rear female clevis (MP2)	1393.0.09F	Stainless steel AISI 316
10	Rear narrow clevis (AB6)	1393.0.30F	Stainless steel AISI 316
11	Rear male clevis (with jointed head - MP6)	1393.0.15F	Stainless steel AISI 316
12	Standard complete trunnion (pos. 7 + pos. 9)	1393.0.22F	Stainless steel AISI 316
13	Square angle trunnion (pos. 9 + pos. 16)	1393.0.35F	Stainless steel AISI 316
14	Standard complete trunnion with jointed head (pos. 10 + pos. 11)	1393.0.36F	Stainless steel AISI 316
15	Complete square angle trunnion (pos. 10 + pos. 17)	1393.0.27F	Stainless steel AISI 316
16	Simple square counter clevis (AB7) (pos. 13)	1393.0.11/2F	Stainless steel AISI 316
17	Simple square counter clevis (pos. 15)	1393.0.28F	Stainless steel AISI 316

**Sensor bracket**

Ordering code

- 1393.A** (Ø32 - Ø40)
- 1393.B** (Ø50 - Ø63)
- 1393.C** (Ø80 - Ø100)

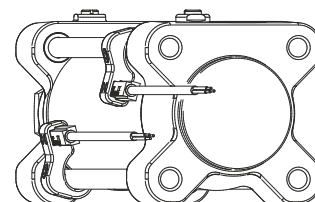
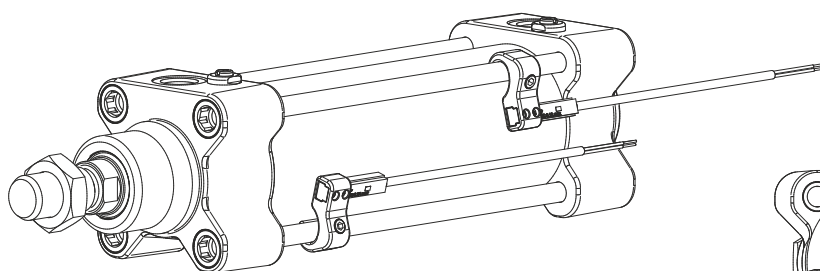
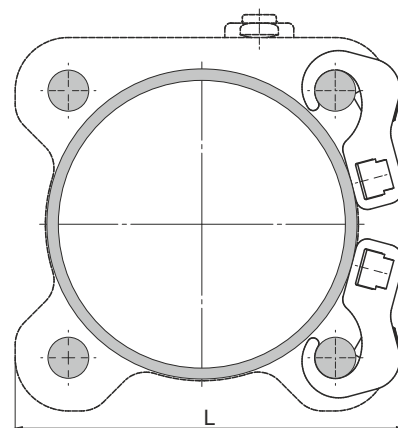


Fixing bracket made of stainless steel AISI 316 for sensor mounting on cylinders.

Sensors code **1580.\_**  
**MRS.\_**  
**MHS.\_**



Bore	L
Ø32	51
Ø40	57
Ø50	67
Ø63	79
Ø80	98
Ø100	115



To mount the brackets on the tie rods use the dedicated stainless steel grub screw.

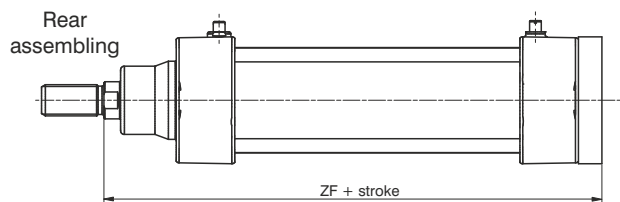
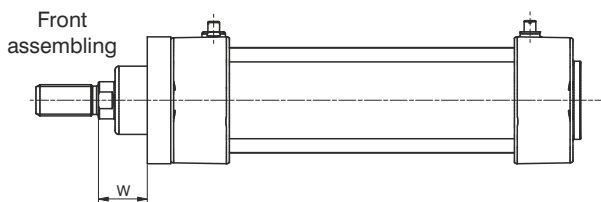
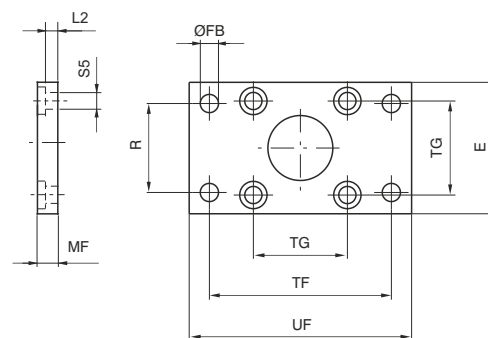
**Front and rear flanges (MF1 - MF2)**

Ordering code

**1393.Ø.03F**



Plate in stainless steel AISI 316 which allows anchorage of the cylinder at a right angle to the plane.



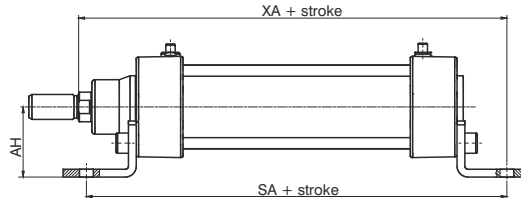
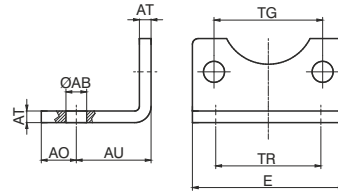
Bore	E	ØFB (H 13)	MF (JS 14)	R (JS 14)	TF (JS 14)	TG	UF	ZF	W	L2	ØS5	Weight (gr.)
32	45	7	10	32	64	32,5	80	130	16	5	6,6	190
40	52	9	10	36	72	38	90	145	20	5	6,6	250
50	65	9	12	45	90	46,5	110	155	25	6,5	9	480
63	75	9	12	50	100	56,5	120	170	25	6,5	9	620
80	95	12	15	63	126	72	150	189	31	7	11	1430
100	115	14	15	75	150	89	170	204	36	7	11	1990



**Short mounting foot brackets (MS1)**

Ordering code

**1393.Ø.05/1F**



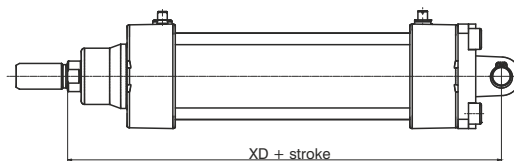
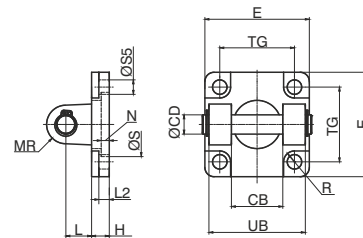
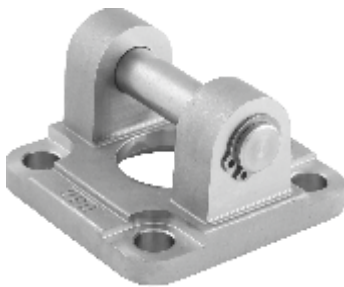
Elements used to anchor the cylinder parallel to the mounting plane. They are made of stainless steel AISI 316.

Bore	32	40	50	63	80	100
ØAB (H 14)	7	9	9	9	12	14
AH	32	36	45	50	63	71
AU (± 0.2)	24	28	32	32	41	41
AO	11	8	15	13	14	16
E	45	52	65	75	95	115
AT	4	4	5	5	6	6
SA	142	161	170	185	210	220
TG	32,5	38	46,5	56,5	72	89
TR (JS 14)	32	36	45	50	63	75
XA	144	163	175	190	215	230
Weight gr.	60	70	160	180	370	430

**Rear clevis (MP2)**

Ordering code

**1393.Ø.09F**



This type of mounting allows anchorage of the cylinder either parallel or right angle to plane; the cylinder rod can oscillate and self-align as necessary when under load. Made of stainless steel AISI 316.

Bore	32	40	50	63	80	100
CB (H 14)	26	28	32	40	50	60
ØCD	10	12	12	16	16	20
E	45	55	65	75	95	115
ØS (H11)	30	35	40	45	45	55
N	5	5	5	5	/	/
R (H13)	5,5	5,5	7,5	7,5	9	9
H	10	10	10	12	14	16
L	12	15	17	20	22	25
MR	10	12	12	16	16	20
TG	32,5	38	46,5	56,5	72	89
UB (h14)	45	52	60	70	90	110
XD	142	160	170	190	210	230
L2 (±0,5)	5,5	5,5	6,5	6,5	10	10
S5 (H13)	6,6	6,6	9	9	11	11
Weight gr.	140	230	370	540	1000	1700

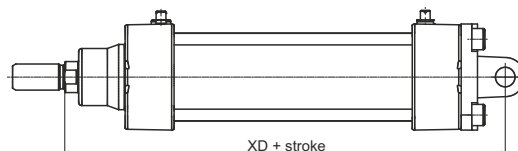
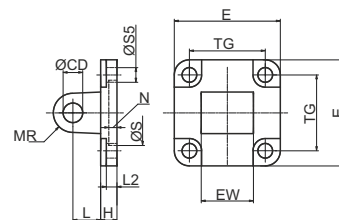
**Rear male clevis (MP4)**

Ordering code

**1393.Ø.09/1F**



Similar to 09 clevis except for the connection, which is male rather than female. Used to mount the cylinder either parallel or at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary when under load. Made of stainless steel AISI 316.

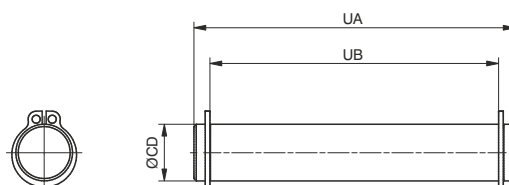


Bore	32	40	50	63	80	100
CD (H 9)	10	12	12	16	16	20
E	45	55	65	75	95	115
EW ( <sup>-0.2</sup> / <sub>-0.6</sub> )	26	28	32	40	50	60
H	10	10	10	12	14	16
L	12	15	17	20	22	25
ØS (H11)	30	35	40	45	45	55
N	5	5	5	5	/	/
R (H13)	5,5	5,5	7,5	7,5	9	9
MR	10	12	12	16	16	20
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
L2 (±0,5)	5,5	5,5	6,5	6,5	10	10
S5 (H13)	6,6	6,6	9	9	11	11
Weight gr.	180	280	370	680	1200	2100

**Pin with circlips for rear clevis (MP4 and MP2)**

Ordering code

**1393.Ø.37F**



Stainless steel AISI 316 pin, complete with stainless steel circlips, which can be used with clevis code 1393.Ø.09/1F and 1393.Ø.09F

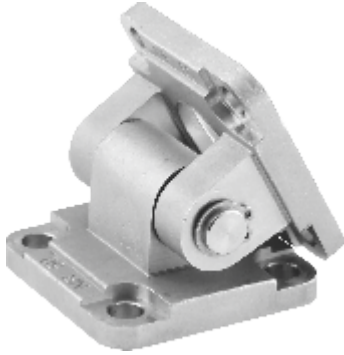
Bore	32	40	50	63	80	100
CD (e8)	10	12	12	16	16	20
UA	53	60	68	78	98	118
UB ( <sup>-0.5</sup> / <sub>-0</sub> )	46	53	61	71	91	111
Weight gr.	35	50	60	120	150	290

**Standard complete trunnion**

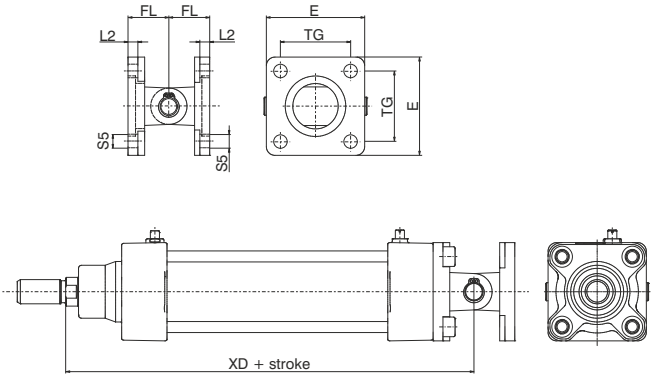
Ordering code

**1393.Ø.22F**

Mounting consists of rear clevis code 1380.Ø09F  
+ rear male clevis code 1380.Ø.09/1F  
(ordering separately)



Made of stainless steel AISI 316.



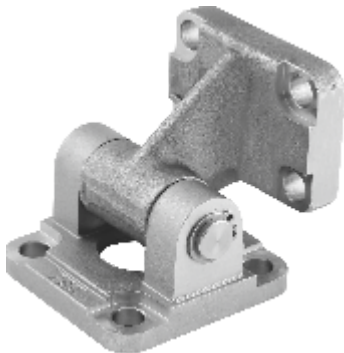
Bore	32	40	50	63	80	100
E	45	55	65	75	95	115
FL	22	25	27	32	36	41
L 2 (±0,5)	5,5	5,5	6,5	6,5	10	10
S 5	6,6	6,6	9	9	11	11
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
Weight gr.	360	580	780	1370	2370	4110

**Square angle trunnion (AB7)**

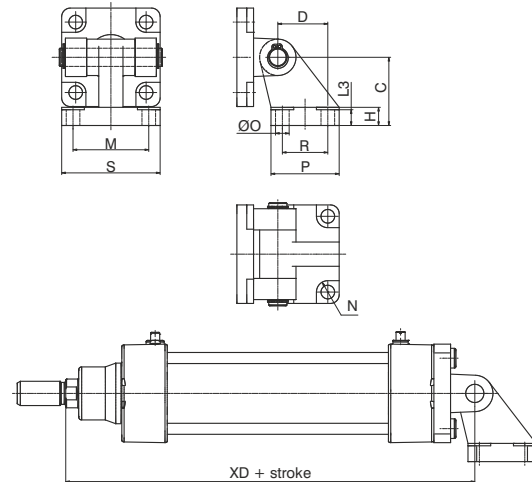
Ordering code

**1393.Ø.35F**

Counter clevis can be ordered  
separately with code 1393.Ø.11/2F



Made of stainless steel AISI 316.

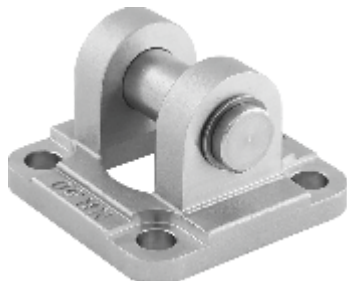


Bore	32	40	50	63	80	100
D (JS 15)	21	24	33	37	47	55
C (JS 15)	32	36	45	50	63	71
H	8	10	12	12	14	15
N (H 13)	5,5	5,5	7,5	7,5	9	9
L3	6,5	8,5	10,5	10,5	11,5	12,5
R (JS 14)	18	22	30	35	40	50
P	31	35	45	50	60	70
O (H 13)	6,6	6,6	9	9	11	11
S	51	54	65	67	86	96
M (JS 14)	38	41	50	52	66	76
XD	142	160	170	190	210	230
Weight gr.	330	520	810	1200	2200	4710

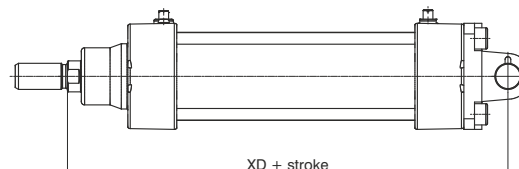
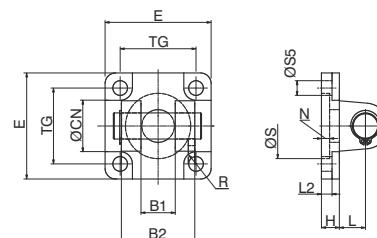
**Rear narrow clevis (AB6)**

Ordering code

**1393.Ø.30F**



Utilised with clevis 1393.Ø.15F allows the cylinder to oscillate in all directions (see standard complete trunnion 1393.Ø.36F)  
Made of stainless steel AISI 316.

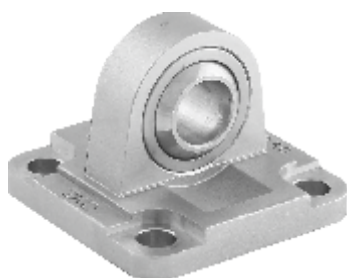


Bore	32	40	50	63	80	100
B1 (H 14)	14	16	21	21	25	25
B2 (h 14)	34	40	45	51	65	75
ØCN	10	12	16	16	20	20
E	45	55	65	75	95	115
H	10	10	10	12	14	16
L	12	15	17	20	22	25
L2 (±0,5)	5,5	5,5	6,5	6,5	10	10
S5 (H 13)	6,6	6,6	9	9	11	11
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
ØS (H 12)	30	35	40	45	45	55
R (H 13)	5,5	5,5	7,5	7,5	9	9
N	5	5	5	5	5	5
Weight gr.	170	270	420	650	1380	2050

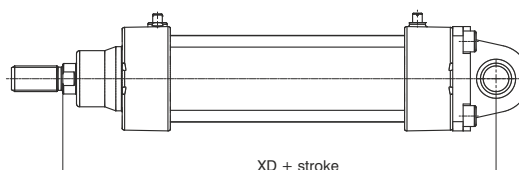
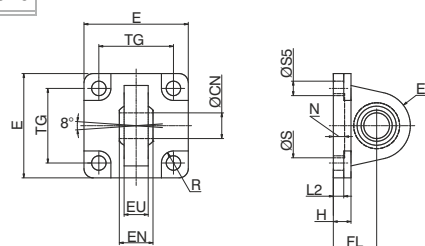
**Rear male clevis (MP6) with jointed head according to DIN 648K standard**

Ordering code

**1393.Ø.15F**



Utilised with clevis 1393.Ø.30F allows the cylinder to oscillate in all directions.  
Made of stainless steel AISI 316.



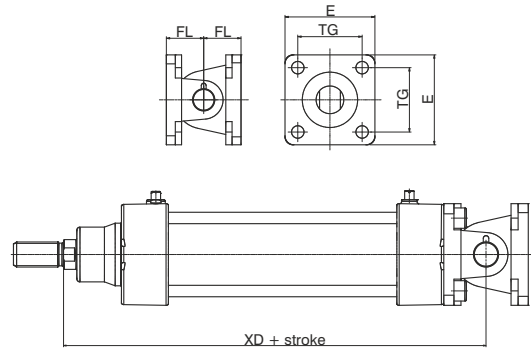
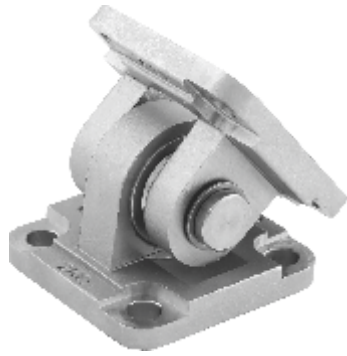
Bore	32	40	50	63	80	100
ØCN (H 7)	10	12	16	16	20	20
E	45	55	65	75	95	115
EN (-0.1)	14	16	21	21	25	25
ER	15	18	20	23	27	30
EU	10,5	12	15	15	18	18
FL (JS 15)	22	25	27	32	36	41
H	10	10	10	12	14	16
L2	5,5	5,5	6,5	6,5	10	10
S5 (H 13)	6,6	6,6	9	9	11	11
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
ØS (H 11)	30	35	40	45	45	55
R (H 13)	5,5	5,5	7,5	7,5	9	9
N	5	5	5	5	5	5
Weight gr.	150	260	370	600	1130	1800

**Standard complete trunnion with jointed head according to DIN 648K standard**

Ordering code

**1393.Ø.36F**

Mounting consists of rear narrow clevis code 1393.Ø.30F  
with rear male clevis code 1393.Ø.15F



Made of stainless steel AISI 316.

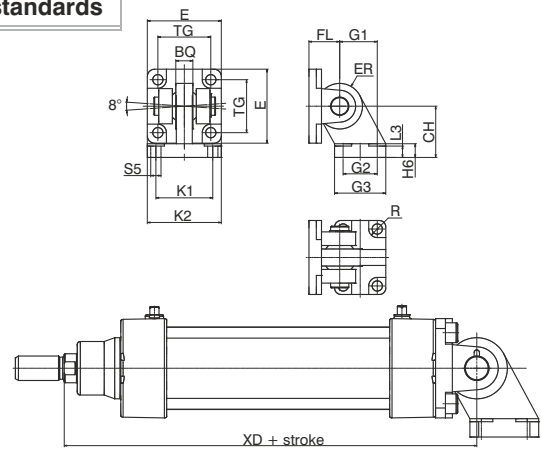
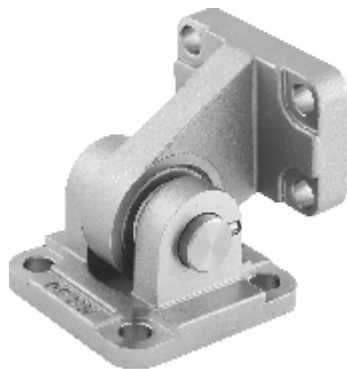
Bore	32	40	50	63	80	100
E	45	55	65	75	95	115
FL (JS 15)	22	25	27	32	36	41
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
Weight gr.	320	530	790	1250	2510	3850

**Complete square angle trunnion with jointed head acc. to DIN 648K standards**

Ordering code

**1393.Ø.27F**

Mounting consist of rear narrow clevis cod. 1393.Ø.30F  
with Simple square counter clevis cod. 1393.Ø.28F  
(ordering separately)



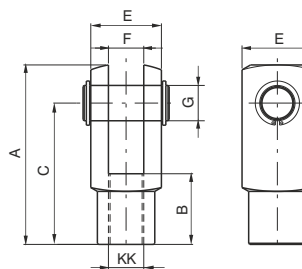
Made of stainless steel AISI 316.

Bore	32	40	50	63	80	100
CH (JS 15)	32	36	45	50	63	71
E	45	55	65	75	95	115
FL	22	25	27	32	36	41
G1 (JS 15)	21	24	33	37	47	55
G2 (JS 14)	18	22	30	35	40	50
G3	31	35	45	50	60	70
H6	10	10	12	12	14	15
K1 (JS 14)	38	41	50	52	66	76
K2	51	54	65	67	86	96
L3 (+0,5)	8,5	8,5	10,5	10,5	11,5	12,5
S5 (H13)	6,6	6,6	9	9	11	11
TG	32,5	38	46,5	56,5	72	89
XD	142	160	170	190	210	230
BQ	10,5	12	15	15	18	18
ER	15	18	20	23	27	30
R (H 13)	5,5	5,5	7,5	7,5	9	9
Weight gr.	350	540	880	1200	2350	3380

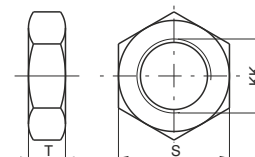
**Rod fork and nuts**

Ordering code

**1393.Ø.13F**



**1393.Ø.18F**



**Fork:**

Element that when screwed to the rod consents a regular functioning even when there are significant lateral forces as the connection point.

Made of stainless steel AISI 303.

**Nut:**

Used to block the position of the fork.

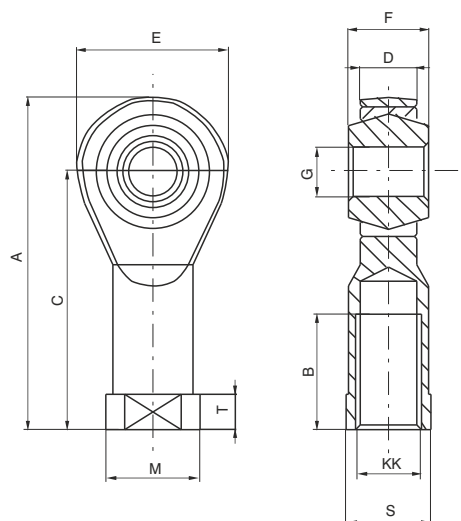
Made of stainless steel AISI 316.

Bore	32	40	50	63	80	100				
A	52	62	83	83	105	105				
B	20	24	32	32	40	40				
C	40	48	64	64	80	80				
E	20	24	32	32	40	40				
F(B13)	10	12	16	16	20	20				
G	10	12	16	16	20	20				
S	17	19	24	24	30	30				
T	6	7	8	8	9	9				
KK	M10X1,25	M12X1,25	M16X1,5	M16X1,5	M20X1,5	M20X1,5				
Weight gr.	fork 100	nut 15	140	20	340	20	680	680	40	40

**Ball joint**

Ordering code

**1393.Ø.32F**



**Ball joint:**

Mounted on the rod thread, assures a regular operation even in the presence of significant forces to the linked element.

Made of stainless steel AISI 304 and 420.

Bore	32	40	50	63	80	100
A	57	66	85	85	102	102
B	20	22	28	28	33	33
C	43	50	64	64	77	77
D	10,5	12	15	15	18	18
E	28	32	42	42	50	50
F	14	16	21	21	25	25
G (H 7)	10	12	16	16	20	20
KK	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5
M	19	22	27	27	34	34
S	17	19	22	22	30	30
T	6,5	6,5	8	8	10	10
Weight gr.	75	110	220	220	410	410

## General

The piston rod lock devices are clamping units mounted on the microcylinders front head. They allow the piston rod to lock in any position.

Piston rod clamping is mechanically obtained by springs actuated purpose-made jaws. This method allows to lock the cylinder in the desired position, should the air pressure drop.

***The piston rod lock device is not a safety device.***

## Construction characteristics

Mounting bracket	anodised aluminium
Body	anodised aluminium
Clamping jaws	hardened alloy copper
Piston	acetal resin
Seal	NBR Oil resistant rubber
Springs	springs steel

## Technical characteristics

Fluid	filtered and lubricated air						
Working pressure	3 bar - 6 bar						
Working temperature	-5°C - +70°C						
Functioning	mechanical double jaws						
Locking	axial, two-direction (normally locked)						
Unlocking	pneumatic						
Clamping force with static load (microcylinders)	$\overline{\text{Ø12}}$	$\overline{\text{Ø16}}$	$\overline{\text{Ø20}}$	$\overline{\text{Ø25}}$	$\overline{\text{Ø32}}$		
	180N	180N	350N	350N	600N		
Clamping force with static load (cylinders)	$\overline{\text{Ø32}}$	$\overline{\text{Ø40}}$	$\overline{\text{Ø50}}$	$\overline{\text{Ø63}}$	$\overline{\text{Ø80}}$	$\overline{\text{Ø100}}$	$\overline{\text{Ø125}}$
	600N	1000N	1400N	2000N	5000N	5000N	7000N

"Attention: Dry air must be used for application below 0°C"

## Use and maintenance

Operate within the specified technical characteristics.

The piston rod lock does not require maintenance if properly utilised.

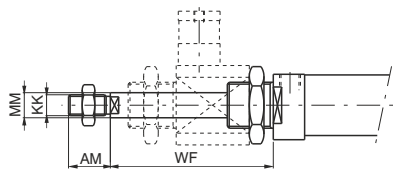
The working inlet port has to be pressurised for assembling the piston rod lock device on cylinder. Alternatively adjust the jaws with screw located on connection.

Spare parts are not available.



### Microcylinders for piston rod lock

Threaded end covers version

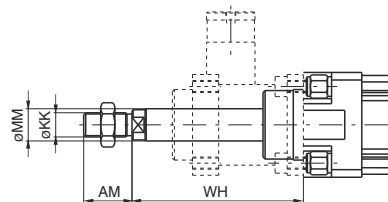


Ordering code

**12\_ \_Ø.stroke.B**

Order piston rod lock separately. Do not use with stainless steel or hexagonal piston rod.

### Cylinders for piston rod lock

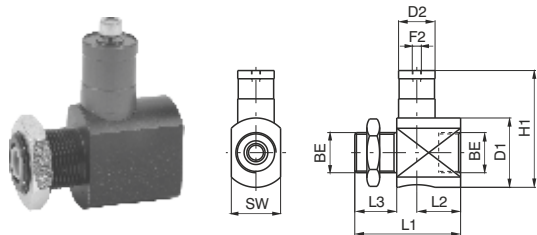


Ordering code

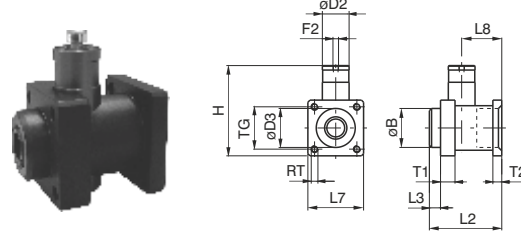
**13 --Ø.stroke.--B**

Order piston rod lock separately. Do not use with stainless steel piston rod.

### Piston rod lock complete



Do not use as safety device



Ordering code

**1260.Ø.51BS**

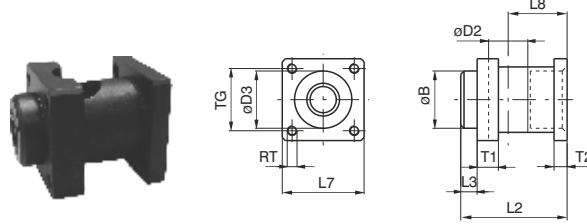
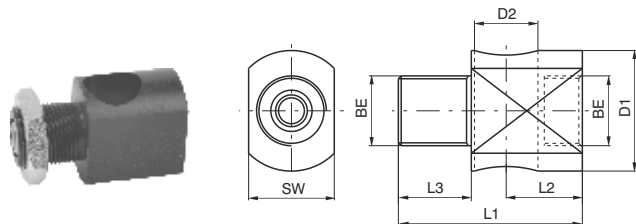
Ø	12	16	20	25	32
Weight gr.	82	82	140	140	188

Ordering code

**1320.Ø.51BS**

Ø	32	40	50	63	80	100	125
Weight gr.	191	276	535	852	1772	2412	5250

### Piston rod lock bracket



Ordering code

**1260.Ø.51S**

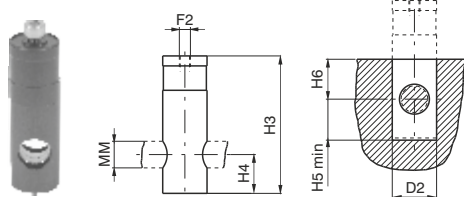
Ø	12	16	20	25	32
Weight gr.	60	60	85	85	133

Ordering code

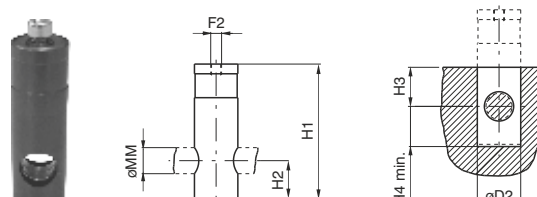
**1320.Ø.51S**

Ø	32	40	50	63	80	100	125
Weight gr.	142	171	360	486	1060	1700	3500

### Piston rod lock and housing



Do not use as safety device



Ordering code

**1260.Ø.51B (Ø12-Ø25)**

Ø	12	16	20	25	32
Weight gr.	22	22	55	55	55

**1320.32.51B (Ø32)**

Ordering code

**1320.Ø.51B**

Ø	32	40	50	63	80	100	125
Weight gr.	49	105	175	366	712	712	1750

### Table of dimensions (series 1200)

Bore	AM	BE	D1	D2	F2	H1	H3	H4	H5	H6	KK	L1	L2	L3	MM	SW	WF
12	16	M16x1.5	20	16	M5	35	35	10	11	10	M6x1	42	21	12	6	20	55
16	16	M16x1.5	20	16	M5	35	35	10	11	10	M6x1	42	21	12	6	20	55
20	20	M22x1.5	38	20	M5	64	62	17.5	19	18	M8x1.25	58	24	23	8	27	73
25	22	M22x1.5	38	20	M5	64	62	17.5	19	18	M10x1.25	58	24	23	10	27	77
32	20	M30x1.5	39.5	20	M5	64	62	17.5	18.5	18	M10x1.25	60	26	22	12	35	76.5

### Table of dimensions (series 1300)

Bore	AM	B	D2	D3	F2	H	H1	H2	H3	H4	KK	L2	L3	L7	L8	MM	RT	T1	T2	TG	WH
32	22	30	20	30.5	M5	67	62	17.5	18	18.5	M10x1.25	58	10	45	31.5	12	M6	13	8	32.5	74
40	24	35	24	35	G 1/8"	86	83	22	22	23	M12x1.25	65	10	50	36	16	M6	13	8	38	85
50	32	40	30	40	G 1/8"	105	100	25	25	26	M16x1.5	82	12	60	45.5	20	M8	16	15	46.5	107
63	32	45	38	45	G 1/8"	121	116	30	30	31	M16x1.5	82	12	70	49.5	20	M8	16	15	56.5	107
80	40	45	48	45	G 1/8"	164	155	36	36	37	M20x1.5	110	20	90	61	25	M10	20	18	72	126
100	40	55	48	55	G 1/8"	172	155	36	36	37	M20x1.5	115	23	105	65	25	M10	20	18	89	143
125	54	60	65	60	G 1/8"	210	195	56	55	56	M27x2	167	45	140	86.5	32	M12	30	22	110	187

**General**

Profiled tube has two "T" slots on the side hosting sensors 1580.\_, MRS.\_, MHS.\_. without adaptors. Two additional connections are also available on rear cover for cylinder feeding.

**Construction characteristics**

End plates	aluminium anodised
Rod	C43 chromed steel or stainless steel
Barrel	aluminium alloy anodised
Piston	acetal resin, aluminium on request
Piston-seal	PUR
Rod-seal	PUR (FPM upon request)
Adjusting screw	zinc plated steel
Shock absorber	NBR

**Technical characteristics**

Fluid	filtered air, with or without lubrication (If lubricated the lubrication must be continuous)
Max. pressure	10 bar
Operating temperature	-5° C - +70°C

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod;
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device and aluminium piston);
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

**Maximum standard strokes**

Size 25	200 mm
Size 32 - 63	300 mm

**Sections (cm<sup>2</sup>)**

Size	25	32	40	50	63
Out stroke (cm <sup>2</sup> )	5.28	8.09	13.09	20.28	32.68
In stroke (cm <sup>2</sup> )	4.49	6.96	11.08	17.14	29.54

In order to calculate the theoretical force generated by the unit, both outstroke and instroke, it is necessary to use the following equation

**FORCE(Kg) = Surface (cm<sup>2</sup>) x Pressure(bar)**

It is also necessary to remember that the theoretical force must be reduced by 10-15% in order to account for the unit internal friction.

**Maximum rod radial movement (°)**

Size	25	32	40	50	63
rod radial movement	±0.8	±0.7	±0.6	±0.5	±0.4

**Maximum torque applicable on the piston rod (Nm):**

Size	25	32	40	50	63
Maximum torque	0.8	1	1.3	1.8	2.1

The maximum torque values must also be accounted for while mounting accessories on the piston rod.

**Basic version "1" female rod**

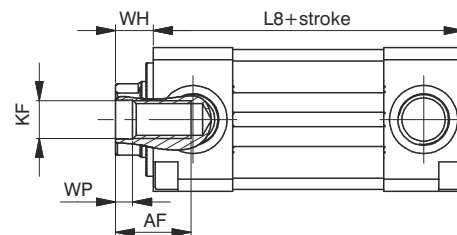
Ordering code

**SIDE CONNECTION**

- 1370.size.stroke.1 Magnetic chrome plated rod
- 1371.size.stroke.1 Magnetic stainless steel rod
- 1372.size.stroke.1 Non magnetic chrome plated rod
- 1373.size.stroke.1 Non magnetic stainless steel rod

**REAR CONNECTION**

- 1370.size.stroke.1.P Magnetic chrome plated rod
- 1371.size.stroke.1.P Magnetic stainless steel rod
- 1372.size.stroke.1.P Non magnetic chrome plated rod
- 1373.size.stroke.1.P Non magnetic stainless steel rod



**Basic version "2" male rod**

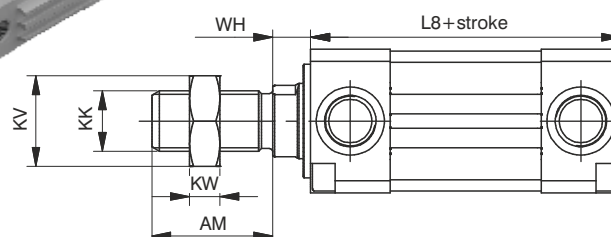
Ordering code

**SIDE CONNECTION**

- 1370.size.stroke.2 Magnetic chrome plated rod
- 1371.size.stroke.2 Magnetic stainless steel rod
- 1372.size.stroke.2 Non magnetic chrome plated rod
- 1373.size.stroke.2 Non magnetic stainless steel rod

**REAR CONNECTION**

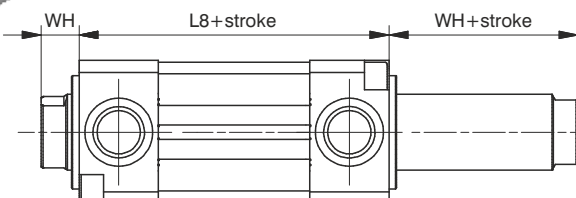
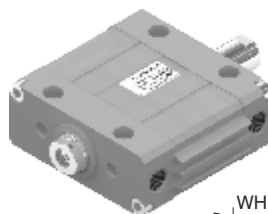
- 1370.size.stroke.2.P Magnetic chrome plated rod
- 1371.size.stroke.2.P Magnetic stainless steel rod
- 1372.size.stroke.2.P Non magnetic chrome plated rod
- 1373.size.stroke.2.P Non magnetic stainless steel rod



**Female Push/Pull version "3"**

Ordering code

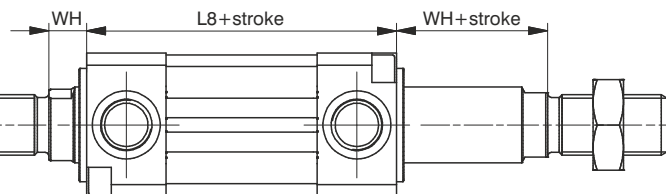
- 1370.size.stroke.3 Magnetic chrome plated rod
- 1371.size.stroke.3 Magnetic stainless steel rod
- 1372.size.stroke.3 Non magnetic chrome plated rod
- 1373.size.stroke.3 Non magnetic stainless steel rod



**Male Push/Pull version "4"**

Ordering code

- 1370.size.stroke.4 Magnetic chrome plated rod
- 1371.size.stroke.4 Magnetic stainless steel rod
- 1372.size.stroke.4 Non magnetic chrome plated rod
- 1373.size.stroke.4 Non magnetic stainless steel rod



**Variants**

Ordering code

137\_.size.stroke.\_K = Version with aluminium piston

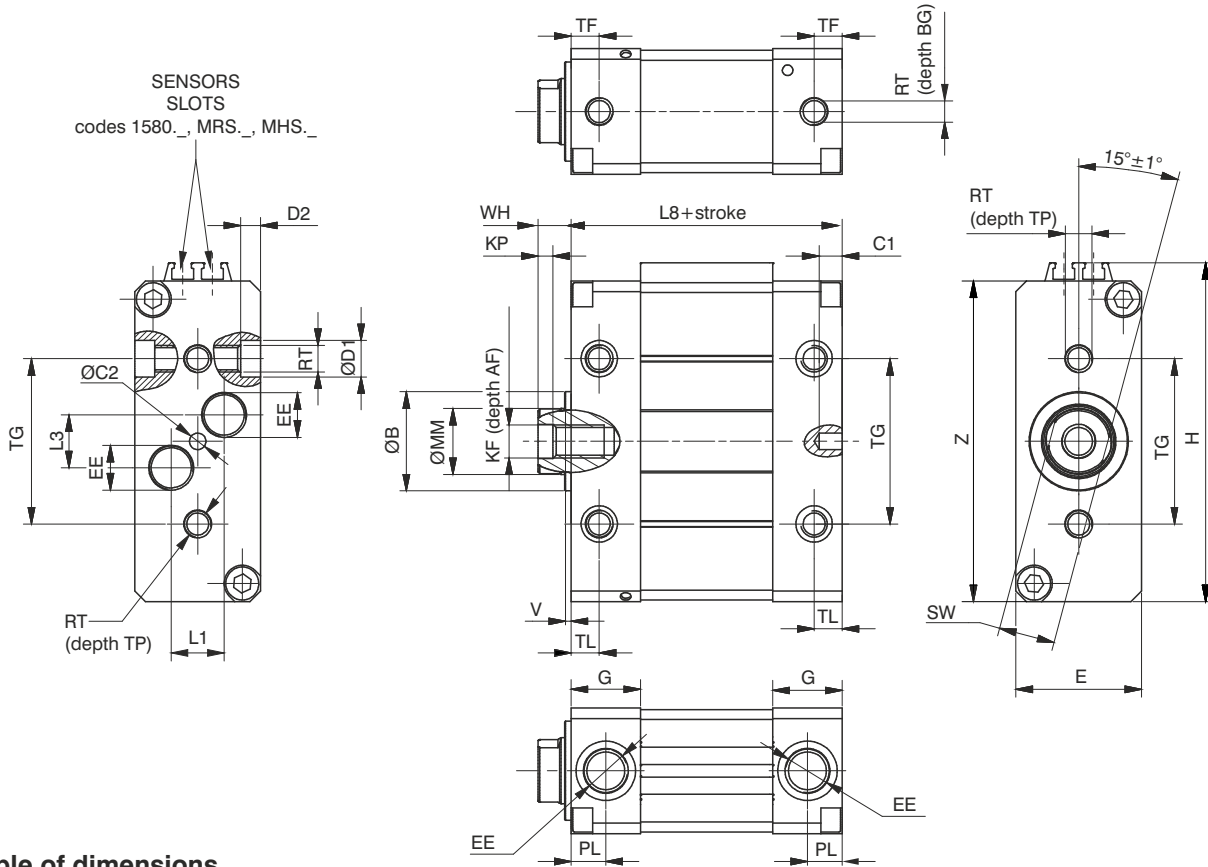


Table of dimensions

Size	25	32	40	50	63		
AM	22	22	24	32	32		
AF	12	14	16	20	20		
Ø B (h9)	16	20	25	30	30		
BG	8	9	9	12	14		
C1	7	7	7	7	7		
C2 (H9)	4	4	4	5	5		
Ø D1	8	10	10	11	15		
D2	4	4	5	6	6		
E	20	24	30	38	50		
EE	M5	G1/8"	G1/8"	G1/4"	G1/4"		
G	12	17	17	21	21		
H	56,5	65,5	82,5	102,5	127		
KF	M5	M6	M8	M10	M10		
KK	M10x1,25	M10x1,25	M12x1,25	M16x1,5	M16x1,5		
KP	2	2,5	3	4,5	4,5		
KV	17	17	19	24	24		
KW	6	6	7	8	8		
L1	6	7,5	7,5	16	19		
L3	10	14,5	14,5	16	21		
L8	62	72	76	82	82		
Ø MM	10	12	16	20	20		
PL	6,5	8,5	8,5	10,5	10,5		
RT	M5	M6	M6	M8	M10		
SW (H13)	8	10	13	17	17		
TF	5	8,5	8,5	8,5	8,5		
TG	25	32	40	50	60		
TL	5	8,5	8,5	8,5	8,5		
TP	8	9	9	12	14		
V	2	2	2	2	2		
VG	30	30	33	42	42		
WH	8	8	9	10	10		
Z	51	60	77	97	1215		
Weight gr.	Versions	1 stroke 0	180	285	482	848	1350
		2 stroke 0	203	309	520	929	1431
	every 10 mm	22	29	49	79	118	
Weight gr.	Versions	3 stroke 0	195	314	534	959	1478
		4 stroke 0	242	362	610	1096	1615
	every 10 mm	28	38	65	103	143	

**Front and rear flange**

Ordering code

**1370.size.03**



Size 25-32-40

Size 50-63

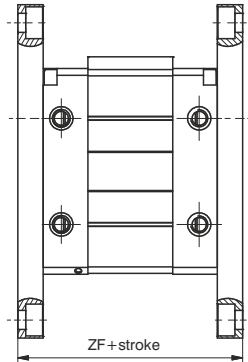
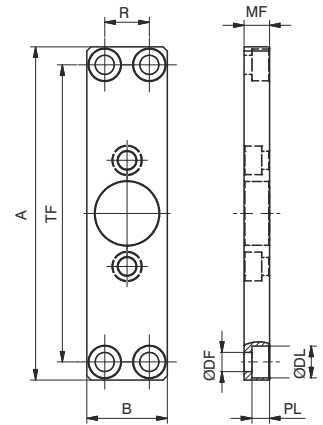
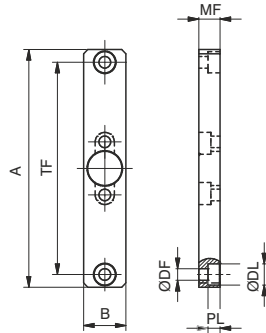


Plate which allows anchorage of the cylinder at a right angle to the plane. Mounted to the cylinder by screws.

Size	25	32	40	50	63
A	112	130	146	157	157
B	20	24	30	38	50
ØDF	5.5	6.6	6.6	9	9
ØDL	10	11	11	15	15
PL	5.7	6.5	6.3	8.3	8.3
MF	10	10	10	12	15
R	/	/	/	21	33
TF	100	115	132	140	140
ZF	82	92	96	106	112

**Foot bracket**

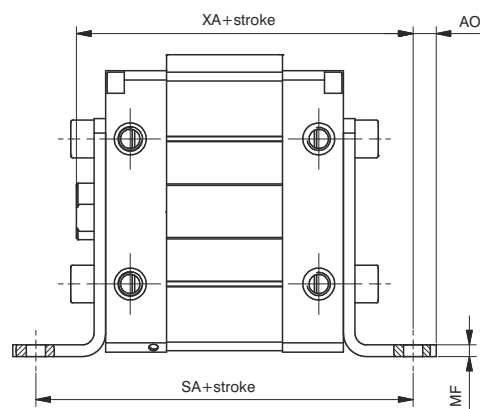
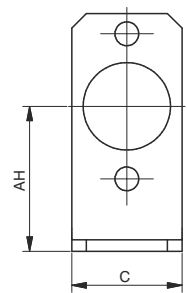
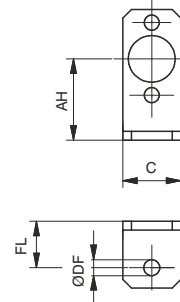
Ordering code

**1370.size.05/1F**  
(n° 1 piece)



Size 25

Size 25-40-50-63



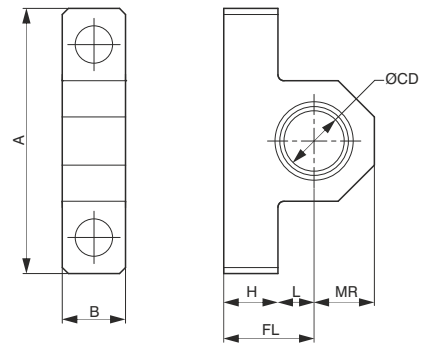
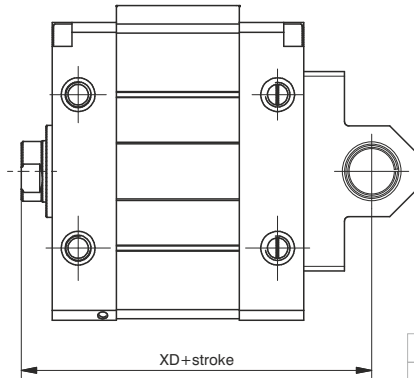
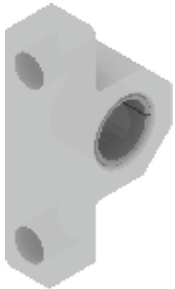
Brackets used to anchor the cylinder parallel to the mounting plane. Manufactured from steel with a rust proof protective treatment. Mounted to the cylinder end caps with bolts.

Size	25	32	40	50	63
AH	28	32	40	50	63
AO	7	5.5	7	8	10
C	20	24	30	38	50
ØDF	5.5	5.5	5.5	6.6	9
FL	16	18	20	24	27
MF	3	3	4	4	4
R	/	13	16	22	30
SA	94	108	116	130	136
XA	86	98	105	116	119

**Rear male clevis**

Ordering code

**1370.size.09/1F**



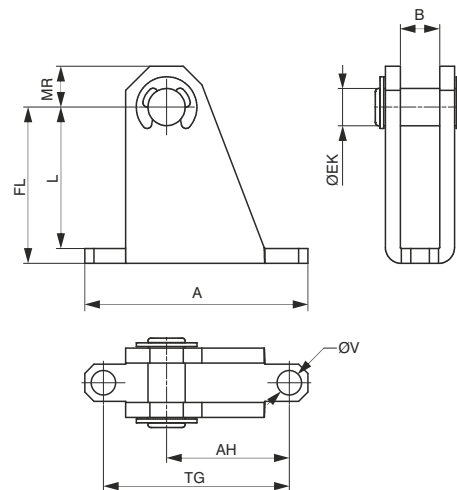
This type of mounting allows anchorage of the cylinder either parallel or right angle to plane; the cylinder rod can oscillate and self-align as necessary when under load.

Size	25	32	40	50	63
A	37	44	52	65	78
B	9	10.5	10.5	20	25
ØCD (H7)	8	10	12	12	16
FL	14	15	18	20	24
H	6	9	9	11	11
L	8	6	9	9	13
MR	7.5	10	13	13	17
XD	84	95	103	112	116

**Rear clevis**

Ordering code

**1370.size.09F**



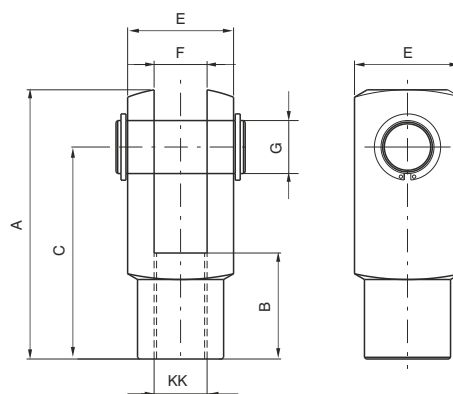
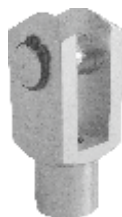
To be used in conjunction with 09/1 clevis. Similar to type 08 but includes a hinge pin. This type of mounting allows anchorage of the cylinder either parallel or right angle to plane; the cylinder rod can oscillate and self-align as necessary when under load. Manufactured from sheet metal with rust proof protective treatment.

Size	25	32	40	50	63
A	49	60	60	46	60
AH	25.5	33	29.5	24	32
B	9.1	10.6	10.6	20.1	25.1
ØEK	8	10	12	12	16
FL	35	42	51	55	68
L	32	38	47	50	63
MR	9.5	11	14	14	18
TG	40	50	50	30	40
ØV	5.5	6.6	6.6	9	11

**Fork**

Ordering code

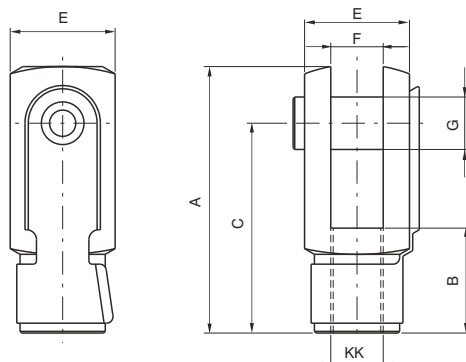
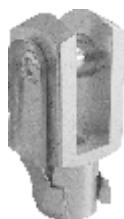
- 1320.32.13F**  
(for ø25 and ø32)
- 1320.40.13F**  
(for ø40)
- 1320.50.13F**  
(for ø50)
- 1320.63.13F**  
(for ø63)



**Fork with a clips**

Ordering code

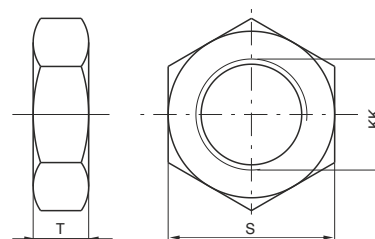
- 1320.32.13/1F**  
(for ø25 and ø32)
- 1320.40.13/1F**  
(for ø40)
- 1320.50.13/1F**  
(for ø50)
- 1320.63.13/1F**  
(for ø63)



**Nut**

Ordering code

- 1320.32.18F**  
(for ø25 and ø32)
- 1320.40.18F**  
(for ø40)
- 1320.50.18F**  
(for ø50)
- 1320.63.18F**  
(for ø63)



**Fork:**  
Element that when screwed to the rod consents a regular functioning even when there are significant lateral forces as the connection point. Made of zinc-plated steel.

**Nut:**  
Used to block the position of the fork.

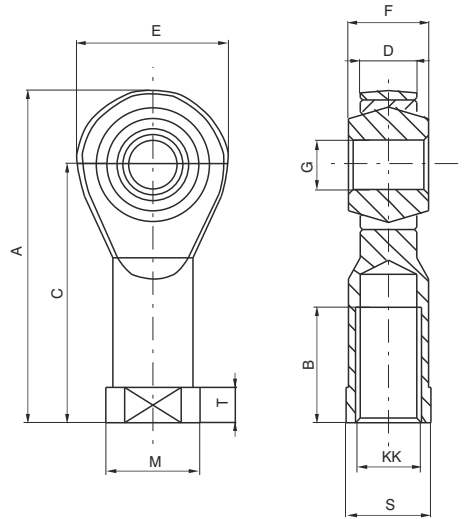
Bore	25	32	40	50	63
A	52	52	62	83	83
B	20	20	24	32	32
C	40	40	48	64	64
E	20	20	24	32	32
F(B12)	10	10	12	16	16
G	10	10	12	16	16
S	17	17	19	24	24
T	6	6	7	8	8
KK	M10X1.25	M10X1.25	M12X1.25	M16X1.5	M16X1.5
Weight	forks	100	100	140	340
gr.	nut	15	15	20	20



**Ball joint**

Ordering code

- 1320.32.32F**  
(for ø25 and ø32)
- 1320.40.32F**  
(for ø40)
- 1320.50.32F**  
(for ø50)
- 1320.63.32F**  
(for ø63)

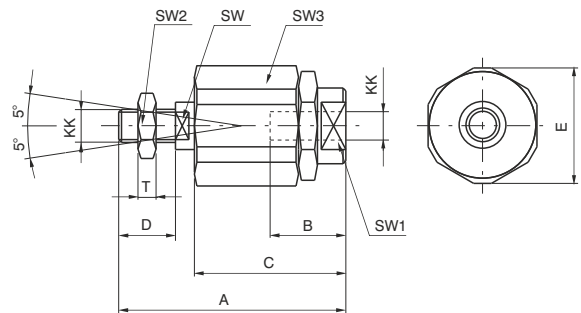
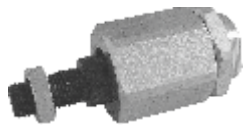


Bore	25	32	40	50	63
A	57	57	66	85	85
B	20	20	22	28	28
C	43	43	50	64	64
D (-0,1)	10.5	10.5	12	15	15
E	28	28	32	42	42
F	14	14	16	21	21
G (H 7)	10	10	12	16	16
KK	M10x1.25	M10x1.25	M12x1.25	M16x1.5	M16x1.5
M	19	19	22	27	27
S	17	17	19	22	22
T	6.5	6.5	6.5	8	8
Weight gr.	76	76	110	220	220

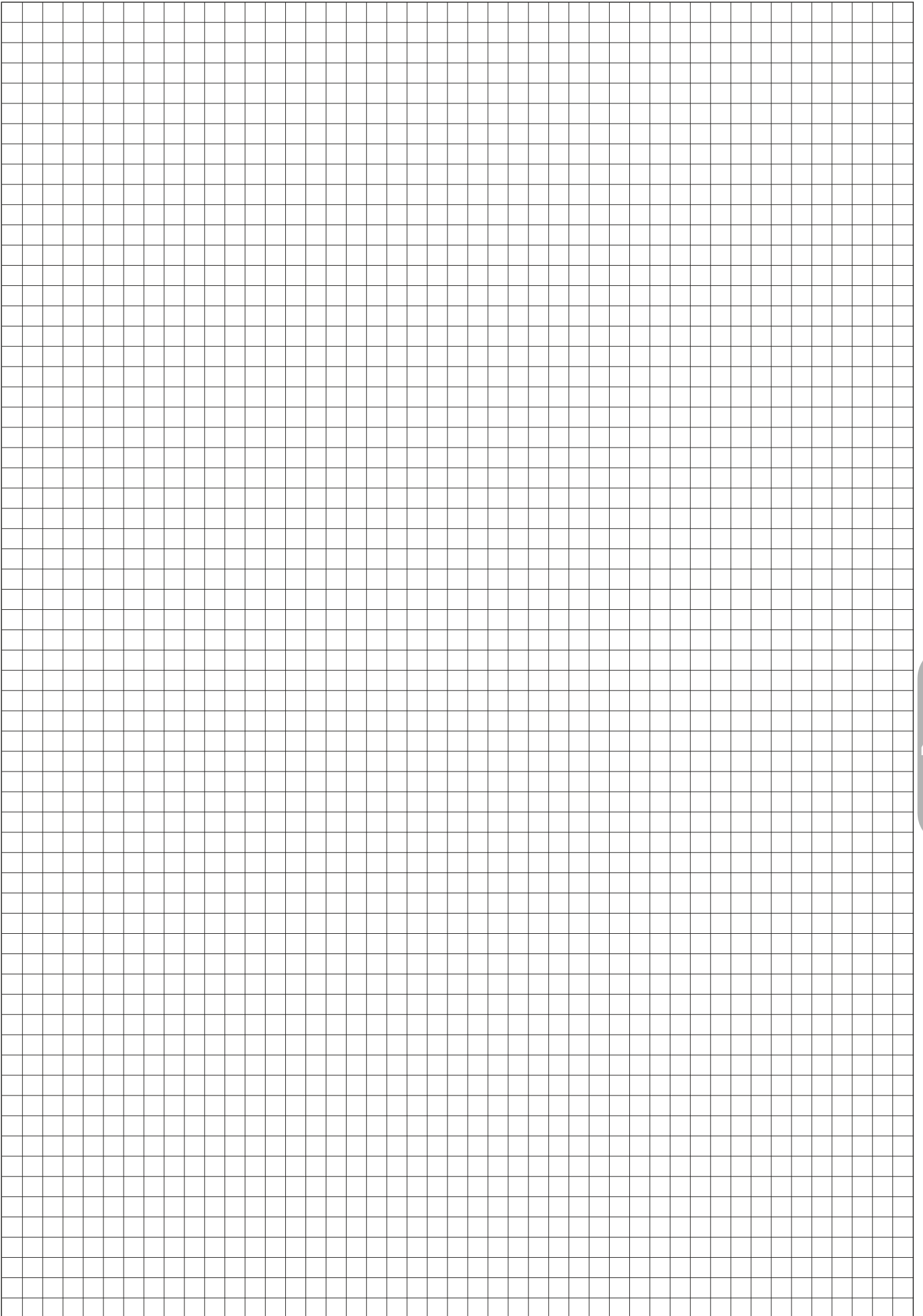
**Self-aligning joint**

Ordering code

- 1320.32.33F**  
(for ø25 and ø32)
- 1320.40.33F**  
(for ø40)
- 1320.50.33F**  
(for ø50)
- 1320.63.33F**  
(for ø63)



Bore	25	32	40	50	63
A	71	71	75	103	103
B	20	20	20	32	32
C	46	46	46	63	63
D	20	20	24	32	32
E	32	32	32	45	45
KK	M10x1,25	M10x1,25	M12x1,25	M16x1,5	M16x1,5
SW	12	12	12	20	20
SW1	19	19	19	27	27
SW2	17	17	19	24	24
SW3	30	30	30	41	41
T	6	6	7	8	8
Weight gr.	220	220	230	660	660



### General

The SKIP and STOP valves are pneumatically actuated 2 ways poppet valves. The SKIP valve (accelerating device) is normally open and is equipped with a supplementary regulator for maximum speed control. It must be activated to obtain speed regulation.

The STOP valve can be normally closed or normally open.

### Construction characteristics

Covers	black anodised aluminium
Barrels	bright painted drawn steel
Rod	C43 chromed steel
Tie rods	plated zinc steel
Piston	aluminium
Waterproof seals	NBR rubber
Piston seal	FPM
Rod seal	PUR
Regulators group	brass
Skip and stop valves	black anodised aluminium
Circuit oil	hydraulic with viscosity 2.9° E at 50°C (viscosity index minimum 118)
Bore	40 mm and 63 mm diameter

### Technical characteristics

Max connecting load	600 kg (Ø40) -1200 Kg (Ø63)
Min. and max. speed	60 - 10000 mm/min.
Working temperature	-5°C - +70°C
Minimum pressure for the actuation of skip and stop valves	4 bar

"Attention: Dry air must be used for application below 0°C"

### Standard strokes

50 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 mm  
minimum stroke for type 1400.stroke.03.05 and 1400.stroke.03.06, 150 mm.

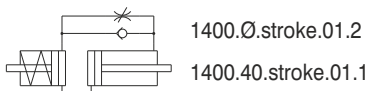
**Important:** For heavier load we have available the hydraulic speed control check cylinders of 63 mm diameter suitable to withstand loads up to 1200 kg. For more information please contact our technical department.

**Maintenance**

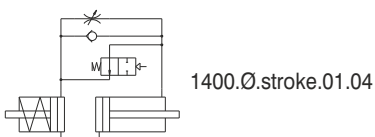
The speed control check is a closed system and there are no external factors that can adversely affect its function. Care however, has to be exercised not to allow the hydraulic fluid level to drop below the minimum indicated on the auxiliary tank. Should this occur, cavitation, or worse, an air pocket would result causing erratic control. Additional fluid should be put in exclusively through a unidirectional valve by means of an appropriate syringe (such as our code number 1400.99.01). Excess fluid will be expelled through a vent into an appropriate container. It is necessary to completely disassemble the regulator and be sure to bleed the system to eliminate air pockets. We suggest that you create a vacuum before beginning to refill. This can be done with a small unidirectional valve turned up and repeatedly loaded with a syringe. The rod must be manually actuated successively releasing air through the valve using a small and pointed instrument.

**Functional schematics**

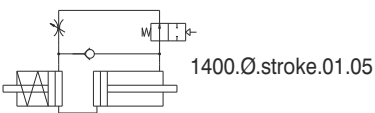
**Outward Stroke Control**



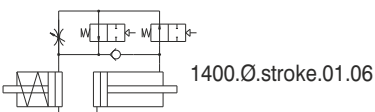
1400.Ø.stroke.01.2  
 1400.40.stroke.01.1



1400.Ø.stroke.01.04

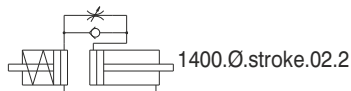


1400.Ø.stroke.01.05

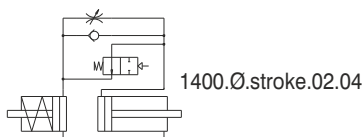


1400.Ø.stroke.01.06

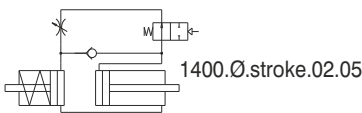
**Inward Stroke Control**



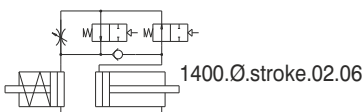
1400.Ø.stroke.02.2



1400.Ø.stroke.02.04

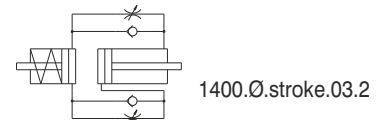


1400.Ø.stroke.02.05

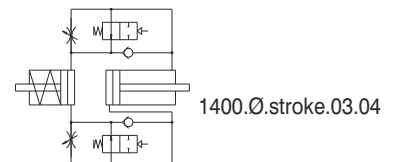


1400.Ø.stroke.02.06

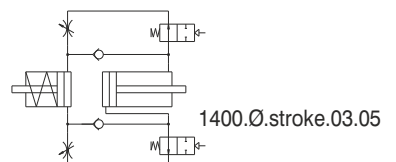
**Inward & Outward Stroke Control**



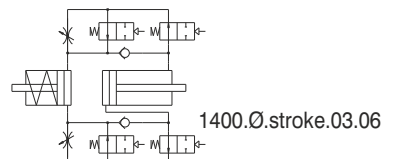
1400.Ø.stroke.03.2



1400.Ø.stroke.03.04



1400.Ø.stroke.03.05

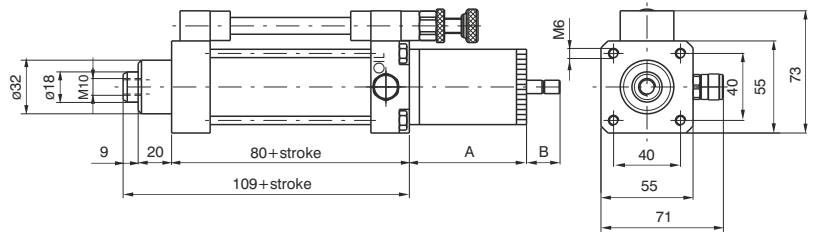
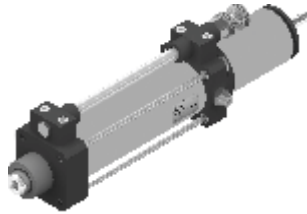


1400.Ø.stroke.03.06

**Regulation on the outward stroke - Tank in line**

Ordering code

**1400.40.stroke.01.1**



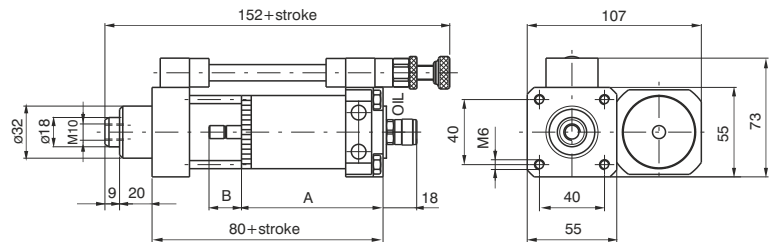
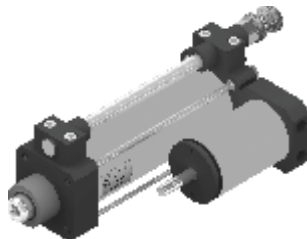
Weight gr.1450 + gr. 300 every 50 mm. stroke

Strokes	A	B max.
< 75	78	30
75 - <150	102	45
150 - <250	127	60
250 - <350	187	90
350 - <500	202	120

**Regulation on the outward stroke - Lateral tank**

Ordering code

**1400.40.stroke.01.2**



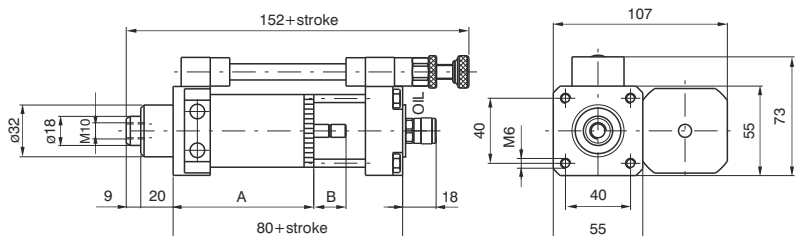
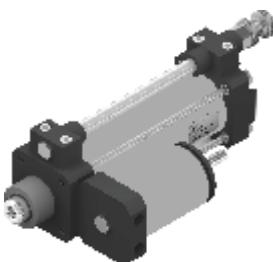
Weight gr. 1530 + gr. 300 every 50 mm. stroke

Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

**Regulation on the inward stroke**

Ordering code

**1400.40.stroke.02.2**



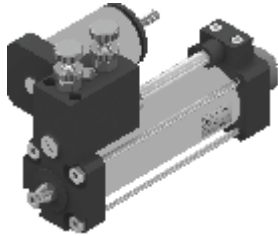
Weight gr. 1530 + gr. 300 every 50 mm. stroke

Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

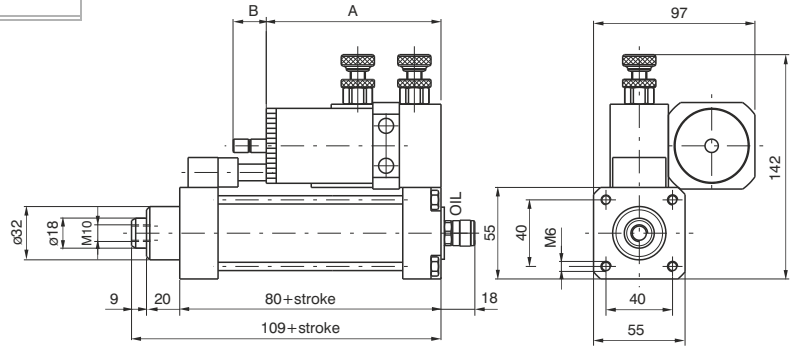
**Regulation in both directions**

Ordering code

**1400.40.stroke.03.2**



Weight gr. 1870 + gr. 300 every 50 mm. stroke



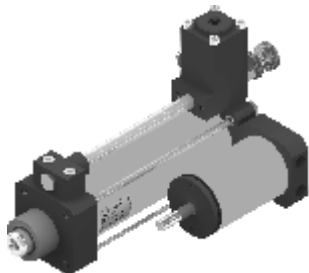
Attention: Minimum stroke=150mm when fitted in tandem (parallel or in-line) with 1319-1320-1321 cylinders series Ø80mm or Ø100mm.

Strokes	A	B max.
< 75	110	30
75 - <150	135	45
150 - <250	160	60
250 - <350	200	90
350 - <500	235	120

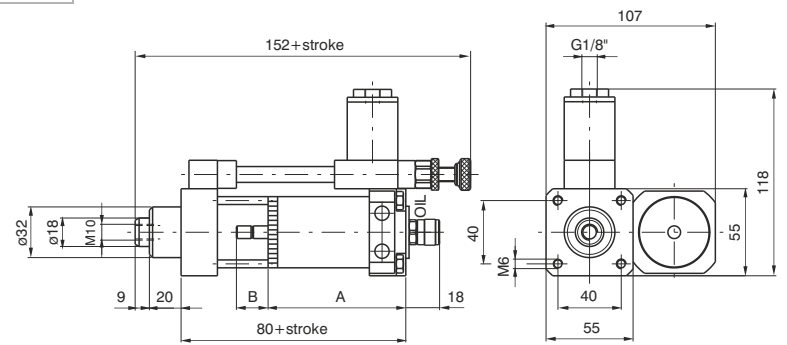
**Regulation on the outward stroke with skip (Acceleration valve)**

Ordering code

**1400.40.stroke.01.04**



Weight gr. 1670 + gr. 300 every 50 mm. stroke

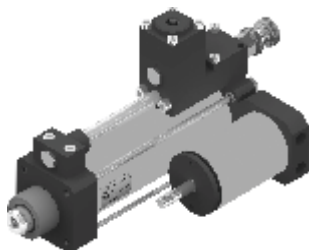


Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

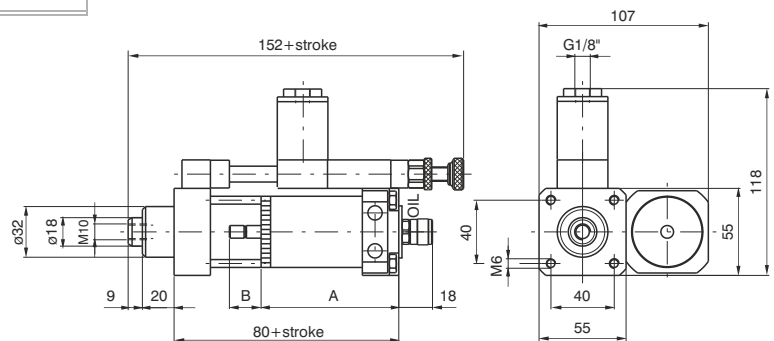
**Regulation on the outward stroke with stop (Stop valve)**

Ordering code

**1400.40.stroke.01.05**



Weight gr. 1710 + gr. 300 every 50 mm. stroke

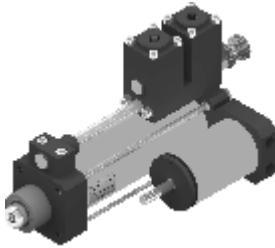


Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

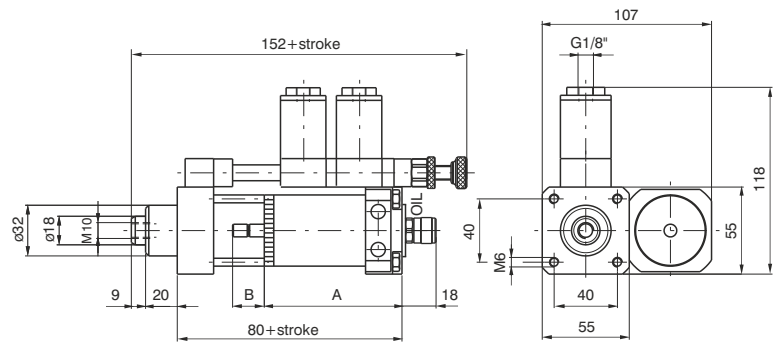
**Regulation on the outward stroke with skip and stop**  
(Acceleration and stop valves)

Ordering code

**1400.40.stroke.01.06**



Weight gr. 1830 + gr. 300 every 50 mm. stroke

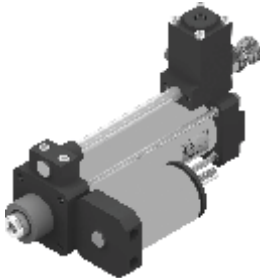


Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

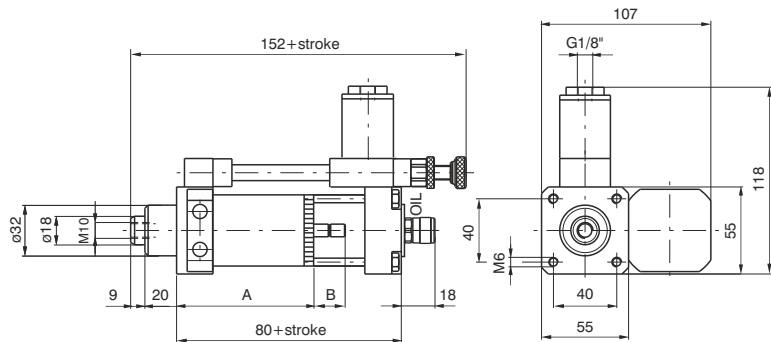
**Regulation on the inward stroke with skip**  
(Acceleration valve)

Ordering code

**1400.40.stroke.02.04**



Weight gr.1670 + gr. 300 every 50 mm. stroke

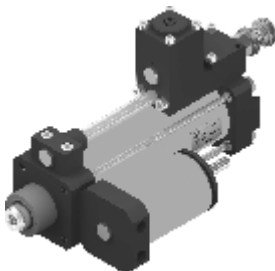


Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

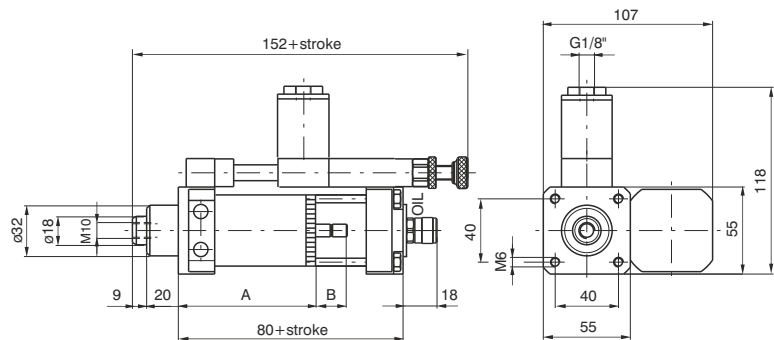
**Regulation on the inward stroke with stop**  
(Stop valve)

Ordering code

**1400.40.stroke.02.05**



Weight gr. 1710 + gr. 300 every 50 mm. stroke



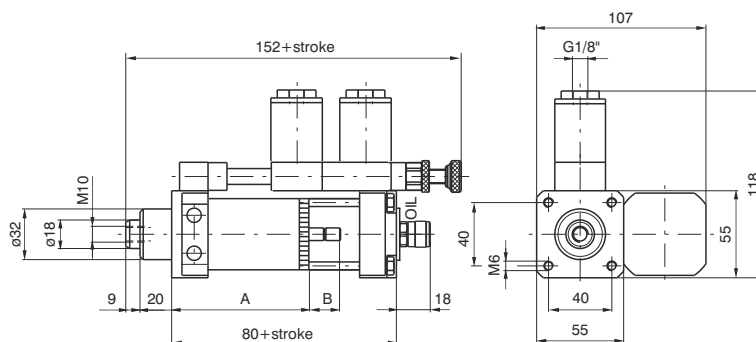
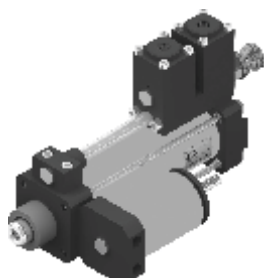
Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120



**Regulation on the inward stroke with skip and stop**  
(Acceleration and stop valves)

Ordering code

**1400.40.stroke.02.06**



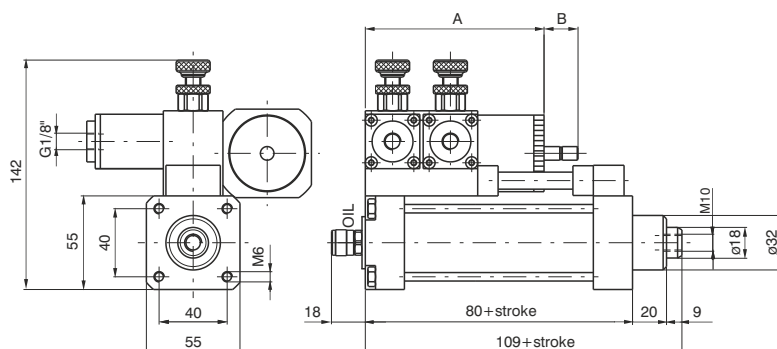
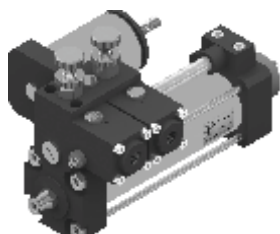
Strokes	A	B max.
< 75	93	30
75 - <150	118	45
150 - <250	143	60
250 - <350	183	90
350 - <500	218	120

Weight gr. 1830 + gr. 300 every 50 mm. stroke

**Regulation in both directions with skip**  
(Acceleration valves in both directions)

Ordering code

**1400.40.stroke.03.04**



Strokes	A	B max.
< 75	110	30
75 - <150	135	45
150 - <250	160	60
250 - <350	200	90
350 - <500	235	120

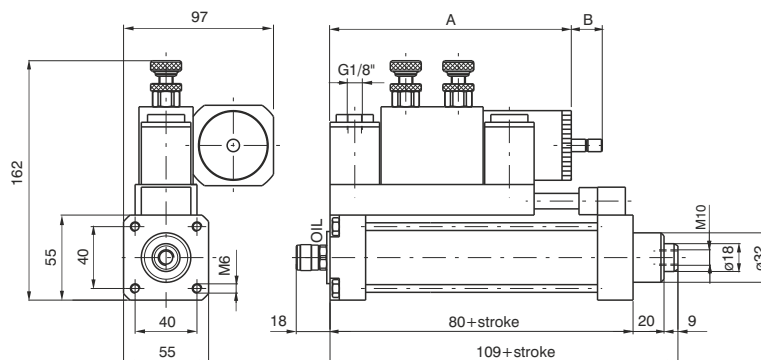
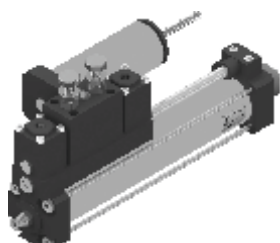
Weight gr. 2110 + gr. 300 every 50 mm. stroke

Attention: Minimum stroke=150mm when fitted in tandem (parallel or in-line) with 1319-1320-1321 cylinders series Ø80mm or Ø100mm.

