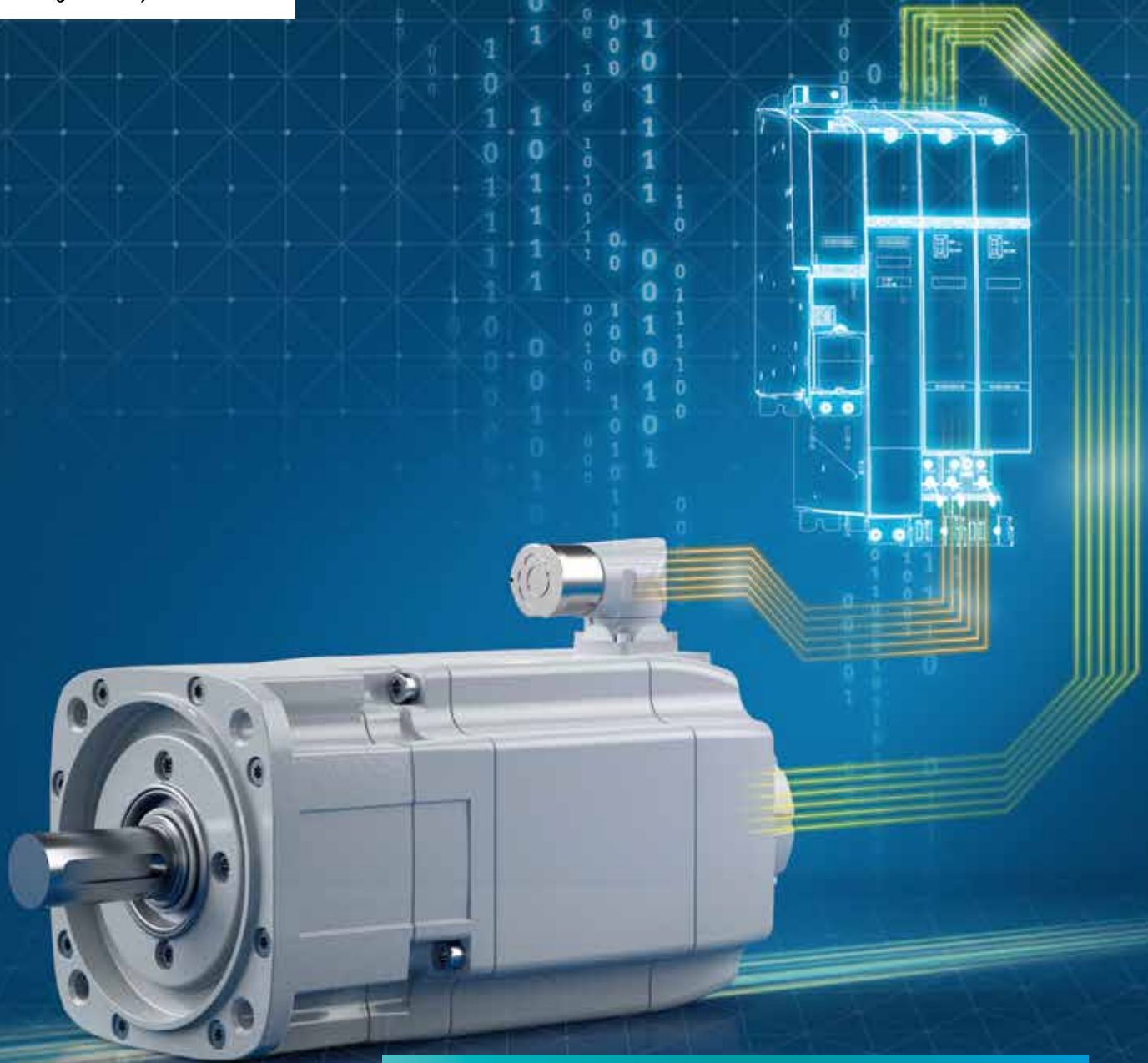


**SIEMENS**

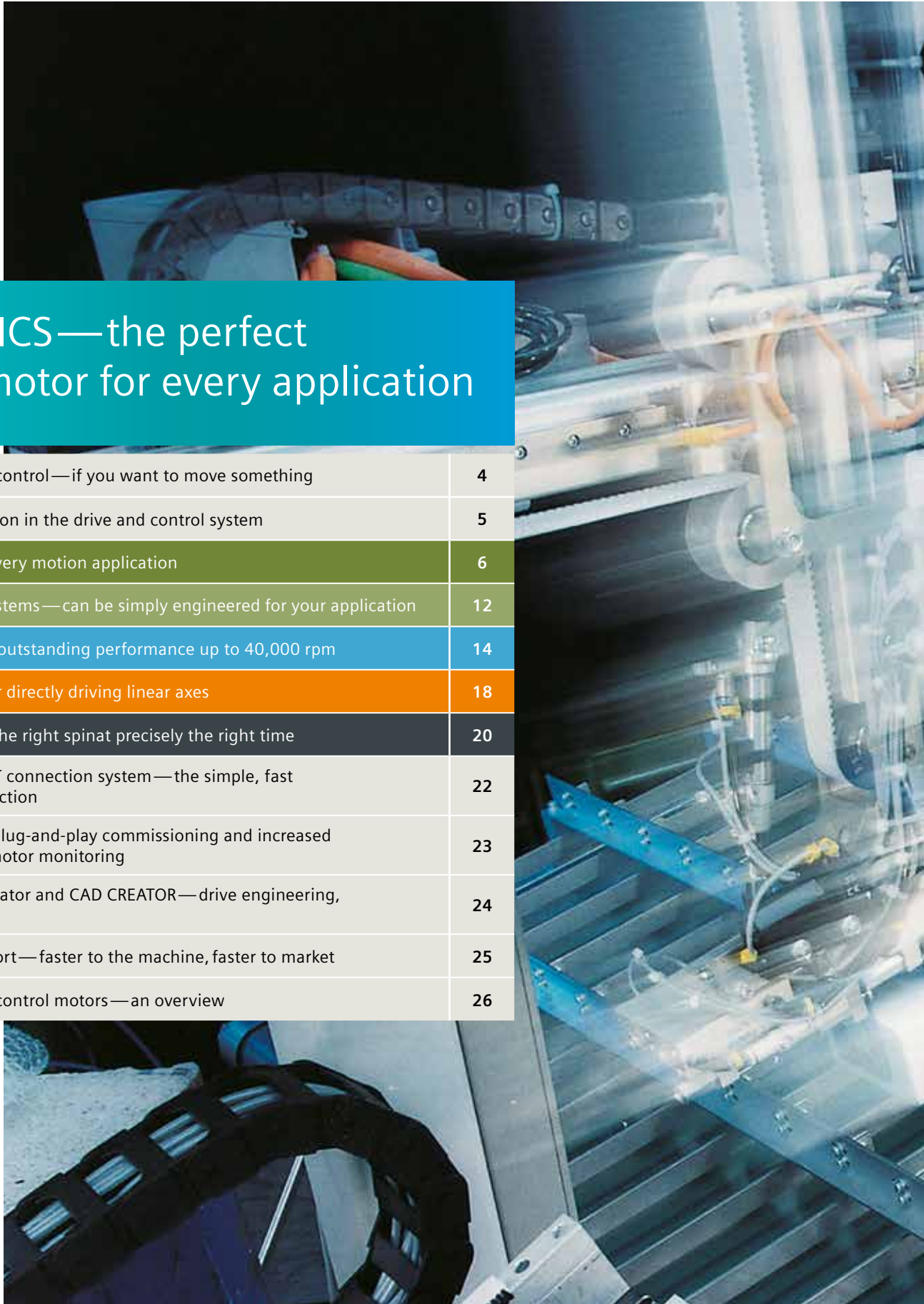
*Ingenuity for life*



## SIMOTICS—compact, dynamic and rugged

The optimum motor for every  
motion control application

[usa.siemens.com/motion-control-motors](http://usa.siemens.com/motion-control-motors)



# SIMOTICS—the perfect servomotor for every application

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# SIMOTICS motors for motion control— if you want something to move


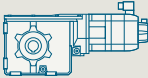
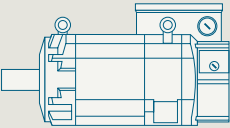

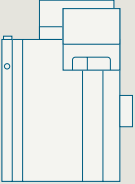
Since the development of the dynamo-electric principle by Werner von Siemens back in 1866, innovative motor technology represents a core business of our company. In addition to low-voltage, DC and high-voltage motors, SIMOTICS motors have firmly established themselves in many industries when it comes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

SIMOTICS motion control motors are based upon:



- 150 years of experience and innovation in electric motor technology
- The widest range of motors worldwide with optimum solutions for motion control tasks in all industries and power classes
- 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				
SIMOTICS S		SIMOTICS M	SIMOTICS L	SIMOTICS T
servomotors	servo geared motors	main motors	linear motors	torque motors
				

**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.

Seamless integrated motion control solutions				
Control system	 SIMATIC	 SINUMERIK	 SIMOTION	
Drive	 SINAMICS V90	 SINAMICS S210	 SINAMICS G120	 SINAMICS S120
MOTION-CONNECT				
Motor	 SIMOTICS S servomotors	 SIMOTICS M main motors	 SIMOTICS L linear motors	 SIMOTICS T torque motors

