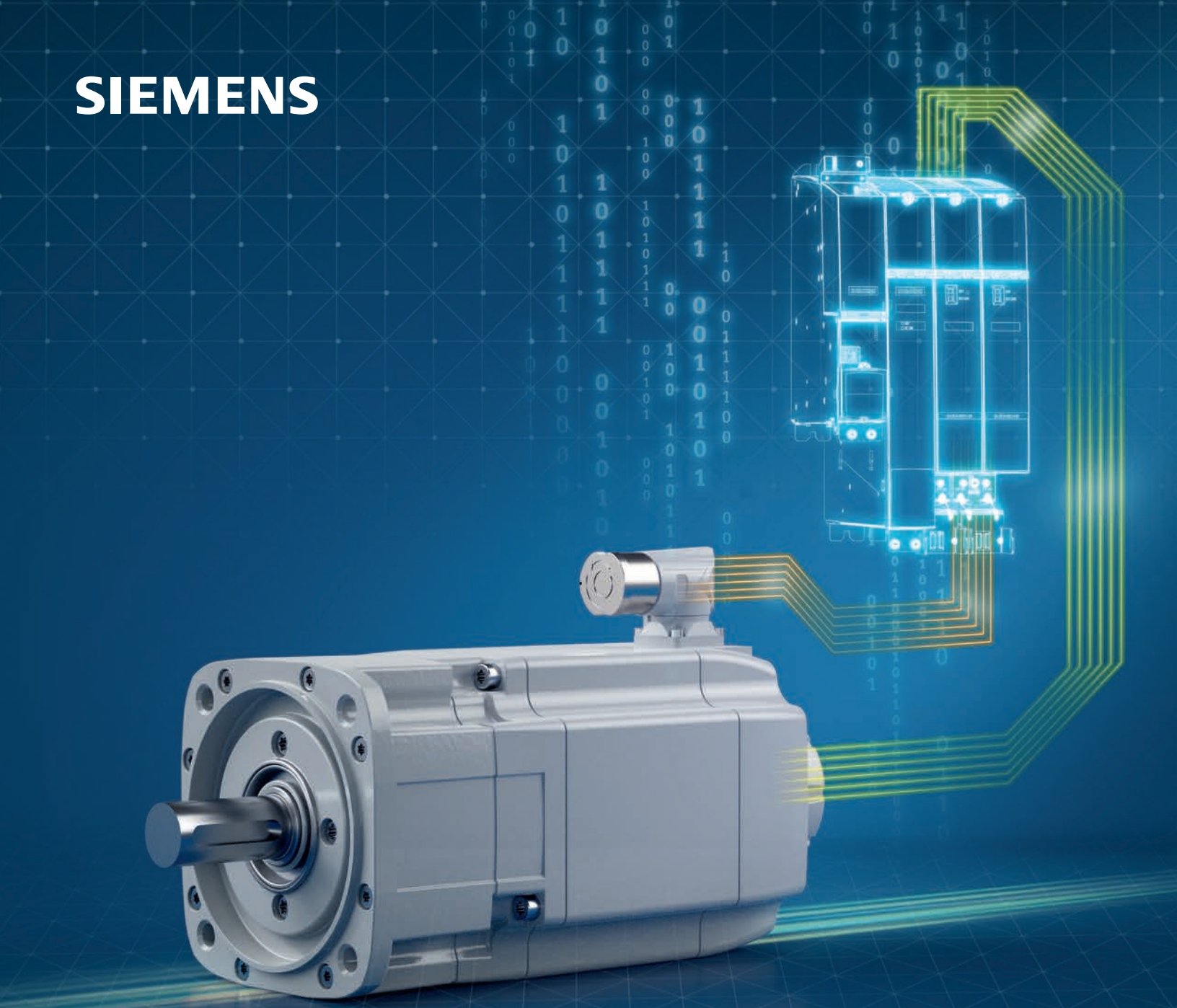
SIEMENS



SIMOTICS
compact, dynamic and rugged

Experience a higher level of precision

SIMOTICS M Main Motors

SIMOTICS motors
for every motion control application

Move it!