**Regulation in both directions with stop**  
(Stop valves in both directions)

Ordering code

**1400.40.stroke.03.05**



Strokes	A	B max.
150 - <250	197	60
250 - <350	237	90
350 - <500	272	120

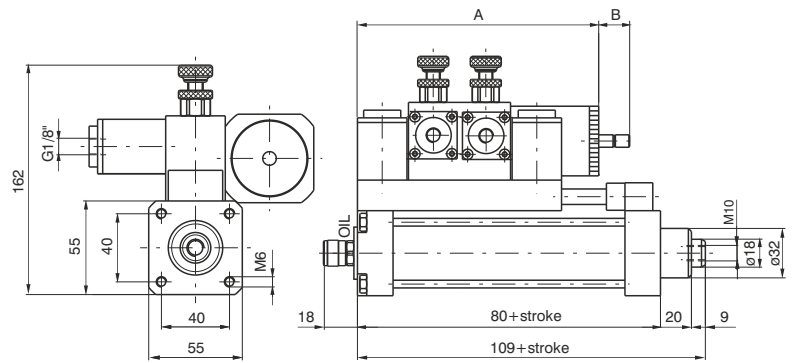
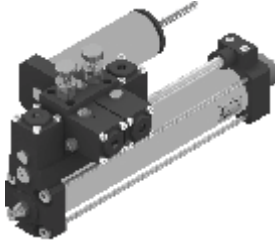
**Min. stroke 150 mm**

Weight gr. 2390 + gr. 300 every 50 mm. stroke

**Regulation in both directions with skip and stop**  
(Acceleration and stop valves in both directions)

Ordering code

**1400.40.stroke.03.06**



**Min. stroke 150 mm**

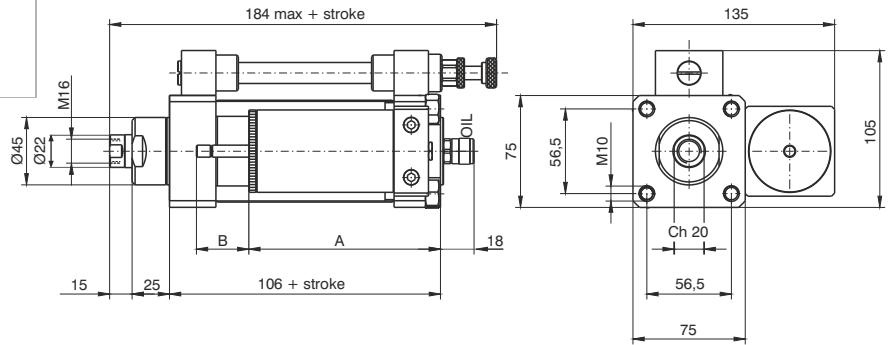
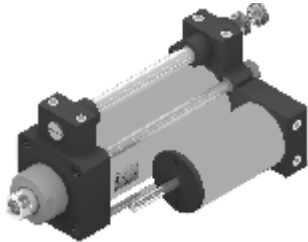
Weight gr. 2630 + gr. 300 every 50 mm. stroke

Strokes	A	B max.
150 - < 250	197	60
250 - < 350	237	90
350 - < 500	272	120

**Regulation on the outward stroke – Lateral tank**

Ordering code

**1400.63.stroke.01.2**



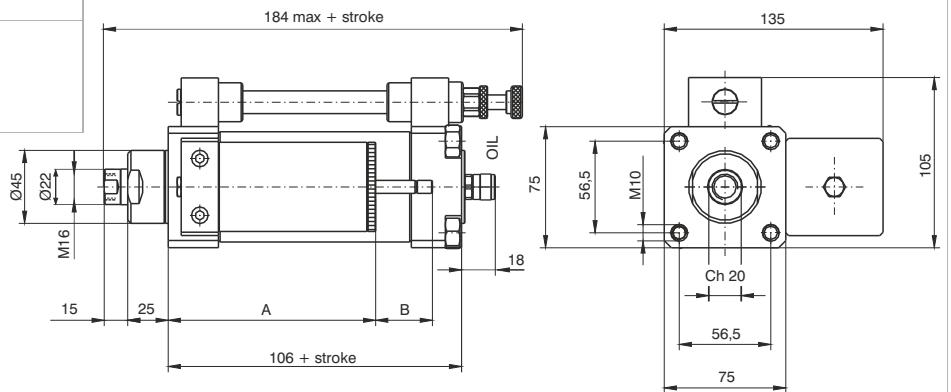
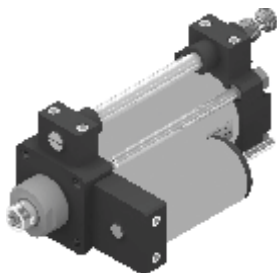
Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

Min. stroke 75 mm  
Weight gr. 2950 + gr. 850 every 50 mm. stroke

**Regulation on the inward stroke**

Ordering code

**1400.63.stroke.02.2**



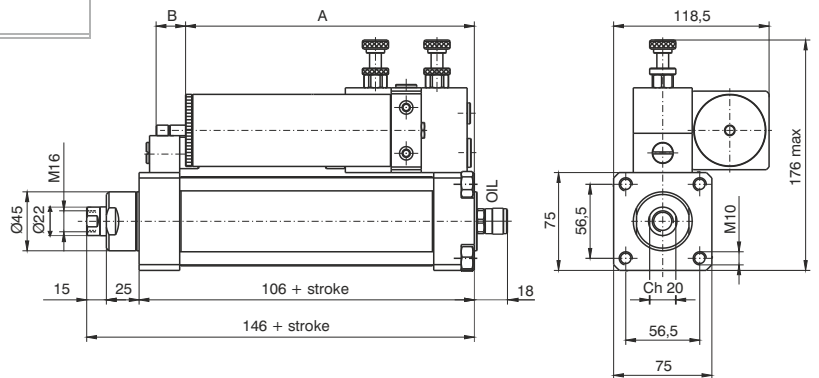
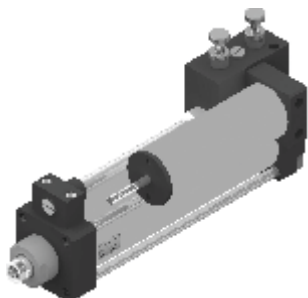
Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

Min. stroke 75 mm  
Weight gr. 2950 + gr. 850 every 50 mm. stroke

**Regulation in both directions**

Ordering code

**1400.63.stroke.03.2**



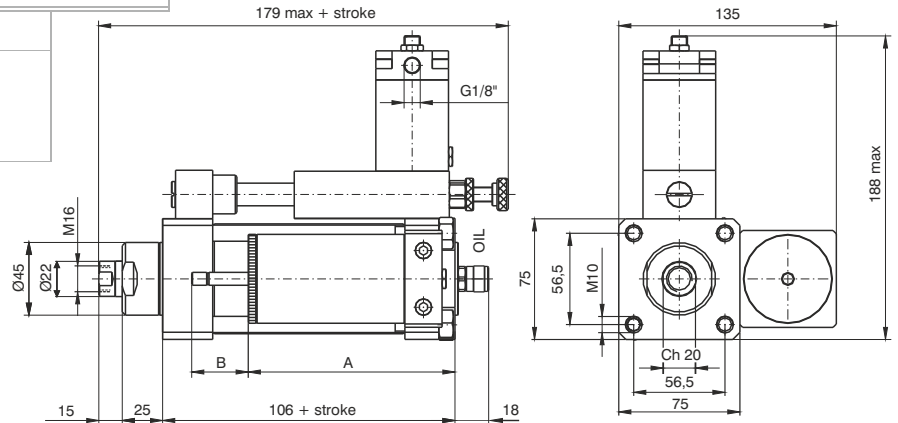
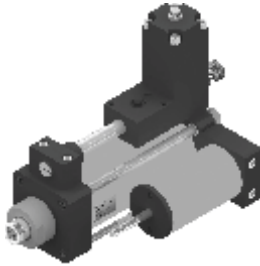
Strokes	A	B max
≥100 - <150	160	50
≥150 - <250	220	80
≥250 - <350	270	100
≥350 - <450	330	130
≥450 - ≤600	390	160

Min. stroke 100 mm  
Weight gr. 3600 + gr. 850 every 50 mm. stroke

**Regulation on the outward stroke with skip**  
(Acceleration valve)

Ordering code

**1400.63.stroke.01.04**



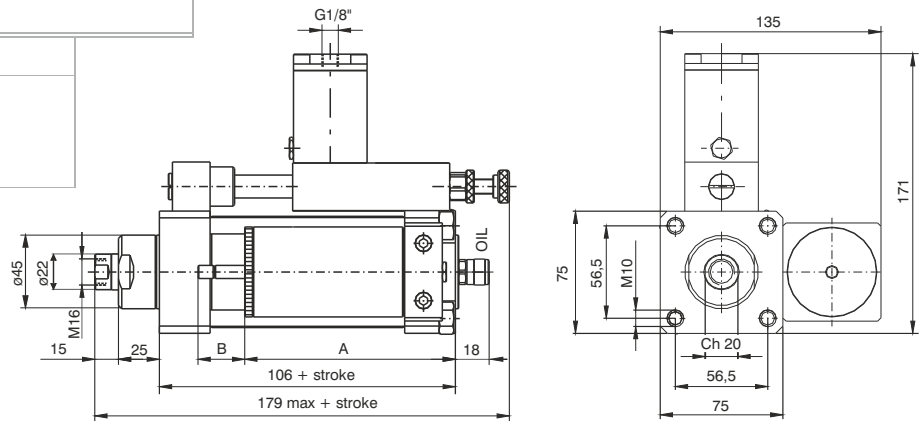
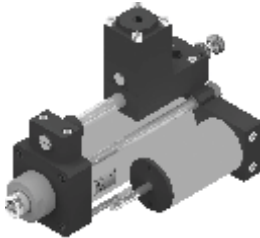
Min. stroke 75 mm  
Weight gr. 3450 + gr. 850 every 50 mm. stroke

Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

**Regulation on the outward stroke with stop**  
(Stop valve)

Ordering code

**1400.63.stroke.01.05**



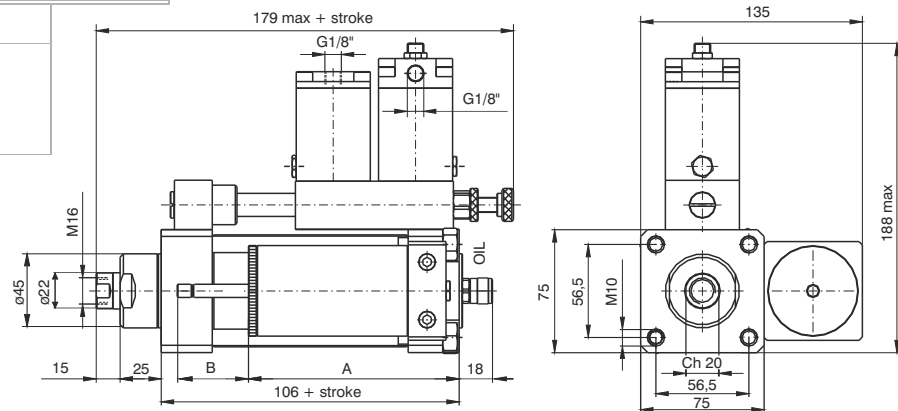
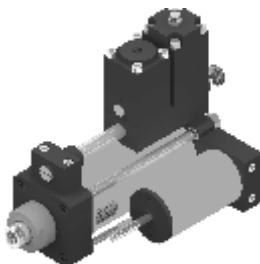
Min. stroke 75 mm  
Weight gr. 3450 + gr. 850 every 50 mm. stroke

Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

**Regulation on the outward stroke with skip and stop**  
(Acceleration and stop valves)

Ordering code

**1400.63.stroke.01.06**



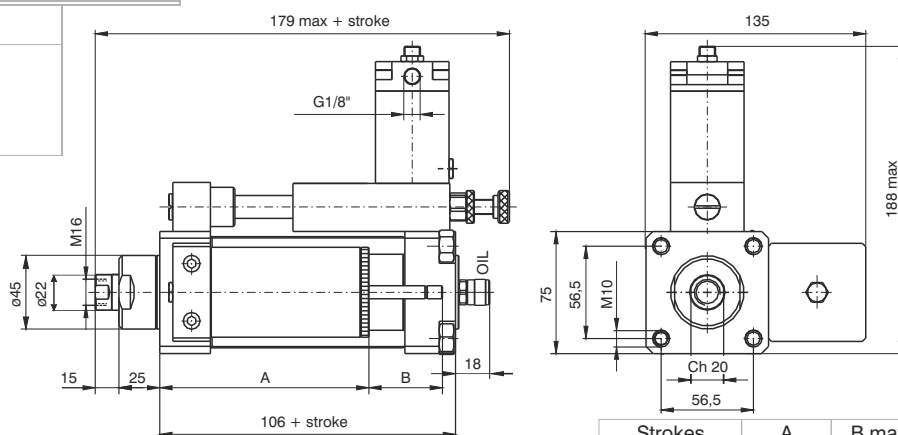
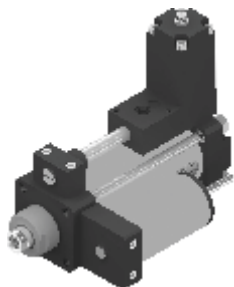
Min. stroke 75 mm  
Weight gr. 3700 + gr. 850 every 50 mm. stroke

Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

**Regulation on the inward stroke with skip**  
(Acceleration valve)

Ordering code

**1400.63.stroke.02.04**



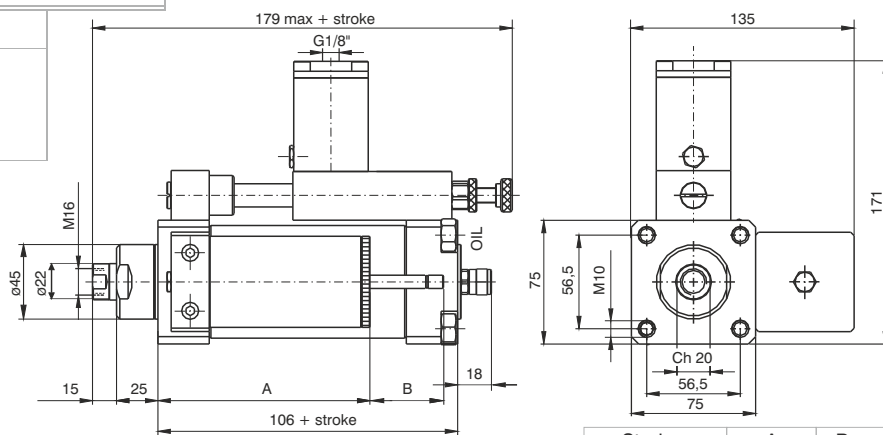
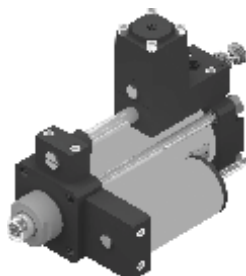
Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

Min. stroke 75 mm  
Weight gr. 3450 + gr. 850 every 50 mm. stroke

**Regulation on the inward stroke with stop**  
(Stop valves)

Ordering code

**1400.63.stroke.02.05**



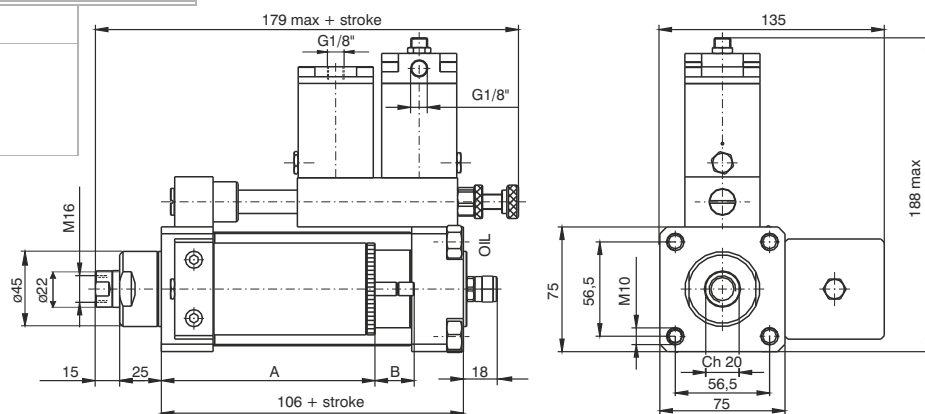
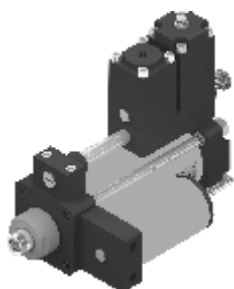
Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

Min. stroke 75 mm  
Weight gr. 3450 + gr. 850 every 50 mm. stroke

**Regulation on the inward stroke with skip and stop**  
(Acceleration and stop valve)

Ordering code

**1400.63.stroke.02.06**



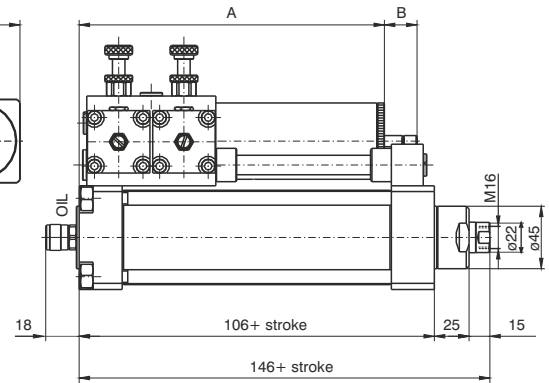
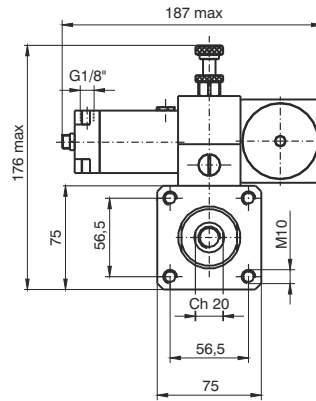
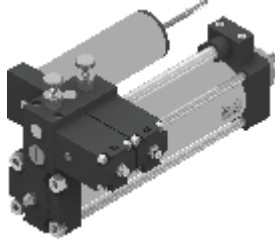
Strokes	A	B max
≥75 - <150	128	50
≥150 - <250	188	80
≥250 - <350	238	100
≥350 - <450	298	130
≥450 - ≤600	358	160

Min. stroke 75 mm  
Weight gr. 3700 + gr. 850 every 50 mm. stroke

**Regulation in both direction with skip**  
(Accelerations valve in two directions)

Ordering code

**1400.63.stroke.03.04**



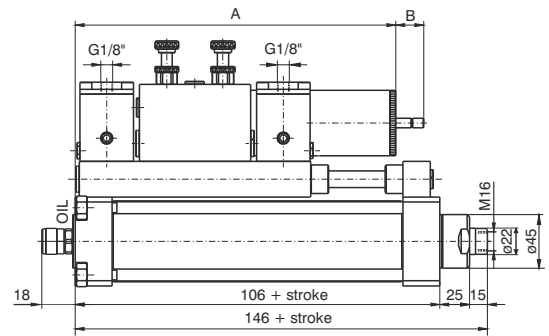
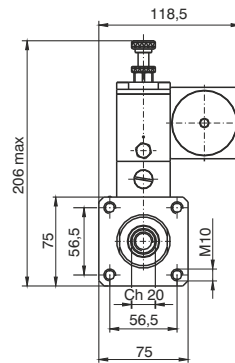
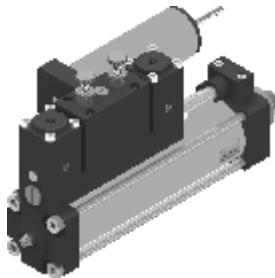
Strokes	A	B max
≥100 - <150	160	50
≥150 - <250	220	80
≥250 - <350	270	100
≥350 - <450	330	130
≥450 - ≤600	390	160

Min. stroke 100 mm  
Weight gr. 4100 + gr. 850 every 50 mm. stroke

**Regulation in both direction with stop**  
(Stop valves in two directions)

Ordering code

**1400.63.stroke.03.05**



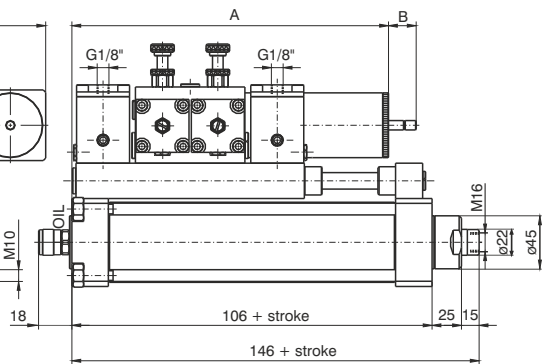
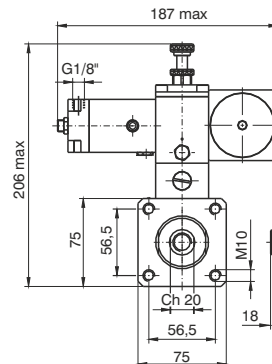
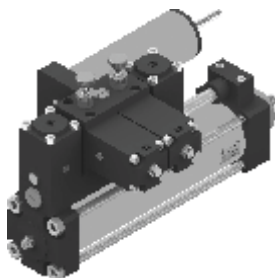
Strokes	A	B max
≥200 - <250	269	80
≥250 - <350	319	100
≥350 - <450	379	130
≥450 - ≤600	439	160

Min. stroke 200 mm  
Weight gr. 4850 + gr. 850 every 50 mm. stroke

**Regulation in both direction with skip and stop**  
(Acceleration and stop valves in two directions)

Ordering code

**1400.63.stroke.03.06**



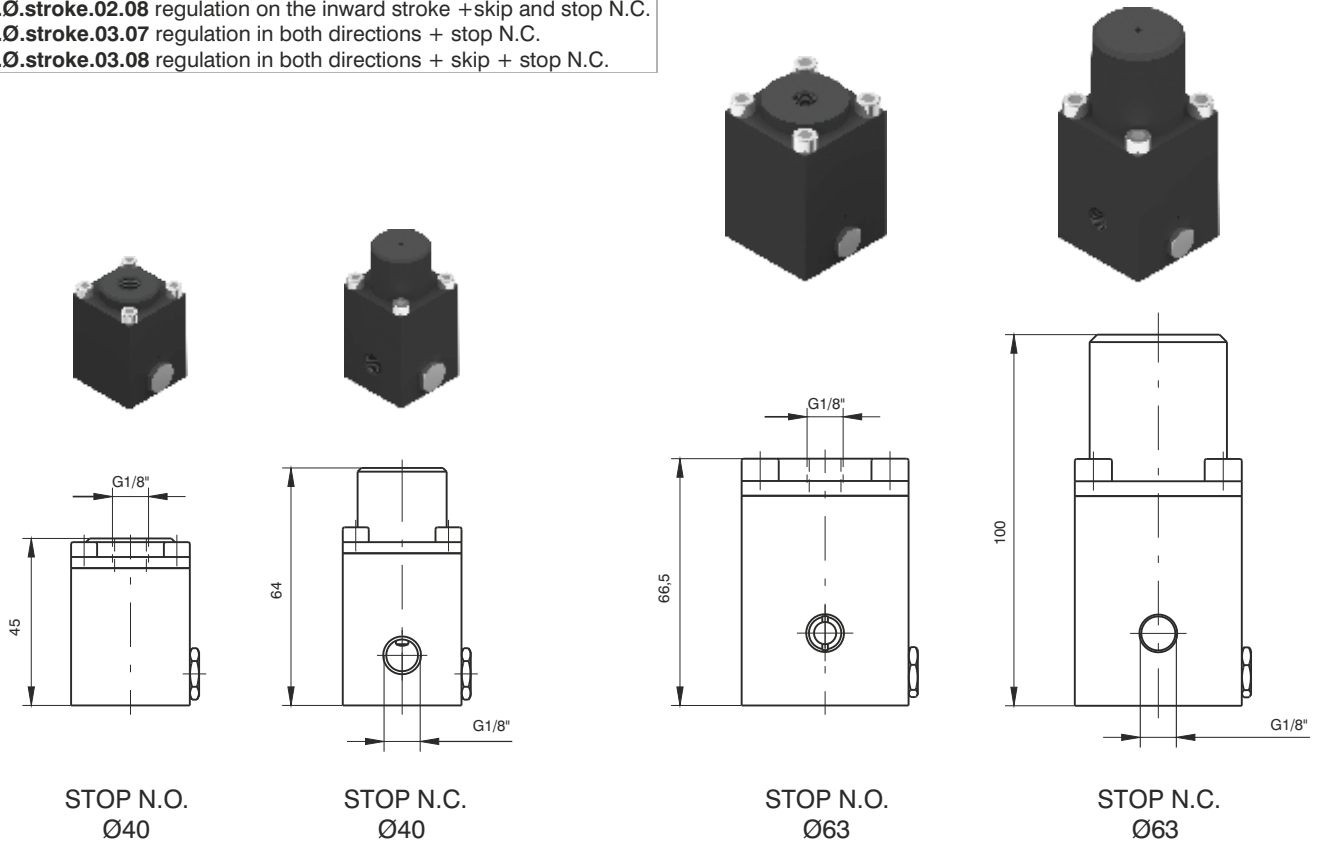
Strokes	A	B max
≥200 - <250	269	80
≥250 - <350	319	100
≥350 - <450	379	130
≥450 - ≤600	439	160

Min. stroke 200 mm  
Weight gr. 5400 + gr. 850 every 50 mm. stroke

**Dimensional releases and power supply positions with N.C. stop valves**

Ordering code

- 1400.Ø.stroke.01.07** regulation on the outward stroke + stop N.C.
- 1400.Ø.stroke.01.08** regulation on the outward stroke + skip + stop N.C.
- 1400.Ø.stroke.02.07** regulation on the inward stroke + stop N.C.
- 1400.Ø.stroke.02.08** regulation on the inward stroke + skip and stop N.C.
- 1400.Ø.stroke.03.07** regulation in both directions + stop N.C.
- 1400.Ø.stroke.03.08** regulation in both directions + skip + stop N.C.



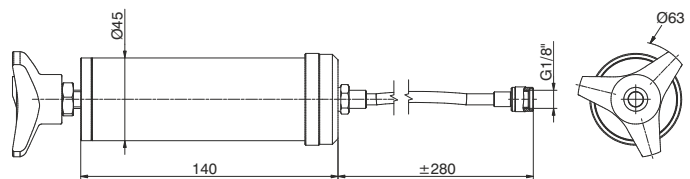
**Hydraulic fluid refill syringe**

Ordering code

**1400.99.02**



Weight gr. 420



**Oil for hydraulic and pneumatic circuits**

Ordering code

**PNEUMOIL 01**  
(1 litre bottles)



This oil is suitable to lubricate pneumatic circuits and also to refill hydraulic speed control tanks. It is completely compatible with our seals.



**General**

Pneumatic cylinder ISO 15552 handling and controlling movement by means of internal hydraulic circuit.  
All ISO fixing devices can be used except for:

- Cylinder Ø63 front clevis code 1463.63.08F
- Cylinder Ø63 front flange code 1463.63.03F
- Cylinder Ø63 foot code 1463.63.05/1F

**Ordering key**

14 .stroke. . . .

Ø50  
Ø63

**Regulation**

- A = Regulation on extraction
- B = Regulation on compression
- D = Double regulation

**STOP function**

- 0 = None
- A = Stop N.C. extraction
- B = Stop N.C. compression
- C = Double Stop N.C.
- D = Stop N.O. extraction
- E = Stop N.O. compression
- F = Double Stop N.O.

**SKIP function**

- 0 = None
- A = Skip N.C. extraction
- B = Skip N.C. compression
- C = Double Skip N.C.
- D = Skip N.O. extraction
- E = Skip N.O. compression
- F = Double Skip N.O.

**Construction characteristics**

End cap	aluminium black anodised
Piston Rod	steel tube externally chrome plated
Barrel	aluminium alloy anodised
Magnetic piston	aluminium
Cushion screw	nickel plated steel
Oil tank	aluminium
Pneumatic piston seal (pneumatic side)	oil resitant NBR rubber
Rod and cushion seal	PUR
Hydraulic piston seal (hydraulic side)	PUR

**Technical characteristics**

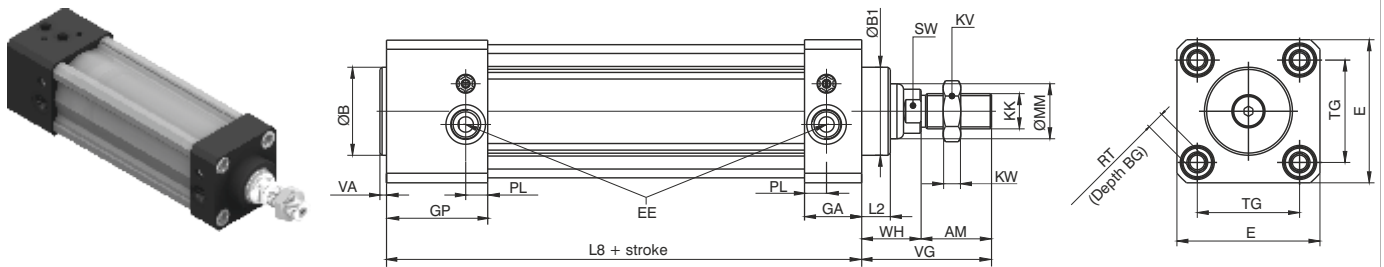
Pneumatic media	filtered and lubricated air
Hydraulic media	filtered 1µ hydraulic oil
Maximum pressure	8 bar
Skip & Stop valve minimum operating pressure	3 bar
Environment temperature	-5°C +70°C
Minimum regulated speed	40 mm/min.
Maximum regulated speed	6000 mm/min. *
Speed with SKIP	150 mm/sec. *
Free speed (without regulation)	300 mm/sec. *
Cushion speed	20 mm *
Standard stroke	from 50 to 450 steps 50 mm
Possibility of rear regulation (on request)	

\* **Attention:** speed recorded with cylinder on horizontal position fed at 8 bar without load on piston rod.

**Force (N)**

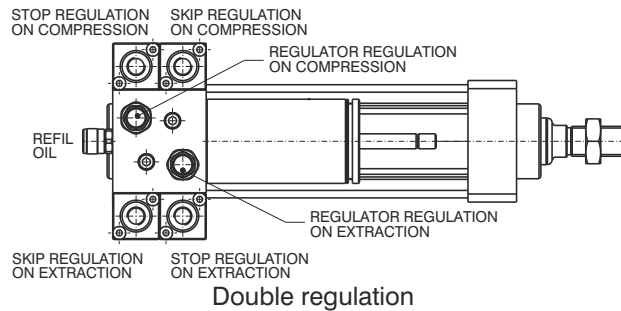
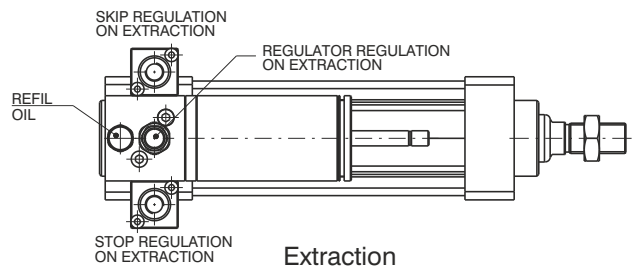
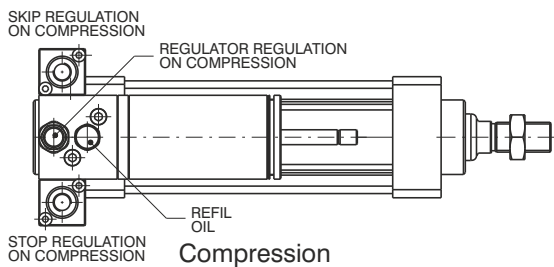
BORE	FORCE	PRESSURE (bar)									
		1	2	3	4	5	6	7	8	9	10
50	Extraction	181.4	362.9	544.3	725.7	907.2	1088.6	1270	1451.5	1632.9	1814.3
	Compression	144.4	288.8	433.2	577.6	722	866.3	1010.7	1155.1	1299.5	1443.9
63	Extraction	294.6	589.1	883.7	1178.2	1472.8	1767.3	2061.9	2356.5	2651	2945.6
	Compression	211.3	422.6	633.9	845.2	1056.6	1267.9	1479.2	1690.5	1901.8	2113.1

**Base cylinder dimensions**

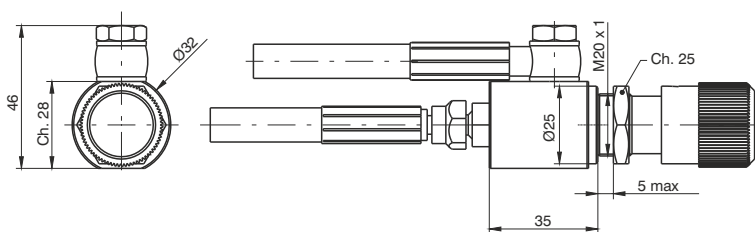


Bore	AM	B (d11)	B1 (d11)	BG	E	EE	GA	GP	KK	KV	KW	L2	L8	MM	PL	RT	SW	TG	VA	VG	WH
50	32	40	40	16	65	G1/4"	26	46	M16x1.5	24	8	13	116	25	10	M8	17	46.5	3	59	27
63		45	50		75	G3/8"			M16x1.5			20	121	35	12			56.5	4	69	37

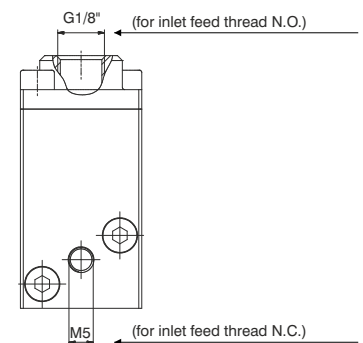
**Function valves and regulators position for the different versions**



**Rear regulator dimensions**

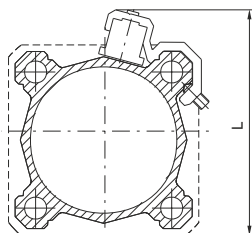


**SKIP and STOP valves inlet feed position**



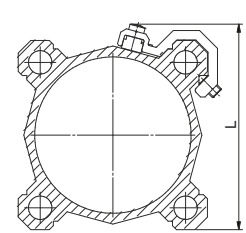
**Sensor brackets codes 1500.\_, RS.\_, HS.\_**

Dimensions	
Bore	L
Ø50	77
Ø63	87



**Sensor brackets codes 1580.\_, MRS.\_, MHS.\_**

Dimensions	
Bore	L
Ø50	66
Ø63	76



Ordering code	1320.B	Brackets for cylinder sensors Ø50 - Ø63
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Ordering code	1320.BS	Brackets for cylinder sensors Ø50 - Ø63
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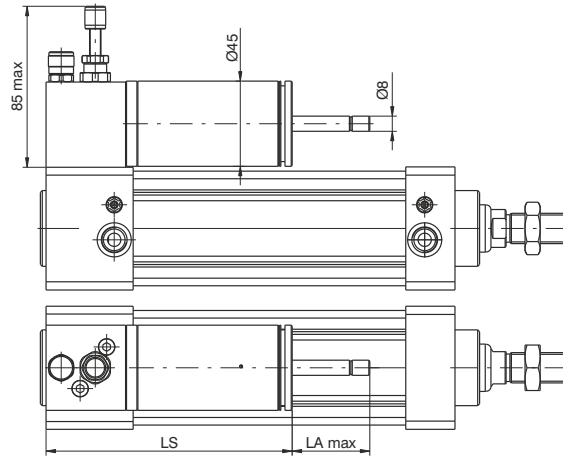
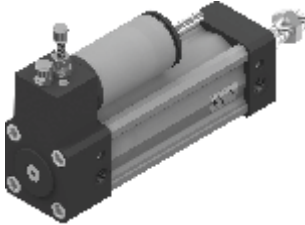
**Sensor for cylinder**

For technical characteristics and code see Chapter 6 "Magnetic sensor"

**Regulation on the outward stroke**

Ordering code

**14Ø.stroke.A.0.0**



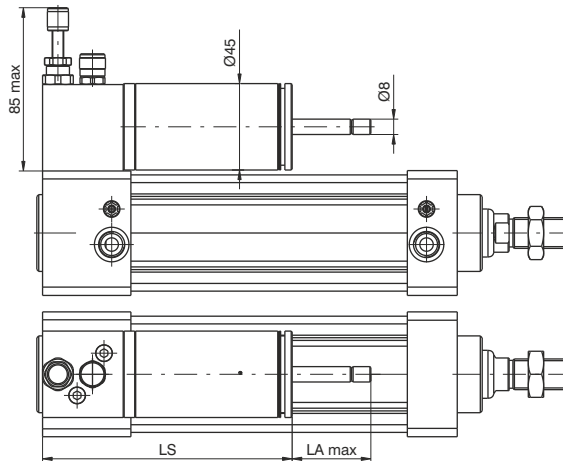
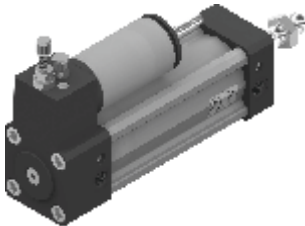
Ø50 Weight gr. 1970 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2591 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

**Regulation on the inward stroke**

Ordering code

**14Ø.stroke.B.0.0**



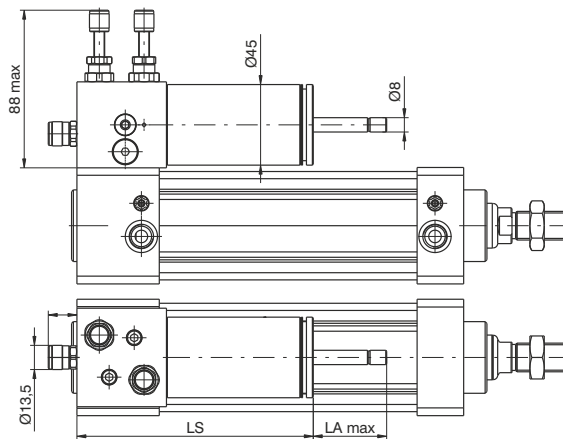
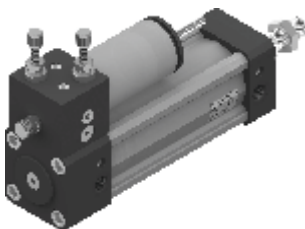
Ø50 Weight gr. 1970 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2591 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

**Regulation in both directions**

Ordering code

**14Ø.stroke.D.0.0**



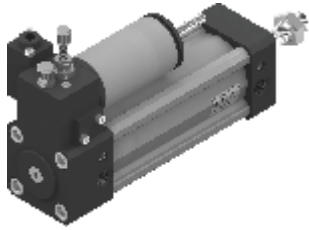
Ø50 Weight gr. 2128 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2749 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	132	41
151 - 350	187	66
351 - 450	257	106

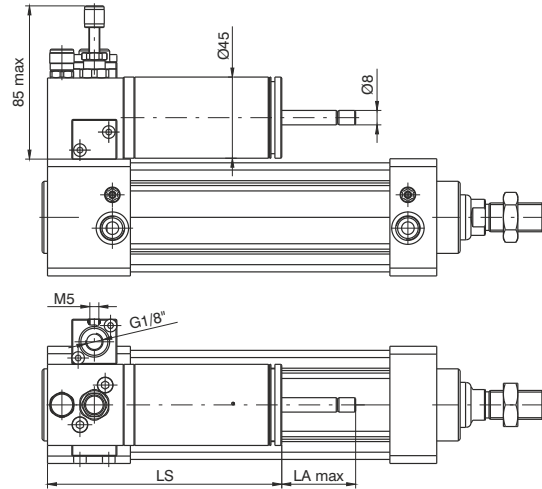
**Regulation on the outward stroke with Skip N.O.**

Ordering code

**14Ø.stroke.A.0.D**



Ø50 Weight gr. 2059 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 2928 + gr. 280 every 50 mm. stroke

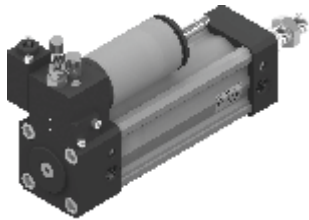


Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

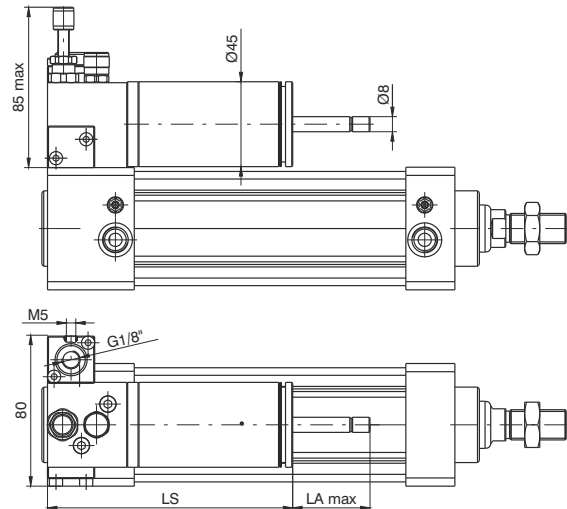
**Regulation on the inward stroke with Skip N.O.**

Ordering code

**14Ø.stroke.B.0.E**



Ø50 Weight gr. 2059 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 2928 + gr. 280 every 50 mm. stroke

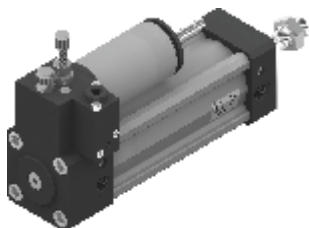


Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

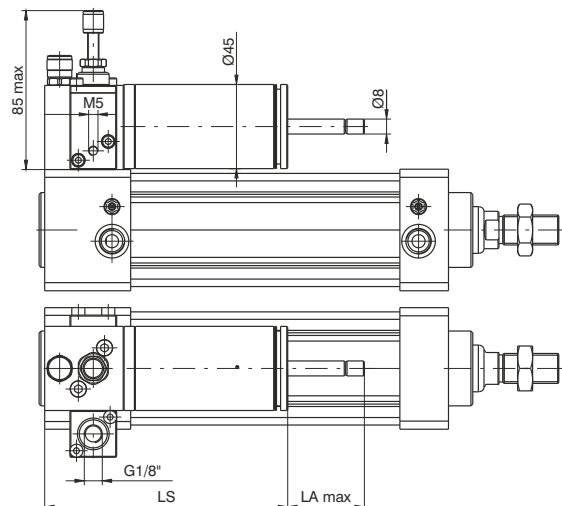
**Regulation on the outward stroke with Stop N.O.**

Ordering code

**14Ø.stroke.A.D.0**



Ø50 Weight gr. 2059 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 2928 + gr. 280 every 50 mm. stroke

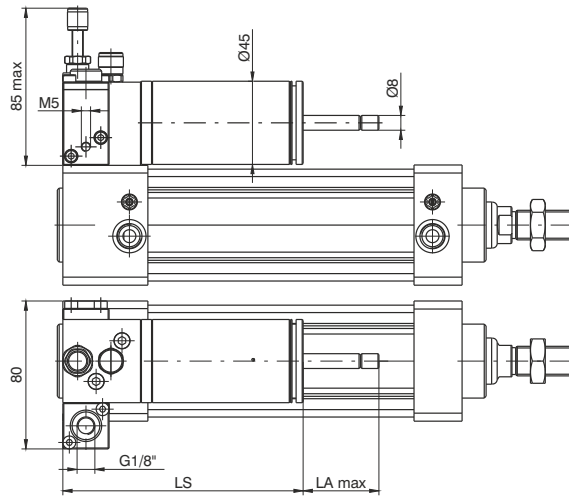
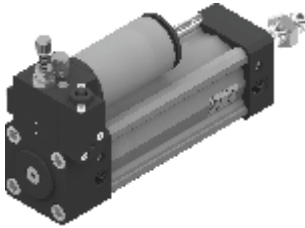


Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

**Regulation on the inward stroke with Stop N.O.**

Ordering code

**14Ø.stroke.B.E.0**



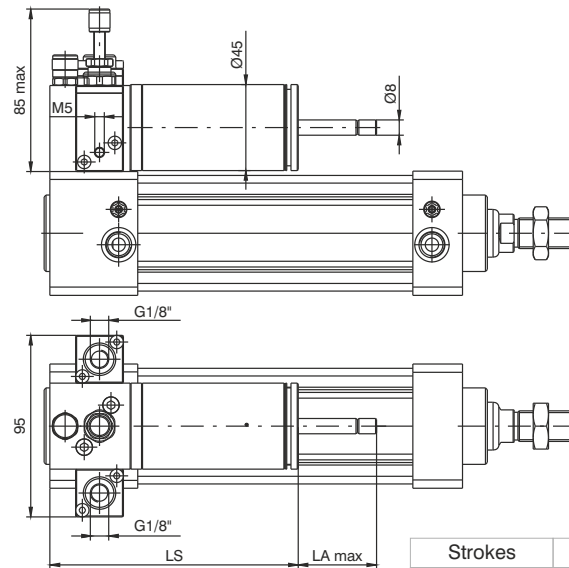
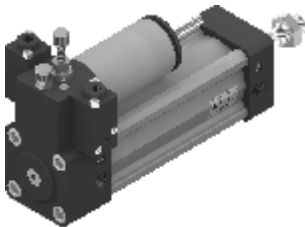
Ø50 Weight gr. 2059 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2928 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

**Regulation on the outward stroke with Skip N.O. - Stop N.O.**

Ordering code

**14Ø.stroke.A.D.D**



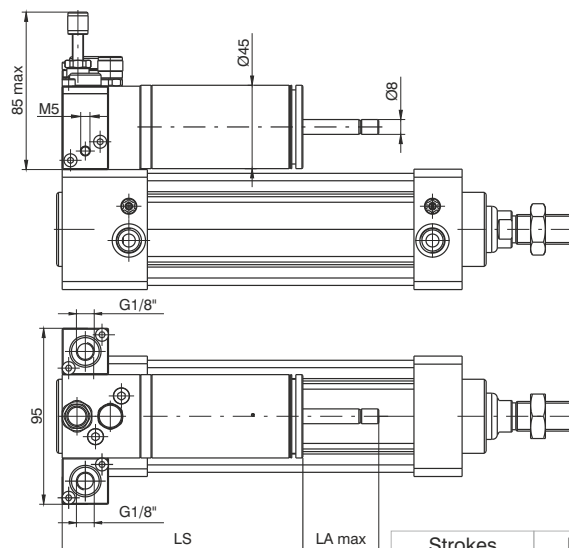
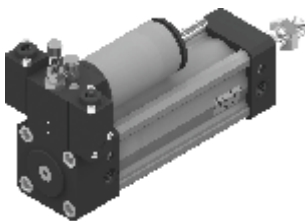
Ø50 Weight gr. 2140 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2761 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

**Regulation on the inward stroke with Skip N.O. - Stop N.O.**

Ordering code

**14Ø.stroke.B.E.E**



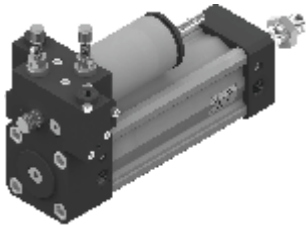
Ø50 Weight gr. 2140 + gr. 200 every 50 mm. stroke  
Ø63 Weight gr. 2761 + gr. 280 every 50 mm. stroke

Strokes	LS	LA max
0 - 150	130	41
151 - 350	185	66
351 - 450	255	106

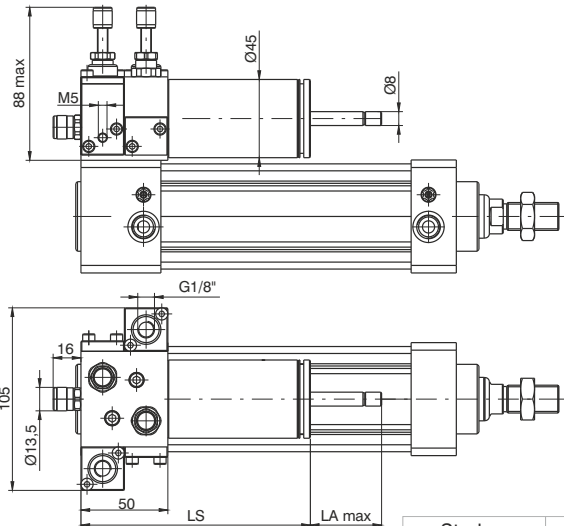
**Regulation and Skip in both directions**  
 (N.O. Skip valves in both directions)

Ordering code

**14Ø.stroke.D.0.F**



Ø50 Weight gr. 2311 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 2932 + gr. 280 every 50 mm. stroke

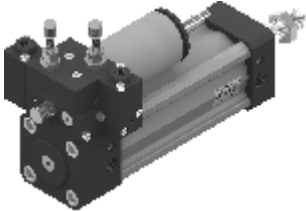


Strokes	LS	LA max
0 - 150	132	41
151 - 350	187	66
351 - 450	257	106

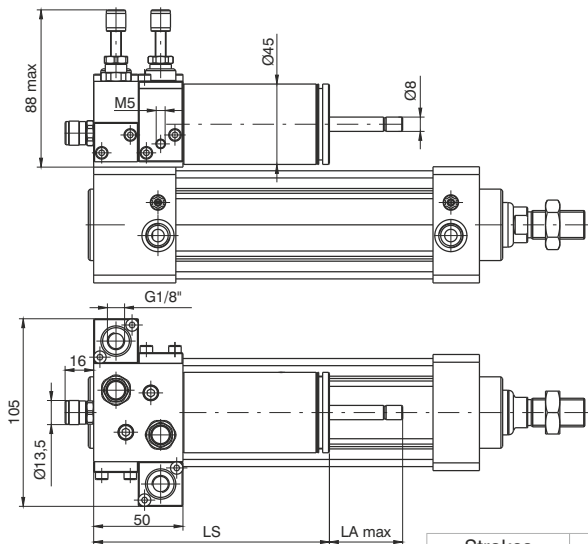
**Regulation and Stop in both directions**  
 (N.O. Stop valves in both directions)

Ordering code

**14Ø.stroke.D.F0**



Ø50 Weight gr. 2311 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 2932 + gr. 280 every 50 mm. stroke

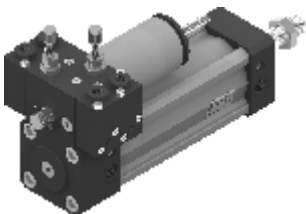


Strokes	LS	LA max
0 - 150	132	41
151 - 350	187	66
351 - 450	257	106

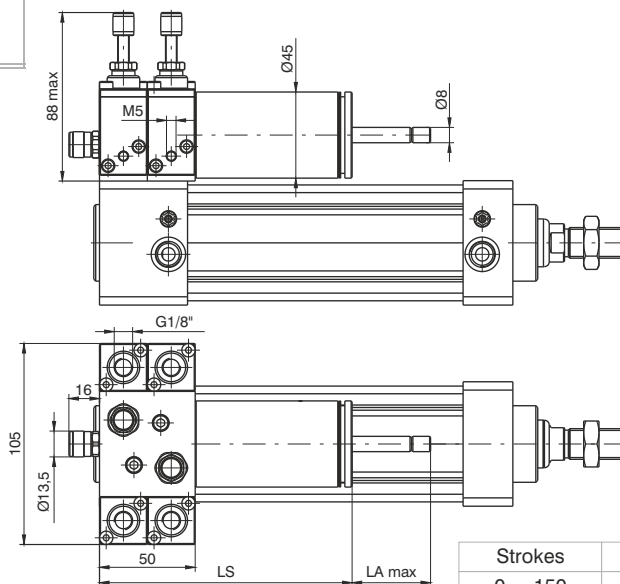
**Regulation with Skip and Stop in both directions**  
 (N.O. Skip and Stop valves in both directions)

Ordering code

**14Ø.stroke.D.F.F**



Ø50 Weight gr. 2473 + gr. 200 every 50 mm. stroke  
 Ø63 Weight gr. 3094 + gr. 280 every 50 mm. stroke



Strokes	LS	LA max
0 - 150	132	41
151 - 350	187	66
351 - 450	257	106

### General

Profiled tube has three "T" slots on the three sides hosting sensors 1500.\_, RS.\_, HS.\_ without adaptors and with adaptor code 1380.01F codes 1580.\_, MRS.\_, MHS.\_.

A complete range of clamps makes them easy to install under any conditions.

It is interesting to note that as these cylinders (from Ø 32 to Ø 100) have anchoring holes with the same lead and thread as those of series 1320 ISO 6431, they accept all mountings except for the intermediate trunnion.

### Construction characteristics

Body	anodised aluminium
Rod	C43 chromed steel (stainless steel for magnetic cylinder Ø20 and Ø25)
Piston	aluminium
Rod bushing	anodised aluminium
End plate	anodised aluminium
Seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (HNBR or FPM seals available upon request)

### Technical characteristics

Fluid	filtered and preferably lubricated air
Max. pressure	10 bar
Working temperature	-5°C - +70°C with standard seals magnetic or non magnetic piston -5°C - +80°C with FPM seals magnetic piston -5°C - +80°C with HNBR seals magnetic piston -5°C - +120°C with HNBR seals non magnetic piston -5°C - +150°C with FPM seals non magnetic piston

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

### Standard strokes

**Type 1501, 1504, 1511, 1514, 1515, 1516, 1517 and 1518:**

for all bores from 5 to 50 mm every 5 mm.

**Type 1502, 1503, 1512 and 1513:**

for all bores from 5 to 10 mm.

**Type with non-rotating device:**

Ø 20 and Ø 25	from 5 to 40 mm every 5 mm.
Ø 32 and Ø 40	from 5 to 50 mm every 5 mm.
Ø 50 and Ø 63	from 5 to 60 mm every 5 mm.
Ø 80 and Ø 100	from 5 to 80 mm every 5 mm.

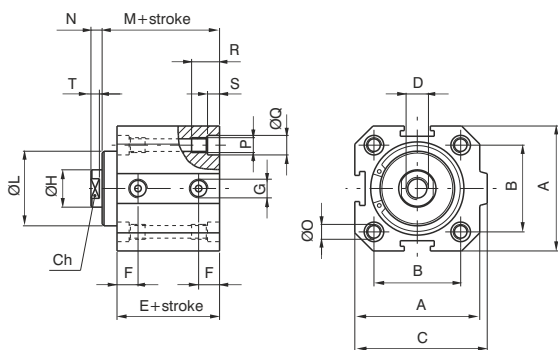




**Double acting version**

Ordering code

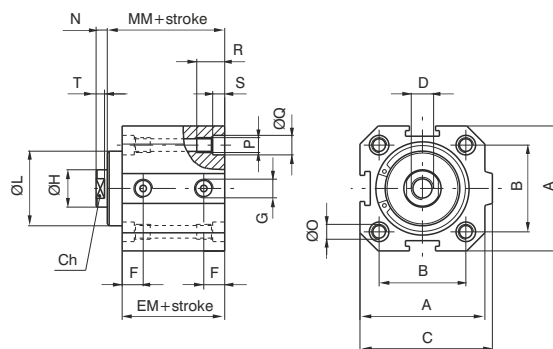
1501.Ø.stroke standard seals  
 1501.Ø.stroke.V FPM seals  
 1501.Ø.stroke.T HNBR seals



**Double acting version with magnetic piston**

Ordering code

1511.Ø.stroke standard seals  
 1511.Ø.stroke.V FPM seals  
 1511.Ø.stroke.T HNBR seals



Bore	20	25	32	40	50	63	80	100
A	35	41	48	57	67	80	100	120
B	26	28	32,5	38	46,5	56,5	72	89
C	39,5	44,5	52	61	71	84	106	126
D	M4x8	M5x10	M6x12	M10x15	M12x18	M12x18	M16x20	M16x20
E	29	30,5	32	33,5	35	38	44	47
EM	34	35,5	37	38,5	40	43	49	52
F	9	9,15	9,75	10,5	11	11,25	13,75	15,25
G	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 3/8"	G 3/8"
Ø H	8	10	12	16	20	20	25	25
Ø L ±0,05 (0,1 for Ø80 and Ø 100)	17	20,5	26	31	39	40	55	55
M	32	33	35,5	39,5	43	46	51,5	54,5
MM	37	38	40,5	44,5	48	51	56,5	59,5
N	4	4	4	5	6	6	8	8
Ø O	4,3	5,3	5,3	5,3	7	7	9	9
P	M5	M6	M6	M6	M8	M8	M10	M10
Ø Q	7,5	8,5	8,5	8,5	10,5	10,5	13,5	13,5
R	15	18	18	18	22	22	30	30
S	4,5	5,5	5,5	5,5	6,5	6,5	8,5	8,5
T	3	3	3	4	4,5	4,5	5,5	5,5
Ch	6	8	10	13	17	17	22	22

**Non magnetic**

Weight gr.	stroke 0	75	110	170	260	400	600	800	1500
	every 10 mm	20	30	40	60	80	100	120	145

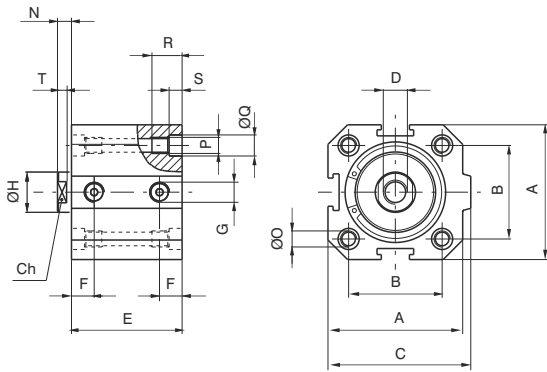
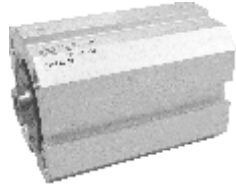
**Magnetic**

Weight gr.	stroke 0	90	130	200	310	460	700	910	1620
	every 10 mm	20	30	40	60	80	100	120	145

**Single acting version with front spring**

Ordering code

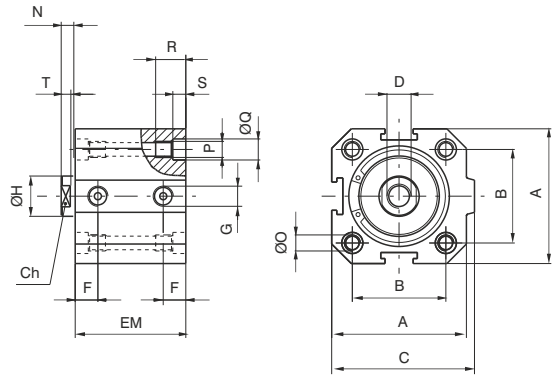
- 1502.Ø.stroke standard seals
- 1502.Ø.stroke.V FPM seals
- 1502.Ø.stroke.T HNBR seals



**Single acting version front spring with magnetic piston**

Ordering code

- 1512.Ø.stroke standard seals
- 1512.Ø.stroke.V FPM seals
- 1512.Ø.stroke.T HNBR seals



4

Bore		20	25	32	40	50	63	80	100
A		35	41	48	57	67	80	100	120
B		26	28	32,5	38	46,5	56,5	72	89
C		39,5	44,5	52	61	71	84	106	126
D		M4X8	M5X10	M6X12	M10X15	M12X18	M12X18	M16X20	M16X20
E	stroke 5	29	30,5	32	33,5	35	38	44	47
	stroke 10	34	35,5	37	38,5	40	43	49	52
EM	stroke 5	34	35,5	37	38,5	40	43	49	52
	stroke 10	39	40,5	42	43,5	45	48	54	57
F		9	9,15	9,75	10,5	11	11,25	13,75	15,25
G		G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 3/8"	G 3/8"
Ø H		8	10	12	16	20	20	25	25
N		4	4	4	5	6	6	8	8
Ø O		4,3	5,3	5,3	5,3	7	7	9	9
P		M5	M6	M6	M6	M8	M8	M10	M10
Ø Q		7,5	8,5	8,5	8,5	10,5	10,5	13,5	13,5
R		15	18	18	18	22	22	30	30
S		4,5	5,5	5,5	5,5	6,5	6,5	8,5	8,5
T		3	3	3	4	4,5	4,5	5,5	5,5
Ch		6	8	10	13	17	17	22	22

**Non magnetic**

Weight gr.	stroke 5	70	105	160	250	370	550	750	1440
	stroke 10	80	120	180	280	410	600	810	1500

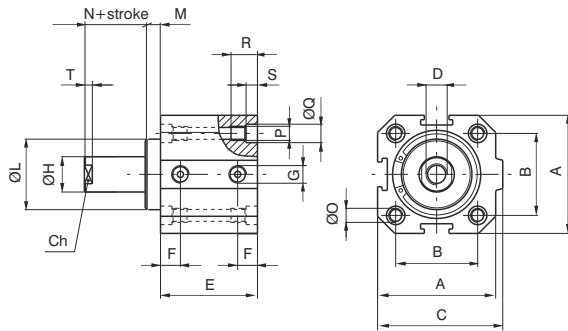
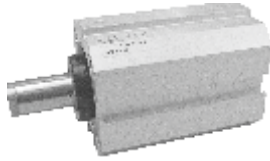
**Magnetic**

Weight gr.	stroke 5	85	125	190	300	430	650	860	1560
	stroke 10	95	140	210	330	470	700	920	1620

**Single acting version with rear spring**

Ordering code

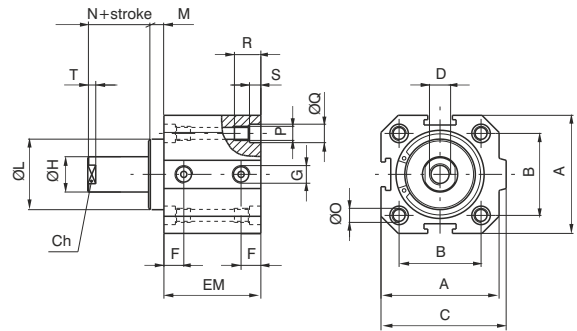
1503.Ø.stroke standard seals  
1503.Ø.stroke.V FPM seals  
1503.Ø.stroke.T HNBR seals



**Single acting version rear spring with magnetic piston**

Ordering code

1513.Ø.stroke standard seals  
1513.Ø.stroke.V FPM seals  
1513.Ø.stroke.T HNBR seals



Bore	20	25	32	40	50	63	80	100	
A	35	41	48	57	67	80	100	120	
B	26	28	32,5	38	46,5	56,5	72	89	
C	39,5	44,5	52	61	71	84	106	126	
D	M4X8	M5X10	M6X12	M10X15	M12X18	M12X18	M16X20	M16X20	
E	stroke 5	29	30,5	32	33,5	35	38	44	47
	stroke 10	34	35,5	37	38,5	40	43	49	52
EM	stroke 5	34	35,5	37	38,5	40	43	49	52
	stroke 10	39	40,5	42	43,5	45	48	54	57
F	9	9,15	9,75	10,5	11	11,25	13,75	15,25	
G	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 3/8"	G 3/8"	
Ø H	8	10	12	16	20	20	25	25	
Ø L ±0,05 (0 -0,1 for Ø90 and Ø100)	17	20,5	26	31	39	40	55	55	
M	3	2,5	3,5	6	8	8	7,5	7,5	
N	4	4	4	5	6	6	8	8	
Ø O	4,3	5,3	5,3	5,3	7	7	9	9	
P	M5	M6	M6	M6	M8	M8	M10	M10	
Ø Q	7,5	8,5	8,5	8,5	10,5	10,5	13,5	13,5	
R	15	18	18	18	22	22	30	30	
S	4,5	5,5	5,5	5,5	6,5	6,5	8,5	8,5	
T	3	3	3	4	4,5	4,5	5,5	5,5	
Ch	6	8	10	13	17	17	22	22	

**Non magnetic**

Weight	stroke 5	70	105	160	250	370	550	750	1440
	stroke 10	80	120	180	280	410	600	810	1500

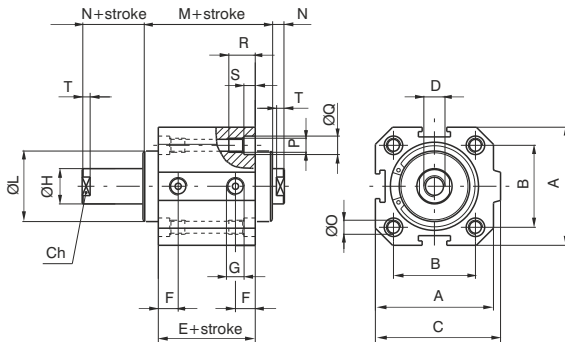
**Magnetic**

Weight	stroke 5	85	125	190	300	430	650	860	1560
	stroke 10	95	140	210	330	470	700	920	1620

**Double acting push-pull rod version**

Ordering code

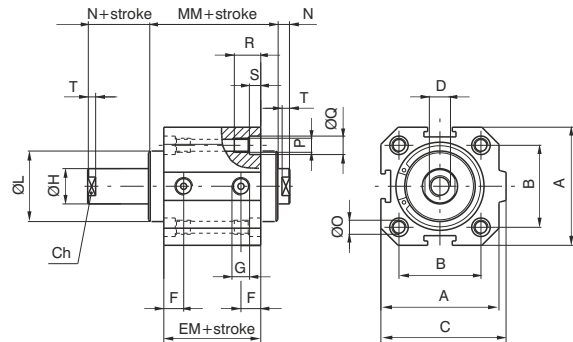
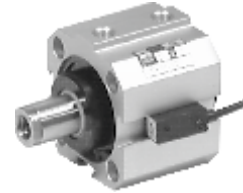
- 1504.Ø.stroke standard seals
- 1504.Ø.stroke.V FPM seals
- 1504.Ø.stroke.T HNBR seals



**Double acting push-pull rod version with magnetic piston**

Ordering code

- 1514.Ø.stroke standard seals
- 1514.Ø.stroke.V FPM seals
- 1514.Ø.stroke.T HNBR seals



4

Bore	20	25	32	40	50	63	80	100
A	35	41	48	57	67	80	100	120
B	26	28	32,5	38	46,5	56,5	72	89
C	39,5	44,5	52	61	71	84	106	126
D	M4X8	M5X10	M6X12	M10X15	M12X18	M12X18	M16X20	M16X20
E	29	30,5	32	33,5	35	38	44	47
EM	34	35,5	37	38,5	40	43	49	52
F	9	9,15	9,75	10,5	11	11,25	13,75	15,25
G	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 3/8"	G 3/8"
Ø H	8	10	12	16	20	20	25	25
Ø L $\pm 0,05$ ( $0$ $-0,1$ for Ø80 and Ø 100)	17	20,5	26	31	39	40	55	55
M	35	35,5	39	45,5	51	54	59	62
MM	40	40,5	44	50,5	56	59	64	67
N	4	4	4	5	6	6	8	8
Ø O	4,3	5,3	5,3	5,3	7	7	9	9
P	M5	M6	M6	M6	M8	M8	M10	M10
Ø Q	7,5	8,5	8,5	8,5	10,5	10,5	13,5	13,5
R	15	18	18	18	22	22	30	30
S	4,5	5,5	5,5	5,5	6,5	6,5	8,5	8,5
T	3	3	3	4	4,5	4,5	5,5	5,5
Ch	6	8	10	13	17	17	22	22

**Non magnetic**

Weight gr.	stroke 0	90	130	200	320	460	670	1100	1680
	every 10 mm	20	35	50	70	90	110	155	185

**Magnetic**

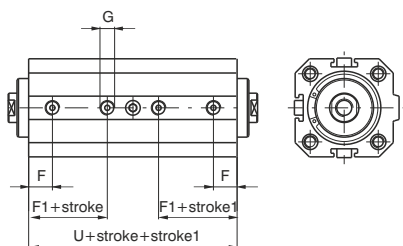
Weight gr.	stroke 0	105	160	240	380	530	740	1210	1820
	every 10 mm	20	35	50	70	90	110	155	185



**Tandem with opposed rods**

Ordering code

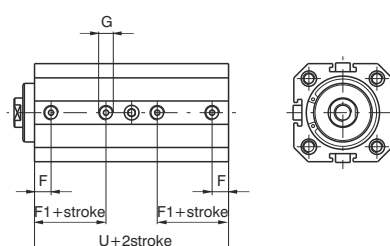
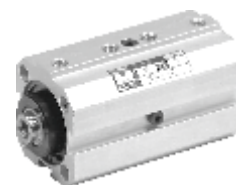
- 1515.Ø.stroke.stroke 1 standard seals
- 1515.Ø.stroke.stroke 1.V FPM seals
- 1515.Ø.stroke.stroke 1.T HNBR seals
- 1515.Ø.stroke.stroke 1.M standard seals, magnetic piston
- 1515.Ø.stroke.stroke 1.MV FPM seals, magnetic piston
- 1515.Ø.stroke.stroke 1.MT HNBR seals, magnetic piston



**Tandem push with common rods**

Ordering code

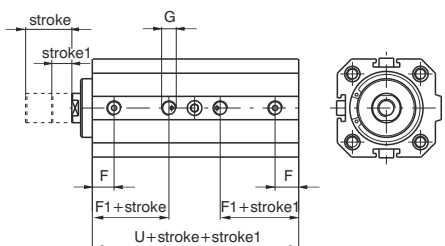
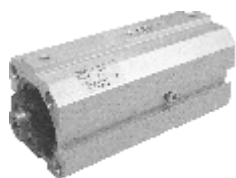
- 1516.Ø.stroke standard seals
- 1516.Ø.stroke.V FPM seals
- 1516.Ø.stroke.T HNBR seals
- 1516.Ø.stroke.M standard seals, magnetic piston
- 1516.Ø.stroke.MV FPM seals, magnetic piston
- 1516.Ø.stroke.MT HNBR seals, magnetic piston



**Tandem push with independent rods**

Ordering code

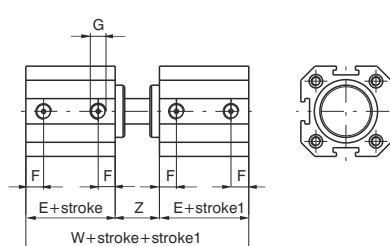
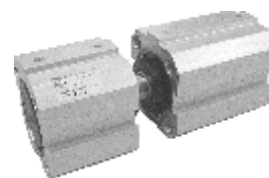
- 1517.Ø.stroke.stroke 1 standard seals
- 1517.Ø.stroke.stroke 1.V FPM seals
- 1517.Ø.stroke.stroke 1.T HNBR seals
- 1517.Ø.stroke.stroke 1.M standard seals, magnetic piston
- 1517.Ø.stroke.stroke 1.MV FPM seals, magnetic piston
- 1517.Ø.stroke.stroke 1.MT HNBR seals, magnetic piston



**Opposed tandem with common rods**

Ordering code

- 1518.Ø.stroke.stroke 1 standard seals
- 1518.Ø.stroke.stroke 1.V FPM seals
- 1518.Ø.stroke.stroke 1.T HNBR seals
- 1518.Ø.stroke.stroke 1.M standard seals, magnetic piston
- 1518.Ø.stroke.stroke 1.MV FPM seals, magnetic piston
- 1518.Ø.stroke.stroke 1.MT HNBR seals, magnetic piston



Bore	20	25	32	40	50	63	80	100
E	29	30,5	32	33,5	35	38	44	47
F	9	9,15	9,75	10,5	11	11,25	13,75	15,25
F1	17,5	18,35	19,75	20,5	21,5	24,25	24,75	26,25
G	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 3/8"	G 3/8"
U	59	60,5	67	68,5	70	78	89	97
W	72	74	79	89	98	104	119	125
Z	14	13	15	22	28	28	31	31

**Variations with magnetic piston**

E	34	35,5	37	38,5	40	43	49	52
F1	22,5	23,35	24,75	25,5	26,5	29,25	29,75	31,25
U	69	70,5	77	78,5	80	88	99	107
W	82	84	89	99	108	114	129	135

**Double acting version**

Ordering code

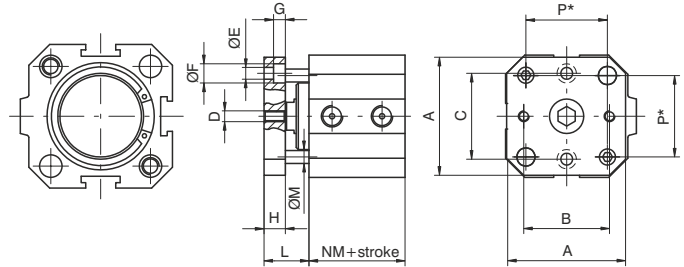
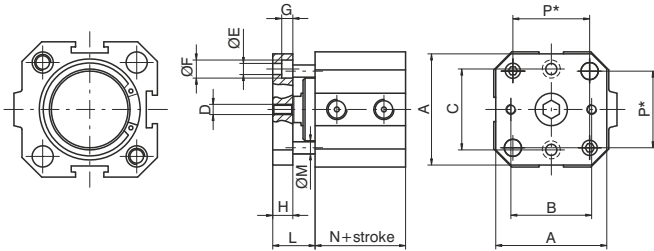
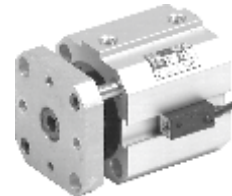
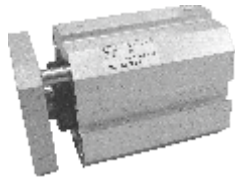
**1501.Ø.stroke.AR** standard seals  
**1501.Ø.stroke.AR.V** FPM seals  
**1501.Ø.stroke.AR.T** HNBR seals

**Double version with magnetic piston**

Ordering code

**1511.Ø.stroke.AR** standard seals  
**1511.Ø.stroke.AR.V** FPM seals  
**1511.Ø.stroke.AR.T** HNBR seals

**Cylinders with non-rotating device**



\* = Distance between rods centres

\* = Distance between rods centres

It is possible, upon request to have four holes threaded and with counter bores in order to rear mount the cylinder as if it was standard.

Bore	20	25	32	40	50	63	80	100	
A	35	40	45	55	65	80	100	120	
B	22	26	32	40	50	62	82	103	
C	22	28	34	40	50	62	82	103	
D	M4	M5	M5	M5	M6	M6	M8	M8	
Ø E	4,5	5,5	5,5	5,5	6,5	8,5	8,5	8,5	
Ø F	7,5	9	9	9	10,5	13,5	13,5	13,5	
G	4,5	5,5	5,5	5,5	6,5	8,5	8,5	8,5	
H	8	8	10	10	12	12	15	15	
L	15	14,5	17,5	21	26	26	30,5	30,5	
Ø M	6	6	6	6	8	8	10	10	
N	29	30,5	32	33,5	35	38	44	47	
NM	34	35,5	37	38,5	40	43	49	52	
P	26	28	32,5	38	46,5	56,5	72	89	
Max. suggestion stroke	40	40	50	50	60	60	80	80	
Weight gr.	stroke 0	40	50	70	90	200	250	490	650
	every 10 mm	5	5	5	5	10	10	20	20

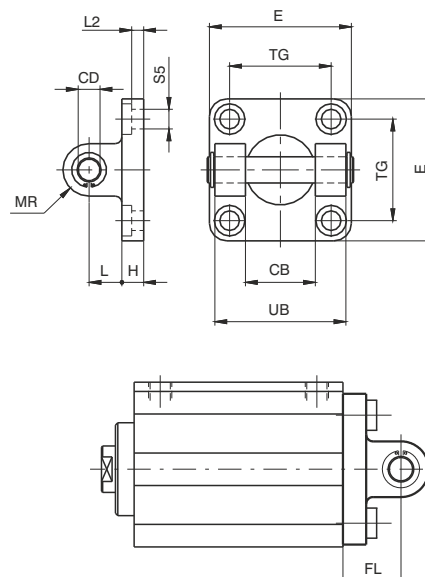
**Rear clevis**

Ordering code

**1500.Ø.09F**



This allows anchorage of the cylinder both parallel and at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary. It is made of aluminium alloy and painted black.



Bore	20	25	32	40	50	63	80	100
CB (h 9)	16	20	26	28	32	40	50	60
CD (H 9)	8	10	10	12	12	16	16	20
E	35	40	45	52	65	75	95	115
H	6	8	9	9	11	11	14	14
L	12	12	13	16	16	21	22	27
MR	8	9	10	12	12	16	16	20
TG	26	28	32,5	38	46,5	56,5	72	89
UB	35	40	45	52	60	70	90	110
FL	18	20	22	25	27	32	36	41
L2	/	/	5,5	5,5	6,5	6,5	10	10
S5 (H13)	5,5	6,6	6,6	6,6	9	9	11	11
Weight gr.	45	75	80	130	185	310	530	910

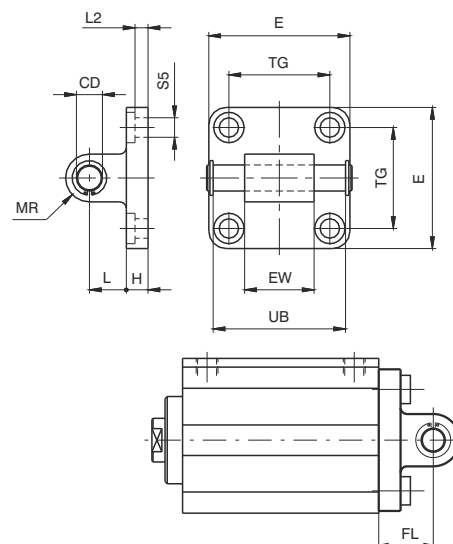
**Rear clevis male**

Ordering code

**1500.Ø.09/1F**



This allows anchorage of the cylinder both parallel and at a right angle to the plane; the cylinder rod can oscillate and self-align as necessary. It is made of aluminium alloy and painted black.



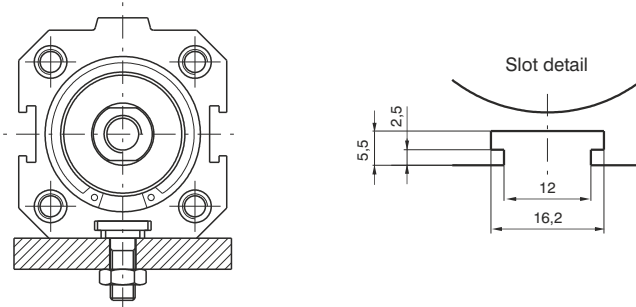
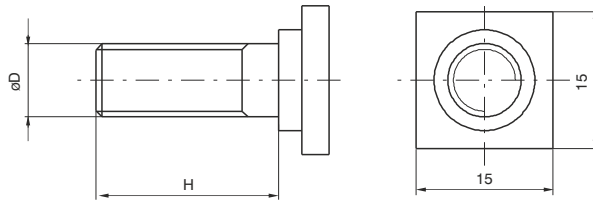
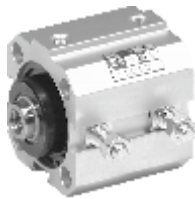
Bore	20	25	32	40	50	63	80	100
CD (h 9)	8	10	10	12	12	16	16	20
E	35	40	45	52	65	75	95	115
EW	16	20	26	28	32	40	50	60
H	6	8	9	9	11	11	14	14
L	12	12	13	16	16	21	22	27
MR	8	9	10	12	12	16	16	20
TG	26	28	32,5	38	46,5	56,5	72	89
UB	35	40	46	53	61	71	91	111
FL	18	20	22	25	27	32	36	41
L2	/	/	5,5	5,5	6,5	6,5	10	10
S5 (H 13)	5,5	6,6	6,6	6,6	9	9	11	11
Weight gr.	53	85	90	130	190	340	580	960



**Slot fixing screws**

Ordering code

- 1500.15F** (from Ø20 to Ø32)
- 1500.16F** (from Ø40 to Ø63)
- 1500.18F** (Ø80 and Ø100)



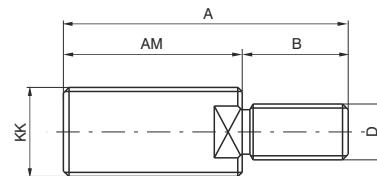
*Example mounted with square headed screws on the plane.*

Bore	20	25	32	40	50	63	80	100
ØD	M6	M6	M6	M8	M8	M8	M10	M10
H	15	15	15	20	20	20	25	25
Weight gr.	10			18			25	

**Nipple with ISO standard thread**

Ordering code

**1500.Ø.17F**



Fitted on the female thread of the compact cylinders, restore the ISO configurations rod (ISO 6432 for cylinders Ø 20 and Ø 25; ISO 6431 for cylinders from Ø 32 to Ø 100).

Bore	20	25	32	40	50	63	80	100
KK	M8x1,25	M10x1,25	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5
AM	20	22	22	24	32	32	40	40
A	26	30	32	36	47	47	58	58
B	6	8	10	12	15	15	18	18
D	M4	M5	M6	M10	M12	M12	M16	M16
Weight gr.	8	15	16	27	65	65	110	110



**General**

This series of cylinders is available in two versions with different threaded fixing holes. The first one includes cylinders from Ø 32 to Ø 100 called "ISO" with fixing holes same as cylinders ISO 6431 - VDMA 24562. Cylinders from Ø 20 to Ø 100 called "UNITOP", parts of second series, are mainly according to standard UNITOP RU - P/6 - P/7. Cylinders Ø 12 and Ø 16 non standard, are interchangeable with similar products available on the market. The ISO version uses all fixing devices of series 1320 with exception of intermediate trunnion, while for cylinders Ø 12, Ø 16 and for "UNITOP" version are available fixing devices as flanges, foot, male and female clevis made with aluminium or steel. For use of magnetic sensors see directions on next page.

**Construction characteristics**

Body	anodised aluminium
Heads	from Ø12 to Ø25 aluminium alloy UNI 9006/1 anodised from Ø32 to Ø100 UNI 5076 aluminium die-casting and painted (cataphoresis)
Piston rod bushing	sintered bronze
Piston rod	from Ø12 to Ø25 stainless steel from Ø32 to Ø100 C43 chromed (on request stainless steel for all bores)
Piston	from Ø12 to Ø25 plated zinc steel dal Ø32 al Ø100 aluminium alloy 2011 UNI 9002/5
Seals	PUR (on request HNBR)
Spring	zinc plated steel for springs
Fixing screws	zinc plated steel

**Technical characteristics**

Fluid	filtered air, with or without lubrication
Maximum working pressure	10 bar
Working temperature	-30°C - +80°C with standard seals (magnetic or non magnetic piston) -5°C - +80°C with HNBR seals (magnetic piston) -5°C - +120°C with HNBR seals (non magnetic piston)

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication. Our Technical Department will be glad to help.

**Standard strokes for single acting cylinders**

Ø12                                    10 mm max.  
from Ø16 to Ø100                25 mm max.

**Standard strokes for double acting cylinders**

Ø12 and Ø16                        from 5 to 40mm every 5mm  
Ø20 and Ø25                        from 5 to 50mm every 5mm  
Ø32 - Ø100                            from 5 to 80mm every 5mm

**Maximum suggested strokes**

Ø12 and Ø16                        100 mm  
Ø20 and Ø25                        200 mm  
Ø32 and Ø40                        300 mm  
Ø50 and Ø63                        400 mm  
Ø80 and Ø100                       500 mm

**Maximum suggested strokes with non-rotating device**

from Ø12 to Ø25                40 mm  
from Ø32 to Ø100               80 mm

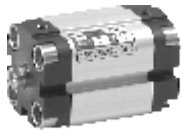
*Longer strokes may be utilised if there is no radial loads on piston rod considering there isn't adjustable cushioning system.*

**Minimum and maximum springs load**

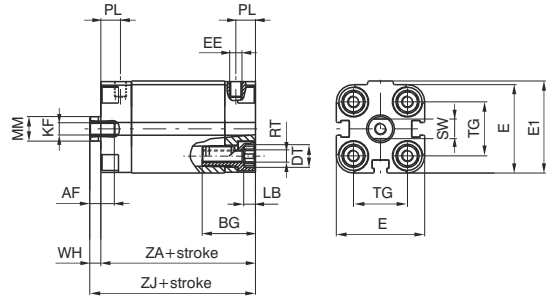
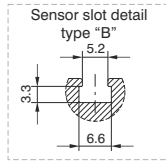
Bore	12	16	20	25	32	40	50	63	80	100
Min. load (N)	3,9	4,4	4,9	9,8	12,3	16,7	27,5	37,3	59,4	101,3
Max. load (N)	9,3	17,7	18,1	25,5	34,3	44,1	51,0	63,8	99,4	141,9



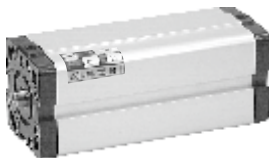
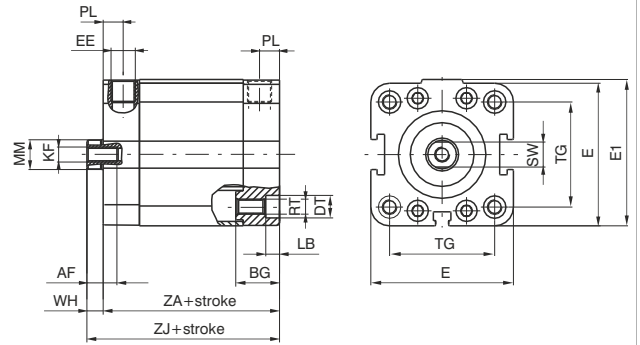
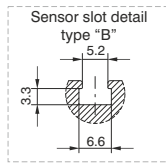
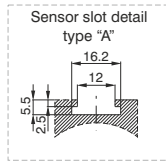
**BASIC version  
double and single acting**



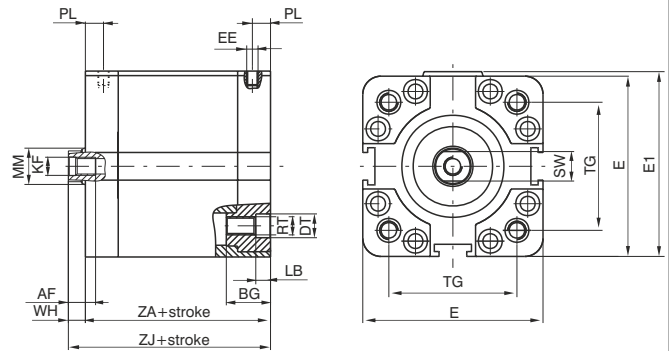
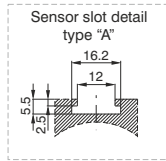
for bores from  $\varnothing 12$  to  $\varnothing 25$   
use sensors codes  
1580.\_, MHS.\_, MRS.\_ only



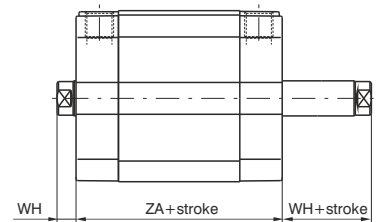
for bores from  $\varnothing 32$  to  $\varnothing 50$   
use sensors codes  
1500.\_, RS.\_, HS.\_ (slot A)  
1580.\_, MHS.\_, MRS.\_  
(slot B and slot A with adapter code 1380.01F)



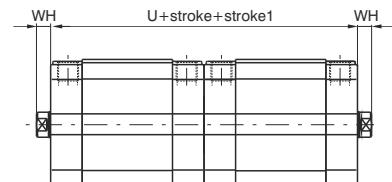
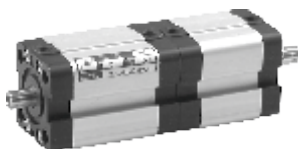
for bores from  $\varnothing 63$  to  $\varnothing 100$   
use sensors codes  
1500.\_, RS.\_, HS.\_ and  
1580.\_, MHS.\_, MRS.\_  
(with adapter code 1380.01F)



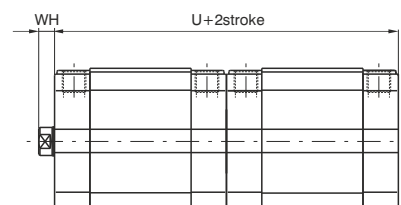
**PUSH/PULL rod version  
double and single acting**



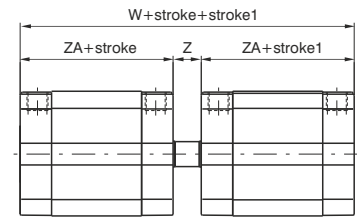
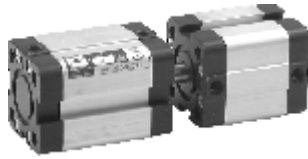
**Tandem with opposite rods**



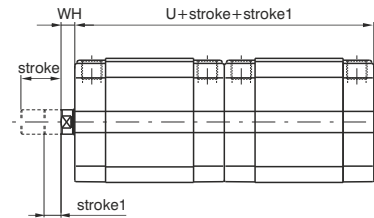
**Tandem push with common rods**



**Opposed tandem with common rod**



**Tandem push with independent rods**



**Ordering code**

**Basic version push/pull**

15 . Ø . stroke . . . .

- 1 = Double acting (magnetic)
  - 2 = Front spring (magnetic)
  - 3 = Rear spring (magnetic)
  - 4 = Double acting (non magnetic)
  - 5 = Front spring (non magnetic)
  - 6 = Rear spring (non magnetic)
  - 01 = Basic version - female piston rod
  - 02 = Basic version - male piston rod
  - 03 = Push / pull version - female piston rod
  - 04 = Push / pull version - male piston rod
  - 05 = Push / pull version - bored male piston rod
  - 06 = Push / pull version - bored female piston rod
  - 07 = Non - rotating version
  - 08 = Push / pull version with non rotating device on one side - female piston rod \*
  - 09 = Push / pull version with non rotating device on one side - male piston rod \*
  - 1 = Chromed rod C43 (from Ø12 to Ø25 stainless steel)
  - 2 = Stainless steel rod (from Ø32 to Ø100)
  - 6 = ISO (Ø32 - Ø100)
  - 7 = ISO HNBR (Ø32 - Ø100)
  - 8 = UNITOP (Ø12 - Ø100)
  - 9 = UNITOP HNBR (Ø12 - Ø100)
- \* for single acting version, the spring is on the anti-rotation side

**Tandem version**

15 . Ø . stroke .(stroke1) . . .

- A = Tandem with opposite rods female thread
- E = Tandem with opposite rods male thread
- L = Tandem opposite rods with non rotating device on both sides
- C = Tandem push with common rods female thread
- G = Tandem push with common rods male thread
- H = Tandem push with common rods, push-pull version rod female threads
- N = Tandem push with common rods with non rotating device
- D = Opposed tandem with common rod
- B = Tandem push with independent rods female thread
- F = Tandem push with independent rods male thread
- M = Tandem push with independent rods with non rotating device
- P = Tandem push/pull with independent rods - female thread
- Q = Tandem push/pull with independent rods - male thread
- 1 = Chromed rod C43 (from Ø12 to Ø25 stainless steel)
- 2 = Stainless steel rod (from Ø32 to Ø100)
- 6 = ISO (Ø32 - Ø100)
- 7 = ISO HNBR (Ø32 - Ø100)
- 8 = UNITOP (Ø12 - Ø100)
- 9 = UNITOP HNBR (Ø12 - Ø100)

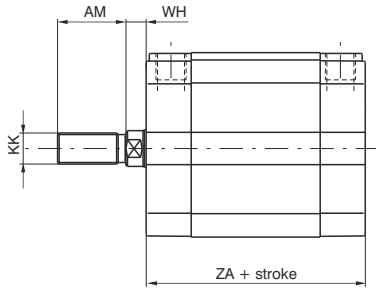
**Table of dimensions**

Bore	12	16	20	25	32	40	50	63	80	100	
AF	6	8	10	10	12	12	12	12	16	20	
BG	19	19	20	20	17.5	17.5	19.5	19.5	23.5	24.5	
DT	6	6	8	8	10	9	10.5	10.5	14	14	
E	29	29	36	40	48	57	67	80	102	122	
E1	30	30	37.5	41.5	49.5	58.5	69	82	105	125	
EE	M 5	M 5	M 5	M 5	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/4"	
KF	M 3	M 4	M 5	M 5	M 6	M 6	M 8	M 8	M 10	M12	
LB	3.5	3.5	4,8	4,8	5,5	5,5	6,5	6,5	8,5	8,5	
MM	6	8	10	10	12	12	16	16	20	25	
PL	8	8	8	8	8	8	8	8	8,5	10,5	
RT	M 4	M 4	M 5	M 5	M 6	M 6	M 8	M 8	M 10	M 10	
SW	5	7	8	8	10	10	13	13	17	22	
TG ISO	/	/	/	/	32.5	38	46.5	56.5	72	89	
TG UNITOP	18	18	22	26	32	42	50	62	82	103	
U	76	76	76	79	89	91	91	100	112	133	
W	85	85	85	90	101	104	106	115	128	153	
WH	4.5	4.5	4.5	5.5	6	6.5	7.5	7.5	8	10	
Z	9	9	9	11	12	13	15	15	16	20	
ZA *	38	38	38	39.5	44.5	45.5	45.5	50	56	66.5	
ZJ *	42.5	42.5	42.5	45	50.5	52	53	57.5	64	76.5	
Weight gr.	stroke 0	88	90	140	170	210	320	460	690	1390	2290
	every 5 mm	8	8	12	13	15	19	25	31	50	66

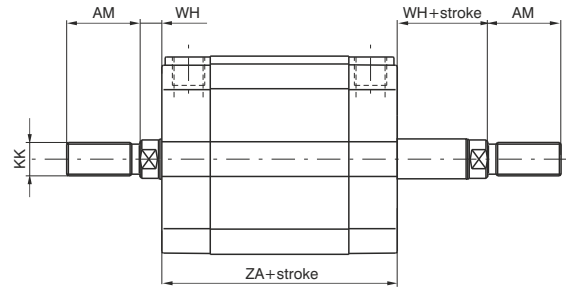
\* These dimensions increase of 10 mm for cylinders ø 12 front spring version.

Tabular weights above refer to Basic Versions. The weights of Tandem versions are approximately double those shown.

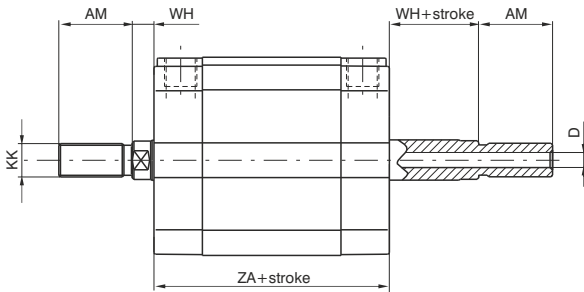
**Basic version male piston rod**



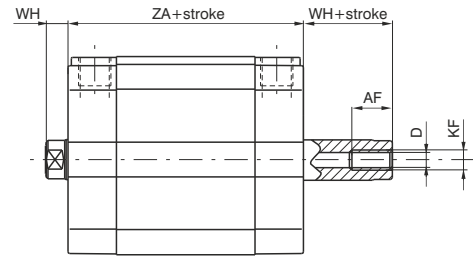
**Push - pull version male rod**



**Push - pull version bored male piston rod**

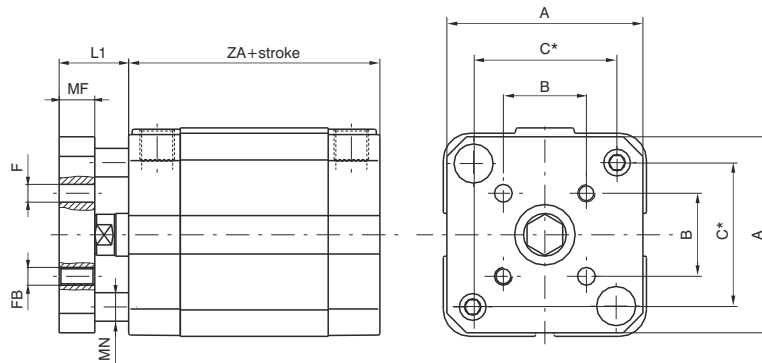


**Push - pull version bored female piston rod**



Maximum allowed stroke = ZB (see table)

**Non-rotating version**



\* = Distance between rods centres

Bore	12	16	20	25	32	40	50	63	80	100
A	28.5	28.5	35.5	39.5	45	55	65	80	100	120
AF	6	8	10	10	12	12	12	12	16	20
AM	16	20	22	22	22	22	24	24	32	40
B	9.9	9.9	12	15.6	19.8	23.3	29.7	35.4	46	56.6
C	18	18	22	26	34	40.5	49	59.5	77	94
D	2.3	3.2	3.8	3.8	4.5	4.5	6	6	8	10
F	3	3	4	5	5	5	6	6	8	10
FB	M 3	M 3	M 4	M 5	M 5	M 5	M 6	M 6	M 8	M 10
KF	M 3	M 4	M 5	M 5	M 6	M 6	M 8	M 8	M 10	M 12
KK	M6X1	M8X1.25	M10X1.25	M10X1.25	M10X1.25	M10X1.25	M12X1.25	M12X1.25	M16X1.5	M20X1.5
L1	10.5	10.5	12.5	13.5	16	16.5	19.5	19.5	22	24
MF	6	6	8	8	10	10	12	12	14	14
MN	5	5	6	6	8	8	10	10	12	12
WH	4.5	4.5	4.5	5.5	6	6.5	7.5	7.5	8	10
ZA	38	38	38	39.5	44.5	45.5	45.5	50	56	66.5
ZB	20	25	50	50	50	50	75	75	80	80

**Front and rear flanges**

Ordering code

ISO  
**1500.Ø.03F**  
steel

UNITOP  
**1580.Ø.03F**  
steel

**1580.Ø.03/1F**  
aluminium

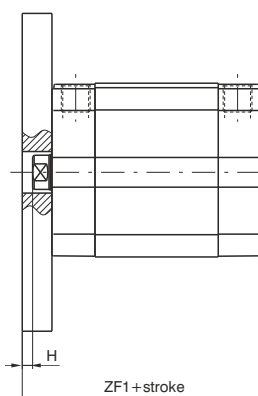
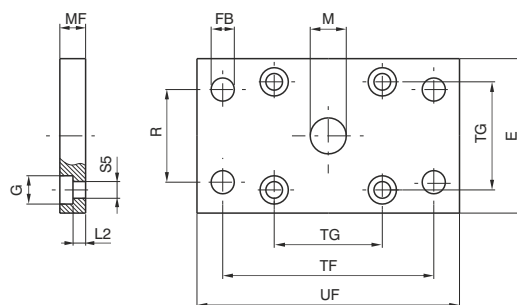
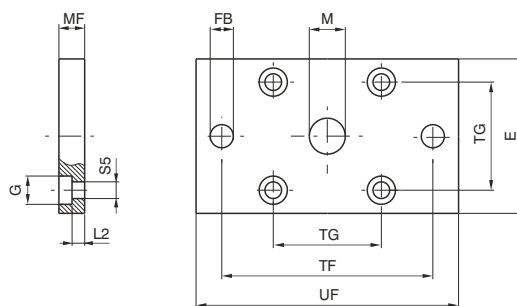


For bores from 12 to 25

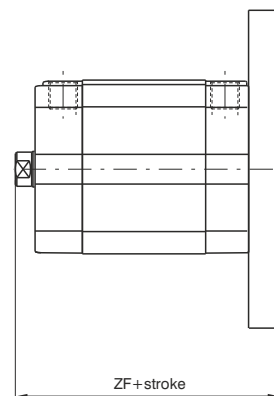


For bores from 32 to 100

Plate which allows anchorage of the cylinder at a right angle to the plane. It is made with zinc-plated extruded steel or with aluminium.



Front

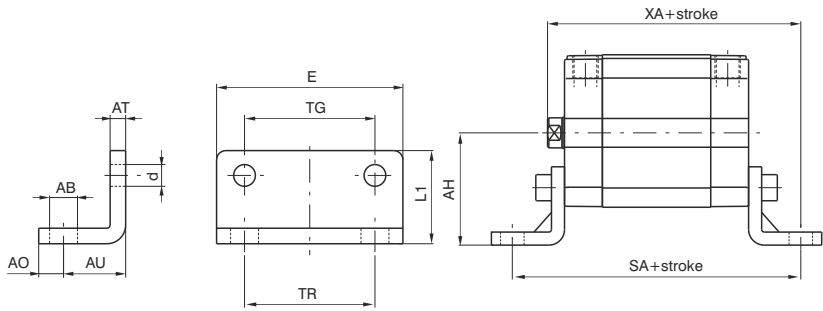
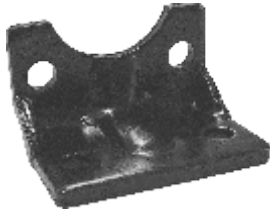


Rear

	ISO Dimensions						UNITOP Dimensions									
	32	40	50	63	80	100	12-16	20	25	32	40	50	63	80	100	
Bore	32	40	50	63	80	100	12-16	20	25	32	40	50	63	80	100	
E	45	52	65	75	95	115	29	36	40	50	60	68	87	107	128	
S5 (H13)	6,6	6,6	9	9	11	11	4,5	5,5	5,5	6,6	6,6	9	9	11	11	
FB(H13)	7	9	9	9	12	14	5,5	6,6	6,6	7	9	9	9	12	14	
G	10,5	11	15	15	18	18	9	10	10	11	11	15	15	18	18	
H	4	3,5	4,5	4,5	8	6	5,5	5,5	4,5	4	3,5	4,5	7,5	7	5	
L2	5	5	6,5	6,5	8	8	4,6	4,6	4,6	3,6	3,6	3,4	6,4	4,4	4,4	
M(H11)	30	35	40	45	45	55	10	12	12	14	14	18	18	23	28	
MF(JS14)	10	10	12	12	16	16	10	10	10	10	10	12	15	15	15	
R(JS14)	32	36	45	50	63	75	/	/	/	32	36	45	50	63	75	
TF(JS14)	64	72	90	100	126	150	43	55	60	65	82	90	110	135	163	
TG	32,5	38	46,5	56,5	72	89	18	22	26	32	42	50	62	82	103	
UF	80	90	110	120	150	170	55	70	76	80	102	110	130	160	190	
ZF	60,5	62	65	69,5	80	92,5	52,5	52,5	55	60,5	62	65	72,5	79	91,5	
ZF1	54,5	55,5	57,5	62	72	82,5	48	48	49,5	54,5	55,5	57,5	65	71	81,5	
Weight gr.	Steel	160	250	480	620	1430	1970	100	170	210	270	430	600	1210	1810	2610
	Aluminium	/	/	/	/	/	/	35	60	70	90	150	210	420	630	900

**Foot**

Ordering code  
*ISO*  
**1500.Ø.05/1F**  
(1 piece)  
*UNITOP*  
**1580.Ø.05/1F**  
(1 piece)

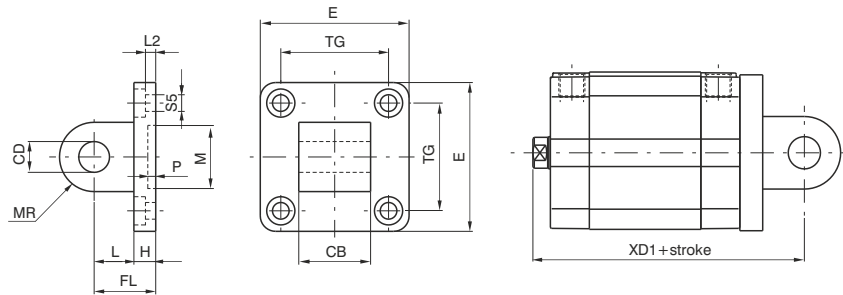
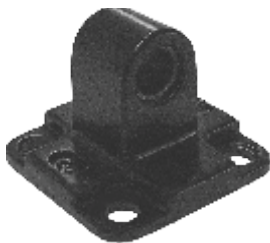


Element used to anchor the cylinder parallel to the mounting plane. They are made with stamped and pierced sheet metal black painted.

	ISO Dimensions						UNITOP Dimensions								
Bore	32	40	50	63	80	100	12-16	20	25	32	40	50	63	80	100
AB (H14)	7	9	9	9	12	14	5.5	6.6	6.6	6.6	9	9	11	11	13.5
AH (JS15)	32	36	45	50	63	71	22	27	30	32	42.5	47	59.5	65.5	78
AO (±0.2)	11	8	15	13	14	16	4.5	6	6	8	8	8	12	12	12
AT	4	4	5	5	6	6	3	4	4	5	5	6	6	8	8
AU (±0.2)	24	28	32	32	41	41	13	16	16	18	20	24	27	30	33
d	7	7	9	9	11	11	4.4	5.4	5.4	6.6	6.6	9	9	11	11
E	45	52	65	75	95	115	30	36	40	50	60	68	84	102	123
L1	30	30	36	35	47	53	17.5	22	23	24	29.5	30	39	36.5	38.5
SA	92.5	101.5	109.5	114	138	148.5	64	70	71.5	80.5	85.5	93.5	104	116	132.5
TG	32.5	38	46.5	56.5	72	89	18	22	26	32	42	50	62	82	103
TR	32	36	45	50	63	75	18	22	26	32	42	50	62	82	103
XA	74.5	80	85	89.5	105	117.5	55.5	58.5	61	68.5	72	77	84.5	94	109.5
Weight gr.	50	70	120	180	320	400	20	35	45	75	100	150	250	390	500

**UNITOP rear male clevis for bores from 12 to 25**

Ordering code  
**1580.Ø.09/1F** (Aluminium)  
**1580.Ø.09/2F** (Steel)



This type of mounting allows anchorage of the cylinder both parallel and at the right angle to the plane. The cylinder rod can oscillate and self-align to the connected load. It's made with aluminium alloy black painted or with zinc plated steel (from Ø 20).

