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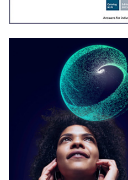


MOTION CONTROL DRIVES

# SINAMICS S210

## Servo Drive System

[siemens.com/d32](https://www.siemens.com/d32)

## Related catalogs

<p><b>Motion Control Drives</b> D 31.1 SINAMICS Inverters for Single-Axis Drives Built-In Units</p> <p>PDF (E86060-K5531-A111-A4-7600)</p>		<p><b>Motion Control System</b> PM 21 SIMOTION Equipment for Production Machines</p> <p>E86060-K4921-A101-A4-7600</p>	
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<p><b>Motion Control Drives</b> D 21.4 SINAMICS S120, SINAMICS S220 and SIMOTICS</p> <p>E86060-K5521-A141-A2-7600</p>		<p><b>SITRAIN</b> Digital Industry Academy</p> <p><a href="http://www.siemens.com/sitrain">www.siemens.com/sitrain</a></p>	
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Combining the real and digital worlds ...  
Transformation

Catalog  
D 32

Edition  
December  
2023

## MOTION CONTROL DRIVES

# SINAMICS S210

## Servo Drive System

[siemens.com/d32](https://www.siemens.com/d32)

Dear Customer,

We are pleased to present you with the new edition of the Catalog D 32 · January 2024. The catalog provides a comprehensive overview of the SINAMICS S210 servo drive system and supersedes Catalog D 32 · April 2023.

The SINAMICS S210 servo drive system consists of a SINAMICS S210 servo converter, a SIMOTICS S servomotor and the associated MOTION-CONNECT connection technology as One Cable Connection (OCC) technology.

The single-axis AC/AC servo converter system stands out due to its high performance and dynamic response.

In addition to updates and technical modifications, the new edition of the catalog has also been supplemented with news for the innovated version of the SINAMICS S210 servo converters under the designation "SINAMICS S210 servo converters (New)" and new versions of the SIMOTICS S-1FT2 servomotors.

The products listed in this catalog are also included in SiePortal. Please contact your local Siemens office for additional information.

Up-to-date information about SINAMICS S210 and matching SIMOTICS motors is available on the internet at:

[www.siemens.com/sinamics-s210](https://www.siemens.com/sinamics-s210)

You can access SiePortal online at: <https://sieportal.siemens.com>

Your personal contact will be happy to receive your suggestions and recommendations for improvement.

You can find your representative in our Personal Contact database at: [www.siemens.com/automation-contact](https://www.siemens.com/automation-contact)

We hope that you will often enjoy using Catalog D 32 · January 2024 as a selection and ordering reference document and wish you every success with our products and solutions.

With kind regards

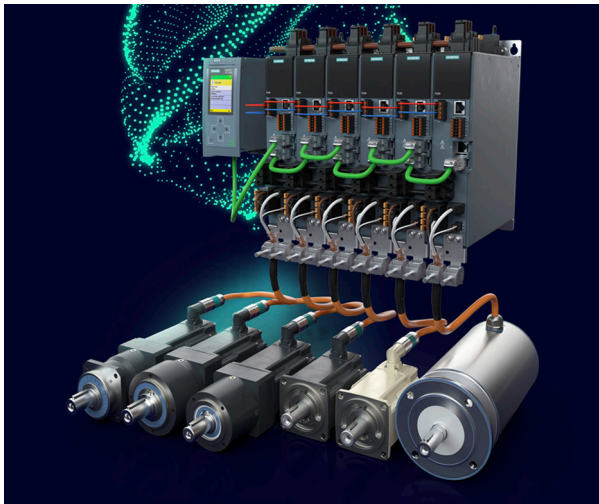
A handwritten signature in blue ink, appearing to read 'Frank Golüke', written in a cursive style.

Frank Golüke  
Vice President  
General Motion Control  
Siemens AG, Digital Industries, Motion Control



# SINAMICS S210 Servo Drive System

## Motion Control Drives



### Catalog D 32 · January 2024

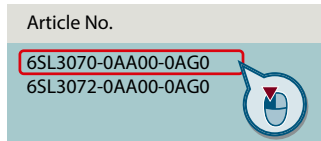
Supersedes:  
Catalog D 32 · April 2023

Refer to SiePortal for current updates of this catalog:  
<https://sieportal.siemens.com>

Please contact your local Siemens branch.

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The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001. The certificate is recognized by all IQNet countries.

## System overview

1

## SINAMICS S210 servo converters

2

## SIMOTICS S servomotors and servo planetary geared motors for SINAMICS S210

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## MOTION-CONNECT connection systems

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## Engineering tools

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## Services and documentation

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# Digitalization in drive technology

## From the digital world to the real world

[siemens.com/digital-drives](https://www.siemens.com/digital-drives)

### *Increase your transparency and productivity by digitalizing your drive technology*

Many drives are used in the manufacturing and process industries. They produce lots of data anyway – why not use them to increase the availability and productivity of machines and plants?

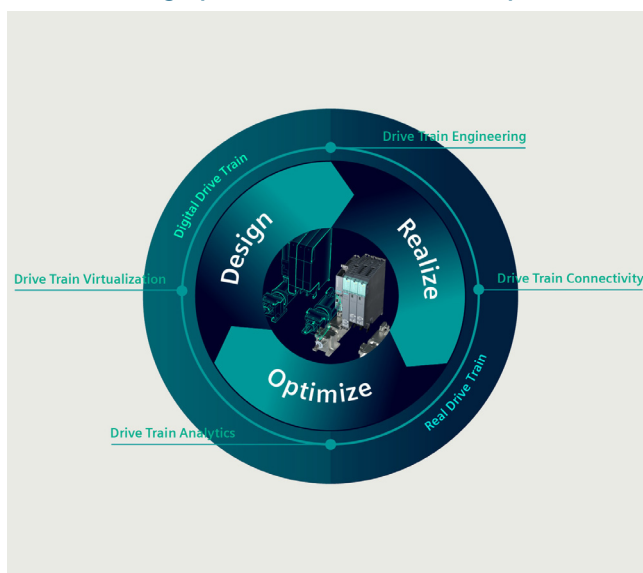
Drive technology offers the ideal entry point into the world of digitalization – for plant and machine builders as well as for users.

The digitalization portfolio for the drive train spans over the complete life cycle – from the design phase to realization and optimization – in the digital and the real world.

Our portfolio contains drive simulation solutions and efficient engineering tools, comprehensive connectivity that allows drives to be easily linked to the relevant platforms as well as smart analytics (e.g. cloud and edge apps) and drive system services.

These solutions enable you to gain a better understanding of processes, states and utilization. The health status of the drive train can be monitored and analyzing drive data enables an early detection of anomalies and reduces downtimes. This way, availability and productivity of machines and plants can be increased and the actual maintenance demand can be identified. Furthermore, data-based business models and service offerings are facilitated.

### *Our digitalization portfolio covers all phases of the life cycle: from the design phase to realization and optimization. It covers the digital and the real drive train.*



**Design:** By creating a digital twin of the drives, machine builders can shorten their time-to-market since they can design, simulate and optimize their machine before ordering any material or products. Together with other tools from the engineering box, simulation can also speed up the engineering phase of drives and entire machines, for example by virtual commissioning of the PLC.

**Realize:** Once the machine is in operation, the drives can be connected to other platforms, for example to the cloud and Industrial Edge. This creates transparency in terms of what is going on inside the drive train, e.g. with regard to the actual current, torque and speed.

**Optimize:** To understand the collected data, our drive train analytics portfolio provides algorithms and analysis tools to unlock the potential of the data and turn the gained transparency into insights and valuable knowledge. These insights can then again be used in the design phase of the next life cycle, thus closing the loop.

## Benefits of drive train digitalization

### Machine builders



#### Availability



Increase the availability of your machines

#### Speed



Shorten time-to-market

#### Business models



Develop new service and business models

### Machine operators



#### Productivity



Increase the productivity of your production

#### Flexibility



Increase the flexibility of your production

#### Efficiency



Identify potential for optimization

### Benefits for machine and plant builders

- Increased availability of machines and plants – thanks to digital options for checking and implementing design improvements and comprehensive monitoring of drive systems
- Shorter time-to-market and faster development times – thanks to practical software tools and a continuous database for concurrent development processes as well as virtual simulations, tests, and commissioning of machines and plants
- New options for future service and business models – ranging from customized application solutions and digital services to contractually guaranteed availabilities of machines and plants

### Benefits for machine and plant operators

- Increased availability and productivity of production, fewer unscheduled downtimes – through the early detection of deviations and emerging risks thanks to digital drive monitoring
- More flexible production down to batch size 1 – through more effective use of knowledge from existing production lines thanks to transparent utilization, states, locations, and capacities down to the drive level
- Identification of potential for optimization to make production faster, better, and more efficient thanks to data-based transparency – for example, for faster modifications, simpler quality control, and the early prediction of maintenance demand as well as demand-oriented maintenance



# TIA Selection Tool – quick, easy, smart configuration

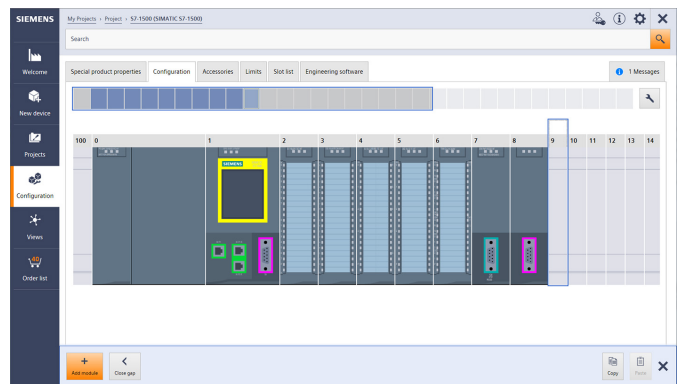
For you to get the most out of our portfolio quickly and easily.

Do you always need the optimum configuration for planning your project?

For your application we offer the TIA Selection Tool to support all project planners, beginners and experts alike.

No detailed portfolio knowledge is necessary.

TIA Selection Tool is available for download as a free desktop version or a cloud variant.



## Your Advantages

### Quick

- Configure a complete project with just a few entries – without a manual, without special knowledge
- Import and export of hardware configuration to TIA Portal or other systems
- Ideal visualization of the projects to be configured

### Easy

- Tool download either as desktop version or web-based cloud version
- Technically always up-to-date about product portfolio and innovative approaches
- Highly flexible, secure, cross-team work in the cloud
- Direct ordering in SiePortal

### Smart

- Smart selection wizard for error-free configuration and ordering
- Configuration options can be tested and simulated in advance
- Library for archiving sample configurations

The TIA Selection Tool is a completely paperless solution.

Download it now:

[www.siemens.com/tst](http://www.siemens.com/tst)

For more  
information,  
scan the  
QR code







# Sustainability @Siemens

Transforming the everyday to create a better tomorrow.



- Decarbonization**
- Ethics**
- Governance**
- Resource Efficiency**
- Equity**
- Employability**

For more information, see [www.siemens.com/sustainability-figures](http://www.siemens.com/sustainability-figures)

As a company, Siemens considers environmental, social and governance (ESG) criteria from all angles with its DEGREE framework (decarbonization, ethics, governance, resource efficiency, equity and employability). We are not only committed to reducing the carbon footprint in our own operations to net zero by 2030, but also helping our customers achieve their decarbonization and sustainability goals.

## Mission & strategy

As a focused technology company, Siemens is committed to addressing the world's most profound challenges by leveraging the synergies between digitalization and sustainability.

## Technology with aim and purpose

We develop technologies that connect the real and digital worlds and enable our customers to positively transform the industries that form the backbone of our economy: industry, infrastructure, transportation and healthcare.

## Our contribution

Siemens makes an impact every day by providing innovative solutions in response to challenges relating to environmental protection, decarbonization, health and safety. Innovative solutions that have a clear goal: to make the world more sustainable, more integrative and a better place to live.

## Sustainability facts

For almost 175 years, Siemens has been driven by the desire to improve the lives of people around the world with our technologies.



## System overview



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1/33	Pre-assembled OCC cables MOTION-CONNECT 400
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1/35	<b>SINAMICS S210 starter kit <span style="color: orange;">NEW</span></b>

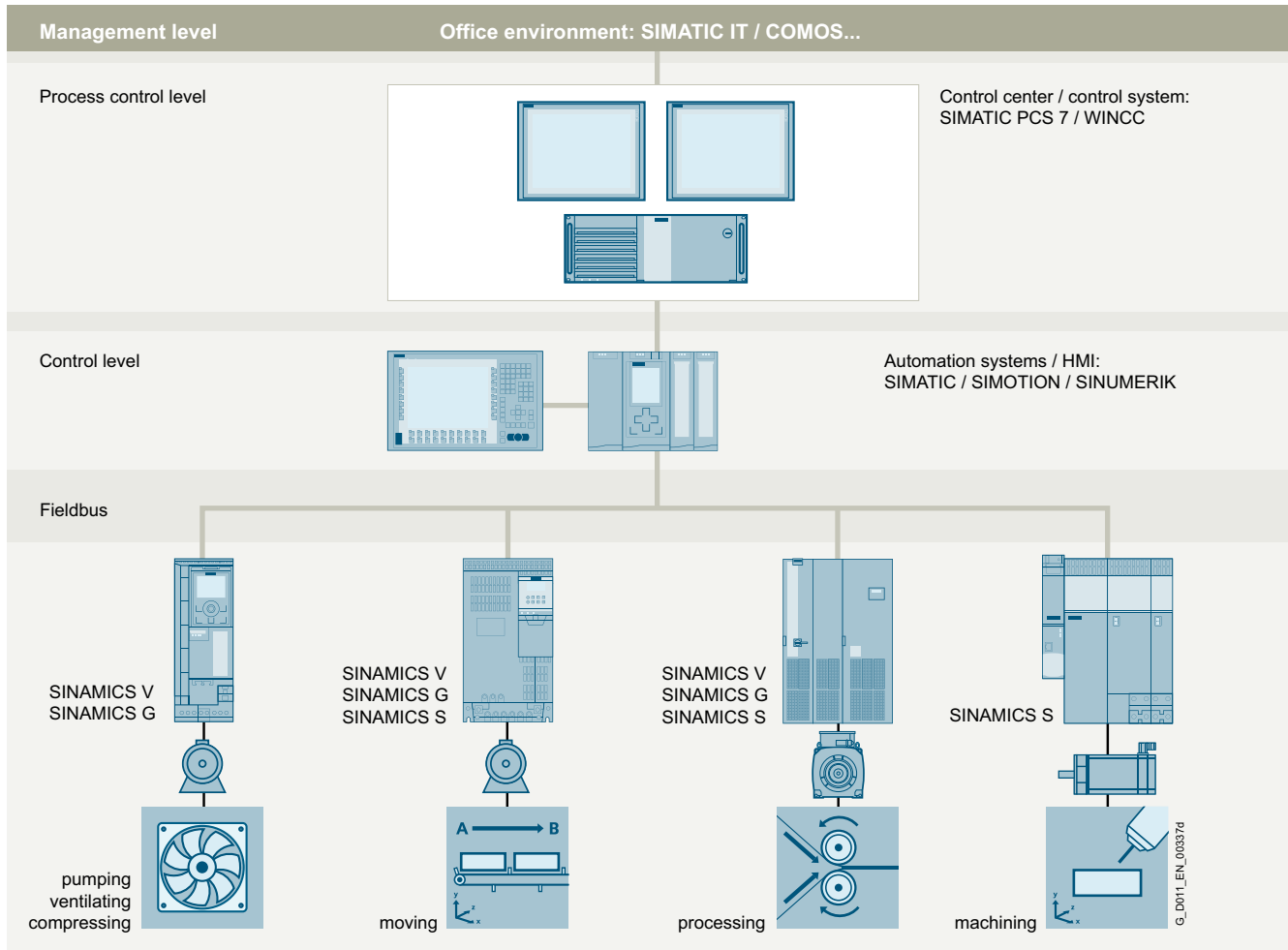
# System overview

1

## The SINAMICS converter family

### Overview

#### Integration in automation



#### Totally Integrated Automation and communication

SINAMICS is an integral component of the Siemens "Totally Integrated Automation" concept. Integrated SINAMICS systems covering configuration, data storage, and communication at automation level ensure low-maintenance solutions with the SIMATIC, SIMOTION and SINUMERIK control systems.

Depending on the application, the appropriate variable frequency drives can be selected and incorporated in the automation concept. With this in mind, the drives are clearly subdivided into their different applications. A wide range of communication options (depending on the drive type) are available for establishing a communication link to the automation system:

- PROFINET
- PROFIBUS
- EtherNet/IP
- Modbus TCP
- Modbus RTU
- AS-Interface
- BACnet MS/TP

#### Applications

SINAMICS is the comprehensive converter family from Siemens designed for machine and plant engineering applications. SINAMICS offers solutions for all drive tasks:

- Simple pump and fan applications in the process industry
- Demanding single drives in centrifuges, presses, extruders, elevators, as well as conveyor and transport systems
- Drive line-ups in textile, plastic film, and paper machines as well as in rolling mill plants
- Highly dynamic servo drives for machine tools, as well as packaging and printing machines

## Overview

**SINAMICS as part of the Siemens modular automation system****Innovative, energy-efficient and reliable drive systems and applications as well as services for the entire drive train**

The solutions for drive technology place great emphasis on the highest productivity, energy efficiency and reliability for all torque ranges, performance and voltage classes.

Siemens offers not only the right innovative variable frequency drive for every drive application, but also a wide range of energy-efficient low-voltage motors, geared motors, explosion-protected motors and high-voltage motors for combination with SINAMICS.

Furthermore, Siemens supports its customers with global pre-sales and after-sales services, with over 295 service points in 130 countries – and with special services e.g. application consulting or motion control solutions.

**Energy efficiency**Energy management process

Efficient energy management consultancy identifies the energy flows, determines the potential for making savings and implements them with focused activities.

Almost two thirds of the industrial power requirement is from electric motors. This makes it all the more important to use drive technology permitting energy consumption to be reduced effectively even in the configuration phase, and consequently to optimize plant availability and process stability. With SINAMICS, Siemens offers powerful energy efficient solutions which, depending on the application, enable a significant reduction in electricity costs.

## System overview

1

### The SINAMICS converter family

#### Overview

##### Up to 70 % potential for savings using variable-speed operation

SINAMICS enables great potential for savings to be realized by controlling the motor speed. In particular, huge potential savings can be recovered from pumps, fans and compressors which are operated with mechanical throttle and valves. Here, changing to variable-speed drives brings enormous economic advantages. In contrast to mechanical control systems, the power consumption at partial load operation is always immediately adjusted to the demand at that time. So energy is no longer wasted, permitting savings of up to 60 % – in exceptional cases even up to 70 %. Variable-speed drives also offer clear advantages over mechanical control systems when it comes to maintenance and repair. Current spikes when starting up the motor and strong torque surges become things of the past – and the same goes for pressure waves in pipelines, cavitation or vibrations which cause sustainable damage to the plant. Smooth starting and ramp-down relieve the load on the mechanical system, ensuring a significantly longer service life of the entire drive train.

#### Variants

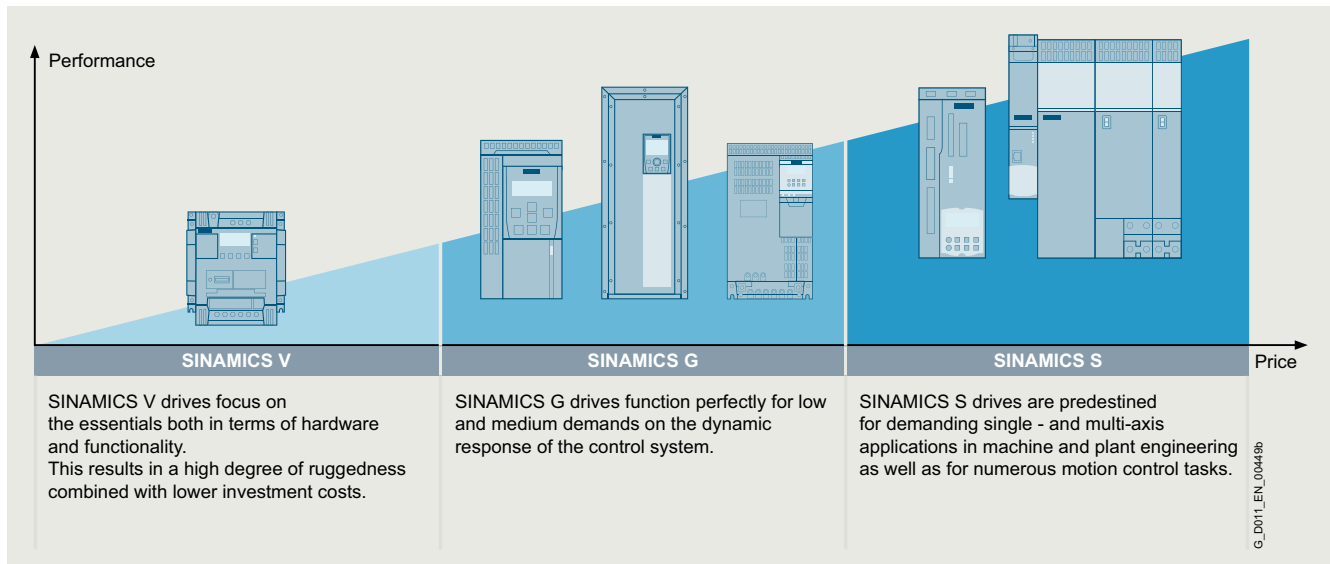
Depending on the application, the SINAMICS converter family offers the ideal variant for any drive task.

##### Regenerative feedback of braking energy

In conventional drive systems, the energy produced during braking is converted to heat using braking resistors. Energy produced during braking is efficiently recovered to the supply system by versions of SINAMICS G and SINAMICS S drives with regenerative feedback capability and these devices do not therefore need a braking resistor. This permits up to 60 % of the energy requirement to be saved, e.g. in lifting applications. Energy which can be reused at other locations on a machine. Furthermore, this reduced power loss simplifies the cooling of the system, enabling a more compact design.

##### SINAMICS in combination with energy-saving motors

Engineering integration stretches beyond the SINAMICS converter family to higher-level automation systems, and to a broad spectrum of energy-efficient motors with a wide range of performance classes, which, compared to previous motors, are able to demonstrate up to 10 % greater efficiency.



Overview

Platform concept

All SINAMICS variants are based on a platform concept. Joint hardware and software components, as well as standardized tools for dimensioning, configuration, and commissioning tasks ensure high-level integration across all components. SINAMICS handles a wide variety of drive tasks with no system gaps. The different SINAMICS variants can be easily combined with each other.

Quality management according to EN ISO 9001

SINAMICS conforms to the most exacting quality requirements. Comprehensive quality assurance measures in all development and production processes ensure a consistently high level of quality.

Of course, our quality management system is certified by an independent authority in accordance with EN ISO 9001.

Integrated system configuration

Siemens offers perfectly matched drive components with which you can meet your requirements. The drive components reveal their true strengths over the full range from engineering and commissioning through to operation: Integrated system configuration is performed using the Siemens Product Configurator: Just select a motor and a converter and design them with the SIZER for Siemens Drives engineering tool (integrated into TIA Selection Tool). The STARTER and SINAMICS Startdrive commissioning tools integrate the motor data and at the same time simplify efficient commissioning. All drive components are incorporated in the TIA Portal – this simplifies engineering, commissioning and diagnostics.

Low voltage											Direct voltage
Standard performance frequency converters		Distributed frequency converters	Industry-specific frequency converters		Servo converters			High performance frequency converters			DC converters
SINAMICS V20 G120C G120	SINAMICS G130 G150	SINAMICS G115D G120D SIMATIC ET 200pro FC-2	SINAMICS G120X	SINAMICS G180	SINAMICS V90 S200	SINAMICS S110	SINAMICS S210 S210 (New)	SINAMICS G220	SINAMICS S120 S120M	SINAMICS S150	SINAMICS DCM DCP <sup>1)</sup>
0.12 kW to 250 kW	75 kW to 2700 kW	0.37 kW to 7.5 kW	0.75 kW to 630 kW	2.2 kW to 6600 kW	0.05 kW to 7 kW	0.55 kW to 132 kW	0.05 kW to 7 kW	0.55 kW to 55 kW	0.55 kW to 5700 kW	75 kW to 1200 kW	6 kW to 30 MW
Pumps, fans, compressors, conveyor belts, mixers, mills, spinning machines, textile machines, refrigerated display counters, fitness equipment, ventilation systems, single-axis positioning applications in machine and plant engineering	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders	Conveyor technology, single-axis positioning applications (G120D)	Pumps, fans, compressors, building management systems, process industry, HVAC, water/waste water industries	Pumps, fans, compressors, conveyor belts, extruders, mixers, mills, kneaders, centrifuges, separators	Handling machines, packaging machines, automatic assembly machines, metal forming machines, printing machines, winding and unwinding units	Single-axis positioning applications in machine and plant engineering	Packaging machines, handling equipment, feed and withdrawal devices, stacking units, automatic assembly machines, laboratory automation, wood, glass and ceramics industry, digital printing machines	Pumps, fans, compressors, conveyor belts, mixers, mills, spinning machines, textile machines, refrigerated display counters, fitness equipment, ventilation systems, single-axis positioning applications in machine and plant engineering	Production machines (packaging, textile and printing machines, paper machines, plastic processing machines), machine tools, plants, process lines and rolling mills, marine drives, test bays	Test bays, cross cutters, centrifuges	Rolling mill drives, wire-drawing machines, extruders and kneaders, cableways and lifts, test bay drives
Catalog D 31.1	Catalog D 11	Catalog D 31.2	Catalog D 31.5	Catalog D 18.1	Catalog D 33 D 37.1	Catalog D 31.1	Catalog D 32	Catalog D 36.1	Catalogs D 21.3, D 21.4 NC 62	Catalog D 21.3	Catalog D 23.1, SiePortal
Engineering tools (e.g. Siemens Product Configurator, TIA Selection Tool, SINAMICS DriveSim Basic/Advanced, STARTER and SINAMICS Startdrive)											

<sup>1)</sup> DC/DC controllers, see SiePortal.

# System overview

## Drive selection

1

### Overview

#### SINAMICS selection guide – typical applications

Use	Requirements for torque accuracy/speed accuracy/position accuracy/coordination of axes/functionality					
	Continuous motion			Non-continuous motion		
	Basic	Medium	High	Basic	Medium	High
<b>Pumping, ventilating, compressing</b> 	Centrifugal pumps Radial / axial fans Compressors  V20 G120C G120X	Centrifugal pumps Radial / axial fans Compressors  G120X G130/G150 G180 <sup>1)</sup> DCM	Eccentric screw pumps  G220 S120	Hydraulic pumps Metering pumps  G120/G220	Hydraulic pumps Metering pumps  S110	Descaling pumps Hydraulic pumps  S120
<b>Moving</b> 	Conveyor belts Roller conveyors Chain conveyors  V20 G115D G120C ET 200pro FC-2 <sup>2)</sup>	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving walkways Indoor cranes Marine drives Cable railways  G120/G220 G120D G130/G150 G180 <sup>1)</sup>	Elevators Container cranes Mining hoists Excavators for open-cast mining Test bays  G220 S120 S150 DCM	Acceleration conveyors Storage and retrieval machines  V90 S200 G120/G220 G120D	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers  S110 <b>S210</b> DCM	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/disengagers  S120 <b>S210</b> DCM
<b>Processing</b> 	Mills Mixers Kneaders Crushers Agitators Centrifuges  V20 G120C	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces  G120/G220 G130/G150 G180 <sup>1)</sup>	Extruders Winders/unwinders Lead/follower drives Calenders Main press drives Printing machines  G220/ S120 S150 DCM	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles  V90 S200 G120/G220	Tubular bagging machines Single-axis motion control such as • Position profiles • Path profiles  S110 <b>S210</b>	Servo presses Rolling mill drives Multi-axis motion control such as • Multi-axis positioning • Cams • Interpolations  S120 <b>S210</b> DCM
<b>Machining</b> 	Main drives for • Turning • Milling • Drilling  S110	Main drives for • Drilling • Sawing  S110 S120	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding  S120	Axis drives for • Turning • Milling • Drilling  S110	Axis drives for • Drilling • Sawing  S110 S120	Axis drives for • Turning • Milling • Drilling • Laser cutting • Gear cutting • Grinding • Nibbling and punching  S120

#### Using the SINAMICS selection guide

The varying range of demands on modern variable frequency drives requires a large number of different types. Selecting the optimum drive has become a significantly more complex process. The application matrix shown simplifies this selection process considerably, by suggesting the ideal SINAMICS drive for examples of typical applications and requirements.

- The application type is selected from the vertical column
  - Pumping, ventilating, compressing
  - Moving
  - Processing
  - Machining
- The quality of the motion type is selected from the horizontal row
  - Basic
  - Medium
  - High

#### More information

Further information about SINAMICS is available on the internet at [www.siemens.com/sinamics](http://www.siemens.com/sinamics)

Practical application examples and descriptions are available on the internet at [www.siemens.com/sinamics-applications](http://www.siemens.com/sinamics-applications)

<sup>1)</sup> Industry-specific converters.

<sup>2)</sup> Information on the SIMATIC ET 200pro FC-2 frequency converter is available in Catalog D 31.2 and at: [www.siemens.com/et200pro-fc](http://www.siemens.com/et200pro-fc)



## Overview



Example: SINAMICS S210 converter (New) frame size FSB, 200 V 1 AC, with SIMOTICS S-1FK2 servomotor shaft height 30



Example: SINAMICS S210 converter (New) frame size FSB, 400 V 3 AC, with SIMOTICS S-1FK2 servomotor shaft height 63

The servo drive system comprises a SINAMICS S210 servo converter, a SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotor and the matching MOTION-CONNECT One Cable Connection (OCC) for connecting the motor to the converter. SINAMICS S210 is a single-axis AC/AC servo converter system with high performance and dynamic response.

SINAMICS S210 servo converters are available for the following line voltages:

- 200 V to 240 V 1 AC (1 AC series)
- 200 V to 480 V 3 AC (3 AC series)

### Flexible in application

The SINAMICS S210 is a flexible, versatile system. SIMOTICS S-1FK2, S-1FT2 or S-1FS2 series synchronous servomotors are installed in rotary and linear axes. The integrated One Cable Connection (OCC) interface allows user-friendly connection of a SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motor with just one cable. The electronic motor type plate data can be read out, which eliminates the need to parameterize the converter with the motor data. This significantly simplifies and shortens commissioning.

In conjunction with the technological functions of the higher-level controller, there are many possibilities of motion – from continuous operation through positioning and synchronous operation, to coordinated motion of multiple axes via cyclic cams or interpolation – everything is possible.

The SINAMICS S210 converter has an integrated PROFINET communications interface for connecting to a control system.

The data exchange with the higher-level controllers takes place via standardized protocols – the PROFIdrive profile for positioning mode and the PROFIsafe profile for safety-related communication.

Thus, operation is optimally ensured with the SIMATIC S7 automation system. The drive axis is connected via technology objects and Motion Control blocks in the SIMATIC S7 or a SIMOTION controller.

### High performance for fast and precise control

The high performance of the SINAMICS S210 servo drive system in conjunction with a SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotor derives from the following features:

- Low moment of inertia and high overload capability of the motor
- High-resolution encoder with fast scanning
- Current controller clock cycle of 62.5  $\mu$ s and a pulse frequency of 8 kHz of the servo converter

This enables short cycle times on the machine even with complex motion control.

### DC link coupling (only 3 AC series)

For devices of the 3 AC series, the DC links of up to six converters can be coupled. Thus, energy balancing between the axes is possible and energy produced during braking can be used by other axes for accelerating. This is not only efficient but also reduces the dissipated heat in the control cabinet, because the energy that is produced no longer has to be converted to heat in the braking resistor.

### SINAMICS S210 servo converters (New)

Parallel to the SINAMICS S210 servo converters available so far, an innovative version is now available under the name "SINAMICS S210 servo converters (New)".

SINAMICS S210 servo converters (New) have extended functionalities with a new hardware and a revised software from the new firmware V6.1.

#### Extended functionalities with new hardware

- Operation on a supply voltage of 200 V to 240 V 3 AC, e.g. for USA, Canada and Japan now also possible with internal braking resistors  
External braking resistors are no longer required.
- 1 communications interface for communication with a 2nd encoder (as of firmware V6.3)
- For future extensions (currently without function):  
- 1 temperature sensor input PTC

#### Revised software from new firmware V6.1

- Security, User Management and Access Control
- Revised web server
- General rounding off and unification for the entire SINAMICS converter family
- Functional safety up to safety integrity level 3, PL e and Category 4.  
Firmware V6.1 includes the Safety Integrated Basic Functions as well as the Safety Integrated Extended Functions SS1, SLS, SDI, SSM.  
All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

From firmware V6.3:

- Basic positioner (EPos): A positioning functionality integrated into the converter.
- EtherNet/IP for communication with third-party controllers

Further functions available soon:  
Safety Integrated Advanced Functions

## System overview

### SINAMICS S210 servo drive system

#### Overview

##### **The SIMOTICS S-1FK2, S-1FT2 and S-1FS2 servomotors differ as follows:**

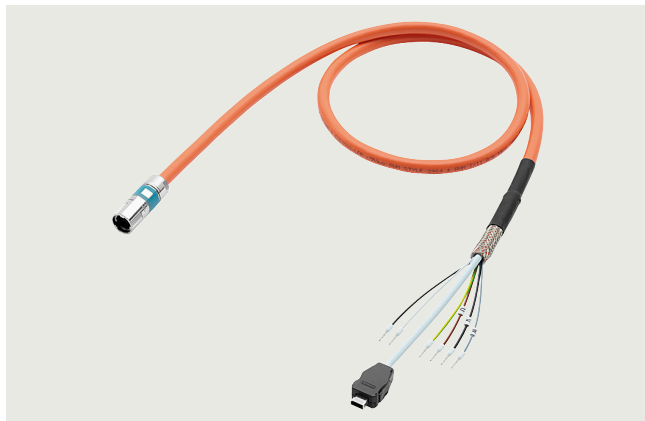
The 1FK2 servomotors are perfectly suited to overcome the essential challenges in servo drive technology. The product range includes a limited number of variants and options and therefore enables a simple overview and selection. They form the core of the servomotors for the SINAMICS S210 servo drive system.

The 1FT2 servomotors are an extension of the 1FK2 motor portfolio. They are more finely graded in terms of rated speeds, offer additional torque levels and have numerous variations and options. This makes it possible to solve the diverse challenges in the drive technology more precisely. Even more demanding tasks or applications in difficult environments can be mastered with 1FT2 servomotors.

	SIMOTICS S servomotors for SINAMICS S210		
	1FK2 High Dynamic (HD) / Compact (CT)	1FT2 High Dynamic (HD) / Compact (CT)	1FS2 High Dynamic (HD) / Compact (CT)
<b>Versions</b> • High Dynamic (HD) • High Dynamic (HD) forced ventilation • Compact (CT) • Compact (CT) forced ventilation	Shaft heights 20, 30, 40, 52, 63 – 30, 40, 48, 63, 80, 100 –	Shaft heights 20, 30, 40, 52, 63, 80 80 30, 40, 48, 63, 80, 100 80	Shaft heights 40, 52, 63 – 80 –
<b>Version as servo planetary geared motors</b>	• with coaxial ECO planetary gearbox	• with coaxial ECO planetary gearbox • with angular ECO planetary gearbox	–
<b>Static torque <math>M_0</math></b>	0.16 ... 40 Nm (0.12 ... 29.50 lb <sub>f</sub> -ft)	0.16 ... 50 Nm (0.12 ... 36.90 lb <sub>f</sub> -ft)	3.1 ... 23.5 Nm (2.29 ... 17.30 lb <sub>f</sub> -ft)
<b>Rated power <math>P_N</math></b>	Up to 6.4 kW	Up to 6.4 kW	Up to 2.51 kW
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Packaging machines</li> <li>• Handling equipment</li> <li>• Feed and withdrawal devices</li> <li>• Stacking units</li> <li>• Automatic assembly machines</li> <li>• Laboratory automation</li> <li>• Woodworking, glass and ceramic industries</li> <li>• Digital printing machines</li> </ul>		<ul style="list-style-type: none"> <li>• Food and beverage industries</li> <li>• Pharmaceutical industry</li> <li>• Packaging machines</li> <li>• Handling equipment</li> <li>• Feed and withdrawal devices</li> </ul>
<b>Housing</b>	Aluminum/anthracite gray	Aluminum/anthracite gray Optionally other colors possible	Stainless steel
<b>Degree of protection</b>	IP64 IP65 optional or retrofittable	IP64 IP65 optional or retrofittable, IP67 optional	IP66/IP67, IP69K
<b>Encoder systems</b> • Absolute encoder 22-bit singleturn • Absolute encoder 22-bit + 12-bit multiturn • Absolute encoder 26-bit singleturn • Absolute encoder 26-bit + 12-bit multiturn	✓ ✓ – –	✓ ✓ ✓ ✓	– ✓ – –
<b>Notes</b>	–	• Numerous variants and options	• Very high detergent resistance • Certification according to EHEDG

## Overview

### Optimized MOTION-CONNECT connection technology with One Cable Connection (OCC)



Example: SINAMICS S210 M12 OCC connecting cable

Motor and converter are simply connected to one another by one instead of the usual two or three cables. With this One Cable Technology, energy supply, encoder signals and braking signal are brought together in a single cable. This results in the following advantages:

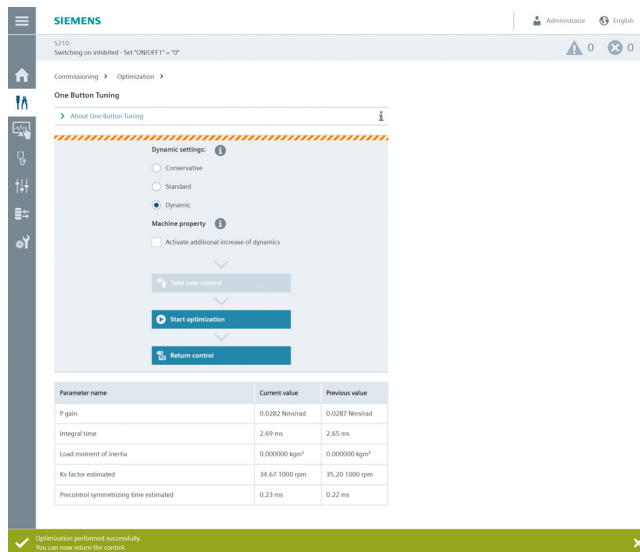
- Time-saving by laying only one cable
- Smaller installation space and space requirement in cable collars, tight bending radii
- Only one cable has to be cleaned. This is advantageous, e.g. in the pharmaceutical industry and where higher requirements are placed upon hygiene
- Can be ordered to the decimeter
- Compact connection system
- Rotatable connector on the motor side
- Motor with very low interfering contour for restricted installation space.

Cables are available in three different qualities:

- MOTION-CONNECT 500
- MOTION-CONNECT 800PLUS
- MOTION-CONNECT 400 (only for SIMOTICS S-1FS2)

In addition to the pre-assembled cable, individual components (connectors and products sold by the meter) can be ordered for self-assembly.

### Easy commissioning via web server, One Button Tuning and SINAMICS Startdrive/TIA Portal<sup>1)</sup>



#### SINAMICS Webserver for SINAMICS S210 (New) – One Button Tuning

The web server of the converter offers a simple means of parameter assignment. The web server allows commissioning purely oriented on the functionality of the drive. With the web server, the SINAMICS S210 servo drive system can be brought into operation with a few clicks.

As a result of reading the electronic type plate of the connected SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotor, only a few operator actions, such as automatic controller optimization with One Button Tuning, are necessary, as the motor and encoder are automatically detected. The controller parameters are automatically optimized. The three selectable dynamic levels of the controller can optimally take into account the desired behavior of the connected mechanics.

A motion of the axis can take place directly via the control panel during commissioning.

The customer benefits from the web server in many ways:

- Commissioning can also be easily done in places difficult to access, as the web server in the converter can also be accessed directly via PROFINET from the controller.
- The web server provides full diagnostic capability without the need for additional software.
- Commissioning and diagnostics can also be done without a cable via mobile devices, such as laptops, smart phones and tablets (an additional WLAN access point is necessary).
- Intuitive user interface

In addition to easy commissioning directly via the web server of the converter, engineering is also possible with SINAMICS Startdrive and TIA Portal<sup>1)</sup>. The tool for configuration, commissioning and diagnostics has been optimized with regard to the consistent utilization of the TIA Portal advantages – one shared work environment for PLC, HMI and drives<sup>2)</sup>.

For more information, see the [Engineering tools selection](#).

<sup>1)</sup> For SINAMICS S210 (6SL3...), from V15.1, for SINAMICS S210 (New) (6SL5...), from V18 SP1.

<sup>2)</sup> For SINAMICS S210 (6SL3...), from firmware V5.2, for SINAMICS S210 (New) (6SL5...), from firmware V6.1.

## System overview

### SINAMICS S210 servo drive system

#### Overview

##### Diagnostics

Faults and warnings are shown on the display located under the front cover, and they can be acknowledged with the Acknowledge button. Extensive diagnostics with plain text messages for cause and remedy information is possible via the web server.

##### Safety Integrated

The integrated safety functions provide highly effective, application-oriented protection for personnel and machinery (terms as defined in IEC 61800-5-2).

The following Safety Integrated Basic Functions are included as standard:

- Safe Torque Off (STO)
- Safe Brake Control (SBC)
- Safe Stop 1 time-controlled (SS1-t)

The following Safety Integrated Extended Functions <sup>3)</sup> are available as options:

- Safe Stop 1 (SS1) <sup>3)</sup>
- Safe Stop 2 (SS2)
- Safe Operating Stop (SOS)
- Safely-Limited Speed (SLS)
- Safe Speed Monitor (SSM)
- Safe Direction (SDI)
- Safely-Limited Acceleration (SLA)
- Safe Brake Test (SBT) diagnostic function

The Safety Integrated Functions are fully integrated into the drive system. They can be activated via fail-safe digital inputs on the converter (only STO and SS1-t) or via PROFINET with PROFIsafe.

The Safety Integrated Functions are implemented electronically and therefore require no additional installation effort or space in the control cabinet. Furthermore, the costs are considerably lower than for externally implemented monitoring functions.

The Safety Integrated Functions can be easily commissioned using the web server of the converter or SINAMICS Startdrive and TIA Portal <sup>1) 3)</sup>.

##### **Perfect combination with SIMATIC S7-1500, SIMATIC S7-1500 T-CPU, SIMATIC ET 200SP Open Controller, and PROFINET**

It communicates with the higher-level control via PROFINET IRT. For optimal interaction between the controller and the SINAMICS S210 servo drive system, SIMATIC S7-1500, SIMATIC S7-1500 T-CPU, SIMATIC ET 200SP Open Controller, and SIMOTION can be used as the control system.

The SINAMICS S210 servo converters have an integrated PROFINET communications interface with a cycle of up to 250 µs for connecting to a control system.

Standardized protocols for linking to a higher-level control with RT and IRT are supported – the PROFIdrive profile with DSC for positioning mode and the PROFIsafe profile for safety-related communication. Functions, such as Shared Device, ring redundancy and PROFInergy, are also possible.

Everything from one source: Through the use of Motion Control functionalities in the controller, the combination of converter and SIMATIC S7 automation system or a SIMOTION controller allows ideally harmonized engineering. As a result, commissioning times are shortened.

Via technology objects and Motion Control blocks of the higher-level controller, there are many possibilities of motion, such as continuous operation, positioning and synchronous operation, and coordinated motion of multiple axes via cyclic cams or interpolation.

Siemens offers tested SIMATIC PLC/HMI application examples for connection of the servo drive system to a SIMATIC controller: [www.siemens.com/sinamics-applications](http://www.siemens.com/sinamics-applications)

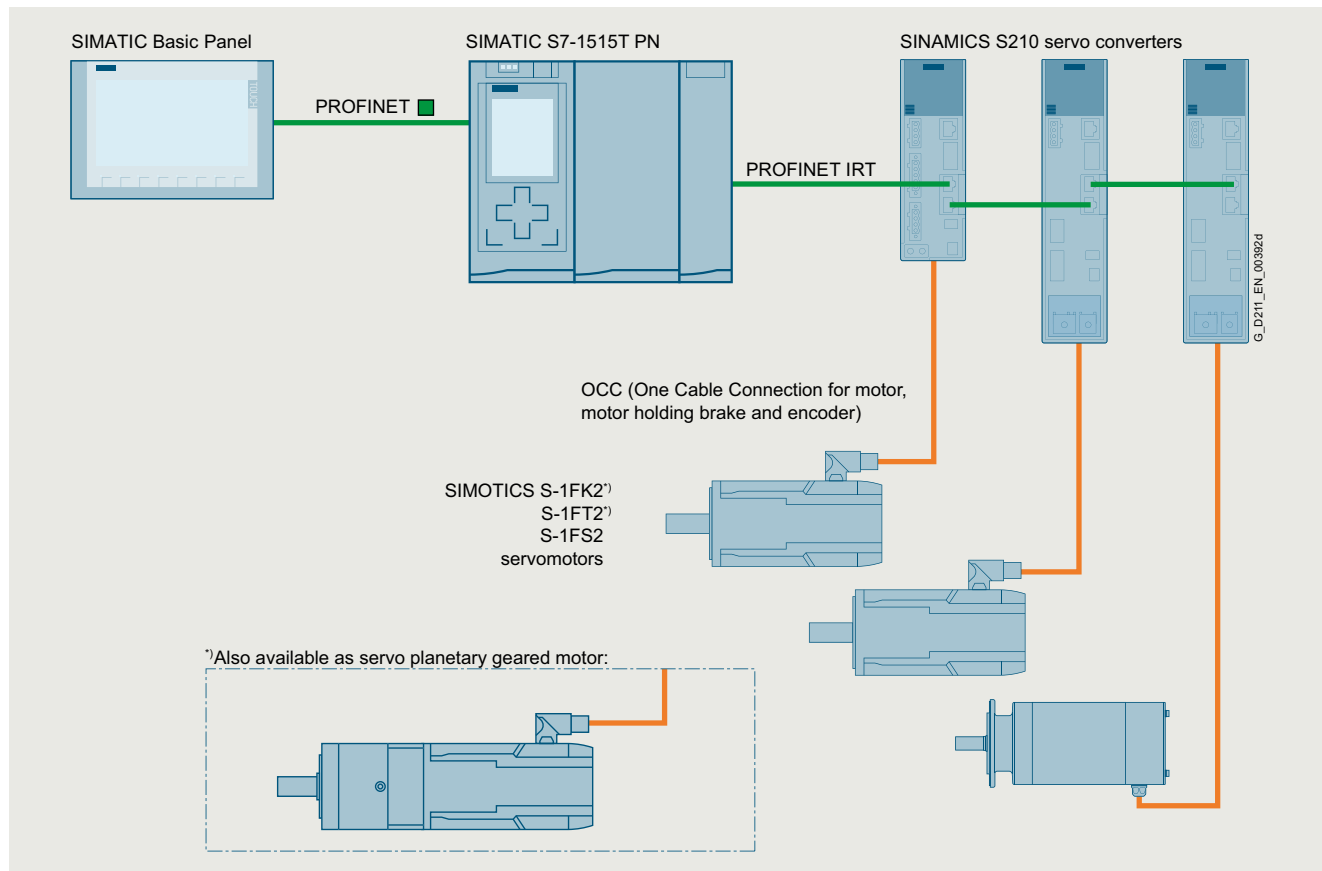
Further information on the SIMATIC S7-1500, SIMATIC S7-1500 T-CPU and SIMATIC ET 200SP Open Controller is available in the ST 70 Catalog and on the internet under [www.siemens.com/simatic-s7-1500](http://www.siemens.com/simatic-s7-1500)

<sup>1)</sup> For SINAMICS S210 (6SL3...), from V15.1, for SINAMICS S210 (New) (6SL5...), from V18 SP1.

<sup>2)</sup> Safe Stop 1 time-controlled (SS1-t) is also included in the Safety Integrated Basic functions.

<sup>3)</sup> The Extended Functions require a safety license. For SINAMICS S210 servo converters (6SL3...), available from SINAMICS V5.1 SP1. For SINAMICS S210 servo converters (New) (6SL5...) with firmware V6.1, the functions SS1, SLS, SDI and SSM are available. All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

## Overview



Example: Communication via PROFINET

**Ruggedness**

The SINAMICS S210 is equipped as standard with varnished or partially varnished modules. The painting on the modules protects the sensitive SMD components against corrosive gases, chemically active dust and moisture.

**Can be used worldwide**

In addition to the usual approvals, the SINAMICS S210 drive system also has UL approval for the North American market. This means that the drive system, comprising SINAMICS S210 and SIMOTICS S-1FK2, S-1FT2 or S-1FS2, including the One Cable Connection (OCC), can be used worldwide.

**More information**

Further documentation, such as the operating instructions, is available free on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Detailed information on the SINAMICS S210 drive system, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions), is available on the internet at:  
[www.siemens.com/sinamics-s210](http://www.siemens.com/sinamics-s210)

and is also available via the Siemens Product Configurator on the internet.

The Siemens Product Configurator can be found in SiePortal at the following address:

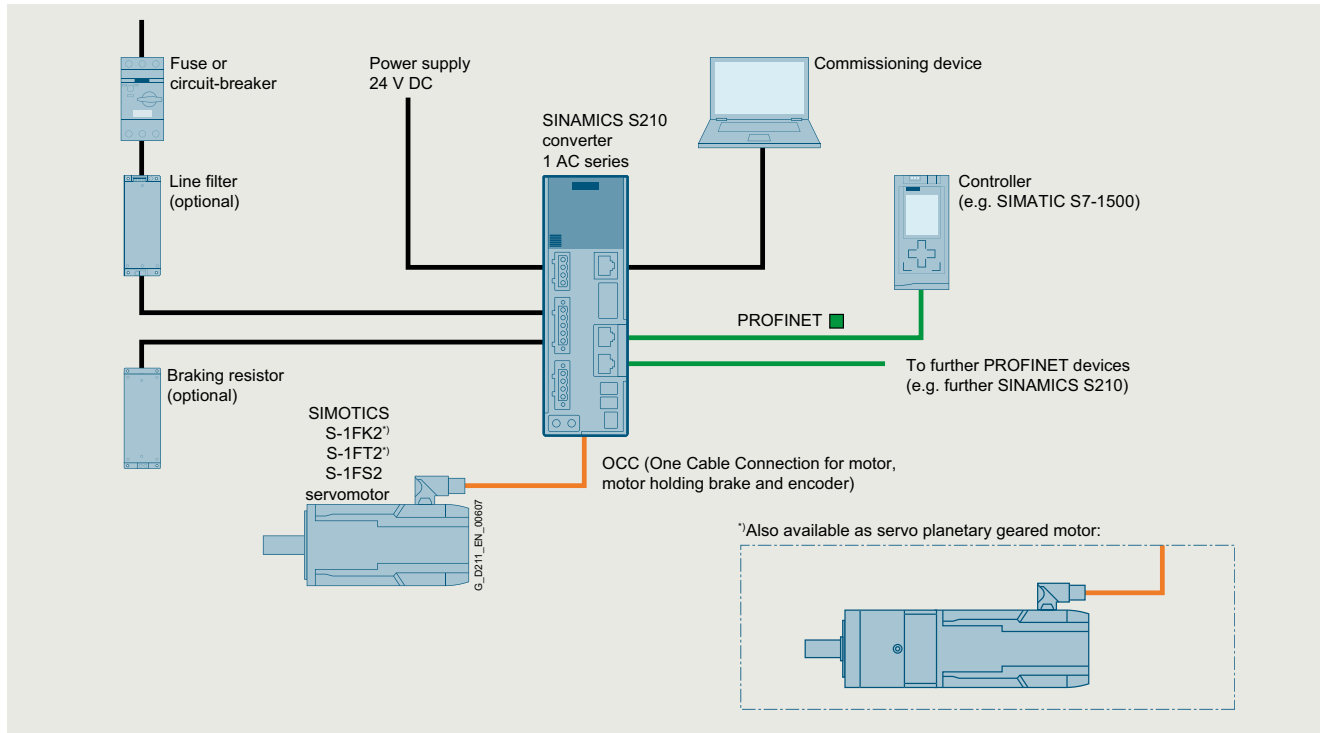
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

# System overview

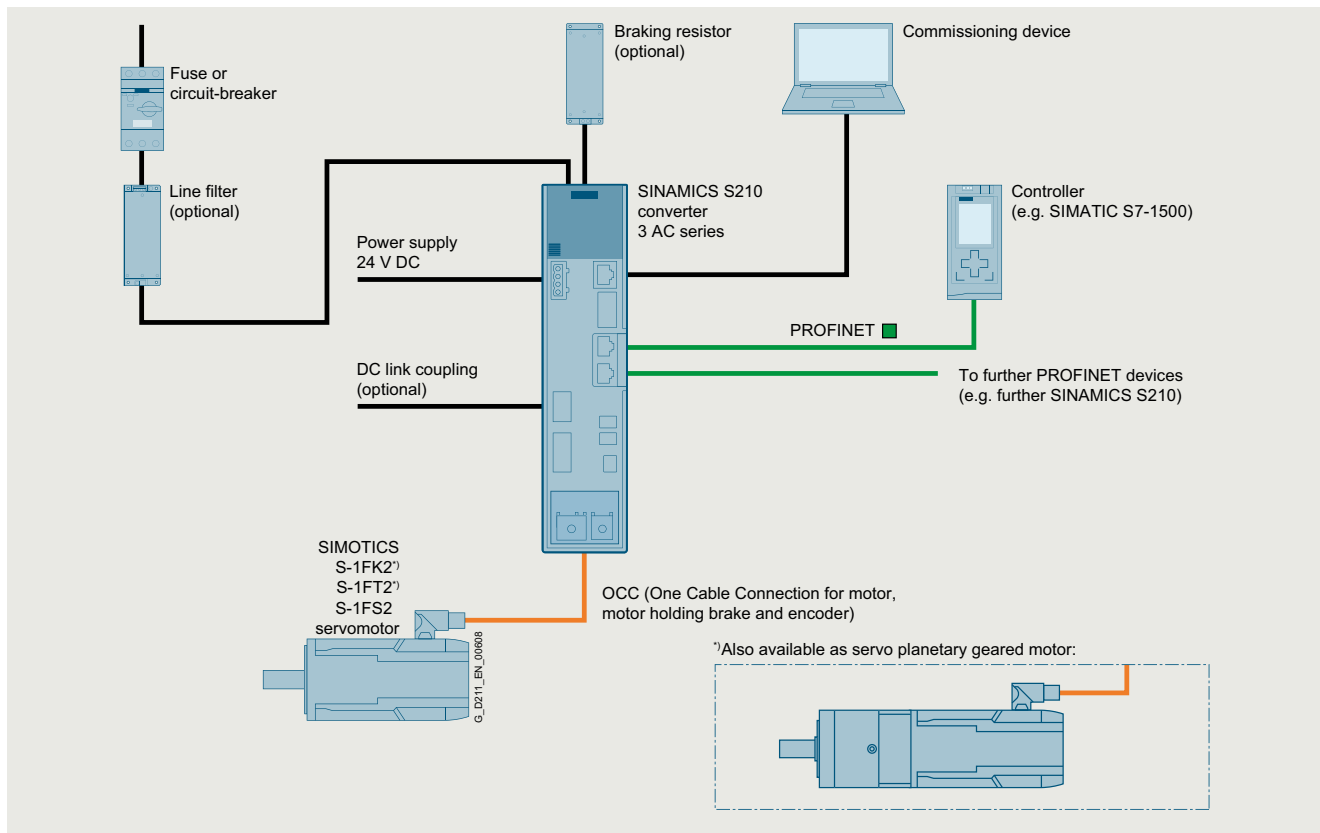
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## SINAMICS S210 servo drive system

### Overview



SINAMICS S210 / SINAMICS S210 (New) drive system, 1 AC series with optional components



SINAMICS S210 / SINAMICS S210 (New) drive system, 3 AC series with optional components

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FK2 servomotors

1

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FK2 servomotors for line connection 200 ... 240 V 1 AC

SIMOTICS S-1FK2 servomotor							SINAMICS S210 servo converter (1 AC series) Supply voltage 200 ... 240 V 1 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 230 V	Rated torque	Article No.	Rated power 230 V	Frame size	Article No.	Article No.
	$M_0$	$M_{max}$	$n_N$	$P_N$	$M_N$		$P_N$			
	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	r/min	kW (hp)	Nm (lb <sub>f</sub> -ft)		kW			
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
20	0.16 (0.12)	0.56 (0.41)	3000	0.05 (0.07)	0.16 (0.12)	1FK2102-0AG	0.1	FSA	0-1	6FX002-8QN04-1
	0.32 (0.24)	1.11 (0.82)	3000	0.1 (0.13)	0.32 (0.24)	1FK2102-1AG	0.1	FSA	0-1	6FX002-8QN04-1
30	0.64 (0.47)	1.95 (1.44)	3000	0.2 (0.27)	0.64 (0.47)	1FK2103-2AG	0.2	FSA	0-2	6FX002-8QN04-1
	1.27 (0.94)	4.05 (2.99)	3000	0.4 (0.54)	1.27 (0.94)	1FK2103-4AG	0.4	FSB	0-4	6FX002-8QN04-1
40	1.27 (0.94)	3.75 (2.77)	1500	0.2 (0.27)	1.27 (0.94)	1FK2104-4AF	0.2	FSA	0-2	6FX002-8QN08-1
	1.27 (0.94)	3.85 (2.84)	3000	0.4 (0.54)	1.27 (0.94)	1FK2104-4AK	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (1.77)	7.5 (5.53)	1500	0.375 (0.50)	2.4 (1.77)	1FK2104-5AF	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (1.77)	7.6 (5.61)	3000	0.75 (1.01)	2.4 (1.77)	1FK2104-5AK	0.75	FSC	0-8	6FX002-8QN08-1
	3.2 (2.36)	10 (7.38)	1500	0.5 (0.67)	3.2 (2.36)	1FK2104-6AF	0.75	FSC	0-8	6FX002-8QN08-1
<b>Compact for high precision applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.85 (1.36)	3000	0.2 (0.27)	0.64 (0.47)	1FK2203-2AG	0.2	FSA	0-2	6FX002-8QN04-1
	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FK2203-4AG	0.4	FSB	0-4	6FX002-8QN04-1
40	2.4 (1.77)	7.1 (5.24)	1500	0.375 (0.50)	2.4 (1.77)	1FK2204-5AF	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FK2204-5AK	0.75	FSC	0-8	6FX002-8QN08-1
	3.2 (2.36)	9.5 (7.01)	1500	0.5 (0.67)	3.2 (2.36)	1FK2204-6AF	0.75	FSC	0-8	6FX002-8QN08-1
	48	3.6 (2.66)	10.8 (7.97)	1500	0.53 (0.71)	3.4 (2.51)	1FK2205-2AF	0.75	FSC	0-8

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64)</li> <li>• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M

<b>SINAMICS S210</b>	
6SL3210-5HB1	-UF0
<b>SINAMICS S210 (New)</b>	
6SL5310-1BB1	-CF0
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

# System overview

Clicking to SiePortal

6SL3255-0AA00-5AA0



## SINAMICS S210 servo drive system with SIMOTICS S-1FK2 servomotors

1

### Order overview

#### SINAMICS S210 drive system with SIMOTICS S-1FK2 servomotors for line connection 200 ... 240 V 3 AC

SIMOTICS S-1FK2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 240 V	Rated torque	Article No.	Rated power 240 V	Frame size	Article No.	Article No.
	$M_0$	$M_{max}$	$n_N$	$P_N$	$M_N$		$P_N$			
	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	r/min	kW (hp)	Nm (lb <sub>f</sub> -ft)		kW			
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
20	0.16 (0.12)	0.56 (0.41)	3000	0.05 (0.07)	0.16 (0.12)	1FK2102-0AG-...-A0	0.24	FSA	0-4	6FX002-8QN04-1
	0.32 (0.24)	1.11 (0.82)	3000	0.1 (0.13)	0.32 (0.24)	1FK2102-1AG-...-A0	0.24	FSA	0-4	6FX002-8QN04-1
30	0.64 (0.47)	1.95 (1.44)	3000	0.2 (0.27)	0.64 (0.47)	1FK2103-2AG-...-A0	0.45	FSA	0-8	6FX002-8QN04-1
	1.27 (0.94)	4.05 (2.99)	3000	0.4 (0.54)	1.27 (0.94)	1FK2103-4AG-...-A0	0.6	FSA	1-0	6FX002-8QN04-1
40	1.27 (0.94)	3.75 (2.77)	1500	0.2 (0.27)	1.27 (0.94)	1FK2104-4AF-...-A0	0.24	FSA	0-4	6FX002-8QN08-1
	1.27 (0.94)	3.85 (2.84)	3000	0.4 (0.54)	1.27 (0.94)	1FK2104-4AK-...-A0	0.6	FSA	1-0	6FX002-8QN08-1
	2.4 (1.77)	7.5 (5.53)	1500	0.375 (0.50)	2.4 (1.77)	1FK2104-5AF-...-A0	0.45	FSA	0-8	6FX002-8QN08-1
	2.4 (1.77)	7.6 (5.61)	3000	0.75 (1.01)	2.4 (1.77)	1FK2104-5AK-...-A0	0.9	FSB	1-5	6FX002-8QN08-1
	3.2 (2.36)	10 (7.38)	1500	0.5 (0.67)	3.2 (2.36)	1FK2104-6AF-...-A0	0.6	FSA	1-0	6FX002-8QN08-1
	5.0 (3.69)	15 (11.06)	1500	0.79 (1.06)	5.0 (3.69)	1FK2105-4AF-...-A0	0.9	FSB	1-5	6FX002-8QN08-1
	8.0 (5.90)	24 (17.70)	1500	1.26 (1.69)	8 (5.90)	1FK2105-6AF-...-A0	1.2	FSB	2-0	6FX002-8QN08-1
	9.0 (6.64)	26 (19.18)	1500	1.3 (1.74)	8.3 (6.12)	1FK2106-3AF-...-A0	3.0	FSC	5-0	6FX002-8QN11-1
63	12 (8.85)	33 (24.34)	1500	1.64 (2.20)	10.5 (7.74)	1FK2106-4AF-...-A0	3.0	FSC	5-0	6FX002-8QN11-1
	16 (11.80)	45.5 (33.56)	1500	2.15 (2.88)	13.8 (10.18)	1FK2106-6AF-...-A0	4.2	FSC	7-0	6FX002-8QN11-1

#### Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64)</li> <li>• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number **6SL3...** for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number **6SL5...** may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.



Clicking to SiePortal

## System overview

6SL3255-0AA00-5AA0



## SINAMICS S210 servo drive system with SIMOTICS S-1FK2 servomotors

1

## Order overview

## SINAMICS S210 drive system with SIMOTICS S-1FK2 servomotors for line connection 200 ... 240 V 3 AC (continued)

SIMOTICS S-1FK2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 240 V	Rated torque	Article No.	Rated power 240 V	Frame size	Article No.	Article No.
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_{max}$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW			
<b>Compact for high precision applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.85 (1.36)	3000	0.2 (0.27)	0.64 (0.47)	1FK2203-2AG-...-...A0	0.45	FSA	0-8	6FX...002-8QN04-1-...-...
	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FK2203-4AG-...-...A0	0.6	FSA	1-0	6FX...002-8QN04-1-...-...
40	2.4 (1.77)	7.1 (5.24)	1500	0.375 (0.50)	2.4 (1.77)	1FK2204-5AF-...-...A0	0.45	FSA	0-8	6FX...002-8QN08-1-...-...
	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FK2204-5AK-...-...A0	0.9	FSB	1-5	6FX...002-8QN08-1-...-...
	3.2 (2.36)	9.5 (7.01)	1500	0.5 (0.67)	3.2 (2.36)	1FK2204-6AF-...-...A0	0.6	FSA	1-0	6FX...002-8QN08-1-...-...
48	3.6 (2.66)	10.8 (7.97)	1500	0.53 (0.71)	3.4 (2.51)	1FK2205-2AF-...-...A0	0.6	FSA	1-0	6FX...002-8QN08-1-...-...
	6.0 (4.43)	18 (13.28)	1500	0.86 (1.15)	5.5 (4.06)	1FK2205-4AF-...-...A0	0.9	FSB	1-5	6FX...002-8QN08-1-...-...
63	6.5 (4.79)	18 (13.28)	1500	0.97 (1.30)	6.1 (4.50)	1FK2206-2AF-...-...A0	0.9	FSB	1-5	6FX...002-8QN11-1-...-...
	12 (8.85)	36 (26.55)	1500	1.72 (2.31)	10.9 (8.04)	1FK2206-4AF-...-...A0	2.1	FSC	3-5	6FX...002-8QN11-1-...-...
80	18 (13.28)	51 (37.62)	1000	1.74 (2.33)	16.6 (12.24)	1FK2208-3AC-...-...A0	2.1	FSC	3-5	6FX...002-8QN11-1-...-...
	22 (16.23)	66 (48.68)	1000	2.15 (2.88)	20 (14.75)	1FK2208-4AC-...-...A0	3.0	FSC	5-0	6FX...002-8QN11-1-...-...
	27 (19.92)	80 (59.01)	1000	2.5 (3.35)	23.5 (17.33)	1FK2208-5AC-...-...A0	4.2	FSC	7-0	6FX...002-8QN11-1-...-...
100	30 (22.13)	90 (66.38)	750	2.5 (3.35)	30 (22.13)	1FK2210-3AB-...-...A0	2.1	FSC	3-5	6FX...002-8QN11-1-...-...
	30 (22.13)	90 (66.38)	1000	3.2 (4.29)	30 (22.13)	1FK2210-3AC-...-...A0	4.2	FSC	7-0	6FX...002-8QN11-1-...-...
	40 (29.50)	120 (88.51)	750	3.05 (4.09)	39 (28.77)	1FK2210-4AB-...-...A0	3.0	FSC	5-0	6FX...002-8QN11-1-...-...
	40 (29.50)	120 (88.51)	1000	3.9 (5.23)	37 (27.29)	1FK2210-4AC-...-...A0	4.2	FSC	7-0	6FX...002-8QN11-1-...-...

## Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• <math>\varnothing 11 \times 23</math> mm (0.43 <math>\times</math> 0.91 in) (only for 1FK2.03 and IP64)</li> <li>• <math>\varnothing 14 \times 30</math> mm (0.55 <math>\times</math> 1.18 in) (only for 1FK2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M

## SINAMICS S210

6SL3210-5HE1-...-UF0

## SINAMICS S210 (New)

6SL5310-1BE1-...-DF0

## Pre-assembled MOTION-CONNECT cable

MOTION-CONNECT 500 5

MOTION-CONNECT 800PLUS 8

## Length code (max. 50 m (164 ft))

0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number **6SL3...** for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number **6SL5...** may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.



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SINAMICS S210 servo drive system with SIMOTICS S-1FK2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FK2 servomotors for line connection 380 ... 480 V 3 AC

SIMOTICS S-1FK2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 400 V	Rated torque	Article No.	Rated power 400 V	Frame size	Article No.	Article No.
	$M_0$	$M_{max}$	$n_N$	$P_N$	$M_N$		$P_N$			
	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	r/min	kW (hp)	Nm (lb <sub>f</sub> -ft)		kW			
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.95 (1.44)	4500	0.28 (0.38)	0.59 (0.44)	1FK2103-2AH-...-A0	0.4	FSA	0-4	6FX002-8QN08-1...
	1.27 (0.94)	4.05 (2.99)	4500	0.48 (0.64)	1.01 (0.74)	1FK2103-4AH-...-A0	0.75	FSA	0-8	6FX002-8QN08-1...
40	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FK2104-4AF-...-A0	0.4	FSA	0-4	6FX002-8QN08-1...
	1.27 (0.94)	3.85 (2.84)	6000	0.6 (0.80)	0.95 (0.70)	1FK2104-4AK-...-A0	1.0	FSA	1-0	6FX002-8QN08-1...
	2.4 (1.77)	7.5 (5.53)	3000	0.75 (1.01)	2.4 (1.77)	1FK2104-5AF-...-A0	0.75	FSA	0-8	6FX002-8QN08-1...
	2.4 (1.77)	7.6 (5.61)	6000	1.07 (1.43)	1.7 (1.25)	1FK2104-5AK-...-A0	1.5	FSB	1-5	6FX002-8QN08-1...
	3.2 (2.36)	10 (7.38)	3000	1.0 (1.34)	3.2 (2.36)	1FK2104-6AF-...-A0	1.0	FSA	1-0	6FX002-8QN08-1...
	5.0 (3.69)	15 (11.06)	3000	1.45 (1.94)	4.6 (3.39)	1FK2105-4AF-...-A0	1.5	FSB	1-5	6FX002-8QN08-1...
52	8.0 (5.90)	24 (17.70)	3000	2.1 (2.82)	6.6 (4.87)	1FK2105-6AF-...-A0	2.0	FSB	2-0	6FX002-8QN08-1...
	9.0 (6.64)	26 (19.18)	3000	2.3 (3.08)	7.3 (5.38)	1FK2106-3AF-...-A0	5.0	FSC	5-0	6FX002-8QN11-1...
63	12 (8.85)	33 (24.34)	3000	2.7 (3.62)	8.6 (6.34)	1FK2106-4AF-...-A0	5.0	FSC	5-0	6FX002-8QN11-1...
	16 (11.80)	45.5 (33.56)	3000	3.3 (4.43)	10.6 (7.82)	1FK2106-6AF-...-A0	7.0	FSC	7-0	6FX002-8QN11-1...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64)</li> <li>• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FK2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FK2 servomotors for line connection 380 ... 480 V 3 AC (continued)

SIMOTICS S-1FK2 servomotor						SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable		
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 400 V	Rated torque	Article No.	Rated power 400 V	Frame size	Article No.	Article No.	
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_N$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW				
<b>Compact for high precision applications</b>						<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>		
30	0.64 (0.47)	1.85 (1.36)	6000	0.255 (0.342)	0.405 (0.299)	1FK2203-2AK-...-A0	0.4	FSA	0-4	6FX002-8QN08-1-...	
	1.27 (0.94)	3.75 (2.77)	6000	0.43 (0.58)	0.68 (0.50)		0.75	FSA			0-8
40	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FK2204-5AF-...-A0	0.75	FSA	0-8	6FX002-8QN08-1-...	
	2.4 (1.77)	7.1 (5.24)	6000	0.57 (0.76)	0.9 (0.66)		1.5	FSB			1-5
	3.2 (2.36)	9.5 (7.01)	3000	1 (1.34)	3.2 (2.36)		1.0	FSA			1-0
48	3.6 (2.66)	10.8 (7.97)	3000	0.94 (1.26)	3.0 (2.21)	1FK2205-2AF-...-A0	1.0	FSA	1-0	6FX002-8QN08-1-...	
	6.0 (4.43)	18 (13.28)	3000	1.45 (1.94)	4.6 (3.39)		1.5	FSB			1-5
63	6.5 (4.79)	18 (13.28)	3000	1.71 (2.29)	5.4 (3.98)	1FK2206-2AF-...-A0	1.5	FSB	1-5	6FX002-8QN11-1-...	
	12 (8.85)	36 (26.55)	3000	2.85 (3.82)	9.1 (6.71)		3.5	FSC			3-5
80	18 (13.28)	51 (37.62)	2000	3.05 (4.09)	14.5 (10.70)	1FK2208-3AC-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...	
	22 (16.23)	66 (48.68)	2000	3.55 (4.76)	17 (12.54)		5.0	FSC			5-0
	27 (19.92)	80 (59.01)	2000	4.0 (5.36)	19.1 (14.09)		7.0	FSC			7-0
100	30 (22.13)	90 (66.38)	1500	4.5 (6.03)	28.5 (21.02)	1FK2210-3AB-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...	
	30 (22.13)	90 (66.38)	2000	5.5 (7.38)	26 (19.18)		7.0	FSC			7-0
	40 (29.50)	120 (88.51)	1500	5.4 (7.24)	34.5 (25.45)		5.0	FSC			5-0
	40 (29.50)	120 (88.51)	2000	6.4 (8.58)	30.5 (22.50)		7.0	FSC			7-0

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64)</li> <li>• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 1 AC

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (1 AC series) Supply voltage 200 ... 240 V 1 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Rated speed $n_N$ r/min	Rated power 230 V $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>f</sub> -ft)	Article No.	Rated power 230 V $P_N$ kW	Frame size	Article No.	Article No.
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
20	0.16 (1.42)	0.56 (4.96)	3000	0.05 (0.07)	0.16 (1.42)	1FT2102-0AG-...-A0	0.1	FSA	0-1	6FX002-8QN04-1
	0.32 (2.83)	1.11 (9.82)	3000	0.1 (0.13)	0.32 (2.83)	1FT2102-1AG-...-A0	0.1	FSA	0-1	6FX002-8QN04-1
30	0.64 (5.66)	1.95 (17.26)	3000	0.2 (0.27)	0.64 (5.66)	1FT2103-2AG-...-A0	0.2	FSA	0-2	6FX002-8QN04-1
	1.27 (11.24)	4.05 (35.85)	3000	0.4 (0.54)	1.27 (11.24)	1FT2103-4AG-...-A0	0.4	FSB	0-4	6FX002-8QN04-1
40	1.27 (11.24)	3.75 (33.19)	1500	0.2 (0.27)	1.27 (11.24)	1FT2104-4AF-...-A0	0.2	FSA	0-2	6FX002-8QN08-1
	1.27 (11.24)	3.85 (34.08)	3000	0.4 (0.54)	1.27 (11.24)	1FT2104-4AK-...-A0	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (21.24)	7.5 (66.38)	1500	0.375 (0.5)	2.4 (21.24)	1FT2104-5AF-...-A0	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (21.24)	7.6 (67.27)	3000	0.75 (1.01)	2.4 (21.24)	1FT2104-5AK-...-A0	0.75	FSC	0-8	6FX002-8QN08-1
	3.2 (28.32)	10 (88.51)	1500	0.5 (0.67)	3.2 (28.32)	1FT2104-6AF-...-A0	0.75	FSC	0-8	6FX002-8QN08-1
<b>Compact for high precision applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.85 (1.36)	3000	0.2 (0.27)	0.64 (0.47)	1FT2203-2AG-...-A0	0.2	FSA	0-2	6FX002-8QN04-1
	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FT2203-4AG-...-A0	0.4	FSB	0-4	6FX002-8QN04-1
40	2.4 (1.77)	7.1 (5.24)	1500	0.375 (0.5)	2.4 (1.77)	1FT2204-5AF-...-A0	0.4	FSB	0-4	6FX002-8QN08-1
	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FT2204-5AK-...-A0	0.75	FSC	0-8	6FX002-8QN08-1
	3.2 (2.36)	9.5 (7.01)	1500	0.5 (0.67)	3.2 (2.36)	1FT2204-6AF-...-A0	0.75	FSC	0-8	6FX002-8QN08-1
48	3.6 (2.66)	10.8 (7.97)	1000	0.36 (0.48)	3.45 (2.54)	1FT2205-2AC-...-A0	0.4	FSB	0-4	6FX002-8QN08-1
	3.6 (2.66)	10.8 (7.97)	1500	0.53 (0.71)	3.4 (2.51)	1FT2205-2AF-...-A0	0.75	FSC	0-8	6FX002-8QN08-1
	3.6 (2.66)	10.8 (7.97)	2500	0.82 (1.1)	3.15 (2.32)	1FT2205-2AH-...-A0	0.75	FSC	0-8	6FX002-8QN08-1

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring) – not available in shaft height 20	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
• $\varnothing 11 \times 23$ mm (0.43 $\times$ 0.91 in) (only for 1FT2.03 and IP64)	
• $\varnothing 14 \times 30$ mm (0.55 $\times$ 1.18 in) (only for 1FT2.04 and IP64)	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HB1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BB1-...-CF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

1

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 3 AC

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable	
Shaft height	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Rated speed $n_N$ r/min	Rated power $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>f</sub> -ft)	Article No.	Rated power 240 V $P_N$ kW	Frame size	Article No.	Article No.	
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>	
20	0.16 (0.12)	0.56 (0.41)	3000	0.05 (0.07)	0.16 (0.12)	1FT2102-0AG-...-...A0	0.24	FSA	0-4	6FX...002-8QN04-1...	
	0.32 (0.24)	1.11 (0.82)	3000	0.1 (0.13)	0.32 (0.24)	1FT2102-1AG-...-...A0	0.24	FSA	0-4	6FX...002-8QN04-1...	
30	0.64 (0.47)	1.95 (1.44)	3000	0.2 (0.27)	0.64 (0.47)	1FT2103-2AG-...-...A0	0.45	FSA	0-8	6FX...002-8QN04-1...	
	1.27 (0.94)	4.05 (2.99)	3000	0.4 (0.54)	1.27 (0.94)	1FT2103-4AG-...-...A0	0.6	FSA	1-0	6FX...002-8QN04-1...	
40	1.27 (0.94)	3.75 (2.77)	1500	0.2 (0.27)	1.27 (0.94)	1FT2104-4AF-...-...A0	0.24	FSA	0-4	6FX...002-8QN08-1...	
	1.27 (0.94)	3.85 (2.84)	3000	0.4 (0.54)	1.27 (0.94)	1FT2104-4AK-...-...A0	0.6	FSA	1-0	6FX...002-8QN08-1...	
	2.4 (1.77)	7.5 (5.53)	1500	0.375 (0.5)	2.4 (1.77)	1FT2104-5AF-...-...A0	0.45	FSA	0-8	6FX...002-8QN08-1...	
	2.4 (1.77)	7.6 (5.61)	3000	0.75 (1.01)	2.4 (1.77)	1FT2104-5AK-...-...A0	0.9	FSB	1-5	6FX...002-8QN08-1...	
	3.2 (2.36)	10 (7.38)	1500	0.5 (0.67)	3.2 (2.36)	1FT2104-6AF-...-...A0	0.6	FSA	1-0	6FX...002-8QN08-1...	
	52	5.0 (3.69)	15 (11.06)	1500	0.79 (1.06)	5.0 (3.69)	1FT2105-4AF-...-...A0	0.9	FSB	1-5	6FX...002-8QN08-1...
		5.0 (3.69)	15 (11.06)	2500	1.27 (1.7)	4.85 (3.58)	1FT2105-4AH-...-...A0	2.1	FSC	3-5	6FX...002-8QN08-1...
8.0 (5.9)		24 (17.7)	1500	1.26 (1.69)	8.0 (5.9)	1FT2105-6AF-...-...A0	1.2	FSB	2-0	6FX...002-8QN08-1...	
63	9.0 (6.64)	26 (19.18)	1500	1.3 (1.74)	8.3 (6.12)	1FT2106-3AF-...-...A0	3.0	FSC	5-0	6FX...002-8QN11-1...	
	12 (8.85)	33 (24.34)	1500	1.64 (2.2)	10.5 (7.74)	1FT2106-4AF-...-...A0	3.0	FSC	5-0	6FX...002-8QN11-1...	
	16 (11.8)	45.5 (33.56)	1500	2.15 (2.88)	13.8 (10.18)	1FT2106-6AF-...-...A0	4.2	FSC	7-0	6FX...002-8QN11-1...	

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring) – not available in shaft height 20	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• <math>\varnothing 11 \times 23</math> mm (0.43 <math>\times</math> 0.91 in) (only for 1FT2.03 and IP64)</li> <li>• <math>\varnothing 14 \times 30</math> mm (0.55 <math>\times</math> 1.18 in) (only for 1FT2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number 6SL3... for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number 6SL5... may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.



# System overview

## SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

1

### Order overview

#### SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 230 V	Rated torque	Article No.	Rated power 240 V	Frame size	Article No.	Article No.
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_N$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW			
<b>High Dynamic for highly dynamic applications (continued)</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	25 (18.44)	74 (54.58)	1000	2.45 (3.29)	23.5 (17.33)	1FT2108-4AC-...-A0	4.2	FSC	7-0	6FX002-8QN11-1
	30 (22.13)	100 (73.73)	750	2.2 (2.95)	28 (20.65)	1FT2108-5AB-...-A0	4.2	FSC	7-0	6FX002-8QN11-1
	37.5 (27.66)	118 (87.04)	750	2.6 (3.49)	33 (24.34)	1FT2108-7AB-...-A0	4.2	FSC	7-0	6FX002-8QN11-1
<b>High Dynamic for highly dynamic applications – forced ventilation</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	40 (29.5)	100 (73.73)	750	3 (4.02)	38 (28.03)	1FT2108-5SB-...-A0	4.2	FSC	7-0	6FX002-8QN11-1

#### Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
With reinforced brake (only for 1FT2108)	2
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• <math>\varnothing 11 \times 23</math> mm (0.43 <math>\times</math> 0.91 in) (only for 1FT2.03 and IP64)</li> <li>• <math>\varnothing 14 \times 30</math> mm (0.55 <math>\times</math> 1.18 in) (only for 1FT2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number **6SL3...** for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number **6SL5...** may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 230 V	Rated torque	Article No.	Rated power 240 V	Frame size	Article No.	Article No.
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_N$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW			
<b>Compact for high precision applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.85 (1.36)	3000	0.2 (0.27)	0.64 (0.47)	1FT2203-2AG-...-A0	0.45	FSA	0-8	6FX002-8QN04-1...
	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FT2203-4AG-...-A0	0.6	FSA	1-0	6FX002-8QN04-1...
40	2.4 (1.77)	7.1 (5.24)	1500	0.375 (0.5)	2.4 (1.77)	1FT2204-5AF-...-A0	0.45	FSA	0-8	6FX002-8QN08-1...
	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FT2204-5AK-...-A0	0.9	FSB	1-5	6FX002-8QN08-1...
	3.2 (2.36)	9.5 (7.01)	1500	0.5 (0.67)	3.2 (2.36)	1FT2204-6AF-...-A0	0.6	FSA	1-0	6FX002-8QN08-1...
48	3.6 (2.66)	10.8 (7.97)	1000	0.36 (0.48)	3.45 (2.54)	1FT2205-2AC-...-A0	0.45	FSA	0-8	6FX002-8QN08-1...
	3.6 (2.66)	10.8 (7.97)	1500	0.53 (0.71)	3.4 (2.51)	1FT2205-2AF-...-A0	0.6	FSA	1-0	6FX002-8QN08-1...
	3.6 (2.66)	10.8 (7.97)	2500	0.82 (1.1)	3.15 (2.32)	1FT2205-2AH-...-A0	0.9	FSB	1-5	6FX002-8QN08-1...
	6.0 (4.43)	18 (13.28)	1500	0.86 (1.15)	5.5 (4.06)	1FT2205-4AF-...-A0	0.9	FSB	1-5	6FX002-8QN08-1...
63	6.0 (4.43)	18 (13.28)	1000	0.61 (0.82)	5.85 (4.31)	1FT2206-2AC-...-A0	0.6	FSA	1-0	6FX002-8QN11-1...
	6.5 (4.79)	18 (13.28)	1500	0.97 (1.3)	6.1 (4.5)	1FT2206-2AF-...-A0	0.9	FSB	1-5	6FX002-8QN11-1...
	6.5 (4.79)	18 (13.28)	2500	1.45 (1.94)	5.5 (4.06)	1FT2206-2AH-...-A0	1.2	FSB	2-0	6FX002-8QN11-1...
	9.0 (6.64)	27 (19.92)	750	0.68 (0.91)	8.7 (6.42)	1FT2206-3AB-...-A0	0.9	FSB	1-5	6FX002-8QN11-1...
	9.0 (6.64)	27 (19.92)	1500	1.29 (1.73)	8.2 (6.05)	1FT2206-3AF-...-A0	1.2	FSB	2-0	6FX002-8QN11-1...
	12 (8.85)	38 (28.03)	1000	1.2 (1.61)	11.5 (8.48)	1FT2206-4AC-...-A0	0.9	FSB	1-5	6FX002-8QN11-1...
	12 (8.85)	36 (26.55)	1500	1.72 (2.31)	10.9 (8.04)	1FT2206-4AF-...-A0	2.1	FSC	3-5	6FX002-8QN11-1...
	12 (8.85)	36 (26.55)	2500	2.4 (3.22)	9.3 (6.86)	1FT2206-4AH-...-A0	3.0	FSC	5-0	6FX002-8QN11-1...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FT2.03 and IP64)	
• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FT2.04 and IP64)	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number 6SL3... for each converter. Use of braking resistors integrated in the converter is not permissible with this supply voltage. The converters with article number 6SL5... may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

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Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Rated speed $n_N$ r/min	Rated power 230 V $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>f</sub> -ft)	Article No.	Rated power 240 V $P_N$ kW	Frame size	Article No.	Article No.
<b>Compact for high precision applications (continued)</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	12.5 (9.22)	38 (28.03)	1500	1.68 (2.25)	10.7 (7.89)	1FT2208-2AF-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	750	1.34 (1.8)	17 (12.54)	1FT2208-3AB-...-A0	1.2	FSB	2-0	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	1000	1.74 (2.33)	16.6 (12.24)	1FT2208-3AC-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	1500	2.4 (3.22)	15.4 (11.36)	1FT2208-3AF-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	750	1.62 (2.17)	20.7 (15.27)	1FT2208-4AB-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	1000	2.15 (2.88)	20 (14.75)	1FT2208-4AC-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	1500	2.75 (3.69)	17.6 (12.98)	1FT2208-4AF-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	27 (19.92)	80 (59.01)	750	1.92 (2.57)	24.5 (18.07)	1FT2208-5AB-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	27 (19.92)	80 (59.01)	1000	2.5 (3.35)	23.5 (17.33)	1FT2208-5AC-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
100	22 (16.23)	60 (44.26)	1000	2.15 (2.88)	20.5 (15.12)	1FT2210-2AC-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	60 (44.26)	1500	3.1 (4.16)	19.6 (14.46)	1FT2210-2AF-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	30 (22.13)	90 (66.38)	750	2.5 (3.35)	30 (22.13)	1FT2210-3AB-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	30 (22.13)	90 (66.38)	1000	3.2 (4.29)	30 (22.13)	1FT2210-3AC-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	40 (29.5)	120 (88.51)	750	3.05 (4.09)	39 (28.77)	1FT2210-4AB-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	40 (29.5)	120 (88.51)	1000	3.9 (5.23)	37 (27.29)	1FT2210-4AC-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	50 (36.88)	150 (110.64)	750	3.5 (4.69)	44.5 (32.82)	1FT2210-5AB-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
With reinforced brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2, 1FT2210-3)	2
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number 6SL3... for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number 6SL5... may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.



6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

1

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 200 ... 240 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 200 ... 240 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 230 V	Rated torque	Article No.	Rated power 240 V	Frame size	Article No.	Article No.
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_N$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW			
<b>Compact for high precision applications – forced ventilation</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	22 (16.23)	51 (37.62)	750	1.62 (2.17)	20.5 (15.12)	1FT2208-2SB-...-A0	2.1	FSC	3-5	6FX002-8QN11-1-...
	22 (16.23)	51 (37.62)	1000	2.15 (2.88)	20.5 (15.12)	1FT2208-3SC-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	51 (37.62)	1500	3.1 (4.16)	19.9 (14.68)	1FT2208-3SF-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	28 (20.65)	66 (48.68)	750	2.1 (2.82)	26.5 (19.55)	1FT2208-4SB-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...
	28 (20.65)	66 (48.68)	1000	2.75 (3.69)	26 (19.18)	1FT2208-4SC-...-A0	4.2	FSC	7-0	6FX002-8QN11-1-...
	35 (25.82)	80 (59.01)	750	2.6 (3.49)	33.5 (24.71)	1FT2208-5SB-...-A0	3.0	FSC	5-0	6FX002-8QN11-1-...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
With reinforced brake (only for 1FT2208-2 and 1FT2208-3)	2
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number 6SL3... for each converter.

Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number 6SL5... may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.

# System overview

Clicking to SiePortal

6SL3255-0AA00-5AA0



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## SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

### Order overview

#### SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 380 ... 480 V 3 AC

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 400 V	Rated torque	Article No.	Rated power 400 V	Frame size	Article No.	Article No.
	$M_0$ Nm (lb <sub>f</sub> -ft)	$M_{max}$ Nm (lb <sub>f</sub> -ft)	$n_N$ r/min	$P_N$ kW (hp)	$M_N$ Nm (lb <sub>f</sub> -ft)		$P_N$ kW			
<b>High Dynamic for highly dynamic applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.95 (1.44)	4500	0.28 (0.38)	0.59 (0.44)	1FT2103-2AH-...-A0	0.4	FSA	0-4	6FX002-8QN08-1...
	1.27 (0.94)	4.05 (2.99)	4500	0.48 (0.64)	1.01 (0.74)	1FT2103-4AH-...-A0	0.75	FSA	0-8	6FX002-8QN08-1...
40	1.27 (0.94)	3.75 (2.77)	3000	0.4 (0.54)	1.27 (0.94)	1FT2104-4AF-...-A0	0.4	FSA	0-4	6FX002-8QN08-1...
	1.27 (0.94)	3.85 (2.84)	6000	0.6 (0.8)	0.95 (0.7)	1FT2104-4AK-...-A0	1.0	FSA	1-0	6FX002-8QN08-1...
	2.4 (1.77)	7.5 (5.53)	3000	0.75 (1.01)	2.4 (1.77)	1FT2104-5AF-...-A0	0.75	FSA	0-8	6FX002-8QN08-1...
	2.4 (1.77)	7.6 (5.61)	6000	1.07 (1.43)	1.7 (1.25)	1FT2104-5AK-...-A0	1.5	FSB	1-5	6FX002-8QN08-1...
	3.2 (2.36)	10 (7.38)	3000	1.0 (1.34)	3.2 (2.36)	1FT2104-6AF-...-A0	1.0	FSA	1-0	6FX002-8QN08-1...
	5.0 (3.69)	15 (11.06)	3000	1.45 (1.94)	4.6 (3.39)	1FT2105-4AF-...-A0	1.5	FSB	1-5	6FX002-8QN08-1...
52	5.0 (3.69)	15 (11.06)	4500	1.74 (2.33)	3.7 (2.73)	1FT2105-4AH-...-A0	3.5	FSC	3-5	6FX002-8QN08-1...
	8.0 (5.9)	24 (17.7)	3000	2.1 (2.82)	6.6 (4.87)	1FT2105-6AF-...-A0	2.0	FSB	2-0	6FX002-8QN08-1...
	9.0 (6.64)	26 (19.18)	3000	2.3 (3.08)	7.3 (5.38)	1FT2106-3AF-...-A0	5.0	FSC	5-0	6FX002-8QN11-1...
63	12 (8.85)	33 (24.34)	3000	2.7 (3.62)	8.6 (6.34)	1FT2106-4AF-...-A0	5.0	FSC	5-0	6FX002-8QN11-1...
	16 (11.8)	45.5 (33.56)	3000	3.3 (4.43)	10.6 (7.82)	1FT2106-6AF-...-A0	7.0	FSC	7-0	6FX002-8QN11-1...

#### Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FT2.03 and IP64)</li> <li>• Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FT2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

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Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 380 ... 480 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque	Maximum torque	Rated speed	Rated power 400 V	Rated torque	Article No.	Rated power 400 V	Frame size	Article No.	Article No.
	$M_0$	$M_{max}$	$n_N$	$P_N$	$M_N$		$P_N$			
	Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	r/min	kW (hp)	Nm (lb <sub>f</sub> -ft)		kW			
<b>High Dynamic for highly dynamic applications (continued)</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	25 (18.44)	74 (54.58)	2000	4.3 (5.77)	20.5 (15.12)	1FT2108-4AC-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
	30 (22.13)	100 (73.73)	1500	4.0 (5.36)	25.5 (18.81)	1FT2108-5AB-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
	37.5 (27.66)	118 (87.04)	1500	4.7 (6.30)	30 (22.13)	1FT2108-7AB-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
<b>High Dynamic for highly dynamic applications – forced ventilation</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	40 (29.5)	100 (73.73)	1500	5.6 (7.51)	35.5 (16.18)	1FT2108-5SB-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
With reinforced brake (only for 1FT2108)	2
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• <math>\varnothing 11 \times 23</math> mm (0.43 <math>\times</math> 0.91 in) (only for 1FT2.03 and IP64)</li> <li>• <math>\varnothing 14 \times 30</math> mm (0.55 <math>\times</math> 1.18 in) (only for 1FT2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8



## System overview

## SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

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## Order overview

## SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 380 ... 480 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque $M_0$ Nm (lb <sub>r</sub> -ft)	Maximum torque $M_{rmax}$ Nm (lb <sub>r</sub> -ft)	Rated speed $n_N$ r/min	Rated power 400 V $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>r</sub> -ft)	Article No.	Rated power 400 V $P_N$ kW	Frame size	Article No.	Article No.
<b>Compact for high precision applications</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
30	0.64 (0.47)	1.85 (1.36)	6000	0.255 (0.34)	0.405 (0.3)	1FT2203-2AK-...-A0	0.4	FSA	0-4	6FX002-8QN08-1
	1.27 (0.94)	3.75 (2.77)	6000	0.43 (0.58)	0.68 (0.5)	1FT2203-4AK-...-A0	0.75	FSA	0-8	6FX002-8QN08-1
40	2.4 (1.77)	7.1 (5.24)	3000	0.75 (1.01)	2.4 (1.77)	1FT2204-5AF-...-A0	0.75	FSA	0-8	6FX002-8QN08-1
	2.4 (1.77)	7.1 (5.24)	6000	0.57 (0.76)	0.9 (0.66)	1FT2204-5AK-...-A0	1.5	FSB	1-5	6FX002-8QN08-1
	3.2 (2.36)	9.5 (7.01)	3000	1.0 (1.34)	3.2 (2.36)	1FT2204-6AF-...-A0	1.0	FSA	1-0	6FX002-8QN08-1
48	3.6 (2.66)	10.8 (7.97)	2000	0.69 (0.93)	3.3 (2.43)	1FT2205-2AC-...-A0	0.75	FSA	0-8	6FX002-8QN08-1
	3.6 (2.66)	10.8 (7.97)	3000	0.94 (1.26)	3.0 (2.21)	1FT2205-2AF-...-A0	1.0	FSA	1-0	6FX002-8QN08-1
	3.6 (2.66)	10.8 (7.97)	4500	1.06 (1.42)	2.25 (1.66)	1FT2205-2AH-...-A0	1.5	FSB	1-5	6FX002-8QN08-1
	6.0 (4.43)	18 (13.28)	3000	1.45 (1.94)	4.6 (3.39)	1FT2205-4AF-...-A0	1.5	FSB	1-5	6FX002-8QN08-1
63	6 (4.43)	18 (13.28)	2000	1.15 (1.54)	5.5 (4.06)	1FT2206-2AC-...-A0	1.0	FSA	1-0	6FX002-8QN11-1
	6.5 (4.79)	18 (13.28)	3000	1.71 (2.29)	5.4 (3.98)	1FT2206-2AF-...-A0	1.5	FSB	1-5	6FX002-8QN11-1
	6.5 (4.79)	18 (13.28)	4500	1.8 (2.41)	3.85 (2.84)	1FT2206-2AH-...-A0	2.0	FSB	2-0	6FX002-8QN11-1
	9.0 (6.64)	27 (19.92)	1500	1.3 (1.74)	8.3 (6.12)	1FT2206-3AB-...-A0	1.5	FSB	1-5	6FX002-8QN11-1
	9.0 (6.64)	27 (19.92)	3000	2.35 (3.15)	7.5 (5.53)	1FT2206-3AF-...-A0	2.0	FSB	2-0	6FX002-8QN11-1
	12 (8.85)	38 (28.03)	2000	2.2 (2.95)	10.5 (7.74)	1FT2206-4AC-...-A0	1.5	FSB	1-5	6FX002-8QN11-1
	12 (8.85)	36 (26.55)	3000	2.85 (3.82)	9.1 (6.71)	1FT2206-4AF-...-A0	3.5	FSC	3-5	6FX002-8QN11-1
	12 (8.85)	36 (26.55)	4500	2.2 (2.95)	4.7 (3.47)	1FT2206-4AH-...-A0	5.0	FSC	5-0	6FX002-8QN11-1

## Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter	0 2
<ul style="list-style-type: none"> <li>• <math>\varnothing 11 \times 23</math> mm (0.43 <math>\times</math> 0.91 in) (only for 1FT2.03 and IP64)</li> <li>• <math>\varnothing 14 \times 30</math> mm (0.55 <math>\times</math> 1.18 in) (only for 1FT2.04 and IP64)</li> </ul>	
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

Clicking to SiePortal

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 380 ... 480 V 3 AC (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque $M_0$ Nm (lb <sub>r</sub> -ft)	Maximum torque $M_{rmax}$ Nm (lb <sub>r</sub> -ft)	Rated speed $r_N$ r/min	Rated power 400 V $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>r</sub> -ft)	Article No.	Rated power 400 V $P_N$ kW	Frame size	Article No.	Article No.
<b>Compact for high precision applications (continued)</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
80	12.5 (9.22)	38 (28.03)	3000	2.85 (3.82)	9.0 (6.64)	1FT2208-2AF-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	1500	2.5 (3.35)	16 (11.8)	1FT2208-3AB-...-A0	2.0	FSB	2-0	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	2000	3.05 (4.09)	14.5 (10.7)	1FT2208-3AC-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...
	18 (13.28)	51 (37.62)	3000	3.5 (4.69)	11.1 (8.19)	1FT2208-3AF-...-A0	5.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	1500	2.9 (3.89)	18.6 (13.72)	1FT2208-4AB-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	2000	3.55 (4.76)	17 (12.54)	1FT2208-4AC-...-A0	5.0	FSC	5-0	6FX002-8QN11-1-...
	22 (16.23)	66 (48.68)	3000	3.7 (4.96)	11.8 (8.7)	1FT2208-4AF-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
	27 (19.92)	80 (59.01)	1500	3.45 (4.63)	22 (16.23)	1FT2208-5AB-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...
	27 (19.92)	80 (59.01)	2000	4.0 (5.36)	19.1 (14.09)	1FT2208-5AC-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
	100	22 (16.23)	60 (44.26)	2000	3.85 (5.16)	18.4 (13.57)	1FT2210-2AC-...-A0	5.0	FSC	5-0
22 (16.23)		60 (44.26)	3000	5.1 (6.84)	16.2 (11.95)	1FT2210-2AF-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
30 (22.13)		90 (66.38)	1500	4.5 (6.03)	28.5 (21.02)	1FT2210-3AB-...-A0	3.5	FSC	3-5	6FX002-8QN11-1-...
30 (22.13)		90 (66.38)	2000	5.5 (7.38)	26 (19.18)	1FT2210-3AC-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
40 (29.5)		120 (88.51)	1500	5.4 (7.24)	34.5 (25.45)	1FT2210-4AB-...-A0	5.0	FSC	5-0	6FX002-8QN11-1-...
40 (29.5)		120 (88.51)	2000	6.4 (8.58)	30.5 (22.5)	1FT2210-4AC-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...
50 (36.88)		150 (110.64)	1500	6.1 (8.18)	39 (28.77)	1FT2210-5AB-...-A0	7.0	FSC	7-0	6FX002-8QN11-1-...

Article No. supplements

<b>Holding brake</b>	
Without brake	0
With brake	1
With reinforced brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2, 1FT2210-3)	2
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring)	2
<b>Shaft extension / feather key</b>	
Plain shaft	0
Shaft with feather key	1
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	S
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	M
AS26DQC (absolute encoder 26-bit singleturn)	B
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	C

<b>SINAMICS S210</b>	
6SL3210-5HE1-...-UF0	
<b>SINAMICS S210 (New)</b>	
6SL5310-1BE1-...-DF0	
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	5
MOTION-CONNECT 800PLUS	8
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	A
10 m (32.8 ft)	B
...	...
50 m (164 ft)	F
0 m (0 ft)	A
1 m (3.28 ft)	B
2 m (6.56 ft)	C
3 m (9.84 ft)	D
4 m (13.1 ft)	E
5 m (16.4 ft)	F
6 m (19.7 ft)	G
7 m (23.0 ft)	H
8 m (26.2 ft)	J
9 m (29.5 ft)	K
0 m (0 ft)	0
0.1 m (0.33 ft)	1
...	...
0.8 m (2.62 ft)	8

# System overview

Clicking to SiePortal

6SL3255-0AA00-5AA0



1

## SINAMICS S210 servo drive system with SIMOTICS S-1FT2 servomotors

### Order overview

**SINAMICS S210 drive system with SIMOTICS S-1FT2 servomotors for line connection 380 ... 480 V 3 AC** (continued)

SIMOTICS S-1FT2 servomotor							SINAMICS S210 servo converter (3 AC series) Supply voltage 380 ... 480 V 3 AC			MOTION-CONNECT motor connection cable
Shaft height	Static torque $M_0$ Nm (lb <sub>r</sub> -ft)	Maximum torque $M_{rmax}$ Nm (lb <sub>r</sub> -ft)	Rated speed $n_N$ r/min	Rated power 400 V $P_N$ kW (hp)	Rated torque $M_N$ Nm (lb <sub>r</sub> -ft)	Article No.	Rated power 400 V $P_N$ kW	Frame size	Article No.	Article No.
<b>Compact for high precision applications – forced ventilation</b>							<b>SINAMICS S210 servo converter</b>			<b>One Cable Connection</b>
<b>80</b>	22 (16.23)	51 (37.62)	1500	3.1 (4.16)	19.9 (14.68)	<b>1FT2208-2SB-...-A0</b>	5.0	FSC	<b>3-5</b>	<b>6FX002-8QN11-1</b>
	22 (16.23)	51 (37.62)	2000	4.0 (4.36)	19.1 (14.09)	<b>1FT2208-3SC-...-A0</b>	7.0	FSC	<b>5-0</b>	<b>6FX002-8QN11-1</b>
	22 (16.23)	51 (37.62)	3000	5.5 (7.38)	17.6 (12.98)	<b>1FT2208-3SF-...-A0</b>	5.0	FSC	<b>7-0</b>	<b>6FX002-8QN11-1</b>
	28 (20.65)	66 (48.68)	1500	4.0 (4.36)	25.5 (18.81)	<b>1FT2208-4SB-...-A0</b>	7.0	FSC	<b>5-0</b>	<b>6FX002-8QN11-1</b>
	28 (20.65)	66 (48.68)	2000	5.1 (6.84)	24 (17.70)	<b>1FT2208-4SC-...-A0</b>	5.0	FSC	<b>7-0</b>	<b>6FX002-8QN11-1</b>
	35 (25.82)	80 (59.01)	1500	5.0 (6.71)	32 (23.60)	<b>1FT2208-5SB-...-A0</b>	3.0	FSC	<b>5-0</b>	<b>6FX002-8QN11-1</b>

#### Article No. supplements

<b>Holding brake</b>	
Without brake	<b>0</b>
With brake	<b>1</b>
With reinforced brake (only for 1FT2208-2 and 1FT2208-3)	<b>2</b>
<b>Degree of protection</b>	
IP64 (without shaft sealing ring)	<b>0</b>
IP65 (with shaft sealing ring)	<b>1</b>
IP67 (with shaft sealing ring)	<b>2</b>
<b>Shaft extension / feather key</b>	
Plain shaft	<b>0</b>
Shaft with feather key	<b>1</b>
<b>Encoder</b>	
AS22DQC (absolute encoder 22-bit singleturn)	<b>S</b>
AM22DQC (absolute encoder 22-bit + 12-bit multiturn)	<b>M</b>
AS26DQC (absolute encoder 26-bit singleturn)	<b>B</b>
AM26DQC (absolute encoder 26-bit + 12-bit multiturn)	<b>C</b>

<b>SINAMICS S210</b>	
	<b>6SL3210-5HE1-...-UF0</b>
<b>SINAMICS S210 (New)</b>	
	<b>6SL5310-1BE1-...-DF0</b>
<b>Pre-assembled MOTION-CONNECT cable</b>	
MOTION-CONNECT 500	<b>5</b>
MOTION-CONNECT 800PLUS	<b>8</b>
<b>Length code (max. 50 m (164 ft))</b>	
0 m (0 ft)	<b>A</b>
10 m (32.8 ft)	<b>B</b>
...	...
50 m (164 ft)	<b>F</b>
0 m (0 ft)	<b>A</b>
1 m (3.28 ft)	<b>B</b>
2 m (6.56 ft)	<b>C</b>
3 m (9.84 ft)	<b>D</b>
4 m (13.1 ft)	<b>E</b>
5 m (16.4 ft)	<b>F</b>
6 m (19.7 ft)	<b>G</b>
7 m (23.0 ft)	<b>H</b>
8 m (26.2 ft)	<b>J</b>
9 m (29.5 ft)	<b>K</b>
0 m (0 ft)	<b>0</b>
0.1 m (0.33 ft)	<b>1</b>
...	...
0.8 m (2.62 ft)	<b>8</b>

Clicking to SiePortal

6SL3255-0AA00-5AA0



SINAMICS S210 servo drive system with SIMOTICS S-1FS2 servomotors

Order overview

SINAMICS S210 drive system with SIMOTICS S-1FS2 servomotors

SIMOTICS S-1FS2 servomotor							SINAMICS S210 servo converter	
Shaft height	Static torque	Maximum torque	Rated speed	Rated power for 380 ... 480 V 3 AC <sup>1)</sup>	Rated torque	Additional order code for cable end and cable length	Supply voltage 200 ... 240 V 1 AC	Supply voltage 200 ... 240 V 3 AC and 380 ... 480 V 3 AC
$M_0$	$M_{max}$	$r_N$	$P_N$	$M_N$	Article No.	Order code	Article No.	Article No.
Nm (lb <sub>f</sub> -ft)	Nm (lb <sub>f</sub> -ft)	r/min	kW (hp)	Nm (lb <sub>f</sub> -ft)				
40	3.1 (2.29)	10 (7.38)	3000	0.8 (1.07)	2.55 (1.88)	1FS2104-6AF7-MZ0 Q	0-8	1-0
52	7.6 (5.61)	24 (17.7)	3000	1.29 (1.73)	4.1 (3.02)	1FS2105-6AF7-MZ0 Q	-	2-0
63	14 (10.3)	42 (31)	2500	1.81 (2.43)	6.9 (5.09)	1FS2106-6AE7-MZ0 Q	-	5-0
			3000	1.95 (2.61)	6.2 (4.57)	1FS2106-6AF7-MZ0 Q	-	5-0
80	23.5 (21.39)	80 (59.1)	2000	2.51 (3.37)	12 (8.85)	1FS2208-5AC7-MZ0 Q	-	7-0

Article No. supplements

Holding brake	
Without brake	0
With brake	1
Shaft extension / feather key	
Plain shaft	0
Shaft with feather key	1

Supplements for the additional order code

Cable end	
Free cable ends for direct connection to the converter	0
Cable end with SPEED-CONNECT coupling M17 (1FS2104 and 1FS2105) or M23 (1FS2106 and 1FS2208)	1
Cable length	
0.5 m (1.64 ft)	A
1 m (3.28 ft)	B
1.5 m (4.92 ft)	C
2 m (6.56 ft)	D
2.5 m (8.20 ft)	E
3 m (9.84 ft)	F
3.5 m (11.48 ft)	G
4 m (13.12 ft)	H
4.5 m (14.76 ft)	J
5 m (16.41 ft)	K
5.5 m (18.05 ft)	L
6 m (19.69 ft)	M
6.5 m (21.33 ft)	N
7 m (22.97 ft)	P
7.5 m (24.61 ft)	Q
8 m (26.25 ft)	R
8.5 m (27.89 ft)	S
9 m (29.53 ft)	T
9.5 m (31.17 ft)	U
10 m (32.81 ft)	V
10.5 m (34.45 ft)	W
11 m (36.09 ft)	X

SINAMICS S210	
6SL3210-5HB1-UF0	6SL3210-5HE1-UF0
SINAMICS S210 (New)	
6SL5310-1BB1-CF0	6SL5310-1BE1-DF0

For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number **6SL3...** for each converter. Use of braking resistors integrated in the converter is not permissible with this supply voltage.

The converters with article number **6SL5...** may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.

<sup>1)</sup> Values for operation at 200 ... 240 V 1/3 AC, see chapter 3.3 "SIMOTICS S-1FS2 servomotors for SINAMICS S210".


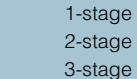


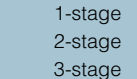





# System overview

## SINAMICS S210 servo drive system with SIMOTICS S-1FK2 and 1FT2 servo planetary geared motors

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### Order overview

#### SIMOTICS S-1FK2 and 1FT2 servo planetary geared motors

		SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors															
		Basic motor						Planetary gearbox									
		Article No.															
		Order codes															
		1F	2	0	-	A					0	-	Z	+	+	+	+
<b>Basic servomotor</b>		K															
		T															
<b>Holding brake</b>	Without			0													
	Holding brake			1													
	Reinforced holding brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)			2													
<b>Degree of protection motor</b>	IP64			0													
	IP65			1													
<b>Motor shaft</b>	Assignment depending on the gearbox size																
<b>Encoder</b>	Absolute encoder 22-bit singleturn (AS22DQC)																S
	Absolute encoder 22-bit + 12-bit multiturn (AM22DQC)																M
	Absolute encoder Singleturn 26 bit (AS26DQC)					T											B
	Absolute encoder 26 bit + 12 bit Multiturn (AM26DQC)					T											C
<b>Connection technology</b>	One-cable technology for SINAMICS S210 servo converters																A
	Two-cable technology for SINAMICS S120 servo converters																B
<b>Gearbox type, gearbox size, number of gearbox stages, transmission ratio, lubrication and gearbox shaft</b>																	
<b>1. Order code – gearbox type, gearbox size and number of gearbox stages</b>																	
<b>• Gearbox type</b>		Planetary gearbox NRB or NRBW												A			
		Planetary gearbox NRK or NRKW												B			
		Planetary gearbox NLC or NLCW												C			
<b>• Gearbox size</b>		040/050												1			
		060/070												2			
		080/090												3			
		120												4			
		155/160												5			
<b>• Number of gearbox stages</b>		Coaxial gearbox						Angular gearbox (only for 1FT2)									
		1-stage		2-stage		3-stage		1-stage		2-stage		3-stage		6			
		1		2		3		6		7		8					
																	
<b>2. Order code – transmission ratio i</b>																	
1-stage		2-stage		3-stage													
3	R 03	9	R 09	60	R 60												
4	R 04	12	R 12	80	R 80												
5	R 05	15	R 15	100	R 01												
7	R 07	16	R 16	120	R 21												
8	R 08	20	R 20	160	R 61												
10	R 10	25	R 25	200	R 02												
		32	R 32	256	R 52												
		40	R 40	320	R 23												
		50	R 50	512	R 51												
		64	R 64														
		100	R 00														
<b>3. Order code – gearbox lubrication and shaft design</b>																	
Standard lubrication				+	Smooth solid shaft								M 0 0				
Standard lubrication				+	Solid shaft with feather key								M 0 1				
Food-grade lubricant				+	Smooth solid shaft								M 1 0				
Food-grade lubricant				+	Solid shaft with feather key								M 1 1				
<b>4. Order code (optional) – Different orientation of the output for angular gearboxes (only for 1FT2)</b>																	
Standard				-			Q 9 1			Q 9 2			Q 9 3				

**Notes:**

- The geared motor can only be delivered as a unit – motor plus gearbox – (no individual gearboxes).
- Not all combinations are possible.
- For shaft design with feather key, the gearbox data only applies to pulsating loads. With alternating load / reversal of direction of rotation, limitation of the torque as a function of the number of load cycles is required (see Configuration Manual).





## Order overview

## Accessories for SINAMICS S210 servo converters

Description	Article No.
<b>SINAMICS SD card for SINAMICS S210 (6SL3...)</b> 512 MB Firmware V5.2 or higher is required for the 3 AC series. The parameter assignment, firmware and licenses for a converter can be stored on the memory card. <ul style="list-style-type: none"> <li>• Empty</li> <li>• Empty and Safety License (Extended Functions) (available with firmware V5.1 SP1 or higher)</li> <li>• With firmware V5.1</li> <li>• With firmware V5.1 SP1</li> <li>• With firmware V5.1 SP1 and Safety license (Extended Functions)</li> <li>• With firmware V5.2</li> <li>• With firmware V5.2 and Safety license (Extended Functions)</li> <li>• With firmware V5.2 SP3</li> <li>• With firmware V5.2 SP3 and Safety license (Extended Functions)</li> </ul>	<b>6SL3054-4AG00-2AA0</b> <b>6SL3054-4AG00-2AA0-Z F01</b> <b>6SL3054-4FB00-2BA0</b> <b>6SL3054-4FB10-2BA0</b> <b>6SL3054-4FB10-2BA0-Z F01</b> <b>6SL3054-4FC00-2BA0</b> <b>6SL3054-4FC00-2BA0-Z F01</b> <b>6SL3054-4FC30-2BA0</b> <b>6SL3054-4FC30-2BA0-Z F01</b>
<b>Safety license for SINAMICS S210 (6SL3...)</b> (Extended Functions) <sup>1) 2)</sup> <ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	<b>6SL3074-0AA10-0AH0</b>
<b>SINAMICS SD card for SINAMICS S210 (New) (6SL5...)</b> 8 GB The parameter assignment, firmware and licenses for a converter can be stored on the memory card. <ul style="list-style-type: none"> <li>• Empty</li> <li>• Empty and Safety License (Extended Functions) <sup>1)</sup></li> <li>• With firmware V6.1</li> <li>• With firmware V6.1 and Safety License (Extended Functions) <sup>1)</sup></li> <li>• With firmware V6.3 <b>NEW</b></li> <li>• With firmware V6.3 and Safety License (Extended Functions) <sup>1)</sup> <b>NEW</b></li> </ul>	<b>6SL5970-0AA00-0AA0</b> <b>6SL5970-0AA00-0AA0-Z F01</b> <b>6SL5370-0GB00-0AA0</b> <b>6SL5370-0GB00-0AA0-Z F01</b> <b>6SL5370-0GD00-0AA0</b> <b>6SL5370-0GD00-0AA0-Z F01</b>
<b>Safety license for SINAMICS S210 (New) (6SL5...)</b> (Extended Functions) <sup>1) 2)</sup> <ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	<b>6SL5977-0AA00-2HA0</b>
<b>PROFINET patch cable</b> For the networking of concatenated converters <ul style="list-style-type: none"> <li>• 0.3 m</li> <li>• 0.5 m</li> </ul>	<b>6XV1870-3QE30</b> <b>6XV1870-3QE50</b>
<b>SINAMICS Smart Adapter <sup>6)</sup> <b>NEW</b></b> Wi-Fi solution for the next generation of SINAMICS converters SINAMICS S200 <sup>6)</sup> , SINAMICS S210 (New) <sup>6)</sup> and SINAMICS G220	<b>6SL4950-0AJ00-0AA0</b>

- <sup>1)</sup> The Extended Functions require a safety license.
- For converters with article number 6SL3... all Extended Functions are available from firmware V5.1 SP1 onwards.
  - For converters with article number 6SL5... from firmware V6.1, the extended functions SS1, SLS, SDI and SSM are available. All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.
- <sup>2)</sup> Extended function for an existing memory card (for converters with article number 6SL3... available with firmware V5.1 SP1 or higher). The memory card is not included in the scope of delivery. The Safety license can also be ordered together with a memory card (see above). With a CoL in electronic form, the license is supplied as a PDF file. Notification of this with a download link is received by email.
- <sup>3)</sup> The data is applicable for the complete cable length of the motors, whose associated converters are coupled with one another via an AC coupling or through the DC link.  
The maximum motor cable length per motor is 25 m using the internal filters to achieve EMC category C3 or an external filter to achieve EMC category C2. If an external filter is used to achieve EMC category C3, the maximum motor cable length per motor is 50 m.

Description	Article No.
<b>Only for the 1 AC series</b>	
<b>Line filter</b> With a line filter, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to IEC 61800-3 can be achieved. <ul style="list-style-type: none"> <li>• ≤ 18 A</li> </ul>	<b>6SL3203-0BB21-8VA1</b>
<b>Only for the 3 AC series</b>	
<b>Line filter</b> With a line filter, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to IEC 61800-3 can be achieved. When connected via a DC link, a total cable length of up to 100 m (328 ft) with Category C2 and up to 250 m (820 ft) with Category C3 is possible <sup>3)</sup> <ul style="list-style-type: none"> <li>• ≤ 35 A</li> <li>• ≤ 65 A</li> </ul>	<b>6SL3203-0BE23-5HA0</b> <b>6SL3203-0BE26-5HA0</b>
<b>Connector set AC bus and DC link</b> For coupling the DC link and the line infeed Scope of delivery: 1 AC bus connector, 1 DC link connector, 2 cover caps The AC bus connector replaces the push-in connector included in the scope of delivery of the converter. Wiring is performed with conventional 16 mm <sup>2</sup> cable (not included in scope of delivery) <sup>4)</sup>	<b>6SL3260-2DC00-0AA0</b>
<b>Connector set AC bus individual</b> For coupling the line infeed Scope of delivery: 1 AC bus connector, 1 cover cap This connector replaces the push-in connector included in the scope of delivery of the converter. Wiring is performed with conventional 16 mm <sup>2</sup> cable (not included in scope of delivery) <sup>4)</sup>	<b>6SL3260-2DC10-0AA0</b>
<b>External braking resistors for 200 ... 240 V 3 AC</b> For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number <b>6SL3...</b> for each converter. Use of braking resistors integrated in the converter is not permissible with this supply voltage. The converters with article number <b>6SL5...</b> may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this. <sup>5)</sup> <ul style="list-style-type: none"> <li>• 100 W, 47 Ω for FSA and FSB</li> <li>• 240 W, 14 Ω for FSC</li> </ul>	<b>GXK:BWG250047TS-190</b> <b>GXK:BWG600014TS-190</b>

- <sup>4)</sup> Permissible cables:
- 16 mm<sup>2</sup>, Class 5 (finely stranded, PVC-insulated) H07V-K + H07V2-K according to EN 50525-2-31
  - HELUTHERM 145: 16 mm<sup>2</sup>, Class 5 (finely stranded, crosslinked polyolefin-copolymer, halogen-free) [www.helukabel.com](http://www.helukabel.com)
  - External diameter 6.7 mm to 8.1 mm
- Permissible cables (UL approval):
- AWG 6, copper cable with PVC insulation, with or without nylon jacket, 19 strands
  - Types: MTW, THHW, THW, THW-2, THHN, THWN-2, TW, TWN
  - CSA types: TW, TWU, TWN75, TW75, TWU75, T90, no compressed conductors
- <sup>5)</sup> The prefix "**GXK:**" is part of a Siemens internal order code that does not belong to the product number of the original manufacturer Michael Koch GmbH.
- <sup>6)</sup> Release for SINAMICS S200 and SINAMICS S210 (New) available soon.



## SINAMICS S210 servo drive system

## Order overview

**Accessories for SIMOTICS S-1FK2 and S-1FT2 servomotors**

Description	For motor	Article No.
<b>Shaft sealing ring (optional)</b>	1FK2102 1FT2102	<b>1FY2902-0GC00</b>
Degree of protection kit to achieve degree of protection IP65 for mounting on the motor -- for retrofitting or as spare part	1FK2.03 1FT2.03	<b>1FY2903-0GC00</b>
	1FK2.04 1FT2.04	<b>1FY2904-0GC00</b>

**Spare parts for SIMOTICS S-1FS2 servomotors**

Description	For motor	Article No.
<b>Gasket</b>	1FS2104	<b>1FY2904-1GF00</b>
External flange gasket on the drive side (DE) of the motor	1FS2105	<b>1FY2905-1GF00</b>
	1FS2106	<b>1FY2906-1GF00</b>
	1FS2108	<b>1FY2908-1GF00</b>

**SINAMICS S210 starter kit NEW**

Description	Article No.
<b>SINAMICS S210 starter kit with Extended Safety</b>	<b>6SL5990-0AE30-0AA0</b>
Scope of delivery:	
<ul style="list-style-type: none"> <li>SINAMICS S210 servo converter (New)</li> <li>SIMOTICS S-1FK2 servomotor, 400 W</li> <li>One Cable Connection (OCC) motor connection cables, 3 m (9.84 ft)</li> <li>Memory card with Safety license (Extended Functions)</li> </ul>	

**Training case**

Description	Article No.
<b>SINAMICS S210 training case</b>	<b>6AG1067-1AA33-0AA0</b>
Scope of delivery:	
<ul style="list-style-type: none"> <li>2 × SINAMICS S210 servo converters (New), 0.1 kW, 230 V 1 AC</li> <li>2 × SIMOTICS S-1FK2 servomotors, High Dynamic</li> <li>2 × One Cable Connection (OCC) motor connection cables</li> <li>Rail, prepared for installation of a controller, e.g. SIMATIC S7-1500 (controller not included in scope of delivery)</li> </ul>	
The SINAMICS S210 training case is supplied as a trolley with a hood.	

6SL3255-0AA00-5AA0



Order overview

Pre-assembled OCC cables MOTION-CONNECT 500 and 800PLUS

Cross-section	Connector size	For SIMOTICS S motor			MOTION-CONNECT 500 and 800PLUS OCC motor connection and extension cables incl. shield clamp
mm <sup>2</sup>		1FK2	1FT2	1FS2	Article No.
0.38	M12	1FK2102, 1FK2.03-..G	1FT2102, 1FT2.03-..G	-	6FX 0 2-8Q 04-1
0.75	M17	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05	1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05	1FS2104, 1FS2105	6FX 0 2-8Q 08-1
1.5	M23	1FK2.06, 1FK2208, 1FK2210	1FT2.06, 1FT2.08, 1FT2210	1FS2106, 1FS2208	6FX 0 2-8Q 11-1
2.5 <sup>1)</sup>	M23	1FK2.06, 1FK2208, 1FK2210	1FT2.06, 1FT2.08, 1FT2210	-	6FX 0 2-8Q 21-1

Article No. supplement

Type of cable

- MOTION-CONNECT 500 – for predominantly fixed routing **5**
- MOTION-CONNECT 800PLUS – for use with cable carriers **8**

Type of assembly

- Completely pre-assembled **0**
- Connector for the converter side enclosed <sup>2)</sup> **1**

Type of cable

- Motor connection cable **N**
- Extension cable **E**

Length code

See table "Length code for pre-assembled cables (max. 50 m (164 ft))"

Pre-assembled OCC cables MOTION-CONNECT 400

Cross-section	Connector size	For SIMOTICS S motor	MOTION-CONNECT 400 OCC cables incl. shield clamp
mm <sup>2</sup>		1FS2	Article No.
0.75	M17	1FS2104, 1FS2105	6FX40 2-8QN08-1
1.5	M23	1FS2106, 1FS2208	6FX40 2-8QN11-1

Article No. supplement

Type of assembly

- Completely pre-assembled **0**
- Converter-side Siemens IX signal connector enclosed **1**

Length code

See table "Length code for pre-assembled cables (max. 50 m (164 ft))"

Length code for pre-assembled cables (max. 50 m (164 ft))

Description	Article No. supplement
<b>MOTION-CONNECT cable</b>	<b>6FX . 0 . 2-8Q . 0 . -1</b>
0 m (0 ft)	<b>A</b>
10 m (32.8 ft)	<b>B</b>
20 m (65.6 ft)	<b>C</b>
30 m (98.4 ft)	<b>D</b>
40 m (131 ft)	<b>E</b>
50 m (164 ft)	<b>F</b>
0 m (0 ft)	<b>A</b>
1 m (3.28 ft)	<b>B</b>
2 m (6.56 ft)	<b>C</b>
3 m (9.84 ft)	<b>D</b>
4 m (13.1 ft)	<b>E</b>
5 m (16.4 ft)	<b>F</b>
6 m (19.7 ft)	<b>G</b>
7 m (23.0 ft)	<b>H</b>
8 m (26.2 ft)	<b>J</b>
9 m (29.5 ft)	<b>K</b>
0 m (0 ft)	<b>0</b>
0.1 m (0.33 ft)	<b>1</b>
0.2 m (0.66 ft)	<b>2</b>
0.3 m (0.98 ft)	<b>3</b>
0.4 m (1.31 ft)	<b>4</b>
0.5 m (1.64 ft)	<b>5</b>
0.6 m (1.97 ft)	<b>6</b>
0.7 m (2.30 ft)	<b>7</b>
0.8 m (2.62 ft)	<b>8</b>

The maximum permissible cable length must be observed.

<sup>1)</sup> For increased requirement regarding routing type and ambient temperature. See tables on page 4/4.

<sup>2)</sup> For the extension cable (10th position of the Article No. "E"), special tools for assembling are required. For more information, refer to the installation instructions.

## System overview

## SINAMICS S210 servo drive system

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## Order overview

## OCC components for customer assembly

Description	Cross-section mm <sup>2</sup>	For SIMOTICS S motor			OCC component Article No.
		1FK2	1FT2	1FS2	
<b>Siemens IX signal connector on the converter side</b>	–	–	–	–	<b>6FX2003-0DE01</b>
<b>Shield clamp</b> (Packing unit: 10 items)					
• For pre-assembled cables with M12 and M17 plugs	0.38 and 0.75	–	–	–	<b>6FX2003-7EX10</b>
• For pre-assembled cables with M23 plugs	1.5 and 2.5	–	–	–	<b>6FX2003-7EX11</b>
<b>SPEED-CONNECT plug</b>					
• M12	0.38	1FK2102, 1FK2.03-..G	1FT2102, 1FT2.03-..G	–	<b>6FX2003-0L ■ 64</b>
• M17	0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05	1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05	1FS2104, 1FS2105	<b>6FX2003-0L ■ 54</b>
• M23	1.5 and 2.5	1FK2.06, 1FK2208, 1FK2210	1FT2.06, 1FT2.08, 1FT2210	1FS2106, 1FS2208	<b>6FX2003-0L ■ 34</b>
<b>Article No. supplement</b>					
• Motor-side plug					<b>U</b>
• Plug with male thread for extension cable					<b>A</b>

## Sold by the meter OCC cables MOTION-CONNECT

Cross-section mm <sup>2</sup>	For SIMOTICS S motor		MOTION-CONNECT 500 and 800PLUS sold by the meter OCC cables Article No.
	1FK2	1FT2	
0.38	1FK2102, 1FK2.03-..G	1FT2102, 1FT2.03-..G	<b>6FX ■ 008-1BE04- ■ ■ A0</b>
0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05	1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05	<b>6FX ■ 008-1BE08- ■ ■ A0</b>
1.5	1FK2.06, 1FK2208, 1FK2210	1FT2.06, 1FT2.08, 1FT2210	<b>6FX ■ 008-1BE11- ■ ■ A0</b>
2.5 <sup>1)</sup>	1FK2.06, 1FK2208, 1FK2210	1FT2.06, 1FT2.08, 1FT2210	<b>6FX ■ 008-1BE21- ■ ■ A0</b>

## Article No. supplement

## Type of cable

- MOTION-CONNECT 500 for predominantly fixed routing
- MOTION-CONNECT 800PLUS for use with cable carriers

## Length code

See table "Length code for cables sold by the meter (max. 500 m (1640 ft))"

Cross-section mm <sup>2</sup>	For SIMOTICS S motor		MOTION-CONNECT 400 sold by the meter OCC cables Article No.
	1FS2		
0.75	1FS2104, 1FS2105		<b>6FX4008-1BE08- ■ ■ A0</b>
1.5	1FS2106, 1FS2208		<b>6FX4008-1BE11- ■ ■ A0</b>

## Article No. supplement

## Length code

See table "Length code for cables sold by the meter (max. 500 m (1640 ft))"

## Length code for cables sold by the meter (max. 500 m (1640 ft))

Description	Article No. supplement
<b>MOTION-CONNECT cable</b>	<b>6FX . 008-1BE . . - ■ ■ A0</b>
50 m (164 ft)	<b>1 F</b>
100 m (328 ft)	<b>2 A</b>
200 m (656 ft)	<b>3 A</b>
300 m (984 ft)	<b>4 A</b>
400 m (1312 ft)	<b>5 A</b>
500 m (1640 ft)	<b>6 A</b>

The maximum permissible cable length must be observed.

## Control cabinet bushing

Description	Article No.
<b>Mounting flange</b> for cabinet bushing	
• For connector size M12	<b>6FX2003-7JX00</b>
• For connector size M17	<b>6FX2003-7HX00</b>
• For connector size M23	<b>6FX2003-7BX00</b>

## Recommended SIMATIC S7 controller

More information about SIMATIC S7-1500 and SIMATIC S7-1500 T-CPU controllers is available in Catalog ST 70 and on the internet at

[www.siemens.com/simatic-s7-1500](http://www.siemens.com/simatic-s7-1500)

<sup>1)</sup> For increased requirement regarding routing type and ambient temperature. See tables on page 4/4.



## Overview



The SINAMICS S210 starter kit with Extended Safety with Article No. 6SL5990-0AE30-0AA0 comprises

- a SINAMICS S210 servo converter (New), 230 V 1 AC, 400 W (Article No. 6SL5310-1BB10-4CF0)
- a SIMOTICS S-1FK2 servomotor, High Dynamic, shaft height 30, 400 W, without brake, shaft with feather key, with absolute encoder multiturn (Article No. 1FK2103-4AG00-1MA0)
- a corresponding One Cable Connection cable (OCC), 3 m (Article No. 6FX5002-8QN04-1AD0)
- a memory card with firmware V6.x and Safety license (Extended Functions) (Article No. 6SL5370-0G..0-0AA0-Z F01)

The delivery quantity is limited to three units per customer.

The SINAMICS S210 starter kit can be perfectly combined with the SIMATIC S7-1500 starter kit. In this way, Motion Control applications can be quickly and easily implemented.

For more information on SIMATIC S7-1500 starter kits, see: [www.siemens.com/s7-1500-starterkits](http://www.siemens.com/s7-1500-starterkits)

## Selection and ordering data

Description	Article No.
<b>SINAMICS S210 starter kit with Extended Safety</b>	<b>NEW 6SL5990-0AE30-0AA0</b>
Scope of delivery:	
<ul style="list-style-type: none"> <li>• SINAMICS S210 servo converter (New)</li> <li>• SIMOTICS S-1FK2 servomotor, 400 W</li> <li>• One Cable Connection (OCC) motor connection cables, 3 m (9.84 ft)</li> <li>• Memory card with Safety license (Extended Functions)</li> </ul>	

## System overview

### Notes

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## SINAMICS S210 servo converters



<b>2/2</b>	<b>SINAMICS S210 servo converters</b>
2/2	Overview
2/5	Design
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<b>2/32</b>	<b>Line-side components</b>
2/32	Line filters
2/34	Recommended line-side overcurrent protection devices
<b>2/35</b>	<b>DC link components</b>
2/35	External braking resistors
<b>2/37</b>	<b>Supplementary system components</b>
2/37	Memory cards
2/39	SINAMICS Smart Adapter

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at [www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address: [www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### SINAMICS S210 servo converters

#### Overview

#### **SINAMICS S210 – the single-axis servo drive for highly dynamic applications**



SINAMICS S210, 1 AC series, frame sizes FSA to FSC



SINAMICS S210, 3 AC series, frame sizes FSA to FSC

The SINAMICS S210 servo converter is designed for connection to SIMOTICS S-1FK2, S-1FT2 or S-1FS2 synchronous servomotors. PROFINET RT/IRT is available for connection to a higher-level control system. That allows, above all, SIMATIC S7 and SIMOTION to be used as controllers.

SINAMICS S210 is optimized for operation with SIMATIC S7-1500 and SIMATIC S7-1500T, which have their own positioning functionality. Therefore, no additional basic positioner is integrated into the converter.

The converter works with a servo controller with or without Dynamic Servo Control (DSC) and has a torque setpoint limitation. A wide range of internal protection functions are included to protect the converter.

The status of the converter is indicated by two multi-color LEDs and a 7-segment display. Pending faults can be acknowledged with a button under the front cover.

The converter has a web server, which can be called via the service interface or via PROFINET from a web browser on a PC. Both commissioning and diagnostics can be performed through this. With the web server, the converter can be brought into operation in a few steps. As the motor data from the converter is read from the electronic type plate, they do not need to be parameterized. The PROFIdrive telegram is automatically accepted by the controller; so only the controller parameters have to be adjusted. This is simply done with the One Button Tuning function, which automatically determines the parameters.

In addition to easy commissioning directly via the web server of the converter, engineering is also possible with SINAMICS Startdrive and TIA Portal (as of V15.1). The tool for configuration, commissioning and diagnostics has been optimized with regard to user friendliness and the consistent utilization of the TIA Portal advantages of a shared work environment for PLC, HMI and drives (requires SINAMICS S210 firmware V5.2 or higher).

SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors can be connected and operated via a One Cable Connection (OCC) line. Third-party motors cannot be connected because the converter requires the type plate data of the motor.

No additional components are required for controlling the motor holding brake as all the required components are integrated into the converter. In addition, no special power supply is required because the converter optimally sets the voltage for the brake internally. Thus, in combination with the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors, shortened opening and closing times of the brakes are also possible.

The converter can be operated optionally with a memory card. The card is inserted in the card slot behind the front cover. Firmware and drive parameters can be stored on the memory card, so that the converter can easily be replaced without any other aids. This memory card can also be used to perform series commissioning on multiple drives of identical type.

The card is available as an empty memory card or containing the latest converter firmware version. The memory card also contains the licenses for chargeable functions, such as the safety license for the Extended Safety Functions. To use these functions, a memory card containing the corresponding safety license must be permanently inserted.

If necessary, the converter contains an integrated braking resistor. As a result of the generous dimensioning of the resistor and the DC link capacities, an external braking resistor is only necessary to meet very high requirements. When operating a SINAMICS S210 servo converter with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required.

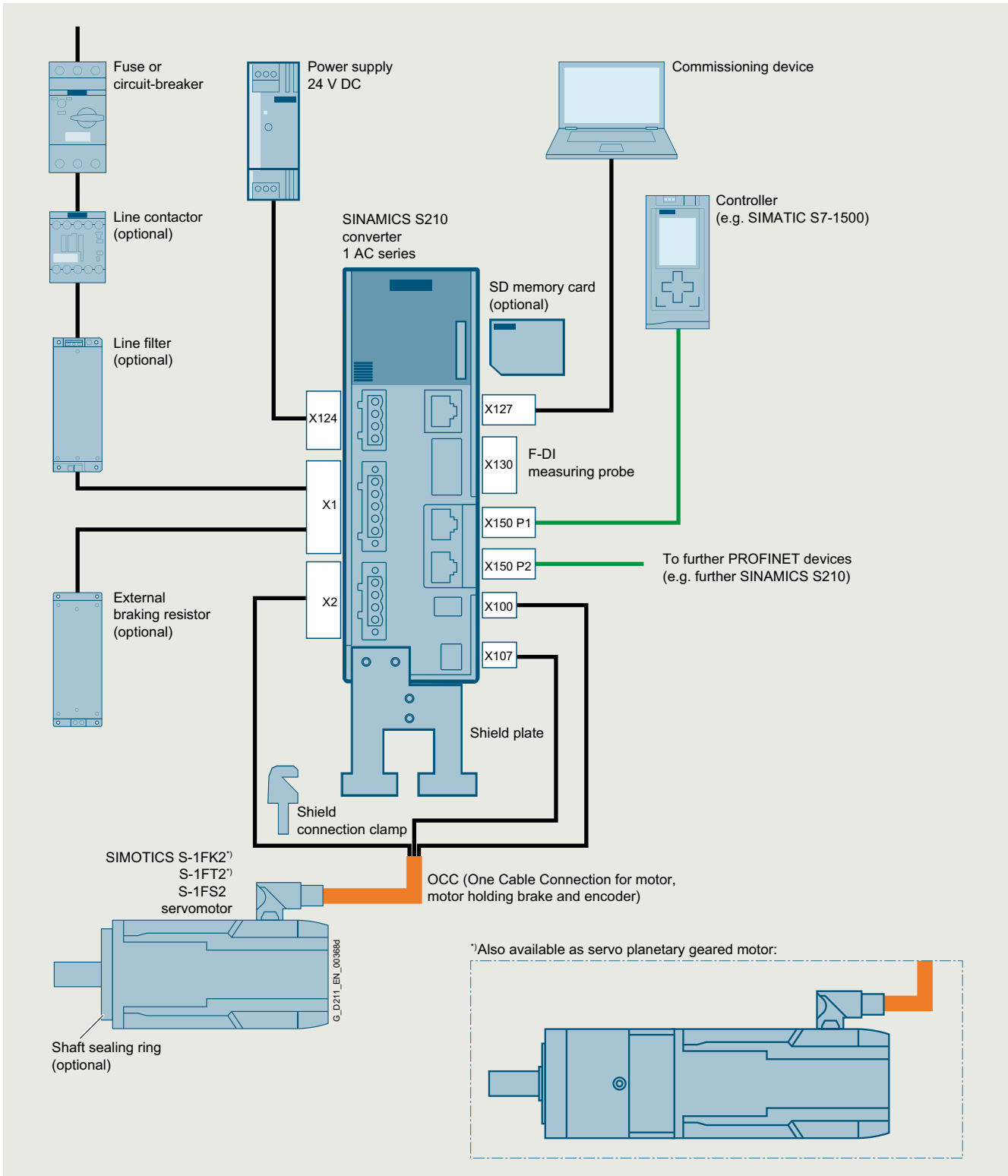
For the 3 AC series, DC link coupling of up to six converters is possible. Thus, the energy that is generated when braking axes can be used for accelerating other axes. This conserves energy and reduces the amount of heat dissipated via the braking resistors.

The converter also features an integrated line filter. For the 1 AC series, it satisfies category C2 for motor cable lengths up to 10 m and category C3 for cable lengths up to 25 m. With an optional external line filter, motor cable lengths of up to 25 m are also possible with category C2 and up to 50 m with category C3.

For the 3 AC series, category C3 is achieved for motor cable lengths up to 25 m. For requirements that go beyond this, an external line filter is required.



**Overview**



Example for SINAMICS S210, 1 AC series

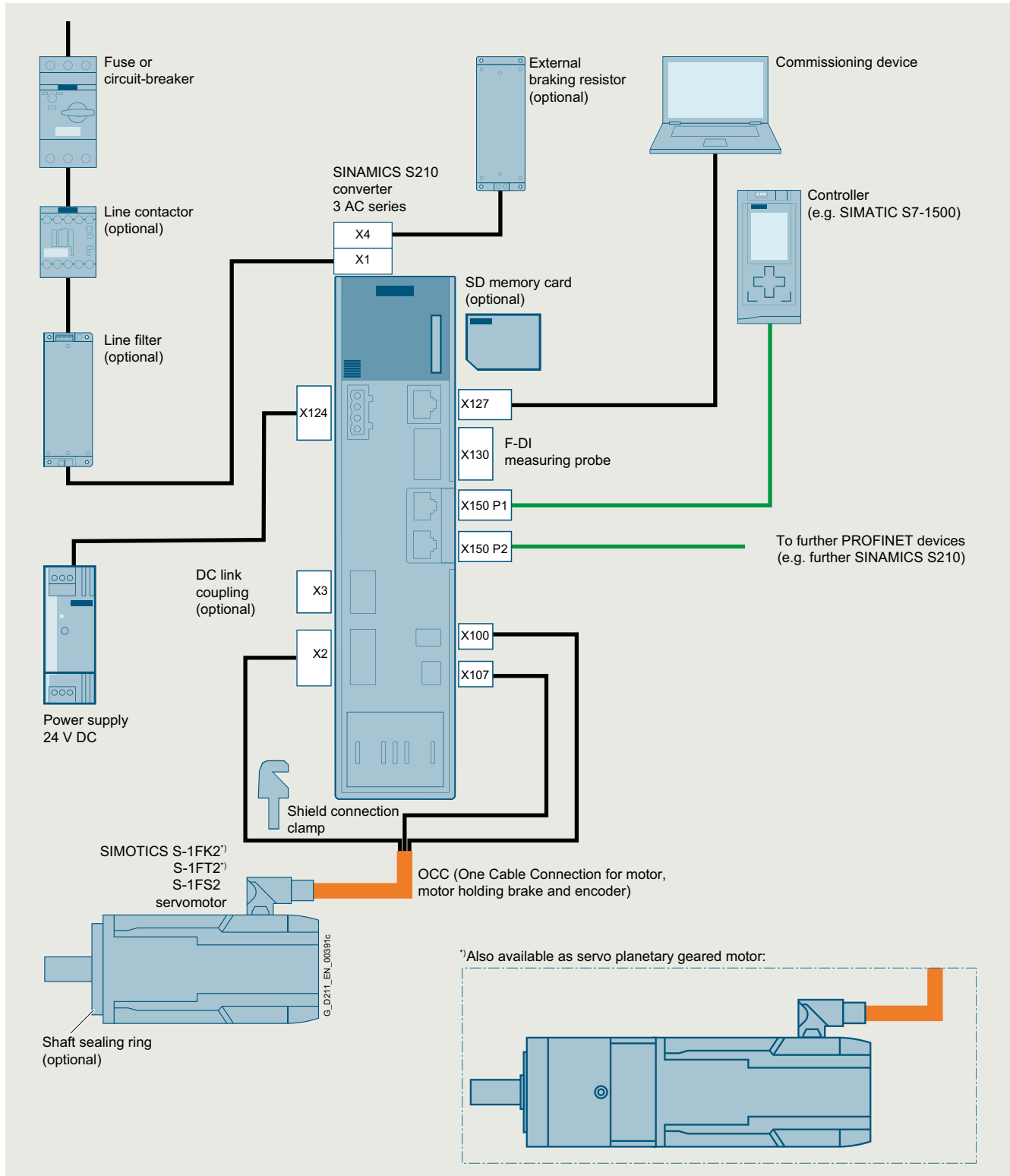
# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters

### Overview

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Example for SINAMICS S210, 3 AC series

**Design**

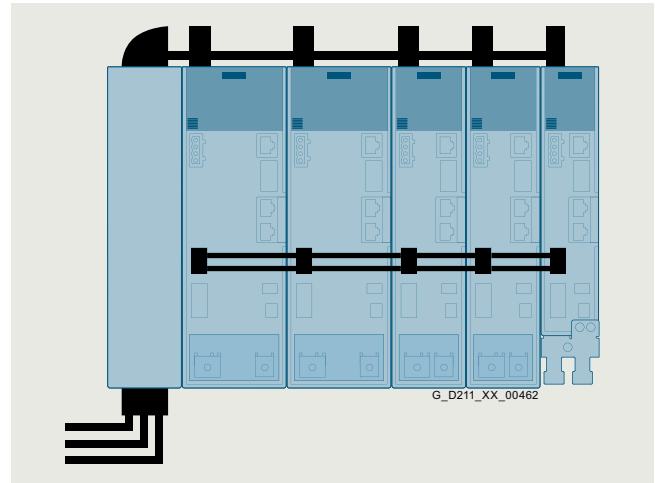
The single-axis AC/AC converter contains a power unit and a Control Unit for the powerful communication, open and closed-loop control functions.

The SINAMICS S210 servo converter features the following connections and interfaces as standard:

- Fieldbus interface
  - 1 PROFINET interface with two ports (RJ45 sockets) with PROFIdrive V4 profile
- 1 service interface for Ethernet communications with a service PC
- One Cable Connection (OCC)
  - 1 communications interface for communication with the encoder of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
  - 1 motor power connector for the power conductors of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
  - 1 brake connection for the conductors of the motor holding brake of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
- 1 connection for the electronic power supply via the 24 V DC supply connector (supply can be looped through connectors for several SINAMICS S210)
- 1 connection for the line voltage and an external braking resistor (braking resistor optional, for the 3 AC series via a separate connector). When connecting to 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required.
- 1 connection for the DC link coupling (optional, only for the 3 AC series)
- Digital inputs
  - 1 fail-safe digital input (isolated) for controlling STO and SS1-t via terminals
  - 2 high-speed digital inputs for measuring probe or reference marks
  - 1 digital input for monitoring the temperature of an external braking resistor
- 1 slot for a memory card on which the firmware, parameters and licenses can be stored
- 1 display with 3-digit, 7-segment display for indicating faults and two status LEDs
- 1 button for acknowledging errors

**DC link coupling (only 3 AC series)**

For converters of the 3 AC series, the DC links of up to six converters can be coupled. Thus, energy balancing between the axes is possible and energy produced during braking can be used by other axes for accelerating. This is not only efficient but also reduces the dissipated heat in the control cabinet, because the energy that is produced no longer has to be converted to heat in the braking resistor. For DC link coupling, the line side must also be coupled (AC bus).



SINAMICS S210, 3 AC series, one line filter plus five servo converters, AC coupling and DC link coupling

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### SINAMICS S210 servo converters

#### Function

<b>Closed-loop control</b>	Servo control with DSC
<b>Control functions</b>	Speed control with encoder Dynamic Servo Control (DSC) Torque setpoint limitation Current controller and current controller adaptation suitably adjusted for SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors One Button Tuning with moment of inertia estimator and reference model Local measuring probe Simple brake control Direction reversal without changing the setpoint channel Travel to fixed stop Vertical axis Speed controller adaptation Thermal monitoring for power unit and servomotor High-performance brake control
<b>Protective functions</b>	Undervoltage DC link voltage Overvoltage DC link voltage Overcurrent power unit Overcurrent motor Overload power unit ( $I^2t$ ) Short-circuit Ground fault Temperature rise servomotor Temperature rise power unit
<b>Safety Integrated</b>	Safe Torque OFF (STO) Safe Brake Control (SBC) Safe Stop 1 time-controlled (SS1-t) Safe Stop 1 (SS1) <sup>1)</sup> Safe Stop 2 (SS2) <sup>1)</sup> Safe Operating Stop (SOS) <sup>1)</sup> Safely-Limited Speed (SLS) <sup>1)</sup> Safe Speed Monitor (SSM) <sup>1)</sup> Safe Direction (SDI) <sup>1)</sup> Safely-Limited Acceleration (SLA) <sup>1)</sup> Safe Brake Test (SBT) diagnostic function <sup>1)</sup>
<b>Commissioning</b>	Identification of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors via the electronic type plate Automatic controller optimization

#### Configuration

The following electronic configuring aids and engineering tools are available for the SINAMICS S210 servo converters:

##### **SINAMICS DriveSim Basic (firmware V5.2 SP3 or higher)**

SINAMICS DriveSim Basic provides easy-to-use models for PROFIdrive-enabled SINAMICS converters, so you can create a digital twin of your drive.

More information is provided on the internet at:  
[www.siemens.com/drive-virtualization](http://www.siemens.com/drive-virtualization)

##### **SINAMICS SELECTOR app**

Frequency converter selection guide for on the move

Siemens has developed the SINAMICS SELECTOR app as a practical tool for finding article numbers for your SINAMICS converter in the power range from 0.1 kW to 630 kW quickly and easily. Whether for SINAMICS V20, SINAMICS V90, SINAMICS G120C, SINAMICS G120P, SINAMICS G120X, SINAMICS G120 or SINAMICS S210: The app will provide you with the correct article numbers conveniently.

How does it work? Simply select your application, the frequency converter you require, the rated power and device options as well as the necessary accessories.

Then you can save your selection and send it by email. The preselection serves as the basis for an order specification with the dealer/Siemens.

You will find free downloads for Android and iOS here:  
[www.siemens.com/sinamics-selector](http://www.siemens.com/sinamics-selector)

##### **Siemens Product Configurator**

The Siemens Product Configurator helps you to configure the optimum drive technology products for a number of applications – starting with gearboxes, motors, converters as well as the associated options and components and ending with controllers, software licenses and connection systems.

The Siemens Product Configurator can be used on the internet without requiring any installation. The Siemens Product Configurator can be found in SiePortal at the following address:  
[www.siemens.com/spc](http://www.siemens.com/spc)

##### **Drive dimensioning of the SINAMICS S210 servo drive system with the TIA Selection Tool**

The SINAMICS S210 servo drive system is easily configured with the TIA Selection Tool under the Drive Dimensioning plug-in. The TIA Selection Tool provides support when selecting the hardware and firmware components necessary to implement a drive task. The plug-in encompasses the configuration of the entire drive system and allows the handling of individual drives.

- Intuitive user interface, menu-based operation and help
- Configuration of the SINAMICS S210 servo drive system
- Adjustable traversing cycles and various mechanical systems integrated for single-axis applications
- Interface to the TIA Portal and SiePortal

The TIA Selection Tool is available for free on the internet at  
[www.siemens.com/tia-selection-tool-standalone](http://www.siemens.com/tia-selection-tool-standalone)

##### **SINAMICS web server for SINAMICS S210**

The converter can be brought easily and quickly into operation and optimized with the web server. Additional software does not need to be installed as access to the converter comes directly from a web browser.

You can find further information about the web server for SINAMICS S210 in the Engineering tools section.

##### **SINAMICS Startdrive commissioning tool (TIA Portal)**

SINAMICS Startdrive is a tool for configuring, commissioning and diagnosing the SINAMICS converter family that is integrated into TIA Portal (V15.1 or higher).

The SINAMICS Startdrive has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common working environment for PLC, HMI and drives. SINAMICS firmware V5.2 or higher is required for SINAMICS S210.

The SINAMICS Startdrive Advanced license is required for the Safety Integrated acceptance test.

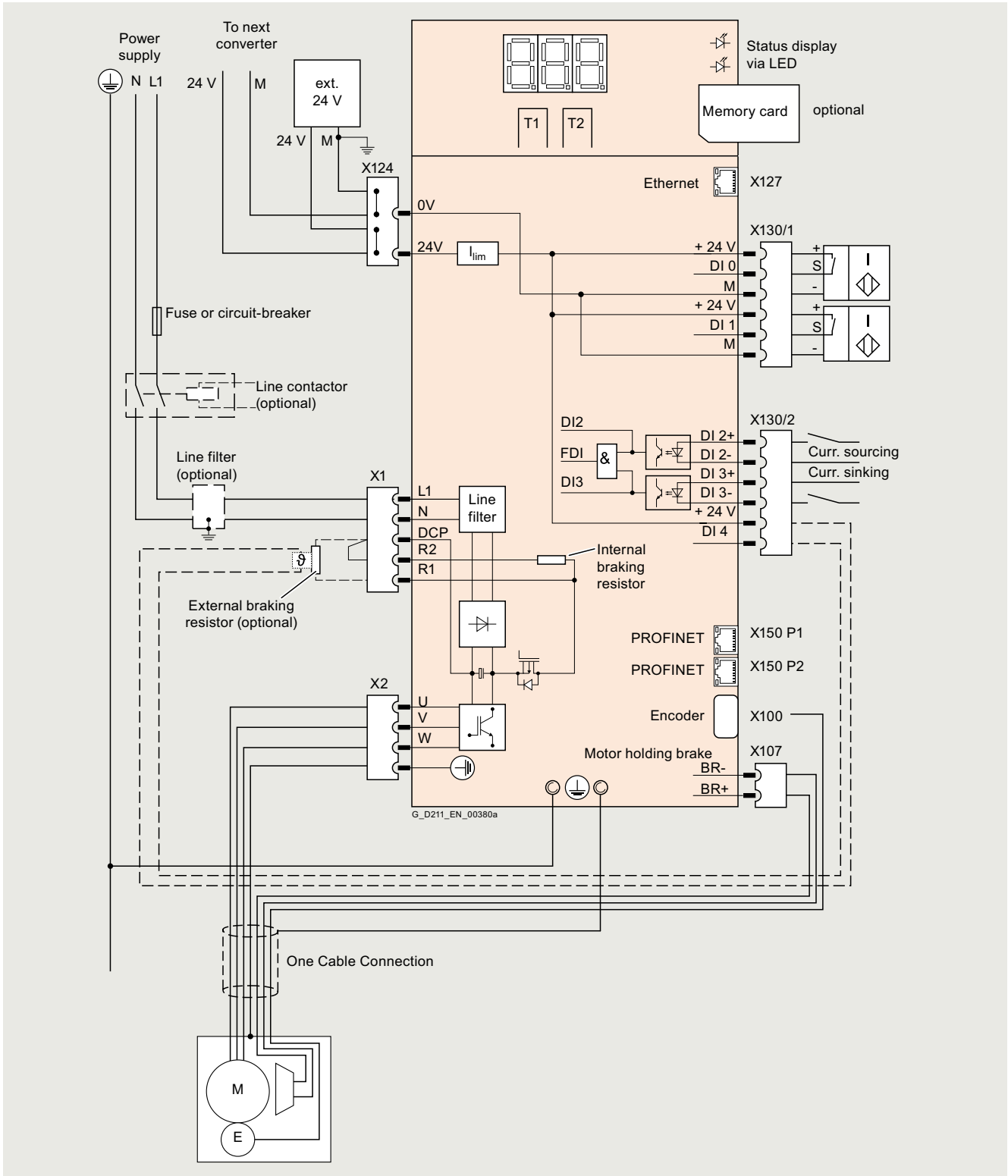
The SINAMICS Startdrive commissioning tool is available free on the internet at  
[www.siemens.com/startdrive](http://www.siemens.com/startdrive)

You can find further information on the SINAMICS Startdrive commissioning tool in the section Engineering tools.

<sup>1)</sup> Available in firmware V5.1 SP1 and higher. The Extended Functions require a Safety license.

**Integration**

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Connection example SINAMICS S210 servo converter, 1 AC series

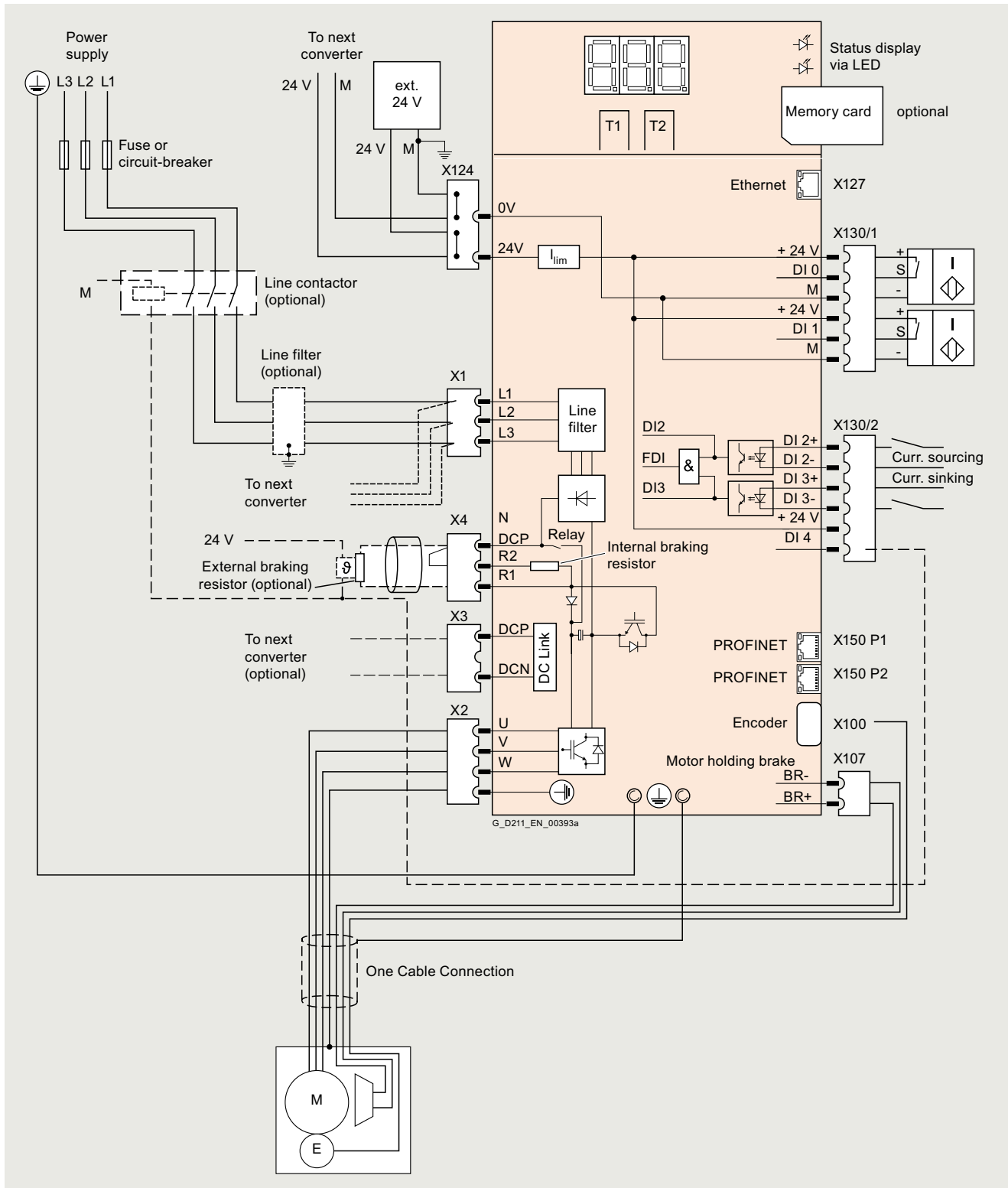
# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters

### Integration

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Connection example SINAMICS S210 servo converter, 3 AC series









# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters

### Selection and ordering data

Description	Frame size	Article No.
<b>200 ... 240 V 1 AC</b>		
<b>SINAMICS S210 servo converters</b> with shield plate and push-in connectors without memory card The shield clamp is included in the scope of delivery of the MOTION-CONNECT cable.		
 <ul style="list-style-type: none"> <li>• 0.1 kW</li> </ul>	FSA	<b>6SL3210-5HB10-1UF0</b>
 <ul style="list-style-type: none"> <li>• 0.2 kW</li> </ul>	FSA	<b>6SL3210-5HB10-2UF0</b>
 <ul style="list-style-type: none"> <li>• 0.4 kW</li> </ul>	FSB	<b>6SL3210-5HB10-4UF0</b>
 <ul style="list-style-type: none"> <li>• 0.75 kW</li> </ul>	FSC	<b>6SL3210-5HB10-8UF0</b>

Description	Frame size	Article No.
<b>200 ... 480 V 3 AC</b>		
<b>SINAMICS S210 servo converters</b> with shield plate (for FSA only) and push-in connectors without memory card The shield clamp is included in the scope of delivery of the MOTION-CONNECT cable.		
 <ul style="list-style-type: none"> <li>• 0.4 kW</li> </ul>	FSA	<b>6SL3210-5HE10-4UF0</b>
 <ul style="list-style-type: none"> <li>• 0.75 kW</li> </ul>	FSA	<b>6SL3210-5HE10-8UF0</b>
 <ul style="list-style-type: none"> <li>• 1 kW</li> </ul>	FSA	<b>6SL3210-5HE11-0UF0</b>
 <ul style="list-style-type: none"> <li>• 1.5 kW</li> </ul>	FSB	<b>6SL3210-5HE11-5UF0</b>
 <ul style="list-style-type: none"> <li>• 2 kW</li> </ul>	FSB	<b>6SL3210-5HE12-0UF0</b>
 <ul style="list-style-type: none"> <li>• 3.5 kW</li> </ul>	FSC	<b>6SL3210-5HE13-5UF0</b>
 <ul style="list-style-type: none"> <li>• 5 kW</li> </ul>	FSC	<b>6SL3210-5HE15-0UF0</b>
 <ul style="list-style-type: none"> <li>• 7 kW</li> </ul>	FSC	<b>6SL3210-5HE17-0UF0</b>

When operating a SINAMICS S210 servo converter with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required.


# SINAMICS S210 servo converters

0.1 kW to 7 kW


## SINAMICS S210 servo converters


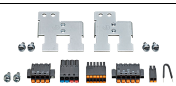
### Selection and ordering data


#### Accessories


Description	Article No.
 <p><b>SINAMICS SD card (optional)</b> 512 MB</p> <p>The parameter assignment, firmware and licenses for a converter can be stored on the memory card. Firmware V5.2 or higher is required for the 3 AC series.</p> <ul style="list-style-type: none"> <li>• Empty</li> <li>• Empty and Safety License (Extended Functions) (available with firmware V5.1 SP1 or higher)</li> <li>• With firmware V5.1</li> <li>• With firmware V5.1 SP1</li> <li>• With firmware V5.1 SP1 and Safety license (Extended Functions)</li> <li>• With firmware V5.2</li> <li>• With firmware V5.2 and Safety license (Extended Functions)</li> <li>• With firmware V5.2 SP3</li> <li>• With firmware V5.2 SP3 and Safety license (Extended Functions)</li> </ul>	<p><b>6SL3054-4AG00-2AA0</b> <b>6SL3054-4AG00-2AA0-Z F01</b></p> <p><b>6SL3054-4FB00-2BA0</b> <b>6SL3054-4FB10-2BA0</b> <b>6SL3054-4FB10-2BA0-Z F01</b></p> <p><b>6SL3054-4FC00-2BA0</b> <b>6SL3054-4FC00-2BA0-Z F01</b></p> <p><b>6SL3054-4FC30-2BA0</b> <b>6SL3054-4FC30-2BA0-Z F01</b></p>


<p><b>Safety license</b> (Extended Functions) <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	<b>6SL3074-0AA10-0AH0</b>
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 <p><b>PROFINET patch cable</b> For the networking of concatenated converters</p> <p>Industrial Ethernet TP cord, CAT 6 A, twisted pair line 4 × 2 cores, pre-assembled with two RJ45 connectors</p> <ul style="list-style-type: none"> <li>• 0.3 m (0.98 ft)</li> <li>• 0.5 m (1.64 ft)</li> </ul>	<p><b>6XV1870-3QE30</b> <b>6XV1870-3QE50</b></p>
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Only for the 1 AC series	
 <p><b>Line filter</b> With a line filter, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to EN 61800-3 can be achieved.</p> <ul style="list-style-type: none"> <li>• ≤ 18 A</li> </ul>	<p><b>6SL3203-0BB21-8VA1</b></p>
 <p><b>Replacement connector set</b> For frame sizes FSA, FSB and FSC With a connector set, as in the scope of delivery, and two shield plates</p>	<b>6SL3260-2DB00-0AA0</b>


Description	Article No.
<b>Only for the 3 AC series</b>	
 <p><b>Line filter</b></p> <p>With a line filters, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to IEC 61800-3 can be achieved.</p> <p>When connected via a DC link, a total motor cable length of up to 100 m (328 ft) with Category C2 and up to 250 m (820 ft) with Category C3 is possible <sup>2)</sup></p> <ul style="list-style-type: none"> <li>• ≤ 35 A</li> <li>• ≤ 65 A</li> </ul>	<p><b>6SL3203-0BE23-5HA0</b> <b>6SL3203-0BE26-5HA0</b></p>

 <p><b>Connector set AC bus and DC link</b></p> <p>For coupling the DC link and the line infeed</p> <p>Scope of delivery: 1 AC bus connector, 1 DC link connector, 2 cover caps</p> <p>The AC bus connector replaces the push-in connector included in the scope of delivery of the converter.</p> <p>Wiring is performed with conventional 16 mm<sup>2</sup> cable (not included in scope of delivery) <sup>3)</sup></p>	<b>6SL3260-2DC00-0AA0</b>
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 <p><b>Connector set AC bus individual</b></p> <p>For coupling the line infeed</p> <p>Scope of delivery: 1 AC bus connector, 1 cover cap</p> <p>This connector replaces the push-in connector included in the scope of delivery of the converter. Wiring is performed with conventional 16 mm<sup>2</sup> cable (not included in scope of delivery) <sup>3)</sup></p>	<b>6SL3260-2DC10-0AA0</b>
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 <p><b>External braking resistors for 200 ... 240 V 3 AC</b></p> <p>For a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for each converter</p> <ul style="list-style-type: none"> <li>• 100 W, 47 Ω for FSA and FSB</li> <li>• 240 W, 14 Ω for FSC</li> </ul>	<p><b>GXK:BWG250047TS-190</b> <b>GXK:BWG600014TS-190</b></p>
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 <p><b>Replacement connector set</b> For frame sizes FSA, FSB and FSC With a connector set, as in the scope of delivery, and one shield plate (for FSA)</p>	<b>6SL3260-2DB10-0AA0</b>
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 <p><b>Replacement fan</b></p> <p>Incl. support</p> <ul style="list-style-type: none"> <li>• Frame size FSA</li> <li>• Frame size FSB</li> <li>• Frame size FSC</li> </ul>	<p><b>6SL3260-0AA00-0AA0</b> <b>6SL3260-0AB00-0AA0</b> <b>6SL3260-0AC00-0AA0</b></p>
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<sup>1)</sup> Extended function for an existing memory card (firmware V5.1 SP1 or higher). The memory card is not included in the scope of delivery. The Safety license can also be ordered together with a memory card (see above). With a CoL in electronic form, the license is supplied as a PDF file. Notification of this with a download link is received by email. For further information, see section Supplementary system components > Memory cards.

<sup>2)</sup> The data is applicable for the complete cable length of the motors, whose associated converters are coupled with one another via an AC coupling or through the DC link.  
The maximum motor cable length per motor is 25 m using the internal filters to achieve EMC category C3 or using an external filter to achieve EMC category C2. If an external filter is used to achieve EMC category C3, the maximum motor cable length per motor is 50 m.

<sup>3)</sup> Permissible cables:  
- 16 mm<sup>2</sup>, Class 5 (finely stranded, PVC-insulated) H07V-K + H07V2-K according to EN 50525-2-31  
- HELUTHERM 145: 16 mm<sup>2</sup>, Class 5 (finely stranded, crosslinked polyolefin-copolymer, halogen-free) [www.helukabel.com](http://www.helukabel.com)  
- External diameter 6.7 mm to 8.1 mm

Permissible cables (UL approval):

- AWG 6, copper cable with PVC insulation, with or without nylon jacket, 19 strands
- Types: MTW, THHW, THW, THW-2, THHN, THWN-2, TW, TWN
- CSA types: TW, TWU, TWN75, TW75, TWU75, T90, no compressed conductors



## Technical specifications

Unless explicitly specified otherwise, the following technical specifications are valid for all SINAMICS S210 servo converters.

General technical specifications	
<b>Mechanical specifications</b>	
<b>Vibratory load</b>	
<ul style="list-style-type: none"> <li>Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>Operation acc. to IEC 60721-3-3: 2002               <ul style="list-style-type: none"> <li>- Test values according to IEC/EN 60068-2-6</li> </ul> </li> </ul>	Class 2M3 Class 3M2 Test Fc (sinusoidal) <ul style="list-style-type: none"> <li>• 2 ... 9 Hz: 1.5 mm deflection amplitude</li> <li>• 9 ... 200 Hz: 0.5 × g acceleration amplitude</li> <li>• 10 frequency cycles per axis</li> </ul>
<b>Shock load</b>	
<ul style="list-style-type: none"> <li>Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>Operation acc. to IEC 60721-3-3: 2002               <ul style="list-style-type: none"> <li>- Test values according to IEC/EN 60068-2-7</li> </ul> </li> </ul>	Class 2M3 Class 3M2 Test Ea (semisinusoidal) <ul style="list-style-type: none"> <li>• 5 × g peak acceleration</li> <li>• 30 ms duration</li> <li>• 3 shocks in all three axes in both directions</li> </ul>
<b>Fieldbus interface</b>	
<b>PROFINET</b>	1 PROFINET interface with two ports (RJ45 sockets) with PROFIdrive V4 profile
<b>Environmental conditions</b>	
<b>Protection class</b> According to IEC/EN 61800-5-1	Class I (with protective bonding circuit) and class III (PELV or SELV)
<b>Degree of protection</b> According to IEC/EN 60529	IP20 Mounting in control cabinet necessary
<b>Permissible ambient temperature (air) in operation</b>	0 ... 50 °C (32 ... 122 °F)
<b>Installation altitude</b>	Up to max. 4000 m (13123 ft) (IEC/EN/UL), up to max. 2000 m (6562 ft) (CSA) <ul style="list-style-type: none"> <li>• Up to 1000 m (3281 ft) above sea level without derating</li> <li>• As from 1000 m (3281 ft) derating 10 % of current or 5 K per 1000 m (3281 ft)</li> <li>• For 1 AC converters, an isolating transformer is required from 2000 m (6562 ft)</li> </ul>
<b>Climatic environmental conditions</b>	
<ul style="list-style-type: none"> <li>Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>Operation acc. to IEC 60721-3-3: 2002</li> </ul>	Class 1K4 -25 ... +55 °C (-13 ... +131 °F) Class 2K4 -40 ... +70 °C (-40 ... +158 °F) Max. air humidity: 95 % at 40 °C (104 °F) Better than class 3K3 0 ... 50 °C (32 ... 122 °F) Relative air humidity: 5 ... 95 % Condensation, splashwater, and ice formation not permitted (IEC/EN 60204, Part 1)
<b>Environmental class/harmful chemical substances</b>	
<ul style="list-style-type: none"> <li>Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>Operation acc. to IEC 60721-3-3: 2002</li> </ul>	Class 1C2 Class 2C2 Class 3C2
<b>Organic/biological influences</b>	
<ul style="list-style-type: none"> <li>Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>Operation acc. to IEC 60721-3-3: 2002</li> </ul>	Class 1B2 Class 2B2 Class 3B2
<b>Degree of pollution</b> According to IEC/EN 61800-5-1	2
<b>Standards</b>	
<b>Certificates of suitability</b>	CE, UKCA, cULus (UL File No. E355661 for 1 AC series, E192450 for 3 AC series), RCM, EAC, KC, SEMI F47
<b>Functional safety</b>	<ul style="list-style-type: none"> <li>• SIL 2 according to IEC 61508 parts 1 to 3 (2010) and IEC 61800-5-2 (2016)</li> <li>• PL d according to ISO 13849 part 1 (2015)</li> <li>• Category 3 according to ISO 13849 part 1 (2015)</li> </ul>

<sup>1)</sup> In transport packaging.

<sup>2)</sup> In product packaging.

# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters

### Technical specifications

Line voltage 200 ... 240 V 1 AC		SINAMICS S210 servo converters, 1 AC series			
		6SL3210-5HB10-1UFO	6SL3210-5HB10-2UFO	6SL3210-5HB10-4UFO	6SL3210-5HB10-8UFO
<b>Line supply connection</b>					
• Supply voltage		200 ... 240 V 1 AC ±10 %			
• Line frequency	Hz	50/60			
• Conductor cross-section, max.	mm <sup>2</sup>	2.5			
• Line system configuration		Grounded TN/TT networks and ungrounded IT networks			
<b>Rated current</b>	A	1.4	2.7	5	9.3
<b>Inrush current</b>	A	8	8	8	8
<b>Power loss</b>	W	15.7	23.2	38.5	71.1
<b>Electronic power supply</b>					
• Voltage		24 V -15 % ... +20 %			
• Power requirement, max.	A	0.8 without brake For current consumption of the brake, see section SIMOTICS S-1FK2 servomotors > Technical specifications > Holding brake, page 3.1/9			
• Conductor cross-section, max.	mm <sup>2</sup>	2.5			
<b>Output</b>					
• Rated power 230 V	kW	0.1	0.2	0.4	0.75
• Rated current	A	0.8	1.4	2.4	4.4
• Output current, max.	A	3.1	4.8	8.7	16
<b>Pulse frequency power unit</b>	kHz	8			
<b>Output frequency</b>	Hz	0 ... 550			
<b>Line filter</b>		Integrated, category C2 (up to 10 m (32.8 ft) motor cable length), category C3 (up to 25 m (82.0 ft) motor cable length)			
<b>Braking resistor</b>		Without <sup>1)</sup>	Integrated	Integrated	Integrated
<b>Digital inputs <sup>2)</sup></b>					
• Fast inputs for measuring probes, reference marks, temperature monitoring, external braking resistor		3			
- Low level		-30 V ... +5 V and ≤ 2 mA			
- High level		15 V ... 30 V			
- Current consumption	mA	6			
- Delay time, typ., L → H	µs	5			
- Delay time, typ., H → L	µs	50			
- Galvanic isolation		No			
• Fail-safe input		1			
- Low level		-30 V ... +5 V and ≤ 2 mA			
- High level		15 V ... 30 V			
- Current consumption	mA	5			
- Delay time, typ., L → H	µs	50			
- Delay time, typ., H → L	µs	100			
- Galvanic isolation		Yes			
• Conductor cross-section, max.	mm <sup>2</sup>	1.5			
<b>Cooling</b>		Convection (without fan)			
<b>Frame size</b>		FSA		FSB	FSC
<b>Dimensions</b>					
• Width	mm (in)	45 (1.77)		55 (2.17)	74.5 (2.93)
• Height	mm (in)	170 (6.69)		170 (6.69)	170 (6.69)
• Depth	mm (in)	172 (6.77)		172 (6.77)	197 (7.76)
<b>Weight, approx.</b>	kg (lb)	1.1 (2.43)		1.2 (2.65)	1.9 (4.19)

<sup>1)</sup> An internal braking resistor is not required for normal operation on account of the available DC link capacity.

<sup>2)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input is processed.

**Technical specifications**

Line voltage 200 ... 480 V 3 AC		SINAMICS S210 servo converters, 3 AC series							
		6SL3210-5HE10-4UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
<b>Line supply connection</b> • Supply voltage • Line frequency • Conductor cross-section, max. • Line system configuration	Hz	200 ... 480 V 3 AC ±10 %							
	mm <sup>2</sup>	50/60							
		6							
		Grounded TN/TT networks, ungrounded IT networks and networks with grounded line conductor only with an isolating transformer							
<b>Rated current</b>	A	1.6	2.8	3.8	6	7.5	12.5	15	17.9
<b>Inrush current</b>	A	4.3	4.3	4.3	8.6	8.6	27.8	27.8	27.8
<b>Power loss</b>	W	69	81	94	114	131	167	191	204
<b>Electronic power supply</b> • Voltage • Power requirement, max.  • Conductor cross-section, max.	A	24 V -15 % ... +20 %							
		1.2 without brake							
		For current consumption of the brake, see section SIMOTICS S-1FK2 servomotors > Technical specifications > Holding brake, page 3.1/9							
<b>Output</b> • Rated power - 400 V - 240 V • Rated current • Output current, max.	kW	0.4	0.75	1	1.5	2	3.5	5	7
	kW	0.24	0.45	0.6	0.9	1.2	2.1	3	4.2
	A	1.2	2.3	3	5	7	9	12	15
	A	4.2	7.6	10.9	19	24	33	44	55
<b>Pulse frequency power unit</b>	kHz	8							
<b>Output frequency</b>	Hz	0 ... 550							
<b>Line filter</b>		Category C3 (up to 25 m (82.0 ft) motor cable length for a single axis, for DC link coupling see Accessories/line filters)							
<b>Braking resistor</b>		Integrated, when connecting to 200 V ... 240 V 3 AC, an external, intrinsically safe braking resistor is always required.							
<b>Digital inputs <sup>1)</sup></b> • Fast inputs for measuring probes, reference marks, temperature monitoring, external braking resistor - Low level - High level - Current consumption - Delay time, typ., L → H - Delay time, typ., H → L - Galvanic isolation • Fail-safe input - Low level - High level - Current consumption - Delay time, typ., L → H - Delay time, typ., H → L - Galvanic isolation • Conductor cross-section, max.		3							
		-30 V ... +5 V and ≤ 2 mA							
		15 V ... 30 V							
	mA	6							
	μs	5							
	μs	50							
		No							
		1							
		-30 V ... +5 V and ≤ 2 mA							
		15 V ... 30 V							
	mA	5							
μs	50								
μs	100								
	Yes								
mm <sup>2</sup>	1.5								
<b>Cooling</b>		Air cooling with integrated fan							
<b>Frame size</b>		FSA			FSB		FSC		
<b>Dimensions</b> • Width • Height • Depth	mm (in)	50 (1.97)			70 (2.76)		105 (4.13)		
	mm (in)	231 (9.09)			280 (11.0)		280 (11.0)		
	mm (in)	223 (8.78)			223 (8.78)		223 (8.78)		
<b>Weight, approx.</b>	kg (lb)	2.1 (4.63)			3.3 (7.28)		5 (11.03)		

<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input is processed.

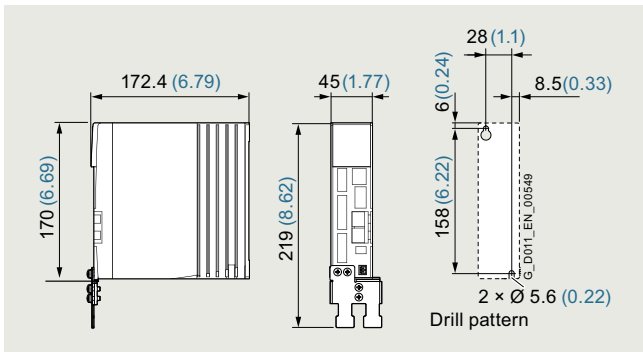
# SINAMICS S210 servo converters

0.1 kW to 7 kW

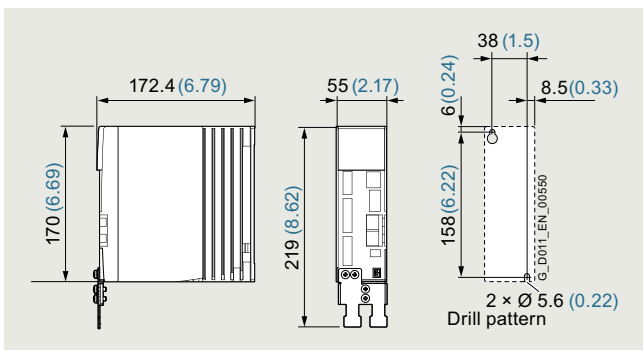
## SINAMICS S210 servo converters

### Dimensional drawings

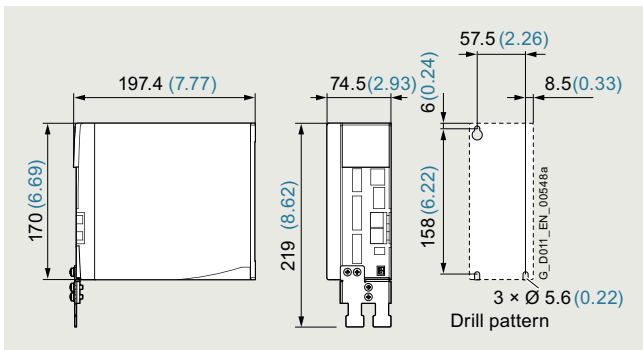
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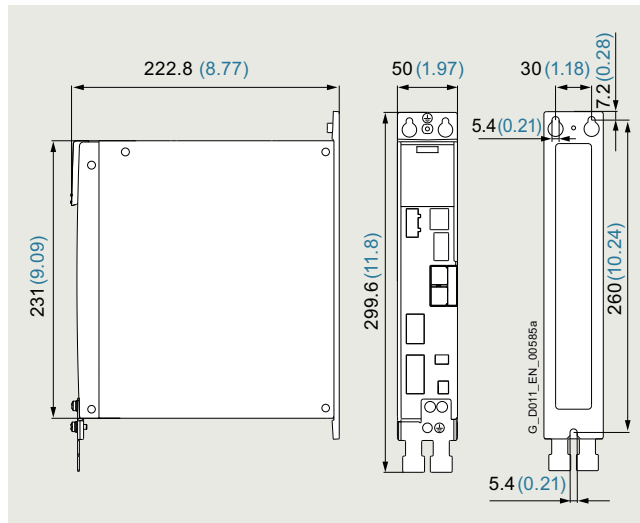
Dimensional drawing SINAMICS S210, frame size FSA, 1 AC series



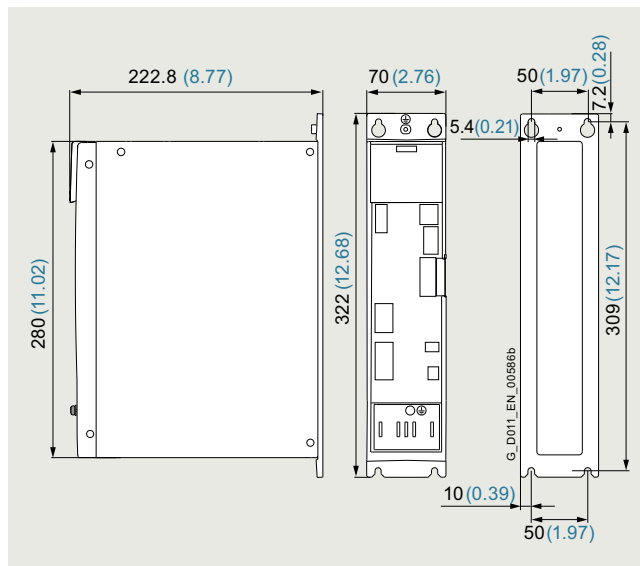
Dimensional drawing SINAMICS S210, frame size FSB, 1 AC series



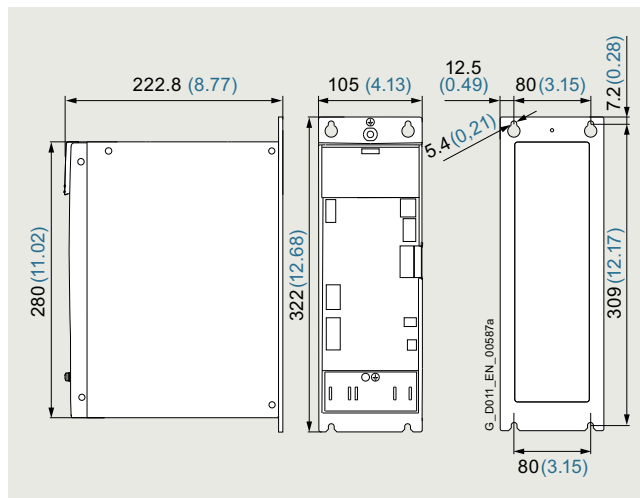
Dimensional drawing SINAMICS S210, frame size FSC, 1 AC series



Dimensional drawing SINAMICS S210, frame size FSA, 3 AC series



Dimensional drawing SINAMICS S210, frame size FSB, 3 AC series



Dimensional drawing SINAMICS S210, frame size FSC, 3 AC series

All dimensions in mm (values in brackets are in inches).

With the OCC motor connection cable connected, the overall depth increases by 57 mm (2.24 inches).

**Accessories**
**Line filters**
**1 AC series**

Filters are already integrated in order to achieve category C2 (for motor cable lengths up to 10 m) or category C3 (for motor cable lengths up to 25 m). Further requirements can be achieved using an external line filter.

1 AC series	Maximum motor cable length	
	for converters without additional line filter	for converters with external line filter
EMC category C2	10 m (32.8 ft)	25 m (82.0 ft)
EMC category C3	25 m (82.0 ft)	50 m (164 ft)

**3 AC series**

Filters for achieving category C3 are already integrated (for motor cable lengths up to 25 m). Further requirements can be achieved using an external line filter.

3 AC series	Line/DC link coupling	Maximum motor cable length	
		for converters with integrated line filter	for converters with external line filter
EMC category C2	Without line/DC link coupling	–	25 m (82 ft)
	With line/DC link coupling ≤ 6 converters <sup>1)</sup>	–	100 m (328 ft)
EMC category C3	Without line/DC link coupling	25 m (82 ft)	50 m (164 ft)
	With line/DC link coupling ≤ 6 converters <sup>1)</sup>	100 m (328 ft)	250 m (820 ft)



Example: SINAMICS S210, 3 AC line filter with servo converter, frame size FSB

**Recommended line-side overcurrent protection devices**

Overcurrent protection devices are necessary for the operation of the converters. The table listed in the section "Recommended line-side overcurrent protection devices" provides recommendations according to IEC and UL regulations, depending on the area of application. Recommendations on further overcurrent protection devices are available at:

<https://support.industry.siemens.com/cs/document/109748999>

Additional information about the listed Siemens fuses is available in Catalog LV 10 as well as in SiePortal.

**Braking resistors**

As far as necessary, braking resistors are integrated into the converters. Together with the generously dimensioned DC link capacities, an external braking resistor is not necessary in the normal case.

If the internal braking resistor is inadequate for applications with very high requirements, an external braking resistor can be connected as an alternative. When operating a SINAMICS S210 servo converter with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required.

**Memory cards**

A memory card (SINAMICS SD card) can be optionally used with SINAMICS S210. The associated slot is located under the front cover of the converter. Not only the firmware but also the device parameterization of a SINAMICS S210 servo converter can be stored on the memory card.

When service is required, e.g. after the converter has been replaced and the data have been downloaded from the memory card, the drive system is immediately ready for use again.

A memory card is only necessary if functions requiring license, such as the Extended Safety Functions, are used. The necessary license is saved on the memory card.

<sup>1)</sup> The data is applicable for the complete cable length of the motors, whose associated converters are coupled with one another via an AC coupling or through the DC link.

The maximum motor cable length per motor is 25 m using the internal filters to achieve EMC category C3 or using an external filter to achieve EMC category C2. If an external filter is used to achieve EMC category C3, the maximum motor cable length per motor is 50 m.

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### SINAMICS S210 servo converters and SINAMICS S210 servo converters (New)

#### Overview



SINAMICS S210 (New), 1 AC series, frame sizes FSA to FSC



SINAMICS S210 (New), 3 AC series, frame sizes FSA to FSC

#### **SINAMICS S210 servo converters (New)**

Parallel to the SINAMICS S210 servo converters available so far, an innovative version is now available under the name "SINAMICS S210 servo converters (New)".

SINAMICS S210 servo converters (New) have extended functionalities with a new hardware and a revised software from the new firmware V6.1.

#### **Extended functionalities with new hardware**

- Operation on a supply voltage of 200 V to 240 V 3 AC, e.g. for USA, Canada and Japan now also possible with internal braking resistors  
External braking resistors are no longer required.
- 1 communications interface for communication with a 2nd encoder (as of firmware V6.3)
- For future extensions (currently without function):  
- 1 temperature sensor input PTC

#### **Revised software from new firmware V6.1**

- Security, User Management and Access Control
- Revised web server
- General rounding off and unification for the entire SINAMICS converter family
- Functional safety up to safety integrity level 3, PL e and Category 4.  
Firmware V6.1 includes the Safety Integrated Basic Functions as well as the Safety Integrated Extended Functions SS1, SLS, SDI, SSM.  
All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

From firmware V6.3:

- Basic positioner (EPos): A positioning functionality integrated into the converter.
- EtherNet/IP for communication with third-party controllers

Further functions available soon: Safety Integrated Advanced Functions

#### **Compatibility**

Due to the lack of Safety Integrated Extended Functions (with firmware V6.1), modified numbering of the parameters and new User Management, the SINAMICS S210 servo converters (New) are not compatible with the SINAMICS S210 servo converters available to date.

SINAMICS S210 servo converters (New) are compatible with the previously available SINAMICS S210 servo converters with regard to the following aspects:

- Dimensions
- Power data
- Connection system
- SIMOTICS S-1FK2, S-1FT2 and S-1FS2 servomotors
- MOTION-CONNECT One Cable Connection (OCC) cables

Complete engineering support with the SINAMICS Startdrive and TIA Portal (from V18 SP1) is available for SINAMICS S210 servo converters (New). The converter can be integrated into the previous TIA Portal versions via the GSDML file, whereby the parameterization is only possible via the integrated web server.

A migration tool is available for upgrading TIA projects from SINAMICS S210 to SINAMICS S210 (New). This means that the converters can be conveniently exchanged while parameterization and networking remain.

<https://support.industry.siemens.com/cs/document/109822030>

It is not possible to operate the SINAMICS S210 servo converters (New) with firmware V5.2 SP3.

Furthermore, it is not possible to operate the previously available SINAMICS S210 servo converters with firmware V6.1 or higher. This means that newly available functions cannot be retrofitted.

**Overview****SINAMICS S210 (New) with firmware V6.1 and higher – the single-axis servo drive for highly dynamic applications**

SINAMICS S210 (New), 1 AC series, frame sizes FSA to FSC



SINAMICS S210 (New), 3 AC series, frame sizes FSA to FSC

The SINAMICS S210 servo converter (New) with firmware V6.1 and higher is designed for connection to SIMOTICS S-1FK2, S-1FT2 or S-1FS2 synchronous servomotors. PROFINET RT/IRT is available for connection to a higher-level control system. That allows, above all, SIMATIC S7 and SIMOTION to be used as controllers.

SINAMICS S210 (New) is optimized for operation with SIMATIC S7-1500 and SIMATIC S7-1500T, which have their own positioning functionality. As of firmware V6.3, a basic positioner (EPos) is also integrated into the converter.

The converter works with a servo controller with or without Dynamic Servo Control (DSC) and has a torque setpoint limitation. A wide range of internal protection functions are included to protect the converter.

The status of the converter is indicated by two multi-color LEDs and a 7-segment display. Pending faults can be acknowledged with a button under the front cover.

The converter has a web server, which can be called via the service interface or via PROFINET from a web browser on a PC. Both commissioning and diagnostics can be performed through this. With the web server, the converter can be brought into operation in a few steps. As the motor data from the converter is read from the electronic type plate, they do not need to be parameterized. The PROFINET telegram is automatically accepted by the controller; so only the controller parameters have to be adjusted. This is simply done with the One Button Tuning function, which automatically determines the parameters.

With the SINAMICS S210 (New), the PROFINET function "Dynamic Frame Packing" is available, which enables the connection of large numbers of axes to a SIMATIC controller.

In addition, communication via EtherNet/IP is available from firmware V6.3 onwards. This allows the SINAMICS S210 (New) to be connected to third-party controllers in conjunction with EPos.

In addition to easy commissioning directly via the web server of the converter, engineering is also possible with SINAMICS Startdrive (as of V18 SP1) and TIA Portal. The tool for configuration, commissioning and diagnostics has been optimized with regard to user friendliness and the consistent utilization of the TIA Portal advantages of a shared work environment for PLC, HMI and drives.

SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors can be connected and operated via a One Cable Connection (OCC) line. Third-party motors cannot be connected because the converter requires the type plate data of the motor.

No additional components are required for controlling the motor holding brake as all the required components are integrated into the converter. In addition, no special power supply is required because the converter optimally sets the voltage for the brake internally. Thus, in combination with the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors, shortened opening and closing times of the brakes are also possible.

The converter can be operated optionally with a memory card. The card is inserted in the card slot behind the front cover. Firmware and drive parameters can be stored on the memory card, so that the converter can easily be replaced without any other aids. This memory card can also be used to perform series commissioning on multiple drives of identical type.

The card is available as an empty memory card or containing the latest converter firmware version. The memory card also contains the licenses for chargeable functions, such as the safety license for the Extended Safety Functions. To use these functions, a memory card containing the corresponding safety license must be permanently inserted.

If necessary, the converter contains an integrated braking resistor. As a result of the generous dimensioning of the resistor and the DC link capacities, an external braking resistor is only necessary to meet very high requirements.

For the 3 AC series, DC link coupling of up to six devices is possible. Thus, the energy that is generated when braking axes can be used for accelerating other axes. This conserves energy and reduces the amount of heat dissipated via the braking resistors.

The converter also features an integrated line filter.

For the 1 AC series, it satisfies category C2 for motor cable lengths up to 10 m and category C3 for cable lengths up to 25 m. With an optional external line filter, motor cable lengths of up to 25 m are also possible with category C2 and up to 50 m with category C3.

For the 3 AC series, category C3 is achieved for motor cable lengths up to 25 m. For requirements that go beyond this, an external line filter is required.

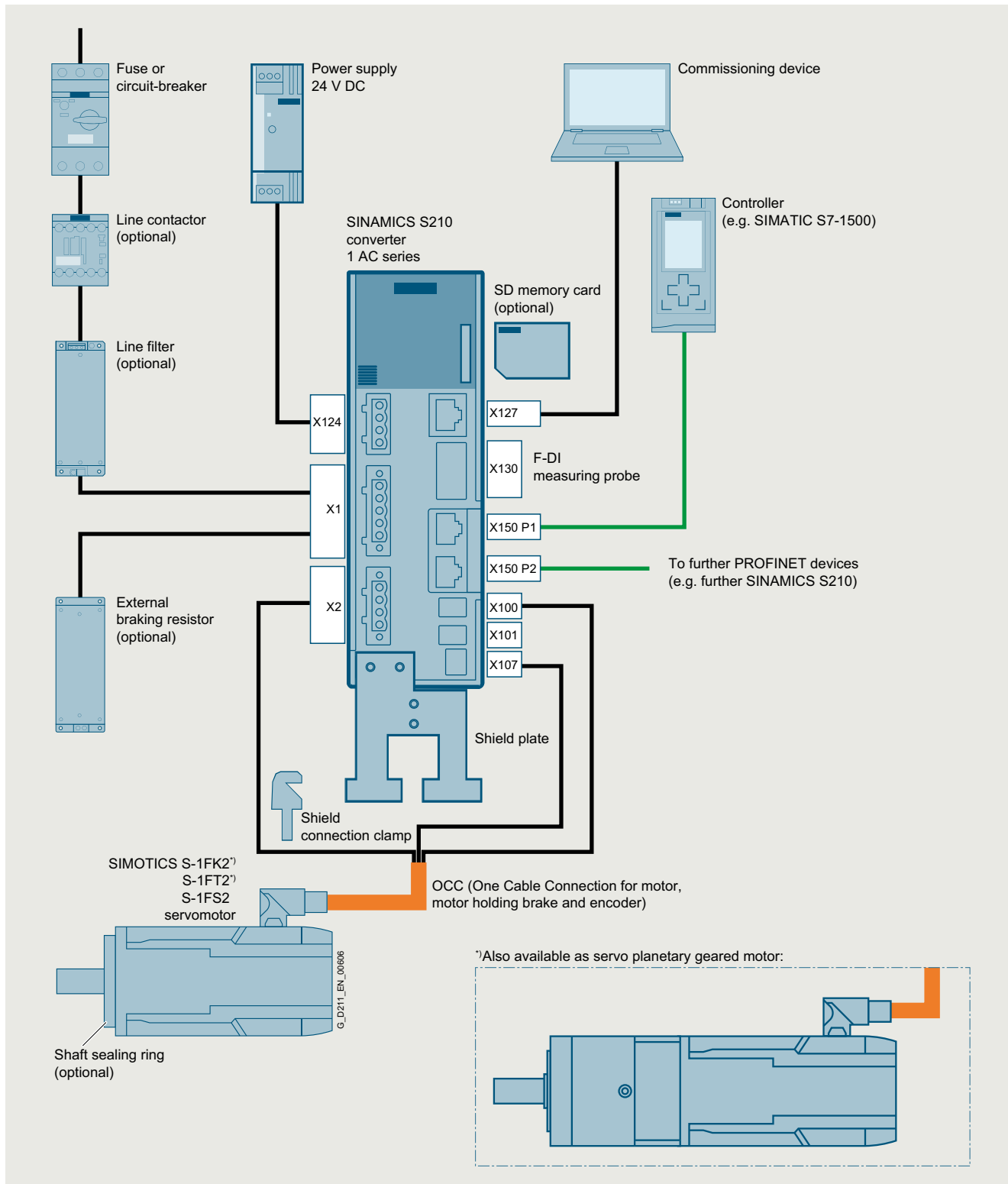
# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters (New)

### Overview

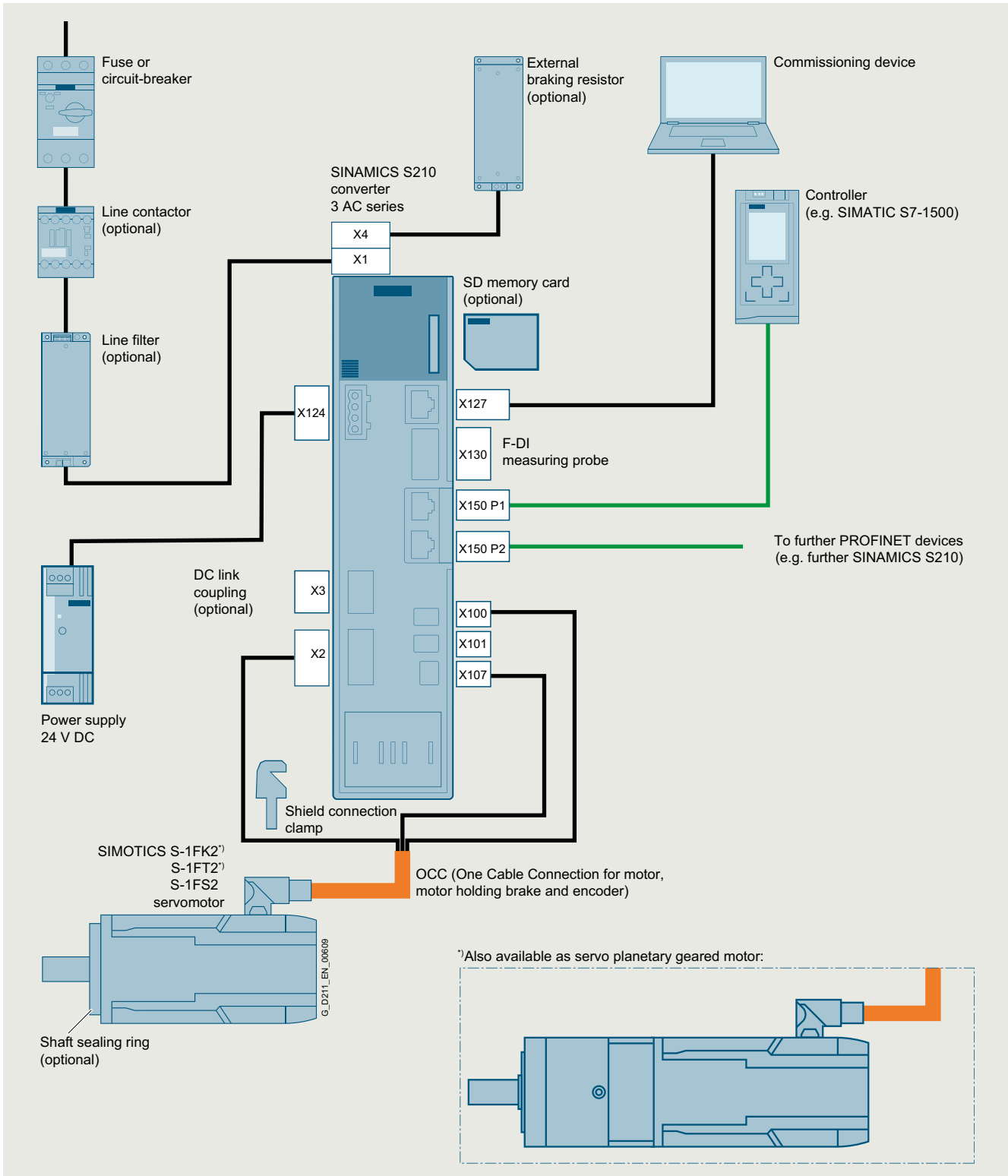
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Example for SINAMICS S210 (New), 1 AC series



**Overview**



Example for SINAMICS S210 (New), 3 AC series

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### SINAMICS S210 servo converters (New)

#### Design

The single-axis AC/AC converter contains a power unit and a Control Unit for the powerful communication, open and closed-loop control functions.

