




SIMOTICS overview

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Trailer

SIMOTICS – whatever proves itself of value also deserves a name!

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SIMOTICS overview



The SIMOTICS name stands for:






- 160 years of experience in electric motors
- A leadership role when it comes to new motor technologies
- A global network of competence
- Sector know-how and understanding of specific regional requirements
- The matching portfolio for all sectors and applications
- The system partner on the motor side for the extensive Siemens product families
- A clearly structured portfolio
- An extensive range of motors that is second to none
- Maximum quality and reliability
- Highest dynamic performance, precision and efficiency with minimum space required
- Service – around the globe and 24/7



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Low voltage line motors









	IEC motors				
	SIMOTICS GP General Purpose	SIMOTICS SD Severe Duty	SIMOTICS XP Explosion-protected	SIMOTICS DP Definite Purpose	SIMOTICS TN Transnorm
Picture					
Specific characteristics	Optimized for line operation	Optimized for line operation	Optimized for line operation	Smoke extraction motors, marine motors, roller table motors, crane motors, customized motors for specific applications	Available for line operation as well as for inverter duty
Applications/ Industries	Pumps, fans, compressors with specific requirements related to low weight and highest efficiency	Pumps, fans, compressors, marine applications, offshore, mixers, crushers, extruders, rolling mills with special requirements regarding ruggedness, especially in chemical and petrochemical industries	For general industrial applications with special requirements related to explosion protection, e.g. in process industries	Special motors, for example transport and working roller tables, ventilating tunnels, parking garages, shopping malls, port cranes, container terminals	Pumps, fans, compressors, mixers, extruders in chemical and petrochemical industry, paper machines, mining, cement, steel industry, marine applications
Power	0.55 - 45 kW	0.09 - 200 kW	0.12 - 1,000 kW	0.09 - 1,250 kW	250 - 5,000 kW
Voltage	Up to 690 V		All of the usual customer-specific voltages		400 - 690 V
# of poles	2 - 8			2 - 6	2 - 8
Frame size	63 - 225	71 - 315	63 - 450	80 - 315	315 - 630
Type of motor	Squirrel-cage induction motor				
Efficiency classes	IE1, IE2, IE3, NEE, NPE		IE1, IE2, IE3	IE2, IE3	IE2, IE3 up to 375 kW
Degree of protection	IP55	IP55, IP56, IP65			IP23, IP24, IP55, IP65
Cooling type	---				IC411, IC416, IC01, IC71W
Enclosure	Aluminum	Cast iron		Aluminum / cast iron	Cast iron / steel

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Low voltage line motors



	Regional lines					
	NEMA motors	APAC Korea	ABNT Brazil	EAGLE USA, CAN, MEX	China China	INDIA India
Picture						
Specific characteristics	Available as GP, SD, XP, DP	Available as GP, SD	Available as GP, SD	Available as GP, SD	Available as GP	---
Applications/ Industries	Automotive, textile, printing, chemical industries, conveyor technology, HVAC sector (Heating, Ventilating & Air Conditioning), fiber industry, oil & gas and chemical industries	Pumps, fans, compressors	Pumps, fans, compressors	Pumps, fans, compressors	Pumps, fans, compressors	Pumps, fans, compressors
Power	1 - 400 HP	0.75 - 200 kW	0.13 - 300 kW (0.16 - 400 CV)	0.75 - 315 kW (1HP - 400 HP)	0.18 - 315 kW	0.12 - 315 kW
Voltage	208 - 230 V / 460 V, 575 V (60 Hz)	Up to 690 V	220- 660 V 60Hz	Up to 600 V		Up to 690 V
# of poles	2 - 6 (60 Hz)	2 - 6	2 - 8	2 - 6	2 - 8	2 - 8
Frame size	140 - 440	80 - 315	63 - 315	80 - 315		63 - 355
Type of motor	Squirrel-cage induction motor					
Efficiency classes	NEMA Premium (MG1, Table 12-12)	IE2, IE3, 60Hz	IE2	IE3 NEMA Premium (MG1, Table 12-12)	IE2, IE3	IS:12615-2011
Degree of protection	IP54, IP55	IP55, IP56, IP65			IP55	IP55, IP56, IP65
Cooling type	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
Enclosure	Aluminum / cast iron				Cast iron	