Bore	12-16	20	25
CB(h14)	12	16	16
CD (H9)	6	8	8
E (±0.5)	27	34	38
FL	16	20	20
H	6	6	6
L	10	14	14
L2 (±0.5)	2.6	2.6	2.6
M (H11)	10	12	12
MR	6	8	8
P (+0.3)	3	3	3
S5 (H13)	4.5	5.5	5.5
TG (±0.2)	18	22	26
XD1	58.5	62.5	65
Weight gr.	Steel	/	70
	Aluminium	13	25



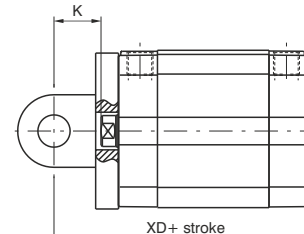
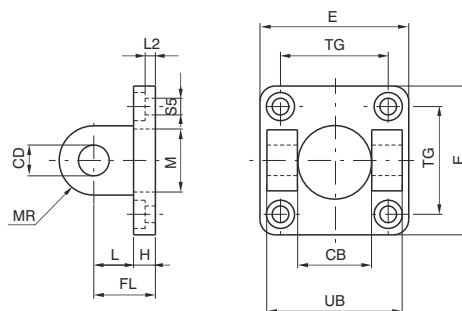
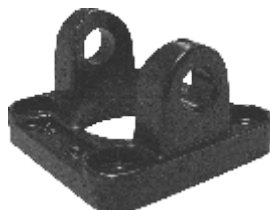
**Front female clevis for bores from 32 to 100**

Ordering code

ISO  
Aluminium  
**1500.Ø.08F**

UNITOP (Aluminium)  
**1580.Ø.11F**

UNITOP (Steel)  
**1580.Ø.13F**



This type of mounting allows anchorage of the cylinder both parallel and at the right angle to the plane. The cylinder rod can oscillate and self-align to the connected load. It's made with aluminium alloy black painted or with zinc plated steel.

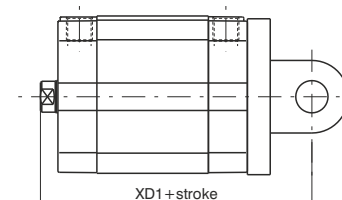
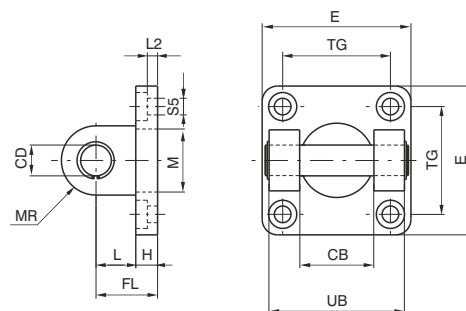
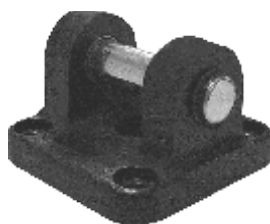
**Rear female clevis for bores from 32 to 100**

Ordering code

ISO  
Aluminium  
**1500.Ø.09F**

UNITOP (Aluminium)  
**1580.Ø.10F**

UNITOP (Steel)  
**1580.Ø.12F**



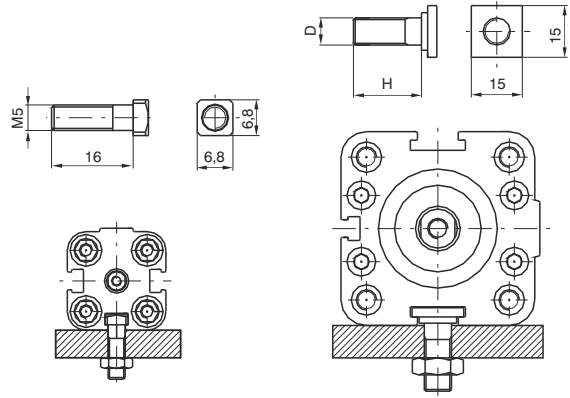
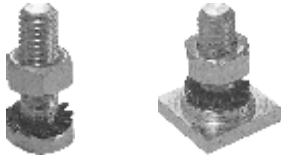
This type of mounting allows anchorage of the cylinder both parallel and at the right angle to the plane. The cylinder rod can oscillate and self-align to the connected load. It's made with aluminium alloy black painted or with zinc plated steel.

		ISO Dimensions						UNITOP Dimensions						
Bore		32	40	50	63	80	100	32	40	50	63	80	100	
CB (H14)		26	28	32	40	50	60	26	28	32	40	50	60	
CD (H9)		10	12	12	16	16	20	10	12	12	16	16	20	
E		45	52	65	75	95	115	48	58	66	83	102	123	
FL		22	25	27	32	36	41	22	25	27	32	36	41	
H		9	9	11	11	14	14	9	9	11	11	13	15	
K		16	18.5	19.5	24.5	28	31	16	18.5	19.5	24.5	28	31	
L		13	16	16	21	22	27	13	16	16	21	23	26	
L2		5.5	5.5	6.5	6.5	10	10	5.5	5.5	6.5	6.5	10	10	
M		30	35	40	45	45	55	14	14	18	18	23	28	
MR		10	12	12	16	16	20	10	12.5	12.5	15	15	20	
S5		6.6	6.6	9	9	11	11	6.6	6.6	9	9	11	11	
TG		32.5	38	46.5	56.5	72	89	32	42	50	62	82	103	
UB		45	52	60	70	90	110	45	52	60	70	90	110	
XD		66.5	70.5	72.5	82	92	107.5	66.5	70.5	72.5	82	92	107.5	
XD1		72.5	77	80	89.5	100	117.5	72.5	77	80	89.5	100	117.5	
Weight gr.	Steel	Front	/	/	/	/	/	/	180	310	420	700	1240	2210
		Rear	/	/	/	/	/	/	220	360	480	830	1390	2500
	Alum.	Front	40	70	120	170	360	570	65	110	145	240	430	770
		Rear	80	120	180	300	500	860	80	125	170	290	480	865

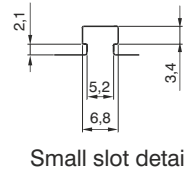
**Slot fixing screws**

Ordering code

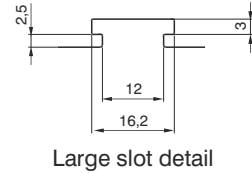
- 1500.17F** small slot (from Ø12 to Ø50)
- 1500.15F** large slot (Ø32)
- 1500.16F** large slot (from Ø40 to Ø63)
- 1500.18F** large slot (from Ø80 to Ø100)



*Example of mounting with square head screws*



Small slot detail



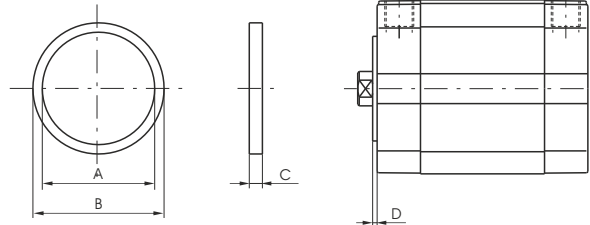
Large slot detail

Bore	12 - 50	32	40 - 63	80 - 100
D	/	M6	M8	M10
H	/	15	20	25
Weight gr.	8	10	18	25

**Centering rings**

Ordering code

**1580.Ø.02F**



This aluminium ring allows the center assembling of the cylinder.

Bore	32	40	50	63	80	100
A	25	30	35	40	40	50
B (e11)	30	35	40	45	45	55
C	3,5	3,5	3,5	4,5	5,5	5,5
D	1,5	1,5	1,5	2	2,5	2,5
Weight gr.	2	2	3	4	5	6

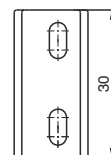
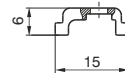
**Sensor adapter**

Ordering code

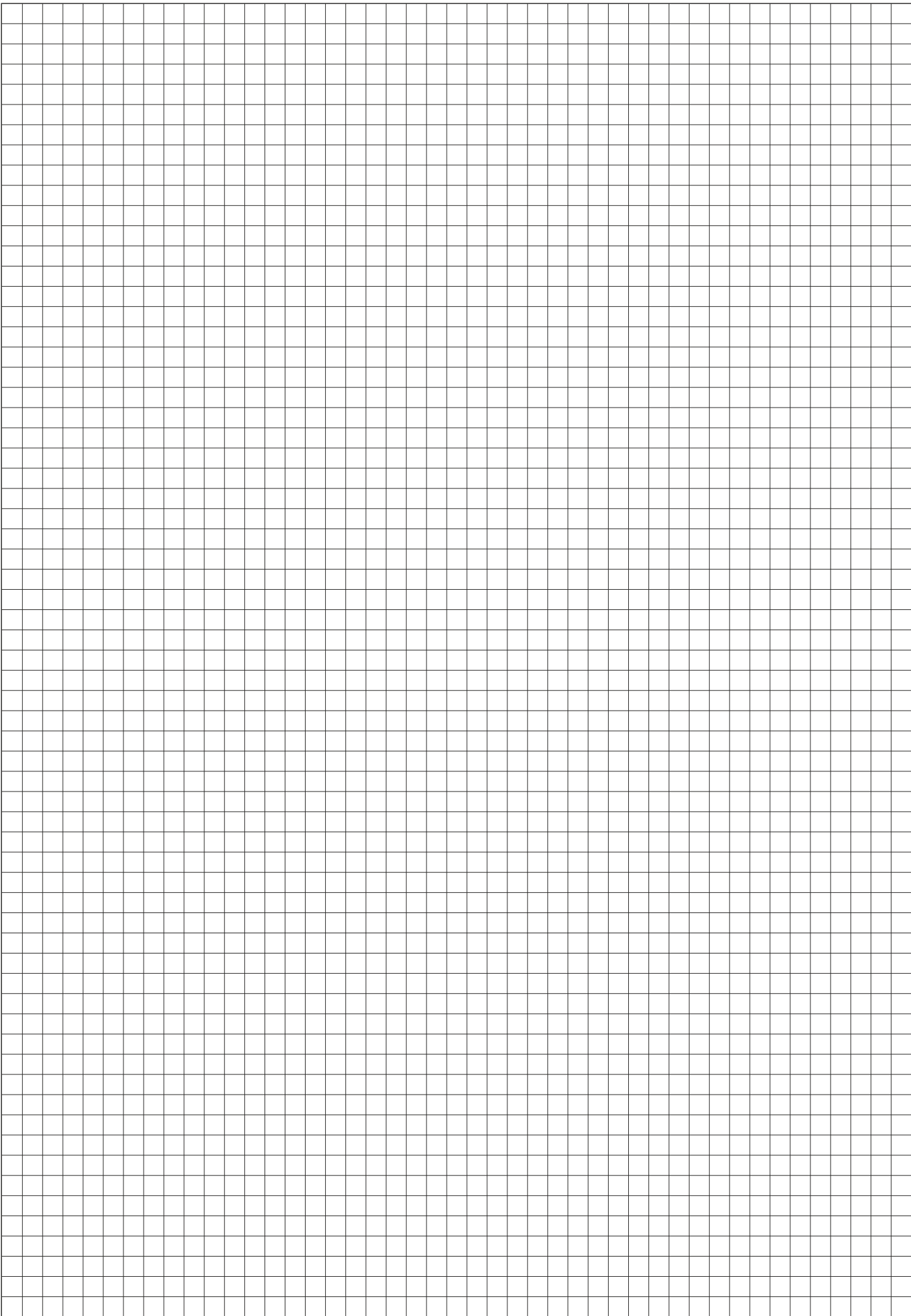
**1380.01F**



Weight gr. 2



Nylon accessory for sensor mounting 1580.\_, MRS.\_, MHS.\_ inside "A" shape.



**General**

These cylinders are built according to ISO 21287 standards. New barrel profile has two sensor slots on the three sides (Ø20 and Ø25 one slot) suitable for sensors 1580.\_, MRS.\_, MHS.\_ series housing, without need for adaptors. Versions with end stroke adjustable pneumatic cushioning are also available, allowing adjustments to deceleration and keeping the required overall dimensions according to ISO 21287. For fixing operation is possible to use the four threaded holes on the end covers, or screws in body holes, alternatively all the fixing devices of UNITOP RU-P/6-P/7 (Ø20 and Ø25) and ISO 15552 (from Ø32 to Ø100) series.

**Construction characteristics**

Body	anodised aluminium
End cap	aluminium alloy casting painted
Bearing piston rod	sintered bronze
Piston rod	from Ø20 to Ø25 stainless steel from Ø32 to Ø100 C43 chromed (on request stainless steel)
Piston	from Ø20 to Ø40 acetal resin (aluminium on request), Ø50 and Ø100 aluminium (with FPM seals, aluminium piston for all standard diameters)
Seals	Standard: NBR Oil resistant rubber, PUR Piston rod seals (PUR or FPM seals available upon request)
Spring	stainless steel
Fixing screws	plated zinc steel

**Technical characteristics**

Fluid	filtered and preferably lubricated air, or non-lubricated (if air is lubricated, the lubrication must be constant)
Max. pressure	10 bar
Operating temperature	-5°C - +70°C with standard seals (magnetic or non magnetic piston)
	-30°C - +80°C with PUR seals (magnetic or non magnetic piston)
	-5°C - +80°C with FPM seals (magnetic piston)
	-5°C - +150°C with FPM seals (non magnetic piston)

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device and aluminium piston)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication. Our Technical Department will be glad to help.

**Stroke tolerance, minimum and maximum spring loads and cushioning length**

Bore (mm)	Stroke tolerance (mm)	Minimum and maximum springs load (N)		Cushioning length (mm)
		min.	max.	
Ø20	+1.5 / 0 mm	10.8	19.6	/
Ø25		16.7	22.6	5
Ø32	+2 / 0 mm	19.6	25.5	6.5
Ø40		25.5	42.2	8
Ø50		44.1	96.3	7.5
Ø63		44.1	96.3	7.5
Ø80	+2.5 / 0mm	63.8	100.1	8
Ø100		107.9	193.3	12



**Standard stroke**

**DOUBLE ACTING  
BASIC version  
and PUSH/PULL ROD**

Bore	Stroke																												
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	100	125	150	160	200	250	300	320	350	400	450	500	
	<b>WITHOUT CUSHIONING DEVICE</b>																												
Ø20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø63	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø80	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	<b>WITH CUSHIONING DEVICE</b>																												
Ø20																													
Ø25					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø32					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø40					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø50					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø63					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø80					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø100					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

**DOUBLE ACTING  
PUSH/PULL ROD  
BORED version**

Bore	Stroke																															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	25	30	35	40	45	50	55	60	65	70	75	80				
	<b>WITHOUT CUSHIONING DEVICE</b>																<b>WITH CUSHIONING DEVICE</b>															
Ø20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø63	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø80	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																

**DOUBLE ACTING version  
WITH NON-ROTATING DEVICE**

Bore	Stroke																															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	25	30	35	40	45	50	55	60	65	70	75	80				
	<b>WITHOUT CUSHIONING DEVICE</b>																<b>WITH CUSHIONING DEVICE</b>															
Ø20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø63	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø80	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
Ø100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																

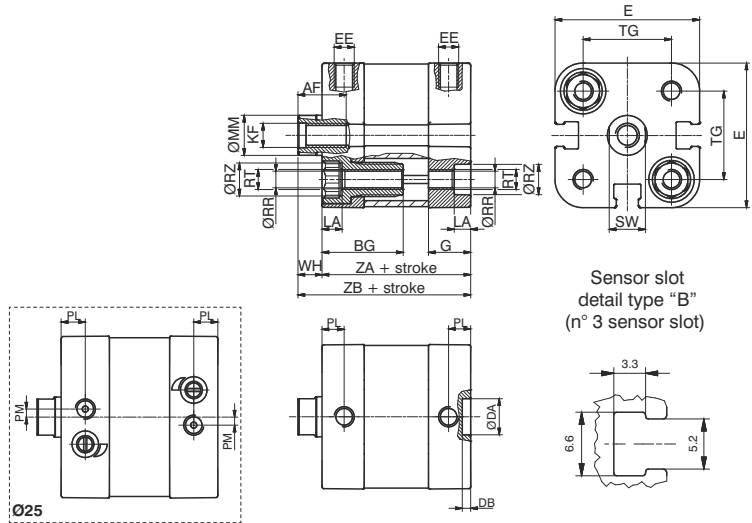
**SINGLE ACTING  
version**

Bore	Stroke				
	5	10	15	20	25
Ø20	•	•	•	•	•
Ø25	•	•	•	•	•
Ø32	•	•	•	•	•
Ø40	•	•	•	•	•
Ø50	•	•	•	•	•
Ø63	•	•	•	•	•
Ø80	•	•	•	•	•
Ø100	•	•	•	•	•

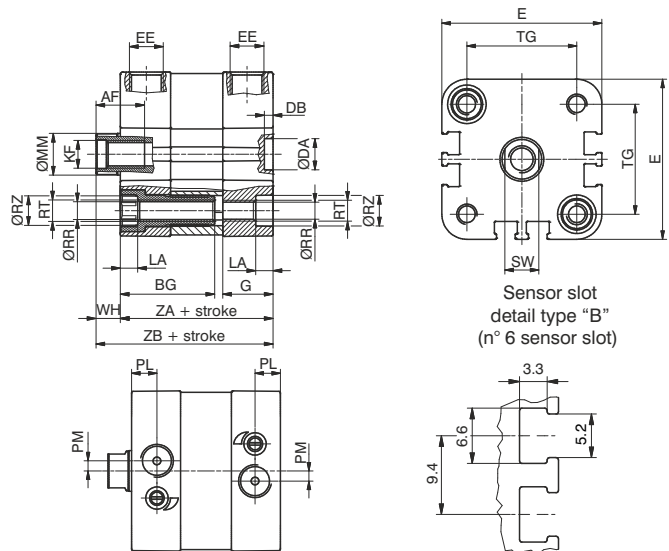
**BASIC version  
double and single acting**



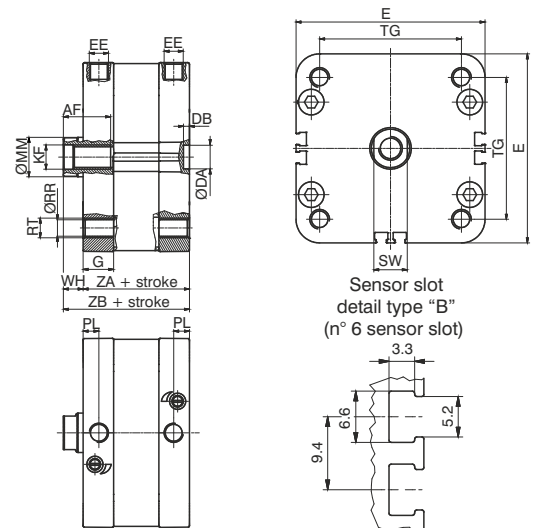
Ø20 and Ø25



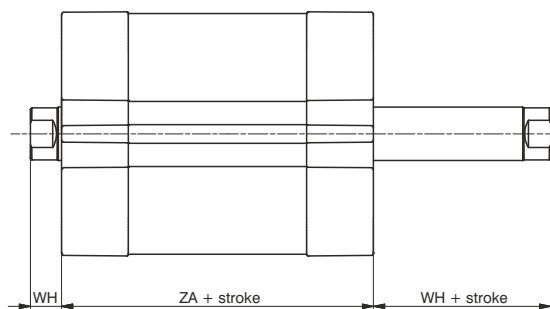
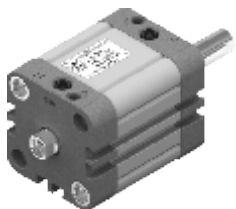
from Ø32 to Ø63



Ø80 and Ø100

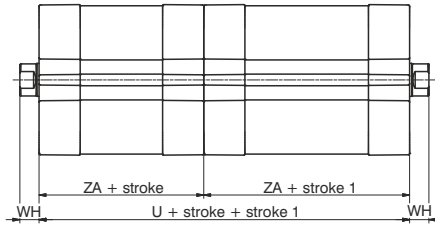


**PUSH/PULL rod version  
double and single acting**

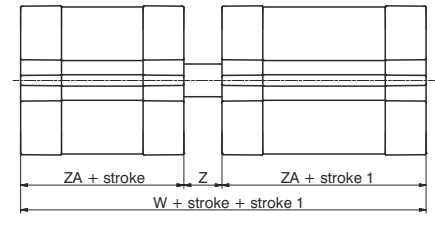
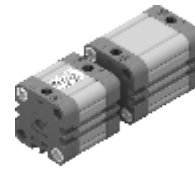




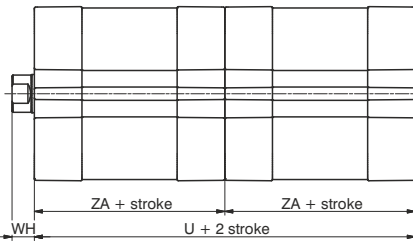
**TANDEM version**



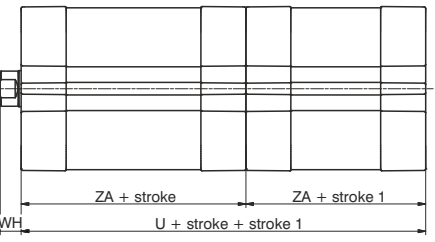
**Tandem with opposed rods**



**Opposed tandem with common rods**



**Tandem push with common rod**



**Tandem push with independent rod**

**Ordering code**

**Basic and push/pull version**

15 . Ø.stroke. . . . .

- 1 = magnetic piston, Double acting
  - 2 = magnetic piston, Single acting with front spring
  - 3 = magnetic piston, Single acting with rear spring
  - 4 = non magnetic piston, Double acting
  - 5 = non magnetic piston, Single acting with front spring
  - 6 = non magnetic piston, Single acting with rear spring
- 01 = Basic, female threaded rod
  - 02 = Basic, male threaded rod
  - 03 = through rod, female threaded rod
  - 04 = through rod, male threaded rod
  - \*\* 05 = through rod, bored female threaded rod
  - 06 = through rod, bored male threaded rod
  - 07 = with non-rotating device
  - 08 = through rod, female threaded rod, with non-rot. device on one side \*\*\*
  - 09 = through rod, male threaded rod, with non-rot. device on one side \*\*\*
- 0 = NBR seals and C43 chromed plated rod\*
  - 1 = NBR seals and stainless steel rod (starting from bore Ø32)
  - 4 = PUR seals and C43 chromed plated rod \*
  - 5 = PUR seals and stainless steel rod (starting from bore Ø32)
  - 6 = FPM seals and C43 chromed plated rod\*
  - 7 = FPM seals and stainless steel rod (starting from bore Ø32)
- \* (Ø20 and Ø25 stainless steel)
- 4 = Non-cushioned versions (mechanical cushioning only)
  - 5 = Versions with adjustable end of stroke cushioning system (from Ø25)

\*\* It is possible to order the Ø20, Ø25, Ø32 and Ø40 cylinders with an aluminium piston by replacing the '0' with 'K' in the ordering code.  
 Example: 1540.20.10.01.1 (Acetyl Resin Piston)  
 1540.20.10.K1.1 (Aluminium Piston version)  
 \*\*\* for single acting version, the spring is on the anti-rotation side

**Table of dimensions**

Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
AF (min)	12	12	14	14	18	18	24	24
BG	20	20	16	16	16	16	/	/
DA (H9) Ø	9	9	9	9	12	12	12	12
DB (+0.1/0)	2.1	2.1	2.5	2.5	2.6	2.6	3	3
E (max)	36	40.5	47.5	55	66	78	96	116
EE	M5	M5	G1/8	G1/8	G1/8	G1/8	G1/8	G1/8
G	10.5	12	14.5	15	15	15	15.5	18.5
KF	M6	M6	M8	M8	M10	M10	M12	M12
LA (0/-0.1)	4.1	4.1	5	5	5	5	/	/
MM (f 7) Ø	10	10	12	12	16	16	20	25
PL (+0.1/0)	5.5	6	7.5	8	8	8	8	8
PM	/	2	3	/	/	/	/	/
RR (min) Ø	4.1	4.1	5.1	5.1	6.6	6.6	8.4	8.4
RT	M5	M5	M6	M6	M8	M8	M10	M10
RZ (min) Ø	7.5	7.5	8.5	8.5	10.5	10.5	/	/
SW (0/-0.1)	9	9	10	10	13	13	17	22
TG (±0.2)	22	26	32.5	38	46.5	56.5	72	89
U	74	78	88	90	90	98	108	134
W	83	89	100	103	105	113	124	154
WH (±1)	6	6	7	7	8	8	10	10
Z	9	11	12	13	15	15	16	20
ZA (±0.5)	37	39	44	45	45	49	54	67
ZB (+1/0)	43	45	51	52	53	57	64	77
Weight stroke every 5mm gr.	105	110	200	270	420	550	760	1400
	10	10.5	13	17	23.5	27	37	51

**TANDEM version (magnetic pistons)**

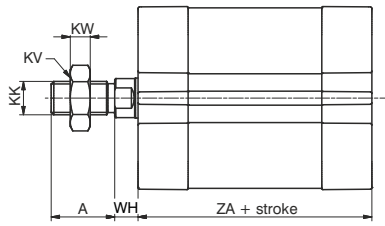
15 . Ø.stroke. (stroke 1) . . . . .

- C = female threaded rod
  - G = male threaded rod
  - H = with through rod and female threaded rod
  - R = with through rod and male threaded rod
  - N = with non-rotating device
- B = female threaded rod
  - F = male threaded rod
  - M = with non-rotating device
  - P = with through rod and female threaded rod
  - Q = with through rod and male threaded rod
- D = Opposed tandem with common rod
  - A = female threaded rod
  - E = male threaded rod
  - L = with non-rotating device on both ends
- 0 = NBR seals and C43 chromed plated rod\*
  - 1 = NBR seals and stainless steel rod (starting from bore Ø32)
  - 4 = PUR seals and C43 chromed plated rod\*
  - 5 = PUR seals and stainless steel rod (starting from bore Ø32)
  - 6 = FPM seals and C43 chromed plated rod\*
  - 7 = FPM seals and stainless steel rod (starting from bore Ø32)
- \* (Ø20 and Ø25 stainless steel)
- 4 = Non-cushioned version (mechanical cushioning only)
  - 5 = Versions with adjustable end of stroke cushioning system (from Ø25)

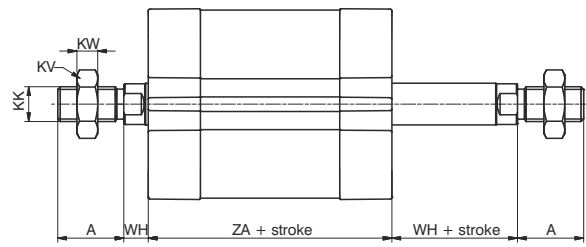
Seals compounds scheme: **NBR** oil resistant nitrilic rubber  
**PUR**: polyurethane seals **FPM**: fluoropolymer rubber seals



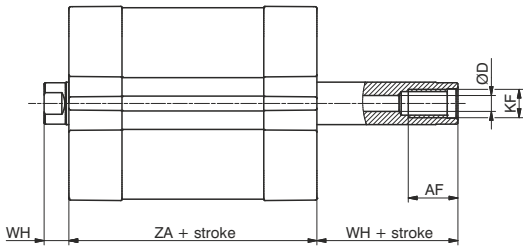
**Basic version male piston rod**



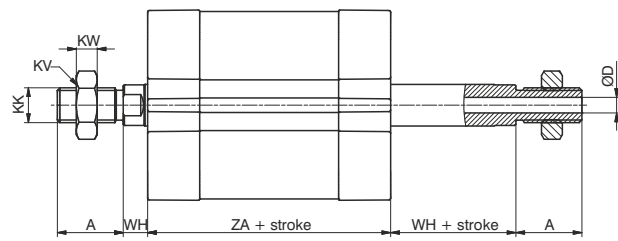
**Push/pull version male rod**



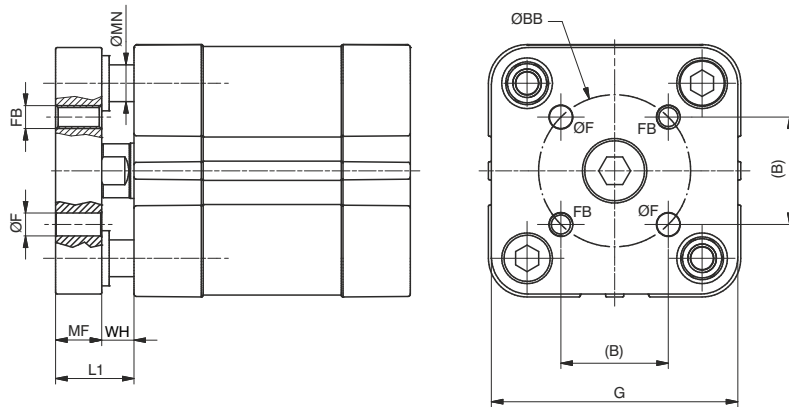
**Push - pull version bored female piston rod**



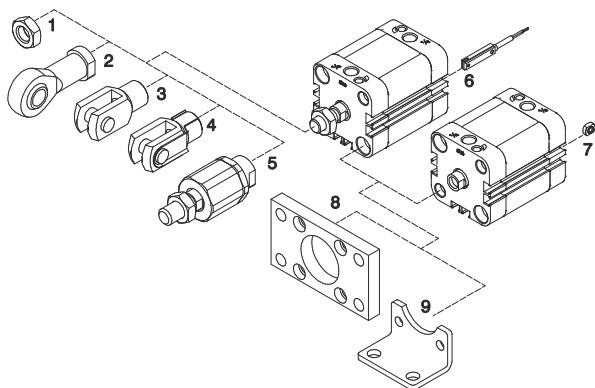
**Push - pull version bored male piston rod**



**Non-rotating version**

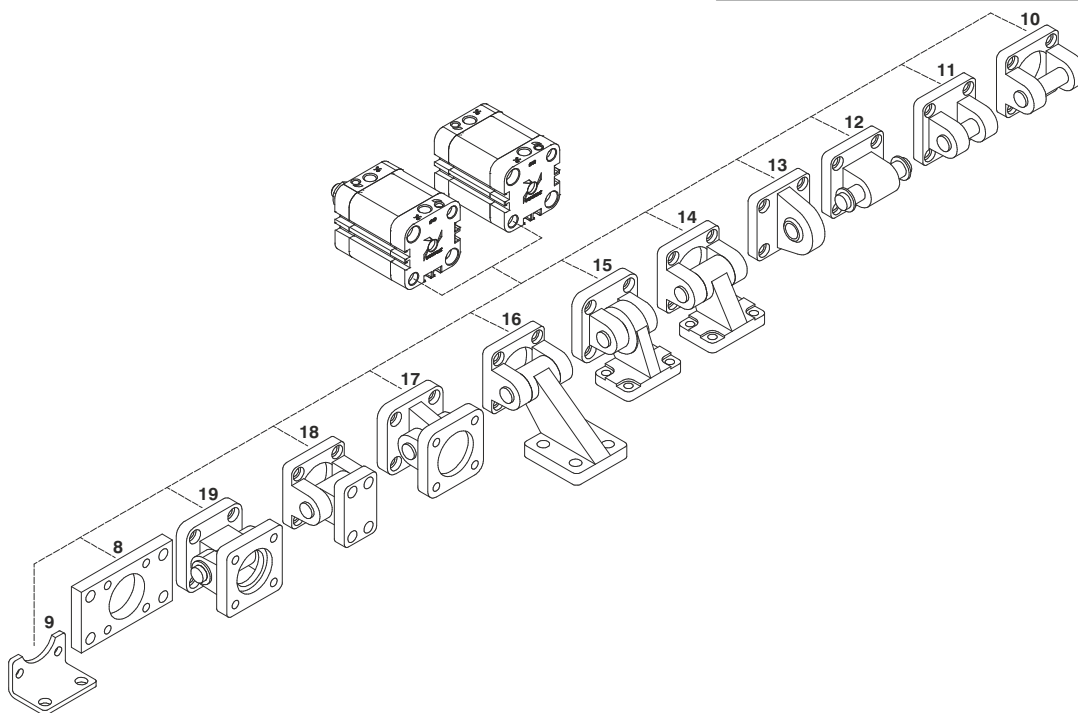


Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A (0/-0.5)	16	16	19	19	22	22	28	28
AF (min)	12	12	14	14	18	18	24	24
B	12	15.6	19.8	23.3	29.7	35.4	46	56.6
BB (±0.1) Ø	17	22	28	33	42	50	65	80
D Ø	3	3.8	4.5	4.5	6	6	8	10
F (+0.1/0) Ø	4	5	5	5	6	6	8	10
FB	M4	M5	M5	M5	M6	M6	M8	M10
G	35	39.5	45	52	65	75	95	115
KF	M6	M6	M8	M8	M10	M10	M12	M12
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
KV	13	13	17	17	19	19	24	24
KW	5	5	6	6	7	7	8	8
L1	14	14	17	17	20	20	24	24
MF (+0.1/0)	8	8	10	10	12	12	14	14
MN (f 7) Ø	6	6	8	8	10	10	12	12
WH (±1)	6	6	7	7	8	8	10	10
ZA (±0,5)	37	39	44	45	45	49	54	67



**Sensor and piston rod accessories**

Pos.	Description	Ordering code	
1	Rod lock nut	1200.20.06	(Ø20-Ø25)
		1320.32.18F	(Ø32-Ø40)
		1320.40.18F	(Ø50-Ø63)
		1320.50.18F	(Ø80-Ø100)
2	Ball joint	1200.20.32F	(Ø20-Ø25)
		1320.32.32F	(Ø32-Ø40)
		1320.40.32F	(Ø50-Ø63)
		1320.50.32F	(Ø80-Ø100)
3	Fork	1200.20.04	(Ø20-Ø25)
		1320.32.13F	(Ø32-Ø40)
		1320.40.13F	(Ø50-Ø63)
		1320.50.13F	(Ø80-Ø100)
4	Fork with clips	1200.20.04/1	(Ø20-Ø25)
		1320.32.13/1F	(Ø32-Ø40)
		1320.40.13/1F	(Ø50-Ø63)
		1320.50.13/1F	(Ø80-Ø100)
5	Self-aligning joint	1200.20.33F	(Ø20-Ø25)
		1320.32.33F	(Ø32-Ø40)
		1320.40.33F	(Ø50-Ø63)
		1320.50.33F	(Ø80-Ø100)
6	Sensors	(See chapter 6 magnetic sensors)	
7	Valves direct mounting bolt	1500.20F	(Ø20 - Ø100)



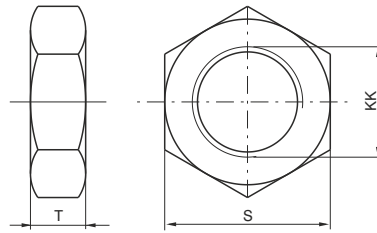
**Fixing**

Pos.	Description	Ordering code	
		Aluminium	Steel
8	Flange (MF2)	/	1540.Ø.03F (Ø20 - Ø25)
		/	1380.Ø.03F (Ø32 - Ø100)
9	Foot (MS1)	/	1540.Ø.05/1F (Ø20 - Ø100)
10	Rear female clevis (MP2)	1380.Ø.09F (Ø32 - Ø100)	1320.Ø.20F (Ø32 - Ø100)
11	Narrow rear female trunnion (AB6)	1380.Ø.30F (Ø32 - Ø100)	1320.Ø.29F (Ø32 - Ø100)
		1580.Ø.09/1F (Ø20 - Ø25)	1580.Ø.09/2F (Ø20 - Ø25)
12	Rear male clevis (MP4)	1380.Ø.09/1F (Ø32 - Ø100)	1320.Ø.21F (Ø32 - Ø100)
		1380.Ø.15F (Ø32 - Ø100)	1320.Ø.25F (Ø32 - Ø100)
13	Rear male clevis (with jointed head - MP6)	1380.Ø.15F (Ø32 - Ø100)	1320.Ø.25F (Ø32 - Ø100)
14	Square angle trunnion (AB7)	1380.Ø.35F (Ø32 - Ø100)	1320.Ø.23F (Ø32 - Ø100)
15	Square angle trunnion (with jointed head)		1320.Ø.27F (Ø32 - Ø100)
16	Square angle trunnion (not specified by ISO 15552)	1380.Ø.11F (Ø32 - Ø100)	/
17	Standard trunnion (with jointed head)	1380.Ø.36F (Ø32 - Ø100)	1320.Ø.26F (Ø32 - Ø100)
18	Standard trunnion (not specified by ISO 15552)	1380.Ø.10F (Ø32 - Ø100)	/
19	Complete standard trunnion	/	1320.Ø.22F (Ø32 - Ø100)

**Rod lock nut**

Ordering code

Ø20-Ø25: **1200.20.06**  
 Ø32-Ø40: **1320.32.18F**  
 Ø50-Ø63: **1320.40.18F**  
 Ø80-Ø100: **1320.50.18F**

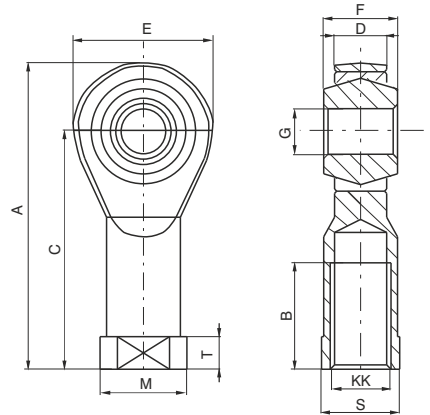


Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
S	13	13	17	17	19	19	24	24
T	5	5	6	6	7	7	8	8
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
Weight gr.	12	12	15	15	20	20	20	20

**Ball joint**

Ordering code

Ø20-Ø25: **1200.20.32F**  
 Ø32-Ø40: **1320.32.32F**  
 Ø50-Ø63: **1320.40.32F**  
 Ø80-Ø100: **1320.50.32F**

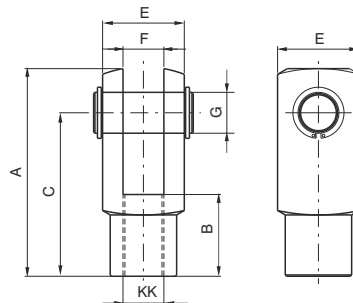
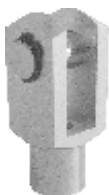


Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	48	48	57	57	66	66	85	85
B	16	16	20	20	22	22	28	28
C	36	36	43	43	50	50	64	64
D (-0.1)	9	9	10.5	10.5	12	12	15	15
E	24	24	28	28	32	32	42	42
F	12	12	14	14	16	16	21	21
G (H7)	8	8	10	10	12	12	16	16
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
M	16	16	19	19	22	22	27	27
S	14	14	17	17	19	19	22	22
T	5	5	6.5	6.5	6.5	6.5	8	8
Weight gr.	46	46	76	76	110	110	220	220

**Fork**

Ordering code

Ø20-Ø25: **1200.20.04**  
 Ø32-Ø40: **1320.32.13F**  
 Ø50-Ø63: **1320.40.13F**  
 Ø80-Ø100: **1320.50.13F**



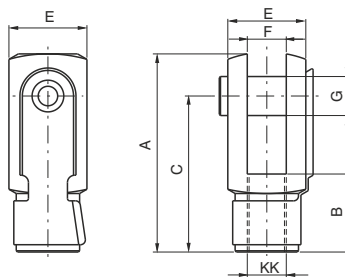
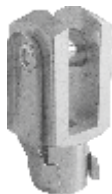
Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	42	42	52	52	62	62	83	83
B	16	16	20	20	24	24	32	32
C	32	32	40	40	48	48	64	64
E	16	16	20	20	24	24	32	32
F (B12)	8	8	10	10	12	12	16	16
G	8	8	10	10	12	12	16	16
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
Weight gr.	45	45	100	100	140	140	340	340



**Fork with clips**

Ordering code

Ø20-Ø25: **1200.20.04/1**  
 Ø32-Ø40: **1320.32.13/1F**  
 Ø50-Ø63: **1320.40.13/1F**  
 Ø80-Ø100: **1320.50.13/1F**

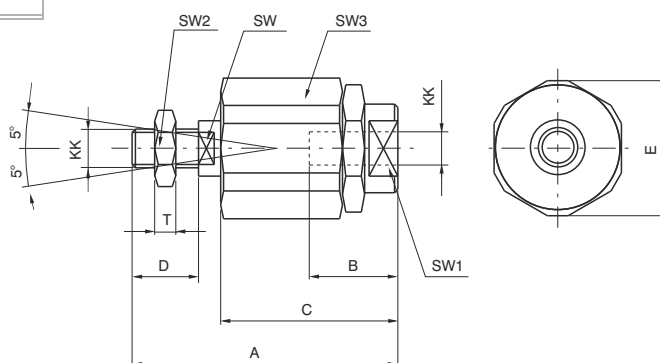


Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	42	42	52	52	62	62	83	83
B	16	16	20	20	24	24	32	32
C	32	32	40	40	48	48	64	64
E	16	16	20	20	24	24	32	32
F (B12)	8	8	10	10	12	12	16	16
G	8	8	10	10	12	12	16	16
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
Weight gr.	45	45	100	100	140	140	340	340

**Self-aligning joint**

Ordering code

Ø20-Ø25: **1200.20.33F**  
 Ø32-Ø40: **1320.32.33F**  
 Ø50-Ø63: **1320.40.33F**  
 Ø80-Ø100: **1320.50.33F**

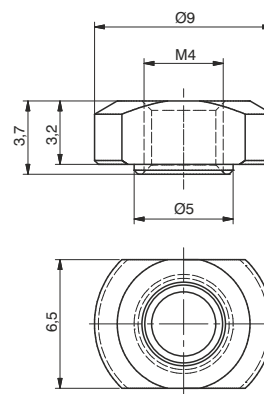


Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	57	57	71	71	75	75	103	103
B	20	20	20	20	20	20	32	32
C	33	33	46	46	46	46	63	63
D	20	20	20	20	24	24	32	32
E	19	19	32	32	32	32	45	45
KK	M8x1.25	M8x1.25	M10x1.25	M10x1.25	M12x1.25	M12x1.25	M16x1.5	M16x1.5
SW	7	7	12	12	12	12	20	20
SW1	11	11	19	19	19	19	27	27
SW2	13	13	17	17	19	19	24	24
SW3	17	17	30	30	30	30	41	41
T	5	5	6	6	7	7	8	8
Weight gr.	60	60	220	220	230	230	660	660

**Valves direct mounting nut**

Ordering code

**1500.20.F**

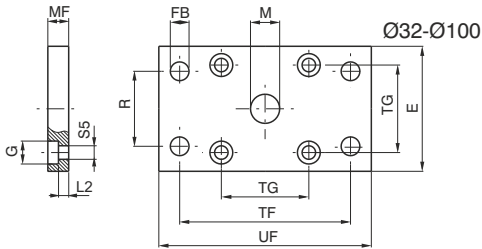
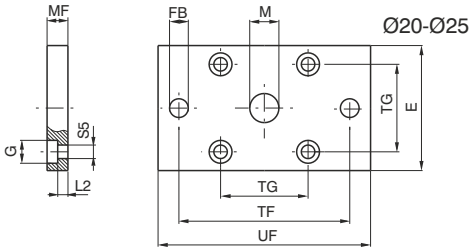
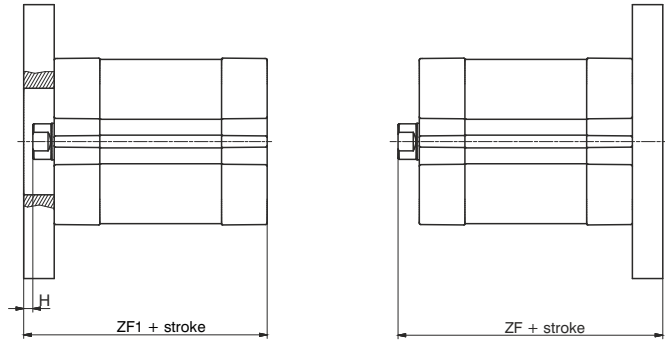


**Flange (MF2)**

Ordering code

Ø20-Ø25: **1540.Ø.03F**  
Ø32-Ø100: **1380.Ø.03F**

The kit comprises:  
n°1 flange (plated zinc steel)  
n°4 screws (plated zinc steel)



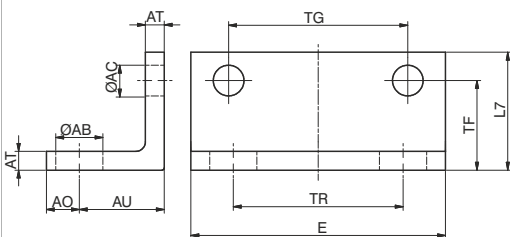
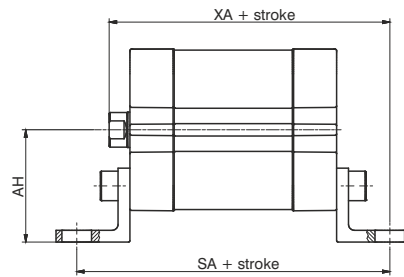
Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
E	35	40	45	52	65	75	95	115
FB (H 13)	6.6	6.6	7	9	9	9	12	14
G	9.5	9.5	10.5	10.5	15	15	18	18
M (H 11)	16	16	30	35	40	45	45	55
MF (JS 14)	8	8	10	10	12	12	16	16
R (JS 14)	/	/	32	36	45	50	63	75
TF (JS 14)	55	60	64	72	90	100	126	150
TG	22	26	32.5	38	46.5	56.5	72	89
UF	70	75	80	90	110	120	150	170
ZF	51	53	130	145	155	170	190	205
ZF1	45	47	54	55	57	61	70	83
H	2	2	3	3	4	4	6	6
L2	3	3	5	5	6.5	6.5	8	8
S5	5.5	5.5	6.6	6.6	9	9	11	11
Weight gr.	125	160	190	250	480	620	1430	1990

**Foot (MS1)**

Ordering code

**1540.Ø.05/1F**

The kit comprises:  
n°1 foot (plated zinc steel)  
n°2 screws (plated zinc steel)



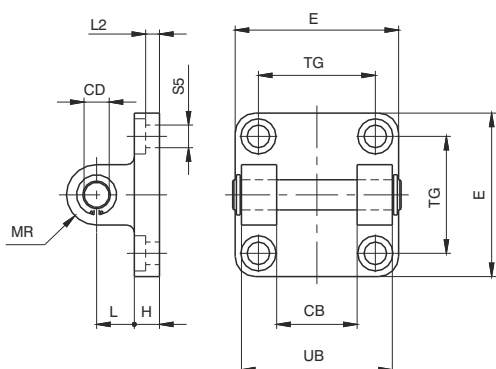
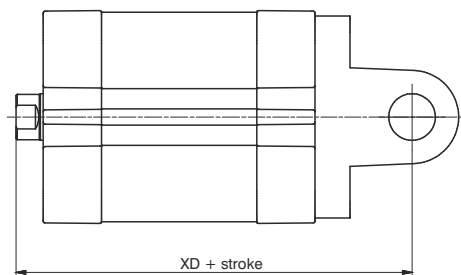
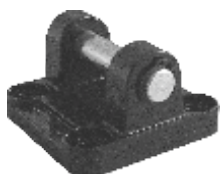
Bore	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
AB (H 14)	7	7	7	10	10	10	12	14.5
AC	5.5	5.5	6.5	6.5	8.5	8.5	10.5	10.5
AH	27	29	33.5	38	45	50	63	74
AO (max)	7	7	7	7	9	9	11	13
AT (±0.5)	4	4	4	4	5	5	6	6
AU (±0.2)	16	16	16	18	21	21	26	27
E (max)	35.5	39.5	46.5	54	65	77	95	115
L7	20	20	25	25	30	30	40	45
TF (±0.1)	16	16	17.25	19	21.75	21.75	27	29.5
TG (±0.2)	22	26	32.5	38	46.5	56.5	72	89
TR (JS 14)	22	26	32	36	45	50	63	75
SA	69	71	76	81	87	91	106	121
XA	59	61	67	70	74	78	90	104
Weight gr.	40	45	60	70	130	160	300	405

**Rear female clevis (MP2)**

Ordering code

The kit comprises:  
n°1 clevis (steel or painted aluminium)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel)  
n°2 circlips (steel)

Aluminium: **1380.Ø.09F**  
Steel: **1320.Ø.20F**



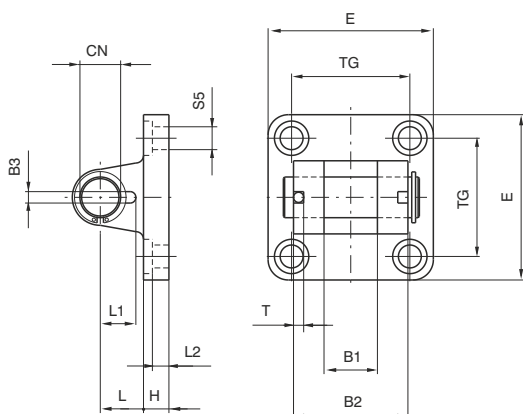
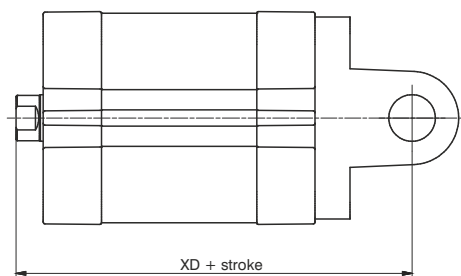
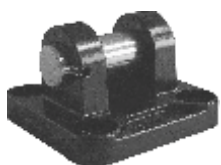
Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CB (H 14)	26	28	32	40	50	60
CD	10	12	12	16	16	20
E	Aluminium	45	52	65	75	95
	Steel	45	55	65	75	95
H	Aluminium	9	9	11	11	14
	Steel	10	10	10	12	14
L	Aluminium	13	16	16	21	22
	Steel	12	15	17	20	22
MR	10	12	12	16	16	20
TG	32.5	38	46.5	56.5	72	89
UB (h14)	45	52	60	70	90	110
XD	73	77	80	83	100	118
L2(±0.5)	5.5	5.5	6.5	6.5	10	10
S5	6.6	6.6	9	9	11	11
Weight	Aluminium	80	130	185	310	530
	Steel	180	290	400	670	1160
gr.						

**Narrow rear female trunnion (AB6)**

Ordering code

The kit comprises:  
n°1 clevis (plated zinc steel or painted)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel) complete with elastic pin and ring

Aluminium: **1380.Ø.30F**  
Steel: **1320.Ø.29F**



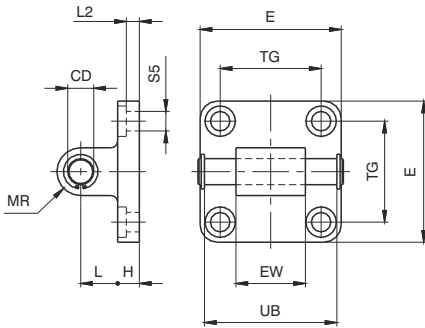
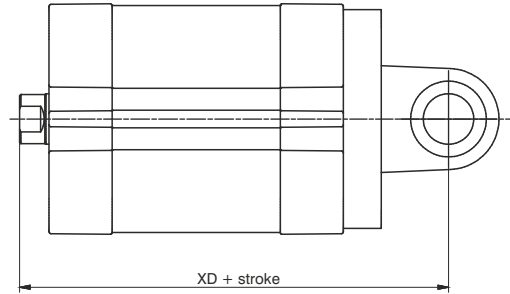
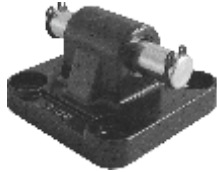
Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
B1 (H 14)	14	16	21	21	25	25
B2 (d 12)	34	40	45	51	65	75
B3 (±0.2)	3.3	4.3	4.3	4.3	4.3	6.3
CN	10	12	16	16	20	20
E	Aluminium	45	52	65	75	95
	Steel	45	55	65	75	95
H	Aluminium	9	9	11	11	14
	Steel	10	10	10	12	14
L	Aluminium	13	16	16	21	22
	Steel	12	15	17	20	22
L1	11.5	12	14	14	16	16
L2 (±0.5)	5.5	5.5	6.5	6.5	10	10
S5	6.6	6.6	9	9	11	11
T	3	4	4	4	4	4
TG	32.5	38	46.5	56.5	72	89
XD	73	77	80	89	100	118
Weight	Aluminium	70	115	200	290	570
	Steel	160	270	370	670	1110
gr.						

**Rear male clevis (MP4)**

Ordering code

Aluminium: Ø20-Ø25: **1580.Ø.09/1F**  
 Ø32-Ø100: **1380.Ø.09/1F**  
 Steel: Ø20-Ø25: **1580.Ø.09/2F**  
 Ø32-Ø100: **1320.Ø.21F**

The kit comprises:  
 n°1 clevis (steel or painted aluminium)  
 n°4 screws (plated zinc steel)  
 n°1 pin (plated zinc steel) ★  
 n°2 circlips (steel)  
 ★(from Ø32)



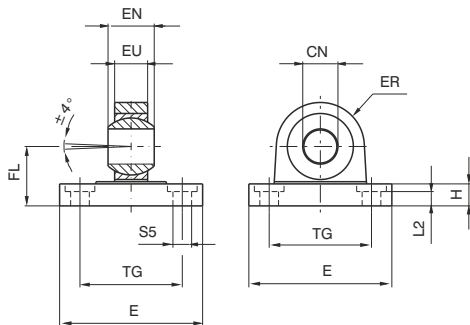
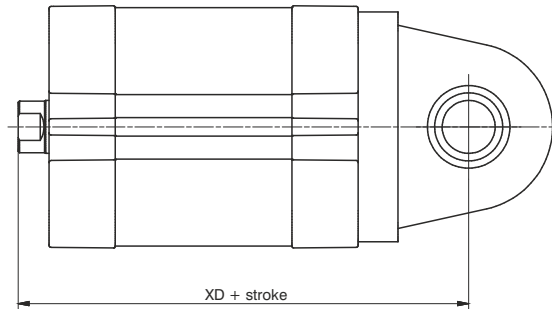
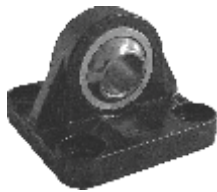
Bore		Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CD		8(H9)	8(H9)	10	12	12	16	16	20
E	Aluminium	34	38	45	52	65	75	95	115
	Steel	34	38	45	55	65	75	95	115
EW		16(h14)	16(h14)	26 <sup>(-0.2)</sup> <sub>(-0.6)</sub>	28 <sup>(-0.2)</sup> <sub>(-0.6)</sub>	32 <sup>(-0.2)</sup> <sub>(-0.6)</sub>	40 <sup>(-0.2)</sup> <sub>(-0.6)</sub>	50 <sup>(-0.2)</sup> <sub>(-0.6)</sub>	60 <sup>(-0.2)</sup> <sub>(-0.6)</sub>
H	Aluminium	6	6	9	9	11	11	14	14
	Steel	/	/	10	10	10	12	14	16
L	Aluminium	14	14	13	16	16	21	22	27
	Steel	/	/	12	15	17	20	22	25
MR		8	8	10	12	12	16	16	20
TG		22	26	32,5	38	46,5	56,5	72	89
UB <sup>(±0.5)</sup>		/	/	46	53	61	71	91	111
XD		63	65	73	77	80	89	100	118
L2 (±0.5)		2,6	2,6	5,5	5,5	6,5	6,5	10	10
S5		5,5	5,5	6,6	6,6	9	9	11	11
Weight gr.	Aluminium	25	28	90	130	190	340	580	960
	Steel	70	80	210	330	430	810	1350	2400

**Rear male clevis (with jointed head MP6)**

Ordering code

Aluminium: **1380.Ø.15F**  
 Steel: **1320.Ø.25F**

The kit comprises:  
 n°1 clevis (steel or painted aluminium)  
 n°4 screws (plated zinc steel)



Bore		Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CN (H 7)		10	12	16	16	20	20
E	Aluminium	45	52	65	75	95	115
	Steel	45	55	65	75	95	115
EN (-0.1)		14	16	21	21	25	25
ER	Aluminium	16	19	21	24	28,5	30
	Steel	15	18	20	23	27	30
EU		10,5	12	15	15	18	18
FL (JS 15)		22	25	27	32	36	41
H	Aluminium	9	9	11	11	14	14
	Steel	10	10	10	12	14	16
L2 (±0.5)		5,5	5,5	6,5	6,5	10	10
S5		6,6	6,6	9	9	11	11
TG		32,5	38	46,5	56,5	72	89
XD		73	77	80	89	100	118
Weight gr.	Aluminium	60	100	180	245	480	650
	Steel	210	310	400	710	1350	2400



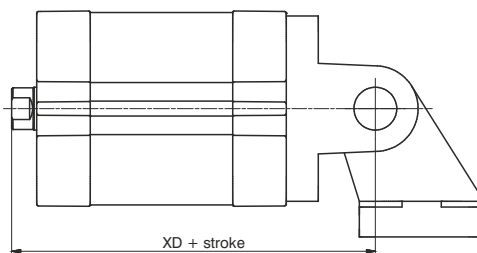
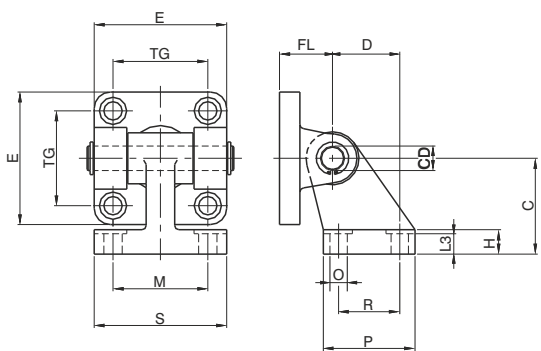


**Square angle trunnion (AB7)**

Ordering code

The kit comprises:  
n°1 clevis (steel or painted aluminium)  
n°1 counter clevis, square (steel or painted aluminium)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel)  
n°2 circlips (steel)

Aluminium: **1380.Ø.35F**  
Steel: **1320.Ø.23F**



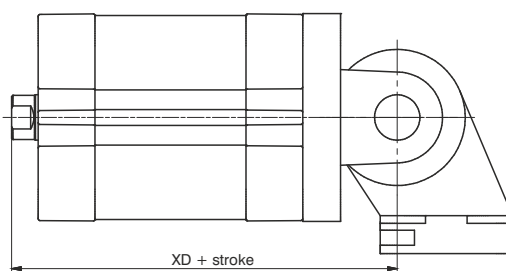
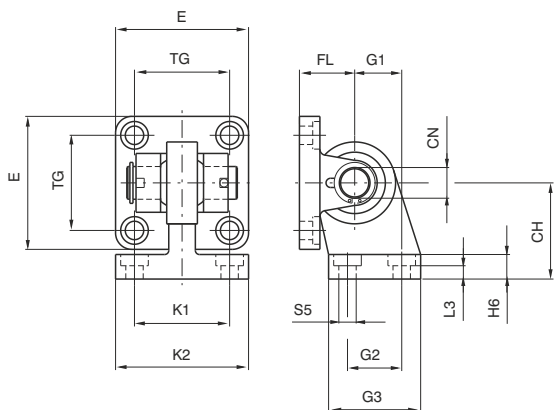
Bore		Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
E	Aluminium	45	52	65	75	95	115
	Steel	45	55	65	75	95	115
TG		32.5	38	46.5	56.5	72	89
FL		22	25	27	32	36	41
D (JS14)		21	24	33	37	47	55
CD		10	12	12	16	16	20
C (JS15)		32	36	45	50	63	71
H	Aluminium	8	10	12	14	14	17
	Steel	8	10	12	12	14	15
L3	Aluminium	6.4	8.4	10.4	12.4	11.5	14.5
	Steel	6.5	8.5	10.5	10.5	11.5	12.5
R (JS14)		18	22	30	35	40	50
P		31	35	45	50	60	70
O (H13)		6.6	6.6	9	9	11	11
S		51	54	65	67	86	96
M (JS14)		38	41	50	52	66	76
XD		73	77	80	89	100	118
Weight gr.	Aluminium	120	180	225	435	730	1220
	Steel	340	500	640	1250	2100	3500

**Square angle trunnion (with joined head)**

Ordering code

The kit comprises:  
n°1 clevis (painted steel)  
n°1 counter clevis square with joined head (painted steel)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel)  
n°2 circlips (steel)


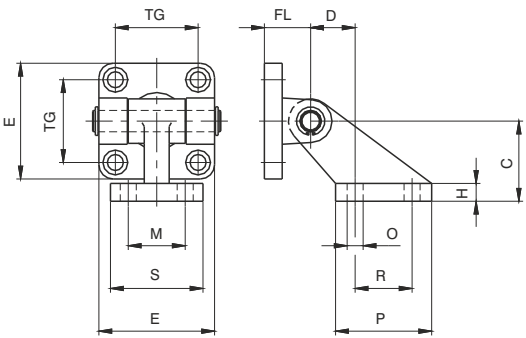
Steel: **1320.Ø.27F**



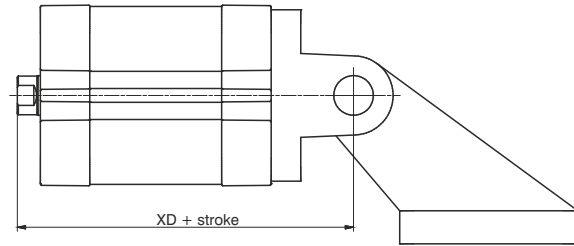
Bore		Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CH (JS 15)		32	36	45	50	63	71
CN		10	12	16	16	20	20
E		45	55	65	75	95	115
FL (JS 15)		22	25	27	32	36	41
G1 (JS 15)		21	24	33	37	47	55
G2 (JS 14)		18	22	30	35	40	50
G3		31	35	45	50	60	70
H6		10	10	12	12	14	15
K1 (JS 14)		38	41	50	52	66	76
K2		51	54	65	67	86	96
L3 (*0.5)		8.5	8.5	10.5	10.5	11.5	12.5
S5		6.6	6.6	9	9	11	11
TG		32.5	38	46.5	56.5	72	89
XD		73	77	80	89	100	118
Weight gr.		330	480	830	1220	2100	3580

**Square angle trunnion (not specified by ISO-VDMA standard)**

Ordering code	The kit comprises:
Aluminium: <b>1380.Ø.11F</b>	n°1 clevis (painted aluminium)
	n°1 counter clevis square (painted aluminium)
	n°4 screws (plated zinc steel)
	n°1 pin (plated zinc steel)
	n°2 circlips (steel)


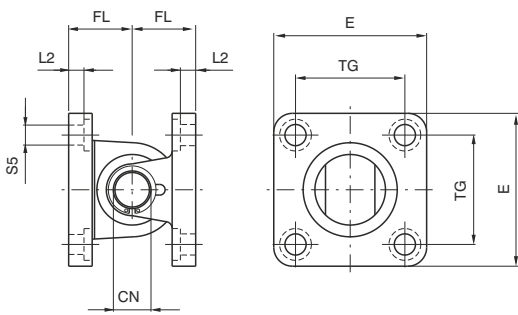



Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
C (±0.2)	32	45	45	63	63	90
D (±0.5)	18	25	25	32	32	40
E	45	52	65	75	95	115
H	8	10	10	12	12	17
FL	22	25	27	32	36	41
M (JS 14)	25	32	32	40	40	50
TG	32.5	38	46.5	56.5	72	89
O (H 13)	7	9	9	11	11	14
P	37	54	54	75	75	103
R (JS 14)	20	32	32	50	50	70
S	41	52	52	63	63	80
XD	73	77	80	89	100	118
Weight gr.	130	260	330	600	820	1560

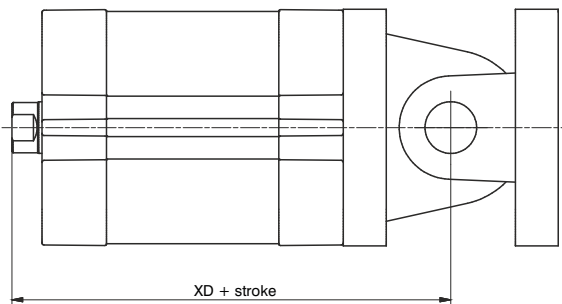


**Square angle trunnion (with joined head)**

Ordering code	The kit comprises :
Aluminium: <b>1380.Ø.36F</b> Steel: <b>1320.Ø.26F</b>	n°1 clevis (steel or painted aluminium)
	n°1 counter clevis with joined head (steel or painted aluminium)
	n°4 screws (plated zinc steel)
	n°1 pin (plated zinc steel) complete with elastic pin and ring

Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CN	10	12	16	16	20	20
E	Aluminium	45	52	65	75	95
	Steel	45	55	65	75	95
FL (JS 15)	22	25	27	32	36	41
L2 (±0.5)	5.5	5.5	6.5	6.5	10	10
S5	6.6	6.6	9	9	11	11
TG	32.5	38	46.5	56.5	72	89
XD	73	77	80	89	100	118
Weight gr.	Aluminium	130	215	380	535	1050
	Steel	380	580	770	1380	2460



Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CN	10	12	16	16	20	20
E	Aluminium	45	52	65	75	95
	Steel	45	55	65	75	95
FL (JS 15)	22	25	27	32	36	41
L2 (±0.5)	5.5	5.5	6.5	6.5	10	10
S5	6.6	6.6	9	9	11	11
TG	32.5	38	46.5	56.5	72	89
XD	73	77	80	89	100	118
Weight gr.	Aluminium	130	215	380	535	1050
	Steel	380	580	770	1380	2460

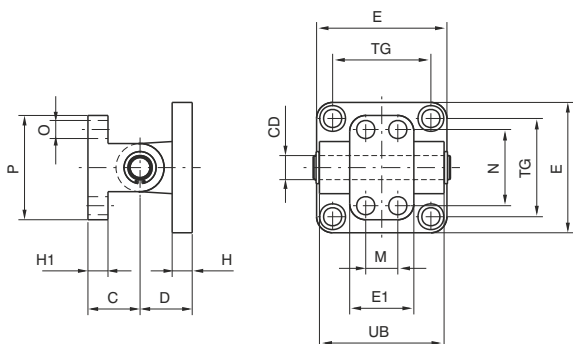
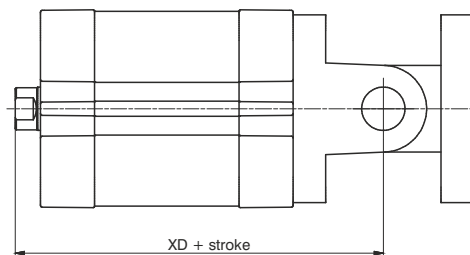


**Standard trunnion (not specified by ISO-VDMA standard)**

Ordering code

The kit comprises:  
n°1 clevis (painted aluminium)  
n°1 counter clevis (painted aluminium)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel)  
n°2 circlips (steel)

Aluminium: **1380.Ø.10F**



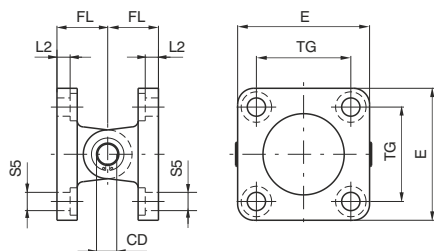
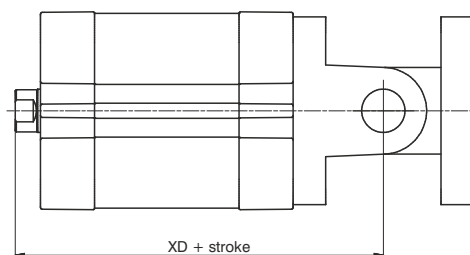
Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
C (±0.2)	18	26	26	34	34	41
CD	10	12	12	16	16	20
D	22	25	27	32	36	41
E	45	52	65	75	95	115
E1	25	32	32	46	46	56
H	10	10	12	12	16	16
H1	8	10	10	12	12	16
M (±0.2)	-	16	16	25	25	32
N (±0.2)	28	38	38	54	54	90
O	7	9	9	11	11	14
P	40	52	52	75	75	115
TG	32.5	38	46.5	56.5	72	89
UB	45	52	60	70	90	110
XD	73	77	80	89	100	118
Weight gr.	110	190	240	490	710	1290

**Complete standard trunnion**

Ordering code

The kit comprises:  
n°1 clevis (painted steel)  
n°1 counter clevis (painted steel)  
n°4 screws (plated zinc steel)  
n°1 pin (plated zinc steel)  
n°2 circlips (steel)

Steel: **1320.Ø.22F**

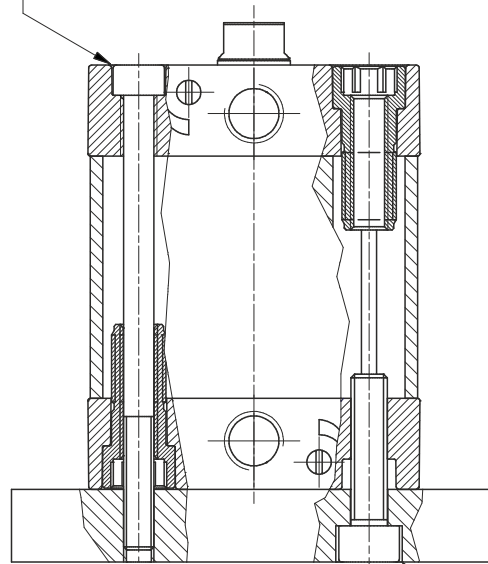


Bore	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
CD	10	12	12	16	16	20
E	45	55	65	75	95	115
FL	22	25	27	32	36	41
L2 (±0.5)	5.5	5.5	6.5	6.5	10	10
S5	6.6	6.6	9	9	11	11
TG	32.5	38	46.5	56.5	72	89
XD	73	77	80	89	100	118
Weight gr.	360	580	780	1370	2370	4110

Alternative fixing options

**Frontal mounting:**

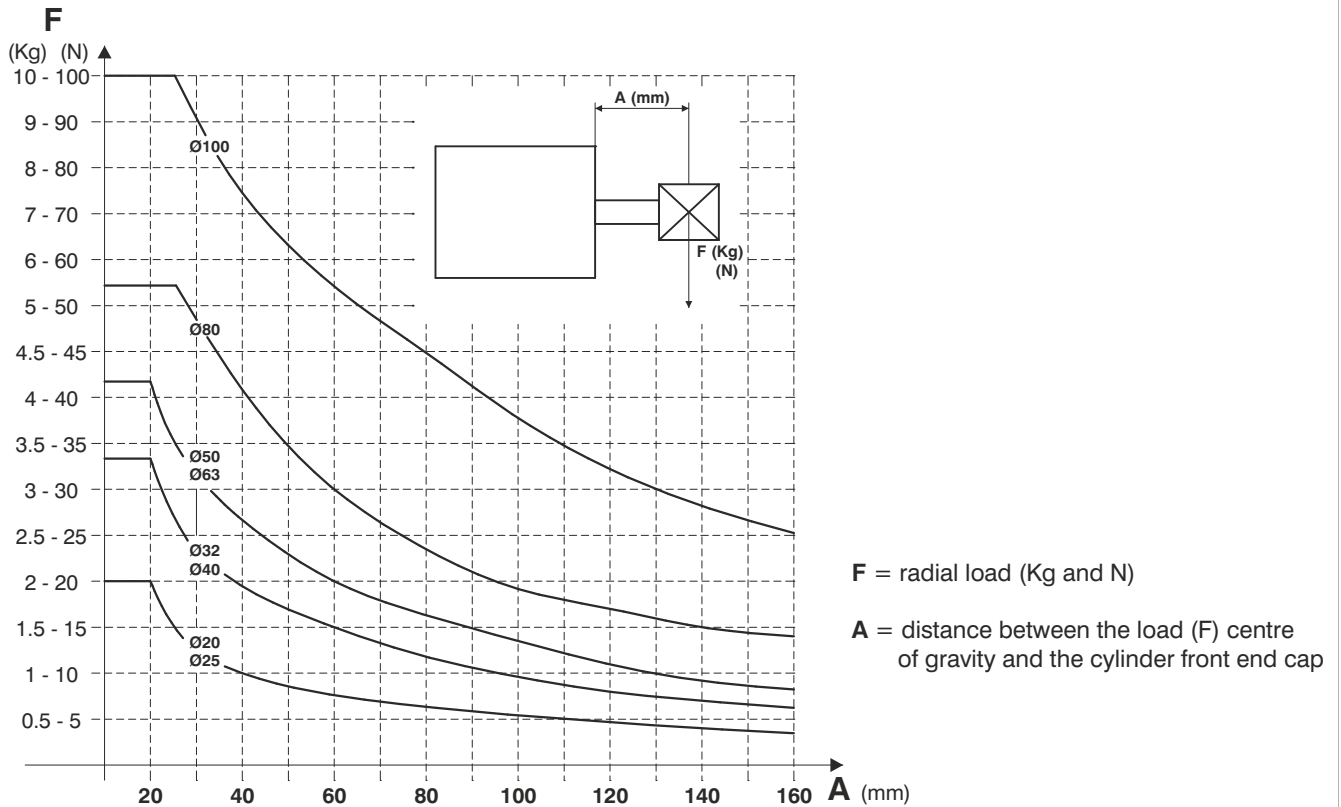
- from  $\varnothing 20$  to  $\varnothing 40$  bolt head
- the use of non-magnetic screws is recommended



Rear mounting

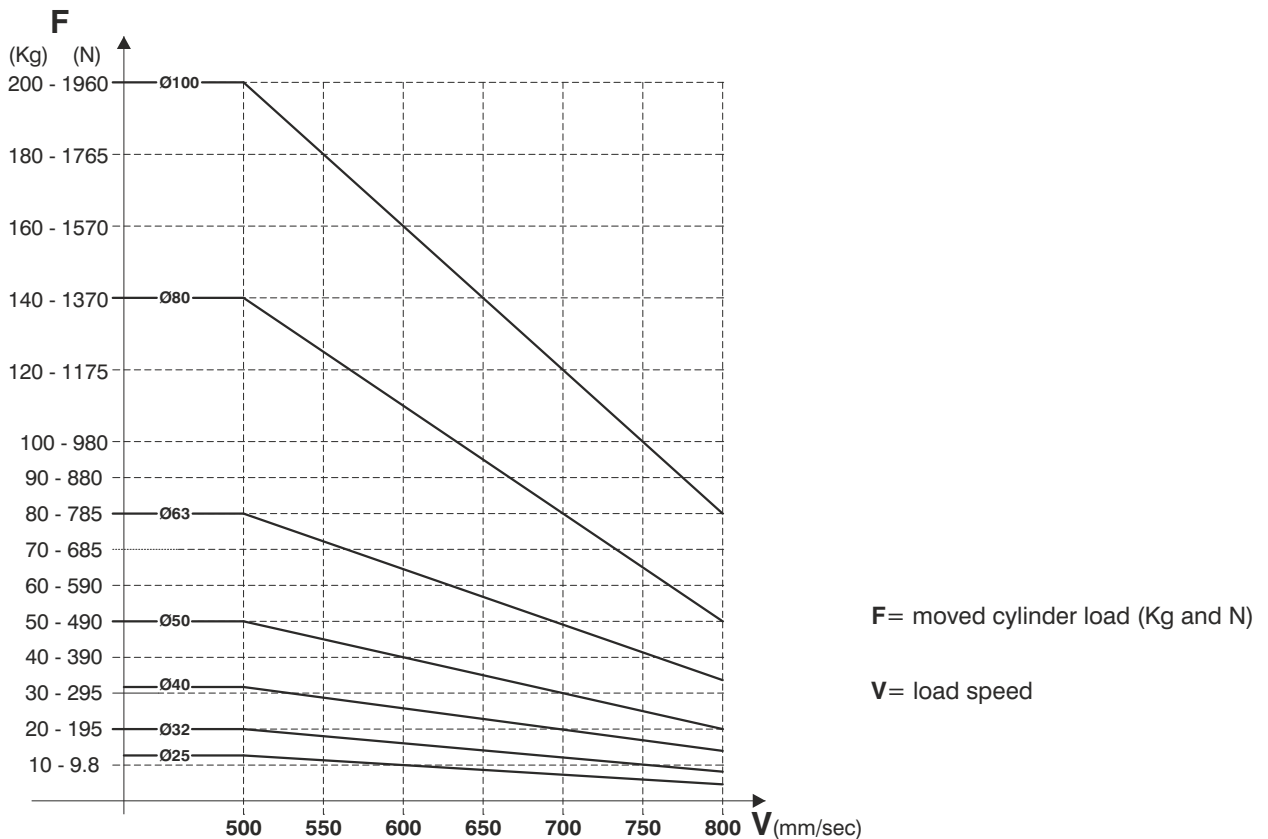


### Admissible maximum radial load diagram



The diagram shows the maximum Radial load  $F$  (in Newtons) that can be applied to the cylinder piston rod as a function of the distance  $A$  (in mm); based upon the standard version cylinder under static conditions

### End of stroke cushioning capacity diagram



The diagram shows, for each diameter, the safety curves relative to the maximum loads which can be moved by the cylinder in function of its speed  $V$ . The data has been calculated under the following test conditions: Cylinder mounted vertically with the rod pointing down, air pressure at 5 bar and with a guided load. Important: Do not exceed the recommended values in the table as reduced life or damage to the cylinder may result.

**General**

Based on the **ECOMPACT** series with piston rods and centring diameters according to ISO 15552 standard

**Construction characteristics**

Body	anodised aluminium
End caps	aluminium alloy casting painted with brass centring bearing
Bearing piston rod	spheroid bronze on steel band with P.T.F.E. coat
Piston rod	C43 chromed steel (on request stainless steel)
Piston	Ø32 and Ø40 acetal resin (aluminium on request)
	Ø50 and Ø63 aluminium (with FPM seals, aluminium for all of standard diameters)
Seals	standard: NBR oil resistant rubber, PUR piston rod seals (PUR or FPM on request)
Spring	stainless steel
Fixing screws	plated zinc steel

**Technical characteristics**

Fluid	filtered and preferably lubricated air, or non-lubricated (if air is lubricated, the lubrication must be constant)
Max. pressure	10 bar
Operating temperature	-5°C - +70°C with standard seals (magnetic or non magnetic piston)
	-30°C - +80°C with PUR seals (magnetic or non magnetic piston)
	-5°C - +80°C with FPM seals (magnetic piston) -5°C - +150°C with FPM seals (non magnetic piston)

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- correct alignment during assembly with regard to the applied load so as to avoid radial components or bending the rod.
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device and aluminium piston)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

**Stroke tolerance, minimum and maximum spring loads and cushioning length**

Bore (mm)	Stroke tolerance (mm)	Minimum and maximum spring load (N)		Cushioning length (mm)
		min.	max.	
Ø32	+2 / 0 mm	19,6	25,5	6,5
Ø40		25,5	42,2	8
Ø50		44,1	96,3	7,5
Ø63	+2,5 / 0 mm	44,1	96,3	7,5

**Standard stroke**

**DOUBLE ACTING  
BASIC and PUSH/PULL ROD version**

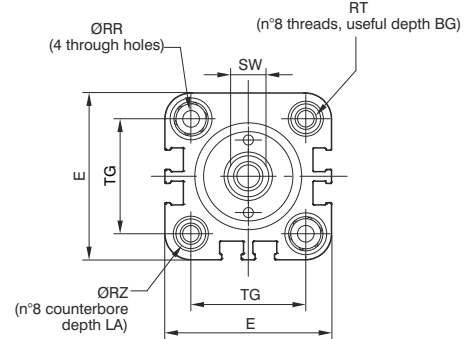
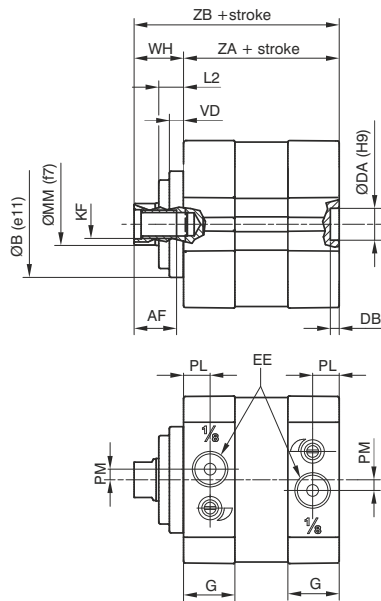
Bore	Stroke																												
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	100	125	150	160	200	250	300	320	350	400	450	500	
<b>WITHOUT CUSHIONING DEVICE</b>																													
Ø32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø63	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>WITH CUSHIONING DEVICE</b>																													
Ø32					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø40					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø50					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø63					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

**DOUBLE ACTING  
PUSH/PULL ROD  
BORED version**

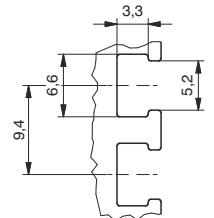
Bore	Stroke																												
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	25	30	35	40	45	50	55	60	65	70	75	80	
<b>WITHOUT CUSHIONING DEVICE</b>																<b>WITH CUSHIONING DEVICE</b>													
Ø32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ø63	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

**Available versions**

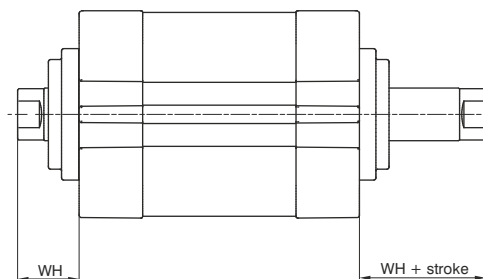
**BASIC version**



Sensor slot detail type "B" (n° 6 slots)



**PUSH/PULL rod version**





Ordering codes

15 .Ø.stroke.

- 0=NBR seals and C43 chromed plated rod
- 1=NBR seals and stainless steel rod
- 4= PUR seals and C43 chromed plated rod
- 5= PUR seals and stainless steel rod
- 6= FPM seals and C43 chromed plated rod
- 7= FPM seals and stainless steel rod

- 4= Non-cushioned version  
(mechanical cushioning only)
- 5= Versions with adjustable end  
of stroke cushioning system

- 1= Double acting, magnetic piston
- 4= Double acting, non magnetic piston

- 10= Basic, female threaded rod
- 11= Basic, male threaded rod
- 12= through rod, female threaded rod
- 13= through rod, male threaded rod
- 14= through rod, bored female threaded rod
- 15= through rod, bored male threaded rod

\*\* It is possible to order the Ø32 and Ø40 cylinders with an aluminium piston by replacing the '1' with '2' in the ordering code.  
Example: 1540.32.10.10.1 (Acetyl Resin Piston)  
1540.32.10.20.1 (Aluminium Piston version)

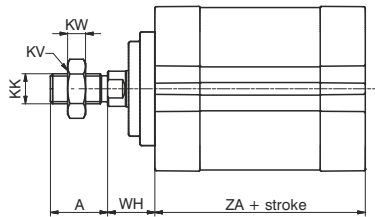
Seals compounds scheme

- NBR: oil resistant nitrilic rubber seals
- PUR: polyurethane seals
- FPM: fluoropolymer rubber seals

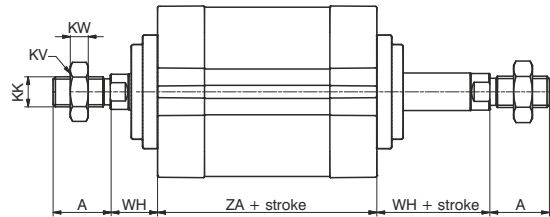
Table of dimensions

Bore	Ø32	Ø40	Ø50	Ø63
AF (min)	12	16	20	20
ØB (e11)	30	35	40	45
BG	16	16	16	16
ØDA (H9)	9	9	12	12
DB (+0,1/0)	2,5	2,5	2,6	2,6
E (max)	47,5	55	66	78
EE	G1/8"	G1/8"	G1/8"	G1/8"
G	14,5	15	15	15
KF	M8	M10	M12	M12
LA (0/-0,1)	5	5	5	5
L2	7	7	10	10
ØMM (f 7)	12	16	20	20
PL (+0,1/0)	7,5	8	8	8
PM	3	/	/	/
ØRR (min)	5,1	5,1	6,6	6,6
RT	M6	M6	M8	M8
ØRZ (min)	8,5	8,5	10,5	10,5
SW (0/-0,1)	10	13	17	17
TG (±0,2)	32,5	38	46,5	56,5
VD	4	4	5	5
WH (±1)	14	14	18	18
ZA (±0,5)	44	45	45	49
ZB (+1/0)	58	59	63	67
Weight stroke	240	330	530	700
gr. every 5mm	13	17	24	27

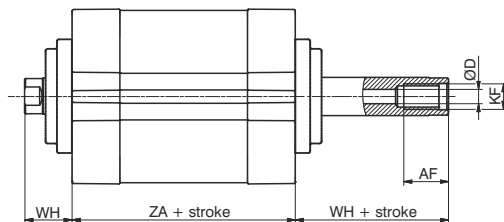
Basic version male piston rod



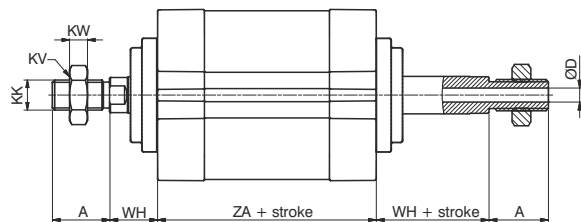
Push/pull version male rod



Push - pull version bored female piston rod

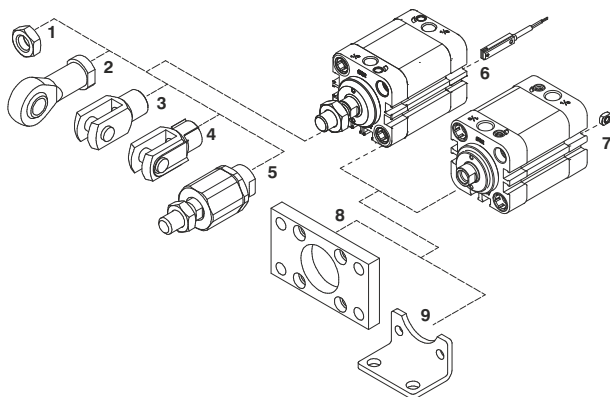


Push - pull version bored male piston rod

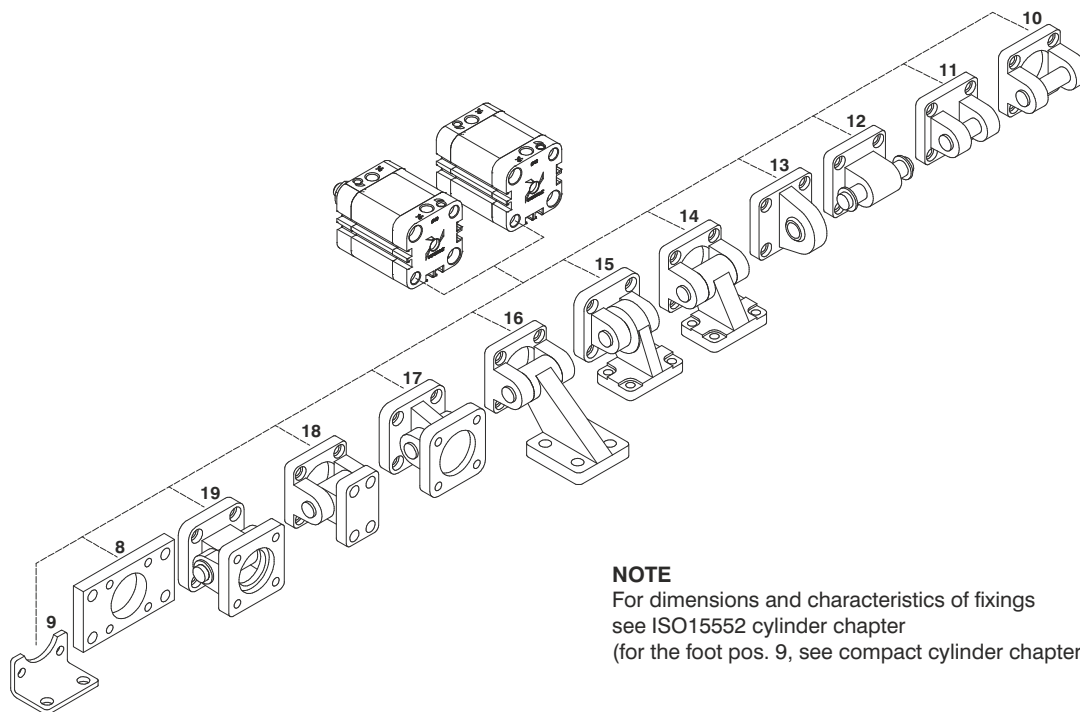


Bore	A (0/-0,5)	AF (min)	ØD	KF	KK	KV	KW	WH (±1)	ZA (±0,5)
Ø32	22	14	4,5	M8	M10x1,25	17	6	14	44
Ø40	24	18	4,5	M10	M12x1,25	19	7	14	45
Ø50	32	24	6	M12	M16x1,5	24	8	18	45
Ø63	32	24	6	M12	M16x1,5	24	8	18	49

Sensor and piston rod accessories



Pos.	Description	Ordering code	
1	Rod lock nut	1320.32.18F	(Ø32)
		1320.40.18F	(Ø40)
		1320.50.18F	(Ø50-Ø63)
2	Ball joint	1320.32.32F	(Ø32)
		1320.40.32F	(Ø40)
		1320.50.32F	(Ø50-Ø63)
3	Fork	1320.32.13F	(Ø32)
		1320.40.13F	(Ø40)
		1320.50.13F	(Ø50-Ø63)
4	Fork with clips	1320.32.13/1F	(Ø32)
		1320.40.13/1F	(Ø40)
		1320.50.13/1F	(Ø50-Ø63)
5	Self-aligning joint	1320.32.33F	(Ø32)
		1320.40.33F	(Ø40)
		1320.50.33F	(Ø50-Ø63)
6	Sensors	(See chapter 6 magnetic sensor)	
7	Valves direct mounting bolt	1500.20F	(Ø32 - Ø63)

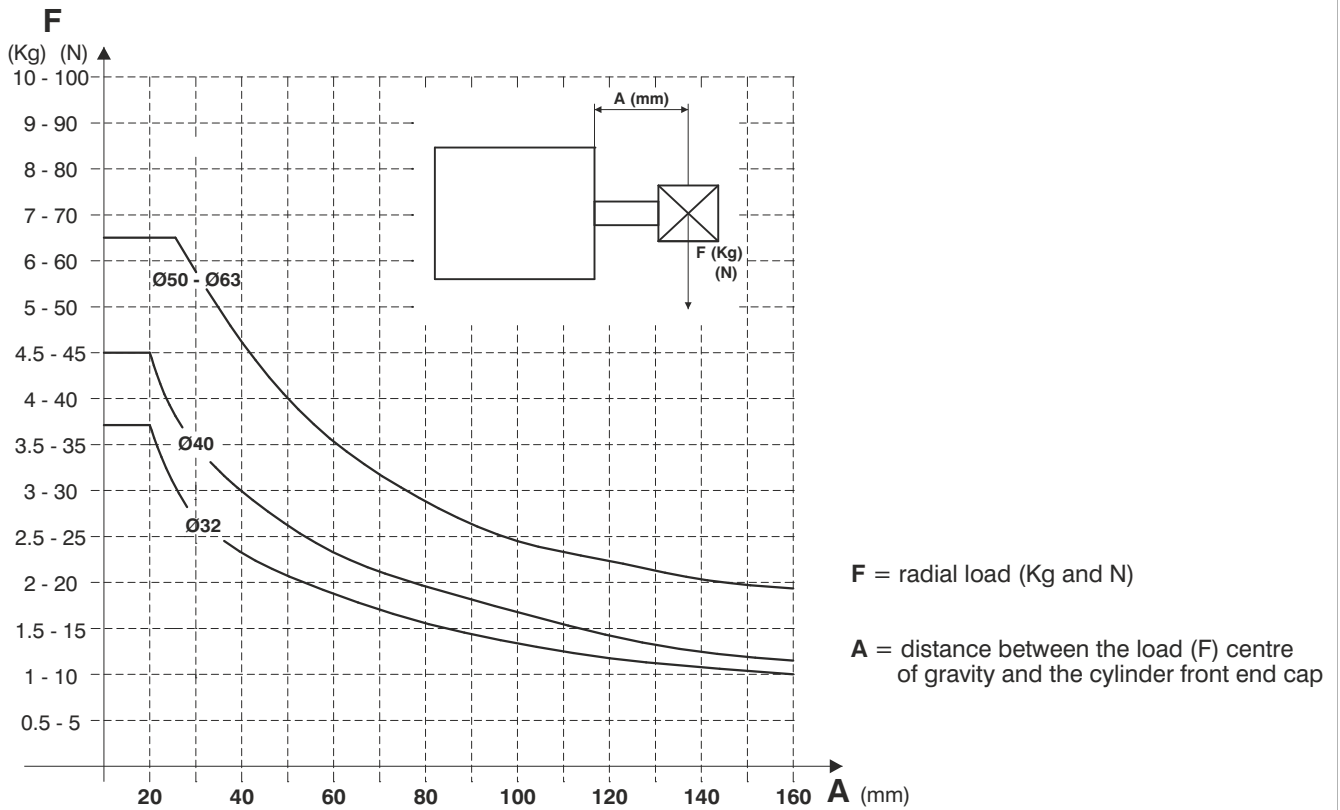


**NOTE**  
For dimensions and characteristics of fixings see ISO15552 cylinder chapter (for the foot pos. 9, see compact cylinder chapter ISO 21287).