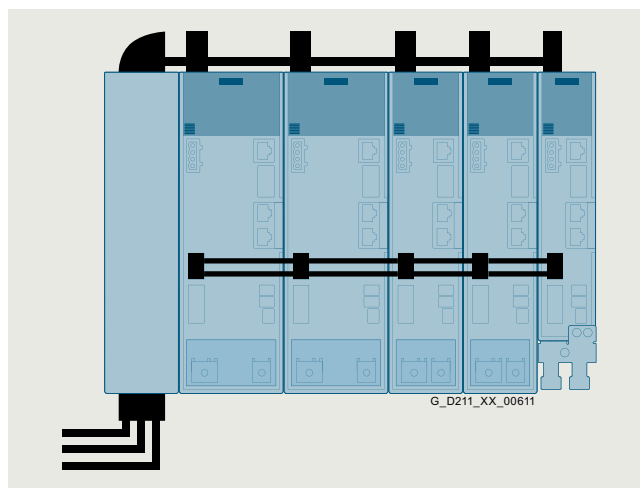
The SINAMICS S210 (New, with firmware V6.1 and higher) servo converter features the following connections and interfaces as standard:

- Fieldbus interface
  - 1 PROFINET interface with two ports (RJ45 sockets) with PROFIdrive V4 profile and Dynamic Frame Packing. As of firmware V6.3, communication via EtherNet/IP is supported.
- 1 service interface for Ethernet communications with a service PC
- One Cable Connection (OCC)
  - 1 communications interface for communication with the encoder of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
  - 1 motor power connector for the power conductors of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
  - 1 brake connection for the conductors of the motor holding brake of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors
- 1 communication interface for communication with a 2nd encoder (encoder with DRIVE-CLiQ interface) (as of firmware V6.3)
- 1 PTC temperature sensor input (for future extensions, currently without function)
- 1 connection for the electronic power supply via the 24 V DC supply connector (supply can be looped through connectors for several SINAMICS S210)
- 1 connection for the line voltage and an external braking resistor (braking resistor optional, for the 3 AC series via a separate connector).
- 1 connection for the DC link coupling (optional, only for the 3 AC series)
- Digital inputs
  - 1 fail-safe digital input (isolated) for controlling STO and SS1-t via terminals
  - 2 high-speed digital inputs for measuring probe or reference marks
  - 1 digital input for monitoring the temperature of an external braking resistor
- 1 slot for a memory card on which the firmware, parameters and licenses can be stored
- 1 display with 3-digit, 7-segment display for indicating faults and two status LEDs
- 1 button for acknowledging errors

#### DC link coupling (only 3 AC series)

For devices of the 3 AC series, the DC links of up to six converters can be coupled. Thus, energy balancing between the axes is possible and energy produced during braking can be used by other axes for accelerating. This is not only efficient but also reduces the dissipated heat in the control cabinet, because the energy that is produced no longer has to be converted to heat in the braking resistor. For DC link coupling, the line side must also be coupled (AC bus).

It is currently recommended that converters with article numbers **6SL5...** and **6SL3...** should not be in a common DC link coupling.



SINAMICS S210 (New), 3 AC series, one line filter plus five servo converters, AC coupling and DC link coupling

### Function

<b>Closed-loop control</b>	Servo control with DSC
<b>Control functions</b>	Speed control with encoder Dynamic Servo Control (DSC) Torque setpoint limitation Current controller and current controller adaptation suitably adjusted for SIMOTICS S-1FK2, S-1FT2 or S-1FS2 servomotors One Button Tuning with moment of inertia estimator and reference model Local measuring probe Simple brake control Direction reversal without changing the setpoint channel Travel to fixed stop Vertical axis Speed controller adaptation Thermal monitoring for power unit and servomotor High-performance brake control
<b>Protective functions</b>	Undervoltage DC link voltage Overvoltage DC link voltage Overcurrent power unit Overcurrent motor Overload power unit ( $I^2t$ ) Short-circuit Ground fault Temperature rise servomotor Temperature rise power unit
<b>Safety Integrated</b>	Safe Torque OFF (STO) Safe Brake Control (SBC) Safe Stop 1 time-controlled (SS1-t) Safe Stop 1 (SS1) <sup>1)</sup> Safe Stop 2 (SS2) <sup>1)</sup> Safe Operating Stop (SOS) <sup>1)</sup> Safely-Limited Speed (SLS) <sup>1)</sup> Safe Speed Monitor (SSM) <sup>1)</sup> Safe Direction (SDI) <sup>1)</sup> Safely-Limited Acceleration (SLA) <sup>1)</sup> Safe Brake Test (SBT) diagnostic function <sup>1)</sup>
<b>Commissioning</b>	Identification of the SIMOTICS S-1FK2, S-1FT2 or S-1FS2 motors via the electronic type plate Automatic controller optimization

### Configuration

The following electronic configuring aids and engineering tools are available for the SINAMICS S210 servo converters (New):

#### **SINAMICS DriveSim Basic and SINAMICS DriveSim Advanced (firmware V6.1 or higher)**

SINAMICS DriveSim Basic and SINAMICS DriveSim Advanced provides easy-to-use models for PROFIdrive-enabled SINAMICS converters, so you can create a digital twin of your drive.

More information is provided on the internet at:  
[www.siemens.com/drive-virtualization](http://www.siemens.com/drive-virtualization)

#### **SINAMICS SELECTOR app**

Frequency converter selection guide for on the move

Siemens has developed the SINAMICS SELECTOR app as a practical tool for finding article numbers for your SINAMICS converter in the power range from 0.1 kW to 630 kW quickly and easily. Whether for SINAMICS V20, SINAMICS V90, SINAMICS G120C, SINAMICS G120P, SINAMICS G120X, SINAMICS G120 or SINAMICS S210: The app will provide you with the correct article numbers conveniently.

How does it work? Simply select your application, the frequency converter you require, the rated power and device options as well as the necessary accessories.

Then you can save your selection and send it by email. The preselection serves as the basis for an order specification with the dealer/Siemens.

You will find free downloads for Android and iOS here:  
[www.siemens.com/sinamics-selector](http://www.siemens.com/sinamics-selector)

#### **Siemens Product Configurator**

The Siemens Product Configurator helps you to configure the optimum drive technology products for a number of applications – starting with gearboxes, motors, converters as well as the associated options and components and ending with controllers, software licenses and connection systems.

The Siemens Product Configurator can be used on the internet without requiring any installation. The Siemens Product Configurator can be found in SiePortal at the following address:  
[www.siemens.com/spc](http://www.siemens.com/spc)

#### **Drive dimensioning of the SINAMICS S210 servo drive system with the TIA Selection Tool**

The SINAMICS S210 servo drive system is easily configured with the TIA Selection Tool under the Drive Dimensioning plug-in. The TIA Selection Tool provides support when selecting the hardware and firmware components necessary to implement a drive task. The plug-in encompasses the configuration of the entire drive system and allows the handling of individual drives.

- Intuitive user interface, menu-based operation and help
- Configuration of the SINAMICS S210 servo drive system
- Adjustable traversing cycles and various mechanical systems integrated for single-axis applications
- Interface to the TIA Portal and SiePortal

The TIA Selection Tool is available for free on the internet at  
[www.siemens.com/tia-selection-tool-standalone](http://www.siemens.com/tia-selection-tool-standalone)

#### **SINAMICS web server for SINAMICS S210 (New)**

The converter can be brought easily and quickly into operation and optimized with the web server. Additional software does not need to be installed as access comes directly from a web browser.

You can find further information about the web server for SINAMICS S210 (New) in the Engineering tools section.

#### **SINAMICS Startdrive commissioning tool (TIA Portal)**

SINAMICS Startdrive (V18 SP1 or higher) is a tool for configuring, commissioning and diagnosing the SINAMICS converter family that is integrated into TIA Portal.

The SINAMICS Startdrive has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common working environment for PLC, HMI and drives. SINAMICS firmware V6.1 or higher is required for SINAMICS S210.

The SINAMICS Startdrive Advanced license is required for the Safety Integrated acceptance test.

The SINAMICS Startdrive commissioning tool is available free on the internet at  
[www.siemens.com/startdrive](http://www.siemens.com/startdrive)

You can find further information on the SINAMICS Startdrive commissioning tool in the section Engineering tools.

<sup>1)</sup> The Extended Functions require a Safety license. The functions SS1, SLS, SDI and SSM are available with firmware V6.1. All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

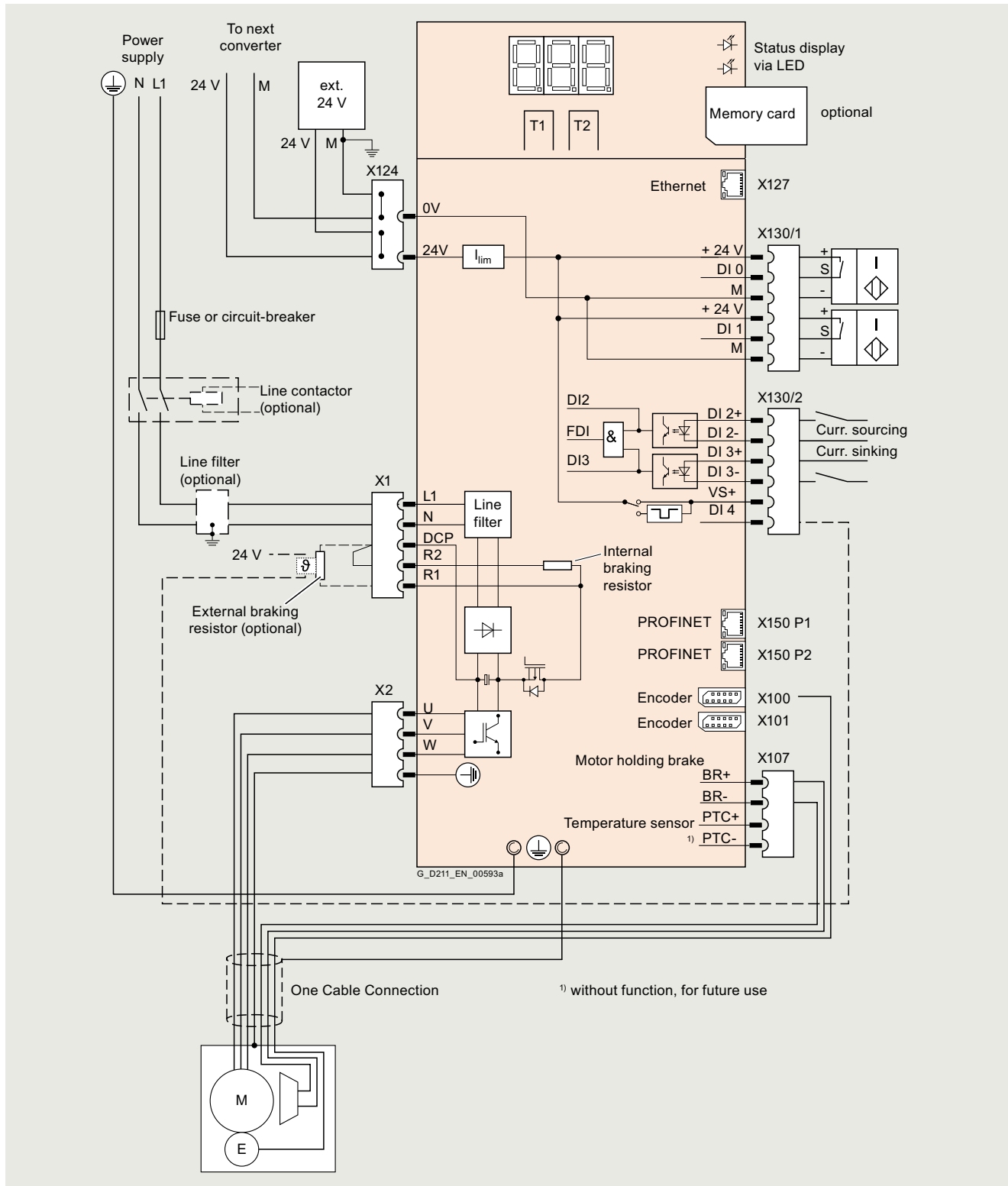
# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters (New)

### Integration

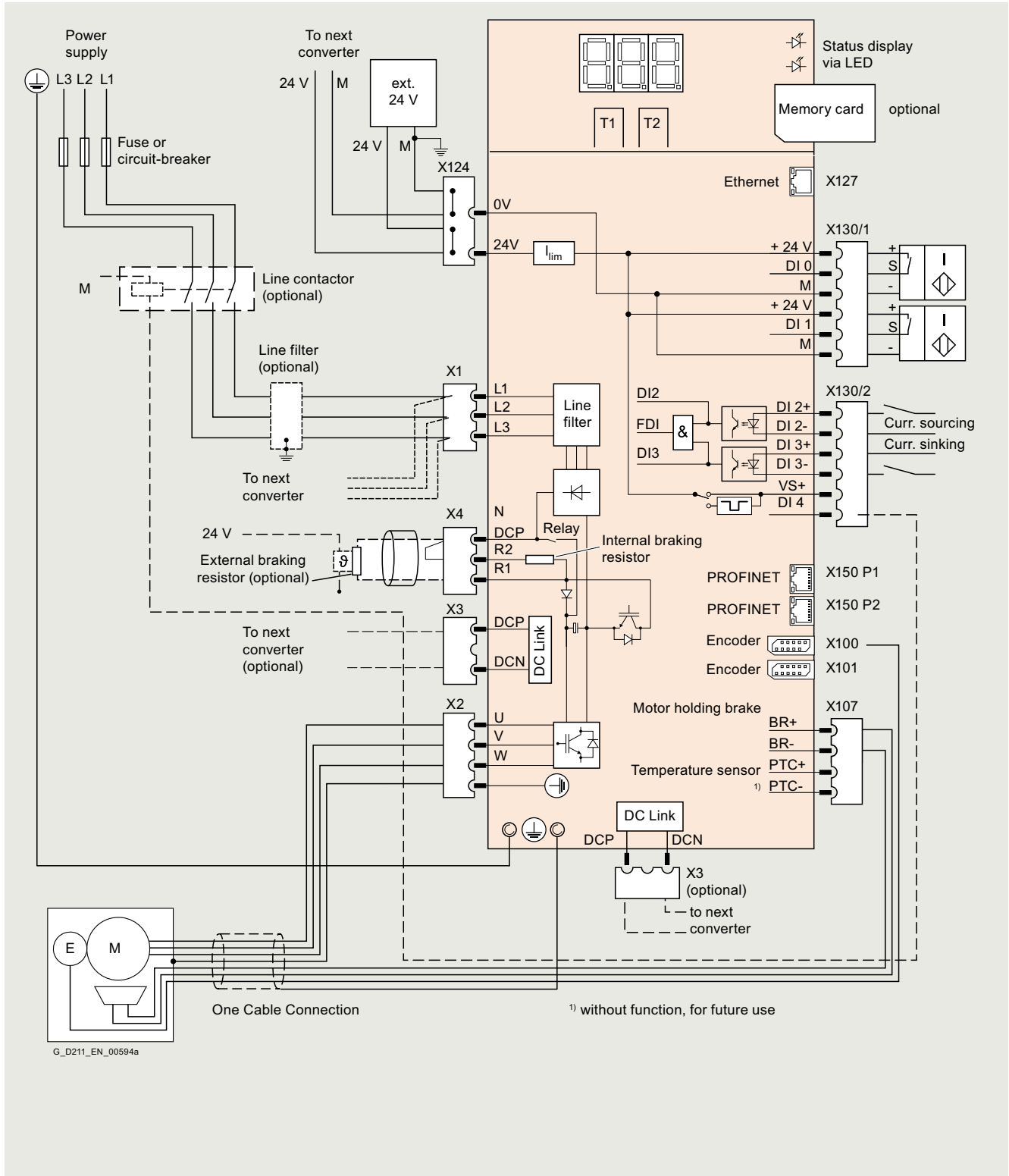
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Connection example SINAMICS S210 servo converter (New), 1 AC series

Integration

2



Connection example SINAMICS S210 servo converter (New), 3 AC series




# SINAMICS S210 servo converters




0.1 kW to 7 kW

## SINAMICS S210 servo converters (New)

### Selection and ordering data






2

Description	Frame size	Article No.
<b>200 ... 240 V 1 AC</b>		
<b>SINAMICS S210 servo converters (New)</b> with shield plate and push-in connectors without memory card		
The shield clamp is included in the scope of delivery of the MOTION-CONNECT cable.		
	• 0.1 kW FSA	<b>6SL5310-1BB10-1CF0</b>
	• 0.2 kW FSA	<b>6SL5310-1BB10-2CF0</b>
	• 0.4 kW FSB	<b>6SL5310-1BB10-4CF0</b>
	• 0.75 kW FSC	<b>6SL5310-1BB10-8CF0</b>

Description	Frame size	Article No.
<b>200 ... 480 V 3 AC</b>		
<b>SINAMICS S210 servo converters (New)</b> with shield plate (for FSA only) and push-in connectors without memory card		
The shield clamp is included in the scope of delivery of the MOTION-CONNECT cable.		
	• 0.4 kW FSA	<b>6SL5310-1BE10-4DF0</b>
	• 0.75 kW FSA	<b>6SL5310-1BE10-8DF0</b>
	• 1 kW FSA	<b>6SL5310-1BE11-0DF0</b>
	• 1.5 kW FSB	<b>6SL5310-1BE11-5DF0</b>
	• 2 kW FSB	<b>6SL5310-1BE12-0DF0</b>
	• 3.5 kW FSC	<b>6SL5310-1BE13-5DF0</b>
	• 5 kW FSC	<b>6SL5310-1BE15-0DF0</b>
	• 7 kW FSC	<b>6SL5310-1BE17-0DF0</b>

### Selection and ordering data

#### Accessories

Description	Article No.
 <p><b>SINAMICS SD card for SINAMICS S210 (New) (optional)</b> 8 GB</p> <p>The parameter assignment, firmware and licenses for a converter can be stored on the memory card.</p> <ul style="list-style-type: none"> <li>• Empty</li> <li>• Empty and Safety License (Extended Functions) 1)</li> <li>• With firmware V6.1</li> <li>• With firmware V6.1 and Safety License (Extended Functions) 1)</li> <li>• With firmware V6.3 <b>NEW</b></li> <li>• With firmware V6.3 and Safety License (Extended Functions) 1) <b>NEW</b></li> </ul>	<p>6SL5970-0AA00-0AA0 6SL5970-0AA00-0AA0-Z F01 6SL5370-0GB00-0AA0 6SL5370-0GB00-0AA0-Z F01 6SL5370-0GD00-0AA0 6SL5370-0GD00-0AA0-Z F01</p>
<p><b>Safety license</b> (Extended Functions) 1)2)</p> <ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	6SL5977-0AA00-2HA0
 <p><b>PROFINET patch cable</b> For the networking of concatenated converters</p> <p>Industrial Ethernet TP cord, CAT 6 A, twisted pair line 4 × 2 cores, pre-assembled with two RJ45 connectors</p> <ul style="list-style-type: none"> <li>• 0.3 m (0.98 ft)</li> <li>• 0.5 m (1.64 ft)</li> </ul>	6XV1870-3QE30 6XV1870-3QE50
 <p><b>SINAMICS Smart Adapter</b> 3) <b>NEW</b></p> <p>Wi-Fi solution for the next generation of SINAMICS converters SINAMICS S200 3), SINAMICS S210 (New) 3) and SINAMICS G220</p>	6SL4950-0AJ00-0AA0
<b>Only for the 1 AC series</b>	
 <p><b>Line filter</b></p> <p>With a line filter, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to EN 61800-3 can be achieved.</p> <ul style="list-style-type: none"> <li>• ≤ 18 A</li> </ul>	6SL3203-0BB21-8VA1
 <p><b>Replacement connector set</b></p> <p>For frame sizes FSA, FSB and FSC</p> <p>With a connector set, as in the scope of delivery, and two shield plates</p>	6SL3260-2DB00-0AA0

1) The Extended Functions require a Safety license. The functions SS1, SLS, SDI and SSM are available with firmware V6.1. All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

2) Extended function for an existing memory card. The memory card is not included in the scope of delivery. The Safety license can also be ordered together with a memory card (see above). With a CoL in electronic form, the license is supplied as a PDF file. Notification of this with a download link is received by email. For further information, see section Supplementary system components > Memory cards.




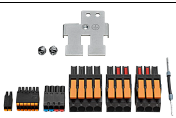

3) Release for SINAMICS S200 and SINAMICS S210 (New) available soon.

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### SINAMICS S210 servo converters (New)

#### Selection and ordering data

Description	Article No.
<b>Only for the 3 AC series</b>	
 <p><b>Line filter</b></p> <p>With a line filter, Category C2 for motor cable lengths up to 25 m (82 ft), Category C3 for cable lengths up to 50 m (164 ft) acc. to IEC 61800-3 can be achieved. When connected via a DC link, a total motor cable length of up to 100 m (328 ft) with Category C2 and up to 250 m (820 ft) with Category C3 is possible <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• ≤ 35 A</li> <li>• ≤ 65 A</li> </ul>	<p><b>6SL3203-0BE23-5HA0</b> <b>6SL3203-0BE26-5HA0</b></p>
 <p><b>Connector set AC bus and DC link</b></p> <p>For coupling the DC link and the line infeed</p> <p>Scope of delivery: 1 AC bus connector, 1 DC link connector, 2 cover caps</p> <p>The AC bus connector replaces the push-in connector included in the scope of delivery of the converter. Wiring is performed with conventional 16 mm<sup>2</sup> cable (not included in scope of delivery) <sup>2)</sup></p>	<p><b>6SL3260-2DC00-0AA0</b></p>
 <p><b>Connector set AC bus individual</b></p> <p>For coupling the line infeed</p> <p>Scope of delivery: 1 AC bus connector, 1 cover cap</p> <p>This connector replaces the push-in connector included in the scope of delivery of the converter. Wiring is performed with conventional 16 mm<sup>2</sup> cable (not included in scope of delivery) <sup>2)</sup></p>	<p><b>6SL3260-2DC10-0AA0</b></p>
 <p><b>Replacement connector set</b></p> <p>For frame sizes FSA, FSB and FSC</p> <p>With a connector set, as in the scope of delivery, and one shield plate (for FSA)</p>	<p><b>6SL3260-2DB10-0AA0</b></p>
 <p><b>Replacement fan</b></p> <p>Incl. support</p> <ul style="list-style-type: none"> <li>• Frame size FSA</li> <li>• Frame size FSB</li> <li>• Frame size FSC</li> </ul>	<p><b>6SL3260-0AA00-0AA0</b> <b>6SL3260-0AB00-0AA0</b> <b>6SL3260-0AC00-0AA0</b></p>

<sup>1)</sup> The data is applicable for the complete cable length of the motors, which associated converters are coupled with one another via an AC coupling or through the DC link. The maximum motor cable length per motor is 25 m using the internal filters to achieve EMC category C3 or an external filter to achieve EMC category C2. If an external filter is used to achieve EMC category C3, the maximum motor cable length per motor is 50 m.

<sup>2)</sup> Permissible cables:

- 16 mm<sup>2</sup>, Class 5 (finely stranded, PVC-insulated) H07V-K + H07V2-K according to EN 50525-2-31
- HELUTHERM 145: 16 mm<sup>2</sup>, Class 5 (finely stranded, crosslinked polyolefin-copolymer, halogen-free) [www.helukabel.com](http://www.helukabel.com)
- External diameter 6.7 mm to 8.1 mm

Permissible cables (UL approval):

- AWG 6, copper cable with PVC insulation, with or without nylon jacket, 19 strands
- Types: MTW, THHW, THW, THW-2, THHN, THWN-2, TW, TWN
- CSA types: TW, TWU, TWN75, TW75, TWU75, T90, no compressed conductors



**Technical specifications**

Unless explicitly specified otherwise, the following technical specifications are valid for all SINAMICS S210 servo converters (New).

General technical specifications	
<b>Mechanical specifications</b>	
<b>Vibratory load</b>	
<ul style="list-style-type: none"> <li>• Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>• Operation acc. to IEC 60721-3-3: 2002               <ul style="list-style-type: none"> <li>- Test values according to IEC/EN 60068-2-6</li> </ul> </li> </ul>	Class 2M3 Class 3M2 Test Fc (sinusoidal) <ul style="list-style-type: none"> <li>• 2 ... 9 Hz: 1.5 mm deflection amplitude</li> <li>• 9 ... 200 Hz: 0.5 × g acceleration amplitude</li> <li>• 10 frequency cycles per axis</li> </ul>
<b>Shock load</b>	
<ul style="list-style-type: none"> <li>• Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>• Operation acc. to IEC 60721-3-3: 2002               <ul style="list-style-type: none"> <li>- Test values according to IEC/EN 60068-2-27</li> </ul> </li> </ul>	Class 2M3 Class 3M2 Test Ea (semisinusoidal) <ul style="list-style-type: none"> <li>• 5 × g peak acceleration</li> <li>• 30 ms duration</li> <li>• 3 shocks in all three axes in both directions</li> </ul>
<b>Fieldbus interface</b>	
<b>PROFINET</b>	1 PROFINET interface with two ports (RJ45 sockets) with PROFIdrive V4 profile and Dynamic Frame Packing
<b>Ethernet/IP</b>	As of firmware V6.3, communication via EtherNet/IP is supported
<b>Environmental conditions</b>	
<b>Protection class</b> According to IEC/EN 61800-5-1	Class I (with protective bonding circuit) and class III (PELV or SELV)
<b>Degree of protection</b> According to IEC/EN 60529	IP20 Mounting in control cabinet necessary
<b>Permissible ambient temperature (air) in operation</b>	-10 ... 50 °C (14 ... 122 °F)
<b>Installation altitude</b>	Up to max. 4000 m (13123 ft) (IEC/EN/UL), up to max. 2000 m (6562 ft) (CSA) <ul style="list-style-type: none"> <li>• Up to 1000 m (3281 ft) above sea level without derating</li> <li>• As from 1000 m (3281 ft) derating 10 % of current or 5 K per 1000 m (3281 ft)</li> <li>• For converters of the 1 AC series, an isolating transformer is required from 2000 m (6562 ft)</li> </ul>
<b>Climatic environmental conditions</b>	
<ul style="list-style-type: none"> <li>• Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>• Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>• Operation acc. to IEC 60721-3-3: 2002</li> </ul>	Class 1K4 -25 ... +55 °C (-13 ... +131 °F) Class 2K4 -40 ... +70 °C (-40 ... +158 °F) Max. air humidity: 95 % at 40 °C (104 °F) Better than class 3K3 0 ... 50 °C (32 ... 122 °F) Relative air humidity: 5 ... 95 % Condensation, splashwater, and ice formation not permitted (IEC/EN 60204, Part 1)
<b>Environmental class/harmful chemical substances</b>	
<ul style="list-style-type: none"> <li>• Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>• Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>• Operation acc. to IEC 60721-3-3: 2002</li> <li>• Operation acc. to ANSI/ISA 71.04: 2013</li> </ul>	Class 1C2 Class 2C2 Class 3C2 Class 3C3 for H <sub>2</sub> S and SO <sub>2</sub> Class G3
<b>Organic/biological influences</b>	
<ul style="list-style-type: none"> <li>• Storage <sup>2)</sup> acc. to IEC 60721-3-1: 1997</li> <li>• Transport <sup>1)</sup> acc. to IEC 60721-3-2: 1997</li> <li>• Operation acc. to IEC 60721-3-3: 2002</li> </ul>	Class 1B2 Class 2B2 Class 3B2
<b>Degree of pollution</b> According to IEC/EN 61800-5-1	2
<b>Standards</b>	
<b>Certificates of suitability</b>	CE, UKCA, cULus (UL File No. E192450 for 1 AC and 3 AC series), RCM, EAC, KC
<b>Functional safety</b>	<ul style="list-style-type: none"> <li>• SIL 3 according to IEC 61508 parts 1 to 3 (2010) and IEC 61800-5-2 (2016)</li> <li>• PL e according to ISO 13849 part 1 (2015)</li> <li>• Category 4 according to ISO 13849 part 1 (2015)</li> </ul>

<sup>1)</sup> In transport packaging.

<sup>2)</sup> In product packaging.

# SINAMICS S210 servo converters

0.1 kW to 7 kW

## SINAMICS S210 servo converters (New)

### Technical specifications

Line voltage 200 ... 240 V 1 AC		SINAMICS S210 servo converters (New), 1 AC series			
		6SL5310-1BB10-1CF0	6SL5310-1BB10-2CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-8CF0
<b>Line supply connection</b>		200 ... 240 V 1 AC ±10 % 50/60 2.5 Grounded TN/TT networks and ungrounded IT networks			
• Supply voltage	Hz				
• Line frequency	mm <sup>2</sup>				
• Conductor cross-section, max.					
• Line system configuration					
<b>Rated current</b>	A	1.4	2.7	5	9.3
<b>Inrush current</b>	A	8	8	8	8
<b>Power loss</b>	W	15.7	23.2	38.5	71.1
<b>Electronic power supply</b>		24 V -15 % ... +20 % 0.8 without brake <a href="#">For current consumption of the brake, see section SIMOTICS S-1FK2 servomotors &gt; Technical specifications &gt; Holding brake, page 3.1/9</a>			
• Voltage	A				
• Power requirement, max.					
• Conductor cross-section, max.	mm <sup>2</sup>	2.5			
<b>Output</b>					
• Rated power 230 V	kW	0.1	0.2	0.4	0.75
• Rated current	A	0.8	1.4	2.4	4.4
• Output current, max.	A	3.1	4.8	8.7	16
<b>Pulse frequency power unit</b>	kHz	8			
<b>Output frequency</b>	Hz	0 ... 550			
<b>Line filter</b>		Integrated, category C2 (up to 10 m (32.8 ft) motor cable length), category C3 (up to 25 m (82.0 ft) motor cable length)			
<b>Braking resistor</b>		Without <sup>1)</sup>	Integrated	Integrated	Integrated
<b>Digital inputs <sup>2)</sup></b>		3			
• Fast inputs for measuring probes, reference marks, temperature monitoring, external braking resistor					
- Low level		-30 V ... +5 V and ≤ 2 mA			
- High level		15 V ... 30 V			
- Current consumption	mA	6			
- Delay time, typ., L → H	µs	5			
- Delay time, typ., H → L	µs	50			
- Galvanic isolation		No			
• Fail-safe input		1			
- Low level		-30 V ... +5 V and ≤ 2 mA			
- High level		15 V ... 30 V			
- Current consumption	mA	5			
- Delay time, typ., L → H	µs	50			
- Delay time, typ., H → L	µs	100			
- Galvanic isolation		Yes			
• Conductor cross-section, max.	mm <sup>2</sup>	1.5			
<b>Cooling</b>		Convection (without fan)			
<b>Frame size</b>		FSA		FSB	FSC
<b>Dimensions</b>					
• Width	mm (in)	45 (1.77)		55 (2.17)	74.5 (2.93)
• Height	mm (in)	170 (6.69)		170 (6.69)	170 (6.69)
• Depth	mm (in)	172 (6.79)		172 (6.79)	197 (7.77)
<b>Weight, approx.</b>	kg (lb)	1.1 (2.43)		1.2 (2.65)	1.9 (4.19)

<sup>1)</sup> An internal braking resistor is not required for normal operation on account of the available DC link capacity.

<sup>2)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input is processed.

**Technical specifications**

Line voltage 200 ... 480 V 3 AC		SINAMICS S210 servo converters (New), 3 AC series							
		6SL5310-1BE10-4DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0
<b>Line supply connection</b> • Supply voltage • Line frequency • Conductor cross-section, max. • Line system configuration	Hz	200 ... 480 V 3 AC ±10 % 50/60							
	mm <sup>2</sup>	6 Grounded TN/TT networks. Ungrounded IT networks only with an isolating transformer and secondary grounding of the neutral point. Networks with grounded line conductor: - at 200 ... 240 V 3 AC without isolating transformer - at 380 ... 480 V 3 AC only with an isolating transformer and secondary grounding of the neutral point							
<b>Rated current</b>	A	1.6	2.8	3.8	6	7.5	12.5	15	17.9
<b>Inrush current</b>	A	4.3	4.3	4.3	8.6	8.6	27.8	27.8	27.8
<b>Power loss</b>	W	69	81	94	114	131	167	191	204
<b>Electronic power supply</b> • Voltage • Power requirement, max.	A	24 V -15 % ... +20 % 1.2 without brake For current consumption of the brake, see section SIMOTICS S-1FK2 servomotors > Technical specifications > Holding brake, page 3.1/9							
	mm <sup>2</sup>	2.5							
<b>Output</b> • Rated power - 400 V - 240 V	kW	0.4	0.75	1	1.5	2	3.5	5	7
	kW	0.24	0.45	0.6	0.9	1.2	2.1	3	4.2
• Rated current	A	1.2	2.3	3	5	7	9	12	15
• Output current, max.	A	4.2	7.6	10.9	19	24	33	44	55
<b>Pulse frequency power unit</b>	kHz	8							
<b>Output frequency</b>	Hz	0 ... 550							
<b>Line filter</b>		Category C3 (up to 25 m (82.0 ft) motor cable length for a single axis, for DC link coupling see Accessories/line filters)							
<b>Braking resistor</b>		Integrated							
<b>Digital inputs <sup>1)</sup></b> • Fast inputs for measuring probes, reference marks, temperature monitoring, external braking resistor - Low level - High level - Current consumption - Delay time, typ., L → H - Delay time, typ., H → L - Galvanic isolation • Fail-safe input - Low level - High level - Current consumption - Delay time, typ., L → H - Delay time, typ., H → L - Galvanic isolation • Conductor cross-section, max.		3							
		-30 V ... +5 V and ≤ 2 mA 15 V ... 30 V							
	mA	6							
	µs	5							
	µs	50							
		No							
		1							
		-30 V ... +5 V and ≤ 2 mA 15 V ... 30 V							
	mA	5							
	µs	50							
µs	100								
	Yes								
mm <sup>2</sup>	1.5								
<b>Cooling</b>		Air cooling with integrated fan							
<b>Frame size</b>		FSA			FSB		FSC		
<b>Dimensions</b> • Width • Height • Depth	mm (in)	50 (1.97)			70 (2.76)		105 (4.13)		
	mm (in)	231 (9.09)			280 (11.0)		280 (11.0)		
	mm (in)	223 (8.78)			223 (8.78)		223 (8.78)		
<b>Weight, approx.</b>	kg (lb)	2.1 (4.63)			3.3 (7.28)		5 (11.03)		

<sup>1)</sup> The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input is processed.

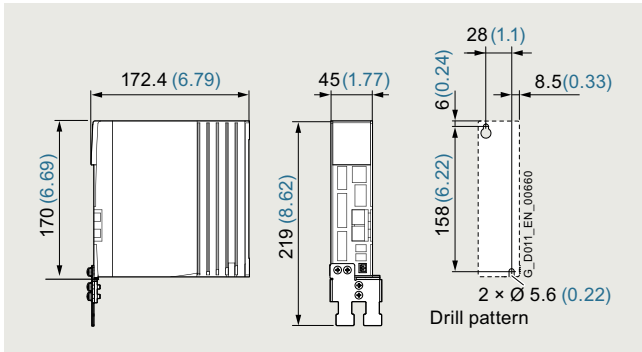
# SINAMICS S210 servo converters

0.1 kW to 7 kW

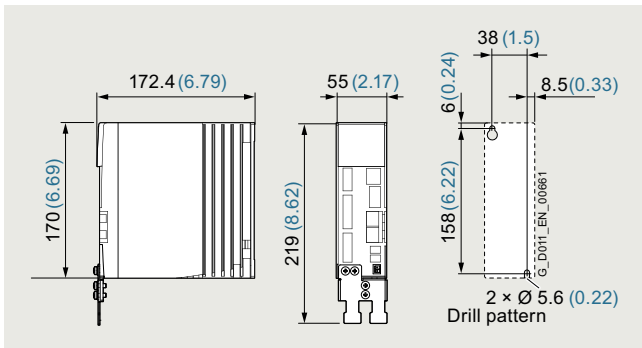
## SINAMICS S210 servo converters (New)

### Dimensional drawings

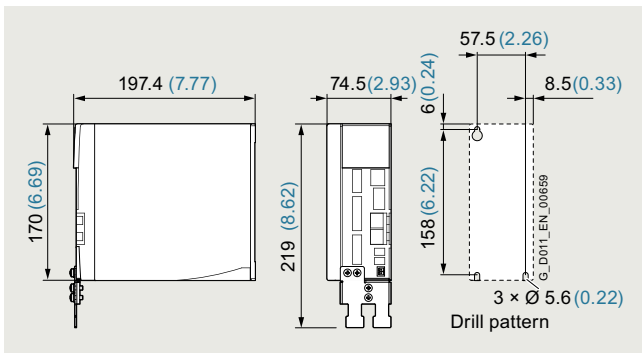
2



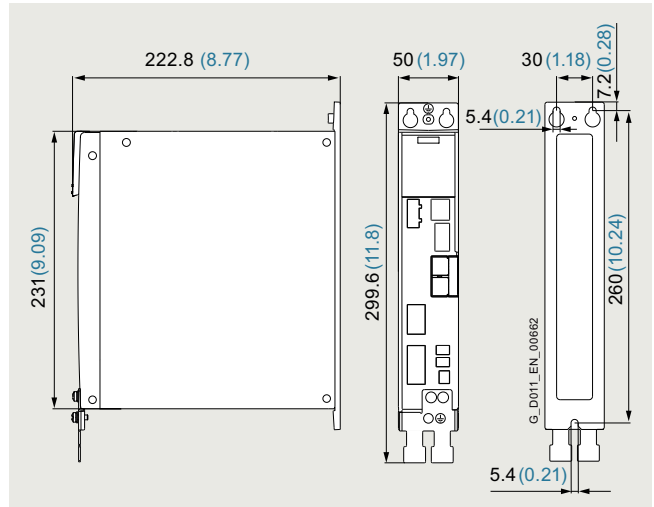
Dimensional drawing SINAMICS S210 (New), frame size FSA, 1 AC series



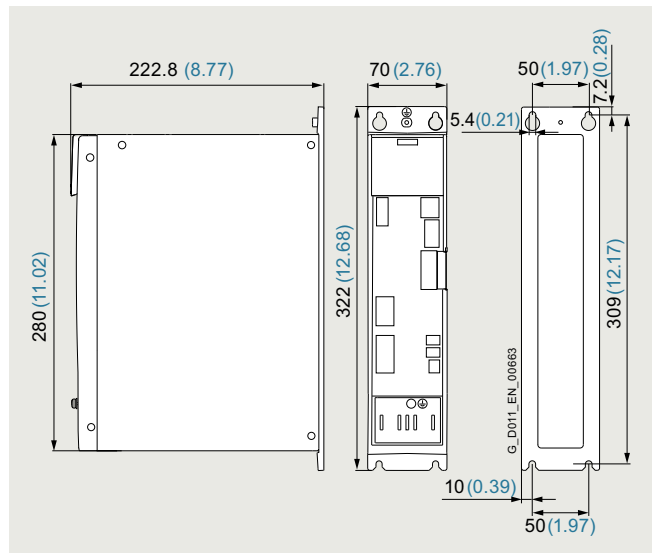
Dimensional drawing SINAMICS S210 (New), frame size FSB, 1 AC series



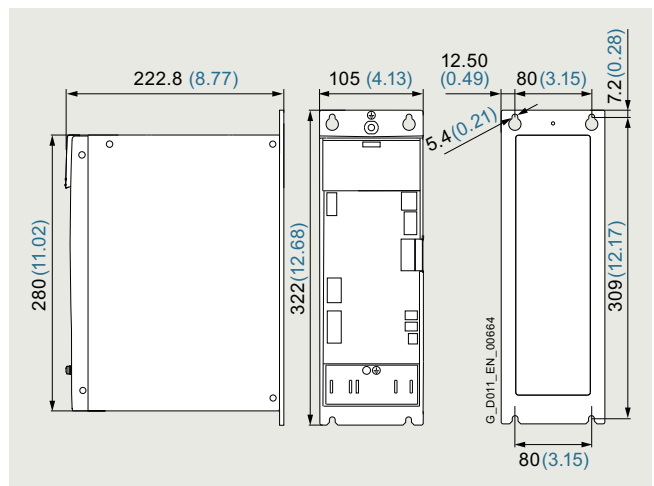
Dimensional drawing SINAMICS S210 (New), frame size FSC, 1 AC series



Dimensional drawing SINAMICS S210 (New), frame size FSA, 3 AC series



Dimensional drawing SINAMICS S210 (New), frame size FSB, 3 AC series



Dimensional drawing SINAMICS S210 (New), frame size FSC, 3 AC series

All dimensions in mm (values in brackets are in inches).

With the OCC motor connection cable connected, the overall depth increases by 57 mm (2.24 inches).

## Accessories

### Line filters

#### 1 AC series

Filters are already integrated in order to achieve category C2 (for motor cable lengths up to 10 m) or category C3 (for motor cable lengths up to 25 m). Further requirements can be achieved using an external line filter.

1 AC series	Maximum motor cable length	
	for converters without additional line filter	for converters with external line filter
EMC category C2	10 m (32.8 ft)	25 m (82.0 ft)
EMC category C3	25 m (82.0 ft)	50 m (164 ft)

#### 3 AC series

Filters for achieving category C3 are already integrated (for motor cable lengths up to 25 m). Further requirements can be achieved using an external line filter.

3 AC series	Line/DC link coupling	Maximum motor cable length	
		for converters with integrated line filter	for converters with external line filter
EMC category C2	Without line/DC link coupling	–	25 m (82 ft)
	With line/DC link coupling ≤ 6 converters <sup>1)</sup>	–	100 m (328 ft)
EMC category C3	Without line/DC link coupling	25 m (82 ft)	50 m (164 ft)
	With line/DC link coupling ≤ 6 converters <sup>1)</sup>	100 m (328 ft)	250 m (820 ft)



Example: SINAMICS S210, 3 AC line filter with servo converter, frame size FSB

### Recommended line-side overcurrent protection devices

Overcurrent protection devices are necessary for the operation of the converters. The table listed in the section "Recommended line-side overcurrent protection devices" provides recommendations according to IEC and UL regulations, depending on the area of application. Recommendations on further overcurrent protection devices are available at:

<https://support.industry.siemens.com/cs/document/109748999>

Additional information about the listed Siemens fuses is available in Catalog LV 10 as well as in SiePortal.

### Braking resistors

As far as necessary, braking resistors are integrated into the converters. Together with the generously dimensioned DC link capacities, an external braking resistor is not necessary in the normal case. Even with a supply voltage of 200 V to 240 V 3AC, no external braking resistor is necessary.

If the internal braking resistor is inadequate for applications with very high requirements, an external braking resistor can be connected as an alternative.

### Memory cards

A memory card (SINAMICS SD card) can be optionally used with SINAMICS S210. The associated slot is located under the front cover of the converter. Not only the firmware but also the device parameterization of a SINAMICS S210 servo converter can be stored on the memory card.

When service is required, e.g. after the converter has been replaced and the data have been downloaded from the memory card, the drive system is immediately ready for use again.

A memory card is only necessary if functions requiring license, such as the Extended Safety Functions, are used. The necessary license is saved on the memory card.

<sup>1)</sup> The data is applicable for the complete cable length of the motors, whose associated converters are coupled with one another via an AC coupling or through the DC link.

The maximum motor cable length per motor is 25 m using the internal filters to achieve EMC category C3 or an external filter to achieve EMC category C2. If an external filter is used to achieve EMC category C3, the maximum motor cable length per motor is 50 m.

## SINAMICS S210 servo converters

0.1 kW to 7 kW

Line-side components > Line filters

### Overview



1 AC line filter, 18 A



3 AC line filter, 35 A and 65 A

The 3 AC line filters are connected via the AC coupling of the converters.  
The total of the rated currents of the converters on an AC bus must not exceed the rated current of the line filter.

### Selection and ordering data

Rated current of the servo converter A	Suitable for SINAMICS S210	Suitable for SINAMICS S210 (New)	Line filter Article No.
<b>Line voltage 200 ... 240 V 1 AC</b>			
1.4	6SL3210-5HB10-1UF0	6SL5310-1BB10-1CF0	<b>6SL3203-0BB21-8VA1</b>
2.7	6SL3210-5HB10-2UF0	6SL5310-1BB10-2CF0	
5	6SL3210-5HB10-4UF0	6SL5310-1BB10-4CF0	
9.3	6SL3210-5HB10-8UF0	6SL5310-1BB10-8CF0	
• Total of the currents ≤ 18 A			
<b>Line voltage 200 ... 480 V 3 AC</b>			
1.6	6SL3210-5HE10-4UF0	6SL5310-1BE10-4DF0	<b>6SL3203-0BE23-5HA0</b> <b>6SL3203-0BE26-5HA0</b>
2.8	6SL3210-5HE10-8UF0	6SL5310-1BE10-8DF0	
3.8	6SL3210-5HE11-0UF0	6SL5310-1BE11-0DF0	
6	6SL3210-5HE11-5UF0	6SL5310-1BE11-5DF0	
7.5	6SL3210-5HE12-0UF0	6SL5310-1BE12-0DF0	
12.5	6SL3210-5HE13-5UF0	6SL5310-1BE13-5DF0	
15	6SL3210-5HE15-0UF0	6SL5310-1BE15-0DF0	
17.9	6SL3210-5HE17-0UF0	6SL5310-1BE17-0DF0	
• Total of the currents ≤ 35 A			
• Total of the currents ≤ 65 A			

**Technical specifications**

<b>Line voltage 200 ... 240 V 1 AC</b>		<b>Line filter</b>	
		6SL3203-0BB21-8VA1	
<b>Rated current</b>	A	18	
<b>Power loss</b>	W	< 1.2	
<b>Line/load connection</b>		Screw terminals	
• Conductor cross-section			
- For single-conductor connection	mm <sup>2</sup>	0.25 ... 6 AWG 24 ... 10	
- For flexible cables	mm <sup>2</sup>	0.25 ... 4 AWG 24 ... 12	
<b>PE connection</b>		M5 screw stud	
<b>Degree of protection</b>		IP20	
<b>Dimensions</b>			
• Width	mm (in)	62 (2.44)	
• Height	mm (in)	155 (6.10)	
• Depth	mm (in)	53 (2.09)	
<b>Weight, approx.</b>	kg (lb)	0.7 (1.54)	
<b>Suitable for SINAMICS S210 servo converters</b>	Type	6SL3210-5HB10-1UF0 (1.4 A) 6SL3210-5HB10-2UF0 (2.7 A) 6SL3210-5HB10-4UF0 (5 A) 6SL3210-5HB10-8UF0 (9.3 A)	
<b>Suitable for SINAMICS S210 servo converters (New)</b>	Type	6SL5310-1BB10-1CF0 (1.4 A) 6SL5310-1BB10-2CF0 (2.7 A) 6SL5310-1BB10-4CF0 (5 A) 6SL5310-1BB10-8CF0 (9.3 A)	
<b>Line voltage 200 ... 480 V 3 AC</b>		<b>Line filter</b>	
		6SL3203-0BE23-5HA0	6SL3203-0BE26-5HA0
<b>Rated current</b>	A	35	65
<b>Power loss</b>	W	12	18
<b>Line supply connection</b>		Screw terminals	Screw terminals
• Conductor cross-section	mm <sup>2</sup>	0.5 ... 10 AWG 24 ... 6	4 ... 25 AWG 10 ... 3
<b>Load connection</b>		Screw terminals	Screw terminals
• Conductor cross-section	mm <sup>2</sup>	16 AWG 6	16 AWG 6
<b>PE connection</b>		M4 screw stud	M5 screw stud
<b>Degree of protection</b>		IP20	IP20
<b>Dimensions</b>			
• Width	mm (in)	50 (1.97)	70 (2.76)
• Height	mm (in)	296.2 (11.66)	348.8 (13.73)
• Depth	mm (in)	220 (8.66)	220 (8.66)
<b>Weight, approx.</b>	kg (lb)	2.3 (5.07)	3.5 (7.72)
<b>Suitable for SINAMICS S210 servo converters</b>	Type	6SL3210-5HE10-4UF0 (1.6 A) 6SL3210-5HE10-8UF0 (2.8 A) 6SL3210-5HE11-0UF0 (3.8 A) 6SL3210-5HE11-5UF0 (6 A) 6SL3210-5HE12-0UF0 (7.5 A) 6SL3210-5HE13-5UF0 (12.5 A) 6SL3210-5HE15-0UF0 (15 A) 6SL3210-5HE17-0UF0 (17.9 A)	
<b>Suitable for SINAMICS S210 servo converters (New)</b>	Type	6SL5310-1BE10-4DF0 (1.6 A) 6SL5310-1BE10-8DF0 (2.8 A) 6SL5310-1BE11-0DF0 (3.8 A) 6SL5310-1BE11-5DF0 (6 A) 6SL5310-1BE12-0DF0 (7.5 A) 6SL5310-1BE13-5DF0 (12.5 A) 6SL5310-1BE15-0DF0 (15 A) 6SL5310-1BE17-0DF0 (17.9 A)	

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### Line-side components > Recommended line-side overcurrent protection devices

#### Selection and ordering data

Overcurrent protection devices are necessary for the operation of the converters. The following table lists recommendations for fuses.

- Siemens fuses of type 3NA3 for use in the area of validity of IEC
- UL-listed fuses Class J for use in USA and Canada

Recommendations on further overcurrent protection devices are available at:

- Für SINAMICS S210 (6SL3...) <https://support.industry.siemens.com/cs/document/109748999>
- Für SINAMICS S210 (New) (6SL5...) <https://support.industry.siemens.com/cs/document/109815356>

The Short Circuit Current Rating (SCCR) according to UL for industrial control cabinet installations to NEC Article 409 or UL 508A/508C or UL 61800-5-1 is as follows for Class J fuses for

- SINAMICS S210: 65 kA

SCCR and ICC values for combination with further overcurrent protection devices are available at:

- For SINAMICS S210 (6SL3...) <https://support.industry.siemens.com/cs/document/109748999>
- For SINAMICS S210 (New) (6SL5...) <https://support.industry.siemens.com/cs/document/109815356>

#### Notes for installations in Canada:

The converters are intended for line supply systems with overvoltage category III.

More information is available in the technical documentation on the internet at:

[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Additional information about the listed Siemens fuses is available in Catalog LV 10 as well as in SiePortal.

Rated power kW	SINAMICS S210 Type	SINAMICS S210 (New) Type	IEC-compliant Fuse		UL/cUL-compliant Fuse type Rated voltage 600 V AC	
			Current A	3NA3 Article No.	Class	Current A
<b>Line voltage 200 ... 240 V 1 AC</b>						
0.1	6SL3210-5HB10-1UF0	6SL5310-1BB10-1CF0	4	<b>3NA3804</b>	J	3.5
0.2	6SL3210-5HB10-2UF0	6SL5310-1BB10-2CF0	6	<b>3NA3801</b>	J	6
0.4	6SL3210-5HB10-4UF0	6SL5310-1BB10-4CF0	10	<b>3NA3803</b>	J	10
0.75	6SL3210-5HB10-8UF0	6SL5310-1BB10-8CF0	16	<b>3NA3805</b>	J	15
<b>Line voltage 200 ... 480 V 3 AC</b>						
0.4	6SL3210-5HE10-4UF0	6SL5310-1BE10-4DF0	4	<b>3NA3804</b>	J	3.5
0.75	6SL3210-5HE10-8UF0	6SL5310-1BE10-8DF0	6	<b>3NA3801</b>	J	5
1	6SL3210-5HE11-0UF0	6SL5310-1BE11-0DF0	10	<b>3NA3803</b>	J	8
1.5	6SL3210-5HE11-5UF0	6SL5310-1BE11-5DF0	10	<b>3NA3803</b>	J	10
2	6SL3210-5HE12-0UF0	6SL5310-1BE12-0DF0	16	<b>3NA3805</b>	J	15
3.5	6SL3210-5HE13-5UF0	6SL5310-1BE13-5DF0	25	<b>3NA3810</b>	J	25
5	6SL3210-5HE15-0UF0	6SL5310-1BE15-0DF0	32	<b>3NA3812</b>	J	30
7	6SL3210-5HE17-0UF0	6SL5310-1BE17-0DF0	32	<b>3NA3812</b>	J	30

#### Group protection of multiple converters

Further information is available in the technical documentation on the internet at:

[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

<https://support.industry.siemens.com/cs/document/109748999>



## Overview

As far as necessary, braking resistors are integrated into the converters. Together with the generously dimensioned DC link capacities, another external braking resistor is not necessary in the normal case.

If the internal braking resistor is inadequate for applications with very high requirements, an external braking resistor can be connected as an alternative.

Only intrinsically safe braking resistors with temperature monitoring may be used in order to minimize the risk of an explosion, the outbreak of fire or melting of the enclosure in the event of a continuous overload, e.g. due to a defect.

### External braking resistors for 200 V to 240 V 3 AC



For operation with a supply voltage of 200 V to 240 V 3 AC, an external, intrinsically safe braking resistor is always required for converters with article number **6SL3...** for each converter. Use of braking resistors integrated in the converter is not permissible with this supply voltage. The converters with article number **6SL5...** may also be operated with the integrated braking resistor at this supply voltage. An external braking resistor is not required for this.

The following resistors are recommended as a substitute for the internal braking resistors of converters with article number **6SL3...** If these are not sufficient, the resistors from Michael Koch GmbH listed in the table can be used.

- 100 W, 47  $\Omega$  for frame sizes FSA and FSB:  
**GXK:BWG250047TS-190**
- 240 W, 14  $\Omega$  for frame size FSC:  
**GXK:BWG600014TS-190**

These resistors have approvals for the North American market (cURus and CSA).

If the temperature sensor of the resistor is connected to the input DI4 of the converter, the converter switches off when the braking resistor is overloaded.

## More information

Further information is available from the "Siemens Product Partner for Drives Options":  
[www.siemens.com/drives-options-partner](http://www.siemens.com/drives-options-partner)

# SINAMICS S210 servo converters

0.1 kW to 7 kW

## DC link components > External braking resistors

### Technical specifications

#### General requirements placed on an external braking resistor

Converter			Braking resistor			
Article No.		Rated power kW	Min. resistance $\Omega$	Max. continuous power W	Max. peak power W	Max. braking energy kJ
6SL3210-...	6SL5310-...					
<b>Line voltage 200 ... 240 V 1 AC</b>						
5HB10-1UF0	1BB10-1CF0	0.1	300	50	350	0.7
5HB10-2UF0	1BB10-2CF0	0.2	150	100	600	1.3
5HB10-4UF0	1BB10-4CF0	0.4	100	200	1300	2.3
5HB10-8UF0	1BB10-8CF0	0.75	50	380	2400	3.8
<b>Line voltage 200 ... 240 V 3 AC</b>						
5HE10-4UF0	1BE10-4DF0	0.4	100	200	600	1
5HE10-8UF0	1BE10-8DF0	0.75	100	380	1200	1
5HE11-0UF0	1BE11-0DF0	1	100	500	1700	1
5HE11-5UF0	1BE11-5DF0	1.5	50	880	2900	20
5HE12-0UF0	1BE12-0DF0	2	50	1000	3800	20
5HE13-5UF0	1BE13-5DF0	3.5	15	1750	7500	25
5HE15-0UF0	1BE15-0DF0	5	15	2500	9500	25
5HE17-0UF0	1BE17-0DF0	7	15	3250	12500	25
<b>Line voltage 380 ... 480 V 3 AC</b>						
5HE10-4UF0	1BE10-4DF0	0.4	200	200	1200	8
5HE10-8UF0	1BE10-8DF0	0.75	200	380	2400	8
5HE11-0UF0	1BE11-0DF0	1	200	500	3400	8
5HE11-5UF0	1BE11-5DF0	1.5	100	880	5700	80
5HE12-0UF0	1BE12-0DF0	2	100	1000	7600	80
5HE13-5UF0	1BE13-5DF0	3.5	30	1750	15000	100
5HE15-0UF0	1BE15-0DF0	5	30	2500	19000	100
5HE17-0UF0	1BE17-0DF0	7	30	3250	25000	100

#### Examples of braking resistors from Michael Koch GmbH

Converter		Braking resistors from Michael Koch GmbH				
Article No.		Order designation with temperature sensor 190 °C (Can only be obtained directly from Michael Koch GmbH)	Continuous power		Max. peak power W	Max. braking energy kJ
6SL3210-...	6SL5310-...		for CE W	for UL W		
<b>Line voltage 200 ... 240 V 1 AC</b>						
5HB10-1UF0	1BB10-1CF0	BWG250047TS-190 <sup>1)</sup>	50	50	350	0.7
5HB10-2UF0	1BB10-2CF0	BWG250047TS-190 <sup>1)</sup>	100	100	600	1.1
5HB10-4UF0	1BB10-4CF0	BWG250047TS-190 <sup>1)</sup>	100	100	1300	1.8
5HB10-8UF0	1BB10-8CF0	BWG500027TS-190	200	200	2400	2.7
<b>Line voltage 200 ... 240 V 3 AC</b>						
5HE10-4UF0	1BE10-4DF0	BWG500027TS-190	200	200	600	0.9
5HE10-8UF0	1BE10-8DF0	BWG600014TS-190 <sup>2)</sup>	380	240	1200	0.8
5HE11-0UF0	1BE11-0DF0	BWG600014TS-190 <sup>2)</sup>	400	240	1700	0.8
5HE11-5UF0	1BE11-5DF0	BWD500027K03LIP65IS	600	600	2900	14.5
5HE12-0UF0	1BE12-0DF0	BWD500027K03LIP65IS	600	600	3800	13.9
5HE13-5UF0	1BE13-5DF0	BWD600014K03LIP65IS	1200	720	7500	18.7
5HE15-0UF0	1BE15-0DF0	BWD600014K03LIP65IS	1200	720	9500	17.8
5HE17-0UF0	1BE17-0DF0	BWD600014K03LIP65IS	1200	720	12500	18.2
<b>Line voltage 380 ... 480 V 3 AC</b>						
5HE10-4UF0	1BE10-4DF0	BWG500100TS-190	200	200	1200	5.2
5HE10-8UF0	1BE10-8DF0	BWG600047TS-190	380	240	2400	6.2
5HE11-0UF0	1BE11-0DF0	BWG600047TS-190	400	240	3400	6.1
5HE11-5UF0	1BE11-5DF0	BWD500100K03LIP65IS	600	600	5700	30.4
5HE12-0UF0	1BE12-0DF0	BWD500100K03LIP65IS	600	600	7600	30.4
5HE13-5UF0	1BE13-5DF0	BWD600047K03LIP65IS	1200	720	15000	50
5HE15-0UF0	1BE15-0DF0	BWD600047K03LIP65IS	1200	720	19000	47.5
5HE17-0UF0	1BE17-0DF0	BWD600047K03LIP65IS	1200	720	25000	41.7

<sup>1)</sup> Can also be ordered directly from Siemens with the article number **GXX:BWG250047TS-190**

<sup>2)</sup> Can also be ordered directly from Siemens with the article number **GXX:BWG600014TS-190**

### Overview



Example of the SINAMICS memory card (SD card)

The parameter assignment, firmware and licenses for a converter can be stored on the SINAMICS memory card (SD card). When service is required, e.g. after the converter has been replaced and the data have been downloaded from the memory card the drive system is immediately ready for use again.

The memory card has the following functions:

- Parameter settings can be written from the memory card to the converter or saved from the converter to the memory card
- The memory card supports series commissioning without the use of a commissioning tool
- If firmware is stored on the memory card, the firmware can be upgraded/downgraded during startup
- It is used for storing licenses when using functions under license, e.g. the Safety license for enabling the Extended Functions<sup>1)</sup>
  - Safe Stop 1 (SS1)<sup>2)</sup>
  - Safe Stop 2 (SS2)
  - Safe Operating Stop (SOS)
  - Safely-Limited Speed (SLS)
  - Safe Speed Monitor (SSM)
  - Safe Direction (SDI)
  - Safely-Limited Acceleration (SLA)
  - Safe Brake Test (SBT) diagnostic function

#### Notes:

In general, the converter can be operated without a memory card. However, it is necessary if licenses, such as the Extended Safety license, are required. The card must then remain permanently inserted.

It is not possible to operate the SINAMICS S210 servo converters (New) with firmware V5.2 SP3. Furthermore, it is not possible to operate the previously available SINAMICS S210 servo converters with firmware V6.1 or higher.

<sup>1)</sup> The Extended Functions require a safety license.  
 - For converters with article number 6SL3... all Extended Functions are available from firmware V5.1 SP1 onwards.  
 - For converters with article number 6SL5... from firmware V6.1, the extended functions SS1, SLS, SDI and SSM are available.  
 All other Safety Integrated Extended Functions are available with firmware V6.3 and TIA Portal from V19 onwards.

<sup>2)</sup> Safe Stop 1 time-controlled (SS1-t) is also included in the Safety Integrated Basic functions.

### Selection and ordering data

Description	Article No.
<b>SINAMICS SD card for SINAMICS S210 (6SL3...)</b> 512 MB Firmware V5.2 or higher is required for the 3 AC series. The parameter assignment, firmware and licenses for a converter can be stored on the memory card.	
<ul style="list-style-type: none"> <li>• Empty</li> </ul>	<b>6SL3054-4AG00-2AA0</b>
<ul style="list-style-type: none"> <li>• Empty and Safety License (Extended Functions) (available with firmware V5.1 SP1 or higher)</li> </ul>	<b>6SL3054-4AG00-2AA0-Z F01</b>
<ul style="list-style-type: none"> <li>• With firmware V5.1</li> </ul>	<b>6SL3054-4FB00-2BA0</b>
<ul style="list-style-type: none"> <li>• With firmware V5.1 SP1</li> </ul>	<b>6SL3054-4FB10-2BA0</b>
<ul style="list-style-type: none"> <li>• With firmware V5.1 SP1 and Safety license (Extended Functions)</li> </ul>	<b>6SL3054-4FB10-2BA0-Z F01</b>
<ul style="list-style-type: none"> <li>• With firmware V5.2</li> </ul>	<b>6SL3054-4FC00-2BA0</b>
<ul style="list-style-type: none"> <li>• With firmware V5.2 and Safety license (Extended Functions)</li> </ul>	<b>6SL3054-4FC00-2BA0-Z F01</b>
<ul style="list-style-type: none"> <li>• With firmware V5.2 SP3</li> </ul>	<b>6SL3054-4FC30-2BA0</b>
<ul style="list-style-type: none"> <li>• With firmware V5.2 SP3 and Safety license (Extended Functions)</li> </ul>	<b>6SL3054-4FC30-2BA0-Z F01</b>
<b>Safety license for SINAMICS S210 (6SL3...)</b> (Extended Functions) <sup>1) 3)</sup>	
<ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	<b>6SL3074-0AA10-0AH0</b>
<b>SINAMICS SD card for SINAMICS S210 (New) (6SL5...)</b> 8 GB The parameter assignment, firmware and licenses for a converter can be stored on the memory card.	
<ul style="list-style-type: none"> <li>• Empty</li> </ul>	<b>6SL5970-0AA00-0AA0</b>
<ul style="list-style-type: none"> <li>• Empty and Safety License (Extended Functions)<sup>1)</sup></li> </ul>	<b>6SL5970-0AA00-0AA0-Z F01</b>
<ul style="list-style-type: none"> <li>• With firmware V6.1</li> </ul>	<b>6SL5370-0GB00-0AA0</b>
<ul style="list-style-type: none"> <li>• With firmware V6.1 and Safety License (Extended Functions)<sup>1)</sup></li> </ul>	<b>6SL5370-0GB00-0AA0-Z F01</b>
<ul style="list-style-type: none"> <li>• With firmware V6.3 <b>NEW</b></li> </ul>	<b>6SL5370-0GD00-0AA0</b>
<ul style="list-style-type: none"> <li>• With firmware V6.3 and Safety License (Extended Functions)<sup>1)</sup> <b>NEW</b></li> </ul>	<b>6SL5370-0GD00-0AA0-Z F01</b>
<b>Safety license for SINAMICS S210 (New) (6SL5...)</b> (Extended Functions) <sup>1) 3)</sup>	
<ul style="list-style-type: none"> <li>• Certificate of License (CoL) in electronic form</li> </ul>	<b>6SL5977-0AA00-2HA0</b>

<sup>3)</sup> Extended function for an existing memory card (for converters with article number 6SL3... available with firmware V5.1 SP1 or higher). The memory card is not included in the scope of delivery. The Safety license can also be ordered together with a memory card (see above). With a CoL in electronic form, the license is supplied as a PDF file. Notification of this with a download link is received by email.

# SINAMICS S210 servo converters

0.1 kW to 7 kW

## Supplementary system components > Memory cards

### More information

#### Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL must be assigned to each use and must be kept in a safe place.

#### Electronic Certificate of License

The electronic Certificate of License is the paperless delivery form for runtime options for SINAMICS and SINUMERIK.

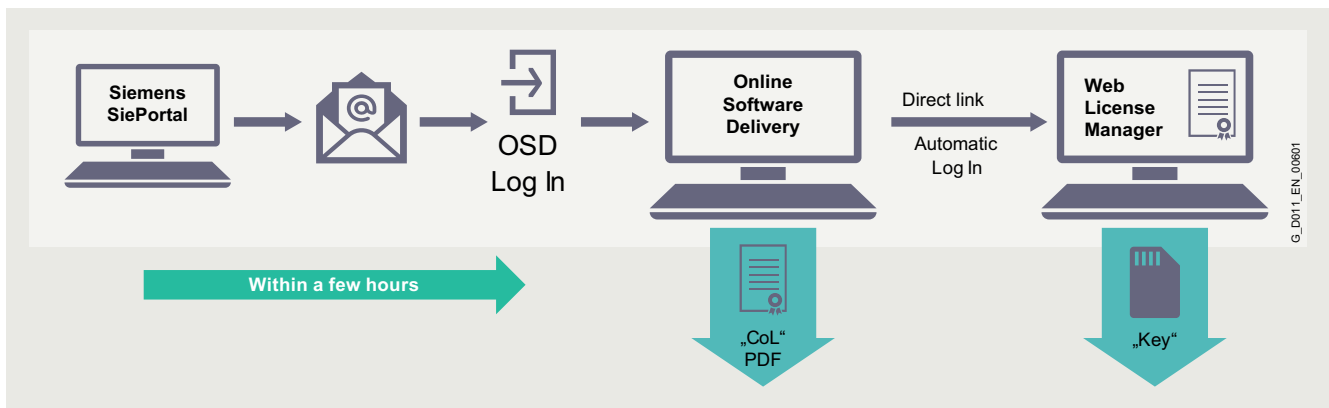
Like the previous paper Certificate of License CoL, the electronic Certificate of License contains information about the type of rights of use purchased for the software. The electronic Certificate of License is supplied as a PDF file via the Online Software Delivery Portal (OSD). This enables quick notification with a download link to the email address to be stated in the order.

The electronic Certificate of License can then be downloaded from the OSD. The Web License Manager can also be called from the OSD to assign the runtime license to a memory card. In this case, the data of the electronic Certificate of License are automatically transferred to the Web License Manager and do not have to be entered manually. This ensures quick availability of the license key and simple and secure handling and management of the license certificates.

You will find information on the OSD at:

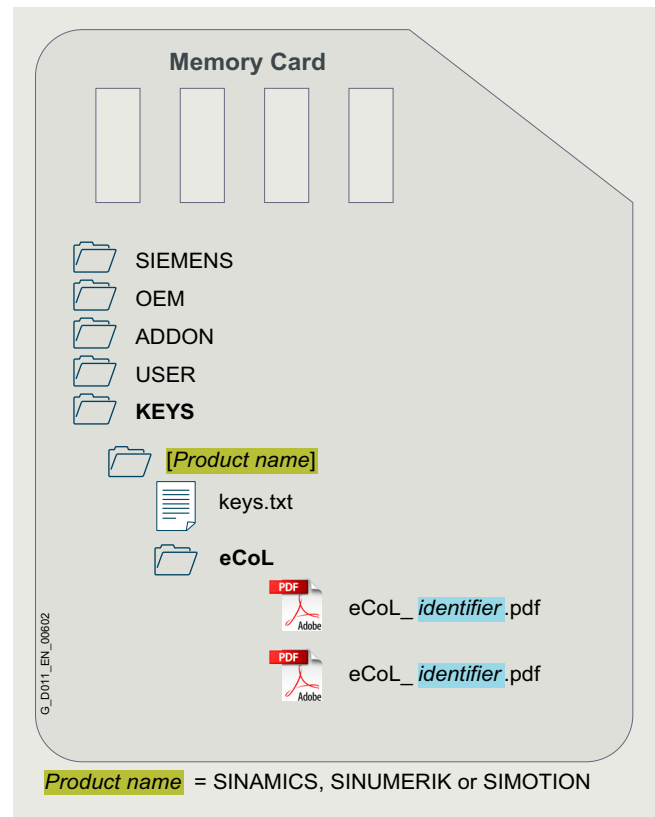
<https://support.industry.siemens.com/cs/document/109759444>

2



Electronic Certificate of License: Procedure for order licenses

In the future, the pre-licensed memory cards will also be delivered with the corresponding electronic Certificates of License on the memory card. The Certificates of License are stored in directory "KEYS". The pre-licensed memory cards will successively make the transition from paper CoLs to electronic CoLs. The CoL on paper will then no longer be contained in the delivery.



Electronic Certificate of License: Storage location on data medium

**Overview**

SINAMICS Smart Adapter

SINAMICS Smart Adapter is a Wi-Fi solution for engineering, service and maintenance tasks for the next generation of SINAMICS converters SINAMICS S200<sup>1)</sup>, SINAMICS S210 (New)<sup>1)</sup> and SINAMICS G220. The adapter is designed to be plugged into and powered from the service interface (X127) on the converter.

**Benefits**

- Wireless access to the converter-integrated web server via mobile users device
- Wireless access with SINAMICS Startdrive to the SINAMICS converters
- Portable and compact Wi-Fi solution for engineering, service and maintenance tasks for the next generation of SINAMICS converters SINAMICS S200<sup>1)</sup>, SINAMICS S210 (New)<sup>1)</sup> and SINAMICS G220
- Advanced security technology
- Plug and Play interface for easy connectivity
- User friendly

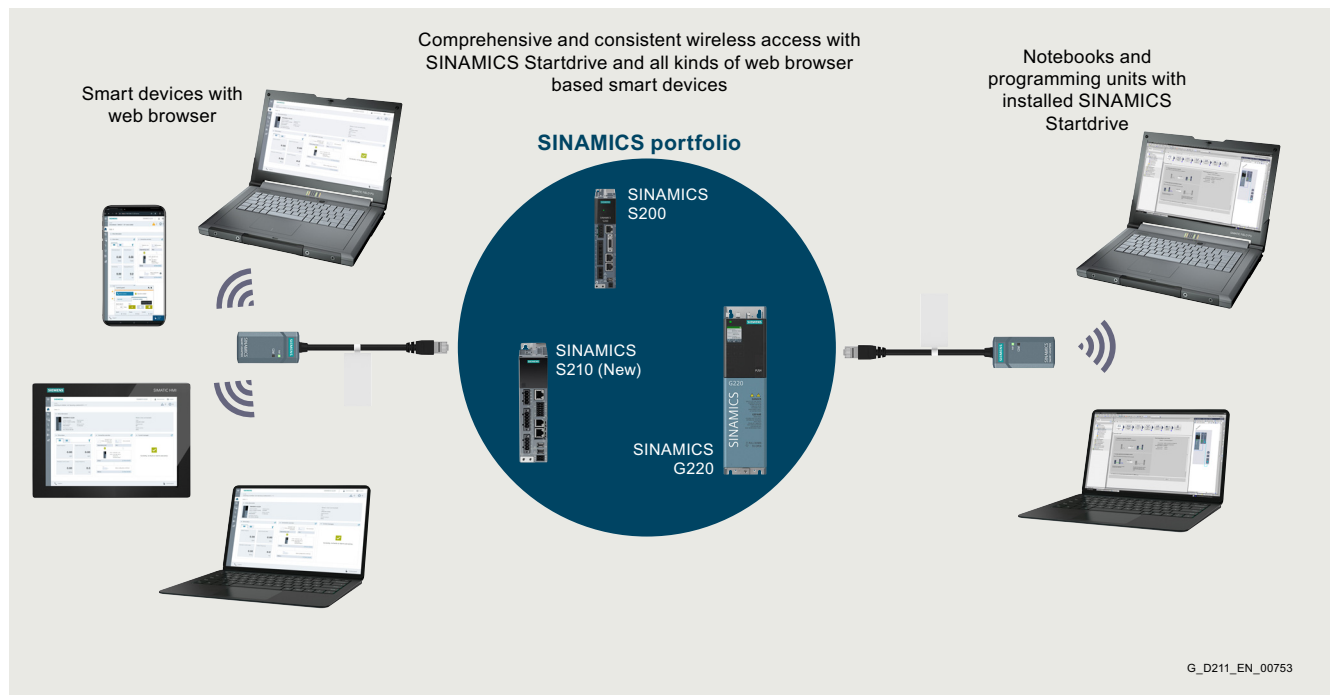
**Application**

SINAMICS Smart Adapter is used in general industrial applications as an engineering solution for quick commissioning and service.

The adapter is especially valuable in areas, which are difficult to access due to their mechanical mounting locations. The use of SINAMICS Smart Adapter avoids cable spaghetti and tripping points during commissioning and service tasks and therefore prevents from occasional accidents.

**Function**

- Easy and quick service and commissioning via a wireless solution using the converter-integrated web server
- Interface that is suitable for the next generation of SINAMICS converters SINAMICS S200<sup>1)</sup>, SINAMICS S210 (New)<sup>1)</sup> and SINAMICS G220 and allows power supply of SINAMICS Smart Adapter directly from the converter.
- Advanced security with WPA3 protocol

**Integration**

Wireless access with SINAMICS Startdrive via SINAMICS Smart Adapter

<sup>1)</sup> Release for SINAMICS S200 and SINAMICS S210 (New) available soon.

## SINAMICS S210 servo converters

0.1 kW to 7 kW

### Supplementary system components > SINAMICS Smart Adapter

#### Selection and ordering data

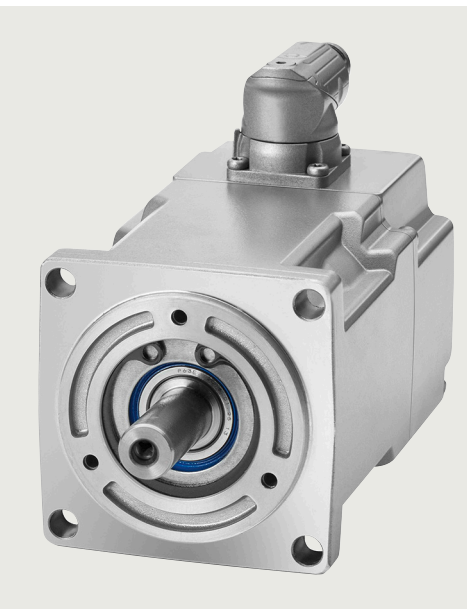
Description	Article No.
<b>SINAMICS Smart Adapter</b> <sup>2)</sup> <b>NEW</b> Wi-Fi solution for the next generation of SINAMICS converters SINAMICS S200 <sup>2)</sup> , SINAMICS S210 (New) <sup>2)</sup> and SINAMICS G220	<b>6SL4950-0AJ00-0AA0</b>

#### Technical specifications

<b>SINAMICS Smart Adapter 6SL4950-0AJ00-0AA0</b>	
<b>Supported operating systems</b>	Apple iOS (from 12.2), Android, Microsoft Windows, Mac OS (from 10.15)
<b>Recommended browsers</b>	Google Chrome (from 69.0), Microsoft Edge (from 80.0), Safari, Opera (from 56.0)
<b>Ambient temperature</b>	
• During storage and transport	-40 °C ... +70 °C (-40 °F ... +158 °F)
• During operation	-10 °C ... +40 °C (-40 °F ... +104 °F)
<b>Humidity</b>	< 95 %, without condensation
<b>Rated voltage</b>	24 V DC
<b>Wireless technology and frequency range</b> <sup>1)</sup>	
• At 2.4G:	Wi-Fi 2400 MHz ... 2483.5 MHz
• At 5G:	Wi-Fi 5150 MHz ... 5250 MHz
<b>Wireless modulation type</b>	
• At 2.4G:	802.11 b/g/n
• At 5G:	802.11 a/n
<b>Maximum output power (EIRP)</b>	
• At 2.4G:	17.66 dBm
• At 5G:	14.50 dBm
<b>Type of modulation</b>	DSSS (DBPSK, DQPSK, CCK), OFDM (BPSK, QPSK, 16QAM, 64QAM)
<b>Maximum wireless communication distance</b>	50 m (164 ft)
<b>Maximum antenna gain</b>	
• At 2.4G:	1.2 dBi
• At 5G:	1.6 dBi
<b>Maximum radio frequency output power</b>	
• At 2.4G:	18 dBm
• At 5G:	15 dBm
<b>Degree of protection</b>	IP20/UL Open Type
<b>Dimensions</b>	
• Width	30 mm (1.18 in)
• Height	200 mm (7.87 in)
• Depth	18 mm (0.71 in)
<b>Weight, approx.</b>	0.032 kg (0.071 lb)
<b>Compliance with standards</b>	CE, UKCA, UL, CRC, IMDA, NBTC, KCC, NCC, ICASA, SDPPI, UkrCEPRO, JRF, RED, FCC, IC, WPC, ANATEL, TRA, MIC, SRRRC, RCM, ENACOM, SUBTEL, MTC, SDOC, MOC

<sup>1)</sup> The actual frequency range may vary depending upon market.

<sup>2)</sup> Release for SINAMICS S200 and SINAMICS S210 (New) available soon.



<b>3/2</b>	<b>Overview</b>
<b>3.1/1</b>	<b>SIMOTICS S-1FK2 servomotors</b>
<b>3.2/1</b>	<b>SIMOTICS S-1FT2 servomotors</b>
<b>3.3/1</b>	<b>SIMOTICS S-1FS2 servomotors</b>
<b>3.4/1</b>	<b>SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors</b>

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

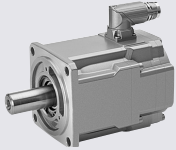
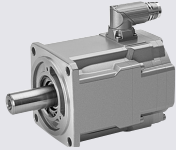
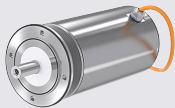
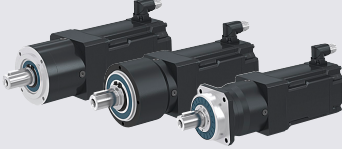
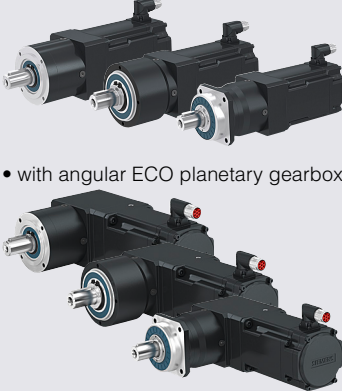
In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S servomotors and servo planetary geared motors for SINAMICS S210

### Overview

The 1FK2 servomotors are perfectly suited to overcome the essential challenges in servo drive technology. The product range includes a limited number of variants and options and therefore enables a simple overview and selection. They form the core of the servomotors for the SINAMICS S210 servo drive system.

The 1FT2 servomotors are an extension of the 1FK2 motor portfolio. They are more finely graded in terms of rated speeds, offer additional torque levels and have numerous variations and options. This makes it possible to solve the diverse challenges in the drive technology more precisely. Even more demanding tasks or applications in difficult environments can be mastered with 1FT2 servomotors.

	<b>SIMOTICS S servomotors for SINAMICS S210</b>		
	<b>1FK2</b> High Dynamic (HD) / Compact (CT)	<b>1FT2</b> High Dynamic (HD) / Compact (CT)	<b>1FS2</b> High Dynamic (HD) / Compact (CT)
			
<b>Versions</b>	Shaft heights • High Dynamic (HD) 20, 30, 40, 52, 63 • High Dynamic (HD) forced ventilation – • Compact (CT) 30, 40, 48, 63, 80, 100 • Compact (CT) forced ventilation –	Shaft heights • High Dynamic (HD) 20, 30, 40, 52, 63, 80, 80 • Compact (CT) 30, 40, 48, 63, 80, 100, 80	Shaft heights • High Dynamic (HD) 40, 52, 63 • Compact (CT) 80
<b>Version as servo planetary geared motor</b>	<ul style="list-style-type: none"> <li>• with coaxial ECO planetary gearbox</li> </ul> 	<ul style="list-style-type: none"> <li>• with coaxial ECO planetary gearbox</li> <li>• with angular ECO planetary gearbox</li> </ul> 	–
<b>Static torque <math>M_0</math></b>	0.16 ... 40 Nm (0.12 ... 29.50 lb <sub>F</sub> -ft)	0.16 ... 50 Nm (0.12 ... 36.90 lb <sub>F</sub> -ft)	3.1 ... 23.5 Nm (2.29 ... 17.33 lb <sub>F</sub> -ft)
<b>Rated power <math>P_N</math></b>	Up to 6.4 kW	Up to 6.4 kW	Up to 2.51 kW
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Packaging machines</li> <li>• Handling equipment</li> <li>• Feed and withdrawal devices</li> <li>• Stacking units</li> <li>• Automatic assembly machines</li> <li>• Laboratory automation</li> <li>• Woodworking, glass and ceramic industries</li> <li>• Digital printing machines</li> </ul>		<ul style="list-style-type: none"> <li>• Food and beverage industries</li> <li>• Pharmaceutical industry</li> <li>• Packaging machines</li> <li>• Handling equipment</li> <li>• Feed and withdrawal devices</li> </ul>
<b>Housing</b>	Aluminum/anthracite gray	Aluminum/anthracite gray Optionally other colors possible	Stainless steel
<b>Degree of protection</b>	IP64 IP65 optional or retrofittable	IP64 IP65 optional or retrofittable, IP67 optional	IP66/IP67, IP69K
<b>Encoder systems</b>			
• Absolute encoder 22-bit singleturn	✓	✓	–
• Absolute encoder 22-bit + 12-bit multiturn	✓	✓	✓
• Absolute encoder 26-bit singleturn	–	✓	–
• Absolute encoder 26-bit + 12-bit multiturn	–	✓	–
<b>Notes</b>	–	• Numerous variants and options	<ul style="list-style-type: none"> <li>• Very high detergent resistance</li> <li>• Certification according to EHEDG</li> </ul>



## SIMOTICS S-1FK2 servomotors for SINAMICS S210



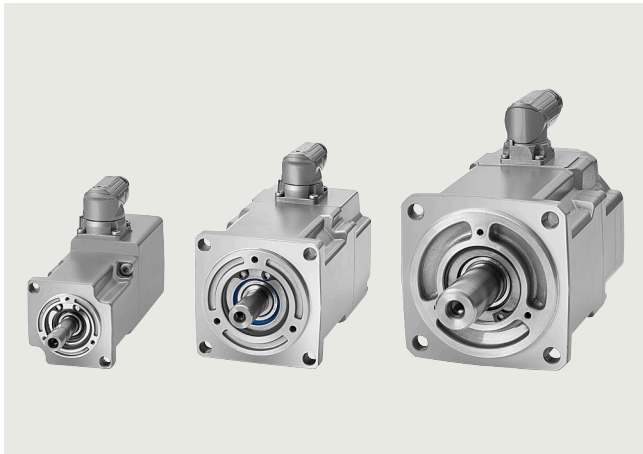
3.1/2	Overview
3.1/2	Benefits
3.1/2	Application
3.1/2	More information
3.1/3	Selection and ordering data
3.1/6	Technical specifications
3.1/6	General technical specifications
3.1/10	Shaft height 20
3.1/12	Shaft height 30
3.1/15	Shaft height 40
3.1/19	Shaft height 48
3.1/21	Shaft height 52
3.1/23	Shaft height 63
3.1/26	Shaft height 80
3.1/29	Shaft height 100

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FK2 servomotors for SINAMICS S210

### Overview



The SIMOTICS S-1FK2 servomotors are compact and highly dynamic synchronous motors for a wide range of uses in an industrial environment. They are characterized by high power density, degree of protection and overload capability.

The 1FK2 servomotors are perfectly suited to overcome the essential challenges in servo drive technology. The product range includes a limited number of variants and options and therefore enables a simple overview and selection. They form the core of the servomotors for the SINAMICS S210 servo drive system.

The 1FT2 servomotors are an extension of the 1FK2 motor portfolio – see chapter 3.2.

They are more finely graded in terms of rated speeds, offer additional torque levels and have numerous variations and options. This makes it possible to solve the diverse challenges in the drive technology more precisely. Even more demanding tasks or applications in difficult environments can be mastered with 1FT2 servomotors.

#### **SIMOTICS S-1FK2 High Dynamic motors**

Highest dynamic response through low inertia for highly dynamic applications with low moved masses.

#### **SIMOTICS S-1FK2 Compact motors**

Precise, stable control with medium to high masses to be moved with medium moment of inertia.

### Benefits

The SIMOTICS S-1FK2 servomotors fully exploit their strengths in the system with the SINAMICS S210 converter:

- Short adjustment and positioning times
- Quick and precise compensation of disturbances
- Stable closed loop control with high dynamic response

This is achieved by:

- Rapid control cycle
- High pulse frequency
- Complex rule algorithms
- High-resolution optical encoder with fast scanning
- Low moment of inertia of the motors
- High overload capability

### Application

- Packaging machines
- Handling equipment
- Feed and withdrawal devices
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Woodworking, glass and ceramic industries
- Digital printing machines

### More information

#### **SIMOTICS S-1FK2 servo planetary geared motors**

SIMOTICS S-1FK2 servo motors can optionally be ordered as SIMOTICS S-1FK2 servo planetary geared motors with coaxial gearboxes – see chapter 3.4.

SIMOTICS S-1FK2 servo planetary geared motors with coaxial gearboxes NRB, NRK, NLC are highly dynamic, compact and economical drive units. The combinations, each composed of a servomotor with a high-performance coaxial planetary gearbox, are suitable for a wide range of applications in an industrial environment.

These planetary geared motors are specified and delivered completely as a unit. All outstanding performance data are matched to the motor-gearbox combination.

#### **More technical information**

Further documentation, such as the operating instructions, is available free on the internet at:

[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Detailed information on the SINAMICS S210 drive system, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions), is available on the internet at:

[www.siemens.com/sinamics-s210](http://www.siemens.com/sinamics-s210)




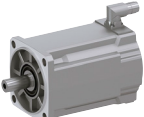

and is also available via the Siemens Product Configurator on the internet.

The Siemens Product Configurator can be found in SiePortal at the following address:

[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)



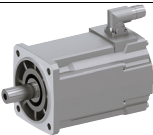
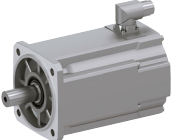
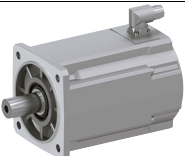
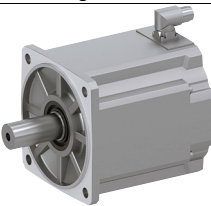
## SIMOTICS S-1FK2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque	Maximum torque	Maximum speed	Rated speed for 200 ... 240 V 1 AC / 3 AC	Rated speed for 380 ... 480 V 3 AC	Rotor moment of inertia	SIMOTICS S-1FK2 servomotor
	$M_0$ Nm (lb <sub>r</sub> -ft)	$M_{max}$ Nm (lb <sub>r</sub> -ft)	$n_{max}$ r/min	$n_N$ r/min	$n_N$ r/min	$J_{Mot}$ kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	
<b>High Dynamic for highly dynamic applications</b>							
<b>Shaft height 20</b>							
	0.16 (0.12)	0.56 (0.41)	8000	3000	–	0.025 (0.009)	<b>1FK2102-0AG</b> ■■■ ■■■ A0
	0.32 (0.24)	1.11 (0.82)	8000	3000	–	0.036 (0.012)	<b>1FK2102-1AG</b> ■■■ ■■■ A0
<b>Shaft height 30</b>							
	0.64 (0.47)	1.95 (1.44)	8000	3000	–	0.093 (0.032)	<b>1FK2103-2AG</b> ■■■ ■■■ A0
	0.64 (0.47)	1.95 (1.44)	8000	–	4500	0.093 (0.032)	<b>1FK2103-2AH</b> ■■■ ■■■ A0
	1.27 (0.94)	4.05 (2.99)	7300	3000	–	0.14 (0.048)	<b>1FK2103-4AG</b> ■■■ ■■■ A0
	1.27 (0.94)	4.05 (2.99)	8000	–	4500	0.14 (0.048)	<b>1FK2103-4AH</b> ■■■ ■■■ A0
<b>Shaft height 40</b>							
	1.27 (0.94)	3.75 (2.77)	7200	1500	3000	0.35 (0.120)	<b>1FK2104-4AF</b> ■■■ ■■■ A0
	1.27 (0.94)	3.85 (2.84)	8000	3000	6000	0.35 (0.120)	<b>1FK2104-4AK</b> ■■■ ■■■ A0
	2.4 (1.77)	7.5 (5.53)	6700	1500	3000	0.56 (0.191)	<b>1FK2104-5AF</b> ■■■ ■■■ A0
	2.4 (1.77)	7.6 (5.61)	8000	3000	6000	0.56 (0.191)	<b>1FK2104-5AK</b> ■■■ ■■■ A0
	3.2 (2.36)	10 (7.38)	7200	1500	3000	0.76 (0.260)	<b>1FK2104-6AF</b> ■■■ ■■■ A0
<b>Shaft height 52</b>							
	5 (3.69)	15 (11.06)	6000	1500	3000	1.7 (0.581)	<b>1FK2105-4AF</b> ■■■ ■■■ A0
	8 (5.90)	24 (17.70)	6000	1500	3000	2.7 (0.923)	<b>1FK2105-6AF</b> ■■■ ■■■ A0
<b>Shaft height 63</b>							
	9 (6.64)	26 (19.18)	6000	1500	3000	4.6 (1.572)	<b>1FK2106-3AF</b> ■■■ ■■■ A0
	12 (8.85)	33 (24.34)	6000	1500	3000	6.0 (2.050)	<b>1FK2106-4AF</b> ■■■ ■■■ A0
	16 (11.80)	45.5 (33.56)	6000	1500	3000	8.7 (2.973)	<b>1FK2106-6AF</b> ■■■ ■■■ A0
<b>Article No. supplements</b>							
<b>Holding brake</b>							
Without brake							0
With brake							1
<b>Degree of protection</b>							
IP64 (without shaft sealing ring)							0
IP65 (with shaft sealing ring)							1
<b>Shaft extension, feather key</b>							
Plain shaft							0
Shaft with feather key							1
Plain shaft, reduced shaft diameter, Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64), Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)							0 2
<b>Encoder</b>							
Absolute encoder 22-bit singleturn							S
Absolute encoder 22-bit + 12-bit multiturn							M

## SIMOTICS S-1FK2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque	Maximum torque	Maximum speed	Rated speed for 200 ... 240 V 1 AC / 3 AC	Rated speed for 380 ... 480 V 3 AC	Rotor moment of inertia	SIMOTICS S-1FK2 servomotor
	$M_0$ Nm (lb <sub>r</sub> -ft)	$M_{max}$ Nm (lb <sub>r</sub> -ft)	$n_{max}$ r/min	$n_N$ r/min	$n_N$ r/min	$J_{Mot}$ kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	
<b>Compact for high precision applications</b>							
<b>Shaft height 30</b>							
	0.64 (0.47)	1.85 (1.36)	8000	3000	–	0.20 (0.068)	1FK2203-2AG■■■-■■■A0
	0.64 (0.47)	1.85 (1.36)	8000	–	6000	0.20 (0.068)	1FK2203-2AK■■■-■■■A0
	1.27 (0.94)	3.75 (2.77)	7800	3000	–	0.35 (0.120)	1FK2203-4AG■■■-■■■A0
	1.27 (0.94)	3.75 (2.77)	8000	–	6000	0.35 (0.120)	1FK2203-4AK■■■-■■■A0
<b>Shaft height 40</b>							
	2.4 (1.77)	7.1 (5.24)	7500	1500	3000	1.2 (0.410)	1FK2204-5AF■■■-■■■A0
	2.4 (1.77)	7.1 (5.24)	8000	3000	6000	1.2 (0.410)	1FK2204-5AK■■■-■■■A0
	3.2 (2.36)	9.5 (7.01)	7600	1500	3000	1.6 (0.547)	1FK2204-6AF■■■-■■■A0
<b>Shaft height 48</b>							
	3.6 (2.66)	10.8 (7.97)	6000	1500	3000	3.2 (1.093)	1FK2205-2AF■■■-■■■A0
	6 (4.43)	18 (13.28)	6000	1500	3000	5.1 (1.743)	1FK2205-4AF■■■-■■■A0
<b>Shaft height 63</b>							
	6.5 (4.79)	18 (13.28)	6000	1500	3000	7.8 (2.665)	1FK2206-2AF■■■-■■■A0
	12 (8.85)	36 (26.55)	5800	1500	3000	15 (5.126)	1FK2206-4AF■■■-■■■A0
<b>Shaft height 80</b>							
	18 (13.28)	51 (37.62)	4100	1000	2000	30 (10.251)	1FK2208-3AC■■■-■■■A0
	22 (16.23)	66 (48.68)	4600	1000	2000	39 (13.326)	1FK2208-4AC■■■-■■■A0
	27 (19.92)	80 (59.01)	4700	1000	2000	48 (16.402)	1FK2208-5AC■■■-■■■A0
<b>Shaft height 100</b>							
	30 (22.13)	90 (66.38)	2500	750	1500	89 (30.411)	1FK2210-3AB■■■-■■■A0
	30 (22.13)	90 (66.38)	4400	1000	2000	89 (30.411)	1FK2210-3AC■■■-■■■A0
	40 (29.50)	120 (88.51)	2500	750	1500	120 (41.004)	1FK2210-4AB■■■-■■■A0
	40 (29.50)	120 (88.51)	3300	1000	2000	120 (41.004)	1FK2210-4AC■■■-■■■A0

## Article No. supplements

## Holding brake

Without brake	0
With brake	1

## Degree of protection

IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1

## Shaft extension, feather key

Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter, Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64), Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)	0 2

## Encoder

Absolute encoder 22-bit singleturn	S
Absolute encoder 22-bit + 12-bit multiturn	M

## Selection and ordering data

## Accessories

Description	For motor	Article No.
<b>Shaft sealing ring</b>	1FK2.02	<b>1FY2902-0GC00</b>
Degree of protection kit to achieve degree of protection IP65 for mounting on the motor – for retrofitting or as spare part	1FK2.03	<b>1FY2903-0GC00</b>
	1FK2.04	<b>1FY2904-0GC00</b>

## Structure of the Article No. of the SIMOTICS S-1FK2 servomotors

Data position in Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
	1	F	K	2	■	■	■	-	■	A	■	■	■	-	■	■	A	0
<b>1st to 4th position:</b> digit, letter, letter, digit	<b>Motor</b> 1 F K 2																	
<b>5th position:</b> digit	<b>Moment of inertia</b>																	
	High Dynamic				1													
	Compact				2													
<b>6th and 7th positions:</b> digit, digit	<b>Shaft height</b>																	
	20				1	0	2											
	30				1/2	0	3											
	40				1/2	0	4											
	52				1	0	5											
	48				2	0	5											
	63				1/2	0	6											
	80				2	0	8											
	100				2	1	0											
<b>8th position:</b> digit	<b>Overall length</b> See specific technical specifications								0 ... 8									
<b>9th position:</b> letter	Reserved									A								
<b>10th position:</b> letter	<b>Winding/rated speed</b>																	
	<b>For converters connected to max. 240 V</b>					<b>For converters connected to max. 480 V</b>												
	750 r/min at 230 V					1500 r/min at 400 V					B							
	1000 r/min at 240 V					2000 r/min at 400 V					C							
	1500 r/min at 230 V					3000 r/min at 400 V					F							
	3000 r/min at 230 V					Not permissible					G							
	2500 r/min at 230 V					4500 r/min at 400 V					H							
	3000 r/min at 230 V					6000 r/min at 400 V					K							
<b>11th position:</b> digit	<b>Brake</b>																	
	None										0							
	Holding brake										1							
<b>12th position:</b> digit	<b>Degree of protection</b>																	
	IP64 (without shaft sealing ring)											0						
	IP65 (with shaft sealing ring)											1						
<b>13th position:</b> digit	<b>Shaft extension, feather key</b>																	
	Plain shaft												0					
	Shaft with feather key												1					
	Plain shaft, reduced shaft diameter Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FK2.03 and IP64), Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FK2.04 and IP64)												0	2				
<b>14th position:</b> letter	<b>Encoder</b>																	
	Absolute encoder 22-bit singleturn (AS22DQC)													S				
	Absolute encoder 22-bit + 12-bit multiturn (AM22DQC)													M				
<b>15th position:</b> letter	<b>One Cable Connection</b>																	
															A			
<b>16th position:</b> digit	Reserved																	
																0		

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## Technical specifications

### General technical specifications

SIMOTICS S-1FK2 High Dynamic/Compact motors	
<b>Motor type</b>	Permanent-magnet synchronous motor
<b>Permissible operating conditions without derating</b> • Ambient temperature • Installation altitude, max.	-15 ... +40 °C (5 ... 104 °F) 1000 m (3281 ft)
<b>Degree of protection</b> According to EN 60034-5 (IEC 60034-5)	IP64 IP65 optional or retrofittable
<b>Cooling</b> According to EN 60034-6	Natural cooling (IC410)
<b>Type of construction</b> According to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
<b>Shaft extension</b> According to DIN 748-3 (IEC 60072-1)	Plain shaft Optional shaft with feather key (half-key balancing)
<b>Shaft and flange accuracy</b> According to DIN 42955 (IEC 60072-1)	Tolerance N In each case for radial eccentricity of the shaft extension, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft extension.
<b>Vibration severity grade</b> According to EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed
<b>Stator winding insulation</b> According to EN 60034-1 (IEC 60034-1) • 1FK2102, 1FK2.03  • 1FK2.04, 1FK2.05, 1FK2.06, 1FK2.08, 1FK2.10	Thermal class 130 (B) for a winding overtemperature of $\Delta T = 80$ K Thermal class 155 (F) for a winding overtemperature of $\Delta T = 100$ K
<b>Sound pressure level <math>L_{pA}</math> (1 m), max.</b> According to ISO 1680 • 1FK2102, 1FK2.03, 1FK2.04 • 1FK2.05 and 1FK2.06 • 1FK2.08 and 1FK2.10	55 dB(A) + 3 dB(A) tolerance 65 dB(A) + 3 dB(A) tolerance 70 dB(A) + 3 dB(A) tolerance
<b>Encoder system</b>	• AS22DQC (absolute encoder 22-bit singleturn) • AM22DQC (absolute encoder 22-bit + 12-bit multiturn)
<b>Holding brake</b>	Optional integrated holding brake
<b>Connection</b>	One Cable Connection (OCC) for signals and power Rotatable connector
<b>Paint finish</b>	RAL 7016 (anthracite gray)
<b>Certificates of suitability</b>	cURus, CE


## Technical specifications


### Regulations, standards, specifications

The motors comply with the appropriate standards and regulations, see table below.

As a result of the fact that in many countries the national regulations have been completely harmonized with the international IEC 60034-1 recommendation, there are no longer any differences with respect to coolant temperatures, temperature classes and temperature rise limits.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Cooling methods of rotating electrical machines	IEC 60034-6
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Noise limit values for rotating electrical machines	IEC 60034-9
Cylindrical shaft extensions for electrical machines	DIN 748-3/IEC 60072-1

 SIMOTICS S-1FK2 motors have UL approval from Underwriters Laboratories Inc. and are marked with the "UL Recognized Component" test symbol. This is used for components which are part of a larger product or system. This confirmed compliance with the corresponding US American and Canadian regulations, and allowed access to the North American market.

 For SIMOTICS S-1FK2 motors, conformity with the relevant EC directives 2006/95/EC and 2014/35/EU and the relevant standards EN 60034-1:2010 and EN 60204-1:2006 is confirmed. By applying the CE mark to the product, Siemens AG confirms this for the product, and secures the free movement of goods within the European Union.

### Degree of protection acc. to IEC 60034-5

A suitable degree of protection must be selected according to the operating and environmental conditions to protect the machine against damage caused by the ingress of water and other liquids, as well as dust and foreign bodies.

SIMOTICS S-1FK2 motors have degree of protection IP64 as standard.

The motor can be optionally supplied with a radial shaft seal ring in degree of protection IP65. This increases the protection against the ingress of liquids.

The degree of protection designation is composed from the code **IP** (for International Protection) and two code numbers for the protection against touching and penetration of foreign bodies, and the degree of protection against the ingress of water.

#### First code number

6: Protection against dust ingress and complete protection against touching

#### Second code number

4: Protection against splashwater from any direction

5: Protection against jet water from any direction

#### Recommended degrees of protection for AC motors

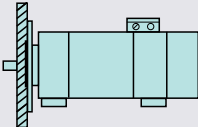
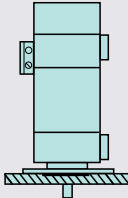
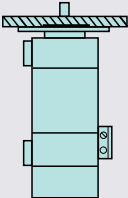
When cooling lubricants are used, protection against water alone is inadequate. The IP rating should only be considered as a guide value in this case. The motors may have to be protected by suitable covers. Attention must be paid to providing suitable sealing of the motor shaft for the selected degree of protection for the motor.

The following table can serve as a decision aid for selecting the proper degree of protection for motors. A permanent covering of liquid on the flange must be avoided when the motor is mounted with the shaft extension facing upwards (IM V3).

Effect	General workshop environment	Water/general cooling lubricant (95 % water, 5 % oil)
Dry	IP64	–
Water-enriched environment	–	IP64
Mist	–	IP65
Spray	–	IP65

### Type of construction, mounting position according to IEC 60034-7

SIMOTICS S-1FK2 motors are designed in type of construction IM B5. It can also be used in mounting positions IM V1 and IM V3.

Code 1	IM B5	IM V1	IM V3
Code 2	IM 3001	IM 3011	IM 3031
			
	Horizontal flange mounting	Flange mounting, output shaft pointing vertically downwards	Flange mounting, output shaft pointing vertically upwards

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## Technical specifications

### Shaft and flange accuracy in accordance with IEC 60072-1

Radial eccentricity tolerance of shaft in relation to housing axis

(referred to cylindrical shaft extensions)

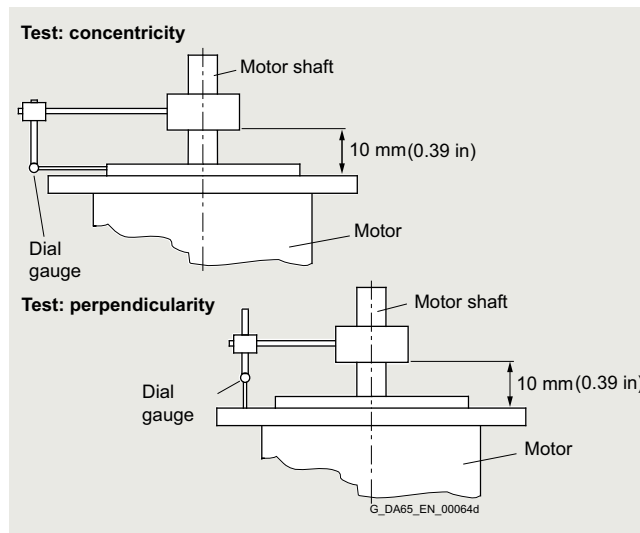
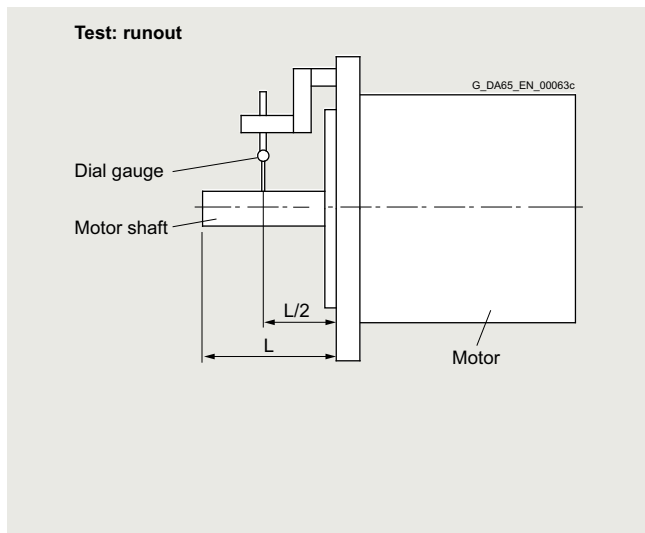
Motor	Shaft extensions D × L	Radial eccentricity Tolerance N
	mm (in)	µm
1FK2102	8 × 25 (0.31 × 0.98)	30
1FK2.03	14 × 30 (0.55 × 1.18)	35
	11 × 23 (0.43 × 0.91)	35
1FK2.04	19 × 40 (0.75 × 1.57)	40
	14 × 30 (0.55 × 1.18)	35
1FK2.05	19 × 40 (0.75 × 1.57)	40
1FK2.06	24 × 50 (0.94 × 1.97)	40
1FK2208	32 × 58 (1.26 × 2.28)	50
1FK2210	38 × 80 (1.50 × 3.15)	50

Concentricity and axial eccentricity tolerance of the flange surface for the shaft axis

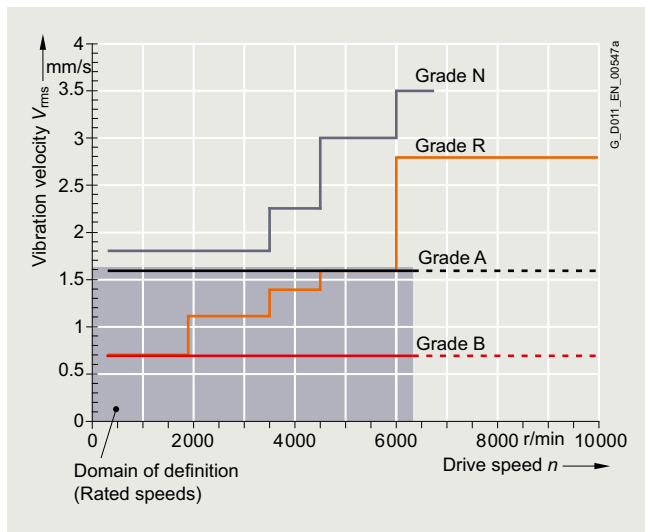
(referred to the centering diameter of the mounting flange)

Motor	Centering diameter	Concentricity and axial eccentricity Tolerance N
	mm (in)	µm
1FK2102	30 (1.18)	80
1FK2.03	50 (1.97)	
1FK2.04	70 (2.76)	
1FK2205	80 (3.15)	
1FK2105	95 (3.74)	
1FK2.06	110 (4.33)	
1FK2208	130 (5.12)	100
1FK2210	130 (5.12)	

3  
1



### Vibration severity and vibration severity grade A according to IEC 60034-14



Vibration severity limit values

The vibration severity is the RMS value of the vibration velocity (frequency range from 10 Hz to 1000 Hz). The vibration severity

is measured using electrical measuring devices according to DIN 45666.

The specified values refer only to the motor. These values can increase as a result of the overall system vibrational behavior due to installation.

The speeds of 1800 r/min and 3600 r/min and the associated limit values are specified according to IEC 60034-14. The speeds of 4500 r/min and 6000 r/min and the specified values are defined by the motor manufacturer.

The motors maintain vibration severity grade A up to the rated speed.

### Balancing according to ISO 21940-32

Apart from the balance quality of the motor, the vibrational quality of motors with attached pulleys is mainly determined by the balance state of the mounted component. If the motor and the mounted component are balanced separately before being joined, the balancing process of the pulley is to be adapted to the motor's balancing type.

SIMOTICS S-1FK2 motors with feather keys are always half-key balanced. In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements.



## Technical specifications

### Vibration stress, imitted vibration values

The requirements of environmental class 3M8 (according to EN 60721-3-3 Table 6) must be maintained for proper function and safeguard the bearing life. The following limits are valid for (imitted) vibration values introduced into the motor from outside:

- Vibration velocity  $V_{rms}$  according to ISO 10816, max. 4.5 mm/s (0.18 in/s)
- Vibration acceleration  $a_{peak}$  axial and radial 50 m/s<sup>2</sup> (164 ft/s<sup>2</sup>)

During transport, the motors withstand single shocks (6 ms) of up to 250 m/s<sup>2</sup> (820 ft/s<sup>2</sup>).

### Ambient temperature and installation altitude

Operating range without restrictions:

Temperature range from -15 °C to +40 °C (5.0 °F to 104 °F), installation altitude up to 1000 m (3281 ft).

If deviating conditions are encountered, the S1 characteristic of the motor must be adapted with regard to speed and torque.

Use the following equation to calculate the reduced S1 characteristic:

$$S1_{red}(n) = x_D \times S1_{40°C; 1000m}(n/x_D)$$

Installation altitude above sea level m (ft)	Derating factor $x_D$ at an ambient temperature of					
	5 °C (41 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)
1000 (3281)	1.16	1.14	1.1	1.05	1	0.91
2000 (6562)	1.12	1.1	1.05	1	0.95	0.84

### Holding brake

Many drives need a holding brake with an EMERGENCY STOP function for safety reasons or to meet process requirements. The brakes used on the SIMOTICS S-1FK2 motors function according to the closed-circuit principle. A spring or permanent magnet exerts a tensile force on the brake armature disk, i.e. in a state of zero current, the brake is closed and the motor shaft thereby stopped.

An electric current that flows through a coil generates an opposing field that counteracts the force effect of the spring or permanent magnet and releases or holds open the brake. Only a limited number of braking operations can be performed for an EMERGENCY STOP or power failure without causing excessive wear on the holding brake. The holding brake is not an operational brake. Regular dynamic braking leads to increased wear and premature brake failure. In order to ensure the functionality

### Encoder systems

In motors with integrated OCC/DRIVE-CLiQ interface, the sensor signal is already digitally prepared in the motor, and then transferred quickly and without loss to the drive system. Motors with an OCC/DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor parameters and encoder system are identified automatically.

#### Single-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute encoder, it does not have a revolution counter, and can therefore only supply the position value within one revolution. It does not have a traversing range.

#### Multi-turn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. It can also count 4096 revolutions. So with a ball screw, for example, the absolute position of the slide can be determined over a longer distance.

14th position in the Article No. of the motor	Designation	
1FK2...-.....- <b>S</b> ..	AS22DQC	Absolute encoder 22-bit singleturn (resolution 4194304)
1FK2...-.....- <b>M</b> ..	AM22DQC	Absolute encoder 22-bit + 12-bit multiturn (resolution 4194304, traversing range 4096 revolutions)

and specification of the brake, neither the total operating energy nor the maximum switching energy per braking operation may be exceeded.

The braking signal is already fully integrated into the SINAMICS S210 converter system, so that an external circuit is not necessary.

After an EMERGENCY STOP sequence with the maximum single switching energy, a cooling time of at least 5 minutes must be allowed.

The following table shows the technical specifications of the holding brakes for operation with SINAMICS S210 (for 1 AC converters, hardware version 2 or higher) and firmware V5.2 or higher.

Motor	Shaft height	Holding torque Nm (lb <sub>F</sub> -ft)	Average dynamic braking torque Nm (lb <sub>F</sub> -ft)	Maximum dynamic braking torque Nm (lb <sub>F</sub> -ft)	Opening time ms	Closing time ms	Maximum permissible single switching energy J	Total operating energy (service life) kJ	Holding current A	Break-induced current, typ. <sup>1)</sup> for 500 ms A
1FK2102	20	0.32 (0.24)	0.32 (0.24)	1 (0.74)	25	20	7.4	1.75	0.1	0.6
1FK2.03	30	1.3 (0.96)	1.3 (0.96)	3.9 (2.88)	40	30	62	17.5	0.15	0.8
1FK2.04	40	3.3 (2.43)	3.3 (2.43)	9 (6.64)	50	40	270	120	0.2	1.2
1FK2.05	48/52	8 (5.90)	5 (3.69)	18 (13.28)	35	20	570	284	0.3	1.1
1FK2106	63	16 (11.80)	9 (6.64)	35 (25.82)	70	35	1065	774	0.35	1.1
1FK2206	63	13 (9.59)	6.5 (4.79)	35 (25.82)	70	35	1550	774	0.35	1.1
1FK2208-3	80	19 (14.0)	12 (8.85)	37 (27.29)	70	35	2000	1800	0.4	1.2
1FK2208-4	80	32 (23.60)	17 (12.54)	70 (51.63)	120	40	4800	2400	0.5	1.4
1FK2208-5	80	32 (23.60)	17 (12.54)	70 (51.63)	120	40	4800	2400	0.5	1.4
1FK2210-3	100	32 (23.60)	17 (12.54)	70 (51.63)	120	40	6600	2400	0.5	1.4
1FK2210-4	100	55 (40.57)	26 (19.18)	100 (73.76)	130	65	8700	3800	0.5	1.5
1FK2210-5	100	55 (40.57)	26 (19.18)	100 (73.76)	130	65	8700	3800	0.5	1.5

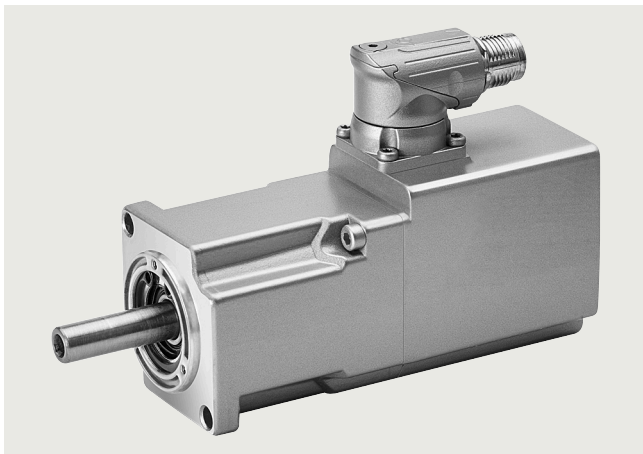
<sup>1)</sup> Typical values at an ambient temperature of 20 °C (68 °F).  
At -15 °C (5 °F), the break-induced currents can increase by up to 30 %.

## SIMOTICS S-1FK2 servomotors for SINAMICS S210

### SIMOTICS S-1FK2 shaft height 20

#### Technical specifications

##### SIMOTICS S-1FK2 shaft height 20

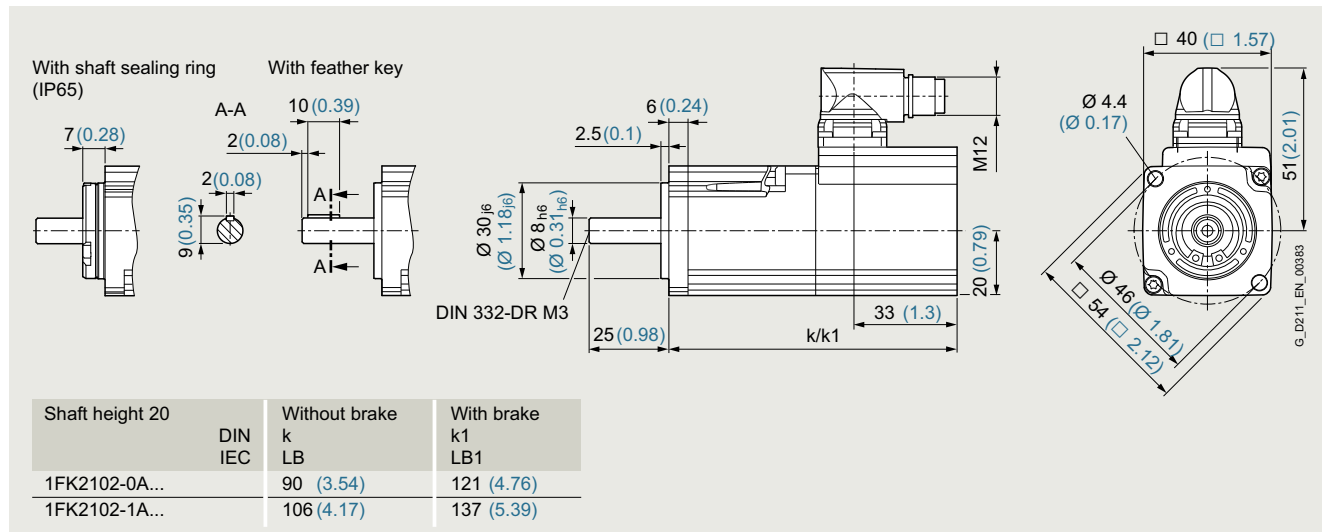


#### Specific technical specifications

SIMOTICS S-1FK2 servomotors		High Dynamic	
Shaft height 20		1FK2102-0AG	1FK2102-1AG
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	0.16 (0.12)	0.32 (0.24)
Stall current $I_0$	A	0.75	0.76
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	0.56 (0.41)	1.11 (0.82)
Maximum current $I_{max}$	A	3.1	2.95
Maximum speed $n_{max}$	r/min	8000	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.025 (0.009)	0.036 (0.012)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.029 (0.010)	0.040 (0.014)
Weight $m_{Mot}$	kg (lb)	0.47 (1.04)	0.60 (1.32)
Weight (with brake) $m_{Mot Br}$	kg (lb)	0.73 (1.61)	0.86 (1.90)
<b>200 ... 240 V 1 AC / 3 AC</b>			
Rated speed $n_N$	r/min	3000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	0.16 (0.12)	0.32 (0.24)
Rated current $I_N$	A	0.75	0.76
Rated power $P_N$	W	50	100
Suitable for SINAMICS S210 servo converters			
• 200 ... 240 V 1 AC		6SL3210-5HB10-1UF0	6SL3210-5HB10-1UF0
• 200 ... 240 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE10-4UF0
Suitable for SINAMICS S210 servo converters (New)			
• 200 ... 240 V 1 AC		6SL5310-1BB10-1CF0	6SL5310-1BB10-1CF0
• 200 ... 240 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE10-4DF0

Technical specifications

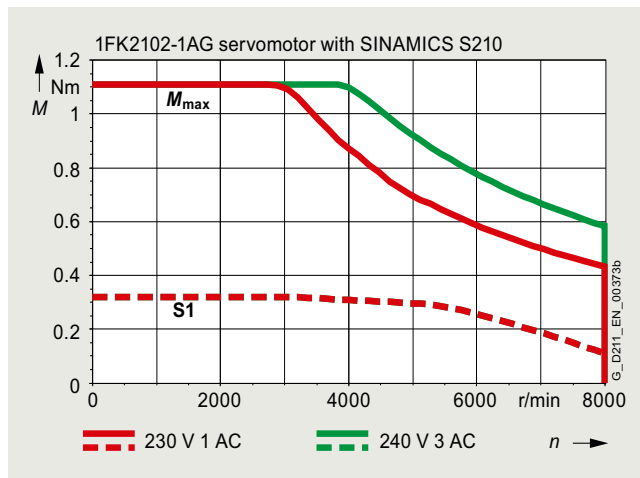
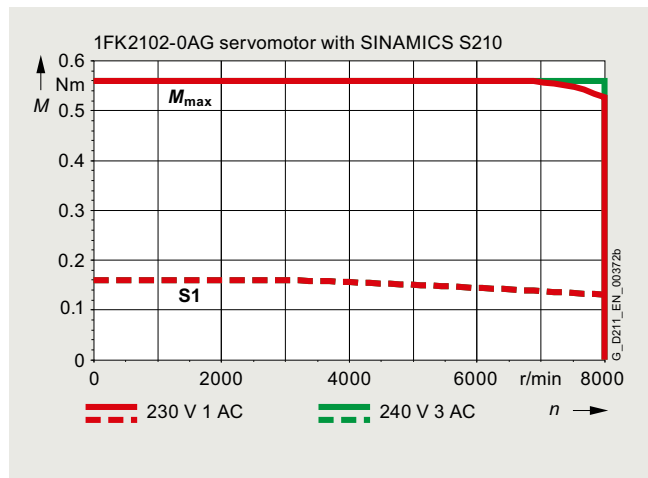
Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

High Dynamic

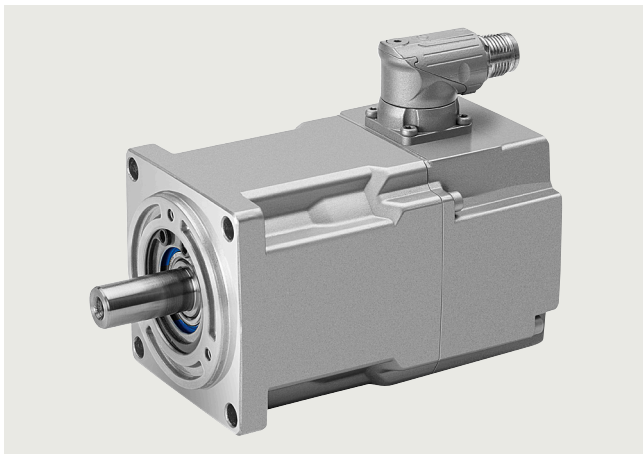


## SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 30

## Technical specifications

## SIMOTICS S-1FK2 shaft height 30

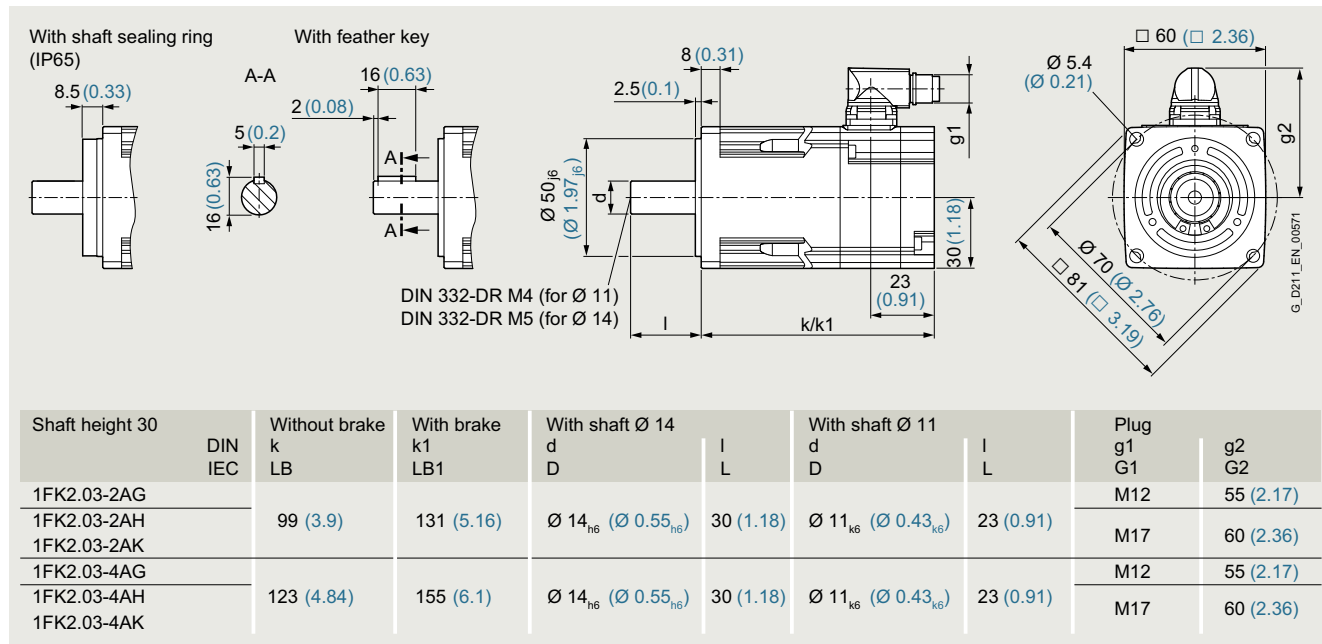


## Specific technical specifications

SIMOTICS S-1FK2 servomotors Shaft height 30		High Dynamic				Compact			
		1FK2103-2AG	1FK2103-2AH	1FK2103-4AG	1FK2103-4AH	1FK2203-2AG	1FK2203-2AK	1FK2203-4AG	1FK2203-4AK
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	0.64 (0.47)	0.64 (0.47)	1.27 (0.94)	1.27 (0.94)	0.64 (0.47)	0.64 (0.47)	1.27 (0.94)	1.27 (0.94)
Stall current $I_0$	A	1.36	1.06	2.4	1.87	1.38	1.05	2.52	2.05
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	1.95 (1.44)	1.95 (1.44)	4.05 (2.99)	4.05 (2.99)	1.85 (1.36)	1.85 (1.36)	3.75 (2.77)	3.75 (2.77)
Maximum current $I_{max}$	A	4.8	3.95	8.7	7.1	4.2	3.4	7.8	6.7
Maximum speed $n_{max}$	r/min	8000	8000	7300	8000	8000	8000	7800	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.093 (0.032)	0.093 (0.032)	0.14 (0.048)	0.14 (0.048)	0.20 (0.068)	0.20 (0.068)	0.35 (0.120)	0.35 (0.120)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.11 (0.038)	0.11 (0.038)	0.16 (0.055)	0.16 (0.055)	0.22 (0.075)	0.22 (0.075)	0.37 (0.126)	0.37 (0.126)
Weight $m_{Mot}$	kg (lb)	1.17 (2.58)	1.18 (2.60)	1.64 (3.62)	1.65 (3.64)	1.15 (2.54)	1.16 (2.56)	1.48 (3.26)	1.49 (3.29)
Weight (with brake) $m_{Mot Br}$	kg (lb)	1.54 (3.40)	1.55 (3.42)	1.98 (4.37)	1.99 (4.39)	1.52 (3.35)	1.53 (3.37)	1.96 (4.32)	1.97 (4.34)
<b>200 ... 240 V 1 AC / 3 AC</b>									
Rated speed $n_N$	r/min	3000	–	3000	–	3000	–	3000	–
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	0.64 (0.47)	–	1.27 (0.94)	–	0.64 (0.47)	–	1.27 (0.94)	–
Rated current $I_N$	A	1.36	–	2.4	–	1.38	–	2.52	–
Rated power $P_N$	W	200	–	400	–	200	–	400	–
<b>380 ... 480 V 3 AC</b>									
Rated speed $n_N$	r/min	–	4500	–	4500	–	6000	–	6000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	–	0.59 (0.44)	–	1.01 (0.74)	–	0.405 (0.299)	–	0.68 (0.50)
Rated current $I_N$	A	–	1.05	–	1.56	–	0.75	–	1.24
Rated power $P_N$	W	–	280	–	480	–	255	–	430
Suitable for SINAMICS S210 servo converters									
• 200 ... 240 V 1 AC		6SL3210-5HB10-2UF0	–	6SL3210-5HB10-4UF0	–	6SL3210-5HB10-2UF0	–	6SL3210-5HB10-4UF0	–
• 200 ... 240 V 3 AC		6SL3210-5HE10-8UF0	–	6SL3210-5HE11-0UF0	–	6SL3210-5HE10-8UF0	–	6SL3210-5HE11-0UF0	–
• 380 ... 480 V 3 AC		–	6SL3210-5HE10-4UF0	–	6SL3210-5HE10-8UF0	–	6SL3210-5HE10-4UF0	–	6SL3210-5HE10-8UF0
Suitable for SINAMICS S210 servo converters (New)									
• 200 ... 240 V 1 AC		6SL5310-1BB10-2CF0	–	6SL5310-1BB10-4CF0	–	6SL5310-1BB10-2CF0	–	6SL5310-1BB10-4CF0	–
• 200 ... 240 V 3 AC		6SL5310-1BE10-8DF0	–	6SL5310-1BE11-0DF0	–	6SL5310-1BE10-8DF0	–	6SL5310-1BE11-0DF0	–
• 380 ... 480 V 3 AC		–	6SL5310-1BE10-4DF0	–	6SL5310-1BE10-8DF0	–	6SL5310-1BE10-4DF0	–	6SL5310-1BE10-8DF0

Technical specifications

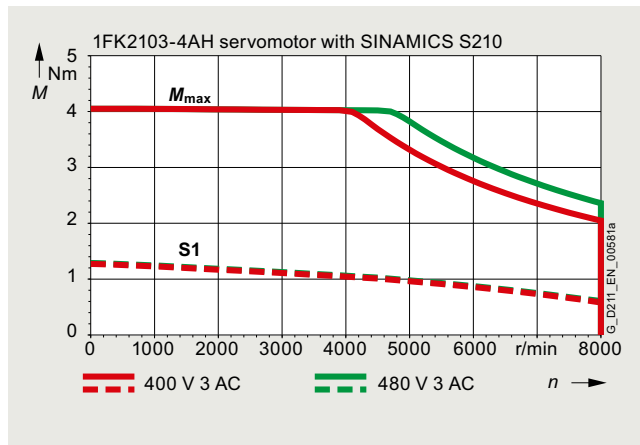
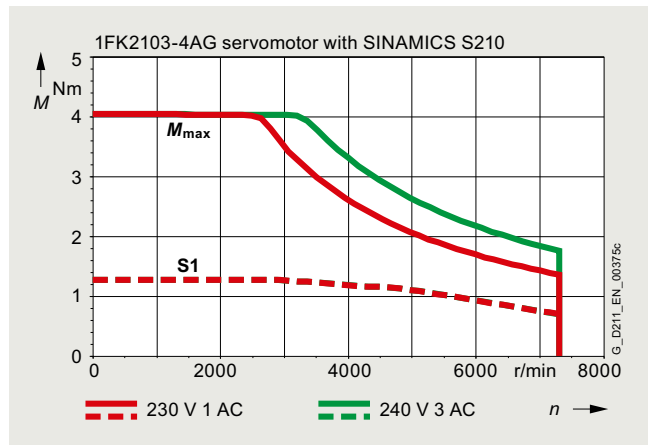
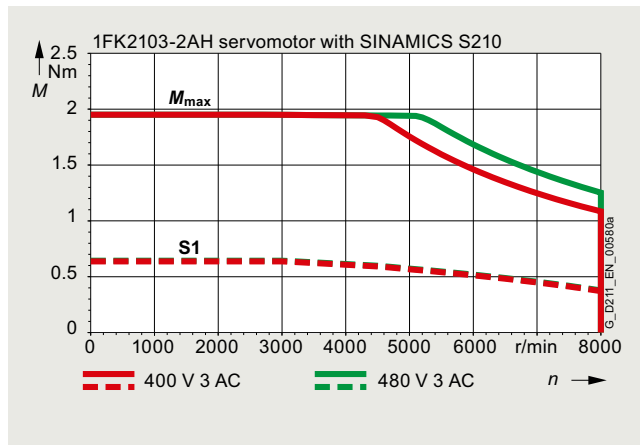
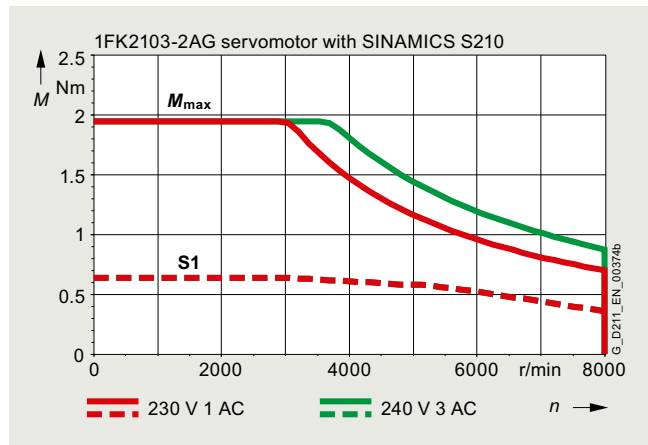
Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

High Dynamic



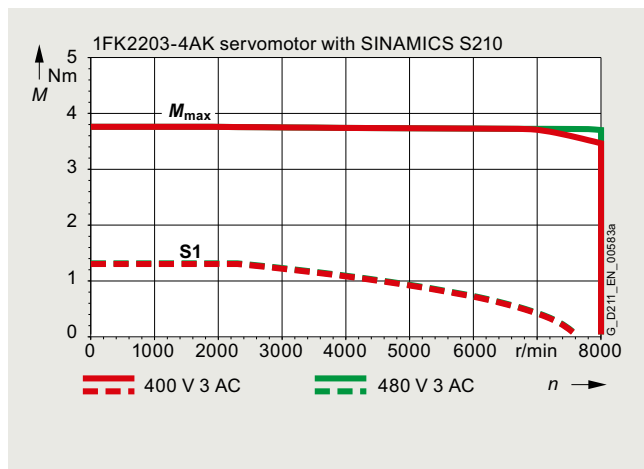
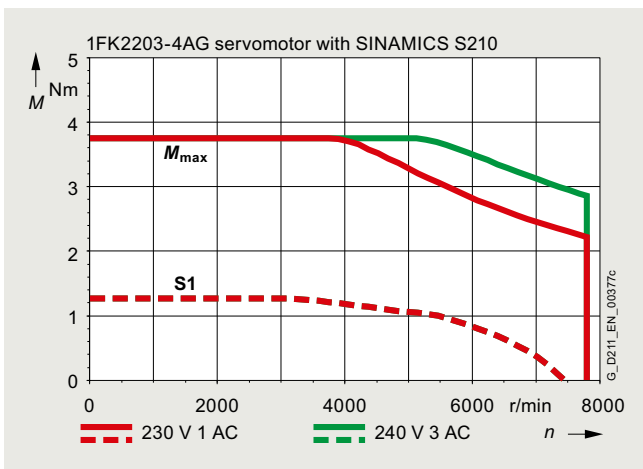
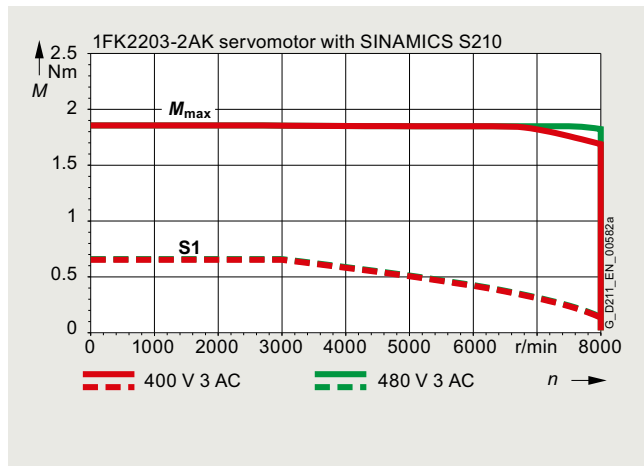
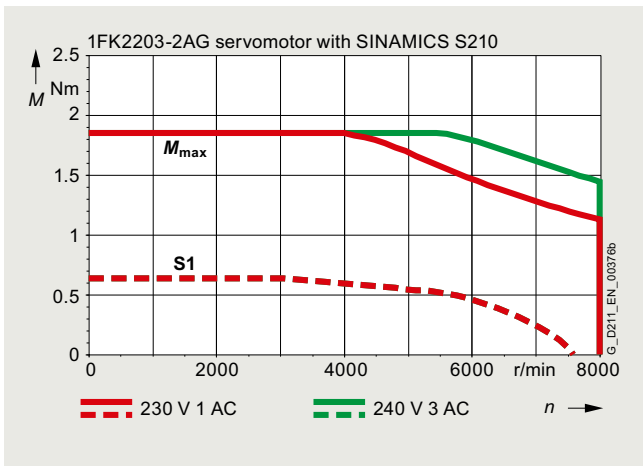
# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 30

### Technical specifications

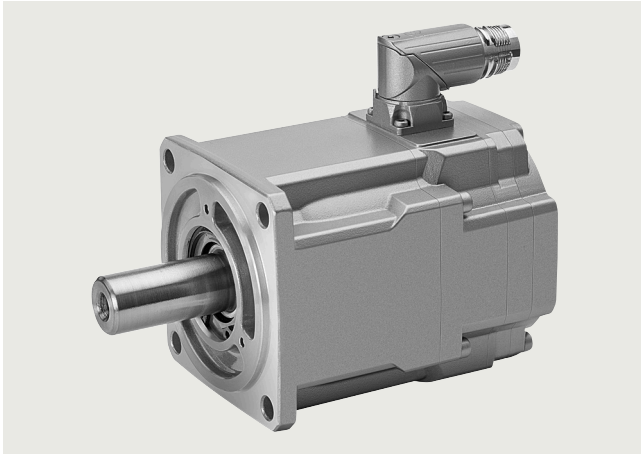
Compact

3  
1



## Technical specifications

## SIMOTICS S-1FK2 shaft height 40



## Specific technical specifications

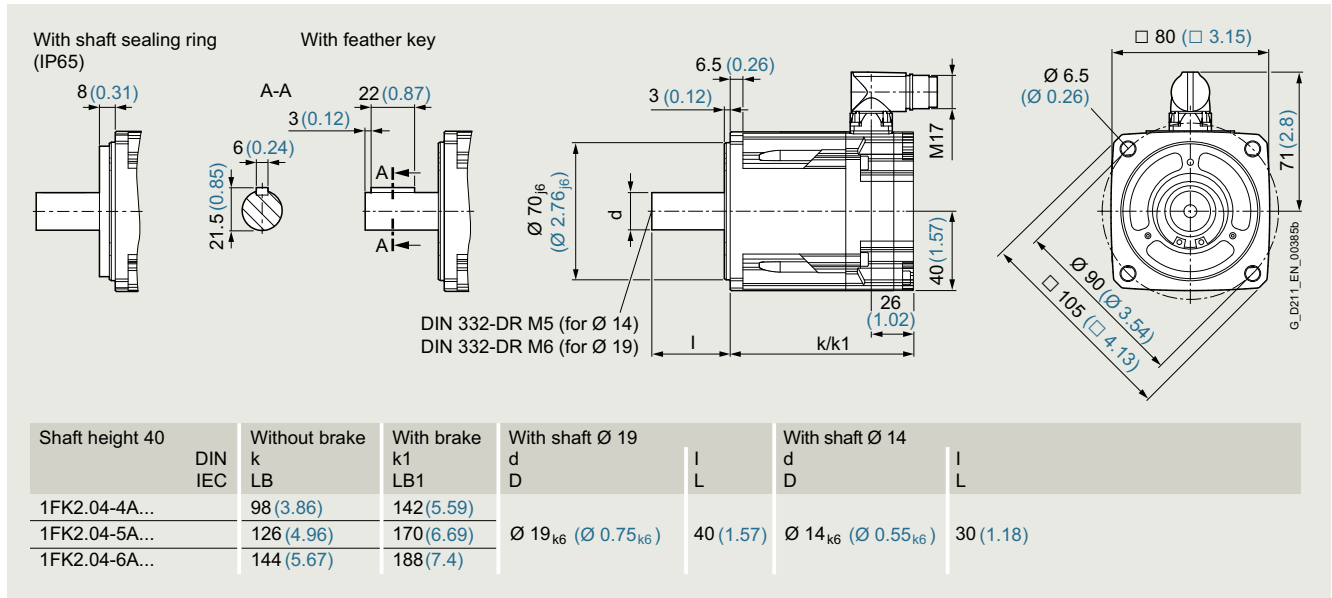
SIMOTICS S-1FK2 servomotors		High Dynamic					Compact		
Shaft height 40		1FK2104-4AF	1FK2104-4AK	1FK2104-5AF	1FK2104-5AK	1FK2104-6AF	1FK2204-5AF	1FK2204-5AK	1FK2204-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	1.27 (0.94)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)
Stall current $I_0$	A	1.19	2.4	2.1	4.4	3	2.25	4.4	3
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	3.75 (2.77)	3.85 (2.84)	7.5 (5.53)	7.6 (5.61)	10 (7.38)	7.1 (5.24)	7.1 (5.24)	9.5 (7.01)
Maximum current $I_{max}$	A	4.2	8.7	7.6	16	10.9	7.1	14.2	9.9
Maximum speed $n_{max}$	r/min	7200	8000	6700	8000	7200	7500	8000	7600
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.35 (0.120)	0.35 (0.120)	0.56 (0.191)	0.56 (0.191)	0.76 (0.260)	1.2 (0.410)	1.2 (0.410)	1.6 (0.547)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.43 (0.147)	0.43 (0.147)	0.65 (0.222)	0.65 (0.222)	0.84 (0.287)	1.3 (0.444)	1.3 (0.444)	1.7 (0.581)
Weight $m_{Mot}$	kg (lb)	2.05 (4.52)	2.05 (4.52)	2.85 (6.28)	2.85 (6.28)	3.4 (7.50)	2.9 (6.39)	2.9 (6.39)	3.5 (7.72)
Weight (with brake) $m_{Mot Br}$	kg (lb)	2.9 (6.39)	2.9 (6.39)	3.7 (8.16)	3.7 (8.16)	4.25 (9.37)	3.75 (8.27)	3.75 (8.27)	4.4 (9.70)
<b>200 ... 240 V 1 AC / 3 AC</b>									
Rated speed $n_N$	r/min	1500	3000	1500	3000	1500	1500	3000	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	1.27 (0.94)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)
Rated current $I_N$	A	1.19	2.4	2.1	4.4	3	2.25	4.4	3
Rated power $P_N$	W	200	400	375	750	500	375	750	500
<b>380 ... 480 V 3 AC</b>									
Rated speed $n_N$	r/min	3000	6000	3000	6000	3000	3000	6000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	0.95 (0.70)	2.4 (1.77)	1.7 (1.25)	3.2 (2.36)	2.4 (1.77)	0.9 (0.66)	3.2 (2.36)
Rated current $I_N$	A	1.19	1.88	2.1	3.20	3	2.25	1.95	3
Rated power $P_N$	W	400	600	750	1070	1000	750	570	1000
Suitable for SINAMICS S210 servo converters									
• 200 ... 240 V 1 AC		6SL3210-5HB10-2UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-8UF0
• 200 ... 240 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0
Suitable for SINAMICS S210 servo converters (New)									
• 200 ... 240 V 1 AC		6SL5310-1BB10-2CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0
• 200 ... 240 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 40

### Technical specifications

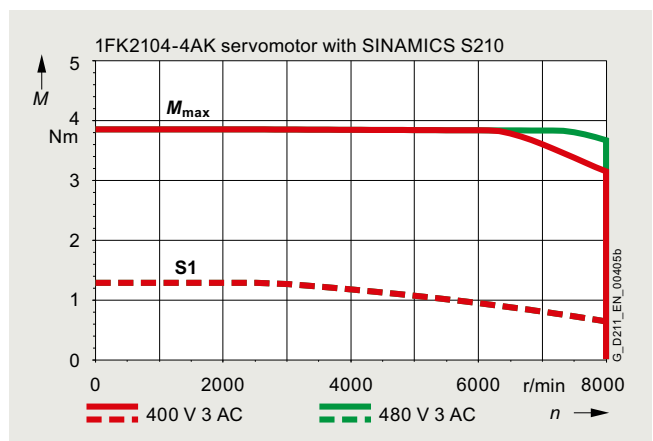
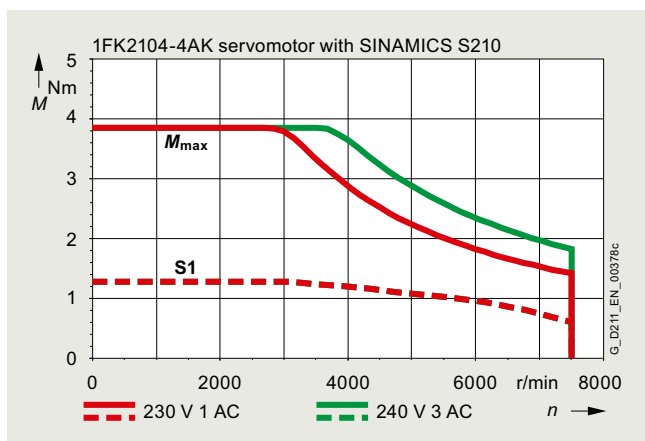
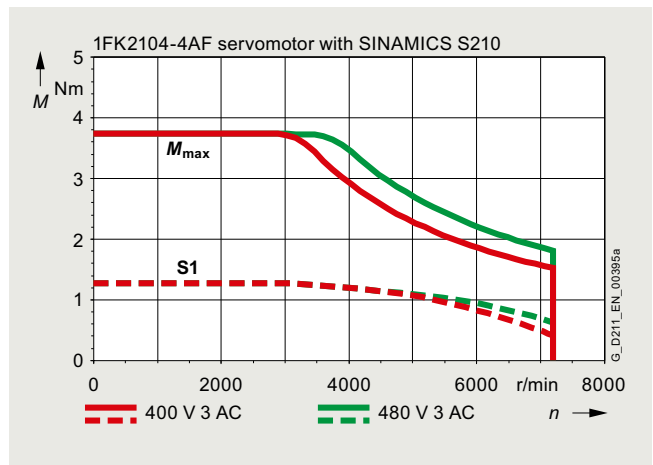
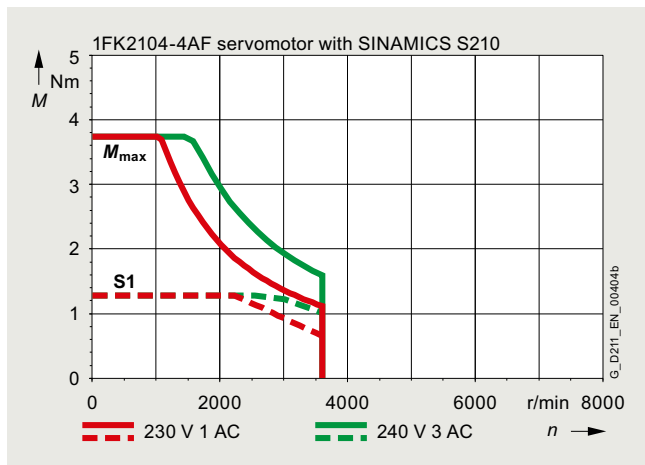
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

##### High Dynamic

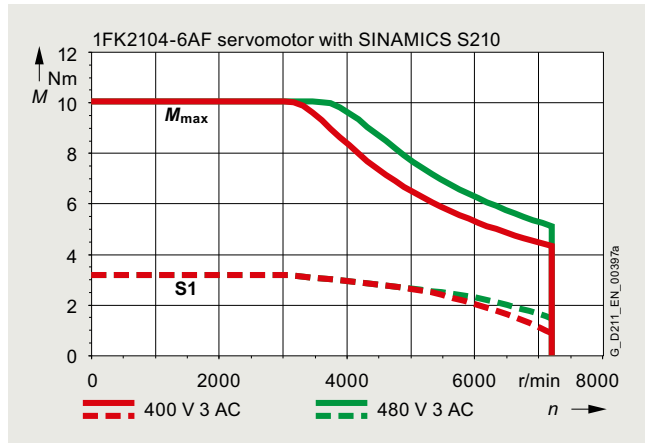
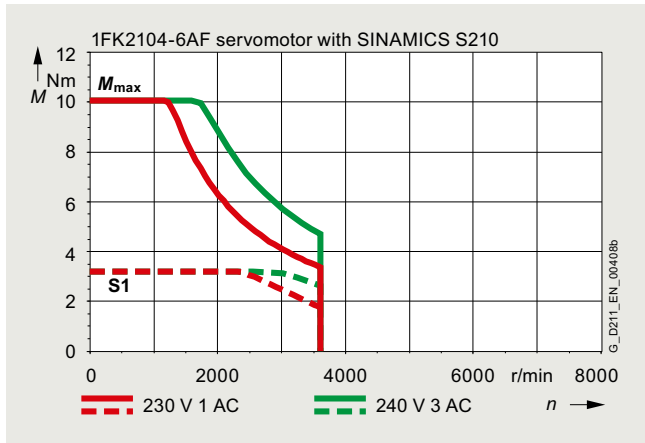
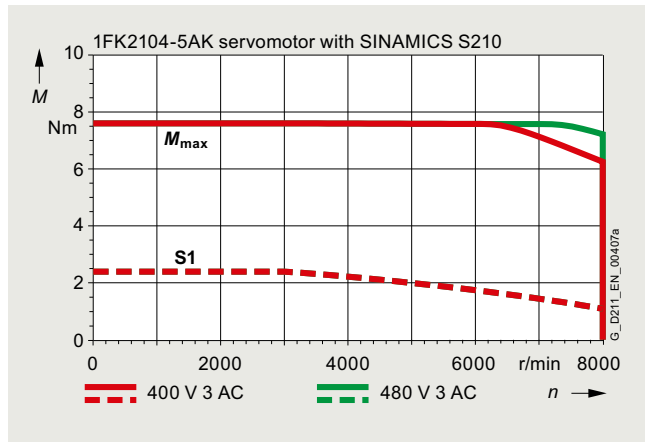
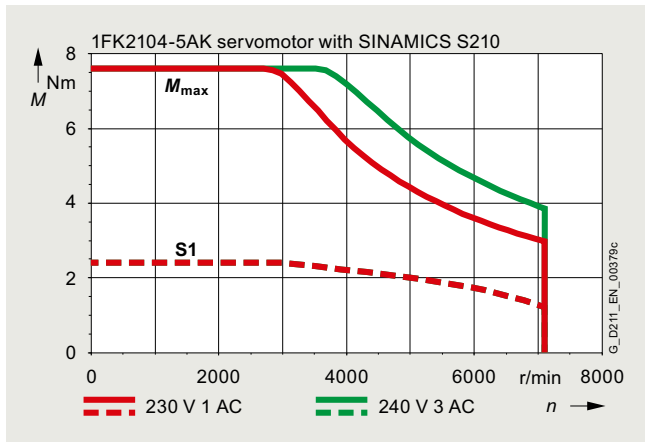
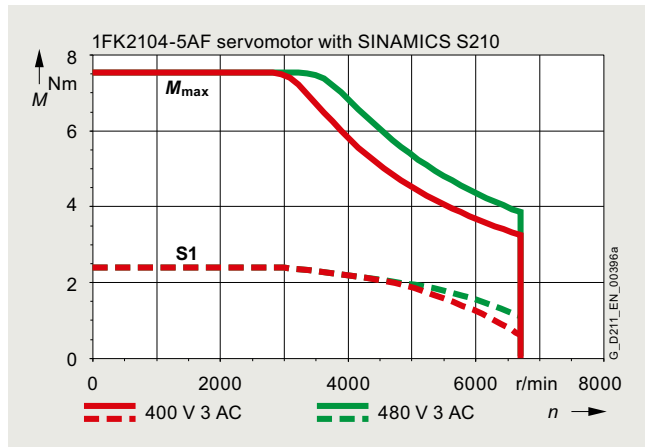
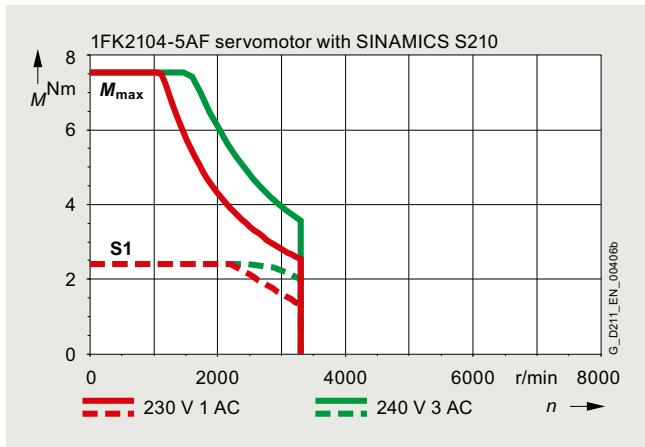




Technical specifications

Speed/torque characteristics (continued)

High Dynamic (continued)



# SIMOTICS S-1FK2 servomotors for SINAMICS S210

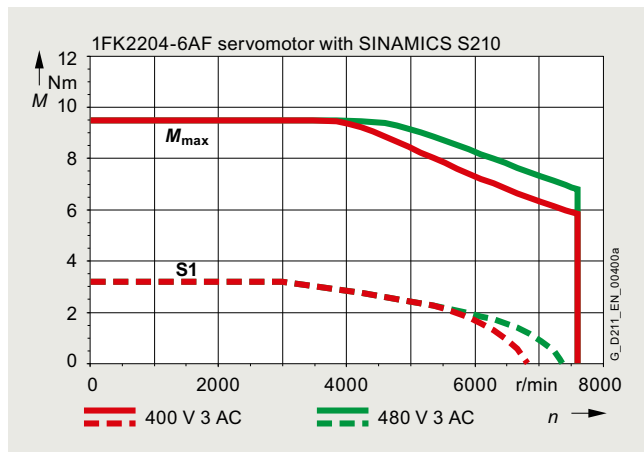
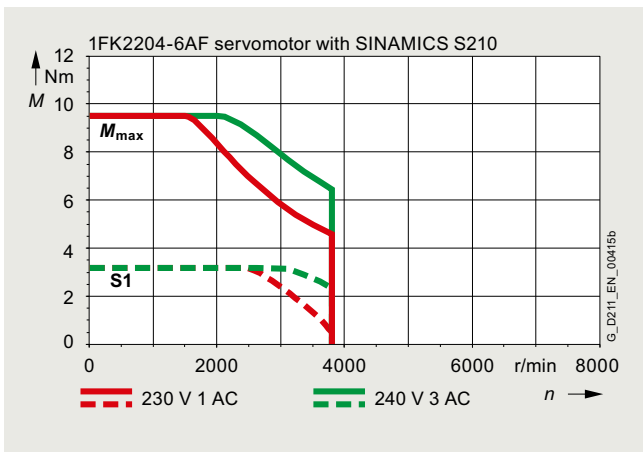
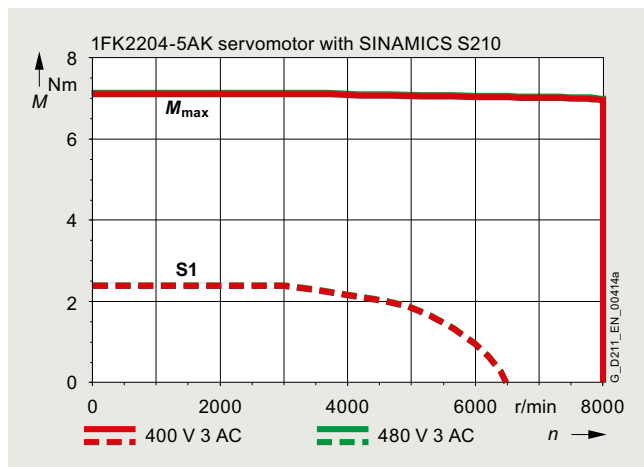
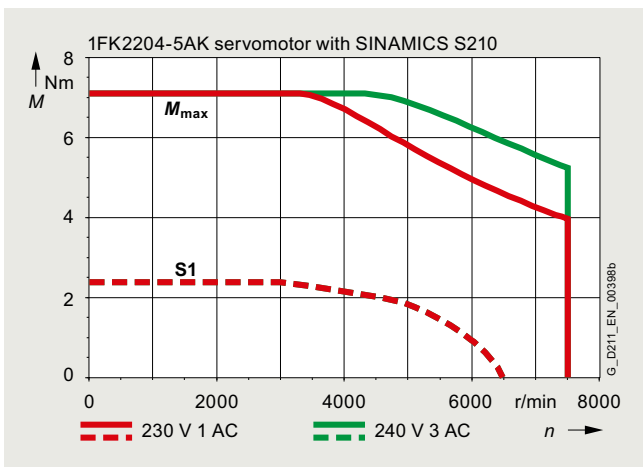
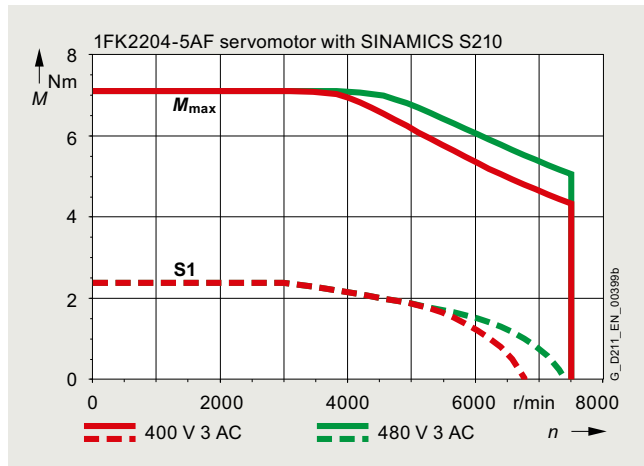
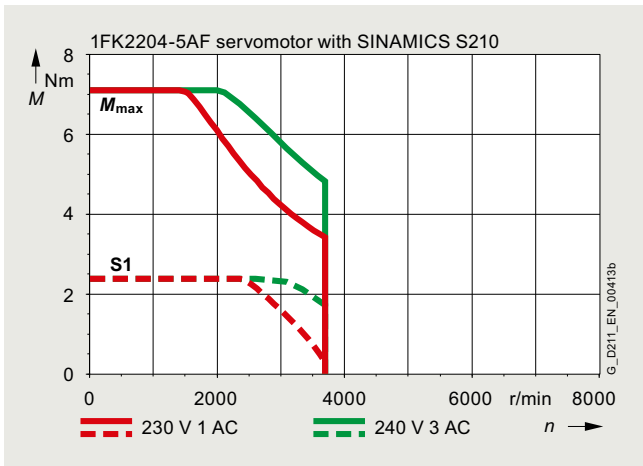
## SIMOTICS S-1FK2 shaft height 40

### Technical specifications

#### Speed/torque characteristics (continued)

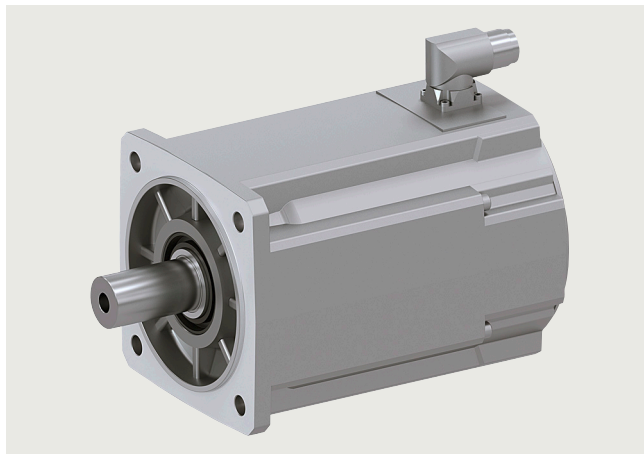
Compact

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## Technical specifications

### SIMOTICS S-1FK2 shaft height 48



#### Specific technical specifications

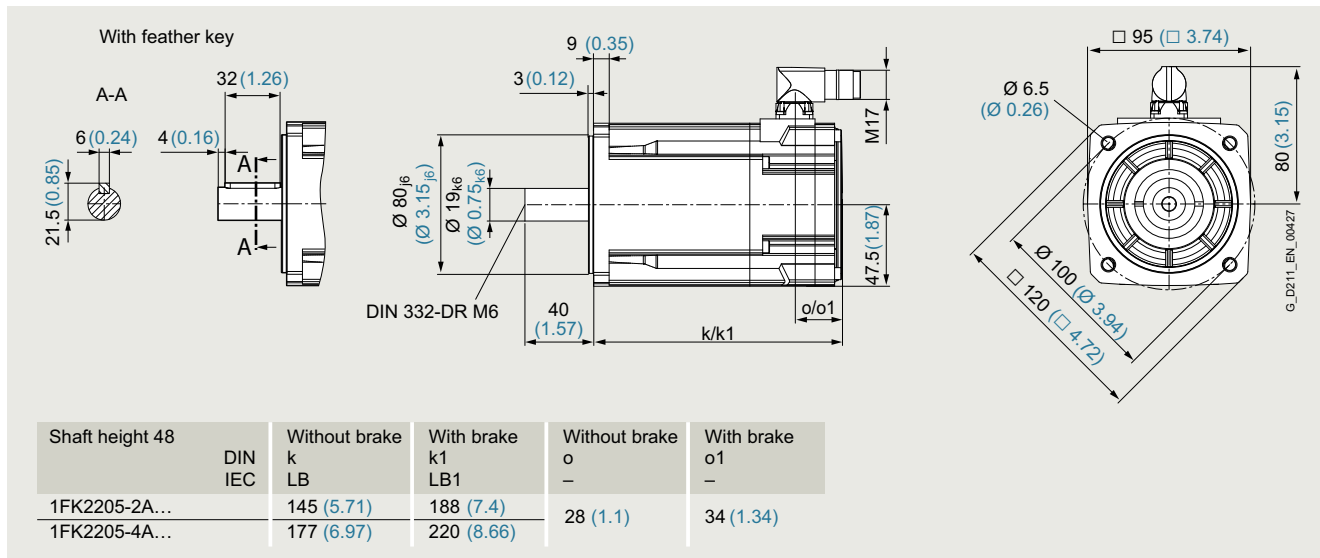
SIMOTICS S-1FK2 servomotors		Compact	
Shaft height 48		1FK2205-2AF	1FK2205-4AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	3.6 (2.66)	6 (4.43)
Stall current $I_0$	A	2.9	4.7
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	10.8 (7.97)	18 (13.28)
Maximum current $I_{max}$	A	9.5	15.1
Maximum speed $n_{max}$	r/min	6000	6000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	3.2 (1.093)	5.1 (1.743)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	4.0 (1.367)	6.0 (2.050)
Weight $m_{Mot}$	kg (lb)	3.75 (8.27)	5.2 (11.47)
Weight (with brake) $m_{Mot Br}$	kg (lb)	4.75 (10.47)	6.2 (13.67)
<b>200 ... 240 V 1 AC / 3 AC</b>			
Rated speed $n_N$	r/min	1500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	3.4 (2.51)	5.5 (4.06)
Rated current $I_N$	A	2.8	4.35
Rated power $P_N$	W	530	860
<b>380 ... 480 V 3 AC</b>			
Rated speed $n_N$	r/min	3000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	3 (2.21)	4.6 (3.39)
Rated current $I_N$	A	2.5	3.75
Rated power $P_N$	W	940	1450
Suitable for SINAMICS S210 servo converters			
• 200 ... 240 V 1 AC		6SL3210-5HB10-8UF0	–
• 200 ... 240 V 3 AC		6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0
• 380 ... 480 V 3 AC		6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0
Suitable for SINAMICS S210 servo converters (New)			
• 200 ... 240 V 1 AC		6SL5310-1BB10-8CF0	–
• 200 ... 240 V 3 AC		6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0
• 380 ... 480 V 3 AC		6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 48

### Technical specifications

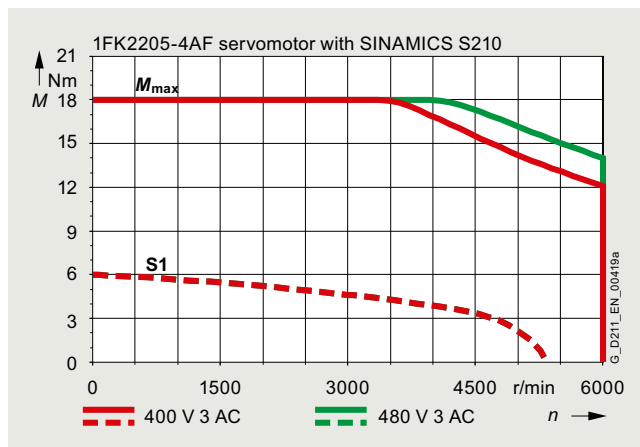
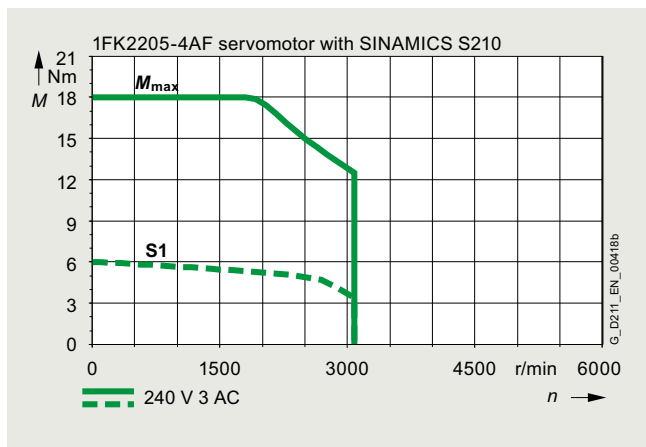
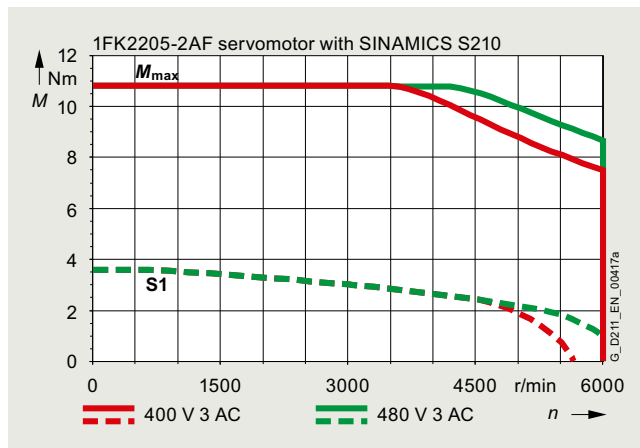
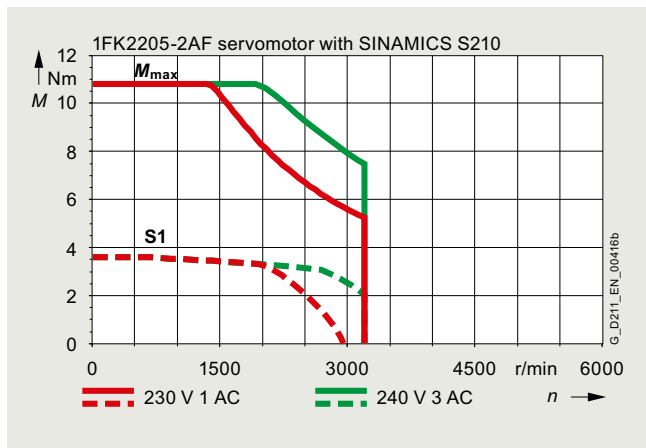
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

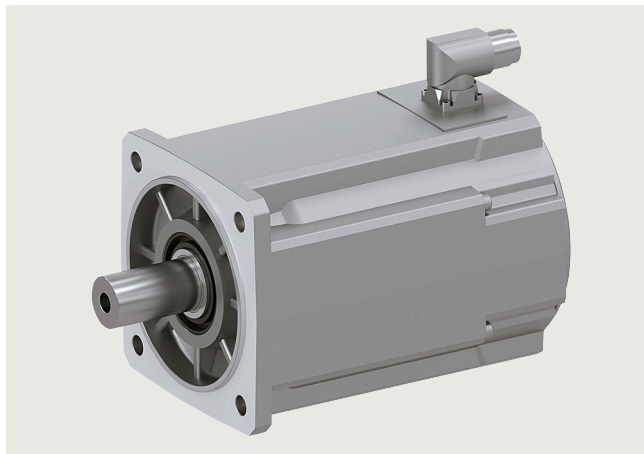
#### Speed/torque characteristics

##### Compact



## Technical specifications

### SIMOTICS S-1FK2 shaft height 52



#### Specific technical specifications

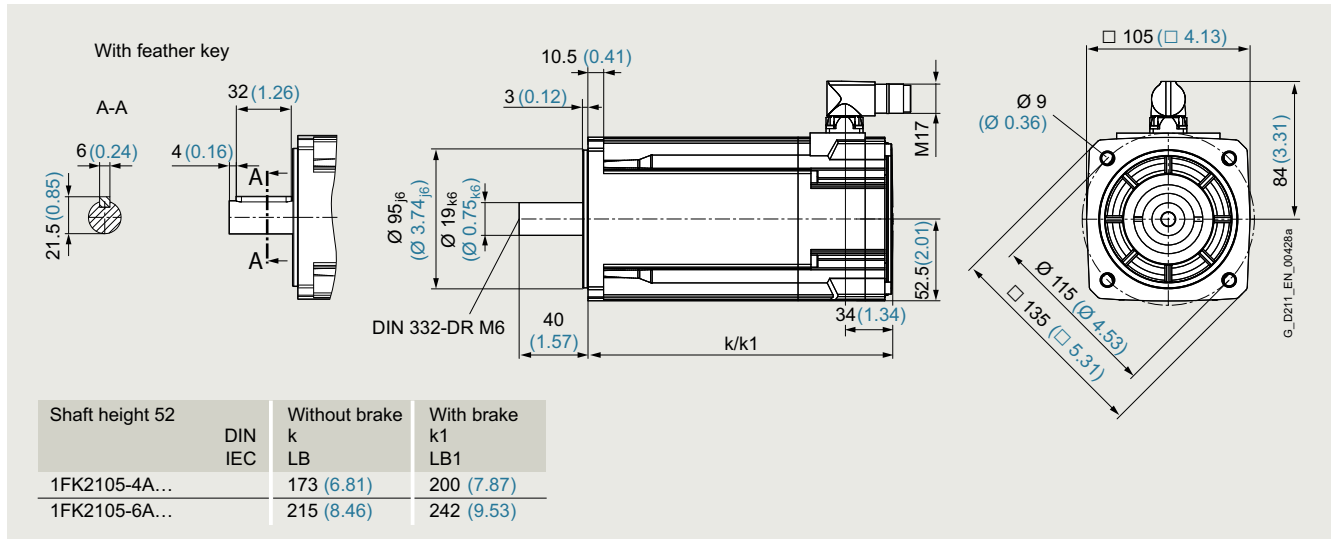
SIMOTICS S-1FK2 servomotors		High Dynamic	
Shaft height 52		1FK2105-4AF	1FK2105-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	5 (3.69)	8 (5.90)
Stall current $I_0$	A	4.65	6.7
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	15 (11.06)	24 (17.70)
Maximum current $I_{max}$	A	18	24
Maximum speed $n_{max}$	r/min	6000	6000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	1.7 (0.581)	2.7 (0.923)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	2.6 (0.888)	3.5 (1.196)
Weight $m_{Mot}$	kg (lb)	5.6 (12.35)	7.7 (16.98)
Weight (with brake) $m_{Mot Br}$	kg (lb)	6.6 (14.55)	8.7 (19.18)
<b>200 ... 240 V 3 AC</b>			
Rated speed $n_N$	r/min	1500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	5 (3.69)	8 (5.90)
Rated current $I_N$	A	4.65	6.7
Rated power $P_N$	W	790	1260
<b>380 ... 480 V 3 AC</b>			
Rated speed $n_N$	r/min	3000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	4.6 (3.39)	6.6 (4.87)
Rated current $I_N$	A	4.35	5.6
Rated power $P_N$	W	1450	2100
Suitable for SINAMICS S210 servo converters			
• 200 ... 240 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0
Suitable for SINAMICS S210 servo converters (New)			
• 200 ... 240 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 52

### Technical specifications

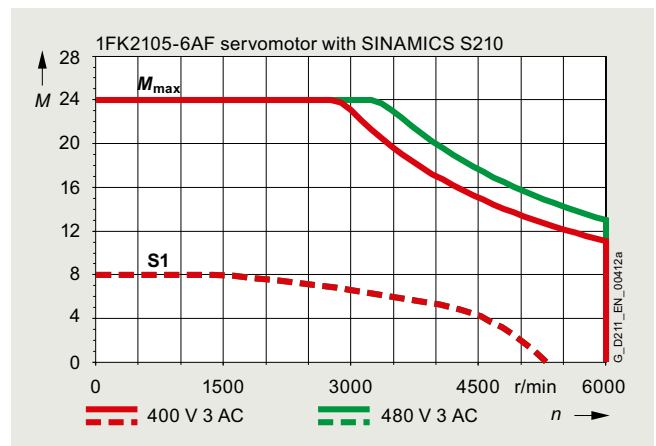
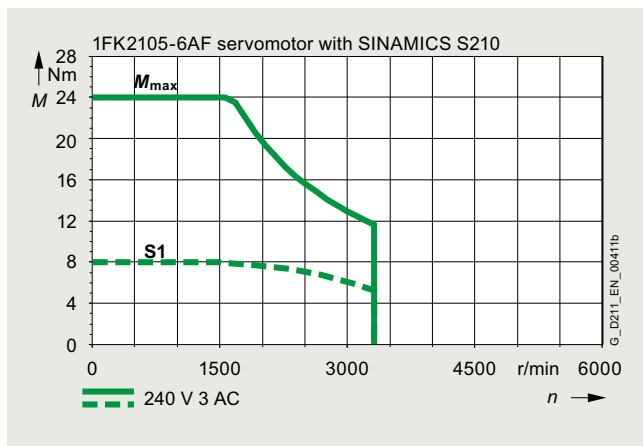
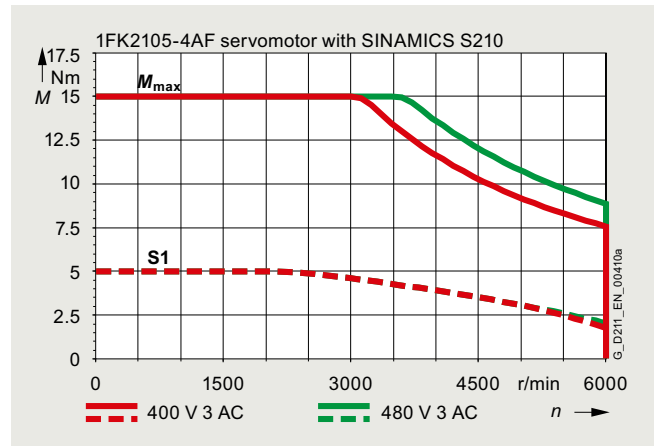
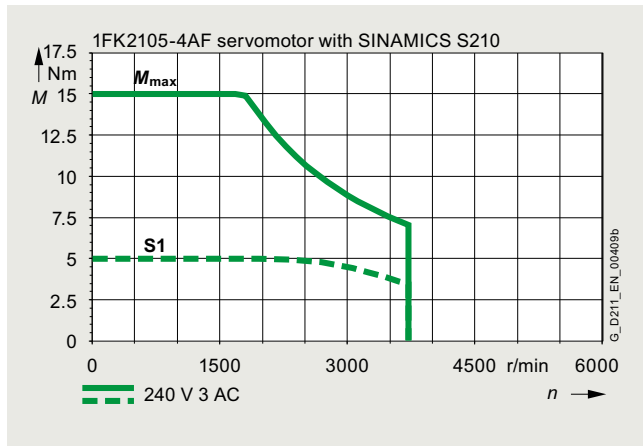
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

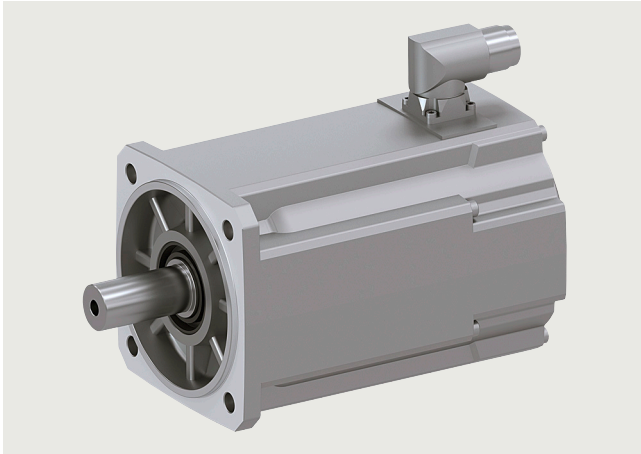
#### Speed/torque characteristics

##### High Dynamic



## Technical specifications

## SIMOTICS S-1FK2 shaft height 63



## Specific technical specifications

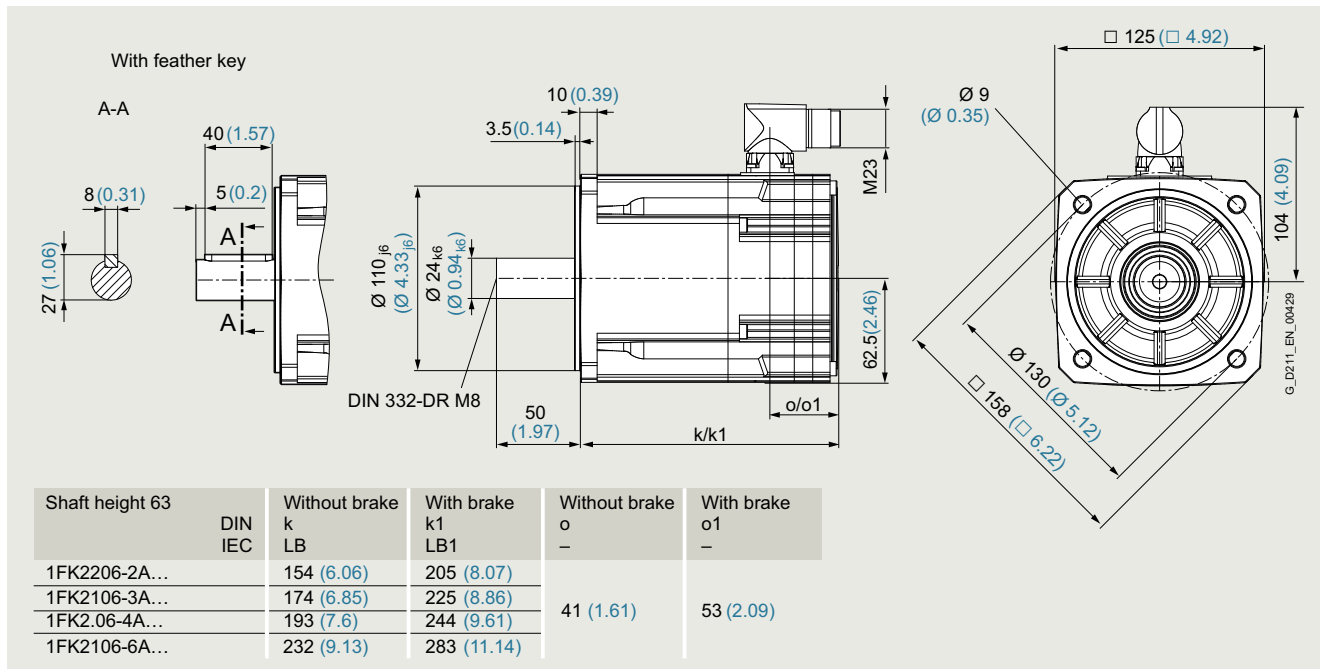
SIMOTICS S-1FK2 servomotors		High Dynamic			Compact	
Shaft height 63		1FK2106-3AF	1FK2106-4AF	1FK2106-6AF	1FK2206-2AF	1FK2206-4AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	9 (6.64)	12 (8.85)	16 (11.80)	6.5 (4.79)	12 (8.85)
Stall current $I_0$	A	9.2	10.7	14.3	5	7.9
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	26 (19.18)	33 (24.34)	45.5 (33.56)	18 (13.28)	36 (26.55)
Maximum current $I_{max}$	A	43	42	49	17.8	29.5
Maximum speed $n_{max}$	r/min	6000	6000	6000	6000	5800
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	4.6 (1.572)	6.0 (2.050)	8.7 (2.973)	7.8 (2.665)	15 (5.126)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	6.3 (2.153)	7.6 (2.597)	10 (3.417)	9.4 (3.212)	17 (5.809)
Weight $m_{Mot}$	kg (lb)	7.4 (16.32)	9 (19.85)	11.8 (26.02)	6.3 (13.89)	8.9 (19.62)
Weight (with brake) $m_{Mot Br}$	kg (lb)	9 (19.85)	10.6 (23.37)	13.4 (29.55)	7.9 (17.42)	10.6 (23.37)
<b>200 ... 240 V 3 AC</b>						
Rated speed $n_N$	r/min	1500	1500	1500	1500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	8.3 (6.12)	10.5 (7.74)	13.8 (10.18)	6.1 (4.50)	10.9 (8.04)
Rated current $I_N$	A	8.7	9.6	12.5	4.8	7.3
Rated power $P_N$	W	1300	1640	2150	970	1720
<b>380 ... 480 V 3 AC</b>						
Rated speed $n_N$	r/min	3000	3000	3000	3000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	7.3 (5.38)	8.6 (6.34)	10.6 (7.82)	5.4 (3.98)	9.1 (6.71)
Rated current $I_N$	A	7.9	8.1	9.7	4.35	6.2
Rated power $P_N$	W	2300	2700	3300	1710	2850
Suitable for SINAMICS S210 servo converters						
• 200 ... 240 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0
• 380 ... 480 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0
Suitable for SINAMICS S210 servo converters (New)						
• 200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0
• 380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 63

### Technical specifications

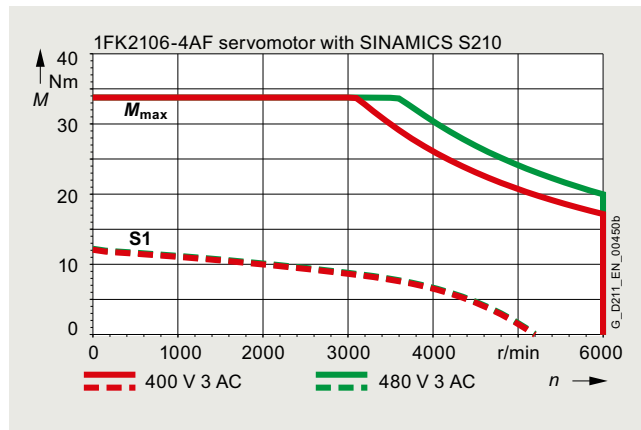
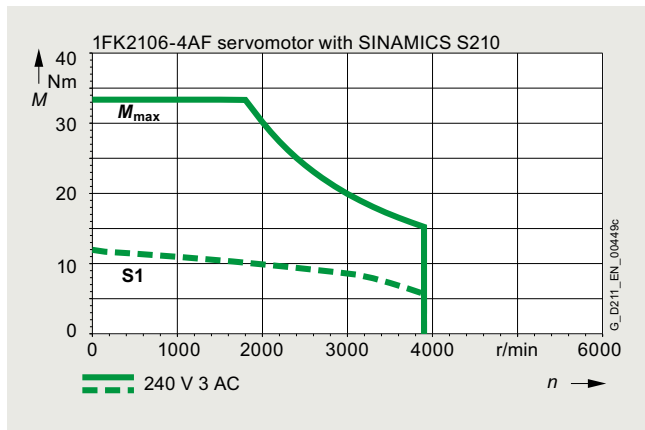
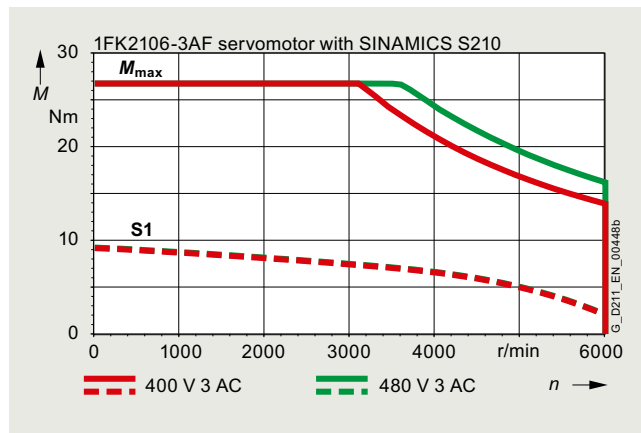
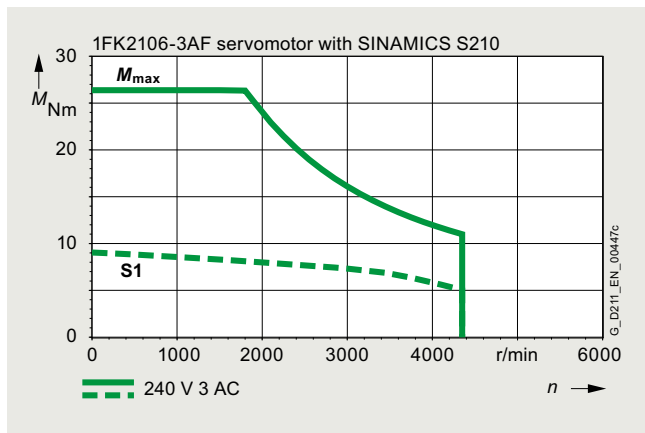
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

##### High Dynamic

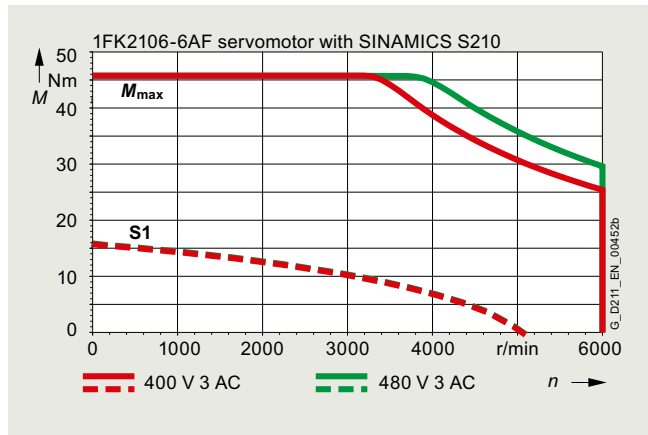
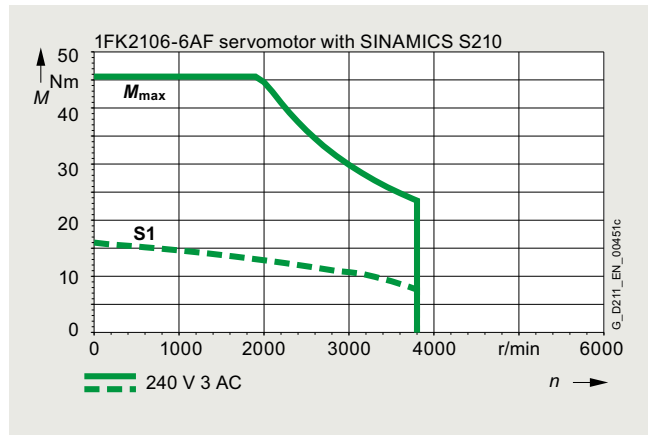




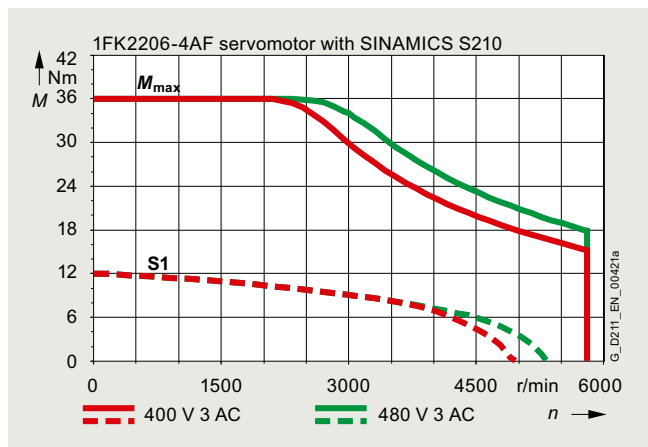
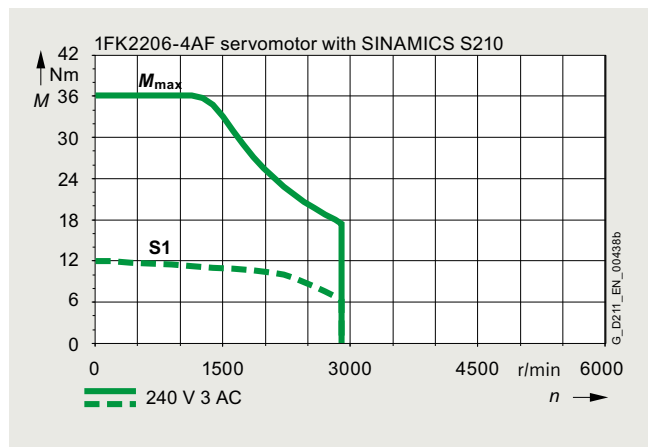
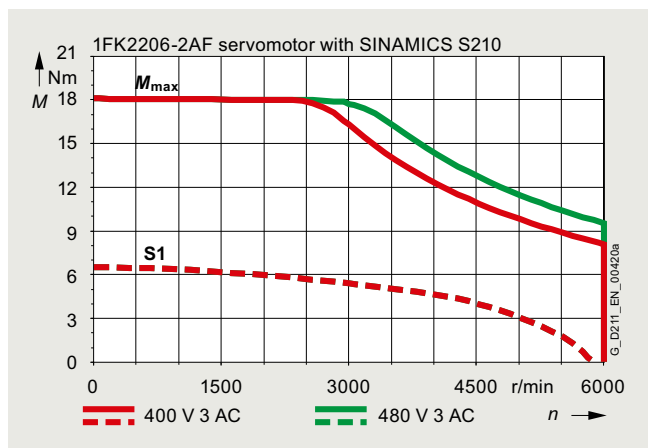
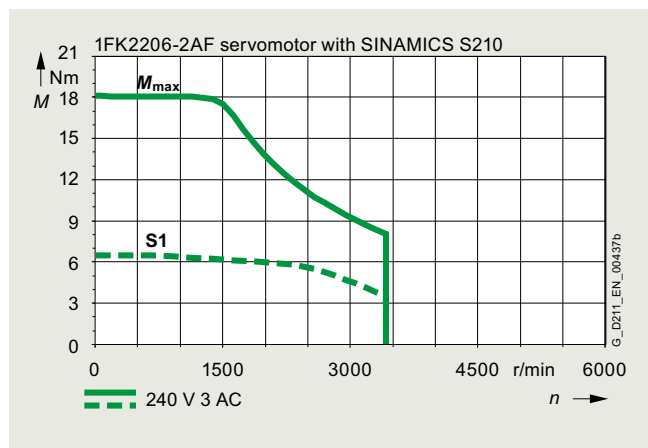
Technical specifications

Speed/torque characteristics (continued)

High Dynamic (continued)



Compact

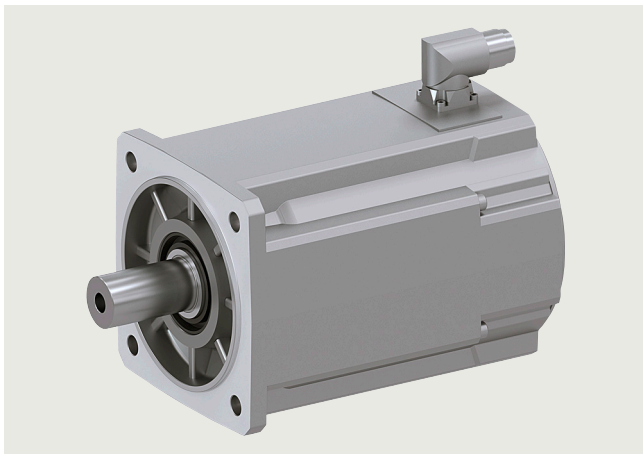


## SIMOTICS S-1FK2 servomotors for SINAMICS S210

### SIMOTICS S-1FK2 shaft height 80

#### Technical specifications

##### SIMOTICS S-1FK2 shaft height 80

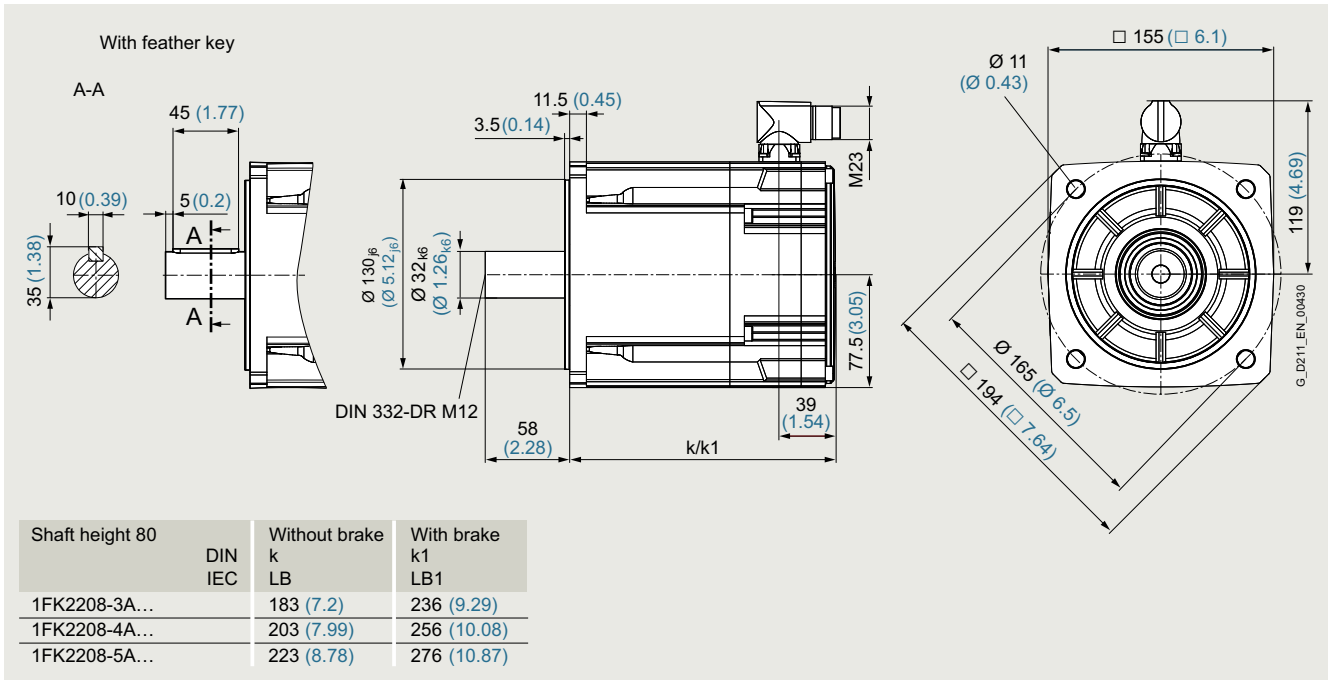


#### Specific technical specifications

SIMOTICS S-1FK2 servomotors		Compact		
Shaft height 80		1FK2208-3AC	1FK2208-4AC	1FK2208-5AC
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	18 (13.28)	22 (16.23)	27 (19.92)
Stall current $I_0$	A	8.4	11.7	14.6
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	51 (37.62)	66 (48.68)	80 (59.01)
Maximum current $I_{max}$	A	29.5	43.5	51.5
Maximum speed $n_{max}$	r/min	4100	4600	4700
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	30 (10.251)	39 (13.326)	48 (16.402)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	33 (11.276)	44 (15.035)	54 (18.452)
Weight $m_{Mot}$	kg (lb)	12.6 (27.78)	14.6 (32.19)	16.6 (36.60)
Weight (with brake) $m_{Mot Br}$	kg (lb)	14.6 (32.19)	17.3 (38.15)	19.3 (42.56)
<b>200 ... 240 V 3 AC</b>				
Rated speed $n_N$	r/min	1000	1000	1000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	16.6 (12.24)	20 (14.75)	23.5 (17.33)
Rated current $I_N$	A	7.9	10.9	13.2
Rated power $P_N$	W	1740	2150	2500
<b>380 ... 480 V 3 AC</b>				
Rated speed $n_N$	r/min	2000	2000	2000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	14.5 (10.70)	17 (12.54)	19.1 (14.09)
Rated current $I_N$	A	7	9.3	10.8
Rated power $P_N$	W	3050	3550	4000
Suitable for SINAMICS S210 servo converters				
• 200 ... 240 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)				
• 200 ... 240 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0

**Technical specifications**

Dimensional drawing



All dimensions in mm (values in brackets are in inches).

