

The right motor for every application



Motors

Answers for industry.



The right motor for every application

| | Low-voltage motors | | | | | Geared motors | | | | EX motors | | DC motors | High-voltage motors | | |
|---|---|--|---|--|--|--|---|---|---|--|--|---|---|---|--|
| | Asynchronous | | Synchronous | | | Asynchronous | | Synchronous | | Asynchronous | Synchronous | | Asynchronous | Synchronous | |
| | Low dynamic performance | Medium dynamic performance | High dynamic performance | Medium dynamic performance | Very high dynamic performance | Low dynamic performance | Low dynamic performance | High dynamic performance | High dynamic performance | Low dynamic performance | High dynamic performance | Medium dynamic performance | Dynamic performance levels | Dynamic performance levels | |
| | Low-voltage motors for line and inverter operation | | Induction servomotors for inverter operation | Permanent-magnet synchronous servomotors | Permanent-magnet direct drive for rotary axes | Permanent-magnet direct drive for linear axes | Geared motors for line and inverter operation | Industrial gears/worm gears | Geared servomotors with helical and angled gear units | Geared servomotors with coaxial/planetary gear | Explosion-protected and fire-damp-protected motors for line and inverter operation (Ex Zone 1 and Division 1) | Permanent-magnet synchronous servomotors | DC motors for variable-speed operation | High-voltage induction motors for line and inverter operation | High-voltage synchronous motors for line and inverter operation |
| | | | | | | | | | | | | | | | |
| Core features | With aluminum frame: Light, reliable, compact, with efficiency classes EFF1, EFF2 (IEC); EPAact, Ultra NEMA Premium (NEMA) | With grey cast iron frame: Reliable, rugged, compact, with efficiency classes EFF1, EFF2 (IEC); EPAact, Ultra NEMA Premium (NEMA) | Compact, high power density, either with solid or hollow shaft | Compact, high power density | Compact, high torque at low speed | Compact, high rate of acceleration at high velocity | High degree of flexibility regarding gearbox types (helical gear, bevel, offset, helical worm, worm gears) | Especially reliable and rugged gearbox with high overload capability, low noise, compact, flexible | Can be mounted, high precision, high efficiency (helical/offset/bevel/worm gears) | Highest precision, extremely high efficiency, compact | Especially reliable and rugged motors with: Increased safety "e", flameproof enclosure "d", pressurized enclosure "p" | Compact, high power density, explosion-protected for use in Ex Zone 1 and Division 1 | Low shaft height with a high torque, reliable, low noise | Compact, flexible, high degree of availability | Compact, flexible, high degree of availability |
| Rated voltage | IEC: 230 ... 690 V NEMA: 220 ... 575 V | IEC: 230 ... 690 V NEMA: 220 ... 575 V | 400 ... 480 V, 690 V | 230 V, 400 ... 480 V | 400 ... 480 V, 690 V | 400 ... 480 V | 230 ... 690 V | 230 ... 690 V | 400 ... 480 V | 400 ... 480 V | IEC: 230 V ... 13.2 kV NEMA: 230 ... 460 | 400 ... 480 V | Up to 810 V DC | 2 ... 13.2 kV | 6 kV ... 13.2 kV |
| Rated speed, velocity at rated force | IEC: Line operation at 50 Hz: 750 ... 3000 rpm NEMA: Line operation at 60 Hz: 900 ... 3600 rpm | IEC: Line operation at 50 Hz: 750 ... 3000 rpm NEMA: Line operation at 60 Hz: 900 ... 3600 rpm | 400 ... 2900/4000 rpm | Up to 6000 rpm | 38 ... 800 rpm | 105 ... 836 m/min | 0.05 ... 1088 rpm | 0.08 ... 580 rpm | 43 ... 780 rpm | 120 ... 1500 rpm | IEC: Line operation 750 ... 3600 rpm NEMA 900 ... 3600 rpm | 1500 ... 6000 rpm | Up to 3600 rpm | Line operation up to 3600 rpm | Line operation up to 3600 rpm |