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Low voltage converter motor



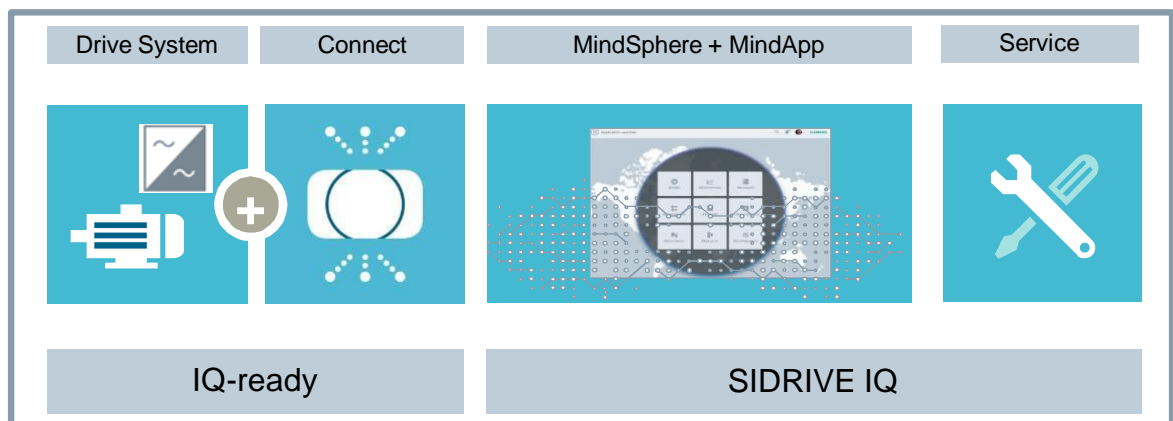
	IEC motors				
	SIMOTICS GP General Purpose	SIMOTICS GP General Purpose	SIMOTICS SD Severe Duty	SIMOTICS SD Severe Duty	SIMOTICS FD Flexible duty
Picture					
Specific characteristics	VSD 10 line: inverter duty	VSD4000 line: synchronous-reluctance technology for inverter duty only	VSD 10 line: inverter duty	VSD4000 line: synchronous-reluctance technology for inverter duty only	Inverter duty Liquid-cooled version: also available for line operation
Applications/ Industries	Pumps, fans, compressors, lifting equipment, production industry	Pumps, fans, compressors, lifting equipment, production industry	Pumps, fans, compressors, marine applications, offshore, mixers, crushers, extruders, rolling mills with special requirements regarding ruggedness, especially in chemical and petrochemical industries	Pumps, fans, compressors and conveyor belts with higher power ratings, as well as cranes, extruders and bow thrusters in branches such as chemicals, paper, oil & gas, marine, metals, cement and mining	
Power	2.2 kW up to 15 kW	0.55 kW to 30 kW	0.25 kW up to 200 kW	5.5 kW to 30 kW	200 - 1,100 kW
Voltage	400 V / 460 V				
Rated speed					750, 1000, 1500, 3000 (50 Hz); 900, 1200, 1800, 3600 (60)
Frame size	100 - 160	80, 112, 132 - 160	71 - 315	132 - 200	315 - 450
Type of motor	Squirrel-cage induction motor	Synchronous-reluctance	Squirrel-cage induction motor	Synchronous-reluctance	Squirrel-cage induction motor
Efficiency classes	No efficiency classes defined. Standard IEC 60034-30-2 in preparation.				
Degree of protection	IP55		IP55, IP56, IP65		IP23, IP55
Cooling type	---		---		IC71W, IC86W, IC01, IC06
Enclosure	Aluminum			Cast iron	
SINAMICS converter	G120, G120P, S120, G180		G120, G120P, S120, G130, G150, G180, S150		G120P Cabinet, G130, G150, S120, S120 CM, S150

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Digital drive systems for low and medium voltage applications



Digital Drive Systems

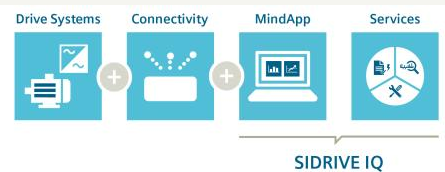


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SIDRIVE IQ – What is it?