# Servomotors for every motion application

No matter whether positioning, angular synchronism, cyclic drives or path control in machine tools—with SIMOTICS servomotors, you benefit from high dynamic performance, precision, compactness and ruggedness.

## SIMOTICS S-1FK7

### Cost-effective, flexible and universal

With our SIMOTICS S-1FK7 servomotors, depending upon the requirements relating to dynamic performance, control response, precision and space, there are three moment of inertia versions to select from—when required, also in combination with a gearbox.

### SIMOTICS S-1FK7 Compact (CT)

High power density with a short length makes our SIMOTICS S-1FK7 Compact (CT) motors pre-destined for universal use in applications where space is restricted.

### SIMOTICS S-1FK7 High Dynamic (HD)

SIMOTICS S-1FK7 High Dynamic (HD) motors set themselves apart as a result of their low rotor diameter. This minimizes the intrinsic moment of inertia and facilitates high-dynamic performance. This makes them the ideal choice when it comes to motion sequences with very short cycle times demanding high-dynamic performance.

### SIMOTICS S-1FK7 High Inertia (HI)

The increased intrinsic moment of inertia of our SIMOTICS S-1FK7 High Inertia (HI) motors ensures an extremely rugged control response, ideal for applications with high and variable load moments of inertia.

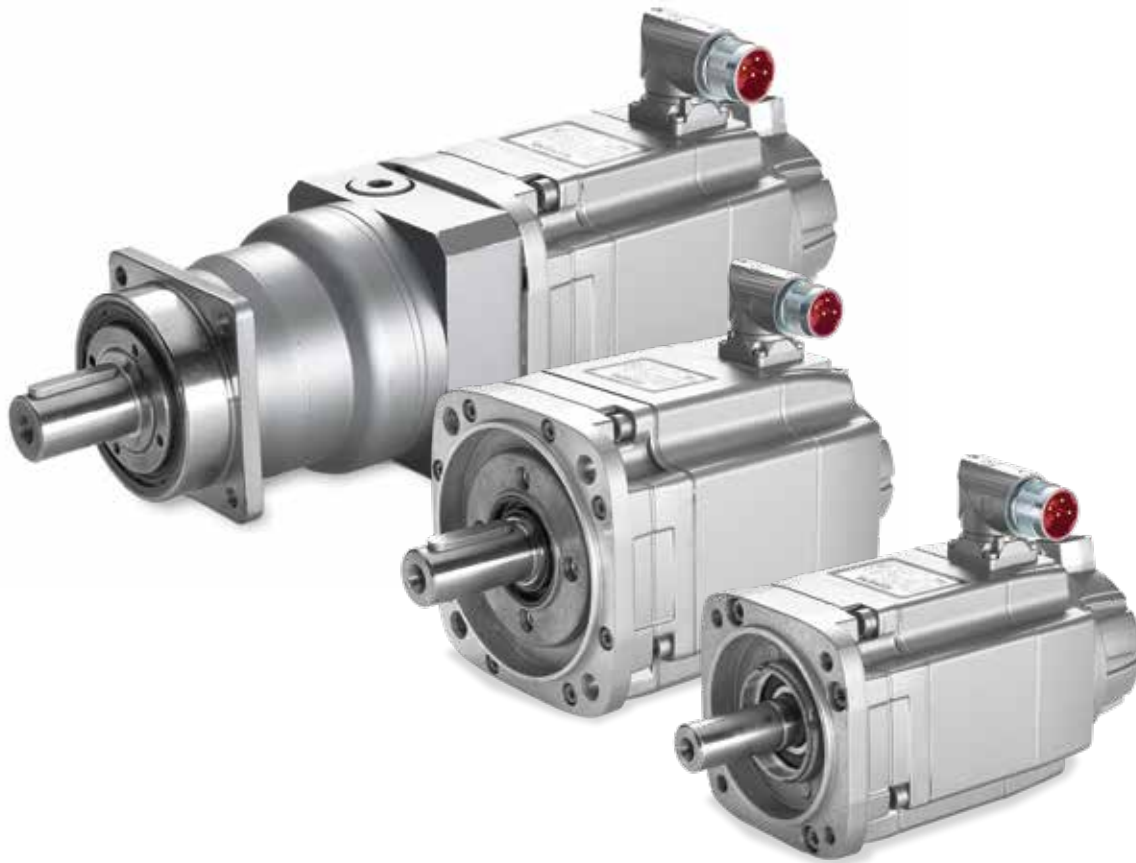
### SIMOTICS S-1FK7 with mounted planetary gearbox

When specified, we can also supply S-1FK7 motors with a mounted planetary gearbox. High-precision and economic planetary gearboxes are available to address a wide range of applications. You benefit from high, smooth-running properties and compactness for motion control applications.