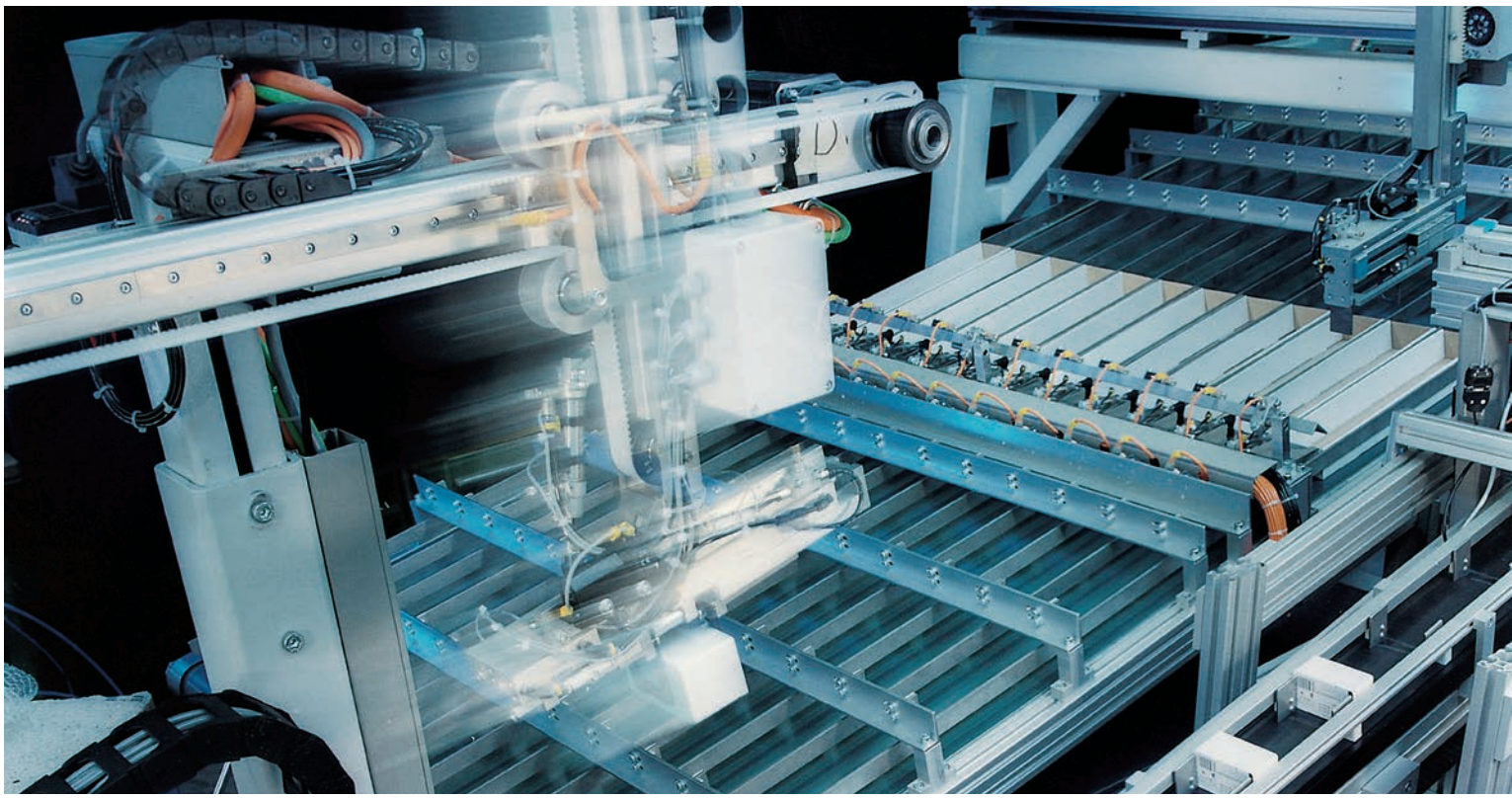
Since the development of the dynamo-electric principle by Werner von Siemens in 1866, innovative motor technology represents a core business of our company. In addition to low-voltage, DC and high-voltage motors, **SIMOTICS motors** have firmly established themselves in many industries when it comes to addressing demanding motion control applications.