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

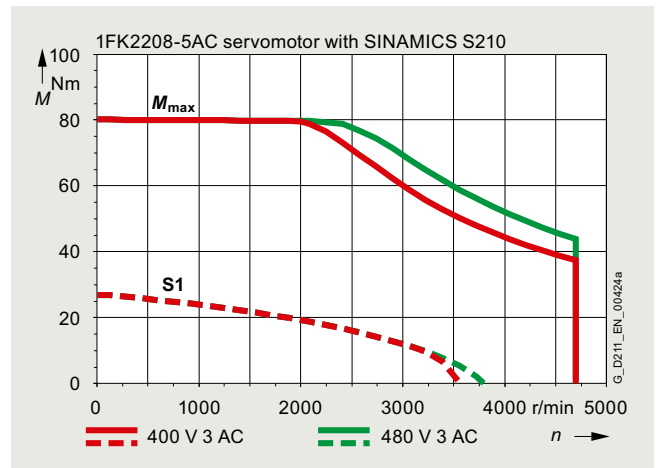
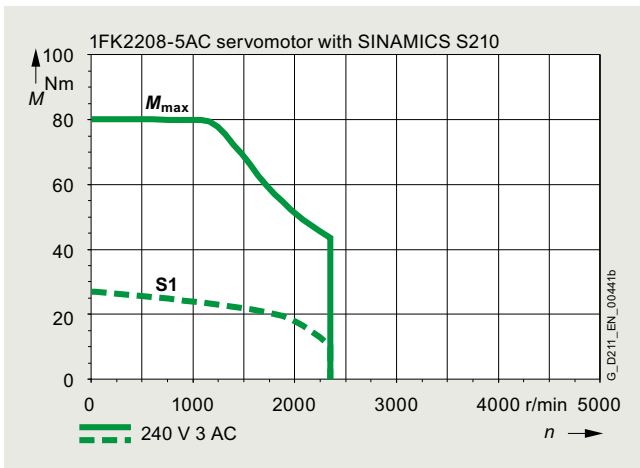
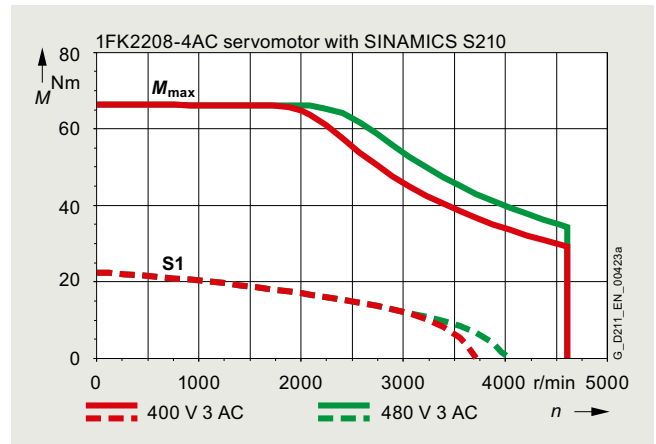
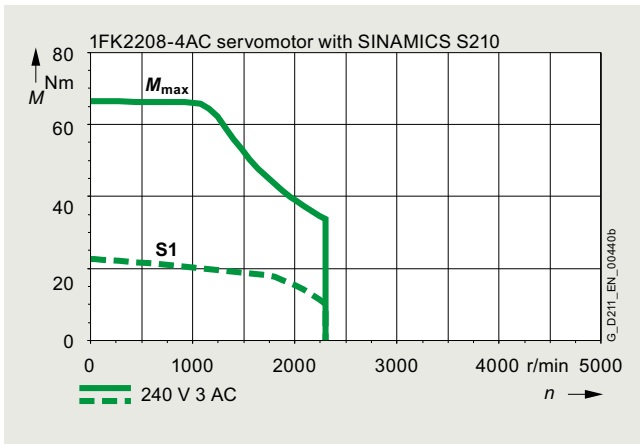
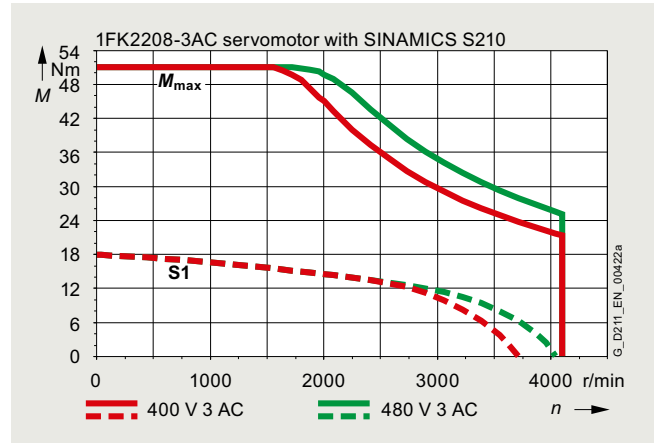
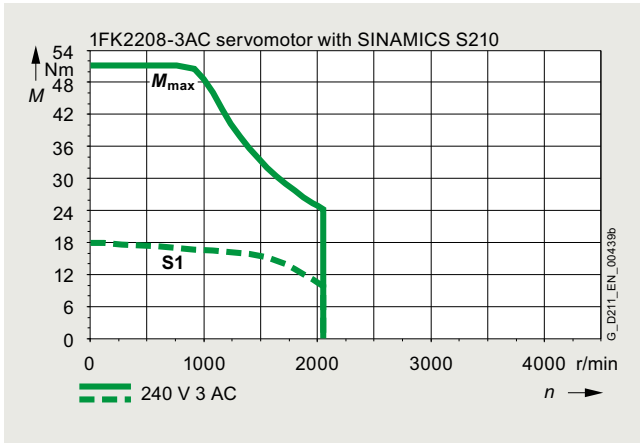
## SIMOTICS S-1FK2 shaft height 80

### Technical specifications

#### Speed/torque characteristics

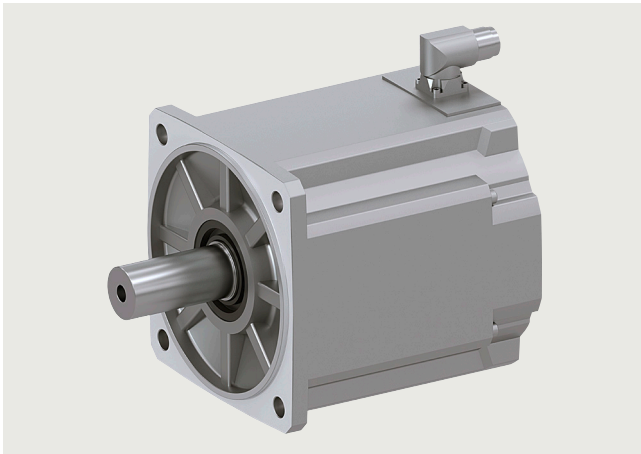
Compact

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## Technical specifications

## SIMOTICS S-1FK2 shaft height 100



## Specific technical specifications

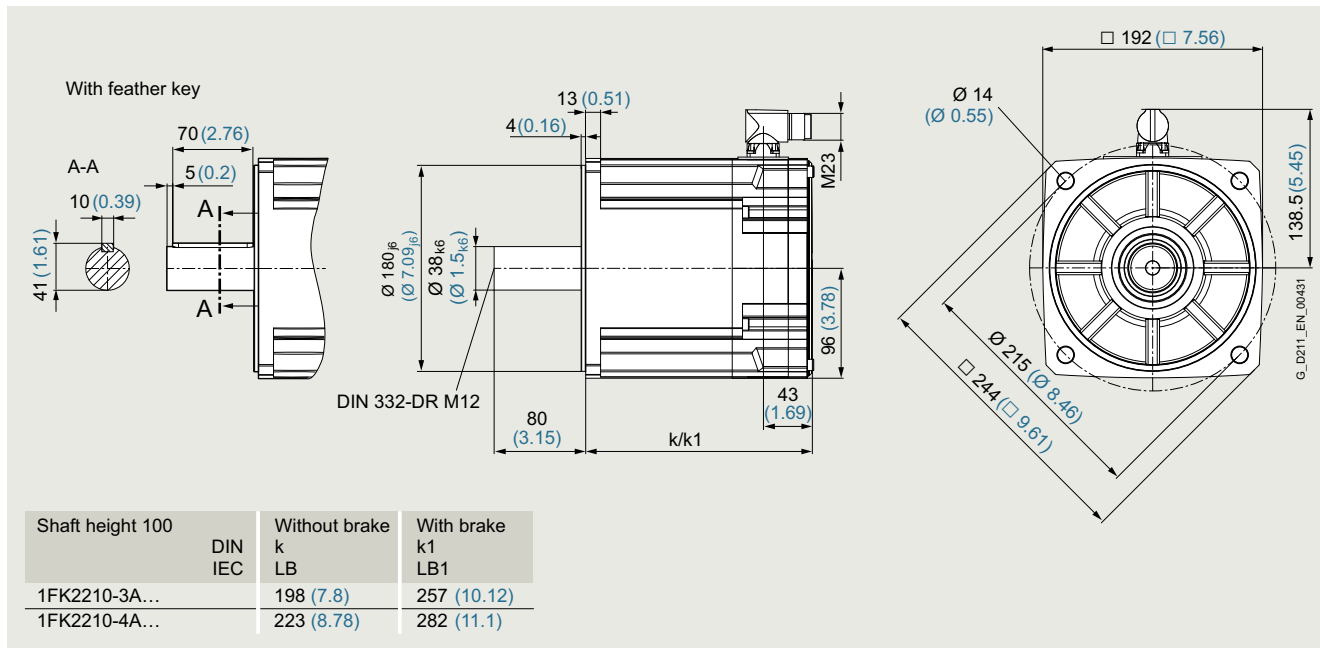
SIMOTICS S-1FK2 servomotors		Compact			
Shaft height 100		1FK2210-3AB	1FK2210-3AC	1FK2210-4AB	1FK2210-4AC
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	30 (22.13)	30 (22.13)	40 (29.50)	40 (29.50)
Stall current $I_0$	A	8.5	15	11.8	15
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	90 (66.38)	90 (66.38)	120 (88.51)	120 (88.51)
Maximum current $I_{max}$	A	31.5	55	43.5	55
Maximum speed $n_{max}$	r/min	2500	4400	2500	3300
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	89 (30.411)	89 (30.411)	120 (41.004)	120 (41.004)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	95 (32.462)	95 (32.462)	130 (44.421)	130 (44.421)
Weight $m_{Mot}$	kg (lb)	22 (48.51)	22 (48.51)	27 (59.54)	27 (59.54)
Weight (with brake) $m_{Mot Br}$	kg (lb)	25 (55.13)	25 (55.13)	31 (68.36)	31 (68.36)
<b>200 ... 240 V 3 AC</b>					
Rated speed $n_N$	r/min	750	1000	750	1000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	30 (22.13)	30 (22.13)	39 (28.77)	37 (27.29)
Rated current $I_N$	A	8.6	15.5	11.6	14.3
Rated power $P_N$	W	2500	3200	3050	3900
<b>380 ... 480 V 3 AC</b>					
Rated speed $n_N$	r/min	1500	2000	1500	2000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	28.5 (21.02)	26 (19.18)	34.5 (25.45)	30.5 (22.50)
Rated current $I_N$	A	8.3	13.5	10.4	11.8
Rated power $P_N$	W	4500	5500	5400	6400
Suitable for SINAMICS S210 servo converters					
• 200 ... 240 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE17-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE17-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)					
• 200 ... 240 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0

# SIMOTICS S-1FK2 servomotors for SINAMICS S210

## SIMOTICS S-1FK2 shaft height 100

### Technical specifications

#### Dimensional drawing

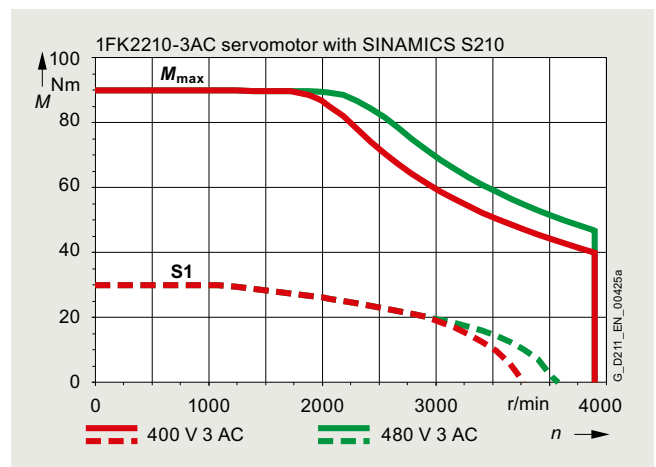
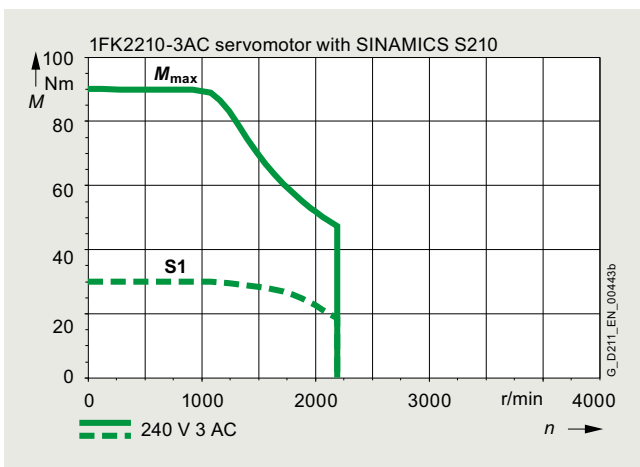
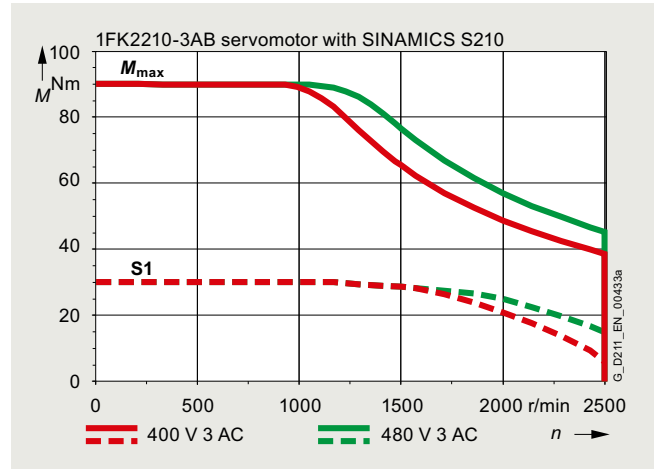
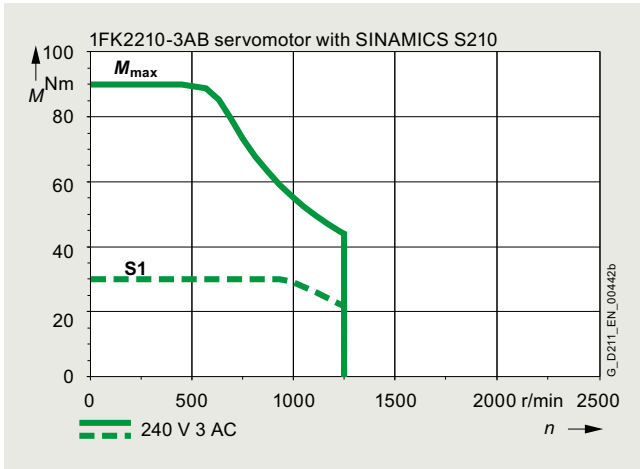


All dimensions in mm (values in brackets are in inches).

Technical specifications

Speed/torque characteristics

Compact



# SIMOTICS S-1FK2 servomotors for SINAMICS S210

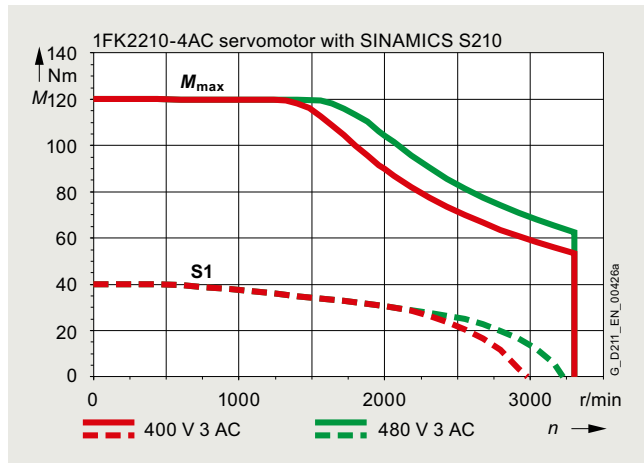
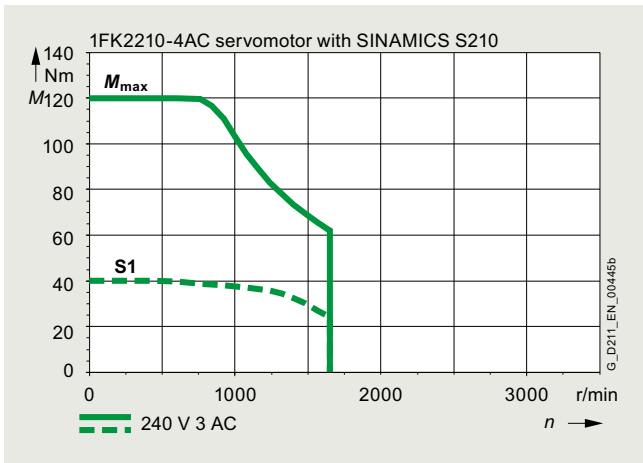
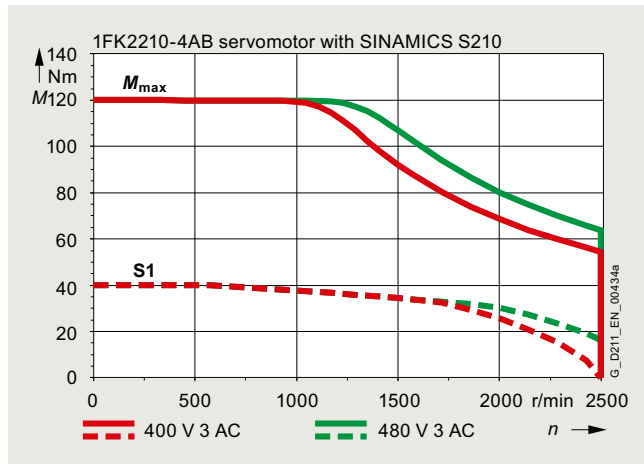
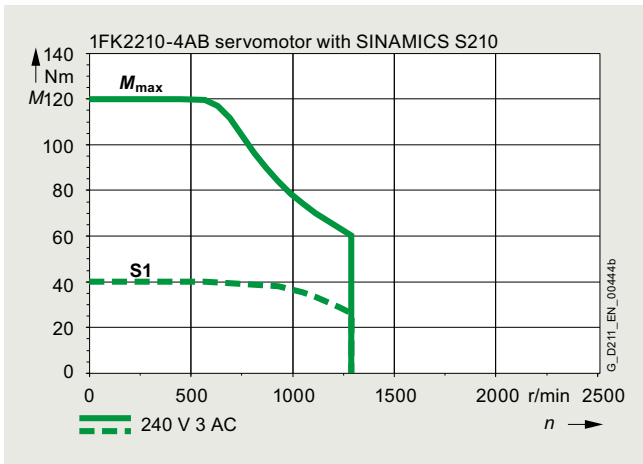
## SIMOTICS S-1FK2 shaft height 100

### Technical specifications

Speed/torque characteristics (continued)

Compact (continued)

3  
1





## SIMOTICS S-1FT2 servomotors for SINAMICS S210



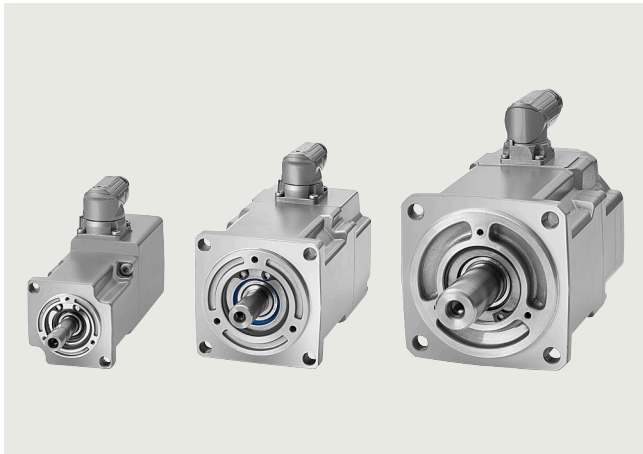
3.2/2	Overview
3.2/2	Benefits
3.2/2	Application
3.2/2	More information
3.2/3	Selection and ordering data
3.2/8	Options
3.2/10	Technical specifications
3.2/10	General technical specifications
3.2/15	Shaft height 20
3.2/17	Shaft height 30
3.2/20	Shaft height 40
3.2/24	Shaft height 48
3.2/27	Shaft height 52
3.2/30	Shaft height 63
3.2/36	Shaft height 80
3.2/44	Shaft height 80 forced ventilation
3.2/49	Shaft height 100

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

### Overview



SIMOTICS S-1FT2 servo motors, natural cooling



SIMOTICS S-1FT2 servo motors, forced ventilation

The SIMOTICS S-1FT2 servomotors are compact and highly dynamic synchronous motors for a wide range of uses in an industrial environment. They are characterized by high power density, degree of protection and overload capability. You can choose between natural cooling or forced ventilation. In the case of natural cooling, the heat loss is dissipated via the surface, while in the case of forced ventilation, an attached fan dissipates the heat loss and significantly increases the continuous performance of the motor.

The 1FT2 servomotors are an extension of the 1FK2 motor portfolio. They are more finely graded in terms of rated speeds, offer additional torque levels and have numerous variations and options. This makes it possible to solve the diverse challenges in the drive technology more precisely. Even more demanding tasks or applications in difficult environments can be mastered with 1FT2 servomotors.

#### **SIMOTICS S-1FT2 High Dynamic motors**

Highest dynamic response through low inertia for highly dynamic applications with low moved masses.

#### **SIMOTICS S-1FT2 Compact motors**

Precise, stable control with medium to high masses to be moved with medium moment of inertia.

### Benefits

The SIMOTICS S-1FT2 servomotors fully exploit their strengths in the system with the SINAMICS S210 converter:

- Short adjustment and positioning times
- Quick and precise compensation of disturbances
- Stable closed loop control with high dynamic response
- Highest flexibility during selection
- More rugged
- Best accuracy

This is achieved by:

- Rapid control cycle
- High pulse frequency
- Complex rule algorithms
- Highest resolution optical encoder
- Low moment of inertia of the motors
- High overload capability

### Application

- Packaging machines
- Handling equipment
- Feed and withdrawal devices
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Woodworking, glass and ceramic industries
- Digital printing machines

### More information

#### **SIMOTICS S-1FT2 servo planetary geared motors**

SIMOTICS S-1FT2 servo motors can optionally be ordered as SIMOTICS S-1FT2 servo planetary geared motors with coaxial gearboxes or right-angle gearboxes – see chapter 3.4.

SIMOTICS S-1FT2 servo planetary geared motors with coaxial gearboxes NRB, NRK, NLC or with right-angle gearboxes NRBW, NRKW, NLCW are highly dynamic, compact and economical drive units. The combinations, each composed of a servomotor with a high-performance coaxial or right-angle planetary gearbox, are suitable for a wide range of applications in an industrial environment.

These planetary geared motors are specified and delivered completely as a unit. All outstanding performance data are matched to the motor-gearbox combination.

#### **More technical information**




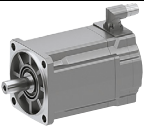
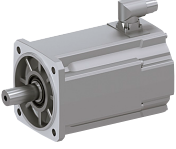
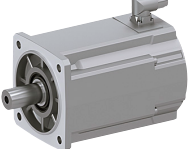
Further documentation, such as the operating instructions, is available free on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Detailed information on the SINAMICS S210 drive system, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions), is available on the internet at:  
[www.siemens.com/sinamics-s210](http://www.siemens.com/sinamics-s210)  
and is also available via the Siemens Product Configurator on the internet.

The Siemens Product Configurator can be found in SiePortal at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Maximum speed $n_{max}$ r/min	Rated speed for 200 ... 240 V 1/3 AC $n_N$ r/min	Rated speed for 380 ... 480 V 3 AC $n_N$ r/min	Rotor moment of inertia $J_{Mot}$ kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	SIMOTICS S-1FT2 servomotor Article No.
<b>High Dynamic for highly dynamic applications</b>							
<b>Shaft height 20</b>							
	0.16 (0.12)	0.56 (0.41)	8000	3000	–	0.025 (0.009)	<b>1FT2102-0AG</b> ■■■ - ■■■ A0
	0.32 (0.24)	1.11 (0.82)	8000	3000	–	0.036 (0.012)	<b>1FT2102-1AG</b> ■■■ - ■■■ A0
<b>Shaft height 30</b>							
	0.64 (0.47)	1.95 (1.44)	8000	3000	–	0.093 (0.032)	<b>1FT2103-2AG</b> ■■■ - ■■■ A0
	0.64 (0.47)	1.95 (1.44)	8000	–	4500	0.093 (0.032)	<b>1FT2103-2AH</b> ■■■ - ■■■ A0
	1.27 (0.94)	4.05 (2.99)	7300	3000	–	0.14 (0.048)	<b>1FT2103-4AG</b> ■■■ - ■■■ A0
	1.27 (0.94)	4.05 (2.99)	8000	–	4500	0.14 (0.048)	<b>1FT2103-4AH</b> ■■■ - ■■■ A0
<b>Shaft height 40</b>							
	1.27 (0.94)	3.75 (2.77)	7200	1500	3000	0.35 (0.120)	<b>1FT2104-4AF</b> ■■■ - ■■■ A0
	1.27 (0.94)	3.85 (2.84)	8000	3000	6000	0.35 (0.120)	<b>1FT2104-4AK</b> ■■■ - ■■■ A0
	2.4 (1.77)	7.5 (5.53)	6700	1500	3000	0.56 (0.191)	<b>1FT2104-5AF</b> ■■■ - ■■■ A0
	2.4 (1.77)	7.6 (5.61)	8000	3000	6000	0.56 (0.191)	<b>1FT2104-5AK</b> ■■■ - ■■■ A0
	3.2 (2.36)	10 (7.38)	7200	1500	3000	0.76 (0.260)	<b>1FT2104-6AF</b> ■■■ - ■■■ A0
<b>Shaft height 52</b>							
	5 (3.69)	15 (11.06)	7400	1500	3000	1.7 (0.581)	<b>1FT2105-4AF</b> ■■■ - ■■■ A0
	5 (3.69)	15 (11.06)	9000	2500	4500	1.7 (0.581)	<b>1FT2105-4AH</b> ■■■ - ■■■ A0
	8 (5.90)	24 (17.70)	6600	1500	3000	2.7 (0.923)	<b>1FT2105-6AF</b> ■■■ - ■■■ A0
<b>Shaft height 63</b>							
	9 (6.64)	26 (19.18)	8000	1500	3000	4.6 (1.572)	<b>1FT2106-3AF</b> ■■■ - ■■■ A0
	12 (8.85)	33 (24.34)	7800	1500	3000	6.0 (2.050)	<b>1FT2106-4AF</b> ■■■ - ■■■ A0
	16 (11.80)	45.5 (33.56)	7600	1500	3000	8.7 (2.973)	<b>1FT2106-6AF</b> ■■■ - ■■■ A0
<b>Shaft height 80</b>							
	25 (18.44)	74 (54.58)	5600	1000	2000	18 (6.151)	<b>NEW</b> <b>1FT2108-4AC</b> ■■■ - ■■■ A0
	30 (22.13)	100 (73.73)	3750	750	1500	22 (7.517)	<b>NEW</b> <b>1FT2108-5AB</b> ■■■ - ■■■ A0
	37.5 (27.66)	118 (87.04)	3550	750	1500	28 (9.568)	<b>NEW</b> <b>1FT2108-7AB</b> ■■■ - ■■■ A0

## Article No. supplements

## Holding brake

Without brake	0
With brake	1
With reinforced brake (only for 1FT2108)	2

## Degree of protection

IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring and spring lock washer) <sup>1)</sup>	2

## Shaft extension, feather key

Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter Ø11 × 23 mm (0.43 × 0.91 in) (only for 1FT2.03 and IP64), Ø14 × 30 mm (0.55 × 1.18 in) (only for 1FT2.04 and IP64)	0 2

## Encoder

Absolute encoder 22-bit singleturn	S
Absolute encoder 22-bit + 12-bit multiturn	M
Absolute encoder 26-bit singleturn	B
Absolute encoder 26-bit + 12-bit multiturn	C

<sup>1)</sup> Not available in shaft height 20.

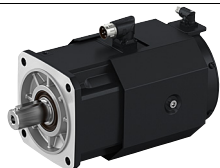
## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Maximum speed $n_{max}$ r/min	Rated speed for 200 ... 240 V 1/3 AC $n_N$ r/min	Rated speed for 380 ... 480 V 3 AC $n_N$ r/min	Rotor moment of inertia $J_{Mot}$ kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	<b>SIMOTICS S-1FT2 servomotor</b> Article No.
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## High Dynamic for highly dynamic applications – forced ventilation

## Shaft height 80



40 (29.50)	100 (73.73)	3700	750	1500	22 (7.517)	<b>NEW</b>	<b>1FT2108-5SB- - -A0</b>
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## Article No. supplements

## Holding brake

Without brake	0
With brake	1
With reinforced brake (only for 1FT2108)	2

## Degree of protection

IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring and spring lock washer) <sup>1)</sup>	2

## Shaft extension, feather key

Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter $\varnothing 11 \times 23$ mm (0.43 $\times$ 0.91 in) (only for 1FT2.03 and IP64), $\varnothing 14 \times 30$ mm (0.55 $\times$ 1.18 in) (only for 1FT2.04 and IP64)	0 2







## Encoder

Absolute encoder 22-bit singleturn	<b>S</b>
Absolute encoder 22-bit + 12-bit multiturn	<b>M</b>
Absolute encoder 26-bit singleturn	<b>B</b>
Absolute encoder 26-bit + 12-bit multiturn	<b>C</b>

<sup>1)</sup> Not available in shaft height 20.

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Maximum speed $n_{max}$ r/min	Rated speed for 200 ... 240 V 1/3 AC $n_N$ r/min	Rated speed for 380 ... 480 V 3 AC $n_N$ r/min	Rotor moment of inertia $J_{Mot}$ kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	SIMOTICS S-1FT2 servomotor Article No.
<b>Compact for high precision applications</b>							
<b>Shaft height 30</b>							
	0.64 (0.47)	1.85 (1.36)	8000	3000	–	0.20 (0.068)	1FT2203-2AG ■■■ ■■■ A0
	0.64 (0.47)	1.85 (1.36)	8000	–	6000	0.20 (0.068)	1FT2203-2AK ■■■ ■■■ A0
	1.27 (0.94)	3.75 (2.77)	7800	3000	–	0.35 (0.120)	1FT2203-4AG ■■■ ■■■ A0
	1.27 (0.94)	3.75 (2.77)	8000	–	6000	0.35 (0.120)	1FT2203-4AK ■■■ ■■■ A0
<b>Shaft height 40</b>							
	2.4 (1.77)	7.1 (5.24)	7500	1500	3000	1.2 (0.410)	1FT2204-5AF ■■■ ■■■ A0
	2.4 (1.77)	7.1 (5.24)	8000	3000	6000	1.2 (0.410)	1FT2204-5AK ■■■ ■■■ A0
	3.2 (2.36)	9.5 (7.01)	7600	1500	3000	1.6 (0.547)	1FT2204-6AF ■■■ ■■■ A0
<b>Shaft height 48</b>							
	3.6 (2.66)	10.8 (7.97)	4850	1000	2000	3.2 (1.093)	1FT2205-2AC ■■■ ■■■ A0
	3.6 (2.66)	10.8 (7.97)	6500	1500	3000	3.2 (1.093)	1FT2205-2AF ■■■ ■■■ A0
	3.6 (2.66)	10.8 (7.97)	8300	2500	4500	3.2 (1.093)	1FT2205-2AH ■■■ ■■■ A0
	6 (4.43)	18 (13.28)	6200	1500	3000	5.1 (1.743)	1FT2205-4AF ■■■ ■■■ A0
<b>Shaft height 63</b>							
	6 (4.43)	18 (13.28)	4300	1000	2000	7.8 (2.665)	1FT2206-2AC ■■■ ■■■ A0
	6.5 (4.79)	18 (13.28)	6800	1500	3000	7.8 (2.665)	1FT2206-2AF ■■■ ■■■ A0
	6.5 (4.79)	18 (13.28)	8000	2500	4500	7.8 (2.665)	1FT2206-2AH ■■■ ■■■ A0
	9 (6.64)	27 (19.92)	3300	750	1500	12 (4.100)	1FT2206-3AB ■■■ ■■■ A0
	9 (6.64)	27 (19.92)	5700	1500	3000	12 (4.100)	1FT2206-3AF ■■■ ■■■ A0
	12 (8.85)	38 (28.03)	3300	1000	2000	15 (5.126)	1FT2206-4AC ■■■ ■■■ A0
	12 (8.85)	36 (26.55)	5800	1500	3000	15 (5.126)	1FT2206-4AF ■■■ ■■■ A0
	12 (8.85)	36 (26.55)	8000	2500	4500	15 (5.126)	1FT2206-4AH ■■■ ■■■ A0
<b>Shaft height 80</b>							
	12.5 (9.22)	38 (28.03)	6000	1500	3000	23 (7.859)	1FT2208-2AF ■■■ ■■■ A0
	18 (13.28)	51 (37.62)	3000	750	1500	30 (10.251)	1FT2208-3AB ■■■ ■■■ A0
	18 (13.28)	51 (37.62)	4100	1000	2000	30 (10.251)	1FT2208-3AC ■■■ ■■■ A0
	18 (13.28)	51 (37.62)	5600	1500	3000	30 (10.251)	1FT2208-3AF ■■■ ■■■ A0
	22 (16.23)	66 (48.68)	3000	750	1500	39 (13.326)	1FT2208-4AB ■■■ ■■■ A0
	22 (16.23)	66 (48.68)	4600	1000	2000	39 (13.326)	1FT2208-4AC ■■■ ■■■ A0
	22 (16.23)	66 (48.68)	5900	1500	3000	39 (13.326)	1FT2208-4AF ■■■ ■■■ A0
	27 (19.92)	80 (59.01)	3000	750	1500	48 (16.402)	1FT2208-5AB ■■■ ■■■ A0
	27 (19.92)	80 (59.01)	4700	1000	2000	48 (16.402)	1FT2208-5AC ■■■ ■■■ A0
	<b>Shaft height 100</b>						
	20 (14.75)	60 (44.26)	4050	1000	2000	62 (21.185)	1FT2210-2AC ■■■ ■■■ A0
	20 (14.75)	60 (44.26)	5000	1500	3000	62 (21.185)	1FT2210-2AF ■■■ ■■■ A0
	30 (22.13)	90 (66.38)	2500	750	1500	89 (30.411)	1FT2210-3AB ■■■ ■■■ A0
	30 (22.13)	90 (66.38)	4400	1000	2000	89 (30.411)	1FT2210-3AC ■■■ ■■■ A0
	40 (29.50)	120 (88.51)	2500	750	1500	120 (41.004)	1FT2210-4AB ■■■ ■■■ A0
	40 (29.50)	120 (88.51)	3300	1000	2000	120 (41.004)	1FT2210-4AC ■■■ ■■■ A0
	50 (36.88)	150 (110.64)	2850	750	1500	150 (51.255)	1FT2210-5AB ■■■ ■■■ A0

## Article No. supplements

## Holding brake

Without brake

0

With brake

1

With reinforced brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)

2

## Degree of protection

IP64 (without shaft sealing ring)

0

IP65 (with shaft sealing ring)

1

IP67 (with shaft sealing ring and spring lock washer)

2

## Shaft extension, feather key

Plain shaft

0

Shaft with feather key

1

Plain shaft, reduced shaft diameter  $\varnothing 11 \times 23$  mm (0.43 × 0.91 in) (only for 1FT2.03 and IP64),  $\varnothing 14 \times 30$  mm (0.55 × 1.18 in) (only for 1FT2.04 and IP64)

0 2

## Encoder

Absolute encoder 22-bit singleturn

S

Absolute encoder 22-bit + 12-bit multiturn

M

Absolute encoder 26-bit singleturn

B

Absolute encoder 26-bit + 12-bit multiturn

C

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque $M_0$ Nm (lb <sub>f</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>f</sub> -ft)	Maximum speed $n_{max}$ r/min	Rated speed for 200 ... 240 V 1/3 AC $n_N$ r/min	Rated speed for 380 ... 480 V 3 AC $n_N$ r/min	Rotor moment of inertia $J_{Mot}$ kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	SIMOTICS S-1FT2 servomotor Article No.
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## Compact for high precision applications

## Achshöhe 80



22 (16.23)	51 (37.62)	3350	750	1500	30 (10.251)	<b>NEW</b>	1FT2208-3SB-■-■A0
22 (16.23)	51 (37.62)	4500	1000	2000	30 (10.251)	<b>NEW</b>	1FT2208-3SC-■-■A0
22 (16.23)	51 (37.62)	6000	1500	3000	30 (10.251)	<b>NEW</b>	1FT2208-3SF-■-■A0
28 (20.65)	66 (48.68)	3150	750	1500	39 (13.326)	<b>NEW</b>	1FT2208-4SB-■-■A0
28 (20.65)	66 (48.68)	4950	1000	2000	39 (13.326)	<b>NEW</b>	1FT2208-4SC-■-■A0
35 (25.82)	80 (59.01)	2900	750	1500	48 (16.402)	<b>NEW</b>	1FT2208-5SB-■-■A0

## Article No. supplements

## Holding brake

Without brake	0
With brake	1
With reinforced brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)	2

## Degree of protection

IP64 (without shaft sealing ring)	0
IP65 (with shaft sealing ring)	1
IP67 (with shaft sealing ring and spring lock washer)	2

## Shaft extension, feather key

Plain shaft	0
Shaft with feather key	1
Plain shaft, reduced shaft diameter $\varnothing 11 \times 23$ mm (0.43 $\times$ 0.91 in) (only for 1FT2.03 and IP64), $\varnothing 14 \times 30$ mm (0.55 $\times$ 1.18 in) (only for 1FT2.04 and IP64)	0 2

## Encoder

Absolute encoder 22-bit singleturn	S
Absolute encoder 22-bit + 12-bit multiturn	M
Absolute encoder 26-bit singleturn	B
Absolute encoder 26-bit + 12-bit multiturn	C

3  
2

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Selection and ordering data

### Accessories

Description	For motor	Article No.
<b>Shaft sealing ring</b>	1FT2102	<b>1FY2902-0GC00</b>
Degree of protection kit to achieve degree of protection IP65 for mounting on the motor – for retrofitting or as spare part	1FT2.03	<b>1FY2903-0GC00</b>
	1FT2.04	<b>1FY2904-0GC00</b>

### Structure of the Article No. of the SIMOTICS S-1FT2 servomotors

Data position in Article No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	<b>1</b>	<b>F</b>	<b>T</b>	<b>2</b>	■	■	■	-	■	■	■	■	-	■	■	<b>A</b>	■
<b>1st to 4th positions:</b> digit, letter, letter, digit	<b>Motor</b>																
<b>5th position:</b> digit	1	F	T	2	<b>Moment of inertia</b>												
					High Dynamic	1											
					Compact	2											
<b>6th and 7th positions:</b> digit, digit					<b>Shaft height</b>												
					20	1	0	2									
					30	1/2	0	3									
					40	1/2	0	4									
					52	1	0	5									
					48	2	0	5									
					63	1/2	0	6									
					80	1/2	0	8									
					100	2	1	0									
<b>8th position:</b> digit								<b>Overall length</b>									
								See specific technical specifications		0 ... 8							
<b>9th position:</b> letter									<b>Cooling</b>								
									Natural cooling		A						
									Forced ventilation (only for 1FT2108-5, 1FT2208-3, 1FT2208-4, 1FT2208-5)		S						
<b>10th position:</b> letter					<b>Winding/rated speed For converters connected to max. 240 V</b>				<b>For converters connected to max. 480 V</b>								
					750 r/min at 230 V				1500 r/min at 400 V				B				
					1000 r/min at 230 V				2000 r/min at 400 V				C				
					1500 r/min at 230 V				3000 r/min at 400 V				F				
					3000 r/min at 230 V				Not permissible				G				
					2500 r/min at 230 V				4500 r/min at 400 V				H				
					3000 r/min at 230 V				6000 r/min at 400 V				K				
<b>11th position:</b> digit											<b>Brake</b>						
											Without		0				
											Holding brake		1				
											Reinforced holding brake (only for 1FT2108, 1FT2208-2, 1FT2208-3, 1FT2210-2, 1FT2210-3)		2				
<b>12th position:</b> digit												<b>Degree of protection</b>					
												IP64 (without shaft sealing ring)		0			
												IP65 (with shaft sealing ring)		1			
												IP67 (with shaft sealing ring and spring lock washer) – not available in shaft height 20		2			
<b>13th position:</b> digit													<b>Shaft extension, feather key</b>				
													Plain shaft		0		
													Shaft with feather key		1		
													Plain shaft, reduced shaft diameter • Ø11 × 23 mm (0.43 × 0.91 in) (for 1FT2.03 and IP64) • Ø14 × 30 mm (0.55 × 1.18 in) (for 1FT2.04 and IP64)		2		
<b>14th position:</b> letter														<b>Encoder</b>			
														Absolute encoder 22-bit singleturn (AS22DQC)		S	
														Absolute encoder 22-bit + 12-bit multiturn (AM22DQC)		M	
														Absolute encoder 26-bit singleturn (AS26DQC)		B	
														Absolute encoder 26-bit + 12-bit multiturn (AM26DQC)		C	
<b>15th position:</b> letter															<b>One Cable Connection</b>		A
<b>16th position:</b> digit																0	

3  
2

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

### Options

Option	Additional identification code <b>-Z</b> with order code and plain text where applicable 1FT2 . . . - . . . . . - . . . A . - <b>Z</b> Order code
Low temperature -30 °C	<b>Q30</b>
Suitable for dry room environments and certification for clean rooms	<b>Q40</b>
Customer-specific text on rating plate	<b>Y84</b> with plain text
Planetary gearboxes	SIMOTICS S-1FT2 servomotors can optionally be ordered as SIMOTICS S-1FT2 servo planetary geared motors with coaxial gearbox or right-angle gearbox via the corresponding order codes – see chapter 3.4.
Paint finish	
• Without	<b>X00</b>
• Jet black RAL 9005	<b>X01</b>
• Cream white RAL 9001	<b>X02</b>
• Reseda green RAL 6011	<b>X03</b>
• Pebble gray RAL 7032	<b>X04</b>
• Sky blue RAL 5015	<b>X05</b>
• Light ivory RAL 1015	<b>X06</b>
• White aluminum RAL 9006	<b>X08</b>
Resistance	
• Special paint finish with additional primer	<b>K23</b>
• Increased detergent resistance	<b>N16</b>
• Metal rating plate instead of adhesive label	<b>Q31</b>
• Pressure equalization	<b>Q20</b>

Ordering example:

**1FT2104-4AF00-1SA0-Z  
N16+Q31+X03**

#### Low temperature -30 °C – order code **Q30**

The permissible temperature range is defined as -15 °C to +40 °C as standard (without power reduction).

A version of the 1FT2 motors that can handle an extended temperature range down to -30 °C is also available as an option via the order code **Q30**. Typical applications of this version include cold stores.

However, the extended operating temperature range is not available for the following versions:

- Degree of protection IP67
- Motors with gearbox
- Motors with forced ventilation

#### Suitable for dry room conditions and certification for clean rooms – order code **Q40**

The permissible range for relative ambient air humidity is 5 % to 95 % as standard, suitability for use in clean rooms is not certified. The 1FT2 motors can optionally be designed for use in extremely dry environments and with certification for use in clean rooms via order code **Q40**.

The following clean room classes are met according to ISO 156441-14 and have been certified accordingly by the TÜV (German Technical Inspectorate):

- Motors without gearbox, with degree of protection IP64: ISO class 7 or better
- Motors without gearbox, with degree of protection IP65: ISO class 6 or better
- Motors with gearbox NRB(W), NRK(W), or NLC(W): ISO class 7 or better

The corresponding certificates can be viewed here:

<https://support.industry.siemens.com/cs/document/109815586>

These motors feature extended specifications for use in relative air humidity: Operation from a relative humidity level of just 0.3 % (dew point -50 °C at 20 °C ambient air temperature) is permitted.

#### Customer-specific text on the rating plate – order code **Y84** with plain text

A text (maximum of 20 characters), which can be freely selected by the person placing the order, can optionally be printed on the rating plate of the 1FT2 motors. Labels can then, for example, be used for the name of the axis, the installation location or customer-specific spare part numbers. The order is placed with the order code Y84 and the plain text for the desired print.

#### Planetary gearboxes – order codes see chapter 3.4

SIMOTICS S-1FT2 servomotors can optionally be ordered as SIMOTICS S-1FT2 servo planetary geared motors with coaxial gearbox or right-angle gearbox via the corresponding order codes.

SIMOTICS S-1FT2 servo planetary geared motors are highly dynamic, compact, and efficient drive units. The combinations, each comprising a servomotor with a high-performance coaxial or right-angle planetary gearbox, are suitable for a wide range of applications in industrial environments.

These planetary geared motors are specified and supplied as a complete unit. All outstanding performance data are matched to the motor-gearbox combination.

For more information see chapter 3.4 "SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors".



## Options

Paint finish –

order codes **X00 ... X08**

If no specific color or paint finish data are specified when placing the order, the 1FT2 motors are finished in the standard anthracite gray color (RAL 7016). Various special colors are available as options. Special colors are ordered via the order codes **X00 ... X08**.

The paint finish in standard and special colors meets the requirements for environmental conditions of climate class 3K4 according to IEC 60721-3-3, with the exception of the influencing variables "low air temperature", "condensation", and "low air pressure". It satisfies the requirements of corrosivity category C1 according to EN ISO 12944-2.

Special paint finish with additional primer –

order code **K23**

- Additional primer with paint finish in the standard anthracite gray color (RAL 7016).
- Properties same as standard paint finish - in addition, condensation is permitted on the external surfaces of the motor.
- A combination with a special color (order codes **X01 ... X08**) as per the color table is permitted - however, a combination with the order code X00 (no paint finish) is not permitted.

Increased detergent resistance –

order code **N16**

(includes the properties special paint finish with additional primer – order code **K23**)

The 1FT2 motors are available with increased chemical resistance via order code **N16**. These have the following additional properties:

- 4-layer paint system (PS Premium paint system)
- Nickel-plated plug connectors
- Resistant to greases, mineral oils, aliphatic solvents (10 %), caustic soda (10 %)

Systems used in the foodstuff industry are typical applications for these versions. With this option, the motor satisfies the requirements of corrosivity category C4(M) according to EN ISO 12944-2.

Certification in terms of the resistance to common ECOLAB cleaners and disinfectants can be viewed here:

<https://support.industry.siemens.com/cs/document/58657336>

Metal rating plate instead of adhesive label –

order code **Q31**

The rating plate of the motor is designed as an adhesive label as standard. However, a metal rating plate made of aluminum can be ordered instead via order code **Q31**. The labeling is lasered on. This ensures legibility for a long time even under poor environmental conditions.

Pressure equalization –

order code **Q20**

When a motor with degree of protection IP67 cools down following operation, this can lead to underpressure in the motor. This may result in moisture ingress. Moisture ingress of this kind can be prevented by using a defined air supply via a connected pressure equalization tube.

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Technical specifications

### General technical specifications

SIMOTICS S-1FT2 High Dynamic/Compact motors	
<b>Motor type</b>	Permanent-magnet synchronous motor
<b>Permissible operating conditions without derating</b>	
<ul style="list-style-type: none"> <li>Ambient temperature</li> <li>Installation altitude, max.</li> </ul>	-15 ... +40 °C (5 ... 104 °F), optional from -30 °C (-22 °F) 1000 m (3281 ft)
<b>Degree of protection</b> According to EN 60034-5 (IEC 60034-5)	IP64 IP65 optional or retrofittable optional IP67
<b>Cooling</b> According to EN 60034-6	Natural cooling (IC410), forced ventilation
<b>Type of construction</b> According to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
<b>Shaft extension</b> According to DIN 748-3 (IEC 60072-1)	Plain shaft Optional shaft with feather key (half-key balancing)
<b>Shaft and flange accuracy</b> According to DIN 42955 (IEC 60072-1)	Tolerance N In each case for radial eccentricity of the shaft extension, concentricity of the centering ring, and axial eccentricity of the mounting flange to the axis of the shaft extension.
<b>Vibration severity grade</b> According to EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed
<b>Stator winding insulation</b> According to EN 60034-1 (IEC 60034-1)	
<ul style="list-style-type: none"> <li>1FT2102, 1FT2.03</li> <li>1FT2.04, 1FT2.05, 1FT2.06, 1FT2.08, 1FT2210</li> </ul>	Thermal class 130 (B) for a winding overtemperature of $\Delta T = 80$ K  Thermal class 155 (F) for a winding overtemperature of $\Delta T = 100$ K
<b>Sound pressure level <math>L_{pA}</math> (1 m), max.</b> According to ISO 1680	
<u>Natural cooling</u>	
<ul style="list-style-type: none"> <li>1FT2102, 1FT2.03, 1FT2.04</li> <li>1FT2.05 and 1FT2.06</li> <li>1FT22.8 and 1FT2210</li> </ul>	55 dB(A) + 3 dB(A) tolerance 65 dB(A) + 3 dB(A) tolerance 70 dB(A) + 3 dB(A) tolerance
<u>Forced ventilation</u>	
<ul style="list-style-type: none"> <li>1FT2.08</li> </ul>	73 dB(A) + 3 dB(A) tolerance
<b>Encoder system</b>	<ul style="list-style-type: none"> <li>AS22DQC (absolute encoder 22-bit singleturn)</li> <li>AM22DQC (absolute encoder 22-bit + 12-bit multiturn)</li> <li>AS26DQC (absolute encoder 26-bit singleturn)</li> <li>AM26DQC (absolute encoder 26-bit + 12-bit multiturn)</li> </ul>
<b>Holding brake</b>	Optional integrated holding brake
<b>Connection</b>	One Cable Connection (OCC) for signals and power Rotatable connector
<b>Coating color</b>	RAL 7016 (anthracite gray) <a href="#">See Options for more colors</a>
<b>Certificates of suitability</b>	cURus, CE, EAC, CEL

## Technical specifications

### Regulations, standards, specifications

The motors comply with the appropriate standards and regulations, see table below.

As a result of the fact that in many countries the national regulations have been completely harmonized with the international IEC 60034-1 recommendation, there are no longer any differences with respect to coolant temperatures, temperature classes and temperature rise limits.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Cooling methods of rotating electrical machines	IEC 60034-6
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Noise limit values for rotating electrical machines	IEC 60034-9
Cylindrical shaft extensions for electrical machines	DIN 748-3/IEC 60072-1



SIMOTICS S-1FT2 motors have UL approval from Underwriters Laboratories Inc. and are marked with the "UL Recognized Component" test symbol.

This is used for components which are part of a larger product or system. This confirmed compliance with the corresponding US American and Canadian regulations, and allowed access to the North American market.



For SIMOTICS S-1FT2 motors, conformity with the relevant EC directives 2006/95/EC and 2014/35/EU and the relevant standards

EN 60034-1:2010 and EN 60204-1:2006 is confirmed. By applying the CE mark to the product, Siemens AG confirms this for the product, and secures the free movement of goods within the European Union.

### Degree of protection acc. to IEC 60034-5

A suitable degree of protection must be selected according to the operating and environmental conditions to protect the motor against damage caused by the ingress of water and other liquids, as well as dust and foreign bodies.

SIMOTICS S-1FT2 motors have degree of protection IP64 as standard.

The motor can be optionally supplied with a radial shaft seal ring with degree of protection IP65. This increases the protection against the ingress of liquids.

Contrary to degree of protection IP65, degree of protection IP67 has increased protection against jet and splashing water as well as brief immersion. The mounting position of the motor must be chosen so that the stagnant water at the shaft exit is avoided.

The degree of protection designation is composed from the code **IP** (for International Protection) and two code numbers for the protection against touching and penetration of foreign bodies, and the degree of protection against the ingress of water.

#### First code number

6: Protection against dust ingress and complete protection against touching

#### Second code number

4: Protection against splashwater from any direction

5: Protection against jet water from any direction

7: Protection against brief immersion

#### Recommended degrees of protection for three-phase motors

When cooling lubricants are used, protection against water alone is inadequate. The IP rating should only be considered as a guide value in this case. The motors may have to be protected by suitable covers. Attention must be paid to providing suitable sealing of the motor shaft for the selected degree of protection for the motor.

The following table can serve as a decision aid for selecting the proper degree of protection for motors. A permanent covering of liquid on the flange must be avoided when the motor is mounted with the shaft extension facing upwards (IM V3).

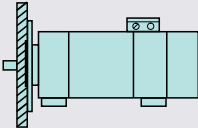
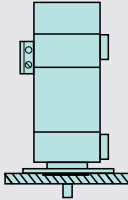
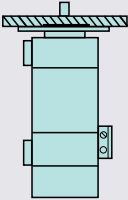
Effect	General workshop environment	Water/ general cooling lubricant (95 % water, 5 % oil)
Dry	IP64	–
Water-enriched environment	–	IP64
Mist	–	IP65
Spraying water	–	IP65
Water jet	–	IP67
Splash/brief immersion/ constant inundation	–	IP67

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## Technical specifications

### Design format, mounting position according to IEC 60034-7

SIMOTICS S-1FT2 motors are designed in type of construction IM B5. It can also be used in mounting positions IM V1 and IM V3.

Code 1	IM B5	IM V1	IM V3
Code 2	IM 3001	IM 3011	IM 3031
			
	Horizontal flange mounting	Flange mounting, output shaft pointing vertically downwards	Flange mounting, output shaft pointing vertically upwards

### Shaft and flange accuracy in accordance with IEC 60072-1

Radial eccentricity tolerance of shaft in relation to housing axis

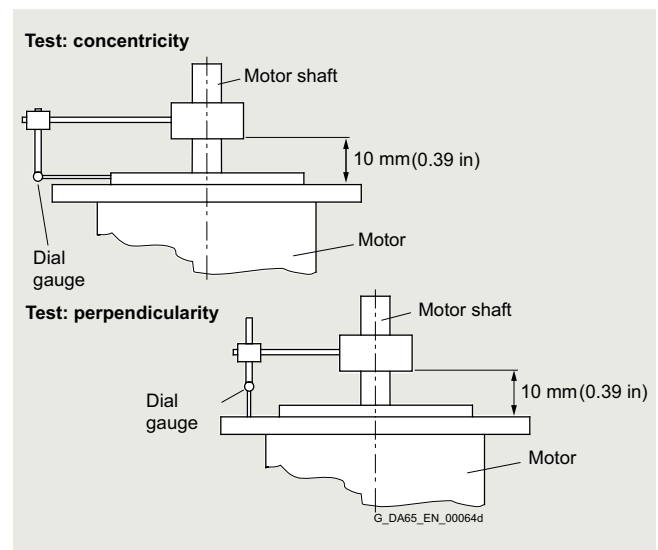
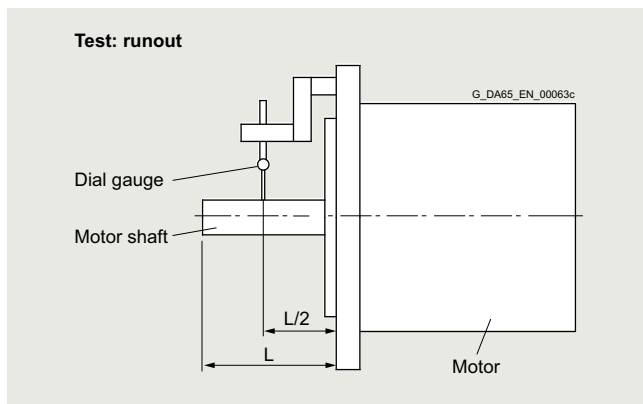
(referred to cylindrical shaft extensions)

Motor	Shaft extensions	Radial eccentricity Tolerance N
	D × L	
	mm (in)	µm
1FT2102	8 × 25 (0.31 × 0.98)	30
1FT2.03	14 × 30 (0.55 × 1.18)	35
	11 × 23 (0.43 × 0.91)	35
1FT2.04	19 × 40 (0.75 × 1.57)	40
	14 × 30 (0.55 × 1.18)	35
1FT2.05	19 × 40 (0.75 × 1.57)	40
1FT2.06	24 × 50 (0.94 × 1.97)	40
1FT2.08	32 × 58 (1.26 × 2.28)	50
1FT2210	38 × 80 (1.50 × 3.15)	50

Concentricity and axial eccentricity tolerance of the flange surface for the shaft axis

(referred to the centering diameter of the mounting flange)

Motor	Centering diameter	Concentricity and axial eccentricity Tolerance N
	mm (in)	
	mm (in)	µm
1FT2102	30 (1.18)	80
1FT2.03	50 (1.97)	
1FT2.04	70 (2.76)	
1FT2205	80 (3.15)	
1FT2105	95 (3.74)	
1FT2.06	110 (4.33)	100
1FT2.08	130 (5.12)	
1FT2210	130 (5.12)	

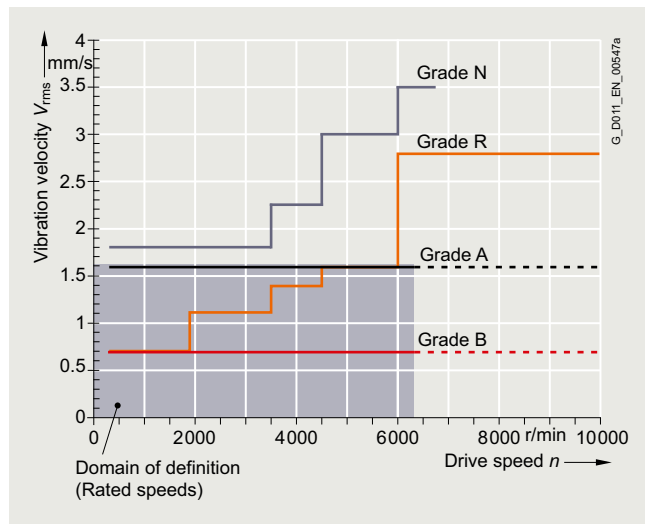


## Technical specifications

### Vibration severity and vibration severity grade A according to IEC 60034-14

The vibration severity is the RMS value of the vibration velocity (frequency range from 10 Hz to 1000 Hz). The vibration severity is measured using electrical measuring devices according to DIN 45666.

The specified values refer only to the motor. These values can increase as a result of the overall system vibrational behavior due to installation.



Vibration severity limit values

The speeds of 1800 r/min and 3600 r/min and the associated limit values are specified according to IEC 60034-14. The speeds of 4500 r/min and 6000 r/min and the specified values are defined by the motor manufacturer.

The motors maintain vibration severity grade A up to the rated speed.

### Balancing according to ISO 21940-32

Apart from the balance quality of the motor, the vibrational quality of motors with attached pulleys is mainly determined by the balance state of the mounted component. If the motor and the mounted component are balanced separately before being joined, the balancing process of the pulley is to be adapted to the motor's balancing type.

SIMOTICS S-1FT2 motors with feather keys are always half-key balanced. In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements.

### Vibration stress, imitted vibration values

The requirements of environmental class 3M8 (according to EN 60721-3-3 Table 6) must be maintained for proper function and safeguard the bearing life. The following limits are valid for (imitted) vibration values introduced into the motor from outside:

- Vibration velocity  $V_{rms}$  according to ISO 10816, max. 4.5 mm/s (0.18 in/s)
- Vibration acceleration  $a_{peak}$  axial and radial 50 m/s<sup>2</sup> (164 ft/s<sup>2</sup>)

During transport, the motors withstand single shocks (6 ms) of up to 250 m/s<sup>2</sup> (820 ft/s<sup>2</sup>).

### Ambient temperature and installation altitude

Operating range without restrictions:

Temperature range from -15 °C to +40 °C (5.0 °F to 104 °F), installation altitude up to 1000 m (3281 ft).

If deviating conditions are encountered, the S1 characteristic of the motor must be adapted with regard to speed and torque.

Use the following equation to calculate the reduced S1 characteristic:

$$S1_{red}(n) = x_D \times S1_{40^\circ C; 1000m}(n/x_D)$$

Installation altitude above sea level	Derating factor $x_D$ at an ambient temperature of					
	5 °C (41 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)
1000 (3281)	1.16	1.14	1.1	1.05	1	0.91
2000 (6562)	1.12	1.1	1.05	1	0.95	0.84

### Encoder systems

In motors with integrated OCC/DRIVE-CLiQ interface, the sensor signal is already digitally prepared in the motor, and then transferred quickly and without loss to the drive system. Motors with an OCC/DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor parameters and encoder system are identified automatically.

#### Singleturn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute encoder, it does not have a revolution counter, and can therefore only supply the position value within one revolution. It does not have a traversing range.

#### Multiturn absolute encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. It can also count 4096 revolutions. So with a ball screw, for example, the absolute position of the slide can be determined over a longer distance.

14th position in the Article No. of the motor	Designation	
1FT2 ...-...-S..	AS22DQC	Absolute encoder 22-bit singleturn (resolution 4194304)
1FT2 ...-...-M..	AM22DQC	Absolute encoder 22-bit + 12-bit multiturn (resolution 4194304, traversing range 4096 revolutions)
1FT2 ...-...-B..	AS26DQC	Absolute encoder 26-bit singleturn (resolution 67108864)
1FT2 ...-...-C..	AM26DQC	Absolute encoder 26-bit + 12-bit multiturn (resolution 67108864, traversing range 4096 revolutions)

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

### Technical specifications

#### Holding brake

Many drives need a holding brake with an EMERGENCY STOP function for safety reasons or to meet process requirements. The brakes used on the SIMOTICS S-1FT2 motors function according to the closed-circuit principle. A spring or permanent magnet exerts a tensile force on the brake armature disk, i.e. in a state of zero current, the brake is closed and the motor shaft thereby stopped.

An electric current that flows through a coil generates an opposing field that counteracts the force effect of the spring or permanent magnet and releases or holds open the brake. Only a limited number of braking operations can be performed for an EMERGENCY STOP or power failure without causing excessive wear on the holding brake. The holding brake is not an operational brake. Regular dynamic braking leads to increased wear and premature brake failure. In order to ensure the functionality and specification of the brake, neither the total operating energy nor the maximum switching energy per braking operation may be exceeded. For the 1FT2108, 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3 motors, a reinforced holding brake is also available.

The brake control is already fully integrated into the SINAMICS S210 converter system, so that an external circuit is not necessary.

After an EMERGENCY STOP sequence with the maximum single switching energy, a cooling time of at least 5 minutes must be allowed.

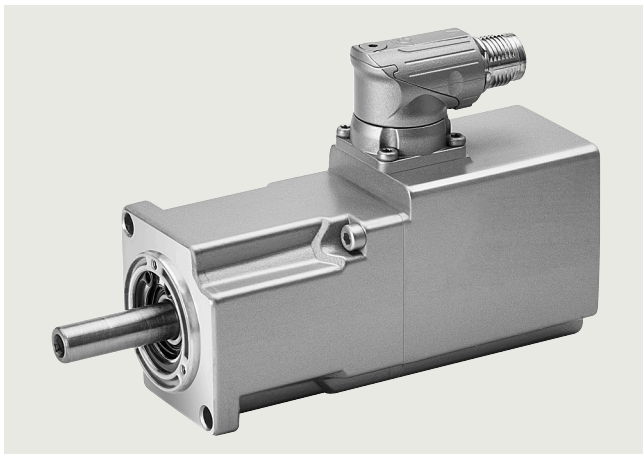
The following table contains technical specifications of the holding brakes for operating on a SINAMICS S210 (for 1-AC converters, hardware version 2 or higher) and firmware V5.2 or higher.

Motor	Shaft height	Holding torque Nm (lb <sub>f</sub> -ft)	Average dynamic braking torque Nm (lb <sub>f</sub> -ft)	Maximum dynamic braking torque Nm (lb <sub>f</sub> -ft)	Opening time ms	Closing time ms	Maximum permissible single switching energy J	Total operating energy (service life) kJ	Holding current A	Break-induced current, typ. <sup>1)</sup> for 500 ms A
<b>Spring-loaded brake, maximum backlash 1°</b>										
1FT2102	20	0.32 (0.24)	0.32 (0.24)	1 (0.74)	25	20	7.4	1.75	0.1	0.6
1FT2.03	30	1.3 (0.96)	1.3 (0.96)	3.9 (2.88)	40	30	62	17.5	0.15	0.8
1FT2.04	40	3.3 (2.43)	3.3 (2.43)	9 (6.64)	50	40	270	120	0.2	1.2
<b>Permanent magnet brake, backlash-free</b>										
1FT2.05	48/52	8 (5.90)	5 (3.69)	18 (13.3)	35	20	570	284	0.3	1.1
1FT2106	63	16 (11.8)	9 (6.64)	35 (25.8)	70	35	1065	774	0.35	1.1
1FT2206	63	13 (9.59)	6.5 (4.79)	35 (25.8)	70	35	1550	774	0.35	1.1
1FT2108	80	36 (26.6)	15 (11.06)	70 (51.6)	120	40	1300	2400	0.5	1.4
1FT2208-2	80	19 (14.0)	12 (8.85)	37 (27.3)	70	35	2000	1800	0.4	1.2
1FT2208-3	80	19 (14.0)	12 (8.85)	37 (27.3)	70	35	2000	1800	0.4	1.2
1FT2208-4	80	32 (23.6)	17 (12.5)	70 (51.6)	120	40	4800	2400	0.5	1.4
1FT2208-5	80	32 (23.6)	17 (12.5)	70 (51.6)	120	40	4800	2400	0.5	1.4
1FT2210-2	100	32 (23.6)	17 (12.5)	70 (51.6)	120	40	6600	2400	0.5	1.4
1FT2210-3	100	32 (23.6)	17 (12.5)	70 (51.6)	120	40	6600	2400	0.5	1.4
1FT2210-4	100	55 (40.6)	26 (19.2)	100 (73.8)	130	65	8700	3800	0.5	1.5
1FT2210-5	100	55 (40.6)	26 (19.2)	100 (73.8)	130	65	8700	3800	0.5	1.5
<b>Reinforced permanent magnet brake, backlash-free</b>										
1FT2108	80	32 (23.6)	17 (12.5)	70 (51.6)	120	40	4800	2400	0.5	1.4
1FT2208-2	80	32 (23.6)	17 (12.5)	70 (51.6)	120	40	4800	2400	0.5	1.4
1FT2208-3	80	32 (23.6)	17 (12.5)	70 (51.6)	120	40	4800	2400	0.5	1.4
1FT2210-2	100	55 (40.6)	26 (19.2)	100 (73.8)	130	65	8700	3800	0.5	1.5
1FT2210-3	100	55 (40.6)	26 (19.2)	100 (73.8)	130	65	8700	3800	0.5	1.5

<sup>1)</sup> Typical values at an ambient temperature of 20 °C (68° F).  
At -15 °C (5 °F), the break-induced currents can increase by up to 30 %.

## Technical specifications

### SIMOTICS S-1FT2 shaft height 20



#### Specific technical specifications

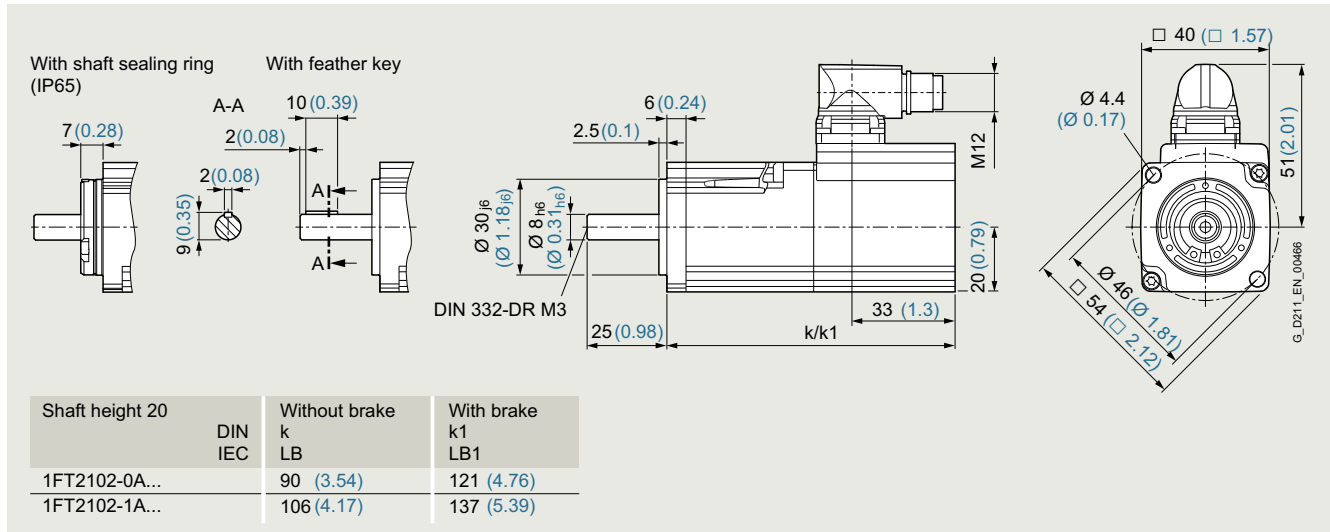
SIMOTICS S-1FT2 servomotors		High Dynamic	
Shaft height 20		1FT2102-0AG	1FT2102-1AG
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	0.16 (0.12)	0.32 (0.24)
Stall current $I_0$	A	0.75	0.76
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	0.56 (0.41)	1.11 (0.82)
Maximum current $I_{max}$	A	3.1	2.95
Maximum speed $n_{max}$	r/min	8000	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.025 (0.009)	0.036 (0.012)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.029 (0.010)	0.040 (0.014)
$J_{Mot Br}$			
Weight $m_{Mot}$	kg (lb)	0.47 (1.04)	0.60 (1.32)
Weight (with brake) $m_{Mot Br}$	kg (lb)	0.73 (1.61)	0.86 (1.90)
<b>200 ... 240 V 1 AC / 3 AC</b>			
Rated speed $n_N$	r/min	3000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	0.16 (0.12)	0.32 (0.24)
Rated current $I_N$	A	0.75	0.76
Rated power $P_N$	W	50	100
Suitable for SINAMICS S210 servo converters			
• 200 ... 240 V 1 AC		6SL3210-5HB10-1UF0	6SL3210-5HB10-1UF0
• 200 ... 240 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE10-4UF0
Suitable for SINAMICS S210 servo converters (New)			
• 200 ... 240 V 1 AC		6SL5310-1BB10-1CF0	6SL5310-1BB10-1CF0
• 200 ... 240 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE10-4DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 20

### Technical specifications

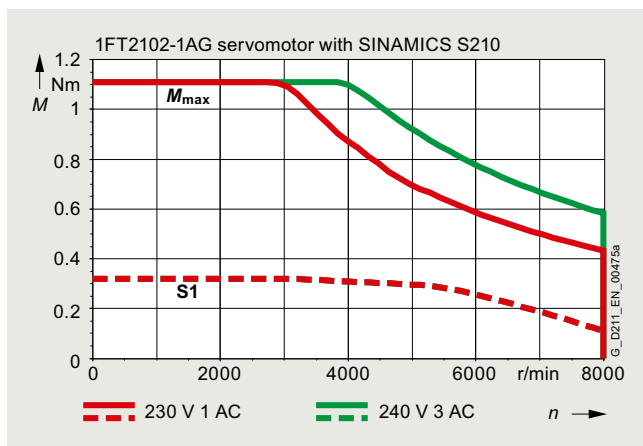
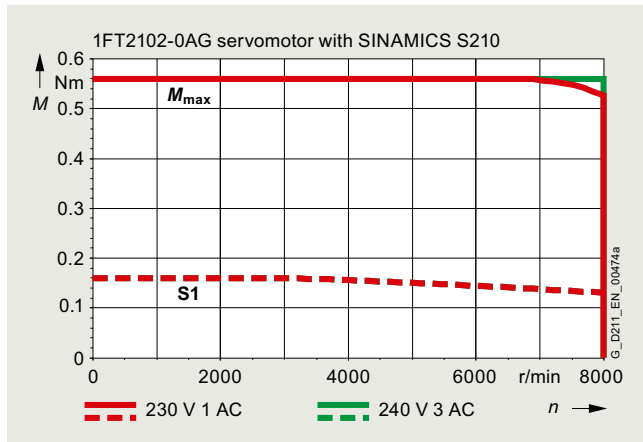
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

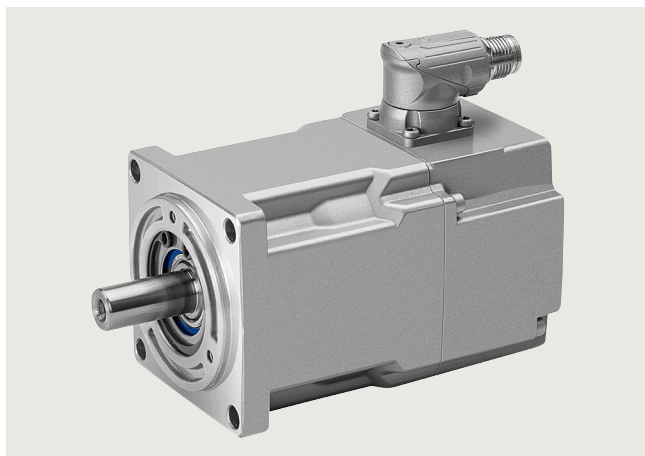
High Dynamic





## Technical specifications

## SIMOTICS S-1FT2 shaft height 30



## Specific technical specifications

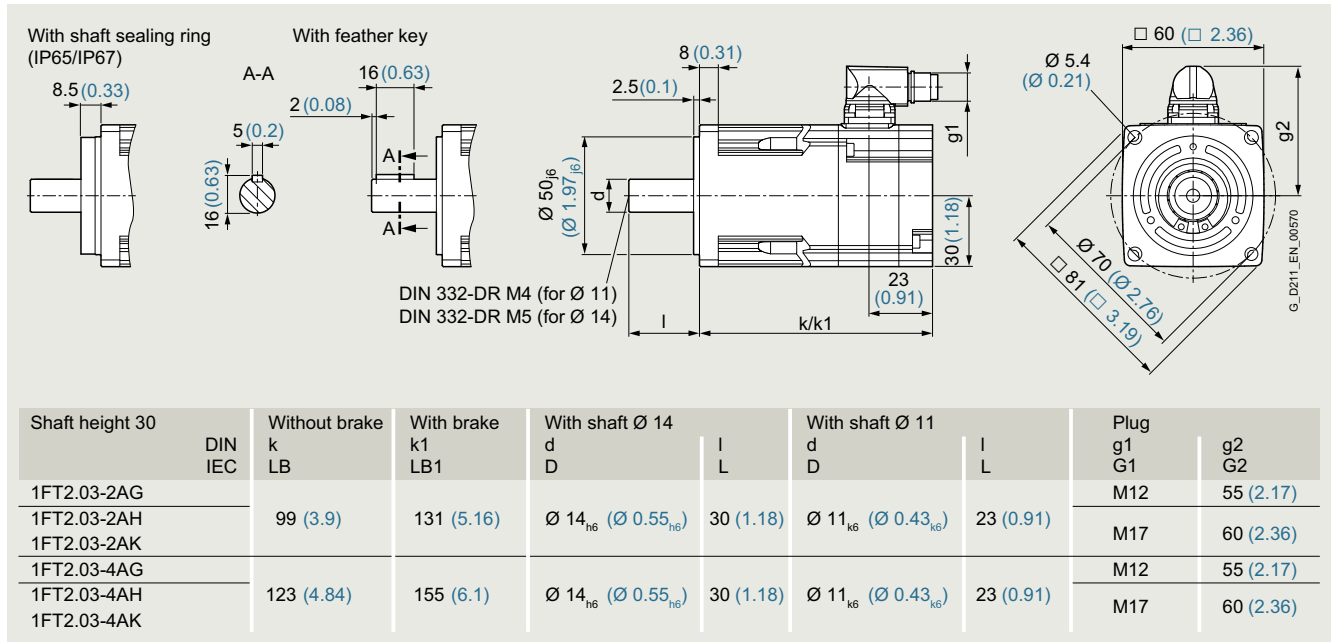
SIMOTICS S-1FT2 servomotors		High Dynamic				Compact			
Shaft height 30		1FT2103-2AG	1FT2103-2AH	1FT2103-4AG	1FT2103-4AH	1FT2203-2AG	1FT2203-2AK	1FT2203-4AG	1FT2203-4AK
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	0.64 (0.47)	0.64 (0.47)	1.27 (0.94)	1.27 (0.94)	0.64 (0.47)	0.64 (0.47)	1.27 (0.94)	1.27 (0.94)
Stall current $I_0$	A	1.36	1.06	2.4	1.87	1.38	1.05	2.52	2.05
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	1.95 (1.44)	1.95 (1.44)	4.05 (2.99)	4.05 (2.99)	1.85 (1.36)	1.85 (1.36)	3.75 (2.77)	3.75 (2.77)
Maximum current $I_{max}$	A	4.8	3.95	8.7	7.1	4.2	3.4	7.8	6.7
Maximum speed $n_{max}$	r/min	8000	8000	7300	8000	8000	8000	7800	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.093 (0.032)	0.093 (0.032)	0.14 (0.048)	0.14 (0.048)	0.20 (0.068)	0.20 (0.068)	0.35 (0.120)	0.35 (0.120)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.11 (0.038)	0.11 (0.038)	0.16 (0.055)	0.16 (0.055)	0.22 (0.075)	0.22 (0.075)	0.37 (0.126)	0.37 (0.126)
Weight $m_{Mot}$	kg (lb)	1.17 (2.58)	1.18 (2.60)	1.64 (3.62)	1.65 (3.64)	1.15 (2.54)	1.16 (2.56)	1.48 (3.26)	1.49 (3.29)
Weight (with brake) $m_{Mot Br}$	kg (lb)	1.54 (3.40)	1.55 (3.42)	1.98 (4.37)	1.99 (4.39)	1.52 (3.35)	1.53 (3.37)	1.96 (4.32)	1.97 (4.34)
<b>200 ... 240 V 1 AC / 3 AC</b>									
Rated speed $n_N$	r/min	3000	–	3000	–	3000	–	3000	–
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	0.64 (0.47)	–	1.27 (0.94)	–	0.64 (0.47)	–	1.27 (0.94)	–
Rated current $I_N$	A	1.36	–	2.4	–	1.38	–	2.52	–
Rated power $P_N$	W	200	–	400	–	200	–	400	–
<b>380 ... 480 V 3 AC</b>									
Rated speed $n_N$	r/min	–	4500	–	4500	–	6000	–	6000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	–	0.59 (0.44)	–	1.01 (0.74)	–	0.405 (0.299)	–	0.68 (0.50)
Rated current $I_N$	A	–	1.05	–	1.56	–	0.75	–	1.24
Rated power $P_N$	W	–	280	–	480	–	255	–	430
Suitable for SINAMICS S210 servo converters									
• 200 ... 240 V 1 AC		6SL3210-5HB10-2UF0	–	6SL3210-5HB10-4UF0	–	6SL3210-5HB10-2UF0	–	6SL3210-5HB10-4UF0	–
• 200 ... 240 V 3 AC		6SL3210-5HE10-8UF0	–	6SL3210-5HE11-0UF0	–	6SL3210-5HE10-8UF0	–	6SL3210-5HE11-0UF0	–
• 380 ... 480 V 3 AC		–	6SL3210-5HE10-4UF0	–	6SL3210-5HE10-8UF0	–	6SL3210-5HE10-4UF0	–	6SL3210-5HE10-8UF0
Suitable for SINAMICS S210 servo converters (New)									
• 200 ... 240 V 1 AC		6SL5310-1BB10-2CF0	–	6SL5310-1BB10-4CF0	–	6SL5310-1BB10-2CF0	–	6SL5310-1BB10-4CF0	–
• 200 ... 240 V 3 AC		6SL5310-1BE10-8DF0	–	6SL5310-1BE11-0DF0	–	6SL5310-1BE10-8DF0	–	6SL5310-1BE11-0DF0	–
• 380 ... 480 V 3 AC		–	6SL5310-1BE10-4DF0	–	6SL5310-1BE10-8DF0	–	6SL5310-1BE10-4DF0	–	6SL5310-1BE10-8DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 30

### Technical specifications

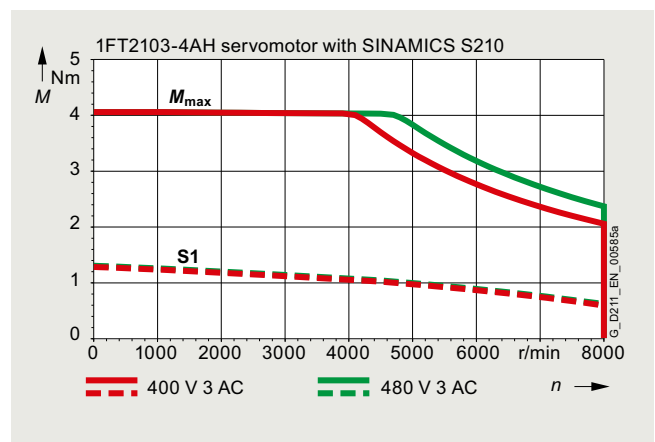
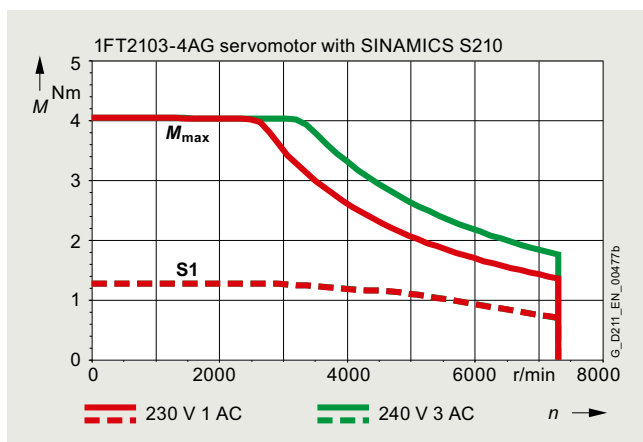
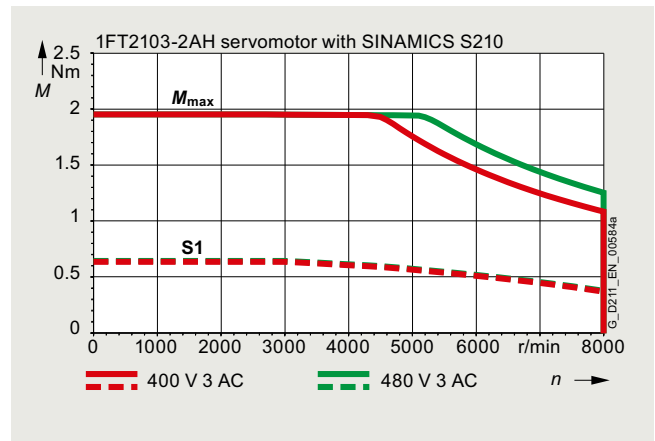
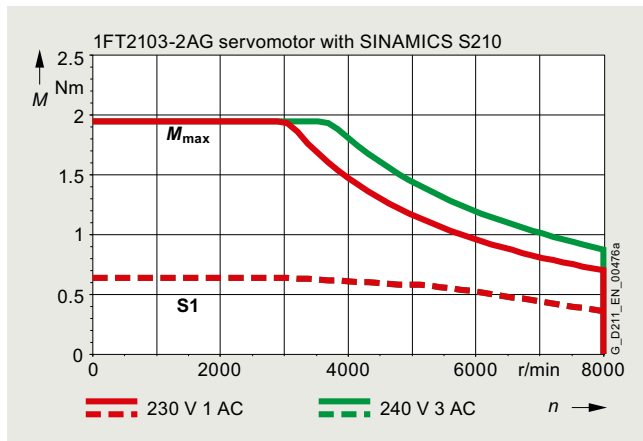
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

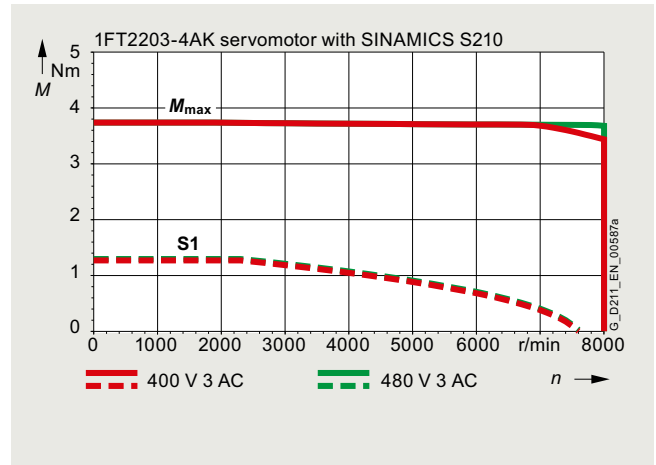
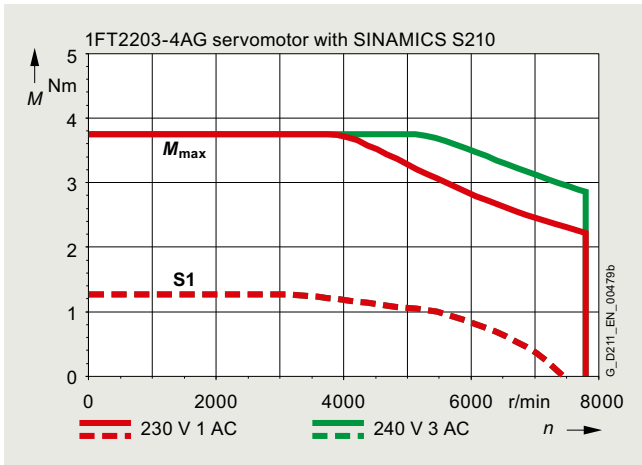
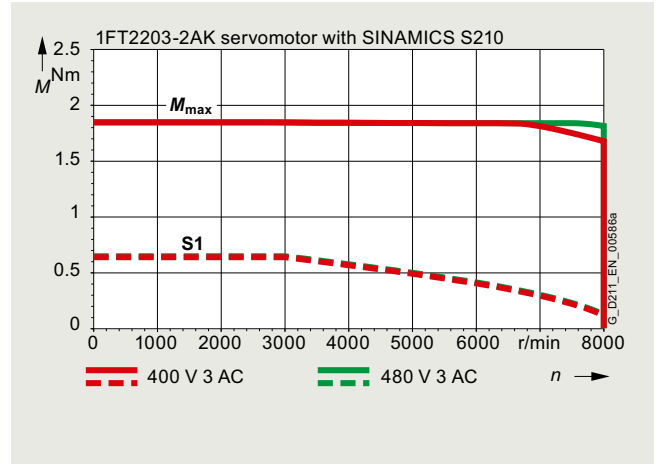
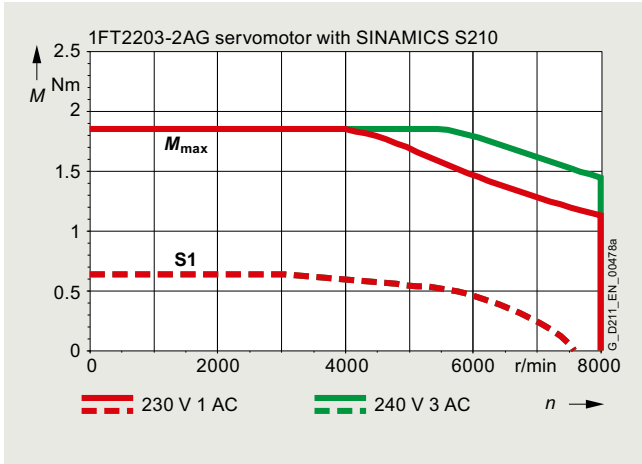
#### Speed/torque characteristics

##### High Dynamic



Technical specifications

Compact

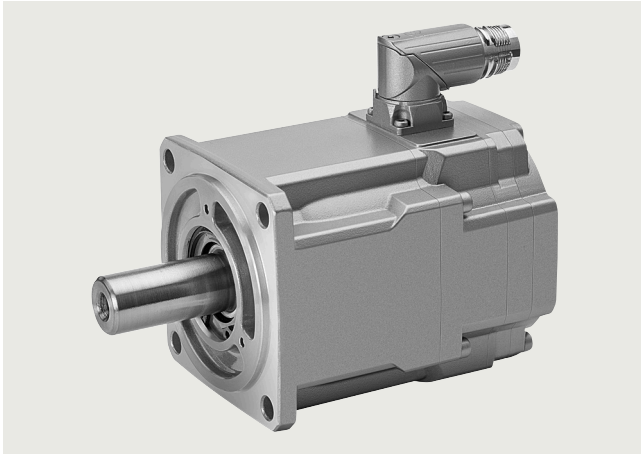


## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 40

## Technical specifications

## SIMOTICS S-1FT2 shaft height 40

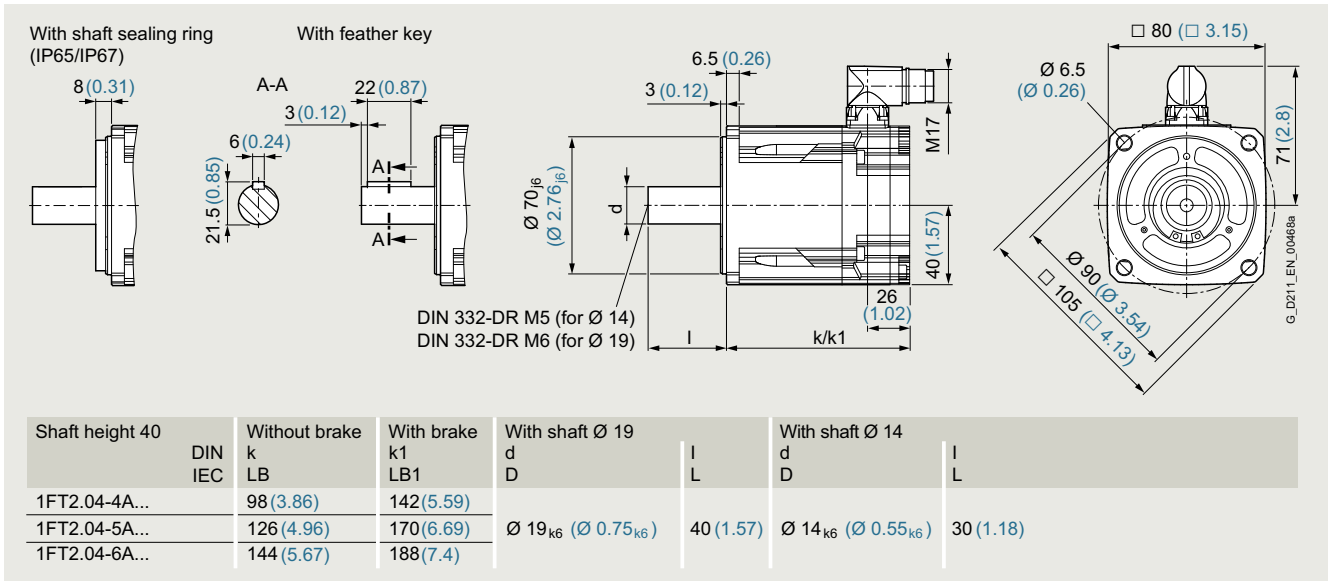


## Specific technical specifications

SIMOTICS S-1FT2 servomotors		High Dynamic					Compact		
Shaft height 40		1FT2104-4AF	1FT2104-4AK	1FT2104-5AF	1FT2104-5AK	1FT2104-6AF	1FT2204-5AF	1FT2204-5AK	1FT2204-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	1.27 (0.94)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)
Stall current $I_0$	A	1.19	2.4	2.1	4.4	3	2.25	4.4	3
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	3.75 (2.77)	3.85 (2.84)	7.5 (5.53)	7.6 (5.61)	10 (7.38)	7.1 (5.24)	7.1 (5.24)	9.5 (7.01)
Maximum current $I_{max}$	A	4.2	8.7	7.6	16	10.9	7.1	14.2	9.9
Maximum speed $n_{max}$	r/min	7200	8000	6700	8000	7200	7500	8000	7600
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.35 (0.120)	0.35 (0.120)	0.56 (0.191)	0.56 (0.191)	0.76 (0.260)	1.2 (0.410)	1.2 (0.410)	1.6 (0.547)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.43 (0.147)	0.43 (0.147)	0.65 (0.222)	0.65 (0.222)	0.84 (0.287)	1.3 (0.444)	1.3 (0.444)	1.7 (0.581)
$J_{Mot Br}$									
Weight $m_{Mot}$	kg (lb)	2.1 (4.63)	2.1 (4.63)	2.9 (6.39)	2.9 (6.39)	3.4 (7.50)	2.9 (6.39)	2.9 (6.39)	3.5 (7.72)
Weight (with brake) $m_{Mot Br}$	kg (lb)	2.9 (6.39)	2.9 (6.39)	3.7 (8.16)	3.7 (8.16)	4.3 (9.48)	3.8 (8.38)	3.8 (8.38)	4.4 (9.70)
<b>200 ... 240 V 1 AC / 3 AC</b>									
Rated speed $n_N$	r/min	1500	3000	1500	3000	1500	1500	3000	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	1.27 (0.94)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)	2.4 (1.77)	2.4 (1.77)	3.2 (2.36)
Rated current $I_N$	A	1.19	2.4	2.1	4.4	3	2.25	4.4	3
Rated power $P_N$	W	200	400	375	750	500	375	750	500
<b>380 ... 480 V 3 AC</b>									
Rated speed $n_N$	r/min	3000	6000	3000	6000	3000	3000	6000	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	1.27 (0.94)	0.95 (0.70)	2.4 (1.77)	1.7 (1.25)	3.2 (2.36)	2.4 (1.77)	0.9 (0.66)	3.2 (2.36)
Rated current $I_N$	A	1.19	1.88	2.1	3.20	3	2.25	1.95	3
Rated power $P_N$	W	400	600	750	1070	1000	750	570	1000
Suitable for SINAMICS S210 servo converters									
• 200 ... 240 V 1 AC		6SL3210-5HB10-2UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-8UF0
• 200 ... 240 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE10-4UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0	6SL3210-5HE10-8UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-0UF0
Suitable for SINAMICS S210 servo converters (New)									
• 200 ... 240 V 1 AC		6SL5310-1BB10-2CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-4CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0
• 200 ... 240 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE10-4DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0	6SL5310-1BE10-8DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-0DF0

**Technical specifications**

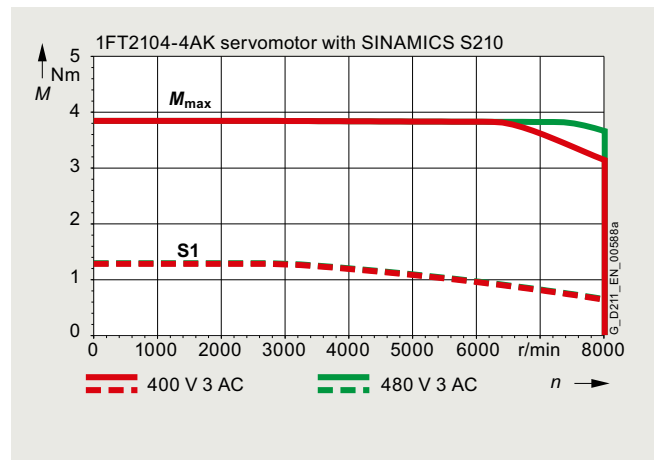
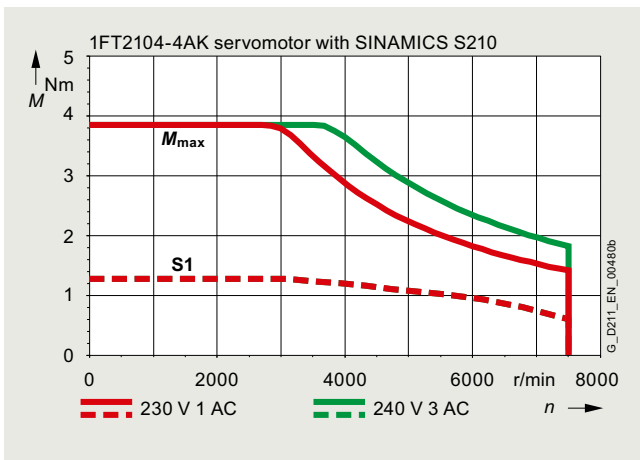
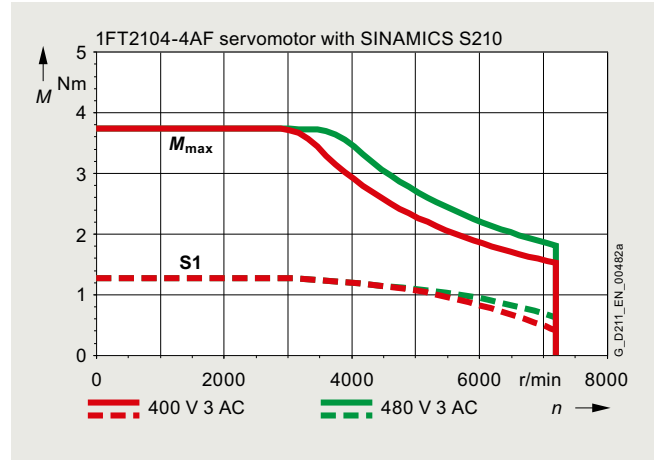
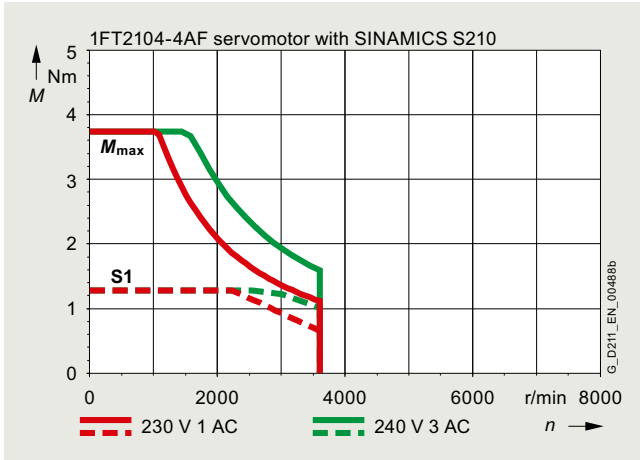
Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

High Dynamic



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

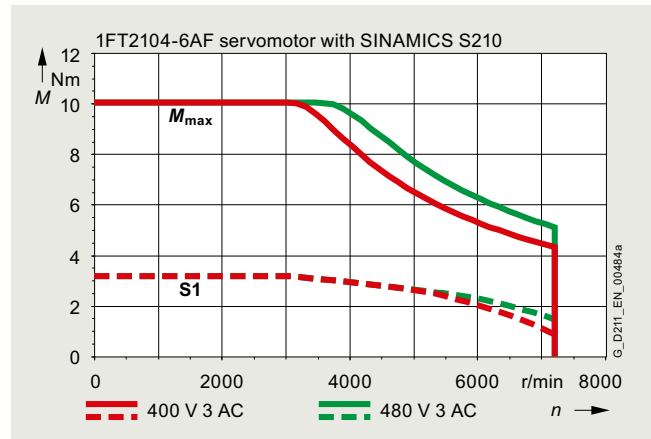
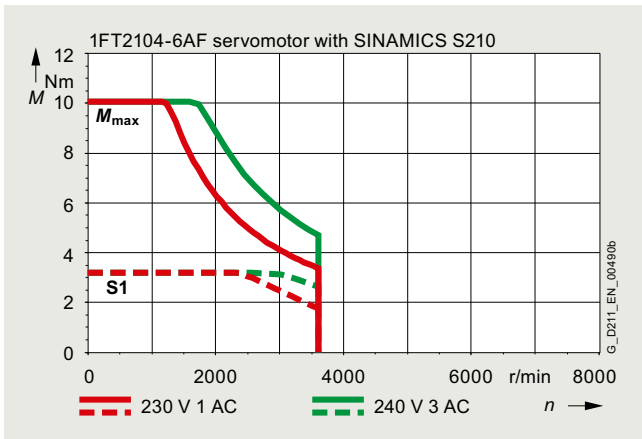
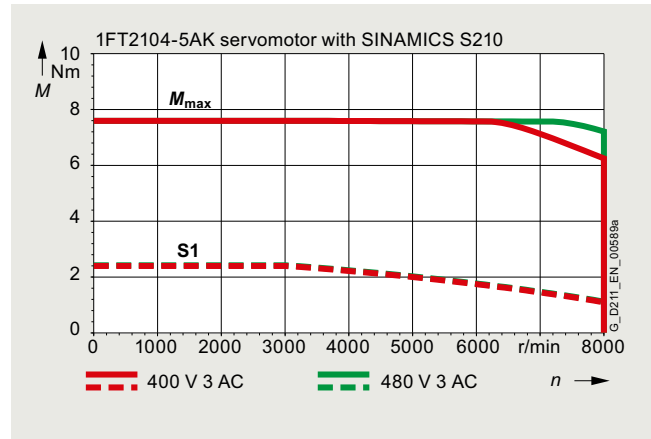
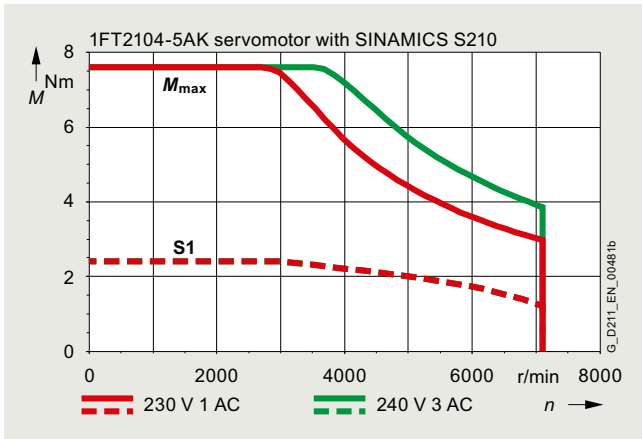
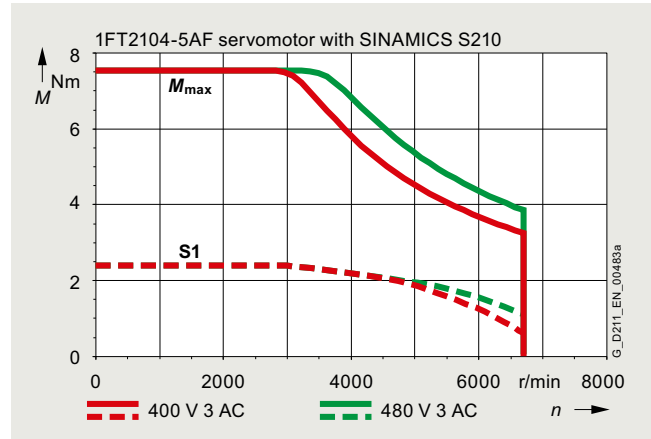
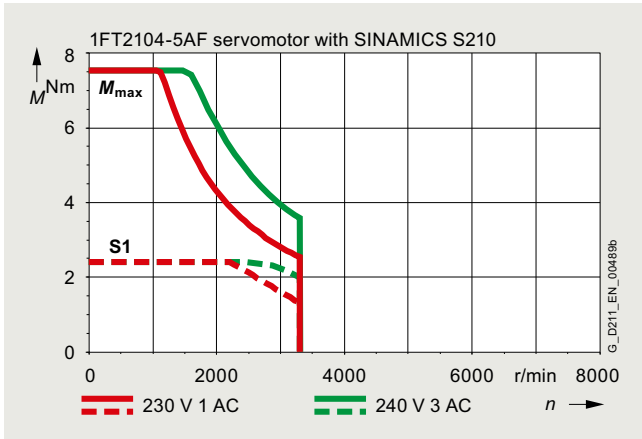
## SIMOTICS S-1FT2 shaft height 40

### Technical specifications

Speed/torque characteristics (continued)

High Dynamic (continued)

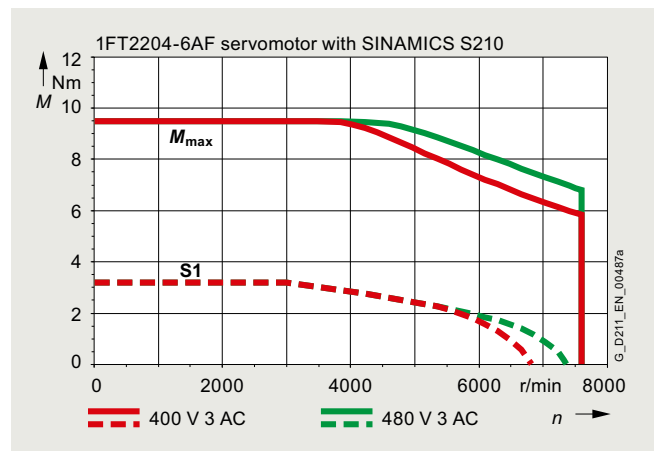
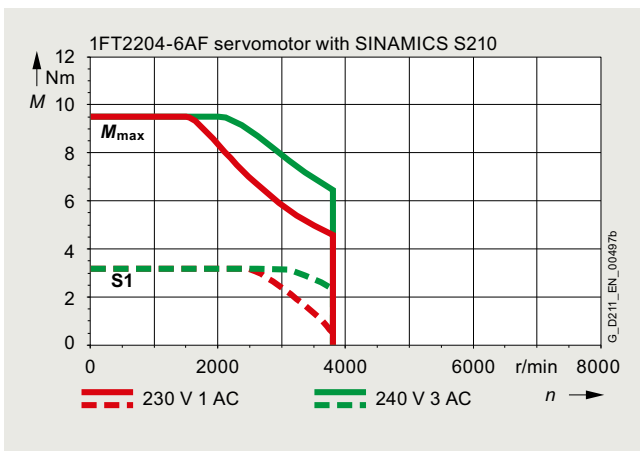
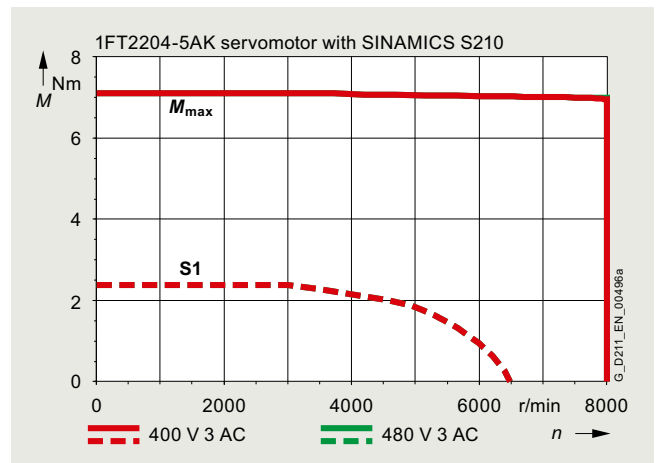
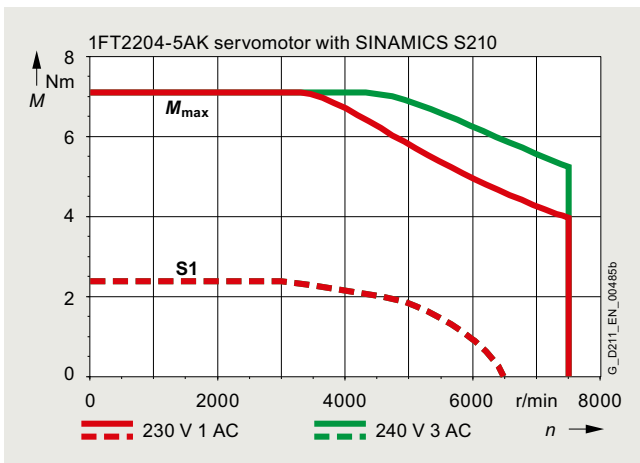
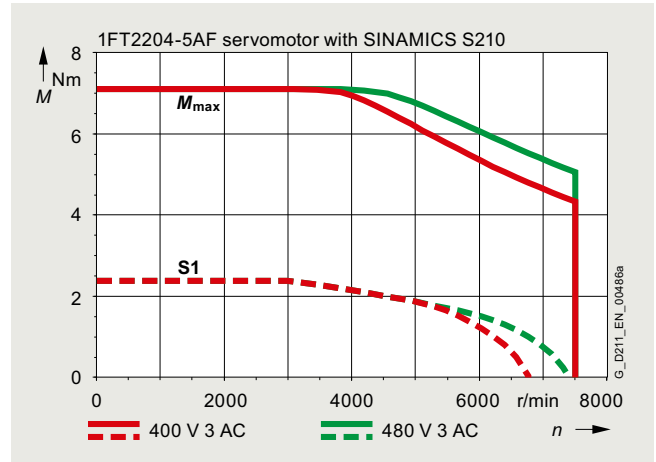
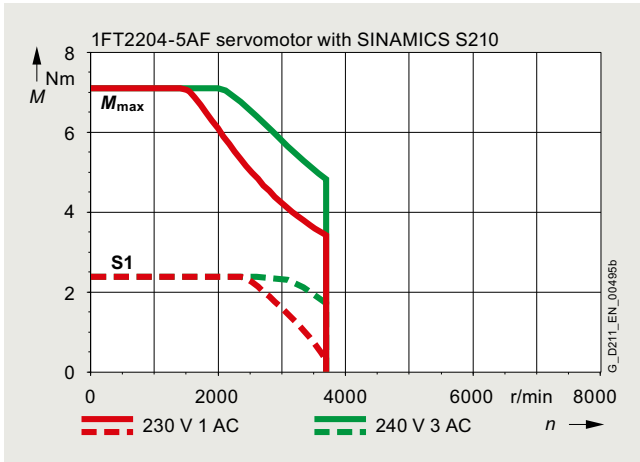
3  
2



Technical specifications

Speed/torque characteristics (continued)

Compact

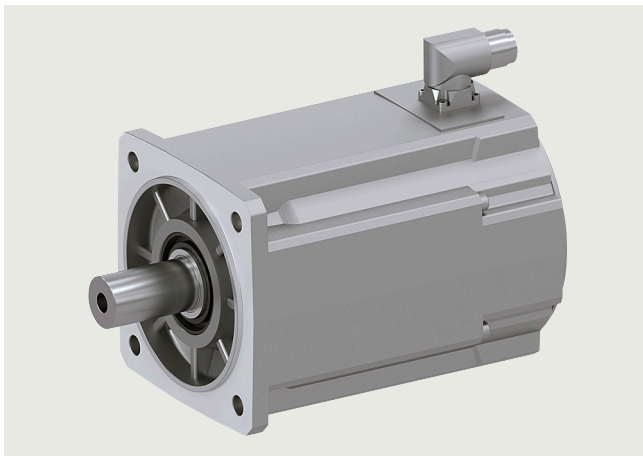


## SIMOTICS S-1FT2 servomotors for SINAMICS S210

### SIMOTICS S-1FT2 shaft height 48

#### Technical specifications

##### SIMOTICS S-1FT2 shaft height 48



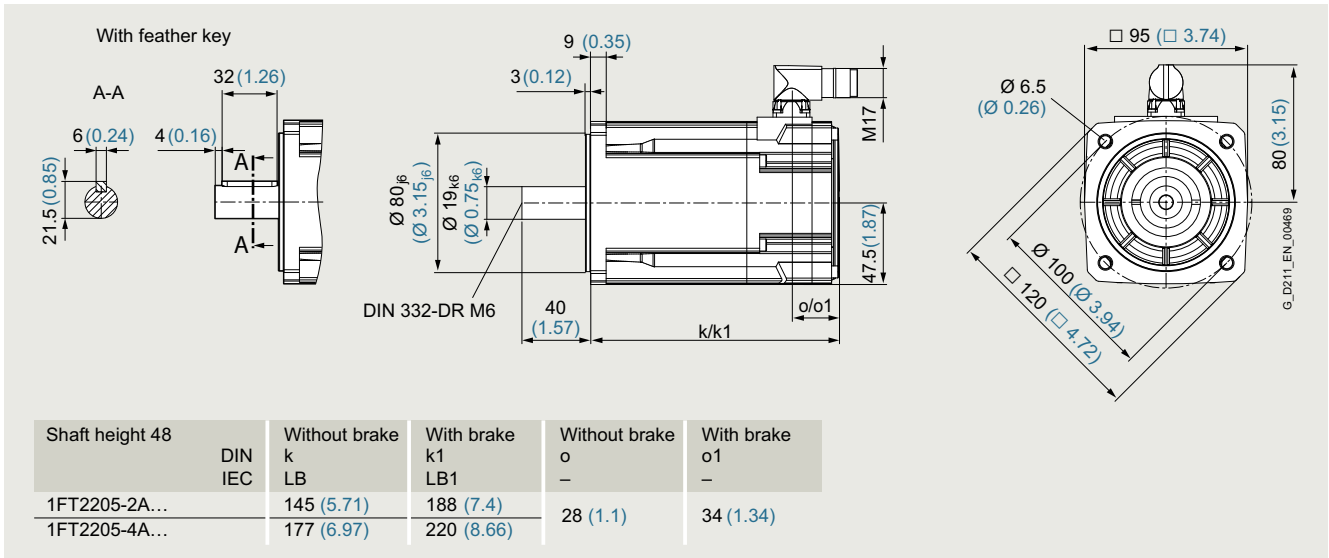
#### Specific technical specifications

SIMOTICS S-1FT2 servomotors		Compact			
Shaft height 48		1FT2205-2AC	1FT2205-2AF	1FT2205-2AH	1FT2205-4AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	3.6 (2.66)	3.6 (2.66)	3.6 (2.66)	6 (4.43)
Stall current $I_0$	A	1.84	2.9	3.8	4.7
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	10.8 (7.97)	10.8 (7.97)	10.8 (7.97)	18 (13.28)
Maximum current $I_{max}$	A	6	9.5	12.1	15.1
Maximum speed $n_{max}$	r/min	4850	6500	8300	6200
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	3.2 (1.093)	3.2 (1.093)	3.2 (1.093)	5.1 (1.743)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	4.1 (1.401)	4.1 (1.401)	4.1 (1.401)	6.0 (2.050)
Weight $m_{Mot}$	kg (lb)	3.8 (8.38)	3.8 (8.38)	3.8 (8.38)	5.2 (11.47)
Weight (with brake) $m_{Mot Br}$	kg (lb)	4.8 (10.58)	4.8 (10.58)	4.8 (10.58)	6.2 (13.67)
<b>200 ... 240 V 1 AC / 3 AC</b>					
Rated speed $n_N$	r/min	1000	1500	2500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	3.45 (2.54)	3.4 (2.51)	3.15 (2.33)	5.5 (4.06)
Rated current $I_N$	A	1.79	2.8	3.45	4.35
Rated power $P_N$	W	360	530	820	860
<b>380 ... 480 V 3 AC</b>					
Rated speed $n_N$	r/min	2000	3000	4500	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	3.3 (2.43)	3 (2.21)	2.3 (1.70)	4.6 (3.39)
Rated current $I_N$	A	1.74	2.5	2.55	3.75
Rated power $P_N$	W	690	940	1100	1450
Suitable for SINAMICS S210 servo converters					
• 200 ... 240 V 1 AC		6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	6SL3210-5HB10-8UF0	–
• 200 ... 240 V 3 AC		6SL3210-5HE10-8UF0	6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-5UF0
• 380 ... 480 V 3 AC		6SL3210-5HE10-8UF0	6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-5UF0
Suitable for SINAMICS S210 servo converters (New)					
• 200 ... 240 V 1 AC		6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0	6SL5310-1BB10-8CF0	–
• 200 ... 240 V 3 AC		6SL5310-1BE10-8DF0	6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-5DF0
• 380 ... 480 V 3 AC		6SL5310-1BE10-8DF0	6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-5DF0



Technical specifications

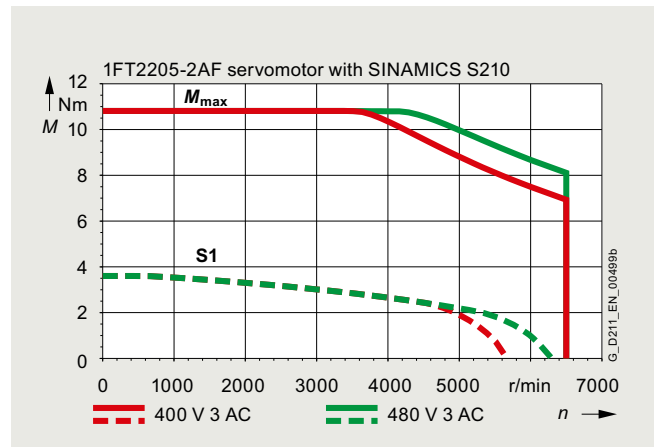
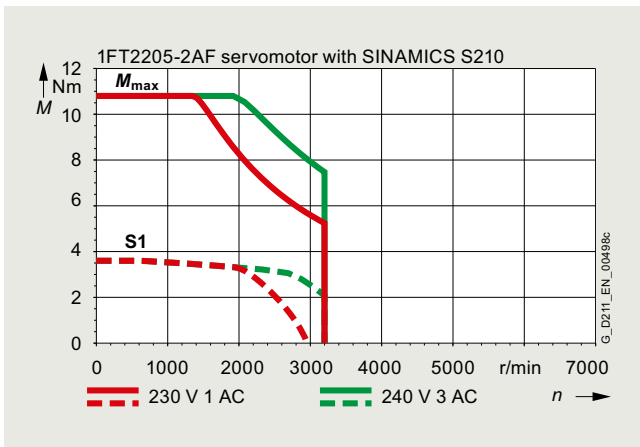
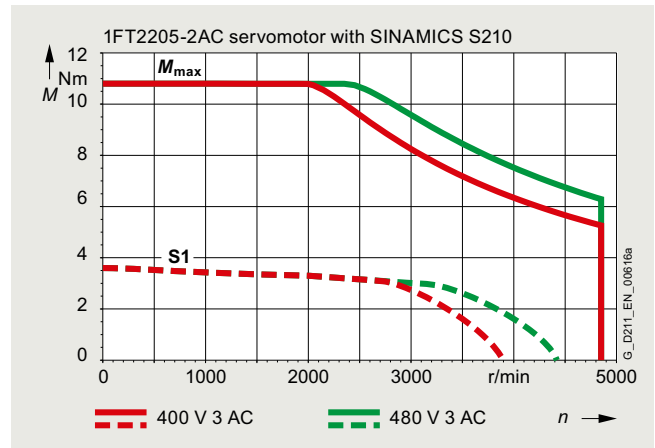
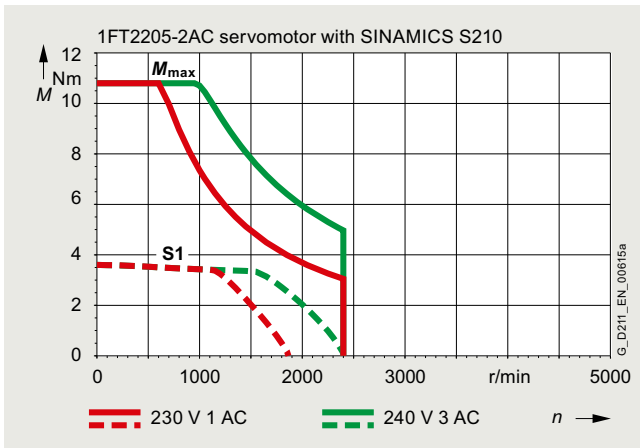
Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

Compact



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

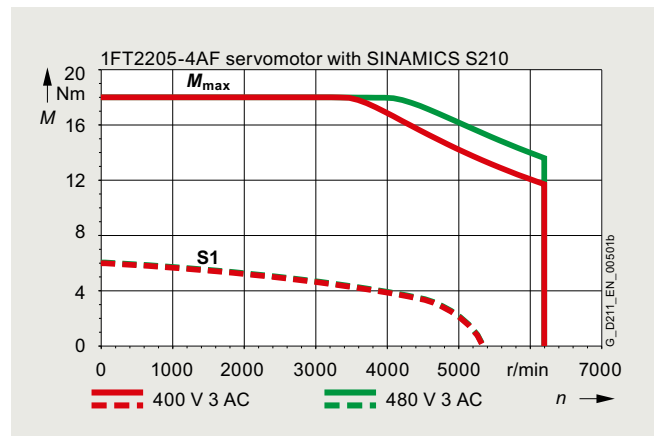
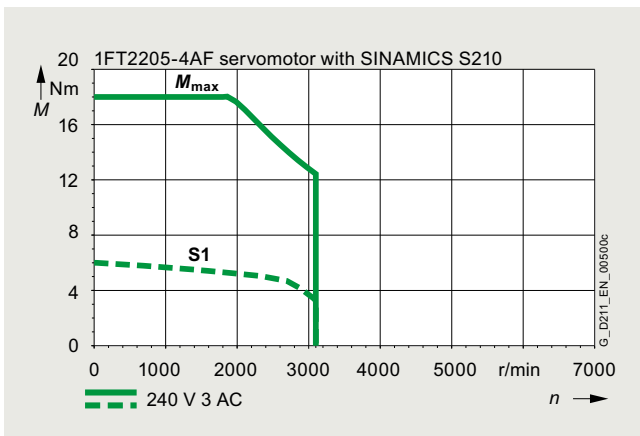
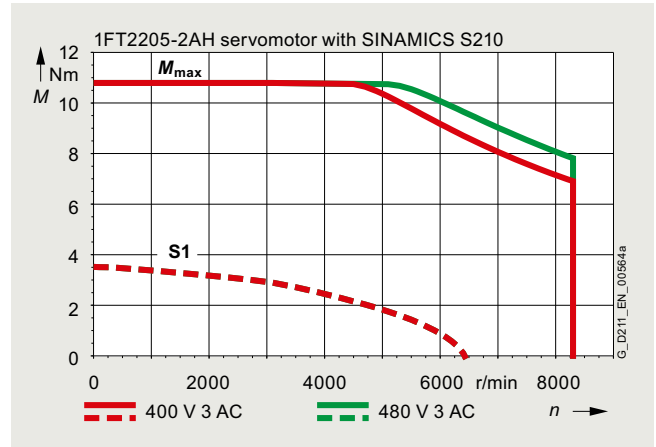
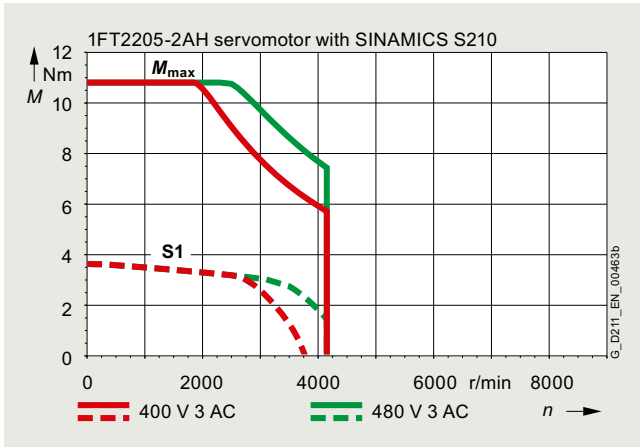
## SIMOTICS S-1FT2 shaft height 48

### Technical specifications

Speed/torque characteristics (continued)

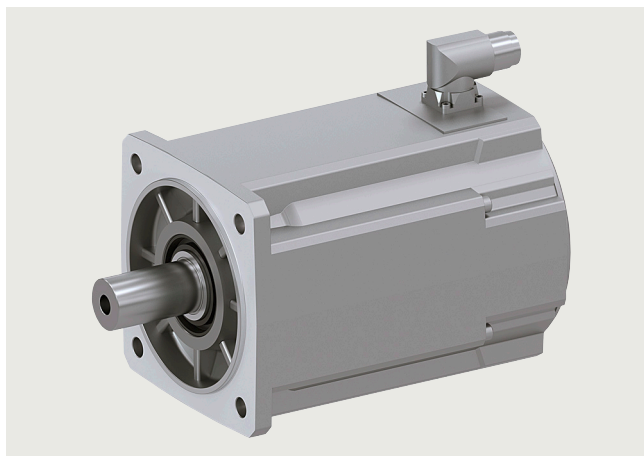
Compact (continued)

3  
2



## Technical specifications

## SIMOTICS S-1FT2 shaft height 52



## Specific technical specifications

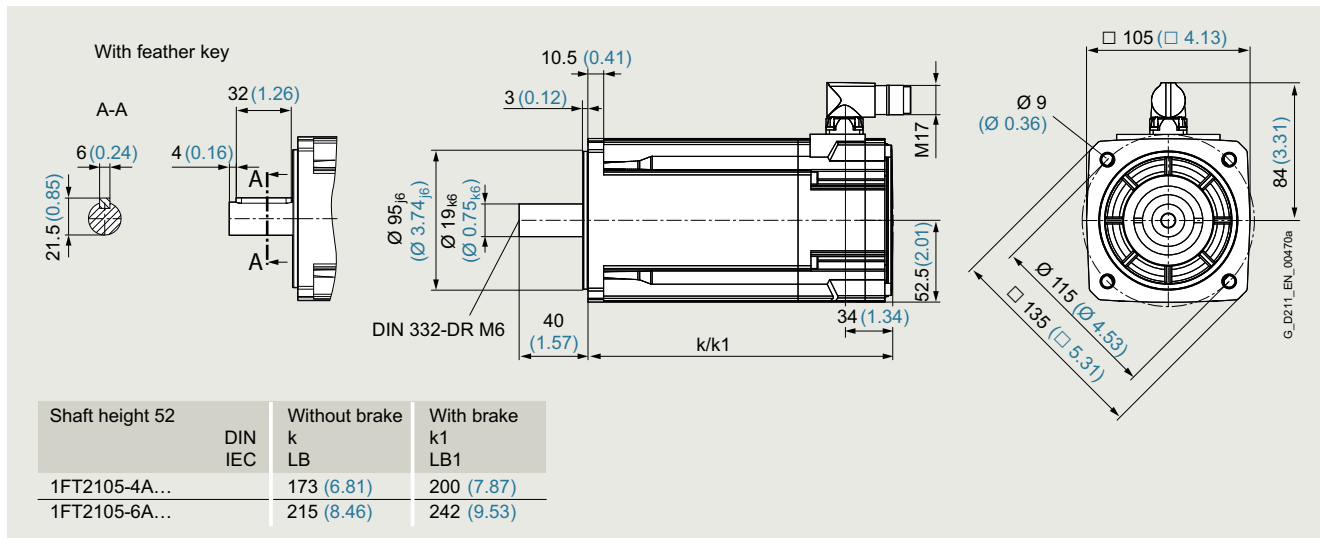
SIMOTICS S-1FT2 servomotors		High Dynamic		
Shaft height 52		1FT2105-4AF	1FT2105-4AH	1FT2105-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	5 (3.69)	5 (3.69)	8 (5.90)
Stall current $I_0$	A	4.65	6.9	6.7
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	15 (11.06)	15 (11.06)	24 (17.70)
Maximum current $I_{max}$	A	18	27	24
Maximum speed $n_{max}$	r/min	7400	9000	6600
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	1.7 (0.581)	1.7 (0.581)	2.7 (0.923)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	2.6 (0.888)	2.6 (0.888)	3.5 (1.196)
$J_{Mot Br}$				
Weight $m_{Mot}$	kg (lb)	5.6 (12.35)	5.6 (12.35)	7.7 (16.98)
Weight (with brake) $m_{Mot Br}$	kg (lb)	6.6 (14.55)	6.6 (14.55)	8.7 (19.18)
<b>200 ... 240 V 3 AC</b>				
Rated speed $n_N$	r/min	1500	2500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	5 (3.69)	4.85 (3.58)	8 (5.90)
Rated current $I_N$	A	4.65	6.9	6.7
Rated power $P_N$	W	790	1270	1260
<b>380 ... 480 V 3 AC</b>				
Rated speed $n_N$	r/min	3000	4500	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	4.6 (3.39)	3.7 (2.73)	6.6 (4.87)
Rated current $I_N$	A	4.35	5.4	5.6
Rated power $P_N$	W	1450	1740	2100
Suitable for SINAMICS S210 servo converters				
• 200 ... 240 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0	6SL3210-5HE12-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0	6SL3210-5HE12-0UF0
Suitable for SINAMICS S210 servo converters (New)				
• 200 ... 240 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0	6SL5310-1BE12-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0	6SL5310-1BE12-0DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 52

### Technical specifications

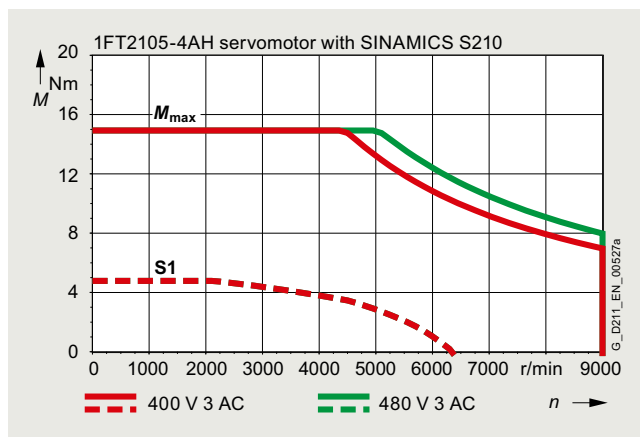
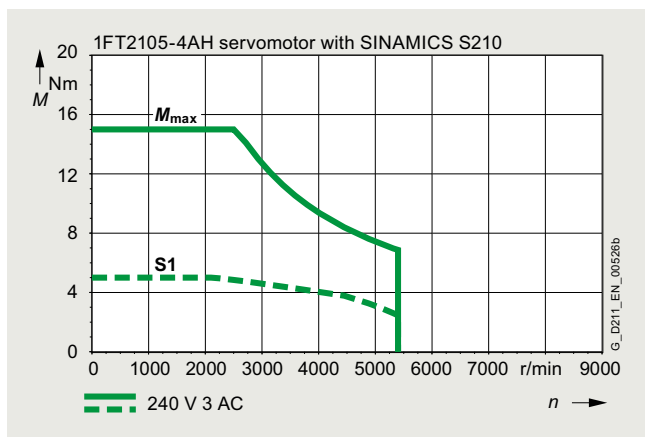
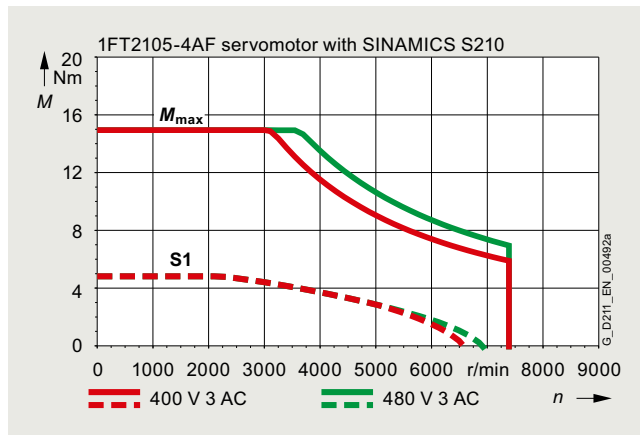
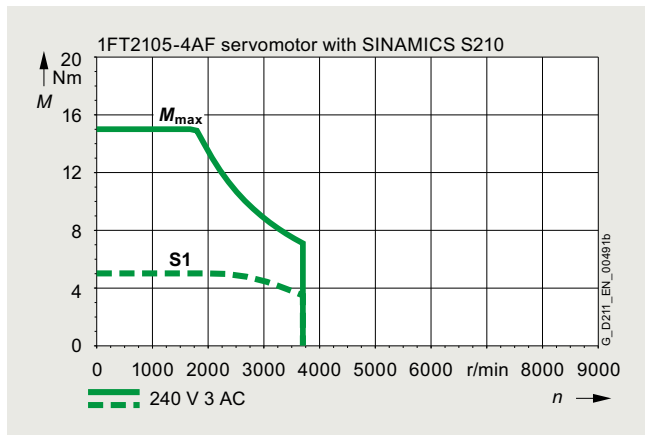
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

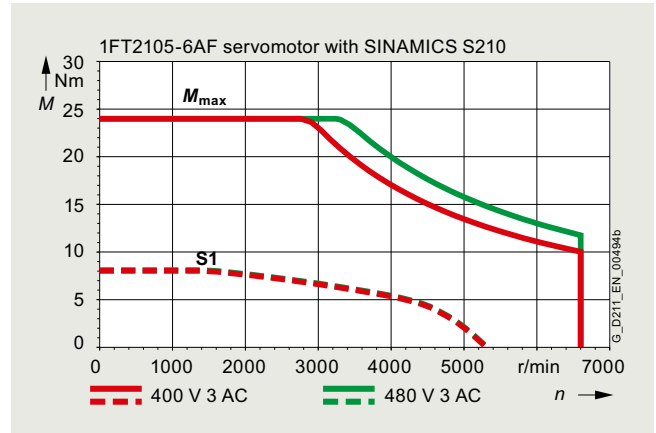
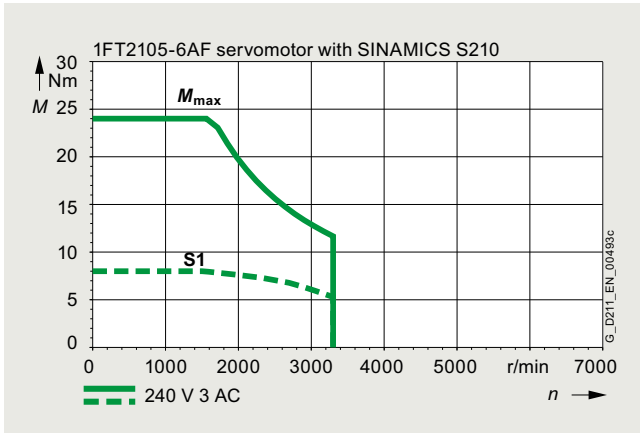
##### High Dynamic



**Technical specifications**

Speed/torque characteristics (continued)

High Dynamic (continued)

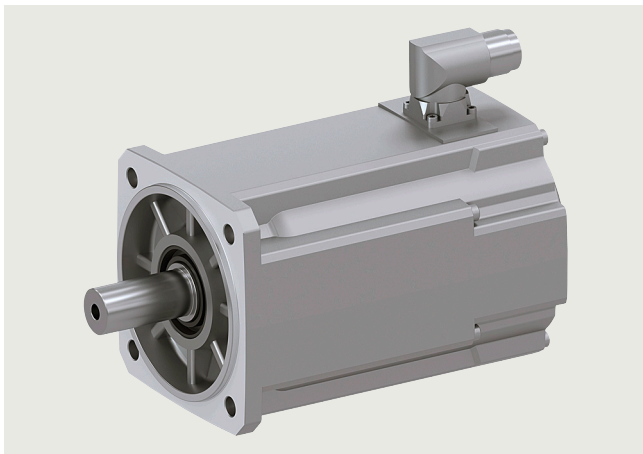


## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 63

## Technical specifications

## SIMOTICS S-1FT2 shaft height 63

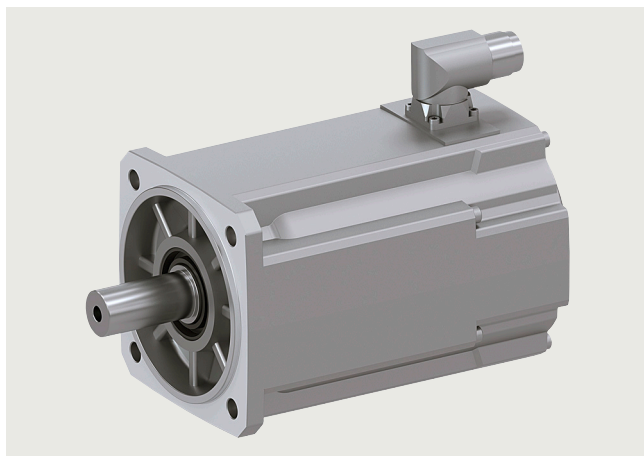


## Specific technical specifications

SIMOTICS S-1FT2 servomotors		High Dynamic			Compact		
Shaft height 63		1FT2106-3AF	1FT2106-4AF	1FT2106-6AF	1FT2206-2AC	1FT2206-2AF	1FT2206-2AH
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	9 (6.64)	12 (8.85)	16 (11.80)	6 (4.43)	6.5 (4.79)	6.5 (4.79)
Stall current $I_0$	A	9.2	10.7	14.3	2.8	5	6.5
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	26 (19.18)	33 (24.34)	45.5 (33.56)	18 (18.28)	18 (13.28)	18 (13.28)
Maximum current $I_{max}$	A	43	42	49	10.3	17.8	22.5
Maximum speed $n_{max}$	r/min	8000	7800	7600	4300	6800	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	4.6 (1.572)	6.0 (2.050)	8.7 (2.973)	7.8 (2.665)	7.8 (2.665)	7.8 (2.665)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	6.3 (2.153)	7.6 (2.597)	10 (3.417)	9.4 (3.212)	9.4 (3.212)	9.4 (3.212)
$J_{Mot Br}$							
Weight $m_{Mot}$	kg (lb)	7.4 (16.32)	9,0 (19.85)	12 (26.46)	6.3 (13.89)	6.3 (13.89)	6.3 (13.89)
Weight (with brake) $m_{Mot Br}$	kg (lb)	9,0 (19.85)	11 (24.26)	13 (28.67)	7.9 (17.42)	7.9 (17.42)	7.9 (17.42)
<b>200 ... 240 V 3 AC</b>							
Rated speed $n_N$	r/min	1500	1500	1500	1000	1500	2500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	8.3 (6.12)	10.5 (7.74)	13.8 (10.18)	5.85 (4.31)	6.1 (4.50)	5.5 (4.06)
Rated current $I_N$	A	8.7	9.6	12.5	3.75	4.8	5.7
Rated power $P_N$	W	1300	1640	2150	610	970	1450
<b>380 ... 480 V 3 AC</b>							
Rated speed $n_N$	r/min	3000	3000	3000	2000	3000	4500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	7.3 (5.38)	8.6 (6.34)	10.6 (7.82)	5.5 (4.06)	5.4 (3.98)	3.9 (2.90)
Rated current $I_N$	A	7.9	8.1	9.7	2.8	4.35	4.1
Rated power $P_N$	W	2300	2700	3300	1150	1710	1800
Suitable for SINAMICS S210 servo converters							
• 200 ... 240 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE11-5UF0
• 380 ... 480 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE11-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0
Suitable for SINAMICS S210 servo converters (New)							
• 200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE11-5DF0
• 380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE11-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0

## Technical specifications

## SIMOTICS S-1FT2 shaft height 63 (continued)



## Specific technical specifications (continued)

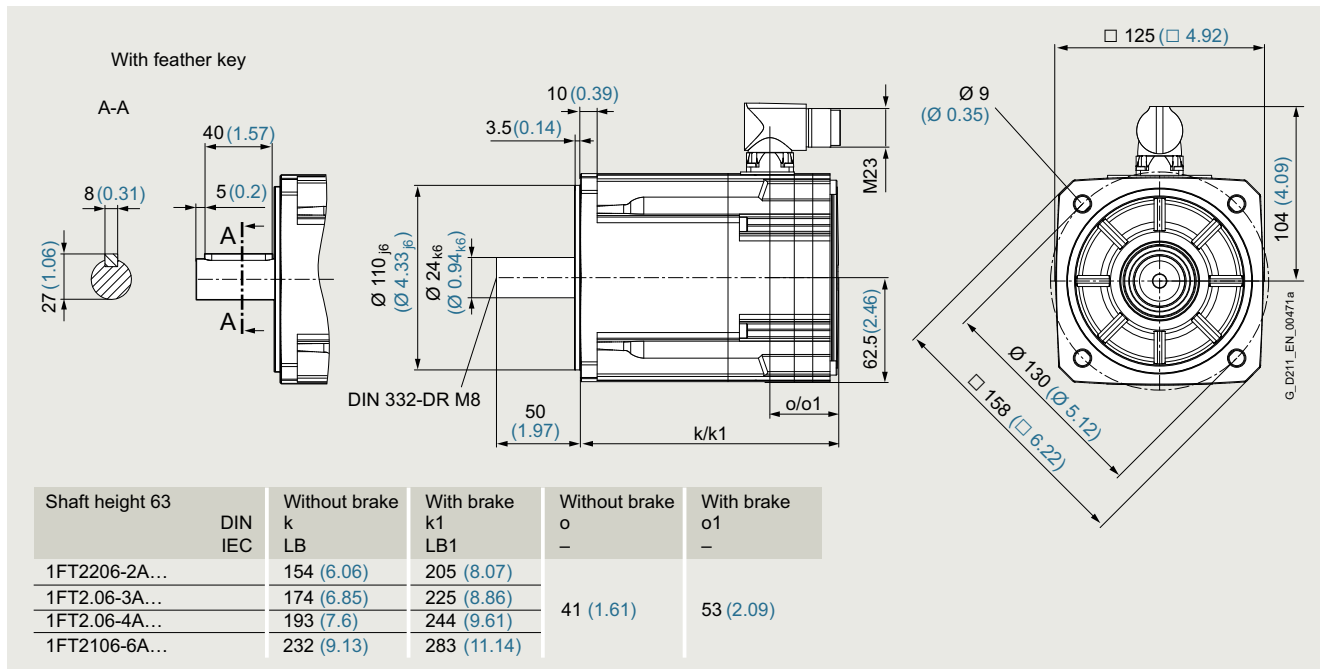
SIMOTICS S-1FT2 servomotors		Compact				
Shaft height 63		1FT2206-3AB	1FT2206-3AF	1FT2206-4AC	1FT2206-4AF	1FT2206-4AH
Static torque $M_0$	Nm (lb <sub>r</sub> -ft)	9 (6.64)	9 (6.64)	12 (8.85)	12 (8.85)	12 (8.85)
Stall current $I_0$	A	3.15	5.4	4.5	7.9	12
Maximum torque $M_{max}$	Nm (lb <sub>r</sub> -ft)	27 (19.92)	27 (19.92)	38 (28.03)	36 (26.55)	36 (26.55)
Maximum current $I_{max}$	A	11.4	19.7	17	29.5	44
Maximum speed $n_{max}$	r/min	3300	5700	3300	5800	8000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	12 (4.100)	12 (4.100)	15.1 (5.160)	15 (5.126)	15 (5.126)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	13 (4.442)	13 (4.442)	16.8 (5.741)	17 (5.809)	17 (5.809)
$J_{Mot Br}$						
Weight $m_{Mot}$	kg (lb)	7.4 (16.32)	7.4 (16.32)	8.9 (19.62)	8.9 (19.62)	8.9 (19.62)
Weight (with brake) $m_{Mot Br}$	kg (lb)	9 (19.85)	9 (19.85)	10.6 (23.37)	11 (24.26)	11 (24.26)
<b>200 ... 240 V 3 AC</b>						
Rated speed $n_N$	r/min	750	1500	1000	1500	2500
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	8.7 (6.42)	8.2 (6.05)	11.5 (8.48)	10.9 (8.04)	9.3 (6.86)
Rated current $I_N$	A	3.05	5.0	4.32	7.3	9.8
Rated power $P_N$	W	680	1290	1200	1720	2400
<b>380 ... 480 V 3 AC</b>						
Rated speed $n_N$	r/min	1500	3000	2000	3000	4500
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	8.3 (6.12)	7.5 (5.53)	10.5 (7.74)	9.1 (6.71)	4.7 (3.47)
Rated current $I_N$	A	2.9	4.65	4.1	6.2	5.2
Rated power $P_N$	W	1300	2350	2200	2850	2200
Suitable for SINAMICS S210 servo converters						
• 200 ... 240 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE11-5UF0	6SL3210-5HE12-0UF0	6SL3210-5HE11-5UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0
Suitable for SINAMICS S210 servo converters (New)						
• 200 ... 240 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE11-5DF0	6SL5310-1BE12-0DF0	6SL5310-1BE11-5DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 63

### Technical specifications

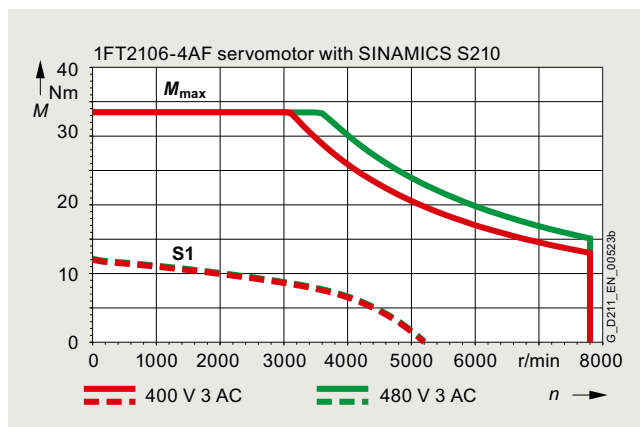
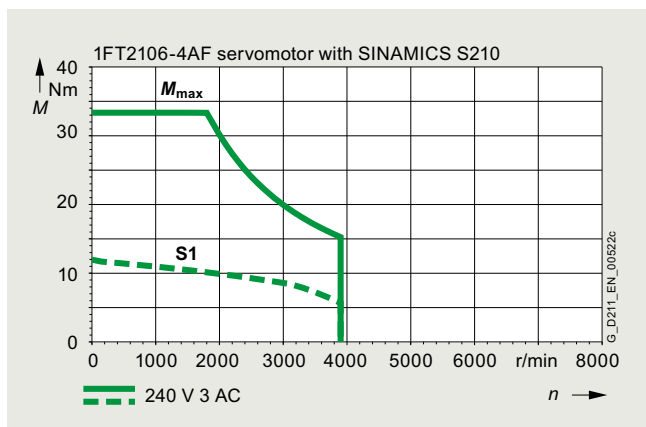
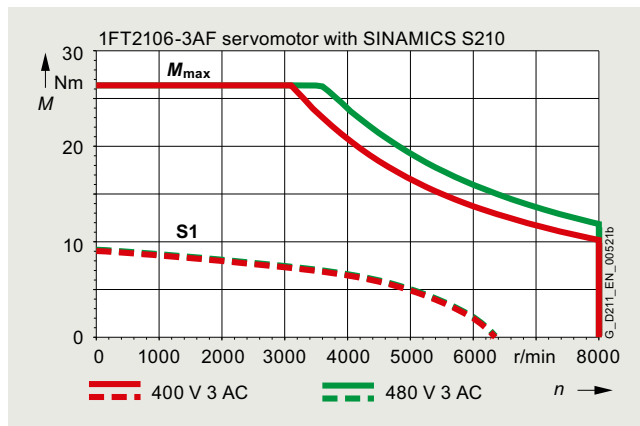
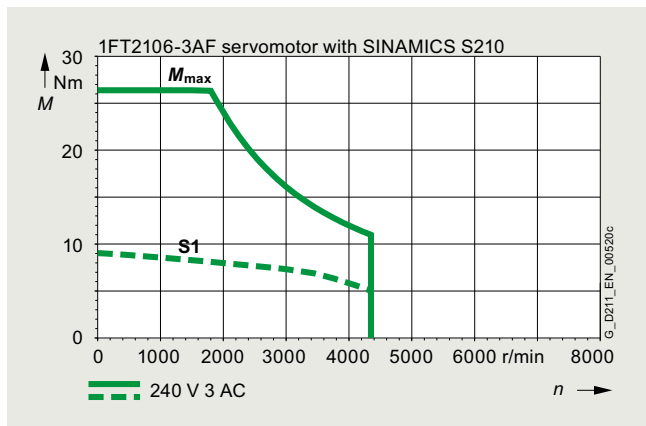
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

##### High Dynamic

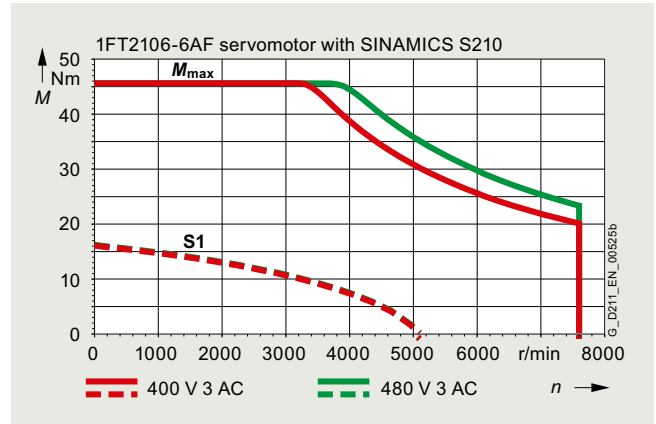
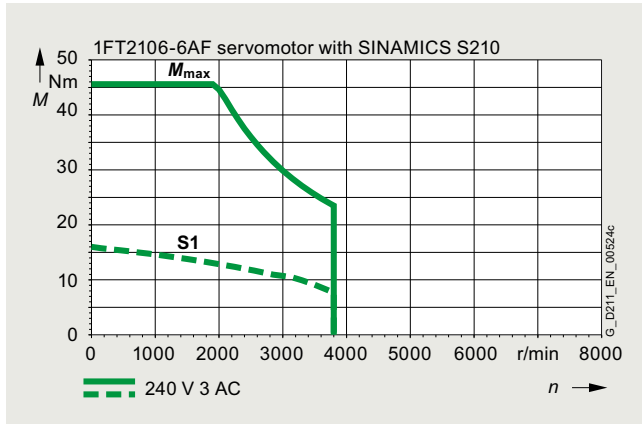




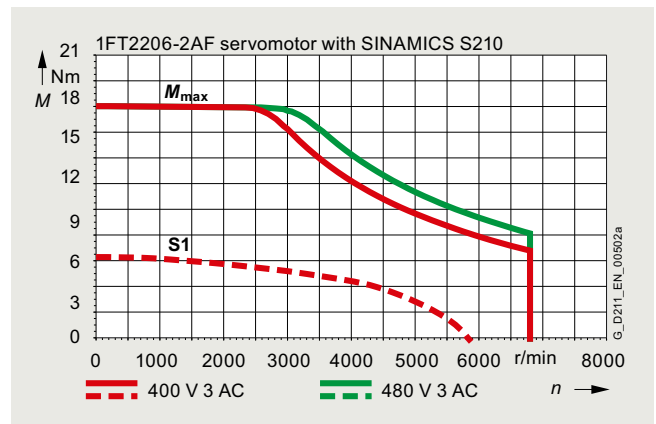
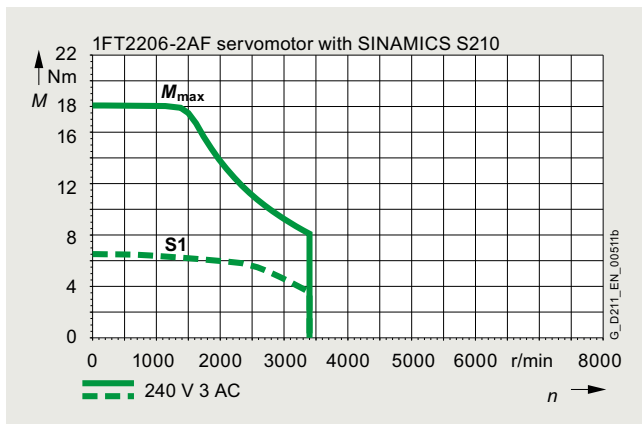
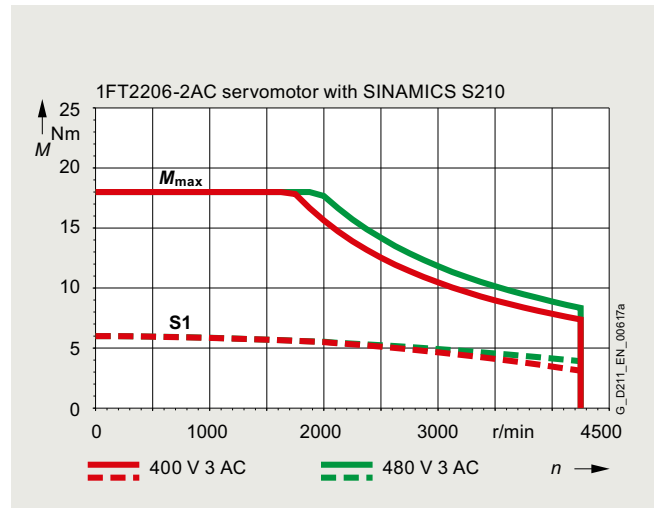
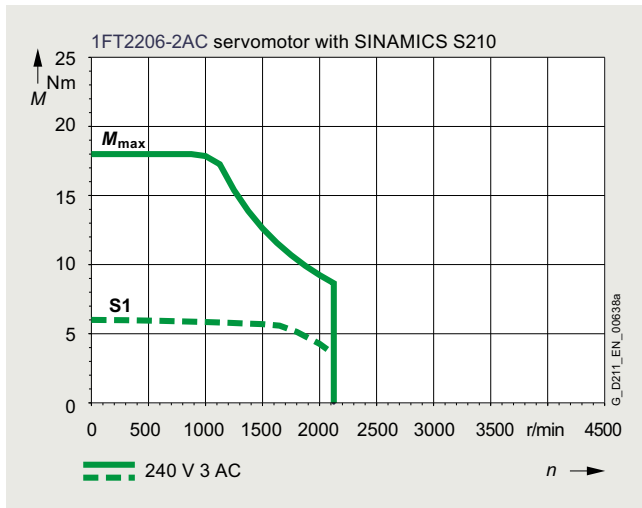
Technical specifications

Speed/torque characteristics (continued)

High Dynamic (continued)



Compact



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

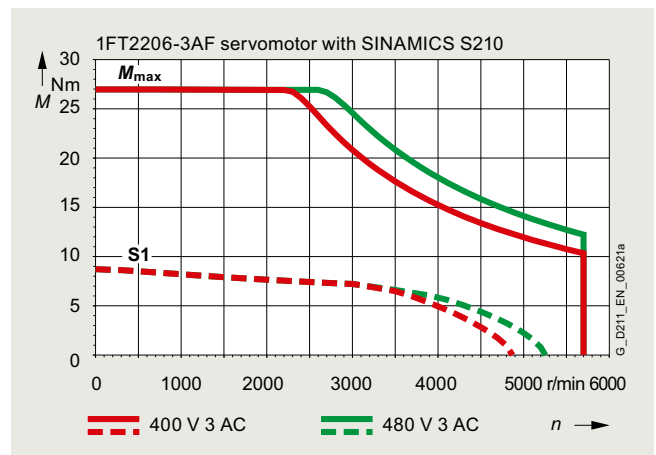
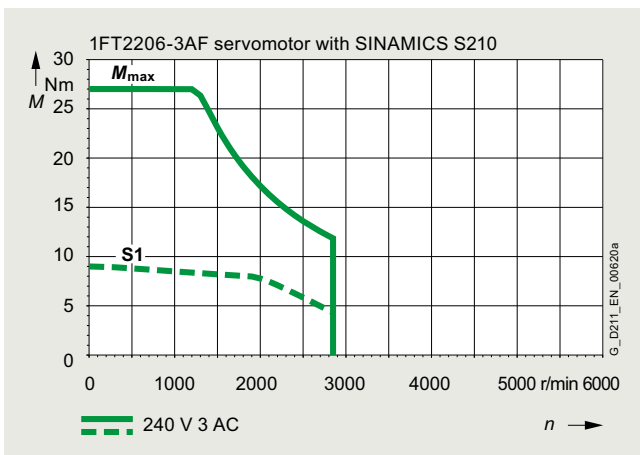
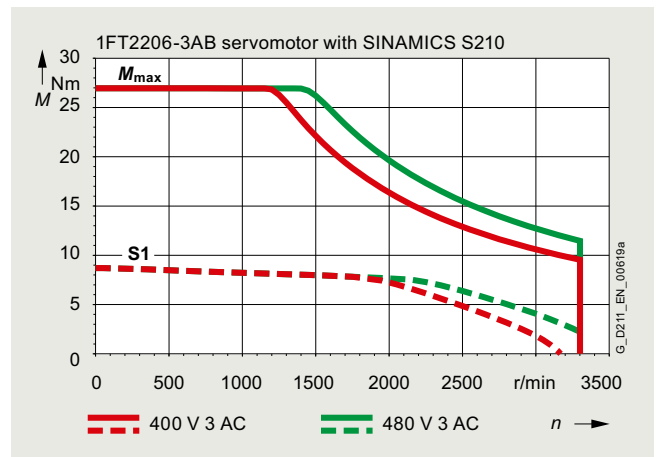
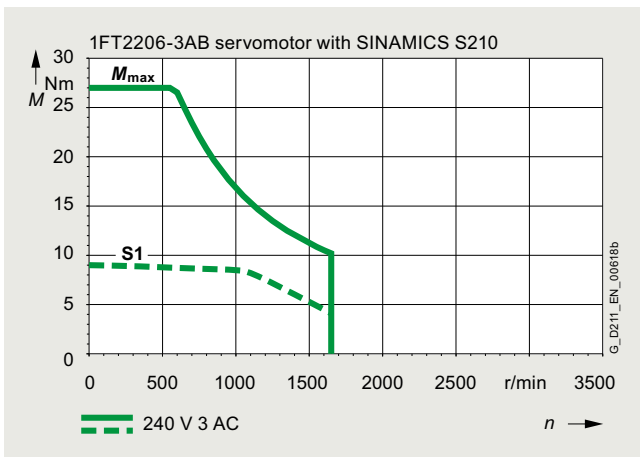
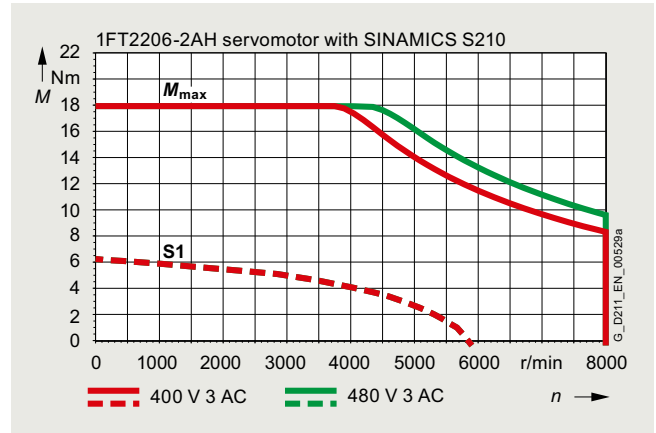
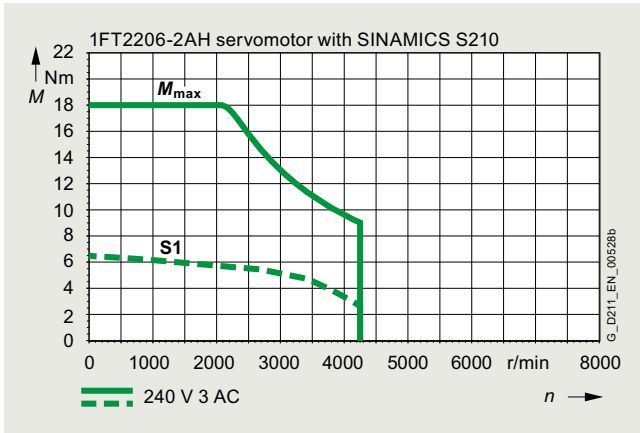
## SIMOTICS S-1FT2 shaft height 63

### Technical specifications

Speed/torque characteristics (continued)

Compact (continued)

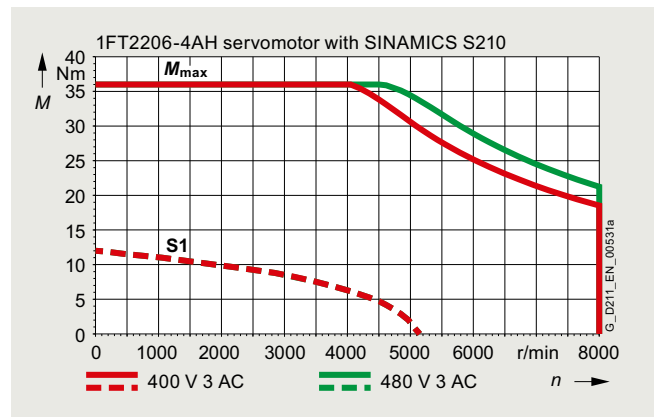
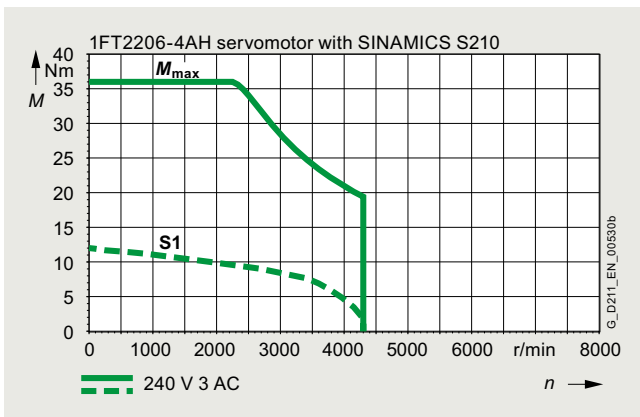
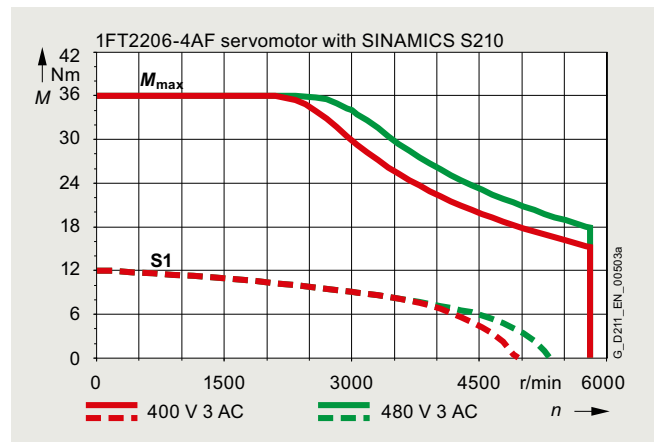
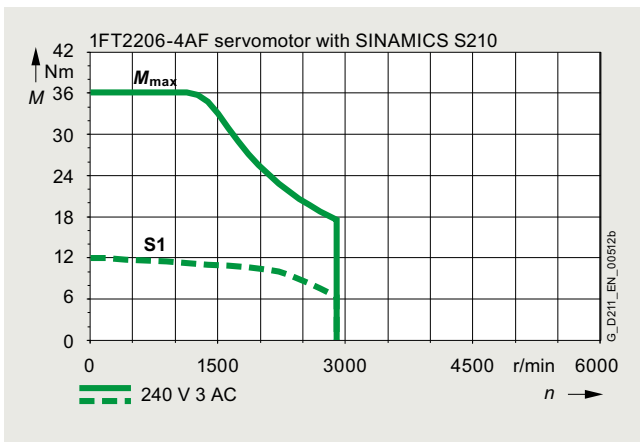
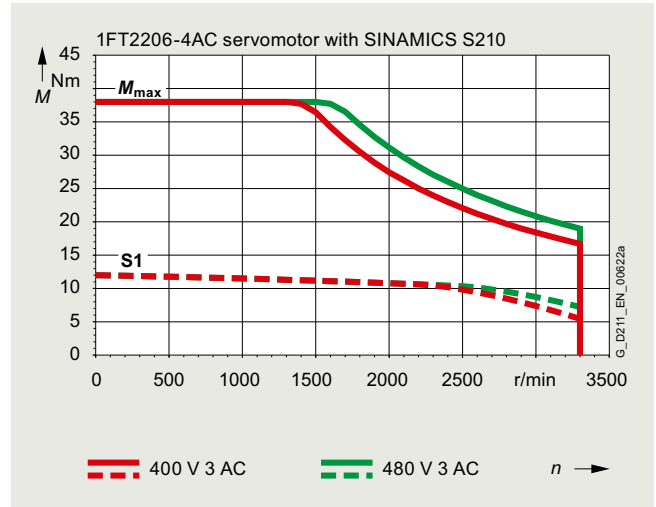
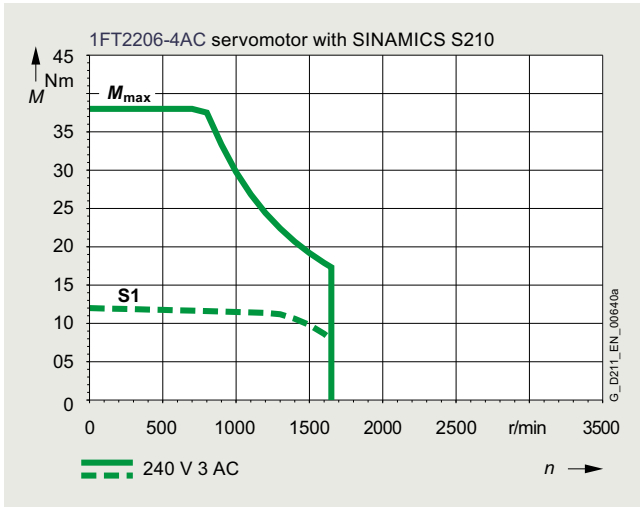
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Technical specifications

Speed/torque characteristics (continued)

Compact (continued)

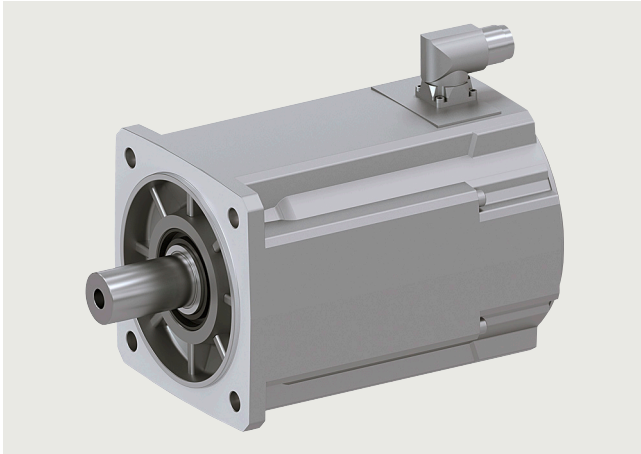


## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 80

## Technical specifications

## SIMOTICS S-1FT2 shaft height 80

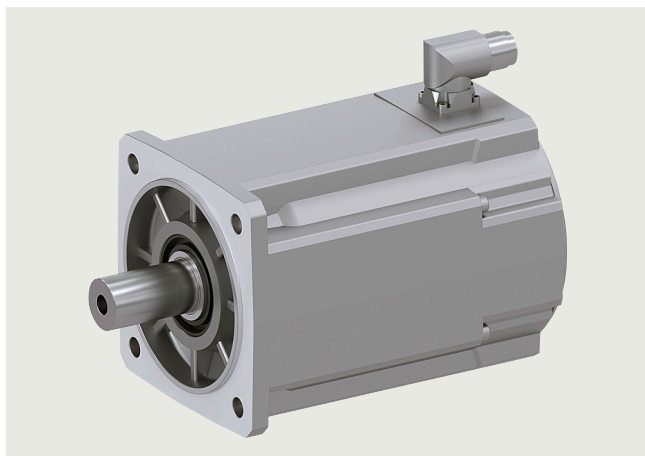


## Specific technical specifications

SIMOTICS S-1FT2 servomotors		High Dynamic		
Shaft height 80		1FT2108-4AC	1FT2108-5AB	1FT2108-7AB
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	25 (18.44)	30 (22.13)	37.5 (27.66)
Stall current $I_0$	A	14.8	11.8	14
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	74 (54.58)	100 (73.73)	118 (87.04)
Maximum current $I_{max}$	A	55	55	55
Maximum speed $n_{max}$	r/min	5600	3750	3550
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	18 (6.151)	22 (7.517)	28 (9.568)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	22 (7.517)	26 (8.884)	32 (10.934)
Moment of inertia (with reinforced brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	24 (8.201)	27 (9.226)	34 (11.618)
Weight $m_{Mot}$	kg (lb)	17 (37.49)	19.7 (43.44)	24.5 (54.02)
Weight (with brake) $m_{Mot Br}$	kg (lb)	20 (44.10)	22 (48.51)	27 (59.54)
Weight (with reinforced brake) $m_{Mot Br}$	kg (lb)	20 (44.10)	23 (50.72)	27 (59.54)
<b>200 ... 240 V 3 AC</b>				
Rated speed $n_N$	r/min	1000	750	750
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	23.5 (17.33)	28 (20.65)	33 (24.34)
Rated current $I_N$	A	14.2	11.1	13
Rated power $P_N$	W	2450	2200	2600
<b>380 ... 480 V 3 AC</b>				
Rated speed $n_N$	r/min	2000	1500	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	20.5 (9.44)	25.5 (18.81)	30 (22.13)
Rated current $I_N$	A	12.8	10.3	11.5
Rated power $P_N$	W	4300	4000	4700
Suitable for SINAMICS S210 servo converters				
• 200 ... 240 V 3 AC		6SL3210-5HE17-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE17-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE17-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)				
• 200 ... 240 V 3 AC		6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0

## Technical specifications

## SIMOTICS S-1FT2 shaft height 80 (continued)



## Specific technical specifications

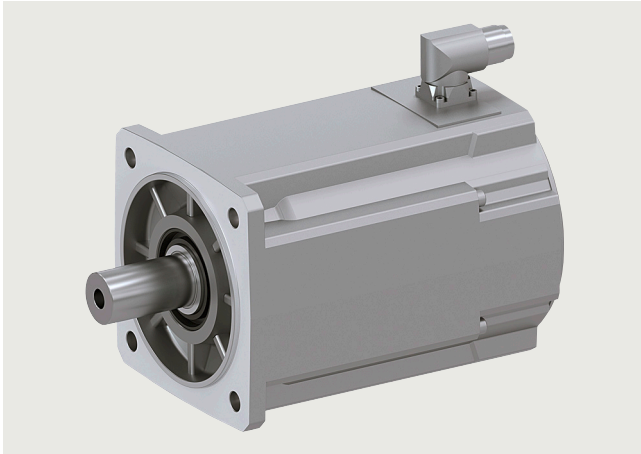
SIMOTICS S-1FT2 servomotors		Compact				
Shaft height 80		1FT2208-2AF	1FT2208-3AB	1FT2208-3AC	1FT2208-3AF	1FT2208-4AB
Static torque $M_0$	Nm (lb <sub>r</sub> -ft)	12.5 (9.22)	18 (13.28)	18 (13.28)	18 (13.28)	22 (16.23)
Stall current $I_0$	A	8.3	6.2	8.4	11.9	7.1
Maximum torque $M_{max}$	Nm (lb <sub>r</sub> -ft)	38 (28.03)	51 (37.62)	51 (37.62)	51 (37.62)	66 (48.68)
Maximum current $I_{max}$	A	31	20.5	29.5	40	25
Maximum speed $n_{max}$	r/min	6000	3000	4100	5600	3000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	23 (7.859)	30 (10.251)	30 (10.251)	30 (10.251)	39 (13.326)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	26 (8.884)	33 (11.276)	33 (11.276)	33 (11.276)	44 (15.035)
Moment of inertia (with reinforced brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	28 (9.568)	35 (11.960)	35 (11.960)	35 (11.960)	–
Weight $m_{Mot}$	kg (lb)	11 (24.26)	13 (28.6)	13 (28.6)	13 (28.6)	15 (33.08)
Weight (with brake) $m_{Mot Br}$	kg (lb)	13 (28.6)	15 (33.08)	15 (33.08)	15 (33.08)	17 (37.49)
Weight (with reinforced brake) $m_{Mot Br}$	kg (lb)	13 (28.6)	15 (33.08)	15 (33.08)	15 (33.08)	17 (37.49)
<b>200 ... 240 V 3 AC</b>						
Rated speed $n_N$	r/min	1500	750	1000	1500	750
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	10.7 (7.89)	17 (12.54)	16.6 (12.24)	15 (11.10)	20.7 (15.27)
Rated current $I_N$	A	8.1	5.9	7.9	10.4	6.7
Rated power $P_N$	W	1680	1340	1740	2400	1620
<b>380 ... 480 V 3 AC</b>						
Rated speed $n_N$	r/min	3000	1500	2000	3000	1500
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	9 (6.64)	16 (11.80)	14.5 (10.70)	11.1 (8.19)	18.6 (13.72)
Rated current $I_N$	A	6,5	5,7	7	7,7	6,4
Rated power $P_N$	W	2850	2500	3050	3500	2900
Suitable for SINAMICS S210 servo converters						
• 200 ... 240 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE12-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE13-5UF0
• 380 ... 480 V 3 AC		6SL3210-5HE13-5UF0	6SL3210-5HE12-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE13-5UF0
Suitable for SINAMICS S210 servo converters (New)						
• 200 ... 240 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE12-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE13-5DF0
• 380 ... 480 V 3 AC		6SL5310-1BE13-5DF0	6SL5310-1BE12-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE13-5DF0

## SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 80

## Technical specifications

## SIMOTICS S-1FT2 shaft height 80 (continued)

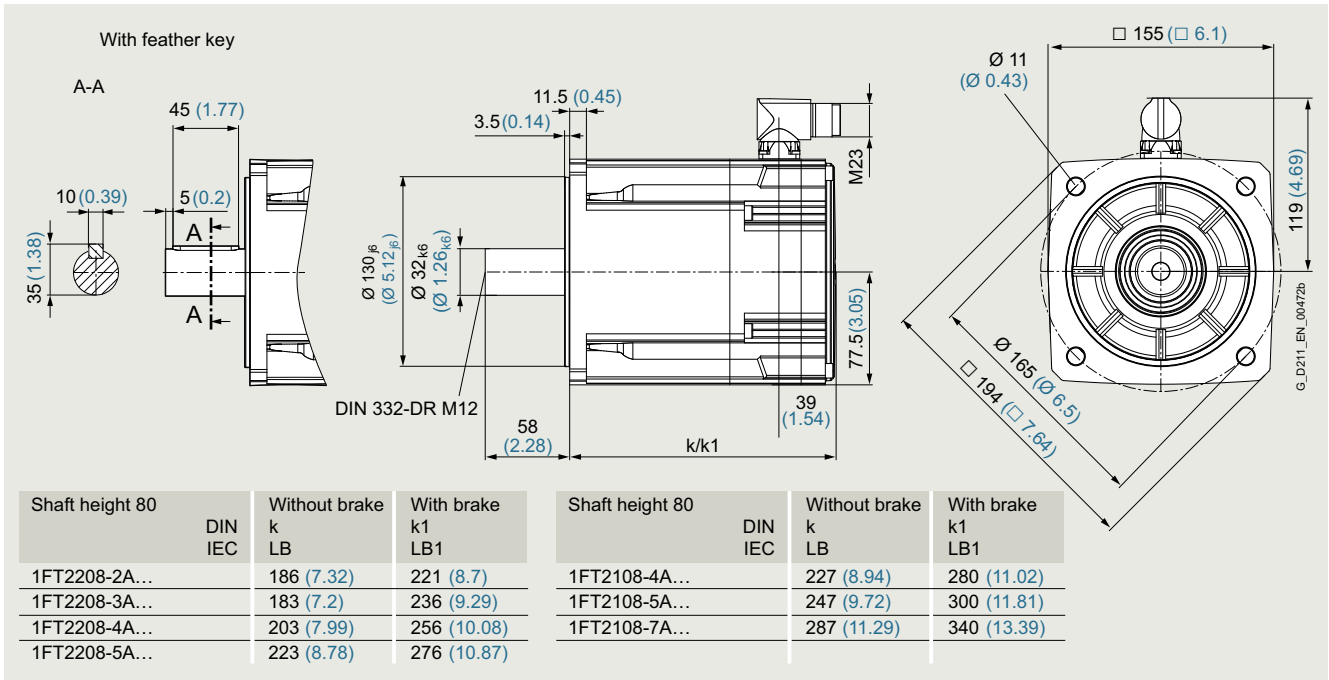


## Specific technical specifications (continued)

SIMOTICS S-1FT2 servomotors		Compact			
Shaft height 80		1FT2208-4AC	1FT2208-4AF	1FT2208-5AB	1FT2208-5AC
Static torque $M_0$	Nm (lb <sub>r</sub> -ft)	22 (16.23)	22 (16.23)	27 (19.92)	27 (19.92)
Stall current $I_0$	A	11.7	15	8.6	15
Maximum torque $M_{max}$	Nm (lb <sub>r</sub> -ft)	66 (48.68)	66 (48.68)	80 (59.01)	80 (59.01)
Maximum current $I_{max}$	A	43.5	55	29.5	51.5
Maximum speed $n_{max}$	r/min	4600	5900	3000	4700
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	39 (13.326)	39 (13.326)	48 (16.402)	48 (16.402)
Moment of inertia (with brake)	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	44 (15.035)	44 (15.035)	54 (18.452)	54 (18.452)
$J_{Mot Br}$					
Moment of inertia (with reinforced brake)	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	–	–	–	–
$J_{Mot Br}$					
Weight $m_{Mot}$	kg (lb)	15 (33.08)	15 (33.08)	17 (37.49)	17 (37.49)
Weight (with brake) $m_{Mot Br}$	kg (lb)	17 (37.49)	17 (37.49)	19 (41.90)	19 (41.90)
Weight (with reinforced brake)	kg (lb)	–	–	–	–
$m_{Mot Br}$					
<b>200 ... 240 V 3 AC</b>					
Rated speed $n_N$	r/min	1000	1500	750	1000
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	20 (14.75)	18 (13.30)	24.5 (18.07)	23.5 (17.33)
Rated current $I_N$	A	10.9	12.4	7.9	13.2
Rated power $P_N$	W	2150	2750	1920	2500
<b>380 ... 480 V 3 AC</b>					
Rated speed $n_N$	r/min	2000	3000	1500	2000
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	17 (12.54)	12 (8.90)	22 (16.23)	19.1 (14.09)
Rated current $I_N$	A	9.3	8.5	7.2	10.8
Rated power $P_N$	W	3550	3700	3450	4000
Suitable for SINAMICS S210 servo converters					
• 200 ... 240 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE17-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)					
• 200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0

**Technical specifications**

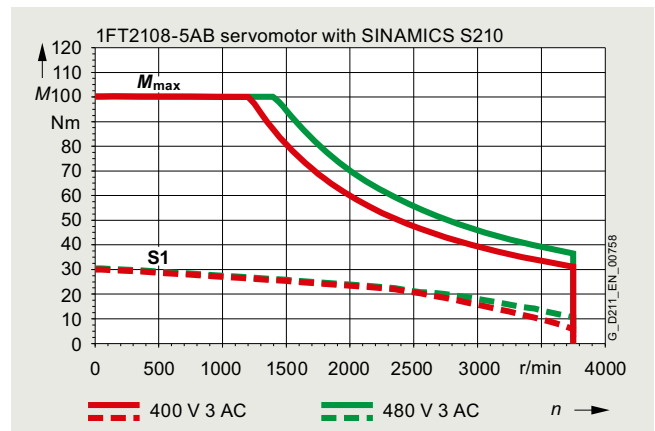
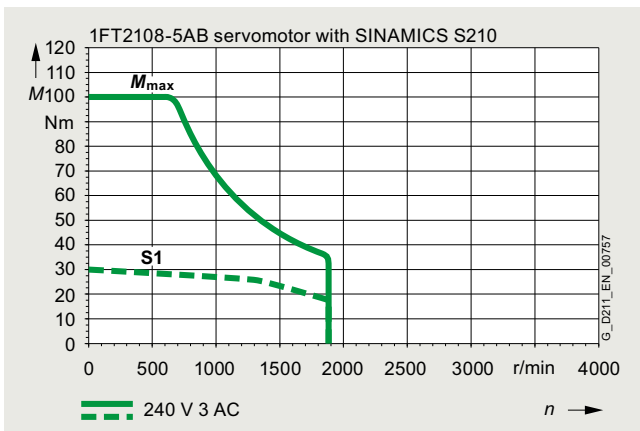
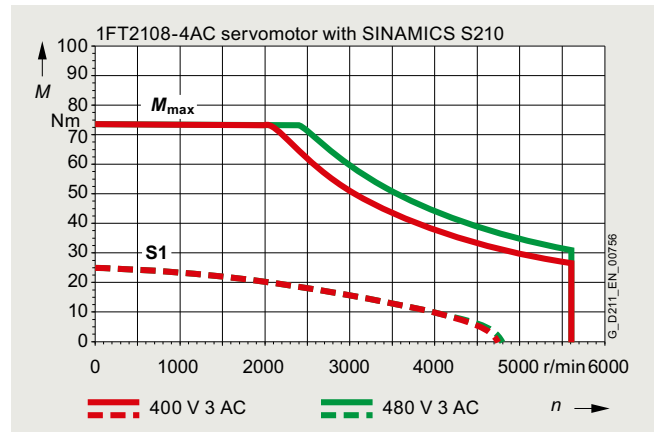
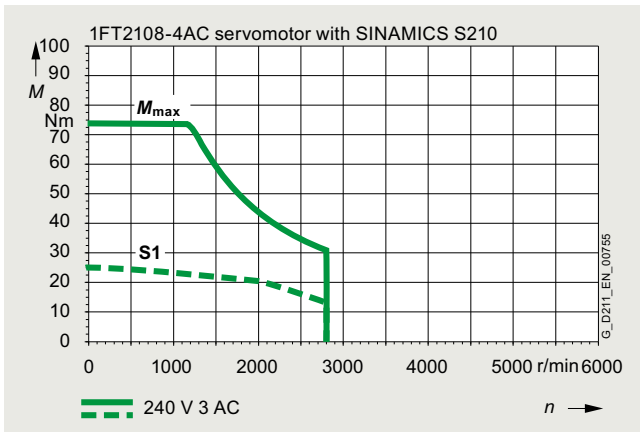
Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

High Dynamic



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

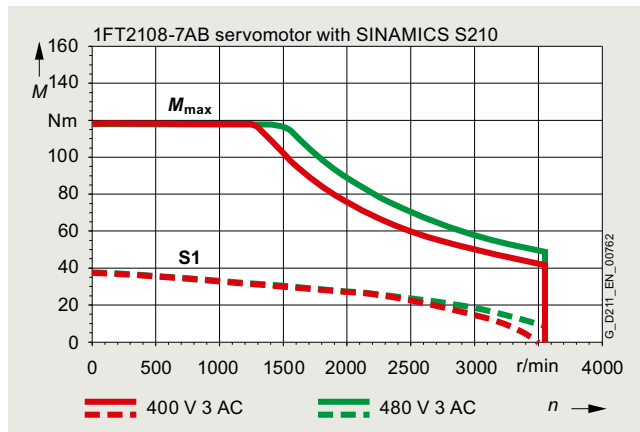
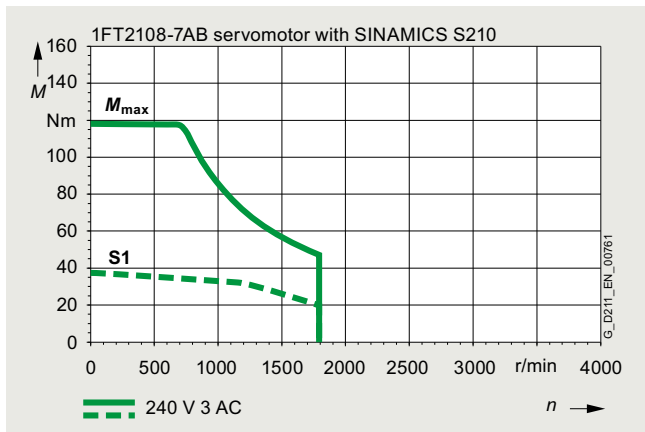
## SIMOTICS S-1FT2 shaft height 80

### Technical specifications

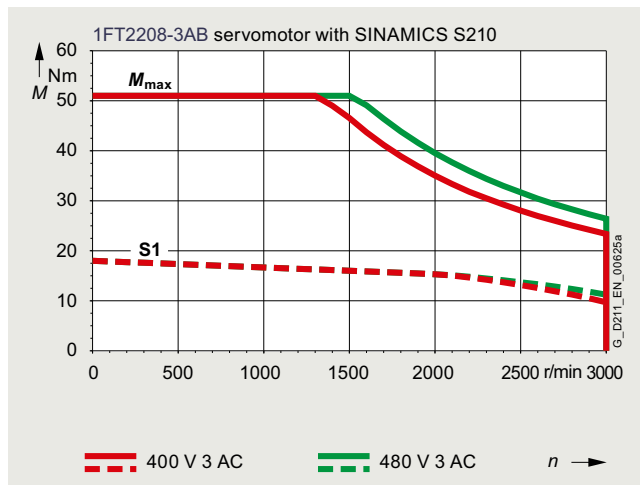
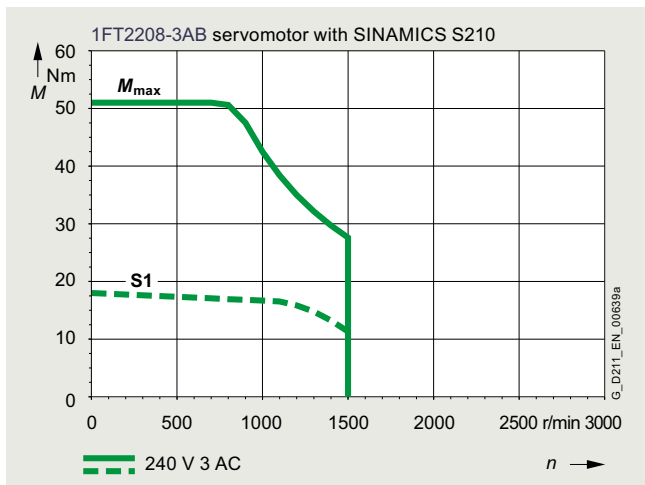
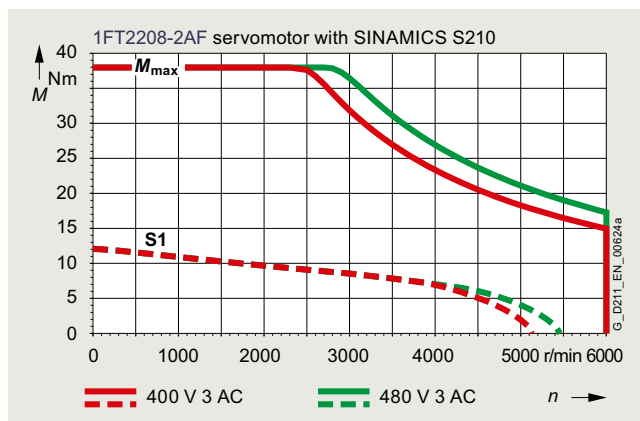
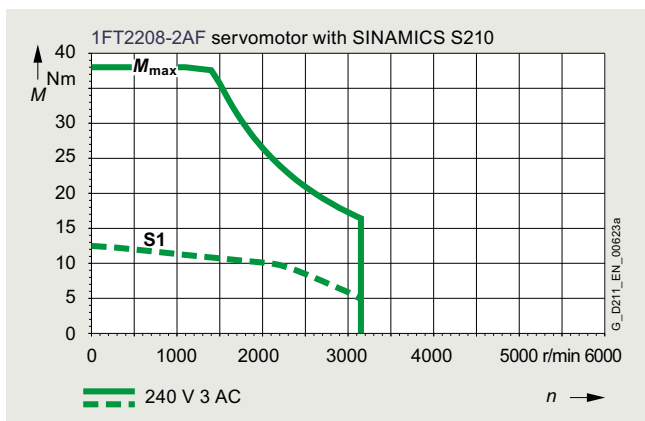
Speed/torque characteristics (continued)

High Dynamic (continued)

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Compact

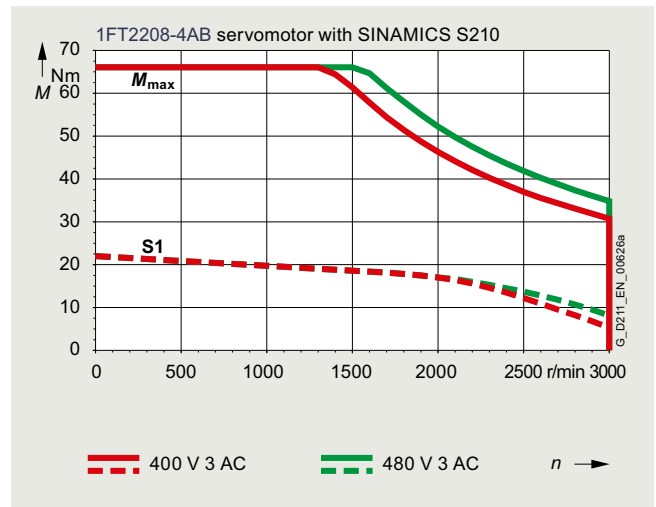
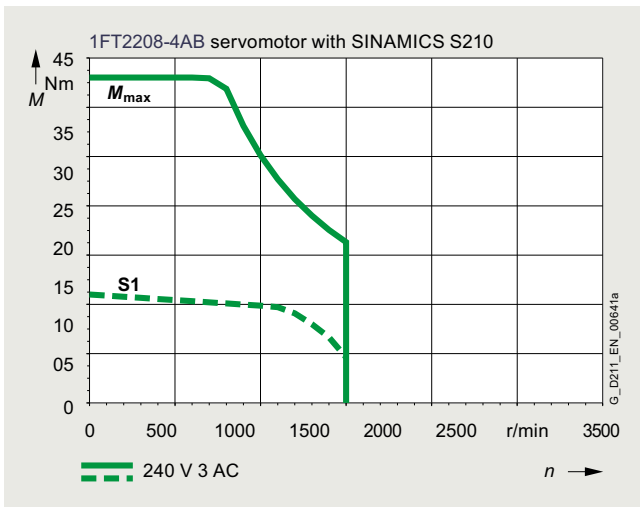
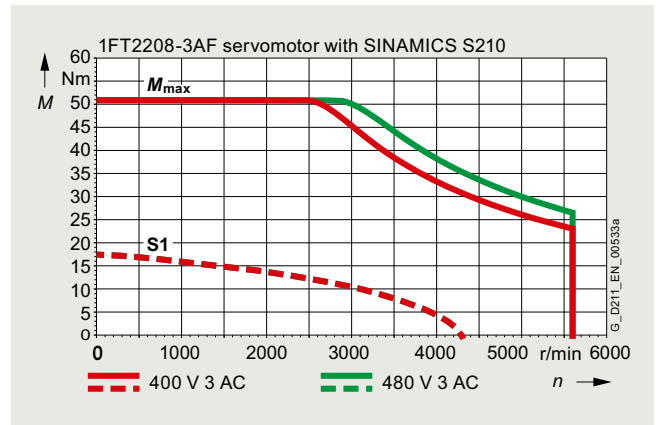
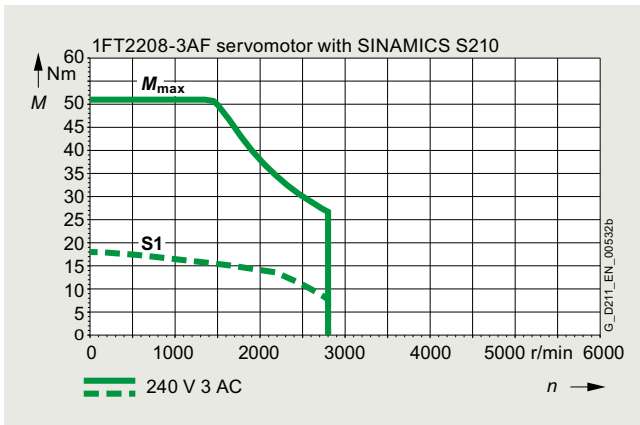
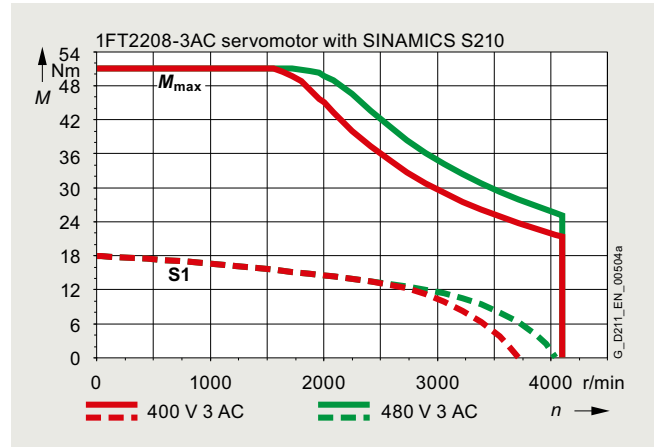
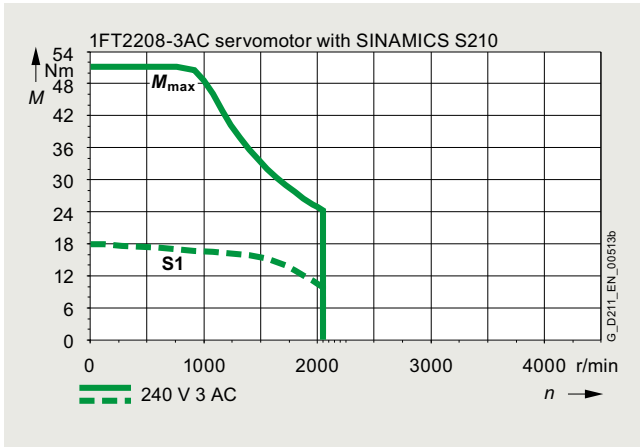




