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SINUMERIK 840

Equipment for Machine Tools

Motion Control

Catalog NC 62

Edition 2016

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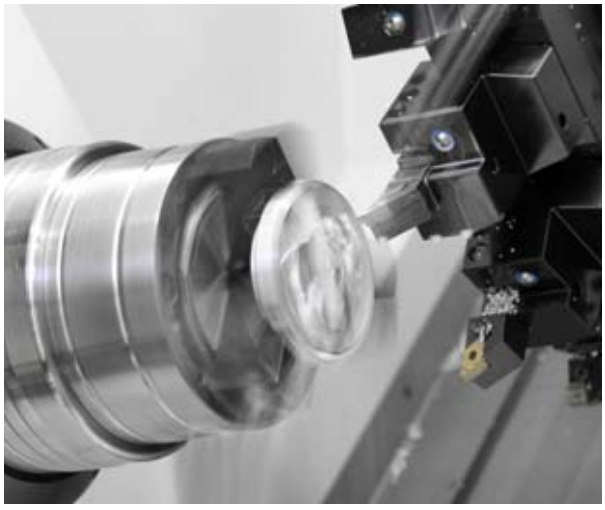
Scan the QR code to download the SINUMERIK 840D sl Glossary as a PDF file to your tablet or smartphone.

Via the Siemens Industry Mall:
www.siemens.com/sinumerik-840dsl-glossary

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SINUMERIK 840
Equipment for Machine Tools

Motion Control



Catalog NC 62 · 2016

Supersedes:
Catalog NC 62 · 2012
Catalog NC 61N · 2012
Catalog NC 61 · 2010
Catalog NC 60 · 2009

Refer to the Industry Mall for current updates of this catalog:
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The products contained in this catalog can also be found in the Interactive Catalog CA 01.
Article No.: E86060-D4001-A510-D6-7600

Please contact your local Siemens branch.

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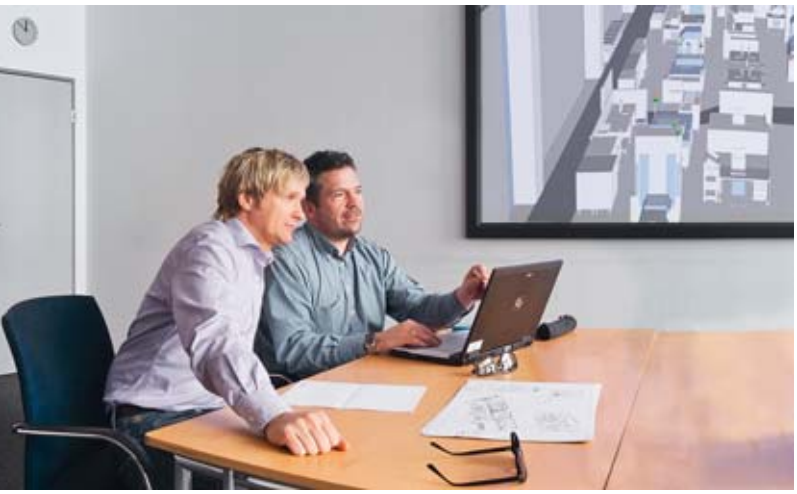
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Answers for industry.

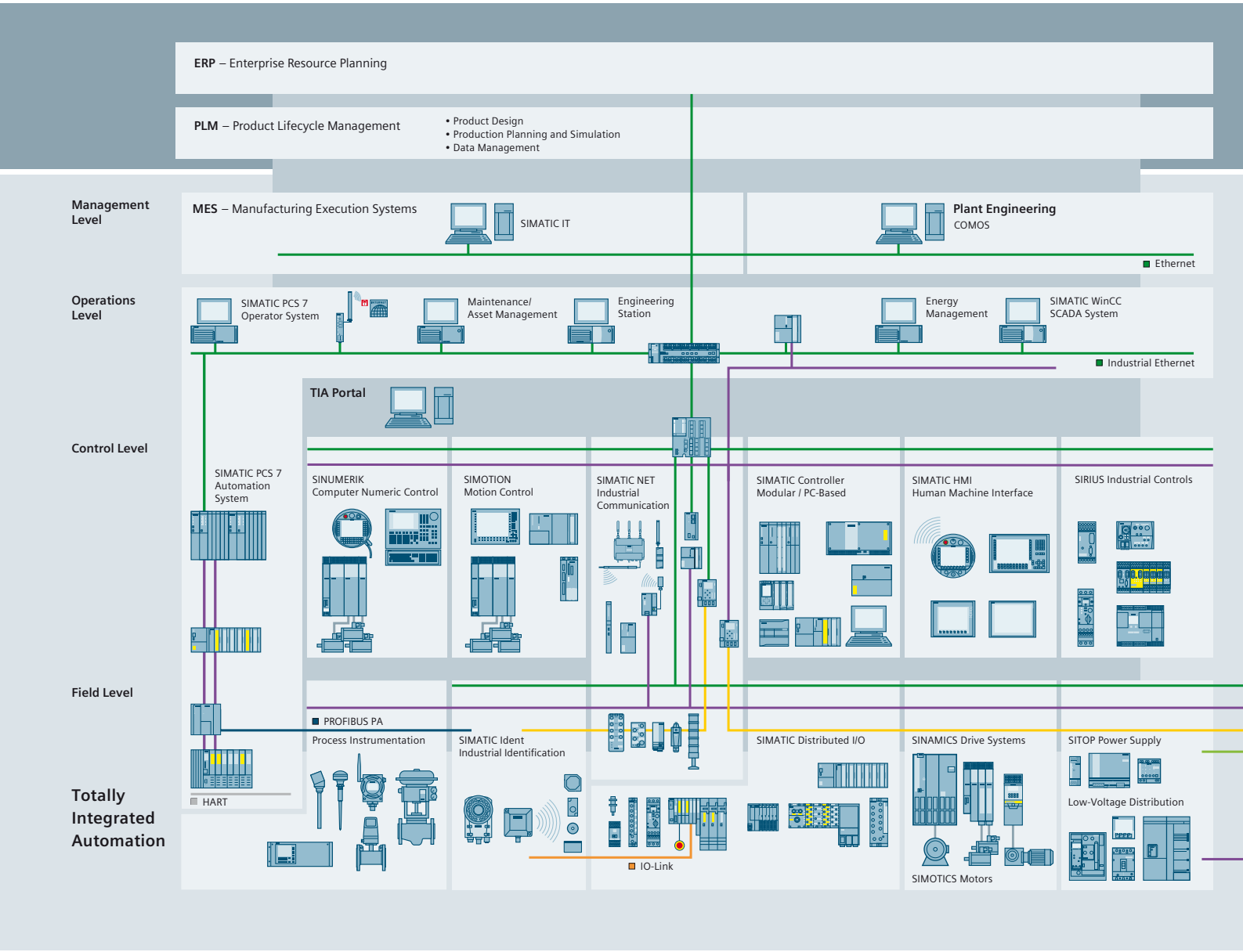
Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

Siemens is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility.

We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

Market launch times can be reduced by up to 50% due to the combination of powerful automation technology and industrial software. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.

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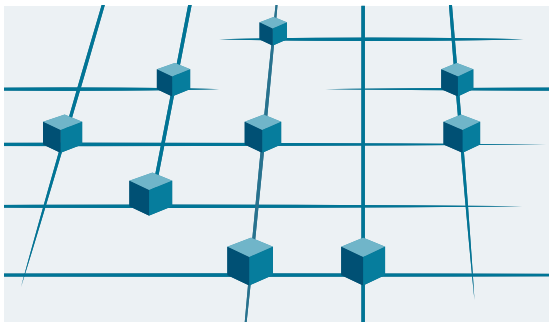


Efficient automation starts with efficient engineering.

Totally Integrated Automation: Efficiency driving productivity.

Efficient engineering is the first step toward better production that is faster, more flexible, and more intelligent. With all components interacting efficiently, Totally Integrated Automation (TIA) delivers enormous time savings right from the engineering phase. The result is lower costs, faster time-to-market, and greater flexibility.

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Totally Integrated Automation
Efficient interoperability of all automation components



A unique complete approach for all industries

As one of the world's leading automation suppliers, Siemens provides an integrated, comprehensive portfolio for all requirements in process and manufacturing industries. All components are mutually compatible and system-tested. This ensures that they reliably perform their tasks in industrial use and interact efficiently, and that each automation solution can be implemented with little time and effort based on standard products. The integration of many separate individual engineering tasks into a single engineering environment, for example, provides enormous time and cost savings.

With its comprehensive technology and industry-specific expertise, Siemens is continuously driving progress in manufacturing industries – and Totally Integrated Automation plays a key role.

Totally Integrated Automation creates real value added in all automation tasks, especially for:

- **Integrated engineering**
  Consistent, comprehensive engineering throughout the entire product development and production process
- **Industrial data management**
  Access to all important data occurring in productive operation – along the entire value chain and across all levels
- **Industrial communication**
  Integrated communication based on international cross-vendor standards that are mutually compatible
- **Industrial security**
  Systematic minimization of the risk of an internal or external attack on plants and networks
- **Safety Integrated**
  Reliable protection of personnel, machinery, and the environment thanks to seamless integration of safety technologies into the standard automation

Making things right with Totally Integrated Automation

Totally Integrated Automation, industrial automation from Siemens, stands for the efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on end-to-end shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

Totally Integrated Automation lays the foundation for comprehensive optimization of the production process:

- Time and cost savings due to efficient engineering
- Minimized downtime due to integrated diagnostic functions
- Simplified implementation of automation solutions due to global standards
- Better performance due to interoperability of system-tested components

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Introduction



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Overview

SINUMERIK 840D sl – ultimate performance in the premium class

SINUMERIK – a CNC portfolio for the global world of machine tools







SINUMERIK 808D/ SINUMERIK 808D ADVANCED

- Panel-based compact CNC
- Technologies: turning and milling
- Up to 5 axes/spindles
- 1 machining channel
- 7.5" color display
- SIMATIC S7-200 PLC

SINAMICS V60 SIMOTICS S-1FL5	SINAMICS V70 SIMOTICS S-1FL6
SINUMERIK 808D	SINUMERIK 808D ADVANCED

Smart class

SINUMERIK 828D BASIC/ SINUMERIK 828D

- Panel-based compact CNC
- Technologies: turning, milling and functions for grinding
- Up to 10 axes/spindles
- Up to 2 machining channels
- 8.4"/10.4" color display
- SIMATIC S7-200 PLC

SINAMICS S120

SINAMICS S120 Combi

SINUMERIK 828D BASIC	SINUMERIK 828D

Compact class

SINUMERIK 840D sl

- Drive-based, modular CNC
- Multi-technology CNC
- Up to 93 axes/spindles
- Up to 30 machining channels
- Modular panel concept up to 19" color display
- SIMATIC S7-300 PLC

SINAMICS S120 Combi	SINAMICS S120
SINUMERIK 840D sl BASIC	SINUMERIK 840D sl

Premium class

G_NC01_EN_00625a

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Overview (continued)



G_NC01_EN_00618a

SINUMERIK 840D sl is an open CNC control for modular premium machine concepts. With powerful, innovative system functions, the SINUMERIK 840D sl opens up a boundless range of technologies. SINUMERIK 840D sl is leading the way in exploiting global machining trends, which makes it the preferred CNC in the industries of the future.

Maximum performance capability

The SINUMERIK 840D sl offers an almost inexhaustible performance potential, thanks to its drive-based, high-performance NCUs (Numerical Control Units) which contain state-of-the-art multicore processor technology. Up to 93 axes can be controlled in 30 machining channels in the NCU-Link. Machine concepts that require fewer axes benefit from the performance capability of the SINUMERIK 840D sl with its combination of the highest standard of machining precision and shortest machining times.

Demanding turning and milling applications are part of the wide range of technologies

Milling and turning at the limit are strengths of the SINUMERIK 840D sl. The milling range extends from highly productive machining centers for manufacturing powertrains in the automotive industry to highly dynamic 5-axis machining centers for mold making or in the aviation industry. The turning range runs from multi-channel, 5-axis turning centers with a B-axis up to highly productive multispindle applications.

In addition to turning and milling applications, the SINUMERIK 840D sl opens up an almost boundless range of other technologies. These include grinding, laser machining, gear wheel and multitasking machining.
The SINUMERIK 840D sl has a high level of system flexibility, which makes it the preferred CNC control when it comes to opening up completely new fields of technology, such as tape layer applications in composite processing in the aviation industry.

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Design



SINUMERIK 840D sl BASIC with SINAMICS S120 Combi – Entry into the premium class with up to 6 axes.



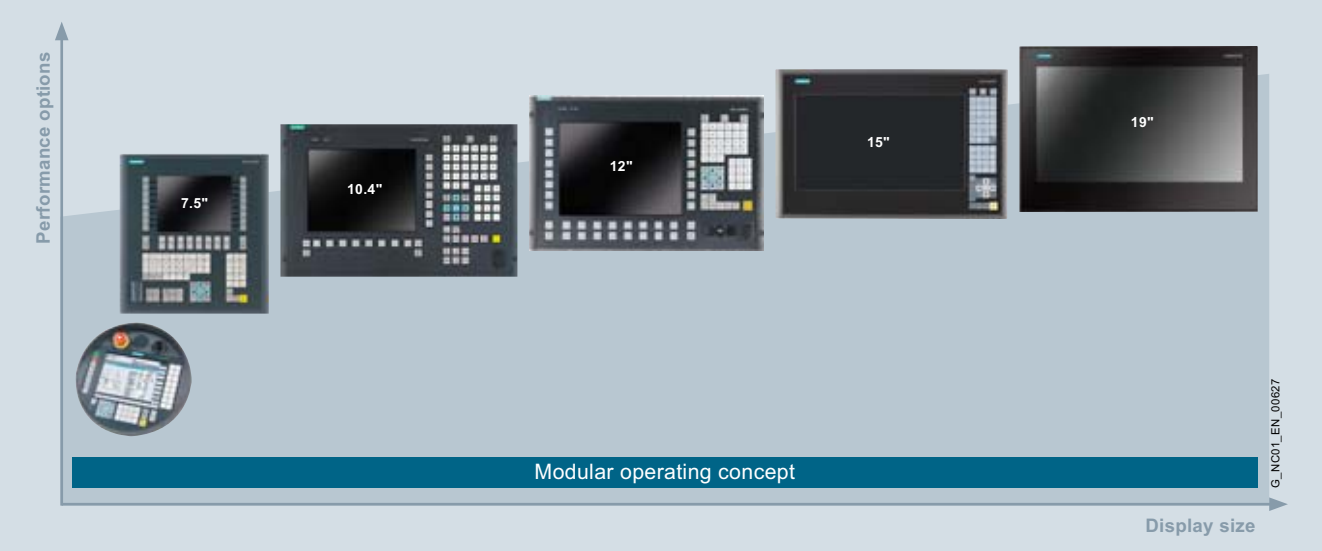
SINUMERIK 840D sl with SINAMICS S120 – CNC performance with up to 93 axes.

Modular and scalable

Optimum compact machine concepts can be developed by combining the SINUMERIK 840D sl BASIC with the SINAMICS S120 Combi compact converter.

As well as scalable NCU performance, the SINUMERIK 840D sl also offers a high degree of modularity of the operator controls. With a flexible M:N operating concept – such as the free combination of operator panels with the NCU – the SINUMERIK 840D sl can be ideally adapted to the operating philosophy of modern premium machine concepts.

Modular operating concept



Engineering

There is nothing to rival the openness of the SINUMERIK 840D sl system. With SINUMERIK Integrate, the CNC control can be optimally adapted to the technology of the machine. SINUMERIK Integrate also provides a high degree of freedom in production automation. For example, the operation can be added to and adapted, and even robots and handling systems can be integrated. The openness in the CNC kernel and the drive enables unique mechanical concepts – such as adapted control algorithms and specific kinematic transformations – to be implemented.

Communication at all levels

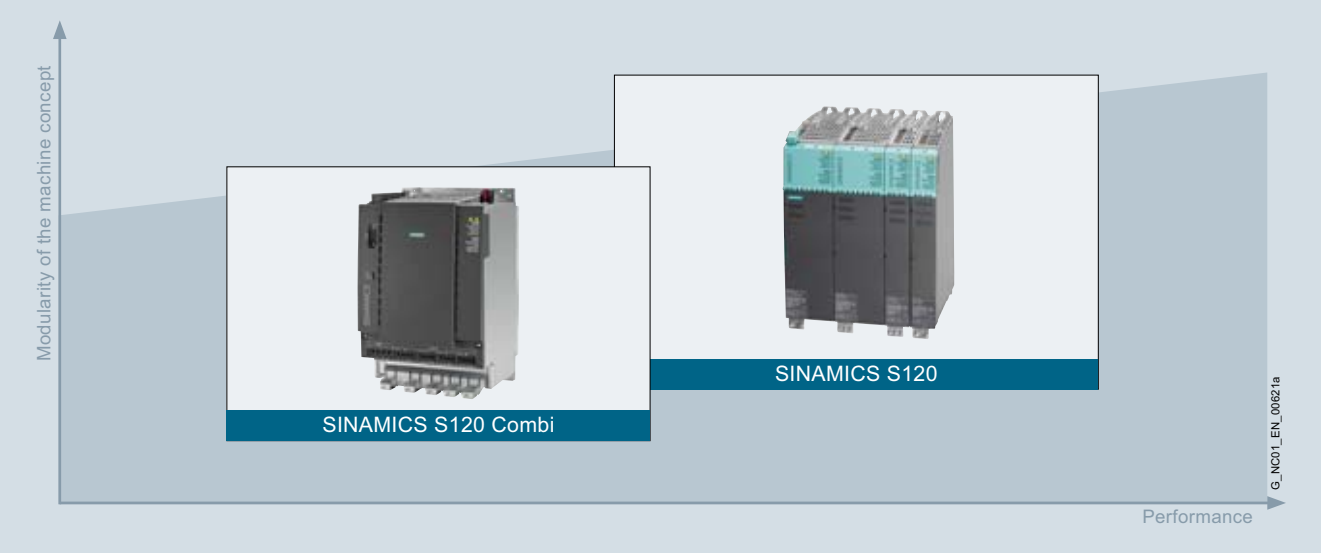
SINUMERIK 840D sl integrates itself perfectly into the Siemens Totally Integrated Automation world with PROFINET, the leading Industrial Ethernet standard. Totally Integrated Automation stands for unique consistency – from field level through production to the corporate level.

The result: Optimal interaction between all components in the automation solution, and thus maximum transparency and availability of the production process.

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Design (continued)

Perfect drive solutions for equipping machine tools



SINAMICS S120 Combi combines the performance capability of the modular SINAMICS S120 with a rugged, compact size. An infeed and up to 4 Motor Modules are integrated into a single enclosure. The intelligent expansion by 2 Motor Modules has made the SINAMICS S120 Combi the perfect basis for equipping compact, standardized machine concepts with a spindle power of up to 15 kW and up to 5 feed axes.

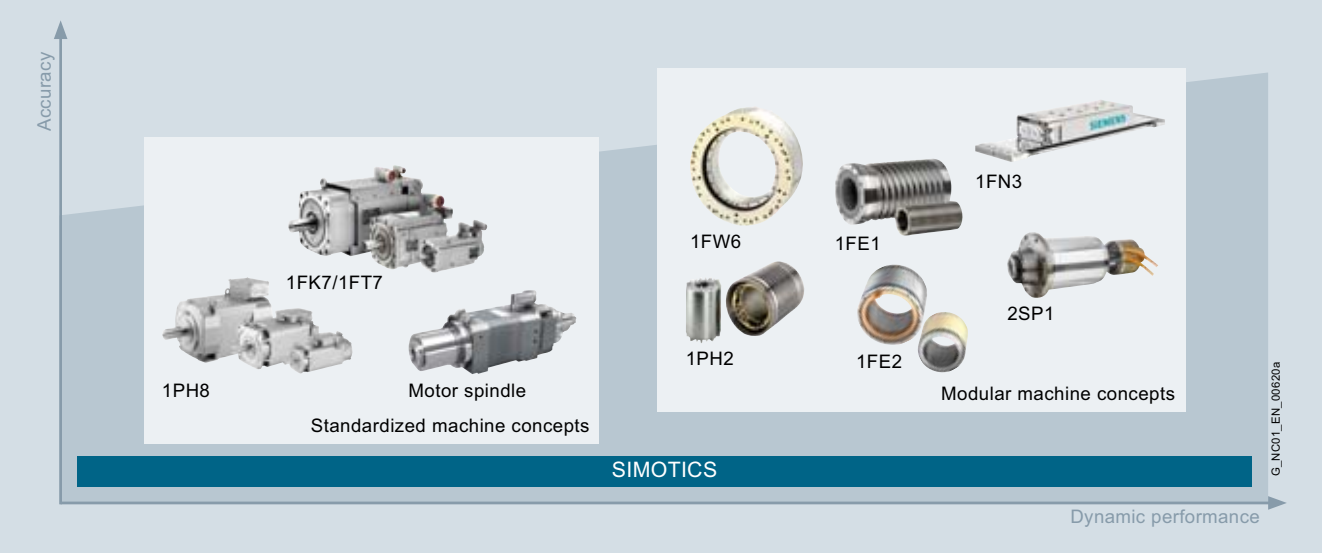
SINAMICS S120 is synonymous with performance capability and flexibility in the equipment of machine tools. Not only a wide range of Motor Modules with up to 300 kW power but also an infeed with a closed-loop DC link are available. This provides the shortest spindle acceleration times, and enables perfect reactive current compensation of the entire machine (cos φ = 1). Furthermore, Dynamic Servo Control (DSC) offers a unique closed-loop position control process for the highest dynamic response of feed and spindle motors.

All components of SINAMICS S120 and S120 Combi, including the SIMOTICS motors and encoders, are connected to the SINUMERIK 840D sl via the high-speed **DRIVE-CLiQ** interface. In this way, the CNC control detects the electronic rating plates – that is the relevant performance data and production data – of all the connected components. This ensures not only automated commissioning, but also optimal diagnostics, faster service and efficient maintenance.

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Design (continued)

SIMOTICS motors for the highest accuracy and dynamic performance in the machine tool.



SIMOTICS 1FK7/1FT7 servomotors are characterized by a high stall torque, high maximum speed and perfect true running properties. A high degree of protection, strong bearing unit and vibration-free mounting ensure absolutely reliable synchronous servomotors. High quality magnetic materials achieve a very high power/weight ratio and so the smallest motor dimensions. This makes installation possible in even the most cramped conditions.

SIMOTICS 1FN3 linear motors can almost completely eliminate elasticity, backlash and friction characteristics, as well as natural vibration of the machine drive train.

SIMOTICS 1FW6 torque motors open up completely new fields of technology, such as turning in milling machines (multi-tasking).

SIMOTICS motor spindles achieve the highest productivity and precision in a machine tool. They facilitate optimal performance and workpiece quality. The mechanically integrated motor solutions are extremely compact, and achieve maximal rigidity, which is the precondition for the highest speeds and precise true running.

The portfolio, which optimally supports every type of spindle solution, ranges from conventional 1PH8 mounted spindle motors and synchronous 1PH2/1FE1/1FE2 built-in spindle motors to mechanical spindles, and 2SP1 hybrid and motor spindles.

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Overview

SINUMERIK MDynamics – synonymous with first class milling

Modern operation, unique technology cycles, ultimate workshop programming, high quality CNC simulation and first class motion control - all combined in a single package: That is the outstanding SINUMERIK MDynamics milling technology package.

Advanced Surface gets the most out of the machine

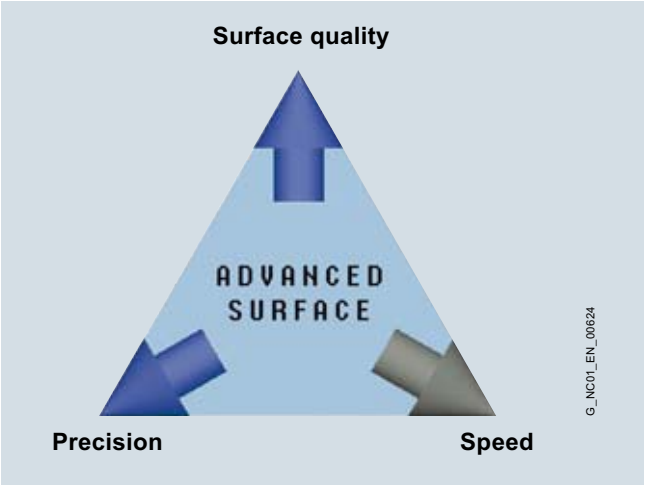
Advanced Surface is synonymous with milling at the physical limit of the machine. State-of-the-art Look Ahead algorithms and intelligent block compression for maximum machining speed, combined with the highest surface quality and accuracy – for 3-axis, 3+2-axis, and dynamic 5-axis machining.

5-axis machining at the highest level

SINUMERIK controls offer the appropriate kinematic transformations for modern milling machines – from cylinder surface transformation with slot wall correction for cylindrical workpieces, through static swiveled planes for multi-face machining, to the dynamic 5-axis transformation (TRAORI) for demanding machining in tool and mold making, and in the aerospace industry.

High-speed settings

The user-friendly, high-speed setting cycle simplifies parameter assignment in mold making applications. A few parameters adapts the SINUMERIK to the machining task – roughing, finishing or rough finishing – as well as to the desired machining tolerance.



The sum makes the difference

Advanced Surface, High-speed settings, kinematic transformations, SINUMERIK Operate for efficient operation and programming, as well as a comprehensive range of technology and measuring cycles go to make up a unique collection of highlights for high-quality milling machines.

This gives first-class milling a name: SINUMERIK MDynamics.

You will find further information on the Internet at:
www.siemens.com/sinumerik-mdynamics

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Overview

Multitasking – consistent in all details

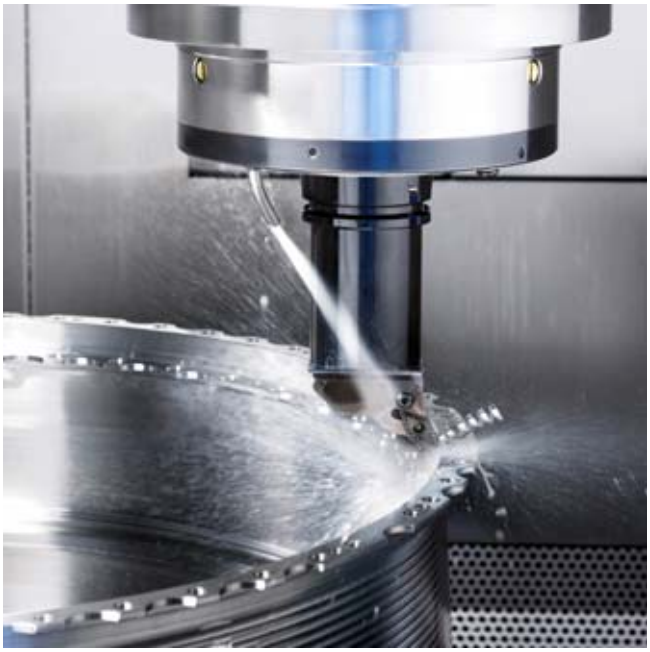
Multitasking made easy:
The consistency of the CNC functions in the SINUMERIK and the standardized look and feel of operation and programming with SINUMERIK Operate enable maximum CNC performance and user friendliness for multitasking in turning and milling applications.

The strength of the CNC functions

Intelligent kinematic transformations with a few parameter inputs turn milling machines into specialized turning machines, and turning machines into professional milling machines. Together with other CNC highlights, such as cross-technology tool management or velocity control, this opens up completely new areas of application for CNC manufacturing, from turning on milling machines, to machining free-form surfaces in turning machines.

Integrated operation

The standardized look and feel of SINUMERIK Operate for all machining technologies enables multiple technologies to be brought together in a single machine – naturally with the highest degree of standardization in operation and programming expected from SINUMERIK. The SINUMERIK technology cycles for drilling, milling, turning, and measuring tasks also adapt perfectly to the particular multitasking machine. This produces the maximum standardization of all multitasking jobs on a machine.



Universal CNC programming

Standardized CNC programming tools extending beyond the technology limits ensure efficient CNC programming of multitasking machines: from machining step programming for single parts to multi-channel programming for mass production. A powerful CNC simulation allows cross-technology visualization of the component, and so offers the highest degree of process reliability for all kinematic versions of modern multitasking machines.

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Overview

IT integration with Siemens – intelligent networking in production

As well as CNC technology, Siemens also offers a comprehensive portfolio for IT integration – from standard data transmission with SINUMERIK Operate to PLM data management with TEAMCENTER.

Standard data transmission

Thanks to LINUX and Windows operating systems, SINUMERIK CNC controls are compatible with all conventional data transmission methods, such as USB, CF card and Ethernet (TCP/IP) – without the need for emulation or file conversion programs.

SINUMERIK Integrate

SINUMERIK Integrate blends SINUMERIK CNC controls perfectly into the IT environment of modern factories. A powerful software suite is available for this purpose:

- SINUMERIK Integrate for production:
  - Manage MyPrograms
    Network-wide organization and management of CNC programs
  - Manage MyTools
    Network-wide tool management
  - Analyze MyCondition
    Evaluation of machine conditions for condition-oriented maintenance
  - Access MyMachine /Ethernet
    Peer-to-peer remote maintenance via LAN or Internet
  - Create MyInterface
    Communication interface for connecting to master computer applications
  - Access MyBackup
    Interface for versioning and archiving CNC data

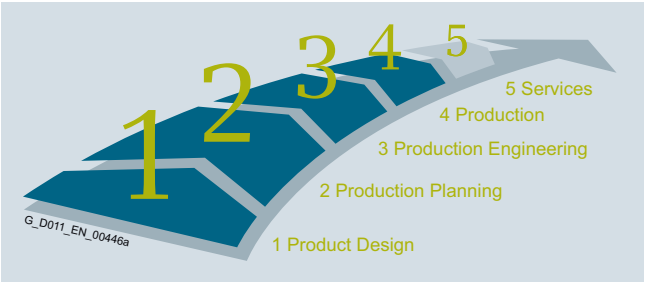


You will find further information on the Internet at:
www.siemens.com/sinumerik-integrate

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Overview

Energy is one of the most important cost factors in industry. Operators can, of course, always make savings here and there, but the full potential for saving energy can only be exploited by taking a holistic view of the entire value chain of a system. As an innovative partner, we offer industry energy-efficient solutions with products and services for all phases in the product development and production process.

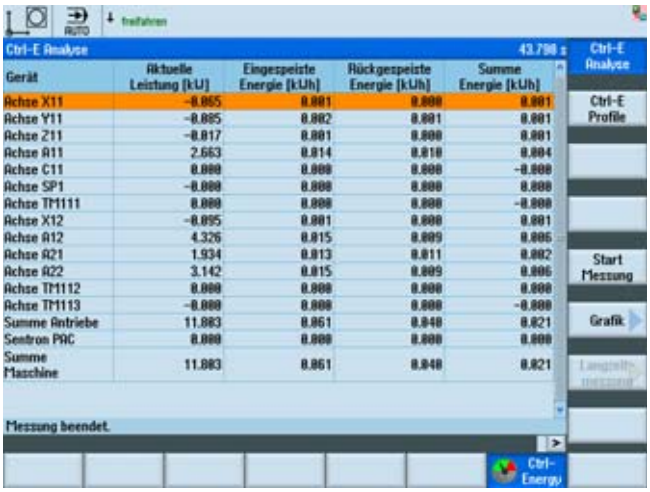


5 steps toward higher energy efficiency

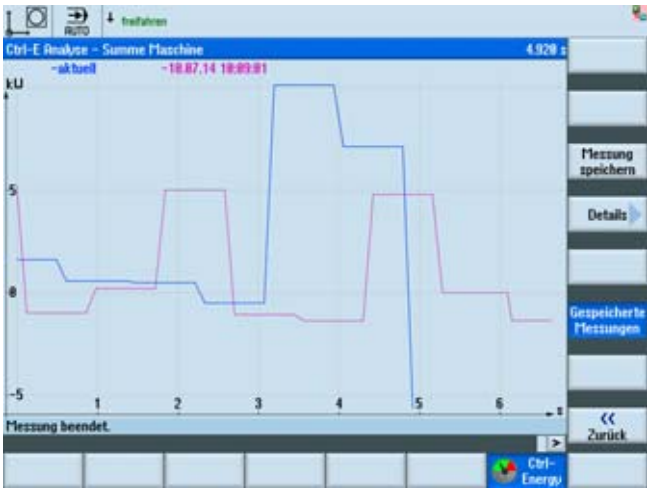
Exploit the full potential of energy efficiency in your production with our comprehensive range of products, systems and solutions, that cover all phases of the product development and production process. Our energy efficiency concept aims to continuously and comprehensively reduce the energy usage of machines and plants and so increase the competitiveness of our customers. To achieve this, as a leading technology partner, we accompany all phases of the product development and production process – from product design through production planning and engineering – up to the production itself, and all the associated services. Only the perfect interaction of all components can achieve maximum energy efficiency in production. Our continual innovations ensure that your investments in energy efficiency pay off more quickly.

Energy efficiency with SINUMERIK Ctrl-Energy

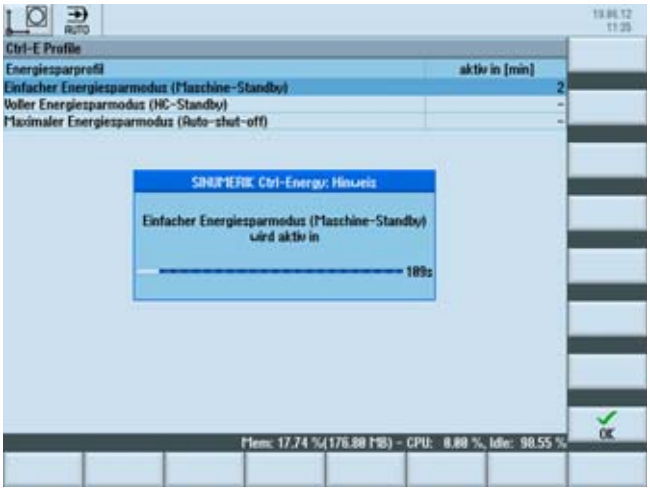
Siemens machine tool systems set the standard for energy efficiency in the machine tool: SINUMERIK Ctrl-Energy covers a wide range of highly efficient drive/motor components, CNC/drive functions, software solutions and services. SINUMERIK Ctrl-Energy thus offers energy-efficient solutions for the complete machine lifecycle – from the design phase to full operation. For example, intelligent functions, such as the analysis of the energy costs of the workpiece, are available to the user: Pressing the shortcut Ctrl + E helps the SINUMERIK save energy.



Representation for a quick overview of the current power and energy consumption



Graphical comparison of two measurements for qualitative evaluation of the energy consumed by a machine tool.



Overview of defined energy saving profiles for a machine tool – pre-warning window in the foreground

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Stabilized power supplies

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Part 8 **CAD CREATOR**
Dimensional drawing and 2D/3D CAD generator
www.siemens.com/cadcreator

Part 8 **Drive Technology Configurator selection tool**
Guided product selection through to exact article number
www.siemens.com/dt-configurator

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The most important functions of the SINUMERIK 840D sl are listed in the function overview.

This gives you quick and selective access to the individual functions.

The designation E in the name of the SINUMERIK 840DE sl CNC indicates that it is the export version, i.e. the control can be exported with the functions specified in the table.

The information in the function overview of the SINUMERIK controls is based on the following software version:

Control	Software version
SINUMERIK 840D sl	4.7

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Overview



The SINUMERIK 840D sl CNC offers modularity, openness, flexibility and uniform structures for operation, programming, and visualization. It provides a system platform with trend-setting functions for almost all technologies.

Integrated into the SINAMICS S120 drive system and complemented by the SIMATIC S7-300 automation system, the SINUMERIK 840D sl forms a complete digital system that is ideally suited for the mid to upper performance range.

SINUMERIK 840D sl is characterized by:

- A high degree of flexibility
- Excellent dynamic response and precision
- Optimum integration into networks

Benefits

- Outstanding performance and flexibility for multi-axis systems of average to high complexity thanks to scalable hardware and software
- Universal openness of the user interface, the PLC and the NCK area to allow integration of your specialist know-how
- Integrated safety functions for man and machine: SINUMERIK Safety Integrated
- Comprehensive range of products for integrating machine tools into communication, engineering and production processes: SINUMERIK Integrate

Application

The SINUMERIK 840D sl can be deployed around the world for the following technologies:

- Turning
- Drilling
- Milling
- Grinding
- Laser machining
- Nibbling
- Punching
- Tool and mold making
- High-speed cutting applications
- Woodworking and glass processing
- Handling
- Transfer lines
- Rotary indexing machines
- Mass production
- JobShop production

The SINUMERIK 840DE sl is available as an export version for use in countries where approval is required.

Design

Matched modular system

The SINUMERIK 840D sl CNC is modular in design, offering outstanding flexibility and openness for any machine application. Entirely in line with the motto "Mix and Match", the components can be perfectly matched to each other - tailored precisely to the requirements of the mechanical engineer and the subsequent operating environment of the machine.

The SINUMERIK 840D sl combines CNC, HMI, PLC, closed-loop control and communication tasks on one SINUMERIK NCU (NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN).

For operation, programming and visualization, the corresponding HMI software is already integrated into the CNC software for the NCU and therefore executes on the high-performance NCU multi-processor module. For enhanced operating performance, the SINUMERIK PCU 50.5 industrial PC can be used.

Up to 4 distributed SINUMERIK OP operator panels can be operated on one NCU or PCU. The operator panel can be installed as a Thin Client at a distance of up to 100 m (328 ft).

The high-performance NCU multi-processor module can be installed to the left of the Line Module of the SINAMICS S120 drive system. If necessary, the NCU can be installed separately at a distance of up to 100 m (328 ft). MOTION-CONNECT DRIVE-CLiQ cables from Siemens are used for the connections.

SINUMERIK 840D sl offers integrated PROFINET functionality and supports PROFINET CBA and PROFINET IO.

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Function

Performance and flexibility

The scalability of the hardware and software – both in the CNC and the operating area – provides exceptional conditions for using SINUMERIK 840D sl in many sectors. The possibilities range from simple positioning tasks up to complex multi-axis systems. We offer different types of NCU for your machining tasks.

A total of 8 axes is provided by SINUMERIK 840D sl with NCU 710.3B PN, while the number of axes can be increased to a maximum of 31 in combination with the NCU 720.3B PN/ NCU 730.3B PN. A total of 3 × 31 axes is possible with the CBE30-2 communication module.

Siemens has bundled its entire milling expertise into the SINUMERIK MDynamics technology packages which allow users to attain outstanding milling results in terms of perfect surface quality, precision, quality and speed:

- Powerful CNC hardware and intelligent CNC functions
- Simple operation
- Unique CAD/CAM/CNC process chain
- Technological expertise in all industries

Use of an NCU 720.3B PN or NCU 730.3B PN is recommended where excellent dynamic response and accuracy are required for mold making applications or in the high-speed cutting (HSC) range.

PROFINET functionality

PROFINET is the leading Industrial Ethernet Standard. PROFINET is based on tried and tested IT standards and fully supports TCP/IP – for company-wide data transfer across all levels. It also offers integrated diagnostics and fail-safe communication to ensure maximum plant availability, modular machine concepts for outstanding flexibility, as well as very fast transfer rates and WLAN applications for significantly enhanced performance.

PROFINET IO is a communication concept for the implementation of modular, distributed applications. PROFINET IO is based on Industrial Ethernet and allows distributed field devices and I/O devices to be connected to the NCU.
128 PROFINET IO devices can be operated as IO controllers.

The integrated PROFINET CBA (Component Based Automation) functionality for machine-to-machine communication allows users to modularize technologically machines and systems on a process-specific basis and benefit accordingly: Systems are easier to standardize and easier to reuse or extend. Response to customer demands is faster and more flexible and startup is simplified and speeded up by pretesting at component level.

Function (continued)

System-wide openness

Thanks to openness across the HMI, CNC and PLC, users can apply their specific expertise such that they achieve exactly the individual control solution desired. SINUMERIK 840D sl offers openness right down to the NCK level. This open architecture and the high computing performance of the SINUMERIK 840D sl mean that the CNC functions can be adapted to many different innovative machine kinematics flexibly, rapidly and cost-effectively. Additional technology-specific functions can be subsequently loaded as compile cycles.

Integrated safety functions

Integrated safety functions (SINUMERIK Safety Integrated) are available with SINUMERIK 840D sl. The safety functions comply with the requirements of Category 3 as well as Performance Level PL d according to EN ISO 13849-1 and Safety Integrity Level SIL 2 according to EN 61508. Consequently, highly effective protection for personnel and machines is achieved in a simple, economical and practical manner.

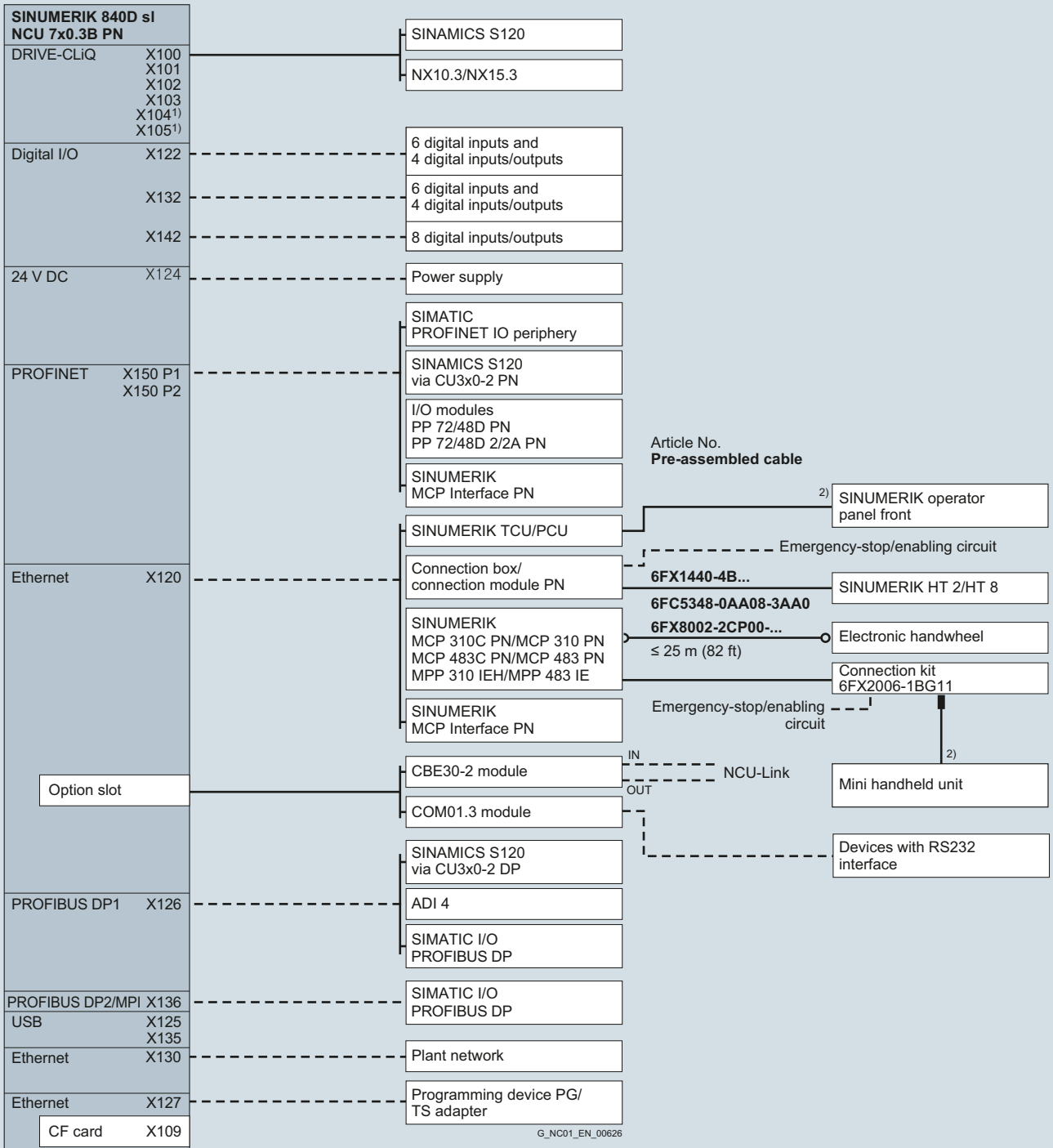
Integration

The following components can be connected to the SINUMERIK 840D sl:

- SINUMERIK operator panel front with TCU
- SINUMERIK PCU 50.5 Windows 7
- SINUMERIK Machine Control Panels MCP and Machine Pushbutton Panels MPP
- SIMATIC Comfort Panels, SIMATIC Mobile Panels and SIMATIC Thin Client Panels
- SINUMERIK handheld units
- Distributed PLC I/O via PROFIBUS DP or PROFINET IO
- SINUMERIK PP 72/48D PN and PP 72/48D 2/2A PN I/O modules
- SINUMERIK Analog Drive Interface for 4 axes, ADI 4
- SINAMICS S120/SINAMICS S120 Combi drive systems
- SIMOTICS feed and main spindle motors
- Probe systems
  (The use of high-precision probes such as those from RENISHAW's RENGAGE range is recommended)

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Integration (continued)



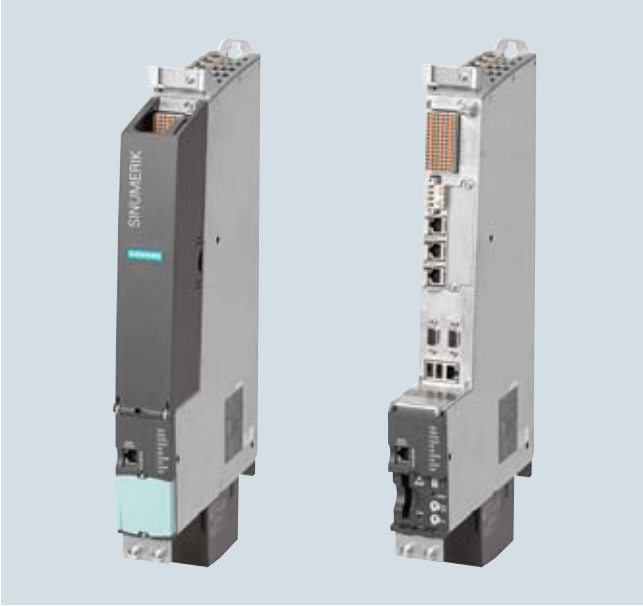
1) Not for NCU 710.3B PN.
2) Cable included in the scope of supply.

Connection overview for SINUMERIK 840D sl

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

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Overview



NCU 710.3B PN

The NCU 710.3B PN represents the first configuration level of the SINUMERIK 840D sl. Up to 8 axes are available in up to 4 machining channels which can be executed in up to 4 mode groups. Up to 8 axes/spindles are supported per channel. Interpolation is possible for a maximum of 8 axes with the CNC software for NCU (multi-axis interpolation option).

The basic version of the CNC user memory is 10 MB, and can be optionally expanded up to 16 MB.

NCU 720.3B PN

The NCU 720.3B PN represents the medium configuration level of the SINUMERIK 840D sl. Up to 31 axes are available in a maximum of 10 machining channels, which can be executed in up to 10 mode groups. Up to 20 axes/spindles are supported per channel. Interpolation is possible for a maximum of 20 axes with the CNC software for NCU (multi-axis interpolation option).

The basic version of the CNC user memory is 10 MB, and can be optionally expanded up to 22 MB.

NCU 730.3B PN

The NCU 730.3B PN is the flagship of the SINUMERIK 840D sl, representing the highest configuration level within the SINUMERIK 840D sl.

Up to 31 axes are available in a maximum of 10 machining channels, which can be executed in up to 10 mode groups. Up to 20 axes/spindles are supported per channel. Interpolation is possible for a maximum of 20 axes with the CNC software for NCU (multi-axis interpolation option).

The basic version of the CNC user memory is 10 MB, and can be optionally expanded up to 22 MB.

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Technical specifications

Article number		6FC5371-0AA30-0AB0	6FC5372-0AA30-0AB0	6FC5373-0AA30-0AB0
Product brand name		SINUMERIK	SINUMERIK	SINUMERIK
Product type designation		840D sl	840D sl	840D sl
Product designation		NCU 710.3B PN	NCU 720.3B PN	NCU 730.3B PN
Type of PLC as SIMATIC S7 Integrated		PLC 317-3 PN/DP	PLC 317-3 PN/DP	PLC 317-3 PN/DP
Storage capacity of main memory 1	GB	2	2	2
• Type of main memory 1		DRAM	DRAM	DRAM
Storage capacity of main memory 2	MB	1	1	1
• Type of main memory 2		NVM	NVM	NVM
Supply voltage at DC Rated value	V	24	24	24
Active power consumption maximum	W	281	352	352
Active power loss typical	W	21	24	24
Degree of protection		IP20	IP20	IP20
• Note		IPXXB with cover for option slot	IPXXB with cover for option slot	IPXXB with cover for option slot
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during				
• storage	%	5 ... 95	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95	5 ... 95
Ambient temperature, during				
• storage	°C (°F)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)
• transport	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Width	mm (in)	50 (1.9685)	50 (1.9685)	50 (1.9685)
Height	mm (in)	455 (17.91339)	455 (17.91339)	455 (17.91339)
Depth	mm (in)	272 (10.70866)	272 (10.70866)	272 (10.70866)
Net weight	kg (lb (avoir-dupois))	3.8 (8.37757)	3.95 (8.70826)	3.95 (8.70826)
Certificate of suitability		CE, cULus	CE, cULus	CE, cULus

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Selection and ordering data

Description	Article No.
Hardware	
NCU 710.3B PN With integrated PLC 317-3 PN/DP	**6FC5371-0AA30-0AB0**
NCU 720.3B PN With integrated PLC 317-3 PN/DP	**6FC5372-0AA30-0AB0**
NCU 730.3B PN With integrated PLC 317-3 PN/DP	**6FC5373-0AA30-0AB0**
Numerical Control Extension NX10.3 Expansion of automatic speed control for SINUMERIK 840D sl up to 3 axes	**6SL3040-1NC00-0AA0**
Numerical Control Extension NX15.3 Expansion of automatic speed control for SINUMERIK 840D sl up to 6 axes	**6SL3040-1NB00-0AA0**
CNC user memory Expanded by 2 MB each	**6FC5800-0AD00-0YB0**
PLC user memory Expanded by 128 KB each	**6FC5800-0AD10-0YB0**
Software	
HMI user memory Additionally on CompactFlash card of NCU, software option • Single license without data storage medium	**6FC5800-0AP12-0YB0**
Accessories	
Spacers For NCU 710.3B PN/ NCU 720.3B PN/NCU 730.3B PN	**6SL3064-1BB00-0AA0**
Blanking cover For NCU 710.3B PN/ NCU 720.3B PN/NCU 730.3B PN	**6SL3064-3BB00-0AA0**
Front cover For NCU 710.3B PN/ NCU 720.3B PN/NCU 730.3B PN	**6FC5348-0AA30-0AA0**

Software options shown with an order code can be ordered in combination with the CNC software for NCU.

The possible software options are listed under Functions starting on page 2/23.

Description	Article No.
Software	
CNC software 31-3 with SINUMERIK Operate for NCU on CompactFlash card Languages: Chinese Simplified, English, French, German, Italian, Spanish	
SINUMERIK 840DE sl (Export):	
• Software version 4.7 SP2 with single license	**6FC5851-1YG44-2YA0**
• Software version 4.7 SP2 without single license	**6FC5851-1YG44-2YA8**
• Single license without data storage medium	**6FC5851-1YF00-0YB0**
SINUMERIK 840D sl:	
• Software version 4.7 SP2 with single license	**6FC5851-1XG44-2YA0**
• Software version 4.7 SP2 without single license	**6FC5851-1XG44-2YA8**
• Single license without data storage medium	**6FC5851-1XF00-0YB0**
CNC software 31-3 with SINUMERIK Operate for NCU on DVD-ROM Languages: Chinese Simplified, English, French, German, Italian, Spanish	
SINUMERIK 840DE sl (Export):	
• Software version 4.7 SP2 without single license	**6FC5851-1YC44-2YA8**
• Single license without data storage medium	**6FC5851-1YF00-0YB0**
SINUMERIK 840D sl:	
• Software version 4.7 SP2 without single license	**6FC5851-1XC44-2YA8**
• Single license without data storage medium	**6FC5851-1XF00-0YB0**
Language extensions[1] On DVD-ROM Without license Languages: Chinese Traditional, Czech, Danish, Dutch, Finnish, Hungarian, Indonesian, Japanese, Korean, Malayan, Polish, Portuguese/Brazilian, Romanian, Russian, Swedish, Slovak, Slovene, Thai, Turkish, Vietnamese • For SINUMERIK 840D sl up to software version 4.5 SP2 • For SINUMERIK Operate operating software up to software version 2.7	**6FC5860-0YC40-0YA8**
Additional languages Use of language extensions Software option • Single license without data storage medium	**6FC5800-0AN00-0YB0**
SINUMERIK 840D sl Toolbox and Protector • Languages: English, German	Supplied on the DVD-ROM containing the CNC software for NCU.

[1] Please inquire about available software versions.

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Overview

Ordering examples for SINUMERIK 840DE sl

- CNC software 31-3 with SINUMERIK Operate on CF card
- Travel to fixed stop with Force Control
- 3 × additional axis/spindle
- 1 × additional machining channel

Ordering as a bundle

Order using article no. with order codes
License key included in delivery

Quantity	Order item	Remark
1	Item 1: 6FC5841-1YG44-2YA0-Z M01+A03+C11	SINUMERIK 840DE sl CNC software 31-3 with SINUMERIK Operate for NCU on CF card 6 languages (Chinese Simplified, English, French, German, Italian, Spanish) Export Software version 4.7 SP2 Single license Travel to fixed stop with Force Control 3 x additional axis/spindle 1 x additional machining channel
Explanation for Item 1:		
1	6FC5841-1YG44-2YA0	SINUMERIK 840DE sl CNC software 31-3 with SINUMERIK Operate for NCU on CF card 6 languages (Chinese Simplified, English, French, German, Italian, Spanish) Export Software version 4.7 SP2 Single license
	-Z	Followed by order codes
1	M01	Travel to fixed stop with Force Control
3	A03	3 × additional axis/spindle
1	C11	1 × additional machining channel

Normal orders:

- Article no. CNC software export on CF card with single license
- Article no. CNC software on CF card with single license

Replacement order, e.g. failure of the CF card:

- Article no. CNC software export on CF card without single license
- Article no. CNC software on CF card without single license

License for customers that always put the CNC software on the CF card themselves:

- Article no. CNC software export single license
- Article no. CNC software single license

Ordering individually

Order using the complete article number
License key obtained over Internet

Quantity	Order item	Remark
1	Item 1: 6FC5841-1YG44-2YA0	SINUMERIK 840DE sl CNC software 31-3 with SINUMERIK Operate for NCU on CF card 6 languages (Chinese Simplified, English, French, German, Italian, Spanish) Export Software version 4.7 SP2 Single license
1	Item 2: 6FC5800-0AM01-0YB0	Travel to fixed stop with Force Control
3	Item 3: 6FC5800-0AA00-0YB0	3 x additional axis/spindle
1	Item 4: 6FC5800-0AC10-0YB0	1 x additional machining channel

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Overview



The NX10.3/NX15.3 Numeric Control Extensions are used with SINUMERIK 840D sl for applications with large numbers of axes. NX10.3/NX15.3 allows the drive-end computing performance for the SINAMICS drives within the SINUMERIK 840D sl to be increased.

The modules have the same design as the SINAMICS S120 components. With a width of only 25 mm (1 in), the modules are also ideal for installation in compact machines.

Function

The drive control is expanded modularly in steps of 3 or 6 additional servo axes by means of Numeric Control Extensions. Each NX10.3 component can control up to 3 additional servo axes and each NX15.3 component can control up to 6 additional servo axes.

The SINUMERIK 840D sl control handles coordinate transformation, motion control and PLC control for up to 31 axes, whereby the drive control for up to 6 servo axes is already integrated into the SINUMERIK 840D sl.

Data management for the NX10.3/NX15.3 components is located exclusively on the SINUMERIK 840D sl, making it much easier to replace components.

Integration

The following can be operated in an axis grouping with SINUMERIK 840D sl:

- Up to 2 NX10.3/NX15.3 components on the NCU 710.3B PN
- Up to 5 NX10.3/NX15.3 components on the NCU 720.3B PN/NCU 730.3B PN

The NX10.3/NX15.3 components are connected to the SINUMERIK 840D sl via DRIVE-CLiQ cables. This ensures that drive control remains high performant and clock synchronized. The communications interfaces on the SINUMERIK 840D sl remain available for other connections.

Technical specifications

Article No.		6SL3040-1NC00-0AA0	6SL3040-1NB00-0AA0
Product brand name		SINAMICS	SINAMICS
Product type designation		Numeric Control Extension NX10.3	Numeric Control Extension NX15.3
Number of axes maximum		3	6
Number of digital inputs		6	6
Number of digital inputs/outputs parameterizable		4	4
Supply voltage at DC Rated value	V	24	24
Consumed current typical	A	0.3	0.3
• Note		Ignoring digital outputs and DRIVE-CLiQ supply	Ignoring digital outputs and DRIVE-CLiQ supply
Output current maximum	A	3.35	3.35
Degree of protection		IP20	IP20
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)
• transport	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Width	mm (in)	25 (0.98425)	25 (0.98425)
Height	mm (in)	414 (16.29921)	414 (16.29921)
Depth	mm (in)	272 (10.70866)	272 (10.70866)
Net weight	kg (lb (avoirdupois))	2.58 (5.68793)	2.58 (5.68793)
Certificate of suitability		CE, cULus	CE, cULus

Selection and ordering data

Description	Article No.
Numeric Control Extension NX10.3 Extension of drive control for SINUMERIK 840D sl up to 3 axes	**6SL3040-1NC00-0AA0**
Numeric Control Extension NX15.3 Extension of drive control for SINUMERIK 840D sl up to 6 axes	**6SL3040-1NB00-0AA0**

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SINUMERIK COM01.3 module

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Overview



With the SINUMERIK COM01.3 module, an RS232C serial interface is available for the NCU 710.3B PN/NCU 720.3B PN/ NCU 730.3B PN. The COM port has been designed in accordance with the ANSI/EIA/TIA-232-F-1997 standard.

Function

The NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN can be connected to a master computer, a PC/PG or a modem via the COM interface.

Integration

The COM01.3 module is inserted in the option slot of the SINUMERIK NCUs.

Technical specifications

Article No.	6FC5312-0FA01-1AA0
Product brand name	SINUMERIK
Product type designation	COM01.3 module
Supply voltage at DC	
• Note	Via NCU 710.3B PN/ NCU 720.3B PN/NCU 730.3B PN
Active power consumption maximum	2 W
Degree of protection	IP20
• Note	Mounted
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	22.5 mm (0.88583 in)
Height	95 mm (3.74016 in)
Depth	130 mm (5.11811 in)
Net weight	65 g (2.29281 oz)
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK COM01.3 module Serial RS232C interface for SINUMERIK 840D sl with NCU 710.3B PN/ NCU 720.3B PN/ NCU 730.3B PN	**6FC5312-0FA01-1AA0**

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Overview



The CBE30-2 communication module for NCU-Link can be used to set up NCU-Link communication between a number of SINUMERIK NCUs on the basis of the generally approved standard configuration.

Benefits

- Using the CBE30-2 communication module, it is possible to implement machines with more than 31 axes via NCU-Link
- Direct linking in the interpolation cycle means that NCUs can exchange data quickly
- Subordination of a physical axis to several different NCUs
- Cross-NCU interpolation
- An increase in the number of usable axes for an NCU grouping
- An increase in the number of channels for an NCU grouping

Design

- 100 Mbit/s full-duplex/autocrossing
- Integrated 4-port switch with four RJ45 sockets based on PROFINET
- Hardwiring for NCU-Link via port 1 (in) and port 2 (out)

Function

To support isochronous Ethernet communication for linking up to three NCUs (NCU-Link).

Integration

The CBE30-2 communication module is inserted in the option slot of the SINUMERIK NCUs.

Technical specifications

Article No.	6FC5312-0FA00-2AA0
Product brand name	SINUMERIK
Product type designation	CBE30-2 communication module
Supply voltage at DC	24 V
Consumed current maximum	0.25 A
Degree of protection	IP20
• Note	Mounted
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	25 mm (0.98425 in)
Height	95 mm (3.74016 in)
Depth	143 mm (5.62992 in)
Net weight	100 g (3.5274 oz)
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
CBE30-2 communication module SINUMERIK/ SIMOTION CBE30-2 communication module for connecting SIMOTION D4x5-2 DP/PN to PROFINET IO and for SINUMERIK NCU 710.3B PN/ NCU 720.3B PN/NCU 730.3B PN as an NCU-Link	**6FC5312-0FA00-2AA0**

More information

You will find more information about FastConnect RJ45 connectors and Industrial Ethernet cables in Catalog IK PI or the Siemens Industry Mall:

www.siemens.com/industrymall

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SINUMERIK Analog Drive Interface for 4 axes ADI 4

Overview



The SINUMERIK Analog Drive Interface for 4 axes ADI 4 can be used to operate up to 4 drives with analog setpoint interface.

Benefits

- Connection via PROFIBUS DP
- Motion Control functionality (isochronous mode)

Design

- 4 inputs for incremental encoders (TTL signals) or optionally 4 inputs for absolute encoders (SSI interface)
- 4 analog outputs ± 10 V for the setpoint
- 4 relay contacts for drive enable of axes 1 to 4
- 8 digital outputs (4 drive-specific)
- 10 digital drive-specific inputs
- Onboard status display on 4 diagnostics LEDs

To supply the module and digital outputs with power, an external voltage source (+24 V DC) is needed.

Integration

The ADI 4 interface module can be used with the following CNCs:

- SINUMERIK 840D sl

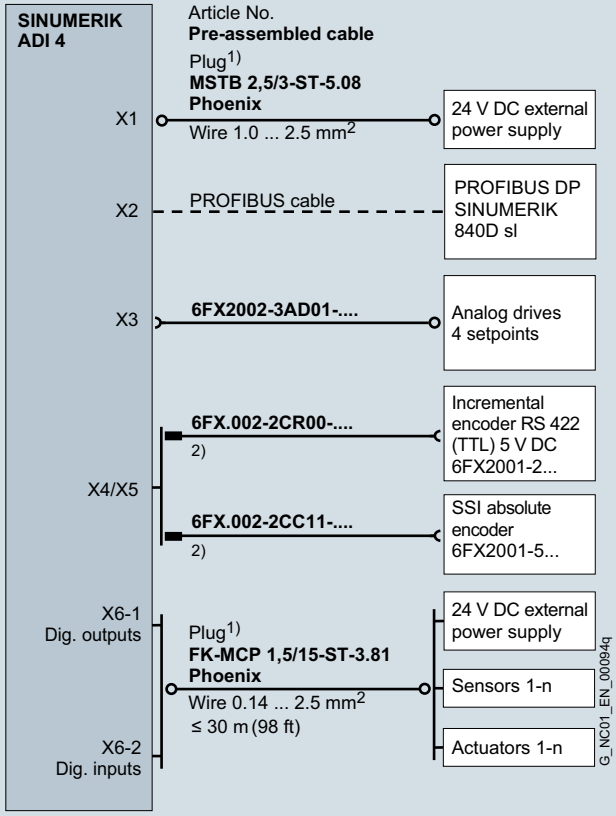
Several ADI 4 Analog Drive Interfaces can be connected to the SINUMERIK 840D sl, permitting analog control of all its axes. Mixed operation of digital drives and ADI 4 modules is possible; the axes can interpolate with one another.

Encoder connection:

- TTL incremental encoder with differential transfer:
  - Track A and inverted signal A
  - Track B and inverted signal B
  - Zero signal and inverted zero signal
  - Output frequency max. 1.5 MHz
  - Phase shift of track A to track B: 90° ± 30°
  - Power consumption max. 300 mA
- Absolute encoder with SSI signal:
  - True and inverted output signal
  - Shift clock as true and inverted signal
  - Transmission frequency max. 750 kbaud
  - Power consumption max. 300 mA
    Only multi-turn encoders are approved for this purpose.
- Linear encoder with distance-coded zero marks/reference marks
  - LS 476 C
  - LS 186 C with external pulse-shaper electronics EXE
- Encoder with sin/cos signals can be connected via external pulse-shaper electronics EXE.

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Integration (continued)



1) Included in scope of supply.
2) The max. cable lengths depend on the current consumption, power supply and frequency of the encoders (see Manual ADI 4).

Connection overview for ADI 4

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

Technical specifications

Article No.	6FC5211-0BA01-0AA4
Product brand name	SINUMERIK
Product type designation	Analog Drive Interface for 4 axes ADI 4
Supply voltage at DC	24 V
Active power consumption maximum	30.2 W
Degree of protection	IP20
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	48.5 mm (1.90945 in)
Height	325 mm (12.79528 in)
Depth	154.4 mm (6.07874 in)
Net weight	1.5 kg (3.30693 lb (avoirdupois))
Certificate of suitability	CE, UL, CSA

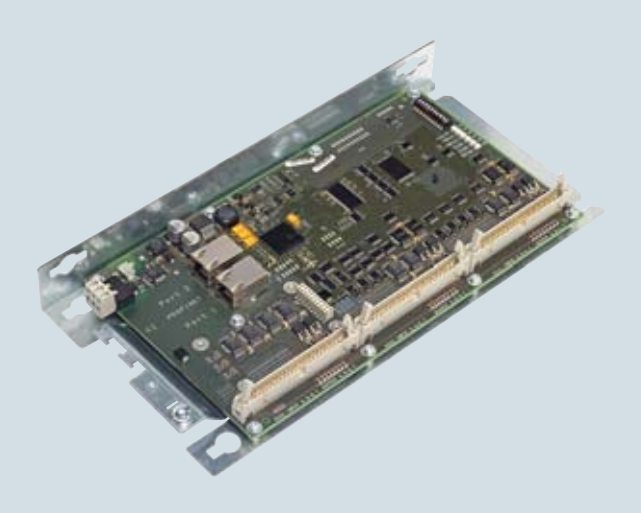
Selection and ordering data

Description	Article No.
SINUMERIK Analog Drive Interface for 4 axes ADI 4 Interface module for operating up to 4 drives with an analog setpoint interface	**6FC5211-0BA01-0AA4**

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SINUMERIK PP 72/48D PN and PP 72/48D 2/2 A PN I/O modules

Overview



The SINUMERIK PP 72/48D PN I/O module is available in a digital variant with 72 inputs and 48 outputs, and in a digital/analog variant PP 72/48D 2/2A PN with an additional 2 analog inputs and 2 analog outputs.

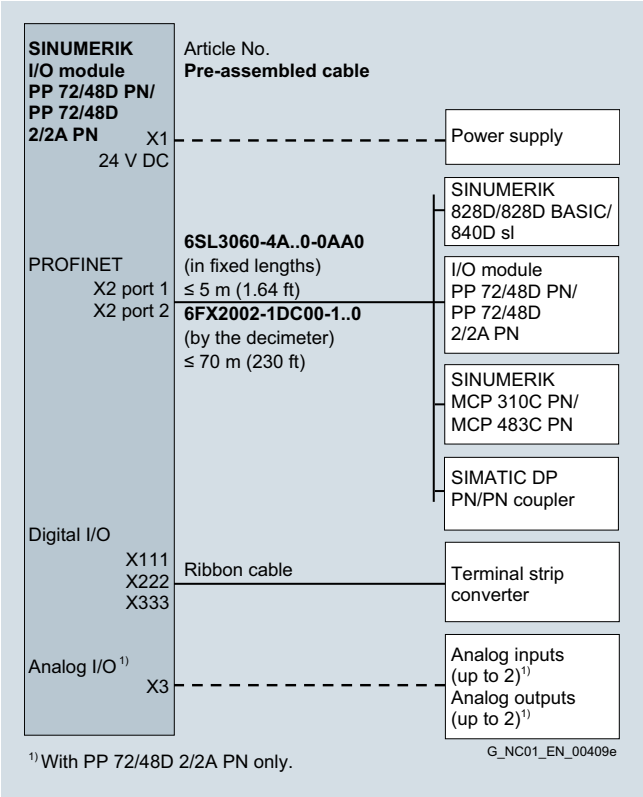
The I/O modules are connected to the CNC via a PROFINET-based I/O interface. The digital inputs and outputs are connected by means of three 50-pin ribbon cables. Terminal strip converters can be used or the direct connection of distribution boards, for example, is possible.

Benefits

- Easy connection via PROFINET-based I/O interface
- Mounting plate for easy module installation in the control cabinet
- Automatic module detection by the CNC, no complex configuring required
- Easy connection of terminal strip converters to plug connectors
- Integrated 24 V DC power supply with electrical isolation between the inputs and outputs and PROFINET

Integration

The PP 72/48D PN and PP 72/48D 2/2A PN I/O modules can be used for the SINUMERIK 840D sl CNC.



Connection overview for SINUMERIK I/O module PP 72/48D PN/PP 72/48D 2/2A PN

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

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Technical specifications

Article No.		6FC5311-0AA00-0AA0	6FC5311-0AA00-1AA0
Product brand name		SINUMERIK	SINUMERIK
Product type designation		PP 72/48D PN I/O module	PP 72/48D 2/2A PN I/O module
Supply voltage at DC	V	24	24
Active power consumption maximum	W	17	19
• Note		–	Without digital outputs
Number of digital inputs		72	72
Number of digital outputs		48	48
Number of analog inputs		–	2
Number of analog outputs		–	2
Degree of protection		IP00	IP00
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• transport	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Width	mm (in)	150 (5.90551)	150 (5.90551)
Height	mm (in)	300 (11.81102)	300 (11.81102)
Depth	mm (in)	35 (1.37795)	35 (1.37795)
Net weight	kg (lb (avoir-dupois))	0.9 (1.98416)	0.9 (1.98416)
Certificate of suitability		CE, cULus	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK PP 72/48D PN I/O module 72 digital inputs and 48 digital outputs	**6FC5311-0AA00-0AA0**
SINUMERIK PP 72/48D 2/2A PN I/O module 72 digital inputs and 48 digital outputs 2 analog inputs and 2 analog outputs	**6FC5311-0AA00-1AA0**

Description	Article No.
Accessories	
Terminal strip converter 50-pin	**6EP5406-5AA00**
Cable set Ribbon cable 50-pin, length 6 m (19.7 ft), 8 insulation displacement connectors, 50-pin	**6EP5306-5BG00**
DRIVE-CLiQ signal cable, pre-assembled For PROFINET connection Connector with degree of protection IP20	
• In precise decimeter lengths[1)]	6FX2002-1DC00-1..0
• In fixed lengths[1)]	6SL3060-4A..0-0AA0

[1)] For information on the cables and length codes refer to section MOTION-CONNECT connection systems.

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Overview

SIMATIC ET 200 distributed I/O



SIMATIC ET200 – offers the right solution for every application

SIMATIC ET 200 offers a broad range of distributed I/O systems - for solutions in the control cabinet or without a control cabinet directly at the machine and for applications in hazardous areas. Thanks to their modular design, ET 200 systems are easy to scale and expand in small steps. Ready integrated add-on modules reduce costs while at the same time offering extremely diverse application potential. A huge range of different combinations can be selected: Digital and analog inputs/outputs, intelligent modules with CPU functionality, safety engineering, motor starters, pneumatic systems, frequency converters and a variety of technology modules, e.g. for counting and positioning tasks.

The communication via PROFIBUS and PROFINET, the uniform engineering, the user-friendly diagnostic tools and the optimum interfacing with SIMATIC controllers and HMI equipment are all proof of the unique consistency of the Totally Integrated Automation.

PROFIBUS

PROFIBUS is the international standard (IEC 1158/61784) for the field level. It is the only fieldbus to allow communication both in manufacturing applications and in process-oriented applications.

PROFIBUS is used to connect field devices such as distributed I/O devices or drives to automation systems such as SIMATIC S7, SIMOTION, SINUMERIK or PCs.

PROFIBUS is standardized in accordance with IEC 61158 and is a powerful, open and rugged fieldbus system with short response times. PROFIBUS is available in different forms for various applications.

Overview (continued)

PROFIBUS DP (distributed I/O)

PROFIBUS DP is used for connecting distributed field devices, e.g. SIMATIC ET 200 or drives, with extremely fast response times. PROFIBUS DP is used when actuators/sensors are distributed at the machine or in the plant, e.g. at field level.

PROFINET

PROFINET is the open, cross-vendor Industrial Ethernet standard (IEC 61158/61784) for automation.

Based on Industrial Ethernet, PROFINET enables direct communication between field devices (IO devices) and controllers (IO controllers), up to and including the solution of isochronous drive controls for motion control applications.

As PROFINET is based on Standard Ethernet according to IEEE 802.3, any devices from the field level to the management level can be connected.

In this way, PROFINET enables system-wide communication, supports plant-wide engineering and applies IT standards, such as Webserver or FTP, right down to field level. Tried and tested fieldbus systems, such as PROFIBUS or AS-Interface, can be easily integrated without any modification to the existing devices.

More information

You will find further information in Catalog ST 70, on the Internet, or in the Siemens Industry Mall:

www.siemens.com/simatic
www.siemens.com/industrymall

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Overview



The 24 V power supply units from the SITOP range are optimized for industrial use and operate on the switched-mode principle. Due to the precisely regulated output voltage, the devices are even suitable for the connection of sensitive sensors. Different versions are available depending on the output current and specific application.

In some cases, functional expansion is possible with add-on modules. For example, to protect against long supply system outages, 6 A, 15 A and 40 A DC UPS modules are available with external buffering by rechargeable batteries and maintenance-free SITOP UPS500 with capacitor technology. 48 V power supplies round off the SITOP product range.

The SITOP PSU400M power supply unit with 600 V DC input is suitable for use on frequency converters as an efficient DC/DC converter.

It converts the DC link voltage to a stabilized 24 V DC thus allowing, for example, specific emergency retraction movements to be performed in the event of a mains failure. This is possible because the control system and the drive electronics continue to receive a power supply for as long as there is sufficient energy stored in the DC link.

The wide DC input range (200 V to 900 V DC) and the high efficiency level (up to 96 %) ensure efficient use of the DC link energy. The compact, rail-mounted device is versatile in its application thanks to its high overload capability with 50 % extra power for 5 s/min, its comprehensive range of functions and its rugged construction. The selectable ON delay which ensures that the converter's DC link is not loaded immediately during starting is one of the features that makes it ideal for operation on SINAMICS frequency converters.

Benefits

- High level of efficiency
  The efficiency of up to 96 % keeps the current consumption low and the control cabinet cool.
- Easy installation
  The low weight and mounting accessories support fast and therefore low-cost installation.
- Low space requirements
  The high power ratio means that the devices only require minimal space in the control cabinet and in the machines.
- Accurate output voltage
  The output voltage of 24 V DC remains accurate even under conditions of extreme voltage variation. The loads are protected from overvoltage spikes which lengthens the lifetime and reduces downtimes.
- Low residual ripple
  The low residual ripple of less than 0.4 % supports voltage-sensitive loads.
- Integrated short-circuit protection
  No additional protection of the cables in the 24 V DC circuit is required.
- Safety isolation
  The UA output is electrically isolated from the input (output voltage SELV acc. to EN 60950). Dangerous voltages cannot arise due to electrical isolation at the output.
- Meets the requirements of national and international standards, e.g.:
  - CE marking in accordance with 89/336 EEC und 73/23 EEC
  - UL/cUL (CSA) approval
  - FM approval (Factory Mutual)
  - Marine approval
- No release of silicone

More information

You will find further information in Catalog KT 10.1, on the Internet or in the Siemens Industry Mall:

www.siemens.com/sitop
www.siemens.com/industrymall

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Overview



SINUMERIK Safety Integrated provides integrated safety functions that support the implementation of highly effective personnel and machine protection. The safety functions comply with the requirements of Category 3 as well as Performance Level PL d according to EN ISO 13849-1 and safety integrity level SIL 2 according to EN 61508. Consequently, important functional safety requirements can be implemented easily and economically. Available functions include, among others:

- Functions for safety monitoring of velocity and standstill
- Functions for establishing safe boundaries in work spaces and protected spaces, and for range recognition
- Direct connection of all safety-related signals and their internal logical linkage

Benefits

- High level of safety:
  Complete implementation of the safety functions in Category 3/SIL 2/PL d
- High level of flexibility:
  Supports the implementation of practically sound safety and operating concepts
- Extremely cost-effective:
  Reduced hardware and installation costs
- Enhanced availability:
  Absence of interference-susceptible electromechanical switching elements

Function

The safety functions are available in all modes and can communicate with the process using safety-oriented input/output signals.

They can be implemented for each individual axis and spindle:

Safety Integrated drive-based (basic version)

- Safe Torque Off (STO)
  Suppression of drive pulses, providing safe electronic interruption of the energy supply
- Safe Brake Control (SBC)
  Safe (2-channel) control of a holding brake (integrated in the SINAMICS S120 Motor Module)
- Safe Stop 1 (SS1)
  Safe shutdown of a drive followed by STO

Safety Integrated system-integrated (option)

- Safe shutdown
  Ensures safe transition of the drive from motion to standstill when a monitoring device or a sensor (e.g. a light barrier) responds.
- Safe braking ramp (SBR)
  Monitoring of the speed curve. The speed must be reduced after a stop request has been issued
- Safe operating stop (SBH)
  Monitors drives for standstill. The drives remain fully functional in closed loop position control
- Safe standstill (SH)
  Suppression of drive pulses, providing safe electronic interruption of the energy supply
- Safely limited speed (SLS)
  Monitoring of configurable speed limits
- Safety-related output $n < n_x$
  Safe speed recognition of a drive
- Safe software limit switches (SE)
  Variable traversing range limitations
- Safe software cams (SN)
  Range recognition
- Safety-related input/output signals (SGE/SGA)
  Interface with process
- Safe programmable logic (SPL)
  Direct connection of all safety-related signals and their internal logical operation
- Safe brake management (SBM)
  - 2-channel braking signal
    (integrated in the SINAMICS S120 Motor Module) (SBC)
  - Cyclic brake test (SBT)
- Safety-related communication via standard bus
  - Connection of distributed I/O for process and safety signals via PROFIBUS/PROFINET using the PROFIsafe protocol.
  - Safety-related CPU - CPU communication via PROFIBUS or PROFINET
- Integrated acceptance test
  Partially automated acceptance test for all safety-related functions. Simple operation of the test process, automatic configuration of Trace functions and automatic generation of an acceptance record.

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Integration

Requirements:

- SINUMERIK 840D sl
- SINAMICS S120 in booksize format
- The encoder systems used must meet the requirements of SINUMERIK Safety Integrated.
- The measuring circuit cables must comply with the SINAMICS S120 specifications.
- Sensor/actuator integration with PROFIsafe I/Os
- Fail-safe modules:
  - SIMATIC ET 200M
  - SIMATIC ET 200S
  - SIMATIC ET 200SP
  - SIMATIC ET 200eco
  - SIMATIC ET 200pro
  - DP/AS-i F-Link
- SIMATIC S7 F Configuration Pack available as a download at: https://support.industry.siemens.com/cs/ww/en/view/15208817
- For the integrated acceptance test
  - SinuCom software tool (can run on PC/PG)

Selection and ordering data

Description	Article No.
SINUMERIK Safety Integrated for SINUMERIK 840D sl	
• SINUMERIK SI-Basic for up to 1 axis/spindle; up to 4 inputs and up to 4 outputs can be used for safe programmable logic	**6FC5800-0AM63-0YB0**
• SINUMERIK SI-Comfort for up to 1 axis/spindle up to 64 inputs and up to 64 outputs can be used for safe programmable logic	**6FC5800-0AM64-0YB0**
• SINUMERIK SI-High Feature for up to 1 axis/spindle up to 192 inputs and up to 192 outputs can be used for safe programmable logic Requirement: NCU 720.3B PN/NCU 730.3B PN	**6FC5800-0AS68-0YB0**
• SINUMERIK SI-axis/spindle package extra for each additional axis/spindle	**6FC5800-0AC70-0YB0**
• SINUMERIK SI-axis/spindle package further additional 15 axes/spindles	**6FC5800-0AC60-0YB0**
SINUMERIK Safety Integrated SI-Connect 16 safe connections	**6FC5800-0AS67-0YB0**

Selection and ordering data (continued)

Only one SI-Basic and one SI-Comfort option can be ordered for each SINUMERIK 840D sl. If a machine with Safety Integrated requires up to 4 safe inputs and 4 safe outputs, the SI Basic option can be ordered. If five or more safe inputs/outputs are required, the SI-Comfort option should be ordered.

Ordering example 1:
The machine has 2 axes and 1 spindle, which are to be monitored by Safety Integrated. 4 safe inputs and 3 safe outputs are required. The following options must be ordered:

Number	Article No.	Remark
1	6FC5800-0AM63-0YB0	SI-Basic
2	6FC5800-0AC70-0YB0	SI-axis/spindle package

Ordering example 2:
The machine has 5 axes and 1 spindle, which are to be monitored by Safety Integrated. 9 safe inputs and 5 safe outputs are required. The following options must be ordered:

Number	Article No.	Remark
1	6FC5800-0AM64-0YB0	SI-Comfort
5	6FC5800-0AC70-0YB0	SI-axis/spindle package

More information

The Safety Integrated functions of the SINUMERIK are generally certified by independent institutes. An up-to-date list of certified components is available on request from your local Siemens office. If you have any questions relating to certifications that have not been completed, please ask your Siemens contact.

Encoder systems

If you require information about the use of suitable encoder systems with SINUMERIK Safety Integrated, please contact your local Siemens office.

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Information about export: Standard/export versions

Overview

As a consequence of the prevailing export restrictions applicable to the CNC software of numerical controls in relation to particular control functions in accordance with the European/German Export List (export list item 2D002), the SINUMERIK 840D sl is available in two versions.

This applies to the CNC system software for the SINUMERIK 840D sl.

The **standard versions** of the SINUMERIK 840D sl offer the full scope of CNC functions, but **require official approval** according to the export list item 2D002 when exported to countries outside the EU.

The **export versions** of the SINUMERIK 840DE sl have restricted functionality in accordance with the export list restrictions, and therefore **do not require official approval** as a result of their type in accordance with EU or German law.

The approval status for the complete CNC system is correspondingly dependent on the hardware or software version used.

General note:

If any particular components require official re-export approval according to US law, this must be duly filed for. Information about official approval requirements for supplied components is given in the delivery documentation: Goods marked here with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods marked with "ECCN not equal to N" are subject to US re-export authorization. Even if goods are not labeled or labeled with "AL:N" or "ECCN:N", they may still be subject to export authorization depending on the final destination and end use of the goods.

If a purchase contract is concluded, fulfillment of this contract by Siemens shall be subject to the proviso that there are no impediments arising from any national or international regulations on foreign trade and that there are no embargos and/or other sanctions.

Important export information

Export of standard versions of components or systems can be subjected to a time-consuming official authorization process, so it is recommended that the **export version is used where applicable**.

"Information on classification verification (Auskunft zur Güterliste (AZG))" pertaining to the official export authorization process is available for export versions (e.g. Federal Office of Economics and Export Control (BAFA), Customs). You can obtain a copy of this verification from your local Siemens sales office.

When the standard versions are used, it is important to note that the official authorization is also required for the export of components subject to export approval within the framework of service provision, the supply of spare parts and delivery of software upgrades/updates. This is especially relevant in cases where the CNC is exported after the machine manufacturer has installed it in a machine tool. The lengthy official approval procedure can severely restrict after-sales service.

When an application for an export permit for a system is made, we therefore recommend that spare parts supplies for any components requiring approval are included in the application as a matter of course to avoid future delays.

If the CNC is to be exported as an installed component in a machine tool, we recommend that machine manufacturers include any spare parts requiring approval in the export permit application for the machine. If the machine itself does not require official export approval, but contains components which do, we recommend that an export permit for the replacement supply of such spare parts is applied for in advance, in case this is necessary.

Spare part supplies requiring official approval can then be exported quickly and easily by the machine manufacturer himself, or by Siemens if the manufacturer can make the original export permit available to Siemens.

Restricted functionality of export versions

The designation "E" in the name of the CNC indicates that it is the export version, i.e. the relevant control software is classified as not requiring official approval (AL=N) with the functional restrictions specified in the table according to export list item 2D002.

You will find further information about "restricted functionality" for the export versions in the glossary for Catalog NC 62 in the Siemens Industry Mall at:

www.siemens.com/sinumerik-840dsl-glossary

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Overview (continued)

Restricted functionality of export versions (continued)

Description ✓ Basic version | – Not available | ▦ Restricted functionality of export versions	Article No.	Order code	SINUMERIK 840DE sl
SINAMICS S120 TM17 Terminal Module	6SL3055-0AA00-3HA0		–
Scalable analog setpoint Run MyCC /SANS	6FC5800-0AN48-0YB0	N48	–
Multi-axis interpolation > 4 interpolating axes	6FC5800-0AM15-0YB0	M15	–
Crank interpolation Run MyCC /CRIP	6FC5800-0AN04-0YB0	N04	–
Motion control:			
• Model-based (engineered motion control) Run MyCC /EMC	6FC5800-0AN47-0YB0	N47	–
Generic couplings:			
• CP-Basic	6FC5800-0AM72-0YB0	M72	▦ [1]
• CP-Comfort	6FC5800-0AM73-0YB0	M73	▦ [1]
• CP-Expert	6FC5800-0AM74-0YB0	M74	▦ [1]
Compensation of a forced mechanical coupling in the machine coordinate system Run MyCC /AXCO	6FC5800-0AM81-0YB0	M81	–
Transformation: Redundant and spatially distributed axes at workpiece in Cartesian coordinate system Run MyCC /RDCC	6FC5800-0AN26-0YB0	N26	–
Generic transformation	✓		–
Transformation: Rotating workpiece and tool Run MyCC /2RPT	6FC5800-0AN43-0YB0	N43	–
Transformation: DOUBLETRANSMIT Run MyCC /2TRA	6FC5800-0AM25-0YB0	M25	–
Double generic transformation Run MyCC /DGEN	6FC5800-0AN34-0YB0	N34	–
Transformation: Dynamic Swivel Tripod Run MyCC /DSTT	6FC5800-0AM84-0YB0	M84	–
Transformation: Eccentric axis Run MyCC /ECCA	6FC5800-0AN44-0YB0	N44	–
Transformation: Eccentric Run MyCC /ECCE	6FC5800-0AN41-0YB0	N41	–
Transformation: HEXAPOD Run MyCC /HEX	6FC5800-0AM71-0YB0	M71	–
Transformation: Machining with virtual Y axis Run MyCC /MAVY	6FC5800-0AN56-0YB0	N56	–
Transformation: PARACOP Run MyCC /PACO	6FC5800-0AM44-0YB0	M44	–
Transformation: Swivel axis Run MyCC /PIVA	6FC5800-0AN52-0YB0	N52	–
Transformation: Handling Run MyCC /RCTRA	6FC5800-0AM31-0YB0	M31	–
Transformation: Robotic extended Run MyCC /ROBX	6FC5800-0AN54-0YB0	N54	–
Transformation: Rotating eccentric Run MyCC /ROTE	6FC5800-0AN37-0YB0	N37	–
Transformation: Pantograph kinematics Run MyCC /SCIS	6FC5800-0AM51-0YB0	M51	–
Transformation: Tripod hybrid kinematics Run MyCC /THYK	6FC5800-0AN36-0YB0	N36	–
Transformation: TRICEPT Run MyCC /TRIC	6FC5800-0AM46-0YB0	M46	–
Machining package 5 axes	6FC5800-0AM30-0YB0	M30	–
Machining package 5 axes, additional function 7th axis	6FC5800-0AS01-0YB0	S01	–
Milling technology package, SINUMERIK MDynamics 5 axes	6FC5800-0AS33-0YB0	S33	–
Cartesian travel to fixed stop Run MyCC /FXSC	6FC5800-0AN38-0YB0	N38	–

[1] The number of simultaneously traversing axes is restricted to 4.

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Information about export: Standard/export versions

Overview (continued)

Restricted functionality of export versions (continued)

Description ✓ Basic version | – Not available | ⊞ Restricted functionality of export versions	Article No.	Order code	SINUMERIK 840DE sl
Velocity adaptation for water jet cutting Run MyCC /VADA	6FC5800-0AN05-0YB0	N05	–
Extrapolated switching signals Run MyCC /XOUT	6FC5800-0AN51-0YB0	N51	–
Synchronous motion Run MyCC /SYMO	6FC5800-0AN66-0YB0	N66	–
Grinding:			
• Fast braking during grinding Run MyCC /FABS	6FC5800-0AN81-0YB0	N81	–
Handling package	6FC5800-0AS31-0YB0	S31	–
Use a KUKA robot with a SINUMERIK 840D sl as the CNC control SINUMERIK Integrate Run MyRobot /Machining	6FC5800-0AP73-0YB0	P73	–
Communication interface to a KUKA robot Run MyCC /RODI	6FC5800-0AN65-0YB0	N65	–
Electronic transfer CP	6FC5800-0AM76-0YB0	M76	⊞ 1)
SINUMERIK plastics package IME	6FC5800-0AS40-0YB0	S40	–
Synchronized actions and fast auxiliary function output incl. 3 synchronous functions	✓		⊞ 1)
Synchronized actions stage 2	6FC5800-0AM36-0YB0	M36	⊞ 2)
1D/3D clearance control in position control cycle Run MyCC /CLC	6FC5800-0AM40-0YB0	M40	⊞ 3)
1D/3D clearance control in position control cycle in any direction Run MyCC /CLC-FD	6FC5800-0AM65-0YB0	M65	⊞ 3)
Tool orientation interpolation	✓		–
Axis collision protection Run MyCC /PROT	6FC5800-0AN06-0YB0	N06	–
Leadscrew error compensation, bidirectional	6FC5800-0AM54-0YB0	M54	⊞ 4)
Sag compensation, multi-dimensional	6FC5800-0AM55-0YB0	M55	⊞ 4)
Nodding compensation Run MyCC /NOCO	6FC5800-0AN63-0YB0	N63	–
Volumetric error compensation:			
• Spatial compensation for 3 axes Run MyCC /VCS-A3	6FC5800-0AN15-0YB0	N15	–
• Spatial compensation for 5 axes Run MyCC /VCS-A5	6FC5800-0AN16-0YB0	N16	–
• Spatial compensation for 5 axes plus Run MyCC /VCS-A5 plus	6FC5800-0AN17-0YB0	N17	–
• Spatial compensation for 2 axes Run MyCC /VCS-ROT	6FC5800-0AN31-0YB0	N31	–
Vibration extinction Run MyCC /VIBX	6FC5800-0AN11-0YB0	N11	–
Magnetic cogging torque compensation Run MyCC /COCO	6FC5800-0AN46-0YB0	N46	–
Integrate OEM-specific solutions in the NC kernel SINUMERIK Integrate Create MyCC:			
• Openness in the NC kernel Create MyCC	On request.		–
• Execute compile cycles Run MyCC	6FC5800-0AM04-0YB0	M04	–
• Spatial compensation interface Run MyCCI /VCI	6FC5800-0AN74-0YB0	N74	–
• Universal spatial compensation interface Run MyCCI /UCI	6FC5800-0AN75-0YB0	N75	–

1) The number of simultaneously traversing axes is restricted to 4.
2) The number of simultaneously traversing path and positioning axes is restricted to 4.
3) Clearance control can be applied to only one axis because 5-axis transformation is not available. The number of interpolating axes is restricted to 4 without Run MyCC /CLC and to 3 with Run MyCC /CLC.
4) The correctable tolerance band is restricted to 1 mm (0.04 in).

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Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Control structure and configuration					
SINUMERIK 840D sl BASIC:					
• NCU 710.3B PN + SINAMICS S120 Combi				O	O
SINUMERIK 840D sl:					
• NCU 710.3B PN with PLC 317-3PN/DP		**6FC5371-0AA30-0AB0**		O	O
• NCU 720.3B PN with PLC 317-3PN/DP		**6FC5372-0AA30-0AB0**		O	O
• NCU 730.3B PN with PLC 317-3PN/DP		**6FC5373-0AA30-0AB0**		O	O
• Numeric Control Extension NX10.3		**6SL3040-1NC00-0AA0**		O	O
• Numeric Control Extension NX15.3		**6SL3040-1NB00-0AA0**		O	O
• Maximum configuration NX:					
- NCU 710.3B PN + SINAMICS S120 Combi				–	–
- NCU 710.3B PN				2	2
- NCU 720.3B PN				5	5
- NCU 730.3B PN				5	5
• Maximum configuration NCU + NX + CU3x0-2:					
- NCU 710.3B PN				9	9
- NCU 720.3B PN				13	13
- NCU 730.3B PN				15	15
• Maximum configuration CU3x0-2:					
- NCU 710.3B PN	x = no. of NX			8-x	8-x
- NCU 720.3B PN	x = no. of NX			12-x	12-x
- NCU 730.3B PN	x = no. of NX			14-x	14-x
• SINUMERIK COM01.3 module	As an alternative to CBE30-2 module.	**6FC5312-0FA01-1AA0**		O	O
• CBE30-2 communication module with PROFINET IO	As an alternative to COM01.3 module.	**6FC5312-0FA00-2AA0**		O	O
Software for SINUMERIK NCUs:					
• CNC software 31-3 export version:					
- On CompactFlash card	Single license Current software version	**6FC5851-1YG00-0YA0**		O	–
	Single license Software version 4.7 SP2	**6FC5851-1YG44-2YA0**		O	–
	Without license Software version 4.7 SP2	**6FC5851-1YG44-2YA8**		O	–
- Without data storage medium	Single license	**6FC5851-1YF00-0YB0**		O	–
• CNC software 31-3 standard version:	Export approval required.				
- On CompactFlash card	Single license Current software version	**6FC5851-1XG00-0YA0**		–	O
	Single license Software version 4.7 SP2	**6FC5851-1XG44-2YA0**		–	O
	Without license Software version 4.7 SP2	**6FC5851-1XG44-2YA8**		–	O
- Without data storage medium	Single license	**6FC5851-1XF00-0YB0**		–	O

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Control structure and configuration

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Control structure and configuration (continued)					
Software for SINUMERIK NCUs (continued):					
• CNC software 31-3 export version and SINUMERIK Operate for PCU:					
- On DVD-ROM	Without license Update on order Software version 4.7 SP2	**6FC5851-1YC44-2YA8**		O	–
- Contract	Software update service	**6FC5851-1YP00-0YL8**		O	–
• CNC software 31-3 standard version and SINUMERIK Operate for PCU:	Export approval required.				
- On DVD-ROM	Without license Update on order Software version 4.7 SP2	**6FC5851-1XC44-2YA8**		–	O
- Contract	Software update service	**6FC5851-1XP00-0YL8**		–	O
Machining channels/mode groups:				✓ 1	✓ 1
• Mode group, each additional		**6FC5800-0AC00-0YB0**	**C01 ... C09**	O	O
• Machining channel, each additional		**6FC5800-0AC10-0YB0**	**C11 ... C19**	O	O
• Maximum configuration:					
- CNC software 31-3				10	10
- NCU 710.3B PN + SINAMICS S120 Combi				4	4
- NCU 710.3B PN				4	4
- NCU 720.3B PN				10	10
- NCU 730.3B PN				10	10
CNC user memory, buffered for programs and OEM cycles				✓ 10 MB	✓ 10 MB
• Expansion by increments of 2 MB		**6FC5800-0AD00-0YB0**	**D01 ... D06**	O	O
• Maximum configuration:					
- NCU 710.3B PN				16 MB	16 MB
- NCU 720.3B PN				22 MB	22 MB
- NCU 730.3B PN				22 MB	22 MB
CNC user memory, expanded for programs and OEM cycles		**6FC5800-0AP77-0YB0**	**P77**	O 100 MB	O 100 MB
• CNC user memory, expanded	Not in combination with the PCU 50.5. Requirements: CNC user memory, expanded (option P77)	**6FC5800-0AP12-0YB0**	**P12**	O 6 GB	O 6 GB
HMI user memory, additional on CompactFlash card of the NCU	Not in combination with the PCU 50.5	**6FC5800-0AP12-0YB0**	**P12**	O	O
Axes/spindles or positioning axes/auxiliary spindle CNC software 31-3:				✓ 3	✓ 3
• Axis/spindle, each additional		**6FC5800-0AA00-0YB0**	**A01 ... A28**	O	O
• Positioning axis/auxiliary spindle, each additional		**6FC5800-0AB00-0YB0**	**B01 ... B28**	O	O
• Multi-axis package Expansion to 31 axes/spindles and 10 machining channels		**6FC5800-0AM10-0YB0**	**M10**	O	O
• Maximum configuration of axes:					
- NCU 710.3B PN + SINAMICS S120 Combi				6	6
- NCU 710.3B PN				8	8
- NCU 720.3B PN				31	31
- NCU 730.3B PN				31	31

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Control structure and configuration (continued)					
Axes/spindles or positioning axes/auxiliary spindle CNC software 31-3 (continued):					
• Maximum configuration of spindles:					
- NCU 710.3B PN + SINAMICS S120 Combi				3	3
- NCU 710.3B PN				8	8
- NCU 720.3B PN				31	31
- NCU 730.3B PN				31	31
• Configuration per channel axes incl. spindles:					
- NCU 710.3B PN + SINAMICS S120 Combi				6	6
- NCU 710.3B PN				8	8
- NCU 720.3B PN				20	20
- NCU 730.3B PN				20	20
• PLC-controlled axis				✓	✓
• PLC positioning axis via PROFIBUS DP				✓	✓
• Maximum configuration axes/spindles, CNC- and PLC-controlled:					
- NCU 710.3B PN + SINAMICS S120 Combi				15	15
- NCU 710.3B PN				15	15
- NCU 720.3B PN				40	40
- NCU 730.3B PN				50	50
• Maximum configuration axes/spindles, PLC-controlled:	No CNC option axis/spindle required.				
- NCU 710.3B PN + SINAMICS S120 Combi	Max. 15 minus CNC-controlled axes/spindles.			9 ... 15	9 ... 15
- NCU 710.3B PN	Max. 15 minus CNC-controlled axes/spindles.			7 ... 15	7 ... 15
- NCU 720.3B PN	Max. 40 minus CNC-controlled axes/spindles.			9 ... 40	9 ... 40
- NCU 730.3B PN	Max. 50 minus CNC-controlled axes/spindles.			19 ... 50	19 ... 50
Drives					
SINUMERIK Analog Drive Interface for 4 axes ADI 4	No PROFIBUS certification.	**6FC5211-0BA01-0AA4**		O	O
SINAMICS S120 Combi Power Modules	See SINAMICS S120.	**6SL3111-3VE21-6FA0** **6SL3111-3VE21-6EA0** **6SL3111-3VE22-0HA0** **6SL3111-4VE21-0EA0** **6SL3111-4VE21-6FA0** **6SL3111-4VE21-6EA0** **6SL3111-4VE22-0HA0**		O	O
SINAMICS S120 booksize compact format Motor Modules as expansion for SINAMICS S120 Combi	See SINAMICS S120.	6SL3420-1TE..-.... 6SL3420-2TE..-....		O	O
SINAMICS S120 booksize format Motor Modules via DRIVE-CLiQ	See SINAMICS S120.	6SL3120-.....-.... 6SL3121-.....-.... 6SL3126-.....-....		O	O

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Drives

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Drives (continued)					
SINAMICS S120 CU320-2 DP Control Unit without CompactFlash card		**6SL3040-1MA00-0AA0**		O	O
SINAMICS S120 CU320-2 PN Control Unit without CompactFlash card		**6SL3040-1MA01-0AA0**		O	O
CompactFlash card with SINAMICS firmware:					
• License for basic performance	Current firmware version	**6SL3054-0EE00-1BA0**		O	O
• License incl. firmware option Performance expansion	Current firmware version	**6SL3054-0EE01-1BA0**		O	O
SINAMICS S120 Control Unit:					
• CU310-2 DP	For positioning tasks via PLC.	**6SL3040-1LA00-0AA0**		O	O
• CU310-2 PN	For positioning tasks via PLC.	**6SL3040-1LA01-0AA0**		O	O
• CUA31 adapter		**6SL3040-0PA00-0AA1**		O	O
• CUA32 adapter		**6SL3040-0PA01-0AA0**		O	O
SINAMICS S110 Control Unit:					
• CU305 DP	For positioning tasks via PLC.	**6SL3040-0JA00-0AA0**		O	O
• CU305 PN	For positioning tasks via PLC.	**6SL3040-0JA02-0AA0**		O	O
SINAMICS S120 Sensor Module Cabinet-Mounted:					
• SMC10	No SINUMERIK Safety Integrated.	**6SL3055-0AA00-5AA3**		O	O
• SMC20		**6SL3055-0AA00-5BA3**		O	O
• SMC30	No SINUMERIK Safety Integrated.	**6SL3055-0AA00-5CA2**		O	O
• SMC40		**6SL3055-0AA00-5DA0**		O	O
SINAMICS S120 Sensor Module External:					
• SME20		**6SL3055-0AA00-5EA3**		O	O
• SME25		**6SL3055-0AA00-5HA3**		O	O
• SME120		**6SL3055-0AA00-5JA3**		O	O
• SME125		**6SL3055-0AA00-5KA3**		O	O
SINAMICS S120 TB Terminal Board:					
• TB30		6SL3055-0AA00-2TA0		–	–
SINAMICS S120 TM Terminal Module:					
• TM15		**6SL3055-0AA00-3FA0**		O	O
• TM17	Requirement: Extrapolated switching signals RunMyCC /XOUT (Option N51).	**6SL3055-0AA00-3HA0**		–	O
• TM31		**6SL3055-0AA00-3AA1**		O	O
• TM41		**6SL3055-0AA00-3PA1**		O	O
• TM120		**6SL3055-0AA00-3KA0**		O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Drives (continued)					
SINAMICS S120 expansion modules:					
• DMC20		**6SL3055-0AA00-6AA1**		O	O
• DME20		**6SL3055-0AA00-6AB0**		O	O
• VSM10	Integrated with SINAMICS S120 chassis format.	**6SL3053-0AA00-3AA1**		O	O
SINAMICS S120 booksize format Motor Modules:	See SINAMICS S120.				
• Internal air cooling		6SL3120-1TE13-0A.. 6SL3120-1TE15-0A.. 6SL3120-1TE21-0A.. 6SL3120-1TE21-8A.. 6SL3120-1TE23-0A.. 6SL3120-1TE24-5A.. 6SL3120-1TE26-0A.. 6SL3120-1TE28-5A.. 6SL3120-1TE31-3A.. 6SL3120-1TE32-0A.. 6SL3120-2TE13-0A.. 6SL3120-2TE15-0A.. 6SL3120-2TE21-0A.. 6SL3120-2TE21-8A..		O	O
• External air cooling		6SL3121-1TE13-0A.. 6SL3121-1TE15-0A.. 6SL3121-1TE21-0A.. 6SL3121-1TE21-8A.. 6SL3121-1TE23-0A.. 6SL3121-1TE24-5A.. 6SL3121-1TE26-0A.. 6SL3121-1TE28-5A.. 6SL3121-1TE31-3A.. 6SL3121-1TE32-0A.. 6SL3121-2TE13-0A.. 6SL3121-2TE15-0A.. 6SL3121-2TE21-0A.. 6SL3121-2TE21-8A..		O	O
SINAMICS S120 booksize format Active Line Modules:	See SINAMICS S120.				
• Internal air cooling		6SL3130-7TE21-6A.. 6SL3130-7TE23-6A.. 6SL3130-7TE25-5A.. 6SL3130-7TE28-0A.. 6SL3130-7TE31-2A..		O	O
• External air cooling		6SL3131-7TE21-6A.. 6SL3131-7TE23-6A.. 6SL3131-7TE25-5A.. 6SL3131-7TE28-0A.. 6SL3131-7TE31-2A..		O	O
SINAMICS S120 High Frequency Drive		**6SL3125-1UE32-2AD0**		O	O
SINAMICS S120 booksize format Active Interface Modules		6SL3100-0BE21-6A.. 6SL3100-0BE23-6A.. 6SL3100-0BE25-5A.. 6SL3100-0BE28-0A.. 6SL3100-0BE31-2A..		O	O
SINAMICS S120 booksize format Smart Line Modules:					
• Internal air cooling		6SL3130-6AE15-0A.. 6SL3130-6AE21-0A.. 6SL3130-6TE21-6A.. 6SL3130-6TE23-6A.. 6SL3130-6TE25-5A..		O	O
• External air cooling		6SL3131-6AE15-0A.. 6SL3131-6AE21-0A.. 6SL3131-6TE21-6A.. 6SL3131-6TE23-6A.. 6SL3131-6TE25-5A..		O	O

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Drives

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Drives (continued)					
SINAMICS S120 booksize format Basic Line Modules:					
• Internal air cooling		6SL3130-1TE22-0A.. 6SL3130-1TE24-0A.. 6SL3130-1TE31-0A..		O	O
SINAMICS S120 chassis format Motor Modules with internal air cooling:					
• Rated pulse frequency 2 kHz		**6SL3320-1TE32-1AA3** **6SL3320-1TE32-6AA3** **6SL3320-1TE33-1AA3** **6SL3320-1TE33-8AA3** **6SL3320-1TE35-0AA3**		O	O
• Rated pulse frequency 1.25 kHz		6SL3320-1TE36-1AA. 6SL3320-1TE37-5AA. 6SL3320-1TE38-4AA. 6SL3320-1TE41-0AA. 6SL3320-1TE41-2AA. 6SL3320-1TE41-4AA.		–	–
SINAMICS S120 chassis format Active Line Modules with internal air cooling:	See SINAMICS S120.				
• Up to 300 kW		6SL3330-7TE32-1AA. 6SL3330-7TE32-6AA. 6SL3330-7TE33-8AA. 6SL3330-7TE35-0AA.		O	O
• 500 kW and higher		6SL3330-7TE36-1AA. 6SL3330-7TE38-4AA. 6SL3330-7TE41-0AA. 6SL3330-7TE41-4AA.		–	–
SINAMICS S120 chassis format Active Interface Modules		6SL3300-7TE32-6A.. 6SL3300-7TE33-8A.. 6SL3300-7TE35-0A..		O	O
SINAMICS S120 blocksize format Power Modules 230 V 1 AC Internal air cooling	No SINUMERIK Safety Integrated.	6SL3210-1SB11-0... 6SL3210-1SB12-3... 6SL3210-1SB14-0...		O	O
SINAMICS S120 blocksize format Power Modules 400 V 3 AC Internal air cooling	No SINUMERIK Safety Integrated.	**6SL3210-1SE11-3UA0** **6SL3210-1SE11-7UA0** **6SL3210-1SE12-2UA0** **6SL3210-1SE13-1UA0** **6SL3210-1SE14-1UA0**		O	O
	See SINAMICS S120.	6SL3210-1SE16-0... 6SL3210-1SE17-7... 6SL3210-1SE21-0... 6SL3210-1SE21-8... 6SL3210-1SE22-5... 6SL3210-1SE23-2... 6SL3210-1SE23-8... 6SL3210-1SE24-5... 6SL3210-1SE26-0... 6SL3210-1SE27-5... 6SL3210-1SE31-0... 6SL3210-1SE31-1... 6SL3210-1SE31-5... 6SL3210-1SE31-8...		O	O
SINAMICS S120 chassis format Power Modules 400 V 3 AC Internal air cooling		6SL3310-1TE32-1AA. 6SL3310-1TE32-6AA. 6SL3310-1TE33-1AA. 6SL3310-1TE33-8AA. 6SL3310-1TE35-0AA.		–	–
SINAMICS S120 HLA		**6SL3420-2HX00-0AA0**		O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Connectable motors					
SIMOTICS synchronous motors:	See SIMOTICS motors.				
• 1FT7/1FK7 feed motors				O	O
• 1PH8/1FE./2SP1 main spindle motors				O	O
• 1FN3 linear motors				O	O
• 1FW6 torque motors				O	O
SIMOTICS asynchronous motors:	See SIMOTICS motors.				
• 1PH8/1PH2/2SP1 main spindle motors				O	O
Connectable measuring systems					
SINAMICS S120 DRIVE-CLiQ on SIMOTICS motor:					
• Resolver				✓	✓
• sin/cos 1 V_{pp}				✓	✓
• EnDat 2.1				✓	✓
Measuring systems per axis, maximum number				2	2
Absolute encoder:					
• With DRIVE-CLiQ interface	Via SINAMICS S120.			✓	✓
• Installed in SIMOTICS S-1FT7/-1FK7 and SIMOTICS M-1PH8 motors	Integrated in motor via SINAMICS Sensor Module.			✓	✓
• With SSI interface	Via SINAMICS SMC30 Sensor Module. For analog axes via SINUMERIK ADI 4.			✓	✓
Incremental encoder:					
• Installed in SIMOTICS S-1FT7/-1FK7 and SIMOTICS M-1PH8 motors	Integrated in motor via SINAMICS Sensor Modules.			✓	✓
Resolver:	Via SINAMICS Sensor Module:				
• Installed in SIMOTICS S-1FK7 motors	Integrated in motor			✓	✓
• As external machine encoder	SMC10			✓	✓
Rotary measuring systems with:	Via SINAMICS Sensor Modules:				
• RS422 (TTL)	SMC30			✓	✓
• sin/cos 1 V_{pp}	SMC20/SME20			✓	✓
• Distance-coded reference marks	SMC20/SME20			✓	✓
• EnDat 2.1	SMC20/SME25			✓	✓
• EnDat 2.2	SMC40			✓	✓
Linear scale LMS with:	Via SINAMICS Sensor Modules:				
• sin/cos 1 V_{pp}	SMC20/SME20			✓	✓
• Distance-coded reference marks	SMC20/SME20			✓	✓
• EnDat 2.1	SMC20/SME25			✓	✓

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Drive functions

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Drive functions					
Voltage protection for SIMOTICS M-1PH8/1FE./2SP1 motors, externally via VPM Voltage Protection Module:	See SIMOTICS motors.				
• VPM 120		**6SN1113-1AA00-1JA1**		O	O
• VPM 200		**6SN1113-1AA00-1KA1**		O	O
• VPM 200 DYNAMIC		**6SN1113-1AA00-1KC1**		O	O
Control:				✓	✓
• Servo control				✓	✓
• Vector control				–	–
• *V*/f control				✓	✓
• Combination of servo/*V*/*f* control possible, e.g. on an NCU, NX or CU				–	–
• Setting the pulse frequency grid in fine steps (3.2 kHz/4 kHz/5.33 kHz/6.4 kHz/8 kHz)	Requires current control cycle of 62.5 µs or 31.25 µs in some cases.			✓	✓
• Sine-wave filter				–	–
• Unit switchover US/SI etc.				–	–
• Direction reversal without changing the setpoint				–	–
• Technology controller				–	–
• k_T estimator				–	–
• $k_T(i_q)$ characteristic				✓	✓
• Rotor/pole position identification saturation-based/motion-based				✓	✓
• Edge modulation				–	–
• Motor data identification stationary/rotating				✓	✓
• Flux reduction for asynchronous motors				✓	✓
Modular machine concept (sub-topologies):					
• Parking axis/encoder				✓	✓
Brakes:					
• Brake control:					
- Basic				✓	✓
- Advanced				✓	✓
• Armature short-circuit brake:					
- Internal				–	–
- External				✓	✓
• DC brake				–	–
Internal motor winding switchover				✓	✓
Motor changeover	Note general conditions.			✓	✓
Suspended axis/electronic counterweight				✓	✓
Dynamic energy management (DC link voltage management)				✓	✓
Runtime meter				✓	✓
I^2t monitoring for motors				✓	✓
Automatic restart mechanism (servo/infeed)				–	–
Technology function: Friction characteristic				–	–

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Drive functions (continued)					
Drive Control Chart DCC	Not possible for integrated drives. Included in basic scope on external SINAMICS S120 drives.			–	–
Drive Based Open Architecture	Drive-related functions can be developed in partnership with Siemens on request.			✓	✓
Basic positioner	Not possible for integrated drives. Included in basic scope on external SINAMICS S120 drives.			–	–
2 command data sets				–	–
Parallel connection of SINAMICS S120 Motor Modules				–	–
Maximum configuration valid for standard PROFIBUS DP cycle with:					
• Current/speed controller cycle 125 µs:					
- Axes/spindles				31	31
- Axes/spindles per NCU or NX				6	6
- Motor measuring systems and direct measuring systems per NCU or NX				12	12
• Current/speed controller cycle 62.5 µs:					
- Axes/spindles				11	11
- Axes/spindles per NCU or NX				3	3
• Current/speed controller cycle 31.25 µs:					
- Axes/spindles				1	1
• SINAMICS S120 chassis format Motor Modules per NCU or NX				6	6
Current/speed controller cycle:					
• SINAMICS S120 booksize format, minimum				31.25 µs	31.25 µs
• SINAMICS S120 chassis format, minimum				125 µs	125 µs
• Maximum				250 µs	250 µs
PROFIBUS DP cycle (corresponds to IPO cycle), minimum				0.5 ms	0.5 ms
Drive data sets, maximum number				32	32
Motor data sets, maximum number				16	16
Encoder data sets, maximum number				8	8

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Axis functions – Spindle functions

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Axis functions					
Traversing range				± 9 decades	± 9 decades
Rotary axis, turning endlessly				✓	✓
Velocity, maximum				300 m/s	300 m/s
Acceleration with jerk limitation				✓	✓
Programmable acceleration				✓	✓
Follow-up mode				✓	✓
Measuring systems 1 and 2, selectable				✓	✓
Feedrate interpolation				✓	✓
Separate feedrate for roundings and chamfers				✓	✓
Travel to fixed stop				✓	✓
Travel to fixed stop with Force Control		**6FC5800-0AM01-0YB0**	**M01**	O	O
Setpoint exchange		**6FC5800-0AM05-0YB0**	**M05**	O	O
Tangential control		**6FC5800-0AM06-0YB0**	**M06**	O	O
Position switching signals/cam controller:		**6FC5800-0AM07-0YB0**	**M07**	O	O
• Pairs, maximum number				16	16
Advanced Position Control APC		**6FC5800-0AM13-0YB0**	**M13**	O	O
Axis container	Within 31 axes.			✓	✓
Link axes (axis container distributed among several NCUs):	Requirement: CBE30-2 communication module.			✓	✓
• NCUs, maximum number				3	3
Spindle functions					
Digital spindle speed				✓	✓
Spindle speed, maximum programmable range of values	Display ± 999 999 999.9999			10^6 ... 10^{-4}	10^6 ... 10^{-4}
Gear stages				5	5
Gear stage selection, automatic				✓	✓
Oriented spindle stop				✓	✓
Spindle speed limitation, minimum/maximum				✓	✓
Constant cutting rate				✓	✓
Spindle control via PLC Positioning, oscillation				✓	✓
Changeover to axis mode				✓	✓
Axis synchronization on-the-fly				✓	✓
Thread run-in and run-out, programmable				✓	✓
Thread cutting with constant or variable pitch				✓	✓
Tapping with compensating chuck/rigid tapping				✓	✓
Scalable analog setpoint Run MyCC /SANS	Requirement: Loadable compile cycle.	**6FC5800-0AN48-0YB0**	**N48**	–	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Interpolations					
Floating point accuracy (80-bit floating point accuracy)				✓	✓
Linear interpolating axes:				4	4
• Maximum number				4	20
Circle via center point and end point				✓	✓
Circle via interpolation point				✓	✓
Helical interpolation				2D+2	2D+6
Universal interpolator NURBS (non-uniform rational B splines)				✓	✓
Continuous-path mode with programmable rounding clearance				✓	✓
Compressor for 3-axis/5-axis machining				✓	✓
Continue machining at the contour (retrace support) Run MyCC /RESU	Requirements: Loadable compile cycle and cross-mode actions (option M43).	**6FC5800-0AM24-0YB0**	**M24**	O	O
Spline interpolation A, B and C splines		**6FC5800-0AS16-0YB0**	**S16**	O	O
Polynomial interpolation		**6FC5800-0AM18-0YB0**	**M18**	O	O
Involute interpolation		**6FC5800-0AM21-0YB0**	**M21**	O	O
Multi-axis interpolation > 4 interpolating axes		**6FC5800-0AM15-0YB0**	**M15**	–	O
Crank interpolation Run MyCC /CRIP	Requirement: Loadable compile cycle.	**6FC5800-0AN04-0YB0**	**N04**	–	O
Motion control:					
• Advanced Surface		**6FC5800-0AS07-0YB0**	**S07**	O	O
• Top Surface		**6FC5800-0AS17-0YB0**	**S17**	O	O
• Model-based (engineered motion control) Run MyCC /EMC Contains the option N63: Nodding compensation Run MyCC /NOCO	Requirement: Loadable compile cycle and NCU 720.3B PN or NCU 730.3B PN.	**6FC5800-0AN47-0YB0**	**N47**	–	O

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Couplings

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	**840D sl**
Couplings					
Pair of synchronous axes (gantry axes):		**6FC5800-0AM02-0YB0**	**M02**	O	O
• Maximum number				8	8
Master/slave for drives		**6FC5800-0AM03-0YB0**	**M03**	O	O
Generic couplings:					
• CP-Standard: - 4 axis pairs in simultaneous coupled motion				✓	✓
• CP-Static: - 1 × simple synchronous spindle, coupling ratio |1|:1, no multi-edge machining		**6FC5800-0AM75-0YB0**	**M75**	O	O
• CP-Basic: - 4 axis pairs in simultaneous coupled motion and - 1 × synchronous spindle/multi-edge turning and/or master value coupling/curve table interpolation and/or axial coupling in the machine coordinate system	1) Restricted functionality of export versions. The number of simultaneously traversing axes is restricted to 4.	**6FC5800-0AM72-0YB0**	**M72**	O 1)	O
• CP-Comfort: - 4 axis pairs in simultaneous coupled motion and - 4 × synchronous spindle/multi-edge turning and/or master value coupling/curve table interpolation and/or axial coupling in the machine coordinate system and - 1 × electronic gear for 3 leading axes without curve table, without cascading	1) Restricted functionality of export versions. The number of simultaneously traversing axes is restricted to 4.	**6FC5800-0AM73-0YB0**	**M73**	O 1)	O
• CP-Expert: - 8 axis pairs in simultaneous coupled motion and - 8 × synchronous spindle/multi-edge turning and/or master value coupling/curve table interpolation and/or axial coupling in the machine coordinate system and - 8 × electronic gear for 3 leading axes with curve tables, with cascading and - 5 × electronic gear for 5 leading axes with curve tables, with cascading	1) Restricted functionality of export versions. The number of simultaneously traversing axes is restricted to 4.	**6FC5800-0AM74-0YB0**	**M74**	O 1)	O
Compensation of a forced mechanical coupling in the machine coordinate system Run MyCC /AXCO	Requirement: Loadable compile cycle.	**6FC5800-0AM81-0YB0**	**M81**	–	O
Transformation: Redundant and spatially distributed axes at workpiece in Cartesian coordinate system Run MyCC /RDCC	Requirement: Loadable compile cycle.	**6FC5800-0AN26-0YB0**	**N26**	–	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Transformations					
Cartesian Point-to-Point travel PTP				✓	✓
Concatenated transformations (inclined axis TRAANG to TRAORI/ cardanic milling head/TRANSMIT/TRACYL)				✓	✓
Generic transformation	Requirement: Machining package 5 axes (option M30) or milling technology package SINUMERIK MDynamics 5 axes (option S33).			–	✓
TRANSMIT/cylinder surface transformation		**6FC5800-0AM27-0YB0**	**M27**	O	O
Inclined axis		**6FC5800-0AM28-0YB0**	**M28**	O	O
Transformation: Rotating workpiece and tool Run MyCC /2RPT	Requirement: Loadable compile cycle.	**6FC5800-0AN43-0YB0**	**N43**	–	O
Transformation: DOUBLETRANSMIT Run MyCC /2TRA	Requirement: Loadable compile cycle.	**6FC5800-0AM25-0YB0**	**M25**	–	O
Double generic transformation Run MyCC /DGEN	Requirement: Loadable compile cycle.	**6FC5800-0AN34-0YB0**	**N34**	–	O
Transformation: Dynamic Swivel Tripod basis 5 axes Run MyCC /DSTT	Requirement: Loadable compile cycle.	**6FC5800-0AM84-0YB0**	**M84**	–	O
Transformation: Eccentric axis Run MyCC /ECCA	Requirement: Loadable compile cycle.	**6FC5800-0AN44-0YB0**	**N44**	–	O
Transformation: Eccentric Run MyCC /ECCE	Requirement: Loadable compile cycle.	**6FC5800-0AN41-0YB0**	**N41**	–	O
Transformation: HEXAPOD 6-axis transformation Run MyCC /HEX	Requirement: Loadable compile cycle.	**6FC5800-0AM71-0YB0**	**M71**	–	O
Transformation: Machining with virtual Y axis Run MyCC /MAVY	Requirement: Loadable compile cycle.	**6FC5800-0AN56-0YB0**	**N56**	–	O
Transformation: PARACOP 3 axes Run MyCC /PACO	Requirement: Loadable compile cycle.	**6FC5800-0AM44-0YB0**	**M44**	–	O
Transformation: Swivel axis Run MyCC /PIVA	Requirement: Loadable compile cycle.	**6FC5800-0AN52-0YB0**	**N52**	–	O
Transformation: Handling Run MyCC /RCTRA	Requirement: Loadable compile cycle.	**6FC5800-0AM31-0YB0**	**M31**	–	O
Transformation: Robotic extended Run MyCC /ROBX	Requirement: Loadable compile cycle.	**6FC5800-0AN54-0YB0**	**N54**	–	O
Transformation: Rotating eccentric Run MyCC /ROTE	Requirement: Loadable compile cycle.	**6FC5800-0AN37-0YB0**	**N37**	–	O
Transformation: Pantograph kinematics Run MyCC /SCIS	Requirement: Loadable compile cycle.	**6FC5800-0AM51-0YB0**	**M51**	–	O
Transformation: Tripod hybrid kinematics Run MyCC /THYK	Requirement: Loadable compile cycle.	**6FC5800-0AN36-0YB0**	**N36**	–	O
Transformation: TRICEPT 5-axis transformation Run MyCC /TRIC	Requirement: Loadable compile cycle.	**6FC5800-0AM46-0YB0**	**M46**	–	O

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Measuring – Technologies

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Measuring					
Logging of measurement results in Automatic mode				✓	✓
Measuring stage 1 Two probes (switching) with/without deletion of distance-to-go				✓	✓
Measuring stage 2 • Axial measurement • Measurements from synchronized actions • Cyclic measuring		**6FC5800-0AM32-0YB0**	**M32**	O	O
Measuring cycles for drilling/milling and turning • Calibrating workpiece probes • Workpiece measurement • Tool measuring		**6FC5800-0AP28-0YB0**	**P28**	O	O
Measure kinematics		**6FC5800-0AP18-0YB0**	**P18**	O	O
Technologies					
Handwheel override				✓	✓
Contour handwheel		**6FC5800-0AM08-0YB0**	**M08**	O	O
Punching/nibbling		**6FC5800-0AM33-0YB0**	**M33**	O	O
Balance cutting, 4-axis roughing		**6FC5800-0AS05-0YB0**	**S05**	O	O
Machining package 5 axes Contains the option M15: Multi-axis interpolation > 4 interpolating axes		**6FC5800-0AM30-0YB0**	**M30**	–	O
Machining package 5 axes Additional function 7th axis		**6FC5800-0AS01-0YB0**	**S01**	–	O
Milling technology package SINUMERIK MDynamics 3 axes Contains the options: • ShopTurn/ShopMill • Residual material detection and machining for contour pockets and stock removal • 3D simulation 1 (finished part) • Simultaneous recording • Advanced Surface motion control • Spline interpolation (A, B and C splines) • TRANSMIT/cylinder surface transformation • Measuring cycles for drilling/milling and turning • Additional HMI user memory on CompactFlash card of the NCU		**6FC5800-0AS32-0YB0**	**S32**	O	O
Milling technology package SINUMERIK MDynamics 5 axes Contains the options: • Machining package 5 axes • Multi-axis interpolation > 4 interpolating axes • ShopTurn/ShopMill • Residual material detection and machining for contour pockets and stock removal • 3D simulation 1 (finished part) • Simultaneous recording • Advanced Surface motion control • Spline interpolation (A, B and C splines) • TRANSMIT/cylinder surface transformation • Measuring cycles for drilling/milling and turning • Additional HMI user memory on CompactFlash card of the NCU • 3D tool radius compensation • Measure kinematics		**6FC5800-0AS33-0YB0**	**S33**	–	O
Cartesian travel to fixed stop Run MyCC /FXSC	Requirement: Loadable compile cycle.	**6FC5800-0AN38-0YB0**	**N38**	–	O
Velocity adaptation for water jet cutting Run MyCC /VADA	Requirement: Loadable compile cycle.	**6FC5800-0AN05-0YB0**	**N05**	–	O
Orientation offset static/dynamic		**6FC5800-0AS14-0YB0**	**S14**	O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	**840D sl**
Technologies (continued)					
Extrapolated switching signals Run MyCC /XOUT	Requirement: Loadable compile cycle.	**6FC5800-0AN51-0YB0**	**N51**	–	O
• Maximum number				–	64
Synchronous motion Run MyCC /SYMO	Requirement: Loadable compile cycle.	**6FC5800-0AN66-0YB0**	**N66**	–	O
Path-related pulse output Run MyCC /PRIG	Requirement: Loadable compile cycle.	**6FC5800-0AN76-0YB0**	**N76**	O	O
Utility programs for the servo Run MyCC /SUTI	Requirement: Loadable compile cycle.	**6FC5800-0AN10-0YB0**	**N10**	O	O
Grinding:					
• Multiple feedrates in one block, e.g. for clamp meters				✓	✓
• Continuous dressing, parallel dressing online modification of tool offset				✓	✓
• Grinding Advanced Extended functions for grinding, such as an axis-parallel dressing/pre-profiling cycle, for example		**6FC5800-0AS35-0YB0**	**S35**	O	O
• Oscillation functions block-related, modal and asynchronous		**6FC5800-0AM34-0YB0**	**M34**	O	O
• Fast braking during grinding Run MyCC /FABS	Requirement: Loadable compile cycle.	**6FC5800-0AN81-0YB0**	**N81**	–	O
• CCG compiler, non-circular grinding (cam contour grinding)	Requirement: SINUMERIK PCU 50.5	**6FC5800-0AP10-0YB0**	**P10**	O	O
Block cycle times (block processing times), typically with:	Requirement: Use of the compressor.				
• NCU 710.3B PN				1.2 ms	1.2 ms
• NCU 720.3B PN				0.5 ms	0.5 ms
• NCU 730.3B PN				0.3 ms	0.3 ms
Handling package Contains the options: • 3 additional axes • 3 additional channels • Handling transformation • Synchronized actions stage 2 No tool offsets or spindles possible.	Requirement: Loadable compile cycle.	**6FC5800-0AS31-0YB0**	**S31**	–	O
Display external positions Run MyCC /EXPD	Requirement: Loadable compile cycle.	**6FC5800-0AN64-0YB0**	**N64**	O	O
Linking KUKA robots into the SINUMERIK 840D sl for operation, programming and diagnostics SINUMERIK Integrate Run MyRobot /Handling Contains the options: • 1 additional machining channel • Run MyCC /EXPD • Run MyHMI /3GL • Run MyScreens	Requirement: Loadable compile cycle.	**6FC5800-0AP74-0YB0**	**P74**	O	O
Use a KUKA robot with a SINUMERIK 840D sl as the CNC control SINUMERIK Integrate Run MyRobot /Machining Contains the options: • Run MyCC /RODI • Multi-axis interpolation > 4 interpolating axes • Run MyHMI /3GL	Requirement: Loadable compile cycle.	**6FC5800-0AP73-0YB0**	**P73**	–	O
Communication interface to a KUKA robot Run MyCC /RODI	Requirement: Loadable compile cycle.	**6FC5800-0AN65-0YB0**	**N65**	–	O

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Technologies – Motion-synchronous actions

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Technologies (continued)					
Electronic transfer CP Contains the options: • Position switching signals/cam controller • Polynomial interpolation • Generic coupling Comfort CP-Comfort • Cross-mode actions • I/O interfacing via PROFIBUS DP • Synchronized actions stage 2 • Pairs of synchronous axes (gantry axes)	1) Restricted functionality of export versions. The number of simultaneously traversing axes is restricted to 4.	**6FC5800-0AM76-0YB0**	**M76**	O 1)	O
SINUMERIK plastics package IME Contains the function: • Travel to fixed stop Contains the options: • 3 additional axes • Pair of synchronous axes (gantry axes) • Master/slave for drives • Position switching signals/cam controller • Polynomial interpolation • Handling transformation • Synchronized actions stage 2 No tool offsets or spindles possible.		**6FC5800-0AS40-0YB0**	**S40**	–	O
Motion-synchronous actions					
CNC inputs/outputs, high-speed:					
• Digital inputs on-board				4	4
• Digital inputs or outputs on-board, total				4	4
• Expansion via SIMATIC S7 I/O	See SIMATIC Catalog ST 70 or Siemens Industry Mall.			O	O
- Digital inputs				32	32
- Digital outputs				32	32
- Analog inputs				4	4
- Analog outputs				4	4
Synchronized actions and fast auxiliary function output incl. 3 synchronous functions (max. 159 elements for synchronized actions)	1) Restricted functionality of export versions. The number of simultaneously traversing axes is restricted to 4.			✓ 1)	✓
• Number of simultaneously active synchronous functions SYNFC				1	24
Synchronized actions stage 2	1) Restricted functionality of export versions. The number of simultaneously traversing path and positioning axes is restricted to 4.	**6FC5800-0AM36-0YB0**	**M36**	O 1)	O
Positioning axes and spindles via synchronized actions (command axes)				✓	✓
Analog value control in the interpolation cycle	Requirement: Analog input			✓	✓
Path velocity-dependent analog output (laser power control)		**6FC5800-0AM37-0YB0**	**M37**	O	O
Laser switching signal, high-speed Run MyCC /HSLC	Requirement: Loadable compile cycle.	**6FC5800-0AM38-0YB0**	**M38**	O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Motion-synchronous actions (continued)					
Clearance control:					
• 1D in interpolation cycle via synchronized actions				✓	✓
• 1D/3D clearance control in position control cycle Run MyCC /CLC	Requirement: Loadable compile cycle. 1) Restricted functionality of export versions. Clearance control can be applied to only one axis because 5-axis transformation is not available. The number of interpolating axes is restricted to 4 without Run MyCC /CLC and to 3 with Run MyCC /CLC.	**6FC5800-0AM40-0YB0**	**M40**	O 1)	O
• 1D/3D clearance control in position control cycle in any direction Run MyCC /CLC-FD	Requirement: Loadable compile cycle and 1D/3D clearance control in position control cycle, Run MyCC /CLC 1) Restricted functionality of export versions.	**6FC5800-0AM65-0YB0**	**M65**	O 1)	O
Evaluation of internal drive variables	Required for Adaptive Control.	**6FC5800-0AM41-0YB0**	**M41**	O	O
Asynchronous subprograms ASUB	High-speed CNC inputs/outputs.			✓	✓
Interrupt routines with fast retraction from the contour		**6FC5800-0AM42-0YB0**	**M42**	O	O
Cross-mode actions ASUBs and synchronized actions in all operating modes		**6FC5800-0AM43-0YB0**	**M43**	O	O

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CNC programming language

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
CNC programming language					
Programming language DIN 66025 and high-level language expansion				✓	✓
Main program call from main program and subprogram				✓	✓
Subprogram levels, maximum				16	16
Interrupt routines, maximum				2	2
Number of subprogram passes				≤ 9999	≤ 9999
Number of levels for skip blocks				0 ... 8	0 ... 8
Polar coordinates				✓	✓
1/2/3-point contours				✓	✓
Dimensions metric/inch, changeover via operator action or program				✓	✓
Inverse-time feedrate				✓	✓
Auxiliary function output via:					
• M word, maximum programmable range of values				INT 2^{31} -1	INT 2^{31} -1
• H word, maximum programmable range of values REAL ± 3.4028 ex 38	Display ± 999 999 999.9999			INT -2^{31} ... 2^{31} -1	INT -2^{31} ... 2^{31} -1
CNC high-level language with:					
• User variables, configurable				✓	✓
• Predefined user variables (arithmetic parameters)				✓	✓
• Predefined user variables (arithmetic parameters), configurable				✓	✓
• Read/write system variables				✓	✓
• Indirect programming				✓	✓
• Program jumps and branches				✓	✓
• Program coordination with WAIT, START, INIT				✓	✓
• Arithmetic and trigonometric functions				✓	✓
• Comparison operations and logic combinations				✓	✓
• Macro techniques				✓	✓
• Control structures IF-ELSE-ENDIF				✓	✓
• Control structures WHILE, FOR, REPEAT, LOOP				✓	✓
• Commands to HMI				✓	✓
• STRING functions				✓	✓
Program functions:					
• Preprocessing memory, dynamic FIFO				✓	✓
• Look Ahead, recorded part program blocks	MDynamics, Top Surface or COMPSURF active.			3000	3000
• Look Ahead, IPO blocks, buffered				1000	1000
• Frame concept				✓	✓
• Inclined-surface machining with frames				✓	✓
• Axis/spindle interchange				✓	✓
• Geometry axes, switchable online in the CNC program				✓	✓
• Program preprocessing				✓	✓
Online ISO dialect interpreter				✓	✓

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
CNC programming language (continued)					
Program/workpiece management:					
• Part programs on the SINUMERIK NCU, maximum number	A maximum total of 512 files per directory.			1000	1000
• Workpieces on the SINUMERIK NCU, maximum number	A maximum total of 256 directories.			250	250
• Workpieces on the SSD of the SINUMERIK PCU, maximum number	A maximum total of 10000 user files.			10000	10000
• Templates for programs and workpieces				✓	✓
• Job lists				✓	✓
• In additional HMI user memory on CompactFlash card of the SINUMERIK NCU	A maximum total of 10000 user files and directories. Requirement: Additional HMI user memory on CF card of NCU.			✓	✓
• On additional plug-in CompactFash card in the SINUMERIK PCU	Requirement: CF card in the PCU.			✓	✓
• On integrated SSD in the SINUMERIK PCU				✓	✓
• On USB storage medium, e.g. memory stick	Requirement: Memory stick.			✓	✓
• On network drive				✓	✓
Basic frames, maximum number				16	16
Settable offsets, maximum number				100	100
Work offsets, programmable (frames)				✓	✓
Scratching, determining work offset				✓	✓
Work offsets, external via PLC				✓	✓
Global and local user data				✓	✓
Global program user data				✓	✓
Display system variables, including in online configurable display, and log them	1) Function is dependent on operating software.			1)	1)
Programming support					
Program editor:					
• Text editor: Selecting, copying, deleting				✓	✓
• Dual editor				✓	✓
• Multi-editor, maximum	Requirement: SINUMERIK OP 019.			4	4
• Write protection for lines				✓	✓
• Suppression of lines in the display				✓	✓
• Technology cycles:					
- Drilling				✓	✓
- Milling				✓	✓
- Pocket milling with free contour definition and islands				✓	✓
- Turning				✓	✓
- Grinding				✓	✓

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Programming support – Simulations

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Programming support (continued)					
programGUIDE:					
• Programming support for cycles				✓	✓
• Dynamic programming graphics				✓	✓
• Animated elements				✓	✓
DXF Reader, integrated: • Accepting contours • Accepting point patterns		**6FC5800-0AP56-0YB0**	**P56**	O	O
ShopTurn/ShopMill: • Machining step programming • Multiple clamping of identical/different workpieces • Manual machine		**6FC5800-0AP17-0YB0**	**P17**	O	O
programSYNC		**6FC5800-0AP05-0YB0**	**P05**	O	O
Residual material detection and machining for contour pockets and stock removal		**6FC5800-0AP13-0YB0**	**P13**	O	O
Programming support is expandable, e.g. user cycles	See SINUMERIK Integrate Run MyScreens.			✓	✓
Access protection for cycles SINUMERIK Integrate Lock MyCycles					
• Cycle protection OEM Lock MyCycles		**6FC5800-0AP54-0YB0**	**P54**	O	O
Simulations					
Machining channels capable of simulation, maximum	Requirement: programSYNC (option P05).			4	4
Simulation of program X, while program Y is being executed	Requirement: NCU 720.3B PN or NCU 730.3B PN.			✓	✓
Quickview for mold-making programs				✓	✓
Turning/drilling/milling:					
• Turning				✓	✓
• Counterspindle				✓	✓
• Turn-milling				✓	✓
• Mill-turning with supported kinematics	Application-specific by machine manufacturer.			✓	✓
• Milling up to 5-axis machining with TRAORI				✓	✓
• Simulation (finished part) in 2D representation				✓	✓
• Simulation 1 (finished part) in 3D representation		**6FC5800-0AP25-0YB0**	**P25**	O	O
• Simultaneous recording Real-time simulation of current machining		**6FC5800-0AP22-0YB0**	**P22**	O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Operating modes					
JOG:				✓	✓
• Handwheel selection				✓	✓
• Inch/metric changeover				✓	✓
• Manual measurement of work offset				✓	✓
• Manual measurement of tool offset				✓	✓
• Automatic tool measurement				✓	✓
• Automatic workpiece measurement				✓	✓
• Reference point approach automatically or via CNC program				✓	✓
MDI:				✓	✓
• Input in text editor				✓	✓
• Save MDI program				✓	✓
Teach-in:				✓	✓
• Teach positions in MDI buffer				✓	✓
• Teach-in function Handling				✓	✓
AUTO :				✓	✓
• Execution from external storage EES (execution from external storage)		**6FC5800-0AP75-0YB0**	**P75**	O	O
• One part program memory for several NCUs	Requirement: Execution from external storage EES (option P75).			O	O
• Execution from HMI memory on the Compact Flash card of the NCU	Requirement: Additional HMI user memory on CF card of NCU.	**6FC5800-0AP12-0YB0**	**P12**	O	O
• Execution from CNC user memory, expanded		**6FC5800-0AP77-0YB0**	**P77**	O	O
• Execution from network drive				✓	✓
• Execution from storage medium connected to USB interface at rear of the SINUMERIK TCU or PCU, e.g. memory stick				✓	✓
• Execution from SSD of the SINUMERIK PCU				✓	✓
• DRF offset				✓	✓
• Program control				✓	✓
• Program editing				✓	✓
• Block search with/without calculation				✓	✓
• Overstore				–	–
Repos (repositioning on the contour) via:				✓	✓
• Operation, semi-automatic				✓	✓
• Program				✓	✓

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Tools

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Tools					
Tool types:					
• Drilling/milling				✓	✓
• Turning				✓	✓
• Groove sawing				✓	✓
• Grinding				✓	✓
• Nibbling	Not in SINUMERIK Operate.			–	–
Tool radius compensations in plane with:					
• Approach and retract strategies				✓	✓
• Transition circle or transition ellipse at outside corners				✓	✓
Configurable intermediate blocks with tool radius compensation active				✓	✓
Tool radius compensation in 3D representation		**6FC5800-0AM48-0YB0**	**M48**	O	O
Tool change via T number				✓	✓
Tool carrier with orientation capability				✓	✓
Look-ahead detection of contour violations				✓	✓
Grinding wheel peripheral speed, programmable				✓	✓
Tool orientation interpolation	Requirement: Milling technology package SINUMERIK MDynamics 5 axes (option S33) or machining package 5 axes (option M30).			–	✓
Tool length compensation, online				✓	✓
Operation without magazine management:				✓	✓
• Tool offset selection via D number without T assignment (flat D number)				–	–
• Editing of tool data				✓	✓
• Tool offset selection via T and D numbers				✓	✓
• Tools in the tool list:					
- NCU 710.3B PN				600	600
- NCU 720.3B PN				600	600
- NCU 730.3B PN				1500	1500
• Cutting edges in the tool list:					
- NCU 710.3B PN				1500	500
- NCU 720.3B PN				1500	1500
- NCU 730.3B PN				3000	3000

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Tools (continued)					
Operation with tool management:					
• Up to 4 magazines				✓	✓
• With more than 4 magazines		**6FC5800-0AM88-0YB0**	**M88**	O	O
• Monitoring for maximum tool speed/acceleration		**6FC5800-0AS08-0YB0**	**S08**	O	O
• System displays in standard software				✓	✓
• User-friendly commissioning via system displays				✓	✓
• Tool list				✓	✓
• Configurable tool list				✓	✓
- Quantity				1	1
• Tools in the tool list:					
- NCU 710.3B PN				600	600
- NCU 720.3B PN				600	600
- NCU 730.3B PN				1500	1500
• Cutting edges in the tool list:					
- NCU 710.3B PN				1500	1500
- NCU 720.3B PN				1500	1500
- NCU 730.3B PN				3000	3000
• Tool offset selection via T and D numbers				✓	✓
• Editing of tool data				✓	✓
• Editing of OA data				✓	✓
• Magazine list				✓	✓
• Configurable magazine list				✓	✓
• Magazines, maximum					
- NCU 710.3B PN				32	32
- NCU 720.3B PN				32	32
- NCU 730.3B PN				64	64
• Magazine locations, maximum					
- NCU 710.3B PN				600	600
- NCU 720.3B PN				600	600
- NCU 730.3B PN				1500	1500
• Magazine data				✓	✓
• Empty location search and place positioning				✓	✓
• Easy empty location search using softkeys				✓	✓
• Loading and unloading of tools				✓	✓
• More than one loading and unloading point per magazine				✓	✓
• Tool life monitoring and workpiece count				✓	✓
• Multi-tool with tools, maximum				64	64
• Adapter data				✓	✓
• Location-dependent offsets				✓	✓
Tool identification for loading/unloading tools with code carrier	See SIMATIC Ident Catalog ID 10 or Siemens Industry Mall.				
• Tool Ident Connection		**6FC5800-0AP52-0YB0**	**P52**	O	O

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Communication and data management

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Communication and data management					
Additional HMI user memory on CompactFlash card of the NCU	Not in combination with PCU 50.5. Requirements: 8 GB CompactFlash card.	**6FC5800-0AP12-0YB0**	**P12**	O 6 GB	O 6 GB
Data on storage medium at:					
• rear USB interface of the TCU or PCU, e.g. card reader or memory stick	2 plant HMIs can be accessed per plant network.			✓	✓
• USB interface at the front of the operator panel front, e.g. memory stick	2 plant HMIs can be accessed per plant network. Requirements: Operator panels SINUMERIK OP 08T/ OP 010/OP 010S/ OP 010C/OP 012/ OP 015A.			✓	✓
Manage additional drives via:					
• Ethernet				4	4
• USB				✓	✓
• CompactFlash card of the PCU				✓	✓
COM (RS232C) serial interface	Requirement: PCU 50.5 or COM01.3 module for NCU.			✓	✓
I/O interfacing via PROFIBUS DP				✓	✓
Axis data output via PROFIBUS Run MyCC /ADAS	Requirement: Loadable compile cycle.	**6FC5800-0AN07-0YB0**	**N07**	O	O
Reading of actual positions correlated with output signal Run MyCC /COPA	Requirement: Loadable compile cycle.	**6FC5800-0AN61-0YB0**	**N61**	O	O
Data backup:					
• CompactFlash card of the NCU (backup/restore) on memory stick or in network				✓	✓
• On integral SSD of PCU 50.5				✓	✓
• With Ghost (backup/restore) on PCU 50.5 or in network				✓	✓
Data link to a master computer Server for OPC unified architecture SINUMERIK Integrate Access MyMachine:	See SINUMERIK Integrate.				
• Access MyMachine /OPC UA	License for NCU.	**6FC5800-0AP67-0YB0**	**P67**	O	O
Variables, maximum number				200	200

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Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Operation					
Operator panel front black line with integrated SINUMERIK TCU:					
• SINUMERIK OP 015 black, 15", multi-touch, capacitive keys		**6FC5303-0AF14-0AA0**		O	O
• SINUMERIK OP 019 black, 18.5", multi-touch, capacitive display area		**6FC5303-0AF17-0AA0**		O	O
Operator panel front with integrated SINUMERIK TCU:					
• SINUMERIK OP 08T, 8", keys		**6FC5203-0AF04-1BA1**		O	O
Operator panel fronts without integrated SINUMERIK TCU:					
• SINUMERIK OP 019, 19", softkeys, capacitive		**6FC5303-0AF13-0AA0**		O	O
• SINUMERIK OP 015A, 15", keys		**6FC5203-0AF05-0AB0**		O	O
• SINUMERIK OP 012, 12.1", keys		**6FC5203-0AF02-0AA1**		O	O
• SINUMERIK OP 010S, 10.4", softkeys, mechanical		**6FC5203-0AF04-0AA0**		O	O
• SINUMERIK OP 010C, 10.4", keys, mechanical		**6FC5203-0AF01-0AA0**		O	O
• SINUMERIK OP 010, 10.4", keys		**6FC5203-0AF00-0AA1**		O	O
• Accessories for operator panel fronts:					
- SINUMERIK TCU 30.2 for operator panel fronts	Only in combination with SINUMERIK OP 019.	**6FC5312-0DA00-1AA0**		O	O
- SINUMERIK TCU 20.2 for operator panel fronts	Not in combination with SINUMERIK OP 019.	**6FC5312-0DA00-0AA2**		O	O
• Additional components for SINUMERIK TCU 20.3/TCU 30.3:	See Catalog IK PI or Siemens Industry Mall.				
- Switch SCALANCE X208 PRO managed		**6GK5208-0HA10-2AA6**		O	O
- Switch SCALANCE X208 managed		**6GK5208-0BA10-2AA3**		O	O
- Switch SCALANCE X108 unmanaged		**6GK5108-0BA00-2AA3**		O	O
- Switch SCALANCE XB005 unmanaged		**6GK5005-0BA00-1AB2**		O	O
- Switch SCALANCE X005 unmanaged		**6GK5005-0BA00-1AA3**		O	O
• USB interface for mounting in control cabinet, with connection between cabinet mounting component and the USB connector, length 1 m (3.28 ft)		**6FC5347-0AF01-1AA0**		O	O
SINUMERIK PCU:					
• SINUMERIK PCU 50.5-C P4505, Windows 7 Ultimate		**6FC5210-0DF52-3AA0**		O	O
- Processor clock frequency				1.86 GHz	1.86 GHz
- RAM capacity				4 GB	4 GB
• SINUMERIK PCU 50.5-P i5-520E, Windows 7 Ultimate		**6FC5210-0DF53-3AA0**		O	O
- Processor clock frequency				2.4 GHz	2.4 GHz
- RAM capacity				8 GB	8 GB
• Memory expansion for SINUMERIK PCU 50.5-C/PCU 50.5-P					
- 1 GB		**6ES7648-2AJ40-1KA0**		O	O
- 2 GB		**6ES7648-2AJ50-1KA0**		O	O
- 4 GB		**6ES7648-2AJ60-1KA0**		O	O

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Operation

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Operation (continued)					
Assembly materials for SINUMERIK PCU and TCU:					
• Mounting bracket for PCU and TCU behind operator panel front		**6FC5248-0AF20-2AA0**		O	O
• Upright mounting bracket for PCU in control cabinet		**6FC5248-0AF20-1AA1**		O	O
• Flat mounting bracket for PCU in control cabinet		**6FC5248-0AF20-0AA0**		O	O
Machine operation with SINUMERIK Operate /NCU	Single license without data storage medium	**6FC5800-0AS00-0YB0**	**S00**	O	O
Machine operation with SINUMERIK Operate /PCU (for SINUMERIK Operate, see CNC software DVD-ROM)	Single license without data storage medium	**6FC5800-0AP88-0YB0**	**P88**	O	O
Software for machine operation with SIMATIC IPC:					
• SINUMERIK PCU base software /IPC Provide SINUMERIK PCU functions on a defined SIMATIC IPC		**6FC5800-0AP86-0YB0**	**P86**	O	O
• Machine operation with SINUMERIK Operate /PCU	Requirement: SINUMERIK PCU base software /IPC (option P86).	**6FC5800-0AP88-0YB0**	**P88**	O	O
Software for machine operation with PC:	Without license Software version 4.7 SP1	**6FC5860-2YC44-1YA8**			
• SINUMERIK Operate for PC	Single license without data storage medium	**6FC5800-0AP87-0YB0**	**P87**	O	O
• Machine operation with SINUMERIK Operate /PC (for SINUMERIK Operate, see CNC software DVD-ROM)	Software update service	**6FC5860-2YP00-0YL8**		O	O
SINUMERIK extended touch SINUMERIK Operate expanded by multi-touch operation	Requirement: Multi-touch-capable operator panel				
• For SINUMERIK operator panel fronts				✓	✓
• For third-party operator panels		**6FC5800-0AP80-0YB0**	**P80**	O	O
Software for machine operation Expand SINUMERIK Operate	See SINUMERIK Integrate Create MyHMI /PRO and RunMyScreens.			O	O
Software for SIMATC operator panel OP 177B/TP 177B/MP 277 for machine operation with TRANSLINE HMI Lite	Single license Current software version	**6FC5263-0PY11-0AG0**		O	O
	Single license Software version 5.2	**6FC5263-5PY11-2AG0**		O	O
	Single license without data storage medium	**6FC5263-0PY11-2AG1**		O	O
Connection for:					
• SIMATIC Comfort Panel	Requirements: SIMATIC WinCC and Run MyHMI /SIMATIC OP.			✓	✓
• SIMATIC Mobile Panel	Requirements: SIMATIC WinCC and Run MyHMI /SIMATIC OP.			✓	✓
• SIMATIC Thin Client Touch 10" and 15" operator panels via Industrial Ethernet				✓	✓
• Standard monitor DVI VGA via external adapter for SINUMERIK PCU 50.5				✓	✓

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Operation (continued)					
Control unit management:					
• Identical display on all OPs with TCU:				✓	✓
- Simultaneous operation interlock				✓	✓
- Activate/deactivate MCP/MPP				✓	✓
- Different resolutions, e.g. SINUMERIK OP 010/OP 012				✓	✓
- Up to 2 operator panel fronts, each with a TCU on one NCU 710.3B PN				✓	✓
- Up to 4 operator panel fronts, each with a TCU on one NCU 720.3B PN/NCU 730.3B PN				✓	✓
- Up to 4 operator panel fronts, each with one TCU on a PCU plus 1 additional operator panel front directly on the PCU				✓	✓
- From 2/4 operator panel fronts, as many operator panel fronts as required due to intelligent suppression				✓	✓
• One or more TCUs selectable via several NCUs and PCUs				✓	✓
• One HMI switchable via several NCUs				✓	✓
• One integrated HMI and one SINUMERIK Operate simultaneously on one NCU	Only for loading/ unloading tools.			✓	✓
Operation via a VNC viewer				✓	✓
Machine control panels:					
• SINUMERIK MCP 310C PN		**6FC5303-0AF23-0AA1**		O	O
• SINUMERIK MCP 310 PN		**6FC5303-0AF23-1AA1**		O	O
• SINUMERIK MCP 483C PN		**6FC5303-0AF22-0AA1**		O	O
• SINUMERIK MCP 483 PN		**6FC5303-0AF22-1AA1**		O	O
• Accessories for machine control panels:					
- Emergency stop mushroom pushbutton, 22 mm (0.87 in), latching, red		**3SB3000-1HA20**		O	O
- Contact block		**3SB3400-0A**		O	O
- Cable set for additional control devices		**6FC5247-0AA35-0AA0**		O	O
- Spindle/rapid traverse override, electronic rotary switch, 1x16G, T=24, cap, button, pointer, rapid-traverse and spindle dials		**6FC5247-0AF12-1AA0**		O	O
- Feedrate/rapid traverse override, electronic rotary switch, 1x23G, T=32, cap, button, pointer, rapid-traverse and feedrate dials		**6FC5247-0AF13-1AA0**		O	O
Machine Push Button Panel MPP with machine control panel functions:					
• SINUMERIK MPP 310 IEH with port for SINUMERIK HT2/HT 8		**6FC5303-1AF20-8AA1**		O	O
• SINUMERIK MPP 483 IE		**6FC5303-1AF10-0AA0**		O	O
• SINUMERIK MPP 483 IEH with port for SINUMERIK HT2/HT 8		**6FC5303-1AF10-8AA0**		O	O
Interface for customer machine control panel SINUMERIK MCP Interface PN		**6FC5303-0AF03-0AA0**		O	O

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Operation

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Operation (continued)					
Handheld units:					
• SINUMERIK HT 2 handheld terminal:		**6FC5303-0AA00-2AA0**		O	O
- Magnetic clamp for HT 2		**6FC5348-0AA08-0AA0**		O	O
- Holder for HT 2		**6FC5348-0AA08-1AA0**		O	O
- Slide-in labels, inscribable (3 A4 sheets)		**6FC5348-0AA08-2AA0**		O	O
• SINUMERIK HT 8 handheld terminal		**6FC5403-0AA20-0AA1**		O	O
• SINUMERIK HT 8 handheld terminal with handwheel		**6FC5403-0AA20-1AA1**		O	O
• Accessories for HT 8 handheld terminals:					
- Touch pen with holding loop		**6FC5348-0AA08-4AA0**		O	O
- Wall holder		**6AV6574-1AF04-4AA0**		O	O
• Accessories for HT 2 and HT 8 handheld terminals:					
- Connection module Basic PN without emergency stop override for mounting in the control cabinet with terminating plug		**6FC5303-0AA01-1AA0**		O	O
- PN Basic connection box without emergency stop override for mounting in the system		**6AV6671-5AE01-0AX0**		O	O
- PN Plus connection box with emergency stop override for mounting in the system		**6AV6671-5AE11-0AX0**		O	O
• Mini handheld unit with coiled connecting cable		**6FX2007-1AD03**		O	O
• Mini handheld unit with straight cable		**6FX2007-1AD13**		O	O
• Accessories for mini handheld units:					
- Connection kit		**6FX2006-1BG03**		O	O
Electronic handwheels:	Third handwheel can be operated as a contour handwheel.			2 (3)	2 (3)
• With 120 mm × 120 mm (4.72 in × 4.72 in) front panel, 5 V DC		**6FC9320-5DB01**		O	O
• With 76.2 mm × 76.2 mm (3 in × 3 in) front panel, 5 V DC		**6FC9320-5DC01**		O	O
• With 76.2 mm × 76.2 mm (3 in × 3 in) front panel, 24 V DC, HTL		**6FC9320-5DH01**		O	O
• Without front panel, without setting wheel, 5 V DC		**6FC9320-5DF01**		O	O
• Without front panel, with setting wheel, 5 V DC		**6FC9320-5DM00**		O	O
• Portable in housing, 2.5 m (8.2 ft) coiled cable, 5 V DC		**6FC9320-5DE02**		O	O
- Flange socket for portable handwheel		**6FC9341-1AQ**		O	O
Keyboards:					
• SINUMERIK KB 310C		**6FC5203-0AF21-0AA1**		O	O
• SINUMERIK KB 483C		**6FC5203-0AF20-0AA1**		O	O
• KBPC CG US standard PC keyboard		**6FC5203-0AC01-3AA0**		O	O
- Keyboard tray for standard PC keyboard		**6FC5247-0AA40-0AA0**		O	O
Electronic Key System EKS	Single license without data storage medium	**6FC5800-0AP53-0YB0**	**P53**	O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Operation (continued)					
Memory and storage devices:					
• Card reader for CF/SD storage media with USB connection:		**6FC5335-0AA00-0AA0**		O	O
• CompactFlash card	Requirement: Card reader.				
- 2 GB		**6FC5313-5AG00-0AA2**		O	O
- 8 GB		**6FC5313-6AG00-0AA0**		O	O
• Industrial USB Hub 4	With SINUMERIK PCU 50.5.	**6AV6671-3AH00-0AX0**		O	O
• SIMATIC USB flash drive 8 GB		**6ES7648-0DC50-0AA0**		O	O
Plain text display of user variables				✓	✓
Multi-channel display:					
• Number of machining channels				3	3
• Number of machining channels with SINUMERIK OP 019				4	4
Workpiece-related actual value system				✓	✓
Menu selection via the PLC				–	–
CNC program messages				✓	✓
Access protection				7 levels	7 levels
Operating software languages:					
• Additional languages	Software versions available on request.	**6FC5800-0AN00-0YB0**	**N00**	O	O
• Language switchover online				✓	✓
• Chinese Simplified, English, French, German, Italian, Spanish				✓	✓
• Installed languages, maximum	Unlimited for SINUMERIK PCU 50.5.			8	8
Language extensions for the operating software SINUMERIK Operate and SINUMERIK 840D sl:	On DVD-ROM Without license				
• Chinese Traditional, Czech, Danish, Dutch, Finnish, Hungarian, Indonesian, Japanese, Korean, Malayan, Polish, Portuguese/Brazilian, Romanian, Russian, Slovak, Slovene, Swedish, Thai, Turkish, Vietnamese	Software versions available on request.	**6FC5860-0YC40-0YA8**		O	O
• Other languages	On request.			O	O

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Monitoring functions

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Monitoring functions					
Working area limitation				✓	✓
Limit switch monitoring Software and hardware limit switches				✓	✓
Position monitoring				✓	✓
Standstill monitoring				✓	✓
Clamping monitoring				✓	✓
2D/3D protection areas				✓	✓
Path length evaluation		**6FC5800-0AM53-0YB0**	**M53**	O	O
Contour monitoring				✓	✓
Contour monitoring with tunnel function		**6FC5800-0AM52-0YB0**	**M52**	O	O
Axis limitation from the PLC				✓	✓
Spindle speed limitation				✓	✓
Integrated spindle monitor (S-Monitor)	Requirements: WEISS spindle sensor module.	**6FC5800-0AP55-0YB0**	**P55**	O	O
Collision check:					
• Collision check in real time (collision avoidance)		**6FC5800-0AS02-0YB0**	**S02**	O	O
• Axis collision protection Run MyCC /PROT	Requirement: Loadable compile cycle.	**6FC5800-0AN06-0YB0**	**N06**	–	O
Extended stop and retract ESR, drive-autonomous		**6FC5800-0AM60-0YB0**	**M60**	O	O
Extended stop and retract ESR, CNC-controlled and drive-autonomous		**6FC5800-0AM61-0YB0**	**M61**	O	O
Tool monitoring and diagnostics:					
• Integrated tool monitoring and diagnostics IMD Light Run MyCC /IMD-L	Requirement: Loadable compile cycle.	**6FC5800-0AN12-0YB0**	**N12**	O	O
• Integrated tool monitoring and diagnostics IMD BASE Run MyCC /IMD	Requirement: Loadable compile cycle.	**6FC5800-0AN13-0YB0**	**N13**	O	O
• PROFIBUS tool and process monitoring Run MyCC /TPM-PB	Requirement: Loadable compile cycle.	**6FC5800-0AM62-0YB0**	**M62**	O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Compensations					
Backlash compensation				✓	✓
Leadscrew error compensation				✓	✓
Measuring system error compensation				✓	✓
Feedforward control:					
• Velocity-dependent				✓	✓
• Acceleration-dependent				✓	✓
Weight counterbalance, electronic	Function of SINAMICS S120.			✓	✓
Temperature compensation				✓	✓
Quadrant error compensation				✓	✓
Circularity test				✓	✓
Optimized friction compensation		**6FC5800-0AS06-0YB0**	**S06**	O	O
Leadscrew error compensation, bidirectional	1) Restricted functionality for export versions. The correctable tolerance band is restricted to 1 mm (0.04 in).	**6FC5800-0AM54-0YB0**	**M54**	O 1)	O
Sag compensation, multi-dimensional	1) Restricted functionality for export versions. The correctable tolerance band is restricted to 1 mm (0.04 in).	**6FC5800-0AM55-0YB0**	**M55**	O 1)	O
Nodding compensation Run MyCC /NOCO	Requirement: Loadable compile cycle.	**6FC5800-0AN63-0YB0**	**N63**	–	O
Volumetric error compensation:					
• Spatial compensation for 3 axes Run MyCC /VCS-A3	Requirement: Loadable compile cycle.	**6FC5800-0AN15-0YB0**	**N15**	–	O
• Spatial compensation for 5 axes Run MyCC /VCS-A5	Requirement: Loadable compile cycle.	**6FC5800-0AN16-0YB0**	**N16**	–	O
• Spatial compensation for 5 axes plus Run MyCC /VCS-A5 plus	Requirement: Loadable compile cycle.	**6FC5800-0AN17-0YB0**	**N17**	–	O
• Spatial compensation for 2 axes Run MyCC /VCS-ROT	Requirement: Loadable compile cycle.	**6FC5800-0AN31-0YB0**	**N31**	–	O
Vibration extinction Run MyCC /VIBX	Requirement: Loadable compile cycle.	**6FC5800-0AN11-0YB0**	**N11**	–	O
Magnetic cogging torque compensation Run MyCC /COCO	Requirement: Loadable compile cycle.	**6FC5800-0AN46-0YB0**	**N46**	–	O

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Programmable logic controller PLC

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	**840D sl**
Programmable logic controller PLC					
Expansion of the PLC user memory by 128 KB each		**6FC5800-0AD10-0YB0**	**D11 ... D18**	O	O
PLC user memory, maximum				1536 KB	1536 KB
SIMATIC S7-300 PLC 317F-3PN/DP integrated				✓	✓
Processing time for:					
• bit operations, minimum				0.025 µs	0.025 µs
• word operations, minimum				0.03 µs	0.03 µs
SIMATIC STEP 7 programming language:					
• Ladder diagram LAD				O	O
• Function block diagram FBD				O	O
• Statement list STL				O	O
• Structured Control Language SCL	Add-on package for SIMATIC STEP 7.			O	O
• Continuous Function Chart CFC	Add-on package for SIMATIC STEP 7.			O	O
• GRAPH	Add-on package for SIMATIC STEP 7.			O	O
PLC programming with HiGraph	Add-on package for SIMATIC STEP 7.			O	O
Distributed I/O via PROFIBUS DP:	See Catalog ST 70 or Siemens Industry Mall.				
• Via integrated interface, data transfer rate up to				12 Mbit/s	12 Mbit/s
• Distributed PROFIBUS DP slaves, maximum number	In total on DP1 and DP2.			124	124
Distributed I/O via PROFINET:	See Catalog ST 70 or Siemens Industry Mall.				
• Via integrated interface, data transfer rate up to				100 Mbit/s	100 Mbit/s
• Distributed PROFINET slaves, maximum number				128	128
PROFINET CBA				✓	✓
PROFINET IO controller				✓	✓
PROFINET IO device				✓	✓
Number of digital inputs can be adjusted between 0 and 4049 bytes	Number = process image inputs.			1024 bytes	1024 bytes
Number of digital outputs can be adjusted between 0 and 4049 bytes	Number = process image outputs.			1024 bytes	1024 bytes
I/O inputs, number:	Logical address range inputs.			8192 bytes	8192 bytes
• Usable, maximum				5700 bytes	5700 bytes
I/O outputs, number:	Logical address range inputs.			8192 bytes	8192 bytes
• Usable, maximum				5700 bytes	5700 bytes
Bit memories, number				4096 bytes	4096 bytes
Timers, number				512	512
Counters, number				512	512

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Programmable logic controller PLC (continued)					
Number of FBs:				2048	2048
• Largest number per FB				7999	7999
Number of FCs:				2048	2048
• Largest number per FC				7999	7999
Number of DBs:				2048	2048
• Largest number				16000	16000
Cyclic function block				✓	✓
Time-controlled function blocks				✓	✓
SINUMERIK PP 72/48D PN I/O module	Quantity limited by I/O quantity structure of PLC.	**6FC5311-0AA00-0AA0**		O	O
SINUMERIK PP 72/48D 2/2A PN I/O module	Quantity limited by I/O quantity structure of PLC.	**6FC5311-0AA00-1AA0**		O	O
SINUMERIK Analog Drive Interface for 4 axes, ADI 4	No PROFIBUS certification.	**6FC5211-0BA01-0AA4**		O	O
Safety functions					
SINUMERIK Safety Integrated Safety functions for personnel and machine protection:					
Safety functions integrated in the system:	Requirement: Safety Integrated with safe programmable logic SPL.			O	O
• Safe shutdown (stops)				O	O
• Safe braking ramp (SBR)				O	O
• Safe standstill (SH)				O	O
• Safe operating stop (SBH)				O	O
• Safely limited speed (SLS)				O	O
• Safe software limit switches (SE)				O	O
• Safe software cams/cam track (SN)				O	O
• Safety-related input/output signals (SGE/SGA)				O	O
• Safe programmable logic (SPL)				O	O
• Safe brake management (SBM)				O	O
• Safety-related output $n < n_x$				O	O
• Safety-related communication via standard bus (PROFIsafe with SIMATIC ET 200S, SIMATIC ET 200pro, SIMATIC ET 200eco)	See Catalog ST 70 or Siemens Industry Mall.			O	O
• Safe integration of sensors via PROFIBUS DP ASi F-Link	See Catalog IK PI or Siemens Industry Mall.			O	O

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Safety functions

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Safety functions (continued)					
SINUMERIK Safety Integrated Safety functions for personnel and machine protection (continued):					
Safety Integrated with safe programmable logic SPL:					
• Safety Integrated SI-Basic incl. 1 axis/spindle 4 inputs/outputs for safe programmable logic		**6FC5800-0AM63-0YB0**	**M63**	O	O
• Safety Integrated SI-Comfort incl. 1 axis/spindle 64 inputs/outputs for safe programmable logic		**6FC5800-0AM64-0YB0**	**M64**	O	O
• Safety Integrated SI-High Feature incl. 1 axis/spindle 192 inputs/outputs for safe programmable logic	Requirement: NCU 720.3B PN or NCU 730.3B PN.	**6FC5800-0AS68-0YB0**	**S68**	O	O
• Safety Integrated SI-axis/spindle extra for each further axis/spindle		**6FC5800-0AC70-0YB0**	**C71 ... C78**	O	O
• Safety Integrated SI-axis/spindle package additional 15 axes/spindles		**6FC5800-0AC60-0YB0**	**C61, C62**	O	O
• Safety Integrated SI-Connect, safe communication for up to 16 connections		**6FC5800-0AS67-0YB0**	**S67**	O	O
Safety Integrated automated acceptance test performed with SinuCom NC-SI	Requirement: SinuCom NC.			O	O
Drive-autonomous safety functions for personnel and machine protection:					
• SBC (Safe Brake Control)				✓	✓
• STO (Safe Torque Off)				✓	✓
• SS1 (Safe Stop 1)				✓	✓
• SS2 (Safe Stop 2)	Requirement: Safety Integrated plus /SI-Logic (option S60).			O	O
• SOS (Safe Operation Stop)	Requirement: Safety Integrated plus /SI-Logic (option S60).			O	O
• SLS (Safely Limited Speed)	Requirement: Safety Integrated plus /SI-Logic (option S60).			O	O
• SSM (Safe Speed Monitoring)	Requirement: Safety Integrated plus /SI-Logic (option S60).			O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Engineering					
Integrated commissioning for the SINUMERIK CNC control and the SINAMICS S120 drive system	Requirement: SINUMERIK Operate.			✓	✓
Commissioning functions for the SINAMICS S120 drive system Auto Servo Tuning AST, fully automatic speed and position controller optimization:	Requirement: SINUMERIK Operate.			✓	✓
• Single-axis optimization, incl. gantry axes				✓	✓
• Speed controller optimization, incl. current setpoint filter setting				✓	✓
• Position controller optimization, incl. speed setpoint filter setting				✓	✓
• Setting of feedforward control				✓	✓
• Overview of optimization results				✓	✓
• Closed circuit can be manually tuned according to Bode plot				✓	✓
• Optimization of path interpolation				✓	✓
• Assignment of torque feedforward control				✓	✓
• Complete user strategy, freely parameterizable				✓	✓
• Forward and backward navigation through optimization menus, re-optimization of speed controller				✓	✓
• Generation of reports, single axis and path interpolation				✓	✓
• Optimization project can be loaded and optimized offline on the PC				✓	✓
Trace	Requirement: SINUMERIK Operate.			✓	✓
Measuring functions for manual drive optimization				✓	✓
Circularity test	Requirement: SINUMERIK Operate.			✓	✓
Call Auto Servo Tuning from the part program AST call		**6FC5800-0AS10-0YB0**	**S10**	O	O
Series start-up via:					
• USB interface with storage medium, e.g. memory stick				✓	✓
• Network drive				✓	✓
• Programming of the CompactFlash card, offline or online	Requirement: Additional HMI user memory on CF card of NCU.			✓	✓
SINUMERIK Toolbox	On DVD-ROM of CNC software.			O	O
SIMATIC STEP 7 software on PC/PG for PLC start-up	See SIMATIC Catalog ST 70 or Siemens Industry Mall.			O	O
Series production and software upgrades SINUMERIK Integrate Create MyConfig		**6FC5862-2YC42-0YA0**		O	O
STARTER commissioning tool for SINAMICS and MICROMASTER	For topology and diagnostics.	6SL3072-0AA00-0AG0		–	–

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Engineering

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Engineering (continued)					
SinuCom commissioning and service tools for SINUMERIK 840D sl	For commissioning and optimization.				
• Software for PC/PG	Single license without data storage medium	**6FC5250-0AY00-0AG1**		O	O
	Single license Current software version	**6FC5250-0AY00-0AG0**		O	O
	Single license SW version 7.7	**6FC5250-7AY00-7AG0**		O	O
	Software update service	**6FC5250-0AY00-0AG2**		O	O
	Update on order software version 7.7	**6FC5250-7AY00-7AG3**		O	O
• Commissioning software for SINAMICS S120				–	–
• SinuCom NC Dialog-based parameterization of machine data, management of series start-up files, integrated online help for functions, machine data and alarms				✓	✓
- SinuCom NC Trace Dynamic recording of variables and signals, optimization without additional oscilloscope				✓	✓
- SinuCom NC SI supports the machine manufacturer in automating the Safety Integrated acceptance test				✓	✓
• SinuCom ARC Reading, deleting, inserting and changing series start-up files				✓	✓
Alarms and messages				✓	✓
Action log can be activated for diagnostic purposes	Logbook for alarms and keys.			✓	✓
Machine logbook, electronic				✓	✓
Trace: CNC, PLC and drives				✓	✓
Easy Message (SMS service)				–	–
PLC status	Generally possible via SIMATIC STEP 7 on PG/PC.			✓	✓
SIMATIC STEP 7 for SINUMERIK hardware for service functions	With SINUMERIK PCU 50.5.				
	Single license without data storage medium	**6FC5252-0AY00-0AG1**		O	O
	Single license Current software version	**6FC5252-0AY00-0AG0**		O	O
	Single license Software version 5.5 SP3	**6FC5252-5AY01-5AG0**		O	O
Remote diagnostics, data transfer and start-up support SINUMERIK Integrate Access MyMachine:					
• Access MyMachine /P2P	License for NCU	**6FC5800-0AP30-0YB0**	**P30**	O	O
• Access MyMachine /P2P for PC/PG Always permits data transfer between PC/PG and CNCs.	Requirement for image transmission by modem: Access MyMachine /P2P.				
	Single license Current software version	**6FC5860-7YC00-0YA0**		O	O
	Single license Software version 4.7 SP1	**6FC5860-7YC44-1YA0**		O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Engineering (continued)					
Program screens, operating areas and user interfaces SINUMERIK Integrate Create MyHMI /3GL	OEM contract required.				
• Programming package Create MyHMI /3GL Software for PC on DVD-ROM	Single license Current software version	**6FC5861-1YC00-0YA0**		O	O
	Single license Software version 4.7 SP1	**6FC5861-1YC44-1YA0**		O	O
	Single license without data storage medium	**6FC5861-1YP00-0YB0**		O	O
	Software update service	**6FC5861-1YP00-0YL8**		O	O
• Use extended HMI applications Run MyHMI /3GL		**6FC5800-0AP60-0YB0**	**P60**	O	O
• Create MyHMI /WinCC Software for PC on DVD-ROM	Single license Current software version	**6FC5861-3YC00-0YA0**		O	O
	Single license Software version 13 SP1	**6FC5861-3YC43-0YA0**		O	O
	Single license without data storage medium	**6FC5861-3YP00-0YB0**		O	O
	Software update service	**6FC5861-3YP00-0YL8**		O	O
• Expand operating area in SINUMERIK Operate Run MyHMI /WinCC	Requirement: SINUMERIK Operate on PCU or PC.	**6FC5800-0AP61-0YB0**	**P61**	O	O
• User interface on SIMATIC Panel Run MyHMI /SIMATIC OP for SIMATIC Comfort and Mobile Panels	Requirement: SIMATIC Panel.	**6FC5800-0AP03-0YB0**	**P03**	O	O
Integrate screens with variable layout in SINUMERIK Operate SINUMERIK Integrate Create MyHMI /PRO:	Single license Current software version	**6FC5867-3YC00-0YA8**		O	O
	Single license Software version 4.5 SP3	**6FC5867-3YC41-3YA8**		O	O
• Use standardized and freely configurable operating screens in SINUMERIK Operate for machine operation, Run MyHMI /PRO		**6FC5800-0AP47-0YB0**	**P47**	O	O
Integrate screens in SINUMERIK Operate SINUMERIK Integrate Run MyScreens:					
• Free screens				5	5
• > 5 screens, extended functions		**6FC5800-0AP64-0YB0**	**P64**	O	O

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Engineering – Industrial software for CNC – Boost manufacturing productivity

Description ✓ Basic version | O Option | – Not available	Instructions (footnotes are applicable line by line)	Article No. Type	Order code	SINUMERIK 840DE sl	 840D sl
Engineering (continued)					
Integrate OEM-specific solutions in the NC kernel SINUMERIK Integrate Create MyCC:					
• Openness in the NC kernel Create MyCC	OEM contract required.	On request.		–	O
• Openness in the NC kernel based on Customized Interface Create MyCCI	COA contract required.	**6FC5863-1YP00-0YB8**		O	O
• Openness in the NC kernel based on Interpreter Interface Create MyCCI /Interpreter	COA contract required.	**6FC5863-0YP00-0YB8**		O	O
• Execute compile cycles Run MyCC	Requirement: Create MyCC.	**6FC5800-0AM04-0YB0**	**M04**	–	O
• Spatial compensation interface Run MyCCI /VCI	Requirement: Create MyCC or Create MyCCI or Create MyCCI /Interpreter.	**6FC5800-0AN74-0YB0**	**N74**	–	O
• Universal spatial compensation interface Run MyCCI /UCI	Requirement: Create MyCC or Create MyCCI.	**6FC5800-0AN75-0YB0**	**N75**	–	O
• COA interface for compiled OEM cycles Run MyCCI /COOC	Requirement: Create MyCC or Create MyCCI or Create MyCCI /Interpreter.	**6FC5800-0AM67-0YB0**	**M67**	O	O
Industrial software for CNC					
SINUMERIK Integrate for production Complete software package	DVD-ROM without license Current software version	**6FC5864-0YD00-0AA8**		O	O
Boost manufacturing productivity					
CNC program transfer SINUMERIK Integrate Manage MyPrograms:					
• Machine connect	License per machine	**6FC5864-1AP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-1AP00-0YF0**		O	O
• Server access	Software update service per year	**6FC5864-1AP00-0YM0**		O	O
Tool management function for individual machines and networked machines SINUMERIK Integrate Manage MyTools:					
• Manage MyTools – individual machine				✓	✓
• Manage MyTools – networked machine					
- Machine connect	License per machine	**6FC5864-2AP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-2AP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-2AP00-0YM0**		O	O

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Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Boost service productivity					
Diagnostic functions in case of machine faults, workflow services, remote control and remote monitoring of machine control systems SINUMERIK Integrate Access MyMachine:					
• Access MyMachine /Ethernet – Single Access					
- Machine connect	License per machine	**6FC5864-4AP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-4AP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-4AP00-0YM0**		O	O
• Access MyMachine /Ethernet – Conferencing					
- Machine connect	License per machine	**6FC5864-4BP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-4BP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-4BP00-0YM0**		O	O
• Access MyMachine /Ethernet – Remote STEP 7					
- Machine connect	License per machine	**6FC5864-4CP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-4CP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-4CP00-0YM0**		O	O
Condition-oriented maintenance SINUMERIK Integrate Analyze MyCondition:					
• Control monitors					
- Machine connect	License per machine	**6FC5864-7AP00-0BF0**		O	O
	Upgrade license per machine	**6FC5864-7AP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-7AP00-0YM0**		O	O
• Diagnostics data					
- Machine connect	License per machine	**6FC5864-7BP00-0BF0**		O	O
	Upgrade license per machine	**6FC5864-7BP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-7BP00-0YM0**		O	O
• Advanced maintenance functions					
- Machine connect	License per machine	**6FC5864-7CP00-0BF0**		O	O
	Upgrade license per machine	**6FC5864-7CP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-7CP00-0YM0**		O	O
Interface for backing up data SINUMERIK Integrate Access MyBackup:					
• Access MyBackup					
- Machine connect	License per machine	**6FC5864-8AP00-0BF0**		O	O
	Upgrade license per machine	**6FC5864-8AP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-8AP00-0YM0**		O	O

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Automate production

Description ✓ Basic version | O Option | – Not available	**Instructions** (footnotes are applicable line by line)	**Article No.** Type	**Order code**	**SINUMERIK** **840DE sl**	 **840D sl**
Automate production					
Open interface for connection to master computer based on RPC (remote procedure call) SINUMERIK Integrate Create MyInterface	Without license Current software version	**6FC6000-7AC02-6AA8**		O	O
• Create MyInterface					
- Machine connect	License per machine	**6FC6000-7NF02-6YB0**		O	O
	Upgrade license per machine	**6FC6000-7NF02-6YF0**		O	O
Open interface for connection to master computer based on SINUMERIK Integrate Server SINUMERIK Integrate Access MyData:	Requirements: Manage MyPrgrams, Manage MyTools, Analyze MyCondition.				
• Access MyData – Manage MyPrograms					
- Machine connect	License per machine	**6FC5864-1DP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-1DP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-1DP00-0YM0**		O	O
• Access MyData – Manage MyTools					
- Machine connect	License per machine	**6FC5864-2DP00-0YB0**		O	O
	Upgrade license per machine	**6FC5864-2DP00-0YF0**		O	O
- Server access	Software update service per year	**6FC5864-2DP00-0YM0**		O	O

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3/2 **The user interface for efficient machine operation**

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3/15 SINUMERIK OP 012
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3/17 SINUMERIK OP 015 black
3/18 SINUMERIK OP 019
3/19 SINUMERIK OP 019 black
3/20 SINUMERIK PCU 50.5 Windows 7
3/23 SINUMERIK TCU 20.2
3/25 SINUMERIK TCU 30.2
3/27 Handheld units
3/27 SINUMERIK HT 2
3/29 SINUMERIK HT 8
3/31 Mini handheld unit
3/33 Electronic handwheel
3/35 Machine control panels
3/35 SINUMERIK MCP 310C PN
3/37 SINUMERIK MCP 310 PN
3/39 SINUMERIK MCP 483C PN
3/41 SINUMERIK MCP 483 PN
3/43 SINUMERIK MPP 310 IEH
3/44 SINUMERIK MPP 483 IE/MPP 483 IEH
3/46 SINUMERIK MCP Interface PN
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Part 8 **CAD CREATOR**
Dimensional drawing and 2D/3D CAD generator
www.siemens.com/cadcreator

Part 8 **Drive Technology Configurator selection tool**
Guided product selection through to exact article number
www.siemens.com/dt-configurator

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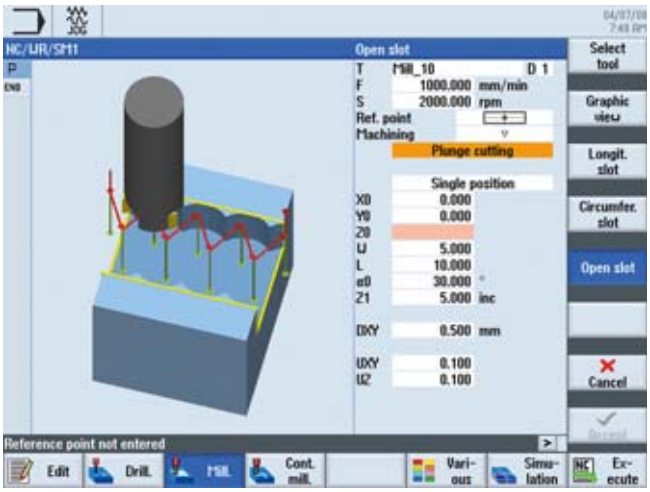
Overview

SINUMERIK Operate – perfect for all programming tasks

With various programming methods, SINUMERIK supports all worldwide promoted CNC programming methods – from single part production to mass production.