| Maximum speed | Inverter operation: Up to 6000 rpm | Inverter operation: Up to 6000 rpm | Up to 18,000 rpm | Up to 12,000 rpm | Up to 1700 rpm | Up to 836 m/min | Up to 1088 rpm | Up to 580 rpm | Up to 780 rpm | Up to 1500 rpm | Inverter operation Ex de: Up to 12,000 rpm | Up to 7000 rpm | | Inverter operation up to 4800 rpm | Inverter operation up to 6300 rpm |
| Rated power | IEC: 0.06 ... 45 kW (0.08 ... 61.2 HP) NEMA: 1 ... 20 HP | 0.75 ... 4000 kW (1.02 ... 5440 HP) NEMA: 1 ... 400 HP | 3.7 ... 630 kW (5.03 ... 856.8 HP) | 0.05 ... 118 kW (0.07 ... 160.48 HP) | 3.1 ... 2150 kW (4.22 ... 2924 HP) | 0.09 ... 200 kW (0.12 ... 272 HP) | 0.12 ... 200 kW (0.41 ... 272 HP) | 0.3 ... 7.9 kW (0.41 ... 10.74 HP) | 0.3 ... 57 kW (0.41 ... 77.52 HP) | 0.3 ... 57 kW (0.41 ... 77.52 HP) | IEC: 0.12 ... 70,000 kW (0.16 ... 95,200 HP) NEMA: 1 ... 400 HP | 1.2 ... 12.4 kW (1.63 ... 16.86 HP) | Up to 1610 kW (2189.6 HP) | 200 ... 30,000 kW (272 ... 40,800 HP) | 5,000 ... 100,000 kW (6,800 ... 136,000 HP) |
| Rated torque, rated force | IEC: 0.3 ... 292 Nm NEMA: 1.5 ... 60 lb-ft | IEC: 9.9 ... 38,000 Nm NEMA: 1.5 ... 1772 lb-ft | 22 ... 3600 Nm | 0.08 ... 690 Nm | 100 ... 42,000 Nm | 150 ... 10,375 N | 40 ... 20,000 Nm | 100 ... 360,000 Nm | 3.6 – 1730 Nm | 2 ... 3400 Nm | IEC: 0.61 ... 450,000 Nm NEMA: 3.0 ... 1772 lb-ft | 1.9 ... 68 Nm | Up to 44,500 Nm | Up to 200,000 Nm | Up to 600,000 Nm |
| Ratios I | – | – | – | – | – | – | 1.36 ... 449.21 | 5.17 ... 75 | 3 ... 70 | 4 ... 50 | – | – | – | – | – |
| Ratio with initial gearbox | – | – | – | – | – | – | 181 ... 71388 | 22.5 ... 10,958 | – | – | – | – | – | – | – |
| Shaft height | IEC: 56 ... 225 NEMA FS: 140 ... 280 | IEC: 100 ... 630 NEMA FS: 140 ... 440 | 100 ... 280 | 20 ... 160 | 150 ... 500 | – | – | 63 ... 630 | Dependent on the motor and gear | 28 ... 132 | IEC: 63 ... 1250 NEMA: 140 ... 440 | 71 ... 132 | 100 ... 630 | 315 ... 1250 | 710 ... 1250 |
| Degree of protection | IEC: IP55, IP56 (non-heavy sea), IP65, NEMA: IP54 | IEC: IP55, IP56 (non-heavy sea), IP65, NEMA: IP55 | IP23, IP55, IP65 | IP64, IP65, IP67, IP68 | IP23, IP54, IP55 | IP65 | IP55, IP56, IP65 | IP55 | IP65 | IP64, IP65 | IEC: IP20, IP55, IP56 (non-heavy sea), IP65, IP67, IP68 NEMA: IP54 | IP64, IP65 | IP23, IP54 | IP23, IP55 | IP55 |
| Explosion-protection (also refer to column explosion-proof motors) | Optional: IEC: Ex nAII T3 (Zone 2) or dust-ex (Zone 21, 22) | Optional: IEC: Ex nAII T3 (Zone 2) or dust-ex (Zone 21, 22) | Optional: Zone 2, 22 IEC: (E) Exn (Zone 2) or dust-ex (Zone 22) | Optional: Zone 2, 22 | – | – | Optional: Zone 1, 2, 21, 22 | Yes | – | – | IEC: Ex e II, Ex de IIC, Ex d IIC, Ex de I, Ex d I, Ex p II and double protection Ex d plus Ex e NEMA: Class I, Group D, Class II, Groups F&G, Division 1, Class I, Groups C&D, Division 1 | Ex de IIC T3 (Zone 1) | No | Ex n AII (Zone 2) or dust-ex | Ex n AII (Zone 2) or dust-ex |
| Cooling type | IEC: Self-ventilated NEMA: TEFC (totally enclosed fan cooled) | IEC: Self-ventilated, force-ventilated, water-jacket-cooled NEMA: TEFC (totally enclosed fan cooled), ODP (open drip proof) | Force-ventilated, water-cooled, open-circuit air-cooled (dependent on the type) | Self-ventilated, force-ventilated, water-cooled (dependent on the type) | Force-ventilated, water-cooled (dependent on the type) | Water-cooled | Self-ventilated, force-ventilated | Self-ventilated, force-ventilated | Non-ventilated | Self-ventilated, force-ventilated, water-cooled | IEC: Self-ventilated, force-ventilated, water-cooled, pipe-cooled, air/air cooler, air/water cooler NEMA: TEFC (totally enclosed fan cooled) | Self-ventilated | Self-ventilated, force-ventilated, open-circuit air-cooled, air/air cooler, air/water cooler, non-ventilated | Self-ventilated, force-ventilated, air/air cooler, air/water cooler | Air/air cooler Air/water cooler |