Technical specifications

Speed/torque characteristics (continued)

Compact (continued)



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

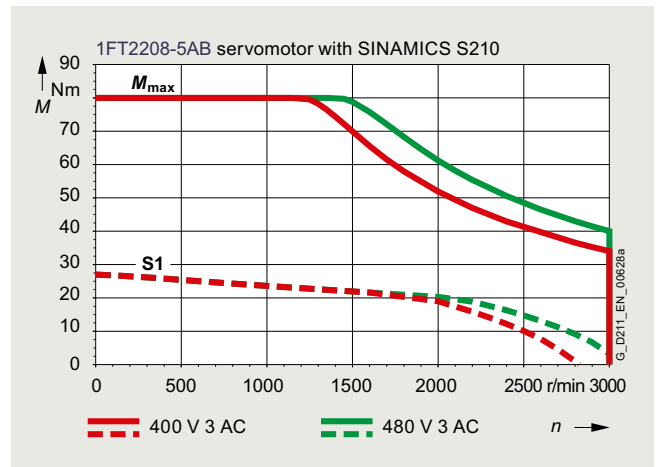
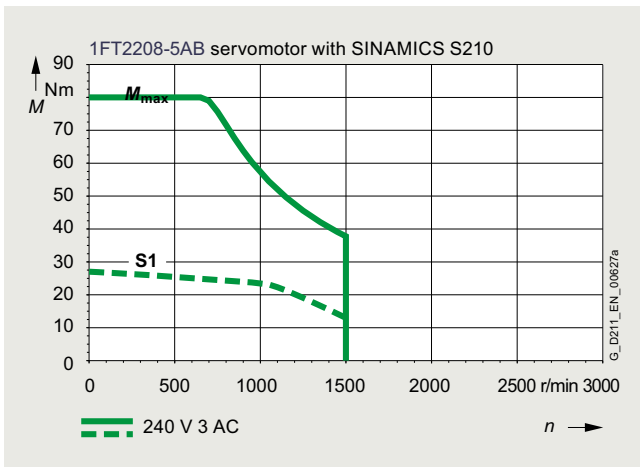
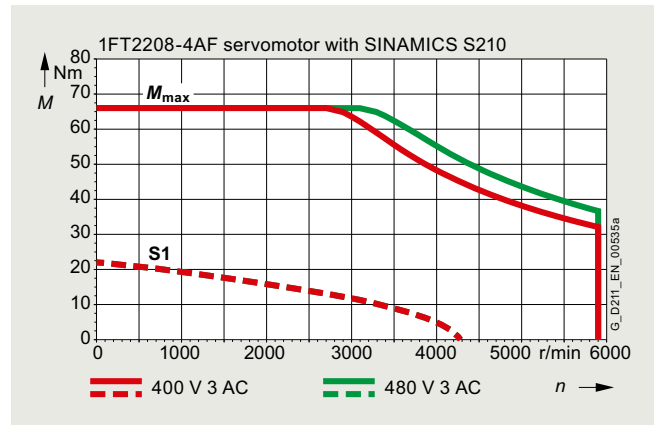
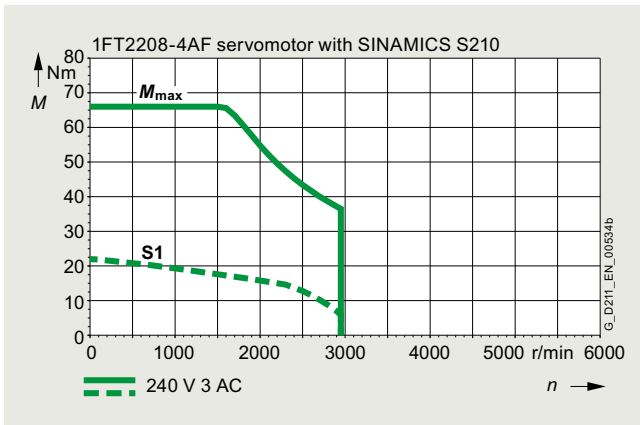
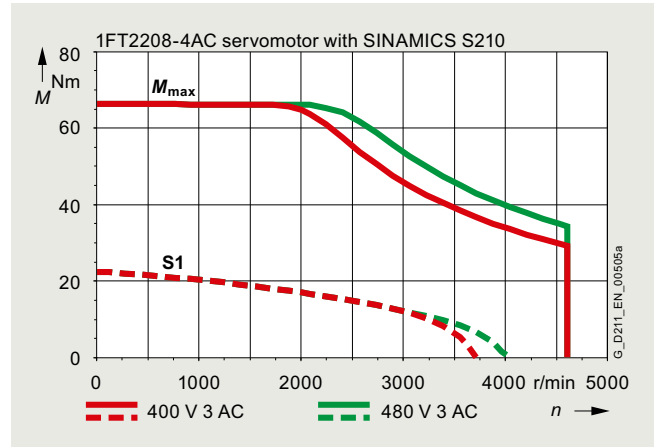
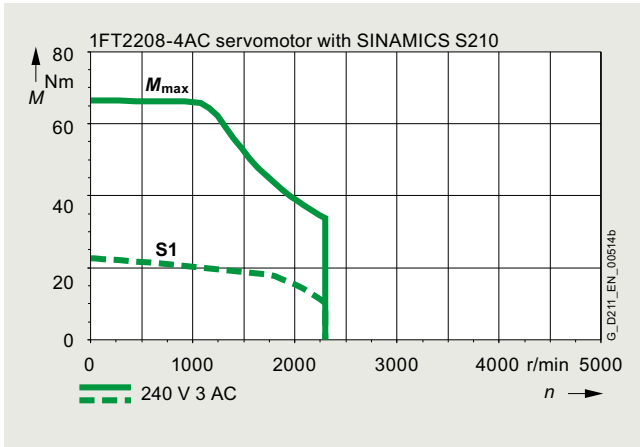
## SIMOTICS S-1FT2 shaft height 80

### Technical specifications

Speed/torque characteristics (continued)

Compact (continued)

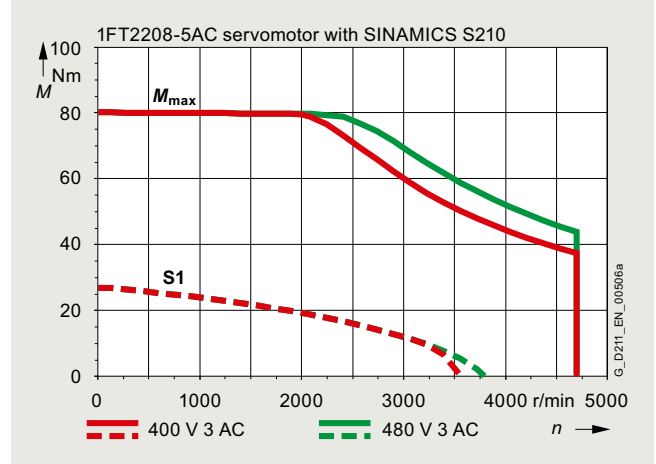
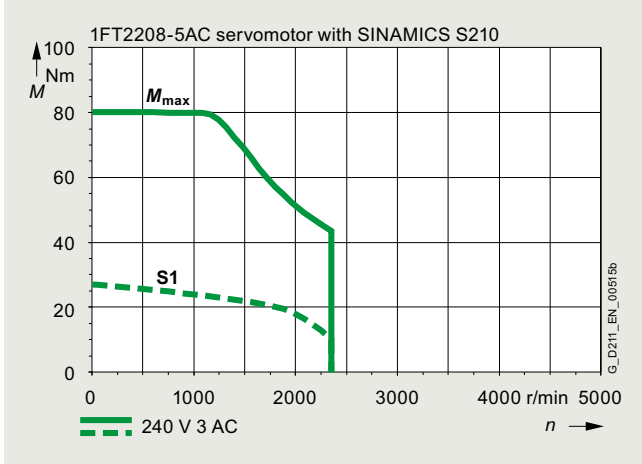
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**Technical specifications**

Speed/torque characteristics (continued)

Compact (continued)



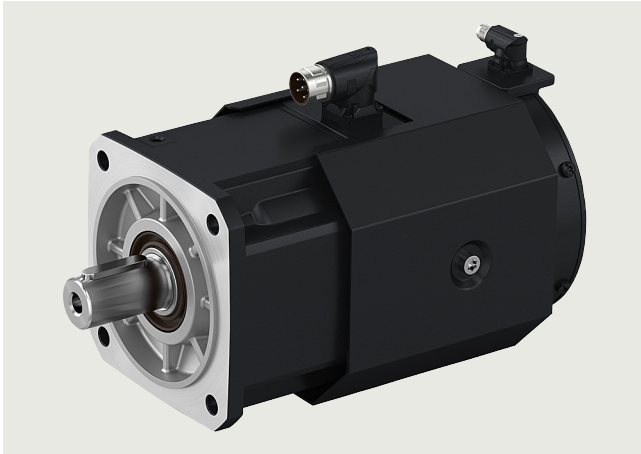
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## SIMOTICS S-1FT2 servomotors for SINAMICS S210

### SIMOTICS S-1FT2 shaft height 80 forced ventilation

#### Technical specifications

##### SIMOTICS S-1FT2 shaft height 80 forced ventilation

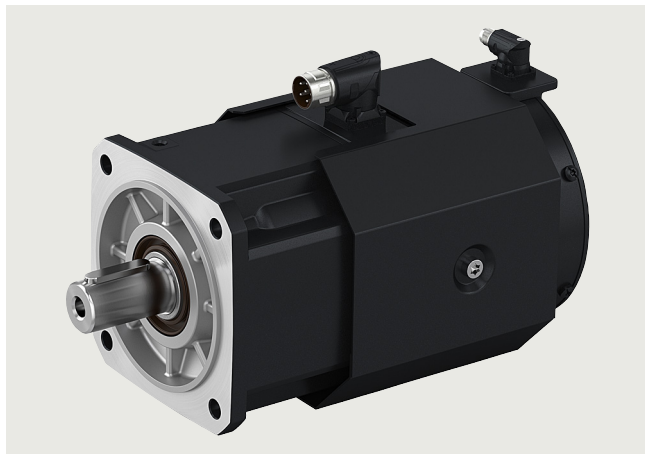


#### Specific technical specifications

SIMOTICS S-1FT2 servomotors Shaft height 80 forced ventilation		High Dynamic 1FT2108-5SB	Compact 1FT2208-3SB	1FT2208-3SC	1FT2208-3SF
Static torque $M_0$	Nm (lb <sub>r</sub> -ft)	40 (29.5)	22 (16.23)	22 (16.23)	22 (16.23)
Stall current $I_0$	A	15.5	7.8	10.4	14.1
Maximum torque $M_{max}$	Nm (lb <sub>r</sub> -ft)	100 (73.73)	51 (37.62)	51 (37.62)	51 (37.62)
Maximum current $I_{max}$	A	55	20.5	29.5	40
Maximum speed $n_{max}$	r/min	3700	3350	4500	6000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	22 (7.517)	30 (10.251)	30 (10.251)	30 (10.251)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	26 (8.884)	33 (11.276)	33 (11.276)	33 (11.276)
Moment of inertia (with reinforced brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	27 (9.226)	35 (11.960)	35 (11.960)	35 (11.960)
Weight $m_{Mot}$	kg (lb)	22 (48.51)	15 (33.08)	15 (33.08)	15 (33.08)
Weight (with brake) $m_{Mot Br}$	kg (lb)	25 (55.13)	17 (37.49)	17 (37.49)	17 (37.49)
Weight (with reinforced brake) $m_{Mot Br}$	kg (lb)	25 (55.13)	18 (39.69)	18 (39.69)	18 (39.69)
<b>200 ... 240 V 3 AC</b>					
Rated speed $n_N$	r/min	750	750	1000	1500
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	38 (28.03)	20.5 (15.12)	20.5 (15.12)	19.9 (15.12)
Rated current $I_N$	A	14.6	7.6	9.9	13.2
Rated power $P_N$	W	3000	1620	2150	3100
<b>380 ... 480 V 3 AC</b>					
Rated speed $n_N$	r/min	1500	1500	2000	3000
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	35.5 (16.18)	19.9 (14.68)	19.1 (14.09)	17.6 (12.98)
Rated current $I_N$	A	14.9	7.3	9.5	12.2
Rated power $P_N$	W	5600	3100	4000	5500
Suitable for SINAMICS S210 servo converters					
• 200 ... 240 V 3 AC					
• 380 ... 480 V 3 AC		6SL3210-5HE17-0UF0	6SL3210-5HE13-5UF0	6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)					
• 200 ... 240 V 3 AC		6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0

## Technical specifications

## SIMOTICS S-1FT2 shaft height 80 forced ventilation (continued)



## Specific technical specifications (continued)

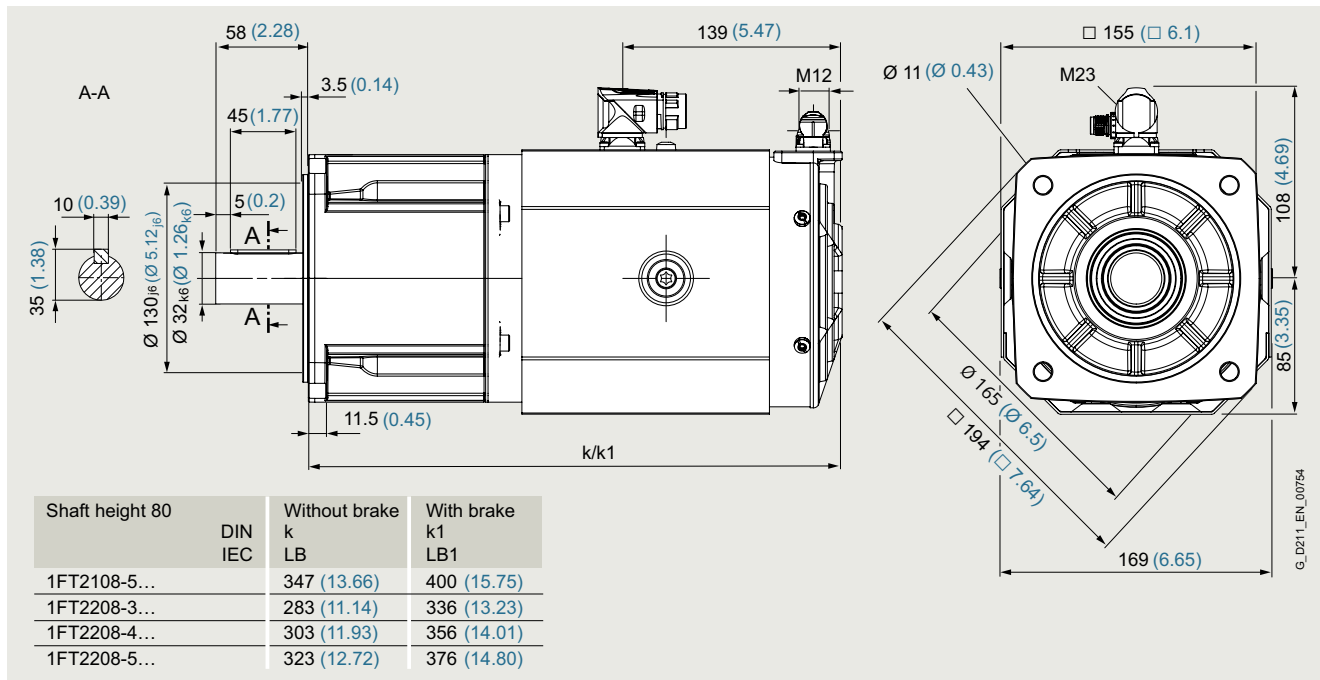
SIMOTICS S-1FT2 servomotors		Compact		
Shaft height 80 forced ventilation		1FT2208-4SB	1FT2208-4SC	1FT2208-5SB
Static torque $M_0$	Nm (lb <sub>r</sub> -ft)	28 (20.65)	28 (20.65)	35 (25.82)
Stall current $I_0$	A	9,3	14,6	10,7
Maximum torque $M_{max}$	Nm (lb <sub>r</sub> -ft)	66 (48.68)	66 (48.68)	80 (59.01)
Maximum current $I_{max}$	A	25	43,5	29,5
Maximum speed $n_{max}$	r/min	3150	4950	2900
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	39 (13.326)	39 (13.326)	48 (16.402)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	44 (15.035)	44 (15.035)	54 (18.452)
Moment of inertia (with reinforced brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	–	–	–
Weight $m_{Mot}$	kg (lb)	18 (39.69)	18 (39.69)	20 (44.10)
Weight (with brake) $m_{Mot Br}$	kg (lb)	20 (44.10)	20 (44.10)	23 (50.72)
Weight (with reinforced brake) $m_{Mot Br}$	kg (lb)	–	–	–
<b>200 ... 240 V 3 AC</b>				
Rated speed $n_N$	r/min	750	1000	750
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	26,5 (19.55)	26 (19.55)	33,5 (24.71)
Rated current $I_N$	A	9	14	10,5
Rated power $P_N$	W	2100	2750	2600
<b>380 ... 480 V 3 AC</b>				
Rated speed $n_N$	r/min	1500	2000	1500
Rated torque $M_N$	Nm (lb <sub>r</sub> -ft)	25,5 (18.81)	24 (17.70)	32 (23.60)
Rated current $I_N$	A	8,8	13,3	10,2
Rated power $P_N$	W	4000	5100	5000
Suitable for SINAMICS S210 servo converters				
• 200 ... 240 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE15-0UF0
• 380 ... 480 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE17-0UF0	6SL3210-5HE15-0UF0
Suitable for SINAMICS S210 servo converters (New)				
• 200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 80 forced ventilation

### Technical specifications

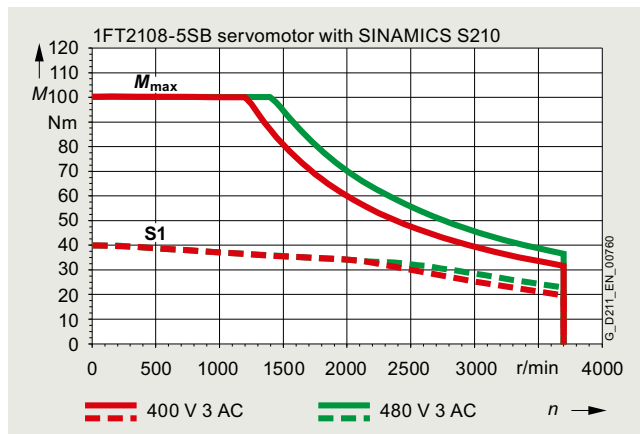
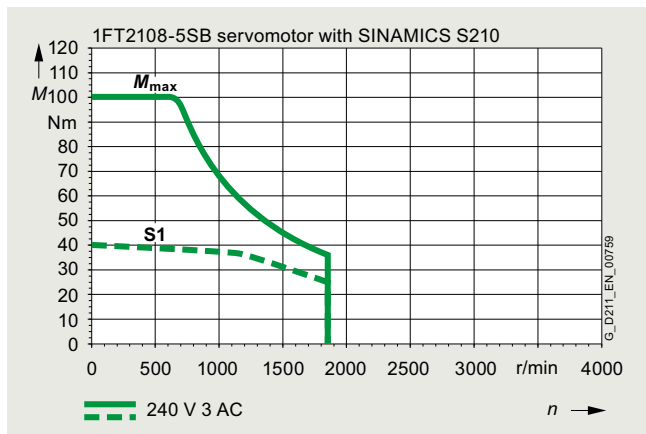
#### Dimensional drawing



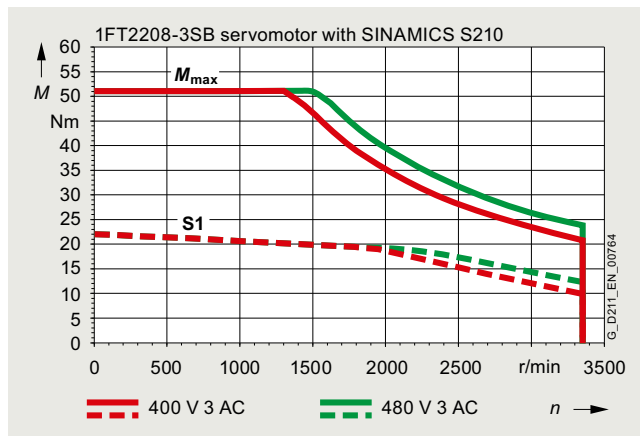
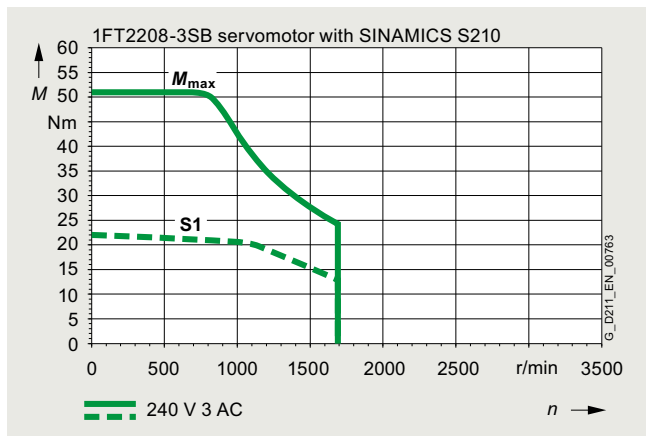
All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

##### High Dynamic



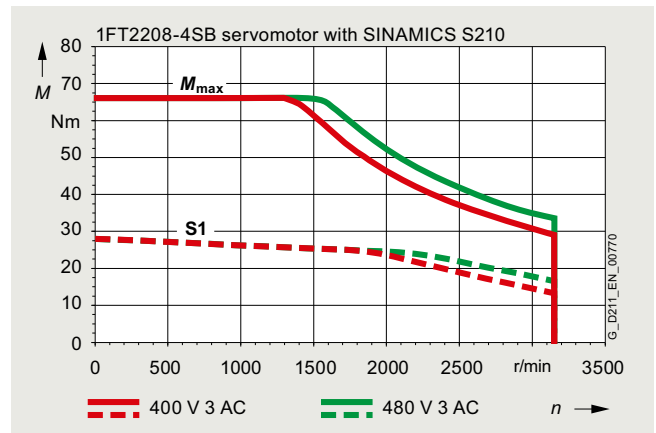
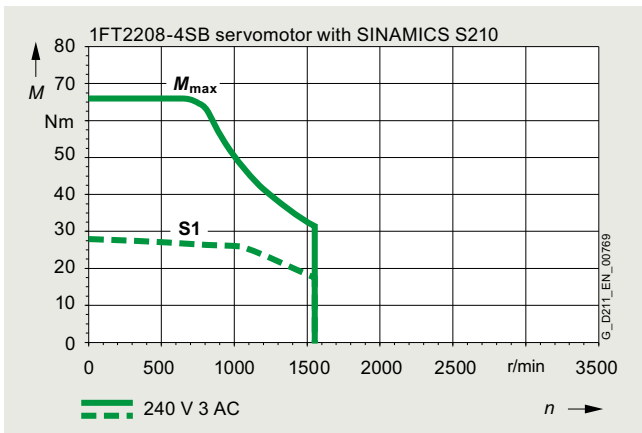
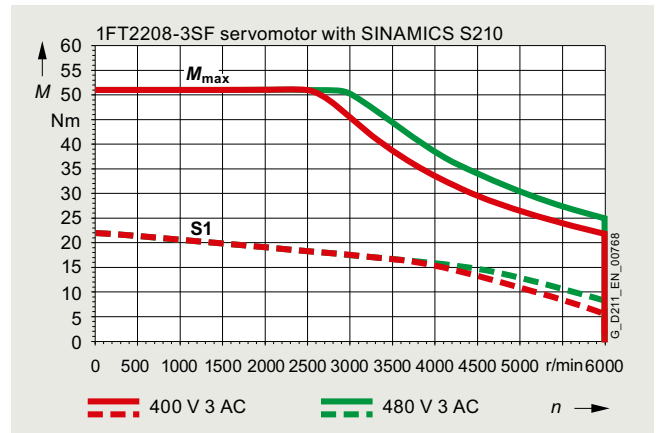
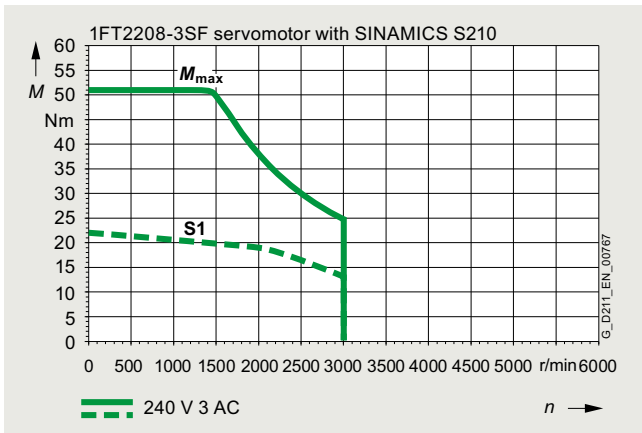
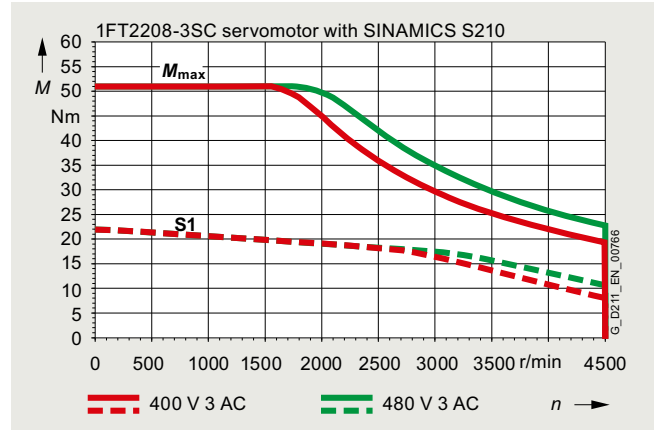
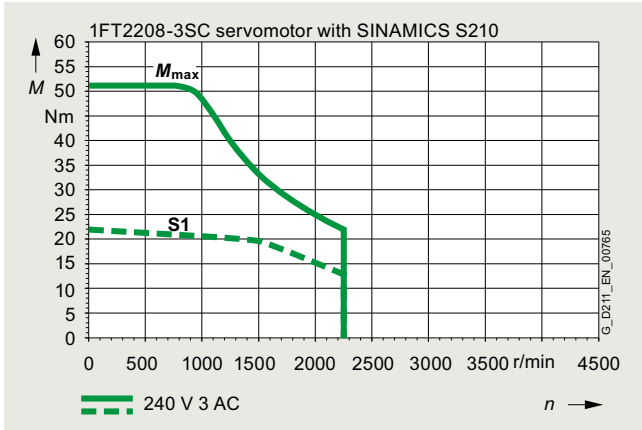
##### Compact



Technical specifications

Speed/torque characteristics (continued)

Compact (continued)



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

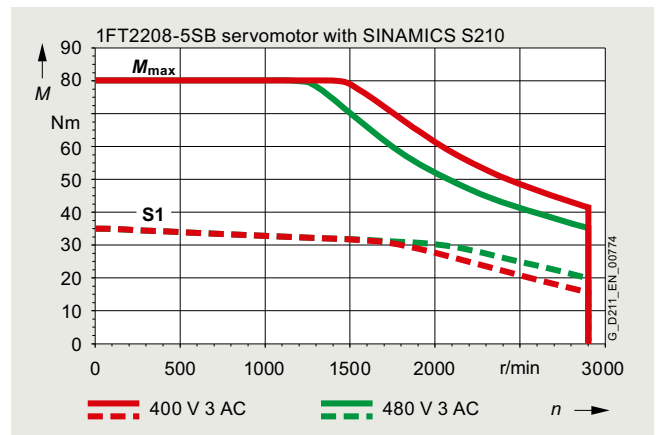
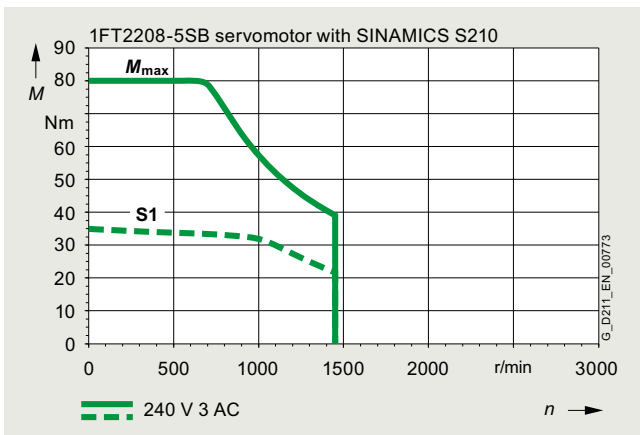
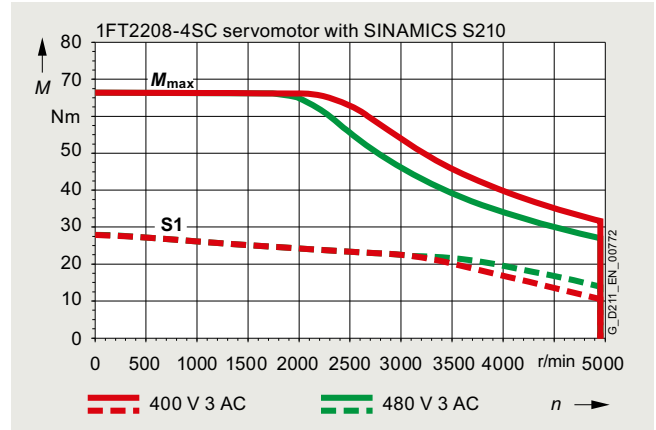
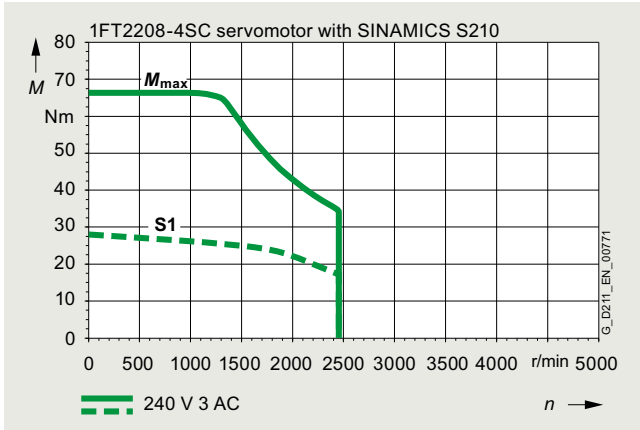
## SIMOTICS S-1FT2 shaft height 80 forced ventilation

### Technical specifications

Speed/torque characteristics (continued)

Compact (continued)

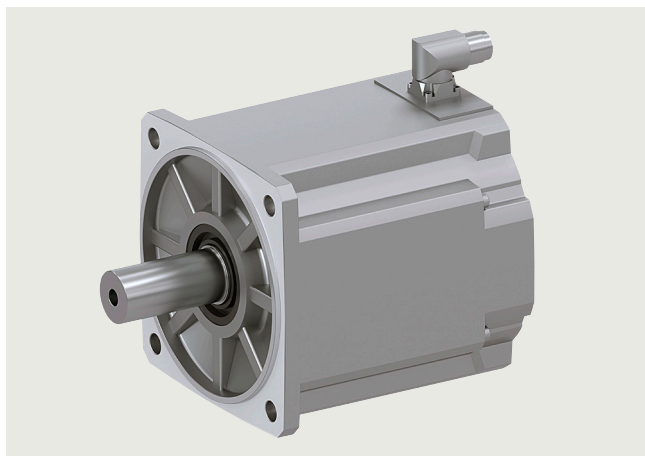
3  
2





## Technical specifications

## SIMOTICS S-1FT2 shaft height 100



## Specific technical specifications

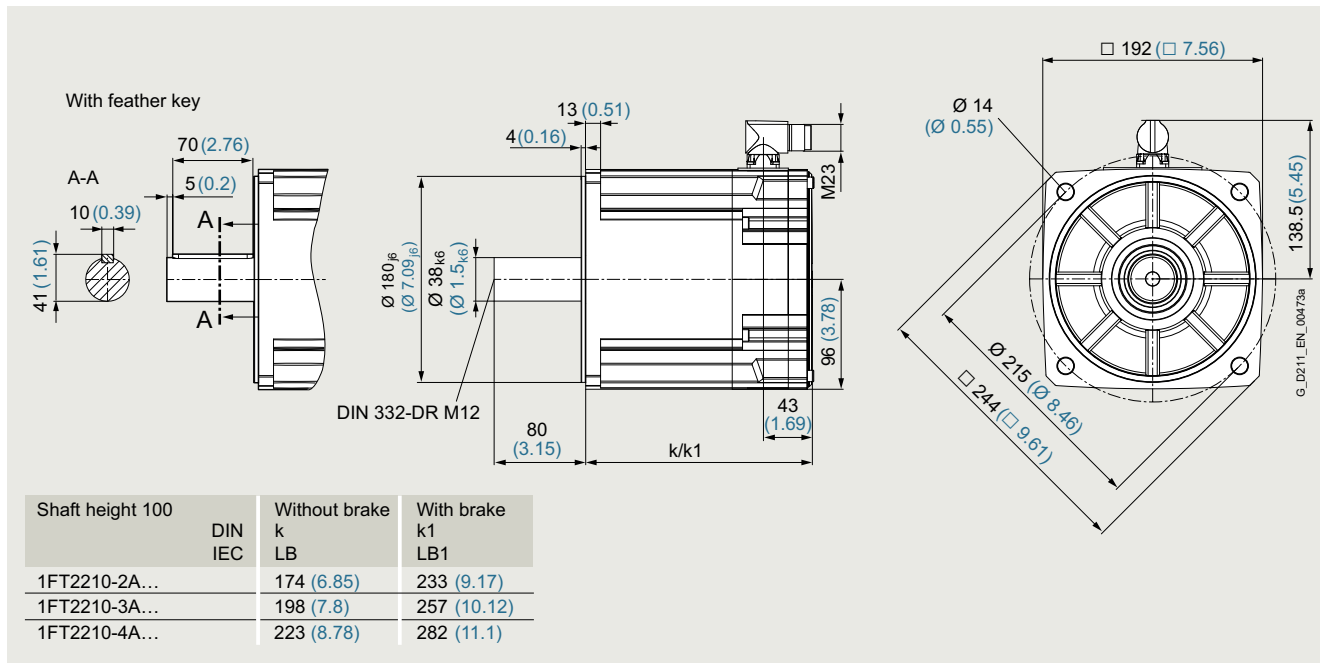
SIMOTICS S-1FT2 servomotors		Compact						
Shaft height 100		1FT2210-2AC	1FT2210-2AF	1FT2210-3AB	1FT2210-3AC	1FT2210-4AB	1FT2210-4AC	1FT2210-5AB
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	22 (16.23)	22 (16.23)	30 (22.13)	30 (22.13)	40 (29.50)	40 (29.50)	50 (36.88)
Stall current $I_0$	A	9.3	12.9	8.5	15	12	15	15
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	60 (44.26)	60 (44.26)	90 (66.38)	90 (66.38)	120 (88.51)	120 (88.51)	150 (110.64)
Maximum current $I_{max}$	A	32	44.5	31.5	55	43.5	55	55
Maximum speed $n_{max}$	r/min	4050	5000	2500	4400	2500	3300	2850
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	62 (21.185)	62 (21.185)	89 (30.411)	89 (30.411)	120 (41.004)	120 (41.004)	150 (51.255)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	68 (23.236)	68 (23.236)	95 (32.462)	95 (32.462)	130 (44.421)	130 (44.421)	160 (54.672)
Moment of inertia (with reinforced brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	77 (26.311)	77 (26.311)	100 (15.035)	100 (15.035)	–	–	–
Weight $m_{Mot}$	kg (lb)	16 (35.28)	16 (35.28)	22 (48.51)	22 (48.51)	27 (59.54)	27 (59.54)	32 (70.56)
Weight (with brake) $m_{Mot Br}$	kg (lb)	19 (41.90)	19 (41.90)	25 (55.13)	25 (55.13)	31 (68.36)	31 (68.36)	36 (79.38)
Weight (with reinforced brake) $m_{Mot Br}$	kg (lb)	20 (44.10)	20 (44.10)	26 (57.33)	26 (57.33)	–	–	–
<b>200 ... 240 V 3 AC</b>								
Rated speed $n_N$	r/min	1000	1500	750	1000	750	1000	750
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	20.5 (15.12)	19.6 (14.46)	30 (22.13)	30 (22.13)	39 (28.77)	37 (27.29)	44.5 (32.82)
Rated current $I_N$	A	9.0	11.9	8.6	15.5	11.6	14.3	13.6
Rated power $P_N$	W	2150	3100	2500	3200	3050	3900	
<b>380 ... 480 V 3 AC</b>								
Rated speed $n_N$	r/min	2000	3000	1500	2000	1500	2000	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	18.4 (13.57)	16.2 (11.95)	28.5 (21.02)	26 (19.18)	34.5 (25.45)	30.5 (22.50)	39 (28.77)
Rated current $I_N$	A	8.1	10.1	8.3	13.5	10.4	11.8	12.1
Rated power $P_N$	W	3850	5100	4500	5500	5400	6400	6100
Suitable for SINAMICS S210 servo converters								
• 200 ... 240 V 3 AC		6SL3210-5HE13-5UFO	6SL3210-5HE15-0UFO	6SL3210-5HE13-5UFO	6SL3210-5HE17-0UFO	6SL3210-5HE15-0UFO	6SL3210-5HE17-0UFO	6SL3210-5HE17-0UFO
• 380 ... 480 V 3 AC		6SL3210-5HE13-5UFO	6SL3210-5HE15-0UFO	6SL3210-5HE13-5UFO	6SL3210-5HE17-0UFO	6SL3210-5HE15-0UFO	6SL3210-5HE17-0UFO	6SL3210-5HE17-0UFO
Suitable for SINAMICS S210 servo converters (New)								
• 200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0
• 380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE13-5DF0	6SL5310-1BE17-0DF0	6SL5310-1BE15-0DF0	6SL5310-1BE17-0DF0	6SL5310-1BE17-0DF0

# SIMOTICS S-1FT2 servomotors for SINAMICS S210

## SIMOTICS S-1FT2 shaft height 100

### Technical specifications

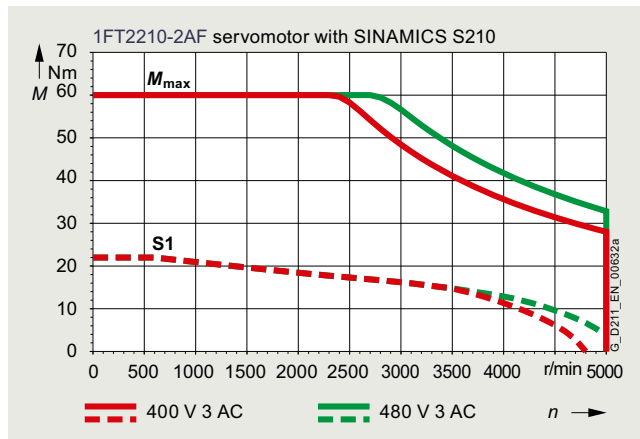
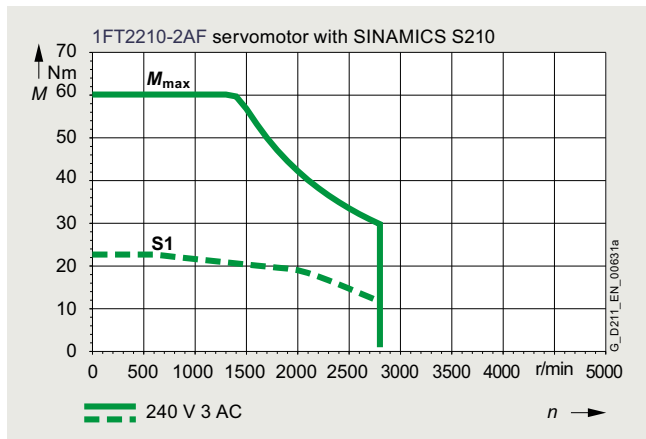
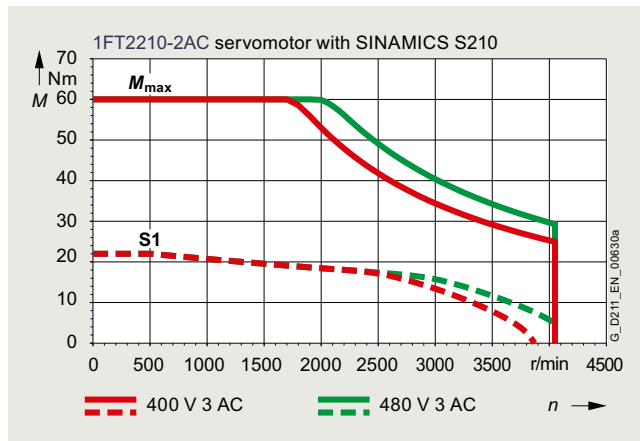
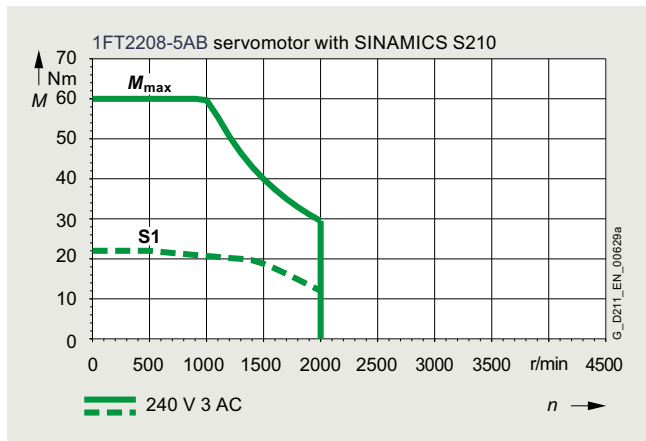
#### Dimensional drawing



All dimensions in mm (values in brackets are in inches).

#### Speed/torque characteristics

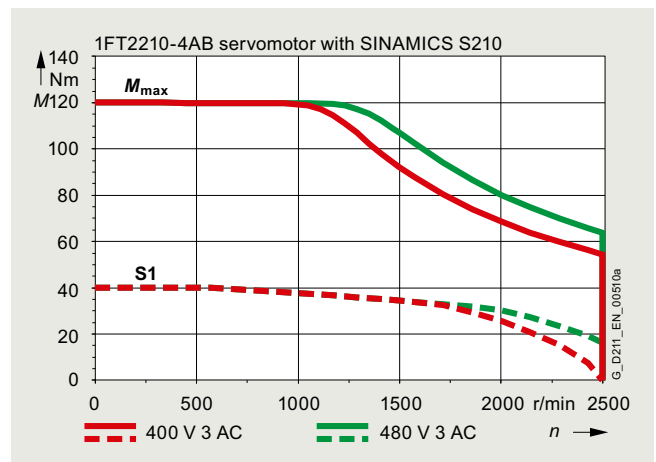
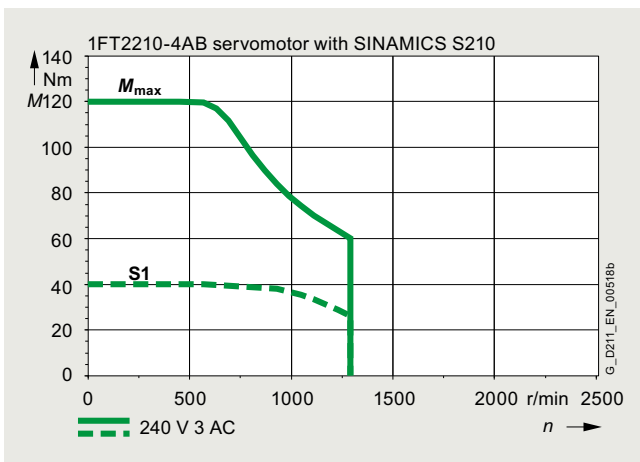
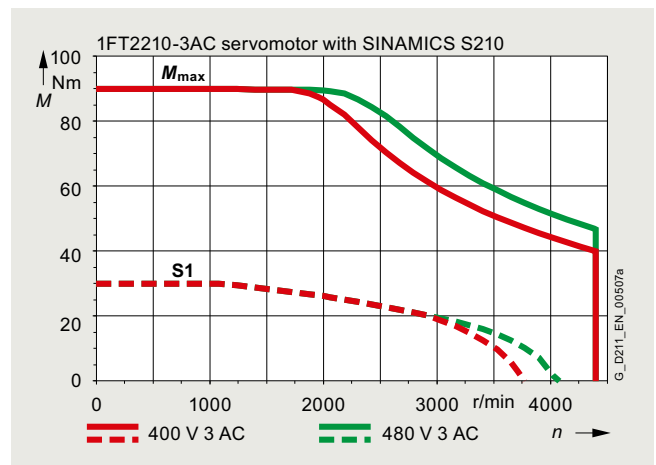
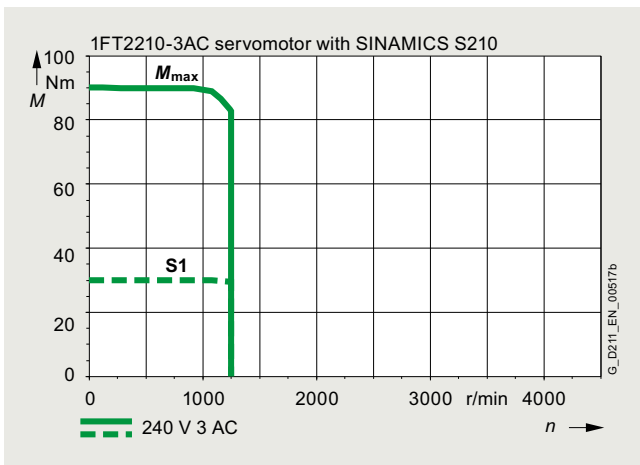
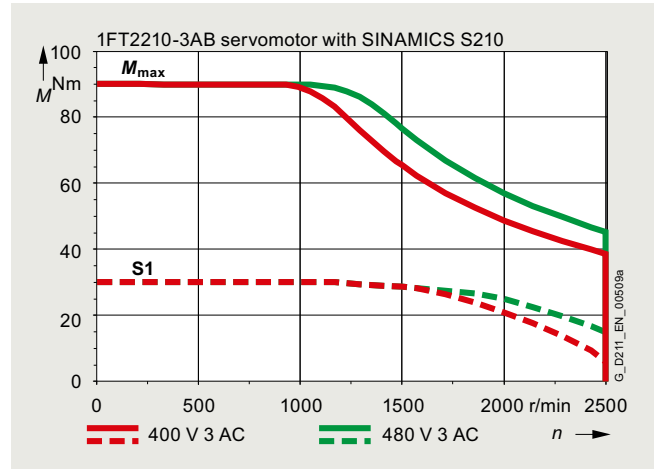
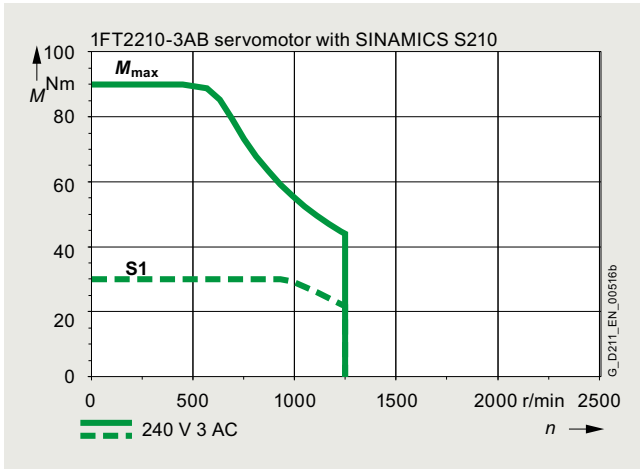
##### Compact



Technical specifications

Speed/torque characteristics (continued)

Compact (continued)



# SIMOTICS S-1FT2 servomotors for SINAMICS S210

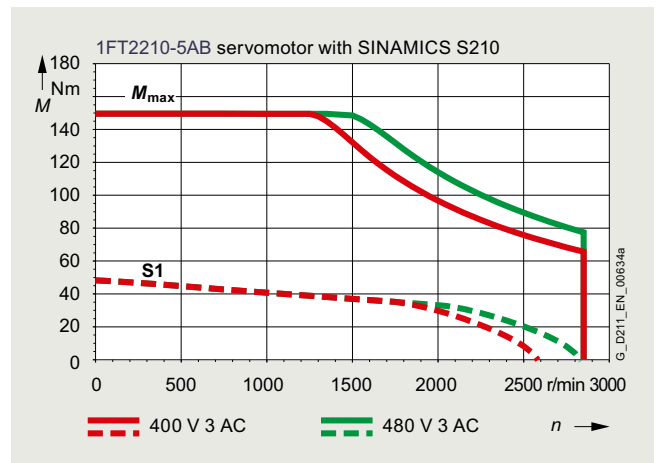
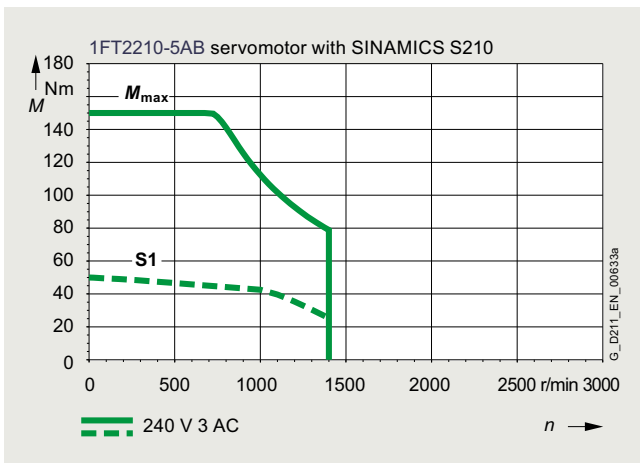
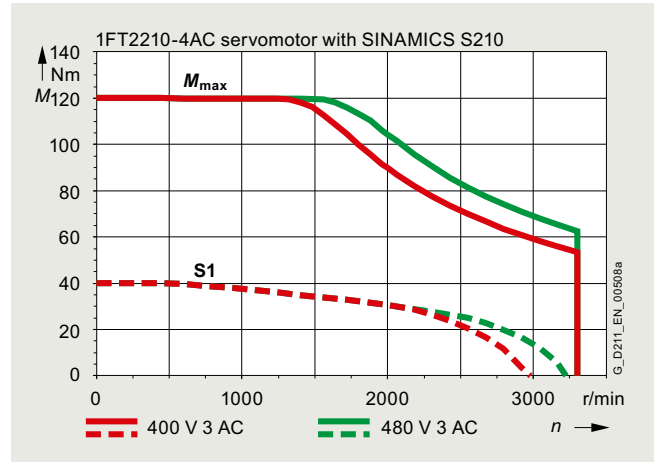
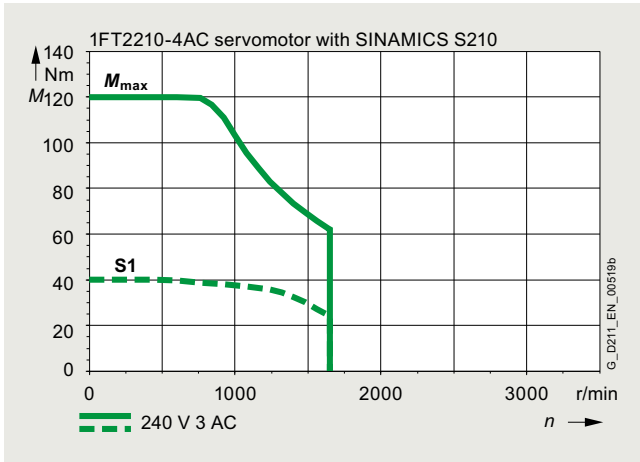
## SIMOTICS S-1FT2 shaft height 100

### Technical specifications

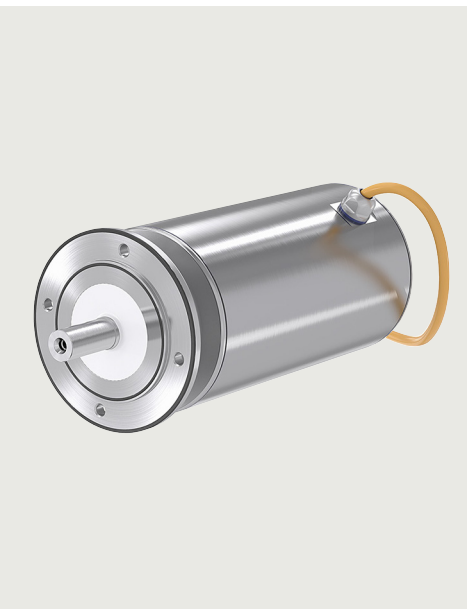
Speed/torque characteristics (continued)

Compact (continued)

3  
2



## SIMOTICS S-1FS2 servomotors for SINAMICS S210



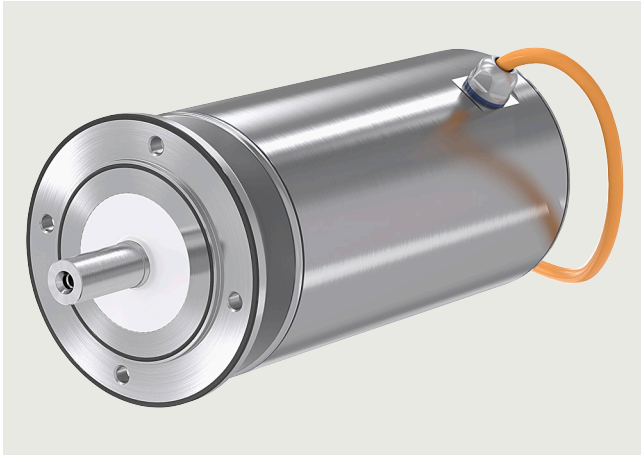
- 3.3/2 Overview
- 3.3/2 Benefits
- 3.3/2 Application
- 3.3/2 More Information
- 3.3/3 Selection and ordering data
- 3.3/4 Technical specifications
  - 3.3/4 General technical specifications
  - 3.3/8 Shaft height 40
  - 3.3/10 Shaft height 52
  - 3.3/12 Shaft height 63
  - 3.3/14 Shaft height 80

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FS2 servomotors for SINAMICS S210

### Overview



The SIMOTICS S-1FS2 servomotors are compact and highly dynamic synchronous motors, especially designed for use in food and pharmaceutical environments with the most stringent requirements for hygiene and cleanliness. They are characterized by high power density, degree of protection and overload capability, a design suitable for cleaning and the use of materials that are approved to be used in food processing.

### Benefits

The SIMOTICS S-1FS2 servomotors fully exploit their strengths in the system with the SINAMICS S210 converter:

- Short adjustment and positioning times
- Quick and precise compensation of disturbances
- Stable closed loop control with high dynamic response
- Maximum flexibility in the selection
- Increased ruggedness
- Simplified cleaning

This is achieved by:

- Rapid control cycle
- High pulse frequency
- Complex rule algorithms
- Highest resolution optical encoders
- Low moment of inertia of the motors
- High overload capability
- One cable connection system

### Application

- Food and beverage industry
- Pharmaceutical industry
- Packaging machines
- Handling equipment
- Feed and withdrawal devices

### More information

#### More technical information

Further documentation, such as the operating instructions, is available free on the internet at:

[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Detailed information on the SINAMICS S210 drive system, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions), is available on the internet at:

[www.siemens.com/sinamics-s210](http://www.siemens.com/sinamics-s210)





and is also available via the Siemens Product Configurator on the internet.

The Siemens Product Configurator can be found in SiePortal at the following address:

[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FS2 servomotors for SINAMICS S210

## Selection and ordering data

	Static torque $M_0$ Nm (lb <sub>r</sub> -ft)	Maximum torque $M_{max}$ Nm (lb <sub>r</sub> -ft)	Maximum speed $n_{max}$ r/min	Rated speed for 200 ... 240 V 1/3 AC $n_N$ r/min	Rated speed for 380 ... 480 V 3 AC $n_N$ r/min	Rotor moment of inertia without/with brake $J_{Mot}$ kg cm <sup>2</sup> (lb <sub>r</sub> -in <sup>2</sup> )	<b>SIMOTICS S-1FS2 servomotor with connection cable</b> Article No.	Additional order code for cable end and cable length Order code
<b>Shaft height 40</b> 	3.1 (2.29)	10 (7.38)	7200	1500	3000	0.72/0.8 (0.246/0.273)	<b>1FS2104-6AF</b> ■ 7- ■ MZ0 ■ Q ■ ■	
<b>Shaft height 52</b> 	7.6 (5.61)	24 (17.7)	6000	1500	3000	2.8/3.6 (0.957/1.230)	<b>1FS2105-6AF</b> ■ 7- ■ MZ0 ■ Q ■ ■	
<b>Shaft height 63</b> 	14 (10.3)	42 (31)	6000	1250	2500	-/11 (-/3.759)	<b>1FS2106-6AE 1 7- ■ MZ0</b> ■ Q ■ ■	
	14 (10.3)	42 (31)	6000	1500	3000	9/- (3.075/-)	<b>1FS2106-6AF 0 7- ■ MZ0</b> ■ Q ■ ■	
<b>Shaft height 80</b> 	23.5 (17.33)	80 (59.01)	4750	1000	2000	49/55 (16.743/18.794)	<b>1FS2208-5AC</b> ■ 7- ■ MZ0 ■ Q ■ ■	

## Article No. supplements

## Holding brake

Without brake

0

With brake

1

## Shaft extension, feather key

Plain shaft

0

Shaft with feather key

1

## Supplements for the additional order code

## Cable end

Free cable ends for direct connection to the converter

0

Cable end with SPEED-CONNECT coupling M17 (1FS2104 and 1FS2105) or M23 (1FS2106 and 1FS2208)

1

## Cable length

0.5 m (1.64 ft)	<b>A</b>	6 m (19.69 ft)	<b>M</b>
1 m (3.28 ft)	<b>B</b>	6.5 m (21.33 ft)	<b>N</b>
1.5 m (4.92 ft)	<b>C</b>	7 m (22.97 ft)	<b>P</b>
2 m (6.56 ft)	<b>D</b>	7.5 m (24.61 ft)	<b>Q</b>
2.5 m (8.20 ft)	<b>E</b>	8 m (26.25 ft)	<b>R</b>
3 m (9.84 ft)	<b>F</b>	8.5 m (27.89 ft)	<b>S</b>
3.5 m (11.48 ft)	<b>G</b>	9 m (29.53 ft)	<b>T</b>
4 m (13.12 ft)	<b>H</b>	9.5 m (31.17 ft)	<b>U</b>
4.5 m (14.76 ft)	<b>J</b>	10 m (32.81 ft)	<b>V</b>
5 m (16.41 ft)	<b>K</b>	10.5 m (34.45 ft)	<b>W</b>
5.5 m (18.05 ft)	<b>L</b>	11 m (36.09 ft)	<b>X</b>

The connection cable of the SIMOTICS S-1FS2 servomotors can be extended with additional cables up to a total cable length of 50 m (164 ft). This applies to motors with the additional order code Q1. (Cable end with SPEED-CONNECT coupling).

For further information see section MOTION-CONNECT connection systems from page 4/1.

## Spare parts

Description	For motor	Article No.
Gasket	1FS2104	<b>1FY2904-1GF00</b>
External flange gasket on the drive side (DE) of the motor	1FS2105	<b>1FY2905-1GF00</b>
	1FS2106	<b>1FY2906-1GF00</b>
	1FS2208	<b>1FY2908-1GF00</b>

# SIMOTICS S-1FS2 servomotors for SINAMICS S210

## Technical specifications

### General technical specifications

SIMOTICS S-1FS2 motors	
<b>Motor type</b>	Permanent-magnet synchronous motor
<b>Permissible operating conditions without derating</b>	
• Ambient temperature	-15 ... +40 °C (5 ... 104 °F)
• Installation altitude, max.	1000 m (3281 ft)
<b>Degree of protection</b>	IP66, IP67
According to EN 60034-5 (IEC 60034-5), ISO 20653	IP69K (does not apply to the shaft outlet)
<b>Cooling</b>	Natural cooling (IC410)
According to EN 60034-6	
<b>Type of construction</b>	IM B5 (IM V1, IM V3)
According to EN 60034-7 (IEC 60034-7)	
<b>Shaft extension</b>	Plain shaft
According to DIN 748-3 (IEC 60072-1)	Optional shaft with feather key (half-key balancing)
<b>Shaft and flange accuracy</b>	Tolerance N
According to DIN 42955 (IEC 60072-1)	In each case for radial eccentricity of the shaft extension, concentricity of the centering edge, and axial eccentricity of the mounting flange to the axis of the shaft extension
<b>Vibration severity grade</b>	Grade A
According to EN 60034-14 (IEC 60034-14)	is maintained up to rated speed
<b>Stator winding insulation</b>	Thermal class 155 (F)
According to EN 60034-1 (IEC 60034-1)	for a winding overtemperature of $\Delta T = 100$ K
<b>Sound pressure level <math>L_{pA}</math> (1 m), max.</b>	
According to ISO 1680	
• 1FS2104	55 dB(A) + 3 dB(A) tolerance
• 1FS2105 and 1FS2106	65 dB(A) + 3 dB(A) tolerance
• 1FS2208	70 dB(A) + 3 dB(A) tolerance
<b>Encoder system</b>	AM22DQC (absolute encoder 22-bit + 12-bit multiturn)
<b>Holding brake</b>	Optional integrated holding brake
<b>Connection</b>	One Cable Connection (OCC) for signals and power, open cable end for direct connection to SINAMICS converter or cable end with plug connector to connect a MOTION-CONNECT basic line
<b>Surface</b>	Stainless steel 1.4404, roughness < 0.8 $\mu$ m
<b>Certificates of suitability</b>	cURus, CE, EAC, CEL, EHEDG

### Regulations, standards, specifications

The motors comply with the appropriate standards and regulations, see table below.

As a result of the fact that in many countries the national regulations have been completely harmonized with the international IEC 60034-1 recommendation, there are no longer any differences with respect to coolant temperatures, temperature classes and temperature rise limits.

General specifications for rotating electrical machines	IEC 60034-1
Terminal designations and direction of rotation for electrical machines	IEC 60034-8
Types of construction of rotating electrical machines	IEC 60034-7
Cooling methods of rotating electrical machines	IEC 60034-6
Degrees of protection of rotating electrical machines	IEC 60034-5
Vibration severity of rotating electrical machines	IEC 60034-14
Noise limit values for rotating electrical machines	IEC 60034-9
Cylindrical shaft extensions for electrical machines	DIN 748-3/IEC 60072-1



SIMOTICS S-1FS2 motors have UL approval from Underwriters Laboratories Inc. and are marked with the "UL Recognized Component" test symbol.

This is used for components which are part of a larger product or system. This confirmed compliance with the corresponding US American and Canadian regulations, and allowed access to the North American market.



For SIMOTICS S-1FS2 motors, conformity with the relevant EC directives 2006/95/EC and 2014/35/EU and the relevant standards

EN 60034-1:2010 and EN 60204-1:2006 is confirmed. By applying the CE mark to the product, Siemens AG confirms this for the product, and secures the free movement of goods within the European Union.

#### Specific standards for the food industry

The SIMOTICS S-1FS2 motors meet the EHEDG directives for "Class I EL AUX". FDA-listed plastic materials are used in the relevant exterior areas. The bearing grease is approved in accordance with NSF H1.

EHEDG certificate:

<https://support.industry.siemens.com/cs/document/109805184>



## Technical specifications

### Degree of protection according to IEC 60034-5

A suitable degree of protection must be selected according to the operating and environmental conditions to protect the motor against damage caused by the ingress of water and other liquids, as well as dust and foreign bodies.

SIMOTICS S-1FS2 motors have degree of protection IP66/IP67 as standard.

In contrast to the degree of protection IP65, the degree of protection IP67 provides increased protection against water jets and splashing water as well as brief immersion. The mounting position of the motor must be chosen so that the stagnant water at the shaft exit is avoided.

The degree of protection designation is composed from the code IP (for International Protection) and two code numbers for the protection against touching and penetration of foreign bodies, and the degree of protection against the ingress of water.

#### First code number

6 Protection against dust ingress and complete protection against touching

#### Second code number

4: Protection against splashwater from any direction

5: Protection against jet water from any direction

6: Increased protection against powerful water jets from any direction

7: Protection against brief immersion

### Type of construction, mounting position according to IEC 60034-7

SIMOTICS S-1FS2 motors are designed in type of construction IM B5. They may also be used in the mounting positions IM V1 and IM V3.

### Degree of protection according to ISO 20653

The motor meets the IP69K requirements of the ISO 20653 standard. Using a much higher pressure for cleaning is generally not advisable in the food sector, as there is a risk of re-contaminating already cleaned system parts with the spray mist.

### Chemical resistance and cleaning agents

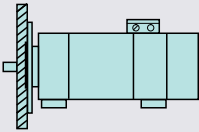
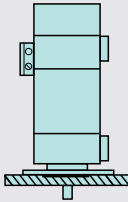
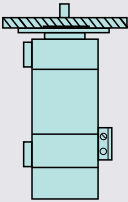
The SIMOTICS S-1FS2 motor is resistant to a wide range of cleaning agents and processes used in the food industry.

For detailed information, such as admissible cleaning agents, see operating instructions "SINAMICS servo drive system with 1FS2":

<https://support.industry.siemens.com/cs/document/109796333>

#### Note:

An EHEDG-compliant V3 mounting position requires additional measures, such as a cover for the motor flange.

Code 1	IM B5	IM V1	IM V3
Code 2	IM 3001	IM 3011	IM 3031
	 <p>Horizontal flange mounting</p>	 <p>Flange mounting, output shaft pointing vertically downwards</p>	 <p>Flange mounting, output shaft pointing vertically upwards</p>

# SIMOTICS S-1FS2 servomotors for SINAMICS S210

## Technical specifications

### Shaft and flange accuracy in accordance with IEC 60072-1

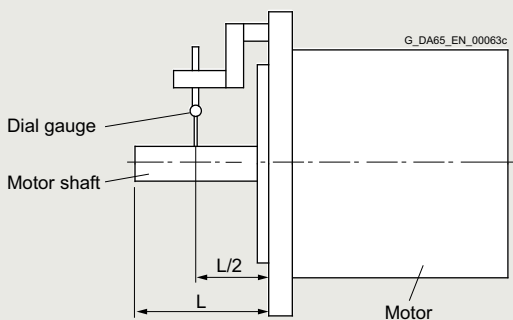
Radial eccentricity tolerance of shaft in relation to housing axis (referred to cylindrical shaft extensions)

Motor	Shaft extension D × L mm (in)	Radial eccentricity Tolerance N μm
1FS2104	19 × 40 (0.75 × 1.57)	40
1FS2105		
1FS2106	24 × 50 (0.94 × 1.97)	

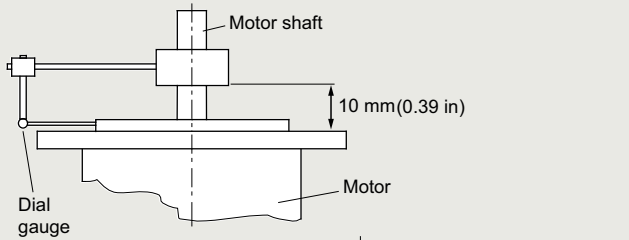
Concentricity and axial eccentricity tolerance of the flange surface for the shaft axis (referred to the centering diameter of the mounting flange)

Motor	Centering diameter mm (in)	Concentricity and axial eccentricity Tolerance N μm
1FS2104	70 (2.76)	80
1FS2105	95 (3.74)	
1FS2106	110 (4.33)	100
1FS2208	130 (5.12)	

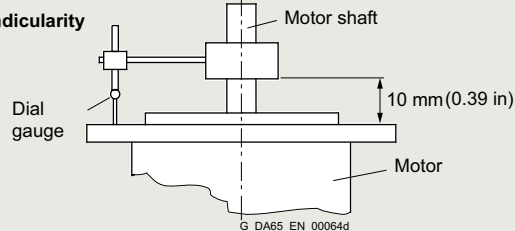
### Test: runout



### Test: concentricity



### Test: perpendicularity



### Vibration severity and vibration severity grade A according to IEC 60034-14

The vibration severity is the RMS value of the vibration velocity (frequency range from 10 Hz to 1000 Hz). The vibration severity is measured using electrical measuring devices according to DIN 45666.

The specified values refer only to the motor. These values can increase as a result of the overall system vibrational behavior due to installation.

### Vibration severity limit values

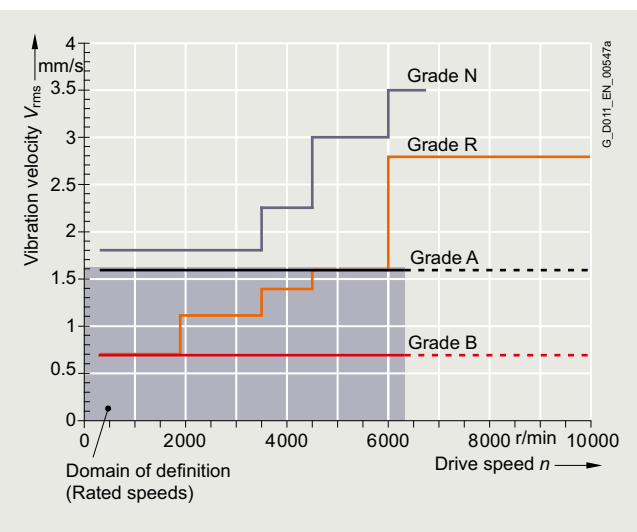
The speeds of 1800 r/min and 3600 r/min and the associated limit values are specified according to IEC 60034-14. The speeds of 4500 r/min and 6000 r/min and the specified values are defined by the motor manufacturer.

The motors maintain vibration severity grade A up to the rated speed.

### Balancing according to ISO 21940-32

Apart from the balance quality of the motor, the vibrational quality of motors with attached belt pulleys is mainly determined by the balance state of the mounted component. If the motor and the mounted component are balanced separately before being joined, the balancing process of the belt pulley is to be adapted to the motor's balancing type.

SIMOTICS S-1FS2 motors with feather keys are always half-key balanced. In general, motors with a plain shaft are recommended for systems with the most stringent vibrational quality requirements.



## Technical specifications

### Vibration stress, imitted vibration values

The requirements of environmental class 3M8 (according to EN 60721-3-3 Table 6) must be maintained for proper function and safeguard the bearing life. The following limits are valid for (imitted) vibration values introduced into the motor from outside:

- Vibration velocity  $V_{rms}$  according to ISO 10816, max. 4.5 mm/s (0.18 in/s)
- Vibration acceleration  $a_{peak}$  axial and radial 50 m/s<sup>2</sup> (164 ft/s<sup>2</sup>)

During transport, the motors withstand single shocks (6 ms) of up to 250 m/s<sup>2</sup> (820 ft/s<sup>2</sup>).

### Ambient temperature and installation altitude

Operating range without restrictions:

Temperature range from -15 °C to +40 °C (5.0 °F to 104 °F), installation altitude up to 1000 m (3281 ft).

If deviating conditions are encountered, the S1 characteristic of the motor must be adapted with regard to speed and torque.

Use the following equation to calculate the reduced S1 characteristic:

$$S1_{red}(n) = x_D \times S1_{40°C; 1000m}(n/x_D)$$

Installation altitude above sea level m (ft)	Derating factor $x_D$ at an ambient temperature of				
	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)
1000 (3281)	1.05	1	0.95	0.89	0.84
2000 (6562)	1	0.95	0.86	0.8	0.73

Larger installation heights with boundary conditions possible, see operating instructions. Operation up to 80 °C (176 °F) ambient temperature is possible with extended derating, design via TIA Selection Tool required.

### Holding brake

Many drives need a holding brake with an EMERGENCY STOP function for safety reasons or to meet process requirements. The brakes used on the SIMOTICS S-1FS2 motors operate on the quiescent current principle. A spring or permanent magnet exerts a tensile force on the brake armature disk. This means that the brake is closed and the motor shaft thereby stopped in a state of zero current.

An electric current that flows through a coil generates an opposing field that counteracts the force effect of the spring or permanent magnet and releases or holds open the brake. Only a limited number of braking operations can be performed for an EMERGENCY STOP or voltage failure without causing excessive wear on the holding brake. The holding brake is not an operational brake. Regular dynamic braking leads to increased wear and premature brake failure. In order to ensure the functionality and specification of the brake, neither the total operating energy nor the maximum switching energy per braking operation may be exceeded.

Motor	Shaft height	Holding torque Nm (lb <sub>f</sub> -ft)	Average dynamic braking torque Nm (lb <sub>f</sub> -ft)	Maximum dynamic braking torque Nm (lb <sub>f</sub> -ft)	Opening time ms	Closing time ms	Maximum permissible single switching energy J	Total operating energy (service life) kJ	Holding current A	Break-induced current, typ. <sup>1)</sup> for 500 ms A
1FS2104	40	3.3 (2.43)	3.3 (2.43)	9 (6.64)	50	40	270	120	0.2	1.2
1FS2105	52	8 (5.90)	5 (3.69)	18 (13.28)	35	20	570	284	0.3	1.1
1FS2106	63	16 (11.80)	9 (6.64)	35 (25.82)	70	35	1065	774	0.35	1.1
1FS2208	80	32 (23.60)	17 (12.54)	70 (51.63)	120	40	4800	2400	0.5	1.4

<sup>1)</sup> Typical values at an ambient temperature of 20 °C (68 °F).  
At -15 °C (5 °F), the break-induced currents can increase by up to 30 %.

### Encoder system

In motors with integrated OCC/DRIVE-CLiQ interface, the sensor signal is already digitally prepared in the motor, and then transferred quickly and without loss to the drive system. Motors with an OCC/DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor parameters and encoder system are identified automatically.

### Multiturn absolute encoder

AM22DQC: absolute encoder 22-bit + 12-bit multiturn

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. It can also count 4096 revolutions. The absolute position is also sensed in the de-energized state. With a ball screw, for example, the absolute position of the slide can be determined over a longer distance.

## SIMOTICS S-1FS2 servomotors for SINAMICS S210

### SIMOTICS S-1FS2 shaft height 40

#### Technical specifications

##### SIMOTICS S-1FS2 shaft height 40

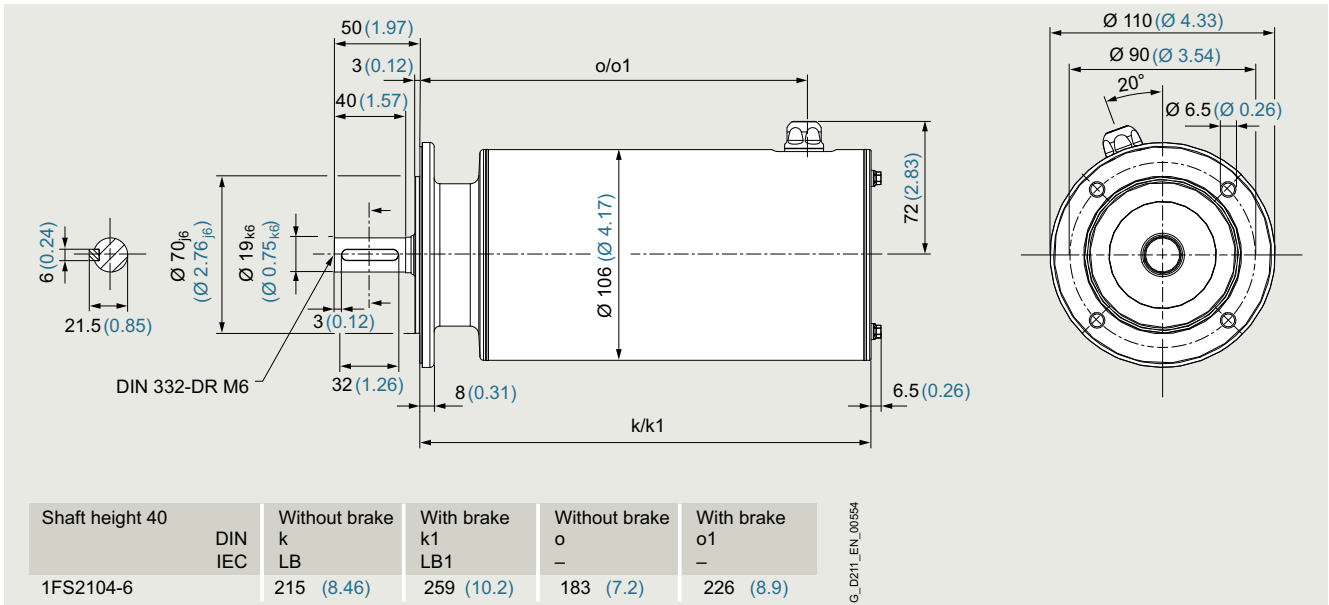


#### Specific technical specifications

SIMOTICS S-1FS2 servomotors		
Shaft height 40		1FS2104-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	3.1 (2.29)
Stall current $I_0$	A	2.75
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	10 (7.38)
Maximum current $I_{max}$	A	10.9
Maximum speed $n_{max}$	r/min	7200
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.72 (0.246)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	0.8 (0.273)
Weight $m_{Mot}$	kg (lb)	7.2 (15.88)
Weight (with brake) $m_{Mot Br}$	kg (lb)	8.7 (19.18)
200 ... 240 V 1 AC / 3 AC		
Rated speed $n_N$	r/min	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	2.85 (2.10)
Rated current $I_N$	A	2.7
Rated power $P_N$	W	450
380 ... 480 V 3 AC		
Rated speed $n_N$	r/min	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	2.55 (1.88)
Rated current $I_N$	A	2.4
Rated power $P_N$	W	800
Suitable for SINAMICS S210 servo converters		
200 ... 240 V 1 AC		6SL3210-5HB10-8UF0
200 ... 240 V 3 AC		6SL3210-5HE11-0UF0
380 ... 480 V 3 AC		6SL3210-5HE11-0UF0
Suitable for SINAMICS S210 servo converters (New)		
200 ... 240 V 1 AC		6SL5310-1BB10-8CF0
200 ... 240 V 3 AC		6SL5310-1BE11-0DF0
380 ... 480 V 3 AC		6SL5310-1BE11-0DF0

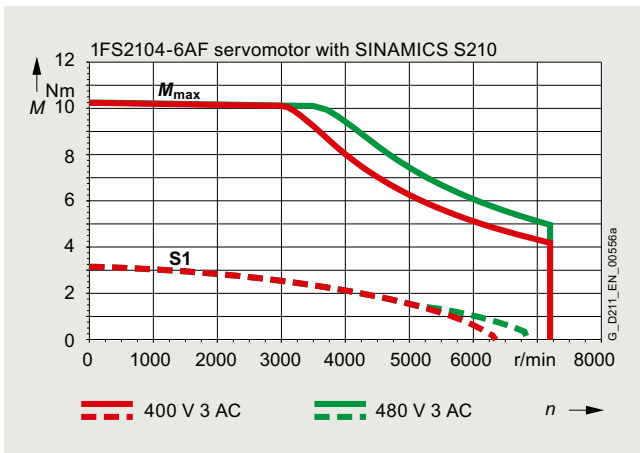
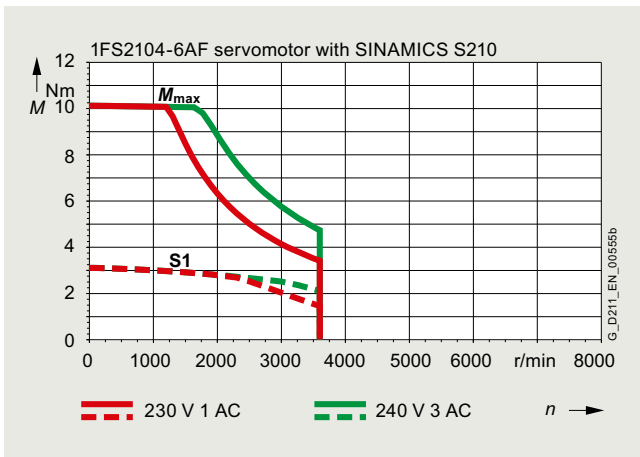
Technical specifications

Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

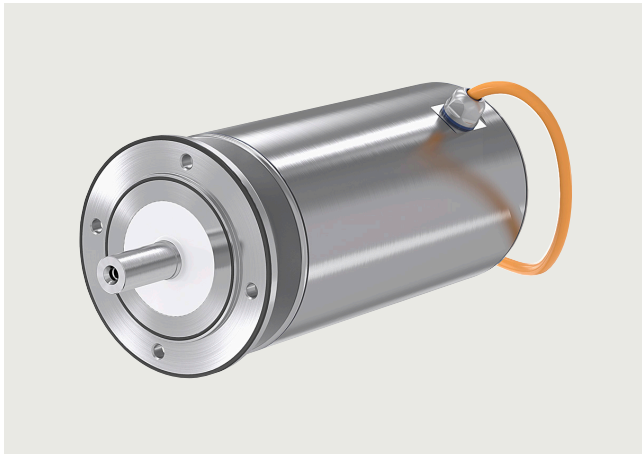


# SIMOTICS S-1FS2 servomotors for SINAMICS S210

## SIMOTICS S-1FS2 shaft height 52

### Technical specifications

#### SIMOTICS S-1FS2 shaft height 52

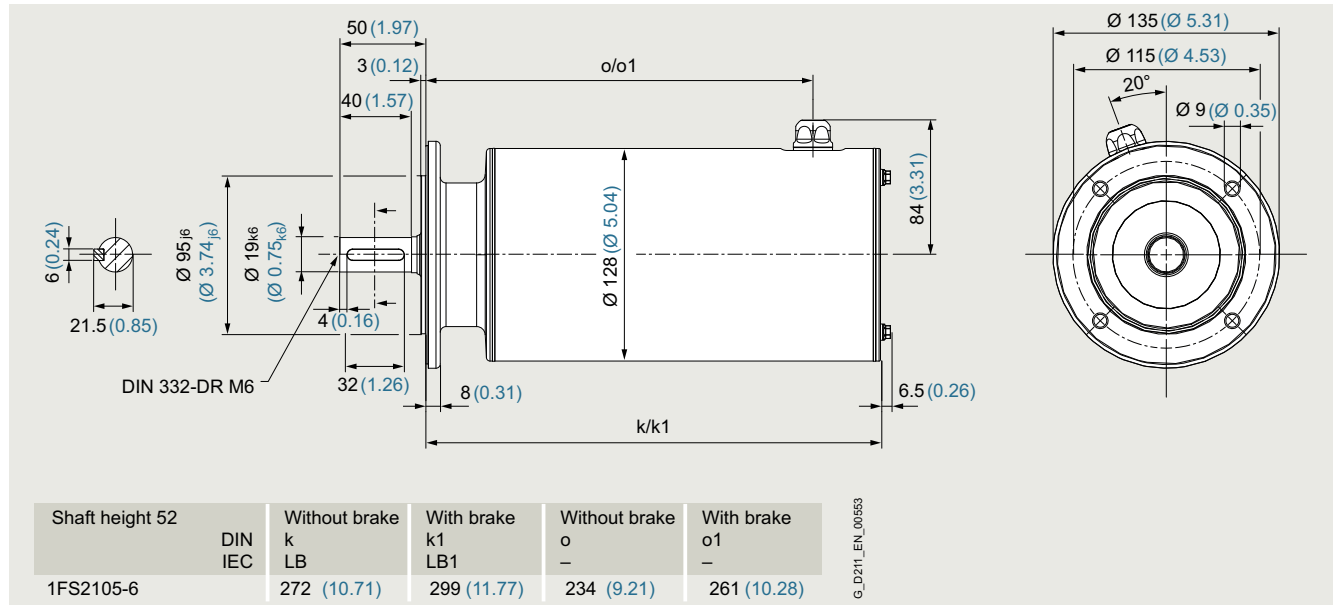


#### Specific technical specifications

SIMOTICS S-1FS2 servomotors		
Shaft height 52		1FS2105-6AF
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	7.6 (5.61)
Stall current $I_0$	A	6.2
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	24 (17.70)
Maximum current $I_{max}$	A	24
Maximum speed $n_{max}$	r/min	6000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	2.8 (0.957)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	3.6 (1.230)
Weight $m_{Mot}$	kg (lb)	13.3 (29.33)
Weight (with brake) $m_{Mot Br}$	kg (lb)	14.6 (32.19)
<b>200 ... 240 V 3 AC</b>		
Rated speed $n_N$	r/min	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	6.2 (4.57)
Rated current $I_N$	A	5.5
Rated power $P_N$	W	980
<b>380 ... 480 V 3 AC</b>		
Rated speed $n_N$	r/min	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	4.1 (3.02)
Rated current $I_N$	A	3.7
Rated power $P_N$	W	1290
Suitable for SINAMICS S210 servo converters		
200 ... 240 V 3 AC		6SL3210-5HE12-0UF0
380 ... 480 V 3 AC		6SL3210-5HE12-0UF0
Suitable for SINAMICS S210 servo converters (New)		
200 ... 240 V 3 AC		6SL5310-1BE12-0DF0
380 ... 480 V 3 AC		6SL5310-1BE12-0DF0

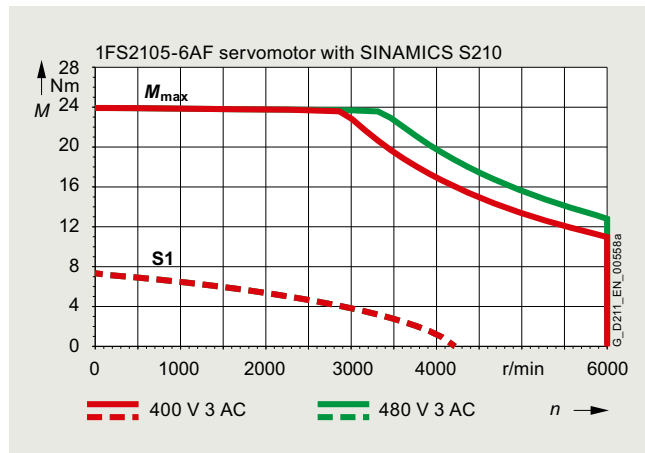
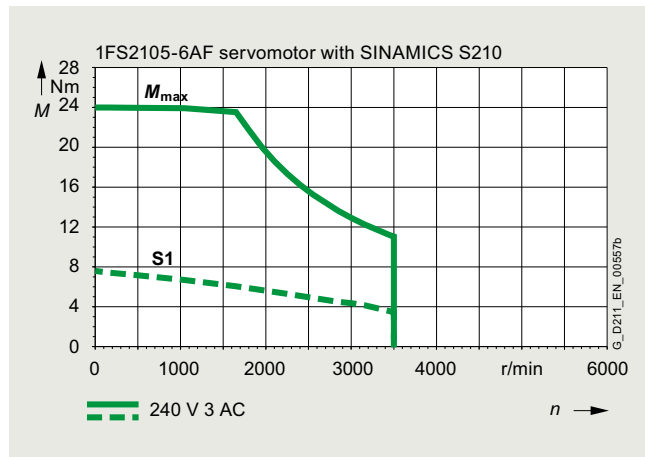
Technical specifications

Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

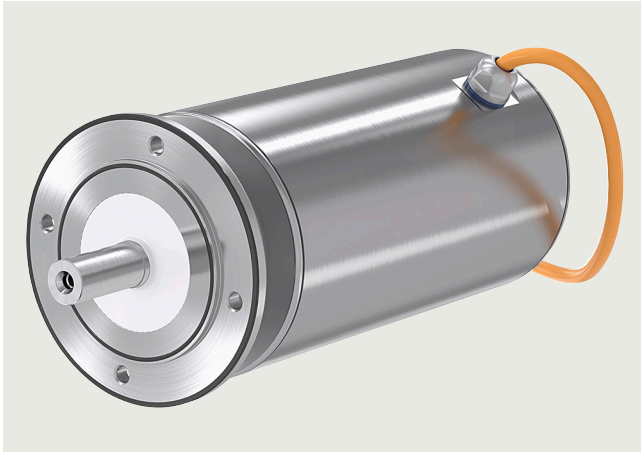


# SIMOTICS S-1FS2 servomotors for SINAMICS S210

## SIMOTICS S-1FS2 shaft height 63

### Technical specifications

#### SIMOTICS S-1FS2 shaft height 63



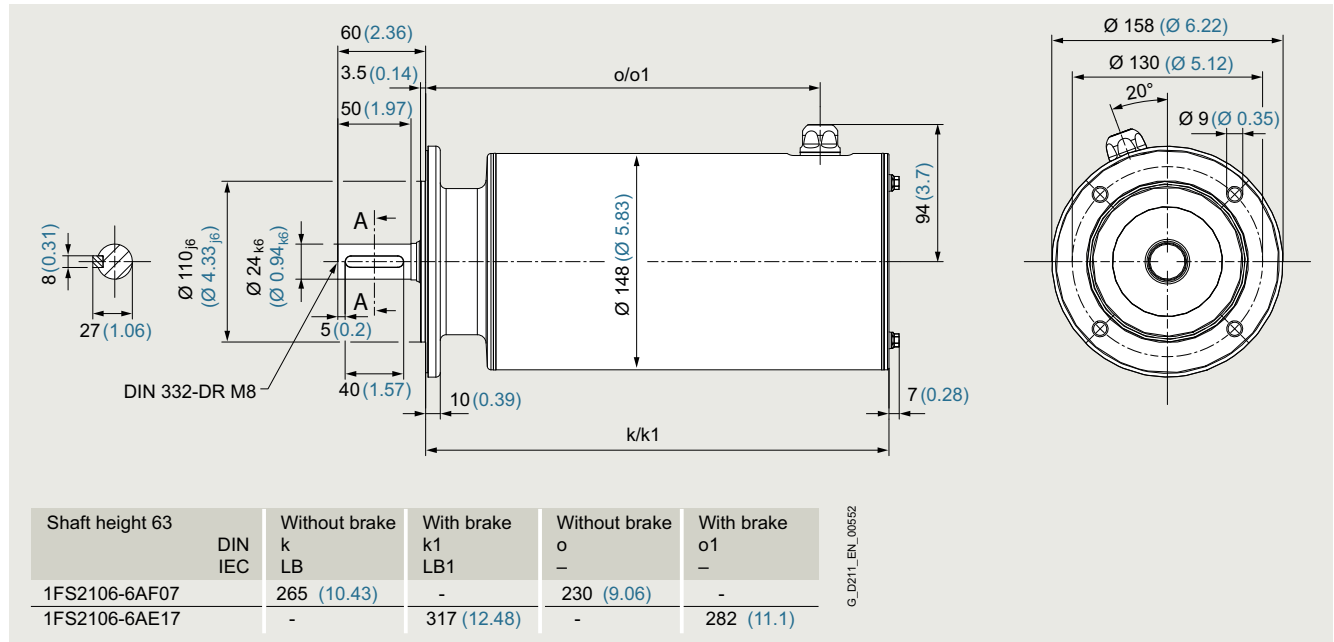
#### Specific technical specifications

SIMOTICS S-1FS2 servomotors			
Shaft height 63		1FS2106-6AE1	1FS2106-6AF0
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	14 (10.33)	14 (10.33)
Stall current $I_0$	A	12.4	12.4
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	42 (30.98)	42 (30.98)
Maximum current $I_{max}$	A	44	44
Maximum speed $n_{max}$	r/min	6000	6000
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	–	9 (3.075)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	11 (3.759)	–
Weight $m_{Mot}$	kg (lb)	–	18.6 (41.01)
Weight (with brake) $m_{Mot Br}$	kg (lb)	21 (46.31)	–
<b>200 ... 240 V 3 AC</b>			
Rated speed $n_N$	r/min	1250	1500
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	11.2 (8.26)	11 (8.11)
Rated current $I_N$	A	10	10.3
Rated power $P_N$	W	1470	1730
<b>380 ... 480 V 3 AC</b>			
Rated speed $n_N$	r/min	2500	3000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	6.9 (5.09)	6.2 (4.57)
Rated current $I_N$	A	6.5	6
Rated power $P_N$	W	1810	1950
Suitable for SINAMICS S210 servo converters			
200 ... 240 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0
380 ... 480 V 3 AC		6SL3210-5HE15-0UF0	6SL3210-5HE15-0UF0
Suitable for SINAMICS S210 servo converters (New)			
200 ... 240 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0
380 ... 480 V 3 AC		6SL5310-1BE15-0DF0	6SL5310-1BE15-0DF0



Technical specifications

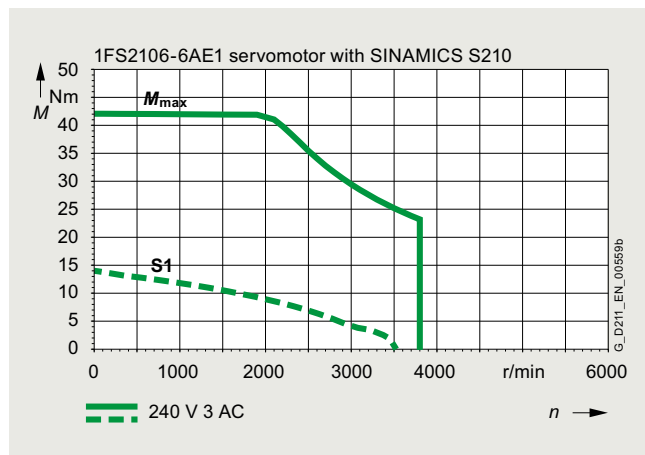
Dimensional drawing



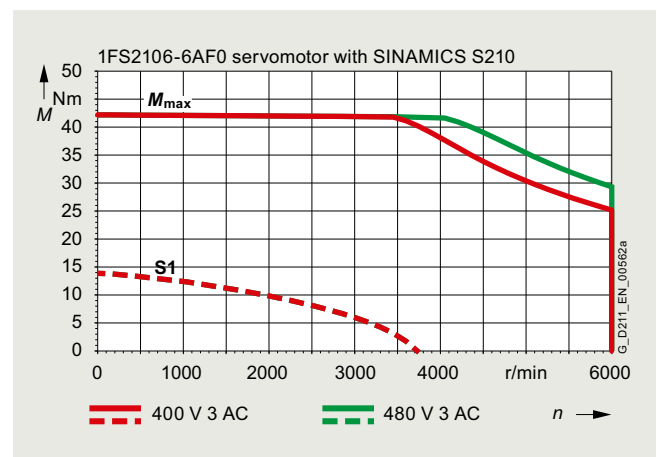
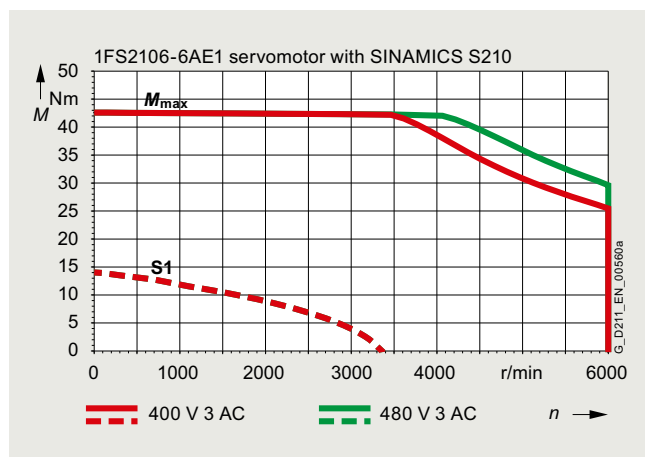
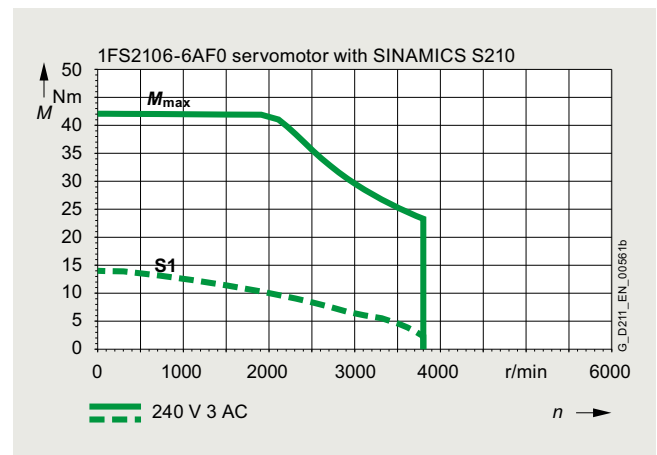
All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

Motor with holding brake



Motor without holding brake

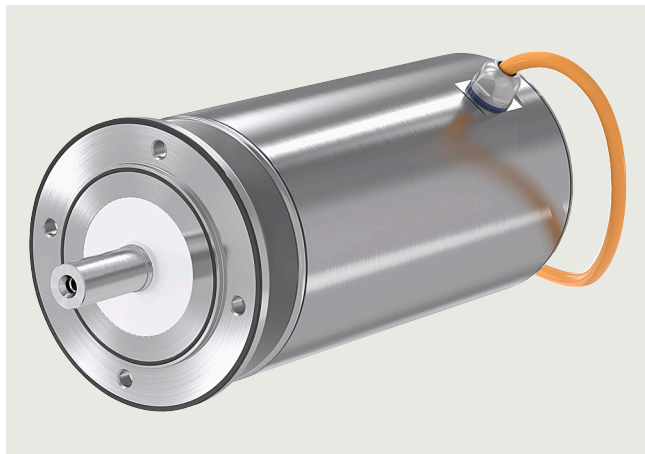


## SIMOTICS S-1FS2 servomotors for SINAMICS S210

### SIMOTICS S-1FS2 shaft height 80

#### Technical specifications

##### SIMOTICS S-1FS2 shaft height 80

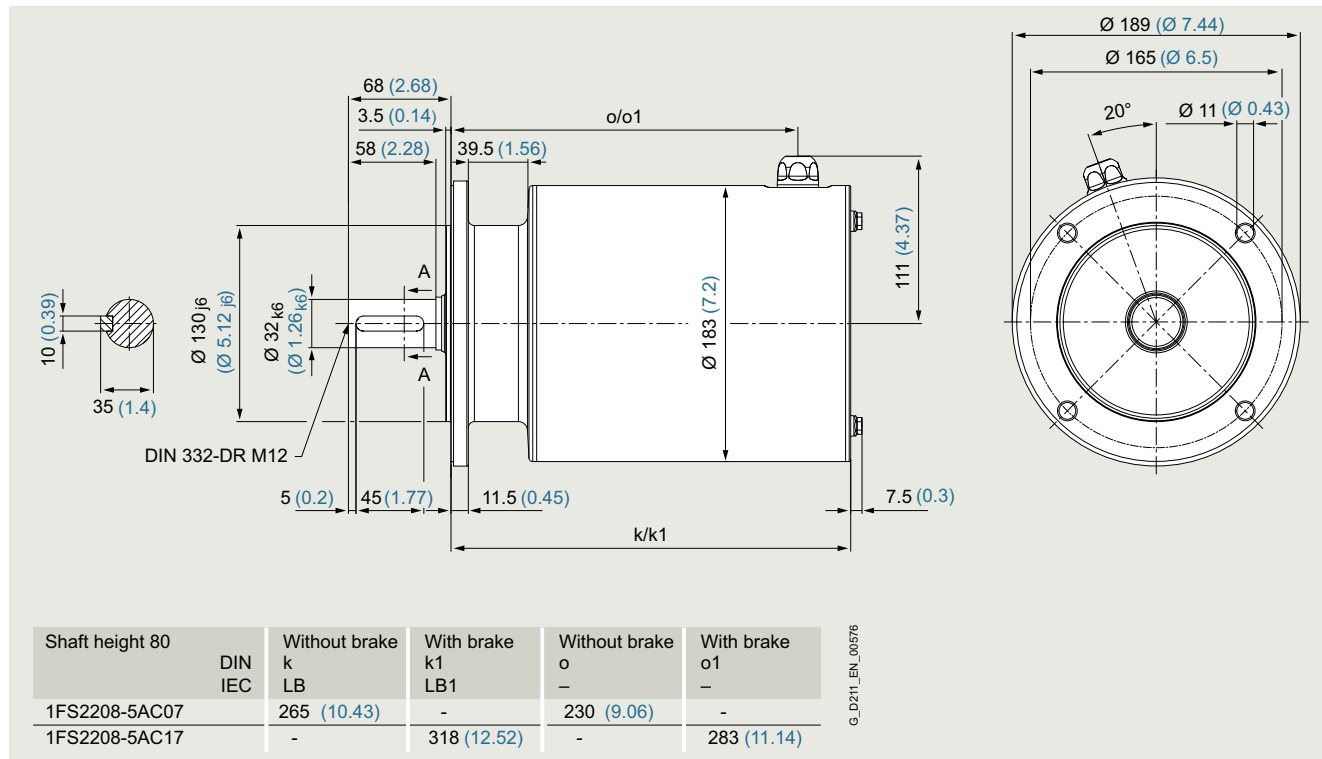


#### Specific technical specifications

SIMOTICS S-1FS2 servomotors		
Shaft height 80		1FS2208-5AC
Static torque $M_0$	Nm (lb <sub>f</sub> -ft)	23.5 (17.33)
Stall current $I_0$	A	12.8
Maximum torque $M_{max}$	Nm (lb <sub>f</sub> -ft)	80 (59.01)
Maximum current $I_{max}$	A	51.5
Maximum speed $n_{max}$	r/min	4750
Rotor moment of inertia $J_{Mot}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	49.1 (16.777)
Moment of inertia (with brake) $J_{Mot Br}$	kg cm <sup>2</sup> (lb <sub>f</sub> -in <sup>2</sup> )	54.7 (18.691)
Weight $m_{Mot}$	kg (lb)	28 (61.74)
Weight (with brake) $m_{Mot Br}$	kg (lb)	32 (70.56)
200 ... 240 V 3 AC		
Rated speed $n_N$	r/min	1000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	19.5 (14.38)
Rated current $I_N$	A	11.1
Rated power $P_N$	W	2040
380 ... 480 V 3 AC		
Rated speed $n_N$	r/min	2000
Rated torque $M_N$	Nm (lb <sub>f</sub> -ft)	12 (8.85)
Rated current $I_N$	A	7.1
Rated power $P_N$	W	2510
Suitable for SINAMICS S210 servo converters		
200 ... 240 V 3 AC		6SL3210-5HE17-0UF0
380 ... 480 V 3 AC		6SL3210-5HE17-0UF0
Suitable for SINAMICS S210 servo converters (New)		
200 ... 240 V 3 AC		6SL5310-1BE17-ODF0
380 ... 480 V 3 AC		6SL5310-1BE17-ODF0

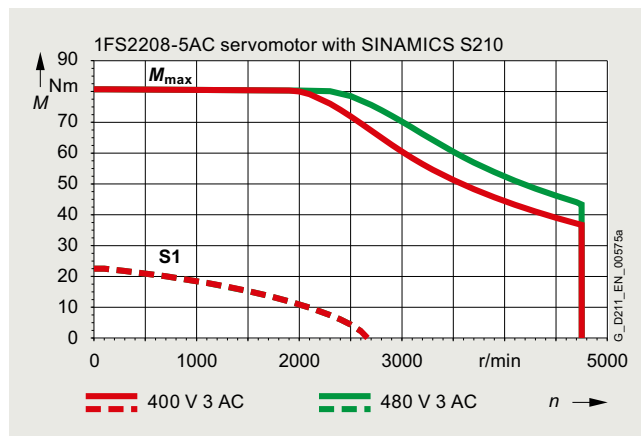
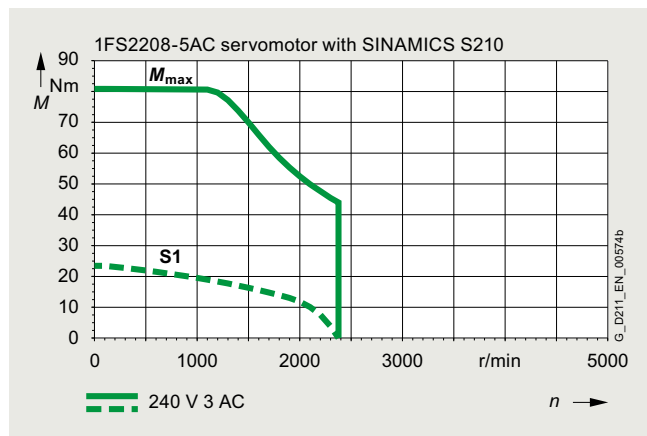
Technical specifications

Dimensional drawing



All dimensions in mm (values in brackets are in inches).

Speed/torque characteristics

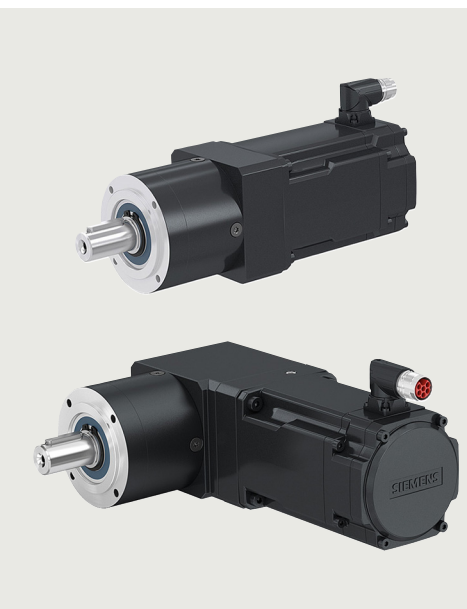


## SIMOTICS S-1FS2 servomotors for SINAMICS S210

### Notes

3  
3

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors



3.4/2	Overview		
3.4/8	Technical specifications		
3.4/8	General technical specifications for NRB, NRK, NLC coaxial gearboxes and NRBW, NRKW, NLCW angular gearboxes		
3.4/9	Coaxial gearbox type NRB		
3.4/15	Coaxial gearbox type NRK		
3.4/19	Coaxial gearbox type NLC		
3.4/23	Angular gearbox type NRBW		
3.4/29	Angular gearbox type NRKW		
3.4/33	Angular gearbox type NLCW		
3.4/37	Selection and ordering data		
3.4/37	Notes on the selection		
3.4/41	<b>Coaxial geared motors</b> for servo converters with <u>line connection 230 V 1 AC / 240 V 3 AC</u>	3.4/158	<b>Angular geared motors</b> for servo converters with <u>line connection 230 V 1 AC / 240 V 3 AC</u>
	Gearbox types:		Gearbox types:
3.4/42	NRB040	3.4/159	NRBW040
3.4/45	NRB060	3.4/161	NRBW060
3.4/51	NRB080	3.4/166	NRBW080
3.4/59	NRB120	3.4/172	NRBW120
3.4/69	NRB160		
3.4/72	NRK050	3.4/180	NRKW050
3.4/74	NRK070	3.4/181	NRKW070
3.4/77	NRK090	3.4/184	NRKW090
3.4/81	NRK120	3.4/187	NRKW120
3.4/86	NRK155		
3.4/90	NLC060	3.4/191	NLCW060
3.4/93	NLC080	3.4/194	NLCW080
3.4/97	NLC120	3.4/197	NLCW120
3.4/102	<b>Coaxial geared motors</b> for servo converters with <u>line connection 400 V 3 AC</u>	3.4/201	<b>Angular geared motors</b> for servo converters with <u>line connection 400 V 3 AC</u>
	Gearbox types:		Gearbox types:
3.4/105	NRB060	3.4/202	NRBW060
3.4/110	NRB080	3.4/206	NRBW080
3.4/117	NRB120	3.4/211	NRBW120
3.4/126	NRB160		
3.4/130	NRK070	3.4/218	NRKW070
3.4/133	NRK090	3.4/220	NRKW090
3.4/137	NRK120	3.4/223	NRKW120
3.4/142	NRK155		
3.4/146	NLC060	3.4/227	NLCW060
3.4/149	NLC080	3.4/229	NLCW080
3.4/153	NLC120	3.4/232	NLCW120

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Overview

#### Servo planetary geared motors

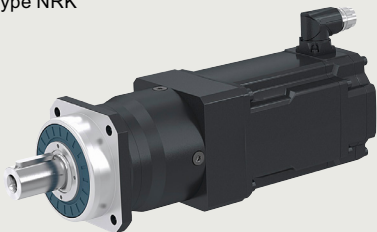
##### – SIMOTICS S-1FK2 and S-1FT2 with coaxial gearbox



- Gearbox type NRB



- Gearbox type NRK



- Gearbox type NLC

##### – SIMOTICS S-1FT2 with angular gearbox



- Gearbox type NRBW



- Gearbox type NRKW



- Gearbox type NLCW

SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors with the NRB, NRK, NLC coaxial gearboxes and SIMOTICS S-1FT2 servo planetary geared motors with the NRBW, NRKW, NLCW angular gearboxes are highly dynamic, compact and cost-effective drive units. The combinations, each composed of a servomotor with a high-performance planetary gearbox, are suitable for a wide range of applications in an industrial environment.

These planetary geared motors are specified and delivered completely as a unit. All outstanding performance data are matched to the motor-gearbox combination.

#### **Motors**

##### High Dynamic

Wherever small masses have to be moved with maximum dynamics and precision, the 1FK2 and 1FT2 High Dynamic servomotors with low inertia really come into their own.

The lightweight and low-friction gearboxes in conjunction with inertia-optimized clamping systems allow the highest cycle rates in the application.

##### Compact

If larger loads need to be moved with precision and dynamically, a motor version with higher inertia is unavoidable for controllable operations. The 1FK2 and 1FT2 Compact servomotors with medium inertia and planetary gearboxes with higher transmission ratios enable even difficult inertia conditions to be mastered in terms of the control technology.

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Overview

**Planetary gearboxes**

The three planetary gearboxes NRB(W), NRK(W) and NLC(W) can be mounted in all spatial positions without restriction and are maintenance-free thanks to their life-long lubrication.

**Coaxial gearboxes****NRB**

NRB is the lightest gearbox with the highest power density. Thanks to its low friction bearing design it is suitable for high speeds and only generates a slight amount of heat.

Application areas:

- Packaging
- Food industry
- Pharmaceutical and medical systems
- Auxiliary axes in machine tools

**NRK**

The NRK series gearbox is suitable for higher radial and axial forces due to the large output bearing. This gearbox is also suitable for higher speeds thanks to low internal friction.

Application areas:

- Automation and mounting technology
- Packaging
- Auxiliary axes in machine tools

**NLC**

Thanks to the preloaded tapered roller bearing, the NLC gearbox has a high degree of rigidity and is perfectly suited for high radial and axial loads. The IP65 cover provides protection against dust and water.

Application areas:



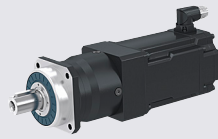
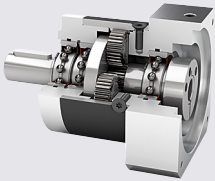
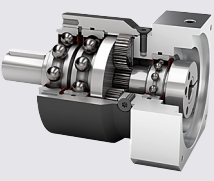
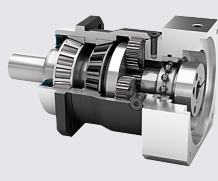
- Automation and mounting technology
- Packaging
- Food industry
- Printing industry
- Auxiliary axes in machine tools

**Angular gearboxes**

With a pre-built bevel gear stage, the planetary gearboxes NRB, NRK and NLC are also available as angular gearboxes NRBW, NRKW and NLCW.




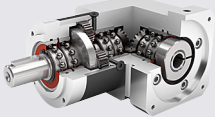
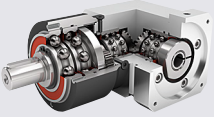
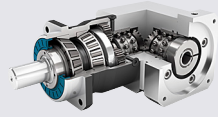
The angled versions are suitable for confined spaces.

Due to the additional angular stage, the losses in the angular gearbox are slightly higher, and the nominal data is reduced, compared to the corresponding coaxial version.

	Coaxial gearbox type		
	NRB	NRK	NLC
<b>SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors</b>			
<b>Transmission ratio <math>i</math></b>	3 ... 512	3 ... 100	3 ... 100
<b>Gearbox stages <math>z</math></b>	1, 2 and 3-stage	1 and 2-stage	1 and 2-stage
<b>Torsional backlash <math>\phi_2</math></b>	6 ... 22	6 ... 19	7 ... 12
<b>Gearbox type</b>	IM B14 / IM V18 / IM V19 IP64 High input speeds thanks to low-friction bearing design	IM B14 / IM V18 / IM V19 IP64 Large ball bearing, optimized for high radial and axial forces	IM B5 / IM V1 / IM V3 IP65 Preloaded tapered roller bearing for best rigidity at highest loads
• Eco planetary gearbox			
• Straight gearing			
• Life-long grease lubrication			
• Average torsional backlash			
			
<b>Geared motor data for 200 ... 240 V 1/3 AC</b>			
<b>Maximum torque <math>M_{2max}</math></b>	Nm (lb <sub>f</sub> -ft) 1.5 ... 1280 (1.11 ... 944)	1.4 ... 736 (1.03 ... 543)	3 ... 416 (2.21 ... 307)
<b>Rated torque <math>M_{2N}</math></b>	Nm (lb <sub>f</sub> -ft) 0.2 ... 650 (0.15 ... 479)	0.1 ... 460 (0.07 ... 339)	0.14 ... 260 (0.10 ... 192)
<b>Rated speed <math>n_{2N}</math></b>	r/min 3 ... 1000	15 ... 1000	15 ... 500
<b>Geared motor data for 380 ... 480 V 3 AC</b>			
<b>Maximum torque <math>M_{2max}</math></b>	Nm (lb <sub>f</sub> -ft) 4.9 ... 1280 (3.61 ... 944)	4.7 ... 736 (3.47 ... 376)	4.7 ... 416 (3.47 ... 307)
<b>Rated torque <math>M_{2N}</math></b>	Nm (lb <sub>f</sub> -ft) 0.8 ... 650 (0.59 ... 479)	0.54 ... 460 (0.40 ... 339)	0.36 ... 260 (0.27 ... 192)
<b>Rated speed <math>n_{2N}</math></b>	r/min 3 ... 1000	20 ... 750	25 ... 500
<b>Suitability</b>			
<b>Power density</b>	+++	++	++
<b>Bearing loading capacity</b>	+	++	+++
<b>Suitable for high speeds</b>	++	++	+
<b>Degree of protection</b>	+	+	++
<b>Options</b>			
<b>Plain shaft / solid shaft with feather key</b>	✓ / ✓	✓ / ✓	✓ / ✓
<b>Standard lubrication / food-grade lubricant</b>	✓ / ✓	✓ / ✓	✓ / ✓

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Overview

SIMOTICS S-1FT2 servo planetary geared motors	Angular gearbox type		
	NRBW	NRKW	NLCW
			
<b>Transmission ratio <math>i</math></b>	3 ... 512	3 ... 100	3 ... 100
<b>Gearbox stages <math>z</math></b>	1, 2 and 3-stage	1 and 2-stage	1 and 2-stage
<b>Torsional backlash <math>\varphi_2</math></b>	11 ... 28	11 ... 25	11 ... 18
<b>Gearbox type</b>	IM B14 / IM V18 / IM V19 IP64 High input speeds thanks to low-friction bearing design	IM B14 / IM V18 / IM V19 IP64 Large ball bearing, opti- mized for high radial and axial forces	IM B5 / IM V1 / IM V3 IP65 Preloaded tapered roller bearing for best rigidity at highest loads
<ul style="list-style-type: none"> <li>• Eco planetary gearbox</li> <li>• Straight gearing</li> <li>• Life-long grease lubrication</li> <li>• Average torsional backlash</li> </ul>			

## Geared motor data for 200 ... 240 V 1/3 AC

<b>Maximum torque <math>M_{2max}</math></b>	Nm (lb <sub>f</sub> -ft)	1.4 ... 416 (1.03 ... 307)	1.5 ... 312 (1.11 ... 230)	3.5 ... 416 (2.58 ... 307)
<b>Rated torque <math>M_{2N}</math></b>	Nm (lb <sub>f</sub> -ft)	0.1 ... 260 (0.07 ... 192)	0.11 ... 195 (0.08 ... 144)	0.12 ... 230 (0.09 ... 170)
<b>Rated speed <math>n_{2N}</math></b>	r/min	3 ... 1000	15 ... 1000	15 ... 375

## Geared motor data for 380 ... 480 V 3 AC

<b>Maximum torque <math>M_{2max}</math></b>	Nm (lb <sub>f</sub> -ft)	4.6 ... 416 (3.39 ... 307)	4.35 ... 312 (3.21 ... 230)	4.6 ... 416 (3.39 ... 307)
<b>Rated torque <math>M_{2N}</math></b>	Nm (lb <sub>f</sub> -ft)	0.52 ... 260 (0.38 ... 192)	0.34 ... 195 (0.25 ... 144)	0.26 ... 230 (0.19 ... 170)
<b>Rated speed <math>n_{2N}</math></b>	r/min	6 ... 1000	15 ... 750	15 ... 375

## Suitability

<b>Power density</b>	++	+	+
<b>Bearing loading capacity</b>	+	++	+++
<b>Suitable for high speeds</b>	+	+	+
<b>Degree of protection</b>	+	+	++

## Options






<b>Plain shaft / solid shaft with feather key</b>	✓ / ✓	✓ / ✓	✓ / ✓
<b>Standard lubrication / food-grade lubricant</b>	✓ / ✓	✓ / ✓	✓ / ✓



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Overview

### Structure of the Article No.

		<b>SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors</b>															
		<u>Basic motor</u>							<u>Planetary gearbox</u>								
		<u>Article No.</u>															
		<u>Order codes</u>															
		1F ■ 2.0 -. . A. ■ ■ - ■ 0 -Z ■ ■ + ■ ■ + ■ ■ + ■ ■ ■															
<b>Basic servomotor</b>		K T															
<b>Holding brake</b>	Without								0								
	Holding brake								1								
	Reinforced holding brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)								2								
<b>Degree of protection motor</b>	IP64								0								
	IP65								1								
<b>Motor shaft</b>	Assignment depending on the gearbox size																
<b>Encoder</b>	Absolute encoder 22-bit singleturn (AS22DQC)								S								
	Absolute encoder 22-bit + 12-bit multiturn (AM22DQC)								M								
	Absolute encoder Singleturn 26 bit (AS26DQC)								T (only for 1FT2)								
	Absolute encoder 26 bit + 12 bit Multiturn (AM26DQC)								T (only for 1FT2)								
<b>Connection technology</b>	One-cable technology for SINAMICS S210 servo converters								A								
	Two-cable technology for SINAMICS S120 servo converters								B								
<b>Gearbox type, gearbox size, number of gearbox stages, transmission ratio, lubrication and gearbox shaft</b>																	
<b>1. Order code – gearbox type, gearbox size and number of gearbox stages</b>																	
• Gearbox type	Planetary gearbox NRB or NRBW														A		
	Planetary gearbox NRK or NRKW														B		
	Planetary gearbox NLC or NLCW														C		
• Gearbox size	040/050														1		
	060/070														2		
	080/090														3		
	120														4		
	155/160														5		
• Number of gearbox stages	Coaxial gearbox												Angular gearbox (only for 1FT2)				
		1-stage	1												1-stage	6	
		2-stage	2												2-stage	7	
		3-stage	3												3-stage	8	
																	
<b>2. Order code – transmission ratio <i>i</i></b>																	
1-stage		2-stage		3-stage													
3	<b>R 03</b>	9	<b>R 09</b>	60	<b>R 60</b>												
4	<b>R 04</b>	12	<b>R 12</b>	80	<b>R 80</b>												
5	<b>R 05</b>	15	<b>R 15</b>	100	<b>R 01</b>												
7	<b>R 07</b>	16	<b>R 16</b>	120	<b>R 21</b>												
8	<b>R 08</b>	20	<b>R 20</b>	160	<b>R 61</b>												
10	<b>R 10</b>	25	<b>R 25</b>	200	<b>R 02</b>												
		32	<b>R 32</b>	256	<b>R 52</b>												
		40	<b>R 40</b>	320	<b>R 23</b>												
		50	<b>R 50</b>	512	<b>R 51</b>												
		64	<b>R 64</b>														
		100	<b>R 00</b>														
<b>3. Order code – gearbox lubrication and shaft design</b>																	
Standard lubrication		+			Smooth solid shaft									M 0 0			
Standard lubrication		+			Solid shaft with feather key									M 0 1			
Food-grade lubricant		+			Smooth solid shaft									M 1 0			
Food-grade lubricant		+			Solid shaft with feather key									M 1 1			
<b>4. Order code (optional) – Different orientation of the output for angular gearboxes (only for 1FT2)</b>																	
		-					Q 9 1						Q 9 2				
Standard													Q 9 3				

3  
4







### Notes:

- The geared motor can only be delivered as a unit – motor plus gearbox – (no individual gearboxes).
- Not all combinations are possible.
- For shaft design with feather key, the gearbox data only applies to pulsating loads. With alternating load / reversal of direction of rotation, limitation of the torque as a function of the number of load cycles is required (see [Configuration Manual](#)).

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Overview

Possible motor-gearbox combinations

Coaxial gearbox type	Gearbox size	Motor							Order code		
		1FK2102 1FT2102	1FK2 . 03 1FT2 . 03	1FK2 . 04 1FT2 . 04	1FK2 . 05 1FT2 . 05	1FK2 . 06 1FT2 . 06	1FK2208 1FT2208	1FK2210 1FT2210	Number of gearbox stages		
For servo converters connected to 200 ... 240 V 200 ... 240 V and 380 ... 480 V								1-stage	2-stage	3-stage	
	NRB 040	✓	✓	–	–	–	–	–	A11	A12	A13
	NRB 060	✓	✓	✓	✓	–	–	–	A21	A22	A23
	NRB 080	–	✓	✓	✓	✓	–	–	A31	A32	A33
	NRB 120	–	✓	✓	✓	✓	✓	–	A41	A42	A43
	NRB 160	–	–	–	✓	✓	✓	–	A51	A52	A53
	NRK 050	✓	✓	–	–	–	–	–	B11	B12	–
	NRK 070	✓	✓	✓	✓	–	–	–	B21	B22	–
	NRK 090	–	✓	✓	✓	✓	–	–	B31	B32	–
	NRK 120	–	✓	✓	✓	✓	✓	–	B41	B42	–
	NRK 155	–	–	–	✓	✓	✓	✓	B51	B52	–
	NLC 060	✓	✓	✓	✓	–	–	–	C21	C22	–
	NLC 080	–	✓	✓	✓	✓	–	–	C31	C32	–
	NLC 120	–	✓	✓	✓	✓	✓	–	C41	C42	–
Angular gearbox type	Gearbox size	Motor							Order code		
For servo converters connected to 200 ... 240 V 200 ... 240 V and 380 ... 480 V								1-stage	2-stage	3-stage	
	NRBW 040	✓	–	–	–	–	–	–	A16	A17	A18
	NRBW 060	✓	✓	✓	–	–	–	–	A26	A27	A28
	NRBW 080	–	✓	✓	✓	–	–	–	A36	A37	A38
	NRBW 120	–	✓	✓	✓	✓	–	–	A46	A47	A48
	NRKW 050	✓	–	–	–	–	–	–	B16	B17	–
	NRKW 070	✓	✓	✓	–	–	–	–	B26	B27	–
	NRKW 090	–	✓	✓	✓	–	–	–	B36	B37	–
	NRKW 120	–	✓	✓	✓	✓	–	–	B46	B47	–
	NLCW 060	✓	✓	✓	–	–	–	–	C26	C27	–
	NLCW 080	–	✓	✓	✓	–	–	–	C36	C37	–
	NLCW 120	–	✓	✓	✓	✓	–	–	C46	C47	–

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Overview

## Gearbox ratio

Number of gearbox stages	Transmission ratio $i$	Order code	
1-stage	3	<b>R03</b>	
	4	<b>R04</b>	
	5	<b>R05</b>	
	7	<b>R07</b>	
	8	<b>R08</b>	
	10	<b>R10</b>	
2-stage	9	<b>R09</b>	
	12	<b>R12</b>	
	15	<b>R15</b>	
	16	<b>R16</b>	
	20	<b>R20</b>	
	25	<b>R25</b>	
	32	<b>R32</b>	
	40	<b>R40</b>	
	50	<b>R50</b>	
	64	<b>R64</b>	
	100	<b>R00</b>	
	3-stage	60	<b>R60</b>
		80	<b>R80</b>
100		<b>R01</b>	
120		<b>R21</b>	
160		<b>R61</b>	
200		<b>R02</b>	
256		<b>R52</b>	
320		<b>R23</b>	
512		<b>R51</b>	

## Option for shaft

The output shaft of the planetary gearbox can be ordered as a plain shaft for a friction-locked connection or optionally with a feather key for positive transmission.

A friction-locked connection free of backlash (plain shaft) is recommended for dynamic loads, particularly during reversals in operation.

For pulsating loads without reversals, a positive feather key connection is also suitable as an alternative.

## Limitation of output torques for gearbox shaft with feather key

It must be ensured that the following torques are not exceeded at the output shaft for gearboxes with feather key and changing application loads. Regardless of this, other limitations such as maximum torque  $M_{2max,G}$  or the rated torque  $M_{2N,G}$  of the gearbox components are maintained.

Gearbox	Max. application torque $M_2$ in feather key design in Nm	
	up to 10 million load changes	up to 100 million load changes
NRB040, NRBW040	9	7
NRB060, NRBW060	31	25
NRB080, NRBW080	68	54
NRB120, NRBW120	132	105
NRB160	401	319
NRK050, NRKW050	12	9
NRK070, NRKW070	No restriction	29
NRK090, NRKW090	84	67
NRK120, NRKW120	No restriction	190
NRK155	389	309
NLC060, NLCW060	37	29
NLC080, NLCW080	76	60
NLC120, NLCW120	239	190

## Option for lubrication

Planetary gearboxes can be optionally ordered with a food-grade lubricant.





This lubricant was developed for the food and pharmaceutical industries for unpredictable contact with products and packaging in the food, cosmetics, pharmaceutical and animal feed industries. NSF H1 registration ensures that the lubricant is compliant with FDA 21 CFR §178.3570.

Lubrication	Shaft design on the gearbox	Order code
Standard lubrication	Smooth solid shaft	<b>M00</b>
	Solid shaft with feather key	<b>M01</b>
Food-grade lubricant <sup>1)</sup>	Smooth solid shaft	<b>M10</b>
	Solid shaft with feather key	<b>M11</b>

## Option for the orientation of the output for angular gearboxes

In the case of angular geared motors, the gear output is oriented to the right as standard (view of the motor from the front).

Optionally, a different assembly can be carried out according to the following table.

Orientation of the gearbox	Order code
 Gearbox output to the right, standard orientation	–
 Gearbox output upwards	<b>Q91</b>
 Gearbox output left	<b>Q92</b>
 Gearbox output to the bottom	<b>Q93</b>

<sup>1)</sup> For the angular planetary gearboxes NRBW, NRKW, NLCW, the choice of the food-grade lubricant leads to a reduction in the rating data from the following data tables. In this case, the exact performance and rating data can be found in the data sheet from the online configurator: [www.siemens.com/spc](http://www.siemens.com/spc)

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### General technical specifications for NRB, NRK, NLC coaxial gearboxes and NRBW, NRKW, NLCW angular gearboxes

#### Technical specifications

##### General technical specifications for NRB, NRK, NLC coaxial gearboxes and NRBW, NRKW, NLCW angular gearboxes

Largest average input speed  $n_{1av,G}$  and maximum input speed  $n_{1max,G}$

$n_{1av,G}$  – largest average input speed:

In each time window of 15 minutes, the average input speed must be below  $n_{1av,G}$

$n_{1max,G}$  – maximum input speed:

The maximum input speed  $n_{1max,G}$  must never be exceeded.

The maximum speeds of the mounted motor can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Coaxial gearbox type	Motor	Largest average input speed $n_{1av,G}$ in r/min	Maximum input speed $n_{1max,G}$ in r/min
NRB040, NRK050	1FK2102, 1FT2102	5000	18000
	1FK2.03, 1FT2.03	4500	
NRB060, NRK070, NLC060	1FK2102, 1FT2102	4500	13000
	1FK2.03, 1FT2.03		
	1FK2.04, 1FT2.04		
NRB080, NRK090, NLC080	1FK2.05, 1FT2.05	4000	7000
	1FK2.03, 1FT2.03	4000	
	1FK2.04, 1FT2.04		
	1FK2.05, 1FT2.05		
NRB120, NRK120, NLC120	1FK2.06, 1FT2.06	3500	6500
	1FK2.03, 1FT2.03	3500	
	1FK2.04, 1FT2.04		
	1FK2.05, 1FT2.05		
NRB160, NRK155	1FK2.06, 1FT2.06	3000	5500
	1FK2208, 1FT2208		
	1FK2210, 1FT2210		
	1FK2210, 1FT2210		
Angular gearbox type	Motor	Largest average input speed $n_{1av,G}$ in r/min	Maximum input speed $n_{1max,G}$ in r/min
NRBW040, NRKW050	1FT2102	5000	18000
	1FT2.03	4500	
NRBW060, NRKW070, NLCW060	1FT2102	4500	13000
	1FT2.03		
	1FT2.04		
NRBW080, NRKW090, NLCW080	1FT2.05	4000	7000
	1FT2.03	4000	
	1FT2.04		
	1FT2.05		
NRBW120, NRKW120, NLCW120	1FT2.06	3500	6500
	1FT2.03	3500	
	1FT2.04		
	1FT2.05		
NRBW120, NRKW120, NLCW120	1FT2.06	3000	
	1FT2208		
	1FT2210		

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRB

## Technical specifications

**Technical specifications for NRB gearbox**

$M_{2N,G}$  – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).

For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
<b>1-stage</b>					
3	11	28	85	115	400
4	15	38	115	155	450
5	14	40	110	195	450
7	8.5	25	65	135	–
8	6	18	50	120	450
10	5	15	38	95	–
<b>2-stage</b>					
9	16.5	44	130	210	–
12	20	44	120	260	800
15	18	44	110	230	700
16	20	44	120	260	800
20	20	44	120	260	800
25	18	40	110	230	700
32	20	44	120	260	800
40	18	40	110	230	700
64	7.5	18	50	120	450
<b>3-stage</b>					
60	20	44	110	260	–
80	20	44	120	260	–
100	20	44	120	260	–
120	18	44	110	230	–
160	20	44	120	260	–
200	18	40	110	230	–
256	20	44	120	260	–
320	18	40	110	230	–
512	7.5	18	50	120	–

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRB

## Technical specifications

$M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see Configuration Manual).

Transmission ratio <i>i</i>	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
<b>1-stage</b>					
3	17.5	45	136	184	640
4	24	61	184	248	720
5	22	64	176	312	720
7	13.5	40	104	216	–
8	10	29	80	192	720
10	8	24	61	152	–
<b>2-stage</b>					
9	26	70	208	336	–
12	32	70	192	416	1280
15	29	70	176	368	1120
16	32	70	192	416	1280
20	32	70	192	416	1280
25	29	64	176	368	1120
32	32	70	192	416	1280
40	29	64	176	368	1120
64	12	29	80	192	720
<b>3-stage</b>					
60	32	70	176	416	–
80	32	70	192	416	–
100	32	70	192	416	–
120	29	70	176	368	–
160	32	70	192	416	–
200	29	64	176	368	–
256	32	70	192	416	–
320	29	64	176	368	–
512	12	29	80	192	–

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRB

## Technical specifications

$M_{2Em.Off}$  – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio <i>i</i>	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
<b>1-stage</b>					
3	22.5	66	180	390	800
4	30	88	240	520	900
5	36	80	220	500	900
7	26	80	178	340	–
8	27	80	190	380	900
10	27	80	200	480	–
<b>2-stage</b>					
9	33	88	260	500	–
12	40	88	240	520	1600
15	36	88	220	500	1400
16	40	88	240	520	1600
20	40	88	240	520	1600
25	36	80	220	500	1400
32	40	88	240	520	1600
40	36	80	220	500	1400
64	27	80	190	380	900
<b>3-stage</b>					
60	40	88	220	520	–
80	40	88	240	520	–
100	40	88	240	520	–
120	36	88	220	500	–
160	40	88	240	520	–
200	36	80	220	500	–
256	40	88	240	520	–
320	36	80	220	500	–
512	27	80	190	380	–

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Coaxial gearbox type NRB

#### Technical specifications

##### $\eta_G$ – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed. The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %				
	Gearbox				
	NRB040	NRB060	NRB080	NRB120	NRB160
<b>1-stage</b>					
3	98	98	98	98	98
4	98	98	98	98	98
5	97 ... 98	98	98	98	98
7	96 ... 97	96 ... 97	97	97	–
8	94 ... 96	95 ... 97	96 ... 97	97	97
10	92 ... 95	94 ... 96	94 ... 96	97	–
<b>2-stage</b>					
9	96 ... 97	96 ... 97	96 ... 97	97	–
12	95 ... 96	95 ... 96	96 ... 97	96	96
15	95 ... 96	95 ... 96	95 ... 96	96	96
16	95 ... 96	95 ... 96	95 ... 96	96	96
20	94 ... 96	94 ... 96	95 ... 96	96	96
25	93 ... 95	93 ... 95	94 ... 95	95	95
32	92 ... 95	92 ... 95	93 ... 95	95	95
40	91 ... 94	91 ... 94	92 ... 94	94	94
64	76 ... 86	78 ... 87	81 ... 89	89	90
<b>3-stage</b>					
60	88 ... 92	88 ... 92	88 ... 92	92	–
80	85 ... 90	86 ... 91	87 ... 91	91	–
100	83 ... 89	83 ... 89	85 ... 90	90	–
120	79 ... 87	81 ... 88	82 ... 89	88	–
160	77 ... 86	77 ... 86	80 ... 88	87	–
200	71 ... 82	72 ... 83	75 ... 85	84	–
256	69 ... 81	69 ... 81	73 ... 84	83	–
320	62 ... 76	63 ... 77	67 ... 80	79	–
512	31 ... 48	34 ... 51	38 ... 57	58	–



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRB

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
<b>1-stage</b>					
3	0.65 ... 0.75	2.2 ... 2.6	7.2 ... 7.9	17.5 ... 18.5	57.5 ... 59.5
4	0.85 ... 0.95	2.4 ... 2.8	9.2 ... 10.1	19 ... 20.5	65 ... 68
5	0.9 ... 0.95	2.5 ... 2.8	9.4 ... 10.2	19.5 ... 21	66 ... 69
7	0.8 ... 0.85	2.3 ... 2.5	8.1 ... 8.7	17.5 ... 18.5	–
8	0.8 ... 0.85	2.2 ... 2.5	8 ... 8.4	17 ... 18	60 ... 62
10	0.75	2 ... 2.2	7.5 ... 7.9	15.5 ... 16.4	–
<b>2-stage</b>					
9	0.75 ... 0.8	2.4 ... 2.7	7.9 ... 8.4	19 ... 20	–
12	0.9 ... 1	2.5 ... 2.8	9.6 ... 10.3	20.5 ... 22	70 ... 73
15	0.9 ... 1	2.4 ... 2.7	9.5 ... 10.2	20 ... 21.5	69 ... 73
16	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.5	20.5 ... 22	72 ... 75
20	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	72 ... 75
25	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20 ... 21.5	70 ... 74
32	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	71 ... 75
40	0.95 ... 1	2.5 ... 2.8	9.6 ... 10.2	20 ... 21.5	70 ... 73
64	0.8 ... 0.85	2.3 ... 2.5	7.9 ... 8.3	17.5 ... 18.5	61 ... 63
<b>3-stage</b>					
60	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	–
80	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.5	20.5 ... 22	–
100	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	–
120	0.95 ... 1	2.4 ... 2.7	9.6 ... 10.2	20 ... 21.5	–
160	0.95 ... 1	2.5 ... 2.8	9.8 ... 10.4	20.5 ... 22	–
200	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20 ... 21.5	–
256	0.95 ... 1	2.5 ... 2.8	9.7 ... 10.3	20.5 ... 22	–
320	0.95 ... 1	2.5 ... 2.8	9.6 ... 10.2	20 ... 21.5	–
512	0.8 ... 0.85	2.3 ... 2.5	7.9 ... 8.3	17.5 ... 18.5	–

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
1-stage	15	10	7	7	6
2-stage	19	12	9	9	10
3-stage	22	15	11	11	–

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0.24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm				
	Gearbox NRB040	NRB060	NRB080	NRB120	NRB160
<b>Average radial force <math>F_{R\ eq}</math></b>					
• for $L_{10h} = 20000$ h	200	400	750	1750	5000
• for $L_{10h} = 30000$ h	160	340	650	1500	4200
<b>Maximum radial force <math>F_{R\ max}</math></b>	200	700	1250	2000	5000
<b>Average axial force <math>F_{A\ eq}</math></b>					
• for $L_{10h} = 20000$ h	200	500	1000	2500	7000
• for $L_{10h} = 30000$ h	160	450	900	2100	6000
<b>Maximum axial force <math>F_{A\ max}</math></b>	240	800	1600	3800	11000

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRB

## Technical specifications

$m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio <i>i</i>	$m_G$ – Weight of the gearbox components in kg									
	Gearbox		NRB060		NRB080		NRB120		NRB160	
	NRB040									
	Motor									
	1FK2102	1FK2 . 03	1FK2102	1FK2 . 04	1FK2 . 03	1FK2 . 06	1FK2 . 03	1FK2208	1FK2 . 05	
	1FT2102	1FT2 . 03	1FT2102	1FT2 . 04	1FT2 . 03	1FT2 . 06	1FT2 . 03	1FT2208	1FT2 . 05	
			1FK2 . 03	1FK2 . 05	1FK2 . 04		1FK2 . 04		1FK2 . 06	
			1FT2 . 03	1FT2 . 05	1FT2 . 04		1FT2 . 04		1FT2 . 06	
					1FK2 . 05		1FK2 . 05		1FK2208	
					1FT2 . 05		1FT2 . 05		1FT2208	
							1FK2 . 06			
							1FT2 . 06			
<b>1-stage</b>										
3	0.34	0.60	0.87	1.7	2.1	3.2	5.7	7.4	17	
4	0.35	0.60	0.88	1.4	2.1	3.2	5.7	7.8	17	
5	0.35	0.60	0.89	1.4	2.2	3.2	5.8	7.8	17	
7	0.35	0.60	0.88	1.4	2.1	3.2	5.7	7.8	–	
8	0.35	0.68	0.88	1.4	2.1	3.2	5.7	7.0	17	
10	0.35	0.61	0.89	1.4	2.2	3.2	5.7	7.8	–	
<b>2-stage</b>										
9	0.43	0.69	1.1	1.9	2.6	3.7	7.4	9.2	–	
12	0.43	0.69	1.1	1.9	2.6	3.7	7.4	9.2	23	
15	0.43	0.69	1.1	1.6	2.6	3.7	7.5	9.3	23	
16	0.44	0.69	1.1	1.6	2.6	3.7	7.5	9.5	23	
20	0.44	0.69	1.1	1.6	2.6	3.7	7.5	9.6	23	
25	0.44	0.69	1.1	1.6	2.7	3.7	7.5	9.6	23	
32	0.44	0.77	1.1	1.6	2.7	3.7	7.5	8.9	23	
40	0.44	0.77	1.1	1.6	2.7	3.7	7.6	8.9	23	
64	0.44	0.78	1.1	1.6	2.7	3.7	7.6	8.9	23	
<b>3-stage</b>										
60	0.52	0.78	1.3	1.8	3.1	4.2	9.2	11	–	
80	0.53	0.78	1.3	1.8	3.1	4.2	9.2	11	–	
100	0.53	0.78	1.3	1.8	3.1	4.2	9.3	11	–	
120	0.53	0.78	1.3	1.8	3.2	4.2	9.3	11	–	
160	0.53	0.86	1.3	1.8	3.1	4.2	9.3	11	–	
200	0.53	0.86	1.3	1.8	3.2	4.2	9.4	11	–	
256	0.54	0.87	1.3	1.8	3.2	4.2	9.4	11	–	
320	0.53	0.87	1.3	1.8	3.2	4.3	9.4	11	–	
512	0.54	0.87	1.3	1.8	3.2	4.3	9.4	11	–	

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial gearbox type NRK

## Technical specifications

**Technical specifications for NRK gearbox** $M_{2N,G}$  – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).

For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm				
	Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
<b>1-stage</b>					
3	11	28	85	115	–
4	15	33	90	155	460
5	13	30	82	172	445
7	8.5	25	65	135	–
8	6	18	50	120	–
10	5	15	38	95	210
<b>2-stage</b>					
9	12	33	97	157	–
12	15	33	90	195	–
15	13	33	82	172	–
16	15	33	90	195	460
20	15	33	90	195	460
25	13	30	82	172	445
32	15	33	90	195	–
40	13	30	82	172	460
50	–	–	–	–	445
64	7.5	18	50	120	–
100	5	15	38	95	210

 $M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.

An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see Configuration Manual).

Transmission ratio $i$	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm				
	Gearbox				
	NRK050	NRK070	NRK090	NRK120	NRK155
<b>1-stage</b>					
3	17.5	45	136	184	–
4	24	53	144	248	736
5	21	48	131	275	712
7	13.5	40	104	216	–
8	9.5	29	80	192	–
10	8	24	61	152	336
<b>2-stage</b>					
9	19	53	155	251	–
12	24	53	144	312	–
15	21	53	131	275	–
16	24	53	144	312	736
20	24	53	144	312	736
25	21	48	131	275	712
32	24	53	144	312	–
40	21	48	131	275	736
50	–	–	–	–	712
64	12	29	80	192	–
100	8	24	61	152	336

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Coaxial gearbox type NRK

#### Technical specifications

##### $M_{2Em,Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio $i$	$M_{2Em,Off}$ – Emergency Off output torque of the gearbox components in Nm				
	Gearbox NRK050	NRK070	NRK090	NRK120	NRK155
<b>1-stage</b>					
3	22.5	66	180	390	–
4	30	88	240	520	920
5	36	80	220	500	890
7	26	80	178	340	–
8	27	80	190	380	–
10	27	80	200	480	420
<b>2-stage</b>					
9	33	88	260	500	–
12	40	88	240	520	–
15	36	88	220	500	–
16	40	88	240	520	920
20	40	88	240	520	920
25	36	80	220	500	890
32	40	88	240	520	–
40	36	80	220	500	920
50	–	–	–	–	890
64	27	80	190	380	–
100	27	80	200	480	420

##### $\eta_G$ – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed. The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %				
	Gearbox NRK050	NRK070	NRK090	NRK120	NRK155
<b>1-stage</b>					
3	97 ... 98	97 ... 98	98	98	–
4	97 ... 98	97 ... 98	98	98	98
5	97 ... 98	97	97 ... 98	98	98
7	95 ... 97	96 ... 97	96 ... 97	97	–
8	94 ... 96	95 ... 96	96 ... 97	97	–
10	92 ... 95	93 ... 95	94 ... 96	96	97
<b>2-stage</b>					
9	95 ... 96	95 ... 96	96 ... 97	96	–
12	95 ... 96	95 ... 96	95 ... 96	96	–
15	94 ... 95	94 ... 95	94 ... 96	96	–
16	94 ... 95	94 ... 95	94 ... 96	96	96
20	93 ... 95	93 ... 95	94 ... 95	95	96
25	91 ... 94	92 ... 94	92 ... 95	95	95 ... 96
32	91 ... 94	91 ... 94	92 ... 94	94	–
40	88 ... 92	89 ... 93	90 ... 94	93	94 ... 95
50	–	–	–	–	94 ... 95
64	76 ... 86	78 ... 86	81 ... 89	89	–
100	60 ... 75	67 ... 80	69 ... 82	83	84 ... 88

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRK

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°				
	Gearbox NRK050	NRK070	NRK090	NRK120	NRK155
<b>1-stage</b>					
3	0.7 ... 0.75	4 ... 5.1	9.7 ... 10.8	29.5 ... 31.5	–
4	0.9 ... 1	4.7 ... 5.7	13.6 ... 15.3	35.5 ... 38.5	65 ... 70
5	0.95 ... 1	5 ... 5.9	14 ... 15.5	36.5 ... 39.5	68 ... 72
7	0.85	4.2 ... 4.6	11.4 ... 12.2	29.5 ... 31	–
8	0.85	4.1 ... 4.5	11.1 ... 11.8	28.5 ... 30.5	–
10	0.75 ... 0.8	3.5 ... 3.8	10.1 ... 10.6	24.5 ... 25.5	54.5 ... 56.5
<b>2-stage</b>					
9	0.8 ... 0.85	4.7 ... 5.2	11 ... 11.7	34 ... 36.5	–
12	1 ... 1.05	5.1 ... 5.7	14.6 ... 15.7	39.5 ... 43	–
15	1 ... 1.05	4.8 ... 5.3	14.4 ... 15.5	37.5 ... 40.5	–
16	1 ... 1.05	5.2 ... 5.8	15 ... 16.1	40 ... 43.5	69 ... 73
20	1 ... 1.05	5.2 ... 5.7	15 ... 16.1	40 ... 43.5	70 ... 73
25	1 ... 1.05	5.3 ... 5.8	14.7 ... 15.8	37.5 ... 41	70 ... 73
32	1 ... 1.05	5.1 ... 5.6	14.8 ... 15.8	39.5 ... 43	–
40	1 ... 1.05	5.2 ... 5.8	14.6 ... 15.6	37.5 ... 40.5	69 ... 72
50	–	–	–	–	69 ... 73
64	0.85 ... 0.9	4.2 ... 4.6	11 ... 11.5	30 ... 31.5	–
100	0.7	3.3 ... 3.6	9.7 ... 10.1	21 ... 22	55 ... 57

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °				
	Gearbox NRK050	NRK070	NRK090	NRK120	NRK155
1-stage	15	10	7	7	6
2-stage	19	12	9	9	9

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0.24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm				
	Gearbox NRK050	NRK070	NRK090	NRK120	NRK155
<b>Average radial force <math>F_{R\ eq}</math></b>					
• for $L_{10h} = 20000$ h	800	1050	1900	2500	5200
• for $L_{10h} = 30000$ h	700	900	1700	2150	4600
<b>Maximum radial force <math>F_{R\ max}</math></b>	1300	1650	3100	4000	8400
<b>Average axial force <math>F_{A\ eq}</math></b>					
• for $L_{10h} = 20000$ h	1000	1350	2000	4000	7000
• for $L_{10h} = 30000$ h	800	1000	1500	3000	6000
<b>Maximum axial force <math>F_{A\ max}</math></b>	1000	2100	3800	5900	11000

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NRK

## Technical specifications

$m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio $i$	$m_G$ – Weight of the gearbox components in kg									
	NRK050		NRK070		NRK090		NRK120		NRK155	
	Gearbox									
	Motor									
	1FK2102	1FK2 . 03	1FK2102	1FK2 . 05	1FK2 . 03	1FK2 . 06	1FK2 . 03	1FK2208	1FK2 . 05	1FK2210
	1FT2102	1FT2 . 03	1FT2102	1FT2 . 05	1FT2 . 03	1FT2 . 06	1FT2 . 03	1FT2208	1FT2 . 05	1FT2210
			1FK2 . 03		1FK2 . 04		1FK2 . 04		1FK2 . 06	
			1FT2 . 03		1FT2 . 04		1FT2 . 04		1FT2 . 06	
			1FK2 . 04		1FT2 . 05		1FK2 . 05		1FK2208	
			1FT2 . 04				1FT2 . 05		1FT2208	
							1FK2 . 06			
							1FT2 . 06			
<b>1-stage</b>										
3	0.61	0.86	1.4	2.2	3.3	4.3	7.5	9.2	–	–
4	0.61	0.87	1.4	1.9	3.3	4.3	7.5	9.6	17	22
5	0.61	0.87	1.4	2	3.3	4.3	7.5	9.6	17	22
7	0.62	0.87	1.4	2	3.3	4.3	7.5	9.6	–	–
8	0.61	0.95	1.4	2	3.3	4.4	7.5	8.9	–	–
10	0.63	0.88	1.4	2	3.3	4.4	7.6	9.7	17	22
<b>2-stage</b>										
9	0.77	1.0	1.7	2.5	3.9	5.0	9.4	11	–	–
12	0.77	1.0	1.7	2.5	3.9	5.0	9.4	11	–	–
15	0.77	1.0	1.7	2.2	3.9	5.0	9.4	11	–	–
16	0.77	1.0	1.7	2.2	3.9	5.0	9.4	11	22	28
20	0.77	1.0	1.7	2.2	3.9	5.0	9.4	12	22	28
25	0.77	1.0	1.7	2.3	4.0	5.0	9.5	12	22	28
32	0.77	1.1	1.7	2.3	4.0	5.0	9.5	11	–	–
40	0.78	1.1	1.7	2.3	4.0	5.0	9.5	11	22	28
50	–	–	–	–	–	–	–	–	22	28
64	0.78	1.1	1.7	2.3	4.0	5.1	9.6	11	–	–
100	0.81	1.1	1.9	2.4	4.1	5.1	9.7	12	22	28

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NLC

## Technical specifications

**Technical specifications for NLC gearbox** $M_{2N,G}$  – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see [Configuration Manual](#)).

For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see [Components and Options](#)).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm		
	Gearbox NLC060	NLC080	NLC120
<b>1-stage</b>			
3	28	85	115
4	38	115	155
5	40	110	195
7	25	65	135
8	18	50	120
10	15	38	95
<b>2-stage</b>			
9	44	130	210
12	44	120	260
15	44	110	230
16	44	120	260
20	44	120	260
25	40	110	230
32	44	120	260
40	40	110	230
64	18	50	120
100	15	38	95

 $M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.

An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see [Configuration Manual](#)).

Transmission ratio $i$	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm		
	Gearbox NLC060	NLC080	NLC120
<b>1-stage</b>			
3	45	136	184
4	61	148	248
5	64	176	312
7	40	104	216
8	29	80	192
10	24	61	152
<b>2-stage</b>			
9	70	208	336
12	70	192	416
15	70	176	368
16	70	192	416
20	70	192	416
25	64	176	368
32	70	192	416
40	64	176	368
64	29	80	192
100	24	61	152

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Coaxial gearbox type NLC

#### Technical specifications

##### $M_{2Em,Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio $i$	$M_{2Em,Off}$ – Emergency Off output torque of the gearbox components in Nm		
	Gearbox NLC060	NLC080	NLC120
<b>1-stage</b>			
3	66	180	390
4	88	240	520
5	80	220	500
7	80	178	340
8	80	190	380
10	80	200	480
<b>2-stage</b>			
9	88	260	500
12	88	240	520
15	88	220	500
16	88	240	520
20	88	240	520
25	80	220	500
32	88	240	520
40	80	220	500
64	80	190	380
100	80	200	480

##### $\eta_G$ – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.

The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %		
	Gearbox NLC060	NLC080	NLC120
<b>1-stage</b>			
3	96	97	97
4	96 ... 97	97	97
5	96 ... 97	97	97
7	94 ... 95	95 ... 96	96
8	93 ... 94	94 ... 96	96
10	91 ... 93	92 ... 94	96
<b>2-stage</b>			
9	95 ... 96	96	96
12	94 ... 95	95 ... 96	96
15	94 ... 95	94 ... 95	96
16	94 ... 95	94 ... 96	96
20	93 ... 95	94 ... 95	95
25	92 ... 94	93 ... 95	95
32	91 ... 94	93 ... 95	95
40	90 ... 93	91 ... 94	94
64	77 ... 85	80 ... 88	89
100	66 ... 78	68 ... 81	83



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NLC

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°		
	Gearbox NLC060	NLC080	NLC120
<b>1-stage</b>			
3	3,4 ... 4,1	8,2 ... 8,9	21,5 ... 22
4	3,9 ... 4,5	10,9 ... 11,8	24,5 ... 25,5
5	4 ... 4,6	11,2 ... 11,9	25 ... 26
7	3,5 ... 3,8	9,4 ... 9,9	21,5 ... 22
8	3,4 ... 3,7	9,2 ... 9,6	21 ... 22
10	3 ... 3,2	8,5 ... 8,9	18,5 ... 19,5
<b>2-stage</b>			
9	3,8 ... 4,2	9,2 ... 9,6	23,5 ... 24,5
12	4,1 ... 4,5	11,5 ... 12,1	26 ... 27,5
15	3,9 ... 4,2	11,4 ... 12	25,5 ... 26,5
16	4,2 ... 4,6	11,8 ... 12,3	26,5 ... 27,5
20	4,1 ... 4,5	11,8 ... 12,3	26,5 ... 27,5
25	4,2 ... 4,6	11,6 ... 12,1	25,5 ... 26,5
32	4,1 ... 4,5	11,5 ... 12,2	26 ... 27,5
40	4,2 ... 4,5	11,5 ... 12	25,5 ... 26,5
64	3,5 ... 3,8	9,2 ... 9,5	21,5 ... 22,5
100	2,9 ... 3,1	8,2 ... 8,5	16,7 ... 17

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °		
	Gearbox NLC060	NLC080	NLC120
1-stage	10	7	7
2-stage	12	9	9

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0,24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm		
	Gearbox NLC060	NLC080	NLC120
<b>Average radial force <math>F_{R\ eq}</math></b>			
• for $L_{10h} = 20000$ h	3200	5500	6000
• for $L_{10h} = 30000$ h	3200	4800	5400
<b>Maximum radial force <math>F_{R\ max}</math></b>	3200	5500	6000
<b>Average axial force <math>F_{A\ eq}</math></b>			
• for $L_{10h} = 20000$ h	4400	6400	8000
• for $L_{10h} = 30000$ h	3900	5700	7000
<b>Maximum axial force <math>F_{A\ max}</math></b>	4400	6400	8000

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial gearbox type NLC

## Technical specifications

 $m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio $i$	$m_G$ – Weight of the gearbox components in kg						
	Gearbox NLC060		NLC080		NLC120		
	Motor						
	1FK2102	1FK2 . 05	1FK2 . 03	1FK2 . 06	1FK2 . 03	1FK2208	
	1FT2102	1FT2 . 05	1FT2 . 03	1FT2 . 06	1FT2 . 03	1FT2208	
	1FK2 . 03		1FK2 . 04		1FK2 . 04		
	1FT2 . 03		1FT2 . 04		1FT2 . 04		
	1FK2 . 04		1FK2 . 05		1FK2 . 05		
	1FT2 . 04		1FT2 . 05		1FT2 . 05		
					1FK2 . 06		
					1FT2 . 06		
<b>1-stage</b>							
3	1.6	2.4	3.0	4.1	6.9	8.7	
4	1.6	2.1	3.0	4.1	6.9	9.0	
5	1.6	2.1	3.1	4.1	7.0	9.1	
7	1.6	2.1	3.0	4.1	7.0	9.1	
8	1.6	2.1	3.0	4.1	6.9	8.2	
10	1.6	2.1	3.1	4.1	7.0	9.1	
<b>2-stage</b>							
9	1.7	2.6	3.6	4.6	8.6	10	
12	1.8	2.6	3.5	4.6	8.6	10	
15	1.7	2.3	3.5	4.6	8.7	10	
16	1.8	2.3	3.5	4.6	8.6	11	
20	1.8	2.3	3.5	4.6	8.7	11	
25	1.8	2.3	3.6	4.6	8.7	11	
32	1.8	2.3	3.6	4.6	8.7	10	
40	1.8	2.3	3.6	4.6	8.8	10	
64	1.8	2.3	3.6	4.6	8.7	10	
100	1.8	2.3	3.6	4.7	8.9	11	

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

**Technical specifications for NRBW gearbox**

$M_{2N,G}$  – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).

For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm			
	Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
<b>1-stage</b>				
3	4.5	14	40	80
4	6	19	53	105
5	7.5	24	67	130
7	8.5	25	65	135
8	6	18	50	120
10	5	15	38	95
<b>2-stage</b>				
9	16.5	44	130	210
12	20	44	120	260
15	18	44	110	230
16	20	44	120	260
20	20	44	120	260
25	18	40	110	230
32	20	44	120	260
40	18	40	110	230
64	7.5	18	50	120
<b>3-stage</b>				
60	20	44	110	260
80	20	44	120	260
100	20	44	120	260
120	18	44	110	230
160	20	44	120	260
200	18	40	110	230
256	20	44	120	260
320	18	40	110	230
512	7.5	18	50	120

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

$M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see Configuration Manual).

Transmission ratio $i$	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm			
	Gearbox NRBW040	NRBW060	NRBW080	NRBW120
<b>1-stage</b>				
3	7	22	64	128
4	10	30	85	168
5	12	38	107	208
7	13.5	40	104	216
8	10	29	80	192
10	8	24	61	152
<b>2-stage</b>				
9	26	70	208	336
12	32	70	192	416
15	29	70	176	368
16	32	70	192	416
20	32	70	192	416
25	29	64	176	368
32	32	70	192	416
40	29	64	176	368
64	12	29	80	192
<b>3-stage</b>				
60	32	70	176	416
80	32	70	192	416
100	32	70	192	416
120	29	70	176	368
160	32	70	192	416
200	29	64	176	368
256	32	70	192	416
320	29	64	176	368
512	12	29	80	192

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

$M_{2Em.Off}$  – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio $i$	$M_{2Em.Off}$ – Emergency Off output torque of the gearbox components in Nm			
	Gearbox NRBW040	NRBW060	NRBW080	NRBW120
<b>1-stage</b>				
3	22.5	66	180	360
4	28	86	240	474
5	35	80	220	500
7	26	80	178	340
8	27	80	190	380
10	25	70	170	430
<b>2-stage</b>				
9	33	88	260	500
12	40	88	240	520
15	36	88	220	500
16	40	88	240	520
20	40	88	240	520
25	36	80	220	500
32	40	88	240	520
40	36	80	220	500
64	27	80	190	380
<b>3-stage</b>				
60	40	88	220	520
80	40	88	240	520
100	40	88	240	520
120	36	88	220	500
160	40	88	240	520
200	36	80	220	500
256	40	88	240	520
320	36	80	220	500
512	27	80	190	380

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

 $\eta_G$  – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed. The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %			
	Gearbox			
	NRBW040	NRBW060	NRBW080	NRBW120
<b>1-stage</b>				
3	94	95	95	95
4	94	95	95	95
5	94	95	95	95
7	94	94	95	95
8	92	93	94	95
10	90	92	93	94
<b>2-stage</b>				
9	94	94	94	94
12	94	94	94	94
15	93	93	93	94
16	93	93	93	94
20	92	92	93	93
25	91	91	92	92
32	91	91	92	92
40	89	89	90	91
64	75	77	80	84
<b>3-stage</b>				
60	86	86	87	88
80	84	84	86	87
100	82	82	84	85
120	78	80	81	82
160	76	76	79	81
200	70	71	74	77
256	68	68	72	75
320	61	62	66	70
512	31	33	38	46

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°			
	Gearbox NRBW040	NRBW060	NRBW080	NRBW120
<b>1-stage</b>				
3	0.45	1.6	4.1	10
4	0.63	2.0	6.0	14
5	0.73	2.2	7.0	15
7	0.78	2.2	7.5	17
8	0.78	2.2	7.5	17
10	0.73	2.2	7.8	16
<b>2-stage</b>				
9	0.73	2.4	7.4	18
12	0.93	2.6	9.3	20
15	0.93	2.5	9.5	20
16	0.95	2.6	9.7	21
20	0.98	2.6	9.9	21
25	0.95	2.7	9.8	20
32	0.98	2.7	10	21
40	0.98	2.7	9.9	21
64	0.83	2.4	8.1	18
<b>3-stage</b>				
60	0.98	2.7	10	21
80	0.98	2.7	10	21
100	0.98	2.7	10	21
120	0.98	2.6	9.9	21
160	0.98	2.7	10	21
200	0.98	2.7	10	21
256	0.98	2.7	10	21
320	0.98	2.7	9.9	21
512	0.83	2.4	8.1	18

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °			
	Gearbox NRBW040	NRBW060	NRBW080	NRBW120
1-stage	21	16	13	11
2-stage	25	18	15	13
3-stage	28	21	17	15

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0.24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm			
	Gearbox NRBW040	NRBW060	NRBW080	NRBW120
<b>Average radial force <math>F_{R\ eq}</math></b>				
• for $L_{10h} = 20000$ h	200	400	750	1750
• for $L_{10h} = 30000$ h	160	340	650	1500
<b>Maximum radial force <math>F_{R\ max}</math></b>	200	700	1250	2000
<b>Average axial force <math>F_{A\ eq}</math></b>				
• for $L_{10h} = 20000$ h	200	500	1000	2500
• for $L_{10h} = 30000$ h	160	450	900	2100
<b>Maximum axial force <math>F_{A\ max}</math></b>	240	800	1600	3800

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRBW

## Technical specifications

$m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio <i>i</i>	$m_G$ – Weight of the gearbox components in kg							
	Gearbox NRBW040	NRBW060		NRBW080		NRBW120		
Motor	1FT2102	1FT2102 1FT2 . 03	1FT2 . 04	1FT2 . 03 1FT2 . 04	1FT2105	1FT2205	1FT2 . 03 1FT2 . 04 1FT2 . 05	1FT2 . 06
<b>1-stage</b>								
3	0.55	1.6	1.8	3.6	4.0	3.8	9.6	10
4	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
5	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
7	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
8	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
10	0.56	1.6	1.8	3.6	4.0	3.8	9.7	10
<b>2-stage</b>								
9	0.64	1.8	2.0	4.1	4.5	4.3	11	12
12	0.64	1.8	2.0	4.1	4.5	4.3	11	12
15	0.64	1.8	2.0	4.1	4.5	4.3	11	12
16	0.64	1.8	2.0	4.0	4.5	4.2	11	12
20	0.65	1.8	2.0	4.1	4.5	4.3	11	12
25	0.64	1.8	2.0	4.1	4.5	4.3	12	12
32	0.65	1.8	2.0	4.1	4.5	4.3	12	12
40	0.65	1.8	2.0	4.1	4.5	4.3	12	12
64	0.65	1.8	2.0	4.1	4.5	4.3	12	12
<b>3-stage</b>								
60	0.74	2.0	2.2	4.5	5.0	4.7	13	14
80	0.74	2.0	2.2	4.5	5.0	4.7	13	14
100	0.74	2.0	2.2	4.6	5.0	4.8	13	14
120	0.74	2.0	2.2	4.6	5.0	4.8	13	14
160	0.74	2.0	2.2	4.6	5.0	4.8	13	14
200	0.74	2.0	2.2	4.6	5.0	4.8	13	14
256	0.74	2.0	2.2	4.6	5.0	4.8	13	14
320	0.74	2.0	2.2	4.6	5.1	4.8	13	14
512	0.75	2.0	2.2	4.6	5.1	4.8	13	14



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRKW

## Technical specifications

**Technical specifications for NRKW gearbox** $M_{2N,G}$  – Rated torque for gearbox components

An endurance strength calculation becomes necessary if this torque is exceeded (see Configuration Manual).

For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see Components and Options).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm			
	Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
<b>1-stage</b>				
3	4.5	14	40	80
4	6	19	53	105
5	7.5	24	67	130
7	8.5	25	65	135
8	6	18	50	120
10	5	15	38	95
<b>2-stage</b>				
9	12	33	97	157
12	15	33	90	195
15	13	33	82	172
16	15	33	90	195
20	15	33	90	195
25	13	30	82	172
32	15	33	90	195
40	13	30	82	172
64	7.5	18	50	120
100	5	15	38	95

 $M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft. An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see Configuration Manual).

Transmission ratio $i$	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm			
	Gearbox			
	NRKW050	NRKW070	NRKW090	NRKW120
<b>1-stage</b>				
3	7	22	64	128
4	10	30	85	168
5	12	38	107	208
7	13.5	40	104	216
8	10	29	80	192
10	8	24	61	152
<b>2-stage</b>				
9	19	53	155	251
12	24	53	144	312
15	21	53	131	275
16	24	53	144	312
20	24	53	144	312
25	21	48	131	275
32	24	53	144	312
40	21	48	131	275
64	12	29	80	192
100	8	24	61	152

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRKW

## Technical specifications

 $M_{2Em,Off}$  – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio $i$	$M_{2Em,Off}$ – Emergency Off output torque of the gearbox components in Nm			
	Gearbox NRKW050	NRKW070	NRKW090	NRKW120
<b>1-stage</b>				
3	22.5	66	180	360
4	28	86	240	474
5	35	80	220	500
7	26	80	178	340
8	27	80	190	380
10	25	70	170	430
<b>2-stage</b>				
9	33	88	260	500
12	40	88	240	520
15	36	88	220	500
16	40	88	240	520
20	40	88	240	520
25	36	80	220	500
32	40	88	240	520
40	36	80	220	500
64	27	80	190	380
100	27	80	170	430

 $\eta_G$  – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.

The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %			
	Gearbox NRKW050	NRKW070	NRKW090	NRKW120
<b>1-stage</b>				
3	94	94	95	95
4	94	94	95	95
5	94	95	95	95
7	94	94	95	95
8	92	93	94	94
10	90	91	92	94
<b>2-stage</b>				
9	93	93	94	94
12	93	93	93	94
15	92	92	93	93
16	92	92	93	93
20	91	91	92	93
25	90	90	91	91
32	89	89	90	91
40	87	87	89	90
64	75	76	80	84
100	59	65	69	75

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NRKW

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°			
	Gearbox NRKW050	NRKW070	NRKW090	NRKW120
<b>1-stage</b>				
3	0.45	2.3	4.8	13
4	0.65	3.2	7.5	20
5	0.75	3.8	9.2	24
7	0.80	4.0	10	27
8	0.80	4.0	10	27
10	0.78	3.7	11	25
<b>2-stage</b>				
9	0.75	4.4	10	31
12	0.98	5.0	14	37
15	0.98	4.8	14	37
16	1.0	5.3	15	39
20	1.0	5.3	15	40
25	1.0	5.5	15	39
32	1.0	5.4	15	41
40	1.0	5.5	15	39
64	0.88	4.4	11	31
100	0.70	3.5	9.9	22

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °			
	Gearbox NRKW050	NRKW070	NRKW090	NRKW120
1-stage	21	16	13	11
2-stage	25	18	15	13

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0.24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm			
	Gearbox NRKW050	NRKW070	NRKW090	NRKW120
<b>Average radial force <math>F_{R\ eq}</math></b>				
• for $L_{10h} = 20000$ h	800	1050	1900	2500
• for $L_{10h} = 30000$ h	700	900	1700	2150
<b>Maximum radial force <math>F_{R\ max}</math></b>	1300	1650	3100	4000
<b>Average axial force <math>F_{A\ eq}</math></b>				
• for $L_{10h} = 20000$ h	1000	1350	2000	4000
• for $L_{10h} = 30000$ h	800	1000	1500	3000
<b>Maximum axial force <math>F_{A\ max}</math></b>	1000	2100	3800	5900

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Angular gearbox type NRKW

#### Technical specifications

$m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio $i$	$m_G$ – Weight of the gearbox components in kg							
	Gearbox NRKW050		NRKW070		NRKW090		NRKW120	
	Motor 1FT2102	1FT2102 1FT2 . 03	1FT2 . 04	1FT2 . 03 1FT2 . 04	1FT2105	1FT2205	1FT2 . 03 1FT2 . 04 1FT2 . 05	1FT2 . 06
<b>1-stage</b>								
3	0.82	2.1	2.3	4.7	5.1	4.9	11	12
4	0.82	2.1	2.3	4.7	5.1	4.9	11	12
5	0.82	2.1	2.3	4.7	5.2	4.9	11	12
7	0.83	2.1	2.3	4.7	5.1	4.9	12	12
8	0.82	2.1	2.3	4.7	5.2	4.9	12	12
10	0.84	2.1	2.3	4.8	5.2	5.0	12	12
<b>2-stage</b>								
9	0.98	2.4	2.6	5.4	5.8	5.6	13	14
12	0.98	2.4	2.6	5.4	5.8	5.6	13	14
15	0.98	2.4	2.6	5.4	5.8	5.6	13	14
16	0.98	2.4	2.6	5.4	5.8	5.6	13	14
20	0.98	2.4	2.6	5.4	5.8	5.6	13	14
25	0.98	2.4	2.6	5.4	5.8	5.6	13	14
32	0.98	2.4	2.6	5.4	5.8	5.6	13	14
40	0.99	2.4	2.6	5.4	5.8	5.6	13	14
64	0.99	2.4	2.6	5.4	5.9	5.6	14	14
100	1.0	2.6	2.8	5.5	5.9	5.7	14	14

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NLCW

## Technical specifications

**Technical specifications for NLCW gearbox** $M_{2N,G}$  – Rated torque for gearbox componentsAn endurance strength calculation becomes necessary if this torque is exceeded (see [Configuration Manual](#)).For the feather key version, the gearbox nominal torque is only permissible as a pulsating load or a reduction must be carried out depending on the number of load changes (see [Components and Options](#)).

Transmission ratio $i$	$M_{2N,G}$ – Rated torque for gearbox components in Nm		
	Gearbox NLCW060	NLCW080	NLCW120
<b>1-stage</b>			
3	14	40	80
4	19	53	105
5	24	67	130
7	25	65	135
8	18	50	120
10	15	38	95
<b>2-stage</b>			
9	44	130	210
12	44	120	260
15	44	110	230
16	44	120	260
20	44	120	260
25	40	110	230
32	44	120	260
40	40	110	230
64	18	50	120
100	15	38	95

 $M_{2max,G}$  – Maximum output torque of the gearbox components

This torque must not be exceeded during operation. It is permissible for a maximum of 30000 revolutions of the output shaft.

An endurance strength configuration of the gearbox becomes necessary, if the output torques up to  $M_{2max,G}$  are used (see [Configuration Manual](#)).

Transmission ratio $i$	$M_{2max,G}$ – Maximum output torque of the gearbox components in Nm		
	Gearbox NLCW060	NLCW080	NLCW120
<b>1-stage</b>			
3	22	64	128
4	30	85	168
5	38	107	208
7	40	104	216
8	29	80	192
10	24	61	152
<b>2-stage</b>			
9	70	208	336
12	70	192	416
15	70	176	368
16	70	192	416
20	70	192	416
25	64	176	368
32	70	192	416
40	64	176	368
64	29	80	192
100	24	61	152

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Angular gearbox type NLCW

#### Technical specifications

##### $M_{2Em,Off}$ – Emergency Off output torque of the gearbox components

The Emergency Off torque can be tolerated a maximum of 1000 times within the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether the torques, caused by very rare operating faults, can damage the gearbox.

Transmission ratio $i$	$M_{2Em,Off}$ – Emergency Off output torque of the gearbox components in Nm		
	Gearbox NLCW060	NLCW080	NLCW120
<b>1-stage</b>			
3	66	180	360
4	86	240	474
5	80	220	500
7	80	178	340
8	80	190	380
10	70	170	430
<b>2-stage</b>			
9	88	260	500
12	88	240	520
15	88	220	500
16	88	240	520
20	88	240	520
25	80	220	500
32	88	240	520
40	80	220	500
64	80	190	380
100	80	200	430

##### $\eta_G$ – Efficiency of the gearbox components under full load

The exact values for the efficiency are, to some extent, dependent on the frame size of the mounted motor and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

In the partial load range, especially when the gearbox is cold, the efficiency of the gearbox is always lower than at operating speed.

The gear losses are already taken into account in the characteristic curves and in the following characteristic data of the geared motor or its components:  $M_{2,0}$ ,  $M_{2,max}$ ,  $M_{0,M}$ ,  $M_{max,M}$ .

A reduction of this characteristic curve and the characteristics on efficiency is not necessary.

Transmission ratio $i$	$\eta_G$ – Efficiency of the gearbox components under full load in %		
	Gearbox NLCW060	NLCW080	NLCW120
<b>1-stage</b>			
3	91	93	94
4	92	93	94
5	92	94	94
7	92	93	94
8	90	92	93
10	88	90	92
<b>2-stage</b>			
9	93	94	94
12	93	94	94
15	93	93	94
16	92	93	94
20	92	93	93
25	91	92	92
32	90	91	92
40	88	90	91
64	75	78	83
100	64	67	74

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NLCW

## Technical specifications

$C_{T2}$  – Torsional rigidity of the gearbox (related to the output)

The exact values for the torsional rigidity are dependent on the motor-gearbox combination and can be found in the data sheet resulting from the configuration on the Siemens Product Configurator.

Transmission ratio $i$	$C_{T2}$ – Torsional rigidity of the gearbox in Nm/°		
	Gearbox NLCW060	NLCW080	NLCW120
<b>1-stage</b>			
3	2,1	4,4	11
4	2,8	6,6	16
5	3,2	7,9	18
7	3,3	8,5	20
8	3,3	8,6	20
10	3,1	8,9	19
<b>2-stage</b>			
9	3,7	8,4	22
12	4,1	11	25
15	4,0	11	25
16	4,2	11	26
20	4,3	12	26
25	4,4	12	26
32	4,3	12	27
40	4,4	12	26
64	3,7	9,3	22
100	3,0	8,4	17

$\varphi_2$  – Torsional backlash of the gearbox on the gearbox output

Gearbox stages $z$	$\varphi_2$ – Torsional backlash of the gearbox on the gearbox output in °		
	Gearbox NLCW060	NLCW080	NLCW120
1-stage	16	13	11
2-stage	18	15	13

## Permissible shaft loading capacity

The limit values shown for the bearing load refer to equivalent forces to be determined mathematically, whose effect is equivalent to the forces occurring in the load profile.

They only apply to radial and axial loads. Axial forces up to maximum  $F_A = 0.24 \times F_R$  are permissible in case of superimposition. They apply to the output speed of 100 r/min and in case of radial force for a force application point in the center of the shaft or for centrally applied axial force. For other speeds or force application points, the permissible radial forces must be obtained from the radial force diagrams of the Configuration Manual.

	Permissible shaft loading capacity, radial and axial forces in Nm		
	Gearbox NLCW060	NLCW080	NLCW120
<b>Average radial force <math>F_{R\ eq}</math></b>			
• for $L_{10h} = 20000$ h	3200	5500	6000
• for $L_{10h} = 30000$ h	3200	4800	5400
<b>Maximum radial force <math>F_{R\ max}</math></b>	3200	5500	6000
<b>Average axial force <math>F_{A\ eq}</math></b>			
• for $L_{10h} = 20000$ h	4400	6400	8000
• for $L_{10h} = 30000$ h	3900	5700	7000
<b>Maximum axial force <math>F_{A\ max}</math></b>	4400	6400	8000

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Angular gearbox type NLCW

## Technical specifications

$m_G$  – Weight of the gearbox components

The weight of the assigned motors and the total weight of the geared motors are in the data sheet resulting from the configuration of the motor or the geared motor in the Siemens Product Configurator.

Transmission ratio $i$	$m_G$ – Weight of the gearbox components in kg						
	Gearbox NLCW060		NLCW080			NLCW120	
	Motor 1FT2102 1FT2 . 03	1FT2 . 04	1FT2 . 03 1FT2 . 04	1FT2105	1FT2205	1FT2 . 03 1FT2 . 04 1FT2 . 05	1FT2206
<b>1-stage</b>							
3	2.3	2.5	4.5	4.9	4.7	11	11
4	2.3	2.5	4.5	4.9	4.7	11	11
5	2.3	2.5	4.5	4.9	4.7	11	11
7	2.3	2.5	4.5	4.9	4.7	11	11
8	2.3	2.5	4.5	4.9	4.7	11	11
10	2.3	2.5	4.5	4.9	4.7	11	11
<b>2-stage</b>							
9	2.4	2.6	5.0	5.4	5.2	12	13
12	2.5	2.7	5.0	5.4	5.2	13	13
15	2.4	2.6	5.0	5.4	5.2	13	13
16	2.5	2.7	5.0	5.4	5.2	13	13
20	2.5	2.7	5.0	5.4	5.2	13	13
25	2.5	2.7	5.0	5.4	5.2	13	13
32	2.5	2.7	5.0	5.4	5.2	13	13
40	2.5	2.7	5.0	5.4	5.2	13	13
64	2.5	2.7	5.0	5.4	5.2	13	13
100	2.5	2.7	5.0	5.5	5.2	13	13









# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Notes on the selection

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### Selection and ordering data

#### Selection of holding brake, degree of protection motor, encoder, connection technology, gearbox lubrication and shaft design

		SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors														
		Basic motor						Planetary gearbox								
		Article No.						Order codes								
		1F	2.0	..	A	.	.	0	-Z	+	+	+	+	+	+	
<b>Basis servomotor</b>	See selection and ordering data tables	K														
		T														
<b>Holding brake</b>	Without							0								
	Holding brake							1								
	Reinforced holding brake (only for 1FT2208-2, 1FT2208-3, 1FT2210-2 and 1FT2210-3)							2								
<b>Degree of protection motor</b>	IP64							0								
	IP65							1								
<b>Motor shaft</b>	Assignment depending on the gearbox size, see selection and ordering data tables															
<b>Encoder</b>	Absolute encoder 22-bit singleturn (AS22DQC)									S						
	Absolute encoder 22-bit + 12-bit multiturn (AM22DQC)									M						
	Absolute encoder Singleturn 26 bit (AS26DQC)						T (only for 1FT2)			B						
	Absolute encoder 26 bit + 12 bit Multiturn (AM26DQC)						T (only for 1FT2)			C						
<b>Connection technology</b>	One-cable technology for SINAMICS S210 servo converters									A						
	Two-cable technology for SINAMICS S120 servo converters									B						
<b>Gearbox type, gearbox size, number of gearbox stages, transmission ratio, lubrication and gearbox shaft</b>																
<b>1. Order code – gearbox type, gearbox size and number of gearbox stages</b>																
	<b>Gearbox type</b> Order codes see selection and ordering data tables	Planetary gearbox NRB or NRBW Planetary gearbox NRK or NRKW Planetary gearbox NLC or NLCW										A				
	<b>Gearbox size</b> Order codes see selection and ordering data tables	040/050 060/070 080/090 120 155/160											1			
	<b>Number of gearbox stages</b> Order codes see selection and ordering data tables	Coaxial gearbox 			Angular gearbox (only for 1FT2) 											
		1-stage	1	1-stage	6	1-stage	6									
		2-stage	2	2-stage	7	2-stage	7									
		3-stage	3	3-stage	8	3-stage	8									
<b>2. Order code – transmission ratio i – Order codes see selection and ordering data tables</b>																
	1-stage			2-stage				3-stage								
	3	R 03		9	R 09			60	R 60							
	4	R 04		12	R 12			80	R 80							
	5	R 05		15	R 15			100	R 01							
	7	R 07		16	R 16			120	R 21							
	8	R 08		20	R 20			160	R 61							
	10	R 10		25	R 25			200	R 02							
				32	R 32			256	R 52							
				40	R 40			320	R 23							
				50	R 50			512	R 51							
				64	R 64											
				100	R 00											
<b>3. Order code – gearbox lubrication and shaft design</b>																
	Standard lubrication									+	Smooth solid shaft				M 00	
	Standard lubrication									+	Solid shaft with feather key				M 01	
	Food-grade lubricant									+	Smooth solid shaft				M 10	
	Food-grade lubricant									+	Solid shaft with feather key				M 11	
<b>4. Order code (optional) – Different orientation of the output for angular gearboxes (only for 1FT2)</b>																
					Q 9 1		Q 9 2		Q 9 3							
	Standard															

**Notes:**

- The geared motor can only be delivered as a unit – motor plus gearbox (no individual gearboxes).
- Not all combinations are possible – See selection and ordering data tables.
- For shaft design with feather key, the gearbox data only applies to pulsating loads. With alternating load/reversal of direction of rotation, limitation of the torque as a function of the number of load cycles is required (see Configuration Manual).

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Notes on the selection

### Selection and ordering data

#### Characteristic curves of the geared motor (available via the Siemens Product Configurator)

- 1  $M_{S1,M}$  – Characteristic of the largest thermally permissible effective torque of the motor component minus the gear friction and with consideration of the thermal interactions of the gearbox attachment.  
The effective operating point must be below this line to avoid thermal overload of the geared motor.
- 2  $M_{max,M}$  – Characteristic of the largest torque that can be generated by the motor component for a short time minus the gear friction.

$M_{S1,M}$  and  $M_{max,M}$  may exceed the mechanically permissible limits of the gearbox, depending on the selection of the motor-gearbox combination <sup>1)</sup>.

#### Important gearbox component data in this catalog:

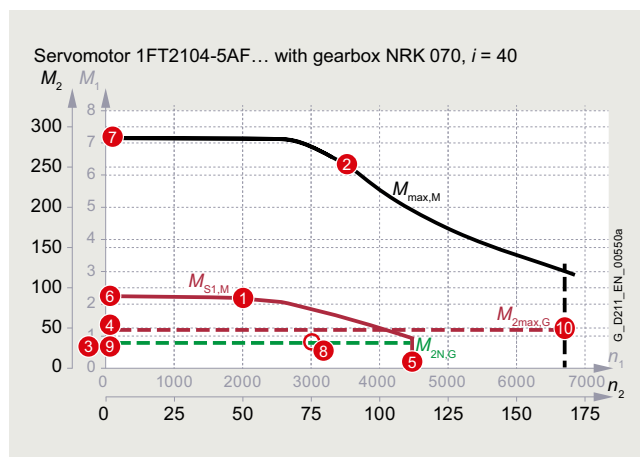
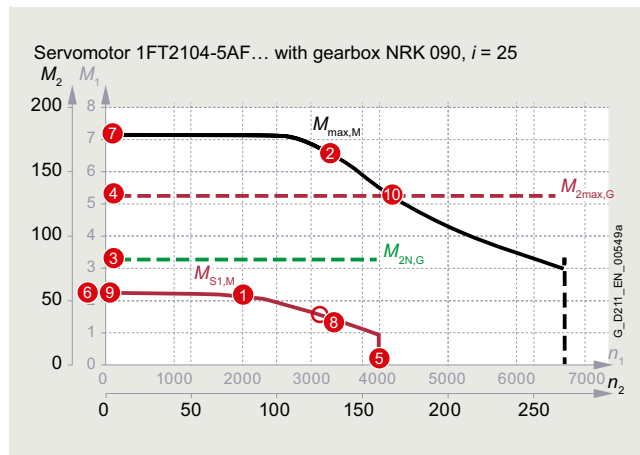
- 3  $M_{2N,G}$  – The rated torque of the gearbox component at the output. This represents the fatigue strength limit of the gear teeth (independently of the motor). If exceeded, the gearbox is partially damaged and a service life calculation is required.
- 4  $M_{2max,G}$  – Maximum torque of the gearbox component. This is the limit of the time strength range (can be tolerated for 30000 revolutions of the output shaft). There is a risk of breakage if the limit is exceeded.
- 5  $n_{1av,G}$  – Greatest average input speed. In each time window of 15 minutes, the average input speed must be below  $n_{1av,G}$ .

#### Important motor component data in this catalog:

- 6  $M_{0,M}$  – The motor component can deliver this torque thermally on a sustained basis at standstill and near standstill. It may exceed the mechanical limits of the gearbox component if necessary <sup>1)</sup>.
- 7  $M_{max,M}$  – The motor component can deliver this torque for a short time. It may exceed the mechanical limits of the gearbox component if necessary <sup>1)</sup>.

#### Important geared motor system data in this catalog:

- 8 Rated operating point:  
 $M_{2N}$  – Rated torque and  
 $n_{2N}$  – rated speed.  
This rated point can be permanently driven thermally and mechanically. If the S1 characteristic  $M_{S1,M}$  at  $n_{2N}$  is greater than  $M_{2N,G}$ ,  $M_{2N}$  is reduced accordingly. At the rated point, the geared motor has approximately its maximum power.
- 9  $M_{2,0}$  – The geared motor can deliver this torque thermally on a sustained basis at standstill and near standstill. It is reduced to  $M_{2N,G}$  if necessary.
- 10  $M_{2max}$  – The geared motor can deliver this torque for a short time. It may be within the time strength range of the gearbox.



<sup>1)</sup> In this case, it must be ensured that the torque effective at the gearbox output does not exceed the permissible limits (consideration of the load-to-motor inertia ratio during acceleration processes).  
More information is provided in the Configuration Manual.

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Notes on the selection

### Selection and ordering data

#### Glossary

Formula symbols	Unit	Designation	Explanation
$i$		Transmission ratio	Input-to-output speed transmission ratio
$C_{T2}$	Nm/°	Torsional stiffness of the gearbox	Torsional stiffness of the gearbox related to the output
$J_1$	kg cm <sup>2</sup>	Mass moment of inertia of the geared motor	Total mass moment of inertia of the geared motor related to the input or the motor shaft
$J_{1,G}$	kg cm <sup>2</sup>	Mass moment of inertia of the gearbox component	Mass moment of inertia of the gearbox component of a geared motor related to the input of the gearbox
$J_M$	kg cm <sup>2</sup>	Mass moment of inertia of the motor component without brake	Mass moment of inertia of the motor component of a geared motor
$J_{M,Br}$	kg cm <sup>2</sup>	Mass moment of inertia of the motor component with brake	Mass moment of inertia of the motor component of a geared motor including motor holding brake
$m$	kg	Mass of the geared motor	Total mass of the geared motor
$m_G$	kg	Mass of the gearbox component	Mass of the gearbox component of a geared motor
$m_M$	kg	Mass of the motor component	Mass of the motor component of a geared motor
$m_{M,Br}$	kg	Mass of the motor component with brake	Mass of the motor component with motor holding brake
$M_{0,M}$	Nm	Static torque of the motor component on the geared motor	Torque of the motor component at standstill and near standstill that can be generated permanently electrically or on average. If this is above $M_{2max,G}$ , it must be ensured that a maximum of $M_{2max,G}/i$ is applied to the gearbox input (observe the gearbox inertia to load inertia ratio). If necessary, limit the acceleration, torque or current accordingly on the application side.
$M_{2,0}$	Nm	Geared motor static torque	The geared motor can deliver this torque thermally on a sustained basis at standstill and near standstill. It is within the fatigue strength range of the gearbox.
$M_{2N}$	Nm	Rated torque of the geared motor	The geared motor can deliver this torque thermally on a sustained basis at its rated speed. It is within the fatigue strength range of the gearbox.
$M_{2N,G}$	Nm	Rated torque of the gearbox component	Rated torque of the gearbox component at the output. This represents the fatigue strength limit of the gear teeth (independently of the motor). If exceeded, the gearbox is partially damaged and a service life calculation is required.
$M_{max}$	Nm	Maximum torque of the motor	Maximum torque of the motor that can be generated for a short time.
$M_{2max}$	Nm	Maximum torque of the geared motor	Maximum possible short-term and permissible torque at the output of the geared motor.
$M_{max,M}$	Nm	Maximum torque of the motor component	Electrically generated maximum torque of the motor component. If this is above $M_{2max,G}$ , it must be ensured that a maximum of $M_{2max,G}/i$ is applied to the gearbox input (observe the gearbox inertia to load inertia ratio). If necessary, limit the acceleration, torque or current accordingly on the application side.
$M_{2max,G}$	Nm	Maximum torque of the gearbox component	Maximum (very rare) permissible torque at the output of the gearbox. This is the limit of the time strength range. There is a risk of breakage if the limit is exceeded.
$M_{2Em.Off}$	Nm	Emergency Off torque	$M_{2Em.Off}$ can be tolerated a maximum of 1000 times during the gearbox service life without causing unacceptable damage to the gearbox. This code can be used to check whether high torques, caused by very rare operating faults, can damage the gearbox.
$n_{1av,G}$	r/min	Largest average input speed of the gearbox component	In each time window of 15 minutes, the average input speed must be below $n_{1av,G}$ .
$n_{1max,G}$	r/min	Maximum input speed of the gearbox component	Maximum permissible short-term input speed of the gearbox component on a geared motor
$n_{max,M}$	r/min	Maximum speed of the motor component	Maximum achievable and maximum permissible speed of the motor component on a geared motor
$n_{2B,G}$	r/min	Reference speed of the gearbox	Reference speed relative to the rated torque $M_{2N,G}$ of the gearbox component. This is required to perform a service life calculation of the gearbox output bearings.
$n_{2max}$	r/min	Maximum speed of the geared motor	Maximum achievable and maximum permissible speed at the gearbox output of a geared motor
$n_{2N}$	r/min	Rated speed of the geared motor	The rated torque of the geared motor is specified at this speed
$F_R$	N	Radial force	Radial force perpendicular to the shaft axis
$F_{R eq}$	N	Average radial force	Radial force averaged over the cycle, perpendicular to the shaft axis. For ball bearings, use the cubic mean. For roller bearings, use the exponent 3.33 instead of the exponent 3.
$F_{R max}$	N	Maximum radial force	Maximum statically permissible radial force
$F_A$	N	Axial force	Axial force
$F_{A eq}$	N	Average axial force	Axial force averaged over the cycle. For ball bearings, use the cubic mean. For roller bearings, use the exponent 3.33 instead of the exponent 3.
$F_{A max}$	N	Maximum axial force	Maximum statically permissible axial force
$M_b$	Nm	Maximum permissible bending moment	Maximum permissible bending moment at the motor flange to gearbox adapter separation point
$\varphi_2$	'	Torsional backlash of the gearbox	Torsional backlash of the gearbox related to the output

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Notes on the selection

### Selection and ordering data

#### Selection of servomotors with planetary gearbox

- Select gearbox type and gearbox size, e.g. on the basis of the required torque or the required shaft loads - Table *Permissible output shaft loads*.
- Select a suitable servomotor-gearbox combination from the *Selection data servomotors with planetary gearbox*, the *Servomotor data* and the *Planetary gearbox data*, e.g. on the basis of the rated speed of the servomotor with planetary gearbox, the associated transmission ratio and the rated torque. The fatigue strength of the motor and gearbox combination must be taken into account – see color background of the *Selection data servomotors with planetary gearbox* with associated color legend.

#### Structure of the tables for selection and ordering data

All combinations of servomotors with planetary gearbox including the transmission ratios available in each case can be found in the selection tables for SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors.

The selection tables are sorted according to the following criteria:

- Line supply voltage of the converter
- Gearbox type and size

The following views contain legends with explanations of the formula symbols and units specified in the selection and order tables.

#### Legend for "Servomotor data":

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		
	Rotor moment of inertia of the motor component (with holding brake) <sup>1)</sup>	1F.2102-0AG...-0.A0-Z
	Maximum possible short-term torque of the motor component <sup>2)</sup>	■ + ■ + ...
	Maximum thermally permissible effective torque of the motor component at standstill or near standstill <sup>2)</sup>	

#### Legend for "Selection data servomotors with planetary gearbox":

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		
...	$n_{2N}$ r/min Rated speed of the servo planetary geared motor	1F.2102-0AG...-0.A0-Z
	$M_{2N}$ Nm Rated torque of the servo planetary geared motor	■ + ■ + ...
	$M_{2,0}$ Nm Static torque of the servo planetary geared motor	
	$M_{2max}$ Nm Max. permissible short-term output torque of the servo planetary geared motor	

#### Legend for "Planetary gearbox data":

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		
<b>Planetary gearbox data</b>		1F.2102-0AG...-0.A0-Z
Gearbox type, gearbox stages:	Gearbox type and number of gearbox stages	■ + ■ + ...
1. Order code	1. Order code for gearbox type, gearbox size and number of gearbox stages	
$i$	Transmission ratio	
2. Order code	2. Order code for transmission ratio	
$M_{2N,G}$ Nm	Rated torque of the gearbox component (fatigue strength)	
$M_{2max,G}$ Nm	Maximum permissible short-term output torque of the gearbox (fatigue strength, max. 30000 revolutions of the output shaft)	
$M_{2Em.Off}$ Nm	Emergency Off output torque of the gearbox (max. 1000 times)	
$J_{1,G}$ kg cm <sup>2</sup>	Moment of inertia of the gearbox related to the input <sup>1)</sup>	
$\varphi_{2,G}$	Torsional backlash of the gearbox related to the output	

#### Color legend for the fatigue strength of the motor and gearbox combination:

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

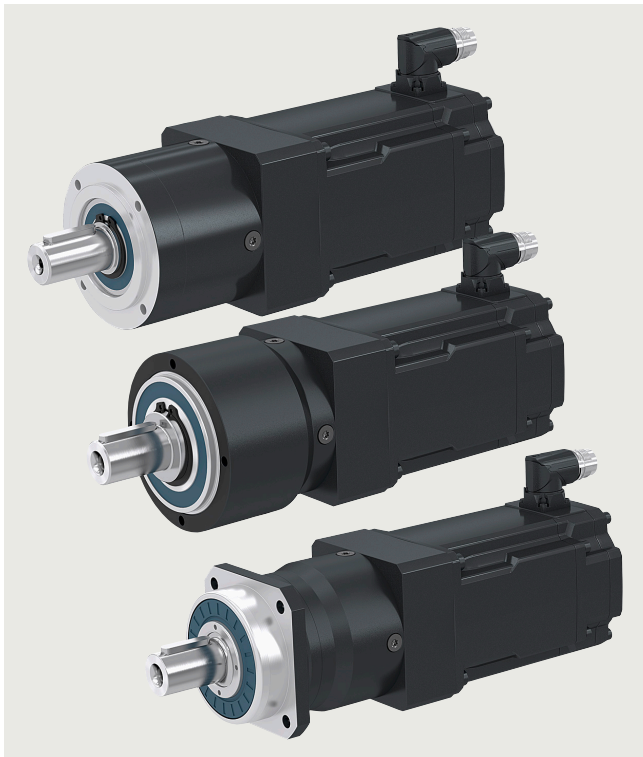
<sup>1)</sup> The total mass inertia is the sum of the motor and gearbox mass inertia. On some motors, the inertia of the gearbox clamping system is attributed to the motor.

