



RULMECA DRIVE ROLLERS SERIES BL3

Moving ahead.



**RDR DRIVE ROLLERS
SERIES BL3**

Moving ahead.



Rulmeca - Moving ahead.

Since its foundation in 1962, the Rulmeca Group, headquartered in Bergamo (Almè), Italy, has grown to become one of the world's leading manufacturers of premium components for material handling.

With 1225 employees in 8 manufacturing companies and 8 sales companies throughout the world, serving customers in over 85 countries, our core business is manufacturing and supplying quality components for Bulk handling and Unit handling conveyor systems.

Rulmeca is a family owned company with strong international managerial approach. The Rulmeca Group Companies share a common philosophy, each operating to the specific needs of its market. These characteristics, the long-term perspective, and the attention to questions of social responsibility and sustainability are the cornerstones of our work.

Experience garnered over more than 55 years of supplying manufacturers and end users has enabled Rulmeca to create a vast range of components for in-house logistics: Rollers, Drum Motors and 24VDC Drive Rollers.

As a manufacturer who focuses on components, Rulmeca is able to respond flexibly to its customers' needs. Our products contribute to improving the performance and reliability of the machines and systems in which they are installed.

This catalogue is the result of updating and continuously improving our product range.

Do not hesitate to get in touch with us; we welcome your comments and suggestions.

Your Rulmeca Team

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A NEW DRIVE ROLLER CONCEPT

Rulmeca is proud to present to the market the wide-ranging RDR series BL3 Drive Roller with an extended selection of related products.

Its excellent value for money makes the RDR BL3 Drive Roller the ideal choice for satisfying even the most demanding of clients.

Ideal in applications which require:

- Low, medium or high speeds which are either set or varied by the client
- Constant high torque throughout the speed range
- Frequent stop/start cycles
- Optimised working consumption
- Low levels of system noise
- Safety for line operators

Rulmeca Drive Rollers (RDR) are designed to play a key role in industrial applications in which roller transportation is an important part of the production process.

According to the characteristics of the items to be conveyed, the overall configuration of the system and environmental conditions, it is possible to configure the Drive Roller in complete safety and with the utmost efficiency.

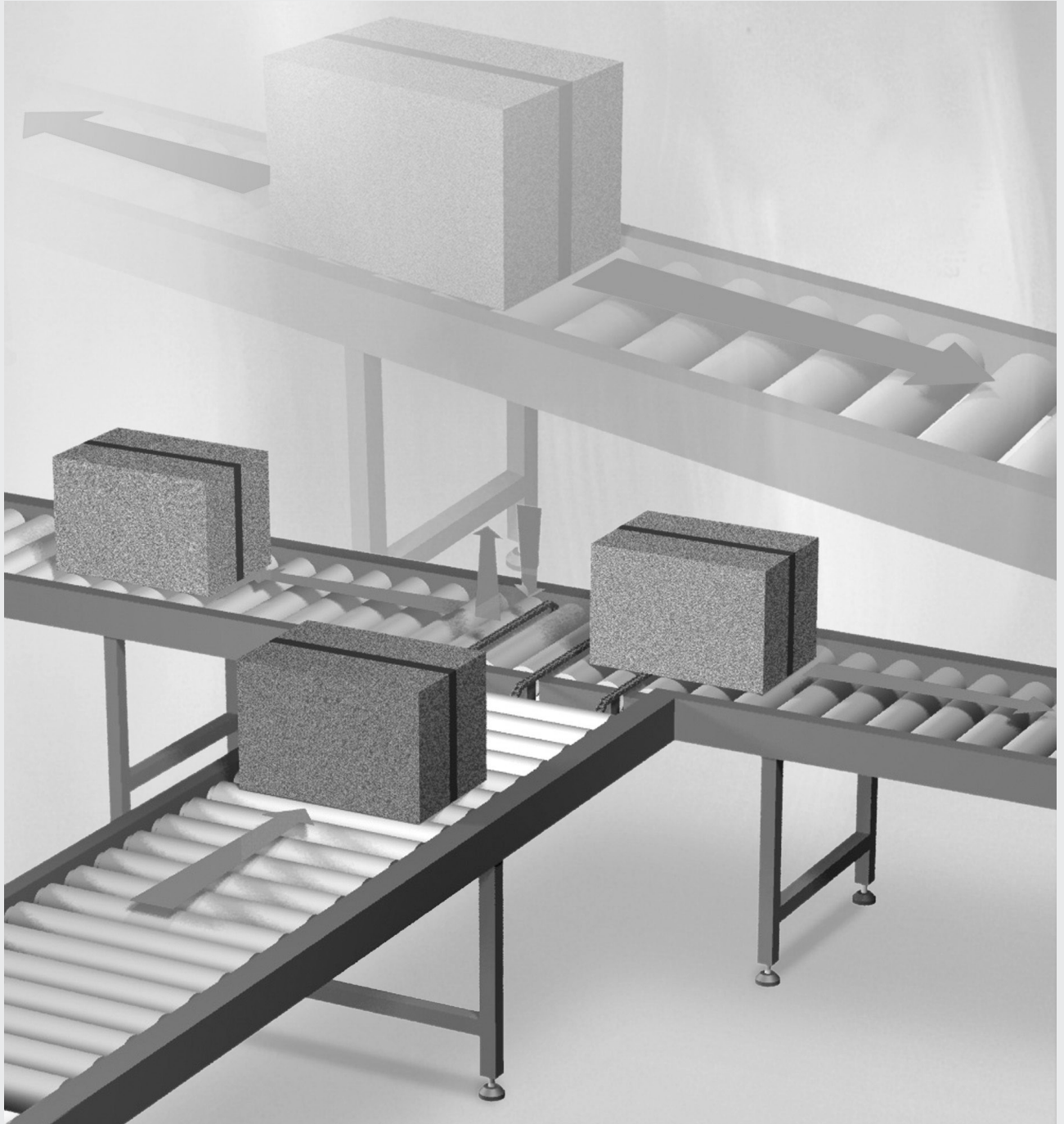
As well as being classified as an electrically-safe system as it is powered by 24V DC, the Drive Roller is an extremely silent, compact, efficient and long-lasting solution which does not require maintenance of its functional parts.

The motor unit, the technological heart of the Drive Roller, is - in the standard set-up proposed - fitted inside a 50 mm Ø tube with the finish agreed with the client.

In order to select the right gear reduction ratio, thus defining the rotation speed and the available torque, it is necessary to take into consideration the weight, size, material and base profile of the items to be conveyed, as well as the desired transportation speed and the working dynamics of the conveyor.

Please contact Rulli Rulmeca S.p.A. for any further information regarding the correct configuration of the Drive Roller and of all the relative components.

www.rulmeca.com
<http://rdr.rulmeca.com>



GENERAL STANDARDS

The elements that determine the initial design of a roller conveyor are:

- The dimensions of the packages to be conveyed (x-y).
- The condition of the support base of the packages in contact with the rollers.
- The weight and number of packages to be conveyed for each sector driven by the single Drive Roller.
- The transfer speed.

Roller pitch (or distance between rollers).

For efficient transfer of the packages on a roller conveyor it is good practice for the packages to have a sufficiently rigid and flat contact surface (so-called "rollable") that at the same time provides good friction.

"Roller pitch" is defined as the distance between the rotation axes of two adjacent rollers (l).

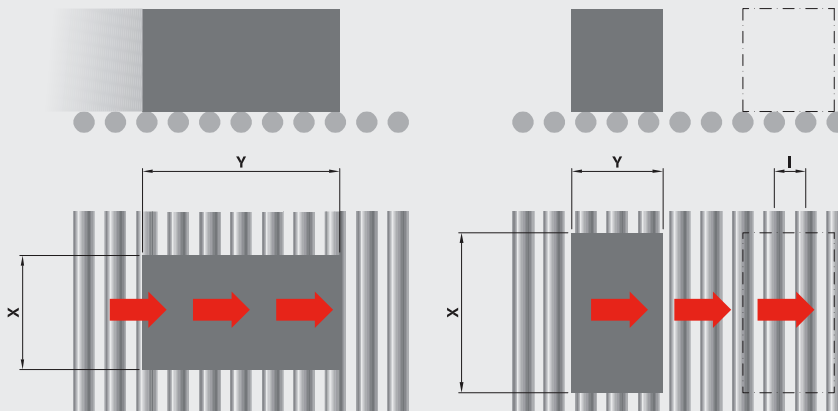
For operating efficiency, we recommend choosing the roller pitch that is suitable for the minimum dimensions of the package to be conveyed. As a general rule, the conveyed package must always be supported by at least 3 rollers simultaneously (i.e. $l \leq \text{minimum length of package divided by } 3$).

In all cases it is preferable to provide a number of support rollers that are greater than 3 to reduce the distance between rollers. In this way, smoother conveying is obtained, especially if the surface is deformable or typically rigid, but not continuous and in order to avoid jams if the packages have protrusions, or if the load is not well distributed or evenly balanced inside the package.

It could be more economical to use a greater number of light rollers rather than a smaller number of medium or heavy rollers.

The system designer is still responsible for checking that the maximum load exerted by the packages on the individual rollers and Drive Rollers is lower than their maximum load capacity specified in the catalogue.

Warning: to calculate the load that can be placed on a single roller, the number of rollers on which the load is considered to be distributed must be only 2/3 of the rollers below the package because the irregular assembly height and surface of the packages and the eccentricity and ovality tolerances of the rollers mean that not all the rollers are in contact at the same time.



Friction coefficient

The revolving friction coefficient between the package and roller plays an important part in conveying packages on a roller conveyor, as it enables the tangential force to be calculated that is necessary to move the packages forwards on the rollers.

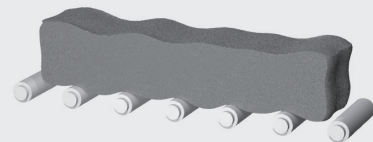
This friction coefficient varies according to the material of which the package that is in contact with the rollers is made.

Refer to the following values:

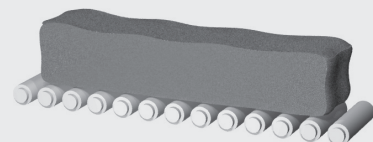
| | |
|------------------|--------|
| Steel | → 0.03 |
| Smooth PVC | → 0.04 |
| Profiled polymer | → 0.05 |
| Wood | → 0.05 |
| Stiff cardboard | → 0.06 |
| Soft cardboard | → 0.08 |

Stiff materials (of the same weight) require less tangential force (and thus drive torque) to be moved.

Soft packages tend to sag between one roller and the other, requiring more tangential force to be moved.



In order to prevent or limit sagging of the packages between the rollers, ensure that the roller pitch is as close together as possible if the type of conveyed package cannot be changed.



LOAD ON ROLLERS

Each type of roller proposed by Rulmeca is characterized by a nominal capacity value. Refer to the roller section or to the "Rollers for internal conveying" catalogue.

It is defined as:

P_1 = Nominal load pressing down on a roller [daN]

P_c = Load capacity of a roller or capacity [daN]

P_r = Weight of the rotating parts of a roller [daN]

P_t = Total weight of a roller [daN]

P_u = Weight of a package [daN]

n = Number of rollers

The distribution of the load on the rollers cannot be extrapolated from its average value.

$$P_1 = \frac{P_u}{n}$$

It must be established whether:

$n > 3$ or $n > 3$ but with package surface NOT extremely rigid.

$$P = \frac{3 \cdot P_u}{2 \cdot n}$$

If $n > 3$ with extremely rigid package surface.

$$P = \frac{2 \cdot P_u}{n}$$

The camber values of loads of the same weight increase or decrease according to how the load is distributed.

In general, the smaller the surface of the concentrated load that comes into contact with the roller, the greater the stress brought to bear on the roller.

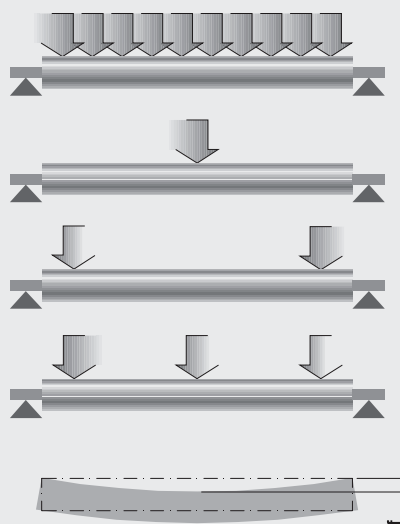


Fig. 1 evenly distributed load

Fig. 2 load concentrated in centre

Fig. 3 load concentrated at ends

Fig. 4 load concentrated at 3 points

(50% in the centre)

Fig. 5 f = camber of the tube bearing a load.

When choosing the type of roller, remember:

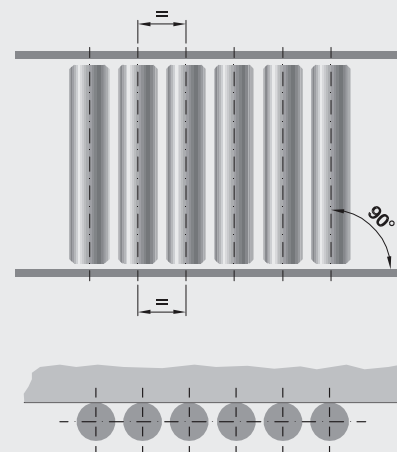
$$P_c \geq P$$

Check the roller's suitability for the environmental conditions (dust, humidity, corrosion, hygiene, etc.) and whether the thickness of the tube will withstand shocks and concentrated loads. Evaluate whether increasing the diameter of the roller (tapered rollers or rubber-lagged rollers), having rollers of the same type, reduces tangential force and increases peripheral speed.

PARALLELISM - ORTHOGONALITY - ALIGNMENT

Attention must be paid to these three factors. They are necessary and indispensable conditions for the operating efficiency of any type of roller conveyor; if they are not fulfilled with minimum processing tolerances, this could give rise to conveying and flow problems.

If particular applications involve the use of rollers tilted forwards or rollers in a double herringbone pattern, align packages on reference points to centre them or direct them to priority aisles by means of guides. Refer to the Rollers for internal conveying catalogue.



CHOOSING YOUR DRIVE ROLLER

The conveyed material moves perpendicularly to the axis of the roller, so when calculating the necessary forces, the revolving friction of the roller with the surface of the base of the conveyed package must be taken into account.

Apply this formula to define the tangential force necessary for handling the package:

$$F_t = P \times G \times U$$

where:

- Ft) required tangential force [N]
- P) Weight of the package (kg).
- G) Gravity acceleration = 9.81 [m/s²]
- U) Friction coefficient.

Once the tangential force that is necessary to move the package has been determined, after the package conveying speed is known, refer to the tables for the single Drive Rollers to define the most suitable reduction ratio.

Example:

Weight of the conveyed material: 30 kg
 PVC package
 Conveying speed: 0.5 m/s
 $F_t = 30 \text{ kg} \times 9.81 \text{ m/s}^2 \times 0.04 = 11.7 \text{ N}$

If you also need to know the torque required, consider the radius of the Drive Roller (equal to 25 mm = 0.025 m). Torque (force x radius) is:

$$11.7 \text{ N} \times 0.025 \text{ m} = 0.3 \text{ Nm}$$

The necessary mechanical power (W) (Tangential Force x Speed) will be:

$$11.7 \text{ N} \times 0.5 \text{ m/s} = 5.9 \text{ W.}$$

Remember that this calculation does not take account of possible force absorption by belts or other transmission systems used to drive the driven rollers.

In addition to making this calculation, the result should be oversized with a suitable safety coefficient due to possible conveying irregularities or frictions (guides, alignments, rubber laggings, etc).

When choosing the Drive Roller, in addition to the above data, you must consider the

type of use (intermittent or continuous), average service life required and the electronic functions required to run the system.

You should always contact Rulli Rulmeca S.p.A. in order to check the calculations made and choose the correct Drive Roller before placing the order.

General logistics



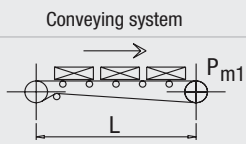
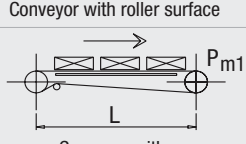
The Drive Roller can also be easily used in small conveyor belts that can convey light loads and which have flexible belts that are not over tensioned.

Typical applications are those in which compact design solutions are required, as is the case in the electronics, pharmaceutical, and automotive industries, injection moulding of plastic parts or manufacturing in general.

You are advised to use the Drive Roller with the shell machined for belt centring together with elastic or mono-ply fabric belts that do not require tension above the capacity of the Drive Roller.

See the following pages for possible types of transmission roller.