Fixing

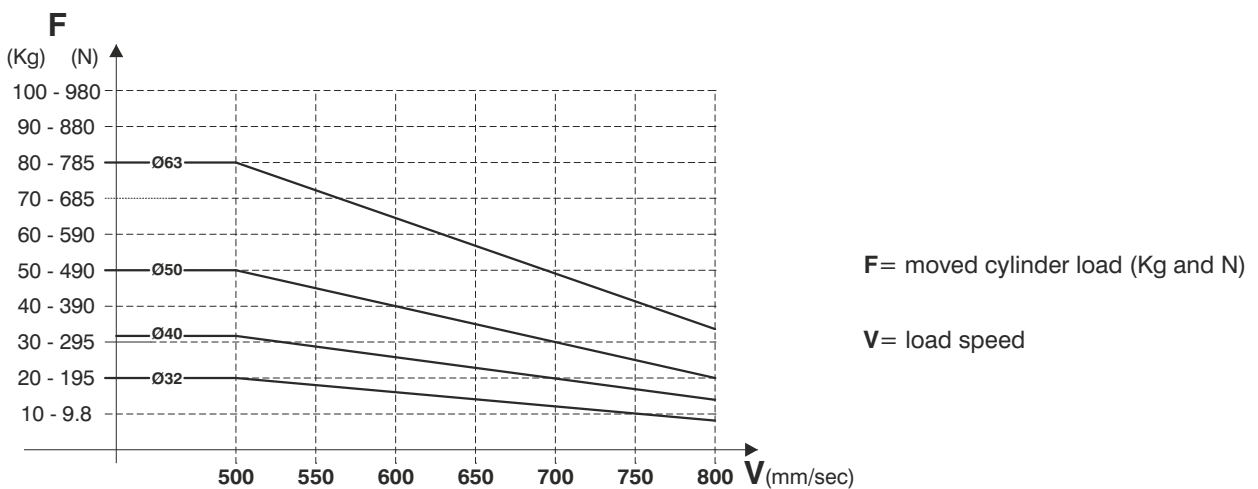
Pos.	Description	Ordering code	
		Aluminium	Steel
8	Flange (MF2)	1390.Ø.03FP	1380.Ø.03F
9	Foot (MS1)	/	1540.Ø.05/1F
10	Rear female clevis (MP2)	1380.Ø.09F	1320.Ø.20F
11	Narrow rear female clevis (AB6)	1380.Ø.30F	1320.Ø.29F
12	Rear male clevis (MP4)	1380.Ø.09/1F	1320.Ø.21F
13	Rear male clevis (with jointed head - MP6)	1380.Ø.15F	1320.Ø.25F
14	Square angle trunnion (Ab7)	1380.Ø.35F	1320.Ø.23F
15	Square angle trunnion (with jointed head)	/	1320.Ø.27F
16	Square angle trunnion (not specified by ISO 15552)	1380.Ø.11F	/
17	Standard trunnion (with jointed head)	1380.Ø.36F	1320.Ø.26F
18	Standard trunnion (not specified by ISO 15552)	1380.Ø.10F	/
19	Complete standard trunnion	1380.Ø.22F	1320.Ø.22F

### Admissible maximum radial load diagram

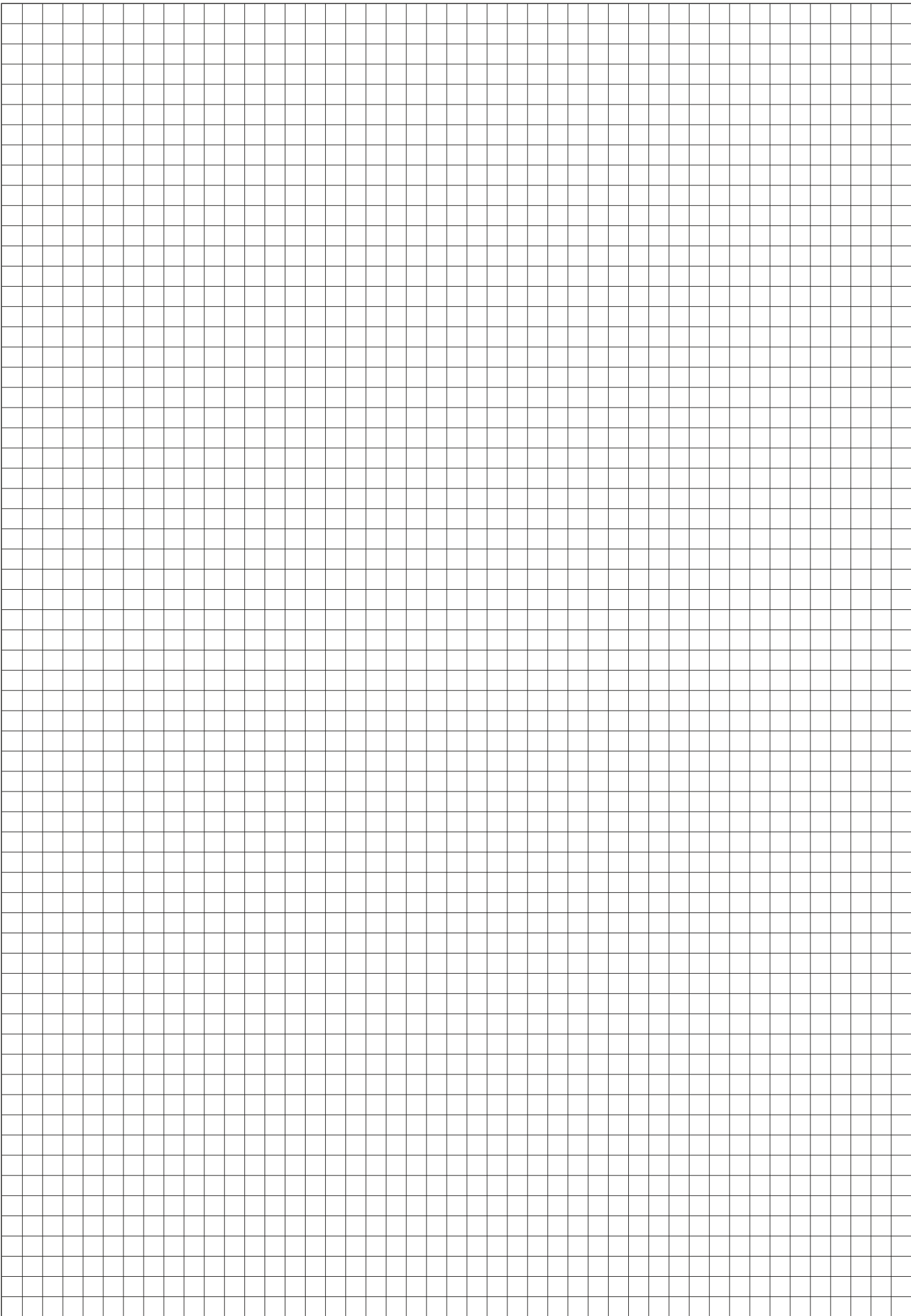


The diagram shows the maximum radial load  $F$  (in Newtons) that can be applied to the cylinder piston rod as a function of the distance  $A$  (in mm), under static conditions

### End of stroke cushioning capacity diagram



The diagram shows, for each diameter, the safety curves relative to the maximum loads which can be moved by the cylinder in function of its speed  $V$ . The data has been calculated under the following test conditions: Cylinder mounted vertically with the rod pointing down, air pressure at 5 bar and with a guided load. Important: Do not exceed the recommended values in the table as reduced life or damage to the cylinder may result.



## General

The purpose of producing a rodless cylinder is to provide a space saving option over conventional cylinders. On a traditional rod type cylinder, the total space occupied with rod out is more than double the length of the cylinder, while with rodless cylinder it is little more than its stroke. Profiled tube allows mounting of sensors 1500.\_, RS.\_, HS.\_ and 1580.\_, MRS.\_, MHS.\_ on the two sides of carriage, by means of suitable brackets. Standard accessories include foot mounting brackets for installation on cylinder and caps, intermediate mounting brackets to give support to long stroke cylinders under load (over one metre), an oscillating coupling device for installation between the mounting plate and the load and on request, a very precise external movement device.

## Construction characteristics

End covers	anodised aluminium
Barrel	anodised aluminium
Bands	tempered stainless steel
Mounting place	anodised aluminium
Piston	acetal resin
Guide blocks	acetal resin
Cushion bearings	aluminium
Piston seals	special 80 shore nitril mixture, wear resistant
Other seals	NBR oil-resistant rubber

## Technical characteristics

Fluid	filtered and lubricated air
Pressure	0.5 - 8 bar
Working temperature	-5°C - +70°C
Max. speed	1.5 m/sec. (normal working conditions)
Bores	Ø 25 - 32 - 40 - 50 - 63
Max. strokes	6 m

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- Please adequately evaluate the load involved and its direction, especially in respect to the moving carriage (also see tables for loads and admitted moments).
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO Vg32) for correct continued lubrication.

Our Technical Department will be glad to help.

For applications where a low smooth uniform operations speed is required, you must specify this on your purchase order so that we can use the proper special grease.

## Use and maintenance

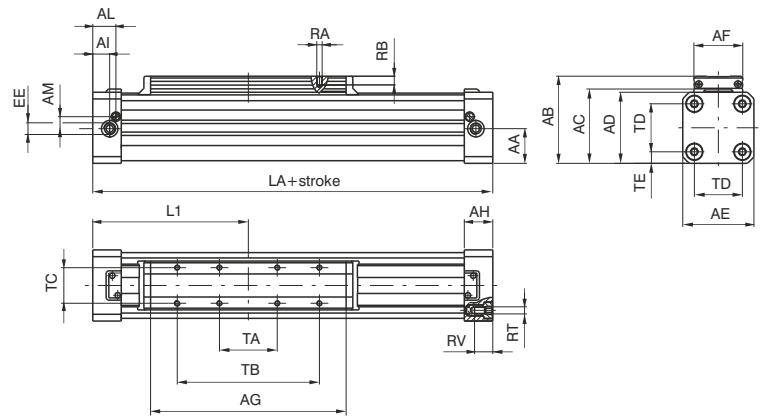
This type of cylinder, due to its characteristics, has to be used within certain criteria. Correct use will give long and troublefree operation. Filtered and lubricated compressed air reduce seal wear. Verify that the load will not produce unforeseen stresses. Never combine high speed with heavy load. Always support the long stroke cylinder with intermediate brackets and never exceed the specified working conditions.

If maintenance is required, follow the instructions supplied with the repair kit.

**Basic version**

Ordering code

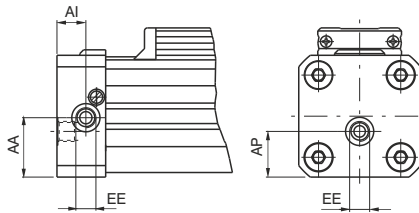
**1605.Ø.stroke.01.M**  
(Max. stroke 6 mt.)



**Left head**

Ordering code

**1605.Ø.stroke.02.M**  
(Max. stroke 6 mt.)

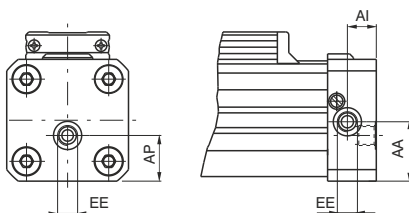


**Possibility of a single feed cylinder head**

**Right head**

Ordering code

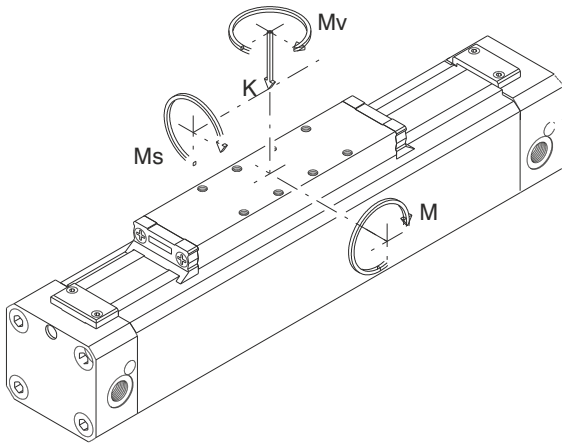
**1605.Ø.stroke.03.M**  
(Max. stroke 6 mt.)



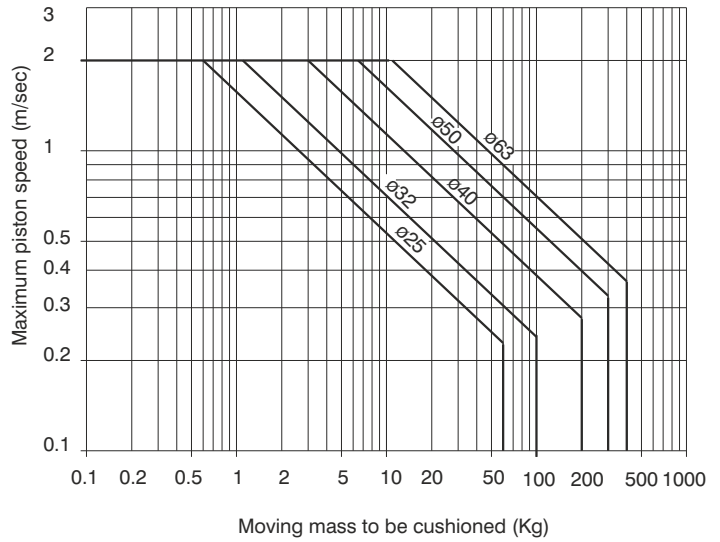
Bore	25	32	40	50	63	
AA	19,5	25,5	31	39	46,5	
AB	56	70	80	98	113,5	
AC	48,5	60	70	85	100	
AD	44	55	65	80	95	
AE	40	55	65	80	95	
AF	30	40	40	55	55	
AG	117	146	186	220	255	
AH	23	27	30	32	36	
AI	12,5	14,5	17,5	19	23	
AL	19	22,5	24,5	26	30	
AM	7,5	10,5	11,5	13,5	16	
AP	13	15,2	23	30	35,5	
EE	G1/8"	G1/4"	G1/4"	G1/4"	G3/8"	
L1	100	125	150	175	215	
LA	200	250	300	350	430	
RA	M4	M5	M5	M6	M6	
RB	7,5	9,5	9,5	11,5	11,5	
RT	M5	M6	M6	M8	M8	
RV	13,5	16,5	16,5	20,5	20,5	
TA	30	40	40	65	65	
TB	80	110	110	160	160	
TC	23	30	30	40	40	
TD	27	36	47	54	68	
TE	6,5	9,5	9	13	13,5	
Weight	stroke 0	900	1650	2650	4330	8010
gr.	every 100mm	225	340	490	725	1070

STROKE TOLERANCE: + 2 mm.

**Basic version cylinder**



**Operating end stroke decelerator diagram**



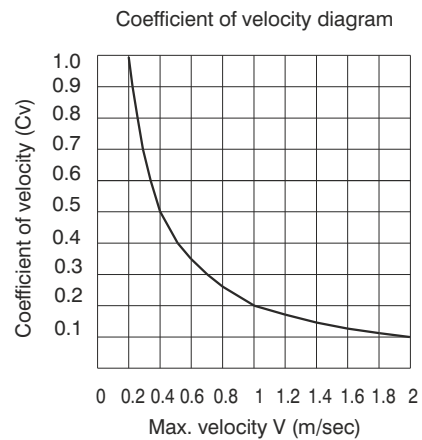
**Recommended loads and moments in static conditions**

CYLINDER BORE	DECELERATING STROKE (mm)	MAX. RECOMMENDED LOAD K (N)	MAX. RECOMMENDED BENDING MOMENT M (Nm)	MAX. RECOMMENDED CROSS MOMENT Ms (Nm)	MAX. RECOMMENDED TWISTING MOMENT Mv (Nm)
25	20	300	15	0.8	3
32	25	450	30	2.5	5
40	31	750	60	4.5	8
50	38	1200	115	7.5	15
63	49	1600	150	8.5	24

**Attention:** use guided carriage for heavier loads or precise linear movements (MG or MH versions).

All reported data are referred to carriage plane and indicates MAX - values in static conditions. These values should not be exceeded either in dynamic conditions (best speed <1m/sec). Should the cylinder be utilised at its maximum performances, ensure the proper additional absorbers are used.

**Calculation of permissible load (Kd) in dynamic conditions**  $Kd = K \cdot Cv$



**Loads under combined stressing conditions**

It is important to take into consideration the following formula when there are a combination of forces with torque:

$$\left[ \left( 2 \times \frac{Ms}{Ms \max} \right) + \left( 1.5 \times \frac{Mv}{Mv \max} \right) + \frac{M}{M \max} + \frac{K}{K \max} \right] \times \frac{100}{Cv} \leq 100$$

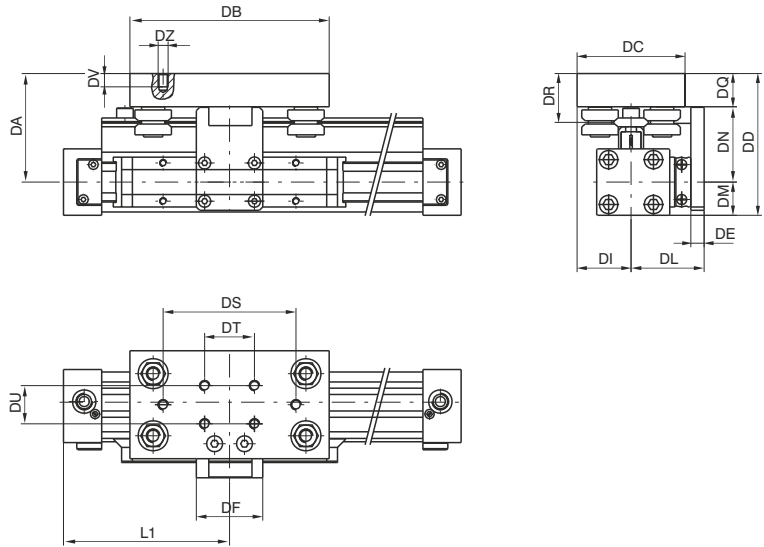
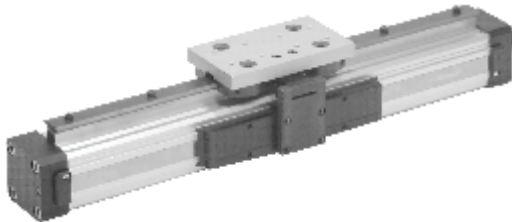


**Cylinder with linear control unit**  
(Ø 25, Ø32, Ø40 and Ø50)

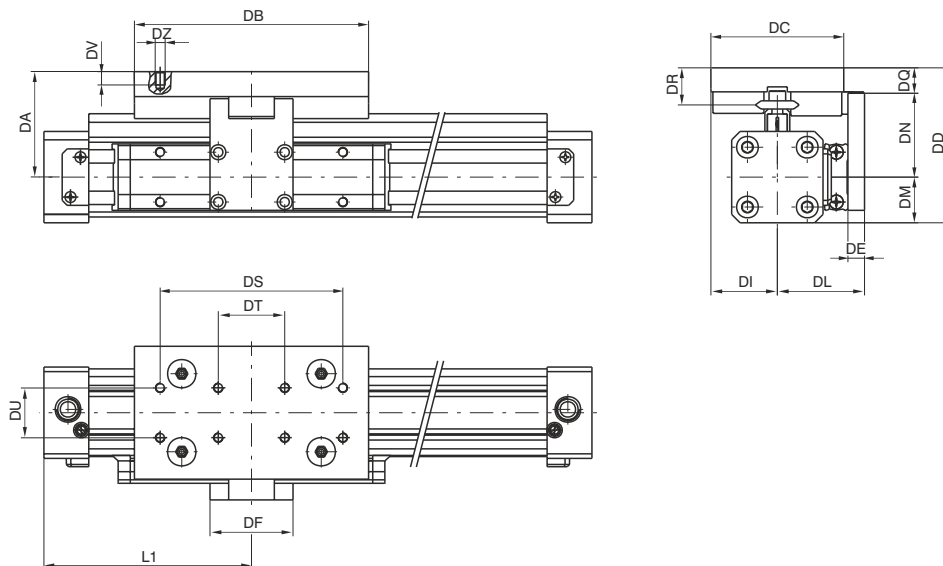
Ordering code

**1605.Ø.stroke.01.MG**  
(Max. stroke 3mt.)

Cylinders Ø 25



Cylinders Ø 32, Ø 40, Ø 50



Bore	DA	DB	DC	DD	DE	DF	DI	DL	DM	DN	DQ	DR	DS	DT	DU	DV	DZ	L1	Weight guide	every 100mm
25	65	120	65	85	8	40	32,5	44	20	45,5	19,5	29	80	30	23	8	M6	100	gr. 850	gr. 90
32	63	141	80	90,5	10	50	40	52,5	27,5	48,5	14,5	21,5	110	40	30	8	M5	125	gr. 950	gr. 90
40	68,5	141	80	101	10	50	40	57,5	32,5	54	14,5	21,5	110	40	30	8	M5	150	gr. 950	gr. 90
50	76	141	80	116	12	80	40	70	40	61,5	14,5	21,5	110	40	30	8	M5	175	gr. 950	gr. 90

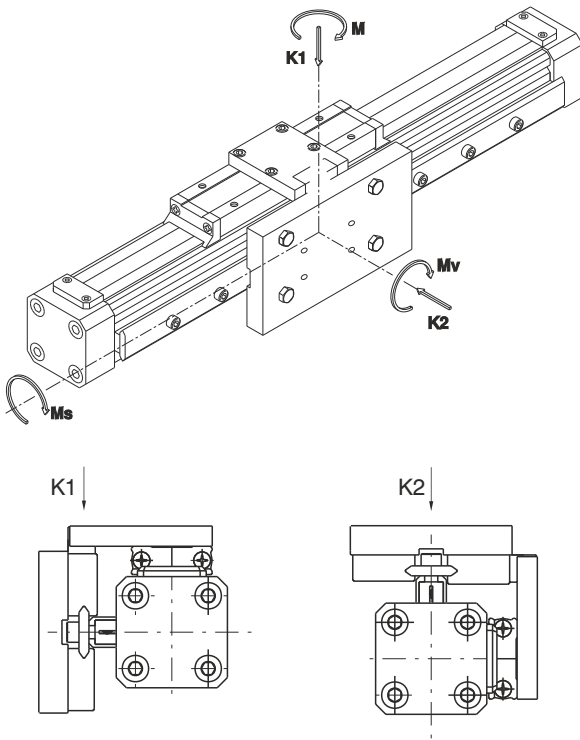
For cylinder weight refer to base version

**Construction characteristics of linear control unit**

Rod	carbon steel with hardness higher than 55-60 HRC
Bearing with shaft	shielded bearing with shaped ring
Carriage plate	anodised aluminium
Cover	acetal resin

**Cylinders with linear control unit Ø32, Ø40 and Ø50**

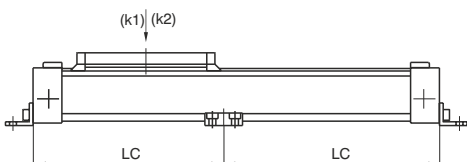
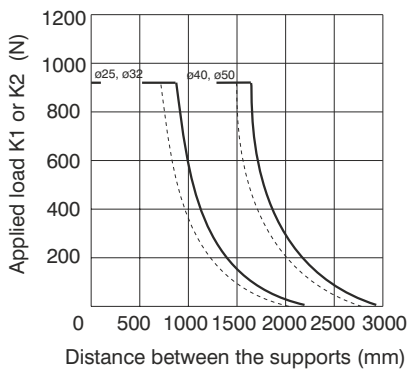
**Max. suggested loads and moments**



K1 (N)	K2 (N)	M (Nm)	Ms (Nm)	Mv (Nm)
960	960	40	12	40

Max. load (K1 o K2) depending on the distance LC between the supports

K1 ..... K2 \_\_\_\_\_

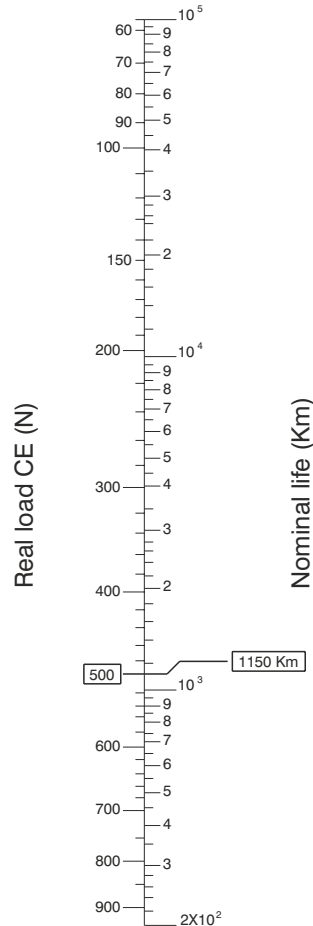


**Real load (CE) under combined stressing conditions**

It is important to take into consideration the following formula when there are a combination of forces with torque :

$$CE = [K1 + K2 + (24 \times M) + (80 \times Ms) + (24 \times Mv)] \leq 960$$

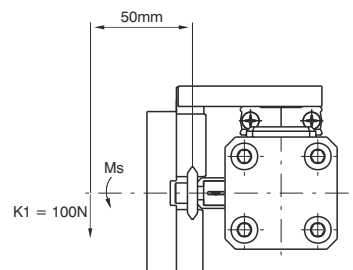
**Nomograph load / life**



All data refers to a linear control unit properly lubricated with linear speed < di 1.5 m/s

**Example to compute the life**

Compute the linear control unit life with a load of 100 N applied 50 mm off its axle.



$$Ms = 0,05 \times 100 = 5 \text{ Nm}$$

$$K1 = 100 \text{ N}$$

How to compute the real load using the formula:

$$CE = [K1 + K2 + (24 \times M) + (80 \times Ms) + (24 \times Mv)]$$

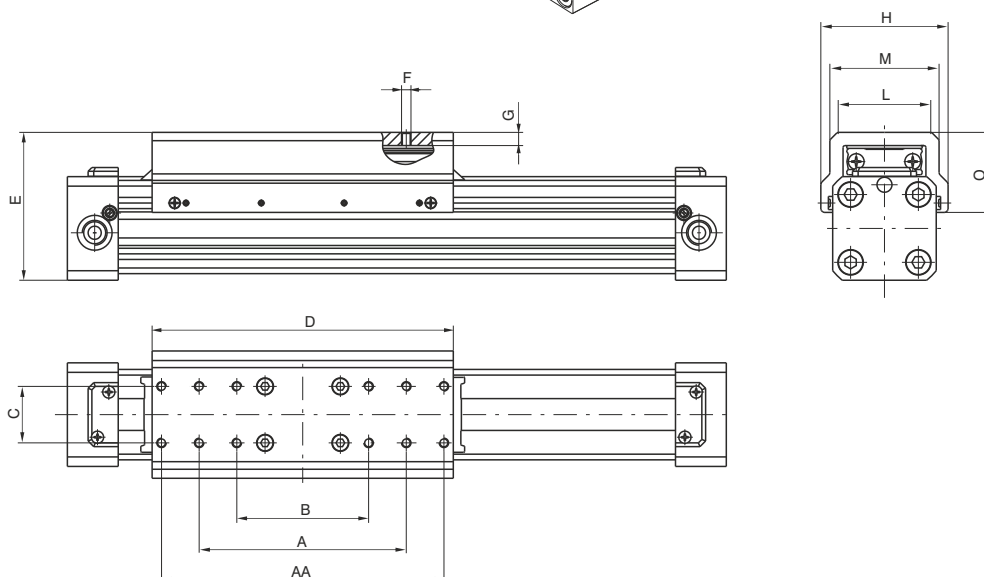
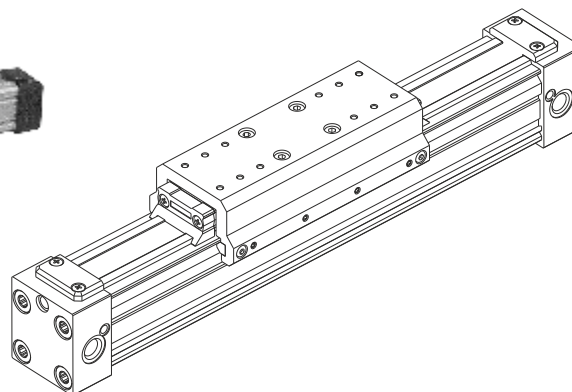
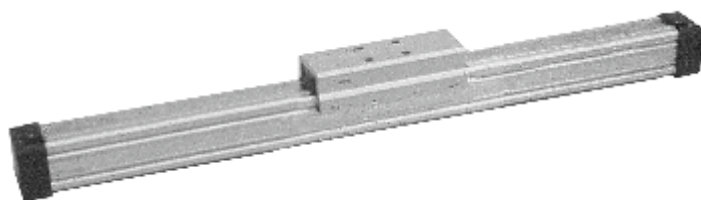
$$CE = [100 + 0 + (24 \times 0) + (80 \times 5) + (24 \times 0)] = 500 \text{ N}$$

After having verified that the CE is lower than 960 N we realise that the life is 1150 Km from the nomograph.

**Cylinder with sliding shoes guide**  
 (Ø 25, Ø 32, Ø 40, Ø 50 and Ø 63)

Ordering code

1605.Ø.stroke.01.MH



Bore	AA	A	B	C	D	E	F	G	H	L	M	O	Weight gr.
Ø25	/	80	55	23	130	64 <sup>±1</sup>	M4	6,5	57	36	42	32	gr. 235
Ø32	/	110	70	30	160	78,5 <sup>±1</sup>	M5	7	68	50	58	42,5	gr. 445
Ø40	/	110	70	30	202	88,5 <sup>±1</sup>	M5	7	77	52	60	45,5	gr. 595
Ø50	210	160	110	40	235	114,5 <sup>±1</sup>	M6	14	100	71	83	61,5	gr. 1453
Ø63	210	160	110	40	270	130 <sup>±1</sup>	M6	14	116	76	90	65,5	gr. 1810

For cylinders weight refer to base version

**Complete sliding shoes guide**

Ordering code

1600.Ø.05F


**Construction characteristics of guide**

Sliding shoes guide

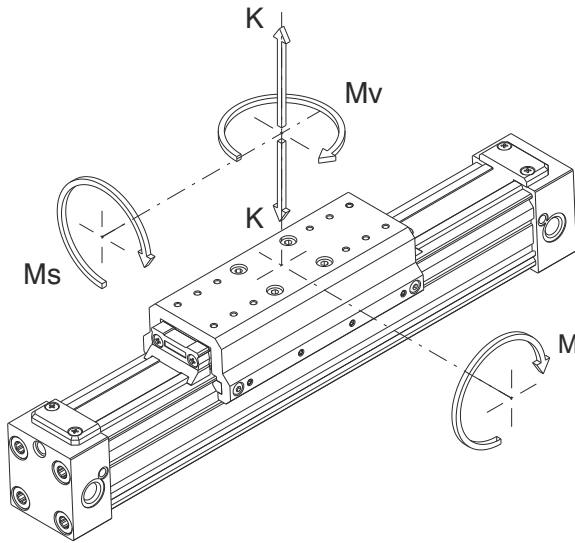
reinforced carbon fibre nylon

Mounting plate

extruded anodised aluminium

**Cylinder with sliding shoes guide  $\varnothing 25$ ,  $\varnothing 32$ ,  $\varnothing 40$ ,  $\varnothing 50$  and  $\varnothing 63$**

**Max. suggested loads and moments**



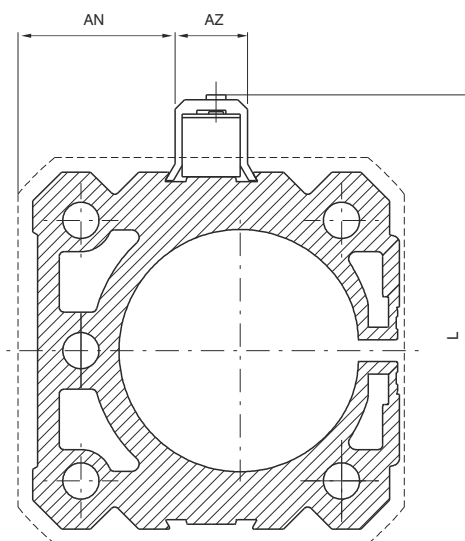
**Recommended loads and moments in static conditions**

CYLINDER BORE	MAX RECOMMENDED LOAD K (N)	MAX RECOMMENDED BENDING MOMENT M (Nm)	MAX RECOMMENDED CROSS MOMENT Ms (Nm)	MAX RECOMMENDED CROSS MOMENT Ms (Nm)
$\varnothing 25$	300	20	1	4
$\varnothing 32$	450	35	3	6
$\varnothing 40$	750	70	5	9
$\varnothing 50$	1200	120	8	16
$\varnothing 63$	1600	155	9	25

**Sensor brackets codes 1600.\_, SRS.\_, SHS.\_**

Ordering code

**1600.A**

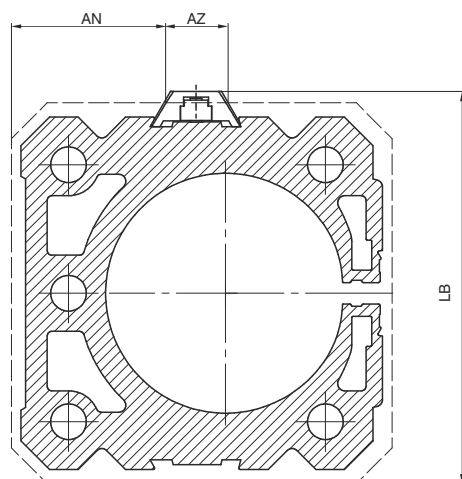


Bore		25	32	40	50	63
AN		12,5	20	25	32,5	40
AZ		15	15	15	15	15
L		55	68	79	94	110
LB		45	58	69	84	100
Weight gr.	1600.A	3	3	3	3	3
	1600.B	1	1	1	1	1

**Sensor brackets codes 1580.\_, MRS.\_, MHS.\_**

Ordering code

**1600.B**



**Sensors**

For technical characteristics and ordering codes see Chapter 6 (magnetic sensors)

**Instruction on how to use the sensors properly**

Particular attention must be paid not to exceed the working limits listed in the tables and that the sensor is never connected to the mains without a load connected in series; these are the only measures that if not observed can put the circuits out of order. In the case of direct current ( D.C.) connection polarities must be respected, that is the brown wire to the positive load (+) and the blue to the negative (-). If these are inverted the sensor remains switched, the load connected and the led turned off. However, this would not damage the circuit.

For the "U" type sensors attention must be paid that the length of the cable doesn't exceed 8 metres, with tension above 100 V. In this case a serial resistance is added to reduce the cumulative effects of the line.

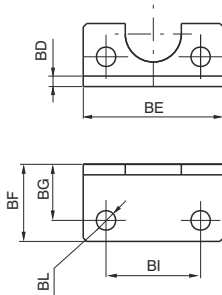
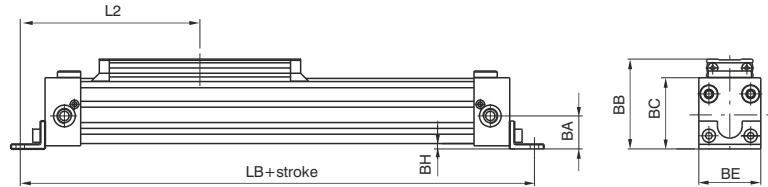
As an example 1000 W per 100-130 V e 2000 W per 200-240 V.

**Mounting foot brackets**

Ordering code

**1600.Ø.01F (1 piece)**

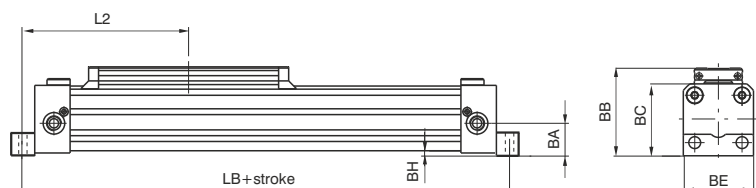
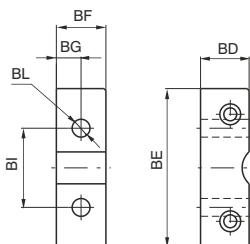
**Bore  
25 - 32**



Bore	25	32	40	50	63
BA	21,5	28	32,5	41	49
BB	58	72,5	81,5	100	116
BC	46	57,5	66,5	82	97,5
BD	3	3	20	25	30
BE	40	55	65	80	95
BF	22	25	25	25	30
BG	16	18	12,5	12,5	15
BH	3,5	6	4,5	5	5
BI	27	36	30	40	48
BL	5,5	6,6	9	9	11
L2	116	143	162,5	187,5	230
LB	232	286	32,5	375	460
Weight gr.	30	45	65	110	190



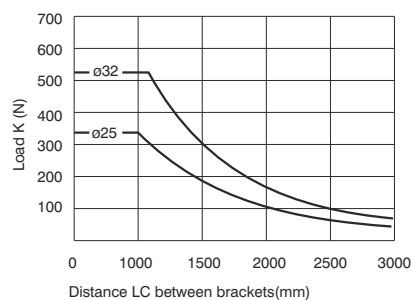
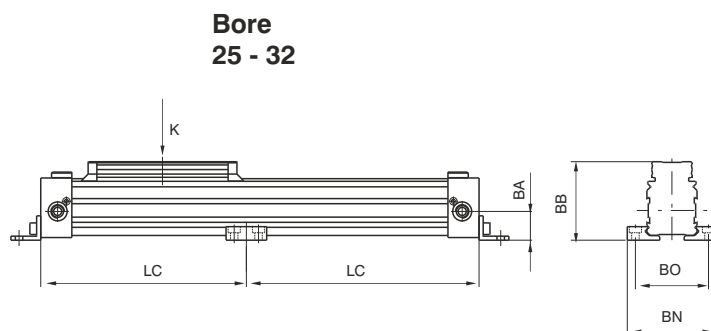
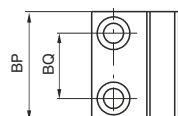
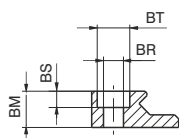
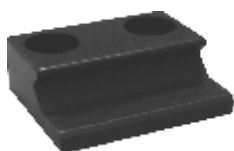
**Bore  
40 - 50 - 63**



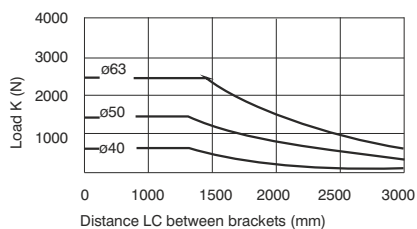
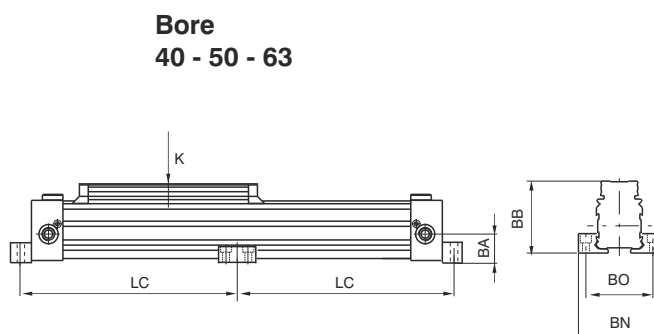
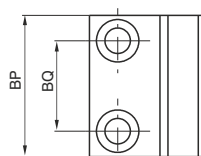
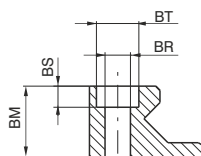
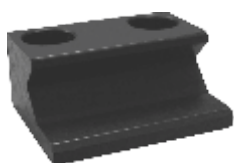
**Intermediate support**

Ordering code

**1600.Ø.02F**



Bore	25	32	40	50	63
BA	21,5	28	32,5	41	49
BB	58	72,5	81,5	100	116
BM	10	18	18	25	30
BN	66	86	96	120	140
BO	54	70	80	100	120
BP	30	40	40	50	50
BQ	18	25	25	32	32
BR	5,5	6,6	6,6	9	9
BS	4,5	5,5	5,5	7,5	7,5
BT	9	11	11	15	15
Weight gr.	25	80	80	160	215



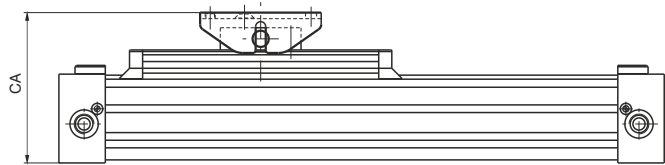
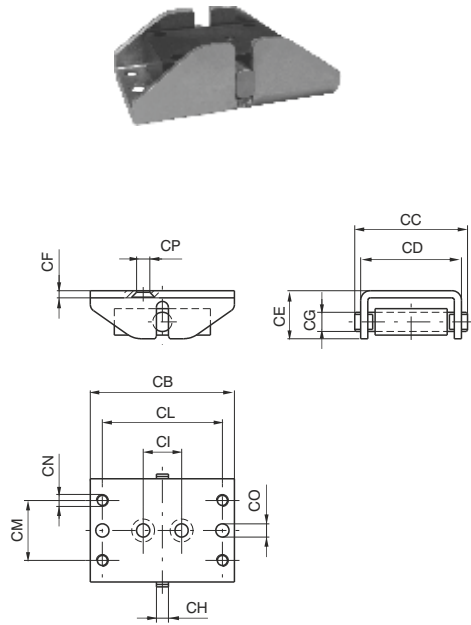


Oscillating hinge

Ordering code

1600.Ø.03F

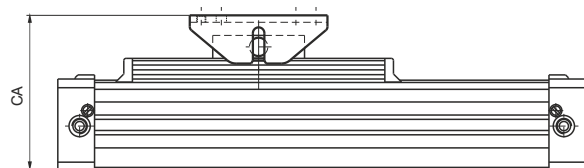
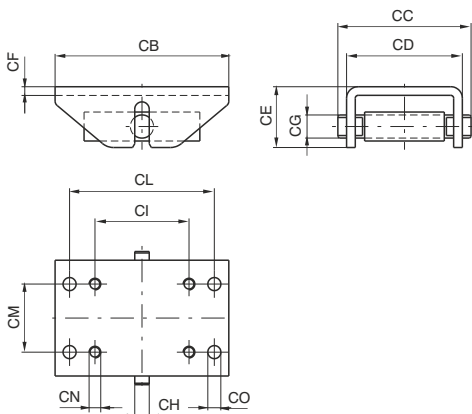
**Bore**  
25 - 32 - 40



Bore	25	32	40	50	63
CA (±5.5)	76	99.5	108.5	135.5	151
CB	60	100	100	120	120
CC	47	64	64	92	92
CD (±5)	42	56	56	80	80
CE	20	30	30	42	42
CF	3	4	4	6	6
CG	8	12	2	16	16
CH	5	8	8	10	10
CI	16	40	40	65	65
CL	50	80	80	100	100
CM	25	30	30	47	47
CN	M5	M6	M6	M8	M8
CO	5.5	6.5	6.5	9	9
CP	5.5	7	7	-	-
Weight gr.	130	380	380	990	990



**Bore**  
50 - 63



**General**

The cable cylinders work in a linear translation systems, they are very compact and can be used where a normal cylinder with a rigid rod is too cumbersome. The main characteristic of the cable cylinders is the absence of the rod which, in coming out of the end plate at the end of the stroke, doubles the total overall dimension of the cylinder. In the case of the cable cylinder, the rod is replaced by a metal rilsan-coated cable. It is connected to the piston and coming at the maximum point of stroke never exceeds the overall dimensions of the cylinder.

The cable is connected to the bracket with clamps which serve also to regulate the tension. Because of the construction characteristics of this type of cylinder it must be used with much care. The cable is capable of supporting large stress due to heavy load and high speed. Unfortunately, we cannot give definitive limits of use if not in presence of masses of a few kilograms to be translated (7 - 10 for 16 and 20 - 25 for Ø 25) with speed inversely proportional to the entity of the same load (max 0,5 m/sec). This is done in a way that the load always has a mechanical stop at the end of the stroke. The magnetic piston version lengthens the overall dimensions by 50 mm; the 1200 series microcylinder sensors are used along with the clips of that series.

**Construction characteristics**

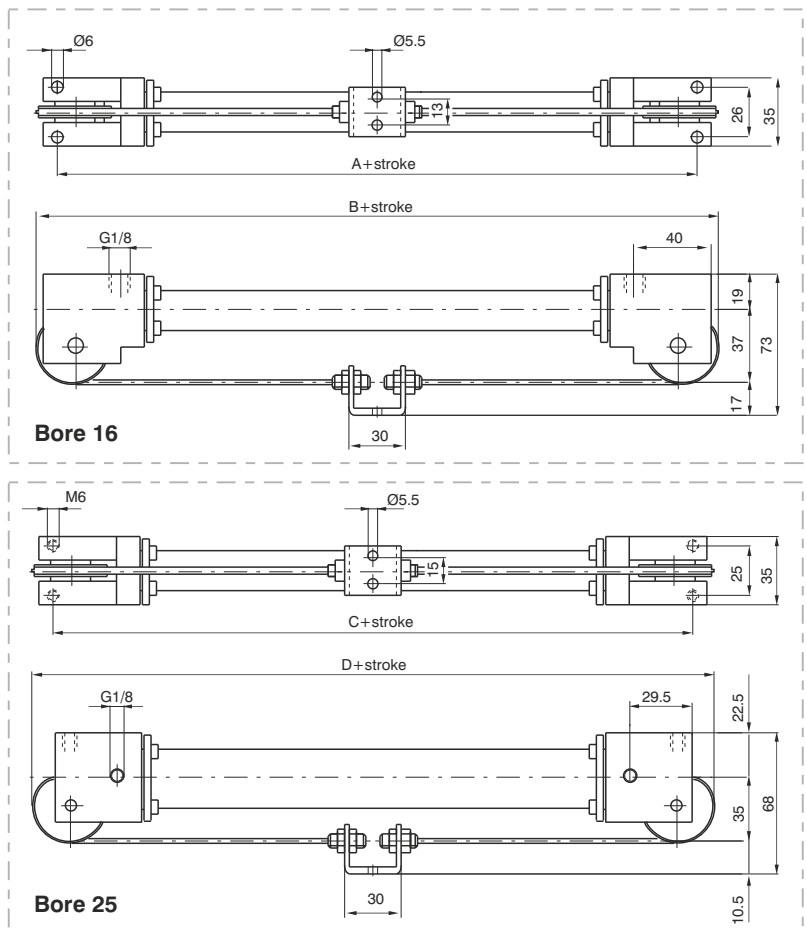
End plates	anodised black aluminium	Piston seals	NBR 80 Shore (at lip)
Barrel	anodised aluminium	Cable seal	PUR
Piston	aluminium	Bracket	steel
Cable	steel	Cable clamps	brass
Cable covering	Rilsan	Pulleys	aluminium with ball bearing

**Technical characteristics**

Fluid: filtered and lubricating air | Max. pressure: 6 bar | Min. and max. temperature: -5°C - +70°C | Max speed: 0.5 m/sec.

**"Attention: Dry air must be used for application below 0°C"**

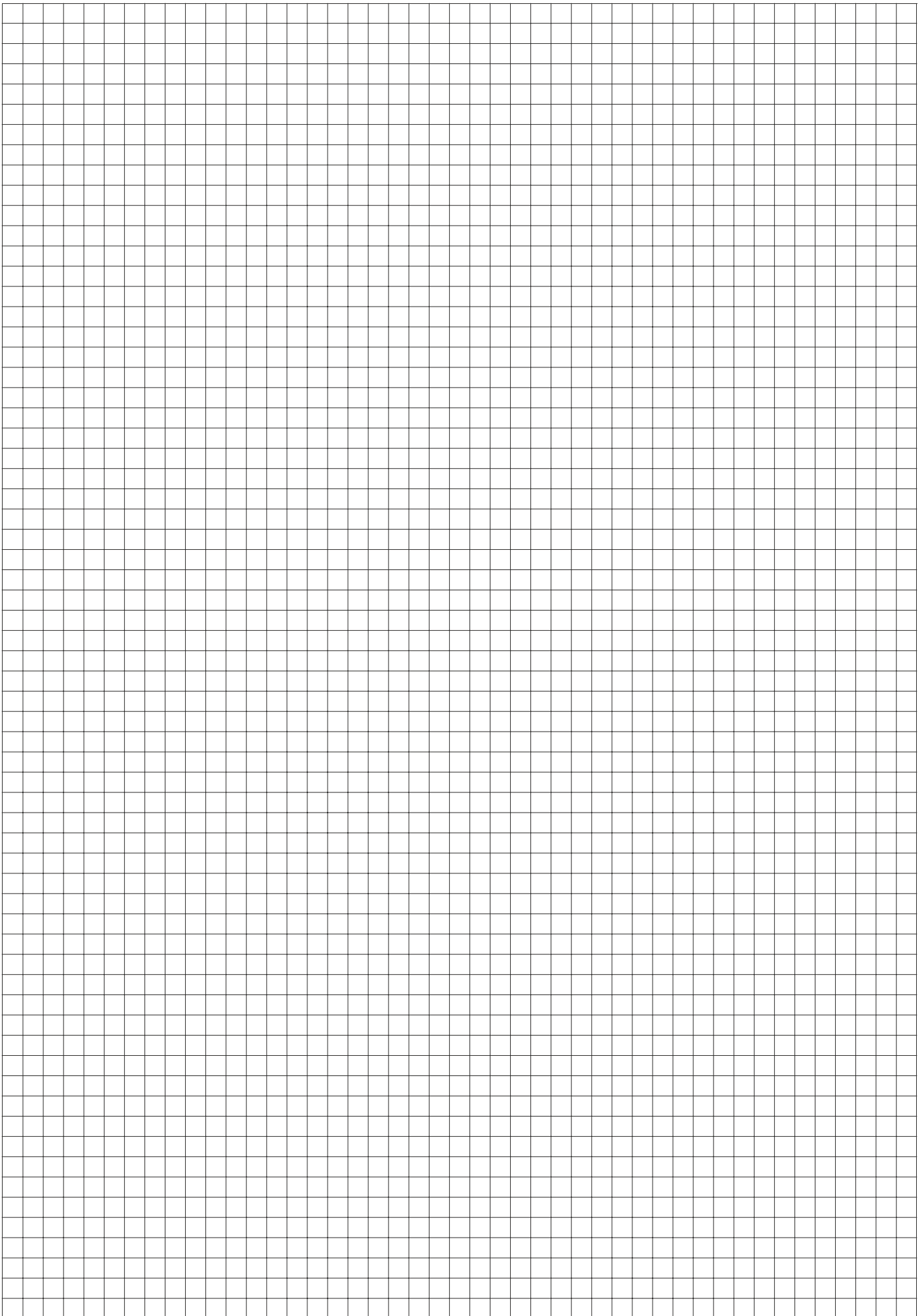
	A	B	C	D
Standard	111	132	86	124
Magnetic	161	182	136	174



Ordering code
<b>1601.Ø.stroke</b>
<b>1601.Ø.stroke.M</b>
Version with magnetic piston

**Maintenance**

The cable is obviously the part most subject to breakage. The cylinder can be disassembled for replacement of the cable which is supplied already complete with threaded bushings to be screwed on to the piston. Once the wear of the barrel and seals has been checked, the cylinders can be reassembled by screwing on the end plates. Next, the ends of the cable are attached to the bracket by way of clamps and the tension regulated. The tension is correct when the cable is not cambered.



## General

Rodless cylinder based on the stainless steel strip sealing technology widely used and tested on bigger bore sizes.

**Available versions:** sliding shoe as standard ("MH").

This system ensures high resistance and long life as the carriage which supports the weight is not tied to the piston and therefore the piston only transfers the movement without bearing any force.

**Air connections:** M5 threaded connections.

All air connections on one end cap version available. (side-back-bottom side)

### Mountings:

- Foot brackets and intermediate supports if needed (depending on the stroke)

- Swivel bracket

- Directly in position via the slot on the end caps- in this conditions the air supply can come directly from the mounting plate.

**Magnetic sensors:** sensors series (1590...., LRS.... and LHS....) can be used directly in the 2 slots on the barrel.

## Construction characteristics

End covers	Anodised aluminium
Barrel	Anodised aluminium
Bands	Stainless steel
External carriage	Anodised aluminium
Sliding bushes	Special technopolymer
Piston	Acetal resin
Cushion bearings	Aluminium
Piston seals	Special NBR
Other seals	NBR

## Technical characteristics

Fluid	Filtered and lubricated air
Working pressure	1,5 - 8 bar
Working temperature	-5°C - +70°C
Max. speed	1 m/s (normal working conditions)
Max. stroke	2,5 meters
Cushioning length	18 mm

Please follow the suggestions below to ensure a long life for these cylinders:

- use clean and lubricated air
- Please adequately evaluate the load involved and its direction, especially in respect to the moving carriage (also see tables for loads and admitted moments).
- avoid high speeds together with long strokes and heavy loads: this would produce kinetic energy which the cylinder cannot absorb, especially if used as a limit stop (in this case use mechanical stop device)
- evaluate the environmental characteristics of cylinder used (high temperature, hard atmosphere, dust, humidity etc.)

**Please note: air must be dried for applications with lower temperature.**

Use hydraulic oils H class (ISO VG32) for correct continued lubrication.

Our Technical Department will be glad to help.

For applications where a low smooth uniform operations speed is required, you must specify this on your purchase order so that we can use the proper special grease.

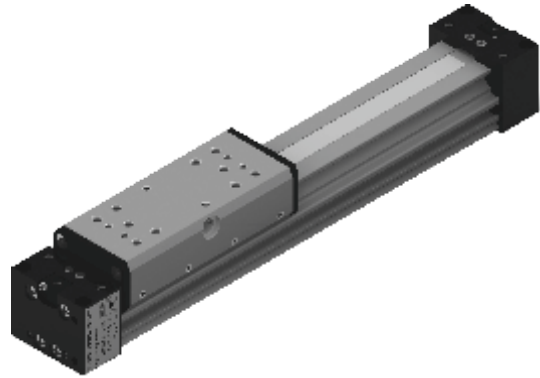
## Use and maintenance

This type of cylinder, due to its characteristics, has to be used within certain criteria. Correct use will give long and troublefree operation. Filtered and lubricated compressed air reduce seal wear. Verify that the load will not produce unforeseen stresses. Never combine high speed with heavy load. Always support the long stroke cylinder with intermediate brackets and never exceed the specified working conditions.

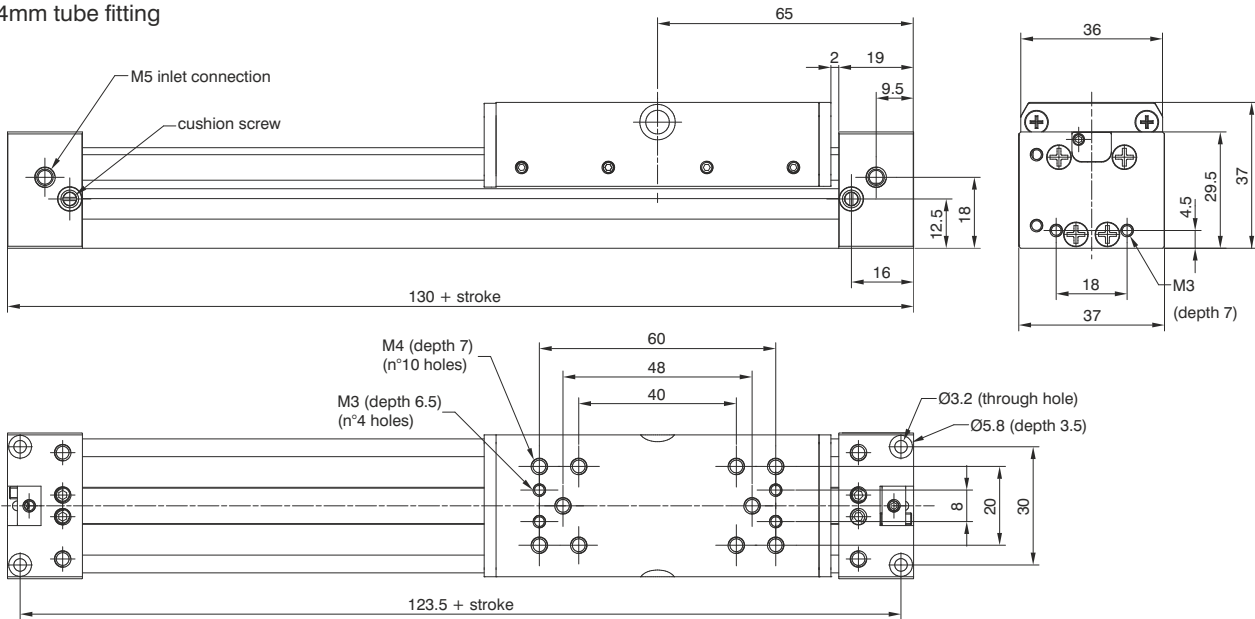
If maintenance is required, follow the instructions supplied with the repair kit.

**Basic version (cylinder with sliding shoes bushes)**

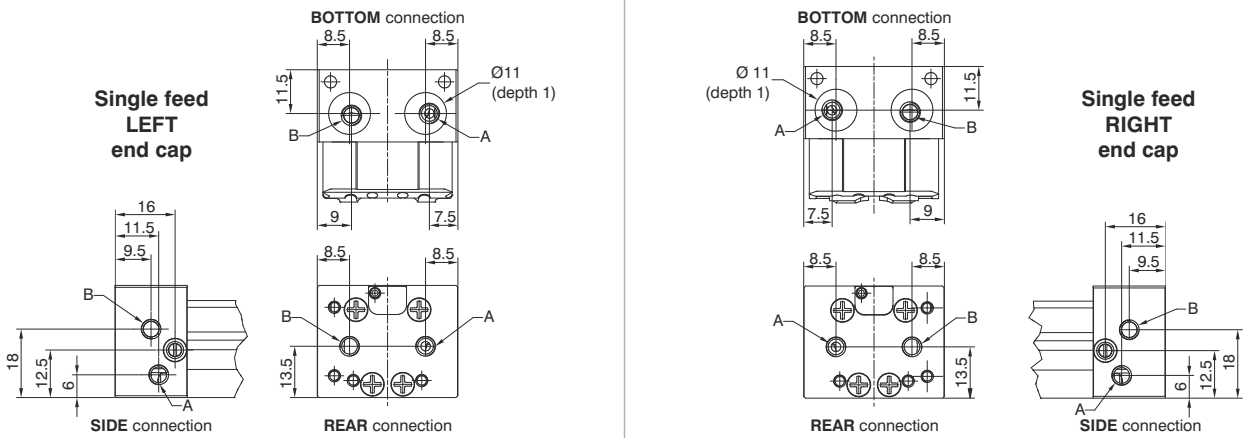
Ordering code
<b>1605.16.stroke.01.MH</b>
Possibility of a single feed cylinder head
<b>1605.16.stroke.02.MH</b> left end cap-side connection
<b>1605.16.stroke.03.MH</b> right end cap-side connection
<b>1605.16.stroke.04.MH</b> left end cap-rear connection*
<b>1605.16.stroke.05.MH</b> right end cap-rear connection*
<b>1605.16.stroke.06.MH</b> left end cap-bottom connection
<b>1605.16.stroke.07.MH</b> right end cap-bottom connection



\* in case of mounting with 1600.16.01F bracket use 4mm tube fitting

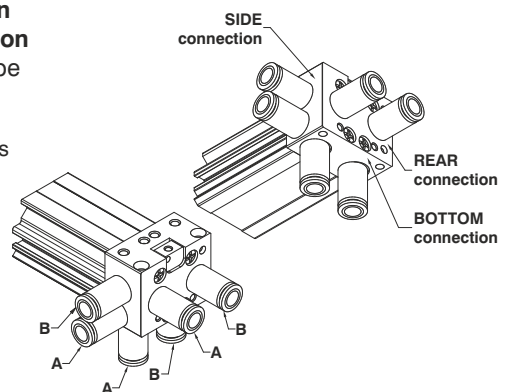
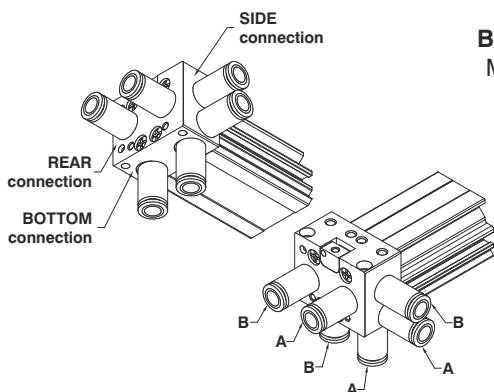


**Possibility of a single feed right or left cylinder head and on 3 different end cap sides**

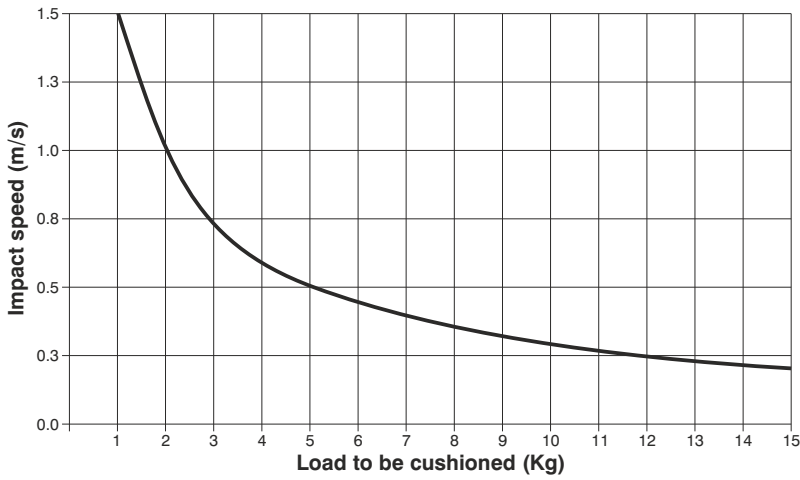


**A = forward stroke connection**  
**B = backwards stroke connection**  
 M5 tube Ø4 and Ø6 fittings can be used for air connections.

In case of use with 1600.16.01F mounting and REAR air connections use a 4mm pipe fitting.



**Operating end stroke decelerator diagram**

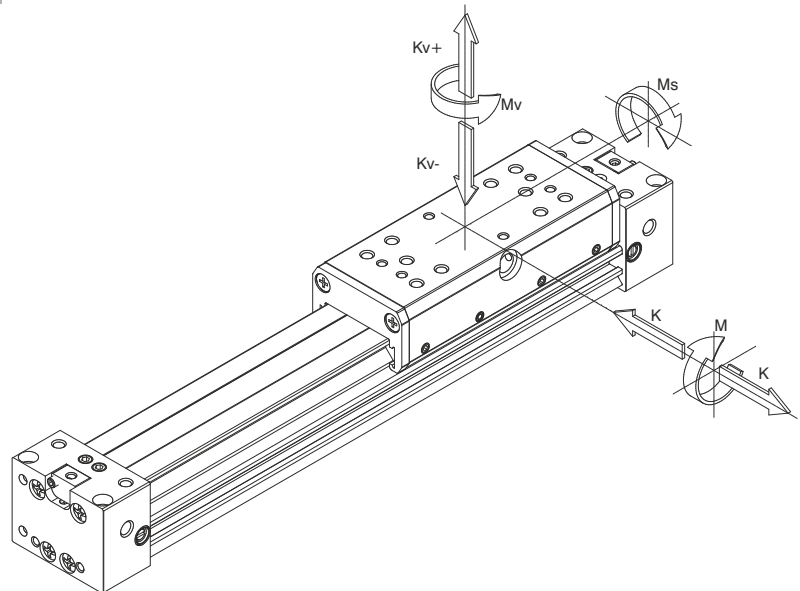


In case of extreme applications close to the maximum allowed values in the graph it is strongly recommended to add external damping systems.

**Suggested loads and moments**

K1	K2	K	M	Ms	Mv
200	250	100	10	2	3
(N)			(Nm)		

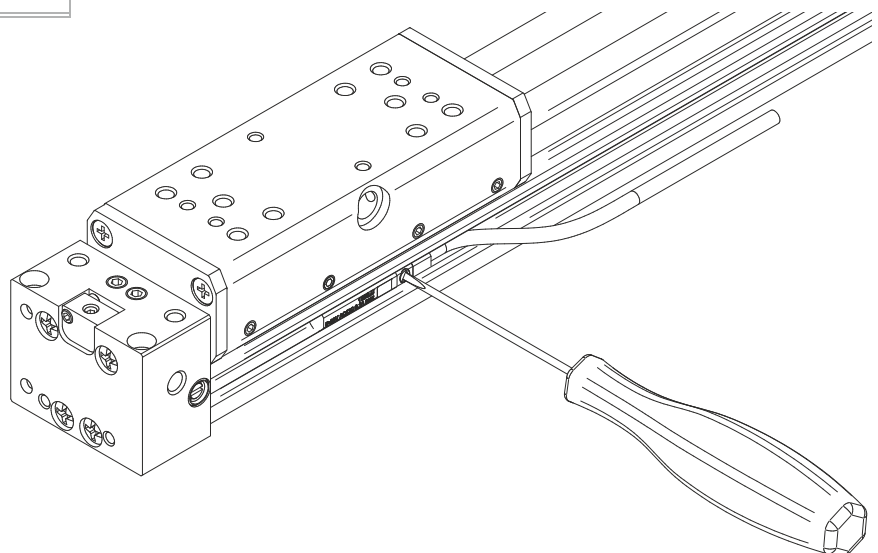
Maximum Load and moments allowed in static or dynamic conditions (max. speed 0,2 m/s)



**Magnetic sensors**

Ordering code

- 1590...
- LRS...
- LHS...



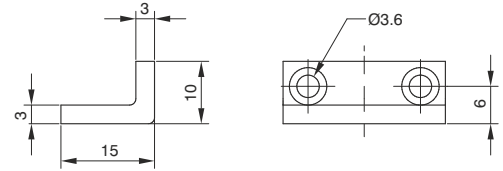
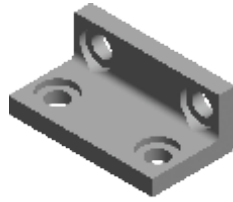
The two side slots allow the direct use of 1590...LRS... and LHS... sensors mounted from the top and positioned via the built in screw.

**Mounting foot brackets**

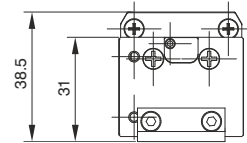
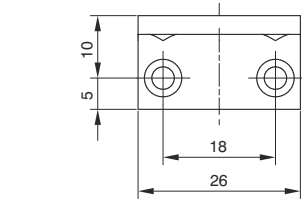
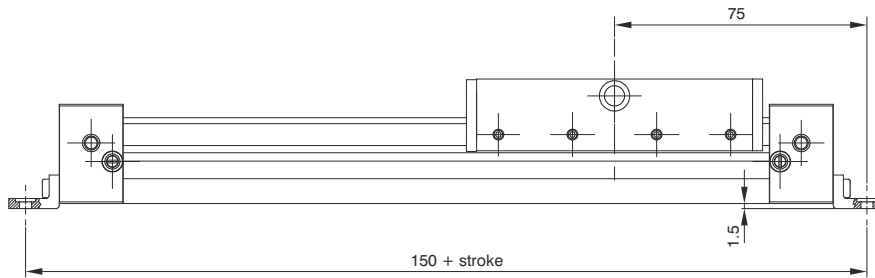
Ordering code

**1600.16.01F**  
(1 piece)

The kit comprises:  
n°1 foot (plated zinc steel)  
n°2 screws (plated zinc steel)



**Attention:** based on the stroke evaluate the need to use also side mounted supports. (see below)

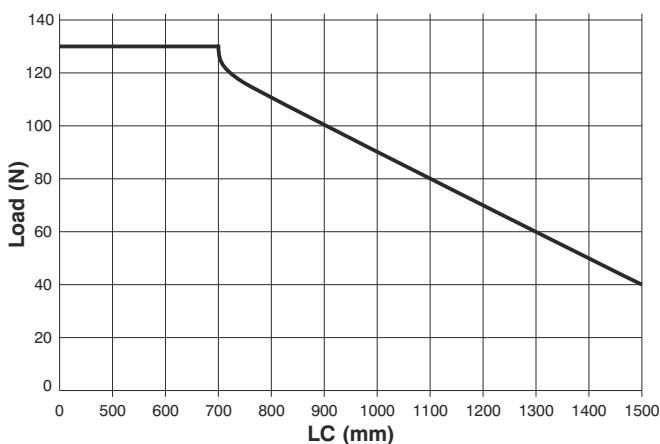
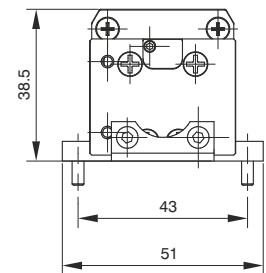
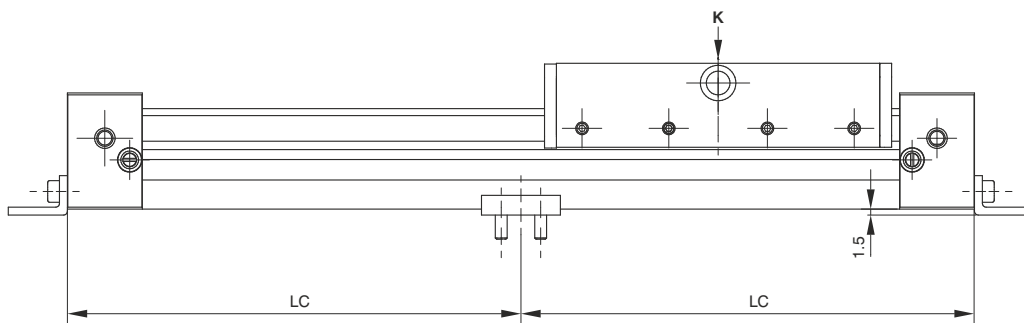
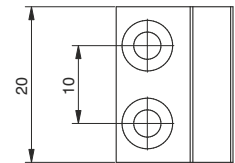
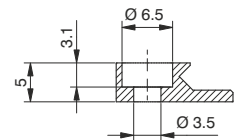
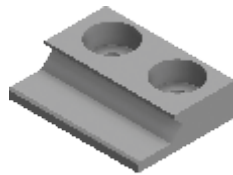


**Intermediate support**

Ordering code

**1600.16.02F**  
(1 piece)

The kit comprises:  
n°1 support (aluminium)  
n°2 screws (plated zinc steel)



The graph shows the LC limit in conjunction with the applied load K beyond which it is necessary to mount an intermediate side support in order to prevent the barrel from bending.

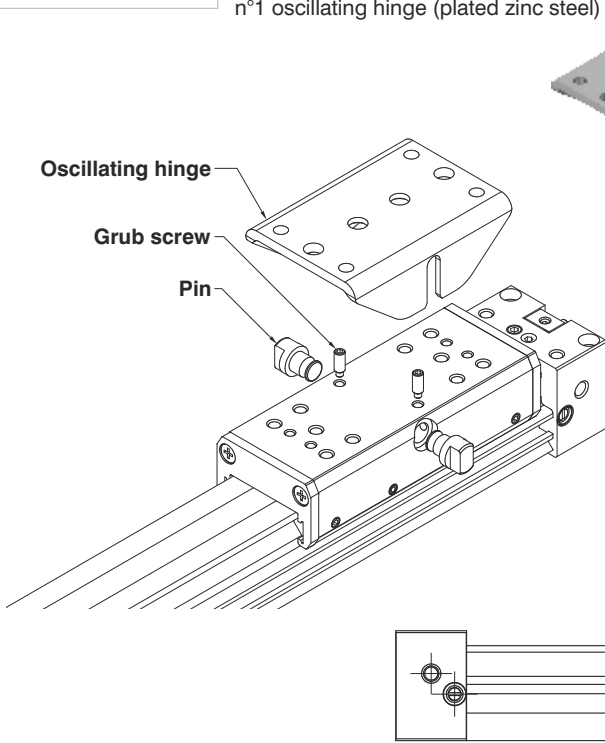
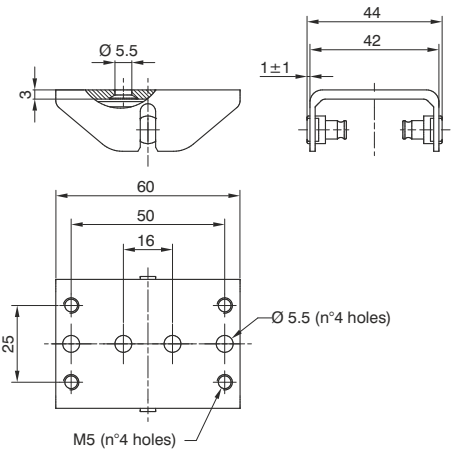


**Oscillating hinge**

Ordering code

**1600.16.03F**  
(1 piece)

The kit comprises:  
 n°2 pins (plated zinc steel)  
 n°2 grub screw (steel)  
 n°1 oscillating hinge (plated zinc steel)



mounting sequence:

- mount the pin into the dedicated housing
- tighten the blocking grub screws in the dedicated housing

**Direct mounting without brackets**

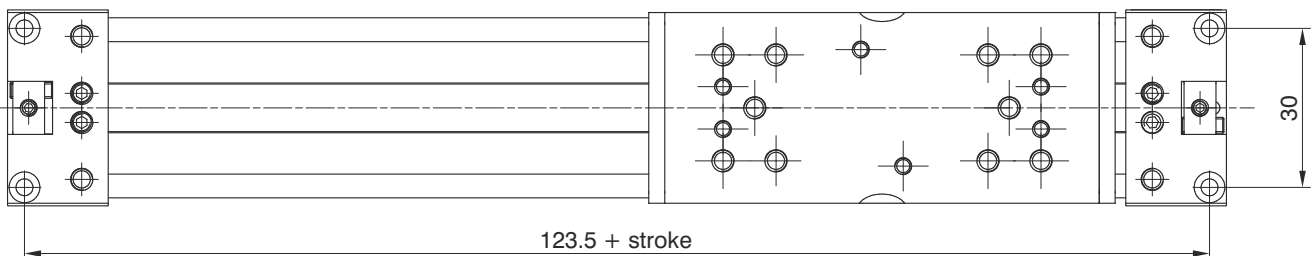
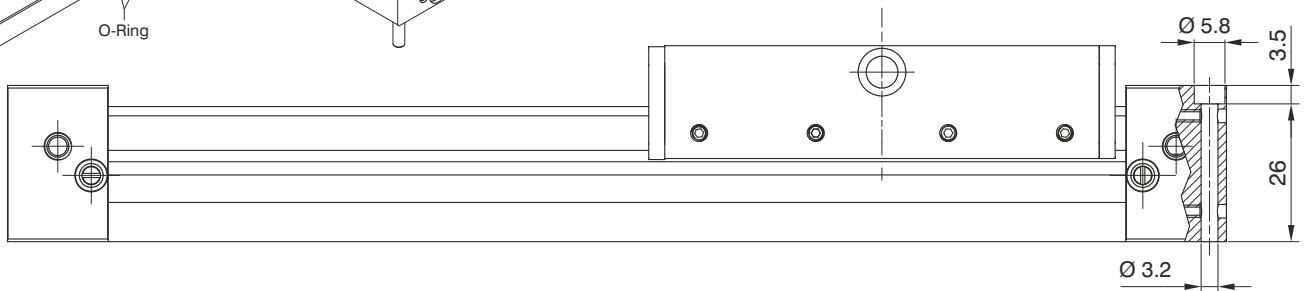
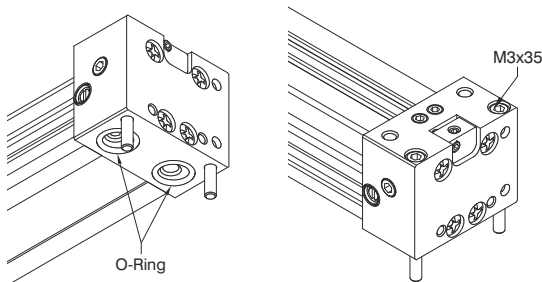
Ordering code

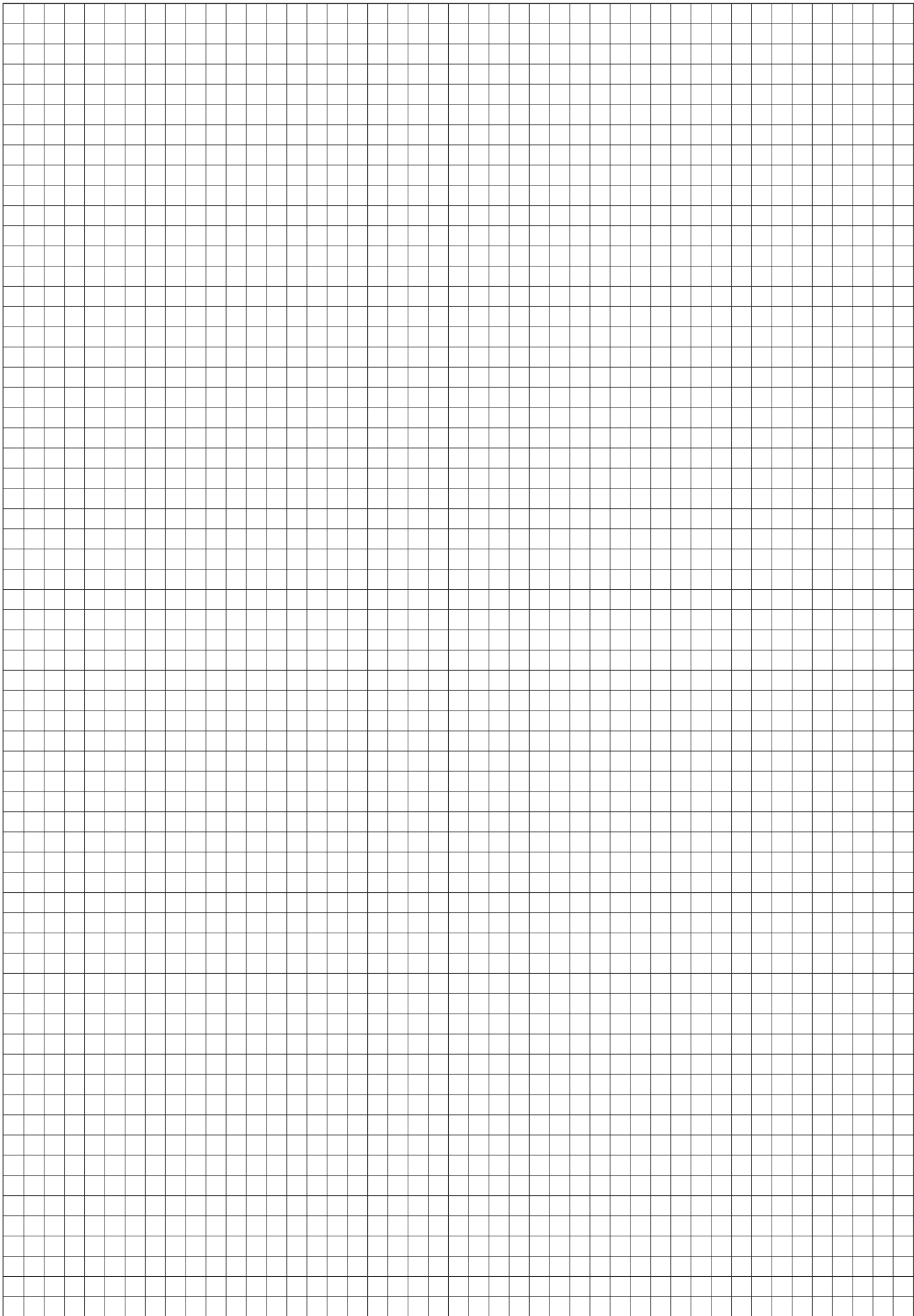
**1600.16.04F**  
(1 piece)

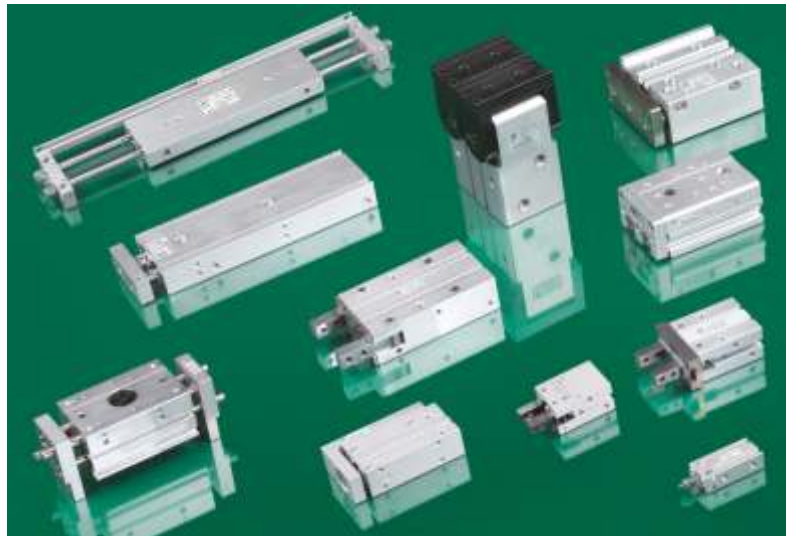
The kit comprises:  
 n°4 screws M3x35 (plated zinc steel)  
 n°2 O-Rings (NBR)

**Direct mounting without brackets**

Thanks to the mounting holes with counter bores on the end caps it is possible to mount the cylinder directly onto the mounting surface. Having the end caps and barrel flush and in contact with the mounting plate it is not necessary to use any intermediate mounting brackets even in case of long strokes. It is also possible to supply air to the cylinder directly through the mounting plate through the two air connection on the bottom side of the end cap (06.MH and 07.MH) which are machined with counterbores.







# MANIPULATION

## Guided compact cylinder

Series 6100  
Series 6101

## Twin-rod slide unit

Series 6200

## Push/pull-twin rod slide unit

Series 6210

## Pneumatic grippers

Series 6301 - Angular grippers - standard version  
Series 6302 - 180° angular grippers  
Series 6303 - Angular gripper, rack & pinion style  
Series 6310 - Parallel style grippers- standard version  
Series 6311 - Wide opening  
Series 6312 - 3 fingers parallel style (air chuck)

## Rotary actuators

Series 6400 - Double rack rotary actuators with turn table  
Series 6411 - Single rack rotary actuators

## Vane type rotary actuators

Series 6420

## Arbitrary mount cylinders

Series 6500

## Slide cylinders

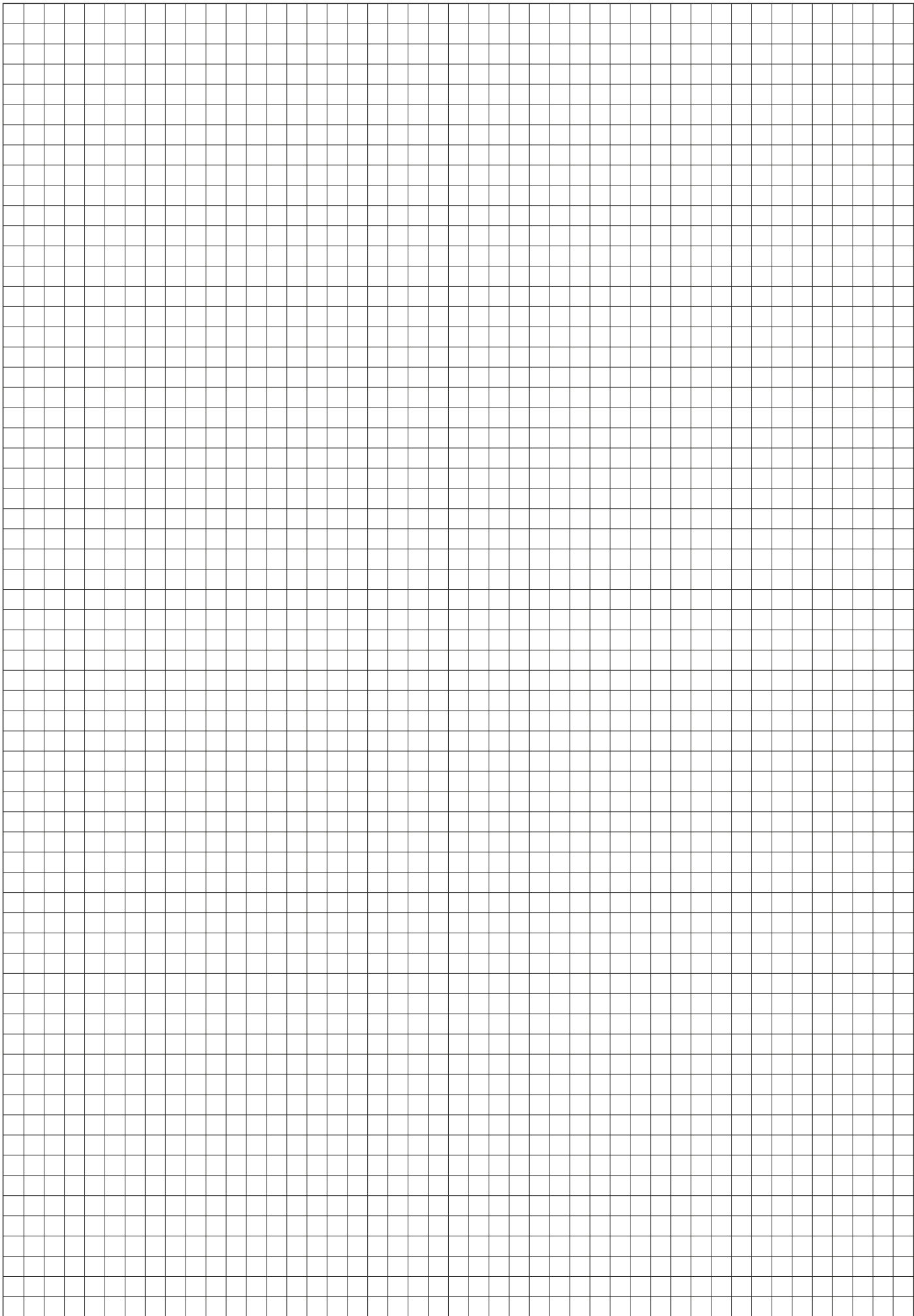
Series 6600

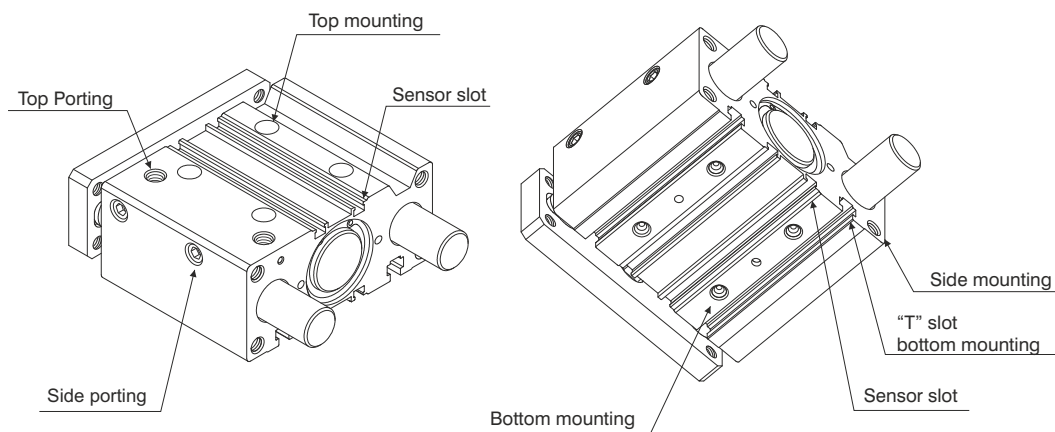
## Guide cylinders

Series 6700

## Dampers

Series 6900





These guided compact cylinders, characterised by reduced overall dimensions, can be used for the compression, conveyance and manipulation of objects in many industrial sectors; similarly they can also be used in pushing, lifting and stopping applications.

These cylinders are available in sizes 32mm to 63 mm diameter, and comprise a single compact cylinder with integral guide rods, making it a true guide cylinder designed with installation flexibility and space saving in mind.

The rod guide is available in two styles:

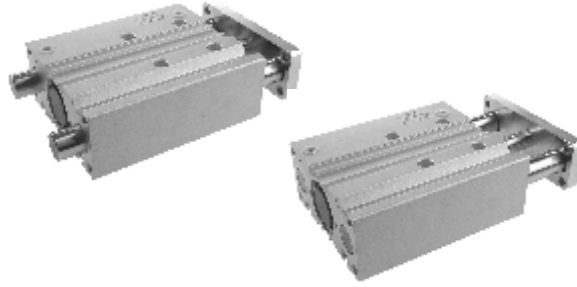
**Self-lubricating bronze bushes** - useful for absorbing lateral loads and forces, especially as a stopper.

**Bearing bushes** - guaranteeing high precision and uniform movement with low friction characteristics, useful with misaligned loads.

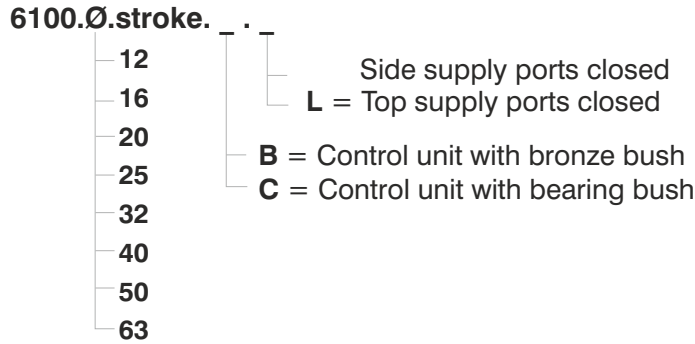
Guided compact cylinders are ideal for use in applications requiring a combination of reduced dimensions and anti-rotation features. Mounting can be achieved on three sides through holes or "T" slots.

Adjustable mounting holes in the front plate ensure safe and accurate assembly. Pneumatic connections can be made to either lateral or top ports (lateral ports plugged on standard units).

When sensors are required, there are special slots in the barrel extrusion where 1580 series miniaturised sensors are easily fitted.