<sup>2)</sup> Exact values can be found in the data sheet of the motor-gearbox combination, available via the Siemens Product Configurator.

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

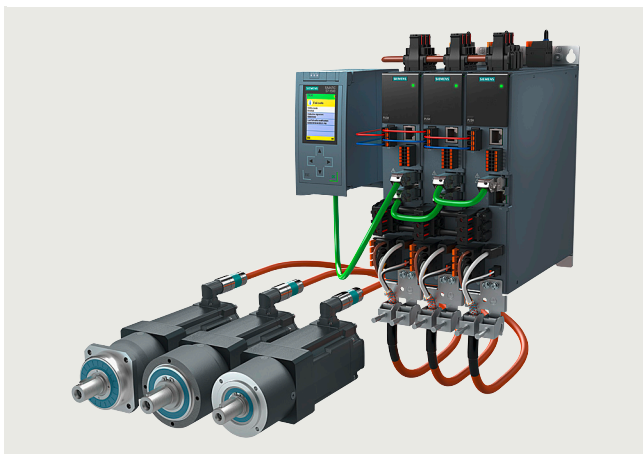
### Selection and ordering data



SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors with coaxial gearbox

The following servo planetary geared motors with coaxial gearbox are suitable for servo converters with line connection 200 V to 240 V 1 AC as well as 200 V to 240 V 3 AC, especially for SINAMICS S210 servo converters.

The rated points of the geared motors are adapted to this voltage.



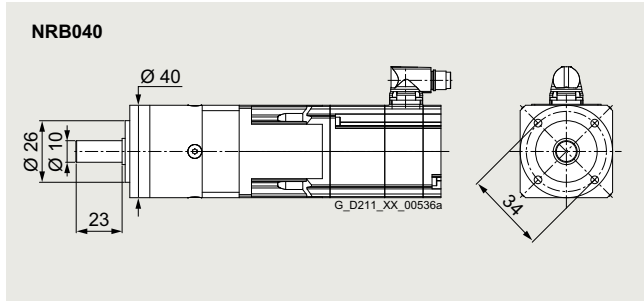
Example: SINAMICS S210 servo converter with SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRB040

#### Selection and ordering data



#### Permissible output shaft loads

Average radial force for 20000 h	$F_{R,eq}$	200 N
Average axial force for 20000 h	$F_{A,eq}$	200 N
Average radial force for 30000 h	$F_{R,eq}$	160 N
Average axial force for 30000 h	$F_{A,eq}$	160 N
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm		kg cm <sup>2</sup>																	
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 1 and 2-stage</b>																				
0.117	0.521	0.0245	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2102-0AG..-0.A0-Z
...	...	(0.0285)	$M_{2N}$	Nm	0.25	0.35	0.465	0.64	0.78	0.99	0.78	1.11	1.4	1.46	1.92	2.35	3.05	3.9	6.2	■ ■ ■ + ■ ■ ■ + ...
0.124	0.535		$M_{2,0}$	Nm	0.35	0.475	0.6	0.85	0.98	1.23	1.07	1.43	1.8	1.92	2.4	3	3.85	4.8	7.5	
			$M_{2max}$	Nm	1.59	2.1	2.65	3.7	4.25	5.3	4.75	6.3	7.9	8.4	10.5	13.2	16.9	21	12	
0.247	1.05	0.036	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2102-1AG..-0.A0-Z
...	...	(0.04)	$M_{2N}$	Nm	0.62	0.84	1.07	1.47	1.77	2.2	1.82	2.5	3.15	3.3	4.25	5.2	6.8	8.6	7.5	■ ■ ■ + ■ ■ ■ + ...
0.264	1.08		$M_{2,0}$	Nm	0.77	1.04	1.31	1.84	2.1	2.6	2.25	3.05	3.8	4.05	5.1	6.4	8.1	10.2	7.5	
			$M_{2max}$	Nm	3.2	4.25	5.3	7.5	8.5	8	9.5	12.7	15.9	17	21	26.5	32	29	12	
0.466	1.83	0.1396	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2103-2AG..-2.A0-Z
...	...	(0.1586)	$M_{2N}$	Nm	1.03	1.4	1.78	2.3	2.9	3.65	2.9	4.15	5.2	5.4	7	8.6	11	14.2	7.5	■ ■ ■ + ■ ■ ■ + ...
0.496	1.89		$M_{2,0}$	Nm	1.47	1.97	2.45	3.45	3.95	4.95	4.3	5.7	7.2	7.7	9.6	12	15.4	18	7.5	
			$M_{2max}$	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.452	1.83	0.1396	$n_{2N}$	r/min	1000	750	500	375	375	250	300	250	200	200	125	100	100	75	50	1F.2103-2AH..-2.0-Z
...	...	(0.1586)	$M_{2N}$	Nm	0.86	1.21	1.79	2.45	2.65	3.65	3	3.8	4.8	4.9	7	8.7	10	13	7.5	■ ■ ■ + ■ ■ ■ + ...
0.482	1.89		$M_{2,0}$	Nm	1.43	1.91	2.35	3.35	3.8	4.8	4.2	5.6	7	7.4	9.3	11.6	14.9	18	7.5	
			$M_{2max}$	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.976	3.85	0.1856	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	150	150	125	100	75	-	1F.2103-4AG..-2.A0-Z
...	...	(0.2046)	$M_{2N}$	Nm	2.3	3	3.7	5	5.1	5	6.5	7.7	9.7	12.6	13	15.5	19.4	18	-	■ ■ ■ + ■ ■ ■ + ...
1.04	3.96		$M_{2,0}$	Nm	3.1	4.1	5.1	7.2	6	5	9	12	15.1	16.1	20	18	20	18	-	
			$M_{2max}$	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	-	
0.881	3.85	0.1856	$n_{2N}$	r/min	750	600	500	375	375	250	300	250	200	200	125	100	100	75	-	1F.2103-4AH..-2.0-Z
...	...	(0.2046)	$M_{2N}$	Nm	2.05	2.65	3.3	4.55	4.6	5	5.9	7	8.8	8.6	13.9	17.4	17.9	18	-	■ ■ ■ + ■ ■ ■ + ...
0.933	3.96		$M_{2,0}$	Nm	2.75	3.7	4.65	6.5	6	5	8.1	10.8	13.6	14.5	18.1	18	20	18	-	
			$M_{2max}$	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	-	

#### Planetary gearbox data

Gearbox type: 1. Order code <i>i</i> 2. Order code		NRB040, 1-stage						NRB040, 2-stage								
		A11			A12			A11			A12					
$M_{2N,G}$	Nm	11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
$M_{2max,G}$	Nm	17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12
$M_{2Em,Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
$J_{1,G}$	kg cm <sup>2</sup>	0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015
$\varnothing_{2,G}$		15						19								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRB040

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2203-2AG...2.A0-Z	
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	0.99	1.35	1.73	2.05	2.8	3.55	2.65	4.05	5	5	6.8	8.2	10.4	13.8	7.5	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2,0}$	Nm	1.68	2.25	2.8	3.95	4.5	5	4.9	6.5	8.2	8.7	10.9	13.7	17.5	18	7.5		
			$M_{2max}$	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12		
0.53	1.74	0.2466 (0.2666)	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1F.2203-2AK...2.0-Z	
...	...	...	$M_{2N}$	Nm	0.93	1.2	1.47	2	2.5	3.05	2.35	3.55	4.7	4.75	5.7	7.2	9.6	12.1	7.5	■ ■ ■ + ■ ■ ■ + ...	
0.566	1.79		$M_{2,0}$	Nm	1.56	2.05	2.6	3.65	4.2	5	4.6	6.1	7.6	8.1	10.2	12.7	16.3	18	7.5		
			$M_{2max}$	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12		
1.13	3.56	0.3966 (0.4166)	$n_{2N}$	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	-	1F.2203-4AG...2.A0-Z	
...	...	...	$M_{2N}$	Nm	2.3	3.15	4.05	6.5	6	5	7.9	9.8	12.2	11.9	16.4	18	20	18	-	■ ■ ■ + ■ ■ ■ + ...	
1.2	3.67		$M_{2,0}$	Nm	3.55	4.75	5.9	8.3	6	5	10.5	14	17.5	18.6	20	18	20	18	-		
			$M_{2max}$	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	-		
1	3.56	0.3966 (0.4166)	$n_{2N}$	r/min	750	500	500	300	300	300	300	200	150	150	125	100	75	75	-	1F.2203-4AK...2.0-Z	
...	...	...	$M_{2N}$	Nm	2.05	3.15	3.15	5.4	5.5	4.75	5.5	8.4	11	11.2	13.7	17.1	20	18	-	■ ■ ■ + ■ ■ ■ + ...	
1.06	3.67		$M_{2,0}$	Nm	3.15	4.2	5.3	7.4	6	5	9.3	12.4	15.5	16.5	20	18	20	18	-		
			$M_{2max}$	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	-		

Planetary gearbox data		NRB040, 1-stage						NRB040, 2-stage								
Gearbox type:		A11						A12								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$i$																
$M_{2N,G}$	Nm	11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5
$M_{2max,G}$	Nm	17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12
$M_{2Em,Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27
$J_{1,G}$	kg cm <sup>2</sup>	0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015
$\varphi_{2,G}$	'	15						19								

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB040

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 3-stage</b>															
0.117	0.521	0.0245 (0.0285)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-0AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	5.5	7.5	9.3	11	15	18	20	18	■ ■ ■ + ■ ■ ■ + ...		
0.124	0.535	...	$M_{2,0}$	Nm	7	9.3	11.6	14	18.6	18	20	18			
...	...	...	$M_{2max}$	Nm	31	32	32	29	32	29	32	29			
0.247	1.05	0.036 (0.04)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-1AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	12.2	16.5	20	18	20	18	20	18	■ ■ ■ + ■ ■ ■ + ...		
0.264	1.08	...	$M_{2,0}$	Nm	14.8	19.8	20	18	20	18	20	18			
...	...	...	$M_{2max}$	Nm	32	32	32	29	32	29	32	29			
0.466	1.83	0.1396 (0.1586)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	1F.2103-2AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	20	20	20	18	20	18	20	-	■ ■ ■ + ■ ■ ■ + ...		
0.496	1.89	...	$M_{2,0}$	Nm	20	20	20	18	20	18	20	-			
...	...	...	$M_{2max}$	Nm	32	32	32	29	32	29	32	-			
0.452	1.83	0.1396 (0.1586)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	-	1F.2103-2AH..-2.0-Z		
...	...	...	$M_{2N}$	Nm	18.6	20	20	18	20	18	20	-	■ ■ ■ + ■ ■ ■ + ...		
0.482	1.89	...	$M_{2,0}$	Nm	20	20	20	18	20	18	20	-			
...	...	...	$M_{2max}$	Nm	32	32	32	29	32	29	32	-			
0.976	3.85	0.1856 (0.2046)	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	-	1F.2103-4AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	20	20	20	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
1.04	3.96	...	$M_{2,0}$	Nm	20	20	20	-	-	-	-	-			
...	...	...	$M_{2max}$	Nm	32	32	32	-	-	-	-	-			
0.881	3.85	0.1856 (0.2046)	$n_{2N}$	r/min	50	37.5	25	-	-	-	-	-	1F.2103-4AH..-2.0-Z		
...	...	...	$M_{2N}$	Nm	20	20	20	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
0.933	3.96	...	$M_{2,0}$	Nm	20	20	20	-	-	-	-	-			
...	...	...	$M_{2max}$	Nm	32	32	32	-	-	-	-	-			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 3-stage</b>															
0.53	1.74	0.2466 (0.2666)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	1F.2203-2AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	19.6	20	20	18	20	18	20	-	■ ■ ■ + ■ ■ ■ + ...		
0.566	1.79	...	$M_{2,0}$	Nm	20	20	20	18	20	18	20	-			
...	...	...	$M_{2max}$	Nm	32	32	32	29	32	29	32	-			
0.493	1.74	0.2466 (0.2666)	$n_{2N}$	r/min	37.5	37.5	30	25	20	15	12.5	-	1F.2203-2AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	18	17.1	20	18	20	18	20	-	■ ■ ■ + ■ ■ ■ + ...		
0.527	1.79	...	$M_{2,0}$	Nm	20	20	20	18	20	18	20	-			
...	...	...	$M_{2max}$	Nm	32	32	32	29	32	29	32	-			
1.13	3.56	0.3966 (0.4166)	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	-	1F.2203-4AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	20	20	20	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
1.2	3.67	...	$M_{2,0}$	Nm	20	20	20	-	-	-	-	-			
...	...	...	$M_{2max}$	Nm	32	32	32	-	-	-	-	-			
1	3.56	0.3966 (0.4166)	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	-	1F.2203-4AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	20	20	20	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
1.06	3.67	...	$M_{2,0}$	Nm	20	20	20	-	-	-	-	-			
...	...	...	$M_{2max}$	Nm	32	32	32	-	-	-	-	-			

Planetary gearbox data			NRB040, 3-stage							
Gearbox type:			<b>A13</b>							
1. Order code										
$i$										
2. Order code										
$M_{2N,G}$	Nm		<b>R60</b>	<b>R80</b>	<b>R01</b>	<b>R21</b>	<b>R61</b>	<b>R02</b>	<b>R52</b>	<b>R23</b>
$M_{2max,G}$	Nm		20	20	20	18	20	18	20	18
$M_{2Em,Off}$	Nm		32	32	32	29	32	29	32	29
$J_{1,G}$	kg cm <sup>2</sup>		40	40	40	36	40	36	40	36
$\varphi_{2,G}$	'		0.025	0.018	0.018	0.025	0.015	0.015	0.015	0.015
			22							

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary





# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 1 and 2-stage (continued)</b>																				
1.16	3.65	0.371 (0.451)	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	<b>1F.2104-4AK...-2.0-Z</b>
...	...	...	$M_{2N}$	Nm	3.1	4.25	5.4	7.3	8.8	11	8.9	12.5	16	16.6	21	26	33.5	40	18	█ + █ + ...
1.19	3.75		$M_{2,0}$	Nm	3.55	4.7	5.9	8.3	9.5	11.9	10.6	14.1	17.7	18.8	23.5	29.5	37.5	40	18	█ + █ + ...
			$M_{2max}$	Nm	11.2	15	18.7	26	29	24	33	44.5	55	59	70	64	70	64	29	█ + █ + ...
2.25	7.16	0.581 (0.671)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	<b>1F.2104-5AF...-2.0-Z</b>
...	...	...	$M_{2N}$	Nm	6.5	8.8	11	15.2	17.6	15	18.8	25.5	32	34	42.5	40	44	40	-	█ + █ + ...
2.3	7.36		$M_{2,0}$	Nm	6.8	9.1	11.4	16	18	15	20.5	27	34	36	44	40	44	40	-	█ + █ + ...
			$M_{2max}$	Nm	22	29	36.5	40	29	24	65	70	70	70	70	64	70	64	-	█ + █ + ...
2.23	7.25	0.581 (0.671)	$n_{2N}$	r/min	1000	750	600	500	375	300	300	250	200	200	150	125	100	75	-	<b>1F.2104-5AK...-2.0-Z</b>
...	...	...	$M_{2N}$	Nm	4.55	6.5	8.4	10.4	13.8	15	15.8	19.3	25	24.5	33.5	40	44	40	-	█ + █ + ...
2.28	7.46		$M_{2,0}$	Nm	6.8	9.1	11.4	15.9	18	15	20	27	33.5	36	44	40	44	40	-	█ + █ + ...
			$M_{2max}$	Nm	22	29.5	37	40	29	24	66	70	70	70	70	64	70	64	-	█ + █ + ...
2.98	9.56	0.781 (0.861)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	<b>1F.2104-6AF...-2.0-Z</b>
...	...	...	$M_{2N}$	Nm	8.2	11.1	14	18.8	18	15	23.5	33.5	42	43.5	44	40	44	40	-	█ + █ + ...
3.05	9.83		$M_{2,0}$	Nm	9.1	12.1	15.2	21	18	15	27	36	44	44	44	40	44	40	-	█ + █ + ...
			$M_{2max}$	Nm	29	39	49	40	29	24	70	70	70	70	70	64	70	64	-	█ + █ + ...
4.59	14.3	1.98 (2.82)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	<b>1F.2105-4AF...-0.0-Z</b>
...	...	...	$M_{2N}$	Nm	12.3	16.4	20.5	25	18	15	32.5	44	44	44	44	40	44	40	-	█ + █ + ...
4.75	14.7		$M_{2,0}$	Nm	14.2	18.9	23.5	25	18	15	42	44	44	44	44	40	44	40	-	█ + █ + ...
			$M_{2max}$	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	-	█ + █ + ...
4.57	14.3	1.98 (2.82)	$n_{2N}$	r/min	600	500	375	250	300	250	200	150	150	125	125	100	75	75	-	<b>1FT.2105-4AH...-0.0-Z</b>
...	...	...	$M_{2N}$	Nm	10	12.1	16.5	24.5	17.9	15	29	38.5	36.5	44	38.5	40	44	40	-	█ + █ + ...
4.75	14.7		$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	42	44	44	44	44	40	44	40	-	█ + █ + ...
			$M_{2max}$	Nm	44	58	64	40	29	24	70	70	70	70	70	64	70	64	-	█ + █ + ...
7.1	23.2	2.92 (3.77)	$n_{2N}$	r/min	500	375	300	250	200	150	-	125	100	100	75	60	50	-	-	<b>1F.2105-6AF...-0.0-Z</b>
...	...	...	$M_{2N}$	Nm	16.5	22	27.5	25	18	15	-	44	44	44	44	40	44	-	-	█ + █ + ...
7.25	23.6		$M_{2,0}$	Nm	21.5	28.5	36	25	18	15	-	44	44	44	44	40	44	-	-	█ + █ + ...
			$M_{2max}$	Nm	45	61	64	40	29	24	-	70	70	70	70	64	70	-	-	█ + █ + ...

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NRB060, 1-stage							NRB060, 2-stage							
1. Order code		<b>A21</b>							<b>A22</b>							
$i$		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066
$\varphi_{2,G}$	°	10						12								

$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1 and 2-stage (continued)																				
1.11	3.56	0.35 (0.37)	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	1F.2203-4AK..-2.0-Z
...	...		$M_{2N}$	Nm	2.55	3.4	4.25	5.9	5.9	7.6	7	8.6	11.1	11	14.8	17.9	22.5	29.5	18	+ + ...
1.15	3.66		$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.2	11.5	10.2	13.7	17.1	18.2	22.5	28.5	36.5	40	18	+ + ...
			$M_{2max}$	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29	+ + ...

Planetary gearbox data		NRB060, 1-stage										NRB060, 2-stage					
Gearbox type:		A21										A22					
1. Order code																	
$i$																	
2. Order code																	
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066	
$\varnothing_{2,G}$		10											12				

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-s-stagetage</b>															
0.106	0.506	0.0245 (0.0285)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-0AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	5.1	6.8	8.6	10.7	13.9	17.8	22	27.5	■ ■ ■ + ■ ■ ■ + ...		
0.122	0.517		$M_{2,0}$	Nm	7.1	9.5	11.9	14.3	19.1	23.5	30.5	38			
			$M_{2max}$	Nm	30.5	40.5	50	61	70	64	70	64			
0.258	1.03	0.036 (0.04)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1F.2102-1AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	13	17.3	21.5	26	34.5	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
0.271	1.06		$M_{2,0}$	Nm	16.1	21	26.5	32	42.5	40	44	40			
			$M_{2max}$	Nm	62	70	70	70	70	64	70	64			
0.525	1.83	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1F.2103-2AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	24.5	32.5	40.5	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
0.554	1.88		$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
0.51	1.83	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	10	1F.2103-2AH..-2.0-Z		
...	...	...	$M_{2N}$	Nm	23	30.5	40.5	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
0.539	1.88		$M_{2,0}$	Nm	30.5	40.5	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
1.09	3.84	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	1F.2103-4AG..-2.A0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-	■ ■ ■ + ■ ■ ■ + ...		
1.16	3.95		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-			
0.972	3.84	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	-	1F.2103-4AH..-2.0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-	■ ■ ■ + ■ ■ ■ + ...		
1.03	3.95		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-			
1.17	3.56	0.371 (0.451)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	1F.2104-4AF..-2.0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-	■ ■ ■ + ■ ■ ■ + ...		
1.2	3.66		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-			
1.16	3.65	0.371 (0.451)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	1F.2104-4AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-	■ ■ ■ + ■ ■ ■ + ...		
1.19	3.75		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-			
2.25	7.16	0.581 (0.671)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	1F.2104-5AF..-2.0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.3	7.36		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-			
2.23	7.25	0.581 (0.671)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	1F.2104-5AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.28	7.46		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-			

➔ Continued on the next page

Planetary gearbox data			NRB060, 3-stage							
Gearbox type:			A23							
1. Order code			60	80	100	120	160	200	256	320
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23
$i$										
$M_{2N,G}$	Nm		44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm		70	70	70	70	70	64	70	64
$M_{2Em,Off}$	Nm		88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>		0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varnothing_{2,G}$	'		15							

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-stage (continued)</b>																
2.98	9.56	0.781 (0.861)	$n_{2N}$	r/min	25	20	-	-	-	-	-	-	-	-	1F2104-6AF..-2.0-Z	
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
3.05	9.83		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-		
4.59	14.3	1.98 (2.82)	$n_{2N}$	r/min	25	-	-	-	-	-	-	-	-	-	1F2105-4AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
4.75	14.7		$M_{2,0}$	Nm	44	-	-	-	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	-	-	-	-	-	-	-	-	-		
4.57	14.3	1.98 (2.82)	$n_{2N}$	r/min	50	-	-	-	-	-	-	-	-	-	1FT2105-4AH..-0.0-Z	
...	...	...	$M_{2N}$	Nm	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
4.75	14.7		$M_{2,0}$	Nm	44	-	-	-	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	-	-	-	-	-	-	-	-	-		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage</b>																
0.561	1.74	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	-	1F2203-2AG..-2.A0-Z	
...	...	...	$M_{2N}$	Nm	25	33	41.5	44	44	40	44	40	-	-	■ ■ ■ + ■ ■ ■ + ...	
0.573	1.79		$M_{2,0}$	Nm	33.5	44	44	44	44	40	44	40	-	-		
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64	-	-		
0.527	1.74	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	-	1F2203-2AK..-2.0-Z	
...	...	...	$M_{2N}$	Nm	19.4	25.5	32	39.5	44	40	44	40	-	-	■ ■ ■ + ■ ■ ■ + ...	
0.538	1.79		$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40	-	-		
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64	-	-		
1.17	3.56	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	-	-	1F2203-4AG..-2.A0-Z	
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
1.19	3.66		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-	-	-		
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-	-	-		
1.11	3.56	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	-	-	1F2203-4AK..-2.0-Z	
...	...	...	$M_{2N}$	Nm	42.5	44	44	44	44	40	44	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
1.15	3.66		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-	-	-		
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-	-	-		
2.21	6.78	1.251 (1.331)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	-	-	1F2204-5AF..-2.0-Z	
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
2.26	6.96		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-	-	-		
2.22	6.78	1.251 (1.331)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	-	-	1F2204-5AK..-2.0-Z	
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
2.27	6.96		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-	-	-		
2.96	9.08	1.631 (1.711)	$n_{2N}$	r/min	25	20	-	-	-	-	-	-	-	-	1F2204-6AF..-2.0-Z	
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
3.03	9.33		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-		
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-		

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### Planetary gearbox data

Gearbox type:		NRB060, 3-stage							
1. Order code		A23							
$i$		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em,Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														

SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage (continued)																
2.73	10.3	3.42	$n_{2N}$	r/min	20	12.5	-	-	-	-	-	-	-	-	-	1FT2205-2AC..-0..0-Z
...	...	(4.32)	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ + ■ + ...
2.84	10.6		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	
2.79	10.3	3.42	$n_{2N}$	r/min	25	20	-	-	-	-	-	-	-	-	-	1F2205-2AF..-0..0-Z
...	...	(4.32)	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ + ■ + ...
2.9	10.6		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	
2.77	10.3	3.42	$n_{2N}$	r/min	50	37.5	-	-	-	-	-	-	-	-	-	1FT2205-2AH..-0..0-Z
...	...	(4.32)	$M_{2N}$	Nm	43	43.5	-	-	-	-	-	-	-	-	-	■ + ■ + ...
2.88	10.6		$M_{2,0}$	Nm	44	43.5	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	

Planetary gearbox data		NRB060, 3-stage									
Gearbox type:		A23									
1. Order code		i									
		60	80	100	120	160	200	256	320		
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23		
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40		
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64		
$M_{2Em,Off}$	Nm	88	88	88	88	88	80	88	80		
$J_{1,G}$	kg cm <sup>2</sup>	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066		
$\varnothing_{2,G}$	'	15									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

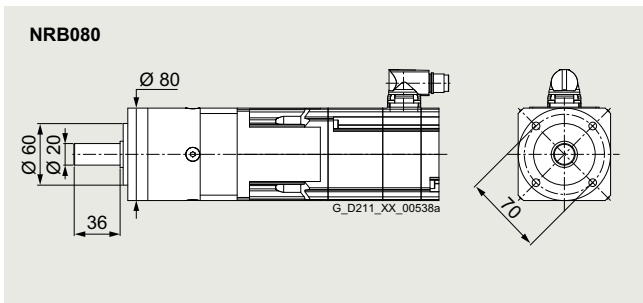
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRB080**

## Selection and ordering data



Permissible output shaft loads	
Average radial force for 20000 h	$F_{R,eq}$ 750 N
Average axial force for 20000 h	$F_{A,eq}$ 1000 N
Average radial force for 30000 h	$F_{R,eq}$ 650 N
Average axial force for 30000 h	$F_{A,eq}$ 900 N
Maximum radial force	$F_{R,max}$ 1250 N
Maximum axial force	$F_{A,max}$ 1600 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																	
Nm	Nm	kg cm <sup>2</sup>																	
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1 and 2-stage</b>																			

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Planetary gearbox data		NRB080, 1-stage						NRB080, 2-stage								
Gearbox type:		<b>A31</b>						<b>A32</b>								
1. Order code		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
$\phi_{2,G}$	'	7						9								

Color legend:		
<span style="background-color: #c6e0b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
<span style="background-color: #e6e6e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
<span style="background-color: #ffb74d; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary





## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1 and 2-stage (continued)</b>																				
1.09	3.52	0.35	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	1F.2203-4AK...0.0-Z
...	...	(0.37)	$M_{2N}$	Nm	2.5	3.25	4.15	5.9	6.1	7.8	6.9	8.4	10.6	10.5	14.6	17.7	22.5	30	46	■ + ■ + ...
1.12	3.62		$M_{2,0}$	Nm	3.25	4.4	5.5	7.7	8.9	11.1	9.9	13.2	16.6	17.7	22	27.5	35.5	44	50	■ + ■ + ...
			$M_{2max}$	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	■ + ■ + ...
2.17	6.72	1.23	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2204-5AF...2.0-Z
...	...	(1.31)	$M_{2N}$	Nm	6.3	8.4	10.7	14.7	17.1	21.5	18.1	25	31	33	41.5	52	66	84	50	■ + ■ + ...
2.22	6.91		$M_{2,0}$	Nm	6.6	8.8	11	15.5	17.7	22	19.8	26	33	35	43.5	54	70	87	50	■ + ■ + ...
			$M_{2max}$	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	■ + ■ + ...
2.18	6.72	1.23	$n_{2N}$	r/min	750	600	500	375	375	300	300	200	200	150	100	100	75	50	50	1F.2204-5AK...2.0-Z
...	...	(1.31)	$M_{2N}$	Nm	5.6	7.3	9.3	13.2	13.2	16.9	15.9	23	23	30.5	32.5	47.5	50	68	50	■ + ■ + ...
2.23	6.91		$M_{2,0}$	Nm	6.6	8.8	11.1	15.6	17.8	22	19.9	26.5	33	35	44	55	70	88	50	■ + ■ + ...
			$M_{2max}$	Nm	20.5	27.5	34.5	48	55	61	61	82	102	109	136	170	192	176	80	■ + ■ + ...
2.92	9.01	1.61	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2204-6AF...2.0-Z
...	...	(1.69)	$M_{2N}$	Nm	8.7	11.7	14.7	20.5	23.5	29.5	25.5	35	43.5	46.5	58	73	93	110	50	■ + ■ + ...
3	9.28		$M_{2,0}$	Nm	8.9	11.9	14.9	20.5	23.5	29.5	26.5	35.5	44.5	47	59	74	94	110	50	■ + ■ + ...
			$M_{2max}$	Nm	27.5	37	46	64	74	61	82	110	137	146	183	176	192	176	80	■ + ■ + ...
2.83	10.3	3.15	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2205-2AC...0.0-Z
...	...	(4.05)	$M_{2N}$	Nm	7.8	10.6	13.3	18.7	21.5	26.5	23.5	30	38.5	40.5	52	61	81	104	50	■ + ■ + ...
2.98	10.6		$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	34.5	43.5	46.5	58	72	92	110	50	■ + ■ + ...
			$M_{2max}$	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	■ + ■ + ...
2.87	10.3	3.15	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2205-2AF...0.0-Z
...	...	(4.05)	$M_{2N}$	Nm	8	10.7	13.5	18.6	21.5	27	23	31.5	39.5	41.5	52	66	84	106	50	■ + ■ + ...
3.02	10.6		$M_{2,0}$	Nm	9	12	15	21	24	30	26.5	35	44	47	59	73	94	110	50	■ + ■ + ...
			$M_{2max}$	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	■ + ■ + ...
2.85	10.3	3.15	$n_{2N}$	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	50	1FT2205-2AH...0.0-Z
...	...	(4.05)	$M_{2N}$	Nm	6.2	9.6	9.9	14	18.2	22	20.5	26.5	34	35	43.5	54	72	90	50	■ + ■ + ...
2.99	10.6		$M_{2,0}$	Nm	8.9	11.9	14.8	20.5	23.5	29.5	26	35	43.5	46.5	58	72	93	110	50	■ + ■ + ...
			$M_{2max}$	Nm	31.5	42	52	73	80	61	94	125	156	166	192	176	192	176	80	■ + ■ + ...
4.89	17.2	5.1	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	1F.2205-4AF...0.0-Z
...	...	(6)	$M_{2N}$	Nm	13.1	17.6	22	29.5	35	38	37	51	64	67	85	107	120	110	-	■ + ■ + ...
5.12	17.7		$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	-	■ + ■ + ...
			$M_{2max}$	Nm	53	70	88	104	80	61	157	192	176	192	192	176	192	176	-	■ + ■ + ...
5.11	17.1	8.676	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2206-2AC...0.0-Z
...	...	(10.276)	$M_{2N}$	Nm	13	18.4	23	32	37	38	41	50	65	66	90	98	120	110	50	■ + ■ + ...
5.35	17.6		$M_{2,0}$	Nm	16	21	26.5	37	42.5	38	47	62	78	83	104	110	120	110	50	■ + ■ + ...
			$M_{2max}$	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	80	■ + ■ + ...
5.04	17.1	8.676	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	1F.2206-2AF...0.0-Z
...	...	(10.276)	$M_{2N}$	Nm	12.9	17.3	21.5	27.5	34	38	33.5	51	63	66	84	106	120	110	-	■ + ■ + ...
5.26	17.6		$M_{2,0}$	Nm	15.7	21	26	36.5	42	38	46.5	61	77	82	103	110	120	110	-	■ + ■ + ...
			$M_{2max}$	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	-	■ + ■ + ...

➔ Continued on the next page

Planetary gearbox data		NRB080, 1-stage					NRB080, 2-stage												
Gearbox type:		A31					A32												
1. Order code																			
<i>i</i>																			
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>			
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50			
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80			
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190			
$J_{1,G}$	kg cm <sup>2</sup>	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366			
$\varphi_{2,G}$	'	7							9										

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 1 and 2-stage (continued)</b>																				
4.9	17.1	8.676 (10.276)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	-	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	10.9	14.8	18.8	28.5	29	38	37.5	46.5	58	57	77	96	117	100	-	■ ■ ■ + ■ ■ ■ + ...
5.11	17.6		$M_{2,0}$	Nm	15.3	20	25.5	35.5	40.5	38	45	60	75	80	100	110	120	110	-	
			$M_{2max}$	Nm	52	70	87	104	80	61	156	192	176	192	192	176	192	176	-	
7.3	25.7	12.38 (13.976)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	20.5	27	34.5	48.5	50	38	55	73	101	106	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
7.64	26.5		$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	67	89	110	119	120	110	120	110	-	
			$M_{2max}$	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	-	
7.17	25.7	12.38 (13.976)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	75	75	60	50	37.5	-	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	14.2	19.1	24	37	37	38	49.5	58	72	95	95	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
7.5	26.5		$M_{2,0}$	Nm	22	29.5	37	52	50	38	66	88	110	117	120	110	120	110	-	
			$M_{2max}$	Nm	79	105	132	104	80	61	208	192	176	192	192	176	192	176	-	
9.95	36.3	15.98 (17.676)	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	25	-	1FT2206-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	22	27	33.5	45.5	50	38	69	90	91	113	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
10.4	37.4		$M_{2,0}$	Nm	31	41.5	52	65	50	38	91	120	110	120	120	110	120	110	-	
			$M_{2max}$	Nm	112	149	176	104	80	61	208	192	176	192	192	176	192	176	-	
9.84	34.4	15.976 (17.676)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	-	1F.2206-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	21	28	35.5	53	50	38	67	79	98	95	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
10.3	35.4		$M_{2,0}$	Nm	30.5	41	51	65	50	38	90	120	110	120	120	110	120	110	-	
			$M_{2max}$	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	-	
9.45	34.4	15.976 (17.676)	$n_{2N}$	r/min	375	300	250	200	200	150	150	100	75	75	75	60	50	50	-	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	21.5	27	33	41.5	39	38	54	81	106	106	102	110	120	102	-	■ ■ ■ + ■ ■ ■ + ...
9.85	35.4		$M_{2,0}$	Nm	29.5	39	49	65	50	38	86	115	110	120	120	110	120	110	-	
			$M_{2max}$	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	-	

### Planetary gearbox data

Gearbox type:		NRB080, 1-stage														NRB080, 2-stage														
1. Order code		A31							A32																					
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64														
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64														
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50														
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80														
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190														
$J_{1,G}$	kg cm <sup>2</sup>	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366														
$\varnothing_{2,G}$	'	7																												

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage</b>														
0.517	1.8	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1F.2103-2AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	21	29.5	37	42.5	60	77	96	110	50	■ ■ ■ + ■ ■ ■ + ...
0.544	1.85		$M_{2,0}$	Nm	31.5	42	52	63	84	105	120	110	50	
			$M_{2max}$	Nm	108	144	180	176	192	176	192	176	80	
0.49	1.8	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	10	5	1F.2103-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	20	28	38	40.5	56	78	100	110	50	■ ■ ■ + ■ ■ ■ + ...
0.516	1.85		$M_{2,0}$	Nm	30.5	40.5	51	61	81	102	120	110	49.5	
			$M_{2max}$	Nm	108	144	180	176	192	176	192	176	80	
1.13	3.81	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F.2103-4AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	49	66	83	98	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.15	3.91		$M_{2,0}$	Nm	67	90	112	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
0.994	3.81	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	10	-	1F.2103-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	42	57	77	85	114	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.06	3.91		$M_{2,0}$	Nm	59	79	99	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
1.14	3.52	0.35 (0.43)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1F.2104-4AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	65	86	109	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.16	3.62		$M_{2,0}$	Nm	68	91	114	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
1.13	3.62	0.35 (0.43)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F.2104-4AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	59	81	101	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.16	3.72		$M_{2,0}$	Nm	68	90	113	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.21	7.1	0.56 (0.65)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1F.2104-5AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.26	7.31		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.19	7.19	0.56 (0.65)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F.2104-5AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	99	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.25	7.41		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.93	9.49	0.76 (0.84)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	-	1F.2104-6AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	-	-	■ ■ ■ + ■ ■ ■ + ...
3.01	9.78		$M_{2,0}$	Nm	110	120	120	110	120	110	120	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	
4.62	14.3	1.71 (2.55)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	-	1F.2105-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
4.74	14.7		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	

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Planetary gearbox data		NRB080, 3-stage									
Gearbox type:		A33									
1. Order code		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$i$											
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366	
$\varnothing_{2,G}$	'	11									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage (continued)</b>														
4.65	14.3	1.71 (2.55)	$n_{2N}$	r/min	50	37.5	25	25	20	-	-	-	-	1F2105-4AH..0..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
4.77	14.7		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	
7.15	22.9	2.65 (3.5)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	-	1F2105-6AF..0..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.5	23.6		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-	
7.25	24.8	5.476 (7.176)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	-	1F2106-3AF..0..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.57	25.5		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-	
9.39	31.5	6.876 (8.476)	$n_{2N}$	r/min	25	-	-	-	-	-	-	-	-	1F2106-4AF..0..0-Z
...	...	...	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
9.81	32.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	-	
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage</b>														
0.511	1.71	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1F2203-2AG..0.A0-Z
...	...	...	$M_{2N}$	Nm	21.5	30	38	43.5	60	79	97	110	50	■ ■ ■ + ■ ■ ■ + ...
0.537	1.75		$M_{2,0}$	Nm	31.5	42.5	53	63	85	106	120	110	50	
			$M_{2max}$	Nm	102	137	171	176	192	176	192	176	80	
0.476	1.71	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	20	20	15	12.5	10	6	1F2203-2AK..0..0-Z
...	...	...	$M_{2N}$	Nm	16.4	23	29	41.5	46	62	73	92	49.5	■ ■ ■ + ■ ■ ■ + ...
0.503	1.75		$M_{2,0}$	Nm	29.5	39.5	49.5	59	79	99	120	110	50	
			$M_{2max}$	Nm	102	137	171	176	192	176	192	176	80	
1.13	3.52	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F2203-4AG..0.A0-Z
...	...	...	$M_{2N}$	Nm	55	75	93	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.16	3.62		$M_{2,0}$	Nm	68	91	113	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
1.09	3.52	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F2203-4AK..0..0-Z
...	...	...	$M_{2N}$	Nm	41	56	70	82	109	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.12	3.62		$M_{2,0}$	Nm	65	87	109	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.17	6.72	1.23 (1.31)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1F2204-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.22	6.91		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.18	6.72	1.23 (1.31)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F2204-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	93	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.23	6.91		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	

➔ Continued on the next page

Planetary gearbox data			NRB080, 3-stage										
Gearbox type:			<b>A33</b>										
1. Order code			<b>60 80 100 120 160 200 256 320 512</b>										
$i$			<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>										
2. Order code													
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50		
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80		
$M_{2Em,Off}$	Nm		220	240	240	220	240	240	220	220	190		
$J_{1,G}$	kg cm <sup>2</sup>		0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366		
$\varphi_{2,G}$	'		11										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRB080**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)</b>																
2.92	9.01	1.61 (1.69)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	-	-	-	1F2204-6AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	-	-	-	-	■ + ■ + ...
3	9.28		$M_{2,0}$	Nm	110	120	120	110	120	110	120	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	-	-	
2.83	10.3	3.15 (4.05)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	-	-	-	-	-	1F2205-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	-	-	-	-	-	■ + ■ + ...
2.98	10.6		$M_{2,0}$	Nm	110	120	120	110	120	109	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	-	-	-	-	-	
2.87	10.3	3.15 (4.05)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	-	-	-	-	-	1F2205-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	-	-	-	-	-	■ + ■ + ...
3.02	10.6		$M_{2,0}$	Nm	110	120	120	110	120	110	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	-	-	-	-	-	
2.85	10.3	3.15 (4.05)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	-	-	-	-	-	1F2205-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	83	116	120	109	120	110	-	-	-	-	-	■ + ■ + ...
2.99	10.6		$M_{2,0}$	Nm	110	120	120	110	120	109	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	-	-	-	-	-	
4.89	17.2	5.1 (6)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	-	-	-	1F2205-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	-	-	-	-	-	-	-	■ + ■ + ...
5.12	17.7		$M_{2,0}$	Nm	110	120	120	110	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	-	-	-	
5.11	17.1	8.676 (10.276)	$n_{2N}$	r/min	20	12.5	10	10	7.5	-	-	-	-	-	-	1F2206-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	-	-	■ + ■ + ...
5.35	17.6		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	-	-	
5.04	17.1	8.676 (10.276)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	-	-	-	1F2206-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	-	-	-	-	-	-	-	■ + ■ + ...
5.26	17.6		$M_{2,0}$	Nm	110	120	120	110	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	-	-	-	
4.9	17.1	8.676 (10.276)	$n_{2N}$	r/min	37.5	25	20	20	-	-	-	-	-	-	-	1F2206-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	95	119	120	109	-	-	-	-	-	-	-	■ + ■ + ...
5.11	17.6		$M_{2,0}$	Nm	110	119	119	109	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	-	-	-	
7.3	25.7	12.38 (13.976)	$n_{2N}$	r/min	12.5	10	7.5	-	-	-	-	-	-	-	-	1F2206-3AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	-	-	■ + ■ + ...
7.64	26.5		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-	-	-	
7.17	25.7	12.38 (13.976)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	-	-	-	1F2206-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	-	-	■ + ■ + ...
7.5	26.5		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-	-	-	

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Planetary gearbox data		NRB080, 3-stage									
Gearbox type:		<b>A33</b>									
1. Order code		<b>60</b> <b>80</b> <b>100</b> <b>120</b> <b>160</b> <b>200</b> <b>256</b> <b>320</b> <b>512</b>									
$i$		<b>R60</b> <b>R80</b> <b>R01</b> <b>R21</b> <b>R61</b> <b>R02</b> <b>R52</b> <b>R23</b> <b>R51</b>									
2. Order code											
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366	
$\varphi_{2,G}$	'	11									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)</b>																
9.95	36.3	15.98	$n_{2N}$	r/min	20	-	-	-	-	-	-	-	-	-	-	1FT2206-4AC..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
10.4	37.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
9.84	34.4	15.976	$n_{2N}$	r/min	25	-	-	-	-	-	-	-	-	-	-	1F2206-4AF..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
10.3	35.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
9.45	34.4	15.976	$n_{2N}$	r/min	30	-	-	-	-	-	-	-	-	-	-	1FT2206-4AH..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
9.85	35.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	-	-	-	■ + ■ + ...

### Planetary gearbox data

Gearbox type:			NRB080, 3-stage									
1. Order code			A33									
$i$			60	80	100	120	160	200	256	320	512	
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm		110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm		176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm		220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>		0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366	
$\varnothing_{2,G}$	'		11									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

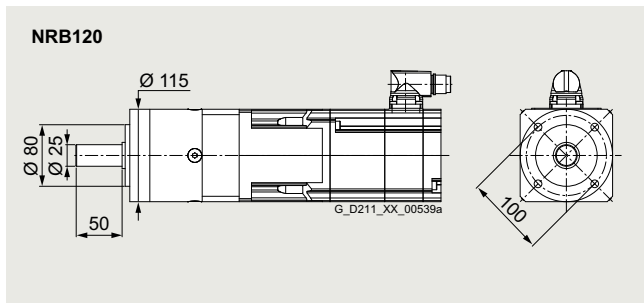
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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB120

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1 and 2-stage</b>																					
0.408	1.72	0.093 (0.112)	$n_{2N}$	r/min	500	500	375	375	300	300	200	150	150	150	125	100	100	75	50	<b>1F.2103-2AG..-0.A0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	0.81	0.96	1.59	2	2.6	2.85	2.9	4	4.15	4.4	6.1	7.9	9.3	12.6	19.3		
0.478	1.77		$M_{2,0}$	Nm	1.22	1.71	2.2	3.15	3.65	4.6	4.1	5.5	7	7.4	9.4	11.8	15.1	19	30.5		
			$M_{2max}$	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112		
0.379	1.72	0.093 (0.112)	$n_{2N}$	r/min	500	500	500	375	300	250	250	150	150	150	125	100	100	75	50	<b>1F.2103-2AH..-0.0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	0.81	0.98	1.19	2.05	2.6	3.35	2.3	3.95	4.2	4.4	6.1	7.8	9.4	12.7	19.4		
0.45	1.77		$M_{2,0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.35	3.85	5.2	6.5	7	8.8	11.1	14.2	17.9	28.5		
			$M_{2max}$	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112		
1.02	3.74	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	<b>1F.2103-4AG..-0.A0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	2.35	3.15	4.75	6.8	7.2	9.1	7.3	9.1	13	13.3	17.8	22.5	32	32.5	64		
1.07	3.83		$M_{2,0}$	Nm	3	4.1	5.2	7.4	8.5	10.7	9.5	12.7	15.9	17	21	26.5	34	42.5	68		
			$M_{2max}$	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192		
1	3.74	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	100	75	50	<b>1F.2103-4AH..-0.0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	2.05	2.75	4	4.85	6.3	8	6.4	8	11	11.6	15.1	19.1	21	29.5	43.5		
1.06	3.83		$M_{2,0}$	Nm	3	4.05	5.1	7.3	8.4	10.5	9.3	12.5	15.7	16.8	21	26	33.5	42	67		
			$M_{2max}$	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192		
1.03	3.45	0.35 (0.43)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	<b>1F.2104-4AF..-0.0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	2.75	3.8	4.9	7	8.2	10.3	8.6	11.8	14.8	15.9	20	25.5	33	41.5	66		
1.09	3.54		$M_{2,0}$	Nm	3.05	4.15	5.3	7.5	8.6	10.8	9.6	12.9	16.2	17.2	21.5	27	34.5	43	69		
			$M_{2max}$	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192		
1.02	3.55	0.35 (0.43)	$n_{2N}$	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	<b>1F.2104-4AK..-0.0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	2.35	3.45	4.7	6.8	7.8	9.9	7.5	11.2	14.2	15.2	18.9	22.5	31.5	40	63		
1.08	3.64		$M_{2,0}$	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16	17.1	21.5	26.5	34.5	43	69		
			$M_{2max}$	Nm	10.7	14.4	18	25	29	36	32	43	54	57	72	90	115	144	192		
2.13	7.03	0.56 (0.65)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	<b>1F.2104-5AF..-0.0-Z</b>	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2N}$	Nm	6	8.2	10.4	14.7	16.9	21	18.4	24.5	31	33	41.5	52	67	84	120		
2.18	7.23		$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	21.5	19.4	25.5	32.5	34.5	43	54	69	86	120		
			$M_{2max}$	Nm	21.5	28.5	36	50	57	72	64	85	107	114	142	178	225	285	192		

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Planetary gearbox data		NRB120, 1-stage						NRB120, 2-stage								
Gearbox type:		A41						A42								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
$\varnothing_{2,G}$	'	7						9								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1 and 2-stage (continued)																				
2.12	7.12	0.56 (0.65)	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	1F2104-5AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	5.8	7.6	8	12.4	16.1	20	16.8	20.5	28.5	29	38	48	66	68	100	■ + ■ + ...
2.17	7.33		$M_{2,0}$	Nm	6.3	8.5	10.7	15.1	17.3	21.5	19.3	25.5	32	34	43	53	68	86	120	
			$M_{2max}$	Nm	21.5	29	36.5	51	58	73	65	87	108	115	144	180	230	285	192	
2.87	9.42	0.76 (0.84)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F2104-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	8.3	11.2	14.1	19.9	22.5	28.5	25	33.5	42	45	56	70	91	114	120	■ + ■ + ...
2.93	9.69		$M_{2,0}$	Nm	8.6	11.6	14.5	20	23	29	26	34.5	43.5	46.5	58	72	93	116	120	
			$M_{2max}$	Nm	28.5	38.5	48	67	77	96	86	115	143	153	191	235	305	368	192	
4.55	14.2	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F2105-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	13	17.7	22	30.5	36	45.5	37.5	52	66	69	89	111	141	179	120	■ + ■ + ...
4.66	14.6		$M_{2,0}$	Nm	13.8	18.5	23	32.5	37	46.5	41.5	55	69	73	92	115	147	184	120	
			$M_{2max}$	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
4.58	14.2	1.71 (2.55)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	50	1FT2105-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	10.7	13.3	19.7	26.5	32	40.5	35.5	47.5	58	60	78	99	108	134	105	■ + ■ + ...
4.69	14.6		$M_{2,0}$	Nm	13.9	18.6	23	32.5	37	46.5	41.5	55	69	74	92	116	148	185	120	
			$M_{2max}$	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	
7.42	22.8	2.65 (3.5)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F2105-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	18.8	25.5	33	43.5	53	68	51	78	98	101	131	164	205	230	120	■ + ■ + ...
7.62	23.5		$M_{2,0}$	Nm	22.5	30	38	53	60	76	68	90	113	120	150	188	240	230	120	
			$M_{2max}$	Nm	70	93	117	164	187	152	205	275	345	370	416	368	416	368	192	
7.8	24.7	4.6 (6.3)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F2106-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	19.4	26.5	34	45	54	69	52	79	99	103	133	166	210	230	120	■ + ■ + ...
8.1	25.5		$M_{2,0}$	Nm	24	32	40	56	64	81	71	95	119	127	159	198	255	230	120	
			$M_{2max}$	Nm	76	101	127	177	192	152	225	300	368	400	416	368	416	368	192	
10.1	31.5	6 (7.6)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F2106-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	23.5	32.5	41.5	53	66	85	60	97	121	123	163	200	255	230	120	■ + ■ + ...
10.5	32.4		$M_{2,0}$	Nm	31.5	42	52	73	84	95	93	124	155	165	205	230	260	230	120	
			$M_{2max}$	Nm	97	129	161	216	192	152	285	380	368	416	416	368	416	368	192	
14.3	43.4	8.7 (10.4)	$n_{2N}$	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	-	1F2106-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	31	42	54	69	85	95	101	122	151	152	200	230	260	230	-	■ + ■ + ...
14.9	44.7		$M_{2,0}$	Nm	44.5	59	74	104	119	95	131	175	215	230	260	230	260	230	-	
			$M_{2max}$	Nm	134	178	220	216	192	152	336	416	368	416	416	365	416	368	-	

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Planetary gearbox data		NRB120, 1-stage						NRB120, 2-stage								
Gearbox type:		<b>A41</b>						<b>A42</b>								
1. Order code		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
$\varnothing_{2,G}$		7						9								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB120

Servomotor data				Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$N_m$																	
Nm	Nm			kg cm <sup>2</sup>																
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage (continued)</b>																				
1.02	3.45	0.35 (0.37)	$n_{2N}$	r/min	600	600	500	375	375	300	250	200	150	150	125	100	75	50	1F.2203-4AG..0-A0-Z	
...	...		$M_{2N}$	Nm	2.65	3.1	4.6	6.8	7.1	9.6	8.4	11.2	14.2	15.2	17.8	20.5	29.5	39	60	
1.08	3.54		$M_{2,0}$	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16.1	17.2	21.5	26.5	34.5	43	69	
			$M_{2max}$	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
0.985	3.45	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	1F.2203-4AK..0-0-Z
...	...		$M_{2N}$	Nm	2.4	3.15	4.55	6.5	7	8.8	7.1	8.8	12.3	12.8	16.5	20.5	29	30.5	58	
1.04	3.54		$M_{2,0}$	Nm	2.95	4	5	7.2	8.2	10.3	9.2	12.3	15.5	16.5	20.5	25.5	33	41.5	66	
			$M_{2max}$	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192	
2.09	6.64	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2204-5AF..0-0-Z
...	...		$M_{2N}$	Nm	5.9	8	10.1	14.3	16.5	20.5	17.9	24	30	32	40.5	51	66	82	120	
2.14	6.83		$M_{2,0}$	Nm	6.2	8.4	10.6	14.9	17	21	19	25	31.5	34	42.5	53	68	85	120	
			$M_{2max}$	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.11	6.64	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	1F.2204-5AK..0-0-Z
...	...		$M_{2N}$	Nm	5.7	7.4	10.1	11.7	15.6	19.4	16.3	20	28	28	36.5	46	65	82	120	
2.16	6.83		$M_{2,0}$	Nm	6.3	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	120	
			$M_{2max}$	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	
2.85	8.94	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2204-6AF..0-0-Z
...	...		$M_{2N}$	Nm	8.2	11.1	14	19.7	22.5	28.5	24.5	33	41.5	44.5	56	70	90	113	120	
2.92	9.19		$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	29	26	34.5	43	46	57	72	92	115	120	
			$M_{2max}$	Nm	27.5	36.5	45.5	64	73	91	82	109	136	145	181	225	290	360	192	
3.08	10.2	3.15 (4.05)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2205-2AC..0-0-Z
...	...		$M_{2N}$	Nm	8	11.1	14	19.8	22.5	28.5	25	32	41	42.5	56	65	87	113	120	
3.2	10.5		$M_{2,0}$	Nm	9.4	12.6	15.8	22	25.5	31.5	28	37.5	47	50	62	78	100	125	120	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.11	10.2	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2205-2AF..0-0-Z
...	...		$M_{2N}$	Nm	7.9	10.8	13.8	19.2	22	28.5	23	32.5	40.5	43	55	69	88	112	120	
3.23	10.5		$M_{2,0}$	Nm	9.5	12.7	16	22.5	25.5	32	28.5	38	47.5	50	63	79	101	127	120	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
3.05	10.2	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	100	100	75	60	37.5	1FT2205-2AH..0-0-Z
...	...		$M_{2N}$	Nm	6.6	8.4	12.4	17	20	20.5	22	29.5	30.5	38.5	49	49	73	92	120	
3.16	10.5		$M_{2,0}$	Nm	9.3	12.5	15.6	22	25	31.5	27.5	37	46.5	49.5	62	77	99	124	120	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	
5.25	17.1	5.1 (6)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1F.2205-4AF..0-0-Z
...	...		$M_{2N}$	Nm	12.6	17.5	22.5	30	36.5	46.5	35.5	54	67	70	91	113	144	183	120	
5.46	17.6		$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	134	171	210	120	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.31	17.1	7.8 (9.4)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2206-2AC..0-0-Z
...	...		$M_{2N}$	Nm	14.1	20	25	35.5	41	51	45.5	55	72	73	100	109	148	200	120	
5.45	17.6		$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	215	120	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	

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Planetary gearbox data			NRB120, 1-stage														NRB120, 2-stage								
Gearbox type:			A41														A42								
1. Order code																									
<i>i</i>			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64								
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64								
$M_{2N,G}$	Nm		115	155	195	135	120	95	210	260	230	260	260	230	260	230	120								
$M_{2max,G}$	Nm		184	248	312	216	192	152	336	416	368	416	416	368	416	368	192								
$M_{2Em,Off}$	Nm		390	520	500	340	380	480	500	520	500	520	520	500	520	500	380								
$J_{1,G}$	kg cm <sup>2</sup>		2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414								
$\varphi_{2,G}$			7															9							

- Color legend:
- $M_{max,M} \times i < M_{2N,G}$     The motor and gearbox combination is fatigue-proof
  - $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$     Check acceleration and inertias, perform service life calculation if necessary
  - $M_{max,M} \times i > M_{2max,G}$     The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

#### Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage (continued)</b>																				
5.41	17.1	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	<b>1F.2206-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	13.6	18.4	23	31.5	37.5	47.5	39	55	68	72	92	115	147	186	120	■ ■ ■ + ■ ■ ■ + ...
5.62	17.6		$M_{2,0}$	Nm	16.7	22	27.5	39	44.5	56	49.5	66	82	88	110	138	176	220	119	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
5.25	17.1	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	37.5	<b>1FT2206-2AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	12.4	17.3	22	29	29	37.5	34.5	46	55	70	72	97	127	152	120	■ ■ ■ + ■ ■ ■ + ...
5.45	17.6		$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	133	171	210	120	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	
7.94	25.7	11.5 (13.1)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	<b>1FT2206-3AB..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	22	29.5	37.5	53	59	75	59	79	110	116	147	184	230	230	120	■ ■ ■ + ■ ■ ■ + ...
8.26	26.4		$M_{2,0}$	Nm	24.5	32.5	41	57	66	82	73	97	121	129	162	200	255	230	120	
			$M_{2max}$	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
7.81	25.7	11.5 (13.1)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	<b>1FT2206-3AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	16.4	22.5	29.5	38	47.5	63	43.5	71	89	90	121	151	189	230	120	■ ■ ■ + ■ ■ ■ + ...
8.12	26.4		$M_{2,0}$	Nm	24	32	40.5	56	64	81	71	95	119	127	159	199	255	230	120	
			$M_{2max}$	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	
10.8	36.2	15.1 (16.8)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	50	50	37.5	25	20	20		<b>1FT2206-4AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	20	30.5	39	53	63	80	77	82	109	109	160	165	225	230	120	■ ■ ■ + ■ ■ ■ + ...
11.1	37.3		$M_{2,0}$	Nm	33	44	55	77	88	95	99	131	164	175	215	230	260	230	120	
			$M_{2max}$	Nm	111	149	186	216	192	152	330	416	368	416	416	368	416	368	192	
10.6	34.3	15.1 (16.8)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	<b>1F.2206-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	24	33	42.5	54	67	89	62	99	123	125	167	205	255	230	120	■ ■ ■ + ■ ■ ■ + ...
11	35.3		$M_{2,0}$	Nm	32.5	43.5	54	76	87	95	97	129	162	172	215	230	260	230	120	
			$M_{2max}$	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.1	34.3	15.1 (16.8)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	<b>1FT2206-4AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	18.5	25.5	33.5	51	53	71	66	80	100	99	136	169	205	190	120	■ ■ ■ + ■ ■ ■ + ...
10.5	35.3		$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	123	154	165	205	230	260	230	120	
			$M_{2max}$	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	
10.3	36.2	24.86 (28.16)	$n_{2N}$	r/min	375	300	250	200	150	125	150	100	100	75	60	50	50	37.5	25	<b>1FT2208-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	25.5	32.5	40.5	52	68	84	67	99	96	132	167	200	199	225	120	■ ■ ■ + ■ ■ ■ + ...
10.6	37.3		$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	94	125	157	167	205	230	260	225	120	
			$M_{2max}$	Nm	111	148	185	216	192	152	330	416	368	416	416	368	416	368	192	
16.2	48.6	31.96 (34.96)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	<b>1FT2208-3AB..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	38.5	49.5	64	94	101	95	106	140	194	200	255	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
16.6	50.1		$M_{2,0}$	Nm	49.5	66	82	116	120	95	148	197	230	260	260	230	260	230	-	
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	
15.2	48.6	31.96 (35.36)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	-	<b>1F.2208-3AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	34.5	50	63	87	103	95	119	130	170	172	245	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
15.8	50.1		$M_{2,0}$	Nm	47	63	79	110	120	95	140	186	230	245	260	230	260	230	-	
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	

▶ Continued on the next page

#### Planetary gearbox data

Gearbox type: 1. Order code <i>i</i> 2. Order code	NRB120, 1-stage							NRB120, 2-stage									
	A41							A42									
	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64		
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	380		
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414	
$\varnothing_{2,G}$		7							9								

- Color legend:      $M_{max,M} \times i < M_{2N,G}$       The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$       Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$       The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	-			
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	32	41	50	64	86	84	98	123	162	162	205	230	225	230	-			
			$M_{2,0}$	Nm	47	62	78	109	120	95	139	185	230	245	260	230	260	230	-			
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-			
15.1	48.6	31.96 (35.36)	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	-	1FT2208-3AF..-0.0-Z		
...	...	...	$M_{2N}$	Nm	32	41	50	64	86	84	98	123	162	162	205	230	225	230	-	■ ■ ■ + ■ ■ ■ + ...		
15.7	50.1		$M_{2,0}$	Nm	47	62	78	109	120	95	139	185	230	245	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
19.7	63.1	41.16 (46.76)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	1FT2208-4AB..-0.0-Z		
...	...	...	$M_{2N}$	Nm	38	48.5	64	96	99	95	100	133	196	197	255	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
20.2	64.9		$M_{2,0}$	Nm	60	80	100	135	120	95	179	235	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
18.9	63.1	41.16 (46.76)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	-	1F2208-4AC..-0.0-Z		
...	...	...	$M_{2N}$	Nm	39.5	58	73	101	118	95	138	142	190	189	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
19.7	64.9		$M_{2,0}$	Nm	58	78	98	135	120	95	174	230	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
18.2	63.1	41.16 (46.76)	$n_{2N}$	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	-	1FT2208-4AF..-0.0-Z		
...	...	...	$M_{2N}$	Nm	39.5	49.5	60	101	103	94	117	143	190	189	235	210	245	230	-	■ ■ ■ + ■ ■ ■ + ...		
18.8	64.9		$M_{2,0}$	Nm	56	75	93	131	120	95	166	220	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
22.9	76.6	50.46 (55.96)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	1FT2208-5AB..-0.0-Z		
...	...	...	$M_{2N}$	Nm	58	74	96	135	120	95	153	200	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
23.7	78.7		$M_{2,0}$	Nm	71	94	118	135	120	95	210	260	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
22.7	76.6	50.46 (55.96)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	60	50	50	37.5	25	-	1F2208-5AC..-0.0-Z		
...	...	...	$M_{2N}$	Nm	42.5	64	81	110	120	95	152	200	200	250	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
23.5	78.7		$M_{2,0}$	Nm	70	94	117	135	120	95	205	260	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		

Planetary gearbox data		NRB120, 1-stage														NRB120, 2-stage														
Gearbox type:		A41							A42																					
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64														
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64														
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120														
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192														
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380														
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414														
$\varnothing_{2,G}$		7						9																						

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage</b>														
0.408	1.72	0.093 (0.112)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1F.2103-2AG..-0.0-Z
...	...	...	$M_{2N}$	Nm	17.8	26.5	32	34	48	64	77	97	120	■ ■ ■ + ■ ■ ■ + ...
0.478	1.77		$M_{2,0}$	Nm	28	37.5	47	56	75	94	121	151	120	
			$M_{2max}$	Nm	104	139	174	205	275	345	416	368	192	
0.379	1.72	0.093 (0.112)	$n_{2N}$	r/min	37.5	37.5	25	20	20	12.5	10	10	5	1F.2103-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	17.6	21	32	33.5	48	71	91	97	119	■ ■ ■ + ■ ■ ■ + ...
0.45	1.77		$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	142	119	
			$M_{2max}$	Nm	104	139	174	205	275	345	416	368	191	
1.02	3.74	0.139 (0.158)	$n_{2N}$	r/min	37.5	30	25	20	20	15	10	10	6	1F.2103-4AG..-0.0-Z
...	...	...	$M_{2N}$	Nm	54	75	92	105	126	172	245	230	120	■ ■ ■ + ■ ■ ■ + ...
1.07	3.83		$M_{2,0}$	Nm	63	85	106	127	170	210	260	230	120	
			$M_{2max}$	Nm	225	300	375	368	416	368	416	368	192	
1	3.74	0.139 (0.158)	$n_{2N}$	r/min	37.5	37.5	25	20	20	12.5	10	10	5	1F.2103-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	44.5	52	76	86	113	160	200	225	120	■ ■ ■ + ■ ■ ■ + ...
1.06	3.83		$M_{2,0}$	Nm	62	83	104	125	167	205	260	230	119	
			$M_{2max}$	Nm	225	300	375	368	416	368	416	368	192	
1.03	3.45	0.35 (0.43)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	3	1F.2104-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	59	80	101	119	164	205	260	230	119	■ ■ ■ + ■ ■ ■ + ...
1.09	3.54		$M_{2,0}$	Nm	64	86	107	129	172	215	260	230	119	
			$M_{2max}$	Nm	205	275	345	368	416	368	416	368	192	
1.02	3.55	0.35 (0.43)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1F.2104-4AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	47.5	76	95	98	157	198	250	230	120	■ ■ ■ + ■ ■ ■ + ...
1.08	3.64		$M_{2,0}$	Nm	64	85	107	128	171	210	260	230	119	
			$M_{2max}$	Nm	210	285	355	368	416	368	416	368	192	
2.13	7.03	0.56 (0.65)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	3	1F.2104-5AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	123	166	205	230	260	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...
2.18	7.23		$M_{2,0}$	Nm	129	171	210	230	260	230	260	230	120	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	192	
2.12	7.12	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1F.2104-5AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	118	161	194	220	245	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...
2.17	7.33		$M_{2,0}$	Nm	128	170	210	230	260	230	260	230	120	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	192	
2.87	9.42	0.76 (0.84)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1F.2104-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	167	220	260	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
2.93	9.69		$M_{2,0}$	Nm	172	230	260	230	260	230	260	230	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	
4.55	14.2	1.71 (2.55)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1F.2105-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	255	260	260	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
4.66	14.6		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	-	
			$M_{2max}$	Nm	416	416	415	368	416	368	416	368	-	

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Planetary gearbox data		NRB120, 3-stage									
Gearbox type:		A43									
1. Order code		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$i$											
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varphi_{2,G}$	'	11									

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage (continued)</b>																
4.58	14.2	1.71 (2.55)	$n_{2N}$	r/min	30	30	25	20	20	12.5	10	10	-	-	-	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	230	240	260	230	255	230	260	230	-	-	-	■ ■ ■ + ■ ■ ■ + ...
4.69	14.6	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	-	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.42	22.8	2.65 (3.5)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	-	-	-	-	-	1F2105-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.62	23.5	...	$M_{2,0}$	Nm	260	260	260	230	260	230	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.8	24.7	4.6 (6.3)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	-	-	-	1F2106-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
8.1	25.5	...	$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	410	415	416	368	416	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.1	31.5	6 (7.6)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	-	-	-	1F2106-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.5	32.4	...	$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
14.3	43.4	8.7 (10.4)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	-	-	-	1F2106-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
14.9	44.7	...	$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage</b>																
0.401	1.62	0.2 (0.22)	$n_{2N}$	r/min	37.5	30	25	20	20	15	10	10	6	-	-	1F2203-2AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	19.7	29	35	37	49.5	67	100	99	119	-	-	■ ■ ■ + ■ ■ ■ + ...
0.471	1.67	...	$M_{2,0}$	Nm	27.5	37	46.5	56	74	93	119	149	120	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	98	131	164	197	260	325	416	368	192	-	-	■ ■ ■ + ■ ■ ■ + ...
0.366	1.62	0.2 (0.22)	$n_{2N}$	r/min	30	30	20	15	15	12.5	10	7.5	6	-	-	1F2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	20	24	36	41	55	66	83	111	120	-	-	■ ■ ■ + ■ ■ ■ + ...
0.437	1.67	...	$M_{2,0}$	Nm	25.5	34.5	43	52	69	86	111	138	120	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	98	131	164	197	260	325	416	368	192	-	-	■ ■ ■ + ■ ■ ■ + ...
1.02	3.45	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	20	20	15	12.5	10	6	-	-	1F2203-4AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	42.5	71	89	113	148	192	235	230	120	-	-	■ ■ ■ + ■ ■ ■ + ...
1.08	3.54	...	$M_{2,0}$	Nm	64	85	107	128	171	210	260	230	120	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	205	275	345	368	416	368	416	368	192	-	-	■ ■ ■ + ■ ■ ■ + ...
0.985	3.45	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	-	-	1F2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	49	67	82	94	114	152	183	225	120	-	-	■ ■ ■ + ■ ■ ■ + ...
1.04	3.54	...	$M_{2,0}$	Nm	62	82	103	124	165	205	260	230	120	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	205	275	345	368	416	368	416	368	192	-	-	■ ■ ■ + ■ ■ ■ + ...
2.09	6.64	1.23 (1.31)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	3	-	-	1F2204-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	120	162	200	230	260	230	260	230	120	-	-	■ ■ ■ + ■ ■ ■ + ...
2.14	6.83	...	$M_{2,0}$	Nm	126	168	210	230	260	230	260	230	120	-	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	400	416	416	368	416	368	416	368	192	-	-	■ ■ ■ + ■ ■ ■ + ...

Continued on the next page

Planetary gearbox data		NRB120, 3-stage														
Gearbox type:		<b>A43</b>														
1. Order code		<b>60 80 100 120 160 200 256 320 512</b>														
$i$		<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>														
2. Order code																
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120						
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192						
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380						
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413						
$\varphi_{2,G}$	'	11														

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)</b>													
2.11	6.64	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	6	1F.2204-5AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	116	157	188	215	225	230	260	230	120
2.16	6.83		$M_{2,0}$	Nm	127	169	210	230	260	230	260	230	120
			$M_{2max}$	Nm	400	416	416	368	416	368	416	368	192
2.85	8.94	1.61 (1.69)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1F.2204-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	165	220	260	230	260	230	260	230	-
2.92	9.19		$M_{2,0}$	Nm	172	225	260	230	260	230	260	230	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-
3.08	10.2	3.15 (4.05)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	5	3.75	1FT2205-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	157	215	260	230	255	230	260	225	-
3.2	10.5		$M_{2,0}$	Nm	185	245	260	230	260	230	260	230	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-
3.11	10.2	3.15 (4.05)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1F.2205-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	160	210	260	230	260	230	260	230	-
3.23	10.5		$M_{2,0}$	Nm	187	245	260	230	260	230	260	225	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-
3.05	10.2	3.15 (4.05)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	10	1FT2205-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	128	172	200	225	260	230	260	225	-
3.16	10.5		$M_{2,0}$	Nm	183	240	260	225	260	230	255	225	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-
5.25	17.1	5.1 (6)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	1F.2205-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	260	-	-
5.46	17.6		$M_{2,0}$	Nm	260	260	260	230	260	230	260	-	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-
5.31	17.1	7.8 (9.4)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	5	-	1FT2206-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	260	-	-
5.45	17.6		$M_{2,0}$	Nm	260	260	260	230	260	230	260	-	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-
5.41	17.1	7.8 (9.4)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	1F.2206-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	260	-	-
5.62	17.6		$M_{2,0}$	Nm	260	260	260	230	255	225	255	-	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-
5.25	17.1	7.8 (9.4)	$n_{2N}$	r/min	30	25	25	20	15	12.5	10	-	1FT2206-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	230	255	230	225	255	230	260	-	-
5.45	17.6		$M_{2,0}$	Nm	260	260	260	225	255	225	255	-	-
			$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-
7.94	25.7	11.5 (13.1)	$n_{2N}$	r/min	12.5	10	7.5	7.5	5	-	-	-	1FT2206-3AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	-
8.26	26.4		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	-

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:

1. Order code

$i$

2. Order code

$M_{2N,G}$

$M_{2max,G}$

$M_{2Em,Off}$

$J_{1,G}$

$\varphi_{2,G}$

### NRB120, 3-stage

#### A43

	60	80	100	120	160	200	256	320	512
	R60	R80	R01	R21	R61	R02	R52	R23	R51
$M_{2N,G}$	260	260	260	230	260	230	260	230	120
$M_{2max,G}$	416	416	416	368	416	368	416	368	192
$M_{2Em,Off}$	520	520	520	500	520	500	520	500	380
$J_{1,G}$	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413
$\varphi_{2,G}$	11								

Color legend:

   $M_{max,M} \times i < M_{2N,G}$

   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$

   $M_{max,M} \times i > M_{2max,G}$

The motor and gearbox combination is fatigue-proof

Check acceleration and inertias, perform service life calculation if necessary

The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRB120**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)</b>													
7.81	25.7	11.5 (13.1)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	1FT2206-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	■ ■ ■ + ■ ■ ■ + ...
8.12	26.4		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	
10.8	36.2	15.1 (16.8)	$n_{2N}$	r/min	20	12.5	10	10	-	-	-	-	1FT2206-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
11.1	37.3		$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	
10.6	34.3	15.1 (16.8)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	1F.2206-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
11	35.3		$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	
10.1	34.3	15.1 (16.8)	$n_{2N}$	r/min	30	25	25	20	-	-	-	-	1FT2206-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	210	225	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.5	35.3		$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	
10.3	36.2	24.86 (28.16)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	1FT2208-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	255	260	255	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.6	37.3		$M_{2,0}$	Nm	255	260	255	225	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	
16.2	48.6	31.96 (34.96)	$n_{2N}$	r/min	12.5	10	7.5	-	-	-	-	-	1FT2208-3AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
16.6	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	
15.2	48.6	31.96 (35.36)	$n_{2N}$	r/min	20	12.5	10	-	-	-	-	-	1F.2208-3AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
15.8	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	
15.1	48.6	31.96 (35.36)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	1FT2208-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
15.7	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	
19.7	63.1	41.16 (46.76)	$n_{2N}$	r/min	12.5	10	-	-	-	-	-	-	1FT2208-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
20.2	64.9		$M_{2,0}$	Nm	260	260	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	-	
18.9	63.1	41.16 (46.76)	$n_{2N}$	r/min	20	12.5	-	-	-	-	-	-	1F.2208-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
19.7	64.9		$M_{2,0}$	Nm	260	260	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	-	

➡ Continued on the next page

Planetary gearbox data		NRB120, 3-stage									
Gearbox type:		A43									
1. Order code		A43									
$i$		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varphi_{2,G}$	'	11									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage (continued)</b>													
18.2	63.1	41.16 (46.76)	$n_{2N}$	r/min	25	20	-	-	-	-	-	-	1FT2208-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	-	-	-	-	-	-	■ + ■ + ...
18.8	64.9	...	$M_{2,0}$	Nm	260	255	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	-	
22.9	76.6	50.46 (55.96)	$n_{2N}$	r/min	12.5	-	-	-	-	-	-	-	1FT2208-5AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	-	-	-	-	-	-	-	■ + ■ + ...
23.7	78.7	...	$M_{2,0}$	Nm	260	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	-	-	-	-	-	-	-	
22.7	76.6	50.46 (55.96)	$n_{2N}$	r/min	20	-	-	-	-	-	-	-	1F.2208-5AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	-	-	-	-	-	-	-	■ + ■ + ...
23.5	78.7	...	$M_{2,0}$	Nm	260	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	-	-	-	-	-	-	-	

### Planetary gearbox data

Gearbox type:		NRB120, 3-stage									
1. Order code		A43									
$i$		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varnothing_{2,G}$	'	11									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

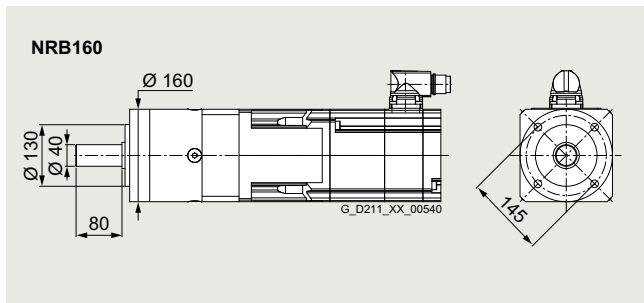


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRB160

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5000 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4200 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	5000 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data		Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )															
Nm	Nm	kg cm <sup>2</sup>															
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1 and 2-stage</b>																	
4.16	14.1	1.71 (2.55)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	50	37.5	20	<b>1F.2105-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	11.2	14.8	19.5	31	44	57	60	76	95	96	136	245	■ ■ ■ + ■ ■ ■ + ...
4.28	14.2	...	$M_{2,0}$	Nm	12.4	16.8	21	34	51	63	68	85	106	136	170	270	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	42	56	70	113	169	210	225	280	350	450	560	720	■ ■ ■ + ■ ■ ■ + ...
4.19	14.1	1.71 (2.55)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	<b>1FT2105-4AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	10.6	13.8	18.8	28.5	41	55	56	73	90	120	122	235	■ ■ ■ + ■ ■ ■ + ...
4.31	14.2	...	$M_{2,0}$	Nm	12.5	16.9	21	34	51	64	68	85	107	137	172	275	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	42	56	70	113	169	210	225	280	350	450	560	720	■ ■ ■ + ■ ■ ■ + ...
7.13	22.8	2.65 (3.5)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F.2105-6AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	16.5	21	29	43	60	83	82	110	132	187	230	350	■ ■ ■ + ■ ■ ■ + ...
7.24	23.1	...	$M_{2,0}$	Nm	21	28.5	36	57	86	107	114	143	179	230	285	450	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	69	92	115	184	270	340	365	455	570	720	910	720	■ ■ ■ + ■ ■ ■ + ...
7.5	24.7	4.6 (6.3)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F.2106-3AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	17.5	22.5	30.5	45.5	63	88	86	115	139	195	240	365	■ ■ ■ + ■ ■ ■ + ...
7.65	25	...	$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	75	100	125	200	295	370	395	495	610	790	980	720	■ ■ ■ + ■ ■ ■ + ...
9.84	31.5	6 (7.6)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F.2106-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	22.5	28.5	39	56	76	108	104	140	167	235	295	435	■ ■ ■ + ■ ■ ■ + ...
10	31.9	...	$M_{2,0}$	Nm	29.5	39.5	50	80	118	147	157	196	245	310	390	450	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	95	127	159	255	375	470	500	630	780	1000	1120	720	■ ■ ■ + ■ ■ ■ + ...
14.1	43.6	8.7 (10.4)	$n_{2N}$	r/min	300	200	200	125	75	60	60	50	37.5	37.5	25	20	<b>1F.2106-6AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	30	47	51	88	137	172	173	215	285	290	440	450	■ ■ ■ + ■ ■ ■ + ...
14.4	44.3	...	$M_{2,0}$	Nm	42.5	57	71	114	168	210	225	280	350	450	560	450	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	132	176	220	350	520	650	690	870	1090	1280	1120	720	■ ■ ■ + ■ ■ ■ + ...
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage</b>																	
2.65	9.99	3.15 (4.05)	$n_{2N}$	r/min	300	250	200	125	100	75	75	50	50	37.5	25	20	<b>1FT2205-2AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	5.5	7.1	10.3	17.6	22.5	30.5	31	43.5	49.5	68	90	127	■ ■ ■ + ■ ■ ■ + ...
2.78	10.1	...	$M_{2,0}$	Nm	7.9	10.8	13.6	22	32.5	40.5	43.5	54	68	87	110	176	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	■ ■ ■ + ■ ■ ■ + ...

Continued on the next page

Planetary gearbox data		NRB160, 1-stage				NRB160, 2-stage										
Gearbox type:		<b>A51</b>				<b>A52</b>										
1. Order code		<b>3</b>				<b>12 15 16 20 25 32 40 64</b>										
$i$		<b>R03</b>				<b>R04 R05 R08 R12 R15 R16 R20 R25 R32 R40 R64</b>										
2. Order code																
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450			
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720			
$M_{2Em,Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900			
$J_{1,G}$	kg cm <sup>2</sup>	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502			
$\varnothing_{2,G}$		6				9										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRB160

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																
Nm	Nm	kg cm <sup>2</sup>																
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage (continued)																		
2.68	9.99	3.15 (4.05)	$n_{2N}$	r/min	300	250	250	150	100	75	75	60	50	37.5	25	1F2205-2AF..-0..0-Z		
...	...	...	$M_{2N}$	Nm	5.9	8.1	8.9	17.6	25	32	33.5	36.5	47	61	85	127	■ ■ ■ + ■ ■ ■ + ...	
2.81	10.1	...	$M_{2,0}$	Nm	8	10.9	13.8	22	33	41	44	55	69	88	111	178	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	■ ■ ■ + ■ ■ ■ + ...	
2.62	9.99	3.15 (4.05)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	1FT2205-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	5.8	7.7	10.5	16.9	24	31	32.5	42.5	53	70	77	139	■ ■ ■ + ■ ■ ■ + ...	
2.74	10.1	...	$M_{2,0}$	Nm	7.8	10.6	13.4	21.5	32	40.5	43	54	67	87	108	174	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	■ ■ ■ + ■ ■ ■ + ...	
4.91	17	5.1 (6)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	1F2205-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	10.4	13.4	18.8	28	40	56	55	74	89	127	160	240	■ ■ ■ + ■ ■ ■ + ...	
5.02	17.2	...	$M_{2,0}$	Nm	14.7	19.8	24.5	40	59	74	78	98	123	158	197	315	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	■ ■ ■ + ■ ■ ■ + ...	
4.94	17	7.8 (9.4)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	37.5	25	15	1FT2206-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	12.2	16.4	17.5	32	52	65	67	85	110	116	176	280	■ ■ ■ + ■ ■ ■ + ...	
5.06	17.2	...	$M_{2,0}$	Nm	14.8	19.9	25	40	60	75	80	100	126	161	200	320	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	■ ■ ■ + ■ ■ ■ + ...	
5.07	17	7.8 (9.4)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	1F2206-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	12.1	16.1	21	33	47.5	61	64	82	102	134	143	260	■ ■ ■ + ■ ■ ■ + ...	
5.18	17.2	...	$M_{2,0}$	Nm	15.2	20	25.5	41	61	76	81	102	127	163	200	325	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	■ ■ ■ + ■ ■ ■ + ...	
4.9	17	7.8 (9.4)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	1FT2206-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	10.8	13.8	19.4	28	40.5	57	56	76	91	129	161	240	■ ■ ■ + ■ ■ ■ + ...	
5.02	17.2	...	$M_{2,0}$	Nm	14.7	19.7	24.5	40	59	74	79	98	123	158	197	315	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	■ ■ ■ + ■ ■ ■ + ...	
7.64	25.7	11.5 (13.1)	$n_{2N}$	r/min	250	200	150	100	75	50	50	37.5	30	25	20	12.5	1FT2206-3AB..-0..0-Z	
...	...	...	$M_{2N}$	Nm	18.8	25	33	53	70	99	104	133	167	210	265	425	■ ■ ■ + ■ ■ ■ + ...	
7.79	26	...	$M_{2,0}$	Nm	23	30.5	38.5	62	91	114	122	152	191	240	305	450	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	■ ■ ■ + ■ ■ ■ + ...	
7.51	25.7	11.5 (13.1)	$n_{2N}$	r/min	250	200	200	125	75	75	60	50	37.5	37.5	30	20	1FT2206-3AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	18.2	24	26	47	74	76	96	121	157	170	210	315	■ ■ ■ + ■ ■ ■ + ...	
7.66	26	...	$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	■ ■ ■ + ■ ■ ■ + ...	
10.6	36.3	15.1 (16.8)	$n_{2N}$	r/min	250	200	150	100	75	60	50	37.5	37.5	30	25	15	1FT2206-4AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	19.8	26	37	59	80	101	122	164	168	215	255	430	■ ■ ■ + ■ ■ ■ + ...	
10.7	36.9	...	$M_{2,0}$	Nm	31.5	42.5	53	85	127	159	169	210	265	340	420	450	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	■ ■ ■ + ■ ■ ■ + ...	
10.3	34.4	15.1 (16.8)	$n_{2N}$	r/min	300	250	200	150	75	75	60	60	50	37.5	30	20	1F2206-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	23	29	39.5	57	106	110	137	143	170	240	300	445	■ ■ ■ + ■ ■ ■ + ...	
10.5	34.9	...	$M_{2,0}$	Nm	31	41.5	52	84	123	154	164	205	255	325	410	450	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2max}$	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	■ ■ ■ + ■ ■ ■ + ...	

▶ Continued on the next page

### Planetary gearbox data

Gearbox type:		NRB160, 1-stage				NRB160, 2-stage							
1. Order code		A51				A52							
$i$		3	4	5	8	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R08	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em,Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$	kg cm <sup>2</sup>	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$	'	6				9							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRB160**

Servomotor data			Selection data servomotors with planetary gearbox												Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )															
Nm	Nm	kg cm <sup>2</sup>															
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage (continued)</b>																	
9.83	34.4	15.1 (16.8)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1FT2206-4AH..0..0-Z
...	...	...	$M_{2N}$	Nm	22.5	29.5	31.5	56	91	115	115	143	191	245	295	350	■ + ■ + ...
10	34.9		$M_{2,0}$	Nm	29.5	39.5	49.5	80	117	147	157	196	245	310	390	450	
			$M_{2max}$	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	
10.1	36.3	22.5 (25.8)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1FT2208-2AF..0..0-Z
...	...	...	$M_{2N}$	Nm	25	33.5	35	62	98	123	126	158	205	260	320	370	■ + ■ + ...
10.3	36.9		$M_{2,0}$	Nm	30.5	40.5	51	82	121	151	161	200	250	320	400	450	
			$M_{2max}$	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
16.1	48.9	29.6 (32.6)	$n_{2N}$	r/min	250	200	150	100	60	50	50	37.5	30	25	20	12.5	1FT2208-3AB..0..0-Z
...	...	...	$M_{2N}$	Nm	29.5	38.5	55	87	143	174	173	235	295	360	455	450	■ + ■ + ...
16.3	49.7		$M_{2,0}$	Nm	48.5	64	81	130	193	240	255	320	400	510	640	450	
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
15	48.9	29.6 (33)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1F.2208-3AC..0..0-Z
...	...	...	$M_{2N}$	Nm	35	46	48.5	85	134	169	167	205	275	355	425	450	■ + ■ + ...
15.3	49.7		$M_{2,0}$	Nm	45.5	61	76	122	180	225	240	300	375	480	590	450	
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
14.9	48.9	29.6 (33)	$n_{2N}$	r/min	250	200	150	125	75	60	60	50	37.5	30	25	20	1FT2208-3AF..0..0-Z
...	...	...	$M_{2N}$	Nm	34	44.5	61	80	129	163	161	198	265	340	410	440	■ + ■ + ...
15.2	49.7		$M_{2,0}$	Nm	45	60	76	121	179	220	235	295	370	475	590	450	
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	
19.4	63.5	38.8 (44.4)	$n_{2N}$	r/min	200	150	125	75	60	50	37.5	37.5	30	25	20	12.5	1FT2208-4AB..0..0-Z
...	...	...	$M_{2N}$	Nm	37.5	51	64	111	143	171	225	230	290	350	440	450	■ + ■ + ...
19.8	64.5		$M_{2,0}$	Nm	59	79	99	158	230	290	310	385	480	620	700	450	
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18.7	63.5	38.8 (44.4)	$n_{2N}$	r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	1F.2208-4AC..0..0-Z
...	...	...	$M_{2N}$	Nm	42	54	75	97	154	194	230	230	315	400	480	450	■ + ■ + ...
19.1	64.5		$M_{2,0}$	Nm	57	76	95	153	220	280	295	370	465	590	700	450	
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
18	63.5	38.8 (44.4)	$n_{2N}$	r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	1FT2208-4AF..0..0-Z
...	...	...	$M_{2N}$	Nm	42.5	55	74	97	155	195	230	230	315	405	480	450	■ + ■ + ...
18.3	64.5		$M_{2,0}$	Nm	54	73	91	146	215	270	285	355	445	570	700	450	
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	
22.7	77	48.1 (53.6)	$n_{2N}$	r/min	250	200	150	100	60	50	50	37.5	30	25	20	12.5	1FT2208-5AB..0..0-Z
...	...	...	$M_{2N}$	Nm	47	61	84	134	205	250	250	340	425	520	650	450	■ + ■ + ...
23.3	78.3		$M_{2,0}$	Nm	69	92	116	186	270	340	360	455	560	720	700	450	
			$M_{2max}$	Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	
22.4	77	48.1 (53.6)	$n_{2N}$	r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	1F.2208-5AC..0..0-Z
...	...	...	$M_{2N}$	Nm	47.5	61	85	135	210	255	250	340	425	520	650	450	■ + ■ + ...
23	78.3		$M_{2,0}$	Nm	68	91	114	183	270	335	355	445	560	710	700	450	
			$M_{2max}$	Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	

Planetary gearbox data			NRB160, 1-stage												NRB160, 2-stage			
Gearbox type:			A51								A52							
1. Order code			3				4				5				8			
$i$			R03				R04				R05				R08			
2. Order code			12				15				16				20			
$M_{2N,G}$			25				32				40				64			
$M_{2max,G}$			800				900				1600				1400			
$M_{2Em,Off}$			11.999				6.912				5.188				3.726			
$J_{1,G}$			10.087				9.913				6.059				4.695			
$\varnothing_{2,G}$			9															

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

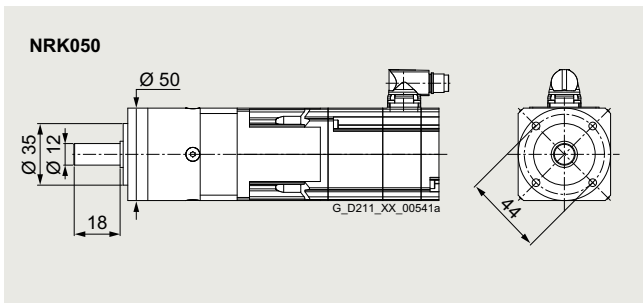
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK050

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	700 N
Average axial force for 30000 h	$F_{A,eq}$	800 N
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$																	
Nm	Nm																	
	$J_M$																	
	( $J_{M,Br}$ )																	
	kg cm <sup>2</sup>																	

### SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK050 1 and 2-stage

$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	1000	750	600	500	375	300	250	200	200	150	125	100	75	50	30	1F.2102-0AG...-0.A0-Z
0.12	0.525	0.0245	$M_{2N}$	r/min	1000	750	600	500	375	300	250	200	200	150	125	100	75	50	30	1F.2102-0AG...-0.A0-Z
...	...	(0.0285)	$M_{2N}$	Nm	0.235	0.355	0.47	0.66	0.81	1.04	0.84	1.21	1.53	1.62	2.1	2.6	3.35	4.3	6.8	5
0.131	0.533		$M_{2,0}$	Nm	0.355	0.49	0.62	0.89	1.02	1.29	1.14	1.54	1.93	2.05	2.55	3.25	4.15	5.2	7.5	5
			$M_{2,max}$	Nm	1.57	2.1	2.6	3.7	4.25	5.3	4.7	6.3	7.9	8.4	10.5	13.2	16.9	21	12	8

### SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1 and 2-stage

$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	1000	750	600	500	375	300	250	200	200	150	125	100	75	50	-	1F.2203-2AG...-2.A0-Z
0.566	1.76	0.2466	$n_{2N}$	r/min	1000	750	600	500	375	300	250	200	200	150	125	100	75	50	-	1F.2203-2AG...-2.A0-Z
...	...	(0.2666)	$M_{2N}$	Nm	1.02	1.43	1.84	2.25	3.05	3.85	3	4.5	5.6	5.7	7.6	9.3	11.7	13	7.5	-
0.574	1.79		$M_{2,0}$	Nm	1.69	2.25	2.85	4	4.55	5	5.1	6.8	8.5	9	11.3	13	15	13	7.5	-
			$M_{2,max}$	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	-

Continued on the next page

### Planetary gearbox data

Gearbox type:		NRK050, 1-stage						NRK050, 2-stage												
1. Order code		B11						B12												
i		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5			
$M_{2max,G}$	Nm	17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12	8			
$M_{2Em,Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27	27			
$J_{1,G}$	kg cm <sup>2</sup>	0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015	0.014			
$\varphi_{2,G}$	'	15						19												

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRK050

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																					
Nm	Nm	kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1 and 2-stage (continued)</b>																							
0.531	1.76	0.2466 (0.2666)	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	150	150	100	75	75	50	-	1F.2203-2AK...-2..0-Z		
...	...	...	$M_{2N}$	Nm	1	1.32	1.63	2.25	2.2	2.85	2.75	3.3	4.15	5.5	5.6	8.5	11.2	11.5	7.5	-	■ + ■ + ...		
0.539	1.79		$M_{2,0}$	Nm	1.59	2.1	2.65	3.75	4.3	5	4.8	6.4	8	8.5	10.6	13	15	13	7.5	-			
			$M_{2max}$	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	-			
1.18	3.61	0.3966 (0.4166)	$n_{2N}$	r/min	1000	750	600	375	375	300	-	250	200	200	150	125	100	75	-	-	1F.2203-4AG...-2..A0-Z		
...	...	...	$M_{2N}$	Nm	2.2	3.1	4.05	6.5	6	5	-	9.9	12.5	12.4	15	13	15	13	-	-	■ + ■ + ...		
1.2	3.66		$M_{2,0}$	Nm	3.55	4.75	5.9	8.3	6	5	-	14.2	13	15	15	13	15	13	-	-			
			$M_{2max}$	Nm	10.9	14.6	18.2	13.5	9.5	8	-	24	21	24	24	21	24	21	-	-			
1.1	3.61	0.3966 (0.4166)	$n_{2N}$	r/min	750	500	500	300	300	300	250	200	150	150	125	125	100	75	-	-	1F.2203-4AK...-2..0-Z		
...	...	...	$M_{2N}$	Nm	1.96	3	3.05	5.3	5.3	4.7	6.6	8.3	11.1	13.4	11.4	14.2	13	-	-	-	■ + ■ + ...		
1.12	3.66		$M_{2,0}$	Nm	3.3	4.4	5.5	7.7	6	5	9.9	13.2	13	15	15	13	15	13	-	-			
			$M_{2max}$	Nm	10.9	14.6	18.2	13.5	9.5	8	19	24	21	24	24	21	24	21	-	-			

Planetary gearbox data			NRK050, 1-stage										NRK050, 2-stage											
Gearbox type:			B11										B12											
1. Order code			3 4 5 7 8 10										9 12 15 16 20 25 32 40 64 100											
$i$			R03 R04 R05 R07 R08 R10										R09 R12 R15 R16 R20 R25 R32 R40 R64 R00											
2. Order code																								
$M_{2N,G}$	Nm		11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5						
$M_{2max,G}$	Nm		17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12	8						
$M_{2Em,Off}$	Nm		22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27	27						
$J_{1,G}$	kg cm <sup>2</sup>		0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015	0.014						
$\varnothing_{2,G}$	'		15											19										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

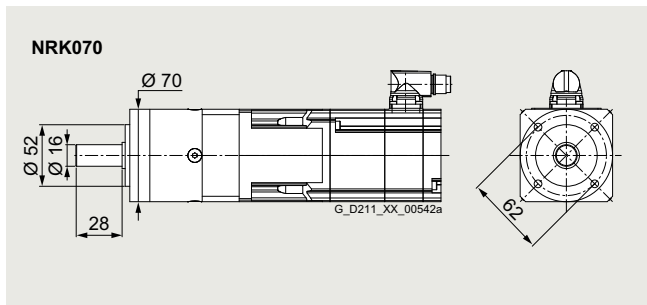
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK070

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																	
Nm	Nm	( $J_{M,Br}$ )																	
		kg cm <sup>2</sup>																	

SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1 and 2-stage																						
0.068	0.468	0.0245 (0.0285)	$n_{2N}$	r/min	375	375	375	375	375	300	300	250	200	200	150	125	100	75	50	30	1F.2102-0AG...-0.A0-Z	
...	...	...	$M_{2N}$	Nm	0.107	0.199	0.28	0.415	0.47	0.68	0.53	0.75	1.14	1.14	1.62	2.05	2.75	3.6	5.7	9.4		■ + ■ + ...
0.121	0.512	...	$M_{2,0}$	Nm	0.2	0.325	0.45	0.7	0.82	1.07	0.94	1.31	1.68	1.8	2.25	2.9	3.75	4.7	7.6	12		
			$M_{2max}$	Nm	1.4	1.92	2.4	3.45	4	5	4.45	6	7.5	8	10.1	12.7	16.3	20	29	24		
0.221	1.01	0.036 (0.04)	$n_{2N}$	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	30	1F.2102-1AG...-0.A0-Z	
...	...	...	$M_{2N}$	Nm	0.415	0.67	0.84	1.25	1.61	2.1	1.62	2.4	3.25	3.35	4.45	5.5	7.2	9.3	14.7	15		■ + ■ + ...
0.27	1.05	...	$M_{2,0}$	Nm	0.66	0.93	1.21	1.76	2	2.55	2.25	3.1	3.9	4.2	5.2	6.6	8.5	10.7	17.2	15		
			$M_{2max}$	Nm	3	4.05	5.1	7.2	8.3	10.4	9.3	12.4	15.6	16.6	20.5	26	33	41.5	29	24		
0.515	1.84	0.093 (0.112)	$n_{2N}$	r/min	750	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	1F.2103-2AG...-2.A0-Z	
...	...	...	$M_{2N}$	Nm	1	1.28	1.77	2.45	3.15	4.1	3.2	4.75	6.2	6.4	8.5	10.5	13.6	17.4	18	15		■ + ■ + ...
0.558	1.87	...	$M_{2,0}$	Nm	1.54	2.1	2.65	3.8	4.35	5.5	4.9	6.5	8.2	8.8	11	13.8	17.7	22	18	15		
			$M_{2max}$	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24		
0.5	1.84	0.093 (0.112)	$n_{2N}$	r/min	600	600	500	375	375	250	300	250	200	200	125	100	100	75	50	25	1F.2103-2AH...-2..0-Z	
...	...	...	$M_{2N}$	Nm	1.09	1.36	1.84	2.75	2.95	4.2	3.45	4.55	5.9	6.1	8.5	10.8	12.9	16.6	18	15		■ + ■ + ...
0.543	1.87	...	$M_{2,0}$	Nm	1.5	2.05	2.6	3.7	4.25	5.3	4.75	6.4	8	8.5	10.7	13.5	17.3	21.5	18	15		
			$M_{2max}$	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24		
1.14	3.89	0.139 (0.158)	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	-	1F.2103-4AG...-2.A0-Z	
...	...	...	$M_{2N}$	Nm	1.91	2.8	3.7	5.4	5.7	7.5	7	8.8	11.8	11.8	16	19.6	25	30	18	-		■ + ■ + ...
1.17	...	...	$M_{2,0}$	Nm	3.4	4.55	5.7	8.1	9.3	11.7	10.4	13.9	17.4	18.6	23	29	33	30	18	-		
	3.94	...	$M_{2max}$	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	-		
0.997	3.89	0.139 (0.158)	$n_{2N}$	r/min	600	600	500	375	375	250	300	250	200	200	125	100	100	75	50	-	1F.2103-4AH...-2..0-Z	
...	...	...	$M_{2N}$	Nm	2.1	2.5	3.3	4.95	5.2	7.7	6.4	8.1	10.8	10.8	16.4	20.5	23	30	18	-		■ + ■ + ...
1.03	3.94	...	$M_{2,0}$	Nm	2.95	4	5	7.1	8.2	10.3	9.1	12.2	15.3	16.4	20.5	25.5	32.5	30	18	-		
			$M_{2max}$	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	-		
1.15	3.6	0.371 (0.451)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	1F.2104-4AF...-2..0-Z	
...	...	...	$M_{2N}$	Nm	3.1	4.3	5.5	7.7	9	11.4	9.8	13.5	17	18	22.5	28.5	33	30	18	-		■ + ■ + ...
1.19	3.64	...	$M_{2,0}$	Nm	3.45	4.65	5.8	8.2	9.4	11.8	10.5	14.1	17.7	18.9	23.5	29.5	33	30	18	-		
			$M_{2max}$	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	-		

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Planetary gearbox data		NRK070, 1-stage							NRK070, 2-stage									
Gearbox type:		B21							B22									
1. Order code																		
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15	
$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24	
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064	
$\varnothing_{2,G}$	'	10							12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRK070**

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1 and 2-stage (continued)</b>																						
1.15	3.7	0.371	$n_{2N}$	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	-	-	<b>1F.2104-4AK...-2.0-Z</b>
...	...	(0.451)	$M_{2N}$	Nm	2.85	4.1	4.6	6.1	8.3	10.8	8.1	12.5	16	16.7	21.5	26.5	33	30	18	-	-	■ + ■ + ...
1.18	3.74		$M_{2,0}$	Nm	3.4	4.6	5.8	8.2	9.4	11.8	10.5	14	17.6	18.7	23.5	29	33	30	18	-	-	■ + ■ + ...
			$M_{2max}$	Nm	11.1	14.9	18.6	26	29	24	33	44	53	53	53	48	53	48	29	-	-	■ + ■ + ...
2.26	7.24	0.581	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	-	-	<b>1F.2104-5AF...-2.0-Z</b>
...	...	(0.671)	$M_{2N}$	Nm	5.9	8.3	10.7	14.6	17.3	15	18.6	26	32.5	33	33	30	33	30	-	-	-	■ + ■ + ...
2.29	7.33		$M_{2,0}$	Nm	6.7	9	11.3	15.9	18	15	20	27	33	33	33	30	33	30	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	21.5	29	36.5	40	29	24	53	53	53	53	53	48	53	48	-	-	-	■ + ■ + ...
2.24	7.34	0.581	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	-	-	-	<b>1F.2104-5AK...-2.0-Z</b>
...	...	(0.671)	$M_{2N}$	Nm	4.45	6.3	8.1	11.6	12	15	14.4	17.7	23	23	31	30	33	30	-	-	-	■ + ■ + ...
2.27	7.43		$M_{2,0}$	Nm	6.7	9	11.3	15.8	18	15	20	27	33	33	33	30	33	30	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	22	29.5	37	40	29	24	53	53	53	53	53	48	53	48	-	-	-	■ + ■ + ...
3.01	9.66	0.781	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	-	-	60	50	37.5	-	-	-	<b>1F.2104-6AF...-2.0-Z</b>
...	...	(0.861)	$M_{2N}$	Nm	7.2	10.1	12.9	17.6	18	15	22	31.5	33	-	-	30	33	30	-	-	-	■ + ■ + ...
3.04	9.79		$M_{2,0}$	Nm	9	12	15.1	21	18	15	27	33	33	-	-	30	33	30	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	29	39	48	40	29	24	53	53	53	-	-	48	53	48	-	-	-	■ + ■ + ...
4.68	14.5	1.98	$n_{2N}$	r/min	500	375	300	250	200	150	-	-	100	100	75	60	50	37.5	-	-	-	<b>1F.2105-4AF...-0.0-Z</b>
...	...	(2.82)	$M_{2N}$	Nm	10.8	15.1	19.3	24.5	18	15	-	-	33	33	33	30	33	30	-	-	-	■ + ■ + ...
4.73	14.7		$M_{2,0}$	Nm	14.1	18.8	23.5	25	18	15	-	-	33	33	33	30	33	30	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	44	53	48	40	29	24	-	-	53	53	53	48	53	48	-	-	-	■ + ■ + ...
4.71	14.5	1.98	$n_{2N}$	r/min	500	375	300	250	250	200	150	150	150	125	100	75	75	-	-	-	-	<b>1FT2105-4AH...-0.0-Z</b>
...	...	(2.82)	$M_{2N}$	Nm	9.6	13.5	17.4	21.5	18	15	26	33	32	30	33	30	33	30	-	-	-	■ + ■ + ...
4.77	14.7		$M_{2,0}$	Nm	14.2	19	23.5	25	18	15	33	33	33	33	33	30	33	30	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	44	53	48	40	29	24	53	53	53	53	53	48	53	48	-	-	-	■ + ■ + ...
7.21	23.2	2.92	$n_{2N}$	r/min	500	375	-	250	200	150	200	125	100	100	75	60	-	-	-	-	-	<b>1F.2105-6AF...-0.0-Z</b>
...	...	(3.77)	$M_{2N}$	Nm	14	19.5	-	25	18	15	33	33	33	33	33	30	-	-	-	-	-	■ + ■ + ...
7.3	23.6		$M_{2,0}$	Nm	21.5	29	-	25	18	15	33	33	33	33	33	30	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	45	53	-	40	29	24	53	53	53	53	53	48	-	-	-	-	-	■ + ■ + ...

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**Planetary gearbox data**

Gearbox type:		<b>NRK070, 1-stage</b>										<b>NRK070, 2-stage</b>																					
1. Order code		<b>B21</b>										<b>B22</b>																					
$i$		3		4		5		7		8		10		9		12		15		16		20		25		32		40		64		100	
2. Order code		<b>R03</b>		<b>R04</b>		<b>R05</b>		<b>R07</b>		<b>R08</b>		<b>R10</b>		<b>R09</b>		<b>R12</b>		<b>R15</b>		<b>R16</b>		<b>R20</b>		<b>R25</b>		<b>R32</b>		<b>R40</b>		<b>R64</b>		<b>R00</b>	
$M_{2N,G}$		28		33		30		25		18		15		33		33		33		33		33		30		33		30		18		15	
$M_{2max,G}$		45		53		48		40		29		24		53		53		53		53		53		48		53		48		29		24	
$M_{2Em,Off}$		66		88		80		80		80		80		88		88		88		88		88		80		88		80		80		80	
$J_{1,G}$		0.174		0.117		0.095		0.078		0.074		0.069		0.126		0.121		0.078		0.087		0.076		0.075		0.067		0.066		0.064			
$\varnothing_{2,G}$		10												12																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK070

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																					
Nm	Nm	kg cm <sup>2</sup>																					
			SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1 and 2-stage (continued)																				
1.11	3.6	0.35	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	200	150	150	100	100	75	50	-	-	1F.2203-4AK..-2..0-Z	
...	...	(0.37)	$M_{2N}$	Nm	2.25	3.1	4.35	4.85	6.3	7.9	7.6	9.9	10.3	13.8	14.2	21.5	21.5	29.5	18	-	-	■ + ■ + ...	
1.14	3.64		$M_{2,0}$	Nm	3.3	4.45	5.6	7.9	9.1	11.4	10.1	13.6	17	18.1	22.5	28	33	30	18	-	-		
			$M_{2max}$	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	-	-		

Planetary gearbox data			NRK070, 1-stage								NRK070, 2-stage									
Gearbox type:			B21				B22													
1. Order code			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100		
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00		
$i$																				
$M_{2N,G}$	Nm		28	33	30	25	18	15	33	33	33	33	30	33	30	18	15			
$M_{2max,G}$	Nm		45	53	48	40	29	24	53	53	53	53	48	53	48	29	24			
$M_{2Em,Off}$	Nm		66	88	80	80	80	80	88	88	88	88	80	88	80	80	80			
$J_{1,G}$	kg cm <sup>2</sup>		0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.064			
$\varphi_{2,G}$	'		10						12											

Color legend:

- $M_{max,M} \times i < M_{2N,G}$       The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$       Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$       The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

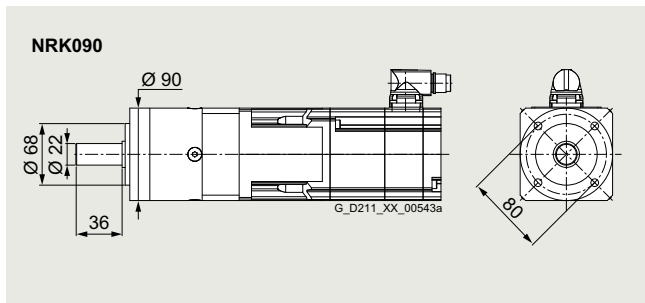


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRK090**

**Selection and ordering data**



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1 and 2-stage</b>																					
0.473	1.78	0.093	$n_{2N}$	r/min	600	600	600	500	375	300	375	250	200	200	150	125	100	75	50	30	<b>1F.2103-2AG..-0.A0-Z</b>
...	...	(0.112)	$M_{2N}$	Nm	0.88	1.13	1.33	1.94	2.7	3.6	2.45	3.95	5.1	5.4	7.4	9.2	12.2	15.9	25	38	■■■ + ■■■ + ...
0.543	1.83		$M_{2,0}$	Nm	1.42	1.97	2.5	3.6	4.15	5.2	4.7	6.3	7.9	8.5	10.7	13.4	17.2	21.5	34.5	38	
			$M_{2max}$	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61	
0.445	1.78	0.093	$n_{2N}$	r/min	600	500	500	375	375	250	300	250	200	200	125	100	100	75	50	25	<b>1F.2103-2AH..-0.0-Z</b>
...	...	(0.112)	$M_{2N}$	Nm	0.86	1.28	1.54	2.4	2.6	3.85	2.95	3.85	4.95	5.2	7.8	9.9	11.8	15.3	24	38	■■■ + ■■■ + ...
0.515	1.83		$M_{2,0}$	Nm	1.33	1.86	2.35	3.4	3.95	5	4.45	6	7.5	8	10.1	12.7	16.3	20.5	32.5	38	
			$M_{2max}$	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61	
1.08	3.86	0.139	$n_{2N}$	r/min	600	500	500	375	300	300	300	200	200	150	150	125	100	75	50	30	<b>1F.2103-4AG..-0.A0-Z</b>
...	...	(0.158)	$M_{2N}$	Nm	2.2	3.1	3.45	5.4	6.9	7.4	6.8	10.7	10.8	14.9	16	19.5	25.5	34.5	50	38	■■■ + ■■■ + ...
1.14	3.9		$M_{2,0}$	Nm	3.2	4.4	5.5	7.8	9	11.3	10.1	13.5	16.9	18.1	22.5	28	36	45.5	50	38	
			$M_{2max}$	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61	
0.998	3.86	0.139	$n_{2N}$	r/min	600	500	500	375	300	250	300	200	200	200	125	100	100	75	50	25	<b>1F.2103-4AH..-0.0-Z</b>
...	...	(0.158)	$M_{2N}$	Nm	1.96	2.75	3.05	4.85	6.2	7.9	6.1	9.4	9.8	10	16.1	20	23.5	31	48.5	38	■■■ + ■■■ + ...
1.05	3.9		$M_{2,0}$	Nm	2.95	4.05	5.1	7.2	8.3	10.5	9.3	12.4	15.6	16.6	20.5	26	33.5	41.5	50	38	
			$M_{2max}$	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61	
1.1	3.56	0.35	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F.2104-4AF..-2.0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	2.95	4.15	5.3	7.5	8.8	11.2	9.5	13.3	16.7	17.7	22	28	36	45	50	38	■■■ + ■■■ + ...
1.15	3.6		$M_{2,0}$	Nm	3.25	4.45	5.6	7.9	9.1	11.4	10.2	13.7	17.1	18.3	22.5	28.5	36.5	46	50	38	
			$M_{2max}$	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61	
1.09	3.66	0.35	$n_{2N}$	r/min	600	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	<b>1F.2104-4AK..-2.0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	3.05	3.7	5	7.4	8.1	10.4	9.2	11.9	15.1	15.8	20.5	25.5	33	42.5	50	38	■■■ + ■■■ + ...
1.15	3.7		$M_{2,0}$	Nm	3.25	4.4	5.6	7.9	9.1	11.4	10.1	13.6	17	18.2	22.5	28.5	36.5	45.5	50	38	
			$M_{2max}$	Nm	10.9	14.6	18.4	25.5	29.5	37	33	44	55	58	73	91	117	131	80	61	
2.2	7.19	0.56	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F.2104-5AF..-2.0-Z</b>
...	...	(0.65)	$M_{2N}$	Nm	6.1	8.5	10.9	15.2	17.7	22	19.1	26	32.5	35	44	55	70	82	50	38	■■■ + ■■■ + ...
2.25	7.29		$M_{2,0}$	Nm	6.6	8.8	11.1	15.6	17.9	22	20	26.5	33	35.5	44.5	55	71	82	50	38	
			$M_{2max}$	Nm	21.5	29	36	50	58	61	65	86	108	115	144	131	144	131	80	61	

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Planetary gearbox data		NRK090, 1-stage							NRK090, 2-stage											
Gearbox type:		<b>B31</b>							<b>B32</b>											
1. Order code																				
$i$		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>			
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>			
$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38			
$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61			
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200			
$J_{1,G}$	kg cm <sup>2</sup>	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356			
$\varnothing_{2,G}$	'	7							9											

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

#### Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			

**SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1 and 2-stage (continued)**

2.19 ... 2.23	7.29 ... 7.39	0.56  (0.65)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	600 5.3 6.5 22	500 7.2 8.8 29	500 7.8 11 36.5	375 11.8 15.5 51	300 15 17.8 59	300 15.8 22 61	300 14.4 19.9 65	200 22 26.5 87	150 29.5 33 109	150 30.5 35 117	150 32 44 144	125 38.5 55 131	100 50 71 144	75 68 82 131	50 50 50 80	30 38 38 61	1F.2104-5AK..-2..0-Z ■■■ + ■■■ + ...
2.95 ... 3	9.62 ... 9.75	0.76  (0.84)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	500 7.5 8.8 29	375 10.7 11.8 38.5	300 13.8 14.8 48.5	250 18.9 20.5 68	200 22.5 23.5 77	150 29 29.5 61	200 24 26.5 86	125 34.5 35.5 115	100 43.5 44.5 131	100 45.5 47.5 144	75 58 59 144	60 73 74 131	50 90 90 144	37.5 82 82 131	25 50 50 80	- - - -	1F.2104-6AF..-2..0-Z ■■■ + ■■■ + ...
4.67 ... 4.72	14.5 ... 14.7	1.71  (2.55)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	500 12.3 14 44	375 16.8 18.7 58	300 21 23.5 73	250 29 33 102	200 34 37.5 80	150 38 38 61	200 36 42 130	125 50 56 144	100 63 70 131	100 66 74 144	75 84 90 144	60 82 90 131	50 90 90 144	37.5 82 82 131	25 50 50 80	- - - -	1F.2105-4AF..-0..0-Z ■■■ + ■■■ + ...
4.7 ... 4.76	14.5 ... 14.7	1.71  (2.55)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	500 11.4 14.1 44	500 11.9 18.9 58	375 17.5 23.5 73	300 23 33 102	250 28.5 38 80	200 36.5 38 61	200 34 42 130	150 50 56 144	125 55 62 131	125 56 71 144	100 68 75 144	100 79 90 131	75 90 90 144	50 50 82 131	50 50 50 80	- - - -	1FT2105-4AH..-0..0-Z ■■■ + ■■■ + ...
7.4 ... 7.52	23.2 ... 23.6	2.65  (3.5)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	500 16.5 22 70	375 23 29.5 94	300 29.5 37.5 117	250 38.5 52 104	200 47.5 50 80	150 38 38 61	150 46 66 155	125 71 82 144	100 82 90 131	100 89 90 144	75 82 90 144	60 90 90 131	50 82 90 144	37.5 82 90 131	- - - -	- - - -	1F.2105-6AF..-0..0-Z ■■■ + ■■■ + ...
7.47 ... 7.58	25.1 ... 25.5	5.476  (7.176)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 18.6 22.5 76	375 19.9 30 101	300 25.5 37.5 127	200 40 50 80	200 40.5 38 61	150 38 38 155	150 51 67 144	125 62 82 131	100 77 82 144	100 90 90 143	75 82 90 144	60 90 90 131	50 82 90 144	37.5 82 82 131	- - - -	- - - -	1F.2106-3AF..-0..0-Z ■■■ + ■■■ + ...
9.67 ... 9.82	31.8 ... 32.4	6.876  (8.476)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 23 29 97	300 30 39 129	250 36.5 49 131	200 40 65 104	200 47 50 80	150 38 38 61	- - - -	125 71 90 144	100 86 82 131	100 82 90 144	75 90 90 144	60 82 90 131	50 82 90 144	37.5 82 82 131	- - - -	- - - -	1F.2106-4AF..-0..0-Z ■■■ + ■■■ + ...

**SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1 and 2-stage**

0.467 ... 0.537	1.68 ... 1.74	0.2  (0.22)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	600 0.96 1.4 5	500 1.42 1.94 6.8	500 1.65 2.45 8.5	375 2.6 3.55 12	375 2.7 4.1 13.8	300 3.65 5.2 17.3	300 3.15 4.6 15.4	250 3.95 6.2 20.5	200 5.1 7.8 25.5	200 5.3 8.4 27.5	150 7.6 10.5 34.5	125 9.3 13.2 43	100 12.4 17 55	75 16.5 21 69	50 25.5 34 80	30 38 38 61	1F.2203-2AG..-0.A0-Z ■■■ + ■■■ + ...
0.432 ... 0.502	1.68 ... 1.74	0.2  (0.22)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	500 0.92 1.29 5	500 1.14 1.8 6.8	375 1.73 3.3 8.5	375 2 3.85 12	300 2.7 3.45 13.8	250 3 4.3 17.3	200 3.95 5.8 15.4	200 5.4 7.3 20.5	150 6 7.8 25.5	150 6 8.8 27.5	100 9.1 9.8 34.5	100 9.6 12.4 43	75 13.2 15.9 55	50 19.8 19.9 69	30 34 32 80	30 38 38 61	1F.2203-2AK..-0..0-Z ■■■ + ■■■ + ...
1.09 ... 1.15	3.56 ... 3.6	0.35  (0.37)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	600 2.9 3.25 10.6	600 3.35 4.4 14.3	500 4.65 5.6 17.9	375 6.9 7.9 25	375 7.3 9.1 28.5	300 9.7 11.4 36	300 8.6 10.1 42.5	250 10.9 13.6 45.3	200 14 17.1 53	200 14.4 18.2 57	150 19.4 22.5 71	125 23.5 28.5 89	100 31 36.5 114	75 40 45.5 131	50 50 50 80	30 38 38 61	1F.2203-4AG..-0.A0-Z ■■■ + ■■■ + ...

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Planetary gearbox data			NRK090, 1-stage								NRK090, 2-stage									
Gearbox type:			<b>B31</b>								<b>B32</b>									
1. Order code																				
<i>i</i>																				
2. Order code			<b>R03</b>				<b>R04</b>				<b>R05</b>				<b>R07</b>					
$M_{2N,G}$	Nm		85	90	92	65	50	38	97	90	82	90	90	82	90	82	90	82	50	38
$M_{2max,G}$	Nm		136	144	131	104	80	61	155	144	131	144	144	131	144	131	144	131	80	61
$M_{2Em,Off}$	Nm		180	240	220	178	190	200	260	240	220	240	240	220	240	220	240	220	190	200
$J_{1,G}$	kg cm <sup>2</sup>		0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356		
$\varphi_{2,G}$	'		7								9									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox						
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																					
Nm	Nm	kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1 and 2-stage (continued)</b>																							
5.05	17.3	8.676 (10.276)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	60	50	-	-	<b>1FT2206-2AH..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	12	15.8	19.7	25.5	25	35	34.5	41.5	52	51	71	82	77	81	-	-	■ + ■ + ...		
5.12	17.6		$M_{2,0}$	Nm	15.2	20	25	35.5	40.5	38	45.5	60	75	80	90	82	90	82	-	-			
			$M_{2max}$	Nm	52	70	87	104	80	61	155	144	131	144	144	131	144	131	-	-			
7.54	26	12.38 (13.976)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	-	<b>1FT2206-3AB..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	20	27	34	48.5	50	38	55	74	82	90	90	82	90	82	-	-	■ + ■ + ...		
7.66	26.5		$M_{2,0}$	Nm	22.5	30.5	38	53	50	38	68	90	82	90	90	82	90	82	-	-			
			$M_{2max}$	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	-	-			
7.41	26	12.38 (13.976)	$n_{2N}$	r/min	375	300	250	200	150	150	100	100	75	75	60	50	37.5	-	-	<b>1FT2206-3AF..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	15.9	20.5	25.5	33	44	38	44	65	64	87	86	82	90	82	-	-	■ + ■ + ...		
7.52	26.5		$M_{2,0}$	Nm	22	30	37.5	52	50	38	66	89	82	90	90	82	90	82	-	-			
			$M_{2max}$	Nm	79	105	131	104	80	61	155	144	131	144	144	131	144	131	-	-			
10.3	36.7	15.98 (17.676)	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	-	-	<b>1FT2206-4AC..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	18.9	23	29.5	40	49	38	61	81	79	76	90	82	90	82	-	-	■ + ■ + ...		
10.5	37.3		$M_{2,0}$	Nm	31	41.5	52	65	50	38	94	90	82	90	90	82	90	82	-	-			
			$M_{2max}$	Nm	111	144	131	104	80	61	155	144	131	144	144	131	144	131	-	-			
10.1	34.7	15.976 (17.676)	$n_{2N}$	r/min	375	300	250	200	200	150	-	125	100	100	75	60	50	37.5	-	-	<b>1F2206-4AF..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	23.5	30.5	37.5	49	48.5	38	-	73	82	88	90	82	90	82	-	-	■ + ■ + ...		
10.3	35.3		$M_{2,0}$	Nm	30.5	41	51	65	50	38	-	90	82	90	90	82	90	82	-	-			
			$M_{2max}$	Nm	106	141	131	104	79	61	-	144	131	144	144	131	144	131	-	-			
9.7	34.7	15.976 (17.676)	$n_{2N}$	r/min	375	300	250	150	150	150	125	100	100	75	75	60	60	50	-	-	<b>1FT2206-4AH..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	18.3	23.5	28.5	49	49.5	38	59	73	68	90	90	82	77	80	-	-	■ + ■ + ...		
9.86	35.3		$M_{2,0}$	Nm	29.5	39	49	65	50	38	87	90	82	90	90	82	90	82	-	-			
			$M_{2max}$	Nm	106	141	131	104	79	61	155	144	131	144	144	131	144	131	-	-			

Planetary gearbox data			NRK090, 1-stage														NRK090, 2-stage																																		
Gearbox type:			<b>B31</b>							<b>B32</b>																																									
1. Order code			<b>3</b>							<b>9</b>							<b>15</b>							<b>25</b>							<b>40</b>							<b>64</b>							<b>100</b>						
$i$			<b>R03</b>							<b>R09</b>							<b>R15</b>							<b>R25</b>							<b>R40</b>							<b>R64</b>							<b>R00</b>						
$M_{2N,G}$	Nm		85	90	82	65	50	38	97	90	82	90	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82	90	82					
$M_{2max,G}$	Nm		136	144	131	104	80	61	155	144	131	144	144	144	131	144	131	144	144	131	144	131	144	144	131	144	131	144	131	80	61																				
$M_{2Em,Off}$	Nm		180	240	220	178	190	200	260	240	220	240	240	240	220	240	220	240	220	240	220	240	240	220	240	220	240	220	190	200																					
$J_{1,G}$	kg cm <sup>2</sup>		0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356																																	
$\varnothing_{2,G}$	'		7							9																																									

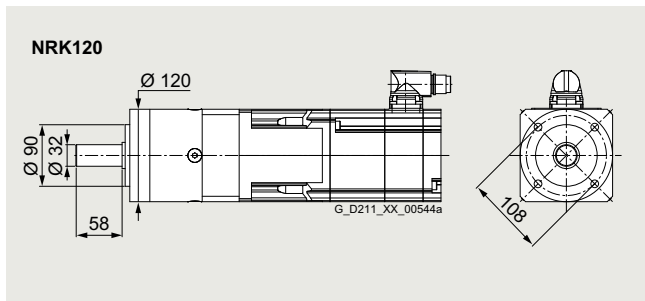
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRK120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	kg cm <sup>2</sup>																			
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1 and 2-stage																					
0.346	1.66	0.093	$n_{2N}$	r/min	300	300	300	300	250	250	200	150	125	125	125	100	75	75	50	30	1F.2103-2AG..-0..A0-Z
...	...	(0.112)	$M_{2N}$	Nm	0.7	0.99	1.3	1.71	2.25	2.5	2.35	3.45	4.4	4.6	5.2	6.8	10.2	10.5	16	28.5	■ ■ ■ + ■ ■ ■ + ...
0.477	1.76		$M_{2.0}$	Nm	1.03	1.52	2	2.95	3.45	4.45	3.9	5.3	6.8	7.3	9.2	11.6	15	18.8	30	47.5	
			$M_{2max}$	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.318	1.66	0.093	$n_{2N}$	r/min	375	300	300	300	250	250	200	150	125	125	125	100	75	75	37.5	25	1F.2103-2AH..-0..0-Z
...	...	(0.112)	$M_{2N}$	Nm	0.55	0.98	1.29	1.73	2.2	2.45	2.35	3.4	4.35	4.55	5.3	6.8	10.1	10.6	21	33	■ ■ ■ + ■ ■ ■ + ...
0.449	1.76		$M_{2.0}$	Nm	0.95	1.41	1.87	2.75	3.25	4.15	3.65	5	6.4	6.8	8.6	10.9	14.1	17.7	28.5	44.5	
			$M_{2max}$	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.955	3.73	0.139	$n_{2N}$	r/min	375	375	300	250	250	200	150	125	125	100	100	75	60	37.5	25		1F.2103-4AG..-0..A0-Z
...	...	(0.158)	$M_{2N}$	Nm	2.45	2.95	4.3	6.1	6.4	8.7	7.7	10.8	13.5	13.8	18.7	18.5	27.5	35	57	87	■ ■ ■ + ■ ■ ■ + ...
1.07	3.82		$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.3	10.5	9.3	12.5	15.8	16.8	21	26.5	34	42.5	68	95	
			$M_{2max}$	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.941	3.73	0.139	$n_{2N}$	r/min	375	375	300	250	250	200	150	125	125	125	100	75	60	37.5	25		1F.2103-4AH..-0..0-Z
...	...	(0.158)	$M_{2N}$	Nm	2	2.55	3.7	5.3	5.7	7.7	6.5	8.9	11.2	11.8	12.7	16.5	24	30	49	76	■ ■ ■ + ■ ■ ■ + ...
1.06	3.82		$M_{2.0}$	Nm	2.8	3.9	4.95	7.1	8.2	10.3	9.2	12.4	15.5	16.6	20.5	26	33.5	42	67	95	
			$M_{2max}$	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.969	3.43	0.35	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-4AF..-0..0-Z
...	...	(0.43)	$M_{2N}$	Nm	2.25	3.45	4.65	6.7	7.9	10.1	8.2	11.7	14.8	15.8	20	25	32.5	41	66	95	■ ■ ■ + ■ ■ ■ + ...
1.09	3.52		$M_{2.0}$	Nm	2.9	4	5.1	7.3	8.4	10.6	9.4	12.7	16	17.1	21	26.5	34.5	43	69	95	
			$M_{2max}$	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
0.963	3.53	0.35	$n_{2N}$	r/min	500	500	375	300	300	250	200	150	150	125	100	100	75	50	30		1F.2104-4AK..-0..0-Z
...	...	(0.43)	$M_{2N}$	Nm	2.45	2.65	4.55	6.7	7.4	9.7	8.1	10.5	14.2	15	19.4	24.5	25	37	53	95	■ ■ ■ + ■ ■ ■ + ...
1.08	3.62		$M_{2.0}$	Nm	2.85	3.95	5	7.2	8.3	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	
			$M_{2max}$	Nm	10.5	14.2	17.8	25	28.5	36	32	43	53	57	71	89	115	143	192	152	
2.07	7.13	0.56	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-5AF..-0..0-Z
...	...	(0.65)	$M_{2N}$	Nm	4.9	7.6	10.1	14.4	16.7	21	18.1	24.5	31	33	41.5	52	67	84	120	95	■ ■ ■ + ■ ■ ■ + ...
2.17	7.21		$M_{2.0}$	Nm	6.2	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34.5	43	54	69	86	120	95	
			$M_{2max}$	Nm	21	28.5	35.5	50	57	72	64	85	107	114	142	178	225	275	392	152	

Continued on the next page

## Planetary gearbox data

Gearbox type:		NRK120, 1-stage							NRK120, 2-stage											
1. Order code		B41							B42											
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95			
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480			
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376			
$\varnothing_{2,G}$	'	7							9											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1 and 2-stage (continued)</b>																						
2.06	7.23	0.56 (0.65)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	<b>1F2104-5AK..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	4.8	7.5	8.3	12	15.1	19.8	17.7	24	30	30.5	40.5	40.5	59	74	119	95	■ ■ ■ + ■ ■ ■ + ...	
2.15	7.31		$M_{2,0}$	Nm	6.1	8.3	10.5	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	85	120	95		
			$M_{2max}$	Nm	21.5	29	36	51	58	73	65	86	108	115	144	180	230	275	192	152		
2.82	9.55	0.76 (0.84)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F2104-6AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	6.2	9.5	12.9	17.7	21.5	28.5	22	33.5	42	44.5	56	70	91	113	120	95	■ ■ ■ + ■ ■ ■ + ...	
2.92	9.67		$M_{2,0}$	Nm	8.4	11.4	14.3	20	23	29	25.5	34.5	43	46	57	72	92	116	120	95		
			$M_{2max}$	Nm	28.5	38	48	67	77	96	86	114	143	153	191	235	305	275	192	152		
4.56	14.4	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F2105-4AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	10.5	15.8	20.5	28	33.5	43.5	34.5	50	63	66	85	106	135	171	120	95	■ ■ ■ + ■ ■ ■ + ...	
4.64	14.6		$M_{2,0}$	Nm	13.6	18.3	23	32	37	46	41	55	69	73	92	115	147	172	120	95		
			$M_{2max}$	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152		
4.59	14.4	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	37.5	25		<b>1FT2105-4AH..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	9.3	14.4	19.6	25.5	32	34	31	42.5	51	63	67	91	119	143	120	95	■ ■ ■ + ■ ■ ■ + ...	
4.67	14.6		$M_{2,0}$	Nm	13.7	18.4	23	32.5	37	46.5	41.5	55	69	74	92	115	148	172	120	95		
			$M_{2max}$	Nm	43.5	58	72	102	116	145	130	173	215	230	285	275	312	275	192	152		
7.52	23.1	2.65 (3.5)	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	<b>1F2105-6AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	18.8	21	28	36.5	46.5	62	43	71	89	90	121	152	190	172	120	-	■ ■ ■ + ■ ■ ■ + ...	
7.6	23.4		$M_{2,0}$	Nm	22.5	30	37.5	53	60	76	67	90	112	120	150	172	195	172	120	-		
			$M_{2max}$	Nm	70	93	117	163	187	152	205	275	275	312	312	275	312	275	192	-		
7.76	25	4.6 (6.3)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	<b>1F2106-3AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	14.8	22	29.5	38	48.5	65	45	73	93	94	126	157	194	172	120	-	■ ■ ■ + ■ ■ ■ + ...	
7.88	25.4		$M_{2,0}$	Nm	23	31	39	55	62	78	70	93	116	124	155	172	195	172	120	-		
			$M_{2max}$	Nm	76	101	126	177	192	152	225	300	275	312	312	275	312	275	192	-		
10.1	31.8	6 (7.6)	$n_{2N}$	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	-	<b>1F2106-4AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	24.5	26	35.5	56	58	79	71	87	109	109	148	172	195	172	120	-	■ ■ ■ + ■ ■ ■ + ...	
10.2	32.3		$M_{2,0}$	Nm	30.5	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	-		
			$M_{2max}$	Nm	96	129	161	216	192	152	251	312	275	312	312	275	312	275	192	-		
14.3	43.9	8.7 (10.4)	$n_{2N}$	r/min	375	300	300	200	200	150	150	125	100	100	75	60	50	37.5	-	-	<b>1F2106-6AF..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	32	43	45	72	73	95	89	106	134	132	181	172	195	172	-	-	■ ■ ■ + ■ ■ ■ + ...	
14.5	44.7		$M_{2,0}$	Nm	43	57	72	101	116	95	128	171	172	195	195	172	195	172	-	-		
			$M_{2max}$	Nm	133	178	220	216	192	152	251	312	275	312	312	275	312	275	-	-		

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:	NRK120, 1-stage	NRK120, 2-stage															
		B41								B42							
1. Order code	i																
2. Order code	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	95	
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	152	
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	500	520	500	380	480	
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.376	
$\varphi_{2,G}$	'	7								9							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1 and 2-stage (continued)</b>																						
0.963	3.43	0.35 (0.37)	$n_{2N}$	r/min	500	375	375	300	300	250	250	200	200	150	150	125	100	75	75	37.5	30	1F2203-4AG..-0.0-Z
...	...	...	$M_{2N}$	Nm	2.45	3.55	4.5	6.6	6.7	8.9	7.5	9.5	13.7	14.2	18.4	23	31.5	33.5	64	90	■■■ + ■■■ + ...	
1.08	3.52		$M_{2,0}$	Nm	2.85	3.95	5	7.2	8.4	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	■■■ + ■■■ + ...	
0.924	3.43	0.35 (0.37)	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	37.5	25	1F2203-4AK..-0.0-Z	
...	...	...	$M_{2N}$	Nm	2.35	3	4.2	6	6.4	8.5	7.3	10	12.5	13.1	17.2	17.3	26	33	53	82	■■■ + ■■■ + ...	
1.04	3.52		$M_{2,0}$	Nm	2.75	3.8	4.85	7	8	10.2	9	12.2	15.3	16.3	20.5	25.5	33	41.5	66	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	■■■ + ■■■ + ...	
2.03	6.74	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	37.5	25	15	1F2204-5AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	4.65	7.3	9.9	13.7	16.3	20.5	17.1	24	30	32	40.5	51	65	82	120	95	■■■ + ■■■ + ...	
2.13	6.82		$M_{2,0}$	Nm	6	8.2	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	53	67	84	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	■■■ + ■■■ + ...	
2.05	6.74	1.23 (1.31)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F2204-5AK..-0.0-Z	
...	...	...	$M_{2N}$	Nm	4.8	7.5	8.1	14	14.8	19.4	17.6	24	29.5	30	40	38	57	71	116	95	■■■ + ■■■ + ...	
2.14	6.82		$M_{2,0}$	Nm	6.1	8.3	10.4	14.8	17	21	19	25	31.5	34	42.5	53	68	85	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	20	27	33.5	47.5	54	68	60	81	101	107	134	168	215	265	192	152	■■■ + ■■■ + ...	
2.81	9.06	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	37.5	25	15	1F2204-6AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	6.5	10.1	13.7	18.8	22	28	23	33	41.5	44.5	56	70	90	112	120	95	■■■ + ■■■ + ...	
2.9	9.18		$M_{2,0}$	Nm	8.4	11.3	14.3	20	23	29	25.5	34.5	43	46	57	72	92	115	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	27	36.5	45.5	64	73	91	81	109	136	145	181	225	290	275	192	152	■■■ + ■■■ + ...	
2.98	10.3	3.15 (4.05)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	10	10	1FT2205-2AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	7.1	10.2	13	18.6	21.5	27	24	30.5	39	41	53	62	83	108	120	94	■■■ + ■■■ + ...	
3.07	10.5		$M_{2,0}$	Nm	8.9	12	15.1	21	24.5	30.5	27	36	45.5	48.5	60	76	97	121	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	■■■ + ■■■ + ...	
3.02	10.3	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	37.5	25	15	1F2205-2AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	6.5	9.8	12.6	17.7	20.5	26.5	22	31	39	41	52	66	84	107	120	95	■■■ + ■■■ + ...	
3.11	10.5		$M_{2,0}$	Nm	9	12.1	15.3	21.5	24.5	31	27.5	36.5	46	49	61	76	98	123	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	■■■ + ■■■ + ...	
2.96	10.3	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	25	10	1FT2205-2AH..-0.0-Z	
...	...	...	$M_{2N}$	Nm	5.6	8.9	12.2	16.4	16.5	22	20	28	34	34	45.5	60	77	95	120	95	■■■ + ■■■ + ...	
3.05	10.5		$M_{2,0}$	Nm	8.8	11.9	15	21	24	30.5	27	36	45	48	60	75	96	120	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	312	275	192	152	■■■ + ■■■ + ...	
5.21	17.3	5.1 (6)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	100	100	75	60	50	37.5	25	15	1F2205-4AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	12.5	14	19.1	25	31.5	43	30	49.5	62	64	86	108	135	172	120	95	■■■ + ■■■ + ...	
5.29	17.5		$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	52	46.5	62	78	83	104	130	167	172	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	■■■ + ■■■ + ...	
5.34	17.3	7.8 (9.4)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	10	10	1FT2206-2AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	11.6	18.1	23.5	33	39	49	43.5	52	70	70	96	105	143	172	120	95	■■■ + ■■■ + ...	
5.42	17.5		$M_{2,0}$	Nm	16	21	26.5	37.5	43	54	48	64	80	86	107	134	172	172	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	■■■ + ■■■ + ...	

➡ Continued on the next page

#### Planetary gearbox data

Gearbox type:		NRK120, 1-stage							NRK120, 2-stage									
1. Order code		B41							B42									
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95	
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152	
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480	
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376	
$\varphi_{2,G}$	'	7																

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1 and 2-stage (continued)</b>																					
5.38	17.3	7.8	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2206-2AF..-0..0-Z
...	...	(9.4)	$M_{2N}$	Nm	11.2	16.8	22	29.5	35.5	45.5	35.5	53	66	69	89	111	141	172	120	95	■■■ + ■■■ + ...
5.46	17.5		$M_{2,0}$	Nm	16.1	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	172	120	95	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
5.22	17.3	7.8	$n_{2N}$	r/min	375	300	300	200	200	150	150	125	100	100	75	60	50	37.5	25		1FT2206-2AH..-0..0-Z
...	...	(9.4)	$M_{2N}$	Nm	12.7	17.3	18.7	30	31	42.5	39	49.5	62	63	86	107	134	130	120	95	■■■ + ■■■ + ...
5.3	17.5		$M_{2,0}$	Nm	15.6	20.5	26	36.5	42	53	47	62	78	83	104	130	167	172	120	94	
			$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	312	275	312	275	192	152	
7.89	26	11.5	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	-	1FT2206-3AB..-0..0-Z
...	...	(13.1)	$M_{2N}$	Nm	21	28	36	51	57	72	57	77	107	112	142	172	195	172	120	-	■■■ + ■■■ + ...
8.01	26.4		$M_{2,0}$	Nm	23.5	31.5	39.5	55	64	80	71	94	118	126	157	172	195	172	120	-	
			$M_{2max}$	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	-	
7.76	26	11.5	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	1FT2206-3AF..-0..0-Z
...	...	(13.1)	$M_{2N}$	Nm	17	23	29	39.5	40	55	51	63	79	79	109	136	169	172	120	-	■■■ + ■■■ + ...
7.88	26.4		$M_{2,0}$	Nm	23	31	39	55	62	78	69	93	116	124	155	172	195	172	120	-	
			$M_{2max}$	Nm	79	105	131	184	192	152	235	312	275	312	312	275	312	275	192	-	
11	36.6	15.1	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	50	50	37.5	25	20	-	1FT2206-4AC..-0..0-Z	
...	...	(16.8)	$M_{2N}$	Nm	20.5	26	34	47.5	57	73	70	72	98	97	146	146	195	172	120	-	■■■ + ■■■ + ...
11.1	37.2		$M_{2,0}$	Nm	33	44	55	77	88	95	98	131	164	175	195	172	195	172	120	-	
			$M_{2max}$	Nm	111	148	186	216	192	152	251	312	275	312	312	275	312	275	192	-	
10.5	34.7	15.1	$n_{2N}$	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	-	1F.2206-4AF..-0..0-Z
...	...	(16.8)	$M_{2N}$	Nm	25	27	36	57	59	80	73	88	111	111	151	172	195	172	120	-	■■■ + ■■■ + ...
10.7	35.3		$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	95	126	158	168	195	172	195	172	120	-	
			$M_{2max}$	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	-	
10.1	34.7	15.1	$n_{2N}$	r/min	375	300	250	200	150	150	100	100	75	75	60	50	50	37.5	-	1FT2206-4AH..-0..0-Z	
...	...	(16.8)	$M_{2N}$	Nm	20	26.5	33.5	44.5	59	62	58	87	87	117	120	150	183	152	117	-	■■■ + ■■■ + ...
10.2	35.3		$M_{2,0}$	Nm	30	40.5	50	71	81	95	90	121	151	161	195	172	195	172	120	-	
			$M_{2max}$	Nm	105	141	176	216	192	152	251	312	275	312	312	275	310	275	192	-	
10.3	36.6	24.86	$n_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	25	-	1FT2208-2AF..-0..0-Z
...	...	(28.16)	$M_{2N}$	Nm	25.5	33	42.5	59	61	75	71	89	119	120	152	172	164	172	119	-	■■■ + ■■■ + ...
10.4	37.2		$M_{2,0}$	Nm	31	41.5	51	72	83	95	92	123	154	164	195	171	195	172	120	-	
			$M_{2max}$	Nm	111	148	185	216	192	152	251	312	275	312	312	275	312	275	192	-	
16.3	49.2	31.96	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	-	-	1FT2208-3AB..-0..0-Z	
...	...	(34.96)	$M_{2N}$	Nm	34	44.5	59	87	93	95	95	127	172	184	195	172	195	172	-	-	■■■ + ■■■ + ...
16.6	50		$M_{2,0}$	Nm	49.5	66	82	115	120	95	146	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	-	-	
15.1	49.2	31.96	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	-	-	1F.2208-3AC..-0..0-Z
...	...	(35.36)	$M_{2N}$	Nm	28	44	57	79	94	95	110	115	154	153	195	172	195	172	-	-	■■■ + ■■■ + ...
15.4	50		$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	-	-	

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### Planetary gearbox data

Gearbox type:		NRK120, 1-stage							NRK120, 2-stage								
1. Order code		B41							B42								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376
$\varnothing_{2,G}$	'	7															

$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK120 1 and 2-stage (continued)</b>																					
15.1	49.2	31.96 (35.36)	$n_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	60	50	37.5	-	-	1FT2208-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	33	42	54	75	76	92	87	108	146	144	183	159	185	172	-	-	■ ■ ■ + ■ ■ ■ + ...
15.3	50		$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	181	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	150	199	245	216	192	152	251	312	275	312	312	275	312	275	-	-	
19.3	63.8	41.16 (46.76)	$n_{2N}$	r/min	250	200	150	100	100	75	75	60	50	50	37.5	30	25	20	-	-	1FT2208-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	32.5	41.5	57	87	89	95	117	148	172	177	195	172	195	172	-	-	■ ■ ■ + ■ ■ ■ + ...
19.7	64.9		$M_{2,0}$	Nm	59	78	98	135	120	95	157	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	-	-	
18.8	63.8	41.16 (46.76)	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	-	-	1F2208-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	40.5	51	65	90	108	95	126	167	168	165	195	172	195	172	-	-	■ ■ ■ + ■ ■ ■ + ...
19.1	64.9		$M_{2,0}$	Nm	57	76	95	134	120	95	157	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	184	248	275	216	192	152	251	312	270	310	312	275	312	275	-	-	
18.1	63.8	41.16 (46.76)	$n_{2N}$	r/min	300	250	200	150	125	125	125	75	75	75	60	60	50	37.5	-	-	1FT2208-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	41	51	65	90	108	95	102	169	168	166	195	168	192	172	-	-	■ ■ ■ + ■ ■ ■ + ...
18.4	64.9		$M_{2,0}$	Nm	55	73	92	128	120	95	157	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	184	248	275	216	192	152	251	312	270	312	312	275	312	275	-	-	
22.8	77.3	50.46 (55.96)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	-	1FT2208-5AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	52	67	89	131	120	95	139	183	172	195	195	172	195	172	-	-	■ ■ ■ + ■ ■ ■ + ...
23.2	78.7		$M_{2,0}$	Nm	69	92	115	135	120	95	157	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	-	-	
22.5	77.3	50.46 (55.96)	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	75	50	50	37.5	25	-	-	1F2208-5AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	45	55	71	98	118	95	138	183	170	170	195	172	195	172	-	-	■ ■ ■ + ■ ■ ■ + ...
22.9	78.7		$M_{2,0}$	Nm	68	91	114	135	120	95	157	195	172	195	195	172	195	172	-	-	
			$M_{2max}$	Nm	184	248	275	216	192	152	251	310	275	312	312	275	312	275	-	-	

Planetary gearbox data		NRK120, 1-stage										NRK120, 2-stage									
Gearbox type:		<b>B41</b>										<b>B42</b>									
1. Order code		<b>3 4 5 7 8 10</b>										<b>9 12 15 16 20 25 32 40 64 100</b>									
<i>i</i>		<b>R03 R04 R05 R07 R08 R10</b>										<b>R09 R12 R15 R16 R20 R25 R32 R40 R64 R00</b>									
2. Order code																					
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95				
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152				
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480				
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376				
$\varnothing_{2,G}$	'	7										9									

- Color legend:
- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
  - $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
  - $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

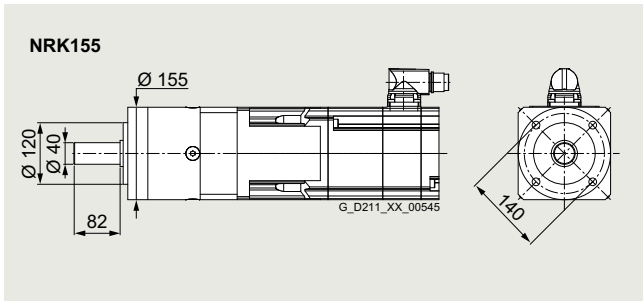
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK155

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5200 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4600 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	8400 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data		Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$													
Nm	Nm	$(J_{M,Br})$													
		kg cm <sup>2</sup>													

### SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1 and 2-stage

4.5	14.3	1.71	$n_{2N}$	r/min	375	300	150	100	75	60	37.5	30	15	1F2105-4AF..-0.0-Z
...	...	(2.55)	$M_{2N}$	Nm	15.1	20.5	44	65	84	106	174	215	210	■ ■ ■ + ■ ■ ■ + ...
4.58	14.5		$M_{2,0}$	Nm	18	22.5	45.5	72	91	113	182	225	210	
			$M_{2max}$	Nm	57	72	145	225	285	355	570	712	336	
4.53	14.3	1.71	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	25	1FT2105-4AH..-0.0-Z
...	...	(2.55)	$M_{2N}$	Nm	13.6	19.6	35	61	63	90	150	195	210	■ ■ ■ + ■ ■ ■ + ...
4.62	14.5		$M_{2,0}$	Nm	18.1	22.5	46	73	91	114	183	225	210	
			$M_{2max}$	Nm	57	72	145	225	285	355	570	712	336	
7.47	23	2.65	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	15	1F2105-6AF..-0.0-Z
...	...	(3.5)	$M_{2N}$	Nm	25.5	28.5	66	87	124	156	260	325	210	■ ■ ■ + ■ ■ ■ + ...
7.54	23.4		$M_{2,0}$	Nm	29.5	37	75	119	149	187	295	370	210	
			$M_{2max}$	Nm	93	116	230	365	460	570	736	712	336	
7.89	25	4.6	$n_{2N}$	r/min	375	300	150	100	75	60	37.5	30	15	1F2106-3AF..-0.0-Z
...	...	(6.3)	$M_{2N}$	Nm	21	29.5	67	91	128	161	260	325	210	■ ■ ■ + ■ ■ ■ + ...
8.04	25.3		$M_{2,0}$	Nm	31.5	39.5	80	126	158	197	315	395	210	
			$M_{2max}$	Nm	101	126	250	400	500	620	736	712	336	
10.3	31.7	6	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	15	1F2106-4AF..-0.0-Z
...	...	(7.6)	$M_{2N}$	Nm	33	36	82	106	153	192	320	400	210	■ ■ ■ + ■ ■ ■ + ...
10.5	32.2		$M_{2,0}$	Nm	41.5	52	104	164	205	255	410	445	210	
			$M_{2max}$	Nm	128	161	320	500	630	712	736	712	336	
14.5	43.9	8.7	$n_{2N}$	r/min	300	250	150	75	75	60	37.5	30	-	1F2106-6AF..-0.0-Z
...	...	(10.4)	$M_{2N}$	Nm	43.5	56	107	179	189	235	400	445	-	■ ■ ■ + ■ ■ ■ + ...
14.8	44.5		$M_{2,0}$	Nm	59	73	148	230	290	360	460	445	-	
			$M_{2max}$	Nm	178	220	336	700	736	712	736	712	-	

### SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage

3.04	10.3	3.15	$n_{2N}$	r/min	250	200	100	75	50	50	25	20	10	1FT2205-2AC..-0.0-Z
...	...	(4.05)	$M_{2N}$	Nm	9.9	12.9	27	40	53	61	109	137	205	■ ■ ■ + ■ ■ ■ + ...
3.12	10.4		$M_{2,0}$	Nm	12.1	15.3	31	49	61	77	123	154	210	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	

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### Planetary gearbox data

Gearbox type:		NRK155, 1-stage				NRK155, 2-stage				
1. Order code		B51				B52				
$i$		4	5	10	16	20	25	40	50	100
2. Order code		R04	R05	R10	R16	R20	R25	R40	R50	R00
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varnothing_{2,G}$		6				9				

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRK155**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>														
3.07	10.3	3.15 (4.05)	$n_{2N}$	r/min	375	300	150	100	75	60	37.5	30	15	1F.2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.2	12.3	26.5	39	51	65	107	135	210	■ ■ ■ + ■ ■ ■ + ...
3.15	10.4		$M_{2,0}$	Nm	12.2	15.4	31.5	49.5	62	77	124	156	210	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	
3	10.3	3.15 (4.05)	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	25	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	8.2	11.8	22.5	37.5	42	58	96	122	183	■ ■ ■ + ■ ■ ■ + ...
3.08	10.4		$M_{2,0}$	Nm	11.9	15.1	30.5	48.5	60	76	122	152	205	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	
5.3	17.2	5.1 (6)	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	15	1F.2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.1	19.2	45	61	87	109	179	220	210	■ ■ ■ + ■ ■ ■ + ...
5.39	17.5		$M_{2,0}$	Nm	21	26.5	53	84	106	132	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.29	17.2	7.8 (9.4)	$n_{2N}$	r/min	250	200	100	75	50	50	25	20	10	1FT2206-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	18.5	24	50	70	97	106	198	245	210	■ ■ ■ + ■ ■ ■ + ...
5.37	17.5		$M_{2,0}$	Nm	21	26.5	53	85	106	133	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.46	17.2	7.8 (9.4)	$n_{2N}$	r/min	375	300	150	100	75	60	37.5	30	15	1F.2206-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	16	21.5	45.5	68	88	111	182	225	205	■ ■ ■ + ■ ■ ■ + ...
5.54	17.5		$M_{2,0}$	Nm	21.5	27	55	87	109	136	215	270	205	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.29	17.2	7.8 (9.4)	$n_{2N}$	r/min	300	300	150	100	75	60	50	37.5	25	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.2	18.8	44.5	60	86	108	138	189	200	■ ■ ■ + ■ ■ ■ + ...
5.37	17.5		$M_{2,0}$	Nm	21	26.5	53	84	105	132	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
8.04	25.9	11.5 (13.1)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	7.5	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	28	36.5	74	113	145	181	285	365	210	■ ■ ■ + ■ ■ ■ + ...
8.19	26.3		$M_{2,0}$	Nm	32	40.5	81	128	161	200	320	400	210	
			$M_{2max}$	Nm	105	131	260	415	520	650	736	712	336	
7.91	25.9	11.5 (13.1)	$n_{2N}$	r/min	300	250	150	75	75	60	37.5	30	15	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	23	30	59	103	111	140	235	295	210	■ ■ ■ + ■ ■ ■ + ...
8.06	26.3		$M_{2,0}$	Nm	31.5	40	80	126	158	198	315	395	210	
			$M_{2max}$	Nm	105	131	260	415	520	650	736	712	336	
10.9	36.6	15.1 (16.8)	$n_{2N}$	r/min	250	200	100	60	50	50	25	20	10	1FT2206-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	27.5	36.5	79	125	156	157	320	400	210	■ ■ ■ + ■ ■ ■ + ...
11	37.1		$M_{2,0}$	Nm	43.50	54	110	174	215	270	435	445	210	
			$M_{2max}$	Nm	148	185	336	580	730	712	736	712	336	
10.7	34.6	15.1 (16.8)	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	15	1F.2206-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	34	37	84	108	155	195	325	405	210	■ ■ ■ + ■ ■ ■ + ...
10.9	35.2		$M_{2,0}$	Nm	43	54	109	171	210	265	425	445	210	
			$M_{2max}$	Nm	140	175	336	550	690	712	736	712	336	

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Planetary gearbox data		NRK155, 1-stage					NRK155, 2-stage				
Gearbox type:		<b>B51</b>					<b>B52</b>				
1. Order code											
$i$											
2. Order code		<b>R04</b>					<b>R00</b>				
$M_{2N,G}$		Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$		Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$		Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$		kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$		'	6			9					

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRK155

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>														
10.2	34.6	15.1 (16.8)	$n_{2N}$	r/min	300	250	150	75	75	50	37.5	30	20	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	27	35	67	119	124	188	265	330	210	■ ■ ■ + ■ ■ ■ + ...
10.4	35.2		$M_{2,0}$	Nm	41	51	104	164	205	255	410	445	210	
			$M_{2max}$	Nm	140	175	336	550	690	712	736	712	336	
10.5	36.6	22.5 (25.8)	$n_{2N}$	r/min	300	250	125	75	60	50	37.5	30	15	1FT2208-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	29.5	38	85	129	166	200	280	350	210	■ ■ ■ + ■ ■ ■ + ...
10.7	37.1		$M_{2,0}$	Nm	42	53	106	167	205	260	415	445	210	
			$M_{2max}$	Nm	148	185	336	580	730	712	736	712	336	
16.4	49.2	29.6 (32.6)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1FT2208-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	48	64	134	199	260	325	460	445	-	■ ■ ■ + ■ ■ ■ + ...
16.6	49.9		$M_{2,0}$	Nm	66	82	165	260	325	405	460	445	-	
			$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	
15.5	49.2	29.6 (33)	$n_{2N}$	r/min	250	200	100	75	50	50	25	20	-	1F.2208-3AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	48	63	132	169	250	260	460	445	-	■ ■ ■ + ■ ■ ■ + ...
15.8	49.9		$M_{2,0}$	Nm	63	78	158	245	310	385	460	445	-	
			$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	
15.4	49.2	29.6 (33)	$n_{2N}$	r/min	250	250	125	75	60	50	30	30	-	1FT2208-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	45.5	48	108	160	205	245	425	410	-	■ ■ ■ + ■ ■ ■ + ...
15.7	49.9		$M_{2,0}$	Nm	62	78	156	245	305	385	460	445	-	
			$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	
19.9	63.8	38.8 (44.4)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1FT2208-4AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	46.5	64	136	197	260	325	460	445	-	■ ■ ■ + ■ ■ ■ + ...
20.1	64.7		$M_{2,0}$	Nm	80	100	200	315	395	445	460	445	-	
			$M_{2max}$	Nm	255	320	336	736	736	712	736	712	-	
19.2	63.8	38.8 (44.4)	$n_{2N}$	r/min	250	200	100	75	50	50	25	20	-	1F.2208-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	56	73	154	186	285	285	460	445	-	■ ■ ■ + ■ ■ ■ + ...
19.6	64.7		$M_{2,0}$	Nm	78	98	196	305	385	445	460	445	-	
			$M_{2max}$	Nm	255	320	336	736	736	712	730	712	-	
18.4	63.8	38.8 (44.4)	$n_{2N}$	r/min	250	200	125	75	60	50	37.5	30	-	1FT2208-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	56	73	128	186	240	285	370	445	-	■ ■ ■ + ■ ■ ■ + ...
18.8	64.7		$M_{2,0}$	Nm	74	93	187	295	365	445	460	445	-	
			$M_{2max}$	Nm	255	320	336	736	736	712	730	712	-	
23.3	77.3	48.1 (53.6)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1FT2208-5AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	73	96	198	285	370	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
23.8	78.5		$M_{2,0}$	Nm	95	118	210	370	460	445	460	445	-	
			$M_{2max}$	Nm	310	390	336	736	736	712	736	712	-	
23.1	77.3	48.1 (53.6)	$n_{2N}$	r/min	250	200	100	60	50	37.5	25	20	-	1F.2208-5AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	61	80	170	250	310	405	460	445	-	■ ■ ■ + ■ ■ ■ + ...
23.5	78.5		$M_{2,0}$	Nm	94	117	210	365	455	445	460	445	-	
			$M_{2max}$	Nm	310	390	336	736	736	712	736	712	-	

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### Planetary gearbox data

Gearbox type:		NRK155, 1-stage				NRK155, 2-stage				
1. Order code		B51				B52				
$i$		4	5	10	16	20	25	40	50	100
2. Order code		R04	R05	R10	R16	R20	R25	R40	R50	R00
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$	'	6			9					

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRK155

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>														
18.2	57.9	66.7 (72.7)	$n_{2N}$	r/min	250	200	100	60	50	37.5	25	20	-	1FT2210-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	57	75	153	235	290	370	460	445	-	■ ■ ■ + ■ ■ ■ + ...
18.6	58.7		$M_{2,0}$	Nm	74	92	185	290	365	445	460	445	-	
			$M_{2max}$	Nm	230	290	336	736	736	712	736	712	-	
18	57.9	66.7 (72.7)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	25	-	1FT2210-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	53	69	148	220	270	360	445	445	-	■ ■ ■ + ■ ■ ■ + ...
18.3	58.7		$M_{2,0}$	Nm	73	91	183	285	360	445	460	445	-	
			$M_{2max}$	Nm	230	290	336	736	736	712	736	712	-	
28.3	86.9	93.8 (99.8)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1F2210-3AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	90	119	210	340	450	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
28.7	88.3		$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	-	
			$M_{2max}$	Nm	350	440	336	736	736	712	736	712	-	
28.3	86.9	93.8 (99.8)	$n_{2N}$	r/min	250	200	100	60	50	37.5	25	20	-	1F2210-3AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	73	95	200	285	350	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
28.7	88.3		$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	-	
			$M_{2max}$	Nm	350	440	336	736	736	710	736	712	-	
27.8	86.9	93.8 (99.8)	$n_{2N}$	r/min	200	200	100	50	37.5	37.5	30	25	-	1FT2210-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	85	86	184	325	435	435	455	445	-	■ ■ ■ + ■ ■ ■ + ...
28.2	88.3		$M_{2,0}$	Nm	112	140	210	445	460	445	455	440	-	
			$M_{2max}$	Nm	350	440	336	736	736	712	736	712	-	
37.6	116	122 (138)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1F2210-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	105	140	210	385	460	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
38.5	118		$M_{2,0}$	Nm	153	192	210	460	460	445	460	445	-	
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-	
37	116	122 (138)	$n_{2N}$	r/min	200	200	100	50	37.5	25	20	-	1F2210-4AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	104	106	210	380	375	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
37.8	118		$M_{2,0}$	Nm	151	188	210	460	460	445	460	445	-	
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-	
35.5	116	122 (138)	$n_{2N}$	r/min	200	150	100	50	37.5	30	25	-	1FT2210-4AF..-0.B0-Z	
...	...	...	$M_{2N}$	Nm	102	138	205	375	360	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
36.2	118		$M_{2,0}$	Nm	144	180	210	460	460	445	460	440	-	
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-	
42.9	145	19.5 (21.1)	$n_{2N}$	r/min	200	150	75	50	37.5	30	20	15	-	1FT2210-5AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	125	168	210	440	460	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
43.7	147		$M_{2,0}$	Nm	174	215	210	460	460	445	460	445	-	
			$M_{2max}$	Nm	580	712	336	736	736	712	736	712	-	
43.9	145	150 (166)	$n_{2N}$	r/min	200	150	100	50	37.5	25	20	-	1F2210-5AC..-0.B0-Z	
...	...	...	$M_{2N}$	Nm	114	154	210	410	390	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...
44.9	147		$M_{2,0}$	Nm	179	220	210	460	460	445	460	445	-	
			$M_{2max}$	Nm	580	712	336	736	736	712	736	712	-	

Planetary gearbox data		NRK155, 1-stage					NRK155, 2-stage				
Gearbox type:		<b>B51</b>					<b>B52</b>				
1. Order code											
$i$											
2. Order code		<b>R04</b>					<b>R00</b>				
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210	
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336	
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420	
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759	
$\varnothing_{2,G}$		6			9						

Color legend:

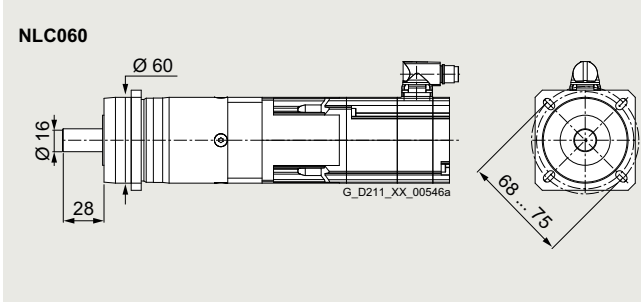
- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLC060

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox							
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min																	1F.2102-0AG..-0.A0-Z	+	+	...	
Nm	Nm	( $J_{M,Br}$ ) kg cm <sup>2</sup>			M <sub>2N</sub>	M <sub>2.0</sub>	M <sub>2max</sub>	100	150	150	125	150	150	150	125	100	75	50	30						
0.038	0.439	0.0245	-	-	-	-	-	100	150	150	125	150	150	150	125	100	75	50	30	■ ■ ■ + ■ ■ ■ + ...	+	...			
...	...	(0.0285)			M <sub>2N</sub>	Nm	-	-	-	0.143	0.175	0.34	0.25	0.4	0.65	0.68	0.89	1.29	1.96				2.75	4.75	8.1
0.112	0.508				M <sub>2.0</sub>	Nm	-	-	-	0.265	0.385	0.63	0.485	0.84	1.19	1.31	1.79	2.35	3.2				4.15	6.9	11.2
					M <sub>2max</sub>	Nm	-	-	-	3.05	3.55	4.6	4.05	5.6	7.1	7.6	9.7	12.3	15.9				20	29	24
0.128	0.918	0.036	-	-	300	375	375	300	300	300	250	200	200	150	125	100	75	50	30	■ ■ ■ + ■ ■ ■ + ...	+	...			
...	...	(0.04)			M <sub>2N</sub>	Nm	-	0.265	0.38	0.7	1.01	1.31	1.03	1.56	2.35	2.4	3.45	4.45	6				7.9	12.9	15
0.26	1.04				M <sub>2.0</sub>	Nm	-	0.51	0.78	1.33	1.61	2.15	1.82	2.6	3.4	3.65	4.75	6.1	7.9				10	16.4	15
					M <sub>2max</sub>	Nm	-	3.65	4.7	6.8	7.9	10	8.9	12	15.1	16.2	20	25.5	32.5				41	29	24
0.341	1.7	0.093	375	375	375	375	375	300	250	200	200	150	125	100	75	50	30	■ ■ ■ + ■ ■ ■ + ...	+	...					
...	...	(0.112)			M <sub>2N</sub>	Nm	0.63	1.01	1.35	1.93	2.15	3	2.6	3.6	5	5.1	7.1				9	11.8	15.5	18	15
0.515	1.85				M <sub>2.0</sub>	Nm	1.02	1.55	2.05	3.15	3.7	4.75	4.1	5.7	7.2	7.7	9.8				12.4	16.1	20	18	15
					M <sub>2max</sub>	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5				46	59	64	29	24
0.326	1.7	0.093	375	375	375	300	300	300	250	200	200	125	100	100	75	50	25	■ ■ ■ + ■ ■ ■ + ...	+	...					
...	...	(0.112)			M <sub>2N</sub>	Nm	0.6	0.96	1.28	2.1	2.35	3.15	2.4	3.35	4.65	4.8	7.1				9.2	11	14.4	18	15
0.5	1.85				M <sub>2.0</sub>	Nm	0.97	1.49	2	3.05	3.55	4.6	4	5.5	7	7.5	9.5				12.1	15.6	19.6	18	15
					M <sub>2max</sub>	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5				46	59	64	28.5	24
0.922	3.77	0.139	375	375	300	300	250	250	200	200	200	150	125	100	75	50	-	■ ■ ■ + ■ ■ ■ + ...	+	...					
...	...	(0.158)			M <sub>2N</sub>	Nm	2.05	2.7	3.25	5.2	5.6	7.6	7	9.6	11.3	11.1	15.6				19.5	25	32.5	18	-
1.07	3.9				M <sub>2.0</sub>	Nm	2.75	3.85	4.95	7.2	8.3	10.5	9.2	12.4	15.7	16.8	21				26.5	34	40	18	-
					M <sub>2max</sub>	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70				64	70	64	29	-
0.801	3.77	0.139	375	375	300	300	250	250	200	200	200	125	100	100	75	50	-	■ ■ ■ + ■ ■ ■ + ...	+	...					
...	...	(0.158)			M <sub>2N</sub>	Nm	1.79	2.35	2.8	4.65	5	6.8	6.1	6.8	9.9	10.1	14.6				18.6	22	28.5	18	-
0.958	3.9				M <sub>2.0</sub>	Nm	2.4	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.8				23.5	30	38	18	-
					M <sub>2max</sub>	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70				64	70	64	29	-
1.01	3.48	0.371	500	375	300	250	200	150	100	100	100	75	60	50	37.5	25	-	■ ■ ■ + ■ ■ ■ + ...	+	...					
...	...	(0.451)			M <sub>2N</sub>	Nm	2	3.45	4.6	6.7	7.9	10.3	8.6	12.2	15.5	16.5	21				26.5	34	40	18	-
1.18	3.6				M <sub>2.0</sub>	Nm	3	4.2	5.4	7.8	9	11.4	10.1	13.7	17.3	18.4	23				29	37	40	18	-
					M <sub>2max</sub>	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70				64	70	64	29	-

Continued on the next page

### Planetary gearbox data

Gearbox type:		NLC060, 1-stage								NLC060, 2-stage							
1. Order code		C21								C22							
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varnothing_{2,G}$	'	10						12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLC060

Servomotor data				Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$	$(J_{M,Br})$																			
Nm	Nm	kg cm <sup>2</sup>																				
2.08	6.78	1.251	(1.331)	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	-	1F2204-5AF..-2..0-Z
...	...	...		$M_{2N}$	Nm	5.2	6.5	9.1	12.9	15.2	15	16.4	23	29	30.5	39	40	44	40	-	-	■ ■ ■ + ■ ■ ■ + ...
2.22	6.89	...		$M_{2,0}$	Nm	6.2	8.4	10.7	15.2	17.5	15	19.6	26	33	35	44	40	44	40	-	-	
...	...	...		$M_{2max}$	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	-	-	

### Planetary gearbox data

Gearbox type:		NLC060, 1-stage							NLC060, 2-stage								
1. Order code		C21							C22								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\phi_{2,G}$	'	10						12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

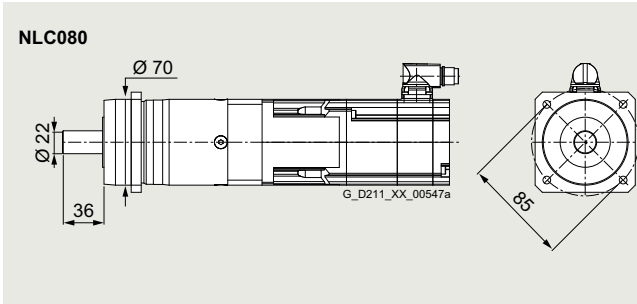


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NLC080**

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1 and 2-stage</b>																					
0.243	1.56	0.093	$n_{2N}$	r/min	250	300	300	300	300	250	250	200	200	150	125	100	75	50	30	1F.2103-2AG..-0.A0-Z	
...	...	(0.112)	$M_{2N}$	Nm	0.375	0.66	1.02	1.65	1.91	2.3	2.25	2.65	3.8	3.85	5.9	7.6	10.6	14.1	22.5	37.5	
0.517	1.82		$M_{2,0}$	Nm	0.72	1.27	1.81	2.9	3.45	4.5	3.85	5.4	7	7.5	9.6	12.2	15.9	20	32.5	38	
			$M_{2max}$	Nm	4.65	6.5	8.3	12.1	13.9	17.6	15.6	21	26.5	28	35.5	44.5	57	72	80	61	
0.224	1.56	0.093	$n_{2N}$	r/min	250	300	300	300	250	250	200	200	125	100	100	75	50	25	1F.2103-2AH..-0.0-Z		
...	...	(0.112)	$M_{2N}$	Nm	0.35	0.63	0.98	1.59	1.83	2.6	2.1	2.5	3.6	3.65	6.3	8.2	10	13.3	21.5	38	
0.501	1.82		$M_{2,0}$	Nm	0.67	1.19	1.72	2.75	3.3	4.35	3.7	5.2	6.7	7.3	9.3	11.8	15.4	19.5	31.5	38	
			$M_{2max}$	Nm	4.65	6.5	8.3	12.1	13.9	17.6	15.6	21	26.5	28	35.5	44.5	57	72	80	61	
0.862	3.64	0.139	$n_{2N}$	r/min	375	375	300	300	250	250	200	200	150	150	125	100	75	50	30	1F.2103-4AG..-0.A0-Z	
...	...	(0.158)	$M_{2N}$	Nm	1.82	2.35	3.7	5	6.4	7.5	6.7	9.2	10	12.8	15.1	18.9	25	32.5	50	38	
1.12	3.85		$M_{2,0}$	Nm	2.55	3.7	4.9	7.2	8.3	10.7	9.3	12.6	16	17.1	21.5	27	35	44	50	38	
			$M_{2max}$	Nm	10.9	14.8	18.7	26.5	30	38	34	45.5	57	61	76	95	122	153	80	61	
0.727	3.64	0.139	$n_{2N}$	r/min	375	375	300	300	250	250	200	200	125	100	100	75	50	25	1F.2103-4AH..-0.0-Z		
...	...	(0.158)	$M_{2N}$	Nm	1.5	2	3.1	4.35	4.65	6.6	5.7	7.8	8.9	8.5	14.1	18	21.5	28	44.5	38	
0.984	3.85		$M_{2,0}$	Nm	2.15	3.2	4.2	6.2	7.3	9.3	8.1	11	14	15	19	23.5	30.5	38.5	50	38	
			$M_{2max}$	Nm	10.9	14.8	18.7	26.5	30	38	34	45.5	57	61	76	95	122	153	80	61	
0.875	3.34	0.35	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-4AF..-2.0-Z
...	...	(0.43)	$M_{2N}$	Nm	2.1	3	4.15	6.2	7.5	10	8.2	11.8	15.1	16	20.5	26	33.5	43	50	38	
1.15	3.56		$M_{2,0}$	Nm	2.6	3.75	4.95	7.3	8.4	10.8	9.5	13	16.5	17.6	22	28	36	45	50	38	
			$M_{2max}$	Nm	10	13.6	17.2	24.5	28	35	31	42	52	56	70	88	113	142	80	61	
0.869	3.44	0.35	$n_{2N}$	r/min	375	375	375	300	300	300	250	200	200	150	125	100	75	50	30	1F.2104-4AK..-2.0-Z	
...	...	(0.43)	$M_{2N}$	Nm	2.35	3.3	4.25	6.5	7.3	8.2	7.6	10.1	13.4	13.9	18.9	23.5	31	40	50	38	
1.14	3.66		$M_{2,0}$	Nm	2.6	3.75	4.9	7.2	8.4	10.7	9.5	12.9	16.4	17.5	22	27.5	35.5	45	50	38	
			$M_{2max}$	Nm	10.3	14	17.7	25	28.5	36	32	43	54	58	72	91	116	145	80	61	
1.98	7.04	0.56	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-5AF..-2.0-Z
...	...	(0.65)	$M_{2N}$	Nm	5.3	6.6	9.4	13.5	16	20.5	17.3	24	30.5	32.5	41.5	52	67	84	50	38	
2.23	7.22		$M_{2,0}$	Nm	5.9	8.2	10.4	15	17.2	21.5	19.3	26	32.5	35	44	55	70	88	50	38	
			$M_{2max}$	Nm	21	28	35.5	50	57	61	64	86	107	114	143	176	192	176	80	61	

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Planetary gearbox data		NLC080, 1-stage							NLC080, 2-stage											
Gearbox type:		C31							C32											
1. Order code																				
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38			
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61			
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200			
$J_{1,G}$	kg cm <sup>2</sup>	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357			
$\varnothing_{2,G}$		7							9											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary





# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLC080

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1 and 2-stage (continued)</b>																					
4.76	17.3	8.676 (10.276)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	-	-	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.2	16.5	18.6	26	25	38	36	47.5	59	60	80	100	101	110	-	-	■ + ■ + ...
4.95	17.5		$M_{2,0}$	Nm	14.2	19.2	24	34	39	38	43.5	58	73	78	97	110	120	110	-	-	
			$M_{2max}$	Nm	52	69	87	104	80	61	155	192	176	192	192	176	192	176	-	-	
7.23	26	12.38 (13.976)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	-	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	19	25.5	32.5	46.5	50	38	53	71	98	104	120	110	120	110	-	-	■ + ■ + ...
7.41	26.3		$M_{2,0}$	Nm	21.5	29	36.5	51	50	38	65	87	109	117	120	110	120	110	-	-	
			$M_{2max}$	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	-	-	
7.09	26	12.38 (13.976)	$n_{2N}$	r/min	300	250	200	200	150	150	150	100	100	100	75	60	50	37.5	-	-	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.1	23	30	33.5	47.5	38	48	70	75	72	104	110	120	110	-	-	■ + ■ + ...
7.28	26.3		$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	85	107	114	120	110	120	110	-	-	
			$M_{2max}$	Nm	78	105	131	104	80	61	208	192	176	192	192	176	192	176	-	-	
9.93	36.7	15.98 (17.676)	$n_{2N}$	r/min	250	200	200	125	125	100	100	100	75	75	50	50	37.5	25	-	-	1FT2206-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	22	30.5	31.5	56	50	38	73	74	103	101	120	110	120	110	-	-	■ + ■ + ...
10.1	37.1		$M_{2,0}$	Nm	29.5	39.5	50	65	50	38	89	119	110	120	120	110	120	110	-	-	
			$M_{2max}$	Nm	111	148	176	104	80	61	208	192	176	192	192	176	192	176	-	-	
9.84	34.7	15.976 (17.676)	$n_{2N}$	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	-	-	1F.2206-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	24.5	33	35	48	46	38	65	100	100	96	120	110	120	110	-	-	■ + ■ + ...
10	35.2		$M_{2,0}$	Nm	29.5	39.5	49.5	65	50	38	88	118	110	120	120	110	120	110	-	-	
			$M_{2max}$	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	-	-	
9.42	34.7	15.976 (17.676)	$n_{2N}$	r/min	300	250	200	150	150	150	125	100	75	75	75	60	60	50	-	-	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	20	27	37	54	50	38	67	86	110	116	112	110	115	110	-	-	■ + ■ + ...
9.6	35.2		$M_{2,0}$	Nm	28	37.5	47.5	65	50	38	84	113	110	120	120	110	120	110	-	-	
			$M_{2max}$	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	-	-	

Planetary gearbox data		NLC080, 1-stage						NLC080, 2-stage											
Gearbox type:		C31						C32											
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100		
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00		
$i$																			
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38		
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61		
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200		
$J_{1,G}$	kg cm <sup>2</sup>	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357		
$\varnothing_{2,G}$	'	7						9											

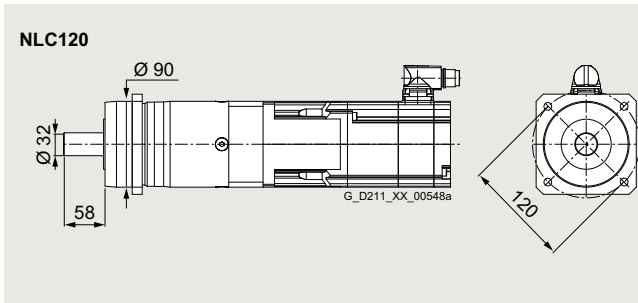
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

#### Gearbox type NLC120

#### Selection and ordering data



Permissible output shaft loads

Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	kg cm <sup>2</sup>																			

SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1 and 2-stage																							
0.176 ... 0.468	1.48 ... 1.75	0.093 (0.112)	$n_{2N}$	r/min	-	150	200	200	200	200	150	125	100	100	100	75	75	60	50	30	1F.2103-2AG..-0.A0-Z		
			$M_{2N}$	Nm	-	0.475	0.7	1.37	1.64	2.05	1.94	2.85	4.1	4.35	5.4	7.7	9.6	12.6	16.2	29.5	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	-	0.7	1.19	2.15	2.65	3.6	3.1	4.55	6	6.4	8.4	10.8	14.1	18	29.5	46.5			
			$M_{2max}$	Nm	-	5.9	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152			
0.211 ... 0.441	1.55 ... 1.75	0.093 (0.112)	$n_{2N}$	r/min	-	-	200	200	200	200	150	125	100	100	100	75	75	50	25	1F.2103-2AH..-0.0-Z			
			$M_{2N}$	Nm	-	-	0.7	1.38	1.65	2.1	1.92	2.85	4.05	4.3	5.4	5.8	9.6	10.2	16.5	33.5	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	-	-	1.05	1.97	2.4	3.35	2.85	4.2	5.5	6	7.8	10.1	13.3	16.9	27.5	44			
			$M_{2max}$	Nm	-	-	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152			
0.681 ... 1.07	3.45 ... 3.78	0.139 (0.158)	$n_{2N}$	r/min	300	250	250	200	200	200	150	150	125	100	100	75	75	60	37.5	25	1F.2103-4AG..-0.A0-Z		
			$M_{2N}$	Nm	1.51	2.65	3.35	5.7	6.2	6.9	7.7	9	11.8	14.6	17.5	23.5	27.5	35.5	59	94	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	2	3.1	4.2	6.4	7.5	9.7	8.5	11.7	15	16	20	25.5	33	41.5	67	95			
			$M_{2max}$	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152			
0.666 ... 1.05	3.45 ... 3.78	0.139 (0.158)	$n_{2N}$	r/min	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	25	1F.2103-4AH..-0.0-Z			
			$M_{2N}$	Nm	1.18	2.15	2.85	4.8	5.4	6	4.9	7.8	10.1	10.6	14.6	15	23.5	30	49.5	78	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	1.99	3.05	4.15	6.3	7.3	9.5	8.3	11.5	14.7	15.8	20	25	32.5	41	66	95			
			$M_{2max}$	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152			
0.695 ... 1.08	3.16 ... 3.49	0.35 (0.43)	$n_{2N}$	r/min	375	300	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-4AF..-0.0-Z		
			$M_{2N}$	Nm	1.51	2.6	3.5	5.5	7	9.3	7	10.8	13.8	14.8	19.3	24.5	32	40.5	65	95	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	2.05	3.15	4.3	6.5	7.6	9.8	8.6	11.9	15.2	16.3	20.5	26	33.5	42	68	95			
			$M_{2max}$	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152			
0.688 ... 1.07	3.26 ... 3.59	0.35 (0.43)	$n_{2N}$	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	1F.2104-4AK..-0.0-Z		
			$M_{2N}$	Nm	1.69	2.75	3.8	5.9	7	9.1	7.5	10.5	12.7	12.7	18.2	23.5	24.5	37.5	57	95	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.5	11.8	15.1	16.1	20.5	25.5	33.5	42	68	95			
			$M_{2max}$	Nm	9.7	13.4	17	24	28	35	31	42	53	56	71	89	114	143	192	152			
1.8 ... 2.16	6.86 ... 7.13	0.56 (0.65)	$n_{2N}$	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1F.2104-5AF..-0.0-Z		
			$M_{2N}$	Nm	5.1	6.6	9.3	11.8	15.7	20	15.2	23.5	30	32	40.5	51	66	83	120	95	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2.0}$	Nm	5.3	7.6	9.8	14.2	16.4	20.5	18.4	25	31.5	33.5	42	53	68	85	120	95			
			$M_{2max}$	Nm	20.5	27.5	35	49.5	56	71	63	84	106	113	141	177	225	280	192	152			

Continued on the next page

#### Planetary gearbox data

Gearbox type:		NLC120, 1-stage							NLC120, 2-stage											
1. Order code		C41							C42											
<i>i</i>		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95			
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480			
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378			
$\varphi_{2,G}$	'	7							9											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1 and 2-stage (continued)</b>																					
1.78	6.96	0.56 (0.65)	$n_{2N}$	r/min	300	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	30	<b>1F2104-5AK..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	5	6.5	9.2	11.5	15.5	17.2	14.9	21.5	27.5	28	39	38.5	60	76	120	95	■■■ + ■■■ + ...
2.15	7.23	...	$M_{2,0}$	Nm	5.3	7.5	9.7	14.1	16.3	20.5	18.3	24.5	31	33	42	52	68	85	120	95	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	20.5	28	35.5	50	57	72	64	86	107	114	143	179	230	285	192	152	■■■ + ■■■ + ...
2.55	9.33	0.76 (0.84)	$n_{2N}$	r/min	300	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F2104-6AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	6.8	8.4	11.8	14.6	19.5	27	18.6	32	41	43	55	69	90	113	120	95	■■■ + ■■■ + ...
2.9	9.59	...	$M_{2,0}$	Nm	7.6	10.6	13.5	19.4	22	28	25	33.5	42.5	45.5	57	71	92	115	120	95	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	27.5	37.5	47	66	76	95	85	114	142	152	190	235	305	368	192	152	■■■ + ■■■ + ...
4.29	14.3	1.71 (2.55)	$n_{2N}$	r/min	375	300	250	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F2105-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	9.8	15	20	23.5	32	42.5	29.5	49	62	65	84	106	136	173	120	95	■■■ + ■■■ + ...
4.6	14.5	...	$M_{2,0}$	Nm	12.8	17.5	22	31.5	36	45.5	40.5	54	68	72	91	114	146	183	120	95	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	■■■ + ■■■ + ...
4.32	14.3	1.71 (2.55)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	100	75	60	50	37.5	25	<b>1FT2105-4AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	11.5	13.7	18.9	27.5	29	40.5	35.5	47	59	62	65	91	123	149	120	95	■■■ + ■■■ + ...
4.63	14.5	...	$M_{2,0}$	Nm	12.9	17.6	22	31.5	36.5	45.5	40.5	54	68	73	91	115	147	184	120	95	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	42.5	57	71	101	115	145	129	172	215	230	285	355	416	368	192	152	■■■ + ■■■ + ...
7.26	23.1	2.65 (3.5)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	<b>1F2105-6AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	17.6	20.5	27.5	40	42	59	53	67	87	88	122	154	195	230	120	-	■■■ + ■■■ + ...
7.52	23.4	...	$M_{2,0}$	Nm	21.5	29	37	52	59	75	66	89	112	119	149	187	240	230	120	-	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	69	92	116	163	186	152	205	275	345	365	416	368	416	368	192	-	■■■ + ■■■ + ...
7.64	25	4.6 (6.3)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	<b>1F2106-3AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	18.6	21.5	29	42	43.5	62	56	70	90	91	126	159	200	230	120	-	■■■ + ■■■ + ...
7.9	25.3	...	$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	70	93	117	125	156	195	250	230	120	-	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	75	100	126	176	192	152	225	300	368	400	416	368	416	368	192	-	■■■ + ■■■ + ...
10	31.8	6 (7.6)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	<b>1F2106-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	23.5	32.5	36	51	52	75	67	83	107	106	149	189	235	230	120	-	■■■ + ■■■ + ...
10.3	32.2	...	$M_{2,0}$	Nm	30	40	50	71	81	95	91	121	152	162	200	230	260	230	120	-	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	96	128	160	216	192	152	285	380	368	416	416	368	416	368	192	-	■■■ + ■■■ + ...
14.3	43.9	8.7 (10.4)	$n_{2N}$	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	37.5	-	-	<b>1F2106-6AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	31.5	42.5	46.5	65	88	95	84	128	131	174	183	230	260	230	-	-	■■■ + ■■■ + ...
14.6	44.5	...	$M_{2,0}$	Nm	43	57	72	101	116	95	129	172	215	230	260	230	260	230	-	-	■■■ + ■■■ + ...
...	...	...	$M_{2max}$	Nm	133	177	220	216	192	152	336	416	368	416	416	365	416	368	-	-	■■■ + ■■■ + ...

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#### Planetary gearbox data

Gearbox type: 1. Order code i		NLC120, 1-stage							NLC120, 2-stage													
		<b>C41</b>							<b>C42</b>													
		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100					
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>					
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95					
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152					
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480					
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378					
$\varnothing_{2,G}$	'	7							9													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	375	300	300	250	250	200	200	150	150	125	125	100	75	50	30	1F2203-4AG..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
Nm	Nm	kg cm <sup>2</sup>																				$(J_{M,Br})$
...	...	...	$M_{2,0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.6	11.8	15.1	16.2	20.5	25.5	33.5	42	68	95		
1.07	3.49	(0.37)	$M_{2max}$	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152		

➔ Continued on the next page

**Planetary gearbox data**

Gearbox type:		NLC120, 1-stage						NLC120, 2-stage									
1. Order code		C41						C42									
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378
$\varnothing_{2,G}$	'	7															

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$	$r_{2N}$	r/min																				
Nm	Nm	( $J_{M,Br}$ )																						
		kg cm <sup>2</sup>																						
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1 and 2-stage (continued)																								
5.18	17.2	7.8	$r_{2N}$	r/min	375	300	250	200	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1F2206-2AF..-0..0-Z</b>			
...	...	(9.4)	$M_{2N}$	Nm	10.9	16.3	21.5	30.5	33.5	44.5	30	51	65	68	88	111	142	181	120	95	■■■ + ■■■ + ...			
5.45	17.5		$M_{2,0}$	Nm	15.5	21	26.5	37.5	43	54	48	64	81	86	108	135	173	215	120	95				
			$M_{2max}$	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152				
5.01	17.2	7.8	$r_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25		<b>1FT2206-2AH..-0..0-Z</b>			
...	...	(9.4)	$M_{2N}$	Nm	11.8	16.4	18.4	26.5	27	39.5	37	46.5	60	61	85	108	137	136	119	95	■■■ + ■■■ + ...			
5.28	17.5		$M_{2,0}$	Nm	15	20	25.5	36.5	42	52	46.5	62	78	83	105	131	168	210	119	95				
			$M_{2max}$	Nm	51	69	86	121	139	152	155	205	255	275	345	368	416	368	192	152				
7.78	26	11.5	$r_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	-	<b>1FT2206-3AB..-0..0-Z</b>			
...	...	(13.1)	$M_{2N}$	Nm	19.1	26.5	35	50	56	72	57	76	107	112	143	179	225	230	120	-	■■■ + ■■■ + ...			
8.04	26.3		$M_{2,0}$	Nm	23	31	39.5	55	64	80	71	95	119	127	159	198	255	230	120	-				
			$M_{2max}$	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	-				
7.64	26	11.5	$r_{2N}$	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	-	<b>1FT2206-3AF..-0..0-Z</b>			
...	...	(13.1)	$M_{2N}$	Nm	16.1	22	24	35	48	52	48	59	77	77	109	138	174	230	120	-	■■■ + ■■■ + ...			
7.91	26.3		$M_{2,0}$	Nm	22.5	30.5	38.5	54	63	79	70	93	117	125	156	195	250	230	120	-				
			$M_{2max}$	Nm	78	104	131	183	192	152	230	310	368	416	416	368	416	368	192	-				
10.8	36.6	15.1	$r_{2N}$	r/min	250	200	200	150	125	100	100	75	75	50	50	37.5	25	20	-	-	<b>1FT2206-4AC..-0..0-Z</b>			
...	...	(16.8)	$M_{2N}$	Nm	20	27.5	29.5	44	55	71	68	93	97	96	149	150	210	230	120	-	■■■ + ■■■ + ...			
11	37.1		$M_{2,0}$	Nm	32	43	54	76	87	95	98	130	163	174	215	230	260	230	120	-				
			$M_{2max}$	Nm	110	148	185	216	192	152	330	416	368	416	416	368	416	368	192	-				
10.5	34.7	15.1	$r_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	<b>1F2206-4AF..-0..0-Z</b>			
...	...	(16.8)	$M_{2N}$	Nm	24	27.5	36.5	52	53	76	68	84	109	108	152	191	240	230	120	-	■■■ + ■■■ + ...			
10.7	35.2		$M_{2,0}$	Nm	31	42	53	74	85	95	95	127	159	169	210	230	260	230	120	-				
			$M_{2max}$	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	-				
10	34.7	15.1	$r_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	-	-	<b>1FT2206-4AH..-0..0-Z</b>			
...	...	(16.8)	$M_{2N}$	Nm	19.4	26.5	36	52	56	70	66	85	114	117	121	153	191	230	120	-	■■■ + ■■■ + ...			
10.3	35.2		$M_{2,0}$	Nm	30	40	50	71	81	95	90	121	152	162	200	230	260	230	120	-				
			$M_{2max}$	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	-				
10.2	36.6	24.86	$r_{2N}$	r/min	250	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	25	-	<b>1FT2208-2AF..-0..0-Z</b>			
...	...	(28.16)	$M_{2N}$	Nm	25	27.5	38	56	57	72	68	87	119	120	154	186	255	225	120	-	■■■ + ■■■ + ...			
10.4	37.1		$M_{2,0}$	Nm	30.5	41	51	72	83	95	92	123	154	165	205	230	255	225	119	-				
			$M_{2max}$	Nm	110	147	184	216	192	152	330	416	368	416	416	368	416	368	192	-				
16.3	49.2	31.96	$r_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	-	<b>1FT2208-3AB..-0..0-Z</b>			
...	...	(34.96)	$M_{2N}$	Nm	28.5	39.5	55	85	91	95	93	127	183	188	245	230	260	230	-	-	■■■ + ■■■ + ...			
16.5	49.9		$M_{2,0}$	Nm	48.5	65	81	115	120	95	147	196	230	260	260	230	260	230	-	-				
			$M_{2max}$	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	-	-				
15.3	49.2	31.96	$r_{2N}$	r/min	300	250	200	150	125	100	100	100	75	75	50	50	37.5	25	-	-	<b>1F2208-3AC..-0..0-Z</b>			
...	...	(35.36)	$M_{2N}$	Nm	28.5	38	51	75	91	95	108	113	154	154	230	230	260	230	-	-	■■■ + ■■■ + ...			
15.5	49.9		$M_{2,0}$	Nm	45.5	61	76	108	120	95	137	183	225	240	260	230	260	230	-	-				
			$M_{2max}$	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	-	-				

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NLC120, 1-stage							NLC120, 2-stage													
		C41							C42													
1. Order code	$i$	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100					
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00					
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95					
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152					
$M_{2Em.Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480					
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378					
$\varphi_{2,G}$	'																	7				

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

#### Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1 and 2-stage (continued)</b>																					
15.2	49.2	31.96 (35.36)	$n_{2N}$	r/min	250	200	200	150	125	125	125	100	75	75	60	50	50	37.5	-	-	1FT2208-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	33	45	48.5	70	86	89	84	106	146	145	186	220	197	230	-	-	■ ■ ■ + ■ ■ ■ + ...
15.4	49.9		$M_{2,0}$	Nm	45.5	61	76	107	120	95	136	182	225	240	260	230	260	230	-	-	
			$M_{2max}$	Nm	149	199	245	216	192	152	336	416	368	416	416	368	416	368	-	-	
19.6	63.7	41.16 (46.76)	$n_{2N}$	r/min	200	150	125	100	100	75	75	60	50	50	37.5	30	25	20	-	-	1FT2208-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	35	50	63	85	86	95	117	149	182	182	245	230	260	230	-	-	■ ■ ■ + ■ ■ ■ + ...
20.1	64.6		$M_{2,0}$	Nm	59	79	99	135	120	95	176	235	230	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	-	
19	63.7	41.16 (46.76)	$n_{2N}$	r/min	250	200	200	150	125	100	100	75	75	60	50	50	37.5	25	-	-	1F2208-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	40.5	55	59	85	105	95	124	168	170	210	255	230	260	230	-	-	■ ■ ■ + ■ ■ ■ + ...
19.3	64.6		$M_{2,0}$	Nm	57	76	95	134	120	95	170	225	230	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	-	
18.3	63.7	41.16 (46.76)	$n_{2N}$	r/min	250	200	200	150	125	125	100	75	75	60	50	50	37.5	-	-		1FT2208-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	41	55	59	85	105	95	125	169	170	215	255	230	205	230	-	-	■ ■ ■ + ■ ■ ■ + ...
18.5	64.6		$M_{2,0}$	Nm	54	73	92	129	120	95	164	215	230	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	-	-	
23	77.3	50.46 (55.96)	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	-	-	1FT2208-5AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	45.5	62	85	129	120	95	137	184	230	260	260	230	260	230	-	-	■ ■ ■ + ■ ■ ■ + ...
23.3	78.4		$M_{2,0}$	Nm	69	92	116	135	120	95	205	260	230	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	-	
22.7	77.3	50.46 (55.96)	$n_{2N}$	r/min	250	200	200	125	125	100	100	75	60	60	50	50	37.5	25	-	-	1F2208-5AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	46	62	63	111	114	95	136	183	225	230	260	230	260	230	-	-	■ ■ ■ + ■ ■ ■ + ...
23.1	78.4		$M_{2,0}$	Nm	68	91	115	135	120	95	205	260	230	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	-	-	

Planetary gearbox data		NLC120, 1-stage							NLC120, 2-stage											
Gearbox type:		<b>C41</b>							<b>C42</b>											
1. Order code																				
$i$																				
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>			
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95			
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480			
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378			
$\varnothing_{2,G}$	'	7							9											

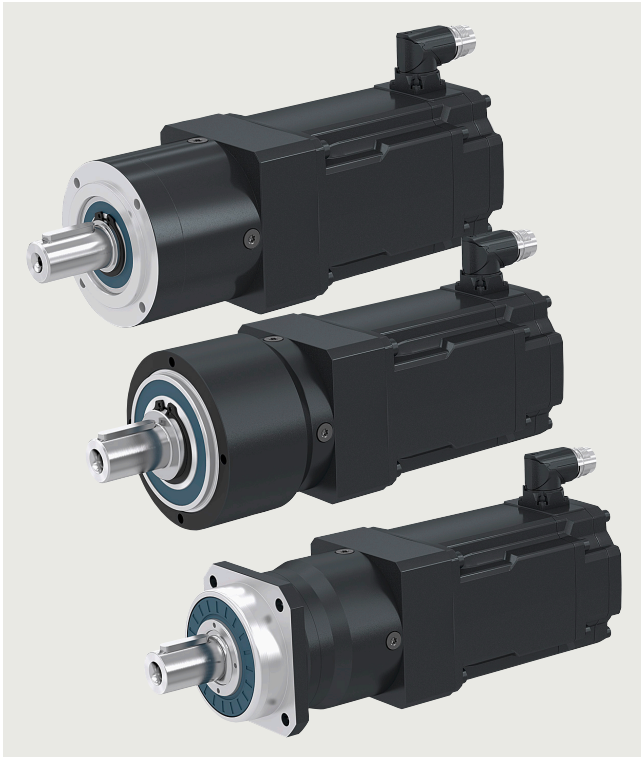
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Selection and ordering data

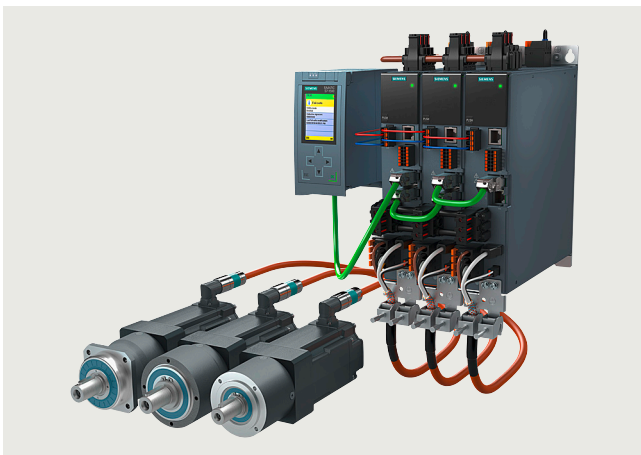


The following servo planetary geared motors with coaxial gearbox are suitable for servo converters with line connection 380 V to 480 V 3 AC, especially for SINAMICS S120 and SINAMICS S210 servo converters.

The rated points of the geared motors are adapted to this voltage.