CALCULATING TANGENTIAL FORCE

| |  |  |
|---|---|--|
| | Force without load | Force for conveying materials horizontally |
|  Conveying system $F_0 = 0.4 \cdot L \cdot (2P_n + P_{pr})$ | | $F_1 = 0.4 \cdot L \cdot P_{m1}$ |
|  Conveyor with roller surface $F_0 = 11 \cdot L \cdot P_n \cdot C_2$ | | $F_1 = 11 \cdot L \cdot P_{m1} \cdot C_2$ |

- F = Tangential force [N]. $F = F_0 + F_1 + F_2 + F_3$. The tangential forces are shown in the performance tables.
- P_n = Belt weight in kg [kg/m].
- P_{pr} = Weight of the rotating parts of the conveyor belt (forward and return travel section) [kg/m].
- P_{m1} = Weight of the product conveyed on the forward travel section for each metre of length of the conveyor belt [kg/m].
- C_2 = coefficient of friction between the underside of the belt and its sliding surface.
- L = Length of the conveyor in metres (distance between drive roller/ transmission) [m].
- F_0-F_1 = Force [N].

| C2 | Friction coefficient | | |
|--|----------------------|---------|----------|
| | PE belt | PP belt | POM belt |
| Sliding surface | 0.30 | 0.15 | 0.10 |
| Sliding surface made of steel or stainless steel | 0.15 | 0.25 | 0.20 |

MOTION TRANSMISSION

Transmitting motion from drive roller to neighbouring rollers

A conveyor with controlled rollers can be built using Drive Rollers with grooves or pulleys connected to idler rollers using the same motion transmission system (driven rollers).

Conveyors configured as motorized

This system involves the Drive Roller and rollers configured as motorized with O-Rings or Poly-V belts.

The BL3 configured as motorized configuration, foresees the direct and continuous junction between the tube and the motion transmission plastic head.

The conveyor configured as motorized consists of more zones independent from each other moved by a single Drive Roller.

The number of the stations is variable depending on the logic handling, from the type of good to be conveyed (weight and size) and the Drive Roller gear ratio that will define the linear speed and available torque.

The motion transmission is direct allowing maximum control of goods handling cycles. The handling packages sequence is assured by manual controls, PLC or electronic Zero Pressure Accumulation management modules. The conveyors configured as motorized excludes the contact between the packages and allows to determine the crossing times, but it is not suitable for totally fulfil the conveyor spaces, especially if the length of the packages is not constant.

Conveyors configured as frictioned

This system involves the use of rollers all controlled by a single Drive Roller all configured as frictioned.

The Drive Roller, in a frictioned configuration can keep the double grooved head in motion independently from its tube.

Thanks to the use of a mechanic stop systems (not supplied by Rulmeca) the Customer is able to stop the packages, thus the peculiarity of the friction system, maintaining a part of tangential force always present (depending on the good conveyed weight). This system ensures the possibility to fulfil spaces between the packages, even with different lengths and weights, creating an accumulation with pressure between the packages. Drive Roller and rollers always gives continuous drag force to the goods,

proportional to the load conveyed.

The braking function, characteristic of BL3 with a frictioned configuration is missing, when the conveyor is full, is mandatory to reduce the Drive Roller speed or switch off the system. The frictioned BL3 is actually available only in combination of Ø5 mm O-Rings plastic head.

Belt transmission

To connect the drive roller to the idler roller with grooves or pulleys, use round polyurethane belts (easily available on the market).

The extent and pretensioning of the round belts depend on the conveyed load and on the roller pitch specified in the design phase. Generally, the pretensioning recommended by round belt manufacturers should not be less than 8%. This value must always be requested from and confirmed by the supplier of the belts because it depends on the type of material used.

Warning: each idler roller driven by belts causes a tangential force loss (Ft) of about 1N. When calculating the load that can be conveyed by every single Drive Roller, this force must be subtracted from the tangential force, which is supplied by the Drive Roller and is shown in the drive roller performance tables. In order to ensure uniform traction and correct conveying of the packages, do not exceed 5 + 5 idler rollers driven by belts by each Drive Roller (which must be placed in a central position).

Transmission of motion to the driven rollers by round belts is advisable for speeds up to 0.6 m/s and for packages weighing up to 40 daN. To ensure a precise package arrest, make sure that the package to be arrested is always positioned on the drive roller during the slowing phase and not exclusively on the rollers driven by belts.

Poly-V belt transmission

Using the transmission system with Poly-V belts is the most efficient method to transmit motion to the driven rollers next to the Drive Roller. Owing to the elasticity that characterizes the belts that can be supplied by Rulmeca, it is possible to apply this technology not only to rectilinear section but also to conveyors with curves in combination with the Drive Rollers and tapered rollers in the KRO ver-

sion. The high efficiency of the Poly-V belt transmission system enables more torque to be transmitted to the driven rollers than is the case with the round belts system, thus increasing the number of rollers that can be driven by the same Drive Roller.

Owing to the great precision of the pulley-belt combination, conveyors can be designed for many different productive applications requiring immediate accurate stops and starts, but with no risk of slipping.

Maintaining the Drive Rollers together, for conveyors on slopes, is assured because belts with up to 4 ribs can be used for heavier loads, whilst still providing a spacing groove between two belts.

Most of the applications can be implemented by 2-rib belts (for conveyed weights not exceeding 50 daN).

The compactness of the pulleys enables more useable surface area to be obtained on the Drive Roller/roller and enables the transmission to be easier guarded to prevent damage, also resulting in a narrower roller conveyor.

In order to ensure uniform traction and correct conveying of the packages, do not exceed 10 + 10 idler rollers driven by Poly-V belts by each Drive Roller (which must be placed in a central position). For low-load applications, with several driven rollers, always get Rulmeca to check and approve the transmission.

Poly-V belts can transmit motion to the driven rollers at speeds up to 1.25 m/s, for loads limited by the torque that can be supplied by the Drive Rollers and by the torque that can be actually transmitted by the belts after the speed loss caused by transmission slips.

Poly-V belt characteristics

- Poly-V belt ISO9982 (DIN7867) with PJ profile with 2 or 3 ribs (or 4 ribs by request).
- In accordance with Directive 2002/95/EC (RoHS).
- All the materials used have been tested and registered in compliance with the REACH Directive (EC 1907/2006).
- The belt does not contain halogens, silicone compounds or PVC.
- UL certified.
- Surface hardness 82 Shore A, ribs hardness 55 Shore A.
- Pretensioning before use 4-6 %.

POLY-V BELTS TABLE

- Electrical conductivity < 7 MΩ.
 - Temperature range -20 to +90 °C.
 - Belts for low-temperature environments can be used (please specify in order).
- For packages around and above 50 daN, 3-rib belts should be used.

The optimum pretensioning for belts supplied by Rulmeca is obtained by complying with the roller pitches prescribed in the table below for the different belt lengths. Transmission is calculated on the basis of the performance guaranteed by the manu-

facturer of the belts used. Poly-V belts are available immediately from stock for the most common standard pitches indicated in the table below in the catalogue. If you have any queries at all, contact Rulmeca.

FLEXIBLE 2 AND 3 RIB POLY-V BELTS, PITCH 2.34 - PROFILE J ISO 9982 DIN 7867

| Std. | Order Code | Roller pitch [mm] | N. Ribs | Ref. No on belt | Description | |
|------|--------------|-------------------|---------|-----------------|---------------------------------|---------------------------------|
| * | BELT-2PJ-60 | 60 | 2 | PJ 256 | Cinghia Poly-V, 2 coste, PJ 256 | |
| | BELT-2PJ-68 | 65 | | PJ 270 | Cinghia Poly-V, 2 coste, PJ 270 | |
| | BELT-2PJ-73 | 70 | | PJ 282 | Cinghia Poly-V, 2 coste, PJ 282 | |
| * | BELT-2PJ-75 | 75 | | PJ 286 | Cinghia Poly-V, 2 coste, PJ 286 | |
| * | BELT-2PJ-78 | 78 | | PJ 288 | Cinghia Poly-V, 2 coste, PJ 288 | |
| * | BELT-2PJ-80 | 80 | | PJ 290 | Cinghia Poly-V, 2 coste, PJ 290 | |
| | BELT-2PJ-90 | 90 | | PJ 314 | Cinghia Poly-V, 2 coste, PJ 314 | |
| | BELT-2PJ-94 | 95 | | PJ 316 | Cinghia Poly-V, 2 coste, PJ 316 | |
| * | BELT-2PJ-100 | 100 | | PJ 336 | Cinghia Poly-V, 2 coste, PJ 336 | |
| | BELT-2PJ-105 | 105 | | PJ 346 | Cinghia Poly-V, 2 coste, PJ 346 | |
| | BELT-2PJ-110 | 110 | | PJ 356 | Cinghia Poly-V, 2 coste, PJ 356 | |
| * | BELT-2PJ-120 | 120 | | PJ 376 | Cinghia Poly-V, 2 coste, PJ 376 | |
| | BELT-2PJ-125 | 125 | | PJ 388 | Cinghia Poly-V, 2 coste, PJ 388 | |
| | BELT-2PJ-133 | 130 | | PJ 416 | Cinghia Poly-V, 2 coste, PJ 416 | |
| | BELT-2PJ-153 | 155 | | PJ 442 | Cinghia Poly-V, 2 coste, PJ 442 | |
| * | BELT-2PJ-160 | 160 | | PJ 456 | Cinghia Poly-V, 2 coste, PJ 456 | |
| | BELT-2PJ-175 | 175 | | PJ 486 | Cinghia Poly-V, 2 coste, PJ 486 | |
| * | BELT-2PJ-200 | 200 | | PJ 536 | Cinghia Poly-V, 2 coste, PJ 536 | |
| * | BELT-3PJ-60 | 60 | | 3 | PJ 256 | Cinghia Poly-V, 3 coste, PJ 256 |
| | BELT-3PJ-68 | 65 | | | PJ 270 | Cinghia Poly-V, 3 coste, PJ 270 |
| | BELT-3PJ-73 | 70 | PJ 282 | | Cinghia Poly-V, 3 coste, PJ 282 | |
| * | BELT-3PJ-75 | 75 | PJ 286 | | Cinghia Poly-V, 3 coste, PJ 286 | |
| * | BELT-3PJ-78 | 78 | PJ 288 | | Cinghia Poly-V, 3 coste, PJ 288 | |
| * | BELT-3PJ-80 | 80 | PJ 290 | | Cinghia Poly-V, 3 coste, PJ 290 | |
| | BELT-3PJ-90 | 90 | PJ 314 | | Cinghia Poly-V, 3 coste, PJ 314 | |
| | BELT-3PJ-94 | 95 | PJ 316 | | Cinghia Poly-V, 3 coste, PJ 316 | |
| * | BELT-3PJ-100 | 100 | PJ 336 | | Cinghia Poly-V, 3 coste, PJ 336 | |
| * | BELT-3PJ-105 | 105 | PJ 346 | | Cinghia Poly-V, 3 coste, PJ 346 | |
| | BELT-3PJ-110 | 110 | PJ 356 | | Cinghia Poly-V, 3 coste, PJ 356 | |
| * | BELT-3PJ-120 | 120 | PJ 376 | | Cinghia Poly-V, 3 coste, PJ 376 | |
| | BELT-3PJ-125 | 125 | PJ 388 | | Cinghia Poly-V, 3 coste, PJ 388 | |
| * | BELT-3PJ-133 | 130 | PJ 416 | | Cinghia Poly-V, 3 coste, PJ 416 | |
| | BELT-3PJ-153 | 155 | PJ 442 | | Cinghia Poly-V, 3 coste, PJ 442 | |
| * | BELT-3PJ-160 | 160 | PJ 456 | | Cinghia Poly-V, 3 coste, PJ 456 | |
| | BELT-3PJ-175 | 175 | PJ 486 | | Cinghia Poly-V, 3 coste, PJ 486 | |
| | BELT-3PJ-200 | 200 | PJ 536 | | Cinghia Poly-V, 3 coste, PJ 536 | |

* Belts with standard measurements. For the others and for different measurements, request availability.

Warning The printed reference number on the belt (PJ-XXX) is not the belt extent and must not be used to calculate roller pitch. The original winding diameter of the belt is calculated as 1 mm above the pulley:
 $D_p = \varnothing \text{ pulley} + 2 \text{ mm}$. Recommended average tension 5%. Min/max permitted tension range 4-6%.



THE RDR DRIVE ROLLER

The Drive Roller can support both a load acting directly on it (a portion of the weight of the package pressing down on the Drive Roller and/or the load due to the tension of the conveyor belt), and convey loads distributed on the roller conveyor portion driven by the Drive Roller.

Load capacity

The load capacity (Pc) on the individual Drive Roller is 110 daN for length as 1000 mm and 50 daN for length from 1000 to 1500 mm. Please contact Rulmeca in case of higher load capacity needs.

Conveyable loads

The total load that can be conveyed by the rollers driven by a single Drive Roller can be extrapolated from the torque/tangential force supplied by the motor with the different gear ratios, at the different speeds. To select the reduction ratio, refer to the drive roller's speed/tangential force tables and to the calculation of tangential necessary force previously explained in this catalogue. In order to increase the service life of the motors, decrease ambient noise and reduce energy consumption, it is very important to operate the Drive Rollers only when there is a package to be conveyed and to stop them (by photocells, timers, relays and/or PLC) as soon as the package has passed.

Electrical protection

USING THE DRIVE ROLLER WITH BL3 MOTION CONTROL BOARD

The Drive Rollers of the BL3 series are normally supplied with the BL3 Motion Control interface. This board not only provides an appropriate power safety fuse to protect the Drive Roller but also provides a system of opto-isolation of I/O signals that ensures that the system is protected from voltage spikes and disturbs.

USING THE DRIVE ROLLER WITHOUT BL3 MOTION CONTROL BOARD

If the customer wishes to use the Drive Roller without the BL3 Motion Control board, it is the customer's responsibility to protect every single motor with a safety fast fuse that is appropriate to the nominal current of the Drive Roller (see the technical data set out below). In general, in order to maximize

the service life of the Drive Roller and avoid malfunctions or faults, use well filtered power supply units with regulated voltage and filter correctly the inductive loads supplied by the same power line (solenoid valves, remote switches, coils etc.).

Contact Rulmeca for information and always refer to the Product Technical Manual that can be downloaded from <http://rdr.rulmeca.com>.

Drive Rollers used without the BL3 Motion Control electronic board, that are returned because of electronic faults, are not covered by the warranty against possible failures following electrical problems generated by the electrical system that supplies and controls them.

Fixing holes in the structure

The Drive Rollers do not have a through axis. The pins that support the bearings on the motor and idler side need to be fixed by roller support profiles that are perpendicular to the Drive Roller, solidly built and do not flex when the load passes.

In order to ensure that the pins are perpendicular to the support and that the nuts are tightened correctly on the pins, use closed support holes, not slots, open recesses or horizontal milling. To tighten the nuts and bolts, use a torque wrench and tighten to the torque setting given in the assembly instructions.

If there is no alternative but to use open recesses, add strong flat washers inside and outside the recess, that are fixed to the conveyor to recreate a rigid surface to provide the nuts and bolts with complete support. In order to determine C (internal abutting width of the shoulders) requested in the Drive Roller order, consider the thickness of any additional washers.

Assembly dimensions

During the Drive Roller design and assembly phase, check that the distance of the roller support shoulders is correct (dimension C of the Drive Roller), does not compress the pins inwards and does not release them to the outside, in order to avoid damaging the end housing and the gear motor cartridge.

To avoid this, the head on the standard M8 idler side and the pulley have an extractable pin for assembly with about 1-1.5 mm extraction in order to enable the Drive Roller to be fitted easily and to overcome any width tolerances of the supporting structure.

Warning: if Drive Rollers and driven rollers with Poly-V belts are used, make holes of max. 8.2 Ø (and max. 12.2 Ø on the cable side of the Drive Roller), to avoid excessive variation in the roller pitch and resulting pre-tensioning of the belts.

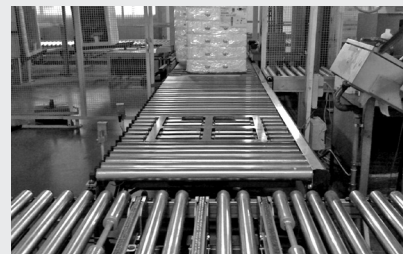
Warning: Never use Drive Rollers if there are mechanical stops with forced stop of the package whilst the Drive Roller is still running (to align the package against the stop). This would shorten the gearbox service life. In the case of a fractioned roller conveyor, make sure that you switch off the Drive Roller after accumulation of each unit is achieved.

Never move or push the packages on the roller conveyor by hand or with forklift trucks to force the movement of the Drive Roller. This would shorten the gearbox service life.

Health and safety and waste disposal

Using the Drive Roller does not exempt the customer from taking all the necessary precautions to ensure the safety of operators or workers who assemble and maintain the roller conveyors. Precautions must also be appropriate to type of transmission used.

It is customer's duty to install all the electrical and mechanical protections specified by the regulations in force in the country in which the conveyor is installed. It is the customer's responsibility to dispose of the Drive Roller properly when it comes to the end of its service life.



THE BL3 DRIVE ROLLER

Powerful, versatile and fast

The great reliability and performance of the brushless motor together with the versatility and enhanced speed and torque range of the brushless motor have brought you the brand new RDR BL3 model, a new concept in Drive Rollers. The excellent value for money and the low energy consumption make the RDR BL3 Drive Roller the ideal choice for customers who demand top performance.