**Ordering code**



**Construction characteristics**

Body	anodised aluminium
Guide rods	C43 chromed steel (control unit with bronze bush) tempered and chromed steel (control unit with bearing bush)
Piston	aluminium
Piston rod	stainless steel (for bores Ø12, Ø16, Ø20, Ø25) C43 chromed steel (for bores Ø32, Ø40, Ø50, Ø63)
Rods bushing	bronze or bearing bushing
End plate	anodised aluminium
Piston seal	oil resistant NBR rubber
Piston rod seal	PUR (NBR 12-16)
Wipers	PUR
Plate	nickel plated steel

**Technical characteristics**

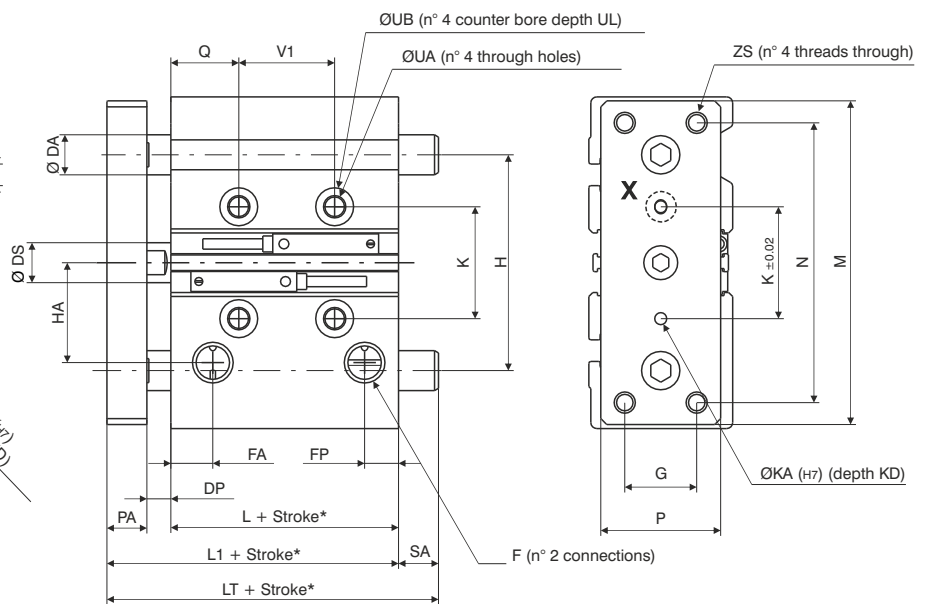
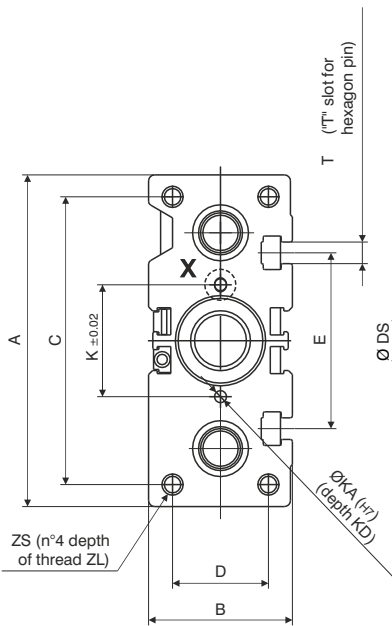
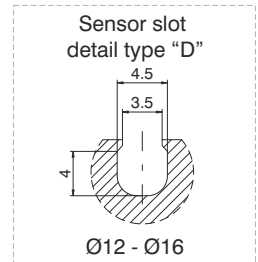
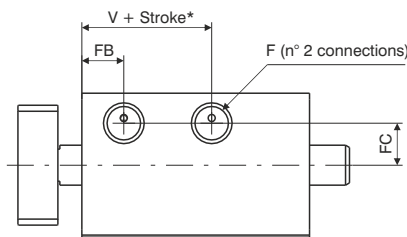
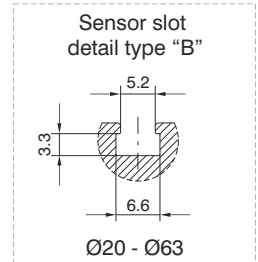
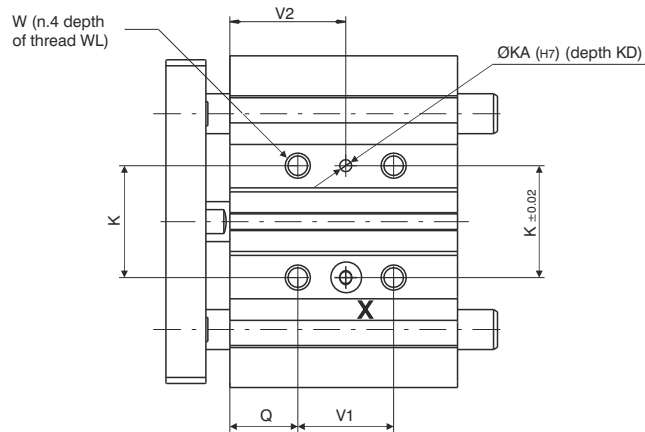
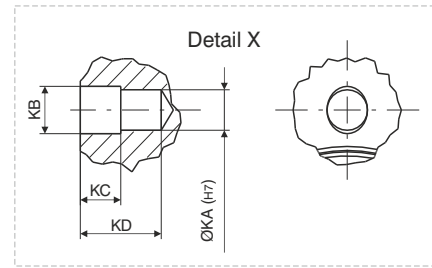
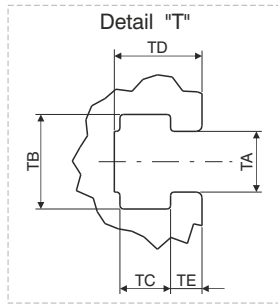
Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	max. 10 bar
Working temperature	-5°C - +70°C
Cushioning	elastic bumper on both ends

**Standard strokes**

Bore	Stroke											
	10	20	25	30	40	50	75	100	125	150	175	200
Ø12	●	●		●	●	●	●	●				
Ø16	●	●		●	●	●	●	●				
Ø20		●		●	●	●	●	●	●	●	●	●
Ø25		●		●	●	●	●	●	●	●	●	●
Ø32			●			●	●	●	●	●	●	●
Ø40			●			●	●	●	●	●	●	●
Ø50			●			●	●	●	●	●	●	●
Ø63			●			●	●	●	●	●	●	●

Intermediate strokes can be obtained using spacers with defined length (5, 10, 15, 20 mm).

Example: It is possible to obtain a 6100.32.45.B cylinder from a 6100.32.50.B cylinder by inserting a spacer with length of 5 mm. The intermediate strokes manufactured without the use of spacers are considered special executions.



\*Dimensions only refer to the "standard stroke"



Control unit with bronze bushes  
Control unit with bearing bushes

Control unit with bronze bushes  
Control unit with bearing bushes

Control unit with bronze bushes  
Control unit with bearing bushes

Bore	Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63
Table of dimensions								
A	58	64	83	93	112	120	148	162
B	26	30	36	42	48	54	64	78
C	40	42	72	82	98	106	130	142
D	18	22	24	30	34	40	46	58
DA	8	10	12	16	20	20	25	25
DP	6	8	10	14	16	16	20	20
DS	2	2	5,5	5,5	9,5	10	13	13
DS	6	8	10	12	16	16	20	20
E	/	/	44	50	63	72	92	110
F	M5	M5	G1/8"	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
FA	11	11	11	12	13	13	13	14
FB	11	11	11	12	13	13	13	14
FC	8,5	10	10,5	13,5	15	18	21,5	28
FP	15	17	9	10,5	9,5	11	11	12,5
G	14	16	18	26	30	30	40	50
H	41,5	46	54	64	78	86	110	124
HA	19,5	23	25	28,5	34	38	47	55
K	23	24	28	34	42	50	66	80
KA	/	/	3	4	4	4	5	5
KB	/	/	3,5	4,5	4,5	4,5	6	6
KC	/	/	3	3	3	3	4	4
KD	/	/	6	6	6	6	8	8
L	29	31	38	38,5	38,5	44	44	49
L1	39	43	53,5	54	60	66	72	77
LT	39	43	53,5	54	97	97	106,5	106,5
LT	57	64	84,5	85	102	102	118	118
See table 1								
M	56	62	81	91	110	118	146	158
N	48	52	70	78	96	104	130	130
PA	8	10	10	10	12	12	15	15
P	22	25	30	38	44	44	60	70
Q	5	5	17,5	17,5	21,5	22	24	24
SA	/	/	/	/	37	31	34,5	29,5
SA	18	21	31	31	42	36	46	41
See table 1								
T	/	/	M5	M5	M6	M6	M8	M10
TA	/	/	5,4	5,4	6,5	6,5	8,5	11
TB	/	/	8,4	8,4	10,5	10,5	13,5	17,8
TC	/	/	4,5	4,5	5,5	5,5	7,5	10
TD	/	/	7,8	8,2	9,5	11	13,5	18,5
TE	/	/	2,8	3	3,5	4	4,5	7
UA	4,3	4,3	5,6	5,6	6,6	6,6	8,6	8,6
UB	8	8	9,5	9,5	11	11	14	14
UL	4,5	4,5	5,5	5,5	7,5	7,5	9	9
V	14	14	13	13	7,5	13	9	14
V1	See table 2							
V2	See table 2							
W	M5	M5	M6x1	M6x1	M8x1,25	M8x1,25	M10x1,5	M10x1,5
WL	10	10	12	12	16	16	20	20
Z	M4	M5	M5x0,8	M6x1	M8x1,25	M8x1,25	M10x1,5	M10x1,5
ZL	9	11	13	15	20	20	22	22
ZS	M4	M5x0,8	M5x0,8	M6x1	M8x1,25	M8x1,25	M10x1,5	M10x1,5

Control unit with bearing bushes

Table 1	LT			SA		
Bore	stroke ≤ 30	30 < stroke ≤ 100	100 < stroke ≤ 200	stroke ≤ 30	30 < stroke ≤ 100	100 < stroke ≤ 200
Ø12	39	53	53	/	14	/
Ø16	43	64	64	/	21	/
Ø20	47	72	72	/	18,5	49
Ø25	49	77	77	/	23	48
	stroke < 50	50 ≤ stroke ≤ 100	100 < stroke ≤ 200	stroke < 50	50 ≤ stroke ≤ 100	100 < stroke ≤ 200
Ø32	/	87	117	/	27	57
Ø40	/	/	/	/	21	51
Ø50	/	92	127	/	20	55
Ø63	/	/	/	/	15	50

Table 2	V1			V2		
Bore	stroke ≤ 30	30 < stroke ≤ 100	100 < stroke ≤ 200	stroke ≤ 30	30 < stroke ≤ 100	100 < stroke ≤ 200
Ø12	4 + stroke			/	/	/
Ø16	4 + stroke			/	/	/
Ø20	24	44	120	29,5	39,5	77,5
Ø25	24	44	120	29,5	39,5	77,5
	stroke ≤ 25	25 < stroke ≤ 100	100 < stroke ≤ 200	stroke ≤ 25	25 < stroke ≤ 100	100 < stroke ≤ 200
Ø32	24	48	124	33,5	45,5	83,5
Ø40	24	48	124	34	46	84
Ø50	24	48	124	36	48	86
Ø63	28	52	128	38	50	88

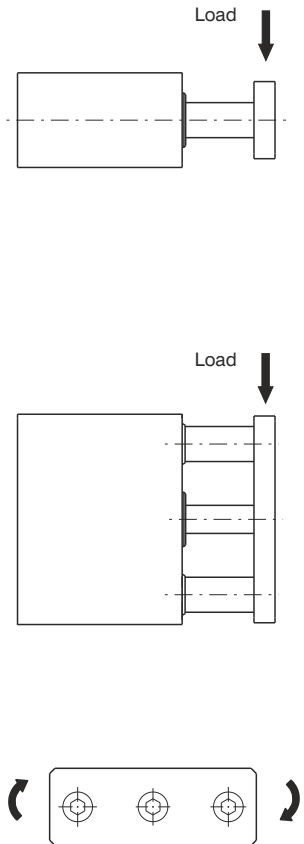


Stroke	Bore																	
	Ø12		Ø16		Ø20		Ø25		Ø32		Ø40		Ø50		Ø63			
	<b>Control unit with bronze bushes</b>																<b>Weight (gr.)</b>	
10	240	330	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
20	280	380	670	950	/	/	/	/	/	/	/	/	/	/	/	/	/	/
25	/	/	/	/	1690	1950	3360	4180	/	/	/	/	/	/	/	/	/	/
30	310	430	750	1050	/	/	/	/	/	/	/	/	/	/	/	/	/	/
40	350	480	830	1160	/	/	/	/	/	/	/	/	/	/	/	/	/	/
50	390	530	910	1270	2070	2370	4000	4940	/	/	/	/	/	/	/	/	/	/
75	500	680	1170	1650	2470	2830	4730	5780	/	/	/	/	/	/	/	/	/	/
100	5903	800	1370	1920	2850	3250	5370	6540	/	/	/	/	/	/	/	/	/	/
125	/	/	1570	2190	3240	3680	6010	7290	/	/	/	/	/	/	/	/	/	/
150	/	/	1760	2470	3620	4100	6650	8050	/	/	/	/	/	/	/	/	/	/
175	/	/	1960	2740	4000	4530	7290	8800	/	/	/	/	/	/	/	/	/	/
200	/	/	2160	3010	4380	4950	7930	9560	/	/	/	/	/	/	/	/	/	/
Stroke	<b>Moving parts</b>																	
10	100	155	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
20	108	170	330	520	/	/	/	/	/	/	/	/	/	/	/	/	/	/
25	/	/	/	/	1070	1140	2150	2500	/	/	/	/	/	/	/	/	/	/
30	116	185	350	560	/	/	/	/	/	/	/	/	/	/	/	/	/	/
40	124	200	380	600	/	/	/	/	/	/	/	/	/	/	/	/	/	/
50	132	215	400	640	1230	1300	2400	2750	/	/	/	/	/	/	/	/	/	/
75	152	250	520	840	1420	1490	2750	3090	/	/	/	/	/	/	/	/	/	/
100	172	285	580	950	1580	1650	3000	3350	/	/	/	/	/	/	/	/	/	/
125	/	/	640	1050	1740	1810	3260	3600	/	/	/	/	/	/	/	/	/	/
150	/	/	700	1150	1910	1980	3510	3860	/	/	/	/	/	/	/	/	/	/
175	/	/	760	1250	2070	2140	3760	4110	/	/	/	/	/	/	/	/	/	/
200	/	/	820	1350	2230	2300	4020	4360	/	/	/	/	/	/	/	/	/	/
Stroke	<b>Control unit with bearing bushes</b>																	
10	240	340	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
20	270	390	700	980	/	/	/	/	/	/	/	/	/	/	/	/	/	/
25	/	/	/	/	1540	1790	3110	3930	/	/	/	/	/	/	/	/	/	/
30	300	430	770	1070	/	/	/	/	/	/	/	/	/	/	/	/	/	/
40	350	510	890	1250	/	/	/	/	/	/	/	/	/	/	/	/	/	/
50	390	560	970	1340	1850	2150	3660	4590	/	/	/	/	/	/	/	/	/	/
75	470	670	1140	1570	2300	2640	4410	5460	/	/	/	/	/	/	/	/	/	/
100	560	790	1310	1810	2620	3000	4960	6120	/	/	/	/	/	/	/	/	/	/
125	/	/	1520	2080	2990	3420	5600	6880	/	/	/	/	/	/	/	/	/	/
150	/	/	1690	2310	3310	3780	6150	7540	/	/	/	/	/	/	/	/	/	/
175	/	/	1870	2540	3620	4140	6700	8210	/	/	/	/	/	/	/	/	/	/
200	/	/	2040	2770	3940	4500	7250	8870	/	/	/	/	/	/	/	/	/	/
Stroke	<b>Moving parts</b>																	
10	95	145	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
20	100	153	310	490	/	/	/	/	/	/	/	/	/	/	/	/	/	/
25	/	/	/	/	820	890	1770	2110	/	/	/	/	/	/	/	/	/	/
30	105	161	330	520	/	/	/	/	/	/	/	/	/	/	/	/	/	/
40	110	169	370	580	/	/	/	/	/	/	/	/	/	/	/	/	/	/
50	120	177	390	610	940	1010	1950	2300	/	/	/	/	/	/	/	/	/	/
75	145	197	440	690	1110	1180	2240	2590	/	/	/	/	/	/	/	/	/	/
100	170	217	480	760	1230	1300	2430	2770	/	/	/	/	/	/	/	/	/	/
125	/	/	560	880	1410	1480	2710	3050	/	/	/	/	/	/	/	/	/	/
150	/	/	600	950	1530	1600	2890	3240	/	/	/	/	/	/	/	/	/	/
175	/	/	650	1020	1650	1720	3080	3420	/	/	/	/	/	/	/	/	/	/
200	/	/	700	1100	1770	1830	3270	3610	/	/	/	/	/	/	/	/	/	/
Working pressure	<b>Cylinder theoretic force (N)</b>																	
2 bar	23	17	40	30	63	47	98	76	161	121	251	211	393	330	623	561	561	
3 bar	34	26	60	45	94	71	147	113	241	181	377	317	589	495	935	841	841	
4 bar	45	34	80	60	126	94	196	151	322	241	503	422	785	660	1247	1121	1121	
5 bar	57	43	101	76	157	118	246	189	402	302	629	528	982	825	1559	1402	1402	
6 bar	68	51	121	91	188	142	295	227	482	362	754	634	1178	989	1870	1682	1682	
7 bar	79	60	141	106	220	165	344	265	563	422	880	739	1374	1154	2182	1962	1962	
8 bar	90	68	161	121	251	189	393	302	643	482	1006	845	1570	1319	2494	2242	2242	
9 bar	102	77	181	136	283	212	442	340	724	543	1131	950	1767	1484	2805	2523	2523	
10 bar	113	85	201	151	314	236	491	378	804	603	1257	1056	1963	1649	3117	2803	2803	
Piston area (mm <sup>2</sup> )	out	in	out	in	out	in	out	in	out	in	out	in	out	in	out	in	in	
	113	85	201	151	314	236	491	378	804	603	1257	1056	1963	1649	3117	2803	2803	
	<b>Maximum permissible Momentum</b>																	
J	0,08		0,09		0,11		0,18		0,29		0,52		0,91		1,54			
<p>How to calculate the Momentum: <math>E_c = \frac{1}{2} m V^2</math> (J)</p> <p><b>m</b> = Total moving mass: weight of driven object added to weight of cylinder moving parts (kg)</p> <p><b>V</b> = max. speed: equal to average speed + 40% (m/sec)</p>																		

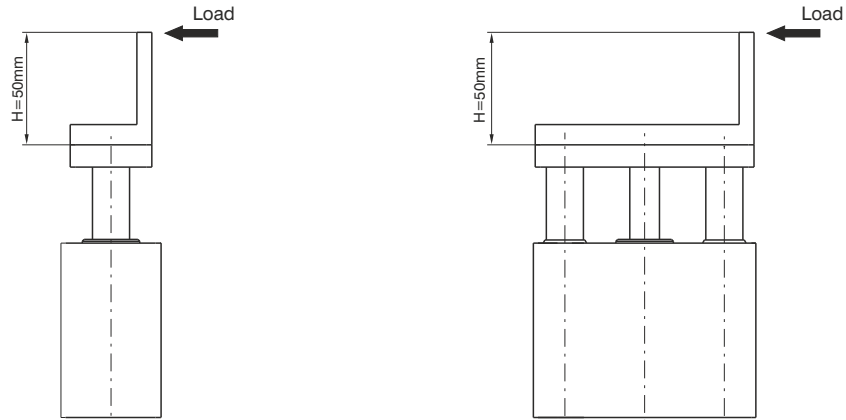
**Permissible lateral load (applied on overall plate)**

Version	Stroke	Bore							
		Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63
<b>Permissible lateral load (N)*</b>									
Control unit with bronze bushes	10	30	48						
	20	23	37	49	69				
	25					203	203	296	296
	30	19	30	43	60				
	40	16	25	38	54				
	50	14	20	35	49	164	164	245	245
	75	12	18	87	116	182	182	273	273
	100	10	15	75	100	159	159	241	241
	125			66	88	142	142	216	216
	150			59	79	127	127	195	195
	175			54	71	116	116	179	179
200			49	65	106	106	164	164	
Control unit with bearing bushes	10	20	35						
	20	15	28	58	69				
	25					191	190	208	206
	30	13	22	48	68				
	40	11	18	101	132				
	50	10	16	90	118	157	157	173	171
	75	8	14	70	93	164	163	223	221
	100	6	11	58	77	144	144	199	196
	125			62	80	203	203	264	262
	150			54	70	186	185	242	240
	175			48	62	171	171	224	221
200			43	55	158	158	207	205	
<b>Recommended torque moments (Nm)</b>									
Control unit with bronze bushes	10	0,40	0,70						
	20	0,35	0,65	1,1	1,8				
	25					6,4	7,0	13,0	14,7
	30	0,28	0,48	0,9	1,6				
	40	0,25	0,45	0,8	1,4				
	50	0,21	0,39	0,8	1,3	5,1	5,7	10,8	12,1
	75	0,42	0,68	1,9	3,0	5,7	6,3	12,0	13,5
	100	0,40	0,60	1,6	2,6	5,0	5,5	10,6	11,9
	125			1,4	2,3	4,4	4,9	9,5	10,7
	150			1,3	2,0	4,0	4,4	8,6	9,7
	175			1,2	1,8	3,6	4,0	7,9	8,9
200			1,1	1,7	3,3	3,7	7,2	8,2	
Control unit with bearing bushes	10	0,62	0,70						
	20	0,41	0,65	1,3	2,1				
	25					6,0	6,6	9,2	10,2
	30	0,33	0,48	1,0	1,8				
	40	0,30	0,45	2,2	3,4				
	50	0,48	0,39	1,9	3,0	4,9	5,4	7,6	8,5
	75	0,38	0,68	1,5	2,4	5,1	5,6	9,8	11,0
	100	0,32	0,60	1,3	2,0	4,5	5,0	8,7	9,7
	125			1,3	2,1	6,3	7,0	11,6	13,0
	150			1,2	1,8	5,8	6,4	10,7	11,9
	175			1,0	1,6	5,3	5,9	9,8	11,0
200			0,9	1,4	4,9	5,4	9,1	10,2	

\*(Applied on overall plate)

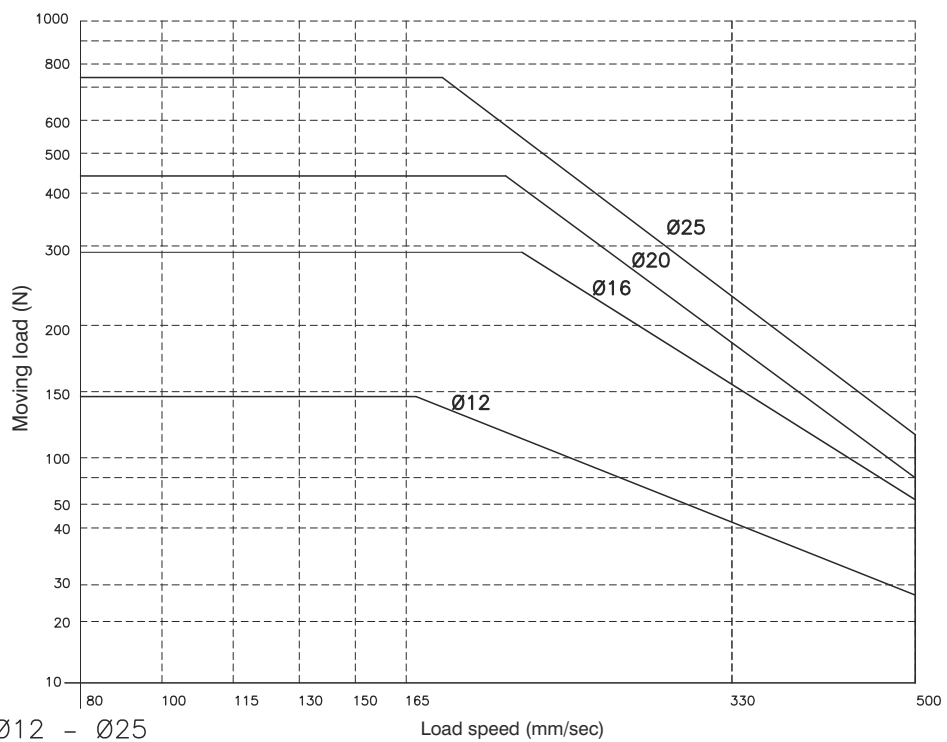


### Stopper device applications



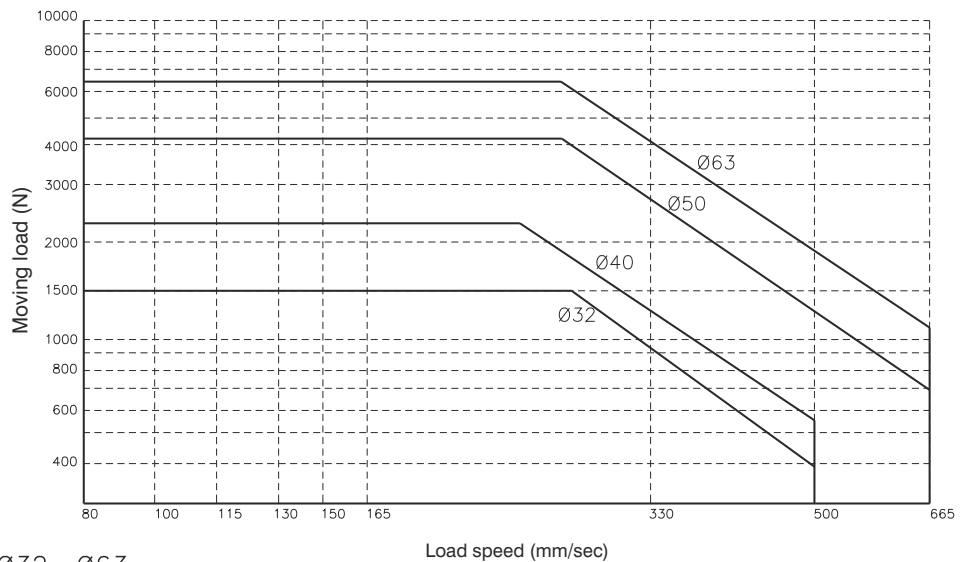
ATTENTION: if  $H > 50$  mm use larger bore

### Control unit with bronze bushes



Ø12 - Ø25

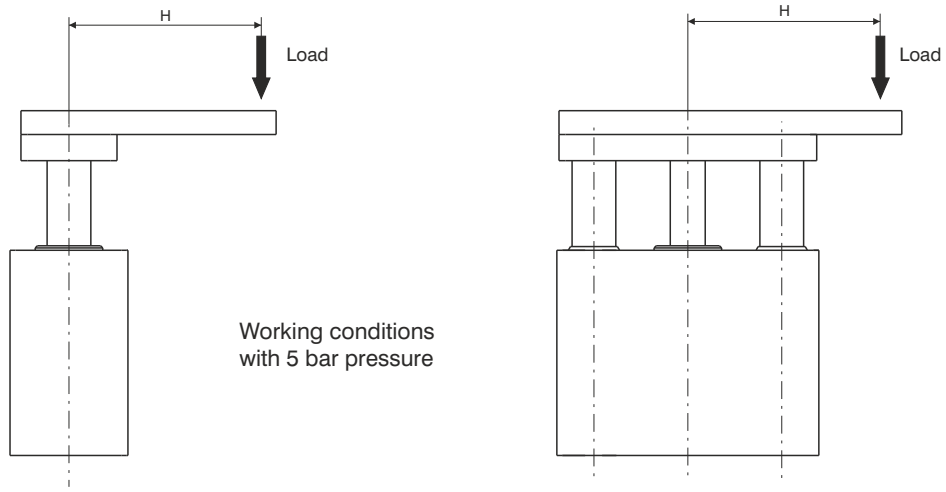
ATTENTION: use with stroke  $\leq 30$  mm



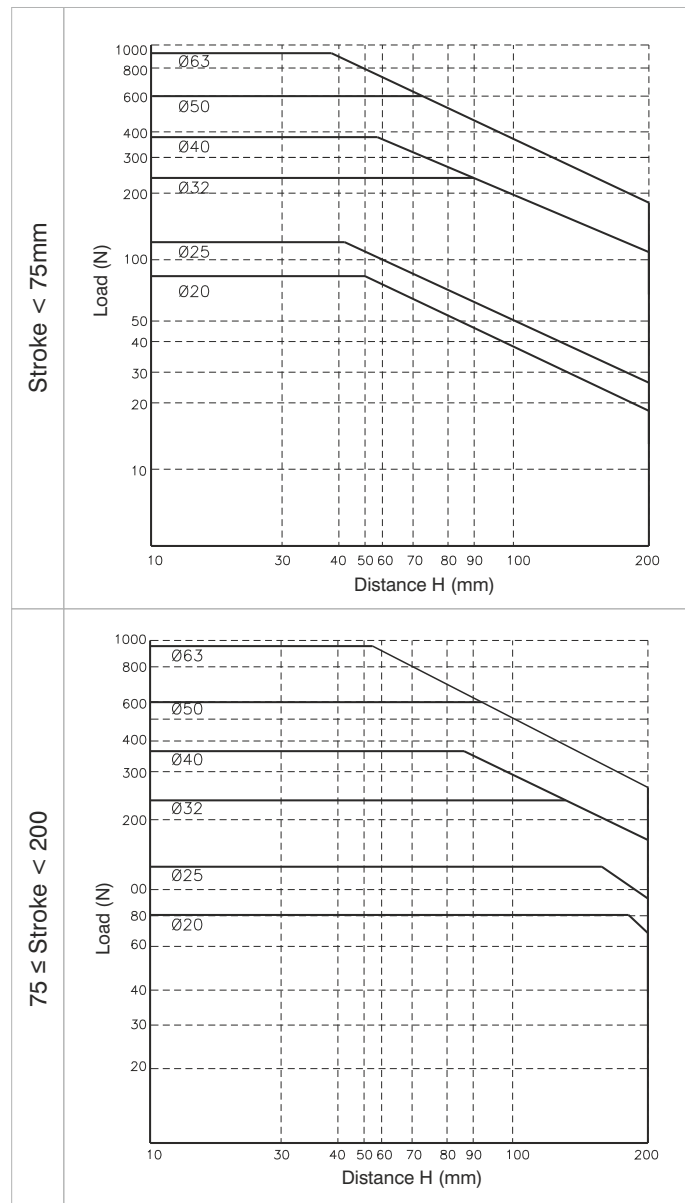
Ø32 - Ø63

ATTENTION: use with stroke  $\leq 50$  mm

### Handling applications

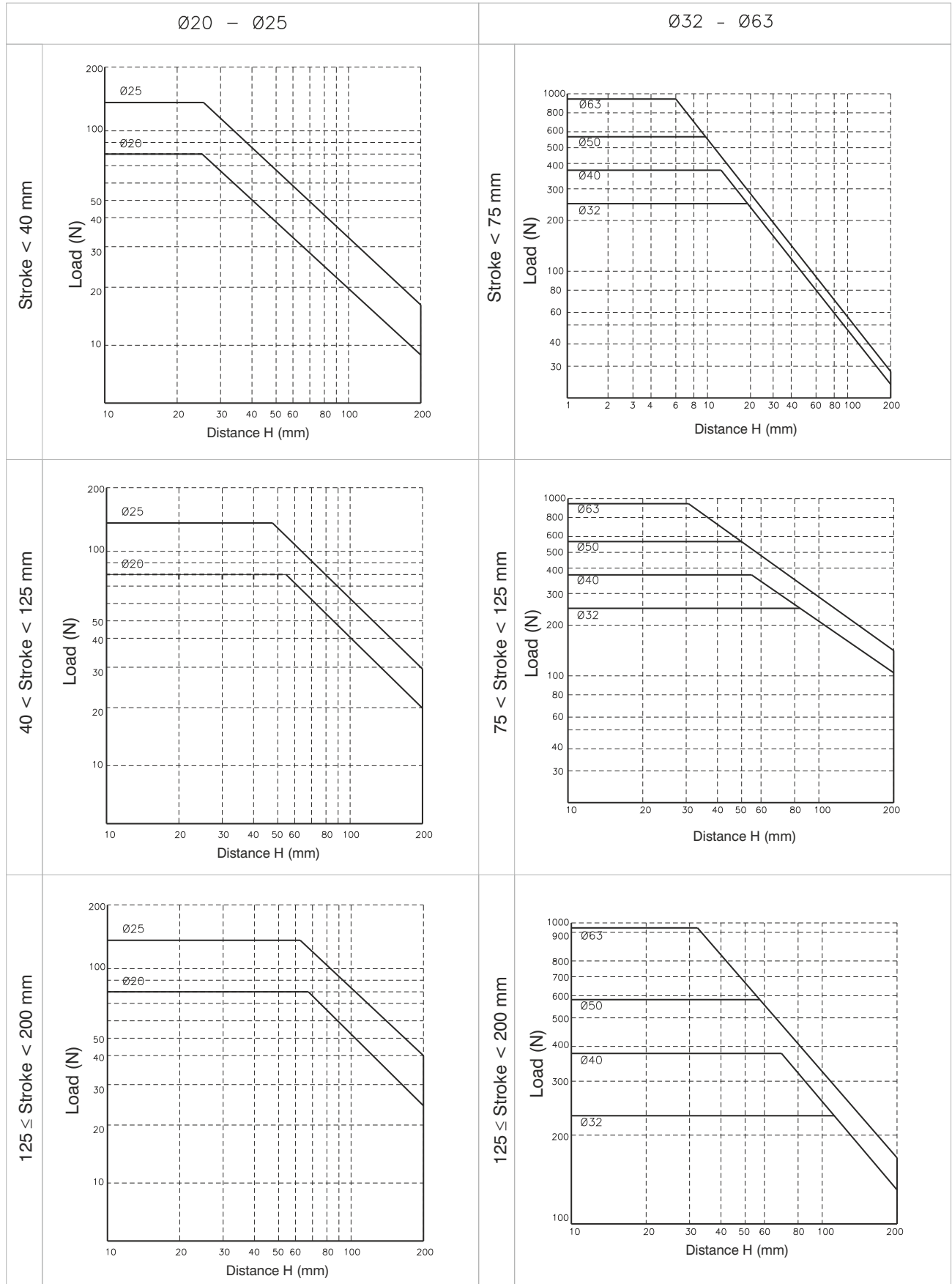


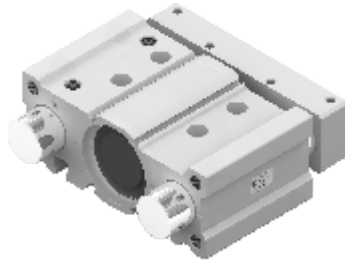
### Control unit with bronze bushes



## Handling applications

### Control unit with bearing bushes





**Ordering code**

**6101.80.stroke. B .**

└─ Side supply ports closed  
└─ **L** = Top supply ports closed

**Construction characteristics**

Body	anodised aluminium
Rods	C43 chromed steel
Piston	aluminium
Piston rod	C43 chromed steel
Piston rod bushing	sintered bronze
Rod bushing	teflon coated bush
End cover / End plate	aluminium
Piston seal	NBR oil-resistant rubber
Piston rod seal	PUR
Plate	anodised aluminium

**Technical characteristics**

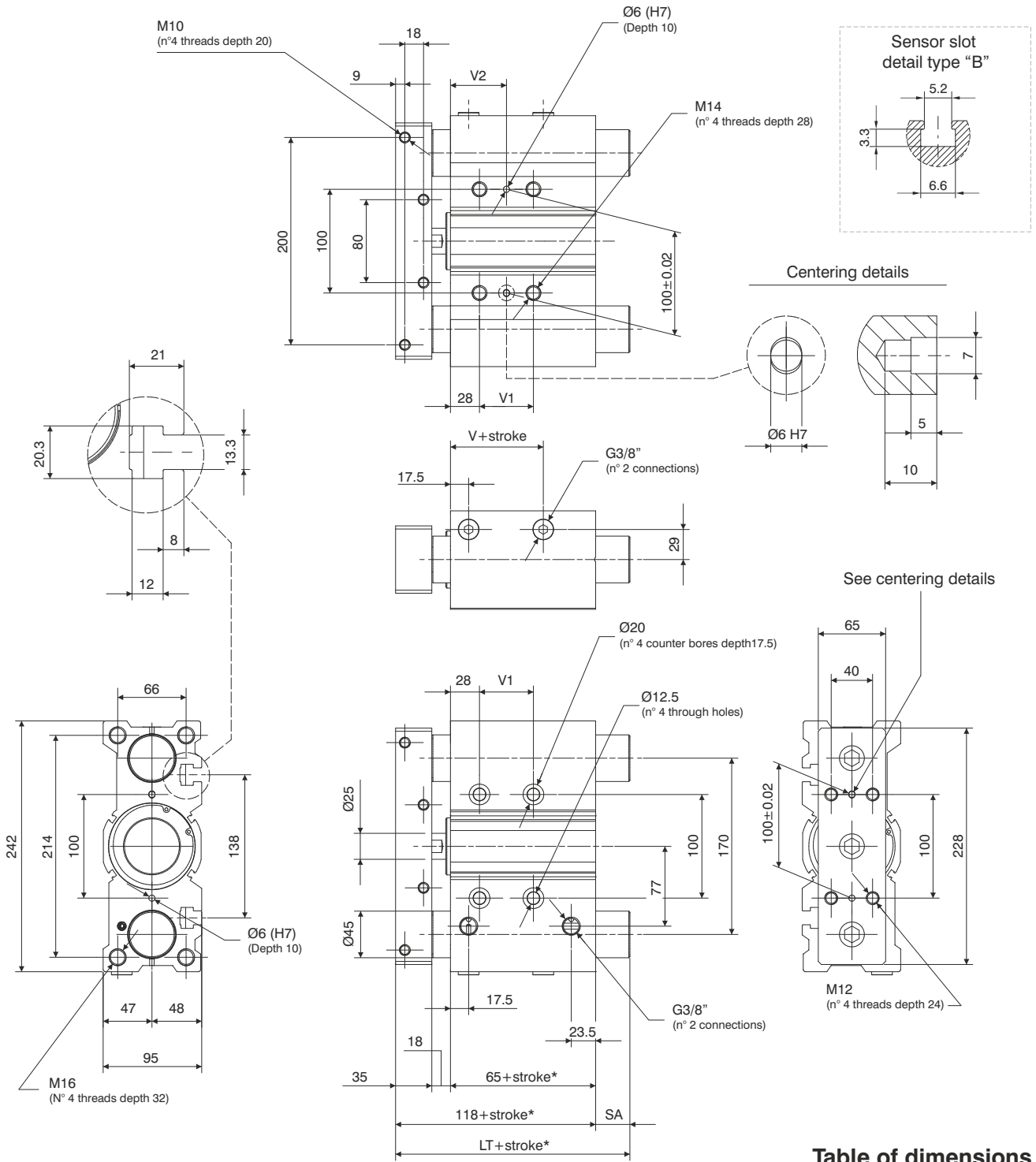
Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max. pressure	max. 10 bar
Working temperature	-5°C - +70°C
Cushioning	elastic bumper on both ends

**Standard strokes**

Bore	Stroke							
	25	50	75	100	125	150	175	200
Ø80	●	●	●	●	●	●	●	●

*Intermediate strokes can be obtained by adding specific spacers (5, 10, 15, 20mm)*  
 Example: It is possible to obtain a **6101.80.45.B** cylinder from a **6101.80.50.B** cylinder by adding a 5mm spacer (the overall dimension will remain as per the 50mm stroke). The Intermediate strokes manufactured without the use of spacers are considered special executions.





\*Dimensions only refer to the "standard stroke"

**Cylinder theoretic force (N)**

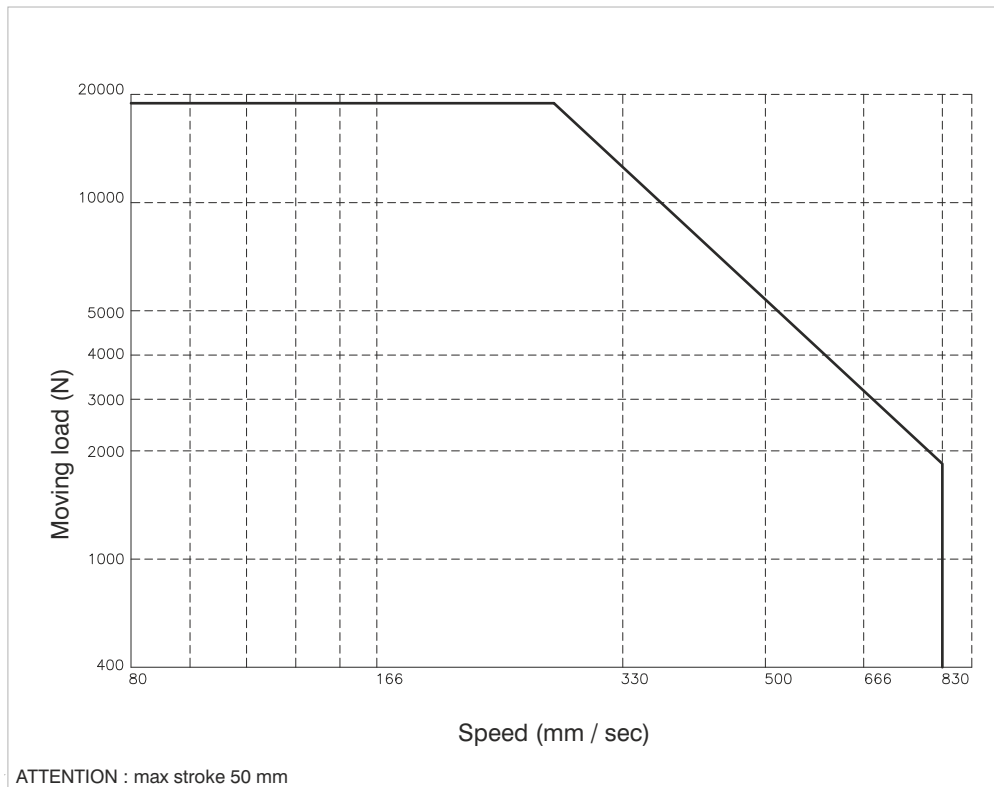
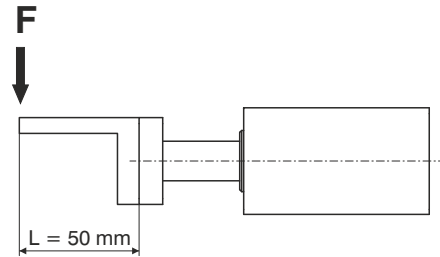
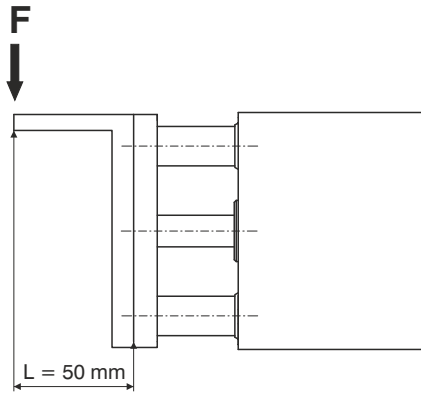
Working pressure		
2 bar	1005	907
3 bar	1508	1361
4 bar	2011	1814
5 bar	2513	2268
6 bar	3016	2721
7 bar	3519	3175
8 bar	4021	3629
9 bar	4524	4082
10 bar	5027	4536
Effective area (mm <sup>2</sup> )	out	in
	5027	4536

**Recommended torque moments**

Stroke	N/m
25	49
50	41
75	51
100	45
125	41
150	38
175	35
200	32

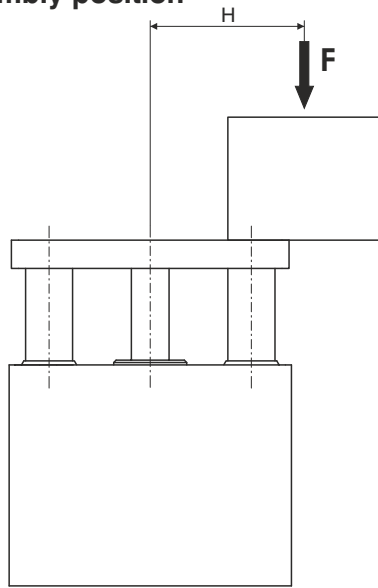


**“Stopper” device applications**

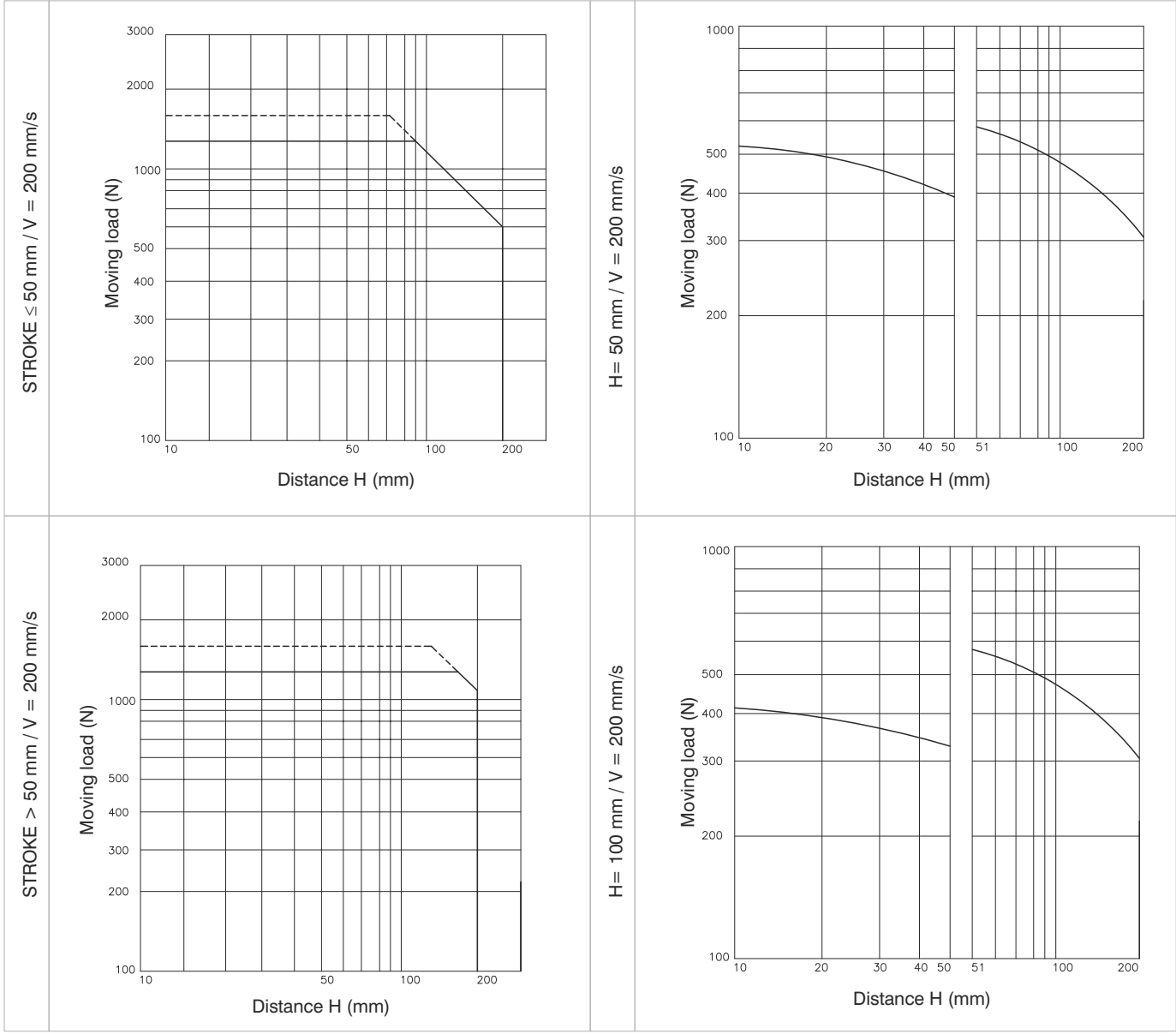
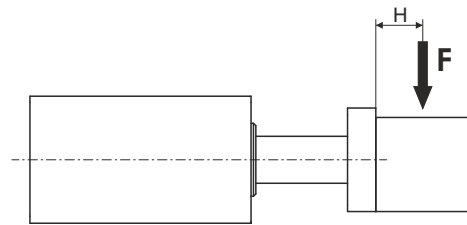


Handling applications

VERTICAL assembly position



HORIZONTAL assembly position



———— Working pressure : 4 bar  
 - - - - - Working pressure : 5 bar

## General

### TWIN-ROD SLIDE UNITS SERIES 6200 AND 6210

The 6200 series twin-rod linear guide units are wide cylinders used in manipulation applications and are characterised by their high force output thanks to their double piston design.

Bores range from 10mm to 32mm diameter, with sintered bronze bearings for standard applications and linear ball bearings for more rugged applications.

One major characteristic of these cylinders is the precision of their anti-rotational design, with the possibility of regulating the stroke to within 0.5mm.

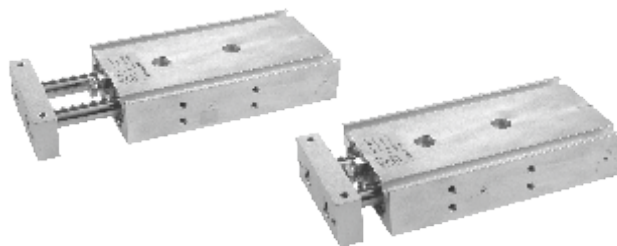
When using magnetic sensors, the 1580 series sensor sits entirely within the extrusion, resulting in a smooth profile.

The liner guided units range includes , alongside the conventional two rod version with flange series 6200 , also the through rod version with twin flanges series 6210

Thanks to the twin-rod, double yoke design of the 6210 series it is possible to either fix the body and use the ends of the rods, or alternatively to fix the rod ends and use the body as the moving part. The cylinder can be piped through the body or through the rods depending on the application.

Stroke limiting screws are fitted at either end of the stroke. The substitution of these screws with shock absorbers makes it possible to use the cylinder on higher velocity applications (up to 500mm/sec.)

Slots are provided along the edge of these units to accommodate 1580 series miniature sensors.



### Ordering code

6200.Ø.stroke.

10	B = Control unit with bronze bush C = Control unit with bearing bush
15	
20	
25	
32	

### Construction characteristics

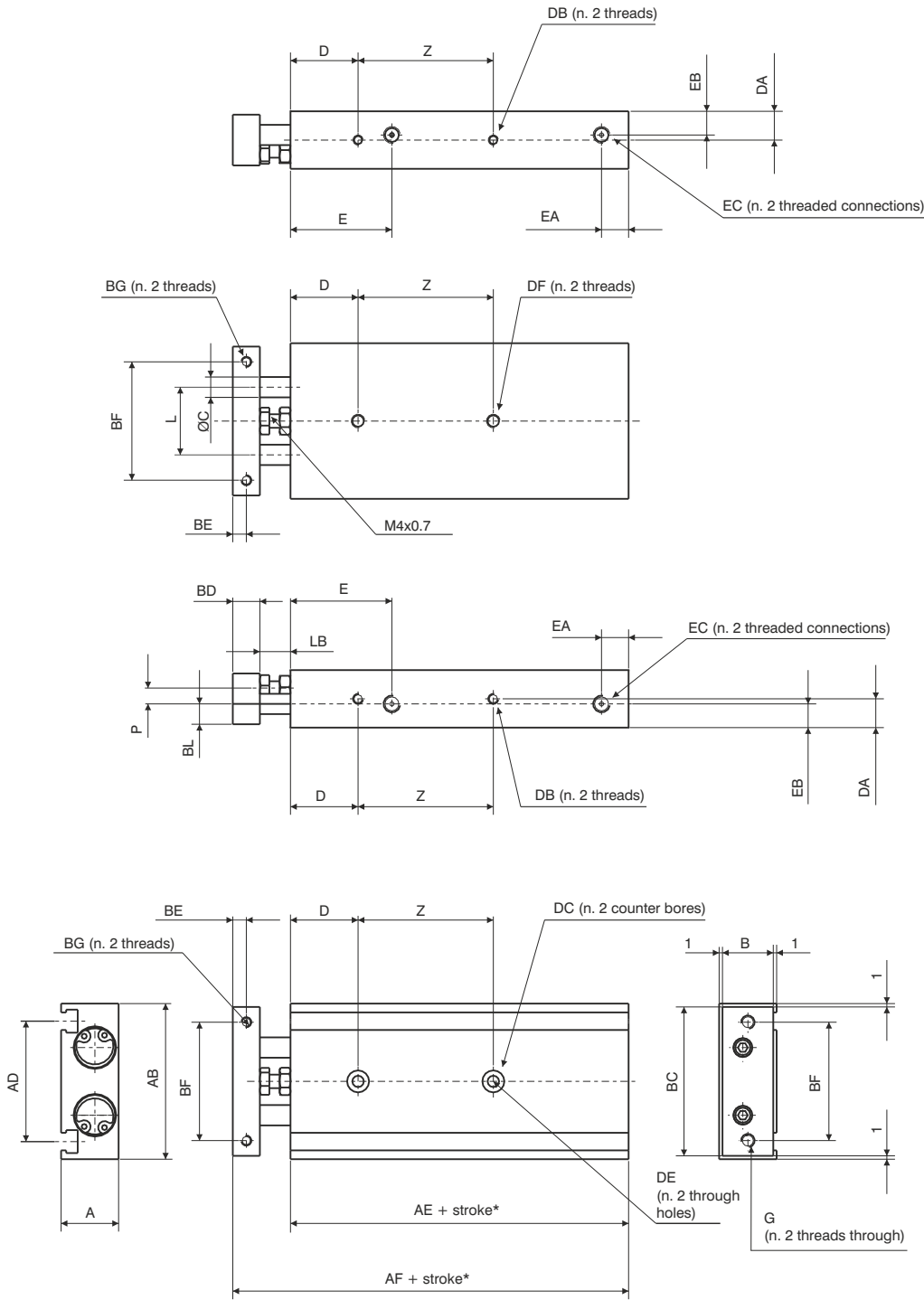
Body	anodised aluminium
Rods	C43 chromed steel (control unit with bronze bush) tempered and chromed steel (control unit with bearing bush)
Piston	aluminium
Rod bushing	brass
End plate	anodised aluminium
Piston seal	oil resistant NBR rubber
Piston rod seal	PUR
Plate	anodised aluminium

### Technical characteristics

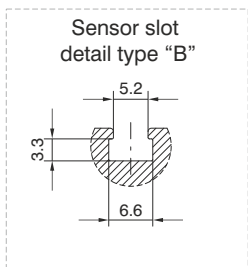
Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max. pressure	7 bar
Working temperature	-5°C - +70°C
Cushioning	elastic bumper

### Standard strokes

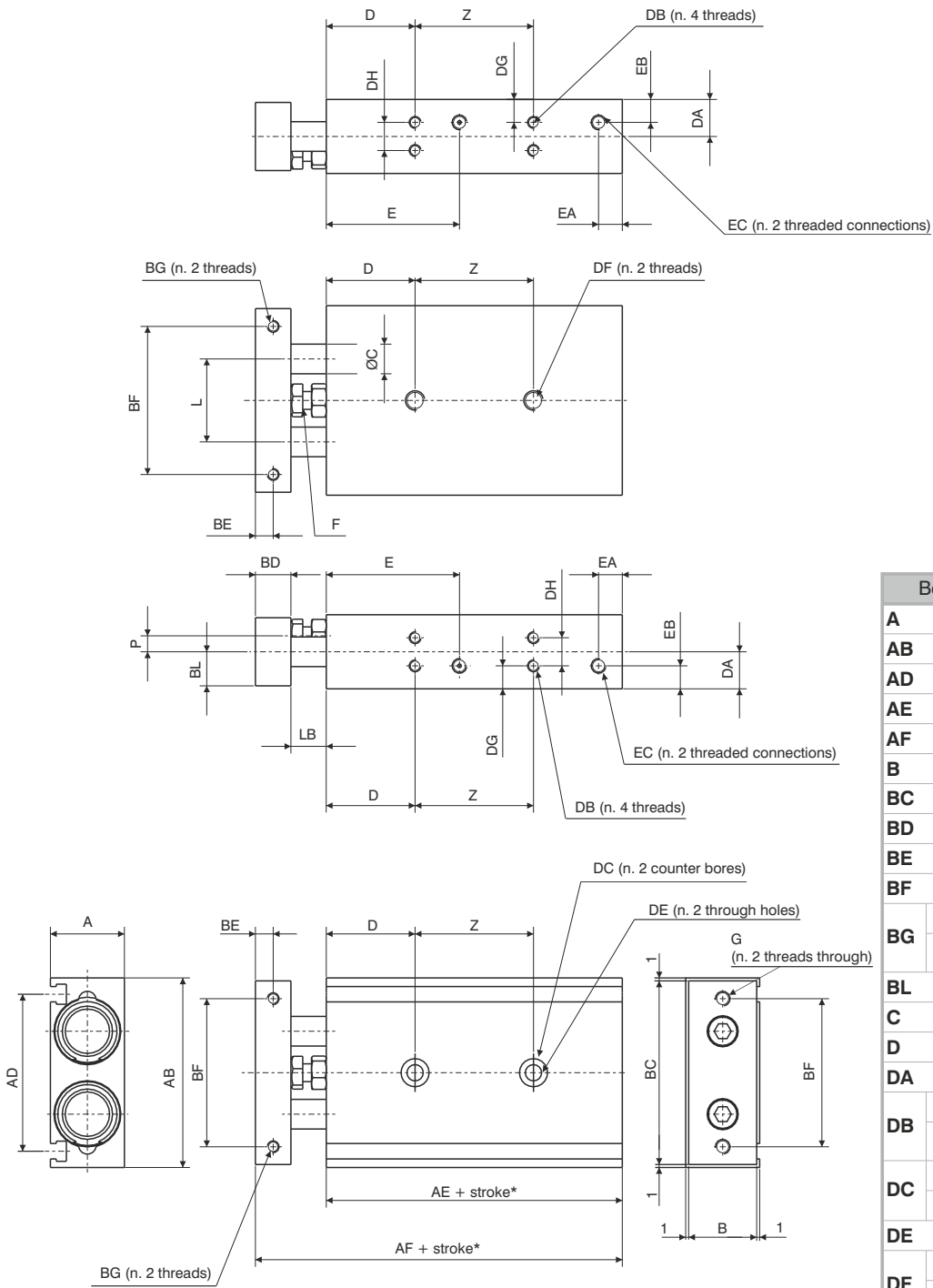
Bore	Stroke														
	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
Ø10	●	●	●	●	●	●	●	●	●	●	●				
Ø15	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ø20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ø25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ø32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



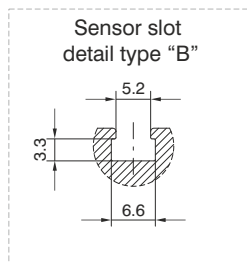
\*Dimensions only refer to the "standard stroke"



	Bore	Ø10	Ø15
A		17	20
AB		46	58
AD		35,6	48
AE		55	60
AF		72	79
B		15	18
BC		44	56
BD		8	10
BE		4	5
BF		35	45
BG		M3x0,5	M4x0,7
BG	Useful depth	5	6
BL		6	9
C		6	8
D		20	30
DA		8,5	10
DB		M3x0,5	M4x0,7
DB	Useful depth	4,5	5
DC		6,5	8
DC	depth	3,3	4,4
DE		3,4	4,3
DF		M4x0,7	M5x0,8
DF	Useful depth	7	8
E		30	38,5
EA		8	8
EB		7	10
EC		M5x0,8	M5x0,8
EC	Useful depth	4,5	4,5
F		M4x0,7	M4x0,7
G		M4x0,7	M5x0,8
L		20	25
LB		9	9
P		4,7	4,5
Z	stroke		
	10 - 25	30	25
	30 - 50	40	35
	60 - 75	50	45
	80	-	45
	90-100	-	55



\*Dimensions only refer to the "standard stroke"



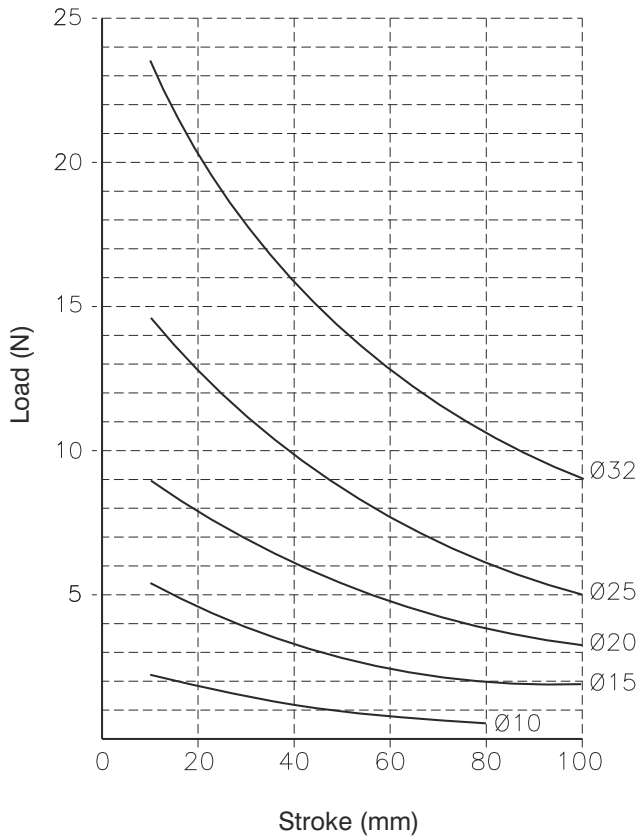
Bore		Ø20	Ø25	Ø32
A		25	30	38
AB		64	80	98
AD		53	64	76
AE		70	72	82
AF		94	96	112
B		23	28	36
BC		62	78	96
BD		12	12	16
BE		6	6	8
BF		50	60	75
BG		M4x0,7	M5x0,8	M5x0,8
BG	Useful depth	6	7,5	8
BL		11,5	14	18
C		10	12	16
D		30	30	30
DA		12,5	15	19
DB		M4x0,7	M5x0,8	M5x0,8
DB	Useful depth	6	7,5	7,5
DC		9,5	11	11
DC	depth	5,3	6,3	6,3
DE		5,5	6,9	6,9
DF		M6x1	M8x1,25	M8x1,25
DF	Useful depth	10	12	12
DG		7,75	8,5	9
DH		9,5	13	20
E		45	46	56
EA		8	9	10
EB		7,75	15	19
EC		M5x0,8	G1/8	G1/8
EC	Useful depth	4,5	6,5	6,5
F		M6x1	M6x1	M8x1,25
G		M5x0,8	M6x1	M6x1
L		28	35	44
LB		12	12	14
P		5,4	7,8	12
Z	stroke	10 - 25	30	30
Z	stroke	30 - 50	40	40
Z	stroke	60 - 100	60	60



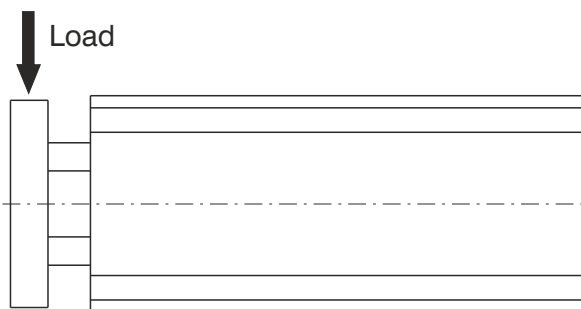
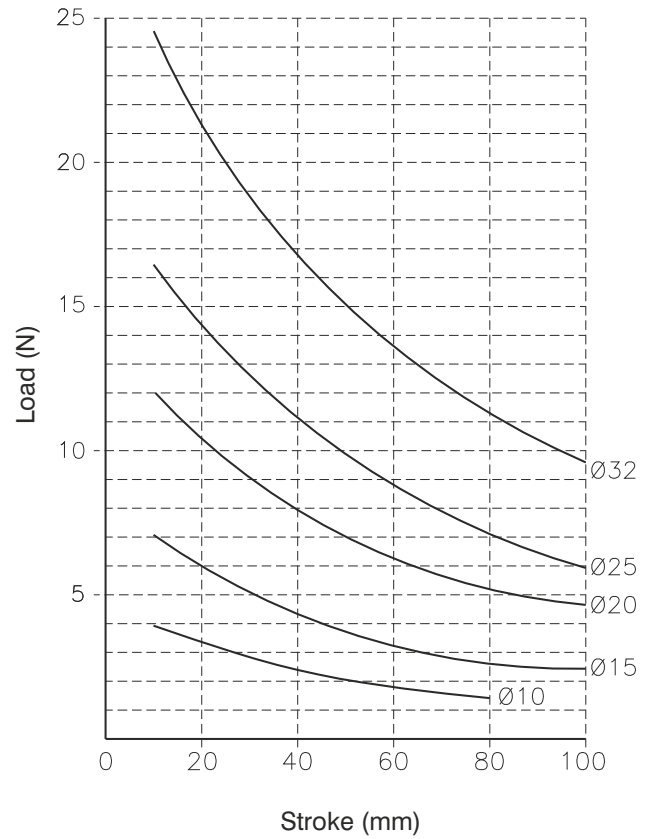
Stroke	Bore									
	Ø10		Ø15		Ø20		Ø25		Ø32	
	<b>Control unit with bronze bush</b>									
	<b>Weight (gr)</b>									
10	150	250	400	610	1150					
15	160	265	420	635	1190					
20	170	280	440	660	1230					
25	180	290	460	690	1275					
30	190	300	480	720	1320					
35	200	315	495	745	1360					
40	210	330	510	770	1400					
45	220	345	530	800	1450					
50	230	360	550	830	1490					
60	250	390	585	890	1580					
70	270	420	620	950	1665					
75	280	435	640	970	1710					
80		450	660	995	1755					
90		480	700	1060	1840					
100		510	740	1000	1930					
	<b>Control unit with bearing bush</b>									
10	160	270	430	620	1160					
15	165	285	445	645	1205					
20	170	300	460	670	1250					
25	180	310	480	700	1295					
30	190	320	500	730	1340					
35	200	335	515	755	1380					
40	210	350	530	780	1420					
45	220	365	550	810	1465					
50	230	380	570	840	1510					
60	250	410	605	895	1595					
70	270	440	640	955	1680					
75	280	455	660	980	1720					
80		470	680	1005	1765					
90		500	715	1065	1855					
100		530	750	1110	1940					
	<b>Theoretical slide force</b>									
Working pressure										
1 bar	16	10	35.5	25	63	47	98	75.5	161	120.5
1.5 bar	23.5	15	53	38	94	62.5	147.5	113.5	241	181
2 bar	31.5	20.0	70.5	50.5	125.5	94	196.5	151	321.5	241
3 bar	47	30	106	75.5	188.5	141	294.5	227	482.5	362
4 bar	63	40	141	101	251	188	393	302.5	643	482.5
5 bar	78.5	50	176.5	126	314	236	491	378	804	603
6 bar	94	60	212	151	377	283	589	453.5	965	723.5
7 bar	110	70	247	176.5	440	330	687.5	529	1125.6	844
	Out	In	Out	In	Out	In	Out	In	Out	In

### Possible loads

Control unit with bronze bush



Control unit with bearing bush





**Ordering code**

6210.Ø.stroke.

- 10
- 15
- 25

C = Fixed body  
P = Fixed end plates

**Construction characteristics**

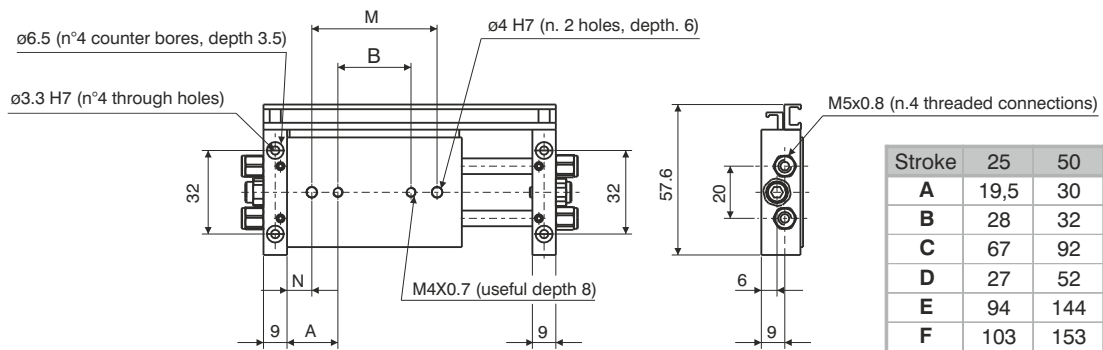
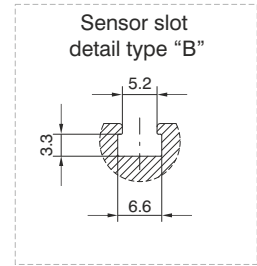
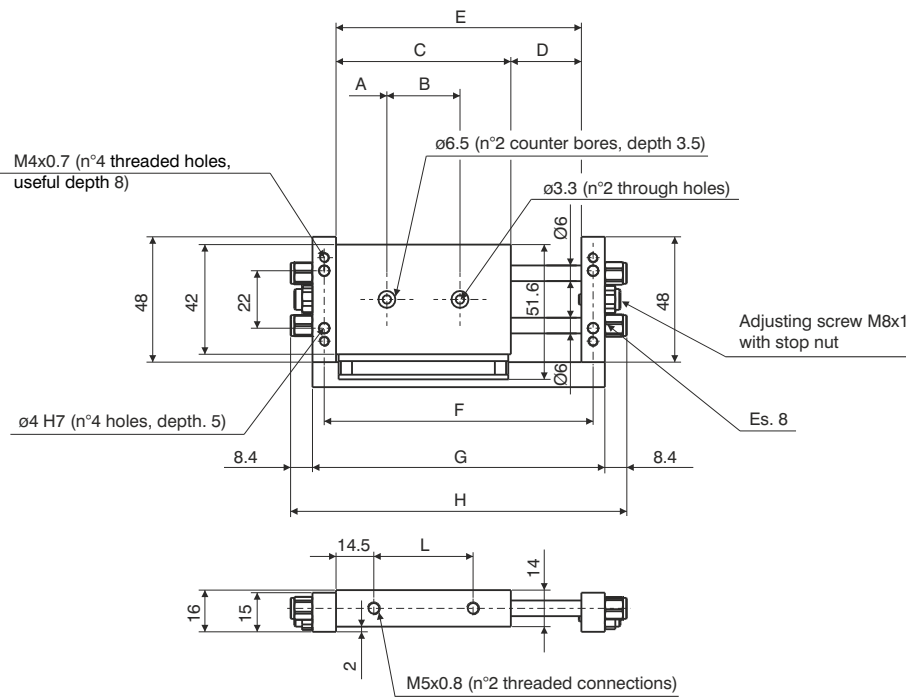
Body	anodised aluminium
Rods	stainless steel
Piston	aluminium
Piston rod bushing	brass
Piston seal	oil resistant NBR rubber
Piston rod seal	PUR
Plate	anodised aluminium

**Technical characteristics**

Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max pressure	10 bar
Operating temperature	-5°C - +70°C
Cushioning	with decelerator (available on request)

**Standard strokes**

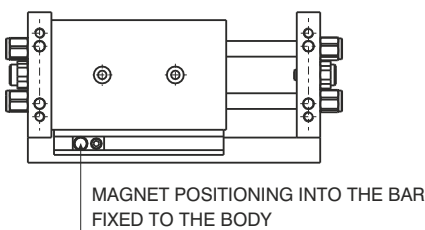
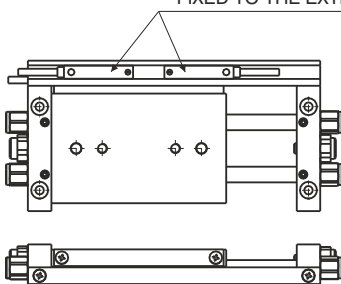
Bore	Stroke							
	25	50	75	100	125	150	175	200
Ø10	●	●	●	●				
Ø15	●	●	●	●	●	●	●	●
Ø25	●	●	●	●	●	●	●	●



Stroke	25	50	75	100
<b>A</b>	19,5	30	35	35
<b>B</b>	28	32	47	72
<b>C</b>	67	92	117	142
<b>D</b>	27	52	77	102
<b>E</b>	94	144	194	244
<b>F</b>	103	153	203	253
<b>G</b>	112	162	212	262
<b>H</b>	129	179	229	279
<b>L</b>	38	63	88	113
<b>M</b>	48	52	67	92
<b>N</b>	9,5	20	25	25
<b>Weight</b>				
gr.	160	230	280	310

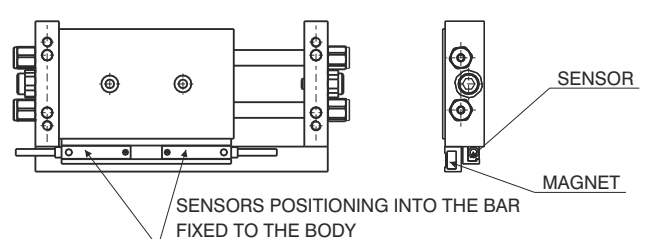
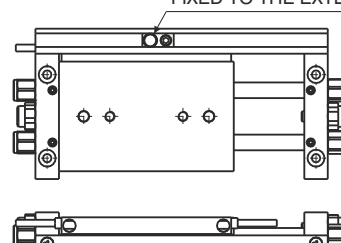
MOUNTING WITH FIXED PLATE

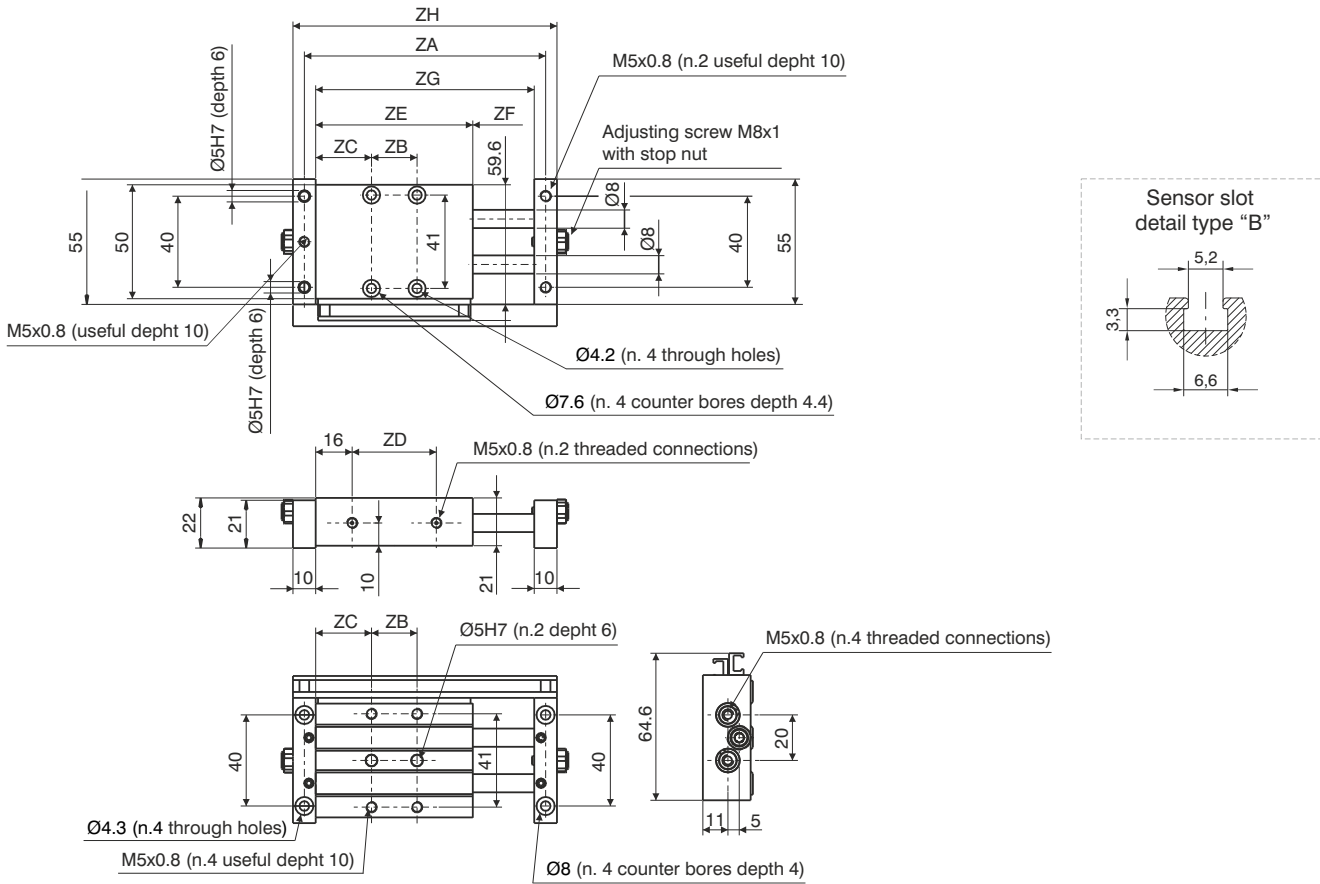
SENSORS POSITIONING INTO THE BAR  
FIXED TO THE EXTERNAL PLATE



MOUNTING WITH A FIXED BODY

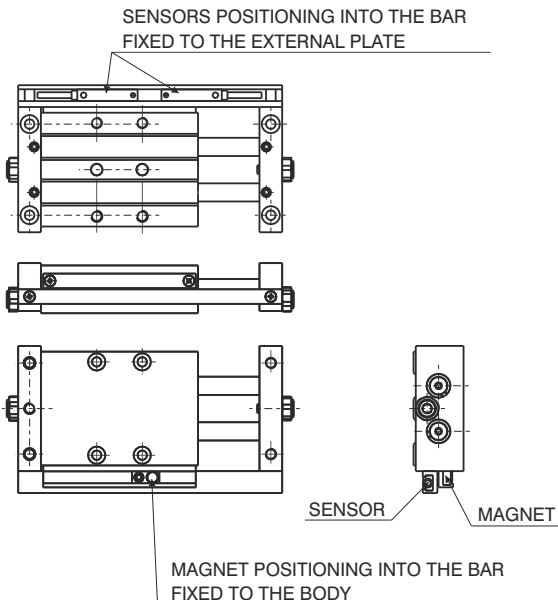
MAGNETS POSITIONING INTO THE BAR  
FIXED TO THE EXTERNAL PLATE



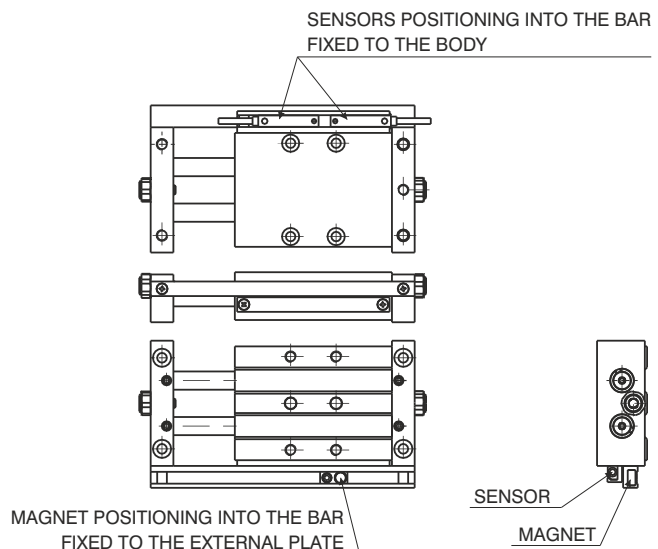


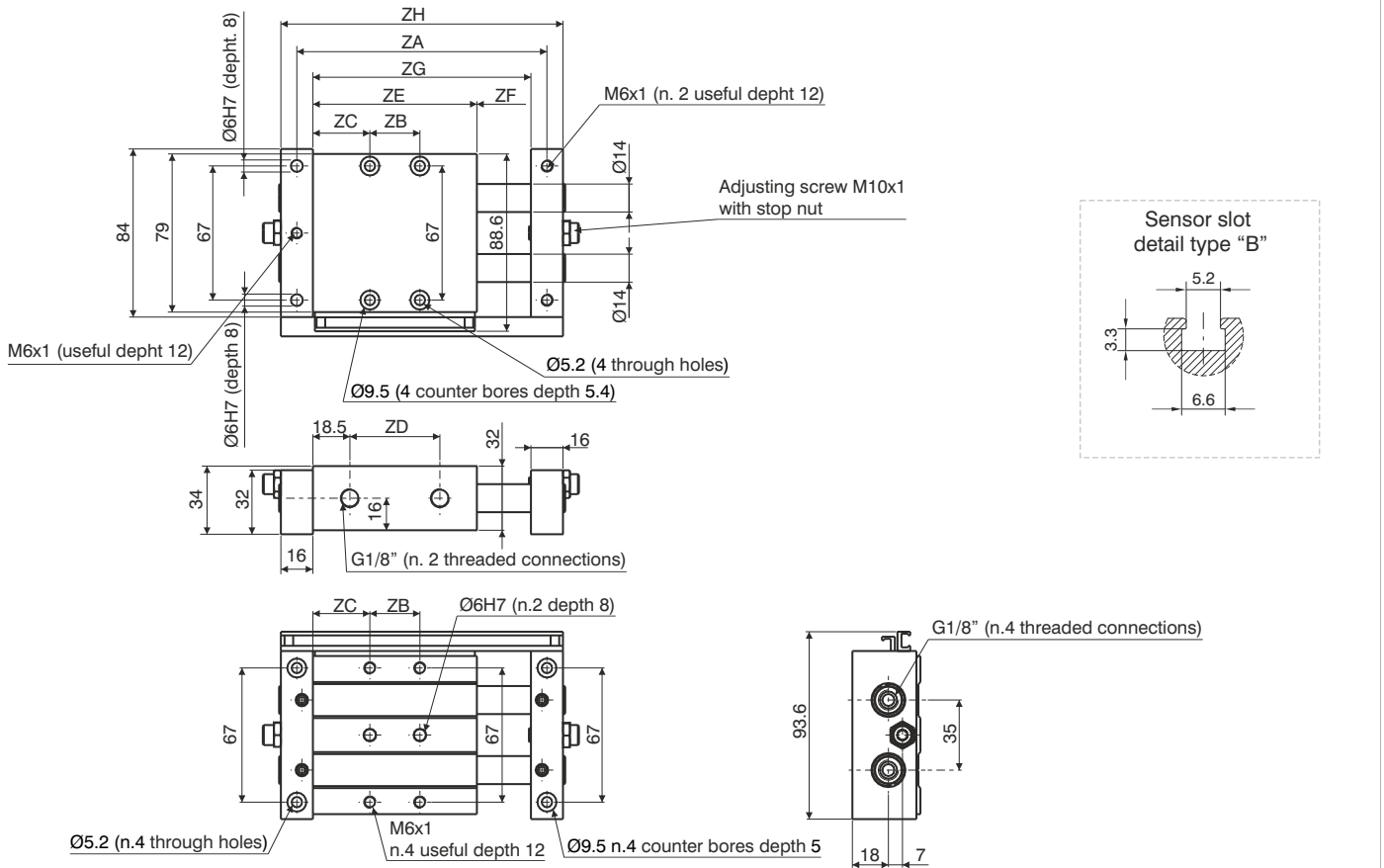
Stroke	25	50	75	100	125	150	175	200
<b>ZA</b>	106	156	206	256	306	356	406	456
<b>ZB</b>	20	45	65	90	90	90	90	90
<b>ZC</b>	24,5	24,5	27	27	39,5	52	64,5	77
<b>ZD</b>	37	62	87	112	137	162	187	212
<b>ZE</b>	69	94	119	144	169	194	219	244
<b>ZF</b>	27	52	77	102	127	152	177	202
<b>ZG</b>	96	146	196	246	296	346	396	446
<b>ZH</b>	116	166	216	266	316	366	416	466
<b>Weight</b>								
gr.	240	350	450	550	670	750	900	1000

**MOUNTING WITH FIXED PLATE**



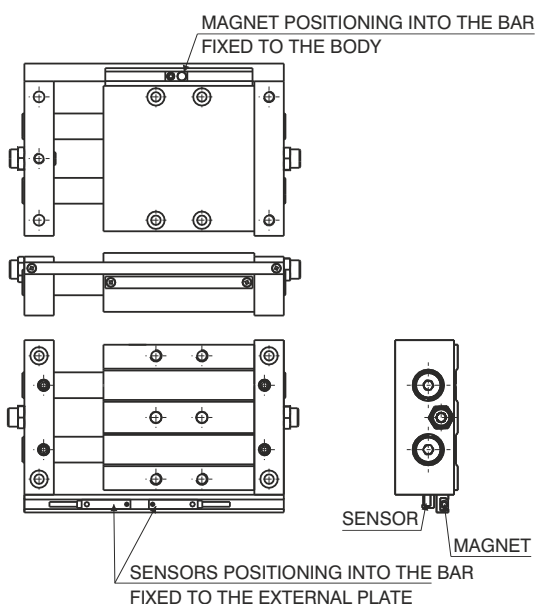
**MOUNTING WITH FIXED BODY**



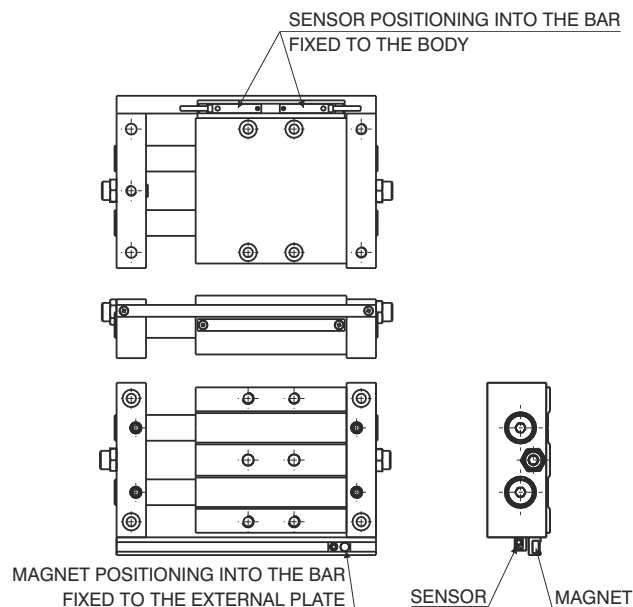


Stroke	25	50	75	100	125	150	175	200
<b>ZA</b>	125	175	225	275	325	375	425	475
<b>ZB</b>	25	45	65	90	90	90	90	90
<b>ZC</b>	28,5	31	33,5	33,5	46	58,5	71	83,5
<b>ZD</b>	45	70	95	120	145	170	195	220
<b>ZE</b>	82	107	132	157	182	207	232	257
<b>ZF</b>	27	52	77	102	127	152	177	202
<b>ZG</b>	109	159	209	259	309	359	409	459
<b>ZH</b>	141	191	241	291	341	391	441	491
<b>Weight</b>								
gr.	950	1140	1350	1600	1800	2000	2300	2500

MOUNTING WITH FIXED PLATE



MOUNTING WITH FIXED BODY



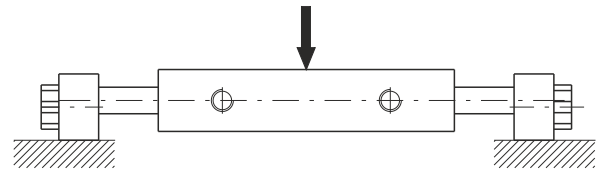
### Theoretical force (N)

Working pressure	Bore		
	Ø10	Ø15	Ø25
2 bar	20	41	119
3 bar	30	62	179
4 bar	40	83	239
5 bar	51	104	299
6 bar	61	124	358
7 bar	71	145	418
8 bar	81	166	478
9 bar	91	186	537
	101	207	597
	Effective area (mm <sup>2</sup> )		

### Deflection of piston rods

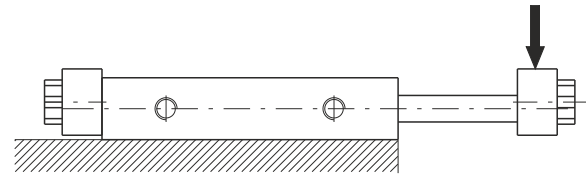
Applied load to body centre

Bore	Load	Deflection (mm)	
Ø10	10 N	0,07	/
Ø15	30 N	0,08	0,28
Ø25	60 N	0,02	0,08
		100	200
		Stroke	

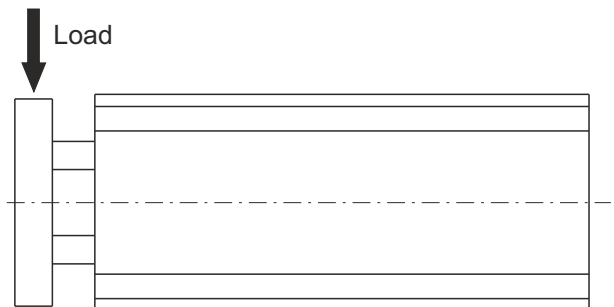
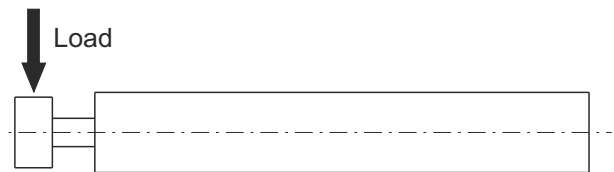
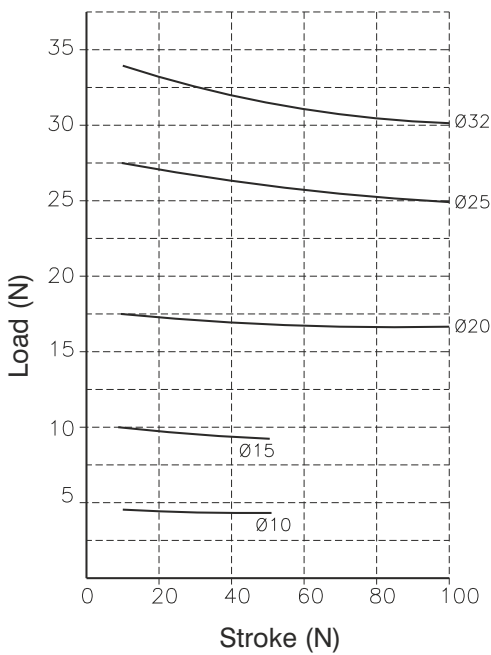


Applied load to body centre

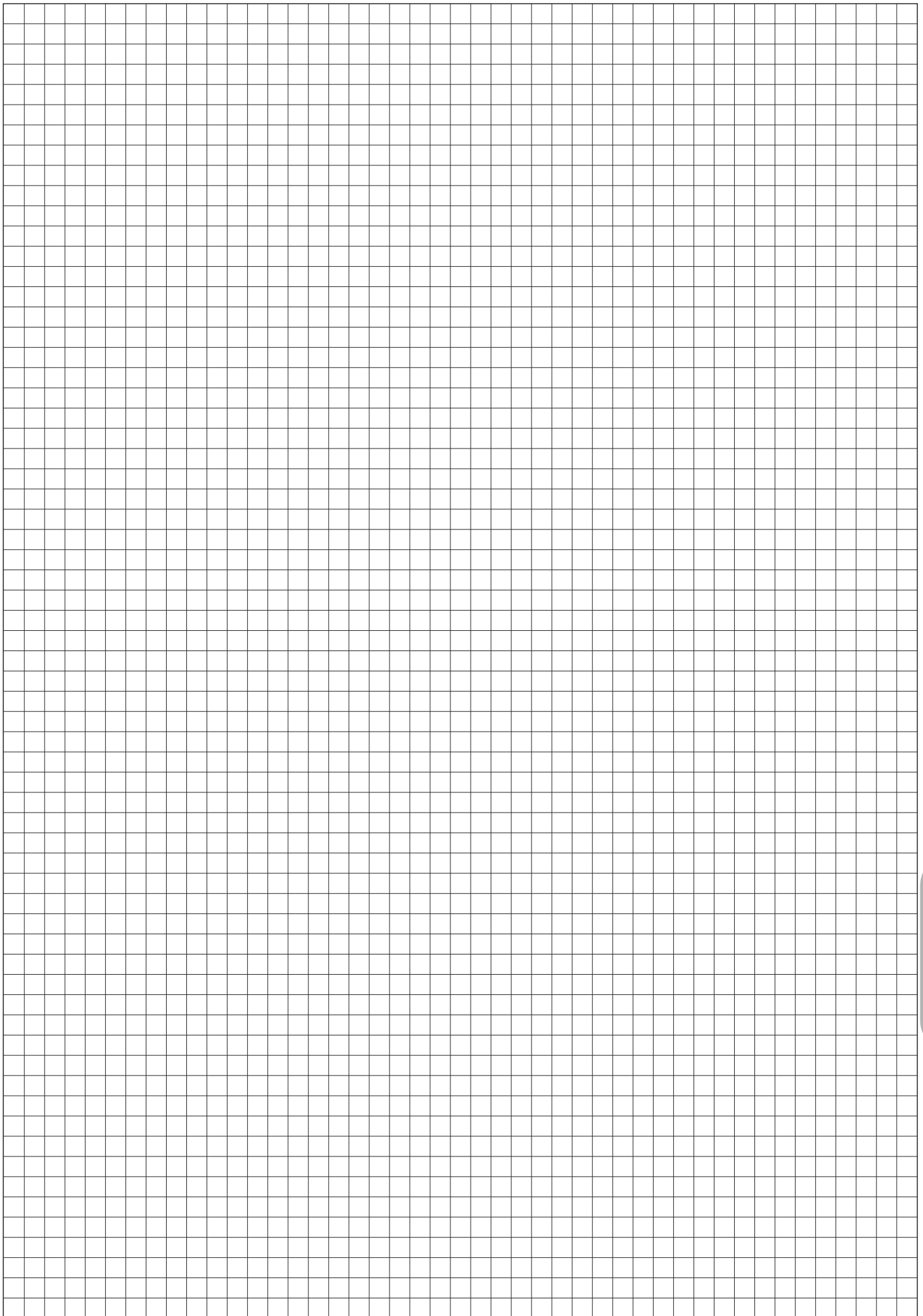
Bore	Load	Deflection (mm)			
Ø10	3 N	0,06	0,3	/	/
Ø15	5 N	0,1	0,2	0,5	1
Ø25	10 N	0,03	0,1	0,15	0,25
		50	100	150	200
		Stroke			



### Control unit with bronze bushes







## General

Pneumatic grippers from the 6300 series are typically used in complex systems such as assembly machines, robots, manipulators etc.