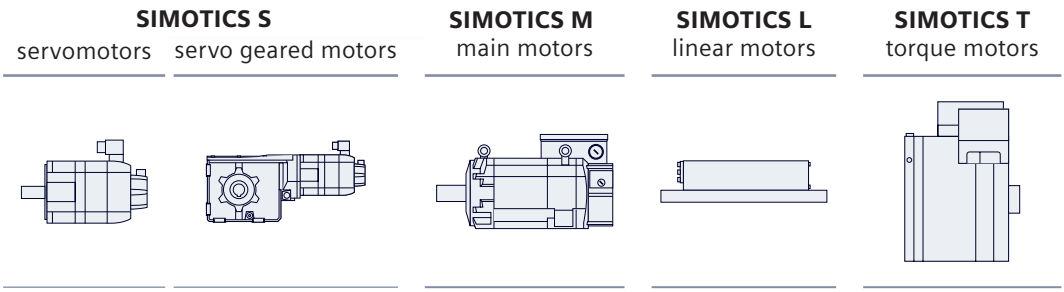
The correct solution

Whether for precise and repeatable positioning, constant speed and high dynamic motion, long traversing paths or fast velocity changes—**the Siemens SIMOTICS portfolio of servo, main, linear and torque motors** has the optimum solution for every motion control application.

SIMOTICS motion control motors are based upon:

- More than 150 years of experience and innovation in electric motor technology
- The widest range of motors worldwide with optimum solutions for motion control applications in every manufacturing industry and power class
- Can be fully integrated into the drive-train to create overall systems, perfectly addressing the control concept
- Rugged and compact design for reliable, low-maintenance operation with the highest dynamic performance and precision
- A global network of skill sets and worldwide service around the clock