The configuration flexibility of the Drive Roller enables it to be used in a wide range of conditions and for a wide range of workloads. The BL3 Drive Roller can be easily used in conveyors with:

- low-medium-high or fixed speeds, or speeds that can be varied;
- compact dimensions without external drives and transmission;
- constant high torque settings throughout the speed range;
- complex operating patterns, also with frequent start/stop cycles;
- optimized operating consumption;
- low operating noise levels;
- maximum safety for line operators.

RDR BL3 DRIVE ROLLER: TECHNICAL CHARACTERISTICS AND ADVANTAGES

- Optimized system for transmitting torque directly from the motor to the shell and to the pulley, without sliding or loss (Rulmeca patent).
- Control and drive electronics of the brushless motor built into the Drive Roller and protected from polarity reversal.
- Integrated diagnostic functions with current fault output signal.
- Controlled dynamic braking.
- Speed from 0.05 to 1.25 m/sec, with the different reduction ratios.
- Speed variation through analogue signal (2.5-10 V) or dip switch on external board (remote control of speed also possible).
- Smart thermal overload protection with (automatic) current limiting.
- Overload overcurrent protection (automatic).
- No current delivery or voltage peaks back on the power supply line during braking.
- Maximum safety because of low supply voltage (24 VDC).
- 5-pins connector for rapid connection of Drive Roller.

- Can be supplied without connector (by request).
- Also works without external BL3 Motion Control electronic board.
- Extra-short version and version for driving narrow conveyor belts are available.
- Use of Drive Roller also for friction roller conveyors (for accumulation with contact of the packages).
- Enhanced functions and protections with the external BL3 Motion Control electronic board (recommended).
- Can be interfaced directly with PLC and distributed logic systems (BUS).
- Reduced noise and vibrations.
- Ideal for replacing traditional gear motors drives.

Shell

- Standard tube: Ø 50 x 1.5 mm, electrolytic zinc plated.
- Tube Ø 50 x 1.5 galvanized Sendzimir.
- Tube Ø 50 x 1.5 AISI 304 stainless steel (can be supplied only with complete stainless steel version).
- Tube Ø 51 x 2.0 (reinforced), electrolytic zinc plated.
- Tube Ø 53 x 3.0 mm (extra thick), zinc plated, by request can be machined convex / crowned for belt guide.

SHELL OPTIONS

- Soft PVC or polyurethane lagging.
- Vulcanized rubber or polyurethane lagging with choice of thickness and degree of hardness.
- Surface heat treatments by request.
- Extra-short version: (enables the shell to be shortened below the minimum standard length).

N.B. The extra-short version may be slightly noisier.

Contact Rulmeca for explanations and for special versions.

Motor cartridge

- Command and control driver built into the motor cartridge.
- High performance 24VDC brushless motor.
- Planetary gearbox with sintered gears, permanently lubricated, with different reduction ratios.
- Available reduction ratios: 12:1, 16:1, 24:1, 36:1, 49:1, 64:1, 96:1.

- Connection cable length 600 mm, Halogen free and with cut-proof sheath, Rulmeca branded, with built-in 5-pin - M8 connector.

CABLE OPTIONS

- Motor cable length 500 mm as above, without connector, with exposed non-stripped wires.
- Extension cable length 500 mm with female M8 - 5 pin connector with exposed non-stripped wires.
- Extension cable length 2000 mm with M8 - 5 pins male and female connectors.
- Extension cable length 5000 mm with M8 - 5 pins male and female connectors.
- Splitter cable length 250 + 2 x 1000 mm with one male M8 - 5 pin connector + two female M8 - 5 pin connector.

Motion transmission system

The BL3 Drive Roller features an optimized system for transmitting motion between the motor and the roller (patented by Rulmeca), which directly connects the output shaft of the gearbox to the transmission head by a sturdy transmission shaft and anti-vibration joints.

The patented system ensures that the pulley or pinion is positively driven without using the roller shell as a transmission means. The patent avoids any loss of traction due to slippage of the pulleys throughout the life of the Drive Roller. The correct coupling of the pinion to the tube is made by the special groove done in the tube and the relative tooth on the pinion. The transmission is the before totally positive obtained by mechanical couplings.

Due to the use of the patented Rulmeca transmission system, (which connects the drive shaft to the pulley mechanically), in combination with the positive coupling pulley (which connects the pulley to the tube mechanically), the Drive Roller is totally free of possible transmission system slips generated by coupling obtained by loose interference of the parts.

Drive Head on cable side (IP54)

- Drive head with IP54 protection marking made of semi conductive antistatic technopolymer, with 6203-2RS bearing, with 11mm hexagonal male threaded pin, M12, pitch 1.75.

BL3 CONFIGURATIONS

PIN OPTIONS

- Standard in steel, electrolytic zinc plated.
- Stainless steel IP54 (supplied without connector).

BEARING OPTIONS

- Standard.
- Stainless steel (can be supplied only in the completely STAINLESS STEEL version without connector).

SCREWS OPTIONS

- Standard zinc plated.
- Stainless steel

Drive Head on side opposite to cable (IP54)

- Standard idler head with 6002-2RS bearing, zinc-plated floating pin M8-19.
- Poly-V pulley, PJ ISO 9981, DIN 7867 with 6002-2RS bearing, zinc plated floating pin.
- Poly-V pulley, PJ ISO 9981 DIN 7867 with 6002-2RS bearing, 625-2RS bearing 11 mm hex. springed zinc plated shaft.
- Poly-V pulley, PJ ISO 9981, DIN 7867 with 6002-2RS bearing, 625-2RS bearing Ø 8 mm fixed zinc plated shaft.
- Double O-ring Ø5 mm pulley with 6002-2RS bearing, zinc plated floating pin M8-19.
- Double O-ring Ø5 mm pulley with 6002-2RS bearing, 625-2RS bearing 11 mm hex springed zinc-plated shaft.
- Double O-ring Ø5 mm pulley with 6002-2RS bearing, 625-2RS bearing; Ø8 mm fixed zinc plated shaft.
- Frictioned double O-ring Ø5 mm pulley with 6002-2RS bearing, zinc-plated floating pin M8-19.
- Single/double chain sprocket 1/2" Z14, driven/frictioned 6002-2RS bearing, zinc plated floating pin M8-19.

PIN OPTIONS

- Standard zinc-plated
- Stainless steel

BEARING OPTIONS

- Standard
- Stainless steel

SCREWS

- Standard zinc-plated
- Stainless steel

Drive Roller fixing screws

The nuts and bolts required to assemble the BL3 Drive Roller are also supplied with the order - in zinc plated steel or in stainless steel for the complete STAINLESS-STEEL versions.

The floating pin on the drive head side, zinc plated, M8 female threaded, 19mm A/F, has an anti-extraction system (except for the standard idler head version). In all STAINLESS-STEEL versions, a STAINLESS-STEEL pin is supplied.

- ALL THE PROPOSED VERSIONS HAVE IP54 PROTECTION MARKING (in accordance with standard CEI EN 60529/1997).
- THE GREASE USED IN THE DRIVE ROLLER IN ALL THE ABOVE VERSIONS ARE NOT CERTIFIED FOR USE WITH FOODSTUFFS.
- THE DRIVE ROLLERS ARE NOT CERTIFIED FOR USE IN (ATEX) EXPLOSIVE ENVIRONMENTS.

Functions built into the RDR BL3 Drive Roller

- Speeds adjustable within the range set out in the motor tables below, depending on the reduction ratio.
- if the Drive Roller is used without any BL3 Motion Control electronic board, a 2.5-10 VDC voltage signal is used to adjust speed.
- if the Drive Roller is used with a BL3 Motion Control electronic board, speed is varied by the dip switches on the board or remotely in digital mode.
- Change of direction
- Acceleration and deceleration ramps controlled by electronic control of braking (dynamic brake).
- Static braking system with stationary package (the braking torque value depends on the reduction ratio).
- Can be connected directly to the PLC.
- Overload protection: when maximum current is reached, the Drive Roller stops and makes a total of 3 restart attempts before sending the fault signal that shuts down the motor.
- If you use the Drive Roller without a BL3 Motion Control electronic board, to reset the fault signal and restore operation, eliminate the cause of the fault and then reset the start signal.
- If you use the Drive Roller with a BL3 Motion Control electronic board, to reset the fault signal and restore operation, disconnect the power supply to the DC bus, eliminate the cause of the fault and then restore the power supply to the system.
- Thermal overload protection: when the

motor's temperature exceeds the safety threshold, the electronic board activates the used power limitation function without sending fault signals. The power limitation function resets automatically when the motor temperature returns within the acceptable range.

If the motor continues to overheat despite the limitation, the motor emits a fault signal and then after 60 seconds it cuts out. The Drive Roller restarts automatically once the operating temperature returns within the acceptable range.

- Protection against polarity reversal: the Drive Roller is protected against accidental connection errors of the supply polarity.
- The Drive Roller manages the current generated by the motor during slowing down of the packages (through inertia) by not supplying voltage that is potentially harmful to the devices connected to the power supply line (power supply units, boards, etc).



For instructions on the correct installation and use of the Drive Roller, download the technical manual of the BL3 from <http://rdr.rulmeca.com> or contact Rulmeca to receive a PDF copy.



TECHNICAL FEATURES

RDR BL3 DRIVE ROLLER

Dimensional data

| | |
|-----------------------|------------------|
| Standard tube [mm] | Ø50 x 1.5 |
| Alternative tube [mm] | Ø51 x 2, Ø53 x 3 |
| Maximum length C [mm] | 1500 |

Please refer to the possible configurations

Electrical data

| | |
|---------------------|-------------|
| Nominal voltage | 24 VDC |
| Power supply range | 18 - 26 VDC |
| No-load current | 0.8 A |
| Max. inrush current | 4.5 A |

Environmental conditions

| | |
|-------------------------------|--------------------------|
| Ambient operating temperature | -10 - +35 °C |
| Ambient storage temperature | -30 - +75 °C |
| Maximum humidity | 90% without condensation |

General technical data

| | |
|--|----------|
| Noise | 55 dB(A) |
| Theoretical average service life in nominal conditions | 15'000 h |
| Maximum static load on the Drive Roller: | |
| C ≤ 1000 mm | 110 daN |
| C ≥ 1000 mm to 1500 mm | 50 daN |

BL3 DRIVE ROLLERS PERFORMANCE

| Reduction ratio | Speed | | | | | | Nominal torque | Starting torque | Tangential force |
|-----------------|-------|------|-------|-----|------|-----|----------------|-----------------|------------------|
| | m/s | | m/min | | rpm | | | | |
| | Min | Max | Min | Max | Min | Max | | | |
| 12:1 | 0.03 | 1.25 | 1.8 | 75 | 11.6 | 484 | 0.9 | 1.0 | 36 |
| 16:1 | 0.02 | 1.00 | 1.2 | 60 | 7.7 | 387 | 1.15 | 1.3 | 46 |
| 24:1 | 0.02 | 0.67 | 1.2 | 40 | 7.7 | 258 | 1.75 | 1.95 | 70 |
| 36:1 | 0.01 | 0.45 | 0.6 | 27 | 3.8 | 172 | 2.6 | 2.9 | 104 |
| 49:1 | 0.01 | 0.33 | 0.6 | 20 | 3.8 | 126 | 3.2 | 3.6 | 128 |
| 64:1 | 0.01 | 0.25 | 0.6 | 15 | 3.8 | 97 | 4.2 | 4.7 | 166 |
| 96:1 | 0.005 | 0.16 | 0.3 | 10 | 1.9 | 65 | 6.3 | 7.0 | 252 |

The declared performance data refer to the Drive Roller with tube Ø 50 mm.

MINIMUM C LENGTH

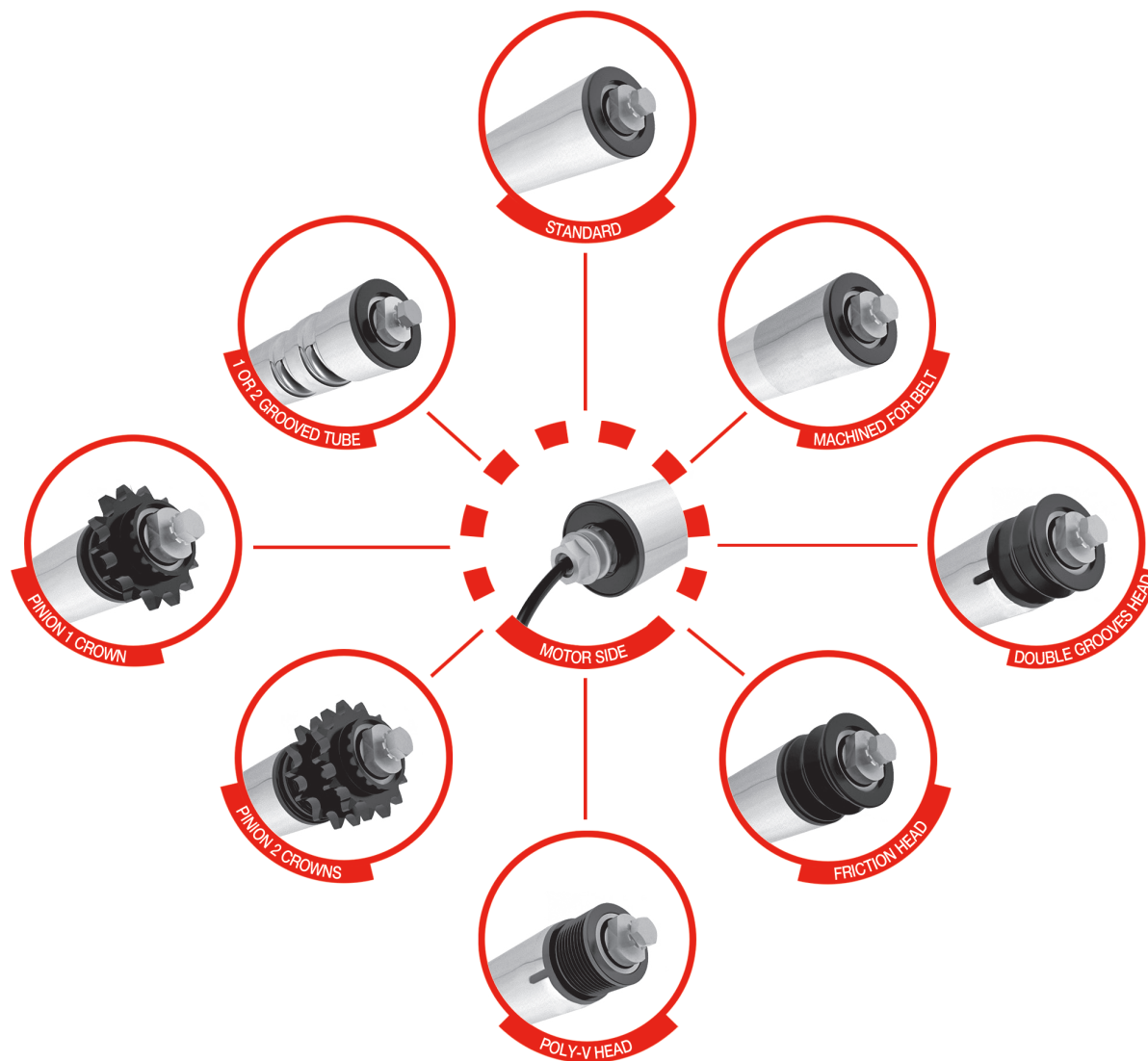
| Red. | Extra-short* version | | | | Standard version | | | | | | |
|------|-----------------------------|--------------------------------------|---------------------------------|--|--|-----------------------------|--------------------------------|--------------------------------------|---------------------------------|--|--|
| | Idler head standard version | Poly-V & double groove fixed pulleys | Frictioned double groove pulley | Single pinion 1/2" Z=14 motorized/frictioned | Double pinion 1/2" Z=14 motorized/frictioned | Idler head standard version | Idler head grooves on the tube | Poly-V & double groove fixed pulleys | Frictioned double groove pulley | Single pinion 1/2" Z=14 motorized/frictioned | Double pinion 1/2" Z=14 motorized/frictioned |
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 12:1 | 240 | 260 | 277 | 300 | 292 | 314 | 310 | 334 | 350 | 350 | 350 |
| 16:1 | 240 | 260 | 277 | 300 | 292 | 314 | 310 | 334 | 350 | 350 | 350 |
| 24:1 | 240 | 260 | 277 | 300 | 292 | 314 | 310 | 334 | 350 | 350 | 350 |
| 36:1 | 240 | 260 | 277 | 300 | 292 | 314 | 310 | 334 | 350 | 350 | 350 |
| 49:1 | 252 | 272 | 289 | 312 | 304 | 326 | 322 | 346 | 362 | 362 | 362 |
| 64:1 | 252 | 272 | 289 | 312 | 304 | 326 | 322 | 346 | 362 | 362 | 362 |
| 96:1 | 252 | 272 | 289 | 312 | 304 | 326 | 322 | 346 | 362 | 362 | 362 |

A Drive Roller C=500 mm long, weights approximately 2.8 kg, and with increase per cm of 0.026 kg/cm

* The length C of the Drive Roller in the extra short version is a fixed value and it is without grooves.