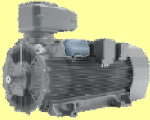



- SIDRIVE IQ is based on connected Drive Systems from Siemens.
- With SIDRIVE IQ, we get intelligent drive systems which deliver enhanced value in productivity, reliability and serviceability to our customers.
- SIDRIVE IQ leverages advancements in IoT, sensing, cloud computing, analytics, domain competence and cyber security to deliver innovation throughout our customers value chain.
- This is completed with the predefined services packages addressing specific customer needs.



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SIMOTICS / SINAMICS CONNECT

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SIMOTICS			SINAMICS	
SIMOTICS (LV)  SIMOTICS CONNECT 400	SIMOTICS (LV & HV) (DOL Motors)  SIMOTICS CONNECT 600	SIMOTICS HV  CMS4000 Sleeve bearing	SINAMICS CONNECT MV  SINAMICS CONNECT 500	SINAMICS CONNECT LV  SINAMICS CONNECT 300

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SIMOTICS GP General Purpose motors – 1LE10

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General Purpose motors

- With IEC efficiency classes IE1, IE2, IE3, IE4
- Country-specific motor lines with certificates, e.g. for North America
- Innovative and optimized design

Advantages at a glance

- Short, compact motors
- Low weight with aluminum frame
- No shaft height jump for the same power rating within the IE classes
- Increased Power-Line: same shaft height
- Eagle-Line: IEC motors for export to the NEMA market with UL, CSA and DOE
- Modular mounting concept for encoder, brake, external fan
- Same look & feel across the whole 1LE1 family



Power:	0.12 kW to 37 kW
Voltage:	up to 690 V
Frame size:	63 ... 225
Number of poles:	2, 4, 6, 8

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SIMOTICS SD Severe Duty motors – 1LE15/6

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Severe Duty motors

- With IEC efficiency classes IE1, IE2, IE3, IE4
- Country-specific motor lines with certificates, e.g. for North America
- Innovative and rugged design

Advantages at a glance:

- Rugged cast-iron frame to cope with harsh environments
- Complies with the requirements of IE3&IE2 according to IEC 60034-30 and EU Regulation 640/2009
- Complies with NPE acc. to NEMA MG1 Table 12-12
- Basic-Line 1LE15 for general applications
- Performance-Line 1LE16 for applications in the process industry
- Can be fully modified with a wide range of options



Power:	0.37 kW to 200 kW
Voltage:	to 690 V
Frame size:	71 ... 315
Number of poles:	2, 4, 6, 8

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SIMOTICS SD Severe Duty motors – China version

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Severe Duty motors

- With IEC efficiency classes IE1, IE2, IE3 according to IEC 60034-30
- Country-specific motor lines with certificates, e.g. for China
- Innovative and rugged design

Advantages at a glance:

- Rugged cast-iron frame to cope with harsh environments
- Distribution-Line **1LE010** for general applications
- Option-Line **1LE002** for applications in the process industry, can be fully modified with a wide range of options



Power:	0.55 kW to 315 kW
Voltage:	to 690 V
Frame size:	80 ... 355
Number of poles:	2, 4, 6

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SIMOTICS SD Severe Duty motors - next generation – 1LE5

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Variant 1:

- Cloud-based data analysis with SIDRIVE IQ
- Converter-capable up to 480 V
- High starting and breakaway torque (M_A/M_N)

SIMOTICS SD
Motors beyond standards

Variant 2:

- Global certificates
- UL Safety and CSA Safety -material as standard
- Converter-capable up to 480 V
- Low starting currents (I_A/I_N): Lower thermal loading, lower network load, reduced torque shocks