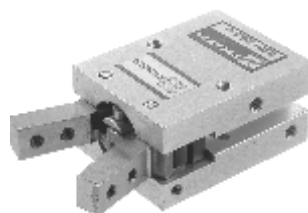
This series covers the wide range requirements of this sector, allowing a variety of applications.

The range includes grippers equipped with holding fingers operating from  $-10^{\circ}$  to  $+30^{\circ}$  degrees, with  $180^{\circ}$  degree opening, or a parallel guided gripper with great rigidity throughout the stroke.

The parallel grippers cater for larger openings (three different strokes for each diameter) with synchronised operation via a pinion-rack system with high strength thanks to a double piston mechanism.

For the typical application of supplying a piece upon to a machine tool, make provision for an automatic three-pronged movement carried along by a wedge mechanism, containing the elevated force dimensions.

The holding fingers can have a tolerance reference as a precise fixing device for the catching mechanism. Every type of "hand" offers different functional levels of performance at varying diameters and lengths, secondary to the application by the "fingers".



### Ordering code

6301.Ø.

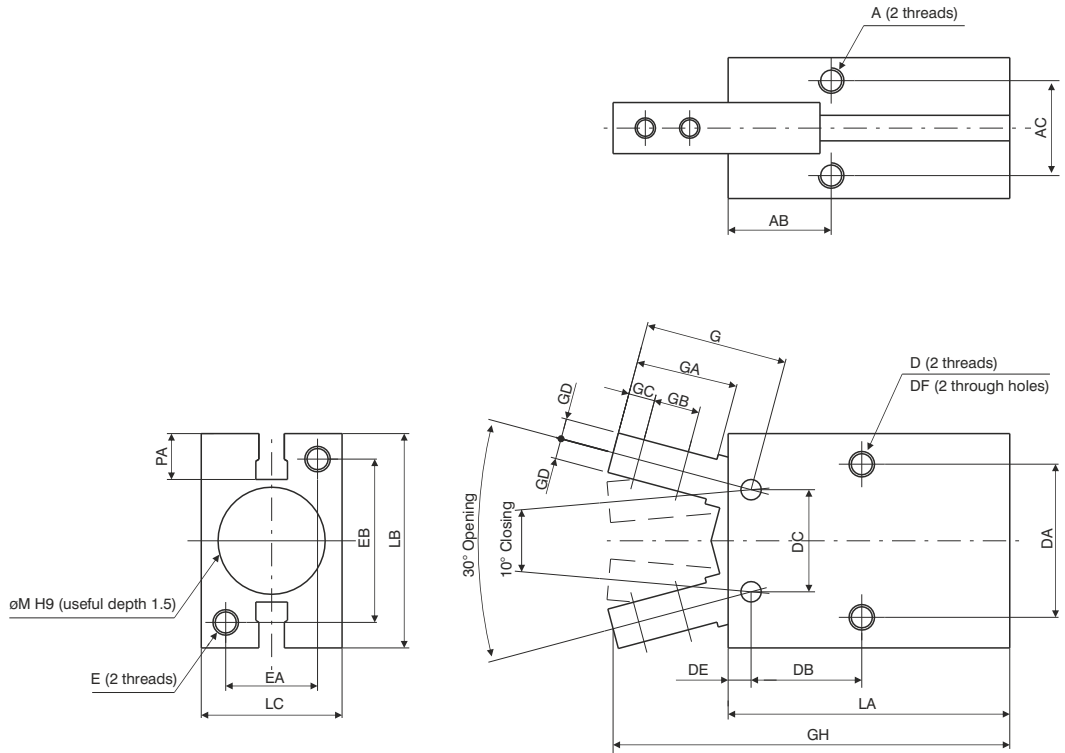
10	D = Double acting S = Single acting (N.O.)
16	
20	
25	

### Construction characteristics

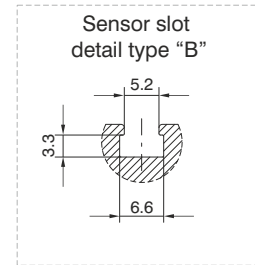
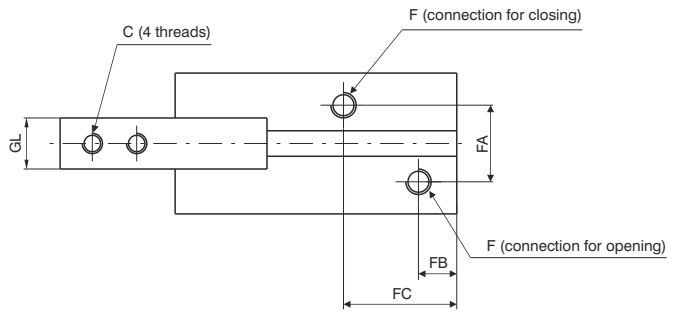
Body	anodised aluminium
Piston	AISI 303 stainless steel
Fingers	nitrate steel
End cover	anodised aluminium
Seals	oil resistant NBR rubber

### Technical characteristics

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)		
Working pressure	1 - 6 bar (double acting) - 2.5 - 6 bar (single acting)		
Operating temperature	-5°C - +70°C		
Opening total stroke	-10° - 30°		
Holding force (Nm) at 5 bar	Bore - Double acting - Single acting		
	Ø10	0.1	0.07
	Ø16	0.4	0.30
	Ø20	0.7	0.55
	Ø25	1.35	1.08
Maximum operating frequency	from Ø10 to Ø25, 190 cycles/minute		



Bore	Ø10	Ø16	Ø20	Ø25
A	M3x0,5	M4x0,7	M5x0,8	M6
Useful depth	6	6,5	8	10
AB	11,6	14,6	20,2	23,9
AC	11,4	16	18,6	22
C	M2,5x0,45	M3x0,5	M4x0,7	M5x0,8
D	M3x0,5	M4x0,7	M5x0,8	M6
Useful depth	5	8	10	12
DA	16	24	30	36
DB	12,8	16,2	21,7	25,8
DC	10	16	20	25
DE	2,8	3,9	4,5	4,6
DF	2,6	3,4	4,3	5,1
E	M3x0,5	M4x0,7	M5x0,8	M6
Useful depth	6	8	10	12
EA	12	15	18	22
EB	18	22	32	40
F	M3x0,5	M5x0,8	M5x0,8	M5x0,8
FA	11	13	15	20
FB	7,2	7	7,5	7,7
FC	18,8	18,3	22,2	23,5
G	17,2	22,6	28	37,5
GA	12	16	20	27
GB	5,7	7	9	12
GC	3	4	5,2	8
GD	2	3,5	4	5
GH	52,4	62,5	78,7	92
GL <sup>0/-0,1</sup>	6,4	8	10	12
LA	38,6	44,6	55,2	60,4
LB	23	30,6	42	52
LC	16,4	23,6	27,6	33,6
M <sup>H9</sup>	11	17	21	26
PA	5,4	5,8	9	11,5
Weight (gr.)	40	90	180	315

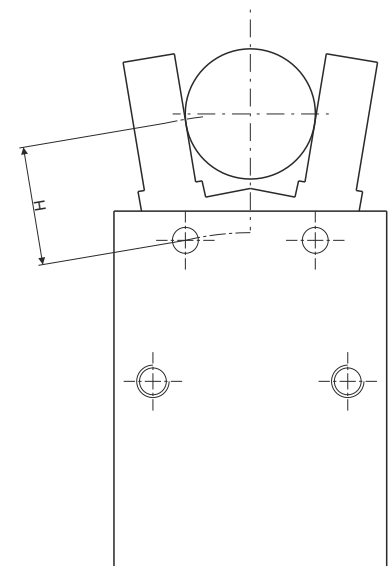
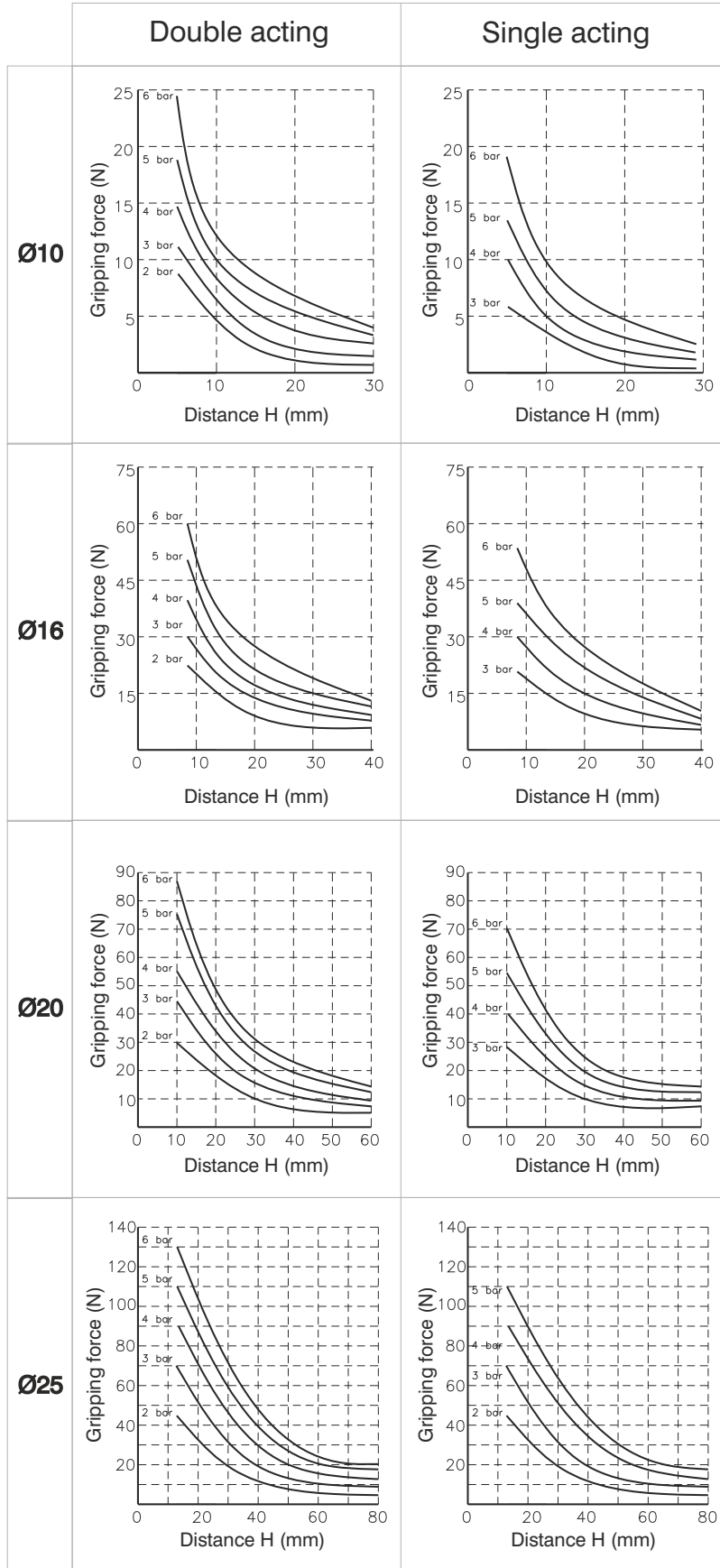


**Gripping force 5 bar (Nm)**

Bore	Ø10	Ø16	Ø20	Ø25
Double acting (Nm)	0,1	0,4	0,7	1,35
Single acting (Nm)	0,07	0,3	0,55	1,08

**NOTE:**

Bore selection should be made considering a holding force 10 to 20 times the component weight.  
In case of acceleration/deceleration a further margin of safety should be considered.





**Ordering code**

**6302.Ø.D**

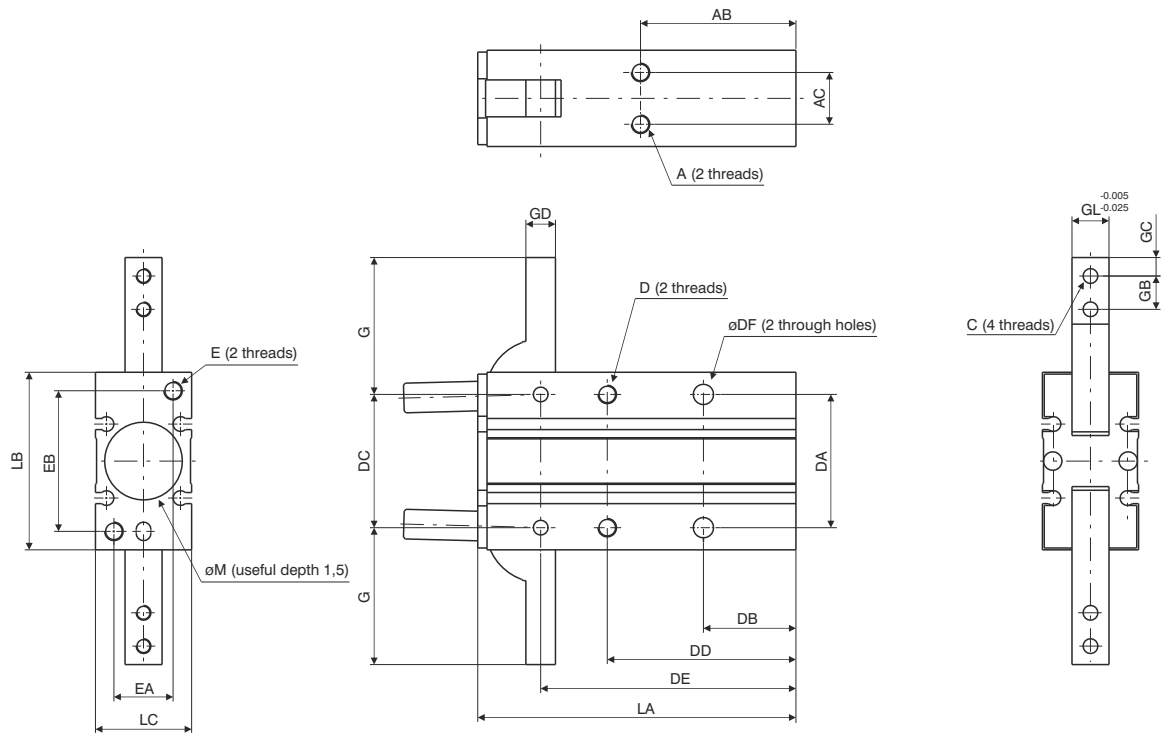
- 10
- 16
- 20
- 25

**Construction characteristics**

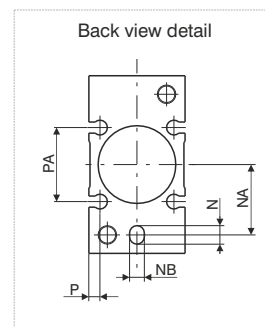
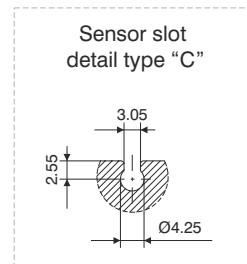
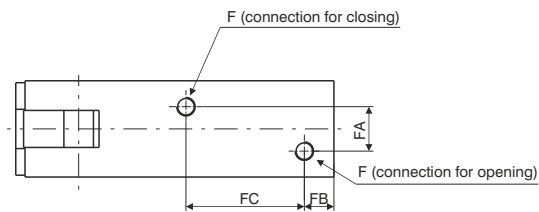
Body	anodised aluminium
Piston	aluminium
Fingers	steel
End cover	anodised aluminium

**Technical characteristics**

Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	1 - 6 bar
Working temperature	-5C° - +70C°
Opening total stroke	-3° - 180°
Maximum operating frequency	from Ø10 to Ø25, 60 cycles/minute



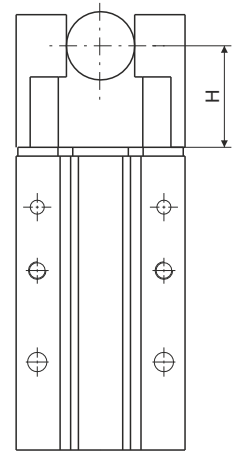
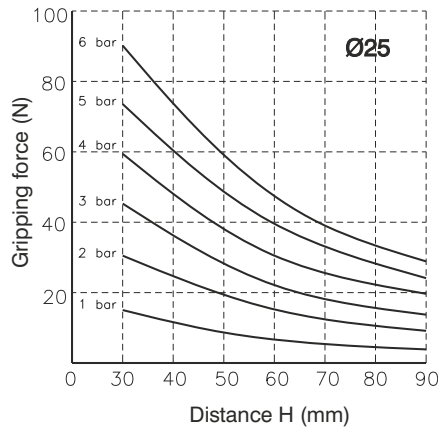
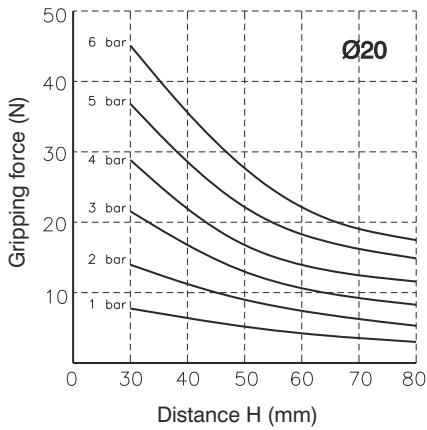
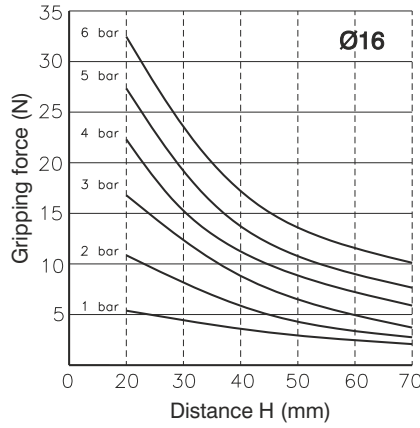
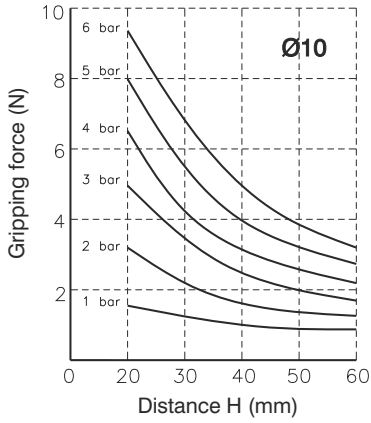
Bore	Ø10	Ø16	Ø20	Ø25
<b>A</b>	M3x0,5	M4x0,7	M5x0,8	M6x1
Useful depth	4	5	8	10
<b>AB</b>	30	33	42	50
<b>AC</b>	9	12	14	16
<b>C</b>	M3x0,5	M3x0,5	M4x0,7	M5x0,8
<b>D</b>	M3x0,5	M4x0,7	M5x0,8	M6x1
Useful depth	6	8	10	12
<b>DA</b>	24	30	36	42
<b>DB</b>	18	20	25	30
<b>DC</b>	22	28	36	45
<b>DD</b>	35	41	51	60
<b>DE</b>	47,5	55,5	69	86
<b>DF</b>	3,4	4,5	5,5	6,6
<b>E</b>	M3x0,5	M4x0,7	M5x0,8	M6x1
Useful depth	6	8	10	12
<b>EA</b>	9	12	16	18
<b>EB</b>	24	30	38	46
<b>F</b>	M5x0,8	M5x0,8	M5x0,8	M5x0,8
<b>FA</b>	3	8	2	14
<b>FB</b>	7	7	8	8
<b>FC</b>	23	25	32	42
<b>G</b>	23,5	28,5	37	45
<b>GB</b>	6	7	9	12
<b>GC</b>	3	4	5	6
<b>GD</b>	4	5	8	10
<b>GL</b>	6	8	10	12
<b>LA</b>	58	69	86	107
<b>LB</b>	30	38	48	58
<b>LC</b>	15	20	26	30
<b>N</b>	4	4	5	5
Useful depth	3	3	4	4
<b>NA</b>	9	15	19	23
<b>ØM<sup>H9</sup></b>	11	17	21	26
<b>ØNB<sup>H9</sup></b>	3	3	4	4
<b>P</b>	2	2,5	3	3
<b>PA</b>	13	18	20	24
Weight (gr.)	70	150	320	550



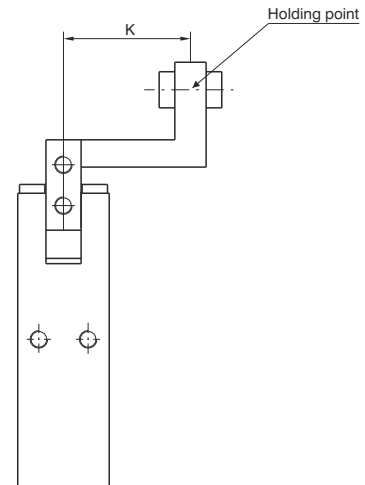
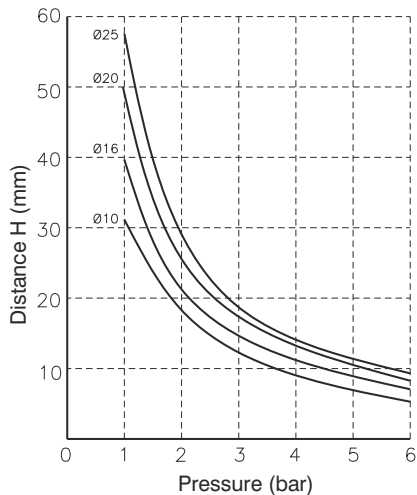


**Gripping force 5 bar (Nm)**

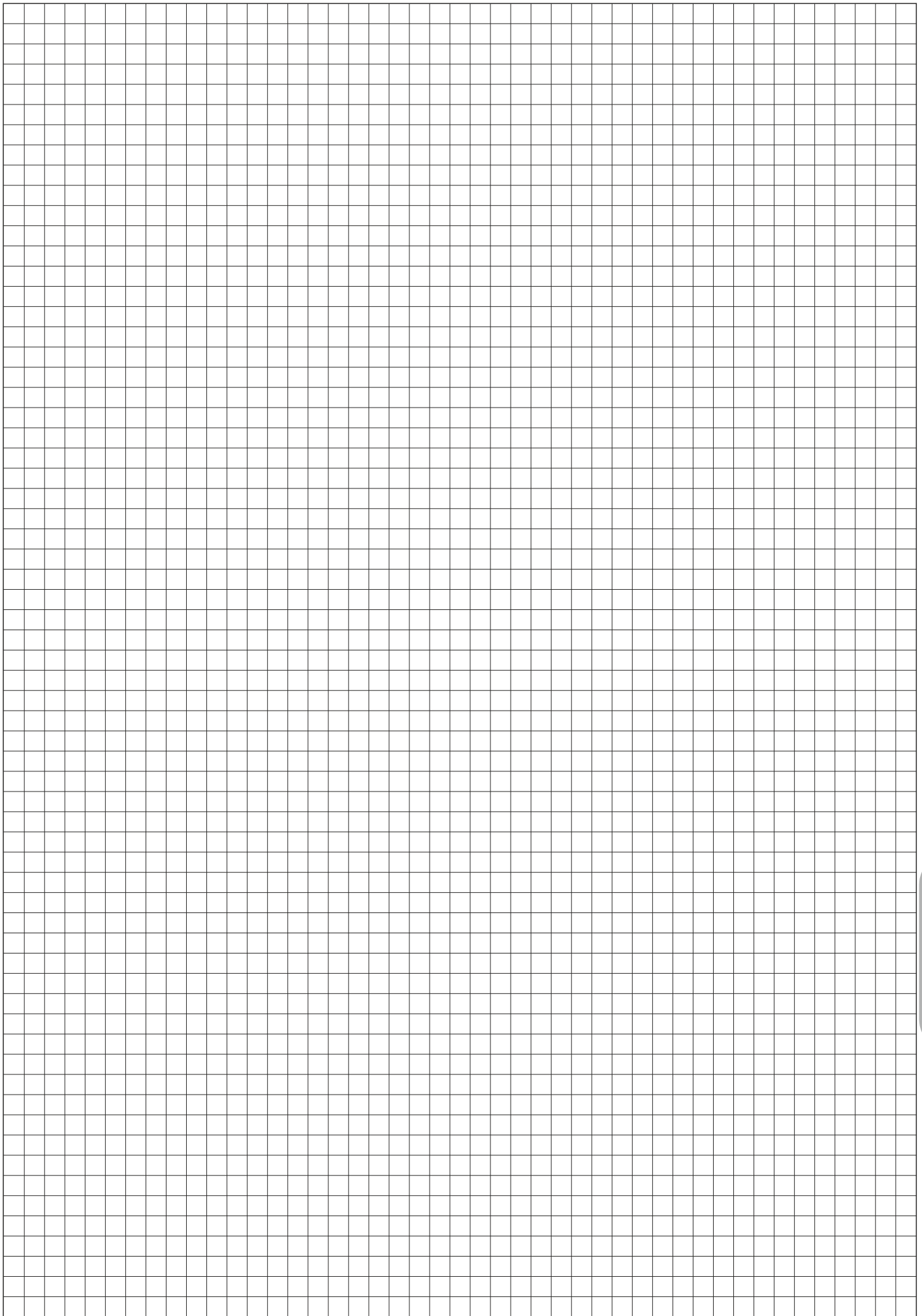
Bore	Ø10	Ø16	Ø20	Ø25
(Nm)	0,16	0,54	1,1	2,28

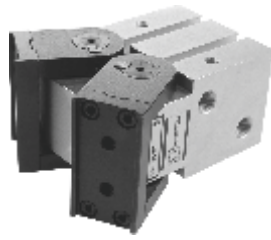


**Confirmation of Holding point**



Applications where the holding point is outside the recommended parameters shown on the above graph might affect the product life.





**Ordering code**

**6303.Ø.D**

- F = Fingers, end fixing
- L = Fingers, side fixing

20  
25  
32  
40  
50

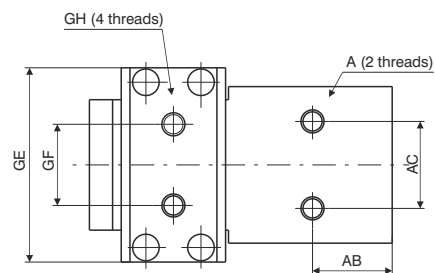
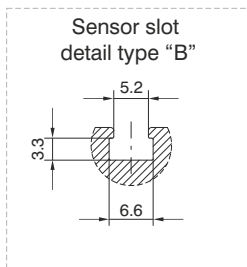
**Construction characteristics**

Body	anodised aluminium
Piston	aluminium
Fingers	steel
End cover	anodised aluminium

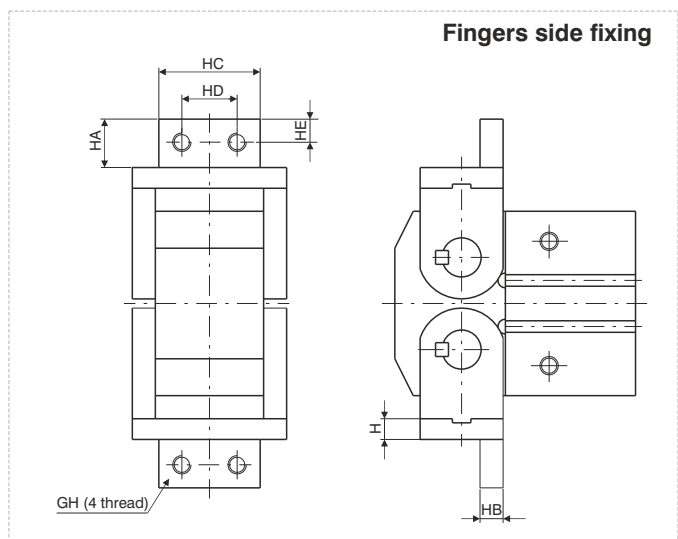
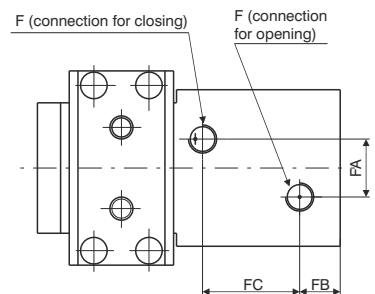
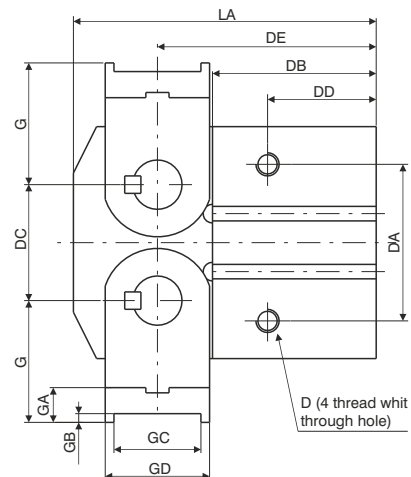
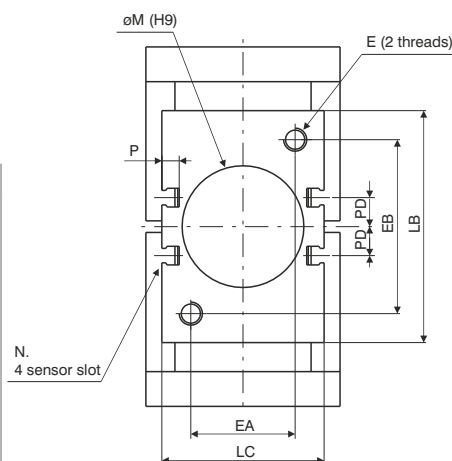
**Technical characteristics**

Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	1.5 - 7 bar
Working temperature	-5C° - +70C°
Opening total stroke	-5° - 180°
Maximum operating frequency	from Ø20 to Ø25, 60 cycles/minute from Ø32 to Ø50, 30 cycles/minute

5



Bore		Ø20	Ø25	Ø32	Ø40	Ø50
A		M5	M6	M6	M8	M10
	Useful depth	7	10	10	15	20
AB		17	20	21	27,5	36
AC		20	24	24	30	40
D		M5	M6	M6	M8	M10
	Useful depth	10	12	12	16	20
DA		27	34	42	54	70
DB		35	40	47	56,5	69
DC		18	24	30	40	56
DD		23	27	29	37,5	48
DE		45	51	61,5	75,5	96
E		M5	M6	M6	M8	M10
	Useful depth	10	12	12	15	20
EA		26	30	30	36	40
EB		26	30	45	60	80
F		M5	M5	G1/8	G1/8	G1/4
FA		12	16	20	20	30
FB		9	10	13	14	16
FC		20	23	25	33,5	44
G		23	27	32	42	58
GA		7	8	9	12	17
GB		2	2	2	3	4
GC		12	17	23	30	44
GD		16	21	27	36	52
GE		41	45	51	67	85
GF		18	20	20	28	38
GH		M4	M5	M6	M8	M10
H		5	6	7	9	13
HA		10	12	14	21	24
HB		5	6	7	10	13
HC		28	30	34	44	58
HD		14	16	18	24	30
LA		60	69	83,5	104,5	136
LB		36	45	58	80	112
LC		36	40	45	56	66
ØM <sup>H9</sup>		21	26	34	42	52
	Useful depth	3	3	4	4	5
P		6	5,5	5,5	6	6
PD		4	4,5	11	10	13
Weight (gr.)		300	500	900	2100	5000

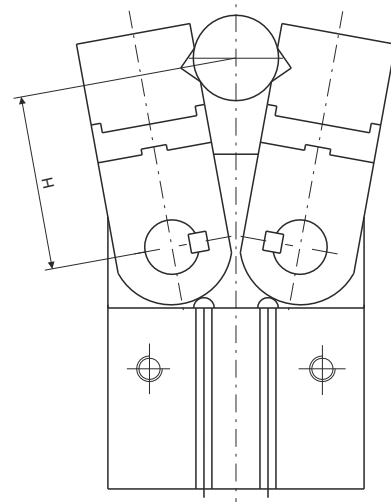
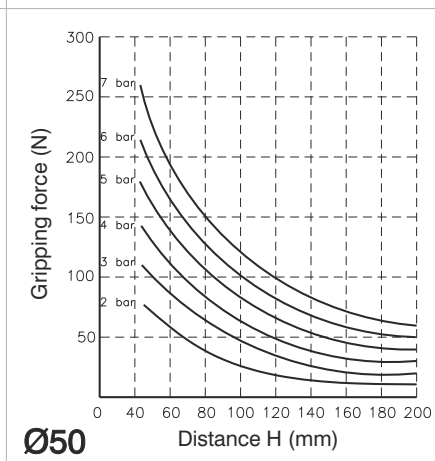
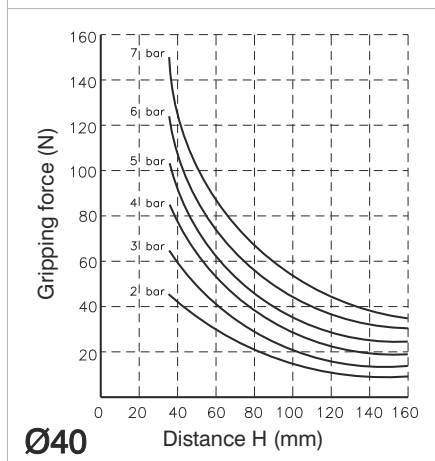
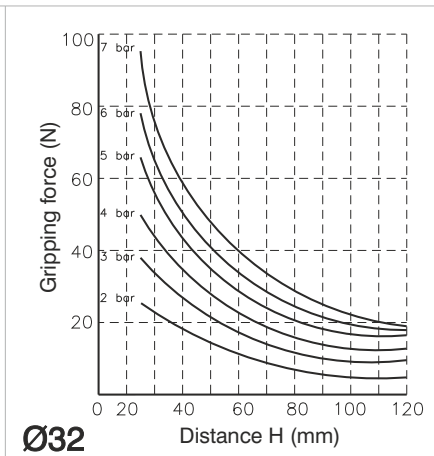
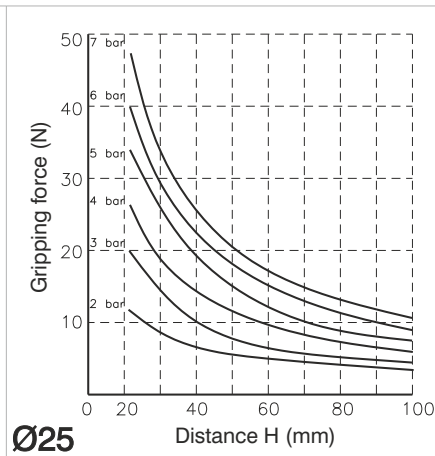
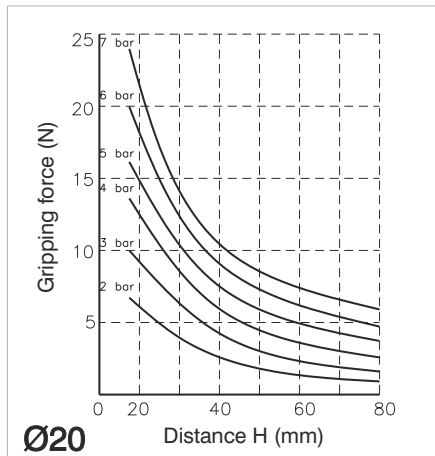


### Gripping force

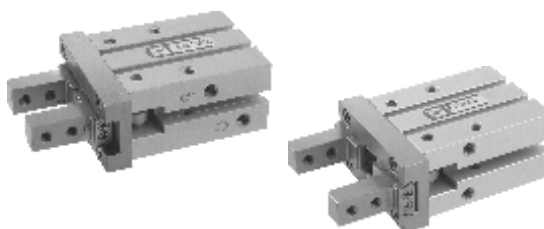
**NOTE:**

Bore selection should be made considering a holding force 10 to 20 times the component weight.  
In case of acceleration/deceleration a further margin of safety should be considered.

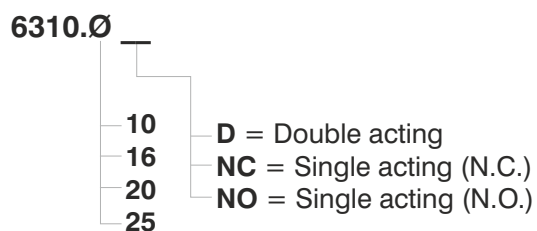
Bore	Ø20	Ø25	Ø32	Ø40	Ø50
(Nm)	0,3	0,7	1,6	3,7	8,3



5



### Ordering code

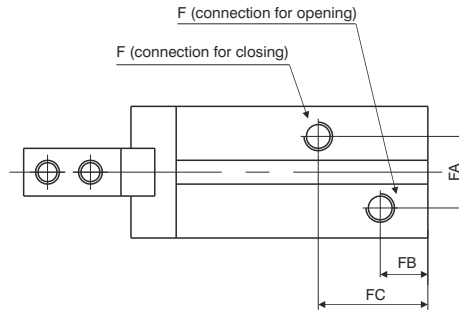
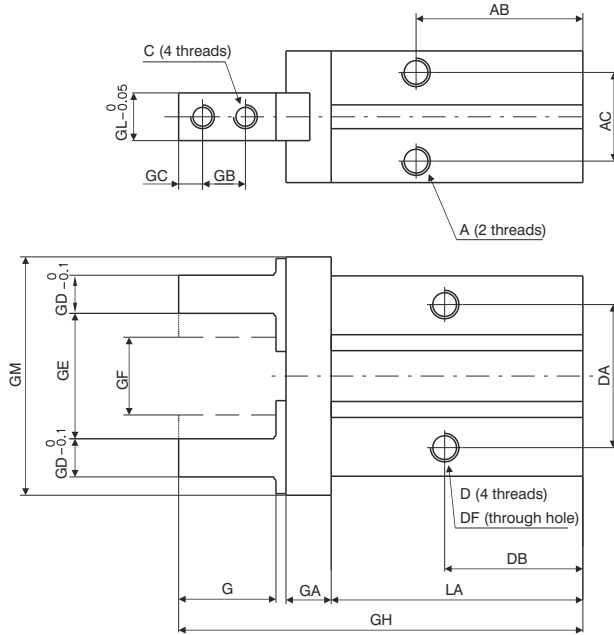
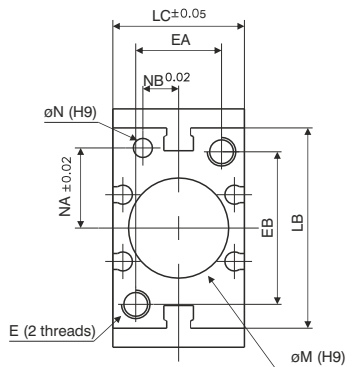


### Construction characteristics

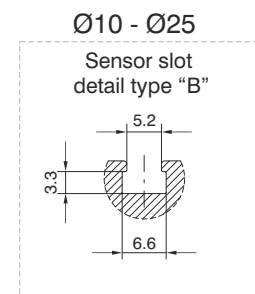
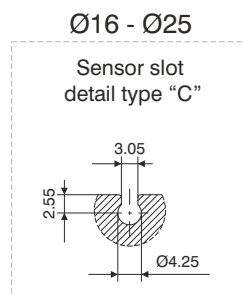
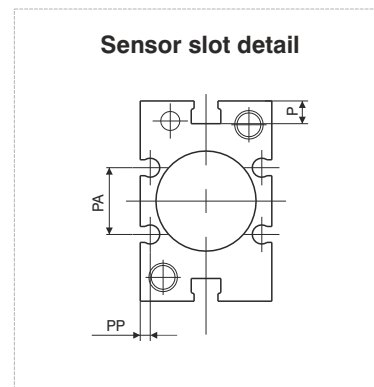
Body	anodised aluminium
Piston	aluminium or stainless steel (depending on the bore)
Fingers	steel
End cover	anodised aluminium
Seals	oil resistant NBR rubber

### Technical characteristics

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	double acting : 2 - 7 bar (for Ø10) - 1 - 7 (for other bores) single acting : 3.5 - 7 bar (for Ø10) - 2.5 - 7 ( for other bores)
Operating temperature	-5°C - +70°C
Maximum operating frequency	from Ø10 to Ø25, 180 cycles/minute



Bore	Ø10	Ø16	Ø20	Ø25
A	M3x0,5	M4x0,7	M5x0,8	M6x1
	Useful depth	6	4,5	8
AB	27	30	35	36,5
AC	11,4	16	18,6	22
C	M2,5x0,45	M3x0,5	M4x0,7	M5x0,8
D	M3x0,5	M4x0,7	M5x0,8	M6x1
	Useful depth	5,5	8	10
DA	16	24	30	36
DB	23	24,5	29	30
ØDF	2,6	3,4	4,3	5,1
E	M3x0,5	M4x0,7	M5x0,8	M6x1
	Useful depth	6	8	10
EA	12	15	18	22
EB	18	22	32	40
F	M3x0,5	M5x0,8	M5x0,8	M5x0,8
FA	11	13	15	20
FB	9	7,5	10	10,7
FC	19	19	23	23,5
G	12	15,5	20	25
GA	6	7,5	9,5	11
GB	5,7	7	9	12
GC	3	4	5	6
GD	4	5	8	10
GE	15,2	20,9	26,3	33,3
GF	11,2	14,9	16,3	19,3
GH	57	67,5	84,8	102,7
GL	5	8	10	12
GM	29	38	50	63
LA	37,8	42,5	52,8	63,6
LB	23	30,6	42	52
LC	16,4	23,6	27,6	33,6
ØM <sup>H9</sup>	11	17	21	26
	Useful depth	2	2	3
ØN <sup>H9</sup>	2	3	4	4
	Useful depth	3	3	4
NA	7,6	11	16,8	21,8
NB	5,2	6,5	7,5	10
P	5,4	5,8	9	11,5
PA	/	11,6	14	19
PP	/	2,1	2,1	3,5
Weight (gr.)	55	120	230	425

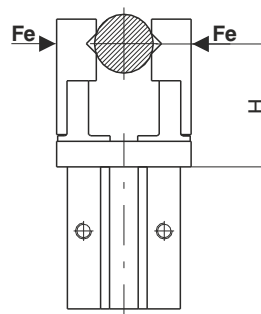




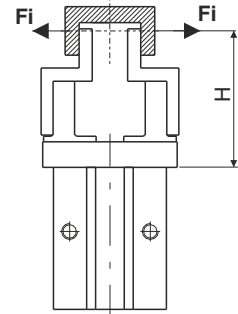
**Holding force (N)** (pressure 5 bar, holding point H=20 half stroke)

Version	Force	Bore			
		Ø10	Ø16	Ø20	Ø25
Double acting	Fe	9,8	30	42	65
	Fi	17	40	66	104
Single acting	N.O. Fe	6,3	24	28	45
	N.C. Fi	12	31	56	83

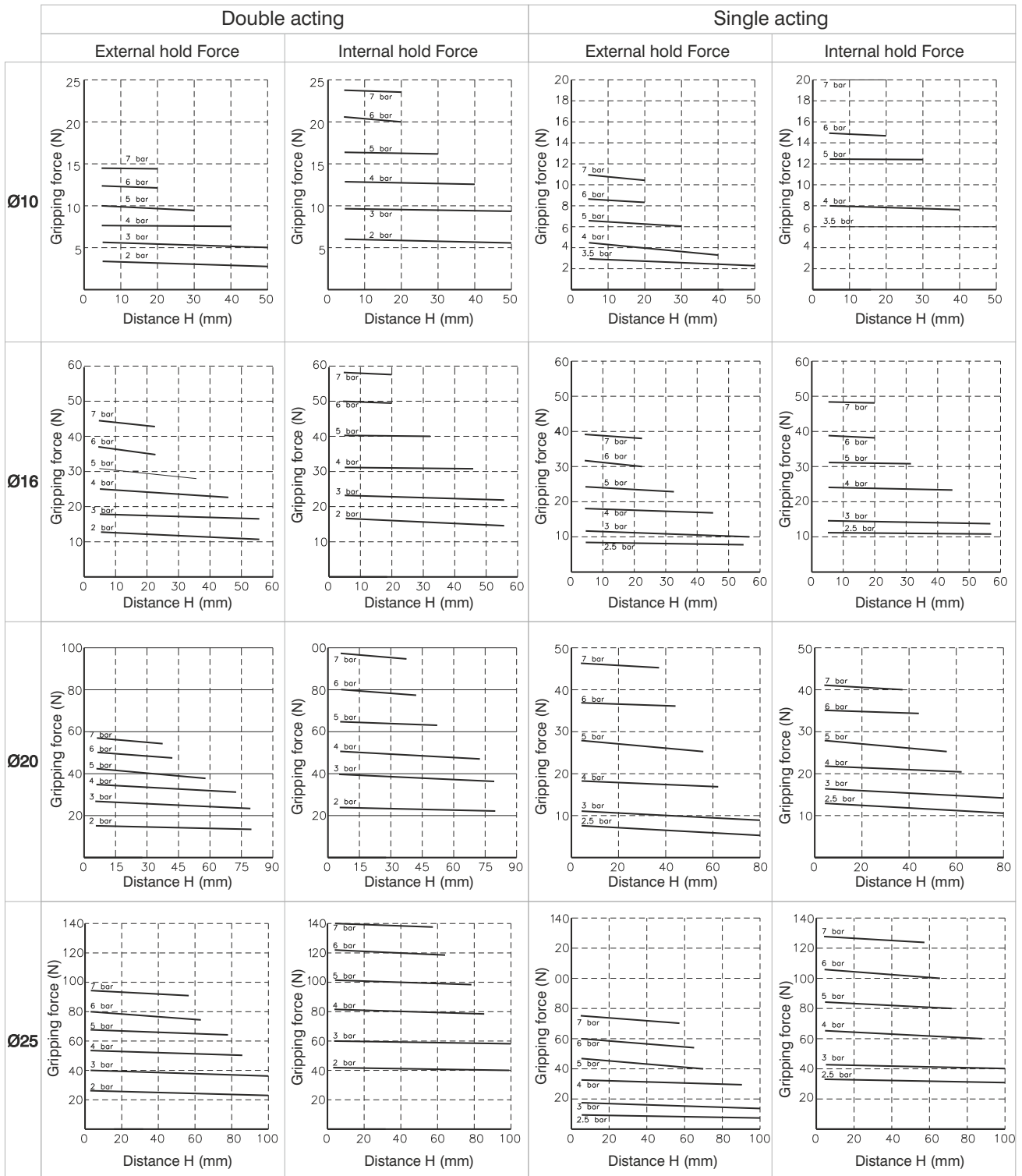
Fe = external holding force    Fi = internal holding force



**EXTERNAL HOLD**



**INTERNAL HOLD**





**Ordering Code**

6311.Ø.D.

- 10
- 16
- 20
- 25
- 32
- 40

Ordering code options	Stroke					
	20	30	40	50	70	100
<b>1</b>	40	60	80	100	120	160
<b>2</b>	60	80	100	120	160	200
	<b>Ø10</b>	<b>Ø16</b>	<b>Ø20</b>	<b>Ø25</b>	<b>Ø32</b>	<b>Ø40</b>
	<b>Bore</b>					

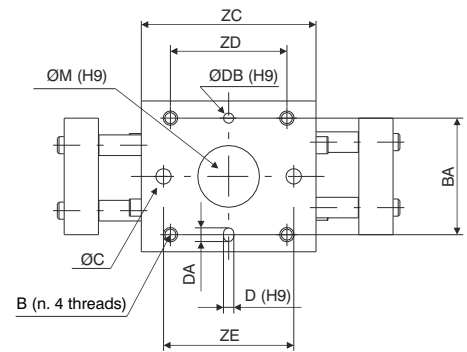
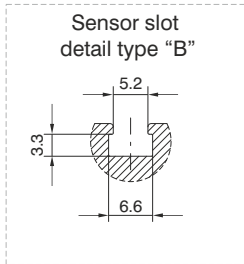
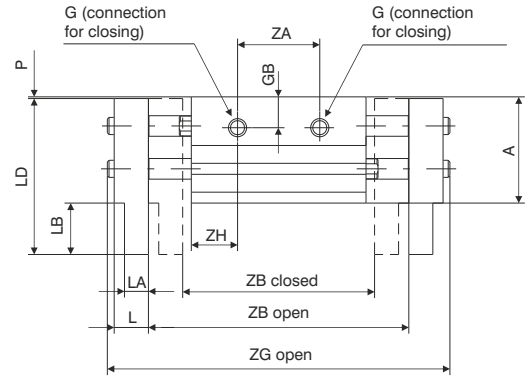
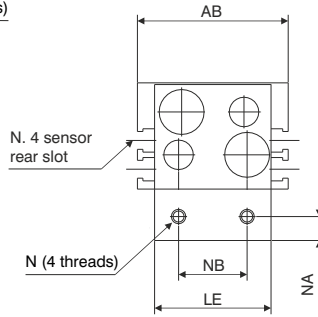
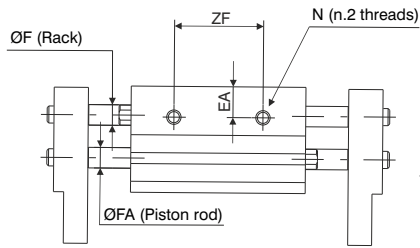
**Construction characteristics**

Body	anodised aluminium
Piston	aluminium
Fingers	anodised aluminium
Rod	steel
Rack	steel
Pinion	steel

**Technical characteristics**

Function	double acting
Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	Ø10: 1.5 - 6 bar - Ø16 - 40: 1 - 6 bar
Working temperature	-5°C - +70°C

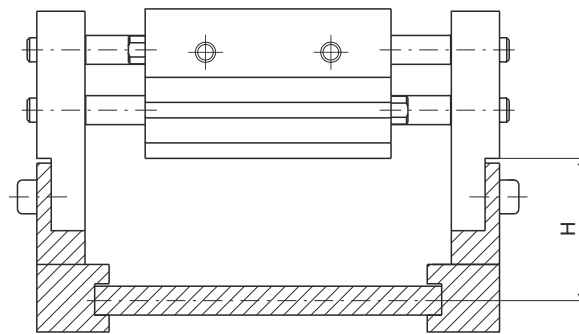
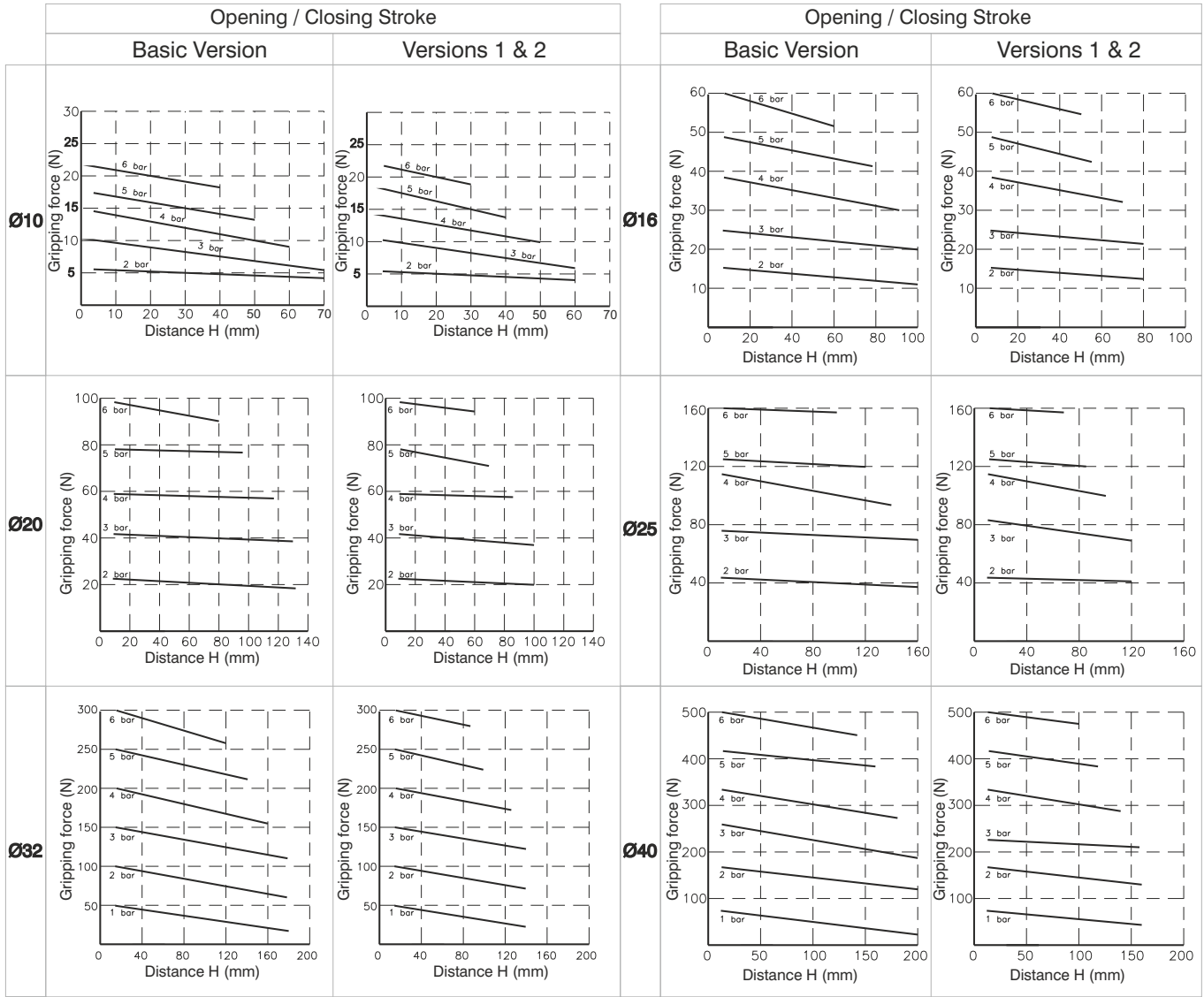
Model	Diameter (mm)	Max.operating frequency cycles/min.	Model	Diameter (mm)	Max.operating frequency cycles/min.
6311.10.D	10	60	6311.25.D	25	60
6311.10.D.1		40	6311.25.D.1		40
6311.10.D.2			6311.25.D.2		
6311.16.D	16	60	6311.32.D	32	30
6311.16.D.1		40	6311.32.D.1		20
6311.16.D.2			6311.32.D.2		
6311.20.D	20	60	6311.40.D	40	30
6311.20.D.1		40	6311.40.D.1		20
6311.20.D.2			6311.40.D.2		



Bore	Ø10	Ø16	Ø20	Ø25	Ø32	Ø40													
<b>A</b>	31	39	46	52	68	79													
<b>AB</b>	44	55	65	76	82	98													
<b>B</b>	M4x0,7	M5x0,8	M6x1	M8x1.25	M8x1.25	M10x1.5													
	Useful depth	8	10	12	16	20													
<b>BA</b>	34	42	52	62	64	76													
<b>ØC</b>	4,5	5,5	6,6	9	/	/													
<b>D<sup>H9</sup></b>	3	3	4	4	6	6													
	Useful depth	3	3	4	4,5	8													
<b>DA</b>	4	4	5	5	7	7													
<b>ØDB<sup>H9</sup></b>	3	3	4	4	6	6													
	Useful depth	3	3	4	4,5	8													
<b>E</b>	M4x0,7	M5x0,8	M6x1	M8x1.25	M8x1.25	M10x1.5													
	Useful depth	5	7	7	11	16													
<b>EA</b>	9	10	11	12,5	22	28													
<b>ØF</b>	6	8	10	12	14	16													
<b>FA</b>	6	8	10	12	16	20													
<b>G</b>	M5x0,8	M5x0,8	M5x0,8	M5x0,8	G1/8	G1/8													
<b>GB</b>	9	10	11	16	16	18													
<b>L</b>	10	13	17	21	24	28													
<b>LA</b>	7	9	12,5	14	15	18													
<b>LB</b>	15	19	24	29	32	38													
<b>LD</b>	45,5	57,5	69	80	100	117													
<b>LE</b>	34	43	54	64	70	86													
<b>ØM<sup>H9</sup></b>	18	23	27	32	35	40													
	Useful depth	1,5	1,5	1,5	1,5	1,5													
<b>N</b>	M4x0,7	M5x0,8	M6x1	M8x1,25	M10x1,5	M10x1,5													
<b>NA</b>	7	8	10	12	15	18													
<b>NB</b>	20	25	30	40	50	60													
<b>P</b>	0,5	0,5	1	1	1	1													
<b>ZA</b>	24	39	57	26	50	70	32	68	88	38	86	104	54	104	148	72	130	170	
<b>ZB</b>	closed	56	78	96	68	110	130	82	142	162	100	182	200	150	198	242	188	246	286
	open	76	118	156	98	170	210	122	222	262	150	282	320	220	318	402	288	406	486
<b>ZC</b>	51	67	85	60	90	110	71	113	133	88	142	160	110	158	202	148	206	246	
<b>ZD</b>	36	52	70	45	75	95	58	100	120	70	124	142	86	134	178	116	174	214	
<b>ZE</b>	38	54	72	40	70	90	54	96	116	66	120	138	/	/	/	/	/	/	
<b>ZF</b>	26	42	60	28	58	78	38	80	100	48	102	120	60	108	152	80	138	178	
<b>ZG</b>	open	100	142	180	128	200	240	160	260	300	196	328	366	272	370	454	348	466	546
		13,5	14	14	17	20	20	19,5	22,5	22,5	25	28	28	28	27				38
Weight (gr.)	280	350	430	600	800	950	1000	1500	1700	1700	2500	2800	2900	3800	4700	5300	6850	7900	
	20	40	60	30	60	80	40	80	100	50	100	120	70	120	160	100	160	200	

Stroke

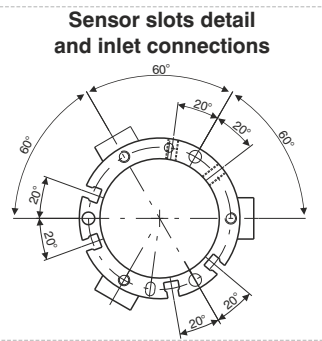
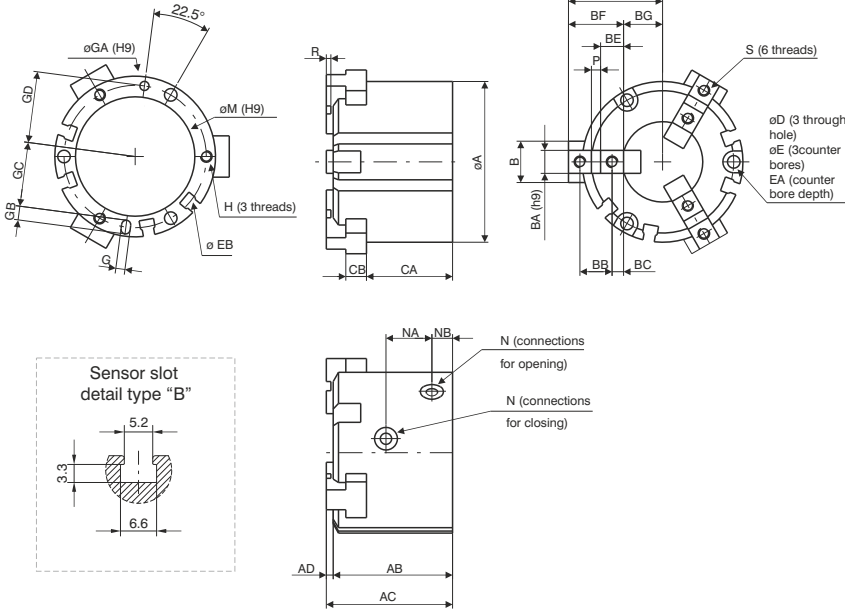
**Holding force**



5

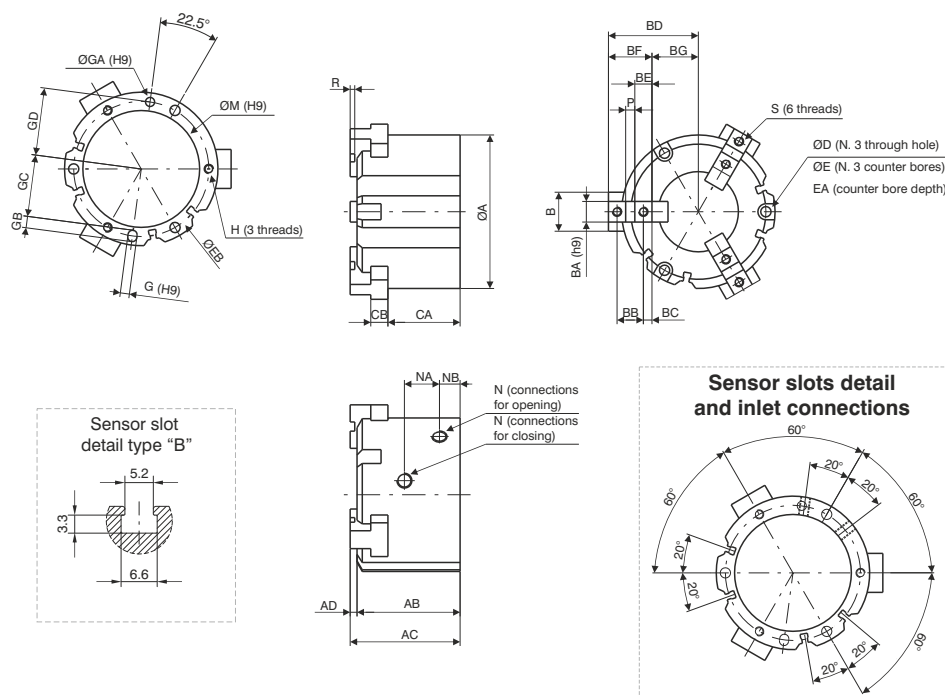


Overall dimensions Ø32 and Ø80



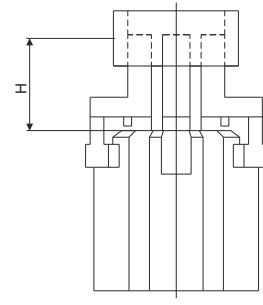
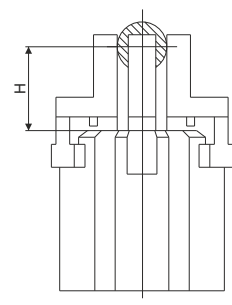
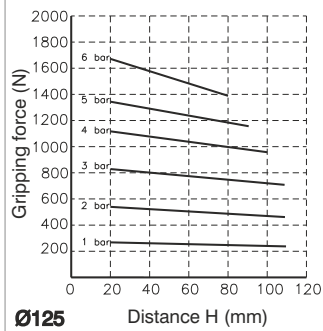
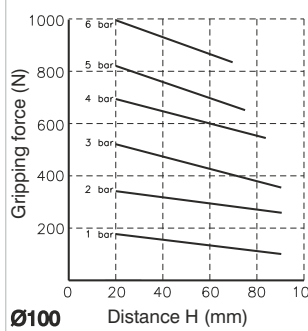
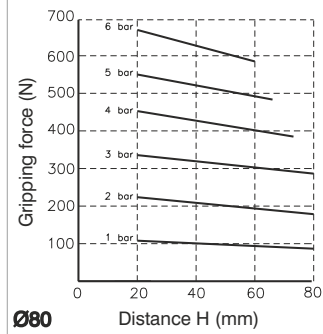
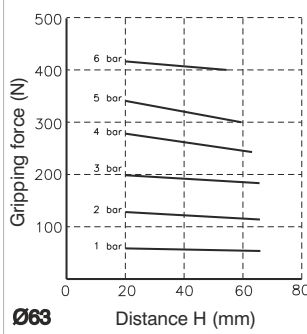
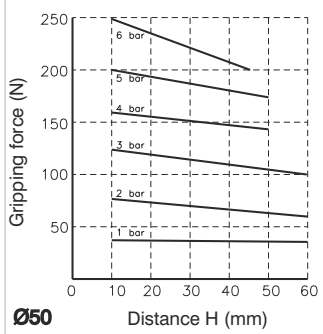
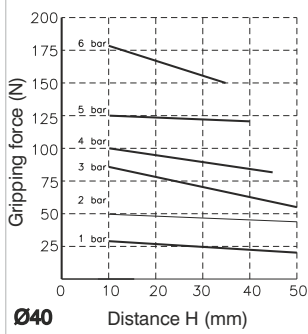
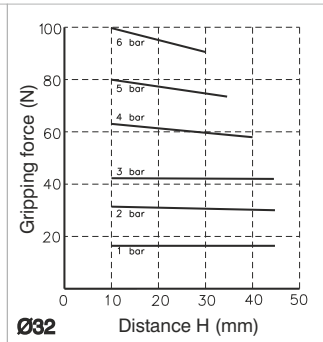
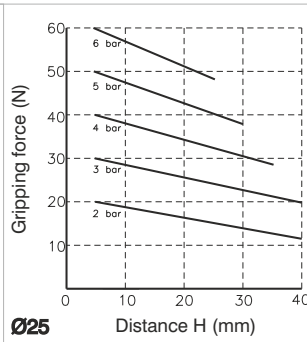
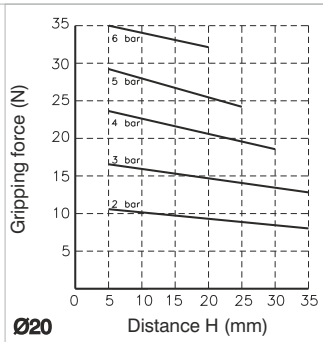
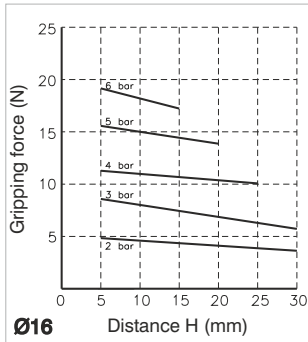
Bore	Ø32	Ø40	Ø50	Ø63	Ø80
ØA	52	62	70	86	106
AB	41	44	52	62	77
AC	44	47	55	66	82
AD	3	3	3	4	5
B	14	16	18	24	28
BA <sup>H9</sup>	8	8	10	12	14
BB	11	12	14	17	20
BC	4,5	4,5	5	5,5	6
BD	open	32	35	41	51
	close	28	31	35	43
BE	9	9	10	11	12
BF	20	21	24	28	32
BG	open	12	14	17	23
	close	8	10	11	15
CA	30,5	32	37,5	44	56
CB	6	7	9	11	12
D	4,5	5,5	5,5	6,6	6,6
E	8	9,5	9,5	11	11
EA	9	9	12	14	19
EB	44	53	62	76	95
H		M4x0,7	M5x0,8	M6x1	M6x1
	Useful depth	6	7,5	10	9
G <sup>H9</sup>		3	4	4	5
	Useful depth	3	4	4	5
ØGA <sup>H9</sup>		3	4	4	5
	Useful depth	3	4	4	5
GB	5	6	6	7	8
GC	19,5	23,5	28	34,5	43,5
GD	22	26,5	31	38	47,5
N		M5x0,8	M5x0,8	M5x0,8	G1/8
	Useful depth	34	42	52	65
ØM <sup>H9</sup>		2	2	2	2,5
	Useful depth	2	2	2	2,5
NA	16	17	20	22	27
NB	8	9	9	12	13,5
P <sup>H9</sup>	2	3	4	6	8
R	2	2	2	3	4
S		M4x0,7	M4x0,7	M5x0,8	M6x1
	Useful depth	8	8	10	10
Gewicht (gr.)	240	354	542	1000	1850

Overall dimensions Ø100 and Ø125



Bore	Ø100	Ø125
ØA	134	166
AB	90	114
AC	96	122
AD	6	8
B	34	40
BA <sup>H9</sup>	18	22
BB	23	31
BC	7,5	10,5
BD	open	78
	close	66
BE	15	21
BF	38	52
BG	open	40
	close	28
CA	63	84
CB	15	18
ØD	9	11
ØE	14	17,5
EA	21	34
EB	118	148
G <sup>H9</sup>		8
	Useful depth	6
ØGA <sup>H9</sup>		8
	Useful depth	6
GB	10	12
GC	54	68
GD	59	74
H		M8x1,25
	Useful depth	16
ØM <sup>H9</sup>		102
	Useful depth	4
N	G1/4	G3/8
NA	30,6	38
NB	18	23,5
P <sup>H9</sup>	8	10
R	4	6
S		M8x1,25
	Useful depth	16
Gewicht (gr.)	3360	6430

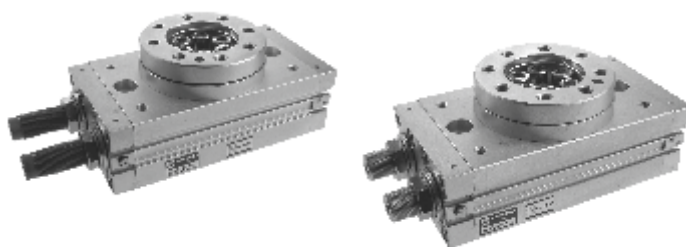
Gripping force (N)





## General

These rotary actuators convert linear motion of a piston into a rotary motion via a rack and pinion device, using a single pinion-rack system for the 6411 version and a double system on 6400 versions. The 6410 series actuators have fixed stops at 90 and 180 degrees; while on the 6400 series, rotation can be adjusted between 0 and 190 degrees using variable stops that can also be substituted with hydraulic stoppers (shock absorbers). These devices are equipped with a rotating table upon which the load is fixed.



### Ordering code

**6400.** .

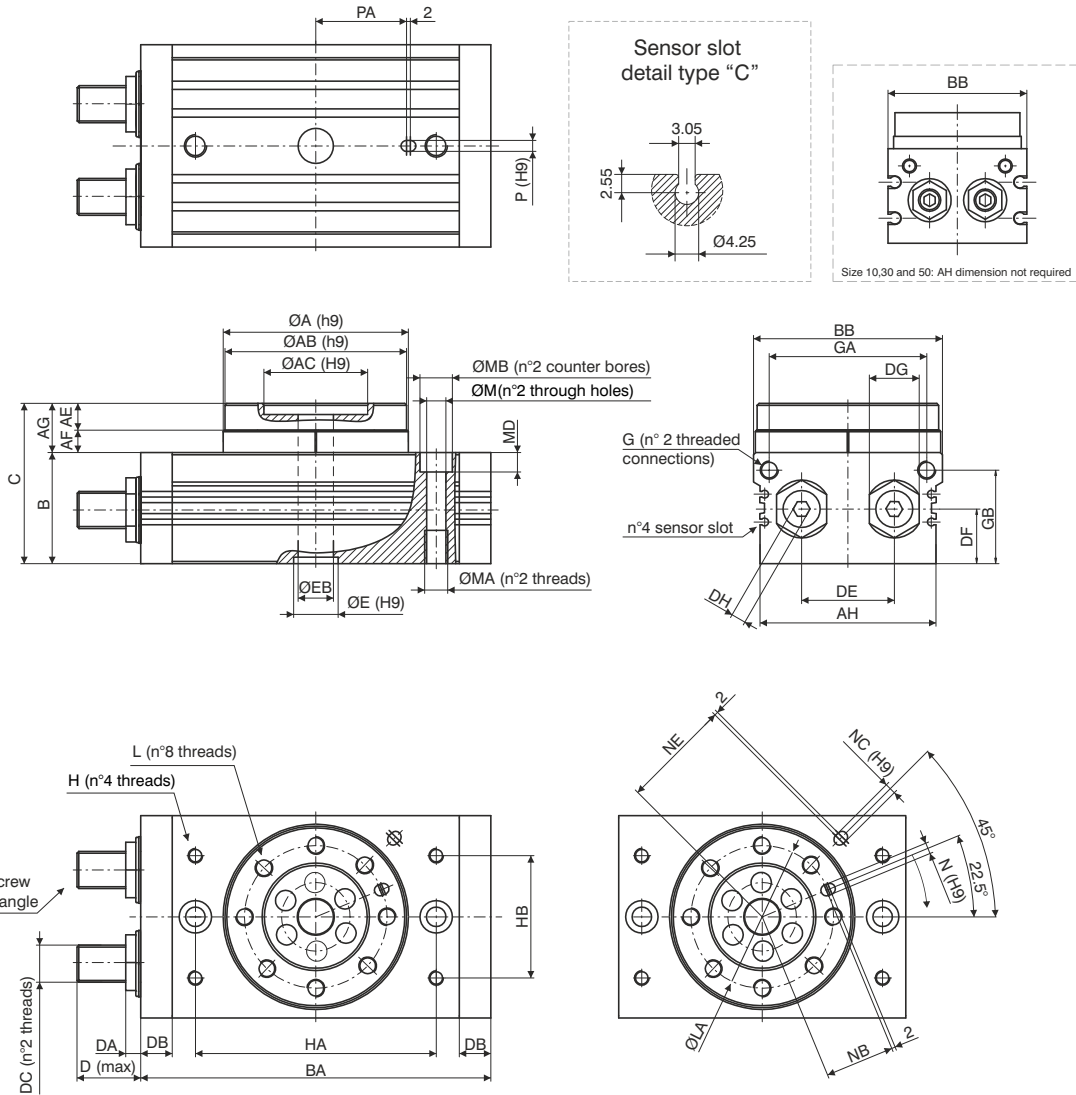
- **A** = Standard
- **R** = Cushioning (Shock absorber)
- **10** (piston  $\varnothing 15$ )
- **30** (piston  $\varnothing 20$ )
- **50** (piston  $\varnothing 25$ )
- **100** (piston  $\varnothing 32$ )
- **200** (piston  $\varnothing 40$ )

### Construction characteristics

Body	anodised aluminium
Cover plate/End plate	anodised aluminium
Piston seal	NBR rubber
Pinion	steel
Rack	steel
Turn table	anodised aluminium
Cushioning	elastic bumper (hydraulic damper available on request)

### Technical characteristics

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max. pressure	10 bar (for type 100 and 200, 6 bar)
Working temperature	-5°C - +70°C
Rotation angle range	0 - 190°
Max. rotation	190°
Rotation speed	s/90° (see rotation time table)

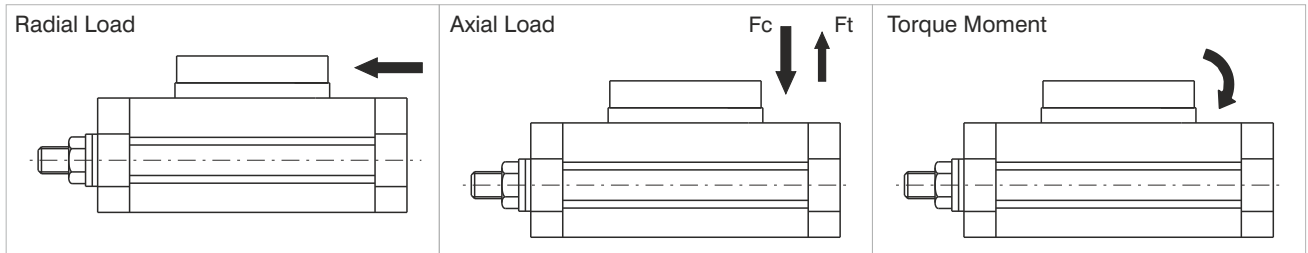


Size	10	30	50	100	200
Ø piston	Ø15	Ø21	Ø25	Ø32	Ø40
ØA <sup>H9</sup>	46	67	77	100	118
ØAB <sup>H9</sup>	45	65	75	98	116
ØAC <sup>H9</sup>	20	32	35	56	64
Useful depth	4	4,5	5	6	9
AE	8	10	12	14,5	16,5
AF	5	7	8	12,5	15,5
AG	13	17	20	27	32
AH	/	/	/	95	114
B <sup>+0,5/0</sup>	34	40	46	59	74
BA	92	127	152	189	240
BB <sup>+0,5/0</sup>	50	70	80	102	120
C <sup>+0,5/0</sup>	47	57	66	86	106
D	17,7	25	31,4	34,3	40,2
DA	8,6	10,6	14	8	20
DB	9,5	12	15,5	17	24
DC	M8x1	M10x1	M14x1,5	M20x1,5	M27x1,5
DE	20	29	38	50	60
DF	15,5	18,5	22	29,5	36,5
DG	12	14	19	27	36
DH	4	5	6	8	10
ØE <sup>H9</sup>	15	22	26	24	32
Useful depth	3	3	3	3,5	5,5
ØEB	5	9	10	19	24
G	M5x0,8	G1/8	G1/8	G1/8	G1/8

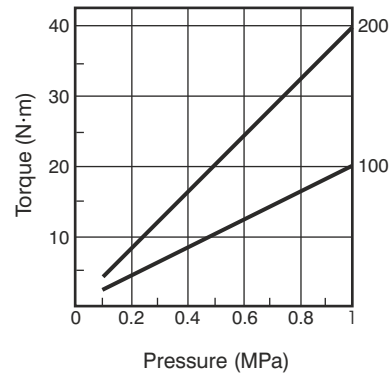
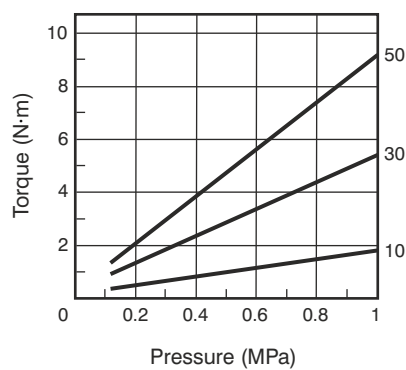
Size	10	30	50	100	200
Ø piston	Ø15	Ø21	Ø25	Ø32	Ø40
GA	34,5	50	63	85	103
GB	27,8	32	37,5	50,5	65,5
H	M5x0,8	M6x1	M8x1,25	M8x1,25	M12x1,75
Useful depth	8	8	8	10	13
HA	60	84	100	130	150
HB	27	37	50	66	80
L	M5x0,8	M6x1	M8x1,25	M10x1,5	M12x1,75
Useful depth	8	10	12	14,5	16,5
LA	32	48	55	77	90
M	6,8	8,6	10,5	10,4	14,2
MA	M8x1,25	M10x1,5	M12x1,75	M12x1,75	M16x2
Useful depth	12	15	18	18	25
MB	11	14	18	17,5	20
MD	6,5	8,5	10,5	10,5	12,5
N <sup>H9</sup>	3	4	5	6	8
Useful depth	3,5	4,5	5,5	6,5	8,5
NB	15	23	26,5	37,5	44
NC <sup>H9</sup>	/	/	/	6	8
Useful depth	/	/	/	4,5	4,5
NE	/	/	/	59	69
P <sup>H9</sup>	/	/	/	6	8
Useful depth	/	/	/	4,5	6,5
PA	/	/	/	49	54
Weight (gr.)	530	1230	2080	4100	7650

### Permissible Loads

		Size				
		10	30	50	100	200
Radial Load (N)		80	200	320	400	550
Axial Load (N)	Fc	80	370	450	710	1000
	Ft	75	200	300	500	750
Torque Moment (Nm)		2,5	5,5	9,5	18	25



### Torque Diagrams

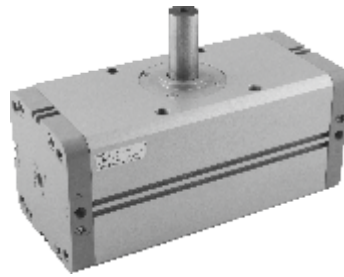


### Rotation time (sec./90°)

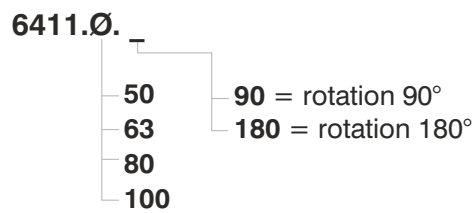
Dimension	With adjusting screw	With hydraulic decelerator
10 - 30 - 50	0.2 - 1	0.2 - 0,7
100	0.2 - 2	0.2 - 1
200	0.2 - 2.5	0.2 - 1

### Kinetic energy

Dimension	With adjusting screw	With hydraulic decelerator
10	0.006	Please apply to our tech-dpt for info (as general rule expressed valves can be multiplied by 3)
30	0.045	
50	0.08	
100	0.30	
200	0.52	



### Ordering code



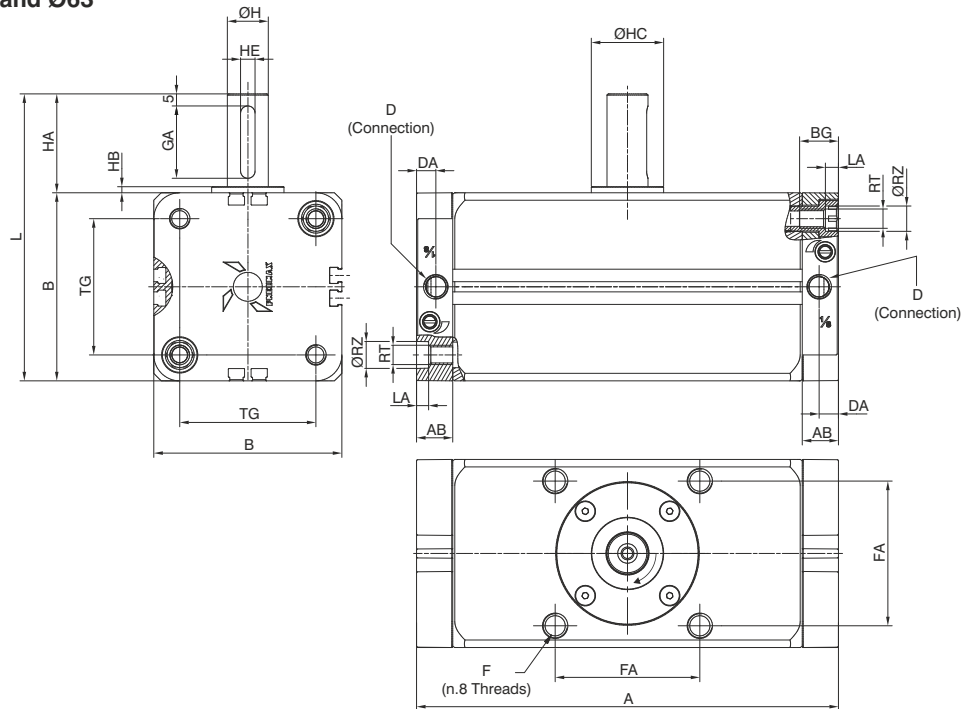
### Construction characteristics

Body	anodised aluminium
Piston	aluminium
End plate	anodised aluminium
Piston seal	NBR rubber
Pinion	steel
Rack	steel

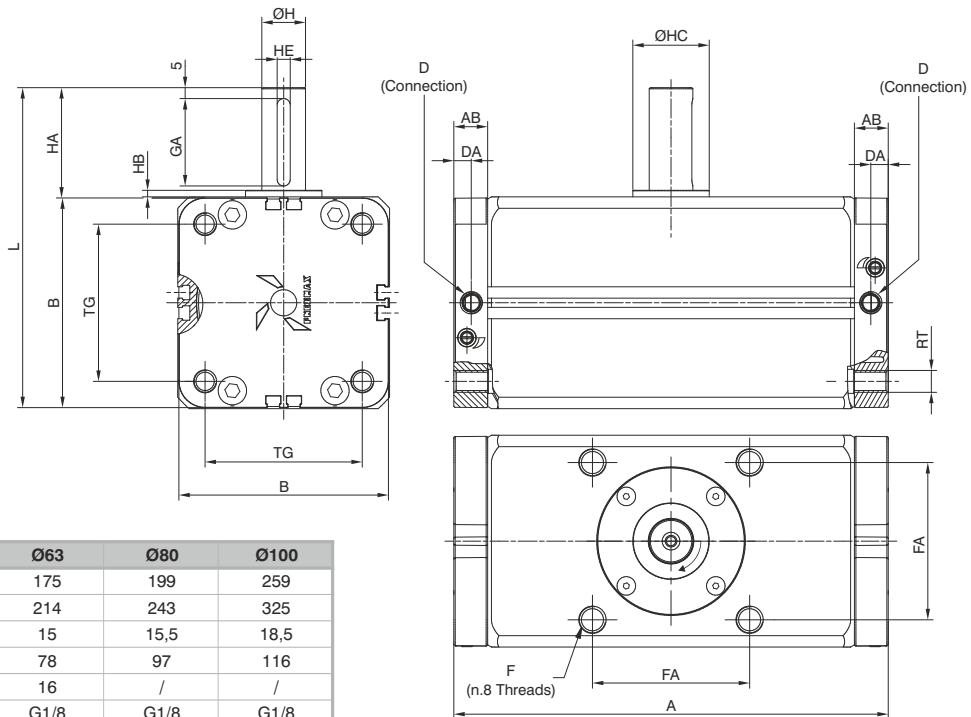
### Technical characteristics

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Max. pressure	10 bar
Working temperature	-5°C - +70°C
Rotation tolerance	0° - +4°

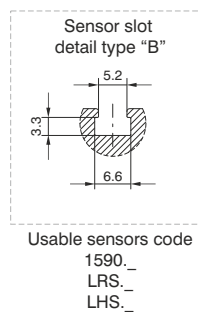
Overall dimensions Ø50 and Ø63



Overall dimensions Ø80 and Ø100

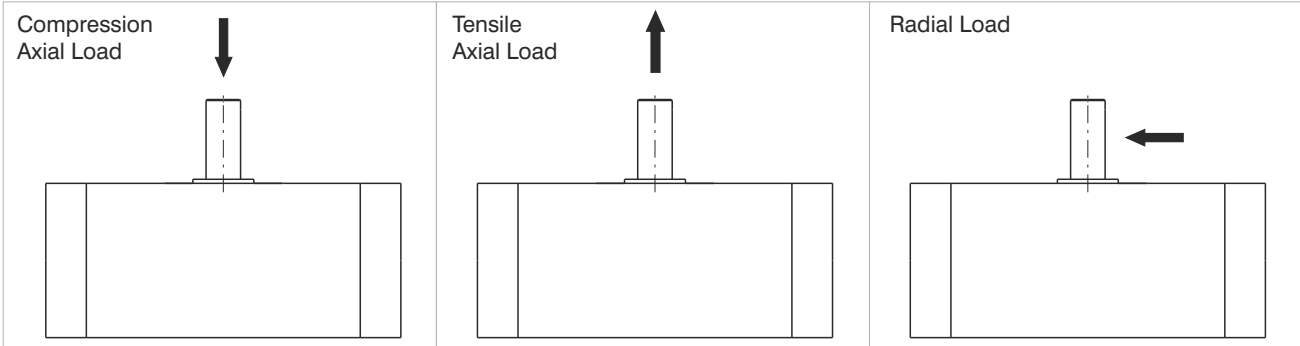


Bore		Ø50	Ø63	Ø80	Ø100
A	90°	156	175	199	259
	180°	189	214	243	325
AB		15	15	15,5	18,5
B		66	78	97	116
BG		16	16	/	/
D		G1/8	G1/8	G1/8	G1/8
DA		8	8	8	8
F		M8x1,25	M10x1,5	M12x1,75	M12x1,75
	Useful depth	12	15	15	18
FA		48	60	72	85
GA		25	30	40	45
H		15	17	20	25
HA		36	41	50	60
HB		2,5	2,5	3	4
HC		25	30	35	39,5
HE <sup>H9</sup>		5	6	6	8
L		102	119	147	176
LA		5	5	/	/
RT		M8	M8	M10	M10
RZ		10,5	10,5	/	/
TG		46,5	56,5	72	89
Weight (gr)	90°	1575	2451	4162	6989
	180°	1815	2823	4774	8329

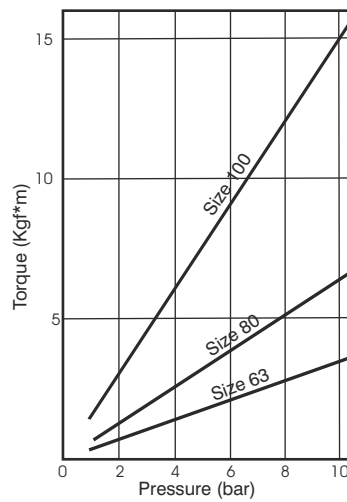
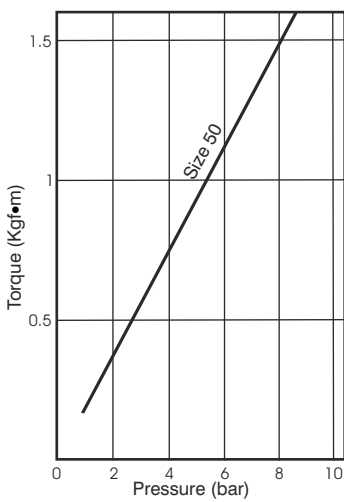


**Allowable Loads**

	Bore			
	Ø50	Ø63	Ø80	Ø100
Radial load (N)	200	300	400	600
Axial Load in compression (N)	500	600	900	1000
Tensile Axial Load (N)	200			



**Torque Diagrams**

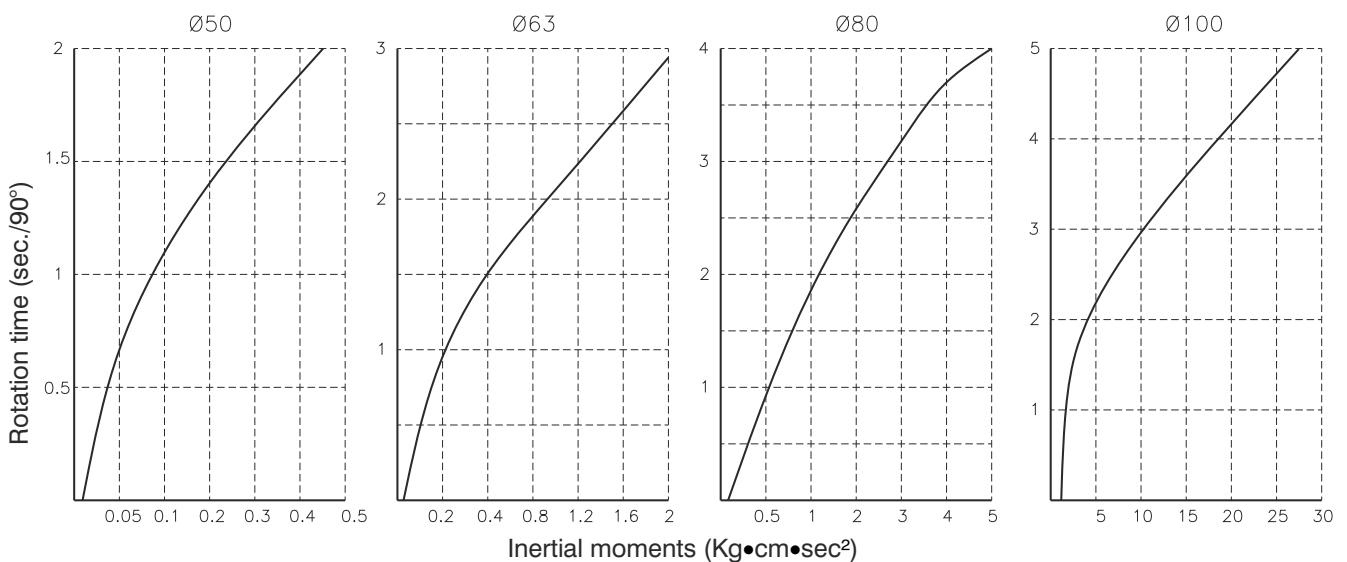


**Max Kinetic energy (Kg-cm)**

Kinetic energy (cushioning angle 35°)

Bore			
Ø50	Ø63	Ø80	Ø100
10	15	20	30

**Rotation time according to inertial moments**



5

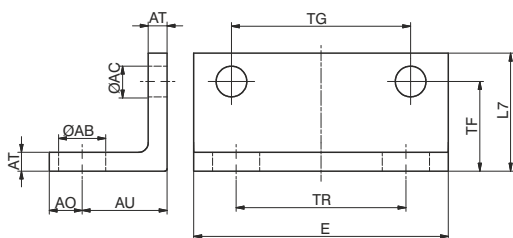
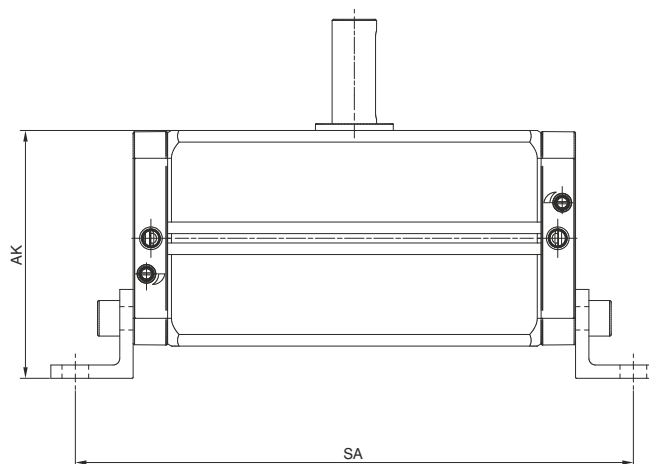


**Foot (MS1)**

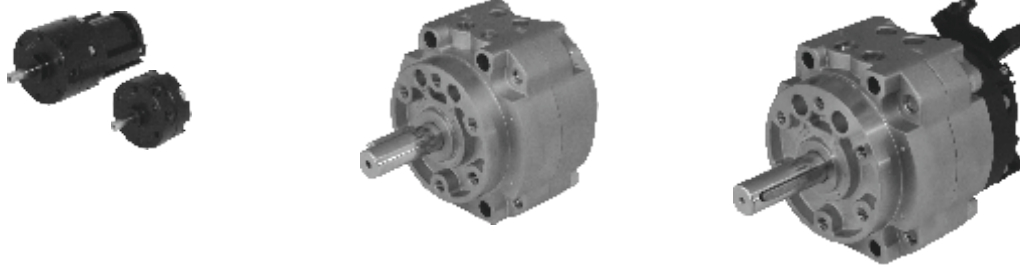
Ordering code

**1540.Ø.05/1F**

The kit comprises:  
n°1 foot (plated zinc steel)  
n°2 screws (plated zinc steel)



Bore	Ø50	Ø63	Ø80	Ø100
<b>AK</b>	78	89	111,5	132
<b>SA</b>	90°	198	217	251
	180°	231	256	295



**General**

The vane type rotary actuators, 6420 series is designed to operate at 90-180 or 270 deg. In a contained space. Dimensionally are more compact than other types of rotary actuators.