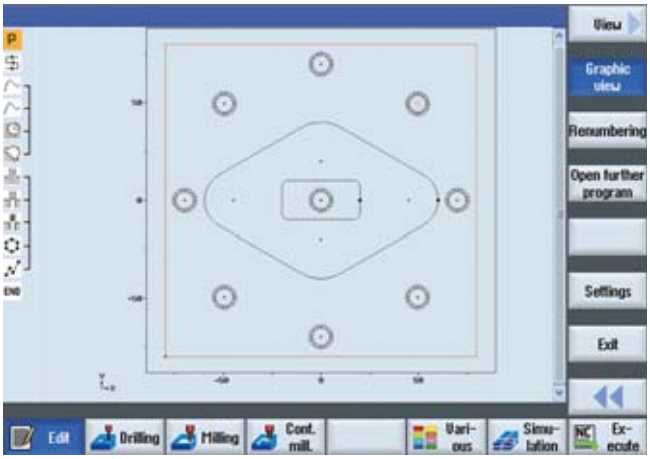
For mass production ...

Shortest machining times for mass production combined with the greatest degree of flexibility for special applications: SINUMERIK CNCs make this possible with advanced CNC programming with high-level language elements. With programGUIDE, SINUMERIK CNC programs can be easily combined with powerful technology and measuring cycles. Even classic ISO codes can be programmed. This makes SINUMERIK especially attractive to operators who prefer this classic type of program.



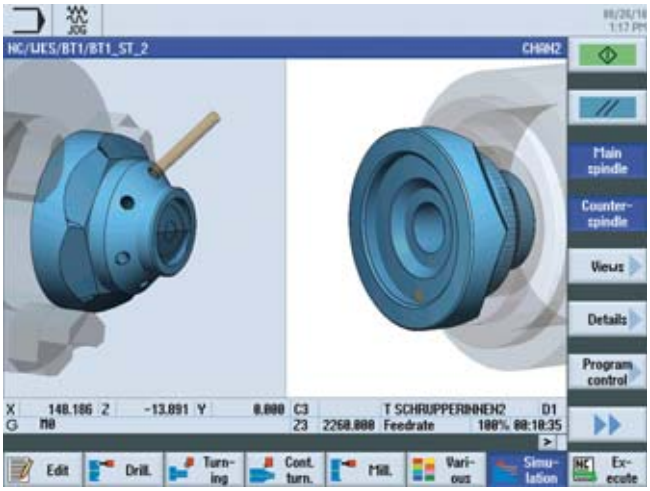
... and small series

The programming times is a crucial productivity factor for small series and single parts. ShopMill and ShopTurn machining step programming is unbeatable in these fields. Processes such as drilling, centering, plunging and pocket milling are represented as machining steps. In this way, CNC programs are extremely compact and easily read, even for complex machining operations. All geometric elements in a CNC program are shown to scale thanks to the dynamic broken-line graphics, the only one of its kind on the market.



Process safety through CNC simulation

SINUMERIK CNC simulation guarantees maximum process safety by using the real geometries of the loaded tools. Of course the simulation displays an exact image of the desired machining – not just brilliant 3D representations. SINUMERIK CNC simulation simulates every type of machining, such as face and cylinder surfaces, swiveled workpiece planes or even machining in multiple machining channels. Even very large part programs can be displayed on screen within seconds with the Quickview for mold-making.



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Overview (continued)

Programming has never been so easy

The SINUMERIK Operate user interface offers many new, high-performance functions. This means that machining step and high-level language programming can be combined under a single system user interface, allowing for very fast, rational and intuitive NC programming and work preparation.

Fast and flexible

G code programming functions with cycle support have been combined in programGUIDE. ProgramGUIDE ensures maximum flexibility and short machining times and is ideal for applications with medium to large batch sizes. SINUMERIK also supports ISO code programming. The ShopMill and ShopTurn machining step programming systems are tailored to the production of single parts and small batch sizes, in other words, they are ideal for shop floor manufacturing.

Support for manufacturing technologies

Cost-effective production methods and innovative CNC solutions are required to produce complex workpieces. The SINUMERIK 840D sl CNC supports multi-technology machines for machining workpieces in a single clamping process and offers innovative functions for this purpose – even where the operation requires switchover between different technologies such as mill-turning and turn-milling. The innovative SINUMERIK Operate user interface provides integrated turning functions for milling applications and integrated milling functions for turning applications, augmented with innovative measuring cycles in the Animated Element design. The usability and look and feel of the interface are always identical with every application.



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SINUMERIK Operate operating software

Overview



CNC user interface

The modern SINUMERIK Operate operating software is a technology-neutral, multi-channel operating software for:

- Machine operation
- Programming
- Diagnostics
- Startup

It permits user-friendly, practice-oriented operation of the machine, from production to the workshop.

Programming of the part programs is optimally supported by a modern text editor with integrated ProgramGUIDE with Animated Elements. The integrated powerful contour calculator enables programming and graphic display of complex workpiece contours. Processes such as drilling, centering, plunging or pocket milling are represented as machining steps in a simple and clear manner. Part programs can be rapidly checked using the 2D/3D simulation for turning and milling.

The user interface can be modified or redesigned easily.

Benefits

- Simple and quick to master
- Operate and program intuitively and clearly with Animated Elements
- CNC programming for the highest degree of productivity using programGUIDE
- Machining step programming for the shortest programming time with ShopMill/ShopTurn
- Help always available from help texts for each edit box on the operator screen form, and functions for efficient production, e.g. Help key, tooltips, search shortcut CTRL+F, UNDO
- Confident programming supported by simulation
- Open for user-generated screens and user-defined operating philosophies and concepts

Function

- Modern text editor with many helpful functions
- ProgramGUIDE with Animated Elements – perfect support for integrating cycles in part programs
- Shopfloor-oriented technology cycles for drilling, milling, and turning
- Comprehensive measuring cycles (option)
- Automatic creation of measurement records
- Residual material detection and machining for contour pockets and stock removal (option)
- Powerful contour computer for entering any contours, from simple to very complex ones
- Comprehensive machining step programming with ShopMill/ShopTurn (option)
- Support of swivel heads and swivel tables
- Multiple clamping of identical or different workpieces (ShopMill/ShopTurn is required)
- Quickview for mold-making programs
- Quick checking of part programs
  - Integrated 2D simulation for turning and milling
  - 3D simulation (option)
- Simultaneous recording of current machining (option)
- Integrated tool management for one magazine, more than 4 magazine tables (option)
- Access to external programs through network drives
- Data storage and execution from external memories (option)
- Implement user-defined operating philosophies and concepts with SINUMERIK Integrate Create MyHMI (option)
- Powerful new functions support the entire workflow:
  - Set-up, programming, tool and program management for complete machining
  - Multi-channel capability with ShopTurn for multi-channel machines, including program synchronization with programSYNC, and much more
  - Display and analysis of energy consumption

Integration

The SINUMERIK Operate operating software is a component of the CNC software with:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN

The separate SINUMERIK Operate operating software can be used for:

- SINUMERIK PCU 50.5 Windows 7
- PC with Windows 7 operating system

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Selection and ordering data

Description	Article No.
SINUMERIK Operate operating software For SINUMERIK PCU 50.5 Windows 7 Languages: Chinese Simplified, English, French, German, Italian, Spanish	Is supplied with CNC software on DVD-ROM.
• Using SINUMERIK Operate /NCU software option Single license without data storage medium	**6FC5800-0AS00-0YB0**
• Using SINUMERIK Operate /PCU software option Single license without data storage medium	**6FC5800-0AP88-0YB0**
SINUMERIK Operate operating software For PC with Windows 7 Languages: Chinese Simplified, English, French, German, Italian, Spanish	
• Without license on DVD-ROM software version 4.7 SP1	**6FC5860-2YC44-1YA8**
• Using SINUMERIK Operate /PC software option Single license without data storage medium	**6FC5800-0AP87-0YB0**
• Software update service	**6FC5860-2YP00-0YL8**
Accessories	
Language extensions[1)] On DVD-ROM Without license Languages: Chinese Traditional, Czech, Danish, Dutch, Finnish, Hungarian, Indonesian, Japanese, Korean, Malayan, Polish, Portuguese/ Brazilian, Romanian, Russian, Slovak, Slovene, Swedish, Thai, Turkish, Vietnamese	**6FC5860-0YC40-0YA8**
• For SINUMERIK 840D sl up to software version 4.5 SP2	
• For SINUMERIK Operate operating software up to software version 2.7	
Additional languages Use of language extensions Software option	**6FC5800-0AN00-0YB0**
• Single license without data storage medium	

Description	Article No.
Accessories *(continued)*	
HMI user memory Additionally on CF card of NCU Software option	**6FC5800-0AP12-0YB0**
• Single license without data storage medium	
Residual material detection and machining for contour pockets and stock removal Software option	**6FC5800-0AP13-0YB0**
• Single license without data storage medium	
ShopMill/ShopTurn Machining step programming Software option	**6FC5800-0AP17-0YB0**
• Single license without data storage medium	
DXF Reader Software option	**6FC5800-0AP56-0YB0**
• Single license without data storage medium	
Simultaneous recording of current machining Real-time simulation of current machining Software option	**6FC5800-0AP22-0YB0**
• Single license without data storage medium	
Simulation 1 (finished part) in 3D representation Simulation of finished part Software option	**6FC5800-0AP25-0YB0**
• Single license without data storage medium	
SINUMERIK Integrate Run MyScreens Configuration for user-defined screens Software option	**6FC5800-0AP64-0YB0**
• Single license without data storage medium	
SINUMERIK Integrate Run MyHMI /PRO Software option	**6FC5800-0AP47-0YB0**
• Single license without data storage medium	
SINUMERIK Integrate Run MyHMI /3GL Software option	**6FC5800-0AP60-0YB0**
• Single license without data storage medium	
SINUMERIK Integrate Run MyHMI /WinCC Software option	**6FC5800-0AP61-0YB0**
• Single license without data storage medium	

[1)] Please inquire about available software versions.

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SinuTrain for SINUMERIK Operate

Overview



SinuTrain for SINUMERIK Operate is a PC-based CNC programming software package, based on the original CNC kernel.

SinuTrain for SINUMERIK Operate enables completely identical operator control and CNC programming as on SINUMERIK CNCs that are equipped with the graphical user interface SINUMERIK Operate.

Application

SinuTrain for SINUMERIK Operate can be used for the following applications:

In the work preparation

- Higher machine availability through work preparation on the CNC programming station and security through offline verification of the programs
- Operation and programming are identical 1:1 to that on the machine, so no new operating or programming knowledge is required.
- Enhanced productivity thanks to integrated program and tool management as on a real CNC control, integration into the company network, and external data storage media, e.g. USB stick

In the training[1)]

- Simple learning and professional training through preconfigured machines, and no additional hardware costs
- Learning as on the CNC, with additional tutorials and programming guides
- Perfectly tailored training packages directly from: www.siemens.com/sce

At the machine manufacturer

- Adaptation of SinuTrain to the specific machine
- The real machine and the machine-manufacturer-specific SinuTrain delivered together to the end users
- Another sales argument thanks to the CNC programming station supplied

For the presentation

- Present always and everywhere
- Live demonstration of (new) SINUMERIK functions instead of slides

Function

Programming, simulation and printing

- DIN/ISO programming with programGUIDE
- ShopTurn/ShopMill machining step programming
- Multi-channel programming with programSYNC
- Fully-fledged graphical CNC simulation
- TCP/IP Ethernet networking with machines
- Software machine control panel and operator panel
- Print function for DIN/ISO and ShopTurn/ShopMill machining step programs
- DXF Reader

Integration

SinuTrain for SINUMERIK Operate Version 4.5 Edition 2 is based on SINUMERIK CNC software with software version 4.5 SP3, and can be used for:

- SINUMERIK 840D sl

Requirements:

Hardware:

- PC with 1.5 GHz processor (single core)
- RAM: 1 GB
- Hard disk: 3 GB of free memory space
- DVD drive for installation from DVD
- Graphics card: Minimum resolution 640 × 480 pixels
- USB interface
- Mouse, keyboard

Software:

- Operating system
  - Windows 7 Home Basic, Home Premium, Professional, Ultimate, Enterprise (32 bit/64 bit)
  - Windows XP Professional SP3
- Adobe Acrobat Reader

[1)] For schools and universities only, not for in-house vocational training departments.

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Selection and ordering data

Description	Article No.
SinuTrain for SINUMERIK Operate Version 4.5 Edition 2 SINUMERIK 828D/828D BASIC SINUMERIK 840D sl with CNC software 4.5 SP3 Turning/milling/universal multi-channel capability On DVD-ROM Languages: Chinese Simplified, English, French, German, Italian, Spanish	
• Single-user license	**6FC5870-4YC41-1YA0**
• Upgrade for single-user license[1)]	**6FC5870-4YC41-1YC0**
• Classroom license (18)	**6FC5870-8YC41-1YA0**
• Upgrade for classroom license (18)[1)]	**6FC5870-8YC41-1YC0**
• SinuTrain trial version 60 days	**6FC5870-0YC41-1YA0**
Machine adaptation for SinuTrain for SINUMERIK Operate	
• Machine adaptation by Siemens[2)]	**6FC5088-4AA22-4AB1**
• SinuTrain MCT (Machine Configuration Tool)	**6FC5870-0CC41-1YA0**
Training packages[3)]	
• Trainer package 6 × single-user licenses 40 × student licenses	**6FC5870-1TC41-0YA0**
• Trainer package XL 1 × classroom license (18) 40 × student licenses	**6FC5870-2TC41-0YA0**
• 300 h student license	**6FC5870-1YC41-1YA0**
• Student package 20 × 300 student licenses	**6FC5870-1SC41-0YA0**

More information

The first steps in working with SINUMERIK Operate can be learned quickly and easily through a web-based training program.

A trial version of SinuTrain for SINUMERIK Operate is available for download on the Internet.

You can find additional information on the Internet at:

www.siemens.com/sinutrain

1) With the upgrade license, you can upgrade an existing complete SinuTrain, SinuTrain ShopTurn or SinuTrain ShopMill to SinuTrain for SINUMERIK Operate V4.5. Prerequisite for the upgrade license is an existing, valid license key for SinuTrain versions 6.3, 7.3, 7.5, 2.6 or 4.4. This excludes SinuTrain Trial/Promotion and SinuTrain BASIC.

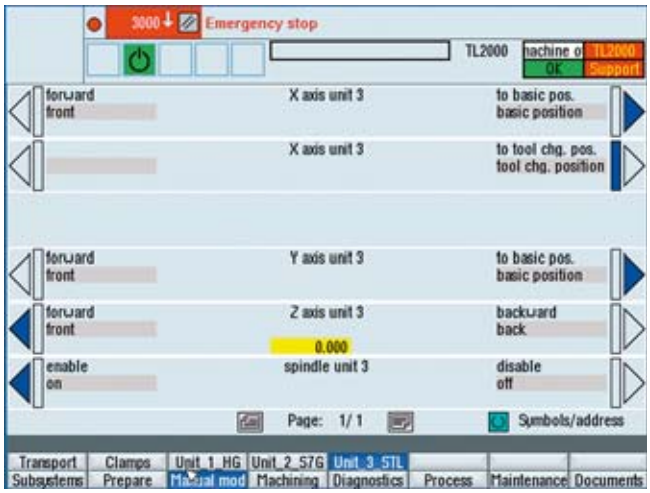
2) Services for machine adaptation:
You provide a complete file for CNC series commissioning archive by E-mail. You will then receive a file for importing into SinuTrain by E-mail. For more information, please contact your Siemens branch.

3) For schools and universities only, not for in-house vocational training departments, at: www.siemens.com/sce

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Overview



The configuration system SINUMERIK Integrate Create MyHMI /PRO together with the software option SINUMERIK Integrate Run MyHMI PRO for SINUMERIK 840D sl provides a machine user interface for operator control and monitoring tasks in mass production, for example in transfer lines, machining centers, and assembly lines. SINUMERIK Integrate Run MyHMI /PRO standardizes the operation of machines with diverse tasks and technologies by means of operator screen forms and a parameterizable navigation menu.

The technology-specific operator screen forms are combined into function groups, e.g.:

- Machine functions
  Workpiece counting, cycle times, workpiece overview
- Help texts
- Overviews
- Tool changing functions
- Manual operation functions

Prepared diagnostics functions support rapid fault localization in the event of a machine fault.

Function

Diverse target hardware is supported to ensure the best possible price/performance ratio for different applications.

Applications created with SINUMERIK Integrate Create MyHMI /PRO can be executed on NCUs and PCUs with software option SINUMERIK Integrate Run MyHMI /PRO in SINUMERIK Operate.

TRANSLINE HMI Lite is available for the SIMATIC KP700/TP700 and KP1200/TP1200 Comfort Panels.

The standard application is easy to adapt or expand and is therefore ideally suited for implementing customized versions for project-specific use.

SINUMERIK Integrate Create MyHMI /PRO

The screen forms for SINUMERIK Integrate Run MyHMI /PRO can be parameterized, configured, and loaded into the target hardware with the configuration software that is executable on PGs/PCs.
Two diagnostics functions are available for the process error diagnostics integrated into SINUMERIK Integrate Run MyHMI /PRO. Process error diagnostics are used in combination with S7-PDIAG and S7-GRAPH.

Users can freely configure their own operator screen forms using the simple, integrated graphic editor.

TRANSLINE HMI Lite

TRANSLINE HMI Lite contains a sample project that can be expanded with machine-specific or project-specific screen forms by using WinCC.

Selection and ordering data

Description	Article No.
TRANSLINE HMI Lite	
Runtime software	
Languages: English, French, German, Italian, Spanish	
• Single license with DVD-ROM, current software version	**6FC5263-0PY11-0AG0**
• Single license with DVD-ROM, software version 6.2	**6FC5263-6PY11-2AG0**
• Copy single license without data storage medium	**6FC5263-0PY11-0AG1**

For further information and ordering data for Create MyHMI /PRO, see under SINUMERIK Integrate for engineering Create MyHMI.

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Overview


SINUMERIK OP 08T


SINUMERIK OP 010


SINUMERIK OP 010S


SINUMERIK OP 010C


SINUMERIK OP 012


SINUMERIK OP 015A


SINUMERIK OP 019


SINUMERIK
OP 015 black


SINUMERIK
OP 019 black


SINUMERIK
PCU 50.5
Windows 7


SINUMERIK
TCU 20.2
TCU 30.2

SINUMERIK operator panel fronts with PCU or TCU

The SINUMERIK operator panel fronts (OP) can be combined with the SINUMERIK PCU (industrial PC) or SINUMERIK Thin Client Unit (TCU) and contain numerous innovations to improve ease of operation.

The USB interfaces provide hot plug & play functionality for a standard PC keyboard, mouse or USB flash drive.. SINUMERIK operator panel fronts are available with various display sizes, membrane keyboards, mechanical or capacitive buttons, as well as state-of-the-art operator panels with capacitive display areas for gesture control.

Thus the SINUMERIK operator panel fronts can be tailored to the individual user's requirements.

SINUMERIK PCU

Innovative operator panels can be created with the SINUMERIK PCU (highly integrated industrial PC) and SINUMERIK operator panel fronts. The SINUMERIK PCU is mounted on the rear of the SINUMERIK operator panel fronts, or can be positioned at distances up to 100 m (328 ft) from the operator panel in the cabinet.

The powerful SINUMERIK PCU features numerous innovations. The communication interfaces via Ethernet and PROFIBUS DP are already on board.

The complementary proven operator control components, such as handheld units, machine control panels, Push Button Panels, electronic handwheels, keyboards, and card readers, can be used with the SINUMERIK PCU or TCU.

SINUMERIK TCU

The SINUMERIK Thin Client Unit (TCU) allows operator panel fronts and the SINUMERIK PCU or NCU to be installed in separate locations. For this reason, the user interface is copied to one or several operator panel fronts, each with a SINUMERIK TCU.

Operator panels

An operator panel comprises a SINUMERIK PCU and/or SINUMERIK TCU available with a range of performance options, as well as a SINUMERIK operator panel front in a variety of display sizes.

The displays comply with quality standards relating to pixel error class as defined by ISO standard 13406-2, Class 2.

- Intelligent, rugged operator panels that have an impressively low-profile and compact design
- Individual design of your user interface, using your expertise by means of openness in human-machine communication
- Distributed design due to physical separation of PCU and operator panel front

The operator panels are predominantly used for visualization and for the operation of machine tools. They are particularly suitable for milling, turning, grinding and special-purpose machines.

For more information about the scope of application, see SINUMERIK CNC → Functions → Operation.

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Overview (continued)


SINUMERIK
MCP 310C PN


SINUMERIK MCP 483C PN


KBPC CG US
standard PC keyboard


SINUMERIK
card reader USB 2.0


SINUMERIK
MCP 310 PN


SINUMERIK MCP 483 PN


SINUMERIK KB 310C


SIMATIC
Industrial USB Hub


SINUMERIK
MPP 310 IEH


SINUMERIK MPP 483 IE


SINUMERIK KB 483C


SIRIUS ACT 3SU1


SINUMERIK expansion panel


Demmel – Full CNC keyboards


SINUMERIK HT 8


SINUMERIK HT 2


SINUMERIK
Mini handheld unit


Electronic handwheel

Handheld units

The SINUMERIK handheld units are available with a variety of performance options. Ergonomic handheld units are available which can be used as mobile machine control panels or as an additional main operator panel.

- Ergonomic machine control thanks to carefully designed housing
- Setup and operation of simple machines with the mini handheld unit, especially as part of JobShop or similar applications
- Setup, operation, teaching and programming of user programs with the multifunctional handheld terminals

Machine control panels

Machine control panels, Machine Push Button Panels and handwheels are available for the user-friendly operation of the machine functions of SINUMERIK and PLC-controlled machines.

- Ergonomic machine control thanks to sophisticated design
- Machine-specific adaptations by means of variable labeling and control devices that can additionally be integrated

Keyboards

The keyboards allow convenient and user-friendly input of programs and texts.

- Ergonomic keyboard
- CNC-specific supplements

Storage devices

Storage devices are used for archiving user data.

Housing systems

Housing systems can be manufactured to precise dimensions and ready to install for numerous combinations of SINUMERIK operating components.

Optimized mounting of SINUMERIK CNCs with:

- Operator panel
- Full CNC keyboard
- Machine control panel
- Machine Push Button Panel

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Overview



The extremely compact SINUMERIK OP 08T operator panel front supports the distributed installation of the operator panel front and CNC. The SINUMERIK OP 08T operator panel front contains a membrane keyboard with 75 keys (layout as SINUMERIK KB 310C full CNC keyboard), as well as 2 × (8 + 2) horizontal and 2 × 8 vertical softkeys.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Design of compact operator panels through shallow installation depth/reduced size and low power dissipation
- Vibration-free mounting of the SINUMERIK PCU in the control cabinet
- Efficient operation of larger machines using up to 4 additional, distributed operator panels simultaneously

Design

The SINUMERIK OP 08T operator panel front is connected to the SINUMERIK PCU/NCU via Industrial Ethernet as Thin Client in its own subnet via DHCP server.

Ports:

- 2 x USB 1.1
- Industrial Ethernet 10/100 Mbit/s

Function

- Signal transmission between operator panel front and PCU/NCU via Industrial Ethernet
- Simple installation
- Mixed operation with one operator panel front directly at the PCU is possible. Operation on an SINUMERIK OP 08T has the same authorization rights as operation on an operator panel front connected directly to the PCU. The operator panel in passive mode shows a darkened screen.
- The distance to the operator panel fronts is determined by the maximum distance between two network nodes/access points (100 m/328 ft).

Integration

The SINUMERIK OP 08T operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

The 2 × 8 vertical softkeys can be used as direct keys with SINUMERIK 840D sl.

Technical specifications

Article No.	6FC5203-0AF04-1BA1
Product brand name	SINUMERIK
Product type designation	OP 08T operator panel front
Screen diagonal	7.5 in
Design of the display	TFT color VGA
Horizontal screen resolution of the display	640 pixels
Vertical screen resolution of the display	480 pixels
Supply voltage at DC	24 V
Active power consumption	
• maximum	15 W
Degree of protection	
• front	IP65
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	330 mm (12.99213 in)
Depth	51.7 mm (2.03543 in)
• Note	Without USB protective cover on the front
Installation depth	41.2 mm (1.62205 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	285 mm (11.22047 in)
• section height	304 mm (11.9685 in)
Net weight	2.9 kg (6.39341 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 08T operator panel front 19.1 cm/7.5" TFT (640 x 480) with membrane keys and integral TCU	**6FC5203-0AF04-1BA1**
Accessories	
Slide-in labels for inscribing For SINUMERIK OP 08T for vertical softkeys 3 A4 sheets	**6FC5248-0AF04-1BA0**

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Overview



The SINUMERIK OP 010 operator panel front with 10.4" TFT color display with a resolution of 640 × 480 pixels (VGA) features a 62-key membrane keypad with 8 + 4 horizontal and 8 vertical softkeys that has been optimized for programming part programs.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Low-cost operator control and monitoring thanks to 10.4" display with optimized keyboard

Integration

The SINUMERIK OP 010 operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

Technical specifications

Article No.	6FC5203-0AF00-0AA1
Product brand name	SINUMERIK
Product type designation	OP 010 operator panel front
Screen diagonal	10.4 in
Design of the display	TFT color VGA
Horizontal screen resolution of the display	640 pixels
Vertical screen resolution of the display	480 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU
Active power consumption	
• typical	10 W
• maximum	16 W
Degree of protection	
• front	IP65
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	310 mm (12.20472 in)
Depth	30 mm (1.1811 in)
• Note	Without USB protective cover on the front
Installation depth	
• without PCU	20 mm (0.7874 in)
• with PCU 50	101 mm (3.97638 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	290 mm (11.41732 in)
Net weight	5 kg (11.02311 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 010 operator panel front 26.4 cm/10.4" TFT (640 x 480) with membrane keys	**6FC5203-0AF00-0AA1**
Accessories	
Slide-in labels for inscribing For SINUMERIK OP 010 3 A4 sheets	**6FC5248-0AF07-0AA0**

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Overview



The slimline SINUMERIK OP 010S operator panel front with 10.4" TFT color display with a resolution of 640 × 480 pixels (VGA) features 8 + 4 horizontal and 8 vertical mechanical softkeys.

The SINUMERIK full CNC keyboard is suitable as the input keyboard.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Space-saving operator control and monitoring
- Ergonomic and reliable operation thanks to the SINUMERIK KB 310C full CNC keyboard

Integration

The SINUMERIK OP 010S operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

Technical specifications

Article No.	6FC5203-0AF04-0AA0
Product brand name	SINUMERIK
Product type designation	OP 010S operator panel front
Screen diagonal	10.4 in
Design of the display	TFT color VGA
Horizontal screen resolution of the display	640 pixels
Vertical screen resolution of the display	480 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU
Active power consumption	
• typical	10 W
• maximum	16 W
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	330 mm (12.99213 in)
Depth	45 mm (1.77165 in)
• Note	Without USB protective cover on the front
Installation depth	
• without PCU	35 mm (1.37795 in)
• with PCU 50	120 mm (4.72441 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	285 mm (11.22047 in)
• section height	304 mm (11.9685 in)
Net weight	5.5 kg (12.12542 lb (avoirdupois))
Certificate of suitability	CE, cULus

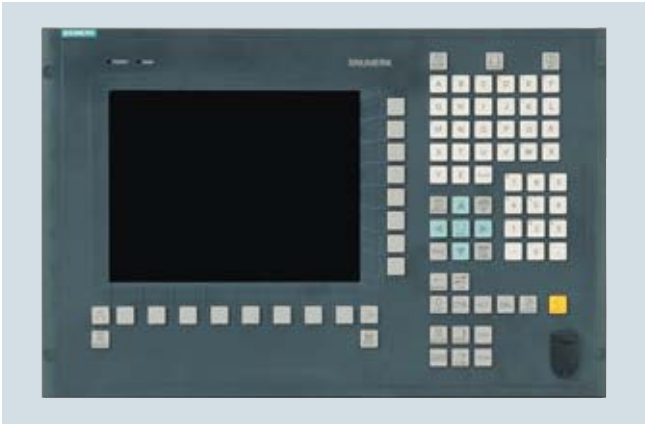
Selection and ordering data

Description	Article No.
SINUMERIK OP 010S operator panel front 26.4 cm/10.4" TFT (640 x 480) with mechanical keys	**6FC5203-0AF04-0AA0**

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SINUMERIK OP 010C

Overview



The SINUMERIK OP 010C operator panel front with 10.4" TFT color display with a resolution of 640 × 480 pixels (VGA) features a 65-key mechanical keypad with 8 + 4 horizontal and 8 vertical softkeys.

The 6 hotkeys are designed with replaceable key covers for machine-specific adaptation. The key covers can be freely inscribed using laser.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Easy, reliable operator control and monitoring thanks to the integral keyboard with mechanical keys
- Fast selection of the main functions using the 6 integral hotkeys

Integration

The SINUMERIK OP 010C operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

Technical specifications

Article No.	6FC5203-0AF01-0AA0
Product brand name	SINUMERIK
Product type designation	OP 010C operator panel front
Screen diagonal	10.4 in
Design of the display	TFT color VGA
Horizontal screen resolution of the display	640 pixels
Vertical screen resolution of the display	480 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU
Active power consumption	
• typical	10 W
• maximum	16 W
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	310 mm (12.20472 in)
Depth	30 mm (1.1811 in)
• Note	Without USB protective cover on the front
Installation depth	
• without PCU	20 mm (0.7874 in)
• with PCU 50	101 mm (3.97638 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	290 mm (11.41732 in)
Net weight	5 kg (11.02311 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 010C operator panel front 26.4 cm/10.4" TFT (640 x 480) with mechanical keys	**6FC5203-0AF01-0AA0**
Accessories	
Square key cover, for labeling 1 set comprising of: 90 × ergo gray, 20 × mid-gray, 20 × red, 20 × yellow, 20 × green	**6FC5248-0AF12-0AA0**

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Overview



The SINUMERIK OP 012 operator panel front with 12.1" TFT color display with a resolution of 800 × 600 pixels (SVGA) features a 59-key membrane keypad as well as 2 x (8 + 2) horizontal and 2 × 8 vertical softkeys. The integral mouse provides an additional method of machine control. The 2 × 8 vertical softkeys can be used as direct keys in the PLC.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- User-friendly operator control and monitoring thanks to 12.1" display
- Easy operation thanks to integral keyboard and mouse

Integration

The SINUMERIK OP 012 operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

Technical specifications

Article No.	6FC5203-0AF02-0AA1
Product brand name	SINUMERIK
Product type designation	OP 012 operator panel front
Screen diagonal	12.1 in
Design of the display	TFT color SVGA
Horizontal screen resolution of the display	800 pixels
Vertical screen resolution of the display	600 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU
Active power consumption	
• typical	16 W
• maximum	21 W
Degree of protection	
• front	IP65
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	310 mm (12.20472 in)
Depth	30 mm (1.1811 in)
• Note	Without USB protective cover on the front
Installation depth	
• without PCU	20 mm (0.7874 in)
• with PCU 50	101 mm (3.97638 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	290 mm (11.41732 in)
Net weight	5 kg (11.02311 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 012 operator panel front 30.7 cm/12.1" TFT (800 × 600) with membrane keys and mouse	**6FC5203-0AF02-0AA1**
Accessories	
Slide-in labels for inscribing For SINUMERIK OP 012 3 A4 sheets	**6FC5248-0AF08-0AA0**

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Overview



The SINUMERIK OP 015A operator panel front with 15" TFT color display with a resolution of 1024 × 768 pixels (XGA) features a 62-key membrane keyboard with 2 × (8 + 2) horizontal and 2 × 8 vertical softkeys and an integral mouse. The 2 × 8 vertical softkeys can be used as direct keys in the PLC.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Very user-friendly operator control and monitoring thanks to 15" display
- Easy operation thanks to integral keyboard and mouse

Integration

The SINUMERIK OP 015A operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

Technical specifications

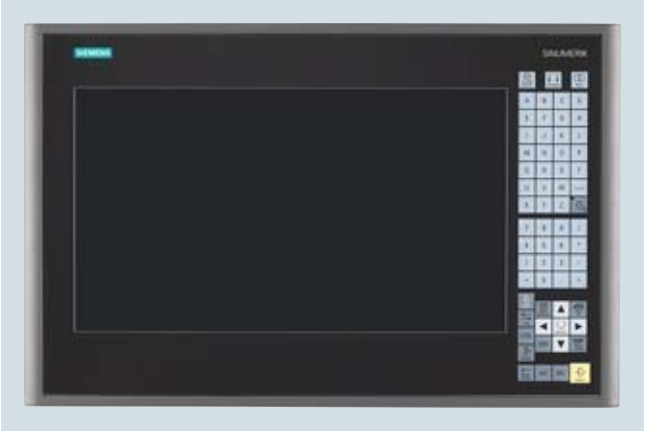
Article No.	6FC5203-0AF05-0AB0
Product brand name	SINUMERIK
Product type designation	OP 015A operator panel front
Screen diagonal	15 in
Design of the display	TFT color XGA
Horizontal screen resolution of the display	1024 pixels
Vertical screen resolution of the display	768 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU
Active power consumption	
• typical	15 W
• maximum	25 W
Degree of protection	
• front	IP65
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	355 mm (13.97638 in)
Depth	53 mm (2.08661 in)
• Note	Without USB protective cover on the front
Installation depth	
• without PCU	42 mm (1.65354 in)
• with PCU 50	127 mm (5 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	335 mm (13.18898 in)
Net weight	8.4 kg (18.51883 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 015A operator panel front 38 cm/15" TFT (1024 × 768) with membrane keys	**6FC5203-0AF05-0AB0**
Accessories	
Slide-in labels for inscribing For SINUMERIK OP 015A for vertical softkeys 3 A4 sheets	**6FC5248-0AF24-0AA0**

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Overview



The SINUMERIK OP 015 black operator panel front with 15.6" LCD color display and 1366 x 768 pixels (widescreen format) enables the distributed installation of the operator panel front and the control. The SINUMERIK OP 015 black operator panel front has a capacitive keyboard with 64 keys and capacitive display area for gesture operation.

The operator panel front is mounted from the rear using special clamps. Installation is assisted by a self-holding mechanism. The clamps are included in the scope of supply.

Benefits

- Capacitive sensor technology for user-friendly operation
- High-quality design and high degree of ruggedness
- Design of flat operator panels through shallow installation depth and low power dissipation
- Vibration-free mounting of the SINUMERIK PCU in the control cabinet
- Efficient operation of larger machines using up to 4 additional, distributed operator panels simultaneously.

Design

The SINUMERIK OP 015 black operator panel front is connected SINUMERIK PCU/NCU via Industrial Ethernet as Thin Client in its own subnet via DHCP server.

Ports:

- 3 × USB 2.0 (rear)
- Industrial Ethernet 10/100/1000 Mbit/s

Function

- Signal transmission between operator panel front and PCU/NCU via Industrial Ethernet
- Easy installation assisted by a self-holding mechanism
- The distance to the operator panel fronts is determined by the maximum distance between two network nodes/access points (100 m/328 ft).

Integration

The SINUMERIK OP 015 black operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

For the USB 2.0 port at the front, a USB extension is available for installation in control desks.

Technical specifications

Article No.	6FC5303-0AF14-0AA0
Product brand name	SINUMERIK
Product type designation	OP 015 black operator panel front
Screen diagonal	15.6 in
Design of the display	LCD color
Horizontal screen resolution of the display	1366 pixels
Vertical screen resolution of the display	768 pixels
Supply voltage at DC	24 V
Active power consumption	
• typical	24 W
• maximum	42 W
Degree of protection	
• front	IP65/IP66
• rear	IP20
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	310 mm (12.20472 in)
Depth	48 mm (1.88976 in)
Installation depth	37 mm (1.45669 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	290 mm (11.41732 in)
Net weight	7 kg (15.43236 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 015 black operator panel front 39.6 cm/15.6" LCD (1366 × 768) with capacitive keys and capacitive display area incl. integrated TCU	**6FC5303-0AF14-0AA0**
Accessories	
USB 1.1/2.0 extension, type A For desk mounting degree of protection IP66 *d* = 22 mm (0.87 in), length 1 m (3.28 ft)	**6FC5347-0AF01-1AA0**

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Overview



The SINUMERIK OP 019 operator panel front with 19" TFT color display, 1280 × 1024 pixels, has a continuous glass front and capacitive keys with 2 × (8 + 2) horizontal and 2 × 8 vertical softkeys. The 2 × 8 vertical softkeys can be used as direct keys in the PLC.

The operator panel front is mounted from the rear using special clamps included in the scope of supply.

Benefits

- Clear operator control and monitoring thanks to the 19" display
- High-quality design and high degree of ruggedness
- Innovative capacitive sensor technology for user-friendly operation

Integration

The SINUMERIK OP 019 operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

For the USB 2.0 port at the front, a USB extension is available for installation in control desks.

Technical specifications

Article No.	6FC5303-0AF13-0AA0
Product brand name	SINUMERIK
Product type designation	OP 019 operator panel front
Screen diagonal	19 in
Design of the display	TFT color SXGA
Horizontal screen resolution of the display	1280 pixels
Vertical screen resolution of the display	1024 pixels
Supply voltage at DC	5 V
• Note	Via PCU or TCU 30.2
Active power consumption	
• typical	35 W
• maximum	45 W
Degree of protection	
• front	IP65/IP66
• rear	IP20
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	399 mm (15.70866 in)
Depth	58.5 mm (2.30315 in)
Installation depth	
• without PCU	47.5 mm (1.87008 in)
• with PCU 50	132 mm (5.19685 in)
• with TCU 30.2	81 mm (3.18898 in)
• Note	Clearance + 10 mm (0.39 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	380 mm (14.96063 in)
Net weight	11 kg (24.25085 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 019 operator panel front 48 cm/19" TFT (1280 × 1024) with capacitive keys	**6FC5303-0AF13-0AA0**
Accessories	
USB 1.1/2.0 extension, type A For desk mounting degree of protection IP66 *d* = 22 mm (0.87 in), length 1 m (3.28 ft)	**6FC5347-0AF01-1AA0**
Signal cable for direct keys For SINUMERIK TCU 20.2/TCU 30.2	**6FC5347-0AF10-0AA0**

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Overview



The SINUMERIK OP 019 black operator panel front with 18.5" TFT color display and 1366 x 768 pixels (widescreen format) enables the distributed installation of the operator panel front and the control. The SINUMERIK OP 019 black operator panel front has a capacitive display area for gesture operation.

The operator panel front is mounted from the rear using special clamps. Installation is assisted by a self-holding mechanism. The clamps are included in the scope of supply.

Benefits

- Clear operator control and monitoring thanks to the 18.5" display
- Capacitive sensor technology for user-friendly operation
- Optimized for multi-touch on the SINUMERIK NCU/PCU
- High-quality design and high degree of ruggedness
- Design of flat operator panels through shallow installation depth and low power dissipation
- Vibration-free mounting of the SINUMERIK PCU in the control cabinet
- Efficient operation of larger machines using up to 4 additional, distributed operator panels simultaneously

Design

The SINUMERIK OP 019 black operator panel front is connected to the SINUMERIK PCU/NCU via Industrial Ethernet as Thin Client in its own subnet via DHCP server.

Connections:

- 3 × USB 2.0 (rear)
- Industrial Ethernet 10/100/1000 Mbit/s

Function

- Signal transmission between operator panel front and PCU/NCU via Industrial Ethernet
- Easy installation assisted by a self-holding mechanism
- The distance to the operator panel fronts is determined by the maximum distance between two network nodes/access points (100 m/328 ft).

Integration

The SINUMERIK OP 019 black operator panel front can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

For the USB 2.0 port at the front, a USB extension is available for installation in control desks.

Technical specifications

Article No.	6FC5303-0AF17-0AA0
Product brand name	SINUMERIK
Product type designation	OP 019 black operator panel front
Screen diagonal	18.5 in
Design of the display	TFT color
Horizontal screen resolution of the display	1366 pixels
Vertical screen resolution of the display	768 pixels
Supply voltage at DC	24 V
Active power consumption	
• typical	24 W
• maximum	42 W
Degree of protection	
• front	IP65/IP66
• rear	IP20
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	337 mm (13.26772 in)
Depth	64.9 mm (2.55512 in)
Installation depth	56 mm (2.20472 in)
• Note	Clearance + 64 mm (2.52 in)
Mounting surface	
• section width	465 mm (18.30709 in)
• section height	319 mm (12.55906 in)
Net weight	7.6 kg (16.75513 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK OP 019 black operator panel front 46.99 cm/18.5" TFT (1366 × 768) with capacitive display area incl. TCU	**6FC5303-0AF17-0AA0**
Accessories	
USB 1.1/2.0 extension, type A For desk mounting degree of protection IP66 *d* = 22 mm (0.87 in), length: 1 m (3.28 ft)	**6FC5347-0AF01-1AA0**

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SINUMERIK PCU 50.5 Windows 7

Overview



The powerful SINUMERIK PCU 50.5 Windows 7 Panel Control Unit provides maximum HMI performance and openness. The PCU 50.5 Windows 7 has all the onboard interfaces required to support communication via Ethernet, leaving the integrated slots free for other tasks.

The SINUMERIK PCU 50.5 with the Windows 7 operating system is equipped with Ghost data backup software for backing up and restoring data.

The operating software SINUMERIK Operate can be ordered separately.

Benefits

- Powerful and energy-efficient thanks to Intel Dual Core processor technology
- Reliable in operation through the use of error-correcting code RAM and solid-state drive as mass storage, as well as monitoring of temperature, SSD and fan
- Maximum processor performance up to 55 °C (131 °F) ambient temperature
- High shock and vibration resistance in all mounting positions
- Extremely compact design for space-saving installation thanks to compact housing design (6 liter volume)
- Service-friendly thanks to support of a USB boot device, for booting from USB memory sticks, USB floppy drives or USB hard disks

Design

- Intel Dual Core processor technology
  - SINUMERIK PCU 50.5-C Windows 7
    Intel Celeron P4505 2M Cache/1.86 GHz/4 GB SDRAM DDR3 ECC/2 MB Cache
  - SINUMERIK PCU 50.5-P Windows 7
    Intel Core i5-520E 3M Cache/2.4 GHz/8 GB SDRAM DDR3 ECC/3 MB Cache
- Replaceable 80 GB solid-state drive
- 20 GB for applications, e.g. SINUMERIK Operate and SINUMERIK Integrate
- 40 GB for data (part programs, documentation, other data) local backups and the software to be installed
- Maximum memory configuration 8 GB including graphics memory on 2 memory module slots
- Integrated 2D/3D graphics
  - Dynamic graphics memory (up to 256 MB), the graphics memory is taken from the main memory
- Windows 7 Ultimate operating system
- Data backup/restore using the Ghost data backup software

Ports:

- 2 × Ethernet 10/100/1000 Mbit/s (RJ45)
- 4 × USB 2.0
- 1 × COM1 (RS232C)
- 1 × DVI

Expansion slots:

- 1 × PCI-Express ×16 (1 × 185 mm/7.28 in)
- 1 × PCI (1 × 185 mm/7.28 in)

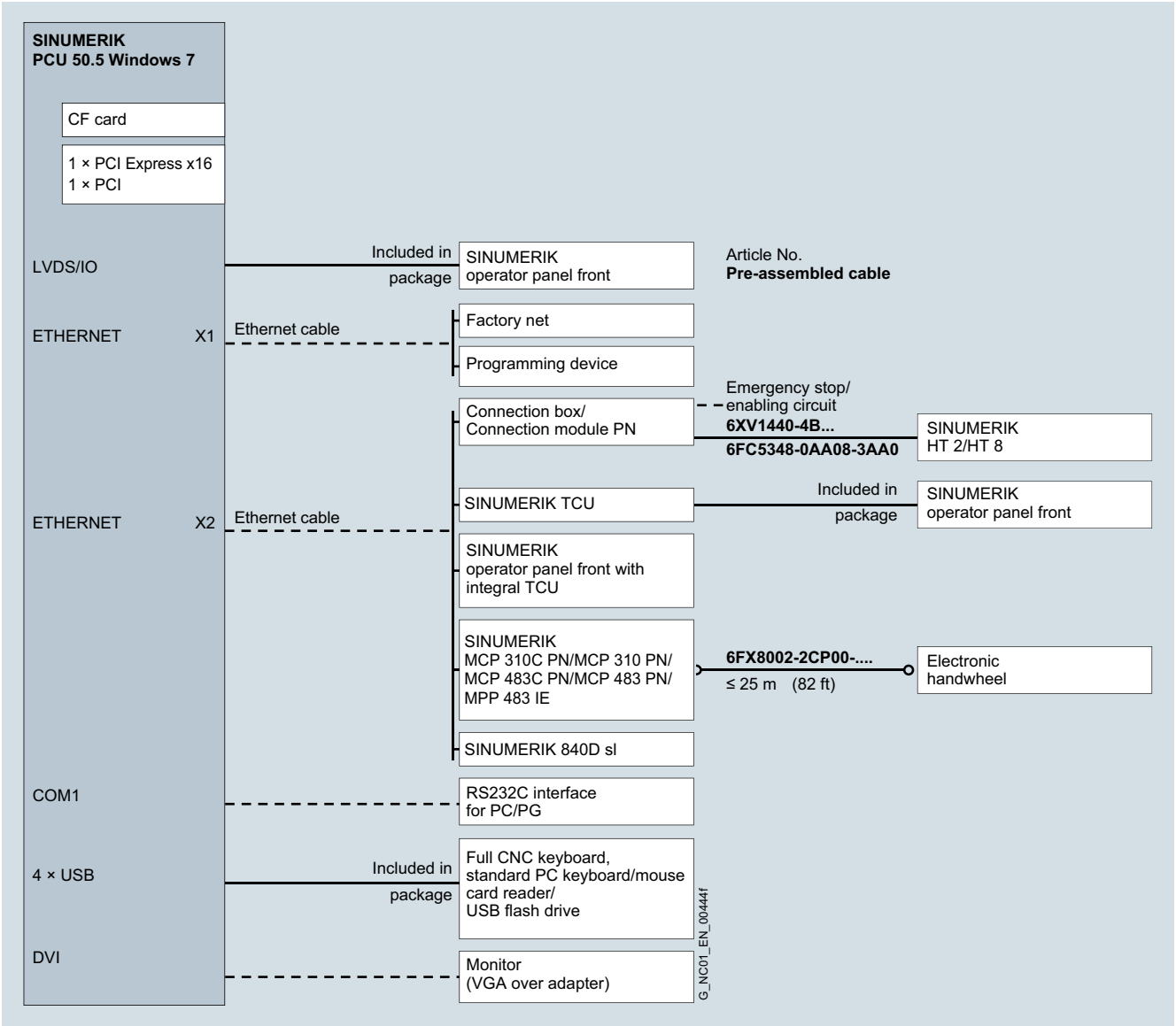
Integration

The SINUMERIK PCU 50.5 Windows 7 can be used for:

- SINUMERIK 840D sl
  with SINUMERIK Operate, software version 4.5 SP2 and higher

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Integration (continued)



Connection overview for SINUMERIK PCU 50.5 Windows 7

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

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Technical specifications

Article No.		6FC5210-0DF52-3AA0	6FC5210-0DF53-3AA0
Product brand name		SINUMERIK	SINUMERIK
Product type designation		PCU 50.5-C	PCU 50.5-P
Operating system pre-installed		Win7 EmbSys (64 bit)	Win7 EmbSys (64 bit)
Design of the processor		Intel Celeron P4505 2M Cache	Intel Core i5-520E 3M Cache
Processor clock frequency	GHz	1.86	2.4
Storage capacity of main memory 1	GB	4	8
• Type of main memory 1		SDRAM DDR3 ECC	SDRAM DDR3 ECC
Storage capacity of main memory 2	MB	2	3
• Type of main memory 2		Cache	Cache
Supply voltage at DC	V	24	24
Active power consumption			
• typical	W	48	48
• maximum	W	190	190
Buffering time in the event of power failure	ms	20	20
Degree of protection		IP20	IP20
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-20 ... +60 (-4 ... +140)	-20 ... +60 (-4 ... +140)
• transport	°C (°F)	-20 ... +60 (-4 ... +140)	-20 ... +60 (-4 ... +140)
• operation			
- at max. 15 W additional active power input	°C (°F)	5 ... 55 (41 ... 131)	5 ... 55 (41 ... 131)
- at max. 25 W additional active power input	°C (°F)	5 ... 50 (41 ... 122)	5 ... 50 (41 ... 122)
- at max. 30 W additional active power input	°C (°F)	5 ... 45 (41 ... 113)	5 ... 45 (41 ... 113)
Width	mm (in)	297 (11.69291)	297 (11.69291)
Height	mm (in)	267 (10.51181)	267 (10.51181)
Depth	mm (in)	82 (3.22835)	82 (3.22835)
Net weight	kg (lb (avoirdupois))	4.5 (9.9208)	4.5 (9.9208)
Certificate of suitability		CE, cULus	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK PCU 50.5-C Windows 7 1.86 GHz/1 × 4 GB, Windows 7 Ultimate Mounting bracket must be ordered separately.	**6FC5210-0DF52-3AA0**
SINUMERIK PCU 50.5-P Windows 7 2.4 GHz/2 × 4 GB, Windows 7 Ultimate Mounting bracket must be ordered separately.	**6FC5210-0DF53-3AA0**

Description	Article No.
Accessories	
Memory expansion For SINUMERIK PCU 50.5	
• 1 GB	**6ES7648-2AJ40-1KA0**
• 2 GB	**6ES7648-2AJ50-1KA0**
• 4 GB	**6ES7648-2AJ60-1KA0**
Mounting bracket (2 units) For SINUMERIK PCU, SINUMERIK TCU or video link receiver behind operator panel front	**6FC5248-0AF20-2AA0**
Upright mounting bracket For SINUMERIK PCU 50.5	**6FC5248-0AF20-1AA1**
8 GB CompactFlash card Blank	**6FC5313-6AG00-0AA0**
SIMATIC IPC USB flash drive 8 GB, USB 2.0, metal enclosure, boot capability, incl. SIMATIC IPC BIOS Manager	**6ES7648-0DC50-0AA0**

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Overview



The SINUMERIK Thin Client Unit TCU 20.2 for distributed installation allows operator panel fronts and the SINUMERIK PCU or SINUMERIK NCU to be installed separately. This is made possible by copying the user interface to to one or several operator panel fronts, each with a SINUMERIK TCU 20.2.

Benefits

- Design of flat operator panels through the shallow installation depth and low power dissipation
- Low-vibration installation of the SINUMERIK PCU in the control cabinet
- Efficient operation of larger machines using up to 5 uniform operator panels simultaneously – of which 4 are Thin Clients
- Effective operation of interlinked machines – more than 4 Thin Client operator panels can be connected thanks to suppression mechanism

Design

The SINUMERIK TCU 20.2 is connected to the SINUMERIK PCU/NCU via Industrial Ethernet as Thin Client in its own subnet via DHCP server.

Graphics:

Resolution 640 × 480 to 1024 × 768 pixels, 16-bit color depth

Ports:

- 3 × USB 2.0 for connection of mouse, keyboard and USB flash drive
- Industrial Ethernet 10/100/1000 Mbit/s

Function

- Signal transmission between SINUMERIK PCU/NCU and operator panel front via Industrial Ethernet
- Easy installation and service-friendly layout thanks to the component structure
- Functionality of the SINUMERIK PCU as in centralized configuration, e.g. number of PCI slots. The same operating screen is shown synchronously on all operator panel fronts and can be used from all operator panel fronts. Operator inputs on a Thin Client have equal priority with operator inputs on an operator panel directly connected to the SINUMERIK PCU. The operator panel in passive mode shows a darkened screen.

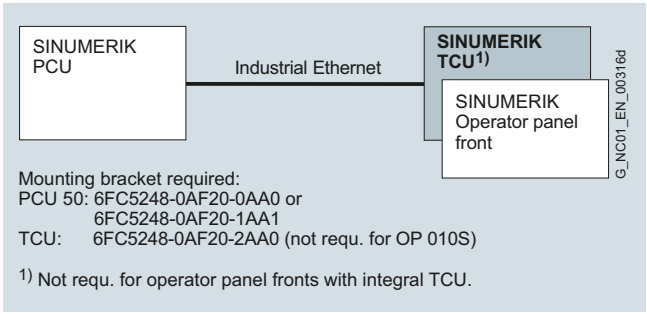
Function (continued)

- Operation is possible on the active operator panel. An enabling function permits a passive operator panel to request operation.
- The combined operation of operator panel fronts on a SINUMERIK TCU or with an integral TCU and an operator panel front directly connected to the SINUMERIK PCU is possible.
- The distance to the operator panel fronts is determined by the maximum distance between two network nodes/access points (100 m/328 ft).

Integration

The SINUMERIK TCU 20.2 can be used for:

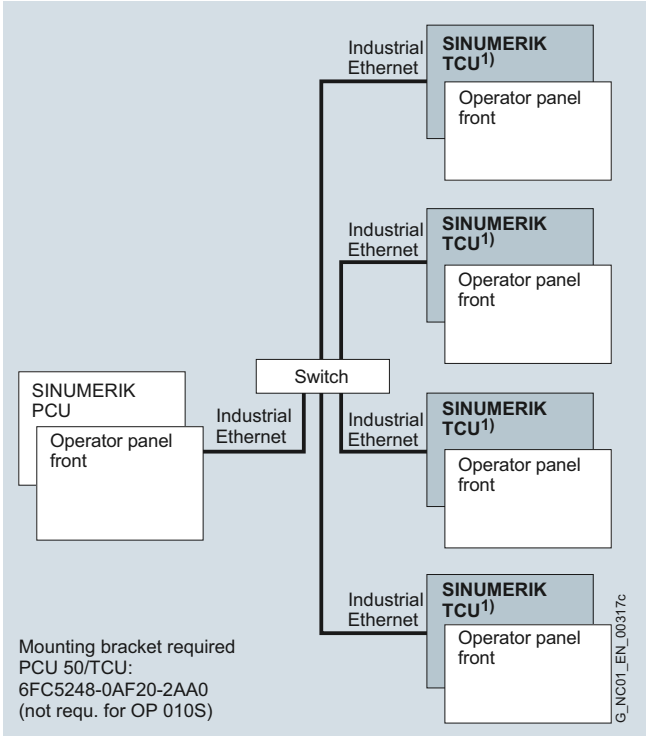
- SINUMERIK 840D sl:
  Operator panel fronts
  OP 010/OP 010C/OP 010S/OP 012/OP 015A connected to NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7



Mounting bracket required:
PCU 50: 6FC5248-0AF20-0AA0 or
6FC5248-0AF20-1AA1
TCU: 6FC5248-0AF20-2AA0 (not requ. for OP 010S)

1) Not requ. for operator panel fronts with integral TCU.

Connection overview for SINUMERIK TCU without central OP on PCU



Mounting bracket required
PCU 50/TCU:
6FC5248-0AF20-2AA0
(not requ. for OP 010S)

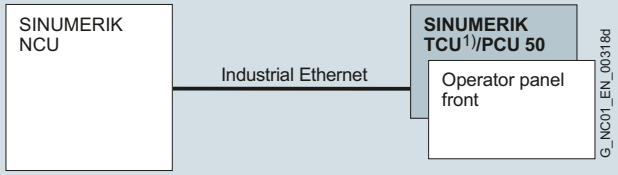
1) Not requ. for operator panel fronts with integral TCU.

Connection overview for SINUMERIK TCU with central OP on PCU

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3

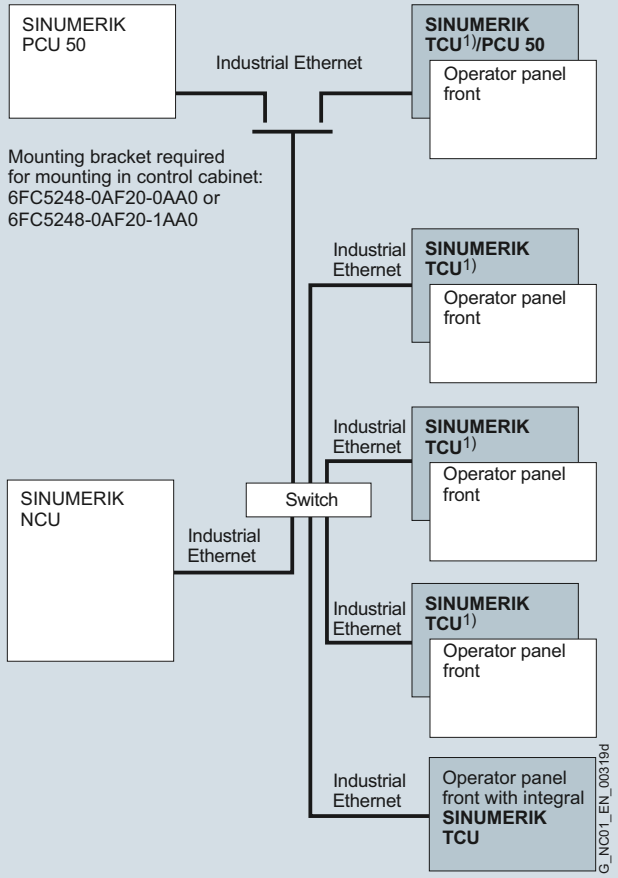
Integration (continued)



1) Not requ. for operator panel fronts with integral TCU.

Mounting bracket required:
PCU 50: 6FC5248-0AF20-2AA0
(not requ. for OP 010S)

Connection overview for SINUMERIK TCU on NCU



Mounting bracket required
for mounting on operator panel front:
TCU/PCU 50: 6FC5248-0AF20-1AA1
(not requ. for OP 010S)

1) Not required for operator panel fronts with integral TCU.

Connection overview for SINUMERIK TCU with several TCUs on NCU

Technical specifications

Article No.	6FC5312-0DA00-0AA2
Product brand name	SINUMERIK
Product type designation	Thin Client Unit TCU 20.2
Supply voltage at DC	24 V
Active power consumption maximum	40 W
• Note	TCU with OP 015 and 3 x 0.5 A on USB
Degree of protection	IP20
• Note	Mounted
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... 55 °C (-13 ... 131 °F)
• transport	-40 ... 70 °C (-40 ... 158 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	260 mm (10.23622 in)
Height	265 mm (10.43307 in)
Depth	34 mm (1.33858 in)
• Note	Without brackets
Net weight	1.96 kg (4.32106 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK Thin Client Unit TCU 20.2	**6FC5312-0DA00-0AA2**
Accessories	
Flat mounting bracket (2 units) For SINUMERIK PCU in the control cabinet	**6FC5248-0AF20-0AA0**
Upright mounting bracket For SINUMERIK PCU 50.5	**6FC5248-0AF20-1AA1**
Mounting bracket (2 units) For SINUMERIK PCU, SINUMERIK TCU or behind operator panel front	**6FC5248-0AF20-2AA0**
Signal cable for direct keys For SINUMERIK TCU 20.2/TCU 30.2	**6FC5347-0AF10-0AA0**

More information

Information on the SIMATIC NET components such as the Industrial Ethernet Electrical Lean Switches SCALANCE and the Industrial Ethernet FC TP Standard/Trailing Cable can be found in the IK PI Catalog or Siemens Industry Mall.

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Overview



The SINUMERIK Thin Client Unit TCU 30.2 for distributed installation allows the OP 019 operator panel front and the SINUMERIK PCU or SINUMERIK NCU to be installed separately. This is made possible by copying the user interface to one or several operator panel fronts, each with a SINUMERIK TCU 30.2.

Benefits

- Design of flat operator panels through the shallow installation depth and low power dissipation
- Low-vibration installation of the SINUMERIK PCU in the control cabinet
- Efficient operation of larger machines using up to 5 uniform operator panels simultaneously – of which 4 are Thin Clients
- Effective operation of interlinked machines – more than 4 Thin Client operator panels can be connected thanks to suppression mechanism

Design

The SINUMERIK TCU 30.2 is connected to the SINUMERIK PCU/NCU via Industrial Ethernet as Thin Client in its own subnet via DHCP server.

Graphics:

Resolution 1280 × 1042 pixels (SXGA), 16-bit color depth

Ports:

- 5 × USB 2.0 for connection of mouse, keyboard and USB flash drive
- Industrial Ethernet 10/100/1000 Mbit/s

Function

- Signal transmission between SINUMERIK PCU, SINUMERIK NCU and operator panel front via Industrial Ethernet
- Easy installation and service-friendly layout thanks to the component structure
- Functionality of the SINUMERIK PCU as in centralized configuration, e.g. number of PCI slots. The same operating screen is shown synchronously on all operator panel fronts and can be used from all operator panel fronts. Operator inputs on a Thin Client have equal priority with operator inputs on an operator panel directly connected to the SINUMERIK PCU. The operator panel in passive mode shows a darkened screen.
- Operation is possible on the active operator panel. An enabling function permits a passive operator panel to request operation.
- The combined operation of operator panel fronts on a SINUMERIK TCU or with an integral TCU and an operator panel front directly connected to the SINUMERIK PCU is possible.
- The distance to the operator panel fronts is determined by the maximum distance between two network nodes/access points (100 m/328 ft).

Integration

The SINUMERIK TCU 30.2 can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK OP 019 operator panel front
- SINUMERIK PCU 50.5 Windows 7

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Technical specifications

Article No.	6FC5312-0DA00-1AA0
Product brand name	SINUMERIK
Product type designation	Thin Client Unit TCU 30.2
Supply voltage at DC	24 V
Active power consumption maximum	60 W
• Note	TCU with OP 019 and 2 × 0.5 A/5 × 0.1 A on USB
Degree of protection	IP20
• Note	Mounted
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... 55 °C (-13 ... 131 °F)
• transport	-40 ... 70 °C (-40 ... 158 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	260 mm (10.23622 in)
Height	265 mm (10.43307 in)
Depth	34 mm (1.33858 in)
• Note	Without brackets
Net weight	1.96 kg (4.32106 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK Thin Client Unit TCU 30.2	**6FC5312-0DA00-1AA0**
Accessories	
Mounting bracket (2 units) For SINUMERIK PCU, SINUMERIK TCU behind operator panel front	**6FC5248-0AF20-2AA0**
USB 1.1/2.0 extension, type A For desk mounting Degree of protection IP66 *d* = 22 mm (0.87 in), length 1 m (3.28 ft)	**6FC5347-0AF01-1AA0**
Signal cable for direct keys For SINUMERIK TCU 20.2/TCU 30.2	**6FC5347-0AF10-0AA0**

More information

Information on the SIMATIC NET components such as the Industrial Ethernet Electrical Lean Switches SCALANCE and the Industrial Ethernet FC TP Standard/Trailing Cable can be found in the IK PI Catalog or Siemens Industry Mall.

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Overview



The mobile SINUMERIK HT 2 handheld terminal is suitable for manually operating machine tools.

Benefits

- Mobility for operator control and monitoring
- 2 enabling buttons for right-handed or left-handed operators
- Easy hot swapping during operation (hot plug and play), without triggering the emergency stop in combination with the PN Plus connection box without an additional, manual actuating element/key switch
  Insertion and removal during operation without triggering of emergency stop for basic variants requires manual actuating element/key switch and terminating plug
- Rugged, light, and ergonomically designed
- Intuitive axis feed thanks to rugged, magnetic handwheel
- All keys can be freely configured and inscribed by the user (default key assignment preconfigured on shipped units)
- Slide-in labels for inscribing (accessory)
- Flexible mounting with different types of holders: Magnetic clamps or hooks (accessory)
- Easily replaceable signal cables, without special tools (accessories)

Application

The SINUMERIK HT 2 is designed to allow manual operation of machine tools in any situation where the operator needs to be mobile, e.g. when setting up. It has been specifically developed with easy handling, ruggedness, and fitness for purpose in mind. The SINUMERIK HT 2 fits seamlessly into the operator component landscape of the SINUMERIK system.

Design

The SINUMERIK HT 2 is connected via the PN Basic/PN Plus connection box when it is installed somewhere in the plant outside the control cabinet or via the Basic PN connection module when it is installed inside the control cabinet

Operator controls:

- 20 keys, all can be freely assigned and inscribed by the user
- Emergency stop button, 2-channel, 3-step
- 2 enabling buttons (for right-handed and left-handed operators), 3-step, 2-channel
- Override rotary button
- Magnetic handwheel
- Key switch (3 positions, 2 keys)

Key type:

- Membrane keys

Interfaces:

- Connecting cable to PN Basic/PN Plus connection box, Basic PN connection module

Display:

- 4-line display (128 × 64 pixels)

Function

The easily accessible operator controls, ergonomic design and light weight make this unit easy to use, even over long work shifts. Protection class IP65, rubber grips and magnetic handwheel make it suitable for use even when production conditions are rough. The key assignments match those on the previous handheld unit type B-MPI. This makes it easy to switch from one version to the next. The keys can be freely assigned and inscribed as required.

Hot swapping is available with the PN Plus connection box.

Integration

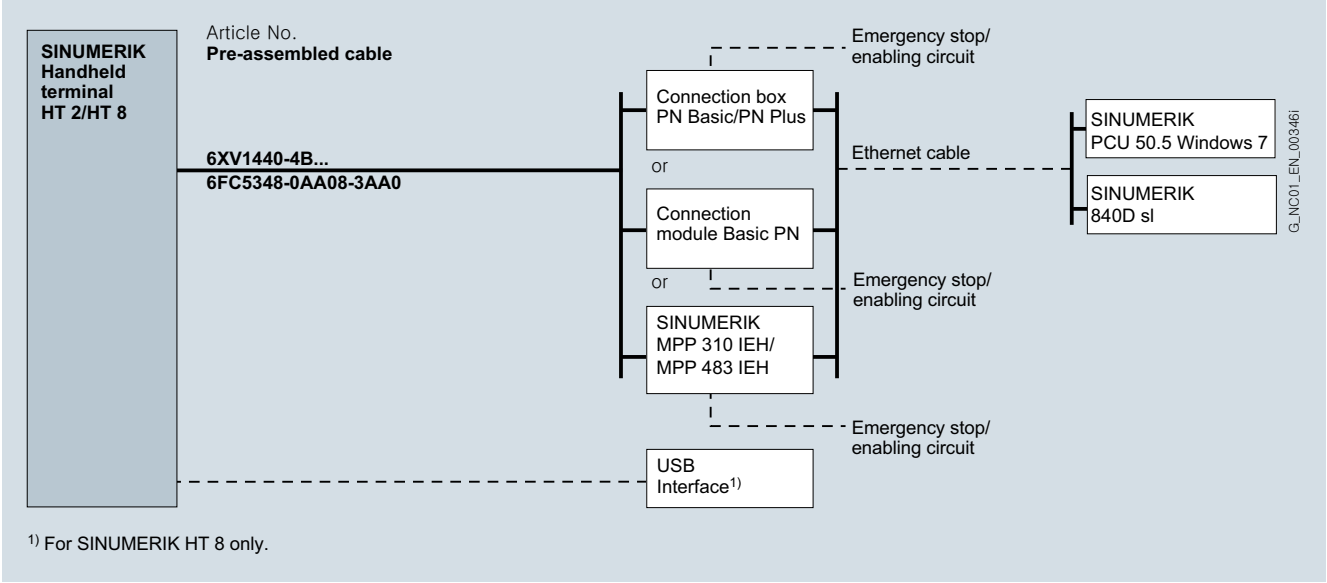
The SINUMERIK HT 2 Handheld Terminal can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

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Integration (continued)



Connection overview for SINUMERIK HT 2

Technical specifications

Article No.	6FC5303-0AA00-2AA0
Product brand name	SINUMERIK
Product type designation	HT 2 handheld terminal
Horizontal screen resolution of the display	128 pixels
Vertical screen resolution of the display	64 pixels
Supply voltage at DC	24 V
Active power consumption maximum	2.5 W
Degree of protection	IP65
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-20 ... +55 °C (-4 ... +131 °F)
• transport	-20 ... +55 °C (-4 ... +131 °F)
• operation	0 ... 55 °C (32 ... 131 °F)
Width	100 mm (3.93701 in)
Height	76.2 mm (3 in)
• Note	Without operator controls
Depth	255 mm (10.03937 in)
Net weight	0.69 kg (1.52119 lb (avoirdupois))
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK HT 2 handheld terminal	**6FC5303-0AA00-2AA0**
Accessories	
PN Basic connection box Degree of protection IP65 Without automatic emergency stop override for mounting in the system	**6AV6671-5AE01-0AX0**
PN Plus connection box Degree of protection IP65 With automatic emergency stop override for mounting in the system	**6AV6671-5AE11-0AX0**
Connection module Basic PN Without automatic emergency stop override for mounting in the control cabinet, complete with terminating plug	**6FC5303-0AA01-1AA0**
Magnetic clamp For SINUMERIK HT 2	**6FC5348-0AA08-0AA0**
Holder For SINUMERIK HT 2	**6FC5348-0AA08-1AA0**
Slide-in labels for inscribing For SINUMERIK HT 2 3 A4 sheets	**6FC5348-0AA08-2AA0**
Set of keys For SINUMERIK HT 2	**6AV6574-1AG04-4AA0**
Signal cable For Mobile Panels PROFINET	
• Length: 2 m (6.56 ft)	**6XV1440-4BH20**
• Length: 5 m (16.41 ft)	**6XV1440-4BH50**
• Length: 8 m (26.25 ft)	**6XV1440-4BH80**
• Length: 10 m (32.81 ft)	**6XV1440-4BN10**
• Length: 15 m (49.22 ft)	**6XV1440-4BN15**
• Length: 20 m (65.62 ft)	**6XV1440-4BN20**
• Length: 25 m (82.03 ft)	**6XV1440-4BN25**
Coiled connecting cable For SINUMERIK HT 2/HT 8 Length: 1.5 m (4.92 ft), stretches to 3.5 m (11.48 ft)	**6FC5348-0AA08-3AA0**

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Overview



The mobile SINUMERIK HT 8 handheld terminal combines the functions of an operator panel and a machine control panel in a single device, permitting complete operator control and monitoring of machines. It can be used as a supplementary main operator panel or as a secondary control panel.

The supplied touch pen with a holding loop permits easy operation of the touch screen, even when operators are wearing gloves. The safety system is designed to allow personnel to work in the machine's hazard zone.

Benefits

- Mobility for operator control and monitoring
- Pixel-graphics 7.5" TFT color display
- Operation via touch screen, membrane keys and touch pen
- Emergency stop button and 2 enabling buttons for left-handed and right-handed operators
- Easy hot swapping during operation (hot plug and play), without triggering the emergency stop in combination with the PN Plus connection box and without an additional, manual actuating element/key switch.
  Insertion and removal during operation without triggering an emergency stop on basic versions requires a manual actuating element/key switch and terminating plug.
- Rugged, compact and ergonomically designed
- Connecting cable can be easily replaced without special tools

Design

The emergency stop button and the 2 enabling buttons (3-step) each have two channels.

Possible connections for SINUMERIK HT 8:

- In the control cabinet via the Basic PN connection module
- At any preferred mounting location in the plant via the Basic or PN Plus connection box

Function

The SINUMERIK HT 8 operates according to the Thin Client principle. The operator software is installed on a SINUMERIK NCU/PCU. An Ethernet link is used to transfer screen contents from the NCU/PCU to the HT 8 and key information from the HT 8 to the NCU/PCU. The HT 8 display shows the same operator interface that is displayed on the standard operator panels of the SINUMERIK control system.

Hot swapping is available with the PN Plus connection box.

The operator interface can be customized if required (see SINUMERIK Integrate).

Technical specifications

Article No.		6FC5403-0AA20-0AA1	6FC5403-0AA20-1AA1
Product brand name		SINUMERIK	SINUMERIK
Product type designation		HT 8 handheld terminal	HT 8 handheld terminal
Product property		Without handwheel	With handwheel
Screen diagonal	in	7.5	7.5
Design of the display		TFT color VGA	TFT color VGA
Horizontal screen resolution of the display	pixels	640	640
Vertical screen resolution of the display	pixels	480	480
Supply voltage at DC	V	24	24
Active power consumption maximum	W	13	13
Degree of protection		IP65	IP65
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-20 ... +55 (-4 ... +131)	-20 ... +55 (-4 ... +131)
• transport	°C (°F)	-20 ... +55 (-4 ... +131)	-20 ... +55 (-4 ... +131)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Outer diameter of the enclosure	mm (in)	290 (11.41732)	290 (11.41732)
Height	mm (in)	65 (2.55906)	65 (2.55906)
• Note		Without operator controls	Without operator controls
Net weight	kg (lb (avoir-dupois))	1.73 (3.814)	1.73 (3.814)
Certificate of suitability		CE, cULus	CE, cULus

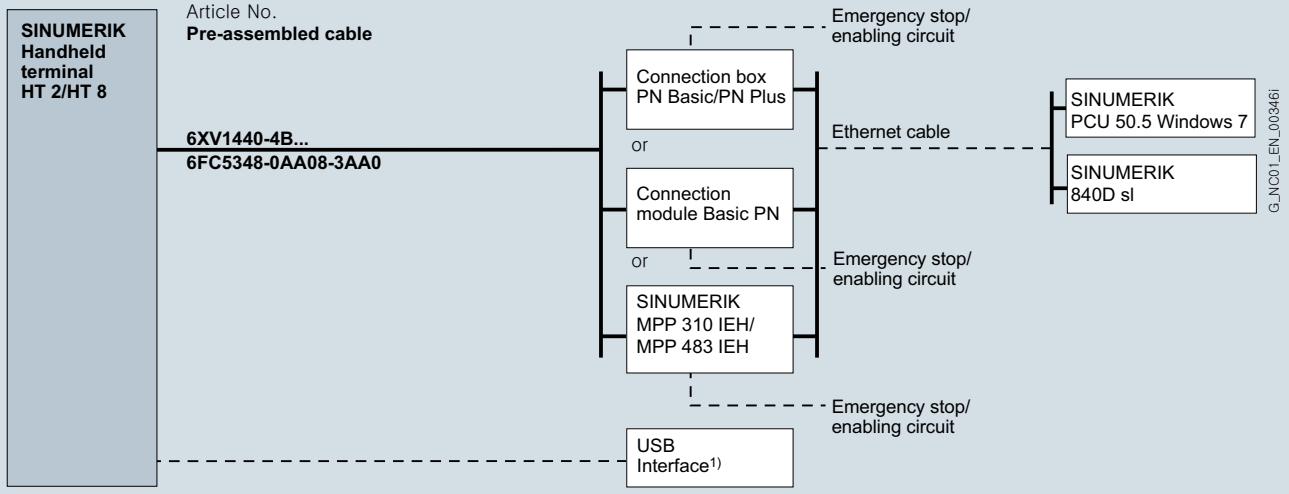
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Integration

The SINUMERIK HT 8 Handheld Terminal can be used for:

- SINUMERIK 840D sl:
  NCU 710.3B PN/NCU 720.3B PN/NCU 730.3B PN
- SINUMERIK PCU 50.5 Windows 7



1) For SINUMERIK HT 8 only.

Connection overview for SINUMERIK HT 8

For information on the cables and length codes, refer to section MOTION-CONNECT connection systems.

Selection and ordering data

Description	Article No.
SINUMERIK HT 8 handheld terminal Based on the Thin Client principle Operating software in the SINUMERIK NCU/PCU	**6FC5403-0AA20-0AA1**
SINUMERIK HT 8 handheld terminal with handwheel Based on the Thin Client principle Operating software in the SINUMERIK NCU/PCU	**6FC5403-0AA20-1AA1**
Accessories	
PN Basic connection box Degree of protection IP65 Without automatic emergency stop override for mounting in the system	**6AV6671-5AE01-0AX0**
PN Plus connection box Degree of protection IP65 With automatic emergency stop override for mounting in the system	**6AV6671-5AE11-0AX0**
Connection module Basic PN Without automatic emergency stop override for mounting in the control cabinet, complete with terminating plug	**6FC5303-0AA01-1AA0**

Description	Article No.
Accessories *(continued)*	
Wall holder For safe storage of the SINUMERIK HT 8, also suitable for stationary operation	**6AV6574-1AF04-4AA0**
Touch pen with holding loop For SINUMERIK HT 8	**6FC5348-0AA08-4AA0**
Protective film (2 units) For MP 277 and SINUMERIK HT 8	**6AV6671-5BC00-0AX0**
Signal cable For Mobile Panels PROFINET	
• Length: 2 m (6.56 ft)	**6XV1440-4BH20**
• Length: 5 m (16.41 ft)	**6XV1440-4BH50**
• Length: 8 m (26.25 ft)	**6XV1440-4BH80**
• Length: 10 m (32.81 ft)	**6XV1440-4BN10**
• Length: 15 m (49.22 ft)	**6XV1440-4BN15**
• Length: 20 m (65.62 ft)	**6XV1440-4BN20**
• Length: 25 m (82.03 ft)	**6XV1440-4BN25**
Coiled connecting cable For SINUMERIK HT 2/HT 8 Length: 1.5 m (4.92 ft), stretches to 3.5 m (11.48 ft)	**6FC5348-0AA08-3AA0**

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Overview



The convenient, ergonomically designed mini handheld unit with rugged metal connector is suitable for setting up and operating standard machines in the Jobshop area.

Benefits

- Mobile positioning of axes
- Since coarse, medium and fine infeeds can easily be graduated, the operator control concept offers fast, increment-precise positioning
- Rugged and compact design

Design

- Emergency stop implemented in 2 channels with 4-wire connection
- The 2-channel, 3-step enabling button has a 3-wire connection.
- Rapid traverse key and two ± keys
- 1 handwheel to traverse the axes in jog mode
- Facility to connect rotary switches for the selection of up to 5 axes
- Customer-specific applications can be implemented via 3 user-assignable function keys. If necessary, the customer can use slide-in labels to mark the keys specifically.
- Connection by means of a connection kit.
- Optional angle socket for a 90° rotated cable outlet direction. The angle socket can only be used in conjunction with the non-assembled connection kit.
- Secured by means of integrated magnetic clamps or optional holder

Integration

The mini handheld unit can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.		6FX2007-1AD03	6FX2007-1AD13
Product brand name		SINUMERIK	SINUMERIK
Product type designation		Mini handheld unit	Mini handheld unit
Product property		With coiled cable	With straight cable
Supply voltage at DC	V	24	24
• Note		For emergency stop button, enabling buttons and switching signals	For emergency stop button, enabling buttons and switching signals
• for handwheel	V	5	5
Design of the interface		RS422	RS422
Number of pulses per revolution maximum		100	100
Transmission link to PCU maximum	m (ft)	25 (82.021)	25 (82.021)
Transmission link to the NCU/PCU maximum	m (ft)	25 (82.021)	25 (82.021)
• Note		When using the handwheel	When using the handwheel
Protection class without shaft input		IP65	IP65
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-20 ... +60 (-4 ... +140)	-20 ... +60 (-4 ... +140)
• transport	°C (°F)	-20 ... +60 (-4 ... +140)	-20 ... +60 (-4 ... +140)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Width	mm (in)	90 (3.54331)	90 (3.54331)
Height	mm (in)	67 (2.6378)	67 (2.6378)
Depth	mm (in)	180 (7.08661)	180 (7.08661)
• Note		With emergency stop button	With emergency stop button
Net weight	kg (lb (avoir-dupois))	0.5 (1.10231)	0.5 (1.10231)
• Note		Without connecting cable	Without connecting cable
Certificate of suitability		CE	CE

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Selection and ordering data

Description	Article No.
Mini handheld unit 3-step enabling button incl. magnetic clamps and connecting cable with metal connector	
• Coiled connecting cable Length 2.1 m (6.89 ft), stretches to 3.5 m (11.48 ft)	**6FX2007-1AD03**
• Straight cable Length 5 m (16.41 ft)	**6FX2007-1AD13**

Description	Article No.
Accessories	
Connection kit for mini handheld unit, non-assembled **Connection socket for self-assembly** Version with metal connector for connection to machine control panel without Industrial Ethernet, with terminator	**6FX2006-1BG03**
Connection kit for mini handheld unit, assembled **Connection socket wired up** Version with metal connector for connection to machine control panel with Industrial Ethernet, with terminator	**6FX2006-1BG11**
90° angle socket For connection kit, non-assembled 6FX2006-1BG03 Metal version	**6FX2006-1BG56**
Holder For mini handheld units 6FX2007-1AD.3 and electronic handwheel in housing 6FC9320-5DE02	**6FX2006-1BG70**

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Overview



Handwheels are used for manually traversing axes.

Benefits

- Positioning of axes
- Rugged and compact (housing variant)

Design

- Handwheels for assembly by user. The front panel can be removed.
- Handwheels with housing and coiled cable, secured by means of the integrated magnetic clamps or the optional holder.

Function

The handwheels are equipped with a magnetic latching mechanism that supports traversing with incremental accuracy.

The handwheels generate either 5 V DC TTL or 24 V DC HTL signals. The version with 24 V DC and an HTL interface is available for connection to I/O modules.

Technical specifications

Article No.		6FC9320-5DB01	6FC9320-5DC01	6FC9320-5DH01	6FC9320-5DM00	6FC9320-5DF01	6FC9320-5DE02
Product brand name		SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK
Product type designation		Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel
Product property		With front panel 120 x 120 mm (4.72 x 4.72 in)	With front panel 76.2 x 76.2 mm (3 x 3 in)	With front panel 76.2 x 76.2 mm (3 x 3 in)	Without front panel, with setting wheel	Without front panel, without setting wheel	Portable in housing with coiled cable
Supply voltage at DC	V	5	5	24	5	5	5
Consumed current maximum	mA	60	60	15	60	60	80
Design of the interface		RS422 (TTL)	RS422 (TTL)	HTL	RS422 (TTL)	RS422 (TTL)	RS422 (TTL)
Phase displacement angle between signal A and signal B	°	90	90	90	90	90	90
Number of pulses per revolution maximum		100	100	100	100	100	100
Minimum actuating torque in activation direction	Nm	0.08	0.04	0.04	0.04	0.04	0.04
Electrical output frequency maximum	kHz	2	2	2	2	2	2
Transmission link to the NCU/PCU maximum	m (ft)	25 (82.021)	25 (82.021)	25 (82.021)	25 (82.021)	25 (82.021)	20 (65.6168)
Degree of protection		–	–	–	–	–	IP65
Degree of protection							
• front		IP65	IP65	IP65	IP65	IP65	–
• rear		IP50	IP50	IP50	IP50	IP50	–
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during							
• storage	%	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95	5 ... 95

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Technical specifications (continued)

Article No.		6FC9320-5DB01	6FC9320-5DC01	6FC9320-5DH01	6FC9320-5DM00	6FC9320-5DF01	6FC9320-5DE02
Product brand name		SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK	SINUMERIK
Product type designation		Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel	Electronic handwheel
Product property		With front panel 120 x 120 mm (4.72 x 4.72 in)	With front panel 76.2 x 76.2 mm (3 x 3 in)	With front panel 76.2 x 76.2 mm (3 x 3 in)	Without front panel, with setting wheel	Without front panel, without setting wheel	Portable in housing with coiled cable
Ambient temperature, during							
• storage	°C (°F)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)
• transport	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Outer diameter of the enclosure	mm (in)	–	–	–	58.5 (2.30315)	50 (1.9685)	–
Width	mm (in)	120 (4.72441)	76.2 (3)	76.2 (3)	–	–	85 (3.34646)
Height	mm (in)	120 (4.72441)	76.2 (3)	76.2 (3)	–	–	160 (6.29921)
Depth	mm (in)	81.8 (3.22047)	81.8 (3.22047)	81.8 (3.22047)	83.8 (3.29921)	64.3 (2.5315)	67 (2.6378)
Net weight	kg (lb (avoir-dupois))	0.7 (1.54324)	0.4 (0.88185)	0.4 (0.88185)	0.3 (0.66139)	0.2 (0.44092)	0.3 (0.66139)
• Note		–	–	–	–	–	Without connecting cable
Certificate of suitability		CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus

Selection and ordering data

Description	Article No.
Electronic handwheel	
• With front panel 120 mm × 120 mm (4.72 in × 4.72 in), with setting wheel 5 V DC, RS422	**6FC9320-5DB01**
• With front panel 76.2 mm × 76.2 mm (3 in × 3 in), with setting wheel 5 V DC, RS422	**6FC9320-5DC01**
• Portable in housing, with setting wheel 5 V DC, RS422 coiled cable, length 2.5 m (8.20 ft)	**6FC9320-5DE02**
• With front panel 76.2 mm × 76.2 mm (3 in × 3 in), with setting wheel 24 V DC, HTL	**6FC9320-5DH01**
• Without front panel, with small setting wheel 5 V DC, RS422	**6FC9320-5DM00**
• Without front panel, without setting wheel, for installation 5 V DC, RS422	**6FC9320-5DF01**

Description	Article No.
Accessories	
Adapter set For installation in front panel with 3-hole fixing	**6FC9320-5DN00**
Flange socket For portable handwheel	**6FC9341-1AQ**
Holder For mini handheld units 6FX2007-1AD.3 and electronic handwheel in housing 6FC9320-5DE02	**6FX2006-1BG70**
Signal cable, pre-assembled For connection of electronic handwheel Length, max. 25 m (82.03 ft)[1)]	6FX8002-2CP00-….

[1)] For complete Article No. and length code, see MOTION-CONNECT connection systems.

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Overview



The SINUMERIK MCP 310C PN machine control panel with mechanical keys is designed to permit user-friendly, well-structured operation of the machine functions. It is suitable for machine-level operation of milling, turning, grinding and special machines.

Apart from PROFINET functionality, SINUMERIK MCP 310C PN also has complete Industrial Ethernet functionality. The network technology can be switched using DIP switches.

All keys are designed with replaceable key covers for machine-specific adaptations. The key covers can be freely inscribed using laser. Transparent key covers can be used as an alternative.

The machine control panel is mounted from the rear using special clamps supplied with the panel.

Included in the scope of supply are the clamps, key caps (30 × ergo gray, 30 × clear, 9 × labeled) and a backing plate for the emergency stop.

Design

Operator controls:

- Mode selectors and function keys
  - 49 keys with LEDs
  - Direction keys for milling machines with rapid traverse override (key covers for direction keys for turning machines are supplied in the accessories pack)
  - Default key assignment includes 16 freely assignable customer keys
- Feedrate control with feedrate/rapid traverse override (rotary switch with 23 positions)
- Key-operated switch (four positions and three different keys)

Key type:

- Mechanical keys

Interfaces:

- PROFINET
- Industrial Ethernet
- 9 inputs/6 outputs for 9 control devices (additional cable set required for control devices)
- For 2 handwheels

Expansion options:

- 6 slots for control devices (d = 16 mm/0.63 in)
- 1 slot for emergency stop pushbutton or rotary override switch (up to d = 22 mm/0.87 in)

Integration

The SINUMERIK MCP 310C PN machine control panel can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-0AF23-0AA1
Product brand name	SINUMERIK
Product type designation	MCP 310C PN machine control panel
Supply voltage at DC	24 V
Active power consumption maximum	21.2 W
Transmission link to the NCU/PCU maximum	100 m (109.36133 yd)
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	175 mm (6.88976 in)
Depth	85.2 mm (3.35433 in)
• Note	With connector for handwheel connection
Installation depth	29.1 mm (1.14567 in)
• Note	Without connector for handwheel connection
Mounting surface	
• section width	285 mm (11.22047 in)
• section height	155 mm (6.10236 in)
Net weight	1.2 kg (2.64555 lb (avoirdupois))
Certificate of suitability	CE, cULus

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Selection and ordering data

Description	Article No.
SINUMERIK MCP 310C PN machine control panel PROFINET/Industrial Ethernet Width 310 mm (12.2 in), with mechanical keys	**6FC5303-0AF23-0AA1**
Accessories	
Square key cover, for labeling 1 set comprising of: 90 × ergo gray, 20 × mid-gray, 20 × red, 20 × yellow, 20 × green	**6FC5248-0AF12-0AA0**
Square key cover, for labeling 90 × transparent	**6FC5248-0AF21-0AA0**
Set of key caps SINUMERIK key covers, square, for inscription	
• 500 × ergo gray (light basic)	**6FC5348-0AF00-0AA0**
• 500 × mid-gray (medium basic)	**6FC5348-0AF01-0AA0**
Emergency stop mushroom pushbutton, 22 mm (0.87 in) Round, plastic, red, 40 mm, positive latching, rotate-to-unlatch mechanism incl. holder	**3SB3000-1HA20**

Description	Article No.
Accessories *(continued)*	
Contact block with 2 contacts 1 NO + 1 NC, 2-pin, screw terminal	**3SB3400-0A**
Spindle/rapid traverse override electronic rotary switch 1 × 16G, T=24, cap, button, pointer, and rapid traverse and spindle dials[1)]	**6FC5247-0AF12-1AA0**
Feedrate/rapid traverse override electronic rotary switch 1 × 23G, T=32, cap, button, pointer, and rapid traverse and feedrate dials[1)]	**6FC5247-0AF13-1AA0**
Cable set (1 set = 60 units) For additional machine control panel control devices Length 500 mm (19.69 in)	**6FC5247-0AA35-0AA0**
Signal cable, pre-assembled For connection of electronic handwheel Length max. 25 m (82.03 ft) [2)]	6FX8002-2CP00-….

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

1) 16G: Latching at position 16; T=24: 24 positions for 360°
23G: Latching at position 23; T=32: 32 positions for 360°

2) For complete Article No. and length code, see MOTION-CONNECT connection systems.

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Overview



The SINUMERIK MCP 310 PN machine control panel with membrane keys is designed to permit user-friendly, well-structured operation of the machine functions. It is suitable for machine-level operation of milling, turning, grinding and special machines.

Apart from PROFINET functionality, SINUMERIK MCP 310 PN also has complete Industrial Ethernet functionality. The network technology can be changed over using DIP switches.

49 keys have user-inscribed slide-in strips for machine-specific adaptations. An A4 sheet (for laser printers) for inscribing the slide-in labels is included in the scope of supply.

A connecting cable is included in the scope of supply for connecting the direct keys of the SINUMERIK operator panel fronts OP 012/OP 015A/OP 019.

The machine control panel is mounted from the rear using special clamps supplied with the panel.

Design

Operator controls:

- Mode selectors and function keys
  - 49 keys with LEDs
  - Direction keys for milling machines with rapid traverse override
  - Default key assignment includes 16 freely assignable customer keys
- Feedrate control with feedrate/rapid traverse override (rotary switch with 23 positions)
- Key-operated switch (four positions and three different keys)

Key type:

- Membrane keys

Interfaces:

- PROFINET
- Industrial Ethernet
- 9 inputs/6 outputs for 9 control devices (additional cable set required for control devices)
- For 16 direct keys of the OP 012/OP 015A/OP 019 (connecting cable (850 mm (2.79 ft)) included in scope of supply)
- For 2 handwheels

Expansion options:

- 6 slots for control devices (d = 16 mm/0.63 in)
- 1 slot for emergency stop button or rotary override switch (up to d = 22 mm/0.87 in)

Integration

The SINUMERIK MCP 310 PN machine control panel can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-0AF23-1AA1
Product brand name	SINUMERIK
Product type designation	MCP 310 PN machine control panel
Supply voltage at DC	24 V
Active power consumption maximum	21.2 W
Transmission link to the NCU/PCU maximum	100 m (109.36133 yd)
Degree of protection	
• front	IP65
• rear	IP00
• Note	Key-operated switch IP54
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	175 mm (6.88976 in)
Depth	85.2 mm (3.35433 in)
• Note	With connector for handwheel connection
Installation depth	53.9 mm (2.12205 in)
• Note	With connector for handwheel connection
Mounting surface	
• section width	285 mm (11.22047 in)
• section height	155 mm (6.10236 in)
Net weight	1.2 kg (2.64555 lb (avoirdupois))
Certificate of suitability	CE, cULus

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Selection and ordering data

Description	Article No.
SINUMERIK MCP 310 PN machine control panel PROFINET/Industrial Ethernet Width 310 mm (12.2 in), with membrane keys	**6FC5303-0AF23-1AA1**
Accessories	
Slide-in labels for inscribing 3 A4 sheets	**6FC5248-0AF23-1AA0**
Emergency stop mushroom pushbutton, 22 mm (0.87 in) Round, plastic, red, 40 mm (1.57 in), positive latching, rotate-to-unlatch mechanism, complete with holder	**3SB3000-1HA20**
Contact block with 2 contacts 1 NO + 1 NC, 2-pin screw terminal	**3SB3400-0A**
Key-operated switch with key For SINUMERIK MCP 6FC5303-0AF22-1AA1 6FC5303-0AF23-1AA1	**6FC5247-0AF02-0AA0**

Description	Article No.
Accessories *(continued)*	
Spindle/rapid traverse override electronic rotary switch 1 × 16G, T=24, cap, button, pointer, and rapid traverse and spindle dials[1)]	**6FC5247-0AF12-1AA0**
Feedrate/rapid traverse override electronic rotary switch 1 × 23G, T=32, cap, button, pointer, and rapid traverse and feedrate dials[1)]	**6FC5247-0AF13-1AA0**
Cable set (1 set = 60 units) For additional machine control panel control devices Length 500 mm (19.69 in)	**6FC5247-0AA35-0AA0**
Signal cable, pre-assembled For connection of electronic handwheel Length max. 25 m (82.03 ft) [2)]	6FX8002-2CP00-….

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

1) 16G: Latching at position 16; T=24: 24 positions for 360°
23G: Latching at position 23; T=32: 32 positions for 360°

2) For complete Article No. and length code, see MOTION-CONNECT connection systems.

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Overview



The SINUMERIK MCP 483C PN machine control panel permits user-friendly operation of the machine functions. It is suitable for machine-level operation of milling, turning, grinding and special machines.

Apart from PROFINET functionality, SINUMERIK MCP 483C PN also has complete Industrial Ethernet functionality. The network technology can be switched using DIP switches.

All keys are designed with replaceable key covers for machine-specific adaptations. The key covers can be freely inscribed using laser. Transparent key covers can be used as an alternative.

The machine control panel is mounted from the rear using special clamps supplied with the panel.

Design

Operator controls:

- Mode selectors and function keys
  - 50 keys with LEDs
  - Direction keys for milling machines with rapid traverse override (key covers for direction keys for turning machines are supplied in the accessories pack)
- Spindle control with spindle override (rotary switch with 16 positions)
- Feedrate control with feedrate/rapid traverse override (rotary switch with 23 positions)
- Key-operated switch (four positions and three different keys)
- Emergency stop pushbutton (2 × (1 NO + 1 NC))

Key type:

- Mechanical keys

Interfaces:

- PROFINET
- Industrial Ethernet
- 9 inputs/6 outputs for 9 control devices (additional cable set required for control devices)
- For 2 handwheels

Expansion options:

- 2 slots for control devices (*d* = 16 mm/0.63 in)

Integration

The SINUMERIK MCP 483C PN machine control panel can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-0AF22-0AA1
Product brand name	SINUMERIK
Product type designation	MCP 483C PN machine control panel
Supply voltage at DC	24 V
Active power consumption maximum	21.2 W
Transmission link to the NCU/PCU maximum	100 m (109.36133 yd)
Degree of protection	
• front	IP54
• rear	IP00
• Note	Mounting frame IP65
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	155 mm (6.10236 in)
Depth	106.3 mm (4.18504 in)
• Note	With connector for handwheel connection
Installation depth	54.5 mm (2.14567 in)
• Note	With connector for handwheel connection
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	135 mm (5.31496 in)
Net weight	2 kg (4.40925 lb (avoirdupois))
Certificate of suitability	CE, cULus

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Selection and ordering data

Description	Article No.
SINUMERIK MCP 483C PN machine control panel PROFINET/Industrial Ethernet, width 19", with mechanical keys, emergency stop button 22 mm (0.87 in)	**6FC5303-0AF22-0AA1**
Accessories	
Square key cover, for labeling 1 set comprising of: 90 × ergo gray, 20 × mid-gray, 20 × red, 20 × yellow, 20 × green	**6FC5248-0AF12-0AA0**
Square key cover, for labeling 90 × transparent	**6FC5248-0AF21-0AA0**
Set of key caps SINUMERIK key covers, square, for inscription	
• 500 × ergo gray (light basic)	**6FC5348-0AF00-0AA0**
• 500 × mid-gray (medium basic)	**6FC5348-0AF01-0AA0**
Emergency stop mushroom pushbutton, 22 mm (0.87 in) Round, plastic, red, 40 mm (1.57 in), positive latching, rotate-to-unlatch mechanism, complete with holder	**3SB3000-1HA20**

Description	Article No.
Accessories *(continued)*	
Contact block with 2 contacts 1 NO + 1 NC, 2-pin, screw terminal	**3SB3400-0A**
Rapid traverse dial (1 set = 20 units) for MCP 483C 16-position rotary switch	**6FC5248-0AF30-0AA0**
Spindle/rapid traverse override electronic rotary switch 1 × 16G, T=24, cap, button, pointer, and rapid traverse and spindle dials[1)]	**6FC5247-0AF12-1AA0**
Feedrate/rapid traverse override electronic rotary switch 1 × 23G, T=32, cap, button, pointer, and rapid traverse and feedrate dials[1)]	**6FC5247-0AF13-1AA0**
Cable set (1 set = 60 units) For additional machine control panel control devices Length 500 mm (19.69 in)	**6FC5247-0AA35-0AA0**

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

1) 16G: Latching at position 16; T=24: 24 positions for 360°
23G: Latching at position 23; T=32: 32 positions for 360°

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Overview



The SINUMERIK MCP 483 PN machine control panel with membrane keys is designed to permit user-friendly, well-structured operation of the machine functions. It is suitable for machine-level operation of milling and turning machines, and particularly grinding machines.

Apart from PROFINET functionality, SINUMERIK MCP 483 PN also has complete Industrial Ethernet functionality. The network technology can be changed over using DIP switches.

46 keys and both control device slots are equipped with user-inscribed slide-in labels for adapting to specific machines. An A4 sheet (for laser printers) for inscribing the slide-in labels is included in the scope of supply.

A connecting cable is included in the scope of supply for connecting the direct keys of the SINUMERIK operator panel fronts OP 012/OP 015A/OP 019.

The machine control panel is mounted from the rear using special clamps supplied with the panel.

Design

Operator controls:

- Mode selectors and function keys
  - 50 keys with LEDs
  - Direction keys for milling machines with rapid traverse override
  - Default key assignment includes 17 freely assignable customer keys
- Spindle control with spindle override (rotary switch with 16 positions)
- Feedrate control with feedrate/rapid traverse override (rotary switch with 23 positions)
- Key-operated switch (four positions and three different keys)
- Emergency stop button (2 × (1 NO + 1 NC))

Key type:

- Membrane keys

Interfaces:

- PROFINET
- Industrial Ethernet
- 9 inputs/6 outputs for 9 control devices (additional cable set required for control devices)
- For 16 direct keys of the OP 012/OP 015A/OP 019 (connecting cable (850 mm (2.79 ft)) included in scope of supply)
- For 2 handwheels

Expansion option:

- 2 slots for control devices (*d* = 16 mm/0.63 in)

Integration

The SINUMERIK MCP 483 PN machine control panel can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-0AF22-1AA1
Product brand name	SINUMERIK
Product type designation	MCP 483 PN machine control panel
Supply voltage at DC	24 V
Active power consumption maximum	21.2 W
Transmission link to the NCU/PCU maximum	100 m (109.36133 yd)
Degree of protection	
• front	IP54
• rear	IP00
• Note	Mounting frame IP65
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	155 mm (6.10236 in)
Depth	106.7 mm (4.20079 in)
• Note	With connector for handwheel connection
Installation depth	53.9 mm (2.12205 in)
• Note	With connector for handwheel connection
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	135 mm (5.31496 in)
Net weight	1.6 kg (3.5274 lb (avoirdupois))
Certificate of suitability	CE, cULus

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Selection and ordering data

Description	Article No.
SINUMERIK MCP 483 PN machine control panel PROFINET/Industrial Ethernet Width 19", with membrane keys, emergency stop button 22 mm (0.87 in)	**6FC5303-0AF22-1AA1**
Accessories	
Slide-in labels for inscribing 3 A4 sheets	**6FC5248-0AF22-1AA1**
Emergency stop mushroom pushbutton, 22 mm (0.87 in) Round, plastic, red, 40 mm (1.57 in), positive latching, rotate-to-unlatch mechanism, complete with holder	**3SB3000-1HA20**
Contact block with 2 contacts 1 NO + 1 NC, 2-pin screw terminal	**3SB3400-0A**
Key-operated switch with key For SINUMERIK MCP 6FC5303-0AF22-1AA1 6FC5303-0AF23-1AA1	**6FC5247-0AF02-0AA0**

Description	Article No.
Accessories *(continued)*	
Spindle/rapid traverse override electronic rotary switch 1 × 16G, T=24, cap, button, pointer, and rapid traverse and spindle dials[1)]	**6FC5247-0AF12-1AA0**
Feedrate/rapid traverse override electronic rotary switch 1 × 23G, T=32, cap, button, pointer, and rapid traverse and feedrate dials[1)]	**6FC5247-0AF13-1AA0**
Cable set (1 set = 60 units) For additional machine control panel control devices Length 500 mm (19.69 in)	**6FC5247-0AA35-0AA0**
Signal cable, pre-assembled For connection of electronic handwheel Length max. 25 m (82.03 ft) [2)]	6FX8002-2CP00-....

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

1) 16G: Latching at position 16; T=24: 24 positions for 360°
23G: Latching at position 23; T=32: 32 positions for 360°

2) For complete Article No. and length code, see MOTION-CONNECT connection systems.

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Overview



The SINUMERIK MPP 310 IEH Machine Push Button Panel for Industrial Ethernet with a port for a handheld terminal has 8 large, long-stroke keys for easy machine operation and a membrane keyboard for powerful setup functions. The SINUMERIK MPP 310 IEH is ideally suited as a supplement to the SINUMERIK OP 08T operator panel front.

The SINUMERIK MPP 310 IEH is suitable for the use with various machines, wherever maximum ergonomics and operation flexibility are required.

An A4 sheet for laser printers for inscribing the slide-in labels plus a set of colored key caps are included in the scope of supply.

The Machine Push Button Panel is mounted from the rear using special clamps supplied with the panel.

Design

- Spindle override
- Feedrate override
- 8 customer keys (long-stroke keys, Schlegel) with LED, slide-in labels
- Blank cover for retrofit of Electronic Key System EKS (Euchner)
- 25 function keys with LEDs (membrane keys), slide-in labels
- With port for SINUMERIK HT 2/HT 8 handheld terminals
- Emergency stop override key
- Emergency stop button
- 4 extension keys (3SU1 keys) with LED, slide-in labels

Integration

The SINUMERIK MPP 310 IEH Machine Push Button Panel can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-1AF20-8AA1
Product brand name	SINUMERIK
Product type designation	MPP 310 IEH Machine Push Button Panel
Product property	With port for SINUMERIK HT 2/ HT 8 handheld terminals
Supply voltage at DC	24 V
Active power consumption maximum	25 W
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	295 mm (11.61417 in)
Depth	200 mm (7.87402 in)
• Note	With connector for handwheel connection
Installation depth	140 mm (5.51181 in)
• Note	Without connector for handwheel connection 105 mm (4.13 in)
Mounting surface	
• section width	278.5 mm (10.96457 in)
• section height	276.5 mm (10.88583 in)
Net weight	3 kg (6.61387 lb (avoirdupois))
Certificate of suitability	CE, UL

Selection and ordering data

Description	Article No.
SINUMERIK MPP 310 IEH Machine Push Button Panel With port for SINUMERIK HT 2/HT 8	**6FC5303-1AF20-8AA1**

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

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Overview



The SINUMERIK MPP 483 IE/MPP 483 IEH Machine Push Button Panels for Industrial Ethernet are available as an expansion to SINUMERIK and PLC-controlled machines. Their modular design and ergonomically arranged operator controls facilitate and simplify operation.

The SINUMERIK MPPs provide large, long-stroke keys for easy machine operation as well as a membrane keyboard for powerful set-up functions.

Tuned to the requirements of the powertrain sector, the SINUMERIK MPP 483 IE/MPP 483 IEH are suitable for use with many different types of machine wherever ergonomics and operating flexibility are priorities. An A4 sheet for laser printers for inscribing the slide-in labels plus a set of colored key caps are included in the scope of supply.

The Machine Push Button Panels are mounted from the rear using special clamps supplied with the panel.

Design

The basic versions of the SINUMERIK MPP 483 IE/MPP 483 IEH Machine Push Button Panels provide:

- Emergency stop button (4-wire), latching, tamper-proof
- 8 equipped illuminated pushbuttons for operator controls (d = 22.5 mm/0.89 in)
- 2 blanking plugs for easy retrofitting
- 25 function keys with inscribed standard slide-in labels (membrane keys)
- Key switches with 2 positions for bridging the emergency stop circuit and for authorization of mode selection
- Direct key connection for SINUMERIK OP 012/OP 015A/ OP 019, incl. ribbon cable
- Feedrate override
- Interfaces for 2 handwheels when connected via Industrial Ethernet (function depends on CNC software)
- Communication via Industrial Ethernet
- 1 port for SINUMERIK HT 2/HT 8 handheld terminals (only with SINUMERIK MPP 483 IEH)

Expansion options:

- 2 spare slots (d = 22.5 mm/0.89 in)
- Spindle override
- Individual adaptation of colors and labels on membrane and long-stroke keys. As a general rule, all keys can be freely assigned and inscribed.

Special versions:

- SINUMERIK MPP 483 IE-S../MPP 483 IEH-S..:
  These special versions with virtually unlimited configuration options combining various operator controls and options are available, for example, with the EKS identification system (Euchner Key System).
- SINUMERIK MPP 483 IE-L/MPP 483 IEH-L:
  This special Large version is characterized by a higher masking frame (244 mm/9.61 in) that offers additional mounting space as an integrated expansion panel.

Integration

SINUMERIK Machine Push Button Panels MPP 483 IE/ MPP 483 IEH can be used for:

- SINUMERIK 840D sl

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Technical specifications

Article No.		6FC5303-1AF10-0AA0	6FC5303-1AF10-8AA0
Product brand name		SINUMERIK	SINUMERIK
Product type designation		MPP 483 IE Machine Push Button Panel	MPP 483 IEH Machine Push Button Panel
Product property		–	With port for SINUMERIK HT 2/HT 8 handheld terminals
Supply voltage at DC	V	24	24
Active power consumption maximum	W	25	35
Degree of protection			
• front		IP54	IP54
• rear		IP10A	IP10A
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	5 ... 95	5 ... 95
Ambient temperature, during			
• storage	°C (°F)	-25 ... +55 (-13 ... +131)	-25 ... +55 (-13 ... +131)
• transport	°C (°F)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation			
- front	°C (°F)	0 ... 45 (32 ... 113)	0 ... 45 (32 ... 113)
- rear	°C (°F)	0 ... 55 (32 ... 131)	0 ... 55 (32 ... 131)
Width	mm (in)	483 (19.01575)	483 (19.01575)
Height	mm (in)	155 (6.10236)	155 (6.10236)
Depth	mm (in)	165 (6.49606)	200 (7.87402)
• Note		–	With connector for handwheel connection
Installation depth	mm (in)	105 (4.13386)	140 (5.51181)
• Note		–	Without connector for handwheel connection 105 mm (4.13 in)
Mounting surface			
• section width	mm (in)	451 (17.75591)	451 (17.75591)
• section height	mm (in)	137.6 (5.41732)	137.6 (5.41732)
Net weight	kg (lb (avoir-dupois))	3 (6.61387)	3 (6.61387)
Certificate of suitability		CE, UL	CE, UL

Selection and ordering data

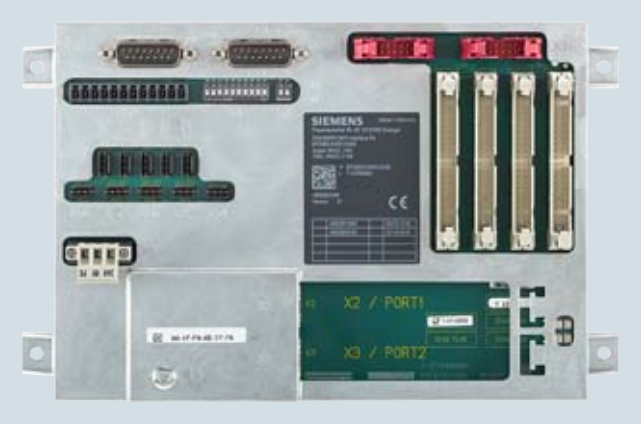
Description	Article No.
SINUMERIK MPP 483 IE Machine Push Button Panel	**6FC5303-1AF10-0AA0**
SINUMERIK MPP 483 IEH Machine Push Button Panel With port for SINUMERIK HT 2/HT 8	**6FC5303-1AF10-8AA0**

For Ethernet or PROFINET ordering data, see Industrial Ethernet Switches – SCALANCE.

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SINUMERIK MCP Interface PN

Overview



The SINUMERIK MCP Interface PN enables customer-specific machine control panels to be connected via PROFINET.

On the SINUMERIK MCP Interface PN, digital inputs, outputs, connections for override rotary switches and handwheels are provided as well as two Industrial Ethernet interfaces for communication.

Design

You can connect the following operator controls to the SINUMERIK MCP Interface PN:

- 80 single keys
- 64 LEDs
- 1 handwheel
- 2 override switches

The following inputs/outputs are also available:

- 9 digital inputs (5 V)
- 6 digital inputs (24 V)
- 15 digital outputs (24 V/each 0.15 A)

Integration

The SINUMERIK MCP Interface PN can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5303-0AF03-0AA0
Product brand name	SINUMERIK
Product type designation	MCP Interface PN
Supply voltage at DC	24 V
Active power consumption maximum	62.4 W
• Note	Of all connectable operator controls, intrinsic consumption 2.4 W
Degree of protection	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	242 mm (9.52756 in)
Height	152 mm (5.98425 in)
Depth	36 mm (1.41732 in)
Net weight	0.557 kg (1.22798 lb (avoirdupois))
Certificate of suitability	CE, cULus, EAC

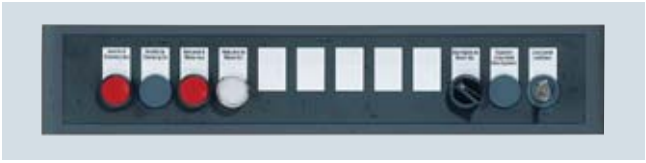
Selection and ordering data

Description	Article No.
SINUMERIK MCP Interface PN For connecting to customized machine control panels over PROFINET	**6FC5303-0AF03-0AA0**
Accessories	
Feedrate/rapid traverse override electronic rotary switch 1 × 23G, T=32, cap, button, pointer, and rapid traverse and feedrate dials[1)]	**6FC5247-0AF13-1AA0**
Spindle/rapid traverse override electronic rotary switch 1 × 16G, T=24, cap, button, pointer, and rapid traverse and spindle dials[2)]	**6FC5247-0AF12-1AA00**
Cable set (1 set = 60 units) For additional control devices Length: 500 mm (19.69 in)	**6FC5247-0AA35-0AA0**

1) 23G: Latching at position 23; T=32: 32 positions for 360°
2) 16G: Latching at position 16; T=24: 24 positions for 360°

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Overview



The SINUMERIK expansion panel is used to install up to 12 additional operator controls, e.g. pushbuttons, indicator lights, and key switches, as an expansion to a Machine Push Button Panel or a machine control panel, or to expand the free inputs/outputs of a machine control panel.
The expansion panel has rounded edges in conformance with the design of the SINUMERIK operator panels.

The expansion panel is mounted from the rear using special clamps supplied with the panel.

Design

The expansion panel is 19" wide, and can accommodate up to twelve 22 mm (0.87 in) operator controls of any type.

The 12 slots are pre-punched and can be easily broken out as required. Panels with customized complements can also be provided on request. Inscriptions are made on 2 slide-in labeling strips which are inserted from the rear.

For add-on operator controls, see also the special versions of SINUMERIK MPP 483.

Technical specifications

Article No.	6FC5247-0AA43-1AA0
Product brand name	SINUMERIK
Product type designation	Expansion panel for MCP 483/MPP 483
Supply voltage at DC	24 V
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	95 mm (3.74016 in)
Depth	31 mm (1.22047 in)
Mounting surface	
• section width	451 mm (17.75591 in)
• section height	77.6 mm (3.05512 in)
Net weight	0.5 kg (1.10231 lb (avoirdupois))

Selection and ordering data

Description	Article No.
SINUMERIK expansion panel for MCP 483/MPP 483 Width 19" with 12 slots for 22 mm (0.87 in) operator controls, not equipped	**6FC5247-0AA43-1AA0**

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SIRIUS ACT 3SU1

Overview

Innovative technology, simple installation

SIRIUS ACT 3SU1 is our modular, tried-and-tested complete range of pushbuttons and indicator lights in round version. Whether plastic or metal - we can supply the ideal solution for any application.

Your benefit: SIRIUS ACT 3SU1 products are quick and easy to install - and are dependable in operation.



Benefits

- Emergency stop with reliable direct connection to AS-Interface
- SIRIUS ACT 3SU1 control devices in plastic and metal for the world market
- Rugged metal control devices: IP67 degree of protection/NEMA 4
- Cost-effective and uniquely identifiable with integral super-bright LED
- Various connection possibilities: screw-type, solder pin or spring-loaded terminals

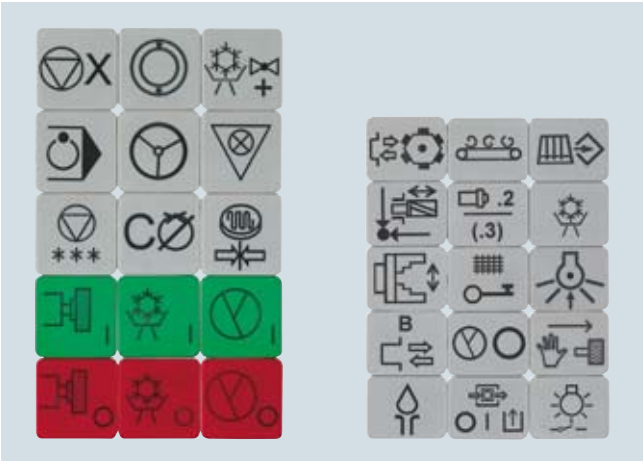
More information

You can find further information in the Catalog IC 10 or Siemens Industry Mall.

www.siemens.com/industrymall

Laser inscription

Overview



High-quality, individual inscription of the mechanical keys on SINUMERIK machine control panels with special symbols required by the customer is easy using lasers.

Laser inscription is possible on all materials in principle and can therefore be used for permanent and reliable identification, also for special keys in the case of SINUMERIK machine control panels.

The quality of laser inscribed products is significantly higher than conventional inscription techniques.

Benefits

- Maximum precision
- Long service life
- Professional key design enhances the ergonomics and appearance of the machine tool

More information

For professional advice and solutions regarding laser-inscribed, mechanical key caps/key symbols for the SINUMERIK machine control panels, please contact:

LASERline Teschauer GmbH

Max-Planck-Straße 22b
09114 CHEMNITZ
GERMANY

Tel.: +49 371 3301057
Fax: +49 371 3301058
E-mail: laserline@teschauer.de
Internet: www.teschauer.de

CoReKu

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Tel.: +49 37608 128-0
Fax: +49 37608 128-20
E-mail: kontakt@coreku.de
Internet: www.coreku.de

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KBPC CG US standard PC keyboard

Overview



Programs and texts can be edited easily with the SINUMERIK KBPC CG US standard PC keyboard.

The standard PC keyboard is not suitable for industrial use (EMC) and should not be used as a permanent installation. It may be used only for servicing and commissioning.

Integration

The SINUMERIK KBPC CG US standard PC keyboard can be used for:

- SINUMERIK 840D sl with SINUMERIK PCU 50.5 Windows 7

The SINUMERIK standard PC keyboard cannot be used in conjunction with the SINUMERIK full CNC keyboard.

Technical specifications

Article No.	6FC5203-0AC01-3AA0
Product brand name	SINUMERIK
Product type designation	KBPC CG US standard PC keyboard
Supply voltage at DC	5.25 V
Active power consumption maximum	0.1 W
Transmission link to the NCU/PCU maximum	3 m (9.84252 ft)
Degree of protection	IP20
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Ambient temperature, during	
• storage	-20 ... +60 °C (-4 ... +140 °F)
• transport	-20 ... +60 °C (-4 ... +140 °F)
• operation	0 ... 50 °C (32 ... 122 °F)
Width	405 mm (15.94488 in)
Height	44 mm (1.73228 in)
Depth	180 mm (7.08661 in)
Net weight	1.3 kg (2.86601 lb (avoirdupois))
Certificate of suitability	CE, cURus, C-Tick (RCM), FCC, GS

Selection and ordering data

Description	Article No.
SINUMERIK KBPC CG US standard PC keyboard MF-II compatible, 104 key layout, connection: USB, incl. connecting cable, length: 1.7 m (5.58 ft)	**6FC5203-0AC01-3AA0**

Keyboard tray

Overview



This extremely stable 19" keyboard tray in anthracite facilitates your work when using a standard external keyboard with an operator panel.

Special screws permit easy attachment of the keyboard tray, and equally easy removal after the work is finished.

If required, a version with an additional removable tray for a mouse is also available.

Technical specifications

Article No.	6FC5247-0AA40-0AA0
Product brand name	SINUMERIK
Product type designation	Keyboard tray
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Width	487 mm (19.17323 in)
Depth	196 mm (7.71654 in)
Net weight	1.6 kg (3.5274 lb (avoirdupois))
Certificate of suitability	CE

Selection and ordering data

Description	Article No.
Keyboard tray For keyboard, incl. 2 collar screws	**6FC5247-0AA40-0AA0**

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SINUMERIK KB 310C

Overview



The SINUMERIK KB 310C full CNC keyboard permits user-friendly input of programs and text.

The keyboard is mounted from the rear using special clamps supplied with the keyboard.

Design

Operator controls:

- Standard/US QWERTY layout
- 75 mechanical keys
- Alpha block with special characters
- Numeric block with special characters
- Cursor block
- CNC function keys with hot keys for fast selection of the control area

Interface:

- USB 1.1

Integration

The SINUMERIK KB 310C full CNC keyboard can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5203-0AF21-0AA1
Product brand name	SINUMERIK
Product type designation	KB 310C full CNC keyboard
Supply voltage at DC	5.25 V
Active power consumption maximum	0.4 W
Transmission link to the NCU/PCU maximum	3 m (9.84252 ft)
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	310 mm (12.20472 in)
Height	175 mm (6.88976 in)
Depth	31 mm (1.22047 in)
Mounting surface	
• section width	285 mm (11.22047 in)
• section height	155 mm (6.10236 in)
Net weight	0.9 kg (1.98416 lb (avoirdupois))
Certificate of suitability	CE

Selection and ordering data

Description	Article No.
SINUMERIK KB 310C full CNC keyboard Width 310 mm (12.2"), connection USB 1.1, with mechanical keys, incl. connecting cable Length 1.5 m (4.92 ft)	**6FC5203-0AF21-0AA1**

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Overview



The SINUMERIK KB 483C full CNC keyboard permits user-friendly input of programs and text.

The keyboard is mounted from the rear using special clamps supplied with the keyboard.

Design

Operator controls:

- Standard/US QWERTY layout
- 78 mechanical keys
- Alpha block with special characters
- Numeric block with special characters
- Cursor block
- CNC function keys with hot keys for fast selection of the control area

Interface:

- USB 1.1

Integration

The SINUMERIK KB 483C full CNC keyboard can be used for:

- SINUMERIK 840D sl

Technical specifications

Article No.	6FC5203-0AF20-0AA1
Product brand name	SINUMERIK
Product type designation	KB 483C full CNC keyboard
Supply voltage at DC	5.25 V
Active power consumption maximum	0.4 W
Transmission link to the NCU/PCU maximum	3 m (9.84252 ft)
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 95 %
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	483 mm (19.01575 in)
Height	133 mm (5.23622 in)
Depth	31 mm (1.22047 in)
Mounting surface	
• section width	450 mm (17.71654 in)
• section height	112.5 mm (4.42913 in)
Net weight	1.3 kg (2.86601 lb (avoirdupois))
Certificate of suitability	CE

Selection and ordering data

Description	Article No.
SINUMERIK KB 483C full CNC keyboard Width 19", connection USB 1.1, with mechanical keys, incl. connecting cable Length 1.5 m (4.92 ft)	**6FC5203-0AF20-0AA1**

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DEMMEL – Full CNC keyboards

Overview



The full CNC membrane keyboards supplied by DEMMEL AG in Siemens design permit user-friendly input of programs and text.

The full CNC keyboards are mounted from the rear using special clamps supplied with the keyboard.

Design

Operator controls:

- Standard/US QWERTY layout
- Membrane keyboard with 78 keys (QWERTY 483)
- Membrane keyboard with 75 keys (QWERTY 310)
- Alpha block with special characters
- Numeric block with special characters
- Cursor block
- CNC function keys with hotkeys for fast selection of the control area

Interface:

- USB 1.1

Integration

Membrane keyboards from DEMMEL AG can be used for:

- SINUMERIK 840D sl

Technical specifications

Product type designation	DEMMEL AG full CNC membrane keyboards
Supply voltage at DC	5.25 V
Active power consumption, maximum	0.4 W
Degree of protection	
• front	IP65
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F)
Ambient temperature, during	
• storage	-25 ... +55 °C (-13 ... +131 °F)
• transport	-40 ... +70 °C (-40 ... +158 °F)
• operation	
- front	0 ... 45 °C (32 ... 113 °F)
- rear	0 ... 55 °C (32 ... 131 °F)
Width	
• QWERTY 483	483 mm (19.02 in)
• QWERTY 310	310 mm (12.20 in)
Height	
• QWERTY 483	133 mm (5.24 in)
• QWERTY 310	175 mm (6.89 in)
Depth	31 mm (1.22 in)
Mounting surface	
• section width	
- QWERTY 483	451 mm (17.76 in)
- QWERTY 310	278.4 mm (10.96 in)
• section height	
- QWERTY 483	115.1 mm (4.53 in)
- QWERTY 310	157.6 mm (6.20 in)
Net weight	
• QWERTY 483	1.3 kg (2.87 lb)
• QWERTY 310	1.1 kg (2.43 lb)
Certificate of suitability	CE

More information

DEMMEL AG is famous for developing innovative, customized operating systems. We are experts in solving human-machine communication problems. Are you looking for solutions?
We can help!

DEMMEL AG

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Overview



The SINUMERIK card reader for CF/SD/MMC storage media is suitable for archiving user data and can be installed in front panels. The connection is made via a USB interface.

Function

The SINUMERIK card reader is suitable for CF, SD and MMC cards and is provided for archiving and exchange of user data (SD cards with up to max. 2 GB capacity).

Since the reader can be installed in front panels, data can be exchanged without opening the control cabinet door.

The card reader can be booted. Cards can be inserted and removed during operation.

Integration

The SINUMERIK card reader for CF/SD/MMC memory media can be connected to:

- SINUMERIK PCU 50.5 Windows 7
- SINUMERIK TCU 30.2 (CompactFlash card only)

Technical specifications

Article No.	6FC5335-0AA00-0AA0
Product brand name	SINUMERIK
Product type designation	Card reader USB 2.0 for CF/SD/MMC memory media
Supply voltage at DC	5.25 V
Degree of protection	
• front	IP54
• rear	IP00
Environmental category acc. to IEC 60721-3-3	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during	
• storage	5 ... 95 %
• transport	5 ... 95 %
• operation	5 ... 90 %
Ambient temperature, during	
• storage	-20 ... +85 °C (-4 ... +185 °F)
• transport	-20 ... +85 °C (-4 ... +185 °F)
• operation	0 ... 70 °C (32 ... 158 °F)
Width	145 mm (5.70866 in)
Height	50 mm (1.9685 in)
Depth	143 mm (5.62992 in)
Installation depth	125 mm (4.92126 in)
Net weight	400 g (14.10959 oz)
Certificate of suitability	CE, cULus

Selection and ordering data

Description	Article No.
SINUMERIK card reader USB 2.0 For storage media CF/SD/MMC with USB connection 2.0 incl. connecting cable length 1 m (3.28 ft)	**6FC5335-0AA00-0AA0**
Accessories	
CompactFlash card Empty memory card	
• 2 GB	**6FC5313-5AG00-0AA2**
• 8 GB	**6FC5313-6AG00-0AA0**

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CompactFlash card

Overview



The CompactFlash card is used to store user data.

Integration

The CompactFlash card is suitable for:

- SINUMERIK 840D sl:
  Additional memory for user data in the SINUMERIK PCU 50.5 Windows 7

Selection and ordering data

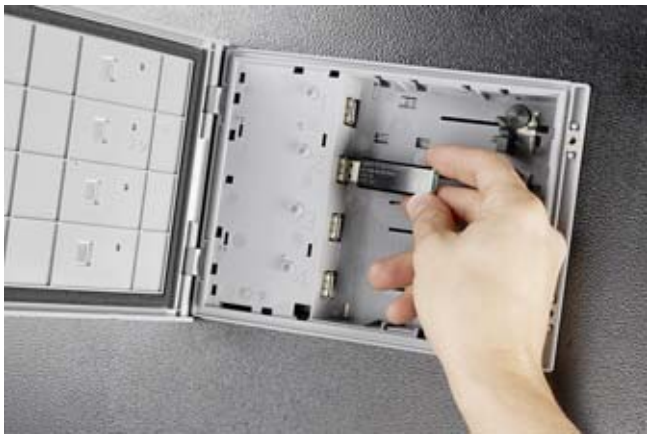
Description	Article No.
CompactFlash card Empty memory card	
• 2 GB	**6FC5313-5AG00-0AA2**
• 8 GB	**6FC5313-6AG00-0AA0**

Technical specifications

Article No.		6FC5313-5AG00-0AA2	6FC5313-6AG00-0AA0
Product brand name		SINUMERIK	SINUMERIK
Product type designation		CompactFlash card	CompactFlash card
Type of memory card		CompactFlash card	CompactFlash card
Storage capacity of memory card	GB	2	8
Supply voltage at DC	V	5.5	5.5
Degree of protection		IP20	IP20
Environmental category acc. to IEC 60721-3-3		Condensation and icing excluded. Low air temperature 0 °C (32 °F).	Condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity at 25 °C (77 °F), during			
• storage	%	5 ... 95	5 ... 95
• transport	%	5 ... 95	5 ... 95
• operation	%	10 ... 80	10 ... 80
Ambient temperature, during			
• storage	°C (°F)	-40 ... +100 (-40 ... +212)	-40 ... +100 (-40 ... +212)
• transport	°C (°F)	-40 ... +100 (-40 ... +212)	-40 ... +100 (-40 ... +212)
• operation	°C (°F)	0 ... 85 (32 ... 185)	0 ... 85 (32 ... 185)
Width	mm (in)	43 (1.69291)	43 (1.69291)
Height	mm (in)	3 (0.11811)	3 (0.11811)
Depth	mm (in)	37 (1.45669)	37 (1.45669)
Net weight	g (oz)	12 (0.42329)	12 (0.42329)
Certificate of suitability		CE, cULus	CE, cULus

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Overview



The Industrial USB Hub 4 is used to connect I/O devices to SINUMERIK PCU 50.5 Windows 7.

USB peripherals can be connected to the operator component and operated via the Industrial USB Hub 4 without opening the cabinet door.

Compared with conventional USB hubs, the Industrial USB Hub 4 is also suitable for use in a severe industrial environment on account of its degree of protection IP65.

Benefits

- Inspection window for each interface
- Vibration-proof latching of connected USB cables and USB flash drive
- One LED per interface for checking the data traffic
- Sufficient interior space for easy insertion and removal of USB plugs and USB flash drives
- Can be installed in a control cabinet or on a standard rail

Application

The Industrial USB Hub 4 enables up to 4 I/O devices, such as USB flash drive and USB floppy disk drive, USB card reader, etc., to be connected simultaneously to the operator components. The cabinet door no longer has to be opened in order to connect the I/O devices, which increases the availability of the system operated. Continuous operation of the operator component is therefore possible.

Integration

The Industrial USB Hub 4 is suitable for connection to:

- SINUMERIK PCU 50.5 Windows 7

Der Industrial USB hub 4 is released for the Windows CE/2000/XP/Windows 7 operating systems. The appropriate drivers are supplied with the operating system software.

Technical specifications

Article No.	6AV6671-3AH00-0AX0
Product type designation	Industrial USB Hub 4
Supply voltage at DC	24 V
• Tolerance	20.4 ... 28.8 V
Number of interfaces acc. to USB	4
• Note	Type USB 2.0, 500 mA each; e.g. connection of mouse, keyboard, printer, USB stick, USB IPC flash drive
Mounting type	Standard DIN rail
Degree of protection	
• front	IP65
• rear	IP20
Relative humidity during operation, maximum	90 %
Ambient temperature during storage and transport	-20 ... +60 °C (-4 ... +140 °F)
Operating temperature in landscape format in vertical mounting position	0 ... 50 °C (32 ... 122 °F)
Width	212 mm (8.34646 in)
Height	156 mm (6.14173 in)
Installation depth	50 mm (1.9685 in)
Net weight	460 g (16.22602 oz)
Certificate of suitability	CE, cULus, C-Tick (RCM)

Selection and ordering data

Description	Article No.
Industrial USB Hub 4 With 4 USB 2.0 interfaces, Degree of protection IP65	**6AV6671-3AH00-0AX0**

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SIMATIC IPC USB flash drive

Overview



The SIMATIC IPC USB flash drive is the ideal mobile storage medium. Thanks to the rugged and ultra-compact construction in a metal enclosure, fast data transfer (USB 2.0) and the high memory capacity of 8 GB, the USB flash drive offers optimum values for use in industrial applications. It can be used to replace floppy disks or CD-ROMs as data storage and it is supplied with boot capability.

Benefits

- 2 USB flash drives can be plugged into the SIMATIC PC/SINUMERIK PCU 50.5 Windows 7 one above the other.
- Suitable for use in industrial environments thanks to the metal enclosure
- Faultless operation (system test) with SIMATIC PC/PG (hardware and software)/SINUMERIK PCU 50.5 Windows 7
- Automation License Manager V2.0 can be installed.

Application

The SIMATIC IPC USB flash drive is the fastest and simplest method for saving data (e.g. recipes, configuration data, user data) and transporting them easily from one place to another, or it can be used as a boot medium, e.g. for SIMATIC PC BIOS Manager, SIMATIC PC Image Creator, or SINUMERIK PCU 50.5 Windows 7.

Function

- Formatted for boot capability incl. preinstalled operating system (FreeDOS) for use as a boot medium, e.g. for SIMATIC PC Image Creator
- High performance for faster data transfer – USB 2.0 high-speed
- High memory capacity of 8 GB
- Simple installation – plug and play, no drivers necessary
- High degree of data security thanks to write protection switch
- Status LED for data transfer and operating state
- SIMATIC BIOS Manager, a software tool for SIMATIC PCs for testing and duplication of BIOS setup settings (CMOS data) included in the scope of supply
- No external power supply necessary

Integration

The SIMATIC IPC USB flash drive is suitable for:

- SINUMERIK PCU 50.5 Windows 7

Technical specifications

Article No.	6ES7648-0DC50-0AA0
Product type designation	SIMATIC IPC USB flash drive, boot capability, 8 GB
Type of electrical connection	USB 2.0
Write protection	No
Storage capacity of the memory can be used	8 GB
Supply voltage at DC	5.5 V
Consumed current	60 mA
Relative humidity during operation maximum	85 %
Ambient temperature, during	
• storage and transport	-10 ... +85 °C (14 ... +185 °F)
• operation	-10 ... +85 °C (14 ... +185 °F)
Width	16.7 mm (0.65748 in)
Height	59.1 mm (2.32677 in)
Thickness	7 mm (0.27559 in)
Net weight	12 g (0.42329 oz)
Certificate of suitability	CE

Selection and ordering data

Description	Article No.
SIMATIC IPC USB flash drive 8 GB, USB 2.0, metal enclosure, boot capability, incl. SIMATIC PC BIOS Manager	**6ES7648-0DC50-0AA0**

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Overview



SCALANCE X is the product group of industrial switches from SIMATIC NET for Industrial Ethernet. Switches are active network components that specifically distribute data to the relevant addressees.

Application

SCALANCE XB005 (degree of protection IP20)

- The unmanaged Industrial Ethernet Switch SCALANCE XB005 is optimized for configuring Industrial Ethernet networks with 10/100 Mbit/s in line and star topologies
- Enclosure for space-saving installation in control cabinets or boxes on a standard rail

SCALANCE X005/X108 (degree of protection IP30)

- For configuring Industrial Ethernet networks in line and star topologies
- The 5/8 RJ45 sockets are industry-compatible and feature additional retaining collars for connection to the IE FC RJ45 Plug 180

SCALANCE X208/X208PRO (degree of protection IP30/IP65/IP67)

- For configuring Industrial Ethernet networks in line, star or ring topologies (8 electrical ports):
  - SCALANCE X208 for installation in the control cabinet
  - SCALANCE X208PRO, specially for use outside the control cabinet
- The 8 RJ45 sockets of the SCALANCE X208 are industry-compatible and feature additional retaining collars for connection to the IE FC RJ45 Plug 180
- The 8 PROFINET-compatible M12 sockets of the SCALANCE X208PRO are designed with IP65 degree of protection for connection to the IE M12 Plug PRO or the pre-assembled IE M12 connecting cable
- The SCALANCE X208PRO can be installed on a DIN rail/S7-300 rail or as a compact flat or upright model directly on the installation or machine.
- Status information can be read in any mounting position thanks to the inclined row of LEDs.
- Power can also be supplied to the SCALANCE X208PRO from outside the control cabinet from the PS791-1PRO power supply module at 230 V AC.

Selection and ordering data

Description	Article No.
Industrial Ethernet Switch SCALANCE XB005 unmanaged With 5 x 10/100 Mbit/s RJ45 ports for configuring small star and line topologies IP20 degree of protection	**6GK5005-0BA00-1AB2**
Industrial Ethernet Switch SCALANCE X005 unmanaged With 5 x 10/100 Mbit/s RJ45 ports for configuring small star and line topologies IP30 degree of protection	**6GK5005-0BA00-1AA3**
Industrial Ethernet Switch SCALANCE X108 unmanaged With 8 x 10/100 Mbit/s RJ45 ports for configuring star and line topologies IP30 degree of protection	**6GK5108-0BA00-2AA3**
Industrial Ethernet Switch SCALANCE X208 managed With 8 × 10/100 Mbit/s RJ45 ports for configuring line, star and ring topologies IP30 degree of protection	**6GK5208-0BA10-2AA3**
Industrial Ethernet Switch SCALANCE X208PRO managed With 8 x 10/100 Mbit/s RJ45 ports for configuring line, star and ring topologies IP65/IP67 degree of protection incl. 8 × RJ45 and 3 × M12 dust protection caps	**6GK5208-0HA10-2AA6**
Ethernet cables and connections	
IE FC RJ45 plug 180 RJ plug connector for Industrial Ethernet with robust metal housing and integrated insulation displacement contacts; with 180° cable outlet	**6GK1901-1BB10-2AA0**
IE FC Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. quantity 1000 m (3281 ft), minimum order quantity 20 m (65.62 ft)	**6XV1840-2AH10**
IE FC Trailing Cable GP 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for use in trailing cables; PROFINET-compatible; without UL approval; sold by the meter; max. quantity 1000 m (3281 ft), minimum order quantity 20 m (65.62 ft)	**6XV1840-3AH10**

More information

Further information on the SIMATIC NET components, such as the Industrial Ethernet SCALANCE Electrical Lean Switches and the Industrial Ethernet FC TP Standard/Trailing Cable, can be found in the IK PI Catalog or Siemens Industry Mall.

www.siemens.com/industrymall

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Technical specifications

Article No.		6GK5005-0BA00-1AB2	6GK5005-0BA00-1AA3	6GK5108-0BA00-2AA3	6GK5208-0BA10-2AA3	6GK5208-0HA10-2AA6
Product type designation		SCALANCE XB005	SCALANCE X005	SCALANCE X108	SCALANCE X208	SCALANCE X208PRO
Transfer rate						
• 1	Mbit/s	10	10	10	10	10
• 2	Mbit/s	100	100	100	100	100
Number of electrical connections						
• for signaling contact		–	–	1	1	1
• for network components or terminal equipment		5	5	8	8	8
• for redundant voltage supply		–	–	1	1	1
• for power supply		1	1	1	1	1
• for signaling contact		–	–	1	1	1
Type of electrical connection						
• for signaling contact		–	–	2-pole terminal block	2-pole terminal block	5-pin M12 socket (b-coded)
• for network components or terminal equipment		RJ45 port	RJ45 port	RJ45 port	RJ45 port	M12 port, 4-pin, D-coded
• for power supply		3-pole terminal block	2-pole terminal block	4-pole terminal block	4-pole terminal block	4-pin M12 interface (A-coded)
Design of the removable storage C-PLUG		–	–	–	Yes	Yes
Type of voltage of the supply voltage		DC	DC	DC	DC	DC
Supply voltage, external	V	24	24	24	24	24
• Tolerance	V	19.2 ... 28.8	18 ... 32	18 ... 32	18 ... 32	18 ... 32
Consumed current maximum	A	0.07	0.08	0.14	0.185	0.185
Active power loss at DC at 24 V	W	1.68	2	3.36	3.84	4.4
Degree of protection		IP20	IP20	IP30	IP30	IP65/67
Ambient temperature, during						
• storage	°C (°F)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• transport	°C (°F)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)	-40 ... +70 (-40 ... +158)	-40 ... +70 (-40 ... +158)
• operation	°C (°F)	-10 ... +60 (14 ... +140)	0 ... 65 (32 ... 149)	-20 ... +70 (-4 ... +158)	-40 ... +60 (-40 ... +140)	-40 ... +70 (-40 ... +158)
Width	mm (in)	45 (1.77165)	40 (1.5748)	60 (2.36221)	60 (2.36221)	90 (3.54331)
Height	mm (in)	100 (3.93701)	125 (4.92126)	125 (4.92126)	125 (4.92126)	125 (4.92126)
Depth	mm (in)	87 (3.4252)	124 (4.88189)	124 (4.88189)	124 (4.88189)	124 (4.88189)
Net weight	kg (lb (avoir-dupois))	0.165 (0.36376)	0.55 (1.21254)	0.78 (1.71961)	0.78 (1.71961)	1 (2.20462)
Certificate of suitability		CE, KC, C-Tick (RCM)	CE, KC, C-Tick (RCM)	CE, KC, E1, e1, C-Tick (RCM)	CE, KC, C-Tick (RCM)	CE, KC, C-Tick (RCM)

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Overview



Rittal command panel systems are manufactured with exact dimensions for any combination of SINUMERIK operator components and are ready for installation. Optimum installation of the operator components is assured thanks to the customized dimensions. Select from a wide range of different housing systems, e.g.:

Rittal VIP 6000 – Multi-talented in shape and function

The increased surface size resulting from cooling fins and screw channels is the most reliable and cheapest type of heat dissipation.