SIMOTICS SD Add
Motors beyond borders

Variant 3:

- Multi-voltage capability at SH 315 – 355
- Stable efficiency levels at 50 Hz/60 Hz
- Global certificates
- UL Safety and CSA Safety -material as standard
- Converter-capable up to 690 V
- SH 315 – 355: High starting and breakaway torque (M_A/M_N)
- SH 400 – 450 : Low starting currents (I_A/I_N)

SIMOTICS SD Pro
Motors beyond horizons

SIMOTICS SD next generation

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SIMOTICS TN Trans-standard motors N-compact – China only

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N-compact

- With efficiency classes IE2, IE3 to 375kW
- Rugged design and quiet operation

Advantages at a glance:

- Especially rugged motors with internal and external ribs for a high strength
- Two separate cooling circuits: Additional inner cooling circuit results in a uniform temperature distribution in the active motor area and reduces thermal stress – for longer life time and more reliability
- High power rating in a small space permits compact, space-saving machines and equipment
- With corrosion protection resistant against aggressive environments, e.g. high air humidity, high temperatures or dust and salt-laden atmospheres
- High voltage strength for line and converter operation



Power:	200 kW to 1250 kW
Voltage:	400 V – 690 V
Frame size:	315 ... 450
Pole number:	2, 4, 6, 8

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SIMOTICS XP
from 0.09 up to 1000 kW – 1MB1



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Features / functions	User benefits
<ul style="list-style-type: none">Standard platform regarding technology and design for all types of protection Ex db, Ex eb, Ex px, Ex tb. In addition, Ex ec and Ex tc extended up to 1000 kW	<ul style="list-style-type: none">The complete range of explosion-protected motors with the same look & feel now available up to high power ratings from a single source. These are suitable for fixed speed systems as well as variable-speed solutions – and address both the product as well as project business
<ul style="list-style-type: none">Based on the well-proven rib-cooled low-voltage motor platforms with the same power rating (0.09 – 1000 kW)	<ul style="list-style-type: none">Simplified stock inventory and spare part management – as well as attractive synergies when equipping and servicing complete plants and systems
<ul style="list-style-type: none">Based on decades of experience and expertise in explosion protection	<ul style="list-style-type: none">Highest quality for maximum reliability and safety – even under the most extreme conditions
<ul style="list-style-type: none">Standardized tools and processes	<ul style="list-style-type: none">Lower costs from the initial planning through engineering, procurement, integration and commissioning up to operation and maintenance
<ul style="list-style-type: none">Additional options such as VIK design, lower starting/inrush currents, C2 – C5M paint finish, components manufactured out of stainless steel and the motors are painted inside	<ul style="list-style-type: none">Additional applications, especially in classic process industries – such as oil, gas and the chemical industry
<ul style="list-style-type: none">All motors have efficiency Class IE3 – for Ex ec and tc motors, from shaft height 315, also IE4	<ul style="list-style-type: none">Low operating costs

SIMOTICS DP
Definite Purpose motors





Roller table motors:

- Used in reversing rolling mills
- Transverse ribbed frame manufactured out of spheroidal cast-iron
- Converter proof up to 460V, optionally up to 690V

Smoke extraction motors:

- According to EN12101-3/June 2002 certified motors for fire classes F200/F300 and F400
- Motor series has been universally accepted for all axial and radial fan
- Standard power assignment unchanged!

	
Roller table motors	Smoke extraction motors
Power: 2.5 kW up to 66 kW	Power: 0.37 kW up to 200 kW
Frame size: 112M up to 400	Frame size: 80M up to 315L

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SIMOTICS DP Definite Purpose motors

Ship motors for operation below deck and for the offshore industry

- EC type-examination with certificate up to 200 kW in compliance with internationally leading marine classification societies
 - Bureau Veritas (BV)
 - Germanischer Lloyd (GL)
 - Lloyds Register (LR)
 - Det Norske Veritas (DNV)
- Manufactured in compliance with additional classification societies: ABS, CCS, RS, RINA
- Energy-saving and explosion-protected motors, types of protection Ex e II T1-T3 and Ex de IIC T1-T4 have an EC type-examination with certificate
- Special motors for addressing individual drive applications (e.g. above deck operation) through Loher GmbH – the specialist for special solutions