| Sensorless operation | Yes | Yes | Yes, dependent on the type | – | Yes | External encoder required | Yes | Yes | – | – | – | – | Yes | Yes | |
| Encoder | Pulse encoder HTL, pulse encoder TTL | Pulse encoder HTL, pulse encoder TTL | Resolver (dependent on the type), incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat (dependent on the type), pulse encoder HTL (dependent on the type) | Resolver, incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat | Resolver (dependent on the type), incremental encoder (sin/cos, 1Vpp) (dependent on the type), absolute encoder EnDat (dependent on the type) | – | Inkrementalgeber TTL Inkrementalgeber HTL Resolver Absolutwertgeber EnDat Absolutwertgeber SSI | Inkrementalgeber TTL Inkrementalgeber HTL Resolver Absolutwertgeber EnDat Absolutwertgeber SSI | Resolver, incremental (sin/cos, 1Vpp), absolute (EnDat) | Resolver, incremental (sin/cos, 1Vpp), absolute (EnDat) | Pulse encoder HTL/TTL (dependent on the type) | Incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat | Resolver (please enquire), incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat (please enquire), pulse encoder HTL, pulse encoder TTL | Resolver, incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat, pulse encoder HTL, pulse encoder TTL | Resolver, incremental encoder (sin/cos, 1Vpp), absolute encoder EnDat, pulse encoder HTL, pulse encoder TTL |
| Options | Brake | Yes | Yes | Yes | – | – | Yes | Yes | Yes | Yes | Please enquire | – | Yes | – | – |
| | Drive-CLIQ interface | – | – | Yes | Yes | Yes, dependent on the type | Yes | – | – | Yes | – | – | – | – | – |
| | Separately-driven fan | Yes | Yes | Yes, dependent on the type | Yes, dependent on the type | Yes, dependent on the type | – | Yes | – | Yes | Yes, dependent on the type | – | Yes | Yes | Yes |
| | ECOFAST | Yes | Yes | – | – | – | – | Yes | – | – | – | – | Yes | – | – |
| | 2 nd shaft end | Yes | Yes, dependent on the type | Yes, dependent on the type | – | Yes, dependent on the type | – | Yes | – | Yes | Yes | – | Yes | Yes | Yes |
| Frequency Converter and Motorstarter | SINAMICS G110, G120, S120 MICROMASTER, MASTERDRIVES, SIMATIC ET 200S FC, SIMATIC ET 200pro FC, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters, SIRIUS compact starters 3RA6, AS-Interface compact starters, SIMATIC ET 200pro motor starters, ECOFAST motor starters | SINAMICS G110, G120, G130, G150, S120, S150, MICROMASTER, MASTERDRIVES, DYNAVERT, SIMATIC ET 200S FC, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters, SIRIUS compact starters 3RA6, AS-Interface compact starters, SIMATIC ET 200S motor starters, SIMATIC ET 200pro motor starters, ECOFAST motor starters | SINAMICS G120, G130, G150, S120, S150, MASTERDRIVES, SIMODRIVE 611 | SINAMICS S120, MASTERDRIVES, SIMODRIVE 611 | SINAMICS S120, G130, G150, S150, MASTERDRIVES, SIMODRIVE 611 | SINAMICS S120, MASTERDRIVES, SIMODRIVE 611 | SINAMICS G110, G120, S120, MICROMASTER, MASTERDRIVES, SIMATIC ET 200S FC, SIMATIC ET 200pro FC, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters, SIRIUS compact starters 3RA6, AS-Interface compact starters SIMATIC ET 200S motor starters, SIMATIC ET 200pro motor starters, ECOFAST motor starters | SINAMICS G110, G120, S120, MICROMASTER, MASTERDRIVES, SIMATIC ET 200S FC, SIMATIC ET 200pro FC, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters, SIRIUS compact starters 3RA6, AS-Interface compact starters SIMATIC ET 200S motor starters, SIMATIC ET 200pro motor starters, ECOFAST motor starters | SINAMICS S120, SIMODRIVE 611, MASTERDRIVES MC | SINAMICS S120, SIMODRIVE 611, MASTERDRIVES MC | SINAMICS G110, G120, G130, G150, S120, S150, GM150, SM150, MICROMASTER, MASTERDRIVES, SIMATIC ET 200S FC, Dynavert T, ROBICON Perfect Harmony, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters | SINAMICS S120, MASTERDRIVES, SIMODRIVE 611 | SIMOREG DC-MASTER | ROBICON Perfect Harmony, SINAMICS GM150, SM150, SIMOVERT D, SINAMICS GL150 | ROBICON Perfect Harmony, SINAMICS GM150, SM150, SIMOVERT D, SINAMICS GL150 |