Warning: The extra short version of the Drive Rollers could be a little noisier.

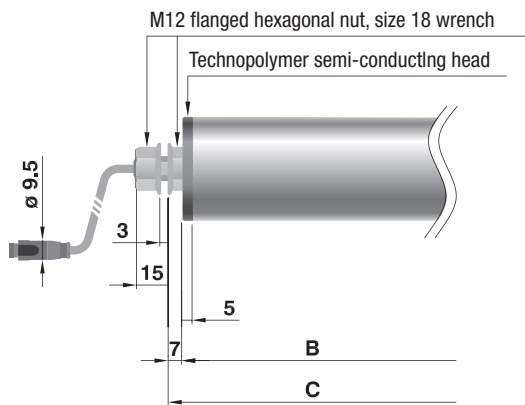
CABLESIDE (FOR ALL CONFIGURATIONS)



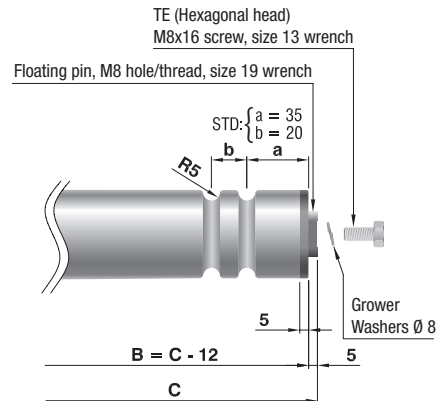
DRIVE POWER CONFIGURATION

| | Standard idler head | Grooved tube | Poly-V pulley head | Double grooves pulley head | Pinion for chain head | Tube machined for belt |
|--------------------------|---------------------|--------------|--------------------|----------------------------|-----------------------|------------------------|
| Floating Pin M8-19 | X | X | X | X | X | X |
| 11 mm hex springed shaft | | | X | X | | |
| Ø8 mm fixed shaft | | | X | X | | |

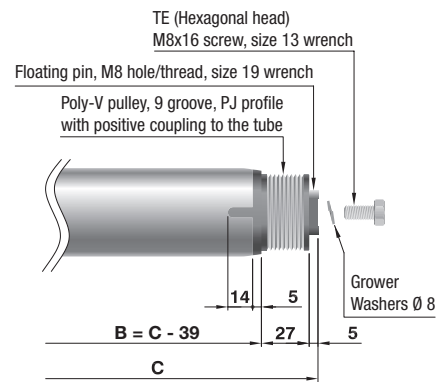
Cableside (for all configurations)



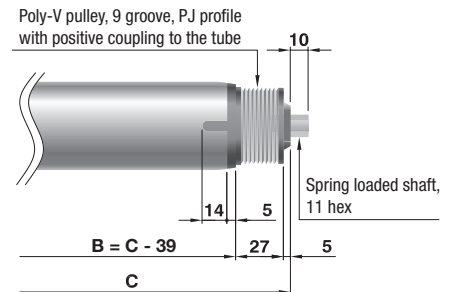
Standard, with or without double or single grooves on the tube



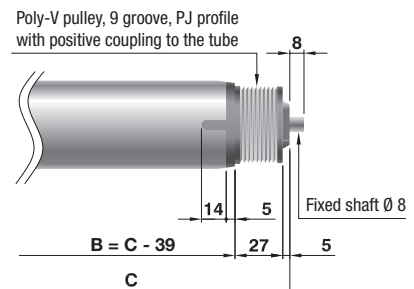
Poly-V head with positive coupling and floating pin



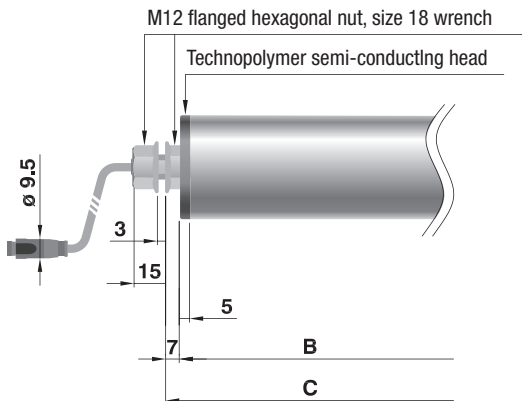
Poly-V head with positive coupling and 11 hex, spring loaded shaft



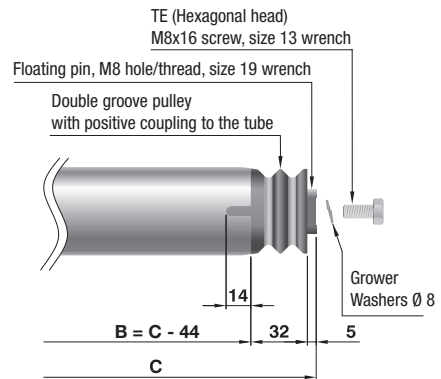
Poly-V head with positive coupling and fixed shaft



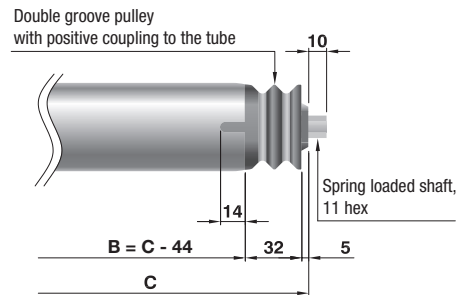
Cableside (for all configurations)



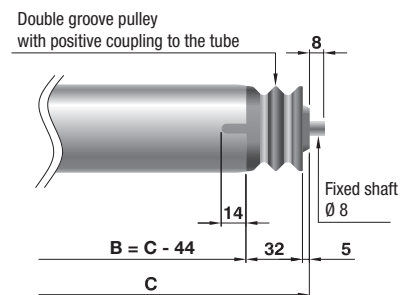
Double groove head with positive coupling and floating pin



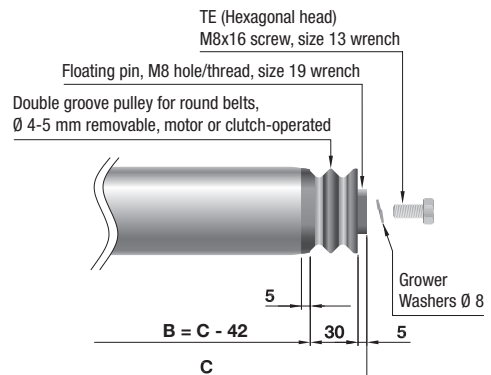
Double groove head with positive coupling and 11 hex, spring loaded shaft



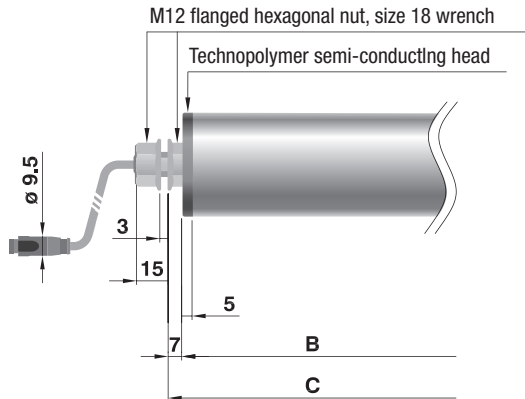
Double groove head with positive coupling and fixed shaft



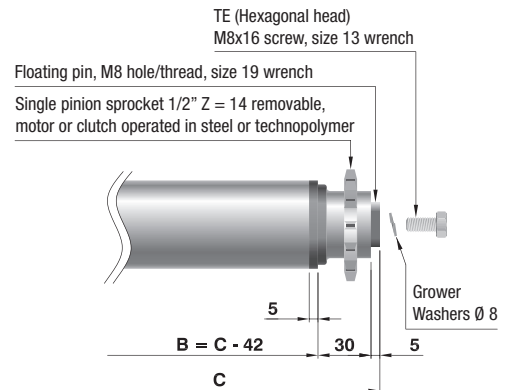
Frictioned double groove head and floating pin



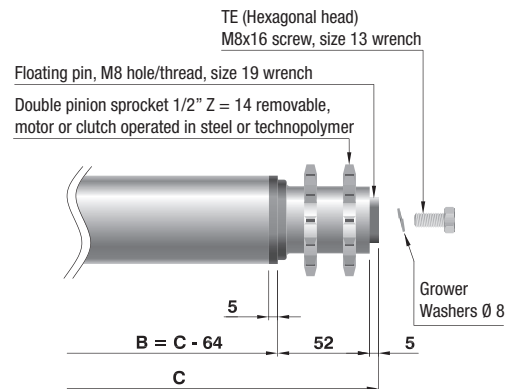
Cableside (for all configurations)



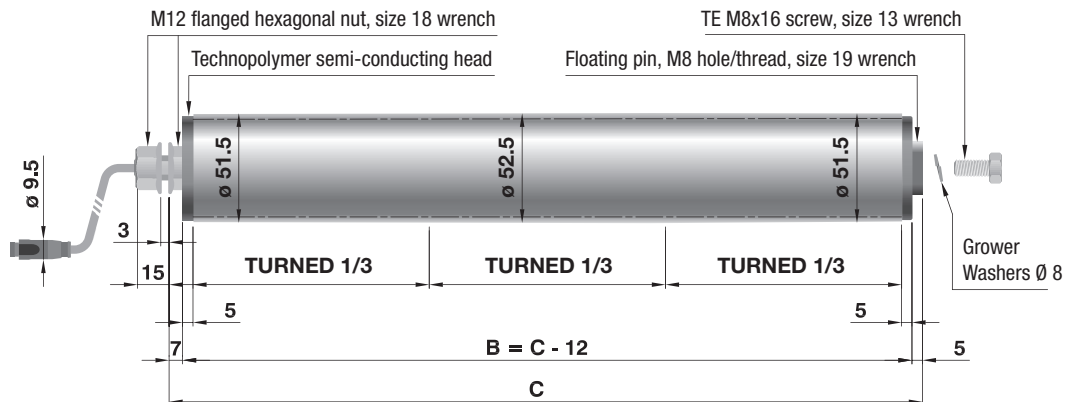
Chain single pinion with floating pin



Chain double pinion with floating pin



BELT VERSION



Examples of order code:

- BL3 Drive Roller with standard head, reduction ratio 36:1, tube 50x1.5 galvanized Sendzimir, C=600
Order Code: **RDR BL3 36 50Z 600**
- BL3 Drive Roller, fixed Poly-V pulley, reduction ratio 64:1, tube 51x2 galvanized electrolytic, C=1100
Order Code: **RDR BL3/PV 64 51J 1100**

For the complete code and further available options, see page at the end of this catalogue.

TAPERED DRIVE ROLLERS FOR CURVES

The Drive Rollers with a tapered shell that can be combined with tapered driven rollers to make curves, have fixed set lengths that are multiples of 50 mm, as shown in the table.

When placing the order, specify the tube version for the various lengths.

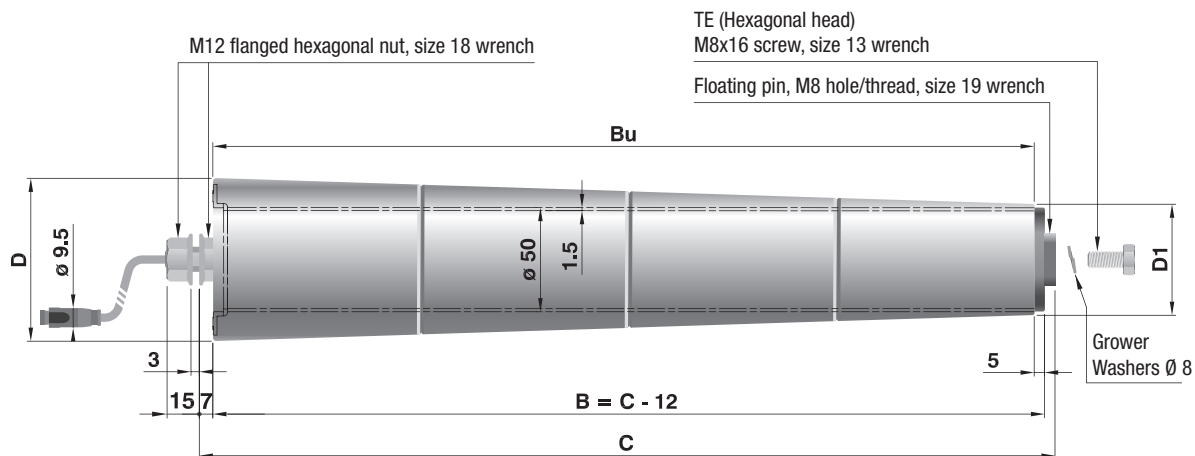
To choose the tapered KRO series Drive and Driven Rollers and the appropriate C values most suitable for the conveyor curve, when considering the conveyed package dimensions, see the specifications for the driven rollers in the chapter:

"KRO series Drive Rollers and tapered driven rollers".

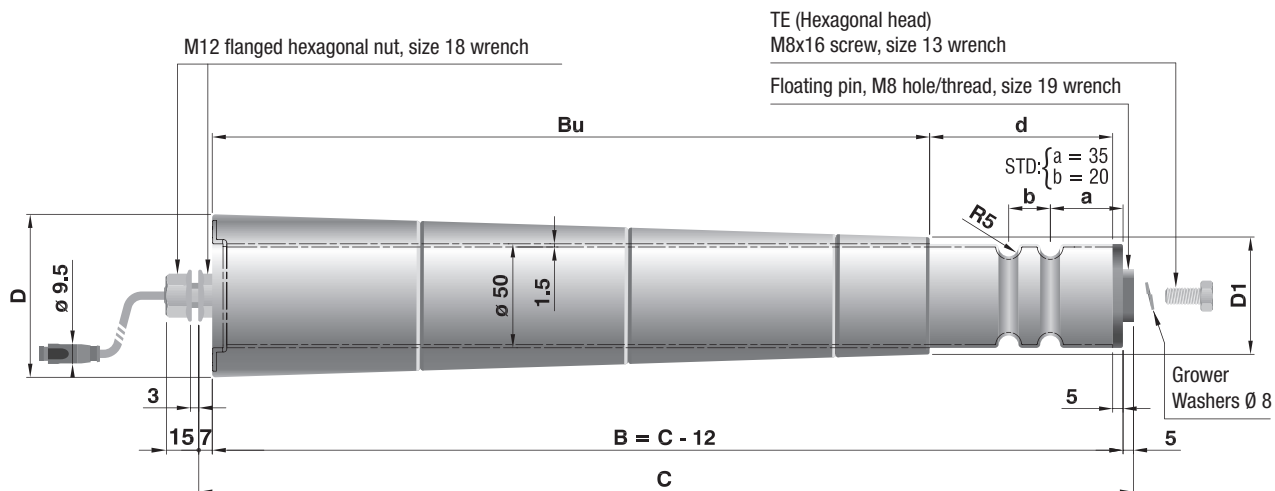
| Without grooves | Roller C length | | Length of tapered part Bu | Tube code |
|-----------------|----------------------------|-------------------------------------|---------------------------|-----------|
| | With 2 grooves on the tube | With Poly-V pulley or double groove | | |
| - | 350 | - | 245 | 71.FK |
| 312 | 400 | 350 | 295 | 72.FK |
| 362 | 450 | 400 | 345 | 77.FK |
| 412 | 500 | 450 | 395 | 78.FK |
| 462 | 550 | 500 | 445 | 84.FK |
| 512 | 600 | 550 | 495 | 85.FK |
| 562 | 650 | 600 | 545 | 90.FK |
| 612 | 700 | 650 | 595 | 91.FK |
| 662 | 750 | 700 | 645 | 96.FK |
| 712 | 800 | 750 | 695 | 97.FK |
| 762 | 850 | 800 | 745 | 103.FK |
| 812 | 900 | 850 | 795 | 104.FK |
| 862 | 950 | 900 | 845 | 109.FK |
| 912 | 1000 | 950 | 895 | 110.FK |

For values of larger diameter (D) and lower diameter (D1) of the tapered part and the curve internal radius (Ri), refer to the tables of the corresponding driven rollers.