The range includes bore sizes from 10 to 100 in 4 configurations:

- Basic.
- With rotary angle adjustment mechanism.
- With sensing support.
- With rotary angle adjustment mechanism and sensing support.

The bodies are in aluminium , the shafts in chrome plated steel and the seals in NBR.

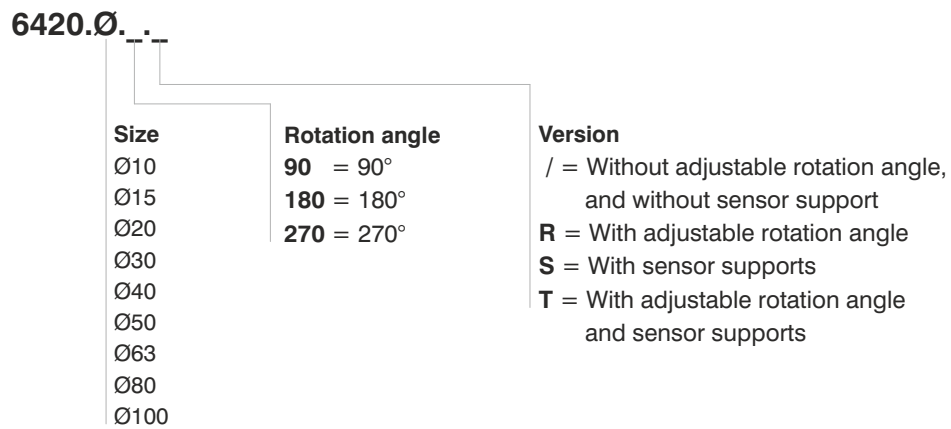
The sensing support kit enables for the sensors to be positioned in any position.

The rotary angle adjustment mechanism enables the adjustment of the complete rotation on bore sizes 10 to 40 while on the others sizes carries as standard hydraulic dampers which enable the adjustment only of the last part of the rotation.

The units can be fixed using the thread on the body or the through holes on the body.

On bore sizes 50 to 100 the shaft runs into ball bearings which ensure high resistance. o rotante è guidato su cuscinetti a sfere che assorbono i carichi radiali e assiali, garantendo durata e affidabilità.

**Ordering code**

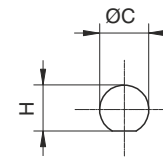
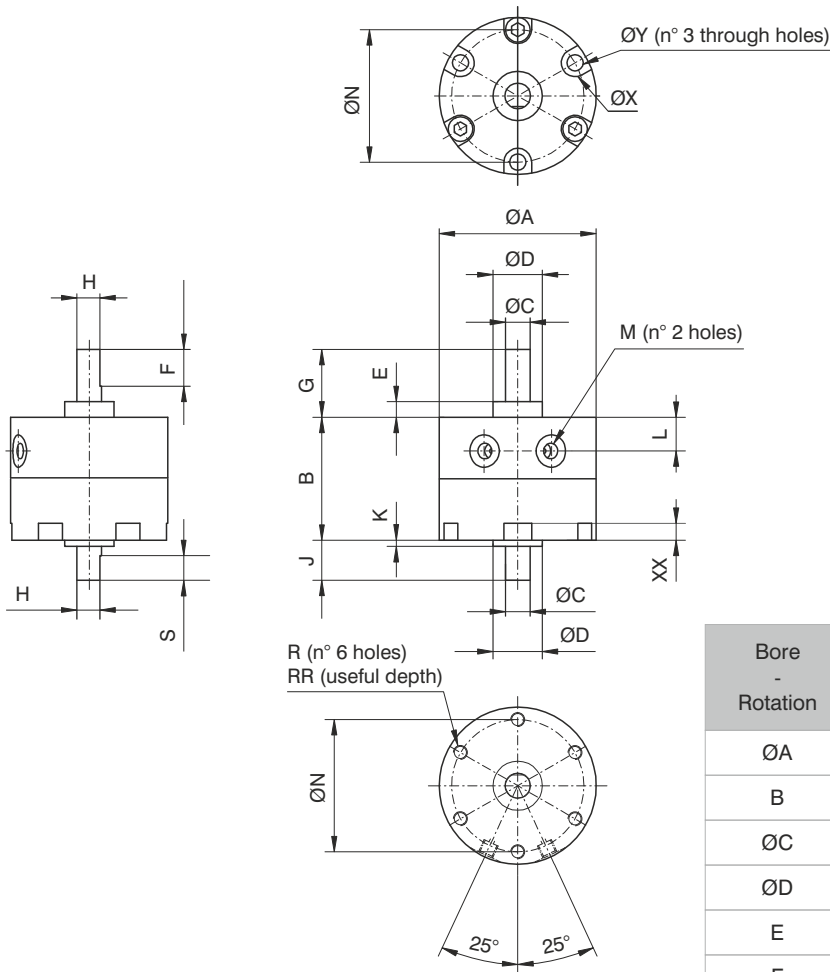


**Construction characteristics**

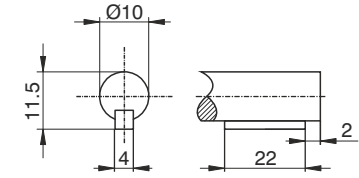
Body	anodised aluminium
Rod	steel
Seals	NBR
Vane	vulcanized NBR rubber on steel core
Cushoning	elastic bumper; hydraulic dampers from size Ø50 - Ø100 versions R or T

**Technical characteristics**

Fluid	Filtered air and preferably lubricated
Working pressure	1,5 - 7 bar
Temperature	0°C - 50°C
Rotation range	90° - 180° - 270°
Max. allowed leak	Ø10 - Ø40 = 0,3 NI/min / Ø50 - Ø100 = 0,5 NI/min

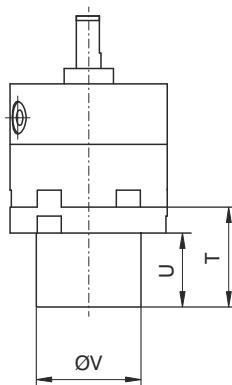


- Ø10 - Ø30 long shaft  
- Ø10 - Ø40 short shaft

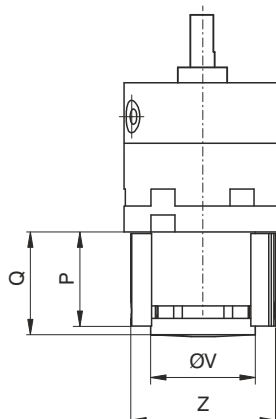


- Ø40 long shaft

**Adjustable rotation angle version**

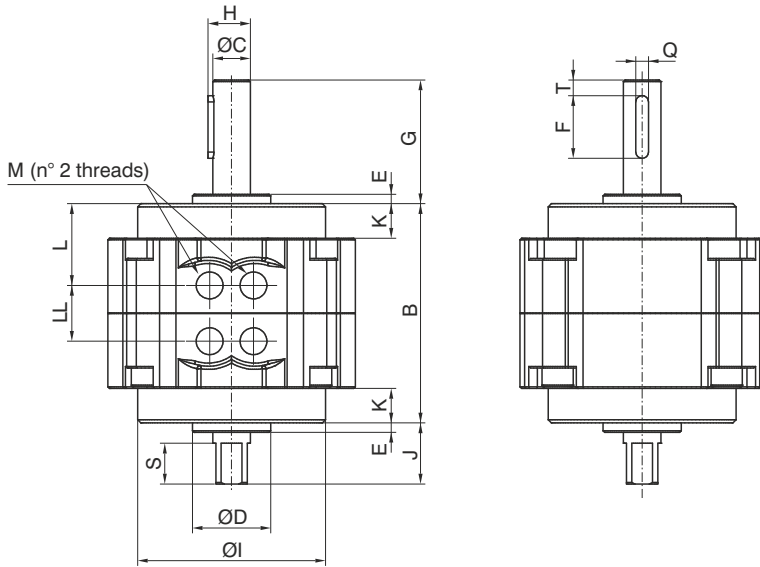
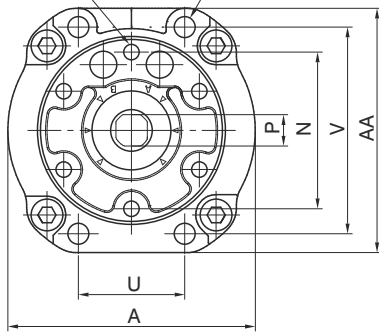


**With sensor support version**

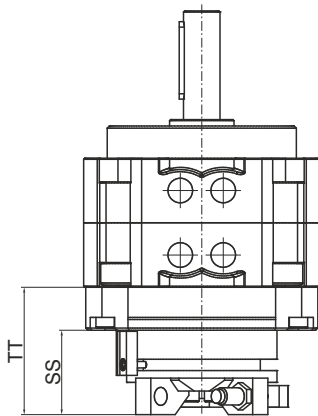


Bore - Rotation	10 - 90°	15 - 90°	20 - 90°	30 - 90°	40 - 90°	
	10 - 180°	15 - 180°	20 - 180°	30 - 180°	40 - 180°	
	10 - 270°	15 - 270°	20 - 270°	30 - 270°	40 - 270°	
ØA	30	35	44	51	64	
B	17	20,1	29,1	40	45	
ØC	4	5	6	8	10	
ØD	9	12	14	16	25	
E	3	4	4,5	5	6,5	
F	9	10	10	12	22	
G	14	18	20,3	22	30	
H	3,5	4,5	5,5	7,5	9	
J	8	9	9,6	13	15	
K	1	1,5	1,6	2	4,5	
L	4,2	5	8,5	11	9,5	
M	M5x0,8	M5x0,8	M5x0,8	M5x0,8	M5x0,8	
ØN	24	29	36	43	56	
P	23,3	28	28	30,8	33	
Q	24	29,5	30,5	34	36	
R	M3x0,5	M3x0,5	M4x0,7	M5x0,8	M5x0,8	
RR	3	3	4,5	9	9	
S	5	6	7	8	9	
T	24	28	28,5	32,5	34,5	
U	18	22	21	24	26	
ØV	18	24	30	34	34	
ØX	6	6	7,5	9	9	
XX	3,5	3,5	4,5	5,5	5,5	
ØY	2,3	2,3	3,2	4,2	4,2	
Z	29	34	42	47	47	
Weight (gr.)	Base	28	48	112	200	342
	With regulation rotation system	78	116	240	390	805

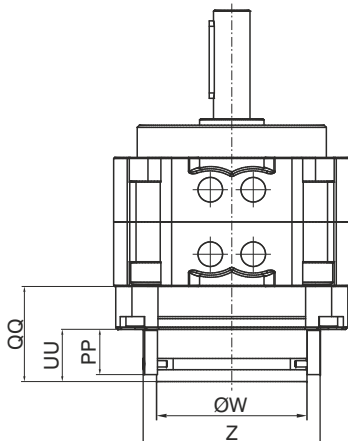
R (n° 6 threads on both sides)  
RR (useful depth)      ØVA (n° 4 holes)



**Adjustable rotation angle version**

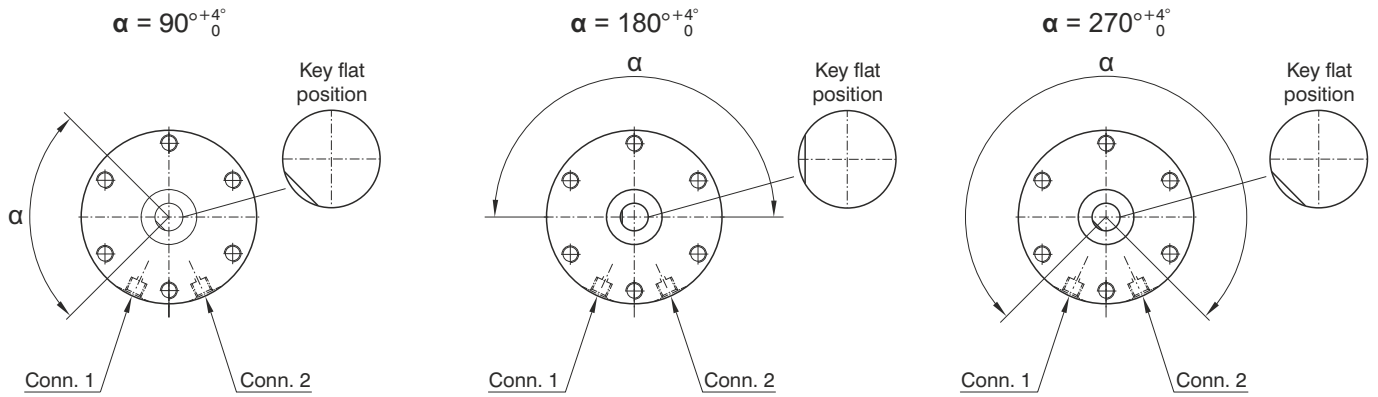


**With sensor support version**



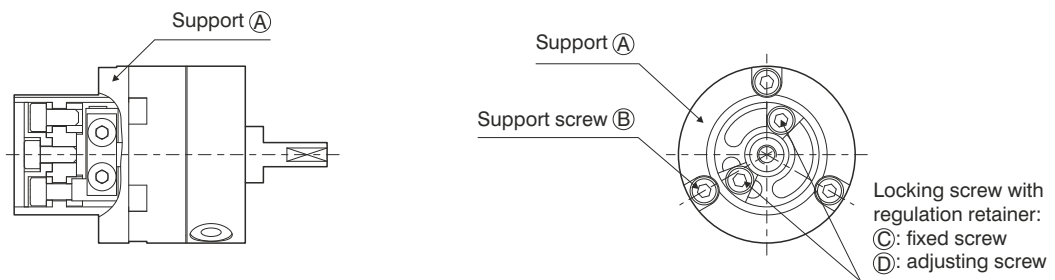
Bore - Rotation	50 - 90°	63 - 90°	80 - 90°	100 - 90°	
	50 - 180°	63 - 180°	80 - 180°	100 - 180°	
	50 - 270°	63 - 270°	80 - 270°	100 - 270°	
A	79	98	110	140	
AA	78	98	110	140	
B	70	80	90	103	
ØC	12	15	17	25	
ØD	25	28	30	45	
E	3	3	3	4	
F	20	25	36	40	
G	39,5	45	53,5	65	
H	13,5	17	19	29	
ØI	60	75	88	108	
J	19,5	21	23,5	30	
K	11	14	15	11,5	
L	26	28,9	30	35,4	
LL	18	22,2	30	32,2	
M	G1/8"	G1/8"	G1/4"	G1/4"	
N	50	60	70	80	
P	10	12	13	19	
PP	21	21	21	21	
Q	4	5	5	7	
QQ	39,4	43	44	48,5	
R	M6x1	M8x1,25	M8x1,25	M10x1,5	
RR	8	10	14	14	
S	13	14	16	16	
SS	38	38	39	39,5	
T	5	7,5	5	5	
TT	53	56,5	59	63	
U	34	39	48	60	
UU	24,5	24,5	24,5	24,5	
V	66	83	94	120	
ØVA	6,5	9	9	11	
ØW	60	60	70	70	
Z	73	73	83	83	
Weight (gr.)	Base	760	1290	1920	4100
	With regulation rotation system	1100	1690	2370	4840

### ROTATING SHAFT KEY FLAT POSITION



### ROTATION ANGLE SETUP

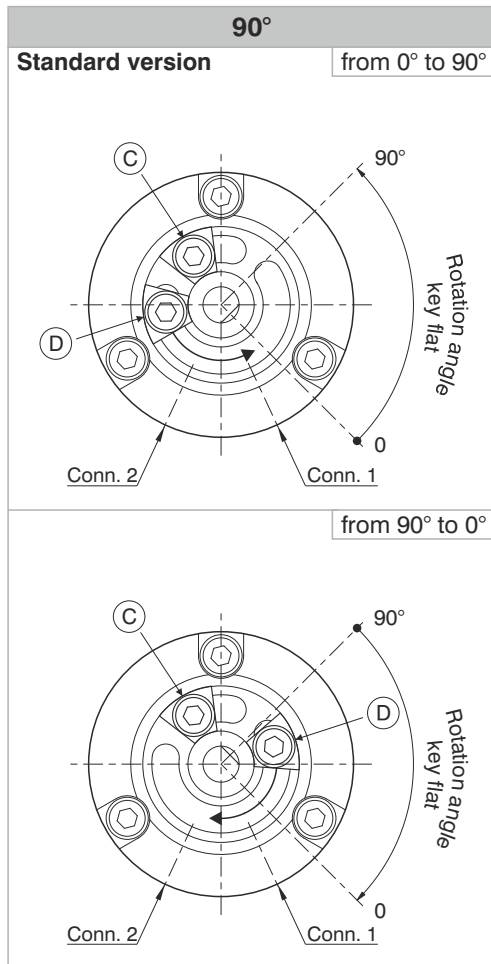
To regulate the rotation angle (codes 6420..R or T), follow the instructions below



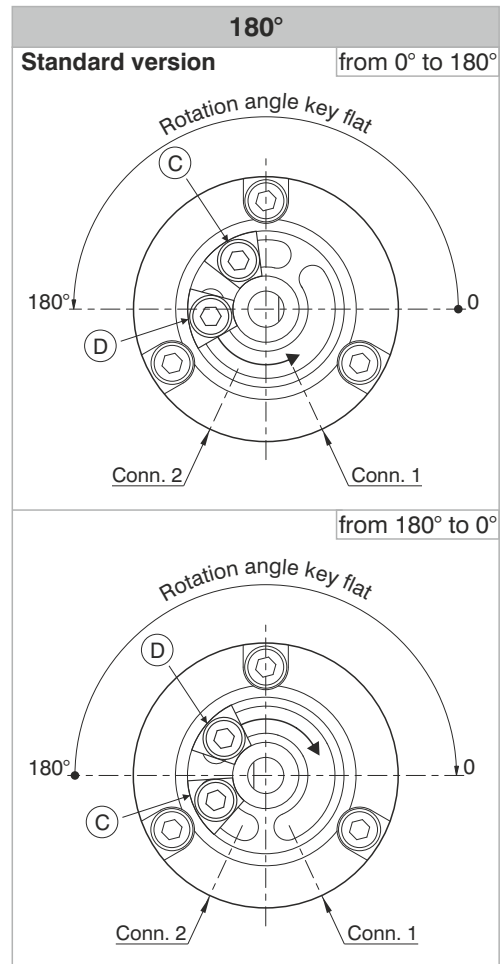
**Phase 1 :** Choose the regulation configuration based on the following options  
(consider the actuator base position):

**rotation 90°, regulation 0 - 90°, rotation 180°, regulation 0 - 180°, rotation 270°, regulation 0 - 175°**

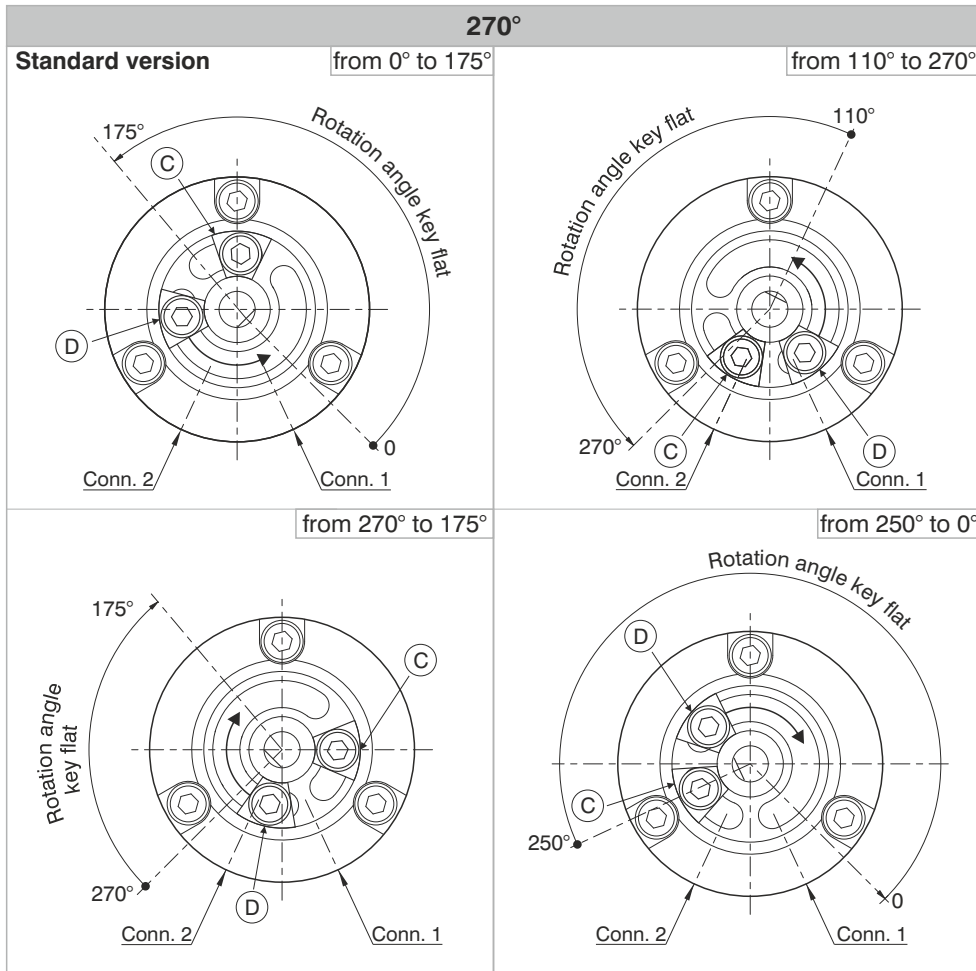
### ROTATION CONFIGURATION



### ROTATION CONFIGURATION



**ROTATION CONFIGURATION**

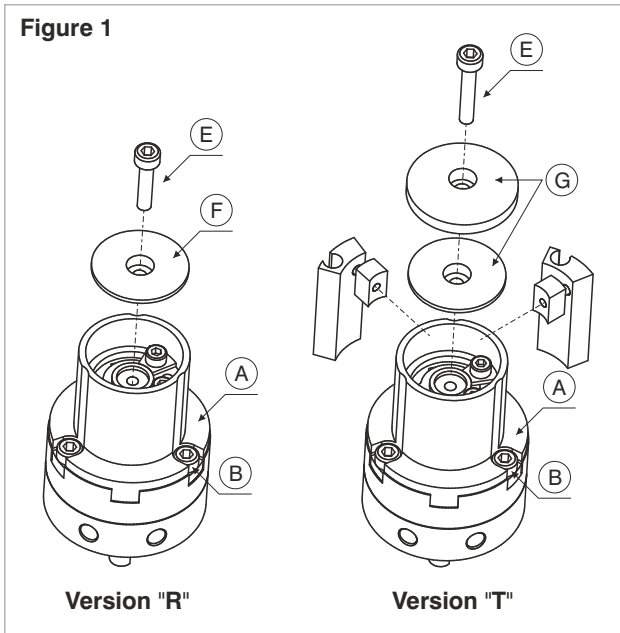


Ⓒ = Fixed screw Ⓓ = Adjusting screw

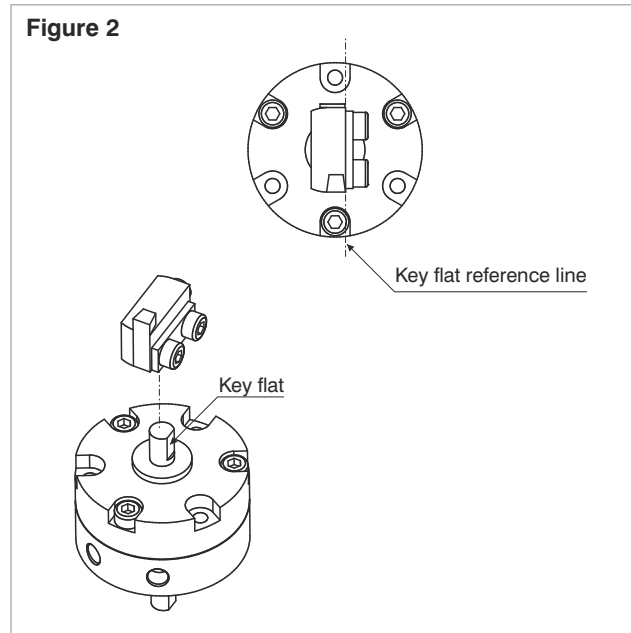
**Phase 2 :** If the desired settings do not correspond to the basic version settings:

- remove screw (E) and disk (F) or (G) (depending on the version) (see figure 1)
- remove screws (B), the actuator support (A) (see figure 1) and unlock blocking screws (C) and (D) (see rotation configuration)
- position screws (C) and (D) and the key flat of rotating shaft as indicated in the chosen rotation configuration in order to align the key flat of rotating shaft (see figure 2)
- re-assemble actuator support (A), tighten screws (B)
- position screws (C) and (D) according to the desired adjustment and tighten the screws
- re-assemble disk (F) or (G) and screw (E)

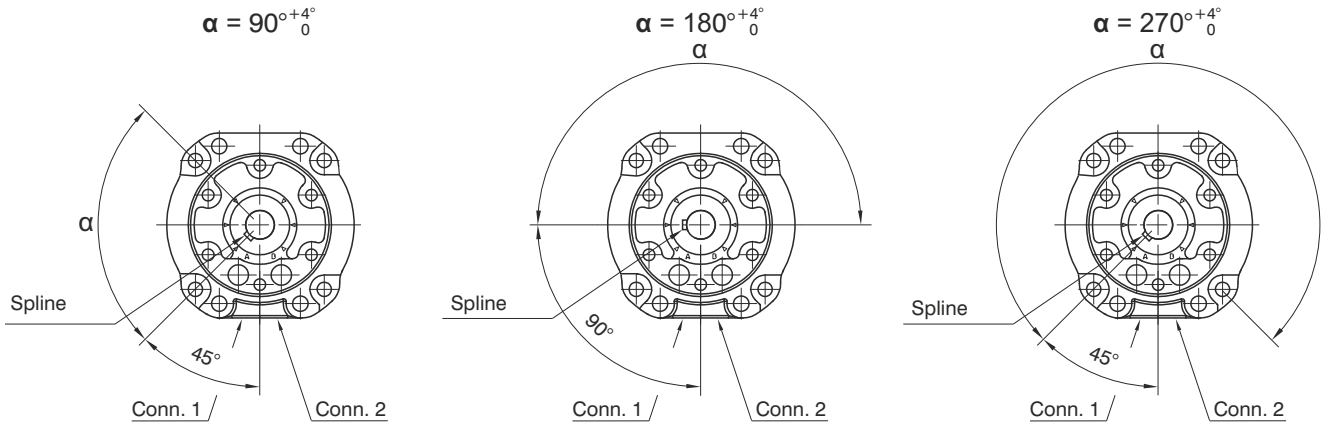
**Figure 1**



**Figure 2**

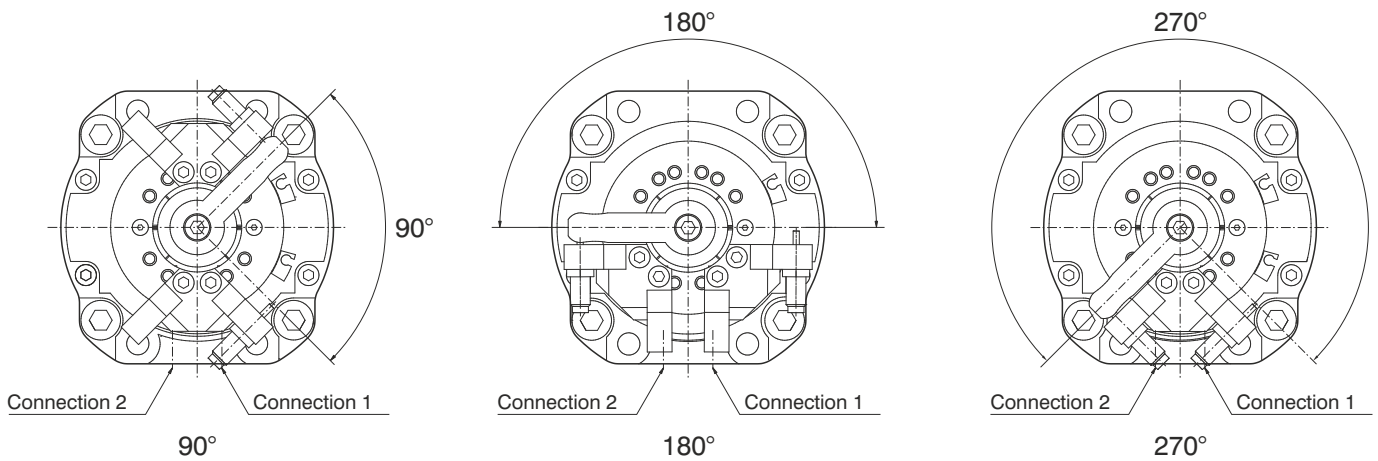


### ROTATING SHAFT SPLINE POSITION



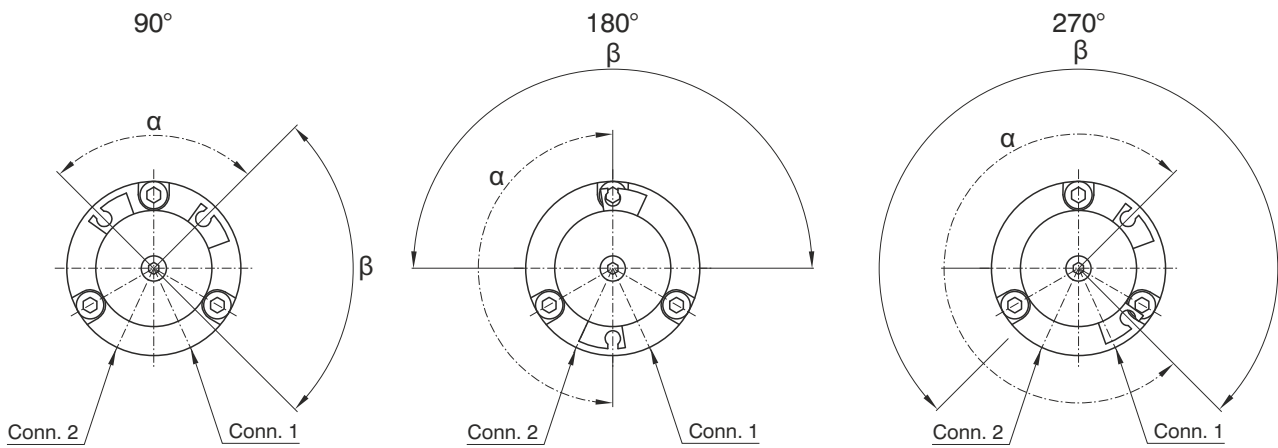
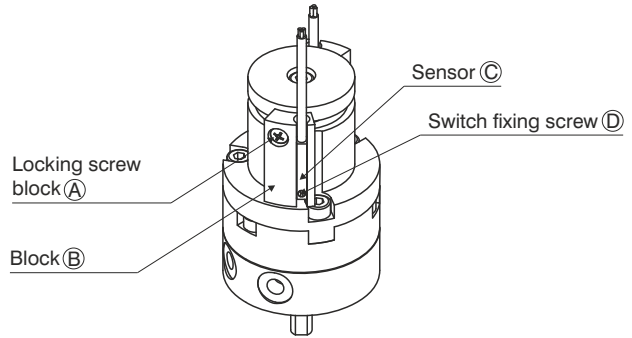
### ROTATION ANGLE SETUP

The version with adjustable rotation angle (cod. 6420..R or T) is available with hydraulic dampers which enable to regulate the rotation angle by 10° and to decelerate moving mass.





- Phase 1** - Unfasten screw (A)
- Phase 2** - Assemble the switch (C) into the dedicated housing (B) and lock with screw (D)
- Phase 3** - Rotate block (B) in the desired position (see following image)



$\alpha$  - magnet rotating angle

$\beta$  - shaft key flat rotating angle

For correct functionality position the switch within angle  $\alpha$

**Phase 4** - tighten screw (A)

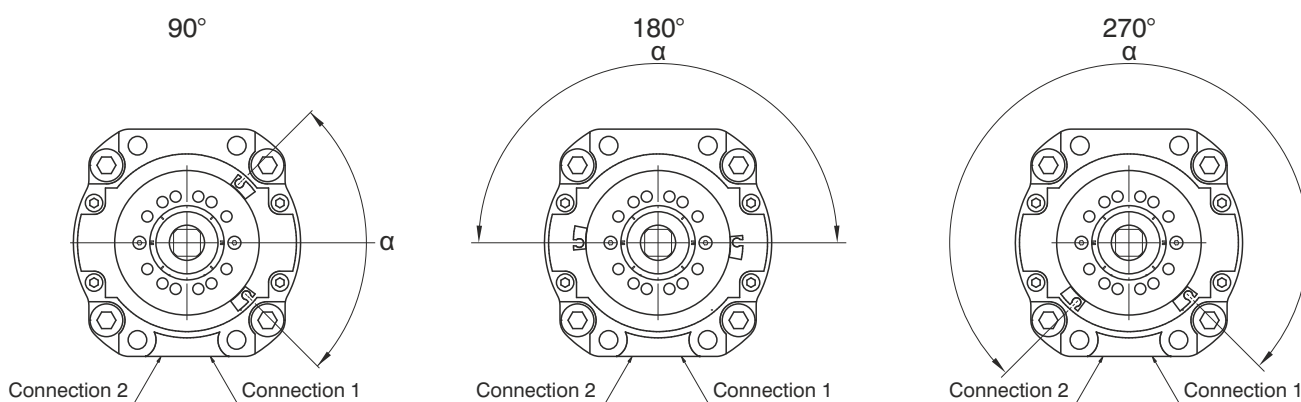
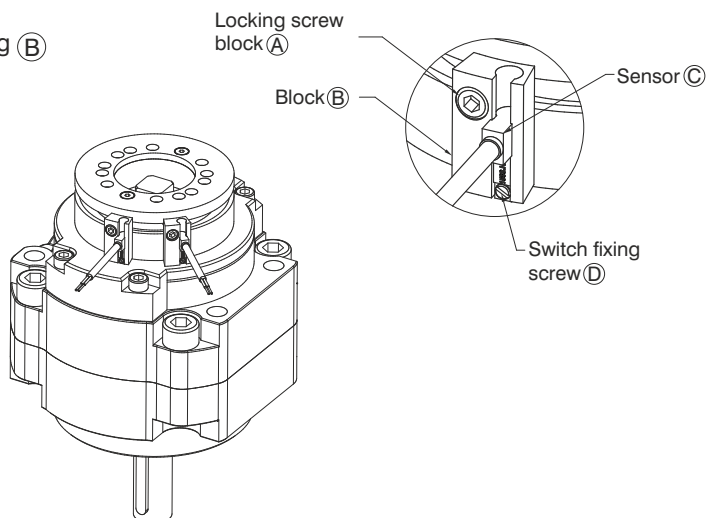
**Phase 5** - repeat the following phases for the second switch

**AVAILABLE SENSORS**

	Code
	1581.U
	TRS.U
	1581.HAP
	THS.P

	Code
	1583.DC
	1583.HAP
	THR.P

- Phase 1** - Unfasten screw (A)
- Phase 2** - Assemble the switch (C) into the dedicated housing (B) and lock with screw (D)
- Phase 3** - Rotate block (B) in the desired position (see following image)



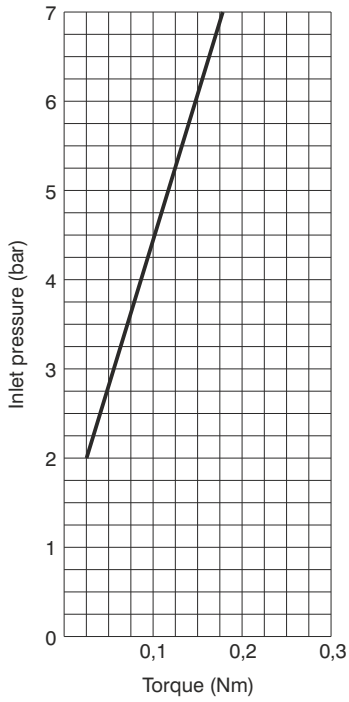
$\alpha$  - magnet rotating angle (that corresponds to the shaft key flat rotating angle)  
For correct functionality position the switch within angle  $\alpha$

- Phase 4** - tighten screw (A)
- Phase 5** - repeat the following phases for the second switch

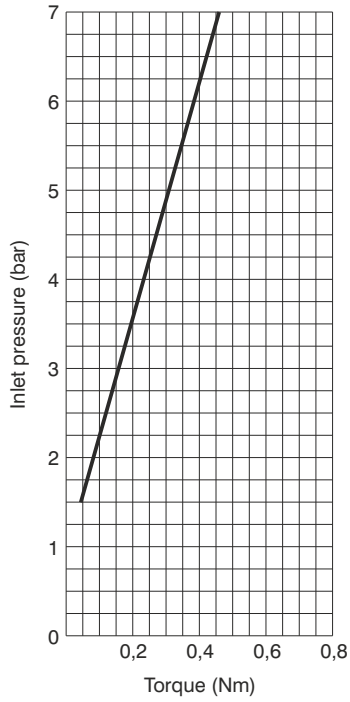
#### AVAILABLE SENSORS

	Code
	1583.DC
	1583.HAP
	THR.P

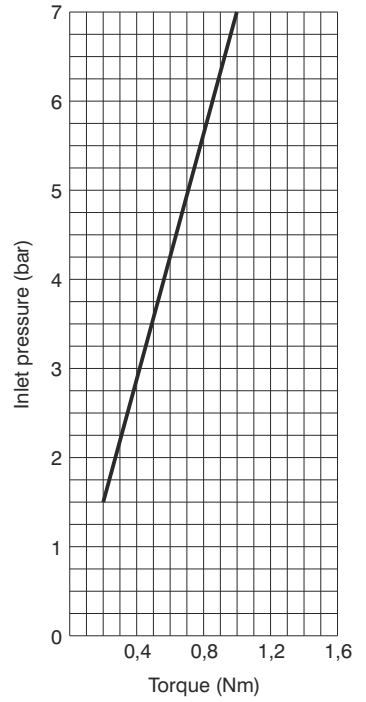
Ø10



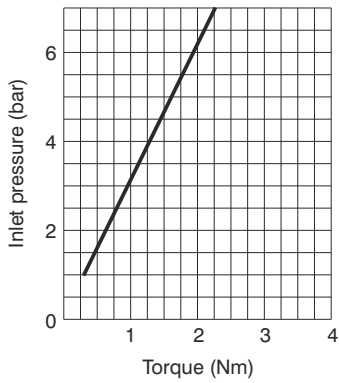
Ø15



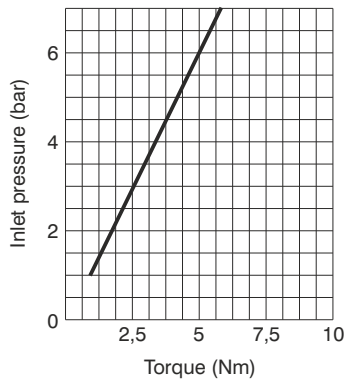
Ø20



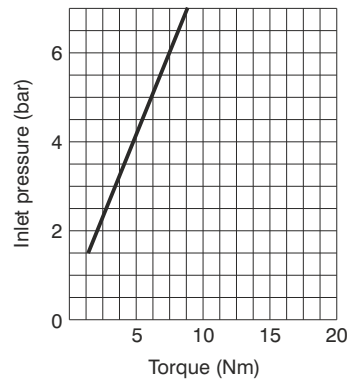
Ø30



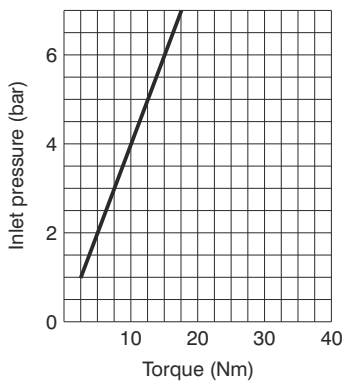
Ø40



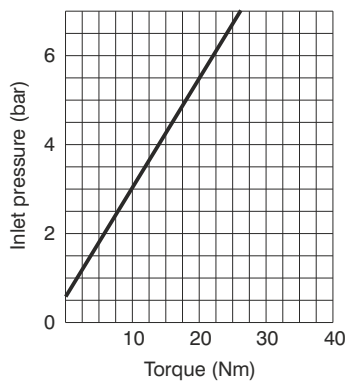
Ø50



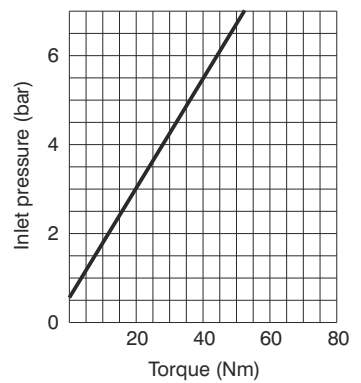
Ø63



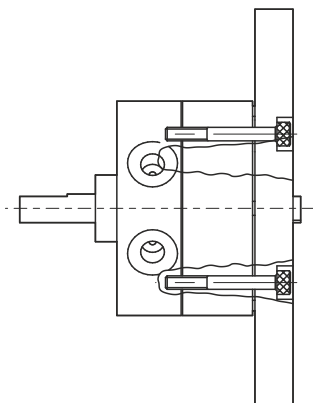
Ø80



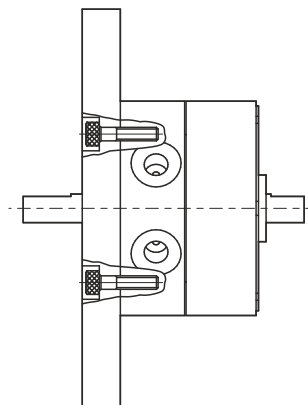
Ø100



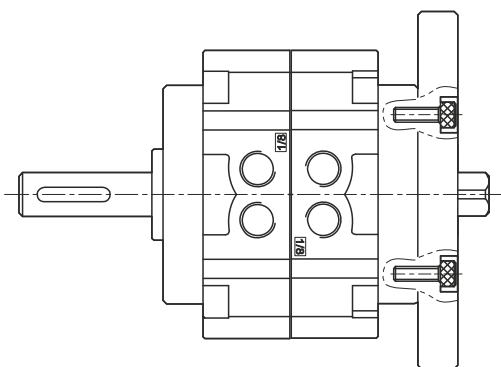
### Mounting types



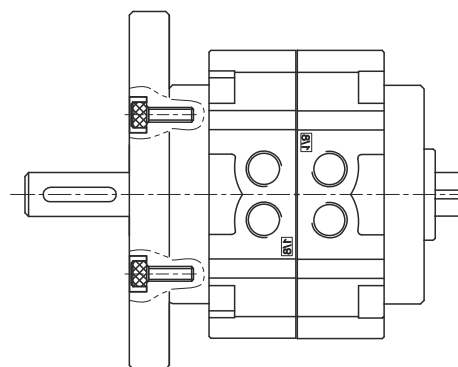
Rear mounting



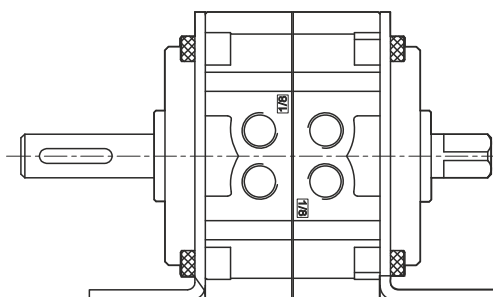
Frontal mounting



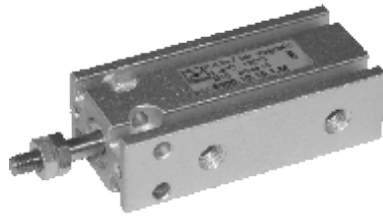
Rear mounting



Frontal mounting



Mounting with flange



**Ordering code**

6500.Ø.stroke. 1 .

10	= non magnetic
16	
20	
25	

M = magnetic

**Construction characteristics**

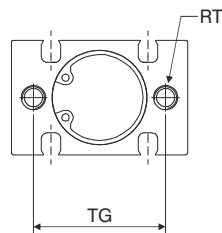
Body	anodised aluminium
Piston rod	stainless steel
Piston	brass
Rods bushing	sinterize bronze
End plate	anodised aluminium
Cushioning washer	PUR
Seal	oil resistant NBR rubber

**Technical characteristics**

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Minimum working pressure	0.6 bar (for bore Ø10 - Ø16) 0.5 bar (for bore Ø20 - Ø32)
Max pressure	7 bar
Operating temperature	-5°C - +70°C
Cushioning	with elastic bumper
Stroke tolerance	+1 / 0 mm
Piston speed	50 - 500 mm/sec (without load)

**Corse standard**

Bore	Stroke							
	5	10	15	20	25	30	40	50
Ø10	●	●	●	●	●	●		
Ø16	●	●	●	●	●	●		
Ø20	●	●	●	●	●	●	●	●
Ø25	●	●	●	●	●	●	●	●



\* $\text{\O}10$ : n° 2 piston rod nuts  
 $\text{\O}16$ : n° 1 piston rod nut

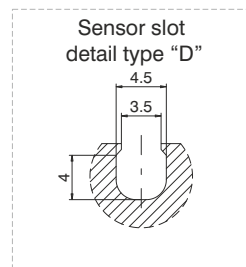
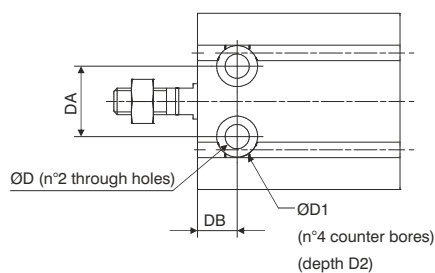
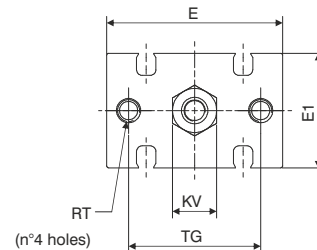
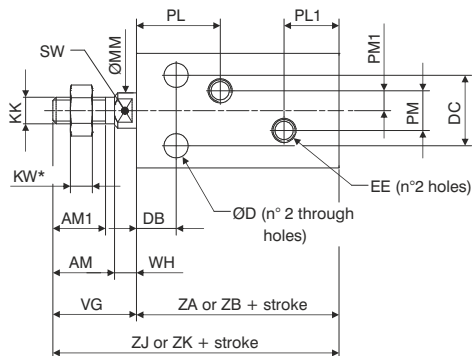
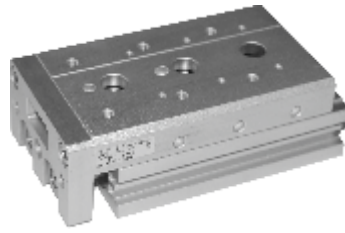


Table of dimensions

	Bore				
	$\text{\O}10$	$\text{\O}16$	$\text{\O}20$	$\text{\O}25$	
AM	/	12,5	14	18	
AM1	10	11	12	15,5	
$\text{\O}D$	$\text{\O}3,2$	$\text{\O}4,5$	$\text{\O}5,5$	$\text{\O}5,5$	
$\text{\O}D1$	$\text{\O}6$	$\text{\O}7,6$	$\text{\O}9,3$	$\text{\O}9,3$	
D2	5	6,5	8	9	
DA	11	14	16	20	
DB	7	7	9	10	
DC	9	12	16	20	
E	24	32	40	50	
E1	15	20	26	32	
EE	M5	M5	M5	M5	
KK	M4	M5	M6	M8	
KV	7	8	10	13	
KW	3	4	5	5	
$\text{\O}MM$	$\text{\O}4$	$\text{\O}6$	$\text{\O}8$	$\text{\O}10$	
PL	16,5	16,5	19	21,5	
PL1	10	11,5	12,5	13	
PM	/	4	9	9	
PM1	/	2	4,5	4,5	
RT	M3 (useful depth 5)	M4 (useful depth 6)	M5 (useful depth 8)	M5 (useful depth 8)	
SW	/	5	6	8	
TG	18	25	30	38	
VG	16	16	19	23	
WH	/	3,5	5	5	
ZA	magnetic	36	40	46	50
ZB	non magnetic	36	30	36	40
ZJ	magnetic	52	56	65	73
ZK	non magnetic	52	46	55	63
<b>Weight (gr.)</b>					
Stroke 0	32	44	84	159	
every 5 mm	4	6	11	17	



**Ordering code**

6600.Ø.stroke. \_ . \_

- 8 = Without accessories
- 12 = **A** = Double regulation end stroke
- 16 = **AU** = Regulation front end stroke
- 20 = **AR** = Regulation rear end stroke
- 25 = **D** = Double shock absorber
- = **DU** = Front shock absorber
- = **DR** = Rear shock absorber

**Construction characteristics**

Body	anodised aluminium
Piston rod	stainless steel
Piston	stainless steel
Piston rod bushing	sintered bronze
End plate	anodised aluminium
Cushioning washer	PUR
Seal	oil resistant NBR rubber
Flange	anodised aluminium
Upper plate	anodised aluminium

**Technical characteristics**

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	1.5 - 7 bar
Working temperature	-5°C - +70°C
Cushioning	with elastic bumper

**Theoretical force**

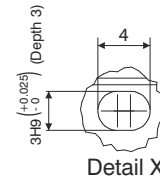
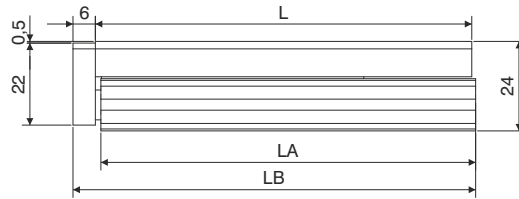
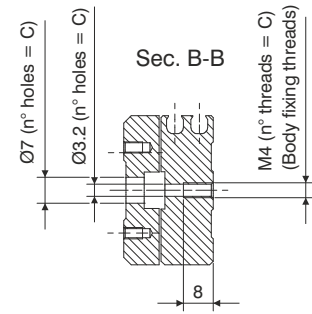
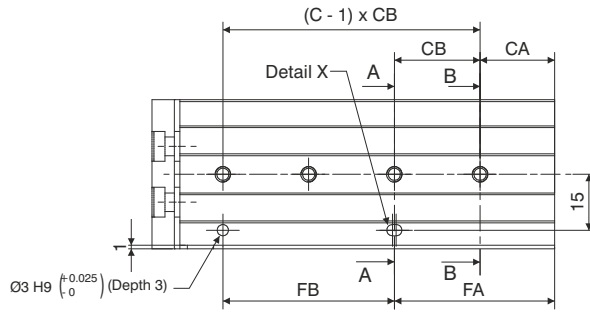
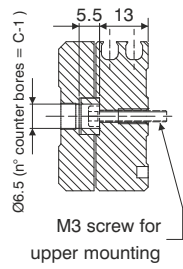
Bore	Effective area (mm <sup>2</sup> )	Force (N)						
		10	20	30	40	50	60	70
Ø8	Out	101	20	30	40	51	61	71
	In	75	15	23	30	38	45	53
Ø12	Out	226	45	68	90	113	136	158
	In	170	34	51	68	85	102	119
Ø16	Out	402	80	121	161	201	241	281
	In	302	60	91	121	151	181	211
Ø20	Out	628	126	188	251	314	377	440
	In	471	94	141	188	236	283	330
Ø25	Out	982	196	295	393	491	589	687
	In	756	151	227	302	378	454	529
		2	3	4	5	6	7	
		Working pressure(bar)						

**Standard strokes**

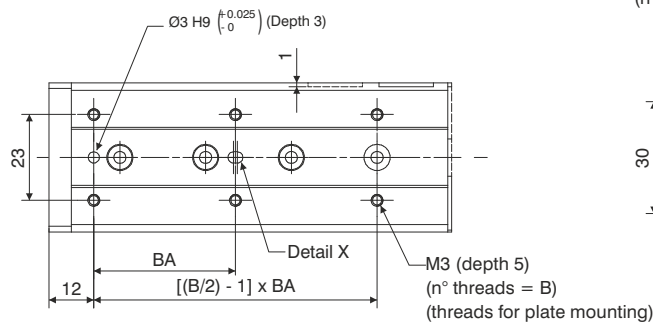
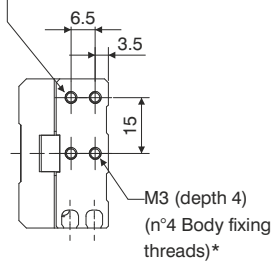
Bore	Stroke								
	10	20	30	40	50	75	100	125	150
Ø8	●	●	●	●	●	●			
Ø12	●	●	●	●	●	●	●		
Ø16	●	●	●	●	●	●	●	●	
Ø20	●	●	●	●	●	●	●	●	●
Ø25	●	●	●	●	●	●	●	●	●



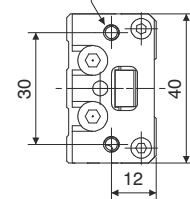
Sec. A-A



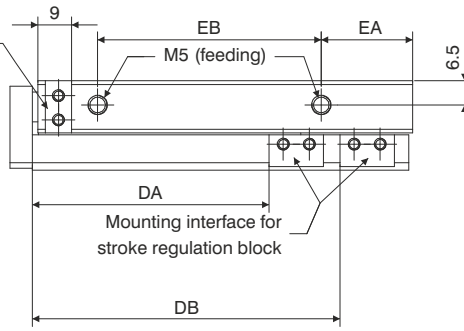
Mounting surface for stroke regulation block



M4 (depth 6) (n°2 Flange fixing threads)



Mounting surface for stroke regulation block



Sensor slot detail type "D"

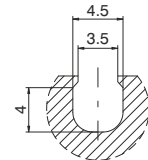


Table of dimensions

	Standard stroke					
	10	20	30	40	50	75
B	4	4	4	4	6	6
BA	25	25	40	50	38	50
C	2	2	3	3	4	5
CA	9	12	13	15	20	27
CB	28	30	20	28	23	28
DA	23,5	33,5	43,5	53,5	63,5	88,5
DB	/	/	/	/	82,5	132,5
FA	17	12	33	43	43	83
FB	20	30	20	28	46	56
EA	13	8,5	9,5	10,5	24,5	38,5
EB	19,5	29	39	56	60	96
L	49	54	65	83	101	151
LA	48,5	53,5	64,5	82,5	100,5	150,5
LB	56	61	72	90	108	158
<b>Weight (gr.)</b>	150	160	190	235	285	410

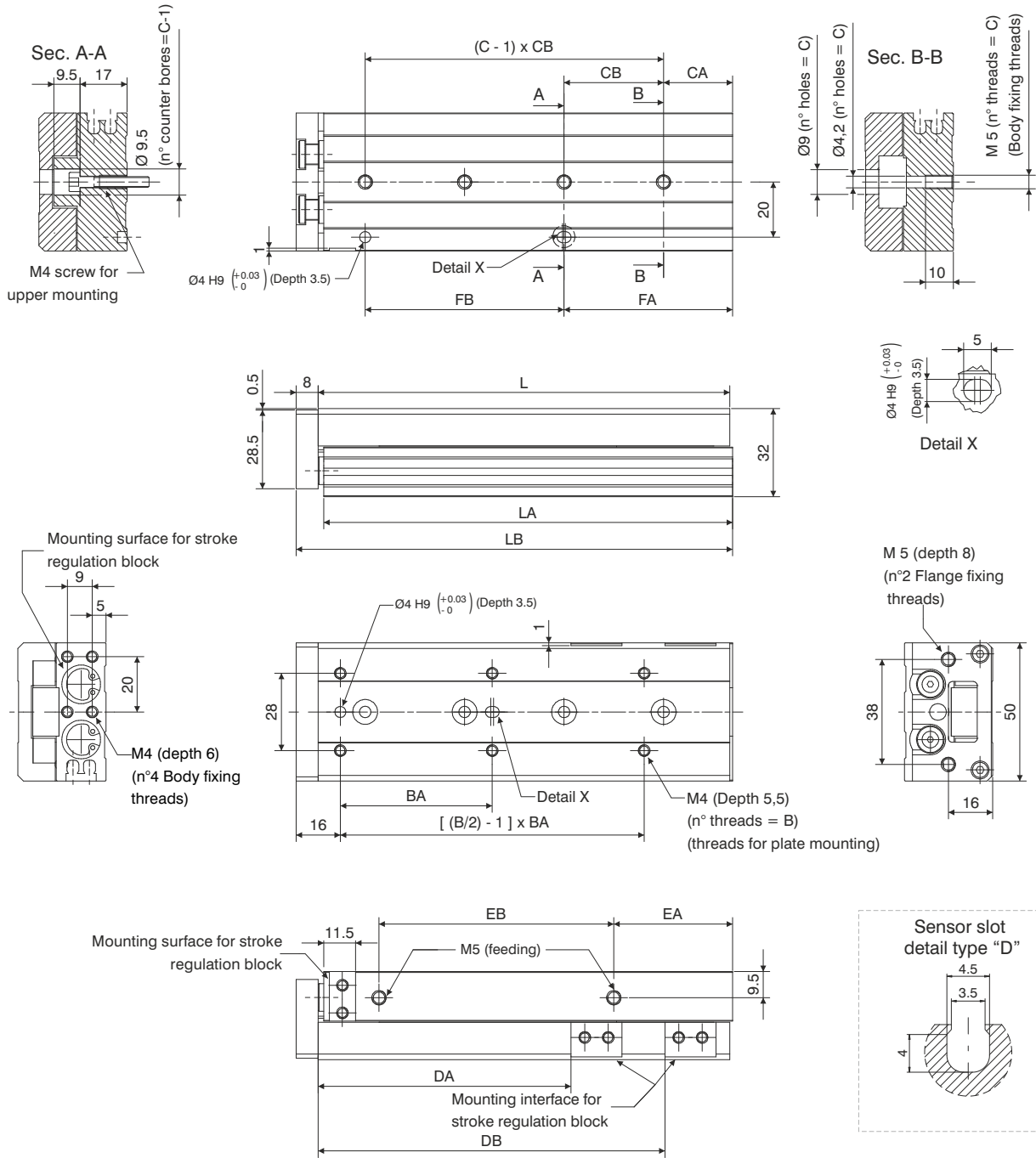


Table of dimensions

	Standard stroke						
	10	20	30	40	50	75	100
B	4			6			
BA		35		50	35	55	65
C		2		3	3	4	5
CA		15		17	15	25	35
CB		40		25	36	36	38
DA	26,5	36,5	46,5	56,5	66,5	91,5	116,5
DB	/	/	/	/	/	125,5	179,5
FA		15		42	51	61	111
FB		40		25	36	72	76
EA		10			22	43	52
EB		40		52	60	85	130
L		71		83	103	149	203
LA		70		82	102	148	202
LB		80		92	112	158	212
<b>Weight (gr.)</b>		325		385	480	660	890

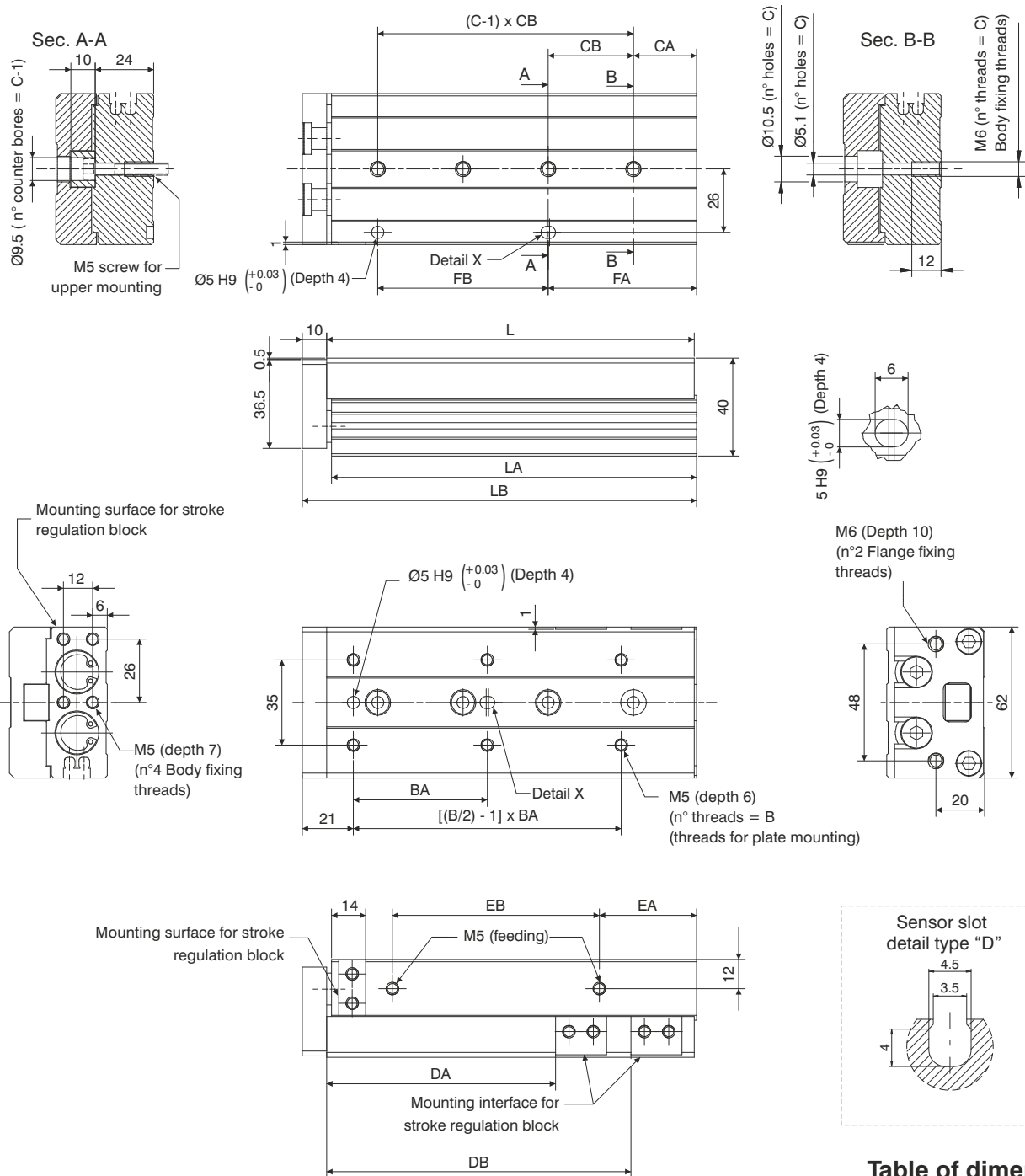


Table of dimensions

	Standard stroke							
	10	20	30	40	50	75	100	125
B	4	4	4	4	6	6	6	8
BA	35	35	35	40	30	55	65	70
C	2	2	2	2	3	4	5	7
CA	16	16	16	16	21	26	39	19
CB	40	40	40	50	30	35	35	35
DA	29	39	49	59	69	94	119	144
DB	/	/	/	/	/	125	173	223
FA	16	16	16	16	51	61	109	159
FB	40	40	40	50	30	70	70	70
EA	10	10	10	10	15	40	55	68
EB	40	40	40	50	60	85	118	155
L	76	76	76	86	101	151	199	249
LA	75	75	75	85	100	150	198	248
LB	87	87	87	97	112	162	210	260
<b>Weight (gr.)</b>	570	570	580	640	760	1090	1370	1700

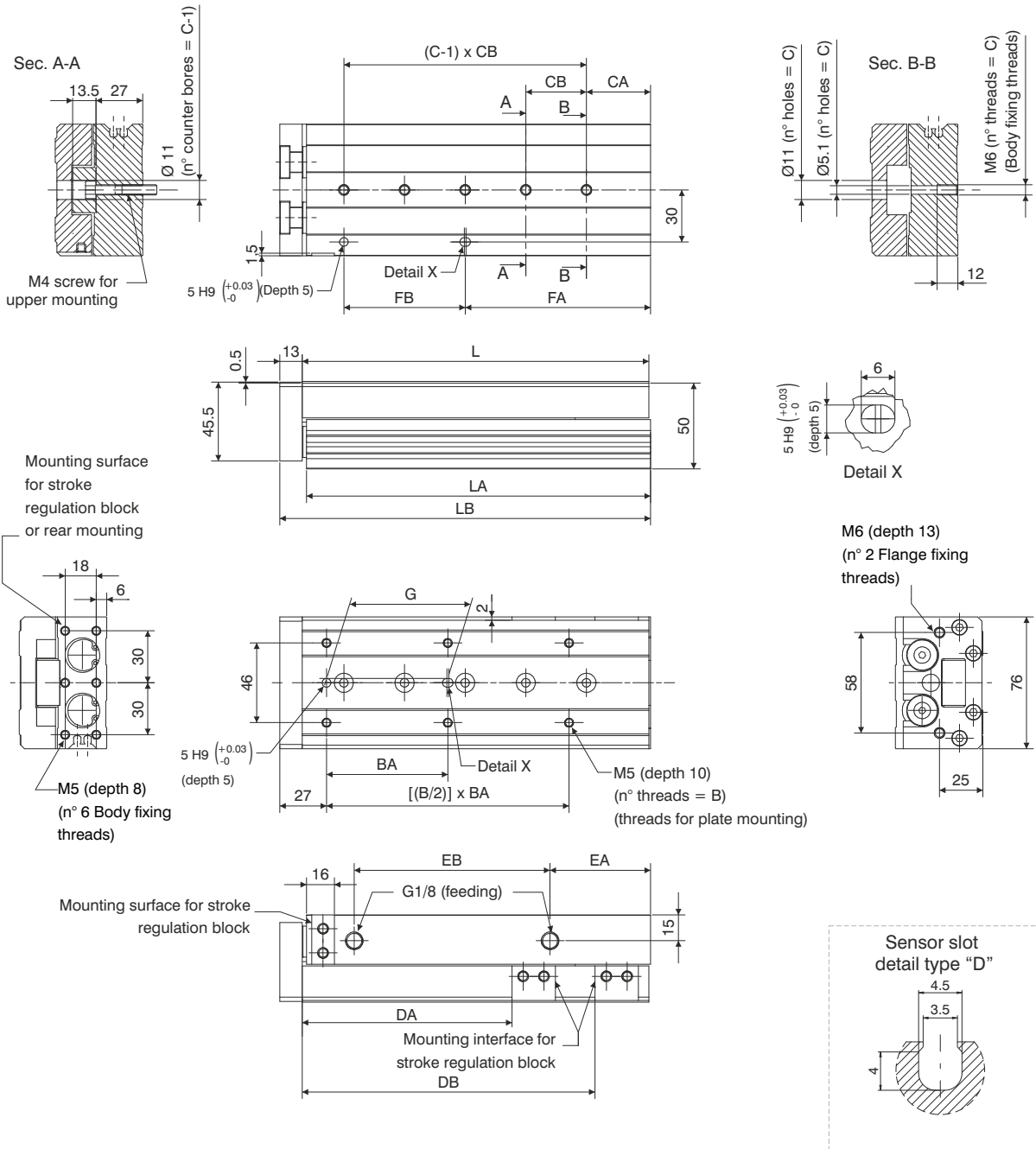


Table of dimensions

	Standard stroke								
	10	20	30	40	50	75	100	125	150
B	4	4	4	4	6	6	6	8	8
BA	50	50	50	60	35	60	70	70	80
C	2	2	2	2	3	4	5	6	7
CA	15	15	15	15	15	19	37	41	19
CB	45	45	45	55	35	35	35	38	44
DA	31	41	51	61	71	96	121	146	171
DB	/	/	/	/	/	/	169	223	275
EA	10	10	10	10	10	10	58	70	87
EB	44	44	44	54	69	108	113	155	190
FA	25	25	25	35	50	54	107	155	195
FB	35	35	35	35	35	70	70	76	88
G	40	40	40	50	35	60	70	70	80
L	83	83	83	93	108	147	200	254	306
LA	81,5	81,5	81,5	91,5	106,5	145,5	198,5	252,5	304,5
LB	97	97	97	107	122	161	214	268	320
Weight (gr.)	960	980	1010	1100	1250	1630	2150	2670	3190

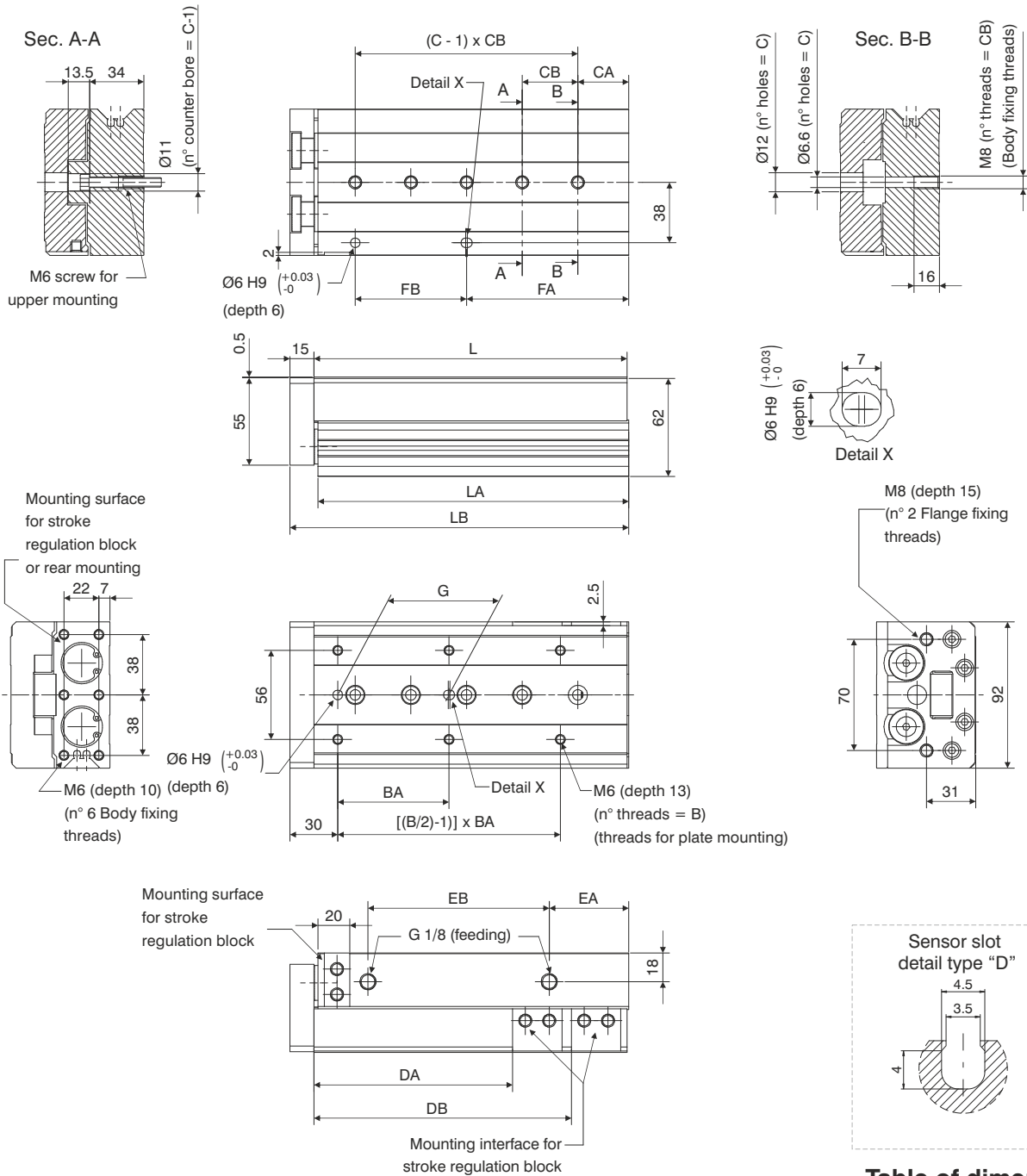
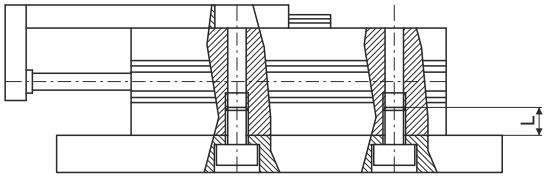


Table of dimensions

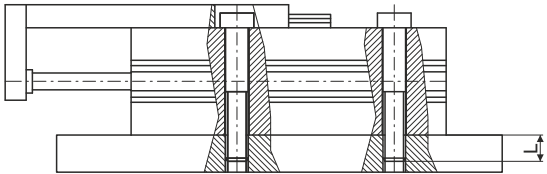
	Standard stroke									
	10	20	30	40	50	75	100	125	150	
B	4	4	4	4	6	6	6	8	8	
BA	50	50	50	60	35	60	70	75	80	
C	2	2	2	2	3	4	5	6	7	
CA	22	22	22	22	20	26	32	40	30	
CB	45	45	45	55	35	35	35	38	40	
DA	35	45	55	65	75	100	125	150	175	
DB	/	/	/	/	/	/	162	218	258	
EA	12	12	12	12	12	33	50	67	82	
EB	47	47	47	57	70	90	114	155	180	
FA	22	22	22	22	55	61	102	154	190	
FB	45	45	45	55	35	70	70	76	80	
G	40	40	40	50	35	60	70	75	80	
L	92	92	92	102	115	156	197	255	295	
LA	90,5	90,5	90,5	100,5	113,5	154,5	195,5	253,5	293,5	
LB	108	108	108	118	131	172	213	271	311	
<b>Weight (gr.)</b>	1660	1680	1690	1840	2090	2650	3270	4140	4710	

SIDE THREADED HOLES



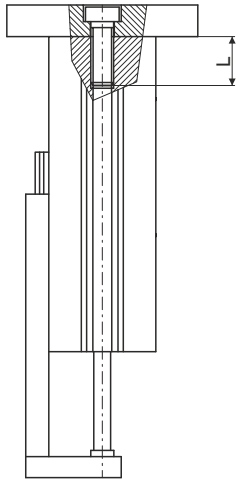
Bore	Screw	Torque (Nm)	Max. Length L (mm)
Ø8	M3	2,1	8
Ø12	M4	4,4	10
Ø16	M5	7,4	12
Ø20	M5	7,4	12
Ø25	M6	18	16

SIDE THROUGH HOLES



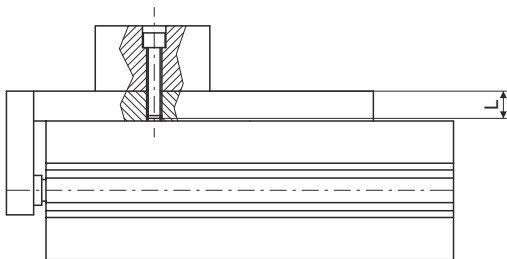
Bore	Screw	Torque (Nm)	Max. Length L (mm)
Ø8	M3	1,2	13
Ø12	M4	2,8	18,5
Ø16	M5	5,7	24
Ø20	M5	5,7	29
Ø25	M6	18	34

AXIAL THREADED HOLES

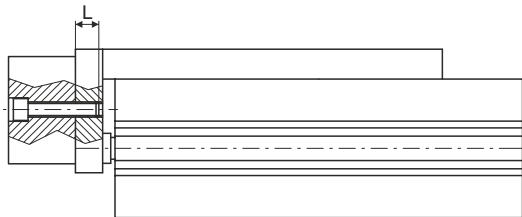


Bore	Screw	Torque (Nm)	Max. Length L (mm)
Ø8	M3	0,9	4
Ø12	M4	2,1	6
Ø16	M5	4,4	7
Ø20	M5	4,4	8
Ø25	M6	7,4	10

Mounting load



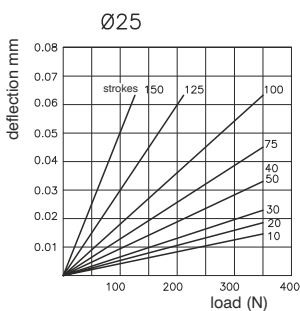
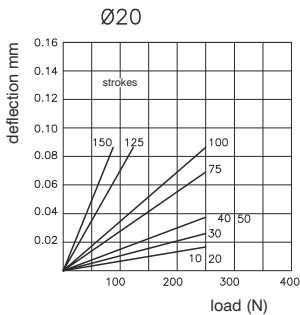
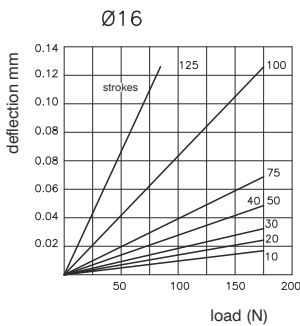
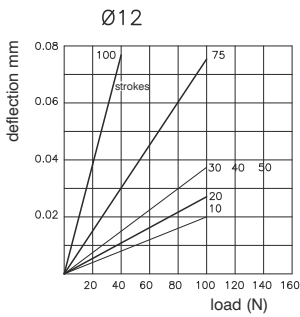
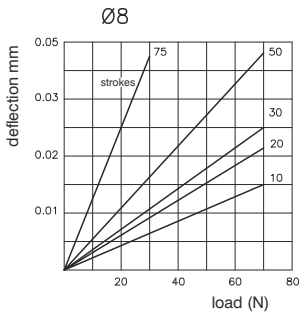
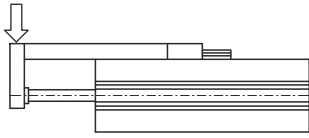
Bore	Screw	Torque (Nm)	Max. Length L (mm)
Ø8	M3	2,1	6
Ø12	M4	4,4	8
Ø16	M5	7,4	10
Ø20	M5	7,4	13
Ø25	M6	18	15



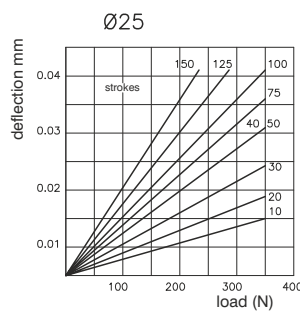
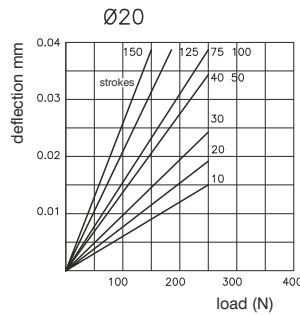
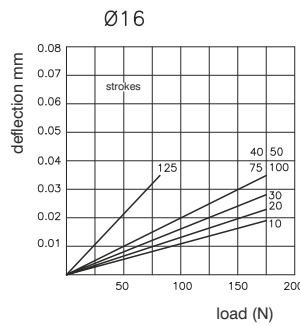
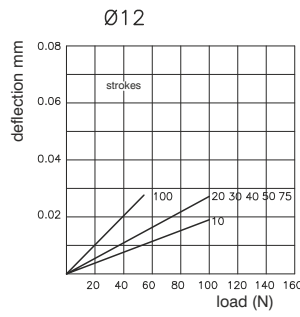
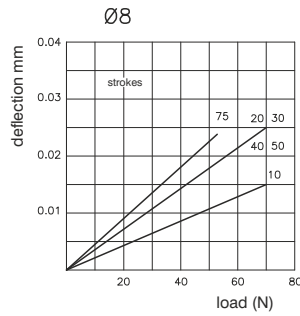
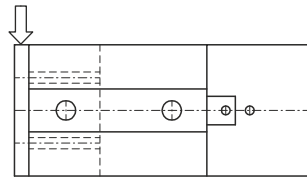
Bore	Screw	Torque (Nm)	Max. Length L (mm)
Ø8	M3	0,9	5
Ø12	M4	2,1	5,5
Ø16	M5	4,4	6
Ø20	M5	4,4	10
Ø25	M6	7,4	13

Kinetic energy (J)	Bore	With elastic bumper	With shock absorber
	Ø8	0,027	See Dampers 6900
	Ø12	0,055	
	Ø16	0,11	
	Ø20	0,16	
	Ø25	0,24	

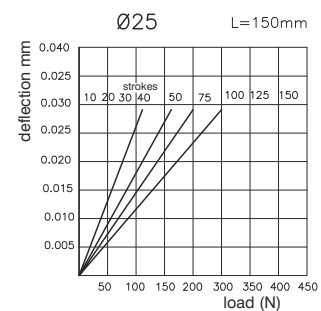
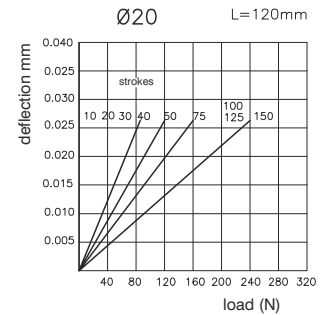
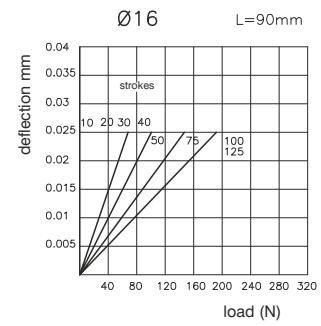
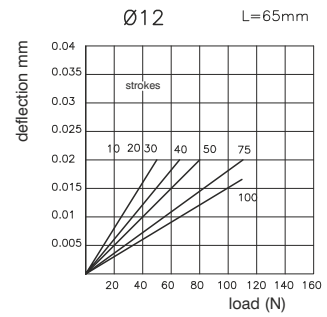
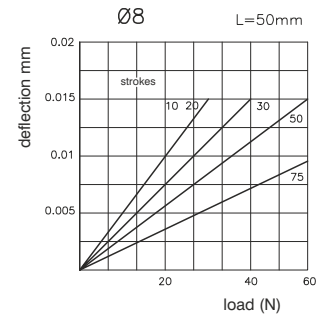
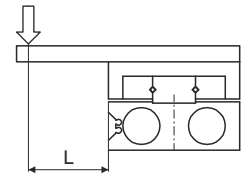
With front moment under static conditions completely extended and with load applied as indicated by the arrows.



With side moment under static conditions completely extended and with load applied as indicated by the arrow

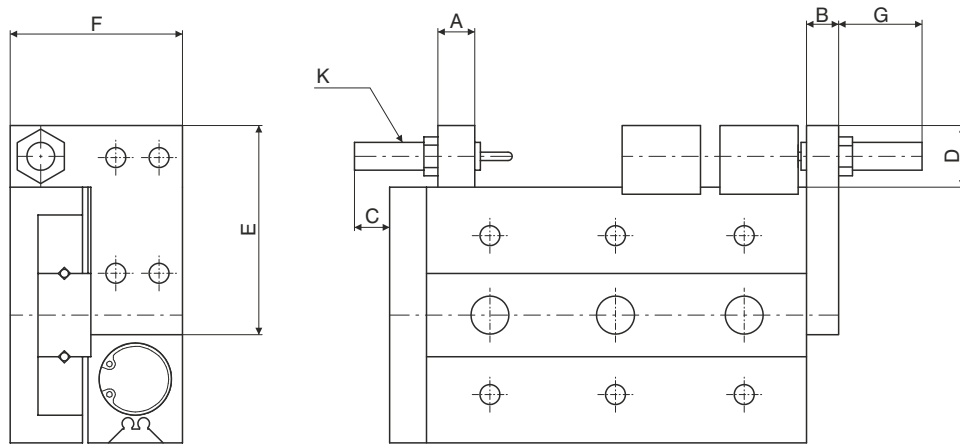


With misaligned side moment with load applied as indicated by the arrow at a distance "L" and with plate completely retracted.