- Individual mounting depths of 155 to 438 mm (6.10 in to 17.24 in)
- 3 frame versions (wide, narrow or combined), depending on application and design requirements
- Optimum heat dissipation with 3 types of housing
- Versatile housing connectors
- Continuous edge profile, 3 versions in 5 colors
- Keyboard housing, mounting depths: 27 mm/44 mm/105 mm (1.06 in/1.73 in/4.13 in), tray for keyboards
- Continuous screw channels for flexible internal design
- Rear panel screwed or hinged

Rittal Optipanel – The slimline alternative design

- Individual mounting depths: 50 mm/100 mm/150 mm (1.97 in/3.94 in/5.91 in)
- Standard housing matched to SINUMERIK operator panels 19" x 7 HU, mounting depth 100 mm (3.94 in), available ex stock
- Continuous edge profile
- Keyboard housing, mounting depths: 50 mm/100 mm (1.97 in/3.94 in), tray for keyboards, tilting angle can be set to any value between 80° and 155°
- Continuous T slot for flexible internal design
- Rear panel screwed or hinged

Overview (continued)

Rittal Comfort Panel – Functional and safe

The "third dimension" command panel in the HMI sector. With a new design and additional functions, the Rittal Comfort Panel is ideally matched to SINUMERIK operator components.

- Individual mounting depths of 74 to 464 mm (2.91 in to 18.27 in)
- Standard housing matched to SINUMERIK operator panels 19" x 7 HU, mounting depths: 74 mm/113 mm/152 mm/191 mm/308 mm (2.91 in/4.45 in/5.98 in/7.52 in/12.13 in), available ex stock
- Keyboard housing, mounting depths: 35 mm/74 mm (1.38 in/2.91 in), tray for keyboards, tilting angle can be set to any value between 88° and 136°, with toothed wheel adjustable in increments of 8°; can be tilted upwards after use to save space where necessary
- Rear panel screwed or hinged
- Design profile for color coordination with the machine or equipment ID
- All-round soft profile made of plastic reduces the risk of injury
- Flat front frame for optimum access to lateral drives
- Continuous mounting channels for individual dismounting of accessories, internally and externally

Accessories

Support arm systems

- **CP-S** compact, for small and flat panel housings
- **CP-L** open for simple cable inlet, closed for small to medium panel housings
- **CP-C** for medium to high loads
- **CP-XL** open for simple cable inlet, closed for high loads

Stand systems

- Stationary
- Mobile
- Adjustable height
- Console as stable base for supporting arm systems

More information

Rittal Service

Configure your Optipanel/Comfort Panel online now – quickly, easily and reliably at:

www.rittal.de/konfigurator

Sending of:

- Visual presentation of the selected Optipanel/Comfort Panel
- 3D data for integration in the machine and plant construction for virtual sample construction on the screen

For full details, please refer to the Rittal Manual. Contact your Rittal representative or order the manual directly from Rittal.

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Overview



Slim Line Commander

The ROSE SL 2000 and SL 3000 Slim Line Commanders are tailored housing systems for built-in control components with numerous configuration possibilities.

With various mounting depths, the basic versions of the aluminum section housing systems in various sizes provide ideal surface-mounting possibilities for CNC with:

- SINUMERIK OP 010/OP 010S/OP 010C/OP 012/OP 015A
- SINUMERIK machine control panels
- SINUMERIK Machine Push Button Panel
- SINUMERIK full CNC keyboards

SL 2000

- Multifunctional built-in and add-on system with all-round fixing slots
- Individual front panel installation from front or back
- Mounting depths: 80 mm/110 mm/185 mm (3.15 in/4.33 in/7.28 in)



Overview (continued)

SL 3000

- Variable depth by combining sections
- Hollow chamber profile for hidden installation of drives and connectors
- Mounting depths: 60 mm/160 mm/200 mm (2.36 in/6.30 in/7.87 in)
- Mounting depths with combined profiles: 120 mm/220 mm/260 mm/360 mm (4.72 in/8.66 in/10.24 in/14.17 in)

LIMANDA



LIMANDA is the ideal polyamide panel housing for installing small operator panels and control devices for mobile and fixed applications to the IP65 degree of protection.

- Dimensions of Limanda 1: 317 mm × 287 mm × 75 mm (12.48 in × 11.30 in × 2.95 in)
- Dimensions of Limanda 2: 270 mm × 248 mm × 64 mm (10.63 in × 9.76 in × 2.52 in)

Suitable for SIMATIC Panels:

- PP7/PP17
- OP7/OP15/OP17
- TP27-6/TP 170
- C7

More information

Are you looking for an individual solution for your application? Ask us!
Your partner for industrial housing systems:

ROSE Systemtechnik GmbH

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Security information

In the case of software for remote maintenance or connection to higher-level networks, suitable protection measures must be taken (including industrial security, e.g. network segmentation) to guarantee safe operation of the system.
You can find more information on industrial security on the Internet at:
www.siemens.com/industrialsecurity

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Overview

Simple, all-round process integration

Integration of the machine tool into a company's workflow is an essential precondition for achieving a lean, efficient manufacturing operation. SINUMERIK Integrate offers a broad range of products for integrating machine tools into communication, engineering and production processes associated with metal-cutting manufacturing.

Integration into engineering processes

SINUMERIK Integrate for engineering employs an innovative PLM process to help users boost the productivity of machine tools over their entire service life and to commission them more effectively. The openness of the SINUMERIK system offers potential for optimizing technology, programming and operation for specific machines and end users.

Integration into production processes

SINUMERIK Integrate for production integrates machine tools quickly, simply and efficiently into the complicated production and communication processes of a company. Even the process of integrating machines into an existing, complex company IT network is quick and simple. The result is higher productivity and availability combined with an overall reduction in production costs. A closed CAD/CAM/CNC chain minimizes the time and cost involved in creating and simulating programs and for conducting trial program runs.

More information

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered.

For more information about industrial security, visit
www.siemens.com/industrialsecurity

To stay informed about product updates as they occur, sign up for a product-specific newsletter.

For more information, visit
https://support.industry.siemens.com

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Overview

The product suite for optimal adaptation of the SINUMERIK to the machine tool

Machine tool manufacturers want to expand the technological functionality of intelligent machines, and to adapt the operation of the machine optimally to its technology. Siemens has the answer to these requirements with the SINUMERIK Integrate for engineering product suite.

The scope of functions of the SINUMERIK NCU can be expanded with compile cycles. A range of standard compile cycles is available for this purpose. Possibilities have been created to support, for example, special kinematics and special compensations. SINUMERIK Integrate Create MyCC supports the creation of manufacturer-specific NCK functions.

The openness in the HMI enables full access to all relevant data of the SINUMERIK NCU, PLC and drives. The operation of SINUMERIK Operate can be adapted in different ways:

- By configuring prepared screen forms, such as SINUMERIK Integrate Create MyHMI /PRO
- By configuring with standard tools, such as SINUMERIK Integrate Create MyHMI /WinCC
- By programming based on C++, .Net or Qt with SINUMERIK Integrate Create MyHMI /3GL

Remote data access is possible via the OPC UA protocol with SINUMERIK Integrate Access MyMachine /OPC UA.

Extensive support for commissioning is offered by, e.g., SINUMERIK Integrate Access MyMachine /P2P, SinuCom or SIMATIC STEP 7.

The SINUMERIK Integrate Run MyRobot product suite offers optimal integration of robots in machines for handling or machining tasks.

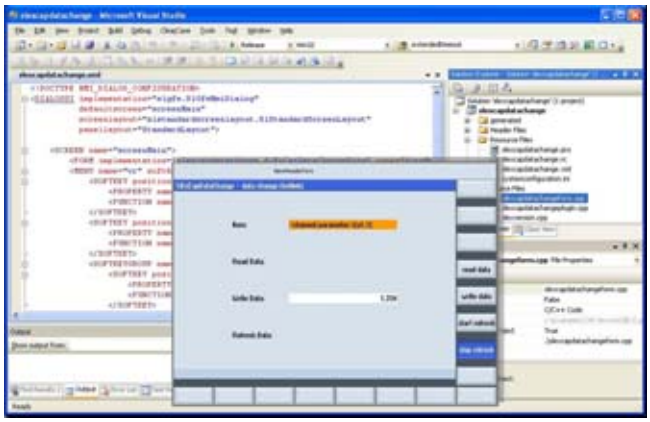
SINUMERIK Integrate Run MyVNCK offers user-side support – the link to a virtual NC kernel in a CAM system. You can protect the technological know-how of your cycles with SINUMERIK Integrate Lock MyCycles.

	SINUMERIK Integrate for engineering
Implement HMI functions	Create MyHMI (Run MyHMI)
Master computer interface with OPC UA	Access MyMachine /OPC UA
Access protection for cycles	Lock MyCycles
Implement NCK functions	Create MyCC (Run MyCC)
Integrate robots	Run MyRobot
Integrate CNC simulation in the CAM system	Run MyVNCK
Commissioning modular machines	Create MyConfig
Perform commissioning and remote maintenance	Access MyMachine /P2P
Commissioning and service tools	SinuCom
Service functions	SIMATIC STEP 7 for SINUMERIK hardware

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Overview



The openness in the HMI enables customers to implement their own integrated operating and display functions or their own user interfaces. This means that users can tailor HMI functions and technological machine operating procedures to meet their own requirements.

The HMI application can be created either by programming in a high-level language or by means of configuration tools. A simple configuring process using a standard editor is available with SINUMERIK Integrate Run MyScreens.

Application

	Hardware	CNC software option
SINUMERIK Integrate for engineering Create MyHMI /3GL	SINUMERIK Operate NCU 710.3B PN NCU 720.3B PN NCU 730.3B PN PCU 50.5 Windows 7	SINUMERIK Integrate for engineering Run MyHMI /3GL Software option P60
SINUMERIK Integrate for engineering Create MyHMI /WinCC	SIMATIC Comfort Panels SIMATIC KTP700/ KTP900 Mobile Panels PC systems SINUMERIK PCU 50.5 Windows 7 SIMATIC IPC 4x7D/6x7D PN/IE	SINUMERIK Integrate for engineering Run MyHMI /SIMATIC OP Software option P03 SINUMERIK Integrate for engineering Run MyHMI /WinCC Software option P61
SINUMERIK Integrate for engineering Create MyHMI /PRO	SINUMERIK Operate NCU 710.3B PN NCU 720.3B PN NCU 730.3B PN PCU 50.5 Windows 7	SINUMERIK Integrate for engineering Run MyHMI /PRO Software option P47

Function

SINUMERIK Integrate for engineering Create MyHMI /3GL

The SINUMERIK Integrate Create MyHMI /3GL programming package allows users to develop high-level language applications in programming language Qt/C++ for the SINUMERIK Operate user interface. A C++ or Microsoft .NET-based communication interface is also provided so that users can create a customized user interface with individual look & feel.

- Integration of single or multiple operator screens as well as user-defined operating areas in SINUMERIK Operate with NCU and PCU.
- Independently executable user interfaces
- Support for C++ or .NET interfaces

The respective software version of the SINUMERIK Integrate Create MyHMI /3GL programming package for SINUMERIK Operate is required for user development of applications.

Example:
SINUMERIK Operate software version 4.5 SP3 requires SINUMERIK Integrate Create MyHMI /3GL 4.5 SP3.

Use of SINUMERIK Integrate Create MyHMI /3GL is always subject to conclusion of an OEM contract.

SINUMERIK Integrate for engineering Create MyHMI /WinCC

The graphics-based SIMATIC WinCC Advanced engineering tool is used as the basis for the configuration of user interfaces. This means that customized screens can be created that will execute on SIMATIC Panels as well as on PC systems.

SINUMERIK Integrate Create MyHMI /WinCC is required in addition to SIMATIC WinCC Advanced for creating user interfaces with access to NCU data and for using the special SINUMERIK HMI function (select parts program).

With SINUMERIK Integrate Create MyHMI /WinCC, any skilled worker with basic technical experience is capable of creating technology-related modules for operating and visualizing without the need for high-level language expertise.

SIMATIC WinCC Runtime Advanced is included in the scope of supply of SINUMERIK Integrate Create MyHMI /WinCC. The SIMATIC WinCC Advanced Engineering System must be ordered separately, as required.

For further information, refer to Catalogs ST 80/ST PC or the Siemens Industry Mall:
www.siemens.com/industrymall

For communication with a SINUMERIK NCU, depending on the system, Panel or PC used, the software option SINUMERIK Integrate Run MyHMI /SIMATIC OP or SINUMERIK Integrate Run MyHMI /WinCC is required.

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Function (continued)

SINUMERIK Integrate for engineering Create MyHMI /PRO

The configuration system SINUMERIK Integrate Create MyHMI /PRO together with the software option SINUMERIK Integrate Run MyHMI /PRO for SINUMERIK 840D sl provides a machine user interface for operator control and monitoring tasks in mass production, for example in transfer lines, machining centers, and assembly lines.
SINUMERIK Integrate Run MyHMI /PRO standardizes the operation of machines with diverse tasks and technologies by means of operator screen forms and a parameterizable navigation menu.

The technology-specific operator screen forms are combined into function groups, e.g.:

- Machine functions
  Workpiece counting, cycle times, workpiece overview
- Help texts
- Overviews
- Tool changing functions
- Manual operator functions

Prepared diagnostics functions support rapid localization in the event of a machine fault.

Diverse target hardware is supported to ensure the best possible price/performance ratio for different applications.

Integration

SINUMERIK Integrate for engineering Run MyHMI /3GL

HMI Open Architecture applications created with the programming package SINUMERIK Integrate Create MyHMI /3GL C++/Qt can be executed on NCUs and PCUs with software option SINUMERIK Integrate Run MyHMI /3GL.

HMI Open Architecture applications which utilize the C++ or .NET interface can execute only on PCUs and require software option SINUMERIK Integrate Run MyHMI /3GL.

Software option SINUMERIK Integrate Run MyHMI /3GL is required for the installation and operation of other software which is integrated in SINUMERIK Operate or in parallel with it. This also applies in cases where the supplementary software does not utilize SINUMERIK communication interfaces.

SINUMERIK Integrate Run MyHMI /3GL enables users to integrate individual program screens, create their own operating areas and set up background functions with data communication.

With software version 4.7 and higher, SINUMERIK Integrate Run MyHMI /3GL includes the option Run MyScreens.

SINUMERIK Integrate for engineering Run MyScreens

The software option SINUMERIK Integrate Run MyScreens permits the execution of text files with EasyScreen format. These configurations can execute on SINUMERIK NCUs or PCUs. Users can design their own user interfaces in order to visualize either specific machine-manufacturer or end-user functional expansions or simply their own screen form layouts.

SINUMERIK Integrate for engineering Run MyHMI /WinCC

The software option SINUMERIK Integrate Run MyHMI /WinCC supports communication between a SINUMERIK 840D sl (software version 4.5 SP2 and higher) and WinCC Runtime Advanced. WinCC Runtime Advanced can be used to integrate full-screen images into the OEM frame area of SINUMERIK Operate.

Integration (continued)

The engineering software SIMATIC WinCC Advanced and the software option SINUMERIK Integrate Create MyHMI /WinCC are needed to create these images. SIMATIC WinCC Runtime Advanced is already integrated into the SIMATIC Panels.

SIMATIC WinCC Runtime Advanced must be installed in PC systems. In addition to WinCC Runtime Advanced, the SINUMERIK Integrate Run MyHMI /WinCC installation package is required.

To use SIMATIC WinCC Runtime Advanced on PC systems with SINUMERIK, one SINUMERIK Integrate Run MyHMI /WinCC software option is required for each SINUMERIK NCU. No SIMATIC Powertags are required for the PC stations.

The supplied HMI integration tool supports the integration of the WinCC RT Advanced configuration on the SINUMERIK PCU 50.5 Windows 7 into SINUMERIK Operate.

SINUMERIK Integrate for engineering Run MyHMI /PRO

Applications created with SINUMERIK Integrate Create MyHMI /PRO can be executed on NCUs and PCUs with software option SINUMERIK Integrate Run MyHMI /PRO.

The standard application is easy to adapt or expand and is therefore ideally suited for implementing customized versions for project-specific use.

The operator screen forms for SINUMERIK Integrate Run MyHMI /PRO can be parameterized, configured, and loaded into the target hardware with the configuration software SINUMERIK Integrate Create MyHMI /PRO that is executable on PGs/PCs. Two diagnostics functions are available for the process error diagnostics integrated into SINUMERIK Integrate Run MyHMI /PRO. Process error diagnostics are used in combination with S7-PDIAG and S7-GRAPH.

Users can freely configure their own operator screens forms using the simple, integrated graphic editor.

SINUMERIK Integrate for engineering Run MyHMI /SIMATIC OP

The software option SINUMERIK Integrate Run MyHMI /SIMATIC OP allows users to run their own WinCC applications on SIMATIC Comfort and Mobile Panels on a SINUMERIK CNC. The engineering software SIMATIC WinCC Advanced and the relevant software option SINUMERIK Integrate Create MyHMI /WinCC are needed to create these applications.

Adding the SINUMERIK software option enables functions to be used in conjunction with:

- CNC variable dialog (symbolic presentation)
- CNC file management, e.g. selection of part program
- CNC functions, e.g. apply tool, CNC Start/Stop and other PI services
- Alarms and messages in plain text

SIMATIC Panels can be connected via PROFIBUS or Ethernet depending on which interface is provided.

To use WinCC applications on the SIMATIC Comfort and Mobile Panels, one SINUMERIK Integrate Run MyHMI /SIMATIC OP software option is required for each SINUMERIK NCU.

The SINUMERIK Integrate Run MyHMI /SIMATIC OP license comprises the Archive and Recipe licenses of SIMATIC as before.

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Selection and ordering data

Description	Article No.
Engineering system	
SINUMERIK Integrate for engineering Create MyHMI /3GL Including operating software SINUMERIK Operate for PC/PG for SINUMERIK 840D sl Engineering system languages: English, German Runtime system languages: Supports all languages of the HMI runtime system	
• Single license without data storage medium	**6FC5861-1YP00-0YB0**
• Single license on DVD-ROM current software version including Automation Value Card with 400 credits	**6FC5861-1YC00-0YA0**
• Single license on DVD-ROM software version 4.7 SP1 including Automation Value Card with 400 credits	**6FC5861-1YC44-1YA0**
• Software upgrade on DVD-ROM software version 4.7 SP1	**6FC5861-1YC44-1YA8**
• Software update service	**6FC5861-1YP00-0YL8**
Qt license key For SINUMERIK Integrate Create MyHMI /3GL	The Qt Company
SINUMERIK Integrate for engineering Create MyHMI /WinCC	
• Single license on DVD-ROM current software version including Automation Value Card with 400 credits	**6FC5861-3YC00-0YA0**
• Single license on DVD-ROM software version 13 SP1 including Automation Value Card with 400 credits	**6FC5861-3YC43-0YA0**
• Single license without data storage medium	**6FC5861-3YP00-0YB0**
• CD-ROM without license software version 13 SP1	**6FC5861-3YC43-0YA8**
• Software update service	**6FC5861-3YP00-0YL8**
SINUMERIK Integrate for engineering Create MyHMI /PRO	
• Single license on DVD-ROM current software version	**6FC5867-3YC00-0YA8**
• Single license on DVD-ROM software version 4.5 SP3	**6FC5867-3YC41-3YA8**

Selection and ordering data (continued)

Description	Article No.
Runtime license	
SINUMERIK Integrate for engineering Run MyHMI /3GL For SINUMERIK 840D sl Software option (in conjunction with SINUMERIK Operate operating software) • Single license without data storage medium	**6FC5800-0AP60-0YB0**
SINUMERIK Integrate for engineering Run MyScreens For SINUMERIK 840D sl/828D Software option (in conjunction with SINUMERIK Operate operating software) • Single license without data storage medium	**6FC5800-0AP64-0YB0**
SINUMERIK Integrate for engineering Run MyHMI /WinCC For SINUMERIK 840D sl Software option (in conjunction with SINUMERIK Operate operating software) • Single license without data storage medium	**6FC5800-0AP61-0YB0**
SINUMERIK Integrate for engineering Run MyHMI /PRO For SINUMERIK 840D sl Software option (in conjunction with SINUMERIK Operate operating software) • Single license without data storage medium	**6FC5800-0AP47-0YB0**
SINUMERIK Integrate for engineering Run MyHMI/SIMATIC OP For SINUMERIK 840D sl Software option (in conjunction with SIMATIC Comfort and Mobile Panels) • Single license without data storage medium	**6FC5800-0AP03-0YB0**

More information

You will find further information in the "Updates" at:
https://support.industry.siemens.com

You can obtain technical support and advice from:

Siemens AG
Digital Factory

Stuttgart office
Competence Center Machine Tools

Fax: +49 711 137-2838
E-mail: info.mc-hmi-oa@siemens.com

You can obtain the Qt license key directly from:

The Qt Company

Contact: Frank Frederking

Tel.: +47 47 451220
Fax: +47 21 080439
E-mail: frank.frederking@theqtcompany.com
Internet: www.qt.io

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Overview

OPC UA (Unified Architecture) is a standardized, industrial communication protocol for access to control data, e.g. by control systems. Variables can be read from and written to a SINUMERIK 840D sl and SINUMERIK 828D via this communication protocol with the SINUMERIK Integrate Access MyMachine /OPC UA software option.

Application

	Hardware	CNC software option
SINUMERIK Integrate for engineering Access MyMachine /OPC UA	SINUMERIK 840D sl SINUMERIK Operate NCU 710.3B PN NCU 720.3B PN NCU 730.3B PN PCU 50.5 Windows 7 or SINUMERIK 828D SINUMERIK Operate PPU2xx.3	SINUMERIK Integrate for engineering Access MyMachine /OPC UA Software option P67

Function

An OPC UA server was integrated in SINUMERIK 840D sl and SINUMERIK 828D as from software version 4.5 SP3.

A configuration dialog is integrated into SINUMERIK Operate after the software option is activated in software version 4.7 SP1. An ADMIN user is then set up with password identification in order to connect an OPC UA client to the OPC UA server. Various read and write permissions can also be assigned. Access is possible to, e.g., CNC and PLC data, GUDs, MDs, setting data.

The number of SINUMERIK variables that can be observed simultaneously is limited:

- SINUMERIK 840D sl
  max. 200 variables
- SINUMERIK 828D software version 4.5
  max. 20 variables
- SINUMERIK 828D software version 4.7
  max. 100 variables

Integration

Requirements:

- SINUMERIK 840D sl with SINUMERIK Operate
- SINUMERIK 828D with SINUMERIK Operate

Selection and ordering data

Description	Article No.
Runtime license	
SINUMERIK Integrate for engineering Access MyMachine / OPC UA For SINUMERIK 840D sl and SINUMERIK 828D software option (in conjunction with SINUMERIK Operate operating software) • Single license without data storage medium	**6FC5800-0AP67-0YB0**

More information

You will find further information in the "Updates" at:
https://support.industry.siemens.com

You can obtain technical support and advice from:

Siemens AG
Digital Factory

Stuttgart office
Competence Center Machine Tools
Fax: +49 711 137-2838
E-mail: info.mc-hmi-oa@siemens.com

Overview

With SINUMERIK Integrate for engineering Lock MyCycles, cycles can be encrypted and then saved in the CNC where they are protected. Execution in the CNC is possible without restrictions, but it is not possible to view the cycle. This protects the internal company know-how. The cycle can, however, be copied in encrypted form. It can, therefore, be used on other machines. However, it is also possible to link the cycle permanently to a specific CNC hardware.

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Lock MyCycles Cycle protection (OEM) for SINUMERIK 840D sl • Single license without data storage medium	**6FC5800-0AP54-0YB0**

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Overview



SINUMERIK Integrate for engineering Create MyCC can be used to implement manufacturer-specific NCK functions (compile cycles). They are programmed in C or C++ on a SUN workstation with the Solaris operating system. The result is uploaded to the SINUMERIK as an executable file, and enables the real-time area of the control to be adjusted and expanded.

Create MyCCI supports the development of loadable compile cycles based on customized interfaces without requiring special hardware as a development environment. For this special application, the customer uses GNU compiler and GNU linker software in an environment known as "Cygwin software shell" on a Windows PC. Use of this application requires installation of the corresponding interface as a loaded compile cycle on the control system.

Prerequisite for SINUMERIK Integrate for engineering Create MyCC is an OEM contract. The SINUMERIK Integrate for engineering Create MyCC package is subject to export authorization.

SINUMERIK Integrate for engineering Run MyCC

The openness in the NCK area of the SINUMERIK 840D sl allows SINUMERIK users to develop solutions for (almost) every technological problem!

This is possible with the integration of technological add-on functions in the CNC software for NCU in the form of compile cycles. These types of compile cycles can either be programmed by the user based on Create MyCC and the appropriate development environment, or through development and testing in industrial conditions contracted to Siemens.

Loadable compile cycles that offer special interfaces for customized developments can be implemented with Run MyCCI.

Application

A typical example for the use of compile cycles are special transformations for specific machine kinematics. With these transformations, workpieces can be programmed in Cartesian coordinates while the transformation calculates the required machine axis movements.

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Create MyCC For openness in the NCK OEM contract required.	On request
SINUMERIK Integrate for engineering Create MyCCI For openness in the NCK based on customized interface OEM contract required.	**6FC5863-1YP00-0YB8**
SINUMERIK Integrate for engineering Create MyCCI /Interpreter For openness in the NCK based on Interpreter interface OEM contract required.	**6FC5863-0YP00-0YB8**
SINUMERIK Integrate for engineering Run MyCC For SINUMERIK 840D sl License for compile cycles developed by the OEM • Single license without data storage medium	**6FC5800-0AM04-0YB0**

Description	Article No.
Technological add-on functions in the form of loadable compile cycles as an option for SINUMERIK 840D sl	
SINUMERIK Integrate for engineering Run MyCC /RESU Continue machining at the contour (retrace support)	**6FC5800-0AM24-0YB0**
SINUMERIK Integrate for engineering Run MyCC /2TRA Transformation: DOUBLETRANSMIT	**6FC5800-0AM25-0YB0**
SINUMERIK Integrate for engineering Run MyCC /RCTRA Transformation: Handling	**6FC5800-0AM31-0YB0**
SINUMERIK Integrate for engineering Run MyCC /HSLC High-speed laser switching signal	**6FC5800-0AM38-0YB0**
SINUMERIK Integrate for engineering Run MyCC /CLC Clearance control 1D/3D in position control cycle	**6FC5800-0AM40-0YB0**
SINUMERIK Integrate for engineering Run MyCC /PACO Transformation: PARACOP 3 AXES	**6FC5800-0AM44-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SCIS Transformation: Pantograph kinematics	**6FC5800-0AM51-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SEC-KT Spatial compensation for kinematic transformations	**6FC5800-0AM57-0YB0**

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Selection and ordering data (continued)

Description	Article No.
***Technological add-on functions in the form of loadable compile cycles as an option for SINUMERIK 840D sl** (continued)*	
SINUMERIK Integrate for engineering Run MyCC /TPM-PB PROFIBUS tool and process monitoring	**6FC5800-0AM62-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SCRA Transformation: SCARA, 2/3 axes	**6FC5800-0AM68-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SKID Transformation: Double slide	**6FC5800-0AM80-0YB0**
SINUMERIK Integrate for engineering Run MyCC /AXCO Compensation of a forced mechanical coupling	**6FC5800-0AM81-0YB0**
SINUMERIK Integrate for engineering Run MyCC /KPXT Drive current measurement	**6FC5800-0AM82-0YB0**
SINUMERIK Integrate for engineering Run MyCC /DSTT Transformation: Dynamic Swivel Tripod	**6FC5800-0AM84-0YB0**
SINUMERIK Integrate for engineering Run MyCC /CRIP Crank interpolation	**6FC5800-0AN04-0YB0**
SINUMERIK Integrate for engineering Run MyCC /PROT Axis collision protection	**6FC5800-0AN06-0YB0**
SINUMERIK Integrate for engineering Run MyCC /ADAS Axis data output via PROFIBUS	**6FC5800-0AN07-0YB0**
SINUMERIK Integrate for engineering Run MyCC /VIBX Vibration extinction	**6FC5800-0AN11-0YB0**
SINUMERIK Integrate for engineering Run MyCC /IMD-L Integrated tool monitoring and diagnostics, IMD light	**6FC5800-0AN12-0YB0**
SINUMERIK Integrate for engineering Run MyCC /VCS-A3 Spatial compensation VCS-A3	**6FC5800-0AN15-0YB0**
SINUMERIK Integrate for engineering Run MyCC /VCS-A5 Spatial compensation VCS-A5	**6FC5800-0AN16-0YB0**
SINUMERIK Integrate for engineering Run MyCC /VCS-A5 PLUS Spatial compensation VCS-A5 PLUS	**6FC5800-0AN17-0YB0**

Description	Article No.
***Technological add-on functions in the form of loadable compile cycles as an option for SINUMERIK 840D sl** (continued)*	
SINUMERIK Integrate for engineering Run MyCC /PCTS Package: Coupling, transformation and sensor technology	**6FC5800-0AN21-0YB0**
SINUMERIK Integrate for engineering Run MyCC /RDCC Transformation: Redundant axes at workpiece	**6FC5800-0AN26-0YB0**
SINUMERIK Integrate for engineering Run MyCC /VCS-ROT Spatial compensation for 2 rotary axes	**6FC5800-0AN31-0YB0**
SINUMERIK Integrate for engineering Run MyCC /DGEN Transformation: Double generic	**6FC5800-0AN34-0YB0**
SINUMERIK Integrate for engineering Run MyCC /THYK Transformation: Tripod hybrid kinematics	**6FC5800-0AN36-0YB0**
SINUMERIK Integrate for engineering Run MyCC /ROTE Transformation: Rotating eccentric	**6FC5800-0AN37-0YB0**
SINUMERIK Integrate for engineering Run MyCC /ECCE Transformation: Eccentric	**6FC5800-0AN41-0YB0**
SINUMERIK Integrate for engineering Run MyCC /MSPZ Metal spinning protection area	**6FC5800-0AN42-0YB0**
SINUMERIK Integrate for engineering Run MyCC /2RPT Transformation: Rotating workpiece and tool	**6FC5800-0AN43-0YB0**
SINUMERIK Integrate for engineering Run MyCC /ECCA Transformation: Eccentric axis	**6FC5800-0AN44-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SW2A Transformation: Swivel by 2 linear axes	**6FC5800-0AN45-0YB0**
SINUMERIK Integrate for engineering Run MyCC /COCO Magnetic cogging torque compensation	**6FC5800-0AN46-0YB0**
SINUMERIK Integrate for engineering Run MyCC /SANS Scalable analog setpoint	**6FC5800-0AN48-0YB0**
SINUMERIK Integrate for engineering Run MyCC /COTE Technological functions with compressor	**6FC5800-0AN50-0YB0**

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Selection and ordering data (continued)

Description	Article No.
***Technological add-on functions in the form of loadable compile cycles as an option for SINUMERIK 840D sl** (continued)*	
SINUMERIK Integrate for engineering Run MyCC /XOUT Extrapolated switching signals	**6FC5800-0AN51-0YB0**
SINUMERIK Integrate for engineering Run MyCC /PIVA Transformation: Swivel axis	**6FC5800-0AN52-0YB0**
SINUMERIK Integrate for engineering Run MyCC /ROBX Transformation: Robotic extended	**6FC5800-0AN54-0YB0**
SINUMERIK Integrate for engineering Run MyCC /PROX Measuring inputs, expanded (16) for axial measurements with TM17	**6FC5800-0AN57-0YB0**
SINUMERIK Integrate for engineering Run MyCC /AMOV Variable-based axis movement	**6FC5800-0AN62-0YB0**
SINUMERIK Integrate for engineering Run MyCC /PRIG Path-related pulse output	**6FC5800-0AN76-0YB0**

Description	Article No.
Loadable compile cycles that offer special interfaces for customized developments can be implemented with Run MyCCI.	
SINUMERIK Integrate for engineering Run MyCCI /COOC COA interface for compiled OEM cycles	**6FC5800-0AM67-0YB0**
SINUMERIK Integrate for engineering Run MyCCI /IMD-B Integrated tool monitoring and diagnostics, Base	**6FC5800-0AN13-0YB0**
SINUMERIK Integrate for engineering Run MyCCI /VCI Spatial compensation interface	**6FC5800-0AN74-0YB0**
SINUMERIK Integrate for engineering Run MyCCI /UCI Universal compensation interface	**6FC5800-0AN75-0YB0**

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Overview



SINUMERIK Integrate for engineering Run MyRobot /Handling

The Run MyRobot /Handling option enables a robot to be operated, programmed and diagnosed for handling tasks with SINUMERIK Operate.

Run MyRobot /Handling is based on remote control software in the PLC, such as mxAutomation from KUKA.

SINUMERIK Integrate for engineering Run MyRobot /Machining

The Run MyRobot /Machining option enables a KUKA robot to be operated, programmed and diagnosed for machining tasks with SINUMERIK Operate. All types of programming are possible with Run MyRobot /Machining:
G code, programGUIDE, ShopMill, etc.

SINUMERIK handles the tool management and path planning of the robot. As a CAM user, the robot can be programmed like a SINUMERIK with Run MyRobot /Machining.

Benefits

SINUMERIK Integrate for engineering Run MyRobot /Handling

- Operate the robot quickly with the proven CNC knowledge
- Standardized, modern operation with SINUMERIK Operate
- Efficient loading and unloading of a machine
- Integrate a user-friendly machine, including robots, into the factory network with SINUMERIK Integrate for production

SINUMERIK Integrate for engineering Run MyRobot /Machining

- Operate the KUKA robot quickly with the proven CNC knowledge
- Standardized, modern operation with SINUMERIK Operate
- Use the existing CAM system for the machine and KUKA robot
- Integrate a user-friendly machine and KUKA robots into the factory network with SINUMERIK Integrate for production

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Run MyRobot /Handling Integrate KUKA robots into the SINUMERIK 840D sl for operation, programming and diagnostics • Single license without data storage medium	**6FC5800-0AP74-0YB0**
SINUMERIK Integrate for engineering Run MyRobot /Machining Use a KUKA robot with a SINUMERIK 840D sl as the CNC • Single license without data storage medium	**6FC5800-0AP73-0YB0**

More information

You will find further information in the "Updates" at https://support.industry.siemens.com

You can obtain technical support and advice from:

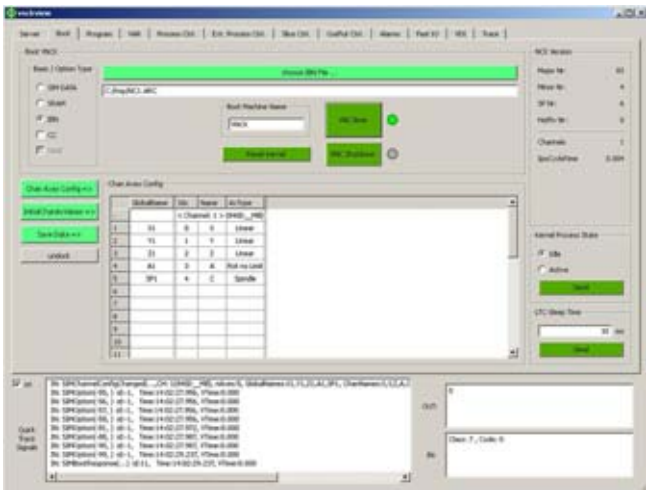
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Overview



SINUMERIK Integrate for engineering Run MyVNCK integrates CNC functions into the simulation process. The kernel uses the same source code as the NC kernel in the CNC. This allows CNC algorithms, language scope, commissioning, data management and communication to be handled in the same way for both Run MyVNCK and NCK. Run MyVNCK is capable of simulating control sequences with their full range of functions. CNC programs including all their high-level language elements can therefore be checked for syntactic correctness and executability. The working area can be reliably assessed for risk of collision and the workpiece geometry and motion behavior can be evaluated. Program runtimes can also be calculated.

By deploying other components, such as the CAD data for the real machine, the machine manufacturer or CAM system manufacturer can create a virtual machine that resembles the real machine as closely as possible.

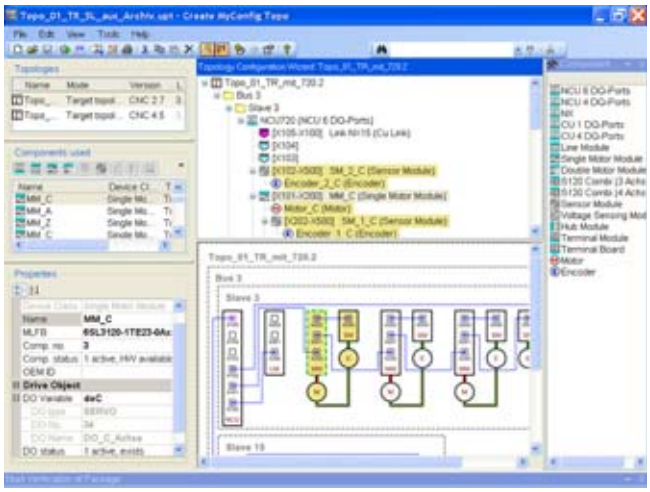
Use of SINUMERIK Integrate for engineering Run MyVNCK is always subject to conclusion of an integration contract.

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Run MyVNCK VNCK basic package for PC • DVD-ROM without license software version 4.5 ED2	**6FC5868-0XC41-1YA8**
SINUMERIK 840D sl VNCK	
• Basic package up to 4 axes simultaneously for 1 machine configuration	**6FC5868-0XF00-0YB0**
• Basic package up to 5 axes simultaneously for 1 machine configuration	**6FC5868-0XF01-0YB0**
• Expansion >1 machine configuration	**6FC5868-0XF03-0YB0**
SINUMERIK VNCK-Link For 1 machine configuration	**6FC5261-0AX30-0AB0**

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Overview



SINUMERIK Integrate for engineering Create MyConfig is used by the machine manufacturer to create and run a project for automated commissioning/production of machines with SINUMERIK 840D sl and SINUMERIK 828D control systems. Even upgrades of these CNCs can be configured and executed automatically on the end user's premises.

The modular concept of Create MyConfig enables different machines of a series to be commissioned and upgraded with one Installer package.

The individual operations on the machine can be performed faster and with greater ease and reliability.

Benefits

- Significantly reduced time for commissioning or upgrade
- Structured preparation and automated processes avoids commissioning and upgrading errors.
- Prevention of topological wiring errors, simple adaptation of topologies
- Reproducibility of the automatic commissioning and upgrading
- Simplification of the commissioning and upgrade processes on the system
- No dependence on the CNC software version; Installer packages can be used as from software version 2.6 - software version 4.7 (SINUMERIK 840D sl only)
- Detailed knowledge of the control system is essential only to configure the Create MyConfig update package, but not to perform commissioning or upgrades at the machine (menu-driven commissioning).

Design

Create MyConfig comprises the following components:

- CMC Expert
  - Configuration of an Installer package, which contains a configurable sequence of production or upgrade steps, and the associated data for various machine versions.
  - Creation of operator menus/operator help for package execution
  - Creation of automated scripts
- CMC Diff
  - Data comparison and automatic adaptation of folders, SINUMERIK archives, files and CNC data
  - Editing of CNC and drive archives, even directly on the machine, by simple archive download and upload function
  - Comparison of folders and data, even within archives
- CMC Topo
  - Creating and editing SINAMICS topologies
  - Adaptation of topologies, even without creating packages, with the archive download and upload function
  - Axis-drive assignment

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Function

Create MyConfig offers support for the installation, upgrade and retrofit of, for example:

- HMI installations (install/upgrade CNC software)
- OEM applications (copy files and data, adapt ini files)
- NCK area (read/adapt/set machine data)
- ShopMill/ShopTurn applications (transfer programs)
- Standard cycles (insert cycles)
- Measuring cycles (insert cycles)
- Languages (install languages according to requirements)
- PLC (e.g. automated adaptation of basic program to match NCK software version)
- OEM images (copy files)
- Drives
  - Manipulation of SINAMICS data in drive archives
  - Creation of a SINAMICS archive with predetermined topology
  - Assignment of drive data in different SINAMICS topologies

Integration

Requirements:

- SINUMERIK 840D sl with SINUMERIK Operate

Requirements for PC/PG:

- Windows 7 operating system
- Drive with 250 MB of free memory space
- Network/Ethernet port/USB FlashDrive

The following must also be installed on the PC/PG:

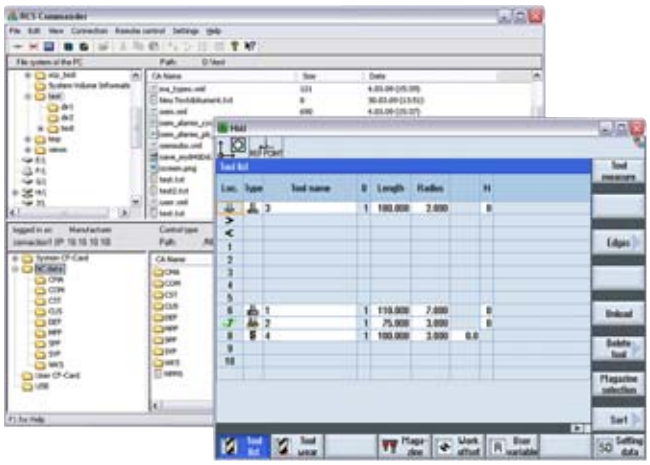
- Microsoft .NET Framework (included on product CD)
- Microsoft Internet Explorer version 6 or higher
- Acrobat Reader version 4 or higher

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Create MyConfig	
For series start-up and software upgrades	
• Single license on data storage medium Software version 4.7	**6FC5862-2YC44-0YA0**
• Single license without data storage medium	**6FC5862-2YP00-0YB0**
• Without license on data storage medium	**6FC5862-2YC44-0YA8**
• Software update service	**6FC5862-2YP00-0YL8**

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Overview



Commissioning support and remote diagnostics with SINUMERIK Operate

SINUMERIK Integrate Access MyMachine /P2P supports the commissioning of machines with SINUMERIK Operate (software version 2.6 and higher) using a standard Windows PC. Its scope of functions includes the exchange of files between the service PC and the control as well as operation of the HMI user interface. EasyScreen texts, alarm texts, tool management texts and other texts can be edited easily.

The file exchange functionality permits access from the NCU to files stored on the CF card and to files in the NCK. Various user profiles are also supported.

The file exchange only requires the Access MyMachine /P2P software. This is installed on the PC (direct access via X127 without a TS adapter does not require the Access MyMachine /P2P option).

If remote access, e.g. via modem, to the HMI user interface is required, the approved modem for this application is the TS Adapter IE (2 versions: analog and ISDN telecommunication networks, only via the X127 service interface) (requires Access MyMachine/P2P option).

Benefits

Cost savings in service thanks to:

- Less frequent service calls for the machines
- More efficient deployment of on-site service personnel
- Better preparation of service calls

Machine availability is enhanced thanks to:

- Rapid online presence on site
- Rapid file transfer to and from the machine

Function

Remote control, monitoring and administration

- File transfer to CF card and CNC file system
- Connection is established following confirmation by the operator
- Status display on the operator panel
- Optional teleservice software:
  (requires Access MyMachine /P2P option)
  Machine connections can be maintained centrally and access data administered via remote connections.

File functions

Access MyMachine /P2P allows simple file management on your PC and on the SINUMERIK control systems.

- Data transfer between SINUMERIK and PC, data transfer to CF card and CNC file system.
- Generation and restoration of images from the CF card of the CNC control for data backup purposes.
- Writing existing images to a CF card.
- Loading files directly to the control system and from the CNC control to the PC.

Support during commissioning

- Managing the CNC data of the CNC control.
- Files can be copied directly from the PC to the CNC, and from the CNC to the PC.
- Monitoring processes and remote control of the SINUMERIK via a remote control function.
- Saving the screenshot of the HMI on the PC.

Presentation of the CNC control and better support in the event of a fault

- Editing the following user files on the PC:
  - PLC alarm texts (oem_alarms_plc)
  - Cycle alarm texts (oem_alarms_cycles)
  - Part program messages (oem_partprogram_messages)
  - EasyScreen files
  - Tool management texts
  - EasyExtend files (oem_aggregate)
  - Maintenance planner files (oem_maintenance)
- Creating and loading an archive on the CNC control
- Managing user files with the following options:
  - Creating a project OFFLINE
  - Creating a project where the files are automatically copied from the CNC control
  - Copying individual files to the CNC control with the project dialog, or copying from the CNC control to the project
  - Deleting user files using the project dialog on the CNC control

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Integration

The components can be connected via X127 (X120/X130 have not been released)

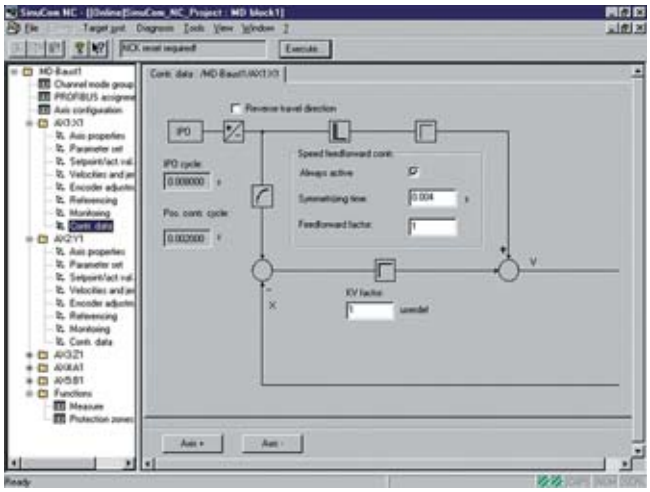
- Point-to-point connection in combination with TS Adapter IE (analog, ISDN modem)
- Ethernet in local networks (LAN)
- Internet (VPN), taking local IT security regulations (IT Policy) into account

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for engineering Access MyMachine /P2P For SINUMERIK 840D sl Software option Languages: Chinese Simplified, English, French, German, Italian, Spanish	**6FC5800-0AP30-0YB0**
SINUMERIK Integrate for engineering Access MyMachine /P2P for PC/PG	
• Single license with CD-ROM current software version	**6FC5860-7YC00-0YA0**
• Single license with CD-ROM software version 4.6	**6FC5860-7YC43-0YA0**
TS Adapter IE with integrated analog modem	**6ES7972-0EM00-0XA0**
TS Adapter IE ISDN with integrated ISDN terminal adapter	**6ES7972-0ED00-0XA0**
Teleservice software With floating license Languages: English, French, German, Italian, Spanish	**6ES7842-0CE00-0YE0**

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Overview



The SinuCom program package consists of:

- SinuCom NC
  - SinuCom NC Trace
  - SinuCom NC SI
- SinuCom FFS
- SinuCom ARC
- Commissioning software for SINAMICS S120

The SinuCom program package supports simple and effective commissioning of control systems. The programs provide comprehensive support to commissioning and service personnel of machine manufacturers for the following:

- Commissioning of the machine including utilization of the trace functionality, for the Safety Integrated acceptance test
- Creation of CF card images
- Administration of data for series start-up
- Transmission of CNC user data
- Know-how protection – guard technological knowledge against unauthorized access

Function

SinuCom NC

The SinuCom NC program facilitates commissioning of control systems by providing:

- Dialog-based parameterization of machine data
- Administration of data for series start-up
- Integrated online help for functions, machine data and alarms
- Functional description in German and English as PDF (part of the online help)

SinuCom NC Trace

The SinuCom NC Trace function permits the dynamic recording of CNC, PLC and HMI variables, and of drive signals that are available via the CNC. These variables can be displayed, printed out or stored in a file, similar to using an oscillograph or logic analyzer. The SinuCom NC Trace function helps with:

- Fault detection and fault correction
- Machine performance analysis, benchmarking and tuning
- Process performance analysis, benchmarking and tuning

SinuCom NC SI

The SinuCom NC SI function supports the machine manufacturer in automating the Safety Integrated acceptance test, and optimizes the process:

- Verification of machines according to the EC Machinery Directive
- Testing of safety functions (partly automated) during the machine acceptance
- Logging of measured data and test results incl. trace functions records
- Testing of single/special-purpose machines, machine components (as a partial test) and series machines as series start-up
- Shorter start-up times since, in the new acceptance mode, power-on alarms during the acceptance test are acknowledged by RESET
- Simple operation using prompted sequences
- Automatic configuration of the trace functions
- Unambiguous quality verification for original equipment manufacturers and customers, and for dealings with government agencies

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SinuCom

Function (continued)

SinuCom FFS

The SinuCom FFS program is used to generate an image for the PC card of the NCU of the SINUMERIK 840D sl. It contains:

- Processing of the Flash File System
- Preparing the image for programming the PC card
- Integrated help

The PC card is programmed using standard tools. These tools are not included in the scope of delivery of the SinuCom FFS.

SinuCom ARC

The SinuCom ARC program simplifies the processing of series start-up data:

- Reading, deleting, inserting and changing of data for series start-up
- Integrated help

Commissioning software for SINAMICS S120

The commissioning software for PCs/PGs enables optimized commissioning of drives with SINAMICS S120.

Integration

Product name	SINUMERIK 840D sl	SINUMERIK 828D	Windows 7 (32 bit/64 bit)
SinuCom NC	✓	–	✓
SinuCom NC Trace	✓	–	✓
SinuCom NC SI	✓	–	✓
SinuCom FFS	–	–	✓
SinuCom ARC	✓	–	✓
S120 commissioning tool	✓	✓	✓

✓ = Possible
– = Not possible

Selection and ordering data

Description	Article No.
SinuCom Commissioning/service tools	
• SinuCom NC, including	
- SinuCom NC Trace	
- SinuCom NC SI	
• SinuCom FFS	
• SinuCom ARC	
Languages: English, French, German, Italian, Spanish	
Documentation: English/German	
• Single license without data storage medium	**6FC5250-0AY00-0AG1**
• Single license on DVD-ROM current software version	**6FC5250-0AY00-0AG0**
• Single license on DVD-ROM software version 7.7	**6FC5250-7AY00-7AG0**
• Update on DVD-ROM on order software version 7.7	**6FC5250-7AY00-7AG3**

SIMATIC STEP 7 for SINUMERIK hardware

Overview

The SIMATIC STEP 7 software for service functions can be used to read status and service displays of the CPU via the PLC program without the need for an additional programming device, and to integrate new modules.

The software is designed for service functions. The conditions of the SINUMERIK supply contract apply.

Existing service packs for SIMATIC STEP 7 are released separately for STEP 7 on SINUMERIK PCU 50.5 Windows 7.

Integration

SIMATIC STEP 7 V5.5 SP4 can be used on the SINUMERIK PCU 50.5 Windows 7.

Requirements:

- Mouse and PC keyboard
- SINUMERIK PCU 50.5 Windows 7 with PCU Base software, version 1.2 or higher

Selection and ordering data

Description	Article No.
SIMATIC STEP 7 for SINUMERIK hardware	
• Single license without data storage medium	**6FC5252-0AY00-0AG1**
• Single license on CD-ROM current software version	**6FC5252-0AY00-0AG0**
• Single license on DVD-ROM software version 5.5 SP4	**6FC5252-5AY01-5AG0**

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Overview

More efficient production through intelligent IT integration

Siemens makes the complete range of IT integration available as an expansion of its CNC technology SINUMERIK 840D sl. This increases productivity in service and production, and expands the automation of the production. Machines communicate with higher-level control systems, and simply have to be expanded by new functionality. On the way toward the digital factory, the SINUMERIK Integrate product family offers productive solutions for integrating IT into production facilities.

There is potential for increasing the productivity of CNC manufacturing by networking machines and plants. This requires production data to be collected and evaluated transparently. Siemens offers SINUMERIK Integrate as a central platform, that provides useful modules for analyzing and managing data for individual machines and networked plants.

Future-proof investment in scalable software

Investment protection and future reliability with SINUMERIK Integrate

A typical production environment lasts for several years or even decades. In this time, the IT infrastructure is subject to continual change, whereas the machines remain virtually unchanged. At the same time, new requirements frequently arise, that can be met by expanding the software functionality – if possible without changing the machine-related software. SINUMERIK Integrate for production enables resources to be networked and processes and production data to be centrally managed. The security of the data is ensured from end to end. On the one hand by encrypted data transport and, on the other hand, because the machines can be operated with completely isolated firewalls.

Scalable stand-alone and client-server solutions

SINUMERIK Integrate for production is a client-server solution that is typically used in the environment of a local or decentralized machine park. Individual SINUMERIK Integrate applications can also be used as local solutions in the environment of a single machine. After installation, SINUMERIK controlled machines can be easily integrated as clients in an IT network on the Integrate server with the user interfaces HMI Advanced or SINUMERIK Operate. The entire software package comes from a single source, individual applications are activated by a simple installation and licensing procedure. The system is thus easily scalable.

The link to company level

SINUMERIK Integrate for production enables machine tools to be easily networked into higher-level IT systems for production. The software runs directly on the CNC, records all the data from the CNC and PLC, and makes it available for further use.

If the machines are connected to the server, new functions can be easily copied onto them. This is where the standardization of the Siemens portfolio pays off, as PLM and MES systems can be easily connected to increase productivity still further. This ensures cost advantages in both procurement and operation.

A platform with many advantages

SINUMERIK Integrate for production is a central platform with which the productivity of the end user or the service of machine manufacturers can be increased, and the automation of production expanded. Optimizing the production enables, on the one hand, more parts to be produced and, on the other hand, errors, such as missing tools, incorrect CNC programs, as well as high energy consumption, and material and tool inventories to be reduced.

	SINUMERIK Integrate for production
Manage CNC programs	Manage MyPrograms
Manage tools	Manage MyTools
Record machine states	Analyze MyCondition
Perform remote maintenance	Access MyMachine /Ethernet
Enable data access	Access MyData
Enable data access	Create MyInterface
Archive machine data	Access MyBackup

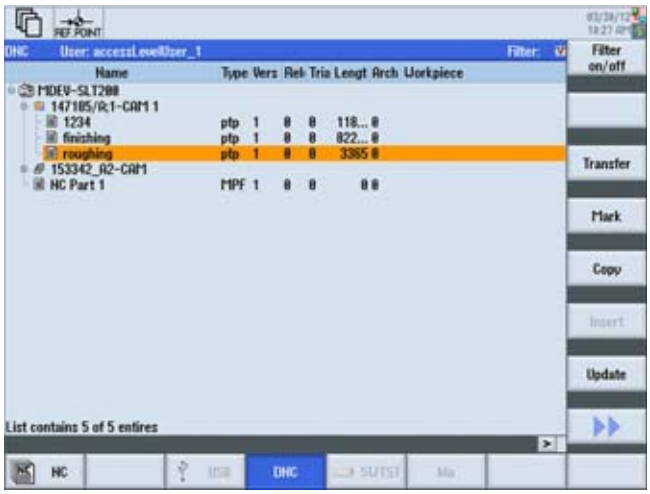
Note:

Access MyBackup is an interface which enables Solution Partners to offer their own products in the field of archiving systems on this basis. The certified SINUMERIK Solution Partners are the companies Auvesy and MDT Software.

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Manage MyPrograms

Overview



With Manage MyPrograms, SINUMERIK Integrate for production offers a powerful client-server software platform for the efficient network-wide organization, management and transfer of CNC programs.

As a result of the convenience of managing and archiving CNC programs electronically, the latest CNC program versions are always available to the machines throughout the entire production area. This is particularly relevant in production areas with a high degree of flexibility and variation, and where CNC data frequently change, for example in machining centers, special-purpose machines and flexible production lines.

Benefits

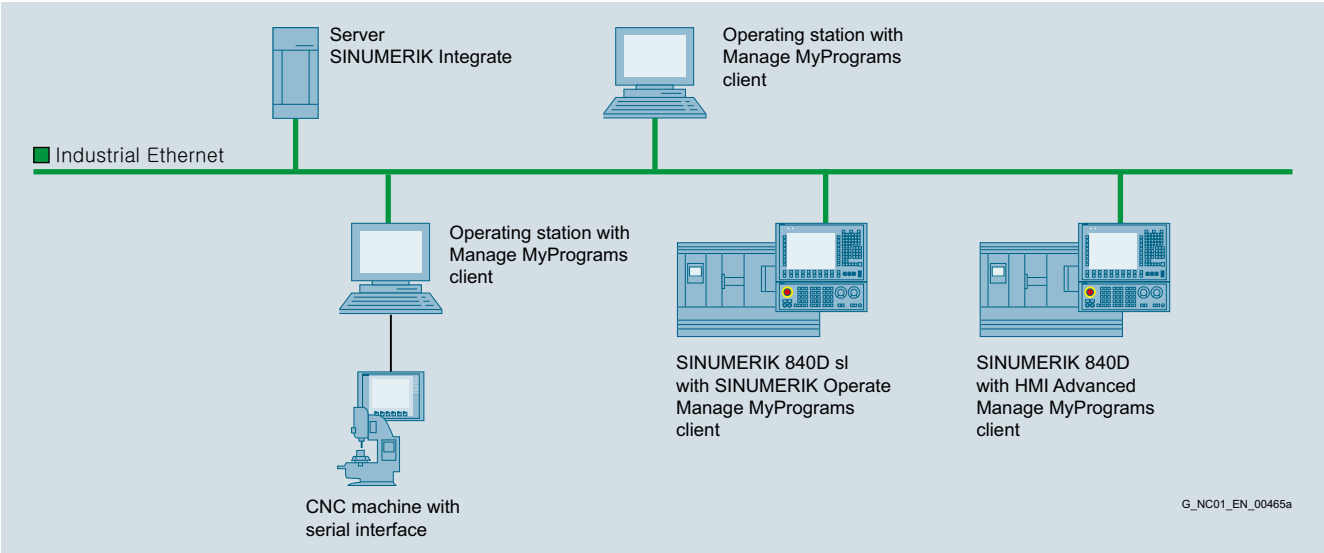
- Costs of CNC data organization are reduced:
  - Convenient, central CNC program management which provides access to CNC programs and attachments, e.g. PDFs and images
  - Low organization overhead and simple handling eliminate the need for external data storage mediums for archiving CNC data
- Fast, secure program transfer from and to the machine initiated on the machine or the server
- Increase in machine operating times and reduction in setup times through fast, reliable supply of CNC programs
- Cost-effective and reliable electronic data archiving
- Simple integration of many different types and generations of CNCs
- Convenient CNC program import and export functions to/from SINUMERIK Integrate for production Manage MyPrograms

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production software package On DVD-ROM without license current software version	**6FC5864-0YD00-0AA8**
SINUMERIK Integrate for production Manage MyPrograms	
• Single license per machine	**6FC5864-1AP00-0YB0**
• Upgrade license per machine	**6FC5864-1AP00-0YF0**
• Software update service/year license	**6FC5864-1AP00-0YM0**

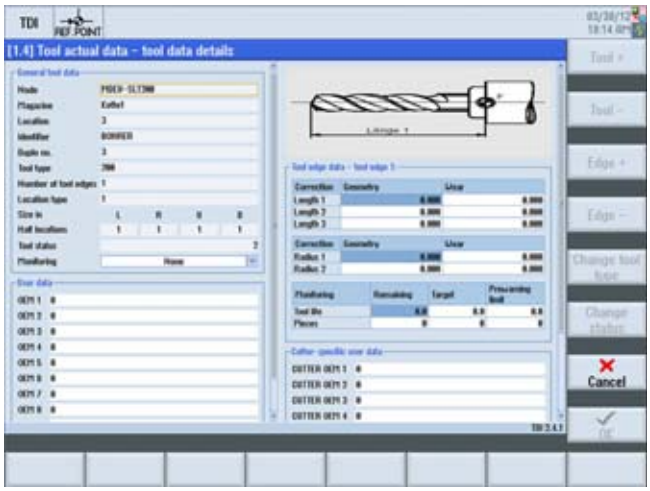
Integration

Manage MyPrograms permits central management and distribution of CNC program data in machine parks with different CNC types.



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Overview



Network-wide tool management

SINUMERIK Integrate for production Manage MyTools offers an integrated software solution for tool cycle management from adjustment, through tool storage, to the machine.

This ensures that machine downtime due to missing tools is reduced through preventive tool planning. Clock times and downtimes with regard to tools are optimized.

Tool organization across the entire production area is one of the central tasks of CNC production. Requirements are:

- Smooth processes within tool cycles
- Cost transparency
- Inventory and cost overview

SINUMERIK Integrate for production Manage MyTools makes this potential for rationalization transparent, and provides functions that help realize the potential savings identified. SINUMERIK Integrate for production Manage MyTools has the correct connection concepts and functions for providing a complete overview of the tools used and a closed tool data cycle in the production area for:

- Single machines, flexible transfer lines, or a complete machine park
- Highly automated SINUMERIK CNCs
- Integration of tool setting stations or cross-factory tool management systems.

Benefits

- Cost transparency in the tool cycle
- Detailed inventory overview, cost overview and productivity potentials in tool management
- The modularity of SINUMERIK Integrate for production Manage MyTools permits optimized customer-oriented and demand-oriented applications.
- Use scalable from a single machine up to a complete machine park.

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production software package On DVD-ROM without license current software version	**6FC5864-0YD00-0AA8**
SINUMERIK Integrate for production Manage MyTools License per machine	
• Single license per machine	**6FC5864-2AP00-0YB0**
• Upgrade license per machine	**6FC5864-2AP00-0YF0**
• Software update service/year license	**6FC5864-2AP00-0YM0**

Function

All SINUMERIK Integrate for production Manage MyTools functions are designed so that they can operate on a single machine or within networked, interconnected systems, e.g., they can display an overview of all actual tool data on a single machine or a central control system.

Scope of functions of single, non-networked machines

- Actual tool data
- Service life can be varied from 10 to 100 %
- Block tool and tool details
- Import/export file interface
- Tool transfer

Thanks to the consistent design as a client-server solution and the use of communication mechanisms, it is possible to vary the distribution of the modules in the network and to access them from any position. This means that up-to-date information can always be accessed wherever it is needed.

The following functions are available:

- Availability of actual tool data throughout the network
- Operator-prompted loading and unloading with TO data import from the tool setting station
- Planning of tool demand based on current magazine assignment
- Statistical evaluations of tool use
- Interface for connecting external management systems
- All available functions combined on a single server and network-wide operation of client-based interfaces
- Stand-alone non-network-compatible function package for tool planning and connection to tool setting stations

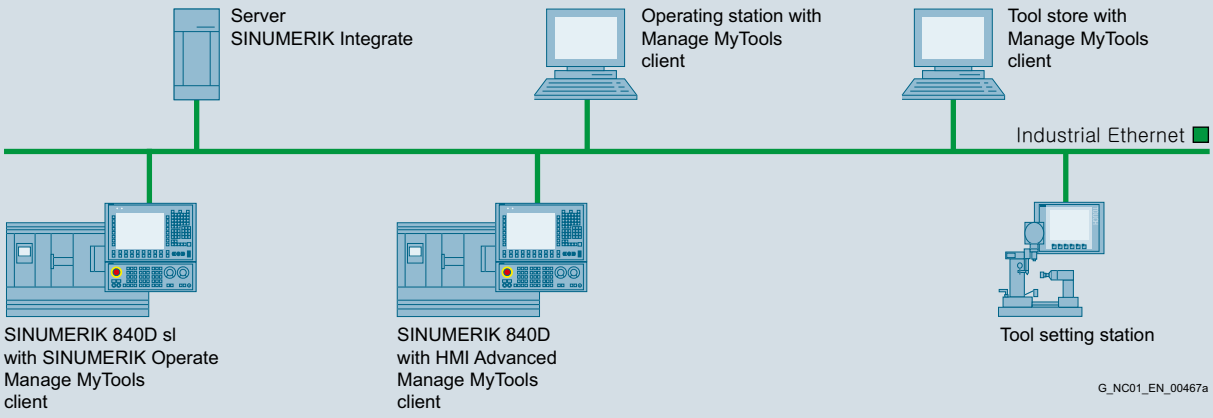
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4

Integration

Requirements:

- It is assumed that the standard tool management option is installed in the SINUMERIK CNCs. SINUMERIK CNCs without standard tool management or with tool management that is specific to the machine manufacturer must be connected for the specific project.
- In the case of third-party control systems, the manageable tool data is reduced to a simplified tool data structure. The basic requirements are that the control panel must be Windows-based, the CNC must be accessible via Ethernet, and the interface must be OPC-compatible. Third-party controls are connected for the specific project.
- If tools stored in tool cabinets are to be recorded and managed, a user interface for loading and unloading the tools must be assigned to the respective storage location, e.g. a Windows PC integrated in the network.



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Overview

SINUMERIK Integrate for production Analyze MyCondition provides test cycles for equability axis tests, for universal axis tests, and for performing circularity tests, and also offers functionality for individual acquisition of CNC data.

It also supports the reporting of parameters about wear of mechatronic components. By employing a condition-oriented maintenance routine, you will keep your machines running longer as well as reduce downtimes and outages.

By means of standardized test procedures,
Analyze MyCondition helps machine operators, maintenance technicians and service engineers to determine the machine condition and monitor the wear on the machine over time. Through continuous evaluation of the condition of the machine tools, trends can be detected early and measures can be taken and planned at the right time. Individual machine components can also be monitored statically and dynamically.

Benefits

- Designing and optimizing the maintenance measures for your machine
- Early spare parts disposition through status monitoring and analysis of machine components
- Provision of a planning service for your customers for preventative or condition-oriented maintenance measures

Function

Delivery stages

SINUMERIK Integrate for production Analyze MyCondition can be delivered in 3 different stages:

Stage 1: Control monitors

These can be used to configure triggers that will initiate a specific action. For example, they can be configured to send an E-mail to the machine manufacturer's organization in response to a specific event.

Stage 2: Diagnostics data (without variable monitors)

In addition to the triggers from stage 1, diagnostics data can be gathered during stage 2 and transmitted to the machine manufacturer's service organization.

Stage 3: Maintenance functions

In addition to the functions from stages 1 and 2, the functions supplied with stage 3 can be used to set up and evaluate event-driven maintenance functions.

Installation versions

Version 1: Local installation at the end user

With this version, the complete infrastructure for Analyze MyCondition is installed for end users. In this case, the IT of the end user is responsible for the server and infrastructure operation.

Version 2: Local installation at the machine manufacturer

With this version, the complete infrastructure for Analyze MyCondition is installed for machine manufacturers. In this case, the IT of the machine manufacturer is responsible for the server and infrastructure operation. Access to the machines is established via a secure Internet connection.

Function (continued)

Version 3: Siemens provides the server operation

With this version, Siemens operates the complete infrastructure for Analyze MyCondition. In this case, Siemens is responsible for the server and infrastructure operation. Access to the machines is established via a secure Internet connection.

This means that Analyze MyCondition facilitates the global and at the same time secure access to the data of a machine tool automated with SINUMERIK.

For versions 2 and 3, remote access from anywhere in the world is always established via a secure connection based on TLS (previously SSL) via the Internet.

The technical implementation of access to the Internet depends on the local conditions at the machine. Access to the Internet can be implemented in different ways. The main requirement is a data transmission rate of at least 64 kbit/s. Depending on the available data transmission rate, some functions may not be executed very quickly or are only available with restrictions.

Integration

Requirement:

- SINUMERIK 840D sl with SINUMERIK Operate

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production software package On DVD-ROM without license current software version	**6FC5864-0YD00-0AA8**
SINUMERIK Integrate for production Analyze MyCondition Control monitors	
• Single license per machine	**6FC5864-7AP00-0YB0**
• Upgrade license per machine	**6FC5864-7AP00-0YF0**
• Software update service/year license	**6FC5864-7AP00-0YM0**
SINUMERIK Integrate for production Analyze MyCondition Diagnostics data (without variable monitors)	
• Single license per machine	**6FC5864-7BP00-0YB0**
• Upgrade license per machine	**6FC5864-7BP00-0YF0**
• Software update service/year license	**6FC5864-7BP00-0YM0**
SINUMERIK Integrate for production Analyze MyCondition Maintenance functions	
• Single license per machine	**6FC5864-7CP00-0YB0**
• Upgrade license per machine	**6FC5864-7CP00-0YF0**
• Software update service/year license	**6FC5864-7CP00-0YM0**

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Overview



SINUMERIK Integrate for production
Access MyMachine /Ethernet enables worldwide, secure remote operation and monitoring of a machine tool automated with SINUMERIK.

Remote access is always established via a secure connection based on TLS (previously SSL) via the Internet.

The technical implementation of access to the Internet depends on the local conditions at the machine. Access to the Internet can be implemented in different ways. The main requirement is a data transmission rate of at least 64 kbit/s. Ideally, DSL is used for this purpose. Depending on the available data transmission rate, some functions (e.g. file transfer) may not be executed very quickly or are only available with restrictions.

Function

Delivery stages

SINUMERIK Integrate for production
Access MyMachine /Ethernet is delivered in 3 different stages:

Stage 1: SINUMERIK Integrate for production
Access MyMachine /Ethernet – Single Access

The following services are provided within
SINUMERIK Integrate for production
Access MyMachine /Ethernet – Single Access:

Remote desktop

This function allows remote operation and monitoring of the user interface of the control system. The user interface is not only accessible to the operator at the machine, but also to service personnel in cases where they are providing support from a remote location, for example.

File transfer

The file transfer function allows files to be copied into the file system of the CNC. In addition, files can be transferred from the CNC's file system to the remote desktop.

Session recording

Session recording is used to record a remote maintenance operation for subsequent reproduction.

Function (continued)

Stage 2: SINUMERIK Integrate for production
Access MyMachine /Ethernet – Conferencing

The Conferencing function supplied with stage 2 allows further participants to be included in a remote maintenance session. In addition to a valid Conferencing license on the machine, the only other prerequisite is that the third participant has access to the Internet.

Stage 2 includes Stage 1.

Stage 3: SINUMERIK Integrate for production
Access MyMachine /Ethernet – Remote STEP 7

The Remote STEP 7 function supplied with stage 3 provides support for the diagnosis and solution of PLC-related problems. The service technician requires a STEP 7 installation, and by means of SINUMERIK Integrate for production
Access MyMachine /Ethernet – Remote STEP 7, he can access the machine's PLC directly. A local installation of STEP 7 on the machine is not necessary.

Stage 3 includes Stages 1 and 2.

Integration

Requirements:

- SINUMERIK 840D sl with SINUMERIK Operate

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production Access MyMachine /Ethernet – Single Access	
• Single license per machine	**6FC5864-4AP00-0YB0**
• Upgrade license per machine	**6FC5864-4AP00-0YF0**
• Software update service/year per machine	**6FC5864-4AP00-0YM0**
SINUMERIK Integrate for production Access MyMachine /Ethernet – Conferencing	
• Single license per machine	**6FC5864-4BP00-0YB0**
• Upgrade license per machine	**6FC5864-4BP00-0YF0**
• Software update service/year per machine	**6FC5864-4BP00-0YM0**
SINUMERIK Integrate for production Access MyMachine /Ethernet – Remote STEP 7	
• Single license per machine	**6FC5864-4CP00-0YB0**
• Upgrade license per machine	**6FC5864-4CP00-0YF0**
• Software update service/year per machine	**6FC5864-4CP00-0YM0**

Accessories

Alternative Internet access via SCALANCE M

The SCALANCE M portfolio from Siemens is the low-cost alternative to the construction of a separate corporate radio network, because it uses the worldwide public mobile network. It is also used in situations where no other transmission medium is available.

SCALANCE M network components can also be used universally together with SINUMERIK Integrate for production Access MyMachine.

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Overview

Modern interfaces for comprehensive data access

The open, flexible software interface SINUMERIK Integrate for production Access MyData enables easy data exchange between SINUMERIK Integrate applications and higher-level or supplementary software systems.

Benefits

There is an increasing number of productivity-boosting solutions based on IT networking of CNC machines and plants in the machining production environment. Integrating these solutions requires modern interfaces, that allow comprehensive access to data as required, either directly to the CNC and PLC data, or to preprocessed data that supports clearly delimited functions.

Function

SINUMERIK Integrate for production Access MyData offers an open interface function enabling smooth access to data on machine tools controlled by SINUMERIK 840D sl. Different versions supplement the SINUMERIK Integrate for production software suite.

Access MyData plays a special role here: Contrary to other applications that directly expand the CNC functions, Access MyData as a component of the Integrate server consistently opens up the SINUMERIK product family.

CNC and PLC data can be read and written directly in the AMD Basic version, which is free of charge. This allows information to be exchanged with the main control room software and all types of computers, as well as a dynamic machine connection to any PLM, ERP or MES system.

The billable versions, Access MyData - MMT and Access MyData - MMP, also offer specialized interfaces for accessing tool data (Manage MyTools) and transferring part programs (Manage MyPrograms).

Integration

The installation of a SINUMERIK Integrate server, and the connection of the relevant machines to the server are general prerequisites. There are no other requirements for the use of the free AMD Basic version.

Other requirements:

- Each machine requires not only a license to use Access MyData - MMP but also a license for Manage MyPrograms (MMP).
- Each machine requires not only a license to use Access MyData - MMT but also a license for Manage MyTools (MMT).

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production software package On DVD-ROM without license current software version	**6FC5864-0YD00-0AA8**
SINUMERIK Integrate for production Access MyData - MMP	
• Single license per machine	**6FC5864-1DP00-0YB0**
• Upgrade license per machine	**6FC5864-1DP00-0YF0**
• Software update service/year per machine, license	**6FC5864-1DP00-0YM0**
SINUMERIK Integrate for production Access MyData - MMT	
• Single license per machine	**6FC5864-2DP00-0YB0**
• Upgrade license per machine	**6FC5864-2DP00-0YF0**
• Software update service/year per machine, license	**6FC5864-2DP00-0YM0**

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Create MyInterface

Overview

The SINUMERIK Integrate for production Create MyInterface software is used to integrate SINUMERIK CNCs into a customer's production network. All essential machine data, such as status information, piece counts, alarms, messages, CNC programs, tool service life, can be exchanged via Create MyInterface between a central control system and the CNC.

Benefits

- Simple integration of the CNC with customer/project applications through a defined Ethernet/TCP-IP-based interface
- Simple configuration of the data to be transferred on the PLC
- SINUMERIK Integrate for production Create MyInterface as a tool that can be used to implement measures designed to boost productivity:
  - Machine capacity utilization improved by production control
  - Machine downtimes reduced by transmission of maintenance data
- Simple application by using standard hardware/software components from the PC world
  - Networking hardware/software (Ethernet cards, TCP-IP)
  - Familiarization
  - Commissioning, maintenance

Function

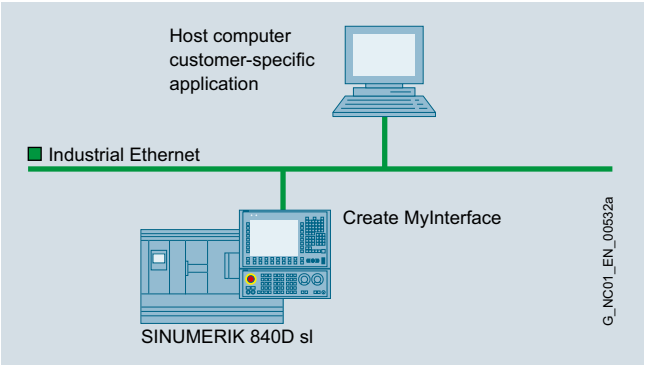
- Defined, opened communications interface for exchanging essential data of the SINUMERIK CNC
- Data transmission can be initiated by the host computer and/or by the SINUMERIK CNC
- The host application is created by the user in the SINUMERIK Integrate for production Create MyInterface environment (interfaces, examples)
- The following data can be exchanged:
  - CNC programs, tool data
  - Machine status data
  - Messages
  - Production dialog data
  - Mode switchover, synchronization
  - Transport jobs
  - Configurable data from PLC or CNC

Even without its own user interface, SINUMERIK Integrate for production Create MyInterface can run with additional languages (e.g., Korean, Russian, Simplified Chinese).

Integration

Requirements:

- SINUMERIK 840D sl with maximum of 4 NCUs
- SINUMERIK PCU 50.5 Windows 7
- SINUMERIK Integrate for production Manage MyTools for computer-controlled loading and unloading of tools



SINUMERIK Integrate for production Create MyInterface cannot run by itself in a given systems environment. An application to be created specifically for a customer (not included in Create MyInterface) is always required on the host computer side.

Selection and ordering data

Description	Article No.
SINUMERIK Integrate for production Create MyInterface Communication software for connecting a host computer to SINUMERIK 840D sl and SINUMERIK Operate Languages: English, German	
• DVD-ROM without license for current software version	**6FC6000-7AC02-6AA8**
• Single license per machine	**6FC6000-7NF02-6YB0**
• Upgrade license per machine	**6FC6000-7NF02-6YF0**

Access MyBackup

Overview

Access MyBackup is an interface which enables Solution Partners to offer their own products in the field of archiving systems on this basis. The certified SINUMERIK Solution Partners are the companies Auvesy and MDT Software.

For more information, refer to chapter 9.

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5/95 Line reactors
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Part 8 **CAD CREATOR**
Dimensional drawing and 2D/3D CAD generator
www.siemens.com/cadcreator

Part 8 **Drive Technology Configurator selection tool**
Guided product selection through to exact article number
www.siemens.com/dt-configurator

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Overview

SINUMERIK and SINAMICS automation system components

SINAMICS S120 drive system

Line-side components
- Line reactors
- Line filters
- Active Interface Modules



Line Modules
- Smart Line Modules
- Active Line Modules
- Active Interface Modules



DC link components
- Braking Module
- Braking resistors
- Capacitor Module
- Control Supply Module



Control Units
- CU310-2
- CU320-2
- CUA31



Control Units SINUMERIK 840D sl
- NCU 710.3B PN
- NCU 720.3B PN
- NCU 730.3B PN

NX10.3/NX15.3



SINAMICS S120 Combi



Motor Modules
- Single Motor Modules
- Double Motor Modules





Sensor Modules

SMC10/SMC20/SMC30/SMC40
SME20/SME25
SME120/SME125



Supplementary system components

DMC20 TM120
DME20 TM15
TM41



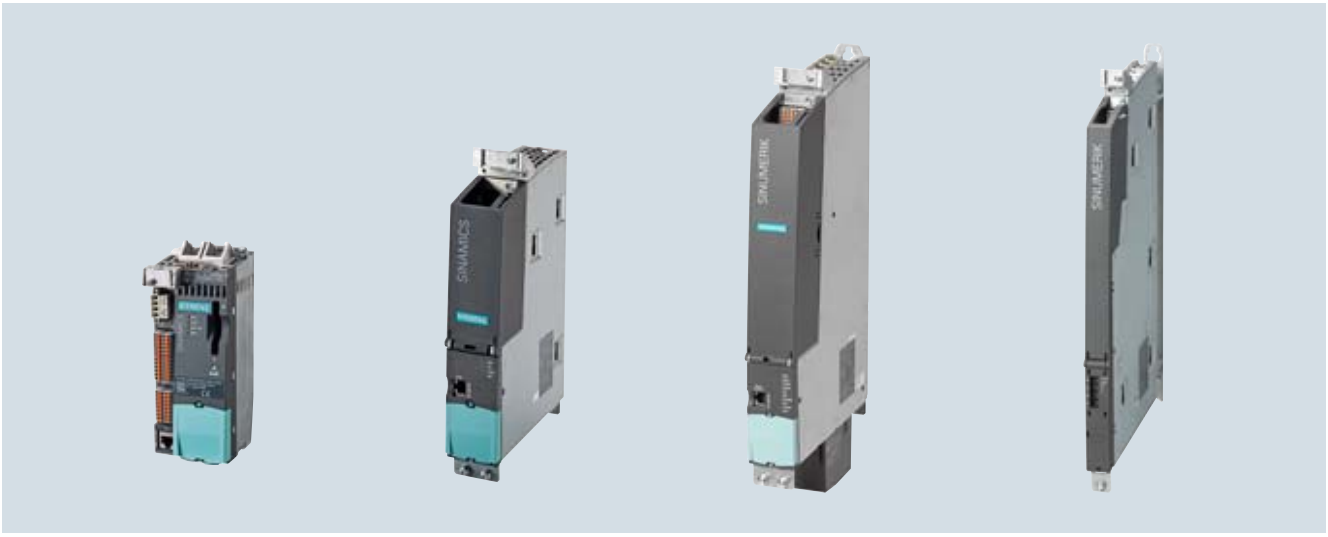
Power Modules



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Overview (continued)



Control Units CU310-2 PN, CU320-2 PN, NCU 730.3B PN and Numeric Control Extension NX15.3 (from left)

Platform concept and Totally Integrated Automation

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.

SINAMICS is part of the Siemens Totally Integrated Automation concept. Integrated SINAMICS systems covering engineering, data management and communication at automation level, ensure low-effort solutions with the SINUMERIK, SIMOTION, and SIMATIC control systems.

All formats can be combined as required

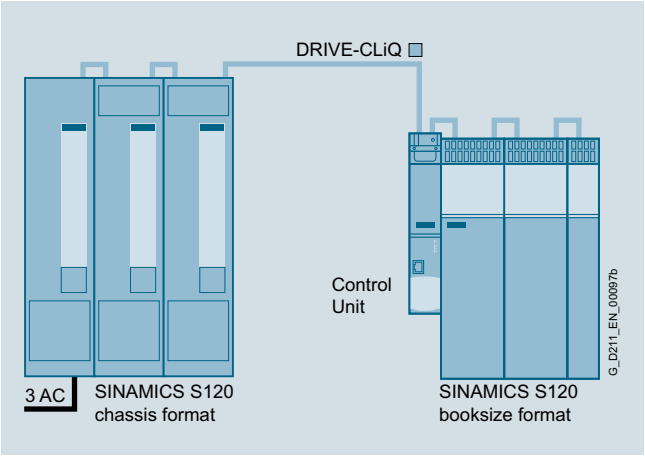
The different formats of SINAMICS S120 can be combined freely thanks to their innovative drive architecture with DRIVE-CLiQ interfaces, e.g. Line Modules in chassis format can be freely combined with Motor Modules in booksize format for multi-axis applications with high total output.



SINAMICS S120 blocksize, booksize, and chassis formats

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Overview (continued)



Modular system for demanding drive tasks

SINAMICS S120 solves demanding drive tasks for a very wide range of industrial applications and is, therefore, designed as a modular system. Users can choose from many different harmonized components and functions to create a solution that best meets their requirements. The powerful SIZER for Siemens Drives engineering tool makes it easier to choose and determine the optimum drive engineering. This is possible due to the consistent subdivision of the drive in hardware and software function objects, which ensures that the power unit and Control Unit are isolated from each other.

The power units are selected in accordance with the requirements for energy consumption for the motion of the working machine and for exchange of energy with the power supply network. The Control Unit is selected in accordance with the number of drives to be controlled and the performance required. Communication between the Control Unit and power unit takes place very simply via the digital system interface DRIVE-CLiQ.

SINAMICS S120 is enhanced by a wide range of motors. Whether synchronous or asynchronous, all motor types are optimally supported by SINAMICS S120.

Particularly suitable for multi-axis applications

Coordinated drives that carry out a drive and motion task together are used in many mechanical and plant engineering applications. Drives with coupled DC links are required for this purpose, as they support economic energy exchange between braking and driving axes.

SINAMICS S120 includes Line Modules (line infeed) and Motor Modules (inverters) for a wide performance range. Their format enables a contiguous installation for space-saving multi-axis drive configurations.

System architecture with a central Control Unit

Electronically coordinated individual drives work together to perform your drive tasks. Higher-level computerized numerical controls such as SINUMERIK operate the drives to achieve the required coordinated movement. This requires cyclic data exchange between the CNC and all the drives. This exchange usually took place via a field bus, which required a great deal of time and effort for installation and configuration. To solve this task, the SINAMICS S120 uses a central Control Unit that is designed as a higher-level drive controller for all connected axes.

Simple technological tasks can be carried out by the SINAMICS S120 Control Unit itself. For more complex numerical tasks, it is replaced by powerful modules from the SINUMERIK product range.

As well as motion control, coordinate transformation and logic functions, these products also integrate the SINAMICS drive control. The NCUs of SINUMERIK can be positioned in or alongside the SINAMICS S120 drive group and connected via DRIVE-CLiQ. In case of tasks that require a greater number of motion axes due to the machine kinematics, the system base units can be expanded with the additional Numeric Control Extensions NX10.3/NX15.3.

DRIVE-CLiQ – the digital interface between all components

All SINAMICS S120 drive system components, including the motors and encoders, are interconnected by a shared serial interface called DRIVE-CLiQ. The standardized cables and connectors reduce the variety of different parts and cut storage costs.

Sensor Modules (converter boards) for converting standard encoder signals to DRIVE-CLiQ are available for motors and encoders without a DRIVE-CLiQ interface or for retrofitting applications. DRIVE-CLiQ cables are designed to allow decentralized system layouts extending up to 100 m (328 ft).

Swift and automatic: The electronic rating plate

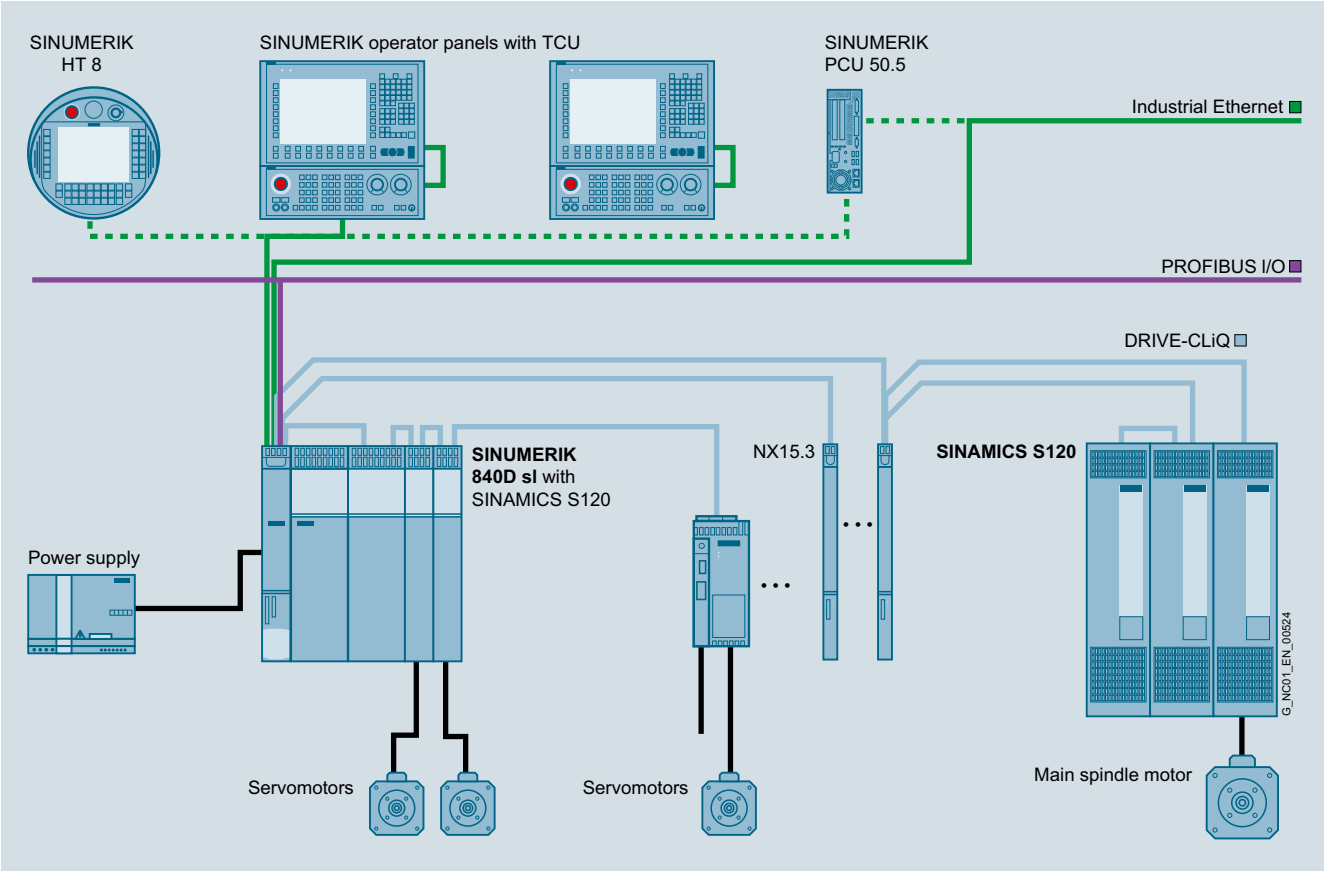
All SINAMICS S120 components with a DRIVE-CLiQ interface have an electronic rating plate. This rating plate contains all the relevant data about that particular component. For motors, for example, these data include the parameters of the electric equivalent circuit diagram and characteristic values for the built-in motor encoder. The Control Unit records this component-specific data automatically via DRIVE-CLiQ so that it does not need to be entered during commissioning or when the equipment is replaced.

In addition to the technical data, the electronic rating plate includes logistical data (manufacturer ID, article number, and globally unique ID). Since this data can be called up electronically on site or remotely, all the components used in a machine can always be individually identified, which helps simplify servicing.

The following overviews feature the SINAMICS S120 components that are primarily used for multi-axis drive tasks.

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Overview (continued)



SINAMICS S120 drive system with SINUMERIK 840D sl

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Overview (continued)

Control Units



CU310-2 PN, CU310-2 DP, CU320-2 PN
CU320-2 DP, NCU 730.3B PN, Numeric Control Extension NX15.3

Control Units for drive control in SINUMERIK, the Numeric Control Extensions NX and the CU320-2

SINAMICS S120 Control Unit CU320-2

These central Control Units can be used to create links between individual drives and implement simple technology functions.

The CU320-2 Control Unit has been designed to control multiple drives. With the SINUMERIK, up to 6 drives can be operated in servo control mode on one Control Unit.

The Control Units in the SINUMERIK CNCs are available in various rating classes for implementing coordinated motion control in a multi-axis interpolation grouping on machine tools:

SINUMERIK 840D sl

- NCU 710.3B PN/NCU 720.3B PN/730.3B PN with integral drive control. Up to three NCU 730 units interlinked by NCU-Link represent the highest possible performance level. They are capable of controlling up to 93 axes in up to 10 machining channels.
- Numeric Control Extensions NX10.3/NX15.3 for extended control of up to 3/6 axes

Commissioning and diagnostics of the various Control Units in combination with the power components is performed in combination with the SINUMERIK using the drive wizard of the SinuCom NC commissioning tool. Alternatively, the drive can be commissioned using the STARTER commissioning tool.

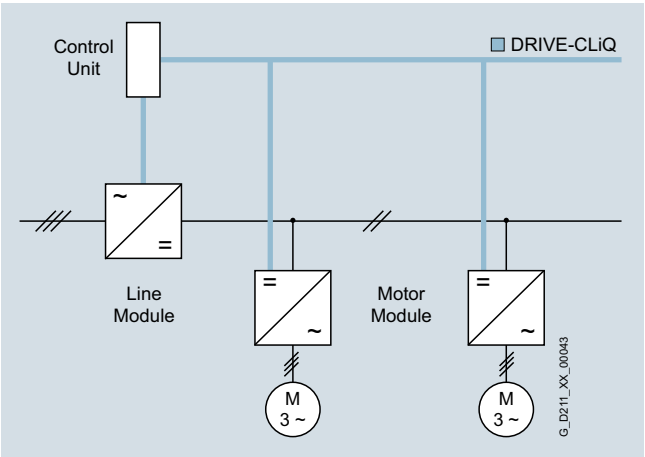
For further information about STARTER, see engineering software.

Motor Modules

The Motor Modules are the final controlling element for the motor and feature a DC link that is fed from a DC voltage and, as an output, an inverter for feeding the motor.



Line Module and two Motor Modules in booksize format



Motor Modules are designed for multi-axis drives and are controlled by a SINUMERIK NCU or a CU320 Control Unit. The Motor Modules are interconnected through a common DC bus. Since the Motor Modules share the same DC link, they can exchange energy with one another, i.e. if one Motor Module operating in generator mode produces energy, the energy can be used by another Motor Module operating in motor mode. The DC link is supplied with line supply voltage by a Line Module.

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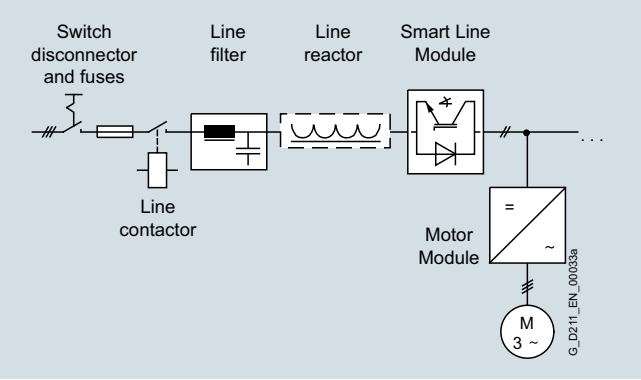
Overview (continued)

Line Modules

Line Modules generate a DC voltage from the line voltage and supply Motor Modules with energy via the voltage-source DC link. The SINAMICS S120 range includes the following types of Line Modules:

Smart Line Modules

Smart Line Modules can feed energy to the DC link of a drive group through a non-stabilized converter and also feed back the generated excess energy into the power supply system. The line voltage variations are mirrored proportionately in the DC link voltage. Braking Modules and braking resistors are required only if the drives need to be decelerated in a controlled manner for island supply systems or after a power failure (i.e. when energy cannot be recovered to the supply). When a Smart Line Module is used as the infeed, the matching line reactor must be installed. A line filter can be installed optionally to restrict the interference voltage level to EN 61800-3 Class C2 limits.

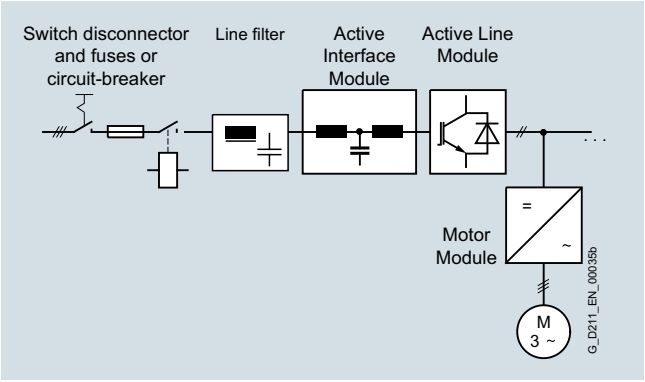


Active Line Modules

Active Line Modules can supply energy to the DC link bus and return regenerative energy to the supply system. In contrast to Smart Line Modules, Active Line Modules generate a regulated DC voltage which remains constant despite fluctuations in the line voltage. In this case, the line voltage must remain within the permissible tolerance range. Braking Modules and braking resistors are required only if the drives need to be decelerated in a controlled manner even after a power failure (when energy cannot be recovered to the supply). Active Line Modules draw a virtually sinusoidal current from the supply which virtually rules out any harmful harmonics. It is essential that the Active Interface Module matched to the output type is used (block diagram, see Active Line Modules in chassis format).

Active Line Modules in chassis format

All the components required to operate an Active Line Module are integrated in the Active Interface Module. An external bypass contactor is required in addition for sizes HX and JX.



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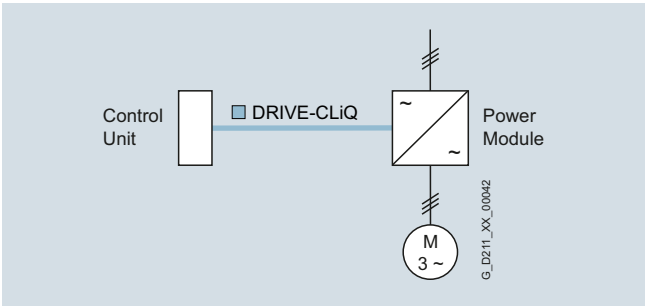
Overview (continued)

Power Modules

The simplest version of a SINAMICS S120 drive system consists of a CU310-2 Control Unit and a Power Module. A line rectifier, a voltage-source DC link and an inverter for supplying a motor are integrated in the Power Module.



Power Module in blocksize format with CU310-2 PN Control Unit



Power Modules are designed for single drives which are not capable of regenerating energy to the supply. Generated energy produced during braking is converted to heat in braking resistors.

Power Modules can also be operated by a CU320-2 Control Unit or a drive control integrated in SINUMERIK, e.g. in configurations where a single drive has been added to a multi-axis drive group. In this case, the Power Modules in blocksize format must be equipped with the CUA31 Control Unit Adapter. This is connected with the CU320-2 Control Unit or the NCU in SINUMERIK using DRIVE-CLiQ. Power Modules in chassis format are directly connected to the Control Unit using a DRIVE-CLiQ cable.

The following versions are available:

- Motor Modules and Line Modules in booksize and chassis formats
- Power Modules in blocksize and chassis formats
- Motor Modules in booksize compact format
- SINAMICS S120 Combi

Booksize format

Booksize format units are optimized for multi-axis applications and are mounted adjacent to one another. The connection for the common DC link is an integral feature.



With respect to control cabinet cooling, SINAMICS S120 in booksize format offers a number of highly effective options. Depending on the application, component heat loss can be transferred to the environment using three different heat dissipation methods. The design of the components differs only in the format of the backplane and the location of the external fan module. The front panel (where the connections are located) and the width of the components are common to all designs.

Internal air cooling

In this standard solution, the power loss from the electronics and power units of the drive components is removed by natural cooling or by a forced-ventilation system and routed to the interior of the control cabinet.

External air cooling

External air cooling uses the through-hole technology. The components' power unit heat sinks pass through the mounting surface in the control cabinet and can thus dissipate the heat losses of the power circuit to a separate external ventilation circuit. Degree of protection IP54 can be achieved at this "mechanical interface" – the external heat sink. The heat sink, with its cooling fins and the fan unit (part of the scope of supply), protrudes through the back into a separate ventilation duct, which can also be open to the outside. The only heat loss that remains in the cabinet is largely emitted by the electronics.

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Overview (continued)

Chassis format

Higher-output units (approximately 100 kW and above) are constructed in chassis format. These devices are available as Line Modules and Motor Modules. Chassis format units are cooled by an internal air cooling circuit.



Blocksize format

The units in blocksize format are optimized for single-axis applications.

The CU310-2 DP/CU310-2 PN Control Units or CUA31 Control Unit Adapters can be snapped on directly. The units are cooled by an internal air cooling circuit.



Power Module with CU310-2 PN Control Unit plugged in

SINAMICS S120 Combi

SINAMICS S120 Combi is a very compact and rugged drive system for compact turning and milling machines.

The prerequisite for operation of the SINAMICS S120 Combi is an NCU 710.3B PN.

SINAMICS S120 Combi integrates a line infeed with regenerative feedback capability, power units for spindle and feed motors as well as a TTL encoder interface into a single Power Module.

Special features are the minimum space requirement in the control cabinet, low energy requirement thanks to state-of-the-art 400-V technology, and perfected expendability using additional Motor Modules in booksize compact format.

The expansion using Motor Modules in booksize compact format is only permissible in combination with a NCU 710.3B PN and the SINAMICS S120 Combi (SINUMERIK 840D sl BASIC).

An intelligent DRIVE-CLiQ interface is provided for cabling.



SINAMICS S120 Combi

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Overview (continued)

Additional system components

The structure of the drive system is defined by the selected Control Unit, Line Module, and Motor Modules or Power Module. An optimal solution can be obtained for the drive task using these system components.

Additional system components can be installed to expand the system's scope of functions and adapt it perfectly to the drive task in question.

System components are divided into the following categories:

- **DC link components**
  e.g. Braking Modules and braking resistors
  Additional DC link components can be used as options to stabilize the DC link voltage and/or to support the electronics power supply.
- **Supplementary system components**
  e.g. Terminal Modules for expanding the I/O interfaces to the machine interface
- **Encoder system connection**
  for connecting various types of encoders to SINAMICS S120
- **Line-side power components**
  such as fuses, contactors, reactors, and filters for switching the power supply and meeting EMC requirements.

Energy efficiency

The SINAMICS S120 drive system saves energy by recovering energy from the axes and using it within the DC link group of a multi-axis configuration and by feeding it back into the supply system. Even at full infeed capacity, no unnecessary heat is generated in the control cabinet. With intelligent compensation of capacitive and inductive reactive currents, SINAMICS S120 also ensures that no unnecessary power losses occur in the power supply and that no current harmonics occur. This not only prevents detrimental effects on other loads, but it also reduces the heat generated in the control cabinet.

The SINAMICS S120 components have been developed for installation in cabinets

They have the following features and characteristics:

- Ease of handling
- Simple assembly and wiring
- Practical connection system, cable routing in accordance with EMC requirements
- Uniform design
- Contiguous assembly
- Various cooling solutions

Rugged units

The SINAMICS units are equipped as standard with varnished or partially varnished modules for enhanced robustness.

The coating on the modules protects the sensitive SMD components against corrosive gases, chemically active dust and moisture.

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Technical specifications

Unless specified otherwise, the following technical specifications are valid for all the following components of the SINAMICS S120 drive system.

Drive system	SINAMICS S120
Electronics power supply	24 V DC -15 %/+20 %
Vibratory load	
• Transport[1] acc. to EN 60721-3-2	
• All units and components except for chassis format	Class 2M3
- Chassis format devices	Class 2M2
• Operation Test values acc. to EN 60068-2-6	Test Fc 10 ... 58 Hz: Constant deflection 0.075 mm (0.003 in) 58 ... 150 Hz: Constant acceleration = 9.81 m/s^2 (3.2 ft/s^2) (1 × *g*)
Shock load	
• Transport[1] acc. to EN 60721-3-2	
- All units and components except for chassis format	Class 2M3
- Chassis format devices	Class 2M2
• Operation Test values acc. to EN 60068-2-27	Test Ea
- Booksize and blocksize formats FSA to FSC	147 m/s^2 (15 × *g*)/11 ms
- Blocksize format FSD to FSF	49 m/s^2 (5 × *g*)/30 ms
- Chassis format	98 m/s^2 (10 × *g*)/20 ms
Environmental conditions	
• Protection class acc. to EN 61800-5-1	Class I (with protective conductor system) and class III (PELV)
• Touch protection	DIN VDE 0106 Part 100 and BGV A 3 when used properly
• Cooling method	Internal/external air cooling, power units with increased air cooling by means of built-in fan
Permissible ambient/coolant temperature (air) during operation	
• For line-side components, Power Modules, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) see derating characteristics
• For Control Units, additional system components, DC link components and Sensor Modules	0 ... 55 °C (32 ... 131 °F) up to 2000 m (6562 ft) above sea level
Climatic ambient conditions	
• Storage[1] acc. to EN 60721-3-1	Class 1K4 Temperature -25...+70 °C (-13 ... +158 °F)
• Transport[1] acc. to EN 60721-3-2	Class 2K4 Temperature -40...+70 °C (-40 ... +158 °F) Max. air humidity 95 % at 40 °C (104 °F)
• Operation acc. to EN 60721-3-3	Class 3K3 Temperature 0 ... 55 °C (32 ... 131 °F) Condensation, splash water, and ice formation not permitted (EN 60204, Part 1)

Drive system	SINAMICS S120
Environmental class/ harmful chemical substances	
• Storage[1] acc. to EN 60721-3-1	Class 1C2
• Transport[1] acc. to EN 60721-3-2	Class 2C2
• Operation acc. to EN 60721-3-3	Class 3C2
Organic/biological influences	
• Storage[1] acc. to EN 60721-3-1	Class 1B1
• Transport[1] acc. to EN 60721-3-2	Class 2B1
• Operation acc. to EN 60721-3-3	Class 3B1
Degree of pollution acc. to EN 61800-5-1	2
European standards	
EN 954-1 Superseded by: ISO 13849-1	Safety of machinery – Safety-related parts of control systems Part 1: General principles for design
EN 61508-1	Functional safety of electrical/ electronic/programmable safety-related systems Part 1: General requirements
EN 50370-1	Electromagnetic compatibility (EMC) – Product family standard for machine tools Part 1: Interference emissions
EN 55011	Industrial, scientific and medical high-frequency devices (ISM devices) – radio interference – limit values and measuring techniques
EN 60204-1	Electrical equipment of machines Part 1: General definitions
EN 61800-3	Adjustable speed electrical power drive systems Part 3: EMC product standard including specific test methods
EN 61800-5-1	Adjustable speed electrical power drive systems Part 5: Safety requirements Main section 1: Electrical and thermal requirements
North American standards	
UL508C	Power Conversion Equipment
CSA C22.2 No. 14	Industrial Control Equipment
Certificate of suitability	
cULus[1]	Testing by UL (Underwriters Laboratories) according to UL and CSA standards www.ul.com

[1] In transport packaging.

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More information

For satisfactory and reliable operation of the drive system, original components of the SINAMICS drive system and the original Siemens accessories as described in this Catalog and the Configuration Manuals, in the functional descriptions or user manuals must be used.

The user must observe the configuring instructions.

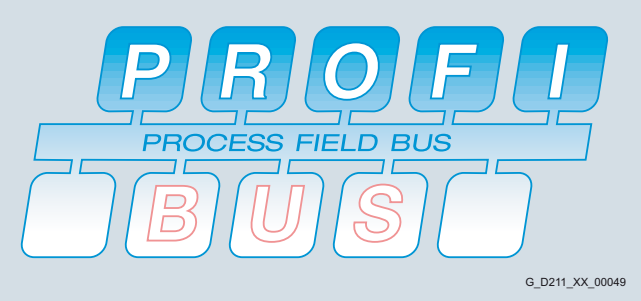
Combinations that differ from the configuring instructions (also in conjunction with non-Siemens products) require a special contractual agreement.

If no original components are used, for example for repairs, approvals such as UL, EN, Safety Integrated, etc. can become invalid and thus the operation authorization for the machine with the non-Siemens components installed becomes invalid.

All certificates of suitability, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated, etc. have been created 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, 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 new certificates to be issued.

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Overview



What is PROFIBUS?

PROFIBUS is the most successful open fieldbus used for automation technology which can be used for a wide range of applications. Standardization according to IEC 61158/EN 50170 secures your investments for the future.

PROFIBUS defines the technical and functional features of a serial fieldbus system, with which the distributed field automation devices in the lower area (sensor/actuator level) can be networked up to the mid performance range (cell level).

The requirements of users for an open, non-proprietary communication system have resulted in the specification and standardization of the PROFIBUS protocol.

Multi-vendor installations

Using the conformity and interoperability test performed by the test laboratories authorized by PROFIBUS & PROFINET International (PI) and the certification of the devices by PI, users have the security that the quality and functionality is guaranteed, even in multi-vendor installations.

PROFIBUS versions

PROFIBUS FMS (Fieldbus Message Specification) – The universal solution for communication tasks on the field and cell level of the industrial communication hierarchy.

PROFIBUS PA (Process Automation) – The version for applications in process automation. PROFIBUS PA uses intrinsically secure data transfer technology defined in IEC 61158-2.

PROFIBUS DP (Distributed Peripherals) – This version, which is optimized for speed, is tailored especially for the communication of automation systems with distributed I/O stations and drives. The outstanding features of PROFIBUS DP are

- very short response times
- high interference immunity

PROFIBUS DP replaces cost-intensive parallel signal transmission with 24 V and the measured value transmission with 0 mA or 4 mA to 20 mA technology.

PROFIBUS and SINAMICS

SINAMICS uses the PROFIBUS DP protocol.

Design

Bus nodes

PROFIBUS DP distinguishes between two different master classes and one slave class:

DP master Class 1

For PROFIBUS DP, DP master Class 1 is the central component. In a defined message cycle that always repeats itself, the central master station exchanges information with distributed stations (DP slaves).

DP master Class 2

Devices of this type are used (programming, configuration or control devices) during start-up, for configuring the DP system, for diagnostics or controlling the plant during normal operation. A DP master Class 2 can be used, for example, to read the input, output, diagnostic and configuration data of the slaves.

DP slave

A DP slave is an I/O device, which receives output information or setpoints from the DP master, and as response, returns input information, measured values and actual values to the DP master. A DP slave never sends data automatically, but only when requested by the DP master.

The quantity of input and output information depends on the device, and for each DP slave in each send direction can be a maximum of 244 bytes.

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Function

Functions on PROFIBUS DP

The functional scope can differ between DP masters and DP slaves. The functional scope is different for DP-V0, DP-V1 and DP-V2.

DP-V0

The DP master functions (DP-V0) comprise of the functions "Configuration", "Parameter assignment", "Read diagnostic data" as well as "Cyclic reading of input data/actual values" and "Writing output data/setpoints".

DP-V1

The additional DP function expansions (DP-V1) make it possible to perform acyclic read and write functions as well as processing cyclic data communication. This type of slave must be supplied with extensive parameterization data during start-up and during normal operation. These acyclically transferred parameterization data are only rarely changed in comparison to the cyclic setpoints, actual values, and measured values, and are transferred at lower priority in parallel with the cyclic high-speed user data transfer. Detailed diagnostic information can be transferred in the same way.

DP-V2

The extended DP master functions (DP-V2) mainly comprise functions for isochronous operation and direct data exchange between DP slaves.

Isochronous mode is implemented by means of an equidistant clock signal in the bus system. This cyclic, equidistant cycle is sent by the DP master to all bus nodes in the form of a Global Control Telegram. Master and slaves can then synchronize their applications with this signal. The jitter of the clock signal from cycle to cycle is less than 1 µs.

The "publisher/subscriber" model is used to implement slave-to-slave communication. Slaves declared as publishers make their input data/actual values and measured values available to other slaves, the subscribers, for reading. This is performed by sending the response frame to the master as a broadcast. Slave-to-slave communication is therefore a cyclic process.

SINAMICS and PROFIBUS DP

The SINAMICS S120 drive system can operate only as a DP slave and supports all communication functions, i.e. DP-V0, DP-V1 and DP-V2.

SINUMERIK and PROFIBUS DP

The SINUMERIK 840D sl control system functions as the DP master for drive axes and supports all DP-V0, DP-V1 and DP-V2 communication functions. SINAMICS S120 drives as well as distributed hydraulic axes can be linked as slaves to these systems. The decentralized hydraulic axes can only be used with isochronous PROFIBUS.

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Overview



PROFINET is the innovative, open Industrial Ethernet standard (IEC 61158) for the industrial automation environment. With PROFINET, devices can be linked up from the field level through to the management level.

PROFINET enables system-wide communication, supports plant-wide engineering and applies IT standards right down to the field level. IT communication, data communication and cyclic process communication are combined on the basis of Industrial Ethernet.

Existing fieldbus systems such as PROFIBUS can also be simply integrated without having to change existing devices.

Your advantages at a glance

Flexibility	Efficiency	Performance
Tailor-made plant concepts	Optimal use of resources	Increased productivity
Industrial Wireless LAN	One cable for all purposes	Speed
Safety	Device/network diagnostics	High precision
Flexible topologies	Energy efficiency	Large quantity structures
Open standard	Easy cabling	High transmission rate
Web tools	Fast device replacement	Redundancy
Expandability	Ruggedness/stability	Fast start-up

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Design

PROFINET device concept

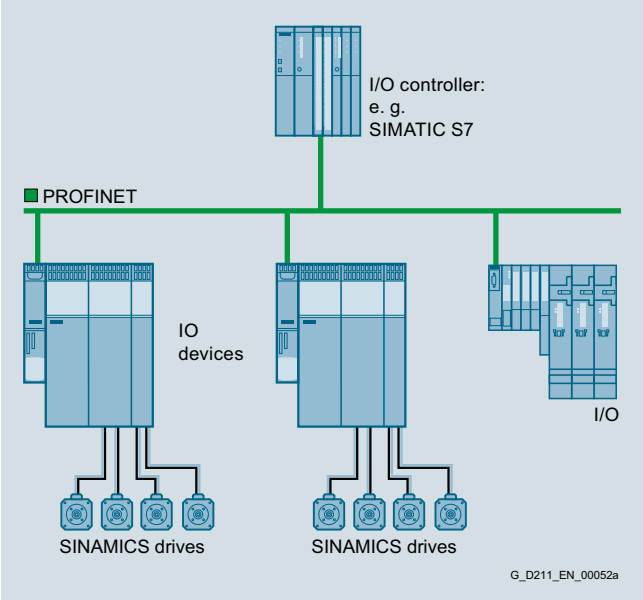
PROFINET distinguishes between the controller and its assigned devices. These are initialized and parameterized by the controllers on power-up. The controller and its devices together constitute a PROFINET I/O system (compare master/slave system for PROFIBUS).

For PROFINET, cyclic communication between an IO Controller and its IO Devices is performed in the same way as for PROFIBUS over the process image. The process image is updated cyclically. Depending on the requirements and device characteristic, this takes place in real-time (RT, devices are typically distributed IO Devices) or isochronous real-time (IRT, devices are typically servo drives). Further, PROFINET permits communication between the controllers and devices of different IO systems.

PROFINET IO with RT for simple standard drive applications

With typical cycle times between 4 ms and 10 ms, PROFINET IO with RT offers the same performance characteristics as PROFIBUS as regards cyclic data transmission.

With this performance level, all standard drive applications belonging to PROFIdrive application categories 1 to 3 can be automated, i.e. those categories requiring the specification of speed, torque and current setpoints or target positions which do not need to be linked isochronously.



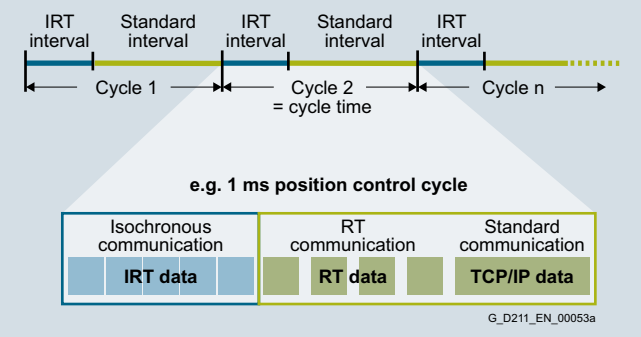
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Design (continued)

PROFINET IO with IRT for Motion Control[1)]

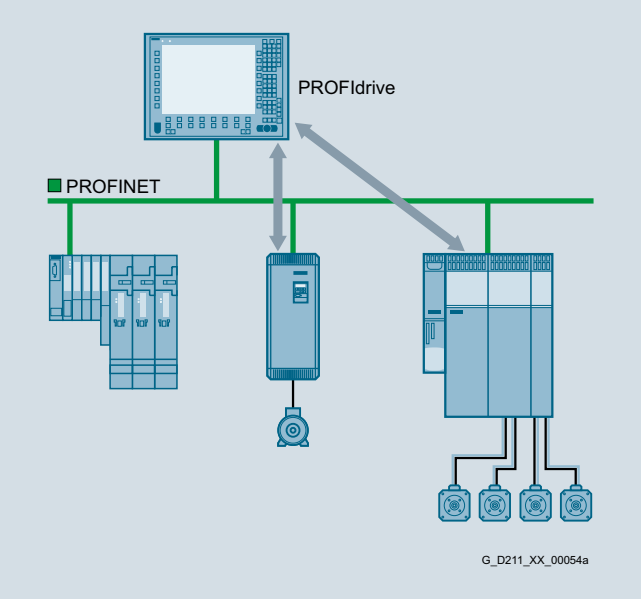
In this case, a Motion Control system controls or synchronizes axes using the PROFINET network. This requires cyclic, isochronous data exchange with the drives. PROFINET IO with IRT fulfills this requirement. The communication cycle is subdivided into different, time-specific channels for this purpose. The first channel is used for isochronous real-time communication (IRT), followed by real-time communication (RT) and standard TCP/IP communication. By appropriately configuring the application, e.g. a synchronous relationship between axes, IRT telegrams are implicitly determined and the appropriate configuration data generated.

The optimum time sequence of the individual messages for each network section is calculated with a special algorithm which takes the topology into account. This means that the switch is in a position to transfer the IRT telegrams without delay from the input port to the defined output port and then to the target device.



Transition from PROFIBUS to PROFINET

The functional interface between the controller and the SINAMICS drives for PROFINET and PROFIBUS is defined by the PROFIdrive V4 profile of PROFIBUS International. When making a transition from PROFIBUS to PROFINET, the user program does not have to be changed.



PROFINET with PROFIdrive

Design (continued)

Motion Control concepts with PROFINET

With SINAMICS, PROFINET supports the implementation of different automation structures. Distributed drive-based motion control concepts or central architectures with a control are supported in the same way as distributed automation solutions with modular automation components.

PROFINET – interface on SINAMICS

- SINAMICS S120 with CU320-2 DP Control Unit and CBE20 Communication Board
  The CU320-2 DP Control Unit on SINAMICS S120 is linked to the PROFINET IO network via the CBE20 Communication Board.
- SINAMICS S120 with CU320-2 PN Control Unit
  The CU320-2 Control Unit on SINAMICS S120 is linked to the PROFINET IO network via the on-board PROFINET interface.
- SINAMICS S120 with CU320-2 PN Control Unit and CBE20 Communication Board
  The CU320-2 PN Control Unit on SINAMICS S120 is linked to the PROFINET IO network via the CBE20 Communication Board.
- SINAMICS S120 with CU310-2 PN Control Unit
  The CU310-2 PN Control Unit on SINAMICS S120 is linked to the PROFINET IO network via the on-board PROFINET interface.

Function

Real-time communication with PROFINET IO

PROFINET uses standard TCP/IP for parameter assignment, engineering and diagnostics. Real-time communication for the transmission of process data is performed on the same line. PROFINET IO has the following real-time features:

- Real-Time (RT)
  uses the option of prioritizing the communication stack of the bus nodes. This permits high-performance data transmission based on standard network components.
- Isochronous real-time (IRT)
  permits strict deterministic, cyclic data transmission with extremely short response times and minimum jitter for high-performance motion control applications. This feature is implemented with a special ASIC, named ERTEC (Enhanced Real Time Ethernet Controller), in the corresponding interfaces (switch integrated into device) or network components (switch).

Automation with PROFINET

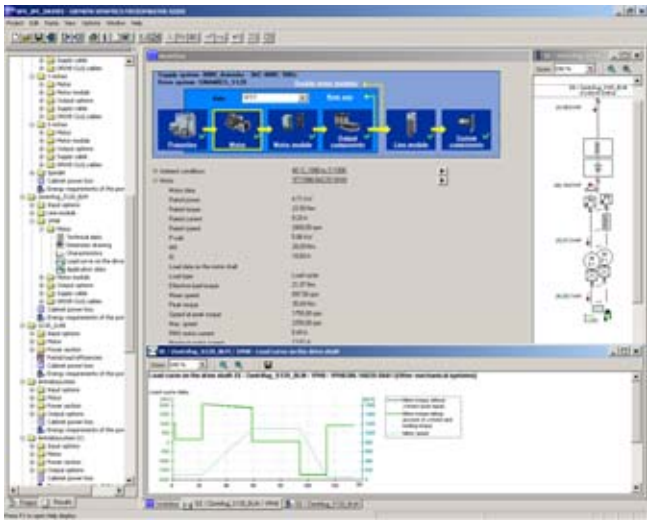
With these and other features, PROFINET fulfills all automation requirements: Industry-compatible installation technology, real-time capability, deterministic responses, integration of distributed field devices, simple network administration and diagnostics, protection against unauthorized access, efficient vendor-independent engineering as well as isochronous motion control applications.

PROFINET relies on switch technology and has expanded this technology for real-time applications (IRT). This has the advantage that the network topology can be optimally utilized and adapted to the requirements of the machine. Collisions are avoided and therefore optimum data flow rates achieved.

1) IRT interpolation with SINUMERIK NCK coming soon.

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Overview



The following drives and controls can be engineered in a user-friendly way using the SIZER for Siemens Drives engineering tool:

- SIMOTICS low-voltage motors, including servo geared motors
- SINAMICS low-voltage drive systems
- Motor starters
- SINUMERIK CNC
- SIMOTION Motion Control System
- SIMATIC Technology

It provides support when selecting the technologies involved in the hardware and firmware components required for a drive task. SIZER for Siemens Drives supports the complete configuration of the drive system, from basic single drives to demanding multi-axis applications.

SIZER for Siemens Drives supports all of the configuring steps in a workflow:

- Configuring the power supply
- Designing the motor and gearbox, including calculation of mechanical transmission elements
- Configuring the drive components
- Compiling the required accessories
- Selecting the line-side and motor-side power options, e.g. cables, filters, and reactors

When SIZER for Siemens Drives was being designed, particular importance was placed on a high degree of usability and a universal, function-based approach to the drive application. The extensive user guidance makes using the tool easy. Status information keeps you continually informed about the progress of the configuration process.

The SIZER for Siemens Drives user interface is available in English, French, German and Italian.

The drive configuration is saved in a project. In the project, the components and functions used are displayed in a hierarchical tree structure.

The project view permits the engineering of drive systems and the copying/inserting/modifying of drives already configured.

Overview (continued)

The configuration process produces the following results:

- A parts list of the required components (export to Excel, use of the Excel data sheet for import to SAP)
- Technical specifications of the system
- Characteristic curves
- Comments on system reactions
- Mounting arrangement of drive and control components and dimension drawings of motors
- Energy requirements of the configured application

These results are displayed in a results tree and can be reused for documentation purposes.

Technological online help is available:

- Detailed technical specifications
- Information about the drive systems and their components
- Decision-making criteria for the selection of components
- Online help in English, French, German, Italian, Chinese and Japanese

System requirements

- PG or PC with Pentium III min. 800 MHz (> 1 GHz recommended)
- 512 MB RAM (1 GB RAM recommended)
- At least 4.1 GB of free hard disk space
- An additional 100 MB of free hard disk space on Windows system drive
- Screen resolution 1024 × 768 pixels (1280 × 1024 pixels recommended)
- Operating system:
  - Windows 7 Professional (32/64 bit)
  - Windows 7 Enterprise (32/64 bit)
  - Windows 7 Ultimate (32/64 bit)
  - Windows 7 Home (32/64 bit)
  - Windows 8.1 Professional (32/64 bit)
  - Windows 8.1 Enterprise (32/64 bit)
- Microsoft Internet Explorer V5.5 SP2

Selection and ordering data

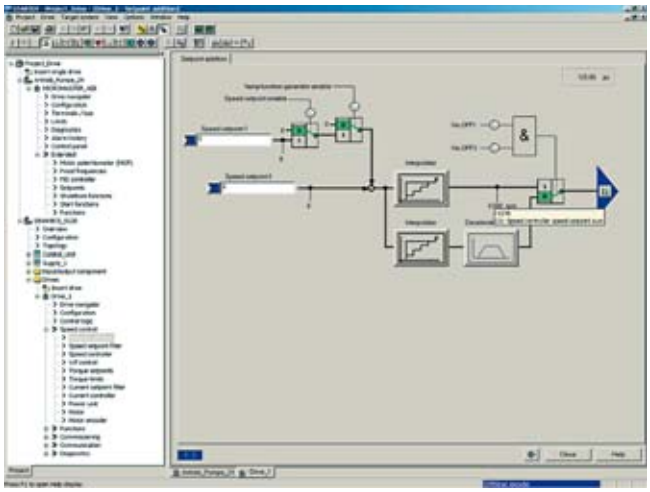
Description	Article No.
SIZER for Siemens Drives engineering tool on DVD-ROM English, French, German, Italian	**6SL3070-0AA00-0AG0**

More information

The SIZER for Siemens Drives engineering tool is available free on the Internet at
www.siemens.com/sizer

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Overview



The user-friendly STARTER commissioning tool can be used for:

- Commissioning
- Optimization
- Diagnostics

This software can be operated as a standalone PC application, or integrated as a TIA-compatible program in SIMATIC STEP 7, or highly integrated into the SCOUT Engineering System (for SIMOTION). The basic functions and handling are the same in both cases.

In addition to the SINAMICS drives, STARTER also supports MICROMASTER 4 devices.

The project wizard can be used to create the drives within the structure of the project tree.

Beginners are supported by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First commissioning is guided by a wizard which makes all the basic settings in the drive. Therefore, getting a motor up and running is merely a question of setting a few of the drive parameters as part of the drive configuration process.

The individual settings required are made using graphics-based parameterization screens, which also precisely visualize the principle of operation of the drive.

Examples of individual settings that can be made include:

- How terminals are used
- Bus interface
- Setpoint channel (e.g. fixed setpoints)
- Closed-loop speed control (e.g. ramp-function generator, limits)
- BICO interconnections
- Diagnostics

For experts, the expert list can be used to specifically and quickly access individual parameters at any time. An individual compilation of frequently used parameters can be saved in dedicated user lists and watch tables.

In addition, the following functions are available for optimization purposes:

- Self-optimization of the controller settings (depending on drive unit)
- Setup and evaluation of trace recordings[1)]
  Tool function for recording 2 × 8 signals with
  - Measuring cursor function
  - Extensive trigger functions
  - Several Y scales
  - Sampling times in the current controller cycle clock

Diagnostics functions provide information about:

- Control/status words
- Parameter status
- Operating conditions
- Communication states

Performance features

- User-friendly: Only a small number of settings need to be made for successful first commissioning: The motor starts to rotate
- Solution-oriented dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization.

Minimum system requirements

The following minimum requirements must be complied with:

- Hardware
  - PG or PC with Pentium III min. 1 GHz (recommended >1 GHz)
  - Work memory 1 GB (2 GB recommended)
  - Screen resolution 1024 × 768 pixels, 16-bit color depth
  - Free hard disk memory: min. 3 GB
- Software
  - Microsoft Internet Explorer V6.0 or higher
  - 32-bit operating systems:
    Microsoft Windows XP Professional SP3
    Microsoft Windows 7 Professional incl. SP1
    Microsoft Windows 7 Ultimate incl. SP1
    Microsoft Windows 7 Enterprise incl. SP1
    (standard installation)
  - 64-bit operating systems:
    Microsoft Windows 7 Professional SP1
    Microsoft Windows 7 Ultimate SP1
    Microsoft Windows 7 Enterprise SP1 (standard installation)
    Microsoft Windows Server 2008 R2 SP1

[1)] Depending on drive unit. Not supported for MICROMASTER 4, SINAMICS G110, SINAMICS G120 <Firmware V4.4, SINAMICS G110D and SINAMICS G120D <Firmware V4.5.

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Integration

Data can be exchanged (depending on the version) via PROFIBUS or PROFINET/Ethernet or via a serial interface.

For commissioning and service, a PG/PC can be connected to the CU320-2 Control Unit via PROFIBUS. A PROFIBUS connection must be available with a connecting cable at the PG/PC.

Further, communication between a CU320-2 Control Unit and PG/PC can also be established via Ethernet, either via an (optional) CBE20 Communication Board or the Ethernet interface -X127 on the CU320-2 Control Unit.

Note:

The terminal strip -X127 is suitable as a communication link to the PG/PC only for the purposes of servicing and commissioning.

Selection and ordering data

Description	Article No.
STARTER commissioning tool for SINAMICS and MICROMASTER English, French, German, Italian, Spanish	**6SL3072-0AA00-0AG0**

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.

Description	Recommended accessories For communication between the drive unit and the programming device or PC	Article No.
SINAMICS S110/S120		
• RS232	**SIMATIC S7 connecting cable** Null modem cable, 6 m (19.7 ft)	**6ES7901-1BF00-0XA0**
• PROFIBUS	**CP 5711 communications module** USB adapter for connecting a PG or notebook to PROFIBUS or MPI USB cable (2 m (6.56 ft)) included in scope of supply	**6GK1571-1AA00**
	SIMATIC DP plug-in cable 12 Mbaud, for PG connector, pre-assembled with 2 × 9-pin sub D connector, 3 m (9.84 ft)	**6ES7901-4BD00-0XA0**
• PROFINET/Ethernet	Standard CAT5 Ethernet cable or PROFINET cable	–

More information

The STARTER commissioning tool is also available on the Internet at
www.siemens.com/starter

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Overview

Overview of key open-loop and closed-loop control functions

Description	Closed-loop control types S120	Open-loop control types S120	Main functions S120 for booksize/chassis format	Comment, note
Infeed control	• Booksize - Current control with/without mains sensor - U_{DC} control with/without mains sensor • Chassis - Current control with mains sensor - U_{DC} control with mains sensor	• Booksize - Smart Line mode can be selected • Chassis - None	• Mains identification • Controller optimization • Harmonics filter • Integral reactive current compensation can be activated for the drive components • Automatic restart	• The mains sensor is the VSM10 Voltage Sensing Module; "current" is the line current; 3-phase with line frequency[1)]
Servo control	• Asynchronous motor - Torque control with encoder - Speed control with/without encoder • Synchronous motor, linear motor and torque motor - Torque control with encoder - Speed control with encoder • For all motor types - Position control with encoder	• Linear/parabolic characteristic • Fixed-frequency characteristic (textile) • Independent voltage setpoint input	• Data set changeover • Setpoint input • Motor identification • Damping application • Reduced magnetic flux in the asynchronous motor for reducing the thermal load on the machine • Technology controller • Basic positioner	• The position control can be selected as a function module (stand-alone drives)

5

Function

Function modules

For stand-alone drive solutions, the additively activatable function module EPos can be called up on the SINAMICS S120 Control Units for the absolute/relative positioning of linear and rotary axes (Modulo) with motor encoders (indirect measuring system) or machine encoders (direct measuring system). The basic positioner can be used to resolve uncomplicated and clear motion control tasks without additional external technological outlay from the drive itself.

Integrated safety functions

The Control Units support drive-autonomous Safety Integrated Basic functions and also licensed Safety Integrated Extended functions.

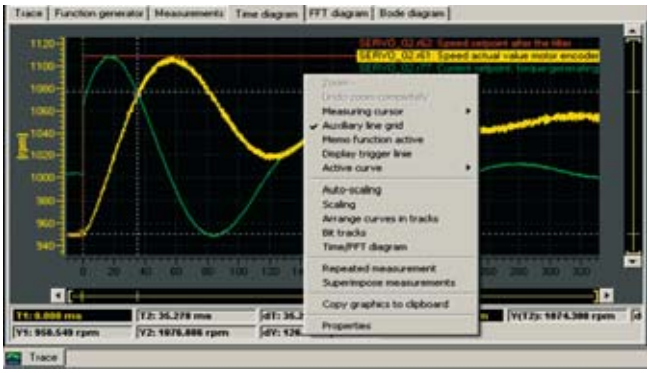
CompactFlash card

The functions of the SINAMICS S120 drives are stored on a CompactFlash card. This card contains the firmware and parameter settings for all drives in the form of a project. The CompactFlash card can also hold additional projects, which means that the correct project can be accessed immediately when series machines of different types are commissioned. When the Control Unit has booted, the data on the CompactFlash card is read and loaded to the RAM.

The firmware is organized in objects. Drive objects are used to implement open-loop and closed-loop control functions for Line Modules, Motor Modules, Power Modules and other system components connected by DRIVE-CLiQ.

Diagnostics optimally supported by trace function

The time characteristics of input and output variables associated with drive objects can be measured by the integrated trace function and displayed using the STARTER commissioning tool or on the SINUMERIK. The trace can record up to 4 signals simultaneously. A recording can be triggered as a function of freely selectable boundary conditions, e.g. the value of an input or output variable.



1) Operation of a Voltage Sensing Module is not approved with a SINUMERIK system.

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Overview



CU310-2 PN and CU310-2 DP Control Units

The CU310-2 Control Unit that is designed for the communication and open-loop/closed-loop control functions of a SINAMICS S120 (AC/AC) is combined with the PM340 Power Module to create a powerful single-axis drive. A PROFINET (PN) variant and a PROFIBUS (DP) variant are available for fieldbus communication.

CompactFlash card for CU310-2 Control Units



The CompactFlash card contains the firmware and set parameters. The CompactFlash card is plugged into the appropriate slot on the CU310-2 Control Unit.

A CU310-2 Control Unit can perform the communication, open-loop and closed-loop control functions for one Power Module. The performance expansion is not required in this case.

In addition to the firmware, the CompactFlash Card also contains licensing codes which are required to enable firmware options.

Currently, the following firmware options can be ordered in addition to the article number:

- Safety Integrated Extended Functions, order code **F01**
- High output frequency[1], order code **J01**

The firmware options can also be enabled on-site, for example, if the Safety Integrated Extended functions are to be enabled later. You will need the serial number of the CompactFlash card and the Article No. of the firmware option to be enabled. With this information, you can purchase the associated license code from a license database and enable the firmware option. The license code is only valid for the CompactFlash card declared and cannot be transferred to other CompactFlash cards.

Design

CU310-2 Control Units feature the following connections and interfaces as standard:

- Fieldbus interface
  - CU310-2 PN: 1 PROFINET interface with 2 ports (RJ45 sockets) with PROFIdrive V4 profile
  - CU310-2 DP: 1 PROFIBUS interface with PROFIdrive V4 profile
- 1 DRIVE-CLiQ socket for communication with the DRIVE-CLiQ motor or other DRIVE-CLiQ devices (e.g. Sensor Modules or Terminal Modules)
- 1 encoder evaluation for evaluating the following encoder signals
  - Incremental encoder TTL/HTL
  - SSI encoders without incremental signals
- 1 PE connection
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 3 parameterizable, fail-safe digital inputs (floating) (can be used with firmware version V4.5 or higher) or alternatively 6 parameterizable digital inputs (floating).
  The fail-safe digital inputs can be routed, i.e. they can be routed via PROFIsafe to a higher-level controller.
- 5 parameterizable digital inputs (floating)
- 1 parameterizable, fail-safe digital output (floating) (can be used with firmware V4.5 or higher) or alternatively 1 digital output (floating)[2]
- 8 parameterizable bidirectional digital inputs/outputs (non-floating)[2]
- 1 analog input, either ± 10 V (resolution 12 bit + sign) or ± 20 mA (11 bit + sign)
- 1 Ethernet interface (socket RJ45) for commissioning and diagnostics
- 1 slot for the CompactFlash card on which firmware and parameters are stored
- 1 PM-IF interface for communication with the Power Modules in blocksize format
- 3 measuring sockets and one reference ground for commissioning support
- 1 interface to the BOP20 Basic Operator Panel[3]

The status of the CU310-2 Control Unit is indicated via multi-color LEDs.

A BOP20 Basic Operator Panel can also be snapped directly onto the CU310-2 Control Unit for diagnostic procedures.

As the firmware and parameter settings are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for software tools.

[1] For more information, see http://support.automation.siemens.com/WW/view/en/104020669

[2] In order to use the digital outputs, an external 24 V power supply must be connected to terminal X124.

[3] BOP20 is not used on machine tools.

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Integration

The CU310-2 Control Unit drives Power Modules in blocksize format via the PM-IF interface. DRIVE-CLiQ motors or Sensor Modules (SMC) can also be connected to the integrated DRIVE-CLiQ socket to permit the operation of motors without a DRIVE-CLiQ interface.

With the BOP20 Basic Operator Panel, parameters can be changed directly on the device. The BOP20 Basic Operator Panel can also be snapped onto the CU310-2 Control Unit during operation to perform diagnostics.

The CU310-2 Control Unit and other connected components are commissioned and diagnosed with the STARTER commissioning tool. The CU310-2 Control Unit requires a CompactFlash card with firmware V4.4 or higher.

A CU310-2 PN Control Unit communicates with the higher-level control system using PROFINET IO and the PROFIdrive V4 profile.

The SINAMICS S120 drive system with the CU310-2 PN Control Unit then assumes the function of a PROFINET IO device and can perform the following functions:

- PROFINET IO device
- 100 Mbit/s full duplex
- Supports real-time classes of PROFINET IO:
  - RT (Real-Time)
  - IRT (Isochronous Real-Time), minimum send cycle 500 µs
- Connects to controls as PROFINET IO devices using PROFIdrive compliant with Specification V4
- Standard TCP/IP communication for engineering processes with the STARTER commissioning tool and for accessing the integrated web server
- Integrated 2-port switch with two RJ45 sockets based on the ERTEC ASIC. The optimum topology (line, star, tree) can therefore be configured without additional external switches.

A 24 V supply voltage must be connected to terminal X124 for the digital outputs to be used. A CompactFlash card with firmware version V4.4 or higher is a mandatory requirement for operation of the CU310-2 Control Unit.

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Technical specifications

	CU310-2 Control Unit
PROFINET **PROFIBUS**	6SL3040-1LA01-0AA0 6SL3040-1LA00-0AA0
Power requirement, max. At 24 V DC, without taking account of digital outputs and DRIVE-CLiQ supply	0.35 A for CU310-2 + 0.5 A for PM340 Power Module
Conductor cross-section, max.	2.5 mm^2
Fuse protection, max.	20 A
Digital inputs	In accordance with IEC 61131-2 Type 1 5 floating digital inputs 8 bidirectional non-floating digital inputs/outputs 3 parameterizable, fail-safe digital inputs (floating) or alternatively 6 parameterizable digital inputs (floating) 5 bidirectional floating digital inputs/outputs
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Delay time of digital inputs[1], approx.	
- L → H	50 µs
- H → L	100 µs
• Delay time of high-speed digital inputs[1], approx. (high-speed digital inputs can be used for position detection)	
- L → H	5 µs
- H → L	50 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs (continuously short-circuit-proof)	8 bidirectional non-floating digital inputs/outputs
• Voltage	24 V DC
• Load current per digital output[2], max.	500 mA
• Delay time[1], typ./max.	
- L → H	150 µs/400 µs
- H → L	75 µs/100 µs
• Conductor cross-section, max.	1.5 mm^2

	CU310-2 Control Unit
PROFINET **PROFIBUS**	6SL3040-1LA01-0AA0 6SL3040-1LA00-0AA0
Analog input	The analog input can be switched between current input and voltage input
• As voltage input	-10 ... +10 V; R_i > 100 kΩ Resolution: 12 bit + sign (with respect to the maximum range that can be resolved -11 ... +11 V)
• As current input	-20 ... +20 mA; R_i > 250 Ω Resolution: 11 bit + sign (based on -22 ... 22 mA) Max. range that can be resolved: -44 ... +44 mA
Encoder evaluation	• Incremental encoder TTL/HTL • SSI encoders without incremental signals
• Input impedance	
- TTL	570 Ω
- HTL, max.	16 mA
• Encoder supply	24 V DC/0.35 A or 5 V DC/0.35 A
• Encoder frequency, max.	300 kHz
• SSI baud rate	100 ... 250 kBaud
• Resolution absolute position SSI	30 bit
• Cable length, max.	
- TTL encoder	100 m (328 ft) (only bipolar signals permitted)[3]
- HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals[3]
- SSI encoder	100 m (328 ft)
Power loss	<20 W
PE connection	M5 screw
Dimensions	
• Width	73 mm (2.87 in)
• Height	
- CU310-2 PN	191 mm (7.52 in)
- CU310-2 DP	187 mm (7.36 in)
• Depth	75 mm (2.95 in)
Net weight	0.95 kg (2.09 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input or output is processed.

[2] In order to use the digital outputs, an external 24 V power supply must be connected to terminal X124.

[3] Signal cables twisted in pairs and shielded.

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Selection and ordering data

Description	Article No.
CU310-2 PN Control Unit Without CompactFlash card	**6SL3040-1LA01-0AA0**
CU310-2 DP Control Unit Without CompactFlash card	**6SL3040-1LA00-0AA0**
CompactFlash card for CU310-2 PN and CU310-2 DP Control Units With firmware V4.7 including license (Certificate of License)	**6SL3054-0EH00-1BA0**
• and with high output frequency[1]	**6SL3054-0EH00-1BA0-Z J01**
• and with safety license	**6SL3054-0EH00-1BA0-Z F01**
License upgrades	
• High output frequency[1] High output frequency option for enabling output frequencies above 550 Hz for upgrading the license of a CompactFlash card	**6SL3074-0AA02-0AA0**
• Safety license Safety Integrated Extended Functions option including Certificate of License for one axis for upgrading the license of a CompactFlash card	**6SL3074-0AA10-0AA0**
Accessories	
STARTER commissioning tool[2] On DVD-ROM	**6SL3072-0AA00-0AG0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

For information on connectors and cables, please refer to Catalog IK PI and the Siemens Industry Mall:
www.siemens.com/industrymall

More information

Firmware version

The firmware version is encoded as follows in the article number printed on the CompactFlash card:

Article No.:		**6SL3054-0 ■■ 00-1BA0**
Firmware version		↑
	4	E
Version		↑
	.4	E
	.5	F
	.6	G
	.7	H

Example:

A CompactFlash card with firmware V4.7 and a safety license for a CU310-2 PN Control Unit are required:
Article No.: 6SL3054-0EH00-1BA0-Z
F01

[1] For more information, see
http://support.automation.siemens.com/WW/view/en/104020669

[2] The STARTER commissioning tool is also available on the Internet at
http://support.automation.siemens.com/WW/view/en/10804985/133100

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Overview



The communication, open-loop and closed-loop control functions for one or more Motor Modules and the Line Module are executed in a CU320-2 Control Unit. The CU320-2 Control Unit is essentially designed for multi-axis operation.

CompactFlash card for CU320-2 Control Units



The CompactFlash card contains the firmware and set parameters. The CompactFlash card is plugged into the appropriate slot on the CU320-2 Control Unit.

A CU320-2 Control Unit can perform the communication, open-loop and closed-loop control functions for several Motor Modules. The computing capacity required increases in proportion to the number of connected Motor Modules and system components and in relation to the dynamic response required. For the CU320-2 Control Unit, the performance expansion is required for machines with 4 axes or more. The utilization of the CU320-2 Control Unit can be calculated with the SIZER engineering tool.

In addition to the firmware, the CompactFlash Card also contains licensing codes which are required to enable firmware options.

Overview (continued)

In addition to the Article No., the following firmware options can currently be ordered with or without performance expansion:

- Safety Integrated Extended Functions, order codes per axis **F01 to F06**
- High output frequency[1], order code **J01**

The firmware options can also be enabled on-site, for example, if the performance expansions required are not known at the time of placing the order or the Safety Integrated Extended Functions are to be enabled retrospectively. You will need the serial number of the CompactFlash card and the Article No. of the firmware option to be enabled. With this information, you can purchase the associated license code from a license database and enable the firmware option. The license code is only valid for the CompactFlash card declared and cannot be transferred to other CompactFlash cards.

Design

CU320-2 Control Units feature the following interfaces as standard:

- 4 DRIVE-CLiQ sockets for communication with other DRIVE-CLiQ devices, e.g. Motor Modules, Active Line Modules, Sensor Modules, Terminal Modules
- CU320-2 PN: 1 PROFINET interface with 2 ports (RJ45 sockets) with PROFIdrive V4 profile
- CU320-2 DP: 1 PROFIBUS interface with PROFIdrive profile V4
- 12 parameterizable digital inputs (floating)
- 8 parameterizable bidirectional digital inputs/outputs (non-floating)
- 1 serial RS232 interface
- 1 interface for the BOP20 Basic Operator Panel[2]
- 1 slot for the CompactFlash card on which firmware and parameters are stored
- 1 slot for mounting an option module (e.g. TB30 Terminal Board)
- 2 rotary coding switches for manually setting the PROFIBUS address
- 1 Ethernet interface for commissioning and diagnostics
- 3 measuring sockets and one reference ground for commissioning support
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection
- 1 ground connection

A shield connection for the signal cable shield on the option module is located on the CU320-2 Control Unit.

The available option slot is used to expand the interfaces, for example, to include additional terminals or for communication purposes.

The status of the CU320-2 Control Unit is indicated via multi-color LEDs.

As the firmware and parameter settings are stored on a plug-in CompactFlash card, the Control Unit can be changed without the need for software tools.

The CU320-2 Control Unit can be mounted on the side of the Line Module in booksize format via brackets integrated in a Line Module. The CU320-2 Control Unit can also be fixed to the wall of the control cabinet using the integrated fixing lugs. As the CU320-2 Control Unit is not as deep as the Line Modules, suitable spacers are available to increase the depth of the CU320-2 Control Unit to 270 mm (10.63 in).

[1] For more information, see http://support.automation.siemens.com/WW/view/en/104020669

[2] BOP20 is not used on machine tools.

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Integration

DRIVE-CLiQ components such as Motor Modules and Active Line Modules can be connected to a CU320-2 Control Unit. The number of modules depends on the performance required, including duty type and additional functions.

The BOP20 Basic Operator Panel can also be snapped onto the CU320-2 Control Unit during operation for diagnostic purposes.

The CU320-2 Control Unit and other connected components are commissioned and diagnosed with the STARTER commissioning tool.

A CompactFlash card with firmware version V4.4 or higher is a mandatory requirement for operation of the CU320-2 PN Control Unit.
A CompactFlash card with firmware version V4.3 or higher is a mandatory requirement for operation of the CU320-2 DP Control Unit.

Technical specifications

	CU320-2 Control Unit
PROFINET **PROFIBUS**	6SL3040-1MA01-0AA0 6SL3040-1MA00-0AA0
Power requirement, max. At 24 V DC, without taking account of digital outputs, option slot expansion, and DRIVE-CLiQ supply	1.0 A
Conductor cross-section, max.	2.5 mm^2
Fuse protection, max.	20 A
Digital inputs	In accordance with IEC 61131-2 Type 1 12 floating digital inputs 8 bidirectional non-floating digital inputs/outputs
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	9 mA
• Delay time of digital inputs[1], approx.	
- L → H	5 µs
- H → L	50 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs Continuously short-circuit-proof	8 bidirectional non-floating digital inputs/outputs
• Voltage	24 V DC
• Load current per digital output, max.	500 mA
• Delay time[1], typ./max.	
- L → H	150 µs/400 µs
- H → L	75 µs/100 µs
• Conductor cross-section, max.	1.5 mm^2
Power loss	24 W
PE connection	M5 screw
Ground connection	M5 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	300 mm (11.81 in)
• Depth	226 mm (8.90 in)
Net weight	2.3 kg (5.07 lb)
Certificate of suitability	cULus

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input or output is processed.

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Selection and ordering data

Description	Article No.
CU320-2 PN Control Unit Without CompactFlash card	**6SL3040-1MA01-0AA0**
CU320-2 DP Control Unit Without CompactFlash card	**6SL3040-1MA00-0AA0**
CompactFlash card for CU320-2 Control Units without safety license	
- Without performance expansion	**6SL3054-0E■00-1BA0**
- With performance expansion firmware option	**6SL3054-0E■01-1BA0**
CompactFlash card for CU320-2 Control Units with safety license	
• For **1 axis**	
- Without performance expansion	**6SL3054-0E■00-1BA0-Z F01**
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F01**
• For **2 axes**	
- Without performance expansion	**6SL3054-0E■00-1BA0-Z F02**
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F02**
• For **3 axes**	
- Without performance expansion	**6SL3054-0E■00-1BA0-Z F03**
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F03**
• For **4 axes**	
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F04**
• For **5 axes**	
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F05**
• For **6 axes**	
- With performance expansion firmware option	**6SL3054-0E■01-1BA0-Z F06**
• and with high output frequency[1]	**6SL3054-0E■00-1BA0-Z J01**
Firmware **V4.4**	**E**
Firmware **V4.5**	**F**
Firmware **V4.6**	**G**
Firmware **V4.7**	**H**

Description	Article No.
License upgrades	
• Performance expansion Performance expansion option including Certificate of License for upgrading the license of a CompactFlash card	**6SL3074-0AA01-0AA0**
• High output frequency[1] High output frequency option for enabling output frequencies above 550 Hz for upgrading the license of a CompactFlash card	**6SL3074-0AA02-0AA0**
• Safety license Safety Integrated Extended Functions option including Certificate of License for one axis for upgrading the license of a CompactFlash card. This option should be ordered once for each axis, max. 6x for a CompactFlash card	**6SL3074-0AA10-0AA0**
Accessories	
Spacers (2 units) Increases the depth of the CU320-2 Control Unit to 270 mm (10.63 in) (if the integrated brackets are not to be used, but the depth still has to be 270 mm (10.63 in)	**6SL3064-1BB00-0AA0**
STARTER commissioning tool	**6SL3072-0AA00-0AG0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs (50 units) For DRIVE-CLiQ port	**6SL3066-4CA00-0AA0**

[1] For more information, see
http://support.automation.siemens.com/WW/view/en/104020669

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Smart Line Modules

Overview



Smart Line Module

Smart Line Modules are stall-protected, line-commutated infeed/regenerative feedback units (diode bridge for incoming supply; stall-protected, line-commutated regenerative feedback via IGBTs) with 100 % continuous regenerative feedback power. The regenerative feedback capability of the modules can be deactivated by means of a digital input (Smart Line Modules 5 kW and 10 kW) or by parameterization (Smart Line Modules 16 kW, 36 kW and 55 kW).

Smart Line Modules are designed for connection to grounded TN and TT supply systems and to non-grounded IT supply systems.

The DC link is pre-charged by means of integrated pre-charging resistors.

The associated line reactor is absolutely essential for operating a Smart Line Module.

Design

The Smart Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronic power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 2 PE connections
- 2 digital inputs (only with 5 kW and 10 kW Smart Line Modules)
- 1 digital output (only with 5 kW and 10 kW Smart Line Modules)
- 3 DRIVE-CLiQ sockets (only with 16 kW, 36 kW and 55 kW Smart Line Modules)

The status of the Smart Line Modules is indicated via two multi-color LEDs.

The signal cable shield can be connected to the Line Module by means of a shield connection terminal, e.g. type KLBÜ 3-8 SC by Weidmüller.

Design (continued)

The scope of supply of the Smart Line Modules includes:

- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m (4.33 in) (on 16 kW, 36 kW and 55 kW Smart Line Modules only)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets (on 16 kW, 36 kW and 55 kW Smart Line Modules only)
- DRIVE-CLiQ cable (length depends on module width) to connect Smart Line Module to adjacent Motor Module, length = width of Smart Line Module + 0.11 m (4.33 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs and outputs
- Connector X22 for digital inputs and outputs (only with 5 kW and 10 kW Smart Line Modules)
- Connector X1 for the line connection (only with 5 kW and 10 kW Smart Line Modules)
- 1 set of warning labels in 30 languages

Technical specifications

Article No.	6SL313.-6....-....
Product designation	Smart Line Modules in booksize format
Line voltage 3 AC Up to 2000 m (6562 ft) above sea level	380 … 480 V ±10 % -15 % < 1 min
Line frequency	47 … 63 Hz
SCCR (**S**hort **C**ircuit **C**urrent **R**ating)	65 kA in conjunction with the recommended fuses class *J* or circuit breakers in accordance with UL489/CSA 22.2 No. 5-02 see recommended line-side components
Line power factor At rated power	
• Fundamental (cos φ_1)	> 0.96
• Total (λ)	0.65 … 0.90
Overvoltage category acc. to EN 60664-1	Class III
DC link voltage, approx.	1.35 × line voltage[1)]
Electronics power supply DC	24 V -15 %/+20 %
Radio interference suppression	
• Standard	No radio interference suppression
• With line filter	Category C2 to EN 61800-3 up to overall cable length 350 m (1148 ft) (shielded)
Cooling method	Internal air cooling External air cooling Power units with increased air cooling by means of built-in fan
Ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating > 1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Certificate of suitability	CE, cULus

1) The DC link voltage is regulated to the mean value of the rectified line voltage.

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Technical specifications (continued)

Article No.		6SL3130-6AE15-0AB1	6SL3130-6AE21-0AB1	6SL3130-6TE21-6AA4	6SL3130-6TE23-6AA3	6SL3130-6TE25-5AA3
Product designation		Smart Line Module in booksize format with internal air cooling				
Article No.		6SL3131-6AE15-0AA1	6SL3131-6AE21-0AA1	6SL3131-6TE21-6AA3	6SL3131-6TE23-6AA3	6SL3131-6TE25-5AA3
Product designation		Smart Line Module in booksize format with external air cooling				
Line voltage 380 ... 480 V 3 AC						
Infeed/regenerative feedback power						
• Rated power P_{rated}						
- at 380 V 3 AC	kW	5	10	16	36	55
- at 460 V 3 AC[3]	(HP)	(5)	(10)	(18)	(40)	(60)
• For S6 duty P_{S6} (40 %)	kW	6.5	13	21	47	71
• P_{max}	kW	10	20	35	70	91
DC link current						
• At 540 V/600 V DC	A	9.3/8.3	18.5/16.6	30/27	67/60	105/92
• For S6 duty (40 %)	A	11	22	35	79	138
• Maximum	A	16.6	33.2	59	117	178
Input current						
• Rated current At 380 V/400 V/480 V 3 AC	A	8.6/8.1/6.7	17/16.2/12.8	26/25/21	58/55/46	94/90/77
• For S6 duty (40 %) at 400 V	A	10.6	21.1	33	72	106
• At 400 V max.	A	15.7	31.2	54	107	130
Power requirement, max. 24 V DC electronics power supply	A	0.8	0.9	0.95	1.5	1.9
Current carrying capacity						
• 24 V DC busbars	A	20	20	20	20	20
• DC link busbars	A	100	100	100	200	200
DC link capacitance						
• Smart Line Module	µF	220	330	710	1410	1880
• Drive line-up, max.	µF	6000	6000	20000	20000	20000
Internal/external air cooling						
• Power loss[1]						
- Internal air cooling	kW	0.08	0.14	0.19	0.405	0.665
- External air cooling int.[2]/ext./total	kW	0.04/0.04/0.08	0.065/0.075/0.14	0.065/0.125/0.19	0.115/0.29/0.405	0.185/0.48/0.665
• Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)	0.016 (0.6)	0.031 (1.1)	0.044 (1.6)
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	< 60	< 60	< 60
Line connection U1, V1, W1		Screw-type terminals (X1)	Screw-type terminals (X1)	Screw-type terminals (X1)	M6 screw studs (X1)	M6 screw studs (X1)
• Conductor cross-section	mm^2	2.5 … 6	2.5 … 6	2.5 … 10	2.5 … 50	2.5 … 95
Shield connection		Shield connection plate integrated into the connector	Shield connection plate integrated into the connector	Shield connection plate integrated into the connector	See Accessories	See Accessories
PE connection		M5 screw	M5 screw	M5 screw	M6 screw	M6 screw
Cable length, max. Total of all motor cables and DC link						
• Shielded	m (ft)	350 (1148)	350 (1148)	630 (2067)	630 (2067)	1000 (3281)
• Unshielded	m (ft)	560 (1837)	560 (1837)	850 (2789)	850 (2789)	1500 (4921)
Degree of protection		IP20	IP20	IP20	IP20	IP20

1) Power loss of Smart Line Module at rated power including losses of 24 V DC electronics power supply.

2) Power loss of the power electronics + power loss of the 24 V electronics.