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SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors



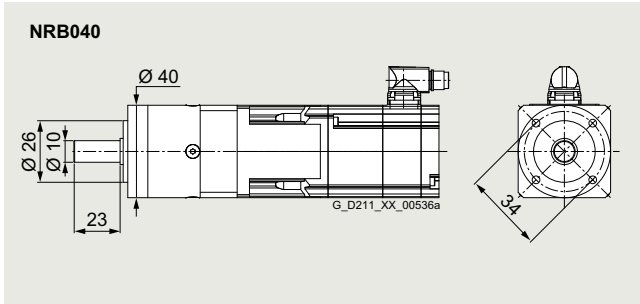
Example: SINAMICS S210 servo converter with SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRB040

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	200 N
Average axial force for 20000 h	$F_{A,eq}$	200 N
Average radial force for 30000 h	$F_{R,eq}$	160 N
Average axial force for 30000 h	$F_{A,eq}$	160 N
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data		Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																		
Nm	Nm	( $J_{M,Br}$ )																		
		kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 1 and 2-stage</b>																				
0.452	1.83	0.1396	$n_{2N}$	r/min	1000	750	600	375	375	300	375	300	200	200	150	125	100	75	60	1F.2103-2AH...-2.0-Z
...	...	(0.1586)	$M_{2N}$	Nm	0.86	1.21	1.59	2.45	2.65	3.35	2.65	3.2	4.8	4.9	6.4	7.9	10	13	7.5	■ ■ ■ + ■ ■ ■ + ...
0.482	1.89		$M_{2,0}$	Nm	1.43	1.91	2.35	3.35	3.8	4.8	4.2	5.6	7	7.4	9.3	11.6	14.9	18	7.5	
			$M_{2max}$	Nm	5.6	7.5	9.4	13.2	10	8	16.8	22	28	29.5	32	29	32	29	12	
0.881	3.85	0.1856	$n_{2N}$	r/min	750	600	600	375	375	375	300	250	200	200	150	125	100	100	-	1F.2103-4AH...-2.0-Z
...	...	(0.2046)	$M_{2N}$	Nm	2.05	2.65	2.75	4.55	4.6	4	5.9	7	8.8	8.6	11.9	14.2	17.9	14.6	-	■ ■ ■ + ■ ■ ■ + ...
0.933	3.96		$M_{2,0}$	Nm	2.75	3.7	4.65	6.5	6	5	8.1	10.8	13.6	14.5	18.1	18	20	18	-	
			$M_{2max}$	Nm	11.8	15.8	19.7	13.5	10	8	26	32	29	32	32	29	32	29	-	
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 1 and 2-stage</b>																				
0.493	1.74	0.2466	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1F.2203-2AK...-2.0-Z
...	...	(0.2666)	$M_{2N}$	Nm	0.93	1.2	1.47	2	2.5	3.05	2.35	3.55	4.7	4.75	5.7	7.2	9.6	12.1	7.5	■ ■ ■ + ■ ■ ■ + ...
0.527	1.79		$M_{2,0}$	Nm	1.56	2.05	2.6	3.65	4.2	5	4.6	6.1	7.6	8.1	10.2	12.7	16.3	18	7.5	
			$M_{2max}$	Nm	5.3	7.1	8.9	12.5	10	8	15.9	21	26.5	28	32	29	32	29	12	
1	3.56	0.3966	$n_{2N}$	r/min	750	500	500	300	300	300	300	200	150	150	125	100	75	75	-	1F.2203-4AK...-2.0-Z
...	...	(0.4166)	$M_{2N}$	Nm	2.05	3.15	3.15	5.4	5.5	4.75	5.5	8.4	11	11.2	13.7	17.1	20	18	-	■ ■ ■ + ■ ■ ■ + ...
1.06	3.67		$M_{2,0}$	Nm	3.15	4.2	5.3	7.4	6	5	9.3	12.4	15.5	16.5	20	18	20	18	-	
			$M_{2max}$	Nm	10.9	14.6	18.3	13.5	10	8	26	32	29	32	32	29	32	29	-	
<b>Planetary gearbox data</b>																				
Gearbox type:			NRB040, 1-stage							NRB040, 2-stage										
1. Order code			A11							A12										
$i$			3 4 5 7 8 10							9 12 15 16 20 25 32 40 64										
2. Order code			R03 R04 R05 R07 R08 R10							R09 R12 R15 R16 R20 R25 R32 R40 R64										
$M_{2N,G}$	Nm		11	15	14	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5			
$M_{2max,G}$	Nm		17.5	24	22	13.5	10	8	26	32	29	32	32	29	32	29	12			
$M_{2Em,Off}$	Nm		22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27			
$J_{1,G}$	kg cm <sup>2</sup>		0.027	0.021	0.019	0.015	0.015	0.014	0.026	0.025	0.025	0.02	0.018	0.018	0.015	0.015	0.015			
$\varphi_{2,G}$	'		15								19									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB040

Servomotor data			Selection data servomotors with planetary gearbox								Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )										
Nm	Nm	kg cm <sup>2</sup>										
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB040 3-stage</b>												
0.452	1.83	0.1396 (0.1586)	$n_{2N}$	r/min	60	50	37.5	37.5	25	20	15	1F.2103-2AH...-2..0-Z ■ ■ ■ + ■ ■ ■ + ...
...	...		$M_{2N}$	Nm	16.4	19.3	20	17.2	20	18	20	
0.482	1.89		$M_{2,0}$	Nm	20	20	20	18	20	18	20	
			$M_{2max}$	Nm	32	32	32	29	32	29	32	
0.881	3.85	0.1856 (0.2046)	$n_{2N}$	r/min	60	50	37.5	-	-	-	-	1F.2103-4AH...-2..0-Z ■ ■ ■ + ■ ■ ■ + ...
...	...		$M_{2N}$	Nm	20	20	20	-	-	-	-	
0.933	3.96		$M_{2,0}$	Nm	20	20	20	-	-	-	-	
			$M_{2max}$	Nm	32	32	32	-	-	-	-	
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB040 3-stage</b>												
0.493	1.74	0.2466 (0.2666)	$n_{2N}$	r/min	37.5	37.5	30	25	20	15	12.5	1F.2203-2AK...-2..0-Z ■ ■ ■ + ■ ■ ■ + ...
...	...		$M_{2N}$	Nm	18	17.1	20	18	20	18	20	
0.527	1.79		$M_{2,0}$	Nm	20	20	20	18	20	18	20	
			$M_{2max}$	Nm	32	32	32	29	32	29	32	
1	3.56	0.3966 (0.4166)	$n_{2N}$	r/min	60	37.5	37.5	-	-	-	-	1F.2203-4AK...-2..0-Z ■ ■ ■ + ■ ■ ■ + ...
...	...		$M_{2N}$	Nm	18.2	20	20	-	-	-	-	
1.06	3.67		$M_{2,0}$	Nm	20	20	20	-	-	-	-	
			$M_{2max}$	Nm	32	32	32	-	-	-	-	

### Planetary gearbox data

Gearbox type:		NRB040, 3-stage						
1. Order code		A13						
$i$		60	80	100	120	160	200	256
2. Order code		R60	R80	R01	R21	R61	R02	R52
$M_{2N,G}$	Nm	20	20	20	18	20	18	20
$M_{2max,G}$	Nm	32	32	32	29	32	29	32
$M_{2Em,Off}$	Nm	40	40	40	36	40	36	40
$J_{1,G}$	kg cm <sup>2</sup>	0.025	0.018	0.018	0.025	0.015	0.015	0.015
$\varphi_{2,G}$	'	22						

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRB060**

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 1 and 2-stage (continued)</b>																				
2.77	10.3	3.42 (4.32)	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	125	125	100	100	75	75	-	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.5	8	10.9	13.6	16.6	14.6	20	27	33	32.5	41	36	44	32	-	■ ■ ■ + ■ ■ ■ + ...
2.88	10.6		$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25	33.5	42.5	44	44	40	44	40	-	
			$M_{2max}$	Nm	31.5	42	52	40	29	24	70	70	70	70	70	64	70	64	-	
4.85	17.4	5.37 (6.27)	$n_{2N}$	r/min	600	500	375	250	300	250	200	150	125	125	125	100	75	75	-	1F2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.6	11.5	15.8	23.5	17	15	28	37.5	44	43	35.5	40	44	32.5	-	■ ■ ■ + ■ ■ ■ + ...
4.95	17.7		$M_{2,0}$	Nm	14.8	19.8	24.5	25	18	15	43.5	44	44	44	44	40	44	40	-	
			$M_{2max}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	-	
Planetary gearbox data			NRB060, 1-stage								NRB060, 2-stage									
Gearbox type:			A21								A22									
1. Order code			3 4 5 7 8 10								9 12 15 16 20 25 32 40 64									
$i$			R03 R04 R05 R07 R08 R10								R09 R12 R15 R16 R20 R25 R32 R40 R64									
2. Order code																				
$M_{2N,G}$	Nm		28	38	40	25	18	15	44	44	44	44	44	40	44	40	18			
$M_{2max,G}$	Nm		45	61	64	40	29	24	70	70	70	70	70	64	70	64	29			
$M_{2Em,Off}$	Nm		66	88	80	80	80	80	88	88	88	88	88	80	88	80	80			
$J_{1,G}$	kg cm <sup>2</sup>		0.128	0.092	0.08	0.069	0.067	0.065	0.121	0.118	0.076	0.085	0.075	0.075	0.066	0.066	0.066			
$\varnothing_{2,G}$	'		10						12											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>	$n_{2N}$	r/min												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB060 3-stage</b>																
0.51	1.83	0.093 (0.112)	$n_{2N}$	r/min	75	50	37.5	37.5	25	20	15	12.5				1F.2103-2AH..-2.0-Z
...	...	...	$M_{2N}$	Nm	18.1	26.5	34.5	37	44	40	44	40				■■■ + ■■■ + ...
0.539	1.88		$M_{2,0}$	Nm	30.5	40.5	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				
0.972	3.84	0.139 (0.158)	$n_{2N}$	r/min	60	50	37.5	37.5	25	20	15	-				1F.2103-4AH..-2.0-Z
...	...	...	$M_{2N}$	Nm	40.5	44	44	44	44	40	44	-				■■■ + ■■■ + ...
1.03	3.95		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-				
1.17	3.56	0.371 (0.451)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-				1F.2104-4AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-				■■■ + ■■■ + ...
1.2	3.66		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-				
1.16	3.65	0.371 (0.451)	$n_{2N}$	r/min	75	50	37.5	37.5	25	20	15	-				1F.2104-4AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	-				■■■ + ■■■ + ...
1.19	3.75		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-				
2.25	7.16	0.581 (0.671)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-				1F.2104-5AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-				■■■ + ■■■ + ...
2.3	7.36		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-				
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-				
2.23	7.25	0.581 (0.671)	$n_{2N}$	r/min	75	50	37.5	37.5	-	-	-	-				1F.2104-5AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-				■■■ + ■■■ + ...
2.28	7.46		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-				
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-				
2.98	9.56	0.781 (0.861)	$n_{2N}$	r/min	50	37.5	-	-	-	-	-	-				1F.2104-6AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-				■■■ + ■■■ + ...
3.05	9.83		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-				
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-				
4.59	14.3	1.98 (2.82)	$n_{2N}$	r/min	50	-	-	-	-	-	-	-				1F.2105-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	44	-	-	-	-	-	-	-				■■■ + ■■■ + ...
4.75	14.7		$M_{2,0}$	Nm	44	-	-	-	-	-	-	-				
			$M_{2max}$	Nm	70	-	-	-	-	-	-	-				
4.57	14.3	1.98 (2.82)	$n_{2N}$	r/min	50	-	-	-	-	-	-	-				1FT2105-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	44	-	-	-	-	-	-	-				■■■ + ■■■ + ...
4.75	14.7		$M_{2,0}$	Nm	44	-	-	-	-	-	-	-				
			$M_{2max}$	Nm	70	-	-	-	-	-	-	-				
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage</b>																
0.527	1.74	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	25	20	20	15	12.5				1F.2203-2AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	19.4	25.5	32	39.5	44	39.5	44	40				■■■ + ■■■ + ...
0.538	1.79		$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				

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Planetary gearbox data		NRB060, 3-stage							
Gearbox type:		A23							
1. Order code		A23							
$i$		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em,Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varnothing_{2,G}$	'	15							

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRB060**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB060 3-stage (continued)</b>																
1.11	3.56	0.35 (0.37)	$n_{2N}$	r/min	50	50	37.5	37.5	25	20	15	-	-	-	-	1F.2203-4AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	42.5	38	44	40.5	44	40	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
1.15	3.66		$M_{2,0}$	Nm	44	44	44	44	44	40	44	-	-	-	-	
			$M_{2max}$	Nm	70	70	70	70	70	64	70	-	-	-	-	
2.21	6.78	1.251 (1.331)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	-	-	-	1F.2204-5AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.26	6.96		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-	-	-	-	
2.22	6.78	1.251 (1.331)	$n_{2N}$	r/min	60	50	37.5	37.5	-	-	-	-	-	-	-	1F.2204-5AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.27	6.96		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-	-	-	-	
2.96	9.08	1.631 (1.711)	$n_{2N}$	r/min	50	37.5	-	-	-	-	-	-	-	-	-	1F.2204-6AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
3.03	9.33		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	
2.73	10.3	3.42 (4.32)	$n_{2N}$	r/min	37.5	25	-	-	-	-	-	-	-	-	-	1FT2205-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.84	10.6		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	
2.79	10.3	3.42 (4.32)	$n_{2N}$	r/min	50	37.5	-	-	-	-	-	-	-	-	-	1F.2205-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.9	10.6		$M_{2,0}$	Nm	44	44	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	
2.77	10.3	3.42 (4.32)	$n_{2N}$	r/min	50	37.5	-	-	-	-	-	-	-	-	-	1FT2205-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	44	44	-	-	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.88	10.6		$M_{2,0}$	Nm	44	43.5	-	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	-	-	-	-	-	-	-	-	-	

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**Planetary gearbox data**

Gearbox type:		<b>NRB060, 3-stage</b>							
1. Order code		<b>A23</b>							
$i$		<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>160</b>	<b>200</b>	<b>256</b>	<b>320</b>
2. Order code		<b>R60</b>	<b>R80</b>	<b>R01</b>	<b>R21</b>	<b>R61</b>	<b>R02</b>	<b>R52</b>	<b>R23</b>
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em.Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>	0.076	0.075	0.074	0.066	0.066	0.066	0.066	0.066
$\varphi_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

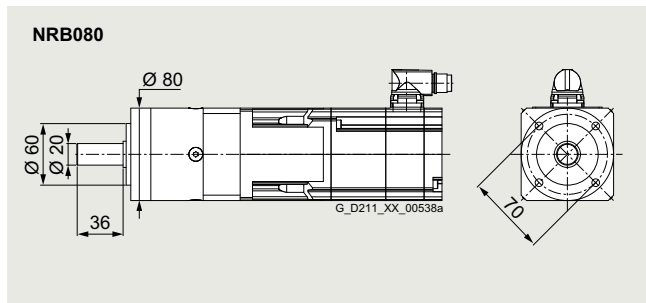
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB080

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																		
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 1 and 2-stage</b>																				
0.49	1.8	0.093	$n_{2N}$	r/min	750	750	600	500	375	375	375	300	250	200	200	150	125	100	60	1F.2103-2AH..-0.0-Z
...	...	(0.112)	$M_{2N}$	Nm	1.04	1.19	1.68	2.3	2.95	3.3	2.7	3.4	4.2	5.2	5.7	7.7	10.1	12.7	21	■ ■ ■ + ■ ■ ■ + ...
0.516	1.85		$M_{2,0}$	Nm	1.46	1.99	2.5	3.55	4.05	5.1	4.55	6.1	7.6	8.2	10.2	12.8	16.4	20.5	33	
			$M_{2max}$	Nm	5.4	7.3	9.1	12.9	14.7	18.4	16.4	21.5	27	29	36.5	45.5	58	73	80	
0.994	3.81	0.139	$n_{2N}$	r/min	750	600	600	500	375	300	375	250	200	200	150	125	125	100	60	1F.2103-4AH..-0.0-Z
...	...	(0.158)	$M_{2N}$	Nm	2.3	3.1	3.35	4.35	6.1	7.8	5.4	8.6	10.8	11.1	14.8	18.2	19.9	24.5	42.5	■ ■ ■ + ■ ■ ■ + ...
1.06	3.91		$M_{2,0}$	Nm	3.05	4.15	5.2	7.3	8.4	10.5	9.2	12.3	15.3	16.4	20.5	25.5	32.5	41	50	
			$M_{2max}$	Nm	11.7	15.6	19.5	27	31	39	34.5	46.5	58	61	77	96	123	154	80	
1.14	3.52	0.35	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1F.2104-4AF..-2.0-Z
...	...	(0.43)	$M_{2N}$	Nm	2.55	3.6	4.7	6.4	7.9	10	7.8	11.2	14	14.5	19.1	23.5	30.5	39	50	■ ■ ■ + ■ ■ ■ + ...
1.16	3.62		$M_{2,0}$	Nm	3.4	4.55	5.7	8.1	9.2	11.6	10.3	13.8	17.3	18.4	23	28.5	36.5	46	50	
			$M_{2max}$	Nm	10.8	14.4	18	25	28.5	36	32	42.5	53	57	71	89	114	142	80	
1.13	3.62	0.35	$n_{2N}$	r/min	1000	750	600	500	500	375	375	300	250	200	200	150	125	100	60	1F.2104-4AK..-2.0-Z
...	...	(0.43)	$M_{2N}$	Nm	2.65	3.9	5.1	7	6.8	9.9	8.6	10.7	12.6	15.8	16.8	23.5	30	37.5	50	■ ■ ■ + ■ ■ ■ + ...
1.16	3.72		$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.2	11.5	10.3	13.7	17.2	18.3	22.5	28.5	36.5	45.5	50	
			$M_{2max}$	Nm	11.1	14.8	18.5	25.5	29.5	37	33	44	55	58	73	91	117	146	80	
2.21	7.1	0.56	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	1F.2104-5AF..-2.0-Z
...	...	(0.65)	$M_{2N}$	Nm	5.9	7.7	9.8	14	14.6	18.6	17	20	25.5	24.5	35.5	42	56	74	50	■ ■ ■ + ■ ■ ■ + ...
2.26	7.31		$M_{2,0}$	Nm	6.7	9	11.2	15.8	18	22.5	20	26.5	33.5	35.5	44.5	55	71	89	50	
			$M_{2max}$	Nm	21.5	29	36.5	51	58	61	65	86	108	115	144	176	192	176	80	
2.19	7.19	0.56	$n_{2N}$	r/min	750	600	600	375	375	300	300	250	200	150	150	125	100	75	60	1F.2104-5AK..-2.0-Z
...	...	(0.65)	$M_{2N}$	Nm	5.8	7.6	8	13.8	14.3	18.3	16.8	20	25	32.5	35	41.5	55	73	50	■ ■ ■ + ■ ■ ■ + ...
2.25	7.41		$M_{2,0}$	Nm	6.6	8.9	11.1	15.7	17.9	22	20	26.5	33	35.5	44	55	71	88	50	
			$M_{2max}$	Nm	22	29.5	37	51	59	61	66	87	109	117	146	176	192	176	80	
2.93	9.49	0.76	$n_{2N}$	r/min	750	600	500	375	375	300	300	200	200	150	150	125	100	75	50	1F.2104-6AF..-2.0-Z
...	...	(0.84)	$M_{2N}$	Nm	7.1	9.3	11.8	16.8	17.3	22	20	29.5	29.5	39.5	41	48.5	64	86	50	■ ■ ■ + ■ ■ ■ + ...
3.01	9.78		$M_{2,0}$	Nm	8.9	12	15	21	24	30	26.5	35.5	44.5	47.5	59	74	95	110	50	
			$M_{2max}$	Nm	29	39	48.5	68	78	61	87	116	144	154	192	176	192	176	80	

Continued on the next page

Planetary gearbox data		NRB080, 1-stage						NRB080, 2-stage										
Gearbox type:		<b>A31</b>						<b>A32</b>										
1. Order code		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>		
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>		
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50		
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80		
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190		
$J_{1,G}$	kg cm <sup>2</sup>	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366		
$\varnothing_{2,G}$	'	7						9										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary





# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC




Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	500	375	300	200	200	200	150	125	100	100	75	75	60	50	-	1F2206-4AF..-0..0-Z + + + ...
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	21	28	35.5	53	50	38	67	79	98	95	120	109	120	110	-	
			$M_{2,0}$	Nm	30.5	41	51	65	50	38	90	120	110	120	120	110	120	110	-	1FT2206-4AH..-0..0-Z + + + ...
			$M_{2max}$	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	-	
9.84	34.4	15.976 (17.676)	$n_{2N}$	r/min	375	300	250	200	200	150	150	100	75	75	75	60	50	50	-	1FT2206-4AH..-0..0-Z + + + ...
...	...	...	$M_{2N}$	Nm	21.5	27	33	41.5	39	38	54	81	106	106	102	110	120	102	-	
10.3	35.4		$M_{2,0}$	Nm	29.5	39	49	65	50	38	86	115	110	120	120	110	120	110	-	
9.45	34.4	15.976 (17.676)	$M_{2max}$	Nm	106	141	176	104	79	61	208	192	176	192	191	176	192	176	-	

Planetary gearbox data		NRB080, 1-stage						NRB080, 2-stage								
Gearbox type:		A31						A32								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$i$																
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	0.654	0.455	0.423	0.379	0.37	0.359	0.613	0.589	0.586	0.446	0.406	0.404	0.366	0.365	0.366
$\varnothing_{2,G}$	'	7						9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB080 3-stage</b>														
0.49	1.8	0.093	$n_{2N}$	r/min	60	50	37.5	30	25	20	15	12.5	7.5	1F.2103-2AH..-0.0-Z
...	...	(0.112)	$M_{2N}$	Nm	17.5	22.5	30	35.5	49	61	81	98	50	■ ■ ■ + ■ ■ ■ + ...
0.516	1.85		$M_{2,0}$	Nm	30.5	40.5	51	61	81	102	120	110	49.5	
			$M_{2max}$	Nm	108	144	180	176	192	176	192	176	80	
0.994	3.81	0.139	$n_{2N}$	r/min	60	50	37.5	30	25	20	15	12.5	-	1F.2103-4AH..-0.0-Z
...	...	(0.158)	$M_{2N}$	Nm	37	45	63	75	101	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.06	3.91		$M_{2,0}$	Nm	59	79	99	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
1.14	3.52	0.35	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F.2104-4AF..-2.0-Z
...	...	(0.43)	$M_{2N}$	Nm	55	74	93	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.16	3.62		$M_{2,0}$	Nm	68	91	114	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
1.13	3.62	0.35	$n_{2N}$	r/min	60	50	37.5	30	25	20	15	12.5	-	1F.2104-4AK..-2.0-Z
...	...	(0.43)	$M_{2N}$	Nm	54	69	91	109	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
1.16	3.72		$M_{2,0}$	Nm	68	90	113	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.21	7.1	0.56	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	-	1F.2104-5AF..-2.0-Z
...	...	(0.65)	$M_{2N}$	Nm	101	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.26	7.31		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.19	7.19	0.56	$n_{2N}$	r/min	50	37.5	37.5	30	25	20	15	12.5	-	1F.2104-5AK..-2.0-Z
...	...	(0.65)	$M_{2N}$	Nm	99	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.25	7.41		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.93	9.49	0.76	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	-	-	1F.2104-6AF..-2.0-Z
...	...	(0.84)	$M_{2N}$	Nm	110	120	120	110	120	110	120	-	-	■ ■ ■ + ■ ■ ■ + ...
3.01	9.78		$M_{2,0}$	Nm	110	120	120	110	120	110	120	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	
4.62	14.3	1.71	$n_{2N}$	r/min	50	37.5	30	25	20	-	-	-	-	1F.2105-4AF..-0.0-Z
...	...	(2.55)	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
4.74	14.7		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	
4.65	14.3	1.71	$n_{2N}$	r/min	50	37.5	30	30	25	-	-	-	-	1FT2105-4AH..-0.0-Z
...	...	(2.55)	$M_{2N}$	Nm	110	120	120	109	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
4.77	14.7		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	
7.15	22.9	2.65	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	-	-	1F.2105-6AF..-0.0-Z
...	...	(3.5)	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.5	23.6		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-	

➔ Continued on the next page

Planetary gearbox data		NRB080, 3-stage									
Gearbox type:		A33									
1. Order code		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366	
$\varnothing_{2,G}$	'	11									

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB080 3-stage (continued)</b>													
4.89	17.2	5.1	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	1F2205-4AF..-0..0-Z
...	...	(6)	$M_{2N}$	Nm	103	120	120	110	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
5.12	17.7		$M_{2,0}$	Nm	110	120	120	110	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	
5.11	17.1	8.676	$n_{2N}$	r/min	30	25	20	15	12.5	-	-	-	1FT2206-2AC..-0..0-Z
...	...	(10.276)	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	■ ■ ■ + ■ ■ ■ + ...
5.35	17.6		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	
5.04	17.1	8.676	$n_{2N}$	r/min	37.5	30	25	20	-	-	-	-	1F2206-2AF..-0..0-Z
...	...	(10.276)	$M_{2N}$	Nm	110	120	120	110	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
5.26	17.6		$M_{2,0}$	Nm	110	120	120	110	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	
4.9	17.1	8.676	$n_{2N}$	r/min	37.5	25	20	20	-	-	-	-	1FT2206-2AH..-0..0-Z
...	...	(10.276)	$M_{2N}$	Nm	95	119	120	109	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
5.11	17.6		$M_{2,0}$	Nm	110	119	119	109	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	-	-	-	-	
7.3	25.7	12.38	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	1FT2206-3AB..-0..0-Z
...	...	(13.976)	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.64	26.5		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	
7.17	25.7	12.38	$n_{2N}$	r/min	37.5	25	20	-	-	-	-	-	1FT2206-3AF..-0..0-Z
...	...	(13.976)	$M_{2N}$	Nm	99	120	120	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.5	26.5		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	
9.95	36.3	15.98	$n_{2N}$	r/min	30	-	-	-	-	-	-	-	1FT2206-4AC..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	105	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.4	37.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	
9.84	34.4	15.976	$n_{2N}$	r/min	37.5	-	-	-	-	-	-	-	1F2206-4AF..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
10.3	35.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	
9.45	34.4	15.976	$n_{2N}$	r/min	30	-	-	-	-	-	-	-	1FT2206-4AH..-0..0-Z
...	...	(17.676)	$M_{2N}$	Nm	110	-	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
9.85	35.4		$M_{2,0}$	Nm	110	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	-	-	-	-	-	-	-	

Planetary gearbox data		NRB080, 3-stage									
Gearbox type:		A33									
1. Order code		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	0.584	0.405	0.404	0.59	0.365	0.365	0.366	0.366	0.366	
$\varnothing_{2,G}$	'	11									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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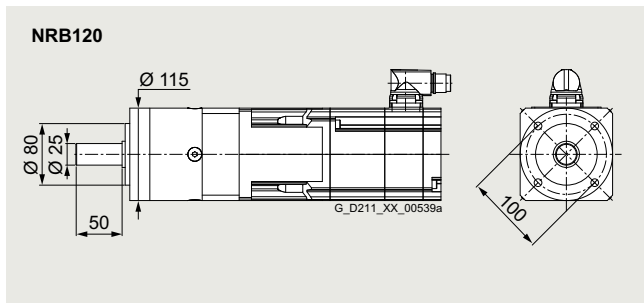


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRB120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1 and 2-stage</b>																						
0.379	1.72	0.093	$n_{2N}$	r/min	500	500	500	375	300	300	250	150	150	150	125	100	100	75	50	1F.2103-2AH..-0.0-Z		
...	...	(0.112)	$M_{2N}$	Nm	0.81	0.98	1.19	2.05	2.6	2.9	2.3	3.95	4.2	4.4	6.1	7.8	9.4	12.7	19.4	■ ■ ■ + ■ ■ ■ + ...		
0.45	1.77		$M_{2,0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.35	3.85	5.2	6.5	7	8.8	11.1	14.2	17.9	28.5			
			$M_{2max}$	Nm	5.1	6.9	8.7	12.3	14.1	17.6	15.7	21	26	28	35	43.5	56	70	112			
1	3.74	0.139	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	100	75	50	1F.2103-4AH..-0.0-Z		
...	...	(0.158)	$M_{2N}$	Nm	2.05	2.75	4	4.85	6.3	8	6.4	8	11	11.6	15.1	19.1	21	29.5	43.5	■ ■ ■ + ■ ■ ■ + ...		
1.06	3.83		$M_{2,0}$	Nm	3	4.05	5.1	7.3	8.4	10.5	9.3	12.5	15.7	16.8	21	26	33.5	42	67			
			$M_{2max}$	Nm	11.3	15.2	19	26.5	30.5	38	34	45.5	56	60	75	94	121	151	192			
1.03	3.45	0.35	$n_{2N}$	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	1F.2104-4AF..-0.0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.2	3.2	4.35	6.5	7.1	9.2	7	10.6	13.9	14.7	17.1	21	28.5	37.5	58	■ ■ ■ + ■ ■ ■ + ...		
1.09	3.54		$M_{2,0}$	Nm	3.05	4.15	5.3	7.5	8.6	10.8	9.6	12.9	16.2	17.2	21.5	27	34.5	43	69			
			$M_{2max}$	Nm	10.4	14	17.5	24.5	28	35	31.5	42	52	56	70	87	112	140	192			
1.02	3.55	0.35	$n_{2N}$	r/min	750	600	500	375	375	300	300	200	150	150	150	125	100	75	50	1F.2104-4AK..-0.0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.35	3.45	4.7	6.8	7.8	9.9	7.5	11.2	14.2	15.2	18.9	22.5	31.5	40	63	■ ■ ■ + ■ ■ ■ + ...		
1.08	3.64		$M_{2,0}$	Nm	3.05	4.15	5.2	7.4	8.5	10.7	9.5	12.8	16	17.1	21.5	26.5	34.5	43	69			
			$M_{2max}$	Nm	10.7	14.4	18	25	29	36	32	43	54	57	72	90	115	144	192			
2.13	7.03	0.56	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	1F.2104-5AF..-0.0-Z		
...	...	(0.65)	$M_{2N}$	Nm	5.9	7.7	8.2	12.6	16.4	20.5	17.1	21	29.5	30	38.5	49	67	69	101	■ ■ ■ + ■ ■ ■ + ...		
2.18	7.23		$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	21.5	19.4	25.5	32.5	34.5	43	54	69	86	120			
			$M_{2max}$	Nm	21.5	28.5	36	50	57	72	64	85	107	114	142	178	225	285	192			
2.12	7.12	0.56	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	75	50	1F.2104-5AK..-0.0-Z		
...	...	(0.65)	$M_{2N}$	Nm	5.8	7.6	8	12.4	16.1	20	16.8	20.5	28.5	29	38	48	66	68	100	■ ■ ■ + ■ ■ ■ + ...		
2.17	7.33		$M_{2,0}$	Nm	6.3	8.5	10.7	15.1	17.3	21.5	19.3	25.5	32	34	43	53	68	86	120			
			$M_{2max}$	Nm	21.5	29	36.5	51	58	73	65	87	108	115	144	180	230	285	192			
2.87	9.42	0.76	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	50	1F.2104-6AF..-0.0-Z		
...	...	(0.84)	$M_{2N}$	Nm	7.3	9.5	13.6	15.3	19.8	24.5	20.5	25.5	35	35.5	46	58	83	104	117	■ ■ ■ + ■ ■ ■ + ...		
2.93	9.69		$M_{2,0}$	Nm	8.6	11.6	14.5	20	23	29	26	34.5	43.5	46.5	58	72	93	116	120			
			$M_{2max}$	Nm	28.5	38.5	48	67	77	96	86	115	143	153	191	235	305	368	192			

Continued on the next page

Planetary gearbox data		NRB120, 1-stage						NRB120, 2-stage													
Gearbox type:		A41						A42													
1. Order code		3 4 5 7 8 10						9 12 15 16 20 25 32 40 64													
2. Order code		R03 R04 R05 R07 R08 R10						R09 R12 R15 R16 R20 R25 R32 R40 R64													
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	260	230	120			
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	416	368	192			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	520	500	380			
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414					
$\varnothing_{2,G}$	'	7						9													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB120

Servomotor data				Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox						
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																					
Nm	Nm	kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 1 and 2-stage (continued)</b>																							
4.55	14.2	1.71 (2.55)	$n_{2N}$	r/min	600	500	375	300	300	250	250	150	150	125	100	100	75	60	50	1F.2105-4AF..-0..0-Z			
...	...		$M_{2N}$	Nm	11.9	15	21	29	29.5	36.5	30.5	50	52	64	82	82	120	150	120	■ ■ ■ + ■ ■ ■ + ...			
4.66	14.6		$M_{2,0}$	Nm	13.8	18.5	23	32.5	37	46.5	41.5	55	69	73	92	115	147	184	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	■ ■ ■ + ■ ■ ■ + ...			
4.58	14.2	1.71 (2.55)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	50	1FT2105-4AH..-0..0-Z			
...	...		$M_{2N}$	Nm	10.7	13.3	19.7	26.5	32	40.5	35.5	47.5	58	60	78	99	108	134	105	■ ■ ■ + ■ ■ ■ + ...			
4.69	14.6		$M_{2,0}$	Nm	13.9	18.6	23	32.5	37	46.5	41.5	55	69	74	92	116	148	185	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	43.5	58	72	102	116	146	130	173	215	230	285	360	416	368	192	■ ■ ■ + ■ ■ ■ + ...			
7.42	22.8	2.65 (3.5)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	75	60	50	50	1F.2105-6AF..-0..0-Z			
...	...		$M_{2N}$	Nm	18.8	25.5	27.5	37	45	57	51	68	81	81	106	141	184	220	119	■ ■ ■ + ■ ■ ■ + ...			
7.62	23.5		$M_{2,0}$	Nm	22.5	30	38	53	60	76	68	90	113	120	150	188	240	230	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	70	93	117	164	187	152	205	275	345	370	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...			
7.8	24.7	4.6 (6.3)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	100	100	75	60	50	50	1F.2106-3AF..-0..0-Z			
...	...		$M_{2N}$	Nm	19.4	26.5	28.5	38	46.5	59	52	70	84	103	109	145	189	225	120	■ ■ ■ + ■ ■ ■ + ...			
8.1	25.5		$M_{2,0}$	Nm	24	32	40	56	64	81	71	95	119	127	159	198	255	230	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	76	101	127	177	192	152	225	300	368	400	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...			
10.1	31.5	6 (7.6)	$n_{2N}$	r/min	500	375	375	250	200	200	125	100	100	75	75	60	50	37.5	1F.2106-4AF..-0..0-Z				
...	...		$M_{2N}$	Nm	23.5	32.5	33.5	53	53	68	60	97	121	123	163	165	210	230	120	■ ■ ■ + ■ ■ ■ + ...			
10.5	32.4		$M_{2,0}$	Nm	31.5	42	52	73	84	95	93	124	155	165	205	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	97	129	161	216	192	152	285	380	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...			
14.3	43.4	8.7 (10.4)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	75	60	60	-	1F.2106-6AF..-0..0-Z			
...	...		$M_{2N}$	Nm	31	42	54	69	85	87	101	122	151	152	200	199	255	215	-	■ ■ ■ + ■ ■ ■ + ...			
14.9	44.7		$M_{2,0}$	Nm	44.5	59	74	104	119	95	131	175	215	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	134	178	220	216	192	152	336	416	368	416	416	365	416	368	-	■ ■ ■ + ■ ■ ■ + ...			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage</b>																							
0.366	1.62	0.2 (0.22)	$n_{2N}$	r/min	500	375	375	300	250	250	200	150	125	125	100	100	75	60	37.5	1F.2203-2AK..-0..0-Z			
...	...		$M_{2N}$	Nm	0.79	1.19	1.5	2.25	2.85	3	2.75	3.85	4.75	4.95	7	6.9	10.9	13.8	22	■ ■ ■ + ■ ■ ■ + ...			
0.437	1.67		$M_{2,0}$	Nm	1.09	1.54	1.99	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	27.5	■ ■ ■ + ■ ■ ■ + ...				
			$M_{2max}$	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.8	24.5	26.5	33	41.5	53	66	106	■ ■ ■ + ■ ■ ■ + ...			
0.985	3.45	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	75	37.5	1F.2203-4AK..-0..0-Z			
...	...		$M_{2N}$	Nm	2.4	3.15	4.55	6.5	7	8.8	7.1	8.8	12.3	12.8	16.5	20.5	29	30.5	58	■ ■ ■ + ■ ■ ■ + ...			
1.04	3.54		$M_{2,0}$	Nm	2.95	4	5	7.2	8.2	10.3	9.2	12.3	15.5	16.5	20.5	25.5	33	41.5	66	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	10.4	14	17.5	24.5	28	35	31.5	42	56	70	87	112	140	192	■ ■ ■ + ■ ■ ■ + ...				
2.09	6.64	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	1F.2204-5AF..-0..0-Z			
...	...		$M_{2N}$	Nm	5.6	7.3	10	11.4	15.2	18.9	15.9	19.5	27.5	27.5	36	45	63	79	120	■ ■ ■ + ■ ■ ■ + ...			
2.14	6.83		$M_{2,0}$	Nm	6.2	8.4	10.6	14.9	17	21	19	25	31.5	34	42.5	53	68	85	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	■ ■ ■ + ■ ■ ■ + ...			
2.11	6.64	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	375	300	250	250	200	150	150	125	100	75	60	37.5	1F.2204-5AK..-0..0-Z			
...	...		$M_{2N}$	Nm	5.7	7.4	10.1	11.7	15.6	19.4	16.3	20	28	28	36.5	46	65	82	120	■ ■ ■ + ■ ■ ■ + ...			
2.16	6.83		$M_{2,0}$	Nm	6.3	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	120	■ ■ ■ + ■ ■ ■ + ...			
			$M_{2max}$	Nm	20	27	34	47.5	54	68	60	81	101	108	135	168	215	265	192	■ ■ ■ + ■ ■ ■ + ...			

➡ Continued on the next page

### Planetary gearbox data

Gearbox type:		NRB120, 1-stage						NRB120, 2-stage								
1. Order code		A41						A42								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414
$\varphi_{2,G}$	'	7						9								

- Color legend:
- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
  - $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
  - $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage (continued)</b>																				
2.85	8.94	1.61 (1.69)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	125	100	100	75	60	50	1F2204-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	7.8	10	13.9	19.7	20.5	25	21	25.5	36.5	44	55	59	86	108	111	■ ■ ■ + ■ ■ ■ + ...
2.92	9.19	...	$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	29	26	34.5	43	46	57	72	92	115	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	27.5	36.5	45.5	64	73	91	82	109	136	145	181	225	290	360	192	■ ■ ■ + ■ ■ ■ + ...
3.08	10.2	3.15 (4.05)	$n_{2N}$	r/min	500	500	375	300	250	200	200	150	125	125	100	75	75	50	37.5	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	7.4	7.6	11.8	16.1	19.8	25	21.5	29	36	37.5	48.5	62	70	99	120	■ ■ ■ + ■ ■ ■ + ...
3.2	10.5	...	$M_{2,0}$	Nm	9.4	12.6	15.8	22	25.5	31.5	28	37.5	47	50	62	78	100	125	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	■ ■ ■ + ■ ■ ■ + ...
3.11	10.2	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	1F2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	7.4	9.7	13.1	18.3	19.6	24	20.5	24.5	35.5	35	45	57	80	101	100	■ ■ ■ + ■ ■ ■ + ...
3.23	10.5	...	$M_{2,0}$	Nm	9.5	12.7	16	22.5	25.5	32	28.5	38	47.5	50	63	79	101	127	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	■ ■ ■ + ■ ■ ■ + ...
3.05	10.2	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	100	100	75	60	37.5	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.6	8.4	12.4	17	20	20.5	22	29.5	30.5	38.5	49	49	73	92	120	■ ■ ■ + ■ ■ ■ + ...
3.16	10.5	...	$M_{2,0}$	Nm	9.3	12.5	15.6	22	25	31.5	27.5	37	46.5	49.5	62	77	99	124	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	31	41.5	52	73	83	104	93	124	155	165	205	255	330	368	192	■ ■ ■ + ■ ■ ■ + ...
5.25	17.1	5.1 (6)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1F2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.6	17.5	19.1	25.5	31	40	35.5	48	57	58	76	101	132	159	120	■ ■ ■ + ■ ■ ■ + ...
5.46	17.6	...	$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	134	171	210	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
5.31	17.1	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	37.5	1FT2206-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	11	15.5	20	25.5	32.5	43.5	41	50	63	64	87	109	136	178	120	■ ■ ■ + ■ ■ ■ + ...
5.45	17.6	...	$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48.5	64	80	86	107	134	172	215	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
5.41	17.1	7.8 (9.4)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	1F2206-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.2	15	21.5	29	35	44	39	52	64	66	84	108	115	143	120	■ ■ ■ + ■ ■ ■ + ...
5.62	17.6	...	$M_{2,0}$	Nm	16.7	22	27.5	39	44.5	56	49.5	66	82	88	110	138	176	220	119	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
5.25	17.1	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	37.5	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.4	17.3	22	29	29	37.5	34.5	46	55	70	72	97	127	152	120	■ ■ ■ + ■ ■ ■ + ...
5.45	17.6	...	$M_{2,0}$	Nm	16.2	21.5	27	38	43.5	54	48	64	80	85	107	133	171	210	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	52	70	87	122	140	152	156	205	260	275	345	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
7.94	25.7	11.5 (13.1)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.5	24	31	40.5	50	66	47	74	93	95	127	158	199	230	120	■ ■ ■ + ■ ■ ■ + ...
8.26	26.4	...	$M_{2,0}$	Nm	24.5	32.5	41	57	66	82	73	97	121	129	162	200	255	230	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
7.81	25.7	11.5 (13.1)	$n_{2N}$	r/min	500	375	300	250	200	200	200	125	100	100	75	75	60	50	37.5	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	16.4	22.5	29.5	38	47.5	48	43.5	71	89	90	121	122	159	188	120	■ ■ ■ + ■ ■ ■ + ...
8.12	26.4	...	$M_{2,0}$	Nm	24	32	40.5	56	64	81	71	95	119	127	159	199	255	230	120	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	79	105	132	184	192	152	235	310	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...

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Planetary gearbox data		NRB120, 1-stage					NRB120, 2-stage												
Gearbox type:		A41					A42												
1. Order code																			
$i$																			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64			
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120			
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380			
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414			
$\varnothing_{2,G}$		7					9												

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage (continued)																				
10.8	36.2	15.1 (16.8)	$n_{2N}$	r/min	375	300	250	150	150	125	125	100	75	75	60	50	37.5	37.5	30	1FT2206-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	20	25.5	31.5	54	55	67	66	82	109	109	138	165	225	210	120	■ ■ ■ + ■ ■ ■ + ...
11.1	37.3	...	$M_{2,0}$	Nm	33	44	55	77	88	95	99	131	164	175	215	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	111	149	186	216	192	152	330	416	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
10.6	34.3	15.1 (16.8)	$n_{2N}$	r/min	500	375	375	250	250	200	200	125	100	100	75	75	60	50	37.5	1F2206-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	24	33	34	54	54	70	62	99	123	125	167	168	215	230	120	■ ■ ■ + ■ ■ ■ + ...
11	35.3	...	$M_{2,0}$	Nm	32.5	43.5	54	76	87	95	97	129	162	172	215	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
10.1	34.3	15.1 (16.8)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	1FT2206-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	18.5	25.5	33.5	51	53	71	66	80	100	99	136	169	205	190	120	■ ■ ■ + ■ ■ ■ + ...
10.5	35.3	...	$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	123	154	165	205	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	106	141	176	216	192	152	310	416	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
10.3	36.2	24.86 (28.16)	$n_{2N}$	r/min	375	300	250	200	150	125	150	100	100	75	60	50	50	37.5	30	1FT2208-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	25.5	32.5	40.5	52	68	84	67	99	96	132	167	200	199	225	119	■ ■ ■ + ■ ■ ■ + ...
10.6	37.3	...	$M_{2,0}$	Nm	31.5	42.5	53	74	85	95	94	125	157	167	205	230	260	225	120	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	111	148	185	216	192	152	330	416	368	416	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...
16.2	48.6	31.96 (34.96)	$n_{2N}$	r/min	375	250	200	150	150	125	125	100	75	60	50	50	37.5	-	1FT2208-3AB..-0.0-Z	
...	...	...	$M_{2N}$	Nm	27.5	42.5	54	74	74	89	87	106	143	176	210	205	260	230	-	■ ■ ■ + ■ ■ ■ + ...
16.6	50.1	...	$M_{2,0}$	Nm	49.5	66	82	116	120	95	148	197	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...
15.2	48.6	31.96 (35.36)	$n_{2N}$	r/min	375	300	250	200	150	150	150	100	75	75	60	60	50	50	-	1F2208-3AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	34.5	44	54	70	92	93	87	130	170	172	215	205	245	177	-	■ ■ ■ + ■ ■ ■ + ...
15.8	50.1	...	$M_{2,0}$	Nm	47	63	79	110	120	95	140	186	230	245	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...
15.1	48.6	31.96 (35.36)	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	-	1FT2208-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	32	41	50	64	86	84	98	123	162	162	205	230	225	230	-	■ ■ ■ + ■ ■ ■ + ...
15.7	50.1	...	$M_{2,0}$	Nm	47	62	78	109	120	95	139	185	230	245	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	150	200	245	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...
19.7	63.1	41.16 (46.76)	$n_{2N}$	r/min	250	200	150	125	100	100	100	75	60	50	50	37.5	37.5	30	-	1FT2208-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	38	48.5	64	80	99	94	100	133	165	197	194	230	230	230	-	■ ■ ■ + ■ ■ ■ + ...
20.2	64.9	...	$M_{2,0}$	Nm	60	80	100	135	120	95	179	235	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...
18.9	63.1	41.16 (46.76)	$n_{2N}$	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	-	1F2208-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	39.5	49.5	60	101	104	94	116	142	190	189	235	210	245	230	-	■ ■ ■ + ■ ■ ■ + ...
19.7	64.9	...	$M_{2,0}$	Nm	58	78	98	135	120	95	174	230	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...
18.2	63.1	41.16 (46.76)	$n_{2N}$	r/min	375	300	250	150	150	150	125	100	75	75	60	60	50	37.5	-	1FT2208-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	39.5	49.5	60	101	103	94	117	143	190	189	235	210	245	230	-	■ ■ ■ + ■ ■ ■ + ...
18.8	64.9	...	$M_{2,0}$	Nm	56	75	93	131	120	95	166	220	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	415	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...

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Planetary gearbox data		NRB120, 1-stage						NRB120, 2-stage												
Gearbox type:		A41						A42												
1. Order code		3 4 5 7 8 10						9 12 15 16 20 25 32 40 64												
$i$		R03 R04 R05 R07 R08 R10						R09 R12 R15 R16 R20 R25 R32 R40 R64												
2. Order code																				
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120				
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192				
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380				
$J_{1,G}$	kg cm <sup>2</sup>	2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414				
$\varnothing_{2,G}$	'	7						9												

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 1 and 2-stage (continued)</b>																						
22.9	76.6	50.46 (55.96)	$n_{2N}$	r/min	375	250	250	150	150	150	125	100	75	60	60	60	50	37.5	-	<b>1FT2208-5AB..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	43	64	65	111	112	95	126	152	205	250	250	215	250	230	-	■ ■ ■ + ■ ■ ■ + ...		
23.7	78.7		$M_{2,0}$	Nm	71	94	118	135	120	95	210	260	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
22.7	76.6	50.46 (55.96)	$n_{2N}$	r/min	375	250	200	150	150	150	125	75	75	60	60	60	50	37.5	-	<b>1F2208-5AC..-0..0-Z</b>		
...	...	...	$M_{2N}$	Nm	42.5	64	81	110	111	92	124	200	200	250	245	200	230	230	-	■ ■ ■ + ■ ■ ■ + ...		
23.5	78.7		$M_{2,0}$	Nm	70	94	117	135	120	95	205	260	230	260	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...		
Planetary gearbox data																						
Gearbox type:			NRB120, 1-stage							NRB120, 2-stage												
1. Order code			A41							A42												
$i$			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64					
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64					
$M_{2N,G}$	Nm		115	155	195	135	120	95	210	260	230	260	260	230	260	230	120					
$M_{2max,G}$	Nm		184	248	312	216	192	152	336	416	368	416	416	368	416	368	192					
$M_{2Em,Off}$	Nm		390	520	500	340	380	480	500	520	500	520	520	500	520	500	380					
$J_{1,G}$	kg cm <sup>2</sup>		2.361	1.835	1.633	1.463	1.431	1.378	2.288	2.224	2.203	1.747	1.573	1.566	1.42	1.417	1.414					
$\varnothing_{2,G}$	'		7						9													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage</b>														
0.379	1.72	0.093 (0.112)	$n_{2N}$	r/min	37.5	37.5	30	20	15	12.5	10	6	1F.2103-2AH..-0.0-Z	
...	...	...	$M_{2N}$	Nm	17.6	21	26.5	33.5	48	63	77	97	120	
0.45	1.77		$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	142	119	
			$M_{2max}$	Nm	104	139	174	205	275	345	416	368	191	
1	3.74	0.139 (0.158)	$n_{2N}$	r/min	37.5	37.5	30	20	15	12.5	10	6	1F.2103-4AH..-0.0-Z	
...	...	...	$M_{2N}$	Nm	44.5	52	66	86	113	147	181	225	119	
1.06	3.83		$M_{2,0}$	Nm	62	83	104	125	167	205	260	230	119	
			$M_{2max}$	Nm	225	300	375	368	416	368	416	368	192	
1.03	3.45	0.35 (0.43)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1F.2104-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	45	69	86	93	143	185	225	225	120	
1.09	3.54		$M_{2,0}$	Nm	64	86	107	129	172	215	260	230	119	
			$M_{2max}$	Nm	205	275	345	368	416	368	416	368	192	
1.02	3.55	0.35 (0.43)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1F.2104-4AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	47.5	76	95	98	157	198	250	230	120	
1.08	3.64		$M_{2,0}$	Nm	64	85	107	128	171	210	260	230	119	
			$M_{2max}$	Nm	210	285	355	368	416	368	416	368	192	
2.13	7.03	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	6	1F.2104-5AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	120	162	197	225	250	230	260	230	120	
2.18	7.23		$M_{2,0}$	Nm	129	171	210	230	260	230	260	230	120	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	192	
2.12	7.12	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	6	1F.2104-5AK..-0.0-Z	
...	...	...	$M_{2N}$	Nm	118	161	194	220	245	230	260	230	120	
2.17	7.33		$M_{2,0}$	Nm	128	170	210	230	260	230	260	230	120	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	192	
2.87	9.42	0.76 (0.84)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	-	1F.2104-6AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	143	194	230	230	260	230	260	230	-	
2.93	9.69		$M_{2,0}$	Nm	172	230	260	230	260	230	260	230	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	
4.55	14.2	1.71 (2.55)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1F.2105-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	205	260	260	185	260	230	260	230	-	
4.66	14.6		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	-	
			$M_{2max}$	Nm	416	416	415	368	416	368	416	368	-	
4.58	14.2	1.71 (2.55)	$n_{2N}$	r/min	30	30	25	20	20	15	12.5	10	-	1FT2105-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	230	240	260	230	255	230	260	230	-	
4.69	14.6		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	
7.42	22.8	2.65 (3.5)	$n_{2N}$	r/min	37.5	30	25	20	20	15	-	-	-	1F.2105-6AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	235	260	260	230	260	230	-	-	-	
7.62	23.5		$M_{2,0}$	Nm	260	260	260	230	260	230	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	-	

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Planetary gearbox data		NRB120, 3-stage									
Gearbox type:		A43									
1. Order code		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$i$											
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varnothing_{2,G}$	'	11									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRB120**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB120 3-stage (continued)</b>															
7.8	24.7	4.6 (6.3)	$n_{2N}$	r/min	37.5	30	25	20	20	-	-	-	-	1F.2106-3AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	240	260	260	230	260	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
8.1	25.5	...	$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	410	415	416	368	416	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
10.1	31.5	6 (7.6)	$n_{2N}$	r/min	37.5	30	25	20	-	-	-	-	1F.2106-4AF..-0..0-Z		
...	...	...	$M_{2N}$	Nm	245	260	260	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
10.5	32.4	...	$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	416	416	416	368	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
14.3	43.4	8.7 (10.4)	$n_{2N}$	r/min	37.5	30	25	-	-	-	-	-	1F.2106-6AF..-0..0-Z		
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
14.9	44.7	...	$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB120 3-stage</b>															
0.366	1.62	0.2 (0.22)	$n_{2N}$	r/min	30	30	20	15	15	12.5	10	7.5	6	1F.2203-2AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	20	24	36	41	55	66	83	111	120	■ ■ ■ + ■ ■ ■ + ...	
0.437	1.67	...	$M_{2,0}$	Nm	25.5	34.5	43	52	69	86	111	138	120	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	98	131	164	197	260	325	416	368	192	■ ■ ■ + ■ ■ ■ + ...	
0.985	3.45	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1F.2203-4AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	49	67	82	94	114	152	183	225	120	■ ■ ■ + ■ ■ ■ + ...	
1.04	3.54	...	$M_{2,0}$	Nm	62	82	103	124	165	205	260	230	120	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	205	275	345	368	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...	
2.09	6.64	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1F.2204-5AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	112	151	184	210	220	230	260	230	119	■ ■ ■ + ■ ■ ■ + ...	
2.14	6.83	...	$M_{2,0}$	Nm	126	168	210	230	260	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	400	416	416	368	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...	
2.11	6.64	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1F.2204-5AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	116	157	188	215	225	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...	
2.16	6.83	...	$M_{2,0}$	Nm	127	169	210	230	260	230	260	230	120	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	400	416	416	368	416	368	416	368	192	■ ■ ■ + ■ ■ ■ + ...	
2.85	8.94	1.61 (1.69)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	-	1F.2204-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	148	200	235	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...	
2.92	9.19	...	$M_{2,0}$	Nm	172	225	260	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...	
3.08	10.2	3.15 (4.05)	$n_{2N}$	r/min	37.5	25	20	20	12.5	10	10	7.5	-	1FT2205-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	121	190	235	210	260	230	255	230	-	■ ■ ■ + ■ ■ ■ + ...	
3.2	10.5	...	$M_{2,0}$	Nm	185	245	260	230	260	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...	
3.11	10.2	3.15 (4.05)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	-	1F.2205-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	143	192	230	230	250	230	260	230	-	■ ■ ■ + ■ ■ ■ + ...	
3.23	10.5	...	$M_{2,0}$	Nm	187	245	260	230	260	230	260	225	-	■ ■ ■ + ■ ■ ■ + ...	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	■ ■ ■ + ■ ■ ■ + ...	

➔ Continued on the next page

Planetary gearbox data		NRB120, 3-stage									
Gearbox type:		<b>A43</b>									
1. Order code		<b>60 80 100 120 160 200 256 320 512</b>									
$i$		<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>									
2. Order code											
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varphi_{2,G}$	'	11									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>Servomotoren SIMOTICS S-1FK2 und S-1FT2 Copcompact mit planetary gearbox NRB120 3-stage (continued)</b>																
3.05	10.2	3.15 (4.05)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	-	-	1FT2205-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	128	172	200	225	199	225	255	225	-	-	■ ■ ■ + ■ ■ ■ + ...	
3.16	10.5	...	$M_{2,0}$	Nm	183	240	260	225	260	230	255	225	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	-		
5.25	17.1	5.1 (6)	$n_{2N}$	r/min	30	30	25	20	20	15	12.5	-	-	-	1F2205-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	240	230	260	230	220	230	260	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
5.46	17.6	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-	-		
5.31	17.1	7.8 (9.4)	$n_{2N}$	r/min	25	25	20	20	12.5	10	10	-	-	-	1FT2206-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	255	250	260	187	260	230	260	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
5.45	17.6	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-	-		
5.41	17.1	7.8 (9.4)	$n_{2N}$	r/min	30	30	25	20	20	15	12.5	-	-	-	1F2206-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	250	250	260	230	220	230	260	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
5.62	17.6	...	$M_{2,0}$	Nm	260	260	260	230	255	225	255	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-	-		
5.25	17.1	7.8 (9.4)	$n_{2N}$	r/min	30	25	25	20	15	15	12.5	-	-	-	1FT2206-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	230	255	230	225	255	225	215	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
5.45	17.6	...	$M_{2,0}$	Nm	260	260	260	225	255	225	255	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	-	-	-		
7.94	25.7	11.5 (13.1)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	-	-	1FT2206-3AB..-0..0-Z	
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
8.26	26.4	...	$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	-	-	-	-	-		
7.81	25.7	11.5 (13.1)	$n_{2N}$	r/min	30	30	25	20	15	-	-	-	-	-	1FT2206-3AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	260	235	255	230	260	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
8.12	26.4	...	$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	-	-	-	-	-		
10.8	36.2	15.1 (16.8)	$n_{2N}$	r/min	25	20	20	15	-	-	-	-	-	-	1FT2206-4AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	260	260	220	230	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
11.1	37.3	...	$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	-	-	-	-	-	-		
10.6	34.3	15.1 (16.8)	$n_{2N}$	r/min	37.5	30	25	20	-	-	-	-	-	-	1F2206-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	250	260	260	230	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
11	35.3	...	$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	-	-	-	-	-	-		
10.1	34.3	15.1 (16.8)	$n_{2N}$	r/min	30	25	25	20	-	-	-	-	-	-	1FT2206-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	260	260	210	225	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
10.5	35.3	...	$M_{2,0}$	Nm	260	260	260	230	-	-	-	-	-	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	-	-	-	-	-	-		

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:

1. Order code

$i$

2. Order code

$M_{2N,G}$

$M_{2max,G}$

$M_{2Em.Off}$

$J_{1,G}$

$\varphi_{2,G}$

### NRB120, 3-stage

#### A43

	60	80	100	120	160	200	256	320	512
<b>R60</b>	<b>R80</b>	<b>R01</b>	<b>R21</b>	<b>R61</b>	<b>R02</b>	<b>R52</b>	<b>R23</b>	<b>R51</b>	
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	380
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413
$\varphi_{2,G}$	'	11							

Color legend:

   $M_{max,M} \times i < M_{2N,G}$

The motor and gearbox combination is fatigue-proof

   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$

Check acceleration and inertias, perform service life calculation if necessary

   $M_{max,M} \times i > M_{2max,G}$

The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRB120**

Servomotor data			Selection data servomotors with planetary gearbox								Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )										
Nm	Nm	kg cm <sup>2</sup>										
<b>Servomotoren SIMOTICS S-1FK2 und S-1FT2 Copcompact mit planetary gearbox NRB120 3-stage (continued)</b>												
10.3	36.2	24.86 (28.16)	$n_{2N}$	r/min	30	25	20	15	-	-	-	1FT2208-2AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	250	250	260	230	-	-	-	■ + ■ + ...
10.6	37.3		$M_{2,0}$	Nm	255	260	255	225	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	-	-	-	
16.2	48.6	31.96 (34.96)	$n_{2N}$	r/min	25	20	15	-	-	-	-	1FT2208-3AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	■ + ■ + ...
16.6	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	
15.2	48.6	31.96 (35.36)	$n_{2N}$	r/min	30	25	20	-	-	-	-	1F.2208-3AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	-	-	-	-	■ + ■ + ...
15.8	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	
15.1	48.6	31.96 (35.36)	$n_{2N}$	r/min	30	25	20	-	-	-	-	1FT2208-3AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	255	250	260	-	-	-	-	■ + ■ + ...
15.7	50.1		$M_{2,0}$	Nm	260	260	260	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	-	-	-	-	
19.7	63.1	41.16 (46.76)	$n_{2N}$	r/min	25	20	-	-	-	-	-	1FT2208-4AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	210	235	-	-	-	-	-	■ + ■ + ...
20.2	64.9		$M_{2,0}$	Nm	260	260	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	
18.9	63.1	41.16 (46.76)	$n_{2N}$	r/min	30	25	-	-	-	-	-	1F.2208-4AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	250	230	-	-	-	-	-	■ + ■ + ...
19.7	64.9		$M_{2,0}$	Nm	260	260	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	
18.2	63.1	41.16 (46.76)	$n_{2N}$	r/min	30	25	-	-	-	-	-	1FT2208-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	255	245	-	-	-	-	-	■ + ■ + ...
18.8	64.9		$M_{2,0}$	Nm	260	255	-	-	-	-	-	
			$M_{2max}$	Nm	416	416	-	-	-	-	-	
22.9	76.6	50.46 (55.96)	$n_{2N}$	r/min	25	-	-	-	-	-	-	1FT2208-5AB..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	-	-	-	-	-	-	■ + ■ + ...
23.7	78.7		$M_{2,0}$	Nm	260	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	-	-	-	-	-	-	
22.7	76.6	50.46 (55.96)	$n_{2N}$	r/min	25	-	-	-	-	-	-	1F.2208-5AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	260	-	-	-	-	-	-	■ + ■ + ...
23.5	78.7		$M_{2,0}$	Nm	260	-	-	-	-	-	-	
			$M_{2max}$	Nm	416	-	-	-	-	-	-	

Planetary gearbox data		NRB120, 3-stage									
Gearbox type:		<b>A43</b>									
1. Order code		<b>60 80 100 120 160 200 256 320 512</b>									
<i>i</i>		<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>									
2. Order code											
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	120	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	192	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.196	1.57	1.563	2.179	1.416	1.416	1.413	1.413	1.413	
$\varnothing_{2,G}$	'	11									

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

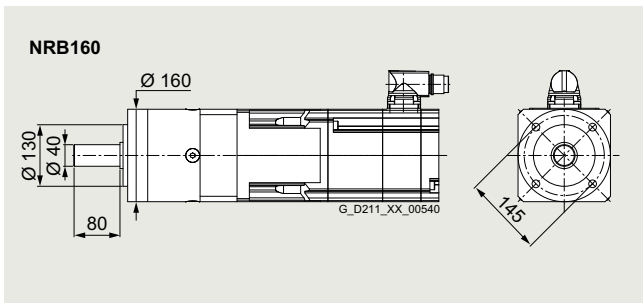
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB160

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5000 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4200 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	5000 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data		Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )															
Nm	Nm	kg cm <sup>2</sup>															
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRB160 1 and 2-stage</b>																	
4.16	14.1	1.71	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	50	37.5	20	<b>1F2105-4AF..-0..0-Z</b>
...	...	(2.55)	$M_{2N}$	Nm	11.2	14.8	19.5	31	44	57	60	76	95	96	136	245	■ ■ ■ + ■ ■ ■ + ...
4.28	14.2		$M_{2,0}$	Nm	12.4	16.8	21	34	51	63	68	85	106	136	170	270	
			$M_{2max}$	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
4.19	14.1	1.71	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	<b>1FT2105-4AH..-0..0-Z</b>
...	...	(2.55)	$M_{2N}$	Nm	10.6	13.8	18.8	28.5	41	55	56	73	90	120	122	235	■ ■ ■ + ■ ■ ■ + ...
4.31	14.2		$M_{2,0}$	Nm	12.5	16.9	21	34	51	64	68	85	107	137	172	275	
			$M_{2max}$	Nm	42	56	70	113	169	210	225	280	350	450	560	720	
7.13	22.8	2.65	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F2105-6AF..-0..0-Z</b>
...	...	(3.5)	$M_{2N}$	Nm	16.5	21	29	43	60	83	82	110	132	187	230	350	■ ■ ■ + ■ ■ ■ + ...
7.24	23.1		$M_{2,0}$	Nm	21	28.5	36	57	86	107	114	143	179	230	285	450	
			$M_{2max}$	Nm	69	92	115	184	270	340	365	455	570	720	910	720	
7.5	24.7	4.6	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F2106-3AF..-0..0-Z</b>
...	...	(6.3)	$M_{2N}$	Nm	17.5	22.5	30.5	45.5	63	88	86	115	139	195	240	365	■ ■ ■ + ■ ■ ■ + ...
7.65	25		$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			$M_{2max}$	Nm	75	100	125	200	295	370	395	495	610	790	980	720	
9.84	31.5	6	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F2106-4AF..-0..0-Z</b>
...	...	(7.6)	$M_{2N}$	Nm	22.5	28.5	39	56	76	108	104	140	167	235	295	435	■ ■ ■ + ■ ■ ■ + ...
10	31.9		$M_{2,0}$	Nm	29.5	39.5	50	80	118	147	157	196	245	310	390	450	
			$M_{2max}$	Nm	95	127	159	255	375	470	500	630	780	1000	1120	720	
14.1	43.6	8.7	$n_{2N}$	r/min	300	200	200	125	75	60	60	50	37.5	37.5	25	20	<b>1F2106-6AF..-0..0-Z</b>
...	...	(10.4)	$M_{2N}$	Nm	30	47	51	88	137	172	173	215	285	290	440	450	■ ■ ■ + ■ ■ ■ + ...
14.4	44.3		$M_{2,0}$	Nm	42.5	57	71	114	168	210	225	280	350	450	560	450	
			$M_{2max}$	Nm	132	176	220	350	520	650	690	870	1090	1280	1120	720	
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage</b>																	
2.65	9.99	3.15	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	<b>1FT2205-2AC..-0..0-Z</b>
...	...	(4.05)	$M_{2N}$	Nm	5.4	7.1	10.2	15.8	22.5	30.5	31	41	51	68	70	135	■ ■ ■ + ■ ■ ■ + ...
2.78	10.1		$M_{2,0}$	Nm	7.9	10.8	13.6	22	32.5	40.5	43.5	54	68	87	110	176	
			$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	

➔ Continued on the next page

Planetary gearbox data		NRB160, 1-stage				NRB160, 2-stage										
Gearbox type:		A51				A52										
1. Order code																
$i$																
2. Order code		R03 R04 R05 R08				R12 R15 R16 R20 R25 R32 R40 R64										
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	800	700	800	700	450		
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1280	1120	1280	1120	720		
$M_{2Em,Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1600	1400	1600	1400	900		
$J_{1,G}$	kg cm <sup>2</sup>	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502			
$\varnothing_{2,G}$		6				9										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRB160**

Servomotor data			Selection data servomotors with planetary gearbox												Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )															
Nm	Nm	kg cm <sup>2</sup>															
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage (continued)</b>																	
2.68	9.99	3.15 (4.05)	$n_{2N}$	r/min	300	250	250	150	100	75	75	75	60	50	37.5	25	<b>1F.2205-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	5.9	8.1	8.9	17.6	25	32	33.5	36.5	47	61	85	127	■ ■ ■ + ■ ■ ■ + ...
2.81	10.1		$M_{2,0}$	Nm	8	10.9	13.8	22	33	41	44	55	69	88	111	178	
			$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
2.62	9.99	3.15 (4.05)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	<b>1FT2205-2AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	5.8	7.7	10.5	16.9	24	31	32.5	42.5	53	70	77	139	■ ■ ■ + ■ ■ ■ + ...
2.74	10.1		$M_{2,0}$	Nm	7.8	10.6	13.4	21.5	32	40.5	43	54	67	87	108	174	
			$M_{2max}$	Nm	29.5	40	50	80	120	150	160	200	250	320	400	630	
4.91	17	5.1 (6)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1F.2205-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	10.4	13.4	18.8	28	40	56	55	74	89	127	160	240	■ ■ ■ + ■ ■ ■ + ...
5.02	17.2		$M_{2,0}$	Nm	14.7	19.8	24.5	40	59	74	78	98	123	158	197	315	
			$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.94	17	7.8 (9.4)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	37.5	30	20	<b>1FT2206-2AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	12.2	16.5	17.5	31.5	52	65	67	85	110	119	150	220	■ ■ ■ + ■ ■ ■ + ...
5.06	17.2		$M_{2,0}$	Nm	14.8	19.9	25	40	60	75	80	100	126	161	200	320	
			$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
5.07	17	7.8 (9.4)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	37.5	20	<b>1F.2206-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	12.1	16.1	21	33	47.5	61	64	82	102	134	143	260	■ ■ ■ + ■ ■ ■ + ...
5.18	17.2		$M_{2,0}$	Nm	15.2	20	25.5	41	61	76	81	102	127	163	200	325	
			$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
4.9	17	7.8 (9.4)	$n_{2N}$	r/min	300	250	200	150	100	75	75	60	50	37.5	30	20	<b>1FT2206-2AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	10.8	13.8	19.4	28	40.5	57	56	76	91	129	161	240	■ ■ ■ + ■ ■ ■ + ...
5.02	17.2		$M_{2,0}$	Nm	14.7	19.7	24.5	40	59	74	79	98	123	158	197	315	
			$M_{2max}$	Nm	51	68	85	137	200	255	270	335	420	540	670	720	
7.64	25.7	11.5 (13.1)	$n_{2N}$	r/min	300	200	200	125	75	75	60	50	37.5	30	20	30	<b>1FT2206-3AB..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	15.7	25	27.5	48.5	76	79	99	125	124	177	220	330	■ ■ ■ + ■ ■ ■ + ...
7.79	26		$M_{2,0}$	Nm	23	30.5	38.5	62	91	114	122	152	191	240	305	450	
			$M_{2max}$	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
7.51	25.7	11.5 (13.1)	$n_{2N}$	r/min	250	200	200	125	75	75	60	50	37.5	37.5	30	20	<b>1FT2206-3AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	18.2	24	26	46.5	75	76	96	121	157	170	210	310	■ ■ ■ + ■ ■ ■ + ...
7.66	26		$M_{2,0}$	Nm	22.5	30	38	61	90	112	120	150	187	240	300	450	
			$M_{2max}$	Nm	77	103	130	205	305	385	410	510	640	820	1020	720	
10.6	36.3	15.1 (16.8)	$n_{2N}$	r/min	250	200	150	100	75	60	50	37.5	37.5	30	25	15	<b>1FT2206-4AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	19.7	26	37	59	80	101	122	164	168	215	255	430	■ ■ ■ + ■ ■ ■ + ...
10.7	36.9		$M_{2,0}$	Nm	31.5	42.5	53	85	127	159	169	210	265	340	420	450	
			$M_{2max}$	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	
10.3	34.4	15.1 (16.8)	$n_{2N}$	r/min	300	250	200	150	75	75	60	60	50	37.5	30	20	<b>1F.2206-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	23	29	39.5	57	106	110	137	143	170	240	300	445	■ ■ ■ + ■ ■ ■ + ...
10.5	34.9		$M_{2,0}$	Nm	31	41.5	52	84	123	154	164	205	255	325	410	450	
			$M_{2max}$	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	

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Planetary gearbox data		NRB160, 1-stage				NRB160, 2-stage							
Gearbox type:		<b>A51</b>				<b>A52</b>							
1. Order code													
$i$													
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R08</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720
$M_{2Em,Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900
$J_{1,G}$	kg cm <sup>2</sup>	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502
$\varphi_{2,G}$	'	6				9							

Color legend:

- $M_{max,M} \times i < M_{2N,G}$       The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$       Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$       The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRB160

Servomotor data			Selection data servomotors with planetary gearbox												Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )															
Nm	Nm	kg cm <sup>2</sup>															
SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRB160 1 and 2-stage (continued)																	
9.83	34.4	15.1 (16.8)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	22.5	29.5	31.5	56	91	115	115	143	191	245	295	350	■ + ■ + ...
10	34.9		$M_{2,0}$	Nm	29.5	39.5	49.5	80	117	147	157	196	245	310	390	450	■ + ■ + ...
			$M_{2max}$	Nm	104	139	174	275	410	510	550	680	860	1100	1120	720	■ + ■ + ...
10.1	36.3	22.5 (25.8)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1FT2208-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	25	33.5	35	62	98	123	126	158	205	260	320	370	■ + ■ + ...
10.3	36.9		$M_{2,0}$	Nm	30.5	40.5	51	82	121	151	161	200	250	320	400	450	■ + ■ + ...
			$M_{2max}$	Nm	110	147	184	290	435	540	580	720	910	1160	1120	720	■ + ■ + ...
16.1	48.9	29.6 (32.6)	$n_{2N}$	r/min	250	200	150	100	60	60	50	37.5	30	25	15	1FT2208-3AB..-0..0-Z	
...	...	...	$M_{2N}$	Nm	29.5	38.5	54	87	143	174	174	235	290	360	450	450	■ + ■ + ...
16.3	49.7		$M_{2,0}$	Nm	48.5	64	81	130	193	240	255	320	400	510	640	450	■ + ■ + ...
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	■ + ■ + ...
15	48.9	29.6 (33)	$n_{2N}$	r/min	250	200	200	125	75	60	60	50	37.5	30	25	20	1F.2208-3AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	35	46	48.5	85	134	169	167	205	275	355	425	450	■ + ■ + ...
15.3	49.7		$M_{2,0}$	Nm	45.5	61	76	122	180	225	240	300	375	480	590	450	■ + ■ + ...
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	■ + ■ + ...
14.9	48.9	29.6 (33)	$n_{2N}$	r/min	250	200	150	125	75	60	60	50	37.5	30	25	20	1FT2208-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	34	44.5	61	80	129	163	161	198	265	340	410	440	■ + ■ + ...
15.2	49.7		$M_{2,0}$	Nm	45	60	76	121	179	220	235	295	370	475	590	450	■ + ■ + ...
			$M_{2max}$	Nm	149	198	245	395	580	730	780	980	1120	1280	1120	720	■ + ■ + ...
19.4	63.5	38.8 (44.4)	$n_{2N}$	r/min	200	150	125	75	60	50	37.5	37.5	30	25	20	15	1FT2208-4AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	37	51	64	111	143	171	225	230	290	350	440	450	■ + ■ + ...
19.8	64.5		$M_{2,0}$	Nm	59	79	99	158	230	290	310	385	480	620	700	450	■ + ■ + ...
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	■ + ■ + ...
18.7	63.5	38.8 (44.4)	$n_{2N}$	r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	1F.2208-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	42	54	75	97	154	194	230	230	315	400	480	450	■ + ■ + ...
19.1	64.5		$M_{2,0}$	Nm	57	76	95	153	220	280	295	370	465	590	700	450	■ + ■ + ...
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	■ + ■ + ...
18	63.5	38.8 (44.4)	$n_{2N}$	r/min	250	200	150	125	75	60	50	50	37.5	30	25	20	1FT2208-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	42.5	55	74	97	155	195	230	230	315	405	480	450	■ + ■ + ...
18.3	64.5		$M_{2,0}$	Nm	54	73	91	146	215	270	285	355	445	570	700	450	■ + ■ + ...
			$M_{2max}$	Nm	193	255	320	510	760	950	1010	1270	1120	1280	1120	720	■ + ■ + ...
22.7	77	48.1 (53.6)	$n_{2N}$	r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	1FT2208-5AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	47	61	84	134	205	250	250	340	420	520	650	450	■ + ■ + ...
23.3	78.3		$M_{2,0}$	Nm	69	92	116	186	270	340	360	455	560	720	700	450	■ + ■ + ...
			$M_{2max}$	Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	■ + ■ + ...
22.4	77	48.1 (53.6)	$n_{2N}$	r/min	250	200	150	100	60	50	50	37.5	30	25	20	20	1F.2208-5AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	47.5	61	85	135	210	255	250	340	425	520	650	450	■ + ■ + ...
23	78.3		$M_{2,0}$	Nm	68	91	114	183	270	335	355	445	560	710	700	450	■ + ■ + ...
			$M_{2max}$	Nm	230	310	390	620	920	1120	1230	1280	1120	1280	1120	720	■ + ■ + ...

### Planetary gearbox data

Gearbox type:		NRB160, 1-stage												NRB160, 2-stage			
1. Order code		A51				A52											
i		3	4	5	8	12	15	16	20	25	32	40	64				
2. Order code		R03	R04	R05	R08	R12	R15	R16	R20	R25	R32	R40	R64				
$M_{2N,G}$	Nm	400	450	450	450	800	700	800	800	700	800	700	450				
$M_{2max,G}$	Nm	640	720	720	720	1280	1120	1280	1280	1120	1280	1120	720				
$M_{2Em,Off}$	Nm	800	900	900	900	1600	1400	1600	1600	1400	1600	1400	900				
$J_{1,G}$	kg cm <sup>2</sup>	11.999	6.912	5.188	3.726	10.087	9.913	6.059	4.695	4.632	3.549	3.524	3.502				
$\varnothing_{2,G}$	'	6				9											

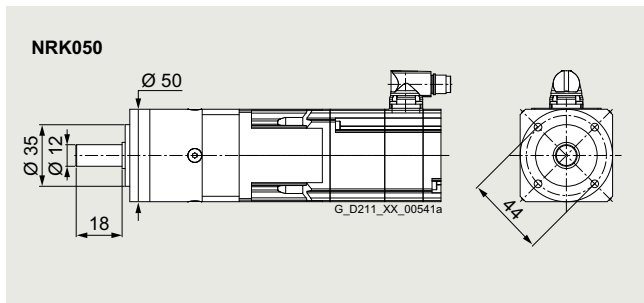
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRK050

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	700 N
Average axial force for 30000 h	$F_{A,eq}$	800 N
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data		Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																
Nm	Nm	( $J_{M,Br}$ )																
		kg cm <sup>2</sup>																

### SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK050 1 and 2-stage

0.5	1.86	0.1396	$n_{2N}$	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	100	60	1F.2103-2AH...-2.0-Z
...	...	(0.1586)	$M_{2N}$	Nm	1.11	1.47	1.55	2.55	2.65	3.35	3.3	4.15	5.2	5.2	7.1	8.6	10.9	9.8	7.5	■ ■ ■ + ■ ■ ■ + ...
0.509	1.89		$M_{2,0}$	Nm	1.5	2	2.5	3.5	4.05	5	4.5	6	7.5	8	10	12.5	15	13	7.5	
			$M_{2max}$	Nm	5.6	7.5	9.4	13.1	9.5	8	16.8	22	21	24	24	21	24	21	12	
0.964	3.9	0.1856	$n_{2N}$	r/min	750	600	600	375	375	375	300	250	200	200	150	150	125	100	-	1F.2103-4AH...-2.0-Z
...	...	(0.2046)	$M_{2N}$	Nm	1.99	2.6	2.7	4.5	4.55	4.15	5.7	6.9	8.8	8.7	11.9	10.8	12.4	13	-	■ ■ ■ + ■ ■ ■ + ...
0.978	3.96		$M_{2,0}$	Nm	2.9	3.85	4.85	6.8	6	5	8.6	11.5	13	15	15	13	15	13	-	
			$M_{2max}$	Nm	11.8	15.8	19.7	13.5	9.5	8	19	24	21	24	24	21	24	21	-	

### SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK050 1 and 2-stage

0.531	1.76	0.2466	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	150	150	100	75	75	60	1F.2203-2AK...-2.0-Z
...	...	(0.2666)	$M_{2N}$	Nm	1	1.32	1.63	2.25	2.2	2.85	2.75	3.3	4.15	5.5	5.6	8.5	11.2	11.5	7.5	■ ■ ■ + ■ ■ ■ + ...
0.539	1.79		$M_{2,0}$	Nm	1.59	2.1	2.65	3.75	4.3	5	4.8	6.4	8	8.5	10.6	13	15	13	7.5	
			$M_{2max}$	Nm	5.3	7.1	8.9	12.4	9.5	8	15.9	21	21	24	24	21	24	21	12	
1.1	3.61	0.3966	$n_{2N}$	r/min	750	500	500	300	300	300	250	200	150	150	125	125	100	75	-	1F.2203-4AK...-2.0-Z
...	...	(0.4166)	$M_{2N}$	Nm	1.96	3	3.05	5.3	5.3	4.7	6.6	8.3	11.1	11.1	13.4	11.4	14.2	13	-	■ ■ ■ + ■ ■ ■ + ...
1.12	3.66		$M_{2,0}$	Nm	3.3	4.4	5.5	7.7	6	5	9.9	13.2	13	15	15	13	15	13	-	
			$M_{2max}$	Nm	10.9	14.6	18.2	13.5	9.5	8	19	24	21	24	24	21	24	21	-	

Planetary gearbox data		NRK050, 1-stage														NRK050, 2-stage														
Gearbox type:		B11							B12																					
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64														
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64														
$M_{2N,G}$	Nm	11	15	13	8.5	6	5	12	15	13	15	15	13	15	13	7.5														
$M_{2max,G}$	Nm	17.5	24	21	13.5	9.5	8	19	24	21	24	24	21	24	21	12														
$M_{2Em,Off}$	Nm	22.5	30	36	26	27	27	33	40	36	40	40	36	40	36	27														
$J_{1,G}$	kg cm <sup>2</sup>	0.03	0.022	0.02	0.016	0.015	0.015	0.026	0.026	0.025	0.02	0.018	0.018	0.015	0.015	0.015														
$\varphi_{2,G}$	'	15						19																						

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

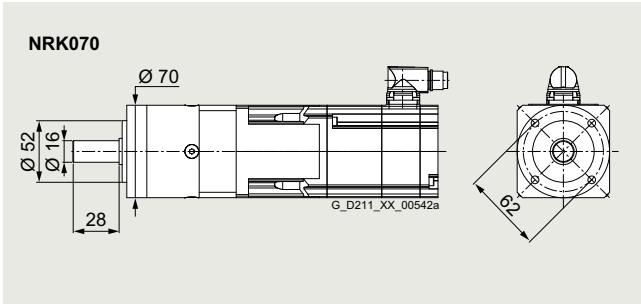
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRK070

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data		Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																						
Nm	Nm	kg cm <sup>2</sup>																						
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK070 1 and 2-stage																						1F.2103-2AH..-2.0-Z		
0.5	1.84	0.093	$n_{2N}$	r/min	600	600	500	375	375	300	375	250	250	200	150	125	100	60	37.5	■■■ + ■■■ + ...				
...	...	(0.112)	$M_{2N}$	Nm	1.09	1.36	1.84	2.75	2.95	3.9	2.85	4.55	5.2	6.1	6.6	9.2	11.5	14.5	18	15	■■■ + ■■■ + ...			
0.543	1.87		$M_{2,0}$	Nm	1.5	2.05	2.6	3.7	4.25	5.3	4.75	6.4	8	8.5	10.7	13.5	17.3	21.5	18	15	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	5.5	7.4	9.2	13	14.9	18.7	16.6	22	27.5	29.5	37	46	53	48	29	24	■■■ + ■■■ + ...			
0.997	3.89	0.139	$n_{2N}$	r/min	600	600	500	375	375	300	300	250	200	200	150	150	100	100	60	-	1F.2103-4AH..-2.0-Z			
...	...	(0.158)	$M_{2N}$	Nm	2.1	2.5	3.3	4.95	5.2	6.8	6.4	8.1	10.8	10.8	14.7	15.1	23	23	18	-	■■■ + ■■■ + ...			
1.03	3.94		$M_{2,0}$	Nm	2.95	4	5	7.1	8.2	10.3	9.1	12.2	15.3	16.4	20.5	25.5	32.5	30	18	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	11.7	15.6	19.6	27.5	29	24	35	46.5	53	53	53	48	53	48	29	-	■■■ + ■■■ + ...			
1.15	3.6	0.371	$n_{2N}$	r/min	750	600	600	500	375	300	375	250	200	200	150	125	100	75	50	-	1F.2104-4AF..-2.0-Z			
...	...	(0.451)	$M_{2N}$	Nm	2.7	3.9	4.4	5.8	7.8	10	7.8	11.6	14.9	15.5	19.9	24.5	31.5	30	18	-	■■■ + ■■■ + ...			
1.19	3.64		$M_{2,0}$	Nm	3.45	4.65	5.8	8.2	9.4	11.8	10.5	14.1	17.7	18.9	23.5	29.5	33	30	18	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	10.8	14.5	18.1	25	29	24	32	43	53	53	53	48	53	48	29	-	■■■ + ■■■ + ...			
1.15	3.7	0.371	$n_{2N}$	r/min	750	600	600	500	375	375	375	300	250	200	200	150	125	100	60	-	1F.2104-4AK..-2.0-Z			
...	...	(0.451)	$M_{2N}$	Nm	2.85	4.1	4.6	6.1	8.3	8.9	8.1	10.5	13.7	16.7	17.4	23.5	29	30	18	-	■■■ + ■■■ + ...			
1.18	3.74		$M_{2,0}$	Nm	3.4	4.6	5.8	8.2	9.4	11.8	10.5	14	17.6	18.7	23.5	29	33	30	18	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	11.1	14.9	18.6	26	29	24	33	44	53	53	53	48	53	48	29	-	■■■ + ■■■ + ...			
2.26	7.24	0.581	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	-	-	1F.2104-5AF..-2.0-Z			
...	...	(0.671)	$M_{2N}$	Nm	4.5	6.4	8.2	11.8	12.2	15	14.6	17.9	23.5	23	31.5	30	33	30	-	-	■■■ + ■■■ + ...			
2.29	7.33		$M_{2,0}$	Nm	6.7	9	11.3	15.9	18	15	20	27	33	33	33	30	30	30	-	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	21.5	29	36.5	40	29	24	53	53	53	53	53	48	53	48	-	-	■■■ + ■■■ + ...			
2.24	7.34	0.581	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	150	125	100	-	-	1F.2104-5AK..-2.0-Z			
...	...	(0.671)	$M_{2N}$	Nm	4.45	6.3	8.1	11.6	12	15	14.4	17.7	23	23	31	30	33	30	-	-	■■■ + ■■■ + ...			
2.27	7.43		$M_{2,0}$	Nm	6.7	9	11.3	15.8	18	15	20	27	33	33	33	30	33	30	-	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	22	29.5	37	40	29	24	53	53	53	53	53	48	53	48	-	-	■■■ + ■■■ + ...			
3.01	9.66	0.781	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	-	-	125	100	75	-	-	1F.2104-6AF..-2.0-Z			
...	...	(0.861)	$M_{2N}$	Nm	5.4	7.7	9.8	14.1	14.5	15	17	20.5	27	-	-	30	33	30	-	-	■■■ + ■■■ + ...			
3.04	9.79		$M_{2,0}$	Nm	9	12	15.1	21	18	15	27	33	33	-	-	30	33	30	-	-	■■■ + ■■■ + ...			
			$M_{2max}$	Nm	29	39	48	40	29	24	53	53	53	-	-	48	53	48	-	-	■■■ + ■■■ + ...			

Continued on the next page

### Planetary gearbox data

Gearbox type:		NRK070, 1-stage								NRK070, 2-stage							
1. Order code		B21								B22							
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064
$\phi_{2,G}$	'	10						12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRK070

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK070 1 and 2-stage (continued)</b>																					
2.87	10.4	3.42 (4.32)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	100	75	75	-	-	1FT2205-2AH..-0..-Z
...	...	...	$M_{2N}$	Nm	6.1	8.7	9	14.4	14.4	15	18.2	24.5	30	29.5	33	30	33	24.5	-	-	■ + ■ + ...
2.9	10.5		$M_{2,0}$	Nm	8.6	11.5	14.4	20	18	15	25.5	33	33	33	33	30	33	30	-	-	
			$M_{2max}$	Nm	31.5	42	48	40	29	24	53	53	53	53	53	48	53	48	-	-	
4.93	17.4	5.37 (6.27)	$n_{2N}$	r/min	500	375	300	250	250	200	150	150	125	125	100	75	-	-	-	-	1F2205-4AF..-0..-Z
...	...	...	$M_{2N}$	Nm	9.3	13.1	16.9	21	18	14.2	25.5	33	30.5	33	31	30	33	-	-	-	■ + ■ + ...
4.99	17.7		$M_{2,0}$	Nm	14.9	19.9	24.5	25	18	15	33	33	33	33	33	30	33	-	-	-	
			$M_{2max}$	Nm	45	53	48	40	29	24	53	53	53	53	53	48	53	-	-	-	
<b>Planetary gearbox data</b>																					
Gearbox type:			NRK070, 1-stage							NRK070, 2-stage											
1. Order code			B21							B22											
$i$			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm		28	33	30	25	18	15	33	33	33	33	33	30	33	30	18	15			
$M_{2max,G}$	Nm		45	53	48	40	29	24	53	53	53	53	53	48	53	48	29	24			
$M_{2Em,Off}$	Nm		66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80			
$J_{1,G}$	kg cm <sup>2</sup>		0.174	0.117	0.095	0.078	0.074	0.069	0.126	0.121	0.078	0.087	0.076	0.075	0.067	0.066	0.066	0.064			
$\varnothing_{2,G}$	'		10						12												

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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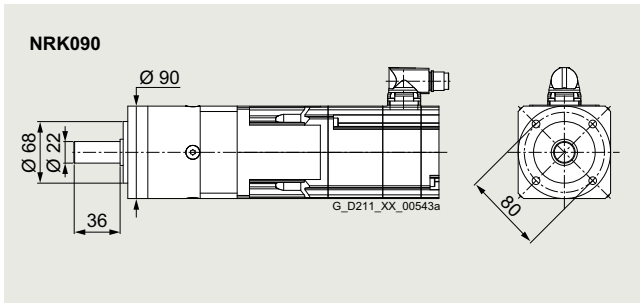


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRK090

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK090 1 and 2-stage</b>																						
0.445	1.78	0.093 (0.112)	$n_{2N}$	r/min	600	500	500	375	375	300	300	250	200	200	150	150	125	100	60	37.5	<b>1F.2103-2AH..-0.0-Z</b>	
...	...	...	$M_{2N}$	Nm	0.86	1.28	1.54	2.4	2.6	3.5	2.95	3.85	4.95	5.2	7.2	7.7	10	12.8	21.5	34.5	■ ■ ■ + ■ ■ ■ + ...	
0.515	1.83		$M_{2,0}$	Nm	1.33	1.86	2.35	3.4	3.95	5	4.45	6	7.5	8	10.1	12.7	16.3	20.5	32.5	38		
			$M_{2max}$	Nm	5.3	7.2	9	12.7	14.6	18.3	16.3	21.5	27	29	36	45.5	58	73	80	61		
0.998	3.86	0.139 (0.158)	$n_{2N}$	r/min	600	500	500	375	300	300	200	200	200	150	125	100	75	50	37.5	<b>1F.2103-4AH..-0.0-Z</b>		
...	...	...	$M_{2N}$	Nm	1.96	2.75	3.05	4.85	6.2	6.7	6.1	9.4	9.8	10	14.7	17.9	23.5	31	48.5	38	■ ■ ■ + ■ ■ ■ + ...	
1.05	3.9		$M_{2,0}$	Nm	2.95	4.05	5.1	7.2	8.3	10.5	9.3	12.4	15.6	16.6	20.5	26	33.5	41.5	50	38		
			$M_{2max}$	Nm	11.5	15.4	19.3	27	31	38.5	34.5	46	57	61	77	96	123	131	80	61		
1.1	3.56	0.35 (0.43)	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	<b>1F.2104-4AF..-2.0-Z</b>	
...	...	...	$M_{2N}$	Nm	2.3	3.5	4.65	6.8	7.5	9.6	8.4	10.9	13.8	14.5	19.2	23.5	30.5	39.5	50	38	■ ■ ■ + ■ ■ ■ + ...	
1.15	3.6		$M_{2,0}$	Nm	3.25	4.45	5.6	7.9	9.1	11.4	10.2	13.7	17.1	18.3	22.5	28.5	36.5	46	50	38		
			$M_{2max}$	Nm	10.6	14.3	17.9	25	28.5	36	32	42.5	53	57	71	89	114	131	80	61		
1.09	3.66	0.35 (0.43)	$n_{2N}$	r/min	600	600	500	375	375	300	300	250	200	200	150	150	125	100	60	37.5	<b>1F.2104-4AK..-2.0-Z</b>	
...	...	...	$M_{2N}$	Nm	3.05	3.7	5	7.4	8.1	10.4	9.2	11.9	15.1	15.8	20.5	21.5	27.5	35	50	38	■ ■ ■ + ■ ■ ■ + ...	
1.15	3.7		$M_{2,0}$	Nm	3.25	4.4	5.6	7.9	9.1	11.4	10.1	13.6	17	18.2	22.5	28.5	36.5	45.5	50	38		
			$M_{2max}$	Nm	10.9	14.6	18.4	25.5	29.5	37	33	44	55	58	73	91	117	131	80	61		
2.2	7.19	0.56 (0.65)	$n_{2N}$	r/min	600	500	500	375	300	300	200	150	150	150	125	100	75	50	30	<b>1F.2104-5AF..-2.0-Z</b>		
...	...	...	$M_{2N}$	Nm	5.4	7.3	8	12	15.3	16.1	14.7	22.5	30	31	32.5	39	51	69	50	38	■ ■ ■ + ■ ■ ■ + ...	
2.25	7.29		$M_{2,0}$	Nm	6.6	8.8	11.1	15.6	17.9	22	20	26.5	33	35.5	44.5	55	71	82	50	38		
			$M_{2max}$	Nm	21.5	29	36	50	58	61	65	86	108	115	144	131	144	131	80	61		
2.19	7.29	0.56 (0.65)	$n_{2N}$	r/min	600	500	500	375	300	300	200	150	150	150	125	100	75	60	37.5	<b>1F.2104-5AK..-2.0-Z</b>		
...	...	...	$M_{2N}$	Nm	5.3	7.2	7.8	11.8	15	15.8	14.4	22	29.5	30.5	32	38.5	50	68	50	38	■ ■ ■ + ■ ■ ■ + ...	
2.23	7.39		$M_{2,0}$	Nm	6.5	8.8	11	15.5	17.8	22	19.9	26.5	33	35	44	55	71	82	50	38		
			$M_{2max}$	Nm	22	29	36.5	51	59	61	65	87	109	117	144	131	144	131	80	61		
2.95	9.62	0.76 (0.84)	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	100	75	50	-	<b>1F.2104-6AF..-2.0-Z</b>	
...	...	...	$M_{2N}$	Nm	6.6	8.9	9.6	14.3	18.3	22.5	20.5	27	35.5	36.5	45.5	57	59	80	50	-	■ ■ ■ + ■ ■ ■ + ...	
3	9.75		$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	90	82	50	-		
			$M_{2max}$	Nm	29	38.5	48.5	68	77	61	86	115	131	144	144	131	144	131	80	-		

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Planetary gearbox data		NRK090, 1-stage										NRK090, 2-stage							
Gearbox type:		<b>B31</b>										<b>B32</b>							
1. Order code																			
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100		
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00		
$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38		
$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61		
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200		
$J_{1,G}$	kg cm <sup>2</sup>	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356		
$\varphi_{2,G}$	'	7										9							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRK090**

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK090 1 and 2-stage (continued)</b>																					
2.94	10.4	3.15 (4.05)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	50	37.5	-	1FT2205-2AC..-0.0-Z
...	...	...	$M_{2N}$	Nm	6.7	9.6	10.5	14.1	17.5	22.5	21	28	29	36	46	45	63	82	50	-	■ + ■ + ...
2.98	10.5		$M_{2,0}$	Nm	8.8	11.8	14.8	20.5	23.5	29.5	26	35	44	47	58	73	90	82	49.5	-	
			$M_{2max}$	Nm	31.5	42	52	73	80	61	94	125	131	144	144	131	144	131	80	-	

➔ Continued on the next page

Planetary gearbox data		NRK090, 1-stage							NRK090, 2-stage								
Gearbox type:		B31							B32								
1. Order code		3 4 5 7 8 10							9 12 15 16 20 25 32 40 64 100								
$i$		R03 R04 R05 R07 R08 R10							R09 R12 R15 R16 R20 R25 R32 R40 R64 R00								
2. Order code																	
$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38
$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm <sup>2</sup>	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356
$\varphi_{2,G}$	°	7							9								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRK090

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox																								
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	375	300	250	200	200	200	-	125	100	100	100	75	60	50	-	-	1F2206-4AF..-0..0-Z	+	+ ...																		
Nm	Nm	$J_{M,Br}$																						$M_{2N}$	Nm	23.5	30.5	37.5	49	48.5	38	-	73	82	88	70	82	90	82	-	-
			$M_{2,0}$	Nm	30.5	41	51	65	50	38	-	90	82	90	90	82	90	82	-	-																					
			$M_{2max}$	Nm	106	141	131	104	79	61	-	144	131	144	144	131	144	131	-	-																					
10.1	34.7	15.976	$i$	r/min	375	300	250	200	200	200	-	125	100	100	100	75	60	50	-	-	1F2206-4AF..-0..0-Z	+	+ ...																		
...	...	(17.676)																						$M_{2N}$	Nm	23.5	30.5	37.5	49	48.5	38	-	73	82	88	70	82	90	82	-	-
10.3	35.3																							$M_{2,0}$	Nm	30.5	41	51	65	50	38	-	90	82	90	90	82	90	82	-	-
			$M_{2max}$	Nm	106	141	131	104	79	61	-	144	131	144	144	131	144	131	-	-																					
9.7	34.7	15.976	$i$	r/min	375	300	250	150	150	150	125	100	100	75	75	60	60	50	-	-	1FT2206-4AH..-0..0-Z	+	+ ...																		
...	...	(17.676)																						$M_{2N}$	Nm	18.3	23.5	28.5	49	49.5	38	59	73	68	90	90	82	77	80	-	-
9.86	35.3																							$M_{2,0}$	Nm	29.5	39	49	65	50	38	87	90	82	90	90	82	90	82	-	-
			$M_{2max}$	Nm	106	141	131	104	79	61	155	144	131	144	144	131	144	131	-	-																					

Planetary gearbox data		NRK090, 1-stage										NRK090, 2-stage									
Gearbox type:		B31										B32									
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
$i$		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm	85	90	82	65	50	38	97	90	82	90	90	82	90	82	50	38				
$M_{2max,G}$	Nm	136	144	131	104	80	61	155	144	131	144	144	131	144	131	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200				
$J_{1,G}$	kg cm <sup>2</sup>	0.789	0.557	0.476	0.409	0.394	0.374	0.625	0.601	0.592	0.453	0.41	0.406	0.368	0.366	0.367	0.356				
$\varnothing_{2,G}$	'	7						9													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

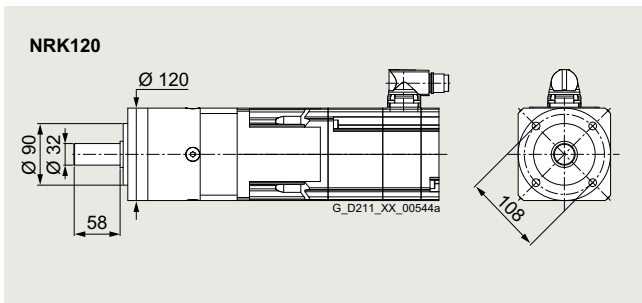
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRK120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$																				
Nm	Nm																				
$J_M$ ( $J_{M,Br}$ )																					
kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK120 1 and 2-stage</b>																					
0.318	1.66	0.093	$n_{2N}$	r/min	375	300	300	300	250	250	200	150	125	125	100	75	75	37.5	30	<b>1F.2103-2AH..-0..0-Z</b>	
...	...	(0.112)	$M_{2N}$	Nm	0.55	0.98	1.29	1.73	2.2	2.45	2.35	3.4	4.35	4.55	5.3	6.8	10.1	10.6	21	28.5	■■■ + ■■■ + ...
0.449	1.76		$M_{2,0}$	Nm	0.95	1.41	1.87	2.75	3.25	4.15	3.65	5	6.4	6.8	8.6	10.9	14.1	17.7	28.5	44.5	
			$M_{2max}$	Nm	4.95	6.7	8.5	12.1	13.9	17.5	15.5	20.5	26	27.5	34.5	43.5	56	70	112	152	
0.941	3.73	0.139	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	75	60	37.5	25	<b>1F.2103-4AH..-0..0-Z</b>	
...	...	(0.158)	$M_{2N}$	Nm	2	2.55	3.7	5.3	5.7	7.7	6.5	8.9	11.2	11.8	12.7	16.5	24	30	49	76	■■■ + ■■■ + ...
1.06	3.82		$M_{2,0}$	Nm	2.8	3.9	4.95	7.1	8.2	10.3	9.2	12.4	15.5	16.6	20.5	26	33.5	42	67	95	
			$M_{2max}$	Nm	11.1	15	18.8	26.5	30	38	33.5	45	56	60	75	94	121	151	192	152	
0.969	3.43	0.35	$n_{2N}$	r/min	500	375	375	300	300	250	250	200	150	150	125	100	100	75	50	30	<b>1F.2104-4AF..-0..0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	2.25	3.45	4.25	6.2	6.8	8.8	7.3	9.7	13	13.6	17.6	22	24	34	51	88	■■■ + ■■■ + ...
1.09	3.52		$M_{2,0}$	Nm	2.9	4	5.1	7.3	8.4	10.6	9.4	12.7	16	17.1	21	26.5	34.5	43	69	95	
			$M_{2max}$	Nm	10.2	13.8	17.4	24.5	28	35	31	41.5	52	55	69	87	112	139	192	152	
0.963	3.53	0.35	$n_{2N}$	r/min	500	500	375	300	300	250	250	200	150	150	125	100	100	75	50	30	<b>1F.2104-4AK..-0..0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	2.45	2.65	4.55	6.7	7.4	9.7	8.1	10.5	14.2	15	19.4	24.5	25	37	53	95	■■■ + ■■■ + ...
1.08	3.62		$M_{2,0}$	Nm	2.85	3.95	5	7.2	8.3	10.6	9.4	12.6	15.9	17	21	26.5	34	43	69	95	
			$M_{2max}$	Nm	10.5	14.2	17.8	25	28.5	36	32	43	53	57	71	89	115	143	192	152	
2.07	7.13	0.56	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	<b>1F.2104-5AF..-0..0-Z</b>
...	...	(0.65)	$M_{2N}$	Nm	4.9	7.6	8.5	12.2	15.3	20	18.1	24.5	30.5	31.5	41	41	60	75	120	95	■■■ + ■■■ + ...
2.17	7.21		$M_{2,0}$	Nm	6.2	8.4	10.6	15	17.2	21.5	19.2	25.5	32	34.5	43	54	69	86	120	95	
			$M_{2max}$	Nm	21	28.5	35.5	50	57	72	64	85	107	114	142	178	225	275	192	152	
2.06	7.23	0.56	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	100	75	60	37.5	30	<b>1F.2104-5AK..-0..0-Z</b>
...	...	(0.65)	$M_{2N}$	Nm	4.8	7.5	8.3	12	15.1	19.8	17.7	24	30	30.5	40.5	40.5	59	74	119	95	■■■ + ■■■ + ...
2.15	7.31		$M_{2,0}$	Nm	6.1	8.3	10.5	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	85	120	95	
			$M_{2max}$	Nm	21.5	29	36	51	58	73	65	86	108	115	144	180	230	275	192	152	
2.82	9.55	0.76	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	30	<b>1F.2104-6AF..-0..0-Z</b>
...	...	(0.84)	$M_{2N}$	Nm	6.2	9.5	10.5	14.9	18.7	24.5	22	30	37	37.5	49.5	65	71	89	120	95	■■■ + ■■■ + ...
2.92	9.67		$M_{2,0}$	Nm	8.4	11.4	14.3	20	23	29	25.5	34.5	43	46	57	72	92	116	120	95	
			$M_{2max}$	Nm	28.5	38	48	67	77	96	86	114	143	153	191	235	305	275	192	152	

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Planetary gearbox data		NRK120, 1-stage							NRK120, 2-stage											
Gearbox type:		<b>B41</b>							<b>B42</b>											
1. Order code																				
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95			
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480			
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376			
$\varnothing_{2,G}$	'	7							9											

Color legend:    $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**  
   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**  
   $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**









## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRK120

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	300	250	200	150	125	150	100	75	75	75	60	60	50	37.5	-	-	1FT2208-5AB..-0..0-Z + ...
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	45	55	71	98	118	79	139	182	171	173	195	168	191	172	-	-	
			$M_{2,0}$	Nm	69	92	115	135	120	95	157	195	172	195	195	172	195	172	-	-	1F2208-5AC..-0..0-Z + ...
			$M_{2max}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	-	-	
22.8	77.3	50.46 (55.96)	$n_{2N}$	r/min	300	250	200	150	125	125	100	75	75	75	60	60	50	37.5	-	-	1FT2208-5AB..-0..0-Z + ...
...	...	...	$M_{2N}$	Nm	45	55	71	98	118	95	138	183	170	170	195	159	173	172	-	-	
23.2	78.7		$M_{2,0}$	Nm	68	91	114	135	120	95	157	195	172	195	195	172	195	172	-	-	1F2208-5AC..-0..0-Z + ...
22.5	77.3	50.46 (55.96)	$M_{2max}$	Nm	184	248	275	216	192	152	251	310	275	312	312	275	312	275	-	-	
...	...	...																			
22.9	78.7																				

Planetary gearbox data		NRK120, 1-stage										NRK120, 2-stage															
Gearbox type:		<b>B41</b>										<b>B42</b>															
1. Order code																											
$i$																											
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>										
$M_{2N,G}$	Nm	115	155	172	135	120	95	157	195	172	195	195	172	195	172	120	95										
$M_{2max,G}$	Nm	184	248	275	216	192	152	251	312	275	312	312	275	312	275	192	152										
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480										
$J_{1,G}$	kg cm <sup>2</sup>	2.764	2.051	1.768	1.546	1.495	1.419	2.334	2.248	2.218	1.76	1.582	1.571	1.423	1.419	1.415	1.376										
$\varnothing_{2,G}$	'	7										9															

Color legend:	<span style="background-color: #d9ead3; border: 1px solid #ccc; padding: 2px;"></span> $M_{max,M} \times i < M_{2N,G}$	<b>The motor and gearbox combination is fatigue-proof</b>
	<span style="background-color: #f4cccc; border: 1px solid #ccc; padding: 2px;"></span> $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	<b>Check acceleration and inertias, perform service life calculation if necessary</b>
	<span style="background-color: #f4cccc; border: 1px solid #ccc; padding: 2px;"></span> $M_{max,M} \times i > M_{2max,G}$	<b>The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary</b>

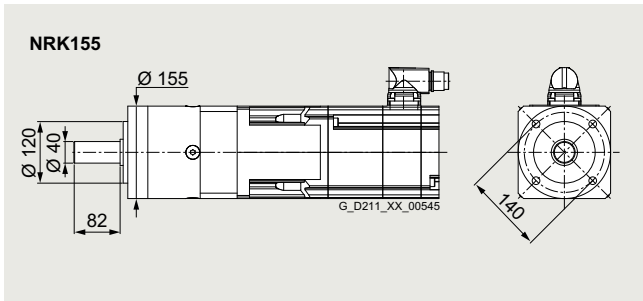
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRK155

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5200 N
Average axial force for 20000 h	$F_{A,eq}$	7000 N
Average radial force for 30000 h	$F_{R,eq}$	4600 N
Average axial force for 30000 h	$F_{A,eq}$	6000 N
Maximum radial force	$F_{R,max}$	8400 N
Maximum axial force	$F_{A,max}$	11000 N

Servomotor data		Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												

### SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NRK155 1 and 2-stage

4.5	14.3	1.71 (2.55)	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	30	1F.2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	15.1	20.5	39.5	65	71	98	161	205	186	■ ■ ■ + ■ ■ ■ + ...
4.58	14.5		$M_{2,0}$	Nm	18	22.5	45.5	72	91	113	182	225	210	
			$M_{2max}$	Nm	57	72	145	225	285	355	570	712	336	
4.53	14.3	1.71 (2.55)	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	25	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	13.6	19.6	35	61	63	90	150	195	210	■ ■ ■ + ■ ■ ■ + ...
4.62	14.5		$M_{2,0}$	Nm	18.1	22.5	46	73	91	114	183	225	210	
			$M_{2max}$	Nm	57	72	145	225	285	355	570	712	336	
7.47	23	2.65 (3.5)	$n_{2N}$	r/min	300	300	200	100	75	60	50	37.5	25	1F.2105-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	25.5	28.5	50	87	124	156	200	270	210	■ ■ ■ + ■ ■ ■ + ...
7.54	23.4		$M_{2,0}$	Nm	29.5	37	75	119	149	187	295	370	210	
			$M_{2max}$	Nm	93	116	230	365	460	570	736	712	336	
7.89	25	4.6 (6.3)	$n_{2N}$	r/min	375	300	200	100	75	60	50	37.5	25	1F.2106-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	21	29.5	52	91	128	161	205	280	210	■ ■ ■ + ■ ■ ■ + ...
8.04	25.3		$M_{2,0}$	Nm	31.5	39.5	80	126	158	197	315	395	210	
			$M_{2max}$	Nm	101	126	250	400	500	620	736	712	336	
10.3	31.7	6 (7.6)	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	25	1F.2106-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	33	36	82	106	153	192	320	400	210	■ ■ ■ + ■ ■ ■ + ...
10.5	32.2		$M_{2,0}$	Nm	41.5	52	104	164	205	255	410	445	210	
			$M_{2max}$	Nm	128	161	320	500	630	712	736	712	336	
14.5	43.9	8.7 (10.4)	$n_{2N}$	r/min	300	250	150	75	75	60	37.5	37.5	-	1F.2106-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	43.5	56	107	179	189	235	400	380	-	■ ■ ■ + ■ ■ ■ + ...
14.8	44.5		$M_{2,0}$	Nm	59	73	148	230	290	360	460	445	-	
			$M_{2max}$	Nm	178	220	336	700	736	712	736	712	-	

### SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage

3.04	10.3	3.15 (4.05)	$n_{2N}$	r/min	300	300	200	100	100	75	50	37.5	20	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.4	11.4	21	37	39	55	94	121	210	■ ■ ■ + ■ ■ ■ + ...
3.12	10.4		$M_{2,0}$	Nm	12.1	15.3	31	49	61	77	123	154	210	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NRK155, 1-stage			NRK155, 2-stage					
1. Order code		B51			B52					
$i$		4	5	10	16	20	25	40	50	100
2. Order code		R04	R05	R10	R16	R20	R25	R40	R50	R00
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varnothing_{2,G}$		6			9					

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRK155**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>														
3.07	10.3	3.15 (4.05)	$n_{2N}$	r/min	375	375	200	125	100	75	60	50	25	<b>1F.2205-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	9.2	9.8	24.5	32.5	47.5	61	90	106	210	■ ■ ■ + ■ ■ ■ + ...
3.15	10.4	...	$M_{2,0}$	Nm	12.2	15.4	31.5	49.5	62	77	124	156	210	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	
3	10.3	3.15 (4.05)	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	25	<b>1FT2205-2AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	8.2	11.8	22.5	37.5	42	58	96	122	183	■ ■ ■ + ■ ■ ■ + ...
3.08	10.4	...	$M_{2,0}$	Nm	11.9	15.1	30.5	48.5	60	76	122	152	205	
			$M_{2max}$	Nm	41	51	103	164	205	255	410	510	336	
5.3	17.2	5.1 (6)	$n_{2N}$	r/min	300	300	200	100	75	60	50	37.5	25	<b>1F.2205-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	17.1	19.2	34	61	87	109	146	196	210	■ ■ ■ + ■ ■ ■ + ...
5.39	17.5	...	$M_{2,0}$	Nm	21	26.5	53	84	106	132	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.29	17.2	7.8 (9.4)	$n_{2N}$	r/min	300	250	150	75	75	60	37.5	30	20	<b>1FT2206-2AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	15.8	20.5	40.5	73	79	100	171	215	205	■ ■ ■ + ■ ■ ■ + ...
5.37	17.5	...	$M_{2,0}$	Nm	21	26.5	53	85	106	133	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.46	17.2	7.8 (9.4)	$n_{2N}$	r/min	375	300	200	100	100	75	50	37.5	25	<b>1F.2206-2AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	16	21.5	39.5	68	71	100	165	210	210	■ ■ ■ + ■ ■ ■ + ...
5.54	17.5	...	$M_{2,0}$	Nm	21.5	27	55	87	109	136	215	270	205	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
5.29	17.2	7.8 (9.4)	$n_{2N}$	r/min	300	300	150	100	75	60	50	37.5	25	<b>1FT2206-2AH..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	17.2	18.8	44.5	60	86	108	138	189	200	■ ■ ■ + ■ ■ ■ + ...
5.37	17.5	...	$M_{2,0}$	Nm	21	26.5	53	84	105	132	210	265	210	
			$M_{2max}$	Nm	69	87	174	275	345	430	690	712	336	
8.04	25.9	11.5 (13.1)	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	15	<b>1FT2206-3AB..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	24	26.5	62	81	117	148	250	310	210	■ ■ ■ + ■ ■ ■ + ...
8.19	26.3	...	$M_{2,0}$	Nm	32	40.5	81	128	161	200	320	400	210	
			$M_{2max}$	Nm	105	131	260	415	520	650	736	712	336	
7.91	25.9	11.5 (13.1)	$n_{2N}$	r/min	300	250	150	75	75	60	37.5	30	25	<b>1FT2206-3AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	23	30	59	103	111	140	235	295	210	■ ■ ■ + ■ ■ ■ + ...
8.06	26.3	...	$M_{2,0}$	Nm	31.5	40	80	126	158	198	315	395	210	
			$M_{2max}$	Nm	105	131	260	415	520	650	736	712	336	
10.9	36.6	15.1 (16.8)	$n_{2N}$	r/min	250	200	125	60	60	50	30	25	20	<b>1FT2206-4AC..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	27.5	36.5	64	125	131	156	275	330	162	■ ■ ■ + ■ ■ ■ + ...
11	37.1	...	$M_{2,0}$	Nm	43.5	54	110	174	215	270	435	445	210	
			$M_{2max}$	Nm	148	185	336	580	730	712	736	712	336	
10.7	34.6	15.1 (16.8)	$n_{2N}$	r/min	300	300	150	100	75	60	37.5	30	25	<b>1F.2206-4AF..-0..0-Z</b>
...	...	...	$M_{2N}$	Nm	34	37	84	108	155	195	325	405	210	■ ■ ■ + ■ ■ ■ + ...
10.9	35.2	...	$M_{2,0}$	Nm	43	54	109	171	210	265	425	445	210	
			$M_{2max}$	Nm	140	175	336	550	690	712	736	712	336	

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Planetary gearbox data		NRK155, 1-stage			NRK155, 2-stage					
Gearbox type:		<b>B51</b>			<b>B52</b>					
1. Order code										
$i$										
2. Order code		<b>R04</b>	<b>R05</b>	<b>R10</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R40</b>	<b>R50</b>	<b>R00</b>
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$	'	6			9					

Color legend:    $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**

   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**

   $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRK155

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>															
10.2	34.6	15.1 (16.8)	$n_{2N}$	r/min	300	250	150	75	75	50	37.5	30	20	20	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	27	35	67	119	124	188	265	330	210	210	■ ■ ■ + ■ ■ ■ + ...
10.4	35.2	...	$M_{2,0}$	Nm	41	51	104	164	205	255	410	445	210	210	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	140	175	336	550	690	712	736	712	336	336	■ ■ ■ + ■ ■ ■ + ...
10.5	36.6	22.5 (25.8)	$n_{2N}$	r/min	300	250	125	75	60	50	37.5	30	20	20	1FT2208-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	29.5	38	85	129	166	200	280	350	210	210	■ ■ ■ + ■ ■ ■ + ...
10.7	37.1	...	$M_{2,0}$	Nm	42	53	106	167	205	260	415	445	210	210	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	148	185	336	580	730	712	736	712	336	336	■ ■ ■ + ■ ■ ■ + ...
16.4	49.2	29.6 (32.6)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	25	-	-	1FT2208-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	39.5	52	113	174	215	280	370	435	-	-	■ ■ ■ + ■ ■ ■ + ...
16.6	49.9	...	$M_{2,0}$	Nm	66	82	165	260	325	405	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...
15.5	49.2	29.6 (33)	$n_{2N}$	r/min	300	250	125	75	60	50	30	30	-	-	1F.2208-3AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	40.5	52	115	169	215	260	450	440	-	-	■ ■ ■ + ■ ■ ■ + ...
15.8	49.9	...	$M_{2,0}$	Nm	63	78	158	245	310	385	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...
15.4	49.2	29.6 (33)	$n_{2N}$	r/min	250	250	125	75	60	50	30	30	-	-	1FT2208-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	45.5	48	108	160	205	245	425	410	-	-	■ ■ ■ + ■ ■ ■ + ...
15.7	49.9	...	$M_{2,0}$	Nm	62	78	156	245	305	385	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	199	245	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...
19.9	63.8	38.8 (44.4)	$n_{2N}$	r/min	200	150	100	50	37.5	37.5	25	20	-	-	1FT2208-4AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	46.5	64	102	197	260	265	405	445	-	-	■ ■ ■ + ■ ■ ■ + ...
20.1	64.7	...	$M_{2,0}$	Nm	80	100	200	315	395	445	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	255	320	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...
19.2	63.8	38.8 (44.4)	$n_{2N}$	r/min	250	200	125	75	60	50	37.5	30	-	-	1F.2208-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	56	73	129	186	240	285	365	440	-	-	■ ■ ■ + ■ ■ ■ + ...
19.6	64.7	...	$M_{2,0}$	Nm	78	98	196	305	385	445	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	255	320	336	736	736	712	730	712	-	-	■ ■ ■ + ■ ■ ■ + ...
18.4	63.8	38.8 (44.4)	$n_{2N}$	r/min	250	200	125	75	60	50	37.5	30	-	-	1FT2208-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	56	73	128	186	240	285	370	445	-	-	■ ■ ■ + ■ ■ ■ + ...
18.8	64.7	...	$M_{2,0}$	Nm	74	93	187	295	365	445	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	255	320	336	736	736	712	730	712	-	-	■ ■ ■ + ■ ■ ■ + ...
23.3	77.3	48.1 (53.6)	$n_{2N}$	r/min	250	200	125	60	50	37.5	37.5	30	-	-	1FT2208-5AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	61	80	138	250	305	405	375	445	-	-	■ ■ ■ + ■ ■ ■ + ...
23.8	78.5	...	$M_{2,0}$	Nm	95	118	210	370	460	445	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	310	390	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...
23.1	77.3	48.1 (53.6)	$n_{2N}$	r/min	250	200	125	60	50	37.5	30	30	-	-	1F.2208-5AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	61	80	137	250	310	405	460	435	-	-	■ ■ ■ + ■ ■ ■ + ...
23.5	78.5	...	$M_{2,0}$	Nm	94	117	210	365	455	445	460	445	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	310	390	336	736	736	712	736	712	-	-	■ ■ ■ + ■ ■ ■ + ...

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Planetary gearbox data		NRK155, 1-stage			NRK155, 2-stage					
Gearbox type:		<b>B51</b>			<b>B52</b>					
1. Order code		<b>4</b>	<b>5</b>	<b>10</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>40</b>	<b>50</b>	<b>100</b>
2. Order code		<b>R04</b>	<b>R05</b>	<b>R10</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R40</b>	<b>R50</b>	<b>R00</b>
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759
$\varphi_{2,G}$	'	6			9					

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRK155**

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NRK155 1 and 2-stage (continued)</b>															
18.2	57.9	66.7 (72.7)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	30	-	1FT2210-2AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	57	74	153	235	290	370	460	400	-	■ ■ ■ + ■ ■ ■ + ...	
18.6	58.7		$M_{2,0}$	Nm	74	92	185	290	365	445	460	445	-		
			$M_{2max}$	Nm	230	290	336	736	736	712	736	712	-		
18	57.9	66.7 (72.7)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	25	-	1FT2210-2AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	53	69	148	220	270	360	440	445	-	■ ■ ■ + ■ ■ ■ + ...	
18.3	58.7		$M_{2,0}$	Nm	73	91	183	285	360	445	460	445	-		
			$M_{2max}$	Nm	230	290	336	736	736	712	736	712	-		
28.3	86.9	93.8 (99.8)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	30	-	1F2210-3AB..-0.0-Z	
...	...	...	$M_{2N}$	Nm	73	96	200	290	355	445	460	435	-	■ ■ ■ + ■ ■ ■ + ...	
28.7	88.3		$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	-		
			$M_{2max}$	Nm	350	440	336	736	736	712	736	712	-		
28.3	86.9	93.8 (99.8)	$n_{2N}$	r/min	250	200	100	60	50	37.5	30	30	-	1F2210-3AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	73	95	200	285	350	445	460	435	-	■ ■ ■ + ■ ■ ■ + ...	
28.7	88.3		$M_{2,0}$	Nm	114	143	210	450	460	445	460	445	-		
			$M_{2max}$	Nm	350	440	336	736	736	710	736	712	-		
27.8	86.9	93.8 (99.8)	$n_{2N}$	r/min	200	200	100	50	37.5	37.5	30	25	-	1FT2210-3AF..-0.0-Z	
...	...	...	$M_{2N}$	Nm	85	86	184	325	435	435	455	445	-	■ ■ ■ + ■ ■ ■ + ...	
28.2	88.3		$M_{2,0}$	Nm	112	140	210	445	460	445	455	440	-		
			$M_{2max}$	Nm	350	440	336	736	736	712	736	712	-		
37.6	116	122 (138)	$n_{2N}$	r/min	200	200	100	50	50	37.5	30	30	-	1F2210-4AB..-0.0-Z	
...	...	...	$M_{2N}$	Nm	105	107	210	385	380	445	460	395	-	■ ■ ■ + ■ ■ ■ + ...	
38.5	118		$M_{2,0}$	Nm	153	192	210	460	460	445	460	445	-		
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-		
37	116	122 (138)	$n_{2N}$	r/min	200	200	100	50	50	37.5	30	30	-	1F2210-4AC..-0.0-Z	
...	...	...	$M_{2N}$	Nm	104	106	210	380	375	445	460	390	-	■ ■ ■ + ■ ■ ■ + ...	
37.8	118		$M_{2,0}$	Nm	151	188	210	460	460	445	460	445	-		
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-		
35.5	116	122 (138)	$n_{2N}$	r/min	200	150	100	50	50	37.5	30	25	-	1FT2210-4AF..-0.B0-Z	
...	...	...	$M_{2N}$	Nm	102	138	205	375	360	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...	
36.2	118		$M_{2,0}$	Nm	144	180	210	460	460	445	460	440	-		
			$M_{2max}$	Nm	470	580	335	736	736	712	736	712	-		
42.9	145	19.5 (21.1)	$n_{2N}$	r/min	200	200	125	50	50	37.5	30	30	-	1FT2210-5AB..-0.0-Z	
...	...	...	$M_{2N}$	Nm	125	126	187	440	430	350	460	435	-	■ ■ ■ + ■ ■ ■ + ...	
43.7	147		$M_{2,0}$	Nm	174	215	210	460	460	445	460	445	-		
			$M_{2max}$	Nm	580	712	336	736	736	712	736	712	-		
43.9	145	150 (166)	$n_{2N}$	r/min	200	150	100	50	50	37.5	30	25	-	1F2210-5AC..-0.B0-Z	
...	...	...	$M_{2N}$	Nm	114	154	210	410	390	445	460	445	-	■ ■ ■ + ■ ■ ■ + ...	
44.9	147		$M_{2,0}$	Nm	179	220	210	460	460	445	460	445	-		
			$M_{2max}$	Nm	580	712	336	736	736	712	736	712	-		

Planetary gearbox data		NRK155, 1-stage					NRK155, 2-stage				
Gearbox type:		<b>B51</b>					<b>B52</b>				
1. Order code											
$i$											
2. Order code		<b>4</b>	<b>5</b>	<b>10</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>40</b>	<b>50</b>	<b>100</b>	
		<b>R04</b>	<b>R05</b>	<b>R10</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R40</b>	<b>R50</b>	<b>R00</b>	
$M_{2N,G}$	Nm	460	445	210	460	460	445	460	445	210	
$M_{2max,G}$	Nm	736	712	336	736	736	712	736	712	336	
$M_{2Em,Off}$	Nm	920	890	420	920	920	890	920	890	420	
$J_{1,G}$	kg cm <sup>2</sup>	7.611	6.482	4.932	7.108	6.172	6.117	5.107	4.774	4.759	
$\varnothing_{2,G}$		6			9						

Color legend:

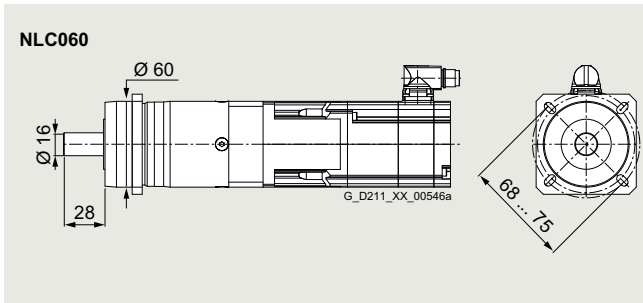
- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLC060

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

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Servomotor data		Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$																					
Nm	Nm	( $J_{M,Br}$ )																					
		kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1 and 2-stage</b>																							
0.326	1.7	0.093	$n_{2N}$	r/min	375	375	375	300	300	300	250	250	200	200	150	125	100	60	37.5	1F.2103-2AH..-2.0-Z			
...	...	(0.112)	$M_{2N}$	Nm	0.6	0.96	1.28	2.1	2.35	2.8	2.4	3.35	3.95	4.8	5.3	7.4	9.6	12.3	18	15	■■■ + ■■■ + ...		
0.5	1.85		$M_{2,0}$	Nm	0.97	1.49	2	3.05	3.55	4.6	4	5.5	7	7.5	9.5	12.1	15.6	19.6	18	15			
			$M_{2max}$	Nm	5	6.9	8.8	12.6	14.5	18.3	16.2	21.5	27	29	36.5	46	59	64	28.5	24			
0.801	3.77	0.139	$n_{2N}$	r/min	375	375	375	300	300	250	250	200	200	150	150	125	100	60	-	1F.2103-4AH..-2.0-Z			
...	...	(0.158)	$M_{2N}$	Nm	1.79	2.35	2.8	4.65	5	6.8	6.1	6.8	9.9	10.1	13.7	15.2	19.4	24.5	18	-	■■■ + ■■■ + ...		
0.958	3.9		$M_{2,0}$	Nm	2.4	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.8	23.5	30	38	18	-			
			$M_{2max}$	Nm	11.3	15.2	19.2	27	29	24	34.5	46	58	61	70	64	70	64	29	-			
1.01	3.48	0.371	$n_{2N}$	r/min	500	375	375	375	300	300	250	200	200	150	125	100	75	50	-	1F.2104-4AF..-2.0-Z			
...	...	(0.451)	$M_{2N}$	Nm	2	3.45	4.35	5.5	7.2	8.6	7.6	10.2	13.3	13.8	18.2	22.5	29	37.5	18	-	■■■ + ■■■ + ...		
1.18	3.6		$M_{2,0}$	Nm	3	4.2	5.4	7.8	9	11.4	10.1	13.7	17.3	18.4	23	29	37	40	18	-			
			$M_{2max}$	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	-			
1.01	3.58	0.371	$n_{2N}$	r/min	500	375	375	375	300	300	250	250	200	200	150	125	100	60	-	1F.2104-4AK..-2.0-Z			
...	...	(0.451)	$M_{2N}$	Nm	2.15	3.75	4.75	5.8	7.8	9.1	8.2	11	11.7	15	15.9	22.5	28.5	36.5	18	-	■■■ + ■■■ + ...		
1.17	3.7		$M_{2,0}$	Nm	3	4.2	5.4	7.8	9	11.3	10.1	13.6	17.1	18.3	23	28.5	37	40	18	-			
			$M_{2max}$	Nm	10.7	14.4	18.2	25.5	29	24	32.5	44	55	58	70	64	70	64	29	-			
2.12	7.18	0.581	$n_{2N}$	r/min	375	375	375	300	300	300	250	200	200	150	150	125	100	75	-	1F.2104-5AF..-2.0-Z			
...	...	(0.671)	$M_{2N}$	Nm	5.4	6.8	7.9	12	12.7	13.1	15.5	21	22.5	29.5	32	40	44	40	-	-	■■■ + ■■■ + ...		
2.26	7.29		$M_{2,0}$	Nm	6.3	8.6	10.9	15.5	17.8	15	19.9	26.5	33.5	35.5	44	40	44	40	-	-			
			$M_{2max}$	Nm	21.5	28.5	36	40	29	24	64	70	70	70	70	64	70	64	-	-			
2.1	7.28	0.581	$n_{2N}$	r/min	375	375	375	300	300	300	250	200	200	150	150	125	125	100	-	-	1F.2104-5AK..-2.0-Z		
...	...	(0.671)	$M_{2N}$	Nm	5.3	6.7	7.8	11.8	12.6	12.9	15.2	20.5	22.5	30	32	39.5	37.5	40	-	-	■■■ + ■■■ + ...		
2.24	7.39		$M_{2,0}$	Nm	6.3	8.5	10.8	15.4	17.7	15	19.8	26.5	33	35.5	44	40	44	40	-	-			
			$M_{2max}$	Nm	21.5	29	36.5	40	29	24	65	70	70	70	70	64	70	64	-	-			
2.87	9.65	0.781	$n_{2N}$	r/min	375	375	375	300	300	300	250	200	150	150	150	125	100	75	-	-	1F.2104-6AF..-2.0-Z		
...	...	(0.861)	$M_{2N}$	Nm	6.7	8.4	9.6	14.5	15.2	15	18.2	24.5	35	35.5	37	40	44	40	-	-	■■■ + ■■■ + ...		
3	9.75		$M_{2,0}$	Nm	8.6	11.6	14.7	20.5	18	15	26.5	35.5	44	44	44	40	44	40	-	-			
			$M_{2max}$	Nm	28.5	38.5	48.5	40	29	24	70	70	70	70	70	64	70	64	-	-			

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NLC060, 1-stage							NLC060, 2-stage											
1. Order code		C21							C22											
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15			
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24			
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80			
$J_{1,G}$	kg cm <sup>2</sup>	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064			
$\varnothing_{2,G}$	'	10							12											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

## Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLC060

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC060 1 and 2-stage (continued)</b>																					
4.51	14.5	1.98 (2.82)	$n_{2N}$	r/min	375	300	300	250	250	250	200	150	150	125	125	100	100	75	-	-	1F2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	10.6	15.4	17.1	22.5	18	15	28.5	40.5	39	44	43.5	40	38	40	-	-	■■■ + ■■■ + ...
4.63	14.6		$M_{2,0}$	Nm	13.5	18.2	22.5	25	18	15	41	44	44	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	-	-	
4.49	14.5	1.98 (2.82)	$n_{2N}$	r/min	375	300	250	200	250	200	200	150	125	125	125	100	75	75	-	-	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.6	14.3	18.7	25	17.7	15	25	36.5	44	43.5	36.5	40	44	40	-	-	■■■ + ■■■ + ...
4.61	14.6		$M_{2,0}$	Nm	13.4	18.1	22.5	25	18	15	40.5	44	44	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	43.5	58	64	40	29	24	70	70	70	70	70	64	70	64	-	-	
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1 and 2-stage</b>																					
0.348	1.6	0.2 (0.22)	$n_{2N}$	r/min	375	375	300	300	250	250	250	200	150	150	125	100	100	75	50	37.5	1F2203-2AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	0.55	0.83	1.32	1.74	2.25	2.55	2.25	3.2	4.75	4.8	6.2	8	8.3	11.7	17.9	15	■■■ + ■■■ + ...
0.529	1.76		$M_{2,0}$	Nm	1.04	1.58	2.1	3.2	3.75	4.8	4.25	5.8	7.4	8	10.1	12.8	16.5	20.5	18	15	
			$M_{2max}$	Nm	4.8	6.5	8.3	11.9	13.7	17.3	15.3	20.5	25.5	27.5	34.5	43.5	55	64	29	24	
0.942	3.48	0.35 (0.37)	$n_{2N}$	r/min	375	375	300	300	250	250	250	200	200	200	150	125	100	75	60	-	1F2203-4AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	2.05	2.6	3.8	4.85	6.1	6.9	6.3	8.5	9.2	9	12.7	15.6	20	27	18	-	■■■ + ■■■ + ...
1.09	3.6		$M_{2,0}$	Nm	2.8	3.95	5	7.3	8.4	10.7	9.4	12.7	16	17.1	21.5	27	34.5	40	18	-	
			$M_{2max}$	Nm	10.4	14	17.7	25	28.5	24	32	42.5	53	57	70	64	70	64	29	-	
2.08	6.78	1.251 (1.331)	$n_{2N}$	r/min	375	375	300	300	250	250	250	200	200	150	150	125	100	75	-	-	1F2204-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.2	6.5	7.3	11.2	14.2	14.9	14.3	19.5	19.9	27.5	28.5	35.5	44	40	-	-	■■■ + ■■■ + ...
2.22	6.89		$M_{2,0}$	Nm	6.2	8.4	10.7	15.2	17.5	15	19.6	26	33	35	44	40	44	40	-	-	
			$M_{2max}$	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	-	-	
2.09	6.78	1.251 (1.331)	$n_{2N}$	r/min	375	375	300	300	250	250	250	200	150	150	125	125	100	100	-	-	1F2204-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.3	6.6	9.4	11.4	14.5	15	14.6	19.9	27.5	28.5	35.5	36	44	38.5	-	-	■■■ + ■■■ + ...
2.23	6.89		$M_{2,0}$	Nm	6.2	8.5	10.8	15.3	17.6	15	19.7	26	33	35	44	40	44	40	-	-	
			$M_{2max}$	Nm	20	27	34	40	29	24	61	70	70	70	70	64	70	64	-	-	
2.85	9.15	1.631 (1.711)	$n_{2N}$	r/min	375	375	300	250	250	300	200	200	150	150	125	125	100	75	-	-	1F2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	7.1	8.7	12.4	17.5	18	13.3	22.5	24	35.5	35.5	43.5	40	44	40	-	-	■■■ + ■■■ + ...
2.98	9.26		$M_{2,0}$	Nm	8.5	11.5	14.6	20.5	18	15	26.5	35.5	44	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	27	36.5	46	40	29	24	70	70	70	70	70	64	70	64	-	-	
2.6	10.4	3.42 (4.32)	$n_{2N}$	r/min	375	300	250	200	200	200	200	150	125	125	100	100	75	50	-	-	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	5.4	8.3	10.9	15.3	16.7	15	16.5	24	30.5	30	39.5	33.5	44	40	-	-	■■■ + ■■■ + ...
2.73	10.5		$M_{2,0}$	Nm	7.7	10.5	13.3	18.9	18	15	24	32	40	43	44	40	44	40	-	-	
			$M_{2max}$	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	-	-	
2.66	10.4	3.42 (4.32)	$n_{2N}$	r/min	375	375	300	250	250	250	200	150	150	125	100	100	75	75	-	-	1F2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.7	7.6	11.3	15.5	15.4	12.4	20.5	27.5	29	36	44	40	44	40	-	-	■■■ + ■■■ + ...
2.79	10.5		$M_{2,0}$	Nm	7.9	10.8	13.6	19.3	18	15	24.5	33	41.5	43.5	44	40	44	40	-	-	
			$M_{2max}$	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	-	-	
2.65	10.4	3.42 (4.32)	$n_{2N}$	r/min	375	300	300	250	200	200	200	150	125	125	100	100	75	75	-	-	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	6	9	9.9	13.4	17.9	15	18.2	26	33	32.5	42.5	37.5	44	38	-	-	■■■ + ■■■ + ...
2.77	10.5		$M_{2,0}$	Nm	7.9	10.7	13.6	19.2	18	15	24.5	32.5	41	43.5	44	40	44	40	-	-	
			$M_{2max}$	Nm	31	41.5	52	40	29	24	70	70	70	70	70	64	70	64	-	-	

➡ Continued on the next page

#### Planetary gearbox data

Gearbox type:		NLC060, 1-stage						NLC060, 2-stage									
1. Order code		C21						C22									
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em,Off}$	Nm	66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064
$\varnothing_{2,G}$	'	10						12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLC060

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																
Nm	Nm	kg cm <sup>2</sup>																

SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC060 1 and 2-stage (continued)																					
4.69	17.4	5.37	$n_{2N}$	r/min	300	300	250	200	250	200	150	125	125	100	100	75	75	-	-	1F.2205-4AF..-0..0-Z	
...	...	(6.27)	$M_{2N}$	Nm	11.9	13.9	18.4	24.5	17.2	15	35	43.5	44	42.5	44	40	44	39	-	-	+ ...
4.81	17.6		$M_{2,0}$	Nm	14	18.9	23.5	25	18	15	42.5	44	44	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	45	61	64	40	29	24	70	70	70	70	70	64	70	64	-	-	

Planetary gearbox data			NLC060, 1-stage							NLC060, 2-stage										
Gearbox type:			C21							C22										
1. Order code																				
$i$																				
2. Order code																				
$M_{2N,G}$	Nm		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>		
$M_{2max,G}$	Nm		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>		
$M_{2Em,Off}$	Nm		28	38	40	25	18	15	44	44	44	44	44	40	44	40	18	15		
$J_{1,G}$	kg cm <sup>2</sup>		45	61	64	40	29	24	70	70	70	70	70	64	70	64	29	24		
$\varnothing_{2,G}$	'		66	88	80	80	80	80	88	88	88	88	88	80	88	80	80	80		
			0.178	0.12	0.097	0.078	0.074	0.069	0.135	0.129	0.081	0.091	0.079	0.078	0.068	0.067	0.067	0.064		
			10								12									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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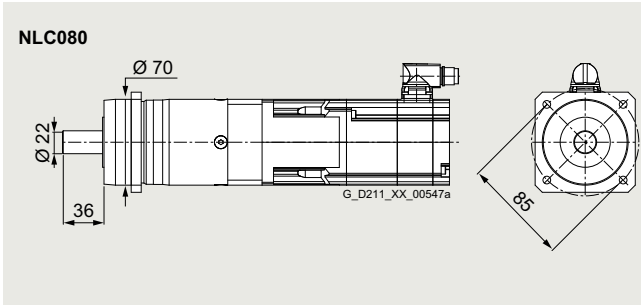


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NLC080

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	$(J_{M,Br})$																			
		kg cm <sup>2</sup>																			

SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1 and 2-stage																				
0.224	1.56	0.093	$n_{2N}$	r/min	250	300	300	300	300	250	250	200	200	150	150	125	100	60	37.5	1F.2103-2AH..-0.0-Z

→ Continued on the next page

Planetary gearbox data		NLC080, 1-stage							NLC080, 2-stage											
Gearbox type:		C31							C32											
1. Order code																				
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38			
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61			
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200			
$J_{1,G}$	kg cm <sup>2</sup>	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357			
$\varnothing_{2,G}$	'	7							9											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLC080

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ <small>(<math>J_{M,Br}</math>)</small>																	
Nm	Nm	kg cm <sup>2</sup>																	

#### SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC080 1 and 2-stage (continued)

4.47	14.4	1.71 (2.55)	$n_{2N}$	r/min	375	375	300	300	250	250	200	200	150	150	125	100	75	50	-	1F2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	11.5	14	19.3	23	29.5	30	28	37	53	53	68	87	115	110	50	■ + ■ + ...
4.66	14.6		$M_{2,0}$	Nm	13.4	18.1	22.5	32	37	38	41	55	69	74	92	110	120	110	50	
			$M_{2max}$	Nm	43	57	72	101	80	61	130	173	176	192	192	176	192	176	80	

#### SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1 and 2-stage

0.286	1.54	0.2 (0.22)	$n_{2N}$	r/min	-	250	250	250	200	200	200	150	150	125	125	100	75	75	37.5	30	1F2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	-	0.73	1.07	1.61	2.2	2.65	2.25	3.5	3.9	4.75	5.3	7.1	10.4	10.8	22	30	■ + ■ + ...
0.496	1.72		$M_{2,0}$	Nm	-	1.14	1.65	2.65	3.15	4.2	3.65	5.1	6.7	7.2	9.2	11.7	15.3	19.3	31	38	
			$M_{2max}$	Nm	-	6.1	7.9	11.4	13.1	16.6	14.8	20	25	26.5	33.5	42.5	54	68	80	61	

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#### Planetary gearbox data

Gearbox type:		NLC080, 1-stage							NLC080, 2-stage								
1. Order code		C31							C32								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm <sup>2</sup>	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357
$\varphi_{2,G}$	'	7							9								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

### Coaxial geared motors for servo converters with line connection 400 V 3 AC

#### Gearbox type NLC080

Servomotor data $M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
---	---	------------------------------------

SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC080 1 and 2-stage (continued)																						
2.62 ... 2.82	10.3 ... 10.5	3.15 (4.05)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 6.2 7.8 30.5	375 6.9 10.7 41	300 10.6 13.6 51	250 15 19.5 73	250 16.4 22 80	200 21 28 61	250 15.8 24.5 93	200 21.5 33 124	150 29.5 41.5 155	125 34 44.5 166	100 43 56 192	100 63 70 176	75 88 90 176	50 50 50 80	-	37.5	1FT2205-2AC...0-0-Z	+ ...
2.67 ... 2.87	10.3 ... 10.5	3.15 (4.05)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 6.7 8 30.5	375 8.8 10.9 41	375 9.6 13.9 51	300 15.3 19.8 73	250 18.6 22.5 80	250 20.5 25 61	250 19.7 33.5 93	200 26 42.5 124	150 34 45 155	125 35.5 57 166	100 45 71 192	100 56 91 176	75 86 110 176	50 50 50 80	-	50	1F2205-2AF...0-0-Z	+ ...
2.64 ... 2.85	10.3 ... 10.5	3.15 (4.05)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 6.5 7.9 30.5	375 7.8 10.8 41	300 11.2 13.7 51	250 15.8 19.6 73	250 17.6 22.5 80	200 22.5 28 61	250 17.4 25 93	200 23.5 33.5 124	150 32 45 155	125 33.5 45 166	100 52 56 192	100 53 70 176	75 78 90 176	60 49.5 50 80	-	60	1FT2205-2AH...0-0-Z	+ ...
4.75 ... 4.94	17.4 ... 17.5	5.1 (6)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 11 14.2 52	300 16.2 19.2 69	300 18.3 24 87	250 25.5 34 80	200 32.5 39 61	200 36 38 61	200 47 43.5 156	150 58 73 192	125 60 77 192	125 67 97 192	100 75 110 176	100 77 120 176	75 110 110 176	-	-	1F2205-4AF...0-0-Z	+ ...	
4.98 ... 5.17	17.3 ... 17.5	8.676 (10.276)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	300 11.7 14.9 52	250 16.2 20 69	200 21 25 87	200 23 35.5 80	150 33.5 41 61	150 34.5 38 61	150 35 45.5 155	100 43.5 61 192	125 56 76 192	100 54 81 192	75 78 102 192	60 89 110 176	50 101 120 176	50 101 110 176	-	37.5	1FT2206-2AC...0-0-Z	+ ...
4.9 ... 5.09	17.3 ... 17.5	8.676 (10.276)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	375 10.9 14.7 52	300 16.2 19.8 69	250 20.5 25 87	200 29 35 80	200 31 40.5 61	150 38 45 155	150 37.5 60 192	100 41 75 192	125 50 80 176	100 64 100 192	75 62 110 176	60 91 120 176	50 119 120 176	-	-	1F2206-2AF...0-0-Z	+ ...	
4.76 ... 4.95	17.3 ... 17.5	8.676 (10.276)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	300 12.2 14.2 52	250 16.5 19.2 69	250 18.6 24 87	200 26 34 80	200 25 39 61	150 38 38 61	150 36 43.5 155	100 47.5 58 192	100 59 73 192	100 60 78 192	75 80 97 192	60 100 110 176	50 101 120 176	50 110 110 176	-	-	1FT2206-2AH...0-0-Z	+ ...
7.23 ... 7.41	26 ... 26.3	12.38 (13.976)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	300 17.7 21.5 78	250 24 29 105	250 25.5 36.5 131	200 35.5 51 80	150 49 50 61	150 38 65 208	150 50 87 192	100 73 109 176	100 79 117 192	100 77 109 192	75 109 120 176	60 110 120 176	50 110 120 176	37.5 110 110 176	-	-	1FT2206-3AB...0-0-Z	+ ...
7.09 ... 7.28	26 ... 26.3	12.38 (13.976)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	300 17 21 78	250 30 28.5 105	200 33.5 35.5 131	200 30 50 80	150 47.5 50 61	150 38 64 208	150 48 85 192	100 58 107 176	100 72 114 192	75 104 120 192	75 89 110 176	60 110 120 176	50 110 120 176	50 110 110 176	-	-	1FT2206-3AF...0-0-Z	+ ...
9.93 ... 10.1	36.7 ... 37.1	15.98 (17.676)	$n_{2N}$ $M_{2N}$ $M_{2,0}$ $M_{2max}$	r/min Nm Nm Nm	250 22 29.5 111	200 30.5 39.5 148	200 31.5 50 176	125 56 65 104	150 45.5 50 61	150 34.5 38 61	100 73 89 208	100 74 119 192	75 103 110 176	75 101 120 192	60 120 120 176	60 110 120 176	50 119 120 176	37.5 110 110 176	-	-	1FT2206-4AC...0-0-Z	+ ...

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Planetary gearbox data			NLC080, 1-stage												NLC080, 2-stage																			
Gearbox type:			C31						C32						C32																			
1. Order code			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
2. Order code	$i$																																	
$M_{2N,G}$	Nm		85	115	110	65	50	38	130	120	110	120	120	120	110	120	110	50	38															
$M_{2max,G}$	Nm		136	184	176	104	80	61	208	192	176	192	192	192	176	192	176	80	61															
$M_{2Em,Off}$	Nm		180	240	220	178	190	200	260	240	220	240	240	240	220	240	220	190	200															
$J_{1,G}$	kg cm <sup>2</sup>		0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357																
$\varphi_{2,G}$	'		7																															

Color legend:   $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**

$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**

$M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLC080

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox							
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	300	250	250	200	200	200	150	100	100	75	75	60	60	-	-	1F.2206-4AF..-0..0-Z	+	+ ...	
Nm	Nm	$(J_{M,Br})$																					$M_{2N}$
			$M_{2,0}$	Nm	29.5	39.5	49.5	65	50	38	88	118	110	120	120	110	120	110	-	-			
			$M_{2max}$	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	-	-			
9.84	34.7	15.976	$n_{2N}$	r/min	300	250	200	150	150	150	125	100	75	75	75	60	60	50	-	-	1FT2206-4AH..-0..0-Z	+	+ ...
...	...	(17.676)	$M_{2N}$	Nm	20	27	37	54	50	38	67	86	110	116	112	110	115	110	-	-			
10	35.2		$M_{2,0}$	Nm	28	37.5	47.5	65	50	38	84	113	110	120	120	110	120	110	-	-			
9.42	34.7	15.976	$M_{2max}$	Nm	105	140	175	104	79	61	208	192	176	192	191	176	192	176	-	-			
...	...	(17.676)																					
9.6	35.2																						

Planetary gearbox data		NLC080, 1-stage						NLC080, 2-stage													
Gearbox type:		C31						C32													
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$i$																					
$M_{2N,G}$	Nm	85	115	110	65	50	38	130	120	110	120	120	110	120	110	50	38				
$M_{2max,G}$	Nm	136	184	176	104	80	61	208	192	176	192	192	176	192	176	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	200	260	240	220	240	240	220	240	220	190	200				
$J_{1,G}$	kg cm <sup>2</sup>	0.775	0.54	0.466	0.401	0.387	0.37	0.641	0.615	0.607	0.46	0.415	0.412	0.37	0.368	0.369	0.357				
$\varnothing_{2,G}$	'	7																9			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

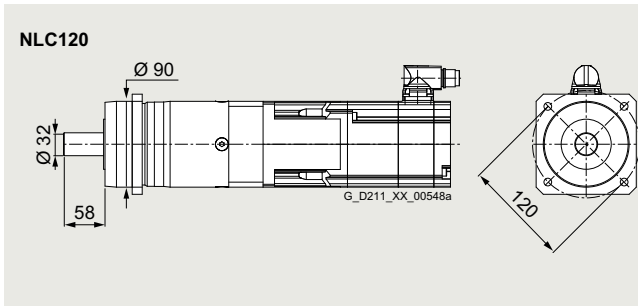
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NLC120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																						
Nm	Nm	kg cm <sup>2</sup>																						
SIMOTICS S-1FK2 and S-1FT2 High Dynamic servomotors with planetary gearbox NLC120 1 and 2-stage																								
0.211	1.55	0.093 (0.112)	$n_{2N}$	r/min	-	-	200	200	200	150	125	100	100	100	100	75	75	50	30	1F.2103-2AH..-0..0-Z				
...	...	...	$M_{2N}$	Nm	-	-	0.7	1.38	1.65	2.1	1.92	2.85	4.05	4.3	5.4	5.8	9.6	10.2	16.5	29.5	■ ■ ■ + ■ ■ ■ + ...			
0.441	1.75		$M_{2,0}$	Nm	-	-	1.05	1.97	2.4	3.35	2.85	4.2	5.5	6	7.8	10.1	13.3	16.9	27.5	44				
			$M_{2max}$	Nm	-	-	7.7	11.3	13	16.6	14.7	20	25	27	34	42.5	55	69	111	152				
0.666	3.45	0.139 (0.158)	$n_{2N}$	r/min	300	250	250	200	200	200	150	125	125	100	100	75	60	37.5	30	1F.2103-4AH..-0..0-Z				
...	...	...	$M_{2N}$	Nm	1.18	2.15	2.85	4.8	5.4	6	4.9	7.8	10.1	10.6	14.6	15	23.5	30	49.5	67	■ ■ ■ + ■ ■ ■ + ...			
1.05	3.78		$M_{2,0}$	Nm	1.99	3.05	4.15	6.3	7.3	9.5	8.3	11.5	14.7	15.8	20	25	32.5	41	66	95				
			$M_{2max}$	Nm	10.3	14.2	18	25.5	29.5	37	33	44.5	55	59	74	93	120	150	192	152				
0.695	3.16	0.35 (0.43)	$n_{2N}$	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	1F.2104-4AF..-0..0-Z			
...	...	...	$M_{2N}$	Nm	1.51	2.6	3.5	5.5	6.3	8.6	7	10.1	11.6	11.9	16.4	21	23.5	34	54	90	■ ■ ■ + ■ ■ ■ + ...			
1.08	3.49		$M_{2,0}$	Nm	2.05	3.15	4.3	6.5	7.6	9.8	8.6	11.9	15.2	16.3	20.5	26	33.5	42	68	95				
			$M_{2max}$	Nm	9.4	13	16.5	23.5	27	34	30.5	41	51	55	69	86	111	139	192	152				
0.688	3.26	0.35 (0.43)	$n_{2N}$	r/min	375	300	300	250	250	200	200	150	150	150	125	100	100	75	50	30	1F.2104-4AK..-0..0-Z			
...	...	...	$M_{2N}$	Nm	1.69	2.75	3.8	5.9	7	9.1	7.5	10.5	12.7	12.7	18.2	23.5	24.5	37.5	57	95	■ ■ ■ + ■ ■ ■ + ...			
1.07	3.59		$M_{2,0}$	Nm	2.05	3.15	4.25	6.4	7.5	9.7	8.5	11.8	15.1	16.1	20.5	25.5	33.5	42	68	95				
			$M_{2max}$	Nm	9.7	13.4	17	24	28	35	31	42	53	56	71	89	114	143	192	152				
1.8	6.86	0.56 (0.65)	$n_{2N}$	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2104-5AF..-0..0-Z				
...	...	...	$M_{2N}$	Nm	5.1	6.6	9.3	11.8	15.7	17.6	15.2	22	28	29	40	39	61	77	120	95	■ ■ ■ + ■ ■ ■ + ...			
2.16	7.13		$M_{2,0}$	Nm	5.3	7.6	9.8	14.2	16.4	20.5	18.4	25	31.5	33.5	42	53	68	85	120	95				
			$M_{2max}$	Nm	20.5	27.5	35	49.5	56	71	63	84	106	113	141	177	225	280	192	152				
1.78	6.96	0.56 (0.65)	$n_{2N}$	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	37.5	30	1F.2104-5AK..-0..0-Z				
...	...	...	$M_{2N}$	Nm	5	6.5	9.2	11.5	15.5	17.2	14.9	21.5	27.5	28	39	38.5	60	76	120	95	■ ■ ■ + ■ ■ ■ + ...			
2.15	7.23		$M_{2,0}$	Nm	5.3	7.5	9.7	14.1	16.3	20.5	18.3	24.5	31	33	42	52	68	85	120	95				
			$M_{2max}$	Nm	20.5	28	35.5	50	57	72	64	86	107	114	143	179	230	285	192	152				
2.55	9.33	0.76 (0.84)	$n_{2N}$	r/min	300	300	250	250	200	200	150	125	125	100	75	75	60	50	30	1F.2104-6AF..-0..0-Z				
...	...	...	$M_{2N}$	Nm	6.8	8.4	11.8	14.6	19.5	21.5	18.6	27	34.5	35	48	65	72	92	97	95	■ ■ ■ + ■ ■ ■ + ...			
2.9	9.59		$M_{2,0}$	Nm	7.6	10.6	13.5	19.4	22	28	25	33.5	42.5	45.5	57	71	92	115	120	95				
			$M_{2max}$	Nm	27.5	37.5	47	66	76	95	85	114	142	152	190	235	305	368	192	152				

Continued on the next page

Planetary gearbox data			NLC120, 1-stage								NLC120, 2-stage											
Gearbox type:			C41								C42											
1. Order code																						
$i$			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm		115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95				
$M_{2max,G}$	Nm		184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152				
$M_{2Em,Off}$	Nm		390	520	500	340	380	480	500	520	500	520	500	520	500	380	480					
$J_{1,G}$	kg cm <sup>2</sup>		2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378				
$\varnothing_{2,G}$	'		7								9											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary





# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLC120

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox						
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	250	200	200	150	125	100	100	75	75	60	60	50	37.5	37.5	30	-	1FT2206-4AC..-0.0-Z			
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	19.9	27.5	29.5	44	55	71	68	93	97	121	125	151	210	193	120	-	■■■ + ■■■ + ...			
			$M_{2,0}$	Nm	32	43	54	76	87	95	98	130	163	174	215	230	260	230	120	-				
			$M_{2max}$	Nm	110	148	185	216	192	152	330	416	368	416	416	368	416	368	192	-				
10.8	36.6	15.1 (16.8)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	30	-	1F2206-4AF..-0.0-Z		
...	...	...	$M_{2N}$	Nm	24	27.5	36.5	52	53	76	68	84	109	108	152	191	240	230	120	-	■■■ + ■■■ + ...			
11	37.1	(16.8)	$M_{2,0}$	Nm	31	42	53	74	85	95	95	127	159	169	210	230	260	230	120	-				
			$M_{2max}$	Nm	104	140	175	216	192	152	310	416	368	416	416	368	416	368	192	-				

SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1 and 2-stage (continued)

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Continued on the next page

Planetary gearbox data		NLC120, 1-stage						NLC120, 2-stage												
Gearbox type:		C41						C42												
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	115	155	195	135	120	95	210	260	230	260	260	230	260	230	120	95			
$M_{2max,G}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	192	152			
$M_{2Em,Off}$	Nm	390	520	500	340	380	480	500	520	500	520	520	500	520	500	380	480			
$J_{1,G}$	kg cm <sup>2</sup>	2.486	1.905	1.677	1.486	1.434	1.39	2.326	2.256	2.233	1.765	1.585	1.577	1.424	1.421	1.417	1.378			
$\varphi_{2,G}$	'	7																		

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Coaxial geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLC120

Servomotor data				Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$	$(J_{M,Br})$																			
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FK2 and S-1FT2 Compact servomotors with planetary gearbox NLC120 1 and 2-stage (continued)</b>																						
23	77.3	50.46	$n_{2N}$	r/min	250	200	200	125	125	125	100	75	60	60	60	50	50	37.5	-	-	<b>1FT2208-5AB..-0..0-Z</b>	
...	...	(55.96)	$M_{2N}$	Nm	45.5	61	63	111	114	95	137	184	225	230	220	230	210	230	-	-	■ + ■ + ...	
23.3	78.4		$M_{2,0}$	Nm	69	92	116	135	120	95	205	260	230	260	260	230	260	230	-	-	■ + ■ + ...	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	416	416	368	416	368	-	-	■ + ■ + ...	
22.7	77.3	50.46	$n_{2N}$	r/min	250	200	200	125	125	125	100	75	60	60	60	50	37.5	37.5	-	-	<b>1F2208-5AC..-0..0-Z</b>	
...	...	(55.96)	$M_{2N}$	Nm	46	62	63	111	114	95	136	183	225	230	220	230	260	230	-	-	■ + ■ + ...	
23.1	78.4		$M_{2,0}$	Nm	68	91	115	135	120	95	205	260	230	260	260	230	260	230	-	-	■ + ■ + ...	
			$M_{2max}$	Nm	184	248	312	216	192	152	336	416	368	415	416	368	416	368	-	-	■ + ■ + ...	
<b>Planetary gearbox data</b>																						
Gearbox type:																						
1. Order code																						
$i$				<b>NLC120, 1-stage</b>						<b>NLC120, 2-stage</b>												
2. Order code				<b>C41</b>						<b>C42</b>												
$M_{2N,G}$				Nm						Nm												
$M_{2max,G}$				Nm						Nm												
$M_{2Em,Off}$				Nm						Nm												
$J_{1,G}$				kg cm <sup>2</sup>						kg cm <sup>2</sup>												
$\varnothing_{2,G}$				'						'												
				7						9												

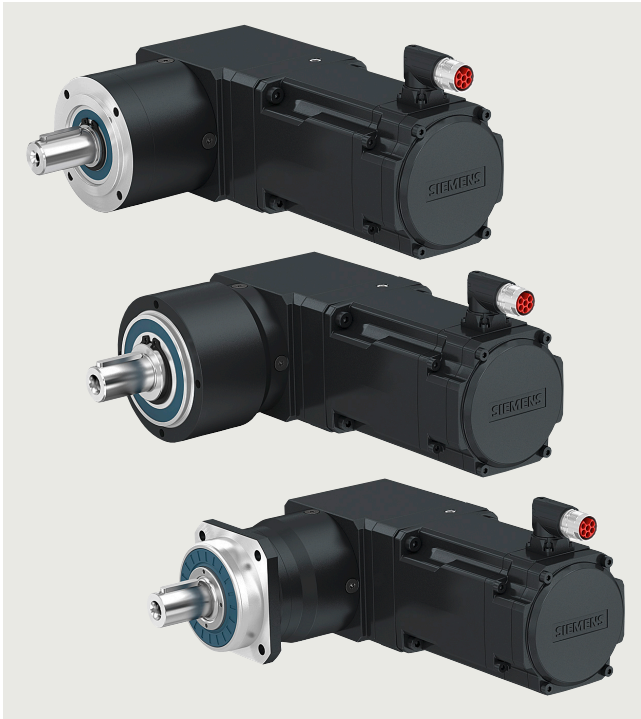
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Selection and ordering data



SIMOTICS S-1FT2 servo planetary geared motors with angular gearbox

The following servo planetary geared motors with angular gearbox are suitable for servo converters with line connection 200 V to 240 V 1 AC as well as 200 V to 240 V 3 AC, especially for SINAMICS S210 servo converters. The angled versions are suitable for confined spaces.

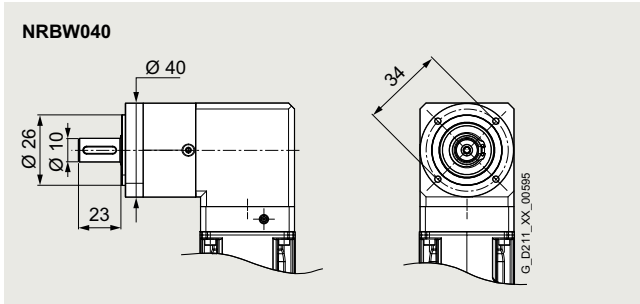
The rated points of the geared motors are adapted to this voltage.

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRBW040

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	200 N
Average axial force for 20000 h	$F_{A,eq}$	200 N
Average radial force for 30000 h	$F_{R,eq}$	160 N
Average axial force for 30000 h	$F_{A,eq}$	160 N
Maximum radial force	$F_{R,max}$	200 N
Maximum axial force	$F_{A,max}$	240 N

Servomotor data		Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																
Nm	Nm	( $J_{M,Br}$ )																
		kg cm <sup>2</sup>																

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW040 1 and 2-stage																				
0.106	0.498	0.0245	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1FT2102-0AG..-0.A0-Z
...	...	(0.0285)	$M_{2N}$	Nm	0.175	0.25	0.33	0.44	0.57	0.73	0.57	0.85	1.07	1.1	1.48	1.82	2.35	3.05	4.75	■ ■ ■ + ■ ■ ■ + ...
0.113	0.511		$M_{2,0}$	Nm	0.315	0.43	0.54	0.77	0.88	1.11	1	1.34	1.68	1.8	2.25	2.8	3.6	4.5	7.2	
			$M_{2max}$	Nm	1.51	2	2.5	3.55	4.05	5.1	4.55	6	7.5	8	10.1	12.6	16.1	20	12	
0.25	1.01	0.036	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	1FT2102-1AG..-0.A0-Z
...	...	(0.04)	$M_{2N}$	Nm	0.54	0.73	0.94	1.26	1.55	1.96	1.64	2.3	2.9	3	3.9	4.8	6.1	7.9	7.5	■ ■ ■ + ■ ■ ■ + ...
0.256	1.04		$M_{2,0}$	Nm	0.74	1	1.26	1.77	2	2.55	2.25	3.05	3.8	4.05	5.1	6.3	8.1	10.2	7.5	
			$M_{2max}$	Nm	3.1	4.15	5.1	7.2	8.3	8	9.2	12.3	15.4	16.4	20.5	25.5	32	29	12	

Planetary gearbox data		NRBW040, 1-stage										NRBW040, 2-stage					
Gearbox type:		A16										A17					
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	
i		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	
2. Order code																	
$M_{2N,G}$	Nm	4.5	6	7.5	8.5	6	5	16.5	20	18	20	20	18	20	18	7.5	
$M_{2max,G}$	Nm	7	10	12	13.5	10	8	26	32	29	32	32	29	32	29	12	
$M_{2Em,Off}$	Nm	22.5	28	35	26	27	25	33	40	36	40	40	36	40	36	27	
$J_{1,G}$	kg cm <sup>2</sup>	0.049	0.041	0.035	0.033	0.032	0.032	0.048	0.048	0.048	0.038	0.034	0.033	0.032	0.032	0.032	
$\varphi_{2,G}$	'	21	25														

Color legend:	Condition	Action
Light Green	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
Light Blue	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
Light Orange	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRBW040

Servomotor data		Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW040 3-stage</b>														
0.106	0.498	0.0245 (0.0285)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1FT2102-0AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	4.4	6	7.5	8.9	12	15.5	19.1	18	7.5	■ ■ ■ + ■ ■ ■ + ...
0.113	0.511	...	$M_{2,0}$	Nm	6.7	9	11.3	13.5	18	18	20	18	7.4	
			$M_{2max}$	Nm	30	32	32	29	32	29	32	29	12	
0.25	1.01	0.036 (0.04)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	6	1FT2102-1AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	11.6	15.6	19.6	18	20	18	20	18	7.4	■ ■ ■ + ■ ■ ■ + ...
0.256	1.04	...	$M_{2,0}$	Nm	15.2	20	20	18	20	18	20	18	7.5	
			$M_{2max}$	Nm	32	32	32	29	32	29	32	29	12	
<b>Planetary gearbox data</b>			<b>NRBW040, 3-stage</b>											
Gearbox type:			<b>A18</b>											
1. Order code			<b>60 80 100 120 160 200 256 320 512</b>											
$i$														
2. Order code			<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>											
	$M_{2N,G}$	Nm	20	20	20	18	20	18	20	18	20	18	7.5	
	$M_{2max,G}$	Nm	32	32	32	29	32	29	32	29	32	29	12	
	$M_{2Em.Off}$	Nm	40	40	40	36	40	36	40	36	40	36	27	
	$J_{1,G}$	kg cm <sup>2</sup>	0.047	0.033	0.033	0.047	0.032	0.032	0.032	0.032	0.032	0.032	0.032	
	$\varphi_{2,G}$	'	28											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

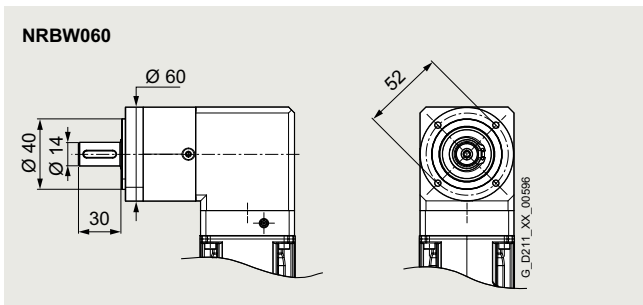
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRBW060

**Selection and ordering data**



Average radial force for 20000 h	$F_{R,eq}$	400 N
Average axial force for 20000 h	$F_{A,eq}$	500 N
Average radial force for 30000 h	$F_{R,eq}$	340 N
Average axial force for 30000 h	$F_{A,eq}$	450 N
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox									
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																								
Nm	Nm	kg cm <sup>2</sup>																								
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 1 and 2-stage</b>																<b>1FT2102-0AG..-0.A0-Z</b>										
0.0764 ... 0.0919	0.468 ... 0.479	0.0245 <i>(0.0285)</i>	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	75	75	60	37.5	█	█	█	+	█	+	...
			$M_{2N}$	Nm	0.107	0.182	0.205	0.29	0.365	0.48	0.41	0.57	0.66	0.78	1.03	1.37	1.47	1.86	3							
			$M_{2,0}$	Nm	0.225	0.32	0.415	0.6	0.69	0.88	0.78	1.06	1.34	1.43	1.8	2.25	2.9	3.65	5.8							
			$M_{2,max}$	Nm	1.4	1.88	2.35	3.3	3.8	4.75	4.25	5.7	7.1	7.6	9.5	11.9	15.2	19	29							

➡ Continued on the next page

Planetary gearbox data			NRBW060, 1-stage						NRBW060, 2-stage								
Gearbox type:			<b>A26</b>						<b>A27</b>								
1. Order code																	
$i$																	
2. Order code			<b>R03 R04 R05 R07 R08 R10</b>						<b>R09 R12 R15 R16 R20 R25 R32 R40 R64</b>								
$M_{2N,G}$	Nm		14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
$M_{2,max,G}$	Nm		22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
$M_{2Em,Off}$	Nm		66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
$J_{1,G}$	kg cm <sup>2</sup>		0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
$\varphi_{2,G}$	'		16						18								

- Color legend:
  - Green:  $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
  - Blue:  $M_{2N,G} < M_{max,M} \times i < M_{2,max,G}$  Check acceleration and inertias, perform service life calculation if necessary
  - Orange:  $M_{max,M} \times i > M_{2,max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox							
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min														1FT2104-4AK..-2..0-Z	1FT2104-5AF..-2..0-Z	1FT2104-5AK..-2..0-Z	1FT2104-6AF..-2..0-Z		
Nm	Nm	kg cm <sup>2</sup>			750	750	600	375	375	300	300	250	200	200	150	125	100					75	50
1.11	3.55	0.368	$n_{2N}$	r/min	750	750	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2104-4AK..-2..0-Z	1FT2104-5AF..-2..0-Z	1FT2104-5AK..-2..0-Z	1FT2104-6AF..-2..0-Z
...	...	(0.448)	$M_{2N}$	Nm	3.05	3.3	4.3	7	7.2	9.1	8.7	10.3	13.7	13.2	18.3	21.5	27.5	37	18				
1.14	3.65		$M_{2,0}$	Nm	3.35	4.5	5.6	7.9	9.1	11.4	10.1	13.5	16.9	18	22.5	28	36	40	18				
			$M_{2max}$	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29				
0.523	1.68	0.2	$n_{2N}$	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2203-2AG..-2.A0-Z	1FT2203-2AK..-2..0-Z	1FT2203-4AG..-2.A0-Z	1FT2203-4AK..-2..0-Z
...	...	(0.22)	$M_{2N}$	Nm	1.12	1.5	1.57	2.6	2.65	3.35	3.15	3.85	5.1	5	6.8	8.2	10.5	14	18				
0.534	1.72		$M_{2,0}$	Nm	1.56	2.1	2.6	3.7	4.25	5.3	4.75	6.3	7.9	8.4	10.6	13.2	16.9	21	18				
			$M_{2max}$	Nm	5.1	6.8	8.6	12	13.7	17.2	15.3	20	25.5	27	34	42.5	54	64	29				

Continued on the next page

Planetary gearbox data			NRBW060, 1-stage						NRBW060, 2-stage								
Gearbox type:			A26						A27								
1. Order code			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm		14	19	24	25	18	15	44	44	44	44	44	40	44	40	18
$M_{2max,G}$	Nm		22	30	38	40	29	24	70	70	70	70	70	64	70	64	29
$M_{2Em,Off}$	Nm		66	86	80	80	80	70	88	88	88	88	88	80	88	80	80
$J_{1,G}$	kg cm <sup>2</sup>		0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222
$\varphi_{2,G}$	'		16						18								

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRBW060

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 1 and 2-stage (continued)																				
2.88	8.88	1.628	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	1FT2204-6AF..-2..0-Z + + + ...
...	...	(1.708)	$M_{2N}$	Nm	7.9	10.7	13.4	17.3	18	15	21	31.5	40	40.5	44	40	44	40	-	
2.95	9.12		$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	

Planetary gearbox data		NRBW060, 1-stage						NRBW060, 2-stage									
Gearbox type:		A26						A27									
1. Order code		3 4 5 7 8 10						9 12 15 16 20 25 32 40 64									
2. Order code		R03 R04 R05 R07 R08 R10						R09 R12 R15 R16 R20 R25 R32 R40 R64									
$i$		14	19	24	25	18	15	44	44	44	44	44	40	44	40	40	18
$M_{2N,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	
$M_{2max,G}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	
$M_{2Em,Off}$	Nm	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222	
$J_{1,G}$	kg cm <sup>2</sup>	16						18									
$\varnothing_{2,G}$	'																

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage</b>													
0.0764	0.468	0.0245 (0.0285)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	1FT2102-0AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	2.9	3.65	4.4	5.8	7.8	9.3	11.6	15.6	■ ■ ■ + ■ ■ ■ + ...
0.0919	0.479	...	$M_{2,0}$	Nm	5.4	7.3	9.1	10.9	14.6	18.2	23	29	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	28	37.5	47	56	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
0.226	0.986	0.036 (0.04)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1FT2102-1AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	10	13.4	16.7	20.5	26	34	42	40	■ ■ ■ + ■ ■ ■ + ...
0.238	1.01	...	$M_{2,0}$	Nm	14.1	18.9	23.5	28	37.5	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	59	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
0.512	1.77	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1FT2103-2AG..-2.A0-Z
...	...	...	$M_{2N}$	Nm	20.5	27.5	34.5	42	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
0.525	1.82	...	$M_{2,0}$	Nm	31	41.5	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
0.498	1.77	0.093 (0.112)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	10	1FT2103-2AH..-2..0-Z
...	...	...	$M_{2N}$	Nm	20	26.5	36.5	40.5	44	40	44	39.5	■ ■ ■ + ■ ■ ■ + ...
0.51	1.82	...	$M_{2,0}$	Nm	30	40	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
1.11	3.74	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1FT2103-4AG..-2.A0-Z
...	...	...	$M_{2N}$	Nm	39	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
1.13	3.85	...	$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
0.983	3.74	0.139 (0.158)	$n_{2N}$	r/min	50	37.5	25	25	20	12.5	10	10	1FT2103-4AH..-2..0-Z
...	...	...	$M_{2N}$	Nm	36	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
0.993	3.85	...	$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
1.12	3.46	0.368 (0.448)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1FT2104-4AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
1.15	3.56	...	$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
1.11	3.55	0.368 (0.448)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1FT2104-4AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
1.14	3.65	...	$M_{2,0}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	70	64	70	64	■ ■ ■ + ■ ■ ■ + ...
2.18	7	0.578 (0.668)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-	1FT2104-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.23	7.18	...	$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.16	7.09	0.578 (0.668)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	1FT2104-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.21	7.28	...	$M_{2,0}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2max}$	Nm	70	70	70	70	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...