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Frame sizes: 63 to 450

Power: 0.9 kW to 1250 kW

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SIMOTICS DP Definite Purpose motors

Crane motors

- These have been developed for indoor and outdoor crane operation, for example, container cranes in ports. These motors are operating perfectly as travel, trolley and hoisting gear drives in many cranes around the world.
- Suitable for converter operation (690 V with special measures), with a torque characteristic adapted to crane applications
- Have a high overload capability
- Designed for extreme conditions such as high humidity, salt-laden air, high wind velocities etc..
- Suitable for mounting a seawater-proof disk brake in an encapsulated design with a high degree of protection; motor and brake form one compact unit

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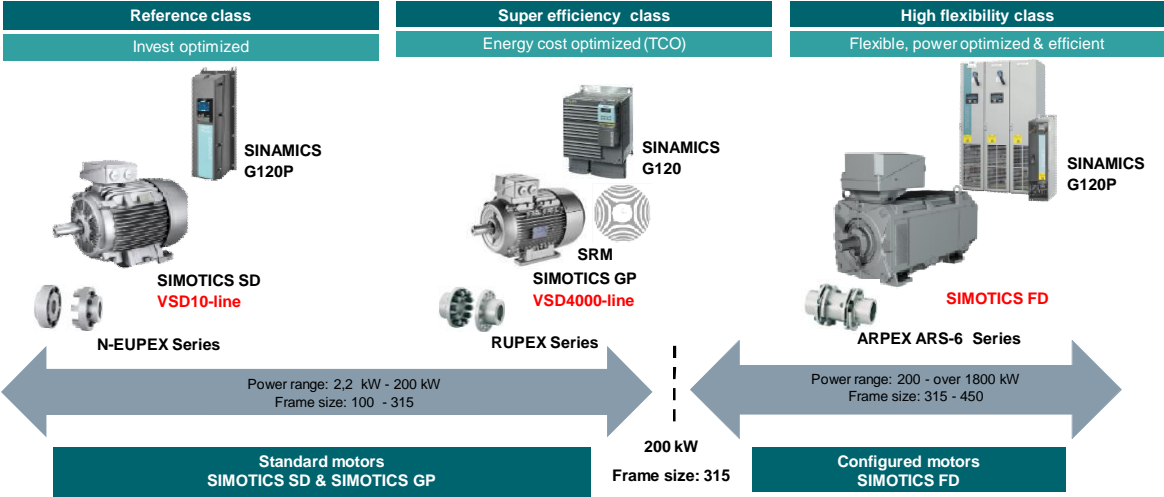
Power: 1.1 kW – 481 kW

Voltage: up to 1000 V

Frame size: 132S up to 315L

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SIMOTICS low voltage converter motors



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Highest efficiency and dynamic performance reluctance drive systems



System comprising SIMOTICS synchronous-reluctance motors VSD4000-Line and SINAMICS converters



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Features / functions	User benefits
<ul style="list-style-type: none">Based on standard products:<ul style="list-style-type: none">1LE1 motor platformSINAMICS G120 converters & S120	<ul style="list-style-type: none">Products widely established in the market, simple to use and selected using known tools
<ul style="list-style-type: none">Very high efficiency under full and partial load conditions	<ul style="list-style-type: none">Efficient drive solution optimized to achieve low lifecycle costs in efficiency class IES2
<ul style="list-style-type: none">System optimized for operation with SINAMICS G120 with sensorless vector control	<ul style="list-style-type: none">Dynamic operation and guaranteed operating data for optimum system utilization
<ul style="list-style-type: none">From firmware V4.8 operation with the whole SINAMICS S120 portfolio possible	<ul style="list-style-type: none">Higher dynamic performance, operation optionally with and without encoders, regenerative feedback with ALM, safety functions
<ul style="list-style-type: none">At the same time optimized for dynamic performance and efficiency – motor-driven and regenerative-driven	<ul style="list-style-type: none">Full range of applications possible: from simple applications with pumps, fans, compressors up to high requirements of coilers and extruders