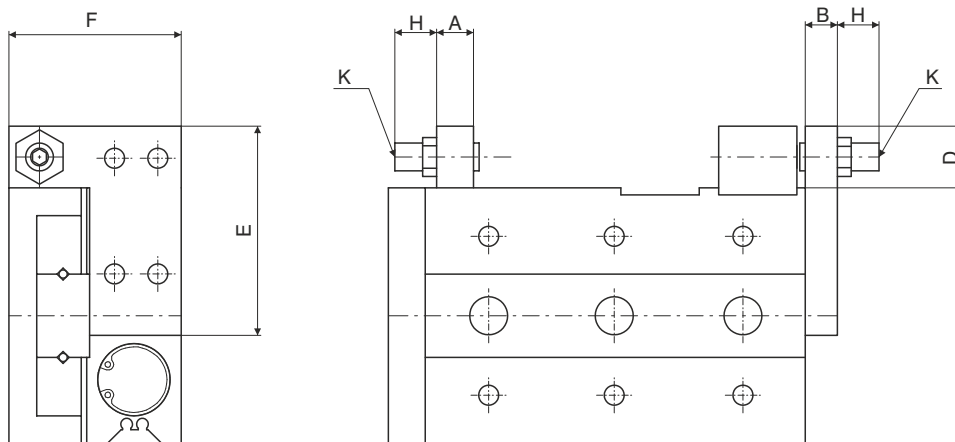




**Dimensions with dampers**

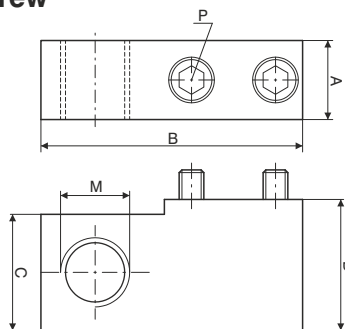


**Dimensions with adjusting screw**



Bore	A	B	C	D	E	F	G max.	H max.	K
Ø8	7	8	26	14,5	38,5	23	25,5	28,5	M8x1
Ø12	9,5	8	21	15	45	31,5	24,5	32	M8x1
Ø16	11	10	19	18	55	37,5	29	34,5	M10x1
Ø20	13	12	28	24,5	70	47,5	42,5	35,5	M14x1,5
Ø25	16	15	34	24,5	80	54,5	39,5	37,5	M14x1,5

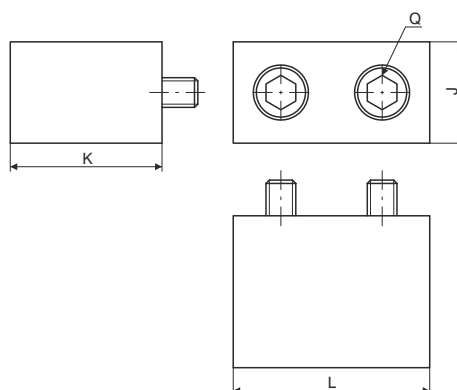
### Shock absorber mounting block / front stroke adjusting screw



Bore	A	B	C	D	M	P
Ø8	7	23	14	15.5	M8x1	M3x16
Ø12	9.5	31	14.5	16		M4x16
Ø16	11	37	17.5	19	M10x1	M5x18
Ø20	13	45.5	23.5	26	M14x1.5	M6x25
Ø25	16	53.5		26.5		M8x25

Ordering code
<b>6600.Ø.SU</b>

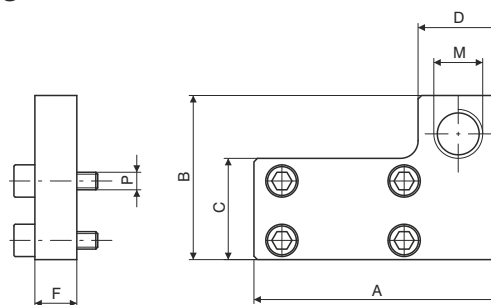
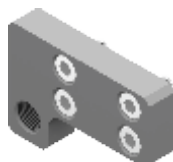
### Reference block



Bore	J	K	L	Q
Ø8	7	15.5	14.6	M3x16
Ø12	10	15	18.5	M4x14
Ø16	12	18.5	21	M5x18
Ø20	13	25.5	25	M6x25
Ø25	17		31	M8x25

Ordering code
<b>6600.Ø.SI</b>

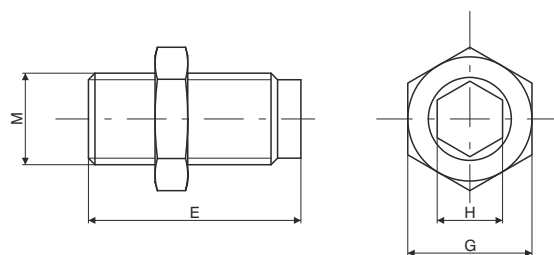
### Shock absorber mounting block / rear stroke adjusting screw



Bore	A	B	C	D	F	M	P
Ø8	38	23	12.5	14	8	M8x1	M3x12
Ø12	45	31	18				M4x12
Ø16	55	37	23.5	16	10	M10x1	M5x14
Ø20	70	47	29	23	12	M14x1.5	M5x16
Ø25	80	54	35		15		M6x20

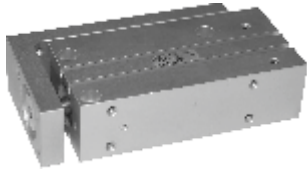
Ordering code
<b>6600.Ø.SR</b>

### Adjusting screw



Bore	E	G	H	M
Ø8	36.5	12	4	M8x1
Ø12	40			
Ø16	44.5	14	5	M10x1
Ø20	47.5	19	6	M14x1.5
Ø25	52.5			

Ordering code
<b>6600.Ø.VR</b>



**Ordering code**

**6700.Ø.stroke**

- 10
- 16
- 20

**Construction characteristics**

Body	anodised aluminium
Piston rod	stainless steel
Piston	aluminium
Piston rod bushing	aluminium
End plate	anodised aluminium
Seals	oil resistant NBR rubber
Table	anodised aluminium

**Standard strokes**

Bore	Stroke								
	5	10	15	20	25	30	40	50	60
Ø10	●	●	●	●	●	●	●	●	●
Ø16	●	●	●	●	●	●	●	●	●
Ø20	●	●	●	●	●	●	●	●	●

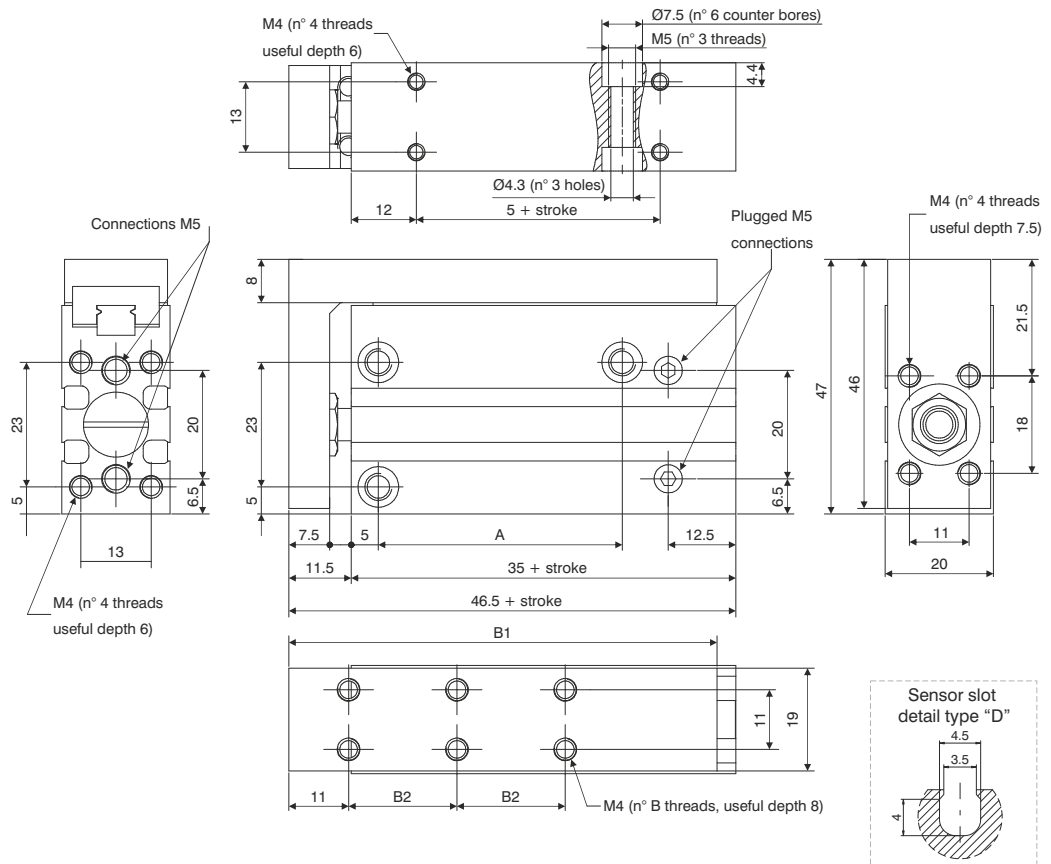
**Technical characteristics**

Fluid	filtered and preferably lubricated air or not (If lubricated the lubrication must be continuous)
Working pressure	1.2 - 7 bar
Working temperature	-5°C - +70°C
Cushioning	with elastic bumper

**Theoretical force**

Bore	Effective Area (mm <sup>2</sup> )	Force (N)						
		2	3	4	5	6	7	
Ø10	Out	28.3	5.7	8.5	11.3	14.2	17	19.8
	In	21.2	4.2	6.4	8.5	10.6	12.7	14.8
Ø16	Out	78.5	15.7	23.6	31.4	39.3	47.1	55
	In	66	13.2	19.8	26.4	33	39.6	46.2
Ø20	Out	314	62.8	94.2	125.6	157	188.4	219.8
	In	264	52.8	79.2	105.6	132	158.4	184.8
		Working pressure(bar)						

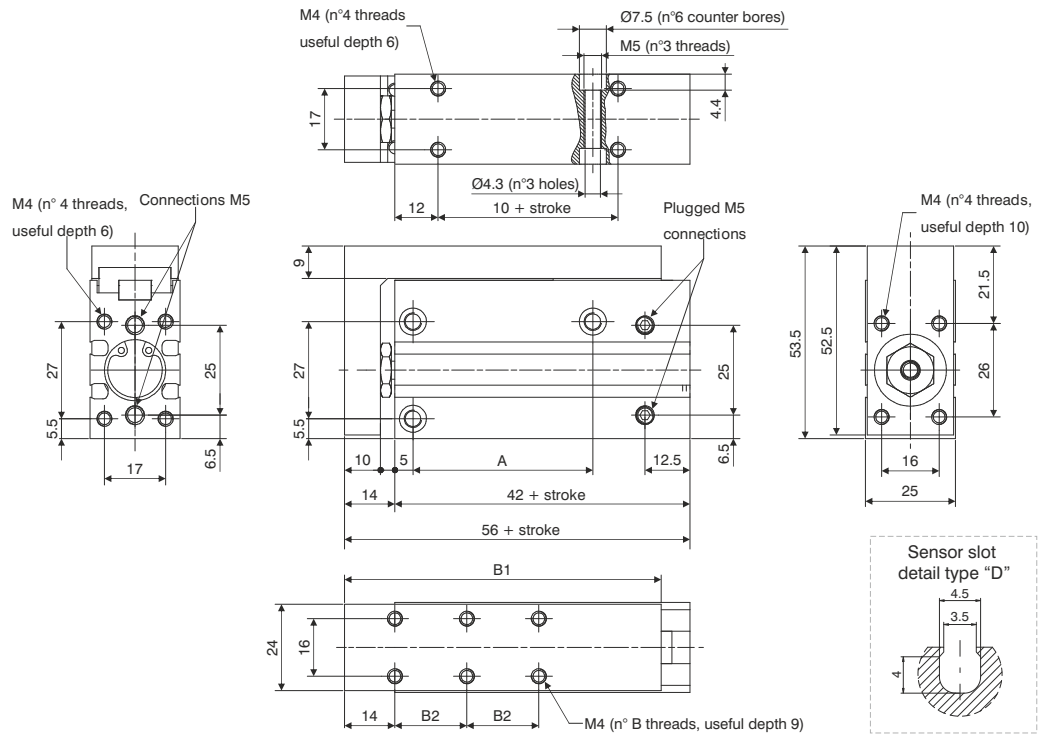
**Overall dimensions - Ø10**



**Table of dimensions**

	Standard strokes								
	5	10	15	20	25	30	40	50	60
A	14	24	30	45	45	60			
B1	49	59	69	79	79	99			
B2	10	20	30	20	20	30			
B	4				6				
Weight (gr.)	117	125	140	148	162	170	192	215	238

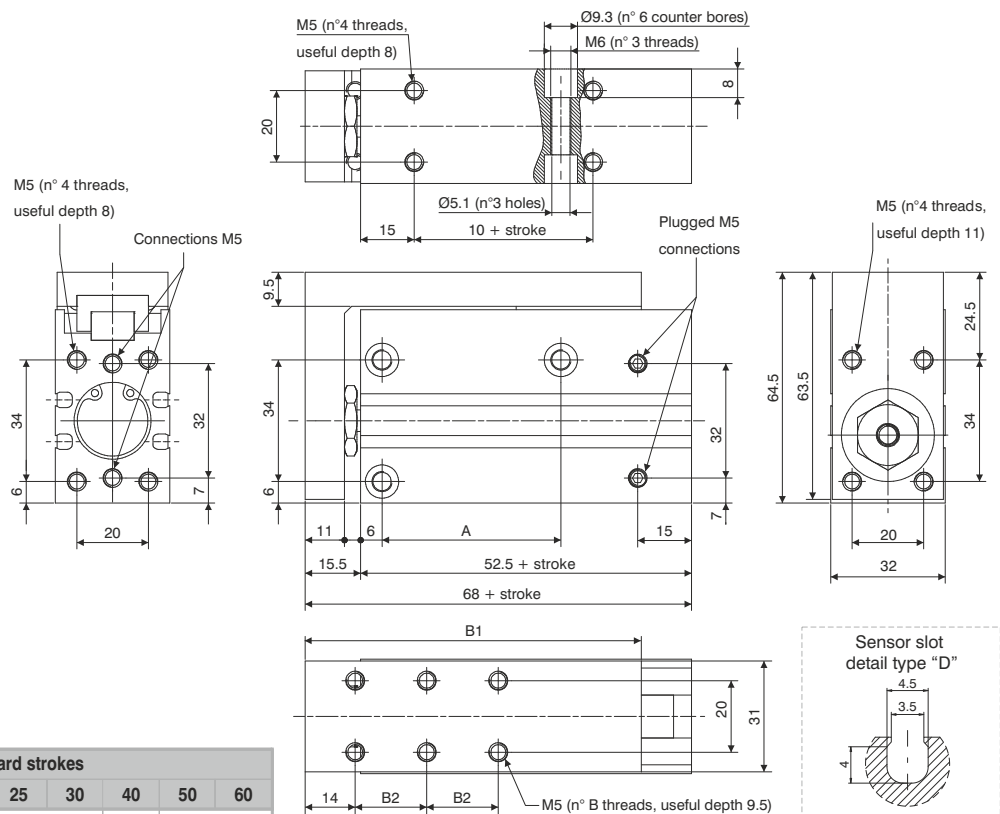
**Overall dimensions - Ø16**



**Table of dimensions**

	Standard strokes								
	5	10	15	20	25	30	40	50	60
A	20	30	40	50	60				
B1	58	68	78	88	98	108			
B2	10	20	30	20	25	30			
B	4				6				
Weight (gr.)	215	230	250	260	280	290	325	350	390

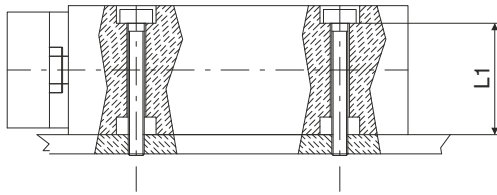
**Overall dimensions - Ø20**



**Table of dimensions**

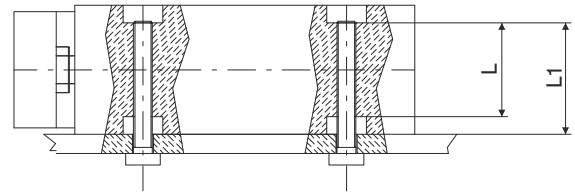
	Standard strokes								
	5	10	15	20	25	30	40	50	60
A	20	25	40	50	70				
B1	64	74	84	94	104	114			
B2	10	20	30	20	25	30			
B	4				6				
Weight (gr.)	440	455	490	505	540	560	600	660	700

LATERAL (THROUGH SCREW)



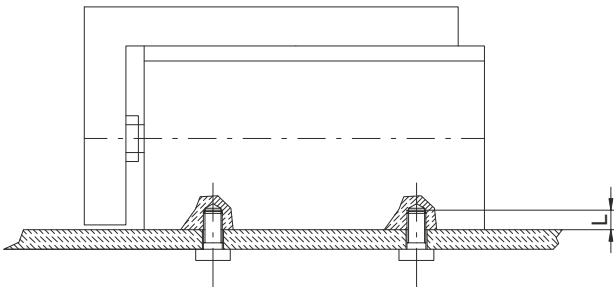
	SCREW	Maximum torque (Nm)	L1
Ø10	M4	2.5	15.6
Ø16	M4	2.5	20.6
Ø20	M5	5.1	24

LATERAL (THREADED HOLE)



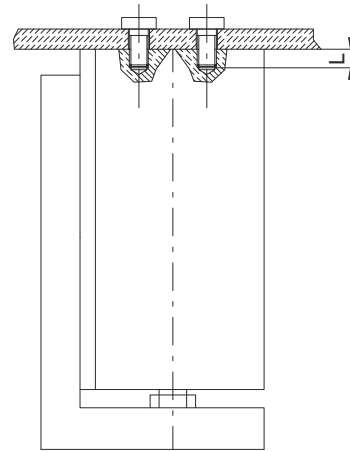
	SCREW	Maximum torque (Nm)	L1	L
Ø10	M5	5.1	15.6	11.2
Ø16	M5	5.1	20.6	16.2
Ø20	M6	8.1	24	16

VERTICAL (THREADED HOLE)



	SCREW	Maximum torque (Nm)	L
Ø10	M4	2.5	6
Ø16	M4	2.5	6
Ø20	M5	5.1	8

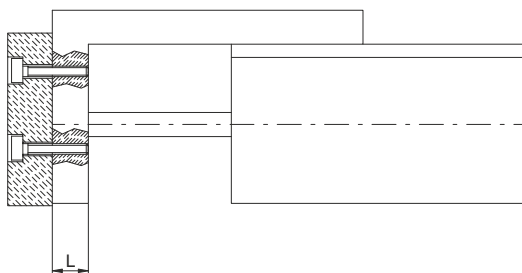
AXIAL (THREADED HOLE)



	SCREW	Maximum torque (Nm)	L
Ø10	M4	2.5	6
Ø16	M4	2.5	6
Ø20	M5	5.1	8

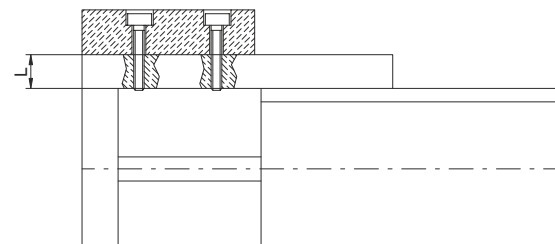
LOAD

FRONTAL MOUNTING

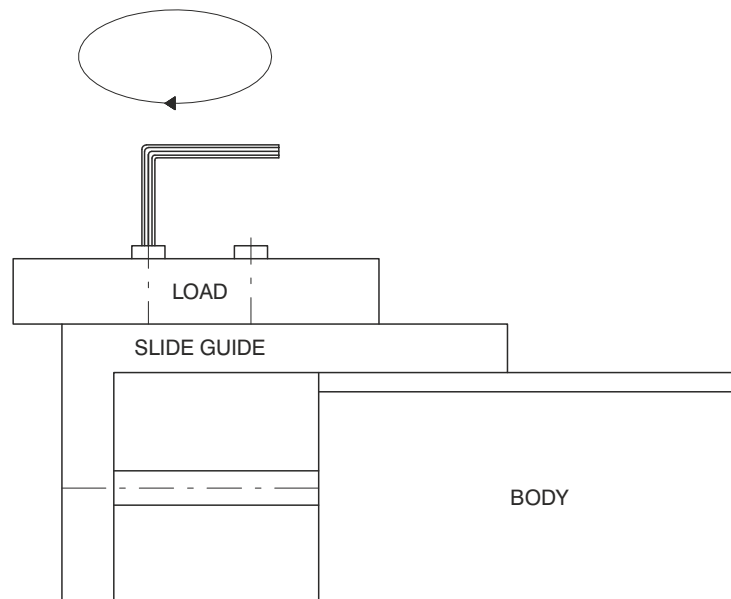


	SCREW	Maximum torque (Nm)	L
Ø10	M4	2.5	7.5
Ø16	M4	2.5	10
Ø20	M5	5.1	11

BACK MOUNTING

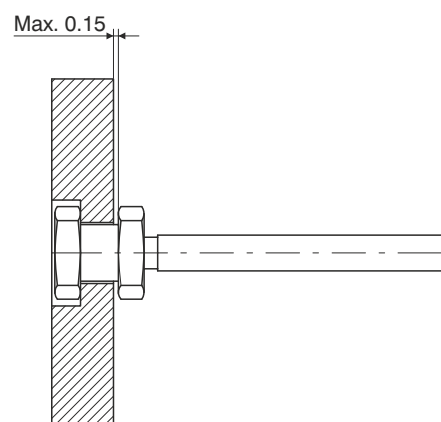


	SCREW	Maximum torque (Nm)	L
Ø10	M4	2.5	8
Ø16	M4	2.5	9
Ø20	M5	5.1	9.5



ATTENTION : Slide must be blocked before fixing the load  
this operation should not be done by blocking the body as the  
guide could get damaged.

#### CONNECTION BETWEEN PLATE AND ROD



The fluctuating connection, maximum clearance 0.15mm as indicated by the arrow

Plate deviation (arrow) when the load is applied on the spot indicated with the arrow and the unit completely extended

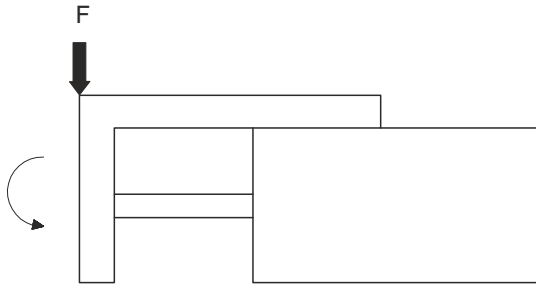
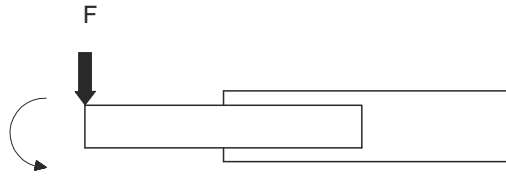
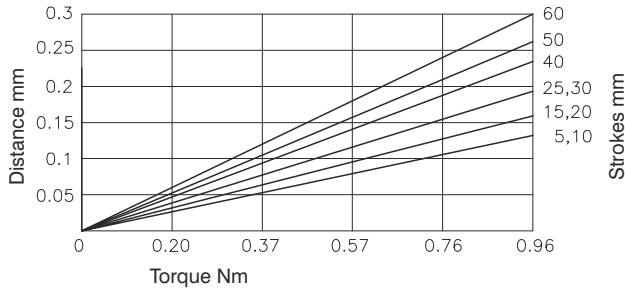


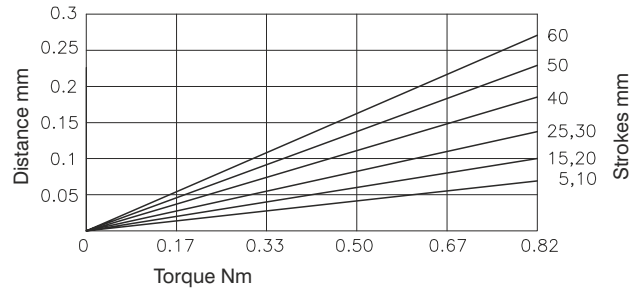
Plate deviation (arrow) when the load is applied on the spot indicated with the arrow and the unit completely extended



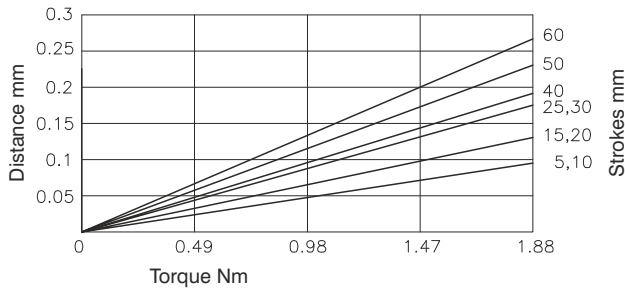
Ø10



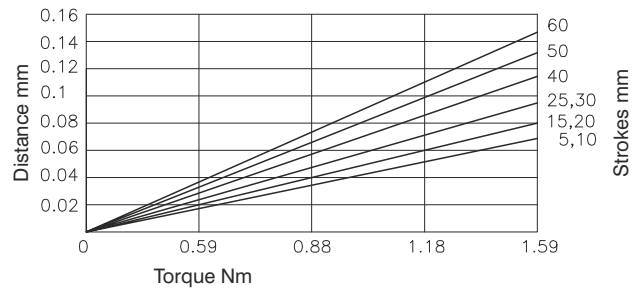
Ø10



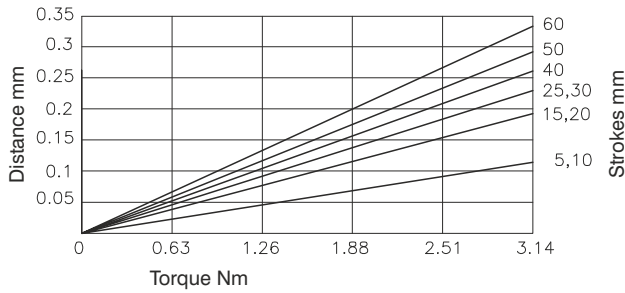
Ø16



Ø16



Ø20



Ø20

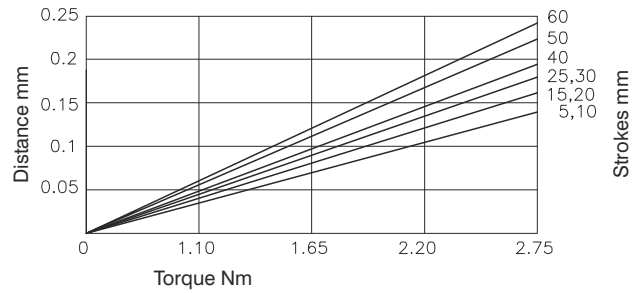
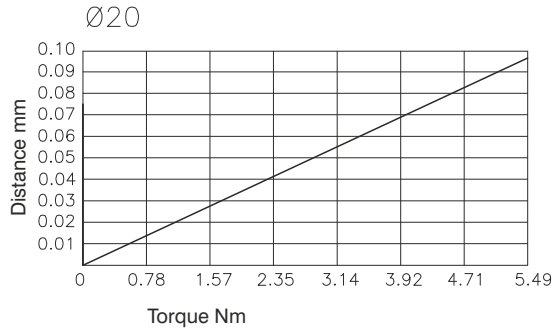
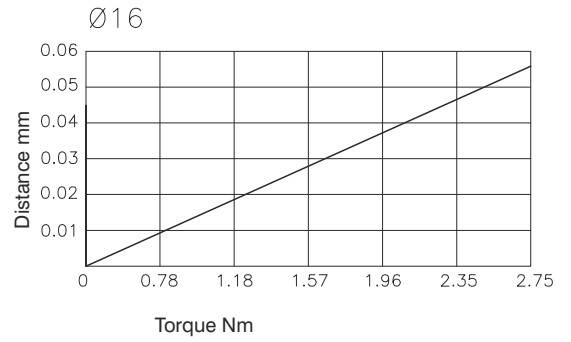
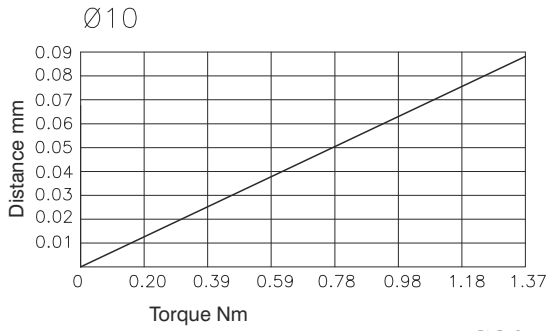
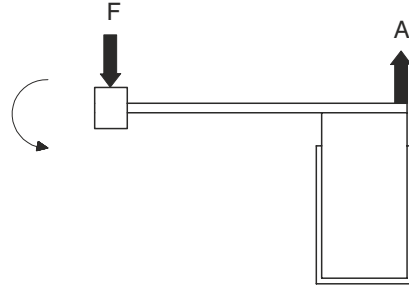




Plate deviation (compared to A) when the load is applied on the spot indicated with the arrow and the unit completely extended

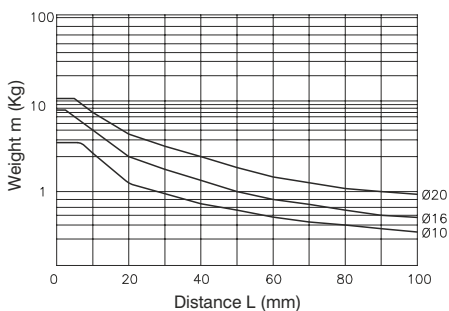


MOUNTING POSITION	VERTICAL			HORIZONTAL								
MAX. SPEED (mm/sec.)	100	200	300	100			200			300		
Load eccentricity				50	100	200	50	100	200	50	100	200
Selection graphs	1	2	3	4	5	6	7	8	9	10	11	12

**Selection graphs 1 - 3 (vertical mounting)**

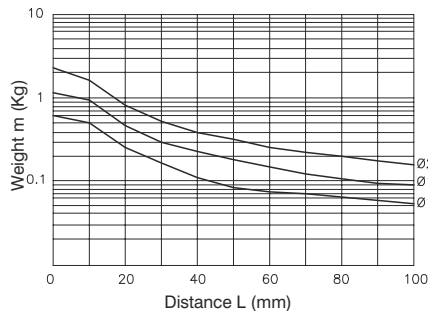
Drawing 1

Maximum speed 100 mm/s or lower



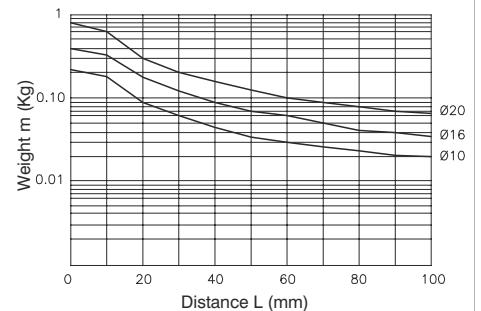
Drawing 2

Maximum speed 300 mm/s or lower



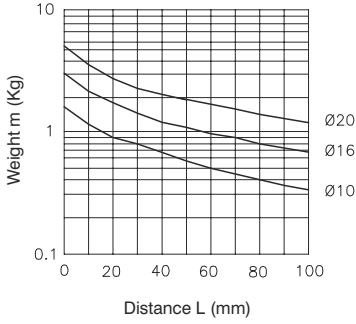
Drawing 3

Maximum speed 500 mm/s or lower

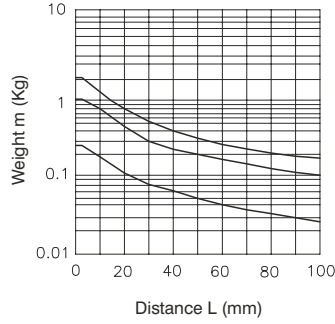


**Selection graphs 4 - 12 (horizontal mounting)**

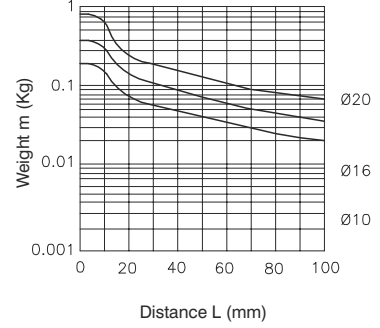
Drawing 4 load eccentricity 50mm  
Maximum speed 100 mm/s or lower



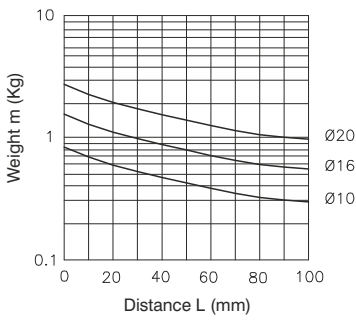
Drawing 7 load eccentricity 50mm  
Maximum speed 300 mm/s or lower



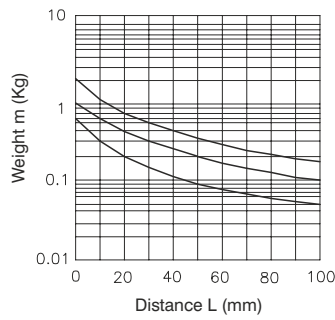
Drawing 10 load eccentricity 50mm  
Maximum speed 500 mm/s or lower



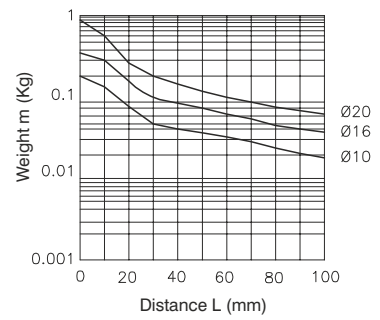
Drawing 5 load eccentricity 100mm  
Maximum speed 100 mm/s or lower



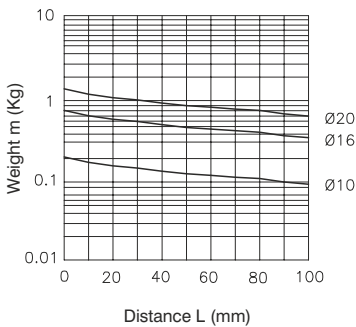
Drawing 8 load eccentricity 100mm  
Maximum speed 300 mm/s or lower



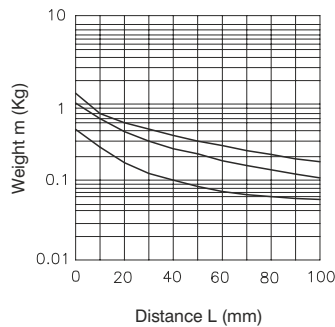
Drawing 11 load eccentricity 100mm  
Maximum speed 500 mm/s or lower



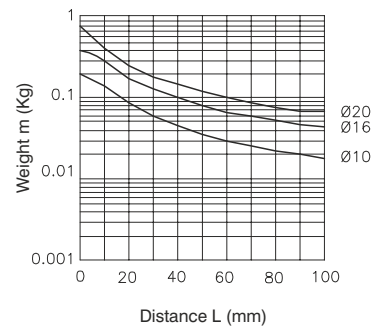
Drawing 6 load eccentricity 200mm  
Maximum speed 100 mm/s or lower



Drawing 9 load eccentricity 200mm  
Maximum speed 300 mm/s or lower



Drawing 12 load eccentricity 200mm  
Maximum speed 500 mm/s or lower





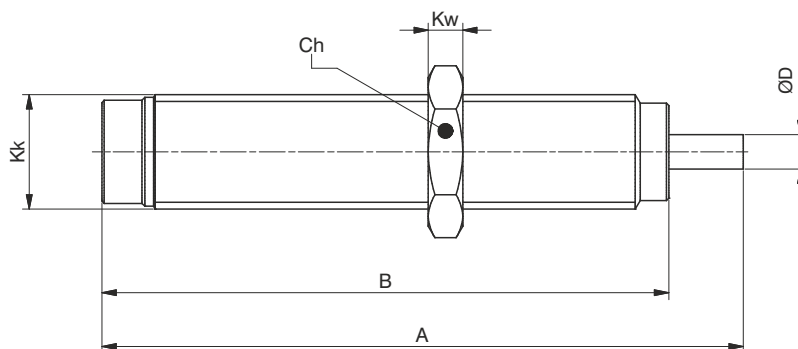
### Ordering code

- 6900.
- A = Thread M8x1
  - B = Thread M10x1
  - C = Thread M14x1.5
  - D = Thread M20x1.5
  - E = Thread M27x1.5

### Technical characteristics

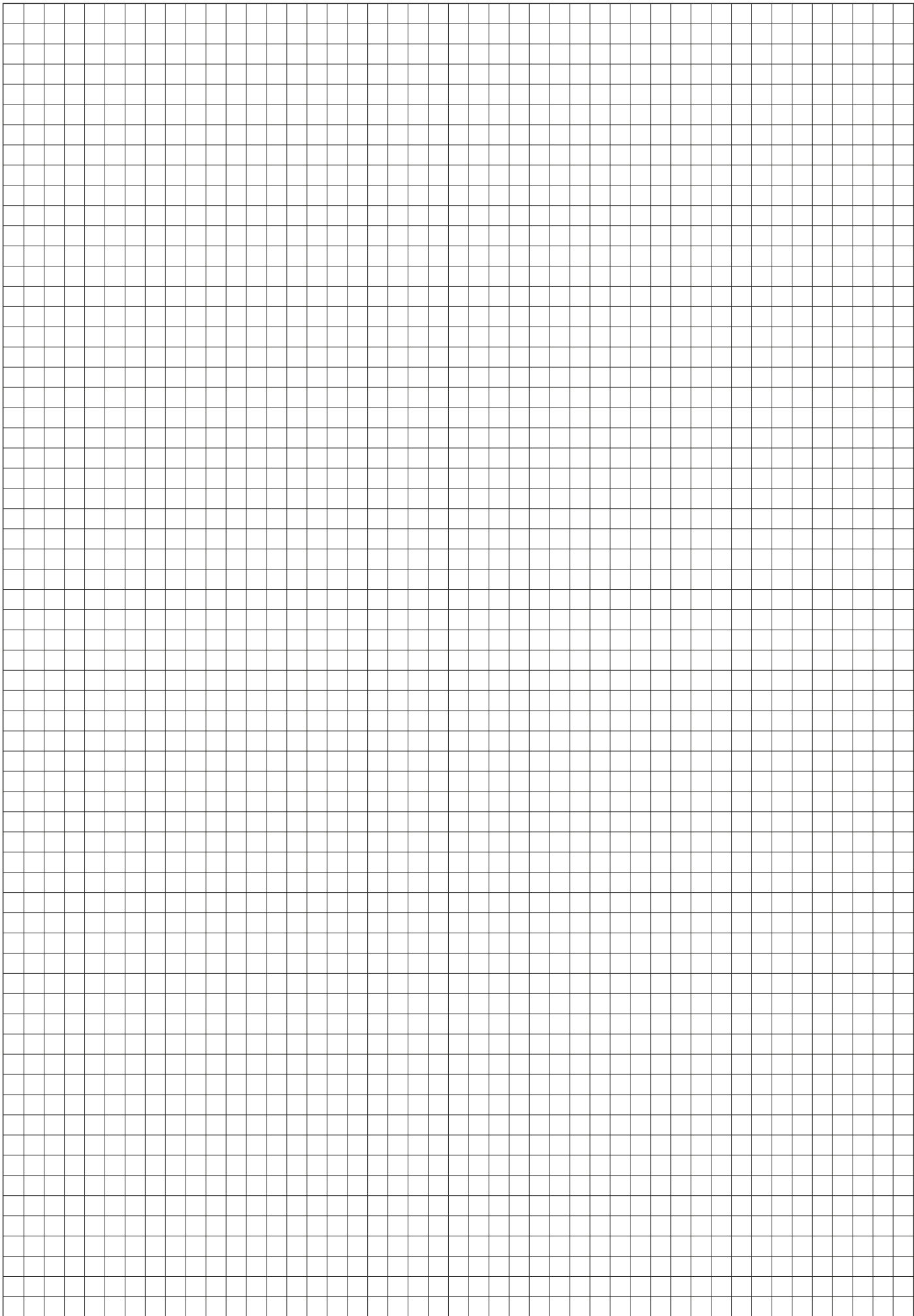
Code	Max. power (Nm)		Return force	Operating temperature	Weight
	For cycle	For hour			
6900.A	4	14400	2,5 ÷ 6 N	-20°C ÷ 80°C	10 gr.
6900.B	15	24000	3,6 ÷ 8 N		20 gr.
6900.C	30	50000	13 ÷ 23 N		50 gr.
6900.D	100	76500	12 ÷ 23 N		140 gr.
6900.E	390	175500	14 ÷ 31 N		340 gr.

### Overall dimensions



### Table of dimensions

Code	A	B	Ch	D	Kk	Kw
6900.A	51	44	11	2,5	M8x1	3
6900.B	56	49,5	13	3	M10x1	3
6900.C	79	69	17	4	M14x1,5	5
6900.D	107	88	24	6	M20x1,5	6
6900.E	126,5	108,5	30	8	M27x1,5	8





## MAGNETIC SENSORS FOR CYLINDERS

**Magnetic sensors REED type with cable**

**Magnetic sensors REED type for connector**

**Magnetic sensors HALL effect with cable**

**Magnetic sensors HALL effect for connector**

**Miniaturized magnetic sensors**

- rectangular profile
- oval profile
- round profile
- round section 90° cable

## General

The limit switches, or magnetic sensors, have to be mounted on cylinders with magnetic piston. These, when hit by the magnetic field generated by the piston as it approaches, close the circuit sending an electrical signal by relè solenoid valve control, etc. or converse with the controlling electronic system situated on the machine. There are available magnetic sensor with ampulla Reed type and with Hall effect. The sensors are attached to the cylinder by a proper clamp, slot or adaptator and have an activation LED indicator.

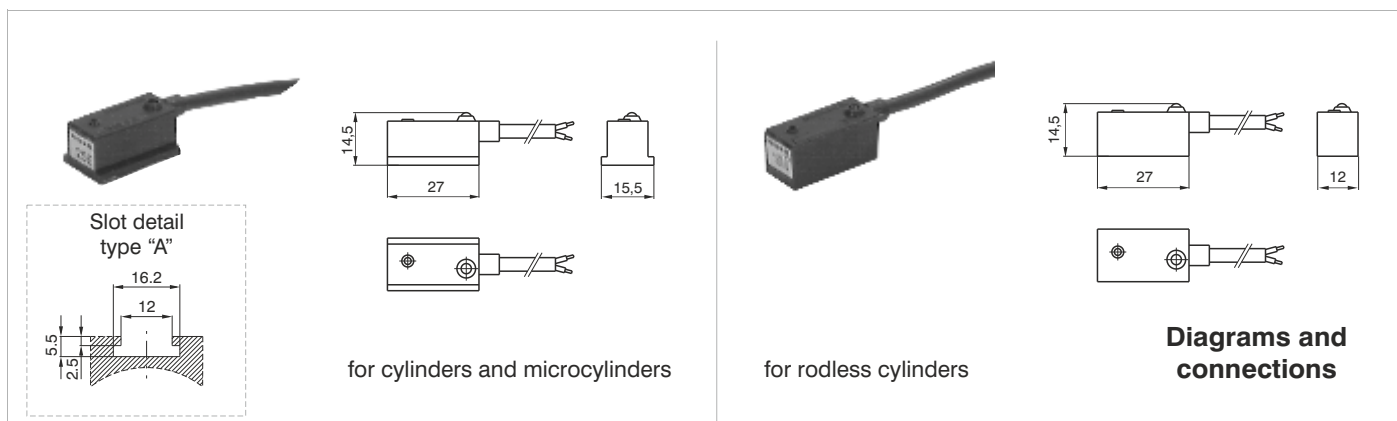
Note: The magnetic sensors are according to the Directive **EMC 89/336/CEE** and following amendments.

## Instruction on how to use the sensors properly

Particular attention should be paid in order not to exceed the wide operating limits shown into the next pages. Besides, the 2 wires sensors have never to be connected to the mains if a load has not been yet connected in series. These are the only cares that, if not followed, may cause damages to the sensor. Furthermore it has to be considered that, while loading, the current absorbed by the sensors might be 50% higher that the rated one. The switch semiconductor construction design makes this sensors extremely compatible, there are no limitation to the type of load applied : inductive, capacitive resistive.

In case of direct current (DC) feeding, the polarity of the connection has to be observed: the brown cable must be connected to the plus (+) and the blue one to the minus (-). The cable length must not exceed 10mtrs. If the cable needs to be longer then 10 mt, we recommend to insert in series an inductance or a resistance to counteract the capacity generated by the cable itself .

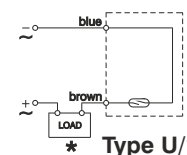
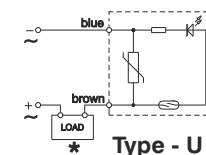
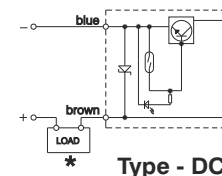
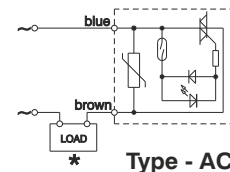
When using a two wire REED type sensor always ensure that the correct load is applied in series on any of the two wires. When using a sensor fitted with the SNAP connector pay attention to the orientation of the connector (see fig. page 6.3) because by inverting the connection the circuit will not be damaged, but the LED will not turn on. In case of two or more sensors connected in series pay attention to tension drop generated (around 3V for each sensor), and eventually use the version designed for in series connection. The Hall effect sensors, which do not include any moving mechanical parts are longer lasting if compared to the Reed version besides, there are some other external factors to be taken into consideration, such as proximity of powered cables, magnetic fields produced by electric motors, mass of iron too close to the sensor, and so on: these factors have to be therefore carefully avoided, being able to influence the sensors and accordingly to cause irregularity of operation.



**Ordering code**

**SENSORS WITH 2 WIRES CABLE (PUR Ø4.2 mm 2 x 0.34mm<sup>2</sup>)**

Cylinders and microcylinders	<b>1500.AC</b>	sensor for alternating current with led
	<b>1500.DC</b>	sensor for continuous current with led
	<b>1500. U</b>	universal sensor with led
	<b>1500.U/1</b>	universal sensor without led (REED ampulla only)
Rodless cylinders	<b>1600.AC</b>	sensor for alternating current with led
	<b>1600.DC</b>	sensor for continuous current with led
	<b>1600.U</b>	universal sensor with led
	<b>1600.U/1</b>	universal sensor without led (REED ampulla only)



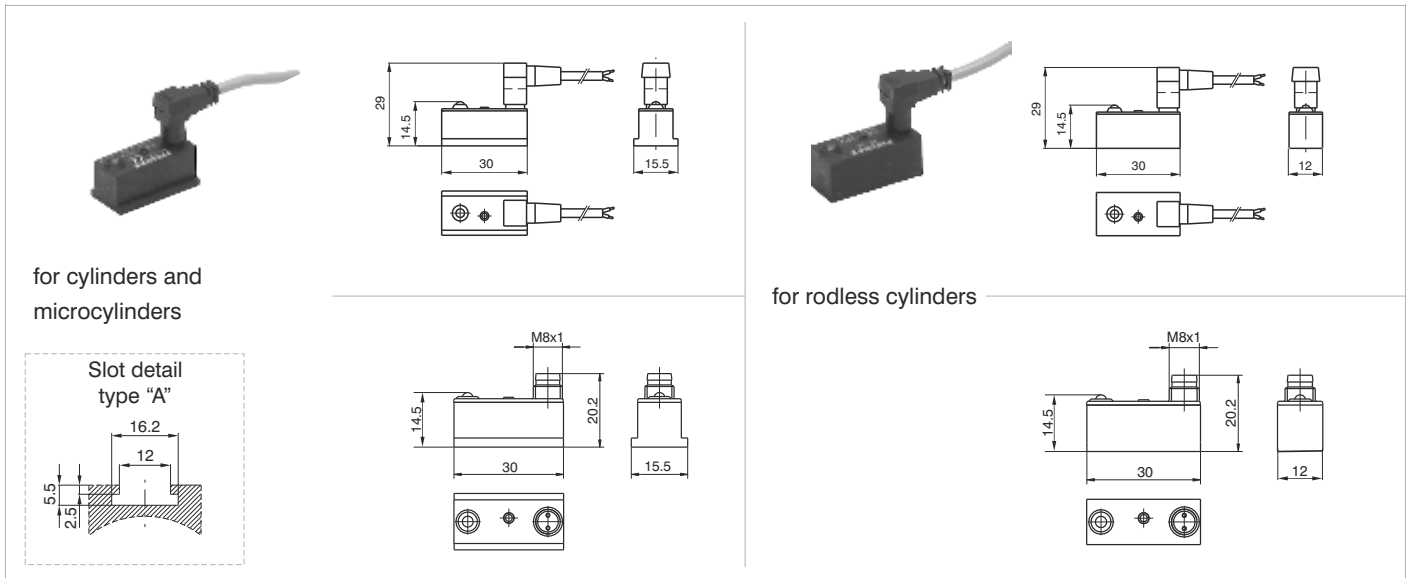
Technical characteristics	A.C.	D.C.	U		U/1	
			a.c.	d.c.	a.c.	d.c.
Maximum permanent current	1,5A	1,2A	0,5A		0,3A	
Maximum current (pulses of 0,5 sec.)	6A	1,5A	1A		0,8A	
Voltage range	12 - 230V	12 - 30V	3 - 230V	12 - 48V	0 - 230V	0 - 48V
Maximum permanent power	375VA	32W	20VA	15W	10VA	8W
Working temperature	-20° C - 70°C					
Maximum voltage drop	3V max	2V max	3V max		0V	
Cable section	2x0,34 mm <sup>2</sup> Ø4,2 mm PUR					
Degree of protection	IP 65					
Connecting time	2 ms					
Disconnecting time	1 ms					
Average working period	10 <sup>7</sup> cycles					
Repetition of intervention point	± 0,1 mm					
Type of contact	N.O.					

★The load (LOAD) can be connected either to negative or positive pole.

These sensors can be used on cylinders series:

SERIES	DESCRIPTION	MOUNTED
<b>1200</b>	for microcylinders with threaded end covers and "TECNO-MIR" microcylinders for microcylinders "MIR" with rolled end covers, cylinders from Ø16 to Ø32 for microcylinders "MIR-INOX" with rolled end covers	with clamps code 1260.Ø.F with clamps code 1280.Ø.F with brackets code 1280.Ø.FX
<b>1306 - 1307 - 1308</b>	for cylinders from Ø32 to Ø63 for cylinders from Ø80 to Ø125 for cylinders from Ø160 to Ø200	with brackets code 1306.A with brackets code 1306.B with brackets code 1306.C
<b>1315</b>	for cylinders Ø250 and Ø320 (ISO)	with brackets code 1306.D
<b>1319 - 1320</b>	for cylinders Ø32 and Ø40	with brackets code 1320.A
	for cylinders Ø50 and Ø63	with brackets code 1320.B
	for cylinders Ø80 and Ø100	with brackets code 1320.C
	for cylinders Ø125	with brackets code 1320.D
	for cylinders Ø160 for cylinders Ø200	with brackets code 1320.E with brackets code 1320.F
<b>1390 - 1391</b>	for cylinders ECOLIGHT Ø32 and Ø40	with brackets code 1390.A
	for cylinders ECOLIGHT Ø50 and Ø63	with brackets code 1390.B
	for cylinders ECOLIGHT Ø80 and Ø100	with brackets code 1390.C
	for cylinders ECOLIGHT Ø125 - Ø200	with brackets code 1390.D
<b>1500</b>	Compact cylinders "Europe" (from Ø32)	directly on groove
<b>1605</b>	Rodless cylinders	with brackets code 1600.A





**Ordering code**

**2 PIN SENSOR FOR SNAP CONNECTOR**

Cylinders and microcylinders	<b>RS.DC</b>	sensor for continuous current with led normally open N.O.
	<b>RS.UA</b>	universal sensor with led normally open N.O.
	<b>RS.UC</b>	universal sensor with led normally closed N.C.
	<b>RS.UA/1</b>	universal sensor without led N.O. (REED ampulla only)
Rodless cylinders	<b>SRS.DC</b>	sensor for continuous current with led normally open N.O.
	<b>SRS.UA</b>	universal sensor with led N.O.
	<b>SRS.UC</b>	universal sensor with led normally closed N.C.
	<b>SRS.UA/1</b>	universal sensor without led N.O.
Cable	<b>C1</b>	connector with 2.5 m. cable 2 wires (PVC Ø3,5 mm 2x 0,25mm <sup>2</sup> )
	<b>C2</b>	connector with 5 m. cable 2 wires (PVC Ø3,5 mm 2x 0,25mm <sup>2</sup> )
	<b>C3</b>	connector with 10 m. cable 2 wires (PVC Ø3,5 mm 2x 0,25mm <sup>2</sup> )

**2 PIN SENSOR FOR SNAP CONNECTOR + C1 CABLE TWO WIRES (PVC Ø3.5 mm 2x0.25 mm<sup>2</sup>)**

Cylinders and microcylinders	<b>RS.DCC1</b>	sensor for DC current N.O. with LED and 2.5 m. cable
	<b>RS.UAC1</b>	universal sensor with led N.O. with connector and 2.5 m. cable
	<b>RS.UCC1</b>	universal sensor with led N.C. with connector and 2.5 m. cable
	<b>RS.UAC1/1</b>	universal sensor without led N.O. with connector and 2.5 m. cable (REED ampulla only)
Rodless cylinders	<b>SRS.DCC1</b>	sensor for continuous current with led normally closed N.O. with connector and 2.5 m. cable
	<b>SRS.UAC1</b>	universal sensor with led N.O. with connector and 2.5 m. cable
	<b>SRS.UCC1</b>	universal sensor with led N.C. with connector and 2.5 m. cable
	<b>SRS.UAC1/1</b>	universal sensor without led N.O. with connector and 2.5 m. cable (REED ampulla only)

**2 PIN SENSOR WITH M8 CONNECTOR**

Cylinders and microcylinders	<b>RS8.DC</b>	sensor for DC current N.O. with LED and M8 plug
	<b>RS8.UA</b>	universal sensor N.O. with LED and M8 plug
	<b>RS8.UC</b>	universal sensor N.C. with LED and M8 plug
Rodless cylinders	<b>SRS8.DC</b>	sensor for DC current N.O. with LED and M8 plug
	<b>SRS8.UA</b>	universal sensor N.O. with LED and M8 plug
	<b>SRS8.UC</b>	universal sensor N.C. with LED and M8 plug
Cable	<b>MCH1</b>	cable 3 wires l=2.5m with M8 connector three wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )
	<b>MCH2</b>	cable 3 wires l=5m with M8 connector three wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )
	<b>MCH3</b>	cable 3 wires l=10m with M8 connector three wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )

### 3 PIN SENSOR FOR SNAP CONNECTOR WITH TWO WIRES ACCORDING TO IEC 947 NORMS

Cylinders and microcylinders	<b>RS.DCNO</b>	sensor for continuous current with led normally open N.O., according to standard IEC 947
	<b>RS.UANO</b>	universal sensor with led normally open N.O., according to standard IEC 947
Cable	<b>C1NO</b>	connector with 2.5 m. cable, according to standard IEC 947 (PVC Ø3.5 mm 2x0.25 mm <sup>2</sup> )
	<b>C2NO</b>	connector with 5 m. cable, according to standard IEC 947 (PVC Ø3.5 mm 2x0.25 mm <sup>2</sup> )
	<b>C3NO</b>	connector with 10 m. cable, according to standard IEC 947 (PVC Ø3.5 mm 2x0.25 mm <sup>2</sup> )

### 3 PIN SENSORS FOR IN SERIES ASSEMBLING WITH SNAP CONNECTOR

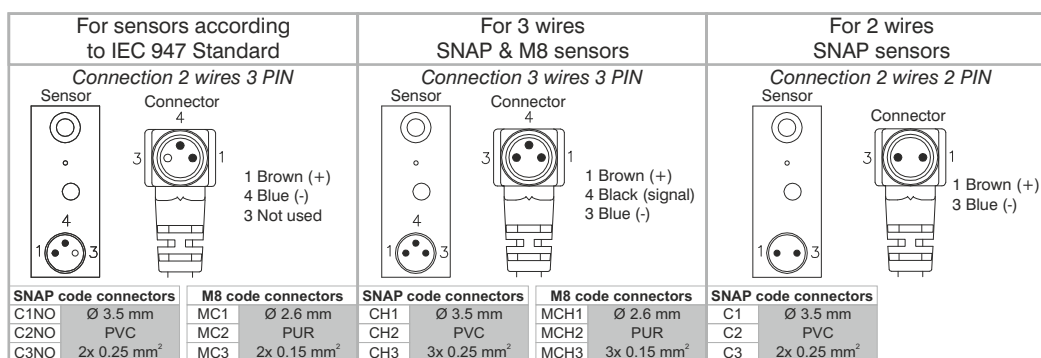
Cylinders and microcylinders	<b>RS.UA/1L</b>	universal sensor with led normally open N.O., for series assembly (3 wires)
Rodless cylinders	<b>SRS.UA/1L</b>	universal sensor with led N.O., for series assembly (3 wires)
Cable	<b>CH1</b>	connector with 2.5 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )
	<b>CH2</b>	connector with 5 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )
	<b>CH3</b>	connector with 10 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )

### 3 PIN SENSORS FOR IN SERIES ASSEMBLING WITH SNAP CONN. + CH1 CABLE 3 WIRES (PVC Ø3.5mm 3x0.25 mm<sup>2</sup>)

Cylinders and microcylinders	<b>RS.UACH1/1L</b>	universal sensor with led N.O. with connector and 2.5 m. cable, for series mounting (3 wires)
Rodless cylinders	<b>SRS.UACH1/1L</b>	universal sensor with led N.O. with connector and 2.5 m. cable, for series assembly (3 wires)

### 3 PIN SENSORS FOR IN SERIES ASSEMBLING WITH M8 CONNECTOR

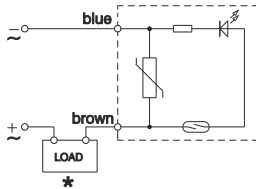
Cylinders and microcylinders	<b>RS8.UA/1L</b>	universal sensor N.O. with LED for in series assembling (3wires) and M8 plug
Rodless cylinders	<b>SRS8.UA/1L</b>	universal sensor N.O. with LED for in series assembling (3wires) and M8 plug
Cable	<b>MCH1</b>	M8 connector with 2.5 m. cable 3 wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )
	<b>MCH2</b>	M8 connector with 5 m. cable 3 wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )
	<b>MCH3</b>	M8 connector with 10 m. cable 3 wires (PUR Ø2.6 mm 3x 0.15 mm <sup>2</sup> )



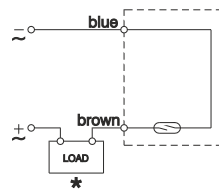
Technical characteristics	DC	UA				UA/1L		UA/1	
		a.c.		d.c.		a.c.	d.c.	a.c.	d.c.
Type of contact	N.O.	N.O.	N.C.	N.O.	N.C.	N.O.		N.O.	
Maximum permanent current	1.2A	0.5A	0.3A	0.5A	0.3A	0.5A		0.5A	
Maximum current (pulses of 0.5 sec.)	1.5A	1A	0.8A	1A	0.8A	1A		1A	
Voltage range	12 - 30V	3 - 250V	3 - 110V	12 - 48V		24V		0 - 250V	0 - 48V
Maximum permanent power	32W	20VA	10VA	15W	8W	20VA	15W	10VA	8W
Working temperature		-20°C - 70°C							
Maximum voltage drop	2V	<3V				0V			
Cables number		2				3		2	
Degree of protection		IP65							
Connecting time		2 ms							
Disconnecting time		1 ms							
Average working period		10 <sup>7</sup> cycles							
Repetition of intervention point		±0.1 mm							

### Diagrams and connections

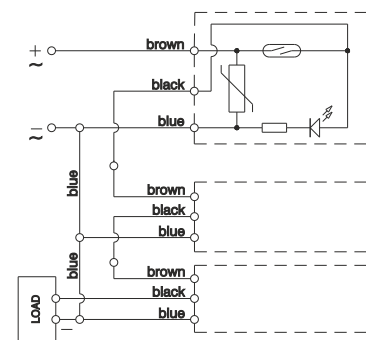
**Type - UA**



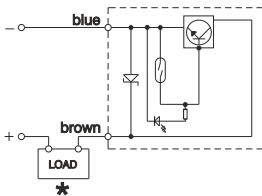
**Type UA/1**



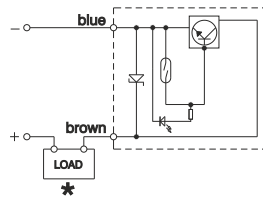
**Type - UA/1L**



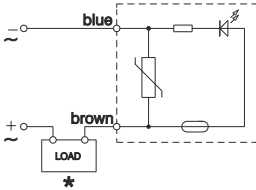
**Type - DC**



**Type - DCNO**



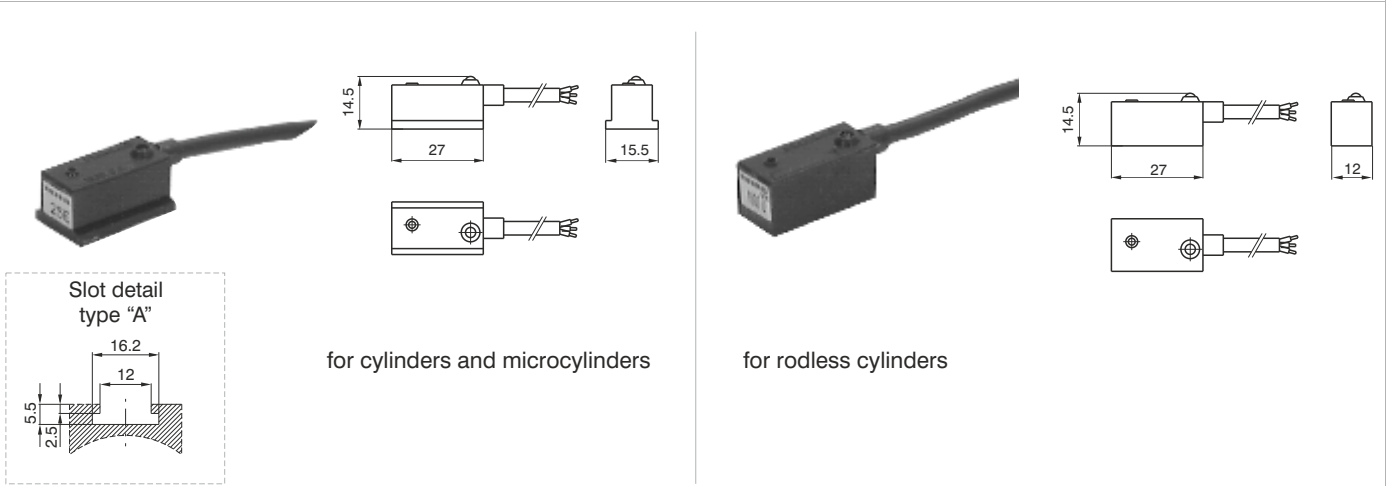
**Type - UC**



\*The load (LOAD) can be connected either to negative or positive pole.

These sensors can be used on cylinders series:

SERIES	DESCRIPTION	MOUNTED
1200	for microcylinders with threaded end covers and "TECNO-MIR" microcylinders	with clamps code 1260.Ø.F
	for microcylinders "MIR" with rolled end covers, cylinders from Ø16 to Ø32	with clamps code 1280.Ø.F
	for microcylinders "MIR-INOX" with rolled end covers	with clamps code 1280.Ø.FX
1306 - 1307 - 1308	for cylinders from Ø32 to Ø63	with brackets code 1306.A
	for cylinders from Ø80 to Ø125	with brackets code 1306.B
	for cylinders from Ø160 to Ø200	with brackets code 1306.C
1315	for cylinders Ø250 and Ø320 (ISO)	with brackets code 1306.D
1319 - 1320	for cylinders Ø32 and Ø40	with brackets code 1320.A
	for cylinders Ø50 and Ø63	with brackets code 1320.B
	for cylinders Ø80 and Ø100	with brackets code 1320.C
	for cylinders Ø125	with brackets code 1320.D
	for cylinders Ø160	with brackets code 1320.E
	for cylinders Ø200	with brackets code 1320.F
1390 - 1391	for cylinders ECOLIGHT Ø32 and Ø40	with brackets code 1390.A
	for cylinders ECOLIGHT Ø50 and Ø63	with brackets code 1390.B
	for cylinders ECOLIGHT Ø80 and Ø100	with brackets code 1390.C
	for cylinders ECOLIGHT Ø125 - Ø200	with brackets code 1390.D
1500	Compact cylinders "Europe" (from Ø32)	directly on groove
1605	Rodless cylinders	with brackets code 1600.A



### Ordering code

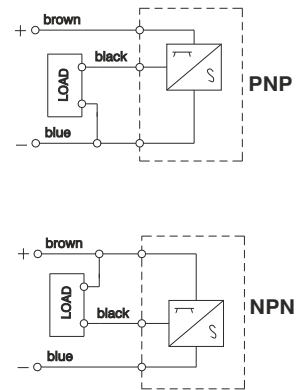
#### SENSORS WITH 3 WIRES CABLE (PUR Ø 4.2 mm 3x0.34mm<sup>2</sup>)

Cylinders and microcylinders	<b>1500.HAP</b>	PNP sensor Hall effect with led, normally open N.O.
	<b>1500.HAN</b>	NPN sensor Hall effect with led, normally open N.O.
Rodless cylinders	<b>1600.HAP</b>	PNP sensor Hall effect with led, normally open N.O.
	<b>1600.HAN</b>	NPN sensor Hall effect with led, normally open N.O.

### Technical characteristics

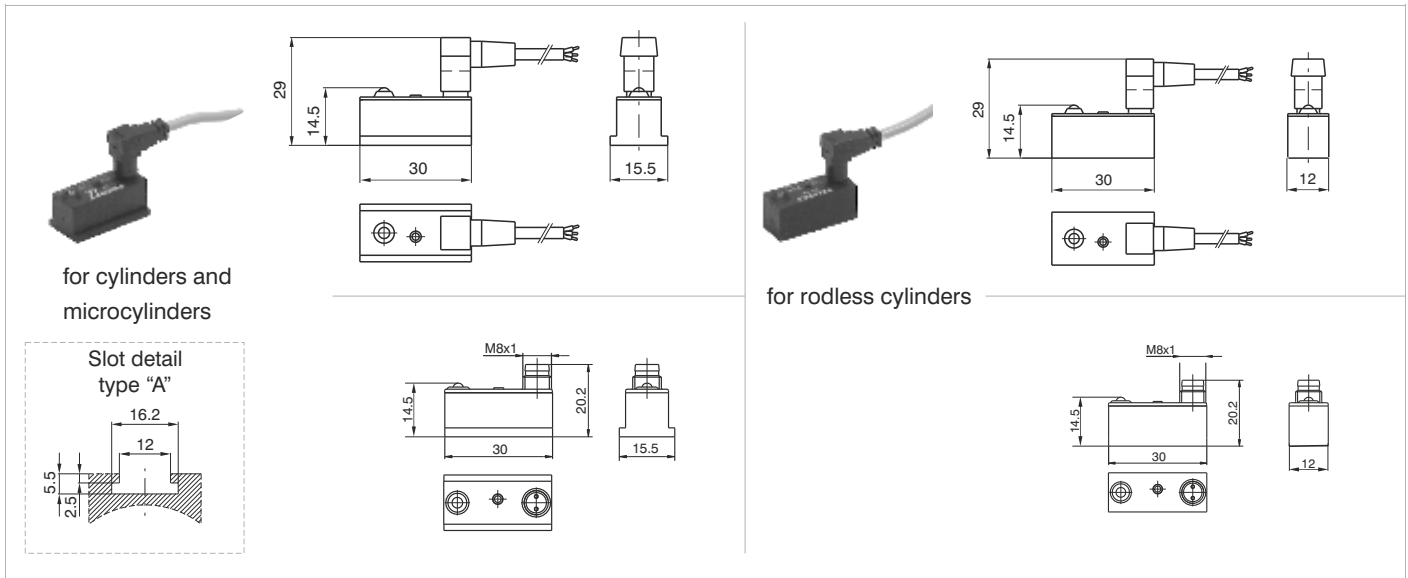
Maximum permanent current	0.5A
Voltage range	10 - 30V DC
Power (inductive load)	10W
Maximum voltage drop	2V
Working temperature	-20°C - 70°C
Cable section	PUR 4.2mm 3x0.34 mm <sup>2</sup>
Degree of protection	IP 65
Connecting time	0.8 μs
Disconnecting time	0.3 μs
Average working period	10 <sup>9</sup> cycles
Repetition of intervention point	± 0.1 mm
Type of contact	N.O.

### Diagrams and connections



#### These sensors can be used on cylinders series:

SERIES	DESCRIPTION	MOUNTED
1200	for microcylinders with threaded end covers and "TECNO-MIR" microcylinders	with clamps code 1260.Ø.F
	for microcylinders "MIR" with rolled end covers, cylinders from Ø16 to Ø32	with clamps code 1280.Ø.F
	for microcylinders "MIR-INOX" with rolled end covers	with clamps code 1280.Ø.FX
1306 - 1307 - 1308	for cylinders from Ø32 to Ø63	with brackets code 1306.A
	for cylinders from Ø80 to Ø125	with brackets code 1306.B
	for cylinders from Ø160 to Ø200	with brackets code 1306.C
1315	for cylinders Ø250 and Ø320 (ISO)	with brackets code 1306.D
1319 - 1320	for cylinders Ø32 and Ø40	with brackets code 1320.A
	for cylinders Ø50 and Ø63	with brackets code 1320.B
	for cylinders Ø80 and Ø100	with brackets code 1320.C
	for cylinders Ø125	with brackets code 1320.D
	for cylinders Ø160	with brackets code 1320.E
	for cylinders Ø200	with brackets code 1320.F
1390 - 1391	for cylinders ECOLIGHT Ø32 and Ø40	with brackets code 1390.A
	for cylinders ECOLIGHT Ø50 and Ø63	with brackets code 1390.B
	for cylinders ECOLIGHT Ø80 and Ø100	with brackets code 1390.C
	for cylinders ECOLIGHT Ø125 - Ø200	with brackets code 1390.D
1500	Compact cylinders "Europe" (from Ø32)	directly on groove
1605	Rodless cylinders	with brackets code 1600.A



**Ordering code**

**3 PIN SENSOR FOR SNAP CONNECTOR**

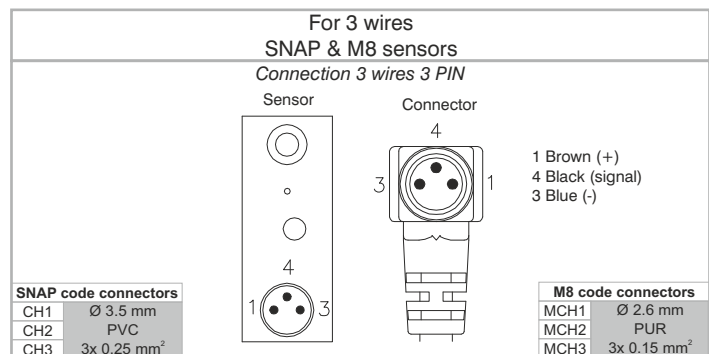
Cylinders and microcylinders	<b>HS.PA</b>	PNP sensor Hall effect with led, normally open N.O.
Rodless cylinders	<b>SHS.PA</b>	PNP sensor Hall effect with led, normally open N.O.
Cable	<b>CH1</b>	connector with 2.5 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )
	<b>CH2</b>	connector with 5 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )
	<b>CH3</b>	connector with 10 m. cable 3 wires (PVC Ø3.5 mm 3x0.25 mm <sup>2</sup> )

**3 PIN SENSOR FOR SNAP CONNECTOR + CH1 CABLE 3 WIRES (PVC Ø3.5 mm 3x0.25 mm<sup>2</sup>)**

Cylinders and microcylinders	<b>HS.PAC1</b>	PNP sensor Hall effect N.O. with led, with connector and 2.5 m. cable
Rodless cylinders	<b>SHS.PAC1</b>	PNP sensor Hall effect N.O. with led, with connector and 2.5 m. cable

**3 PIN SENSOR FOR M8 CONNECTOR**

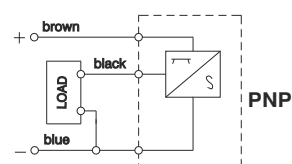
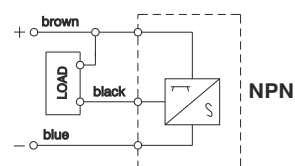
Cylinders and microcylinders	<b>HS8.NA</b>	NPN Hall effect sensor N.O. with LED and M8 plug
	<b>HS8.PA</b>	PNP Hall effect sensor N.O. with LED and M8 plug
Rodless cylinders	<b>SHS8.NA</b>	NPN Hall effect sensor N.O. with LED and M8 plug
	<b>SHS8.PA</b>	PNP Hall effect sensor N.O. with LED and M8 plug
Cable	<b>MCH1</b>	M8 connector with cable 2.5 m. 3 wires (PUR Ø2.6 mm 3x0.15mm <sup>2</sup> )
	<b>MCH2</b>	M8 connector with cable 5 m. 3 wires (PUR Ø2.6 mm 3x0.15mm <sup>2</sup> )
	<b>MCH3</b>	M8 connector with cable 10 m. 3 wires (PUR Ø2.6 mm 3x0.15mm <sup>2</sup> )



### Technical characteristic

Maximum permanent current	0,25A
Voltage range	6 - 30V DC
Power (inductive load)	6W
Maximum Voltage drop	2V
Working temperature	-20°C - 70°C
Cables number	3
Degree of protection	IP 65
Connecting time	0,8 ms
Disconnecting time	0,3 ms
Average working period	10 <sup>9</sup> cycles
Repetition of intervention point	± 0,1 mm
Contact normally open	N.O.

### Diagrams and connections



### These sensors can be used on cylinders series:

SERIES	DESCRIPTION	MOUNTED
1200	for microcylinders with threaded end covers and "TECNO-MIR" microcylinders	with clamps code 1260.Ø.F
	for microcylinders "MIR" with rolled end covers, cylinders from Ø16 to Ø32	with clamps code 1280.Ø.F
	for microcylinders "MIR-INOX" with rolled end covers	with clamps code 1280.Ø.FX
1306 - 1307 - 1308	for cylinders from Ø32 to Ø63	with brackets code 1306.A
	for cylinders from Ø80 to Ø125	with brackets code 1306.B
	for cylinders from Ø160 to Ø200	with brackets code 1306.C
1315	for cylinders Ø250 and Ø320 (ISO)	with brackets code 1306.D
1319 - 1320	for cylinders Ø32 and Ø40	with brackets code 1320.A
	for cylinders Ø50 and Ø63	with brackets code 1320.B
	for cylinders Ø80 and Ø100	with brackets code 1320.C
	for cylinders Ø125	with brackets code 1320.D
	for cylinders Ø160	with brackets code 1320.E
	for cylinders Ø200	with brackets code 1320.F
1390 - 1391	for cylinders ECOLIGHT Ø32 and Ø40	with brackets code 1390.A
	for cylinders ECOLIGHT Ø50 and Ø63	with brackets code 1390.B
	for cylinders ECOLIGHT Ø80 and Ø100	with brackets code 1390.C
	for cylinders ECOLIGHT Ø125 - Ø200	with brackets code 1390.D
1500	Compact cylinders "Europe" (from Ø32)	directly on groove
1605	Rodless cylinders	with brackets code 1600.A

## General

The limit switches, or magnetic sensors, have to be mounted on cylinders with magnetic piston. These, when hit by the magnetic field generated by the piston as it approaches, close the circuit sending an electrical signal by relè solenoid valve control, etc. or converse with the controlling electronic system situated on the machine. There are available magnetic sensor with ampulla Reed type and with Hall effect. The sensors are attached to the cylinder by a proper clamp, slot or adaptator and have an activation LED indicator.

Note: The magnetic sensors are according to the Directive **EMC 89/336/CEE** and following amendments.

## Instruction on how to use the sensors properly

Particular attention should be paid in order not to exceed the wide operating limits shown into the next pages. Besides, the 2 wires sensors have never to be connected to the mains if a load has not been yet connected in series. These are the only cares that, if not followed, may cause damages to the sensor. Furthermore it has to be considered that, while loading, the current absorbed by the sensors might be 50% higher than the rated one. The switch semiconductor construction design makes these sensors extremely compatible, there are no limitations to the type of load applied: inductive, capacitive resistive. In case of direct current (DC) feeding, the polarity of the connection has to be observed: the brown cable must be connected to the plus (+) and the blue one to the minus (-). The cable length must not exceed 10mtrs. If the cable needs to be longer than 10m, we recommend to insert in series an inductance or a resistance to counteract the capacity generated by the cable itself. When using a two wire REED type sensor always ensure that the correct load is applied in series on any of the two wires. In case of two or more sensors connected in series pay attention to the voltage drop generated (around 3V for each sensor), and eventually use the 3 wire REED version designed for in series connection. The Hall effect sensors, which do not include any moving mechanical parts are longer lasting if compared to the Reed version besides, there are some other external factors to be taken into consideration, such as proximity of powered cables, magnetic fields produced by electric motors, mass of iron too close to the sensor, and so on: these factors have to be therefore carefully avoided, being able to influence the sensors and accordingly to cause irregularity of operation.

**Sensor with 2.5 m. cable**

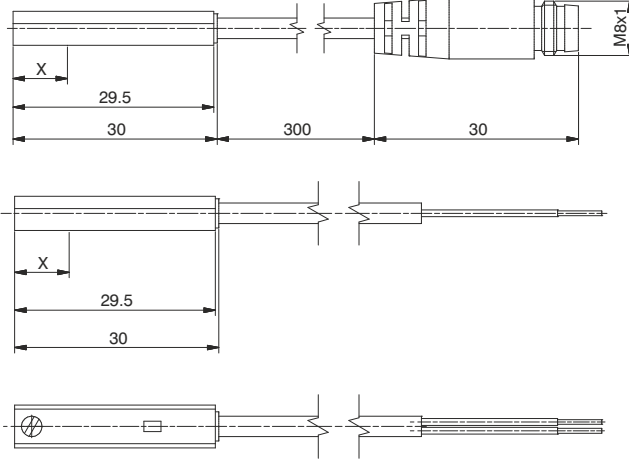


Weight gr. 27

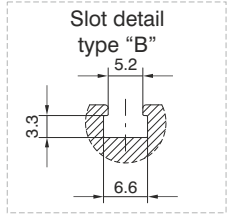
**Sensor with cable and M8 connector**



Weight gr. 15



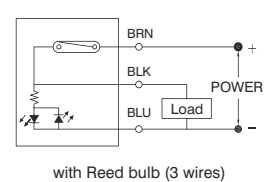
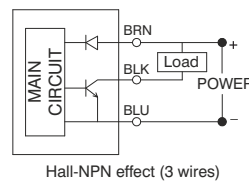
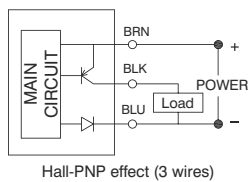
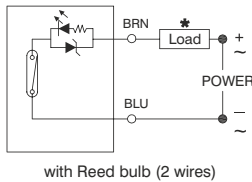
X= point of commutation



**Sensor ordering codes**

Ampulla Reed sensors, with led, Universal, N.O. (Normally open)		X=point of commutation
<b>1580.U</b>	(2 wires) cable 2.5 mt.	15 mm
<b>MRS.U</b>	(2 wires) cable 300 mm, M8 connector (use MC1 or MC2 connectors)	15 mm
<b>1580.UAP</b>	PNP (3 wires) cable 2.5 mt.	15 mm
<b>MRS.UAP</b>	PNP (3 wires) cable 300 mm, M8 connector (use MCH1 or MCH2 connectors)	15 mm
Hall effect sensors, with led, DC, N.O. (Normally open)		X=point of commutation
<b>1580.HAP</b>	PNP (3 wires) cable 2.5 mt.	8 mm
<b>1580.HAN</b>	NPN (3 wires) cable 2.5 mt.	8 mm
<b>MHS.P</b>	PNP (3 wires) cable 300 mm, M8 connector (use MCH1 or MCH2 connectors)	8 mm

**Diagrams and connections**



\* The load (LOAD) can be connected either to negative or positive pole

Technical characteristics	1580.U	MRS.U	1580.UAP	MRS.UAP	1580.HAP	1580.HAN	MHS.P
Type of contact	N.O.						
Output type	PNP				NPN		PNP
Maximum current	14 VA - 10 W		4 VA - 3 W		3 W		
Maximum permanent power	5 - 230V DC/AC		5 - 30V DC/AC		10 - 30 V DC		
Voltage range	3.5 V		0V **		2 V		
Working temperature	2 x 0.14 Ø3.3mm PUR		2 x 0.14 Ø3.3mm PUR		3 x 0.14 Ø3.3 mm PUR		
Maximum voltage drop	-10°C - +70°C						
Cable section (mm <sup>2</sup> )	IP 67						

\*\* Even if one sensor generates a voltage drop very close to 0 Volts, we suggest to connect no more than 30 sensors in series.

**Cable ordering code**

**Connection 2 wires**

- MC1** cable 2 wires l=2.5m with M8 connector
- MC2** cable 2 wires l=5m with M8 connector
- MC3** cable 2 wires l=10m with M8 connector

Connector



Sensor



- 1 Brown (+)
- 4 Blue (-)
- 3 Not use

**Connection 3 wires**

- MCH1** cable 3 wires l=2.5m with M8 connector
- MCH2** cable 3 wires l=5m with M8 connector
- MCH3** cable 3 wires l=10m with M8 connector

Connector



Sensor

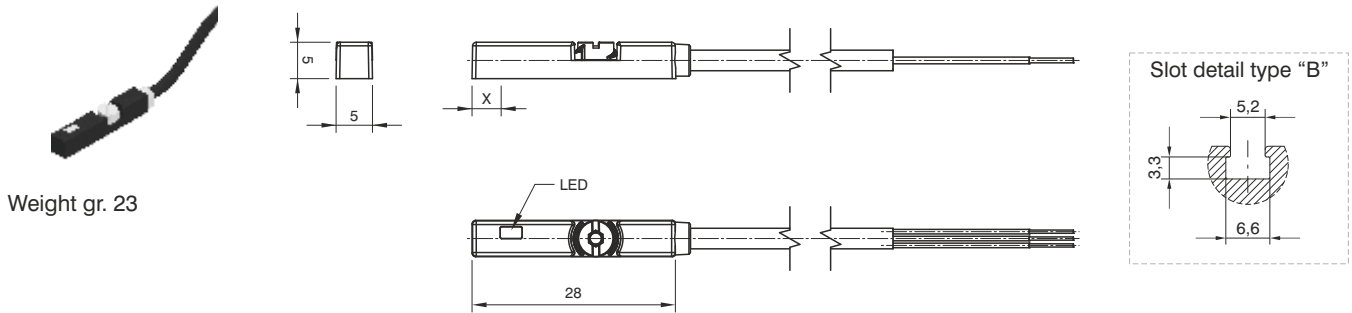


- 1 Brown (+)
- 4 Black (signal)
- 3 Blue (-)



Sensor with 2.5 m. cable

X= point of commutation



Weight gr. 23

Sensor ordering codes

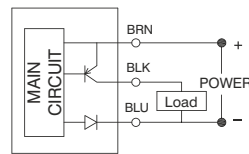
Hall effect sensors, with led, DC, N.O. (Normally open)

X= point of commutation

1595.HAP PNP (3 wires) cable 2.5 mt.

2.3 mm

Diagrams and connections



Hall-PNP effect (3 wires)

Technical characteristics	1595.HAP
Type of contact	N.O.
Output type	PNP
Maximum current	100 mA
Maximum permanent power	3W
Voltage range	10 - 28 VDC
Working temperature	-10 - +70°C
Maximum voltage drop	1,5V
Cable section (mm <sup>2</sup> )	3 x 0,14 Ø2.8 mm PUR
Degree of protection	IP67

**Sensor with 2.5 m. cable**

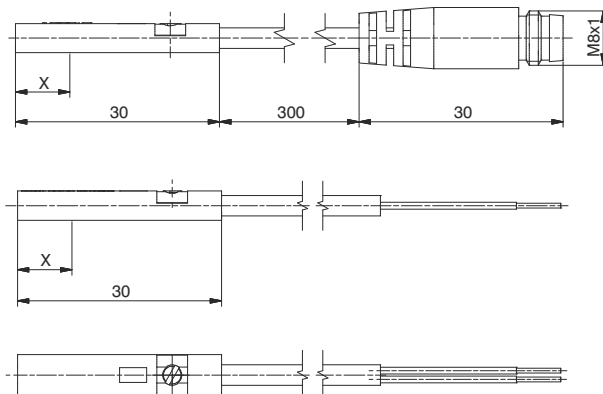


Weight gr. 27

**Sensor with cable and M8 connector**

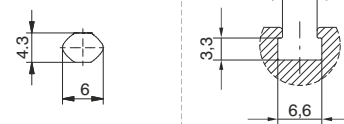


Weight gr. 15



X= point of commutation

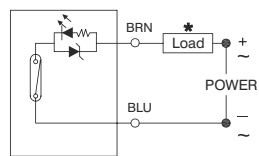
Slot detail type "B"



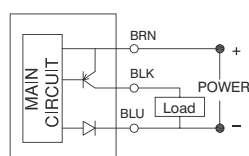
**Sensor ordering codes**

Ampulla Reed sensors, with led, Universal, N.O. (Normally open)		X=point of commutation
<b>1590.U</b>	(2 wires) cable 2.5 mt.	8 mm
<b>LRS.U</b>	(2 wires) cable 300 mm, M8 connector (use MC1 or MC2 connectors)	8 mm
<b>1590.UAP</b>	PNP (3 wires) cable 2.5 mt.	8 mm
<b>LRS.UAP</b>	PNP (3 wires) cable 300 mm, M8 connector (use MCH1 or MCH2 connectors)	8 mm
Hall effect sensors, with led, DC, N.O. (Normally open)		X=point of commutation
<b>1590.HAP</b>	PNP (3 wires) cable 2.5 mt.	6 mm
<b>LHS.P</b>	PNP (3 wires) cable 300 mm, M8 connector (use MCH1 or MCH2 connectors)	6 mm

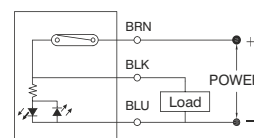
**Diagrams and connections**



with Reed bulb (2 wires)



Hall-PPN effect (3 wires)



with Reed bulb (3 wires)

\* The load (LOAD) can be connected either to negative or positive pole

Technical characteristics	1590.U	LRS.U	1590.UAP	LRS.UAP	1590.HAP	LHS.P
Type of contact	N.O.					
Maximum current	100mA		500mA		200mA	
Maximum permanent power	14 VA - 10 W		14 VA - 10 W		6 W	
Voltage range	5 - 30V DC/AC		10 - 30 V DC/AC		10 - 30 V DC	
Working temperature	-10°C - +70°C					
Maximum voltage drop	3 V		0V **		1.5 V	
Cable section (mm <sup>2</sup> )	2 x 0.14 Ø3 mm PUR		3 x 0.14 Ø3 mm PUR			
Degree of protection	IP 67					

\*\* Even if one sensor generates a voltage drop very close to 0 Volts, we suggest to connect no more than 30 sensors in series.

**Cable ordering code**

**Connection 2 wires**

- MC1** cable 2 wires l=2.5m with M8 connector
- MC2** cable 2 wires l=5m with M8 connector
- MC3** cable 2 wires l=10m with M8 connector

Connector



Sensor



- 1 Brown (+)
- 4 Blue (-)
- 3 Not use

**Connection 3 wires**

- MCH1** cable 3 wires l=2.5m with M8 connector
- MCH2** cable 3 wires l=5m with M8 connector
- MCH3** cable 3 wires l=10m with M8 connector

Connector



Sensor



- 1 Brown (+)
- 4 Black (signal)
- 3 Blue (-)

**Sensor with 2.5 m. cable**

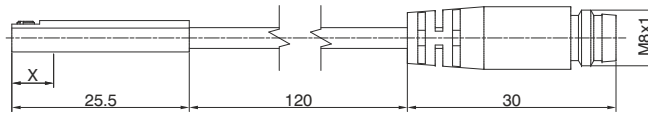


Weight gr. 22

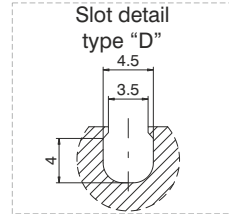
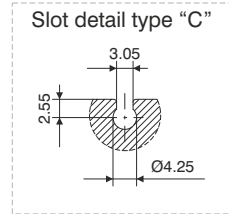
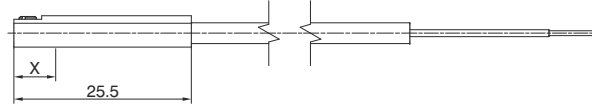
**Sensor with cable and M8 connector**



Weight gr. 10



X= point of commutation



**Sensor ordering codes**

**Ampulla Reed sensors, with led, Universal, N.O. (Normally open)**

X=point of commutation

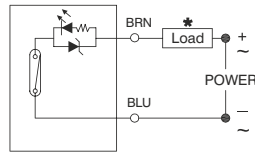
<b>1581.U</b>	(2 wires) cable 2.5 mt.	10 mm
<b>TRS.U</b>	(2 wires) cable 100 mm, M8 connector (use MC1 or MC2 connectors)	10 mm

**Hall effect sensors, with led, DC, N.O. (Normally open)**

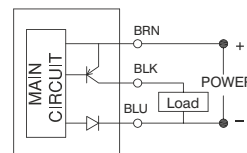
X=point of commutation

<b>1581.HAP</b>	PNP (3 wires) cable 2.5 mt.	7.5 mm
<b>THS.P</b>	PNP (3 wires) cable 100 mm, M8 connector (use MCH1 or MCH2 connectors)	7.5 mm

**Diagrams and connections**



with Reed bulb (2 wires)



Hall-PPN effect (3 wires)

\* The load (LOAD) can be connected either to negative or positive pole

Technical characteristics	1581.U	TRS.U	1581.HAP	THS.P
Type of contact	N.O.			
Maximum current	50mA			
Maximum permanent power	8 VA - 1,5 W		1,5 W	
Voltage range	5 - 30V DC/AC		10 - 30 V DC	
Working temperature	-10°C - +70°C			
Maximum voltage drop	3,5 V		1 V	
Cable section (mm <sup>2</sup> )	2 x 0,14 Ø2,8 mm PUR		3 x 0,14 Ø2,8 mm PUR	
Degree of protection	IP 67			

**Cable ordering code**

**Connection 2 wires**

Connector



Sensor



1 Brown (+)  
4 Blue (-)  
3 Not use

**Connection 3 wires**

Connector



Sensor



1 Brown (+)  
4 Black (signal)  
3 Blue (-)

- MC1** cable 2 wires l=2.5m with M8 connector
- MC2** cable 2 wires l=5m with M8 connector
- MC3** cable 2 wires l=10m with M8 connector

- MCH1** cable 3 wires l=2.5m with M8 connector
- MCH2** cable 3 wires l=5m with M8 connector
- MCH3** cable 3 wires l=10m with M8 connector

**Sensor with cable**

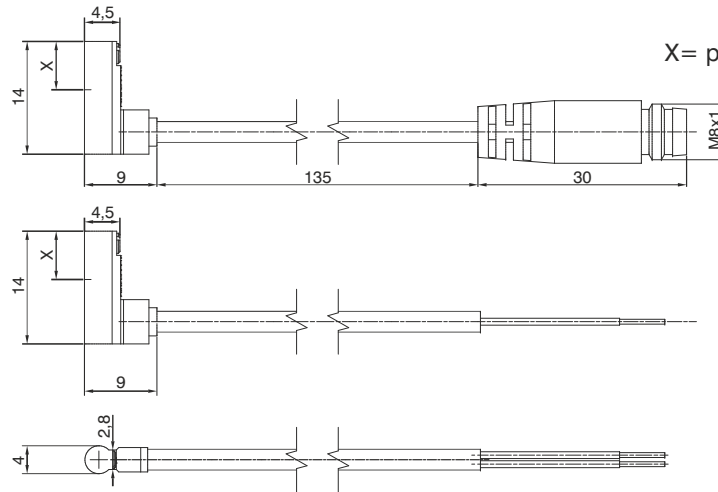


Weight gr. 22

**Sensor with cable and M8 connector**

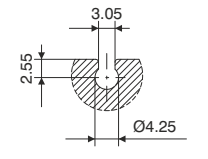


Weight gr. 10

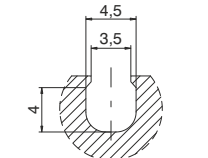


X= point of commutation

Slot detail type "C"



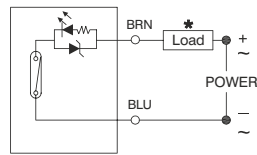
Slot detail type "D"



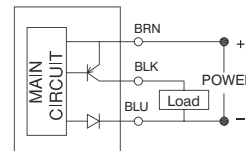
**Sensor ordering codes**

Ampulla Reed sensors, with led, DC, N.O. (Normally open)		X=point of commutation
1583.DC	(2 wires) cable 2 mt.	6 mm
Hall effect sensors, with led, N.O. (Normally open)		X=point of commutation
1583.HAP	PNP (3 wires) cable 3 mt.	6 mm
THR.P	PNP (3 wires) cable 100 mm, M8 connector (use MCH1 or MCH2 connectors)	6 mm

**Diagrams and connections**



with Reed bulb (2 wires)



Hall-PNP effect (3 wires)

\* The load (LOAD) can be connected either to negative or positive pole

TECHNICAL CHARACTERISTICS	1583.DC	1583.HAP	THR.P
Type of contact		N.O.	
Maximum current	20mA	50mA	
Maximum permanent power	0,6 W	1,5 W	
Voltage range	10 - 28V DC	4,5 - 28 V DC	
Working temperature		-10°C - +70°C	
Maximum voltage drop	3,5 V	0,5 V	
Cable	Ø2,6 mm PVC - 2 m	Ø2,6 mm PVC - 3 m	
Degree of protection		IP 67	

**Cable ordering code**

- MCH1** cable 3 wires l=2.5m with M8 connector
- MCH2** cable 3 wires l=5m with M8 connector

**Connection 3 wires**

Connector



Sensor



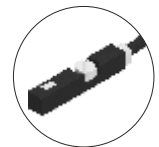
- 1 Brown (+)
- 4 Black (signal)
- 3 Blue (-)

**Rectangular section version (for sensor slot type "B")**

SERIES	DESCRIPTION	MOUNTED
1200	Microcylinders with threaded end covers and "TECNO-MIR" microcylinders Microcylinders "MIR" with rolled end covers Microcylinders "MIR-INOX" with rolled end covers	with clamps code 1260.Ø.FS with clamps code 1280.Ø.FS with clamps code 1280.Ø.FSX
1319 - 1320 1325 - 1345 1330 - 1332 1348 - 1349	for cylinders Ø32 - Ø40 for cylinders Ø50 - Ø63 for cylinders Ø80 - Ø100 for cylinders Ø125 for cylinders Ø160 for cylinders Ø200	with brackets code 1320.AS with brackets code 1320.BS with brackets code 1320.CS with brackets code 1320.DSC with brackets code 1320.ESC with brackets code 1320.FSC
1386-87 / 1396-97	Cylinders according to standard ISO 15552 ECOPLUS	directly on groove
1390 - 1391	Cylinders according to standard ISO 15552 ECOLIGHT <b>Warning:</b> To use only into the lateral slot, from Ø32 to Ø63 cylinders. (do not use into the 2 slots positioned on the side of feeding connection)	directly on groove
1370-1373	Cylinders ECOFLAT Short stroke compact cylinders	directly on groove with adapter code 1380.01F
1500	Compact cylinders "Europe"  Compact cylinder according to standard ISO 21287 ECOMPACT	from Ø12 to Ø25: directly on groove  from Ø32 to Ø50: directly on groove or with adapter 1380.01F  from Ø63 to Ø100: with adapter cod. 1380.01F directly on groove
1605	Rodless cylinders	with adapter code 1600.B
6100	Guided compact cylinder (Ø20 - Ø63)	directly on groove
6101	Heavy duty guided shortstroke cylinder	
6200	Twin rod slides units	
6210	Push/pull twin rod slides units	
6301	Pneumatic grippers, angular standard version	
6303	180° angular gripper rack & pinion style	
6310	Parallel style pneumatic grippers standard version (Ø10)	
6311	Parallel style pneumatic grippers wide opening	
6312	3 finger parallel style pneumatic grippers (Ø32 - Ø125)	


**Rectangular section version (for sensor slot type "B")**

SERIES	DESCRIPTION	MOUNTED
1200	Microcylinders with threaded end covers and "TECNO-MIR" microcylinders Microcylinders "MIR" with rolled end covers Microcylinders "MIR-INOX" with rolled end covers	with clamps code 1260.Ø.FS with clamps code 1280.Ø.FS with clamps code 1280.Ø.FSX
1319 - 1320 1325 - 1345 1330 - 1332 1348 - 1349	for cylinders Ø32 - Ø40 for cylinders Ø50 - Ø63 for cylinders Ø80 - Ø100 for cylinders Ø125 for cylinders Ø160 for cylinders Ø200	with brackets code 1320.ASC with brackets code 1320.BSC with brackets code 1320.CSC with brackets code 1320.DSC with brackets code 1320.ESC with brackets code 1320.FSC
1386-87 / 1396-97	Cylinders according to standard ISO 15552 ECOPLUS	directly on groove
1390 - 1391	Cylinders according to standard ISO 15552 ECOLIGHT	directly on groove
1370-1373	Cylinders ECOFLAT Short stroke compact cylinders	directly on groove with adapter code 1380.01F
1500	Compact cylinders "Europe"  Compact cylinder according to standard ISO 21287 ECOMPACT	from Ø12 to Ø25: directly on groove  from Ø32 to Ø50: directly on groove or with adapter 1380.01F  from Ø63 to Ø100: with adapter cod. 1380.01F directly on groove
1605	Rodless cylinders	with adapter code 1600.B
6100	Guided compact cylinder (Ø20 - Ø63)	directly on groove
6101	Heavy duty guided shortstroke cylinder	
6200	Twin rod slides units	
6210	Push/pull twin rod slides units	
6311	Parallel style pneumatic grippers wide opening	



**Oval section version (for sensor slot type “B”)**

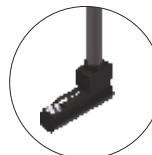
SERIES	DESCRIPTION	MOUNTED
1386-87 / 1396-97	Cylinders according to standard ISO 15552 ECOPLUS	directly on groove
1390-1391	Cylinders according to standard ISO 15552 ECOLIGHT	directly on groove
1370-1373	Cylinders ECOFLAT	directly on groove
1500	Compact cylinders "Europe"	from Ø12 to Ø25: directly on groove
	Compact cylinder according to standard ISO 21287 ECOMPACT	directly on groove
6100	Guided compact cylinder (Ø20 - Ø63)	directly on groove
6101	Heavy duty guided shortstroke cylinder	
6200	Twin rod slides units	
6210	Push/pull twin rod slides units	
6301	Pneumatic grippers, angular standard version	
6303	180° angular gripper rack & pinion style	
6310	Parallel style pneumatic grippers standard version (Ø10)	
6311	Parallel style pneumatic grippers wide opening	
6312	3 finger parallel style pneumatic grippers (Ø32 - Ø125)	
6411	Single rack rotary actuators	


**Round section version (for sensor slot type “C” and “D”)**

SERIES	DESCRIPTION	MOUNTED
6100	Guided compact cylinder (Ø12 - Ø16)	directly on groove
6302	Pneumatic grippers, 180° angular	
6310	Parallel style pneumatic grippers standard version (Ø10 and Ø16)	
6312	3 finger parallel style pneumatic grippers (Ø16 - Ø25)	
6400	Double rack rotary actuators with turn table	
6420	Vane type rotary actuators (from Ø10 to Ø40)	
6500	Arbitrary mount cylinders	
6600	Slide cylinders	
6700	Guide cylinders	


**Round section 90° cable version (for sensor slot type “C” and “D”)**

SERIES	DESCRIPTION	MOUNTED
6420	Vane type rotary actuators	directly on groove





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