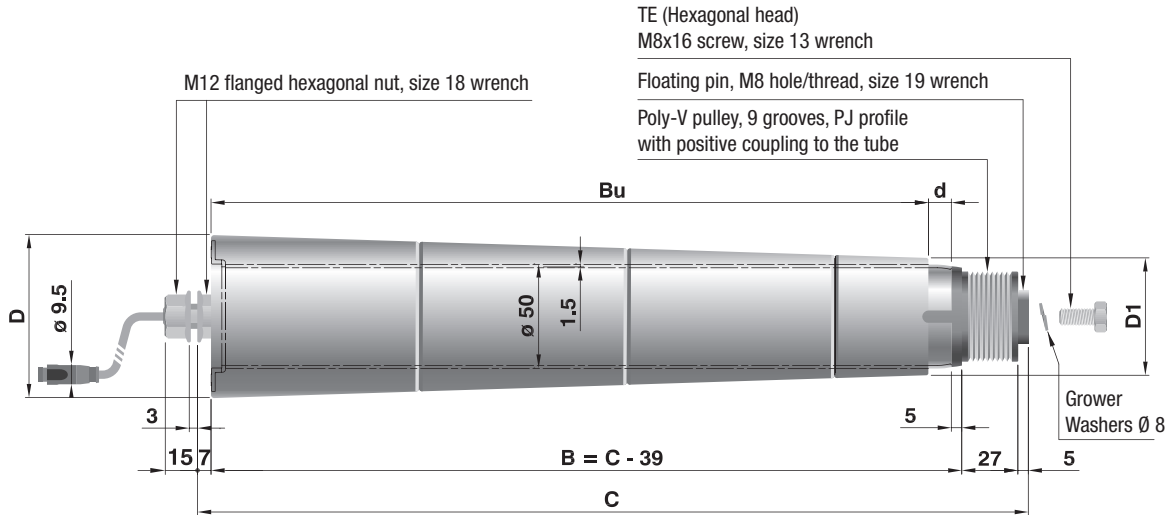
STANDARD WITH TAPERED SLEEVES



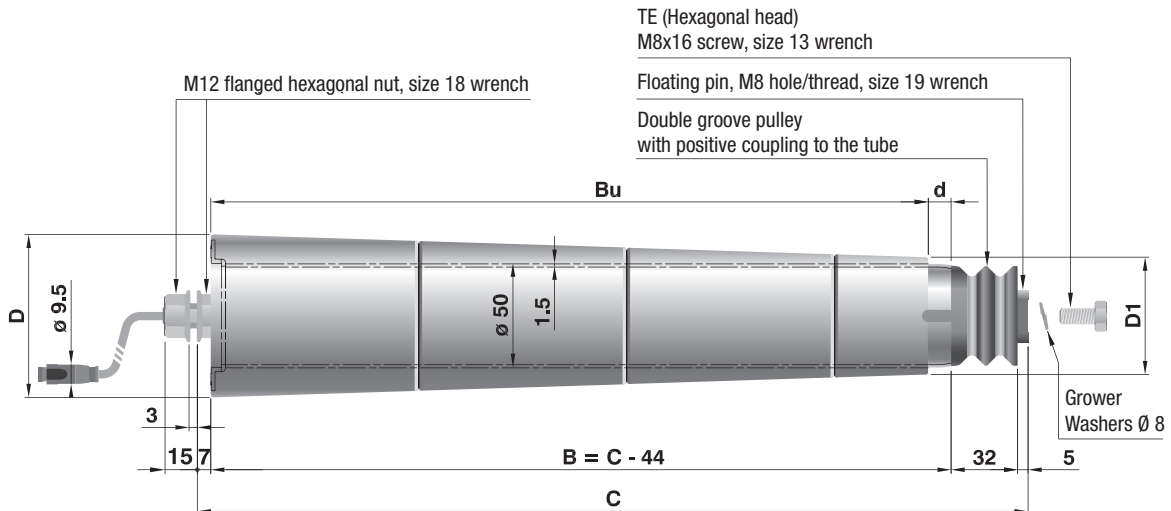
GROOVED TUBE AND TAPERED SLEEVES



POLY-V HEAD WITH POSITIVE COUPLING AND TAPERED SLEEVES



DOUBLE GROOVE HEAD WITH POSITIVE COUPLING AND TAPERED SLEEVES

**Examples of order code:**

- BL3 drive roller, standard head, with tapered sleeves, reduction ratio 36:1, tube 50x1.5, Sendzimir galvanized $\varnothing 97.6$, length $C=662$:
Order code: **RDR BL3 36 96ZK 662**
- BL3 drive roller, fixed Poly-V pulley, con tapered sleeves, reduction ratio 64:1, tube 50x1.5 galvanized Sendzimir, length $C=900$:
Order code: **RDR BL3/PV 64 109ZK 900**

For the complete code and further available options, see page at the end of this catalogue.

ELECTRICAL CONTROL OF THE RDR BL3 DRIVE ROLLER

For use without BL3 Motion Control board

Electrical control of the RDR BL3 Drive Roller

The BL3 Drive Roller does not necessarily need the external Motion Control electronic board (although it is strongly recommended). It can be connected directly to a PLC or to automation systems, or BUS, or be controlled by simple switches and potentiometers (the latter only for varying speed).

The Drive Roller is supplied with a standard multicore cable with 5 conductors, 600 mm in length, with 5-pin connector.

On request, the Drive Roller can be supplied without the connector, with the cable, with sheath and the individual 5 wires exposed at the end, but not stripped, with 570 mm cable length.

The Drive Roller, with built-in driver, offers the basic protections required against:

- Overcurrents
- Thermal overload
- 24 VDC inverted polarity

The available functions with a direct connection (without external Motion Control board), are:

- Motor power supply
- Start/stop (input)
- Speed variation (input)
- Change of direction (input)
- Fault signal (output)

Warning: the BL3 Drive Roller used without the Motion Control electronic board is not protected from voltage fluctuations or peaks (spikes) generated by inductive loads and propagated on the VDC power supply line and on the Input/output control signals.

The customer is responsible for providing a regulated constant VDC supply and appropriately filtering the sources of disturbs, (mainly generated by the disconnection of inductive loads) so that they do not damage the integrated electronics.

It is the customer's responsibility to fit the required fuses and short circuit protections on the power supply line.

Any faults due to these problems are not covered by the warranty if the external RMC BL3 board is not used.

Please refer to the Technical Manual at <http://rdr.rulmeca.com>.



CONNECTION OF THE BL3 DRIVE ROLLER

For use without BL3 Motion Control board

Connection of BL3 Drive Roller without connector

The BL3 Drive Roller with cable without connector (to be expressly requested), has a connecting cable ending in 5 exposed but not stripped wires of different colours. The chart below shows the colours and sections of the wires for the different functions:

Power supply: connect the RED power wire to positive pole and BLUE to negative pole of the 24 VDC power supply unit (better if of voltage controlled and filtered switching type) that is able to supply appropriate current to the maximum loads conveyed simultaneously.

Using the BL3 Motion Control electronic board

The connection cable of the BL3 Drive Roller consists of 5 wires that, in the standard version, is supplied already ending with the M8-5pin male connector.

The connector has been designed to be easily inserted through the supporting hole in the structure in which the Drive Roller's fixing pin \varnothing 12 mm has to be fixed. Insert the connector into the relative socket of the BL3 Motion Control electronic board.

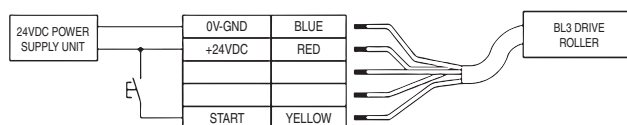
Please refer to the Technical Manual at <http://rdr.rulmeca.com>.



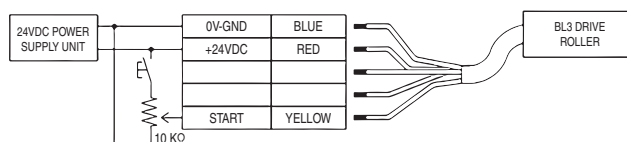
| Wire colour | Function | Wire section mm ² |
|-------------|-----------------------|------------------------------|
| Red | Supply +24 VDC | 0.34 |
| Blue | Supply 0V-GND | 0.34 |
| Yellow | Start- Speed | 0.14 |
| Green | Rotation direction | 0.14 |
| Black | Fault signal (output) | 0.14 |

CONNECTION OF THE BL3 DRIVE ROLLER (without BL3 Motion Control electronic board)

Start: to start the Drive Roller at maximum speed, once the fixed 24 VDC supply has been connected, supply 10 - 24 VDC to the YELLOW wire. In this way, the Drive Roller will reach its maximum speed (in the anticlockwise default direction, seen from the cable output side).



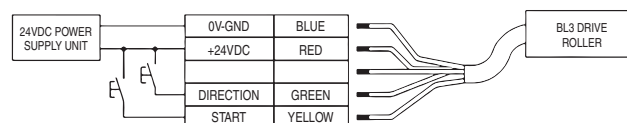
Speed variation (optional): to set an intermediate speed between minimum and maximum, send a signal between 2.5 and 10 VDC to the yellow wire (START). For this purpose, a 10 K Ω potentiometer (or a resistor of suitable value) can be connected between the RED wire and the YELLOW wire according to the wiring diagram by adjusting the speed you can also create acceleration and/or deceleration ramps, setting a variation in the reference voltage/speed over the desired time, using a PLC with analogue output voltage that can be varied by the program.



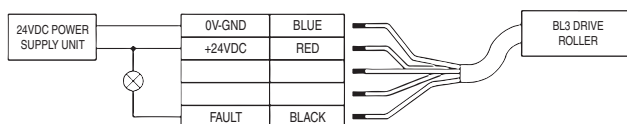
Rotation direction: the default rotation direction of the Drive Roller is anticlockwise (viewed from the cable output side). To reverse the rotation direction, connect a 10 to +24 VDC signal to the GREEN wire or directly to the positive supply pole.

Warning: before changing direction, make sure that the Drive Roller and the load are completely stationary to avoid damaging the reduction gear.

Warning: to start up the Drive Roller directly in the opposite direction of travel (clockwise), first supply the direction signal and only then start up the motor with the start signal.



Fault (alarm): if the motor is operating within the permitted temperature and current range, the output voltage on the BLACK cable is +24 VDC (referring to the positive Open-Collector output). In the event of an excessive internal temperature (>120°C), overcurrent or malfunction alarm, the signal voltage value on the BLACK cable falls to 0V (alarm logic). The fault signal can provide a maximum current of 15 mA.

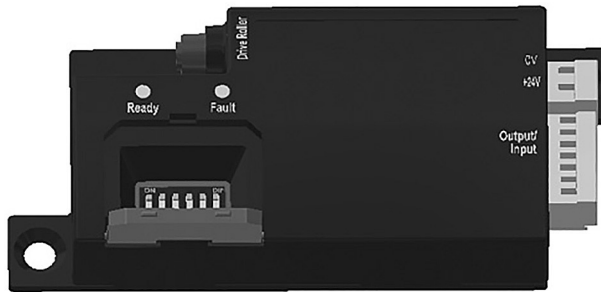


BUS systems. The RDR BL3 Drive Roller can be connected to BUS systems (like ASi BUS systems). Refer to the signals supplied by the BUS system chosen to control the Drive Roller.

The Technical Manual can be downloaded from <http://rdr.rulmeca.com>.

EXTERNAL BOARD

Rulmeca RMC-BL3 Motion Control



Features

Although the RDR BL3 Drive Roller can be operated directly without any need for an external electronic board (in the version with a cable without a connector), Rulmeca can supply and advise using an external electronic board. This will enhance the basic functions of the Drive Roller, making its control simple and protected, high performance, compact and inexpensive, avoiding terminal boxes and junction boxes that have to be installed by the customer.

The BL3 Motion Control boards facilitate the connection, running and electrical protection of the BL3 Drive Roller. The Motion Control board has a M8-5 pin socket to make installation of the Drive Roller easy and clean, ensuring fast and safe connection.

The board is also provided with terminal blocks that can be extracted with a tool-free fixing system so as to make cabling of the rest of the machine simpler.

Characteristics of the BL3 Motion Control board:

- Compact dimensions 114 x 50 x h23 mm.
- IP20 protection marking.
- System for fixing the board to the conveyor with 2 screws.
- Protected M8-5 pin socket for fast and safe connection of the BL3 Drive Roller.
- Extractable terminal blocks for power supply and command signals
- Microprocessor logic.
- Dip switches for rapid selection of the functions, protected by interlock
- Signal LED for immediate and intuitive detection of functions.

RMC board functions

- Drive Roller power supply, protected by fuse (not replaceable).
- Opto-isolation of Input/ Output signals.
- Change of rotation direction by dip switch or by remote control signal.
- Digital selection of the speed by dip switch or by 3 contacts on terminal block J2.
- Smart control of fault signal activation.
- Start-stop, speed, rotation direction and fault signal output can be managed remotely.

The contacts of the input/output signals are all opto-isolated so as to be able to connect the Motion Control board directly to possible PLCs or simple contacts, in complete safety.

The built-in fuse protects the Drive Roller effectively from overcurrents.

The customer is responsible for protecting the power supply line suitably from short circuits or disturbances. Please refer to the Technical Manual at <http://rdr.rulmeca.com>.



EXTERNAL BOARD

Rulmeca RMC-BL3 Motion Control

Motor protections

The Drive Roller is protected by the electronic board built into the motor that prevents damage to the motor from incorrect cabling and polarity reversal of the power supply.

The Motion Control electronic board enables the protections to be extended. It also protects the Drive Roller via a suitable fuse and opto-isolation of the I/O signals that ensures that the system is not harmed by spikes.

Warning: do not connect 230 or 400 VAC. Such a VAC supply would irreparably damage the board and the Drive Roller connected to it.

Status lamps

On the front of the board there are two lamps that give immediate visual information on the status of the Drive Roller.

LED READY (green)

- OFF
Main power supply (+24VDC) absent or incorrect
- STEADY BEAM
Main power supply (+24VDC) correct
- FLASHING
Drive Roller start command received and Drive Roller rotating

LED FAULT (red)

- OFF
No problem detected
- STEADY BEAM
Fuse inside tripped. Replace RMC.
- FLASHING
Drive Roller fault, incorrect motor cabling, Drive Roller alarm signal due to tripped overcurrent or thermal overload protection.

BOARD DIMENSIONS

mm 114 x 50 x h 23 (Max)

Electrical data

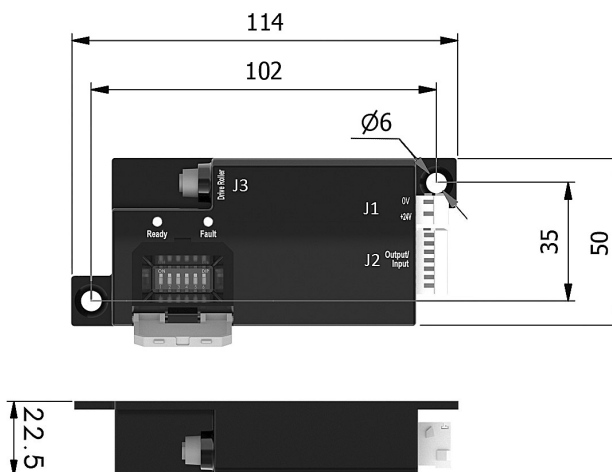
| | |
|---------------------|-------------|
| Nominal voltage | 24 VDC |
| Voltage Range | 20 - 26 VDC |
| No-load current | 0.03 A |
| Safety fuse | Present |
| Power supply ripple | Max 5 % |
| Protection level | IP 20 |

Environmental conditions

| | |
|----------------------------------|--------------|
| Ambient operating temperature | -10 - +45 °C |
| Ambient storage temperature | -20 - +75 °C |
| Maximum non- condensing humidity | 90% |

Electrical Connections

| | |
|-------------------------|----------------------------------|
| Power cable section | 1 mm ² |
| I/O power cable section | from 0.08 to 0.5 mm ² |



EXTERNAL BOARD

Rulmeca RMC-BL3 Motion Control

Setting functions by DIP SWITCH

From the front opening, the dip switches can be accessed to set:

- Speed (dip switches 2-3-4-5);
- Rotation direction (dip switch 1); dip switch 6 is not used.

If dip switches are used to set the Drive Roller's operating parameters, the electronic board must be connected in the following manner:

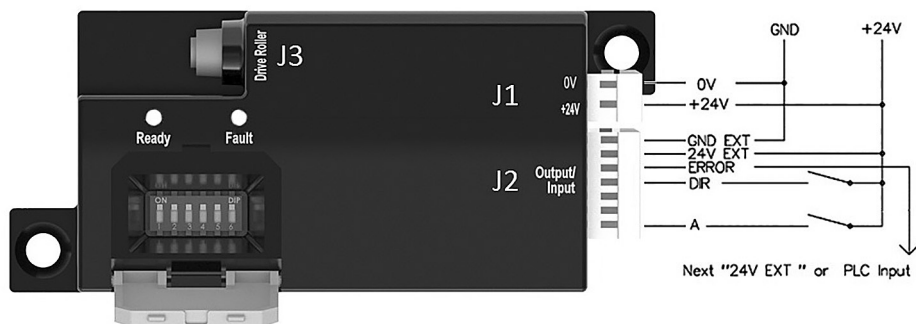
Contact A, when connected to the +24 VDC power supply, starts up the Drive Roller (in the anticlockwise default direction).

The DIR contact (optional), when connected to the +24 VDC power supply, changes the rotation direction of the Drive Roller to clockwise.

Warning: disconnect the power supply when wiring the board to the power supply and when connecting the Drive Roller to the Motion Control board.

Each setting (speed or rotation direction) should be carried out with the Drive Roller stationary.

Please refer to the Technical Manual at <http://rdr.rulmeca.com>.



EXTERNAL BOARD

Rulmeca RMC-BL3 Motion Control

DIP SWITCH settings

Speeds selectable from board

Use dip switches 2 - 3 - 4 - 5 to change the rotation speed of the BL3 Drive Roller.