### Highlights of the SIMOTICS S-1FK7 motor series

- 3 versions with different moment of inertia versions— Compact, High Dynamic, High Inertia
- High efficiency 300% overload capability
- Resistant to shock and vibration—the encoder is mechanically decoupled
- Optional absolute encoder, incremental encoder or resolver
- Installation and service-friendly using a rotatable quick-release connector and field-replaceable encoder
- Digital DRIVE-CLiQ interface with electronic type plate for optimal connectivity to SINAMICS S120 drives
- Optionally with different types of gearboxes and backlash-free holding brake
- Cooling methods—natural cooling and forced ventilation



### SIMOTICS S-1FK7 servomotors—overview

SIMOTICS S-1FK7	Standstill torque *	Rated speed *	Rated power *
CT – Compact	0.2–48 Nm	up to 6,000 rpm	0.05–8.2 kW
HD – High Dynamic	1.3–28 Nm	up to 6,000 rpm	0.6–3.8 kW
HI – High Inertia	3–48 Nm	up to 6,000 rpm	0.9–7.7 kW

\* depending upon the version and type

### Typical application areas

- Packaging machines
- Plastics and textile machines
- Printing machines
- Wood, glass, ceramic and stone processing machines
- Robots, handling systems and conveyor technology
- Feed and auxiliary axes for machine tools



# SIMOTICS S-1FT7

## Maximum power and performance with customized cooling

Our SIMOTICS S-1FT7 servomotors are completely in their element when it comes to high-performance motion applications in the torque range up to 280 Nm. They are available in two different versions with various cooling methods.

## SIMOTICS S-1FT7 Compact motors (CT)

Naturally cooled, force-ventilated or water-cooled 1FT7 motors are predominantly used where space is restricted and a high power density is required. Their low torque ripple makes them predestined for machine tool applications where a high surface quality is critical.

## SIMOTICS S-1FT7 High Dynamic motors (HD)

This version sets itself apart as a result of the extremely low intrinsic moment of inertia. This makes them predestined for applications demanding the highest dynamic response and shortest cycle times. 1FT7 High Dynamic motors are available with forced ventilation and water cooling—and are characterized by their high continuous power capability.

## SIMOTICS S-1FT7 with mounted planetary gearboxes

When specified, we can also provide our S-1FT7 motors with mounted planetary gearboxes. High-precision planetary gearboxes are available to address a wide range of applications. With these motors, you benefit from high, smooth-running properties and a high degree of compactness for motion control applications.



## Highlights of the SIMOTICS S-1FT7 motor series

- Two versions with different moments of inertia— Compact, High Dynamic
- High efficiency and 400 % overload capability (naturally cooled versions)
- High surface quality of the workpiece through low radial eccentricity and low torque ripple
- Either naturally-cooled, forced-ventilated or water-cooled
- IP67 degree of protection makes them extremely rugged—and encoders are mounted so they are decoupled from any oscillation and vibration
- Optional absolute encoder or incremental encoder
- Service- and installation-friendly using the crossover profile, quick release connector that can be rotated and field-replaceable encoder
- Digital DRIVE-CLiQ interface with electronic type plate for optimum connectivity to SINAMICS S120 drives
- Optional: holding brake with no backlash—and planetary gearbox with low backlash





Forced ventilation



Natural cooling



Water cooling

### SIMOTICS S-1FT7 servomotors—overview

SIMOTICS S-1FK7	Standstill torque *	Rated speed *	Rated power *
CT – Compact	2–280 Nm	up to 6,000 rpm	0.88–45.5 kW
HD – High Dynamic	14–105 Nm	up to 4,500 rpm	3.8–21.7 kW

\* depending upon the version and type

### Typical application areas

- Machine tools
- Packaging machines
- Printing machines
- Conveyor technology and handling systems



# SIMOTICS S-1FG1

## Open for a wide range of gearboxes

The concept of our SIMOTICS S-1FG1 servo geared motors is attractive as a result of the variable configuration options that can be used to create customized solutions—both regarding the type of construction and power rating. Irrespective of whether your application requires a helical, parallel shaft, bevel or helical worm gearbox, with high efficiencies, low torsional backlash and finely graduated ratios, these motors can optimally address a wide range of different motion control applications.

## Optimum interaction

These servo geared motors are optimally adapted to the SINAMICS S120 drive system and the various commissioning tools. This facilitates seamless integration into the drive and automation environment. Commissioning can be performed very quickly using the DRIVE-CLiQ system and electronic type plate. Pre-fabricated MOTION-CONNECT power and signal cables ensure that perfect connections can be established quickly and easily.



## Highlights of the SIMOTICS S-1FG1 motor series

- Versions for standard (Compact) and especially fast load cycles (High Dynamic)
- Naturally cooled design with a high power density
- Helical gearing for very smooth operation
- Wide range of versions based on four gearbox types and up to 25 ratios
- High transmission ratio in the first gearbox stage allows two instead of three stage gearboxes to be used—resulting in a two percent higher efficiency with lower temperature rise
- Digital DRIVE-CLiQ interface with electronic type plate for optimum connectivity to SINAMICS S120 drives



Helical geared motor



Parallel shaft geared motor



Bevel geared motor



Helical worm geared motor

### SIMOTICS S-1FG1 servo geared motors—overview

Geared motor type	Helical <sup>1)</sup>	Parallel shaft <sup>1)</sup>	Bevel <sup>2)</sup>	Helical worm <sup>3)</sup>
<b>Gearbox designation</b>	Z29–Z129 D29–D129	FZ29–FZ129 FD29–FD129	B29–B49 K39–K149	C29–C89
<b>Max. drive torque (Nm)</b>	14–1,890 (Z) 146–5,000 (D)	17–5,000 (FZ) 163–5,010 (FD)	15–465 (B) 24–8,160 (K)	46–1,480
<b>Range of transmission ratios</b>	3.4–62.5 (Z) 39.3–373 (D)	3.6–65.2 (FZ) 46.4–413 (FD)	3.5–59.3 (B) 5.2–244.3 (K)	6.2–102.5

<sup>1)</sup> 2-stage (Z), 3-stage (FD) <sup>2)</sup> 2-stage (B), 3-stage (K) <sup>3)</sup> 2-stage

### Typical application areas

- Packaging machines
- Printing machines
- Wood and metal processing
- Palletizers and storage and retrieval machines with hoisting, gantry and fork drives
- Dosing pumps and actuator drives



# Our servo drive systems can be simply engineered for your application

## SIMOTICS S-1FL6 and SINAMICS V90

### Can be flexibly configured in the lower power range

Together with SINAMICS V90 drives, SIMOTICS S-1FL6 servomotors form a seamlessly integrated drive system with eight drive sizes and seven motor versions. Based upon their optimized moment of inertia, the motors handle continuous motion such as winding and punching—with very high, smooth running characteristics. Versions with a very low moment of inertia are available for motion sequences demanding a high dynamic performance with high positioning accuracy.