| Motormanagement | Motormanagement system SIMOCODE pro | Motormanagement system SIMOCODE pro | | | | | Motormanagement system SIMOCODE pro | Motormanagement system SIMOCODE pro | | | Motormanagement system SIMOCODE pro (Ex die) | Motormanagement system SIMOCODE pro (Ex die) | | | |
| Typical applications | Pumps, fans, compressors, conveyor systems with special requirements regarding low weight and highest efficiency | Pumps, fans, compressors, conveyor systems, marine applications, offshore, mixers, crushers, extruders, rolls with special requirements regarding the ruggedness – especially in the chemical and petrochemical industries | High-power rating applications with requirements for a high dynamic performance and compact design, e.g. printing machines, extruders, main spindle drives in machine tools | Applications with high up to the highest dynamic performance, e.g. robots and handling systems, woodworking, glass, ceramic and stone processing, packaging, plastic and textile machines and in the machine tool sector | Extruders, swiveling indexes, rotary and rotary cyclic tables, tool magazines, turret indexing, cylinder indexing, rotary spindles, roll drives and in the machine tool area | High requirements on the dynamic performance and precision for linear motions, e.g. machining centers, turning, grinding, laser machining, handling and in the machine tool area | Pumps, conveyor systems, cooling tower drives, agitators and mixers, crane systems, washing lines, food & beverage industry | Solar systems, elevators, escalators, theater drives, presses, heavy duty applications, e.g. in the area of steel plants and power stations | Basic positioning tasks and continuously running auxiliary drives with servo quality (production machines, high-bay racking units, filling systems, conveyor belts) | Positioning tasks in machine tools, production machines, robots and handling systems, auxiliary axes | For general industrial applications with special requirements on explosion protection, e.g. in the process industry | For general industrial applications with specific requirements on explosion protection, e.g. flexo printing and photogravure printing machines, filling systems | Motors for standard drive applications in all industrial areas and in the infrastructure | Medium- and high-voltage drive applications – especially pumps, compressors, blowers, extruders, mixers, crushers, conveyor belt systems, ship's propulsion systems | Medium- and high-voltage drive applications – including compressors, blast furnace blowers, refiners, pumps, extruders |
| Catalog | IEC: DB1.1 NEMA: DB1.2 | IEC: DB1.1 NEMA: DB1.2 | PM21, NC 60, NC61 | PM21, NC 60, NC61 | PM21, NC 60, NC61, DB6.2 | NC 60, NC61 | DB7.1 MOTOX Konfigurator | K88 MOTOX Konfigurator | PM21 | PM21, NC60, NC61 | IEC: DB1.1, NEMA: DB1.2 Loher: IM01 | PM21 | DA12 | – | – |

Industry sector-specific motors, e.g.
 - spindles/spindle drives for machine tools (turning, milling, grinding)
 - special drives for the textile industry
 - special motors for oil & gas, chemical/petrochemical, marine engineering, mining, steel industry

Application-specific motors, e.g.
 - high-speed motors with up to 21,000 rpm
 - motors for high- and low-temperature applications
 - distributed drives with integrated drive inverters
 - smoke extraction motors, stepping motors

Customer-specific motors and drive solutions:
 Across the complete range shown here we also design – in close cooperation with customers – individual motors up to integrated mechatronic drive solutions