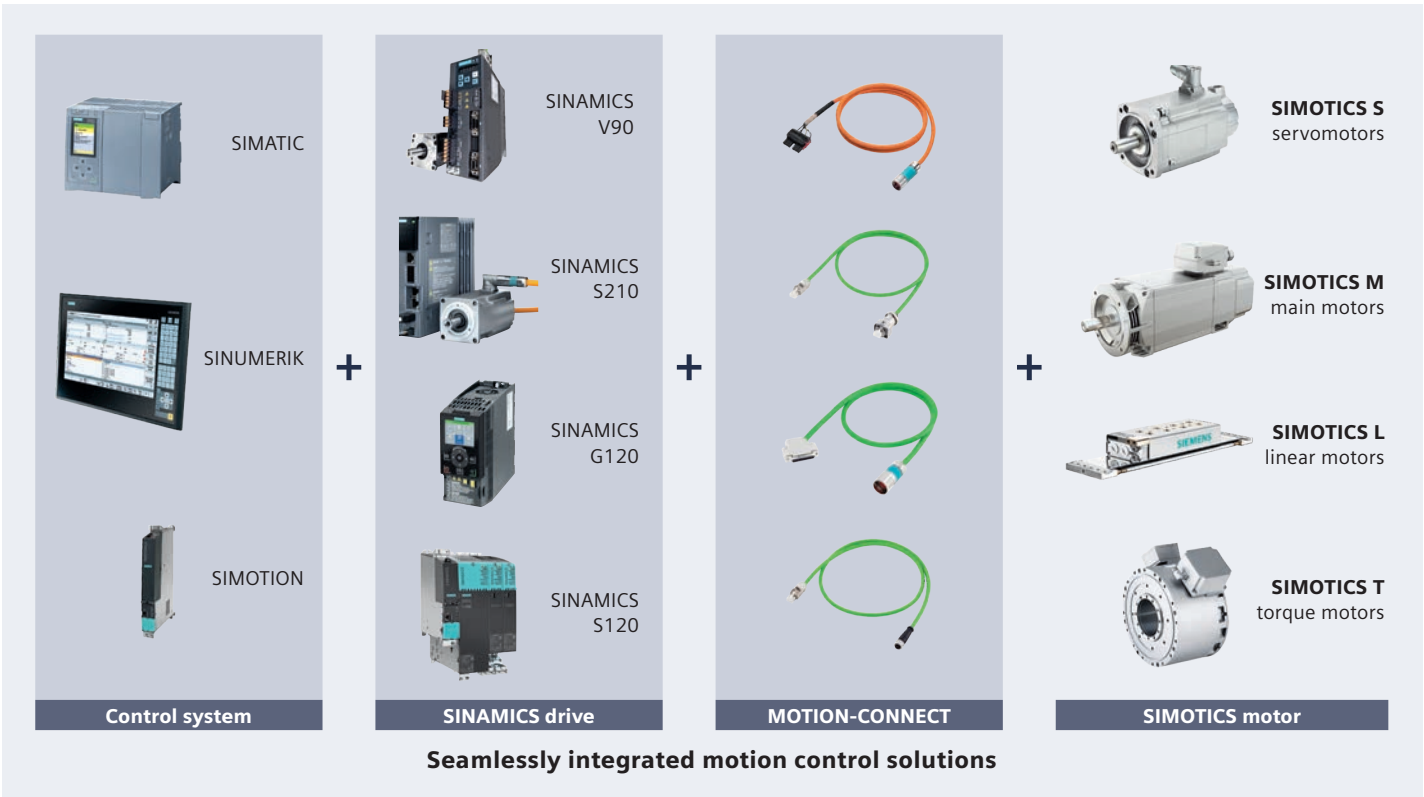


SIMOTICS motion control motors are perfectly harmonized and coordinated for operation with our SINAMICS family of drives. This simplifies the engineering and commissioning needed for high-performance applications in machine building and plant construction.

Optimum integration in the drive and control system

To optimize interaction with the drive, Siemens motors have a DRIVE-CLiQ interface to quickly transfer data—and transparently monitor important motor information. In addition, SIMOTICS motion control motors operate perfectly with SIMATIC, SINUMERIK and SIMOTION control systems from Siemens.

For specific questions related to your application, simply e-mail us: mc.us@siemens.com



Seamlessly integrated motion control solutions

Main motors with outstanding performance up to 40,000 rpm

SIMOTICS M-1PH8

Highlights

Extended power range from 2.8 kW to 1,340 kW

Flexible configuration options
- Induction, synchronous or reluctance motor versions
- Force-ventilated or water-cooled
- Solid or hollow shaft
- Wide range of bearing concepts
- Various encoder types for closed-loop speed control and high-precision positioning

High smooth-running characteristics and ruggedness thanks to the outstanding true running and low vibration severity at maximum speeds of up to 24,000 rpm

High-dynamic performance and short accelerating time

Winding switchover (star / delta)

Simple and flexible connection system

Commissioning using the electronic rating plate via digital DRIVE-CLiQ interface

Typical application areas

SIMOTICS M-1PH8 induction motors
- Machine tool spindles
- Paper and printing machines, winders
- Hoisting equipment and cranes
- Wood, glass, ceramics and stone processing machines
- Test stands
- Presses
- Plastics and textile machines
- Wire-drawing machines

SIMOTICS M-1PH8 synchonous motors
- Machine tools
- Servo-presses and cross-cutters
- Printing machines
- Extruders, calenders and rubber injection systems
- Foil machines and systems producing non-woven fibers
- Rod mills and cable stranding machines
- Coiler and winder drives

Modular power houses

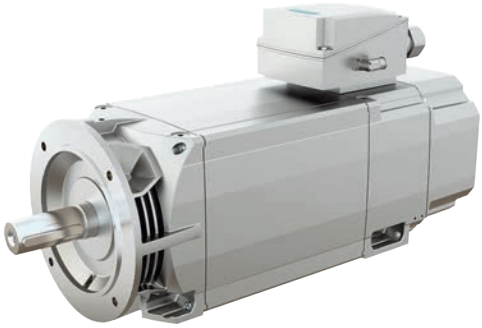
The sophisticated modular design offers various degrees of protection and cooling methods—as well as several options to electrically and mechanically integrate the main motor.

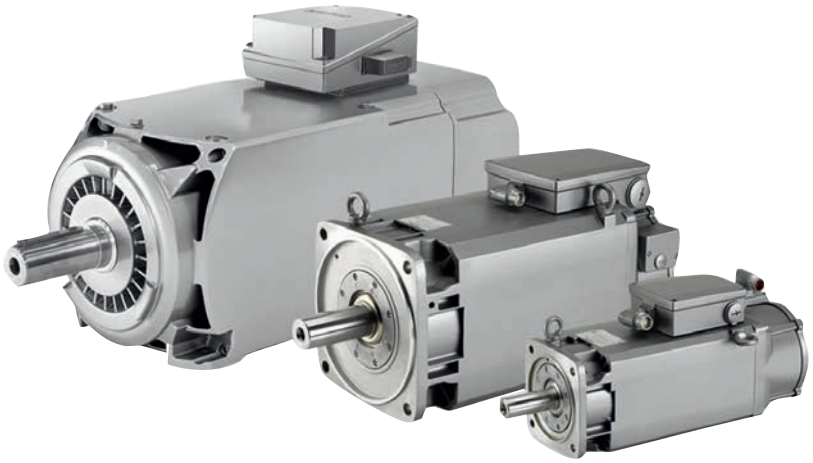
Whether induction, synchronous or reluctance, it's always SIMOTICS

SIMOTICS M-1PH8 induction motors are the ideal choice for applications where—in addition to the higher drive power—the primary focus is on precise, smooth-running characteristics and precise controllability of the axes. Additionally, you can operate them together with SINAMICS G120 drives which, when compared to standard main motors, extends the applications that they can realize as a result of the wider speed range. This allows them to address new, more compact machine concepts.