See the table below for the speed values of the dip switch settings and the reduction ratio indicated in the Drive Roller specifications.

Direction

Through the dip-switch 1 it is possible to change the drive roller rotation direction from clockwise (off position) to counter clockwise (on position).

| Speed setting of the BL3 Drive Rollers with the dip switches on the Motion Control board | | | | Speed in relation to reduction ratio | | | | | | |
|--|-----|-----|-----|--------------------------------------|------|------|------|------|------|-------|
| | | | | m/s | | | | | | |
| 2 | 3 | 4 | 5 | 12:1 | 16:1 | 24:1 | 36:1 | 49:1 | 64:1 | 96:1 |
| on | on | on | on | 1.25 | 1.00 | 0.67 | 0.45 | 0.33 | 0.25 | 0.16 |
| on | on | on | off | 1.24 | 0.95 | 0.66 | 0.43 | 0.32 | 0.24 | 0.15 |
| on | on | off | on | 1.22 | 0.90 | 0.60 | 0.41 | 0.30 | 0.23 | 0.13 |
| on | on | off | off | 1.10 | 0.85 | 0.55 | 0.38 | 0.28 | 0.21 | 0.12 |
| on | off | on | on | 1.00 | 0.77 | 0.50 | 0.34 | 0.25 | 0.19 | 0.11 |
| on | off | on | off | 0.90 | 0.70 | 0.45 | 0.31 | 0.23 | 0.18 | 0.10 |
| on | off | off | on | 0.80 | 0.60 | 0.40 | 0.28 | 0.20 | 0.15 | 0.09 |
| on | off | off | off | 0.70 | 0.55 | 0.37 | 0.24 | 0.18 | 0.13 | 0.08 |
| off | on | on | on | 0.60 | 0.47 | 0.32 | 0.21 | 0.15 | 0.12 | 0.07 |
| off | on | on | off | 0.50 | 0.40 | 0.26 | 0.17 | 0.13 | 0.10 | 0.06 |
| off | on | off | on | 0.40 | 0.30 | 0.21 | 0.14 | 0.10 | 0.08 | 0.05 |
| off | on | off | off | 0.30 | 0.25 | 0.16 | 0.11 | 0.08 | 0.06 | 0.04 |
| off | off | on | on | 0.20 | 0.16 | 0.11 | 0.07 | 0.05 | 0.04 | 0.03 |
| off | off | on | off | 0.10 | 0.08 | 0.06 | 0.04 | 0.03 | 0.02 | 0.01 |
| off | off | off | on | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.006 |
| off | off | off | off | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.005 |

EXTERNAL BOARD

Rulmeca RMC-BL3 Motion Control

Setting functions remotely

The Motion Control electronic board is arranged to be remote controlled by sending the motor of the BL3 Drive Roller all the required signals.

The Drive Roller can be set remotely only if all the dip switches have been switched OFF.

The board has 3 sockets:

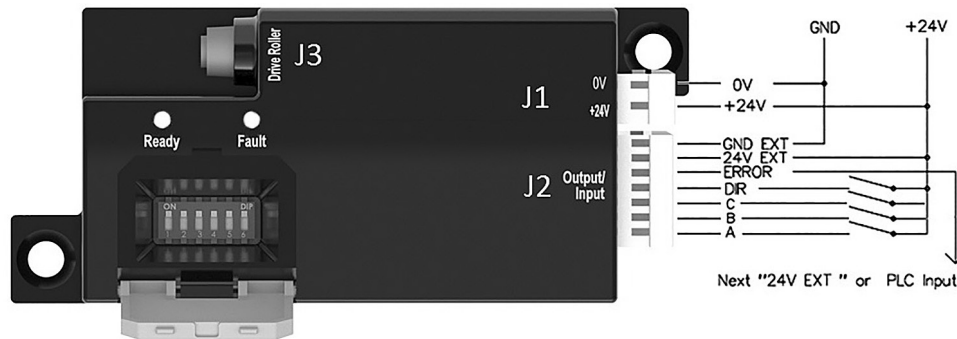
- J1: 2-core extractable terminal block to connect to the main power supply.

- J2: Extractable 7-core terminal block to connect the remote Input/Output.
- J3: 5-core socket for connecting the BL3 Drive Roller.

Warning: disconnect the power supply when wiring the board to the power supply and when connecting the Drive Roller to the Motion Control board.

For the remote control of the Drive Roller, connect the board as shown on the relative wiring diagram:

Please refer to the Technical Manual at <http://rdr.rulmeca.com>.



Selecting speeds remotely

Switch all dip switches to OFF if using contacts A-B-C of the terminal block J2 to vary drive roller rotation speed remotely.

Send 24 VDC signals to the combined contacts A-B-C to set the speed of the Drive Roller in accordance with the following table:

Selecting speed remotely (using a PLC) enables acceleration or deceleration ramps to be created by combining the three signals together.

| Setting speed dip switches on control board | | | Reduction ratio speed | | | | | | |
|---|-----|-----|-----------------------|------|------|------|------|------|------|
| | | | m/s | | | | | | |
| A | B | C | 12:1 | 16:1 | 24:1 | 36:1 | 49:1 | 64:1 | 96:1 |
| on | on | on | 1.25 | 1.00 | 0.67 | 0.45 | 0.33 | 0.25 | 0.16 |
| on | on | off | 1.22 | 0.92 | 0.63 | 0.41 | 0.30 | 0.23 | 0.15 |
| on | off | on | 1.00 | 0.77 | 0.52 | 0.34 | 0.25 | 0.19 | 0.13 |
| on | off | off | 0.80 | 0.62 | 0.41 | 0.28 | 0.20 | 0.15 | 0.10 |
| off | on | on | 0.63 | 0.47 | 0.32 | 0.21 | 0.15 | 0.12 | 0.08 |
| off | on | off | 0.41 | 0.31 | 0.21 | 0.14 | 0.10 | 0.08 | 0.05 |
| off | off | on | 0.20 | 0.16 | 0.11 | 0.07 | 0.05 | 0.04 | 0.03 |



DRIVEN ROLLERS

117 Series



Idler rollers for conveying packages with light and medium loads, in indoor environments with grooves for transmission with round belts.

They are very versatile rollers with great scope that run particularly smoothly and silently. The bearings are housed in black polyamide seats; with radial precision bearings, 6002-2RZ as standard, or permanently lubricated stainless steel bearings. They are protected by a RAL 1023 yellow polypropylene cover.

The drilled and threaded shaft for fixing with screws makes the assembly more rigid and sturdier.

The tube can be zinc plated or galvanized steel, or stainless steel, D 50, 1.5 mm thick,

with 2 grooves formed into tube for transmission with round belts.

This particular form of polymer housing, the precision of the assembly and the type of bearing used make these rollers particularly strong, with excellent performance in driven and belt applications.

Use is normally permitted for ambient temperatures between -5° C to +80° C. Lower minimum temperatures are permitted if conditions of use are checked.

We advise you to use the standard specifications and lengths. Rollers with grooves for transmission with round belts are supplied as standard in the antistatic version. The belts must have a section of ø 4-5 mm.

| Order code | | | | | | | | | | | Weight | | Weight of rotating parts | | Options | |
|------------|-------|-------|------|-------|----------|------|---|----|----|---|-----------|------------|--------------------------|------------|--------------|------------|
| Type | Shaft | | Tube | | Length C | | f | a | b | R | C=200 daN | Per cm daN | C=200 daN | Per cm daN | Vers. per cm | Vers. Tube |
| | d(ø) | vers. | d(ø) | vers. | min. | max | | | | | | | | | | |
| 117/12 | 12 | R | 50 | Z | 70 | 1600 | 5 | 35 | 20 | 5 | 0.630 | 0.027 | 0.432 | 0.018 | daN | N-J-I-P |

N.B. Please remember that rollers lagged with PVC or rubber are not antistatic. The user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the rollers.

Legend of version acronyms:

R Shaft, bored and threaded

D Shaft with spring

J Shaft, electro-zinc plated

I Shaft, AISI 304 stainless steel

Z Tube, galvanized Sendzimir

J Tube, electro-zinc plated

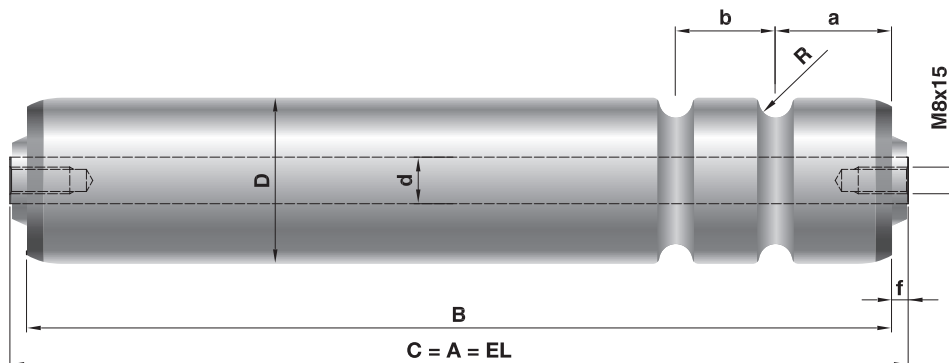
N Tube, normal steel

I Tube, AISI 304 stainless steel

P Lagged with soft PVC sheath

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



DRIVEN ROLLERS

135/138 series



Friction and fixed driven rollers with pulley for flexible Poly-V belts.

These rollers have general characteristics corresponding to those of the 135 (driven) series and of the 138 (friction-operated) series but with interchangeable pulleys instead of toothed pinions. The pulleys are black polyamide with 9 V-profile grooves, pitch J (ISO 9981 DIN 7867), stabilized and particularly hard-wearing and suitable for heavy duty. The pulley accepts belts with up to 4 ribs (with a free groove interposed between the two belts)

The rollers feature 6002-2RZ precision radial bearings or stainless-steel bearings on request. They are available in the galvanized steel tube version or by request in

the AISI 304 stainless steel version or other versions that are equivalent to the Drive Rollers. Use is normally permitted for ambient temperatures between -5°C to $+80^{\circ}\text{C}$. Never connect more than 20 rollers to any one motor. The maximum number of rollers is influenced by the torque that can be dispensed by the Drive Roller.

The antistatic version of these rollers must always be requested.

Remember that rollers lagged with PVC or polyurethane will not be antistatic. In this case, the user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the rollers.

| Type | Shaft | | Tube | | Length C | | s | Weight | | Weight of rotating parts | | Options | |
|--------|-------|-------|------|-------|----------|------|-----|-----------|------------|--------------------------|------------|--------------|--------------|
| | d(ø) | vers. | d(ø) | vers. | min. | max | | C=200 daN | Per cm daN | C=200 daN | Per cm daN | Vers. per cm | Version Tube |
| 135/V1 | 14 | R | 50 | Z | 130 | 1600 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |
| 138/V1 | 14 | R | 50 | Z | 130 | 1200 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |

N.B. for clutch- operated rollers, do not exceed a speed of 0.5 m/s.

On request: antistatic version (COMPULSORY), version with AISI 440 stainless steel bearings. Versions with PVC sheath or other types of lagging reduce the thrust capacity of the clutch-operated rollers.

Legend of version acronyms:

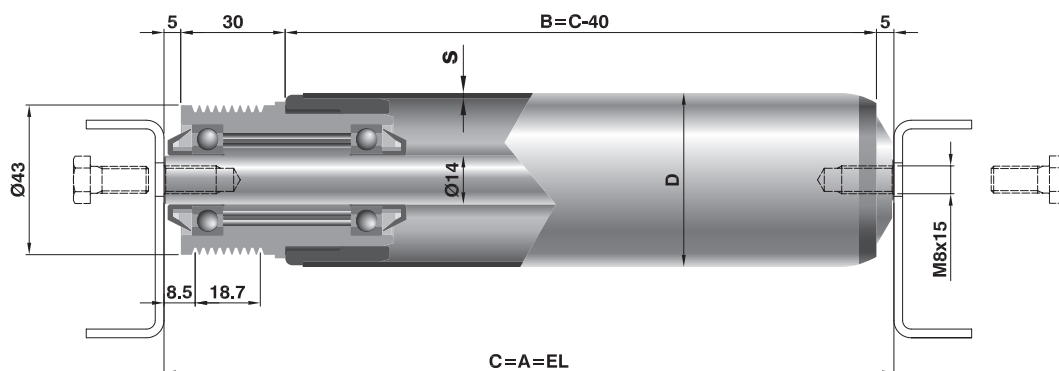
- R** Shaft, bored and threaded
- J** Shaft, electro-zinc plated
- I** Shaft, AISI 304 stainless steel

Z Tube, Sendzimir galvanized

- J** Tube, electro-zinc plated
- N** Tube, normal steel
- I** Tube, AISI 304 stainless steel
- P** Lagged with soft PVC sheath

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



DRIVEN ROLLERS

135/138 series



Friction and fixed driven rollers with double groove pulley for round belts

These rollers have general characteristics corresponding to those of the 135 (driven) series and of the 138 (friction-operated) series, but with interchangeable pulleys instead of the toothed pinions.

The black polyamide pulleys with 2 grooves for round belts measuring \varnothing 4-5 mm have been stabilized and are particularly hard-wearing and suitable for heavy duty. The rollers are supplied with 6002-2RZ precision radial bearings as standard, or stainless-steel bearings on request. They are available

in the galvanized steel tube version or by request in the AISI 304 stainless steel version. Use is normally permitted for ambient temperatures between -5° C and $+80^{\circ}$ C. Performance depends on the characteristics, brand and type of belt used.

The antistatic version of these rollers must always be requested.

Remember that rollers lagged with PVC or polyurethane will not be antistatic. In such cases, the user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the rollers.

| Type | Order code | | | | Length C | | s | Weight | | Weight of rotating parts | | Options | |
|--------|--------------------|-------|--------------------|-------|----------|------|-----|-----------|------------|--------------------------|------------|--------------|------------|
| | Shaft | | Tube | | | | | C=200 daN | Per cm daN | C=200 daN | Per cm daN | Vers. per cm | Vers. Tube |
| | d(\varnothing) | vers. | d(\varnothing) | vers. | min. | max. | | | | | | | |
| 135/F1 | 14 | R | 50 | Z | 130 | 1600 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |
| 138/F1 | 14 | R | 50 | Z | 130 | 1200 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |

N.B. for clutch-operated rollers, do not exceed a speed of 0.5 m/s.

On request: antistatic version (COMPULSORY), version with AISI 440 stainless steel bearings. Versions with PVC sheath or other types of lagging reduce the thrust capacity of the clutch-operated rollers.

Legend of version acronyms:

- R** Shaft, bored and threaded
- J** Shaft, electro-zinc plated
- I** Shaft, AISI 304 stainless steel

- Z** Tube, Sendzimir galvanized

- J** Tube, electro-zinc plated

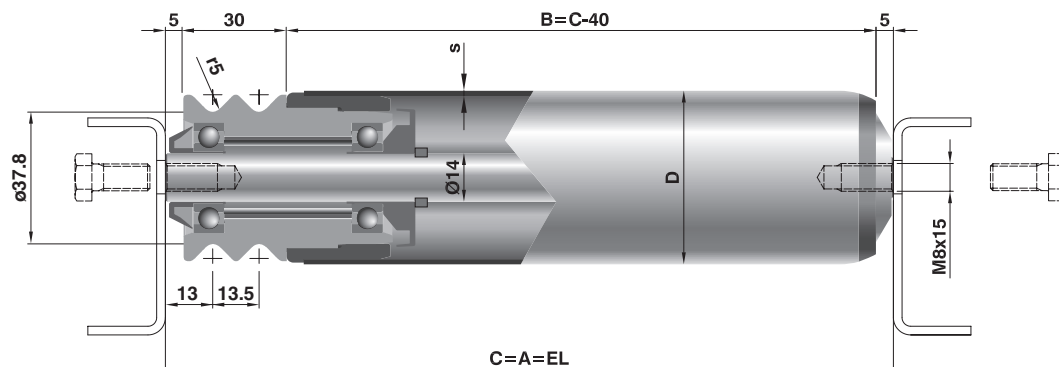
- N** Tube, normal steel

- I** Tube, AISI 304 stainless steel

- P** Tube lagged with soft PVC

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



DRIVEN ROLLERS

135/138 series



Friction and fixed driven rollers with P2C pinion for light and medium loads

These rollers of the 135 (Driven) series and of the 138 (Friction-operated) series are interchangeable and are intended for use in RDR Drive Rollers for transmission to chain rings, with P2C pinion 2 crown sprockets, $\frac{1}{2}$ ", Z=14. The pinions are made of black polyamide, that have been stabilized and are particularly hard-wearing and suitable for heavy duty, locked with a particular snap-in system into the element interposed at the end of the tube. 6002-2RZ radial precision bearings are supplied standard, or permanently lubricated stainless steel bearings. can be supplied. The bored and threaded shaft for fixing with screws makes the assembly rigid and more sturdier. The

tube can be galvanized steel or stainless steel, \varnothing 50, 1.5 mm thick. The package conveying speed can reach 1 m/s for driven rollers but the recommended maximum speed for friction-operated rollers is 0.5 m/s in order to limit prolonged accumulation time. Use is normally permitted for ambient temperatures between -5° C and $+80^{\circ}$ C for the driven rollers and -5° C to $+40^{\circ}$ C for the clutch-operated rollers. The anti-static version of these rollers must always be requested.