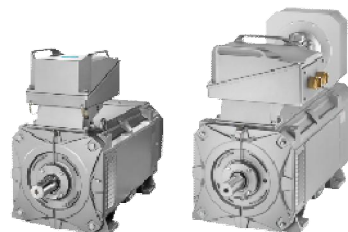
SIMOTICS FD

Flexible Duty motors - from 200kW and above

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FD motors

- § Converter-optimized low-voltage induction motor series
- § Three product lines:
 - § Enclosed air-cooled (IC411, IC416)
 - § Water-cooled (IC71W, IC86W)
 - § Open air-cooled (IC01, IC06)
- § Power range from 200 kW up to over 1600 kW
- § Shaft heights 315, 355, 400 and 450
- § Rugged cast iron frame
- § Water-cooled motors also available for direct online operation
- § Explosion version: zone 2 and zone 22



Power:	above 200 kW
Voltage:	up to 1000 V
Frame size:	315, 355, 400 & 450

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DC motors - SIMOTICS DC

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SIMOTICS DC

- Modular design with a wealth of options
- Self-ventilated or force ventilated with or without fan
- For harsh environments in degree of protection IP23, IP54 and IP55

Advantages at a glance:

- Rugged and low maintenance
- High mechanical stiffness ensures unique smooth running characteristics and balance quality
- Bearings, commutators and brush holders have an especially long service life
- Long brush lifetimes
- Smooth running characteristics ensure the highest machining precision
- Very low noise levels reduce costs for local noise dampening measures
- Can be optimally adapted to the specific project



Power:	31.5 kW to 1610 kW
Voltage:	420 to 810 V DC
Frame size:	160 to 630

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Tools



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Links



www.siemens.com/simotics

Tools Overview:

www.siemens.com/engineering-tools

www.siemens.com/sinasave

www.siemens.com/dt-configurator

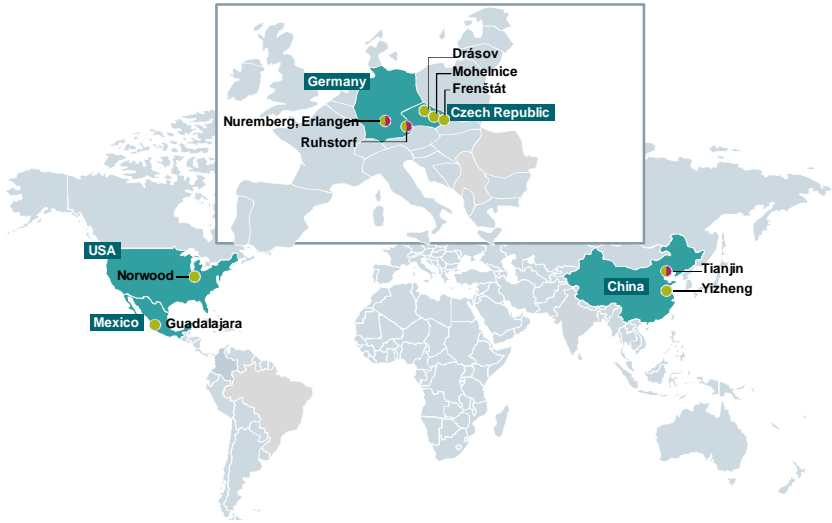
www.siemens.com/sizer

www.siemens.com/industrymall

www.siemens.com/starter

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9 motor plants around the world
close to our customers



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Seite 25

Servo motor



SIMOTICS S Servomotors	SIMOTICS M Main motors	SIMOTICS L / T Direct motors	Components
Rotating motors for servo drive applications, synchronous motor technology	Rotating motors for main drive applications, synchronous and asynchronous motor technology	Motors for direct drive applications, synchronous motor technology	Connection between drive and motor Built-on encoders DRIVE-CLiQ - the open interface for encoders

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Thank you for your attend!

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