➔ Continued on the next page

Planetary gearbox data		NRBW060, 3-stage							
Gearbox type:		A28							
1. Order code		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$i$									
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em,Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
$\phi_{2,G}$	'	21							

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage (continued)</b>																
2.89	9.35	0.778 (0.858)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	-	-	-	1FT2104-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	-	-	-	-	-	-	-	-	■ + ■ + ...
2.96	9.6		$M_{2,0}$	Nm	44	44	44	-	-	-	-	-	-	-	-	
			$M_{2max}$	Nm	70	70	70	-	-	-	-	-	-	-	-	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage</b>																
0.523	1.68	0.2 (0.22)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10				1FT2203-2AG..-2.A0-Z
...	...	...	$M_{2N}$	Nm	20.5	27.5	34.5	42	44	40	44	40				■ + ■ + ...
0.534	1.72		$M_{2,0}$	Nm	31.5	42	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				
0.489	1.68	0.2 (0.22)	$n_{2N}$	r/min	50	30	25	20	20	15	12.5	10				1FT2203-2AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	15.8	26.5	32	40.5	38.5	40	44	40				■ + ■ + ...
0.5	1.72		$M_{2,0}$	Nm	29.5	39	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				
1.12	3.46	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10				1FT2203-4AG..-2.A0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	44	40	44	40				■ + ■ + ...
1.14	3.56		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				
1.08	3.46	0.35 (0.37)	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10				1FT2203-4AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	33.5	43.5	44	44	44	40	44	40				■ + ■ + ...
1.1	3.56		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40				
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64				
2.14	6.62	1.248 (1.328)	$n_{2N}$	r/min	25	20	15	12.5	-	-	-	-				1FT2204-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-				■ + ■ + ...
2.19	6.8		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-				
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-				
2.15	6.62	1.248 (1.328)	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-				1FT2204-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	44	-	-	-	-				■ + ■ + ...
2.2	6.8		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-				
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-				
2.88	8.88	1.628 (1.708)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-				1FT2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	44	44	44	-	-	-	-	-				■ + ■ + ...
2.95	9.12		$M_{2,0}$	Nm	44	44	44	-	-	-	-	-				
			$M_{2max}$	Nm	70	70	70	-	-	-	-	-				
<b>Planetary gearbox data</b>																
Gearbox type:			NRBW060, 3-stage													
1. Order code			A28													
$i$			60	80	100	120	160	200	256	320						
2. Order code			R60	R80	R01	R21	R61	R02	R52	R23						
$M_{2N,G}$	Nm		44	44	44	44	44	40	44	40						
$M_{2max,G}$	Nm		70	70	70	70	70	64	70	64						
$M_{2Em,Off}$	Nm		88	88	88	88	88	80	88	80						
$J_{1,G}$	kg cm <sup>2</sup>		0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222						
$\varnothing_{2,G}$			21													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

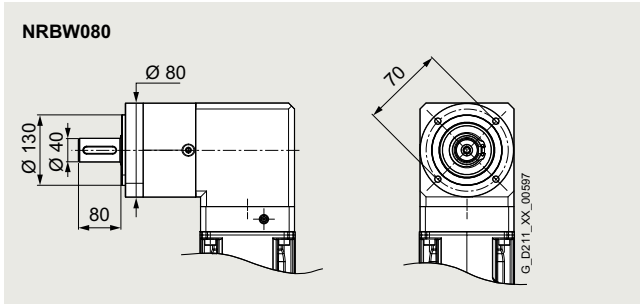
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW080

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1 and 2-stage</b>																				
0.45	1.71	0.093 (0.112)	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2103-2AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	0.84	1.09	1.17	1.73	2.2	2.7	2.5	3.2	4.35	4.35	5.5	6.9	9.6	12.1	19.5	■ ■ ■ + ■ ■ ■ + ...
0.477	1.75		$M_{2,0}$	Nm	1.34	1.83	2.3	3.25	3.75	4.7	4.2	5.6	7	7.5	9.4	11.8	15.2	19	30.5	
			$M_{2max}$	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
0.422	1.71	0.093 (0.112)	$n_{2N}$	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2103-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	0.66	1.07	1.15	1.7	2.15	2.7	2.45	3.15	4.25	4.25	5.4	6.8	9.4	11.8	19.1	■ ■ ■ + ■ ■ ■ + ...
0.45	1.75		$M_{2,0}$	Nm	1.26	1.72	2.15	3.05	3.55	4.45	3.95	5.3	6.6	7.1	8.9	11.2	14.3	17.9	28.5	
			$M_{2max}$	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
1.05	3.68	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5	1FT2103-4AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	2.5	3.1	4.35	5.7	6.9	8.8	6.8	8.4	11.7	13.9	17.6	17.5	24.5	31	49.5	■ ■ ■ + ■ ■ ■ + ...
1.07	3.78		$M_{2,0}$	Nm	3.1	4.2	5.2	7.4	8.5	10.6	9.5	12.7	15.9	16.9	21	26.5	34	42.5	50	
			$M_{2max}$	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
0.983	3.68	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	1FT2103-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	2.1	2.7	3.65	5	5	6	6.1	7.5	10.4	10.1	12.5	15.7	22	27.5	44.5	■ ■ ■ + ■ ■ ■ + ...
1.01	3.78		$M_{2,0}$	Nm	2.9	3.95	4.95	7	8	10	9	12	15	16	20	25	32	40	50	
			$M_{2max}$	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
1.06	3.4	0.35 (0.43)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2104-4AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	2.85	3.9	4.95	6.8	8	10.2	8.6	12	15.1	15.8	20	25	32	40.5	50	■ ■ ■ + ■ ■ ■ + ...
1.08	3.49		$M_{2,0}$	Nm	3.15	4.25	5.3	7.5	8.6	10.8	9.6	12.8	16.1	17.2	21.5	26.5	34	43	50	
			$M_{2max}$	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
1.05	3.49	0.35 (0.43)	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1FT2104-4AK..-2.0-Z
...	...	...	$M_{2N}$	Nm	2.65	3.4	4.3	6.1	7.6	9.5	7.2	11.2	14.5	15	18.8	23.5	31	39	41.5	■ ■ ■ + ■ ■ ■ + ...
1.08	3.59		$M_{2,0}$	Nm	3.15	4.2	5.3	7.5	8.5	10.7	9.5	12.8	16	17	21	26.5	34	42.5	50	
			$M_{2max}$	Nm	10.7	14.3	17.8	25	28.5	35.5	31.5	42.5	53	56	70	88	113	141	80	
2.11	6.91	0.56 (0.65)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2104-5AF..-2.0-Z
...	...	...	$M_{2N}$	Nm	6.1	8.2	10.3	14.2	16.5	21	17.9	24.5	31	32.5	41.5	51	66	83	50	■ ■ ■ + ■ ■ ■ + ...
2.16	7.11		$M_{2,0}$	Nm	6.4	8.5	10.7	15.1	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	50	
			$M_{2max}$	Nm	21	28	35.5	49.5	56	61	63	84	105	112	140	175	192	176	80	

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Planetary gearbox data		NRBW080, 1-stage						NRBW080, 2-stage								
Gearbox type:		A36						A37								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varnothing_{2,G}$	'	13						15								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																	
Nm	Nm	kg cm <sup>2</sup>																	
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1 and 2-stage (continued)</b>																			
2.09	7	0.56 (0.65)	$n_{2N}$	r/min	600	500	375	300	250	200	250	150	150	125	100	75	50	50	1FT2104-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.6	6.8	9.5	12.4	14.9	18.9	14.5	24	24	29	37	49	75	75	49.5
2.15	7.2		$M_{2,0}$	Nm	6.3	8.5	10.6	14.9	17.1	21	19.1	25.5	31.5	34	42.5	53	68	84	50
			$M_{2max}$	Nm	21.5	28.5	35.5	50	57	61	64	85	106	113	142	176	192	176	80
2.82	9.25	0.76 (0.84)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25
...	...	...	$M_{2N}$	Nm	7.8	10.5	13.4	17.5	21	27.5	21.5	32.5	40.5	41.5	54	68	84	109	50
2.89	9.53		$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	28.5	25.5	34	43	45.5	57	71	91	110	50
			$M_{2max}$	Nm	28.5	38	47.5	66	76	61	84	113	141	150	188	176	192	176	80
4.47	14	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25
...	...	...	$M_{2N}$	Nm	12	16	20	26.5	31.5	38	32	47.5	59	62	79	99	120	110	50
4.59	14.4		$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	40.5	54	68	72	90	110	120	110	50
			$M_{2max}$	Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80
4.5	14	1.71 (2.55)	$n_{2N}$	r/min	500	375	375	250	200	200	150	100	100	75	75	50	50	37.5	25
...	...	...	$M_{2N}$	Nm	11.3	15.2	15.4	24	30	29.5	29	38.5	57	58	76	76	117	110	50
4.62	14.4		$M_{2,0}$	Nm	13.8	18.4	23	32	36.5	38	41	54	68	73	91	110	120	110	50
			$M_{2max}$	Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80
7.27	22.4	2.65 (3.5)	$n_{2N}$	r/min	500	375	300	250	200	150	150	125	100	100	75	60	50	37.5	-
...	...	...	$M_{2N}$	Nm	15.6	20.5	26.5	32	40.5	38	51	61	76	76	101	110	120	110	-
7.4	23.1		$M_{2,0}$	Nm	22	29.5	36.5	51	50	38	66	88	110	117	120	110	120	110	-
			$M_{2max}$	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	-
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1 and 2-stage</b>																			
0.444	1.62	0.2 (0.22)	$n_{2N}$	r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5
...	...	...	$M_{2N}$	Nm	0.93	1.19	1.7	2.3	2.8	3.55	2.7	3.35	4.65	5.5	7.1	7.2	10.2	12.8	20.5
0.471	1.66		$M_{2,0}$	Nm	1.33	1.8	2.25	3.2	3.7	4.65	4.15	5.5	7	7.4	9.3	11.7	15	18.8	30
			$M_{2max}$	Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80
0.409	1.62	0.2 (0.22)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	30
...	...	...	$M_{2N}$	Nm	0.9	1.26	1.37	2.2	2.25	2.9	2.75	3.7	4.5	4.5	5.8	7.8	10.2	12.3	20.5
0.437	1.66		$M_{2,0}$	Nm	1.22	1.67	2.1	3	3.45	4.3	3.85	5.1	6.4	6.9	8.6	10.8	13.9	17.4	27.5
			$M_{2max}$	Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80
1.06	3.4	0.35 (0.37)	$n_{2N}$	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5
...	...	...	$M_{2N}$	Nm	2.45	3.7	3.85	5.5	7.2	8.9	8.2	10.6	13.8	14.2	17.6	22	29.5	36.5	50
1.08	3.49		$M_{2,0}$	Nm	3.15	4.25	5.3	7.5	8.6	10.7	9.6	12.8	16	17.1	21	26.5	34	42.5	50
			$M_{2max}$	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80
1.02	3.4	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	250	200	150	125	100	100	75	60	37.5
...	...	...	$M_{2N}$	Nm	2.35	2.95	4	5.4	6.4	8.1	6.5	7.8	11.1	12.8	16.2	16.2	23.5	29.5	47.5
1.04	3.49		$M_{2,0}$	Nm	3	4.05	5.1	7.2	8.2	10.3	9.2	12.3	15.4	16.4	20.5	25.5	33	41	50
			$M_{2max}$	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80
2.07	6.53	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25
...	...	...	$M_{2N}$	Nm	5.8	7.8	9.8	13.4	15.7	20	16.9	23.5	29.5	31	39.5	49.5	62	79	50
2.12	6.72		$M_{2,0}$	Nm	6.3	8.4	10.5	14.8	16.9	21	18.9	25	31.5	33.5	42	52	67	83	50
			$M_{2max}$	Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80

Continued on the next page

Planetary gearbox data		NRBW080, 1-stage						NRBW080, 2-stage								
Gearbox type:		A36						A37								
1. Order code																
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varnothing_{2,G}$		13						15								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1 and 2-stage (continued)</b>																				
2.08	6.53	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	150	125	125	100	75	60	50	50	1FT2204-5AK..-2..0-Z	
...	...	...	$M_{2N}$	Nm	5.5	6.7	9.3	12.1	14.7	18.5	17.6	23	28.5	28.5	36.5	48	61	74	39.5	■ + ■ + ...
2.13	6.72		$M_{2,0}$	Nm	6.3	8.4	10.6	14.9	17	21	19	25	31.5	33.5	42	52	67	84	50	
			$M_{2max}$	Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80	
2.81	8.78	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	150	125	100	100	75	60	50	37.5	25	1FT2204-6AF..-2..0-Z	
...	...	...	$M_{2N}$	Nm	8.2	11.1	14	18.4	22	28	22.5	33	41.5	43.5	55	69	88	110	50	■ + ■ + ...
2.88	9.04		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	91	110	50	
			$M_{2max}$	Nm	27	36	45	63	72	61	80	107	134	142	178	176	192	176	80	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	1FT2205-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	7.3	10	12.6	17.7	20	25.5	23	29	37	39	50	59	78	101	49.5	■ + ■ + ...
2.92	10.3		$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	58	72	92	110	49.5	
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.91	10	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	125	100	100	75	60	50	37.5	25	1FT2205-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	7.4	9.9	12.5	17.1	20	25	21.5	30	37.5	39	50	62	79	100	50	■ + ■ + ...
2.96	10.3		$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	23.5	29.5	26.5	35	44	47	58	73	94	110	50	
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	250	200	150	125	100	100	75	60	50	37.5	25	1FT2205-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.3	7.4	10.6	16.3	16.4	20.5	20.5	27	32.5	37.5	40.5	55	70	83	50	■ + ■ + ...
2.92	10.3		$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	57	72	92	110	49.5	
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
4.95	16.8	5.1 (6)	$n_{2N}$	r/min	500	375	300	250	200	150	125	100	100	75	60	50	37.5	25	1FT2205-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	11.2	15.1	19.2	23.5	29.5	38	28.5	45.5	57	57	76	94	116	110	50	■ + ■ + ...
5.04	17.3		$M_{2,0}$	Nm	15.1	20	25	35	40	38	45	60	75	80	100	110	120	110	50	
			$M_{2max}$	Nm	51	69	86	104	80	61	153	192	176	192	192	176	192	176	80	

### Planetary gearbox data

Gearbox type:		NRBW080, 1-stage							NRBW080, 2-stage								
1. Order code		<b>A36</b>							<b>A37</b>								
$i$		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917	
$\varnothing_{2,G}$	'	13						15									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRBW080**

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage</b>																
0.45	1.71	0.093 (0.112)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	7.5	6	1FT2103-2AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	18.1	23.5	28.5	34.5	49	49.5	75	98	50	■ ■ ■ + ■ ■ ■ + ...		
0.477	1.75		$M_{2,0}$	Nm	28	37.5	47	56	75	94	120	110	50			
			$M_{2max}$	Nm	103	137	171	176	192	176	192	176	80			
0.422	1.71	0.093 (0.112)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	5	1FT2103-2AH..-0.0-Z		
...	...	...	$M_{2N}$	Nm	17.7	23	28	33.5	48	58	73	96	49.5	■ ■ ■ + ■ ■ ■ + ...		
0.45	1.75		$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	110	49.5			
			$M_{2max}$	Nm	103	137	171	176	192	176	192	176	80			
1.05	3.68	0.139 (0.158)	$n_{2N}$	r/min	37.5	30	25	20	15	15	12.5	10	6	1FT2103-4AG..-0.A0-Z		
...	...	...	$M_{2N}$	Nm	48.5	61	72	90	120	107	115	110	50	■ ■ ■ + ■ ■ ■ + ...		
1.07	3.78		$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	50			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80			
0.983	3.68	0.139 (0.158)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	10	5	1FT2103-4AH..-0.0-Z		
...	...	...	$M_{2N}$	Nm	42	55	65	80	112	110	120	110	49.5	■ ■ ■ + ■ ■ ■ + ...		
1.01	3.78		$M_{2,0}$	Nm	60	80	100	110	120	110	120	110	50			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80			
1.06	3.4	0.35 (0.43)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	3	1FT2104-4AF..-2.0-Z		
...	...	...	$M_{2N}$	Nm	60	79	101	110	120	110	120	110	50	■ ■ ■ + ■ ■ ■ + ...		
1.08	3.49		$M_{2,0}$	Nm	64	85	106	110	120	110	120	110	49.5			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80			
1.05	3.49	0.35 (0.43)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	6	1FT2104-4AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	58	76	93	110	108	110	120	110	50	■ ■ ■ + ■ ■ ■ + ...		
1.08	3.59		$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	49.5			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80			
2.11	6.91	0.56 (0.65)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1FT2104-5AF..-2.0-Z		
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...		
2.16	7.11		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-			
2.09	7	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2104-5AK..-2.0-Z		
...	...	...	$M_{2N}$	Nm	97	119	120	107	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...		
2.15	7.2		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-			
2.82	9.25	0.76 (0.84)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1FT2104-6AF..-2.0-Z		
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...		
2.89	9.53		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-			
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-			
4.47	14	1.71 (2.55)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	-	1FT2105-4AF..-0.0-Z		
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
4.59	14.4		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-			
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-			

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Planetary gearbox data		NRBW080, 3-stage								
Gearbox type:		<b>A38</b>								
1. Order code		<b>60    80    100    120    160    200    256    320    512</b>								
2. Order code		<b>R60    R80    R01    R21    R61    R02    R52    R23    R51</b>								
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917
$\varnothing_{2,G}$	'	17								

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	<b>The motor and gearbox combination is fatigue-proof</b>
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	<b>Check acceleration and inertias, perform service life calculation if necessary</b>
	$M_{max,M} \times i > M_{2max,G}$	<b>The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary</b>

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage (continued)</b>														
4.5	14	1.71 (2.55)	$n_{2N}$	r/min	37.5	30	25	20	15	-	-	-	1FT2105-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
4.62	14.4		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-		
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-		
7.27	22.4	2.65 (3.5)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-	1FT2105-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
7.4	23.1		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-		
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-		
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 3-stage</b>														
0.444	1.62	0.2 (0.22)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	6	1FT2203-2AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	19.4	25	30	36.5	52	62	78	105	49.5	■ ■ ■ + ■ ■ ■ + ...
0.471	1.66		$M_{2,0}$	Nm	27.5	37	46.5	55	74	93	119	110	50	
			$M_{2max}$	Nm	97	130	162	176	192	176	192	176	80	
0.409	1.62	0.2 (0.22)	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	7.5	6	1FT2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	19.5	24	30.5	39	50	63	83	83	50	■ ■ ■ + ■ ■ ■ + ...
0.437	1.66		$M_{2,0}$	Nm	25.5	34.5	43	51	69	86	110	110	49.5	
			$M_{2max}$	Nm	97	130	162	176	192	176	192	176	80	
1.06	3.4	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	6	1FT2203-4AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	55	72	88	107	94	110	120	110	50	■ ■ ■ + ■ ■ ■ + ...
1.08	3.49		$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	50	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80	
1.02	3.4	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	10	6	1FT2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	45	58	68	85	119	110	120	100	50	■ ■ ■ + ■ ■ ■ + ...
1.04	3.49		$M_{2,0}$	Nm	61	81	102	110	120	110	120	110	50	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80	
2.07	6.53	1.23 (1.31)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1FT2204-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.12	6.72		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.08	6.53	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2204-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	94	116	120	88	107	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.13	6.72		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.81	8.78	1.61 (1.69)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	-	1FT2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...
2.88	9.04		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	5	-	-	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	109	119	-	-	■ ■ ■ + ■ ■ ■ + ...
2.92	10.3		$M_{2,0}$	Nm	110	120	120	110	120	110	120	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	

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Planetary gearbox data		NRBW080, 3-stage										
Gearbox type:		<b>A38</b>										
1. Order code		<b>60 80 100 120 160 200 256 320 512</b>										
$i$		<b>R60 R80 R01 R21 R61 R02 R52 R23 R51</b>										
2. Order code												
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50		
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80		
$M_{2Em,Off}$	Nm	220	240	240	220	240	240	240	220	190		
$J_{1,G}$	kg cm <sup>2</sup>	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917		
$\varphi_{2,G}$	'	17										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

#### Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 3-stage (continued)																
2.91	10	3.15	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-	-	-	-	1FT2205-2AF..-0..0-Z
...	...	(4.05)	$M_{2N}$	Nm	110	120	120	110	120	110	120	-	-	-	-	■ + ■ + ...
2.96	10.3		$M_{2,0}$	Nm	110	120	120	110	120	110	119	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	-	-	
2.87	10	3.15	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	-	-	-	-	1FT2205-2AH..-0..0-Z
...	...	(4.05)	$M_{2N}$	Nm	98	116	120	110	120	110	120	-	-	-	-	■ + ■ + ...
2.92	10.3		$M_{2,0}$	Nm	110	120	119	110	120	109	119	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	-	-	
4.95	16.8	5.1	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	-	-	-	1FT2205-4AF..-0..0-Z
...	...	(6)	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	-	-	■ + ■ + ...
5.04	17.3		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	-	-	
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	-	-	

Planetary gearbox data		NRBW080, 3-stage									
Gearbox type:		A38									
1. Order code		60 80 100 120 160 200 256 320 512									
$i$		R60 R80 R01 R21 R61 R02 R52 R23 R51									
2. Order code											
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917	
$\varnothing_{2,G}$	'	17									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

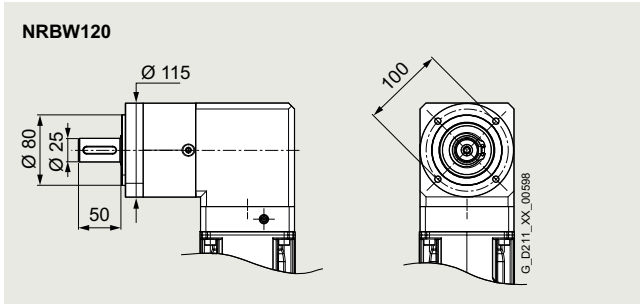
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW120

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1 and 2-stage</b>																				
0.338	1.62	0.093 (0.112)	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	75	60	50	30	1FT2103-2AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	0.61	0.91	1.09	1.57	2	2.1	2.25	2.85	3.65	3.75	5.5	5.7	8.1	9.8	16.6	■ ■ ■ + ■ ■ ■ + ...
0.407	1.67		$M_{2,0}$	Nm	1.01	1.42	1.84	2.65	3.05	3.9	3.45	4.7	5.9	6.3	7.9	10	12.9	16.2	26	
			$M_{2max}$	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106	
0.31	1.62	0.093 (0.112)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	100	100	100	75	60	50	30	1FT2103-2AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	0.56	0.69	1.07	1.55	2	2.1	2.1	2.75	3.55	3.7	4.1	5.7	8	9.7	16.4	■ ■ ■ + ■ ■ ■ + ...
0.379	1.67		$M_{2,0}$	Nm	0.92	1.31	1.7	2.45	2.85	3.65	3.2	4.35	5.5	5.9	7.4	9.3	12	15.1	24	
			$M_{2max}$	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106	
0.934	3.61	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	1FT2103-4AG..-0.A0-Z
...	...	...	$M_{2N}$	Nm	1.98	2.45	3.95	5.5	6.6	8.4	7.2	9.8	12.2	12.7	16.7	21	25	31.5	50	■ ■ ■ + ■ ■ ■ + ...
0.992	3.7		$M_{2,0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.8	8.7	11.7	14.7	15.7	19.7	24.5	31.5	39.5	63	
			$M_{2max}$	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192	
0.92	3.61	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	300	200	250	150	150	125	125	100	75	60	37.5	1FT2103-4AH..-0.0-Z
...	...	...	$M_{2N}$	Nm	1.61	2.1	3.1	4.4	4.4	6.7	4.65	7.8	8.3	10	10.8	13.8	20	25	40.5	■ ■ ■ + ■ ■ ■ + ...
0.978	3.7		$M_{2,0}$	Nm	2.75	3.75	4.75	6.7	7.7	9.7	8.6	11.6	14.5	15.5	19.4	24	31	39	62	
			$M_{2max}$	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192	
0.948	3.33	0.35 (0.43)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2104-4AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	2.35	3.3	4.25	6.1	7.1	9	7.4	10.2	12.9	13.7	17.7	22	28.5	36	57	■ ■ ■ + ■ ■ ■ + ...
1.01	3.41		$M_{2,0}$	Nm	2.8	3.85	4.85	6.9	7.9	10	8.9	11.9	14.9	15.9	20	25	32	40	64	
			$M_{2max}$	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
0.941	3.42	0.35 (0.43)	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2104-4AK..-0.0-Z
...	...	...	$M_{2N}$	Nm	2.25	3.1	3.1	5	6.7	8.4	7.1	9.2	12	12.7	16.5	20.5	27.5	34.5	55	■ ■ ■ + ■ ■ ■ + ...
0.999	3.5		$M_{2,0}$	Nm	2.8	3.8	4.85	6.8	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	63	
			$M_{2max}$	Nm	10.3	13.9	17.4	24	27.5	35	31	41.5	52	55	69	86	111	138	192	
2.03	6.84	0.56 (0.65)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	1FT2104-5AF..-0.0-Z
...	...	...	$M_{2N}$	Nm	5.6	7.6	9.6	13.6	15.7	19.7	17	23	28.5	30.5	38.5	48.5	62	78	120	■ ■ ■ + ■ ■ ■ + ...
2.08	7.02		$M_{2,0}$	Nm	6	8.1	10.2	14.4	16.5	20.5	18.5	24.5	30.5	33	41	51	66	82	120	
			$M_{2max}$	Nm	20.5	28	35	49	56	70	62	83	104	111	138	173	220	275	192	

Continued on the next page

Planetary gearbox data		NRBW120, 1-stage						NRBW120, 2-stage								
Gearbox type:		A46						A47								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varnothing_{2,G}$	'	11						13								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRBW120**

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	1FT2104-5AK..-0..0-Z		
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	5.1	6.4	9.4	12.9	15.4	19.4	16.8	22.5	28	30	38	36	55	68	110	■■■ + ■■■ + ...		
			$M_{2,0}$	Nm	6	8.1	10.2	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120			
			$M_{2max}$	Nm	21	28	35.5	49.5	56	71	63	84	105	112	140	175	225	280	192			

➔ Continued on the next page

Planetary gearbox data		NRBW120, 1-stage							NRBW120, 2-stage							
Gearbox type:		<b>A46</b>							<b>A47</b>							
1. Order code																
$i$																
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$	'	11							13							

Color legend:

<span style="background-color: #e6f2e6; border: 1px solid #ccc; padding: 2px;"></span> $M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
<span style="background-color: #e6e6e6; border: 1px solid #ccc; padding: 2px;"></span> $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
<span style="background-color: #ffe0b2; border: 1px solid #ccc; padding: 2px;"></span> $M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1 and 2-stage (continued)</b>																				
0.943	3.33	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	150	150	125	100	75	60	37.5	1FT2203-4AG..-0..0-Z		
...	...	...	$M_{2N}$	Nm	2.25	3.05	4.1	5.9	6.4	8	6.8	8.6	11.7	12.1	15.6	19.6	27	34	55	
1	3.41		$M_{2,0}$	Nm	2.8	3.8	4.85	6.9	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	64	
			$M_{2max}$	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
0.903	3.33	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	150	150	125	100	100	75	60	37.5	1FT2203-4AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	1.85	2.4	3.5	4.95	5.9	7.6	6.6	8.9	9.3	11.4	15	14.9	22	27.5	44.5	
0.961	3.41		$M_{2,0}$	Nm	2.7	3.65	4.65	6.6	7.6	9.5	8.5	11.4	14.3	15.2	19.1	23.5	30.5	38	61	
			$M_{2max}$	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192	
1.99	6.47	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	75	60	50	37.5	25	1FT2204-5AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	5.4	7.4	9.4	13.2	15.3	19.2	16.4	22	28	29.5	37.5	47.5	61	76	120	
2.04	6.64		$M_{2,0}$	Nm	5.9	8	10	14.2	16.2	20	18.1	24	30	32	40	50	64	81	120	
			$M_{2max}$	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2	6.47	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	150	125	125	100	75	75	60	37.5	1FT2204-5AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	5.1	6.2	9.3	12.6	15.2	19.1	16.6	22	27.5	29.5	37.5	47	53	66	107	
2.05	6.64		$M_{2,0}$	Nm	6	8	10.1	14.3	16.3	20.5	18.2	24	30.5	32.5	40.5	50	65	81	120	
			$M_{2max}$	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2.74	8.71	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	75	60	50	37.5	25	1FT2204-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	7.7	10.4	13.1	18.5	21	26.5	23	31	39	41.5	52	66	85	106	120	
2.8	8.95		$M_{2,0}$	Nm	8.2	11	13.8	19.5	22	27.5	24.5	33	41.5	44	55	69	88	111	120	
			$M_{2max}$	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	177	220	280	350	192	
2.99	9.93	3.15 (4.05)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	7.3	10.1	12.8	18.1	20.5	26	23.5	29.5	37.5	39.5	52	60	80	105	120	
3.03	10.2		$M_{2,0}$	Nm	8.9	12	15	21	24	30	27	36	45	48	60	75	96	120	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
3.02	9.93	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	75	60	50	37.5	25	1FT2205-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	7.1	9.7	12.4	17	20	25.5	21	29.5	37	39	50	63	80	102	120	
3.06	10.2		$M_{2,0}$	Nm	9	12.1	15.2	21	24	30.5	27	36.5	45.5	48.5	61	76	97	122	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
2.96	9.93	3.15 (4.05)	$n_{2N}$	r/min	600	375	375	300	250	200	150	125	125	100	75	60	50	37.5	1FT2205-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	5.9	9.3	11	14.2	17.9	22.5	20	26.5	33	34.5	44	56	73	90	114	
3	10.2		$M_{2,0}$	Nm	8.8	11.8	14.9	20.5	23.5	30	26.5	35.5	44.5	47.5	59	74	95	119	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
5.14	16.7	5.1 (6)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	75	60	50	37.5	25	1FT2205-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	11.9	16.5	21	27	33.5	43	31.5	50	63	65	85	106	134	171	120	
5.23	17.2		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	103	129	166	205	120	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.15	16.7	7.8 (9.4)	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	1FT2206-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	13.5	18.8	23.5	33	38	48	43	52	68	69	94	103	140	190	120	
5.27	17.2		$M_{2,0}$	Nm	15.7	20.5	26	36.5	42	52	47	62	78	83	104	130	167	205	119	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	

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### Planetary gearbox data

Gearbox type:		NRBW120, 1-stage						NRBW120, 2-stage								
1. Order code		A46						A47								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$	'	11						13								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW120

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ <small>(<math>J_{M,Br}</math>)</small> Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1 and 2-stage (continued)																			
5.29 ... 5.39	16.7 ... 17.2	7.8 (9.4)	$n_{2N}$ r/min	500	375	300	250	200	150	100	100	75	60	50	37.5	25	1FT2206-2AF..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...		
			$M_{2N}$ Nm	12.5	16.9	21.5	29	34	43.5	35.5	51	64	67	86	107	136		173	119
			$M_{2,0}$ Nm	16	21	26.5	37.5	43	53	48	64	80	85	107	133	171		210	120
			$M_{2max}$ Nm	51	68	85	120	137	152	153	200	250	270	335	368	416		368	192
5.13 ... 5.23	16.7 ... 17.2	7.8 (9.4)	$n_{2N}$ r/min	500	375	300	250	200	150	100	100	75	75	50	50	37.5	1FT2206-2AH..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...		
			$M_{2N}$ Nm	11.8	16.5	20.5	26.5	33.5	42.5	30.5	50	62	65	84	85	133		129	120
			$M_{2,0}$ Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	77	83	103	129	166		205	120
			$M_{2max}$ Nm	51	68	85	120	137	152	153	200	250	270	335	368	416		368	192
7.8 ... 7.95	25.1 ... 25.9	11.5 (13.1)	$n_{2N}$ r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	1FT2206-3AB..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...
			$M_{2N}$ Nm	21	27.5	35.5	50	56	71	56	75	105	111	141	176	220	230	120	
			$M_{2,0}$ Nm	23.5	31.5	39.5	55	63	79	71	94	118	126	157	197	250	230	120	
			$M_{2max}$ Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
7.68 ... 7.82	25.1 ... 25.9	11.5 (13.1)	$n_{2N}$ r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	1FT2206-3AF..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...
			$M_{2N}$ Nm	15.1	21	27.5	42.5	43	58	54	65	82	81	112	139	171	225	120	
			$M_{2,0}$ Nm	23	31	38.5	54	62	78	70	93	116	124	155	193	245	230	120	
			$M_{2max}$ Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
10.6 ... 10.8	35.5 ... 36.5	15.1 (16.8)	$n_{2N}$ r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	1FT2206-4AC..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...	
			$M_{2N}$ Nm	20.5	31.5	40	54	65	82	77	80	107	107	160	160	215	230		120
			$M_{2,0}$ Nm	32	43	54	75	86	95	96	128	160	171	210	230	260	230		120
			$M_{2max}$ Nm	109	145	182	216	192	152	325	416	368	416	416	368	416	368		192
10.4 ... 10.6	33.6 ... 34.6	15.1 (16.8)	$n_{2N}$ r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	1FT2206-4AF..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...
			$M_{2N}$ Nm	21	29	37.5	58	58	79	73	87	109	107	148	184	225	230	120	
			$M_{2,0}$ Nm	31.5	42	52	74	84	95	94	126	158	168	210	230	260	230	120	
			$M_{2max}$ Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192	
9.93 ... 10.1	33.6 ... 34.6	15.1 (16.8)	$n_{2N}$ r/min	375	300	250	200	150	150	100	75	75	60	50	37.5	37.5	37.5	1FT2206-4AH..-0..0-Z ■ ■ ■ + ■ ■ ■ + ...	
			$M_{2N}$ Nm	23.5	30	37.5	48	63	65	61	92	120	122	154	185	245	230		113
			$M_{2,0}$ Nm	30	40	50	70	80	95	90	120	150	160	200	230	260	230		119
			$M_{2max}$ Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368		192

Planetary gearbox data		NRBW120, 1-stage						NRBW120, 2-stage									
Gearbox type:		A46						A47									
1. Order code		3 4 5 7 8 10						9 12 15 16 20 25 32 40 64									
2. Order code		R03 R04 R05 R07 R08 R10						R09 R12 R15 R16 R20 R25 R32 R40 R64									
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855	
$\varnothing_{2,G}$	'	11						13									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage</b>														
0.338	1.62	0.093	$n_{2N}$	r/min	25	25	20	12.5	12.5	10	7.5	6	1FT2103-2AG..-0.A0-Z	
...	...	(0.112)	$M_{2N}$	Nm	15.9	17.9	22.5	32	41	51	68	85	■ ■ ■ + ■ ■ ■ + ...	
0.407	1.67		$M_{2,0}$	Nm	24	32	40	48	64	80	103	129		
			$M_{2max}$	Nm	99	131	164	197	260	325	416	368		
0.31	1.62	0.093	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	6	1FT2103-2AH..-0..0-Z	
...	...	(0.112)	$M_{2N}$	Nm	12.9	17.9	22.5	26.5	40.5	50	67	84	■ ■ ■ + ■ ■ ■ + ...	
0.379	1.67		$M_{2,0}$	Nm	22.5	30	37.5	45	60	75	96	120		
			$M_{2max}$	Nm	99	131	164	197	260	325	416	368		
0.934	3.61	0.139	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	1FT2103-4AG..-0.A0-Z	
...	...	(0.158)	$M_{2N}$	Nm	43.5	59	69	77	128	156	192	230	■ ■ ■ + ■ ■ ■ + ...	
0.992	3.7		$M_{2,0}$	Nm	58	78	98	117	157	196	250	230		
			$M_{2max}$	Nm	215	285	360	368	416	368	416	368		
0.92	3.61	0.139	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	1FT2103-4AH..-0..0-Z	
...	...	(0.158)	$M_{2N}$	Nm	34.5	48	58	66	102	124	157	205	■ ■ ■ + ■ ■ ■ + ...	
0.978	3.7		$M_{2,0}$	Nm	58	77	96	116	155	193	245	230		
			$M_{2max}$	Nm	215	285	360	368	416	368	416	368		
0.948	3.33	0.35	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1FT2104-4AF..-0..0-Z	
...	...	(0.43)	$M_{2N}$	Nm	51	70	88	103	143	180	230	225	■ ■ ■ + ■ ■ ■ + ...	
1.01	3.41		$M_{2,0}$	Nm	59	79	99	119	159	198	250	230		
			$M_{2max}$	Nm	200	265	330	368	416	368	416	368		
0.941	3.42	0.35	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	10	1FT2104-4AK..-0..0-Z	
...	...	(0.43)	$M_{2N}$	Nm	48	66	82	96	137	149	215	188	■ ■ ■ + ■ ■ ■ + ...	
0.999	3.5		$M_{2,0}$	Nm	59	79	98	118	158	197	250	230		
			$M_{2max}$	Nm	205	270	340	368	416	368	416	368		
2.03	6.84	0.56	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1FT2104-5AF..-0..0-Z	
...	...	(0.65)	$M_{2N}$	Nm	114	154	193	225	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...	
2.08	7.02		$M_{2,0}$	Nm	122	163	200	230	260	230	260	230		
			$M_{2max}$	Nm	410	416	416	368	416	368	416	368		
2.02	6.93	0.56	$n_{2N}$	r/min	37.5	30	20	20	15	15	10	10	1FT2104-5AK..-0..0-Z	
...	...	(0.65)	$M_{2N}$	Nm	98	129	188	174	260	210	260	230	■ ■ ■ + ■ ■ ■ + ...	
2.07	7.12		$M_{2,0}$	Nm	122	162	200	230	260	230	260	230		
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
2.75	9.18	0.76	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1FT2104-6AF..-0..0-Z	
...	...	(0.84)	$M_{2N}$	Nm	157	210	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...	
2.81	9.44		$M_{2,0}$	Nm	165	220	260	230	260	230	260	230		
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
4.4	13.9	1.71	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	1FT2105-4AF..-0..0-Z	
...	...	(2.55)	$M_{2N}$	Nm	240	260	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...	
4.51	14.3		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230		
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368		

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Planetary gearbox data		NRBW120, 3-stage							
Gearbox type:		A48							
1. Order code		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$i$									
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varnothing_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage (continued)</b>															
4.43	13.9	1.71 (2.55)	$n_{2N}$	r/min	30	25	20	20	15	12.5	10	7.5		1FT2105-4AH..-0..0-Z	
...	...		$M_{2N}$	Nm	215	255	260	220	260	230	260	230		■ ■ ■ + ■ ■ ■ + ...	
4.54	14.3		$M_{2,0}$	Nm	260	260	260	230	260	230	260	225			
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368			
7.22	22.3	2.65 (3.5)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	-		1FT2105-6AF..-0..0-Z	
...	...		$M_{2N}$	Nm	260	260	260	230	260	230	260	-		■ ■ ■ + ■ ■ ■ + ...	
7.41	23		$M_{2,0}$	Nm	260	260	260	230	260	230	260	-			
			$M_{2max}$	Nm	416	416	416	368	416	368	416	-			
7.66	24.2	4.6 (6.3)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	-	-		1FT2106-3AF..-0..0-Z	
...	...		$M_{2N}$	Nm	260	260	260	230	260	230	-	-		■ ■ ■ + ■ ■ ■ + ...	
7.8	24.9		$M_{2,0}$	Nm	260	260	260	230	260	230	-	-			
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-			
9.97	30.8	6 (7.6)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-		1FT2106-4AF..-0..0-Z	
...	...		$M_{2N}$	Nm	260	260	260	230	260	-	-	-		■ ■ ■ + ■ ■ ■ + ...	
10.1	31.7		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-			
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-			
14.1	42.5	8.7 (10.4)	$n_{2N}$	r/min	25	20	15	-	-	-	-	-		1FT2106-6AF..-0..0-Z	
...	...		$M_{2N}$	Nm	260	260	260	-	-	-	-	-		■ ■ ■ + ■ ■ ■ + ...	
14.4	43.8		$M_{2,0}$	Nm	260	260	260	-	-	-	-	-			
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-			
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage</b>															
0.33	1.52	0.2 (0.22)	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	7.5		1FT2203-2AG..-0.A0-Z	
...	...		$M_{2N}$	Nm	14.5	20.5	26	29.5	45	56	73	74		■ ■ ■ + ■ ■ ■ + ...	
0.401	1.58		$M_{2,0}$	Nm	23.5	31.5	39.5	47.5	63	79	101	127			
			$M_{2max}$	Nm	93	124	155	186	245	310	395	368			
0.297	1.52	0.2 (0.22)	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	6		1FT2203-2AK..-0..0-Z	
...	...		$M_{2N}$	Nm	12.1	16.3	20.5	25	38	47.5	64	80		■ ■ ■ + ■ ■ ■ + ...	
0.367	1.58		$M_{2,0}$	Nm	21.5	29	36	43.5	58	72	93	116			
			$M_{2max}$	Nm	93	124	155	186	245	310	395	368			
0.943	3.33	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5		1FT2203-4AG..-0.A0-Z	
...	...		$M_{2N}$	Nm	48	65	80	92	137	169	210	230		■ ■ ■ + ■ ■ ■ + ...	
1	3.41		$M_{2,0}$	Nm	59	79	99	118	158	197	250	230			
			$M_{2max}$	Nm	200	265	330	368	416	368	416	368			
0.903	3.33	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5		1FT2203-4AK..-0..0-Z	
...	...		$M_{2N}$	Nm	39	53	63	73	113	136	170	225		■ ■ ■ + ■ ■ ■ + ...	
0.961	3.41		$M_{2,0}$	Nm	57	76	95	114	152	190	240	230			
			$M_{2max}$	Nm	200	265	330	368	416	368	416	368			
1.99	6.47	1.23 (1.31)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5		1FT2204-5AF..-0..0-Z	
...	...		$M_{2N}$	Nm	111	150	188	220	260	230	260	230		■ ■ ■ + ■ ■ ■ + ...	
2.04	6.64		$M_{2,0}$	Nm	120	160	200	230	260	230	260	230			
			$M_{2max}$	Nm	385	416	416	368	416	368	416	368			

Continued on the next page

Planetary gearbox data		NRBW120, 3-stage							
Gearbox type:		<b>A48</b>							
1. Order code		<b>60 80 100 120 160 200 256 320</b>							
$i$		<b>R60 R80 R01 R21 R61 R02 R52 R23</b>							
2. Order code									
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varphi_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage (continued)</b>															
2	6.47	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	20	15	15	12.5	10	10	10	10	1FT2204-5AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	95	125	186	220	260	230	260	197	260	197	■ ■ ■ + ■ ■ ■ + ...
2.05	6.64		$M_{2,0}$	Nm	121	161	200	230	260	230	260	230	260	230	
			$M_{2max}$	Nm	385	416	416	368	416	368	416	368	416	368	
2.74	8.71	1.61 (1.69)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	5	5	1FT2204-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	156	205	260	230	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...
2.8	8.95		$M_{2,0}$	Nm	165	215	260	230	260	230	260	230	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
2.99	9.93	3.15 (4.05)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	5	3.75	5	3.75	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	148	205	255	225	260	230	255	225	255	225	■ ■ ■ + ■ ■ ■ + ...
3.03	10.2		$M_{2,0}$	Nm	180	240	260	230	260	230	260	230	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
3.02	9.93	3.15 (4.05)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	5	5	1FT2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	149	198	250	225	260	230	260	225	260	225	■ ■ ■ + ■ ■ ■ + ...
3.06	10.2		$M_{2,0}$	Nm	182	240	260	230	255	230	255	230	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
2.96	9.93	3.15 (4.05)	$n_{2N}$	r/min	30	25	20	15	15	12.5	10	7.5	10	7.5	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	135	176	220	230	260	225	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...
3	10.2		$M_{2,0}$	Nm	178	235	260	230	260	225	260	225	260	225	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
5.14	16.7	5.1 (6)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	5	5	1FT2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	250	260	260	230	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...
5.23	17.2		$M_{2,0}$	Nm	260	260	260	230	260	230	260	260	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
5.15	16.7	7.8 (9.4)	$n_{2N}$	r/min	20	12.5	10	10	7.5	5	5	3.75	5	3.75	1FT2206-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	255	260	260	230	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...
5.27	17.2		$M_{2,0}$	Nm	260	260	260	230	260	225	255	230	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
5.29	16.7	7.8 (9.4)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	6	5	5	5	1FT2206-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	250	260	260	225	260	230	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...
5.39	17.2		$M_{2,0}$	Nm	260	260	255	230	255	225	260	230	260	230	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
5.13	16.7	7.8 (9.4)	$n_{2N}$	r/min	30	25	20	15	15	12.5	10	7.5	10	7.5	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	205	240	255	175	260	230	255	225	260	225	■ ■ ■ + ■ ■ ■ + ...
5.23	17.2		$M_{2,0}$	Nm	260	255	255	230	260	230	260	225	260	225	
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	416	368	
7.8	25.1	11.5 (13.1)	$n_{2N}$	r/min	12.5	10	7.5	7.5	5	3.75	-	-	-	-	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
7.95	25.9		$M_{2,0}$	Nm	260	260	260	230	255	230	-	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	-	-	

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### Planetary gearbox data

Gearbox type:		NRBW120, 3-stage							
1. Order code		A48							
$i$		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varphi_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage (continued)</b>													
7.68	25.1	11.5 (13.1)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	-	-	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	230	-	-	■ + ■ + ...
7.82	25.9		$M_{2,0}$	Nm	260	260	260	230	260	230	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	
10.6	35.5	15.1 (16.8)	$n_{2N}$	r/min	20	12.5	10	10	7.5	-	-	-	1FT2206-4AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	■ + ■ + ...
10.8	36.5		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	
10.4	33.6	15.1 (16.8)	$n_{2N}$	r/min	25	20	15	12.5	10	-	-	-	1FT2206-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	260	230	260	-	-	-	■ + ■ + ...
10.6	34.6		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	
9.93	33.6	15.1 (16.8)	$n_{2N}$	r/min	30	25	20	15	15	-	-	-	1FT2206-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	250	260	260	230	260	-	-	-	■ + ■ + ...
10.1	34.6		$M_{2,0}$	Nm	260	260	260	230	255	-	-	-	
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	

Planetary gearbox data		NRBW120, 3-stage							
Gearbox type:		A48							
1. Order code		A48							
$i$		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em.Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\varnothing_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

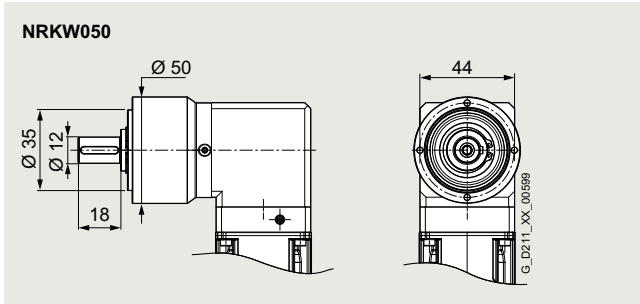
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRKW050

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	800 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	700 N
Average axial force for 30000 h	$F_{A,eq}$	800 N
Maximum radial force	$F_{R,max}$	1300 N
Maximum axial force	$F_{A,max}$	1000 N

Servomotor data		Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																
Nm	Nm	$(J_{M,Br})$																
		kg cm <sup>2</sup>																

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW050 1 and 2-stage																					
0.103	0.501	0.0245	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	1FT2102-0AG..-0.A0-Z
...	...	(0.0285)	$M_{2N}$	Nm	0.152	0.235	0.32	0.435	0.57	0.74	0.57	0.86	1.1	1.15	1.53	1.89	2.45	3.15	4.95	5	■ ■ ■ + ■ ■ ■ + ...
0.116	0.509		$M_{2,0}$	Nm	0.305	0.425	0.54	0.77	0.89	1.12	1	1.35	1.7	1.82	2.25	2.85	3.65	4.6	7.3	5	
			$M_{2max}$	Nm	1.5	2	2.5	3.55	4.05	5	4.5	6	7.5	8	10.1	12.6	16.1	20	12	8	
0.249	1.03	0.036	$n_{2N}$	r/min	1000	750	600	500	375	300	375	250	200	200	150	125	100	75	50	30	1FT2102-1AG..-0.A0-Z
...	...	(0.04)	$M_{2N}$	Nm	0.52	0.73	0.95	1.28	1.58	2	1.67	2.35	2.95	3.1	4	4.95	6.3	8.1	7.5	5	■ ■ ■ + ■ ■ ■ + ...
0.261	1.04		$M_{2,0}$	Nm	0.74	1.01	1.27	1.79	2.05	2.55	2.3	3.1	3.85	4.1	5.1	6.4	8.3	10.4	7.5	5	
			$M_{2max}$	Nm	3.05	4.1	5.1	7.2	8.3	8	9.2	12.3	15.4	16.4	20.5	21	24	21	12	8	

Planetary gearbox data		NRKW050, 1-stage										NRKW050, 2-stage																					
Gearbox type:		B16					B17					B16					B17																
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$i$																																	
$M_{2N,G}$	Nm	4.5	6	7.5	8.5	6	5	12	15	13	15	15	13	15	13	7.5	5	12	15	13	15	15	13	12	15	13	15	13	7.5	5			
$M_{2max,G}$	Nm	7	10	12	13.5	10	8	19	24	21	24	24	21	24	21	12	8	19	24	21	24	24	21	19	24	21	24	21	12	8			
$M_{2Em,Off}$	Nm	22.5	28	35	26	27	25	33	40	36	40	40	36	40	36	27	27	33	40	36	40	40	33	40	40	36	40	36	27	27			
$J_{1,G}$	kg cm <sup>2</sup>	0.052	0.04	0.035	0.033	0.033	0.032	0.049	0.048	0.048	0.038	0.034	0.033	0.032	0.032	0.031		0.049	0.048	0.048	0.038	0.034	0.033	0.049	0.048	0.048	0.038	0.034	0.033	0.032	0.031		
$\varphi_{2,G}$	'	21						25										25					25										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

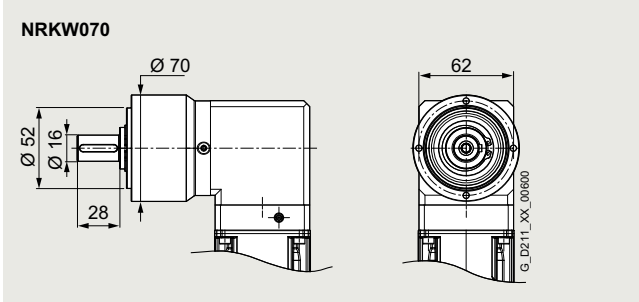


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NRKW070**

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	-	200	200	200	200	150	150	125	125	125	100	75	60	50	37.5	25	1FT2102-0AG...-0.A0-Z	■ ■ ■ + ■ ■ ■ + ...	
Nm	Nm																						kg cm <sup>2</sup>
0.053	0.444	0.0245 (0.0285)	...	...	...	0.0911	0.475	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
0.189	0.963	0.036 (0.04)	...	...	...	0.237	0.998	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
0.475	1.78	0.093 (0.112)	...	...	...	0.523	1.81	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
0.461	1.78	0.093 (0.112)	...	...	...	0.508	1.81	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
1.08	3.79	0.139 (0.158)	...	...	...	1.12	3.83	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
0.948	3.79	0.139 (0.158)	...	...	...	0.989	3.83	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1
1.1	3.5	0.368 (0.448)	...	...	...	1.14	3.54	...	0.21	0.305	0.49	0.58	0.77	0.67	0.95	1.23	1.32	1.69	2.15	2.8	3.55	5.7	9.1

Continued on the next page

Planetary gearbox data		NRKW070, 1-stage							NRKW070, 2-stage									
Gearbox type:		B26							B27									
1. Order code		i							i									
2. Order code		M <sub>2N,G</sub>							M <sub>2N,G</sub>									
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15	
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24	
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218	
$\phi_{2,G}$	'	16							18									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRKW070

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW070 1 and 2-stage (continued)</b>																					
1.1	3.6	0.368 (0.448)	$n_{2N}$	r/min	600	600	500	375	300	250	300	200	200	150	150	100	75	50	30	<b>1FT2104-4AK..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	2.95	3.4	4.4	6.3	8	10	7.9	12	12.7	16.2	17.3	25	26	30	18	15	■ ■ ■ + ■ ■ ■ + ...
1.13	3.64		$M_{2,0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	17.9	22.5	28	33	30	18	15	
			$M_{2max}$	Nm	10.8	14.4	18.1	25	29	24	32	43	53	53	53	48	53	48	29	24	
2.19	7.07	0.578 (0.668)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	<b>1FT2104-5AF..-2..0-Z</b>
...	...	...	$M_{2N}$	Nm	5.6	7.8	10	13.3	16.1	15	16.8	24.5	30.5	32	33	30	33	30	18	-	■ ■ ■ + ■ ■ ■ + ...
2.22	7.16		$M_{2,0}$	Nm	6.5	8.7	11	15.4	17.6	15	19.7	26	32.5	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	21	28.5	35.5	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.17	7.16	0.578 (0.668)	$n_{2N}$	r/min	600	500	375	300	300	250	200	150	150	125	100	75	50	50	-	-	<b>1FT2104-5AK..-2..0-Z</b>
...	...	...	$M_{2N}$	Nm	4.75	6.2	8.6	11.5	11.7	14.5	13.8	17.5	24	24	29	26.5	32.5	30	18	-	■ ■ ■ + ■ ■ ■ + ...
2.2	7.26		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	21.5	28.5	36	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.92	9.45	0.778 (0.858)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	-	<b>1FT2104-6AF..-2..0-Z</b>
...	...	...	$M_{2N}$	Nm	6.7	9.4	12	15.9	18	15	19.7	29	33	33	33	30	33	30	-	-	■ ■ ■ + ■ ■ ■ + ...
2.95	9.57		$M_{2,0}$	Nm	8.7	11.7	14.6	20.5	18	15	26	33	33	33	33	30	33	30	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	-	-	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1 and 2-stage</b>																					
0.486	1.68	0.2 (0.22)	$n_{2N}$	r/min	600	600	500	375	300	250	300	200	200	150	125	100	75	50	30	<b>1FT2203-2AG..-2.A0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.01	1.19	1.56	2.25	2.9	3.6	2.9	4.45	4.8	4.65	6.5	7.9	10	13.6	18	15	■ ■ ■ + ■ ■ ■ + ...
0.529	1.71		$M_{2,0}$	Nm	1.45	1.99	2.5	3.6	4.1	5.2	4.6	6.2	7.8	8.3	10.4	13.1	16.8	21	18	15	
			$M_{2max}$	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
0.452	1.68	0.2 (0.22)	$n_{2N}$	r/min	600	500	375	300	300	250	200	150	150	125	100	75	60	50	30	<b>1FT2203-2AK..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	0.8	1.12	1.6	2.2	2.25	2.8	2.7	3.55	4.95	4.95	6.1	7.7	10.4	13.1	14.6	15	■ ■ ■ + ■ ■ ■ + ...
0.495	1.71		$M_{2,0}$	Nm	1.35	1.85	2.35	3.35	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.3	15.7	19.7	18	15	
			$M_{2max}$	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
1.1	3.5	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	300	250	200	200	150	150	125	100	75	50	30	<b>1FT2203-4AG..-2.A0-Z</b>	
...	...	...	$M_{2N}$	Nm	2.8	3.75	3.9	5.7	7.4	9.2	7.1	11.2	11.4	15.2	18.9	23.5	23	30	18	15	■ ■ ■ + ■ ■ ■ + ...
1.13	3.54		$M_{2,0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	18	22.5	28	33	30	18	15	
			$M_{2max}$	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
1.06	3.5	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	150	125	100	75	60	50	30	<b>1FT2203-4AK..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	2.05	2.75	3.95	5.3	6.5	8.3	6.5	8.2	11.7	11.5	13.9	17.7	24	29.5	18	15	■ ■ ■ + ■ ■ ■ + ...
1.09	3.54		$M_{2,0}$	Nm	3.15	4.25	5.3	7.6	8.7	10.9	9.7	13	16.3	17.3	21.5	27	33	30	18	15	
			$M_{2max}$	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
2.15	6.69	1.248 (1.328)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	<b>1FT2204-5AF..-2..0-Z</b>
...	...	...	$M_{2N}$	Nm	5.3	7.5	9.6	12.7	15.4	15	16	23	29	30.5	33	30	33	30	18	-	■ ■ ■ + ■ ■ ■ + ...
2.18	6.77		$M_{2,0}$	Nm	6.4	8.6	10.8	15.1	17.3	15	19.3	25.5	32	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.16	6.69	1.248 (1.328)	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	100	100	75	50	-	-	<b>1FT2204-5AK..-2..0-Z</b>
...	...	...	$M_{2N}$	Nm	4.65	6	8.4	11.1	13.5	13.4	13.1	21.5	23	27	33	30	26.5	30	18	-	■ ■ ■ + ■ ■ ■ + ...
2.19	6.77		$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	15	19.5	26	32.5	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	-	

Continued on the next page

### Planetary gearbox data

Gearbox type: 1. Order code $i$ 2. Order code		NRKW070, 1-stage								NRKW070, 2-stage							
		B26								B27							
		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218
$\varnothing_{2,G}$		16								18							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRKW070

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1 and 2-stage (continued)																					
2.91	8.98	1.628	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	-	-	1FT2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	7	9.8	12.6	16.4	18	15	20	30.5	33	33	33	30	33	30	-	-	+ ...
2.93	9.09	(1.708)	$M_{2,0}$	Nm	8.7	11.6	14.6	20.5	18	15	26	33	33	33	33	30	33	30	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	-	-	

Planetary gearbox data		NRKW070, 1-stage								NRKW070, 2-stage												
Gearbox type:		B26								B27												
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100					
$i$		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00					
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15					
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24					
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80					
$J_{1,G}$	kg cm <sup>2</sup>	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218					
$\phi_{2,G}$	'	16																18				

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

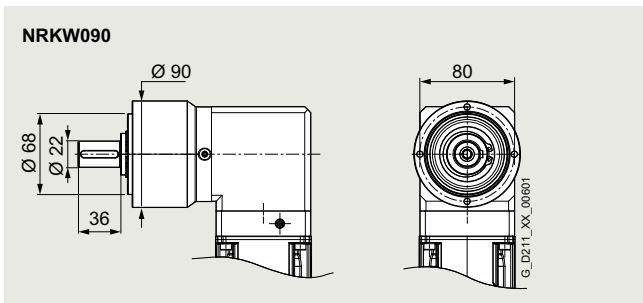
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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NRKW090

#### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min																			
Nm	Nm				kg cm <sup>2</sup>																		
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1 and 2-stage																							
0.407	1.69	0.093	$n_{2N}$	r/min	500	375	375	300	300	250	200	200	150	150	125	100	75	60	37.5	25	1FT2103-2AG...0.A0-Z		
...	...	(0.112)	$M_{2N}$	Nm	0.67	1.07	1.26	1.82	1.89	2.4	2.2	2.85	4	4.1	5.2	6.6	9.2	11.6	18.8	28.5	■ + ■ + ...		
0.476	1.74		$M_{2,0}$	Nm	1.22	1.7	2.15	3.15	3.6	4.6	4.05	5.5	6.9	7.4	9.3	11.7	15	18.9	30	38			
			$M_{2,max}$	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61			
0.379	1.69	0.093	$n_{2N}$	r/min	500	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	25	1FT2103-2AH...0..0-Z		
...	...	(0.112)	$M_{2N}$	Nm	0.66	0.79	1.24	1.8	1.85	2.3	2.15	2.85	3.95	4.05	5.1	6.5	9	11.4	18.5	28	■ + ■ + ...		
0.449	1.74		$M_{2,0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.3	3.85	5.2	6.5	7	8.8	11	14.2	17.8	28.5	38			
			$M_{2,max}$	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61			
1	3.72	0.139	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	50	37.5	30	1FT2103-4AG...0.A0-Z		
...	...	(0.158)	$M_{2N}$	Nm	2.25	3.35	3.65	6	6.2	8	7.7	10.5	13	13.2	17	22	23	35	47	38	■ + ■ + ...		
1.06	3.77		$M_{2,0}$	Nm	3	4.05	5.1	7.3	8.4	10.5	9.4	12.6	15.7	16.8	21	26	33.5	42	50	38			
			$M_{2,max}$	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61			
0.938	3.72	0.139	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	1FT2103-4AH...0..0-Z		
...	...	(0.158)	$M_{2N}$	Nm	1.97	2.8	3.2	4.35	5.5	7.1	6.5	8.8	9.4	11.4	14.6	14.5	20.5	26	42	38	■ + ■ + ...		
1	3.77		$M_{2,0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.9	8.8	11.8	14.9	15.9	19.9	24.5	31.5	39.5	50	38			
			$M_{2,max}$	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61			
1.02	3.43	0.35	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF...-2..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.55	3.6	4.65	6.5	7.7	9.9	8.2	11.7	14.8	15.6	20	25	31.5	40.5	50	38	■ + ■ + ...		
1.07	3.48		$M_{2,0}$	Nm	3.05	4.1	5.2	7.4	8.5	10.7	9.5	12.7	16	17	21	26.5	34	42.5	50	38			
			$M_{2,max}$	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61			
1.01	3.53	0.35	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AK...-2..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.6	3.45	4.75	6.6	6.9	8.5	8.2	10.6	14.1	14.7	18.2	23	30.5	38	50	38	■ + ■ + ...		
1.07	3.57		$M_{2,0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.6	15.8	16.9	21	26.5	34	42.5	50	38			
			$M_{2,max}$	Nm	10.5	14.1	17.7	24.5	28.5	35.5	31.5	42.5	53	56	70	88	113	131	80	61			
2.1	7	0.56	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-5AF...-2..0-Z		
...	...	(0.65)	$M_{2N}$	Nm	5.5	7.8	10	13.4	16.2	20.5	17	24.5	30.5	32	41	51	65	82	50	38	■ + ■ + ...		
2.15	7.09		$M_{2,0}$	Nm	6.3	8.4	10.6	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	82	50	38			
			$M_{2,max}$	Nm	21	28	35	49.5	56	61	63	84	105	112	140	131	144	131	80	61			

➔ Continued on the next page

#### Planetary gearbox data

Gearbox type:		NRKW090, 1-stage								NRKW090, 2-stage											
1. Order code		B36								B37											
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170				
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907				
$\varnothing_{2,G}$	'	13																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRKW090

Servomotor data			Selection data servomotors with planetary gearbox																			Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																						
Nm	Nm	kg cm <sup>2</sup>																						
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1 and 2-stage (continued)</b>																								
2.08	7.09	0.56 (0.65)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1FT2104-5AK...-2...0-Z			
...	...	...	$M_{2N}$	Nm	5.4	7.7	8.3	13.2	13.6	17.5	16.7	22.5	27.5	27.5	35.5	47	60	72	46	38	■■■ + ■■■ + ...			
2.13	7.19	...	$M_{2,0}$	Nm	6.2	8.4	10.5	14.8	17	21	19	25	31.5	33.5	42	52	67	82	50	38				
...	...	...	$M_{2max}$	Nm	21	28.5	35.5	50	57	61	64	85	106	113	142	131	144	131	80	61				
2.84	9.37	0.76 (0.84)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF...-2...0-Z			
...	...	...	$M_{2N}$	Nm	6.7	9.5	12.3	16.1	20	26	20	31	39	40	52	65	82	82	50	38	■■■ + ■■■ + ...			
2.88	9.5	...	$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	90	82	50	38				
...	...	...	$M_{2max}$	Nm	28	37.5	47	66	76	61	84	112	131	144	144	131	144	131	80	61				
4.52	14.1	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25		1FT2105-4AF...-0...0-Z			
...	...	...	$M_{2N}$	Nm	10.6	15	19.4	24	30.5	38	29.5	47	59	60	79	82	90	82	50	50	■■■ + ■■■ + ...			
4.57	14.3	...	$M_{2,0}$	Nm	13.6	18.1	22.5	31.5	36.5	38	40.5	54	67	72	90	82	90	82	50	-				
...	...	...	$M_{2max}$	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	-				
4.56	14.1	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	60	37.5	-		1FT2105-4AH...-0...0-Z			
...	...	...	$M_{2N}$	Nm	9.6	13.7	17.9	22	28	37.5	26.5	44	55	55	74	72	89	72	50	-	■■■ + ■■■ + ...			
4.61	14.3	...	$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	41	54	68	73	90	82	90	82	50	-				
...	...	...	$M_{2max}$	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	-				
7.31	22.7	2.65 (3.5)	$n_{2N}$	r/min	375	375	300	200	200	150	150	125	100	100	75	60	50	37.5	-		1FT2105-6AF...-0...0-Z			
...	...	...	$M_{2N}$	Nm	17.7	18.7	24	37.5	37.5	38	48	58	72	72	90	82	90	82	-	-	■■■ + ■■■ + ...			
7.38	23	...	$M_{2,0}$	Nm	22	29	36.5	51	50	38	66	87	82	90	90	82	90	82	-	-				
...	...	...	$M_{2max}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	-	-				
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1 and 2-stage</b>																								
0.401	1.59	0.2 (0.22)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2203-2AG...-0.A0-Z			
...	...	...	$M_{2N}$	Nm	0.77	1.22	1.38	1.95	2.45	3.2	2.95	4.1	5.1	5.2	6.8	9.1	9.7	12.2	19.8	30	■■■ + ■■■ + ...			
0.47	1.64	...	$M_{2,0}$	Nm	1.2	1.68	2.15	3.1	3.55	4.55	4	5.4	6.8	7.3	9.2	11.5	14.9	18.6	30	38				
...	...	...	$M_{2max}$	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61				
0.366	1.59	0.2 (0.22)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	125	100	75	60	50	30	20		1FT2203-2AK...-0...0-Z			
...	...	...	$M_{2N}$	Nm	0.82	0.99	1.39	1.9	2.4	2.55	2.4	3.35	4.15	4.2	5.5	7.5	9.7	11.8	19.9	30	■■■ + ■■■ + ...			
0.436	1.64	...	$M_{2,0}$	Nm	1.09	1.54	1.98	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	38				
...	...	...	$M_{2max}$	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61				
1.01	3.43	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	30	1FT2203-4AG...-0.A0-Z			
...	...	...	$M_{2N}$	Nm	2.4	3.15	4.55	6.3	6.2	7.6	7.7	9.7	13.3	13.6	16.7	21	28.5	36	50	38	■■■ + ■■■ + ...			
1.07	3.48	...	$M_{2,0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.7	15.9	16.9	21	26.5	34	42.5	50	38				
...	...	...	$M_{2max}$	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61				
0.974	3.43	0.35 (0.37)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	60	37.5	30	1FT2203-4AK...-0...0-Z			
...	...	...	$M_{2N}$	Nm	2.2	3.15	3.55	5.6	6	7.7	7.1	9.7	12	12.5	15.9	20.5	21.5	27	44.5	33.5	■■■ + ■■■ + ...			
1.03	3.48	...	$M_{2,0}$	Nm	2.9	3.95	5	7.1	8.1	10.2	9.1	12.2	15.3	16.3	20	25.5	32.5	41	50	38				
...	...	...	$M_{2max}$	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61				
2.06	6.62	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF...-2...0-Z			
...	...	...	$M_{2N}$	Nm	5.2	7.4	9.5	12.8	15.3	19.6	16.2	23	29	30.5	39	49	62	78	50	38	■■■ + ■■■ + ...			
2.11	6.71	...	$M_{2,0}$	Nm	6.1	8.3	10.4	14.6	16.8	21	18.7	25	31	33	41.5	52	67	82	50	38				
...	...	...	$M_{2max}$	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61				

➔ Continued on the next page

Planetary gearbox data		NRKW090, 1-stage										NRKW090, 2-stage									
Gearbox type:		B36										B37									
1. Order code		3 4 5 7 8 10										9 12 15 16 20 25 32 40 64 100									
$i$		R03 R04 R05 R07 R08 R10										R09 R12 R15 R16 R20 R25 R32 R40 R64 R00									
2. Order code																					
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170				
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907				
$\varphi_{2,G}$	'	13																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRKW090

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1 and 2-stage (continued)</b>																						
2.07	6.62	1.23	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AK..-2..0-Z	
...	...	(1.31)	$M_{2N}$	Nm	5.4	7.7	8.1	13.1	13.2	17.1	16.5	22	27	27	34.5	46.5	59	71	50	38	■ + ■ + ...	
2.12	6.71		$M_{2,0}$	Nm	6.2	8.3	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	52	67	82	50	38		
			$M_{2max}$	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61		
2.82	8.9	1.61	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-2..0-Z	
...	...	(1.69)	$M_{2N}$	Nm	7	10	13	16.8	21	27.5	21	32.5	41	42	55	68	86	82	50	38	■ + ■ + ...	
2.87	9.02		$M_{2,0}$	Nm	8.4	11.3	14.2	20	22.5	28.5	25.5	34	42.5	45	56	71	90	82	50	38		
			$M_{2max}$	Nm	27	36	45	63	72	61	80	107	131	142	144	131	144	131	80	61		
2.85	10.1	3.15	$n_{2N}$	r/min	375	250	200	150	125	100	100	100	75	75	50	50	37.5	25	20	-	1FT2205-2AC..-0..0-Z	
...	...	(4.05)	$M_{2N}$	Nm	7	9.8	12.3	17.3	20	25	22.5	28.5	36.5	38.5	50	58	77	82	49.5	-	■ + ■ + ...	
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	-		
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-		
2.89	10.1	3.15	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	-	1FT2205-2AF..-0..0-Z	
...	...	(4.05)	$M_{2N}$	Nm	7	9.6	12.1	16.6	19.6	24.5	21	29.5	37	39	49.5	62	78	82	50	-	■ + ■ + ...	
2.94	10.3		$M_{2,0}$	Nm	8.6	11.6	14.5	20.5	23	29	26	35	43.5	46.5	58	73	90	82	50	-		
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-		
2.85	10.1	3.15	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	37.5	20	-	1FT2205-2AH..-0..0-Z	
...	...	(4.05)	$M_{2N}$	Nm	6.4	9.1	11.7	15.1	18.8	18.8	18.8	25.5	30.5	37.5	38	52	66	78	49.5	-	■ + ■ + ...	
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	-		
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-		
4.98	17	5.1	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	25	-	1FT2205-4AF..-0..0-Z	
...	...	(6)	$M_{2N}$	Nm	9.3	13.4	17.4	27	27.5	37	35	43	54	54	72	82	90	82	50	-	■ + ■ + ...	
5.02	17.2		$M_{2,0}$	Nm	14.9	19.9	25	35	40	38	44.5	59	74	79	90	82	90	82	50	-		
			$M_{2max}$	Nm	51	68	86	104	80	61	153	144	131	144	144	131	144	131	80	-		

### Planetary gearbox data

Gearbox type:		NRKW090, 1-stage								NRKW090, 2-stage							
1. Order code		B36								B37							
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
$\varnothing_{2,G}$	'	13								15							

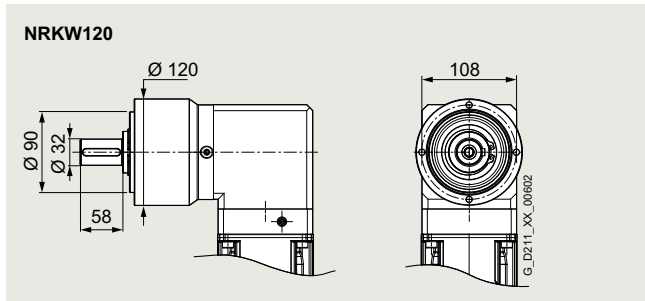
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRKW120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data		Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$															
Nm	Nm	kg cm <sup>2</sup>															

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1 and 2-stage																					
0.277	1.56	0.093	$n_{2N}$	r/min	250	250	200	200	150	150	125	100	100	75	60	60	50	30	20	<b>1FT2103-2AG..-0..A0-Z</b>	
...	...	(0.112)	$M_{2N}$	Nm	0.495	0.7	1.11	1.45	1.53	2.3	1.9	2.45	3.25	3.3	5	6.4	7	8.5	14.7	22.5	■■■ + ■■■ + ...
0.406	1.67		$M_{2,0}$	Nm	0.83	1.24	1.66	2.45	2.9	3.7	3.3	4.5	5.7	6.1	7.8	9.8	12.7	16	25.5	40.5	
			$M_{2max}$	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152	
0.249	1.56	0.093	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	30	20	<b>1FT2103-2AH..-0..0-Z</b>
...	...	(0.112)	$M_{2N}$	Nm	0.38	0.68	0.88	1.44	1.54	2.25	1.88	2.4	3.2	3.3	4.9	6.3	7	8.5	14.7	22.5	■■■ + ■■■ + ...
0.379	1.67		$M_{2,0}$	Nm	0.74	1.13	1.52	2.3	2.65	3.45	3.05	4.2	5.3	5.7	7.2	9.1	11.8	14.9	24	37.5	
			$M_{2max}$	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152	
0.874	3.59	0.139	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	125	100	75	60	50	30	20	<b>1FT2103-4AG..-0..A0-Z</b>	
...	...	(0.158)	$M_{2N}$	Nm	2.15	2.65	3.8	5.2	6.6	6.8	6.4	9	11	10.8	14.8	20	26.5	32.5	54	83	■■■ + ■■■ + ...
0.992	3.68		$M_{2,0}$	Nm	2.6	3.6	4.6	6.6	7.6	9.6	8.6	11.5	14.5	15.5	19.5	24.5	31.5	39	63	95	
			$M_{2max}$	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152	
0.86	3.59	0.139	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	125	100	75	60	50	30	20	<b>1FT2103-4AH..-0..0-Z</b>	
...	...	(0.158)	$M_{2N}$	Nm	1.7	2.15	3	4.25	4.25	5.9	5.2	7.3	9.1	9.4	12.4	16.3	21.5	26	43.5	67	■■■ + ■■■ + ...
0.978	3.68		$M_{2,0}$	Nm	2.55	3.55	4.55	6.5	7.5	9.5	8.4	11.4	14.3	15.3	19.2	24	31	38.5	62	95	
			$M_{2max}$	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152	
0.888	3.3	0.35	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-4AF..-0..0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	1.89	2.85	3.9	5.5	6.7	8.8	6.8	10.1	12.8	13.6	17.6	22	28.5	36	57	91	■■■ + ■■■ + ...
1.01	3.39		$M_{2,0}$	Nm	2.65	3.65	4.7	6.7	7.7	9.8	8.7	11.7	14.7	15.7	19.8	24.5	31.5	39.5	64	95	
			$M_{2max}$	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
0.881	3.4	0.35	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	<b>1FT2104-4AK..-0..0-Z</b>
...	...	(0.43)	$M_{2N}$	Nm	2.05	3	3.85	5.4	6.6	8.5	7.2	9.8	11	13.2	17	17.1	26.5	33.5	54	84	■■■ + ■■■ + ...
0.998	3.49		$M_{2,0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.6	15.6	19.6	24.5	31.5	39.5	63	95	
			$M_{2max}$	Nm	10.2	13.7	17.2	24	27.5	34.5	31	41	51	55	69	86	110	138	192	152	
1.97	6.93	0.56	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-5AF..-0..0-Z</b>
...	...	(0.65)	$M_{2N}$	Nm	4.6	7.1	9.4	12.8	15.4	19.5	15.7	22.5	28.5	30.5	38.5	48.5	62	78	120	95	■■■ + ■■■ + ...
2.07	7.01		$M_{2,0}$	Nm	5.9	8	10.1	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	95	
			$M_{2max}$	Nm	20.5	27.5	34.5	48.5	55	70	62	83	104	111	138	173	220	275	192	152	

Continued on the next page

### Planetary gearbox data

Gearbox type: 1. Order code <i>i</i> 2. Order code		NRKW120, 1-stage							NRKW120, 2-stage									
		B46							B47									
		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95	
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152	
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818	
$\varnothing_{2,G}$	'	11						13										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRKW120

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				

### SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)

$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	500	375	300	250	200	150	125	100	100	75	60	50	30	25	1FT2104-5AK..-0..0-Z	
1.96	7.03	0.56 (0.65)	$M_{2N}$	r/min	500	375	300	250	200	150	125	100	100	75	60	50	30	25	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2,0}$	Nm	4.5	7	9.3	12.6	12.4	16.4	15.4	21	25.5	30	34	46.5	60	72	120	95
2.05	7.1		$M_{2max}$	Nm	5.8	7.9	10	14.2	16.2	20	18.2	24	30.5	32.5	40.5	51	65	81	120	95
				Nm	21	28	35	49.5	56	71	63	84	105	112	140	175	225	275	192	152

### SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage

$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	100	75	75	60	50	30	20	1FT2203-2AG..-0.A0-Z
0.271	1.46	0.2 (0.22)	$M_{2N}$	r/min	375	300	250	200	150	150	125	100	100	75	75	60	50	30	20	■ ■ ■ + ■ ■ ■ + ...
...	...	...	$M_{2,0}$	Nm	0.365	0.69	1.05	1.7	1.84	2.65	2.1	2.85	3.75	3.95	5.4	5.8	8	9.6	16.8	25.5
0.4	1.57		$M_{2max}$	Nm	0.81	1.22	1.63	2.45	2.85	3.65	3.2	4.45	5.6	6	7.6	9.6	12.5	15.7	25	39.5
				Nm	4.35	5.9	7.5	10.7	12.3	15.5	13.8	18.5	23	24.5	31	39	50	62	100	152

➡ Continued on the next page

Planetary gearbox data		NRKW120, 1-stage								NRKW120, 2-stage											
Gearbox type:		B46								B47											
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95				
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152				
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430				
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818				
$\varnothing_{2,G}$	'	11																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NRKW120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)</b>																					
0.883	3.3	0.35 (0.37)	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	125	125	100	75	60	37.5	25	1FT2203-4AG..-0..0-Z	
...	...	...	$M_{2N}$	Nm	2.05	3	3.65	5	6.4	8.3	7.2	9.8	12.4	13.1	16.9	21.5	25	31.5	51	78	
1	3.39		$M_{2,0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.7	15.7	19.7	24.5	31.5	39.5	63	95	
			$M_{2max}$	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
0.843	3.3	0.35 (0.37)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	125	100	75	60	50	30	20	1FT2203-4AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	2	2.5	3.5	4.85	6	6.7	6	8.3	10.3	10.6	13.9	18.4	24	29.5	49	75	
0.961	3.39		$M_{2,0}$	Nm	2.5	3.5	4.45	6.4	7.4	9.3	8.3	11.2	14.1	15	18.9	23.5	30.5	38	61	95	
			$M_{2max}$	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	
1.93	6.55	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	4.35	6.8	9	12.2	14.9	19	14.9	22	28	29.5	37.5	47	61	76	120	95	
2.03	6.62		$M_{2,0}$	Nm	5.7	7.8	9.9	14	16	20	17.9	24	30	32	40	50	64	80	120	95	
			$M_{2max}$	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	
1.94	6.55	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	30	25	1FT2204-5AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	4.5	7	9.2	12.5	15.1	16	15.3	21	25.5	30	33	46	59	71	119	95	
2.04	6.62		$M_{2,0}$	Nm	5.8	7.9	9.9	14.1	16.1	20	18.1	24	30	32	40.5	50	65	81	120	95	
			$M_{2max}$	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	
2.69	8.83	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2204-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.1	9.4	12.9	16.5	21	26.5	19.9	31	39	41.5	52	66	84	106	120	95	
2.78	8.94		$M_{2,0}$	Nm	8	10.8	13.7	19.3	22	27.5	24.5	33	41	44	55	69	88	110	120	95	
			$M_{2max}$	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	176	220	280	275	192	152	
2.89	10.1	3.15 (4.05)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.7	9.5	12.2	17.3	20	25	22.5	28.5	36.5	38.5	50	58	78	102	120	95	
2.98	10.2		$M_{2,0}$	Nm	8.6	11.6	14.6	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	95	119	120	95	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.92	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.1	9	11.6	16	19.1	24.5	19.8	28.5	36	38	49	61	78	99	120	94	
3.01	10.2		$M_{2,0}$	Nm	8.7	11.8	14.8	20.5	23.5	30	26.5	35.5	45	48	60	75	96	120	120	95	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.86	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	150	125	100	100	75	60	50	30	25	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	5.3	8.4	11.2	14.5	18.3	23.5	17.5	24	28.5	36.5	36.5	52	67	79	119	95	
2.95	10.2		$M_{2,0}$	Nm	8.5	11.5	14.5	20.5	23.5	29.5	26	35	44	47	58	73	94	117	119	94	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
5.08	16.9	5.1 (6)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.3	16.6	21	28	28.5	39.5	37	45	57	56	78	98	120	160	120	95	
5.16	17.1		$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	120	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.18	16.9	7.8 (9.4)	$n_{2N}$	r/min	375	250	200	150	125	100	100	75	75	50	50	37.5	25	20	10	1FT2206-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	11.7	18.1	22.5	32	37	46.5	42	50	67	67	92	100	137	172	120	94	
5.26	17.1		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	104	130	166	172	120	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	

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Planetary gearbox data		NRKW120, 1-stage							NRKW120, 2-stage											
Gearbox type:		B46							B47											
1. Order code																				
$i$																				
2. Order code																				
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95			
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152			
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430			
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818			
$\varphi_{2,G}$	'	11							13											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NRKW120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$																					
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)</b>																							
5.25	16.9	7.8	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2206-2AF..-0..0-Z		
...	...	(9.4)	$M_{2N}$	Nm	10	15.2	20.5	24.5	32.5	42.5	29	49.5	62	64	84	105	132	170	120	94	■ + ■ + ...		
5.33	17.1		$M_{2,0}$	Nm	15.7	21	26	37	42.5	53	47.5	63	79	84	105	132	169	172	120	95			
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152			
5.09	16.9	7.8	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	1FT2206-2AH..-0..0-Z		
...	...	(9.4)	$M_{2N}$	Nm	12.5	16.7	21	28	28	39	37	44.5	56	55	78	97	119	159	119	91	■ + ■ + ...		
5.17	17.1		$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	119	95			
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152			
7.78	25.4	11.5	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	-	1FT2206-3AB..-0..0-Z		
...	...	(13.1)	$M_{2N}$	Nm	20	27	34.5	49	55	70	55	74	103	109	138	172	195	172	120	-	■ + ■ + ...		
7.85	25.8		$M_{2,0}$	Nm	23	31	39	54	62	78	70	93	117	124	155	172	195	172	120	-			
			$M_{2max}$	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	-			
7.65	25.4	11.5	$n_{2N}$	r/min	375	300	250	200	150	125	150	100	75	75	60	50	37.5	37.5	25	-	1FT2206-3AF..-0..0-Z		
...	...	(13.1)	$M_{2N}$	Nm	16.5	21.5	27.5	35.5	48	59	47	71	93	95	120	145	193	172	120	-	■ + ■ + ...		
7.72	25.8		$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	-			
			$M_{2max}$	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	-			
10.7	35.9	15.1	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	25	20	-	1FT2206-4AC..-0..0-Z		
...	...	(16.8)	$M_{2N}$	Nm	21	26	34	46.5	57	72	68	91	92	116	140	134	186	172	120	-	■ + ■ + ...		
10.8	36.5		$M_{2,0}$	Nm	32	43	53	75	86	95	96	128	160	171	195	172	195	172	120	-			
			$M_{2max}$	Nm	109	145	182	216	192	152	251	312	275	312	312	275	312	275	192	-			
10.4	34	15.1	$n_{2N}$	r/min	375	300	250	200	150	150	100	75	75	60	60	50	37.5	25	-	1FT2206-4AF..-0..0-Z			
...	...	(16.8)	$M_{2N}$	Nm	23	30.5	38	49.5	66	68	63	95	126	127	161	160	191	172	120	-	■ + ■ + ...		
10.5	34.5		$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	125	156	166	195	172	195	172	120	-			
			$M_{2max}$	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	-			
9.93	34	15.1	$n_{2N}$	r/min	375	250	250	150	150	125	125	100	75	75	60	50	50	37.5	30	-	1FT2206-4AH..-0..0-Z		
...	...	(16.8)	$M_{2N}$	Nm	19.1	30	31	53	55	67	64	80	107	107	136	163	152	172	120	-	■ + ■ + ...		
10	34.5		$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	195	172	195	172	120	-			
			$M_{2max}$	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	-			

### Planetary gearbox data

Gearbox type:		NRKW120, 1-stage								NRKW120, 2-stage											
1. Order code		<b>B46</b>								<b>B47</b>											
<i>i</i>		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>				
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>				
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95				
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152				
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430				
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818				
$\varnothing_{2,G}$	'	11																13			

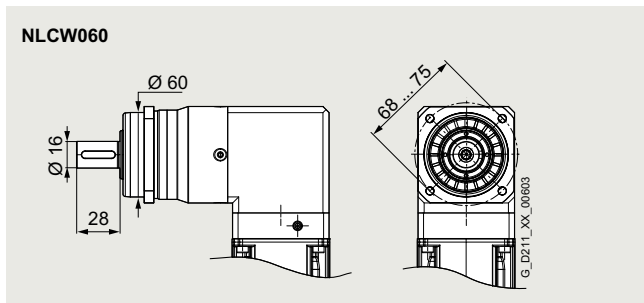
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NLCW060

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	( $J_{M,Br}$ ) kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1 and 2-stage</b>																						
0.0258	0.416	0.0245	$n_{2N}$	r/min	-	-	-	-	-	60	30	50	50	50	50	50	37.5	37.5	25	20	1FT2102-0AG..-0.A0-Z	
...	...	(0.0285)	$M_{2N}$	Nm	-	-	-	-	-	0.165	0.119	0.23	0.415	0.46	0.64	0.81	1.33	1.54	2.75	3.75	■■■ + ■■■ + ...	
0.0878	0.477		$M_{2,0}$	Nm	-	-	-	-	-	0.325	0.23	0.51	0.79	0.89	1.26	1.73	2.35	3.1	5.3	8.7		
			$M_{2max}$	Nm	-	-	-	-	-	4.2	3.7	5.1	6.6	7.1	9	11.4	14.8	18.7	29	24		
0.0892	0.863	0.036	$n_{2N}$	r/min	-	200	250	250	200	150	150	125	125	100	100	75	60	37.5	30	1FT2102-1AG..-0.A0-Z		
...	...	(0.04)	$M_{2N}$	Nm	-	0.2	0.315	0.6	0.72	1.13	0.99	1.34	1.94	2	2.75	3.05	4.55	5.9	10	13.4	■■■ + ■■■ + ...	
0.236	1		$M_{2,0}$	Nm	-	0.355	0.59	1.08	1.32	1.81	1.57	2.25	3	3.25	4.2	5.4	7.1	9	14.8	15		
			$M_{2max}$	Nm	-	3.45	4.45	6.4	7.5	9.5	8.5	11.5	14.6	15.6	19.6	24.5	31.5	39.5	29	24		
0.323	1.63	0.093	$n_{2N}$	r/min	375	375	375	300	300	250	200	150	150	150	125	100	75	60	50	30	1FT2103-2AG..-2.A0-Z	
...	...	(0.112)	$M_{2N}$	Nm	0.48	0.77	1	1.74	1.89	2.6	2.4	3.6	4.3	4.35	5.7	7.5	10.3	13.2	15.8	15	■■■ + ■■■ + ...	
0.502	1.81		$M_{2,0}$	Nm	0.96	1.49	2	3.05	3.6	4.65	3.95	5.5	7	7.5	9.5	12.1	15.6	19.7	18	15		
			$M_{2max}$	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24		
0.309	1.63	0.093	$n_{2N}$	r/min	375	300	300	250	250	200	150	150	125	125	100	75	75	60	37.5	25	1FT2103-2AH..-2..0-Z	
...	...	(0.112)	$M_{2N}$	Nm	0.455	0.91	1.2	1.94	2.05	3	2.75	3.25	4.5	4.45	6.1	8.5	8.9	11.7	18	15	■■■ + ■■■ + ...	
0.489	1.81		$M_{2,0}$	Nm	0.92	1.43	1.95	2.95	3.45	4.5	3.85	5.3	6.8	7.3	9.3	11.7	15.2	19.2	18	15		
			$M_{2max}$	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24		
0.93	3.66	0.139	$n_{2N}$	r/min	300	300	300	250	200	200	150	125	125	100	75	60	50	50	30	1FT2103-4AG..-2.A0-Z		
...	...	(0.158)	$M_{2N}$	Nm	2.05	2.65	3.1	4.6	6.1	6.7	6.5	8.7	9.6	9.6	12.9	17.9	23	28.5	18	15	■■■ + ■■■ + ...	
1.09	3.83		$M_{2,0}$	Nm	2.75	3.9	5	7.3	8.4	10.7	9.2	12.5	15.8	16.9	21	26.5	34	40	18	15		
			$M_{2max}$	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24		
0.795	3.66	0.139	$n_{2N}$	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	50	50	25	1FT2103-4AH..-2..0-Z	
...	...	(0.158)	$M_{2N}$	Nm	1.77	2.3	3.25	4.05	5.4	5.9	5.7	7.7	8.5	10.6	11.4	15.9	20.5	25.5	17.3	15	■■■ + ■■■ + ...	
0.962	3.83		$M_{2,0}$	Nm	2.35	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.7	23.5	30	38	18	15		
			$M_{2max}$	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24		
0.952	3.37	0.368	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	37.5	25	15	1FT2104-4AF..-2..0-Z	
...	...	(0.448)	$M_{2N}$	Nm	2.3	2.95	4.25	6.1	7.3	9.6	6.8	11.1	14.4	15.1	19.5	24.5	31.5	40	18	15	■■■ + ■■■ + ...	
1.14	3.54		$M_{2,0}$	Nm	2.85	4	5.1	7.4	8.6	10.9	9.7	13.2	16.7	17.8	22	28	36	40	18	15		
			$M_{2max}$	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24		

Continued on the next page

### Planetary gearbox data

Gearbox type:		NLCW060, 1-stage								NLCW060, 2-stage							
1. Order code		C26								C27							
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80
$J_{1,G}$	kg cm <sup>2</sup>	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22
$\varnothing_{2,G}$	'	16						18									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLCW060

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1 and 2-stage (continued)</b>																					
0.945	3.46	0.368 (0.448)	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	75	60	50	30	1FT2104-4AK...-2..0-Z	
...	...	...	$M_{2N}$	Nm	2.5	3.1	4.6	6.6	7	9.6	7.1	10.6	13.9	14	18.5	25	26.5	34.5	18	15	
1.14	3.64		$M_{2,0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15	
			$M_{2max}$	Nm	10.3	14	17.6	24.5	28.5	24	32	43	54	57	70	64	70	64	29	24	
2.03	7	0.578 (0.668)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	-	1FT2104-5AF...-2..0-Z
...	...	...	$M_{2N}$	Nm	4.45	6.6	7.5	10.5	13.6	15	14.9	19.4	25.5	26	35	40	44	40	18	-	
2.22	7.15		$M_{2,0}$	Nm	6.1	8.3	10.5	15	17.2	15	19.4	26	32.5	35	43.5	40	44	40	18	-	
			$M_{2max}$	Nm	20.5	28	35	40	29	24	63	70	70	70	70	64	70	64	29	-	
2.02	7.09	0.578 (0.668)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	125	100	75	60	50	37.5	25	-	1FT2104-5AK...-2..0-Z
...	...	...	$M_{2N}$	Nm	4.35	6.5	7.4	10.3	13.4	14.5	14.6	16.1	21	20.5	27	37.5	37.5	40	18	-	
2.2	7.24		$M_{2,0}$	Nm	6	8.2	10.4	14.9	17.1	15	19.3	25.5	32.5	34.5	43.5	40	44	40	18	-	
			$M_{2max}$	Nm	21	28.5	35.5	40	29	24	64	70	70	70	70	64	70	64	29	-	
2.77	9.42	0.778 (0.858)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	-	-	1FT2104-6AF...-2..0-Z
...	...	...	$M_{2N}$	Nm	5.5	8.1	9.1	12.5	16.3	15	17.9	23	30.5	31	41.5	40	44	40	-	-	
2.94	9.55		$M_{2,0}$	Nm	8.3	11.2	14.2	20	18	15	26	34.5	43.5	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	-	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1 and 2-stage</b>																					
0.335	1.53	0.2 (0.22)	$n_{2N}$	r/min	375	300	300	250	250	200	200	150	150	125	125	100	75	60	50	30	1FT2203-2AG...-2.A0-Z
...	...	...	$M_{2N}$	Nm	0.56	1.06	1.36	2.1	2.3	3.25	2.55	3.8	4.35	5.2	5.5	7.4	10.4	13.4	15.6	15	
0.531	1.72		$M_{2,0}$	Nm	1	1.54	2.05	3.15	3.65	4.75	4.2	5.8	7.4	8	10.1	12.8	16.6	20.5	18	15	
			$M_{2max}$	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.301	1.53	0.2 (0.22)	$n_{2N}$	r/min	300	300	250	250	200	200	150	150	125	125	100	75	60	50	37.5	30	1FT2203-2AK...-2..0-Z
...	...	...	$M_{2N}$	Nm	0.55	0.83	1.27	1.67	2.25	2.55	2.6	3	4.05	4.05	5.4	7.6	10	12.3	17.1	15	
0.497	1.72		$M_{2,0}$	Nm	0.9	1.4	1.91	2.9	3.4	4.4	3.9	5.4	6.9	7.4	9.4	11.9	15.5	19.5	18	15	
			$M_{2max}$	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.947	3.37	0.35 (0.37)	$n_{2N}$	r/min	375	300	300	250	250	200	150	150	125	125	100	75	60	60	50	30	1FT2203-4AG...-2.A0-Z
...	...	...	$M_{2N}$	Nm	2.25	3.5	4.15	6	6.3	8.7	8.4	9.4	12.6	12.5	16.7	23	30	30.5	18	15	
1.14	3.54		$M_{2,0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15	
			$M_{2max}$	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
0.907	3.37	0.35 (0.37)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	30	1FT2203-4AK...-2..0-Z
...	...	...	$M_{2N}$	Nm	2.1	2.65	3.75	5.5	5.9	8.3	6.4	8.4	11.4	11.5	15.9	16.6	21.5	26.5	18	15	
1.1	3.54		$M_{2,0}$	Nm	2.7	3.8	4.9	7.1	8.2	10.4	9.3	12.6	16	17.1	21.5	27	34.5	40	18	15	
			$M_{2max}$	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
1.99	6.61	1.248 (1.328)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	-	1FT2204-5AF...-2..0-Z
...	...	...	$M_{2N}$	Nm	4.25	6.4	7.1	9.8	12.9	15	14.3	18.5	24	24.5	33.5	40	44	40	18	-	
2.18	6.76		$M_{2,0}$	Nm	5.9	8.1	10.3	14.7	16.9	15	19.1	25.5	32	34	43	40	44	40	18	-	
			$M_{2max}$	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	-	
2.01	6.61	1.248 (1.328)	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	125	100	100	75	60	60	50	-	1FT2204-5AK...-2..0-Z
...	...	...	$M_{2N}$	Nm	4.35	6.5	7.3	10	13.2	13.9	14.5	18.8	20	25	25.5	36	44	40	18	-	
2.19	6.76		$M_{2,0}$	Nm	6	8.2	10.4	14.8	17	15	19.2	25.5	32	34.5	43	40	44	40	18	-	
			$M_{2max}$	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	-	

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### Planetary gearbox data

Gearbox type:		NLCW060, 1-stage							NLCW060, 2-stage									
1. Order code		C26							C27									
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15	
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24	
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22	
$\varnothing_{2,G}$	'	16							18									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

### Gearbox type NLCW060

Servomotor data	Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>																	

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1 and 2-stage (continued)																					
2.76	8.93	1.628	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	-	-	1FT2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.7	8.5	11.2	15.8	16.7	15	18.5	23.5	31.5	31.5	43	40	44	40	-	-	■ + ■ + ...
2.93	9.07	(1.708)	$M_{2,0}$	Nm	8.2	11.2	14.1	20	18	15	25.5	34.5	43.5	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	-	

Planetary gearbox data		NLCW060, 1-stage										NLCW060, 2-stage											
Gearbox type:		C26										C27											
1. Order code		i																					
2. Order code		R03 R04 R05 R07 R08 R10										R09 R12 R15 R16 R20 R25 R32 R40 R64 R00											
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15						
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24						
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80						
$J_{1,G}$	kg cm <sup>2</sup>	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22						
$\varnothing_{2,G}$	'	16						18															

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

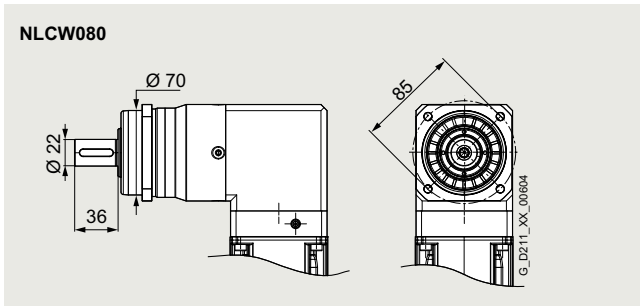
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLCW080

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data		Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1 and 2-stage</b>																						
0.25	1.53	0.093 (0.112)	$n_{2N}$	r/min	-	200	200	200	200	150	150	125	100	100	100	75	60	50	37.5	25	<b>1FT2103-2AG..-0.A0-Z</b>	
...	...	...	$M_{2N}$	Nm	-	0.51	0.81	1.31	1.49	2.35	1.85	2.65	3.7	3.8	4.3	6.2	8.5	10.6	15	23.5	■ ■ ■ + ■ ■ ■ + ...	
0.475	1.75		$M_{2,0}$	Nm	-	0.99	1.48	2.45	2.9	3.9	3.4	4.85	6.3	6.8	8.7	11.1	14.5	18.4	30	38		
			$M_{2max}$	Nm	-	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61		
0.223	1.53	0.093 (0.112)	$n_{2N}$	r/min	-	200	200	200	200	150	150	125	100	100	75	75	60	50	30	20	<b>1FT2103-2AH..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	-	0.495	0.8	1.3	1.49	2.35	1.83	2.65	3.65	3.8	5.4	6.1	8.4	10.5	18.2	28.5	■ ■ ■ + ■ ■ ■ + ...	
0.447	1.75		$M_{2,0}$	Nm	-	0.89	1.35	2.25	2.7	3.6	3.15	4.55	5.9	6.3	8.2	10.4	13.7	17.3	28	38		
			$M_{2max}$	Nm	-	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61		
0.769	3.49	0.139 (0.158)	$n_{2N}$	r/min	250	250	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	<b>1FT2103-4AG..-0.A0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.88	2.5	3	4.75	5	7.6	5.9	7.8	10.5	10.6	15.3	19.9	25	34	45	38	■ ■ ■ + ■ ■ ■ + ...	
1.07	3.76		$M_{2,0}$	Nm	2.3	3.35	4.45	6.6	7.7	9.8	8.7	12	15.2	16.3	20.5	26	33.5	42	50	38		
			$M_{2max}$	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61		
0.695	3.49	0.139 (0.158)	$n_{2N}$	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	<b>1FT2103-4AH..-0..0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.27	2.1	2.55	4.15	4.3	6.6	5.1	8.4	9.2	9.2	13.5	17.6	22.5	30	40	37	■ ■ ■ + ■ ■ ■ + ...	
0.975	3.76		$M_{2,0}$	Nm	2.05	3.05	4.05	6.1	7.1	9.1	7.9	10.9	13.8	14.8	18.7	23.5	30.5	38	50	38		
			$M_{2max}$	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61		
0.782	3.2	0.35 (0.43)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-4AF..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.62	2.7	3.25	4.9	6.4	8.6	7.4	10	13	13.6	18	22.5	29.5	37.5	50	38	■ ■ ■ + ■ ■ ■ + ...	
1.08	3.48		$M_{2,0}$	Nm	2.3	3.4	4.5	6.7	7.8	9.9	8.9	12.1	15.4	16.5	20.5	26	34	42.5	50	38		
			$M_{2max}$	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61		
0.776	3.3	0.35 (0.43)	$n_{2N}$	r/min	375	300	250	250	200	200	150	125	100	100	100	75	60	50	37.5	30	<b>1FT2104-4AK..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.77	3.05	4.15	5.1	7.1	7.5	8.2	11	14.2	14.9	15.6	22.5	30	37	46.5	32.5	■ ■ ■ + ■ ■ ■ + ...	
1.07	3.57		$M_{2,0}$	Nm	2.3	3.4	4.45	6.6	7.7	9.9	8.8	12	15.3	16.4	20.5	26	33.5	42	50	38		
			$M_{2max}$	Nm	9.8	13.4	17	24	27.5	35	31	42	52	56	70	88	113	142	80	61		
1.87	6.83	0.56 (0.65)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-5AF..-2..0-Z</b>	
...	...	...	$M_{2N}$	Nm	4.9	7	8.1	12	12.5	18	14.8	19.1	25	25	35	45	57	76	50	38	■ ■ ■ + ■ ■ ■ + ...	
2.16	7.08		$M_{2,0}$	Nm	5.5	7.7	9.9	14.2	16.4	20.5	18.6	25	31.5	33.5	42	53	68	85	50	38		
			$M_{2max}$	Nm	20	27.5	34.5	48.5	56	61	63	84	105	112	141	176	192	176	80	61		

Continued on the next page

### Planetary gearbox data

Gearbox type:		NLCW080, 1-stage							NLCW080, 2-stage											
1. Order code		C36							C37											
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38			
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61			
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200			
$J_{1,G}$	kg cm <sup>2</sup>	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906			
$\varnothing_{2,G}$	'	13																		

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NLCW080**

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																						
Nm	Nm	kg cm <sup>2</sup>																						
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1 and 2-stage (continued)</b>																								
1.85	6.93	0.56 (0.65)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	37.5	30	<b>1FT2104-5AK..-2..0-Z</b>			
...	...	...	$M_{2N}$	Nm	4.8	6.9	7.9	11.7	12.3	17.7	14.5	18.7	24.5	24.5	34.5	44.5	47	56	50	35.5		+		...
2.14	7.17		$M_{2,0}$	Nm	5.5	7.7	9.8	14.1	16.3	20.5	18.4	24.5	31	33.5	42	52	67	85	50	38		+		...
			$M_{2max}$	Nm	20.5	27.5	35	49.5	56	61	64	85	107	114	143	176	192	176	80	61		+		...
2.6	9.25	0.76 (0.84)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-6AF..-2..0-Z</b>			
...	...	...	$M_{2N}$	Nm	6.2	8.8	10	14.6	15.2	21.5	18	23	30	30.5	42.5	54	68	91	50	38		+		...
2.88	9.48		$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	25	33.5	42.5	45	57	71	91	110	50	38		+		...
			$M_{2max}$	Nm	27.5	37	46.5	65	75	61	84	113	141	151	189	176	192	176	80	61		+		...
4.3	14.1	1.71 (2.55)	$n_{2N}$	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	37.5	25	-	<b>1FT2105-4AF..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	10.9	15	16.4	23	31.5	34	28.5	44.5	46	61	65	83	104	110	50	-		+		...
4.57	14.3		$M_{2,0}$	Nm	12.9	17.5	22	31	35.5	38	40	54	67	72	90	110	120	110	50	-		+		...
			$M_{2max}$	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	-		+		...
4.33	14.1	1.71 (2.55)	$n_{2N}$	r/min	300	250	200	200	150	125	125	100	75	75	60	50	50	37.5	37.5	-	<b>1FT2105-4AH..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	10.2	14	18.9	20.5	29.5	37	31.5	41.5	56	57	73	90	92	110	50	-		+		...
4.6	14.3		$M_{2,0}$	Nm	12.9	17.6	22	31	36	38	40.5	54	68	73	91	110	120	110	50	-		+		...
			$M_{2max}$	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	-		+		...
7.09	22.8	2.65 (3.5)	$n_{2N}$	r/min	300	250	200	150	150	150	125	100	75	75	60	60	50	37.5	-	-	<b>1FT2105-6AF..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	14.7	19.9	26.5	39	41	38	44	57	77	78	101	100	120	110	-	-		+		...
7.28	23		$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	86	108	115	120	110	120	110	-	-		+		...
			$M_{2max}$	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	-	-		+		...
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1 and 2-stage</b>																								
0.244	1.44	0.2 (0.22)	$n_{2N}$	r/min	-	200	200	200	150	150	150	125	100	100	75	75	60	50	30	20	<b>1FT2203-2AG..-0.A0-Z</b>			
...	...	...	$M_{2N}$	Nm	-	0.71	1.03	1.53	2.25	2.7	2.1	3	4.15	4.2	6.2	6.6	9.1	11.3	19.9	31		+		...
0.469	1.65		$M_{2,0}$	Nm	-	0.97	1.45	2.4	2.85	3.85	3.35	4.8	6.2	6.7	8.6	11	14.3	18.2	29.5	38		+		...
			$M_{2max}$	Nm	-	5.7	7.4	10.7	12.4	15.7	14	19	24	25.5	32	40.5	52	65	80	61		+		...
0.209	1.44	0.2 (0.22)	$n_{2N}$	r/min	-	200	150	150	150	125	125	100	100	75	75	60	50	37.5	25	20	<b>1FT2203-2AK..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	-	0.52	1.04	1.61	1.83	2.55	2	3	3.25	4.45	5	6.7	8.7	12	19.1	24		+		...
0.434	1.65		$M_{2,0}$	Nm	-	0.83	1.28	2.15	2.6	3.5	3.05	4.35	5.7	6.1	7.9	10.1	13.2	16.8	27	38		+		...
			$M_{2max}$	Nm	-	5.7	7.4	10.7	12.4	15.7	14	19	24	25.5	32	40.5	52	65	80	61		+		...
0.777	3.2	0.35 (0.37)	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	25	<b>1FT2203-4AG..-0.A0-Z</b>			
...	...	...	$M_{2N}$	Nm	2.05	2.8	4	6	6.7	9.1	7.8	10.4	13.6	14.1	18.9	20.5	27.5	33.5	40.5	38		+		...
1.08	3.48		$M_{2,0}$	Nm	2.3	3.4	4.5	6.6	7.7	9.9	8.8	12.1	15.3	16.4	20.5	26	33.5	42.5	50	38		+		...
			$M_{2max}$	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61		+		...
0.738	3.2	0.35 (0.37)	$n_{2N}$	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	<b>1FT2203-4AK..-0..0-Z</b>			
...	...	...	$M_{2N}$	Nm	1.65	2.55	3.05	4.8	4.85	7.5	5.9	9.5	10.5	10.3	15.4	19.8	25	33	43	30.5		+		...
1.04	3.48		$M_{2,0}$	Nm	2.2	3.25	4.3	6.4	7.4	9.5	8.5	11.6	14.7	15.8	20	25	32.5	40.5	50	38		+		...
			$M_{2max}$	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61		+		...
1.83	6.44	1.23 (1.31)	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2204-5AF..-2..0-Z</b>			
...	...	...	$M_{2N}$	Nm	4.75	6.8	7.8	11.4	11.8	17.3	14.1	18.1	23.5	23.5	33.5	43	54	73	50	38		+		...
2.11	6.69		$M_{2,0}$	Nm	5.4	7.6	9.7	14	16.1	20	18.2	24.5	30.5	33	41.5	52	67	84	50	38		+		...
			$M_{2max}$	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61		+		...

→ Continued on the next page

### Planetary gearbox data

Gearbox type:		NLCW080, 1-stage							NLCW080, 2-stage								
		<b>C36</b>							<b>C37</b>								
1. Order code	$i$	<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$	kg cm <sup>2</sup>	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
$\varnothing_{2,G}$	'	13						15									

Color legend:		$M_{max,M} \times i < M_{2N,G}$	<b>The motor and gearbox combination is fatigue-proof</b>
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	<b>Check acceleration and inertias, perform service life calculation if necessary</b>
		$M_{max,M} \times i > M_{2max,G}$	<b>The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary</b>

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLCW080

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$																					
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1 and 2-stage (continued)</b>																							
1.84	6.44	1.23	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2204-5AK..-2..0-Z		
...	...	(1.31)	$M_{2N}$	Nm	4.9	7	8	11.7	12.1	17.6	14.5	18.5	24	24	34.5	44	55	74	50	38	■■■ + ■■■ + ...		
2.13	6.69		$M_{2,0}$	Nm	5.5	7.6	9.7	14	16.2	20	18.3	24.5	31	33	41.5	52	67	84	50	38			
			$M_{2max}$	Nm	19.3	26	32.5	46	52	61	59	79	99	106	133	166	192	176	80	61			
2.59	8.77	1.61	$n_{2N}$	r/min	300	250	250	200	150	150	125	100	100	75	60	50	37.5	37.5	25	15	1FT2204-6AF..-2..0-Z		
...	...	(1.69)	$M_{2N}$	Nm	6.7	9.4	10.6	15.3	20.5	22.5	18.9	23.5	31	31	44.5	56	71	95	50	38	■■■ + ■■■ + ...		
2.87	9		$M_{2,0}$	Nm	7.7	10.6	13.5	19.3	22	27.5	25	33.5	42	45	56	71	91	110	50	38			
			$M_{2max}$	Nm	26	35	44	62	71	61	80	107	134	143	179	176	192	176	80	61			
2.6	10	3.15	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	50	50	37.5	25	20	10	1FT2205-2AC..-0..0-Z			
...	...	(4.05)	$M_{2N}$	Nm	5.8	8.2	11	16	18.7	23.5	21	25.5	34.5	35.5	47.5	55	75	97	49.5	38	■■■ + ■■■ + ...		
2.85	10.3		$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33	42	44.5	56	70	90	110	50	38			
			$M_{2max}$	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61			
2.64	10	3.15	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2205-2AF..-0..0-Z		
...	...	(4.05)	$M_{2N}$	Nm	6.5	7.9	10.9	15.6	15.9	23	19.3	24	31.5	31.5	45	57	72	95	50	38	■■■ + ■■■ + ...		
2.89	10.3		$M_{2,0}$	Nm	7.9	10.8	13.8	19.7	22.5	28.5	25	33.5	42.5	45.5	57	71	92	110	50	38			
			$M_{2max}$	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61			
2.61	10	3.15	$n_{2N}$	r/min	300	250	250	200	150	150	125	100	100	75	75	60	50	37.5	37.5	25	1FT2205-2AH..-0..0-Z		
...	...	(4.05)	$M_{2N}$	Nm	6.2	8.7	9.6	13.9	18.6	20.5	27	28	37.5	40	51	64	87	44	37.5	25	■■■ + ■■■ + ...		
2.86	10.3		$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33.5	42	45	56	70	90	110	50	37.5			
			$M_{2max}$	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61			
4.73	17	5.1	$n_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	25	-	1FT2205-4AF..-0..0-Z		
...	...	(6)	$M_{2N}$	Nm	9.9	13.6	18.5	27	29	36.5	30.5	40.5	55	56	72	88	90	110	50	-	■■■ + ■■■ + ...		
4.94	17.2		$M_{2,0}$	Nm	14.1	19.2	24	34	39	38	43.5	58	73	78	98	110	120	110	50	-			
			$M_{2max}$	Nm	50	68	85	104	80	61	154	192	176	192	192	176	192	176	80	-			

### Planetary gearbox data

Gearbox type:		NLCW080, 1-stage								NLCW080, 2-stage											
1. Order code		C36								C37											
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200				
$J_{1,G}$	kg cm <sup>2</sup>	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906				
$\varnothing_{2,G}$	'	13								15											

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

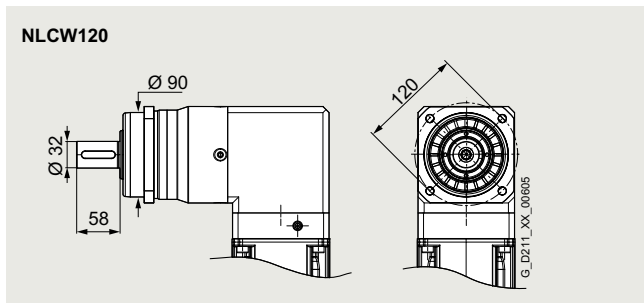


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

Gearbox type NLCW120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1 and 2-stage</b>																					
0.159	1.44	0.093 (0.112)	$n_{2N}$	r/min	-	-	150	150	150	125	100	75	75	75	60	50	50	37.5	25	20	<b>1FT2103-2AG..-0.A0-Z</b>
...	...	...	$M_{2N}$	Nm	-	-	0.39	1.01	1.23	1.92	1.45	2.45	2.9	3	4.55	5.9	7.1	9.9	16	20.5	■■■ + ■■■ + ...
0.402	1.68		$M_{2.0}$	Nm	-	-	0.79	1.63	2	2.85	2.45	3.7	4.9	5.3	7	9.1	12	15.3	25	40	
			$M_{2max}$	Nm	-	-	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.132	1.44	0.093 (0.112)	$n_{2N}$	r/min	-	-	150	150	150	150	100	100	75	75	75	60	50	37.5	30	20	<b>1FT2103-2AH..-0.0-Z</b>
...	...	...	$M_{2N}$	Nm	-	-	0.255	0.85	1.12	1.54	1.35	1.77	2.85	3	3.6	4.95	7	9.8	13.2	21	■■■ + ■■■ + ...
0.375	1.68		$M_{2.0}$	Nm	-	-	0.65	1.43	1.82	2.6	2.2	3.35	4.5	4.9	6.4	8.4	11.1	14.2	23.5	37	
			$M_{2max}$	Nm	-	-	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.584	3.3	0.139 (0.158)	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	75	60	50	30	20	<b>1FT2103-4AG..-0.A0-Z</b>
...	...	...	$M_{2N}$	Nm	1.25	2.2	2.95	4.6	5.9	6.8	6.3	8.3	11.3	11.4	16.3	16.8	24	29	51	79	■■■ + ■■■ + ...
0.995	3.69		$M_{2.0}$	Nm	1.75	2.75	3.75	5.7	6.8	8.8	7.8	10.8	13.8	14.8	18.9	23.5	31	39	63	95	
			$M_{2max}$	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.569	3.3	0.139 (0.158)	$n_{2N}$	r/min	300	300	300	250	200	150	125	100	100	75	75	60	50	30	20	<b>1FT2103-4AH..-0.0-Z</b>	
...	...	...	$M_{2N}$	Nm	0.98	1.56	2.1	3.45	3.75	5.4	4.9	6.6	8.8	9.3	13	14.6	20	25	42	66	■■■ + ■■■ + ...
0.981	3.69		$M_{2.0}$	Nm	1.7	2.7	3.7	5.6	6.6	8.6	7.6	10.6	13.6	14.6	18.6	23.5	30.5	38.5	62	95	
			$M_{2max}$	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.597	3.01	0.35 (0.43)	$n_{2N}$	r/min	375	375	300	250	200	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-4AF..-0.0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.27	1.87	2.95	4.7	6	7.9	6.5	8.8	11.5	12.1	16.7	21	28	35.5	57	91	■■■ + ■■■ + ...
1.01	3.41		$M_{2.0}$	Nm	1.79	2.8	3.8	5.8	6.9	8.9	7.9	11	14	15	19.1	24	31	39.5	64	95	
			$M_{2max}$	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
0.59	3.11	0.35 (0.43)	$n_{2N}$	r/min	375	375	375	300	250	200	150	125	125	100	75	75	60	37.5	25	<b>1FT2104-4AK..-0.0-Z</b>	
...	...	...	$M_{2N}$	Nm	1.31	2.1	2.5	4.6	5.8	7.6	5.2	8.7	11.1	10.9	16	20.5	22	29.5	51	77	■■■ + ■■■ + ...
1	3.5		$M_{2.0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.8	7.8	10.9	13.9	14.9	19	24	31	39	63	95	
			$M_{2max}$	Nm	9.3	12.8	16.3	23	26.5	33.5	30	41	51	55	69	86	111	139	192	152	
1.68	6.64	0.56 (0.65)	$n_{2N}$	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	<b>1FT2104-5AF..-0.0-Z</b>
...	...	...	$M_{2N}$	Nm	4.55	5.6	8.5	12.4	14.6	18.6	16.4	21.5	28	29	38	48	62	78	120	95	■■■ + ■■■ + ...
2.08	7.01		$M_{2.0}$	Nm	5	7.1	9.2	13.4	15.5	19.7	17.6	23.5	30	32	40.5	51	65	82	120	95	
			$M_{2max}$	Nm	19.9	26.5	33.5	48	55	69	62	83	104	111	139	174	220	275	192	152	

Continued on the next page

Planetary gearbox data		NLCW120, 1-stage							NLCW120, 2-stage									
Gearbox type:		C46							C47									
1. Order code																		
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95	
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152	
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818	
$\varphi_{2,G}$	'	11						13										

Color legend:    $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**  
   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**  
   $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLCW120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	kg cm <sup>2</sup>																				
SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1 and 2-stage (continued)																						
1.67	6.74	0.56 (0.65)	$n_{2N}$	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2104-5AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	4.5	5.4	8.4	12.2	12.3	17.3	16.2	21	27.5	28.5	37.5	41	56	68	118	95	■■■ + ■■■ + ...	
2.07	7.1		$M_{2,0}$	Nm	4.95	7	9.1	13.3	15.4	19.6	17.5	23.5	29.5	32	40	50	65	82	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	20	27	34	48.5	55	70	63	84	105	112	141	176	225	280	192	152	■■■ + ■■■ + ...	
2.42	9.06	0.76 (0.84)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2104-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.5	9.5	11	15.5	20	26	21	26.5	35	35.5	51	64	83	107	120	95	■■■ + ■■■ + ...	
2.81	9.41		$M_{2,0}$	Nm	7.2	10	12.9	18.5	21	27	24	32.5	41	44	55	69	89	111	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	27	36.5	46	64	74	93	83	112	140	149	187	230	300	368	192	152	■■■ + ■■■ + ...	
4.11	13.9	1.71 (2.55)	$n_{2N}$	r/min	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2105-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	11	15.2	18.4	24.5	31	40	34.5	43	56	56	78	99	126	161	120	95	■■■ + ■■■ + ...	
4.5	14.2		$M_{2,0}$	Nm	12.3	16.8	21	30	34.5	44	39.5	53	66	71	89	111	143	179	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	■■■ + ■■■ + ...	
4.15	13.9	1.71 (2.55)	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	37.5	25	1FT2105-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	10.5	14.6	16.9	22	29.5	29	32	39.5	51	51	75	94	120	154	97	95	■■■ + ■■■ + ...	
4.53	14.2		$M_{2,0}$	Nm	12.4	17	21.5	30.5	35	44	39.5	53	67	71	89	112	144	180	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152	■■■ + ■■■ + ...	
7.03	22.6	2.65 (3.5)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2105-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	16	22.5	30	42	42.5	61	54	71	71	98	103	131	164	220	120	95	■■■ + ■■■ + ...	
7.39	22.9		$M_{2,0}$	Nm	21	28.5	35.5	50	58	73	65	87	110	117	147	184	235	230	120	95	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	67	90	113	159	182	152	205	270	340	365	416	368	416	368	192	152	■■■ + ■■■ + ...	
7.48	24.6	4.6 (6.3)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	-	1FT2106-3AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	16.8	23.5	30.5	43	44	62	47	74	74	101	107	136	171	230	120	-	■■■ + ■■■ + ...	
7.75	24.8		$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	-	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	73	98	123	172	192	152	220	295	368	395	416	368	416	368	192	-	■■■ + ■■■ + ...	
9.85	31.3	6 (7.6)	$n_{2N}$	r/min	375	300	250	200	200	150	125	100	75	75	60	50	50	37.5	25	-	1FT2106-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	20.5	29	37.5	52	51	74	69	89	120	123	158	193	194	230	120	-	■■■ + ■■■ + ...	
10.1	31.5		$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	-	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	93	125	157	216	192	152	280	375	368	416	416	368	416	368	192	-	■■■ + ■■■ + ...	
14.1	43.4	8.7 (10.4)	$n_{2N}$	r/min	300	250	250	200	150	150	125	100	75	75	60	50	50	37.5	-	-	1FT2106-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	33.5	44.5	46.5	63	88	90	85	109	148	151	195	225	225	230	-	-	■■■ + ■■■ + ...	
14.4	43.6		$M_{2,0}$	Nm	42	56	71	100	114	95	127	169	210	225	260	230	260	230	-	-	■■■ + ■■■ + ...	
			$M_{2max}$	Nm	128	168	208	216	192	152	336	416	368	416	368	416	368	-	-	-	■■■ + ■■■ + ...	

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### Planetary gearbox data

Gearbox type: 1. Order code $i$ 2. Order code		NLCW120, 1-stage							NLCW120, 2-stage									
		C46							C47									
		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95	
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152	
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818	
$\varphi_{2,G}$	'	11						13										

- Color legend:
- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
  - $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
  - $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

**Gearbox type NLCW120**

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	375	375	300	300	250	200	150	150	125	100	100	75	60	50	37.5	20	1FT2203-4AG..-0..0-Z
Nm	Nm	kg cm <sup>2</sup>																			
0.592	3.01	0.35	$M_{2N}$	Nm	1.31	2.1	3.1	4.15	5.7	7.6	6.6	8	10.2	12.7	15.3	20.5	27	34.5	46	88	■ ■ ■ + ■ ■ ■ + ...
...	...	(0.37)	$M_{2,0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.9	7.8	10.9	13.9	15	19	24	31	39	63	95	■ ■ ■ + ■ ■ ■ + ...
1	3.41		$M_{2max}$	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	■ ■ ■ + ■ ■ ■ + ...

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Planetary gearbox data		NLCW120, 1-stage						NLCW120, 2-stage									
Gearbox type:		C46						C47									
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
$\varnothing_{2,G}$	'	11						13									

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 230 V 1 AC / 240 V 3 AC

## Gearbox type NLCW120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox						
$M_{0,M}$	$M_{max,M}$	$J_M$																					
Nm	Nm	$(J_{M,Br})$ kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1 and 2-stage (continued)</b>																							
5.04	16.8	7.8	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	100	75	60	50	37.5	25	15	1FT2206-2AF..-0..0-Z			
...	...	(9.4)	$M_{2N}$	Nm	11.8	16.3	19.5	25	32.5	42	37	45.5	59	59	83	104	133	170	120	95	■ ■ ■ + ■ ■ ■ + ...		
5.33	17.1		$M_{2,0}$	Nm	15.1	20.5	25.5	36.5	42	53	47	63	79	84	105	132	170	210	120	95			
			$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152			
4.87	16.8	7.8	$n_{2N}$	r/min	375	300	250	200	150	150	100	100	75	75	60	50	37.5	30	20	1FT2206-2AH..-0..0-Z			
...	...	(9.4)	$M_{2N}$	Nm	10.9	15.7	20	28.5	29.5	41	31.5	50	49.5	67	72	93	116	158	119	94	■ ■ ■ + ■ ■ ■ + ...		
5.17	17.1		$M_{2,0}$	Nm	14.6	19.8	25	35.5	40.5	51	45.5	61	76	81	102	128	165	205	119	95			
			$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152			
7.62	25.5	11.5	$n_{2N}$	r/min	250	200	150	100	100	75	100	75	50	50	37.5	30	25	20	12.5	-	1FT2206-3AB..-0..0-Z		
...	...	(13.1)	$M_{2N}$	Nm	19.5	26	34	49	55	70	54	73	103	108	138	173	220	230	120	-	■ ■ ■ + ■ ■ ■ + ...		
7.89	25.8		$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	69	93	116	124	156	195	250	230	120	-			
			$M_{2max}$	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	-			
7.49	25.5	11.5	$n_{2N}$	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	25	-	1FT2206-3AF..-0..0-Z		
...	...	(13.1)	$M_{2N}$	Nm	18.4	20.5	27.5	38	50	55	50	65	88	90	117	143	196	198	120	-	■ ■ ■ + ■ ■ ■ + ...		
7.76	25.8		$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	-			
			$M_{2max}$	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	-			
10.5	36.2	15.1	$n_{2N}$	r/min	250	200	200	150	125	100	100	75	60	60	50	37.5	30	25	20	-	1FT2206-4AC..-0..0-Z		
...	...	(16.8)	$M_{2N}$	Nm	24	33	35.5	51	63	81	63	86	110	112	138	184	235	230	120	-	■ ■ ■ + ■ ■ ■ + ...		
10.8	36.3		$M_{2,0}$	Nm	31	42	53	74	85	95	96	128	161	172	215	230	260	230	120	-			
			$M_{2max}$	Nm	108	144	181	216	192	152	325	416	368	416	416	368	416	368	192	-			
10.3	34.2	15.1	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	50	37.5	25	-	1FT2206-4AF..-0..0-Z			
...	...	(16.8)	$M_{2N}$	Nm	21	29.5	38.5	52	70	75	70	91	122	125	161	196	199	230	120	-	■ ■ ■ + ■ ■ ■ + ...		
10.6	34.4		$M_{2,0}$	Nm	30.5	41.5	52	73	84	95	93	124	156	166	205	230	260	230	120	-			
			$M_{2max}$	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	-			
9.81	34.2	15.1	$n_{2N}$	r/min	300	250	200	150	125	125	100	75	75	60	50	37.5	37.5	30	-	1FT2206-4AH..-0..0-Z			
...	...	(16.8)	$M_{2N}$	Nm	22.5	30	40	57	60	75	58	74	102	103	134	161	220	215	120	-	■ ■ ■ + ■ ■ ■ + ...		
10.1	34.4		$M_{2,0}$	Nm	29	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	-			
			$M_{2max}$	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	-			

### Planetary gearbox data

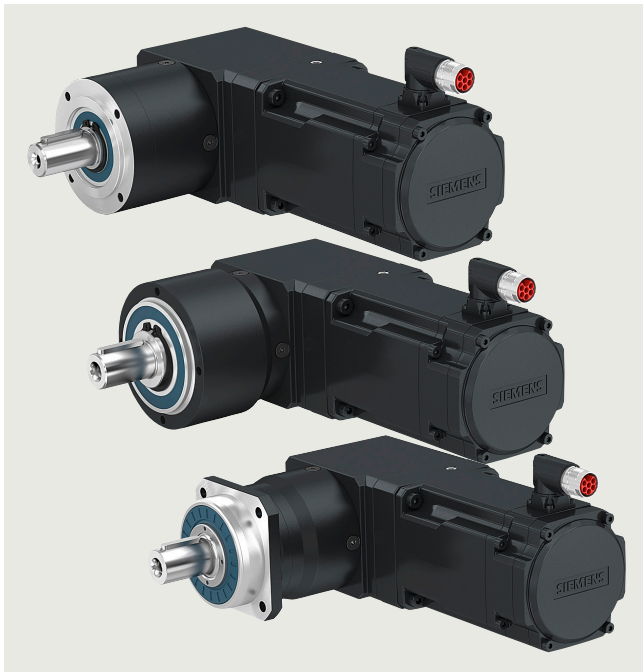
Gearbox type:		NLCW120, 1-stage							NLCW120, 2-stage											
1. Order code		<b>C46</b>							<b>C47</b>											
<i>i</i>		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>			
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>			
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95			
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152			
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430			
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818			
$\varnothing_{2,G}$	'	11																		

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Selection and ordering data



SIMOTICS S-1FT2 servo planetary geared motors with angular gearbox

The following servo planetary geared motors with angular gearbox are suitable for servo converters with line connection 380 V to 480 V 3 AC, especially for SINAMICS S120 and SINAMICS S210 servo converters.

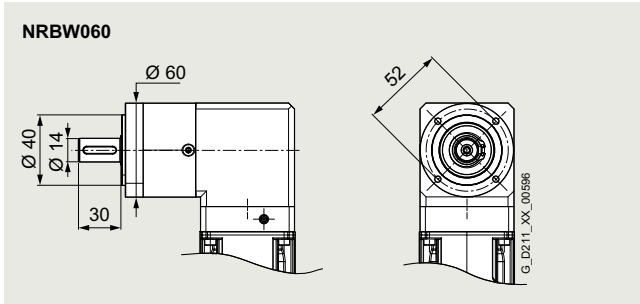
The rated points of the geared motors are adapted to this voltage.

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW060

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	400 N
Average axial force for 20000 h	$F_{A,eq}$	500 N
Average radial force for 30000 h	$F_{R,eq}$	340 N
Average axial force for 30000 h	$F_{A,eq}$	450 N
Maximum radial force	$F_{R,max}$	700 N
Maximum axial force	$F_{A,max}$	800 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																		
Nm	Nm	$(J_{M,Br})$																		
		kg cm <sup>2</sup>																		

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 1 and 2-stage																					
0.498	1.77	0.093	$n_{2N}$	r/min	750	600	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2103-2AH..-2..0-Z	
...	...	(0.112)	$M_{2N}$	Nm	1.02	1.38	1.48	2.4	2.55	3.25	3	3.75	4.95	4.95	6.6	8.1	10.3	13.5	18	■■■ + ■■■ + ...	
0.51	1.82		$M_{2,0}$	Nm	1.49	2	2.5	3.5	4.05	5	4.55	6	7.6	8.1	10.1	12.7	16.3	20	18		
			$M_{2max}$	Nm	5.4	7.2	9	12.7	14.5	18.1	16.2	21.5	27	28.5	36	45	57	64	29		
0.983	3.74	0.139	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	200	150	125	100	75	75	60	1FT2103-4AH..-2..0-Z	
...	...	(0.158)	$M_{2N}$	Nm	2.05	2.7	3.35	4.65	5.8	7.1	5.7	8.6	8.9	11.8	14.5	18.1	24	24.5	18	■■■ + ■■■ + ...	
0.993	3.85		$M_{2,0}$	Nm	2.95	3.9	4.9	6.9	7.9	9.9	8.9	11.9	14.8	15.8	19.8	24.5	31.5	39.5	18		
			$M_{2max}$	Nm	11.5	15.3	19.2	26.5	29	24	34	45.5	57	60	70	64	70	64	29		
1.12	3.46	0.368	$n_{2N}$	r/min	1000	750	600	375	375	300	300	250	200	200	150	125	100	75	50	1FT2104-4AF..-2..0-Z	
...	...	(0.448)	$M_{2N}$	Nm	2.1	3.15	4.1	6.5	6.9	8.8	8.1	10	13.2	12.7	17.6	21	26.5	35.5	18	■■■ + ■■■ + ...	
1.15	3.56		$M_{2,0}$	Nm	3.4	4.55	5.7	8	9.1	11.4	10.2	13.6	17	18.2	22.5	28	36	40	18		
			$M_{2max}$	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29		
1.11	3.55	0.368	$n_{2N}$	r/min	750	750	600	375	375	300	300	250	200	200	150	125	100	75	60	1FT2104-4AK..-2..0-Z	
...	...	(0.448)	$M_{2N}$	Nm	3.05	3.3	4.3	7	7.2	9.1	8.7	10.3	13.7	13.2	18.3	21.5	27.5	37	18	■■■ + ■■■ + ...	
1.14	3.65		$M_{2,0}$	Nm	3.35	4.5	5.6	7.9	9.1	11.4	10.1	13.5	16.9	18	22.5	28	36	40	18		
			$M_{2max}$	Nm	10.9	14.6	18.2	25.5	29	24	32.5	43	54	57	70	64	70	64	29		
2.18	7	0.578	$n_{2N}$	r/min	750	600	500	375	300	250	250	200	150	150	125	100	100	75	-	1FT2104-5AF..-2..0-Z	
...	...	(0.668)	$M_{2N}$	Nm	4.8	6.2	7.6	10.3	13	15	15	18.8	25.5	25.5	30.5	38.5	35	40	-	■■■ + ■■■ + ...	
2.23	7.18		$M_{2,0}$	Nm	6.6	8.8	11.1	15.5	17.8	15	19.8	26	33	35	44	40	44	40	-		
			$M_{2max}$	Nm	21.5	28.5	35.5	40	29	24	63	70	70	70	70	64	70	64	-		
2.16	7.09	0.578	$n_{2N}$	r/min	750	600	500	375	300	250	250	200	150	150	125	100	100	75	-	1FT2104-5AK..-2..0-Z	
...	...	(0.668)	$M_{2N}$	Nm	4.75	6.1	7.5	10.2	12.9	15	14.8	18.6	25	25	30	38	35	40	-	■■■ + ■■■ + ...	
2.21	7.28		$M_{2,0}$	Nm	6.6	8.8	11	15.4	17.6	15	19.7	26	32.5	35	43.5	40	44	40	-		
			$M_{2max}$	Nm	21.5	29	36	40	29	24	64	70	70	70	70	64	70	64	-		
2.89	9.35	0.778	$n_{2N}$	r/min	750	600	500	375	300	300	250	200	150	150	125	100	100	75	-	1FT2104-6AF..-2..0-Z	
...	...	(0.858)	$M_{2N}$	Nm	5.6	7.3	8.9	12	15.2	14.2	17.4	21.5	29.5	29	35	40	39	40	-	■■■ + ■■■ + ...	
2.96	9.6		$M_{2,0}$	Nm	8.8	11.8	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	-		
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-		

Planetary gearbox data		NRBW060, 1-stage								NRBW060, 2-stage									
Gearbox type:		A26								A27									
1. Order code																			
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64			
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18			
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29			
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	88	88	80	80			
$J_{1,G}$	kg cm <sup>2</sup>	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222			
$\varphi_{2,G}$	'	16															18		

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRBW060

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ Nm Nm kg cm <sup>2</sup> (J <sub>M,Br</sub> )		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 1 and 2-stage																				
0.489	1.68	0.2	$n_{2N}$	r/min	750	600	500	375	300	250	250	200	150	150	125	100	75	60	50	1FT2203-2AK...-2..0-Z
...	...	(0.22)	$M_{2N}$	Nm	0.89	1.19	1.47	2	2.55	3.1	2.95	3.8	5.2	5.2	6.4	8	10.7	13.5	15.1	■ + ■ + ...
0.5	1.72		$M_{2,0}$	Nm	1.46	1.97	2.45	3.45	3.95	4.95	4.45	5.9	7.4	7.9	9.9	12.4	15.9	19.8	18	
			$M_{2max}$	Nm	5.1	6.8	8.6	12	13.7	17.2	15.3	20	25.5	27	34	42.5	54	64	29	
1.08	3.46	0.35	$n_{2N}$	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	60	50	1FT2203-4AK...-2..0-Z
...	...	(0.37)	$M_{2N}$	Nm	2.1	3.35	3.35	5.8	6	7.2	7.1	8.9	12.2	12.3	14.9	18.6	25	31.5	18	■ + ■ + ...
1.1	3.56		$M_{2,0}$	Nm	3.25	4.35	5.5	7.7	8.8	11	9.8	13.1	16.4	17.5	21.5	27	34.5	40	18	
			$M_{2max}$	Nm	10.6	14.2	17.7	24.5	28	24	31.5	42	52	56	70	64	70	64	29	
2.14	6.62	1.248	$n_{2N}$	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	75	-	1FT2204-5AF...-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.4	6.9	6.9	11.9	12	14.4	14	17.3	23.5	23.5	28	35	44	40	-	■ + ■ + ...
2.19	6.8		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.4	15	19.5	25.5	32	34.5	43	40	44	40	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	-	
2.15	6.62	1.248	$n_{2N}$	r/min	750	500	500	300	300	250	250	200	150	150	125	100	75	75	-	1FT2204-5AK...-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.5	7	7	12.1	12.2	14.6	14.2	17.6	24	24	28.5	35.5	44	40	-	■ + ■ + ...
2.2	6.8		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	34.5	43.5	40	44	40	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	60	70	70	70	70	64	70	64	-	
2.88	8.88	1.628	$n_{2N}$	r/min	600	500	375	300	250	250	150	150	125	100	100	100	75	-	-	1FT2204-6AF...-2..0-Z
...	...	(1.708)	$M_{2N}$	Nm	7	8.8	11.7	15	17.8	15	17.2	28	29	34.5	43.5	40	33	40	-	■ + ■ + ...
2.95	9.12		$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	18	15	26	35	43.5	44	44	40	44	40	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	

Planetary gearbox data		NRBW060, 1-stage										NRBW060, 2-stage					
Gearbox type:		A26										A27					
1. Order code		i															
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.357	0.248	0.236	0.225	0.223	0.221	0.35	0.346	0.232	0.241	0.231	0.231	0.222	0.222	0.222	
$\varnothing_{2,G}$	'	16										18					

Color legend:

<span style="background-color: #d9ead3; border: 1px solid #ccc; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
<span style="background-color: #f4cccc; border: 1px solid #ccc; display: inline-block; width: 15px; height: 10px;"></span>	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
<span style="background-color: #fce4d6; border: 1px solid #ccc; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW060 3-stage</b>															
0.498	1.77	0.093	$n_{2N}$	r/min	50	37.5	30	30	20	20	15	12.5	1FT2103-2AH...-2..0-Z		
...	...	(0.112)	$M_{2N}$	Nm	20	26.5	33	34	44	40	44	39.5	■ ■ ■ + ■ ■ ■ + ...		
0.51	1.82		$M_{2,0}$	Nm	30	40	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
0.983	3.74	0.139	$n_{2N}$	r/min	50	37.5	37.5	30	25	20	15	12.5	1FT2103-4AH...-2..0-Z		
...	...	(0.158)	$M_{2N}$	Nm	36	44	39	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
0.993	3.85		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
1.12	3.46	0.368	$n_{2N}$	r/min	50	37.5	30	25	20	15	12.5	10	1FT2104-4AF...-2..0-Z		
...	...	(0.448)	$M_{2N}$	Nm	44	44	44	44	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
1.15	3.56		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
1.11	3.55	0.368	$n_{2N}$	r/min	60	50	37.5	37.5	25	20	15	12.5	1FT2104-4AK...-2..0-Z		
...	...	(0.448)	$M_{2N}$	Nm	41	42	44	43	44	40	44	40	■ ■ ■ + ■ ■ ■ + ...		
1.14	3.65		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
2.18	7	0.578	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	1FT2104-5AF...-2..0-Z		
...	...	(0.668)	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.23	7.18		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-			
2.16	7.09	0.578	$n_{2N}$	r/min	60	50	37.5	30	-	-	-	-	1FT2104-5AK...-2..0-Z		
...	...	(0.668)	$M_{2N}$	Nm	44	42	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.21	7.28		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-			
2.89	9.35	0.778	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	-	1FT2104-6AF...-2..0-Z		
...	...	(0.858)	$M_{2N}$	Nm	44	44	44	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.96	9.6		$M_{2,0}$	Nm	44	44	44	-	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	-	-	-	-	-			
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage</b>															
0.489	1.68	0.2	$n_{2N}$	r/min	50	30	25	20	20	15	12.5	12.5	1FT2203-2AK...-2..0-Z		
...	...	(0.22)	$M_{2N}$	Nm	15.8	26.5	32	40.5	38.5	40	44	33	■ ■ ■ + ■ ■ ■ + ...		
0.5	1.72		$M_{2,0}$	Nm	29.5	39	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
1.08	3.46	0.35	$n_{2N}$	r/min	50	37.5	30	30	20	15	15	12.5	1FT2203-4AK...-2..0-Z		
...	...	(0.37)	$M_{2N}$	Nm	33.5	43.5	44	39	44	40	44	38	■ ■ ■ + ■ ■ ■ + ...		
1.1	3.56		$M_{2,0}$	Nm	44	44	44	44	44	40	44	40			
			$M_{2max}$	Nm	70	70	70	70	70	64	70	64			
2.14	6.62	1.248	$n_{2N}$	r/min	50	37.5	30	25	-	-	-	-	1FT2204-5AF...-2..0-Z		
...	...	(1.328)	$M_{2N}$	Nm	44	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...		
2.19	6.8		$M_{2,0}$	Nm	44	44	44	44	-	-	-	-			
			$M_{2max}$	Nm	70	70	70	70	-	-	-	-			

➔ Continued on the next page

Planetary gearbox data		NRBW060, 3-stage							
Gearbox type:		<b>A28</b>							
1. Order code		<b>60</b> <b>80</b> <b>100</b> <b>120</b> <b>160</b> <b>200</b> <b>256</b> <b>320</b>							
i		<b>R60</b> <b>R80</b> <b>R01</b> <b>R21</b> <b>R61</b> <b>R02</b> <b>R52</b> <b>R23</b>							
2. Order code									
$M_{2N,G}$	Nm	44	44	44	44	44	40	44	40
$M_{2max,G}$	Nm	70	70	70	70	70	64	70	64
$M_{2Em,Off}$	Nm	88	88	88	88	88	80	88	80
$J_{1,G}$	kg cm <sup>2</sup>	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222
$\varnothing_{2,G}$	'	21							

Color legend:		$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
		$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
		$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRBW060

Servomotor data			Selection data servomotors with planetary gearbox								Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )										
Nm	Nm	kg cm <sup>2</sup>										
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW060 3-stage (continued)</b>												
2.15	6.62	1.248	$n_{2N}$	r/min	50	37.5	37.5	30	-	-	-	1FT2204-5AK...-2...0-Z
...	...	(1.328)	$M_{2N}$	Nm	44	44	43.5	44	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.2	6.8		$M_{2,0}$	Nm	44	44	44	44	-	-	-	
			$M_{2max}$	Nm	70	70	70	70	-	-	-	
2.88	8.88	1.628	$n_{2N}$	r/min	50	37.5	30	-	-	-	-	1FT2204-6AF...-2...0-Z
...	...	(1.708)	$M_{2N}$	Nm	44	44	44	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...
2.95	9.12		$M_{2,0}$	Nm	44	44	44	-	-	-	-	
			$M_{2max}$	Nm	70	70	70	-	-	-	-	
Planetary gearbox data												
Gearbox type:			<b>NRBW060, 3-stage</b>									
1. Order code			<b>A28</b>									
$i$			<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>160</b>	<b>200</b>	<b>256</b>	<b>320</b>		
2. Order code			<b>R60</b>	<b>R80</b>	<b>R01</b>	<b>R21</b>	<b>R61</b>	<b>R02</b>	<b>R52</b>	<b>R23</b>		
$M_{2N,G}$		Nm	44	44	44	44	44	40	44	40		
$M_{2max,G}$		Nm	70	70	70	70	70	64	70	64		
$M_{2Em,Off}$		Nm	88	88	88	88	88	80	88	80		
$J_{1,G}$		kg cm <sup>2</sup>	0.232	0.231	0.231	0.222	0.222	0.222	0.222	0.222		
$\varnothing_{2,G}$		'	21									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

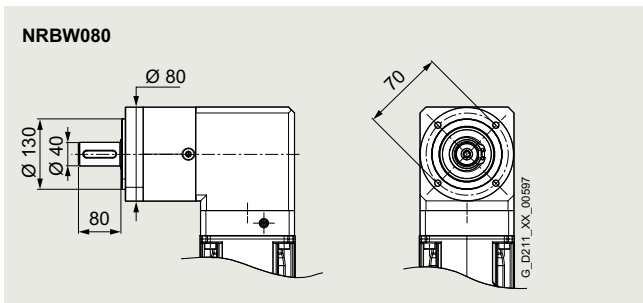
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW080

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	750 N
Average axial force for 20000 h	$F_{A,eq}$	1000 N
Average radial force for 30000 h	$F_{R,eq}$	650 N
Average axial force for 30000 h	$F_{A,eq}$	900 N
Maximum radial force	$F_{R,max}$	1250 N
Maximum axial force	$F_{A,max}$	1600 N

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 1 and 2-stage</b>																				
0.422	1.71	0.093 (0.112)	$n_{2N}$	r/min	750	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2103-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	0.66	1.07	1.15	1.7	2.15	2.7	2.45	3.15	4.25	4.25	5.4	6.8	9.4	11.8	19.1	■ ■ ■ + ■ ■ ■ + ...
0.45	1.75		$M_{2,0}$	Nm	1.26	1.72	2.15	3.05	3.55	4.45	3.95	5.3	6.6	7.1	8.9	11.2	14.3	17.9	28.5	
			$M_{2max}$	Nm	5.2	6.9	8.7	12.2	14	17.5	15.6	20.5	26	27.5	34.5	43	55	69	80	
0.983	3.68	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	1FT2103-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	2.1	2.7	3.65	5	5	6	6.1	7.5	10.4	10.1	12.5	15.7	22	27.5	44.5	■ ■ ■ + ■ ■ ■ + ...
1.01	3.78		$M_{2,0}$	Nm	2.9	3.95	4.95	7	8	10	9	12	15	16	20	25	32	40	50	
			$M_{2max}$	Nm	11.3	15	18.8	26	30	37.5	33.5	44.5	56	59	74	93	119	149	80	
1.06	3.4	0.35 (0.43)	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	75	50	1FT2104-4AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	2.45	3.2	4.05	5.7	7	8.6	6.9	10.3	13.3	13.7	17.1	21.5	28.5	29	39.5	■ ■ ■ + ■ ■ ■ + ...
1.08	3.49		$M_{2,0}$	Nm	3.15	4.25	5.3	7.5	8.6	10.8	9.6	12.8	16.1	17.2	21.5	26.5	34	43	50	
			$M_{2max}$	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80	
1.05	3.49	0.35 (0.43)	$n_{2N}$	r/min	750	600	500	375	300	250	300	200	150	150	125	100	75	60	50	1FT2104-4AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	2.65	3.4	4.3	6.1	7.6	9.5	7.2	11.2	14.5	15	18.8	23.5	31	39	41.5	■ ■ ■ + ■ ■ ■ + ...
1.08	3.59		$M_{2,0}$	Nm	3.15	4.2	5.3	7.5	8.5	10.7	9.5	12.8	16	17	21	26.5	34	42.5	50	
			$M_{2max}$	Nm	10.7	14.3	17.8	25	28.5	35.5	31.5	42.5	53	56	70	88	113	141	80	
2.11	6.91	0.56 (0.65)	$n_{2N}$	r/min	600	500	375	300	250	200	250	200	150	125	100	75	75	50	50	1FT2104-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.7	7	9.6	12.6	15.2	19.2	14.7	17.9	24.5	29.5	37.5	49.5	51	77	49.5	■ ■ ■ + ■ ■ ■ + ...
2.16	7.11		$M_{2,0}$	Nm	6.4	8.5	10.7	15.1	17.2	21.5	19.2	25.5	32	34	42.5	53	68	85	50	
			$M_{2max}$	Nm	21	28	35.5	49.5	56	61	63	84	105	112	140	175	192	176	80	
2.09	7	0.56 (0.65)	$n_{2N}$	r/min	600	500	375	300	250	200	250	150	150	125	100	75	75	50	50	1FT2104-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.6	6.8	9.5	12.4	14.9	18.9	14.5	24	24	29	37	49	50	75	49.5	■ ■ ■ + ■ ■ ■ + ...
2.15	7.2		$M_{2,0}$	Nm	6.3	8.5	10.6	14.9	17.1	21	19.1	25.5	31.5	34	42.5	53	68	84	50	
			$M_{2max}$	Nm	21.5	28.5	35.5	50	57	61	64	85	106	113	142	176	192	176	80	
2.82	9.25	0.76 (0.84)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	50	1FT2104-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	6.8	8.3	11.5	15	18.1	22.5	21.5	29	35	35	44.5	58	75	90	50	■ ■ ■ + ■ ■ ■ + ...
2.89	9.53		$M_{2,0}$	Nm	8.6	11.5	14.4	20	23	28.5	25.5	34	43	45.5	57	71	91	110	50	
			$M_{2max}$	Nm	28.5	38	47.5	66	76	61	84	113	141	150	188	176	192	176	80	

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Planetary gearbox data		NRBW080, 1-stage						NRBW080, 2-stage								
Gearbox type:		A36						A37								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varnothing_{2,G}$	'	13						15								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRBW080**

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min																1FT2105-4AF..-0..0-Z	+	+	...
Nm	Nm	kg cm <sup>2</sup>			600	500	375	250	250	200	200	150	125	100	100	75	60	60	50				
4.47	14	1.71 (2.55)	$M_{2N}$	Nm	10.4	12.1	17.2	26.5	26	33	32	42.5	51	62	63	84	107	94	48.5				
4.59	14.4		$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	40.5	54	68	72	90	110	120	110	50				
			$M_{2max}$	Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80				
4.5	14	1.71 (2.55)	$n_{2N}$	r/min	500	375	375	250	200	200	150	100	100	75	75	50	50	37.5	1FT2105-4AH..-0..0-Z	+	+	...	
4.62	14.4		$M_{2N}$	Nm	11.3	15.2	15.4	24	30	29.5	29	38.5	57	58	76	76	117	110	50				
			$M_{2,0}$	Nm	13.8	18.4	23	32	36.5	38	41	54	68	73	91	110	120	110	50				
			$M_{2max}$	Nm	43	57	71	100	80	61	127	170	176	192	192	176	192	176	80				
7.27	22.4	2.65 (3.5)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	75	60	60	-	1FT2105-6AF..-0..0-Z	+	+	...
7.4	23.1		$M_{2N}$	Nm	15.6	20.5	26.5	32	40.5	37.5	51	61	76	76	101	97	119	96	-				
			$M_{2,0}$	Nm	22	29.5	36.5	51	50	38	66	88	110	117	120	110	120	110	-				
			$M_{2max}$	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	-				
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW080 1 and 2-stage</b>																							
0.409	1.62	0.2 (0.22)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	30	1FT2203-2AK..-0..0-Z	+	+	...
0.437	1.66		$M_{2N}$	Nm	0.9	1.26	1.37	2.2	2.25	2.9	2.75	3.7	4.5	4.5	5.8	7.8	10.2	12.3	20.5				
			$M_{2,0}$	Nm	1.22	1.67	2.1	3	3.45	4.3	3.85	5.1	6.4	6.9	8.6	10.8	13.9	17.4	27.5				
			$M_{2max}$	Nm	4.9	6.5	8.2	11.5	13.2	16.5	14.7	19.7	24.5	26	32.5	41	52	65	80				
1.02	3.4	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	100	100	75	60	37.5	1FT2203-4AK..-0..0-Z	+	+	...	
1.04	3.49		$M_{2N}$	Nm	2.35	2.95	4	5.4	6.4	8.1	6.5	7.8	11.1	12.8	16.2	16.2	23.5	29.5	47.5				
			$M_{2,0}$	Nm	3	4.05	5.1	7.2	8.2	10.3	9.2	12.3	15.4	16.4	20.5	25.5	33	41	50				
			$M_{2max}$	Nm	10.4	13.9	17.4	24	27.5	34.5	31	41	51	55	69	86	110	137	80				
2.07	6.53	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	250	150	125	125	100	75	60	50	50	1FT2204-5AF..-2..0-Z	+	+	...
2.12	6.72		$M_{2N}$	Nm	5.4	6.5	9.1	11.8	14.4	18.2	13.7	22.5	27.5	28	36	46.5	59	73	39				
			$M_{2,0}$	Nm	6.3	8.4	10.5	14.8	16.9	21	18.9	25	31.5	33.5	42	52	67	83	50				
			$M_{2max}$	Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80				
2.08	6.53	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	50	1FT2204-5AK..-2..0-Z	+	+	...
2.13	6.72		$M_{2N}$	Nm	5.5	6.7	9.3	12.1	14.7	18.5	17.6	23	28.5	28.5	36.5	48	61	74	39.5				
			$M_{2,0}$	Nm	6.3	8.4	10.6	14.9	17	21	19	25	31.5	33.5	42	52	67	84	50				
			$M_{2max}$	Nm	20	26.5	33.5	47	53	61	59	79	99	106	132	165	192	176	80				
2.81	8.78	1.61 (1.69)	$n_{2N}$	r/min	600	500	375	250	250	200	200	150	125	125	100	75	60	50	50	1FT2204-6AF..-2..0-Z	+	+	...
2.88	9.04		$M_{2N}$	Nm	7.1	8.5	11.9	18.4	18.7	23.5	22.5	30	36.5	36	45.5	61	77	93	44.5				
			$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	91	110	50				
			$M_{2max}$	Nm	27	36	45	63	72	61	80	107	134	142	178	176	192	176	80				
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	600	375	375	250	250	200	200	150	125	100	100	75	60	50	37.5	1FT2205-2AC..-0..0-Z	+	+	...
2.92	10.3		$M_{2N}$	Nm	5.8	9.2	9.8	15.5	15.1	19.2	19.3	25.5	30.5	36.5	37.5	51	65	77	50				
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	58	72	92	110	49.5				
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80				
2.91	10	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1FT2205-2AF..-0..0-Z	+	+	...
2.96	10.3		$M_{2N}$	Nm	7	8.5	11.8	15.2	18.6	23	21.5	28.5	35.5	36	45.5	59	76	92	50				
			$M_{2,0}$	Nm	8.8	11.7	14.7	20.5	23.5	29.5	26.5	35	44	47	58	73	94	110	50				
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80				

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Planetary gearbox data		NRBW080, 1-stage						NRBW080, 2-stage								
Gearbox type:		<b>A36</b>						<b>A37</b>								
1. Order code		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
$\varnothing_{2,G}$	'	13						15								

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**
- $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	600	500	375	250	250	200	200	150	125	100	100	75	60	50	37.5	1FT2205-2AH..-0..0-Z + + + ...
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	6.3	7.4	10.6	16.3	16.4	20.5	20.5	27	32.5	37.5	40.5	55	70	83	50	
			$M_{2,0}$	Nm	8.7	11.6	14.5	20	23	29	26	34.5	43.5	46	57	72	92	110	49.5	
			$M_{2max}$	Nm	30.5	41	51	72	80	61	91	122	152	162	192	176	192	176	80	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	200	200	125	100	100	75	60	50	50	37.5	1FT2205-4AF..-0..0-Z + + + ...
...	...	...	$M_{2N}$	Nm	11.2	15.1	19.2	23.5	29.5	28.5	28.5	45.5	57	57	76	94	116	108	50	
2.92	10.3		$M_{2,0}$	Nm	15.1	20	25	35	40	38	45	60	75	80	100	110	120	110	50	
4.95	16.8	5.1 (6)	$M_{2max}$	Nm	51	69	86	104	80	61	153	192	176	192	192	176	192	176	80	
...	...	...																		
5.04	17.3																			

Planetary gearbox data		NRBW080, 1-stage						NRBW080, 2-stage									
Gearbox type:		A36						A37									
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	
$i$		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	
2. Order code	$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50
	$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80
	$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190
	$J_{1,G}$	kg cm <sup>2</sup>	1.273	1.004	0.973	0.929	0.92	0.91	1.232	1.209	1.205	0.996	0.955	0.954	0.917	0.916	0.917
	$\varnothing_{2,G}$	'	13						15								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox											Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )													
Nm	Nm	kg cm <sup>2</sup>													
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW080 3-stage</b>															
0.422	1.71	0.093 (0.112)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	7.5	6	1FT2103-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	17.7	23	28	33.5	48	49.5	73	96	49.5	■ ■ ■ + ■ ■ ■ + ...	
0.45	1.75		$M_{2,0}$	Nm	26.5	35.5	44.5	53	71	89	114	110	49.5		
			$M_{2max}$	Nm	103	137	171	176	192	176	192	176	80		
0.983	3.68	0.139 (0.158)	$n_{2N}$	r/min	37.5	30	25	20	15	15	12.5	10	6	1FT2103-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	42	55	65	80	112	98	104	110	50	■ ■ ■ + ■ ■ ■ + ...	
1.01	3.78		$M_{2,0}$	Nm	60	80	100	110	120	110	120	110	50		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80		
1.06	3.4	0.35 (0.43)	$n_{2N}$	r/min	37.5	37.5	25	20	20	15	12.5	10	6	1FT2104-4AF..-2..0-Z	
...	...	...	$M_{2N}$	Nm	53	56	85	103	103	110	120	110	49.5	■ ■ ■ + ■ ■ ■ + ...	
1.08	3.49		$M_{2,0}$	Nm	64	85	106	110	120	110	120	110	49.5		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80		
1.05	3.49	0.35 (0.43)	$n_{2N}$	r/min	37.5	30	25	20	20	15	12.5	10	7.5	1FT2104-4AK..-2..0-Z	
...	...	...	$M_{2N}$	Nm	58	76	93	110	108	110	120	110	50	■ ■ ■ + ■ ■ ■ + ...	
1.08	3.59		$M_{2,0}$	Nm	63	84	105	110	120	110	120	110	49.5		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80		
2.11	6.91	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2104-5AF..-2..0-Z	
...	...	...	$M_{2N}$	Nm	98	119	120	107	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...	
2.16	7.11		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-		
2.09	7	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2104-5AK..-2..0-Z	
...	...	...	$M_{2N}$	Nm	97	119	120	107	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...	
2.15	7.2		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-		
2.82	9.25	0.76 (0.84)	$n_{2N}$	r/min	37.5	30	30	25	20	15	12.5	10	-	1FT2104-6AF..-2..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	108	110	120	110	120	110	-	■ ■ ■ + ■ ■ ■ + ...	
2.89	9.53		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-		
			$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-		
4.47	14	1.71 (2.55)	$n_{2N}$	r/min	37.5	30	30	25	20	-	-	-	-	1FT2105-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	106	110	119	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
4.59	14.4		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-		
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-		
4.5	14	1.71 (2.55)	$n_{2N}$	r/min	37.5	30	25	20	15	-	-	-	-	1FT2105-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
4.62	14.4		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-		
			$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-		
7.27	22.4	2.65 (3.5)	$n_{2N}$	r/min	37.5	30	25	-	-	-	-	-	-	1FT2105-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	110	120	120	-	-	-	-	-	-	■ ■ ■ + ■ ■ ■ + ...	
7.4	23.1		$M_{2,0}$	Nm	110	120	120	-	-	-	-	-	-		
			$M_{2max}$	Nm	176	192	192	-	-	-	-	-	-		

Planetary gearbox data		NRBW080, 3-stage													
Gearbox type:		A38													
1. Order code		60    80    100    120    160    200    256    320    512													
2. Order code		R60    R80    R01    R21    R61    R02    R52    R23    R51													
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50					
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80					
$M_{2Em.Off}$	Nm	220	240	240	220	240	220	240	220	190					
$J_{1,G}$	kg cm <sup>2</sup>	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917					
$\varphi_{2,G}$	'	17													

Color legend:   $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**

$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**

$M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW080

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	7.5	6	1FT2203-2AK..-0..0-Z ■■■ + ■■■ + ...
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	19.5	24	30.5	39	50	63	83	83	50	
0.409	1.62	0.2 (0.22)	$M_{2,0}$	Nm	25.5	34.5	43	51	69	86	110	110	49.5	1FT2203-4AK..-0..0-Z ■■■ + ■■■ + ...
0.437	1.66		$M_{2max}$	Nm	97	130	162	176	192	176	192	176	80	
1.02	3.4	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	10	6	1FT2204-5AF..-2..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	45	58	68	85	119	110	120	100	50	
1.04	3.49		$M_{2,0}$	Nm	61	81	102	110	120	110	120	110	50	1FT2204-5AK..-2..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	176	80	
2.07	6.53	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	-	-	1FT2204-6AF..-2..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	92	114	120	110	106	110	120	110	-	
2.12	6.72		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	1FT2204-6AK..-2..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.08	6.53	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2205-2AC..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	94	116	120	88	107	110	120	110	-	
2.13	6.72		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	1FT2205-2AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.81	8.78	1.61 (1.69)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	10	-	1FT2205-2AH..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	110	120	120	100	117	110	120	110	-	
2.88	9.04		$M_{2,0}$	Nm	110	120	120	110	120	110	120	110	-	1FT2205-4AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	176	-	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	37.5	25	20	20	12.5	10	10	-	-	1FT2205-2AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	89	120	120	110	120	110	120	-	-	
2.92	10.3		$M_{2,0}$	Nm	110	120	120	110	120	110	120	-	-	1FT2205-2AH..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	
2.91	10	3.15 (4.05)	$n_{2N}$	r/min	37.5	30	25	25	20	15	12.5	-	-	1FT2205-4AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	109	120	120	89	100	110	120	-	-	
2.96	10.3		$M_{2,0}$	Nm	110	120	120	110	120	110	119	-	-	1FT2205-2AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	
2.87	10	3.15 (4.05)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	-	-	1FT2205-2AH..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	98	116	120	110	120	109	120	-	-	
2.92	10.3		$M_{2,0}$	Nm	110	120	119	110	120	109	119	-	-	1FT2205-4AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	176	192	-	-	
4.95	16.8	5.1 (6)	$n_{2N}$	r/min	37.5	30	25	20	15	-	-	-	-	1FT2205-4AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2N}$	Nm	110	120	120	110	120	-	-	-	-	
5.04	17.3		$M_{2,0}$	Nm	110	120	120	110	120	-	-	-	-	1FT2205-4AF..-0..0-Z ■■■ + ■■■ + ...
...	...		$M_{2max}$	Nm	176	192	192	176	192	-	-	-	-	

### Planetary gearbox data

Gearbox type:		NRBW080, 3-stage									
1. Order code		A38									
$i$		60	80	100	120	160	200	256	320	512	
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23	R51	
$M_{2N,G}$	Nm	110	120	120	110	120	110	120	110	50	
$M_{2max,G}$	Nm	176	192	192	176	192	176	192	176	80	
$M_{2Em,Off}$	Nm	220	240	240	220	240	220	240	220	190	
$J_{1,G}$	kg cm <sup>2</sup>	1.203	0.955	0.954	1.209	0.916	0.916	0.917	0.917	0.917	
$\varnothing_{2,G}$	'	17									

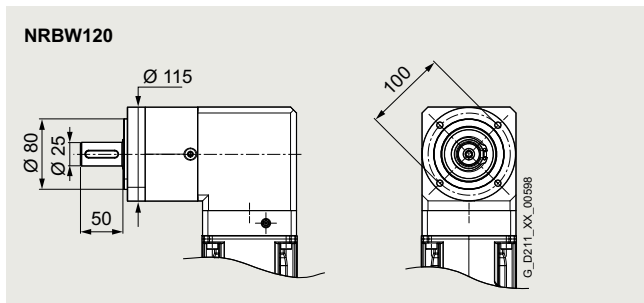
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRBW120

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1750 N
Average axial force for 20000 h	$F_{A,eq}$	2500 N
Average radial force for 30000 h	$F_{R,eq}$	1500 N
Average axial force for 30000 h	$F_{A,eq}$	2100 N
Maximum radial force	$F_{R,max}$	2000 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1 and 2-stage</b>																						
0.31	1.62	0.093 (0.112)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	100	100	100	75	60	50	30	1FT2103-2AH..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	0.56	0.69	1.07	1.55	2	2.1	2.1	2.75	3.55	3.7	4.1	5.7	8	9.7	16.4			
0.379	1.67	...	$M_{2,0}$	Nm	0.92	1.31	1.7	2.45	2.85	3.65	3.2	4.35	5.5	5.9	7.4	9.3	12	15.1	24			
...	...	...	$M_{2max}$	Nm	4.85	6.5	8.2	11.6	13.3	16.7	14.8	19.9	24.5	26.5	33	41.5	53	66	106			
0.92	3.61	0.139 (0.158)	$n_{2N}$	r/min	600	500	375	300	300	200	250	150	150	125	125	100	75	60	37.5	1FT2103-4AH..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	1.61	2.1	3.1	4.4	4.4	6.7	4.65	7.8	8.3	10	10.8	13.8	20	25	40.5			
0.978	3.7	...	$M_{2,0}$	Nm	2.75	3.75	4.75	6.7	7.7	9.7	8.6	11.6	14.5	15.5	19.4	24	31	39	62			
...	...	...	$M_{2max}$	Nm	10.9	14.6	18.3	25.5	29.5	36.5	32.5	43.5	54	58	73	91	117	146	192			
0.948	3.33	0.35 (0.43)	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2104-4AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...		
...	...	...	$M_{2N}$	Nm	2.1	2.85	4	4.7	6	7.5	6.3	8.1	10.9	11.3	14.7	18.5	25.5	32.5	52			
1.01	3.41	...	$M_{2,0}$	Nm	2.8	3.85	4.85	6.9	7.9	10	8.9	11.9	14.9	15.9	20	25	32	40	64			
...	...	...	$M_{2max}$	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	135	192			
0.941	3.42	0.35 (0.43)	$n_{2N}$	r/min	600	500	500	375	300	250	250	200	150	150	125	100	75	60	37.5	1FT2104-4AK..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	2.25	3.1	3.1	5	6.7	8.4	7.1	9.2	12	12.7	16.5	20.5	27.5	34.5	55			
0.999	3.5	...	$M_{2,0}$	Nm	2.8	3.8	4.85	6.8	7.9	9.9	8.8	11.8	14.8	15.8	19.8	24.5	31.5	39.5	63			
...	...	...	$M_{2max}$	Nm	10.3	13.9	17.4	24	27.5	35	31	41.5	52	55	69	86	111	138	192			
2.03	6.84	0.56 (0.65)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	1FT2104-5AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	5.2	6.5	9.5	13.1	15.5	19.5	17	22.5	28	30	38	36.5	56	70	112			
2.08	7.02	...	$M_{2,0}$	Nm	6	8.1	10.2	14.4	16.5	20.5	18.5	24.5	30.5	33	41	51	66	82	120			
...	...	...	$M_{2max}$	Nm	20.5	28	35	49	56	70	62	83	104	111	138	173	220	275	192			
2.02	6.93	0.56 (0.65)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	100	75	60	37.5	1FT2104-5AK..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	5.1	6.4	9.4	12.9	15.4	19.4	16.8	22.5	28	30	38	36	55	68	110			
2.07	7.12	...	$M_{2,0}$	Nm	6	8.1	10.2	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120			
...	...	...	$M_{2max}$	Nm	21	28	35.5	49.5	56	71	63	84	105	112	140	175	225	280	192			
2.75	9.18	0.76 (0.84)	$n_{2N}$	r/min	500	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1FT2104-6AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...	
...	...	...	$M_{2N}$	Nm	7.8	7.9	12	15.9	19.6	25	23	30.5	37	37.5	49	65	85	103	120			
2.81	9.44	...	$M_{2,0}$	Nm	8.3	11.1	13.9	19.6	22	28	25	33	41.5	44.5	55	69	89	111	120			
...	...	...	$M_{2max}$	Nm	28	37.5	47	65	75	94	84	112	140	149	186	230	295	368	192			

Continued on the next page

Planetary gearbox data		NRBW120, 1-stage						NRBW120, 2-stage										
Gearbox type:		A46						A47										
1. Order code		i																
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64		
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120		
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192		
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380		
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855		
$\varnothing_{2,G}$	'	11						13										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																		
Nm	Nm	kg cm <sup>2</sup>																		
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 1 and 2-stage (continued)</b>																				
4.4	13.9	1.71 (2.55)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1FT2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	10.2	12.1	18.5	23.5	29.5	38	34	45.5	56	55	72	95	123	151	120	■■■ + ■■■ + ...
4.51	14.3		$M_{2,0}$	Nm	13.4	17.9	22	31.5	36	45	40	53	67	71	89	111	142	178	120	
			$M_{2max}$	Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
4.43	13.9	1.71 (2.55)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	11.3	15.4	16.8	26	26.5	34.5	32	43	51	50	66	90	117	139	120	■■■ + ■■■ + ...
4.54	14.3		$M_{2,0}$	Nm	13.5	18	22.5	31.5	36	45	40	53	67	71	89	112	143	179	120	
			$M_{2max}$	Nm	42.5	57	71	99	114	142	127	169	210	225	280	350	416	368	192	
7.22	22.3	2.65 (3.5)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	50	37.5	1FT2105-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	17	23	30	37.5	48	63	43	72	90	90	122	152	188	179	120	■■■ + ■■■ + ...
7.41	23		$M_{2,0}$	Nm	22	29.5	36.5	51	59	74	66	88	110	117	146	183	230	230	120	
			$M_{2max}$	Nm	68	91	114	160	183	152	200	270	340	360	416	368	416	368	192	
7.66	24.2	4.6 (6.3)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	60	50	50	37.5	1FT2106-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.6	24	31	39	49.5	63	44.5	74	93	93	125	156	194	184	120	■■■ + ■■■ + ...
7.8	24.9		$M_{2,0}$	Nm	23	31	38.5	54	62	78	69	93	116	124	154	193	245	230	120	
			$M_{2max}$	Nm	74	99	124	174	192	152	220	295	368	390	416	368	416	368	192	
9.97	30.8	6 (7.6)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	1FT2106-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	20.5	28.5	37	55	57	78	70	86	107	106	146	182	220	196	120	■■■ + ■■■ + ...
10.1	31.7		$M_{2,0}$	Nm	30	40.5	50	70	81	95	90	121	151	161	200	230	260	230	120	
			$M_{2max}$	Nm	95	126	158	216	192	152	280	375	368	416	416	368	416	368	192	
14.1	42.5	8.7 (10.4)	$n_{2N}$	r/min	375	300	250	200	200	150	150	100	75	75	60	60	50	50	-	1FT2106-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	34.5	44	54	70	69	94	87	129	170	171	215	210	255	220	-	■■■ + ■■■ + ...
14.4	43.8		$M_{2,0}$	Nm	43	57	71	100	115	95	128	171	210	225	260	230	260	230	-	
			$M_{2max}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	-	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 1 and 2-stage</b>																				
0.297	1.52	0.2 (0.22)	$n_{2N}$	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	30	1FT2203-2AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	0.52	0.66	1.06	1.45	1.95	2.6	2	2.6	3.35	3.55	5	5.2	9	15.5	■■■ + ■■■ + ...	
0.367	1.58		$M_{2,0}$	Nm	0.88	1.26	1.64	2.35	2.75	3.5	3.1	4.2	5.3	5.7	7.1	9	11.6	23		
			$M_{2max}$	Nm	4.55	6.1	7.7	10.9	12.5	15.7	14	18.7	23	25	31	39	50	62	100	
0.903	3.33	0.35 (0.37)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	150	125	100	100	75	60	37.5	1FT2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	1.85	2.4	3.5	4.95	5.9	7.6	6.6	8.9	9.3	11.4	15	14.9	22	27.5	44.5	■■■ + ■■■ + ...
0.961	3.41		$M_{2,0}$	Nm	2.7	3.65	4.65	6.6	7.6	9.5	8.5	11.4	14.3	15.2	19.1	23.5	30.5	61		
			$M_{2max}$	Nm	10	13.5	16.9	23.5	27	34	30	40.5	50	54	67	84	108	138	192	
1.99	6.47	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	1FT2204-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	5	6.1	9	12.3	14.6	18.5	16.4	22	27	28	36	46.5	52	65	105	■■■ + ■■■ + ...
2.04	6.64		$M_{2,0}$	Nm	5.9	8	10	14.2	16.2	20	18.1	24	30	32	40	50	64	81	120	
			$M_{2max}$	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	
2	6.47	1.23 (1.31)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	75	60	37.5	1FT2204-5AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	5.1	6.2	9.3	12.6	15.2	19.1	16.6	22	27.5	29.5	37.5	47	53	66	107	■■■ + ■■■ + ...
2.05	6.64		$M_{2,0}$	Nm	6	8	10.1	14.3	16.3	20.5	18.2	24	30.5	32.5	40.5	50	65	81	120	
			$M_{2max}$	Nm	19.8	26	33	46	53	66	59	78	98	105	131	164	210	260	192	

Continued on the next page

### Planetary gearbox data

Gearbox type: 1. Order code $i$ 2. Order code	NRBW120, 1-stage						NRBW120, 2-stage								
	A46						A47								
	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858
$\varphi_{2,G}$	°	11						13							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



### SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

#### Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox													Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	600	500	375	300	250	200	150	125	125	100	75	60	50	37.5	1FT2204-6AF..-0..0-Z	
Nm	Nm	kg cm <sup>2</sup>																		$M_{2N}$
2.74	8.71	1.61 (1.69)	$M_{2,0}$	Nm	8.2	11	13.8	19.5	22	27.5	24.5	33	41.5	44	55	69	88	111	120	■ ■ ■ + ■ ■ ■ + ...
2.8	8.95		$M_{2max}$	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	177	220	280	350	192	
2.99	9.93	3.15 (4.05)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	1FT2205-2AC..-0..0-Z
...	...		$M_{2N}$	Nm	6.7	9.1	10.5	15.9	17.1	22	19.7	26	32.5	32.5	43	55	72	88	105	■ ■ ■ + ■ ■ ■ + ...
3.03	10.2		$M_{2,0}$	Nm	8.9	12	15	21	24	30	27	36	45	48	60	75	96	120	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
3.02	9.93	3.15 (4.05)	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1FT2205-2AF..-0..0-Z
...	...		$M_{2N}$	Nm	6.6	8.1	11.6	15.9	18.8	23.5	21	28	34.5	36.5	46.5	59	65	81	120	■ ■ ■ + ■ ■ ■ + ...
3.06	10.2		$M_{2,0}$	Nm	9	12.1	15.2	21	24	30.5	27	36.5	45.5	48.5	61	76	97	122	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
2.96	9.93	3.15 (4.05)	$n_{2N}$	r/min	600	375	375	300	250	200	200	150	125	125	100	75	60	50	37.5	1FT2205-2AH..-0..0-Z
...	...		$M_{2N}$	Nm	5.9	9.3	11	14.2	17.9	22.5	20	26.5	33	34.5	44	56	73	90	114	■ ■ ■ + ■ ■ ■ + ...
3	10.2		$M_{2,0}$	Nm	8.8	11.8	14.9	20.5	23.5	30	26.5	35.5	44.5	47.5	59	74	95	119	120	
			$M_{2max}$	Nm	30.5	40.5	50	71	81	102	91	121	151	161	200	250	320	368	192	
5.14	16.7	5.1 (6)	$n_{2N}$	r/min	500	375	300	250	200	200	150	150	100	100	75	60	50	37.5	1FT2205-4AF..-0..0-Z	
...	...		$M_{2N}$	Nm	11.9	16.5	21	27	33.5	33.5	31.5	42.5	63	65	64	88	115	135	120	■ ■ ■ + ■ ■ ■ + ...
5.23	17.2		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	103	129	166	205	120	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.15	16.7	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	1FT2206-2AC..-0..0-Z	
...	...		$M_{2N}$	Nm	10.7	15	19.8	30.5	31	42.5	39.5	48	60	60	83	104	127	170	120	■ ■ ■ + ■ ■ ■ + ...
5.27	17.2		$M_{2,0}$	Nm	15.7	20.5	26	36.5	42	52	47	62	78	83	104	130	167	205	119	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.29	16.7	7.8 (9.4)	$n_{2N}$	r/min	600	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	1FT2206-2AF..-0..0-Z
...	...		$M_{2N}$	Nm	10.4	16.9	18.9	29	30	38.5	35.5	47.5	57	55	72	99	128	152	120	■ ■ ■ + ■ ■ ■ + ...
5.39	17.2		$M_{2,0}$	Nm	16	21	26.5	37.5	43	53	48	64	80	85	107	133	171	210	120	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
5.13	16.7	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	75	50	50	37.5	1FT2206-2AH..-0..0-Z
...	...		$M_{2N}$	Nm	11.8	16.5	20.5	26.5	33.5	42.5	30.5	50	62	65	84	85	133	129	120	■ ■ ■ + ■ ■ ■ + ...
5.23	17.2		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	77	83	103	129	166	205	120	
			$M_{2max}$	Nm	51	68	85	120	137	152	153	200	250	270	335	368	416	368	192	
7.8	25.1	11.5 (13.1)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	1FT2206-3AB..-0..0-Z	
...	...		$M_{2N}$	Nm	16	22	28.5	44	45	61	56	68	85	85	117	145	179	230	120	■ ■ ■ + ■ ■ ■ + ...
7.95	25.9		$M_{2,0}$	Nm	23.5	31.5	39.5	55	63	79	71	94	118	126	157	197	250	230	120	
			$M_{2max}$	Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	
7.68	25.1	11.5 (13.1)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	37.5	1FT2206-3AF..-0..0-Z	
...	...		$M_{2N}$	Nm	15.1	21	27.5	42.5	43	58	54	65	82	81	112	140	171	225	120	■ ■ ■ + ■ ■ ■ + ...
7.82	25.9		$M_{2,0}$	Nm	23	31	38.5	54	62	78	70	93	116	124	155	193	245	230	120	
			$M_{2max}$	Nm	77	103	129	180	192	152	230	305	368	405	416	368	416	368	192	

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#### Planetary gearbox data

Gearbox type:		NRBW120, 1-stage						NRBW120, 2-stage								
1. Order code		A46						A47								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varphi_{2,G}$	'	11						13								

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	375	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	1FT2206-4AC..-0..0-Z		
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	20.5	31.5	40	54	55	67	64	80	107	107	135	160	215	199	120	+ + ...		
			$M_{2,0}$	Nm	32	43	54	75	86	95	96	128	160	171	210	230	260	230	120			
			$M_{2max}$	Nm	109	145	182	216	192	152	325	416	368	416	416	368	416	368	192			
10.6	35.5	15.1 (16.8)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	60	50	50	37.5	1FT2206-4AF..-0..0-Z		
...	...	...	$M_{2N}$	Nm	21	29	37.5	58	58	79	73	87	109	107	148	184	225	199	120	+ + ...		
10.8	36.5		$M_{2,0}$	Nm	31.5	42	52	74	84	95	94	126	158	168	210	230	260	230	120			
			$M_{2max}$	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192			
10.4	33.6	15.1 (16.8)	$n_{2N}$	r/min	375	300	250	200	150	150	100	75	75	60	50	37.5	37.5	37.5	30	1FT2206-4AH..-0..0-Z		
...	...	...	$M_{2N}$	Nm	23.5	30	37.5	48	63	65	61	92	120	122	154	185	245	230	113	+ + ...		
10.6	34.6		$M_{2,0}$	Nm	30	40	50	70	80	95	90	120	150	160	200	230	260	230	119			
			$M_{2max}$	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192			
9.93	33.6	15.1 (16.8)	$n_{2N}$	r/min	375	300	250	200	150	150	100	75	75	60	50	37.5	37.5	37.5	30	1FT2206-4AH..-0..0-Z		
...	...	...	$M_{2N}$	Nm	23.5	30	37.5	48	63	65	61	92	120	122	154	185	245	230	113	+ + ...		
10.1	34.6		$M_{2,0}$	Nm	30	40	50	70	80	95	90	120	150	160	200	230	260	230	119			
			$M_{2max}$	Nm	103	138	172	216	192	152	305	405	368	416	416	368	416	368	192			

Planetary gearbox data		NRBW120, 1-stage						NRBW120, 2-stage								
Gearbox type:		A46						A47								
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380
$J_{1,G}$	kg cm <sup>2</sup>	2.846	2.276	2.074	1.905	1.873	1.82	2.773	2.708	2.687	2.188	2.015	2.007	1.861	1.858	1.855
$\varnothing_{2,G}$	'	11						13								

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

3  
4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )												
Nm	Nm	kg cm <sup>2</sup>												
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage</b>														
0.31	1.62	0.093 (0.112)	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	6	1FT2103-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	12.9	17.9	22.5	26.5	40.5	50	67	84	■ ■ ■ + ■ ■ ■ + ...	
0.379	1.67	...	$M_{2,0}$	Nm	22.5	30	37.5	45	60	75	96	120		
...	...	...	$M_{2max}$	Nm	99	131	164	197	260	325	416	368		
0.92	3.61	0.139 (0.158)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	1FT2103-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	34.5	48	58	66	102	124	157	205	■ ■ ■ + ■ ■ ■ + ...	
0.978	3.7	...	$M_{2,0}$	Nm	58	77	96	116	155	193	245	230		
...	...	...	$M_{2max}$	Nm	215	285	360	368	416	368	416	368		
0.948	3.33	0.35 (0.43)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	10	1FT2104-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	45	62	75	86	131	139	200	178	■ ■ ■ + ■ ■ ■ + ...	
1.01	3.41	...	$M_{2,0}$	Nm	59	79	99	119	159	198	250	230		
...	...	...	$M_{2max}$	Nm	200	265	330	368	416	368	416	368		
0.941	3.42	0.35 (0.43)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	10	1FT2104-4AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	48	66	82	96	137	149	215	188	■ ■ ■ + ■ ■ ■ + ...	
0.999	3.5	...	$M_{2,0}$	Nm	59	79	98	118	158	197	250	230		
...	...	...	$M_{2max}$	Nm	205	270	340	368	416	368	416	368		
2.03	6.84	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	25	20	15	15	10	10	1FT2104-5AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	100	131	152	176	260	210	260	230	■ ■ ■ + ■ ■ ■ + ...	
2.08	7.02	...	$M_{2,0}$	Nm	122	163	200	230	260	230	260	230		
...	...	...	$M_{2max}$	Nm	410	416	416	368	416	368	416	368		
2.02	6.93	0.56 (0.65)	$n_{2N}$	r/min	37.5	30	20	20	15	15	10	10	1FT2104-5AK..-0..0-Z	
...	...	...	$M_{2N}$	Nm	98	129	188	174	260	210	260	230	■ ■ ■ + ■ ■ ■ + ...	
2.07	7.12	...	$M_{2,0}$	Nm	122	162	200	230	260	230	260	230		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
2.75	9.18	0.76 (0.84)	$n_{2N}$	r/min	30	25	20	20	15	15	12.5	10	1FT2104-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	155	198	245	205	260	230	230	230	■ ■ ■ + ■ ■ ■ + ...	
2.81	9.44	...	$M_{2,0}$	Nm	165	220	260	230	260	230	260	230		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
4.4	13.9	1.71 (2.55)	$n_{2N}$	r/min	30	25	25	20	15	15	12.5	10	1FT2105-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	225	260	225	230	260	230	210	230	■ ■ ■ + ■ ■ ■ + ...	
4.51	14.3	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	230		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
4.43	13.9	1.71 (2.55)	$n_{2N}$	r/min	30	25	20	20	15	12.5	10	7.5	1FT2105-4AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	215	255	260	220	260	230	260	230	■ ■ ■ + ■ ■ ■ + ...	
4.54	14.3	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	225		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	368		
7.22	22.3	2.65 (3.5)	$n_{2N}$	r/min	30	25	25	20	15	15	10	-	1FT2105-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	260	260	230	230	260	210	260	-	■ ■ ■ + ■ ■ ■ + ...	
7.41	23	...	$M_{2,0}$	Nm	260	260	260	230	260	230	260	-		
...	...	...	$M_{2max}$	Nm	416	416	416	368	416	368	416	-		

➔ Continued on the next page

Planetary gearbox data		NRBW120, 3-stage							
Gearbox type:		A48							
1. Order code		60	80	100	120	160	200	256	320
2. Order code		R60	R80	R01	R21	R61	R02	R52	R23
$i$									
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855
$\phi_{2,G}$	'	15							

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )														
Nm	Nm	kg cm <sup>2</sup>														
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRBW120 3-stage (continued)</b>																
7.66	24.2	4.6 (6.3)	$n_{2N}$	r/min	30	30	25	20	15	15	-	-	-	-	-	1FT2106-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	215	235	230	260	215	-	-	-	-	-	■ + ■ + ...
7.8	24.9		$M_{2,0}$	Nm	260	260	260	230	260	230	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	-	-	-	■ + ■ + ...
9.97	30.8	6 (7.6)	$n_{2N}$	r/min	30	25	25	20	15	-	-	-	-	-	-	1FT2106-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	260	210	230	260	-	-	-	-	-	-	■ + ■ + ...
10.1	31.7		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	-	-	-	■ + ■ + ...
14.1	42.5	8.7 (10.4)	$n_{2N}$	r/min	30	30	20	-	-	-	-	-	-	-	-	1FT2106-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	260	225	260	-	-	-	-	-	-	-	-	■ + ■ + ...
14.4	43.8		$M_{2,0}$	Nm	260	260	260	-	-	-	-	-	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	-	-	-	-	-	-	-	-	■ + ■ + ...
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRBW120 3-stage</b>																
0.297	1.52	0.2 (0.22)	$n_{2N}$	r/min	30	25	20	15	12.5	10	7.5	6	-	-	-	1FT2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.1	16.3	20.5	25	38	47.5	64	80	-	-	-	■ + ■ + ...
0.367	1.58		$M_{2,0}$	Nm	21.5	29	36	43.5	58	72	93	116	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	93	124	155	186	245	310	395	368	-	-	-	■ + ■ + ...
0.903	3.33	0.35 (0.37)	$n_{2N}$	r/min	37.5	30	25	20	15	12.5	10	7.5	-	-	-	1FT2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	39	53	63	73	113	136	170	225	-	-	-	■ + ■ + ...
0.961	3.41		$M_{2,0}$	Nm	57	76	95	114	152	190	240	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	200	265	330	368	416	368	416	368	-	-	-	■ + ■ + ...
1.99	6.47	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	20	15	15	12.5	10	10	-	-	-	1FT2204-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	93	122	181	220	260	230	260	194	-	-	-	■ + ■ + ...
2.04	6.64		$M_{2,0}$	Nm	120	160	200	230	260	230	260	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	385	416	416	368	416	368	416	368	-	-	-	■ + ■ + ...
2	6.47	1.23 (1.31)	$n_{2N}$	r/min	37.5	30	20	15	15	12.5	10	10	-	-	-	1FT2204-5AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	95	125	186	220	260	230	260	197	-	-	-	■ + ■ + ...
2.05	6.64		$M_{2,0}$	Nm	121	161	200	230	260	230	260	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	385	416	416	368	416	368	416	368	-	-	-	■ + ■ + ...
2.74	8.71	1.61 (1.69)	$n_{2N}$	r/min	30	25	20	20	15	15	10	10	-	-	-	1FT2204-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	154	205	255	205	260	215	260	220	-	-	-	■ + ■ + ...
2.8	8.95		$M_{2,0}$	Nm	165	215	260	230	260	230	260	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	-	-	■ + ■ + ...
2.99	9.93	3.15 (4.05)	$n_{2N}$	r/min	30	25	20	15	12.5	10	10	7.5	-	-	-	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	132	173	215	230	260	230	260	230	-	-	-	■ + ■ + ...
3.03	10.2		$M_{2,0}$	Nm	180	240	260	230	260	230	260	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	-	-	■ + ■ + ...
3.02	9.93	3.15 (4.05)	$n_{2N}$	r/min	37.5	25	20	20	15	15	10	10	-	-	-	1FT2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	117	185	230	200	255	197	260	190	-	-	-	■ + ■ + ...
3.06	10.2		$M_{2,0}$	Nm	182	240	260	230	255	230	255	230	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	-	-	-	■ + ■ + ...

Continued on the next page

Planetary gearbox data		NRBW120, 3-stage								
Gearbox type:		<b>A48</b>								
1. Order code		<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>	<b>160</b>	<b>200</b>	<b>256</b>	<b>320</b>	
$i$		<b>R60</b>	<b>R80</b>	<b>R01</b>	<b>R21</b>	<b>R61</b>	<b>R02</b>	<b>R52</b>	<b>R23</b>	
2. Order code										
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	500	
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855	
$\varnothing_{2,G}$		15								

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRBW120

Servomotor data			Selection data servomotors with planetary gearbox										Servomotors with planetary gearbox
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )											
Nm	Nm	kg cm <sup>2</sup>											
<b>Servomotoren SIMOTICS S-1FK2 und S-1FT2 Copcompact mit planetary gearbox NRBW120 3-stage (continued)</b>													
2.96	9.93	3.15 (4.05)	$n_{2N}$	r/min	30	25	20	15	15	12.5	10	7.5	1FT2205-2AH..-0..0-Z
...	...		$M_{2N}$	Nm	135	176	220	230	260	225	260	230	■ + ■ + ...
3	10.2		$M_{2,0}$	Nm	178	235	260	230	260	225	260	225	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	■ + ■ + ...
5.14	16.7	5.1 (6)	$n_{2N}$	r/min	30	25	20	20	15	12.5	10	7.5	1FT2205-4AF..-0..0-Z
...	...		$M_{2N}$	Nm	210	250	260	210	260	230	260	230	■ + ■ + ...
5.23	17.2		$M_{2,0}$	Nm	260	260	260	230	260	230	260	230	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	■ + ■ + ...
5.15	16.7	7.8 (9.4)	$n_{2N}$	r/min	25	25	20	15	12.5	10	10	7.5	1FT2206-2AC..-0..0-Z
...	...		$M_{2N}$	Nm	240	205	255	230	260	230	250	225	■ + ■ + ...
5.27	17.2		$M_{2,0}$	Nm	260	260	260	230	260	225	255	230	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	■ + ■ + ...
5.29	16.7	7.8 (9.4)	$n_{2N}$	r/min	30	25	20	20	15	12.5	10	7.5	1FT2206-2AF..-0..0-Z
...	...		$M_{2N}$	Nm	235	260	260	225	260	230	260	230	■ + ■ + ...
5.39	17.2		$M_{2,0}$	Nm	260	260	255	230	255	225	260	230	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	■ + ■ + ...
5.13	16.7	7.8 (9.4)	$n_{2N}$	r/min	30	25	20	20	15	12.5	10	7.5	1FT2206-2AH..-0..0-Z
...	...		$M_{2N}$	Nm	205	240	255	175	260	230	255	225	■ + ■ + ...
5.23	17.2		$M_{2,0}$	Nm	260	255	255	230	260	230	260	225	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	416	368	■ + ■ + ...
7.8	25.1	11.5 (13.1)	$n_{2N}$	r/min	25	20	15	12.5	10	7.5	-	-	1FT2206-3AB..-0..0-Z
...	...		$M_{2N}$	Nm	260	260	260	230	260	230	-	-	■ + ■ + ...
7.95	25.9		$M_{2,0}$	Nm	260	260	260	230	255	230	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	■ + ■ + ...
7.68	25.1	11.5 (13.1)	$n_{2N}$	r/min	30	25	20	20	15	12.5	-	-	1FT2206-3AF..-0..0-Z
...	...		$M_{2N}$	Nm	245	260	260	187	260	230	-	-	■ + ■ + ...
7.82	25.9		$M_{2,0}$	Nm	260	260	260	230	260	230	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	368	-	-	■ + ■ + ...
10.6	35.5	15.1 (16.8)	$n_{2N}$	r/min	25	20	15	15	12.5	-	-	-	1FT2206-4AC..-0..0-Z
...	...		$M_{2N}$	Nm	260	260	260	230	260	-	-	-	■ + ■ + ...
10.8	36.5		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	■ + ■ + ...
10.4	33.6	15.1 (16.8)	$n_{2N}$	r/min	30	25	25	20	15	-	-	-	1FT2206-4AF..-0..0-Z
...	...		$M_{2N}$	Nm	260	260	215	230	260	-	-	-	■ + ■ + ...
10.6	34.6		$M_{2,0}$	Nm	260	260	260	230	260	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	■ + ■ + ...
9.93	33.6	15.1 (16.8)	$n_{2N}$	r/min	30	25	20	15	15	-	-	-	1FT2206-4AH..-0..0-Z
...	...		$M_{2N}$	Nm	250	260	260	230	260	-	-	-	■ + ■ + ...
10.1	34.6		$M_{2,0}$	Nm	260	260	260	230	255	-	-	-	■ + ■ + ...
			$M_{2max}$	Nm	416	416	416	368	416	-	-	-	■ + ■ + ...

Planetary gearbox data		NRBW120, 3-stage									
Gearbox type:		A48									
1. Order code		60    80    100    120    160    200    256    320									
$i$		R60    R80    R01    R21    R61    R02    R52    R23									
2. Order code											
$M_{2N,G}$	Nm	260	260	260	230	260	230	260	230	260	230
$M_{2max,G}$	Nm	416	416	416	368	416	368	416	368	416	368
$M_{2Em,Off}$	Nm	520	520	520	500	520	500	520	520	500	500
$J_{1,G}$	kg cm <sup>2</sup>	2.681	2.011	2.005	2.663	1.857	1.857	1.855	1.855	1.855	1.855
$\varnothing_{2,G}$	'	15									

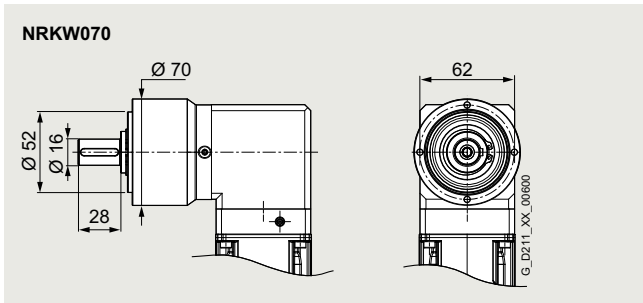
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRKW070

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1050 N
Average axial force for 20000 h	$F_{A,eq}$	1350 N
Average radial force for 30000 h	$F_{R,eq}$	900 N
Average axial force for 30000 h	$F_{A,eq}$	1000 N
Maximum radial force	$F_{R,max}$	1650 N
Maximum axial force	$F_{A,max}$	2100 N

Servomotor data		Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																			
Nm	Nm	kg cm <sup>2</sup>																			

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW070 1 and 2-stage																					
0.461	1.78	0.093	$n_{2N}$	r/min	600	500	500	375	300	250	300	250	200	200	150	125	100	75	50	37.5	1FT2103-2AH..-2..0-Z
...	...	(0.112)	$M_{2N}$	Nm	0.91	1.28	1.43	2.15	2.7	3.4	2.8	3.35	4.65	4.35	6.4	7.8	9.9	13.2	18	15	■■■ + ■■■ + ...
0.508	1.81		$M_{2,0}$	Nm	1.38	1.89	2.4	3.4	3.95	4.95	4.45	5.9	7.5	8	10	12.6	16.1	20	18	15	
			$M_{2max}$	Nm	5.3	7.1	8.9	12.6	14.4	18	16.1	21.5	26.5	28.5	35.5	44.5	53	48	29	24	
0.948	3.79	0.139	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	60	37.5	1FT2103-4AH..-2..0-Z
...	...	(0.158)	$M_{2N}$	Nm	1.92	2.6	3.65	5	5.2	6.4	6.2	8.1	11.1	11.2	13.8	17.4	23	29	18	15	■■■ + ■■■ + ...
0.989	3.83		$M_{2,0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.8	8.8	11.7	14.7	15.7	19.7	24.5	31.5	30	18	15	
			$M_{2max}$	Nm	11.4	15.2	19.1	26.5	29	24	34	45.5	53	53	53	48	53	48	29	24	
1.1	3.5	0.368	$n_{2N}$	r/min	750	600	500	375	375	300	300	250	200	200	150	125	100	75	50	30	1FT2104-4AF..-2..0-Z
...	...	(0.448)	$M_{2N}$	Nm	2.25	3.25	4.2	6.1	5.9	7.8	7.6	9.1	12.2	11.7	16.6	19.9	25	30	18	15	■■■ + ■■■ + ...
1.14	3.54		$M_{2,0}$	Nm	3.3	4.45	5.6	7.9	9	11.3	10.1	13.5	16.9	18	22.5	28	33	30	18	15	
			$M_{2max}$	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
1.1	3.6	0.368	$n_{2N}$	r/min	600	600	500	375	300	250	300	200	200	150	150	100	100	75	60	37.5	1FT2104-4AK..-2..0-Z
...	...	(0.448)	$M_{2N}$	Nm	2.95	3.4	4.4	6.3	8	10	7.9	12	12.7	16.2	17.3	25	26	30	18	15	■■■ + ■■■ + ...
1.13	3.64		$M_{2,0}$	Nm	3.25	4.4	5.5	7.8	9	11.3	10	13.4	16.8	17.9	22.5	28	33	30	18	15	
			$M_{2max}$	Nm	10.8	14.4	18.1	25	29	24	32	43	53	53	53	48	53	48	29	24	
2.19	7.07	0.578	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	125	100	75	50	-	1FT2104-5AF..-2..0-Z
...	...	(0.668)	$M_{2N}$	Nm	4.85	6.3	8.8	11.7	12	14.7	14	17.7	24.5	24	29.5	26.5	32.5	30	18	-	■■■ + ■■■ + ...
2.22	7.16		$M_{2,0}$	Nm	6.5	8.7	11	15.4	16.5	19.7	15	19.7	26	32.5	33	33	30	30	18	-	
			$M_{2max}$	Nm	21	28.5	35.5	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.17	7.16	0.578	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	125	100	75	60	-	1FT2104-5AK..-2..0-Z
...	...	(0.668)	$M_{2N}$	Nm	4.75	6.2	8.6	11.5	11.7	14.5	13.8	17.5	24	24	29	26.5	32.5	30	18	-	■■■ + ■■■ + ...
2.2	7.26		$M_{2,0}$	Nm	6.5	8.7	10.9	15.3	17.5	15	19.6	26	32.5	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	21.5	28.5	36	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.92	9.45	0.778	$n_{2N}$	r/min	600	500	375	300	300	300	250	200	150	150	125	125	100	75	-	-	1FT2104-6AF..-2..0-Z
...	...	(0.858)	$M_{2N}$	Nm	5.8	7.5	10.4	13.8	13.9	12.5	16.2	20.5	28	28	32.5	29.5	33	30	-	-	■■■ + ■■■ + ...
2.95	9.57		$M_{2,0}$	Nm	8.7	11.7	14.6	20.5	18	15	26	33	33	33	33	30	33	30	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	-	-	

Planetary gearbox data		NRKW070, 1-stage								NRKW070, 2-stage											
Gearbox type:		B26								B27											
1. Order code																					
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15				
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24				
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80				
$J_{1,G}$	kg cm <sup>2</sup>	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218				
$\varphi_{2,G}$	'	16																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NRKW070

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ $(J_{M,Br})$ Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW070 1 and 2-stage																					
0.452	1.68	0.2	$n_{2N}$	r/min	600	500	375	300	300	250	250	200	150	150	125	100	75	60	50	37.5	1FT2203-2AK..-2..0-Z
...	...	(0.22)	$M_{2N}$	Nm	0.8	1.12	1.6	2.2	2.25	2.8	2.7	3.55	4.95	4.95	6.1	7.7	10.4	13.1	14.6	13.7	■ + ■ + ...
0.495	1.71		$M_{2,0}$	Nm	1.35	1.85	2.35	3.35	3.85	4.85	4.3	5.8	7.3	7.8	9.8	12.3	15.7	19.7	18	15	
			$M_{2max}$	Nm	5	6.7	8.4	11.9	13.6	17.1	15.2	20	25	27	33.5	42.5	53	48	29	24	
1.06	3.5	0.35	$n_{2N}$	r/min	600	500	375	300	250	200	200	150	150	125	100	75	60	50	37.5	1FT2203-4AK..-2..0-Z	
...	...	(0.37)	$M_{2N}$	Nm	2.05	2.75	3.95	5.3	6.5	8.3	6.5	8.2	11.7	11.5	13.9	17.7	24	29.5	18	15	■ + ■ + ...
1.09	3.54		$M_{2,0}$	Nm	3.15	4.25	5.3	7.6	8.7	10.9	9.7	13	16.3	17.3	21.5	27	33	30	18	15	
			$M_{2max}$	Nm	10.5	14.1	17.6	24.5	28	24	31.5	42	52	53	53	48	53	48	29	24	
2.15	6.69	1.248	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	100	100	100	75	50	-	1FT2204-5AF..-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.55	5.9	8.3	10.9	13.3	13.2	12.9	16.2	22.5	27	33	30	26.5	30	18	-	■ + ■ + ...
2.18	6.77		$M_{2,0}$	Nm	6.4	8.6	10.8	15.1	17.3	15	19.3	25.5	32	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.16	6.69	1.248	$n_{2N}$	r/min	600	500	375	300	250	250	250	150	150	125	100	100	100	75	60	-	1FT2204-5AK..-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.65	6	8.4	11.1	13.5	13.4	13.1	21.5	23	27	33	30	26.5	30	18	-	■ + ■ + ...
2.19	6.77		$M_{2,0}$	Nm	6.4	8.6	10.8	15.2	17.4	15	19.5	26	32.5	33	33	30	33	30	18	-	
			$M_{2max}$	Nm	20	27	33.5	40	29	24	53	53	53	53	53	48	53	48	29	-	
2.91	8.98	1.628	$n_{2N}$	r/min	600	500	375	300	250	250	200	150	150	125	125	125	100	75	-	-	1FT2204-6AF..-2..0-Z
...	...	(1.708)	$M_{2N}$	Nm	5.8	7.4	10.6	13.8	16.8	15	20	27	27.5	33	32	24.5	30	30	-	-	■ + ■ + ...
2.93	9.09		$M_{2,0}$	Nm	8.7	11.6	14.6	20.5	18	15	26	33	33	33	33	30	33	30	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	-	-	

Planetary gearbox data		NRKW070, 1-stage										NRKW070, 2-stage																					
Gearbox type:		B26										B27																					
1. Order code																																	
<i>i</i>		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	33	33	33	33	33	30	33	30	18	15	14	19	24	25	18	15	33	33	33	33	30	33	30	18	15	
$M_{2max,G}$	Nm	22	30	38	40	29	24	53	53	53	53	53	48	53	48	29	24	22	30	38	40	29	24	53	53	53	53	48	53	48	29	24	
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80	66	86	80	80	80	70	88	88	88	88	80	88	80	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.223	0.219	0.219	0.219	0.218	0.329	0.23	0.224	0.22	0.219	0.218	0.326	0.326	0.224	0.228	0.223	0.219	0.219	0.218		
$\varnothing_{2,G}$	'	16						18										16						18									

Color legend:

<span style="background-color: #c6e0b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
<span style="background-color: #d9d9d9; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
<span style="background-color: #ffc000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

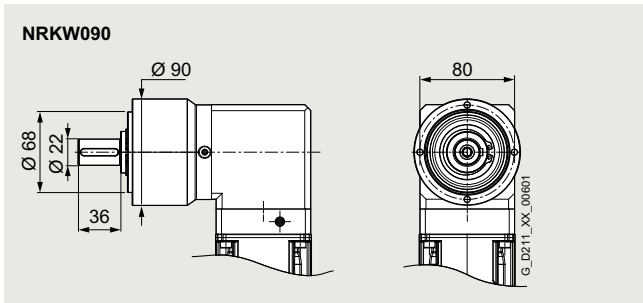
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRKW090

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	1900 N
Average axial force for 20000 h	$F_{A,eq}$	2000 N
Average radial force for 30000 h	$F_{R,eq}$	1700 N
Average axial force for 30000 h	$F_{A,eq}$	1500 N
Maximum radial force	$F_{R,max}$	3100 N
Maximum axial force	$F_{A,max}$	3800 N

Servomotor data		Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	$(J_{M,Br})$																				
		kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1 and 2-stage</b>																						
0.379	1.69	0.093	$n_{2N}$	r/min	500	500	375	300	300	250	250	200	150	150	125	100	75	60	37.5	25	1FT2103-2AH..-0..0-Z	
...	...	(0.112)	$M_{2N}$	Nm	0.66	0.79	1.24	1.8	1.85	2.3	2.15	2.85	3.95	4.05	5.1	6.5	9	11.4	18.5	28	■■■ + ■■■ + ...	
0.449	1.74		$M_{2,0}$	Nm	1.13	1.59	2.05	2.95	3.4	4.3	3.85	5.2	6.5	7	8.8	11	14.2	17.8	28.5	38		
			$M_{2max}$	Nm	5	6.8	8.5	12.1	13.8	17.4	15.5	20.5	25.5	27.5	34.5	43	55	69	80	61		
0.938	3.72	0.139	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	30	1FT2103-4AH..-0..0-Z	
...	...	(0.158)	$M_{2N}$	Nm	1.97	2.8	3.2	4.35	5.5	7.1	6.5	8.8	9.4	11.4	14.6	14.5	20.5	26	42	38	■■■ + ■■■ + ...	
1	3.77		$M_{2,0}$	Nm	2.8	3.8	4.8	6.8	7.8	9.9	8.8	11.8	14.9	15.9	19.9	24.5	31.5	39.5	50	38		
			$M_{2max}$	Nm	11.1	14.9	18.7	26	30	37.5	33.5	44.5	55	59	74	93	119	131	80	61		
1.02	3.43	0.35	$n_{2N}$	r/min	600	500	375	300	300	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AF..-2..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.35	3.2	4.3	6	6.5	8.1	7.5	9.8	12.9	13.4	16.8	21	28	35	50	37.5	■■■ + ■■■ + ...	
1.07	3.48		$M_{2,0}$	Nm	3.05	4.1	5.2	7.4	8.5	10.7	9.5	12.7	16	17	21	26.5	34	42.5	50	38		
			$M_{2max}$	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61		
1.01	3.53	0.35	$n_{2N}$	r/min	600	500	375	300	300	250	200	150	150	125	100	75	60	37.5	30	1FT2104-4AK..-2..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.6	3.45	4.75	6.6	6.9	8.5	8.2	10.6	14.1	14.7	18.2	23	30.5	38	50	38	■■■ + ■■■ + ...	
1.07	3.57		$M_{2,0}$	Nm	3	4.1	5.2	7.3	8.4	10.6	9.4	12.6	15.8	16.9	21	26.5	34	42.5	50	38		
			$M_{2max}$	Nm	10.5	14.1	17.7	24.5	28.5	35.5	31.5	42.5	53	56	70	88	113	131	80	61		
2.1	7	0.56	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1FT2104-5AF..-2..0-Z	
...	...	(0.65)	$M_{2N}$	Nm	5.5	7.8	8.4	13.4	13.8	17.8	17	23	28	28	36	47.5	61	73	46	38	■■■ + ■■■ + ...	
2.15	7.09		$M_{2,0}$	Nm	6.3	8.4	10.6	14.9	17.1	21	19.1	25.5	32	34	42.5	53	68	82	50	38		
			$M_{2max}$	Nm	21	28	35	49.5	56	61	63	84	105	112	140	131	144	131	80	61		
2.08	7.09	0.56	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	50	30	1FT2104-5AK..-2..0-Z	
...	...	(0.65)	$M_{2N}$	Nm	5.4	7.7	8.3	13.2	13.6	17.5	16.7	22.5	27.5	27.5	35.5	47	60	72	46	38	■■■ + ■■■ + ...	
2.13	7.19		$M_{2,0}$	Nm	6.2	8.4	10.5	14.8	17	21	19	25	31.5	33.5	42	52	67	82	50	38		
			$M_{2max}$	Nm	21	28.5	35.5	50	57	61	64	85	106	113	142	131	144	131	80	61		
2.84	9.37	0.76	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	60	50	30	1FT2104-6AF..-2..0-Z	
...	...	(0.84)	$M_{2N}$	Nm	6.7	9.5	10.1	16.1	16.5	21	20	27	33	33	42.5	56	72	69	49	38	■■■ + ■■■ + ...	
2.88	9.5		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34	42.5	45.5	57	71	90	82	50	38		
			$M_{2max}$	Nm	28	37.5	47	66	76	61	84	112	131	144	144	131	144	131	80	61		

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NRKW090, 1-stage								NRKW090, 2-stage											
1. Order code		<b>B36</b>								<b>B37</b>											
$i$		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>				
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>				
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170				
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907				
$\varnothing_{2,G}$	'	13																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary



## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NRKW090

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox	
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW090 1 and 2-stage (continued)</b>																					
4.52	14.1	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	60	50	–	1FT2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	10.6	15	19.4	24	30.5	30.5	29.5	39.5	47.5	60	59	80	90	82	40	–	■ + ■ + ...
4.57	14.3		$M_{2,0}$	Nm	13.6	18.1	22.5	31.5	36.5	38	40.5	54	67	72	90	82	90	82	50	–	
			$M_{2max}$	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
4.56	14.1	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	75	60	60	37.5	–	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.6	13.7	17.9	22	28	37.5	26.5	44	55	55	74	72	89	72	50	–	■ + ■ + ...
4.61	14.3		$M_{2,0}$	Nm	13.7	18.3	22.5	32	36.5	38	41	54	68	73	90	82	90	82	50	–	
			$M_{2max}$	Nm	42.5	57	71	100	80	61	127	144	131	144	144	131	144	131	80	–	
7.31	22.7	2.65 (3.5)	$n_{2N}$	r/min	375	375	300	200	200	200	150	125	100	100	75	75	60	60	–	–	1FT2105-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.7	18.7	24	37.5	37.5	34.5	48	58	72	72	90	82	90	82	–	–	■ + ■ + ...
7.38	23		$M_{2,0}$	Nm	22	29	36.5	51	50	38	66	87	82	90	90	82	90	82	–	–	
			$M_{2max}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	–	–	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1 and 2-stage</b>																					
0.366	1.59	0.2 (0.22)	$n_{2N}$	r/min	375	375	300	250	200	200	200	150	125	125	100	75	60	50	30	20	1FT2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	0.82	0.99	1.39	1.9	2.4	2.55	2.4	3.35	4.15	4.2	5.5	7.5	9.7	11.8	19.9	30	■ + ■ + ...
0.436	1.64		$M_{2,0}$	Nm	1.09	1.54	1.98	2.85	3.3	4.2	3.7	5	6.3	6.8	8.5	10.7	13.8	17.3	27.5	38	
			$M_{2max}$	Nm	4.75	6.4	8.1	11.4	13.1	16.4	14.6	19.5	24.5	26	32.5	40.5	52	65	80	61	
0.974	3.43	0.35 (0.37)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	75	60	37.5	30	1FT2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	2.2	3.15	3.55	5.6	6	7.7	7.1	9.7	12	12.5	15.9	20.5	21.5	27	44.5	33.5	■ + ■ + ...
1.03	3.48		$M_{2,0}$	Nm	2.9	3.95	5	7.1	8.1	10.2	9.1	12.2	15.3	16.3	20	25.5	32.5	41	50	38	
			$M_{2max}$	Nm	10.3	13.7	17.2	24	27.5	34.5	31	41	51	55	68	86	110	131	80	61	
2.06	6.62	1.23 (1.31)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.2	7.4	7.9	12.8	13	16.7	16.2	22	26.5	26.5	34	45.5	58	70	50	38	■ + ■ + ...
2.11	6.71		$M_{2,0}$	Nm	6.1	8.3	10.4	14.6	16.8	21	18.7	25	31	33	41.5	52	67	82	50	38	
			$M_{2max}$	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	
2.07	6.62	1.23 (1.31)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	30	1FT2204-5AK..-2..0-Z
...	...	...	$M_{2N}$	Nm	5.4	7.7	8.1	13.1	13.2	17.1	16.5	22	27	27	34.5	46.5	59	71	50	38	■ + ■ + ...
2.12	6.71		$M_{2,0}$	Nm	6.2	8.3	10.4	14.7	16.9	21	18.9	25	31.5	33.5	42	52	67	82	50	38	
			$M_{2max}$	Nm	20	26.5	33	46.5	53	61	59	79	99	106	132	131	144	131	80	61	
2.82	8.9	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	30	1FT2204-6AF..-2..0-Z
...	...	...	$M_{2N}$	Nm	7	10	13	16.8	21	21.5	21	28	34	42	43.5	58	74	82	50	38	■ + ■ + ...
2.87	9.02		$M_{2,0}$	Nm	8.4	11.3	14.2	20	22.5	28.5	25.5	34	42.5	45	56	71	90	82	50	38	
			$M_{2max}$	Nm	27	36	45	63	72	61	80	107	131	142	144	131	144	131	80	61	

➔ Continued on the next page

Planetary gearbox data		NRKW090, 1-stage								NRKW090, 2-stage											
Gearbox type:		<b>B36</b>								<b>B37</b>											
1. Order code																					
$i$																					
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>				
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170				
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907				
$\varphi_{2,G}$	'	13																			

Color legend:

	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRKW090

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW090 1 and 2-stage (continued)</b>																					
2.85	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	150	100	100	100	75	60	50	37.5	-	1FT2205-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	5.8	8.5	11.1	13.9	17.9	23	17.4	23.5	34.5	36	35	48.5	61	72	50	-	■ ■ ■ + ■ ■ ■ + ...
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	-	
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-	
2.89	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	375	250	250	200	200	150	125	125	100	75	60	50	37.5	-	1FT2205-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	7	9.6	10.4	16.6	16.8	21.5	21	28	34	34	43	58	74	82	50	-	■ ■ ■ + ■ ■ ■ + ...
2.94	10.3		$M_{2,0}$	Nm	8.6	11.6	14.5	20.5	23	29	26	35	43.5	46.5	58	73	90	82	50	-	
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-	
2.85	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	200	200	150	125	100	100	75	60	50	37.5	-	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.4	9.1	11.7	15.1	18.8	18.8	18.8	25.5	30.5	37.5	38	52	66	78	49.5	-	■ ■ ■ + ■ ■ ■ + ...
2.9	10.3		$M_{2,0}$	Nm	8.5	11.4	14.3	20	23	28.5	25.5	34.5	43	46	57	72	90	82	49.5	-	
			$M_{2max}$	Nm	30.5	41	51	71	80	61	91	122	131	144	144	131	144	131	80	-	
4.98	17	5.1 (6)	$n_{2N}$	r/min	500	375	300	200	200	150	150	125	100	100	75	75	60	50	37.5	-	1FT2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.3	13.4	17.4	27	27.5	37	35	43	54	54	72	70	88	82	50	-	■ ■ ■ + ■ ■ ■ + ...
5.02	17.2		$M_{2,0}$	Nm	14.9	19.9	25	35	40	38	44.5	59	74	79	90	82	90	82	50	-	
			$M_{2max}$	Nm	51	68	86	104	80	61	153	144	131	144	144	131	144	131	80	-	

### Planetary gearbox data

Gearbox type:		NRKW090, 1-stage							NRKW090, 2-stage								
1. Order code		B36							B37								
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	40	53	67	65	50	38	97	90	82	90	90	82	90	82	50	38
$M_{2max,G}$	Nm	64	85	107	104	80	61	155	144	131	144	144	131	144	131	80	61
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	170
$J_{1,G}$	kg cm <sup>2</sup>	1.408	1.107	1.026	0.96	0.944	0.925	1.245	1.22	1.211	1.002	0.96	0.956	0.918	0.917	0.917	0.907
$\varnothing_{2,G}$	'	13							15								

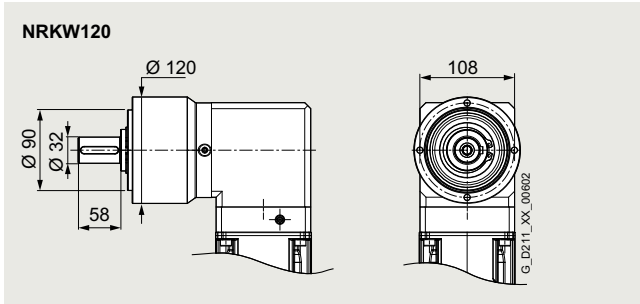
Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRKW120**

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	2500 N
Average axial force for 20000 h	$F_{A,eq}$	4000 N
Average radial force for 30000 h	$F_{R,eq}$	2150 N
Average axial force for 30000 h	$F_{A,eq}$	3000 N
Maximum radial force	$F_{R,max}$	4000 N
Maximum axial force	$F_{A,max}$	5900 N

Servomotor data			Selection data servomotors with planetary gearbox																		Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																					
Nm	Nm	kg cm <sup>2</sup>																					
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1 and 2-stage</b>																							
0.249	1.56	0.093	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	30	20	1FT2103-2AH..-0..0-Z		
...	...	(0.112)	$M_{2N}$	Nm	0.38	0.68	0.88	1.44	1.54	2.25	1.88	2.4	3.2	3.3	4.9	6.3	7	8.5	14.7	22.5		■ ■ ■ + ■ ■ ■ + ...	
0.379	1.67		$M_{2,0}$	Nm	0.74	1.13	1.52	2.3	2.65	3.45	3.05	4.2	5.3	5.7	7.2	9.1	11.8	14.9	24	37.5			
			$M_{2max}$	Nm	4.65	6.3	8	11.4	13.1	16.5	14.7	19.7	24.5	26	33	41	53	66	106	152			
0.86	3.59	0.139	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	75	60	50	30	20	1FT2103-4AH..-0..0-Z		
...	...	(0.158)	$M_{2N}$	Nm	1.7	2.15	3	4.25	4.25	5.9	5.2	7.3	9.1	9.4	12.4	16.3	21.5	26	43.5	67		■ ■ ■ + ■ ■ ■ + ...	
0.978	3.68		$M_{2,0}$	Nm	2.55	3.55	4.55	6.5	7.5	9.5	8.4	11.4	14.3	15.3	19.2	24	31	38.5	62	95			
			$M_{2max}$	Nm	10.7	14.4	18.2	25.5	29	36.5	32.5	43.5	54	58	73	91	117	146	192	152			
0.888	3.3	0.35	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	1FT2104-4AF..-0..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	1.89	2.85	3.4	4.95	6	7.8	6.8	9.4	10.1	12.2	16	16.2	24	30	48.5	75		■ ■ ■ + ■ ■ ■ + ...	
1.01	3.39		$M_{2,0}$	Nm	2.65	3.65	4.7	6.7	7.7	9.8	8.7	11.7	14.7	15.7	19.8	24.5	31.5	39.5	64	95			
			$M_{2max}$	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152			
0.881	3.4	0.35	$n_{2N}$	r/min	500	375	375	300	250	200	200	150	150	125	100	100	75	60	37.5	25	1FT2104-4AK..-0..0-Z		
...	...	(0.43)	$M_{2N}$	Nm	2.05	3	3.85	5.4	6.6	8.5	7.2	9.8	11	13.2	17	17.1	26.5	33.5	54	84		■ ■ ■ + ■ ■ ■ + ...	
0.998	3.49		$M_{2,0}$	Nm	2.6	3.65	4.65	6.7	7.7	9.7	8.6	11.6	14.6	15.6	19.6	24.5	31.5	39.5	63	95			
			$M_{2max}$	Nm	10.2	13.7	17.2	24	27.5	34.5	31	41	51	55	69	86	110	138	192	152			
1.97	6.93	0.56	$n_{2N}$	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	30	25	1FT2104-5AF..-0..0-Z		
...	...	(0.65)	$M_{2N}$	Nm	4.6	7.1	9.4	12.8	12.6	16.7	15.7	21.5	26	30.5	34.5	47	61	74	120	95		■ ■ ■ + ■ ■ ■ + ...	
2.07	7.01		$M_{2,0}$	Nm	5.9	8	10.1	14.3	16.4	20.5	18.3	24.5	30.5	32.5	41	51	65	82	120	95			
			$M_{2max}$	Nm	20.5	27.5	34.5	48.5	55	70	62	83	104	111	138	173	220	275	192	152			
1.96	7.03	0.56	$n_{2N}$	r/min	500	375	300	250	250	200	200	150	125	100	100	75	60	50	30	25	1FT2104-5AK..-0..0-Z		
...	...	(0.65)	$M_{2N}$	Nm	4.5	7	9.3	12.6	12.4	16.4	15.4	21	25.5	30	34	46.5	60	72	120	95		■ ■ ■ + ■ ■ ■ + ...	
2.05	7.1		$M_{2,0}$	Nm	5.8	7.9	10	14.2	16.2	20	18.2	24	30.5	32.5	40.5	51	65	81	120	95			
			$M_{2max}$	Nm	21	28	35	49.5	56	71	63	84	105	112	140	175	225	275	192	152			
2.71	9.3	0.76	$n_{2N}$	r/min	500	375	300	250	200	200	200	125	100	100	100	75	60	50	37.5	25	1FT2104-6AF..-0..0-Z		
...	...	(0.84)	$M_{2N}$	Nm	5.7	8.8	12	15.6	20	20	19	31.5	39.5	40.5	41	56	73	88	105	95		■ ■ ■ + ■ ■ ■ + ...	
2.8	9.42		$M_{2,0}$	Nm	8.1	10.9	13.7	19.4	22	27.5	24.5	33	41.5	44	55	69	89	111	120	95			
			$M_{2max}$	Nm	28	37	46.5	65	75	94	83	111	139	149	186	230	295	275	192	152			

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### Planetary gearbox data

Gearbox type:		NRKW120, 1-stage								NRKW120, 2-stage							
1. Order code		B46								B47							
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
$\varnothing_{2,G}$	'	11						13									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRKW120

