

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 drives for rotary axes	Permanent-magnet direct drives 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 fireproof-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 IE1, IE2, EPM, Ultra NEMA Premium (NEMA)	With grey cast iron frame: Reliable, rugged, compact, with efficiency classes IE1, IE2, EPM, 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", nonsparking "n"	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 ... 6000 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: 230 V ... 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 12,000 rpm	Up to 20,000 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 15,000 rpm	Inverter operation up to 6300 rpm
Rated power	IEC: 0.09 ... 45 kW (0.08 ... 61.2 HP) NEMA: 1 ... 20 HP	0.37 ... 4000 kW (1.02 ... 5440 HP) NEMA: 1 ... 400 HP	2.8 ... 1340 kW (3.8 ... 1820 HP)	0.05 ... 118 kW (0.07 ... 160.48 HP)	3.1 ... 2150 kW (4.22 ... 2924 HP)	2.8 ... 1340 kW (3.8 ... 1820 HP)	0.09 ... 200 kW (0.12 ... 272 HP)	0.12 ... 200 kW (0.16 ... 272 HP)	0.3 ... 7.9 kW (0.41 ... 10.74 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: 0.61 ... 292 Nm NEMA: 1.5 ... 60 lb-ft	IEC: 5 ... 38,000 Nm NEMA: 1.5 ... 1772 lb-ft	13 ... 12,415 Nm	0.08 ... 690 Nm	100 ... 42,000 Nm	150 ... 10,375 N	3400 ... 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	-	-	-	-	-	-	22.5 ... 71388	-	-	-	-	-	-	-	-
Shaft height	IEC: F563M ... F5225 NEMA FS: 140 ... 280	IEC: F5100 ... F5630 NEMA FS: 140 ... 440	80 ... 355	20 ... 160	150 ... 500		Dependent on the motor and gearbox	63 ... 630	Dependent on the motor and gear	28 ... 132	IEC: F563 ... F51250 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, IP54, IP65	IP64, IP65, IP67, IP68	IP23, IP54, IP55	IP65	IP55, 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: IEC: Ex nAII T3 (Zone 2) or dust-ex (Zone 21, 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 fan cooled 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, 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/water cooler, air/water cooler NEMA: TEFC (totally enclosed fan cooled)	Self-ventilated	Self-ventilated, force-ventilated, open-circuit air-cooled, air/water cooler, air/water cooler, open-circuit air-cooled	Self-ventilated, force-ventilated, air/water cooler, air/water cooler, open-circuit air-cooled	Air/water cooler
Sensorless operation	Yes	Yes	Yes, dependent on the type	-	Yes	External encoder required	Yes	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)	-	Incremental encoder TTL Incremental encoder HTL Resolver Absolute encoder EnDat Absolute encoder SSI	Incremental encoder TTL Incremental encoder HTL Resolver Absolute encoder EnDat Absolute encoder SSI	Resolver, incremental encoder (sin/cos, 1Vpp), absolute (EnDat)	Resolver, incremental encoder (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 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	Yes, dependent on the type	-	Yes	Yes	Yes
ECOFast	Yes	Yes	-	-	-	-	Yes	Yes	-	-	-	-	Yes	-	-
2nd extension shaft	Yes	Yes, dependent on the type	Yes, dependent on the type	-	Yes, dependent on the type	-	Yes	Yes	-	Yes	Yes	-	Yes	Yes	Yes
Drive, Frequency Converter and Motorstarter	SINAMICS G110, G120, S110, 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, G130, G150, S120, S150, MICROMASTER, MASTERDRIVES, DYNNAVERT, 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 G120, G130, G150, S110, S120, S150, MASTERDRIVES, SIMODRIVE 611	SINAMICS S110, S120, MASTERDRIVES, SIMODRIVE 611	SINAMICS S120, G130, G150, S150, MASTERDRIVES, SIMODRIVE 611	SINAMICS S120, SIMODRIVE 611	SINAMICS G110, G120, S110, 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 S110, S120, SIMODRIVE 611, MASTERDRIVES MC	SINAMICS S110, S120, SIMODRIVE 611, MASTERDRIVES MC	SINAMICS G110, G120, G130, S120, S150, GM150, SM150, MICROMASTER, MASTERDRIVES, SIMATIC ET 200S FC, Dynaver T, ROBICON Perfect Harmony, SIRIUS 3RW30, 3RW40 and 3RW44 soft starters	SINAMICS S120, MASTERDRIVES, SIMODRIVE 611	SIMOREG DC-MASTER, SINAMICS DC-MASTER	ROBICON Perfect Harmony, SINAMICS GM150, SM150, SL150	ROBICON Perfect Harmony, SINAMICS GM150, SM150, SL150
Motor management	Motor management system SIMOCODE pro	Motor management system SIMOCODE pro					Motor management system SIMOCODE pro	Motor management system SIMOCODE pro			Motor management system SIMOCODE pro (Ex die)	Motor management 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 axes, rotary and rotary cyclic tables, toll 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 motion, 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, foil coating 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: D81.1 NEMA: D81.2	IEC: D81.1 NEMA: D81.2	PM21, NC 60, NC61	PM21, NC 60, NC61	PM21, NC 60, NC61, D86.2	NC 60, NC61	D87.1 MOTOX Konfigurator	K88 MOTOX Konfigurator	PM21	PM21, NC60, NC61	IEC: D81.1, NEMA: D81.2 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