3) Nominal HP ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

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Technical specifications (continued)

Article No.		6SL3130-6AE15-0AB1	6SL3130-6AE21-0AB1	6SL3130-6TE21-6AA4	6SL3130-6TE23-6AA3	6SL3130-6TE25-5AA3
Product designation		Smart Line Module in booksize format with internal air cooling				
Article No.		6SL3131-6AE15-0AA1	6SL3131-6AE21-0AA1	6SL3131-6TE21-6AA3	6SL3131-6TE23-6AA3	6SL3131-6TE25-5AA3
Product designation		Smart Line Module in booksize format with external air cooling				
Line voltage 380 ... 480 V 3 AC						
Width	mm (in)	50 (1.97)	50 (1.97)	100 (3.94)	150 (5.91)	200 (7.87)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
Depth						
• With internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• With external air cooling on/behind mounting surface	mm (in)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/71 (8.90/2.80)	226/92 (8.90/3.62)
Net weight						
• With internal air cooling	kg (lb)	4.7 (10.4)	4.8 (10.6)	7 (15.4)	10.3 (22.7)	17 (37.5)
• With external air cooling	kg (lb)	5.3 (11.7)	5.4 (11.9)	8.8 (19.4)	13.8 (30.4)	18.5 (40.8)

5

Selection and ordering data

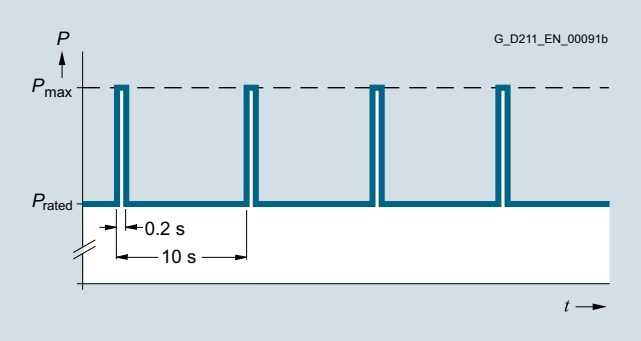
Description	Article No.
SINAMICS S120 Smart Line Module in booksize format with internal air cooling	
Rated power:	
• 5 kW (5 HP)	**6SL3130-6AE15-0AB1**
• 10 kW (10 HP)	**6SL3130-6AE21-0AB1**
• 16 kW (18 HP)	**6SL3130-6TE21-6AA4**
• 36 kW (40 HP)	**6SL3130-6TE23-6AA3**
• 55 kW (60 HP)	**6SL3130-6TE25-5AA3**
SINAMICS S120 Smart Line Module in booksize format with external air cooling	
Rated power:	
• 5 kW (5 HP)	**6SL3131-6AE15-0AA1**
• 10 kW (10 HP)	**6SL3131-6AE21-0AA1**
• 16 kW (18 HP)	**6SL3131-6TE21-6AA3**
• 36 kW (40 HP)	**6SL3131-6TE23-6AA3**
• 55 kW (60 HP)	**6SL3131-6TE25-5AA3**
Accessories	
Shield connection plate For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in)	**6SL3162-1AF00-0AA1**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 … 10 mm² For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 95 mm² For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.9 in) and 300 mm (11.9 in)	**6SL3162-2BM00-0AA0**

Description	Article No.
Accessories	
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm² For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
SINAMICS S120 Terminal Kit Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port	
• For Smart Line Modules with a width of 50 mm (1.97 in)	**6SL3163-8KB00-0AA1**
• For Active/Smart Line Modules with a width of 100 mm (3.94 in)	**6SL3163-8FD00-0AA0**
• For Active/Smart/ Basic Line Modules with a width of 150 mm (5.91 in)	**6SL3163-8GF00-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

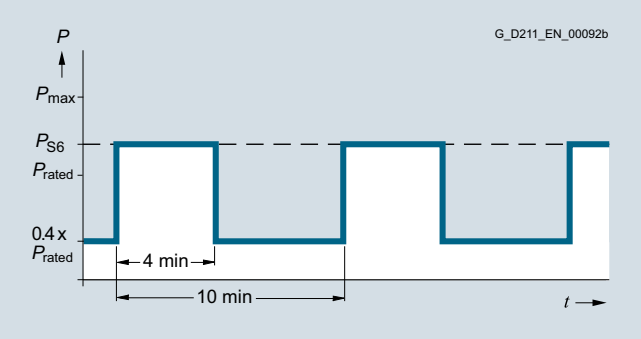
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Characteristic curves

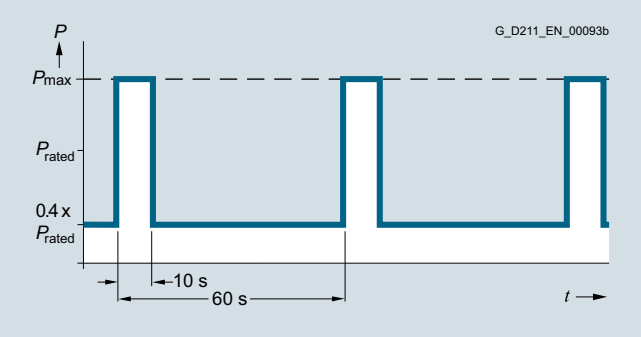
Overload capability



Load cycle with previous load

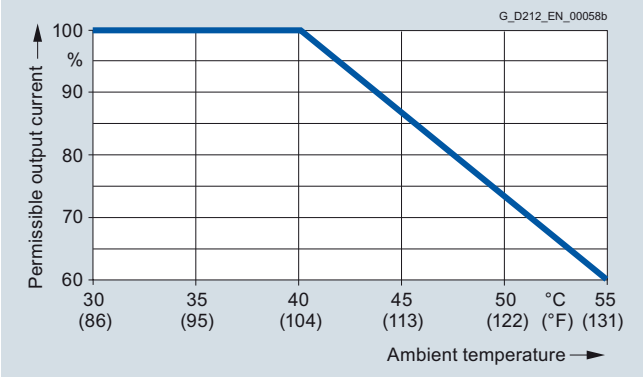


S6 load cycle with previous load

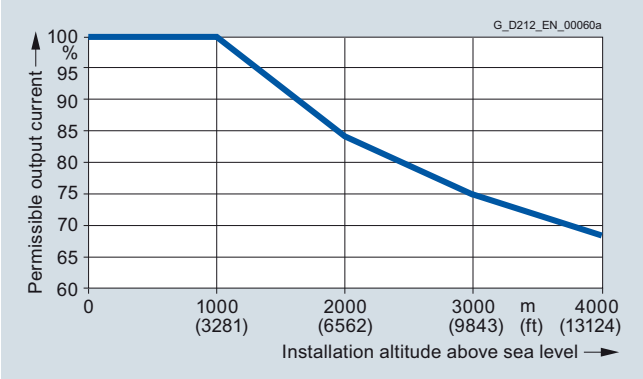


S6 load cycle with previous load

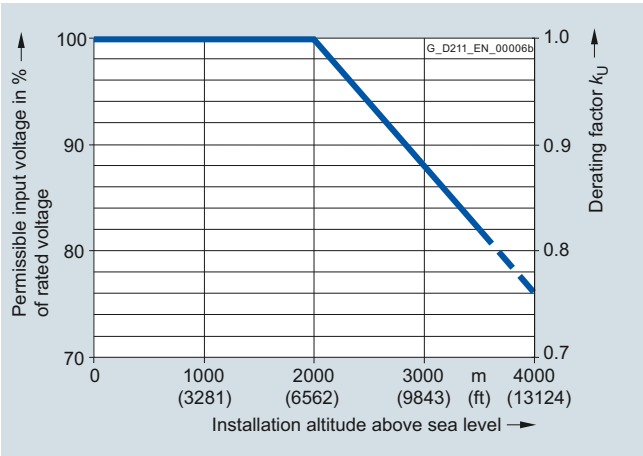
Derating characteristics



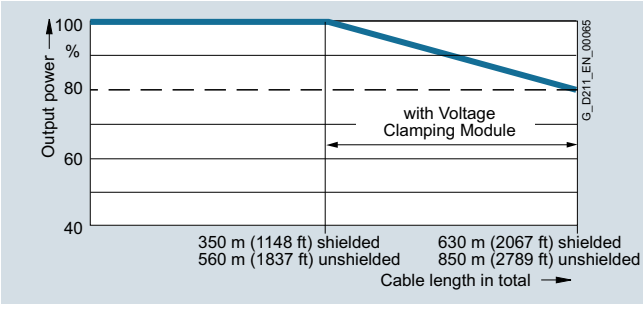
Output power dependent on ambient temperature



Output power dependent on installation altitude



Voltage derating dependent on installation altitude



Output power dependent on total cable length

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Overview



Line reactor

Smart Line Modules are not warranted to operate without the specified line reactors.

The use of other makes of line reactor can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Suitable for Smart Line Module		SINAMICS line reactor	
Rated power Smart Line Module	Booksize format Internal air cooling External air cooling	Rated current	
kW (HP)	Type	A	Article No.
5 (5)	6SL3130-6AE15-0AB1 6SL3131-6AE15-0AA1	**14**	**6SL3000-0CE15-0AA0**
10 (10)	6SL3130-6AE21-0AB1 6SL3131-6AE21-0AA1	**28**	**6SL3000-0CE21-0AA0**
16 (18)	6SL3130-6TE21-6AA4 6SL3131-6TE21-6AA3	**35**	**6SL3000-0CE21-6AA0**
36 (40)	6SL3130-6TE23-6AA3 6SL3131-6TE23-6AA3	**69**	**6SL3000-0CE23-6AA0**
55 (60)	6SL3130-6TE25-5AA3 6SL3131-6TE25-5AA3	**103**	**6SL3000-0CE25-5AA0**

Technical specifications

Article No.		6SL3000-0CE15-0AA0	6SL3000-0CE21-0AA0	6SL3000-0CE21-6AA0	6SL3000-0CE23-6AA0	6SL3000-0CE25-5AA0
Product designation		Line reactor	Line reactor	Line reactor	Line reactor	Line reactor
Line voltage 380 … 480 V 3 AC						
Rated current	A	14	28	35	69	103
Power loss	W	62	116	110	170	190
Line/load connection 1U1, 1V1, 1W1/ 1U2, 1V2, 1W2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	4	10	10	16	70
PE connection		Screw-type terminals	Screw-type terminals	M5 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M8 screw studs according to DIN 46234
• Conductor cross-section	mm^2	4	10	–	–	–
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	150 (5.91)	177 (6.97)	219 (8.62)	228 (8.98)	270 (10.62)
Height	mm (in)	175 (6.89)	196 (7.72)	180 (7.09)	235 (9.25)	275 (10.83)
Depth	mm (in)	70 (2.76)	110 (4.33)	144 (5.67)	224 (8.82)	290 (11.42)
Net weight	kg (lb)	3.7 (8.16)	7.5 (16.5)	9.5 (20.9)	17 (37.5)	36 (79.4)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus

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Overview



Line filter

In plants with strict EMC requirements, line filters work together with line reactors to restrict the conducted interference emanating from the Power Modules to the limit values of Class A1 as defined in EN 55011 and Category C2 as defined in EN 61800-3. Line filters are suitable only for direct connection to TN systems.

The use of other makes of line filter can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Suitable for Smart Line Module		SINAMICS line filter	
Rated power Smart Line Module	Booksize format Internal air cooling External air cooling	Rated current	
kW (HP)	Type	A	Article No.
5 (5)	6SL3130-6AE15-0AB1 6SL3131-6AE15-0AA1	**12**	**6SL3000-0HE15-0AA0**
10 (10)	6SL3130-6AE21-0AB1 6SL3131-6AE21-0AA1	**25**	**6SL3000-0HE21-0AA0**
16 (18)	6SL3130-6TE21-6AA4 6SL3131-6TE21-6AA3	**36**	**6SL3000-0BE21-6DA0**
36 (40)	6SL3130-6TE23-6AA3 6SL3131-6TE23-6AA3	**74**	**6SL3000-0BE23-6DA1**
55 (60)	6SL3130-6TE25-5AA3 6SL3131-6TE25-5AA3	**105**	**6SL3000-0BE25-5DA0**

Technical specifications

Article No.		6SL3000-0HE15-0AA0	6SL3000-0HE21-0AA0	6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA1	6SL3000-0BE25-5DA0
Product designation		Line filter	Line filter	Line filter	Line filter	Line filter
Line voltage 380 … 480 V 3 AC						
Rated current	A	12	25	36	74	105
Power loss	W	20	20	16	26	43
Line/load connection L1, L2, L3/U, V, W		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	10	10	10	35	50
PE connection		M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M8 screw studs according to DIN 46234
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	60 (2.36)	60 (2.36)	50 (1.97)	75 (2.95)	100 (3.94)
Height	mm (in)	285 (11.22)	285 (11.22)	429 (16.89)	433 (17.05)	466 (18.35)
Depth	mm (in)	122 (4.80)	122 (4.80)	226 (8.90)	226 (8.90)	226 (8.90)
Net weight	kg (lb)	2.1 (4.63)	2.3 (5.07)	5.0 (11)	7.5 (16.5)	11.5 (25.4)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus

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Overview

Suitable line-side power components are assigned depending on the power rating of the Smart Line Module.

Additional information about the recommended line-side components can be found in Catalogs IC 10 and LV 10.

The tables below list recommended components.

Assignment of line-side power components to Smart Line Modules in booksize or booksize compact format

Suitable for Smart Line Module		Line contactor	**Circuit breaker IEC 60947**	Circuit breaker UL489/CSA C22.2 No. 5-02	**Main switch**
Rated power	Booksize format Internal air cooling External air cooling		Article No.		
kW (HP)	Type	Type	Type	Type	Article No.
5 (5)	6SL3130-6AE15-0AB1 6SL3131-6AE15-0AA1	3RT1023-...	**3RV1031-4BA10**	3VL1102-2KM30-....	**3LD2003-0TK51**
10 (10)	6SL3130-6AE21-0AB1 6SL3131-6AE21-0AA1	3RT1026-...	**3RV1031-4FA10**	3VL1135-2KM30-....	**3LD2203-0TK51**
16 (18)	6SL3130-6TE21-6AA4 6SL3131-6TE21-6AA3	3RT1035-...	**3RV1031-4FA10**	3VL2505-2KN30-....	**3LD2504-0TK51**
36 (40)	6SL3130-6TE23-6AA3 6SL3131-6TE23-6AA3	3RT1045-...	**3RV1041-4LA10**	3VL2508-2KN30-....	**3LD2704-0TK51**
55 (60)	6SL3130-6TE25-5AA3 6SL3131-6TE25-5AA3	3RT1054-...	3VL2712-1DC33-....	3VL2112-2KN30-....	**3KA5330-1GE01**

Suitable for Smart Line Module		**Fuse-switch disconnector**	**Switch disconnector with fuse holders**	**LV HRC fuse (gL/gG)**			UL/CSA fuse, Class J Available from: Mersen www.ep.mersen.com		
Rated power	Booksize format Internal air cooling External air cooling			Rated current	Size		Rated current	Dimensions	
kW (HP)	Type	Article No.	Article No.	A		Article No.	A	mm	Reference No.
5 (5)	6SL3130-6AE15-0AB1 6SL3131-6AE15-0AA1	**3NP1123-1CA20**	**3KL5030-1GB01**	16	000	**3NA3805**	17.5	21 × 57	AJT17-1/2
10 (10)	6SL3130-6AE21-0AB1 6SL3131-6AE21-0AA1	**3NP1123-1CA20**	**3KL5030-1GB01**	35	000	**3NA3814**	35	27 × 60	AJT35
16 (18)	6SL3130-6TE21-6AA4 6SL3131-6TE21-6AA3	**3NP1123-1CA20**	**3KL5030-1GB01**	35	000	**3NA3814**	35	27 × 60	AJT35
36 (40)	6SL3130-6TE23-6AA3 6SL3131-6TE23-6AA3	**3NP1123-1CA20**	**3KL5230-1GB01**	80	000	**3NA3824**	80	27 × 117	AJT80
55 (60)	6SL3130-6TE25-5AA3 6SL3131-6TE25-5AA3	**3NP1143-1DA20**	**3KL5530-1GB01**	125	000	**3NA3132**	125	41 × 146	AJT125

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Overview



Active Line Module

Active Line Modules are self-commutated infeed/regenerative feedback units (with IGBTs in infeed and regenerative feedback directions) and generate a regulated DC link voltage. This means that the connected Motor Modules are decoupled from the line voltage. Line voltage fluctuations within the permissible supply tolerances have no effect on the motor voltage. Active Line Modules are designed for connection to grounded, star (TN, TT) and non-grounded, symmetrical (IT) supply systems.

The DC link is pre-charged by means of integrated pre-charging resistors.

In order to operate an Active Line Module, it is absolutely essential to use the appropriate Active Interface Module.

Design

The Active Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronic power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 3 DRIVE-CLiQ sockets
- 2 PE connections

The status of the Active Line Modules is indicated via two multi-color LEDs.

On the 100 mm (3.94 in) wide Active Line Module, the shield for the power supply cable can be connected to the integrated shield connection plate via a shield connection terminal or tube clip, e.g., type KLBÜ CO 4 manufactured by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism. Shield connection plates are available for 150 mm (5.91 in, 200 mm (7.87 in) and 300 mm (11.81 in) modules.

The signal cable shield can be connected to the Line Module by means of a shield connection terminal, e.g. type KLBÜ 3-8 SC by Weidmüller.

The scope of supply of the Active Line Modules includes:

- DRIVE-CLiQ cable for connection to the Control Unit on the immediate left for drive control, length 0.11 m (4.33 in)
- DRIVE-CLiQ cable (length depends on module width) to connect Active Line Module to adjacent Motor Module, length = width of Active Line Module + 0.11 m (4.33 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs
- Fan insert for Active Line Modules of 80 kW and 120 kW (the voltage is supplied by the Active Line Module)
- 1 set of warning labels in 30 languages

Integration

The Active Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

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Technical specifications

Article No.	6SL313 . -7TE...
Product designation	Active Line Modules in booksize format
Line voltage 3 AC Up to 2000 m (6562 ft) above sea level	380 … 480 V ±10 % -15 % < 1 min
SCCR (**S**hort **C**ircuit **C**urrent **R**ating)	65 kA in conjunction with the recommended fuses class *J* or circuit breakers in accordance with UL489/CSA 22.2 No. 5-02 see recommended line-side components
Line frequency	47 … 63 Hz
Line power factor	
• Active mode	
- Fundamental (cos φ_1)	1.0 (factory setting) can be altered by inputting a reactive current setpoint
- Total (λ)	1.0 (factory setting)
• Smart Mode	
- Fundamental (cos φ_1)	> 0.96
- Total	0.65 … 0.90
Efficiency	98 %
Overvoltage category acc. to EN 60664-1	Class III
DC link voltage V_d	In Active Mode, the DC link voltage is regulated and can be adjusted as a voltage decoupled from the line voltage. In Smart Mode the DC link voltage is regulated in proportion to the line voltage to the mean rectified line voltage value. Factory setting for DC link voltage: 380 ... 400 V 3 AC: 600 V (Active Mode) 400 ... 415 V 3 AC: 625 V (Active Mode) 416 ... 480 V 3 AC: 1.35 × line voltage (Smart Mode)[1)]
Electronics power supply DC	24 V -15 %/+20 %

Article No.	6SL313 . -7TE...
Product designation	Active Line Modules in booksize format
Radio interference suppression	
• Standard Active Line Module + Active Interface Module	Category C3 to EN 61800-3 up to 350 m (1148 ft) total cable length
• With line filter	Category C2 to EN 61800-3 up to 350 m (1148 ft) total cable length Category C3 to EN 618003 up to 350 ... 1000 m (1148 ... 3281 ft) total cable length
Cooling method	Internal air cooling Power units with increased air cooling by means of built-in fan External air cooling Power units with increased air cooling by means of built-in fan
Ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating > 1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Certificate of suitability	CE, cULus

[1)] Active Mode can also be selected if the connected motors are suitable for > 650 V DC.

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Technical specifications (continued)

Article No.		6SL3130-7TE21-6AA4	6SL3130-7TE23-6AA3	6SL3130-7TE25-5AA3	6SL3130-7TE28-0AA3	6SL3130-7TE31-2AA3
Product designation		Active Line Module in booksize format with internal air cooling				
Article No.		6SL3131-7TE21-6AA3	6SL3131-7TE23-6AA3	6SL3131-7TE25-5AA3	6SL3131-7TE28-0AA3	6SL3131-7TE31-2AA3
Product designation		Active Line Module in booksize format with external air cooling				
Line voltage 380 … 480 V 3 AC						
Infeed/regenerative feedback power						
• Rated power P_{rated}						
- at 380 V 3 AC	kW	16	36	55	80	120
- at 460 V 3 AC[3]	(HP)	(18)	(40)	(60)	(100)	(150)
• For S6 duty P_{S6} (40 %)	kW	21	47	71	106	145
• P_{max}	kW	35	70	91	131	175
DC link current						
• At 600 V DC	A	27	60	92	134	200
• For S6 duty (40 %)	A	35	79	121	176	244
• Maximum	A	59	117	152 (176[1])	218	292
Input current						
• Rated current At 380 V/400 V/480 V 3 AC	A	26/25/21	58/55/46	88/84/70	128/122/102	192/182/152
• For S6 duty (40 %) at 400 V	A	32	71	108	161	220
• At 400 V max.	A	54	107	139 (168[1])	200	267
Power requirement, max. 24 V DC electronics power supply	A	1.1	1.5	1.9	2.0	2.5
Current carrying capacity						
• 24 V DC busbars	A	20	20	20	20	20
• DC link busbars	A	100	200	200	200	200
DC link capacitance						
• Active Line Module	µF	710	1410	1880	2820	3995
• Drive line-up, max.	µF	20000	20000	20000	20000	20000
Internal/external air cooling						
• Power loss[1]						
- Total power loss for cooling methods: Internal air cooling, external air cooling	kW	0.29	0.67	0.95	1.39	2.26
- With external air cooling int.[2]/ext.	kW	0.09/0.2	0.17/0.5	0.25/0.7	0.3/1.0	0.55/1.71
• Cooling air requirement	m^3/s (ft^3/s)	0.016 (0.6)	0.031 (1.1)	0.044 (1.6)	0.144 (5.1)	0.144 (5.1)
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 65	< 60	< 75	< 75

[1] Higher peak power is possible in combination with the Active Interface Module 6SL3100-0BE25-5AB0 (for operating cycle constraints, see SINAMICSS120 Manual).

[2] Power loss of Active Line Module at rated power including losses of 24 V DC electronics power supply.

[3] Nominal HP ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

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Technical specifications (continued)

Article No.		6SL3130-7TE21-6AA4	6SL3130-7TE23-6AA3	6SL3130-7TE25-5AA3	6SL3130-7TE28-0AA3	6SL3130-7TE31-2AA3
Product designation		Active Line Module in booksize format with internal air cooling				
Article No.		6SL3131-7TE21-6AA3	6SL3131-7TE23-6AA3	6SL3131-7TE25-5AA3	6SL3131-7TE28-0AA3	6SL3131-7TE31-2AA3
Product designation		Active Line Module in booksize format with external air cooling				
Line voltage 380 … 480 V 3 AC						
Line connection U1, V1, W1		Screw-type terminals (X1)	M6 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm^2	2.5 … 10	2.5 … 50	2.5 … 95, 2 × 35	2.5 … 120, 2 × 50	2.5 … 120, 2 × 50
Shield connection		Integrated in the connector	See Accessories	See Accessories	See Accessories	See Accessories
PE connection		M5 screw	M6 screw	M6 screw	M8 screw	M8 screw
Cable length, max. Sum of all motor cables and DC link						
• Shielded	m (ft)	630 (2067 ft)[1]	630 (2067 ft)[1]	1000 (3281)	1000 (3281)	1000 (3281)
• Unshielded	m (ft)	850 (2789 ft)[1]	850 (2789 ft)[1]	1500 (4921)	1500 (4921)	1500 (4921)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	100 (3.94)	150 (5.91)	200 (7.87)	300 (11.81)	300 (11.81)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• With fan[2]	mm (in)	–	–	–	629 (24.76)	629 (24.76)
Depth						
• With internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• With external air cooling on/behind mounting surface	mm (in)	226/66.5 (8.90/2.62)	226/71 (8.90/2.80)	226/92 (8.90/3.62)	226/82 (8.90/3.23)	226/82 (8.90/3.23)
Net weight						
• With internal air cooling	kg (lb)	7 (15.4)	10.3 (22.7)	17 (37.5)	23 (50.7)	23 (50.7)
• With external air cooling	kg (lb)	8.8 (19.4)	13.8 (30.4)	18.5 (40.8)	27.7 (61.1)	30.7 (67.7)

[1] Max. cable lengths in conjunction with Active Interface Module and Basic Line Filter (Category C3 in accordance with EN 61800-3).

[2] The fan is supplied with the Active Line Module and must be installed before the Active Line Module is commissioned.

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Selection and ordering data

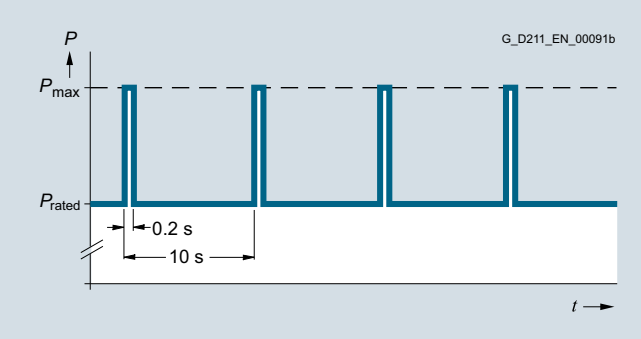
Description	Article No.
SINAMICS S120 Active Line Module in booksize format with internal air cooling	
Rated power:	
• 16 kW (18 HP)	**6SL3130-7TE21-6AA4**
• 36 kW (40 HP)	**6SL3130-7TE23-6AA3**
• 55 kW (60 HP)	**6SL3130-7TE25-5AA3**
• 80 kW (100 HP)	**6SL3130-7TE28-0AA3**
• 120 kW (150 HP)	**6SL3130-7TE31-2AA3**
SINAMICS S120 Active Line Module in booksize format with external air cooling	
Rated power:	
• 16 kW (18 HP)	**6SL3131-7TE21-6AA3**
• 36 kW (40 HP)	**6SL3131-7TE23-6AA3**
• 55 kW (60 HP)	**6SL3131-7TE25-5AA3**
• 80 kW (100 HP)	**6SL3131-7TE28-0AA3**
• 120 kW (150 HP)	**6SL3131-7TE31-2AA3**
Accessories	
Shield connection plate	
For Line Modules and Motor Modules in booksize format with a width of	
• 150 mm (5.91 in) for internal air cooling	**6SL3162-1AF00-0AA1**
• 150 mm (5.91 in) for external air cooling	**6SL3162-1AF00-0BA1**
• 200 mm (7.87 in) for internal air cooling	**6SL3162-1AH01-0AA0**
• 200 mm (7.87 in) for external air cooling	**6SL3162-1AH01-0BA0**
• 300 mm (11.81 in) for all cooling types	**6SL3162-1AH00-0AA0**
DC link rectifier adapter	
For direct infeed of DC link voltage	
• Screw-type terminals 0.5 … 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 95 mm^2 For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units)	**6SL3162-2BM01-0AA0**
For multi-tier configuration Screw-type terminals 35 ... 95 mm^2 For all Line Modules and Motor Modules in booksize format	
SINAMICS S120 Terminal Kit	
Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port For Active Line Modules with a width of	
• 100 mm (3.94 in)	**6SL3163-8FD00-0AA0**
• 150 mm (5.91 in)	**6SL3163-8GF00-0AA0**
• 200 mm (7.87 in)	**6SL3163-8HH00-0AA0**
• 300 mm (11.81 in)	**6SL3163-8JM00-0AA0**

Description	Article No.
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**
SINAMICS/SINUMERIK/ SIMOTION dust-proof blanking plugs	
For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

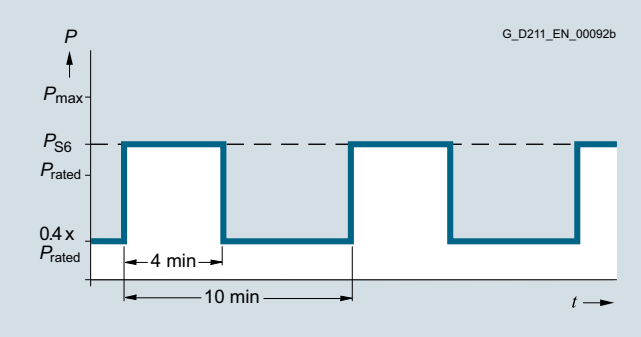
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Characteristic curves

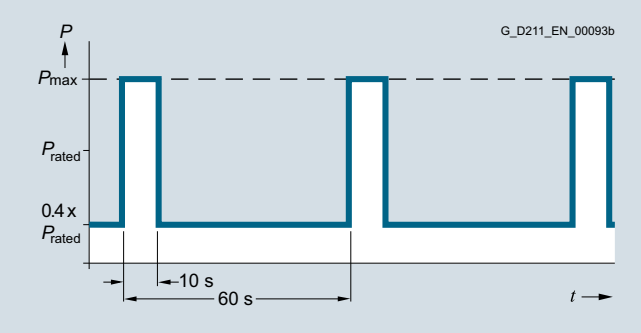
Overload capability



Load cycle with previous load

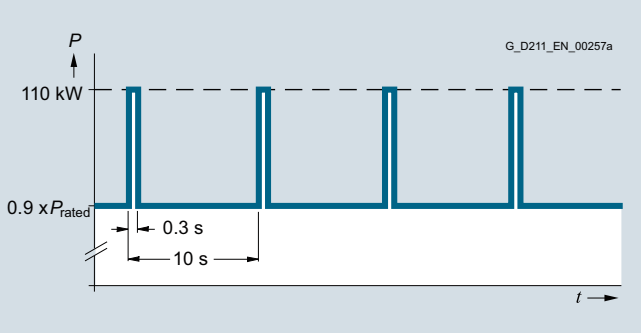


S6 load cycle with previous load



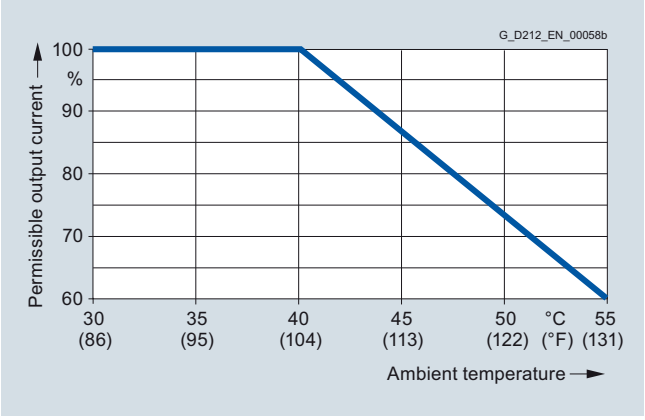
S6 load cycle with previous load

55 kW Active Line Module only:

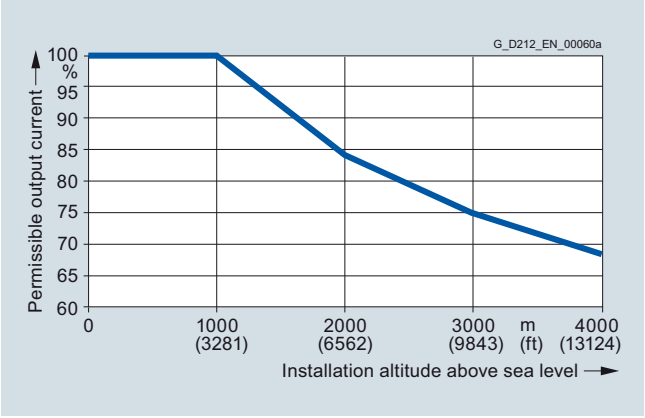


Peak power load duty cycle with previous load

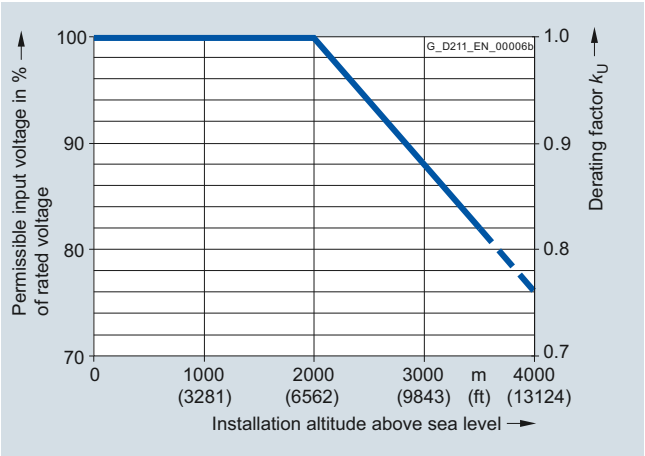
Derating characteristics



Output power dependent on ambient temperature



Output power dependent on installation altitude



Voltage derating dependent on installation altitude

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Overview



Active Interface Modules for 16 kW, 36 kW, 55 kW and 80 kW/120 kW

The Active Interface Modules combine with the Active Line Modules to form a functional unit and are essential for operation of the associated Active Line Module. The Active Interface Modules contain a Clean Power Filter and basic interference suppression to ensure compliance with Category C3 in accordance with EN 61800-3 with respect to emitted interference.

The Clean Power Filter protects the mains connection from switching-frequency harmonics. The drive system therefore draws a sinusoidal current from the supply and causes almost no harmonics.

The Active Line Modules in combination with the Active Interface Module can also be operated on supply systems with an isolated neutral (IT systems).

Design

The scope of supply of the Active Interface Modules includes:

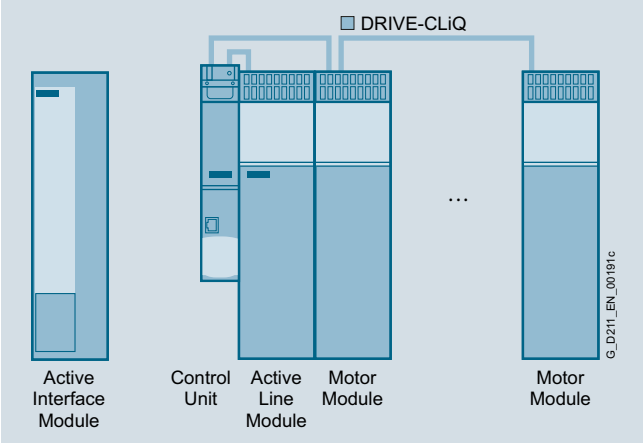
- Connector X21 for temperature evaluation and fan control
- Connector X24 for connecting the 24 V supply for the integrated fan
- DRIVE-CLiQ cable for connecting the Control Unit to the Active Line Module; length of the DRIVE-CLiQ cable = width of the Active Interface Module + 0.11 m (4.33 in)
- Shield connection plate for Active Interface Module 16 kW
- 1 set of warning labels in 30 languages

Depending on the position of the Active Interface Module in the drive system, additional DRIVE-CLiQ cables may be required. If it is separately installed on the left next to the Control Unit and Active Line Module, no additional DRIVE-CLiQ cables are required. If the Active Interface Module is placed between the Control Unit and Active Line Module, the DRIVE-CLiQ cables supplied with the Active Line Modules are suitable for setting up a line topology, i.e. Active Line Module and all Motor Modules in series on one DRIVE-CLiQ line.

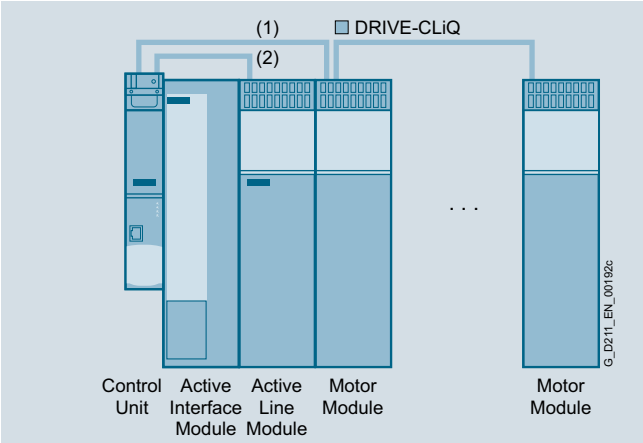
If the Active Line Module is connected over a separate DRIVE-CLiQ line, the DRIVE-CLiQ cable marked with (1) must be ordered. A DRIVE-CLiQ cable suitable for connection (2) is included in the scope of supply of the Active Line Module.

For DRIVE-CLiQ cables for different configurations, see MOTION-CONNECT connection systems.

Design (continued)



Separate Active Interface Module



(1) DRIVE-CLiQ cable between Control Unit and Motor Module

Active Interface Module 16 kW:	0.31 m (see Accessories)
Active Interface Module 36 kW:	0.41 m (see Accessories)
Active Interface Module 55 kW:	0.60 m (see Accessories)
Active Interface Module 80 kW and 120 kW:	0.95 m (see Accessories)

(2) Included in scope of supply of Active Line Modules

Active Interface Module integrated in the drive line-up

Function

The Active Interface Module requires a 24 V DC supply for operation of the integral fan.

The fan rotates after the 24 V DC supply is applied and can, if necessary (service life, noise), be shut off from the Control Unit over the "Fan off" input. It is only permissible to switch off the fan when the infeed of the drive system is not operating, otherwise the Active Interface Module will overheat.

The thermostatic switch installed in the Active Interface Module is evaluated via the connected Active Line Module.

The power cables between the Active Interface Module and Active Line Module must be shielded if limit values for interference suppression are to be complied with.

The cable shield can be routed over the shield connection plate (accessory) to the Active Interface Module or Active Line Module.

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Technical specifications

Article No.		6SL3100-0BE21-6AB0	6SL3100-0BE23-6AB0	6SL3100-0BE25-5AB0	6SL3100-0BE28-0AB0	6SL3100-0BE31-2AB0
Product designation		Active Interface Module with internal air cooling				
Line voltage 380 … 480 V 3 AC						
Rated current	A	27	60	88	132	200
Power requirement, max. 24 V DC electronics power supply	A	0.25	0.5	0.6	1.2	1.2
Internal resistance Digital input Fan off (X21/pin 4)	Ω	1440 ±10 %	1440 ±10 %	1440 ±10 %	1440 ±10 %	1440 ±10 %
Power loss	kW	0.3	0.39	0.45	0.575	0.8
Cooling air requirement	m^3/s (ft^3/s)	0.03 (1.1)	0.04 (1.4)	0.075 (2.6)	0.15 (5.3)	0.15 (5.3)
Sound pressure level L_{pA} (1 m)	dB	57	60	66	68	68
Line/load connection L1, L2, L3/U2, V2, W2		Screw-type terminals	Screw-type terminals	M8 screw studs	M8 screw studs	M8 screw studs
• Conductor cross-section	mm^2	16	50	2.5 … 95 or 2 × 35	2.5 … 120 or 2 × 50	2.5 … 120 or 2 × 50
Thermostatic switch		NC contact	NC contact	NC contact	NC contact	NC contact
• Switching capacity AC		250 V/1.6 A	250 V/1.6 A	250 V/1.6 A	250 V/1.6 A	250 V/1.6 A
• Switching capacity DC		60 V/0.75 A	60 V/0.75 A	60 V/0.75 A	60 V/0.75 A	60 V/0.75 A
PE connection		M5 screw	M5 screw	M6 screw	M8 screw	M8 screw
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width × height × depth	mm (in)	100 × 380 × 270 (3.94 × 14.96 × 10.63)	150 × 380 × 270 (5.91 × 14.96 × 10.63)	200 × 380 × 270 (7.87 × 14.96 × 10.63)	300 × 380 × 270 (11.81 × 14.96 × 10.63)	300 × 380 × 270 (11.81 × 14.96 × 10.63)
Net weight	kg (lb)	11 (24.3)	18.5 (40.8)	21 (46.3)	29 (63.9)	36 (79.4)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus

Selection and ordering data

Suitable for Active Line Module		**SINAMICS Active Interface Module**	
Rated power Active Line Module	Booksize format Internal air cooling External air cooling	Rated current	
kW (HP)	Type	A	Article No.
16 (18)	6SL3130-7TE21-6AA4 6SL3131-7TE21-6AA3	**27**	**6SL3100-0BE21-6AB0**
36 (40)	6SL3130-7TE23-6AA3 6SL3131-7TE23-6AA3	**60**	**6SL3100-0BE23-6AB0**
55 (60)	6SL3130-7TE25-5AA3 6SL3131-7TE25-5AA3	**88**	**6SL3100-0BE25-5AB0**
80 (100)	6SL3130-7TE28-0AA3 6SL3131-7TE28-0AA3	**132**	**6SL3100-0BE28-0AB0**
120 (150)	6SL3130-7TE31-2AA3 6SL3131-7TE31-2AA3	**200**	**6SL3100-0BE31-2AB0**

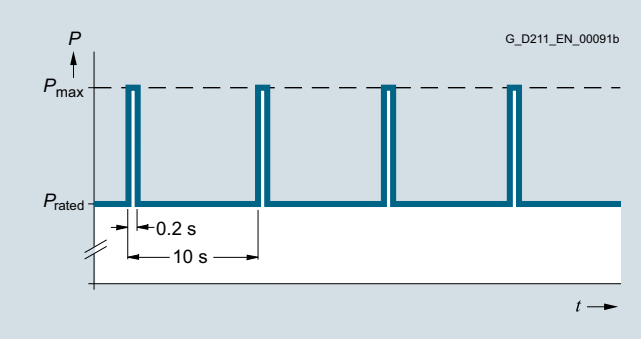
Description	Article No.
Accessories	
Shield connection plate For Active Interface Module	
• 16 kW (18 HP)	Included in the scope of delivery
• 36 kW (40 HP)	**6SL3163-1AF00-0AA0**
• 55 kW (60 HP)	**6SL3163-1AH00-0AA0**
• 80 kW (100 HP) and 120 kW (150 HP)	**6SL3163-1AM00-0AA0**

Description	Article No.
Accessories (continued)	
DRIVE-CLiQ cable, pre-assembled Connectors with degree of protection IP20/IP20 For Active Interface Module	
• 16 kW, length 0.31 m (12.2 in)	**6SL3060-4AK00-0AA0**
• 36 kW, length 0.41 m (16.1 in)	**6SL3060-4AP00-0AA0**
• 55 kW, length 0.60 m (23.6 in)	**6SL3060-4AU00-0AA0**
• 80 kW and 120 kW, length 0.95 m (37.4 in)	**6SL3060-4AA10-0AA0**
SINAMICS S120 Terminal Kit Plug-in terminals, DRIVE-CLiQ jumper For Active Interface Modules with a width of	
• 100 mm (3.94 in)	**6SL3160-8CD10-0AA0**
• 150 mm (5.91 in)	**6SL3160-8DF10-0AA0**
• 200 mm (7.87 in)	**6SL3160-8EH10-0AA0**
• 300 mm (11.81 in)	**6SL3160-8FM10-0AA0**
Accessories for re-ordering	
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**

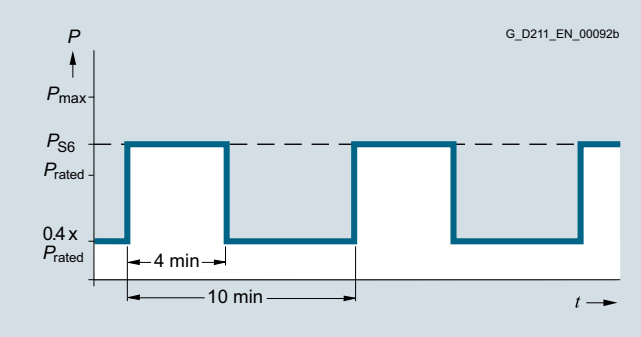
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Characteristic curves

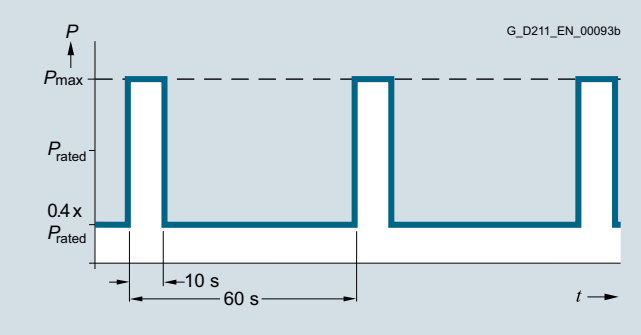
Overload capability



Load cycle with previous load

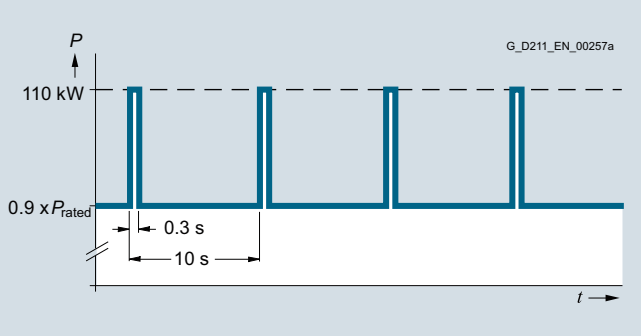


S6 load cycle with previous load



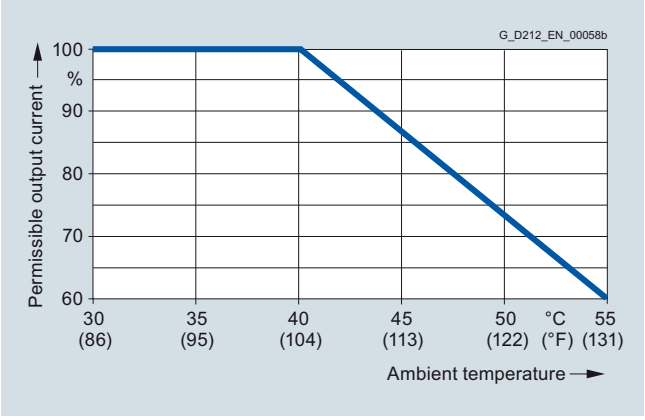
S6 load cycle with previous load

55 kW Active Line Module only:

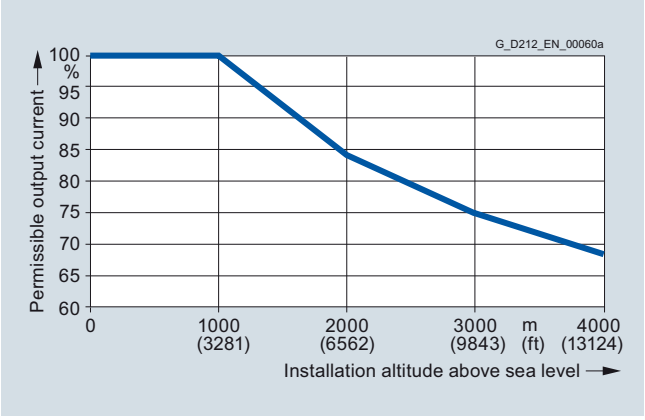


Peak power load duty cycle with previous load

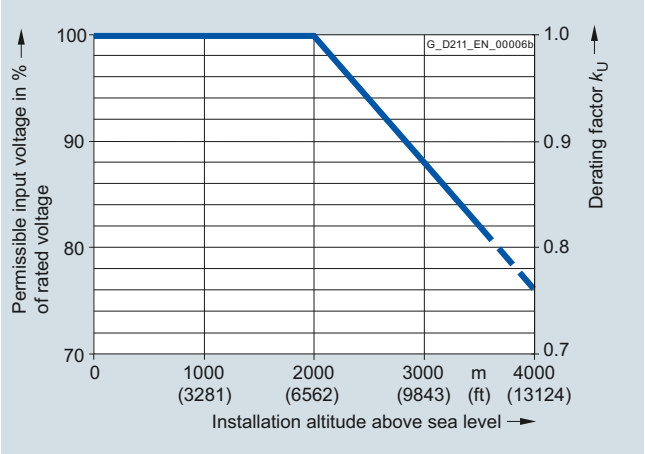
Derating characteristics



Output power dependent on ambient temperature



Output power dependent on installation altitude



Voltage derating dependent on installation altitude

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Overview



Basic Line Filter

Basic Line Filters are used on machines on which conducted interference emissions in the frequency range between 150 kHz and 30 MHz need to be damped in accordance with the requirements of CE-EMC legislation.

With the Basic Line Filters in combination with the Active Interface Modules, the limits for the interference voltages can be extended to Category C2 as defined in IEC 61800-3 or, maintaining compliance with Category C3, longer total cable lengths may be used in the configuration.

Selection and ordering data

Suitable for Active Line Module		SINAMICS Basic Line Filter	
Rated power Active Line Module	Booksize format Internal air cooling External air cooling	Rated current	
kW (HP)	Type	A	Article No.
16 (18)	6SL3130-7TE21-6AA4 6SL3131-7TE21-6AA3	**36**	**6SL3000-0BE21-6DA0**
36 (40)	6SL3130-7TE23-6AA3 6SL3131-7TE23-6AA3	**74**	**6SL3000-0BE23-6DA1**
55 (60)	6SL3130-7TE25-5AA3 6SL3131-7TE25-5AA3	**105**	**6SL3000-0BE25-5DA0**
80 (100)	6SL3130-7TE28-0AA3 6SL3131-7TE28-0AA3	**132**	**6SL3000-0BE28-0DA0**
120 (150)	6SL3130-7TE31-2AA3 6SL3131-7TE31-2AA3	**192**	**6SL3000-0BE31-2DA0**

Technical specifications

Article No.		6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA1	6SL3000-0BE25-5DA0	6SL3000-0BE28-0DA0	6SL3000-0BE31-2DA0
Product designation		Basic Line Filter	Basic Line Filter	Basic Line Filter	Basic Line Filter	Basic Line Filter
Line voltage 380 … 480 V 3 AC						
Rated current	A	36	74	105	132	192
Power loss	W (HP)	16 (0.21)	28 (0.04)	41 (0.05)	48 (0.06)	86 (0.12)
Line/load connection L1, L2, L3/U, V, W		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	10	35	50	95	95
PE connection		M6 screw studs according to DIN 46234	M6 screw studs according to DIN 46234	M8 screw studs according to DIN 46234	M10 screw studs according to DIN 46234	M10 screw studs according to DIN 46234
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	50 (1.97)	75 (2.95)	100 (3.94)	150 (5.91)	150 (5.91)
Height	mm (in)	429 (16.89)	433 (17.05)	466 (18.35)	479 (18.86)	479 (18.86)
Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)
Net weight	kg (lb)	5 (11)	7.5 (16.5)	11.5 (25.4)	18.2 (40.1)	18.8 (41.5)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus

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Overview

Suitable line-side power components are assigned depending on the power rating of the Active Line Modules.

Additional information about the recommended line-side components can be found in Catalogs IC 10 and LV 10.

The tables below list recommended components.

Assignment of line-side power components to Active Line Modules in booksize format

Suitable for Active Line Module		Line contactor	**Output coupling link for line contactor**	**Main switch**	**Leading auxiliary switch for main switch**
Rated power	Booksize format Internal air cooling External air cooling				
kW (HP)	Type	Type	Article No.	Article No.	Article No.
16 (18)	6SL3130-7TE21-6AA4 6SL3131-7TE21-6AA3	3RT1035-…	**3TX7004-1LB00**	**3LD2504-0TK51**	**3LD9200-5B**
36 (40)	6SL3130-7TE23-6AA3 6SL3131-7TE23-6AA3	3RT1045-…	**3TX7004-1LB00**	**3LD2704-0TK51**	**3LD9200-5B**
55 (60)	6SL3130-7TE25-5AA3 6SL3131-7TE25-5AA3	3RT1054-…	**3TX7004-1LB00**	**3KA5330-1GE01**	**3KX3552-3EA01**
80 (100)	6SL3130-7TE28-0AA3 6SL3131-7TE28-0AA3	3RT1056-…	**3TX7004-1LB00**	**3KA5330-1GE01**	**3KX3552-3EA01**
120 (150)	6SL3130-7TE31-2AA3 6SL3131-7TE31-2AA3	3RT1065-…	**3TX7004-1LB00**	**3KA5730-1GE01**	**3KX3552-3EA01**

Suitable for Active Line Module		**Circuit breaker IEC 60947**	Circuit breaker UL489/ CSA C22.2 No. 5-02	**Fuse-switch disconnector**	**Switch disconnector with fuse holders**	**Leading auxiliary switch for switch disconnector with fuse holders**
Rated power	Booksize format	Article No.				
kW (HP)	Type	Type	Type	Article No.	Article No.	Article No.
16 (18)	6SL3130-7TE21-6AA4 6SL3131-7TE21-6AA3	**3RV1031-4FA10**	3VL2505-2KN30-....	**3NP1123-1CA20**	**3KL5230-1GB01**	**3KX3552-3EA01**
36 (40)	6SL3130-7TE23-6AA3 6SL3131-7TE23-6AA3	**3RV1041-4LA10**	3VL2508-2KN30-....	**3NP1123-1CA20**	**3KL5230-1GB01**	**3KX3552-3EA01**
55 (60)	6SL3130-7TE25-5AA3 6SL3131-7TE25-5AA3	3VL2712-1DC33-....	3VL2512-2KN30-....	**3NP1143-1DA20**	**3KL5530-1GB01**	**3KX3552-3EA01**
80 (100)	6SL3130-7TE28-0AA3 6SL3131-7TE28-0AA3	3VL3720-1DC33-....	3VL3517-2KN30-....	**3NP1143-1DA20**	**3KL5530-1GB01**	**3KX3552-3EA01**
120 (150)	6SL3130-7TE31-2AA3 6SL3131-7TE31-2AA3	3VL3725-1DC36-....	3VL3525-2KN30-....	**3NP1153-1DA20**	**3KL5730-1GB01**	**3KX3552-3EA01**

Suitable for Active Line Module		**NEOZED fuse (gL/gG)**			**DIAZED fuse (gL/gG)**			**LV HRC fuse (gL/gG)**			UL/CSA fuse, Class J[1] Available from: Mersen www.ep.mersen.com		
Rated power	Booksize format	Rated current	Size	Article No.	Rated current	Size	Article No.	Rated current	Size	Article No.	Rated current	Dimen-sions	Ref. No.
kW (HP)	Type											mm	
16 (18)	6SL3130-7TE21-6AA4 6SL3131-7TE21-6AA3	35	D02	**5SE2335**	35	DIII	**5SB411**	35	000	**3NA3814**	35	27×60	AJT35
36 (40)	6SL3130-7TE23-6AA3 6SL3131-7TE23-6AA3	–	–	–	80	DIV	**5SC211**	80	000	**3NA3824**	80	29×117	AJT80
55 (60)	6SL3130-7TE25-5AA3 6SL3131-7TE25-5AA3	–	–	–	–	–	–	125	1	**3NA3132**	125	41×146	AJT125
80 (100)	6SL3130-7TE28-0AA3 6SL3131-7TE28-0AA3	–	–	–	–	–	–	160	1	**3NA3136**	175	41×146	AJT175
120 (150)	6SL3130-7TE31-2AA3 6SL3131-7TE31-2AA3	–	–	–	–	–	–	250	1	**3NA3144**	250	54×181	AJT250

[1] Not suitable for 3NP and 3KL switch disconnectors.

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Basic Line Modules

Overview



20 kW, 40 kW and 100 kW Basic Line Modules in booksize format

Basic Line Modules are available for applications in which no energy is returned to the supply or where the energy exchange between motor and generator axes takes place in the DC link. Basic Line Modules can only feed energy from the supply system into the DC link, energy cannot be fed back into the supply system. The DC link voltage is directly derived from the 3-phase line voltage via a 6-pulse bridge circuit. Basic Line Modules are designed for connection to grounded, star (TN, TT) and non-grounded, symmetrical IT supply systems. The connected Motor Modules are pre-charged over the integrated pre-charging resistors (20 kW and 40 kW) or through activation of the thyristors (100 kW).

Basic Line Modules 20 kW and 40 kW are equipped with an integrated brake chopper and can be used directly for applications in generator mode after an external brake resistor has been connected.
A Braking Module is only necessary in combination with the Basic Line Module 100 kW in generator mode.

Design

The Basic Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection
- 1 connection for the 24 V DC electronics power supply
- 1 DC link connection
- 3 DRIVE-CLiQ sockets
- 1 connection for braking resistor
  (only 20 kW and 40 kW Basic Line Modules)
- 1 temperature sensor input
  (KTY84-130/PT1000 or PTC/Pt100)

The status of the Basic Line Modules is indicated via two multi-color LEDs.

The scope of supply of the Basic Line Modules includes:

- DRIVE-CLiQ cable for connection to the Control Unit on the immediate left for drive control, length 0.11 m (4.33 in)
- DRIVE-CLiQ cable (length depends on module width) to connect Basic Line Module to adjacent Motor Module, length = width of Basic Line Module + 0.11 m (4.33 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- 1 set of warning labels in 30 languages

Note:

The thermostatic switch built into the braking resistor must be looped into the shutdown chain of the drive to prevent thermal overloading of the system in the event of a fault. If a braking resistor is not connected, a jumper must be connected between X21.1 and X21.2.

Integration

The Basic Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

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Technical specifications

Article No.	6SL313 . -1TE...
Product designation	Basic Line Modules in booksize format
Line voltage Up to 2000 m (6562 ft) above sea level	380 ... 480 V 3 AC ±10 % -15 % < 1 min[1)]
SCCR (**S**hort **C**ircuit **C**urrent **R**ating)	65 kA in conjunction with the recommended fuses class *J* or circuit breakers in accordance with UL489/CSA 22.2 No. 5-02 see recommended line-side components
Line frequency	47 … 63 Hz
Line power factor At rated power	
• Fundamental (cos φ_1)	> 0.96
• Total (λ)	0.75 … 0.93
Overvoltage category acc. to EN 60664-1	Class III
DC link voltage, approx.	1.35 x line voltage[2)]
Electronics power supply DC	24 V -15 %/+20 %

Article No.	6SL313 . -1TE...
Product designation	Basic Line Modules in booksize format
Radio interference suppression	
• Standard	
- 20 kW and 40 kW Basic Line Modules	No radio interference suppression
- 100 kW Basic Line Module	Category C3 to EN 61800-3 up to overall cable length 350 m (1148 ft) (shielded)
• With line filter	Category C2 to EN 61800-3 up to overall cable length 350 m (1148 ft) (shielded)
Cooling method	Internal air cooling, power units with increased air cooling by means of built-in fan
Ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating > 1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Certificate of suitability	CE, cULus

Article No.		6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0	6SL3130-1TE31-0AA0
Product designation		Basic Line Module in booksize format with internal air cooling with varnished modules	Basic Line Module in booksize format with internal air cooling with varnished modules	Basic Line Module in booksize format with internal air cooling with varnished modules
Line voltage 380 … 480 V 3 AC				
Power				
• Rated power P_{rated}				
- at 380 V 3 AC	kW	20	40	100
- at 460 V 3 AC[3)]	(HP)	(25)	(50)	(125)
• For S6 duty P_{S6} (40 %)	kW	26	52	130
• P_{max}	kW	60	120	175
Braking power With external braking resistor				
• $P_{Bmax.}$ (= 2 × P_{rated})	kW	40	80	–
• Continuous braking power P_d (= 0.25 × P_{rated})	kW	5	10	–
DC link current				
• At 600 V DC	A	34	67	167
• For S6 duty (40 %)	A	43	87	217
• Maximum	A	100	200	292
Input current				
• Rated current at 380 V 3 AC	A	35	69	172
• Maximum	A	113	208	301
Activation threshold Braking chopper	V	774	774	–

1) Can also be operated on supply systems with 200 ... 240 V 3 AC ±10 % with appropriate parameter assignment and reduced output.

2) The DC link voltage is unregulated and load-dependent.

3) Nominal HP ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

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Technical specifications (continued)

Article No.		6SL3130-1TE22-0AA0	6SL3130-1TE24-0AA0	6SL3130-1TE31-0AA0
Product designation		Basic Line Module in booksize format with internal air cooling with varnished modules		
Line voltage 380 … 480 V 3 AC				
Resistance value External braking resistor	Ω	≥ 14.8	≥ 7.4	–
Cable length, max. To braking resistor	m (ft)	15 (49)	15 (49)	–
Connection for braking resistor (X2)		Screw-type terminals	Screw-type terminals	–
• Conductor cross-section, max.	mm^2	0.5 … 4	0.5 … 10	
Power requirement, max. 24 V DC electronics power supply	A	1	1.4	2
Current carrying capacity				
• 24 V DC busbars	A	20	20	20
• DC link busbars	A	100	200	200
DC link capacitance				
• Basic Line Module	µF	940	1880	4100
• Drive line-up, max.	µF	20000	20000	50000
Internal air cooling				
• Power loss[1)]	kW	0.144	0.284	0.628
• Cooling air requirement	m^3/s (ft^3/s)	0.016 (0.6)	0.031 (1.1)	0.05 (1.8)
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 65	< 65
Line connection U1, V1, W1		Screw-type terminals	Screw-type terminals	M8 screw studs
• Conductor cross-section, max.	mm^2	0.5 … 16	10 … 50	1 × 35 … 120 or 2 × 50
Shield connection		Integrated into the power plug	See Accessories	See Accessories
PE connection		M5 screw	M6 screw	M6 screw
Cable length, max. Sum of all motor cables and DC link				
• Shielded	m (ft)	630 (2067)	630 (2067)	1000 (3281)
• Unshielded	m (ft)	850 (2789)	850 (2789)	1500 (4921)
Degree of protection		IP20	IP20	IP20
Width	mm (in)	100 (3.94)	150 (5.91)	200 (7.87)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)
Depth	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
Net weight	kg (lb)	6.8 (15.0)	11.3 (24.9)	15.8 (34.8)

1) Power loss of Basic Line Module at rated power including losses of 24 V DC electronics power supply.

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Selection and ordering data

Description	Article No.
SINAMICS S120 Basic Line Module in booksize format with internal air cooling	
Rated power:	
• 20 kW (25 HP)	**6SL3130-1TE22-0AA0**
• 40 kW (50 HP)	**6SL3130-1TE24-0AA0**
• 100 kW (125 HP)	**6SL3130-1TE31-0AA0**
Accessories	
Shield connection plate	
For Line Modules and Motor Modules in booksize format	
• With a width of 150 mm (5.91 in) for internal air cooling	**6SL3162-1AF00-0AA1**
• With a width of 200 mm (7.87 in) for internal air cooling	**6SL3162-1AH01-0AA0**
DC link rectifier adapter	
For direct infeed of DC link voltage	
• Screw-type terminals 0.5 … 10 mm^2 For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 95 mm^2 For Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.9 in) and 300 mm (11.9 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units)	**6SL3162-2BM01-0AA0**
For multi-tier configuration Screw-type terminals 35 ... 95 mm^2 For all Line Modules and Motor Modules in booksize format	
SINAMICS S120 Terminal Kit	
Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port	
• For Basic Line Modules with a width of 100 mm (3.94 in)	**6SL3163-8LD00-0AA0**

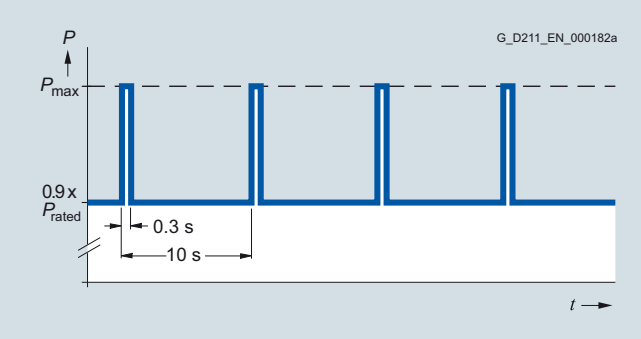
Description	Article No.
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs	
For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

5

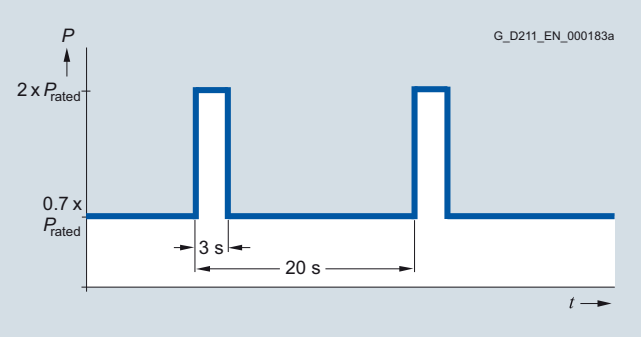
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Characteristic curves

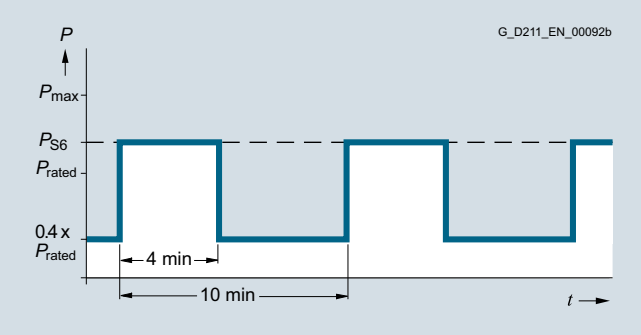
Overload capability



Load cycle with previous load

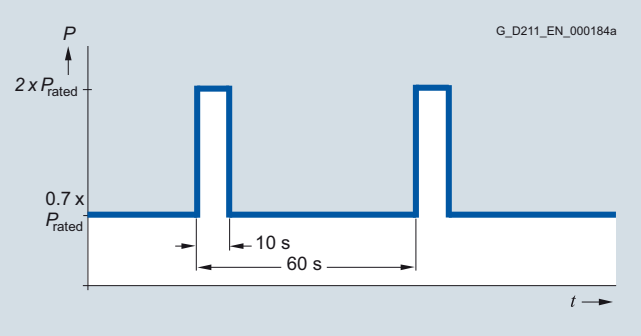


Load cycle with previous load



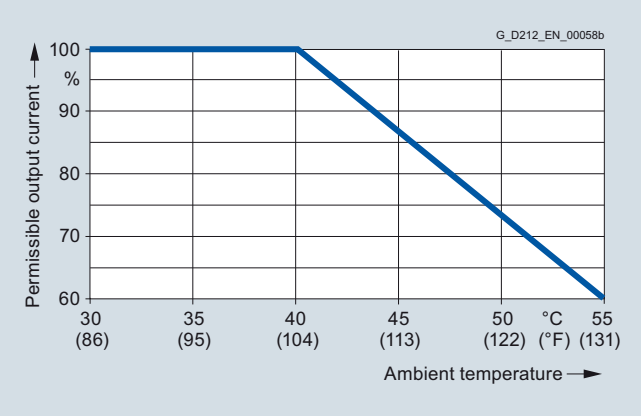
S6 load cycle with previous load

20 kW and 40 kW Basic Line Modules only

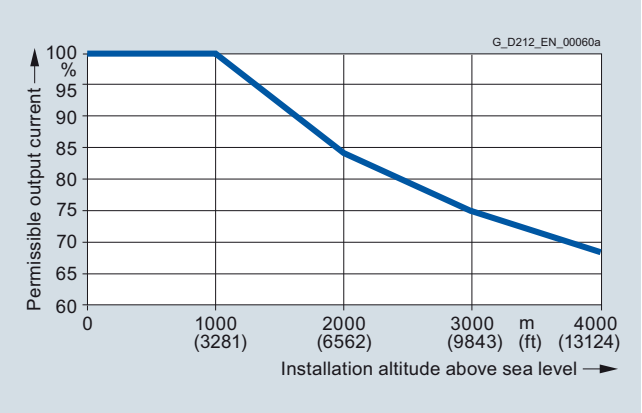


Load cycle with previous load

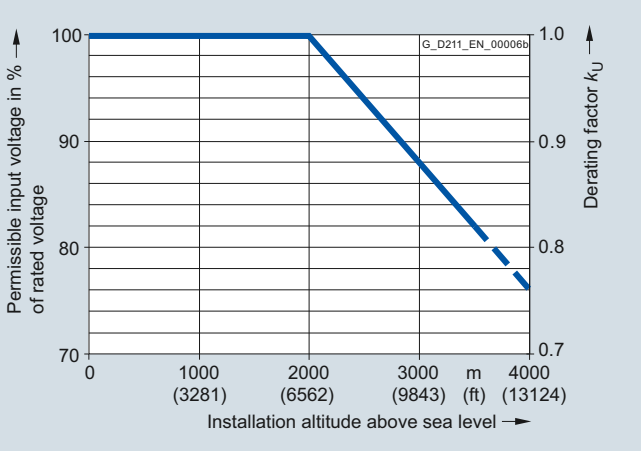
Derating characteristics



Output power dependent on ambient temperature



Output power dependent on installation altitude



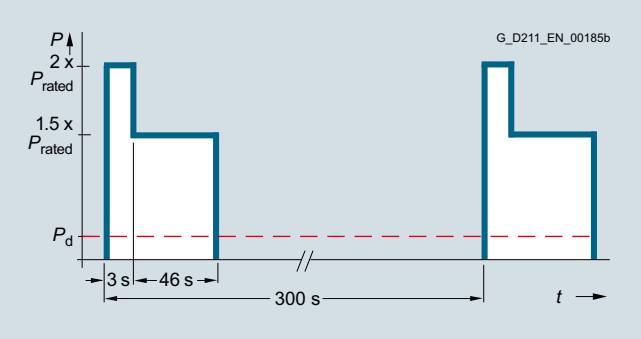
Voltage derating dependent on installation altitude

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Characteristic curves (continued)

Braking power with external braking resistor

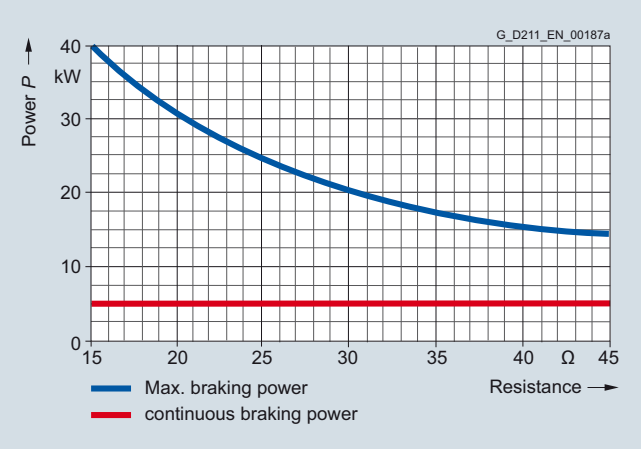
The following load cycles are defined for the braking modules of the 20 kW and 40 kW Basic Line Modules:



The maximum possible braking power P_{max} is calculated using the following formula:

$P_{max} = U^2/R$
U = activation threshold
R = resistance value of the external braking resistor

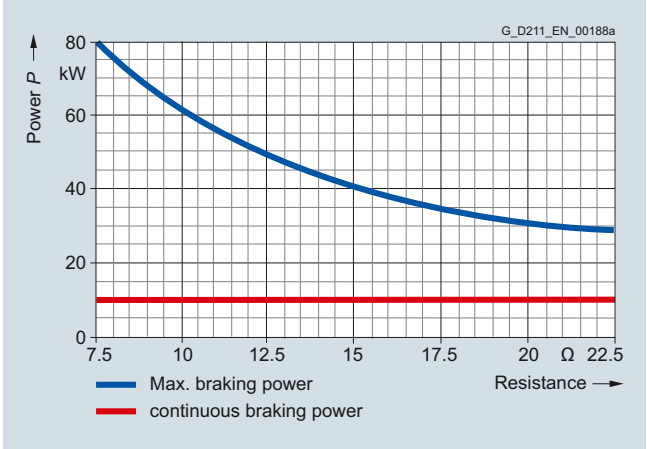
The maximum braking power is achieved with the smallest permissible resistance value. The maximum possible braking power falls at larger resistance values.



Braking power of the 20 kW Basic Line Module depending on the connected braking resistor

When the recommended braking resistor is used, the following values result for the maximum braking power or continuous braking power:

Braking resistor 6SE7023-2ES87-2DC0
Resistance value = 20 Ω → max. braking power = 30 kW; continuous braking power = 5 kW



Braking power of the 40 kW Basic Line Module depending on the connected braking resistor

When the recommended braking resistor is used, the following values result for the maximum braking power or continuous braking power:

Braking resistor 6SE7028-0ES87-2DC0
Resistance value = 8 Ω → max. braking power = 75 kW; continuous braking power = 10 kW (limited by braking module)

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Overview



20 kW and 100 kW line reactors

Line reactors reduce low-frequency line harmonic distortions and offload the semiconductors of the Basic Line Module.

The use of other makes of line reactor can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Suitable for Basic Line Module		SINAMICS line reactor	
Rated power Basic Line Module	Booksize format	Rated current	
kW (HP)	Type	A	Article No.
20 (25)	6SL3130-1TE22-0AA0	**37**	**6SL3000-0CE22-0AA0**
40 (50)	6SL3130-1TE24-0AA0	**74**	**6SL3000-0CE24-0AA0**
100 (125)	6SL3130-1TE31-0AA0	**185**	**6SL3000-0CE31-0AA0**

Technical specifications

Article No.		6SL3000-0CE22-0AA0	6SL3000-0CE24-0AA0	6SL3000-0CE31-0AA0
Product designation		Line reactor	Line reactor	Line reactor
Line voltage 380 … 480 V 3 AC				
Rated current	A	37	74	185
Power loss				
• At 50 Hz	W	130	270	480
• At 60 Hz	W	154	320	565
Line/load connection		Screw-type terminals	Screw-type terminals	Flat connector for M8 screw
• Conductor cross-section	mm^2	0.5 … 16	2.5 … 35	–
Degree of protection		IP20	IP20	IP00
Width	mm (in)	178 (7.01)	210 (8.27)	261 (10.28)
Height	mm (in)	165 (6.50)	245 (9.65)	228 (8.98)
Depth	mm (in)	100 (3.94)	93 (3.66)	137 (5.39)
Net weight	kg (lb)	5.2 (11.5)	11.2 (24.7)	21.7 (47.8)
Certificate of suitability		cURus	cURus	cURus

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Overview



Line filter

In plants with strict EMC requirements, line filters work together with line reactors to restrict the conducted interference emanating from the Power Modules to the limit values of Class A1 as defined in EN 55011 and Category C2 as defined in EN 61800-3. Line filters are suitable only for direct connection to TN systems.

The use of other makes of line filter can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Suitable for Basic Line Module		SINAMICS line filter	
Rated power Basic Line Module	Booksize format	Rated current	
kW (HP)	Type	A	Article No.
20 (25)	6SL3130-1TE22-0AA0	**36**	**6SL3000-0BE21-6DA0**
40 (50)	6SL3130-1TE24-0AA0	**74**	**6SL3000-0BE23-6DA1**
100 (125)	6SL3130-1TE31-0AA0	**192**	**6SL3000-0BE31-2DA0**

Technical specifications

Article No.		6SL3000-0BE21-6DA0	6SL3000-0BE23-6DA1	6SL3000-0BE31-2DA0
Product designation		Line filter	Line filter	Line filter
Line voltage 380 … 480 V 3 AC				
Rated current	A	36	74	192
Power loss	W	16	20	90
Line/load connection L1, L2, L3/U, V, W		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	10	35	95
PE connection		M6 screw stud	M6 screw stud	M10 screw stud
Degree of protection		IP20	IP20	IP20
Width	mm (in)	50 (1.97)	75 (2.95)	150 (5.91)
Height	mm (in)	429 (16.89)	433 (17.05)	479 (18.86)
Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)
Net weight	kg (lb)	5 (11)	7.5 (16.5)	18.8 (41.5)
Certificate of suitability		cURus	cURus	cURus

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Overview

Suitable line-side power components are assigned depending on the power rating of the Basic Line Module.

Additional information about the recommended line-side components can be found in Catalogs IC 10 and LV 10.

The tables below list recommended components.

Assignment of line-side power components to Basic Line Modules in booksize format

Suitable for Basic Line Module		Line contactor	**Output coupling link for line contactor**	**Main switch**
Rated power	Booksize format			
kW (HP)	Type	Type	Article No.	Article No.
20 (25)	6SL3130-1TE22-0AA0	3RT1035-…	**3TX7004-1LB00**	**3LD2504-0TK51**
40 (50)	6SL3130-1TE24-0AA0	3RT1045-…	**3TX7004-1LB00**	**3LD2704-0TK51**
100 (125)	6SL3130-1TE31-0AA0	3RT1056-…	**3TX7004-1LB00**	**3KA5530-1GE01**

Suitable for Basic Line Module		**Circuit breaker IEC 60947**	Circuit breaker UL489/CSA C22.2 No. 5-02	**Fuse-switch disconnector**
Rated power	Booksize format	Article No.		
kW (HP)	Type	Type	Type	Article No.
20 (25)	6SL3130-1TE22-0AA0	**3RV1041-4JA10**	3VL2506-2KN30-....	**3NP1123-1CA20**
40 (50)	6SL3130-1TE24-0AA0	3VL2710-1DC33-....	3VL2510-2KN30-....	**3NP1123-1CA20**
100 (125)	6SL3130-1TE31-0AA0	3VL3725-1DC36-....	3VL3525-2KN30-....	**3NP1143-1DA20**

Suitable for Basic Line Module		**Switch disconnector with fuse holders**	**LV HRC fuse (gL/gG)**			UL/CSA fuse, Class J[1] Available from: Mersen www.ep.mersen.com		
Rated power	Booksize format		Rated current	Size		Rated current	Dimen-sions	
kW (HP)	Type	Article No.	A		Article No.	A	mm	Reference No.
20 (25)	6SL3130-1TE22-0AA0	**3KL5230-1GB01**	63	000	**3NA3822**	60	27 × 60	AJT60
40 (50)	6SL3130-1TE24-0AA0	**3KL5230-1GB01**	100	000	**3NA3830**	100	27 × 117	AJT100
100 (125)	6SL3130-1TE31-0AA0	**3KL5730-1GB01**	250	1	**3NA3144**	250	54 × 181	AJT250

[1] Not suitable for 3NP and 3KL switch disconnectors.

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Design



Single Motor Module in booksize format

The Single Motor Modules in booksize format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC busbars
- 3 DRIVE-CLiQ sockets
- 1 motor connection, plug-in (not included in scope of supply) or screw-stud depending on rated output current
- 1 safe standstill input (enable pulses)
- 1 safe motor brake control
- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 2 PE connections

The status of the Motor Modules is indicated via two multi-color LEDs.

The motor cable shield is inside the connector on 50 mm and 100 mm (1.97 in and 3.94 in) wide Motor Modules. A shield connection plate can be supplied for 150 mm, 200 mm and 300 mm (5.91 in, 7.87 in, 11.81 in) wide Motor Modules. On these modules, the motor cable shield can be connected using a tube clip.

The signal cable shield can be connected to the Motor Module by means of a shield connection terminal, e.g. type KLBÜ 3-8 SC by Weidmüller.

Design (continued)

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (2.36 in)
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connector X21
- Connector X11 for motor brake connection (for Motor Modules with a rated output current of 45 A to 200 A)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Fan insert for the 132 A and 200 A Motor Modules (the voltage for the fan insert is supplied by the Motor Module)
- 1 set of warning labels in 30 languages

Integration

The Single Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

Technical specifications

Article No.	6SL312 . -1TE...
Product designation	Single Motor Module in booksize format
DC link voltage Up to 2000 m (6562 ft) above sea level	510 ... 720 V (line voltage 380 ... 480 V 3 AC)
Output frequency	0 ... 650 Hz[1)2)]
Electronics power supply DC	24 V -15 %/+20 %
Cooling method	Internal air cooling, External air cooling Power units with increased air cooling by means of built-in fan
Permissible ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating >1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Certificate of suitability	CE, cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PLd) according to ISO 13849-1 and Control Category 3 according to ISO 13849-1/EN 954-1

1) At rated output current (max. output frequency 1300 Hz for 62.5 µs current control cycle, 8 kHz pulse frequency, 60 % permissible output current). Note the correlation between max. output frequency, pulse frequency and current derating.

2) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license: High output frequency.

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Technical specifications (continued)

Article No.		6SL3120-1TE13-0AA4	6SL3120-1TE15-0AA4	6SL3120-1TE21-0AA4	6SL3120-1TE21-8AA4	6SL3120-1TE23-0AA4
Product designation		Single Motor Module in booksize format with internal air cooling				
Article No.		6SL3121-1TE13-0AA4	6SL3121-1TE15-0AA4	6SL3121-1TE21-0AA4	6SL3121-1TE21-8AA4	6SL3121-1TE23-0AA3
Product designation		Single Motor Module in booksize format with external air cooling				
DC link voltage 510 … 720 V DC						
Output current						
• Rated current I_{rated}	A	**3**	**5**	**9**	**18**	**30**
• Base-load current I_H	A	2.6	4.3	7.7	15.3	25.5
• For S6 duty I_{S6} (40 %)	A	3.5	6	10	24	40
• I_{max}	A	9	15	27	54	56
Type rating[1]						
• Based on I_{rated}	kW (HP)	1.6 (1.5)	2.7 (3)	4.8 (5)	9.7 (10)	16.0 (20)
• Based on I_H	kW (HP)	1.4 (1)	2.3 (2.5)	4.1 (5)	8.2 (10)	13.7 (18)
Rated pulse frequency	kHz	4	4	4	4	4
DC link current I_d[2]	A	3.6	6	11	22	36
Current carrying capacity						
• DC link busbars[3]	A	100	100	100	100	100
• 24 V DC busbars[4]	A	20	20	20	20	20
DC link capacitance	µF	110	110	110	220	710
Power requirement at 24 V DC, max.	A	0.85	0.85	0.85	0.85	0.9
Internal/external air cooling						
• Power loss[5]						
- Maximum losses with internal air cooling in control cabinet	W	50	70	100	190	310
- Typical losses with internal air cooling in control cabinet[6]	W	30	40	60	140	260
- With external air cooling, int./ext.	W	35/15	40/30	55/45	100/90	100/210
• Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)	0.016 (0.6)
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	< 60	< 60	< 60
Motor connection[7] U2, V2, W2		Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A	Connector (X1), max. 30 A
Shield connection		Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)	Integrated in connector (X1)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1) 24 V DC, 2 A	Integrated into the plug-in motor connector (X1) 24 V DC, 2 A	Integrated into the plug-in motor connector (X1) 24 V DC, 2 A	Integrated into the plug-in motor connector (X1) 24 V DC, 2 A	Integrated into the plug-in motor connector (X1) 24 V DC, 2 A

1) Rated power of a typical standard asynchronous motor at 600 V DC link voltage.
2) Rated DC link current for dimensioning an external DC connection.
3) With reinforced DC link busbar set, 150 A is possible (accessories).
4) If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).
5) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.
6) With max. motor cable length 30 m (98 ft), pulse frequency 4 kHz and DC link voltage 540 … 600 V.
7) Connector not included in scope of supply, see Accessories.

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Technical specifications (continued)

Article No.		6SL3120-1TE13-0AA4	6SL3120-1TE15-0AA4	6SL3120-1TE21-0AA4	6SL3120-1TE21-8AA4	6SL3120-1TE23-0AA4
Product designation		Single Motor Module in booksize format with internal air cooling				
Article No.		6SL3121-1TE13-0AA4	6SL3121-1TE15-0AA4	6SL3121-1TE21-0AA4	6SL3121-1TE21-8AA4	6SL3121-1TE23-0AA3
Product designation		Single Motor Module in booksize format with external air cooling				
DC link voltage 510 … 720 V DC						
Motor cable length, max.						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)	100 (328)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)	150 (492)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)	100 (3.94)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
Depth						
• With internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• With external air cooling, on/behind mounting surface	mm (in)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)
Net weight						
• With internal air cooling	kg (lb)	5.0 (11)	5.0 (11)	5.0 (11)	5.0 (11)	6.9 (15.2)
• With external air cooling	kg (lb)	5.7 (12.6)	5.7 (12.6)	5.7 (12.6)	5.7 (12.6)	8.5 (18.7)

Article No.		6SL31201TE24-5AA3	6SL31201TE26-0AA3	6SL31201TE28-5AA3	6SL31201TE31-3AA3	6SL31201TE32-0AA4
Product designation		Single Motor Module in booksize format with internal air cooling				
Article No.		6SL3121-1TE24-5AA3	6SL3121-1TE26-0AA3	6SL3121-1TE28-5AA3	6SL3121-1TE31-3AA3	6SL3121-1TE32-0AA4
Product designation		Single Motor Module in booksize format with external air cooling				
DC link voltage 510 … 720 V DC						
Output current						
• Rated current I_{rated}	A	**45**	**60**	**85**	**132**	**200**
• Base-load current I_H	A	38	52	68	105	141
• For S6 duty I_{S6} (40 %)	A	60	80	110	150	230
• I_{max}	A	85	113	141	210	282
Rated pulse frequency	kHz	4	4	4	4	4
• **Power**[1] With 600 V DC link voltage						
• Rated power	kW	24	32	46	71	107
• Based on I_H	kW	21	28	37	57	76
DC link current I_d[2]	A	54	72	102	158	200
Current carrying capacity						
• DC link busbars	A	200	200	200	200	200
• 24 V DC busbars	A	20	20	20	20	20
DC link capacitance	µF	1175	1410	1880	2820	3995
Power requirement at 24 V DC, max.	A	1.2	1.2	1.5	1.5	1.5

[1] Rated power of a typical standard asynchronous motor at 600 V DC link voltage.

[2] Rated DC link current for dimensioning an external DC connection.

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Technical specifications (continued)

Article No.		6SL31201TE24-5AA3	6SL31201TE26-0AA3	6SL31201TE28-5AA3	6SL31201TE31-3AA3	6SL31201TE32-0AA4
Product designation		Single Motor Module in booksize format with internal air cooling				
Article No.		6SL3121-1TE24-5AA3	6SL3121-1TE26-0AA3	6SL3121-1TE28-5AA3	6SL3121-1TE31-3AA3	6SL3121-1TE32-0AA4
Product designation		Single Motor Module in booksize format with external air cooling				
DC link voltage 510 … 720 V DC						
Internal/external air cooling						
• Power loss[1]						
- Maximum power loss with internal air cooling in control cabinet	kW	0.46	0.62	0.79	1.29	2.09
- Typical losses with internal air cooling in control cabinet[2]	kW	0.38	0.55	0.77	1.26	2.03
- With external Air cooling, int./ext.	kW	0.14/0.32	0.16/0.46	0.2/0.59	0.29/1.0	0.47/1.62
• Cooling air requirement	m^3/s (ft^3/s)	0.031 (1.1)	0.031 (1.1)	0.044 (1.6)	0.144 (5.1)	0.144 (5.1)
• Sound pressure level L_{pA} (1 m)	dB	< 65	< 65	< 60	< 73	< 73
Motor connection U2, V2, W2		M6 screw studs (X1)	M6 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)	M8 screw studs (X1)
• Conductor cross-section, max.	mm^2	2.5 … 50	2.5 … 50	2.5 … 95, 2 × 35	2.5 … 120, 2 × 50	2.5 … 120, 2 × 50
Shield connection		See accessories	See accessories	See accessories	See accessories	See accessories
PE connection		M6 screw	M6 screw	M6 screw	M8 screw	M8 screw
Motor brake connection		Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A	Plug-in connector (X11), 24 V DC, 2 A
Motor cable length, max.						
• Shielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
• Unshielded	m (ft)	150 (492)	150 (492)	150 (492)	150 (492)	150 (492)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Width	mm (in)	150 (5.91)	150 (5.91)	200 (7.87)	300 (11.81)	300 (11.81)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
• With fan[3]	mm (in)	–	–	–	629 (24.76)	629 (24.76)
• With screwed fitting	mm (in)	–	–	–	–	553 (21.77)[1]
Depth						
• With internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• With external air cooling, on/behind mounting surface	mm (in)	226/71 (8.90/2.80)	226/71 (8.90/2.80)	226/92 (8.90/3.62)	226/82 (8.90/3.23)	226/82 (8.90/3.23)
Net weight						
• With internal air cooling	kg (lb)	9 (19.8)	9 (19.8)	15 (33.1)	21 (46.3)	21 (46.3)
• With external air cooling	kg (lb)	13.2 (29.1)	13.4 (29.5)	17.2 (37.9)	27.2 (60.0)	30 (66.2)

1) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.
2) With max. motor cable length 30 m (98 ft), pulse frequency 4 kHz and DC link voltage 540 … 600 V.
3) The fan is supplied with the Motor Module and must be installed before the Motor Module is commissioned.

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Selection and ordering data

Rated output current	Type rating	SIAMICS S120 Single Motor Module in booksize format	
		Internal air cooling	External air cooling
A	kW (HP)[1]	Article No.	Article No.
DC link voltage 510 … 720 V DC			
3	1.6 (1.5)	**6SL3120-1TE13-0AA4**	**6SL3121-1TE13-0AA4**
5	2.7 (3)	**6SL3120-1TE15-0AA4**	**6SL3121-1TE15-0AA4**
9	4.8 (5)	**6SL3120-1TE21-0AA4**	**6SL3121-1TE21-0AA4**
18	9.7 (10)	**6SL3120-1TE21-8AA4**	**6SL3121-1TE21-8AA4**
30	16 (20)	**6SL3120-1TE23-0AA4**	**6SL3121-1TE23-0AA3**
45	24 (30)	**6SL3120-1TE24-5AA3**	**6SL3121-1TE24-5AA3**
60	32 (40)	**6SL3120-1TE26-0AA3**	**6SL3121-1TE26-0AA3**
85	46 (60)	**6SL3120-1TE28-5AA3**	**6SL3121-1TE28-5AA3**
132	71 (100)	**6SL3120-1TE31-3AA3**	**6SL3121-1TE31-3AA3**
200	107 (150)	**6SL3120-1TE32-0AA4**	**6SL3121-1TE32-0AA4**

Description	Article No.
Accessories	
Power connector (X1) At Motor Module end, with screw-type terminals 1.5 … 10 mm², For Motor Modules with a rated output current of 3 ... 30 A	**6SL3162-2MA00-0AA0**
Shield connection plate For Line Modules and Motor Modules in booksize format with a width of	
• 150 mm (5.91 in) for internal air cooling	**6SL3162-1AF00-0AA1**
• 150 mm (5.91 in) for external air cooling	**6SL3162-1AF00-0BA1**
• 200 mm (7.87 in) for internal air cooling	**6SL3162-1AH01-0AA0**
• 200 mm (7.87 in) for external air cooling	**6SL3162-1AH01-0BA0**
• 300 mm (11.81 in) for all cooling types	**6SL3162-1AH00-0AA0**
DC link rectifier adapter For direct infeed of DC link voltage	
• Screw-type terminals 0.5 … 10 mm² for Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) or 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• Screw-type terminals 35 ... 95 mm² for Line Modules and Motor Modules in booksize format with a width of 150 mm (5.91 in), 200 mm (7.9 in) and 300 mm (11.9 in)	**6SL3162-2BM00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm² For all Line Modules/ Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Reinforced DC link busbar set For replacement of DC link busbars for 5 modules in booksize format with a width of	
• 50 mm (1.97 in)	**6SL3162-2DB00-0AA0**
• 100 mm (3.94 in)	**6SL3162-2DD00-0AA0**

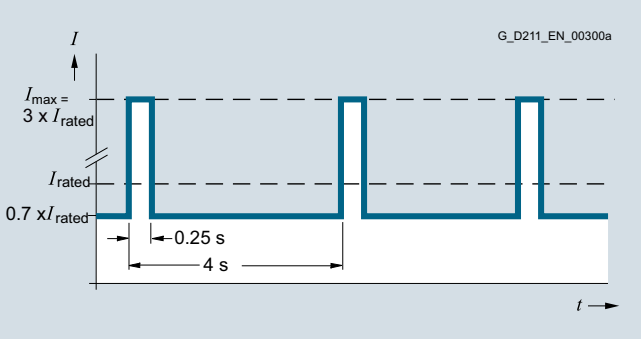
Description	Article No.
Accessories *(continued)*	
SINAMICS S120 Terminal Kit Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port For Motor Modules int./ext. air cooling with a width of	
• 50 mm (1.97 in)	**6SL3162-8AB00-0AA0**
• 100 mm (3.94 in)	**6SL3162-8BD00-0AA0**
• 150 mm (5.91 in)	**6SL3162-8CF00-0AA0**
• 200 mm (7.87 in)	**6SL3162-8DH00-0AA0**
• 300 mm (11.81 in)	**6SL3162-8EM00-0AA0**
Accessories for re-ordering	
24 V terminal adapter For all Line Modules/ Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

[1] Nominal HP based on asynchronous motors (induction motors). Match the motor nameplate current for specific sizing.

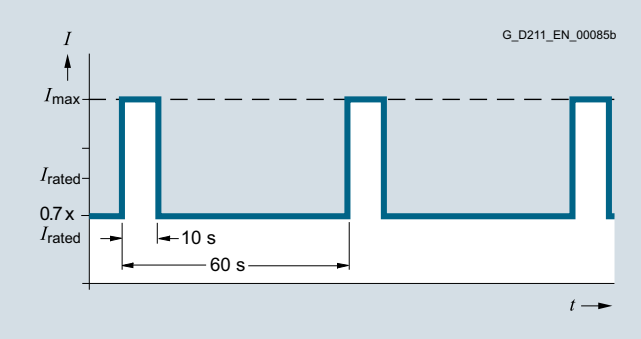
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Characteristic curves

Overload capability



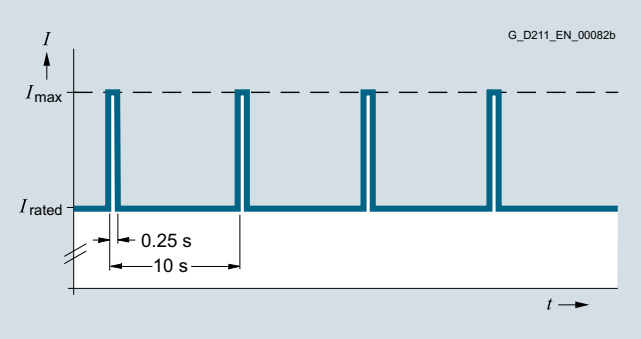
Peak current load cycle with initial load (300% overload)



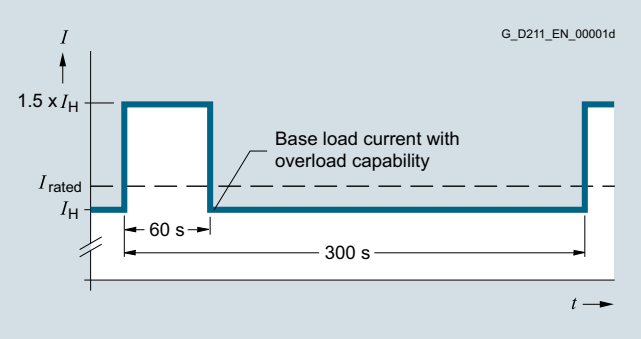
S6 load cycle with previous load with a load cycle period of 60 s

Note:

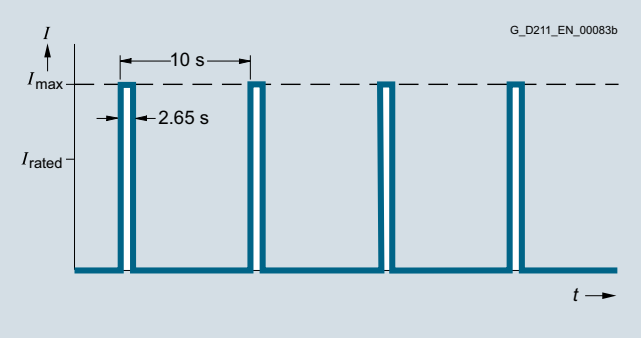
I_{max} stands for 2 x I_{rated} in the following overload characteristics.



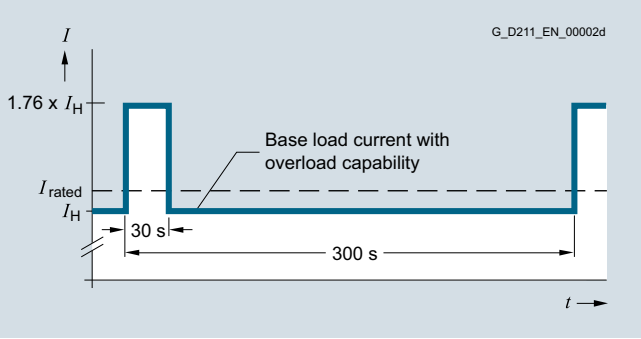
Load cycle with previous load



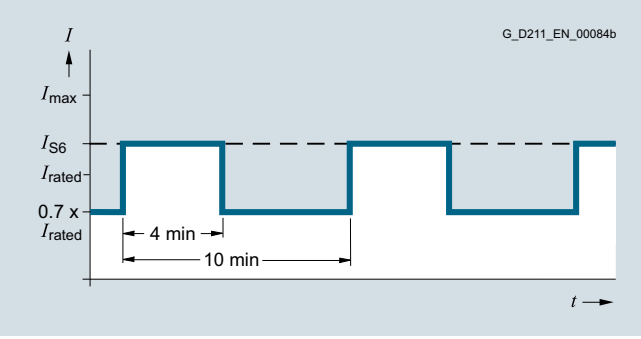
Load cycle with 60 s overload with a load cycle period of 300 s



Load cycle without previous load



Load cycle with 30 s overload with a load cycle period of 300 s

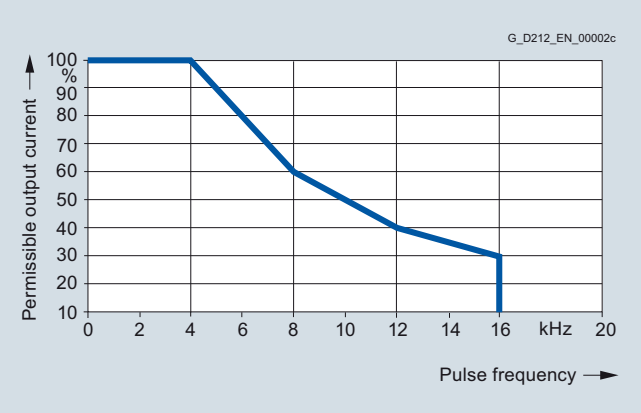


S6 load cycle with previous load with a load cycle period of 600 s

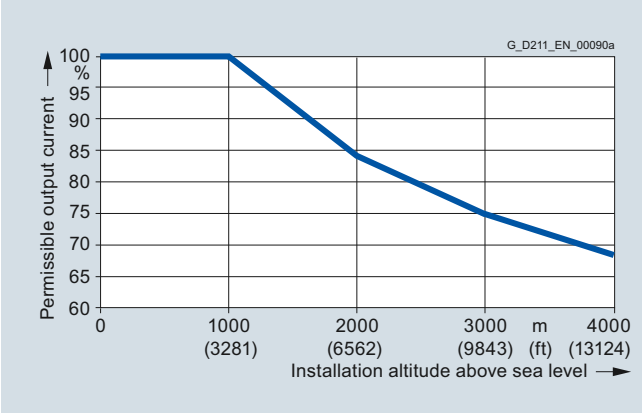
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Characteristic curves (continued)

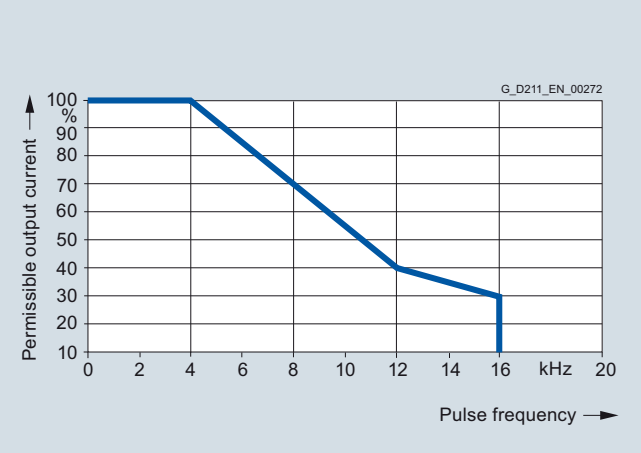
Derating characteristics



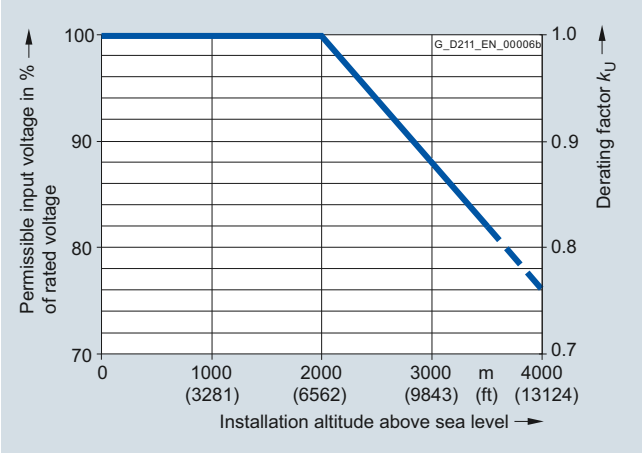
Output current dependent on pulse frequency
(rated current up to 132 A for Single Motor Modules in booksize format)



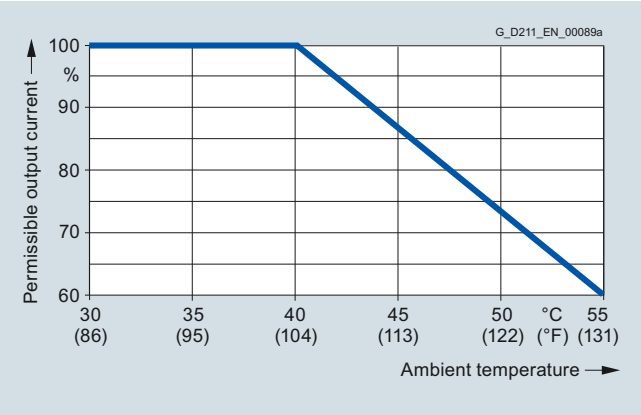
Output current dependent on installation altitude



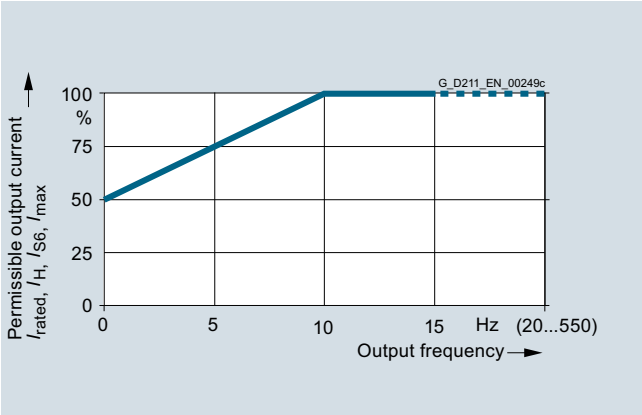
Output current dependent on pulse frequency
(rated current up to 200 A for Single Motor Modules in booksize format)



Voltage derating dependent on installation altitude



Output current dependent on ambient temperature



Current derating dependent on output frequency

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Double Motor Modules

Design



Double Motor Module

Double Motor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 4 DRIVE-CLiQ sockets
- 2 plug-in motor connections (not included in scope of supply)
- 2 safe standstill inputs (1 input per axis)
- 2 safe motor brake control
- 2 temperature sensor inputs (KTY84-130/PT1000 or PTC)
- 3 PE connections

The status of the Motor Modules is indicated via two multi-color LEDs.

On Double Motor Modules, the motor cable shield can be connected in the connector.

The signal cable shield can be connected to the Motor Module by means of a shield connection terminal, e.g., type KLBÜ 3-8 SC by Weidmüller.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable appropriate to the width of the Motor Module for connection to the adjacent Motor Module, length = width of Motor Module + 0.06 m (2.36 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Device fans for cooling power units on modules with internal and external air cooling supplied from the internal voltage levels
- 1 set of warning labels in 30 languages

Integration

The Double Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

Technical specifications

Article No.	6SL312 . -2TE...
Product designation	Double Motor Modules in booksize format
DC link voltage Up to 2000 m (6562 ft) above sea level	510 … 720 V (line voltage 380 … 480 V 3 AC)
Output frequency	0 ... 650 Hz[1)2)]
Electronics power supply DC	24 V -15 %/+20 %
Cooling method	Internal air cooling External air cooling, Power units with increased air cooling by means of built-in fan
Permissible ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating > 1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Certificate of suitability	CE, cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508, Performance Level d (PLd) According to ISO 13849-1 Control Category 3 according to ISO 13849-1/EN 954-1

1) Note the correlation between max. output frequency, pulse frequency and current derating.

2) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license: High output frequency.

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Technical specifications (continued)

Article No.		6SL3120-2TE13-0AA4	6SL3120-2TE15-0AA4	6SL3120-2TE21-0AA4	6SL3120-2TE21-8AA3
Product designation		Double Motor Module in booksize format with internal air cooling			
Article No.		6SL3121-2TE13-0AA4	6SL3121-2TE15-0AA4	6SL3121-2TE21-0AA4	6SL3121-2TE21-8AA3
Product designation		Double Motor Module in booksize format with external air cooling			
DC link voltage 510 … 720 V DC					
Output current					
Rated current I_{rated}	A	2 × 3	2 × 5	2 × 9	2 × 18
For S6 duty I_{S6} (40 %)	A	2 × 3.5	2 × 6	2 × 10	2 × 24
Base-load current I_H	A	2 × 2.6	2 × 4.3	2 × 7.7	2 × 15.3
I_{max}	A	2 × 9	2 × 15	2 × 27	2 × 36
Type rating[1]					
Based on I_{rated}	kW (HP)	2 × 1.6 (1.5)	2 × 2.7 (3)	2 × 4.8 (5)	2 × 9.7 (10)
Based on I_H	kW (HP)	2 × 1.4 (1)	2 × 2.3 (2.5)	2 × 4.1 (5)	2 × 8.2 (10)
DC link current I_d[2]	A	7.2	12	22	43
Current carrying capacity					
DC link busbars	A	100	100	100	100
24 V DC busbars[3]	A	20	20	20	20
DC link capacitance	µF	220 With internal cooling	220	220	705
Power requirement at 24 V DC, max.	A	1.15	1.15	1.15	1.0
Internal/external air cooling					
• Power loss[4]					
- Maximum losses with internal air cooling in control cabinet	kW	0.10	0.13	0.19	0.35
- Typical losses with internal air cooling in control cabinet[5]		0.05	0.08	0.15	0.28
- With external air cooling, int./ext.[4]	kW	0.06/0.035	0.07/0.06	0.09/0.095	0.105/0.24
• Cooling air requirement	m^3/s (ft^3/s)	0.008 (0.3)	0.008 (0.3)	0.008 (0.3)	0.016 (0.6)
• Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	< 60	< 60
Motor connection U2, V2, W2		2 connectors (X1, X2), max. 30 A (not included in scope of supply, see Accessories)			
Shield connection		Integrated in connector (X1, X2)	Integrated in connector (X1, X2)	Integrated in connector (X1, X2)	Integrated in connector (X1, X2)
PE connection		M5 screw	M5 screw	M5 screw	M5 screw
Motor brake connection		Integrated into the plug-in motor connector (X1, X2), 24 V DC, 2 A			
Motor cable length, max.					
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	70 (230)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20
Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	100 (3.94)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
Depth					
• With internal air cooling	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
• With external air cooling on/behind mounting surface	mm (in)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)	226/66.5 (8.90/2.62)
Net weight					
• With internal air cooling	kg (lb)	5.3 (11.7)	5.3 (11.7)	5.5 (12.1)	6.8 (15)
• With external air cooling	kg (lb)	5.8 (12.8)	5.8 (12.8)	5.7 (12.6)	8.6 (19)

1) Rated power of a typical standard asynchronous motor at 600 V DC link voltage.

2) Rated DC link current for dimensioning an external DC connection.

3) If, due to a number of Line Modules and Motor Modules being mounted side-by-side, the current carrying capacity exceeds 20 A, an additional 24 V DC connection using a 24 V terminal adapter is required (max. cross-section 6 mm^2, max. fuse protection 20 A).

4) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.

5) With max. motor cable length 30 m (98 ft), pulse frequency 4 kHz and DC link voltage 540 … 600 V.

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Double Motor Modules

Selection and ordering data

Rated output current	Type rating	SINAMICS S120 Double Motor Module in booksize format	
		Internal air cooling	External air cooling
A	kW (HP)[1]	Article No.	Article No.
2 × 3	2 × 1.6 (2 × 1.5)	**6SL3120-2TE13-0AA4**	**6SL3121-2TE13-0AA4**
2 × 5	2 × 2.7 (2 × 3)	**6SL3120-2TE15-0AA4**	**6SL3121-2TE15-0AA4**
2 × 9	2 × 4.8 (2 × 5)	**6SL3120-2TE21-0AA4**	**6SL3121-2TE21-0AA4**
2 × 18	2 × 9.7 (2 × 10)	**6SL3120-2TE21-8AA3**	**6SL3121-2TE21-8AA3**

Description	Article No.
Accessories	
Power connector (X1/X2) At Motor Module end, with screw-type terminals 1.5 … 10 mm², For Motor Modules with a rated output current of 3 ... 30 A	**6SL3162-2MA00-0AA0**
DC link rectifier adapter For direct infeed of DC link voltage Screw-type terminals 0.5 … 10 mm² For Line Modules and Motor Modules in booksize format with a width of 50 mm (1.97 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
DC link adapter (2 units) For multi-tier configuration Screw-type terminals 35 ... 95 mm² For all Line Modules and Motor Modules in booksize format	**6SL3162-2BM01-0AA0**
Reinforced DC link busbar set For replacement of DC link busbars for 5 modules in booksize format with a width of	
• 50 mm (1.97 in)	**6SL3162-2DB00-0AA0**
• 100 mm (3.94 in)	**6SL3162-2DD00-0AA0**
SINAMICS S120 Terminal Kit Plug-in terminals, DRIVE-CLiQ jumper, dust-proof blanking plugs for DRIVE-CLiQ port For Motor Modules int./ext. air cooling with a width of	
• 50 mm (1.97 in)	**6SL3162-8AB00-0AA0**
• 100 mm (3.94 in)	**6SL3162-8BD00-0AA0**

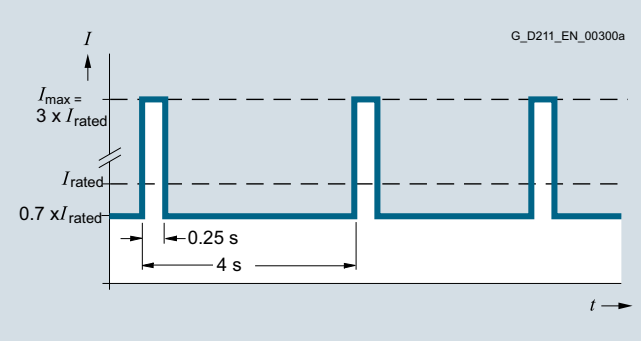
Description	Article No.
Accessories for re-ordering	
24 V terminal adapter For all Line Modules and Motor Modules in booksize format	**6SL3162-2AA00-0AA0**
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

[1] Nominal HP based on asynchronous motors (induction motors). Match the motor nameplate current for specific sizing.

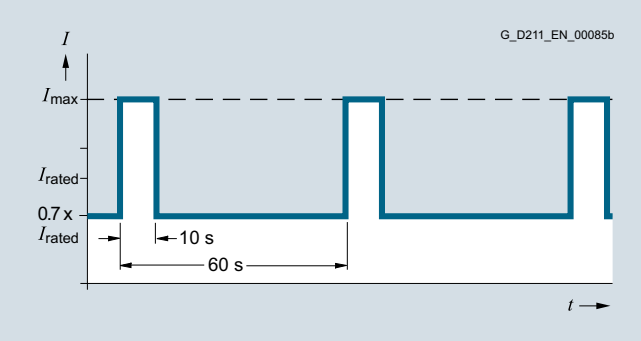
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Characteristic curves

Overload capability



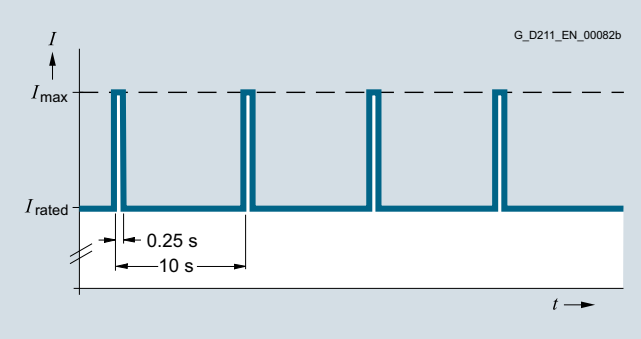
Peak current load cycle with previous load (300 % overload)



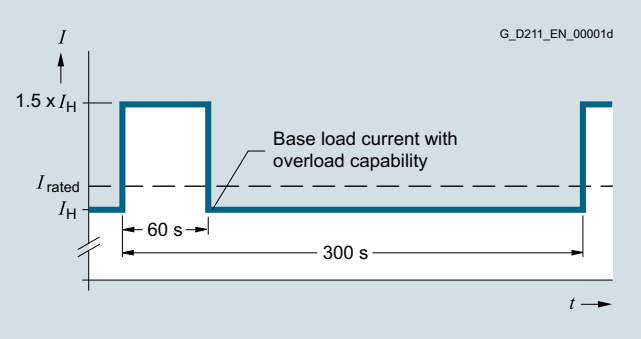
S6 load cycle with previous load with a load cycle period of 60 s

Note:

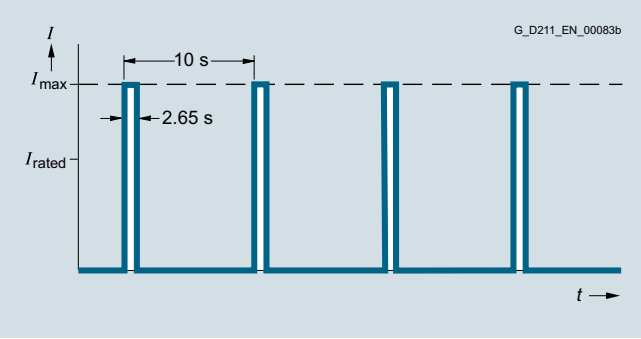
I_{max} stands for 2 x I_{rated} in the following overload characteristics.



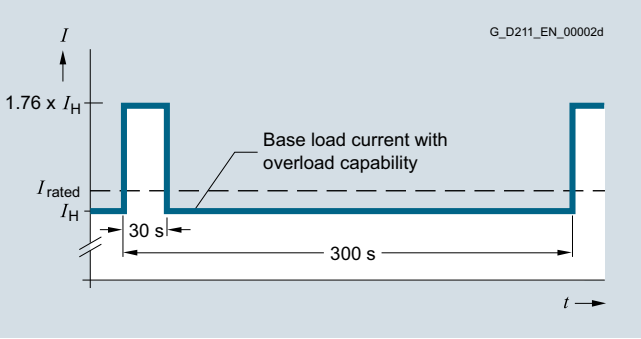
Load cycle with previous load



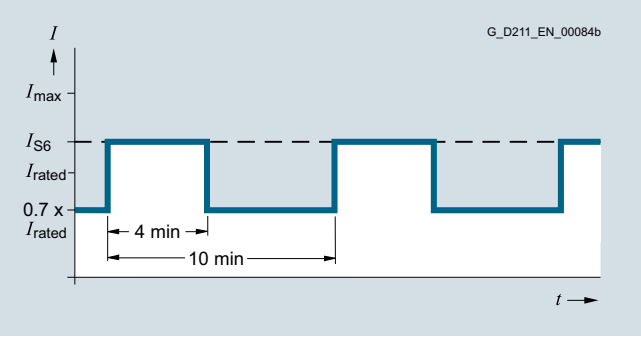
Load cycle with 60 s overload with a load cycle period of 300 s



Load cycle without previous load



Load cycle with 30 s overload with a load cycle period of 300 s

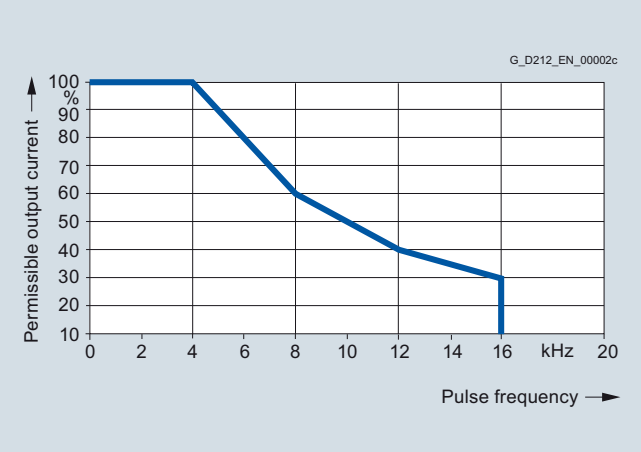


S6 load cycle with previous load with a load cycle period of 600 s

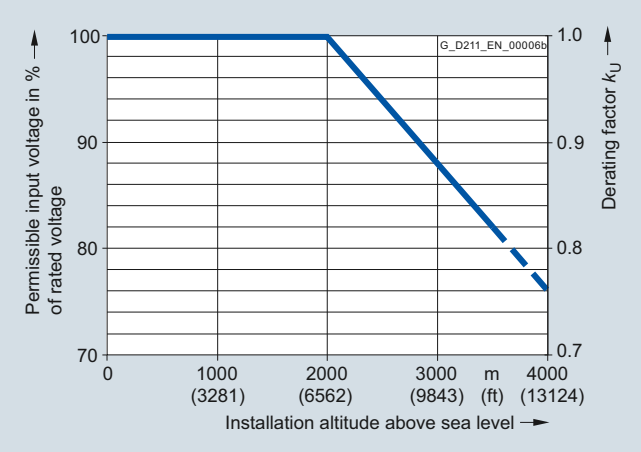
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Characteristic curves (continued)

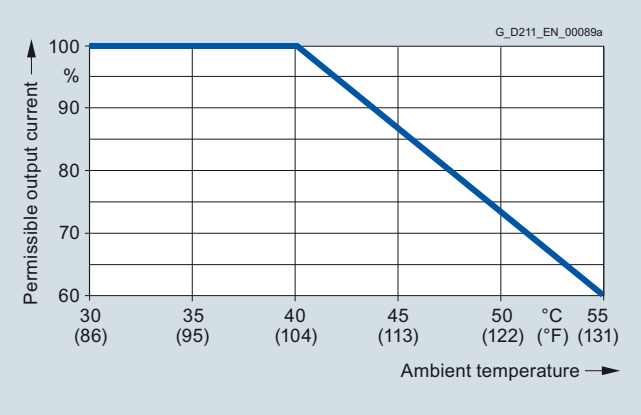
Derating characteristics



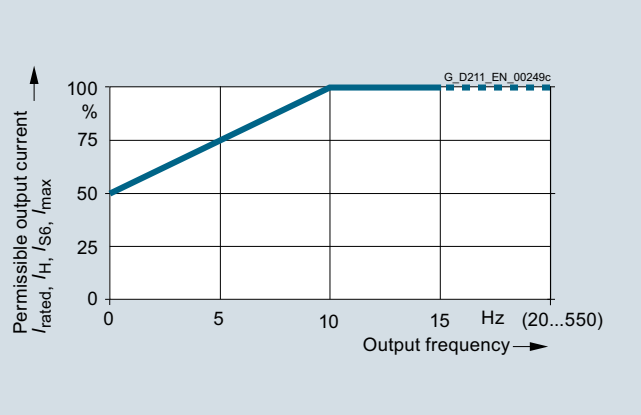
Output current dependent on pulse frequency



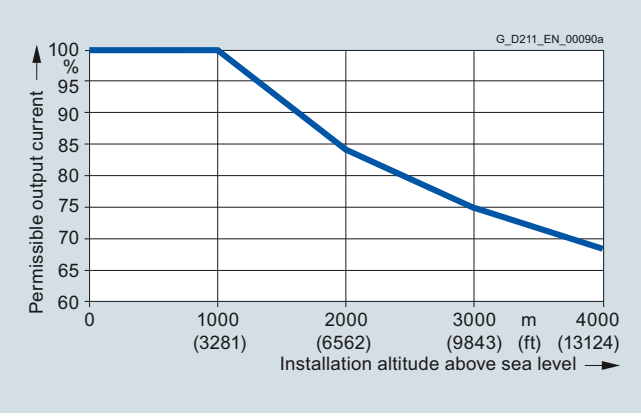
Voltage derating dependent on installation altitude



Output current dependent on ambient temperature



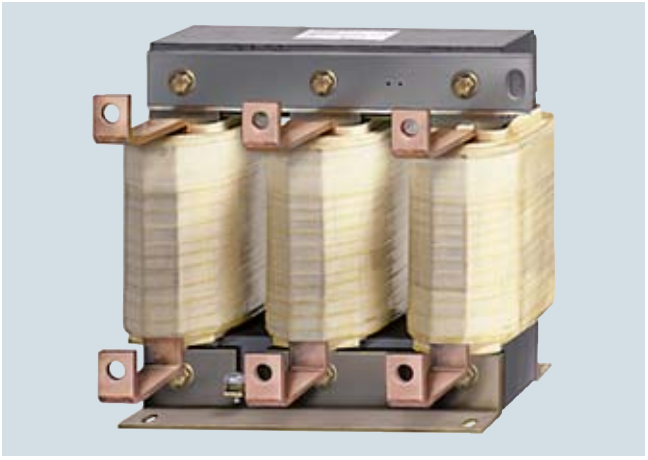
Current derating dependent on output frequency



Output current dependent on installation altitude

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Overview



Series motor reactor

A series reactor in the form of a three-limb iron-cored reactor may be required in the case of special motors with low leakage inductance (for which the controller settings are insufficient). Motors with a low leakage inductance are, from experience, motors that can achieve high stator frequencies > 300 Hz or motors with a high rated current > 85 A.

The series motor reactors are designed for a pulse frequency of 4 kHz or 8 kHz output from the Motor Module. Higher pulse frequencies are not permissible.

Overview (continued)

The series motor reactor must be installed as close as possible to the Motor Module.

The voltage drop across a series reactor depends on the motor current and the motor frequency. If an unregulated infeed is used, the maximum rated motor voltage depends on the connected line supply voltage. If these guide values are observed, lower reductions in power in the upper speed range of the motor can be achieved.

The surface temperature of the series motor reactor can reach up to 100 °C (212 °F). This additional heat source must be taken into
account in the system.

The notes in the Configuration Manual for the motors used must be observed.

Selection and ordering data

Suitable for Motor Module in booksize format Internal air cooling External air cooling	**Series motor reactor**		
	Rated current	Rated inductance	
Type	A	mH	Article No.
6SL3120-... 6SL3121-...	**22.5**	0.3	**4EU2552-0EF00-4BA0**
6SL3120-... 6SL3121-...	**108**	0.1	**4EU3951-0AR00-4B**

Technical specifications

Article No.		4EU2552-0EF00-4BA0	4EU3951-0AR00-4B
Product designation		Series motor reactor	Series motor reactor
Input voltage 380 ... 480 V 3 AC (DC link voltage 510 ... 720 V DC)			
Rated current	A	22.5	108
Rated inductance	mH	0.3	0.1
Power loss	W	146	454
Continuous current I_{thmax}, therm. perm.	A	25	120
Continuous frequency, therm. perm.	Hz	1400	1400
Pulse frequency, max.	kHz	8	8
Relative voltage drop at the series motor reactor At I_{thmax} and V_{rated}	%	23	38
Ambient temperature	°C (°F)	40 (104)	40 (104)
Connection to Motor Module/motor		Flat-type terminal	Flat-type terminal
PE connection		M6 screw	M8 screw
Degree of protection		IP00	IP00
Width	mm (in)	225 (8.86)	410 (16.14)
Height	mm (in)	210 (8.27)	385 (15.16)
Depth	mm (in)	115 (4.53)	174 (6.85)
Net weight	kg (lb)	16 (35.3)	68 (150)
Certificate of suitability		cURus	cURus

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Braking Module

Overview



Braking Module

A Braking Module and the matching external braking resistor are required to bring drives to a controlled standstill in the event of a power failure (e.g., emergency retraction or EMERGENCY OFF category 1) or limit the DC link voltage for brief periods of generator operation, e.g., when the regenerative feedback capability of the Line Module is deactivated. The Braking Module includes the power electronics and the associated control circuit. During operation, the DC link power is converted into heat loss in an external braking resistor. Braking Modules function autonomously.

Braking modules in booksize format can also be used for rapid discharge of the DC link.

Design

The Braking Module in booksize format features the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- Terminals for connecting the braking resistor
- 2 digital inputs (disable Braking Module/acknowledge faults and rapid discharge of DC link)
- 2 digital outputs (Braking Module disabled and prewarning $I \times t$ monitoring)
- 2 PE connections

The status of the Braking Module is indicated via two 2-color LEDs.

Technical specifications

Article No.	6SL3100-1AE31-0AB1
Product designation	Braking Module in booksize format with internal air cooling
DC link voltage 510 … 720 V DC	
Rated power P_{DB}	1.5 kW[1)]
Peak power P_{max}	100 kW[1)]
Activation threshold	770 V
Cable length, max. to braking resistor	10 m (32.8 ft)
DC link capacitance	110 µF
Power requirement at 24 V DC, max.	0.5 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 … +30 V
• Low level (an open digital input is interpreted as "low")	-3 … +5 V
• High level	15 … 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Conductor cross-section, max.	1.5 mm^2
Digital outputs	Continuously short-circuit-proof
• Voltage DC	24 V
• Load current per digital output, max.	100 mA
• Conductor cross-section, max.	1.5 mm^2
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
PE connection	M5 screw
Width	50 mm (1.97 in)
Height	380 mm (14.96 in)
Depth, with spacer	270 mm (10.63 in)
Net weight	4.1 kg (9 lb)
Certificate of suitability	cURus

Selection and ordering data

Description	Article No.
Braking Module in booksize format Internal air cooling, incl. spacers	**6SL3100-1AE31-0AB1**
Accessories for re-ordering	
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**

1) Several Braking Modules can be operated in parallel, typically up to 4 Modules.

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Overview



Braking resistor

Excess energy in the DC link is dissipated via the braking resistor.

The corresponding braking resistor is connected to a Braking Module or Basic Line Module. Positioning the braking resistor outside the control cabinet or switchgear room enables the resulting thermal losses to be routed away. This reduces the level of air conditioning required.

Selection and ordering data

Suitable for Braking Module in booksize format	Braking resistor		
	Rated power	Peak power	
Type	kW	kW	Article No.
6SL3100-1AE31-0AB1	**0.3**	25	**6SN1113-1AA00-0DA0**
	1.5	100	**6SL3100-1BE31-0AA0**

Suitable for Basic Line Module in booksize format	Braking resistor		
	Rated power	Peak power	
Type	kW	kW	Article No.
6SL3130-1TE22-0AA0	**5**	30	**6SE7023-2ES87-2DC0**
6SL3130-1TE24-0AA0	**12.5**	75	**6SE7028-0ES87-2DC0**

Technical specifications

Article No.		6SN1113-1AA00-0DA0		6SL3100-1BE31-0AA0		6SE7023-2ES87-2DC0	6SE7028-0ES87-2DC0
Product designation		Braking resistor for Braking Module in booksize and booksize compact format					
DC link voltage 510 ... 720 V DC							
Resistance	Ω	17		5.7		20	8
Rated power P_{DB}	kW	0.3		1.5		5	12.5
Peak power P_{max}	kW	25		100		30	75
Load duration t_a for peak power	s	0.1	0.4	1	2	15	15
Cycle duration t of braking duty cycle	s	11.5	210	68	460	90	90
Power connections		–		–		M6 screw stud	M6 screw stud
PE connection				–		M6 screw stud	M8 screw studs
Thermostatic switch (NC contact)		–		–		Screw-type terminals	Screw-type terminals
• Switching capacity AC		–		–		250 V/max. 10 A	250 V/max. 10 A
• Switching capacity DC		–		–		42 V/0.2 A	42 V/0.2 A
• Conductor cross-section	mm^2	–		–		2.5	2.5
Degree of protection		IP54[1)]		IP20		IP20	IP20
Width	mm (in)	80 (3.15)		193 (7.60)		430 (16.93)	740 (29.13)
Height	mm (in)	210 (8.27)		410 (16.14)		485 (19.09)	485 (19.09)
Depth	mm (in)	53 (2.09)		240 (9.45)		305 (12.01)	305 (12.01)
Net weight	kg (lb)	3.4 (7.5)		5.6 (12.3)		14 (30.9)	22 (48.5)
Certificate of suitability		cULus		–		UL, CSA	UL, CSA

[1)] Braking resistor with connected 1.5 mm^2 shielded cable, length 3 m (9.84 ft)

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Capacitor Module

Overview



Capacitor Module

The Capacitor Module is used to increase the DC link capacitance to bridge momentary power losses.

The Capacitor Module is connected to the DC link voltage via the integrated DC link busbars. The Capacitor Module functions autonomously.

Several Capacitor Modules can be operated in parallel.

Design

Capacitor Modules feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 PE connections

Technical specifications

Article No.	6SL3100-1CE14-0AA0
Product designation	Capacitor Module in booksize format
DC link voltage 510 … 720 V DC	
Capacitance	4000 µF
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
PE connection	M5 screw
Width	100 mm (3.94 in)
Height	380 mm (14.96 in)
Depth, with spacer	270 mm (10.63 in)
Net weight	7.2 kg (16 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
Capacitor Module in booksize format Internal air cooling, incl. spacers	**6SL3100-1CE14-0AA0**
Accessories for re-ordering	
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**

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Overview



Control Supply Module

The Control Supply Module in booksize format provides a 24 V to 28.8 V DC power supply that can be set using an integrated potentiomenter via the line or DC link. The Control Supply Module can either be operated individually or in a parallel connection with a maximum of 10 devices.
A DIP switch on the top of the module is used to change over between single and parallel mode in the de-energized state (details of connection for parallel operation are given in the Manual for booksize modules).

Using the Control Supply Module, it is possible, for example, to make emergency retraction movements in the event of a supply failure, provided that the DC link voltage is available.

Design

Control Supply Modules feature the following connections and interfaces as standard:

- 1 line connection
- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 1 connection for the electronics power supply for Control Units, Terminal Modules, Sensor Modules, etc., via the 24 V terminal adapter provided in the scope of supply (max. cross-section 6 mm^2, max. fuse protection 20 A)
- 1 integrated potentiometer for setting the output voltage
- 1 digital output to signal the error-free state
- 1 DIP switch to change over between single and parallel mode
- 2 PE connections

The status of the Control Supply Modules is indicated via two multi-color LEDs.

Technical specifications

Article No.	6SL3100-1DE22-0AA1
Product designation	Control Supply Module in booksize format
DC link voltage 510 … 720 V DC	
Line voltage 380 ... 480 V 3 AC	
Rated input current	
• At 400 V 3 AC	≤ 2 A
• At 600 V DC	1.1 A
DC link voltage DC range	300 … 882 V Operation in 300 ... 430 V range is permitted briefly for < 1 min.
Radio interference suppression (standard)	Category C2 to EN 61800-3
Rated output voltage DC	24 V ... 28.8 V adjustable using potentiometer
Rated output current	20 A
Current carrying capacity	
• 24 V DC busbars	20 A
• DC link busbars	100 A
Line connection L1, L2, L3 (X1)	Screw-type terminals
• Conductor cross-section	0.2 … 4.0 mm^2
PE connection	M5 screw
Width	50 mm (1.97 in)
Height	380 mm (14.96 in)
Depth, with spacer	270 mm (10.63 in)
Net weight	4.8 kg (10.6 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
Control Supply Module in booksize format Internal air cooling incl. spacers	**6SL3100-1DE22-0AA1**
Accessories for re-ordering	
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**

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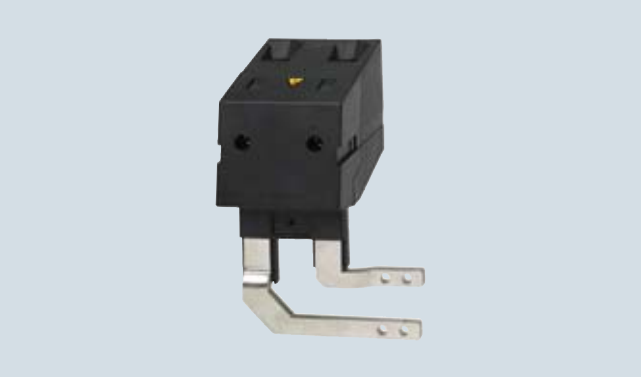
DC link adapter

Overview

DC link rectifier adapter



DC link rectifier adapter for unit widths of 50 mm ... 100 mm (1.97 in ...3.94 in)



DC link rectifier adapter for unit widths of 150 mm ... 300 mm (5.91 in ... 11.81 in)

If the internal DC link busbars of the Motor Modules are not used, the DC link voltage must be supplied externally through a DC link rectifier adapter, e.g. when devices of booksize format are coupled with devices of chassis format over an external DC busbar. The DC link rectifier adapter is mounted on the DC link busbars of the Motor Module. The DC link cables are routed from above.

DC link adapter



DC link adapter (multi-tier) for all unit widths

If a multi-tier Motor Module configuration is used, a DC link adapter can be provided for linking the DC links of two drive line-ups. The DC link adapter is mounted sideways on the DC link busbars of the Motor Module. Installation is possible on the right or left side of the Motor Module. The marking of the poles (DCN and DCP) at the DC link adapter match the side chosen for installation. The DC link cables are routed from behind. The DC link adapter (multi-tier) cannot be used in combination with the reinforced DC link busbars for the Motor Modules ≤ 100 mm (3.94 in) in width. DC link adapters are supplied in sets of 2 units.

Selection and ordering data

Description	Article No.
DC link rectifier adapter For direct infeed of DC link voltage For Line Modules and Motor Modules in booksize and booksize compact format with a width of	
• 50 mm (1.97 in), 75 mm (2.95 in) and 100 mm (3.94 in)	**6SL3162-2BD00-0AA0**
• 150 mm (5.91 in), 200 mm (7.9 in) and 300 mm (11.81 in)	**6SL3162-2BM00-0AA0**
DC link adapter set (2 units) For multi-tier configuration For all Line Modules and Motor Modules in booksize and booksize compact format	**6SL3162-2BM01-0AA0**

Technical specifications

Article No.		6SL3162-2BD00-0AA0	6SL3162-2BM00-0AA0	6SL3162-2BM01-0AA0
Product designation		DC link rectifier adapter	DC link rectifier adapter	DC link adapter
Connection		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	0.5 … 10	35 … 95	35 … 95
Current carrying capacity	A	43	240	240
Net weight	kg (lb)	0.06 (0.13)	0.48 (1.06)	0.76 (1.68)
Certificate of suitability		cURus	cURus	cURus

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Overview



A wide range of single-axis Line Modules and Motor Modules with graded current/power ratings can be supplied:

- Active Line Modules: Single-axis version in chassis format with rated power from 132 kW to 300 kW
- Single Motor Modules: Single-axis version in chassis format with rated output currents of 210 A to 490 A

In principle, all Single Motor Modules can operate on Active Line Modules for the corresponding voltage range.

The self-commutated infeed/regenerative feedback units (with IGBTs in infeed and regenerative feedback directions) generate a regulated DC link voltage. This means that the connected Motor Modules are decoupled from the line voltage. Line voltage fluctuations within the permissible supply tolerances have no effect on the motor voltage.

If required, the Active Line Modules can also provide reactive power compensation.

Active Line Modules are designed for connection to grounded TN and TT supply systems and to non-grounded IT supply systems.

In order to operate an Active Line Module, it is absolutely essential to use the appropriate Active Interface Module.

Design

The Active Line Modules in chassis format feature the following interfaces as standard:

- 1 line connection
- 1 connection for the 24 V DC electronics power supply
- 1 DC link connection (DCP, DCN) for supplying the connected Motor Modules
- 1 DC link connection (DCPA, DCNA) for connecting a Braking Module
- 3 DRIVE-CLiQ sockets
- 2 PE connections

The status of the Active Line Modules is indicated via two multi-color LEDs.

The scope of supply of the Active Line Modules includes:

- Frame sizes FX and GX:
  - 0.60 m (1.97 ft) DRIVE-CLiQ cable for connection to the CU320-2 Control Unit or SINUMERIK NCU

Integration

The Active Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

Technical specifications

Article No.	6SL3330-7TE3...
Product designation	Active Line Modules in chassis format
Line voltage Up to 2000 m (6562 ft) above sea level	380 ... 480 V 3 AC ±10 % (-15 % < 1 min)
Line frequency	47 … 63 Hz
Line power factor	
• Fundamental (cos φ_1)	1.0 (factory setting) can be altered by inputting a reactive current setpoint
• Total (λ)	1.0 (factory setting)
Overvoltage category According to EN 60664-1	Class III
DC link voltage V_d	The DC link voltage is regulated and can be adjusted as a voltage decoupled from the line voltage. Factory setting for DC link voltage: 1.5 × line voltage
Electronics power supply	24 V DC, -15 %/+20 %
Radio interference suppression	
• Standard With Active Interface Module	Category C3 to EN 61800-3
Cooling method	Increased air cooling by means of built-in fan
Ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 … 55 °C (> 104 ... 131 °F) see derating characteristics
Installation altitude	Up to 2000 m (6562 ft) above sea level without derating, > 2000 ... 4000 m (6562 ... 13124 ft) above sea level see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cULus

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		Active Line Module in chassis format			
	6SL3330-...	7TE32-1AA3	7TE32-6AA3	7TE33-8AA3	7TE35-0AA3
Infeed/regenerative feedback power					
• Rated power P_{rated}					
- at 400 V 3 AC	kW	**132**	**160**	**235**	**300**
- at 460 V 3 AC[1]	(HP)	(200)	(225)	(350)	(450)
• P_{max}	kW	198	240	352.5	450
DC link current					
• Rated current I_{rated_DC}	A	235	291	425	549
• I_{H_DC}	A	209	259	378	489
• I_{max_DC}	A	352	436	637	823
Input current					
• Rated current at 400 V 3 AC	A	210	260	380	490
• Maximum	A	315	390	570	735
Power requirement					
• 24 V DC electronics power supply, max.	A	1.1	1.1	1.35	1.35
• Fan supply with 400 V 2 AC, 50/60 Hz, max.	A	0.63/0.95	1.13/1.7	1.8/2.7	1.8/2.7
DC link capacitance	µF	4200	5200	7800	9600
Power loss, max.	kW	2.3	2.9	4.2	5.1
Cooling air requirement	m^3/s (ft^3/s)	0.17 (6)	0.23 (8.1)	0.36 (12.7)	0.36 (12.7)
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	64/67	64/67	69/73	69/73
Line connection U1, V1, W1		Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 185	2 × 185
DC link connection DCP, DCN		Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 185	2 × 185
PE connection		M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross-section, max.					
- PE1/GND	mm^2	1 × 185	1 × 185	1 × 240	1 × 240
- PE2/GND	mm^2	2 × 185	2 × 185	2 × 240	2 × 240
Cable length, max. Total of all motor cables and DC link					
• Shielded	m (ft)	2700 (8859)	2700 (8859)	2700 (8859)	2700 (8859)
• Unshielded	m (ft)	4050 (13288)	4050 (13288)	4050 (13288)	4050 (13288)
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	326 (12.83)	326 (12.83)	326 (12.83)	326 (12.83)
• Height	mm (in)	1400 (55.12)	1400 (55.12)	1533 (60.35)	1533 (60.35)
• Depth	mm (in)	356 (14.02)	356 (14.02)	545 (21.46)	545 (21.46)
Frame size		FX	FX	GX	GX
Net weight	kg (lb)	95 (209)	95 (209)	136 (300)	136 (300)

Selection and ordering data

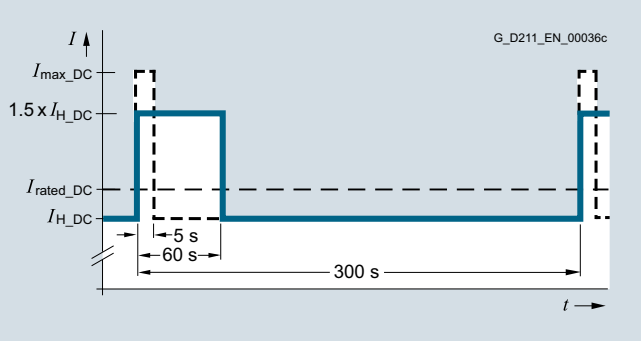
Description	Article No.
Active Line Module in chassis format Rated power:	
• 132 kW (200 HP)	**6SL3330-7TE32-1AA3**
• 160 kW (225 HP)	**6SL3330-7TE32-6AA3**
• 235 kW (350 HP)	**6SL3330-7TE33-8AA3**
• 300 kW (450 HP)	**6SL3330-7TE35-0AA3**

[1] Nominal HP ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading.

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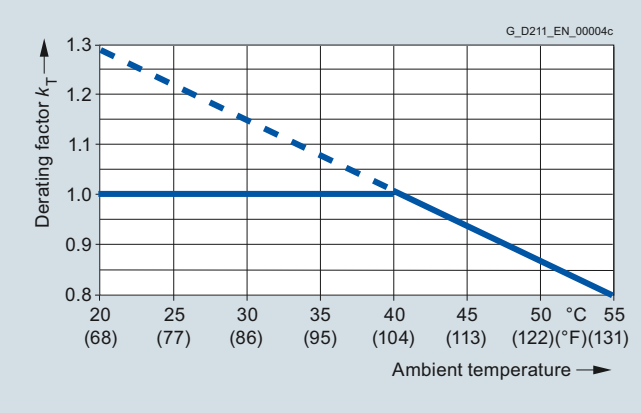
Characteristic curves

Overload capability



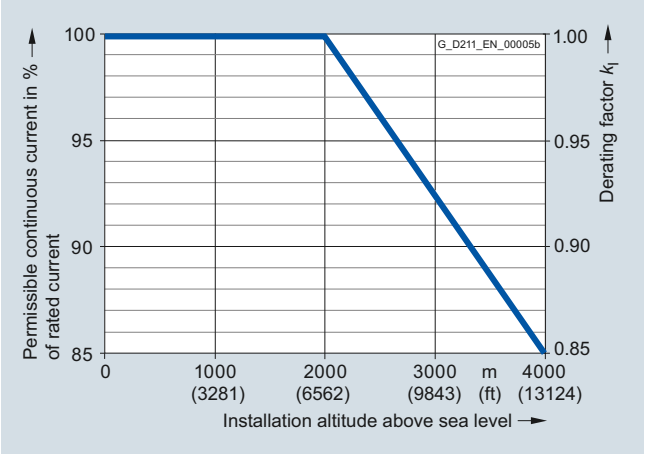
High overload

Derating characteristics

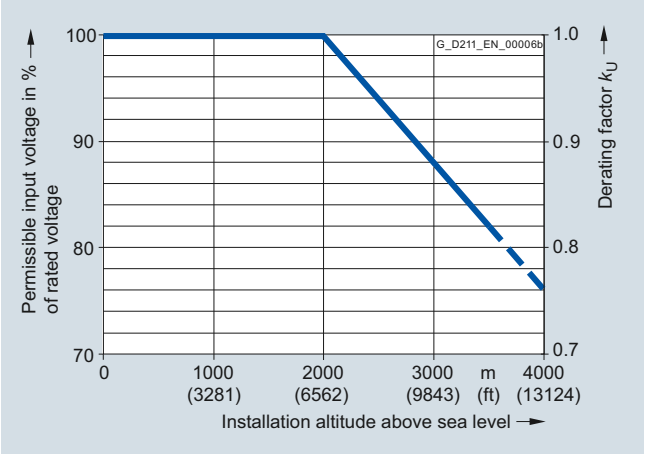


Current derating dependent on ambient temperature

Note: A derating factor k_T > 1.0 can be applied only in conjunction with "current derating dependent on installation altitude". The rated current data must not be exceeded.



Current derating dependent on installation altitude



Voltage derating dependent on installation altitude

5

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Overview



Active Interface Modules are used in combination with Active Line Modules in chassis format. Active Interface Modules contain a Clean Power Filter with basic RI suppression, the pre-charging circuit for the Active Line Module, the line voltage sensing circuit and monitoring sensors. The bypass contactor is an integral component in types FI and GI, ensuring a highly compact design.

Line harmonics are largely suppressed by the Clean Power Filter.

Overview (continued)

The scope of supply of the Active Interface Modules includes:

- Frame size FI:
  - 0.60 m (1.97 ft) DRIVE-CLiQ cable for connection between Active Interface Module and Active Line Module
  - 1.45 m (4.76 ft) DRIVE-CLiQ cable for connection between the Control Unit or the SINUMERIK NCU and first Motor Module
- Frame size GI:
  - 0.95 m (3.12 ft) DRIVE-CLiQ cable for connection between Active Interface Module and Active Line Module
  - 1.45 m (4.76 ft) DRIVE-CLiQ cable for connection between the Control Unit or the SINUMERIK NCU and first Motor Module

Selection and ordering data

Line voltage 380 … 480 V 3 AC		
Rated power of the Active Line Module kW (HP)	Suitable for Active Line Module in chassis format	Active Interface Module Article No.
132 (200) 160 (225)	6SL3330-7TE32-1AA3 6SL3330-7TE32-6AA3	**6SL3300-7TE32-6AA0**
235 (350)	6SL3330-7TE33-8AA3	**6SL3300-7TE33-8AA0**
300 (450)	6SL3330-7TE35-0AA3	**6SL3300-7TE35-0AA0**

Technical specifications

Line voltage 380 … 480 V 3 AC		Active Interface Module in chassis format			
		6SL3300-7TE32-6AA0		6SL3300-7TE33-8AA0	6SL3300-7TE35-0AA0
Rated current	A	210	260	380	490
Bypass contactor		Included	Included	Included	Included
DC link capacitance of the drive line-up, max.	µF	41600	41600	76800	76800
Power requirement					
• 24 V DC electronics power supply, max.	A	0.17	0.17	0.17	0.17
• Fan supply with 230 V 2 AC, 50/60 Hz, max.	A	0.45/0.6	0.45/0.6	0.9/1.2	0.9/1.2
Power loss, max.	kW	2.1	2.2	3.0	3.9
Cooling air requirement	m^3/s (ft^3/s)	0.24 (8.5)	0.24 (8.5)	0.47 (16.6)	0.47 (16.6)
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	71/73	71/73	71/73	71/73
Line/load connection L1, L2, L3 / U2, V2, W2		Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 185	2 × 185
PE connection		M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 185	2 × 185
Degree of protection		IP20	IP20	IP20	IP20
Dimensions					
• Width	mm (in)	325 (12.80)	325 (12.80)	325 (12.80)	325 (12.80)
• Height	mm (in)	1400 (55.12)	1400 (55.12)	1533 (60.35)	1533 (60.35)
• Depth	mm (in)	355 (13.98)	355 (13.98)	544 (21.42)	544 (21.42)
Frame size		FI	FI	GI	GI
Net weight	kg (lb)	135 (298)	135 (298)	190 (419)	190 (419)
Certificate of suitability		cURus	cURus	cURus	cURus
Suitable for Active Line Module in chassis format	Type	6SL3330-7TE32-1AA3	6SL3330-7TE32-6AA3	6SL3330-7TE33-8AA3	6SL3330-7TE35-0AA3
• Rated power of the Active Line Module	kW	132 (200)	160 (225)	235 (350)	300 (450)

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Overview

Suitable line-side power components are assigned depending on the power rating of the Active Line Modules.

Additional information about the recommended line-side components can be found in Catalogs IC 10 and LV 10.

The tables below list recommended components.

Assignment of line-side power components to Active Line Modules in chassis format

Rated power	Input current	Assignment to Active Interface Module	Assignment to Active Line Module	Bypass contactor
kW (HP)	A	6SL3300-...	6SL3330-...	
132 (200)	210	7TE32-6AA0	7TE32-1AA3	included in Active Interface Module
160 (225)	260	7TE32-6AA0	7TE32-6AA3	included in Active Interface Module
235 (350)	380	7TE33-8AA0	7TE33-8AA3	included in Active Interface Module
300 (450)	490	7TE35-0AA0	7TE35-0AA3	included in Active Interface Module

Rated power	Input current	Assignment to Active Interface Module	Switch disconnector without handle or shaft	Switch disconnector with handle and shaft	Cable protection fuse		Cable protection fuse incl. semiconductor protection	
kW (HP)	A	6SL3300-...	Article No.	Article No.	Rated current	Article No.	Rated current	Article No.
132 (200)	210	7TE32-6AA0	**3KL5530-1AB01**	**3KL5530-1GB01**	250 A	**3NA3144**	315 A	**3NE1230-2**
160 (225)	260	7TE32-6AA0	**3KL5730-1AB01**	**3KL5730-1GB01**	315 A	**3NA3252**	350 A	**3NE1331-2**
235 (350)	380	7TE33-8AA0	**3KL5730-1AB01**	**3KL5730-1GB01**	500 A	**3NA3365**[*)]	500 A	**3NE1334-2**
300 (450)	490	7TE35-0AA0	**3KL6130-1AB02**	**3KL6130-1GB02**	630 A	**3NA3372**	630 A	**3NE1436-2**

[*)] Fuse suitable only for 3KL6130...

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Single Motor Modules

Overview



The Single Motor Modules in chassis format feature the following interfaces as standard:

- 1 DC link connection (DCP, DCN) for connecting to the supply DC busbar
- 1 DC link connection (DCPA, DCNA) for connecting a Braking Module
- 1 electronics power supply connection
- 3 DRIVE-CLiQ sockets
- 1 motor connection
- 1 safe standstill input (enable pulses)
- 1 temperature sensor input (KTY84-130/PT1000/PT100 two-wire or PTC)
- 1 PE connection

The status of the Motor Modules is indicated via two multi-color LEDs.

The scope of supply of the Motor Modules includes:

- Frame sizes FX and GX:
  - 0.60 m (1.97 ft) DRIVE-CLiQ cable for connection to the adjacent Motor Module

Integration

The Single Motor Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

Selection and ordering data

Description	Article No.
Single Motor Module in chassis format Rated output current:	
• 210 A	**6SL3320-1TE32-1AA3**
• 260 A	**6SL3320-1TE32-6AA3**
• 310 A	**6SL3320-1TE33-1AA3**
• 380 A	**6SL3320-1TE33-8AA3**
• 490 A	**6SL3320-1TE35-0AA3**

Technical specifications

Article No.	6SL3320-...
Product designation	Single Motor Modules in chassis format
DC link voltage Up to 2000 m (6562 ft) above sea level	510 … 720 V DC (line voltage 380 … 480 V 3 AC)
Output frequency	0 … 300 Hz[1)]
Electronics power supply	24 V DC -15 %/+20 %
Cooling method	Internal air cooling, Power units with increased air cooling by means of built-in fan
Permissible ambient and coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 … 55 °C (> 104 ... 131 °F) see derating characteristics
Installation altitude	Up to 2000 m (6562 ft) above sea level without derating, > 2000 ... 4000 m (6562 ... 13124 ft) above sea level see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability Only Motor Modules 510 ... 720 V DC	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) acc. to IEC 61508, Performance Level d (PLd) acc. to ISO 13849-1 and Control Category 3 acc. to ISO 13849-1 or EN 954-1

1) Note correlation between max. output frequency, pulse frequency, and current derating (250 µs current controller cycle; 4 kHz pulse frequency, see characteristics for derating).

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Technical specifications (continued)

DC link voltage 510 … 720 V DC		Single Motor Module in chassis format				
	6SL3320-...	1TE32-1AA3	1TE32-6AA3	1TE33-1AA3	1TE33-8AA3	1TE35-0AA3
Output current						
• Rated current I_{rated}	A	**210**	**260**	**310**	**380**	**490**
• Base-load current I_L	A	205	250	302	370	477
• Base-load current I_H	A	178	233	277	340	438
• For S6 duty I_{S6} (40 %)	A	230	285	340	430	540
• I_{max}	A	307	375	453	555	715
Type rating[1]						
• Based on I_{rated}	kW (HP)	110 (150)	132 (200)	160 (250)	200 (300)	250 (400)
• Based on I_H	kW (HP)	90 (125)	110 (150)	132 (200)	160 (250)	200 (350)
Rated pulse frequency	kHz	2	2	2	2	2
Rated DC link current I_d[2] When supplied via						
• Active Line Module	A	227	281	335	411	529
DC link capacitance	µF	4200	5200	6300	7800	9600
Power requirement						
• At 24 V DC, max.	A	0.8	0.8	0.9	0.9	0.9
• Fan supply with 400 V 2 AC, 50/60 Hz, max.	A	0.63/0.95	1.13/1.7	1.8/2.7	1.8/2.7	1.8/2.7
Power loss, max.	kW	1.94	2.6	3.1	3.8	4.5
Cooling air requirement	m^3/s (ft^3/s)	0.17 (6)	0.23 (8.1)	0.36 (12.7)	0.36 (12.7)	0.36 (12.7)
Sound pressure level L_{pA} (1 m) at 50/60 Hz	dB	64/67	64/67	69/73	69/73	69/73
DC link connection DCP, DCN		Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
Motor connection U2, V2, W2		Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
PE connection		M10 screw	M10 screw	M10 screw	M10 screw	M10 screw
• Conductor cross-section, max.	mm^2	2 × 185	2 × 185	2 × 240	2 × 240	2 × 240
Motor brake connection		–	–	–	–	–
Motor cable length, max. Without external options						
• Shielded	m (ft)	300 (984)	300 (984)	300 (984)	300 (984)	300 (984)
• Unshielded	m (ft)	450 (1476)	450 (1476)	450 (1476)	450 (1476)	450 (1476)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	326 (12.83)	326 (12.83)	326 (12.83)	326 (12.83)	326 (12.83)
• Height	mm (in)	1400 (55.12)	1400 (55.12)	1533 (60.35)	1533 (60.35)	1533 (60.35)
• Depth	mm (in)	356 (14.02)	356 (14.02)	545 (21.46)	545 (21.46)	545 (21.46)
Frame size		FX	FX	GX	GX	GX
Net weight	kg (lb)	95 (210)	95 (210)	136 (300)	136 (300)	136 (300)

1) Rated power of a typical standard asynchronous motor at 600 V DC link voltage.

2) Rated DC link current for dimensioning an external DC connection.

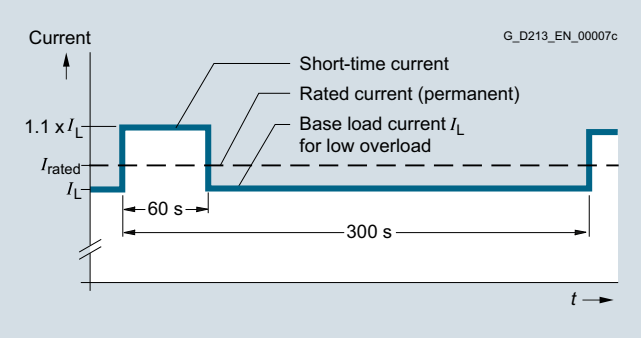
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Characteristic curves

Overload capability

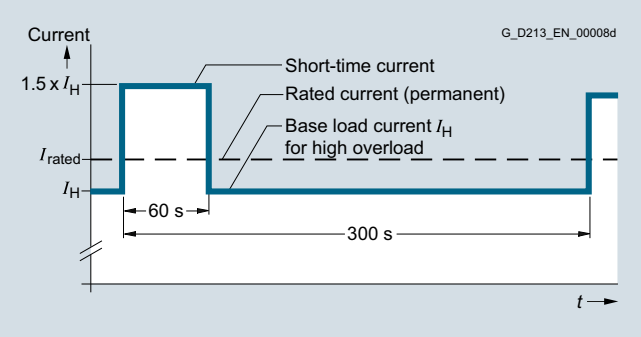
Load cycle data for Single Motor Modules in chassis format

The base-load current I_L is based on a load cycle of 110 % for 60 s or 150 % for 10 s with a load cycle period of 300 s.



Low overload

The base-load current I_H is based on a load cycle of 150 % for 60 s or 160 % for 10 s with a load cycle period of 300 s.



High overload

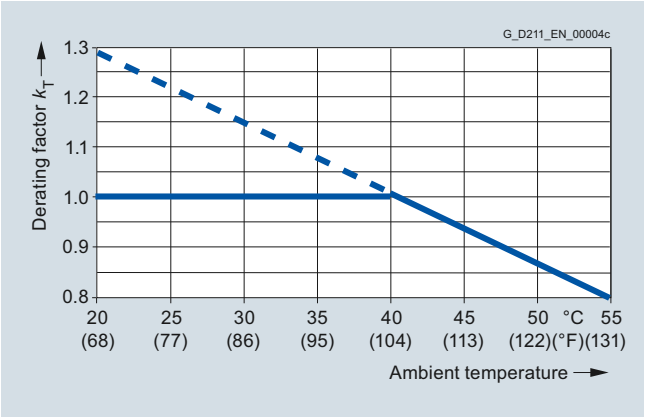
Derating factors

When the pulse frequency is increased, the derating factor of the output current must be taken into account.

This derating factor must be applied to the currents specified in the technical specifications.

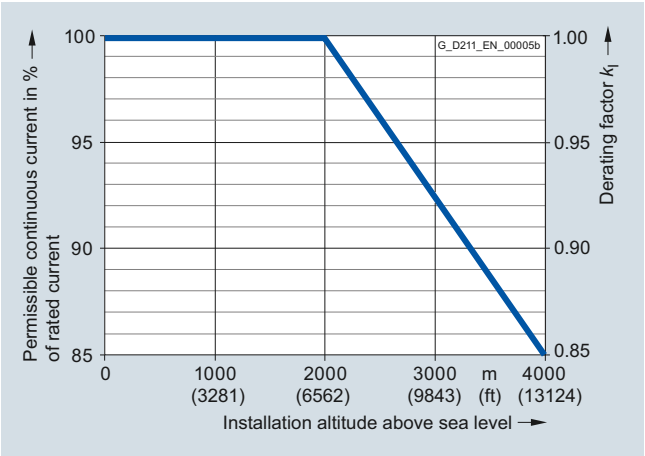
Derating factor of the output current dependent on pulse frequency for devices with a rated pulse frequency of 2 kHz

Single Motor Module in chassis format Type 6SL3320- ...	Type rating kW (HP)	Output current at 2 kHz pulse frequency A	Derating factor at 4 kHz pulse frequency
1TE32-1AA3	110 (150)	210	**0.82**
1TE32-6AA3	132 (200)	260	**0.83**
1TE33-1AA3	160 (250)	310	**0.88**
1TE33-8AA3	200 (300)	380	**0.87**
1TE33-0AA3	250 (400)	490	**0.78**

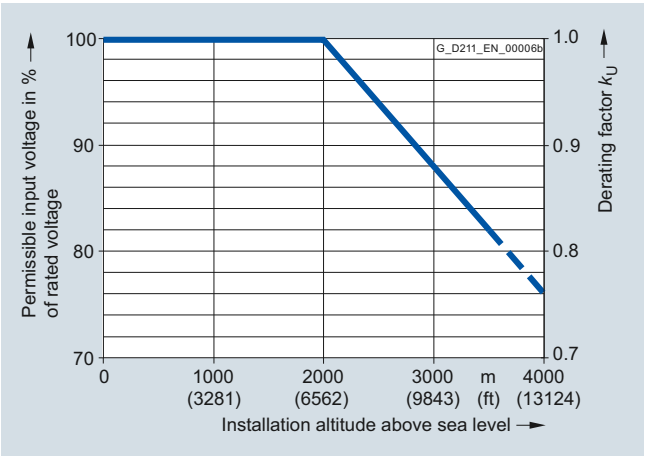


Current derating dependent on ambient temperature

Note: A derating factor k_T > 1.0 can be applied only in conjunction with "current derating dependent on installation altitude". The rated current data must not be exceeded.



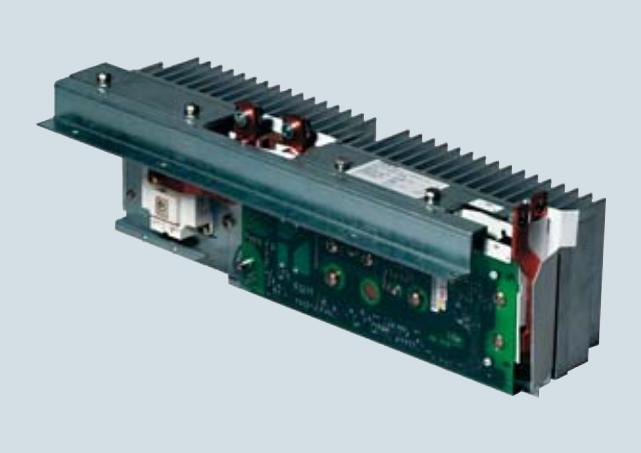
Current derating dependent on installation altitude



Voltage derating dependent on installation altitude

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Overview



A Braking Module and the matching external braking resistor are required to bring drives to a controlled standstill in the event of a power failure (e.g. emergency retraction or EMERGENCY STOP) or limit the DC link voltage for brief periods of generator operation, e.g. when the regenerative feedback capability of the Line Module is deactivated. The Braking Module includes the power electronics and the associated control circuit. During operation, the DC link power is converted into heat loss in an external braking resistor. Braking Modules function autonomously. Parallel operation of several braking modules is possible. In this case, each Braking Module must have its own braking resistor.

Braking Modules are designed to be built into Motor Modules, Line Modules or Power Modules in chassis format and are cooled by the fans on these modules. The supply voltage for the electronics is taken from the DC link. The Braking Modules are connected to the DC link by means of the busbar sets included in the scope of supply or flexible cables and, in the case of the Basic Line Module of frame size GB, by means of a separate molded cable set (see Accessories).

The activation threshold of the Braking Module can be adjusted by means of a DIP switch. The braking power values specified in the technical specifications apply to the upper activation threshold.

Design

The Braking Modules in chassis format feature the following connections and interfaces as standard:

- 1 DC link connection
- 1 braking resistor connection
- 1 digital input (block Braking Module/acknowledge error)
- 1 digital output (Braking Module inhibited)
- 1 DIP switch for adjusting the activation threshold

Integration

Braking Modules in chassis format are designed for mounting in air-cooled units in chassis format. The fan of the Line Module, Motor Module or Power Module in which the Braking Module is mounted also cools the Braking Module. Braking Modules cannot operate autonomously because they are not equipped with cooling fans.