#### SIMOTICS S-1FL6 servomotors—overview

SIMOTICS S-1FL6	Standstill torque *	Rated speed *	Rated power *
LI – Low Inertia	0.16–6.37 Nm	up to 5,000 rpm	0.05 – 2.0 kW
HI – High Inertia	1.27–33.4 Nm	up to 3,000 rpm	0.4 – 7.0 kW

\* depending upon the version and type

#### Highlights of the SIMOTICS S-1FL6 and SINAMICS V90

- Two versions with different moments of inertia—Low and High Inertia
- 300% overload capability and high IP65 degree of protection
- With either incremental or absolute encoder
- Quick release connector for simple motor installation
- Servo tuning and machine optimization using the auto-tuning function
- All frame sizes have an integrated braking resistor
- Optional with /without brake—as well as with plain shaft or feather key



#### Typical application areas

- Handling systems, automatic equipping and assembly machines
- Packaging and labeling machines
- Metal forming machines
- Printing machines
- Winders and unwinders

# SIMOTICS S-1FK2 and SINAMICS S210

## Perfect interaction to address high requirements

SIMOTICS S-1FK2 motors have been specifically developed for use with SINAMICS S210 drives—to create a servo drive system with five power classes from 50 up to 750 Watts. This means that low loads can be moved with an extremely high dynamic response and high loads can be positioned with a high degree of precision. Motors are connected to the drives through an innovative connection system called One Cable Connection—OCC with quick release. This combines power conductors, encoder signal and brake in one thin cable along with a single, compact plug connector that can be rotated—simplifying installation and increasing drive ruggedness.

### SIMOTICS S-1FK2 servomotors—overview

SIMOTICS S-1FK2	Standstill torque *	Rated speed *	Rated power *
CT – Compact	0.64–1.27 Nm	3,000 rpm	0.2–0.4 kW
HD – High Dynamic	0.16–2.4 Nm	3,000 rpm	0.05–0.75 kW

\* depending upon the version and type

### Highlights of the SIMOTICS S-1FK2 and SINAMICS S210

- Two versions with different moments of inertia—Compact and High Dynamic
- High efficiency and 300% overload capability
- With either multi-turn absolute or absolute encoder
- Extremely simple to commission with web server, motor parameters are automatically read in—and the drive system can be perfectly optimized using the One Button Tuning function
- One Cable Connection (OCC) to connect the motor to the drive



### Typical application areas

- Packaging machines and filling systems
- Feeding, removing, mounting and stacking systems
- Wood and ceramic processing
- Digital printing machines

# Main motors with outstanding performance up to 40,000 rpm

## SIMOTICS M-1PH8

### 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. 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. In addition, 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 torques, our compact SIMOTICS M-1PH8 **synchronous motors** have unbeatable smooth-running characteristics.

### Whether synchronous or induction—it is always SIMOTICS

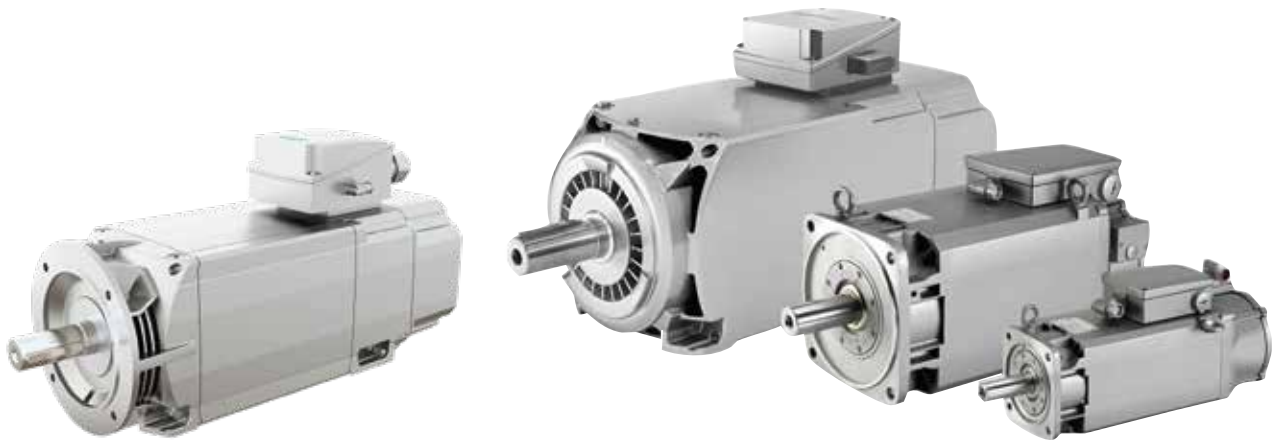
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When the focus is on high-rated torque, our compact SIMOTICS M-1PH8 **synchronous motors** have unbeatable smooth-running operation. With a wide range of options, they can be flexibly adapted to every application, and are available with forced ventilation 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.



### Highlights of the SIMOTICS M-1PH8 motors

- Extended power range from 2.8 kW to 1,340 kW
- Flexible configuration options
  - Induction or synchronous 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 times
- Winding switchover (star / delta)
- Simple and flexible connection system
- Commissioning using the electronic rating plate via digital DRIVE-CLiQ interface



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

SIMOTICS M-1PH8	Standstill torque *	Rated speed *	Max. speed *	Rated power *
<b>Induction</b>	2.9–12,435 Nm	400–10,000 rpm	up to 24,000 rpm	2.8–1,340 kW
<b>Synchronous</b>	94–approx. 1,650 Nm	700–3,600 rpm	up to 4,500 rpm	15–310 kW

\* depending upon the version and type



### 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 synchronous 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

Our SIMOTICS main motors have been 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 due to their short rise times—and can even handle extreme load cycles with high speed, torque and positioning precision.





# SIMOTICS M-1FE

## It has enough space in any spindle

SIMOTICS M-1FE synchronous built-in motors are especially compact main spindle motors with a very high-dynamic performance that have been specifically designed for 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.