Remember that rollers lagged with PVC or polyurethane will not be antistatic. In this case, the user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the rollers.

| Order code | | | | | | | p | Z | Dp | s | Weight | | Weight of rotating parts | | Options | |
|------------|--------------------|-------|--------------------|-------|----------|------|------|----|-------|-----|-----------|------------|--------------------------|------------|--------------|---------------|
| Type | Shaft | | Tube | | Length C | | | | | | C=200 daN | Per cm daN | C=200 daN | Per cm daN | Vers. per cm | Vers. on Tube |
| | d(\varnothing) | vers. | d(\varnothing) | vers. | min. | max | | | | | | | | | | |
| 135/S3 | 14 | R | 50 | Z | 130 | 1600 | 1/2" | 14 | 57.07 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |
| 138/S3 | 14 | R | 50 | Z | 130 | 1200 | 1/2" | 14 | 57.07 | 1.5 | 0.721 | 0.030 | 0.452 | 0.018 | J-I | J-N-I-P |

On request: antistatic version (COMPULSORY), version with AISI 440 stainless steel bearings

Versions with PVC sheath or other types of lagging reduce the thrust capacity of the clutch-operated rollers.

Legend of version acronyms:

R Shaft, bored and threaded

J Shaft, electro-zinc plated

I Shaft, AISI 304 stainless steel

Z Tube, Sendzimir galvanized

J Tube, electro-zinc plated

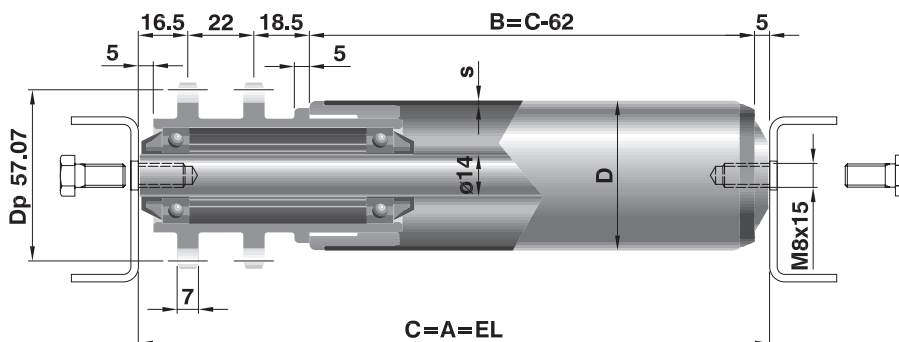
N Tube, normal steel

I Tube, AISI 304 stainless steel

P Lagged with soft PVC sheath

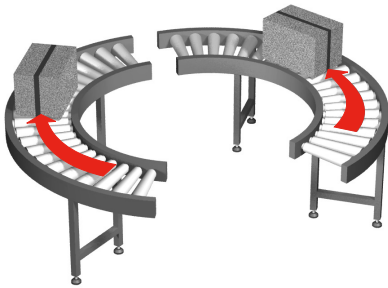
LOAD CAPACITY

For load capacity refer to the Drive Roller general data calculating 110 daN for length "C" as 1000 mm, 50 daN for length "C" as 1500 mm.



DRIVE ROLLERS AND TAPERED DRIVEN ROLLERS

KRO series

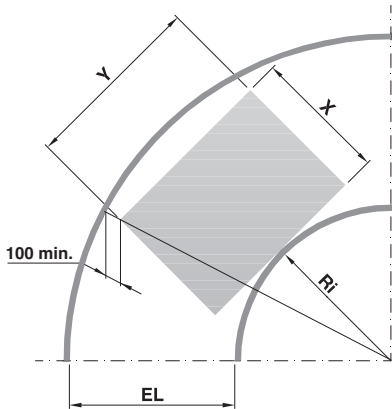


Choosing roller with curved sections

When choosing the type of roller, remember:

$$P_c \geq P$$

Also check the suitability for the environmental conditions (dust, humidity, corrosion, hygiene, etc.) and whether the thickness of the tube will withstand shocks and concentrated loads, taking into consideration that the use of rollers with greater diameter but the same size of bearing can reduce thrust force.



Roller length

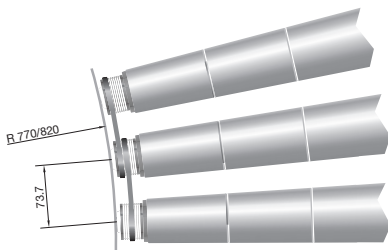
Tapered rollers should be used to make curves because they ensure flow and regular forward travel of the packages, avoiding as far as possible skidding provided that design criteria are complied with (internal radius, maximum pitch and angle between the rollers and the horizontal position (of the

upper surface of the rollers). The length of the rollers and thus the width of the conveyor on a curve is determined by the maximum dimensions of the packages:

$$C = X + 100 \text{ min.}$$

$$EL = C \text{ with ends fastened with screws.}$$

$$EL = \sqrt{(R_i + X)^2 + (Y/2)^2} - R_i + 100 \text{ min.}$$



To transmit motion from the tapered drive rollers to the tapered driven rollers, use only the Poly-V BELT-2PJ-75 (the reference number PJ286 is displayed on the belt).

TAPERED DRIVEN ROLLERS

KRO series



Tapered rollers with grooves for transmission with round belts

They are obtained by fitting grey polypropylene tapered sleeves to the base roller with a 50 Ø galvanized tube. In the protruding part with a smaller diameter, 2 grooves are made in the steel tube for transmission with round belts measuring 4-5 mm Ø. The general characteristics are the same as for the KRO series (roller base 117), except for the different configuration of the cones.

The rollers are fitted with 6002 2RZ precision radial bearings and are supplied in the antistatic version (except for the polypropylene cones).

Use is normally permitted for ambient temperatures between 0° C and +50° C. They are available in length "B" in multiples of 50 only in the sizes indicated in the table below.

| Type | Shaft | | Tube | | Length C | Base roller | Length Bu | D (ø) | D (ø) | Ri | Total weight daN |
|--------|-------|---------|------|---------|----------|-------------|-----------|-------|-------|-----|------------------|
| | d(ø) | version | d(ø) | version | | | | | | | |
| KRO/F2 | 12 | R | ZFK | 65 | 300 | KRO-117 | 195 | 65.6 | 52.5 | 720 | 0.98 |
| | | | | 71 | 350 | | 245 | 72.0 | 55.8 | 770 | 1.16 |
| | | | | 72 | 400 | | 295 | 72.0 | 52.5 | 720 | 1.32 |
| | | | | 77 | 450 | | 345 | 78.5 | 55.8 | 770 | 1.53 |
| | | | | 78 | 500 | | 395 | 78.5 | 52.5 | 720 | 1.69 |
| | | | | 84 | 550 | | 445 | 85.0 | 55.8 | 770 | 1.91 |
| | | | | 85 | 600 | | 495 | 85.0 | 52.5 | 720 | 2.07 |
| | | | | 90 | 650 | | 545 | 91.3 | 55.8 | 770 | 2.31 |
| | | | | 91 | 700 | | 595 | 91.3 | 52.5 | 720 | 2.47 |
| | | | | 96 | 750 | | 645 | 97.6 | 55.8 | 770 | 2.72 |
| | | | | 97 | 800 | | 695 | 97.6 | 52.5 | 720 | 2.89 |
| | | | | 103 | 850 | | 745 | 104.0 | 55.8 | 770 | 3.16 |
| | | | | 104 | 900 | | 795 | 104.0 | 52.5 | 720 | 3.33 |
| | | | | 109 | 950 | | 845 | 110.3 | 55.8 | 770 | 3.62 |
| | | | | 110 | 1000 | | 895 | 110.3 | 52.5 | 720 | 3.78 |

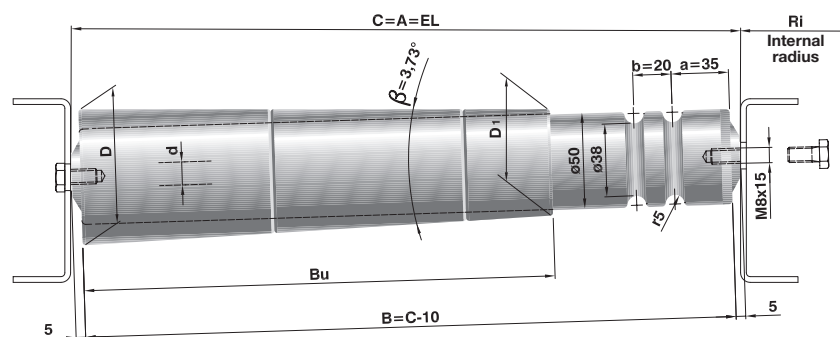
N.B: the user must remove or at least avoid the generation of static electricity on the packages and on the surface of the tapered sleeves by fitting appropriate additional conductive devices.

Legend of version acronyms:

- R Shaft, bored and threaded
- Z Tube, sendzimir galvanized
- K Propylene tapered sleeves
- F Tube with 2 grooves for round belts

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



TAPERED DRIVEN ROLLERS

KRO series



Driven tapered rollers with fixed pulley for transmission with flexible Poly-V belts.

These rollers have an innovative transmission system, are ideal for making curves in the conveying lines for packages, and are obtained by fitting polypropylene tapered sleeves.

The V pulley, 9 grooves, pitch J, (ISO 9982 DIN 7867), is snap-fitted on the side with a smaller diameter into the coupling head.

Transmission is only with Poly-V belt rings in the very flexible 2-rib version, for a roller

pitch within the curve, $l=73.7$ mm, BELT TYPE 2P J-75.

The number of Drive Rollers that can be used for each 90° section can be defined by analysing the application.

The pulley is made of black polyamide whereas the general characteristics are the same as those of the KRO series (base roller 135). The rollers are provided with precision radial bearings with the serial number 6002-2RZ.

The antistatic version of these rollers must be requested (apart from the cones).

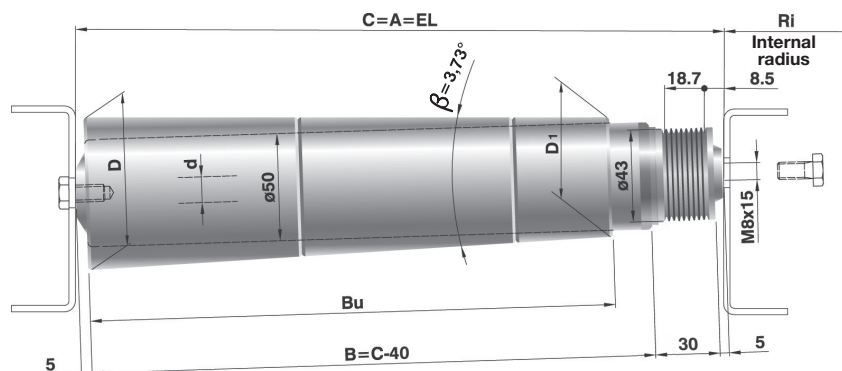
| Type | Shaft | | Tube | | Length C | Base roller | Length Bu | D (ø) | D (ø) | Ri | Total weight daN |
|--------|-------|-------|------|-------|-------------|-------------|--------------|-------|-------|-----|---------------------|
| | d(ø) | vers. | d(ø) | vers. | | | | | | | |
| KRO/VM | 14 | R | ZK | | 350 | KRO-135 | 295 | 72.0 | 52.5 | 770 | 1.42 |
| | | | | | 400 | | 345 | 78.5 | 55.8 | 820 | 1.54 |
| | | | | | 450 | | 395 | 78.5 | 52.5 | 770 | 1.69 |
| | | | | | 500 | | 445 | 85.0 | 55.8 | 820 | 1.81 |
| | | | | | 550 | | 495 | 85.0 | 52.5 | 770 | 1.97 |
| | | | | | 600 | | 545 | 91.3 | 55.8 | 820 | 2.04 |
| | | | | | 650 | | 595 | 91.3 | 52.5 | 770 | 2.26 |
| | | | | | 700 | | 645 | 97.6 | 55.8 | 820 | 2.38 |
| | | | | | 750 | | 695 | 97.6 | 52.5 | 770 | 2.58 |
| | | | | | 800 | | 745 | 104.0 | 55.8 | 820 | 2.70 |
| | | | | | 850 | | 795 | 104.0 | 52.5 | 770 | 2.97 |
| | | | | | 900 | | 845 | 110.3 | 55.8 | 820 | 3.03 |
| | | | | | 950 | | 895 | 110.3 | 52.5 | 770 | 3.26 |

N.B: the user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the tapered sleeves.

Legend of version acronyms:
R Shaft, bored and threaded
Z Tube, sendzimir galvanized
K Propylene tapered sleeves

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



TAPERED DRIVEN ROLLERS

KRO series



Driven tapered rollers with double groove pulley for transmission with round belts
The innovative transmission system using a round belt positioned to the side of the roller is ideal for making curves in conveyor lines for light and medium-weight packages. These rollers have a pulley housing the round belt transmission system and obtained by fitting polypropylene tapered sleeves. The pulley with 2 grooves for transmission of round belts measuring 4-5 mm Ø is snap-fitted into the coupling head of the base roller.

A 90° curve can provide rollers connected together by round belts to a minimum of 2 Drive Rollers.

The pulley is made of black polyamide whereas the general characteristics are the same as those of the KRO series (roller base 135). The rollers feature 6002-2RZ precision radial bearings.

The antistatic version of these rollers must be requested (apart from the cones).

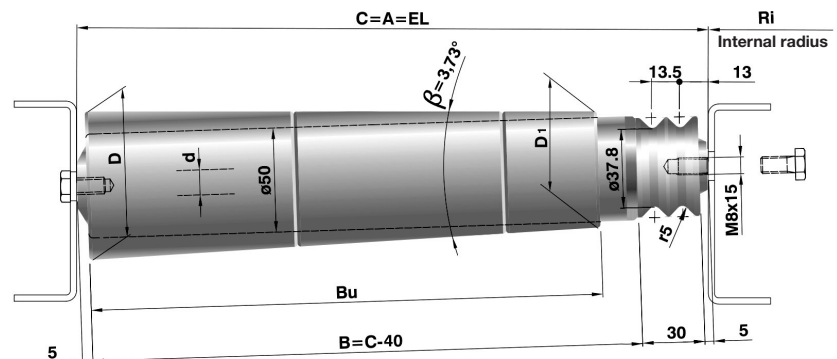
| Type | Order code | | | | Length C | Base roller | Length Bu | D (ø) | D (ø) | Ri | Total weight daN |
|--------|------------|-------|------|-------|----------|-------------|-----------|-------|-------|-----|------------------|
| | Shaft | | Tube | | | | | | | | |
| | d(ø) | vers. | d(ø) | vers. | | | | | | | |
| KRO/FM | 14 | R | ZK | 72 | 350 | KRO-135 | 295 | 72.0 | 52.5 | 770 | 1.42 |
| | | | | 77 | 400 | | 345 | 78.5 | 55.6 | 820 | 1.54 |
| | | | | 78 | 450 | | 395 | 78.5 | 52.5 | 770 | 1.69 |
| | | | | 84 | 500 | | 445 | 85.0 | 55.6 | 820 | 1.81 |
| | | | | 85 | 550 | | 495 | 85.0 | 52.5 | 770 | 1.97 |
| | | | | 90 | 600 | | 545 | 91.3 | 55.6 | 820 | 2.04 |
| | | | | 91 | 650 | | 595 | 91.3 | 52.5 | 770 | 2.26 |
| | | | | 96 | 700 | | 645 | 97.6 | 55.6 | 820 | 2.38 |
| | | | | 97 | 750 | | 695 | 97.6 | 52.5 | 770 | 2.58 |
| | | | | 103 | 800 | | 745 | 104.0 | 55.6 | 820 | 2.70 |
| | | | | 104 | 850 | | 795 | 104.0 | 52.5 | 770 | 2.97 |
| | | | | 109 | 900 | | 845 | 110.3 | 55.6 | 820 | 3.03 |
| | | | | 110 | 950 | | 895 | 110.3 | 52.5 | 770 | 3.26 |

N.B: the user must fit additional conductive devices that we cannot supply to prevent static electricity being generated on the packages and on the surface of the tapered sleeves.

Legend of version acronyms:
R Shaft, bored and threaded
Z Tube, sendzimir galvanized
K Propylene tapered sleeves

LOAD CAPACITY

Please refer to the Unit Handling master catalogue for the max. weight per roller.