Servomotor data			Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)</b>																						
4.41	14.1	1.71 (2.55)	$n_{2N}$	r/min	500	375	300	250	200	150	200	150	100	100	75	75	60	50	37.5	25	15	1FT2105-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	9.5	14.4	19.4	24	31	40	28.5	39	59	61	79	83	107	126	120	95	27.5	■■■ + ■■■ + ...
4.49	14.2		$M_{2,0}$	Nm	13.2	17.7	22	31	35.5	44.5	40	53	66	71	89	111	142	172	120	95	27.5	
			$M_{2max}$	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	152	
4.44	14.1	1.71 (2.55)	$n_{2N}$	r/min	375	375	300	250	200	150	150	125	100	100	75	60	50	37.5	37.5	25	15	1FT2105-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	11.6	13.1	17.9	21.5	29	38.5	34.5	45	56	58	76	95	120	154	110	95	27.5	■■■ + ■■■ + ...
4.52	14.2		$M_{2,0}$	Nm	13.3	17.8	22	31.5	36	45	40	53	67	71	89	112	143	172	120	95	27.5	
			$M_{2max}$	Nm	42.5	56	71	99	113	142	127	169	210	225	280	275	312	275	192	152	152	
7.32	22.6	2.65 (3.5)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	15	15	1FT2105-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	18	24	30	40	40	55	51	62	78	77	107	133	163	144	120	95	27.5	■■■ + ■■■ + ...
7.39	22.9		$M_{2,0}$	Nm	21.5	29	36.5	51	59	73	65	87	109	117	146	172	195	172	120	95	27.5	
			$M_{2max}$	Nm	68	91	114	160	183	152	200	270	275	312	312	275	312	275	192	152	152	
7.64	24.5	4.6 (6.3)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	-	-	-	1FT2106-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	18.7	24.5	31	41.5	41.5	57	53	64	81	80	111	139	169	149	120	-	-	■■■ + ■■■ + ...
7.72	24.8		$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	-	-	
			$M_{2max}$	Nm	74	99	124	173	192	152	220	295	275	312	312	275	312	275	192	-	-	
9.94	31.1	6 (7.6)	$n_{2N}$	r/min	375	300	250	200	150	150	100	100	75	60	60	50	50	37.5	-	-	-	1FT2106-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	23	30	37.5	49	64	67	62	94	92	125	158	157	189	152	116	-	-	■■■ + ■■■ + ...
10	31.6		$M_{2,0}$	Nm	29.5	39.5	50	70	80	95	89	119	149	159	195	172	195	172	120	-	-	
			$M_{2max}$	Nm	94	126	157	216	192	152	251	312	275	312	312	275	312	275	192	-	-	
14.1	43	8.7 (10.4)	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	60	50	50	-	-	-	1FT2106-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	28.5	37	46	58	80	80	90	114	151	152	190	172	195	171	-	-	-	■■■ + ■■■ + ...
14.2	43.7		$M_{2,0}$	Nm	42.5	56	71	99	113	95	127	169	172	195	195	172	195	172	-	-	-	
			$M_{2max}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	-	-	-	
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage</b>																						
0.236	1.46	0.2 (0.22)	$n_{2N}$	r/min	300	250	250	200	150	150	150	125	100	100	75	60	50	37.5	25	15	15	1FT2203-2AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	0.34	0.63	0.87	1.39	1.89	2.15	1.87	2.3	3.1	3.1	4.8	6.2	8	10.8	16.8	27.5	27.5	■■■ + ■■■ + ...
0.366	1.57		$M_{2,0}$	Nm	0.7	1.08	1.46	2.2	2.55	3.3	2.9	4.05	5.1	5.5	7	8.8	11.4	14.4	23	36.5	36.5	
			$M_{2max}$	Nm	4.35	5.9	7.5	10.7	12.3	15.5	13.8	18.5	23	24.5	31	39	50	62	100	152	152	
0.843	3.3	0.35 (0.37)	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	125	100	75	60	50	30	20	20	20	1FT2203-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	2	2.5	3.5	4.85	6	6.7	6	8.3	10.3	10.6	13.9	18.4	24	29.5	49	75	75	■■■ + ■■■ + ...
0.961	3.39		$M_{2,0}$	Nm	2.5	3.5	4.45	6.4	7.4	9.3	8.3	11.2	14.1	15	18.9	23.5	30.5	38	61	95	95	
			$M_{2max}$	Nm	9.9	13.3	16.7	23.5	27	33.5	30	40	50	53	67	84	107	134	192	152	152	
1.93	6.55	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	30	25	25	25	1FT2204-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	4.35	6.8	9	12.2	14.9	15.6	14.9	20.5	24.5	29.5	32.5	44.5	58	69	116	95	95	■■■ + ■■■ + ...
2.03	6.62		$M_{2,0}$	Nm	5.7	7.8	9.9	14	16	20	17.9	24	30	32	40	50	64	80	120	95	95	
			$M_{2max}$	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	152	
1.94	6.55	1.23 (1.31)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	100	100	75	60	50	30	25	25	25	1FT2204-5AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	4.5	7	9.2	12.5	15.1	16	15.3	21	25.5	30	33	46	59	71	119	95	95	■■■ + ■■■ + ...
2.04	6.62		$M_{2,0}$	Nm	5.8	7.9	9.9	14.1	16.1	20	18.1	24	30	32	40.5	50	65	81	120	95	95	
			$M_{2max}$	Nm	19.6	26	32.5	46	52	66	59	78	98	104	131	163	205	260	192	152	152	

➡ Continued on the next page

### Planetary gearbox data

Gearbox type:	1. Order code	$i$	2. Order code	NRKW120, 1-stage					NRKW120, 2-stage												
				B46					B47												
				3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100		
			$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95	95
			$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152	152
			$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	430
			$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818	1.818
			$\varphi_{2,G}$	'	11						13										

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

**Gearbox type NRKW120**

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																			
Nm	Nm	kg cm <sup>2</sup>																			
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)</b>																					
2.69	8.83	1.61 (1.69)	$n_{2N}$	r/min	500	375	300	250	200	200	150	100	100	100	75	60	50	37.5	25	1FT2204-6AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.1	9.4	12.9	16.5	21	20.5	19.9	27	39	41.5	42.5	59	76	91	102	95	■■■ + ■■■ + ...
2.78	8.94		$M_{2,0}$	Nm	8	10.8	13.7	19.3	22	27.5	24.5	33	41	44	55	69	88	110	120	95	
			$M_{2max}$	Nm	26.5	35.5	44.5	62	71	89	79	106	132	141	176	220	280	275	192	152	
2.89	10.1	3.15 (4.05)	$n_{2N}$	r/min	375	375	300	250	200	150	200	125	100	100	75	60	50	30	20	1FT2205-2AC..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.7	7.8	10.9	13.3	17.8	23	16	27	34	35.5	46	48.5	63	74	119	94	■■■ + ■■■ + ...
2.98	10.2		$M_{2,0}$	Nm	8.6	11.6	14.6	20.5	23.5	29.5	26.5	35.5	44.5	47.5	59	74	95	119	120	95	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.92	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	200	150	125	125	100	75	60	50	37.5	25	1FT2205-2AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.1	9	11.6	16	15.4	20.5	19.8	27	32.5	31.5	42	57	74	90	99	95	■■■ + ■■■ + ...
3.01	10.2		$M_{2,0}$	Nm	8.7	11.8	14.8	20.5	23.5	30	26.5	35.5	45	48	60	75	96	120	120	95	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
2.86	10.1	3.15 (4.05)	$n_{2N}$	r/min	500	375	300	250	200	150	200	150	125	100	100	75	60	50	30	25	1FT2205-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	5.3	8.4	11.2	14.5	18.3	23.5	17.5	24	28.5	36.5	36.5	52	67	79	119	95	■■■ + ■■■ + ...
2.95	10.2		$M_{2,0}$	Nm	8.5	11.5	14.5	20.5	23.5	29.5	26	35	44	47	58	73	94	117	119	94	
			$M_{2max}$	Nm	30	40.5	50	71	81	101	90	121	151	161	200	250	312	275	192	152	
5.08	16.9	5.1 (6)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	25	1FT2205-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.3	16.6	21	28	28.5	39.5	37	45	57	56	78	98	120	160	102	95	■■■ + ■■■ + ...
5.16	17.1		$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	120	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.18	16.9	7.8 (9.4)	$n_{2N}$	r/min	375	300	250	200	150	125	150	100	100	75	75	50	37.5	37.5	30	20	1FT2206-2AC..-0..0-Z
...	...	...	$M_{2N}$	Nm	11.7	15.6	19.7	25.5	35	43	34	52	51	69	70	107	143	146	120	95	■■■ + ■■■ + ...
5.26	17.1		$M_{2,0}$	Nm	15.5	20.5	26	36.5	41.5	52	46.5	62	78	83	104	130	166	172	120	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.25	16.9	7.8 (9.4)	$n_{2N}$	r/min	500	375	300	250	200	150	200	125	100	100	75	75	50	37.5	37.5	25	1FT2206-2AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	10	15.2	20.5	24.5	32.5	42.5	29	49.5	62	64	84	84	132	170	114	94	■■■ + ■■■ + ...
5.33	17.1		$M_{2,0}$	Nm	15.7	21	26	37	42.5	53	47.5	63	79	84	105	132	169	172	120	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
5.09	16.9	7.8 (9.4)	$n_{2N}$	r/min	375	300	250	200	200	150	150	125	100	100	75	60	50	37.5	30	25	1FT2206-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	12.5	16.7	21	28	28	39	37	44.5	56	55	78	97	119	159	119	91	■■■ + ■■■ + ...
5.17	17.1		$M_{2,0}$	Nm	15.2	20	25.5	36	41	51	46	61	77	82	102	128	164	172	119	95	
			$M_{2max}$	Nm	51	68	85	119	136	152	152	200	250	270	312	275	312	275	192	152	
7.78	25.4	11.5 (13.1)	$n_{2N}$	r/min	375	300	250	200	150	150	150	100	100	75	75	60	50	37.5	25	-	1FT2206-3AB..-0..0-Z
...	...	...	$M_{2N}$	Nm	17.2	22.5	28.5	37.5	50	52	49	73	73	98	101	126	153	172	120	-	■■■ + ■■■ + ...
7.85	25.8		$M_{2,0}$	Nm	23	31	39	54	62	78	70	93	117	124	155	172	195	172	120	-	
			$M_{2max}$	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	-	
7.65	25.4	11.5 (13.1)	$n_{2N}$	r/min	375	300	250	200	150	125	150	100	75	75	60	50	37.5	37.5	30	-	1FT2206-3AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	16.5	21.5	27.5	35.5	48.5	59	47	71	93	95	120	145	193	172	120	-	■■■ + ■■■ + ...
7.72	25.8		$M_{2,0}$	Nm	22.5	30.5	38	53	61	77	69	92	115	122	153	172	195	172	120	-	
			$M_{2max}$	Nm	77	103	128	180	192	152	230	305	275	312	312	275	312	275	192	-	

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Planetary gearbox data		NRKW120, 1-stage								NRKW120, 2-stage											
Gearbox type:		<b>B46</b>								<b>B47</b>											
1. Order code		<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>64</b>	<b>100</b>				
2. Order code		<b>R03</b>	<b>R04</b>	<b>R05</b>	<b>R07</b>	<b>R08</b>	<b>R10</b>	<b>R09</b>	<b>R12</b>	<b>R15</b>	<b>R16</b>	<b>R20</b>	<b>R25</b>	<b>R32</b>	<b>R40</b>	<b>R64</b>	<b>R00</b>				
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95				
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152				
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430				
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818				
$\varphi_{2,G}$	'	11																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	<b>The motor and gearbox combination is fatigue-proof</b>
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	<b>Check acceleration and inertias, perform service life calculation if necessary</b>
	$M_{max,M} \times i > M_{2max,G}$	<b>The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary</b>

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4

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NRKW120

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																	
		$(J_{M,Br})$																	
Nm	Nm	kg cm <sup>2</sup>																	

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NRKW120 1 and 2-stage (continued)																					
10.7	35.9	15.1	$n_{2N}$	r/min	300	250	200	150	125	100	100	75	75	60	50	50	37.5	37.5	25	-	1FT2206-4AC..-0..0-Z
...	...	(16.8)	$M_{2N}$	Nm	21	26	34	46.5	56	72	68	91	92	115	141	134	185	153	120	-	■ ■ ■ + ■ ■ ■ + ...
10.8	36.5		$M_{2,0}$	Nm	32	43	53	75	86	95	96	128	160	171	195	172	195	172	120	-	
			$M_{2max}$	Nm	109	145	182	216	192	152	251	312	275	312	312	275	312	275	192	-	
10.4	34	15.1	$n_{2N}$	r/min	375	300	250	200	150	150	100	75	75	60	60	50	50	37.5	-	1FT2206-4AF..-0..0-Z	
...	...	(16.8)	$M_{2N}$	Nm	23	30.5	38	49.5	66	68	63	95	126	127	161	160	191	158	118	-	■ ■ ■ + ■ ■ ■ + ...
10.5	34.5		$M_{2,0}$	Nm	31	41.5	52	73	83	95	93	125	156	166	195	172	195	172	120	-	
			$M_{2max}$	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	-	
9.93	34	15.1	$n_{2N}$	r/min	375	250	250	150	150	125	125	100	75	75	60	50	50	37.5	30	-	1FT2206-4AH..-0..0-Z
...	...	(16.8)	$M_{2N}$	Nm	19.1	30	31	53	55	67	64	80	107	107	136	163	152	172	120	-	■ ■ ■ + ■ ■ ■ + ...
10	34.5		$M_{2,0}$	Nm	29.5	39.5	49.5	70	80	95	89	119	149	159	195	172	195	172	120	-	
			$M_{2max}$	Nm	103	138	172	216	192	152	251	312	275	312	312	275	312	275	192	-	

Planetary gearbox data		NRKW120, 1-stage										NRKW120, 2-stage																					
Gearbox type:		B46										B47																					
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95	80	105	130	135	120	95	157	195	172	195	195	172	195	172	120	95
$M_{2max,G}$	Nm	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152	128	168	208	216	192	152	251	312	275	312	312	275	312	275	192	152
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	360	474	500	340	380	430	500	520	500	520	500	380	430			
$J_{1,G}$	kg cm <sup>2</sup>	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818	3.248	2.492	2.209	1.989	1.936	1.861	2.818	2.733	2.702	2.201	2.023	2.012	1.864	1.86	1.856	1.818
$\varnothing_{2,G}$	'	11						13										11						13									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

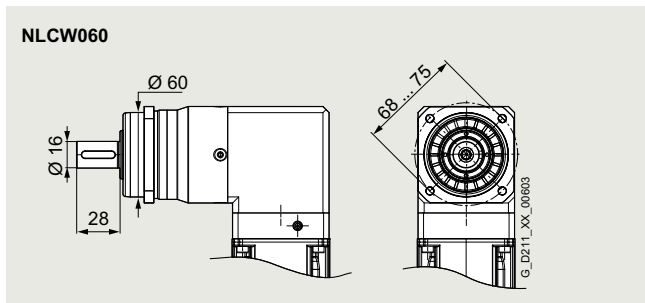
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NLCW060

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	3200 N
Average axial force for 20000 h	$F_{A,eq}$	4400 N
Average radial force for 30000 h	$F_{R,eq}$	3200 N
Average axial force for 30000 h	$F_{A,eq}$	3900 N
Maximum radial force	$F_{R,max}$	3200 N
Maximum axial force	$F_{A,max}$	4400 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox				
$M_{0,M}$	$M_{max,M}$	$J_M$																				
Nm	Nm	( $J_{M,Br}$ )																				
		kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW060 1 and 2-stage</b>																						
0.309	1.63	0.093	$n_{2N}$	r/min	375	300	300	250	250	200	150	150	125	125	100	75	75	60	37.5	30	<b>1FT2103-2AH..-2..0-Z</b>	
...	...	(0.112)	$M_{2N}$	Nm	0.455	0.91	1.2	1.94	2.05	3	2.75	3.25	4.5	4.45	6.1	8.5	8.9	11.7	18	14.9	■ ■ ■ + ■ ■ ■ + ...	
0.489	1.81		$M_{2,0}$	Nm	0.92	1.43	1.95	2.95	3.45	4.5	3.85	5.3	6.8	7.3	9.3	11.7	15.2	19.2	18	15		
			$M_{2max}$	Nm	4.85	6.6	8.5	12.1	13.9	17.6	15.8	21	26.5	28.5	35.5	44.5	57	64	29	24		
0.795	3.66	0.139	$n_{2N}$	r/min	300	300	250	250	200	200	150	125	125	100	100	75	60	50	50	30	<b>1FT2103-4AH..-2..0-Z</b>	
...	...	(0.158)	$M_{2N}$	Nm	1.77	2.3	3.25	4.05	5.4	5.9	5.7	7.7	8.5	10.6	11.4	15.9	20.5	25.5	17.3	15	■ ■ ■ + ■ ■ ■ + ...	
0.962	3.83		$M_{2,0}$	Nm	2.35	3.35	4.35	6.3	7.3	9.3	8.1	11	13.9	14.9	18.7	23.5	30	38	18	15		
			$M_{2max}$	Nm	10.9	14.8	18.6	26	29	24	34	45.5	57	60	70	64	70	64	29	24		
0.952	3.37	0.368	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	100	75	60	50	30	<b>1FT2104-4AF..-2..0-Z</b>	
...	...	(0.448)	$M_{2N}$	Nm	2.3	2.95	4.25	6.1	6.7	8.9	6.8	10.1	13.3	13.4	17.7	17.8	25.5	33	18	15	■ ■ ■ + ■ ■ ■ + ...	
1.14	3.54		$M_{2,0}$	Nm	2.85	4	5.1	7.4	8.6	10.9	9.7	13.2	16.7	17.8	22	28	36	40	18	15		
			$M_{2max}$	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24		
0.945	3.46	0.368	$n_{2N}$	r/min	375	375	300	250	250	200	200	150	125	125	100	75	75	60	50	37.5	<b>1FT2104-4AK..-2..0-Z</b>	
...	...	(0.448)	$M_{2N}$	Nm	2.5	3.1	4.6	6.6	7	9.6	7.1	10.6	13.9	14	18.5	25	26.5	34.5	18	15	■ ■ ■ + ■ ■ ■ + ...	
1.14	3.64		$M_{2,0}$	Nm	2.8	3.95	5.1	7.4	8.5	10.8	9.7	13.1	16.6	17.7	22	28	36	40	18	15		
			$M_{2max}$	Nm	10.3	14	17.6	24.5	28.5	24	32	43	54	57	70	64	70	64	29	24		
2.03	7	0.578	$n_{2N}$	r/min	375	300	300	250	200	200	150	150	125	125	100	75	75	60	50	-	<b>1FT2104-5AF..-2..0-Z</b>	
...	...	(0.668)	$M_{2N}$	Nm	4.45	6.6	7.5	10.5	13.6	14.6	14.9	16.3	21	20.5	27.5	38	38	40	18	-	■ ■ ■ + ■ ■ ■ + ...	
2.22	7.15		$M_{2,0}$	Nm	6.1	8.3	10.5	15	17.2	15	19.4	26	32.5	35	43.5	40	44	40	18	-		
			$M_{2max}$	Nm	20.5	28	35	40	29	24	63	70	70	70	70	64	70	64	29	-		
2.02	7.09	0.578	$n_{2N}$	r/min	375	300	300	250	200	200	150	150	125	125	100	75	75	60	50	-	<b>1FT2104-5AK..-2..0-Z</b>	
...	...	(0.668)	$M_{2N}$	Nm	4.35	6.5	7.4	10.3	13.4	14.5	14.6	16.1	21	20.5	27	37.5	37.5	40	18	-	■ ■ ■ + ■ ■ ■ + ...	
2.2	7.24		$M_{2,0}$	Nm	6	8.2	10.4	14.9	17.1	15	19.3	25.5	32.5	34.5	43.5	40	44	40	18	-		
			$M_{2max}$	Nm	21	28.5	35.5	40	29	24	64	70	70	70	70	64	70	64	29	-		
2.77	9.42	0.778	$n_{2N}$	r/min	375	300	300	250	200	200	150	150	125	100	100	75	75	75	-	-	<b>1FT2104-6AF..-2..0-Z</b>	
...	...	(0.858)	$M_{2N}$	Nm	5.5	8.1	9.1	12.5	16.3	15	17.9	19.4	25	31	32.5	40	43.5	33.5	-	-	■ ■ ■ + ■ ■ ■ + ...	
2.94	9.55		$M_{2,0}$	Nm	8.3	11.2	14.2	20	18	15	26	34.5	43.5	44	44	40	44	40	-	-		
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	-		

Planetary gearbox data		NLCW060, 1-stage								NLCW060, 2-stage									
Gearbox type:		C26								C27									
1. Order code																			
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100		
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00		
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15		
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24		
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80		
$J_{1,G}$	kg cm <sup>2</sup>	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22		
$\varnothing_{2,G}$	'	16																	

Color legend:    $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**

   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**

   $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLCW060

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ ( $J_{M,Br}$ ) Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW060 1 and 2-stage																					
0.301	1.53	0.2	$n_{2N}$	r/min	300	300	250	250	200	200	150	150	125	125	100	75	60	50	37.5	30	1FT2203-2AK...-2..0-Z
...	...	(0.22)	$M_{2N}$	Nm	0.55	0.83	1.27	1.67	2.25	2.55	2.6	3	4.05	4.05	5.4	7.6	10	12.3	17.1	15	■ + ■ + ...
0.497	1.72		$M_{2,0}$	Nm	0.9	1.4	1.91	2.9	3.4	4.4	3.9	5.4	6.9	7.4	9.4	11.9	15.5	19.5	18	15	
			$M_{2max}$	Nm	4.55	6.3	8	11.4	13.2	16.6	14.9	20	25	27	33.5	42.5	54	64	29	24	
0.907	3.37	0.35	$n_{2N}$	r/min	300	300	250	200	200	150	150	125	100	100	75	75	60	50	37.5	30	1FT2203-4AK...-2..0-Z
...	...	(0.37)	$M_{2N}$	Nm	2.1	2.65	3.75	5.5	5.9	8.3	6.4	8.4	11.4	11.5	15.9	16.6	21.5	26.5	18	15	■ + ■ + ...
1.1	3.54		$M_{2,0}$	Nm	2.7	3.8	4.9	7.1	8.2	10.4	9.3	12.6	16	17.1	21.5	27	34.5	40	18	15	
			$M_{2max}$	Nm	10.1	13.6	17.2	24	27.5	24	31	42	52	56	70	64	70	64	29	24	
1.99	6.61	1.248	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	-	-	1FT2204-5AF...-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.25	6.4	7.1	9.8	12.9	13.6	14.3	18.5	24	24.5	25	35.5	44	40	18	-	■ + ■ + ...
2.18	6.76		$M_{2,0}$	Nm	5.9	8.1	10.3	14.7	16.9	15	19.1	25.5	32	34	43	40	44	40	18	-	
			$M_{2max}$	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	-	
2.01	6.61	1.248	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	125	100	100	75	60	60	50	-	1FT2204-5AK...-2..0-Z
...	...	(1.328)	$M_{2N}$	Nm	4.35	6.5	7.3	10	13.2	13.9	14.5	18.8	20	25	25.5	36	44	40	18	-	■ + ■ + ...
2.19	6.76		$M_{2,0}$	Nm	6	8.2	10.4	14.8	17	15	19.2	25.5	32	34.5	43	40	44	40	18	-	
			$M_{2max}$	Nm	19.8	26.5	33	40	29	24	60	70	70	70	70	64	70	64	29	-	
2.76	8.93	1.628	$n_{2N}$	r/min	375	300	250	200	200	200	150	125	100	100	75	75	75	60	-	-	1FT2204-6AF...-2..0-Z
...	...	(1.708)	$M_{2N}$	Nm	5.7	8.5	11.2	15.8	16.7	15	18.5	23.5	31.5	31.5	43	40	40	40	-	-	■ + ■ + ...
2.93	9.07		$M_{2,0}$	Nm	8.2	11.2	14.1	20	18	15	25.5	34.5	43.5	44	44	40	44	40	-	-	
			$M_{2max}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	-	-	

Planetary gearbox data		NLCW060, 1-stage										NLCW060, 2-stage																					
Gearbox type:		C26										C27																					
1. Order code		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm	14	19	24	25	18	15	44	44	44	44	44	40	44	40	18	15	14	19	24	25	18	15	44	44	44	44	40	44	40	18	15	
$M_{2max,G}$	Nm	22	30	38	40	29	24	70	70	70	70	70	64	70	64	29	24	22	30	38	40	29	24	70	70	70	70	64	70	64	29	24	
$M_{2Em,Off}$	Nm	66	86	80	80	80	70	88	88	88	88	88	80	88	80	80	80	66	86	80	80	80	70	88	88	88	88	80	88	80	80	80	
$J_{1,G}$	kg cm <sup>2</sup>	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.222	0.22	0.406	0.275	0.253	0.234	0.23	0.225	0.355	0.35	0.234	0.242	0.233	0.231	0.223	0.222	0.22	0.22
$\varnothing_{2,G}$	'	16						18										16						18									

Color legend:

- $M_{max,M} \times i < M_{2N,G}$  The motor and gearbox combination is fatigue-proof
- $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  Check acceleration and inertias, perform service life calculation if necessary
- $M_{max,M} \times i > M_{2max,G}$  The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

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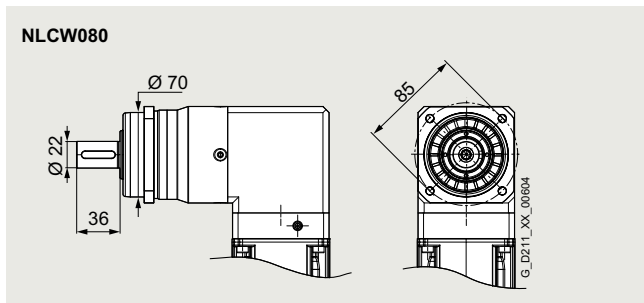


# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

Gearbox type NLCW080

## Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	5500 N
Average axial force for 20000 h	$F_{A,eq}$	6400 N
Average radial force for 30000 h	$F_{R,eq}$	4800 N
Average axial force for 30000 h	$F_{A,eq}$	5700 N
Maximum radial force	$F_{R,max}$	5500 N
Maximum axial force	$F_{A,max}$	6400 N

Servomotor data		Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																		
Nm	Nm	$(J_{M,Br})$																		
		kg cm <sup>2</sup>																		

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW080 1 and 2-stage																						
0.223	1.53	0.093	$n_{2N}$	r/min	-	200	200	200	200	150	150	125	100	100	75	75	60	50	30	20	1FT2103-2AH...0..0-Z	
...	...	...	$M_{2N}$	Nm	-	0.495	0.8	1.3	1.49	2.35	1.83	2.65	3.65	3.8	5.4	6.1	8.4	10.5	18.2	28.5	■■■ + ■■■ + ...	
0.447	1.75	(0.112)	$M_{2,0}$	Nm	-	0.89	1.35	2.25	2.7	3.6	3.15	4.55	5.9	6.3	8.2	10.4	13.7	17.3	28	38		
			$M_{2,max}$	Nm	-	6.1	7.8	11.4	13.1	16.7	14.9	20	25	27	34	43	55	69	80	61		
0.695	3.49	0.139	$n_{2N}$	r/min	300	250	250	200	200	150	150	100	100	100	75	60	50	37.5	30	25	1FT2103-4AH...0..0-Z	
...	...	...	$M_{2N}$	Nm	1.27	2.1	2.55	4.15	4.3	6.6	5.1	8.4	9.2	9.2	13.5	17.6	22.5	30	40	37	■■■ + ■■■ + ...	
0.975	3.76	(0.158)	$M_{2,0}$	Nm	2.05	3.05	4.05	6.1	7.1	9.1	7.9	10.9	13.8	14.8	18.7	23.5	30.5	38	50	38		
			$M_{2,max}$	Nm	10.4	14.2	18	25.5	29	36.5	33	44.5	55	59	74	93	120	150	80	61		
0.782	3.2	0.35	$n_{2N}$	r/min	375	300	300	250	200	200	150	150	125	100	100	75	60	50	37.5	25	1FT2104-4AF...2..0-Z	
...	...	...	$M_{2N}$	Nm	1.62	2.7	3.25	4.9	6.4	7.1	7.4	8.4	10.8	13.6	14.8	21	27.5	34.5	44.5	37.5	■■■ + ■■■ + ...	
1.08	3.48	(0.43)	$M_{2,0}$	Nm	2.3	3.4	4.5	6.7	7.8	9.9	8.9	12.1	15.4	16.5	20.5	26	34	42.5	50	38		
			$M_{2,max}$	Nm	9.5	13	16.5	23.5	27	34	30.5	41	51	54	68	86	110	138	80	61		
0.776	3.3	0.35	$n_{2N}$	r/min	375	300	250	250	200	200	150	125	100	100	100	75	60	50	37.5	30	1FT2104-4AK...2..0-Z	
...	...	...	$M_{2N}$	Nm	1.77	3.05	4.15	5.1	7.1	7.5	8.2	11	14.2	14.9	15.6	22.5	30	37	46.5	32.5	■■■ + ■■■ + ...	
1.07	3.57	(0.43)	$M_{2,0}$	Nm	2.3	3.4	4.45	6.6	7.7	9.9	8.8	12	15.3	16.4	20.5	26	33.5	42	50	38		
			$M_{2,max}$	Nm	9.8	13.4	17	24	27.5	35	31	42	52	56	70	88	113	142	80	61		
1.87	6.83	0.56	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	50	37.5	30	1FT2104-5AF...2..0-Z	
...	...	...	$M_{2N}$	Nm	4.9	7	8.1	12	12.5	18	14.8	19.1	25	25	35	45	57	57	50	35.5	■■■ + ■■■ + ...	
2.16	7.08	(0.65)	$M_{2,0}$	Nm	5.5	7.7	9.9	14.2	16.4	20.5	18.6	25	31.5	33.5	42	53	68	85	50	38		
			$M_{2,max}$	Nm	20	27.5	34.5	48.5	56	61	63	84	105	112	141	176	192	176	80	61		
1.85	6.93	0.56	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	60	50	37.5	30	1FT2104-5AK...2..0-Z	
...	...	...	$M_{2N}$	Nm	4.8	6.9	7.9	11.7	12.3	17.7	14.5	18.7	24.5	24.5	34.5	44.5	47	56	50	35.5	■■■ + ■■■ + ...	
2.14	7.17	(0.65)	$M_{2,0}$	Nm	5.5	7.7	9.8	14.1	16.3	20.5	18.4	24.5	31	33.5	42	52	67	85	50	38		
			$M_{2,max}$	Nm	20.5	27.5	35	49.5	56	61	64	85	107	114	143	176	192	176	80	61		
2.6	9.25	0.76	$n_{2N}$	r/min	300	250	250	200	200	150	150	125	100	100	75	60	50	37.5	37.5	30	1FT2104-6AF...2..0-Z	
...	...	...	$M_{2N}$	Nm	6.2	8.8	10	14.6	15.2	21.5	18	23	30	30.5	42.5	54	68	91	50	37.5	■■■ + ■■■ + ...	
2.88	9.48	(0.84)	$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	25	33.5	42.5	45	57	71	91	110	50	38		
			$M_{2,max}$	Nm	27.5	37	46.5	65	75	61	84	113	141	151	189	176	192	176	80	61		

Continued on the next page

### Planetary gearbox data

Gearbox type:	NLCW080, 1-stage								NLCW080, 2-stage												
	C36								C37												
1. Order code																					
$i$	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100					
2. Order code	R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00					
$M_{2N,G}$	Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38				
$M_{2max,G}$	Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61				
$M_{2Em,Off}$	Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200				
$J_{1,G}$	kg cm <sup>2</sup>	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906				
$\varnothing_{2,G}$	'	13																			

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLCW080

Servomotor data			Selection data servomotors with planetary gearbox																Servomotors with planetary gearbox			
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )	$n_{2N}$	r/min	300	250	250	200	150	150	150	100	100	75	75	60	50	50	37.5	–	1FT2105-4AF..-0..0-Z	+ ...
Nm	Nm	kg cm <sup>2</sup>	$M_{2N}$	Nm	10.9	15	16.4	23	31.5	34	28.5	44.5	46	61	65	83	104	94	50	–		
			$M_{2,0}$	Nm	12.9	17.5	22	31	35.5	38	40	54	67	72	90	110	120	110	50	–		
			$M_{2max}$	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–		
4.3	14.1	1.71 (2.55)	$n_{2N}$	r/min	300	250	200	200	150	125	125	100	75	75	60	50	50	37.5	37.5	–	1FT2105-4AH..-0..0-Z	+ ...
...	...		$M_{2N}$	Nm	10.2	14	18.9	20.5	29.5	37	31.5	41.5	56	57	73	90	92	110	50	–		
4.57	14.3		$M_{2,0}$	Nm	12.9	17.6	22	31	36	38	40.5	54	68	73	91	110	120	110	50	–		
			$M_{2max}$	Nm	42	56	70	99	80	61	128	171	176	192	192	176	192	176	80	–		
7.09	22.8	2.65 (3.5)	$n_{2N}$	r/min	300	250	200	150	150	150	125	100	75	75	60	60	50	50	–	–	1FT2105-6AF..-0..0-Z	+ ...
...	...		$M_{2N}$	Nm	14.7	19.9	26.5	39	41	38	44	57	77	78	101	100	120	101	–	–		
7.28	23		$M_{2,0}$	Nm	21	28.5	35.5	50	50	38	64	86	108	115	120	110	120	110	–	–		
			$M_{2max}$	Nm	64	85	107	104	80	61	205	192	176	192	192	176	192	176	–	–		

Continued on the next page

### Planetary gearbox data

Gearbox type: 1. Order code $i$ 2. Order code	NLCW080, 1-stage								NLCW080, 2-stage							
	C36								C37							
	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
$M_{2N,G}$ Nm	40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38
$M_{2max,G}$ Nm	64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61
$M_{2Em,Off}$ Nm	180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200
$J_{1,G}$ kg cm <sup>2</sup>	1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906
$\varphi_{2,G}$	13						15									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLCW080

Servomotor data			Selection data servomotors with planetary gearbox														Servomotors with planetary gearbox					
$M_{0,M}$	$M_{max,M}$	$J_M$ ( $J_{M,Br}$ )																				
Nm	Nm	kg cm <sup>2</sup>																				
<b>SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW080 1 and 2-stage (continued)</b>																						
2.61	10	3.15 (4.05)	$n_{2N}$	r/min	300	250	250	200	150	150	125	100	100	75	75	60	50	37.5	37.5	25	1FT2205-2AH..-0..0-Z	
...	...	...	$M_{2N}$	Nm	6.2	8.7	9.6	13.9	18.6	20.5	20.5	27	28	37.5	40	51	64	87	44	37.5	+ ...	
2.86	10.3		$M_{2,0}$	Nm	7.8	10.7	13.6	19.4	22	28	24.5	33.5	42	45	56	70	90	110	50	37.5		
			$M_{2max}$	Nm	30	40	50	71	80	61	91	122	153	163	192	176	192	176	80	61		
4.73	17	5.1 (6)	$n_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	50	50	37.5	37.5	-	1FT2205-4AF..-0..0-Z	
...	...	...	$M_{2N}$	Nm	9.9	13.6	18.5	27	29	36.5	30.5	40.5	55	56	72	88	90	110	47	-	+ ...	
4.94	17.2		$M_{2,0}$	Nm	14.1	19.2	24	34	39	38	43.5	58	73	78	98	110	120	110	50	-		
			$M_{2max}$	Nm	50	68	85	104	80	61	154	192	176	192	192	176	192	176	80	-		
<b>Planetary gearbox data</b>																						
Gearbox type:			NLCW080, 1-stage							NLCW080, 2-stage												
1. Order code			C36							C37												
$i$			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100				
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00				
$M_{2N,G}$	Nm		40	53	67	65	50	38	130	120	110	120	120	110	120	110	50	38				
$M_{2max,G}$	Nm		64	85	107	104	80	61	208	192	176	192	192	176	192	176	80	61				
$M_{2Em,Off}$	Nm		180	240	220	178	190	170	260	240	220	240	240	220	240	220	190	200				
$J_{1,G}$	kg cm <sup>2</sup>		1.394	1.089	1.016	0.951	0.937	0.921	1.246	1.218	1.21	1.001	0.959	0.956	0.918	0.917	0.917	0.906				
$\varphi_{2,G}$	'		13						15													

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

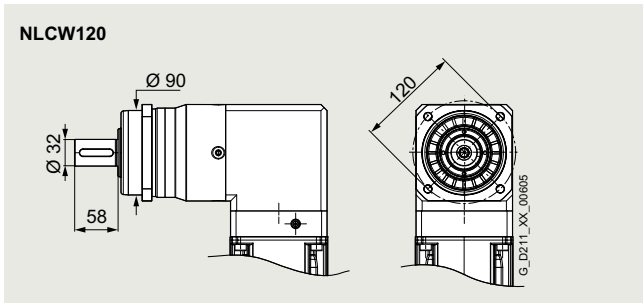
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# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLCW120

### Selection and ordering data



Permissible output shaft loads		
Average radial force for 20000 h	$F_{R,eq}$	6000 N
Average axial force for 20000 h	$F_{A,eq}$	8000 N
Average radial force for 30000 h	$F_{R,eq}$	5400 N
Average axial force for 30000 h	$F_{A,eq}$	7000 N
Maximum radial force	$F_{R,max}$	6000 N
Maximum axial force	$F_{A,max}$	8000 N

3  
4

Servomotor data		Selection data servomotors with planetary gearbox															Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$																	
Nm	Nm	$(J_{M,Br})$																	
		kg cm <sup>2</sup>																	

SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1 and 2-stage																					
0.132	1.44	0.093	$n_{2N}$	r/min	-	-	150	150	150	150	100	100	75	75	75	60	50	37.5	30	20	1FT2103-2AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	-	-	0.255	0.85	1.12	1.54	1.35	1.77	2.85	3	3.6	4.95	7	9.8	13.2	21	■■■ + ■■■ + ...
0.375	1.68	(0.112)	$M_{2.0}$	Nm	-	-	0.65	1.43	1.82	2.6	2.2	3.35	4.5	4.9	6.4	8.4	11.1	14.2	23.5	37	
			$M_{2max}$	Nm	-	-	7.1	10.5	12.2	15.6	13.9	19	24	25.5	32.5	40.5	52	66	106	152	
0.569	3.3	0.139	$n_{2N}$	r/min	300	300	300	250	250	200	150	125	100	100	75	75	60	50	30	20	1FT2103-4AH..-0..0-Z
...	...	...	$M_{2N}$	Nm	0.98	1.56	2.1	3.45	3.75	5.4	4.9	6.6	8.8	9.3	13	14.6	20	25	42	66	■■■ + ■■■ + ...
0.981	3.69	(0.158)	$M_{2.0}$	Nm	1.7	2.7	3.7	5.6	6.6	8.6	7.6	10.6	13.6	14.6	18.6	23.5	30.5	38.5	62	95	
			$M_{2max}$	Nm	9.9	13.6	17.3	24.5	28	35.5	32	43	54	58	73	91	117	147	192	152	
0.597	3.01	0.35	$n_{2N}$	r/min	375	375	300	300	250	200	150	150	125	125	100	75	75	60	37.5	25	1FT2104-4AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	1.27	1.87	2.95	4.05	5.2	7.1	6.5	7.7	9.9	10.1	14.2	19.2	21	27.5	47	73	■■■ + ■■■ + ...
1.01	3.41	(0.43)	$M_{2.0}$	Nm	1.79	2.8	3.8	5.8	6.9	8.9	7.9	11	14	15	19.1	24	31	39.5	64	95	
			$M_{2max}$	Nm	9	12.4	15.8	22.5	26	33	29.5	39.5	50	53	67	84	108	135	192	152	
0.59	3.11	0.35	$n_{2N}$	r/min	375	375	375	300	250	200	200	150	125	125	100	75	75	60	37.5	25	1FT2104-4AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	1.31	2.1	2.5	4.6	5.8	7.6	5.2	8.7	11.1	10.9	16	20.5	22	29.5	51	77	■■■ + ■■■ + ...
1	3.5	(0.43)	$M_{2.0}$	Nm	1.77	2.75	3.8	5.8	6.8	8.8	7.8	10.9	13.9	14.9	19	24	31	39	63	95	
			$M_{2max}$	Nm	9.3	12.8	16.3	23	26.5	33.5	30	41	51	55	69	86	111	139	192	152	
1.68	6.64	0.56	$n_{2N}$	r/min	375	375	300	250	250	200	150	125	100	100	100	75	60	50	30	25	1FT2104-5AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	4.55	5.6	8.5	12.4	12.5	17.7	16.4	21.5	28	29	28.5	42	57	69	120	95	■■■ + ■■■ + ...
2.08	7.01	(0.65)	$M_{2.0}$	Nm	5	7.1	9.2	13.4	15.5	19.7	17.6	23.5	30	32	40.5	51	65	82	120	95	
			$M_{2max}$	Nm	19.9	26.5	33.5	48	55	69	62	83	104	111	139	174	220	275	192	152	
1.67	6.74	0.56	$n_{2N}$	r/min	375	375	300	250	250	200	150	125	100	100	75	75	60	50	30	25	1FT2104-5AK..-0..0-Z
...	...	...	$M_{2N}$	Nm	4.5	5.4	8.4	12.2	12.3	17.3	16.2	21	27.5	28.5	37.5	41	56	68	118	95	■■■ + ■■■ + ...
2.07	7.1	(0.65)	$M_{2.0}$	Nm	4.95	7	9.1	13.3	15.4	19.6	17.5	23.5	29.5	32	40	50	65	82	120	95	
			$M_{2max}$	Nm	20	27	34	48.5	55	70	63	84	105	112	141	176	225	280	192	152	
2.42	9.06	0.76	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	37.5	25	1FT2104-6AF..-0..0-Z
...	...	...	$M_{2N}$	Nm	6.5	9.5	11	15.5	20	21.5	21	26.5	35	35.5	51	64	69	83	98	95	■■■ + ■■■ + ...
2.81	9.41	(0.84)	$M_{2.0}$	Nm	7.2	10	12.9	18.5	21	27	24	32.5	41	44	55	69	89	111	120	95	
			$M_{2max}$	Nm	27	36.5	46	64	74	93	83	112	140	149	187	230	300	368	192	152	

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Planetary gearbox data		NLCW120, 1-stage					NLCW120, 2-stage													
Gearbox type:		C46					C47													
1. Order code																				
$i$		3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100			
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00			
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95			
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152			
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430			
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818			
$\varphi_{2,G}$	'	11																		

Color legend:    $M_{max,M} \times i < M_{2N,G}$  **The motor and gearbox combination is fatigue-proof**

   $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$  **Check acceleration and inertias, perform service life calculation if necessary**

   $M_{max,M} \times i > M_{2max,G}$  **The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary**

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLCW120

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ Nm Nm kg cm <sup>2</sup> (J <sub>M,Br</sub> )		

#### SIMOTICS S-1FT2 High Dynamic servomotors with planetary gearbox NLCW120 1 and 2-stage (continued)

4.11 ... 4.5	13.9 ... 14.2	1.71 (2.55)	$n_{2N}$ r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	50	37.5	25	1FT2105-4AF..-0..0-Z	
			$M_{2N}$ Nm	11	15.2	18.4	24.5	31	32.5	34.5	43	56	56	78	99	126	123	120	95		+ + ...
			$M_{2,0}$ Nm	12.3	16.8	21	30	34.5	44	39.5	53	66	71	89	111	143	179	120	95		
			$M_{2max}$ Nm	41.5	55	70	98	112	141	127	169	210	225	280	350	416	368	192	152		

#### SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1 and 2-stage

0.192 ... 0.362	1.42 ... 1.58	0.2 (0.22)	$n_{2N}$ r/min	-	-	-	150	150	150	125	100	75	75	60	50	50	37.5	25	15	1FT2203-2AK..-0..0-Z	
			$M_{2N}$ Nm	-	-	-	0.76	1.02	1.47	1.01	1.73	2.7	2.95	4.3	5.6	6.6	9.5	15.2	27		+ + ...
			$M_{2,0}$ Nm	-	-	-	1.34	1.72	2.45	2.05	3.2	4.3	4.7	6.2	8	10.7	13.7	22.5	36		
			$M_{2max}$ Nm	-	-	-	9.9	11.5	14.7	13.1	17.8	22.5	24	30.5	38.5	49.5	62	100	152		

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Planetary gearbox data																		
Gearbox type:			NLCW120, 1-stage								NLCW120, 2-stage							
1. Order code			C46								C47							
$i$			3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100
2. Order code			R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00
$M_{2N,G}$	Nm		80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95
$M_{2max,G}$	Nm		128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152
$M_{2Em,Off}$	Nm		360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430
$J_{1,G}$	kg cm <sup>2</sup>		2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818
$\varphi_{2,G}$	'		11						13									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

# SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

## Gearbox type NLCW120

Servomotor data			Selection data servomotors with planetary gearbox																	Servomotors with planetary gearbox		
$M_{0,M}$	$M_{max,M}$	$J_M$	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	100	100	75	75	60	50	30	25	1FT2204-6AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
Nm	Nm	kg cm <sup>2</sup>																				
2.4	8.58	1.61	$M_{2N}$	Nm	6.7	7.6	11.9	16.4	20	22.5	22.5	28.5	37.5	37.5	52	52	72	86	120	95		
...	...	(1.69)	$M_{2,0}$	Nm	7.2	10	12.8	18.4	21	26.5	24	32.5	40.5	43.5	55	69	88	111	120	95		
2.8	8.93		$M_{2max}$	Nm	25.5	34.5	43.5	61	70	88	79	106	133	142	177	220	285	355	192	152		
2.66	9.84	3.15	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	30	20	1FT2205-2AC..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(4.05)	$M_{2N}$	Nm	5.6	8.1	9.9	13.4	17.3	17.9	19.2	23.5	31.5	31	44.5	56	72	93	120	95		
2.99	10.2		$M_{2,0}$	Nm	7.9	11	14.1	20	23	29.5	25.5	34.5	43.5	46.5	58	73	95	119	120	95		
...	...		$M_{2max}$	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152		
2.69	9.84	3.15	$n_{2N}$	r/min	375	375	300	250	200	200	150	125	100	100	75	75	60	50	30	25	1FT2205-2AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(4.05)	$M_{2N}$	Nm	6	7.6	10.7	15.3	15.7	22	20	27	34.5	36	47.5	52	71	85	119	94		
3.03	10.2		$M_{2,0}$	Nm	8	11.1	14.2	20.5	23.5	29.5	26	35	44	47	59	74	96	120	120	95		
...	...		$M_{2max}$	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152		
2.63	9.84	3.15	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	60	50	30	25	1FT2205-2AH..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(4.05)	$M_{2N}$	Nm	5.8	8.3	10.3	14.3	17.7	19.4	19.8	25.5	33	33.5	45.5	57	62	74	120	94		
2.97	10.2		$M_{2,0}$	Nm	7.8	10.9	13.9	20	23	29	25.5	34.5	43.5	46.5	58	73	94	118	120	94		
...	...		$M_{2max}$	Nm	29.5	39.5	49.5	70	80	101	90	121	151	162	200	250	325	368	192	152		
4.88	16.8	5.1	$n_{2N}$	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	30	25	1FT2205-4AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(6)	$M_{2N}$	Nm	10.7	15.6	20	29	30	41.5	31.5	49.5	50	68	73	93	118	159	120	95		
5.17	17.1		$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	45.5	61	76	81	102	128	164	205	120	95		
...	...		$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152		
4.89	16.8	7.8	$n_{2N}$	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	30	20	1FT2206-2AC..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(9.4)	$M_{2N}$	Nm	12.7	14.5	19.5	27	35.5	39.5	36	46.5	64	65	85	103	142	143	119	95		
5.27	17.1		$M_{2,0}$	Nm	14.6	19.9	25	35.5	41	51	46	62	78	83	104	130	168	210	120	95		
...	...		$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152		
5.04	16.8	7.8	$n_{2N}$	r/min	375	300	300	250	200	200	150	125	100	100	75	60	50	37.5	37.5	25	1FT2206-2AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(9.4)	$M_{2N}$	Nm	11.8	16.3	19.5	25	32.5	32.5	37	45.5	59	59	83	104	133	170	105	94		
5.33	17.1		$M_{2,0}$	Nm	15.1	20.5	25.5	36.5	42	53	47	63	79	84	105	132	170	210	120	95		
...	...		$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152		
4.87	16.8	7.8	$n_{2N}$	r/min	375	300	250	200	200	150	150	100	100	75	75	60	50	37.5	30	20	1FT2206-2AH..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(9.4)	$M_{2N}$	Nm	10.9	15.7	20	28.5	29.5	41	31.5	50	49.5	67	72	93	116	158	119	94		
5.17	17.1		$M_{2,0}$	Nm	14.6	19.8	25	35.5	40.5	51	45.5	61	76	81	102	128	165	205	119	95		
...	...		$M_{2max}$	Nm	50	67	84	118	136	152	153	200	255	270	340	368	416	368	192	152		
7.62	25.5	11.5	$n_{2N}$	r/min	375	300	250	200	200	150	125	100	75	75	60	50	50	37.5	25	-	1FT2206-3AB..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(13.1)	$M_{2N}$	Nm	15.2	21.5	28.5	40	40	57	52	68	92	94	122	148	154	205	120	-		
7.89	25.8		$M_{2,0}$	Nm	22.5	30.5	38.5	54	62	78	69	93	116	124	156	195	250	230	120	-		
...	...		$M_{2max}$	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	-		
7.49	25.5	11.5	$n_{2N}$	r/min	300	300	250	200	150	150	125	100	75	75	60	50	37.5	37.5	30	-	1FT2206-3AF..-0..0-Z	■ ■ ■ + ■ ■ ■ + ...
...	...	(13.1)	$M_{2N}$	Nm	18.4	20.5	27.5	38	50	55	50	65	88	90	117	143	196	198	120	-		
7.76	25.8		$M_{2,0}$	Nm	22	30	38	53	61	77	68	91	114	122	153	192	245	230	120	-		
...	...		$M_{2max}$	Nm	76	102	128	179	192	152	230	305	368	410	416	368	416	368	192	-		

➔ Continued on the next page

### Planetary gearbox data

Gearbox type:		NLCW120, 1-stage							NLCW120, 2-stage									
		C46							C47									
1. Order code	$i$	3	4	5	7	8	10	9	12	15	16	20	25	32	40	64	100	
2. Order code		R03	R04	R05	R07	R08	R10	R09	R12	R15	R16	R20	R25	R32	R40	R64	R00	
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	120	95	
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	192	152	
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	380	430	
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818	
$\varphi_{2,G}$	'	11							13									

Color legend:	$M_{max,M} \times i < M_{2N,G}$	The motor and gearbox combination is fatigue-proof
	$M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	Check acceleration and inertias, perform service life calculation if necessary
	$M_{max,M} \times i > M_{2max,G}$	The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary

## SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors

Angular geared motors for servo converters with line connection 400 V 3 AC

### Gearbox type NLCW120

Servomotor data	Selection data servomotors with planetary gearbox	Servomotors with planetary gearbox
$M_{0,M}$ $M_{max,M}$ $J_M$ <small>(<math>J_{M,Br}</math>)</small> Nm Nm kg cm <sup>2</sup>		

SIMOTICS S-1FT2 Compact servomotors with planetary gearbox NLCW120 1 and 2-stage (continued)																						
10.5	36.2	15.1	$n_{2N}$	r/min	250	200	200	150	125	100	100	75	60	60	50	37.5	30	30	25	-	1FT2206-4AC..-0..0-Z	
...	...	...		$M_{2N}$	Nm	24	33	35.5	51	63	81	63	86	110	111	138	185	235	225	120	-	■ ■ ■ + ■ ■ ■ + ...
10.8	36.3	(16.8)		$M_{2,0}$	Nm	31	42	53	74	85	95	96	128	161	172	215	230	260	230	120	-	
			$M_{2max}$	Nm	108	144	181	216	192	152	325	416	368	416	416	368	416	368	192	-		
10.3	34.2	15.1	$n_{2N}$	r/min	375	300	250	200	150	150	125	100	75	75	60	50	50	37.5	37.5	-	1FT2206-4AF..-0..0-Z	
...	...	...		$M_{2N}$	Nm	21	29.5	38.5	52	70	75	70	91	122	125	161	196	199	230	109	-	■ ■ ■ + ■ ■ ■ + ...
10.6	34.4	(16.8)		$M_{2,0}$	Nm	30.5	41.5	52	73	84	95	93	124	156	166	205	230	260	230	120	-	
			$M_{2max}$	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	-		
9.81	34.2	15.1	$n_{2N}$	r/min	300	250	200	150	150	125	125	100	75	75	60	50	37.5	37.5	30	-	1FT2206-4AH..-0..0-Z	
...	...	...		$M_{2N}$	Nm	22.5	30	40	57	60	75	58	74	102	103	134	161	220	215	120	-	■ ■ ■ + ■ ■ ■ + ...
10.1	34.4	(16.8)		$M_{2,0}$	Nm	29	39.5	49.5	70	80	95	89	119	149	159	199	230	260	230	120	-	
			$M_{2max}$	Nm	102	137	171	216	192	152	305	410	368	416	416	368	416	368	192	-		

Planetary gearbox data		NLCW120, 1-stage										NLCW120, 2-stage									
Gearbox type:		C46										C47									
1. Order code		3 4 5 7 8 10 9 12 15 16 20 25 32 40 64 100										R03 R04 R05 R07 R08 R10 R09 R12 R15 R16 R20 R25 R32 R40 R64 R00									
2. Order code		R03 R04 R05 R07 R08 R10 R09 R12 R15 R16 R20 R25 R32 R40 R64 R00										R03 R04 R05 R07 R08 R10 R09 R12 R15 R16 R20 R25 R32 R40 R64 R00									
$M_{2N,G}$	Nm	80	105	130	135	120	95	210	260	230	260	260	230	260	230	260	230	120	95		
$M_{2max,G}$	Nm	128	168	208	216	192	152	336	416	368	416	416	368	416	368	416	368	192	152		
$M_{2Em,Off}$	Nm	360	474	500	340	380	430	500	520	500	520	520	500	520	500	520	500	380	430		
$J_{1,G}$	kg cm <sup>2</sup>	2.97	2.346	2.118	1.928	1.876	1.832	2.787	2.716	2.692	2.192	2.017	2.009	1.862	1.859	1.855	1.818				
$\varnothing_{2,G}$	'	11						13													

Color legend:	<span style="background-color: #d3d3d3; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> $M_{max,M} \times i < M_{2N,G}$	<b>The motor and gearbox combination is fatigue-proof</b>
	<span style="background-color: #d3d3d3; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> $M_{2N,G} < M_{max,M} \times i < M_{2max,G}$	<b>Check acceleration and inertias, perform service life calculation if necessary</b>
	<span style="background-color: #ffa500; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> $M_{max,M} \times i > M_{2max,G}$	<b>The motor can destroy the gearbox, check acceleration and inertias, perform service life calculation if necessary</b>

3  
4

## **SIMOTICS S-1FK2 and S-1FT2 servo planetary geared motors**

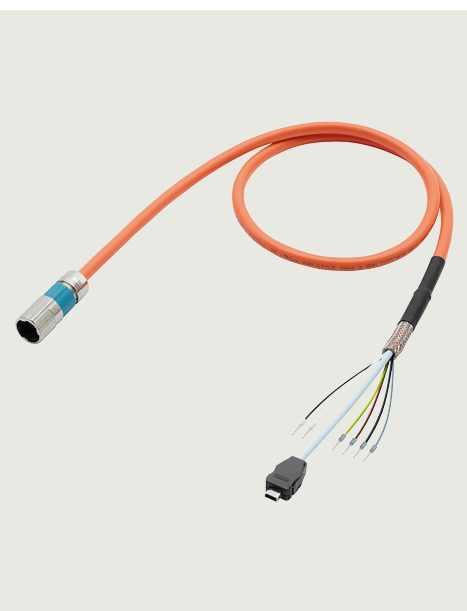
Angular geared motors for servo converters with line connection 400 V 3 AC

### Notes

3  
4



## MOTION-CONNECT connection systems



### 4/2 MOTION-CONNECT connection systems

- 4/2 Overview
- 4/2 Benefits
- 4/2 Application
- 4/2 Function
- 4/3 Characteristic curves
- 4/4 More information

### 4/5 One Cable Connection (OCC) technology for SINAMICS S210

- 4/5 Overview
- 4/5 Technical specifications
- 4/6 Selection and ordering data
- 4/10 More information

Detailed technical information on the SINAMICS S210 servo drive system is available on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

In addition, the Siemens Product Configurator can be used on the internet at the following address:  
[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## MOTION-CONNECT connection systems

### MOTION-CONNECT connection systems

#### Overview

MOTION-CONNECT cables are suitable for use with many different types of machine tools and production machinery.

The following variants of MOTION-CONNECT cable are available as fully-assembled power and signal cables or sold by the meter:

- **MOTION-CONNECT 500**
  - Cost-effective solution for predominantly fixed installation
  - Suitable for low mechanical loading
  - Tested for traversing paths up to 5 m (16.4 ft)
- **MOTION-CONNECT 800PLUS**
  - Meets requirements for use in cable carriers
  - Suitable for high mechanical loading
  - Oil resistance
  - Tested for traversing paths of up to 50 m (164 ft)
- **MOTION-CONNECT 400 (only for SIMOTICS S-1FS2 motors)**
  - Extremely chemically resistant FEP jacket (especially against common cleaning agents and disinfectants used in the F&B industry)
  - With integrated pressure compensation tube
  - Not suitable for repeated bending stress!

#### Benefits

Pre-assembled MOTION-CONNECT cables provide high quality and impeccable system-tested functionality.

#### SPEED-CONNECT

Connectors with SPEED-CONNECT quick-release locks enable fast, stable and reliable connection. All that is required to attain stable interlocking and a secure connection is less than a quarter turn of the lock nut of the connector. Tools are not required.

Cables with SPEED-CONNECT connectors supplement the previous offering of MOTION-CONNECT cables with full-thread connectors.

#### Application

MOTION-CONNECT cables are designed for machinery use. They are not suitable for building technology applications or outdoor installation.

MOTION-CONNECT cables have been tested in a cable carrier with horizontal traversing path and have also been designed for this type of application. They are not self-supporting.

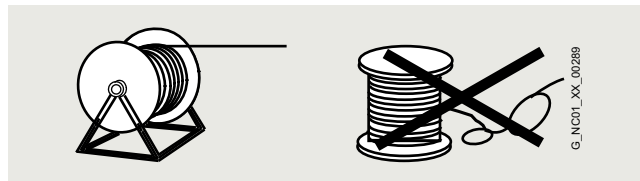
The pre-assembled cables can be ordered in length units of 10 cm (3.94 in) and can be extended, if necessary.

When cable lengths (basic cables and extensions) are determined for the systems and applications described in this catalog, the technically permissible maximum cable lengths (e.g. 25 m (82 ft)) specified in the catalog must be observed. Malfunctions can occur if longer cables are used. Siemens assumes no liability for correct transmission of signals or power in this case.

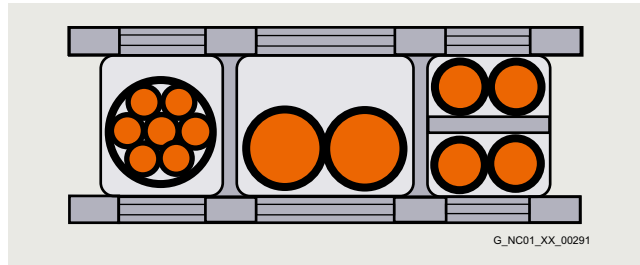
Connector on motor with external thread	Connector with cap nut on cable	Compatibility
SPEED-CONNECT	SPEED-CONNECT	✓
SPEED-CONNECT <sup>1)</sup>	Full-thread	✓
Full-thread	Full-thread	✓
Full-thread	SPEED-CONNECT	–

<sup>1)</sup> If shocks and vibration can occur, an additional O-ring is recommended to prevent the connection from coming loose.

#### Function



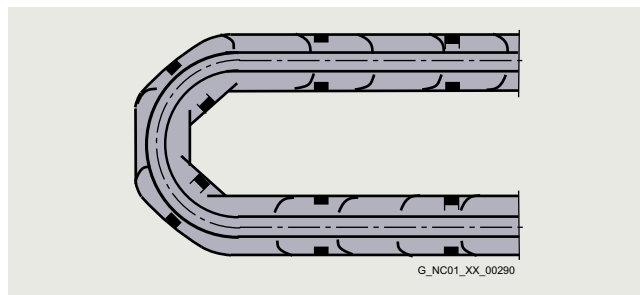
The cables must be removed from the drum without twisting, i.e., the cables must be unwound and must never be lifted over the drum flange in loops.



To maximize the service life of the cable carrier and cables, cables in the carrier made from different materials must be separated by spacers in the cable carrier. The spacers must be filled evenly to ensure that the position of the cables does not change during operation. The cables should be distributed as symmetrically as possible according to their weights and dimensions. Cables with very different outer diameters should also be separated by spacers.

When inserting pre-assembled cables into the cable carrier, do not pull at the connector, as this may damage the strain relief or cable clamping.

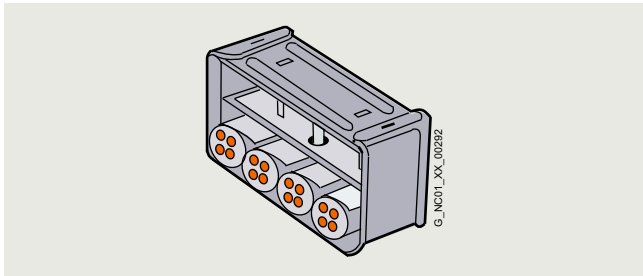
The cables must not be fixed in the cable carrier. They must be freely movable.



The cables must be able to be moved without applying force in particular in the bending radii of the carrier. The specified minimum bending radius must be adhered to.

## Function

The cable fixings must be attached at both ends at an appropriate distance away from the end points of the moving parts in a dead zone.



MOTION-CONNECT cables are tested in a cable carrier. The cables are attached at one end by means of strain relief to the moving ends of the cable carrier. Strain relief is applied over a wide area of the cable jacket surface without crimping the cable.

Cables must be installed in accordance with the instructions supplied by the cable carrier manufacturer.

### Note:

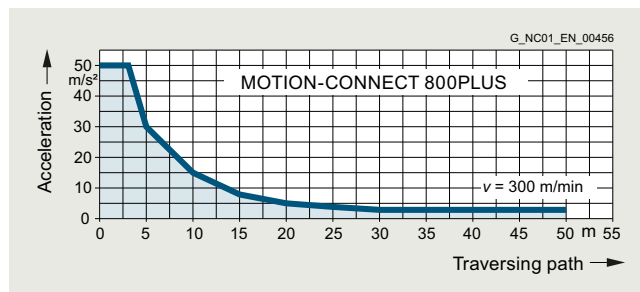
If, for example, pre-assembled cables are installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connector can also be supplied (power and signal cables<sup>1)</sup>). Depending on the version, the contacts of the cables are crimped and the connector is supplied separately. After installing the cables, the customer assembles the connector.

In case of vibration load and with horizontal or vertical cable entries, we recommend that the cable is additionally fixed if between the cable strain relief on the cable carrier and the terminal at the motor part of the cable is hanging loose or is not routed. To prevent machine vibrations being transmitted to the connectors, the cable should be fixed at the moving part where the motor is mounted.

## Characteristic curves

### Characteristic curve for MOTION-CONNECT 800PLUS

The blue area beneath the characteristic curve represents the potential range of use for the cables. The characteristic curve represents the tested operating points.



Permissible acceleration for MOTION-CONNECT 800PLUS signal and power cables up to 16 mm<sup>2</sup>

<sup>1)</sup> Not for DRIVE-CLiQ signal cables.

## MOTION-CONNECT connection systems

### MOTION-CONNECT connection systems

#### More information

##### Current carrying capacity for power and signal cables

The current carrying capacity of PVC/PUR-insulated copper cables is specified in the table for installation types B1, B2, C, and E under continuous operating conditions with reference to

an ambient air temperature of 40 °C (104 °F). For other ambient temperatures, the values must be corrected by the derating factors from the table.

Cross-section mm <sup>2</sup>	Current carrying capacity rms AC 50/60 Hz or DC in amps for installation type			
	B1 Single-core cables in conduits or installation ducts	B2 Multi-core cables in conduits or installation ducts	C Multi-core cables, vertically or horizontally on walls/open, without conduits and installation ducts/ with contact	E Multi-core cables, horizontally or vertically on perforated cable racks/open, without conduits and installation ducts/ with contact
<b>Electronics <sup>1)</sup></b>				
0.2	–	4.3	4.4	4.4
0.5	–	7.5	7.5	7.8
0.75	–	9	9.5	10
<b>Power <sup>2)</sup></b>				
0.38	6.2	6.1	7.1	7.4
0.75	8.6	8.5	9.8	10.4
1	10.3	10.1	11.7	12.4
1.5	13.5	13.1	15.2	16.1
2.5	18.3	17.4	21	22
4	24	23	28	30
6	31	30	36	37
10	44	40	50	52
16	59	54	66	70

##### Derating factors for PVC/PUR-insulated power and signal cables

Ambient air temperature °C (°F)	Derating factor acc. to EN 60204-1, Table D.1
30 (86)	1.15
35 (95)	1.08
40 (104)	1
45 (113)	0.91
50 (122)	0.82
55 (131)	0.71
60 (140)	0.58

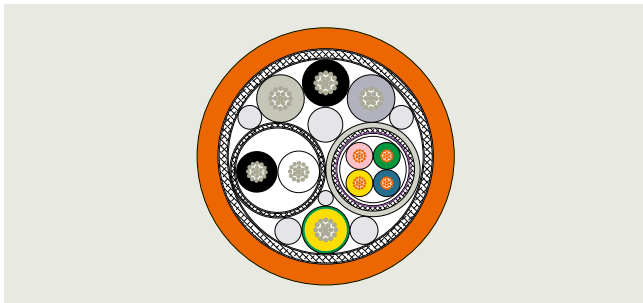
##### Note:

Derating for MOTION-CONNECT 400 analog acc. to EN 60204-1.

<sup>1)</sup> One control circuit pair.

<sup>2)</sup> One symmetrically loaded three-phase AC cable.

## Overview



Motor and converter are simply connected to one another by one cable instead of the usual two or three cables. With this One Cable Technology, energy supply, encoder signals and braking signal are brought together in a single cable.

This results in the following advantages:

- Time-saving by laying only one cable
- Smaller installation space and space requirement in cable collars
- Only one cable has to be cleaned. This is advantageous, e.g. in the pharmaceutical industry and where higher requirements are placed upon hygiene
- Can be ordered to the decimeter
- Compact connection system
- Rotatable connectors on the motor side
- Motor with very low interfering contour for restricted installation space
- Bending radius optimized to  $2.5 \times$  cable diameter static or  $4 \times$  cable diameter dynamic for MOTION-CONNECT 800PLUS

## Technical specifications

MOTION-CONNECT 500	6FX5002-8QN04-1...	6FX5002-8QN08-1...	6FX5002-8QN11-1...	6FX5002-8QN21-1...
<b>Cable jacket material</b>	PVC	PVC	PVC	PVC
<b>Connector</b>				
• Converter side	Siemens IX	Siemens IX	Siemens IX	Siemens IX
• Motor side	M12 (SPEED-CONNECT)	M17 (SPEED-CONNECT)	M23 (SPEED-CONNECT)	M23 (SPEED-CONNECT)
<b>Number of cores</b>	10	10	10	10
<b>Cross-section</b>	0.38 mm <sup>2</sup>	0.75 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
<b>Cable length, max.</b>	50 m (164 ft)	50 m (164 ft)	50 m (164 ft)	50 m (164 ft)
<b>Cable structure</b>	4G0.38+1Q0.2+1P0.38	4G0.75+1Q0.2+1P0.5	4G1.5+1Q0.2+1P1.5	4G2.5+1Q0.2+1P1.5
<b>Max. number of bends</b>	100000	100000	100000	100000
<b>Number of disconnection points, max.</b>	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)
<b>Degree of protection</b>				
• Converter side	IP20	IP20	IP20	IP20
• Motor side	IP67	IP67	IP67	IP67
<b>Certificates of suitability</b>	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA
<b>Suitable for SIMOTICS S-1FK2/S-1FT2/S-1FS2 servomotors</b>	1F.2102, 1F.2.03	1F.2.04, 1F.2.05	1F.2.06, 1F.2.08, 1F.2210	1F.2.06, 1F.2.08, 1F.2210
MOTION-CONNECT 800PLUS	6FX8002-8QN04-1...	6FX8002-8QN08-1...	6FX8002-8QN11-1...	6FX8002-8QN21-1...
<b>Cable jacket material</b>	PUR	PUR	PUR	PUR
<b>Connector</b>				
• Converter side	Siemens IX	Siemens IX	Siemens IX	Siemens IX
• Motor side	M12 (SPEED-CONNECT)	M17 (SPEED-CONNECT)	M23 (SPEED-CONNECT)	M23 (SPEED-CONNECT)
<b>Number of cores</b>	10	10	10	10
<b>Cross-section</b>	0.38 mm <sup>2</sup>	0.75 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
<b>Cable length, max.</b>	50 m (164 ft)	50 m (164 ft)	50 m (164 ft)	50 m (164 ft)
<b>Cable structure</b>	4G0.38+1Q0.2+1P0.38	4G0.75+1Q0.2+1P0.5	4G1.5+1Q0.2+1P1.5	4G2.5+1Q0.2+1P1.5
<b>Max. number of bends</b>	10 million	10 million	10 million	10 million
<b>Number of disconnection points, max.</b>	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)
<b>Degree of protection</b>				
• Converter side	IP20	IP20	IP20	IP20
• Motor side	IP67	IP67	IP67	IP67
<b>Certificates of suitability</b>	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA
<b>Suitable for SIMOTICS S-1FK2/S-1FT2/S-1FS2 servomotors</b>	1F.2102, 1F.2.03	1F.2.04, 1F.2.05	1F.2.06, 1F.2.08, 1F.2210	1F.2.06, 1F.2.08, 1F.2210

# MOTION-CONNECT connection systems

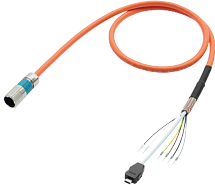
## One Cable Connection (OCC) technology for SINAMICS S210

### Technical specifications

MOTION-CONNECT 400	6FX4002-8QN08-1...	6FX4002-8QN11-1...
<b>Cable jacket material</b>	FEP	FEP
<b>Connector</b>		
• Converter side	Siemens IX	Siemens IX
• Motor side	M17 (SPEED-CONNECT)	M23 (SPEED-CONNECT)
<b>Number of cores</b>	10	10
<b>Cross-section</b>	0.75 mm <sup>2</sup>	1.5 mm <sup>2</sup>
<b>Cable length, max.</b>	50 m (164 ft)	50 m (164 ft)
<b>Cable structure</b>	4x0.75+4x0.34+2x0.5C C	4x1.5+4x0.34+2x0.5C C
<b>Max. number of bends</b>	Not suitable for bending loads	Not suitable for bending loads
<b>Number of disconnection points, max.</b>	3 in 50 m (3 in 164 ft)	3 in 50 m (3 in 164 ft)
<b>Degree of protection</b>		
• Converter side	IP20	IP20
• Motor side	IP67	IP67
<b>Certificates of suitability</b>	RoHS, cURus, CE, UKCA	RoHS, cURus, CE, UKCA
<b>Suitable for SIMOTICS S-1FS2 servomotors</b>	1FS2104, 1FS2105	1FS2106, 1FS2208

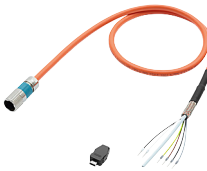
### Selection and ordering data

#### Motor connection cable

Version	Description	Connector size	Cross-section mm <sup>2</sup>	D <sub>max</sub> mm (in)	r <sub>static</sub> mm (in)	r <sub>dynamic</sub> mm (in)	For motor (Possible for 1FS2 with Q1x)	Article No. (Length code see table)
	<b>Pre-assembled OCC motor connection cable MOTION-CONNECT 500 for predominantly fixed routing</b> with SPEED-CONNECT connector on the motor side and Siemens IX pre-assembled signal connector for the converter side (shield clamp included in the scope of delivery)	M12	0.38	9.7 (0.38)	23.5 (0.93)	195 (7.68)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX5002-8QN04-1</b> ■■■■
		M17	0.75	10.5 (0.41)	25.5 (1.00)	195 (7.68)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX5002-8QN08-1</b> ■■■■
		M23	1.5	12.7 (0.50)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX5002-8QN11-1</b> ■■■■
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX5002-8QN21-1</b> ■■■■
		M12	0.38	9.7 (0.38)	28.2 (1.11)	38 (1.50)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX8002-8QN04-1</b> ■■■■
		M17	0.75	10.5 (0.41)	30.6 (1.20)	38 (1.50)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX8002-8QN08-1</b> ■■■■
	<b>Pre-assembled OCC motor connection cable MOTION-CONNECT 800PLUS for use with cable carriers</b> with SPEED-CONNECT connector on the motor side and Siemens IX pre-assembled signal connector for the converter side (shield clamp included in the scope of delivery)	M23	1.5	12.7 (0.50)	36.9 (1.45)	92.2 (3.63)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX8002-8QN11-1</b> ■■■■
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	39.9 (1.57)	99.7 (3.93)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX8002-8QN21-1</b> ■■■■
		M17	0.75	10.1 (0.40)	97 (3.82)	–	1FS2104, 1FS2105	<b>6FX4002-8QN08-1</b> ■■■■
		M23	1.5	11.8 (0.46)	114 (4.49)	–	1FS2106, 1FS2208	<b>6FX4002-8QN11-1</b> ■■■■

<sup>1)</sup> For increased requirement regarding routing type and ambient temperature.  
See tables on page 4/4.

## Selection and ordering data

Version	Description	Connector size	Cross-section mm <sup>2</sup>	D <sub>max</sub> mm (in)	r <sub>static</sub> mm (in)	r <sub>dynamic</sub> mm (in)	For motor (Possible for 1FS2 with Q1x)	Article No.  (Length code see table)	
	<b>Partially assembled OCC motor connection cable MOTION-CONNECT 500 for predominantly fixed routing</b>  With SPEED-CONNECT connector on the motor side and Siemens IX signal connector for the converter side enclosed separately (shield clamp included in the scope of delivery)	M12	0.38	9.7 (0.38)	23.5 (0.93)	195 (7.68)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX5012-8QN04-1</b> ■■■■	
		M17	0.75	10.5 (0.41)	25.5 (1.00)	195 (7.68)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX5012-8QN08-1</b> ■■■■	
		M23	1.5	12.7 (0.50)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX5012-8QN11-1</b> ■■■■	
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX5012-8QN21-1</b> ■■■■	
		M12	0.38	9.7 (0.38)	28.2 (1.11)	38 (1.50)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX8012-8QN04-1</b> ■■■■	
		M17	0.75	10.5 (0.41)	30.6 (1.20)	38 (1.50)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX8012-8QN08-1</b> ■■■■	
	<b>OCC motor connection cable MOTION-CONNECT 800PLUS for use with cable carriers</b>  With SPEED-CONNECT connector on the motor side and Siemens IX signal connector for the converter side enclosed separately (shield clamp included in the scope of delivery)	M23	1.5	12.7 (0.50)	36.9 (1.45)	92.2 (3.63)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX8012-8QN11-1</b> ■■■■	
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	39.9 (1.57)	99.7 (3.93)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX8012-8QN21-1</b> ■■■■	
		<b>OCC motor connection cable MOTION-CONNECT 400 for fixed routing</b>  With SPEED-CONNECT connector on the motor side and Siemens IX signal connector for the converter side enclosed separately (shield clamp included in the scope of delivery)	M17	0.75	10.1 (0.40)	97 (3.82)	–	1FS2104, 1FS2105	<b>6FX4012-8QN08-1</b> ■■■■
			M23	1.5	11.8 (0.46)	114 (4.49)	–	1FS2106, 1FS2208	<b>6FX4012-8QN11-1</b> ■■■■


<sup>1)</sup> For increased requirement regarding routing type and ambient temperature.  
See tables on page 4/4.

## MOTION-CONNECT connection systems

## One Cable Connection (OCC) technology for SINAMICS S210

## Selection and ordering data

## Extension cable

Version	Description	Connector size	Cross-section mm <sup>2</sup>	$D_{max}$ mm (in)	$r_{static}$ mm (in)	$r_{dynamic}$ mm (in)	For motor (Possible for 1FS2 with Q1x)	Article No.  (Length code see table)	
	<b>Pre-assembled OCC extension cable MOTION-CONNECT 500 for predominantly fixed routing</b> with SPEED-CONNECT connectors	M12	0.38	9.7 (0.38)	23.5 (0.93)	195 (7.68)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX5002-8QE04-1</b> ■■■■	
		M17	0.75	10.5 (0.41)	25.5 (1.00)	195 (7.68)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX5002-8QE08-1</b> ■■■■	
		M23	1.5	12.7 (0.50)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX5002-8QE11-1</b> ■■■■	
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX5002-8QE21-1</b> ■■■■	
	<b>Pre-assembled OCC extension cable MOTION-CONNECT 800PLU S for use with cable carriers</b> with SPEED-CONNECT connectors	M12	0.38	9.7 (0.38)	28.2 (1.11)	38 (1.50)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX8002-8QE04-1</b> ■■■■	
		M17	0.75	10.5 (0.41)	30.6 (1.20)	38 (1.50)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX8002-8QE08-1</b> ■■■■	
		M23	1.5	12.7 (0.50)	36.9 (1.45)	92.2 (3.63)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX8002-8QE11-1</b> ■■■■	
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	39.9 (1.57)	99.7 (3.93)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX8002-8QE21-1</b> ■■■■	
	<b>Partially assembled OCC extension cable MOTION-CONNECT 500 for predominantly fixed routing</b> with SPEED-CONNECT connectors (male contacts inserted on the converter side, insulator and connector housing enclosed separately) <sup>2)</sup>	<b>Partially assembled OCC extension cable MOTION-CONNECT 500 for predominantly fixed routing</b> with SPEED-CONNECT connectors (male contacts inserted on the converter side, insulator and connector housing enclosed separately) <sup>2)</sup>	M12	0.38	9.7 (0.38)	23.5 (0.93)	195 (7.68)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX5012-8QE04-1</b> ■■■■
			M17	0.75	10.5 (0.41)	25.5 (1.00)	195 (7.68)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX5012-8QE08-1</b> ■■■■
			M23	1.5	12.7 (0.50)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX5012-8QE11-1</b> ■■■■
			M23	2.5 <sup>1)</sup>	13.7 (0.54)	30.7 (1.21)	195 (7.68)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX5012-8QE21-1</b> ■■■■
<b>Partially assembled OCC extension cable MOTION-CONNECT 800PLU S for use with cable carriers</b> with SPEED-CONNECT connectors (male contacts inserted on the converter side, insulator and connector housing enclosed separately) <sup>2)</sup>		M12	0.38	9.7 (0.38)	28.2 (1.11)	38 (1.50)	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX8012-8QE04-1</b> ■■■■	
		M17	0.75	10.5 (0.41)	30.6 (1.20)	38 (1.50)	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX8012-8QE08-1</b> ■■■■	
		M23	1.5	12.7 (0.50)	36.9 (1.45)	92.2 (3.63)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX8012-8QE11-1</b> ■■■■	
		M23	2.5 <sup>1)</sup>	13.7 (0.54)	39.9 (1.57)	99.7 (3.93)	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX8012-8QE21-1</b> ■■■■	

<sup>1)</sup> For increased requirement regarding routing type and ambient temperature. See tables on page 4/4.





<sup>2)</sup> For the extension cable, special tools for assembling are required. For more information, refer to the installation instructions.



## Selection and ordering data

## Accessories

## OCC components for customer assembly




Version	Description	Cross-section mm <sup>2</sup>	For motor (Possible for 1FS2 with Q1x)	Article No. (Length code see table)	
	<b>Sold by the meter, OCC cable MOTION-CONNECT 500</b> For the self assembly of motor connection or extension cables MOTION-CONNECT 500 for predominantly fixed routing (see table for length codes)	0.38	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX5008-1BE04-■ ■ ■ A0</b>	
		0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX5008-1BE08-■ ■ ■ A0</b>	
		1.5	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX5008-1BE11-■ ■ ■ A0</b>	
		2.5 <sup>1)</sup>	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX5008-1BE21-■ ■ ■ A0</b>	
		<b>Sold by the meter, OCC cable MOTION-CONNECT 800PLUS</b> For the self assembly of motor connection or extension cables MOTION-CONNECT 800PLUS for use with cable carriers (see table for length codes)	0.38	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX8008-1BE04-■ ■ ■ A0</b>
	0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX8008-1BE08-■ ■ ■ A0</b>		
	1.5	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX8008-1BE11-■ ■ ■ A0</b>		
	2.5 <sup>1)</sup>	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210	<b>6FX8008-1BE21-■ ■ ■ A0</b>		
	<b>Sold by the meter, OCC cable MOTION-CONNECT 400</b> For the self assembly of motor connection or extension cables MOTION-CONNECT 400 for fixed routing (see table for length codes)	0.75	1FS2104, 1FS2105	<b>6FX4008-1BE08-■ ■ ■ A0</b>	
	1.5	1FS2106, 1FS2208	<b>6FX4008-1BE11-■ ■ ■ A0</b>		
	<b>Motor-side M12 SPEED-CONNECT connector</b> 10-pole, including all socket contacts	0.38	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX2003-0LU64</b>	
		<b>Motor-side M17 SPEED-CONNECT connector</b> 10-pole, including all socket contacts	0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX2003-0LU54</b>
		<b>Motor-side M23 SPEED-CONNECT connector</b> 10-pole, including all socket contacts	1.5 and 2.5	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX2003-0LU34</b>
	<b>M12 SPEED-CONNECT connector with male thread for extension cable</b> 10-pole, including all pin contacts	0.38	1FK2102, 1FK2.03-..G 1FT2102, 1FT2.03-..G	<b>6FX2003-0LA64</b>	

<sup>1)</sup> For increased requirement regarding routing type and ambient temperature.  
See tables on page 4/4.


# MOTION-CONNECT connection systems

## One Cable Connection (OCC) technology for SINAMICS S210

### Selection and ordering data

Version	Description	Cross-section mm <sup>2</sup>	For motor (Possible for 1FS2 with Q1x)	Article No. (Length code see table)
	<b>M17 SPEED-CONNECT connector with male thread for extension cable</b> 10-pole, including all pin contacts	0.75	1FK2103-..H, 1FK2203-..K, 1FK2.04, 1FK2.05 1FT2103-..H, 1FT2203-..K, 1FT2.04, 1FT2.05 1FS2104, 1FS2105	<b>6FX2003-0LA54</b>
	<b>M23 SPEED-CONNECT connector with male thread for extension cable</b> 10-pole, including all pin contacts	1.5 and 2.5	1FK2.06, 1FK2208, 1FK2210 1FT2.06, 1FT2.08, 1FT2210 1FS2106, 1FS2208	<b>6FX2003-0LA34</b>
	<b>Siemens IX signal connector on the converter side</b> Device version in insulation displacement method for field assembly	–	–	<b>6FX2003-0DE01</b>
	<b>Shield clamp</b> For attaching the connection cables to the shield plate of the converter (packing unit 10 items) • For pre-assembled cables with M12 and M17 plugs • For pre-assembled cables with M23 plugs	– –	– –	<b>6FX2003-7EX10</b> <b>6FX2003-7EX11</b>

### Control cabinet bushing

Version	Description	Article No.
	<b>Mounting flange</b> For cabinet bushing • For connector size M12 • For connector size M17 • For connector size M23	<b>6FX2003-7JX00</b> <b>6FX2003-7HX00</b> <b>6FX2003-7BX00</b>

### Length codes for pre-assembled cables (max. 50 m (164 ft))

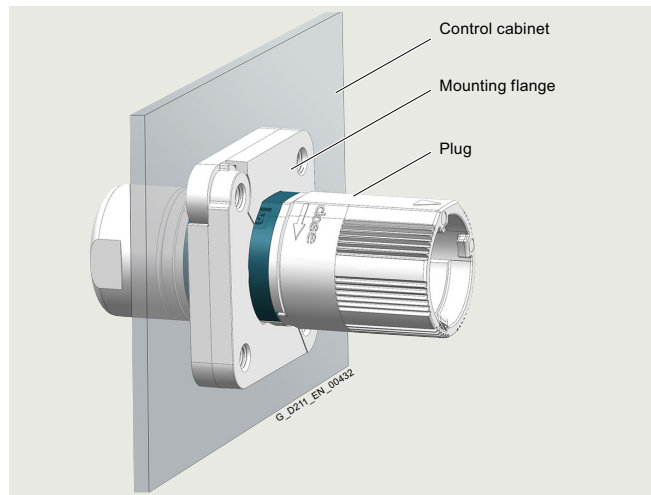
Description	Article No. supplement
<b>MOTION-CONNECT cable</b>	<b>6FX . 0 . 2-8Q . 0 . -1 ■ ■ ■</b>
0 m (0 ft)	<b>A</b>
10 m (32.8 ft)	<b>B</b>
20 m (65.6 ft)	<b>C</b>
30 m (98.4 ft)	<b>D</b>
40 m (131 ft)	<b>E</b>
50 m (164 ft)	<b>F</b>
0 m (0 ft)	<b>A</b>
1 m (3.28 ft)	<b>B</b>
2 m (6.56 ft)	<b>C</b>
3 m (9.84 ft)	<b>D</b>
4 m (13.1 ft)	<b>E</b>
5 m (16.4 ft)	<b>F</b>
6 m (19.7 ft)	<b>G</b>
7 m (23.0 ft)	<b>H</b>
8 m (26.2 ft)	<b>J</b>
9 m (29.5 ft)	<b>K</b>
0 m (0 ft)	<b>0</b>
0.1 m (0.33 ft)	<b>1</b>
0.2 m (0.66 ft)	<b>2</b>
0.3 m (0.98 ft)	<b>3</b>
0.4 m (1.31 ft)	<b>4</b>
0.5 m (1.64 ft)	<b>5</b>
0.6 m (1.97 ft)	<b>6</b>
0.7 m (2.30 ft)	<b>7</b>
0.8 m (2.62 ft)	<b>8</b>

### Length code for cables sold by the meter

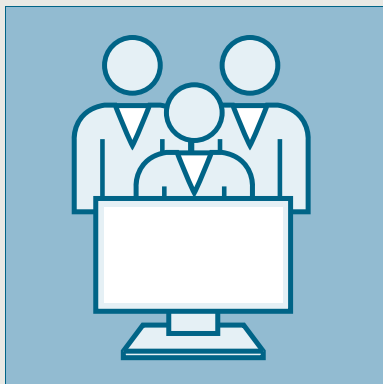
Description	Article No. supplement
<b>MOTION-CONNECT cable</b>	<b>6FX . 008-1BE . . - ■ ■ ■ A0</b>
50 m (164 ft)	<b>1 F</b>
100 m (328 ft)	<b>2 A</b>
200 m (656 ft)	<b>3 A</b>
500 m (1640 ft)	<b>6 A</b>

The maximum permissible cable length must be observed.

### More information



Arrangement of mounting flange and plug in a control cabinet panel  
More information, particularly on grounding, is available in the technical documentation on the internet at:  
[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)



### SINAMICS SELECTOR App Mobile selection guide for frequency converters



Siemens has developed the SINAMICS SELECTOR app as a practical tool for finding article numbers for your SINAMICS converter in the power range from 0.1 kW to 630 kW quickly and easily. Whether for SINAMICS V20, SINAMICS V90, SINAMICS G120C, SINAMICS G120P, SINAMICS G120X, SINAMICS G120 or SINAMICS S210: The app will provide you with the correct article numbers conveniently. How does it work? Simply select your application, the frequency converter you require, the rated power and device options as well as the necessary accessories. Then you can save your selection and send it by email. The preselection serves as the basis for an order specification with the dealer/Siemens. You will find free downloads for Android and iOS here: [www.siemens.com/sinamics-selector](http://www.siemens.com/sinamics-selector)

5/2	<b>SINAMICS DriveSim Basic</b>
5/4	<b>SINAMICS DriveSim Advanced</b>
5/6	<b>Siemens Product Configurator</b>
5/7	<b>TIA Selection Tool</b>
5/8	<b>SINAMICS web server for SINAMICS S210</b>
5/9	<b>SINAMICS web server for SINAMICS S210 (New)</b>
5/13	<b>SINAMICS Startdrive commissioning tool</b>
5/14	<b>SINAMICS Migration Tool</b>

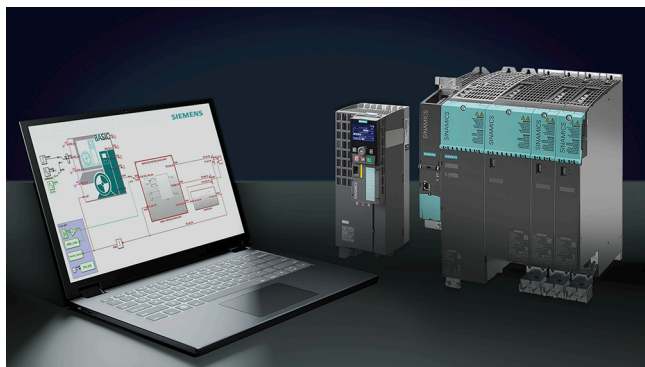
#### **Cybersecurity information**

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks. In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept. Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place. For additional information on industrial cybersecurity measures that may be implemented, please visit [www.siemens.com/cybersecurity-industry](http://www.siemens.com/cybersecurity-industry) Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats. To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under <https://www.siemens.com/cert>

## Engineering tools

### SINAMICS DriveSim Basic

#### Overview



SINAMICS DriveSim Basic provides easy-to-use models for PROFIdrive-enabled SINAMICS converters, so you can create a digital twin of your drive.

The models are validated and tested against real SINAMICS converters and are available in the form of a standardized FMU (Functional Mockup Unit). Therefore, they are compatible with various standard time-based simulation programs such as SIMIT, Simcenter Amesim, ANSYS Twin Builder, MATLAB Simulink or Hopsan.

SINAMICS DriveSim Basic is another element in your engineering toolbox. Together with other virtual Siemens solutions, e.g. SIMATIC S7-PLCSIM Advanced or NX Mechatronics Concept Designer, a consistent model-based development process can be implemented.

#### Benefits

- Speed up time-to-market for OEMs
- Test validated SINAMICS models under real conditions already at the design or planning stage and make needed adjustments
- Identify issues and improvement capabilities early in the design stage and reduce testing effort to save time and cost
- Download is free of charge. The ideal entry point for drive system simulation
- Valid for the most commonly used Siemens drives

Advantages of SINAMICS DriveSim Basic compared to SIMIT PROFIdrive blocks:

- Increased level of detail due to speed controller, current setpoint filters and internal load model
- Identical parameter values and meaning as in the real SINAMICS device
- Direct reference to SINAMICS documentation
- Validated against the real SINAMICS drive
- No wiring effort to represent functional configurations
- Significant reduction of SIMIT simulation tags (even more is possible if unused in-/ outputs are deselected within the Component Type Editor (CTE))
- Enables simulation of an (internal) two-mass oscillator as application with realistic SINAMICS parameter settings, besides the known limitations by the minimum sample time in SIMIT
- Compatible with every FMU Co-Simulation 2.0 compatible simulation

#### Application

With SINAMICS DriveSim Basic, you can implement three major use cases:

- Providing load characteristics for drive selection and dimensioning
- Virtual commission your PLC already in the design phase
- Test and improve interaction between PLC, drives and application virtually

#### **Use case 1: Providing load profiles for drive sizing**

If you are designing a machine, you want to make sure that you select the SINAMICS converter and SIMOTICS motor most suitable for your drive application. As SINAMICS DriveSim Basic is control-unit-agnostic and thus represents a generic drive, you can parametrize it according to the functionality of your application. Running the simulation results in load characteristics, i.e. torque or speed curves over time. You can import these load profiles into TIA Selection Tool to select the suitable Control Unit and dimension the drive to best fit to the demand. So as a result you have well selected SINAMICS converters and SIMOTICS motors with the help of the digital twin.

#### **Use case 2: Virtual commission your PLC already in the design phase**

If you are designing a machine, you want to make sure the PLC code works with your SINAMICS drive. After writing the PLC code in TIA Portal, you can connect it via PLCSIM Advanced to any time-based simulation tool (e.g. SIMIT). Integrated into the simulation tool, SINAMICS DriveSim Basic acts as a realistic communication partner for the PLC. Next, you can commission the virtual PLC in TIA Portal as you would do with a real PLC connected to a real drive. Without simulation, you would need to do that on-site. With simulation, you not only save time, but also have the freedom to try out various configurations and optimize your PLC code early in the process.

#### **Use case 3: Test and improve interaction between PLC, drives and application virtually**

With the third Use case, you can connect a simulation tool such as NX Mechatronic Concept Designer to visualize the mechanical movements of your application. This way, you ensure that the drive behaves according to the desired machine performance. You can test several fault scenarios and optimize the interaction between PLC, application and drive virtually so overall, you can avoid unplanned machine behavior and increase the performance of your setup.

## Integration

SINAMICS DriveSim Basic can be run in tools that support FMU 2.0 Co-Simulation Import (<https://fmi-standard.org/tools/>).

The FMU has been tested in the following simulation environments and is available in the attached application examples.

Tool	Manufacturer	DriveSimBasic*** variant	PLC Sim Advanced interface	Notes
SIMIT	Siemens	***.fmu	Yes	<ul style="list-style-type: none"> <li>Permissible configuration: ExternalLoad = 1 &amp; . SpeedController = 0 or ExternalLoad = 0 &amp; . SpeedController = 1</li> <li>Simulation with external load can provide wrong results because the minimum possible time step is 1 ms</li> </ul>
Simcenter Amesim	Siemens	***_double.fmu	Yes	
MATLAB Simulink	MathWorks	< 2019a ***_unstruct.fmu ≥ 2019a ***.fmu	Yes	
ANSYS Twin Builder	ANSYS	***.fmu	No	
Hopsan	Linköping University	***_double.fmu	No	<ul style="list-style-type: none"> <li>Open Source</li> <li>Install "win64-with_compiler-installer.exe" package</li> </ul>

## Selection and ordering data

Description	Artikel-Nr.
<b>SINAMICS DriveSim Basic</b>	<b>6FC6490-1SP10-0AB0</b>

## More information

More information is provided on the internet at: <https://support.industry.siemens.com/cs/document/109798225>

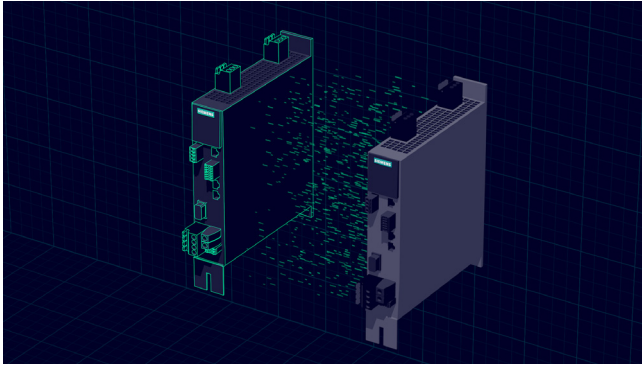
You can find more videos on the topic at:

- [Simulation of drive systems – Quick, Easy and Validated](#)
- [Simulation of drive systems – An introduction to SINAMICS](#)
- [Getting started with SINAMICS DriveSim Basic](#)
- [How to import SINAMICS DriveSim Basic into SIMIT, Matlab Simulink, Amesim and ANSYS TwinBuilder](#)
- [How to connect SINAMICS DriveSim Basic via PLCSim Advance to TIA Portal](#)
- [How to use SINAMICS DriveSim Basic for drive sizing with TIA Selection Tool](#)
- [How to visualize drive system behavior in NX Mechatronics Concept Designer](#)

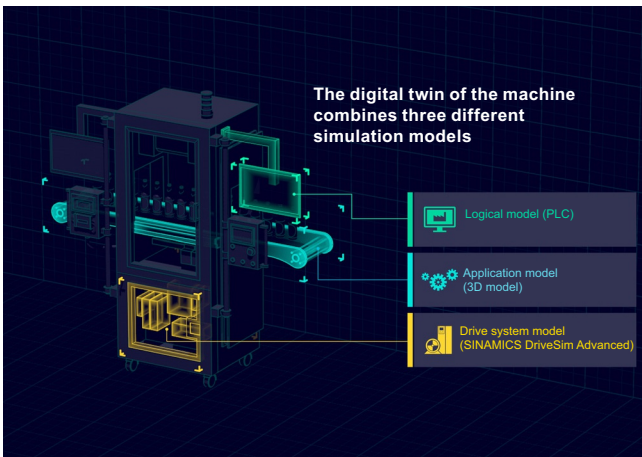
## Engineering tools

### SINAMICS DriveSim Advanced

#### Overview



In summary, SINAMICS DriveSim Advanced is a powerful tool that provides a complete digital twin of the next generation of SINAMICS converters, ensuring unparalleled accuracy and reliability. With its seamless integration into the TIA Portal and SINAMICS Startdrive, the advanced level of customization, the detailed and intuitive interface, it is the ultimate solution for optimizing your drive train system.



SINAMICS DriveSim Advanced is an innovative solution that combines drive simulation and virtual commissioning. With this powerful combination, you can optimize your drive systems, test and validate your projects and ensure that your drive systems function correctly prior to the installation.

SINAMICS DriveSim Advanced is the ultimate solution for optimizing your drive systems. With its advanced technology and user-friendly interface, you can simulate and optimize the performance of your drive systems to meet the demands of your processes. SINAMICS DriveSim Advanced is the solution you have been searching for to improve efficiency, productivity, as well as the overall performance of your drive systems.

The complete digital twin of the real SINAMICS firmware for the next generation of SINAMICS converters ensures that all parameters and configurations are identical to those of the real drive, providing unparalleled accuracy and reliability.

SINAMICS DriveSim Advanced is a software-dependent solution that works seamlessly with the TIA Portal and SINAMICS Startdrive, eliminating the need for additional simulation tools. Its low-level interaction with the current control loop of the real drive ensures that the behavior is validated and verified, making it a reliable partner for optimizing your drive train system.

What sets SINAMICS DriveSim Advanced apart is its advanced level of customization and detail, allowing for more accurate testing and optimization of the drive train system. Its intuitive interface enables the fast set-up and configuration of your digital twin as well as the simulation of different operating conditions and scenarios.

Whether you are designing, commissioning or optimizing your drive train system, SINAMICS DriveSim Advanced is the tool you need. Its advanced features and high level of accuracy make it an essential tool for the best possible system performance.

#### Benefits

- Reduce costs and time: Eliminate the need for on-site visits, reduce costs and speed up the commissioning process.
- Testing and optimization of the drive train system without material damage.
- Improved accuracy: Perform precision simulations and tests on your systems, ensuring that they are optimized before the actual purchase.
- Increased flexibility: Make changes to your systems quickly and easily with flexibility to respond to the changes in your project requirements.
- Train the engineers and new users with the help of the virtual twin acting as a realistic partner.
- Virtual demonstration of the SINAMICS converters (prior to mounting or purchase).
- Diagnose and validate the faults or issues in the real environment and fix them with the help of the simulation without any risk of material damage and save resources (lower maintenance and downtime time, i.e. lower costs) without time pressure on the plant side.
- Identify issues and improvement capabilities early in the design stage and reduce testing effort to save time and cost.
- Valid for the next generation of SINAMICS converters.

## Application

SINAMICS DriveSim Advanced can be implemented in three major use cases.

Use case	Old approach	Advantages of the new approach with SINAMICS DriveSim Advanced
Virtual commissioning and engineering of the next generation of SINAMICS converters prior to the mounting	Commissioning of the converters after mounting or purchase	<ul style="list-style-type: none"> <li>• Saving of resources (lower maintenance and shorter downtime, i.e. lower costs)</li> <li>• No time pressure in the real installation, quick and fast reconfiguration of the system</li> <li>• Improved accuracy of the drive train system in detecting and resolving potential issues</li> <li>• Virtual commissioning helps ensure that the system is future-proof by incorporating the latest technologies and design standards.</li> </ul>
Virtual training and demonstration of the next generation of SINAMICS converters for engineers and new users	Trainings and demonstrations on the plant side (not in advance)	<ul style="list-style-type: none"> <li>• Virtual trainings and demonstrations in advance with the digital twin acting as a realistic partner</li> <li>• Make the changes to your systems quickly and easily.</li> <li>• Show and use different application (drives) just on one computer (no need for demo cases).</li> <li>• Traveling costs for trainings and demonstrations will not rise. Everything can be done virtually and in advance (before the hardware is purchased or released).</li> </ul>
Diagnose and validate the faults or issues in the real environment and fix them with the digital twin (optimization of the real machine)	Faults and issues of the system are solved on the plant side	<ul style="list-style-type: none"> <li>• Saving of resources (lower maintenance and shorter downtime, i.e. lower costs)</li> <li>• No time pressure in the real installation, quick and fast reconfiguration of the system</li> <li>• Improved accuracy of the drive train system in detecting and resolving potential issues</li> <li>• Virtual commissioning helps ensure that the system is future-proof by incorporating the latest technologies and design standards.</li> </ul>

## Integration

SINAMICS DriveSim Advanced is directly integrated in TIA Portal and SINAMICS Startdrive, i.e. different software tools are not necessary. Only the installation of SINAMICS DriveSim Advanced and TIA Portal with SINAMICS Startdrive is required.

## Selection and ordering data

Description	Article No.
<b>SINAMICS DriveSim Advanced V1.0 – Perpetual license (unlimited)</b>	<b>9SV1210-4AA00-0AA0</b>
<b>SINAMICS DriveSim Advanced V1.0 – Subscription (1 year license)</b>	<b>9SV1210-3AA00-0AA0</b>

## More information

More information is provided on the internet at:  
[www.siemens.com/drive-virtualization](http://www.siemens.com/drive-virtualization)

## Engineering tools

### Siemens Product Configurator

#### Overview

The Siemens Product Configurator helps you to configure the optimum drive technology products for a number of applications. The product portfolio comprises the full drive technology range of gearbox, motor, converter and connection system as well as corresponding controller with suitable software license. The intuitive user interface in conjunction with product-specific preliminary selectors makes it simple, fast and efficient to configure products. The result is a bill of materials with extensive documentation consisting of technical data sheets, motor characteristic curves, 2D dimensional drawings / 3D CAD models, EPLAN macros and much more. You can order the products directly by transferring the bill of materials to the shopping cart of SiePortal.



#### **Siemens Product Configurator at a glance**

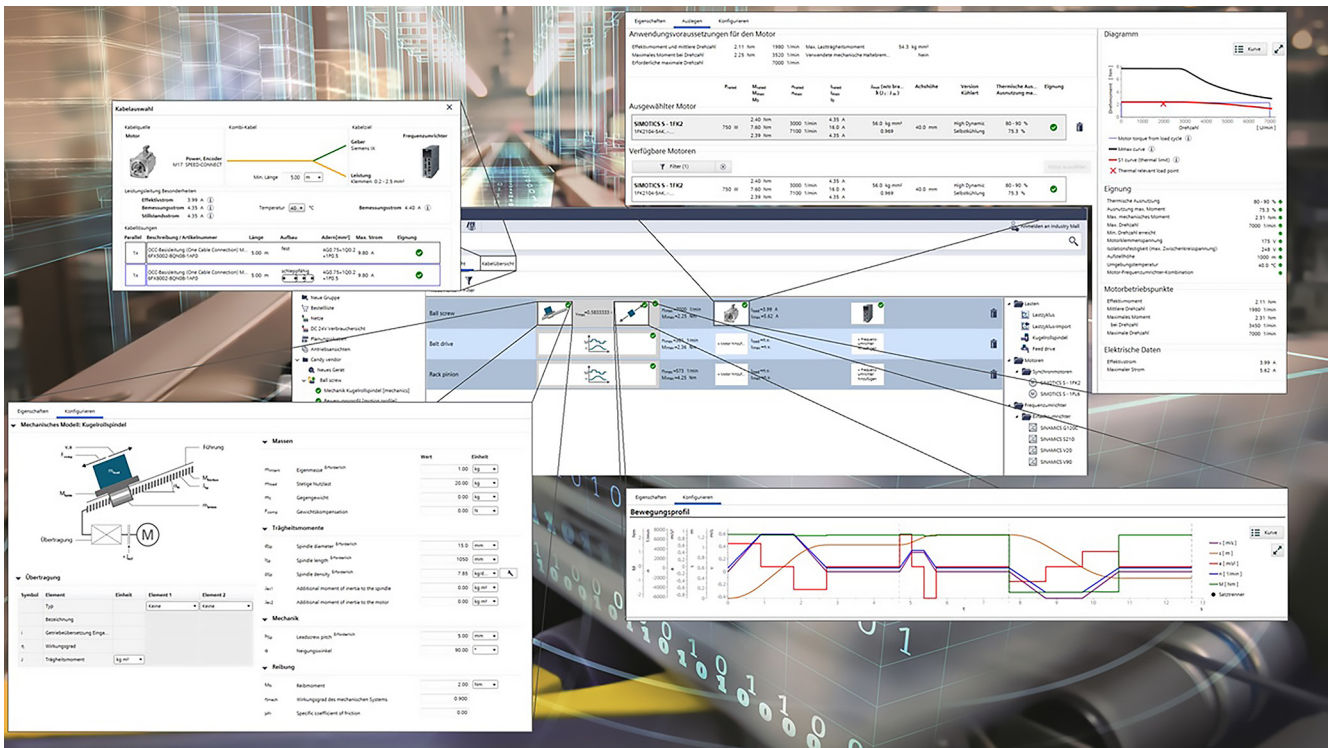
- Quick and easy configuration of drive products and associated components – gearboxes, motors, converters, controllers, connection systems
- Extensive documentation for all products and components, such as
  - Data sheets in up to 12 languages
  - Motor characteristic curves
  - 2D dimensional drawings / 3D CAD models in different formats
  - Terminal box drawing and terminal connection diagram
  - Certificates
  - EPLAN macros
- Ability to order products directly through SiePortal

#### Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without the need for registration or logging in:  
[www.siemens.com/spc](http://www.siemens.com/spc)



## Overview

Selection guide and configurator for automation technology

Error-free configuration without expert knowledge through intelligent configurators and selection wizards. Desktop and cloud versions enable cross-team collaboration with maximum flexibility.

There are two versions of the TIA Selection Tool:

- One for downloading and execution on Microsoft Windows PCs (from Microsoft Windows 10)
- One for running from the cloud, which is launched from mobile devices directly in the browser (we recommend Safari, Chrome and Firefox)

Projects stored in the cloud can be edited with both tools. This makes it possible to work on-the-go using a tablet, at home on a PC – and vice versa, or together with colleagues and customers.

In order to use the full functionality, we recommended setting up a SiePortal account for both cases. This gives you access to prices and enables you to save your projects to our cloud.

You can find additional information about the TIA Selection Tool at:

[www.siemens.com/tia-selection-tool](http://www.siemens.com/tia-selection-tool)

Drive dimensioning in the TIA Selection Tool

Application-specific requirements can be determined using drive technology dimensioning in the TIA Selection Tool. This can include motors, gearboxes and converters. The tool supports the configuration and dimensioning of control functions with an open and closed control loop. The technical documentation with features of the technical drive system, as well as a product list for ordering via SiePortal can also be compiled.

You can find more information on the SIZER for Siemens Drives engineering tool at

<https://support.industry.siemens.com/cs/ww/en/ps/13434/dl>

## Engineering tools

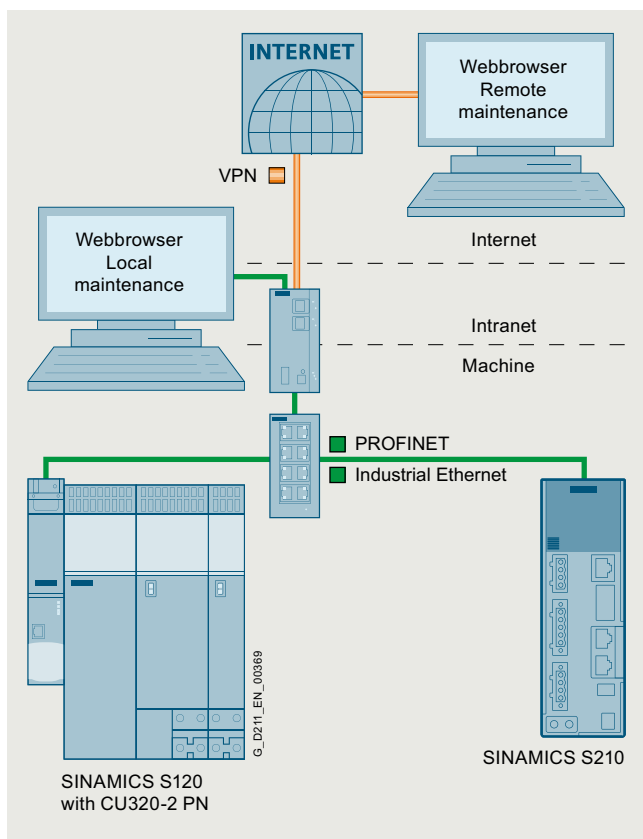
### SINAMICS web server for SINAMICS S210

#### Overview

##### **Web server for efficient commissioning, diagnostics and maintenance – available anywhere, anytime**

Thanks to the web server, the SINAMICS S210 drive system offers efficient commissioning, diagnostics and maintenance options. The web server provides access to a multi-faceted range of new options for parameter assignment, drive diagnostics and remote maintenance for any networked PC with a web browser or for tablets and smartphones (via a separate WLAN access point), including:

- Simple and fast commissioning
- Drive traversing via the control panel
- Downloading/uploading a configuration
- Providing a status overview of the drive
- Evaluating warnings and fault messages
- Monitoring and adapting parameter setting



Integration of the SINAMICS web server as shown by the example of SINAMICS S120, SINAMICS S210 and PROFINET communication

#### Benefits

##### Simple and fast commissioning

- No installation of additional commissioning software
- Simple controller optimization with One Button Tuning
- Easy parameterization of Safety Integrated Functions
- Standard pages for limit values and settings
- Comprehensive fault diagnosis
- Firmware update

##### Shorter machine downtimes

- Efficient diagnostics and maintenance

##### Direct language selection

- English, French, German, Italian, Spanish, Chinese Simplified

##### Accessibility

- Via all LAN or PROFINET interfaces
- Tablet and smartphone access via WLAN with separate access point

##### Two users with different rights profiles

- e.g. for operators and service personnel

##### Diagnostic functions

- Quick overview of the current configuration and the state of the drive
- Understandable diagnostic information and messages, including the causes of issues and possible remedies, are displayed in plain text in multiple languages

##### Freely configurable parameter lists

- Monitoring parameters for diagnostic purposes, for example for operating personnel
- Adjustment of the parameter lists using filters, parameter groups and the configuration of personal lists

##### Access security

- Protection against unauthorized access to the drive information

#### Application

The web server is ideal for applications in which special commissioning software or version dependencies are not desired. Easy commissioning, diagnostics and maintenance are possible both locally and remotely, provided appropriate security measures are applied.

## Overview

### **Web server for efficient commissioning, diagnostics, maintenance and operator control and monitoring, any time, from anywhere**

Thanks to the web server, the SINAMICS S210 drive system with the SINAMICS S210 servo converters (New) offers an efficient commissioning, diagnostics, maintenance option as well as operation and monitoring functions. The user is supported by a help function and additional links to specific product information, downloads, FAQs and manuals.

The web server provides access to a multi-faceted range of new options for commissioning or parameter assignment, drive diagnostics, remote maintenance as well as operator control and monitoring for any networked PC with a web browser or for tablets and smartphones (via a separate WLAN access point, such as SINAMICS Smart Adapter).

The following provides an insight into the functionality offered.

### The start screen offers a quick overview of the state of the drive

- Drive type, connected motor as well as the article number and installed firmware
- Important drive parameters show the operating state (can be configured)
- The connection overview provides information about the status of the connections (operating unit - converter - motor)
- Overview of all pending fault and warning messages

Start screen of the web server integrated into SINAMICS S210 (New)

## Commissioning

- The quick commissioning provides information about the current motor/encoder and offers the configuration of limit values and digital inputs
- Optimization of the drive settings using One Button Tuning (OBT)
- Easily and conveniently commission Safety Integrated functions

Nameplate data	Value	Unit
Rated current	2.4	Arms
Rated speed	3000	rpm
Rated voltage	130	Vrms
Maximum motor speed	7300	rpm
Maximum motor current	8.7	Arms
Optional motor data	Value	Unit
Rated power	0.4	kW
Rated torque	1.27	Nm
Motor stall current	2.4	Arms
Motor stall torque	1.27	Nm
Motor moment of inertia	0.000014	kgm <sup>2</sup>

Quick commissioning with open dialog showing the set motor data

Parameter name	Current value	Previous value
P gain	0.0282 Nms/rad	0.0287 Nms/rad
Integral time	2.69 ms	2.65 ms
Load moment of inertia	0.000000 kgm <sup>2</sup>	0.000000 kgm <sup>2</sup>
Kv factor estimated	34.67 1000 rpm	35.20 1000 rpm
Precontrol symmetrizing time estimated	0.23 ms	0.22 ms

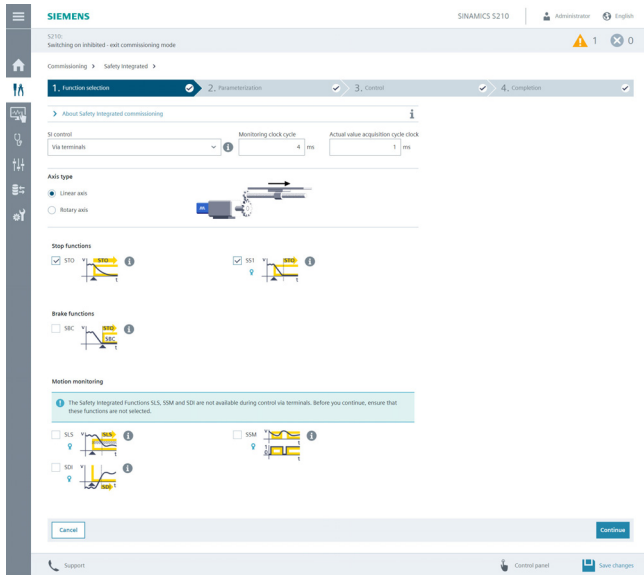
One Button Tuning (OBT)

# Engineering tools

## SINAMICS web server for SINAMICS S210 (New)

### Overview

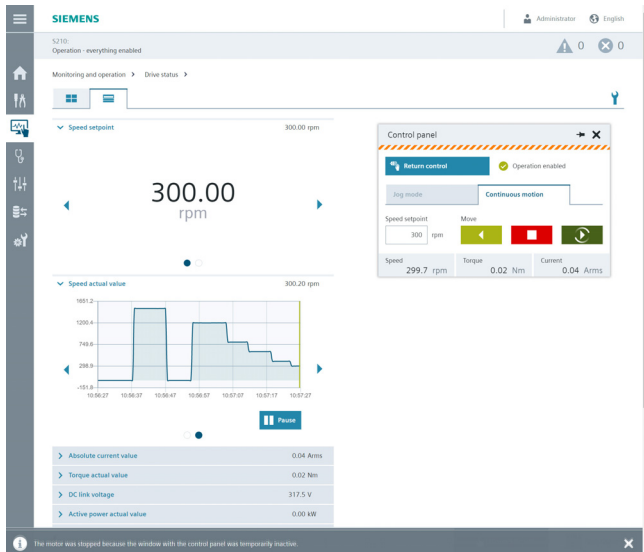
#### Commissioning (continued)



Safety Integrated assistant

#### Operator control and monitoring

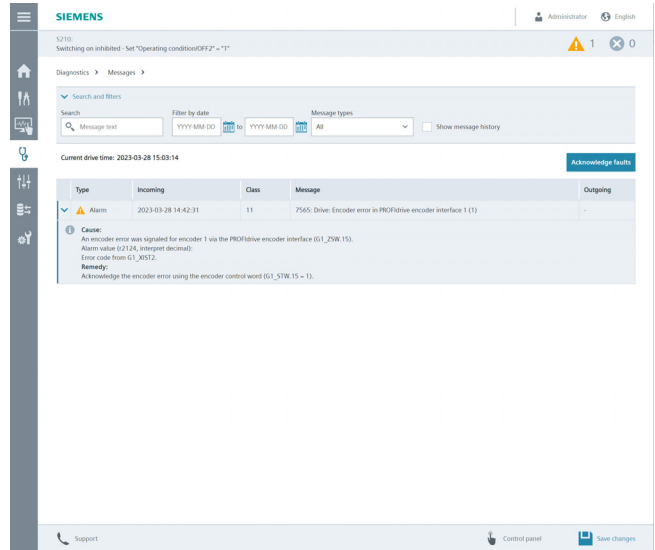
- Configurable drive status with value or trend display
- Status of the digital inputs
- Drive traversing via the control panel, which can be freely positioned on the screen



Operator control and monitoring of the drive with the help of the drive status and control panel

#### Diagnostics

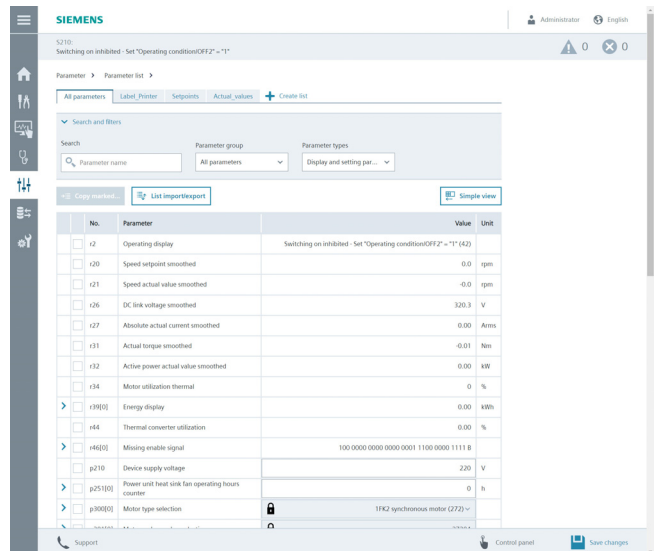
- Evaluation of warnings and fault messages
- Evaluation of system events (diagnostic buffer)
- Analysis of the safety status
- Connection overview, diagnostics of the drive communication and control and status words



Alarm view with convenient search and filter functions

#### Service and maintenance functions

- Monitor and adjust drive parameters
- Create, import and export user-specific parameter lists
- Back up and restore the drive configuration
- Perform firmware update, also via the network
- Manage software licenses
- Configure basic settings for the drive and web server (e.g. date and time of the drive)
- Configure and manage user accounts and access controls (UMAC)



Parameter list for quick access to drive parameters, also via user-defined parameter lists

## Overview

### Support

- Operator support with comprehensive information about the drive and user interface
- Easy access to product information such as FAQs, software downloads, manuals and certificates
- When storing the html documentation on the drive memory card, the user manual can be accessed in a context-sensitive manner from the user interface

Support



#### Links to the Siemens Industry Online Support

##### General links

[Product page SINAMICS S210](#)

[Siemens Industry Online Support - homepage](#)

##### Product-specific links for SINAMICS S210

[Product support](#)

[FAQs](#)

[Software downloads](#)

[Manuals / Operating Instructions](#)

[Test certificates / Certificates](#)

[Product note](#)

#### Link to product information

[Component-specific QR codes](#)



Component



Type: SINAMICS S210  
Article number: 6SL5310-1BB10-1CF0  
Serial number: ZVR1102803278

OK

Support dialog for quick access to product-specific information

## Benefits

### Simple and fast commissioning

- Installation of additional commissioning software is not required.
- Tools required for the commissioning are ready to use via the integrated web server.
- Standard pages to set thresholds and onboard inputs
- Simple controller optimization with One Button Tuning (OBT)
- Guided parameterization of Safety Integrated functions
- Extensive online help with context-sensitive access to the Operating Instructions (memory card required)

### Shorter machine downtimes

- Quick overview of the current configuration and the state of the drive
- Efficient diagnostics and maintenance
- Understandable diagnostic information and messages, including the causes of issues and possible remedies, are displayed in plain text in multiple languages
- Context-sensitive help with optional access to the web-based device documentation provides quick help with questions about drive functions

### Convenient service and maintenance functions

- Quick backup and restoration of the drive data
- Convenient firmware update, also via the network
- Convenient access to drive parameters
- User-defined parameter lists that focus on what matters
- Easy and efficient handling of the parameter list by using search functions and filters (e.g. parameter groups, parameter types)
- Easy exchange with operating personnel by importing/exporting user-defined parameter lists.
- User-defined parameter lists can be exchanged between the SINAMICS Startdrive and the web server.

### Direct language selection

- English, French, German, Italian, Spanish, Chinese Simplified

### Accessibility

- Via all LAN or PROFINET interfaces
- Use of mobile devices (e.g. notebooks/tablets and smartphones) via WLAN e.g. with SINAMICS Smart Adapter or a separate access point
- Access to the web server via PCs/notebooks, SIMATIC HMI (> 10"), smartphones/tablets with a Chromium-based internet browser

### Access security

- Protection against unauthorized access to the drive functions and data
- Convenient user administration that supports a roles concept
- Easy set-up and management of user accounts

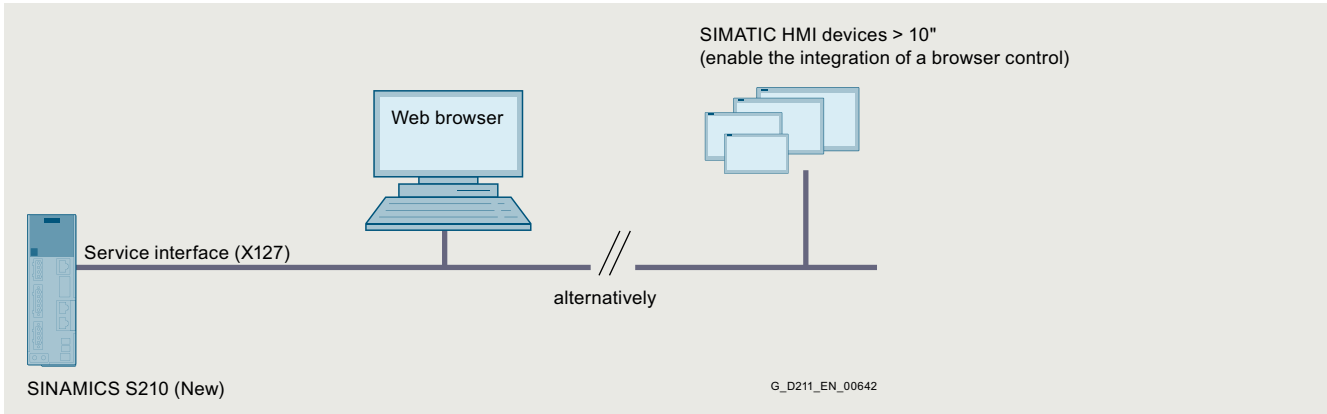
## Application

The web server is ideal for applications not requiring any special commissioning software or version dependencies. Commissioning, diagnostics and maintenance as well as operator control and monitoring are possible both locally and remotely, provided appropriate security measures are applied.

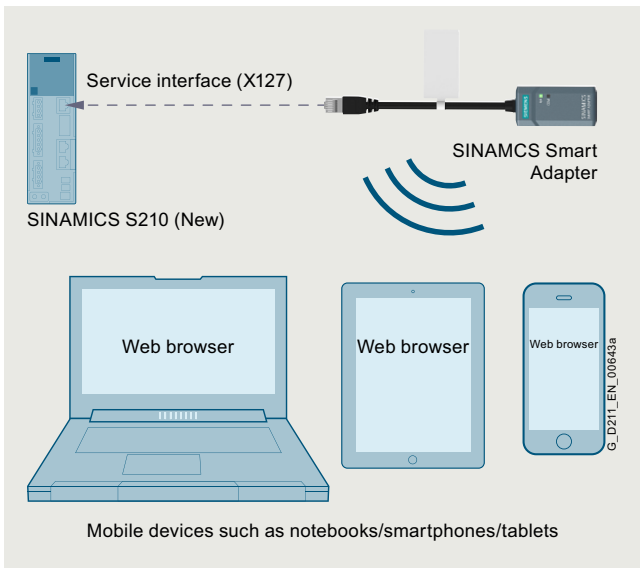
# Engineering tools

## SINAMICS web server for SINAMICS S210 (New)

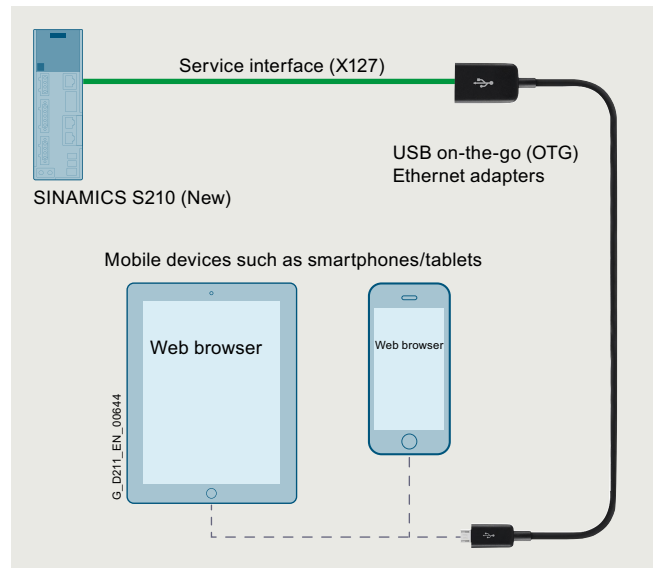
### Integration



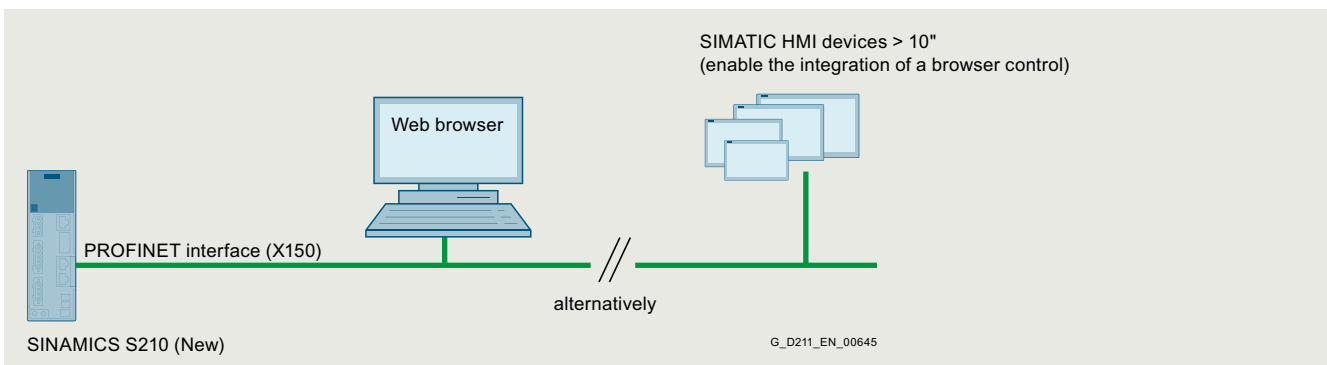
Integration of the SINAMICS web server based on the example of a SINAMICS S210 (New) and the service interface (X127)



Wireless access to the web server via the service interface (X127) of the SINAMICS S210 (New) with the help of the SINAMICS Smart Adapter



Access to the web server via the service interface (X127) of the SINAMICS S210 (New) with the help of a USB on-the-go (OTG) Ethernet adapter



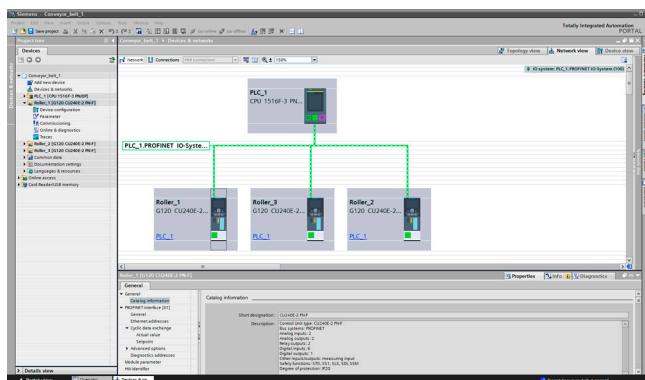
Integration of the SINAMICS web server based on the example of a SINAMICS S210 (New) and the PROFINET interface (X150) as connected web client (e.g. PC, SIMATIC HMI etc.)

5

## Overview

SINAMICS Startdrive is integrated in the TIA Portal and is a tool for the configuration, commissioning and diagnostics of the SINAMICS family of converters.

The SINAMICS Startdrive commissioning tool has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common working environment for PLC, HMI and drives. Time-saving and guided step-by-step commissioning with maximum flexibility is complemented by user-friendly graphic function views for all drive functions, including functional safety (Safety Integrated) and drive-based technology functions (e.g. EPos). The automatic message display, the powerful real-time trace and the context-sensitive online help make converter diagnostics very easy.



The software packages based on the TIA Portal are harmonized with each other and offer important benefits, the main advantage being a shared project storage. The TIA Portal enables simple integration of SINAMICS converters in your automation solution. Thanks to the standardization of operator actions and the integration in general TIA Portal operating concepts (e.g. UMAC, Openness) as well as standard TIA Portal functions (e.g. Undo/Redo), familiarization is easy both for drive experts as well as SIMATIC users. Special focus is placed on the interaction between SIMATIC and SINAMICS, especially when connecting the SINAMICS drives to SIMATIC technology objects.

## Integration

### Supported frequency converters

SINAMICS Startdrive Basic enables complete commissioning, diagnostics, parameterization, optimization and connection to the PLC for the following SINAMICS converters integrated in SINAMICS Startdrive:

- SINAMICS G120, G120C, G120D, G120P
- SINAMICS G115D
- SINAMICS G130, G150
- SINAMICS G220 (as of V18 SP2)
- SINAMICS S120 <sup>1)</sup>, S150
- SINAMICS S210 and SINAMICS S210 (New) (as of V18 SP1)
- SINAMICS S200 (as of V18 SP2)
- SINAMICS MV

<sup>1)</sup> Including SINAMICS S220 Smart Line Modules in booksize format as of SINAMICS Startdrive V17 Update 1.

## SINAMICS Startdrive Advanced

With SINAMICS Startdrive Advanced (available as of V15) you benefit from powerful engineering functions that save you considerable time and ultimately costs.

- Safety acceptance test:
  - Guided acceptance test wizard for all drive-based Safety Integrated functions
  - Automatic and safety function-specific generation of traces to analyze the machine behavior
  - Generation of an acceptance report as Excel file (xlsx format, can also be used with OpenOffice)
  - Safety Activation Test
- Improved optimization options in the drive: Extended measuring functions (available for CU320-2 PN/DP and CU310-2 PN as of V5.2 SP3, SINAMICS S210 (New) as of V6.1 and SINAMICS S200 as of V6.2), long-term trace
- Also contains all Startdrive Basic functions
- Only license key required, no additional installation

## New in V19

### Startdrive Basic V19

- Support of the shared device functionality for SINAMICS S210, S120, G220 for separate control of the drives by separate controllers
- Improvement of the library function for individual drive objects in the multi-axis system
- Integration of the decentralised SINAMICS S120M drives
- Integration of the drive version V6.3 for SINAMICS S200 and SINAMICS S210 (New):
  - Introduction of the positioning function EPos for SINAMICS S210 (New)

### Startdrive Advanced V19

- Long-term trace functionality for CU320-2 PN/DP and CU310-2 PN-based drive units

## Installation versions

SINAMICS Startdrive can be installed as an optional package to SIMATIC STEP 7 or as a stand-alone application (without SIMATIC STEP 7).

## System requirements

The following table shows the recommended hardware and system equipment for the operation of SINAMICS Startdrive.

Hardware	Recommendation
<b>Computer</b>	As of SIMATIC FIELD PG M6 Comfort (or comparable PC)
<b>Processor</b>	Intel Core i5-8400H (2.5 ... 4.2 GHz; 4 cores + hyper-threading; 8 MB Smart Cache)
<b>RAM</b>	16 GB or more (32 GB for large projects)
<b>Hard disk</b>	SSD with at least 50 GB available memory
<b>Screen resolution</b>	15.6" Full HD display (1920 × 1080 or larger)
<b>Operating systems</b>	<ul style="list-style-type: none"> <li>• <b>Microsoft Windows 10 (64 bit)</b> <ul style="list-style-type: none"> <li>- Windows 10 Professional Version 22H2</li> <li>- Windows 10 Enterprise 21H2, 22H2</li> <li>- Windows 10 Enterprise 2016 LTSC</li> <li>- Windows 10 Enterprise 2019 LTSC</li> <li>- Windows 10 Enterprise 2021 LTSC</li> </ul> </li> <li>• <b>Microsoft Windows 11 (64 bit)</b> <ul style="list-style-type: none"> <li>- Windows 11 Home Version 21H2, 22H2</li> <li>- Windows 11 Professional Version 21H2, 22H2</li> <li>- Windows 11 Enterprise 21H2, 22H2</li> </ul> </li> <li>• <b>Microsoft Windows Server (64 bit)</b> <ul style="list-style-type: none"> <li>- Windows Server 2016 Standard (full installation)</li> <li>- Windows Server 2019 Standard (full installation)</li> <li>- Windows Server 2022 Standard (full installation)</li> </ul> </li> </ul>

## Engineering tools

### SINAMICS Startdrive commissioning tool

#### Integration

##### Compatibility with other products

- SINAMICS Startdrive V19 operates with STEP 7, WinCC and Scout TIA V19 in one framework
- SINAMICS Startdrive V19 can be installed on the same computer in parallel with other versions of SINAMICS Startdrive V12 to V18
- SINAMICS Startdrive can be installed on the same computer as SINAMICS MICROMASTER STARTER

##### Supported virtualization platforms

SINAMICS Startdrive can be installed in a virtual machine. For this purpose, one of the following virtualization platforms in the specified version or a newer version can be used:

- VMware vSphere Hypervisor (ESXi) 6.7
- VMware Workstation 15.5.0
- VMware Player 15.5.0
- Microsoft Hyper-V Server 2019

##### Supported safety programs

The following safety programs have been tested with SINAMICS Startdrive V19:

- Virus scanners:
  - Symantec Endpoint Protection 14.6
  - Trend Micro OfficeScan 14.0
  - McAfee Endpoint Security (ENS) 10.6 and 10.7
  - Microsoft Defender
  - Qihoo 360 "Safe Guard 12.1" + "Virus Scanner"
- Encryption software:
  - Microsoft Bitlocker
- Host-based Intrusion Detection System
  - McAfee Application Control 8.3.3

#### Selection and ordering data

Description	Article No.
<b>SINAMICS Startdrive Basic V19 commissioning tool</b> Single license and certificate of license English, French, German, Italian, Spanish, Chinese Simplified • Software download (email address required for delivery)	<b>6SL3072-4KA02-0XG0</b>
<b>SINAMICS Startdrive Advanced V19 commissioning tool</b> License key (floating license) English, French, German, Italian, Spanish, Chinese Simplified • On DVD-ROM with license key on USB flash drive • Software download incl. license key (email address required for delivery)	<b>6SL3072-4KA02-0XA5</b> <b>6SL3072-4KA02-0XG5</b>
<b>Upgrade SINAMICS Startdrive Advanced V15 ... V18 to V19</b> • On DVD-ROM with license key on USB flash drive • Software download incl. license key (email address required for delivery)	<b>6SL3072-4KA02-0XE5</b> <b>6SL3072-4KA02-0XK5</b>
<b>Software Update Service with SINAMICS Startdrive Advanced in the TIA Portal</b> Delivery is performed according to the number of ordered SUS products (e.g. 10 upgrade license keys (floating license) with 10 DVD-ROMs, 10 USB flash drives, etc.) • On DVD-ROM with upgrade license key on USB flash drive • Software download incl. license key (email address required for delivery)	<b>6SL3072-4AA02-0XL8</b> <b>6SL3072-4AA02-0XY8</b>

#### Accessories

Depending on the version of the Control Unit (CU), the Control Unit of the drive unit can communicate with the programming device (PG) or PC via PROFIBUS or PROFINET/Ethernet or via a serial interface. The following accessories are available for the particular drive system as listed in the following table.

Recommended accessories For communication between the drive unit and the programming device or PC	
Description	Article No.
<b>SINAMICS S210 (New)</b> • Wi-Fi <b>SINAMICS Smart Adapter</b> <sup>1)</sup> Wi-Fi solution for the next generation of SINAMICS converters SINAMICS S200 <sup>1)</sup> , SINAMICS S210 (New) <sup>1)</sup> and SINAMICS G220	<b>6SL4950-0AJ00-0AA0</b>

#### More information

The SINAMICS Startdrive Basic commissioning tool is available free on the internet at [www.siemens.com/startdrive](http://www.siemens.com/startdrive)

### SINAMICS Migration Tool

#### Overview

##### Support for migration from SINAMICS S210 TIA projects

To update TIA projects with existing SINAMICS S210 and firmware V5.x to SINAMICS S210 (New) with firmware V6.x, the SINAMICS Migration Tool is on hand, offering a convenient way to replace the converters.

Migration tends to take place automatically in offline mode. Parameter assignment and drive networking remain unchanged.

Only the security settings (incl. Safety Integrated) need to be manually set, for the purpose of protecting the project.

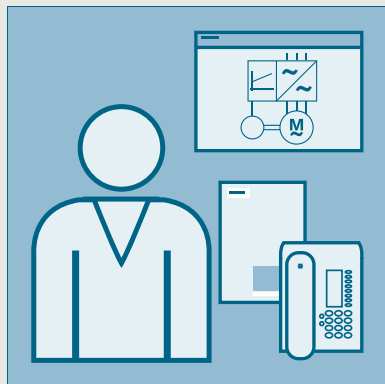
The SINAMICS Migration Tool requires the TIA Portal V18 SP1 or higher.

<https://support.industry.siemens.com/cs/document/109822030>

<sup>1)</sup> Release for SINAMICS S200 and SINAMICS S210 (New) available soon.



## Services and documentation



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<b>6/10</b>	<b>Drives Options Partner</b>
<b>6/11</b>	<b>mySupport documentation</b>
<b>6/12</b>	<b>Documentation</b>
6/13	General documentation
6/13	SINAMICS S210 documentation

## Services and documentation

### Partner

#### Partner at Siemens

**SIEMENS**

**Contacts at Siemens**

Please choose a city in the upper search field, if possible. Or select a city on a contact person on the map on the right. If you do not find your city in the subsection, we recommend choosing the nearest city.

**Siemens NVISA**

Digital Factory - Process Industries and Drives  
Service Shop

Address  
GUIDO GIZELLESTRAAT 123  
1654 Beersel  
Belgium

Communication data  
+32 2 536 4971  
+32 2 536 8851  
silrepairs.be@siemens.com  
http://www.siemens.be/industry

Competence:

Products & Branches:

Region:

**Siemens SPA**

Digital Factory - Process Industries and Drives  
- Service

Address  
L'Entassement el Kadous, Lot No 10  
16035 Algier  
Algeria

Communication data  
+213 21 36 14 55/58/74/75/76/82/94  
+213 21 36 13 79  
support\_automation\_dz@siemens.com  
rehab\_benamar@siemens.com  
http://www.siemens.com

Competence:

Products & Branches:

Region:

At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Siemens.

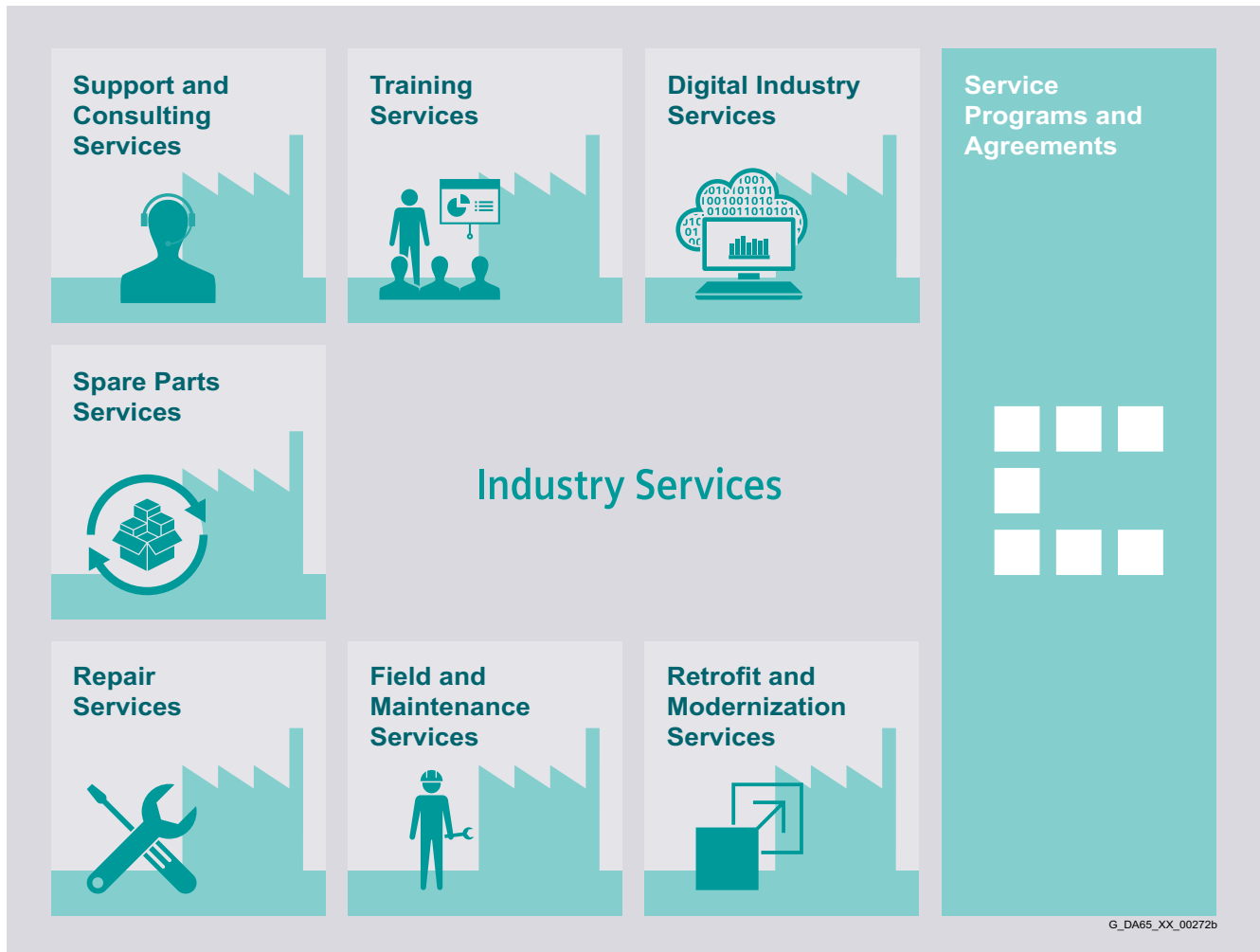
Your partner can be found in our Personal Contacts Database at: [www.siemens.com/automation-contact](http://www.siemens.com/automation-contact)

You start by selecting

- the required competence,
- products and branches,
- a country and a city

or by a

- location search or free text search.

**Overview**

**Keep your business running and shaping your digital future – with Industry Services**

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

[www.siemens.com/industryservices](http://www.siemens.com/industryservices)

## Services and documentation

### Industry Services

#### Industry Services – Portfolio overview

##### Overview



Digital Industry Services

#### Digital Industry Services

Digital Industry Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.

[www.siemens.com/global/en/products/services/industry/digital-industry-services.html](https://www.siemens.com/global/en/products/services/industry/digital-industry-services.html)



Training Services

#### Training Services

From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

<https://support.industry.siemens.com/cs/ww/en/sc/2226>



Support and Consulting Services

#### Support and Consulting Services

**Industry Online Support** site for comprehensive information, application examples, FAQs and support requests.

**Technical and Engineering Support** for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

**Information & Consulting Services**, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2235>



Spare Parts Services

#### Spare Parts

Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management.

Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

**Asset Optimization Services** help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

<https://support.industry.siemens.com/cs/ww/en/sc/2110>



Repair Services

#### Repair Services

Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.

<https://support.industry.siemens.com/cs/ww/en/sc/2154>



Field and Maintenance Services

#### Field and Maintenance Services

Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.

All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

<https://support.industry.siemens.com/cs/ww/en/sc/2265>



Retrofit and Modernization Services

#### Retrofit and Modernization Services

Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2286>



Service Programs and Agreements

#### Service Programs and Agreements

A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.

<https://support.industry.siemens.com/cs/ww/en/sc/2275>

Overview

Online Support – fast, intuitive, whenever you want, wherever you need

**Web**  
[www.siemens.com/online-support](http://www.siemens.com/online-support)

**App**

GET IT ON Google Play | Learn on the App Store | Herunterladen von Microsoft

Scan the QR code for information on our Online Support app.

- FAQ / Application examples**  
Information about industrial products, programming and configuration as well as application examples
- Technical information**  
Videos, documentation, manuals, updates, product notes, compatibility tool, certificates, planning data such as dimensional drawings, product data, 3D models
- Forum**  
Exchange information and experience with other users and experts

## Online Support for Siemens Industry Products

Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.

## Services and documentation

### Training

#### SITRAIN – Digital Industry Academy

#### Introduction



SITRAIN – DIGITAL INDUSTRY ACADEMY  
**The Future of Learning starts now**

SITRAIN - Digital Industry Academy stands for a modern learning culture that focuses on the needs of learners and the demands of innovative companies.

SITRAIN offers a comprehensive range of knowledge on Siemens industrial products and, under the vision "Future of Learning", pursues a holistic approach that combines different forms and methods of learning. Different learning formats allow for more effective, flexible and continuous learning depending on the type of learning.

#### Education and training directly from the manufacturer



##### Industrial Automation Systems SIMATIC

Training available for: SIMATIC S7-1500, TIA Portal, SIMATIC S7-300/400, SIMATIC S7-1200



##### Drive Technology

Training available for: SINAMICS S120 and SINAMICS G120 low-voltage converters, SINAMICS G130 / G150 / G180 / S150



##### SINUMERIK CNC automation system

Training available for: SINUMERIK 840D, SINUMERIK 840D sl and SINUMERIK ONE



##### Process Control Systems

Training available for: SIMATIC PCS 7, SIMATIC PCS neo



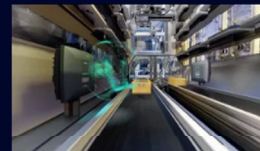
##### Digital Enterprise

Training available for: Openness, SIMIT, OPC UA, Industrial Edge, Virtual commissioning



##### Industrial Communications

Training available for: PROFINET, SCALANCE, RUGGEDOM, Industrial Ethernet, Fieldbus communication, Industrial Security, Remote communication



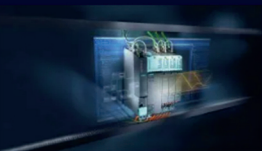
##### Identification and Locating

Training available for: RFID, RTLS-Systems



##### Operator Control and Monitoring Systems

Training available for: SIMATIC WinCC Unified in TIA Portal, SIMATIC WinCC in TIA Portal, SIMATIC WinCC V7x



##### Motion Control System SIMOTION

Training available for: SIMOTION (Programming, Commissioning, Diagnostics, Service)



##### Smart Infrastructure

Training available for: SIRIUS, SENTRON, SIVACON, ALPHA, SIMOCODE, Circuit breakers



##### Process Analytics & Instrumentation

Training is available for process analytics and instrumentation, explosion protection, process gas chromatographs



##### Additional training offer

SIMOVE with Automated Guided Vehicles (AGV), SIPLUS CMS, Guidelines and standards for control cabinets

**Introduction**

**Different learning formats and methods for maximum learning success**

Face-to-face training in the training center or in the virtual classroom, with fixed dates and course times, learning in a group with a learning guide? Or digital training, on your own responsibility and location-independent, on demand, 24/7?

With the learning formats "Learning Journey", "Learning Membership" and "Learning Event", SITRAIN offers a wide range of different learning options in connection with didactically effective methods and modular possibilities.



**Learning Journey**

The combination for sustainable learning success

- The optimal mix of self-study units and guided live modules
- Includes a Learning Membership to work through the self-study modules and access on-demand content
- The SITRAIN learning consultant is available for questions and one-on-one consultations
- Ideal integration into the daily work routine and adaptation to one's own learning pace.



**Learning Membership**

Securing knowledge through continuous learning on your own responsibility

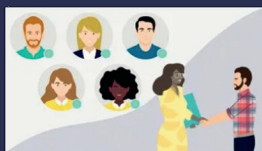
- With access to the comprehensive and constantly growing range of self-study units on SITRAIN access, the digital learning platform
- Search and find specific learning content or simply have a look around – anytime and anywhere
- A modern learning culture through continuous learning on your own responsibility and transparency about your learning success in the team or company.



**Learning Event**

Acquire theoretical and practical knowledge in a compact and guided format

- You achieve a defined learning goal in the shortest possible time
- The learning consultant guides you through the practical exercises and is also exclusively available to you during the theoretical sessions for the entire duration
- Focused learning, outside of the daily work routine, in a protected learning environment – virtually, in the training center, or at your company.



**Live**

Learn together with others, simultaneously and guided by a learning consultant. Online, in the SITRAIN training center or at your company.



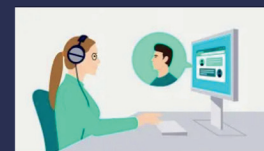
**Self-reliant**

Expand your knowledge self-determined with industry learning and work on your learning units at your own pace and according to your own schedule.



**On demand**

Get the knowledge you need, exactly when you need it. Be it to answer a current question or to work on a special topic.



**Individuell**

Talk directly with the learning consultant, clarify detailed questions and get personal coaching for transferring the learned topics to your own application.



**Training cases catalog**

<https://www.siemens.com/sitrain-catalog-training-cases>

Find your local offer here



**SITRAIN – Digital Industry Academy worldwide**

You will find the regional knowledge offer in the country selection. One click will take you to the corresponding website.

## Services and documentation

### Training

#### SINAMICS S210 training case

##### Overview



SINAMICS S210 training case

The SINAMICS S210 training case (version with 2 axes and PROFINET) is a convincing demonstration system thanks to its compact design. It is suitable for direct presentations as well as for tests in technical departments. The training case enables the functions of SINAMICS S210 servo drive system to be demonstrated and tested quickly and easily.

It contains the following components:

- 2 × SINAMICS S210 servo converters (New), 0.1 kW, 230 V 1 AC
- 2 × SIMOTICS S-1FK2 servomotors, High Dynamic (1 × singleturn, 1 × multiturn, without break)
- 2 × One Cable Connection (OCC) motor connection cable
- Rail, prepared for installation of a controller, e.g. SIMATIC S7-1500 (controller not included in scope of delivery)

The SINAMICS S210 training case is supplied as a trolley with a hood.

##### Technical specifications

SINAMICS S210 training case	6AG1067-1AA33-0AA0
<b>Supply voltage</b>	230 V 1 AC
<b>Dimensions</b>	
• Width	420 mm (16.54 in)
• Height	580 mm (22.83 in)
• Depth	340 mm (13.39 in)
<b>Weight, approx.</b>	21 kg (46.3 lb)

##### Selection and ordering data

Description	Article No.
<b>SINAMICS S210 training case</b>	<b>6AG1067-1AA33-0AA0</b>



### Overview



Our understanding of an application is the customer-specific solution of an automation task based on standard hardware and software components. In this respect, industry knowledge and technological expertise are just as important as expert knowledge about how our products and systems work. We are setting ourselves this challenge with more than 280 application engineers in 20 countries.

#### Application centers

We currently have application centers in:

- Germany: Head Office in Erlangen and in other German regions, e.g. in Munich, Nuremberg, Stuttgart, Mannheim, Frankfurt, Chemnitz, Cologne, Bielefeld, Bremen, Hanover, Hamburg
- Belgium: Brussels
- Brazil: Sao Paulo
- China: Beijing and 12 regions
- Denmark: Ballerup
- France: Paris
- Great Britain: Manchester
- India: Mumbai
- Italy: Bologna, Milan
- Japan: Tokyo, Osaka
- The Netherlands: The Hague
- Austria: Vienna
- Poland: Warsaw
- Sweden: Göteborg
- Switzerland: Zurich, Lausanne
- Spain: Madrid
- South Korea: Seoul
- Taiwan: Taipei
- Turkey: Istanbul
- USA: Atlanta

These application centers specialize in the use of SIMATIC/SIMOTION/SINAMICS. You therefore can rely on automation and drive specialists for implementing successful applications. By involving your personnel at an early stage in the process, we can provide a solid basis for rapid knowledge transfer, maintenance and further development of your automation solution.

#### Advice on applications and implementation

We offer a variety of consultation services to help you find the optimum solution for the SIMATIC/SIMOTION/SINAMICS application you want to implement:

The quotation phase includes

- clarification of technical questions,
- discussion of machine concepts and customer-specific solutions,
- selection of suitable technology and
- suggestions for implementation.

A technical feasibility study is also performed at the outset. In this way, difficult points of the application can be identified and solved early on. We can also configure and implement your application as a complete solution from a single source.

A large number of proven standard applications are available for use during the implementation phase. This saves engineering costs.

The system can be commissioned by experienced, competent personnel, if required. This saves time and trouble.

If servicing is required, we can support you on site or remotely. For further information about servicing, please see the section "Industry Services".

#### On-site application training

Training for the implemented applications can also be organized and carried out on site. This training for machine manufacturers and their customers does not deal with individual products, but the entire hardware and software system (for example, automation, drives and visualization).

From an initial concept to successful installation and commissioning: We provide complete support for SIMATIC/SIMOTION/SINAMICS! Contact your Siemens representative.

You can find further information at [www.siemens.com/machinebuilding](http://www.siemens.com/machinebuilding)

## Services and documentation

### Drives Options Partner

#### Overview

##### Siemens Product Partners for Drives Options

###### Individual options for our drives

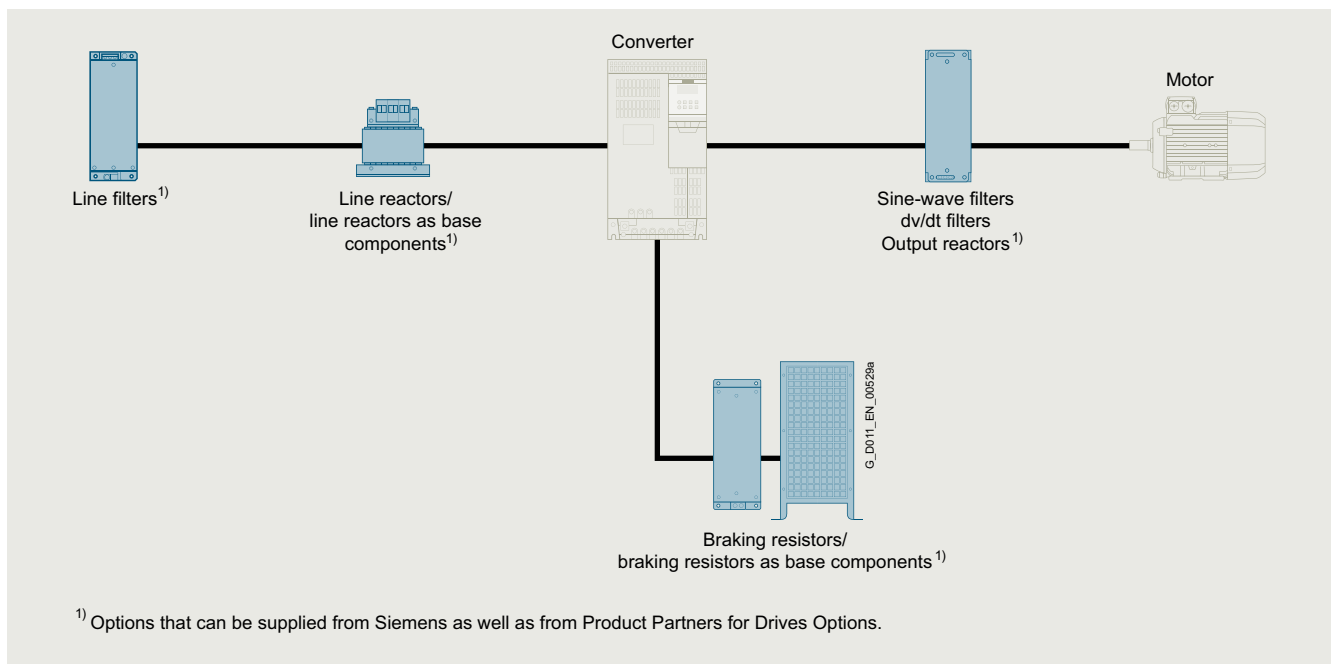
In order to meet as many customer requirements as possible in the field of drive technology, in addition to its own products, Siemens also relies on the individual and complementary services of selected partners.

We are increasingly focusing on the standard drive options, and our Siemens Product Partners for Drives Options supplement our drives with individual drive options.

This gives Siemens a unique flexibility to meet all application requirements. Naturally, we support our Siemens Product Partners for Drives Options in tailoring their options perfectly to our drives.

For you as our customer, there are multiple benefits:

- The Siemens Product Partners for Drives Options meet the same high standards of quality and performance that we place on our own products
- Drive options can be adapted to individual requirements/ designs
- The Siemens Product Partners for Drives Options know our Siemens converter portfolio and can advise you individually and quickly



Schematic circuit diagram

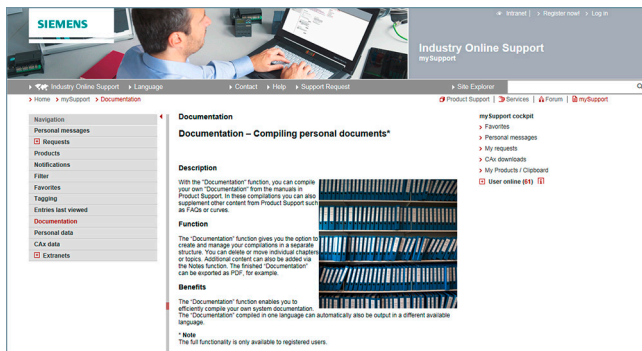
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#### More information

You can find more information on the internet at [www.siemens.com/drives-options-partner](http://www.siemens.com/drives-options-partner)

### Overview

#### mySupport documentation – Compiling personal documents



mySupport documentation is a web-based system for generating personalized documentation based on standard documents and is part of the Siemens Industry Online Support portal.

In mySupport, a personal document library can be created in the "Documentation" category. This library can be accessed online in mySupport or also be generated in various formats for offline use.

Previously, this functionality was available in the My Documentation Manager for configurable manuals. Due to the integration in mySupport, all entries of the Industry Online Support can now be imported into the personal document library, including FAQs or product notifications.

If you have already worked with the My Documentation Manager, all of the previously created libraries will continue to be available without restrictions in mySupport.

In addition, the personal library in mySupport can be shared with other mySupport users. In this way, a collection of relevant documents can be created very effectively and used together with other mySupport users all over the world.

You must register/log in for configuring and generating/managing.

### Benefits

- Display  
View, print or download standard documents or personalized documents
- Configure  
Transfer standard documents or parts of them to personalized documents
- Generate/Manage  
Generate and manage personalized documents in the formats PDF, RTF or XML in all available languages

### Function

#### Opening mySupport documentation in the Industry Online Support portal

- Via the product support, entry type "Manual":  
<https://support.industry.siemens.com/cs/ww/en/ps/manual>  
By clicking on the required version of the manual and then "Show and configure", the manual opens in a modular view, where you can navigate from topic to topic. Here the direct link to a topic can be used and made available to other users. The selected document can be added to the personal library via "mySupport Cockpit" > "Add to mySupport documentation".
- Via the direct link  
<https://support.industry.siemens.com/my/ww/en/documentation/advanced>  
After logon/registration, the online help is displayed as the current document.

### More information

You can find additional information on the internet at

- <https://support.industry.siemens.com/my/ww/en/documentation>
- [https://support.industry.siemens.com/cs/helpcenter/en/index.htm?#persoenliche\\_bibliothek\\_aufbauen.htm](https://support.industry.siemens.com/cs/helpcenter/en/index.htm?#persoenliche_bibliothek_aufbauen.htm)

## Services and documentation

### Documentation

#### Overview

A high-quality programmable control or drive system can be used to maximum effect only if the user is aware of the performance of the products used as a result of intensive training and good technical documentation.

This is becoming more important due to the shorter innovation cycles of modern automation products and the convergence of electronics and mechanical engineering.

A comprehensive range of documentation is available which includes a Getting Started guide, operating instructions, installation manuals and a list manual.

The documents are available in hardcopy form or as a PDF file for downloading from the internet.

Information and documentation relating to SINUMERIK, SINAMICS, SIMOTION and SIMOTICS are available on the internet at <https://support.industry.siemens.com/cs/document/109476679>

#### Application

##### *Explanations of the manuals:*

- **Operating Instructions**  
contain all the information needed to install the device and make electrical connections, information about commissioning and a description of the converter functions.  
Phases of use: Control cabinet construction, commissioning, operation, maintenance and servicing.
- **Hardware Installation Manual**  
contains all relevant information about the intended use of the components of a system (technical specifications, interfaces, dimensional drawings, characteristics, or possible applications), information about installation and electrical connections and information about maintenance and servicing.  
Phases of use: Control cabinet configuration/construction, maintenance and servicing.
- **Operating and Installation Instructions** (for converter and accessories)  
contain all relevant information about the intended use of the components, such as technical specifications, interfaces, dimensional drawings, characteristics, or possible applications.  
Phases of use: Control cabinet configuration/construction.
- **Manual/Configuration Manual**  
contains all necessary information about the intended use of the components of a system, e.g. technical specifications, interfaces, dimensional drawings, characteristics, or possible applications.  
Phases of use: Cabinet configuration/setup, circuit diagram configuration/drawing.
- **Commissioning Manual**  
contains all information relevant to commissioning after installation and wiring. It also contains all safety and warning notices relevant to commissioning in addition to overview drawings.  
Phases of use: Commissioning of components that have already been connected, configuration of system functions.
- **List Manual**  
contains all parameters, function diagrams, and faults/alarms for the product/system as well as their meanings and setting options. It contains parameter data and fault/alarm descriptions with functional correlations.  
Phases of use: Commissioning of components that have already been connected, configuration of system functions, fault cause/diagnosis.
- **Getting Started**  
provides information about getting started for the first-time user as well as references to additional information. It contains information about the basic steps to be taken during commissioning. The information in the other documentation should be carefully observed for all of the other work required.  
Phases of use: Commissioning of components that have already been connected.
- **Function Manual Drive Functions**  
contains all the relevant information about individual drive functions: Description, commissioning and integration in the drive system.  
Phases of use: Commissioning of components that have already been connected, configuration of system functions.

**Overview**

Description	Article No.
<b>Decentralization with PROFIBUS DP/DPV1</b> <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> </ul>	Via bookstore  <b>ISBN 978-3-89578-189-6</b> <b>ISBN 978-3-89578-218-3</b>
<b>Automating with PROFINET: Industrial Communication Based on Industrial Ethernet</b> <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> </ul>	Via bookstore  <b>ISBN 978-3-89578-293-0</b> <b>ISBN 978-3-89578-294-7</b>

**SINAMICS S210 documentation****Overview**

A **Quick Installation Guide** is supplied in hard copy form in English and Turkish with every SINAMICS S210.

Identification link according to IEC 61406 for SINAMICS S210 (New)

The ID link contains the article and serial number of the product. As a QR code, it replaces the previous data matrix code on the nameplate and takes you with the URL directly to a product information page on the internet with access to the technical documentation, data sheet, certificates, FAQs, product notifications, and catalogs. Paper package inserts become superfluous since the information is available electronically directly via the QR code, even years later. In this way, we are making a valuable contribution to the preservation of our environment. You don't need an additional app. Simply scan the QR code with your smartphone or tablet. According to IEC 61406, the QR code of an ID link is marked with a frame and a triangle at the bottom right.

With their globally unique identifiers, Siemens products are ready for Industry 4.0.

The ID serves as a connection to the administration shell with which modules of the digital twin can be provided.

Further documentation, such as the operating instructions, is available free on the internet at:

[www.siemens.com/sinamics-s210/documentation](http://www.siemens.com/sinamics-s210/documentation)

Detailed information on the SINAMICS S210 drive system, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, manuals and operating instructions), is available on the internet at:

[www.siemens.com/sinamics-s210](http://www.siemens.com/sinamics-s210)

and is also available via the Siemens Product Configurator on the internet.

The Siemens Product Configurator can be found in SiePortal at the following address:

[www.siemens.com/sinamics-s210/configuration](http://www.siemens.com/sinamics-s210/configuration)

## Services and documentation

Documentation

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## Appendix



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## Appendix

### Certificates of suitability (approvals)








#### Overview

Many of the products in this catalog fulfill requirements, e.g. for UL, CSA or FM and are labeled with the corresponding approval designation.

All of the certificates of suitability, approvals, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated etc. have been performed with the associated system components as they are described in the Catalogs and Configuration Manuals.

The certificates are only valid if the products are used with the described system components, are installed according to the Installation Guidelines and used for their intended purpose.






In other cases, the vendor of these products is responsible for arranging for the issue of new certificates.

Test code	Tested by	Device series/ Component	Test standard	Product category/ File-No.
<b>UL: Underwriters Laboratories</b> Independent public testing body in North America				
	UL according to UL standard	SINUMERIK	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110 NRAQ/7.E217227
		SIMOTION	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110
	UL according to CSA standard	SINAMICS	Standard UL 508, 508C, 61800-5-1 CSA C22.2 No. 142, 274	NRAQ/7.E164110, NMMS/2/7/8.E192450, NMMS/2/7/8.E203250, NMMS/7.E214113, NMMS/7.E253831
	UL according to UL and CSA standards			NMMS/2/7/8.E121068 NMMS/7.E355661 NMMS/7.E323473
	UL according to UL standard	SIMODRIVE	Standard UL 508C, CSA C22.2 No. 274	NMMS/2/7/8.E192450 NMMS/7.E214113
	UL according to CSA standard	SIMOTICS	Standard UL 1004-1, 1004-6, 1004-8, CSA C22.2 No. 100	PRGY2/8.E227215 PRHZ2/8.E93429 PRHJ2/8.E342747 PRGY2/8.E253922 PRHZ2/8.E342746
	UL according to UL and CSA standards			
		Line/motor reactors	Standard UL 508, 506, 5085-1, 5085-2, 1561, CSA C22.2 No. 14, 47, 66.1-06, 66.2-06	XQNX2/8.E257859 NMTR2/8.E219022 NMMS2/8.E333628 XPTQ2/8.E257852 XPTQ2/8.E103521 NMMS2/8.E224872 XPTQ2/8.E354316 XPTQ2/8.E198309 XQNX2/8.E475972
		Line filters, dv/dt filters, sine-wave filters	UL 1283, CSA C22.2 No. 8	FOKY2/8.E70122
		Resistors	UL 508, 508C, CSA C22.2 No. 14, 274	NMTR2/8.E224314 NMMS2/8.E192450 NMTR2/8.E221095 NMTR2/8.E226619
<b>TUV: TÜV Rheinland of North America Inc.</b> Independent public testing body in North America, Nationally Recognized Testing Laboratory (NRTL)				
<b>TÜV: TÜV SÜD Product Service</b> Independent public testing body in Germany, Nationally Recognized Testing Laboratory (NRTL) for North America				
	TUV according to UL and CSA standards	SINAMICS	NRTL listing according to standard UL 508C	U7V 12 06 20078 013 U7 11 04 20078 009 U7 11 04 20078 010 U7 11 04 20078 011
		SIMOTION	NRTL listing according to standard UL 508	U7V 13 03 20078 01
		SIMODRIVE	NRTL listing according to standard UL 508C, CSA C22.2. No. 14	CU 72090702
		Motion Control Encoder	NRTL listing according to UL 61010-1 CSA C22.2 No. 61010-1	U8V 10 06 20196 024



## Certificates of suitability (approvals)

## Overview

Test code	Tested by	Device series/ Component	Test standard	Product category/ File-No.
<b>CSA: Canadian Standards Association</b> Independent public testing body in Canada				
	CSA according to CSA standard	SINUMERIK	Standard CSA C22.2 No. 142	2252-01 : LR 102527
<b>FMRC: Factory Mutual Research Corporation</b> Independent public testing body in North America				
	FM according to FM standard	SINUMERIK	Standard FMRC 3600, FMRC 3611, FMRC 3810, ANSI/ISA S82.02.1	-
<b>EAC:</b> Independent public testing body within the Eurasian Conformity Area				
	EAC in accordance with the EAC Directive	SINAMICS SINUMERIK SIMOTION	Standard IEC 61800-5-1/-2, IEC 61800-3	-
<b>RCM: Australian Communications and Media Authority</b> Independent public testing body in Australia				
	RCM according to EMC standard	SINAMICS SINUMERIK SIMOTION	Standard IEC AS 61800-3, EN 61800-3	-
<b>KC: National Radio Research Agency</b> Independent public testing body in South Korea				
	KC according to EMC standard	SINAMICS SINUMERIK SIMOTION	Standard KN 11	-
<b>BIA</b> Federal Institute for Occupational Safety				
-	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	-
<b>TÜV SÜD Rail</b>				
-	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	-

More information about certificates can be found online at:  
<https://support.industry.siemens.com/cs/ww/en/ps/cert>

## Appendix

### Software licenses

#### Overview

##### **Software types**

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

##### **Engineering software**

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

##### **Runtime software**

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

##### **License types**

Siemens Digital Industries and Smart Infrastructure offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

##### **Floating license**

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started. A license is required for each concurrent user.

##### **Single license**

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

##### **Rental license**

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

##### **Rental floating license**

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

##### **Trial license**

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

##### **Demo license**

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

##### **Demo floating license**

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

##### **Certificate of License (CoL)**

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

##### **Downgrading**

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

##### **Delivery versions**

Software is constantly being updated. The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

##### **PowerPack**

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

##### **Upgrade**

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

## Overview

### **ServicePack**

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

### **License key**

Siemens Digital Industries and Smart Infrastructure supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

### **Software Update Service (SUS)**

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from [https://mall.industry.siemens.com/legal/ww/en/terms\\_of\\_trade\\_en.pdf](https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf)

## Appendix

## Conversion tables

**Rotary inertia** (to convert from A to B, multiply by entry in table)

A \ B	lb-in <sup>2</sup>	lb-ft <sup>2</sup>	lb-in-s <sup>2</sup>	lb-ft-s <sup>2</sup> slug-ft <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm-s <sup>2</sup>	gm-cm <sup>2</sup>	gm-cm-s <sup>2</sup>	oz-in <sup>2</sup>	oz-in-s <sup>2</sup>
lb-in <sup>2</sup>	1	$6.94 \times 10^{-3}$	$2.59 \times 10^{-3}$	$2.15 \times 10^{-4}$	2.926	$2.98 \times 10^{-3}$	$2.92 \times 10^3$	2.984	16	$4.14 \times 10^{-2}$
lb-ft <sup>2</sup>	144	1	0.3729	$3.10 \times 10^{-2}$	421.40	0.4297	$4.21 \times 10^5$	429.71	2304	5.967
lb-in-s <sup>2</sup>	386.08	2.681	1	$8.33 \times 10^{-2}$	$1.129 \times 10^3$	1.152	$1.129 \times 10^6$	$1.152 \times 10^3$	$6.177 \times 10^3$	16
lb-ft-s <sup>2</sup> slug-ft <sup>2</sup>	$4.63 \times 10^3$	32.17	12	1	$1.35 \times 10^4$	13.825	$1.355 \times 10^7$	$1.38 \times 10^4$	$7.41 \times 10^4$	192
kg-cm <sup>2</sup>	0.3417	$2.37 \times 10^{-3}$	$8.85 \times 10^{-4}$	$7.37 \times 10^{-5}$	1	$1.019 \times 10^{-3}$	1000	1.019	5.46	$1.41 \times 10^{-2}$
kg-cm-s <sup>2</sup>	335.1	2.327	0.8679	$7.23 \times 10^{-2}$	980.66	1	$9.8 \times 10^5$	1000	$5.36 \times 10^3$	13.887
gm-cm <sup>2</sup>	$3.417 \times 10^{-4}$	$2.37 \times 10^{-6}$	$8.85 \times 10^{-7}$	$7.37 \times 10^{-8}$	$1 \times 10^{-3}$	$1.01 \times 10^{-6}$	1	$1.01 \times 10^{-3}$	$5.46 \times 10^{-3}$	$1.41 \times 10^{-5}$
gm-cm-s <sup>2</sup>	0.335	$2.32 \times 10^{-3}$	$8.67 \times 10^{-4}$	$7.23 \times 10^{-5}$	0.9806	$1 \times 10^{-3}$	980.6	1	5.36	$1.38 \times 10^{-2}$
oz-in <sup>2</sup>	0.0625	$4.34 \times 10^{-4}$	$1.61 \times 10^{-4}$	$1.34 \times 10^{-5}$	0.182	$1.86 \times 10^{-4}$	182.9	0.186	1	$2.59 \times 10^{-3}$
oz-in-s <sup>2</sup>	24.13	0.1675	$6.25 \times 10^{-2}$	$5.20 \times 10^{-3}$	70.615	$7.20 \times 10^{-2}$	$7.09 \times 10^4$	72.0	386.08	1

**Torque** (to convert from A to B, multiply by entry in table)

A \ B	lb-in	lb-ft	oz-in	N-m	kg-cm	kg-m	gm-cm	dyne-cm
lb-in	1	$8.333 \times 10^{-2}$	16	0.113	1.152	$1.152 \times 10^{-2}$	$1.152 \times 10^3$	$1.129 \times 10^6$
lb-ft	12	1	192	1.355	13.825	0.138	$1.382 \times 10^4$	$1.355 \times 10^7$
oz-in	$6.25 \times 10^{-2}$	$5.208 \times 10^{-3}$	1	$7.061 \times 10^{-3}$	$7.200 \times 10^{-2}$	$7.200 \times 10^{-4}$	72.007	$7.061 \times 10^4$
N-m	8.850	0.737	141.612	1	10.197	0.102	$1.019 \times 10^4$	$1 \times 10^7$
kg-cm	0.8679	$7.233 \times 10^{-2}$	13.877	$9.806 \times 10^{-2}$	1	$10^{-2}$	1000	$9.806 \times 10^5$
kg-m	86.796	7.233	$1.388 \times 10^3$	9.806	100	1	$1 \times 10^5$	$9.806 \times 10^7$
gm-cm	$8.679 \times 10^{-4}$	$7.233 \times 10^{-5}$	$1.388 \times 10^{-2}$	$9.806 \times 10^{-5}$	$1 \times 10^{-3}$	$1 \times 10^{-5}$	1	980.665
dyne-cm	$8.850 \times 10^{-7}$	$7.375 \times 10^{-8}$	$1.416 \times 10^{-5}$	$10^{-7}$	$1.0197 \times 10^{-6}$	$1.019 \times 10^{-8}$	$1.019 \times 10^{-3}$	1

**Length** (to convert from A to B, multiply by entry in table)

A \ B	inches	feet	cm	yd	mm	m
inches	1	0.0833	2.54	0.028	25.4	0.0254
feet	12	1	30.48	0.333	304.8	0.3048
cm	0.3937	0.03281	1	$1.09 \times 10^{-2}$	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	$1.09 \times 10^{-3}$	1	0.001
m	39.37	3.281	100	1.09	1000	1

**Force** (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	dyne	N
lb	1	16	453.6	$4.448 \times 10^5$	4.4482
oz	0.0625	1	28.35	$2.780 \times 10^4$	0.27801
gm	$2.205 \times 10^{-3}$	0.03527	1	$1.02 \times 10^{-3}$	N.A.
dyne	$2.248 \times 10^{-6}$	$3.59 \times 10^{-5}$	980.7	1	0.00001
N	0.22481	3.5967	N.A.	100000	1

**Mass** (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	kg	slug
lb	1	16	453.6	0.4536	0.0311
oz	$6.25 \times 10^{-2}$	1	28.35	0.02835	$1.93 \times 10^{-3}$
gm	$2.205 \times 10^{-3}$	$3.527 \times 10^{-2}$	1	$10^{-3}$	$6.852 \times 10^{-5}$
kg	2.205	35.27	$10^3$	1	$6.852 \times 10^{-2}$
slug	32.17	514.8	$1.459 \times 10^4$	14.59	1

**Rotation** (to convert from A to B, multiply by entry in table)

A \ B	r/min	rad/s	degrees/s
r/min	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	$1.745 \times 10^{-2}$	1

**Power** (to convert from A to B, multiply by entry in table)

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./s)	$2.645 \times 10^{-6}$	$1.972 \times 10^{-3}$
(lb-in) (r/min)	$1.587 \times 10^{-5}$	$1.183 \times 10^{-2}$
(lb-ft) (deg./s)	$3.173 \times 10^{-5}$	$2.366 \times 10^{-2}$
(lb-ft) (r/min)	$1.904 \times 10^{-4}$	0.1420
Watts	$1.341 \times 10^{-3}$	1

## Conversion tables

## Temperature Conversion

°F	°C	°C	°F
0	-17.8	-10	14
32	0	0	32
50	10	10	50
70	21.1	20	68
90	32.2	30	86
98.4	37	37	98.4
212	100	100	212
subtract 32 and multiply by $\frac{5}{9}$		multiply by $\frac{9}{5}$ and add 32	

## Mechanism Efficiencies

Acme-screw with brass nut	~0.35–0.65
Acme-screw with plastic nut	~0.50–0.85
Ball-screw	~0.85–0.95
Chain and sprocket	~0.95–0.98
Preloaded ball-screw	~0.75–0.85
Spur or bevel-gears	~0.90
Timing belts	~0.96–0.98
Worm gears	~0.45–0.85
Helical gear (1 reduction)	~0.92

## Friction Coefficients

Materials	$\mu$
Steel on steel (greased)	~0.15
Plastic on steel	~0.15–0.25
Copper on steel	~0.30
Brass on steel	~0.35
Aluminum on steel	~0.45
Steel on steel	~0.58
Mechanism	$\mu$
Ball bushings	<0.001
Linear bearings	<0.001
Dove-tail slides	~0.2++
Gibb ways	~0.5++

## Material Densities

Material	lb-in <sup>3</sup>	gm-cm <sup>3</sup>
Aluminum	0.096	2.66
Brass	0.299	8.30
Bronze	0.295	8.17
Copper	0.322	8.91
Hard wood	0.029	0.80
Soft wood	0.018	0.48
Plastic	0.040	1.11
Glass	0.079–0.090	2.2–2.5
Titanium	0.163	4.51
Paper	0.025–0.043	0.7–1.2
Polyvinyl chloride	0.047–0.050	1.3–1.4
Rubber	0.033–0.036	0.92–0.99
Silicone rubber, without filler	0.043	1.2
Cast iron, gray	0.274	7.6
Steel	0.280	7.75

Wire Gauges<sup>1)</sup>

Cross-section mm <sup>2</sup>	Standard Wire Gauge (SWG)	American Wire Gauge (AWG)
0.2	25	24
0.3	23	22
0.5	21	20
0.75	20	19
1.0	19	18
1.5	17	16
2.5	15	13
4	13	11
6	12	9
10	9	7
16	7	6
25	5	3
35	3	2
50	0	1/0
70	000	2/0
95	00000	3/0
120	0000000	4/0
150	–	6/0
185	–	7/0

<sup>1)</sup> The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

## Appendix

### Metal surcharges

#### Explanation of the raw material/metal surcharges <sup>1)</sup>

##### Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium <sup>2)</sup> and/or neodym <sup>2)</sup>, surcharges are calculated on a daily basis using the so-called metal factor. These apply to products containing these raw materials and are calculated per raw material. These surcharges are added to the price of a product if the basic official price (BOP) of the raw material in question is exceeded. Surcharges are calculated in accordance with the following criteria:

##### Basic official price (BOP) of the raw material

- BOP of the workday prior to receipt of the order or prior to release order (Daily Price) for:
  - Silver (processed) <sup>3)</sup>
  - Gold (processed) <sup>3)</sup>
  - Aluminum (temporary constant 360.31 EUR per 100 kg, due to loss of DEL-Notiz)
  - Lead (constant 199.50 EUR per 100 kg)
- BOP of two workdays prior to receipt of the order or prior to release order (Daily Price) per 100 kg for:
  - Copper (LME-notation/10, converted from USD to EUR using LME-FX-Rate [MTLE] + 1.2%) + 1% <sup>4)</sup>
- If BOP is suspended, the last one is used.

##### Metal factor of the products

Certain products are displayed with a metal factor. The metal factor determines the official price (for those raw materials concerned) as of which the metal surcharges are applied and the calculation method used (weight or percentage method). An exact explanation is given below.

##### Structure of the metal factor

Metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a discounted price (customer net price) (L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)
3rd digit	for copper (CU)
4th digit	for aluminum (AL)
5th digit	for lead (PB)
6th digit	for gold (AU)
7th digit	for dysprosium (Dy) <sup>2)</sup>
8th digit	for neodym (Nd) <sup>2)</sup>

##### Weight method

The weight method uses the BOP, the daily price and the raw material weight. In order to calculate the surcharge, the BOP must be subtracted from the daily price. The difference is then multiplied by the raw material weight.

The BOP can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

##### Percentage method

Use of the percentage method is indicated by the letters A-Z at the respective digit of the metal factor.

The surcharge is increased - dependent on the deviation of the daily price compared with the BOP - using the percentage method in "steps" and consequently offers surcharges that remain constant within the framework of this "step range". A higher percentage rate is charged for each new step. The respective percentage level can be found in the table below.

##### Metal factor examples

<b>L E A - - - - -</b>	<ul style="list-style-type: none"> <li>Basis for % surcharge: List price</li> <li>Silver Basis 150 €, Step 50 €, 0.5 %</li> <li>Copper Basis 150 €, Step 50 €, 0.1 %</li> <li>No surcharge for aluminum</li> <li>No surcharge for lead</li> <li>No surcharge for gold</li> <li>No surcharge for dysprosium</li> <li>No surcharge for neodym</li> </ul>
<b>N - A 6 - - - - -</b>	<ul style="list-style-type: none"> <li>Basis for % surcharge: Customer net price</li> <li>No surcharge for silver</li> <li>Copper Basis 150 €, Step 50 €, 0.1 %</li> <li>Aluminum acc. to weight, basic offic. price 225 €</li> <li>No surcharge for lead</li> <li>No surcharge for gold</li> <li>No surcharge for dysprosium</li> <li>No surcharge for neodym</li> </ul>
<b>- - 3 - - - - -</b>	<ul style="list-style-type: none"> <li>No basis necessary</li> <li>No surcharge for silver</li> <li>Copper acc. to weight, basic official price 150 €</li> <li>No surcharge for aluminum</li> <li>No surcharge for lead</li> <li>No surcharge for gold</li> <li>No surcharge for dysprosium</li> <li>No surcharge for neodym</li> </ul>

<sup>1)</sup> Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).

<sup>2)</sup> For a different method of calculation, refer to the separate explanation for these raw materials on the next page.

<sup>3)</sup> Source: Umicore, Hanau ([www.metalsmanagement.umicore.com](http://www.metalsmanagement.umicore.com)).

<sup>4)</sup> Source: The London Metal Exchange – an HKEX Company (<https://www.lme.com/>).

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## Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

### Surcharge calculation

To compensate for variations in the price of the raw materials silver <sup>1)</sup>, copper <sup>1)</sup>, aluminum <sup>1)</sup>, lead <sup>1)</sup>, gold <sup>1)</sup>, dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor. This applies to products containing at least one of these raw materials. The surcharge for dysprosium and neodym is calculated as a supplement to the price of a product if the basic official price (BOP) of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price (BOP) of the raw material <sup>2)</sup>  
Three-month basic average price (see below) in the period before the quarter in which the order was received or the release order took place (average official price) for  
- Dysprosium (Dy metal, 99 % min. FOB China; USD/kg)  
- Neodym (Nd metal, 99 % min. FOB China; USD/kg)
- Metal factor of the products  
Certain products are displayed with a metal factor. The metal factor indicates (for those raw materials concerned) the BOP as of which the surcharges for dysprosium and neodym are calculated using the weight method. An exact explanation of the metal factor is given below.

### Three-month average price

The prices of rare earths vary according to the foreign currency, and there is no freely accessible stock exchange listing. This makes it more difficult for all parties involved to monitor changes in price. In order to avoid continuous adjustment of the surcharges, but to still ensure fair, transparent pricing, an average price is calculated over a three-month period using the average monthly foreign exchange rate from USD to EUR (source: European Central Bank). Since not all facts are immediately available at the start of each month, a one-month buffer is allowed before the new average price applies.

Examples of calculation of the average official price:

Period for calculation of the average price:	Period during which the order/release order is effected and the average price applies:
Sep 2012 - Nov 2012	Q1 in 2013 (Jan - Mar)
Dec 2012 - Feb 2013	Q2 in 2013 (Apr - Jun)
Mar 2013 - May 2013	Q3 in 2013 (Jul - Sep)
Jun 2013 - Aug 2013	Q4 in 2013 (Oct - Dec)

### Structure of the metal factor

The metal factor consists of several digits; the first digit is not relevant to the calculation of dysprosium and neodym.

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

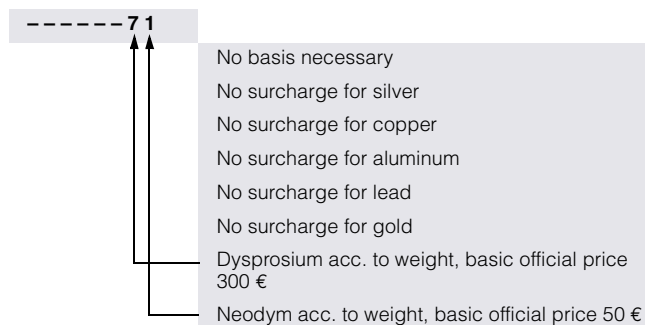
1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG) <sup>1)</sup>
3rd digit	for copper (CU) <sup>1)</sup>
4th digit	for aluminum (AL) <sup>1)</sup>
5th digit	for lead (PB) <sup>1)</sup>
6th digit	for gold (AU) <sup>1)</sup>
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

### Weight method

The weight method uses the basic official price, the average price and the raw material weight. In order to calculate the surcharge, the BOP must be subtracted from the average price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. Your Sales contact can inform you of the raw material weight.

### Metal factor examples



<sup>1)</sup> For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.

<sup>2)</sup> Source: Asian Metal Ltd ([www.asianmetal.com](http://www.asianmetal.com))

## Appendix

### Metal surcharges

#### Values of the metal factor

Percentage method	Basic official price in €	Step range in €	% surcharge 1st step	% surcharge 2nd step	% surcharge 3rd step	% surcharge 4th step	% surcharge per additional step	
			Price in €	Price in €	Price in €	Price in €		
			150.01 - 200.00	200.01 - 250.00	250.01 - 300.00	300.01 - 350.00		
A	150	50	0.1	0.2	0.3	0.4	0.1	
B	150	50	0.2	0.4	0.6	0.8	0.2	
C	150	50	0.3	0.6	0.9	1.2	0.3	
D	150	50	0.4	0.8	1.2	1.6	0.4	
E	150	50	0.5	1.0	1.5	2.0	0.5	
F	150	50	0.6	1.2	1.8	2.4	0.6	
G	150	50	1.0	2.0	3.0	4.0	1.0	
H	150	50	1.2	2.4	3.6	4.8	1.2	
I	150	50	1.6	3.2	4.8	6.4	1.6	
J	150	50	1.8	3.6	5.4	7.2	1.8	
			175.01 - 225.00	225.01 - 275.00	275.01 - 325.00	325.01 - 375.00		
O	175	50	0.1	0.2	0.3	0.4	0.1	
P	175	50	0.2	0.4	0.6	0.8	0.2	
R	175	50	0.5	1.0	1.5	2.0	0.5	
			225.01 - 275.00	275.01 - 325.00	325.01 - 375.00	375.01 - 425.00		
S	225	50	0.2	0.4	0.6	0.8	0.2	
U	225	50	1.0	2.0	3.0	4.0	1.0	
V	225	50	1.0	1.5	2.0	3.0	1.0	
W	225	50	1.2	2.5	3.5	4.5	1.0	
			150.01 - 175.00	175.01 - 200.00	200.01 - 225.00	225.01 - 250.00		
Y	150	25	0.3	0.6	0.9	1.2	0.3	
			400.01 - 425.00	425.01 - 450.00	450.01 - 475.00	475.01 - 500.00		
Z	400	25	0.1	0.2	0.3	0.4	0.1	
<b>Price basis (1st digit)</b>								
L	Calculation based on the list price							
N	Calculation based on the customer net price (discounted list price)							
<b>Weight method</b>	<b>Basic official price in €</b>							
1	50	Calculation based on raw material weight						
2	100							
3	150							
4	175							
5	200							
6	225							
7	300							
8	400							
9	555							
<b>Miscellaneous</b>								
-	No metal surcharge							



## 1. General Provisions

By using this catalog you can purchase hard- and software products as well as services (together hereinafter referred to as "products") described therein from Siemens Aktiengesellschaft subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Note, for products purchased from any Siemens entity having a registered office outside of Germany, the respective terms and conditions of sale and delivery of the respective Siemens entity apply exclusively. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

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For customers with a seat or registered office in European Union, the following terms and conditions apply subordinate to T&C:

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- for consulting services the "Allgemeine Geschäftsbedingungen für Beratungsleistungen für Infrastructure & Industry Geschäft (Deutsches Recht)"<sup>1)</sup> (available only in German) and/or
- for other services, the „Supplementary Terms and Conditions for Services for Infrastructure & Industry Business (German Law) ("BL")"<sup>1)</sup> and/or
- for other products the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"<sup>1)</sup>.  
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### 1.2 For customers with a seat or registered office outside European Union

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- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for consulting services the "Standard Terms and Conditions for Consulting Services for Infrastructure & Industry Business (Swiss Law)"<sup>1)</sup> and/or
- for other services the "International Terms & Conditions for Services"<sup>1)</sup> supplemented by "Software Licensing Conditions"<sup>1)</sup> and/or
- for other products the "International Terms & Conditions for Products"<sup>1)</sup> supplemented by "Software Licensing Conditions"<sup>1)</sup>

### 1.3 For customers with master or framework agreement

To the extent products offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

## 2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials.

A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation. The metal factor, provided it is relevant, can be found in the respective product description.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges".

To calculate the surcharge (except in the cases of copper, dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to copper, the official price from two days prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

## 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

<sup>1)</sup> The text of the Terms and Conditions of Siemens AG can be downloaded at  
[https://mall.industry.siemens.com/legal/ww/en/terms\\_of\\_trade\\_en.pdf](https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf)

## Appendix

### Conditions of sale and delivery

#### 4. Export Control and Sanctions Compliance

##### 4.1 General

Customer shall comply with all applicable sanctions, embargoes and (re-)export control laws and regulations, and, in any event, with those of the European Union, the United States of America and any locally applicable jurisdiction (collectively "Export Regulations").

##### 4.2 Checks for Products

Prior to any transaction by customer concerning products (including hardware, documentation and technology) delivered by Siemens, or products (including maintenance and technical support) performed by Siemens with a third party, customer shall check and certify by appropriate measures that

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- (iii) customer has screened all direct and indirect parties involved in the receipt, use, transfer, or distribution of the products against all applicable restricted party lists of the Export Regulations concerning trading with entities, persons and organizations listed therein and
- (iv) products within the scope of items-related restrictions, as specified in the respective annexes to the Export Regulations, will not, unless permitted by the Export Regulations, be
  - (a) exported, directly or indirectly (e.g., via Eurasian Economic Union (EAEU) countries), to Russia or Belarus, or
  - (b) resold to any third party business partner that does not take a prior commitment not to export such products to Russia or Belarus.

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Customer shall not, unless permitted by the Export Regulations or respective governmental licenses or approvals,

- (i) download, install, access or use the products from or in any location prohibited by or subject to comprehensive sanctions or subject or to license requirements according to the Export Regulations;
  - (ii) grant access to, transfer, (re-)export (including any "deemed (re-)exports"), or otherwise make available the products to any entity, person, or organization identified on a restricted party list of the Export Regulations;
  - (iii) use the products for any purpose prohibited by the Export Regulations (e.g. use in connection with armaments, nuclear technology or weapons);
  - (iv) upload to a products platform any customer content unless it is non-controlled (e.g. in the EU: AL = N; in the U.S.: ECCN = N or EAR99);
  - (v) facilitate any of the afore mentioned activities by any user.
- Customer shall provide all users with all information necessary to ensure compliance with the Export Regulations.

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Customer will not, without advance written authorization from Siemens, use offerings for the development or production of integrated circuits at any semiconductor fabrication facility located in China meeting the criteria specified in the U.S. Export Administration Regulations, 15 C.F.R. 744.23.

##### 4.5 Information

Upon request by Siemens, customer shall promptly provide Siemens with all information pertaining to users, the intended use and the location of use or the final destination (in the case of hardware, documentation and technology) of the products. Customer will notify Siemens prior to customer disclosing any information to Siemens that is defense-related or requires controlled or special data handling pursuant to applicable government regulations, and will use the disclosure tools and methods specified by Siemens.

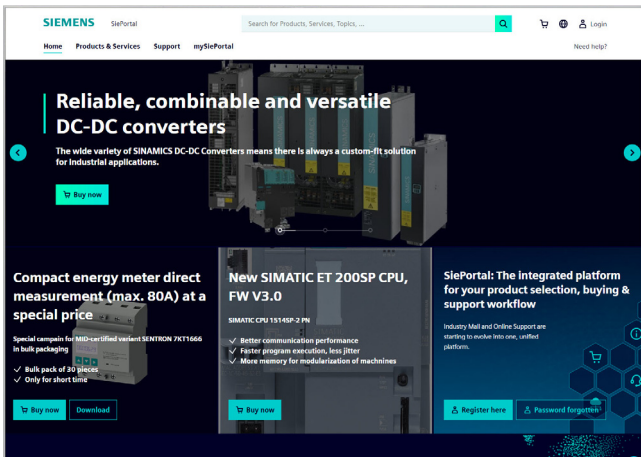
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Siemens shall not be obligated to fulfill this agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes or other sanctions. Customer acknowledges that Siemens may be obliged under the Export Regulations to limit or suspend access by customer and/or users to products.

#### 5. Miscellaneous

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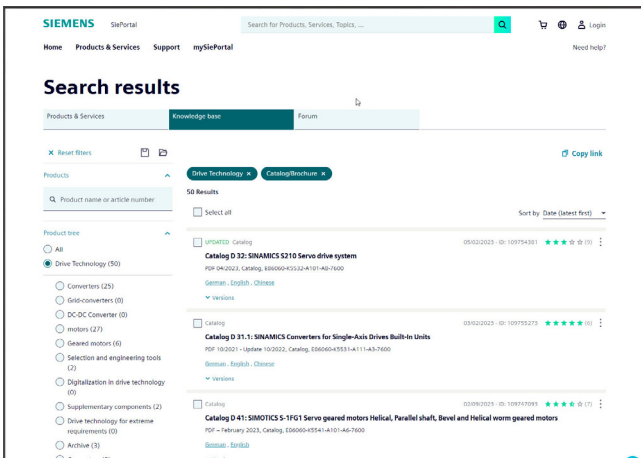
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