### Highlights of the SIMOTICS M-1FE main motors

- Compact design as mechanical components can be eliminated
- Short accelerating and braking times
- High degree of stiffness for milling spindles based on 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

	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



# The benchmark for directly driving linear axes

**SIMOTICS linear motors set benchmarks when it comes to accuracy, precision and cost effectiveness of applications involving linear motion. Contrary to conventional drive solutions, they do not require any mechanical transmission elements—which simplifies the design of your machines and optimizes their availability.**

## SIMOTICS L-1FN3

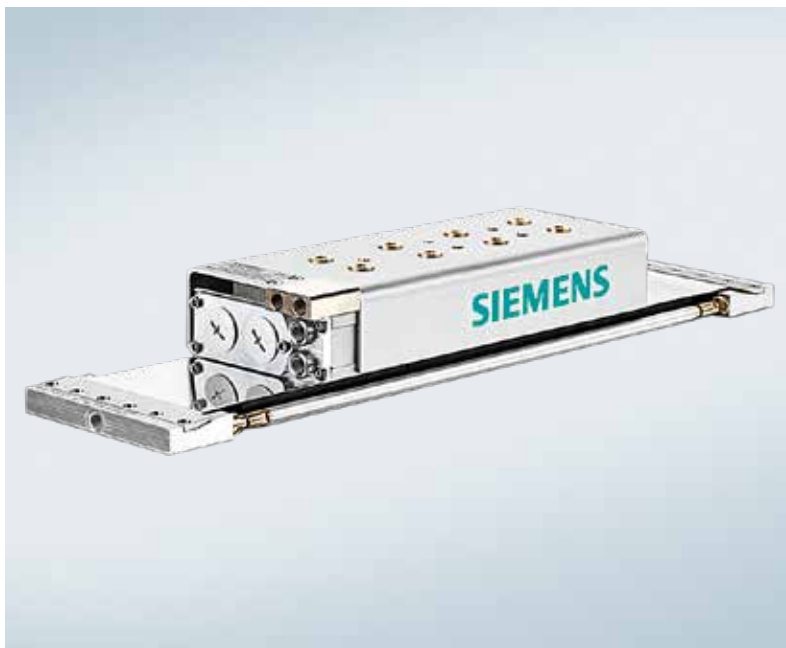
### The modular industry sector standard

SIMOTICS L-1FN3 motors are water-cooled and were specifically developed for machine tool applications. They have been the proven standard for linear motion for many years. The modular principle provides you with a comprehensive range of motor versions that are almost wear-free and therefore low-maintenance. 1FN3 linear motors are available in several different widths and up to five different lengths—as well as several winding types.

The motors are harmonized and coordinated for operation with SINAMICS S120 drives. A wide range of accessories is available to further optimize the high degree of ruggedness and thermal encapsulation.

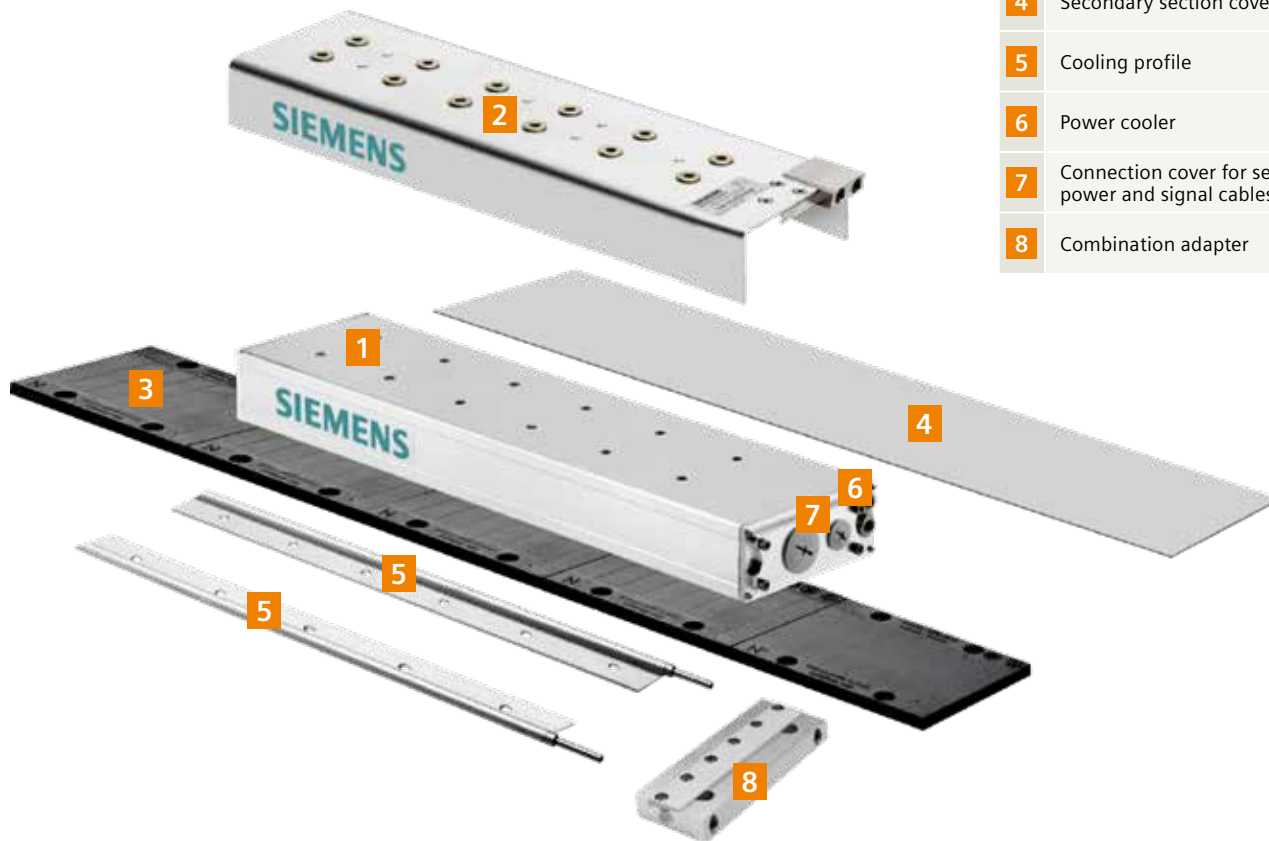
When it comes to using direct drives in machine tools and production machines, Siemens has many years of experience and a wealth of specific know-how. Based upon all of this experience and know-how, we are more than willing to support you by quickly and reliably implementing your development goals. Simply contact us:

✉ [motor.support.motioncontrol@siemens.com](mailto:motor.support.motioncontrol@siemens.com)



### Highlights of the SIMOTICS L-1FN3 linear motors

- Highest precision linear motion with high-dynamic performance
- Enormous force density in a compact design
- Highest traversing velocities for all applications
- Highest precision when using suitable measuring systems
- High energy efficiency
- Large air gap, therefore extremely rugged against external influences
- Wide range of options depending upon the application profile
- Simple mounting and installation
- Wear-free drive components
- Low machine lifecycle costs