SLEEVING / LAGGING

Rollers lagged with PVC sleeving

All the tube versions listed in this catalogue can feature a soft and elastic PVC (polyvinyl chloride) sleeve covering with 73 Sh(A) hardness, of a metallic grey colour (RAL 9006) with a smooth surface that is particularly resistant to chemical agents

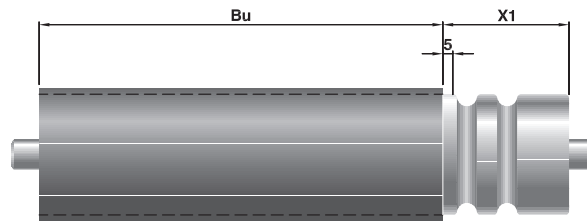
It is normally used to provide greater friction between the package and roller without marking the conveyed materials. The sleeve is placed on the tube and remains in place by elastic shrinkage.

Operating temperature from -10°C to +50°C.



Rollers with rubber lagging

Consists of (hot) anti-abrasive vulcanized rubber lagging, hardness 70 ± 5 Sh(A), machined surface, thickness: 3 mm minimum. On request, the lagging can be obtained with different hardness or thickness or with glued rubber or neoprene, silicone etc., if this is compatible with the quantity of rollers requested. The R letter must be added to the tube version of the pre-chosen roller.



Sleeves with greater friction

If it is necessary to create greater friction between the rollers and the conveyed packages, applying sleeves with greater friction is particularly effective.

They are made of transparent polyurethane

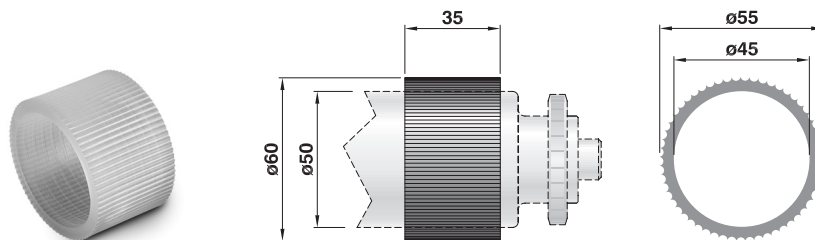
75 Sh(A) with grooves parallel to the axis of the roller and are supplied loose to be fitted tight only onto rollers with $\varnothing 50$ tube and can be combined with all the roller/ Drive Roller versions of this catalogue.

Fit additional conductive devices that we

cannot supply to prevent static electricity being generated by the packages rubbing on the sleeves.

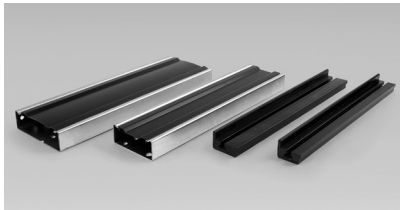
Code : SVGN-00050

Description : Sleeves D.45/55 L=35



Note: tapered rollers, or rollers lagged with sheaths, rubber, or sleeves have a larger diameter than the standard 50 of the Drive Roller, thus the speeds of every reduction of the Drive Roller will increase and the torque/tangential force will decrease proportionally.

PROFILES FOR DRIVEN CONVEYORS

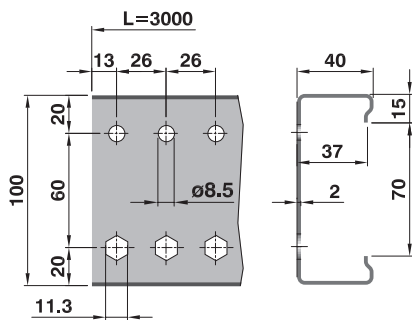


Profiles CP1 and CP2 can be supplied untreated or can be subjected to electrolytic galvanization.

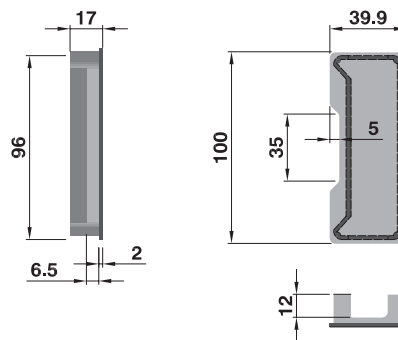
In combination with the P5 and P6 profiles, the relative lagging in grey PVC and the closing caps in black polyethylene can be supplied. The CP1 and CP2 profiles are particularly suitable for making both driven and

friction-operated roller conveyors of the 135 and 138 series, with chain or belt or timing belt transmission.

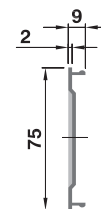
Warning: all the profiles must be cropped to obtain the first hole with the centre 13 mm from the end; the length values "L" are accordingly purely nominal.



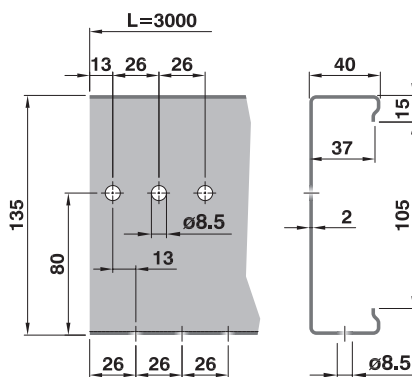
Profile
PR CP1 3000 (untreated)
PR CP1J 3000 (galvanized)
Weight = 9.50 daN



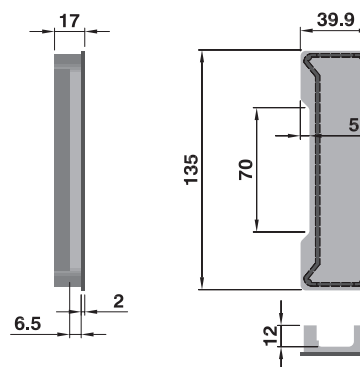
Cap KR32
RMSP-00138
Weight = 0.012 daN



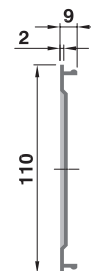
Guard L3000
PR P5 3000
Weight = 0.75 daN



Profile
PR CP2 3000 (untreated)
PR CP2J 3000 (galvanized)
Weight = 11.00 daN



Cap KR31
RMSP-00137
Weight = 0.017 daN



Guard L3000
PR P6 3000
Weight = 0.75 daN

ZERO PRESSURE ACCUMULATION (ZPA) CONTROL MODULE BY PEPPERL+FUCHS

The ZPA control module allows to connect e command in simple and quick way 2 RDR BL3 drive roller for the development of roller conveyors with zero pressure accumulation logic in combination with two zone sensors (one for each zone).

Thanks to its compact design and protection ratio IP65 it is easily installed on the roller conveyor profile.

This module is also equipped with all the cable required for the electrical wiring provided with connectors that allow a quick connection and without using any kind of tools.

Moving the three rotative selector placed on the back of the module is possible select in practical and quick way:

- Eight different rotation speeds of the drive roller.
- Five acceleration/deceleration ramps
- Seven specific working modes.

These features made the connection of the BL3 drive roller, the zone sensor and the interface of several modules very simple.



- Improved transportation flow with the control module for BL3 Drive roller with zero pressure accumulation logic.
- The integrated logic allows immediate use of the module without the need of an external programming.
- Seven pre-programmed specific working modes.
- Chance to create pre-assembled modular roller conveyor finishing the wiring simple connecting the power cable with

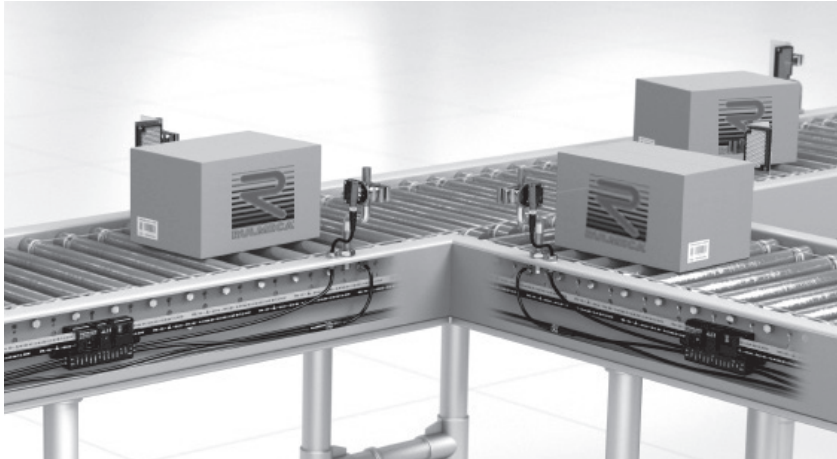
piercing technology.

- Fast connection – all the necessary connection cables are integrated and fitted with connector.
- The analysis instrument (OPT) grant the diagnostic and a full control about all the settings.
- Full system protection thanks to the integrated fuse (1 for channel).
- Frontal status LED.

Technical data

| | |
|--|---|
| Input/Output | 2 Input M8 connector 4 Pin for connect photosensor/limit switches 2 Output M8 5 Pin for connect BL3 drive roller 2 connectors for connect upstream/downstream. |
| Compatible Drive Roller | Rulmeca RDR BL3 |
| Tension range | 18 ÷ 28 VDC |
| Nominal absorbed current | Input = 500 mA Output = 2 A (max. 5 A < 2 s) |
| Temperature range | -30 ÷ +60 °C |
| Mechanical vibration and shock resistance | 30 g, 11 ms (3 urti) / 10 g, 16 ms (1,000 urti) |
| Protection ratio IP | IP65 |
| Cable length | Input/Output = 1 m Connectors up/downstream = 1.5 m |
| Size | 130 mm x 53 mm x 27.5 mm |
| 24VDC connection | With flat cable piercing technology |
| LED indicators | ERR1 [Yellow]: Drive 1 in Fault status ERR2 [Yellow]: Drive 2 in Fault status PWR: [Green]: 24VDC Power Supply IN1 [Yellow]: Input 1 status IN2 [Yellow]: Input 2 status MOT1 [Yellow]: Drive 1 command MOT2 [Yellow]: Drive 2 command XIN 1 e 2 [Yellow]: IN1 e 2 zone status XOUT 1 e 2 [Yellow]: Out zone status |

MATERIAL FLOW CONTROL, PRODUCTIVE PROCESS OPTIMIZATION



Quick, efficient and reliable conveyors are crucial in the world of logistic. To avoid any collision with the transported packages the ZPA control module check constantly the material flow allowing to realize high performing roller conveyor simple to realize.

Reliable and economically advantageous

The transported material on every conveyor must be constantly monitored to prevent collision and avoid interrupt the working flow.

The zero pressure accumulation ensure that the correct distance between the transported materials is maintained avoiding carefully that going in touch among them.

This system for smart roller conveyor is helpful also when are phases of manual work into assembling station.

In addition to the collision prevention between transported material the system reduces also the energy costs activating the Drive roller only when necessary, with a significant reduction of the energy consumption e the overall noise of the entire conveyor.

Thanks to the preloaded e selectable logic, the roller conveyor is divided into various zone each provided of its drive roller and the relative zone ending photosensor.

If a zone is occupied the module, thanks to the signal provided by the relative photosensor, makes sure that the material in previous zone stay stop.

In the case a transported material is removed from the conveyor, also manually,

the internal logic provides to push forward the material upstream of the removed one so to keep the right distance in every phase of the transport.

High flexibility with specific operative mode

Every application needs a determinate transportation logic.

The ZPA module allows to choose, thanks to the rear rotative selector, the command logic that more fit to the conveyor. For example, it's possible manage the types of release for the material or the dimension of the zone.

With the block release mode is possible reduce the distance between the transported material to the minimum increasing in this way the efficiency of the entire conveyor.

For highly complex application, the entire system can be connected to receive commands via PLC.

Simple installation and modular assembly

The innovative installation e wiring mode of the zero pressure accumulation module allow to realize modular conveyor segments easily connectible one to each other.

To the modules, once installed, is connected to power cable (black flat) securing to the module with piercing technology.

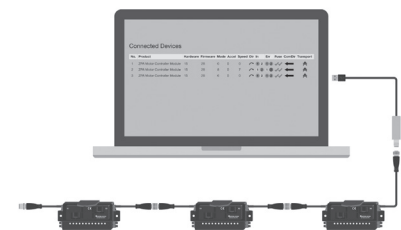
Using the ZPA modules allow therefore to reduce the commissioning time going at the same time to standardize the assembly processes.

Simple access to the settings and the diagnostic

Run a diagnostic of the ZPA system is simple thanks to the analysis tool.

Connecting the last module of a row to the analyzer is possible to have an overview of the settings and the system status.

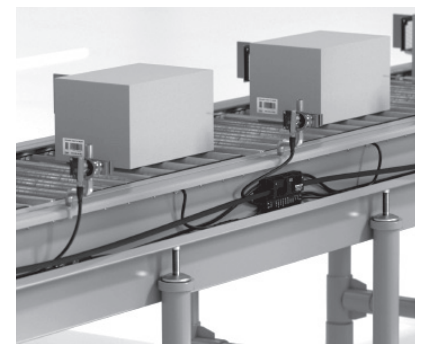
Information about the configuration of the connected module, the operative mode set and the status of the input are provided e also possible identify any defective module.



AS-I Bus interface

In the application that required the use of the AS-I Bus system Rulmeca, for interfacing their own BL3 drive rollers to the system, can provide:

- The interface module that can control n. 2 Drive Roller and n.2 Photosensor.
- Gateway with Profinet interface to PLC– Ethernet IP or Profibus.
- Power supply unit for gateway 4 or 8 Am-pere
- Photosensor reflex with M8 connector
- ASi Bus flat yellow cable section 1.5 mmq
- Flat power black cable 2.5 mmq
- Various consumable.



RDR BL3 DRIVE ROLLERS CODE

RDR BL3-PV - 16 R I 50 JF 1234

Series

Type

| | |
|---------------|--|
| BL3 | Standard IP54 version (without pulley or pinion) |
| BL3-PV | Fixed Poly-V pulley with positive coupling |
| BL3-1V | Frictioned Poly-V head |
| BL3-F1 | 2-groove head with positive coupling |
| BL3-1F | 2-groove frictioned head |
| BL3-S3 | PA P2C 1/2" Z14 pinion (extractable like 135/S3) |
| BL3-3S | PA P2C 1/2" Z14 clutch-operated pinion (extractable like 138/S3) |

Connector

| | |
|----------|---------------------------------------|
| - | Standard - cable with 5 pin connector |
| S | Cable WITHOUT connector |

Reduction ratio

12:1
16:1
24:1
36:1
49:1
64:1
96:1

Version

| | |
|----------|-----------------------|
| - | Standard |
| R | Extra-short dimension |

Pins version

| | |
|----------|--|
| - | Standard (IP54) |
| I | Stainless steel bearings and pins (IP54) |

Tube

| | |
|-----------|---|
| 50 | Tube 50x1.5 Cylindrical |
| 51 | Tube 51x2.0 (No stainless steel) cylindrical |
| 52 | Convex machined tube (No stainless steel) |
| 53 | Cylindrical tube 53x3.0 mm (No stainless steel) |

Tube finish and options

| | |
|-----------|--|
| N | Steel untreated |
| Z | Sendzimir galvanized |
| J | Electro-zinc plated |
| I | Stainless steel |
| E | With 1 groove |
| F | With 2 grooves |
| P | Soft PVC lagging |
| Pu | Polyurethane lagging |
| K | Tapered version with polypropylene sleeves |
| R | Rubber lagging |

Roller length C (= EL internal distance between the frames)

RDR RULMECA DRIVE ROLLER - DATA GATHERING FORM

Customer: _____ Reference: _____

Telephone: _____ Email: _____

Commercial ref: _____ Agency: _____

Data on roller conveyor

Conveyor length [m]: _____ "C" dimension of roller support profile [mm]: _____ Linear speed [m/s]: _____

Roller pitch [mm]: _____ Length of accumulation area [m]: _____ Load: Maximum Minimum Average

Change of direction request Inclined roller conveyor [mm, degrees]: _____ Work cycle: Continuous Intermittent

No of Starts-Stops/min: _____ Managed accumulation without pressure Transfer Accumulation with pressure

Notes: _____

Data on package or material to be conveyed

Max. / min. package dimensions (Length x depth x height) [mm] _____ / _____ Leading face: L p

Max./Min. weight of package [kg]: _____ / _____ Total weight on roller conveyor [kg]: _____

Type of material in contact with the rollers: Plastic Cardboard Wood Other (Specify) _____

Finish of the base of the packages in contact with the rollers: Stiff Soft Smooth Coarse Flexible

Notes: _____

Environmental data

Max / min [°C] ambient temperature _____ / _____ Temperature of conveyed package [°C] _____ / _____

Environment: Dry Humid Wet Corrosive Washes Detergents High pressure Steam

Conveyed material Dry Humid Wet Abrasive Other

Notes: _____

Requested Drive Roller options

Electro-zinc plated tube (Bright) Sendzimir galvanized tube Untreated tube Surface treatment _____

Vulcanized rubber thickness [mm] _____ Hardness [ShA] _____ Colour _____ Q Soft PVC sheath Thickness 2.5, 70 ShA

Tapered Drive Roller

Other: _____

Additional functional considerations

Drawing of system and considerations

- Enclose a technical drawing or layout of the planned system and possibly a wiring diagram.
- State the required conditions for the cabling and filters on the power supply (filters on relay-remote switch coils)
- Technical manuals can be downloaded from: <http://rdr.rulmeca.com>



Moving ahead.

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