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Braking Modules

Technical specifications

DC link voltage 510 … 720 V DC		Braking Module in chassis format 6SL3300-1AE31-3AA0	6SL3300-1AE32-5AA0
Power			
• Rated power P_{DB}	kW	25	50
• Peak power P_{15}	kW	125	250
• Power P_{20}	kW	100	200
• Power P_{40}	kW	50	100
Activation thresholds (adjustable via DIP switch)	V	774 (factory setting) or 673	774 (factory setting) or 673
Cable length to braking resistor, max.	m (ft)	100 (328)	100 (328)
Digital inputs In accordance with IEC 61131-2 Type 1			
• Voltage	V	-3 … +30	-3 … +30
• Low level (an open digital input is interpreted as "low")	V	-3 … +5	-3 … +5
• High level	V	15 … 30	15 … 30
• Current consumption at 24 V DC, typ.	mA	10	10
• Conductor cross-section, max.	mm^2	1.5	1.5
Digital outputs (continuously short-circuit-proof)			
• Voltage	V	24 DC	24 DC
• Load current per digital output, max.	mA	500	500
• Conductor cross-section, max.	mm^2	1.5	1.5
Connection R1/R2		M8 screw	M8 screw
• Conductor cross-section, max.	mm^2	35	50
Net weight	kg (lb)	3.6 (7.94)	7.3 (16.10)
Certificate of suitability		cURus	cURus
Suitable for installation in an air-cooled Motor Module Power Module or Line Module	Frame size	FX/FB	GX/GB[1)]

Selection and ordering data

Description	Braking Module in chassis format Article No.
DC link voltage 510 … 720 V DC	
Frame size FX, 25 kW/125 kW	**6SL3300-1AE31-3AA0**
Frame size GX, 50 kW/250 kW	**6SL3300-1AE32-5AA0**
Accessories	
Cable harness set For mounting a Braking Module of frame size GX into a Basic Line Module of frame size GB	**6SL3366-2NG00-0AA0**
Accessories	
Warning labels in 30 languages This label set can be glued over the standard English or German labels to provide warnings in other languages. One set of labels is supplied with the devices. One sign in each of the following languages is provided in each set: BG, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, JP, KR, LT, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR	**6SL3166-3AB00-0AA0**

[1)] Cable harness set 6SL3366-2NG00-0AA0 is required to connect the Braking Module to a Basic Line Module of frame size GB.

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Overview



Excess energy in the DC link is dissipated via the braking resistor.

The braking resistor is connected to a Braking Module. Positioning the braking resistor outside the control cabinet or switchgear room enables the resulting thermal losses to be routed away. This reduces the level of air conditioning required.

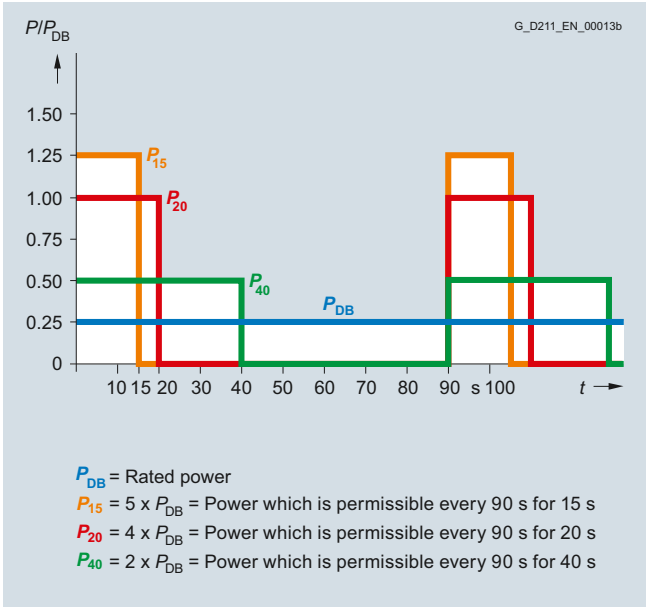
2 braking resistors with different rated and peak power values are available for chassis format units.

The braking resistor is monitored on the basis of the duty factor. A temperature switch (NC contact) is also fitted. This responds when the maximum permissible temperature is exceeded and can be evaluated by a controller.

Selection and ordering data

Power P_{DB}/P_{max}	Suitable for Braking Module in chassis format	Braking resistor Article No.
DC link voltage 510 … 720 V DC		
25 kW/125 kW	6SL3300-1AE31-3AA0	**6SL3000-1BE31-3AA0**
50 kW/250 kW	6SL3300-1AE32-5 **.** A0	**6SL3000-1BE32-5AA0**

Characteristic curves



Load diagram for chassis format Braking Module and braking resistor

Technical specifications

DC link voltage 510 … 720 V DC		Braking resistor 6SL3000-1BE31-3AA0	6SL3000-1BE32-5AA0
Resistance	Ω	4.4	2.2
Rated power P_{DB}	kW	25	50
Peak power P_{max}	kW	125	250
Load duration for peak power	s	15	15
Cycle duration of braking duty cycle	s	90	90
Current, max.	A	189	378
Cable entry		Via M50 cable gland	Via M50 cable gland
Power connection		Via M10 stud	Via M10 stud
• Conductor cross-section, max.	mm^2	50	70
Degree of protection		IP20	IP20
Dimensions			
• Width	mm (in)	740 (29.13)	810 (31.89)
• Height	mm (in)	605 (23.82)	1325 (52.17)
• Depth	mm (in)	485 (19.09)	485 (19.09)
Net weight	kg (lb)	50 (110)	120 (265)
Certificate of suitability		cURus	cURus
Suitable for Braking Module in chassis format	Type	6SL3300-1AE31-3AA0	6SL3300-1AE32-5 . A0

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Design



PM340 Power Modules in blocksize format, frame sizes FSA to FSF

The PM340 Power Modules in blocksize format feature the following connections and interfaces as standard:

- Line connection
- DCP/R1 and DCN DC link terminals
- PM-IF interface for connection of the PM340 Power Module and CU310-2 Control Unit or CUA31 Control Unit Adapter. The PM340 Power Module also supplies power to the CU310-2 Control Unit or CUA31 Control Unit Adapter by means of an integrated power pack
- Terminals DCP/R1 and R2 for connection of an external braking resistor
- Motor connection using screw-type terminals or screw studs
- Control circuit for the Safe Brake Relay for controlling a holding brake
- 2 PE connections

Power Modules without integrated line filter can be connected to grounded star (TN, TT) and non-grounded symmetrical IT systems. Power Modules with integrated line filter are suitable only for connection to TN systems with grounded neutral.

The integrated Braking Module is rated with the capability to continuously utilize the external braking resistor. The temperature of the external braking resistor must be monitored to provide protection against thermal overloading.

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Integration

PM340 Power Modules in blocksize format communicate via the PM-IF interface with the CU310-2 Control Unit or the CUA31 Control Unit Adapter.



PM340 Power Module in blocksize format in frame size FSD with CU310-2 PN Control Unit

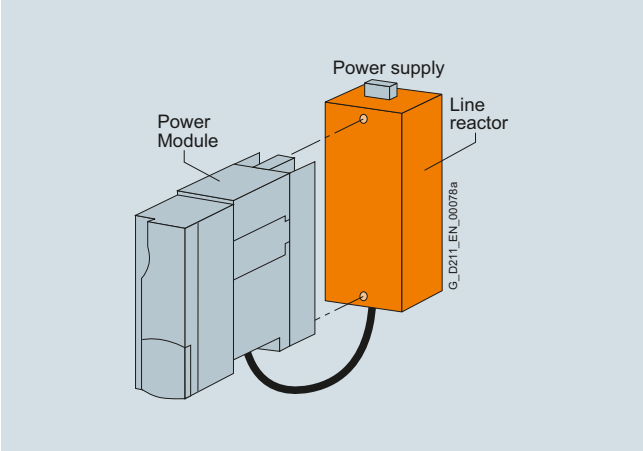


PM340 Power Module in blocksize format in frame size FSE with CUA31 Control Unit Adapter

Many system components are designed as base components for PM340 Power Modules, i.e. the component is mounted on the baseplate and the PM340 Power Module in front in a space-saving construction. Up to two base components can be mounted in front of one another.

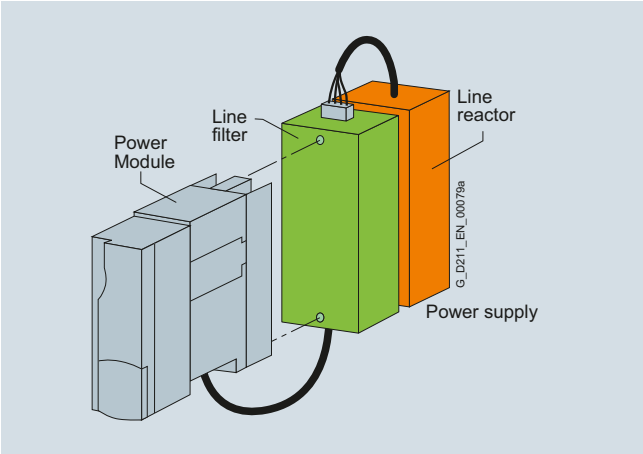
	FSA	FSB	FSC	FSD	FSE	FSF
Line filter	✓	–	–	–	–	–
Line reactor	✓	✓	✓	✓	✓	O
Braking resistor	✓	✓	O	O	O	O
Motor reactor	✓	✓	✓	O	O	O

✓ = suitable as base-type
O = not suitable as base-type
– = not available (use Power Modules with integrated line filter)



Basic layout of a PM340 Power Module with line reactor as base component

The side reactors are equipped with terminals on the line side and with a pre-assembled cable on the Power Module side. When installed, the mains terminals are at the top on frame sizes FSA to FSC, and at the bottom on frame sizes FSD and FSE.



PM340 Power Module in frame size FSA with line reactor and line filter

If a line filter is installed in addition to the line reactor on frame size FSA, the components must be arranged as shown in the diagram above. In this case, the line supply connection is at the bottom.

Power Modules of frame size FSB and higher are available with integrated line filters, alleviating the need for an external line filter.

For arrangements involving more than two base-type system components, individual components must be mounted to the side of the Power Module. In this instance, the line reactor must be installed behind the Power Module and the braking resistor to the side.

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Technical specifications

Article No.	6SL3210-...
Product designation	Power Modules in blocksize format
Line voltage Up to 2000 m (6562 ft) above sea level	200 … 240 V ±10 % 1 AC (-15 % < 1 min) or 380 ... 480 V 3 AC ±10 % (-15 % < 1 min)
Line frequency	47 … 63 Hz
Line power factor At rated power	
• Fundamental (cos φ_1)	> 0.96
• Total (λ)	
- 200 … 240 V 1 AC	0.45 … 0.7
- 380 … 480 V 3 AC	0.65 … 0.95
Overvoltage category According to EN 60664-1	Class III
Precharging frequency Of the DC link, max.	1× every 30 s
DC link voltage, approx.	1.35 × line voltage
Output frequency	0 … 650 Hz[1)2)]
Electronics power supply	24 V DC -15 %/+20 %
Radio interference suppression	
• Standard	No radio interference suppression
• With integrated line filter	Category C2 to EN 61800-3
Cooling method	Increased air cooling by means of built-in fan
Ambient or coolant temperature (air) In operation for line-side components, Power Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 … 55 °C (> 104 ... 131 °F) see derating characteristics
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, >1000 ... 4000 m (3281 ... 13124 ft) above sea level see derating characteristics
Declarations of conformity	CE (Low Voltage and EMC Directives)
Certificate of suitability	cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) acc. to IEC 61508, Performance Level d (PLd) acc. to ISO 13849-1 and Control Category 3 acc. to ISO 13849-1 or EN 954-1

1) Note the correlation between max. output frequency, pulse frequency and current derating. For further information see System Description.

2) The output frequency is currently limited to 550 Hz. The specified values apply to systems with license for high output frequency. Fore more information, refer to section Control Units and http://support.automation.siemens.com/WW/view/en/104020669

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Technical specifications (continued)

Line voltage 200 … 240 V 1 AC	6SL3210-...	PM340 Power Module in blocksize format 1SB11-0...	1SB12-3...	1SB14-0...
Output current				
• Rated current I_{rated}	A	**0.9**	**2.3**	**3.9**
• Base-load current I_H	A	0.8	2.0	3.4
• For S6 duty I_{S6} (40 %)	A	1.4	3.3	5.5
• I_{max}	A	2.0	4.6	7.8
Type rating[1] Based on I_{rated}	kW (HP)	0.12 (0.2)	0.37 (0.5)	0.75 (0.75)
Rated pulse frequency	kHz	4	4	4
Power loss	kW	0.06	0.075	0.11
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)
Sound pressure level L_{pA} (1 m)	dB	< 45	< 45	< 45
24 V DC power supply For Control Unit	A	1.0	1.0	1.0
Rated input current[2] With/without line reactor	A	1.4/2.2	4/6	6.5/10
Resistance value External braking resistor	Ω	≥ 180	≥ 180	≥ 180
Cable length To braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)
Line connection L, N		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
Motor connection U2, V2, W2		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
DC link connection, connection for braking resistor DCP/R1, DCN, R2		Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
PE connection		M4 screw	M4 screw	M4 screw
Motor cable length[3], **max.** Without external options				
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)
• Height	mm (in)	173 (6.81)	173 (6.81)	173 (6.81)
• Depth				
- PM340	mm (in)	145 (5.71)	145 (5.71)	145 (5.71)
- PM340 with CU310-2	mm (in)	234.6 (9.24)	234.6 (9.24)	234.6 (9.24)
- PM340 with CUA31	mm (in)	175.3 (6.90)	175.3 (6.90)	175.3 (6.90)
Frame size		FSA	FSA	FSA
Net weight	kg (lb)	1.2 (2.65)	1.3 (2.87)	1.3 (2.87)

[1] Nominal HP based on asynchronous motors and 460 V AC. For specific sizing select drive based on motor nameplate current and overload.

[2] The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) with a line impedance corresponding to u_k = 1 %.

[3] Max. motor cable length 15 m (49 ft) (shielded) for PM340 Power Modules with integrated line filter to conform to the limit values of EN 61800-3 Category C2.

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		PM340 Power Module in blocksize format				
	6SL3210-...	1SE11-3UA0	1SE11-7UA0	1SE12-2UA0	1SE13-1UA0	1SE14-1UA0
Output current						
• Rated current I_{rated}	A	**1.3**	**1.7**	**2.2**	**3.1**	**4.1**
• Base-load current I_H	A	1.1	1.5	1.9	2.7	3.6
• For S6 duty I_{S6} (40 %)	A	1.3	2.0	2.5	3.5	4.5
• I_{max}	A	2.6	3.4	4.4	6.2	8.2
Type rating[1]						
• Based on I_{rated}	kW	0.37 (0.5)	0.55 (0.75)	0.75 (1)	1.1 (1.5)	1.5 (2)
• Based on I_H	kW	0.37 (0.5)	0.55 (0.5)	0.75 (0.75)	1.1 (1)	1.5 (2)
Rated pulse frequency	kHz	4	4	4	4	4
Power loss	kW	0.10	0.10	0.10	0.11	0.11
Cooling air requirement	m^3/s (ft^3/s)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)	0.005 (0.18)
Sound pressure level L_{pA} (1 m)	dB	< 45	< 45	< 45	< 45	< 45
24 V DC power supply For Control Unit	A	1.0	1.0	1.0	1.0	1.0
Rated input current[2] With/without line reactor	A	1.3/1.7	1.7/2.2	2.2/2.6	3.1/3.9	4.1/4.8
Resistance value External braking resistor	Ω	≥ 390	≥ 390	≥ 390	≥ 390	≥ 390
Cable length To braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line connection U1/L1, V1/L2, W1/L3		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
Motor connection U2, V2, W2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
DC link connection, connection for braking resistor DCP/R1, DCN, R2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5	1.0 … 2.5
PE connection		M4 screw	M4 screw	M4 screw	M4 screw	M4 screw
Motor cable length[3], **max.**						
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	75 (246)	75 (246)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)	73 (2.87)
• Height	mm (in)	173 (6.81)	173 (6.81)	173 (6.81)	173 (6.81)	173 (6.81)
• Depth						
- PM340	mm (in)	145 (5.71)	145 (5.71)	145 (5.71)	145 (5.71)	145 (5.71)
- PM340 with CU310-2	mm (in)	234.6 (9.24)	234.6 (9.24)	234.6 (9.24)	234.6 (9.24)	234.6 (9.24)
- PM340 with CUA31	mm (in)	175.3 (6.90)	175.3 (6.90)	175.3 (6.90)	175.3 (6.90)	175.3 (6.90)
Frame size		FSA	FSA	FSA	FSA	FSA
Net weight	kg (lb)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)

1) Nominal HP based on asynchronous motors and 460 V AC. For specific sizing select drive based on motor nameplate current and overload.

2) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) with a line impedance corresponding to u_k = 1 %.

3) Max. motor cable length 25 m (82 ft) (shielded) for PM340 Power Modules with integrated line filter to conform to the limit values of EN 61800-3 Category C2.

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		PM340 Power Module in blocksize format					
	6SL3210-...	1SE16-0...	1SE17-7...	1SE21-0...	1SE21-8...	1SE22-5...	1SE23-2...
Output current							
• Rated current I_{rated}	A	**5.9**	**7.7**	**10.2**	**18**	**25**	**32**
• Base-load current I_H	A	5.2	6.8	9.1	14	21	27
• For S6 duty I_{S6} (40 %)	A	6.4	8.3	10.8	19.6	27.8	37.1
• I_{max}	A	11.8	15.4	20.4	26.4	38	52
Type rating[1]							
• Based on I_{rated}	kW (HP)	2.2 (3)	3 (5)	4 (5)	7.5 (10)	11 (15)	15 (20)
• Based on I_H	kW (HP)	2.2 (3)	3 (4)	4 (5)	5.5 (10)	7.5 (15)	11 (20)
Rated pulse frequency	kHz	4	4	4	4	4	4
Power loss	kW	0.14	0.16	0.18	0.24	0.30	0.40
Cooling air requirement	m^3/s (ft^3/s)	0.009 (0.32)	0.009 (0.32)	0.009 (0.3)	0.038 (1.3)	0.038 (1.3)	0.038 (1.3)
Sound pressure level L_{pA} (1 m)	dB	< 50	< 50	< 50	< 60	< 60	< 60
24 V DC power supply For Control Unit	A	1.0	1.0	1.0	1.0	1.0	1.0
Rated input current[2] With/without line reactor	A	5.6/6.7	7.5/8.9	9.8/12.4	17.1/23.1	24.6/32.6	33/39
Resistance value External braking resistor	Ω	≥ 160	≥ 160	≥ 160	≥ 56	≥ 56	≥ 56
Cable length To braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line connection U1/L1, V1/L2, W1/L3		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 6	1.0 … 6	1.0 … 6	2.5 … 10	2.5 … 10	2.5 … 10
Motor connection U2, V2, W2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 6	1.0 … 6	1.0 … 6	2.5 … 10	2.5 … 10	2.5 … 10
DC link connection, connection for braking resistor DCP/R1, DCN, R2		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	1.0 … 6	1.0 … 6	1.0 … 6	2.5 … 10	2.5 … 10	2.5 … 10
PE connection		M5 screw	M5 screw	M5 screw	M5 screw	M5 screw	M5 screw
Motor cable length[3], **max.**							
• Shielded	m (ft)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)	50 (164)
• Unshielded	m (ft)	75 (246)	75 (246)	75 (246)	75 (246)	75 (246)	75 (246)
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	153 (6.02)	153 (6.02)	153 (6.02)	188.4 (7.42)	188.4 (7.42)	188.4 (7.42)
• Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	333.4 (13.13)	333.4 (13.13)	333.4 (13.13)
• Depth							
- PM340	mm (in)	165 (6.50)	165 (6.50)	165 (6.50)	185 (7.28)	185 (7.28)	185 (7.28)
- PM340 with CU310-2	mm (in)	254.6 (10.02)	254.6 (10.02)	254.6 (10.02)	274.6 (10.81)	274.6 (10.81)	274.6 (10.81)
- PM340 with CUA31	mm (in)	195.3 (7.69)	195.3 (7.69)	195.3 (7.69)	215.3 (8.48)	215.3 (8.48)	215.3 (8.48)
Frame size		FSB	FSB	FSB	FSC	FSC	FSC
Net weight	kg (lb)	4.0 (8.82)	4.0 (8.82)	4.0 (8.82)	6.5 (14.3)	6.5 (14.3)	6.5 (14.3)

1) Nominal HP based on asynchronous motors and 460 V AC. For specific sizing select drive based on motor nameplate current and overload.

2) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) with a line impedance corresponding to u_k = 1 %.

3) Max. motor cable length 25 m (82 ft) (shielded) for PM340 Power Modules with integrated line filter to conform to the limit values of EN 61800-3 Category C2.

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		PM340 Power Module in blocksize format				
	6SL3210-...	1SE23-8...	1SE24-5...	1SE26-0...	1SE27-5...	1SE31-0...
Output current						
• Rated current I_{rated}	A	**38**	**45**	**60**	**75**	**90**
• Base-load current I_H	A	33	40	48	65	80
• For S6 duty I_{S6} (40 %)	A	49	58	78	98	117
• I_{max}	A	64	76	90	124	150
Type rating[1]						
• Based on I_{rated}	kW (HP)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)
• Based on I_H	kW (HP)	15 (20)	18.5 (30)	22 (30)	30 (50)	37 (60)
Rated pulse frequency	kHz	4	4	4	4	4
Power loss	kW	0.38	0.51	0.69	0.99	1.21
Cooling air requirement	m^3/s (ft^3/s)	0.022 (0.8)	0.022 (0.8)	0.039 (1.4)	0.022 (0.8)	0.039 (1.4)
Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	< 61	< 60	62
24 V DC power supply for Control Unit	A	1.0	1.0	1.0	1.0	1.0
Rated input current[2] With/without line reactor	A	40/46	47/53	63/72	78/88	94/105
Resistance value External braking resistor	Ω	≥ 27	≥ 27	≥ 27	≥ 15	≥ 15
Cable length To braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)	15 (49)	15 (49)
Line connection U1/L1, V1/L2, W1/L3		M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35
Motor connection U2, V2, W2		M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35
DC link connection, connection for braking resistor DCP/R1, DCN, R2		M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud	M6 screw stud
• Conductor cross-section	mm^2	10 ... 35	10 ... 35	10 ... 35	10 ... 35	10 ... 35
PE connection		M6 screw	M6 screw	M6 screw	M6 screw	M6 screw
Motor cable length[3], **max.**						
• Shielded	m (ft)	70 (230)	70 (230)	70 (230)	70 (230)	70 (230)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20	IP20	IP20
Dimensions						
• Width	mm (in)	275 (10.83)	275 (10.83)	275 (10.83)	275 (10.83)	275 (10.83)
• Height PM340 without/with int. filter	mm (in)	418.3/511 (16.47/20.12)	418.3/511 (16.47/20.12)	418.3/511 (16.47/20.12)	498.3/633 (19.62/24.92)	498.3/633 (19.62/24.92)
• Depth						
- PM340	mm (in)	203.5 (8.01)	203.5 (8.01)	203.5 (8.01)	203.5 (8.01)	203.5 (8.01)
- PM340 with CU310-2	mm (in)	293.1 (11.54)	293.1 (11.54)	293.1 (11.54)	293.1 (11.54)	293.1 (11.54)
- PM340 with CUA31	mm (in)	233.8 (9.20)	233.8 (9.20)	233.8 (9.20)	233.8 (9.20)	233.8 (9.20)
Frame size		FSD	FSD	FSD	FSE	FSE
Net weight PM340 without/with int. filter	kg (lb)	15.9/19.3 (35/43)	15.9/19.3 (35/43)	15.9/19.3 (35/43)	19.8/27.1 (44/60)	19.8/27.1 (44/60)

1) Nominal HP based on asynchronous motors and 460 V AC. For specific sizing select drive based on motor nameplate current and overload.

2) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) with a line impedance corresponding to u_k = 1 %.

3) Max. motor cable length 25 m (82 ft) (shielded) for PM340 Power Modules with integrated line filter to conform to the limit values of EN 61800-3 Category C2.

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		PM340 Power Module in blocksize format		
	6SL3210-...	1SE31-1...	1SE31-5...	1SE31-8...
Output current				
• Rated current I_{rated}	A	**110**	**145**	**178**
• Base-load current I_H	A	95	115	155
• For S6 duty I_{S6} (40 %)	A	143	188	231
• I_{max}	A	180	220	290
Type rating[1]				
• Based on I_{rated}	kW (HP)	55 (75)	75 (100)	90 (125)
• Based on I_H	kW (HP)	45 (60)	55 (75)	75 (100)
Rated pulse frequency	kHz	4	4	4
Power loss	kW	1.42	1.93	2.31
Cooling air requirement	m^3/s (ft^3/s)	0.094 (3.3)	0.094 (3.3)	0.117 (4.1)
Sound pressure level L_{pA} (1 m)	dB	< 60	< 60	65
24 V DC power supply For Control Unit	A	1.0	1.0	1.0
Rated input current[2] with/without line reactor	A	115/129	151/168	186/204
Resistance value External braking resistor	Ω	≥ 8.2	≥ 8.2	≥ 8.2
Cable length To braking resistor, max.	m (ft)	15 (49)	15 (49)	15 (49)
Line connection U1/L1, V1/L2, W1/L3		M8 screw studs	M8 screw studs	M8 screw studs
• Conductor cross-section, max.	mm^2	120	120	120
Motor connection U2, V2, W2		M8 screw studs	M8 screw studs	M8 screw studs
• Conductor cross-section, max.	mm^2	120	120	120
DC link connection, connection for braking resistor DCP/R1, DCN, R2		M8 screw studs	M8 screw studs	M8 screw studs
• Conductor cross-section, max.	mm^2	120	120	120
PE connection		M8 screw	M8 screw	M8 screw
Motor cable length[3], **max.**				
• Shielded	m (ft)	70 (230)	70 (230)	70 (230)
• Unshielded	m (ft)	100 (328)	100 (328)	100 (328)
Degree of protection		IP20	IP20	IP20
Dimensions				
• Width	mm (in)	350 (13.78)	350 (13.78)	350 (13.78)
• Height PM340 without/with int. filter	mm (in)	634/934 (24.96/36.77)	634/934 (24.96/36.77)	634/934 (24.96/36.77)
• Depth				
- PM340	mm (in)	315.5 (12.42)	315.5 (12.42)	315.5 (12.42)
- PM340 with CU310-2	mm (in)	405.1 (15.95)	405.1 (15.95)	405.1 (15.95)
- PM340 with CUA31	mm (in)	345.8 (13.61)	345.8 (13.61)	345.8 (13.61)
Frame size		FSF	FSF	FSF
Net weight PM340 without/with int. filter	kg (lb)	50.7/66.7 (112/147)	50.7/66.7 (112/147)	50.7/66.7 (112/147)

1) Nominal HP based on asynchronous motors and 460 V AC. For specific sizing select drive based on motor nameplate current and overload.

2) The input current depends on the motor load and line impedance. The input currents apply for a load at rated power (based on I_{rated}) with a line impedance corresponding to u_k = 1 %.

3) Max. motor cable length 25 m (82 ft) (shielded) for PM340 Power Modules with integrated line filter to conform to the limit values of EN 61800-3 Category C2.

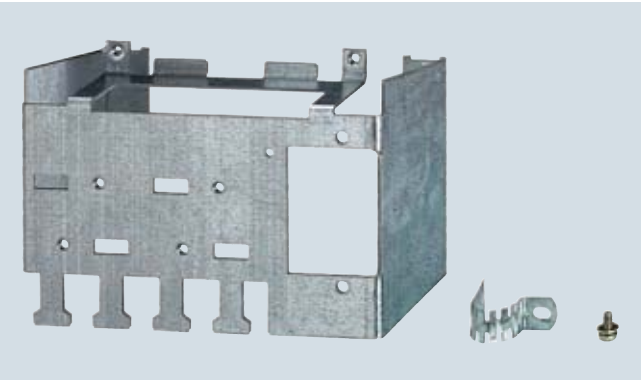
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Power Modules

Selection and ordering data

Rated output current A	Type rating kW (HP)	Frame size	PM340 Power Module in blocksize format without line filter Article No.	PM340 Power Module in blocksize format with integrated line filter Article No.
Line voltage 200 … 240 V 1 AC				
0.9	0.12 (0.2)	FSA	**6SL3210-1SB11-0UA0**	**6SL3210-1SB11-0AA0**
2.3	0.37 (0.5)	FSA	**6SL3210-1SB12-3UA0**	**6SL3210-1SB12-3AA0**
3.9	0.75 (0.75)	FSA	**6SL3210-1SB14-0UA0**	**6SL3210-1SB14-0AA0**
Line voltage 380 … 480 V 3 AC				
1.3	0.37 (0.5)	FSA	**6SL3210-1SE11-3UA0**	–
1.7	0.55 (0.75)	FSA	**6SL3210-1SE11-7UA0**	–
2.2	0.75 (1)	FSA	**6SL3210-1SE12-2UA0**	–
3.1	1.1 (1.5)	FSA	**6SL3210-1SE13-1UA0**	–
4.1	1.5 (2)	FSA	**6SL3210-1SE14-1UA0**	–
5.9	2.2 (3)	FSB	**6SL3210-1SE16-0UA0**	**6SL3210-1SE16-0AA0**
7.7	3 (5)	FSB	**6SL3210-1SE17-7UA0**	**6SL3210-1SE17-7AA0**
10.2	4 (5)	FSB	**6SL3210-1SE21-0UA0**	**6SL3210-1SE21-0AA0**
18	7.5 (10)	FSC	**6SL3210-1SE21-8UA0**	**6SL3210-1SE21-8AA0**
25	11 (15)	FSC	**6SL3210-1SE22-5UA0**	**6SL3210-1SE22-5AA0**
32	15 (20)	FSC	**6SL3210-1SE23-2UA0**	**6SL3210-1SE23-2AA0**
38	18.5 (25)	FSD	**6SL3210-1SE23-8UA0**	**6SL3210-1SE23-8AA0**
45	22 (30)	FSD	**6SL3210-1SE24-5UA0**	**6SL3210-1SE24-5AA0**
60	30 (40)	FSD	**6SL3210-1SE26-0UA0**	**6SL3210-1SE26-0AA0**
75	37 (50)	FSE	**6SL3210-1SE27-5UA0**	**6SL3210-1SE27-5AA0**
90	45 (60)	FSE	**6SL3210-1SE31-0UA0**	**6SL3210-1SE31-0AA0**
110	55 (75)	FSF	**6SL3210-1SE31-1UA0**	**6SL3210-1SE31-1AA0**
145	75 (100)	FSF	**6SL3210-1SE31-5UA0**	**6SL3210-1SE31-5AA0**
178	90 (125)	FSF	**6SL3210-1SE31-8UA0**	**6SL3210-1SE31-8AA0**

Accessories



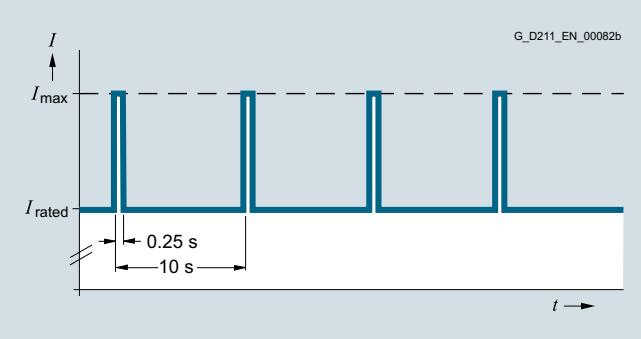
Example of shield connection kit for PM340 frame size FSB

Description	Article No.
Accessories	
Shield connection kit For PM340	
• Frame size FSA	**6SL3262-1AA00-0BA0**
• Frame size FSB	**6SL3262-1AB00-0DA0**
• Frame size FSC	**6SL3262-1AC00-0DA0**
• Frame sizes FSD and FSE	**6SL3262-1AD00-0DA0**
• Frame size FSF	**6SL3262-1AF00-0DA0**

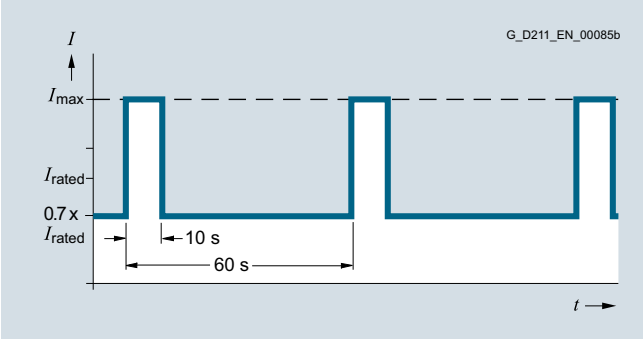
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Characteristic curves

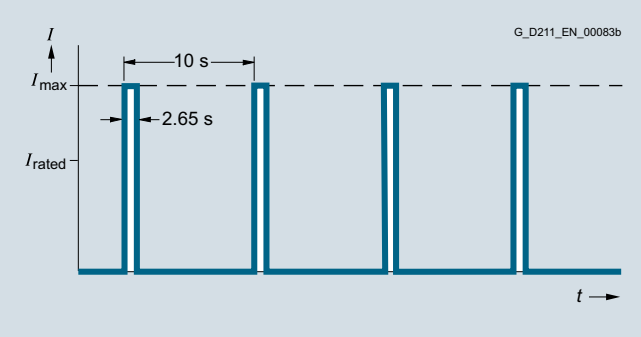
Overload capability



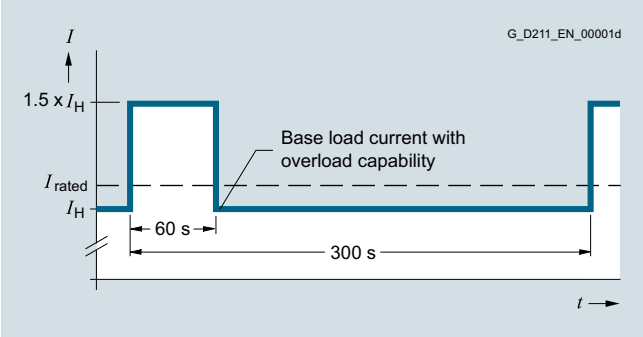
Load cycle with previous load



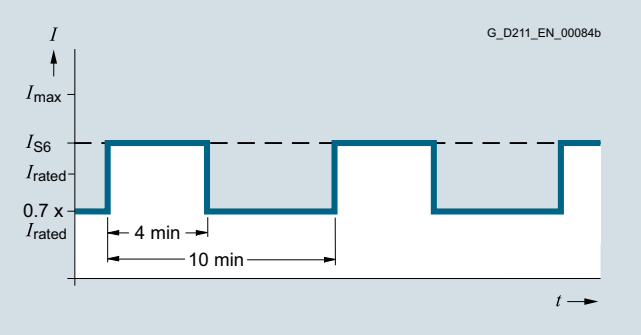
S6 load cycle with previous load with a load cycle period of 60 s



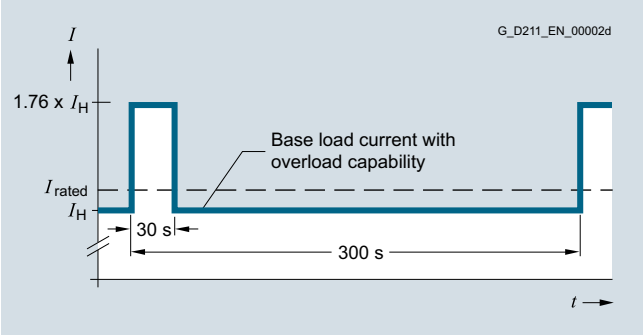
Load cycle without previous load



Load cycle with 60 s overload with a load cycle period of 300 s



S6 load cycle with previous load with a load cycle period of 600 s

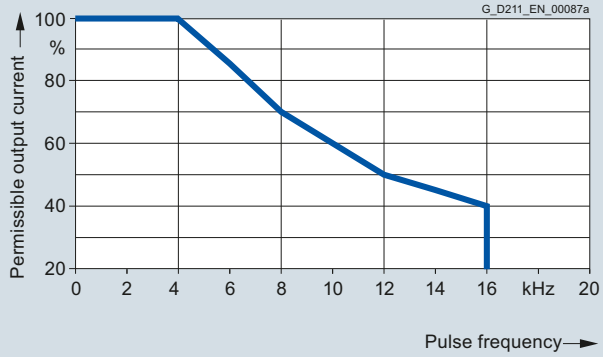


Load cycle with 30 s overload with a load cycle period of 300 s

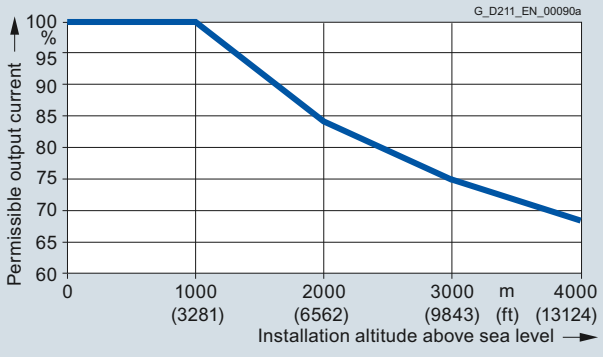
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Characteristic curves (continued)

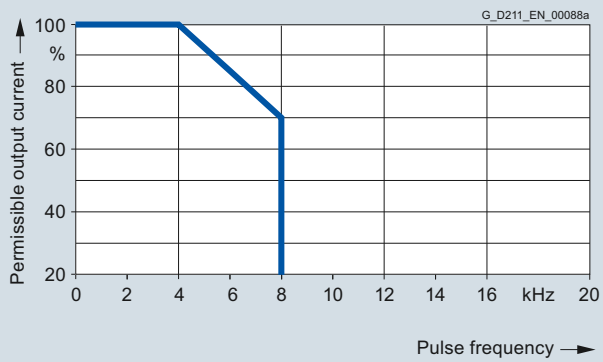
Derating characteristics



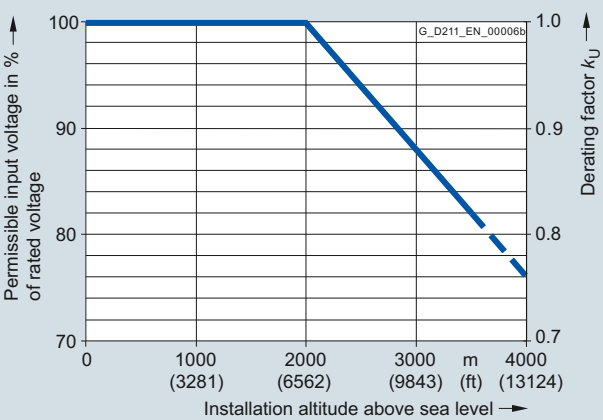
Frame sizes FSA to FSE: Output current dependent on pulse frequency



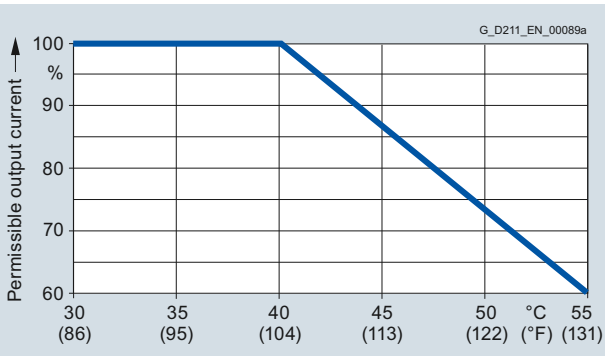
Output current dependent on installation altitude



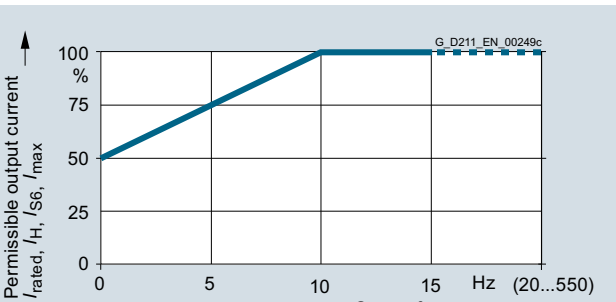
Frame size FSF: Output current dependent on pulse frequency



Voltage derating dependent on installation altitude



Output current dependent on ambient temperature



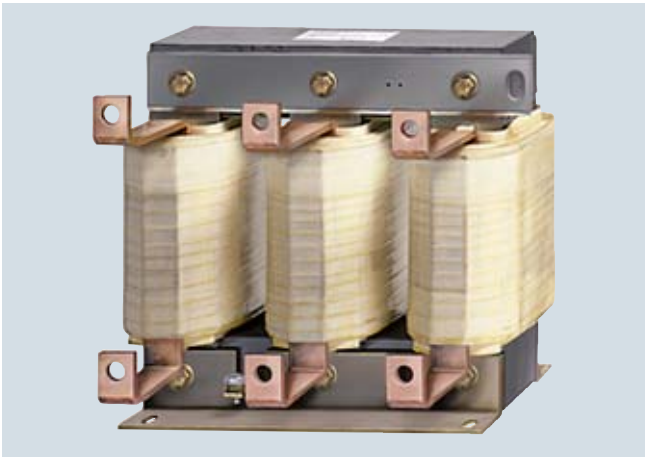
Output current dependent on output frequency

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Overview



Line reactors for PM340 Power Modules, frame sizes FSA to FSE



Line reactor for PM340 Power Modules, frame size FSF

Line reactors limit the low-frequency harmonic effects and reduce the load on the other loads in the same supply system. In addition, the line reactors limit the current spikes at the inverter input, e.g. in the case of commutation notches.
It is advisable to use the line reactors in combination with unfiltered PM340 units and line voltages with a high harmonic content (industrial networks).

Integration

The line reactors for PM340 Power Modules of frame sizes FSA to FSE are designed as base components.
The line reactor is attached to the mounting surface and the Power Module is mounted directly on the line reactor. The cables to the Power Module are already connected at the line reactor.

The line reactor is connected to the line supply through terminals.



PM340 Power Module frame size FSB with line reactor as base component and shield connection kit

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Line reactors

Technical specifications

Line voltage 200 … 240 V 1 AC		Line reactor	
		6SE6400-3CC00-4AB3	6SE6400-3CC01-0AB3
Rated current	A	3.4	8.1
Power loss, approx. at 50/60 Hz	W	12.5/15	11.5/14.5
Line connection U1, V1, W1		Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	6	6
Load connection		Cable	Cable
• Conductor cross-section		3 × AWG16 (1.5 mm^2)	3 × AWG16 (1.5 mm^2)
• Length, approx.	m (ft)	0.38 (1.25)	0.38 (1.25)
PE connection		M5 screw stud	M5 screw stud
Degree of protection[1]		IP20	IP20
Dimensions			
• Width	mm (in)	75.5 (2.97)	75.5 (2.97)
• Height	mm (in)	201 (7.91)	201 (7.91)
• Depth	mm (in)	50 (1,97)	50 (1,97)
Net weight	kg (lb)	1.3 (2.87)	1.3 (2.87)
Certificate of suitability		cURus	cURus
Suitable for Power Module in blocksize format	Type (rated output current)	6SL3210-1SB11-0... (0.9 A) 6SL3210-1SB12-3... (2.3 A)	6SL3210-1SB14-0... (3.9 A)

Line voltage 380 … 480 V 3 AC		Line reactor					
		6SE6400-3CC00-2AD3	6SE6400-3CC00-4AD3	6SE6400-3CC00-6AD3	6SL3203-0CD21-0AA0	6SL3203-0CD21-4AA0	6SL3203-0CD22-2AA0
Rated current	A	1.9	3.5	4.8	9	11.6	25
Power loss at 50/60 Hz	W	6/7	12.5/15	7.5/9	9/11	27/32	98/118
Line connection U1, V1, W1		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	6	6	6	6	6	6
Load connection		Cable	Cable	Cable	Cable	Cable	Cable
• Conductor cross-section		3 × AWG16 (1.5 mm^2)	3 × AWG16 (1.5 mm^2)	3 × AWG16 (1.5 mm^2)	3 × AWG16 (1.5 mm^2)	3 × AWG16 (1.5 mm^2)	4 × AWG10 (2.5 mm^2)
• Length, approx.	m (ft)	0.38 (1.25)	0.38 (1.25)	0.38 (1.25)	0.46 (1.51)	0.46 (1.51)	0.49 (1.61)
PE connection		M5 screw stud	M5 screw stud	M5 screw stud	M5 screw stud	M5 screw stud	M5 screw stud
Degree of protection[1]		IP20	IP20	IP20	IP20	IP20	IP20
Dimensions							
• Width	mm (in)	75.5 (2.97)	75.5 (2.97)	75.5 (2.97)	153 (6.02)	153 (6.02)	190 (7.48)
• Height	mm (in)	201 (7.91)	201 (7.91)	201 (7.91)	270 (10.63)	270 (10.63)	336 (13.23)
• Depth	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	70 (2.76)	70 (2.767)	50 (1.97)
Net weight	kg (lb)	1.2 (2.65)	1.3 (2.87)	1.3 (2.87)	3.4 (7.5)	3.4 (7.5)	6.3 (13.89)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus	cURus
Suitable for Power Module in blocksize format	Type (rated output current)	6SL3210-1SE11-3... (1.3 A) 6SL3210-1SE11-7... (1.7 A)	6SL3210-1SE12-2... (2.2 A) 6SL3210-1SE13-1... (3.1 A)	6SL3210-1SE14-1... (4.1 A)	6SL3210-1SE16-0... (5.9 A) 6SL3210-1SE17-7... (7.7 A)	6SL3210-1SE21-0... (10 A)	6SL3210-1SE21-8... (18 A) 6SL3210-1SE22-5... (25 A)

[1] With correctly connected load connection cable.

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Technical specifications (continued)

Line voltage 380 … 480 V 3 AC		Line reactor					
		6SL3203-0CD23-5AA0	6SL3203-0CJ24-5AA0	6SL3203-0CD25-3AA0	6SL3203-0CJ28-6AA0	6SE6400-3CC11-2FD0	6SE6400-3CC11-7FD0
Rated current	A	33	47	63	95	151	186
Power loss at 50/60 Hz	W	37/44	90/115	90/115	170/215	280/360	280/360
Line connection U1, V1, W1		Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section	mm^2	16	16	16	50	–	–
Load connection		Cable	Cable	Cable	Cable	Flat connector for M10 screw	Flat connector for M10 screw
• Conductor cross-section		4 × AWG10 (2.5 mm^2)	4 × 16 mm^2	4 × 16 mm^2	4 × 35 mm^2	–	–
• Length, approx.	m (ft)	0.49 (1.61)	0.7 (2.30)	0.7 (2.30)	0.7 (2.30)	–	–
PE connection		M5 screw stud	M8 screw	M8 screw	M8 screw	M8 screw stud	M8 screw stud
Degree of protection[1]		IP20	IP20	IP20	IP20	IP00	IP00
Dimensions							
• Width	mm (in)	190 (7.48)	275 (10.83)	275 (10.83)	275 (10.83)	240 (9.45)	240 (9.45)
• Height	mm (in)	336 (13.23)	455 (17.91)	455 (17.91)	577 (22.72)	228 (8.98)	228 (8.98)
• Depth	mm (in)	50 (1.97)	83.5 (3.29)	83.5 (3.29)	93.5 (3.68)	141 (5.55)	141 (5.55)
Net weight	kg (lb)	6.4 (14.1)	13 (28.7)	13 (28.7)	19 (41.9)	25 (55.1)	25 (55.1)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus	cURus
Suitable for Power Module in blocksize format	Type (rated output current)	6SL3210-1SE23-2... (32 A)	6SL3210-1SE23-8... (38 A) 6SL3210-1SE24-5... (45 A)	6SL3210-1SE26-0... (60 A)	6SL3210-1SE27-5... (75 A) 6SL3210-1SE31-0... (90 A)	6SL3210-1SE31-1... (110 A) 6SL3210-1SE31-5... (145 A)	6SL3210-1SE31-8... (178 A)

[1] With correctly connected load connection cable.

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Line reactors

Selection and ordering data

Rated output current	Type rating	Suitable for Power Module in blocksize format		Line reactor
A	kW (HP)	Type	Frame size	Article No.
Line voltage 200 ... 240 V 1 AC				
0.9	0.12 (0.2)	6SL3210-1SB11-0...	FSA	**6SE6400-3CC00-4AB3**
2.3	0.37 (0.5)	6SL3210-1SB12-3...		
3.9	0.75 (0.75)	6SL3210-1SB14-0...	FSA	**6SE6400-3CC01-0AB3**
Line voltage 380 ... 480 V 3 AC				
1.3	0.37 (0.5)	6SL3210-1SE11-3UA0	FSA	**6SE6400-3CC00-2AD3**
1.7	0.55 (0.75)	6SL3210-1SE11-7UA0		
2.2	0.75 (1)	6SL3210-1SE12-2UA0	FSA	**6SE6400-3CC00-4AD3**
3.1	1.1 (1.5)	6SL3210-1SE13-1UA0		
4.1	1.5 (2)	6SL3210-1SE14-1UA0	FSA	**6SE6400-3CC00-6AD3**
5.9	2.2 (3)	6SL3210-1SE16-0...	FSB	**6SL3203-0CD21-0AA0**
7.7	3 (5)	6SL3210-1SE17-7...		
10	4 (5)	6SL3210-1SE21-0...	FSB	**6SL3203-0CD21-4AA0**
18	7.5 (10)	6SL3210-1SE21-8...	FSC	**6SL3203-0CD22-2AA0**
25	11 (15)	6SL3210-1SE22-5...		
32	15 (20)	6SL3210-1SE23-2...	FSC	**6SL3203-0CD23-5AA0**
38	18.5 (25)	6SL3210-1SE23-8...	FSD	**6SL3203-0CJ24-5AA0**
45	22 (30)	6SL3210-1SE24-5...		
60	30 (40)	6SL3210-1SE26-0...	FSD	**6SL3203-0CD25-3AA0**
75	37 (50)	6SL3210-1SE27-5...	FSE	**6SL3203-0CJ28-6AA0**
90	45 (60)	6SL3210-1SE31-0...		
110	55 (75)	6SL3210-1SE31-1...	FSF	**6SE6400-3CC11-2FD0**
145	75 (100)	6SL3210-1SE31-5...		
178	90 (125)	6SL3210-1SE31-8...	FSF	**6SE6400-3CC11-7FD0**

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Overview



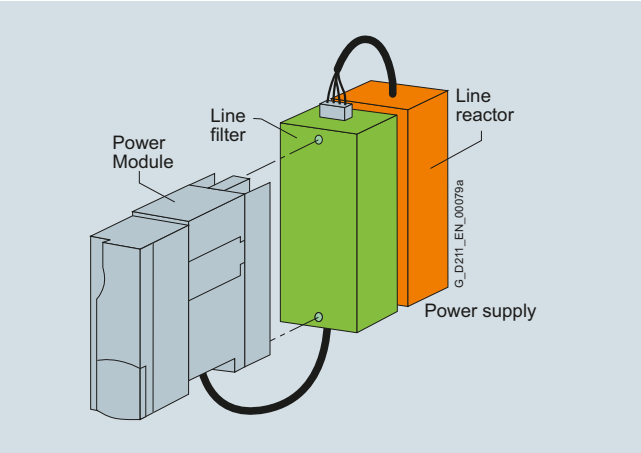
In plants with strict EMC requirements, the line filter for frame size FSA restricts the conducted interference emanating from the PM340 Power Module to the limit values of Class C2 as defined in EN 61800-3. The line filter is only suitable for direct connection to TN line supplies.

Note:

The line filter is designed only for PM340 Power Modules of frame size FSA and a line voltage of 380 V to 480 V 3 AC. All other PM340 Power Modules are available with integrated line filter.

Integration

Line filter, line reactor and Power Module can be mounted in front of one another.



Technical specifications

Line voltage 380 … 480 V 3 AC	Line filter 6SE6400-2FA00-6AD0
Rated current	6 A
Power loss	<5 W
Line connection L1, L2, L3	Screw-type terminals
• Conductor cross-section	1 ... 2.5 mm^2
PE connection	M4 screw stud
Load connection U, V, W, PE	Shielded cable
• Conductor cross-section	4 × 1.5 mm^2
• Length, approx.	0.24 m (0.79 ft)
Degree of protection	IP20 (with correctly connected load connection cable)
Dimensions	
• Width	73.5 mm (2.89 in)
• Height	200 mm (7.87 in)
• Depth	44 mm (1.73 in)
Net weight	0.5 kg (1 lb)
Certificate of suitability	cURus
Suitable for Power Module in blocksize format Type (rated output current)	6SL3210-1SE11-... (1.3 A and 1.7 A) 6SL3210-1SE12-... (2.2 A) 6SL3210-1SE13-... (3.1 A) 6SL3210-1SE14-... (4.1 A)

Selection and ordering data

Suitable for Power Module in blocksize format Frame size FSA	Line filter
Type	Article No.
Line voltage 380 ... 480 V 3 AC	
6SL3210-1SE11-... 6SL3210-1SE12-... 6SL3210-1SE13-... 6SL3210-1SE14-...	**6SE6400-2FA00-6AD0**

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Recommended line-side components

Overview

Suitable line-side power components are assigned depending on the power rating of the Power Modules.

The following tables list recommended components and apply for ambient temperatures up to 40 °C (104 °F).

Additional information about the recommended line-side components can be found in Catalogs IC 10 and LV 10.

Assignment of line-side power components to Power Modules in blocksize format

Rated output current	Type rating	Suitable for Power Module in blocksize format	Line contactor	Circuit breaker IEC 60947 and UL489/ CSA C22.2 No. 5-02	UL/CSA fuse, Class J Available from: Mersen www.ep.mersen.com		
A	kW (HP)	Type 6SL3210-...	Type	Article No.	Rated current	Size mm	Reference No.
Line voltage 200 ... 240 V 1 AC							
0.9	0.12 (0.2)	1SB11-0...	**5TT57...**	**5SJ4206-7HG41**	6 A	21 × 57	AJT6
2.3	0.37 (0.5)	1SB12-3...	**5TT57...**	**5SJ4210-7HG41**	10 A	21 × 57	AJT10
3.9	0.75 (0.75)	1SB14-0...	**5TT57...**	**5SJ4216-7HG41**	15 A	21 × 57	AJT15

Rated output current	Type rating	Suitable for Power Module in blocksize format	Line contactor	Circuit breaker IEC 60947	Circuit breaker UL489/CSA C22.2 No. 5-02	Main switch
A	kW (HP)	Type 6SL3210-...	Type	Article No.	Type	Article No.
Line voltage 380 ... 480 V 3 AC						
1.3	0.37 (0.5)	1SE11-3UA0	**3RT2015-...**	**3RV2011-1DA10**	**–**	**3LD2003-1TP51**
1.7	0.55 (0.75)	1SE11-7UA0	**3RT2015-...**	**3RV2011-1DA10**	**–**	**3LD2003-1TP51**
2.2	0.75 (1)	1SE12-2UA0	**3RT2015-...**	**3RV2011-1FA10**	**–**	**3LD2003-1TP51**
3.1	1.1 (1.5)	1SE13-1UA0	**3RT2015-...**	**3RV2011-1GA10**	**–**	**3LD2003-1TP51**
4.1	1.5 (2)	1SE14-1UA0	**3RT2015-...**	**3RV2011-1HA10**	**–**	**3LD2003-1TP51**
5.9	2.2 (3)	1SE16-0...	**3RT2015-...**	**3RV2011-1KA10**	**–**	**3LD2003-1TP51**
7.7	3 (5)	1SE17-7...	**3RT2015-...**	**3RV2011-4AA10**	**–**	**3LD2003-1TP51**
10	4 (5)	1SE21-0...	**3RT2016-...**	**3RV2021-4BA10**	**–**	**3LD2103-1TP51**
18	7.5 (10)	1SE21-8...	**3RT1025-...**	**3RV1031-4EA10**	**–**	**3LD2203-0TK51**
25	11 (15)	1SE22-5...	**3RT1026-...**	**3RV1031-4FA10**	**–**	**3LD2504-0TK51**
32	15 (20)	1SE23-2...	**3RT1034-...**	**3RV1031-4HA10**	**–**	**3LD2504-0TK51**
38	18.5 (25)	1SE23-8...	**3RT1035-...**	**3RV1042-4JA10**	**–**	**3LD2504-0TK51**
45	22 (30)	1SE24-5...	**3RT1036-...**	**3RV1042-4KA10**	**–**	**3LD2504-0TK51**
60	30 (40)	1SE26-0...	**3RT1044-...**	**3RV1042-4MA10**	**3VL2191-3KN30-....**	**3LD2704-0TK51**
75	37 (50)	1SE27-5...	**3RT1045-...**	**3VL1712-1DD33-....**	**3VL2110-3KN30-....**	**3LD2704-0TK51**
90	45 (60)	1SE31-0...	**3RT1046-...**	**3VL1716-1DD33-....**	**3VL2112-3KN30-....**	**3LD2804-0TK51**
110	55 (75)	1SE31-1...	**3RT1054-...**	**3VL3720-1DC36-....**	**3VL2115-3KN30-....**	**3KA5330-1GE01**
145	75 (100)	1SE31-5...	**3RT1056-...**	**3VL3720-1DC36-....**	**3VL3120-3KN30-....**	**3KA5530-1GE01**
178	90 (125)	1SE31-8...	**3RT1064-...**	**3VL4725-1DC36-....**	**3VL3125-3KN30-....**	**3KA5530-1GE01**

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Overview (continued)

Rated output current	Type rating	Suitable for Power Module in blocksize format	Fuse-switch disconnector	Switch disconnector with fuse holders	Fuse	UL/CSA fuse, Class J[1] Available from: Mersen www.ep.mersen.com		
A	kW (HP)	Type 6SL3210-...	Article No.	Article No.	Article No.	Rated current	Size mm	Reference No.
Line voltage 380 ... 480 V 3 AC								
1.3	0.37 (0.5)	1SE11-3UA0	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3804**	4 A	21 × 57	AJT4
1.7	0.55 (0.75)	1SE11-7UA0	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3804**	4 A	21 × 57	AJT4
2.2	0.75 (1)	1SE12-2UA0	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3801**	6 A	21 × 57	AJT6
3.1	1.1 (1.5)	1SE13-1UA0	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3803**	8 A	21 × 57	AJT8
4.1	1.5 (2)	1SE14-1UA0	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3803**	10 A	21 × 57	AJT10
5.9	2.2 (3)	1SE16-0...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3803**	10 A	21 × 57	AJT10
7.7	3 (5)	1SE17-7...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3805**	12 A	21 × 57	AJT12
10	4 (5)	1SE21-0...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3805**	15 A	21 × 57	AJT15
18	7.5 (10)	1SE21-8...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3810**	25 A	21 × 57	AJT25
25	11 (15)	1SE22-5...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3814**	35 A	27 × 60	AJT35
32	15 (20)	1SE23-2...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3817**	45 A	27 × 60	AJT45
38	18.5 (25)	1SE23-8...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3820**	50 A	27 × 60	AJT50
45	22 (30)	1SE24-5...	**3NP4010-0CH01**	**3KL5030-1GB01**	**3NA3822**	60 A	27 × 60	AJT60
60	30 (40)	1SE26-0...	**3NP4010-0CH01**	**3KL5230-1GB01**	**3NA3824**	90 A	29 × 117	AJT90
75	37 (50)	1SE27-5...	**3NP4010-0CH01**	**3KL5230-1GB01**	**3NA3830**	100 A	29 × 117	AJT100
90	45 (60)	1SE31-0...	**3NP4070-0CH01**	**3KL5230-1GB01**	**3NA3832**	125 A	41 × 146	AJT125
110	55 (75)	1SE31-1...	**3NP4070-0CH01**	**3KL5330-1GB01**	**3NA3836**	150 A	41 × 146	AJT150
145	75 (100)	1SE31-5...	**3NP4270-0CA01**	**3KL5530-1GB01**	**3NA3140**	200 A	41 × 146	AJT200
178	90 (125)	1SE31-8...	**3NP4270-0CA01**	**3KL5530-1GB01**	**3NA3144**	250 A	54 × 181	AJT250

[1] Not suitable for 3NP and 3KL switch disconnectors.

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Braking resistors

Overview



Braking resistor for blocksize format, frame sizes FSA and FSC

PM340 Power Modules cannot regenerate into the line supply. For regenerative operation, e.g. the braking of a rotating mass, a braking resistor must be connected to convert the resulting energy into heat.

The braking resistor is connected at terminals DCP/R1 and R2.

The braking resistors can be installed at the side next to the PM340 Power Modules. The braking resistors for the FSA and FSB frame sizes are designed as base components. If the PM340 Power Modules of the FSA or FSB frame size are operated without line reactor, the braking resistors can also be installed under the Power Modules.

The braking resistors for the Power Modules of the FSC to FSF frame sizes should be placed outside the control cabinet or the switchgear room in order to lead the resulting heat loss away from the Power Modules. This reduces the level of air conditioning required.

The braking resistors are designed with a temperature switch. The temperature switch must be evaluated to prevent consequential damage if the braking resistor overheats.

Technical specifications

DC link voltage 240 … 360 V DC	Braking resistor 6SE6400-4BC05-0AA0
Resistance	180 Ω
Rated power P_{DB}	0.05 kW
Peak power P_{max}	1 kW
Degree of protection[1]	IP20
Power connections	3 × 1.5 mm² (shielded)
• Length	0.5 m (19.69 in)
Thermostatic switch (NC contact)	
• Switching capacity	250 V AC/max. 2.5 A
• Conductor cross-section	0.5 … 2.5 mm²
Dimensions	
• Width	72 mm (2.83 in)
• Height	230 mm (9.06 in)
• Depth	43.5 mm (1.71 in)
Net weight	1 kg (2.21 lb)
Certificate of suitability	cURus
Suitable for Power Module in blocksize format	Frame size FSA

[1] With correctly connected load connection cable.

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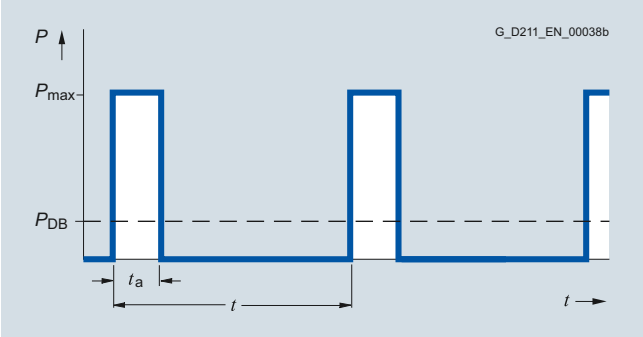
Technical specifications (continued)

DC link voltage 510 … 720 V DC		Braking resistor					
		6SE6400-4BD11-0AA0	6SL3201-0BE12-0AA0	6SE6400-4BD16-5CA0	6SE6400-4BD21-2DA0	6SE6400-4BD22-2EA1	6SE6400-4BD24-0FA0
Resistance	Ω	390	160	56	27	15	8.2
Rated power P_{DB}	kW	0.1	0.2	0.65	1.2	2.2	4
Peak power P_{max}	kW	1.7	4.1	12	24	44	80
Degree of protection[1]		IP20	IP20	IP20	IP20	IP20	IP20
Power connections		3 × 1.5 mm² (shielded)	3 × 1.5 mm² (shielded)	3 × 1.5 mm² (shielded)	M6 screw stud	M6 screw stud	M6 screw stud
• Length	m (ft)	0.5 (1.64)	0.5 (1.64)	0.9 (2.95)	–	–	–
Thermostatic switch (NC contact)							
• Switching capacity		250 V AC/ max. 2.5 A	250 V AC/ max. 2.5 A	250 V AC/ max. 2.5 A	250 V AC/ max. 2.5 A	250 V AC/ max. 2.5 A	250 V AC/ max. 2.5 A
• Conductor cross-section	mm²	0.5 … 2.5	0.5 … 2.5	0.5 … 2.5	0.5 … 2.5	0.5 … 2.5	0.5 … 2.5
Dimensions							
• Width	mm (in)	72 (2.83)	153 (6.02)	185 (7.28)	270 (10.63)	301 (11.85)	400 (15.75)
• Height	mm (in)	230 (9.06)	329 (12.95)	285 (11.22)	515 (20.28)	484 (19.06)	650 (25.59)
• Depth	mm (in)	43.5 (1.71)	43.5 (1.71)	150 (5.91)	175 (6.89)	326 (12.83)	315 (12.40)
Net weight	kg (lb)	1 (2.21)	1.6 (3.53)	3.8 (8.38)	7.4 (16.3)	10.6 (23.4)	16.7 (36.8)
Certificate of suitability		cURus	cURus	cURus	cURus	cURus	cURus
Suitable for Power Module in blocksize format	Frame size	FSA	FSB	FSC	FSD	FSE	FSF

Selection and ordering data

Description	Suitable for Power Module in blocksize format Frame size	Braking resistor Article No.
DC link voltage 240 … 360 V DC (line voltage 200 ... 240 V 1 AC)		
180 Ω	FSA	**6SE6400-4BC05-0AA0**
DC link voltage 510 … 720 V DC (line voltage 380 ... 480 V 3 AC)		
390 Ω	FSA	**6SE6400-4BD11-0AA0**
160 Ω	FSB	**6SL3201-0BE12-0AA0**
56 Ω	FSC	**6SE6400-4BD16-5CA0**
27 Ω	FSD	**6SE6400-4BD21-2DA0**
15 Ω	FSE	**6SE6400-4BD22-2EA1**
8.2 Ω	FSF	**6SE6400-4BD24-0FA0**

Characteristic curves



Load diagram for braking resistors in blocksize format

t_a = 12 s
t = 240 s

[1] With correctly connected load connection cable.

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Overview



SINAMICS S120 Combi Power Module

SINAMICS S120 Combi is a very compact and rugged drive concept tailored for compact turning and milling machines. SINAMICS S120 Combi integrates a line infeed with regenerative feedback capability, power units for spindle and feed motors as well as a TTL encoder interface into a single Power Module. The SINAMICS S120 Combi Power Modules are optimized as a drive for machine tools with 3 to 6 axes. The Power Modules are available with external air cooling. SINAMICS Motor Modules in booksize compact format are used as expansion axes.

Benefits

- Compact multi-axis module with line infeed with regenerative feedback capability and power units for 3 or 4 axes
- Customized drive system for compact standard turning and milling machines
- Requires very little mounting space in control cabinet incl. fan unit, shield terminals and ventilation clearances
- Optimized for weak supply networks with frequent under-voltage, network imbalances and large frequency fluctuations
- Optimized for harsh operating conditions with increased cabinet temperature and increased humidity
- Rugged Power Modules resistant to short circuits, overvoltage and ground faults
- Rugged and easy-to-fit screw-type terminals with integrated shield connection for the power cables
- Perfectly designed for expansion using additional Motor Modules in booksize compact format
- Low energy consumption thanks to state-of-the-art 400-V technology
- Excellent dynamic response and machining precision thanks to Dynamic Servo Control (DSC)
- Simple cabling due to intelligent DRIVE-CLiQ interface
- Very simple commissioning thanks to predefined topologies

Function

- Power Module with 3 or 4 integrated power units
- Integrated line infeed with regenerative feedback capability
- Integrated TTL encoder interface
- Integrated motor brake control for one axis
- Integrated fan power supply
- Line supply voltage 380 to 480 V 3 AC
- Supply types TT, TN and IT
- Integrated shield terminals
- Heat dissipation concept with an external heatsink for extremely low power losses in the control cabinet
- Easy-to-mount fan module optimized for harsh environments
- Increased availability thanks to fan monitoring
- Derating only from 45 °C (113 °F) cabinet temperature
- Power cables are connected by means of screw-type terminals

Integration

The following components can be connected to the SINAMICS S120 Combi drive system:

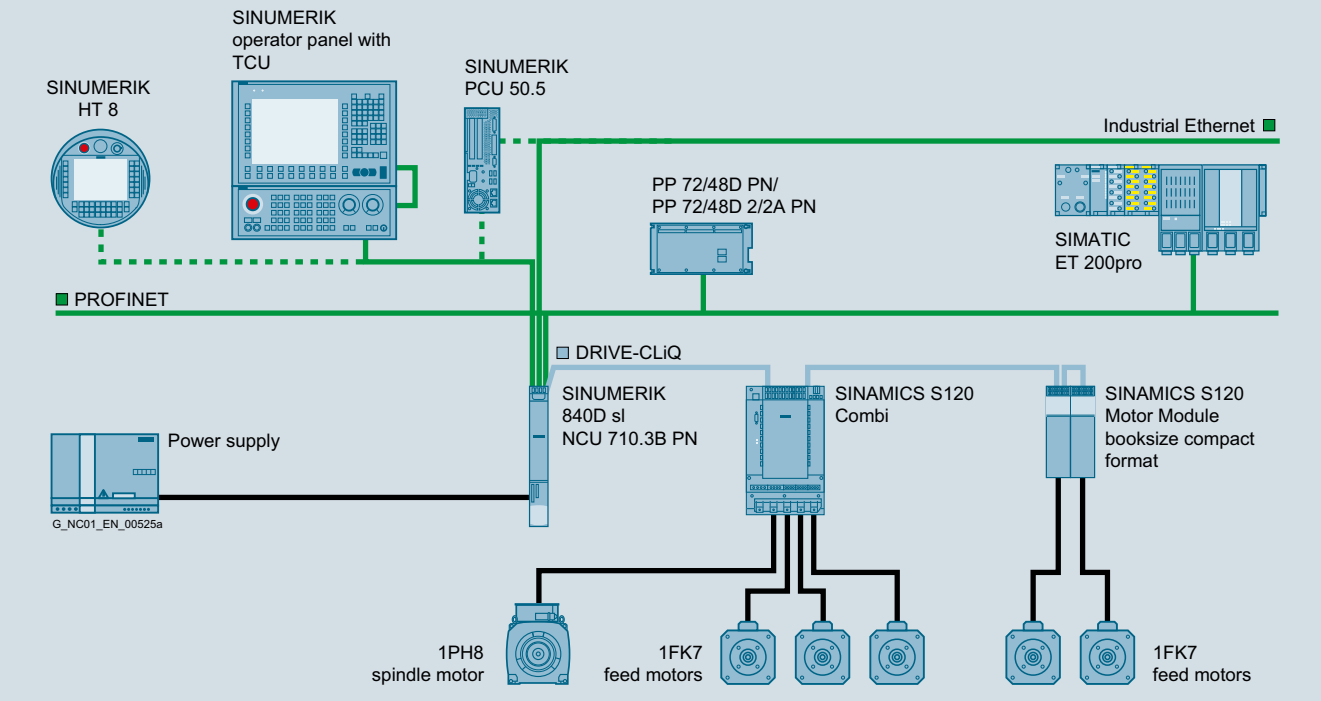
- SINUMERIK 828D BASIC
- SINUMERIK 828D
- 3 or 4 spindle/feed motors
- 3 or 4 motor encoders
- 3 or 4 direct encoders via DMC20
- Direct spindle encoder directly to TTL or sin/cos via SMC20
- External fan module
- Up to two additional SINAMICS S120 Motor Modules in booksize compact format via DC link connection and 24 V DC busbars
- Braking Module with braking resistor via DC link connection
- Control Supply Module via DC link connection and 24 V DC busbars
- One safe motor brake control
- 5 or 6 DRIVE-CLiQ sockets
- 24 V electronic power supply via connector
- 1 safe standstill input for the infeed (Enable Pulses)
- 1 safe standstill input for the spindle and feeds (Enable Pulses)
- 1 temperature sensor input for the spindle (KTY84-130/PT1000 or PTC)
- PE connections

The scope of supply of the SINAMICS S120 Combi Power Modules includes:

- SINAMICS S120 Combi Power Module
- Accessories pack consisting of:
  - 4 DRIVE-CLiQ dust-proof blanking plugs
  - Connector X224 for the electronics power supply
  - Connector X11 for motor brake control
  - Connector X21 Enable Pulses infeed
  - Connector X22 Enable Pulses drives/temp.
  - 5 shield terminals for power cables
  - Shield terminal for signal cable

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Integration (continued)



Selection and ordering data

SINAMICS S120 Combi Power Module with external air cooling

Rated power Infeed	Rated output current Spindle	Rated output current Feedrate 1	Rated output current Feedrate 2	Rated output current Feedrate 3	
kW	A	A	A	A	Article No.
3-axis Power Module					
16	18	5	5	–	**6SL3111-3VE21-6FA0**
16	24	9	9	–	**6SL3111-3VE21-6EA0**
20	30	9	9	–	**6SL3111-3VE22-0HA0**
4-axis Power Module					
10	24 [1]	12	12	12	**6SL3111-4VE21-0EA0**
16	18	9	5	5	**6SL3111-4VE21-6FA0**
16	24	9	9	9	**6SL3111-4VE21-6EA0**
20	30	12	9	9	**6SL3111-4VE22-0HA0**

Technical specifications

Article No.	6SL3111-3VE2.-.... 6SL3111-4VE2.-....
Product brand name	SINAMICS
Product type designation	S120 Combi
Product designation	Power Module
DC link voltage [2]	1.35 × line voltage
Output voltage	0 ... 0.7 × DC link voltage
Line power factor at rated power	
• Fundamental (cos φ_1)	> 0.96
• Total (λ)	0.65 … 0.90
Radio interference suppression	
• Standard	No radio interference suppression
• With line filter	Category C2 to EN 61800-3
Degree of protection	IP20

Article No.	6SL3111-3VE2.-.... 6SL3111-4VE2.-....
Product brand name	SINAMICS
Product type designation	S120 Combi
Product designation	Power Module
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating, > 1000 ... 4000 m (3281 ... 13124 ft) with derating
Certificate of suitability	CE, cULus
Safety Integrated	Safety Integrity Level 2 (SIL 2) according to IEC 61508 Performance Level d (PLd) According to ISO 13849-1 Control Category 3 According to ISO 13849-1

[1] Pulse frequency 4 kHz/8 kHz.

[2] The DC link voltage adjusts itself to the mean value of the rectified line voltage.

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Technical specifications (continued)

Article No.		6SL3111-3VE21-6FA0	6SL3111-3VE21-6EA0	6SL3111-3VE22-0HA0
Product designation		3-axis Power Module with external air cooling		
Infeed				
• Rated power P_{rated} (S1)	**kW**	**16**	**16**	**20**
• Infeed power P_{S6} (S6-40 %)	kW	21	21	26.5
• Peak infeed power P_{max}	kW	35	35	40
Regenerative feedback				
• Rated power P_{rated} (S1)	kW	16	16	20
• Peak regenerative feedback power P_{max}	kW	35	35	40
Supply voltages				
• Line voltage 3 AC	V	380 -10 % ... 480 +10 %		
• Line frequency	Hz	45 ... 66		
• Electronics power supply DC	V	24 (20.4 ... 28.8)		
Rated input current				
• At 400 V 3 AC	A	28	28	34
• At 380 V/480 V 3 AC	A	29/25	29/25	35/30
• Bei 400 V 3 AC (S6-40 %)	A	35.5	35.5	44
• At 400 V 3 AC peak current	A	56	56	63.5
Pulse frequency	kHz	4	4	4
Output voltage AC	V	0 ... 0.7 × DC link voltage		
Spindle				
• Rated output current AC I_{rated}	**A**	**18**	**24**	**30**
• Base-load current AC I_H	A	15.3	20.4	25.5
• Intermittent-duty operating current AC $I_{S6-40\%}$	A	24	32	40
• Peak current AC I_{max}	A	36	48	56
Rated power				
• At 540 V DC link voltage	kW	8.7	11.7	14.4
• At 600 V DC link voltage	kW	9.7	13	16
Feedrate 1/Feedrate 2				
• Rated output current AC I_{rated}	**A**	**5**	**9**	**9**
• Base-load current AC I_H	A	4.3	7.7	7.7
• Intermittent-duty operating current AC $I_{S6-40\%}$	A	6.5	12	12
• Peak current AC I_{max}	A	10	18	18
Rated power				
• At 540 V DC link voltage	kW	2.4	4.3	4.3
• At 600 V DC link voltage	kW	2.7	4.8	4.8
Output for expansion axis				
• DC link output current DC I_{rated}	A	40	40	40
• DC link voltage	V	460 ... 720	460 ... 720	460 ... 720
• Electronics output current for for an expansion axis 24 V DC	A	20	20	20
Electronics current consumption at 24 V DC				
• Without external fan module	A	1.5	1.5	1.5
• With external fan module	A	2.3	2.3	2.3
Total power loss, incl. electronics losses	W	425	537	634
• Internal	W	81	91	102
• External	W	344	446	532

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Technical specifications (continued)

Article No.		6SL3111-3VE21-6FA0	6SL3111-3VE21-6EA0	6SL3111-3VE22-0HA0
Product designation		3-axis Power Module with external air cooling		
Ambient temperature, max.				
• Without derating	°C (°F)	45 (113)	45 (113)	45 (113)
• With derating	°C (°F)	55 (131)	55 (131)	55 (131)
DC link voltage	V	460 ... 720		
• Overvoltage trip DC	V	820 ± 2 %		
• Undervoltage trip DC	V	380 ± 2 %		
DC link capacitance	µF	1645	1880	2115
Circuit breaker (UL)				
• Type		3VL2505-2KN30-....	3VL2505-2KN30-....	3VL2506-2KN30-....
• Rated current	A	35	35	60
• Short-circuit current rating SCCR at 480 V 3 AC, resulting	kA	65	65	65
Safety fuses (UL)				
• Type		AJT35	AJT35	AJT60
• Rated current	A	35	35	60
• Short-circuit current rating SCCR, resulting				
- At 480 V 3 AC	kA	65	65	65
- At 600 V 3 AC	kA	200	200	200
Cooling air requirement	m^3/h (ft^3/h)	160 (5650)	160 (5650)	160 (5650)
Width	mm (in)	260 (10.24)	260 (10.24)	260 (10.24)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)
Depth	mm (in)	304 (11.97)	304 (11.97)	304 (11.97)
Net weight	kg (lb)	18.4 (40.6)	18.4 (40.6)	18.5 (40.6)

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Technical specifications (continued)

Article No.		6SL3111-4VE21-0EA0	6SL3111-4VE21-6FA0	6SL3111-4VE21-6EA0	6SL3111-4VE22-0HA0
Product designation		4-axis Power Module with external air cooling			
Infeed					
• Rated power P_{rated} (S1)	**kW**	**10**	**16**	**16**	**20**
• Infeed power P_{S6} (S6-40 %)	kW	13	21	21	26.5
• Peak infeed power P_{max}	kW	35	35	35	40
Regenerative feedback					
• Rated power P_{rated} (S1)	kW	10	16	16	20
• Peak regenerative feedback power P_{max}	kW	35	35	35	40
Supply voltages					
• Line voltage 3 AC	V	380 -10 % ... 480 +10 %			
• Line frequency	Hz	45 ... 66			
• Electronics power supply DC	V	24 (20.4 ... 28.8)			
Rated input current					
• At 400 V 3 AC	A	16.2	28	28	34
• At 380 V/480 V 3 AC	A	17/12.8	29/25	29/25	35/30
• At 400 V 3 AC (S6-40 %)	A	21.1	35.5	35.5	44
• At 400 V 3 AC peak current	A	56.7	56	56	63.5
Pulse frequency	kHz	4/8	4	4	4
Output voltage AC	V	0 ... 0.7 × DC link voltage			
Spindle					
• Rated output current AC I_{rated}	**A**	**24**	**18**	**24**	**30**
• Base-load current AC I_H	A	20.4	15.3	20.4	25.5
• Intermittent-duty operating current AC $I_{S6-40\%}$	A	32 at 4 kHz 19.2 at 8 kHz	24	32	40
• Peak current AC I_{max}	A	60	36	48	56
Rated power					
• At 540 V DC link voltage	kW	11.7	8.7	11.7	14.4
• At 600 V DC link voltage	kW	13	9.7	13	16
Feedrate 1					
• Rated output current AC I_{rated}	**A**	**12**	**9**	**9**	**12**
• Base-load current AC I_H	A	10.8	7.7	7.7	10.3
• Intermittent-duty operating current AC $I_{S6-40\%}$	A	16	12	12	16
• Peak current AC I_{max}	A	36	18	18	24
Rated power					
• At 540 V DC link voltage	kW	5.8	4.3	4.3	5.8
• At 600 V DC link voltage	kW	6.5	4.8	4.8	6.5
Feedrate 2/Feedrate 3					
• Rated output current AC I_{rated}	**A**	**12**	**5**	**9**	**9**
• Base-load current AC I_H	A	10.8	4.3	7.7	7.7
• Intermittent-duty operating current AC $I_{S6-40\%}$	A	16	6.5	12	12
• Peak current AC I_{max}	A	36	10	18	18
Rated power					
• At 540 V DC link voltage	kW	5.8	2.4	4.3	4.3
• At 600 V DC link voltage	kW	6.5	2.7	4.8	4.8
Output for expansion axis					
• DC link output current DC I_{rated}	A	18.5	40	40	40
• DC link voltage	V	510 ... 720	510 ... 720	510 ... 720	510 ... 720
• Electronics output current for for an expansion axis 24 V DC	A	5	20	20	20
Electronics current consumption at 24 V DC					
• Without external fan module	A	1.6	1.6	1.6	1.6
• With external fan module	A	2.4	2.4	2.4	2.4

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Technical specifications (continued)

Article No.		6SL3111-4VE21-0EA0	6SL3111-4VE21-6FA0	6SL3111-4VE21-6EA0	6SL3111-4VE22-0HA0
Product designation		4-axis Power Module with external air cooling			
Total power loss, incl. electronics losses	W	770	492	607	733
• Internal	W	115	87	100	113
• External	W	655	405	507	620
Ambient temperature, max.					
• Without derating	°C (°F)	45 (113)	45 (113)	45 (113)	45 (113)
• With derating	°C (°F)	55 (131)	55 (131)	55 (131)	55 (131)
DC link voltage	V	460 ... 720			
• Overvoltage trip DC	V	820 ± 2 %			
• Undervoltage trip DC	V	380 ± 2 %			
DC link capacitance	µF	2520	1645	2115	2520
Circuit breaker (UL)					
• Type		3VL2105-2KN30-....	3VL2105-2KN30-....	3VL2105-2KN30-....	3VL2106-2KN30-....
• Rated current	A	50	50	50	60
• Short-circuit current rating SCCR at 480 V 3 AC, resulting	kA	65	65	65	65
Safety fuses (UL)					
• Type		AJT35	AJT35	AJT35	AJT60
• Rated current	A	35	35	35	60
• Short-circuit current rating SCCR, resulting					
- At 480 V 3 AC	kA	65	65	65	65
- At 600 V 3 AC	kA	200	200	200	200
Cooling air requirement	m^3/h (ft^3/h)	160 (5650)	160 (5650)	160 (5650)	160 (5650)
Width	mm (in)	260 (10.24)	260 (10.24)	260 (10.24)	260 (10.24)
Height	mm (in)	380 (14.96)	380 (14.96)	380 (14.96)	380 (14.96)
Depth	mm (in)	304 (11.97)	304 (11.97)	304 (11.97)	304 (11.97)
Net weight	kg (lb)	19.4 (42.8)	18.9 (41.7)	19 (41.9)	19 (41.9)

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Overview

External fan module



External fan module

The external fan module combined with the reinforcement plates is employed to provide perfect cooling of a SINAMICS S120 Combi Power Module.

To cool the SINAMICS S120 Combi Power Modules, a volumetric flow of air through the heatsink of at least 160 m^3/h is required.

The external fan module delivers a maximum volumetric flow rate of 290 m^3/h. This dimensioning ensures an adequate air flow rate, even with a lower supply voltage or with a slightly soiled heatsink.

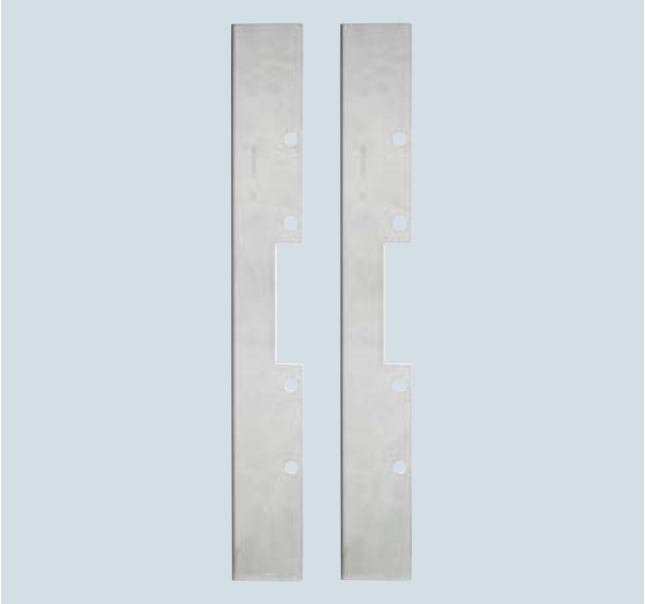
Due to the encapsulated electronics and the ball-bearing-mounted closed rotor, the fan module can be used even under exacting environmental conditions. The fans are equipped with electronic reverse-polarity, blocking and overload protection systems. To ensure maximum machine availability, the fan speed is monitored. A user alarm is displayed if the fan stops.

Technical specifications

Article No.	6SL3161-0EP00-0AA0
Product designation	External fan module
Rated voltage DC	24 V
Voltage range DC	20.4 … 28.8 V
Volumetric flow, max.	290 m^3/h (10241 ft^3/h)
Current consumption	0.8 A
Power consumption	18 W
Ambient temperature, max.	-20 ... +70 °C (-4 ... +158 °F)
Service life	
• At 55 °C (131 °F)	50000 h
• At 70 °C (158 °F)	20000 h
Degree of protection	IP54
Height	258 mm (10.16 in)
Width	104 mm (4.09 in)
Depth	86 mm (3.39 in)
Net weight	1.5 kg (3.3 lb)
Certificate of suitability	CSA, UL, VDE

Overview

Reinforcement plates



Reinforcement plates

It is essential to ensure that the air actually flows through the heatsink. The gap between the fan module and heatsink must therefore be closed. The reinforcement plates must be used for this purpose where possible.

The reinforcement plates

- Close the gap between the fan module and heatsink
- Reinforce the rear wall of the control cabinet for sealed installation
- Guarantee ideal ventilation spaces

Technical specifications

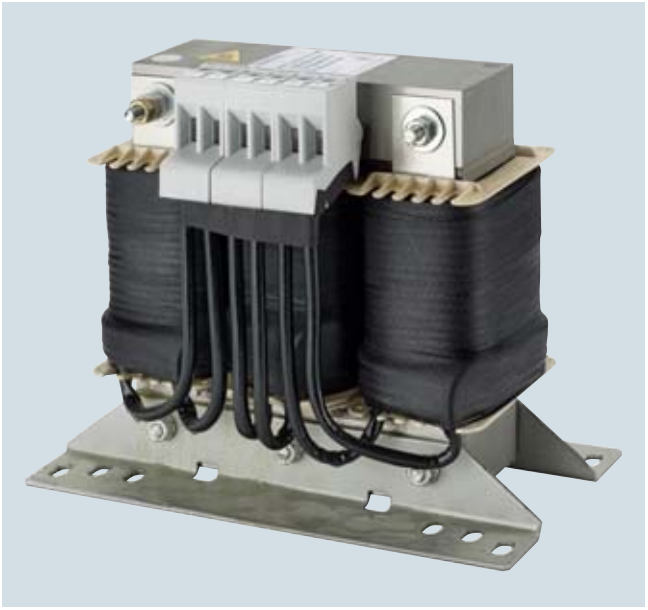
Article No.	6SL3161-1LP00-0AA0
Product designation	Reinforcement plates
Height	575 mm (22.64 in)
Width	15 mm (0.59 in)
Depth	75 mm (2.95 in)
Net weight	0.75 kg (1.65 lb)

Selection and ordering data

Description	Article No.
External fan module	**6SL3161-0EP00-0AA0**
Accessories	
Reinforcement plates (2 units)	**6SL3161-1LP00-0AA0**

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Overview



Line reactor

SINAMICS S120 Combi Power Modules cannot operate without line reactors.

The use of other makes of line reactor can lead to malfunctions or irreparable damage to equipment.

Selection and ordering data

Suitable for SINAMICS S120 Combi		**SINAMICS line reactor**	
Rated power Infeed	Power Module	Rated power	
kW	Type	kW	Article No.
16	6SL3111-3VE21-6FA0	**16**	**6SL3100-0EE21-6AA0**
16	6SL3111-3VE21-6EA0		
10	6SL3111-4VE21-0EA0		
16	6SL3111-4VE21-6FA0		
16	6SL3111-4VE21-6EA0		
20	6SL3111-3VE22-0HA0	**20**	**6SL3100-0EE22-0AA0**
20	6SL3111-4VE22-0HA0		

Technical specifications

Article No.		6SL3100-0EE21-6AA0	6SL3100-0EE22-0AA0
Product designation		Line reactor	Line reactor
Rated power	kW	16	20
Rated current	A	28	33
Power loss	W	75	98
Line/load connection 1U1, 1V1, 1W1/1U2, 1V2, 1W2		Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	4	10
PE connection		Screw-type terminals	Screw-type terminals
• Conductor cross-section	mm^2	4	10
Degree of protection		IP20	IP20
Width	mm (in)	219 (8.62)	219 (8.62)
Height	mm (in)	176 (6.93)	176 (6.93)
Depth	mm (in)	120 (4.72)	130 (5.12)
Net weight	kg (lb)	10.7 (23.6)	10.9 (24)
Certificate of suitability		cURus	cURus

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Overview



Line filter

In plants with strict EMC requirements, line filters work together with line reactors to restrict the conducted interference emanating from the Power Modules to the limit values of Class A1 as defined in EN 55011 and Category C2 as defined in EN 61800-3. Line filters are suitable only for direct connection to TN systems.

The use of other makes of line filter can lead to malfunctions or irreparable damage to equipment.

Note:

According to product standard IEC 61800-3, RFI suppression commensurate with the relevant rated conditions must be provided and is a legal requirement in the EU (EMC Directive). Line filters and line reactors are required for this purpose.

The machine manufacturer must provide verification that the machinery to be operated with the drive products and the installed suppression elements, e.g. line filters, are CE-EMC-compliant.

Technical specifications

Article No.	6SL3000-0BE21-6DA0
Product designation	Line filter
Rated current	36 A
Rated infeed power	10 kW, 16 kW, 20 kW
Power loss in rated operation	12 W, 15 W, 16 W
Line/load connection L1, L2, L3/U, V, W	Screw-type terminals
• Conductor cross-section	10 mm^2
PE connection	M6 screw stud
Degree of protection	IP20
Width	50 mm (1.97 in)
Height	429 mm (16.89 in)
Depth	226 mm (8.90 in)
Net weight	5 kg (11 lb)
Certificate of suitability	cURus

Selection and ordering data

Suitable for SINAMICS S120 Combi		**SINAMICS Line filter**
Rated power Infeed	Power Module	
kW	Type	Article No.
16	6SL3111-3VE21-6FA0	**6SL3000-0BE21-6DA0**
16	6SL3111-3VE21-6EA0	
20	6SL3111-3VE22-0HA0	
10	6SL3111-4VE21-0EA0	
16	6SL3111-4VE21-6FA0	
16	6SL3111-4VE21-6EA0	
20	6SL3111-4VE22-0HA0	

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Overview

The SINAMICS S120 Combi Power Module can be extended by the SINAMICS S120 Motor Modules in booksize compact format.

Benefits

- Simple addition of supplementary machine components when using the SINAMICS S120 Combi drive system
- Expansion axes can interpolate freely with the SINAMICS S120 Combi axes
- Connection of the Motor Modules by simple connection of DC link busbars and 24 V busbars
- Motor Modules are supplied via the infeed integrated in the SINAMICS S120 Combi
- Energy exchange between Motor Modules and the SINAMICS S120 Combi Power Module through a shared DC link
- Simple connection to the DRIVE-CLiQ interface

Function

- Connection of up to two SINAMICS S120 Motor Modules in booksize compact format to the integrated line infeed of the SINAMICS S120 Combi Power Modules[1)]

Technical specifications

Article No.	6SL3420-1TE...
Product designation	Single Motor Module in booksize compact format
Article No.	6SL3420-2TE...
Product designation	Double Motor Module in booksize compact format
DC link voltage Up to 2000 m (6562 ft) above sea level	510 … 720 V (line voltage 380 … 480 V 3 AC)
Electronics power supply DC	24 V -15 %/+20 %
Cooling method	Internal air cooling Power units with increased air cooling by means of built-in fan
Ambient or coolant temperature (air) During operation for line-side components, Line Modules and Motor Modules	0 ... 40 °C (32 ... 104 °F) without derating, > 40 ... 55 °C (> 104 ... 131 °F) with derating
Installation altitude	Up to 1000 m (3281 ft) above sea level without derating >1000 ... 4000 m (3281 ... 13124 ft) above sea level with derating
Degree of protection	IP20
Certificate of suitability	CE, cULus, cURus
Safety Integrated	Safety Integrity Level 2 (SIL2) according to IEC 61508 Performance Level d (PLd) According to ISO 13849-1 Control Category 3 According to ISO 13849-1

1) The simultaneity factor of the axis grouping for the infeed power of the SINAMICS S120 Combi Power Modules must be observed.

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Single Motor Modules in booksize compact format

Design



Single Motor Modules in booksize compact format

The Single Motor Modules in booksize compact format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 1 electronics power supply connection via integrated 24 V DC busbars
- 3 DRIVE-CLiQ sockets
- 1 motor connection via connector
- 1 safe standstill input (enable pulses)
- 1 safe motor brake control
- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 2 PE connections

Design (continued)

The status of the Motor Modules is indicated via two multi-color LEDs.

The shield of the motor cable is routed over the connector to the motor connection.

The signal cable shield can be connected to the Motor Module by means of a shield connection terminal, e.g., type KLBÜ 3-8 SC by Weidmüller.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable (length depends on Motor Module width) to connect Motor Module to adjacent Motor Module, length 0.11 m (4.33 in) for 50 mm (1.97 in) wide Motor Modules or length 0.16 m (6.30 in) for 75 mm (2.95 in) wide Motor Modules.
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connector X21
- Connector X11 for motor brake connection
- Connector X1 for motor connection
- 1 set of warning labels in 30 languages
- 1 heat conducting foil

Selection and ordering data

SINAMICS S120 Single Motor Modules in booksize compact format		
Rated output current	Rated power	Internal air cooling
A	kW (HP)[3]	Article No.
DC link voltage 510 … 720 V DC		
3	1.6 (1.5)	**6SL3420-1TE13-0AA1**
5	2.7 (3)	**6SL3420-1TE15-0AA1**
9	4.8 (5)	**6SL3420-1TE21-0AA1**
18	9.7 (10)	**6SL3420-1TE21-8AA1**

Technical specifications

Article No.		6SL3420-1TE13-0AA1	6SL3420-1TE15-0AA1	6SL3420-1TE21-0AA1	6SL3420-1TE21-8AA1
Product designation		Single Motor Modules in booksize compact format with internal air cooling			
DC link voltage 510 … 720 V DC					
Output current					
• Rated current I_{rated}	A	3	5	9	18
• I_{max}	A	9	15	27	54
Rated power	kW (HP)	1.6 (1.5)	2.7 (3)	4.8 (5)	9.7 (10)
DC link current I_d[1]	A	3.6	6	11	22
Power requirement at 24 V DC, max.	A	0.85	0.85	0.85	0.85
Power loss[2]					
• With internal air cooling in control cabinet	W	70	100	100	180
Width	mm (in)	50 (1.97)	50 (1.97)	50 (1.97)	75 (2.95)
Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)	270 (10.63)
Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)	226 (8.90)
Net weight	kg (lb)	2.7 (5.95)	2.7 (5.95)	2.7 (5.95)	3.4 (7.5)

[1] Rated DC link current for dimensioning an external DC connection.
[2] Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.
[3] Nominal HP based on asynchronous motors (induction motors). Match the motor nameplate current for specific sizing.

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Design



Double Motor Modules in booksize compact format

The Double Motor Modules in booksize compact format feature the following connections and interfaces as standard:

- 2 DC link connections via integrated DC link busbars
- 2 electronics power supply connections via integrated 24 V DC busbars
- 4 DRIVE-CLiQ sockets
- 2 motor connections via connector
- 2 safe standstill inputs (1 input per axis)
- 2 safe motor brake controls
- 2 temperature sensor inputs (KTY84-130/PT1000 or PTC)
- 3 PE connections

Design (continued)

The status of the Motor Modules is indicated via two multi-color LEDs.

The shield of the motor cables is routed over the connectors to the motor connection.

The signal cable shield can be connected to the Motor Module by means of a shield connection terminal, e.g., type KLBÜ 3-8 SC by Weidmüller.

The scope of supply of the Motor Modules includes:

- DRIVE-CLiQ cable for connecting to the adjacent Motor Module, length 0.16 m (6.3 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- Connectors X21 and X22
- Connectors X1 and X2 for motor connection
- 1 set of warning labels in 30 languages
- 1 heat conducting foil

Selection and ordering data

SINAMICS S120
Double Motor Modules in booksize compact format

Rated output current	Rated power	Internal air cooling
A	kW (HP)[3]	Article No.
DC link voltage 510 … 720 V DC		
2 × 1.7	2 × 0.9 (2 × 0.75)	**6SL3420-2TE11-7AA1**
2 × 3	2 × 1.6 (2 × 1.5)	**6SL3420-2TE13-0AA1**
2 × 5	2 × 2.7 (2 × 3)	**6SL3420-2TE15-0AA1**

Technical specifications

Article No.		6SL3420-2TE11-7AA1	6SL3420-2TE13-0AA1	6SL3420-2TE15-0AA1
Product designation		Double Motor Modules in booksize compact format with internal air cooling		
DC link voltage 510 … 720 V DC				
Output current				
• Rated current I_{rated}	A	2 × 1.7	2 × 3	2 × 5
• I_{max}	A	2 × 5.1	2 × 9	2 × 15
Rated power	kW (HP)	2 × 0.9 (2 × 0.75)	2 × 1.6 (2 × 1.5)	2 × 2.7 (2 × 3)
DC link current I_d[1]	A	4.1	7.2	12
Power loss[2]				
• With internal air cooling in control cabinet	W	110	130	190
Width	mm (in)	75 (2.95)	75 (2.95)	75 (2.95)
Height	mm (in)	270 (10.63)	270 (10.63)	270 (10.63)
Depth	mm (in)	226 (8.90)	226 (8.90)	226 (8.90)
Net weight	kg (lb)	3.4 (7.5)	3.4 (7.5)	3.4 (7.5)

1) Rated DC link current for dimensioning an external DC connection.
2) Power loss of Motor Module at rated power including losses of 24 V DC electronics power supply.
3) Nominal HP based on asynchronous motors (induction motors). Match the motor nameplate current for specific sizing.

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CBE20 Communication Board

Overview



CBE20 Communication Board

The CBE20 Communication Board can be used to connect to a PROFINET IO network via a CU320-2 Control Unit.

The SINAMICS S120 then assumes the function of a PROFINET IO device and can perform the following functions:

- PROFINET IO device
- 100 Mbit/s full duplex
- Supports real-time classes of PROFINET IO:
  - RT (Real-Time)
  - IRT (Isochronous Real-Time), minimum send cycle 500 µs
- Connects to controls as PROFINET IO devices using PROFIdrive compliant with Specification V4
- Standard TCP/IP communication for engineering processes using the STARTER commissioning tool
- Integrated 4-port switch with four RJ45 sockets based on the PROFINET ASIC ERTEC400. The optimum topology (line, star, tree) can therefore be configured without additional external switches.
- Supports the media redundancy procedure and shared device functions.

Integration

The CBE20 Communication Board plugs into the option slot on the CU320-2 Control Unit.

Technical specifications

Article No.	6SL3055-0AA00-2EB0
Product designation	CBE20 Communication Board
Power requirement at 24 V DC	0.16 A
Power loss	2.4 W
Ambient temperature, permissible	
• Storage and transport	-40 ... +70 °C (-40 ... +158 °F)
• Operation	0 ... 55 °C (32 ... 131 °F)
Depth	130 mm (5.12 in)
Height	78 mm (3.07 in)
Net weight	0.1 kg (0.22 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
CBE20 Communication Board	**6SL3055-0AA00-2EB0**
Accessories	
Industrial Ethernet FC	
• RJ45 plug 180 (1 unit)	**6GK1901-1BB10-2AA0**
• RJ45 plug 180 (10 units)	**6GK1901-1BB10-2AB0**
• Stripping tool	**6GK1901-1GA00**
• Standard cable GP 2x2	**6XV1840-2AH10**
• Flexible cable GP 2x2	**6XV1870-2B**
• Trailing cable GP 2x2	**6XV1870-2D**
• Trailing cable 2x2	**6XV1840-3AH10**
• Marine cable 2x2	**6XV1840-4AH10**

For more information on connectors and cables, please refer to Catalog IK PI or the Siemens Industry Mall:
www.siemens.com/industrymall

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Overview



CUA31 Control Unit Adapter

The CUA31 Control Unit Adapter converts the PM-IF interface to a DRIVE-CLiQ interface. The CUA31 Control Unit Adapter allows Power Modules in blocksize format to operate on a Control Unit, e.g. as a single axis next to a multi-axis drive. In this case, the CUA31 Control Unit Adapter must be the last device in the DRIVE-CLiQ link from the viewpoint of the Control Unit.

Design

The CUA31 Control Unit Adapter features the following connections and interfaces:

- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 3 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 safe standstill input (enable pulses)

The status of the CUA31 Control Unit Adapter is indicated via a multi-color LED.

Integration

The CUA31 Control Unit Adapter is snapped onto the Power Module in blocksize format and communicates with the CU320-2 Control Unit, an NCU 7.x of the SINUMERIK by means of a DRIVE-CLiQ link.

The CUA31 Control Unit Adapter's power is supplied by the Power Module via the PM-IF interface. If the CUA31 Control Unit Adapter needs to communicate when the Power Module is switched off, it must be supplied with 24 V DC from an external source.

Other DRIVE-CLiQ devices such as Sensor Modules or Terminal Modules can be connected to the CUA31 Control Unit Adapter.

Technical specifications

Article No.	6SL3040-0PA00-0AA1
Product designation	CUA31 Control Unit Adapter
Power requirement, max. at 24 V DC without DRIVE-CLiQ supply	0.15 A for CUA31 + max. 0.5 A for PM340 Power Module
• Conductor cross-section, max.	2.5 mm^2
Power loss, max.	4 W
PE connection	M5 screw
Dimensions	
• Width	73 mm (2.87 in)
• Height	165.8 mm (6.53 in)
• Depth	37.3 mm (1.47 in)
Net weight	0.31 kg (0.68 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
CUA31 Control Unit Adapter Without DRIVE-CLiQ cable	**6SL3040-0PA00-0AA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs	
For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

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CUA32 Control Unit Adapter

Overview



CUA32 Control Unit Adapter

The CUA32 Control Unit Adapter converts the PM-IF interface to a DRIVE-CLiQ interface. The CUA32 Control Unit Adapter is also equipped with an integral encoder evaluation device which can be configured for an HTL/TTL or SSI encoder. The CUA32 Control Unit Adapter allows Power Modules in blocksize format to operate on a Control Unit, e.g. as a single axis next to a multi-axis drive. In this case, the CUA32 Control Unit Adapter must be the last device in the DRIVE-CLiQ link from the viewpoint of the Control Unit.

Design

The CUA32 Control Unit Adapter features the following connections and interfaces:

- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 3 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 safe standstill input (enable pulses)
- 1 encoder evaluator for
  - TTL/HTL incremental encoder
  - SSI encoder without incremental signals

The status of the CUA32 Control Unit Adapter is indicated via a multi-color LED.

Integration

The CUA32 Control Unit Adapter is snapped onto the Power Module in blocksize format and communicates with a CU320-2 Control Unit or a SINUMERIK NCU 7.x via a DRIVE-CLiQ connection.

The CUA32 Control Unit Adapter's power is supplied by the Power Module via the PM-IF interface. If the CUA32 Control Unit Adapter needs to communicate when the Power Module is switched off, it must be supplied with 24 V DC from an external source.

Other DRIVE-CLiQ devices such as Sensor Modules or Terminal Modules can be connected to the CUA32 Control Unit Adapter.

Technical specifications

Article No.	6SL3040-0PA01-0AA0
Product designation	CUA32 Control Unit Adapter
Power requirement, max. at 24 V DC without DRIVE-CLiQ supply or encoder supply	0.15 A for CUA32 + max. 0.5 A for PM340 Power Module
• Conductor cross-section, max.	2.5 mm^2
Encoder evaluation	• TTL/HTL incremental encoder (parameterizable) • SSI encoder without incremental signals
• Input impedance	
- TTL	570 Ω
- HTL, max.	16 mA
• Encoder supply	24 V DC/0.35 A or 5 V DC/0.35 A
• Encoder frequency, max.	300 Hz
• SSI baud rate	100 ... 250 kbaud
• Resolution absolute position SSI	30 bit
• Cable length, max.	
- TTL encoder	100 m (328 ft) (only bipolar signals permitted)[1]
- HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals[1]
- SSI encoder	100 m (328 ft)
Power loss, max.	4 W
PE connection	M5 screw
Dimensions	
• Width	73 mm (2.87 in)
• Height	165.8 mm (6.53 in)
• Depth	37.3 mm (1.47 in)
Net weight	0.32 kg (0.71 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
CUA32 Control Unit Adapter Without DRIVE-CLiQ cable	**6SL3040-0PA01-0AA0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

[1] Signal cables twisted in pairs and shielded.

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DMC20 DRIVE-CLiQ Hub Module

Overview



DMC20 DRIVE-CLiQ Hub Module

The DMC20 DRIVE-CLiQ Hub Module is used to implement a star-shaped topology of a DRIVE-CLiQ line. Two DMC20 DRIVE-CLiQ Hub Modules can be connected in series (cascaded).

Design

The following are located on the DMC20 DRIVE-CLiQ Hub Module:

- 6 DRIVE-CLiQ sockets for connecting 5 DRIVE-CLiQ devices
- 1 connection for the electronics power supply via the 24 V DC supply connector

The status of the DMC20 DRIVE-CLiQ Hub Module is indicated via a multi-color LED.

Technical specifications

Article No.	6SL3055-0AA00-6AA1
Product designation	DMC20 DRIVE-CLiQ Hub Module
Power requirement at 24 V DC, max. without DRIVE-CLiQ supply	0.15 A
• Conductor cross-section, max.	2.5 mm^2
Degree of protection	IP20
Width	50 mm (1.97 in)
Height	151 mm (5.94 in)
Depth	110 mm (4.33 in)
Net weight	0.36 kg (0.79 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
DMC20 DRIVE-CLiQ Hub Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-6AA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

Integration

Refer to DME20 DRIVE-CLiQ Hub Module.

DME20 DRIVE-CLiQ Hub Module

Overview



DME20 DRIVE-CLiQ Hub Module

The DME20 DRIVE-CLiQ Hub Module is used to implement a star-shaped topology of a DRIVE-CLiQ line. Two DME20 DRIVE-CLiQ Hub Modules can be connected in series (cascaded).

Design

The following are located on the DME20 DRIVE-CLiQ Hub Module:

- 6 DRIVE-CLiQ sockets for connecting 5 DRIVE-CLiQ devices
- 1 connection for the electronics power supply via the 24 V DC circular supply connector via conductor cross-section 4 × 0.75 mm^2 (pins 1+2 internally bridged; pins 3+4 internally bridged)

The scope of supply of the DME20 DRIVE-CLiQ Hub Modules includes:

- 6 blanking plugs for sealing unused DRIVE-CLiQ sockets

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DME20 DRIVE-CLiQ Hub Module

Technical specifications

Article No.	6SL3055-0AA00-6AB0
Product designation	DME20 DRIVE-CLiQ Hub Module
Power requirement at 24 V DC, max. without DRIVE-CLiQ supply	0.15 A
• Conductor cross-section, max.	4 × 0.75 mm^2
Degree of protection	IP67
Width	99 mm (3.9 in)
Height	149 mm (5.87 in)
Depth	55.7 mm (2.19 in) without connector
Net weight	0.8 kg (1.76 lb)
Certificate of suitability	cULus

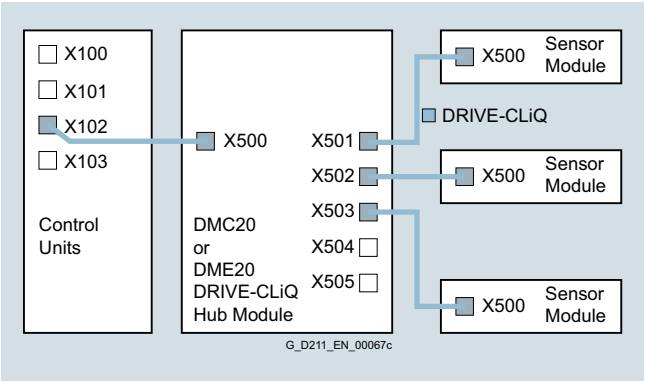
Selection and ordering data

Description	Article No.
DME20 DRIVE-CLiQ Hub Module Without DRIVE-CLiQ cable; without electronics power supply cable and circular connector for 24 V DC	**6SL3055-0AA00-6AB0**
Accessories	
24 V DC power supply cable	Ordering and delivery Phoenix Contact www.phoenixcontact.com
• Shielded connector, 5-pole, can be assembled by the user	Art. No. 1508365
• Unshielded connector, 4-pole, can be assembled by the user, Speedcon quick-release lock	Art. No. 1521601
Accessories for re-ordering	
SINAMICS/SINUMERIK/ SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

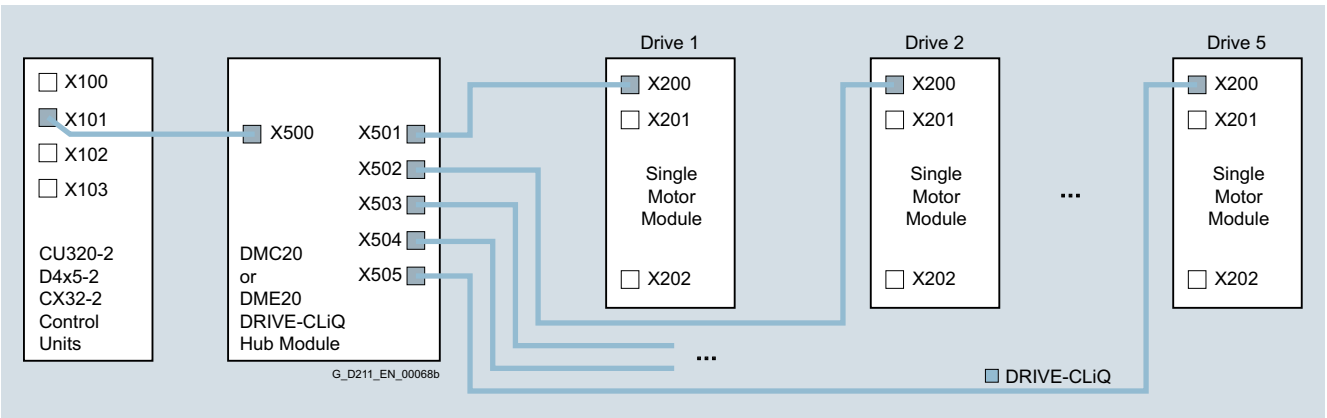
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Integration

Signals from more than one encoder can be collected with one DRIVE-CLiQ Hub Module and forwarded to the Control Unit through a single DRIVE-CLiQ cable.



With the DRIVE-CLiQ Hub Module, individual DRIVE-CLiQ devices can be removed without interrupting the data exchange with the remaining devices in the DRIVE-CLiQ line.



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Overview



TM15 Terminal Module

The number of available digital inputs and outputs within a drive system can be expanded with the TM15 Terminal Module.

Design

The following are located on the TM15 Terminal Module:

- 24 bidirectional digital inputs/outputs (isolation in 3 groups with 8 channels each)
- 24 green status LEDs for indicating the logical signal status of the relevant terminal
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the TM15 Terminal Module is indicated via a multi-color LED.

The TM15 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be connected to the TM15 Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Integration

The TM15 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit

Technical specifications

Article No.	6SL3055-0AA00-3FA0
Product designation	TM15 Terminal Module
Power requirement, max. at 24 V DC without load	0.15 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Number of DRIVE-CLiQ sockets	2
I/O devices	
• Digital inputs/outputs	Can be parameterized channel-by-channel as DI or DO
• Number of digital inputs/outputs	24
• Electrical isolation	Yes, in groups of 8
• Connection method	Plug-in screw-type terminals
• Conductor cross-section, max.	1.5 mm^2
Digital inputs	
• Voltage	-30 ... +30 V
• Low level (an open digital input is interpreted as "low")	-30 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC	5 ... 11 mA
• Delay times of digital inputs, typ. [1]	
- L → H	50 µs
- H → L	100 µs
Digital outputs (continuously short-circuit-proof)	
• Voltage	24 V DC
• Load current per digital output, max.	0.5 A
• Delay times (resistive load) [1]	
- L → H, typ.	50 µs
- L → H, max.	100 µs
- H → L, typ.	150 µs
- H → L, max.	225 µs
• Total current of the outputs (per group), max.	
- Up to 60 °C (140 °F)	2 A
- Up to 50 °C (131 °F)	3 A
- Up to 40 °C (104 °F)	4 A
Power loss, max.	3 W
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Net weight	0.86 kg (1.90 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
TM15 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3FA0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs	
For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input/output is processed.

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Overview



TM31 Terminal Module

With the TM31 Terminal Module, the number of available digital inputs and outputs and the number of analog input and outputs within a drive can be expanded.

The TM31 Terminal Module also features relay outputs with changeover contact and a temperature sensor input.

Design

The following are located on the TM31 Terminal Module:

- 8 digital inputs
- 4 bidirectional digital inputs/outputs
- 2 relay outputs with changeover contact
- 2 analog inputs
- 2 analog outputs
- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the TM31 Terminal Module is indicated via a multi-color LED.

The TM31 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be connected to the TM31 Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Integration

The TM31 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units:

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

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Technical specifications

Article No.	6SL3055-0AA00-3AA1
Product designation	TM31 Terminal Module
Power requirement, max. At 24 V DC without taking account of the digital outputs and DRIVE-CLiQ supply	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Digital inputs In accordance with IEC 61131-2 Type 1	
• Voltage	-3 ... +30 V
• Low level (an open digital input is interpreted as "low")	-3 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	10 mA
• Delay times of digital inputs[1], approx.	
- L → H	50 µs
- H → L	100 µs
• Conductor cross-section, max.	1.5 mm^2
Digital outputs (continuously short-circuit proof)	
• Voltage	24 V DC
• Load current per digital output, max.	100 mA
• Total current of digital outputs, max.	400 mA
• Delay times of digital outputs[1]	
- Typ.	150 µs with 0.5 A resistive load
- Max.	500 µs
• Conductor cross-section, max.	1.5 mm^2
Analog inputs (a switch is used to toggle between voltage and current input)	
• As voltage input	
- Voltage range	-10 ... +10 V
- Internal resistance R_i	100 kΩ
- Resolution[2]	11 bit + sign
• As current input	
- Current ranges	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
- Internal resistance R_i	250 Ω
- Resolution[2]	10 bit + sign
• Conductor cross-section, max.	1.5 mm^2

Technical specifications (continued)

Article No.	6SL3055-0AA00-3AA1
Product designation	TM31 Terminal Module
Analog outputs (continuously short-circuit proof)	
• Voltage range	-10 ... +10 V
• Max. load current	-3 ... +3 mA
• Current ranges	4 ... 20 mA, -20 ... +20 mA, 0 ... 20 mA
• Load resistance, max.	500 Ω for outputs in the range -20 ... +20 mA
• Resolution	11 bit + sign
• Conductor cross-section, max.	1.5 mm^2
Relay outputs (changeover contacts)	
• Max. load current	8 A
• Operational voltage, max.	250 V AC, 30 V DC
• Switching capacity, max.	
- At 250 V AC	2000 VA (cos φ = 1) 750 VA (cos φ = 0.4)
- At 30 V DC	240 W (resistive load)
• Required minimum current	100 mA
• Conductor cross-section, max.	2.5 mm^2
Power loss, max.	10 W
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Net weight	0.87 kg (2 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
TM31 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3AA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

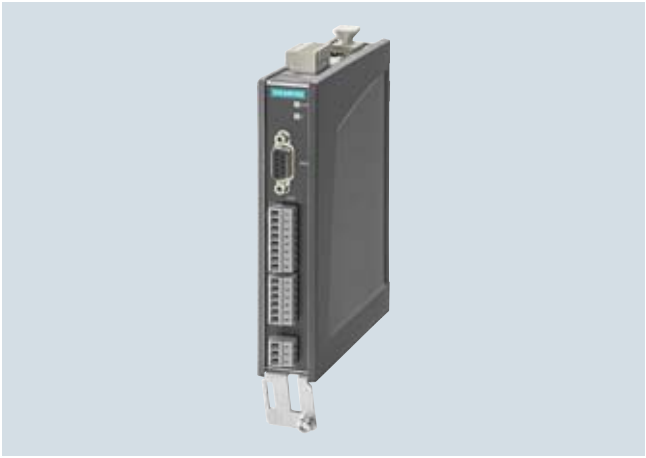
[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{\text{time slice}}$ must be at least twice the value of the highest signal frequency f_{max}.

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TM41 Terminal Module

Overview



TM41 Terminal Module

The TM41 Terminal Module supplies TTL signals which emulate an incremental encoder, e.g. to a higher-level control. The encoder interface (incremental encoder emulation) can be linked to an encoder signal from the Control Unit, e.g. incremental encoder sin/cos, by parameter assignment.

The TM41 Terminal Module increases the number of digital inputs/outputs and analog inputs that are available in the drive system.

Design

The following are located on the TM41 Terminal Module:

- 4 bidirectional digital inputs/outputs
- 4 digital inputs (with electrical isolation)
- 1 analog input
- 1 interface for emulation of TTL incremental encoder (RS422)
- 1 LED for signaling zero mark detection for encoder interface
- 2 DRIVE-CLiQ sockets
- 1 connection for the 24 V DC supply of the digital outputs
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the TM41 Terminal Module is indicated via a multi-color LED.
An LED next to the interface for TTL pulse encoder emulation is illuminated as soon as a zero mark is detected.

The TM41 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield can be connected to the TM41 Terminal Module via a shield connection terminal, e.g. type SK8 supplied by Phoenix Contact or type KLBÜ CO 1 supplied by Weidmüller. The shield connection terminal must not be used as a strain relief mechanism.

Integration

The TM41 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units.

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK Control Unit

[1] The specified delay times refer to the hardware. The actual reaction time depends on the time slot in which the digital input/output is processed.

[2] If the analog input is to be operated in the signal processing sense with continuously variable input voltage, the sampling frequency $f_a = 1/t_{time\ slice}$ must be at least twice the value of the highest signal frequency f_{max}.

Technical specifications

Article No.	6SL3055-0AA00-3PA1
Product designation	TM41 Terminal Module
Power requirement (X524 at DC 24 V) without DRIVE-CLiQ supply or digital outputs (X514)	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
I/O devices	
• Digital inputs/outputs	Individually parameterizable as DI or DO
• Number of digital inputs/outputs	4
• Number of digital inputs/outputs (with isolation)	4
• Connection method	Plug-in screw-type terminals
• Conductor cross-section, max.	1.5 mm^2
Digital inputs	
• Voltage	
- Without electrical isolation	-3 ... +30 V
- With electrical isolation	-30 ... +30 V
• Low level (an open digital input is interpreted as "low")	
- Without electrical isolation	-3 ... +5 V
- With electrical isolation	-30 ... +5 V
• High level	15 ... 30 V
• Current consumption at 24 V DC, typ.	<9 mA
• Delay times of digital inputs, max.[1]	
- L → H	3 ms
- H → L	3 ms
Digital outputs (continuously short-circuit-proof)	
• Voltage	24 V DC
• Load current per digital output, max.	0.5 A
• Delay times (resistive load)[1]	
- L → H, typ.	50 µs
- L → H, max.	100 µs
- H → L, typ.	75 µs
- H → L, max.	150 µs
Analog input (difference)	
• Voltage range	-10 ... +10 V
• Internal resistance	≥100 kΩ
• Resolution[2]	12 bits + sign
Pulse encoder emulation	
• Level	TTL (RS422), A+, A-, B+, B-, zero track N+, N-
• Limit frequency $f_{max.}$	512 kHz
• Ratio Encoder pulses: Encoder emulation	Any number of ratio/ reduction ratio of pulses
Power loss, max.	10 W
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	151 mm (5.94 in)
• Depth	110 mm (4.33 in)
Net weight	0.32 kg (0.71 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
TM41 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3PA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proofblanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

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Overview



TM120 Terminal Module

Four temperature sensors (KTY84-130/PT1000 or PTC) can be evaluated via the TM120 Terminal Module. The temperature sensor inputs are safely electrically separated from the evaluation electronics in the TM120 Temperature Module and are suitable for evaluating the temperature of special motors, e.g. 1FN linear motors and 1FW6 built-in torque motors.

Design

The following are located on the TM120 Terminal Module:

- 4 temperature sensor inputs (KTY84-130/PT1000 or PTC)
- 2 DRIVE-CLiQ sockets
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the TM120 Terminal Module is indicated via a multi-color LED.

The TM120 Terminal Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

Technical specifications

Article No.	6SL3055-0AA00-3KA0
Product designation	TM120 Terminal Module
Power requirement, max. at 24 V DC	0.5 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Temperature sensor inputs The inputs can be individually parameterized to evaluate sensors of type KTY84-130/PT1000 or PTC, or temperature switches	
• Conductor cross-section	0.2 ... 6 mm^2
• Constant current per sensor, approx.	2 mA
• Safe electrical separation up to line voltage, max.	480 V AC
Power loss, typically	2.4 W
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Net weight	0.41 kg (0.90 lb)

Selection and ordering data

Description	Article No.
TM120 Terminal Module Without DRIVE-CLiQ cable	**6SL3055-0AA00-3KA0**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

Integration

The TM120 Terminal Module can communicate via DRIVE-CLiQ with the following Control Units with SINAMICS firmware version V4.3 and higher:

- CU310-2 Control Unit
- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

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VSM10 Voltage Sensing Module

Overview



VSM10 Voltage Sensing Module

The VSM10 Voltage Sensing Module can detect the exact line voltage characteristic and supports fault-free operation of Line Modules when power supply conditions are unfavorable, e.g. with severe voltage fluctuations or short-time interruptions.

The VSM10 Voltage Sensing Module is integrated in chassis format Active Interface Modules and in the chassis format Smart Line Modules. It can be used optionally with all booksize format Active Line Modules and 16 kW or 36 kW Smart Line Modules.

Design

The VSM10 Voltage Sensing Module has the following connections and interfaces:

- 1 connection for direct line voltage detection up to 690 V
- 1 connection for line voltage detection using voltage transformers, maximum voltage 100 V
- 2 analog inputs (reserved for resonance monitoring in Active Interface Modules in chassis format)
- 1 temperature sensor input (KTY84-130/PT1000 or PTC)
- 1 DRIVE-CLiQ socket
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the VSM10 Voltage Sensing Module is indicated via a two-color LED.

The VSM10 Voltage Sensing Module can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

Integration

The VSM10 Voltage Sensing Module can communicate via DRIVE-CLiQ with the following Control Units:

- CU320-2 Control Unit
- SINUMERIK 840D sl with
  - NCU 710.3B PN
  - NCU 720.3B PN
  - NCU 730.3B PN
  - Numeric Control Extensions NX10.3/NX15.3

Technical specifications

Article No.	6SL3053-0AA00-3AA1
Product designation	VSM10 Voltage Sensing Module
Power requirement, max. at 24 V DC	0.2 A
• Conductor cross-section, max.	2.5 mm^2
Power loss, max.	10 W
Line voltage detection	
• Insulation resistance, neutral point – ground when the jumper is not inserted:	> 10 MΩ
• Input resistance	
- Terminal X521	> 362 kΩ/phase
- Terminal X522	> 2.5 MΩ/phase
Analog inputs (reserved for monitoring an Active Interface Module in chassis format)	
• Internal resistance, approx. (between differential inputs)	100 kΩ
• Resolution	12 bit
PE connection	M4 screw
Dimensions	
• Width	50 mm (1.97 in)
• Height	150 mm (5.910in)
• Depth	111 mm (4.37 in)
Net weight	0.9 kg (2 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
VSM10 Voltage Sensing Module Without DRIVE-CLiQ cable	**6SL3053-0AA00-3AA1**
Accessories for re-ordering	
SINAMICS/SINUMERIK/SIMOTION dust-proof blanking plugs For DRIVE-CLiQ port	
• 6 units	**6SL3066-4CA01-0AA0**
• 50 units	**6SL3066-4CA00-0AA0**

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Overview



Hydraulic Linear Actor (HLA module)

The 2-axis HLA module is a DRIVE-CLiQ component for control cabinet installation.

- From a topology viewpoint, the HLA module can be viewed as a hydraulic double-axis Motor Module. The HLA module is an interface module for the I/O components of a hydraulic linear drive.
- The HLA module therefore functions in a similar way to a Terminal Module. This module can be used for a variety of different purposes in the SINAMICS S120 drive line-up.

Benefits

- Closed-loop control for up to two hydraulic axes
- Parallel operation of hydraulic and electrical drives
- Closed-loop velocity and force control
- Safety Integrated functions

Application

- Presses
- Rotary indexing machines
- Forming machines
- Bending technology

Function

The HLA module has been designed to control (open-loop and closed-loop) electro-hydraulic control valves of hydraulic linear axes in conjunction with the SINUMERIK 840D sl. Up to two hydraulic axes can be controlled by this module.

To control a hydraulic linear drive, a control unit is required in addition to the HLA module. This unit can be either the NCU 7x0.3B PN, an NX or a CU320-2 Control Unit which operates under the control of a SINUMERIK 840D sl system. By combining a control unit with the HLA module, it is possible to create a highly dynamic, electro-hydraulic control circuit. A hydraulic linear axis can be combined and interpolated with other hydraulic or electrical axes on one SINUMERIK 840D sl.

The HLA module requires a 24 V supply. This power supply is used to internally supply the HLA module and is also required by various sensors.

The HLA module generates the power supply for the control valves and the shutoff valves from an external DC voltage supply (e.g. SITOP) with a rated voltage of 26.5 V.

The purely hydraulic components, designed for CNC operation, must be supplied by the user.

Function (continued)

Interfaces:

- 4 DRIVE-CLiQ sockets
- 1 × 24 V for the electronics power supply
- 1 × 26.5 V to supply the hydraulic components
- 2 TTL/SSI encoder connections (1 per axis)
- 6 pressure sensor inputs (3 per axis)
- 2 control valve connections (1 per axis)
- 2 shutoff valve outputs (1 per axis)
- 2 terminals for valve spool sensors of the shutoff valves (1 per axis)
- 2 EP terminals (1 per axis)

Technical specifications

Article No.		6SL3420-2HX00-0AA0
Product designation		Hydraulic Linear Actor (HLA module)
Electronics power supply		
• Voltage	V_{DC}	20.4 ... 28.8 (24 – 15 % + 20 %)
• Current, max.	A_{DC}	1.1
• Power loss, max.	W	12
Supply of hydraulic components		
• DC voltage	V_{DC}	26 ... 27 (26.5 ± 2 %)
• Direct current, max.	A_{DC}	8.5 A
• Temperature range	°C (°F)	0 ... 55 (32 ... 131) (with derated output current for the control valves)
Max. cable lengths • to valves • to sensors • to encoder (SSI, TTL)	m (ft)	40 (131)
DRIVE-CLiQ cables/ encoders	m (ft)	100 (328)
24 V, 26.5 V and EP terminals	m (ft)	10 (32.8)
PE/ground connection		At the housing with M5/3 Nm screw
Net weight (without mating connector)	kg (lb)	1.75 (3.86)
Degree of protection		IP20
Environmental conditions		
Climatic environmental conditions		
• Long-term storage in the transport packaging		Class 1K4 to EN 60721-3-1 Temperature: -25 ... +55 °C (-13 ... +131 °F)
• Transport in the transport packaging		Class 2K4 acc. to EN 60721-3-2 Temperature: -40 ... +70 °C (-40 ... +158 °F)
• Operation		Temperature: 0 ... 55 °C (32 ... 131 °F)[1)2)] Relative humidity: 5 ... 95 % Oil mist, salt mist, ice formation, condensation, dripping water, spraying water, splashing water and water jets are not permitted

Selection and ordering data

Description	Article No.
Hydraulic Linear Actor (HLA module) 2-axis controller Two-axis version (can also be used for single-axis drives) With one measuring system for direct position sensing per axis	**6SL3420-2HX00-0AA0**

1) Current derating above 40 °C (104 °F) at the control valve output

2) At altitudes exceeding 1500 m (4921 ft) above sea level, the upper temperature limit must be reduced by 3.5 °C (38.3 °F) / 500 m (1640 ft).

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Safe Brake Relay

Overview



Safe Brake Relay

With the Safe Brake Relay the brake is controlled in accordance with IEC 61508 SIL 2 and EN ISO 13849-1.

Design

The Safe Brake Relay can be installed below the Power Module on the shield connection plate.

The Safe Brake Relay has the following connections and interfaces:

- 1 two-channel transistor output stage to control the motor brake solenoid
- 1 connection for the cable harness (CTRL) to the Power Module in blocksize format
- 1 connection for the 24 V DC power supply

The connection between the 24 V DC supply and the Safe Brake Relay must be kept as short as possible.

The scope of supply of a Safe Brake Relay includes the following:

- 2 cable harnesses for connecting to the CTRL socket of the Power Module
  - Length 0.32 m (1.05 ft) for frame sizes FSA to FSC
  - Length 0.55 m (1.80 ft) for frame sizes FSD to FSF

Integration

The 24 V DC solenoid of the motor brake is directly connected to the Safe Brake Relay. External surge suppressors are not required.

Technical specifications

Article No.	6SL3252-0BB01-0AA0
Product designation	Safe Brake Relay
Power supply	20.4 ... 28.8 V DC Recommended rated supply voltage 26 V DC (to compensate for voltage drop in feeder cable to 24 V DC motor brake solenoid)
Power requirement, max.	
• Motor brake	2 A
• at 24 V DC	0.05 A + power requirement of motor brake
Conductor cross-section, max.	2.5 mm^2
Dimensions	
• Width	69 mm (2.71 in)
• Height	63 mm (2.48 in)
• Depth	33 mm (1.3 in)
Net weight	0.17 kg (0.37 lb)

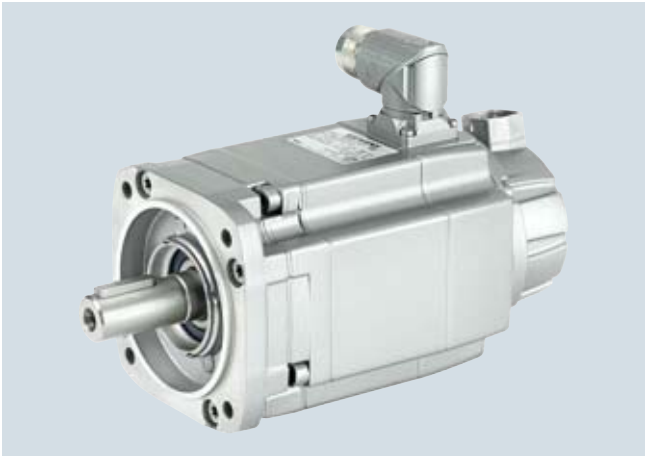
Selection and ordering data

Description	Article No.
Safe Brake Relay Including cable harness for connection to Power Module	**6SL3252-0BB01-0AA0**

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Overview

Motors with DRIVE-CLiQ interface



DRIVE-CLiQ is the preferred method for connecting the encoder systems to SINAMICS S120.

Motors with DRIVE-CLiQ interface are available for this purpose, e.g.

- 1PH8/1FT7/1FK7 synchronous motors
- 1PH8 asynchronous motors (induction motors)

Motors with a DRIVE-CLiQ interface can be directly connected to the associated Motor Module via the available MOTION-CONNECT DRIVE-CLiQ cables. The connection of the MOTION-CONNECT DRIVE-CLiQ cable at the motor has degree of protection IP67.

The DRIVE-CLiQ interface supplies power to the motor encoder via the integrated 24 V DC supply and transfers the motor encoder and temperature signals and the electronic rating plate data, e.g. a unique identification number, rating data (voltage, current, torque) to the Control Unit. This means that for the various encoder types – e.g. resolver or absolute encoder – different encoder cables with varying permissible lengths are now no longer required; just one cable type, MOTION-CONNECT DRIVE-CLiQ with varying permissible lengths, can be used for all encoders.

Motors with DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor and encoder type are identified automatically.

Motors without DRIVE-CLiQ interface

The encoder and temperature signals of motors without DRIVE-CLiQ interface, as well as those of external encoders, must be connected via Sensor Modules. Sensor Modules Cabinet-Mounted are available in degree of protection IP20 for control cabinet installation, as well as Sensor Modules External in degree of protection IP67.

Only one encoder system can be connected to each Sensor Module.

Technical specifications

Motors with DRIVE-CLiQ interface

Built-in encoder systems	• Incremental encoder 22 bit (resolution 4,194,304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ) • Absolute encoder 22 bit single-turn (resolution 4,194,304, internal 2048 S/R) + 12 bit multi-turn (traversing range 4096 revolutions) (encoder AM22DQ) • Absolute encoder 20 bit single-turn (resolution 1,048,576, internal 512 S/R) + 12 bit multi-turn (traversing range 4096 revolutions) (encoder AM20DQ) • Absolute encoder 16 bit single-turn (resolution 65,536, internal 32 S/R) + 12 bit multi-turn (traversing range 4096 revolutions) (encoder AM16DQ) • Absolute encoder 15 bit single-turn (resolution 32,768, internal 16 S/R) + 12 bit multi-turn (traversing range 4096 revolutions) (encoder AM15DQ) • Resolver 15 bit (resolution 32,768, internal, multi-pole) (R15DQ) • Resolver 14 bit (resolution 16,384, internal, 2-pole) (R14DQ)
Power requirement at 24 V DC, max. (supply via MOTION-CONNECT DRIVE-CLiQ cable)	190 mA
Cable length, max.	
• When using MOTION-CONNECT 500 DRIVE-CLiQ cables	100 m (328 ft)
• When using MOTION-CONNECT 800 DRIVE-CLiQ cables	50 m (164 ft)

More information

Motor encoder and temperature signals must be connected when possible to the corresponding Motor Module or Power Module and external encoders to the Control Unit. However, the DRIVE-CLiQ connections can also be bundled via DRIVE-CLiQ Hub Modules.

Safety Integrated

The Safety Integrated Extended Functions of the SINAMICS S120 drive system require suitable encoders.

Motor driven by belt

Unfavorable material combinations generate static electricity between the belt pulley and the belt. Electrostatic charging must be prevented, since this can discharge via the motor shaft and the encoder, thereby causing disturbances in the encoder signals. One remedy is to use an anti-static belt.

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SMC10 Sensor Module Cabinet-Mounted

Overview



SMC10 Sensor Module Cabinet-Mounted

The SMC10 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC10.

The following encoder signals can be evaluated:

- 2-pole resolver
- Multi-pole resolver

Design

The SMC10 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 encoder connection including motor temperature detection (KTY84-130/PT1000 or PTC) via SUB-D connector
- 1 DRIVE-CLiQ interface
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the SMC10 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC10 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield is connected via the encoder system connector and can also be connected to the SMC10 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1. The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC10 Sensor Modules Cabinet-Mounted communicate with a Control Unit via DRIVE-CLiQ.

Technical specifications

Article No.	6SL3055-0AA00-5AA3
Product designation	SMC10 Sensor Module Cabinet-Mounted
Power requirement, max. at 24 V DC, without considering encoder	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• 2-pole resolver • Multi-pole resolver
• Excitation voltage, rms	4.1 V
• Excitation frequency	5 ... 10 kHz depending on the current controller clock cycle of the Motor Module or Power Module
• Transformation ratio	0.5
• Encoder frequency, max.	2 kHz (120000 rpm) depending on the number of resolver pole pairs and current controller clock cycle of the Motor Module or Power Module
• Signal subdivision (interpolation), max.	16384 times (14 bit)
• Cable length to encoder, max.	130 m (427 ft)
PE connection	M4 screw
Dimensions	
• Width	30 mm (1.18 in)
• Height	150 mm (5.91 in)
• Depth	111 mm (4.37 in)
Net weight	0.4 kg (0.88 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
SMC10 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5AA3**

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Overview



SMC20 Sensor Module Cabinet-Mounted

The SMC20 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC20.

The following encoder signals can be evaluated:

- Incremental encoder sin/cos 1 V_{pp}
- Absolute encoder EnDat 2.1
- SSI encoder with incremental signals sin/cos 1 V_{pp} (as of firmware version V2.4)

The motor temperature can also be detected using KTY84-130/PT1000 or PTC.

Design

The SMC20 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 DRIVE-CLiQ interface
- 1 encoder connection including motor temperature detection (KTY84-130/PT1000 or PTC) via SUB-D connector
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the SMC20 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

SMC20 Sensor Modules Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The signal cable shield is connected via the encoder system connector and can also be connected to the SMC20 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g. Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1.

The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC20 Sensor Modules Cabinet-Mounted communicate with a Control Unit via DRIVE-CLiQ.

Technical specifications

Article No.	6SL3055-0AA00-5BA3
Product designation	SMC20 Sensor Module Cabinet-Mounted
Power requirement at 24 V DC, max. without considering encoder	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• Incremental encoder sin/cos 1 V_{pp} • Absolute encoder EnDat • SSI encoder with incremental signals sin/cos 1 V_{pp} (as of firmware version V2.4)
• Encoder supply DC	5 V/0.35 A
• Encoder frequency incremental signals, max.	500 kHz
• Signal subdivision (interpolation), max.	16384 times (14 bit)
• SSI baud rate	100 kBaud
Cable length to encoder, max.	100 m (328 ft)
PE connection	M4 screw
Width	30 mm (1.18 in)
Height	150 mm (5.91 in)
Depth	111 mm (4.37 in)
Net weight	0.45 kg (0.99 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
SMC20 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5BA3**

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SMC30 Sensor Module Cabinet-Mounted

Overview



SMC30 Sensor Module Cabinet-Mounted

The SMC30 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC30.

The following encoder signals can be evaluated:

- Incremental encoders TTL/HTL with and without wire break detection (wire break detection is only available with bipolar signals)
- SSI encoders with TTL/HTL incremental signals
- SSI encoders without incremental signals

The motor temperature can also be detected using KTY84-130/PT1000 or PTC.

Design

The SMC30 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 1 DRIVE-CLiQ interface
- 1 encoder connection including motor temperature detection (KTY84-130/PT1000 or PTC) via SUB-D connector or terminals
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the SMC30 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC30 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The maximum signal cable length between SMC30 modules and encoders is 100 m (328 ft). For HTL encoders, this length can be increased to 300 m (984 ft) if the A+/A- and B+/B- signals are evaluated and the power supply cable has a minimum cross-section of 0.5 mm^2.

The signal cable shield can be connected to the SMC30 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g., Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1.

The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC30 Sensor Modules Cabinet-Mounted communicate with a Control Unit via DRIVE-CLiQ.

Technical specifications

Article No.	6SL3055-0AA00-5CA2
Product designation	SMC30 Sensor Module Cabinet-Mounted
Power requirement at 24 V DC, max. without considering encoder	0.2 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	10 W
Encoders which can be evaluated	• Incremental encoder TTL/HTL • SSI encoder with TTL/HTL incremental signals • SSI encoder without Incremental signals
• Input impedance	
- TTL	570 Ω
- HTL, max.	16 mA
• Encoder supply DC	24 V/0.35 A or 5 V/0.35 A
• Encoder frequency, max.	300 kHz
• SSI baud rate	100 … 250 kBaud
• Resolution absolute position SSI	30 bit
Cable length, max.	
• TTL encoder	100 m (328 ft) only bipolar signals permitted[1)]
• HTL encoder	100 m (328 ft) for unipolar signals 300 m (984 ft) for bipolar signals[1)]
• SSI encoder	100 m (328 ft)
PE connection	M4 screw
Width	30 mm (1.18 in)
Height	150 mm (5.91 in)
Depth	111 mm (4.37 in)
Net weight	0.45 kg (0.99 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
SMC30 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5CA2**

[1)] Signal cables twisted in pairs and shielded.

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Overview



SMC40 Sensor Module Cabinet-Mounted

The SMC40 Sensor Module Cabinet-Mounted is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface. External encoders can also be connected via the SMC40.

The following encoder signals can be evaluated:

- Absolute encoder EnDat 2.2

Design

The SMC40 Sensor Module Cabinet-Mounted features the following connections and interfaces as standard:

- 2 DRIVE-CLiQ interfaces
- 2 encoder system interfaces
- 1 connection for the electronics power supply via the 24 V DC supply connector
- 1 PE connection

The status of the SMC40 Sensor Module Cabinet-Mounted is indicated via a multi-color LED.

The SMC40 Sensor Module Cabinet-Mounted can be snapped onto a TH 35 standard mounting rail in accordance with EN 60715 (IEC 60715).

The maximum signal cable length between the SMC40 and encoder system is 100 m (328 ft). The specified supply voltage of the encoder must be observed. The maximum DRIVE-CLiQ cable length is 30 m (98 ft).

The signal cable shield can be connected to the SMC40 Sensor Module Cabinet-Mounted via a shield connection terminal, e.g., Phoenix Contact type SK8 or Weidmüller type KLBÜ CO 1.

The shield connection terminal must not be used as a strain relief mechanism.

Integration

SMC40 Sensor Modules Cabinet-Mounted communicate with a Control Unit via DRIVE-CLiQ.

Technical specifications

Article No.	6SL3055-0AA00-5DA0
Product designation	SMC40 Sensor Module Cabinet-Mounted
Power requirement at 24 V DC, max. without considering encoder	0.1 A
• Conductor cross-section, max.	2.5 mm^2
• Fuse protection, max.	20 A
Power loss, max.	4 W
Encoders which can be evaluated	Absolute encoder EnDat 2.2
PE connection	M4 screw
Width	30 mm (1.18 in)
Height	150 mm (5.91 in)
Depth	111 mm (4.37 in)
Net weight	0.45 kg (0.99 lb)
Certificate of suitability	cULus

Selection and ordering data

Description	Article No.
SMC40 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	**6SL3055-0AA00-5DA0**

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SME20/SME25 Sensor Modules External

Overview



SME20/SME25 Sensor Module External

SME20/SME25 Sensor Modules External are encoder evaluation units for machine encoders (direct measuring systems).
The enclosures are designed with IP67 degree of protection. This means that the units can be installed outside the control cabinet near the machine encoder.

The following encoder signals can be evaluated:

- Incremental encoder sin/cos 1 V_{pp} without rotor position track (C and D tracks)
- Absolute encoder EnDat 2.1
- SSI absolute encoder[1)] with incremental signals sin/cos 1 V_{pp} (firmware V2.4 and later)

It is possible to connect a motor with a 17-pole circular encoder connector to the 12-pole circular connector of the SME20 using adapter cable 6FX8002-2CA88-...

- KTY/PT1000/PTC temperature sensors can be used for motor temperature evaluation (only possible with SME20).
- The Sensor Module is only suitable for motors without absolute track signals (C and D tracks), e.g.:
  - Synchronous motors with pole position identification (1FN, 1FW)
  - Asynchronous motors (1PH)

SME20/SME25 Sensor Modules External evaluate the encoder signals and convert the information obtained to DRIVE-CLiQ. Neither motor nor encoder data are saved in the SME20/SME25.

Design

SME20/SME25 Sensor Modules External feature the following connections and interfaces as standard:

- 1 encoder connector via circular connector
- 1 DRIVE-CLiQ interface with integrated 24 V DC electronics power supply from the Control Unit or Motor Module
- 1 PE connection

Integration

SME20/SME25 Sensor Modules External communicate with a Control Unit via DRIVE-CLiQ.

[1)] For SME25, only SSI encoders with 5 V supply voltage.

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Technical specifications

Article No.		6SL3055-0AA00-5EA3	6SL3055-0AA00-5HA3
Product designation		SME20 Sensor Module External	SME25 Sensor Module External
Encoder		• Incremental encoder sin/cos 1 V_{pp} with 5 V voltage supply 0.35 A	• Absolute encoder EnDat with 5 V voltage supply 0.35 A • Absolute encoders SSI with incremental signals sin/cos 1 V_{pp} with 5 V voltage supply 0.35 A
Signal subdivision (interpolation)		≤ 16384 times (14 bit)	≤ 16384 times (14 bit)
Max. encoder frequency that can be evaluated	kHz	≤ 500	≤ 500
SSI/EnDat 2.1 baud rate	kHz	–	100
Measuring system interface		12-pin M23 circular connector	17-pin M23 circular connector
Output		IP67 DRIVE-CLiQ connector	IP67 DRIVE-CLiQ connector
Power requirement, max. At 24 V DC, without considering encoder	A	0.11	0.11
• Conductor cross-section		According to connector contacts	According to connector contacts
• Fuse protection		Via DRIVE-CLiQ power supply source	Via DRIVE-CLiQ power supply source
Power loss, max.	W	4	4
PE connection		M4 screw/1.8 Nm	M4 screw/1.8 Nm
Cable length, max.			
• To measuring system[1)]	m (ft)	3 (9.84)	3 (9.84)
• To automatic speed control	m (ft)	100 (328)	100 (328)
Degree of protection		IP67	IP67
Dimensions			
• Width	mm (in)	58 (2.28)	58 (2.28)
• Height	mm (in)	44 (1.73)	44 (1.73)
• Depth	mm (in)	112 (4.41)	112 (4.41)
Net weight	kg (lb)	0.31 (0.68)	0.31 (0.68)
Certificate of suitability		cULus	cULus

Selection and ordering data

Description	Article No.
SME20 Sensor Module External For incremental measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5EA3**
SME25 Sensor Module External For absolute measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5HA3**
Accessories	
Adapter cable[2)] For SME20 to connect motors with 17-pole encoder connector to encoders without C and D tracks.	**6FX8002-2CA88-....**

1) The maximum cable length for the encoder system interface depends on the current consumption of the encoder system and the cross-section of the wires in the cable. However, the maximum length is 10 m (32.8 ft) (for further details see Manual SINAMICS S120 Control Units and Supplementary System Components).

2) For length code, see MOTION-CONNECT connection systems.

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Overview



SME120/SME125 Sensor Module External

The SME120/SME125 Sensor Modules External are encoder evaluation units with degree of protection IP67, especially suitable for use in linear and torque motor applications. They can be installed close to the motor systems and encoders in the machine.

Sensor Modules External evaluate the encoder signals and motor temperature sensors specifically and convert the information obtained for DRIVE-CLiQ. The motor temperature signals are safely electrically separated.

A Hall-effect sensor box can be connected for the SME120 to determine the commutation position of a linear motor.

Neither motor nor encoder data are saved in the SME120/SME125.

The SME120 and SME125 can be operated on Control Units with firmware release V2.4 and later.

The following encoder signals can be evaluated depending on the type of Sensor Module:

- Incremental encoder sin/cos 1 V_{pp}
- Absolute encoder EnDat 2.1
- SSI absolute encoder[1)] with sin/cos 1 V_{pp} incremental signals, but without reference signal

The motor temperature can also be detected using KTY84-130, PT1000 or PTC thermistors.

Design

SME120/SME125 Sensor Modules External feature the following connections and interfaces as standard:

- 1 encoder connector via circular connector
- 1 temperature sensor connection via circular connector
- 1 Hall-effect sensor connection via circular connector (SME120 only)
- 1 DRIVE-CLiQ interface with integrated 24 V DC electronics power supply from the Control Unit or Motor Module
- 1 PE connection

1) For SME125, only SSI encoders with 5 V supply voltage.

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Technical specifications

Article No.		6SL3055-0AA00-5JA3	6SL3055-0AA00-5KA3
Product designation		SME120 Sensor Module External	SME125 Sensor Module External
Encoder		• Incremental encoder sin/cos 1 V_{pp} with 5 V voltage supply	• Absolute encoder EnDat with 5 V voltage supply • Absolute encoders SSI with incremental signals sin/cos 1 V_{pp} with 5 V voltage supply
Signal subdivision (interpolation)		≤ 16384 times (14 bit)	≤ 16384 times (14 bit)
Max. encoder frequency that can be evaluated	kHz	≤ 500	≤ 500
SSI/EnDat 2.1 baud rate	kHz	–	100
Measuring system interface		12-pin M23 circular connector	17-pin M23 circular connector
Temperature sensor input		6-pin M17 circular connector	6-pin M17 circular connector
Hall-effect sensor input		9-pin M23 circular connector	–
Output		IP67 DRIVE-CLiQ connector	IP67 DRIVE-CLiQ connector
Power requirement, max. at 24 V DC, without considering encoder	A	0.16	0.16
• Load rating of encoder power supply, for measuring system (at 5 V DC) and, where applicable, including Hall-effect sensor box	A	0.35	0.35
• Conductor cross-section		According to connector contacts	According to connector contacts
• Fuse protection		Via DRIVE-CLiQ power supply source	Via DRIVE-CLiQ power supply source
Power loss, max.	W	4.5	4.5
PE connection		M4 screw/1.8 Nm	M4 screw/1.8 Nm
Cable length, max.			
• To measuring system[1] / temperature sensor	m (ft)	3 (9.84)	3 (9.84)
• To automatic speed control	m (ft)	100 (328)	100 (328)
Degree of protection		IP67	IP67
Dimensions			
• Width	mm (in)	117.6 (4.63)	117.6 (4.63)
• Height	mm (in)	44 (1.73)	44 (1.73)
• Depth	mm (in)	127 (5)	127 (5)
Net weight	kg (lb)	0.7 (1.54)	0.7 (1.54)
Certificate of suitability		cULus	cULus

Selection and ordering data

Description	Article No.
SME120 Sensor Module External For incremental measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5JA3**
SME125 Sensor Module External For absolute measuring systems Without DRIVE-CLiQ cable	**6SL3055-0AA00-5KA3**

Description	Article No.
Accessories	
Connector for temperature sensor input (connector kits, 6+1-pole)	**6FX2003-0SU07**
Connector for Hall-effect sensor input (connector kits, 9-pole)	**6FX2003-0SU01**
Connector for SME120 encoder system interface (connector kits, 12-pole)	**6FX2003-0SA12**
Connector for SME125 encoder system interface (connector kits, 17-pole)	**6FX2003-0SA17**

[1] The maximum cable length for the encoder system interface depends on the current consumption of the encoder system and the cross-section of the wires in the cable. However, the maximum length is 10 m (32.8 ft) (for further details see Manual SINAMICS S120 Control Units and Supplementary System Components).

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Overview

Encoder type	Interface	Safety Integrated[1]	Accuracy in angular seconds	Resolution	Degree of protection without/with shaft input
Incremental encoders 	sin/cos 1 V_{pp}	Yes	± 18 mech. × 3600/ PPR count *z*	2500 S/R	IP67/IP64
	RS422 (TTL)	[2]	± 18 mech. × 3600/ PPR count *z*	5000 S/R	IP67/IP64
	HTL	[2]	± 18 mech. × 3600/ PPR count *z*	2500 S/R	IP67/IP64
	RS422 (TTL) double track	[2]	Track 1: ± 63 Track 2: ± 12	Track 1: 1024 S/R Track 2: 9000 S/R	IP67/IP64
Absolute encoders 	DRIVE-CLiQ	[2]	± 36	Single-turn 22 bit Multi-turn 34 bit (22 bit single-turn + 12 bit multi-turn)	IP67/IP64
	SSI	[2]	± 79 (with 8192 steps)	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	IP67/IP64
	EnDat	Yes	± 60 (incremental track)	Single-turn 13 bit (8192 steps) Multi-turn 25 bit (8192 steps × 4096 revolutions)	IP67/IP64
	PROFIBUS DP	[2]	± 79 (with 8192 steps)	Single-turn 13 bit (8192 steps) Multi-turn 27 bit (8192 steps × 16384 revolutions)	IP67/IP64
	PROFINET IO	[2]	± 79 (with 8192 steps)	Single-turn 13 bit (8192 steps) Multi-turn 27 bit (8192 steps × 16384 revolutions)	IP67/IP64

S/R = signals/revolution

Power supply

The measuring systems only fulfil the requirements stipulated in the standard IEC 61010-1 if the power is supplied from a secondary circuit with limited power according to IEC 61010-1[3rd Ed.], Section 9.4 or with limited power according to IEC 60950-1[2nd Ed.], Section 2.5, or from a secondary circuit Class 2 according to UL1310. You can also use the corresponding sections of the standards DIN EN 61010-1, EN 61010-1, UL 61010-1 and CAN/CSA-C22.2 No. 61010-1 instead of the standard IEC 61010-1[3rd Ed.], Section 9.4, respectively the corresponding sections of the standards DIN EN 60950-1, EN 60950-1, UL 60950-1 and CAN/CSA-C22.2 No. 60950-1 instead of the standard IEC 60950-1[2nd Ed.], Section 2.5.

[1] Built-on rotary encoders can be used for Safety Integrated.

[2] If you require information about the usability of built-on rotary encoders for Safety Integrated, please contact your local Siemens office.

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Overview



The built-on optoelectronic rotary encoders sense distances, angles of rotation or speeds in machines. They can be used in conjunction with numerical control systems, programmable logic controllers, drives and position displays, e.g. for:

- SINUMERIK CNC controls
- SIMOTION Motion Control Systems
- SIMATIC programmable logic controllers
- SINAMICS drive systems

Application

A distinction is made between incremental and absolute measuring procedures:

- In the case of incremental encoders, the machine must travel to a reference point after each power-off state, as the position is not usually stored in the controller, and movements of the machine while the power is off are not recorded.
- Absolute encoders, on the other hand, also record these movements while the power is off and return the actual position after power on. Travel to a reference point is not necessary.

Design

All encoders are available in Synchro flange and clamp flange versions. Encoders with a Synchro flange can be attached to the machine with 3 clamps or mounted with axial screws. The encoder is driven by means of a plug-in coupling or a spring disk coupling. Alternatively, pulleys can also be used.

The encoder supply voltage is 5 V DC or alternatively 10 V to 30 V DC. The 10 V to 30 V DC version supports longer cable lengths. Most control systems supply the voltage directly at the measuring circuit connector. With SINAMICS, the power supply for the measuring systems is provided via the Sensor Modules.

For rotary encoders with cables, the cable length including the connector is 1 m (3.28 ft).

The following bending radii must be observed for the cable to the encoder:

- One-time bending: ≥ 20 mm (0.79 in)
- Continuous bending: ≥ 75 mm (2.95 in)

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Function



Incremental encoder (sin/cos 1 V_{pp}/RS422/HTL) with cable and connector, clamp flange or Synchro flange

Incremental encoders deliver a defined number of electrical pulses per revolution, which represent the measurement of the traveled distance or angle.

Incremental encoders operate on the principle of optoelectronic scanning of dividing discs with the transmitted light principle. The light source is a light emitting diode (LED). The light-dark modulation generated as the encoder shaft rotates is picked up by photoelectronic elements. With an appropriate arrangement of the line pattern on the dividing disk connected to the shaft and the fixed aperture, the photoelectronic elements provide two trace signals A and B at 90° to one another, as well as a reference signal R. The encoder electronics amplify these signals and convert them into different output levels.

The following output levels are available:

- Analog signals sin/cos with level 1 V_{pp}
  In order to obtain a finer resolution, in the case of encoders with sinusoidal signals, these signals are interpolated in the higher-level controller.
- RS422 difference signals (TTL)
  In the case of RS422 incremental encoders (TTL), the resolution can be improved by a factor of four by means of edge evaluation.
- HTL (High Voltage Transistor Logic)
  Encoders with an HTL interface are designed for applications with digital inputs with 24 V level.

Technical specifications

Article No.		6FX2001-3....	6FX2001-2....	6FX2001-4...0	6FX2001-2UK00
Product designation		Incremental encoder with sin/cos 1 V_{pp}	Incremental encoder with RS422 (TTL)	Incremental encoder with HTL	Double-track incremental encoder with RS422 (TTL)
Operating voltage DC V_p on encoder	V	5 ± 10 %	5 ± 10 % or 10 ... 30	10 ... 30	5 ± 5 %
Limit frequency, typ.	kHz	≥ 100 (- 3 dB) ≥ 200 (- 6 dB)	–	–	–
Scanning frequency, max.	kHz	–	300	300	Track 1: 160 Track 2: 1000
No-load current consumption, max.	mA	150	150	150	Track 1: 150 Track 2: 150
Signal level		Sinusoidal 1 V_{pp}	RS422 (TTL)	V_H ≥ 21 V with I_H = 20 mA at 24 V V_L ≤ 2.8 V with I_L = 20 mA at 24 V	RS422 (TTL)
Outputs protected against short circuit to 0 V		Yes	Yes	Yes	Yes
Switching time (10 … 90 %) rise/fall time t_+/t_- (for 1 m (3.28 ft) cable and recommended input circuit)	ns	–	≤ 50	≤ 200	≤ 100
Phase angle, signal A to B Edge spacing, min.	Degrees	90 ± 10	90	90	90
• At 160 kHz	µs	–	–	–	Track 1: ≥ 0.8
• At 300 kHz	µs	–	≥ 0.45	≥ 0.45	–
• At 1 MHz	µs	–	–	–	Track 2: ≥ 0.125
Cable length to downstream electronics, max. [1]	m (ft)	150 (492)	100 (328)	300 (984)	Up to 500 kHz: 100 (328) Up to 1 MHz: 50 (164)
LED failure monitoring		–	High-resistance driver	High-resistance driver	–
Resolution, max.	S/R	2500	5000	2500	Track 1: 1024 Track 2: 9000
Accuracy	arcsec	± 18 mech. × 3600/ PPR count z	± 18 mech. × 3600/ PPR count z	± 18 mech. × 3600/ PPR count z	Track 1: ± 63 Track 2: ± 12

[1] With recommended cable and input circuitry of the downstream electronics, observe max. permissible cable length of module to be evaluated.