1	Primary section
2	Precision cooler
3	Secondary section
4	Secondary section cover
5	Cooling profile
6	Power cooler
7	Connection cover for separate power and signal cables
8	Combination adapter



### SIMOTICS L-1FN3 linear motors—overview

SIMOTICS L-1FN3	Peak load	Continuous load
Feed force*	up to 20,700 N	up to 17,610 N
Velocity*	up to 836 m/min	up to 435 m/min
Overload capability*	up to 2.75 x F <sub>N</sub>	1.7 x F <sub>N</sub>

\* depending upon the version and type

### Typical application areas

- Milling, turning and grinding machines
- Laser machining centers
- Handling systems
- Production machines
- Oscillators
- Test setups

# Always providing the right spin at precisely the right time

Whether for machine tools, extruder worms or paper rolls—SIMOTICS slow speed permanent-magnet torque motors represent an attractive solution for driving all rotary axis types. They can be completely integrated in machines without requiring mechanical transmission elements. This reduces the space required, provides maximum flexibility when integrating the motors, minimizes maintenance costs and maximizes availability.

In addition, the direct mechanical connection results in an increased dynamic performance and control quality in the overall system and ensures a high torque at the optimum speed with high precision—resulting in highly productive machines. So depending upon your application, you have the choice between two motor types.

## SIMOTICS T-1FW3 and SIMOTICS T-1FW6

### SIMOTICS torque motors—the highest precision for rotary axes

The extremely compact, water-cooled **SIMOTICS T-1FW3 complete torque motors** are flanged to the machine using torque arms specifically developed for the purpose. An optional clamping element makes it easier to couple the rotor to the machine shaft.

The pre-installed mounting set includes the torque arm, clamping element and centering sleeve (only for hollow shafts)—making it simple and safe to establish a connection to the motor. This creates a perfectly stiff drive train that can be optimally controlled.

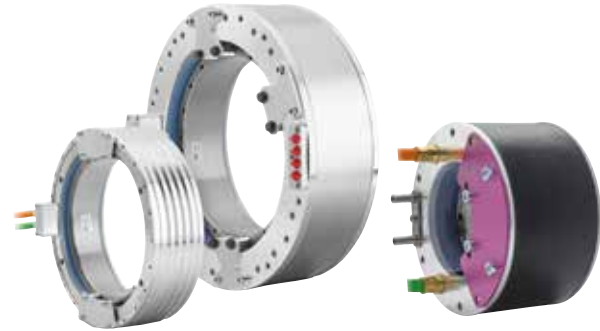


### Highlights of the SIMOTICS torque motors

- Highest precision, power and dynamic performance
- Various application-specific versions
- Direct controllability—no elasticities in the drive train
- Low space requirement and simplified maintenance as the motor can be directly integrated into the machine structure without having to use mechanical transmission elements
- High number of poles for high torques at low speeds
- Short acceleration times, very high smooth-running characteristics
- High degree of efficiency
- High degree of availability



SIMOTICS T-1FW3



SIMOTICS T-1FW6

For **SIMOTICS T-1FW6 built-in torque motors**, stator and rotor are supplied as components and are directly integrated into the machine itself. They are available with jacket as well as with integrated cooling. Additionally, the motors operate without any mechanical transmission elements—e.g. coupling and gearbox—and require significantly less space than conventional drives. The compact design and low number of installed parts reduce the number of interfaces, maintenance costs and stock inventory costs—thus minimizing machine failures.

#### SIMOTICS T-1FW3 and T-1FW6 torque motors—overview

SIMOTICS T	T-1FW3 Complete torque motor	T-1FW6 Built-in torque motor
<b>Rated torque*</b>	up to 7,000 Nm	up to 5,600 Nm
<b>Rated speed*</b>	up to 1,200 rpm	up to 940 rpm
<b>Maximum speed*</b>	up to 1,800 rpm	up to 1,500 rpm
<b>Maximum torque</b>	11,000 Nm	10,900 Nm

\* depending upon the version and type

#### Typical application areas

##### SIMOTICS T-1FW3 motors

- Rolling mill drives
- Paper machines
- Plastic injection molding machines
- Handling and assembly systems
- Servo presses

##### SIMOTICS T-1FW6 motors

- Rotary indexing machines
- Rotary indexing tables and partial machines
- Rotary axes (A/B/C for 5-axis machining centers)
- Workpiece spindles
- Roll and cylinder drives



# MOTION-CONNECT connection system

The simple, fast and reliable connection

With MOTION-CONNECT, Siemens offers a reliable, high-quality and efficient cabling system for your motion control applications. You benefit from higher machine and plant availability thanks to this innovative connection system. It's significantly faster and much easier to connect than conventional systems.

## Always the optimum connection

- **MOTION-CONNECT 500**—cost-effective product for predominantly fixed cable routing
- **MOTION-CONNECT 800PLUS**— for high-dynamic performance in drag chains with increased mechanical requirements up to 5 g or longer traversing distances up to 50 m
- **SPEED-CONNECT**—fast, rugged and reliable connection using robust round connectors with quick release
- **DRIVE-CLiQ**—high-quality shielded cables with RJ45 metal connector or compact and rugged M12 connector for connecting direct measuring systems

## Highlights of MOTION-CONNECT

- The optimum connection between SINAMICS drives and SIMOTICS motors; plug-and-play based upon system-tested original components
- Pre-fabricated cables with rugged IP67 connectors
- Cables pre-fabricated with decimeter accuracy
- Large selection based upon the finely graduated cross-sections from 1.5 up to 120 mm<sup>2</sup>
- Consistent quality management and a comprehensive testing program
- Highest plant / system availability and high EMC quality using a 360° shield connection

Technical overview of MOTION-CONNECT									
Product	Type	Max. traversing velocity [m/min]		Max. bending operations* [millions]		Max. acceleration* [m/s <sup>2</sup> ]		Max. traversing distance* [m]	
MC500	Power cable	0–30		0–0.1		0–2		0–5	
	Signal cable	0–30		0–0.1		0–2		0–5	
MC800 PLUS	Power cable <sup>1</sup> and signal cable	0–300		0–10		0–50		0–50	
	Power cable <sup>2</sup>	0–300		0–10		0–50		0–50	

\* mechanically tested <sup>1</sup>(up to 16 mm<sup>2</sup>) <sup>2</sup>(25 to 50 mm<sup>2</sup>)