When the focus is on high-rated torque, our compact SIMOTICS M-1PH8 synchronous motors have unbeatable smooth-running operation. With a wide range of options, they can be flexibly adapted to every application, and are available with forced ventilation as well as with water cooling. This is a typical requirement for machine tools and printing machines—but also for servo-presses, rod mills and more.

Application-specific advantages of reluctance motor versions include:
- Unchanged dimensions and interfaces
- High torque density
- Low rotor inertia
- High efficiency within large torque vs. speed range
- Encoderless or with encoder
- System release for SINAMICS G120 and S120 drives





SIMOTICS M-1PH8 induction and synchronous main motors—overview

SIMOTICS M-1PH8	Standstill torque *	Rated speed *	Max. speed *	Rated power *
Induction	2.9–12,435 Nm	400–10,000 rpm	up to 24,000 rpm	2.8–1,340 kW
Synchronous	94–approx. 1,650 Nm	700–3,600 rpm	up to 4,500 rpm	15–310 kW
Reluctance	200–450 Nm	1,000–2,800 rpm	up to 3,700 rpm	21–121 kW

* depending upon the version and type

SIMOTICS main motors

They are designed to address the increasing demands associated with state-of-the-art machine building and plant construction. Available in rugged induction or synchronous versions, they set themselves apart thanks to their short rise times—and they can even handle extreme load cycles with high speed, torque and positioning precision.

SIMOTICS M-1FE

Highlights

Compact design as mechanical components can be eliminated

Short accelerating and braking times

High degree of stiffness for milling spindles based upon the large inner rotor bores (and therefore large shaft diameter)

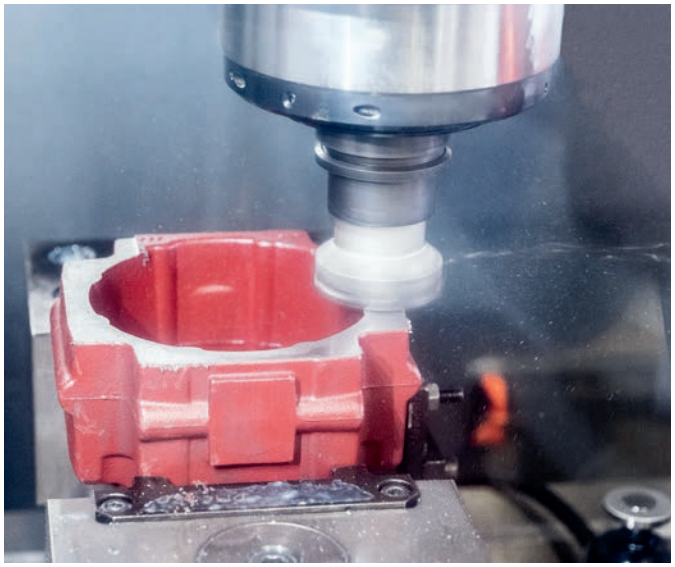
Typical application areas

- Turning spindles
- Grinding spindles
- Milling spindles

SIMOTICS M-1FE main motors—overview

SIMOTICS M-1FE	High speed	High torque
Series	M-1FE1	M-1FE1, M-1FE2
Rated torque*	up to 300 Nm	up to 1,530 Nm
Max. speed*	up to 40,000 rpm	up to 20,000 rpm
Rated power*	6.5–94 kW	4–159 kW

* depending upon the version and type

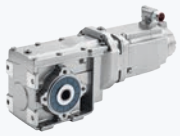


It has enough space in any spindle

SIMOTICS M-1FE synchronous built-in motors are very compact main spindle motors with a very high-dynamic performance that have been specifically designed for CNC machine tool applications. They set themselves apart as a result of their very high machining quality, short acceleration times, highest precision and smooth running characteristics.