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Technical specifications (continued)

Article No.		6FX2001-3....	6FX2001-2....	6FX2001-4...0	6FX2001-2UK00
Product designation		Incremental encoder with sin/cos 1 V_{pp}	Incremental encoder with RS422 (TTL)	Incremental encoder with HTL	Double-track incremental encoder with RS422 (TTL)
Speed, max.					
• Electrical	rpm	(18×10^6 rpm)/ PPR count (at - 6 dB)	(18×10^6 rpm)/ PPR count	(18×10^6 rpm)/ PPR count	Track 1: 9000 Track 2: 6500
• Mechanical	rpm	12000	12000	12000	12000
Friction torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Starting torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Shaft loading capacity					
• $n \leq 6000$ rpm					
- Axial	N (lb_f)	40 (8.99)	40 (8.99)	40 (8.99)	10 (2.25)
- Radial at shaft extension	N (lb_f)	60 (13.5)	60 (13.5)	60 (13.5)	20 (4.50)
• $n > 6000$ rpm					
- Axial	N (lb_f)	10 (2.25)	10 (2.25)	10 (2.25)	–
- Radial at shaft extension	N (lb_f)	20 (4.50)	20 (4.50)	20 (4.50)	–
Shaft diameter					
• Synchro flange	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)	–
Shaft length					
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)	15 (0.59)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)	20 (0.79)	–
Angular acceleration, max.	rad/s^2	10^5	10^5	10^5	10^5
Moment of inertia of rotor	kgm^2 (lb_f-in-s^2)	1.45×10^{-6} (12.8×10^{-6})	1.45×10^{-6} (12.8×10^{-6})	1.45×10^{-6} (12.8×10^{-6})	20×10^{-6} (177×10^{-6})
Vibration (55 … 2000 Hz) acc. to EN 60068-2-6	m/s^2 (ft/s^2)	≤ 300 (984)	≤ 300 (984)	≤ 300 (984)	≤ 100 (328)
Shock acc. to EN 60068-2-27					
• 2 ms	m/s^2 (ft/s^2)	≤ 2000 (6562)	≤ 2000 (6562)	≤ 2000 (6562)	–
• 6 ms	m/s^2 (ft/s^2)	≤ 1000 (3281)	≤ 1000 (3281)	≤ 1000 (3281)	≤ 1000 (3281)
Degree of protection acc. to EN 60529 (IEC 60529)					
• Without shaft input		IP67	IP67	IP67	IP67
• With shaft input		IP64	IP64	IP64	IP64
Ambient temperature					
Operation					
• Flange outlet or fixed cable					
- At V_p = 5 V ± 10 %	°C (°F)	-40 ... +100 (-40 ... +212)	-40 ... +100 (-40 ... +212)	-40 ... +100 (-40 ... +212)	-10 ... +70 (+14 ... +158)
- At V_p = 10 … 30 V	°C (°F)	–	-40 ... +70 (+14 ... +158)	–	–
• Flexible cable					
- At V_p = 5 V ± 10 %	°C (°F)	-10 ... +100 (+14 ... +212)	-10 ... +100 (+14 ... +212)	-10 ... +100 (+14 ... +212)	-10 ... +70 (+14 ... +158)
- At V_p = 10 … 30 V	°C (°F)	–	-10 ... +70 (+14 ... +158)	–	–
Net weight	kg (lb)	0.3 (0.66)	0.3 (0.66)	0.3 (0.66)	0.7 (1.54)
EMC	Tested in accordance with the guidelines for electromagnetic compatibility 89/336/EEC and the regulations of the EMC guidelines (generic standards)				
Certificate of suitability		CE, cULus	CE, cULus	CE, cULus	CE, cULus

S/R = signals/revolution

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Selection and ordering data

Description	Article No.
Incremental encoder with sin/cos 1 V_{pp}	
5 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-3G** ■■■
• Radial flange outlet	**6FX2001-3E** ■■■
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-3C** ■■■
Resolution	
1000 S/R	**B 0 0**
1024 S/R	**B 0 2**
2500 S/R	**C 5 0**
Incremental encoder with RS422 (TTL)	
5 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-2G** ■■■
• Radial flange outlet	**6FX2001-2E** ■■■
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-2C** ■■■
Clamp flange and connection via	
• Axial flange outlet	**6FX2001-2R** ■■■
• Radial flange outlet	**6FX2001-2P** ■■■
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-2M** ■■■
10 ... 30 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-2H** ■■■
• Radial flange outlet	**6FX2001-2F** ■■■
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-2D** ■■■
Clamp flange and connection via	
• Axial flange outlet	**6FX2001-2S** ■■■
• Radial flange outlet	**6FX2001-2Q** ■■■
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-2N** ■■■
Resolution	
500 S/R	**A 5 0**
1000 S/R	**B 0 0**
1024 S/R	**B 0 2**
1250 S/R	**B 2 5**
1500 S/R	**B 5 0**
2000 S/R	**C 0 0**
2048 S/R	**C 0 4**
2500 S/R	**C 5 0**
3600 S/R	**D 6 0**
5000 S/R	**F 0 0**

S/R = signals/revolution

Description	Article No.
Incremental encoder with HTL	
10 ... 30 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-4H** ■■ **0**
• Radial flange outlet	**6FX2001-4F** ■■ **0**
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-4D** ■■ **0**
Clamp flange and connection via	
• Axial flange outlet	**6FX2001-4S** ■■ **0**
• Radial flange outlet	**6FX2001-4Q** ■■ **0**
• Cable 1 m (3.28 ft) with connector[1]	**6FX2001-4N** ■■ **0**
Resolution	
100 S/R	**A 1**
500 S/R	**A 5**
1000 S/R	**B 0**
2500 S/R	**C 5**
Double-track incremental encoder with RS422 (TTL)	
5 V DC supply voltage	
Synchro flange and connection via	
• Cable 1 m (3.28 ft) with axial connector 2 types of resolution: 9000/1024 S/R	**6FX2001-2UK00**

S/R = signals/revolution

[1] Universal integrated cable outlet for axial and radial outlet direction.

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Function



Absolute encoders with SSI/EnDat and PROFIBUS DP at the top, and DRIVE-CLiQ and PROFINET IO at the bottom

Absolute encoders (absolute shaft encoders) are designed on the same scanning principle as incremental encoders, but have a greater number of tracks. For example, if there are 13 tracks, then 2^{13} = 8192 steps are coded in the case of single-turn encoders. The code used is a one-step code (gray code) which prevents any scanning errors from occurring.

After the machine is powered up, the position value is transferred immediately to the controller. There is no need for homing.

Absolute encoders with DRIVE-CLiQ, SSI and EnDat are of advantage in time-critical applications.

In plants with a large number of encoders, encoders with PROFIBUS DP and PROFINET IO are more advantageous due to the reduced wiring overhead. Encoders with PROFIBUS DP are parameterizable and support isochronous mode with direct data exchange. The encoders with PROFINET IO are also parameterizable, additionally have two ports and support the RT and IRT operating modes.

Single-turn encoders

Single-turn encoders divide one rotation (360 degrees mechanical) into a specific number of steps, e.g. 8192. A unique code word is assigned to each position. After 360° the position values are repeated.

Multi-turn encoders

Multi-turn encoders record the number of revolutions in addition to the absolute position within one revolution. To do this, further code discs which are coupled via gear steps with the encoder shaft are scanned. When evaluating 12 additional tracks, this means that 2^{12} = 4096 revolutions can be coded.

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Technical specifications

Article No.		6FX2001-5.D..-0AA1	6FX2001-5.S..	6FX2001-5.E..
Product designation		Absolute encoder with DRIVE-CLiQ	Absolute encoder with SSI	Absolute encoder with EnDat
Operating voltage DC V_p on encoder	V	24 - 15 % + 20 %	10 ... 30	5 ± 5 %
Current consumption, approx.				
• Single-turn	mA	245	160	160
• Multi-turn	mA	325	200	200
Interface		DRIVE-CLiQ	SSI	EnDat
Clock input		–	Differential cable receiver acc. to EIA standard RS 485	Differential cable receiver acc. to EIA standard RS 485
Data output		DRIVE-CLiQ	Differential cable driver acc. to EIA standard RS 485	Differential cable driver acc. to EIA standard RS 485
Short-circuit strength		Yes	Yes	Yes
Transmission rate	Mbit	100	–	–
	kHz	–	100 … 1000	100 ... 2000
Speed, max.				
• Electrical	rpm	14000	–	–
- At ± 1 bit accuracy	rpm	–	5000	5000
- At ± 100 bit accuracy	rpm	–	10000	10000
• Mechanical				
- Single-turn	rpm	12000	12000	12000
- Multi-turn	rpm	10000	10000	10000
Cable length to downstream electronics, max. [1]	m (ft)	100 (328)	–	–
• Up to 100 kHz cycle	m (ft)	–	400 (1312)	–
• Up to 300 kHz cycle	m (ft)	–	100 (328)	150 (492)
• Up to 1 MHz cycle	m (ft)	–	50 (164)	50 (164)

[1] Observe the max. permissible cable length of the connected module.

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Technical specifications (continued)

Article No.		6FX2001-5.D..-0AA1	6FX2001-5.S..	6FX2001-5.E..
Product designation		Absolute encoder with DRIVE-CLiQ	Absolute encoder with SSI	Absolute encoder with EnDat
Connection		DRIVE-CLiQ connector, radial	Flange outlet, axial/radial	Flange outlet, axial/radial
Resolution				
• Single-turn	bit	22	13 (8192 steps)	13 (8192 steps)
• Multi-turn	bit	34 (22 bit single-turn + 12 bit multi-turn)	25 (8192 steps × 4096 revolutions)	25 (8192 steps × 4096 revolutions)
Frame				
• Single-turn	bit	–	13 without parity	According to EnDat specification
• Multi-turn	bit	–	25 without parity	According to EnDat specification
Incremental track	S/R	2048, 1 V_{pp} (internal only)	–	512, 1 V_{pp}
Code type				
• Sampling		Gray	Gray	Gray
• Transfer		DRIVE-CLiQ	Gray, fir tree format	Binary
Parameterization capability				
• Preset		–	Set to zero	–
• Counting direction		Yes	Yes	–
Accuracy	arcsec	± 36	± 79 (with 8192 steps)	± 60 (incremental track)
Friction torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Starting torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Shaft loading capacity				
• $n \leq 6000$ rpm				
- Axial	N (lb_f)	40 (8.99)	40 (8.99)	40 (8.99)
- Radial at shaft extension	N (lb_f)	60 (13.5)	60 (13.5)	60 (13.5)
• $n > 6000$ rpm				
- Axial	N (lb_f)	10 (2.25)	10 (2.25)	10 (2.25)
- Radial at shaft extension	N (lb_f)	20 (4.50)	20 (4.50)	20 (4.50)
Shaft diameter				
• Synchro flange	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)
• Torque arm Hollow shaft	mm (in)	10 or 12 (0.39 or 0.47)	–	–
Shaft length				
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)	10 (0.39)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)	20 (0.79)
Angular acceleration, max.	rad/s^2	10^5	10^5	10^5
Moment of inertia of rotor				
• Solid shaft	kgm^2 (lb_f-in-s^2)	1.90×10^{-6} (16.8×10^{-6})	1.45×10^{-6} (12.8×10^{-6})	1.45×10^{-6} (12.8×10^{-6})
• Hollow shaft	kgm^2 (lb_f-in-s^2)	2.80×10^{-6} (24.8×10^{-6})	–	–
Vibration (55 … 2000 Hz) acc. to EN 60068-2-6	m/s^2 (ft/s^2)	≤ 100 (328)	≤ 300 (984)	≤ 300 (984)
Shock acc. to EN 60068-2-27				
• 2 ms	m/s^2 (ft/s^2)	≤ 2000 (6562)	≤ 2000 (6562)	≤ 2000 (6562)
• 6 ms	m/s^2 (ft/s^2)	≤ 1000 (3281)	≤ 1000 (3281)	≤ 1000 (3281)
Degree of protection acc. to EN 60529 (IEC 60529)				
• Without shaft input		IP67	IP67	IP67
• With shaft input		IP64	IP64	IP64
Ambient temperature				
• Operation	°C (°F)	-20 ... +100 (-4 ... +212)	-40 ... +85 (-40 ... +185)	-40 ... +100 (-40 ... +212)
Net weight				
• Single-turn	kg (lb)	0.4 (0.88)	0.35 (0.77)	0.35 (0.77)
• Multi-turn	kg (lb)	0.5 (1.1)	0.35 (0.77)	0.35 (0.77)
EMC		Tested in accordance with DIN EN 50081 and EN 50082	Tested in accordance with DIN EN 50081 and EN 50082	Tested in accordance with DIN EN 50081 and EN 50082
Certificate of suitability		CE, cULus	CE, cULus	CE, cULus

S/R = signals/revolution

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Technical specifications (continued)

Article No.		6FX2001-5.P..	6FX2001-5.N..
Product designation		Absolute encoders with PROFIBUS DP	Absolute encoders with PROFINET IO
Operating voltage DC V_p on encoder	V	10 ... 30	10 ... 30
Current consumption, approx.			
• Single-turn	mA	300 ... 100 (2.5 W)	400 ... 130 (4 W)
• Multi-turn	mA	300 ... 100 (2.5 W)	400 ... 130 (4 W)
Interface		PROFIBUS DP-V2	PROFINET IO with RT/IRT
Clock input		Differential cable receiver acc. to EIA standard RS 485	2 ports IRT
Data output		Differential cable driver acc. to EIA standard RS 485	2 ports IRT
Short-circuit strength		Yes	Yes
Transmission rate	Mbit/s	12	100
LED for diagnostics		Green/red	Green/red/yellow
Speed, max.			
• Electrical			
- At ± 1 bit accuracy	rpm	5800	5800
• Mechanical			
- Single-turn	rpm	12000	12000
- Multi-turn	rpm	6000	6000
Cable length to downstream electronics, max. [1]			
• Up to 93.75 kbit/s	m (ft)	1200 (3937)	–
• Up to 1.5 Mbit/s	m (ft)	200 (656)	–
• Up to 12 Mbit/s	m (ft)	100 (328)	100 (328)
Number of nodes		99	–
Connection		Terminal block with address selector switch and bus terminating resistor in removable cover with radial cable glands (3 units)	2 x M12 connectors, 4-pole for PROFINET ports 1 x M12 connector, 4-pole for operating voltage
• Cable diameter	mm (in)	6.5 ... 9 (0.26 ... 0.35) Removal of cover possible without interrupting bus	–
Resolution			
• Single-turn	bit	13 (8192 steps)	13 (8192 steps)
• Multi-turn	bit	27 (8192 steps × 16384 revolutions)	27 (8192 steps × 16384 revolutions)
Frame		According to PNO encoder profile V 4.1 Class 1, Class 2, Class 3 Standard frame 81	According to PNO encoder profile V 4.1 Class 1, Class 2, Class 3, Class 4 Standard frames 81/82/83/84 Siemens frame 860
Code type			
• Sampling		Gray	Gray
• Transfer		Binary, PROFIBUS	Binary, PROFINET
Bus load, approx.			
• At 12 Mbit/s per encoder	µs	20	–
Cycle time	ms	0.667	1 ... 100
Parameterization capability			
• Resolution per revolution		1 ... 8192	1 ... 8192
• Total resolution		1 ... 16384	1 ... 16384
• Preset		Yes	Yes
• Counting direction		Yes	Yes
• Velocity signal		Yes	Yes
• Limit switches		Yes, 2 units	No
• Isochronous mode		Yes	Yes
• Direct data exchange		Yes	No

[1] Observe the max. permissible cable length of the connected module.

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Technical specifications (continued)

Article No.		6FX2001-5.P..	6FX2001-5.N..
Product designation		Absolute encoders with PROFIBUS DP	Absolute encoders with PROFINET IO
Online parameterization		Yes	Yes
PNO certificate		Yes	Yes
Supported profiles		PNO encoder profile V 4.1	PNO encoder profile V 4.1
Accuracy with 8192 steps	arcsec	± 79 (± ½ LSB)	± 79 (± ½ LSB)
Friction torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Starting torque (at 20 °C) (68 °F)	Nm (lb_f-in)	≤ 0.01 (0.09)	≤ 0.01 (0.09)
Shaft loading capacity			
• n ≤ 6000 rpm			
- Axial	N (lb_f)	40 (8.99)	40 (8.99)
- Radial at shaft extension	N (lb_f)	110 (24.73)	110 (24.73)
• n > 6000 rpm			
- Axial	N (lb_f)	10 (2.25)	10 (2.25)
- Radial at shaft extension	N (lb_f)	20 (4.50)	20 (4.50)
Shaft diameter			
• Synchro flange	mm (in)	6 (0.24)	6 (0.24)
• Clamp flange	mm (in)	10 (0.39)	10 (0.39)
• Torque arm Hollow shaft	mm (in)	15 (0.59)[1)]	15 (0.59)[1)]
Shaft length			
• Synchro flange	mm (in)	10 (0.39)	10 (0.39)
• Clamp flange	mm (in)	20 (0.79)	20 (0.79)
Angular acceleration, max.	rad/s^2	10^5	10^5
Moment of inertia of rotor			
• Solid shaft	kgm^2 (lb_f-in-s^2)	1.90×10^{-6} (16.8×10^{-6})	1.90×10^{-6} (16.8×10^{-6})
• Hollow shaft	kgm^2 (lb_f-in-s^2)	2.80×10^{-6} (24.8×10^{-6})	2.80×10^{-6} (24.8×10^{-6})
Vibration (55 ... 2000 Hz) acc. to EN 60068-2-6	m/s^2 (ft/s^2)	≤ 100 (328)	≤ 100 (328)
Shock acc. to EN 60068-2-27			
• 2 ms	m/s^2 (ft/s^2)	≤ 2000 (6562)	≤ 2000 (6562)
• 6 ms	m/s^2 (ft/s^2)	≤ 1000 (3281)	≤ 1000 (3281)
Degree of protection acc. to EN 60529 (IEC 60529)			
• Without shaft input		IP67	IP67
• With shaft input		IP64	IP64
Ambient temperature			
• Operation	°C (°F)	-40 ... +85 (-40 ... +185)	-40 ... +85 (-40 ... +185)
Net weight			
• Single-turn	kg (lb)	0.4 (0.88)	0.4 (0.88)
• Multi-turn	kg (lb)	0.5 (1.1)	0.5 (1.1)
EMC		Tested in accordance with DIN EN 50081 and EN 50082	Tested in accordance with DIN EN 50081 and EN 50082
Certificate of suitability		CE, cULus	CE, cULus

[1)] Hollow shaft diameter 12 mm, 10 mm or 8 mm (0.47 in, 0.39 in or 0.31 in) possible via reduction sleeves included in the delivery.

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Selection and ordering data

Description	Article No.
Absolute encoders with DRIVE-CLiQ	
24 V DC supply voltage	
Radial connection	
• Synchro flange Solid shaft	**6FX2001-5FD■■-0AA1**
• Clamp flange Solid shaft	**6FX2001-5QD■■-0AA1**
• Torque arm Hollow shaft diameter 10 mm (0.39 in)	**6FX2001-5VD■■-0AA1**
• Torque arm Hollow shaft diameter 12 mm (0.47 in)	**6FX2001-5WD■■-0AA1**
Resolution	
• Single-turn 22 bit	**1 3**
• Multi-turn 34 bit	**2 5**
Absolute encoders with SSI	
10 ... 30 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-5HS■■**
• Radial flange outlet	**6FX2001-5FS■■**
Clamp flange and connection via	
• Axial flange outlet	**6FX2001-5SS■■**
• Radial flange outlet	**6FX2001-5QS■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 2**
• Multi-turn 8192 steps/revolution, 4096 revolutions (25 bit)	**2 4**
Absolute encoders with EnDat	
5 V DC supply voltage	
Synchro flange and connection via	
• Axial flange outlet	**6FX2001-5HE■■**
• Radial flange outlet	**6FX2001-5FE■■**
Clamp flange and connection via	
• Axial flange outlet	**6FX2001-5SE■■**
• Radial flange outlet	**6FX2001-5QE■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 3**
• Multi-turn 8192 steps/revolution, 4096 revolutions (25 bit)	**2 5**

Description	Article No.
Absolute encoders with PROFIBUS DP	
10 ... 30 V DC supply voltage	
Radial connection	
• Synchro flange Solid shaft	**6FX2001-5FP■■**
• Clamp flange Solid shaft	**6FX2001-5QP■■**
• Torque arm Hollow shaft diameter 15 mm (0.59 in)[1]	**6FX2001-5WP■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 2**
• Multi-turn 8192 steps/revolution, 16384 revolutions (27 bit)	**2 4**
Absolute encoders with PROFINET IO	
10 ... 30 V DC supply voltage	
Radial connection	
• Synchro flange Solid shaft	**6FX2001-5FN■■**
• Clamp flange Solid shaft	**6FX2001-5QN■■**
• Torque arm Hollow shaft diameter 15 mm (0.59 in)[1]	**6FX2001-5WN■■**
Resolution	
• Single-turn 8192 steps/revolution (13 bit)	**1 3**
• Multi-turn 8192 steps/revolution, 16384 revolutions (27 bit)	**2 5**

More information

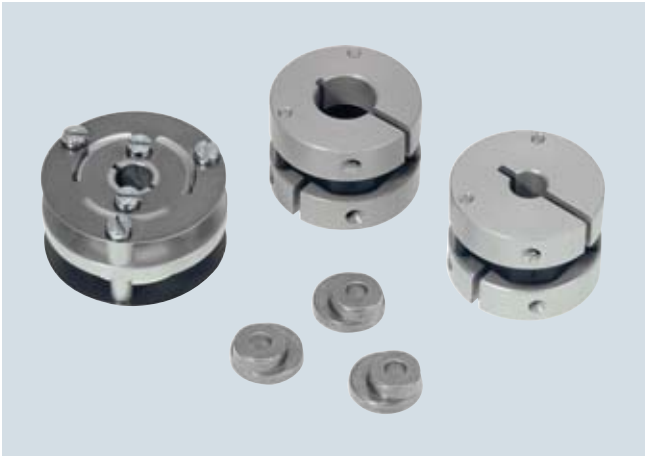
Since the DRIVE-CLiQ interface has been disclosed, it is possible to use other makes of absolute encoder with integrated DRIVE-CLiQ interface.

You can find further information at:
https://support.industry.siemens.com/cs/ww/en/view/65402168

[1] Hollow shaft diameter 12 mm, 10 mm or 8 mm (0.47 in, 0.39 in or 0.31 in) possible via reduction sleeves included in the delivery.

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Overview



Couplings and clamps

Couplings and clamps

Couplings and clamp straps are available as mounting accessories for the built-on rotary encoders. The clamps are used to fix the encoders with Synchro flange.

Signal connector as mating connector

A signal connector is available as mating connector for encoders with flange outlet or with cable and connector. The connector with 12 contacts is suitable for all incremental encoders. The connector with 17 contacts is suitable for absolute encoders with EnDat.

Signal connector

A signal connector is available as a replacement for encoders with cable and connector.

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Technical specifications

Article No.		6FX2001-7KF06	6FX2001-7KF10	6FX2001-7KS06	6FX2001-7KS10
Product designation		Spring disk coupling	Spring disk coupling	Plug-in coupling	Plug-in coupling
Diameter					
• 1st shaft diameter	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)	10 (0.39)
• 2nd shaft diameter	mm (in)	5 (0.20)	6 (0.24)	6 (0.24)	10 (0.39)
Transferable torque, maximum	Nm (oz_f)	0.8 (2.88)	0.8 (2.88)	0.7 (2.52)	0.7 (2.52)
Mechanical speed, max.	rpm	12000	12000	12000	12000
Center offset of shafts, maximum	mm (in)	0.4 (0.02)	0.4 (0.02)	0.5 (0.02)	0.5 (0.02)
Axial displacement	mm (in)	0.4 (0.02)	0.4 (0.02)	0.5 (0.02)	0.5 (0.02)
Angular displacement of shafts, maximum	°	3	3	1	1
Radial rigidity	Nm/rad (oz_f/rad)	150 (539.51)	150 (539.51)	31 (111.5)	31 (111.5)
Axial rigidity	N/mm (lb_f)	6 (1.35)	6 (1.35)	10 (2.25)	10 (2.25)
Moment of inertia	kgcm^2 (lb_f-in^2)	0.019 (0.006)	0.019 (0.006)	0.02 (0.007)	0.02 (0.007)
Ambient temperature, during					
• Operation	°C (°F)	-40 ... +150 (-40 ... +302)	-40 ... +150 (-40 ... +302)	-40 ... +80 (-40 ... +176)	-40 ... +80 (-40 ... +176)
Outer diameter	mm (in)	30 (1.18)	30 (1.18)	25 (0.98)	25 (0.98)
Length	mm (in)	18.3 (0.72)	18.3 (0.72)	19 (0.75)	19 (0.75)
Net weight	g (oz)	16 (0.56)	16 (0.56)	20 (0.71)	20 (0.71)

Article No.	6FX2001-7KP01
Product designation	Clamp
Diameter	
• 1st clamp diameter	9 mm (0.35 in)
• 2nd clamp diameter	12 mm (0.47 in)
Clamp hole diameter	3.2 mm (0.13 in)
Height	5.5 mm (0.22 in)
Net weight	3 g (0.11 oz)

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Selection and ordering data

Description	Article No.
Spring disk coupling	
Shaft diameter:	
• 6 mm/6 mm (0.24 in/0.24 in)	**6FX2001-7KF10**
• 6 mm/5 mm (0.24 in/0.20 in)	**6FX2001-7KF06**
Plug-in coupling	
Shaft diameter:	
• 6 mm/6 mm (0.24 in/0.24 in)	**6FX2001-7KS06**
• 10 mm/10 mm (0.39 in/0.39 in)	**6FX2001-7KS10**
Clamp (1 unit)	**6FX2001-7KP01**
For double-track encoders and encoders with Synchro flange (3 units are required.)	
Signal connector with cap nut (1 unit)	**6FX2003-0SU12**
Mating connector for incremental encoder with TTL, sin/cos 1 V_{pp}, HTL and absolute encoder with SSI	
12-pole, insulator each with 12 socket contacts 0.08 ... 0.22 mm^2 and 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm, and 10.1 ... 13 mm	
Signal connector with cap nut (1 unit)	**6FX2003-0SU17**
Mating connector for absolute encoder with EnDat	
17-pole, insulator with 17 socket contacts 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm, and 10.1 ... 13 mm	
Signal connector with external thread for encoders with cable (1 unit)	**6FX2003-0SA12**
Replacement connector for incremental encoder with RS422, sin/cos 1 V_{pp} and HTL	
12-pole, insulator with 12 pin contacts 0.20 ... 0.56 mm^2, 2 × cable clamping 6.5 ... 10 mm, and 10.1 ... 13 mm	
Power connecting cable	
Pre-assembled cable for power supply of the absolute encoders with PROFINET IO with M12 plug connector and M12 plug socket, A-coded, 4-pole	
• Length 2 m (6.56 ft)	**6XV1801-5DH20**
• Length 3 m (9.84 ft)	**6XV1801-5DH30**
• Length 5 m (16.4 ft)	**6XV1801-5DH50**
• Length 10 m (32.8 ft)	**6XV1801-5DN10**
• Length 15 m (49.2 ft)	**6XV1801-5DN15**

Description	Article No.
IE connecting cable	
Pre-assembled signal cable for absolute encoders PROFINET IO with M12 plug connector and RJ45, D-coded, 4-pole	
• Length 2 m (6.56 ft)	**6XV1871-5TH20**
• Length 3 m (9.84 ft)	**6XV1871-5TH30**
• Length 5 m (16.4 ft)	**6XV1871-5TH50**
• Length 10 m (32.8 ft)	**6XV1871-5TN10**
• Length 15 m (49.2 ft)	**6XV1871-5TN15**
IE FC RJ45 Plug 145 (1 unit)	**6GK1901-1BB30-0AA0**
2 × 2 RJ45 connector with rugged metal enclosure and FC connection technology, 145° cable outlet	
IE FC M12 Plug PRO (1 unit)	**6GK1901-0DB20-6AA0**
M12 connector with metal enclosure and FC connection technology, axial cable outlet, D-coded	
IE POWER M12 CABLE CONNECTOR PRO (3 units)	**6GK1907-0DC10-6AA3**
Connection socket for connecting SCALANCE W-700/X208pro for 24 V DC supply voltage, 4-pole, A-coded, including assembly instructions	
IE FC TP Trailing Cable 2 × 2 (PROFINET Type C)	**6XV1840-3AH10**
4-wire, shielded, PROFINET-compliant, TP installation cable for use in cable carriers, sold by the meter Max. length 2000 m (6562 ft) Minimum order 20 m (65.6 ft)	

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Notes

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6/70 Linear motors
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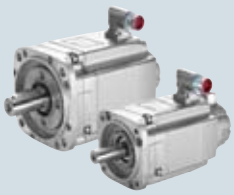
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Part 8 **CAD CREATOR**
Dimensional drawing and 2D/3D CAD generator
www.siemens.com/cadcreator

Part 8 **Drive Technology Configurator selection tool**
Guided product selection through to exact article number
www.siemens.com/dt-configurator

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Motor type		Features	Degree of protection	Type of cooling
SIMOTICS S servomotors – permanent-magnet				
	**SIMOTICS S-1FT7** Compact	Compact Very high power density	IP64[1)] (optional IP65, IP67)	Natural cooling Forced ventilation Water cooling
	SIMOTICS S-1FT7 High Dynamic	High Dynamic Very low rotor moment of inertia	IP64 (optional IP65, IP67)	Forced ventilation Water cooling
	**SIMOTICS S-1FK7** Compact Compact for Power Modules 230 V 1 AC	Compact High power density	IP64 (optional IP65)	Natural cooling
	SIMOTICS S-1FK7 High Dynamic High Dynamic for Power Modules 230 V 1 AC	High Dynamic Very low rotor moment of inertia	IP64 (optional IP65)	Natural cooling
	SIMOTICS S-1FK7 High Inertia	High Inertia High or variable load moment of inertia	IP64 (optional IP65)	Natural cooling

Feed motors

The potential applications for SIMOTICS S-1FT7/S-1FK7 motors are extremely diverse.

On machine tools, they are designated and used as feed motors.

On production machines e.g. printing, packaging and textile machines, they are designated as synchronous servomotors.

Core types can be supplied for certain motor types. These core types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply. For this reason, core types should be used for configuration wherever possible.

The selection and ordering data for the SINAMICS S120 Motor Modules are based on the booksize format by way of example. Other formats are also possible. The SIZER configuration tool is available for detailed configuration.

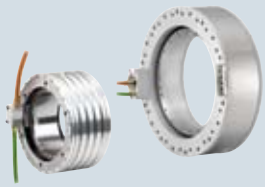
[1)] Core type: IP65.

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Shaft height	Rated power P_{rated} for S1 duty type kW (HP)	Rated torque M_{rated}	Selection and ordering data
	0.01 0.1 1 10 100 1000 10000		Page
SH 36/SH 48/SH 63/ SH 80/SH 100/SH 132	0.88 (1.2) 17 (22.8)	1.4 ... 108 Nm (12.4 ... 956 lb_f-in)	6/20 ... 6/27
SH 80/SH 100	5 (6.71) 18.8 (25.2)	21 ... 73 Nm (186 ... 646 lb_f-in)	6/28 ... 6/29
SH 63/SH 80/SH 100	3.1 (4.16) 34.2 (45.9)	9.2 ... 125 Nm (81.4 ... 1106 lb_f-in)	6/30 ... 6/33
SH 63/SH 80	3.8 (5.10) 10.8 (14.5)	11 ... 33 Nm (97.4 ... 292 lb_f-in)	6/34 ... 6/35
SH 63/SH 80	5.7 (7.64) 21.7 (29.1)	16.5 ... 51 Nm (146 ... 451 lb_f-in)	
SH 20/SH 28/SH 36/ SH 48/SH 63/SH 80/ SH 100	0.05 (0.07) 8.2 (11)	0.08 ... 37 Nm (0.71 ... 327 lb_f-in)	6/40 ... 6/45
SH 20/SH 28/SH 36/ SH 48	0.05 (0.07) 0.8 (1.07)	0.08 ... 2.6 Nm (0.71 ... 23 lb_f-in)	6/50 ... 6/53
SH 36/SH 48/SH 63/ SH 80	0.6 (0.8) 3.8 (5.10)	0.9 ... 18 Nm (8.0 ... 159 lb_f-in)	6/46 ... 6/47
SH 36/SH 48	0.4 (0.54) 0.9 (1.21)	1.2 ... 3 Nm (10.6 ... 26.6 lb_f-in)	6/54 ... 6/55
SH 48/SH 63/SH 80/ SH 100	0.9 (1.21) 7.7 (10.3)	1.5 ... 37.0 Nm (13.3 ... 327.5 lb_f-in)	6/48 ... 6/49

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Motor type	Features	Degree of protection	Type of cooling
SIMOTICS L linear motors – permanent-magnet			
 **SIMOTICS L-1FN3**	Synchronous linear motor	IP65	Water cooling

Motor type	Features	Degree of protection	Type of cooling
SIMOTICS T torque motors – permanent-magnet			
 **SIMOTICS T-1FW6**	Synchronous motor Built-in torque motor Hollow shaft Individual components	IP23[1)]	Natural cooling Water cooling

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Linear and torque motors

The potential applications for SIMOTICS L-1FN3/T-1FW6 motors are extremely diverse.

On machine tools, they are designated and used as feed motors.

On production machines e.g. printing, packaging and textile machines, they are designated as synchronous servomotors.

Core types can be supplied for certain motor types. These core types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply. For this reason, core types should be used for configuration wherever possible.

The selection and ordering data for the SINAMICS S120 Motor Modules are based on the booksize format by way of example. Other formats are also possible. The SIZER configuration tool is available for detailed configuration.

1) The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer.

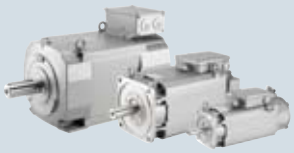
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Primary section width mm	Feed force F_{rated} N (lb_f)	Velocity v_{max} at F_{rated}	Selection and ordering data
	0.1 … 1 … 10 … 100 … 1000 … 10000		Page
Precision cooling without with 67/96 76/105 126/141 135/150 188/248 197/257 342 351	Peak load: 200 (45) – 8100 (1821) Continuous load: 150 (33.7) – 10375 (2332)	105 ... 836 m/min (345 ... 2743 ft/min) 129 ... 435 m/min (423 ... 1427 ft/min)	6/72 ... 6/75 6/76 ... 6/77

Diameter mm	Rated torque M_{rated} Nm (lb_f-in)	Rated speed n_{rated}	Selection and ordering data
	0.1 … 1 … 10 … 100 … 1000 … 10000		Page
Outer diameter 159/184/230/310/ 385/440/502/576/ 730	9.91 (87.7) – 38.9 (344.3) 22.2 (196.5) – 5760 (50982)	400 ... 600 rpm 37.7 ... 964 rpm	6/86 ... 6/87 6/88 ... 6/99

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Motor type	Features	Degree of protection	Type of cooling
SIMOTICS M main spindle motors			
 **SIMOTICS M-1PH8**	Asynchronous motor Three-phase squirrel-cage motor without housing Compact unit with high power density	IP55[1)]	Forced ventilation
		IP55/IP65[2)]	Water cooling
	SIMOTICS M-1PH8 Premium Performance	IP55	Forced ventilation
		IP65	Water cooling
	Synchronous motor Permanent-magnet Outstanding performance capabilities Compact unit with extremely high power density	IP55[1)]	Forced ventilation
		IP55/IP65[2)]	Water cooling
 **SIMOTICS M-1FE1/1FE2**	Built-in spindle motor Permanent-magnet	IP00	Water cooling
 **SIMOTICS M-1PH2**	Asynchronous motor Three-phase squirrel-cage motor	IP00	Water cooling
 **2SP1 motor spindles**	Synchronous and asynchronous versions	Operating range: IP64 Behind the spindle flange: IP53	Water cooling

Main spindle motors

The potential applications for SIMOTICS M-1PH8/M-1FE1/M-1FE2/M-1PH2 motors and 2SP1 motor spindles are extremely diverse.

For machine tool applications, they are generally referred to as main spindle motors and deployed as such.

For production machine applications such as printing, packaging and forming machines, they are deployed as high-performance main motors.

The selection and ordering data for the SINAMICS S120 Motor Modules are based on the booksize format by way of example. Other formats are also possible. The SIZER configuration tool is available for detailed configuration.

1) For additional versions, see Options.
2) From SH 180: IP55.

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Shaft height / diameter mm	Rated power P_{rated} for S1 duty type kW (HP)	Rated torque M_{rated}	Selection and ordering data
	0.1 … 1 … 10 … 100 … 1000 … 10000		Page
SH 80/SH 100/ SH 132/SH 160/ SH 180/SH 225/ SH 280	3.2 (4.29) – 270 (362)	10 ... 2481 Nm (88.5 ... 21959 lb_f-in)	6/104 ... 6/111
SH 80/SH 100/ SH 132/SH 160/ SH 180/SH 225/ SH 280	4.0 (5.36) – 265 (355)	14 ... 2598 Nm (124 ... 22995 lb_f-in)	6/112 ... 6/115
SH 80	2.8 (3.75) – 6.5 (8.72)	3.0 ... 8.3 Nm (26.6 ... 73.5 lb_f-in)	6/106 ... 6/107
SH 80	7.3 (9.79) – 11.0 (14.8)	7.2 ... 21.0 Nm (63.7 ... 186 lb_f-in)	
SH 132/SH 160/ SH 180/SH 225	18.0 (24.1) – 195 (261)	95 ... 1086 Nm (840.8 ... 9612 lb_f-in)	6/128 ... 6/135
SH 132/SH 160/ SH 180/SH 225	20.4 (27.4) – 238 (319)	108 ... 1647 Nm (956 ... 14577.6 lb_f-in)	6/128 ... 6/135
Outer diameter (cooling jacket)			
High-Torque series 95/115/130/190/ 205/250/310	4 (5.36) – 103 (138)	4.5 ... 820 Nm (39.8 ... 7258 lb_f-in)	6/146 ... 6/149
High-Speed series 120/155/180/205/ 230/270	6.5 (8.72) – 94 (126)	5 ... 300 Nm (44.3 ... 2655 lb_f-in)	6/150 ... 6/153
High-Torque series 180	34 (45.6) – 159 (213)	640 ... 1530 Nm (5664.6 ... 13542 lb_f-in)	6/154 ... 6/155
Outer diameter mm 205/250	7.5 (10.1) – 23.6 (31.6)	48 ... 146 Nm (425 ... 1292 lb_f-in)	6/158 ... 6/159
Spindle diameter 200/250	12 (16.1) – 53.4 (71.6)	42 ... 170 Nm (372 ... 1505 lb_f-in)	6/164 ... 6/165

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Overview

Regulations, standards and 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 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 electric machines	DIN 748 Part 3/ IEC 60072

The motors listed below are UL-approved by Underwriters Laboratories Inc. and also comply with Canadian cUR standards: SIMOTICS S-1FK7/1FT7/ SIMOTICS T-1FW3/1FW6/SIMOTICS M-1PH8 (without brake)/ SIMOTICS L-1FN3.

Degrees of protection for AC motors

A suitable degree of protection must be selected depending on the operating and environmental conditions to protect the machine against:

- Ingress of water, dust and solid foreign objects,
- Contact with or approach to rotating parts inside a motor and
- Contact with or approach to live parts.

Degrees of protection of electric motors are specified by a code. This comprises two letters, two digits and, if required, an additional letter.

IP (International Protection)
Code letter designating the degree of protection against contact and the ingress of solid foreign objects and water

0 to **6**
1st digit designating the degree of touch protection and protection against ingress of solid foreign objects

0 to **8**
2nd digit designating the degree of protection against ingress of water (no oil protection)

W, S and **M**
Additional code letters for special degrees of protection

Most motors are supplied with the following degrees of protection:

Motor	Degree of protection	1st digit: Touch protection	Protection against foreign objects	2nd digit, protection against water
Internally cooled	**IP23**	Protection against finger contact	Protection against medium-sized, solid foreign objects above 12 mm (0.47 in) Ø	Protection against spray water up to 60° from the vertical
Surface-cooled	**IP54**	Complete protection against accidental contact	Protection against harmful dust deposits	Splash water from any direction
	IP55			Jet water from any direction
	IP64	Complete protection against accidental contact	Protection against ingress of dust	Splash water from any direction
	IP65[1]			Jet water from any direction
	IP67[1]			Motor under defined pressure and time conditions under water

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 guideline in this case. The motors must be protected by a suitable cover where necessary. Attention must be paid to providing suitable sealing of the motor shaft for the selected degree of protection for the motor (for 1FT7: degree of protection IP67 and flange 0).

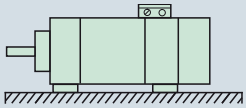
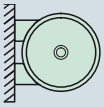
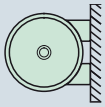
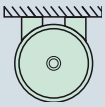
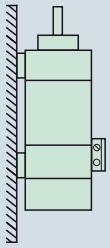
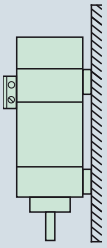
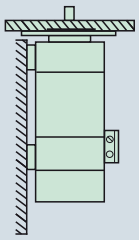
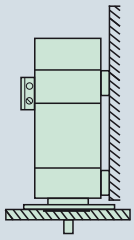
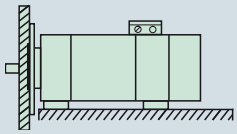
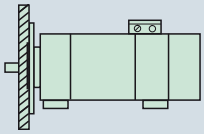
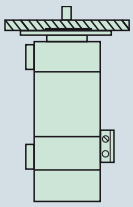
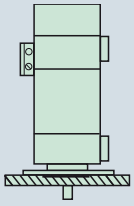
The table can serve as a decision aid for selecting the proper degree of protection for motors. With mounting position IM V3/IM V19/IM V6/IM V35 with shaft extension facing upwards, a permanent covering of liquid on the flange must be avoided.

Effect \ Liquids	General workshop environment	Water; general cooling lubricant (95 % water, 5 % oil)
Dry	IP64	–
Liquid-enriched environment	–	IP64
Mist	–	IP65
Spray	–	IP65
Jet	–	IP67
Splash/brief immersion/ constant inundation	–	IP67

[1] DIN VDE 0530 Part 5 or EN 60034 Part 5 specifies that there are only 5 degrees of protection for the first digit code and 8 degrees of protection for the second digit code in relation to rotating electrical machinery. However, IP6 is included in DIN 40050 which generally applies to electrical equipment.

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Overview (continued)

Types of construction/mounting positions	Types of construction/mounting positions
IM B3	**IM B6**
	
IM B7	**IM B8**
	
IM V6	**IM V5**
	
IM V35[1]	**IM V15**[1]
	
IM B35[1]	**IM B5, IM B14**
	
IM V3, IM V19	**IM V1, IM V18**
	

[1] Fixing on the flange and feet is necessary.

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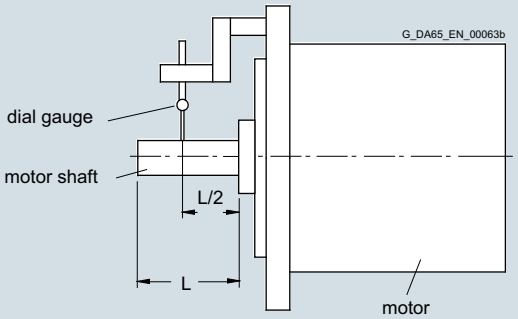
Overview (continued)

Radial eccentricity tolerance of shaft in relation to housing axis

referred to cylindrical shaft extensions

Shaft height SH	Tolerance N mm (in)	Tolerance R mm (in)	Tolerance SPECIAL mm (in)
28/36	0.035 (0.00138)	0.018 (0.00071)	–
48/63	0.04 (0.00157)	0.021 (0.00083)	–
80/100/132	0.05 (0.00197)	0.025 (0.00098)	0.01 (0.00039)
160/180/225	0.06 (0.00236)	0.03 (0.00118)	0.01/–/– (0.00039)/–/–
280	0.07 (0.00276)	0.035 (0.00138)	–
355	0.08 (0.00315)	0.04 (0.00157)	–

Test: radial eccentricity

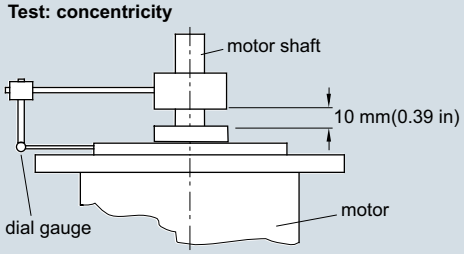


Concentricity and axial eccentricity tolerance of the flange surface relative to the shaft axis

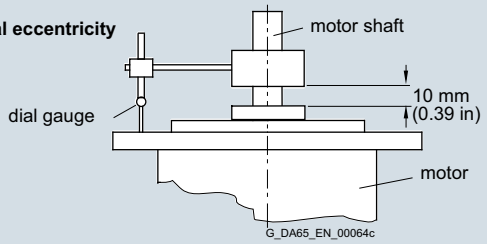
(referred to the centering diameter of the mounting flange)

Shaft height SH	Tolerance N mm (in)	Tolerance R mm (in)	Tolerance SPECIAL mm (in)
28/36/48	0.08 (0.00315)	0.04 (0.00157)	–
63/80/100	0.1 (0.00394)	0.05 (0.00197)	–/0.03/0.04 (-/0.00118/0.00157)
132/160/180/225	0.125 (0.00492)	0.063 (0.00248)	0.04/0.04/– (0.00157/0.00157)–
280/355	0.16 (0.00630)	0.08 (0.00315)	–

Test: concentricity



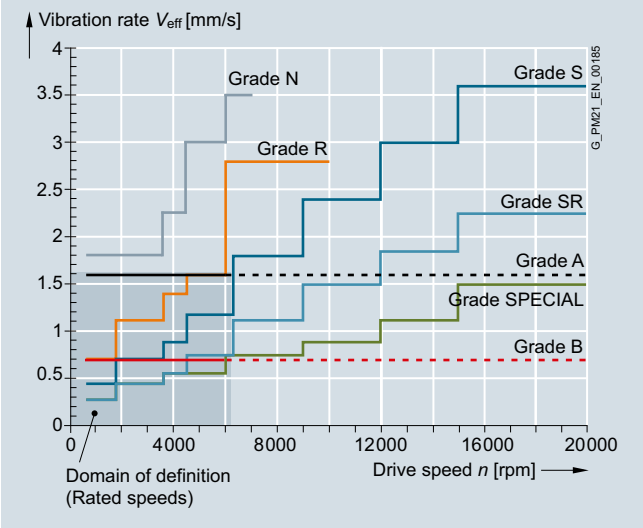
Test: axial eccentricity



Vibration severity and vibration severity grade A in accordance with IEC 60034-14

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

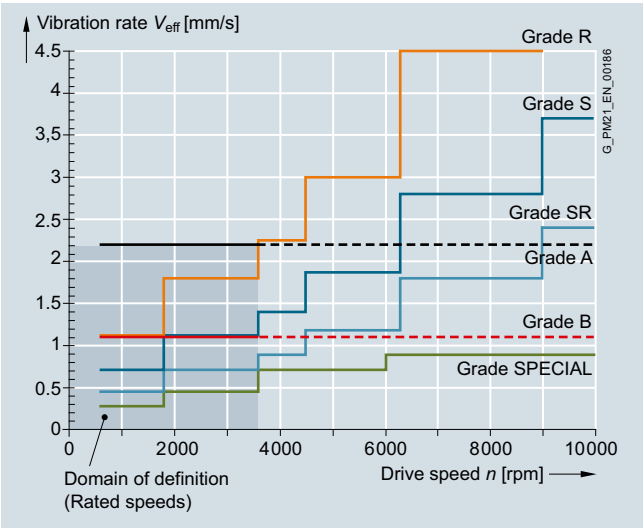
The values indicated refer only to the motor. These values can increase as a result of the overall system vibrational behavior due to installation.



Vibration severity limit values for shaft heights 20 to 132

The speeds of 1800 rpm and 3600 rpm and the associated limit values are defined in accordance with IEC 60034-14. The speeds of 4500 rpm and 6000 rpm and the specified values are defined by the motor manufacturer.

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



Vibration severity limit values for shaft heights 160 to 355

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Overview (continued)

Balancing in accordance with DIN ISO 8821

In addition to the balance quality of the motor, the vibration quality of motors with mounted belt pulleys and couplings is essentially determined by the balance quality of the mounted component.

If the motor and mounted component are separately balanced before they are assembled, then the process used to balance the belt pulley or coupling must be adapted to the motor balancing type. The following different balancing methods are used on motors of type SIMOTICS M-1PH8:

- Half-key balancing
- Full-key balancing
- Plain shaft extension

The letter H (half key) or F (full key) is printed on the shaft extension face to identify a half-key balanced or a full-key balanced SIMOTICS M-1PH8 motor.

SIMOTICS S-1FT7/1FK7 motors with feather key are always half-key balanced.

In general, motors with a plain shaft are recommended for systems with the most stringent vibration quality requirements For full-key balanced motors, we recommend belt pulleys with two opposite keyways, but only one feather key in the shaft extension.

Vibration stress, immitted vibration values

The following maximum permissible vibration stress limit for a fully functional machine applies only to SIMOTICS S-1FT7/1FK7 permanent-magnet servomotors.

Vibration stress in accordance with DIN ISO 10816:

- 1 *g* at 20 Hz up to 2 kHz

For all main motors of type SIMOTICS M-1PH8, the following limits are valid for (immitted) vibration values transferred into the motor from an external source:

Vibration frequency	Vibration values for 1PH808/1PH810/1PH813/1PH816	
< 6.3 Hz	Vibration displacement *s*	≤ 0.16 mm (0.006 in)
6.3 ... 250 Hz	Vibration velocity V_{rms}	≤ 4.5 mm/s (0.18 in/s)
> 250 Hz	Vibration acceleration *a*	≤ 10 m/s^2 (32.8 ft/s^2)

Vibration frequency	Vibration values for 1PH818/1PH822/1PH828/1PH835	
< 6.3 Hz	Vibration displacement *s*	≤ 0.25 mm (0.099 in)
6.3 ... 63 Hz	Vibration velocity V_{rms}	≤ 7.1 mm/s (0.28 in/s)
> 63 Hz	Vibration acceleration *a*	≤ 4.0 m/s^2 (13.12 ft/s^2)

Coolant temperature (ambient temperature) and installation altitude for motors with natural cooling and forced ventilation

Operation (unrestricted): -15 °C to +40 °C (+5 to 104 °F)

The rated power (rated torque) is applicable to continuous duty (S1) in accordance with EN 60034-1 at rated frequency, a coolant temperature of 40 °C (104 °F) and an installation altitude of up to 1000 m (3281 ft) above sea level.

Apart from the SIMOTICS M-1PH8 motors, all motors are designed for temperature class 155 (F) and utilized in accordance with temperature class 155 (F). The SIMOTICS M-1PH8 motors are designed for temperature class 180 (H). For all other conditions, the factors given in the table below must be applied to determine the permissible output (torque).

The coolant temperature and installation altitude are rounded to 5 °C and 500 m (1640 ft) respectively.

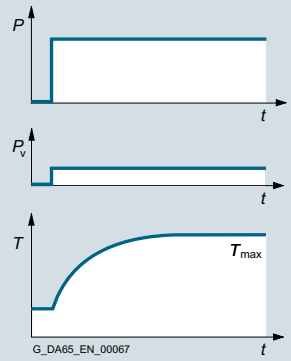
Installation altitude above sea level	Coolant temperature (ambient temperature)			
m (ft)	< 30 °C (86 °F)	30 ... 40 °C (86 ... 104 °F)	45 °C (113 °F)	50 °C (122 °F)
1000 (3281)	1.07	1.00	0.96	0.92
1500 (4922)	1.04	0.97	0.93	0.89
2000 (6562)	1.00	0.94	0.90	0.86
2500 (8203)	0.96	0.90	0.86	0.83
3000 (9843)	0.92	0.86	0.82	0.79
3500 (11484)	0.88	0.82	0.79	0.75
4000 (13124)	0.82	0.77	0.74	0.71

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Overview (continued)

Duty types S1 and S6 in accordance with EN 60034-1

S1: Continuous duty

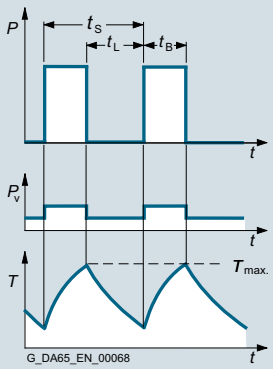


Duty cycle under constant load condition of sufficient duration to establish thermal equilibrium.

Designation: S1

Output specification (torque).

S6: Continuous duty with intermittent loading



Duty cycle comprising a sequence of identical duty cycles, each of which consists of a period of constant load followed by an interval at no load. There are no de-energized intervals.

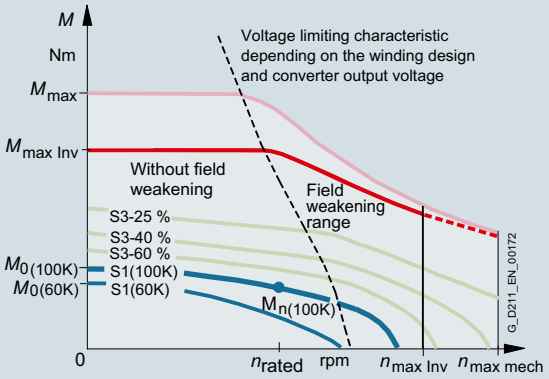
Designation:

e.g.: S6 - 40 %, 85 kW (114 HP)

$t_r = \frac{t_B}{t_B + t_L}$

t_s = 10 min

Characteristic curves



Torque characteristic of a synchronous motor operating on a converter with field weakening (example)

n_{rated}	Rated speed
$n_{max,\ Inv}$	Maximum permissible electric speed limit
$n_{max\ mech}$	Maximum permissible mechanical speed limit
M_0	Static torque
M_{rated}	Rated torque at rated speed
$M_{max\ Inv}$	Achievable maximum torque with recommended motor module
M_{max}	Maximum permissible torque

Rated torque

The torque supplied on the shaft is indicated in Nm (lb_f-ft) in the selection and ordering data.

$$M_{rated} = 9.55 \times P_{rated} \times \frac{1000}{n_{rated}}$$

P_{rated} Rated power in kW
n_{rated} Rated speed in rpm
M_{rated} Rated torque in Nm

$$M_{rated} = P_{rated} \times \frac{5250}{n_{rated}}$$

P_{rated} Rated power in HP
n_{rated} Rated speed in rpm
M_{rated} Rated torque in lb_f-ft

DURIGNIT IR 2000 insulation

The DURIGNIT IR 2000 insulation system consists of high-quality enamel wires and insulating sheeting in conjunction with solvent-free resin impregnation.

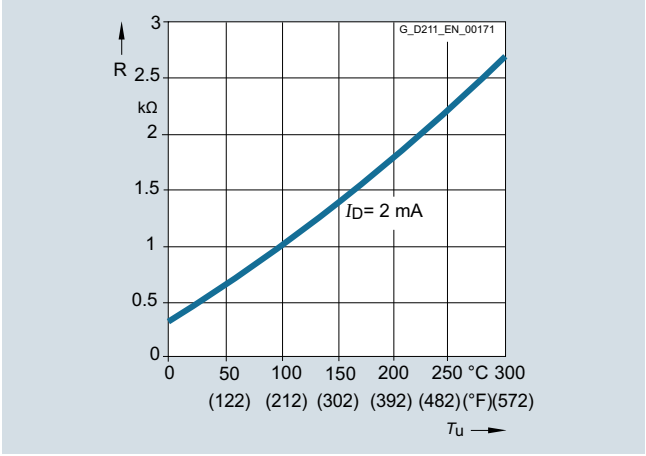
The insulating material system ensures that these motors will have a high mechanical and electrical stability, high service value and a long service life.

The insulation system protects the winding to a large degree against aggressive gases, vapors, dust, oil and increased air humidity. It can withstand the usual vibration stressing.

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Overview (continued)

Motor protection



The KTY84-130 temperature sensor is used to measure the motor temperature for converter-fed motor operation.

This sensor is a semi-conductor that changes its resistance depending on temperature in accordance with a defined curve.

Siemens converters calculate the motor temperature from the resistance of the temperature sensor.

Their parameters can be set for specific alarm and shutdown temperatures.

The KTY84-130 temperature sensor is embedded in the winding overhang of the motor like a PTC thermistor.

Starting in 2016, a new PT1000 temperature sensor will be phased in and will gradually replace the KTY-84 sensor in the motors. Before the new sensor is released, all the relevant information will be made available at an appropriate time.

Sensors are evaluated as standard in the SINAMICS S120 drive system.

If the motors are operated on converters that do not feature a KTY84 evaluation circuit, the temperature can be measured with the external 3RS1040 temperature monitoring relay.

For further information, please refer to Catalog IC 10 or visit the Siemens Industry Mall:

www.siemens.com/industrymall

Paint finish

Motors without a paint finish have an impregnated resin coating. Motors with primer have corrosion protection.

All motors can be painted over with commercially available paints. Up to 2 additional paint coats are permissible.

Version	Suitability of paint finish for climate group in accordance with IEC 60721, Part 2 – 1	
Paint finish	**Moderate** (expanded) for indoor and outdoor installation with roof protection	
	Briefly	Up to 150 °C (302 °F)
	Continuously	Up to 120 °C (248 °F)
Special paint finish	**Worldwide** (expanded) for outdoor installation	
	Briefly	Up to 150 °C (302 °F)
	Continuously	Up to 120 °C (248 °F)
	Also	For corrosive atmospheres up to 1 % acid and alkali concentration or permanent dampness in sheltered rooms

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Overview (continued)

Built-in encoder systems without DRIVE-CLiQ interface

For motors without an integrated DRIVE-CLiQ interface, the analog encoder signal in the drive system is converted into a digital signal. For these motors and external encoders, the encoder signals must be connected to SINAMICS S120 via Sensor Modules.

Built-in encoder systems with DRIVE-CLiQ interface

For motors with an integrated DRIVE-CLiQ interface, the analog encoder signal is internally converted to a digital signal. There is no further conversion of the encoder signal in the drive system. The motor-internal encoders are the same encoders that are used for motors without a DRIVE-CLiQ interface. Motors with a DRIVE-CLiQ interface simplify commissioning and diagnostics because, for example, the encoder system is identified automatically.

The different encoder types, incremental, absolute or resolver, are all connected with one type of MOTION-CONNECT DRIVE-CLiQ cable.

Short designations for the encoder systems

The first letters of the short designation define the encoder type. This is followed by the resolution in signals per revolution if S/R is specified (for encoders without DRIVE-CLiQ interface) or in bits if DQ or DQI is specified (for encoders with DRIVE-CLiQ interface).

Type	Resolution/interface	
AM AS IC IN HTL	xxxxS/R	Encoder without DRIVE-CLiQ interface Resolution = xxxx signals per revolution
AM AS IC IN R	xxDQ or xxDQI	Encoder with DRIVE-CLiQ interface Resolution = xx bit (2^{xx})
AM	Multi-turn absolute encoder	
AS	Single-turn absolute encoder	
IC	Incremental encoder sin/cos with commutation position C and D tracks	
IN	Incremental encoder sin/cos without commutation position	
HTL	Incremental encoder with HTL signal	
R	Resolver	

Overview of motor encoder systems

Encoder without DRIVE-CLiQ interface				Encoder with DRIVE-CLiQ interface				Absolute position within one revolution (single-turn)	Absolute position over 4096 revolutions (multi-turn)	For use in safety applications
	Identification letter in the motor article number				Identification letter in the motor article number					
Encoder	1FT7	1FK7	1PH8	Encoder	1FT7	1FK7	1PH8			
–	–	–	–	AM24DQI	C	C	–	Yes	Yes	Yes
–	–	–	–	AM20DQI	–	R	–	Yes	Yes	Yes
–	–	–	–	AS24DQI	B	B	–	Yes	No	Yes
–	–	–	–	AS20DQI	–	Q	–	Yes	No	Yes
AM2048S/R	M	E	E	AM22DQ	F	F	F	Yes	Yes	Yes
AM512S/R	–	H	–	AM20DQ	–	L	–	Yes	Yes	Yes
AM32S/R	–	G	–	AM16DQ	–	K	–	Yes	Yes	No
AM16S/R	–	J	–	AM15DQ	–	V	–	Yes	Yes	No
AS2048S/R	–	–	–	AS22DQ	–	–	–	Yes	No	No
IC2048S/R	N	A	M	IC22DQ	D	D	D	No	No	Yes
HTL1024S/R	–	–	H	–	–	–	–	No	No	No
HTL2048S/R	–	–	J	–	–	–	–	No	No	No
Resolver p=1	–	T	–	R14DQ	–	P	–	Yes	No	No
Resolver p=3	–	S	–	R15DQ	–	U	–	No	No	No
Resolver p=4	–	S	–	R15DQ	–	U	–	No	No	No

Not every encoder is available for every motor frame size.

– Not possible

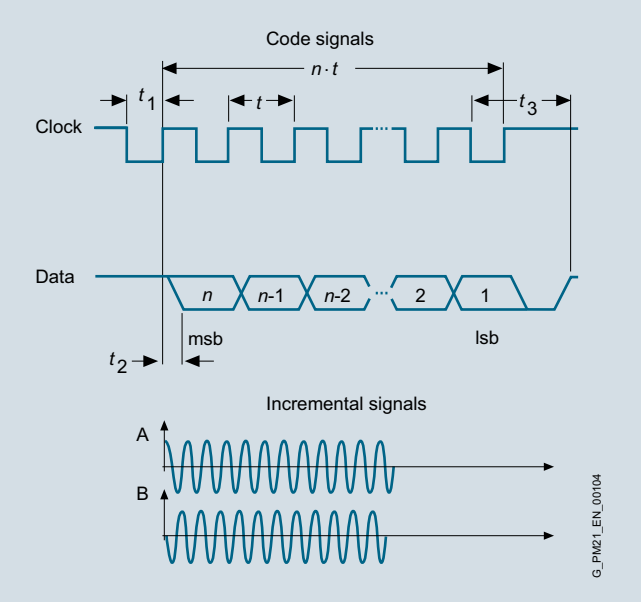
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Overview (continued)

Absolute encoder, multi-turn

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. An internal measuring gearbox enables it to differentiate 4096 revolutions.

So with a ball screw, for example, the absolute position of the slide can be determined over a long distance.



Multi-turn absolute encoder

Absolute encoder, single-turn

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute encoder, it has no measuring gearbox and can therefore only supply the position value within one revolution. It does not have a traversing range.

Absolute encoders without DRIVE-CLiQ interface	
AM2048S/R encoder	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM512S/R encoder	Absolute encoder 512 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM32S/R encoder	Absolute encoder 32 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM16S/R encoder	Absolute encoder 16 S/R, 4096 revolutions, multi-turn, with EnDat interface
AS2048S/R encoder	Absolute encoder single-turn 2048 S/R
Absolute encoders with DRIVE-CLiQ interface	
AM24DQI encoder	Absolute encoder 24 bit (resolution 16777216, internal 2048 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM20DQI encoder	Absolute encoder 20 bit (resolution 1048576, internal 512 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM22DQ encoder	Absolute encoder 22 bit (resolution 4194304, internal 2048 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM20DQ encoder	Absolute encoder 20 bit (resolution 1048576, internal 512 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM16DQ encoder	Absolute encoder 16 bit (resolution 65536, internal 32 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM15DQ encoder	Absolute encoder 15 bit (resolution 32768, internal 16 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AS24DQI encoder[2)]	Absolute encoder, single-turn, 24 bit (resolution 16777216)
AS20DQI encoder[2)]	Absolute encoder, single-turn, 20 bit (resolution 1048576)
AS22DQ encoder	Absolute encoder, single-turn, 22 bit (resolution 4194304)

Technical specifications

Absolute encoders without DRIVE-CLiQ interface

Supply voltage	5 V
Absolute position interface via EnDat 2.1	
• Traversing range (multi-turn)[1)]	4096 revolutions
Incremental signals (sinusoidal, 1 V_{pp})	
• Signals per revolution	2048/512/32/16

Absolute encoders with DRIVE-CLiQ interface

Supply voltage	24 V
Absolute position via DRIVE-CLiQ	
• Resolution within one revolution	$2^{24}/2^{22}/2^{20}/2^{16}/2^{15}$ bit
• Traversing range (multi-turn)[1)]	4096 revolutions

[1)] Not for absolute encoder, single-turn AS

[2)] The single-turn absolute encoder is used for the previously employed incremental encoders.

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Overview (continued)

Incremental encoder

This encoder senses relative movements and does not supply absolute position information. In combination with evaluation logic, a zero point can be determined using the integrated reference mark, which can be used to calculate the absolute position.

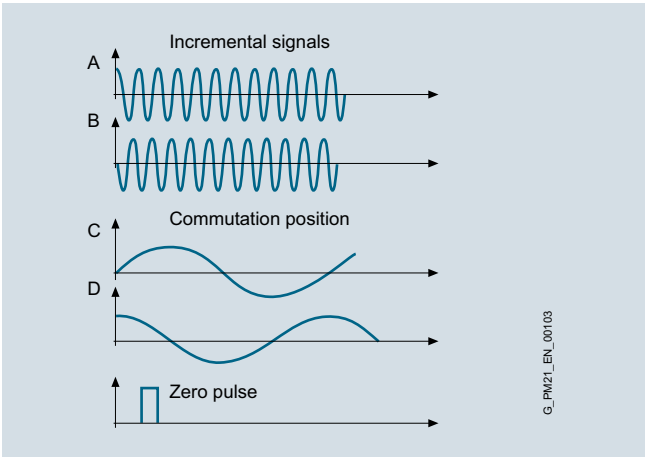
Incremental encoder IC/IN (sin/cos)

The encoder outputs sine and cosine signals. These can be interpolated using evaluation logic (usually 2048 points) and the direction of rotation can be determined.

In the version with DRIVE-CLiQ interface, this evaluation logic is already integrated in the encoder.

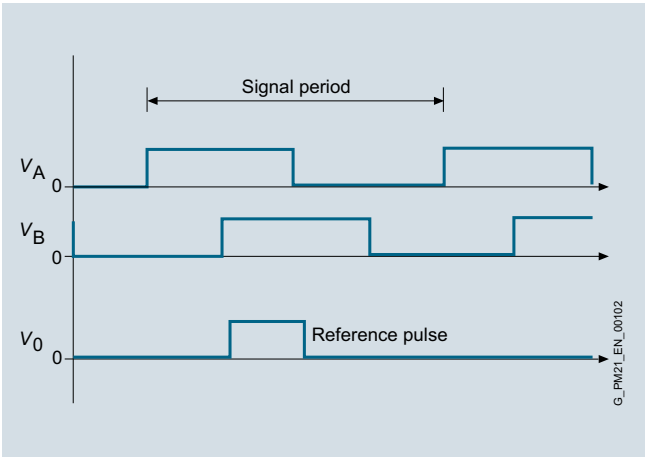
Commutation position

The position of the rotor is required for commutation of a synchronous motor. Encoders with commutation position (also termed C and D tracks) detect the angular position of the rotor.



Incremental encoder IC/IN (sin/cos), commutation position only for IC

Incremental encoder HTL



Incremental encoder HTL

Incremental encoders without DRIVE-CLiQ interface	
IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
IN2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R without C and D tracks
HTL2048S/R encoder	Incremental encoder HTL 2048 S/R
HTL1024S/R encoder	Incremental encoder HTL 1024 S/R
Incremental encoders with DRIVE-CLiQ interface[1)]	
IC22DQ encoder	Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit
IN22DQ encoder	Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) without commutation position

Technical specifications

Incremental encoders IC/IN (sin/cos) without DRIVE-CLiQ interface	
Supply voltage	5 V
Incremental signals per revolution	
• Resolution (sin/cos)	2048
• Commutation position (only for IC)	1 sin/cos
• Reference signal	1

Incremental encoders IC/IN (sin/cos) with DRIVE-CLiQ interface	
Supply voltage	24 V
Incremental signals per revolution	
• Resolution	2^{22} bit
• Commutation position in bits (only for IC)	11
• Reference signal	1

Incremental encoders HTL without DRIVE-CLiQ interface	
Supply voltage	10 ... 30 V
Incremental signals per revolution	
• Resolution (HTL)	2048/1024
• Reference signal	1

[1)] Instead of the IC22DQ incremental encoder, the AS24DQI single-turn absolute encoder is used for SIMOTICS S-1FK7/1FT7.

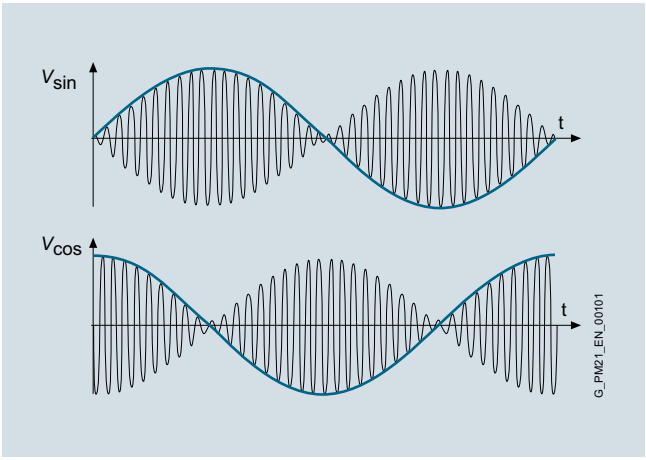
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Overview (continued)

Resolver

The number of sine and cosine periods per revolution corresponds to the number of pole pairs of the resolver. In the case of a 2-pole resolver, the evaluation electronics may output an additional zero pulse per encoder revolution. This zero pulse ensures a unique assignment of the position information in relation to an encoder revolution. A 2-pole resolver can therefore be used as a single-turn encoder.

2-pole resolvers can be used for motors with any number of poles. With multi-pole resolvers, the pole pair numbers of the motor and the resolver are always identical, so that the resolution is correspondingly higher than with 2-pole resolvers.



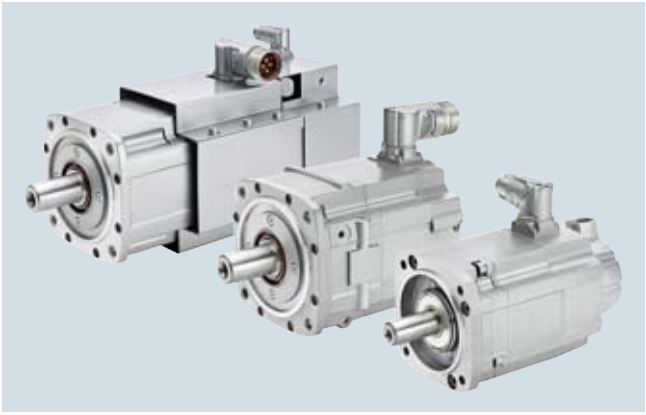
Resolvers without DRIVE-CLiQ interface[1]	
Resolver p = 1	2-pole resolver
Resolver p = 3	6-pole resolver
Resolver p = 4	8-pole resolver
Resolvers with DRIVE-CLiQ interface	
R15DQ	15-bit resolver (resolution 32768, internal multi-pole)
R14DQ	14-bit resolver (resolution 16384, internal 2-pole)

Technical specifications	
Resolvers without DRIVE-CLiQ interface	
Excitation voltage, rms	2 ... 8 V
Excitation frequency	5 ... 10 kHz
Output signals	$U_{\text{sine track}} = r \times U_{\text{excitation}} \times \sin \alpha$ $U_{\text{cosine track}} = r \times U_{\text{excitation}} \times \cos \alpha$ $\alpha = \arctan (U_{\text{sine track}}/U_{\text{cosine track}})$
Transmission ratio	$r = 0.5 \pm 5\ \%$
Resolvers with DRIVE-CLiQ interface	
Supply voltage	24 V
• Resolution	$2^{15}/2^{14}$ bit

[1] Output signals:
2-pole resolver: 1 sin/cos signal per revolution
6-pole resolver: 3 sin/cos signals per revolution
8-pole resolver: 4 sin/cos signals per revolution

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Overview



SIMOTICS S-1FT7 motors – forced ventilation, water cooling and natural cooling

The SIMOTICS S-1FT7 servomotors are permanent-magnet synchronous motors with very compact dimensions and an attractive design.

The S-1FT7 motors fulfill the highest standards in terms of dynamic performance, speed setting range, shaft and flange accuracy. They are equipped with state-of-the-art encoder technology and optimized for operation on our fully digital drive and control systems.

Natural cooling, forced ventilation or water cooling are available as cooling methods. With the natural cooling method, heat is dissipated through the surface of the motor. With the forced ventilation method, heat is forced out by means of built-on fans. The water cooling method achieves maximum cooling, thereby ensuring that the motor can be operated at maximum output.

Benefits

- Excellent dynamic performance in a wide speed range thanks to high overload capability ~ 4 × M_0 with natural cooling
- Wide speed setting range
- Outstanding resistance to vibratory and shock loads thanks to vibration-isolated encoder mounting
- High degree of protection – allows operation even under demanding environmental conditions
- Quick and easy mounting due to cross-profile (up to SH 100) and rotatable connectors with quick-release locks
- Zero-backlash holding brake
- Extremely high efficiency

SIMOTICS S-1FT7 Compact motors

S-1FT7 Compact motors have a low torque ripple so that they are ideal for use in machine tool applications that require extremely high surface quality and optimum machining results. Thanks to their compact dimensions, they can be installed in confined spaces.

SIMOTICS S-1FT7 High Dynamic motors

S-1FT7 High Dynamic motors have very low rotor moments of inertia to achieve extremely good dynamic performance and very short cycle times. The motors are available with forced ventilation or water cooling and have high continuous output ratings as a result.

Application

- High-performance machine tools
- Machines with stringent requirements in terms of dynamic performance and precision, e.g.:
  - Packaging machines
  - Foil extractor machines
  - Printing machines
  - Handling equipment

More information

Some SIMOTICS S-1FT7 motors are available as core types. These core types can be express delivered as replacement motors in the event of plant outages and offer the advantage of a quicker spare parts supply. For this reason, core types should be used for configuration wherever possible.

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Technical specifications

SIMOTICS S-1FT7 Compact/1FT7 High Dynamic	
Motor type	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnet material
Cooling	Natural cooling, forced ventilation, water cooling
Temperature monitoring	Temperature sensor in stator winding
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature rise of ΔT = 100 K at an ambient temperature of 40 °C (104 °F). For water cooling, max. inlet temperature 30 °C (86 °F). Avoid condensation.
Type of construction in accordance with EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3) with flange 0/flange 1 (compatible with 1FT6)
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)	IP64/IP65/IP67
Shaft extension at DE in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft/feather key and keyway (half-key balancing)
Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1)[1]	Tolerance N/Tolerance R
Vibration severity in accordance with EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed/Grade R
Sound pressure level L_{pA} (1 m) in accordance with EN ISO 1680, max. Tolerance + 3 dB	
• 1FT703 • 1FT704 ... 1FT706 • 1FT708 ... 1FT713	60 dB 65 dB 70 dB[4]
Connection	Connectors for signals and power rotatable
Paint finish	Pearl dark gray RAL 9023
2nd rating plate	Enclosed separately
Holding brake	Without/with
Certificate of suitability	cURus

Built-in encoder systems without DRIVE-CLiQ interface

Incremental encoder	
IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
Absolute encoder	
AM2048S/R encoder	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn

Built-in encoder systems with DRIVE-CLiQ interface

Absolute encoder, single-turn[2]	
AS24DQI encoder	Absolute encoder, single-turn, 24 bit
Absolute encoder, multi-turn	
AM24DQI encoder	Absolute encoder, 24 bit + 12-bit multiturn

S/R = Signals/Revolution

1) Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.
2) The single-turn absolute encoder is used for the previously employed incremental encoders.
3) Additional plain text required.
4) Motors with forced ventilation 73 dB.

Options

Order code	Description
J..	Mounting of SP+ planetary gearbox (see SIMOTICS S geared motors)
K20	Reinforced bearing with transverse forces as specified in the latest configuration manual (only 1FT7 Compact in conjunction with flange 1)
L03	Version for increased vibration stress (information about validity and specification can be found in the latest configuration manual)
N05	Alternative shaft geometry
N16	Version for increased chemical resistance
N40	Stainless-steel shaft and coating for increased chemical resistance (information about validity and specification can be found in the latest configuration manual)
Q12	Sealing air connection (Only in conjunction with option IP67. Not in combination with terminal box.)
Y84	Customer specifications on rating plate (max. 30 characters)[3]
	Paint finish
K23	Special paint finish for "Worldwide" climate group: Primer and paint finish in anthracite RAL 7016
K23+X..	Special paint finish for "Worldwide" climate group: Primer and other paint finish can be selected from X01 to X09
K24	Primed (unpainted)
X01	Paint finish: Jet black, matt RAL 9005
X02	Paint finish: Cream white RAL 9001
X03	Paint finish: Reseda green RAL 6011
X04	Paint finish: Pebble gray RAL 7032
X05	Paint finish: Sky blue RAL 5015
X06	Paint finish: Light ivory RAL 1015
X08	Paint finish: White aluminum
X09	Paint finish: Anthracite RAL 7016

When ordering a motor with options, **-Z** must be added to the article number.

N05
Alternative shaft geometry

The following versions are delivered with a smaller shaft extension:

- 1FT7034-5A.71-.... /1FT7042-5A.71-....
- 1FT7062-5A.71-.... /1FT7064-5A.71-....
- 1FT7082-5A.71-.... /1FT7084-5A.71-.... /1FT7086-5A.71-....
- 1FT7102-5A.71-.... /1FT7105-5A.71-.... /1FT7108-5A.71-....

Shaft dimensions (diameter × length) according to shaft height (SH):

- SH 36: 11 × 23 mm (0.43 × 0.91 in)
- SH 48: 14 × 30 mm (0.55 × 1.18 in)
- SH 63: 19 × 40 mm (0.75 × 1.57 in)
- SH 80: 24 × 50 mm (0.94 × 1.97 in)
- SH 100: 32 × 58 mm (1.26 × 2.28 in)

N16
Version for increased chemical resistance

Please refer to the latest configuration manual for further information.

Option N16 is available for the following naturally cooled SIMOTICS S-1FT7 Compact motors (only up to SH 100):

- 1FT7...-5A...-1B.. AS24DQI encoder
- 1FT7...-5A...-1C.. AM24DQI encoder
- 1FT7...-5A...-1M.. AM2048S/R encoder

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Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K	**Core type**	p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
2000	100	5.03 (6.75)	30 (22.1)	24 (17.7)	10	**1FT7102-1AC7■-1 ■ ■ 1**	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38 (28)	15	**1FT7105-1AC7■-1 ■ ■ 1**	5	178 (157)	44.2 (97.5)
3000	48	1.35 (1.81)	5 (3.7)	4.3 (3.2)	2.6	**1FT7044-1AF7■-1 ■ ■ 1**	3	5.43 (4.81)	7.2 (15.9)
	63	1.7 (2.28)	6 (4.4)	5.4 (4)	3.9	**1FT7062-1AF7■-1 ■ ■ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.2)	9 (6.6)	7.6 (5.6)	5.2	**1FT7064-1AF7■-1 ■ ■ 1**	5	11.9 (10.5)	9.7 (21.4)
	80	3.24 (4.34)	13 (9.6)	10.3 (7.6)	6.6	**1FT7082-1AF7■-1 ■ ■ 1**	5	26.5 (23.4)	14 (30.9)
		4.56 (6.11)	20 (14.8)	14.5 (10.7)	8.5	**1FT7084-1AF7■-1 ■ ■ 1**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	**1FT7086-1AF7■-1 ■ ■ 1**	5	63.6 (56.2)	27.5 (60.6)
4500	80	4.82 (6.46)[1]	20 (14.8)	11.5 (8.48)[1]	10.1[1]	**1FT7084-1AH7■-1 ■ ■ 1**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.4)	10	**1FT7086-1AH7■-1 ■ ■ 1**	5	63.6 (56.2)	27.5 (60.6)
6000	36	0.88 (1.2)	2 (1.5)	1.4 (1)	2.1	**1FT7034-1AK7■-1 ■ ■ 1**	3	0.85 (0.75)	3.8 (8.38)
	63	2.13 (2.86)[2]	6 (4.4)	3.7 (2.73)[2]	5.9[2]	**1FT7062-1AK7■-1 ■ ■ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47)[3]	9 (6.6)	5.5 (4.06)[3]	6.1[3]	**1FT7064-1AK7■-1 ■ ■ 1**	5	11.9 (10.5)	9.7 (21.4)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**	
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder		**N** **M**	
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**	
Shaft extension: Plain shaft Plain shaft	**Shaft and flange accuracy:** Tolerance N Tolerance N	**Holding brake:** Without With	**G** **H**	
Vibration severity: Grade A	**Degree of protection:** IP65			**1**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[4]	Stall current	Calculated power P_{calc}[7]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system		Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[5]		Power connector	Cable cross-section[6]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7102-1AC7...	93	12.5	6.28 (8.42)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7105-1AC7...	93	18	10.47 (14)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7044-1AF7...	92	2.8	1.57 (2.11)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7062-1AF7...	91	3.9	1.88 (2.52)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-1AF7...	93	5.7	2.83 (3.8)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7082-1AF7...	93	7.6	4.08 (5.47)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7084-1AF7...	93	11	6.28 (8.42)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7086-1AF7...	93	15.5	8.8 (11.8)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7084-1AH7...	93	15.6	9.42 (12.6)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-1AH7...	91	22.4	13.19 (17.7)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7034-1AK7...	90	2.7	1.26 (1.69)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7062-1AK7...	90	8.4	3.77 (5.06)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-1AK7...	91	9	5.65 (7.58)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) These values refer to n = 4000 rpm.
2) These values refer to n = 5500 rpm.
3) These values refer to n = 4500 rpm.
4) Optimum efficiency in continuous duty.
5) With default setting of the pulse frequency.
6) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
7) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
1500	100	4.08 (5.47)	30 (22.1)	26 (19.2)	8	**1FT7102-5AB7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.5)
		6.6 (8.85)	50 (36.9)	42 (31)	13	**1FT7105-5AB7■-1 ■ ■ ■**	5	178 (157)	44.2 (97.5)
		9.58 (12.85)	70 (51.6)	61 (45)	16	**1FT7108-5AB7■-1 ■ ■ ■**	5	248 (219)	59 (130)
	132	10.52 (14.11)	90 (121)	67 (49.4)	17.4	**1FT7132-5AB71 -1 ■ ■ ■**	4	459 (406)	76 (168)
		12.88 (17.27)	118 (158)	82 (60.5)	22.0	**1FT7134-5AB71 -1 ■ ■ ■**	4	604 (535)	92 (203)
		14.45 (19.38)	140 (188)	92 (67.9)	25.0	**1FT7136-5AB71 -1 ■ ■ ■**	4	748 (662)	108 (238)
		16.96 (22.74)	170 (228)	108 (79.7)	28.5	**1FT7138-5AB71 -■ ■ ■**	4	896 (793)	124 (273)
2000	80	2.39 (3.20)	13 (9.6)	11.4 (8.4)	4.9	**1FT7082-5AC7■-1 ■ ■ ■**	5	26.5 (23.4)	14 (30.9)
		3.54 (4.75)	20 (14.8)	16.9 (12.5)	8.4	**1FT7084-5AC7■-1 ■ ■ ■**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	22.5 (16.6)	9.2	**1FT7086-5AC7■-1 ■ ■ ■**	5	63.6 (56.3)	27.5 (60.6)
	100	5.03 (6.75)	30 (22.1)	24 (18)	10	**1FT7102-5AC7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.67)	50 (36.9)	38 (28)	15	**1FT7105-5AC7■-1 ■ ■ ■**	5	178 (157)	44.2 (97.5)
		10.5 (14.8)	70 (51.6)	50 (36.9)	18	**1FT7108-5AC7■-1 ■ ■ ■**	5	248 (219)	59 (130)
	132	11.52 (15.45)	90 (121)	55 (40.6)	18.7	**1FT7132-5AC71 -1 ■ ■ ■**	4	459 (406)	76 (168)
		13.82 (18.53)[5]	118 (158)	66 (48.7)[5]	21[5]	**1FT7134-5AC71 -1 ■ ■ ■**	4	604 (535)	92 (203)
		14.87 (19.94)[5]	140 (188)	71 (52.4)[5]	23.0[5]	**1FT7136-5AC71 -■ ■ ■**	4	748 (662)	109 (240)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ cable entry:[1]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors <u>without</u> DRIVE-CLiQ interface:	IC2048S/R encoder (only up to shaft height 100) AM2048S/R encoder (only up to shaft height 100)		**N** **M**
Encoder systems for motors <u>with</u> DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[2]	Stall current	Calculated power P_{calc}[6]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system	Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[3]			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}	Power connector	Cable cross-section[4]	Pre-assembled cable
	%	A	kW (HP)	A	Size	mm^2	Article No.
1FT7102-5AB7...	93	9	4.71 (6.32)	9	1.5	4 × 1.5	**6FX■002-5■ N21-....**
1FT7105-5AB7...	93	15	7.85 (10.53)	18	1.5	4 × 1.5	**6FX■002-5■ N21-....**
1FT7108-5AB7...	93	18	10.99 (14.7)	18	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7132-5AB7...	94	22.5	14.14 (18.96)	30	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7134-5AB7...	95	30.0	18.53 (24.85)	30	1.5	4 × 6	**6FX■002-5■ N51-....**
1FT7136-5AB7...	94	36.0	21.99 (29.49)	45	1.5	4 × 6	**6FX■002-5■ N51-....**
1FT7138-5AB7...	94	43.0	26.7 (35.80)	45	3	4 × 10	**6FX■002-5■ S13-....**
1FT7082-5AC7...	93	5	2.72 (3.65)	5	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7084-5AC7...	93	9	4.19 (5.62)	9	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7086-5AC7...	93	10.6	5.86 (7.86)	18	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7102-5AC7...	93	12.5	6.28 (8.42)	18	1.5	4 × 1.5	**6FX■002-5■ N21-....**
1FT7105-5AC7...	93	18	10.47 (14)	18	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7108-5AC7...	93	25	14.66 (19.7)	30	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7132-5AC7...	94	29.5	18.85 (25.28)	30	1.5	4 × 6	**6FX■002-5■ N51-....**
1FT7134-5AC7...	95	36.0	24.71 (33.14)	45	1.5	4 × 6	**6FX■002-5■ N51-....**
1FT7136-5AC7...	94	43.0	29.32 (39.32)	45	3	4 × 10	**6FX■002-5■ S13-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected with connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

5) Rated data are applicable with a DC link voltage of 600 to 720 V DC.

6) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FT7 Compact synchronous motors	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
3000	48	0.85 (1.14)	3 (2.2)	2.7 (2)	2.1	**1FT7042-5AF7■-1 ■ ■ ■**	3	2.81 (2.49)	4.6 (10.1)
		1.35 (1.81)	5 (3.7)	4.3 (3.2)	2.6	**1FT7044-5AF7■-1 ■ ■ ■**	3	5.43 (4.81)	7.2 (15.9)
		1.76 (2.36)	7 (5.2)	5.6 (4.1)	3.5	**1FT7046-5AF7■-1 ■ ■ ■**	3	7.52 (6.66)	9.3 (20.5)
	63	1.7 (2.28)	6 (4.4)	5.4 (4.0)	3.9	**1FT7062-5AF7■-1 ■ ■ ■**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.2)	9 (6.6)	7.6 (5.6)	5.2	**1FT7064-5AF7■-1 ■ ■ ■**	5	11.9 (10.5)	9.7 (21.4)
		2.92 (3.92)	12 (8.9)	9.3 (6.9)	7.2	**1FT7066-5AF7■-1 ■ ■ ■**	5	16.4 (14.5)	12.3 (27.1)
		3.42 (4.59)	15 (11.1)	10.9 (8)	6.7	**1FT7068-5AF7■-1 ■ ■ ■**	5	23.2 (20.5)	16.3 (35.9)
	80	3.24 (4.34)	13 (9.6)	10.3 (7.6)	6.6	**1FT7082-5AF7■-1 ■ ■ ■**	5	26.5 (23.5)	14 (30.9)
		4.55 (6.1)	20 (14.8)	14.5 (10.7)	8.5	**1FT7084-5AF7■-1 ■ ■ ■**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	**1FT7086-5AF7■-1 ■ ■ ■**	5	63.6 (56.3)	27.5 (60.6)
	100	6.28 (8.42)	30 (22.1)	20 (14.8)	12	**1FT7102-5AF7■-1 ■ ■ ■**	5	91.4 (80.9)	26.1 (57.5)
		8.8 (11.8)	50 (36.9)	28 (20.7)	15	**1FT7105-5AF7■-1 ■ ■ ■**	5	178 (157)	44.2 (97.5)
		6.28 (8.42)	70 (51.6)	20 (14.8)	12	**1FT7108-5AF7■-1 ■ ■ ■**	5	248 (220)	59 (130)
	132	8.48 (11.37)	90 (66.4)	27 (19.9)	14	**1FT7132-5AF71 -■ ■ ■**	4	459 (406)	77 (170)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ Cable entry:[1]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder (only up to shaft height 100) AM2048S/R encoder (only up to shaft height 100)		**N** **M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[2]	Stall current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[3]	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7042-5AF7...	92	2.1	0.94 (1.26)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7044-5AF7...	92	2.8	1.57 (2.11)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7046-5AF7...	92	4	2.2 (2.95)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7062-5AF7...	91	3.9	1.88 (2.52)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7064-5AF7...	93	5.7	2.83 (3.8)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7066-5AF7...	92	8.4	3.77 (5.06)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7068-5AF7...	92	8.3	4.71 (6.32)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7082-5AF7...	93	7.6	4.08 (5.47)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7084-5AF7...	93	11	6.28 (8.42)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■ N01-....**
1FT7086-5AF7...	93	15.5	8.8 (11.8)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7102-5AF7...	93	18	9.42 (12.6)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7105-5AF7...	94	26	15.71 (21)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7108-5AF7...	93	36	21.99 (29.5)	45	**6SL312■-1 TE24-5AA.**	1.5	4 × 6	**6FX■002-5■ N54-....**
1FT7132-5AF7...	94	43.5	28.27 (37.91)	45	**6SL312■-1 TE24-5AA.**	3	4 × 10	**6FX■002-5■ S13-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Connector size 3 not rotatable. An alternative terminal box can be selected with connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
4500	48	1.32 (1.77)[1]	7 (5.2)	3.6 (2.66)[1]	4.7[1]	**1FT7046-5AH7■-1■■■**	3	7.52 (6.66)	9.3 (20.5)
	63	2.55 (3.42)[2]	12 (8.9)	6.1 (4.50)[2]	7.5[2]	**1FT7066-5AH7■-1■■■**	5	16.4 (14.5)	12.3 (27.1)
	80	3.77 (5.06)	13 (9.6)	8 (5.9)	7.8	**1FT7082-5AH7■-1■■■**	5	26.5 (23.4)	14 (30.9)
		4.82 (6.46)[2]	20 (14.8)	11.5 (8.48)[2]	10.1[2]	**1FT7084-5AH7■-1■■■**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.4)	10	**1FT7086-5AH7■-1■■■**	5	63.6 (56.3)	27.5 (60.6)
6000	36	0.88 (1.18)	2 (1.5)	1.4 (1)	2.1	**1FT7034-5AK7■-1■■■**	3	0.85 (0.75)	3.8 (8.38)
		1.07 (1.43)	3 (2.2)	1.7 (1.3)	2.4	**1FT7036-5AK7■-1■■■**	3	1.33 (1.18)	5.0 (11)
	48	1.26 (1.69)	3 (2.2)	2 (1.5)	3	**1FT7042-5AK7■-1■■■**	3	2.81 (2.49)	4.6 (10.1)
		1.41 (1.89)[3]	5 (3.7)	3 (2.21)[3]	3.6[3]	**1FT7044-5AK7■-1■■■**	3	5.43 (4.81)	7.2 (15.9)
	63	2.13 (2.89)[4]	6 (4.4)	3.7 (2.73)[4]	5.9[4]	**1FT7062-5AK7■-1■■■**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47)[3]	9 (6.6)	5.5 (4.06)[3]	6.1[3]	**1FT7064-5AK7■-1■■■**	5	11.9 (10.5)	9.7 (21.4)

Type of construction:	IM B5	Flange 0	**0**
	IM B5	Flange 1 (compatible with 1FT6)	**1**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder		**N**
	AM2048S/R encoder		**M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder		**B**
	AM24DQI encoder		**C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[5]	Stall current	Calculated power P_{calc}[8]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system		Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[6]		Power connector	Cable cross-section[7]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7046-5AH7...	90	8.1	3.3 (4.43)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7066-5AH7...	90	13.6	5.65 (7.58)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7082-5AH7...	93	12.3	6.13 (8.22)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7084-5AH7...	93	15.6	9.42 (12.6)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-5AH7...	91	22.4	13.19 (17.7)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7034-5AK7...	90	2.7	1.26 (1.69)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7036-5AK7...	90	4.0	1.88 (2.52)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7042-5AK7...	91	3.9	1.88 (2.52)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7044-5AK7...	91	5.7	3.14 (4.21)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7062-5AK7...	90	8.4	3.77 (5.06)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-5AK7...	91	9	5.65 (7.59)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) These values refer to n = 3500 rpm.
2) These values refer to n = 4000 rpm.
3) These values refer to n = 4500 rpm.
4) These values refer to n = 5500 rpm.
5) Optimum efficiency in continuous duty.
6) With default setting of the pulse frequency.
7) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
8) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Forced ventilation

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Forced ventilation									
2000	80	5.0 (6.71)	27 (19.9)	24 (17.7)	13.5	**1FT7084-5SC7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		6.7 (8.98)	36 (26.6)	32 (23.6)	17	**1FT7086-5SC7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)
	100	11.7 (15.7)	65 (47.9)	56 (41.3)	29	**1FT7105-5SC7■-1 ■ ■ ■**	5	178 (158)	50 (110)
		15.3 (20.5)	91 (67)	73 (54)	33	**1FT7108-5SC7■-1 ■ ■ ■**	5	248 (220)	64 (57)
3000	80	7.2 (9.66)	27 (19.9)	23 (17)	18.5	**1FT7084-5SF7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		9.1 (12.2)	36 (26.6)	29 (21.4)	24	**1FT7086-5SF7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)
	100	15.1 (20.2)	65 (47.9)	48 (35.4)	35	**1FT7105-5SF7■-■ ■ ■ ■**	5	178 (158)	50 (110)
		18.8 (25.2)	91 (67)	60 (44)	38	**1FT7108-5SF7■-■ ■ ■ ■**	5	248 (220)	64 (57)
4500	80	9.9 (13.3)	27 (19.9)	21 (15.5)	24.5	**1FT7084-5SH7■-1 ■ ■ ■**	5	45 (39.8)	25 (55.1)
		11.8 (15.8)	36 (26.6)	25 (18.4)	25	**1FT7086-5SH7■-1 ■ ■ ■**	5	64 (56.6)	36 (79.4)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1)]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ Cable entry:[1)]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder		**N** **M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Feather key	Tolerance R	Without	**D**
Feather key	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**[2)]	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade R	IP64	**3**
Grade R	IP65	**4**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[3]	Stall current	Calculated power P_{calc}[6]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system		Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[4]		Power connector	Cable cross-section[5]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7084-5SC7...	93	15	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7086-5SC7...	93	19.5	7.5 (10.1)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7105-5SC7...	93	31	13.6 (18.2)	45	**6SL312■-1TE24-5AA.**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7108-5SC7...	93	39	19.1 (25.6)	45	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7084-5SF7...	94	21	8.5 (11.4)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-5SF7...	93	29	11.3 (15.2)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 6	**6FX■002-5■N51-....**
1FT7105-5SF7...	94	45	20.4 (27.4)	45	**6SL312■-1TE24-5AA.**	3	4 × 10	**6FX■002-5■S14-....**
1FT7108-5SF7...	94	57	28.6 (38.4)	60	**6SL312■-1TE26-0AA.**	3	4 × 16	**6FX■002-5■S23-....**
1FT7084-5SH7...	94	30.5	12.7 (17.0)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 6	**6FX■002-5■N51-....**
1FT7086-5SH7...	93	34	17.0 (22.8)	45	**6SL312■-1TE24-5AA.**	1.5	4 × 6	**6FX■002-5■N54-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Connector size 3 not rotatable. An alternative terminal box can be selected with connector size 3 only.
2) The degree of protection refers to the motor. The built-in fan meets the requirements of degree of protection IP54.
3) Optimum efficiency in continuous duty.
4) With default setting of the pulse frequency.
5) The current carrying capacity of the power cable complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
6) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Water cooling									
1500	100	7.9 (10.6)	50 (36.9)	50 (36.9)	20.3	**1FT7102-5WB7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		14.1 (18.9)	90 (66.4)	90 (66.4)	29.5	**1FT7105-5WB7■-1 ■ ■ ■**	5	191 (169)	54.8 (121)
		19.6 (26.3)	125 (92.2)	125 (92.2)	40.3	**1FT7108-5WB7■-1 ■ ■ ■**	5	265 (235)	68.6 (151)
2000	80	4.4 (5.90)	21 (15.5)	21 (15.5)	11	**1FT7082-5WC7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		7.33 (9.83)	35 (25.8)	35 (25.8)	17	**1FT7084-5WC7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		10.5 (14.1)	50 (36.9)	50 (36.9)	24	**1FT7086-5WC7■-1 ■ ■ ■**	5	67.8 (60)	34.1 (75.2)
	100	10.4 (13.9)	50 (36.9)	49.5 (36.5)	29.3	**1FT7102-5WC7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		18.8 (25.2)	90 (66.4)	90 (66.4)	40.8	**1FT7105-5WC7■-1 ■ ■ ■**	5	191 (169)	54.8 (121)
		26.2 (35.1)	125 (92.2)	125 (92.2)	47.5	**1FT7108-5WC7■-■ ■ ■**	5	265 (235)	69.6 (154)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1)]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ Cable entry:[1)]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder		**N** **M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[2]	Stall current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[3]	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7102-5WB7...	93	17.8	7.9 (10.6)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7105-5WB7...	94	28	14.1 (18.9)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7108-5WB7...	94	39	19.6 (26.3)	45	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7082-5WC7...	93	10.7	4.4 (5.90)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7084-5WC7...	94	16.5	7.3 (9.79)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-5WC7...	94	23	10.5 (14.1)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7102-5WC7...	94	25.5	10.5 (14.1)	30	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7105-5WC7...	94	39	18.8 (25.2)	45	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7108-5WC7...	95	45.3	26.2 (35.1)	45	**6SL312■-1TE24-5AA.**	3	4 × 10	**6FX■002-5■S14-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Connector size 3 not rotatable. An alternative terminal box can be selected with connector size 3 only.
2) Optimum efficiency in continuous duty.
3) With default setting of the pulse frequency.
4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 Compact – Water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FT7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC – Water cooling									
3000	63	3.1 (4.16)	10 (7.38)	10 (7.38)	7.8	**1FT7062-5WF7■-1 ■ ■ ■**	5	8.1 (7.17)	11 (24.3)
		5 (6.71)	16 (11.8)	16 (11.8)	12.5	**1FT7064-5WF7■-1 ■ ■ ■**	5	12.9 (11.4)	13.7 (30.2)
		6.2 (8.31)	20 (14.8)	19.6 (14.5)	14.4	**1FT7066-5WF7■-1 ■ ■ ■**	5	17.7 (15.7)	16.3 (35.9)
		9.3 (12.5)	30 (22.1)	29.5 (21.8)	19.6	**1FT7068-5WF7■-1 ■ ■ ■**	5	24.8 (22)	20.1 (44.3)
	80	6.4 (8.58)	21 (15.5)	20.5 (15.1)	16	**1FT7082-5WF7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		11 (14.8)	35 (25.8)	35 (25.8)	24.2	**1FT7084-5WF7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		15.4 (20.7)	50 (36.9)	49 (36.1)	36	**1FT7086-5WF7■-1 ■ ■ ■**	5	67.8 (60)	34.1 (75.2)
	100	14.3 (19.2)	50 (36.9)	45.5 (33.6)	38.8	**1FT7102-5WF7■-1 ■ ■ ■**	5	98.9 (87.5)	36.6 (80.7)
		24.8 (33.3)	90 (66.4)	79 (58.3)	49.5	**1FT7105-5WF7■-■ ■ ■ ■**	5	164 (145)	55.9 (123)
		34.2 (45.9)	125 (92.2)	109 (80.4)	60	**1FT7108-5WF7■-■ ■ ■ ■**	5	265 (235)	69.6 (153)
4500	63	9.1 (12.2)	20 (14.8)	19.4 (14)	20.8	**1FT7066-5WH7■-1 ■ ■ ■**	5	17.7 (15.7)	16.3 (35.9)
	80	8.95 (12)	21 (15.5.)	19 (14)	23.9	**1FT7082-5WH7■-1 ■ ■ ■**	5	28.9 (25.6)	20.7 (45.6)
		15.08 (21.19)	35 (25.8)	32 (23.6)	34.5	**1FT7084-5WH7■-1 ■ ■ ■**	5	48.3 (42.8)	27.5 (60.6)
		20.3 (27.2)	50 (36.9)	43 (31.7)	38	**1FT7086-5WH7■-1 ■ ■ ■**	5	67.8 (60)	34.1 (75.2)
6000	63	5.8 (7.78)	10 (7.38)	9.2 (6.79)	12.7	**1FT7062-5WK7■-1 ■ ■ ■**	5	8.1 (7.17)	11 (24.3)
		8.9 (11.9)	16 (11.8)	14.2 (10.5)	20	**1FT7064-5WK7■-1 ■ ■ ■**	5	12.9 (11.4)	13.7 (30.2)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1)]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ Cable entry:[1)]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder		**N** **M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[2]	Stall current	Calculated power P_{calc}[6]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system	Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[3]			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}	Power connector	Cable cross-section[4]	Pre-assembled cable
	%	A	kW (HP)	A	Size	mm^2	Article No.
1FT7062-5WF7...	91	7.4	3.1 (4.16)	9	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-5WF7...	91	11.9	5.0 (6.71)	18	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7066-5WF7...	91	14	6.3 (8.45)	18	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7068-5WF7...	93	19	9.4 (12.6)	18[5]	1	4 × 2.5	**6FX■002-5■N11-....**
1FT7082-5WF7...	94	16	6.6 (8.85)	18	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7084-5WF7...	94	23	11.0 (14.8)	30	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7086-5WF7...	94	34	15.7 (21.1)	45	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7102-5WF7...	95	40	15.7 (21.1)	45	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7105-5WF7...	94	53.2	28.3 (38.0)	60	3	4 × 16	**6FX■002-5■S23-....**
1FT7108-5WF7...	95	65	39.3 (52.7)	85	3	4 × 16	**6FX■002-5■G23-....**
1FT7066-5WH7...	91	19.7	9.4 (12.6)	30	1	4 × 2.5	**6FX■002-5■N11-....**
1FT7082-5WH7...	94	24	9.9 (13.3)	30	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7084-5WH7...	94	34.3	16.5 (22.1)	45	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7086-5WH7...	94	40.5	23.6 (31.6)	45	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7062-5WK7...	92	12.5	6.3 (8.5)	18	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-5WK7...	92	20.2	10.1 (13.5)	30	1	4 × 2.5	**6FX■002-5■N11-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Connector size 3 is not rotatable. An alternative terminal box can be selected with connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

4) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

5) With the specified Motor Module, at ΔT = 100 K winding temperature rise, the motor cannot be fully utilized with M_0. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

6) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FT7 High Dynamic – Forced ventilation/Water cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FT7 High Dynamic	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 High Dynamic for DC link voltage 510 ... 720 V DC – Forced ventilation									
3000	63	3.8 (5.10)	14 (10.3)	12 (8.85)	10.5	**1FT7065-7SF7■-1 ■ ■ ■**	5	6.4 (5.66)	19 (41.9)
		4.4 (5.90)	17 (12.5)	14 (10.3)	13	**1FT7067-7SF7■-1 ■ ■ ■**	5	8.3 (7.35)	23 (50.7)
	80	7.2 (9.66)	34 (25.1)	23 (17.0)	20	**1FT7085-7SF7■-1 ■ ■ ■**	5	20.7 (18.3)	34 (75.0)
		10.4 (13.9)	48 (35.4)	33 (24.3)	29	**1FT7087-7SF7■-1 ■ ■ ■**	5	27.4 (24.3)	42 (92.6)
4500	63	5.2 (6.97)	14 (10.3)	11 (8.11)	13.5	**1FT7065-7SH7■-1 ■ ■ ■**	5	6.4 (5.66)	19 (41.9)
		6.1 (8.18)	17 (12.5)	13 (9.59)	15	**1FT7067-7SH7■-1 ■ ■ ■**	5	8.3 (7.35)	23 (50.7)
	80	8.2 (11)	34 (25.1)	17.5 (12.9)	22.5	**1FT7085-7SH7■-1 ■ ■ ■**	5	20.7 (18.3)	34 (75.0)
		10.8 (14.5)	48 (35.4)	23 (17.0)	24	**1FT7087-7SH7■-■ ■ ■ ■**	5	27.4 (24.3)	43 (94.8)
1FT7 High Dynamic for DC link voltage 510 ... 720 V DC – Water cooling									
3000	63	5.7 (7.64)	19 (14.0)	18 (13.3)	15	**1FT7065-7WF7■-1 ■ ■ ■**	5	6.4 (5.66)	16 (35.3)
		7.4 (9.92)	25 (18.4)	23.5 (17.3)	21	**1FT7067-7WF7■-1 ■ ■ ■**	5	8.3 (7.35)	22 (48.5)
	80	11.9 (16.0)	43 (31.7)	38 (28.0)	32	**1FT7085-7WF7■-1 ■ ■ ■**	5	20.7 (18.3)	32 (70.6)
		16.0 (21.5)	61 (45.0)	51 (37.6)	43	**1FT7087-7WF7■-■ ■ ■ ■**	5	27.4 (24.3)	41 (90.4)
4500	63	7.8 (10.5)	19 (14.0)	16.5 (12.2)	20	**1FT7065-7WH7■-1 ■ ■ ■**	5	6.4 (5.66)	16 (35.3)
		10.4 (13.9)	25 (18.4)	22 (16.2)	25	**1FT7067-7WH7■-1 ■ ■ ■**	5	8.3 (7.35)	22 (48.5)
	80	15.6 (20.9)	43 (31.7)	33 (24.3)	48	**1FT7085-7WH7■-■ ■ ■ ■**	5	20.7 (18.3)	32 (70.6)
		21.7 (29.1)	61 (45.0)	46 (33.9)	53	**1FT7087-7WH7■-■ ■ ■ ■**	5	27.4 (24.3)	41 (90.4)

Type of construction:	IM B5 IM B5	Flange 0 Flange 1 (compatible with 1FT6)	**0** **1**
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1)]	Transverse right Transverse left Axial NDE Axial DE	**1** **2** **3** **4**
Terminal box/ Cable entry:[1)]	Top/transverse from right Top/transverse from left Top/axial from NDE Top/axial from DE		**5** **6** **7** **8**
Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder		**N** **M**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder		**B** **C**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key and keyway	Tolerance N	Without	**A**
Feather key and keyway	Tolerance N	With	**B**
Feather key and keyway	Tolerance R	Without	**D**
Feather key and keyway	Tolerance R	With	**E**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Plain shaft	Tolerance R	Without	**K**
Plain shaft	Tolerance R	With	**L**

Vibration severity:	**Degree of protection:**	
Grade A	IP64	**0**
Grade A	IP65	**1**
Grade A	IP67 (only with water cooling)	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67 (only with water cooling)	**5**

To select the type of construction and degree of protection, see Technical definitions.

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Motor type (repeated)	Effi-ciency[2]	Stall current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module Booksize format. For other versions and components, see SINAMICS S120 drive system		Power cable with complete shield. Motor connection (and brake connection) via power connector		
				Rated output current[3]		Power connector	Cable cross-section[4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FT7065-7SF7...	92	12	4.4 (5.90)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■ N21-....**
1FT7067-7SF7...	94	15	5.3 (7.11)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■ N21-....**
1FT7085-7SF7...	92	28	10.7 (14.3)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7087-7SF7...	93	40	15.1 (20.2)	45	**6SL312■-1 TE24-5AA.**	1.5	4 × 10	**6FX■002-5■ N64-....**
1FT7065-7SH7...	92	16	6.6 (8.85)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7067-7SH7...	94	19	8.0 (10.7)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7085-7SH7...	92	40	16.0 (21.5)	45	**6SL312■-1 TE24-5AA.**	1.5	4 × 10	**6FX■002-5■ N64-....**
1FT7087-7SH7...	93	45	22.6 (30.3)	45	**6SL312■-1 TE24-5AA.**	3	4 × 10	**6FX■002-5■ S14-....**
1FT7065-7WF7...	92	16	6.0 (8.05)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■ N31-....**
1FT7067-7WF7...	94	22	7.9 (10.6)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7085-7WF7...	93	36	13.5 (18.1)	45	**6SL312■-1 TE24-5AA.**	1.5	4 × 6	**6FX■002-5■ N54-....**
1FT7087-7WF7...	94	51	19.2 (25.7)	60	**6SL312■-1 TE26-0AA.**	3	4 × 16	**6FX■002-5■ S23-....**
1FT7065-7WH7...	92	22	9.0 (12.1)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7067-7WH7...	94	28	11.8 (15.8)	30	**6SL312■-1 TE23-0AA.**	1.5	4 × 4	**6FX■002-5■ N41-....**
1FT7085-7WH7...	94	58	20.3 (27.2)	60	**6SL312■-1 TE26-0AA.**	3	4 × 16	**6FX■002-5■ S23-....**
1FT7087-7WH7...	94	67	28.7 (38.5)	85	**6SL312■-1 TE28-5AA.**	3	4 × 25	**6FX■002-5DG33-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Connector size 3 is not rotatable. An alternative terminal box can be selected with connector size 3 only.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

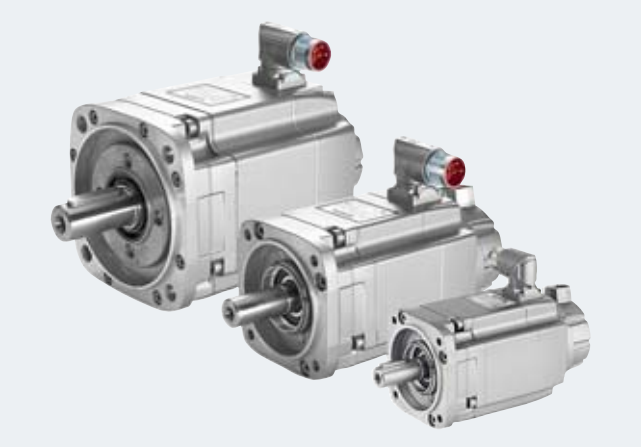
4) The current carrying capacity of the power cable complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7

Overview



SIMOTICS S-1FK7 motors

SIMOTICS S-1FK7 motors are compact permanent-magnet synchronous motors. The available options, gearboxes and encoders, together with the expanded product range, mean that the SIMOTICS S-1FK7 motors can be optimally adapted to any application. They therefore also satisfy the permanently increasing demands of state-of-the-art machine generations.

1FK7 motors can be combined with the SINAMICS S120 drive system to create a powerful system with high functionality. The integrated encoder systems for speed and position control can be selected depending on the application.

The motors are designed for operation without external cooling and the heat is dissipated through the motor surface.
1FK7 motors have a high overload capability.

Benefits

SIMOTICS S-1FK7 Compact motors:

- Space-saving installation due to extremely high power density
- For universal applications
- Wide range of motors

SIMOTICS S-1FK7 High Dynamic motors:

- Extremely high dynamic response thanks to the very low rotor moment of inertia

SIMOTICS S-1FK7 High Inertia motors:

- Robust closed-loop control properties for high or variable load moment of inertia
- Minimal optimization and commissioning overhead for the compensation of disturbance variables

Application

- Machine tools
- Robots and handling systems
- Wood, glass, ceramics and stone working
- Packaging, plastics and textile machines
- Printing machines
- Auxiliary axes

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Technical specifications

SIMOTICS S-1FK7 Compact/High Dynamic/High Inertia motor	
Motor type	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnet material
Cooling	Natural cooling
Temperature monitoring	Temperature sensor in stator winding
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature rise of ΔT = 100 K at an ambient temperature of 40 °C (104 °F)
Type of construction in accordance with EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)
Degree of protection in accordance with EN 60034-5 (IEC 60034-5) [1]	IP64 (optional IP65)
Shaft extension at DE in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft, optional shaft with feather key (half-key balancing)
Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1)[2]	Tolerance N
Vibration severity in accordance with EN 60034-14 (IEC 60034-14)	Grade A is maintained up to rated speed
Sound pressure level L_{pA} (1 m) in accordance with EN ISO 1680, max. Tolerance + 3 dB	
• 1FK701 ... 1FK704	55 dB
• 1FK706	65 dB
• 1FK708/1FK710	70 dB
Connection	Connectors for signals and power
Paint finish [3]	Anthracite (RAL 7016)
2nd rating plate	Enclosed separately
Holding brake	Optional integrated holding brake (free of backlash, 24 V DC)
Certificate of suitability	cURus

Built-in encoder systems without DRIVE-CLiQ interface

Incremental encoder	
IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
Absolute encoder	
AM2048S/R encoder	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn
AM512S/R encoder	Absolute encoder 512 S/R, 4096 revolutions, multi-turn
AM16S/R encoder	Absolute encoder 16 S/R, 4096 revolutions, multi-turn
Resolver	
Multi-pole resolver	Multi-pole resolver (number of pole pairs corresponds to number of pole pairs of the motor)
2-pole resolver	2-pole resolver

Built-in encoder systems with DRIVE-CLiQ interface

Incremental encoder/absolute encoder, single-turn[4]	
IC22DQ encoder	Incremental encoder 22 bit + commutation position 11 bit
AS24DQI encoder	Absolute encoder, single-turn, 24 bit
AS20DQI encoder	Absolute encoder, single-turn, 20 bit
Absolute encoder, multi-turn	
AM24DQI encoder	Absolute encoder 24 bit + 12 bit multi-turn (traversing range 4096 revolutions)
AM22DQ encoder	Absolute encoder 22 bit + 12 bit multi-turn (traversing range 4096 revolutions)
AM20DQI/ AM20DQ encoder	Absolute encoder 20 bit + 12 bit multi-turn (traversing range 4096 revolutions)
AM15DQ encoder	Absolute encoder 15 bit + 12 bit multi-turn (traversing range 4096 revolutions)
Resolver	
R15DQ resolver	Resolver 15 bit (internal, multi-pole)
R14DQ resolver	Resolver 14 bit (internal, 2-pole)

S/R = Signals/Revolution

[1] 1FK701 can be supplied only with IP54 degree of protection.

[2] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

[3] 1FK702 without a paint finish as standard.

[4] The single-turn absolute encoder is used for the previously employed incremental encoders.

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Options

Order code	Description
J..	Mounting of SP+ planetary gearbox (see SIMOTICS S geared motors)
M03	Version for potentially explosive atmospheres Zone 2 in accordance with EN 50021/IEC 60079-15
M39	Version for potentially explosive atmospheres Zone 22 in accordance with EN 50281/IEC 61241-1
N05	Alternative shaft geometry
N16	Version for increased chemical resistance
N24	Reinforced brake
Q31	Metal rating plate instead of adhesive label
V..	Mounting of LP+ planetary gearbox (see SIMOTICS S geared motors)
	Paint finish
K23	Special paint finish for "Worldwide" climate group: Primer and paint finish in anthracite RAL 7016[1)]
K23+X..	Special paint finish for "Worldwide" climate group: Primer and other paint finish can be selected from X01 to X27
K24	Primer (without paint finish)[2)]
X01	Paint finish: Jet black, matt RAL 9005[1)]
X02	Paint finish: Cream white RAL 9001
X03	Paint finish: Reseda green RAL 6011[1)]
X04	Paint finish: Pebble gray RAL 7032[1)]
X05	Paint finish: Sky blue RAL 5015[1)]
X06	Paint finish: Light ivory RAL 1015[1)]
X08	Paint finish: Suitable for food grade applications White aluminum RAL 9006[1)]
X27	Paint finish: Dark pearl grey RAL 9023[1)]

When ordering a motor with options, **-Z** must be added to the article number.

N24
Reinforced brake

When option "Reinforced brake" is selected for 1FK7 motors, they are fitted with a holding brake that is stronger than the standard brake (cf. built-in holding brakes).

The option "Reinforced brake" is available for the following 1FK7 motors:

- 1FK703.-.....-.... 1FK7101-.....-....
- 1FK704.-.....-.... 1FK7103-.....-....
- 1FK706.-.....-.... 1FK7105-.....-....
- 1FK708.-.....-....

Note:
Check whether the mechanical components of the customer's machine are capable of withstanding increased forces and torques in the event of an Emergency Off scenario before using motors with a reinforced brake.

M03
Version for potentially explosive atmospheres Zone 2 in accordance with IEC 60079-15

Combustible or potentially explosive gases and vapors develop only rarely or for brief periods in Zone 2 areas. This type of protection is designated as EEx nA II (non sparking).

The special conditions for operating 1FK7 motors in Zone 2 areas, in particular the reduction in permissible operating speeds, are described in detail in Annex 610.40089.01 to the EC Declaration of Conformity 664.20038.02.

M39
Version for potentially explosive atmospheres Zone 22 in accordance with IEC 61241-1

Combustible or potentially explosive dust (non-conductive dust) develops only rarely and for brief periods in Zone 22 areas. This type of protection is designated as Ex 3D T 160 °C (320 °F).

The special conditions for operating 1FK7 motors in Zone 22 areas are described in detail in Annex 610.40090.01 to the EC Declaration of Conformity 664.20039.02.

Note regarding options M03 and M39:
It is not always permissible to combine the option for potentially explosive atmospheres with other motor options. Please refer to the configuration manual for further information.

[1)] For the paint finish, the 1FK702 motors must be ordered with 3 or 5 on the 16th data position.

[2)] For the primer, the 1FK702 motors must be ordered with 0 or 2 in the 16th data position.

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Options (continued)

N05
Alternative shaft geometry

1FK7 motors are delivered with a shaft extension that has an alternative shaft geometry (smaller dimensions).

- 1FK703: 11 × 23 mm (0.43 × 0.91 in)
- 1FK704: 14 × 30 mm (0.55 × 1.18 in)
- 1FK706: 19 × 40 mm (0.75 × 1.57 in)
- 1FK708: 24 × 50 mm (0.94 × 1.97 in)
- 1FK710: 32 × 58 mm (1.26 × 2.28 in)

Note:
The shaft and flanges of 1FK7 motors with option N05 are always compatible with the corresponding 1FT5 motors.
Exception: The shaft of 1FK706... motors is only compatible with 1FT506... motors.

N16
Version for increased chemical resistance

1FK7 motors with option N16 are designed for operation in food processing environments.

The PS Premium paint system of these motors is resistant to a broad range of commonly used cleaning agents and disinfectants.

Additional properties of motors equipped with option N16:

- 4-coat paint system
- Nickel-plated connector

Note:
The PS Premium paint system has been tested with a broad spectrum of industrial cleaning products with pH values ranging from 1.5 – 13. Resistance to the acidic and alkaline cleaning agents and disinfectants in general use was verified in a material resistance test conducted by the company ECOLAB Deutschland GmbH.

Option N16 is available for 1FK703 to 1FK710 motors with the following encoders:

- AM20DQI (1FK7...-.....-.R..)
  Absolute encoder 20 bit + 12 bit multi-turn with DRIVE-CLiQ interface
- AM24DQI (1FK7...-.....-.C..)
  Absolute encoder 24 bit + 12 bit multi-turn with DRIVE-CLiQ interface
- AS24DQI (1FK7...-.....-.B..)
  Absolute encoder, single-turn, 24 bit with DRIVE-CLiQ interface
- AM2048S/R (1FK7...-.....-.E..)
  Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface
- Multi-pole resolver (1FK7...-.....-.S..)
- Two-pole resolver (1FK7...-.....-.T..)

Motors with DRIVE-CLiQ interface differ from the standard motor version in the following respects:

- The motor is 5 mm longer and has the same overall length as a motor without DRIVE-CLiQ interface.
- The connector is a rotatable angle plug.
- The height of the interfering contour relative to the motor center is 82 mm (3.23 in)
- A non-standard signal cable is required (see MOTION-CONNECT connection systems > Connection overview of SIMOTICS S-1FT7/-1FK7 motors with RJ45 connection or with option N16 installed on SINAMICS S120)

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SIMOTICS S-1FK7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
2000	48	0.6 (0.8)	3.0 (2.2)	2.8 (2.1)	1.55	**1FK7042-2AC71-1■■■**	4	2.9 (2.57)	4.6 (10.1)
	63	1.1 (1.48)	6.0 (4.0)	5.3 (4.0)	2.95	**1FK7060-2AC71-1■■■**	4	7.7 (6.82)	7.1 (15.7)
		1.5 (2.01)	8.5 (6.0)	7.0 (5.0)	2.65	**1FK7062-2AC71-1■■■**	4	11.2 (9.91)	9.1 (20.1)
		1.9 (2.55)	11.0 (8.0)	8.9 (7.0)	4.4	**1FK7063-2AC71-1■■■**	4	14.7 (13.01)	11.1 (24.5)
	80	2.1 (2.82)	12.0 (8.9)	10.0 (7.4)	4.4	**1FK7081-2AC71-1■■■**	4	20 (17.7)	12.9 (28.4)
		2.6 (3.49)	16.0 (11.8)	12.5 (9.2)	6.3	**1FK7083-2AC71-1■■■**	4	26 (23)	15.6 (34.4)
		3.1 (4.16)	20.0 (14.8)	15.0 (11.1)	6.7	**1FK7084-2AC71-1■■■**	4	32.5 (28.8)	18.3 (40.4)
	100	3 (4.02)	18.0 (13.3)	14.5 (10.7)	7.1	**1FK7100-2AC71-1■■■**	4	54 (47.8)	17.6 (38.8)
		4.3 (5.77)	27.0 (19.9)	20.5 (15.1)	9.7	**1FK7101-2AC71-1■■■**	4	79 (69.9)	23.0 (50.7)
		5.2 (6.97)	36.0 (26.6)	25.0 (18.4)	11.0	**1FK7103-2AC71-1■■■**	4	104 (92.1)	28.5 (62.8)
		7.7 (10.33)	48.0 (35.4)	37.0 (27.3)	16.0	**1FK7105-2AC71-1■■■**	4	154 (136.3)	39.0 (86)
3000	48	0.8 (1.07)	3.0 (2.2)	2.6 (1.9)	2.0	**1FK7042-2AF71-1■■■**	4	2.9 (2.57)	4.6 (10.1)
	63	1.5 (2.01)	6.0 (4.0)	4.7 (3.0)	3.7	**1FK7060-2AF71-1■■■**	4	7.7 (6.82)	7.1 (15.7)
		1.9 (2.55)	8.5 (6.0)	6.0 (4.0)	4.0	**1FK7062-2AF71-1■■■**	4	11.2 (9.91)	9.1 (20.1)
		2.3 (3.08)	11.0 (8.0)	7.3 (5.0)	5.6	**1FK7063-2AF71-1■■■**	4	14.7 (13.01)	11.1 (24.5)
	80	2.1 (2.82)	8.0 (5.9)	6.8 (5.0)	4.4	**1FK7080-2AF71-1■■■**	4	14.2 (12.8)	10.3 (22.7)
		2.7 (3.62)	12.0 (8.9)	8.7 (6.4)	6.8	**1FK7081-2AF71-1■■■**	4	20 (17.7)	12.9 (28.4)
		3.3 (4.43)	16.0 (11.8)	10.5 (7.7)	7.2	**1FK7083-2AF71-1■■■**	4	26 (32)	15.6 (34.4)
		3.1 (4.16)	20.0 (14.8)	10.0 (7.4)	6.5	**1FK7084-2AF71-1■■■**	4	32.5 (28.8)	18.3 (40.4)
	100	3.8 (5.10)	18.0 (13.3)	12.0 (8.9)	8.0	**1FK7100-2AF71-1■■■**	4	54 (47.8)	17.6 (38.8)
		4.9 (6.57)	27.0 (19.9)	15.5 (11.4)	11.6	**1FK7101-2AF71-1■■■**	4	79 (69.9)	23.0 (50.7)
		4.4 (5.9)	36.0 (26.6)	14.0 (10.3)	11.5	**1FK7103-2AF71-1■■■**	4	104 (92.1)	28.5 (62.8)
		8.2 (11)	48.0 (35.4)	26.0 (19.2)	18.0	**1FK7105-2AF71-1■■■**	4	154 (136.6)	39.0 (86)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder		**A**
	AM2048S/R encoder		**E**
	Multi-pole resolver 2-pole resolver		**S** **T**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder		**B**
	AM24DQI encoder		**C**
	AS20DQI encoder		**Q**
	AM20DQI encoder		**R**
	R15DQ resolver		**U**
	R14DQ resolver		**P**
Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**
Degree of protection:	IP64		**0**
	IP65		**1**
	IP65 and DE flange IP67		**2**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	**Booksize format** For other versions and components, see SINAMICS S120 drive system			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}		Power connector	Cable cross-section[3]	Pre-assembled cable
	%	A	kW (HP)	A	Article No.	Size	mm²	Article No.
				Line voltage 380 ... 480 V 3 AC				
1FK7042-2AC71-...	88	1.6	0.6 (0.8)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7060-2AC71-...	90	3.15	1.3 (1.74)	3[4]	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7062-2AC71-...	90	3.0	1.8 (2.41)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7063-2AC71-...	91	5.3	2.3 (3.08)	5[4]	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7081-2AC71-...	93	5.0	2.5 (3.35)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7083-2AC71-...	93	7.5	3.4 (4.56)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7084-2AC71-...	93	8.5	4.2 (5.63)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7100-2AC71-...	92	8.4	3.8 (5.10)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7101-2AC71-...	93	12.3	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FK7103-2AC71-...	93	14.4	7.5 (10.1)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FK7105-2AC71-...	93	20.0	10.1 (13.54)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FK7042-2AF71-...	89	2.2	0.9 (1.21)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7060-2AF71-...	90	4.45	1.9 (2.55)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7062-2AF71-...	91	5.3	2.7 (3.62)	5[4]	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7063-2AF71-...	91	8.0	3.5 (4.69)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7080-2AF71-...	92	4.9	2.5 (3.35)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7081-2AF71-...	93	8.7	3.8 (5.10)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7083-2AF71-...	93	10.1	5 (6.71)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7084-2AF71-...	93	12.1	6.3 (8.45)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7100-2AF71-...	92	11.1	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7101-2AF71-...	93	18.8	8.5 (11.4)	18[4]	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FK7103-2AF71-...	93	26.0	11.3 (15.2)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FK7105-2AF71-...	94	31.0	15.1 (20.25)	30[4]	**6SL312■-■TE23-0AA.**	1.5	4 × 6	**6FX■002-5■N51-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm².

4) With the specified Motor Module, at ΔT = 100 K winding temperature rise, the motor cannot be fully utilized with M_0. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
4500	63	1.7 (2.28)	6.0 (4.4)	3.7 (2.7)	4.3	**1FK7060-2AH71-1■■■**	4	7.7 (6.82)	7.1 (15.7)
		1.4 (1.88)	8.5 (6.0)	3.0 (2.2)	3.3	**1FK7062-2AH71-1■■■**	4	11.2 (9.91)	9.1 (20.1)
		1.4 (1.88)	11.0 (8.0)	3.0 (2.2)	3.8	**1FK7063-2AH71-1■■■**	4	14.7 (13.01)	11.1 (24.5)
	80	2.1 (2.82)	8.0 (6.0)	4.5 (3.3)	4.8	**1FK7080-2AH71-1■■■**	4	14.2 (12.57)	10.3 (22.7)
		1.8 (2.41)	12.0 (8.9)	3.8 (2.8)	4.9	**1FK7081-2AH71-1■■■**	4	20 (17.7)	12.9 (28.4)
		1.4 (1.88)	16.0 (11.8)	3.0 (2.2)	3.6	**1FK7083-2AH71-1■■■**	4	26 (23.01)	15.6 (34.4)
6000	36	0.5 (0.67)	1.15 (0.8)	0.8 (0.6)	1.3	**1FK7032-2AK71-1■■■**	3	0.65 (0.58)	2.7 (5.95)
		0.6 (0.8)	1.6 (1.2)	1.0 (0.7)	1.3	**1FK7034-2AK71-1■■■**	3	0.9 (0.8)	3.5 (7.72)
	48	0.7 (0.94)	1.6 (1.2)	1.1 (0.8)	1.85	**1FK7040-2AK71-1■■■**	4	1.6 (1.42)	3.2 (7.06)
		0.9 (1.21)	3.0 (2.2)	1.5 (1.1)	2.5	**1FK7042-2AK71-1■■■**	4	2.9 (2.57)	4.6 (10.14)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM2048S/R encoder	**E**
	Multi-pole resolver 2-pole resolver	**S** **T**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder	**B**
	AM24DQI encoder	**C**
	AS20DQI encoder	**Q**
	AM20DQI encoder	**R**
	R15DQ resolver	**U**
	R14DQ resolver	**P**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	IP64	**0**
	IP65	**1**
	IP65 and DE flange IP67	**2**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[4]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm²	Article No.
				Line voltage 380 ... 480 V 3 AC				
1FK7060-2AH71-...	90	6.3	2.8 (3.75)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7062-2AH71-...	91	8.0	4 (5.36)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7063-2AH71-...	90	12.0	5.2 (6.97)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7080-2AH71-...	92	7.4	3.8 (5.10)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7081-2AH71-...	93	13.1	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7083-2AH71-...	93	15.0	7.5 (10.06)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7032-2AK71-...	88	1.7	0.7 (0.94)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7034-2AK71-...	88	1.9	1 (1.34)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7040-2AK71-...	88	2.35	1 (1.34)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7042-2AK71-...	89	4.4	1.9 (2.55)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm².

4) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7 Compact – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 Compact synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC – Natural cooling									
6000	20	0.05 (0.07)	0.18 (0.13)	0.08 (0.06)	0.85	**1FK7011-5AK71-1■■■**	4	0.064 (0.06)	0.9 (1.98)
		0.1 (0.13)	0.35 (0.26)	0.16 (0.13)	0.85	**1FK7015-5AK71-1■■■**	4	0.083 (0.07)	1.1 (2.43)
	28	0.38 (0.51)	0.85 (0.63)	0.6 (0.44)	1.4	**1FK7022-5AK71-1■■■**	3	0.28 (0.25)	1.8 (3.97)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM512S/R encoder (only for 1FK702) AM16S/R encoder	**H** **J**
	Multi-pole resolver	**S**
	2-pole resolver	**T**
Encoder systems for motors with DRIVE-CLiQ interface: (Only for 1FK702)[1]	IC22DQ encoder	**D**
	AM20DQ encoder AM15DQ encoder	**L** **V**
	R15DQ resolver	**U**
	R14DQ resolver	**P**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	**Paint finish:**	
IP64 (only for 1FK702)	Without	**0**
IP65 and DE flange IP67 (only for 1FK702)	Without	**2**
IP54 (only for 1FK701), IP64 (only for 1FK702)	With	**3**
IP65 and DE flange IP67 (only for 1FK702)	With	**5**

[1] 1FK701 motors cannot be equipped with a DRIVE-CLiQ interface. The encoder systems are connected via SMC (Sensor Module Cabinet-Mounted).

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[4]	**SINAMICS S120 Motor Module** Rated output current[2]	**Booksize format** For other versions and components, see SINAMICS S120 drive system	**Power cable with complete shield** Motor connection (and brake connection) via power connector: Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}		Size	mm^2	
	%	A	kW (HP)	A	Article No.			
				Line voltage 380 ... 480 V 3 AC				
1FK7011-5AK71-...	62	1.5	0.1 (0.13)	3	**6SL312■-■TE13-0AA.**	0.5	4 × 1.5	**6FX5002-5DN20-....**
1FK7015-5AK71-...	68	1.5	0.2 (0.27)	3	**6SL312■-■TE13-0AA.**	0.5	4 × 1.5	**6FX5002-5DN20-....**
1FK7022-5AK71-...	86	1.8	0.5 (0.67)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm^2.

4) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7 High Dynamic – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 High Dynamic synchronous motors Natural cooling**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 High Dynamic for DC link voltage 510 ... 720 V DC – Natural cooling									
2000	63	2.1 (2.82)	12.0 (8.85)	10.0 (7.38)	7.1	**1FK7064-4CC71-1■■■**	3	7.5 (6.64)	15.4 (33.96)
	80	3.1 (4.16)	22.0 (16.23)	15.0 (11.06)	10.0	**1FK7085-4CC71-1■■■**	4	22 (19.5)	23.0 (50.7)
		3.8 (5.10)	28.0 (20.65)	18.0 (13.28)	9.0	**1FK7086-4CC71-1■■■**	4	22 (19.5)	23.0 (50.7)
3000	48	1.2 (1.61)	4.5 (3.32)	3.7 (2.73)	3.45	**1FK7044-4CF71-1■■■**	3	1.26 (1.12)	7.4 (16.3)
	63	1.7 (2.28)	6.4 (4.72)	5.4 (3.98)	5.3	**1FK7061-4CF71-1■■■**	3	4.1 (3.63)	9.5 (20.95)
		2.5 (3.35)	12.0 (8.85)	8.0 (5.9)	7.6	**1FK7064-4CF71-1■■■**	3	7.5 (6.64)	15.4 (33.96)
	80	2 (2.68)	22.0 (16.23)	6.5 (4.8)	7.0	**1FK7085-4CF71-1■■■**	4	22 (19.5)	23.0 (50.7)
		2 (2.68)	28.0 (20.65)	6.5 (4.8)	5.7	**1FK7086-4CF71-1■■■**	4	22 (19.5)	23.0 (50.7)
4500	48	1.2 (1.61)	3.5 (2.58)	2.6 (1.9)	3.3	**1FK7043-4CH71-1■■■**	3	1 (0.89)	6.0 (13.23)
		1.4 (1.88)	4.5 (3.32)	3.0 (2.2)	3.9	**1FK7044-4CH71-1■■■**	3	1.26 (1.12)	7.4 (16.3)
	63	2 (2.68)	6.4 (4.72)	4.3 (3.2)	6.2	**1FK7061-4CH71-1■■■**	3	4.1 (3.63)	9.5 (20.95)
		2.4 (3.22)	12.0 (8.85)	5.0 (3.7)	7.0	**1FK7064-4CH71-1■■■**	3	7.5 (6.64)	15.4 (33.96)
6000	36	0.6 (0.8)	1.3 (1.0)	0.9 (0.66)	1.6	**1FK7033-4CK71-1■■■**	3	0.25 (0.22)	3.0 (6.62)
	48	1.3 (1.74)	3.5 (2.58)	2.0 (1.48)	3.5	**1FK7043-4CK71-1■■■**	3	1 (0.89)	6.0 (13.23)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM2048S/R encoder	**E**
	Multi-pole resolver	**S**
	2-pole resolver	**T**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder	**B**
	AM24DQI encoder	**C**
	AS20DQI encoder	**Q**
	AM20DQI encoder	**R**
	R15DQ resolver	**U**
	R14DQ resolver	**P**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	IP64	**0**
	IP65	**1**
	IP65 and DE flange IP67	**2**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[4]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
				Line voltage 380 ... 480 V 3 AC				
1FK7064-4CC71-...	93	8.1	2.5 (3.35)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7085-4CC71-...	92	13.5	4.6 (6.17)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7086-4CC71-...	93	13.2	5.9 (7.91)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7044-4CF71-...	91	4.0	1.4 (1.88)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7061-4CF71-...	93	6.1	2 (2.68)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7064-4CF71-...	93	10.8	3.8 (5.10)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7085-4CF71-...	92	22.0	6.9 (9.25)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FK7086-4CF71-...	93	21.5	8.8 (11.8)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FK7043-4CH71-...	90	4.1	1.6 (2.15)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7044-4CH71-...	91	5.4	2.1 (2.8)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7061-4CH71-...	93	8.7	3 (4.02)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7064-4CH71-...	93	15.0	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7033-4CK71-...	88	2.1	0.8 (1.07)	3	**6SL312■-■TE13-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7043-4CK71-...	90	5.6	2.2 (2.95)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:		
Internal air cooling	**0**	
External air cooling	**1**	
Motor Module:		
Single Motor Module	**1**	
Double Motor Module	**2**	

Power cable:		
MOTION-CONNECT 800PLUS	**8**	
MOTION-CONNECT 500	**5**	
Without brake cores		**C**
With brake cores		**D**
Length code		**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm^2.

4) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7 High Inertia – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 High Inertia synchronous motors**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 High Inertia for DC link voltage 510 ... 720 V DC – Natural cooling									
2000	80	3.1 (4.16)	20.0 (14.75)	15.0 (11.06)	6.7	**1FK7084-3BC71-1■■■**	4	99 (87.62)	23.0 (50.72)
	100	3 (4.02)	18.0 (13)	14.5 (11)	7.1	**1FK7100-3BC71-1■■■**	4	87 (77)	19.4 (42.78)
		4.3 (5.77)	27.0 (20)	20.5 (15)	9.7	**1FK7101-3BC71-1■■■**	4	127 (112.41)	25.7 (56.67)
		5.2 (6.97)	36.0 (27)	25.0 (18)	11.0	**1FK7103-3BC71-1■■■**	4	168 (148.70)	32.1 (70.78)
		7.7 (10.33)	48.0 (35)	37.0 (27)	16.0	**1FK7105-3BC71-1■■■**	4	249 (220.39)	44.4 (97.90)
3000	63	1.5 (2.01)	6.0 (4.43)	4.7 (3.5)	3.7	**1FK7060-3BF71-1■■■**	4	12.5 (11.06)	7.9 (17.42)
		1.9 (2.55)	8.5 (6.27)	6.0 (4.43)	4.0	**1FK7062-3BF71-1■■■**	4	23.5 (20.80)	10.7 (23.59)
	80	2.7 (3.62)	12.0 (8.85)	8.7 (6.4)	6.8	**1FK7081-3BF71-1■■■**	4	49 (43.37)	15.2 (33.52)
		3.1 (4.16)	20.0 (14.75)	10.0 (7.4)	6.5	**1FK7084-3BF71-1■■■**	4	99 (87-62)	23.0 (50.72)
	100	4.9 (6.57)	27.0 (20)	15.5 (11)	11.6	**1FK7101-3BF71-1■■■**	4	127 (112.41)	25.7 (56.76)
		4.4 (5.90)	36.0 (27)	14.0 (10)	11.5	**1FK7103-3BF71-1■■■**	4	168 (148.70)	32.1 (70.78)
6000	48	0.9 (1.21)	3.0 (2.21)	1.5 (1.1)	2.5	**1FK7042-3BK71-1■■■**	4	5.1 (4.51)	5.1 (11.25)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM2048S/R encoder	**E**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder	**B**
	AM24DQI encoder	**C**
	AS20DQI encoder	**Q**
	AM20DQI encoder	**R**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	IP64	**0**
	IP65	**1**
	IP65 and DE flange IP67	**2**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	**Booksize format** For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
				Line voltage 380 ... 480 V 3 AC				
1FK7084-3BC71-...	93	8.5	4.2 (5.63)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7100-3BC71-...	92	8.4	3.8 (5.10)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7101-3BC71-...	93	12.3	5.7 (7.64)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FK7103-3BC71-...	93	14.4	7.5 (10.06)	18	**6SL312■-■TE21-8AA.**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FK7105-3BC71-...	93	20.0	10.1 (13.54)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FK7060-3BF71-...	90	4.45	1.9 (2.55)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7062-3BF71-...	91	5.3	2.7 (3.62)	5[4]	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7081-3BF71-...	93	8.7	3.8 (5.10)	9	**6SL312■-■TE21-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7084-3BF71-...	93	12.1	6.3 (8.45)	18	**6SL312■-■TE21-8AA.**	1	4 × 1.5	**6FX■002-5■N01-....**
1FK7101-3BF71-...	93	18.8	8.5 (11.4)	18[4]	**6SL312■-■TE21-8AA.**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FK7103-3BF71-...	93	26.0	11.3 (15.15)	30	**6SL312■-■TE23-0AA.**	1.5	4 × 4	**6FX■002-5■N41-....**
1FK7042-3BK71-...	89	4.4	1.9 (2.55)	5	**6SL312■-■TE15-0AA.**	1	4 × 1.5	**6FX■002-5■N01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm^2.

4) With the specified Motor Module, at ΔT = 100 K winding temperature rise, the motor cannot be fully utilized with M_0. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 Compact synchronous motors for Power Modules 230 V 1 AC**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 270 ... 330 V DC – Natural cooling									
3000	36	0.3 (0.4)	1.15 (0.85)	1.0 (0.74)	1.6	**1FK7032-2AF21-1■■■**	3	0.65 (0.58)	2.7 (5.95)
		0.5 (0.67)	1.6 (1.18)	1.45 (1.07)	1.8	**1FK7034-2AF21-1■■■**	3	0.9 (0.8)	3.5 (7.72)
	48	0.8 (1.07)	3.0 (2.21)	2.6 (1.92)	3.5	**1FK7042-2AF21-1■■■**	4	2.9 (2.57)	4.6 (10.14)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder		**A**	
	AM2048S/R encoder		**E**	
	Multi-pole resolver		**S**	
	2-pole resolver		**T**	
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder		**B**	
	AM24DQI encoder		**C**	
	AS20DQI encoder		**Q**	
	AM20DQI encoder		**R**	
	R15DQ resolver		**U**	
	R14DQ resolver		**P**	
Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**		
Feather key	Tolerance N	Without	**A**	
Feather key	Tolerance N	With	**B**	
Plain shaft	Tolerance N	Without	**G**	
Plain shaft	Tolerance N	With	**H**	
Degree of protection:	IP64			**0**
	IP65			**1**
	IP65 and DE flange IP67			**2**

6

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[5]	**SINAMICS S110/S120 blocksize format**		**Power cable with complete shield** Motor connection (and brake connection) via power connector		
				Rated output current[2]	**PM340 Power Module Air cooling**	Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
				Line voltage 200 ... 240 V 1 AC				
1FK7032-2AF21-...	85	1.7	0.4 (0.54)	2.3	**6SL3210-1SB12-3■A0**	1	4 × 1.5	**6FX■002-5■G10-....**
1FK7034-2AF21-...	85	1.9	0.5 (0.67)	2.3	**6SL3210-1SB12-3■A0**	1	4 × 1.5	**6FX■002-5■G10-....**
1FK7042-2AF21-...	88	3.95	0.9 (1.21)	3.9[4]	**6SL3210-1SB14-0■A0**	1	4 × 1.5	**6FX■002-5■G10-....**

Line filter:		
Without		**U**
Integrated		**A**
Power cable:		
MOTION-CONNECT 800PLUS		**8**
MOTION-CONNECT 500		**5**
Without brake cores		**C**
With brake cores		**D**
Length code		**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm^2.

4) With the specified Motor Module, at ΔT = 100 K winding temperature rise, the motor cannot be fully utilized with M_0. If a Motor Module with a higher rating is used, you must check whether the specified power cable can be connected to it.

5) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 Compact synchronous motors for Power Modules 230 V 1 AC**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 270 ... 330 V DC – Natural cooling									
6000	20	0.05 (0.07)	0.18 (0.13)	0.08 (0.06)	0.5	**1FK7011-5AK21-1■■■**	4	0.064 (0.06)	0.9 (1.98)
		0.1 (0.13)	0.35 (0.26)	0.16 (0.12)	0.5	**1FK7015-5AK21-1■■■**	4	0.083 (0.07)	1.1 (2.43)
	28	0.38 (0.51)	0.85 (0.63)	0.6 (0.44)	1.4	**1FK7022-5AK21-1■■■**	3	0.28 (0.25)	1.8 (3.97)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM512S/R encoder (only for 1FK702) AM16S/R encoder	**H** **J**
	Multi-pole resolver	**S**
	2-pole resolver	**T**
Encoder systems for motors with DRIVE-CLiQ interface: (only for 1FK702)	IC22DQ encoder	**D**
	AM20DQ encoder AM15DQ encoder	**L** **V**
	R15DQ resolver	**U**
	R14DQ resolver	**P**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	**Paint finish:**	
IP64 (only for 1FK702)	Without	**0**
IP65 and DE flange IP67 (only for 1FK702)	Without	**2**
IP54 (only for 1FK701), IP64 (only for 1FK702)	With	**3**
IP65 and DE flange IP67 (only for 1FK702)	With	**5**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[4]	SINAMICS S110/S120 blocksize format		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	PM340 Power Module Air cooling	Power connector	Cable cross-section[3]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Article No.	Size	mm²	Article No.
				Line voltage 200 ... 240 V 1 AC				
1FK7011-5AK21-...	62	0.85	0.1 (0.13)	0.9	**6SL3210-1SB11-0■A0**	0.5	4 × 1.5	**6FX5002-5DN30-....**
1FK7015-5AK21-...	68	0.85	0.2 (0.27)	0.9	**6SL3210-1SB11-0■A0**	0.5	4 × 1.5	**6FX5002-5DN30-....**
1FK7022-5AK21-...	88	1.8	0.5 (0.27)	2.3	**6SL3210-1SB12-3■A0**	1	4 × 1.5	**6FX■002-5■G10-....**

Line filter:
Without **U**
Integrated **A**

Power cable:
MOTION-CONNECT 800PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm².

4) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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SIMOTICS S-1FK7 High Dynamic > for Power Modules 230 V 1 AC – Natural cooling

Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**SIMOTICS S-1FK7 High Dynamic synchronous motors for Power Modules 230 V 1 AC**	No. of pole pairs	Moment of inertia Rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K		p	J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Article No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 High Dynamic for DC link voltage 270 ... 330 V DC – Natural cooling									
3000	36	0.4 (0.54)	1.3 (0.96)	1.2 (0.89)	2.05	**1FK7033-4CF21-1■■■**	3	0.25 (0.22)	3.0 (6.62)
	48	0.9 (1.21)	3.3 (2.43)	3.0 (2.12)	3.7	**1FK7043-4CF21-1■■■**	3	1 (0.89)	6.0 (13.23)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	**A**
	AM2048S/R encoder	**E**
	Multi-pole resolver 2-pole resolver	**S** **T**
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder	**B**
	AM24DQI encoder	**C**
	AS20DQI encoder	**Q**
	AM20DQI encoder	**R**
	R15DQ resolver	**U**
	R14DQ resolver	**P**

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Feather key	Tolerance N	Without	**A**
Feather key	Tolerance N	With	**B**
Plain shaft	Tolerance N	Without	**G**
Plain shaft	Tolerance N	With	**H**

Degree of protection:	IP64	**0**
	IP65	**1**
	IP65 and DE flange IP67	**2**

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Motor type (repeated)	Effi-ciency[1]	Stall current	Calculated power P_{calc}[4]	SINAMICS S120 blocksize format		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[2]	PM340 Power Module Air cooling			
	η	I_0 at M_0 ΔT=100 K	P_{calc} at M_0 ΔT=100 K	I_{rated}		Power connector	Cable cross-section[3]	Pre-assembled cable
	%	A	kW (HP)	A	Article No.	Size	mm²	Article No.
				Line voltage 200 ... 240 V 1 AC				
1FK7033-4CF21-...	86	2.1	0.4 (0.54)	2.3	**6SL3210-1SB12-3■A0**	1	4 × 1.5	**6FX■002-5■G10-....**
1FK7043-4CF21-...	88	3.9	1 (1.34)	3.9	**6SL3210-1SB14-0■A0**	1	4 × 1.5	**6FX■002-5■G10-....**

Line filter:		
Without		**U**
Integrated		**A**
Power cable:		
MOTION-CONNECT 800PLUS		**8**
MOTION-CONNECT 500		**5**
Without brake cores		**C**
With brake cores		**D**
Length code		**....**

For information on the cables refer to MOTION-CONNECT connection systems

6

1) Optimum efficiency in continuous duty.

2) With default setting of the pulse frequency.

3) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F). Cable cross-section for brake connection 2 × 1.5 mm².

4) $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[hp] = \frac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

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Overview

Many drives need a holding brake with an emergency stop function for safety reasons or to meet process requirements.

The permanent magnet or spring-loaded single-surface brakes used on the 1FT7/1FK7 motors function according to the closed circuit principle The magnetic field of the permanent-magnet exerts a tension on the brake anchor plate, i.e. in a condition of zero current, the brake is closed and the motor shaft thereby stopped. When the rated voltage of 24 V DC ± 10 % is applied to the brake, current flows through the coil and produces a counter-field that cancels the pull of the permanent-magnet, causing the brake to release.

With the spring-loaded single-surface brake version, the brake is operated by the compressive force of the spring rather than the permanent magnet.

In the event of an emergency stop or power outage, approximately 2000 braking operations can be performed with maximum switched energy without causing excessive wear on the holding brake (condition: maximum external moment of inertia = moment of inertia of motor and n_{max} type-specific).

The holding brake is not an operational brake.

In order to avoid switching overvoltages and any related effects on the plant environment, the brake cables must be connected externally with a varistor. The connection is made via the power connector or the terminal box.

When connected to the SINAMICS S120 drive system, this overvoltage protection is provided by the SINAMICS system.

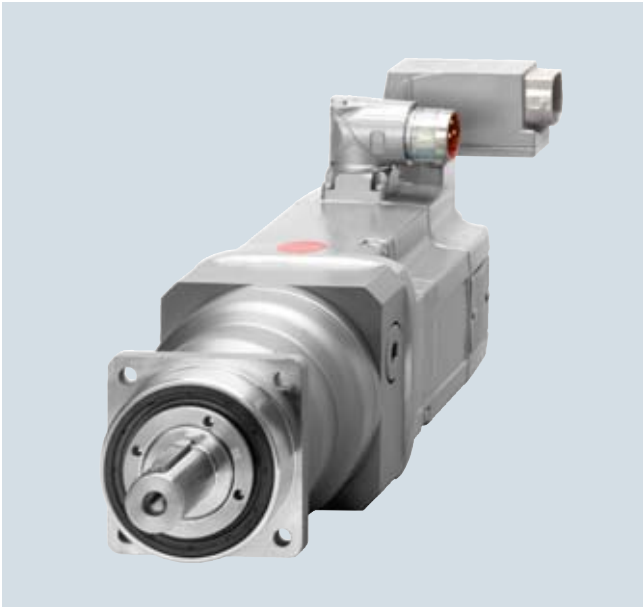
Technical specifications

Motor		Built-in holding brake					
Shaft height SH	Type	Holding torque[1]	Direct current	Opening time with varistor	Closing time with varistor	Moment of inertia	Maximum switched energy per brake operation from n = 3000 rpm
		Nm (lb_f-ft)	A	ms	ms	10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	J
1FT7 motors with permanent-magnet brake, without backlash, and 1FK7 motors with option N24							
36	1FT703	3 (2.21)	0.3	60	25	0.12 (0.11)	30
48	1FT704	8 (5.9)	0.6	90	30	0.87 (0.77)	270
63	1FT706	18 (13.3)	0.8	150	50	2.84 (2.51)	880
80	1FT708	48 (35.4)	1.0	220	65	15.4 (13.63)	1900
100	1FT710	85 (62.7)	1.6	250	70	27.6 (24.43)	5300
132	1FT713	140 (103)	1.8	350	70	51.0 (45.14)	9800
1FK7 Compact/High Dynamic/High Inertia motors with permanent magnet brake, without backlash							
10	1FK701	0.4 (0.3)	0.3	30	20	0.019 (0.02)	2
28	1FK7022	1.0 (0.7)	0.3	30	20	0.07 (0.06)	8
36	1FK703	1.9 (1.4)	0.3	50	30	0.098 (0.09)	40
48	1FK704	4.0 (2.95)	0.5	70	30	0.32 (0.28)	150
63	1FK706	13 (9.59)	0.8	100	50	0.99 (0.88)	380
80	1FK708	22 (16.2)	0.9	200	60	3.28 (2.90)	1400
100	1FK7100	23 (16.96)	1.0	300	70	7.5 (6.64)	3380
100	1FK7101 1FK7103 1FK7105	43 (31.72)	1.0	300	70	7.5 (6.64)	3380
1FK7-DYA geared servomotors and 1FK7 helical/bevel/parallel shaft/worm geared motors							
36	1FK7032	1.3 (0.96)	0.4	50	30	0.08 (0.07)	17
48	1FK704	3.2 (2.36)	0.6	70	30	0.72 (0.64)	74
63	1FK706	13 (9.59)	0.8	100	50	2.25 (1.99)	400
80	1FK7080 1FK7083	10 (7.38) 22 (16.2)	0.7 0.9	100 200	50 60	3.1 (2.74) 8.6 (7.61)	400 1400
100	1FK7100	22 (16.2)	0.9	200	60	8.6 (7.61)	1400
100	1FK7101 1FK7103 1FK7105	41 (30.2)	1.0	300	70	13.5 (11.96)	3000

[1] The holding torque is the highest permissible torque with which the closed brake can be loaded in steady-state operation without slip (holding function when motor is stationary).

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Overview



SIMOTICS S-1FT7 motor with mounted SP+ series planetary gearbox

SIMOTICS S-1FT7 motors can be combined with planetary gearboxes to form compact coaxial drive units. The gearboxes are flanged directly to the drive end of the motors.

When selecting the gearbox, ensure that its maximum permissible input speed is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, allowance must be made for the factor f_2 (see Configuration Manual, SIMOTICS S-1FT7 synchronous motors). The frictional losses of the gearbox must always be taken into account.

The gearboxes are only available in non-balanced design.

Benefits

- High efficiency
  Single-stage: > 97 %
  Two-stage: > 94 %
- Minimum torsional backlash
  Single-stage: ≤ 4 arcmin
  Two-stage: ≤ 6 arcmin
- Power transmission from the central sun wheel via planet wheels
- No shaft deflections in the planet wheel set due to symmetrical force distribution
- Very low moment of inertia and thus short acceleration times of the motors
- Output shaft bearings dimensioned for high cantilever and axial loads with preloaded tapered-roller bearings
- The gearboxes are connected to the motor shaft via an integrated clamping hub. A plain motor shaft extension is necessary for this purpose. Shaft and flange accuracy tolerance N in accordance with DIN 42955 and vibration severity grade A in accordance with EN 60034-14 are sufficient. The motor flange is adapted by means of adapter plates.
- Output shaft of gearbox exactly coaxial with the motor
- The gearboxes are enclosed (seal between gearbox and motor) and filled with oil in the factory. They are lubricated and sealed for their service life.
  The gearboxes are suitable for all mounting positions.
- Degree of protection of gearbox: IP65
- Small dimensions
- Low weight

Integration

S-1FT703 to 1FT710 SIMOTICS motors can be supplied ex works (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and the gear ratios *i* available for these motor/gearbox combinations are listed in the subsequent selection table. The maximum permissible input speed of the gearbox (this is the same as the maximum motor speed) must be taken into account when a gearbox is selected.

The motor/gearbox combinations listed in the selection tables are mainly intended for cycle operation S3-60 % (ON time ≤ 60 % and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON time > 60 % or > 20 min). The gearbox temperature may not exceed 90 °C (194 °F).

Follow the instructions contained in the Configuration Manual for SIMOTICS S-1FT7 synchronous motors when assigning gearboxes to the motor.

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Selection and ordering data

Motor	Planetary gearbox Single-stage			Available gear ratio i =				Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1]	Axial output shaft loading, max.[1]
Type	Type	Torsional backlash	Gearbox weight, approx.	4	5	7	10	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)					rpm	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FT7034	SP 060S-MF1	≤ 4	1.9 (4.2)	✔	✔	✔	–	6000	40 (29.5)	2700 (607)	2400 (540)
1FT7034	SP 075S-MF1	≤ 4	3.9 (8.6)	–	–	–	✔	6000	110 (81.1)	4000 (899)	3350 (753)
1FT7036				✔	✔	✔	✔		(90 for i = 10)		
1FT7042				✔	✔	✔	✔				
1FT7044				✔	✔	✔	✔				
1FT7046				✔	✔	✔	–				
1FT7046	SP 100S-MF1	≤ 3	7.7 (17.0)	–	–	–	✔	4500	300 (221)	6300 (1416)	5650 (1270)
1FT7062				✔	✔	✔	✔		(225 for i = 10)		
1FT7064				✔	✔	✔	✔				
1FT7065				✔	✔	✔	–				
1FT7066				✔	✔	✔	✔				
1FT7067				✔	✔	✔	–				
1FT7068				✔	✔	✔	–				
1FT7065	SP 140S-MF1	≤ 3	17.2 (37.9)	–	–	–	✔	4000	600 (443)	9450 (2124)	9870 (2219)
1FT7067				–	–	–	✔		(480 for i = 10)		
1FT7068				–	–	–	✔				
1FT7082				✔	✔	✔	✔				
1FT7084				✔	✔	✔	✔				
1FT7085				✔	✔	✔	–				
1FT7086				✔	✔	✔	–				
1FT7087				✔	✔	–	–				
1FT7085	SP 180S-MF1	≤ 3	34 (75.0)	–	–	–	✔	3500	1100 (811)	14700 (3305)	14150 (3181)
1FT7086				–	–	–	✔		(880 for i = 10)		
1FT7087				–	–	✔	✔				
1FT7102				✔	✔	✔	✔				
1FT7105				✔	✔	✔	–				
1FT7108				✔	✔	✔	–				
1FT7105	SP 210S-MF1	≤ 3	56 (123)	–	–	–	✔	2500	2500 (1844)	21000 (4721)	30000 (6744)
1FT7108				–	–	–	✔		(2400 for i = 7 1900 for i = 10)		
1FT7132				✔	✔	✔	✔				
1FT7134				✔	✔	✔	–				
1FT7136				✔	✔	✔	–				
1FT7138				✔	✔	✔	–				
1FT7134	SP 240S-MF1	≤ 3	83 (183)	–	–	–	✔	2500	4500 (3319)	30000 (6744)	33000 (7419)
1FT7136				–	–	–	✔		(4300 for i = 7 (3400 for i = 10)		
1FT7138				–	–	–	✔				
	Gear shaft			**Order code**							
	With feather key			J02	J03	J05	J09				
	Without feather key			J22	J23	J25	J29				

Preconditions:

SP+ planetary gearboxes can be mounted with the following motor versions:
- Flange 1
- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- Vibration severity gade A/IP65 degree of protection

SP+ planetary gearboxes can therefore only be ordered with these motors: **1FT7...-5..71-..G1**, **1FT7...-5..71-..H1**,

1FT7...-7..71-..G1, **1FT7...-7..71-..H1**
When ordering a motor with gearbox, **-Z** must be added to the article number.