# DRIVE-CLiQ—plug-and-play commissioning

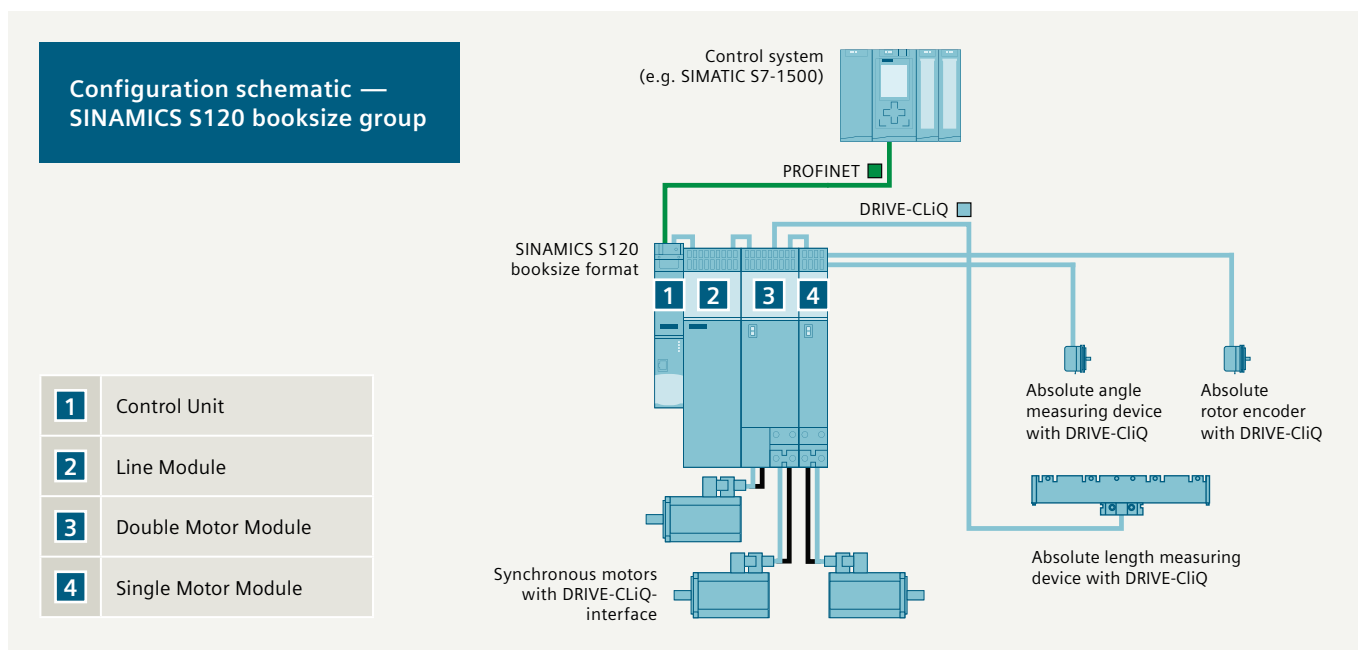
Increased transparency when it comes to motor monitoring

As the digital interface for SIMOTICS motors, DRIVE-CLiQ uses an Ethernet-based format for fast encoder and motor data transfers between the motor and drive. The motor and encoder electronic type plate are identified in the SINAMICS drive system via this connection—thus facilitating automatic parameterization. This results in fast and simple commissioning.

DRIVE-CLiQ offers some significant advantages while the motor is operational. Transferring actual operating data allows machines and plants to be monitored more transparently.

## Highlights of DRIVE-CLiQ include

- High-performance system interface for the SINAMICS drive system
- Encoders from various manufacturers can be connected
- Integrated safety functions are supported (SINAMICS Safety Integrated)
- Auto-configuration based upon electronic rating plates
- Simple standard cabling for all encoder types
- Hubs are used to reduce cable connections
- Low engineering costs
- Simple and fast diagnostics of the measuring system



# SIZER, DT Configurator and CAD CREATOR

Drive engineering—simple and fast

With Siemens, you can obtain the optimum motor solution in a convenient and user-friendly way—thanks to the efficient and high-performance DT Configurator and CAD CREATOR tools for engineering and design.

## Efficient motor selection and dimensioning— Sizer engineering software

The SIZER engineering software supports you when engineering a complete drive system, including options, accessories and connection systems. SIZER allows you to simply handle single-motor drives up to complex multi-axis drives. Starting from the application, a motor Wizard supports you step-by-step when dimensioning the motor. The advantage of this approach is that SIZER not only provides a list of all the components with the various ordering information, but also allows motor data to be simply imported into the CAD CREATOR.

## Selecting and configuring made easy by using the Drive Technology Configurator

The Drive Technology Configurator, or DT Configurator, supports you when selecting the optimum products for your application—from motors through drives up to the relevant options.


Comprehensive documentation—from data sheets through operating instructions up to 2D/3D dimension drawings and certificates—can also be called up. The components you selected can be directly ordered by transferring them into the Industry Mall shopping cart.

## Integrated—mechanical design based upon CAD CREATOR

Technical data, dimension drawings and CAD motor data can be quickly and simply generated using CAD CREATOR. The data can be easily transferred into the system documentation and used for the mechanical design.

CAD CREATOR is included in the scope of supply of the SIZER engineering software.



 [siemens.com/sizer](https://www.siemens.com/sizer)  
[siemens.com/dt-configurator](https://www.siemens.com/dt-configurator)  
[siemens.com/cad-creator](https://www.siemens.com/cad-creator)



# Mechatronic Support

Faster to the machine—faster to market

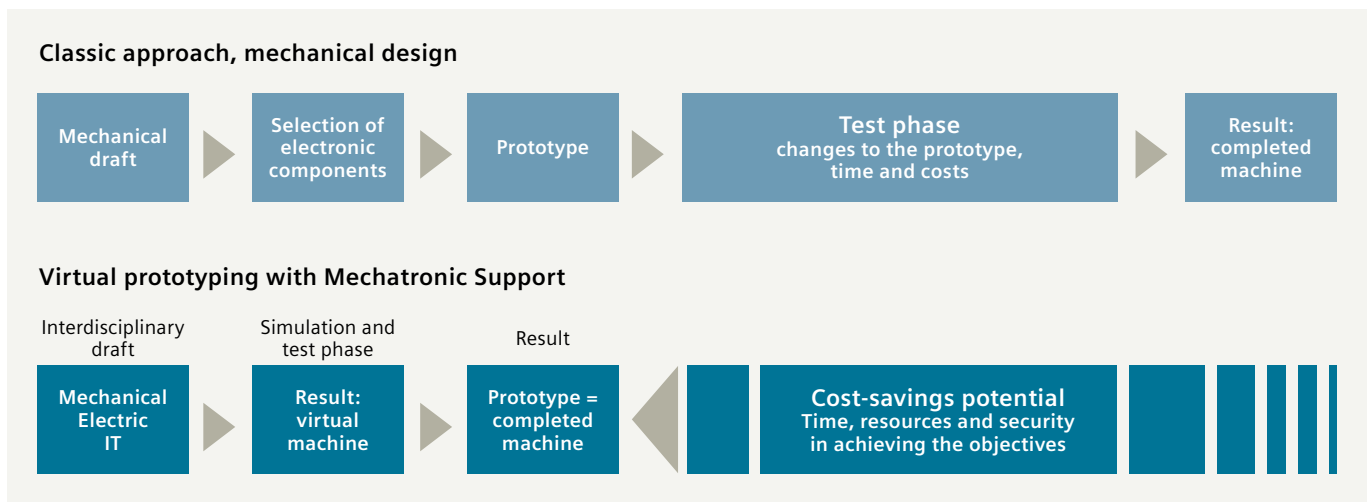
With Mechatronic Support, Siemens can offer you the ideal basis to significantly optimize the productivity and precision of your machine—and this, already in the design phase. As a result, new machine concepts can be virtually compared with one another, modified and optimized—without having to build a prototype.