Versions are available for very high torque utilization (High Torque)—or high maximum speeds (High Speed) to address specific applications. The mechanical motor power is directly transferred to the spindle without any mechanical transmission elements. The rotor and stator are ready to be installed and are water-cooled.

SIMOTICS motion control motors—an overview

SIMOTICS				
	S-1FK7	**S-1FT7**	**S-1FG1**	**S-1FL6**
	Servomotors			**Servo-drive systems**
Cooling method				
Natural cooling	Yes	Yes	Yes	Yes
Forced-ventilated	Yes	Yes	—	—
Water-cooled	—	Yes	—	—
Open-circuit-cooled	—	—	—	—
Shaft height	20 ... 100	36 ... 132	29...109	20 ... 90
Degree of protection	IP64 to IP65	IP64 to IP67	IP65	IP65
Rated speed / velocity	2,000 ... 6,000 rpm	1,500 ... 6,000 rpm	13 ... 1,279 rpm	2,000 ... 5,000 rpm
Rated power	0.05 ... 8.17 kW	0.88 ... 45.5 kW	0.5 ...1.8 kW	0.05 ... 7.0 kW
Rated Nm torque / force	0.08 ... 37 Nm	1.4 ... 250 Nm	up to 3,070 Nm [1)]	0.16 ... 33.4 Nm
Encoder				
Single-turn absolute	Yes	Yes	Yes	Yes
Multi-turn absolute	Yes	Yes	Yes	Yes
Incremental	Yes	Yes	—	Yes
Resolver	Yes	—	Yes	—
External required	—	—	—	—
Holding brake as option	Yes	Yes	Yes	Yes
Drive systems	SINAMICS S120	SINAMICS S120	SINAMICS S120	SINAMICS V90
Catalogs				
D21.4 SINAMICS S120 and SIMOTICS	Yes	Yes	—	—
D31.1 SINAMICS drives for single axis drives / built-in units	Yes	Yes	—	—
D32 SINAMICS S210 servo-drive systems	—	—	—	—
D33 SINAMICS V90 basis servo-drive system	—	—	—	Yes
D41 SIMOTICS S-1FG1 servo geared motor	—	—	Yes	—
NC62 SINUMERIK CNC systems for machine tools	Yes	Yes	—	—

[1)] Dependent upon the geared motor

					
S-1FK2 / 1FT2 / 1FS2	**M-1PH8**	**M-1FE1, M-1FE2**	**L-1FN3**	**T-1FW3**	**T-1FW6**
	Main motors		**Linear motor**	**Torque motors**	
Yes	—	—	—		Yes
—	Yes	—	—		
—	Yes	Yes	Yes	Yes	Yes
—	Yes	—	—		
20 ... 100	80 ... 355	40 ... 180	–	150 ... 280	159 ... 730 [4]
IP64 to IP67	IP23, IP55, IP65	IP00	IP65	IP54/IP55	IP23
3,000 rpm	400 ... 10,000 rpm	500 ... 25,000 rpm	up to 836 m/min [2]	150 ... 1,200 rpm	38 ... 940 rpm
0.05 ... 7.5 kW	2.8 ... 1,340 kW	4.0 ... 159 kW	1.7 ... 81.9 kW	2.8 ... 380 kW	1.7 ... 54.1 kW
0.16 ... 34.5 Nm	2.9 ...12,435 Nm	up to1,530 Nm	150 ... 10,375 N3 [3]	100 ... 7,000 Nm	10... 5,760 Nm
Yes	—	—	—	Yes	—
Yes	Yes	—	—	Yes	—
—	Yes	—	—	Yes	—
—	—	—	—	Yes	—
—	—	Yes	Yes	—	Yes
Yes	Yes	—	—	—	—
SINAMICS S210	SINAMICS S120, G120	SINAMICS S120	SINAMICS S120	SINAMICS S120	SINAMICS S120
—	Yes	—	Yes	Yes	Yes
—	Yes	—	—	—	—
Yes	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	Yes	Yes	Yes	—	Yes

[2] Maximum velocity at rated force (feed force F_N)
[3] Rated force (feed force F_N)
[4] Outer stator diameter

Published by
Siemens Industry, Inc.

100 Technology Drive
Alpharetta, GA 30005

(770) 871-3800

Order No. DRBR-SIMOTICS-0822

Printed in USA

usa.siemens.com/motioncontrol