Example:
- 1FT7042 motor without holding brake
- with single-stage SP+ planetary gearbox
- with i = 5 and gear shaft without feather key

1FT7042-5AF71-1NG1**-Z**
J23

✔ Possible
– Not possible

[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

Single-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1[1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.	1FT713.
	i	n_{rated1}	M_{rated2} (T_{2rated})	J_1	J_1	J_1	J_1	J_1	J_1
		rpm	Nm (lb_f-ft)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)
SP 060S-MF1	4	3300	26 (19.2)	0.22 (0.08)	–	–	–	–	–
	5	3300	26 (19.2)	0.20 (0.07)	–	–	–	–	–
	7	4000	26 (19.2)	0.18 (0.06)	–	–	–	–	–
SP 075S-MF1	4	2900	75 (55.3)	0.61 (0.21)	0.78 (0.27)	–	–	–	–
	5	2900	75 (55.3)	0.51 (0.17)	0.68 (0.23)	–	–	–	–
	7	3100	75 (55.3)	0.42 (0.14)	0.59 (0.20)	–	–	–	–
	10	3100	52 (38.4)	0.38 (0.13)	0.54 (0.19)	–	–	–	–
SP 100S-MF1	4	2500	180 (133)	–	–	3.04 (1.04)	–	–	–
	5	2500	175 (129)	–	–	2.61 (0.89)	–	–	–
	7	2800	170 (125)	–	–	2.29 (0.78)	–	–	–
	10	2800	120 (88.5)	–	1.38 (0.47)	2.07 (0.71)	–	–	–
SP 140S-MF1	4	2100	360 (266)	–	–	–	11.0 (3.76)	–	–
	5	2100	360 (266)	–	–	–	9.95 (3.40)	–	–
	7	2600	360 (266)	–	–	–	9.01 (3.08)	–	–
	10	2600	220 (162)	–	–	5.28 (1.80)	8.44 (2.88)	–	–
SP 180S-MF1	4	1500	750 (553)	–	–	–	–	33.9 (11.6)	–
	5	1500	750 (553)	–	–	–	–	27.9 (9.53)	–
	7	2300	750 (553)	–	–	–	–	22.2 (7.59)	–
	10	2300	750 (553)	–	–	–	19.2 (6.56)	19.2 (6.56)	–
SP 210S-MF1	4	1200	1500 (1106)	–	–	–	–	–	94.3 (32.2)
	5	1500	1500 (1106)	–	–	–	–	–	76.9 (26.3)
	7	1700	1400 (1033)	–	–	–	–	–	61.5 (21.01)
	10	2000	1000 (738)	–	–	–	–	53.1 (18.1)	53.1 (18.1)
SP 240S-MF1	10	1700	1300 (959)	–	–	–	–	–	70.8 (24.2)

[1] The limit values in the table apply for S1 continuous duty (ON time > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Selection and ordering data

Motor	Planetary gearbox Two-stage			Available gear ratio i =					Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1]	Axial output shaft loading, max.[1]
Type	Type	Torsional backlash	Gearbox weight, approx.	16	20	28	40	50	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)						rpm	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FT7034	SP 075S-MF2	≤ 6	3.6 (7.9)	✔	✔	✔	–	–	6000	110 (81.1)	4000 (899)	3350 (753)
1FT7036				✔	–	–	–	–				
1FT7042				✔	–	–	–	–				
1FT7034	SP 100S-MF2	≤ 5	7.9 (17.4)	–	–	–	✔	✔	4500	300 (221)	6300 (1416)	5650 (1270)
1FT7036				–	✔	✔	✔	✔				
1FT7042				–	✔	✔	✔	✔				
1FT7044				✔	✔	✔	–	–				
1FT7046				✔	✔	–	–	–				
1FT7062				✔	✔	–	–	–				
1FT7064				✔	–	–	–	–				
1FT7044	SP 140S-MF2	≤ 5	17 (37.5)	–	–	–	✔	✔	4000	600 (443)	9450 (2124)	9870 (2219)
1FT7046				–	–	✔	✔	✔				
1FT7062				–	–	✔	✔	✔				
1FT7064				–	✔	✔	–	–				
1FT7065				✔	✔	–	–	–				
1FT7066				✔	✔	–	–	–				
1FT7067				✔	–	–	–	–				
1FT7068				✔	✔	–	–	–				
1FT7082				✔	✔	–	–	–				
1FT7084				✔	–	–	–	–				
1FT7064	SP 180S-MF2	≤ 5	36.4 (80.3)	–	–	–	✔	✔	4000	1100 (811)	14700 (3305)	14150 (3181)
1FT7065				–	–	✔	✔	–				
1FT7066				–	–	✔	✔	✔				
1FT7067				–	✔	✔	–	–				
1FT7068				–	–	✔	✔	✔				
1FT7082				–	–	✔	✔	✔				
1FT7084				–	✔	✔	–	–				
1FT7085				✔	–	–	–	–				
1FT7086				✔	✔	–	–	–				
1FT7102				✔	✔	–	–	–				
1FT7084	SP 210S-MF2	≤ 5	55 (121)	–	–	–	✔	✔	3500	2400 (1770) (2500 for i = 20)	21000 (4721)	30000 (6744)
1FT7085				–	✔	✔	–	–				
1FT7086				–	–	✔	✔	–				
1FT7087				✔	✔	✔	–	–				
1FT7102				–	–	✔	–	–				
1FT7105				✔	✔	–	–	–				
1FT7108				✔	–	–	–	–				
1FT7085	SP 240S-MF2	≤ 5	80.6 (178)	–	–	–	✔	✔	3500	4500 (3319) (4000 for i = 40 4300 for i = 50)	30000 (6744)	33000 (7419)
1FT7086				–	–	–	–	✔				
1FT7102				–	–	–	✔	✔				
1FT7105				–	–	✔	✔	–				
1FT7108				–	✔	✔	–	–				
1FT7132				✔	✔	–	–	–				
1FT7134				✔	–	–	–	–				
1FT7136				✔	–	–	–	–				
	Gear shaft			**Order code**								
	With feather key			**J12**	**J13**	**J15**	**J16**	**J17**				
	Without feather key			**J32**	**J33**	**J35**	**J36**	**J37**				

Preconditions, see page 6/58.

✔ Possible
– Not possible

[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

Two-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1[1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.	1FT713.
	i	n_{rated1}	M_{rated2} (T_{2rated})	J_1	J_1	J_1	J_1	J_1	J_1
		rpm	Nm (lb_f-ft)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)
SP 075S-MF2	16	3500	75 (55.3)	0.23 (0.08)	0.55 (0.19)	–	–	–	–
	20	3500	75 (55.3)	0.20 (0.07)	–	–	–	–	–
	28	3500	75 (55.3)	0.18 (0.06)	–	–	–	–	–
SP 100S-MF2	16	3100	180 (133)	–	0.81 (0.28)	2.18 (0.75)	–	–	–
	20	3100	180 (133)	0.54 (0.19)	0.70 (0.24)	2.07 (0.71)	–	–	–
	28	3100	180 (133)	0.43 (015)	0.60 (0.21)	–	–	–	–
	40	3100	180 (133)	0.38 (0.13)	0.55 (0.19)	–	–	–	–
	50	3500	175 (129)	0.38 (0.13)	0.54 (0.19)	–	–	–	–
SP 140S-MF2	16	2900	360 (265)	–	–	3.19 (1.09)	10.3 (3.52)	–	–
	20	2900	360 (265)	–	–	2.71 (0.93)	9.77 (3.34)	–	–
	28	2900	360 (265)	–	1.65 (0.56)	2.34 (0.80)	–	–	–
	40	2900	360 (265)	–	1.40 (0.48)	2.10 (0.72)	–	–	–
	50	3200	360 (265)	–	1.39 (0.48)	2.08 (0.71)	–	–	–
SP 180S-MF2	16	2700	750 (553)	–	–	–	12.4 (4.24)	13.5 (4.61)	–
	20	2700	750 (553)	–	–	–	10.9 (3.73)	12.0 (4.10)	–
	28	2700	750 (553)	–	–	6.32 (2.16)	9.48 (3.24)	–	–
	40	2700	750 (553)	–	–	5.51 (1.88)	8.67 (2.96)	–	–
	50	2900	750 (553)	–	–	5.45 (1.86)	8.61 (2.94)	–	–
SP 210S-MF2	16	2500	1500 (1106)	–	–	–	–	34.5 (11.8)	–
	20	2500	1500 (1106)	–	–	–	–	31.5 (10.8)	–
	28	2500	1500 (1106)	–	–	–	30.0 (10.3)	30.0 (10.3)	–
	40	2500	1500 (1106)	–	–	–	28.5 (9.74)	–	–
	50	2500	1500 (1106)	–	–	–	28.3 (9.67)	–	–
SP 240S-MF2	16	2300	2500 (1844)	–	–	–	–	–	39.2 (13.4)
	20	2500	2500 (1844)	–	–	–	–	34.6 (11.8)	34.6 (11.8)
	28	2500	2500 (1844)	–	–	–	–	30.5 (10.4)	–
	40	2500	2500 (1844)	–	–	–	–	28.2 (9.64)	–
	50	2500	2500 (1844)	–	–	–	27.9 (9.53)	27.9 (9.53)	–

[1] The limit values in the table apply for S1 continuous duty (ON time > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Planetary gearbox series SP+ for SIMOTICS S-1FK7

Overview



SIMOTICS S-1FK7 motor with mounted SP+ planetary gearbox

SIMOTICS S-1FK7 motors can easily be combined with planetary gearboxes to form compact coaxial drive units. The gearboxes are flanged directly to the drive end of the motors.

When selecting the gearbox, ensure that its maximum permissible input speed is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, allowance must be made for the factor f_2 (see Configuration Manual, SIMOTICS S-1FK7 synchronous motors). The frictional losses of the gearbox must always be taken into account.

The gearboxes are only available in non-balanced design.

Benefits

- High efficiency
  Single-stage: > 97 %
  Two-stage: > 94 %
- Minimum torsional backlash
  Single-stage: ≤ 4 arcmin
  Two-stage: ≤ 6 arcmin
- Power transmission from the central sun wheel via planet wheels
- No shaft deflections in the planet wheel set due to symmetrical force distribution
- Very low moment of inertia and thus short acceleration times of the motors
- Output shaft bearings dimensioned for high cantilever and axial loads with preloaded tapered-roller bearings
- The gearboxes are connected to the motor shaft via an integrated clamping hub. A plain motor shaft extension is necessary for this purpose. Shaft and flange accuracy tolerance N in accordance with DIN 42955 and vibration severity grade A in accordance with EN 60034-14 are sufficient. The motor flange is adapted by means of adapter plates.
- Output shaft of gearbox exactly coaxial with the motor
- The gearboxes are enclosed (seal between gearbox and motor) and filled with oil in the factory. They are lubricated and sealed for their service life.
  The gearboxes are suitable for all mounting positions.
- Degree of protection of gearbox: IP65
- Small dimensions
- Low weight

Integration

S-1FK702 to 1FK710 SIMOTICS motors can be supplied ex works (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and the gear ratios *i* available for these motor/gearbox combinations are listed in the subsequent selection table. The maximum permissible input speed of the gearbox (this is the same as the maximum motor speed) must be taken into account when a gearbox is selected.

The motor/gearbox combinations listed in the selection table are mainly intended for cycle operation S3-60 % (ON time ≤ 60 % and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON time > 60 % or > 20 min). The gearbox temperature may not exceed 90 °C (194 °F).

Follow the instructions contained in the Configuration Manual for SIMOTICS S-1FK7 synchronous motors when assigning gearboxes to the motor.

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Selection and ordering data

Motor	Planetary gearbox Single-stage			Available gear ratio i =				Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1]	Axial output shaft loading, max.[1]
Type	Type	Torsional backlash	Gearbox weight, approx.	4	5	7	10	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)					rpm	Nm (lb_f-ft)	N (lb_f)	N (lb_f)
1FK7022	SP 060S-MF1	≤ 4	1.9 (4.2)	✔	✔	✔	✔	6000	40 (29.5)	2700 (607)	2400 (540)
1FK7032				✔	✔	✔	✔		(32 for i = 10)		
1FK7033				✔	✔	✔	✔				
1FK7034				✔	✔	✔	✔				
1FK7040	SP 075S-MF1	≤ 4	3.9 (8.6)	✔	✔	✔	✔	6000	110 (81.1)	4000 (899)	3350 (753)
1FK7042				✔	✔	✔	✔		(90 for i = 10)		
1FK7043				✔	✔	✔	✔				
1FK7044				✔	✔	✔	✔				
1FK7060	SP 100S-MF1	≤ 3	7.7 (17.0)	✔	✔	✔	✔	4500	300 (221)	6300 (1416)	5650 (1270)
1FK7061				✔	✔	✔	✔		(225 for i = 10)		
1FK7062				✔	✔	✔	✔				
1FK7063				✔	✔	✔	✔				
1FK7064				✔	✔	✔	✔				
1FK7080	SP 140S-MF1	≤ 3	17.2 (37.9)	✔	✔	✔	✔	4000	600 (442)	9450 (2124)	9870 (2219)
1FK7081				✔	✔	✔	✔		(480 for i = 10)		
1FK7083				✔	✔	✔	✔				
1FK7084				✔	✔	✔	✔				
1FK7085				✔	✔	✔	✔				
1FK7086				✔	✔	✔	✔				
1FK7100	SP 180S-MF1	≤ 3	34 (75.0)	✔	✔	✔	✔	3500	1100 (810)	14700 (3305)	14150 (3181)
1FK7101				✔	✔	✔	✔		(880 for i = 10)		
1FK7103				✔	✔	✔	✔				
1FK7105				✔	✔	✔	–				
1FK7105	SP 210S-MF1	≤ 3	56 (123)	–	–	–	✔	2500	2500 (1844) (2400 for i = 7 1900 for i = 10)	21000 (4721)	30000 (6744)
	Gear shaft			**Order code**							
	With feather key			**J02**	**J03**	**J05**	**J09**				
	Without feather key			**J22**	**J23**	**J25**	**J29**				

Preconditions:

SP+ planetary gearboxes can be mounted with the following motor versions:

- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- IP65 degree of protection and anthracite paint finish

SP+ planetary gearboxes can therefore only be ordered with these motors:

1FK7 . . . -2 A . . . -. . ■ 1 Compact
1FK7 . . . -3 B . . . -. . ■ 1 High Inertia
1FK7 . . . -4 C . . . -. . ■ 1 High Dynamic
G without brake
H with brake

or

1FK7 0 2 . -5 A . . . -. . G 5
1FK7 0 2 . -5 A . . . -. . H 5

When ordering a motor with gearbox, **-Z** must be added to the article number.

Example:

1FK7042 motor without holding brake
with single-stage SP+ planetary gearbox
with i = 7 and gear shaft without feather key.
1FK7042-2AF71-1AG1**-Z**
J25

✔ Possible
– Not possible
[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FK7 motor with SP+ planetary gearbox

Single-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1[1]		1FK702.	1FK703.	1FK704.	1FK706.	1FK708.	1FK710.
	i	n_{rated1}	M_{rated2} (T_{2rated})	J_1	J_1	J_1	J_1	J_1	J_1
		rpm	Nm (lb_f-ft)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)
SP 060S-MF1	4	3300	26 (19.2)	0.15 (0.05)	0.22 (0.08)	–	–	–	–
	5	3300	26 (19.2)	0.12 (0.04)	0.20 (0.07)	–	–	–	–
	7	4000	26 (19.2)	0.10 (0.034)	0.18 (0.062)	–	–	–	–
	10	4000	17 (12.5)	0.09 (0.031)	0.17 (0.058)	–	–	–	–
SP 075S-MF1	4	2900	75 (55.3)	–	–	0.78 (0.27)	–	–	–
	5	2900	75 (55.3)	–	–	0.68 (0.23)	–	–	–
	7	3100	75 (55.3)	–	–	0.59 (0.20)	–	–	–
	10	3100	52 (38.4)	–	–	0.54 (0.19)	–	–	–
SP 100S-MF1	4	2500	180 (133)	–	–	–	3.04 (1.04)	–	–
	5	2500	175 (129)	–	–	–	2.61 (0.89)	–	–
	7	2800	170 (125)	–	–	–	2.29 (0.78)	–	–
	10	2800	120 (88.5)	–	–	–	2.07 (0.71)	–	–
SP 140S-MF1	4	2100	360 (266)	–	–	–	–	11.0 (3.76)	–
	5	2100	360 (266)	–	–	–	–	9.95 (3.40)	–
	7	2600	360 (266)	–	–	–	–	9.01 (3.08)	–
	10	2600	220 (162)	–	–	–	–	8.44 (2.88)	–
SP 180S-MF1	4	1500	750 (553)	–	–	–	–	–	33.9 (11.6)
	5	1500	750 (553)	–	–	–	–	–	27.9 (9.53)
	7	2300	750 (553)	–	–	–	–	–	22.2 (7.59)
	10	2300	750 (553)	–	–	–	–	–	19.2 (6.56)
SP 210S-MF1	10	2000	1000 (738)	–	–	–	–	–	53.1 (18.1)

[1] The limit values in the table apply for S1 continuous duty (ON time > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Selection and ordering data

Motor	Planetary gearbox Two-stage			Available gear ratio i =					Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1]	Axial output shaft loading, max.[1]
Type	Type	Torsional backlash	Gearbox weight, approx.	16	20	28	40	50	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)						rpm	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FK7022	SP 060S-MF2	≤ 6	2 (4.4)	✔	✔	✔	–	–	6000	40 (29.5)	2700 (607)	2400 (540)
1FK7032				✔	✔	–	–	–				
1FK7033				✔	✔	–	–	–				
1FK7022	SP 075S-MF2	≤ 6	3.6 (7.9)	–	–	–	✔	✔	6000	110 (81.1)	4000 (899)	3350 (753)
1FK7032				–	–	✔	✔	✔				
1FK7033				–	–	✔	✔	✔				
1FK7034				✔	✔	✔	–	–				
1FK7040				✔	✔	✔	–	–				
1FK7042				✔	✔	–	–	–				
1FK7043				✔	–	–	–	–				
1FK7034	SP 100S-MF2	≤ 5	7.9 (17.4)	–	–	–	✔	✔	4500	300 (221)	6300 (1416)	2400 (540)
1FK7040				–	–	–	✔	✔				
1FK7042				–	–	✔	✔	✔				
1FK7043				–	✔	✔	✔	✔				
1FK7044				✔	✔	✔	✔	–				
1FK7060				✔	✔	✔	–	–				
1FK7061				✔	✔	–	–	–				
1FK7062				✔	✔	–	–	–				
1FK7044	SP 140S-MF2	≤ 5	17 (37.5)	–	–	–	–	✔	4000	600 (442)	9450 (2124)	9870 (2219)
1FK7060				–	–	–	✔	✔				
1FK7061				–	–	✔	✔	✔				
1FK7062				–	–	✔	✔	–				
1FK7063				✔	✔	✔	–	–				
1FK7064				✔	✔	✔	–	–				
1FK7080				✔	✔	✔	✔	–				
1FK7081				✔	✔	✔	–	–				
1FK7083				✔	✔	–	–	–				
1FK7084				✔	–	–	–	–				
	Gear shaft			**Order code**								
	With feather key			**J12**	**J13**	**J15**	**J16**	**J17**				
	Without feather key			**J32**	**J33**	**J35**	**J36**	**J37**				

Preconditions:

SP+ planetary gearboxes can be mounted with the following motor versions:

- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- IP65 degree of protection and anthracite paint finish

SP+ planetary gearboxes can therefore only be ordered with these motors:

1FK7 . . . -2 A . . . -. . ■ 1 Compact
1FK7 . . . -3 B . . . -. . ■ 1 High Inertia
1FK7 . . . -4 C . . . -. . ■ 1 High Dynamic
G without brake
H with brake

or

1FK7 0 2 . -5 A . . . -. . G 5
1FK7 0 2 . -5 A . . . -. . H 5

When ordering a motor with gearbox, **-Z** must be added to the article number.

Example:

1FK7042 motor without holding brake with two-stage SP+ planetary gearbox with i = 28 and gear shaft without feather key
1FK7042-2AF71-1AG1**-Z**
J35

✔ Possible
– Not possible
[1] Referred to output shaft center

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Selection and ordering data

Motor	Planetary gearbox Two-stage			Available gear ratio i =					Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1]	Axial output shaft loading, max.[1]
Type	Type	Torsional backlash	Gearbox weight, approx.	16	20	28	40	50	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)						rpm	Nm (lb$_f$-ft)	N (lb$_f$)	N (lb$_f$)
1FK7062	SP 180S-MF2	≤ 5	36.4 (80.3)	–	–	–	–	✔	4000	1100 (811)	14700 (3305)	14150 (3181)
1FK7063				–	–	–	✔	✔				
1FK7064				–	–	–	✔	✔				
1FK7080				–	–	–	–	✔				
1FK7081				–	–	–	✔	✔				
1FK7083				–	–	✔	–	–				
1FK7084				–	✔	✔	–	–				
1FK7085				✔	✔	–	–	–				
1FK7086				✔	✔	–	–	–				
1FK7100				✔	✔	✔	–	–				
1FK7101				✔	✔	–	–	–				
1FK7103				✔	–	–	–	–				
1FK7083	SP 210S-MF2	≤ 6	55 (121)	–	–	–	✔	✔	3500	2400 (1770) (2500 for i = 20)	21000 (4721)	30000 (6744)
1FK7084				–	–	–	✔	✔				
1FK7085				–	–	✔	✔	–				
1FK7086				–	–	✔	–	–				
1FK7100				–	–	–	✔	✔				
1FK7101				–	–	✔	–	–				
1FK7103				–	✔	–	–	–				
1FK7105				✔	✔	–	–	–				
1FK7101	SP 240S-MF2	≤ 6	80.6 (178)	–	–	–	✔	✔	3500	4500 (3319) (4000 for i = 40 4300 for i = 50)	30000 (6744)	33000 (7419)
1FK7103				–	–	✔	✔	–				
1FK7105				–	–	✔	–	–				
	Gear shaft With feather key			**Order code** J12	J13	J15	J16	J17				
	Without feather key			J32	J33	J35	J36	J37				

Preconditions:

SP+ planetary gearboxes can be mounted with the following motor versions:

- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- IP65 degree of protection and anthracite paint finish

SP+ planetary gearboxes can therefore only be ordered with these motors:

1FK7 . . . -2 A . . . -. . ■ 1 Compact
1FK7 . . . -3 B . . . -. . ■ 1 High Inertia
1FK7 . . . -4 C . . . -. . ■ 1 High Dynamic
G without brake
H with brake

or

1FK7 0 2 . -5 A . . . -. . G 5
1FK7 0 2 . -5 A . . . -. . H 5

When ordering a motor with gearbox, **-Z** must be added to the article number.

Example:

1FK7042 motor without holding brake
with two-stage SP+ planetary gearbox
with i = 16 and gear shaft without feather key
1FK7103-2AC71-1AG1**-Z**
J32

✔ Possible
– Not possible
[1] Referred to output shaft center.

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Technical specifications

SIMOTICS S-1FK7 motor with SP+ planetary gearbox

Two-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearboxes (referred to the drive)					
		Continuous duty S1[1]		1FK702.	1FK703.	1FK704.	1FK706.	1FK708.	1FK710.
	i	n_{rated1}	M_{rated2} (T_{2rated})	J_1	J_1	J_1	J_1	J_1	J_1
		rpm	Nm (lb_f-ft)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)	kgcm^2 (lb_f-in^2)
SP 060S-MF2	16	4400	26 (19.2)	0.08 (0.03)	0.17 (0.06)	–	–	–	–
	20	4400	26 (19.2)	0.07 (0.024)	0.16 (0.05)	–	–	–	–
	28	4400	26 (19.2)	0.06 (0.021)	–	–	–	–	–
SP 075S-MF2	16	3500	75 (55.3)	–	0.23 (0.08)	0.55 (0.19)	–	–	–
	20	3500	75 (55.3)	–	0.20 (0.07)	0.53 (0.18)	–	–	–
	28	3500	75 (55.3)	–	0.18 (0.062)	0.50 (0.17)	–	–	–
	40	3500	75 (55.3)	0.10 (0.03)	0.17 (0.058)	–	–	–	–
	50	3800	75 (55.3)	0.10 (0.03)	0.16 (0.055)	–	–	–	–
SP 100S-MF2	16	3100	180 (133)	–	–	0.81 (0.28)	2.18 (0.75)	–	–
	20	3100	180 (133)	–	–	0.70 (0.24)	2.07 (0.71)	–	–
	28	3100	180 (133)	–	–	0.60 (0.21)	1.97 (0.67)	–	–
	40	3100	180 (133)	–	0.38 (0.13)	0.55 (0.188)	–	–	–
	50	3500	175 (129)	–	0.38 (0.13)	0.54 (0.185)	–	–	–
SP 140S-MF2	16	2900	360 (265)	–	–	–	3.19 (1.09)	10.3 (3.52)	–
	20	2900	360 (265)	–	–	–	2.71 (0.93)	9.77 (3.34)	–
	28	2900	360 (265)	–	–	–	2.34 (0.80)	9.41 (3.21)	–
	40	2900	360 (265)	–	–	–	2.10 (0.72)	9.16 (3.13)	–
	50	3200	360 (265)	–	–	1.39 (0.48)	2.08 (0.71)	–	–
SP 180S-MF2	16	2700	750 (553)	–	–	–	–	12.4 (4.24)	13.5 (4.61)
	20	2700	750 (553)	–	–	–	–	10.9 (3.73)	12.0 (4.10)
	28	2700	750 (553)	–	–	–	–	9.48 (3.24)	10.6 (3.62)
	40	2700	750 (553)	–	–	–	5.51 (1.88)	8.67 (2.96)	–
	50	2900	750 (553)	–	–	–	5.45 (1.86)	8.61 (2.94)	–
SP 210S-MF2	16	2500	1500 (1106)	–	–	–	–	–	34.5 (11.8)
	20	2500	1500 (1106)	–	–	–	–	–	31.5 (10.76)
	28	2500	1500 (1106)	–	–	–	–	30.0 (10.25)	30.0 (10.25)
	40	2500	1500 (1106)	–	–	–	–	28.5 (9.74)	28.5 (9.74)
	50	2500	1500 (1106)	–	–	–	–	28.3 (9.67)	28.3 (9.67)
SP 240S-MF2	28	2500	2500 (1844)	–	–	–	–	–	30.5 (10.4)
	40	2500	2500 (1844)	–	–	–	–	–	28.2 (9.64)
	50	2500	2500 (1844)	–	–	–	–	–	27.9 (9.53)

[1] The limit values in the table apply for S1 continuous duty (ON time > 60 % or > 20 min) for a maximum gearbox temperature of 90 °C (194 °F).

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Planetary gearbox series LP+ for SIMOTICS S-1FK7

Overview



SIMOTICS S-1FK7 motor with mounted LP+ planetary gearbox

SIMOTICS S-1FK7 motors can easily be combined with planetary gearboxes to form compact coaxial drive units. The gearboxes are flanged directly to the drive end of the motors.

When selecting the gearbox, ensure that its maximum permissible input speed is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, allowance must be made for the factor f_2 (see Configuration Manual, SIMOTICS S-1FK7 synchronous motors). The frictional losses of the gearbox must always be taken into account.

The gearboxes are only available in non-balanced design and with feather key.

Benefits

- High efficiency, single-stage: > 97 %
- Minimum torsional backlash
  Single-stage: ≤ 12 arcmin
- Power transmission from the central sun wheel via planet wheels
- No shaft deflections in the planet wheel set due to symmetrical force distribution
- The gearboxes are connected to the motor shaft via an integrated clamping hub. A plain motor shaft extension is necessary for this purpose. Shaft and flange accuracy tolerance N in accordance with DIN 42955 and vibration severity grade A in accordance with EN 60034-14 are sufficient. The motor flange is adapted by means of adapter plates.
- Output shaft of gearbox exactly coaxial with the motor
- The gearboxes are suitable for all mounted systems.
- The gearboxes are enclosed (seal between gearbox and motor) and filled with grease in the factory.
  They are lubricated and sealed for their service life.
- Degree of protection of gearbox: IP64
- Small dimensions
- Low weight

Integration

S-1FK702 to 1FK710 SIMOTICS motors can be supplied ex works (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and the gear ratios *i* available for these motor/gearbox combinations are listed in the subsequent selection table. The maximum permissible input speed of the gearbox (this is the same as the maximum motor speed) must be taken into account when a gearbox is selected.

The motor/gearbox combinations listed in the selection table are mainly intended for cycle operation S3-60 % (ON time ≤ 60 % and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON time > 60 % or > 20 min). The gearbox temperature may not exceed 90 °C (194 °F).

Follow the instructions contained in the Configuration Manual for SIMOTICS S-1FK7 synchronous motors when assigning gearboxes to the motor.

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Selection and ordering data

Motor	Planetary gearbox LP+ Single-stage Torsional backlash ≤ 12 arcmin		Available gear ratio i =		Input speed, max. S3-60 %	Output torque, max. S3-60 %		Output shaft radial force, max.[1]	Gearbox moment of inertia
Type	Type	Gearbox weight, approx.	5	10	n_{G1}	M_{G2} at i = 5	M_{G2} at i = 10	F_r	J_G at i = 5/10
		kg (lb)			rpm	Nm (lb_f-ft)	Nm (lb_f-ft)	N (lb_f)	10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)
1FK7022	LP 050-MO1	0.75 (1.65)	✔	–	8000	12 (8.9)	11 (8.1)	650 (146)	0.055 (0.05)
1FK7022	LP 070-MO1	2 (4.41)	–	✔	6000	35 (25.8)	32 (23.6)	1450 (326)	0.28 (0.25)
1FK7032			✔	✔					
1FK7033			✔	✔					
1FK7034			✔	✔					
1FK7040	LP 090-MO1	4 (8.82)	✔	✔	6000	90 (66.4)	80 (59.0)	1900 (427)	1.77 (1.57)
1FK7042			✔	✔					
1FK7043			✔	✔					
1FK7044			✔	✔					
1FK7060	LP 120-MO1	8.6 (19.0)	✔	✔	4800	220 (162)	200 (148)	4000 (899)	5.42 (4.80)
1FK7061			✔	✔					
1FK7062			✔	✔					
1FK7063			✔	✔					
1FK7064			✔	–					
1FK7080	LP 155-MO1	17 (37.5)	✔	✔	3600	450 (332)	350 (258)	6000 (1349)	25.7 (22.8)
1FK7081			✔	✔					
1FK7083			✔	✔					
1FK7084			✔	✔					
1FK7085			✔	✔					
1FK7086			✔	✔					
1FK7100			✔	✔					
1FK7101			✔	–					
1FK7103			✔	–					
1FK7105			✔	–					
	Gear shaft With feather key		**Order code** **V40**	**V42**					

Preconditions:

LP+ planetary gearboxes can be mounted with the following motor versions:

- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- IP64 degree of protection and anthracite paint finish

LP+ planetary gearboxes can therefore only be ordered with these motors:

1FK7 . . . -2 A . 7 1 - 1 . ■ 0 Compact
1FK7 . . . -3 B . 7 1 - 1 . ■ 0 High Inertia
1FK7 . . . -4 C . 7 1 - 1 . ■ 0 High Dynamic
G without brake
H with brake

or

1FK7 0 2 . -5 A . 7 1 - 1 . G 3
1FK7 0 2 . -5 A . 7 1 - 1 . H 3

When ordering a motor with gearbox, **-Z** must be added to the article number.

Example:

1FK7042 motor with holding brake
with single-stage LP+ planetary gearbox
with i = 5 and gear shaft with feather key
1FK7042-3BK71-1AH0-**Z**
V40

Continuous duty

Continuous duty is permissible at rated speed and rated torque. The gearbox temperature may not exceed 90 °C (194 °F).

Planetary gearbox LP+ Single-stage Torsional backlash ≤ 12 arcmin	Rated input speed	Rated output torque	
Type	n_{G1}	M_{G2} at i = 5	M_{G2} at i = 10
	rpm	Nm (lb_f-ft)	Nm (lb_f-ft)
LP 050-MO1	4000	5.7 (4.2)	–
LP 070-MO1	3700	18 (13.3)	16.5 (12.2)
LP 090-MO1	3400	45 (33.2)	40 (29.5)
LP 120-MO1	2600	110 (81.1)	100 (73.8)
LP 155-MO1	2000	320 (236)	190 (140)

✔ Possible
– Not possible
[1] Referred to output shaft center at 100 rpm.

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SIMOTICS L-1FN3

Overview



In combination with the SINAMICS S120 drive system, SIMOTICS L-1FN3 linear motors provide an optimally tuned linear direct drive system for the requirements of modern mechanical engineering.

The motors comprise a primary section and a secondary section track with magnets made of rare-earth material. The primary section has fixed dimensions, while the secondary section track is made up of individual elements (secondary sections) to suit the required traversing range. Through parallel operation of the motors, feedrate force and length can be scaled beyond the available spectrum.

Benefits

- Outstanding dynamic response and very high traversing velocity
- Excellent precision
- Simple installation
- Drive components are free of wear thanks to contactless drive force transmission

The main advantage of linear direct drive technology is the extensive avoidance of the effects of elasticity, backlash, and friction, as well as natural oscillation in the drive train. This results in a higher dynamic response and increased precision. If suitable measuring systems are used and the temperature conditions are appropriate, the motors can be positioned in the nanometer range.

Application

Version for peak load

Used in machine axes that are temporarily accelerated, e.g. S3 duty or when large forces are required for a short time.

Typical applications:

- Highly dynamic, flexible machine tool and production machine construction
- Laser machining
- Handling

Version for continuous load

Used in machine axes with constant acceleration changes, e.g. S1 duty, with high process/weight forces or for operation without water cooling.

Typical applications:

- Grinding
- Non-circular machining (e.g. oscillating applications)
- Z axes without weight compensation, quills
- Handling, Cartesian robots

Design

The simple mechanical construction without transmission elements, such as ballscrew, coupling or belt, enhances the reliability of the drive components.

Heat loss occurs almost exclusively in the primary section and is dissipated via an integrated liquid cooling system. The Thermo-Sandwich dual-circuit cooling system allows the motor to be decoupled from the machine, and is also an inexpensive cooling design.

The stainless steel encapsulation of the primary section ensures the high mechanical ruggedness and resistance to soiling required for use in machine tools and production machines, as well as high resistance to corrosive liquids. In addition, the motor places minimal demands on the preparation of mounting surfaces thanks to the large air gap. The mounting tolerances for the air gap are ± 0.3 mm (0.012 in).

Design variants

SIMOTICS L-1FN3 linear motors are available as single-sided or double-sided motors.

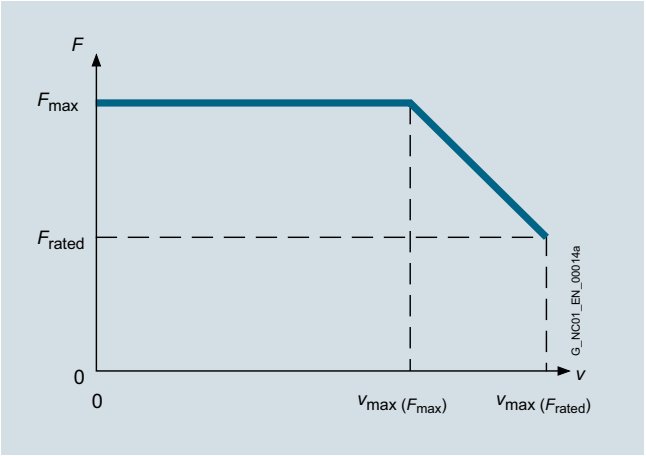
- Single-sided motors
  The single-sided version consists of a primary section that is arranged in parallel to the associated secondary section.
- Double-sided motors
  The special secondary section of the double-sided version is positioned between two primary sections (one primary section with standard winding and one with complementary winding). The design as a double-sided motor is particularly suitable for applications with movable secondary section and small traversing paths with extremely fast acceleration rates, e.g. non-circular machining.

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Technical specifications

Product name	SIMOTICS L-1FN3 linear motor
Motor type	Permanent-magnet linear motor
Magnet material	Rare-earth permanent magnets
Overload ratio (F_{max}:F_{rated}) up to max.	
• Version for peak load	2.75
• Version for continuous load	1.7
Cooling	Water cooling
Water cooler connections	G 1/8" internal thread on all primary and secondary section coolers
Temperature influence on surrounding construction with precision cooling, max.	+4 K
Coolant inlet temperature, permissible	35 °C (95 °F) (avoid condensation) > 35 °C (95 °F) if rated motor power is reduced
Temperature monitoring integrated in the primary section winding[1]	2 monitoring circuits: Temp-S with PTC thermistor and Temp-F with KTY84 temperature sensor
Insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature of 120 °C (248 °F)
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)	IP65
Available configurations	Different graduations due to modular construction
Secondary section cover	Continuous, covering the complete secondary section track or exchangeable segment by segment
2nd rating plate	Enclosed separately
Encoder system[2] (not included in scope of delivery)	Select according to general conditions specific to the application and the drive.
Connection	
• 1FN3050	Permanently connected signal and power cables, pre-assembled with connectors or with exposed core ends
• 1FN3100 ... 1FN3900	Connection cover prepared for separate power and signal cables
• 1FN3100 ... 1FN3900	Connection cover prepared for a heavy-gauge threaded joint Version for continuous load
Certificate of suitability	cURus UR for 1FN3900-4WC00-...

Characteristic curves



Velocity/force characteristic curve

The SIMOTICS L-1FN3 linear motors have an overload range available for acceleration processes. The maximum force F_{max} can only be utilized up to a maximum velocity $v_{max(Fmax)}$; up to velocity $v_{max(Frated)}$ only the feedrate force F_{rated} is available.

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[1] Evaluation via SME120/SME125 Sensor Module External or TM120 Terminal Module, see SINAMICS S120 drive system.

[2] See recommended linear measuring systems.

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Selection and ordering data

Feedrate force		Maximum Velocity[3]		SIMOTICS L-1FN3 linear motors Version for peak load		Weight, approx.	
				Primary section	Secondary section	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_{rated}[1)2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_{rated}				
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling							
200 (45)	550 (124)	146 (479)	373 (1224)	**1FN3050-2WC00-0 E A1**	**1FN3050-4SA00-0AA0**	2.4/2.9 (5.3/6.4)	0.4/0.5 (0.9/1.1)
		146 (479)	373 (1224)	**1FN3050-2WC00-0 F A1**			
200 (45)	490 (110)	138 (453)	322 (1056)	**1FN3100-1WC00-0 ■ A1**	**1FN3100-4SA00-0AA0**	2.2/– (4.9/–)[4]	0.7/0.8 (1.5/1.8)
450 (101)	1100 (247)	131 (430)	297 (974)	**1FN3100-2WC00-0 ■ A1**		3.8/4.4 (8.4/9.7)	
		237 (778)	497 (1631)	**1FN3100-2WE00-0 ■ A1**			
675 (152)	1650 (371)	120 (394)	277 (909)	**1FN3100-3WC00-0 ■ A1**		5.4/6.2 (11.9/13.7)	
		237 (778)	497 (1631)	**1FN3100-3WE00-0 ■ A1**			
900 (202)	2200 (495)	131 (430)	297 (974)	**1FN3100-4WC00-0 ■ A1**		7.4/8.5 (16.3/18.7)	
		237 (778)	497 (1631)	**1FN3100-4WE00-0 ■ A1**			
1125 (253)	2750 (618)	109 (358)	255 (837)	**1FN3100-5WC00-0 ■ A1**		9.1/10.4 (20.1/22.9)	
340 (76)	820 (184)	126 (413)	282 (925)	**1FN3150-1WC00-0 ■ A1**	**1FN3150-4SA00-0AA0**	3.0/–(6.6/–)[4]	1.2/1.3 (2.7/2.9)
675 (152)	1650 (371)	126 (413)	282 (925)	**1FN3150-2WC00-0 ■ A1**		5.3/6 (11.7/13.2)	
1010 (227)	2470 (555)	126 (413)	282 (925)	**1FN3150-3WC00-0 ■ A1**		7.8/8.7 (17.2/19.2)	
1350 (304)	3300 (742)	126 (413)	282 (925)	**1FN3150-4WC00-0 ■ A1**		10.2/11.4 (22.5/25.1)	
1690 (380)	4120 (926)	126 (413)	282 (925)	**1FN3150-5WC00-0 ■ A1**		12.8/14.2 (28.2/31.3)	
610 (137)	1720 (387)	128 (420)	309 (1014)	**1FN3300-1WC00-0 ■ A1**	**1FN3300-4SA00-0AA0**	6.2/– (13.7/–)[4]	2.4/2.6 (5.3/5.7)
1225 (275)	3450 (776)	63 (207)	176 (577)	**1FN3300-2WB00-0 ■ A1**		11.4/12.4 (25.1/27.3)	
		125 (410)	297 (974)	**1FN3300-2WC00-0 ■ A1**			
		369 (1211)	805 (2641)	**1FN3300-2WG00-0 ■ A1**			
1840 (414)	5170 (1162)	125 (410)	297 (974)	**1FN3300-3WC00-0 ■ A1**		17.0/18.4 (37.5/40.6)	
		383 (1257)	836 (2743)	**1FN3300-3WG00-0 ■ A1**			
2450 (551)	6900 (1551)	63 (207)	176 (577)	**1FN3300-4WB00-0 ■ A1**		22.2/24 (48.9/52.9)	
		125 (410)	297 (974)	**1FN3300-4WC00-0 ■ A1**			

Type of connection:	
1FN3100 to 1FN3900 motors	
Connection cover prepared for a heavy-gauge threaded joint Combined power/signal connection cable	**A**
Connection cover prepared for separate power and signal cables	**B**
1FN3050 motor	
Permanently connected power and signal cables with exposed core ends Length: 2 m (6.56 ft)	**E**
1FN3050 motor	
Permanently connected power and signal cables, pre-assembled, with connectors Length: 0.5 m (1.64 ft)	**F**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L linear motors	
• 1FN3100/1FN3150	**6FX7002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX7002-2SL02-....**

For information on the cables refer to MOTION-CONNECT connection systems

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module Booksize format**		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For other versions and components, see SINAMICS S120 drive system				
	I_{rated} [1]	I_{max}	$P_{el, max}$	I_{rated} / I_{max}		Pre-assembled adapter cable for motor	Power connector	Cable cross-section [5]	Pre-assembled basic cable to drive system
	A	A	kW (HP)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3050-2WC00-...	2.7	8.2	4.1 (5.5)	5/10	**6SL312■-■TE15-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3050-2WC00-...	2.7	8.2	4.1 (5.5)	5/10	**6SL312■-■TE15-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-1WC00-...	2.4	6.5	3.1 (4.2)	5/10	**6SL312■-■TE15-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-2WC00-...	5.1	13.5	6.3 (8.5)	9/18	**6SL312■-■TE21-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-2WE00-...	8.1	21.5	8.3 (11.1)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-3WC00-...	7.2	19.1	9.2 (12.3)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-3WE00-...	12.1	32.2	12.4 (16.6)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-4WC00-...	10.1	27.0	12.6 (16.9)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-4WE00-...	16.1	43.0	16.6 (22.3)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3100-5WC00-...	11.0	29.5	14.4 (19.3)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3150-1WC00-...	3.6	9.5	4.3 (5.8)	5/10	**6SL312■-■TE15-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3150-2WC00-...	7.2	19.1	8.7 (11.7)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3150-3WC00-...	10.7	28.6	13.0 (17.4)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3150-4WC00-...	14.3	38.2	17.4 (23.3)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3150-5WC00-...	17.9	47.7	21.7 (29.1)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM42-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-1WC00-...	6.5	20.0	8.7 (11.7)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-2WB00-...	8.0	24.7	13.2 (17.7)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-2WC00-...	12.6	39.2	16.7 (22.4)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-2WG00-...	32.2	99.7	30.1 (40.4)	60/113	**6SL312■-1TE26-0AA.**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3300-3WC00-...	19.0	58.7	25.1 (33.7)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-3WG00-...	50.0	154.9	46.2 (61.9)	132/210	**6SL312■-1TE31-3AA.**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**
1FN3300-4WB00-...	16.0	49.4	26.3 (35.3)	30/56	**6SL312■-1TE23-0AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3300-4WC00-...	25.3	78.3	33.5 (44.9)	45/85	**6SL312■-1TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

.... Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

[1] For water cooling with inlet temperature 35 °C (95 °F).
[2] A reduction of up to 30 % must be expected in case of motor standstill, at very low velocities, or with very short traverse paths.
[3] Velocity values refer to a DC link voltage of the drive system of 600 V DC.
[4] No precision cooler available.
[5] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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Selection and ordering data

Feedrate force		Maximum Velocity[3]		SIMOTICS L-1FN3 linear motors Version for peak load		Weight, approx.	
				Primary section	**Secondary section**	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_{rated}[1)2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_{rated}				
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling							
1930 (434)	5180 (1165)	30 (98)	112 (368)	**1FN3450-2WA50-0 ■ A1**	**1FN3450-4SA00-0AA0**	15.9/17.1 (35.1/37.7)	3.8/4 (8.4/8.8)
		120 (394)	275 (902)	**1FN3450-2WC00-0 ■ A1**			
		240 (787)	519 (1703)	**1FN3450-2WE00-0 ■ A1**			
2895 (651)	7760 (1745)	62 (203)	164 (538)	**1FN3450-3WB00-0 ■ A1**		22.6/24.3 (49.8/53.6)	
		90 (295)	217 (712)	**1FN3450-3WB50-0 ■ A1**			
		120 (394)	275 (902)	**1FN3450-3WC00-0 ■ A1**			
		240 (787)	519 (1703)	**1FN3450-3WE00-0 ■ A1**			
3860 (868)	10350 (2327)	62 (203)	164 (538)	**1FN3450-4WB00-0 ■ A1**		30.9/33.1 (68.1/73)	
		90 (295)	217 (712)	**1FN3450-4WB50-0 ■ A1**			
		120 (394)	275 (902)	**1FN3450-4WC00-0 ■ A1**			
		240 (787)	519 (1703)	**1FN3450-4WE00-0 ■ A1**			
2610 (587)	6900 (1551)	36 (118)	120 (394)	**1FN3600-2WA50-0 ■ A1**	**1FN3600-4SA00-0AA0**	22.2/24.7 (49/54.5)	4.6/5 (10.1/11)
3915 (880)	10350 (2327)	58 (190)	155 (509)	**1FN3600-3WB00-0 ■ A1**		31.5/33.4 (69.5/73.7)	
		127 (417)	279 (915)	**1FN3600-3WC00-0 ■ A1**			
5220 (1174)	13800 (3102)	26 (85)	105 (345)	**1FN3600-4WA30-0 ■ A1**		40.8/43.3 (90/95.5)	
		58 (190)	155 (509)	**1FN3600-4WB00-0 ■ A1**			
		91 (299)	215 (705)	**1FN3600-4WB50-0 ■ A1**			
		112 (367)	254 (833)	**1FN3600-4WC00-0 ■ A1**			
4050 (910)	10350 (2327)	65 (213)	160 (525)	**1FN3900-2WB00-0 ■ A1**	**1FN3900-4SA00-0AA0**	28.2/29.7 (62.2/65.4)	7.5/7.9 (16.5/17.4)
		115 (377)	253 (830)	**1FN3900-2WC00-0 ■ A1**			
6075 (1366)	15530 (3491)	75 (246)	181 (594)	**1FN3900-3WB00-0 ■ A1**		42.2/44.3 (93.1/97.6)	
8100 (1821)	20700 (4653)	65 (213)	160 (525)	**1FN3900-4WB00-0 ■ A1**		56.2/58.9 (124/130)	
		88 (290)	203 (666)	**1FN3900-4WB50-0 ■ A1**			
		115 (377)	253 (830)	**1FN3900-4WC00-0 ■ A1**			

Type of connection:	
1FN3100 to 1FN3900 motors	
Connection cover prepared for a heavy-gauge threaded joint Combined power/signal connection cable	**A**
Connection cover prepared for separate power and signal cables	**B**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L linear motors	
• 1FN3100/1FN3150	**6FX7002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX7002-2SL02-....**

For information on the cables refer to MOTION-CONNECT connection systems

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module Booksize format**		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For other versions and components, see SINAMICS S120 drive system				
	I_{rated} [1]	I_{max}	$P_{el, max}$	I_{rated} / I_{max}		Pre-assembled adapter cable for motor	Power connector	Cable cross-section [4]	Pre-assembled basic cable to drive system
	A	A	kW (HP)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3450-2WA50-...	8.6	25.3	15.9 (21.3)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3450-2WC00-...	18.8	55.3	23.1 (31)	30/56	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3450-2WE00-...	33.8	99.7	32.6 (43.7)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3450-3WB00-...	17.9	52.7	27.5 (36.9)	30/56	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3450-3WB50-...	22.8	67.3	31.1 (41.7)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3450-3WC00-...	28.1	83.0	34.6 (46.4)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3450-3WE00-...	50.7	149.6	49.0 (65.7)	132/210	**6SL312■-1 TE31-3AA.**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**
1FN3450-4WB00-...	23.8	70.3	36.7 (49.2)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3450-4WB50-...	30.4	89.8	41.4 (55.5)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3450-4WC00-...	37.5	110.6	46.2 (61.9)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3450-4WE00-...	67.6	199.5	65.3 (87.5)	132/210	**6SL312■-1 TE31-3AA.**	**6FX7008-1BB61-....** [5]	–	4 × 25	**6FX7008-1BB25-....** [6]
1FN3600-2WA50-...	12.4	36.0	21.9 (29.4)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM62-....**	1	4 × 2.5	**6FX8002-5CS11-....**
1FN3600-3WB00-...	23.2	67.3	35.4 (47.5)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3600-3WC00-...	35.7	105.9	44.6 (59.8)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3600-4WA30-...	22.3	64.9	41.9 (56.2)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3600-4WB00-...	30.9	89.8	47.2 (63.3)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM82-....**	1.5	4 × 6	**6FX8002-5CS54-....**
1FN3600-4WB50-...	40.8	118.5	53.2 (71.3)	85/141	**6SL312■-1 TE28-5AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3600-4WC00-...	46.9	136.5	55.5 (74.4)	85/141	**6SL312■-1 TE28-5AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-2WB00-...	24.7	69.5	34.5 (46.3)	45/85	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM72-....**	1.5	4 × 4	**6FX8002-5CS54-....**
1FN3900-2WC00-...	36.7	103.3	40.9 (54.8)	60/113	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-3WB00-...	40.6	114.0	54.5 (73.1)	85/141	**6SL312■-1 TE28-5AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-4WB00-...	49.4	138.9	68.9 (92.4)	132/210	**6SL312■-1 TE31-3AA.**	**6FX7002-5LM32-....**	1.5	4 × 10	**6FX8002-5CS64-....**
1FN3900-4WB50-...	60.6	170.3	76.3 (102.3)	132/210	**6SL312■-1 TE31-3AA.**	**6FX7002-5LM02-....**	1.5	4 × 16	**6FX8002-5CS24-....**
1FN3900-4WC00-...	73.5	206.5	81.9 (109.8)	132/210	**6SL312■-1 TE31-3AA.**	**6FX7008-1BB61-....** [5]	–	4 × 25	**6FX7008-1BB25-....** [6]

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

.... Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

[1] For water cooling with inlet temperature 35 °C (95 °F).

[2] A reduction of up to 30 % must be expected in case of motor standstill, at very low velocities, or with very short traverse paths.

[3] Velocity values refer to a DC link voltage of the drive system of 600 V DC.

[4] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

[5] Sold by the meter only (4 × 16 mm^2). Connected to primary section with 16 mm^2 (< 1.5 m (4.92 ft)) then routed onwards through terminal box with 25 mm^2.

[6] Sold by the meter only (4 × 25 mm^2).

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Selection and ordering data

Feedrate force		Maximum Velocity[3]		SIMOTICS L-1FN3 linear motors Version for continuous load		Weight, approx.	
				Primary section	**Secondary section**	Primary section without/with precision cooling	Secondary section without/with heatsink profiles
F_{rated}[1)2)]	F_{max}	v_{max} at F_{max}	v_{max} at F_{rated}				
N (lb$_f$)	N (lb$_f$)	m/min (ft/min)	m/min (ft/min)	Article No.	Article No.	kg (lb)	kg (lb)
Water cooling							
150 (34)	260 (58)	242 (794)	435 (1427)	**1FN3050-1ND00-0EA1**	**1FN3050-4SA00-0AA0**	1.9/2.4 (4.2/5.3)	0.4/0.5 (0.9/1.1)
		242 (794)	435 (1427)	**1FN3050-1ND00-0FA1**			
300 (67)	510 (115)	106 (348)	202 (663)	**1FN3050-2NB80-0EA1**		3.2/4.0 (7.1/8.8)	
		106 (348)	202 (663)	**1FN3050-2NB80-0FA1**			
300 (67)	510 (115)	117 (384)	214 (702)	**1FN3100-1NC00-0BA1**	**1FN3100-4SA00-0AA0**	3/3.5 (6.6/7.7)	0.7/0.8 (1.5/1.8)
605 (136)	1020 (229)	170 (558)	307 (1007)	**1FN3100-2NC80-0BA1**		5.1/5.9 (11.3/13.1)	
905 (203)	1530 (344)	115 (337)	211 (692)	**1FN3100-3NC00-0BA1**		7.3/8.3 (16.1/18.03)	
1205 (271)	2040 (459)	169 (555)	305 (1001)	**1FN3100-4NC80-0BA1**		10/11.3 (22.1/24.9)	
455 (102)	770 (173)	129 (423)	234 (768)	**1FN3150-1NC20-0BA1**	**1FN3150-4SA00-0AA0**	4.1/4.6 (9.0/10.1)	1.2/1.3 (2.7/2.9)
905 (203)	1530 (344)	110 (361)	201 (660)	**1FN3150-2NB80-0BA1**		7.2/8.1 (15.9/17.9)	
1360 (306)	2300 (517)	163 (535)	292 (958)	**1FN3150-3NC70-0BA1**		10.5/11.7 (23.2/25.8)	
1810 (407)	3060 (688)	109 (358)	200 (656)	**1FN3150-4NB80-0BA1**		13.8/15.2 (30.4/33.5)	
865 (195)	1470 (331)	129 (423)	230 (755)	**1FN3300-1NC10-0BA1**	**1FN3300-4SA00-0AA0**	8.8/9.5 (19.4/20.9)	2.4/2.6 (5.3/5.7)
1730 (389)	2940 (661)	127 (417)	228 (748)	**1FN3300-2NC10-0BA1**		16.1/17.2 (35.5/37.9)	
2595 (583)	4400 (989)	144 (473)	257 (843)	**1FN3300-3NC40-0BA1**		22.8/24.3 (50.3/53.6)	
3460 (778)	5870 (1320)	109 (358)	196 (643)	**1FN3300-4NB80-0BA1**		30.4/32.3 (67.0/71.2)	
2595 (583)	4400 (989)	153 (502)	271 (889)	**1FN3450-2NC50-0BA1**	**1FN3450-4SA00-0AA0**	22/23.2 (48.5/51.2)	3.8/4 (8.4/8.8)
3890 (875)	6600 (1484)	152 (499)	270 (886)	**1FN3450-3NC50-0BA1**		32/33.6 70.6/74.1)	
5185 (1166)	8810 (1981)	106 (348)	190 (623)	**1FN3450-4NB80-0BA1**		42.3/44.3 (93.3/97.9)	
3460 (778)	5870 (1320)	112 (368)	200 (656)	**1FN3600-2NB80-0BA1**	**1FN3600-4SA00-0AA0**	28.9/30.4 (63.7/67.0)	4.6/5 (10.1/11)
5185 (1166)	8810 (1981)	111 (364)	199 (653)	**1FN3600-3NB80-0BA1**		42.9/45.0 (94.6/99.2)	
6915 (1555)	11740 (2639)	111 (364)	199 (653)	**1FN3600-4NB80-0BA1**		56.6/59.2 (124.8/130.54)	
5185 (1166)	8810 (1981)	71 (233)	130 (427)	**1FN3900-2NB20-0BA1**	**1FN3900-4SA00-0AA0**	42.4/44.2 (93.5/97.5)	7.5/7.9 (16.5/17.4)
7780 (1749)	13210 (2970)	71 (233)	129 (423)	**1FN3900-3NB20-0BA1**		62/64.5 (136.7/142.2)	
10375 (2332)	17610 (3959)	70 (230)	129 (423)	**1FN3900-4NB20-0BA1**		82.2/85.3 (181.3/188.1)	

Type of connection:

1FN3100 to 1FN3900 motors

Connection cover prepared for separate power and signal cables — **B**

1FN3050 motor

Permanently connected power and signal cables with exposed core ends
Length: 2 m (6.56 ft) — **E**

1FN3050 motor

Permanently connected power and signal cables, pre-assembled, with connectors
Length: 0.5 m (1.64 ft) — **F**

Description	Article No.
Signal cable, pre-assembled with M17 connector	
For SIMOTICS L linear motors	
• 1FN3100/1FN3150	**6FX7002-2SL01-....**
• 1FN3300 ... 1FN3900	**6FX7002-2SL02-....**

For information on the cables refer to MOTION-CONNECT connection systems

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Motor type Primary section (repeated)	Rated current	Maximum current	Calculated power	**SINAMICS S120 Motor Module Booksize format**		**Power cable with complete shield** Motor connection via adapter cable with power connector for increased velocity/acceleration			
				Required rated current	For other versions and components, see SINAMICS S120 drive system				
	I_{rated} [1]	I_{max}	$P_{el, max}$	I_{rated} / I_{max}		Pre-assembled adapter cable for motor	Power connector	Cable cross-section [5]	Pre-assembled basic cable to drive system
	A	A	kW (HP)	A	Article No.	Article No.	Size	mm^2	Article No.
1FN3050-1ND...	2.8	5.9	1.7 (2.28)	3/6	**6SL312■-■TE13-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3050-1ND...	2.8	5.9	1.7 (2.28)	3/6	**6SL312■-■TE13-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3050-2NB...	2.8	5.9	2.3 (3.08)	3/6	**6SL312■-■TE13-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3050-2NB...	2.8	5.9	2.3 (3.08)	3/6	**6SL312■-■TE13-0AA.**	Permanent cable connection	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3100-1NC...	2.8	5.9	2.1 (2.8)	3/6	**6SL312■-■TE13-0AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3100-2NC...	8	16.5	5.1 (6.84)	9/18	**6SL312■-■TE21-0AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3100-3NC...	8.5	17.6	6.3 (8.5)	9/18	**6SL312■-■TE21-0AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3100-4NC...	15.9	33.1	10.2 (13.9)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3150-1NC...	4.5	9.4	3.2 (4.3)	5/10	**6SL312■-■TE15-0AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3150-2NB...	8	16.5	5.8 (7.78)	9/18	**6SL312■-■TE21-0AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3150-3NC...	16.9	35.2	10.8 (14.5)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3150-4NB...	15.9	33.1	11.6 (15.6)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM42- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3300-1NC...	8.1	17.1	5.4 (7.2)	9/18	**6SL312■-■TE21-0AA.**	**6FX7002-5LM62- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3300-2NC...	16.2	34.1	10.7 (14.3)	18/36	**6SL312■-■TE21-8AA.**	**6FX7002-5LM62- ....**	1	4 × 2.5	**6FX8002-5CS11- ....**
1FN3300-3NC...	27.3	57.4	17.3 (23.2)	30/56 [4]	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM72- ....**	1.5	4 × 4	**6FX8002-5CS41- ....**
1FN3300-4NB...	28.4	59.6	19.6 (26.3)	30/56 [4]	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM72- ....**	1.5	4 × 4	**6FX8002-5CS41- ....**
1FN3450-2NC...	28.4	59.6	17.4 (23.3)	30/56 [4]	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM72- ....**	1.5	4 × 4	**6FX8002-5CS41- ....**
1FN3450-3NC...	42.5	89.5	26.1 (35.0)	45/85 [4]	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM32- ....**	1.5	4 × 10	**6FX8002-5CS64- ....**
1FN3450-4NB...	40.8	85.8	27.9 (37.4)	45/85 [4]	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM32- ....**	1.5	4 × 10	**6FX8002-5CS64- ....**
1FN3600-2NB...	28.4	59.6	19.3 (25.9)	30/56 [4]	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM72- ....**	1.5	4 × 4	**6FX8002-5CS41- ....**
1FN3600-3NB...	42.5	89.5	28.9 (38.8)	45/85 [4]	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM32- ....**	1.5	4 × 10	**6FX8002-5CS64- ....**
1FN3600-4NB...	56.7	119.3	38.5 (51.6)	60/113 [4]	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM02- ....**	1.5	4 × 16	**6FX8002-5CS24- ....**
1FN3900-2NB...	28.4	59.6	22.3 (29.9)	30/56 [4]	**6SL312■-1 TE23-0AA.**	**6FX7002-5LM72- ....**	1.5	4 × 4	**6FX8002-5CS41- ....**
1FN3900-3NB...	42.5	89.5	33.4 (44.8)	45/85 [4]	**6SL312■-1 TE24-5AA.**	**6FX7002-5LM32- ....**	1.5	4 × 10	**6FX8002-5CS64- ....**
1FN3900-4NB...	56.7	119.3	44.5 (59.7)	60/113 [4]	**6SL312■-1 TE26-0AA.**	**6FX7002-5LM02- ....**	1.5	4 × 16	**6FX8002-5CS24- ....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

.... Length code **....**

For information on the cables refer to MOTION-CONNECT connection systems

[1] For water cooling with inlet temperature 35 °C (95 °F).

[2] A reduction of up to 30 % must be expected in case of motor standstill, at very low velocities, or with very short traverse paths.

[3] Velocity values refer to a DC link voltage of the drive system of 600 V DC.

[4] Power modules are designed for feedrate force F_{rated}. If feedrate force F_{max} is utilized, the next larger power module must be selected. If a power module with a higher rating is used, you must check whether the specified power cable can be connected to it.

[5] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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Selection and ordering data

SIMOTICS L-1FN3 linear motors	Optional components		
	Secondary section cover		Cover end pieces for secondary section cover[2]
Type	Continuous[1]	Segmented	Retention of the continuous cover without heatsink profiles
	Article No.	Article No.	Article No.
1FN3050-...	**1FN3050-0TB00-1 ■ ■ 0**	**1FN3050-4TP00-1A ■ ■**	**1FN3050-0TC00-0AA0**
1FN3100-...	**1FN3100-0TB00-1 ■ ■ 0**	**1FN3100-4TP00-1A ■ ■**	**1FN3100-0TC00-0AA0**
1FN3150-...	**1FN3150-0TB00-1 ■ ■ 0**	**1FN3150-4TP00-1A ■ ■**	**1FN3150-0TC00-0AA0**
1FN3300-...	**1FN3300-0TB00-1 ■ ■ 0**	**1FN3300-4TP00-1A ■ ■**	**1FN3300-0TC00-0AA0**
1FN3450-...	**1FN3450-0TB00-1 ■ ■ 0**	**1FN3450-4TP00-1A ■ ■**	**1FN3450-0TC00-0AA0**
1FN3600-...	**1FN3600-0TB00-1 ■ ■ 0**	**1FN3600-4TP00-1A ■ ■**	–
1FN3900-...	**1FN3900-0TB00-1 ■ ■ 0**	**1FN3900-4TP00-1A ■ ■**	–

Number of secondary sections

0	**A**
10	**B**
20	**C**
30	**D**
40	**E**
50	**F**

0	**A**
1	**B**
2	**C**
3	**D**
4	**E**
5	**F**
6	**G**
7	**H**
8	**J**
9	**K**

Number of secondary sections for all motors

2.5	**C**	**5**
3	**D**	**0**
3.5	**D**	**5**
4	**E**	**0**
5	**F**	**0**

Number of secondary sections for motors 1FN3600/1FN3900

5.5	**F**	**5**
6.5	**G**	**5**

SIMOTICS L-1FN3 linear motors Version for peak load	Optional components Precision cooler
Type	Article No.
1FN3050-2W...	**1FN3050-2PK00-0AA0**
1FN3100-2W...	**1FN3100-2PK00-0AA0**
1FN3100-3W...	**1FN3100-3PK00-0AA0**
1FN3100-4W...	**1FN3100-4PK00-0AA0**
1FN3100-5W...	**1FN3100-5PK00-0AA0**
1FN3150-2W...	**1FN3150-2PK00-0AA0**
1FN3150-3W...	**1FN3150-3PK00-0AA0**
1FN3150-4W...	**1FN3150-4PK00-0AA0**
1FN3150-5W...	**1FN3150-5PK00-0AA0**
1FN3300-2W...	**1FN3300-2PK00-0AA0**
1FN3300-3W...	**1FN3300-3PK00-0AA0**
1FN3300-4W...	**1FN3300-4PK00-0AA0**
1FN3450-2W...	**1FN3450-2PK00-0AA0**
1FN3450-3W...	**1FN3450-3PK00-0AA0**
1FN3450-4W...	**1FN3450-4PK00-0AA0**
1FN3600-2W...	**1FN3600-2PK00-0AA0**
1FN3600-3W...	**1FN3600-3PK00-0AA0**
1FN3600-4W...	**1FN3600-4PK00-0AA0**
1FN3900-2W...	**1FN3900-2PK00-0AA0**
1FN3900-3W...	**1FN3900-3PK00-0AA0**
1FN3900-4W...	**1FN3900-4PK00-0AA0**

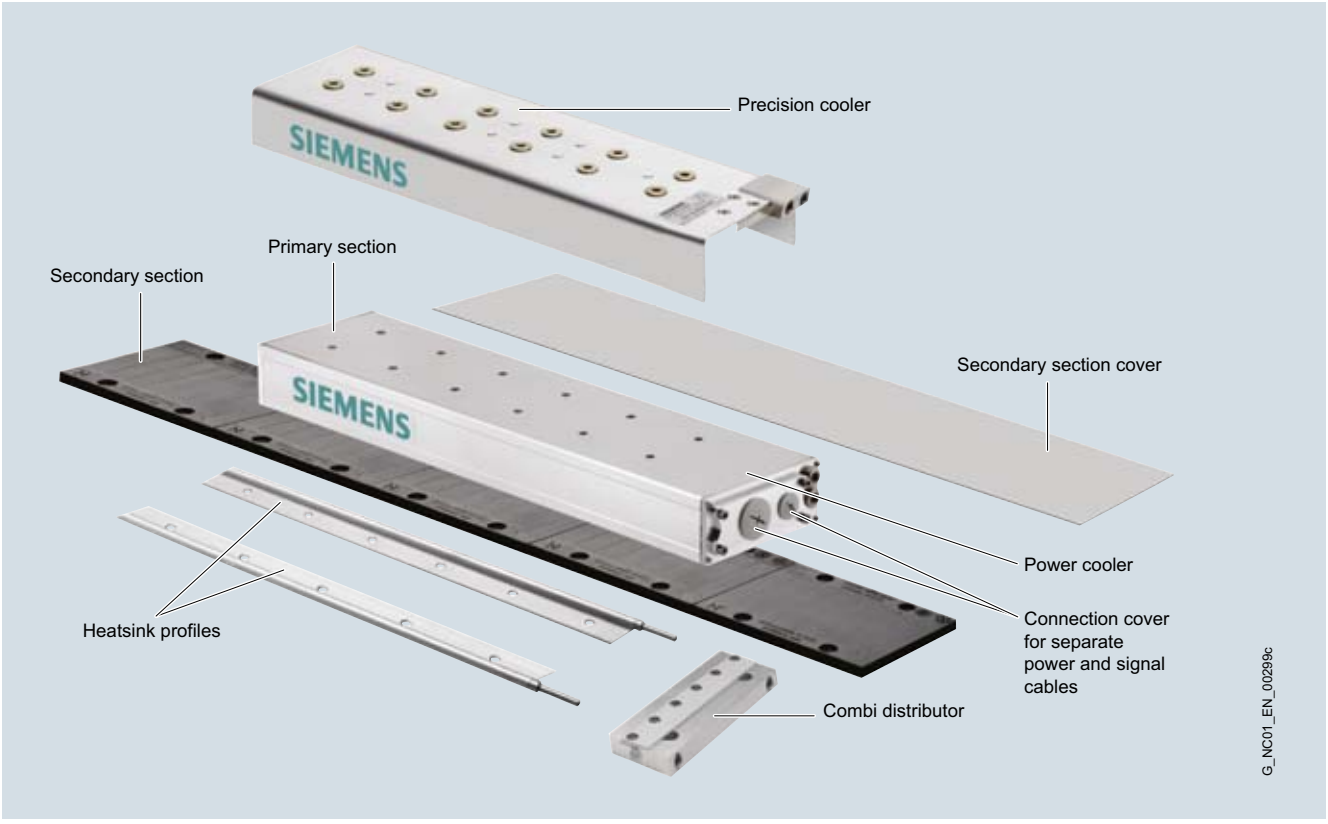
SIMOTICS L-1FN3 linear motors Version for continuous load	Optional components Precision cooler
Type	Article No.
1FN3050-1N...	**1FN3050-1PK10-0AA0**
1FN3050-2N...	**1FN3050-2PK10-0AA0**
1FN3100-1N...	**1FN3100-1PK10-0AA0**
1FN3100-2N...	**1FN3100-2PK10-0AA0**
1FN3100-3N...	**1FN3100-3PK10-0AA0**
1FN3100-4N...	**1FN3100-4PK10-0AA0**
1FN3150-1N...	**1FN3150-1PK10-0AA0**
1FN3150-2N...	**1FN3150-2PK10-0AA0**
1FN3150-3N...	**1FN3150-3PK10-0AA0**
1FN3150-4N...	**1FN3150-4PK10-0AA0**
1FN3300-1N...	**1FN3300-1PK10-0AA0**
1FN3300-2N...	**1FN3300-2PK10-0AA0**
1FN3300-3N...	**1FN3300-3PK10-0AA0**
1FN3300-4N...	**1FN3300-4PK10-0AA0**
1FN3450-2N...	**1FN3450-2PK10-0AA0**
1FN3450-3N...	**1FN3450-3PK10-0AA0**
1FN3450-4N...	**1FN3450-4PK10-0AA0**
1FN3600-2N...	**1FN3600-2PK10-0AA0**
1FN3600-3N...	**1FN3600-3PK10-0AA0**
1FN3600-4N...	**1FN3600-4PK10-0AA0**
1FN3900-2N...	**1FN3900-2PK10-0AA0**
1FN3900-3N...	**1FN3900-3PK10-0AA0**
1FN3900-4N...	**1FN3900-4PK10-0AA0**

[1] Integrated cover for several secondary sections. The maximum length of the secondary section cover is 6 m (19.7 ft). For the following motors, this corresponds to: 1FN3050 to 1FN3150, a maximum number of 50 secondary sections (AB to FA). 1FN3300 to 1FN3900, a maximum number of 32 secondary sections (AB to DC).

[2] The secondary section end pieces are designed to allow clamping of the integrated secondary section cover.

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Selection and ordering data (continued)



SIMOTICS L-1FN3 linear motors	**Optional components**			
Type	**Heatsink profile**[3]	**Secondary section end pieces**[2]		
		Combi distributor	**Combi adapter**	**Combi end piece**
		Parallel water connection for all heatsink profiles	Combi adapter and end piece can only be implemented together.	
			Single-sided water connection	Water diversion
	Article No.	Article No.	Article No.	Article No.
1FN3050-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3050-0TJ01-0AA0**	**1FN3050-0TG01-0AA0**	**1FN3050-0TF01-0AA0**
1FN3100-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3100-0TJ01-0AA0**	**1FN3100-0TG01-0AA0**	**1FN3100-0TF01-0AA0**
1FN3150-...	**1FN3002-0TK0 ■ -1 ■ ■ 0**	**1FN3150-0TJ01-0AA0**	**1FN3150-0TG01-0AA0**	**1FN3150-0TF01-0AA0**
1FN3300-...	**1FN3003-0TK0 ■ -1 ■ ■ 0**	**1FN3300-0TJ01-0AA0**	**1FN3300-0TG01-0AA0**	**1FN3300-0TF01-0AA0**
1FN3450-...	**1FN3003-0TK0 ■ -1 ■ ■ 0**	**1FN3450-0TJ01-0AA0**	**1FN3450-0TG01-0AA0**	**1FN3450-0TF01-0AA0**
1FN3600-...	**1FN3004-0TK0 ■ -1 ■ ■ 0**	**1FN3600-0TJ01-0AA0**	–	–
1FN3900-...	**1FN3005-0TK0 ■ -1 ■ ■ 0**	**1FN3900-0TJ01-0AA0**	–	–

With plug-in coupling prepared for connection to combi distributor with plug-in coupling, combi adapter with plug-in coupling, combi end piece with plug-in coupling or as intermediate unit for heatsink profile with cable grommet nipple	**4**		
1FN3050 to 1FN3450 motors[4]: **Grommet nipple only on right end** of secondary section track	**6**		
1FN3600/1FN3900 motors: **Grommet nipple on both ends** of secondary section track	**6**		
1FN3050 to 1FN3450 motors[4]: **Grommet nipple only on left end** of secondary section track	**7**		
		A	0
		B	10
		C	20
		A	0
		B	1
		C	2
		D	3
		E	4
		F	5
		G	6
		H	7
		J	8
		K	9

Number of secondary sections

[3] 1FN3050 to 1FN3450 motors:
2 units required per secondary section track.
1FN3600 to 1FN3900:
3 units required per secondary section track.
The maximum available length of a single-part heatsink profile is 3 m (9.84 ft).
For the following motors, this corresponds to:
1FN3050 to 1FN3150, a maximum number of 24 secondary sections (AB to CE)
1FN3300 to 1FN3900, a maximum number of 16 secondary sections (AB to BG).

[4] Available only in length AC (equals 2 secondary sections). The difference in the secondary section track length must be compensated through assembly with the heatsink profile 1FN300.-0TK04-1..0.

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Overview



It may be necessary to use the Hall-effect sensor box in conjunction with linear measuring systems in cases where the software-based pole position identification processes cannot be applied.

Integration

The Hall-effect sensor box is suitable for use with SIMOTICS L-1FN3 linear motors.

Configuration

Linear motors	**Hall-effect sensor box**	
SIMOTICS L-1FN3	Straight cable outlet	Cable outlet at side
Type	Article No.	Article No.
Mounted opposite primary section terminal end		
1FN3050-2... 1FN3100-2... 1FN3100-4... 1FN3150-2... 1FN3150-4...	**1FN3002-0PH00-0AA0**	**1FN3002-0PH01-0AA0**
1FN3100-1... 1FN3100-3... 1FN3100-5... 1FN3150-1... 1FN3150-3... 1FN3150-5...	**1FN3005-0PH00-0AA0**	**1FN3005-0PH01-0AA0**
1FN3300-2... 1FN3300-4... 1FN3450-2... 1FN3450-4... 1FN3600-2... 1FN3600-4... 1FN3900-2... 1FN3900-4...	**1FN3003-0PH00-0AA0**	**1FN3003-0PH01-0AA0**
1FN3300-1... 1FN3300-3... 1FN3450-3... 1FN3600-3... 1FN3900-3...	**1FN3006-0PH00-0AA0**	**1FN3006-0PH01-0AA0**
Mounted on primary section terminal end		
1FN3050-... 1FN3100-... 1FN3150-...	**1FN3002-0PH00-0AA0**	**1FN3002-0PH01-0AA0**
1FN3300-... 1FN3450-... 1FN3600-... 1FN3900-...	**1FN3003-0PH00-0AA0**	**1FN3003-0PH01-0AA0**

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Overview

Recommended linear measuring systems for SIMOTICS L-1FN3 linear motors

	Incremental encoder sin/cos 1 V_{pp} enclosed	
Type	**LS 187**	**LS 487**
Signal cycle	20 µm	20 µm
Acceleration in measuring direction, max.	100 m/s^2 (328 ft/s^2)	100 m/s^2 (328 ft/s^2)
Traversing velocity, max.	120 m/min (394 ft/min)	120 m/min (394 ft/min)
Measuring length, max.	3040 mm (120 in)	2040 mm (80.3 in)
Output signal	1 V_{pp}	1 V_{pp}

	Incremental encoder sin/cos 1 V_{pp} open	
Type	**LIDA 485**	**Renishaw RG2**
Signal cycle	20 µm	20 µm
Acceleration in measuring direction, max.[1)]	200 m/s^2 (656 ft/s^2)	300 m/s^2 (984 ft/s^2)
Traversing velocity, max.	480 m/min (1575 ft/min)	300 m/min (984 ft/min)
Measuring length, max.	30040 mm (1183 in)	50000 mm (1968 in)
Output signal	1 V_{pp}	1 V_{pp}

Absolute encoder with DRIVE-CLiQ

Absolute measuring systems with integrated DRIVE-CLiQ interface are available from various manufacturers. The absolute encoders can be used as a motor feedback system.

An up-to-date list of the relevant manufacturers and available measuring systems can be viewed on the Internet at:

http://support.automation.siemens.com/WW/view/en/65402168

It is also possible to use absolute measuring systems with EnDat 2.1.

Overview

Liquid cooling

These are non-Siemens products whose fundamental suitability is familiar to us. It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or dictates. We do not accept liability for the quality of non-Siemens products.

Please get in touch with the cooler manufacturers listed below for technical information.

ait-deutschland GmbH
http://www.kkt-chillers.com

BKW Kälte-Wärme-Versorgungstechnik GmbH
www.bkw-kuema.de

Helmut Schimpke und Team Industriekühlanlagen GmbH + Co. KG
www.schimpke.com

Hydac System GmbH
www.hydac.com

Pfannenberg GmbH
www.pfannenberg.com

Rittal GmbH & Co. KG
www.rittal.com

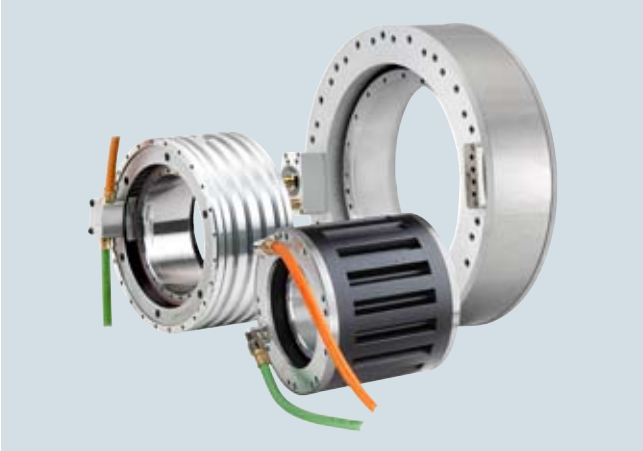
For design information about the coolers, refer to the SIMOTICS L-1FN3 Linear Motors Configuration Manual.

[1)] Refers to the measuring head.

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SIMOTICS T-1FW6

Overview



SIMOTICS T-1FW6 built-in torque motors with jacket cooling (on left), naturally cooled (in center) and with integrated cooling (on right).

SIMOTICS T-1FW6 built-in torque motors are liquid-cooled or naturally cooled multi-pole permanent-magnet AC synchronous motors with a hollow shaft. The motors are supplied as built-in components that are held together in the delivered state by transport locks. For a complete drive unit, an additional bearing and shaft encoder are required.

Each frame size is available in different axis lengths. Most stators and rotors are equipped with flanges at each end with centering surfaces and threaded holes for installation in the machine.

Please note that when SIMOTICS T-1FW6 direct motors (torque motors) are used in fork heads for machine tools or robots, a license for US patent US5584621 and the associated international patent protection may be required. Please observe the national and international licensing conditions when using direct motors so that no infringements of industrial property rights occur.

Benefits

- No elasticity in the drive train
- High availability, since there are no gear components subject to wear in the drive train
- High torque, compact design and low construction volume
- Low moment of inertia
- Direct coupling to the machine using flanges

Application

In conjunction with the SINAMICS S120 drive system, the SIMOTICS T built-in torque motors can be used as a direct drive for the following machine applications:

- Rotary indexing machines
- Rotary tables and splitters
- Rotary axes (A, B, C axis on 5-axis machine tools)
- Turret indexing and cylinder indexing for single-spindle and multi-spindle machines
- Tool spindles
- Roller and cylinder drives
- Infeed and handling axes
- Tablet presses
- Medical systems
- Measuring machines

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Design

The SIMOTICS T-1FW6 built-in torque motor comprises the following components:

Stator

Version in 3-phase AC winding. The stator is generally designed for operation with liquid cooling.

Rotor

Cylindrical hollow shaft made of steel with permanent magnets fixed to the circumference.

If the main cooler and precision cooler are used together in a cooling unit, a cooling connection adapter (accessory) can be ordered separately for simpler connection.

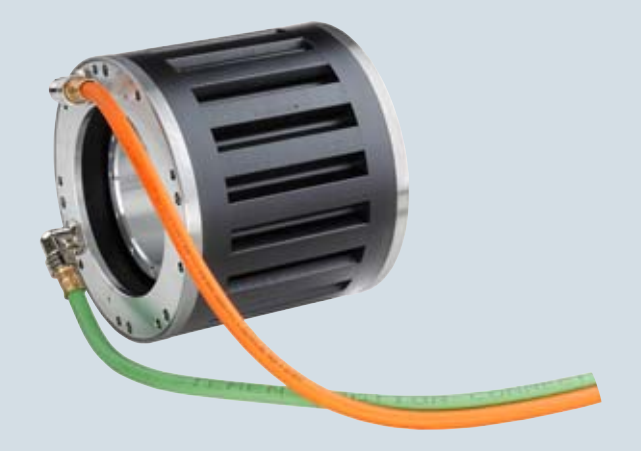
Cooling types

The design of the cooling system is dependent on the size (external diameter) of the motor.

Built-in torque motor SIMOTICS T-1FW6 Type	**Type of cooling**
1FW6050 and 1FW6060	Integrated water cooling with one cooling circuit
1FW6053 and 1FW6063	Natural cooling
1FW6090 ... 1FW6150	Jacket water cooling
1FW6160 ... 1FW6290	Integrated water cooling with two cooling circuits

Naturally cooled motors

Naturally cooled motors have the same dimensions as water-cooled motors in frame sizes 1FW6050 and 1FW6060, but have a lower continuous torque capability because they are naturally cooled. They can be used for any application for which liquid-cooled motors would be deemed undesirable or unnecessary. In addition to their dimensions, their mechanical interfaces are also compatible with those of water-cooled motors which means that it is relatively easy to change the cooling method.



Components of naturally cooled motors in frame sizes 1FW6053 and 1FW6063 (rotor and stator)

Motors with integrated single-circuit cooling

These motors have a ready-to-connect, integrated single-circuit cooling system; they are compact and therefore suitable for easy integration in a machine.



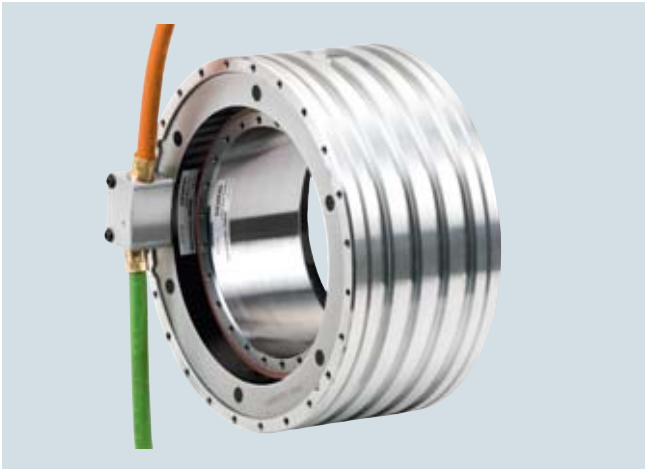
Components of motors in frame sizes 1FW6050 and 1FW6060 with integrated single-circuit cooling (rotor, stator)

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Design (continued)

Motors with jacket water cooling

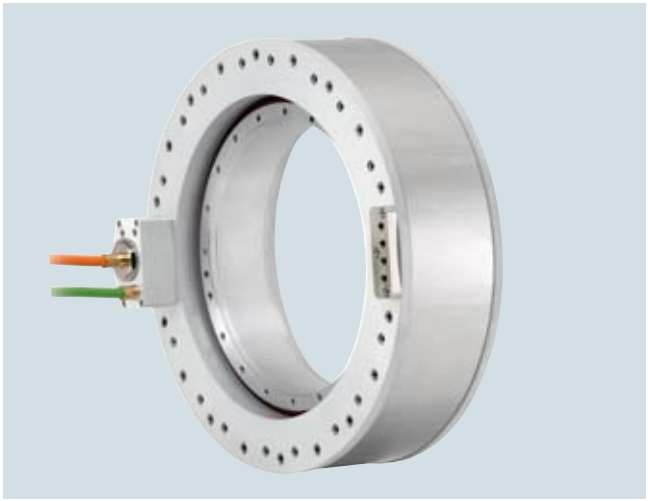
The coolant inlet/return flow circuit must be provided by the machine manufacturer in the surrounding construction.



Components of jacket-cooled motors in frame sizes 1FW6090 to 1FW6150 (rotor and stator)

Motors with integrated dual-circuit cooling

These motors feature a ready-to-connect, integrated dual-circuit cooling system and are therefore thermally insulated to a large extent against the mechanical axis construction.



Components of motors in frame sizes 1FW6160 to 1FW6290 with integrated dual-circuit cooling (rotor and stator)

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Integration

The SIMOTICS T-1FW6 built-in torque motors supplied via the SINAMICS S120 drive system are designed for operation on a 600 V DC link voltage level.

The cable connection is brought out of the front face of the stator. The cable end has a pre-assembled connector or exposed cable cores depending on the motor version. The length of the power and signal cables from the motor to the drive system must not exceed 50 m (164 ft).

Absolute measuring systems with DRIVE-CLiQ

Measuring systems with integrated DRIVE-CLiQ interface are available from various manufacturers. The encoders can be used as a motor feedback system.

An up-to-date list of the relevant manufacturers and available measuring systems can be viewed on the Internet at:

http://support.automation.siemens.com/WW/view/en/65402168

It is also possible to use absolute measuring systems with EnDat 2.1 or incremental systems with 1 V_{pp}.

Technical specifications

Product name	SIMOTICS T-1FW6 built-in torque motor
Motor type	Synchronous motor with permanent-magnet rotor, multi-pole (22 to 98 rotor poles)
Torque ripple	≤ 1.5 % M_0
Coolant inlet temperature, maximum	35 °C (95 °F)
Pressure in cooling circuit, maximum	10 bar (static)
Thermal motor protection in accordance with DIN 44081/DIN 44082[1)]	
• 1FW6050 and 1FW6060 (water cooling) 1FW6053 and 1FW6063 (natural cooling)	1 × PTC thermistor triplet with response threshold 130 °C (266 °F)
• 1FW6090 ... 1FW6290	2 × PTC thermistor triplet with response threshold 130 °C/150 °C (266 °F/302 °F)
Temperature monitoring in accordance with EN 60034-111)[1)]	
• 1FW6050 ... 1FW6290	1 × KTY84 temperature sensor
Stator winding insulation in accordance with EN 60034-1	Temperature class 155 (F)
Type of construction	Individual components: Stator, rotor
Degree of protection in accordance with EN 60034-5	IP23 The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer. Protection against touch, foreign bodies and water for electrical equipment is specified in accordance with IEC 60034-5.
Measuring system (not included in scope of delivery)	Select according to basic conditions specific to the application and the drive
Connection, electrical	Permanently connected power and signal cables
Paint finish	Unpainted
Rating plate	1 unit enclosed separately
Certificate of suitability	cURus

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[1)] Evaluation via SME120/SME125 Sensor Module or TM120 Terminal Module (see SINAMICS S120 drive system).

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SIMOTICS T-1FW6 – Natural cooling

Selection and ordering data

Maximum torque	Static torque[1]	Rated torque[2]	Speed at maximum torque, max.[2]	Rated speed[2]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Natural cooling							
34.4 (25.4)	11.3 (8.3)	9.91 (7.31)	695	600	**1FW6053-0■B03-0F■1**	0.139 (0.012)	3.7 (8.16)
57.5 (54.4)	16.6 (12.2)	13.8 (10.2)	374	600	**1FW6053-0■B05-0F■1**	0.267 (0.024)	6.5 (14.3)
81.2 (59.9)	19.2 (14.2)	15.2 (11.2)	677	600	**1FW6053-0■B07-0K■1**	0.39 (0.035)	8.5 (18.7)
116 (85.6)	24.6 (18.1)	18.6 (13.7)	428	600	**1FW6053-0■B10-0K■1**	0.488 (0.043)	12 (26.5)
174 (128)	32.5 (24.0)	22.9 (16.9)	653	600	**1FW6053-0■B15-1J■1**	0.691 (0.061)	19.8 (43.7)
64.5 (47.6)	15.5 (11.4)	14 (10.3)	325	400	**1FW6063-0■B03-0F■1**	0.347 (0.031)	7.7 (17.0)
123 (90.7)	25.7 (19.0)	22.2 (16.4)	396	400	**1FW6063-0■B05-0K■1**	0.665 (0.059)	10.5 (23.2)
166 (122)	31.5 (23.2)	25.9 (19.1)	250	400	**1FW6063-0■B07-0K■1**	0.904 (0.080)	13.1 (28.9)
226 (167)	38.1 (28.1)	28.5 (21.0)	470	400	**1FW6063-0■B10-1J■1**	1.21 (0.107)	16.8 (37.0)
332 (245)	49 (36.1)	38.9 (21.3)	257	400	**1FW6063-0■B15-1J■1**	1.72 (0.152)	23 (50.7)

Cable outlet only for 1FW6053 and 1FW6063:	
Axial	**K**
Tangential	**L**
Type of connection:	
Permanently connected power and signal cables with exposed core ends[5] Length: 2 m (6.56 ft)	**C**
Permanently connected power and signal cables with pre-assembled connectors Length: 0.5 m (1.64 ft)	**D**

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Motor type (repeated)	Stall current [1]	Rated current [2]	Maximum current [2]	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector [3]		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section [4]	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated} / I_{max}				
	A	A	A	kW (HP)	A	Article No.	Size	mm^2	Article No.
1FW6053-0.B03-0F..	2.3	2.04	7.61	4.2 (5.63)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6053-0.B05-0F..	2	1.7	7.64	4.6 (6.17)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6053-0.B07-0K..	3.4	2.68	14.6	8.8 (11.8)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6053-0.B10-0K..	3.1	2.31	14.6	9.2 (12.3)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6053-0.B15-1J..	5.4	3.78	29.1	17.5 (23.5)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6063-0.B03-0F..	2.1	1.86	9.81	6 (8.05)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6063-0.B05-0K..	3.3	2.8	17.7	10.3 (13.8)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6063-0.B07-0K..	3	2.42	17.8	10.9 (14.6)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6063-0.B10-1J..	5	3.71	31.5	19.1 (25.6)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6063-0.B15-1J..	4.3	3.45	31.5	20.4 (27.4)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

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[1] Torque and current at low speeds.

[2] The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

[3] For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

[4] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
34.4 (25.4)	24.2 (17.8)	22.2 (16.4)	697	964	**1FW6050-0■B03-0F■1**	0.139 (0.012)	3.1 (6.84)
57.5 (54.4)	40.4 (29.8)	38.5 (28.5)	376	533	**1FW6050-0■B05-0F■1**	0.267 (0.024)	5.9 (13.01)
80.6 (59.5)	56.6 (41.7)	54.8 (40.4)	236	353	**1FW6050-0■B07-0F■1**	0.39 (0.035)	7.9 (17.42)
81.2 (59.9)	53 (39.1)	48.6 (35.8)	685	912	**1FW6050-0■B07-0K■1**		
116 (85.6)	75.8 (55.9)	71.6 (52.8)	437	598	**1FW6050-0■B10-0K■1**	0.488 (0.043)	11.4 (25.14)
174 (128)	114 (84.1)	110 (81.1)	234	352	**1FW6050-0■B15-0K■1**	0.691 (0.061)	19.2 (42.34)
		105 (77.4)	658	864	**1FW6050-0■B15-1J■1**		
64.5 (47.6)	33.3 (24.6)	30.7 (22.6)	330	647	**1FW6060-0■B03-0F■1**	0.347 (0.031)	7.1 (15.66)
123 (90.7)	63.1 (46.5)	60.8 (44.8)	126	312	**1FW6060-0■B05-0F■1**	0.665 (0.059)	9.9 (21.83)
		58.1 (42.9)	399	674	**1FW6060-0■B05-0K■1**		
166 (122)	85.4 (63)	83.3 (61.4)	43.3	205	**1FW6060-0■B07-0F■1**	0.904 (0.080)	12.5 (27.56)
		80.6 (59.5)	256	470	**1FW6060-0■B07-0K■1**		
231 (170)	119 (87.8)	114 (84.1)	133	305	**1FW6060-0■B10-0K■1**	1.21 (0.107)	16.2 (35.72)
226 (167)	116 (85.6)	106 (78.2)	471	718	**1FW6060-0■B10-1J■1**		
339 (250)	174 (128.3)	171 (126.1)	27.6	175	**1FW6060-0■B15-0K■1**	1.72 (0.152)	22.4 (49.39)
332 (245)	171 (126.1)	161 (118.8)	260	447	**1FW6060-0■B15-1J■1**		

Cable outlet only for 1FW6050 and 1FW6060:	
Axial	**W**
Tangential	**T**
Type of connection:	
Permanently connected power and signal cables with exposed core ends[5)]	**C**
Length: 2 m (6.56 ft)	
Permanently connected power and signal cables pre-assembled with connectors	**D**
Length: 0.5 m (1.64 ft)	

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current 2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector 5)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section 6)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$ kW (HP)	I_{rated} / I_{max}		Size	mm^2	
	A	A	A		A	Article No.			Article No.
1FW6050-0.B03-0F..	5	4.6	7.6	4.23 (5.67)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B05-0F..	5.1	4.8	7.6	4.59 (6.16)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B07-0F..	5.1	4.9	7.6	4.85 (7.84)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B07-0K..	9.3	8.6	14	8.79 (11.79)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B10-0K..	9.3	8.8	14	9.16 (12.28)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B15-0K..	9.3	9	14	9.74 (13.06)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6050-0.B15-1J..	18	17	29	17.5 (23.47)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B03-0F..	4.5	4.1	9.8	5.91 (7.93)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B05-0F..	4.5	4.3	9.8	6.65 (8.92)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B05-0K..	8.1	7.4	17	10.2 (13.68)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B07-0F..	4.5	4.4	9.8	7.06 (9.47)	5/10	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B07-0K..	8.1	7.6	17	10.8 (14.48)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B10-0K..	8.1	7.8	17	11.8 (15.82)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B10-1J..	15	13	31	19.1 (25.61)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B15-0K..	8.1	7.9	17	12.9 (17.30)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6060-0.B15-1J..	15	14.4	31	20.3 (27.22)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) Selection optimized to size of the Motor Module. The next higher Motor Module offers 100 % torque utilization.

5) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

6) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
179 (132)	119 (87.8)	113 (83.3)	52.9	143	**1FW6090-0■B05-0F■2**	1.52 (0.13)	9.2 (20.3)
		109 (80.4)	144	252	**1FW6090-0■B05-0K■2**		
251 (185)	166 (122)	154 (114)	131	227	**1FW6090-0■B07-0K■2**	2.2 (0.19)	12.2 (27)
		142 (105)	281	430	**1FW6090-0■B07-1J■2**		
358 (264)	238 (176)	231 (170)	14.9	85.4	**1FW6090-0■B10-0K■2**	3.09 (0.27)	17.2 (37.9)
		216 (159)	171	273	**1FW6090-0■B10-1J■2**		
537 (396)	357 (263)	338 (249)	81.9	155	**1FW6090-0■B15-1J■2**	4.65 (0.41)	27.2 (60)
		319 (235)	203	313	**1FW6090-0■B15-2J■2**		
439 (324)	258 (190)	240 (177)	49.6	134	**1FW6130-0■B05-0K■2**	6.37 (0.56)	13.2 (29.1)
		216 (159)	184	309	**1FW6130-0■B05-1J■2**		
614 (453)	361 (266)	343 (253)	24.8	97.5	**1FW6130-0■B07-0K■2**	8.92 (0.79)	18.2 (40.1)
		323 (238)	111	202	**1FW6130-0■B07-1J■2**		
878 (648)	516 (381)	483 (356)	52.7	124	**1FW6130-0■B10-1J■2**	12.7 (1.12)	25.2 (55.6)
		449 (331)	150	250	**1FW6130-0■B10-2J■2**		
1320 (974)	775 (572)	743 (548)	18.3	79.7	**1FW6130-0■B15-1J■2**	19.1 (1.69)	38.2 (84.2)
		713 (526)	80.7	153	**1FW6130-0■B15-2J■2**		
710 (524)	360 (266)	338 (249)	108	234	**1FW6150-0■B05-1J■2**	10.1 (0.8939)	21.7 (47.8)
		298 (220)	332	655	**1FW6150-0■B05-4F■2**		
994 (733)	504 (372)	470 (347)	126	259	**1FW6150-0■B07-2J■2**	14.2 (1.2568)	33.5 (73.9)
		444 (327)	230	449	**1FW6150-0■B07-4F■2**		
1420 (1047)	720 (531)	688 (507)	76.3	171	**1FW6150-0■B10-2J■2**	20.9 (1.8498)	47.5 (104.7)
		663 (490)	152	301	**1FW6150-0■B10-4F■2**		
2130 (1571)	1080 (797)	1050 (774)	34.1	103	**1FW6150-0■B15-2J■2**	31.3 (2.7703)	70.8 (156)
		1030 (760)	89.8	189	**1FW6150-0■B15-4F■2**		

Cable outlet only for 1FW6090/1FW6130/1FW6150:	
Axial	**P**
Radially outwards	**Q**
Tangential	**N**
Type of connection:	
Permanently connected power and signal cables with exposed core ends[5)] Length: 2 m (6.56 ft)	**C**
Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**D**

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current 2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector 5)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section 6)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$ kW (HP)	I_{rated} / I_{max}				
	A	A	A		A	Article No.	Size	mm^2	Article No.
1FW6090-0.B05-0F..	5.9	5.6	9.5	6.64 (8.90)	5/10 4)	**6SL312■-■TE15-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B05-0K..	8.2	7.4	13	8.19 (10.98)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B07-0K..	10	9.5	16.7	10.3 (13.8)	9/18 4)	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B07-1J..	16	13	26	14.2 (19.04)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B10-0K..	8.2	7.9	13	9.6 (12.87)	9/18	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B10-1J..	16	14	26	15.5 (20.79)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B15-1J..	16	15	26	17.2 (23.07)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6090-0.B15-2J..	26	23	43	24.3 (32.59)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6130-0.B05-0K..	9.7	9	18	12.4 (16.63)	9/18 4)	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B05-1J..	17	14	32	18.6 (24.94)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B07-0K..	11	10	20	14.4 (19.31)	9/18 4)	**6SL312■-■TE21-0AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B07-1J..	17	15	32	19.9 (26.69)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B10-1J..	17	16	32	21.7 (17.03)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B10-2J..	28	24	53	31 (41.57)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6130-0.B15-1J..	19	18	36	25.8 (34.60)	18/36 4)	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6130-0.B15-2J..	28	26	54	34.4 (46.13)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6150-0.B05-1J..	18	17	44	23.3 (31.25)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6150-0.B05-4F..	44	36	106	39.8 (53.37)	45/85	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B07-2J..	27	25	66	32.5 (43.58)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6150-0.B07-4F..	44	38	106	43.2 (57.93)	45/85	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B10-2J..	27	26	66	36.7 (49.21)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6150-0.B10-4F..	44	40	106	47.7 (63.97)	45/85	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX8002-5CS64-....**
1FW6150-0.B15-2J..	27	26	66	42.9 (57.53)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6150-0.B15-4F..	44	41	106	54.9 (73.62)	45/85	**6SL312■-1TE24-5AA.**	1.5	4 × 10	**6FX8002-5CS64-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) Selection optimized to size of the Motor Module. The next higher Motor Module offers 100 % torque utilization.

5) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

6) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
716 (528)	467 (344)	432 (319)	81.1	140	**1FW6160-0■B05-1J■2**	19.0 (1.68)	36.3 (80.0)
		405 (299)	143	243	**1FW6160-0■B05-2J■2**		
		317 (234)	309	574	**1FW6160-0■B05-5G■2**		
1000 (738)	653 (482)	621 (458)	52.4	94	**1FW6160-0■B07-1J■2**	25.8 (2.28)	48.3 (107)
		596 (440)	97.8	165	**1FW6160-0■B07-2J■2**		
		517 (381)	218	380	**1FW6160-0■B07-5G■2**		
		436 (322)	320	595	**1FW6160-0■B07-8F B2**		
1430 (1055)	933 (688)	904 (667)	29.2	59.5	**1FW6160-0■B10-1J■2**	36.0 (3.19)	66.3 (146)
		879 (648)	62.9	108	**1FW6160-0■B10-2J■2**		
		807 (595)	149	250	**1FW6160-0■B10-5G■2**		
		737 (544)	221	383	**1FW6160-0■B10-8F B2**		
		629 (464)	318	584	**1FW6160-0■B10-2P B2**		67.4 (149)
2150 (1586)	1400 (1033)	1350 (996)	34.4	65	**1FW6160-0■B15-2J■2**	53.1 (4.70)	95.3 (210)
		1280 (944)	94.2	156	**1FW6160-0■B15-5G■2**		
		1220 (900)	143	238	**1FW6160-0■B15-8F B2**		
		1130 (833)	208	356	**1FW6160-0■B15-2P B2**		96.4 (213)
		970 (715)	304	552	**1FW6160-0■B15-0W B2**		
2860 (2110)	1870 (1379)	1760 (1298)	65.8	111	**1FW6160-0■B20-5G■2**	70.1 (6.20)	124.3 (274)
		1700 (1254)	103	170	**1FW6160-0■B20-8F B2**		
		1610 (1188)	152	254	**1FW6160-0■B20-2P B2**		125.4 (277)
		1470 (1084)	225	387	**1FW6160-0■B20-0W B2**		

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for connection types C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with exposed core ends[4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not configurable)**:** Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current 2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector 4)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section 5)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated} / I_{max}		Size	mm^2	
	A	A	A	kW (HP)	A	Article No.			Article No.
1FW6160-0.B05-1J..	18	16	31	15 (20.12)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6160-0.B05-2J..	28	24	49	19.7 (26.42)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6160-0.B05-5G..	56	37	98	32.3 (43.31)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B07-1J..	18	17	31	16.7 (22.4)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6160-0.B07-2J..	28	25	49	21.5 (28.83)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6160-0.B07-5G..	56	43	98	34.3 (46)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B07-8FB.	80	52	141	45.3 (60.75)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6160-0.B10-1J..	18	17	31	19 (25.5)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6160-0.B10-2J..	28	26	49	24.4 (32.7)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6160-0.B10-5G..	56	48	98	37.3 (50.02)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B10-8FB.	80	62	141	48.4 (64.90)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6160-0.B10-2PB.	112	74	198	62.5 (83.81)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6160-0.B15-2J..	28	27	49	28.2 (37.8)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6160-0.B15-5G..	56	51	98	41.8 (56.05)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B15-8FB.	80	69	141	53.3 (71.48)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6160-0.B15-2PB.	112	89	198	67.5 (90.52)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6160-0.B15-0WB.	160	109	282	89.6 (120.15)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6160-0.B20-5G..	56	52	98	46.9 (62.9)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6160-0.B20-8FB.	80	72	141	58.2 (78.05)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6160-0.B20-2PB.	112	95	198	72.4 (97.09)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6160-0.B20-0WB.	160	124	282	94.8 (127.13)	200/282	**6SL312■-1TE32-0AA.**	–	–	–

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
990 (730)	672 (496)	634 (468)	52.2	93.2	**1FW6190-0■B05-1J■2**	35.8 (3.17)	42.8 (94.4)
		608 (448)	91.5	155	**1FW6190-0■B05-2J■2**		
		516 (381)	204	364	**1FW6190-0■B05-5G■2**		
1390 (1025)	941 (694)	906 (668)	31.9	61.5	**1FW6190-0■B07-1J■2**	48.6 (4.30)	55.8 (123)
		881 (650)	61.3	105	**1FW6190-0■B07-2J■2**		
		797 (588)	144	244	**1FW6190-0■B07-5G■2**		
		714 (527)	21	378	**1FW6190-0■B07-8F B2**		
1980 (1460)	1340 (988)	1310 (966)	14.9	37.7	**1FW6190-0■B10-1J■2**	67.8 (6.0)	75.8 (167)
		1290 (952)	37.6	67.9	**1FW6190-0■B10-2J■2**		
		1210 (892)	96.9	161	**1FW6190-0■B10-5G■2**		
		1140 (841)	145	246	**1FW6190-0■B10-8F B2**		
		971 (716)	238	431	**1FW6190-0■B10-2P B2**		77.1 (170)
2970 (2191)	2020 (1490)	1970 (1453)	17.5	39.4	**1FW6190-0■B15-2J■2**	99.8 (8.83)	107.8 (238)
		1890 (1394)	59.8	100	**1FW6190-0■B15-5G■2**		
		1830 (1350)	92.7	153	**1FW6190-0■B15-8F B2**		
		1680 (1239)	156	263	**1FW6190-0■B15-2P B2**		109.1 (241)
		1560 (1151)	202	352	**1FW6190-0■B15-0W B2**		
3960 (2921)	2690 (1984)	2570 (1896)	40.3	70.3	**1FW6190-0■B20-5G■2**	132.0 (11.68)	136.2 (300)
		2510 (1851)	65.6	109	**1FW6190-0■B20-8F B2**		
		2380 (1755)	114	188	**1FW6190-0■B20-2P B2**		137.5 (303)
		2270 (1674)	148	250	**1FW6190-0■B20-0W B2**		

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for connection types C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with exposed core ends[4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not configurable)**:** Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current 2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector 4)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section 5)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$ kW (HP)	I_{rated} / I_{max}		Size	mm^2	
	A	A	A		A	Article No.			Article No.
1FW6190-0.B05-1J..	18	17	31	16.3 (21.9)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6190-0.B05-2J..	27	24	47	20.3 (27.22)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6190-0.B05-5G..	54	40	95	32 (42.91)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B07-1J..	18	17	31	18.2 (24.4)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6190-0.B07-2J..	27	25	47	22.5 (30.17)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6190-0.B07-5G..	54	45	95	34.4 (46.13)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B07-8FB.	78	57	136	44.8 (60.08)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6190-0.B10-1J..	18	17	31	20.9 (28.03)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6190-0.B10-2J..	27	26	47	25.6 (34.33)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6190-0.B10-5G..	54	48	95	37.9 (50.82)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B10-8FB.	78	64	136	48.5 (65.04)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6190-0.B10-2PB.	123	85	214	67.4 (90.38)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6190-0.B15-2J..	27	26	47	30.1 (40.4)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6190-0.B15-5G..	54	50	95	43.3 (58.07)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B15-8FB.	78	69	136	54.3 (72.82)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6190-0.B15-2PB.	123	100	214	73.3 (98.30)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6190-0.B15-0WB.	156	118	272	88.1 (118.14)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6190-0.B20-5G..	54	52	95	48.6 (65.17)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6190-0.B20-8FB.	78	72	136	60.1 (80.59)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6190-0.B20-2PB.	123	107	214	79.3 (106.34)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6190-0.B20-0WB.	156	129	272	94.3 (126.46)	200/282	**6SL312■-1TE32-0AA.**	–	–	–

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
1320 (974)	841 (620)	801 (591)	33	66.5	**1FW6230-0■B05-1J■2**	62.2 (5.51)	44.8 (98.8)
		777 (571)	56.4	104	**1FW6230-0■B05-2J■2**		
		669 (493)	147	275	**1FW6230-0■B05-5G■2**		
1840 (1357)	1180 (870)	1140 (841)	18.6	43.6	**1FW6230-0■B07-1J■2**	84.3 (7.46)	58.8 (130)
		1120 (826)	36.4	70.2	**1FW6230-0■B07-2J■2**		
		1020 (752)	103	186	**1FW6230-0■B07-5G■2**		
		936 (690)	149	276	**1FW6230-0■B07-8FB2**		
2630 (1940)	1680 (1239)	1630 (1202)	20.2	44.7	**1FW6230-0■B10-2J■2**	118.0 (10.4)	81.8 (180)
		1530 (1129)	69.3	123	**1FW6230-0■B10-5G■2**		
		1460 (1077)	102	181	**1FW6230-0■B10-8FB2**		
		1330 (981)	150	278	**1FW6230-0■B10-2PB2**		
3950 (2914)	2520 (1859)	2450 (1807)	19	41.8	**1FW6230-0■B15-4C■2**	173.0 (15.3)	117.8 (260)
		2380 (1755)	42.1	76.4	**1FW6230-0■B15-5G■2**		
		2320 (1711)	64.3	113	**1FW6230-0■B15-8FB2**		
		2200 (1623)	97.3	173	**1FW6230-0■B15-2PB2**		
		2040 (1505)	142	258	**1FW6230-0■B15-0WB2**		119.4 (263)
5260 (3880)	3360 (2478)	3230 (2382)	27.7	53.6	**1FW6230-0■B20-5G■2**	228.0 (20.2)	153.8 (339)
		3170 (2338)	45	80.8	**1FW6230-0■B20-8FB2**		
		3060 (2257)	70.2	123	**1FW6230-0■B20-2PB2**		
		2910 (2146)	104	184	**1FW6230-0■B20-0WB2**		155.4 (343)

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for connection types C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with exposed core ends[4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not configurable)**:** Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current 2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector 4)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section 5)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$ kW (HP)	I_{rated} / I_{max}		Size		
	A	A	A		A	Article No.		mm^2	Article No.
1FW6230-0.B05-1J..	17	16	31	17.3 (23.2)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6230-0.B05-2J..	24	22	45	20.9 (28.03)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6230-0.B05-5G..	53	41	101	33.1 (44.39)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B07-1J..	17	16	31	19.5 (26.15)	18/36	**6SL312■-■TE21-8AA.**	1	4 × 2.5	**6FX8002-5CS11-....**
1FW6230-0.B07-2J..	24	22	45	23.4 (31.38)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6230-0.B07-5G..	53	45	101	36 (48.28)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B07-8FB.	74	57	139	44.8 (60.08)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6230-0.B10-2J..	24	23	45	27.1 (36.3)	30/56	**6SL312■-1TE23-0AA.**	1.5	4 × 4	**6FX8002-5CS41-....**
1FW6230-0.B10-5G..	53	48	101	40.1 (53.77)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B10-8FB.	74	63	139	49.2 (65.98)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6230-0.B10-2PB.	106	81	199	63.1 (84.62)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6230-0.B15-4C..	33	32	63	37.9 (50.82)	45/85	**6SL312■-1TE24-5AA.**	1.5	4 × 6	**6FX8002-5CS54-....**
1FW6230-0.B15-5G..	53	50	101	46.6 (62.36)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B15-8FB.	74	67	139	56 (75.10)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6230-0.B15-2PB.	106	91	199	70.3 (94.27)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6230-0.B15-0WB.	148	117	279	87.9 (117.87)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6230-0.B20-5G..	53	51	101	53.1 (71.21)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6230-0.B20-8FB.	74	69	139	62.8 (84.21)	85/141	**6SL312■-1TE28-5AA.**	–	–	–
1FW6230-0.B20-2PB.	106	95	199	77.6 (104.06)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6230-0.B20-0WB.	148	126	279	95.1 (127.53)	200/282	**6SL312■-1TE32-0AA.**	–	–	–

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

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SIMOTICS T-1FW6 – Water cooling

Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Speed at maximum torque, max.[2)]	Rated speed[2)]	**SIMOTICS T-1FW6 built-in torque motors**	Moment of inertia Rotor	Weight, approx. Stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Article No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
Water cooling							
4000 (2950)	2220 (1637)	2060 (1519)	57.6	106	**1FW6290-0■B07-5G■2**	228 (20.2)	103.6 (228)
		1910 (1409)	110	205	**1FW6290-0■B07-0L B2**		
		1810 (1335)	144	272	**1FW6290-0■B07-2P B2**		108.8 (240)
6280 (4632)	3490 (2574)	3320 (2449)	39.2	73	**1FW6290-0■B11-7A■2**	334 (29.6)	159 (351)
		3200 (2360)	68.6	125	**1FW6290-0■B11-0L B2**		
		3110 (2294)	90.4	165	**1FW6290-0■B11-2P B2**		164.2 (362)
8570 (6321)	4760 (3511)	4600 (3393)	26.6	51.2	**1FW6290-0■B15-7A■2**	440 (38.9)	214.6 (473)
		4480 (3304)	48.7	88.5	**1FW6290-0■B15-0L B2**		
		4390 (3238)	64.9	117	**1FW6290-0■B15-2P B2**		219.8 (485)
10900 (8040)	6030 (4448)	5760 (4249)	36.9	68	**1FW6290-0■B20-0L B2**	546 (48.3)	260.6 (575)
		5670 (4182)	50	90.3	**1FW6290-0■B20-2P B2**		265.8 (586)

Cable outlet only for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (only for connection types C and D)	**W** **V** **T**
Type of connection: Permanently connected power and signal cables with exposed core ends[4)] Length: 2 m (6.56 ft) Permanently connected power and signal cables pre-assembled with connectors Length: 0.5 m (1.64 ft)	**C** **D**
Type of connection only for specific motors (not configurable)**:** Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

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Motor type (repeated)	Stall current 1)3)	Rated current 2)3)	Maximum current2)	Calculated power	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector4)		
					Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section5)	Pre-assembled basic cable to drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated} / I_{max}		Size	mm^2	
	A	A	A	kW (HP)	A	Article No.			Article No.
1FW6290-0.B07-5G..	56	52	119	46.6 (62.49)	60/113	**6SL312■-1TE26-0AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B07-0LB.	101	86	212	68.6 (92.07)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6290-0.B07-2PB.	129	105	272	82.9 (111.17)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6290-0.B11-7A..	63	59	133	57.2 (76.71)	85/141	**6SL312■-1TE28-5AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B11-0LB.	101	91	212	76.6 (102.72)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6290-0.B11-2PB.	129	114	272	91.2 (122.30)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6290-0.B15-7A..	63	60	133	64 (85.82)	85/141	**6SL312■-1TE28-5AA.**	1.5	4 × 16	**6FX8002-5CS24-....**
1FW6290-0.B15-0LB.	101	94	212	83.8 (112.38)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6290-0.B15-2PB.	129	118	272	98.7 (132.36)	200/282	**6SL312■-1TE32-0AA.**	–	–	–
1FW6290-0.B20-0LB.	101	95	212	90.6 (121.49)	132/210	**6SL312■-1TE31-3AA.**	–	–	–
1FW6290-0.B20-2PB.	129	121	272	106 (142.15)	200/282	**6SL312■-1TE32-0AA.**	–	–	–

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

Length code	**....**

For information on the cables refer to MOTION-CONNECT connection systems

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Accessories

Description	Article No.
Cooling connection adapter	
For SIMOTICS T-1FW6 built-in torque motors	
• 1FW6160 ... 1FW6230	**1FW6160-1BA00-0AA0**
• 1FW6290	**1FW6290-1BA00-0AA0**

Description	Article No.
Power connector4)	
For SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2	**6FX2003-0LA00**
• Size 1.5 for 4 × 4/4 × 10/4 × 16 mm^2	**6FX2003-0LA10**
Signal connector4)	
For SIMOTICS T-1FW6 built-in torque motors	**6FX2003-0SU07**
• M17 (socket) for 6 × 0.5 + 1 × 1.0 mm^2	
Signal cable, pre-assembled6)	**6FX8002-2SL10-....**
For SIMOTICS T-1FW6 built-in torque motors	

1) Torque and current at low speeds.

2) The values refer to a supply voltage of 400 V 3 AC ±10 % (drive system DC link voltage 600 V DC).

3) In case of water cooling with inlet temperature of 35 °C (95 °F) and maximum rotor flange temperature of 60 °C (140 °F).

4) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor and must be ordered separately.

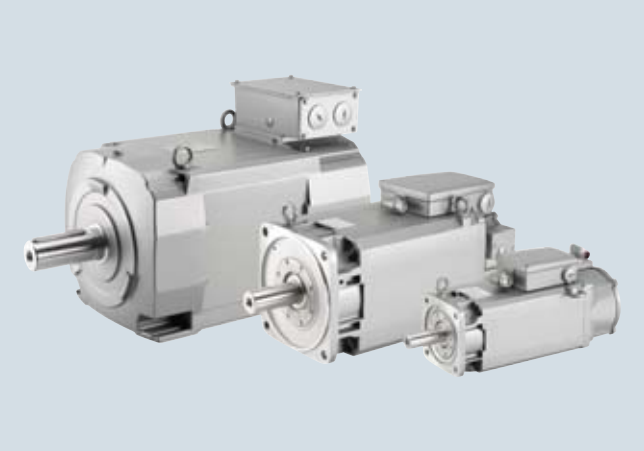
5) The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).

6) For length code, see MOTION-CONNECT connection systems.

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SIMOTICS M-1PH8

Overview



SIMOTICS M-1PH8 motors are compact asynchronous squirrel-cage motors with IP55/IP65 degree of protection. SIMOTICS M-1PH8 motors are available in two different cooling types:

- Forced ventilation
- Water cooling

The motors have been designed specifically for use in conjunction with the SINAMICS S120 drive system. Depending on the control requirements, appropriate encoder systems are available for the motors for sensing the motor speed and indirect position.

For machine tools, the encoder system is capable of C-axis operation as standard – i.e. an additional encoder is not required for C-axis operation.

Benefits

- Wide range of power ratings
- The right design for any application
  - Forced ventilation or water cooling
  - Solid or hollow shaft
  - Various bearing concepts
  - Different encoder types for speed control and high-precision positioning
- Excellent performance features
  - Maximum speeds up to 24000 rpm
  - Excellent rotational accuracy of up to 10 µm
  - Excellent vibration severity
  - High dynamic response (short ramp-up times)
- Low noise emissions
- Simple and flexible connection system
- Commissioning with electronic rating plate and DRIVE-CLiQ interface

Water cooling always brings benefits:

- With applications in which extreme ambient conditions, such as high temperatures, dust, dirt, or a corrosive atmosphere, do not permit air cooling
- In processes in which the environment must not be heated

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Application

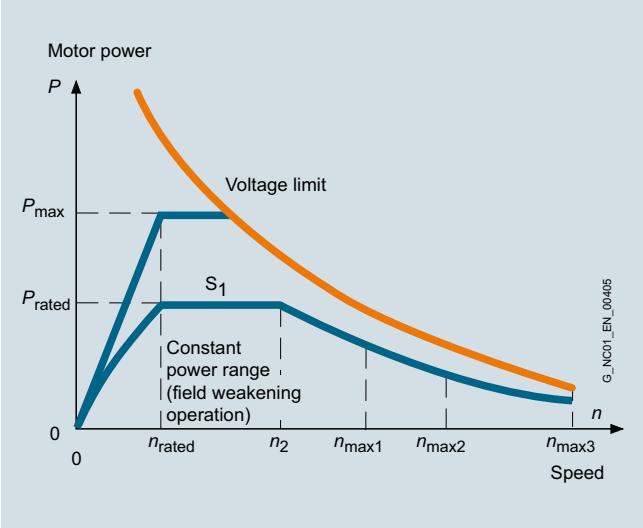
- Compact machine tools
- Complex machining centers and turning machines
- Fully encapsulated milling machines
- High-load milling spindles
- Counterspindles or power tools for turning machines
- Direct power tools with internal cooling
- Special-purpose machines

Configuration

Ordering example

Selection criteria	Design	Structure of the Article No.
1PH8 motor	Shaft height 80 Version status 1	**1PH8083- . . . . . - . . . 1**
	Asynchronous version without brake	**1PH8083-1 . . . . - . . . 1**
Encoder system	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)	**1PH8083-1M . . .- . . . 1**
Cooling	Water cooling	**1PH8083-1M . 2 . - . . . 1**
Rated speed	1750 rpm	**1PH8083-1MF2 . - . . . 1**
Rated power	3.3 kW	
Type of construction	IM B3 (IM V5, IM V6)	**1PH8083-1MF20- . . . 1**
Shaft extension DE	Plain shaft	**1PH8083-1MF20-0 . . 1**
Bearing version	Standard Vibration severity R/A Shaft and flange accuracy R	**1PH8083-1MF20-0B . 1**
Connection	Power connection at top of terminal box Cable entry on right Signal connection at DE	**1PH8083-1MF20-0BA1**
Options		**1PH8083-1MF20-0BA1-Z**
	Additional PTC thermistor chain for alarm and tripping	**1PH8083-1MF20-0BA1-Z A12**
	Special paint finish, worldwide: Sky blue RAL 5015	**1PH8083-1MF20-0BA1-Z A12 K23 X05**

Characteristic curves



Typical speed/power graph for SIMOTICS M-1PH8 motors

The graph shows the typical relationship between motor speed and drive power for SIMOTICS M-1PH8 motors for duty type S1 (continuous duty) in accordance with IEC 60034-1.

Data for short-time duty S2 and continuous duty S6 is listed in the 1PH8 Motors Configuration Manual.

More information

For further configuration information, see the 1PH8 Motors Configuration Manual.

If you are using a Smart Line Module, proceed in accordance with the 1PH8 Motors Configuration Manual.

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Technical specifications

Product name	SIMOTICS M-1PH8		
Cooling	Forced ventilation	Water cooling	
• Cooling water pressure at inlet, max.	–	6 bar	
		Cooling water Flow rate	Connection thread at NDE[1]
- 1PH808	–	6 l/min (1.59 US gallons/min.)	G 1/8"
- 1PH810	–	8 l/min (2.11 US gallons/min.)	G 1/4"
- 1PH813	–	12 l/min (3.17 US gallons/min.)	G 3/8"
- 1PH816	–	15 l/min (3.96 US gallons/min.)	G 1/2"
- 1PH818	–	15 l/min (3.96 US gallons/min.)	G 3/8"
- 1PH822	–	20 l/min (5.28 US gallons/min.)	G 3/8"
- 1PH828	–	35 l/min (9.25 US gallons/min.)	G 1/2"
Ambient temperature, permissible	-15 ... +40 °C (5 ... 104 °F)		
Coolant inlet temperature	–	≤ 30 °C (86 °F)	
Temperature monitoring	Temperature sensor in stator winding		
• 1PH818/1PH822/1PH828	Additional temperature sensor as reserve		
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	For an ambient temperature of up to 40 °C (104 °F) Temperature class 180 (H)	For a coolant inlet temperature up to 30 °C (86 °F) Temperature class 180 (H)	
Fan supply voltage		–	
• 1PH808	230 V 1 AC 50/60 Hz, 265 V 1 AC 60 Hz	–	
• 1PH810 to 1PH816	400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz	–	
• 1PH818/1PH822	200 V ... 277 V 1 AC, 50/60 Hz (EC fan) 400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz optional (L75)	–	
• 1PH828	400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz	–	
Encoder system, built-in	Without DRIVE-CLiQ interface or with DRIVE-CLiQ interface		
Sound pressure level L_{pA} (1 m) in accordance with DIN EN ISO 1680 max. tolerance +3 dB			
• 1PH808 to 1PH813	70 dB at rated pulse frequency 4 kHz and speed range up to 5000 rpm	68 dB at rated pulse frequency 4 kHz and speed range up to 5000 rpm	
• 1PH816	73 dB at rated pulse frequency 4 kHz and speed range up to 5000 rpm	69 dB at rated pulse frequency 4 kHz and speed range up to 5000 rpm	
• 1PH818/1PH822	73 dB at a rated pulse frequency of 2 kHz and a speed range: Forced ventilation (IP55) • 1PH818 up to 5000 rpm • 1PH822 up to 3500 rpm	70 dB at rated pulse frequency 2 kHz and speed ranges: • 1PH818 up to 5000 rpm • 1PH822 up to 3500 rpm	
• 1PH828	74 dB at rated pulse frequency 2 kHz and speed range up to 3300 rpm	72 dB at rated pulse frequency 2 kHz and speed range up to 3300 rpm	

S/R = Signals/Revolution

[1] DE is the drive end with shaft. NDE is the non-drive end.

[2] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

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Technical specifications (continued)

Product name	SIMOTICS M-1PH8	
Connection		
• 1PH808/1PH810/1PH813	Power connector or terminal box	
• 1PH816/1PH818/1PH822/1PH828	Terminal box	Terminal box
• Fan		
- 1PH808	Power connector	–
- 1PH810/1PH813	Power connector or terminal box	–
- 1PH816/1PH818/1PH822/1PH828	Terminal box	–
• Encoder system	Connector for signals (without mating connector) or DRIVE-CLiQ	
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14)	
Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1)	Tolerance R	
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)		
• 1PH808/1PH810/1PH813/1PH816	IP55	IP65
• 1PH818/1PH822/1PH828	IP55	IP55
• fans	IP55, option L74: IP65[1)]	–
Rating plate	1 unit attached to motor 1 unit supplied loose in terminal box	
Paint finish	Anthracite RAL 7016	
Certificate of suitability	cURus	

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1) Only for 1PH808/1PH810/1PH813/1PH816.

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Selection and ordering data

Rated speed	Continuous speed, max.[1]				Operating speed during field weakening[1)5)]	Rated power	Rated torque	Static torque	**SIMOTICS M-1PH8 asynchronous motors**
	With holding brake	Without holding brake							
n_{rated}	$n_{max, Br}$	n_{max1}[2)]	n_{max2}[3)]	n_{max3}[4)]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 80 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	5000	10000	12000	–	5200	3.3 (4.43)	18 (13.3)	21 (15.5)	**1PH8083-■■F■■-■■■1**
2300	5000	10000	15000	17000	10550	4.1 (5.50)	17 (12.5)	21 (15.5)	**1PH8083-■■G■■-■■■1**
3300	5000	10000	15000	20000	16500	4.5 (6.03)	13 (9.59)	21 (15.5)	**1PH8083-■■M■■-■■■1**
5000	–	10000	15000	20000	20000	5.3 (7.11)	10 (7.38)	19 (14.0)	**1PH8083-1■N■■-■■■1**
1750	5000	10000	14000	–	5850	4.3 (5.77)	23 (17.0)	27 (19.9)	**1PH8087-■■F■■-■■■1**
2300	5000	10000	15000	18000	9650	5.4 (7.24)	22 (16.2)	27 (19.9)	**1PH8087-■■G■■-■■■1**
3300	5000	10000	15000	20000	19400	5.2 (6.97)	15 (11.1)	27 (19.9)	**1PH8087-■■M■■-■■■1**
5000	–	10000	15000	20000	20000	6.5 (8.72)	12 (8.85)	25 (18.4)	**1PH8087-1■N■■-■■■1**
Shaft height 100 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	5000	9000	12000	–	5000	4.3 (5.77)	23 (17.0)	29 (21.4)	**1PH8101-■■F■■-■■■1**
1150	5000	9000	12000	–	2450	4.3 (5.77)	36 (26.6)	38 (28.0)	**1PH8103-■■D■■-■■■1**
1750	5000	9000	12000	–	4000	6.3 (8.45)	34 (25.1)	38 (28.0)	**1PH8103-■■F■■-■■■1**
2300	5000	9000	12000	–	6000	7.5 (10.06)	31 (22.9)	38 (28.0)	**1PH8103-■■G■■-■■■1**
3300	5000	9000	12000	18000	16000	9.3 (12.47)	27 (19.9)	38 (28.0)	**1PH8103-■■M■■-■■■1**
1750	5000	9000	12000	–	5900	8.0 (10.73)	44 (32.5)	52 (38.4)	**1PH8105-■■F■■-■■■1**
500	5000	7000	–	–	1500	3.2 (4.29)	61 (45)	62 (45.7)	**1PH8107-■■B■■-■■■1**
1150	5000	9000	12000	–	4750	7.2 (9.66)	60 (44.3)	63 (46.5)	**1PH8107-■■D■■-■■■1**
1750	5000	9000	12000	–	4600	10.0 (13.41)	55 (40.6)	63 (46.5)	**1PH8107-■■F■■-■■■1**
2300	5000	9000	12000	–	7500	12.0 (16.1)	50 (36.9)	63 (46.5)	**1PH8107-■■G■■-■■■1**
3300	5000	9000	12000	18000	18000	13.0 (17.43)	38 (28.0)	59 (43.5)	**1PH8107-■■M■■-■■■1**
Shaft height 132 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module									
500	4500	6000	–	–	1500	3.6 (4.83)	69 (50.9)	76 (56.1)	**1PH8131-■■B■■-■■■1**
1750	4500	8000	10000	11000	5150	13.0 (17.43)	71 (52.4)	96 (70.8)	**1PH8131-■■F■■-■■■1**
500	4500	6000	–	–	1200	6.5 (8.72)	124 (91.5)	124 (91.5)	**1PH8133-■■B■■-■■■1**
1150	4500	8000	10000	–	3000	13.5 (18.10)	112 (82.6)	128 (94.4)	**1PH8133-■■D■■-■■■1**
1750	4500	8000	10000	13000	5000	17.5 (23.47)	96 (70.8)	126 (92.9)	**1PH8133-■■F■■-■■■1**
2300	4500	8000	10000	15000	6500	22.5 (30.7)	93 (68.6)	126 (92.9)	**1PH8133-■■G■■-■■■1**
500	4500	6000	–	–	1200	8.0 (10.73)	153 (113)	162 (119)	**1PH8135-■■B■■-■■■1**
1750	4500	8000	10000	14000	5500	21.5 (28.83)	118 (87.0)	157 (116)	**1PH8135-■■F■■-■■■1**
500	4500	6000	–	–	1400	8.6 (11.3)	165 (122)	171 (126)	**1PH8137-■■B■■-■■■1**
1150	4500	8000	10000	12000	4000	19.5 (26.15)	162 (119)	183 (135)	**1PH8137-■■D■■-■■■1**
1750	4500	8000	10000	15000	5000	22.0 (29.5)	140 (103)	172 (127)	**1PH8137-■■F■■-■■■1**
2300	4500	8000	10000	15000	5000	29.0 (38.89)	120 (88.5)	176 (130)	**1PH8137-■■G■■-■■■1**
Shaft height 160 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module									
500	4000	6500	–	–	2200	12.0 (16.1)	229 (169)	253 (187)	**1PH8163-■■B■■-■■■1**
1150	4000	6500	9000	10000	3550	25.0 (33.53)	208 (153)	243 (179)	**1PH8163-■■D■■-■■■1**
1750	4000	6500	9000	10000	3050	34.0 (45.59)	186 (137)	252 (186)	**1PH8163-■■F■■-■■■1**
2300	4000	6500	9000	10000	3200	38.0 (50.96)	158 (117)	254 (187)	**1PH8163-■■G■■-■■■1**
500	4000	6500	–	–	1850	16.0 (21.46)	306 (226)	329 (243)	**1PH8165-■■B■■-■■■1**
1150	4000	6500	9000	10000	4850	31.0 (41.57)	257 (190)	302 (223)	**1PH8165-■■D■■-■■■1**
1750	4000	6500	9000	10000	2650	41.0 (54.98)	224 (165)	304 (224)	**1PH8165-■■F■■-■■■1**
2300	4000	6500	9000	10000	3000	44.0 (59)	183 (135)	302 (223)	**1PH8165-■■G■■-■■■1**

For versions, see Article No. supplement and options.

1) Speed data are based on an infeed with Active Line Module (see characteristic curves); the maximum speed of the encoders must be observed.
2) Bearing version for Standard (14th data position is B to H); reduced values for type F, see 1PH8 Configuration Manual.
3) Bearing version for Performance (14th data position is L).
4) Bearing version for High Performance (14th data position is M).
5) n_2: max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

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Motor type (repeated)	Efficiency	Moment of inertia without holding brake	Weight, approx.[6] without holding brake	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[7]	Booksize format For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm² (lb$_f$-in-s²)	kg (lb)	A	A	Type	A	Article No.
1PH8083-..F...	83.1	0.0064 (0.06)	32 (70.6)	7.5	8	gk803	9	6SL312■-■TE21-0AA.
1PH8083-..G...	85.2			11.3	12	gk803	18	6SL312■-■TE21-8AA.
1PH8083-..M...	87.5			13.5	17	gk803	18	6SL312■-■TE21-8AA.
1PH8083-1.N...	87.0			17.0	23	gk803	18	6SL312■-■TE21-8AA.
1PH8087-..F...	83.8	0.0089 (0.08)	39 (86.0)	10.0	11	gk803	18	6SL312■-■TE21-8AA.
1PH8087-..G...	85.9			13.7	15	gk803	18	6SL312■-■TE21-8AA.
1PH8087-..M...	87.8			17.1	23	gk803	18	6SL312■-■TE21-8AA.
1PH8087-1.N...	87.8			19.5	28	gk803	30	6SL312■-1TE23-0AA.
1PH8101-..F...	85.2	0.0138 (0.12)	42 (92.6)	12.5	14	gk813	18	6SL312■-■TE21-8AA.
1PH8103-..D...	82.4	0.0172 (0.15)	51 (112)	10.0	11	gk813	18	6SL312■-■TE21-8AA.
1PH8103-..F...	85.9			13.0	14	gk813	18	6SL312■-■TE21-8AA.
1PH8103-..G...	89.1			17.0	19	gk813	18	6SL312■-■TE21-8AA.
1PH8103-..M...	90.0			25.7	31	gk813	30	6SL312■-1TE23-0AA.
1PH8105-..F...	87.8	0.0252 (0.22)	65 (143)	17.5	20	gk813	18	6SL312■-■TE21-8AA.
1PH8107-..B...	73.0	0.0289 (0.26)	73 (161)	8.8	9	gk813	9	6SL312■-1TE21-0AA.
1PH8107-..D...	85.2			17.5	25	gk813	18	6SL312■-■TE21-8AA.
1PH8107-..F...	87.8			22.0	25	gk813	30	6SL312■-1TE23-0AA.
1PH8107-..G...	90.9			26.0	29	gk813	30	6SL312■-1TE23-0AA.
1PH8107-..M...	90.0			38.0	48	gk813	45	6SL312■-1TE24-5AA.
1PH8131-..B...	81.0	0.059 (0.52)	89 (196)	9.0	10	gk833	9	6SL312■-1TE21-0AA.
1PH8131-..F...	91.4			24.0	30	gk833	30	6SL312■-1TE23-0AA.
1PH8133-1.B...	78.0	0.076 (0.67)	106 (234)	15.5	16	gk833	18	6SL312■-1TE21-8AA.
1PH8133-..D...	88.4			29.0	32	gk833	30	6SL312■-1TE23-0AA.
1PH8133-..F...	91.3			34.0	42	gk833	45	6SL312■-1TE24-5AA.
1PH8133-..G...	93.3			44.0	54	gk833	45	6SL312■-1TE24-5AA.
1PH8135-..B...	78.0	0.094 (0.83)	125 (276)	18.0	19	gk833	18	6SL312■-1TE21-8AA.
1PH8135-..F...	90.9			43.0	53	gk833	45	6SL312■-1TE24-5AA.
1PH8137-..B...	82.0	0.109 (0.96)	141 (311)	18.0	19	gk833	18	6SL312■-1TE21-8AA.
1PH8137-..D...	89.1			43.0	47	gk833	45	6SL312■-1TE24-5AA.
1PH8137-..F...	90.7			56.0	68	gk833	60	6SL312■-1TE26-0AA.
1PH8137-..G...	92.9			56.0	73	gk833	60	6SL312■-1TE26-0AA.
1PH8163-..B...	81.9	0.216 (1.91)	196 (432)	30.0	32	gk863	30	6SL312■-1TE23-0AA.
1PH8163-..D...	91.5			55.0	60	gk863	60	6SL312■-1TE26-0AA.
1PH8163-..F...	92.6			70.0	87	gk863	85	6SL312■-1TE28-5AA.
1PH8163-..G...	93.5			78.0	111	gk863	85	6SL312■-1TE28-5AA.
1PH8165-..B...	83.0	0.232 (2.83)	230 (507)	36.0	37	gk863	45	6SL312■-1TE24-5AA.
1PH8165-..D...	92.1			69.0	77	gk863	85	6SL312■-1TE28-5AA.
1PH8165-..F...	93.4			76.0	95	gk863	85	6SL312■-1TE28-5AA.
1PH8165-..G...	93.2			85.0	122	gk863	85	6SL312■-1TE28-5AA.

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

6) Extra weight for version with hollow shaft approx. 2.5 kg (5.51 lb).

7) Compliance with the rated pulse frequencies is essential; the rated motor data is valid for 4 kHz.

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Selection and ordering data

Rated speed	Maximum speed	Rated power	Rated torque	Maximum torque[1]	**SIMOTICS M-1PH8 Premium Performance asynchronous motors**	Efficiency	Moment of inertia	Motor with solid shaft weight, approx.
n_{rated}	n_{max}	P_{rated}	M_{rated}	M_{max}		η	J	m
rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.	%	kgm^2 (lb_f-in-s^2)	kg (lb)
Shaft height SH 80 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
9000	24000	**2.8 (3.75)**	3.0 (2.21)	20.0 (14.8)	**1PH8081-1 ■ U ■2-■N■1-Z Q12+Q52**	88.5	0.0045 (0.04)	24 (52.9)
9000	24000	**2.8 (3.75)**	3.0 (2.21)	20.0 (14.8)	**1PH8081-1 ■ W ■2-■N■1-Z Q12+Q52**	84.3	0.0045 (0.04)	24 (52.9)
9000	24000	**3.5 (4.69)**	3.7 (2.73)	24.0 (17.7)	**1PH8081-1 ■ V ■2-■N■1-Z Q12+Q52**	95.0	0.0045 (0.04)	24 (52.9)
5200	24000	**4.5 (6.03)**	8.3 (6.12)	50.0 (36.9)	**1PH8083-1 ■ W ■2-■N■1-Z Q12+Q52**	86.6	0.0069 (0.06)	29.5 (65)
12000	24000	**4.5 (6.03)**	3.6 (2.66)	20.0 (14.8)	**1PH8083-1 ■ V ■2-■N■1-Z Q12+Q52**	93.9	0.0069 (0.06)	29.5 (65)
12000	24000	**6.5 (8.72)**	5.2 (3.84)	19.0 (14.0)	**1PH8087-1 ■ V ■2-■N■1-Z Q12+Q52**	94.7	0.0094 (0.08)	37 (81.6)
Shaft height SH 80 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
9000	24000	**8.0 (10.7)**	8.5 (6.27)	32.0 (23.6)	**1PH8081-1 ■ T 2 2-■N■1-Z Q12+Q52**	94.7	0.0045 (0.04)	27 (59.5)
9000	24000	**7.5 (10.1)**	8.0 (5.90)	27.0 (19.9)	**1PH8081-1 ■ U 2 2-■N■1-Z Q12+Q52**	91.1	0.0045 (0.04)	27 (59.5)
9000	24000	**7.3 (9.79)**	7.7 (5.68)	18.0 (13.3)	**1PH8081-1 ■ W 2 2-■N■1-Z Q12+Q52**	92.7	0.0045 (0.04)	27 (59.5)
9000	24000	**7.7 (10.3)**	8.2 (6.05)	21.0 (15.5)	**1PH8081-1 ■ V 2 2-■N■1-Z Q12+Q52**	98.0	0.0045 (0.04)	27 (59.5)
12000	24000	**9.0 (12.1)**	7.2 (5.31)	24.0 (17.7)	**1PH8083-1 ■ T 2 2-■N■1-Z Q12+Q52**	83.6	0.0069 (0.06)	34 (75)
5200	24000	**10.0 (13.4)**	18.4 (13.6)	64.0 (47.2)	**1PH8083-1 ■ U 2 2-■N■1-Z Q12+Q52**	91.9	0.0069 (0.06)	34 (75)
5000	24000	**11.0 (14.8)**	21.0 (15.5)	67.0 (49.4)	**1PH8087-1 ■ U 2 2-■N■1-Z Q12+Q52**	95.8	0.0094 (0.08)	44 (97)

For versions, see
Article No. supplement and options.

[1] Dependent on selected Motor Module.

[2] The pulse frequency must be taken into account; a derating factor of 0.6 is applied for 8 kHz.

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Motor type (repeated)	Rated current	Maximum current[1]	SINAMICS S120	SINAMICS S120 Motor Module	
			Pulse frequency	Rated output current[2]	Booksize format
	I_{rated}	I_{max}		I_{rated}	
	A	A	kHz	A	Article No.
1PH8081-1.U.2-...	12.5	60.0	4	18	**6SL312■-■TE21-8AA.**
1PH8081-1.W.2-...	12.5	60.0	8	18	**6SL312■-1TE23-0AA.**
1PH8081-1.V.2-...	15.5	60.0	8	18	**6SL312■-1TE23-0AA.**
1PH8083-1.W.2-...	15.5	68.0	8	18	**6SL312■-1TE23-0AA.**
1PH8083-1.V.2-...	15.5	68.0	8	18	**6SL312■-1TE23-0AA.**
1PH8087-1.V.2-...	19.0	68.0	8	27	**6SL312■-1TE24-5AA.**
1PH8081-1.T22-...	25.6	77.0	4	30	**6SL312■-1TE23-0AA.**
1PH8081-1.U22-...	25.0	77.0	4	30	**6SL312■-1TE23-0AA.**
1PH8081-1.W22-...	23.9	54.0	8	27	**6SL312■-1TE24-5AA.**
1PH8081-1.V22-...	23.8	54.0	8	27	**6SL312■-1TE24-5AA.**
1PH8083-1.T22-...	24.0	78.0	4	45	**6SL312■-1TE24-5AA.**
1PH8083-1.U22-...	26.4	81.0	4	45	**6SL312■-1TE24-5AA.**
1PH8087-1.U22-...	25.1	71.0	4	45	**6SL312■-1TE24-5AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

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Selection and ordering data

Rated speed	Continuous speed, max.[1]			Operating speed during field weakening[1)5)]	Rated power	Rated torque	Static torque	**SIMOTICS M-1PH8 asynchronous motors**
Y/Δ	Y/Δ	Y/Δ	Δ	Y/Δ	Y/Δ	Y/Δ	Y/Δ	
n_{rated}	n_{max1}[2)]	n_{max2}[3)]	n_{max3}[4)]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 100 – Forced ventilation – Star/delta circuit – Line voltage 400 V 3 AC, operation on Active Line Module								
2000/5000	9000	12000	18000	8950/10000	4.9/4.9 (6.57/6.57)	23/9 (17.0/6.64)	29/19 (21.4/14.0)	**1PH8101-1■S■■-■■■1**
	9000	12000	18000	7650/10000	10/9.3 (13.4/12.5)	48/18 (35.4/13.3)	55/36 (40.6/26.6)	**1PH8105-1■S■■-■■■1**
	9000	12000	18000	8550/10000	11/11 (14.8/14.8)	53/21 (39.1/15.5)	63/42 (46.5/31.0)	**1PH8107-1■S■■-■■■1**
Shaft height 132 – Forced ventilation – Star/delta circuit – Line voltage 400 V 3 AC, operation on Active Line Module								
2000/5000	8000	10000	15000	8000/10000	14.6/14.6 (19.6/19.6)	70/28 (51.6/20.7)	94/55 (69.3/40.6)	**1PH8131-1■S■■-■■■1**
	8000	10000	15000	6500/10000	24.5/24.5 (32.9/32.9)	117/47 (86.3/34.7)	157/94 (116/69.3)	**1PH8135-1■S■■-■■■1**
	8000	10000	15000	3000/6000	29/27.5 (38.9/36.9)	138/53 (102/39.1)	185/105 (136/77.4)	**1PH8137-1■S■■-■■■1**

For versions, see Article No. supplement and options.

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1) Speed data are based on an infeed with Active Line Module (see characteristic curves); the maximum speed of the encoders must be observed.
2) Bearing version for Standard (14th data position is B to H); reduced values for type F, see 1PH8 Configuration Manual.
3) Bearing version for Performance (14th data position is L).
4) Bearing version for High Performance (14th data position is M).
5) n_2: max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

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Motor type (repeated)	Efficiency	Moment of inertia	Weight, approx.[6]	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[7]	Booksize format For other versions and components, see SINAMICS S120 drive system
	Y/Δ			Y/Δ	Y/Δ			
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8101-1.S...	87.2/90.2	0.0138 (0.12)	42 (92.6)	13.2/13.5	15/20	gk826	18	**6SL312■-■TE21-8AA.**
1PH8105-1.S...	89.1/91.4	0.0252 (0.22)	65 (143)	23/24	25/34	gk826	30	**6SL312■-1TE23-0AA.**
1PH8107-1.S...	89.4/90.9	0.0289 (0.26)	73 (161)	26.7/28	30/40	gk826	30	**6SL312■-1TE23-0AA.**
1PH8131-1.S...	90.8/89.7	0.059 (0.52)	89 (196)	39/40	47/56	gk846	45	**6SL312■-1TE24-5AA.**
1PH8135-1.S...	91.7/93.9	0.094 (0.83)	125 (276)	51/52	62/78	gk846	60	**6SL312■-1TE26-0AA.**
1PH8137-1.S...	93.1/91.9	0.109 (0.96)	141 (311)	56/56	68/87	gk846	60	**6SL312■-1TE26-0AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

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[6] Extra weight for version with hollow shaft approx. 2.5 kg.

[7] Compliance with the rated pulse frequencies is essential; the rated motor data is valid for 4 kHz.

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Selection and ordering data

Rated speed	Continuous speed, max.[1]			Operating speed during field weakening[1)4]	Rated power	Rated torque	Static torque	SIMOTICS M-1PH8 asynchronous motors
	With holding brake	Without holding brake						
n_{rated}	$n_{max, Br}$	n_{max1}[2)]	n_{max2}[3)]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 180 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
500	3500	5000	7500	2900	20.5 (27.49)	392 (289.1)	392 (289.1)	**1PH8184-■■B■■-■■■1**
800	3500	5000	7500	3800	31.0 (41.57)	370 (272.9)	368 (271)	**1PH8184-■■C■■-■■■1**
1150	3500	5000	7500	4800	44.0 (59)	372 (274)	372 (274)	**1PH8184-■■D■■-■■■1**
1750	3500	5000	7500	5000	60.0 (80.46)	327 (241.2)	325 (240)	**1PH8184-■■F■■-■■■1**
2900	3500	5000	7500	5000	81.0 (108.62)	267 (169.9)	298 (220)	**1PH8184-■■L■■-■■■1**
500	3500	5000	7500	3100	26.5 (35.54)	506 (373)	506 (373)	**1PH8186-■■B■■-■■■1**
800	3500	5000	7500	4100	40.0 (53.64)	478 (353)	478 (353)	**1PH8186-■■C■■-■■■1**
1150	3500	5000	7500	5000	58.0 (77.78)	482 (355.5)	487 (359)	**1PH8186-■■D■■-■■■1**
1750	3500	5000	7500	5000	85.0 (113.99)	464 (342.2)	471 (347)	**1PH8186-■■F■■-■■■1**
2900	3500	5000	7500	5000	101 (135.44)	333 (245.6)	405 (299)	**1PH8186-■■L■■-■■■1**
Shaft height 225 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
500	3100	4500	6000	2500	38.0 (50.96)	726 (535.5)	726 (535)	**1PH8224-■■B■■-■■■1**
800	3100	4500	6000	3400	57.0 (76.44	681 (502.3)	750 (553)	**1PH8224-■■C■■-■■■1**
1150	3100	4500	6000	3400	81.0 (108.62)	673 (496.4)	678 (500)	**1PH8224-■■D■■-■■■1**
1750	3100	4500	6000	3200	110 (147.51)	600 (442.6)	605 (446)	**1PH8224-■■F■■-■■■1**
2900	3100	4500	6000	3300	149 (199.81)	491 (362.2)	542 (400)	**1PH8224-■■L■■-■■■1**
500	3100	4500	6000	2600	49.0 (65.71)	936 (690)	936 (690)	**1PH8226-■■B■■-■■■1**
800	3100	4500	6000	3600	73.0 (97.89)	872 (643.2)	928 (684)	**1PH8226-■■C■■-■■■1**
1150	3100	4500	6000	3400	105 (140.81)	872 (643.2)	879 (648)	**1PH8226-■■D■■-■■■1**
1750	3100	4500	6000	3300	135 (181.04)	737 (543.6)	828 (611)	**1PH8226-■■F■■-■■■1**
2900	3100	4500	6000	3300	185 (248.09)	609 (449.2)	642 (474)	**1PH8226-■■L■■-■■■1**
500	3100	4500	6000	2700	60.0 (80.46)	1146 (845)	1146 (845)	**1PH8228-■■B■■-■■■1**
800	3100	4500	6000	3800	92.0 (123.37)	1098 (809.9)	1119 (825)	**1PH8228-■■C■■-■■■1**
1150	3100	4500	6000	3400	129 (172.99)	1071 (790)	1079 (796)	**1PH8228-■■D■■-■■■1**
1750	3100	4500	6000	3400	179 (240.04)	977 (720.6)	1019 (752)	**1PH8228-■■F■■-■■■1**
2900	3100	4500	6000	3300	215 (288.32)	708 (522.2)	783 (578)	**1PH8228-■■L■■-■■■1**
Shaft height 280 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
500	–	3300	–	1600	80.0 (107.3)	1529 (1127.8)	1504 (1109)	**1PH8284-1■B■■-■■■1**
800	–	3300	–	2300	125 (167.63)	1492 (1054)	1501 (1107)	**1PH8284-1■C■■-■■■1**
1150	–	3300	–	2200	170 (227.97)	1414 (1043)	1433 (1057)	**1PH8284-1■D■■-■■■1**
1750	–	3300	–	2200	225 (301.73)	1228 (905.8)	1248 (921)	**1PH8284-1■F■■-■■■1**
500	–	3300	–	1600	100 (220.50)	1909 (4209.35)	1909 (1408.1)	**1PH8286-1■B■■-■■■1**
800	–	3300	–	2300	155 (341.78)	1850 (1364.6)	1883 (1388.9)	**1PH8286-1■C■■-■■■1**
1150	–	3300	–	2200	210 (463.05)	1745 (1287.1)	1738 (1281.9)	**1PH8286-1■D■■-■■■1**
1750	–	3300	–	2200	270 (595.35)	1474 (1087.2)	1592 (1174.3)	**1PH8286-1■F■■-■■■1**
500	–	3300	–	1600	130 (174.33)	2481 (1830)	2481 (1830)	**1PH8288-1■B■■-■■■1**
800	–	3300	–	2300	190 (254.79)	2268 (1672.9)	2268 (1672.9)	**1PH8288-1■C■■-■■■1**
1150	–	3300	–	2200	260 (348.66)	2160 (1593.2)	2158 (1591.7)	**1PH8288-1■D■■-■■■1**

For versions, see Article No. supplement and options.

1) Speed data are based on an infeed with Active Line Module (see characteristic curves); the maximum speed of the encoders must be observed.
2) Bearing version for Standard (14th data position is A to F).
3) Bearing version for Performance (14th data position is L).
4) n_2: max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

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Motor type (repeated)	Effi-ciency	Moment of inertia	Weight, approx. without holding brake	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[5]	Booksize format For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8184-..B...	86.1	0.489 (4.33)	350 (772)	49	49	1XB7322	60	**6SL312■-1 TE26-0AA.**
1PH8184-..C...	90.1	0.489 (4.33)	350 (772)	65	65	1XB7322	85	**6SL312■-1 TE28-5AA.**
1PH8184-..D...	92.8	0.489 (4.33)	350 (772)	86	87	1XB7322	85[6]	**6SL312■-1 TE28-5AA.**
1PH8184-..F...	94.4	0.489 (4.33)	350 (772)	120	116	1XB7322	132	**6SL312■-1 TE31-3AA.**
1PH8184-..L...	95.2	0.489 (4.33)	350 (772)	152	166	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8186-..B...	87.5	0.652 (5.77)	422 (931)	65	65	1XB7322	85	**6SL312■-1 TE28-5AA.**
1PH8186-..C...	91.6	0.652 (5.77)	422 (931)	83	83	1XB7322	85	**6SL312■-1 TE28-5AA.**
1PH8186-..D...	93.3	0.652 (5.77)	422 (931)	112	112	1XB7322	132	**6SL312■-1 TE31-3AA.**
1PH8186-..F...	94.9	0.652 (5.77)	422 (931)	164	166	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8186-..L...	95.4	0.652 (5.77)	422 (931)	198	230	1XB7422	260	**6SL312■-1 TE32-6AA.**
1PH8224-..B...	89.6	1.48 (13.10)	610 (1345)	85	86	1XB7322	85[6]	**6SL312■-1 TE28-5AA.**
1PH8224-..C...	93.4	1.48 (13.10)	610 (1345)	126	136	1XB7322	132[6]	**6SL312■-1 TE31-3AA.**
1PH8224-..D...	94.6	1.48 (13.10)	610 (1345)	156	158	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8224-..F...	95.6	1.48 (13.10)	610 (1345)	198	200	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8224-..L...	95.7	1.48 (13.10)	610 (1345)	270	295	1XB7700	310	**6SL332■-1 TE33-1AA.**
1PH8226-..B...	90.8	1.93 (17.08)	740 (1632)	110	110	1XB7322	132	**6SL312■-1 TE31-3AA.**
1PH8226-..C...	94.0	1.93 (17.08)	740 (1632)	154	162	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8226-..D...	94.9	1.93 (17.08)	740 (1632)	192	194	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8226-..F...	96.0	1.93 (17.08)	740 (1632)	250	270	1XB7422	310	**6SL332■-1 TE33-1AA.**
1PH8226-..L...	96.0	1.93 (17.08)	740 (1632)	335	350	1XB7700	380	**6SL332■-1 TE33-8AA.**
1PH8228-..B...	91.4	2.33 (20.62)	870 (1918)	132	132	1XB7322	132	**6SL312■-1 TE31-3AA.**
1PH8228-..C...	94.1	2.33 (20.62)	870 (1918)	182	188	1XB7322	200	**6SL312■-1 TE32-0AA.**
1PH8228-..D...	95.3	2.33 (20.62)	870 (1918)	235	235	1XB7422	260	**6SL312■-1 TE32-6AA.**
1PH8228-..F...	96.1	2.33 (20.62)	870 (1918)	330	340	1XB7700	380	**6SL332■-1 TE33-8AA.**
1PH8228-..L...	96.1	2.33 (20.62)	870 (1918)	390	420	1XB7700	490	**6SL332■-1 TE35-0AA.**
1PH8284-1.B...	93.5	4.20 (37.17)	1200 (2464)	154	154	1XB7700	200	**6SL312■-1 TE32-0AA.**
1PH8284-1.C...	95.2	4.20 (37.17)	1200 (2464)	235	240	1XB7700	260	**6SL332■-1 TE32-6AA.**
1PH8284-1.D...	96.0	4.20 (37.17)	1200 (2464)	310	315	1XB7700	310[6]	**6SL332■-1 TE33-1AA.**
1PH8284-1.F...	96.4	4.20 (37.17)	1200 (2464)	390	390	1XB7700	490	**6SL332■-1 TE35-0AA.**
1PH8286-1.B...	93.9	5.20 (46.03)	1400 (3087)	188	188	1XB7700	200	**6SL312■-1 TE32-0AA.**
1PH8286-1.C...	95.5	5.20 (46.03)	1400 (3087)	285	295	1XB7700	310	**6SL332■-1 TE33-1AA.**
1PH8286-1.D...	96.2	5.20 (46.03)	1400 (3087)	410	410	1XB7700	490	**6SL332■-1 TE35-0AA.**
1PH8286-1.F...	96.6	5.20 (46.03)	1400 (3087)	460	490	1XB7700	490	**6SL332■-1 TE35-0AA.**
1PH8288-1.B...	94.1	6.30 (55.76)	1650 (3638)	245	245	1XB7700	260	**6SL332■-1 TE32-6AA.**
1PH8288-1.C...	95.7	6.30 (55.76)	1650 (3638)	365	365	1XB7700	380	**6SL332■-1 TE33-8AA.**
1PH8288-1.D...	96.4	6.30 (55.76)	1650 (3638)	495	495	1XB7700	490[6]	**6SL332■-1 TE35-0AA.**

Format:	
Booksize	**1**
Chassis	**3**
Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

[5] Compliance with the rated pulse frequencies is essential; the rated motor data is valid for 4 kHz or 2 kHz.
[6] The rated output current of the Motor Module is lower than the rated motor current at 4 kHz or 2 kHz.

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Selection and ordering data

Rated speed	Continuous speed, max.[1]				Operating speed during field weakening[1)5)]	Rated power	Rated torque	Static torque	**SIMOTICS M-1PH8 asynchronous motors**
	With holding brake	Without holding brake							
n_{rated}	$n_{max, Br}$	n_{max1}[2)]	n_{max2}[3)]	n_{max3}[4)]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 80 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	50000	10000	12000	–	4100	4.0 (5.36)	22 (16.2)	23 (17.0)	**1PH8083-■■F2■-■■■1**
2300	50000	10000	15000	16000	8150	4.9 (6.57)	20 (14.8)	23 (17.0)	**1PH8083-■■G2■-■■■1**
5000	–	10000	15000	20000	17700	7.5 (10.06)	14 (10.3)	23 (17.0)	**1PH8083-1■N2■-■■■1**
1750	5000	10000	15000	–	6600	5.4 (7.24)	29 (21.4)	34 (25.1)	**1PH8087-■■F2■-■■■1**
2300	5000	10000	15000	19000	8850	7.0 (9.39)	29 (21.4)	34 (25.1)	**1PH8087-■■G2■-■■■1**
5000	–	10000	15000	20000	18700	9.5 (12.74)	18 (13.3)	27 (19.9)	**1PH8087-1■N2■-■■■1**
Shaft height 100 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	5000	9000	–	–	2500	5.8 (7.78)	32 (24)	34 (25.1)	**1PH8101-■■F2■-■■■1**
2300	5000	9000	12000	–	5000	7.3 (9.79)	30 (22.1)	34 (25.1)	**1PH8101-■■G2■-■■■1**
1750	5000	9000	–	–	5000	8.2 (11)	45 (33.2)	48 (35.4)	**1PH8103-■■F2■-■■■1**
2300	5000	9000	12000	–	3000	10.9 (14.62)	45 (33.2)	48 (35.4)	**1PH8103-■■G2■-■■■1**
3300	5000	9000	12000	18000	13550	11.7 (15.69)	34 (25.1)	46 (33.9)	**1PH8103-■■M2■-■■■1**
1750	5000	9000	–	–	3400	12.5 (16.76)	68 (50.2)	74 (54.6)	**1PH8105-■■F2■-■■■1**
2300	5000	9000	12000	–	3500	15.0 (20.12)	62 (45.7)	74 (54.6)	**1PH8105-■■G2■-■■■1**
3300	5000	9000	12000	18000	9050	18.5 (24.81)	54 (39.8)	71 (52.4)	**1PH8105-■■M2■-■■■1**
1750	5000	9000	12000	–	4500	15.5 (20.79)	85 (62.7)	94 (69.3)	**1PH8107-■■F2■-■■■1**
3300	5000	9000	12000	18000	18050	20.0 (26.82)	58 (42.8)	82 (60)	**1PH8107-■■M2■-■■■1**
Shaft height 132 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	4500	8000	10000	11000	2500	17.0 (22.8)	93 (68.6)	96 (70.8)	**1PH8131-■■F2■-■■■1**
2300	4500	8000	10000	14000	4000	20.0 (26.82)	83 (61.2)	101 (74.5)	**1PH8131-■■G2■-■■■1**
1750	4500	8000	10000	13000	3500	19.5 (26.15)	106 (78.2)	136 (100)	**1PH8133-■■F2■-■■■1**
2300	4500	8000	10000	15000	6000	25.0 (33.53)	104 (76.7)	134 (98.8)	**1PH8133-■■G2■-■■■1**
1750	4500	8000	10000	14000	4000	25.5 (34.2)	139 (102.5)	172 (127)	**1PH8135-■■F2■-■■■1**
2300	4500	8000	10000	15000	4500	31.0 (41.57)	129 (95.2)	170 (125)	**1PH8135-■■G2■-■■■1**
1750	4500	8000	10000	15000	4500	31.5 (42.24)	172 (127)	202 (149)	**1PH8137-■■F2■-■■■1**
1750	4500	8000	10000	15000	5000	33.0 (44.25)	180 (132.8)	223 (164)	**1PH8138-■■F2■-■■■1**
Shaft height 160 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module									
1750	4000	6500	9000	10000	3500	43.0 (57.66)	235 (173.3)	288 (212.4)	**1PH8163-■■F2■-■■■1**
2300	4000	6500	9000	10000	4000	48.0 (64.37)	199 (146.8)	281 (207.3)	**1PH8163-■■G2■-■■■1**
1750	4000	6500	9000	10000	3050	53.0 (71.1)	289 (213.2)	334 (246.4)	**1PH8165-■■F2■-■■■1**
2300	4000	6500	9000	10000	3000	60.0 (80.46)	249 (183.7)	306 (225.7)	**1PH8165-■■G2■-■■■1**
1750	4000	6500	9000	10000	3050	61.0 (81.80)	333 (245.6)	353 (260.4)	**1PH8166-■■F2■-■■■1**
2300	4000	6500	9000	10000	3000	72.0 (96.55)	299 (220.5)	353 (260.4)	**1PH8166-■■G2■-■■■1**

For versions, see Article No. supplement and options.