## A clever alternative to trial and error






With Mechatronic Support, Siemens offers you an intelligent alternative to developing costly prototypes. Using virtual prototyping, already in the draft phase, all mechanical, electronic and IT systems can be modeled and optimized regarding their functionality. The machine is produced without first having to build a prototype.

## Siemens—your partner for machine development

- Comparison and assessment of machine concepts regarding static and dynamic precision, control loop dynamics, stiffness
- Mechatronic model building and machine simulation (finite element techniques)
- Computer-based optimization of machine structures
- Optimum dimensioning and selection of all motor and control loop components
- Commissioning and control loop optimization
- Analysis and optimization of existing tool and production machines locally on-site
- Shorter development times—faster to market
- Development objectives are reliably reached
- Risk-free testing of new machine concepts
- Higher quality and productivity from the start



# SIMOTICS motion control motors—an overview

Motor types	SIMOTICS servomotors			Servo drive systems	
					
	SIMOTICS S-1FK7	SIMOTICS S-1FT7	SIMOTICS S-1FG1	SIMOTICS S-1FL6	SIMOTICS S-1FK2
<b>Cooling methods</b>	Natural cooling, forced-ventilated	Natural cooling, forced-ventilated, water-cooled	Natural cooling	Natural cooling	Natural cooling
<b>Shaft height</b>	20 ... 100	36 ... 132	Frame sizes 29...109	20 ... 90	20, 30, 40
<b>Degree of protection</b>	IP64 to IP65	IP64 to IP67	IP65	IP65	IP64 to IP65
<b>Rated speed/velocity</b>	2,000 ... 6,000 rpm	1,500 ... 6,000 rpm	13 ... 1,279 rpm	2,000 ... 5,000 rpm	3,000 rpm
<b>Rated power</b>	0.05 ... 8.17 kW	0.88 ... 45.5 kW	0.5 ... 1.8 kW	0.05 ... 7.0 kW	0.05 ... 7.5 kW
<b>Rated Nm torque/force</b>	0.08 ... 37 Nm	1.4 ... 250 Nm	dependent upon the geared motor, up to 3,070 Nm	0.16 ... 33.4 Nm	0.16 ... 2.4 Nm
<b>Encoder</b>	Single and multi-turn absolute encoder, incremental encoder, resolver	Single and multi-turn absolute encoder, incremental encoder	Single and multi-turn absolute encoder, resolver	Single and multi-turn absolute encoder, incremental encoder	Single and multi-turn absolute encoder
<b>Holding brake as option</b>	yes	yes	yes	yes	yes
<b>Typical applications</b>	Applications with high, up to very high demands on the dynamic performance and precision, e.g. robots and handling systems, wood, glass, ceramic and stone processing, packaging, digital printing, plastics and textile machines and in the machine tool industry		In applications such as palletizers, storage and retrieval machines with hoisting, travel and fork drives, dosing pumps and actuator drives	Handling systems, automatic equipping and assembly machines, packaging and labeling machines, metal forming machines, printing machines, winders and unwinders	Applications with high, up to very high demands on the dynamic performance and precision, e.g. robots and handling systems, wood, glass, ceramic and stone processing, packaging, digital printing, plastics and textile machines and in the machine tool industry
<b>Drive systems</b>	SINAMICS S120	SINAMICS S120	SINAMICS S120	SINAMICS V90	SINAMICS S120
<b>Catalog<sup>*)</sup></b>	D21.4, NC62, D31.1	D21.4, NC62, D31.1	D41	D33	D32

<sup>\*)</sup> D21.4: SINAMICS S120 and SIMOTICS

D33: SINAMICS V90 basis servo drive systems

D31.1: SINAMICS drives for single-axis drives / built-in units

D41: SIMOTICS S-1FG1 servo geared motors

D32: SINAMICS S210 servo drive systems

NC62: SINUMERIK 840 equipment for machine tools

SIMOTICS main motors		SIMOTICS linear motors	SIMOTICS torque motors	
				
SIMOTICS M-1PH8	SIMOTICS M-1FE1, M-1FE2	SIMOTICS L-1FN3	SIMOTICS T-1FW3	SIMOTICS T-1FW6
Forced-ventilated, open-circuit-cooled, water-cooled	Water cooling	Water cooling	Water cooling	Water cooling, natural cooling
80 ... 355	40 ... 180	–	150 ... 280	159 ... 730 (outer stator diameter)
IP23, IP55, IP65	IP00	IP65	IP54/IP55	IP23
400 ... 10,000 rpm	500 ... 25,000 rpm	Max. velocity at rated force (feed force $F_N$ ): up to 836 m/min	150 ... 1,200 rpm	38 ... 940 rpm
2.8 ... 1,340 kW	4.0 ... 159 kW	1.7 ... 81.9 kW	2.8 ... 380 kW	1.7 ... 54.1 kW
2.9 ... 12,435 Nm	up to 1,530 Nm	Rated force (feed force $F_N$ ): 150 ... 10,375 N	100 ... 7,000 Nm	10 ... 5,760 Nm
Multi-turn encode, incremental encoder	External encoder required	External encoder required	Single and multi-turn absolute encoder, incremental encoder, resolver	External encoder required
yes	–	–	–	–
High-precision and high-dynamic rotary axes, e.g. main drives in presses, printing machines, roll drives and winders in foil machines and other converting applications, extruders, main spindle drives in machine tools	Motor spindles in machine tools, e.g. turning, grinding and milling spindles	Linear axes with the highest requirements on the dynamic response and precision, e.g. machining centers, grinding and out-of-center turning machines, laser and water-jet cutters, handling gantries and linked/cascaded systems	Applications with high, up to very high requirements on the torque and precision, e.g. extruders, injection molding machines, roll drives in foil-drawing machines, paper machines, winders, servo presses	Applications with high, up to very high requirements on the torque and precision, e.g. rolls and winders, rotary indexing tables, rotary cyclic machines, swiveling axes, tool turrets
SINAMICS S120, G120	SINAMICS S120	SINAMICS S120	SINAMICS S120	SINAMICS S120
D21.4, NC62, D31.1	NC62	D21.4, NC62	D21.4	D21.4, NC62

There's more to it.

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