1) Speed data are based on an infeed with Active Line Module (see characteristic curves); the maximum speed of the encoders must be observed.
2) Bearing version for Standard (14th data position is A to H); reduced values for type F, see 1PH8 Configuration Manual.
3) Bearing version for Performance (14th data position is L).
4) Bearing version for High Performance (14th data position is M).
5) n_2: max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

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Motor type (repeated)	Effi-ciency	Moment of inertia without holding brake	Weight, approx.[6] without holding brake	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[7]	Booksize format For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8083-1.F2...	80.8	0.0064 (0.06)	36 (79.4)	8.7	9	gk803	9	**6SL312■-■TE21-0AA.**
1PH8083-1.G2...	84.6			12.0	13	gk803	18	**6SL312■-■TE21-8AA.**
1PH8083-1.N2...	89.1			18.0	23	gk803	18	**6SL312■-■TE21-8AA.**
1PH8087-1.F2...	83.1	0.0089 (0.08)	44 (97.0)	13.7	15	gk803	18	**6SL312■-■TE21-8AA.**
1PH8087-1.G2...	86.0			17.7	19	gk803	18	**6SL312■-■TE21-8AA.**
1PH8087-1.N2...	89.4			24.0	31	gk803	30	**6SL312■-1TE23-0AA.**
1PH8101-1.F2...	83.4	0.0138 (0.12)	51 (113)	12.8	13	gk823	18	**6SL312■-1TE21-8AA.**
1PH8101-1.G2...	87.4			16.8	18	gk803	18	**6SL312■-■TE21-8AA.**
1PH8103-1.F2...	85.1	0.0172 (0.15)	60 (132)	19.7	20	gk823	30	**6SL312■-1TE23-0AA.**
1PH8103-1.G2...	88.3			23.8	24	gk823	30	**6SL312■-1TE23-0AA.**
1PH8103-1.M2...	90.0			30.0	35	gk823	30	**6SL312■-1TE23-0AA.**
1PH8105-1.F2...	86.2	0.0252 (0.22)	74 (163)	28.5	29	gk823	30	**6SL312■-1TE23-0AA.**
1PH8105-1.G2...	89.1			34.0	38	gk823	45	**6SL312■-1TE24-5AA.**
1PH8105-1.M2...	91.0			45.0	52	gk823	45	**6SL312■-1TE24-5AA.**
1PH8107-1.F2...	84.7	0.0289 (0.26)	83 (183)	42.0	44	gk823	45	**6SL312■-1TE24-5AA.**
1PH8107-1.M2...	90.0			60.0	73	gk823	60	**6SL312■-1TE26-0AA.**
1PH8131-1.F2...	89.7	0.059 (0.52)	105 (232)	30.0	30	gk843	30	**6SL312■-1TE23-0AA.**
1PH8131-1.G2...	92.0			39.0	44	gk843	45	**6SL312■-1TE24-5AA.**
1PH8133-1.F2...	91.3	0.076 (0.67)	123 (271)	38.0	45	gk843	45	**6SL312■-1TE24-5AA.**
1PH8133-1.G2...	92.3			52.0	61	gk843	60	**6SL312■-1TE26-0AA.**
1PH8135-1.F2...	91.4	0.094 (0.83)	141 (311)	51.0	58	gk843	60	**6SL312■-1TE26-0AA.**
1PH8135-1.G2...	92.4			61.0	73	gk843	85	**6SL312■-1TE28-5AA.**
1PH8137-1.F2...	91.1	0.109 (0.96)	157 (346)	67.0	73	gk843	85	**6SL312■-1TE28-5AA.**
1PH8138-1.F2...	89.8	0.109 (0.96)	160 (353)	77.0	88	gk843	85	**6SL312■-1TE28-5AA.**
1PH8163-1.F2...	92.4	0.216 (1.91)	229 (505)	84.0	96	gk873	85	**6SL312■-1TE28-5AA.**
1PH8163-1.G2...	93.9	0.216 (1.91)	229 (505)	93.0	120	gk873	132	**6SL312■-1TE31-3AA.**
1PH8165-1.F2...	93.5	0.232 (2.05)	264 (582)	104	112	gk873	132	**6SL312■-1TE31-3AA.**
1PH8165-1.G2...	94.6	0.232 (2.05)	264 (582)	107	135	gk873	132	**6SL312■-1TE31-3AA.**
1PH8166-1.F2...	94.0	0.232 (2.05)	269 (593)	116	127	gk873	132	**6SL312■-1TE31-3AA.**
1PH8166-1.G2...	94.6	0.232 (2.05)	269 (593)	124	147	gk873	132	**6SL312■-1TE31-3AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

[6] Extra weight for version with hollow shaft approx. 2.5 kg.

[7] Compliance with the rated pulse frequencies is essential; the rated motor data is valid for 4 kHz.

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Selection and ordering data

Rated speed	Continuous speed, max.[1]			Operating speed during field weakening[1)4)]	Rated power	Rated torque	Static torque	SIMOTICS M-1PH8 asynchronous motors
	With holding brake	Without holding brake						
n_{rated}	$n_{max, Br}$	n_{max1}[2)]	n_{max2}[3)]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 180 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
500	3500	5000	7500	1800	23.0 (30.8)	439 (323.8)	406 (299)	**1PH8184-■■B2■-■■■1**
800	3500	5000	7500	2900	38.0 (50.96)	454 (334.9)	450 (332)	**1PH8184-■■C2■-■■■1**
1150	3500	5000	7500	5000	54.0 (72.41)	448 (330.4)	449 (331)	**1PH8184-■■D2■-■■■1**
1750	3500	5000	7500	5000	82.0 (109.96)	447 (329.7)	446 (329)	**1PH8184-■■F2■-■■■1**
2900	3500	5000	7500	5000	102 (136.78)	336 (247.8)	363 (268)	**1PH8184-■■L2■-■■■1**
500	3500	5000	7500	2200	30.0 (40.23)	573 (422.6)	549 (405)	**1PH8186-■■B2■-■■■1**
800	3500	5000	7500	3500	49.0 (65.71)	585 (431.5)	587 (433)	**1PH8186-■■C2■-■■■1**
1150	3500	5000	7500	5000	74.0 (99.23)	615 (453.6)	611 (451)	**1PH8186-■■D2■-■■■1**
1750	3500	5000	7500	5000	111 (148.85)	606 (447)	592 (437)	**1PH8186-■■F2■-■■■1**
2900	3500	5000	7500	5000	135 (181.94)	445 (328.2)	458 (338)	**1PH8186-■■L2■-■■■1**
Shaft height 225 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
500	3100	4500	6000	1500	46.0 (61.69)	879 (648.4)	860 (634.3)	**1PH8224-■■B2■-■■■1**
800	3100	4500	6000	2300	70.0 (93.9)	836 (616.6)	832 (613.7)	**1PH8224-■■C2■-■■■1**
1150	3100	4500	6000	3000	101 (135.44)	839 (618.8)	850 (627)	**1PH8224-■■D2■-■■■1**
1750	3100	4500	6000	3800	138 (185.06)	753 (555.4)	758 (559)	**1PH8224-■■F2■-■■■1**
2900	3100	4500	6000	3600	164 (219.92)	540 (398.3)	584 (431)	**1PH8224-■■L2■-■■■1**
500	3100	4500	6000	1700	59.0 (79.12)	1127 (831.3)	1122 (828)	**1PH8226-■■B2■-■■■1**
800	3100	4500	6000	2500	93.0 (124.71)	1110 (818.7)	1105 (815)	**1PH8226-■■C2■-■■■1**
1150	3100	4500	6000	2700	131 (157.67)	1088 (802.5)	1098 (810)	**1PH8226-■■D2■-■■■1**
1750	3100	4500	6000	3900	169 (226.63)	922 (680.1)	923 (681)	**1PH8226-■■F2■-■■■1**
2900	3100	4500	6000	3600	204 (207.56)	672 (495.7)	707 (521)	**1PH8226-■■L2■-■■■1**
500	3100	4500	6000	1800	72.0 (96.55)	1375 (1014.2)	1385 (1022)	**1PH8228-■■B2■-■■■1**
800	3100	4500	6000	2700	110 (147.51)	1313 (968.5)	1310 (966)	**1PH8228-■■C2■-■■■1**
1150	3100	4500	6000	2500	161 (215.90)	1337 (986.2)	1347 (994)	**1PH8228-■■D2■-■■■1**
1750	3100	4500	6000	3900	221 (296.36)	1206 (889.5)	1222 (901)	**1PH8228-■■F2■-■■■1**
2900	3100	4500	6000	3600	237 (317.82)	780 (575.3)	863 (637)	**1PH8228-■■L2■-■■■1**
Shaft height 280 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
500	–	3300	–	2200	89.0 (119)	1700 (1253.9)	1695 (1250)	**1PH8284-1■B2■-■■■1**
800	–	3300	–	2200	141 (189)	1683 (1241.4)	1678 (1238)	**1PH8284-1■C2■-■■■1**
1150	–	3300	–	2200	198 (265.52)	1644 (1212.6)	1643 (1212)	**1PH8284-1■D2■-■■■1**
1750	–	3300	–	2200	265 (355.37)	1446 (1066.6)	1445 (1066)	**1PH8284-1■F2■-■■■1**
500	–	3300	–	2200	111 (148.85)	2120 (1563.7)	2125 (1567)	**1PH8286-1■B2■-■■■1**
800	–	3300	–	2200	175 (234.68)	2089 (1540.8)	2087 (1539)	**1PH8286-1■C2■-■■■1**
1150	–	3300	–	2300	246 (329.89)	2043 (1506.9)	2044 (1508)	**1PH8286-1■D2■-■■■1**
500	–	3300	–	2200	136 (182.38)	2598 (1916.3)	2602 (1919)	**1PH8288-1■B2■-■■■1**
800	–	3300	–	2200	215 (288.32)	2567 (1893.4)	2565 (1892)	**1PH8288-1■C2■-■■■1**

For versions, see Article No. supplement and options.

1) Speed data are based on an infeed with Active Line Module (see characteristic curves); the maximum speed of the encoders must be observed.
2) Bearing version for Standard (14th data position is A to F).
3) Bearing version for Performance (14th data position is L).
4) n_2: max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

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Motor type (repeated)	Effi-ciency	Moment of inertia without holding brake	Weight, approx. Without holding brake	Rated current	Stall current	Terminal box	**SINAMICS S120 Motor Module**	
							Rated output current[5]	**Booksize format** For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8184-..B2...	85.0	0.489 (4.33)	340 (750)	54	50	1XB7322-P05	60	**6SL312■-1TE26-0AA.**
1PH8184-..C2...	88.5			77	77	1XB7322-P05	85	**6SL312■-1TE28-5AA.**
1PH8184-..D2...	91.5			112	114	1XB7322-P05	132	**6SL312■-1TE31-3AA.**
1PH8184-..F2...	93.3			150	150	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8184-..L2...	94.5			182	196	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8186-..B2...	86.8	0.652 (5.77)	410 (904)	70	68	1XB7322-P05	85	**6SL312■-1TE28-5AA.**
1PH8186-..C2...	90.4			99	97	1XB7322-P05	132	**6SL312■-1TE31-3AA.**
1PH8186-..D2...	92.7			148	148	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8186-..F2...	93.9			200	198	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8186-..L2...	94.8			245	250	1XB7422-P06	260	**6SL3320-1TE32-6AA.**
1PH8224-..B2...	88.3	1.45 (12.83)	610 (1345)	100	100	1XB7322-P05	132	**6SL312■-1TE31-3AA.**
1PH8224-..C2...	92.0			130	128	1XB7322-P05	132	**6SL312■-1TE31-3AA.**
1PH8224-..D2...	94.4			186	188	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8224-..F2...	95.4			240	240	1XB7422-P06	260	**6SL3320-1TE32-6AA.**
1PH8224-..L2...	96.1			285	310	1XB7700-P02	310	**6SL3320-1TE33-1AA.**
1PH8226-..B2...	89.9	1.90 (16.82)	740 (1632)	128	130	1XB7322-P05	132	**6SL312■-1TE31-3AA.**
1PH8226-..C2...	93.4			186	184	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8226-..D2...	94.5			230	235	1XB7422-P06	260	**6SL3320-1TE32-6AA.**
1PH8226-..F2...	89.5			295	295	1XB7700-P02	310	**6SL3320-1TE33-1AA.**
1PH8226-..L2...	96.0			360	380	1XB7700-P02	380	**6SL3320-1TE33-8AA.**
1PH8228-..B2...	90.8	2.35 (20.8)	870 (1918)	150	154	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8228-..C2...	93.7			210	210	1XB7322-P05	210	**6SL3320-1TE32-1AA.**
1PH8228-..D2...	94.8			280	280	1XB7700-P02	310	**6SL3320-1TE33-1AA.**
1PH8228-..F2...	96.1			390	390	1XB7700-P02	380[6]	**6SL3320-1TE33-8AA.**
1PH8228-..L2...	96.3			415	455	1XB7700-P02	490	**6SL3320-1TE35-0AA.**
1PH8284-1.B2...	92.9	4.21 (37.26)	1280 (2822)	172	170	1XB7322-P05	200	**6SL312■-1TE32-0AA.**
1PH8284-1.C2...	95.0			260	260	1XB7700-P02	260	**6SL3320-1TE32-6AA.**
1PH8284-1.D2...	96.0			355	350	1XB7700-P02	380	**6SL3320-1TE33-8AA.**
1PH8284-1.F2...	96.6			445	445	1XB7700-P02	490	**6SL3320-1TE35-0AA.**
1PH8286-1.B2...	93.1	5.16 (45.67)	1490 (3285)	205	210	1XB7322-P05	210	**6SL3320-1TE32-1AA.**
1PH8286-1.C2...	95.3			320	320	1XB7700-P02	380	**6SL3320-1TE33-8AA.**
1PH8286-1.D2...	96.2			455	460	1XB7700-P02	490	**6SL3320-1TE35-0AA.**
1PH8288-1.B2...	93.8	6.29 (55.67)	1750 (3859)	260	260	1XB7700-P02	260	**6SL3320-1TE32-6AA.**
1PH8288-1.C2...	95.6			405	400	1XB7700-P02	490	**6SL3320-1TE35-0AA.**

Format:	
Booksize	**1**
Chassis	**3**
Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

[5] Compliance with the rated pulse frequencies is essential; the rated motor data is valid for 4 kHz or 2 kHz.

[6] The rated output current of the Motor Module is lower than the rated motor current at 4 kHz or 2 kHz.

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 80	**1**	**P**	**H**	**8**	**0**	**8**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length							**1**													
							3													
							7													
Asynchronous version									**1**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Incremental encoder sin/cos 1 V_{pp} 256 S/R without C and D tracks (encoder IN256S/R)										**C**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Incremental encoder 19 bit without commutation position (encoder IN19DQ)										**S**										
Rated speed (winding version)																				
Cooling / **Degree of protection**																				
Forced ventilation DE → NDE / IP55												**0**								
Forced ventilation NDE → DE / IP55												**1**								
Water cooling / IP65												**2**								
Type of construction																				
IM B5 (IM V1, IM V3)													**2**							
Shaft extension DE[1] / **Balancing**																				
Plain shaft / –															**0**					
Plain hollow shaft[2] / –															**3**					**Y64**[2]
Bearing version / **Vibration severity acc. to Siemens/EN 60034-14** / **Shaft and flange accuracy**																				
Premium Performance[3] / SPECIAL/B / SPECIAL																**N**				**Q12**[3]
Power connection (looking at DE) / **Cable entry** / **Signal connection**																				
Terminal box top / Right / DE																	**A**			
Terminal box top / Left / DE																	**B**			
Terminal box top / NDE / Left																	**C**			
Terminal box top / DE / Left																	**D**			
Power connector top / Right / DE																	**E**			
Power connector top / Left / DE																	**F**			
Power connector top / NDE / Left																	**G**			
Power connector top / DE / Left																	**H**			
Version status																		**1**		
Special version (order codes required for options)																				
Flange DE with additional 4 × M8 thread for adapter plate for aligning motor shaft with spindle shaft																				**Q52**[4]

[1] Shaft extension 24 mm × 50 mm (0.94 in × 1.97 in) (d × l).

[2] Only possible in combination with option Y64, prepared for turning bushings without bearings.

[3] Only possible in combination with option Q12.
Option Q12 (sealing air connection) is absolutely essential for Premium Performance motors in order to cool the bearings and provide protection against the ingress of fluid. For further details on interfaces and sealing air conditioning, see the 1PH8 Configuration Manual.

[4] It is absolutely essential to order all versions with this option.

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 80	**1**	**P**	**H**	**8**	**0**	**8**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 100	**1**	**P**	**H**	**8**	**1**	**0**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**

Overall length		
Asynchronous version with holding brake[1]		**3**
Encoder systems for motors without DRIVE-CLiQ interface		
Without encoder		**A**
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R) with EnDat interface (encoder AM2048S/R)		**E**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)		**M**
Encoder systems for motors with DRIVE-CLiQ interface		
Absolute encoder 22 bit single-turn + 12 bit multi-turn (encoder AM22DQ)		**F**
Incremental encoder 22 bit with commutation position (encoder IC22DQ)		**D**
Rated speed (winding version)		
Cooling	**Degree of protection**	
Forced ventilation DE → NDE	IP55	**0**
Forced ventilation NDE → DE	IP55	**1**
Water cooling	IP55[2]	**2**
Type of construction		
IM B5 (IM V1, IM V3)[3]		**2**
IM B35 (IM V15, IM V35)[4]		**3**
Shaft extension DE	**Balancing**	
Plain shaft	–	**0**
Feather key	Half-key	**2**
Bearing version	**Vibration severity acc. to Siemens[5]/EN 60034-14**	**Shaft and flange accuracy**
Standard	A	N **A**
Advanced Lifetime	A	N **P**
Power connection[6] (looking at DE)	**Cable entry**	**Signal connection**
Terminal box top	Right	DE **A**
Terminal box top	Left	DE **B**
Terminal box top	NDE	Left **C**
Terminal box top	DE	Left **D**
Power connector top[7]	Right	DE **E**
Power connector top[7]	Left	DE **F**
Power connector top[7]	NDE	Left **G**
Power connector top[7]	DE	Left **H**
Version status		**1**
Brake versions		
Brake supply voltage 230 V 1 AC 50/60 Hz	Holding brake DE	**U60**
	Holding brake DE with micro switch	**U61**
	Holding brake DE with manual brake release lever	**U62**
	Holding brake DE with micro switch and manual brake release lever	**U63**
Brake supply voltage 24 V DC	Holding brake DE	**U65**
	Holding brake DE with micro switch	**U66**
	Holding brake DE with manual brake release lever	**U67**
	Holding brake DE with micro switch and manual brake release lever	**U68**
Z options that cannot be combined with holding brake DE: K18, M03, M39		

1) A U option must also be stated in the order to specify the holding brake version.
Shaft height 80: limited to n_{max} = 5000 rpm.
Shaft height 100: limited to n_{max} = 5000 rpm.
Shaft height 132: limited to n_{max} = 4500 rpm.
Shaft height 160: limited to n_{max} = 4000 rpm.

2) The degree of protection is limited to IP55 as a result of the holding brake.

3) Not possible with shaft height 160.

4) Not possible with shaft height 80.

5) For a definition of the vibration severity according to Siemens, refer to the 1PH8 Motors Configuration Manual.

6) Holding brake can only be connected via terminal box top.

7) Power connector for motor only (not with holding brake):
Power connector for shaft height 100 only possible up to a maximum stall current of I_0 = 36 A.
Power connector for shaft height 132 only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for shaft height 160.

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SIMOTICS M-1PH8 without holding brake – Article No. supplement > SH 80 to SH 160 – Forced ventilation/Water cooling

Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 80	**1**	**P**	**H**	**8**	**0**	**8**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 100	**1**	**P**	**H**	**8**	**1**	**0**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**

Overall length

Asynchronous version without brake — **1**

Encoder systems for motors without DRIVE-CLiQ interface

Without encoder	**A**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)[1]	**M**
Incremental encoder sin/cos 1 V_{pp} 512 S/R without C and D tracks (encoder IN256S/R)[2]	**T**
Incremental encoder sin/cos 1 V_{pp} 256 S/R without C and D tracks (encoder IN256S/R)[3]	**C**
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)[1]	**E**

Encoder systems for motors with DRIVE-CLiQ interface

Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)[1]	**D**
Incremental encoder 20 bit (resolution 1048576, internal 512 S/R)[2] without commutation position (encoder IN20DQ)	**U**
Incremental encoder 19 bit without commutation position (encoder IN19DQ)[3]	**S**
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)[1]	**F**

Rated speed (winding version)

Cooling	**Degree of protection**	
Forced ventilation DE → NDE	IP55	**0**
Forced ventilation NDE → DE	IP55	**1**
Water cooling	IP65	**2**

Type of construction

IM B3 (IM V5, IM V6)	**0**
IM B5 (IM V1, IM V3) (Not possible for 1PH816 and when 14th data position is L or M)	**2**
IM B35 (IM V15, IM V35) (Only possible for 1PH810/1PH813/1PH816)	**3**

Shaft extension DE	**Balancing**	
Plain shaft	–	**0**
Feather key (not possible when 14th data position is M)	Full-key	**1**
Feather key (not possible when 14th data position is M)	Half-key	**2**
Plain hollow shaft[3]	–	**3**

Bearing version	**Vibration severity acc. to Siemens[4]/EN 60034-14**	**Shaft and flange accuracy**	
Standard with location bearing[8]	R/A	R	**B**
Standard with location bearing[8]	S/A	R	**C**
Standard with location bearing[8]	SR/A	R	**D**
Standard[8]	R/A	R	**G**
Standard[8]	S/A	R	**H**
Increased radial forces[8]	R/A	R	**F**
Performance[5][6]	SPECIAL/B	SPECIAL	**L**
High Performance[6][7]	SPECIAL/B	SPECIAL	**M**
Advanced Lifetime[8][9]	S/A	R	**Q**

Power connection (looking at DE)	**Cable entry**	**Signal connection**	
Terminal box top	Right	DE	**A**
Terminal box top	Left	DE	**B**
Terminal box top	NDE	Left	**C**
Terminal box top	DE	Left	**D**
Power connector top[8][10]	Right	DE	**E**
Power connector top[8][10]	Left	DE	**F**
Power connector top[8][10]	NDE	Left	**G**
Power connector top[8][10]	DE	Right	**H**

Version status — **1**

Special version (order codes required for options) — **Z**

[1] Limited to n_{max} = 12000 rpm.
[2] Limited to n_{max} = 15000 rpm.
[3] Only possible when 14th data position is L, M or 9. Data position C, S.
[4] For definition of the vibration severity according to Siemens, see 1PH8 Motors Configuration Manual.
[5] For 1PH808 limited to n_{max} = 15000 rpm. For 1PH810 limited to n_{max} = 12000 rpm. For 1PH813 limited to n_{max} = 10000 rpm. For 1PH816 limited to n_{max} = 9000 rpm.
[6] Not possible for 1PH816 when 12th data position is 2 (type of construction IM B5).
[7] For 1PH808 limited to n_{max} = 20000 rpm. For 1PH810 limited to n_{max} = 18000 rpm. For 1PH813 limited to n_{max} = 15000 rpm. For 1PH816 limited to n_{max} = 10000 rpm.
[8] Not possible when 9th data position is T, U.
[9] For 1PH808/1PH810 limited to n_{max} = 5000 rpm. For 1PH813 limited to n_{max} = 4500 rpm. For 1PH816 limited to n_{max} = 4000 rpm.
[10] Power connector for 1PH810 only possible up to a maximum stall current of I_0 = 36 A. Power connector for 1PH813 only possible up to a maximum stall current of I_0 = 85 A. Power connector not possible for 1PH816.

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	**3**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length																				
Asynchronous version with holding brake[1]									**3**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder										**A**										
Absolute encoder EnDat 2048 S/R (encoder AM2048S/R)										**E**										
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)										**M**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Absolute encoder 22 bit single-turn + 12 bit multi-turn (encoder AM22DQ)										**F**										
Incremental encoder 22 bit with commutation position (encoder IC22DQ)										**D**										
Rated speed (winding version)																				
Cooling	**Degree of protection**																			
Forced ventilation DE → NDE	IP55											**0**								
Forced ventilation NDE → DE	IP55											**1**								
Water cooling	IP55											**2**								
Type of construction																				
IM B3 (IM B6, IM B7, IM B8)													**0**							
Shaft extension DE	**Balancing**																			
Feather key	Half-key														**2**					
Bearing version	**Vibration severity acc. to Siemens[2]/EN 60034-14**							**Shaft and flange accuracy**												
Standard	A							N								**A**				
Power connection[3] (looking at DE)	**Cable entry**							**Signal connection**												
Terminal box top	Right							DE									**A**			
Terminal box top	Left							DE									**B**			
Terminal box top	NDE							Left									**C**			
Terminal box top	DE							Right									**D**			
Version status																		**1**		
Brake versions																				
Brake supply voltage 230 V 1 AC 50/60 Hz	Holding brake DE with micro switch and manual brake release lever																			**U63**
Z options that cannot be combined with holding brake DE: K18, K90, L03, V92, M39																				

[1] A U option must also be stated in the order to specify the holding brake version.
Shaft height 180: limited to n_{max} = 3500 rpm.
Shaft height 225: limited to n_{max} = 3100 rpm.

[2] For a definition of the vibration severity according to Siemens, refer to the 1PH8 Motors Configuration Manual.

[3] Holding brake can only be connected via terminal box top.

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SIMOTICS M-1PH8 without holding brake – Article No. supplement > SH 180 to SH 280 – Forced ventilation/Water cooling

Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	**1**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 280 (only water cooling)	**1**	**P**	**H**	**8**	**2**	**8**	**.**	**–**	**1**	■	**.**	**2**	■	**–**	■	■	■	**1**	**–**	**Z**

Overall length

Asynchronous version without brake — **1**

Encoder systems for motors without DRIVE-CLiQ interface

Without encoder	**A**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)	**M**
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)	**E**

Encoder systems for motors with DRIVE-CLiQ interface

Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)	**D**
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)	**F**

Rated speed (winding version)

Cooling	**Degree of protection**	
Forced ventilation DE → NDE	IP55	**0**
Forced ventilation NDE → DE	IP55	**1**
Water cooling	IP55	**2**

Type of construction

1PH818	1PH822	1PH828	
• IM B3 (IM B6/IM B7/ IM B8/IM V6)	• IM B3 (IM B6/IM B7/ IM B8/IM V6)	• IM B3 (IM V6)	**0**
• IM V5	• IM V5	• IM V5[4]	**1**
• IM B5 with flange A450 (IM V3)[1]	• IM B5 with flange A550 (IM V3)[2]	• IM B5 with flange A660 (IM V3)[3][4]	**2**
• IM B35 with flange A450 (IM V35)	• IM B35 with flange A550 (IM V35)	• IM B35 with flange A660 (IM V35)	**3**
• IM V15 with flange A450	• IM V15 with flange A550	• IM V15 with flange A660[4]	**5**

Shaft extension DE	**Balancing**	
Plain shaft	–	**0**
Feather key	Full-key	**1**
Feather key	Half-key	**2**

Bearing version	**Vibration severity acc. to Siemens[5]/EN 60034-14**	**Shaft and flange accuracy**	
Standard	R/A	R	**B**
Increased radial forces	R/A	R	**F**
Also possible with 1PH818/1PH822:			
Standard	S/A	R	**C**
Standard	SR/A	R	**D**
Performance[6]	SR/A	R	**L**

Power connection (looking at DE)	**Cable entry**	**Signal connection**	
Terminal box top	Right	DE	**A**
Terminal box top	Left	DE	**B**
Terminal box top	NDE	Right	**C**
Terminal box top	DE	Right	**D**

Version status — **1**

Special version (order codes required for options) — **Z**

[1] Limited to n_{max} = 3000 rpm. Not possible when 14th data position is L (Performance bearings).
[2] Limited to n_{max} = 2500 rpm. Not possible when 14th data position is L (Performance bearings).
[3] Limited to n_{max} = 2000 rpm.
[4] Only possible when 14th data position is B (Standard bearings).
[5] For definition of the vibration severity according to Siemens, see 1PH8 Motors Configuration Manual.
[6] For 1PH818 limited to n_{max} = 7500 rpm. Not possible when 12th data position is 2 (type of construction IM B5).
For 1PH822 limited to n_{max} = 6000 rpm. Not possible when 12th data position is 2 (type of construction IM B5).

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 280 (only forced ventilation)	**1**	**P**	**H**	**8**	**2**	**8**	**.**	**–**	**1**	■	**.**	**1**	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length																				
Asynchronous version without brake									**1**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Without encoder										**A**										
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)										**M**										
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)										**E**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)										**D**										
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)										**F**										
Rated speed (winding version)																				
Cooling / **Degree of protection**																				
Forced ventilation / IP55												**1**								
Type of construction																				
IM B3 (IM V6)													**0**							
IM V5[1]													**1**							
IM B5 with flange A660 (IM V3)[1]													**2**							
IM B35 with flange A660 (IM V35)													**3**							
IM V15 with flange A660[1]													**5**							
Shaft extension DE / **Balancing**																				
Plain shaft / –															**0**					
Feather key / Full-key															**1**					
Feather key / Half-key															**2**					
Bearing version / **Vibration severity acc. to Siemens[2]/EN 60034-14** / **Shaft and flange accuracy**																				
Standard / R/A / R																**B**				
Increased radial forces / R/A / R																**F**				
Power connection (looking at DE) / **Cable entry** / **Signal connection** / **External fan NDE** Air inlet from NDE, air-flow direction NDE → DE																				
Terminal box NDE right / Bottom / DE / Top																	**U**			
Left (order code **G00** required)																	**U**		–	**Z**
Terminal box NDE left / Bottom / DE / Top																	**V**			
Right (order code **G02** required)																	**V**		–	**Z**
Terminal box NDE top / Right / DE / Left (order code **G00** required)																	**W**		–	**Z**
Right (order code **G02** required)																	**W**		–	**Z**
Terminal box DE top[3] / Right / NDE / Top[3][4]																	**X**			
Left[3] (order code **G00** required)																	**X**		–	**Z**
Right[3] (order code **G02** required)																	**X**		–	**Z**
Version status																		**1**		
Special version (order codes required for options)																				**Z**

[1] Only possible when 14th data position is B (Standard bearings).
[2] For definition of the vibration severity according to Siemens, see 1PH8 Motors Configuration Manual.
[3] Only possible when 12th data position is 0 (type of construction IM B3) or 1 (type of construction IM V5).
[4] Only possible for assignment with terminal box 1XB7712-P..

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Options

Order code	Description of option When ordering a motor with options, **-Z** must be added to the article number. The order code should also be specified for each additional required option. Note: Order codes must not be repeated in plain text in the order.	For use with motors Shaft height 80 to 160	Shaft height 180 to 225 Shaft height 280 for water cooling only (11th data position 2)	Shaft height 280 for forced ventilation only (11th data position 1)
A12	Additional PTC thermistor chain for alarm and tripping (Only possible for version with terminal box)	✔	✔	✔
A25	Additional KTY84 temperature sensor as reserve connected to signal terminal strip (Only possible for version with terminal box)	✔	Standard	Standard
B02	Test certificate (for ordered motor)	✔	Standard	Standard
G00	External fan NDE left, air inlet at NDE (possible if 15th data position is U, W or X)	–	–	✔
G02	External fan NDE right, air inlet at NDE (possible if 15th data position is V, W or X)	–	–	✔
G06	External fan DE left, air inlet at NDE (possible if 15th data position is U, V or W)	–	–	✔
G07	External fan DE left, air inlet at DE (possible if 15th data position is U, V or W)	–	–	✔
G08	External fan DE right, air inlet at NDE (possible if 15th data position is U, V or W)	–	–	✔
G09	External fan DE right, air inlet at DE (possible if 15th data position is U, V or W)	–	–	✔
G11	External fan DE top, air inlet at DE (possible if 15th data position is U, V or W)	–	–	✔
G14	With air filter (only possible if 11th data position is 1)	Only for SH 132 and SH 160	✔	✔
G50	M8 thread for sensor mounting (e.g. acceleration sensor for bearing condition monitoring)	–	–	✔
K08	Encoder connector or DRIVE-CLiQ mounted opposite (not possible when 15th data position is X)	–	✔	✔
K09	Terminal box or power connector NDE on the right	Only for SH 100 [1] to SH 160	–	–
	Terminal box NDE on the right, cable entry DE, signal connection at top (only possible if 15th data position is A)	–	✔	–
K10	Terminal box or power connector NDE on the left	Only for SH 100 [1] to SH 160	–	–
	Terminal box NDE on the left, cable entry DE, signal connection at top (only possible if 15th data position is A)	–	✔	–
K16	Second shaft extension (SH 280 d × l: 95 mm (3.74 in) x 170 mm (6.69 in) (possible if 9th data position is A and 12th data position is 0 or 3)	–	–	✔
K17	Labyrinth seal DE for Performance bearings (14th data position is L)	Only for SH 180	–	–
K18	Radial shaft sealing ring DE[2] (not possible for version with holding brake)	✔	✔	–
K40	Regreasing system, DE and NDE	–	Only for SH 180 and SH 225	Standard
K45	Anti-condensation heating 230 V AC	–	✔	✔
K69	Pipe connection prepared NDE right (only possible with forced ventilation, not with G00, G02, G06, G07, G08, G09, G11, G14 and L02)	–	–	✔
K70	Pipe connection prepared NDE left (only possible with forced ventilation, not with G00, G02, G06, G07, G08, G09, G11, G14 and L02)	–	–	✔
K71	Pipe connection prepared NDE top (only possible with forced ventilation, not with G00, G02, G06, G07, G08, G09, G11, G14 and L02)	–	–	✔
K80	Axial pipe connection NDE (only possible with forced ventilation)	✔	Only for SH 180 and SH 225	Options K69, K70, K71
K83	Rotation of terminal box by +90 degrees (possible in combination with options K09 or K10 or if 15th data position is U, V or W)	–	✔ [3]	✔
K84	Rotation of terminal box by -90 degrees (possible in combination with options K09 or K10 or if 15th data position is U, V, W or X)	–	✔ [3]	✔
K85	Rotation of terminal box by +180 degrees (possible in combination with options K09 or K10 or if 15th data position is U, V, W or X)	–	✔	✔
K90	Version with flange size A400 (possible if 12th data position is 2, 3 or 5)	–	Only for SH 180	–

✔	Option available
–	Option not available

[1] Not possible when 12th data position is 2 (type of construction IM B5).

[2] Only appropriate if oil spray or oil vapor is occasionally deposited on the sealing ring. Radial shaft sealing ring not possible when: 14th data position is E, F, L, M or N.

[3] Not possible with 1PH822 and terminal box 1XB7712-P03.

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Options (continued)

Order code	Description of option When ordering a motor with options, **-Z** must be added to the article number. The order code should also be specified for each additional required option. Note: Order codes must not be repeated in plain text in the order.	For use with motors Shaft height 80 to 160	Shaft height 180 to 225 Shaft height 280 for water cooling only (11th data position 2)	Shaft height 280 for forced ventilation only (11th data position 1)
L00	Replace terminal box (standard) with the next larger terminal box (Note dimension implications, see CAD CREATOR.)	–	✔	✔
L02	Fan version for increased vibration resistance		–	✔
L03	Increased vibration stress	–	Only for SH 180 and SH 225	–
L12	Condensation drain hole	–	✔ 7)	✔
L27	NDE bearing in insulated version	–	Only for SH 180	Standard
L29	Enhanced corrosion protection for installation in industrial/marine climates	–	On request	✔
L72	Shaft made of special steel	–	–	✔
L74	Fan version with IP65 degree of protection 4)	✔	–	–
L75	Special fan version for 400 V 3 AC with IP65 degree of protection 4)		✔	
M03	Version for potentially explosive atmospheres Zone 2 5)	✔	–	–
M39	Version for potentially explosive atmospheres Zone 22 5)	✔	Only for SH 180 and SH 225	–
M83	Additional back-off thread on motor feet (possible if 12th data position is 0 or 3)	–	–	✔
P00	Undrilled cable entry plate	–	✔	✔
P01	Cable entry plate 3 × M63 × 1.5	–	Only for 1XB7700-P02 1XB7712-P03	Only for 1XB7712-P03
P02	Cable entry plate 3 × M75 × 1.5	–	Only for 1XB7712-P03	Only for 1XB7712-P01 1XB7712-P03
P03	Cable entry plate 4 × M75 × 1.5	–	–	Only for 1XB7712-P01
P04	Cable entry plate 4 × M63 × 1.5	–	Only for 1XB7712-P03	Only for 1XB7712-P01 1XB7712-P03
Q00	Extra grounding terminals in terminal box	–	–	✔
Q12	M5 sealing air connection	✔	–	–
Q14	Filter for special fan L75	–	Only for SH 180 and SH 225	–
Q31	Metal rating plate instead of adhesive label	✔	✔	✔
U60	Holding brake 230 V	✔	–	–
U61	Holding brake 230 V with micro switch	✔	–	–
U62	Holding brake 230 V with manual brake release lever	✔	–	–
U63	Holding brake 230 V with micro switch and manual brake release lever	✔	Only for SH 180 and SH 225	–
U65	Holding brake 24 V DC	✔	–	–
U66	Holding brake 24 V DC with micro switch	✔	–	–
U67	Holding brake 24 V DC with manual brake release lever	✔	–	–
U68	Holding brake 24 V DC with micro switch and manual brake release lever	✔	–	–

✔	Option available
–	Option not available

4) Regardless of the degree of protection, at high levels of atmospheric pollution, the fan must be cleaned.
5) Not in combination with the following bearings (14th data position): A, F, L, M, N, P.
6) Only with direction of air flow NDE → DE (11th digit in MLFB = 1).
7) Standard for water-cooled motors.

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Options (continued)

Order code	Description of option	For use with motors		
	When ordering a motor with options, **-Z** must be added to the article number. The order code must also be stated for each required option. Note: Order codes must not be repeated in plain text in the order.	Shaft height 80 to 160	Shaft height 180 to 280	Shaft height 280 for forced ventilation only (11th data position 1)
V90	1PH7-compatible shaft extension ($d \times l$: 42 mm (1.65 in) x 110 mm (4.33 in) (note reduced radial forces!)	Only for SH 132	–	–
V92	1PH7184-/1PL6184-compatible shaft extension ($d \times l$: 60 mm (2.36 in) x 140 mm (5.51 in)	–	Only for 1PH8184	–
Y64	Hollow shaft prepared for bearingless rotary unions with flange diameter 114 H6	✔	–	–
Y84	Customer specifications on rating plate (max. 30 characters)	✔	✔	✔
–	Paint finish: Anthracite RAL 7016	Standard	Standard	Standard
X01	Paint finish: Jet black RAL 9005	✔	✔	✔
X02	Paint finish: Cream white RAL 9001	✔	✔	✔
X03	Paint finish: Reseda green RAL 6011	✔	✔	✔
X04	Paint finish: Pebble gray RAL 7032	✔	✔	✔
X05	Paint finish: Sky blue RAL 5015	✔	✔	✔
X06	Paint finish: Light ivory RAL 1015	✔	✔	✔
X08	Paint finish: White aluminum RAL 9006	✔	✔	✔
K24	Primer	Pale green	Red brown	Red brown
K23	Special paint finish "Worldwide" Primer and paint finish in anthracite RAL 7016	✔	✔	✔
K23 + X..	Special paint finish "Worldwide" Primer and paint finish can be selected from X01 to X08	✔	✔	✔

✔	Option available
–	Option not available

[1] Not possible when 12th data position is 2 (type of construction IM B5).

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Options (continued)

Terminal box type (See selection and ordering data for assignment)	Cable entry Power	External signals	Outer cable diameter, max.[1] mm (in)	Number of main terminals	Cross-section per terminal, max. mm²	Rated current, max.[2] A
gk803	1 × M25 × 1.5	1 × M16 × 1.5[3]	20 (0.79)	Phases: 3 × M5 Grounding: 2 × M5	1 × 10	52
gk813	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases: 3 × M5 Grounding: 2 × M5	1 × 16	70
gk823	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases: 3 × M5 Grounding: 2 × M5	1 × 16	70
gk826	1 × M32 × 1.5	1 × M16 × 1.5[3]	24.2 (0.95)	Phases: 6 × M5 Grounding: 2 × M5	1 × 10	52
gk833	1 × M40 × 1.5	1 × M16 × 1.5[3]	32 (1.26)	Phases: 3 × M6 Grounding: 2 × M6	1 × 35	110
gk843	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases: 3 × M6 Grounding: 2 × M6	1 × 50	133
gk846	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases: 6 × M6 Grounding: 2 × M6	1 × 25	88
gk863	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases: 3 × M6 Grounding: 2 × M6	1 × 50	133
gk873	1 × M63 × 1.5	1 × M16 × 1.5[3]	42.6 (1.68)	Phases: 3 × M6 Grounding: 2 × M6	1 × 50	133
1XB7322-P05	2 × M50 × 1.5	1 × M16 × 1.5[4]	38 (1.50)	Phases: 3 × M12 Grounding: 2 × M6	2 × 50	210
1XB7422-P06	2 × M63 × 1.5	1 × M16 × 1.5[4]	53 (2.09)	Phases: 3 × M12 Grounding: 4 × M8	2 × 70	270
1XB7700-P02	3 × M75 × 1.5	1 × M16 × 1.5[4]	68 (2.68)	Phases: 3 × 2 × M12 Grounding: 3 × fixing eyelet	3 × 150	700
1XB7712-P03	4 × M75 × 1.5	1 × M16 × 1.5[4]	68 (2.68)	Phases: 3 × 4 × M16 Grounding: 4 × M16	4 × 185	1150

For terminal box type **1XB7712-P01** or **1XB7712-P03**, other cable entries (power) can be ordered via P options depending on the standard:

P00	Undrilled cable entry plate
P01	Cable entry plate 3 × M63 × 1.5 (not with 1XB7712-P01)
P02	Cable entry plate 3 × M75 × 1.5
P03	Cable entry plate 4 × M75 × 1.5 (not with 1XB7712-P03)
P04	Cable entry plate 4 × M63 × 1.5

For terminal box type **1XB7700-P02**, other cable entries (power) can be ordered via P options depending on the standard:

P00	Undrilled cable entry plate
P01	Cable entry plate 3 × M63 × 1.5

For terminal box types **1XB7322-P05** and **1XB7422-P06**, another cable entry (power) can be ordered via the P option depending on the standard:

P00	Undrilled cable entry plate

With option **K09** or **K10**, terminal box **gk873** mounted on the side is used instead of terminal box **gk863**.

With option **K09** or **K10**, terminal box **gk843** mounted on the side is used instead of terminal box **gk833**.

With option **K09** or **K10**, terminal box **gk823** mounted on the side is used instead of terminal box **gk813**.

[1] Dependent on the design of the metric cable gland.

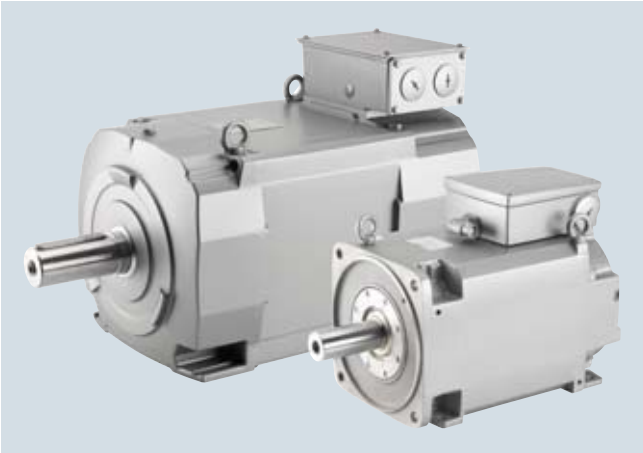
[2] Current-carrying capacity based on EN 60204-1/IEC 60364-5-52 with installation type E.

[3] Thread M16 × 1.5 arranged with 90° to signal connection; thread only with options A12, A25 and when 9th data position is A (without encoder).

[4] Thread M16 × 1.5 arranged opposite the signal connection (lateral to the cable entry plate); thread only with option A12 and when 9th data position is A (without encoder).

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Overview



SIMOTICS M-1PH8 motors are compact permanent-magnet synchronous motors with IP55/IP65 degree of protection. The motors are available in different cooling types:

- Forced ventilation for SH 132 to SH 225
- Water cooling for SH 132 to SH 225

The motors have been designed specifically for use in conjunction with the SINAMICS S120 drive system. Depending on the control requirements, appropriate encoder systems are available for the motors for sensing the motor speed and indirect position.

Benefits

- Wide range of power ratings
- Different bearing designs
- Different encoder types for speed control and high-precision positioning
- Excellent performance features
  - Excellent rotational accuracy
  - Excellent vibration severity
  - High dynamic response (short ramp-up times)
- Low noise emissions
- Simple and flexible connection system
- Commissioning with electronic rating plate and DRIVE-CLiQ interface

Application

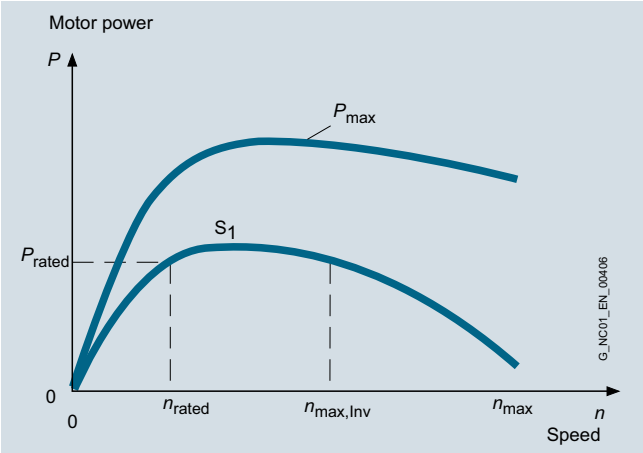
- As feed motors in machine tools
- Machines with high requirements in terms of dynamic performance and precision, e.g.:
  - Packaging machines
  - Servo presses
  - Printing machines
  - Cross cutters

More information

For further configuration information, see the 1PH8 Motors Configuration Manual.

If you are using a Smart Line Module, proceed in accordance with the 1PH8 Motors Configuration Manual.

Characteristic curves



Typical speed/power graph for synchronous motors SIMOTICS M-1PH8

The graph shows the typical relationship between motor speed and drive power for SIMOTICS M-1PH8 motors for duty type S1 (continuous duty) in accordance with IEC 60034-1.

Data for short-time duty S2 and continuous duty S6 is listed in the 1PH8 Motors Configuration Manual.

Configuration

Ordering example

Selection criteria	Design	Structure of the Article No.
1PH8 motor	Shaft height 132 Version status 1	**1PH8131- . . . . . - . . . 1**
	Synchronous version without brake	**1PH8131-2 . . . . - . . . 1**
Encoder system	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)	**1PH8131-2M . . .- . . . 1**
Cooling	Water cooling	**1PH8131-2M . 2 . - . . . 1**
Rated speed	1750 rpm	**1PH8131-2MF2 . - . . . 1**
Rated power	20.4 kW	
Type of construction	IM B3 (IM V5, IM V6)	**1PH8131-2MF20- . . . 1**
Shaft extension DE	Plain shaft	**1PH8131-2MF20-0 . . 1**
Bearing version	Standard Vibration severity R/A Shaft and flange accuracy R	**1PH8131-2MF20-0B . 1**
Connection	Power connection at top of terminal box Cable entry on right Signal connection at DE	**1PH8131-2MF20-0BA1**
Options		**1PH8131-2MF20-0BA1-Z**
	Additional PTC thermistor chain for alarm and tripping	**1PH8131-2MF20-0BA1-Z A12**
	Special paint finish, worldwide: Primer and other paint finish sky blue RAL 5015	**1PH8131-2MF20-0BA1-Z A12 K23 X05**

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Technical specifications

Product name	SIMOTICS M-1PH8		
Cooling	Forced ventilation	Water cooling	
• Cooling water pressure at inlet, max.	–	6 bar	
		Cooling water flow rate	Connection thread at NDE[1]
- 1PH813	–	12 l/min (3.17 US gallons/min.)	G 3/8"
- 1PH816	–	15 l/min (3.96 US gallons/min.)	G 1/2"
- 1PH818	–	15 l/min (3.96 US gallons/min.)	G 3/8"
- 1PH822	–	25 l/min (6.61 US gallons/min.)	G 3/8"
Ambient temperature, permissible	-15 ... +40 °C (5 ... 104 °F)[2]		
Coolant inlet temperature	–	< 30 °C (86 °F)	
Temperature monitoring	Temperature sensor in stator winding		
• 1PH818/1PH822	Additional temperature sensor as reserve		
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	For an ambient temperature of up to 40 °C (104 °F) Temperature class 180 (H)[3]		
Fan supply voltage			
• 1PH813/1PH816	400 V 3 AC ± 10 %, 50/60 Hz 480 V 3 AC ± 10 %, 60 Hz		
• 1PH818/1PH822	200 V 1 AC ... 277 V 50/60 Hz (EC fan) 400 V 3 AC 50/60 Hz, 480 V 3 AC 60 Hz (option L75)		
Encoder system, built-in	Without DRIVE-CLiQ interface or with DRIVE-CLiQ interface		
Sound pressure level L_{pA} (1 m) in accordance with DIN EN ISO 1680 Tolerance + 3 dB			
• 1PH813	70 dB[4]	68 dB[4]	
• 1PH816	73 dB[4]	69 dB[4]	
• 1PH818/1PH822	73 dB[5]	70 dB[5]	
Connection			
• 1PH813	Power connector or terminal box		
• 1PH816 to 1PH822	Terminal box	Terminal box	
• Fan for 1PH813	Power connector or terminal box	–	
• Fan for 1PH816 to 1PH822	Terminal box	–	
• Encoder system	Connector for signals (without mating connector) or DRIVE-CLiQ		
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14)		
Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1)[6]	Tolerance R		
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)			
• 1PH813/1PH816	IP55	IP65	
• 1PH818/1PH822	IP55	IP55	
• fans	IP55, option L74/L75: IP65[7]	–	
Rating plate	1 unit attached to motor 1 unit supplied loose in terminal box		
Paint finish	Anthracite RAL 7016		
Certificate of suitability	cURus		

[1] DE is the drive end with shaft. NDE is the non-drive end.

[2] With water cooling – due to the formation of condensation – the ambient temperature may be a maximum of 5 K above that of the coolant inlet temperature.

[3] The following motors are designed to conform to temperature class 155 (F):
1PH8138-2.F2/1PH8138-2.G2
1PH8164/1PH8166/1PH8168

[4] Rated pulse frequency 4 kHz and speed range up to 5000 rpm.

[5] Rated pulse frequency 4 kHz or 2 kHz and speed range up to 3800 rpm (1PH818) or 3500 rpm (1PH822).

[6] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

[7] L74 for 1PH813 and 1PH816; L75 for 1PH818 and 1PH822.

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Selection and ordering data

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power S1 duty	Rated torque S1 duty	Static torque	**SIMOTICS M-1PH8 synchronous motors**
n_{rated}	n_{max}	$n_{max, Inv}$	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 132 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
1750	4500	2550	18.0 (24.14)	98 (72.3)	105 (77.4)	**1PH8131-■■F ■■-■■■1**
2800	4500	4050	27.7 (37.15)	95 (70.1)	105 (77.4)	**1PH8131-■■L ■■-■■■1**
1750	4500	3050	23.1 (30.98)	126 (92.9)	131 (96.6)	**1PH8133-■■F ■■-■■■1**
2800	4500	3950	35.2 (47.2)	120 (88.5)	131 (96.6)	**1PH8133-■■L ■■-■■■1**
1750	4500	2450	27.2 (36.48)	149 (110)	158 (117)	**1PH8135-■■F ■■-■■■1**
2300	4500	3500	35.6 (47.74)	148 (110)	158 (117)	**1PH8135-■■G ■■-■■■1**
1750	4500	2700	35.6 (47.74)	194 (143)	203 (150)	**1PH8137-■■F ■■-■■■1**
2800	4500	3900	53.4 (71.61)	182 (134)	203 (150)	**1PH8137-■■L ■■-■■■1**
3300	4500	4500	62.2 (83.41)	180 (133)	203 (150)	**1PH8137-■■M ■■-■■■1**
Shaft height 132 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
1750	4500	3150	20.4 (27.36)	112 (82.6)	115 (84.8)	**1PH8131-■■F 2■-■■■1**
2800	4500	4500	31.7 (42.51)	108 (79.7)	115 (84.8)	**1PH8131-■■L 2■-■■■1**
1750	4500	2450	26.4 (35.40)	144 (106)	155 (114)	**1PH8133-■■F 2■-■■■1**
2300	4500	3450	34.9 (46.80)	145 (107)	155 (114)	**1PH8133-■■G 2■-■■■1**
1750	4500	2650	34.1 (45.7)	186 (137)	196 (145)	**1PH8135-■■F 2■-■■■1**
2300	4500	3800	44.3 (59.41)	184 (136)	196 (145)	**1PH8135-■■G 2■-■■■1**
1750	4500	2350	37.0 (49.62)	202 (149)	226 (167)	**1PH8137-■■F 2■-■■■1**
2300	4500	3500	50.5 (67.72)	212 (156)	226 (167)	**1PH8137-■■G 2■-■■■1**
1750	4500	3500	52.4 (70.27)	286 (211)	290 (214)	**1PH8138-■■F 2■-■■■1**
2300	4500	3900	67.7 (90.79)	281 (207)	290 (214)	**1PH8138-■■G 2■-■■■1**

For versions, see Article No. supplement and options.

[1] Maximum speed that must not be exceeded, also applies to versions with holding brake.

[2] Maximum permissible operating speed based on the voltage induced in the motor and the voltage stability of the Motor Module (without protective circuit).

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Motor type (repeated)	Effi-ciency	Moment of inertia without holding brake	Weight, approx. without holding brake	Rated current S1 duty	Stall current S1 duty	Terminal box	**SINAMICS S120 Motor Module**	
							Rated output current[3] S1 duty	For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8131-2.F...	94.7	0.0446 (0.39)	85 (187)	29	30	gk833	30	**6SL312■-1TE23-0AA.**
1PH8131-2.L...	94.9	0.0446 (0.39)	85 (187)	44	48	gk833	45	**6SL312■-1TE24-5AA.**
1PH8133-2.F...	95.0	0.0600 (0.53)	103 (227)	43	45	gk833	45	**6SL312■-1TE24-5AA.**
1PH8133-2.L...	95.2	0.0600 (0.53)	103 (227)	54	59	gk833	60	**6SL312■-1TE26-0AA.**
1PH8135-2.F...	95.2	0.0750 (0.66)	120 (265)	42	44	gk833	45	**6SL312■-1TE24-5AA.**
1PH8135-2.G...	95.3	0.0750 (0.66)	120 (265)	59	63	gk833	60	**6SL312■-1TE26-0AA.**
1PH8137-2.F...	95.3	0.0885 (0.78)	136 (300)	59	62	gk833	60	**6SL312■-1TE26-0AA.**
1PH8137-2.L...	95.3	0.0885 (0.78)	136 (300)	82	89[4]	gk833	85	**6SL312■-1TE28-5AA.**
1PH8137-2.M...	95.2	0.0885 (0.78)	136 (300)	102	115[4]	gk833	132	**6SL312■-1TE31-3AA.**
1PH8131-2.F2...	94.7	0.0446 (0.39)	102 (225)	40	41	gk843	45	**6SL312■-1TE24-5AA.**
1PH8131-2.L2...	94.9	0.0446 (0.39)	102 (225)	56	60	gk843	60	**6SL312■-1TE26-0AA.**
1PH8133-2.F2...	94.8	0.0600 (0.53)	120 (265)	42	43	gk843	45	**6SL312■-1TE24-5AA.**
1PH8133-2.G2...	95.1	0.0600 (0.53)	120 (265)	57	61	gk843	60	**6SL312■-1TE26-0AA.**
1PH8135-2.F2...	95.1	0.0750 (0.66)	138 (304)	56	59	gk843	60	**6SL312■-1TE26-0AA.**
1PH8135-2.G2...	95.2	0.0750 (0.66)	138 (304)	80	85[4]	gk843	85	**6SL312■-1TE28-5AA.**
1PH8137-2.F2...	95.2	0.0885 (0.78)	153 (337)	58	60	gk843	60	**6SL312■-1TE26-0AA.**
1PH8137-2.G2...	95.6	0.0885 (0.78)	153 (337)	84	90[4]	gk843	85	**6SL312■-1TE28-5AA.**
1PH8138-2.F2...	95.9	0.0885 (0.78)	156 (344)	118	120[4]	gk843	132	**6SL312■-1TE31-3AA.**
1PH8138-2.G2...	96.1	0.0885 (0.78)	156 (344)	130	133[4]	gk843	132	**6SL312■-1TE31-3AA.**

Format: Booksize	**1**	
Cooling: Internal air cooling		**0**
External air cooling		**1**
Motor Module: Single Motor Module		**1**

[3] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz.

[4] Above approx. 85 A, connection type "Power connector top" is not possible (15th data position E to H).

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Selection and ordering data

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power S1 duty	Rated torque S1 duty	Static torque	**SIMOTICS M-1PH8 synchronous motors**
n_{rated}	n_{max}	$n_{max, Inv}$	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 160 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
1750	4000	2600	69.0 (92.5)	375 (277)	440 (325)	**1PH8165-■■F■■-■■■1**
2800	4000	3900	87.0 (116.67)	300 (221)	440 (325)	**1PH8165-■■L■■-■■■1**
1750	4000	2600	77.0 (103.26)	420 (310)	500 (369)	**1PH8167-■■F■■-■■■1**
2800	4000	4000	98.0 (131.42)	335 (247)	500 (369)	**1PH8167-■■L■■-■■■1**
Shaft height 160 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
1750	4000	2400	67.0 (89.85)	365 (269)	440 (325)	**1PH8164-■■F2■-■■■1**
2300	4000	4000	93.0 (124.71)	315 (232)	440 (325)	**1PH8164-■■L2■-■■■1**
1750	4000	2600	85.0 (113.99)	460 (339)	550 (406)	**1PH8166-■■F2■-■■■1**
2300	4000	3900	109 (146.17)	375 (277)	550 (406)	**1PH8166-■■L2■-■■■1**
1750	4000	2600	94.0 (126.05)	510 (376)	620 (457)	**1PH8168-■■F2■-■■■1**
2300	4000	4000	123 (164.94)	420 (310)	520 (384)	**1PH8168-■■L2■-■■■1**

For versions, see Article No. supplement and options.

[1] Maximum speed that must not be exceeded, also applies to versions with holding brake.

[2] Maximum permissible operating speed based on the voltage induced in the motor and the voltage stability of the Motor Module (without protective circuit).

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Motor type (repeated)	Efficiency	Moment of inertia without holding brake	Weight, approx. without holding brake	Rated current S1 duty	Stall current S1 duty	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[3] S1 duty	For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8165-..F...	94.3	0.216 (1.91)	218 (481)	115	126	gk874	132	**6SL312■-1TE31-3AA3**
1PH8165-..L...	95.5	0.216 (1.91)	218 (481)	138	188	gk874	200	**6SL312■-1TE32-0AA4**
1PH8167-..F...	94.3	0.244 (2.16)	240 (529)	128	143	gk874	132[4]	**6SL312■-1TE31-3AA3**
1PH8167-..L...	95.9	0.244 (2.16)	240 (529)	164	230	gk874	200[4]	**6SL312■-1TE32-0AA4**
1PH8164-..F2...	94.3	0.175 (1.55)	224 (994)	108	118	gk874	132	**6SL312■-1TE31-3AA3**
1PH8164-..L2...	95.9	0.175 (1.55)	224 (494)	156	205	gk874	200[4]	**6SL312■-1TE32-0AA4**
1PH8166-..F2...	94.3	0.216 (1.91)	257 (567)	143	159	gk874	200	**6SL312■-1TE32-0AA4**
1PH8166-..L2...	95.9	0.216 (1.91)	257 (567)	188	240	gk874	200[4]	**6SL312■-1TE32-0AA4**
1PH8168-..F2...	94.3	0.244 (2.16)	279 (615)	164	179	gk874	200	**6SL312■-1TE32-0AA4**
1PH8168-..L2...	95.9	0.244 (2.16)	279 (615)	210	240	gk874	260	**6SL332 0-1TE32-6AA3**

Format:	
Booksize	**1**
Chassis	**3**
Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

[3] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz.

[4] The rated output current of the Motor Module is lower than the motor rated current or the motor stall current at 4 kHz.

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Selection and ordering data

Rated speed	Speed, max.[1] with holding brake	Speed, max.[1] without holding brake	Operating speed, max.[2]	Rated power S1 duty	Rated torque S1 duty	Static torque	**SIMOTICS M-1PH8 synchronous motors**
n_{rated}	$n_{max, Br}$	n_{max1}[2]	$n_{max, Inv}$	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 180 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module							
800	3500	3800	1450	38.0 (50.96)	454 (335)	480 (354)	**1PH8184-■■C■■-■■■1**
1150	3500	3800	1950	53.0 (71.07)	440 (325)	480 (354)	**1PH8184-■■D■■-■■■1**
1750	3500	3800	2700	82.0 (109.96)	447 (330)	480 (354)	**1PH8184-■■F■■-■■■1**
800	3500	3800	1450	50.0 (67.05)	597 (440)	640 (472)	**1PH8186-■■C■■-■■■1**
1150	3500	3800	2050	71.0 (95.21)	590 (435)	640 (472)	**1PH8186-■■D■■-■■■1**
1750	3500	3800	2950	109 (146.17)	595 (439)	640 (472)	**1PH8186-■■F■■-■■■1**
Shaft height 180 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module							
800	3500	3800	1450	48.0 (64.4)	573 (423)	590 (435)	**1PH8184-■■C2■-■■■1**
1150	3500	3800	1950	70.0 (93.87)	581 (429)	600 (443)	**1PH8184-■■D2■-■■■1**
1750	3500	3800	2700	103 (138.12)	562 (415)	600 (443)	**1PH8184-■■F2■-■■■1**
2800	3500	3800	3800	140 (187.74)	461 (340)	530 (391)	**1PH8184-■■L2■-■■■1**
800	3500	3800	1450	66.0 (88.51)	788 (581)	800 (590)	**1PH8186-■■C2■-■■■1**
1150	3500	3800	2050	92.0 (123.37)	764 (564)	800 (590)	**1PH8186-■■D2■-■■■1**
1750	3500	3800	2950	138 (185.06)	753 (555)	800 (590)	**1PH8186-■■F2■-■■■1**
2800	3500	3800	3800	178 (238.7)	586 (432)	720 (531)	**1PH8186-■■L2■-■■■1**

For versions, see Article No. supplement and options.

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the voltage induced in the motor and the voltage stability of the Motor Module (without protective circuit).

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Motor type (repeated)	Effi-ciency	Moment of inertia without holding brake	Weight, approx. without holding brake	Rated current S1 duty	Stall current S1 duty	Terminal box	**SINAMICS S120 Motor Module** Rated output current[3] S1 duty	For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb_f-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8184-..C...	92.6	0.46 (4.07)	330 (728)	80.0	84	1XB7322-P05	85	**6SL312■-1TE28-5AA3**
1PH8184-..D...	94.2	0.46 (4.07)	330 (728)	106	115	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8184-..F...	95.4	0.46 (4.07)	330 (728)	150	157	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-..C...	93.1	0.60 (5.31)	400 (882)	108	115	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8186-..D...	94.8	0.60 (5.31)	400 (882)	148	157	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-..F...	95.5	0.60 (5.31)	405 (893)	215	229	1XB7422-P06	260	**6SL332 0 -1TE32-6AA3**
1PH8184-..C2..	92.6	0.457 (4.04)	330 (728)	102	103	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8184-..D2..	94.2	0.457 (4.04)	330 (728)	140	143	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8184-..F2..	95.4	0.457 (4.04)	330 (728)	186	196	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8184-..L2..	95.6	0.457 (4.04)	330 (728)	250	278	1XB7700-P02	260[4]	**6SL332 0 -1TE32-6AA0**
1PH8186-..C2..	93.1	0.599 (5.30)	400 (882)	142	143	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-..D2..	94.8	0.599 (5.30)	400 (882)	190	196	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-..F2..	95.5	0.599 (5.30)	400 (882)	275	285	1XB7700-P02	310	**6SL332 0 -1TE33-1AA0**
1PH8186-..L2..	95.5	0.599 (5.30)	400 (882)	340	405	1XB7700-P02	380[4]	**6SL332 0 -1TE33-8AA0**

Format:	
Booksize	**1**
Chassis	**3**
Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

[3] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz (booksize format) or 2 kHz (chassis format).

[4] The rated output current of the Motor Module is lower than the motor rated current or the motor stall current at 4 kHz or 2 kHz.

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Selection and ordering data

Rated speed	Speed, max.[1] with holding brake	Speed, max.[1] without holding brake	Operating speed, max.[2]	Rated power S1 duty	Rated torque S1 duty	Static torque	SIMOTICS M-1PH8 synchronous motors
n_{rated}	$n_{max, Br}$	n_{max1}[2]	$n_{max, Inv}$	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	Article No.
Shaft height 225 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module							
800	3100	3500	1450	55.0 (73.76)	657 (485)	708 (522)	**1PH8224-■■C■■-■■■1**
1150	3100	3500	2050	78.0 (104.6)	648 (478)	708 (522)	**1PH8224-■■D■■-■■■1**
1750	3100	3500	2900	117 (156.9)	638 (471)	708 (522)	**1PH8224-■■F■■-■■■1**
800	3100	3500	1550	73.0 (97.89)	871 (624)	944 (696)	**1PH8226-■■C■■-■■■1**
1150	3100	3500	1950	104 (139.46)	864 (637)	944 (696)	**1PH8226-■■D■■-■■■1**
1750	3100	3500	2700	156 (209.2)	851 (628)	944 (696)	**1PH8226-■■F■■-■■■1**
800	3100	3500	1450	91.0 (122.03)	1086 (801)	1180 (870)	**1PH8228-■■C■■-■■■1**
1150	3100	3500	1950	129 (172.99)	1071 (790)	1180 (870)	**1PH8228-■■D■■-■■■1**
1750	3100	3500	2900	195 (261.5)	1064 (785)	1180 (870)	**1PH8228-■■F■■-■■■1**
Shaft height 225 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module							
800	3100	3500	1450	81.0 (108.62)	967 (713)	1007 (743)	**1PH8224-■■C2■-■■■1**
1150	3100	3500	2050	115 (154.22)	955 (704)	1007 (743)	**1PH8224-■■D2■-■■■1**
1750	3100	3500	2900	175 (234.68)	955 (704)	1007 (743)	**1PH8224-■■F2■-■■■1**
2800	3100	3500	3500	191 (256.13)	629 (464)	885 (631)	**1PH8224-■■L2■-■■■1**
800	3100	3500	1550	108 (144.83)	1289 (951)	1330 (981)	**1PH8226-■■C2■-■■■1**
1150	3100	3500	1950	155 (207.86)	1287 (949)	1330 (981)	**1PH8226-■■D2■-■■■1**
1750	3100	3500	2700	233 (312.45)	1271 (938)	1330 (981)	**1PH8226-■■F2■-■■■1**
2800	3100	3500	3500	238 (319.16)	784 (578)	1170 (863)	**1PH8226-■■L2■-■■■1**
800	3100	3500	1450	138 (185.06)	1647 (1215)	1680 (1239)	**1PH8228-■■C2■-■■■1**
1150	3100	3500	1950	194 (260.15)	1611 (1188)	1680 (1239)	**1PH8228-■■D2■-■■■1**

For versions, see Article No. supplement and options.

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the voltage induced in the motor and the voltage stability of the Motor Module (without protective circuit).

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Motor type (repeated)	Effi-ciency	Moment of inertia without holding brake	Weight, approx. without holding brake	Rated current S1 duty	Stall current S1 duty	Terminal box	**SINAMICS S120 Motor Module**	
							Rated output current[3] S1 duty	For other versions and components, see SINAMICS S120 drive system
	η	J	m	I_{rated}	I_0		I_{rated}	
	%	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	Type	A	Article No.
1PH8224-..C...	96.2	1.28 (11.3)	580 (1279)	120	128	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8224-..D...	96.5	1.28 (11.3)	580 (1279)	170	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8224-..F...	96.5	1.28 (11.3)	580 (1279)	235	256	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..C...	96.5	1.66 (14.7)	700 (1544)	170	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8226-..D...	96.7	1.66 (14.7)	700 (1544)	215	233	1XB7422-P06	260	**6SL3320-1TE32-6AA3**
1PH8226-..F...	96.6	1.66 (14.7)	700 (1544)	295	320	1XB7700-P02	310[4]	**6SL3320-1TE33-1AA3**
1PH8228-..C...	96.7	2.02 (17.9)	810 (1786)	198	213	1XB7322-P05	200[4]	**6SL312■-1TE32-0AA4**
1PH8228-..D...	96.9	2.02 (17.9)	810 (1786)	260	284	1XB7422-P06	310	**6SL3320-1TE33-1AA3**
1PH8228-..F...	96.6	2.02 (17.9)	810 (1786)	390	427	1XB7700-P02	490	**6SL3320-1TE35-0AA3**
1PH8224-..C2..	95.2	1.28 (11.3)	580 (1279)	178	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8224-..D2..	95.9	1.28 (11.3)	580 (1279)	250	262	1XB7700-P02	260[4]	**6SL3320-1TE32-6AA0**
1PH8224-..F2..	96.3	1.28 (11.3)	580 (1279)	355	367	1XB7700-P02	380	**6SL3320-1TE33-8AA0**
1PH8224-..L2..	95.8	1.28 (11.3)	580 (1279)	335	460	1XB7700-P02	380[4]	**6SL3320-1TE33-8AA0**
1PH8226-..C2..	95.6	1.66 (14.7)	700 (1544)	255	260	1XB7700-P02	260	**6SL3320-1TE32-6AA0**
1PH8226-..D2..	96.2	1.66 (14.7)	700 (1544)	325	330	1XB7700-P02	380	**6SL3320-1TE33-8AA0**
1PH8226-..F2..	96.5	1.66 (14.7)	700 (1544)	440	454	1XB7700-P02	490	**6SL3320-1TE35-0AA0**
1PH8226-..L2..	95.8	1.66 (14.7)	700 (1544)	365	532	1XB7700-P02	490	**6SL3320-1TE35-0AA0**
1PH8228-..C2..	95.8	2.02 (17.9)	810 (1786)	305	306	1XB7700-P02	310	**6SL3320-1TE33-1AA0**
1PH8228-..D2..	96.4	2.02 (17.9)	810 (1786)	395	408	1XB7700-P02	490	**6SL3320-1TE35-0AA0**

Format:	
Booksize	**1**
Chassis	**3**
Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

[3] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz (booksize format) or 2 kHz (chassis format).

[4] The rated output current of the Motor Module is lower than the motor rated current or the motor stall current at 4 kHz or 2 kHz.

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SIMOTICS M-1PH8 with holding brake – Article No. supplement > SH 80 to SH 160 – Forced ventilation/Water cooling

Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	**4**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	**4**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length																				
Synchronous version with holding brake (only shaft heights 132 and 160)[1]									**4**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)										**M**										
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)										**E**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)										**D**										
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)										**F**										
Rated speed (winding version)																				
Cooling / **Degree of protection**																				
Forced ventilation DE → NDE / IP55												**0**								
Forced ventilation NDE → DE / IP55												**1**								
Water cooling / IP55[3]												**2**								
Type of construction																				
IM B5 (IM V1, IM V3)[4]													**2**							
IM B35 (IM V15, IM V35)													**3**							
Shaft extension DE / **Balancing**																				
Plain shaft / –															**0**					
Feather key / Half-key															**2**					
Bearing version / **Vibration severity acc. to Siemens[2]/EN 60034-14** / **Shaft and flange accuracy**																				
Standard / A / N																**A**				
Advanced Lifetime / A / N																**P**				
Power connection[6] (looking at DE) / **Cable entry** / **Signal connection**																				
Terminal box top / Right / DE																	**A**			
Terminal box top / Left / DE																	**B**			
Terminal box top / NDE / Left																	**C**			
Terminal box top / DE / Left																	**D**			
Power connector top[5] / Right / DE																	**E**			
Power connector top[5] / Left / DE																	**F**			
Power connector top[5] / NDE / Left																	**G**			
Power connector top[5] / DE / Left																	**H**			
Version status																		**1**		
Brake versions																				
Brake supply voltage 230 V 1 AC 50/60 Hz / Holding brake DE																				**U60**
Holding brake DE with micro switch																				**U61**
Holding brake DE with manual brake release lever																				**U62**
Holding brake DE with micro switch and manual brake release lever																				**U63**
Brake supply voltage 24 V DC / Holding brake DE																				**U65**
Holding brake DE with micro switch																				**U66**
Holding brake DE with manual brake release lever																				**U67**
Holding brake DE with micro switch and manual brake release lever																				**U68**
Z options that cannot be combined with holding brake DE: K18, V91, M03, M39																				

[1] A U option must also be stated in the order to specify the holding brake version.
Shaft height 132: limited to n_{max} = 4500 rpm.
Shaft height 160: limited to n_{max} = 4000 rpm.

[2] For a definition of the vibration severity according to Siemens, refer to the 1PH8 Motors Configuration Manual.

[3] The degree of protection is limited to IP55 as a result of the holding brake.

[4] Not possible with shaft height 160

[5] Power connector for motor only (not with holding brake):
Power connector for shaft height 132 only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for shaft height 160.

[6] Holding brake can only be connected via terminal box top.

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 132	**1**	**P**	**H**	**8**	**1**	**3**	**.**	**–**	**2**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 160	**1**	**P**	**H**	**8**	**1**	**6**	**.**	**–**	**2**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length																				
Synchronous version without brake									**2**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)										**M**										
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)										**E**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)										**D**										
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)										**F**										
Rated speed (winding version)																				
Cooling / **Degree of protection**																				
Forced ventilation DE → NDE / IP55												**0**								
Forced ventilation NDE → DE / IP55												**1**								
Water cooling / IP65												**2**								
Type of construction																				
IM B3 (IM V5, IM V6)													**0**							
IM B5 (IM V1, IM V3)													**2**							
IM B35 (IM V15, IM V35)													**3**							
Shaft extension DE / **Balancing**																				
Plain shaft / –															**0**					
Feather key / Full-key															**1**					
Feather key / Half-key															**2**					
Bearing version / **Vibration severity acc. to Siemens[1]/EN 60034-14** / **Shaft and flange accuracy**																				
Standard with location bearing / R/A / R																**B**				
Standard with location bearing / S/A / R																**C**				
Standard / R/A / R																**G**				
Standard / S/A / R																**H**				
Increased radial forces / R/A / R																**F**				
Advanced Lifetime[2] / S/A / R																**Q**				
Power connection (looking at DE) / **Cable entry** / **Signal connection**																				
Terminal box top / Right / DE																	**A**			
Terminal box top / Left / DE																	**B**			
Terminal box top / NDE / Left																	**C**			
Terminal box top[4] / DE / Left																	**D**			
Power connector top[3] / Right / DE																	**E**			
Power connector top[3] / Left / DE																	**F**			
Power connector top[3] / NDE / Left																	**G**			
Power connector top[3] / DE / Left																	**H**			
Version status																		**1**		
Special version (order codes required for options)																				**Z**

[1] For definition of the vibration severity according to Siemens, see 1PH8 Motors Configuration Manual.

[2] For 1PH813 limited to n_{max} = 4500 rpm.
For 1PH816 limited to n_{max} = 4000 rpm.

[3] Power connector for 1PH813 only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for 1PH816.

[4] Not possible for 1PH816.

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SIMOTICS M-1PH8 with holding brake – Article No. supplement > SH 180/SH 225 – Forced ventilation/Water cooling

Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	**4**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	**4**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Overall length																				
Synchronous version with holding brake[1]									**4**											
Encoder systems for motors without DRIVE-CLiQ interface																				
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)										**M**										
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)										**E**										
Encoder systems for motors with DRIVE-CLiQ interface																				
Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)										**D**										
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)										**F**										
Rated speed (winding version)																				
Cooling	**Degree of protection**																			
Forced ventilation DE → NDE	IP55											**0**								
Forced ventilation NDE → DE	IP55											**1**								
Water cooling	IP55											**2**								
Type of construction																				
IM B3 (IM B6, IM B7, IM B8)													**0**							
Shaft extension DE	**Balancing**																			
Feather key	Half-key														**2**					
Bearing version	**Vibration severity acc. to Siemens[2]/EN 60034-14**								**Shaft and flange accuracy**											
Standard	A								N							**A**				
Power connection[3] (looking at DE)	**Cable entry**								**Signal connection**											
Terminal box top	Right								DE								**A**			
Terminal box top	Left								DE								**B**			
Terminal box top	NDE								Left								**C**			
Terminal box top	DE								Right								**D**			
Version status																		**1**		
Brake versions																				
Brake supply voltage 230 V 1 AC 50/60 Hz	Holding brake DE with micro switch and manual brake release lever																			**U63**
Z options that cannot be combined with holding brake DE: K18, K90, L03, M39																				

[1] A U option must also be stated in the order to specify the holding brake version.
Shaft height 180: limited to n_{max} = 3500 rpm.
Shaft height 225: limited to n_{max} = 3100 rpm.

[2] For a definition of the vibration severity according to Siemens, refer to the 1PH8 Motors Configuration Manual.

[3] Holding brake can only be connected via terminal box top.

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Selection and ordering data

Position of the Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16		
Shaft height 180	**1**	**P**	**H**	**8**	**1**	**8**	**.**	**–**	**2**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**
Shaft height 225	**1**	**P**	**H**	**8**	**2**	**2**	**.**	**–**	**2**	■	**.**	■	■	**–**	■	■	■	**1**	**–**	**Z**

Overall length

Synchronous version without brake — **2**

Encoder systems for motors without DRIVE-CLiQ interface

Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks (encoder IC2048S/R)	**M**
Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface (encoder AM2048S/R)	**E**

Encoder systems for motors with DRIVE-CLiQ interface

Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit (encoder IC22DQ)	**D**
Absolute encoder 22 bit + 12 bit multi-turn (encoder AM22DQ)	**F**

Rated speed (winding version)

Cooling	**Degree of protection**	
Forced ventilation DE → NDE	IP55	**0**
Forced ventilation NDE → DE	IP55	**1**
Water cooling	IP55	**2**

Type of construction

IM B3 (IM B6, IM B7, IM B8, IM V6)	**0**
IM V5	**1**
IM B5 (IM V3)[1)2)]	**2**
IM B35 (IM V35)[2)]	**3**
IM V15 (Not possible for belt coupling)	**5**

Shaft extension DE	**Balancing**	
Plain shaft	–	**0**
Feather key	Full-key	**1**
Feather key	Half-key	**2**

Bearing version	**Vibration severity acc. to Siemens[3)]/EN 60034-14**	**Shaft and flange accuracy**	
Standard	R/A	R	**B**
Standard	S/A	R	**C**
Increased radial forces	R/A	R	**F**

Power connection (looking at DE)	**Cable entry**	**Signal connection**	
Terminal box top	Right	DE	**A**
Terminal box top	Left	DE	**B**
Terminal box top	NDE	Right	**C**
Terminal box top	DE	Right	**D**

Version status — **1**

Special version (order codes required for options) — **Z**

1) For 1PH818 continuous speed n_{max} = 3000 rpm.
For 1PH822 continuous speed n_{max} = 2500 rpm.

2) For 1PH818 with flange A450.
For 1PH822 with flange A550.

3) For definition of the vibration severity according to Siemens, see 1PH8 Motors Configuration Manual.

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Options

Order code	Description of option When ordering a motor with options, **-Z** must be added to the article number. The order code must also be stated for each required option. Order codes must not be repeated in plain text in the order.	For use with SIMOTICS M motors 1PH813 1PH816	 1PH818 1PH822
A12	Additional PTC thermistor chain for alarm and tripping (Only possible for versions with terminal box.)	✔	✔
A25	Additional KTY84 temperature sensor as reserve connected to signal terminal strip (Only possible for versions with terminal box.)	✔	Standard
B02	Test certificate (for ordered motor)	✔	Standard
G14	Fan unit with air filter (only possible if 11th data position is 1)	✔	✔
K08	Encoder connector or DRIVE-CLiQ mounted opposite	–	✔
K09	Terminal box or power connector NDE on the right (For terminal box type, see selection guides or CAD CREATOR)	✔ 1)	–
	Terminal box NDE on the right, cable entry DE/signal connection at top (only possible if 15th data position is A)	–	✔
K10	Terminal box or power connector NDE on the left (For terminal box type, see selection guides or CAD CREATOR)	✔ 1)	–
	Terminal box NDE on the left, cable entry DE/signal connection at top (only possible if 15th data position is A)	–	✔
K18	Radial shaft sealing ring DE 2) (Not possible if 14th data position is F)	✔	✔
K40	Regreasing system, DE and NDE	–	✔
K45	Anti-condensation heating 230 V AC	–	✔
K80	Axial pipe connection NDE (only possible with forced ventilation)	✔	✔
K83	Rotation of the terminal box by + 90° (only possible in combination with options K09 or K10)	–	✔
K84	Rotation of the terminal box by – 90° (only possible in combination with options K09 or K10)	–	✔
K85	Rotation of the terminal box by + 180° (only possible in combination with options K09 or K10)	–	✔
K90	Version with flange size A400 (only possible if 12th data position is 2, 3 or 5)	–	✔ For 1PH818 only
L00	Replace terminal box (standard) with the next larger terminal box (Note dimension implications, see CAD CREATOR.)	–	✔
P00	Undrilled cable entry plate	–	✔
P01	Cable entry plate 3 × M63 × 1.5 (Only for terminal box type 1XB7700-P02)	–	✔
L03	Increased vibration stress	–	✔
L12	Condensation drain hole	–	✔ 4)
L27	NDE bearing in insulated version	–	✔ For 1PH818 only Standard for 1PH822
L74	Fan version with IP65 degree of protection 3)	✔	–
L75	Special fan version for 400 V 3 AC with IP65 degree of protection 3)	–	✔
M03	Version for potentially explosive atmospheres Zone 2 5)	✔	–
M39	Version for potentially explosive atmospheres Zone 22 5)	✔	–
Q12	M5 sealing air connection	✔	–
Q31	Metal rating plate instead of adhesive label	✔	✔

✔	Option available
–	Option not available

1) A different terminal box type mounted on the side is used in conjunction with options K09 or K10. Instead of gk833, gk843 is used. Only possible with type of construction IM B3 or IM B35.

2) Only appropriate if oil spray or oil vapor is occasionally deposited on the sealing ring.

3) Regardless of the degree of protection, at high levels of atmospheric pollution, the fan must be cleaned.

4) Standard for water-cooled motors.

5) Only with direction of air flow NDE → DE (11th digit in MLFB = 1).

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Options (continued)

Order code	Description of option When ordering a motor with options, **-Z** must be added to the article number. The order code must also be stated for each required option. Order codes must not be repeated in plain text in the order.	For use with SIMOTICS M motors	
		1PH813 1PH816	1PH818 1PH822
U60	Holding brake 230 V	✔	–
U61	Holding brake 230 V with micro switch	✔	–
U62	Holding brake 230 V with manual brake release lever	✔	–
U63	Holding brake 230 V with micro switch and manual brake release lever	✔	✔
U65	Holding brake 24 V DC	✔	–
U66	Holding brake 24 V DC with micro switch	✔	–
U67	Holding brake 24 V DC with manual brake release lever	✔	–
U68	Holding brake 24 V DC with micro switch and manual brake release lever	✔	–
V91	1FT6-compatible shaft extension ($d \times l$: 48 × mm (1.89 in × 82 mm (3.23 in)) (Only possible for 1PH813)	✔	–
Y84	Customer specifications on rating plate (max. 30 characters)	✔	✔
–	Paint finish: Anthracite RAL 7016	Standard	Standard
X01	Paint finish: Jet black RAL 9005	✔	✔
X02	Paint finish: Cream white RAL 9001	✔	✔
X03	Paint finish: Reseda green RAL 6011	✔	✔
X04	Paint finish: Pebble gray RAL 7032	✔	✔
X05	Paint finish: Sky blue RAL 5015	✔	✔
X06	Paint finish: Light ivory RAL 1015	✔	✔
X08	Paint finish: White aluminum RAL 9006	✔	✔
K24	Primer	✔ Pale green	✔ Red brown
K23	Special paint finish "Worldwide" Primer and paint finish in anthracite RAL 7016	✔	✔
K23+X..	Special paint finish "Worldwide" Primer and paint finish can be selected from X01 to X08	✔	✔

✔	Option available
–	Option not available

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SIMOTICS M-1PH8 – Terminal box assignment, max. connectable cross-sections

Configuration

Terminal box type (See selection and ordering data for assignment)	Cable entry Power	External signals	Outer cable diameter, max.[1] mm (in)	Number of main terminals		Cross-section per terminal, max. mm²	Rated current, max.[2] A
gk833	1 × M40 × 1.5	1 × M16 × 1.5[3]	32 (1.26)	Phases:	3 × M6	1 × 35	110
				Grounding:	2 × M6		
gk843	1 × M50 × 1.5	1 × M16 × 1.5[3]	38 (1.50)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk874	1 × M63 × 1.5	1 × M16 × 1.5[3]	42.6 (1.68)	Phases:	3 × M10	2 × 70	240
				Grounding:	2 × M6		
1XB7322-P05	2 × M50 × 1.5	1 × M16 × 1.5[4]	38 (1.50)	Phases:	3 × M12	2 × 50	210
				Grounding:	2 × fixing eyelet		
1XB7422-P06	2 × M63 × 1.5	1 × M16 × 1.5[4]	53 (2.09)	Phases:	3 × M12	2 × 70	270
				Grounding:	2 × fixing eyelet		
1XB7700-P02	3 × M75 × 1.5	1 × M16 × 1.5[4]	68 (2.68)	Phases:	3 × 2 × M12	3 × 150	700
				Grounding:	2 × fixing eyelet		

For terminal box type **1XB7700-P02** other cable entries (power) can be ordered via P options depending on the standard:

P00	Undrilled cable entry plate
P01	Cable entry plate 3 × M63 × 1.5

For terminal box types **1XB7322-P05** and **1XB7422-P06**, another cable entry (power) can be ordered via the P option depending on the standard:

P00	Undrilled cable entry plate

With option **K09** or **K10**, terminal box **gk843** mounted on the side is used instead of terminal box **gk833**.

6

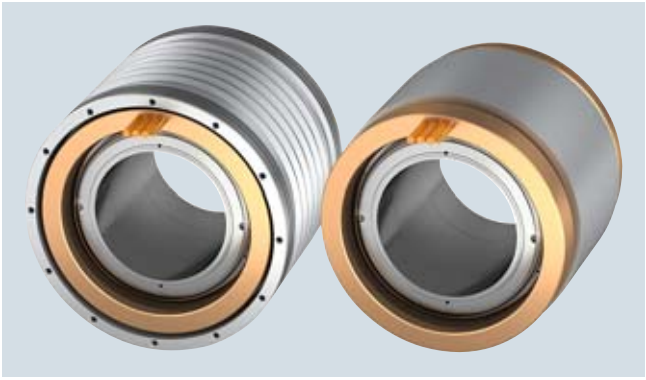
1) Dependent on the design of the metric cable gland.
2) Current-carrying capacity based on EN 60204-1/IEC 60364-5-52 with installation type E.
3) Thread M16 × 1.5 arranged with 90° to signal connection. Thread only for option A12, A25 and 9th data position is A (without encoder).
4) Thread M16 × 1.5 arranged opposite the signal connection (lateral to the cable entry plate); thread only with option A12 and 9th data position (without encoder).

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Overview



SIMOTICS M-1FE1 built-in motors



SIMOTICS M-1FE2 built-in motors

The SIMOTICS M-1FE built-in motors are water-cooled synchronous motors that are supplied as stator and rotor components. When the stator and rotor have been mounted to the spindle in the spindle box, a complete spindle unit is created.

Benefits

- Compact design (e.g. for turning machines and vertical milling machines) by dispensing with mechanical components, such as motor switch armature, belt drive, gearbox and spindle encoder
- High power density thanks to water cooling
- Maximum speeds up to 40000 rpm, torques up to 1530 Nm in S1 duty
- Higher torque – up to 60 % – with the same active component volume, consequently more compact machine design compared to SIMOTICS M-1PH2
- Extremely short ramp-up and braking times (50 %) thanks to higher torque compared to SIMOTICS M-1PH2
- Cold rotor due to excitation using permanent magnets in the lower speed range and lower power losses in the rotor, resulting in reduced bearing temperature rise and spindle expansion
- The stator and rotor are **ready to install**, no finishing is necessary
- The absence of drive transverse forces permits extremely high accuracy on the workpiece thanks to smooth, accurate spindle motion even at very low speeds.
- Larger rotor inner bore than squirrel-cage rotor of asynchronous motors, but with the same outer diameter – of advantage with regard to the bar capacity of automatic turning machines and results in higher spindle stiffness due to larger shaft diameters for milling spindles
- Increased rigidity of the spindle drive, achieved by mounting the motor components between the main spindle bearings
- Less cooling capacity required for the same power compared to SIMOTICS M-1PH2, i.e. greater efficiency
- Only one encoder (hollow-shaft measuring system) for sensing motor speed and spindle position
- Simple servicing by replacing complete motor spindles
- Compatible system of SINUMERIK, SINAMICS S120 and motor, therefore fast commissioning is ensured
- Higher machine productivity:
  The permanently excited motor spindles (PE spindles) increase the power density and economic efficiency of CNC machines. The optimized combination of SIMOTICS M-1FE built-in motor, drive control and CNC offers further opportunities for rationalization, such as shorter workpiece machining times and fewer clamping faces.

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Application

The water-cooled SIMOTICS M-1FE built-in motors are used in combination with the SINAMICS S120 drive system for applications that require the highest quality of machining, accuracy and running smoothness, as well as very short ramp-up times.

There are two main versions of SIMOTICS M-1FE built-in motor available:

- High-Torque series
  6-pole/8-pole and 16-pole synchronous motors are available that have been developed for turning and grinding machines with moderate maximum speeds.
  These motors are characterized by an extremely high torque utilization. In this case, the speed range is approximately 1:2.
- High-Speed series
  This series includes 4-pole synchronous motors for milling applications. These motors are optimized for high maximum speeds and a speed range of over 1:4.

A Voltage Protection Module VPM is required for certain motor types if they are operated up to maximum speed.

Design

The SIMOTICS M-1FE built-in motor comprises:

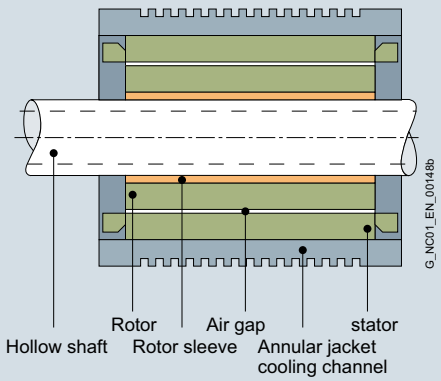
- A laminated, permanent-field rotor, which, as an option, can be designed with a sleeve for simple mounting and removal.
- A wound stator core with cooling jacket and encapsulated winding overhang
  - Free cable ends, length 0.5/1.5 m (1.64 ft/4.92 ft)
  - Two integral PTC thermistors (incl. 1 spare), optionally with full or universal protection
  - A cooling jacket into which the stator has been inserted.

Rotor with sleeve

Torque is transmitted to the spindle mechanically without backlash by means of a cylindrical stepped press fit. The rotor is mounted on the spindle by thermal shrinking.
The rotor with sleeve is pre-balanced and can be removed and subsequently remounted. The bond can be released by pressure-oil injection without affecting the joint surfaces.

Rotor without sleeve

Torque is transmitted to the spindle mechanically without backlash by means of a cylindrical stepped press fit. The rotor is mounted on the spindle by thermal shrinking.
Removal of the rotor is not possible with this type of mounting. Rotors without sleeves are not pre-balanced.



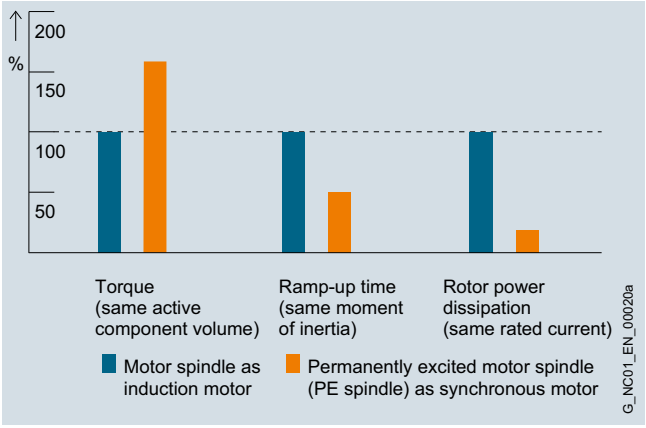
Technical specifications

Product name	SIMOTICS M-1FE built-in motor
Type of machine	Synchronous spindle with permanent-field rotor
Range of constant power	1:2 (6-/8-/16-pole)/1:4 (4-pole)
Recommended coolant inlet temperature, approx.	25 °C (77 °F)
Standard protection temperature monitoring	2 KTY thermistors in the stator winding, 1 x spare
Full protection optional Application example: Machining when motor is stationary	In addition to standard protection 3 × PTC thermistor triplet Evaluation option, e.g. using thermal motor protection: Article No.: 3RN1013-1GW10
Universal protection optional	Full protection + NTC PT3-51F + NTC K227
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a coolant inlet temperature of 25 °C (77 °F)
Type of construction (cf. ISO)	Individual components: Stator, rotor
Degree of protection in accordance with IEC 60034-5	IP00
Balance quality of rotor in accordance with ISO 1940-1	
• Rotor with sleeve	Version specific - Pre-balanced, balance quality G 2.5 Reference speed 3600 rpm - Non-balanced for full balancing after assembly
• Rotor without sleeve	Non-balanced
Encoder system (not included in scope of supply)	Hollow-shaft measuring system with sinusoidal voltage signals 1 V_{pp} and with zero mark
Motor connection	Free cable ends, length 0.5/1.5 m (1.64 ft/4.92 ft)
Rating plate	2 units enclosed separately

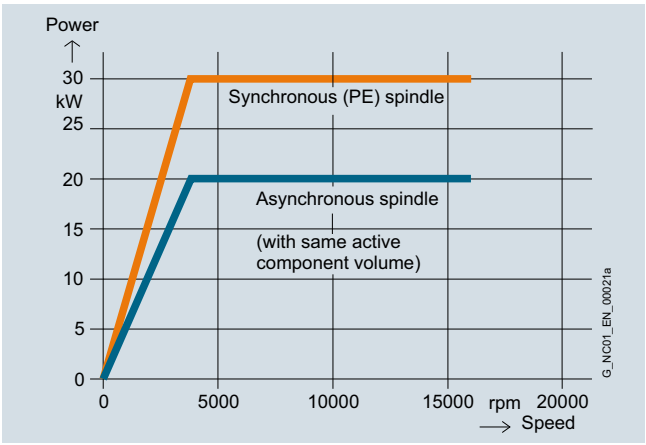
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Characteristic curves

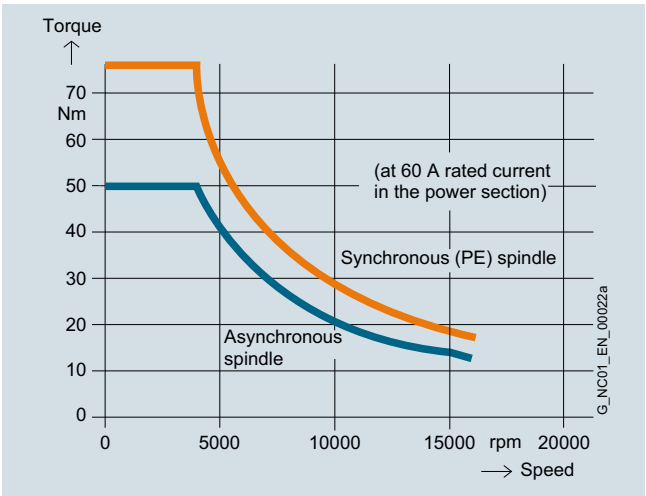
Comparison of synchronous/asynchronous spindles



Advantages of SIMOTICS M-1FE1 synchronous spindle over asynchronous spindle



Comparison of power/speed characteristics



Comparison of torque/speed characteristics

Power/speed and torque/speed characteristics of PE spindles compared to the asynchronous version under the following supplementary conditions: identical active part volume and identical rated current (60 A) of the Motor Module.

More information

For a list of cooling unit manufacturers, please refer to Main spindle motors – Liquid cooling.

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Standard-type SIMOTICS M-1FE1 synchronous built-in motors – Water cooling

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	**SIMOTICS M-1FE1 synchronous built-in motors Standard type**	Moment of inertia rotor without sleeve[8]	Weight, approx. stator + rotor without sleeve
P_{rated}		M_{rated}		n_{rated}	$n_{max,\,Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (HP)	kW (HP)	Nm (lb_f-in)	Nm (lb_f-in)	rpm	rpm	rpm	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High-Torque series – Water cooling – ΔT = 105 K – Line voltage 400 V 3 AC, operation on Active Line Module									
7.4 (9.9)	9.9 (13.28)	4.5 (39.8)	6 (53.1)	15800	18000	18000	**1FE1041-6WM ■ 0 - 1 B A ■**	0.00019 (0.0017)	2.8 (6.2)
4 (5.36)	5.3 (7.11)	4.5 (39.8)	6 (53.1)	8500	13100	18000	**1FE1041-6WU ■ ■ - 1 B A ■**	0.00019 (0.0017)	2.8 (6.2)
14.4 (19.3)	18.3 (24.54)	11 (97.4)	14 (124)	12500	18000	18000	**1FE1042-6WN ■ 0 - 1 B A ■**	0.00033 (0.0029)	6.5 (14.3)
11.5 (15.4)	14.7 (19.7)	11 (97.4)	14 (124)	10000	15000	18000	**1FE1042-6WR ■ ■ - 1 B A ■**	0.00033 (0.0029)	6.5 (14.3)
9.2 (12.34)	11.7 (15.69)	11 (97.4)	14 (124)	8000	12000	18000	**1FE1042-6WT ■ ■ - 1 B A ■**	0.00033 (0.0029)	6.5 (14.3)
8.3 (11.1)	10.4 (13.9)	10 (88.5)	12.4 (110)	8000	15000	15000	**1FE1051-6WK ■ 0 - 1 B ■ ■**	0.00106 (0.0094)	5.5 (12.1)
6.3 (8.5)	7.9 (10.6)	10 (88.5)	12.6 (112)	6000	12300	15000	**1FE1051-6WN ■ ■ - 1 B ■ ■**	0.00106 (0.0094)	5.5 (12.1)
14 (18.8)	18 (24.1)	18 (159)	23 (204)	7500	15000	15000	**1FE1052-6WK ■ 0 - 1 B ■ ■**	0.00195 (0.0173)	8.2 (18.1)
11.5 (15.4)	14.5 (19.4)	20 (177)	25.2 (225)	5500	12300	15000	**1FE1052-6WN ■ ■ - 1 B ■ ■**	0.00195 (0.0173)	8.2 (18.1)
5.7 (7.64)	7.2 (9.66)	18 (159)	23 (204)	3000	6000	14200	**1FE1052-6WY ■ ■ - 1 B ■ ■**	0.00195 (0.0173)	8.2 (18.1)
23 (30.8)	29 (38.89)	37 (327)	46 (407)	6000	12000	12000	**1FE1054-6WN ■ 0 - 1 B ■ ■**	0.0038 (0.0336)	14.3 (31.5)
20.2 (27.09)	28.9 (38.8)	42 (372)	60 (531)	4600	8500	12000	**1FE1054-6WR ■ ■ - 1 B ■ ■**	0.0038 (0.0336)	14.3 (31.5)
11.6 (15.6)	15 (20.1)	13 (115)	17 (151)	8500	12000	12000	**1FE1061-6WH ■ 0 - 1 B ■ ■**	0.00141 (0.0125)	5.5 (12.1)
4.8 (6.44)	6.2 (8.31)	13 (115)	17 (151)	3500	6300	12000	**1FE1061-6WV ■ ■ - 1 B ■ ■**	0.00141 (0.0125)	5.5 (12.1)
4 (5.4)	5.3 (7.1)	13 (115)	17 (151)	3000	5300	10500	**1FE1061-6WY ■ ■ - 1 B ■ ■**	0.00141 (0.0125)	5.5 (12.1)
14 (18.8)	17 (22.8)	23 (204)	28 (230)	5800	9700	12000	**1FE1062-6WQ ■ 1 - 1 B A ■**	0.0028 (0.0025)	7.7 (16.98)
25 (33.5)	36.5 (48.9)	56 (496)	81 (717)	4300	8000	12000	**1FE1064-6WN ■ 1 - 1 B A ■**	0.00553 (0.0489)	14.5 (32)
20 (26.8)	29 (38.9)	56 (496)	81 (717)	3400	6300	10000	**1FE1064-6WQ ■ 1 - 1 B A ■**	0.00553 (0.0489)	14.5 (32)
34 (45.6)	42.5 (56.99)	65 (575)	81 (717)	5000	8500	9000	**1FE1082-6WP ■ ■ - 1 B ■ ■**	0.01048 (0.0927)	14 (30.9)
29.3 (39.3)	36.5 (48.9)	65 (575)	81 (717)	4300	7700	9000	**1FE1082-6WQ 1 1 - 1 B ■ ■**	0.01048 (0.0927)	14 (30.9)
24.5 (32.8)	30 (40.23)	65 (575)	81 (717)	3600	6000	9000	**1FE1082-6WS ■ ■ - 1 B ■ ■**	0.01048 (0.0927)	14 (30.9)
15 (20.1)	18.7 (25.1)	65 (575)	81 (717)	2200	3800	9000	**1FE1082-6WW ■ 1 - 1 B ■ ■**	0.01048 (0.0927)	14 (30.9)
11.6 (15.6)	14.4 (19.31)	65 (575)	81 (717)	1700	3100	8000	**1FE1082-6WE ■ 1 - 1 B ■ ■**	0.01048 (0.0927)	14 (30.9)
35.5 (47.61)	46.5 (62.36)	97 (859)	127 (1124)	3500	5600	9000	**1FE1083-6WP ■ ■ - 1 B ■ ■**	0.016 (0.0142)	24 (52.9)
31 (41.6)	42 (56.3)	130 (1151)	175 (1549)	2300	3800	9000	**1FE1084-6WR ■ 1 - 1 B ■ ■**	0.02067 (0.1829)	30 (66.2)
23.1 (31)	31.1 (41.7)	130 (1151)	175 (1549)	1700	2900	7000	**1FE1084-6WU ■ 1 - 1 B ■ ■**	0.02067 (0.1829)	30 (66.2)
15 (20.1)	19 (25.5)	130 (1151)	174 (1530)	1100	1900	4500	**1FE1084-6WX ■ 1 - 1 B ■ ■**	0.02067 (0.1829)	30 (66.2)
10 (13.4)	13.2 (17.7)	28 (248)	36 (319)	3500	7000	7000	**1FE1091-6WN ■ 0 - 1 B ■ ■**	0.00814 (0.0720)	17 (37.5)
6.3 (8.5)	7.5 (10.1)	30 (266)	36 (319)	2000	4100	7000	**1FE1091-6WS ■ ■ - 1 B ■ ■**	0.00814 (0.0720)	17 (37.5)
24.2 (32.4)	31 (41.6)	66 (584)	85 (752)	3500	7000	7000	**1FE1092-6WN ■ 0 - 1 B ■ ■**	0.01566 (0.1386)	26 (57.3)
22 (29.5)	28.5 (38.2)	66 (584)	85 (752)	3200	5100	7000	**1FE1092-6WR ■ 1 - 1 B ■ ■**	0.01566 (0.1386)	26 (57.3)
36.6 (49.1)	47 (63)	100 (885)	128 (1133)	3500	7000	7000	**1FE1093-6WN ■ 0 - 1 B ■ ■**	0.02317 (0.2051)	36 (79.4)
27.2 (36.48)	34 (45.59)	100 (885)	130 (1140)	2600	4300	7000	**1FE1093-6WS ■ ■ - 1 B ■ ■**	0.02317 (0.2051)	36 (79.4)
16.8 (22.5)	21.5 (28.8)	100 (885)	128 (1133)	1600	3400	7000	**1FE1093-6WV ■ 1 - 1 B ■ ■**	0.02317 (0.2051)	36 (79.4)
15 (20.1)	18 (24.1)	98 (867)	130 (1151)	1460	2500	6300	**1FE1093-6WX ■ 1 - 1 B ■ ■**	0.02317 (0.2051)	36 (79.4)

• Standard protection: 2 × KTY[1]	**1**				
• Full protection: 2 × KTY + 3 × PTC thermistor triplet[2]	**3**				
• Universal protection[3]	**5**				
• Operation without VPM module		**0**			
• Operation with VPM module		**1**			
• Delivery of stator + rotor[1)4)5)]			**1**		
• Stator with cooling jacket[1)7)]				**B**	
• Without rotor sleeve, d_i see dimensions table					**A**
• With rotor sleeve, d^* see dimensions table (only for 1FE1061/1FE108/1FE109)					**B**
• With rotor sleeve, d^{**} see dimensions table (only for 1FE1051/1FE1052/1FE108/1FE109)					**C**
• With rotor sleeve, "d^{**} see dimensions table (only for 1FE1082)					**D**
• Free cable ends, length 1.5 m (4.92 ft)[6]					
Cable outlet at larger outer diameter of cooling jacket					**0**
Cable outlet at smaller outer diameter of cooling jacket (on request)					**1**
• Free cable ends, length 0.5 m (1.64 ft)[6]					
Cable outlet at larger outer diameter of cooling jacket					**2**
Cable outlet at smaller outer diameter of cooling jacket (on request)					**3**

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE104/1FE105/1FE106/1FE1082: Duty cycle time 1 min
Type 1FE1084/1FE109: Duty cycle time 2 min

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system
	I_{rated} S1 A	S6-40 % A		I_{rated} S1 to n_{max} A	Article No.
1FE1041-6WM...	13	17.5	–	30[10]	6SL312 ■-1TE23-0AA.
1FE1041-6WU...	8	11	VPM 120	18[10]	6SL312 ■-■TE21-8AA.
1FE1042-6WN...	24	32	–	45[10]	6SL312 ■-1TE24-5AA.
1FE1042-6WR...	19	26	VPM 120	30[10]	6SL312 ■-1TE23-0AA.
1FE1042-6WT...	16	22	VPM 120	30[10]	6SL312 ■-1TE23-0AA.
1FE1051-6WK...	20	29	–	30[10]	6SL312 ■-1TE23-0AA.
1FE1051-6WN...	15	22	VPM 120	18[10]	6SL312 ■-■TE21-8AA.
1FE1052-6WK...	37	54	–	45[10]	6SL312 ■-1TE24-5AA.
1FE1052-6WN...	30	44	VPM 120	30	6SL312 ■-1TE23-0AA.
1FE1052-6WY...	13.5	20	VPM 120	18	6SL312 ■-■TE21-8AA.
1FE1054-6WN...	60	88	–	60	6SL312 ■-1TE26-0AA.
1FE1054-6WR...	40	58	VPM 120	45[9]	6SL312 ■-1TE24-5AA.
1FE1061-6WH...	21	30	–	30	6SL312 ■-1TE23-0AA.
1FE1061-6WV...	9	13	VPM 120	9[9]	6SL312 ■-1TE21-0AA.
1FE1061-6WY...	8	11.5	VPM 120	9[9]	6SL312 ■-1TE21-0AA.
1FE1062-6WQ...	28.5	36	VPM 120	30[9]	6SL312 ■-1TE23-0AA.
1FE1064-6WN...	56	80	VPM 120	60[9]	6SL312 ■-1TE26-0AA.
1FE1064-6WQ...	43	61	VPM 120	45[9]	6SL312 ■-1TE24-5AA.
1FE1082-6WP...	65	91	VPM 120	85	6SL312 ■-1TE28-5AA.
1FE1082-6WQ...	60	84	VPM 120	60[9]	6SL312 ■-1TE26-0AA.
1FE1082-6WS...	45	62	VPM 120	45[9]	6SL312 ■-1TE24-5AA.
1FE1082-6WW...	30	42	VPM 120	30[9]	6SL312 ■-1TE23-0AA.
1FE1082-6WE...	24	33	VPM 120	30	6SL312 ■-1TE23-0AA.
1FE1083-6WP...	66	92	VPM 120	85	6SL312 ■-1TE28-5AA.
1FE1084-6WR...	60	84	VPM 120	60[9]	6SL312 ■-1TE26-0AA.
1FE1084-6WU...	45	64	VPM 120	45[9]	6SL312 ■-1TE24-5AA.
1FE1084-6WX...	30	42	VPM 120	30[9]	6SL312 ■-1TE23-0AA.
1FE1091-6WN...	24	35	–	30	6SL312 ■-1TE23-0AA.
1FE1091-6WS...	15	19	VPM 120	18	6SL312 ■-■TE21-8AA.
1FE1092-6WN...	58	84	–	60	6SL312 ■-1TE26-0AA.
1FE1092-6WR...	41	58	VPM 120	45	6SL312 ■-1TE24-5AA.
1FE1093-6WN...	83	120	–	85	6SL312 ■-1TE28-5AA.
1FE1093-6WS...	53	76	VPM 120	60	6SL312 ■-1TE26-0AA.
1FE1093-6WV...	43	60	VPM 120	45	6SL312 ■-1TE24-5AA.
1FE1093-6WX...	30	45	VPM 120	30[9]	6SL312 ■-1TE23-0AA.

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

1) Standard scope of supply: Encapsulated winding with 2 × KTY (1 × spare).
2) Full protection option, application example: Load at motor standstill, external tripping unit required: Article No.: 3RN1013-1GW10.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering spare parts: Stator: 1FE1…-…..-2.W.
5) Ordering spare parts: Rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) For moment of inertia with sleeve, see Configuration Manual.
9) Larger Motor Module required for operation without VPM.
10) PWM clock cycle must be increased.

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Standard-type SIMOTICS M-1FE1 synchronous built-in motors – Water cooling

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed with-out VPM, max.	Speed, max.	**SIMOTICS M-1FE1 synchronous built-in motors Standard type**	Moment of inertia rotor without sleeve[8]	Weight, approx. stator + rotor without sleeve
P_{rated}		M_{rated}		n_{rated}	$n_{max,Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (HP)	kW (HP)	Nm (lb_f-in)	Nm (lb_f-in)	rpm	rpm	rpm	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High-Torque series – Water cooling – ΔT = 105 K – Line voltage 400 V 3 AC, operation on Active Line Module									
33 (44.2)	35 (46.9)	150 (1328)	190 (1682)	2100	3300	6500	**1FE1113-6WU ■ 1 - 1 B ■ ■**	0.047 (0.4160)	53 (117)
22 (29.5)	24 (32.2)	150 (1328)	190 (1682)	1400	2300	5700	**1FE1113-6WX ■ 1 - 1 B ■ ■**	0.047 (0.4160)	53 (117)
41.9 (56.2)	53.6 (71.9)	200 (1770)	256 (2270)	2000	4300	6500	**1FE1114-6WR ■ 1 - 1 B ■ ■**	0.06239 (0.5522)	67 (148)
29.3 (39.3)	37.5 (50.3)	200 (1770)	256 (2270)	1400	3400	6500	**1FE1114-6WT ■ 1 - 1 B ■ ■**	0.06239 (0.5522)	67 (148)
20.9 (28.0)	26.8 (35.9)	200 (1770)	256 (2270)	1000	2300	6000	**1FE1114-6WW ■ 1 - 1 B ■ ■**	0.06239 (0.5522)	67 (148)
41.6 (55.8)	45 (60.4)	265 (2345)	340 (3009)	1500	2600	6500	**1FE1115-6WT ■ 1 - 1 B ■ ■**	0.078 (0.690)	81 (179)
29.1 (39.02)	30 (40.23)	265 (2345)	340 (3009)	1050	1800	4500	**1FE1115-6WW ■ 1 - 1 B ■ ■**	0.078 (0.690)	81 (179)
37.7 (50.5)	48.3 (64.8)	300 (2655)	384 (3390)	1200	2800	6500	**1FE1116-6WR ■ 1 - 1 B ■ ■**	0.09285 (0.8218)	92 (203)
28.3 (37.9)	36.2 (48.5)	300 (2655)	384 (3390)	900	2200	5500	**1FE1116-6WT ■ 1 - 1 B ■ ■**	0.09285 (0.8218)	92 (203)
22 (29.5)	28 (37.5)	300 (2655)	384 (3390)	700	1500	4000	**1FE1116-6WW ■ 1 - 1 B ■ ■**	0.09285 (0.8218)	92 (203)
24 (32.18)	24 (32.18)	310 (2670)	410 (3650)	740	1100	3000	**1FE1116-6WY ■ 1 - 1 B ■ ■**	0.09285 (0.8218)	92 (203)
61.3 (82.20)	78 (105)	325 (2850)	440 (3900)	1800	3200	8000	**1FE1143-8WM ■ 1 - 1 B A ■**	0.0859 (0.7603)	74.4 (164)
38.5 (51.63)	47 (63.03)	320 (2900)	440 (3900)	1150	1900	5000	**1FE1143-8WQ ■ 1 - 1 B A ■**	0.0859 (0.7603)	74.4 (164)
63 (84.5)	80 (107)	430 (3806)	610 (5400)	1400	2600	6500	**1FE1144-8WL ■ 1 - 1 B ■ ■**	0.1145 (1.0134)	84.5 (186)
49.5 (66.38)	60 (80.46)	430 (3806)	610 (5400)	1100	2000	4900	**1FE1144-8WQ ■ 1 - 1 B ■ ■**	0.1145 (1.0134)	84.5 (186)
40.5 (54.31)	51 (68.39)	430 (3806)	610 (5400)	900	1700	3800	**1FE1144-8WT ■ 1 - 1 B ■ ■**	0.1145 (1.0134)	84.5 (186)
35.1 (47.07)	40 (53.64)	430 (3806)	610 (5400)	780	1400	3500	**1FE1144-8WV ■ 1 - 1 B ■ ■**	0.1145 (1.0134)	84.5 (186)
104 (139.4)	124 (166)[10]	585 (5188)	795 (7036)[10]	1700	3100	8000	**1FE1145-8WN ■ 1 - 1 B ■ ■**	0.21636 (1.9148)[9]	117 (258)
79.6 (106.7)	97 (130)	585 (5188)	795 (7036)	1300	2400	6000	**1FE1145-8WQ ■ 1 - 1 B ■ ■**	0.21636 (1.9148)[9]	117 (258)
67.4 (90.4)	80 (107)	585 (5188)	795 (7036)	1100	1900	5000	**1FE1145-8WS ■ 1 - 1 B ■ ■**	0.21636 (1.9148)[9]	117 (258)
48 (64.37)	52 (69.73)	585 (5188)	795 (7036)	780	1300	3500	**1FE1145-8WE ■ 1 - 1 B ■ ■**	0.21636 (1.9148)[9]	117 (258)
103 (138.1)	124 (166)[10]	820 (7258)	1110 (9824)[10]	1200	2200	5500	**1FE1147-8WN ■ 1 - 1 B ■ ■**	0.28823 (2.5508)[9]	155 (342)
81.6 (109.4)	97 (130)	820 (7258)	1110 (9824)	950	1700	4200	**1FE1147-8WQ ■ 1 - 1 B ■ ■**	0.28823 (2.5508)[9]	155 (342)
64.4 (86.3)	80 (107)	820 (7258)	1110 (9824)	750	1400	3500	**1FE1147-8WS ■ 1 - 1 B ■ ■**	0.28823 (2.5508)[9]	155 (342)

• Standard protection: 2 × KTY[1]	**1**			
• Full protection: 2 × KTY + 3 × PTC thermistor triplet[2]	**3**			
• Universal protection[3]	**5**			
• Delivery of stator + rotor[1)4)5]		**1**		
• Stator with cooling jacket[1)7]		**B**		
• Without rotor sleeve (only for 1FE111x/1FE1143/1FE1144)			**A**	
• With rotor sleeve, *d** see dimensions table (only for 1FE1114/1FE1116)			**B**	
• With rotor sleeve, *d*** see dimensions table (not for 1FE1113)			**C**	
• With rotor sleeve, "*d*** see dimensions table (only for 1FE1113/1FE1145/1FE1147)			**D**	
• With rotor sleeve, *d*** see dimensions table (only for 1FE1113/1FE1145)			**E**	
• Free cable ends, length 1.5 m (4.92 ft)[6]				
Cable outlet at larger outer diameter of cooling jacket				**0**
Cable outlet at smaller outer diameter of cooling jacket (on request)				**1**
• Free cable ends, length 0.5 m (1.64 ft)[6]				
Cable outlet at larger outer diameter of cooling jacket				**2**
Cable outlet at smaller outer diameter of cooling jacket (on request)				**3**

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE111/1FE114: Duty cycle time 2 min

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system
	I_{rated}			I_{rated}	
	S1	S6-40 %		S1 to n_{max}	
	A	A		A	Article No.
1FE1113-6WU...	60	91	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1113-6WX...	43	62	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1114-6WR...	108	159	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1114-6WT...	84	123	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1114-6WW...	58	85	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1115-6WT...	85	123	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1115-6WW...	60	87	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1116-6WR...	109	160	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1116-6WT...	84	123	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1116-6WW...	60	87	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1116-6WY...	45	65	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1143-8WM...	120	180	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1143-8WQ...	77	113	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1144-8WL...	133	193	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1144-8WQ...	100	146	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1144-8WT...	85	124	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1144-8WV...	71	103	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1145-8WN...	200	290[10)]	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1145-8WQ...	158	230	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1145-8WS...	130	188	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1145-8WE...	85	128	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1147-8WN...	200	290[10)]	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1147-8WQ...	158	230	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1147-8WS...	130	190	VPM 200	132	**6SL312 ■-1TE31-3AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

1) Standard scope of supply: Encapsulated winding with 2 × KTY (1 × spare).
2) Full protection option, application example: Load at motor standstill, external tripping unit required: Article No.: 3RN1013-1GW10.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering spare parts: Stator: 1FE1…-…..-2.W.
5) Ordering spare parts: Rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) For moment of inertia with sleeve, see Configuration Manual.
9) Moment of inertia of rotor with rotor sleeve d**.
10) Note Motor Module limit value.

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Standard-type SIMOTICS M-1FE1 synchronous built-in motors – Water cooling

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	**SIMOTICS M-1FE1 synchronous built-in motors Standard type**	Moment of inertia rotor	Weight, approx. stator + rotor without sleeve
P_{rated}		M_{rated}		n_{rated}	$n_{max, Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (HP)	kW (HP)	Nm (lb_f-in)	Nm (lb_f-in)	rpm	rpm	rpm	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High-Speed series – Water cooling – ΔT = 105 K – Line voltage 400 V 3 AC, operation on Active Line Module									
12.6 (16.9)	17.6 (23.6)	5 (44.3)	7 (62)	24000	40000	40000	**1FE1051-4HC ■ 0 - 1 B A ■**	0.00045 (0.004)	4.1 (9.0)
10 (13.41)	14 (18.8)	5 (44.3)	7 (62)	19000	34100	40000	**1FE1051-4HF ■ 1 - 1 B A ■**	0.00045 (0.004)	4.1 (9.0)
6.5 (8.7)	8 (10.7)	6.5 (57.5)	9 (79.7)	9500	17000	30000	**1FE1051-4WN ■ 1 - 1 B A ■**	0.00057 (0.005)	4.2 (9.3)
31.4 (42.1)	35 (46.9)	12 (106)	15 (133)	25000	40000	40000[9]	**1FE1052-4HD ■ 0 - 1 B A ■**	0.00087 (0.007)	7.15 (15.8)
23.9 (32.0)	29.8 (40.0)	12 (106)	15 (133)	19000	32200	40000[9]	**1FE1052-4HG ■ 1 - 1 B A ■**	0.00087 (0.007)	7.15 (15.8)
17.5 (23.1)	19 (25.5)	13 (115)	17 (150)	12500	20700	30000	**1FE1052-4WK ■ 1 - 1 B A ■**	0.00110 (0.0097)	7.35 (16.2)
11 (15)	12 (16.1)	13 (115)	18 (159)	8000	13100	30000	**1FE1052-4WN ■ 1 - 1 B A ■**	0.00110 (0.0097)	7.35 (16.2)
25.5 (34.2)	32.5 (43.6)	18 (159)	23 (204)	13500	23100	40000[9]	**1FE1053-4HH ■ 1 - 1 B A ■**	0.00128 (0.0113)	10.2 (22.5)
23 (31)	25 (33.5)	20 (177)	27 (239)	11000	14800	30000	**1FE1053-4WJ ■ 1 - 1 B A ■**	0.00163 (0.0144)	10.5 (23.2)
16.5 (22.1)	18 (24.1)	20 (177)	27 (239)	7900	12800	30000	**1FE1053-4WN ■ 1 - 1 B A ■**	0.00163 (0.0144)	10.5 (23.2)
28.5 (38.2)	28.5 (38.2)	28 (248)	40 (354)	9700	17500	24000	**1FE1072-4WH ■ 1 - 1 B A ■**	0.00287 (0.0254)	11.2 (24.7)
20 (26.8))	20 (26.8)	28 (248)	40 (354)	6800	12600	24000	**1FE1072-4WL ■ 1 - 1 B A ■**	0.00287 (0.0254)	11.2 (24.7)
16 (21.5)	16 (21.5)	28 (248)	40 (354)	5500	9900	24000	**1FE1072-4WN ■ 1 - 1 B A ■**	0.00287 (0.0254)	11.2 (24.7)
7.3 (9.79)	8.5 (11.4)	28 (248)	40 (354)	2500	5100	12600	**1FE1072-4WV ■ 1 - 1 B A ■**	0.00287 (0.0254)	11.2 (24.7)
45 (60.35)	45 (60.3)	44 (389)	67 (593)	9700	14800	24000	**1FE1073-4WL ■ 1 - 1 B A ■**	0.0043 (0.0381)	16 (35.3)
30 (40.2)	30 (40.2)	42 (372)	59 (522)	6800	11800	24000	**1FE1073-4WN ■ 1 - 1 B A ■**	0.0043 (0.0381)	16 (35.3)
15 (20.1)	15 (20.1)	45 (398)	64 (566)	3200	5500	14000	**1FE1073-4WT ■ 1 - 1 B A ■**	0.0043 (0.0381)	16 (35.3)
48 (64)	51 (68.4)	60 (531)	86 (761)	7700	13400	20000	**1FE1074-4WM ■ 1 - 1 B A ■**	0.00573 (0.0507)	21 (46.3)
41 (55)	41 (55)	56 (496)	79 (699)	7000	12300	20000	**1FE1074-4WN ■ 1 - 1 B A ■**	0.00573 (0.0507)	21 (46.3)
30 (40.2)	33 (44.3)	60 (531)	85 (752)	4800	8200	20000	**1FE1074-4WR ■ 1 - 1 B A ■**	0.00573 (0.0507)	21 (46.3)
25.8 (34.6)	28 (248)	60 (531)	85 (752)	4100	7200	18000	**1FE1074-4WT ■ 1 - 1 B A ■**	0.00573 (0.0507)	21 (46.3)
23.9 (32.0)	25 (33.5)	60 (531)	80 (708)	3800	6300	15500	**1FE1074-4WV ■ 1 - 1 B A ■**	0.00573 (0.0507)	21 (46.3)
23.6 (31.65)	27 (36.2)	75 (664)	100 (885)	3000	5700	14000	**1FE1075-4WQ ■ 1 - 1 B A ■**	0.00741 (0.0656)	25.5 (45.2)
33 (44.3)	37 (49.6)	42 (372)	55 (487)	7500	16500	20000	**1FE1082-4WF ■ 1 - 1 B A ■**	0.00559 (0.0495)	15.1 (33.3)
24.5 (32.85)	24.5 (32.9)	42 (372)	55 (487)	5600	10700	20000	**1FE1082-4WK ■ 1 - 1 B A ■**	0.00559 (0.0495)	15.1 (33.3)
15.5 (20.8)	15.5 (20.8)	42 (372)	55 (487)	3500	7800	20000	**1FE1082-4WN ■ 1 - 1 B A ■**	0.00559 (0.0495)	15.1 (33.3)
12 (16.09)	12 (16.09)	42 (372)	55 (487)	2700	5900	15000	**1FE1082-4WP ■ 1 - 1 B A ■**	0.00559 (0.0495)	15.1 (33.3)
8.8 (11.8)	8.8 (11.8)	42 (372)	55 (487)	2000	4500	11000	**1FE1082-4WR ■ 1 - 1 B A ■**	0.00559 (0.0495)	15.1 (33.3)
28 (37.5)	28 (37.5)	63 (558)	83 (735)	4200	9600	20000	**1FE1083-4WN ■ 1 - 1 B A ■**	0.00847 (0.0750)	22 (48.5)
38 (51)	38 (51)	84 (743)	110 (974)	4300	9800	20000	**1FE1084-4WN ■ 1 - 1 B A ■**	0.01118 (0.0989)	28.5 (62.9)
35 (46.9)	35 (46.9)	78 (690)	110 (974)	4300	8200	20000	**1FE1084-4WP ■ 1 - 1 B A ■**	0.01118 (0.0989)	28.5 (62.9)
30 (40.2)	30 (40.2)	84 (743)	110 (974)	3400	7600	18000	**1FE1084-4WQ ■ 1 - 1 B A ■**	0.01118 (0.0989)	28.5 (62.9)
26.4 (35.4)	26.4 (35.4)	84 (743)	110 (974)	3000	5900	15000	**1FE1084-4WT ■ 1 - 1 B A ■**	0.01118 (0.0989)	28.5 (62.9)
22.9 (30.71)	23 (30.84)	84 (743)	110 (974)	2600	4900	12000	**1FE1084-4WV ■ 1 - 1 B A ■**	0.01118 (0.0989)	28.5 (62.9)
38 (51)	38 (51)	105 (929)	138 (1221)	3500	7700	18000	**1FE1085-4WN ■ 1 - 1 B A ■**	0.01388 (0.1228)	35 (77.2)
33 (44.3)	33 (44.3)	105 (929)	140 (1239)	3000	6500	16000	**1FE1085-4WQ ■ 1 - 1 B A ■**	0.01388 (0.1228)	35 (77.2)
24 (32.2)	24 (32.2)	105 (929)	140 (1239)	2200	4700	12000	**1FE1085-4WT ■ 1 - 1 B A ■**	0.01388 (0.1228)	35 (77.2)

• Standard protection: 2 × KTY[1]	**1**
• Full protection: 2 × KTY + 3 × PTC thermistor triplet[2]	**3**
• Universal protection[3]	**5**
• Operation without VPM module	**0**
• Operation with VPM module	**1**
• Delivery of stator + rotor[1)4)5)]	**1**
• Stator with cooling jacket[1)7)]	**B**
• Without rotor sleeve	**A**
• Free cable ends, length 1.5 m (4.92 ft)[6]	
Cable outlet at larger outer diameter of cooling jacket	**0**
Cable outlet at smaller outer diameter of cooling jacket (on request)	**1**
• Free cable ends, length 0.5 m (1.64 ft)[6]	
Cable outlet at larger outer diameter of cooling jacket	**2**
Cable outlet at smaller outer diameter of cooling jacket (on request)	**3**

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE105/1FE107: Duty cycle time 1 min
Type 1FE108: Duty cycle time 2 min

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system
	I_{rated} S1 A	S6-40 % A		I_{rated} S1 to n_{max} A	Article No.
1FE1051-4HC...	25	34.5	–	45[8]	**6SL312 ■-1TE24-5AA.**
1FE1051-4HF...	21	29	VPM 120	45[8]	**6SL312 ■-1TE24-5AA.**
1FE1051-4WN...	12	17	VPM 120	18[8]	**6SL312 ■-1TE21-8AA.**
1FE1052-4HD...	57	75	–	132[8]	**6SL312 ■-1TE31-3AA.**
1FE1052-4HG...	44	59	VPM 120	85[8]	**6SL312 ■-1TE28-5AA.**
1FE1052-4WK...	30	39	VPM 120	45[8]	**6SL312 ■-1TE24-5AA.**
1FE1052-4WN...	20	26	VPM 120	30[8]	**6SL312 ■-1TE23-0AA.**
1FE1053-4HH...	46	63	VPM 120	85[8]	**6SL312 ■-1TE28-5AA.**
1FE1053-4WJ...	36	49	VPM 120	45[8]	**6SL312 ■-1TE24-5AA.**
1FE1053-4WN...	29	38	VPM 120	45[8]	**6SL312 ■-1TE24-5AA.**
1FE1072-4WH...	64	96	VPM 120	85[8]	**6SL312 ■-1TE28-5AA.**
1FE1072-4WL...	45	68	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1072-4WN...	36	54	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1072-4WV...	18	26.5	VPM 120	18	**6SL312 ■-1TE21-8AA.**
1FE1073-4WL...	83	124	VPM 120	132[8]	**6SL312 ■-1TE31-3AA.**
1FE1073-4WN...	65	97	VPM 120	85[8]	**6SL312 ■-1TE28-5AA.**
1FE1073-4WT...	30	44	VPM 120	30	**6SL312 ■-1TE23-0AA.**
1FE1074-4WM...	97	144	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1074-4WN...	91	136	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1074-4WR...	58	85	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1074-4WT...	53	77	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1074-4WV...	45	66	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1075-4WQ...	51	75	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1082-4WF...	81	115	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1082-4WK...	55	78	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1082-4WN...	42	60	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1082-4WP...	30	43	VPM 120	30	**6SL312 ■-1TE23-0AA.**
1FE1082-4WR...	24	34	VPM 120	30	**6SL312 ■-1TE23-0AA.**
1FE1083-4WN...	77	110	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1084-4WN...	105	150	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1084-4WP...	79	120	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1084-4WQ...	83	119	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1084-4WT...	60	85	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1084-4WV...	50	71	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1085-4WN...	105	150	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1085-4WQ...	85	120	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1085-4WT...	60	85	VPM 120	60	**6SL312 ■-1TE26-0AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

1) Standard scope of supply: Encapsulated winding with 2 × KTY (1 × spare).
2) Full protection option, application example: Load at motor standstill, external tripping unit required: Article No.: 3RN1013-1GW10.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering spare parts: Stator: 1FE1…-…..-2.W.
5) Ordering spare parts: Rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) PWM clock cycle must be increased.
9) Series reactor required, see Configuration Manual.

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Standard-type SIMOTICS M-1FE1 synchronous built-in motors – Water cooling

Selection and ordering data

Rated power for duty type		Rated torque		Rated speed	Speed without VPM, max.	Speed, max.	**SIMOTICS M-1FE1 synchronous built-in motors Standard type**	Moment of inertia rotor	Weight, approx. stator + rotor without sleeve
P_{rated}		M_{rated}		n_{rated}	$n_{max,\ Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (HP)	kW (HP)	Nm (lb_f-in)	Nm (lb_f-in)	rpm	rpm	rpm	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE1 High-Speed series – Water cooling – ΔT = 105 K – Line voltage 400 V 3 AC, operation on Active Line Module									
16 (21)	16 (21)	45 (398)	60 (531)	3400	7300	18000	**1FE1092-4WP ■ 1 - 1 B R ■**	0.00916 (0.0811)[8]	30 (66.2)
10.5 (14.1)	10.5 (14.1)	50 (443)	64 (566)	2000	4100	10000	**1FE1092-4WV ■ 1 - 1 B R ■**	0.00916 (0.0811)[8]	30 (66.2)
35.3 (47.3)	35 (47.3)	75 (664)	103 (912)	4500	9500	18000	**1FE1093-4WH ■ 1 - 1 B ■ ■**	0.01350 (0.1195)[8]	41.6 (91.7)
27.5 (36.9)	27.5 (36.9)	75 (664)	103 (912)	3500	7200	18000	**1FE1093-4WM ■ 1 - 1 B ■ ■**	0.01350 (0.1195)[8]	41.6 (91.7)
26 (35)	26 (35)	75 (664)	103 (912)	3300	6800	16000	**1FE1093-4WN ■ 1 - 1 B ■ ■**	0.01350 (0.1195)[8]	41.6 (91.7)
46 (62)	46 (62)	100 (885)	137 (1213)	4400	9200	18000	**1FE1094-4WK ■ 1 - 1 B ■ ■**	0.01808 (0.1600)[8]	48.5 (107)
40 (54)	40 (54)	100 (885)	137 (1213)	3800	7600	18000	**1FE1094-4WL ■ 1 - 1 B ■ ■**	0.01808 (0.1600)[8]	48.5 (107)
26 (35)	26 (35)	100 (885)	125 (1106)	2500	5100	13000	**1FE1094-4WS ■ 1 - 1 B ■ ■**	0.01808 (0.1600)[8]	48.5 (107)
18 (24)	18 (24)	95 (841)	119 (1053)	1800	3900	10000	**1FE1094-4WU ■ 1 - 1 B ■ ■**	0.01808 (0.1600)[8]	48.5 (107)
46 (62)	46 (62)	125 (1106)	171 (1514)	3500	7300	18000	**1FE1095-4WN ■ 1 - 1 B ■ ■**	0.02242 (0.1984)[8]	56.8 (125)
52 (70)	52 (70)	150 (1328)	206 (1823)	3300	6800	16000	**1FE1096-4WN ■ 1 - 1 B ■ ■**	0.02700 (0.2390)[8]	64.2 (142)
38.5 (51.6)	45 (60)	102 (903)	142 (1257)	3600	7200	16000	**1FE1103-4WN ■ 1 - 1 B A ■**	0.01589 (0.1406)	34 (75)
35 (47)	38 (50.96)	100 (885)	130 (1150)	3300	6200	15000	**1FE1103-4WQ ■ 1 - 1 B A ■**	0.01589 (0.1406)	34 (75)
26 (35)	29 (38.89)	100 (885)	130 (1150)	2500	4700	12000	**1FE1103-4WT ■ 1 - 1 B A ■**	0.01589 (0.1406)	34 (75)
75 (101)	75 (101)	136 (1204)	175 (1549)	5300	9300	16000	**1FE1104-4WL ■ 1 - 1 B A ■**	0.02098 (0.1857)	42.5 (93.7)
54 (72)	64 (86)	136 (1204)	189 (1600)	3800	7700	16000	**1FE1104-4WN ■ 1 - 1 B A ■**	0.02098 0.1857)	42.5 (93.7)
53.4 (71.6)	64 (86)	170 (1505)	236 (2089)	3000	6100	16000	**1FE1105-4WN ■ 1 - 1 B A ■**	0.02608 (0.2309)	52 (115)
46.3 (62.1)	55 (73.76)	170 (1505)	230 (2036)	2600	4900	12200	**1FE1105-4WQ ■ 1 - 1 B A ■**	0.02608 (0.2309)	52 (115)
41 (55.0)	44 (59)	170 (1505)	230 (2036)	2300	4300	10500	**1FE1105-4WS ■ 1 - 1 B A ■**	0.02608 (0.2309)	52 (115)
72.6 (97.3)	85 (114)	204 (1806)	283 (2505)	3400	6900	16000	**1FE1106-4WN ■ 1 - 1 B A ■**	0.03147 (0.2785)	61.5 (136)
62 (83)	66 (89)	204 (1806)	270 (2390)	2900	5400	14000	**1FE1106-4WR ■ 1 - 1 B A ■**	0.03147 (0.2785)	61.5 (136)
56.5 (75.7)	60 (80)	200 (1770)	270 (2390)	2700	5100	12500	**1FE1106-4WS ■ 1 - 1 B A ■**	0.03147 (0.2785)	61.5 (136)
25 (34)	30 (40)	200 (1770)	270 (2390)	1200	2500	6000	**1FE1106-4WY ■ 1 - 1 B A ■**	0.03147 (0.2785)	61.5 (136)
63 (85)	75 (101)	200 (1770)	275 (2434)	3000	6100	14000	**1FE1124-4WN ■ 1 - 1 B A ■**	0.05112 (0.4524)	62.6 (138)
52.4 (70.3)	55.9 (84.96)	200 (1770)	275 (2434)	2500	4900	12000	**1FE1124-4WQ ■ 1 - 1 B A ■**	0.05112 (0.4524)	62.6 (138)
78.5 (105)	90 (121)	250 (2213)	345 (3054)	3000	5800	14000	**1FE1125-4WN ■ 1 - 1 B A ■**	0.06337 (0.5608)	76 (168)
65.5 (87.8)	82 (110)	250 (2213)	345 (3054)	2500	5300	12500	**1FE1125-4WP ■ 1 - 1 B A ■**	0.06337 (0.5608)	76 (168)
57.6 (77.2)	65 (87.17)	250 (2213)	345 (3054)	2200	4200	10000	**1FE1125-4WQ ■ 1 - 1 B A ■**	0.06337 (0.5608)	76 (168)
94 (126)	112 (150)[9]	300 (2655)	410 (3629)[9]	3000	6100	14000	**1FE1126-4WN ■ 1 - 1 B A ■**	0.07604 (0.6729)	90 (198)
78.5 (105)	100 (134)[9]	300 (2655)	410 (3629)[9]	2500	5400	12500	**1FE1126-4WP ■ 1 - 1 B A ■**	0.07604 (0.6729)	90 (198)
63 (85)	82 (110)	300 (2655)	410 (3629)	2000	4400	10000	**1FE1126-4WQ ■ 1 - 1 B A ■**	0.07604 (0.6729)	90 (198)

• Standard protection: 2 × KTY[1]	**1**
• Full protection: 2 × KTY + 3 × PTC thermistor triplet[2]	**3**
• Universal protection[3]	**5**
• Delivery of stator + rotor[1)4)5]	**1**
• Stator with cooling jacket[1)7]	**B**
• Without rotor sleeve	**A**
• Without rotor sleeve, d_i = 80 mm (3.15 in) for 1FE109.-4W... only	**R**
• Free cable ends, length 1.5 m (4.92 ft)[6]	
Cable outlet at larger outer diameter of cooling jacket	**0**
Cable outlet at smaller outer diameter of cooling jacket (on request)	**1**
• Free cable ends, flexible, length 0.5 m (4.92 ft)[6] (preferred variant)	
Cable outlet at larger outer diameter of cooling jacket	**2**
Cable outlet at smaller outer diameter of cooling jacket (on request)	**3**

S1 = Continuous duty
S6 = Intermittent duty:
Type 1FE109/1FE110/1FE112: Duty cycle time 2 min

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Motor type (repeated)	Rated current for duty type		Voltage Protection Module (VPM)	SINAMICS S120 Motor Module	
				Required rated current	Booksize format For other versions and components, see SINAMICS S120 drive system
	I_{rated}			I_{rated}	
	S1	S6-40 %		S1 to n_{max}	
	A	A		A	Article No.
1FE1092-4WP...	41	58	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1092-4WV...	24	35	VPM 120	30	**6SL312 ■-1TE23-0AA.**
1FE1093-4WH...	83	120	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1093-4WM...	64	92	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1093-4WN...	60	86	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1094-4WK...	108	156	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1094-4WL...	90	130	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1094-4WS...	60	85	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1094-4WU...	45	64	VPM 120	45	**6SL312 ■-1TE24-5AA.**
1FE1095-4WN...	108	156	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1096-4WN...	120	173	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1103-4WN...	84	127	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1103-4WQ...	68	98	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1103-4WT...	53	75	VPM 120	60	**6SL312 ■-1TE26-0AA.**
1FE1104-4WL...	140	200	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1104-4WN...	120	181	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1105-4WN...	120	180	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1105-4WQ...	95	135	VPM 120	132	**6SL312 ■-1TE31-3AA.**
1FE1105-4WS...	84	120	VPM 120	85	**6SL312 ■-1TE28-5AA.**
1FE1106-4WN...	159	240	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1106-4WR...	128	184	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1106-4WS...	120	170	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1106-4WY...	60	85	VPM 200	60	**6SL312 ■-1TE26-0AA.**
1FE1124-4WN...	135	198	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1124-4WQ...	110	162	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1125-4WN...	162	240	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1125-4WP...	147	215	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1125-4WQ...	116	169	VPM 200	132	**6SL312 ■-1TE31-3AA.**
1FE1126-4WN...	200	295[9]	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1126-4WP...	180	265[9]	VPM 200	200	**6SL312 ■-1TE32-0AA.**
1FE1126-4WQ...	147	215	VPM 200	200	**6SL312 ■-1TE32-0AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

1) Standard scope of supply: Encapsulated winding with 2 × KTY (1 × spare).
2) Full protection option, application example: Load at motor standstill, external tripping unit required: Article No.: 3RN1013-1GW10.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering spare parts: Stator: 1FE1…-…..-2.W.
5) Ordering spare parts: Rotor: 1FE1…-…..-3W..
6) For cable design, see Configuration Manual.
7) Stator without cooling jacket on request.
8) For moment of inertia for version R without rotor sleeve d_i = 80 mm (3.15 in), see Configuration Manual.
9) Note Motor Module limit value.

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Standard-type SIMOTICS M-1FE2 synchronous built-in motors – Water cooling

Selection and ordering data

Rated power for duty type		Rated torque	Torque at low speeds for duty type	Rated speed	Speed without VPM, max.	Speed, max.	**SIMOTICS M-1FE2 synchronous built-in motors**	Moment of inertia rotor with C sleeve	Weight, stator with cooling jacket
P_{rated}		M_{rated}		n_{rated}	$n_{max,Inv}$	n_{max}		J	m
S1	S6-40 %	S1	S6-40 %						
kW (HP)	kW (HP)	Nm (lb_f-in)	Nm (lb_f-in)	rpm	rpm	rpm	Article No.	kgm^2 (lb_f-in-s^2)	kg (lb)
SIMOTICS M-1FE2 High-Torque series – Water cooling – ΔT = 100 K – Line voltage 400 V 3 AC, operation on Active Line Module									
68 (91.2)	85.9 (115)	640 (5665)	916 (8108)	1000	2000	4200	**1FE2182-8LH ■■-■■C 0**	0.75 (6.64)	110 (243)
34 (45.6)	40.8 (54.7)	650 (5665)	925 (8187)	500	1000	2400	**1FE2182-8LN ■■-■■C 0**	0.75 (6.64)	110 (243)
88 (118)	110 (147.5)	840 (7435)	1190 (10533)	1000	2000	4200	**1FE2183-8LH ■■-■■C 0**	0.9 (7.97)	130 (287)
44.5 (59.7)	52.4 (70.3)	840 (7435)	1197 (10595)	500	1000	2400	**1FE2183-8LN ■■-■■C 0**	0.9 (7.97)	130 (287)
105 (141)	130.9 (176)	1000 (8850)	1425 (12613)	1000	2000	4200	**1FE2184-8LH ■■-■■C 0**	1.05 (9.29)	150 (331)
85 (114)	106.4 (143)	1010 (8940)	1437 (12719)	800	1600	4010	**1FE2184-8LK ■■-■■C 0**	1.05 (9.29)	150 (331)
53 (71.1)	62.8 (84.2)	1010 (8940)	1437 (12719)	500	1000	2400	**1FE2184-8LN ■■-■■C 0**	1.05 (9.29)	150 (331)
122 (164)	149.7 (201)	1160 (10267)	1653 (14631)	1000	1900	4200	**1FE2185-8LH ■■-■■C 0**	1.2 (10.62)	170 (375)
87 (117)	106.3 (143)	1180 (10444)	1665 (14737)	700	1400	3440	**1FE2185-8LL ■■-■■C 0**	1.2 (10.62)	170 (375)
62 (83.1)	73.8 (99.0)	1180 (10444)	1646 (14569)	500	1000	2420	**1FE2185-8LN ■■-■■C 0**	1.2 (10.62)	170 (375)
142 (190)	171.7 (230)	1350 (11949)	1932 (17100)	1000	1900	4200	**1FE2186-8LH ■■-■■C 0**	1.35 (11.95)	190 (419)
86 (115)	104.9 (141)	1370 (12126)	1936 (17136)	600	1200	3000	**1FE2186-8LM ■■-■■C 0**	1.35 (11.95)	190 (419)
72 (96.6)	84.8 (114)	1370 (12126)	1941 (17180)	500	1000	2400	**1FE2186-8LN ■■-■■C 0**	1.35 (11.95)	190 (419)
159 (351)	193.7 (427)	1510 (13365)	2151 (19039)	1000	1900	4200	**1FE2187-8LH ■■-■■C 0**	1.49 (13.19)	210 (463)
80 (107)	100 (134)	1530 (13542)	2156 (19083)	500	1100	2670	**1FE2187-8LN ■■-■■C 0**	1.49 (13.19)	210 (463)

Winding protection				
• Standard protection 2 × KTY[1)]	**1**			
• Full protection: 2 × KTY + 3 × PTC thermistor triplet[2)]	**3**			
• Universal protection[3)]	**5**			
Type of connection (cable outlet[6)])				
• Cable outlet large outer diameter or "Without cooling jacket"		**0**		
• Cable outlet small outer diameter		**1**		
Delivery				
• Delivery of stator + rotor[1)4)5)7)]			**1**	
Stator				
• Stator without cooling jacket				**A**
• Stator with cooling jacket				**C**
Rotor				
• Standard rotor sleeve				**C**

S1 = Continuous duty
S6 = Intermittent duty

Additional options
Z = X15 ... cable length 1.5 m (4.92 ft)[8)]
Z = T00 ... Rotor pre-balanced

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Motor type (repeated)	Rated current for duty type		**Voltage Protection Module (VPM)**	**SINAMICS S120 Motor Module**		
				Quantity Motor Modules	Required rated current	**Booksize format** For other versions and components, see SINAMICS S120 drive system
	I_{rated} S1 A	S6-40 % A			I_{rated} S1 to n_{max} A	Article No.
1FE2182-8LH...	145	214	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2182-8LN...	73	108	VPM 120	1	85	**6SL312 ■ -1TE28-5AA.**
1FE2183-8LH...	189	278	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2183-8LN...	95	140	VPM 200	1	132	**6SL312 ■ -1TE31-3AA.**
1FE2184-8LH...	225	333	2 × VPM 200	2	2 × 132	**6SL312 ■ -1TE31-3AA.**
1FE2184-8LK...	190	280	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2184-8LN...	114	168	VPM 200	1	132	**6SL312 ■ -1TE31-3AA.**
1FE2185-8LH...	250	368	2 × VPM 200	2	2 × 132	**6SL312 ■ -1TE31-3AA.**
1FE2185-8LL...	189	278	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2185-8LN...	132	194	VPM 200	1	132	**6SL312 ■ -1TE31-3AA.**
1FE2186-8LH...	290	424	2 × VPM 200	2	2 × 200	**6SL312 ■ -1TE32-0AA.**
1FE2186-8LM...	192	283	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2186-8LN...	154	227	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**
1FE2187-8LH...	325	479	2 × VPM 200	2	2 × 200	**6SL312 ■ -1TE32-0AA.**
1FE2187-8LN...	190	280	VPM 200	1	200	**6SL312 ■ -1TE32-0AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**

6

1) Standard scope of supply: Impregnated winding with 2 × KTY (1 × reserve).
2) Full protection option, application example: Load at motor standstill, external tripping unit required: Article No.: 3RN1013-1GW10.
3) Universal protection option: Full protection + NTC PT3-51F + NTC K227.
4) Ordering spare parts: Stator: 1FE2…-…..-2...
5) Ordering spare parts: Rotor: 1FE2…-…..-3...
6) For cable design, see Configuration Manual, standard cable length = 0.5 m (1.64 ft).
7) Standard rotor is not pre-balanced.
8) Not for 1FE2187-8LH.

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SIMOTICS M-1PH2 asynchronous built-in motors for direct drive – Water cooling

Overview



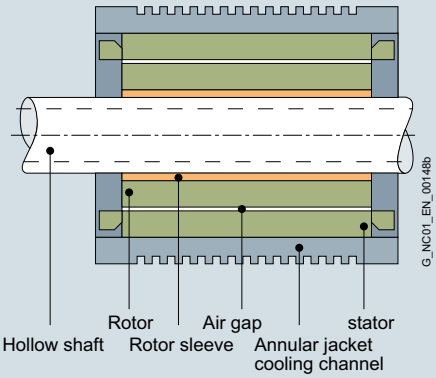
Active parts (rotor and stator) of SIMOTICS M-1PH2 asynchronous built-in motors

SIMOTICS M-1PH2 built-in motors for turning machines are liquid-cooled squirrel-cage AC asynchronous motors. These built-in motors have been specially developed for variable-speed operation of main spindles on turning machines.

Benefits

- Compact design obtained by dispensing with mechanical components such as coupling, belt drive, gearbox and spindle encoder
- High power density as a result of liquid cooling
- The absence of drive transverse forces permits extremely high accuracy on the workpiece thanks to smooth, accurate spindle motion even at very low speeds.
- Extremely short ramp-up and braking times
- Full rated torque is continuously available, even at standstill
- Simple servicing by replacing complete motor spindles
- Increased rigidity of the spindle drive, achieved by mounting the motor components between the main spindle bearings
- C-axis compatibility with hollow-shaft measuring system mounted on the spindle
- Low noise emissions due to absence of machine elements
- Torque is transmitted to the spindle mechanically without backlash by means of a cylindrical stepped press fit. The rotor is mounted on the spindle by thermal shrinking. The bond can be released by pressure-oil injection without affecting the joint surfaces.
- The rotor with sleeve is pre-balanced and can be removed and subsequently reinstalled.
- The rotor with sleeve is finished-machined, i.e. the rotor outer diameter need not be finished after mounting.

Design



Application

SIMOTICS M-1PH2 built-in motors are used for machines requiring an extremely high standard of machining quality, accuracy and running smoothness

- Turning machines
- Grinding machines

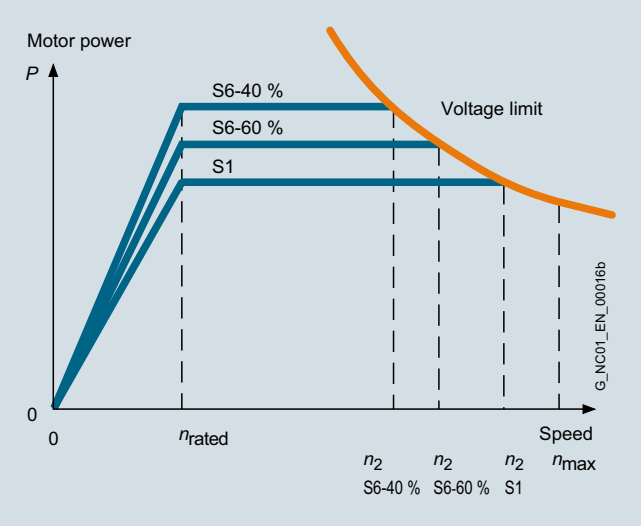
Technical specifications

Product name	SIMOTICS M-1PH2 built-in motor
Coolant inlet temperature	Because of the formation of condensation, we recommend a coolant inlet temperature of approx. 25 °C (77 °F), depending on the ambient conditions.
Cooling water pressure at inlet, max.	7 bar
Coolant flow rate (water)	8 l/min (2.11 U.S. gallons/min.)
Connection thread	Dependent on cooling unit used
Temperature monitoring	2 KTY 84 temperature sensors in the stator winding, 1 × as reserve
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a coolant inlet temperature up to 25 °C (77 °F)
Recommended motor encoder	Hollow-shaft measuring system (not included in scope of supply)
Type of construction (cf. ISO)	Individual components: Stator, rotor
Motor connection type	Free cable ends with length of 0.5 m (19.7 in) or 1.5 m (59.1 in)
Balance quality of rotor in accordance with ISO 1940-1	1PH2093 to 1PH2118: G 2.5 reference speed 3600 rpm
Degree of protection in accordance with IEC 60034-5	IP00
Rating plate	1 unit enclosed separately

Refer to Liquid cooling for a list of cooling unit manufacturers.

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Characteristic curves



Typical speed/power graph for AC motors[1)]

The graph shows the typical relationship between motor speed and drive power for SIMOTICS M-1PH2 motors for the following duty types in accordance with IEC 60034-1:

S1: Continuous duty

S6: Continuous duty with intermittent load and a relative duty factor of 60 % (S6-60 %) or 40 % (S6-40 %) with a maximum duty cycle time of 10 minutes.

SIMOTICS M-1PH2 built-in motor	Rated speed	Attainable speed at rated power in duty type		
Type	n_{rated}	n_2[2)] S1	S6-60 %	S6-40 %
	rpm	rpm	rpm	rpm
1PH2093	1500	4700	4200	3900
1PH2095		4000	3600	3300
1PH2113	1500	5400	4800	4400
1PH2115		4500	4100	3700
1PH2117		4700	4200	3800
1PH2118		5000	4500	4100

1) For further configuration information, see the SIMOTICS M-1PH2 Motors Configuration Manual.

2) Values indicated by the speed/power graph are valid in systems with an Active Line Module and a 400 V 3 AC supply system.
If you are using a Smart Line Module, proceed in accordance with the SIMOTICS M-1PH2 Motors Configuration Manual.

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SIMOTICS M-1PH2 asynchronous built-in motors for direct drive – Water cooling

Selection and ordering data

Rated speed	Speed, max.	Rated power for duty type[1]				SIMOTICS M-1PH2 asynchronous built-in motor for direct drive Standard type	Rated torque[1]	
n_{rated}	n_{max}	P_{rated} S1	S1 ΔT=105 K	S6-60 %	S6-40 %		M_{rated}	ΔT=105 K
rpm	rpm	kW (HP)	kW (HP)	kW (HP)	kW (HP)	Article No.	Nm (lb_f-ft)	Nm (lb_f-ft)
1PH2 water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	10000	7.5 (10.1)	9.4 (12.6)	8.2 (11.0)	9 (12.1)	**1PH2093-6WF4■**	48 (35.4)	60 (44.3)
		10.1 (13.5)	13 (17.4)	11 (14.8)	12 (16.1)	**1PH2095-6WF4■**	64 (47.2)	83 (61.2)
1500	10000	15.1 (20.2)	18.5 (24.8)	17 (22.8)	19 (25.5)	**1PH2113-6WF4■**	95 (70.1)	118 (87.0)
		16.5 (22.1)	21.5 (28.8)	18.5 (24.8)	21 (28.2)	**1PH2115-6WF4■**	105 (77.4)	137 (101)
		18.1 (24.3)	23.7 (31.8)	20.5 (27.5)	23 (30.8)	**1PH2117-6WF4■**	115 (84.8)	151 (111)
		23.6 (31.6)	30.9 (41.4)	26.0 (34.9)	29.5 (39.6)	**1PH2118-6WF4■**	146 (108)	197 (145)

Free cable ends:	
Length: 1.5 m (59.1 in)	**1**
Length: 0.5 m (19.7 in) (preferred type)	**2**

[1] Data for ΔT = 70 K unless otherwise specified.

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Motor type (repeated)	Moment of inertia of rotor	Weight (rotor and stator), approx.	Rated current for duty type[1]			SINAMICS S120 Motor Module	
						Required rated output current for duty type S1	**Booksize format** For other versions and components, see Chapter SINAMICS S120 drive system
	J	m	I_{rated}			I_{rated}	
			S1	S6-60 %	S6-40 %		
	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A	A	A	Article No.
1PH2093-6W...	0.028 (0.25)	33 (72.8)	24	26	28	30	**6SL312■-1TE23-0AA.**
1PH2095-6W...	0.036 (0.32)	42 (92.6)	30	32	34	30	**6SL312■-1TE23-0AA.**
1PH2113-6W...	0.066 (0.58)	51 (112)	56	61	67	60	**6SL312■-1TE26-0AA.**
1PH2115-6W...	0.073 (0.65)	56 (123)	55	60	66	60	**6SL312■-1TE26-0AA.**
1PH2117-6W...	0.079 (0.70)	62 (137)	60	67	74	60	**6SL312■-1TE26-0AA.**
1PH2118-6W...	0.100 (0.89)	78 (172)	82	90	100	85	**6SL312■-1TE28-5AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

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VPM Voltage Protection Module

Overview



The voltage protection function is deployed on 1FE motors and on the synchronous version of 2SP1 motor spindles with an EMF of $\hat{U}$ > 820 V to 2000 V (U_{rms} 570 V to 1400 V) in order to limit the DC link voltage in the drive system in the event of a fault.

If the line voltage fails with the motor operating at maximum speed, or if the drive system pulses are suppressed as a result of a line voltage failure, the synchronous motor feeds energy at high voltage back into the DC link.

The VPM detects that the DC link voltage is too high (DC > 820 V) and shorts the three motor feeder cables in order to brake the motor. The residual motor energy is converted to heat via the short circuit in the VPM and motor.

Integration

The VPM can be operated in conjunction with SINAMICS S120, with 1FE motors and with 2SP1 motor spindles.

The VPM must be installed between the motor and drive system (maximum distance from drive system 1.5 m (4.92 ft). Shielded 6FX8 motor feeder cables must be used when a VPM is installed.

Requirements for operation of 1FE/2SP1 motors with SINAMICS S120:

- SINAMICS S120
- SINUMERIK 840D sl, SW version 1.3 and higher

Technical specifications

Article No.	6SN1113-1AA00-1JA1	6SN1113-1AA00-1KA1	6SN1113-1AA00-1KC1
Product name	Voltage Protection Module		
Product type designation	VPM 120	VPM 200	VPM 200 DYNAMIK
Rated current, perm.	120 A	200 A	200 A
Short-circuit current, perm.	90 A	200 A	200 A
Degree of protection in accordance with EN 60529 (IEC 60529)	IP20	IP20	IP20
Humidity class based on EN 60721-3-3	Class 3K3 condensation and icing excluded. Low air temperature 0 °C (32 °F)		
Ambient temperature			
• Storage	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)
• Transport	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)	-25 ... +55 °C (-13 ... +131 °F)
• Operation	0 … 55 °C (32 ... 131 °F)	0 … 55 °C (32 ... 131 °F)	0 … 55 °C (32 ... 131 °F)
Dimensions			
• Height	300 mm (11.81 in)	300 mm (11.81 in)	300 mm (11.81 in)
• Width	150 mm (5.91 in)	250 mm (9.84 in)	250 mm (9.84 in)
• Depth	180 mm (7.09 in)	190 mm (7.48 in)	260 mm (10.24 in)
Weight, approx.	6 kg (13.23 lb)	11 kg (24.3 lb)	12 kg (26.5 lb)
Certificate of suitability	cULus	cULus	cULus

Selection and ordering data

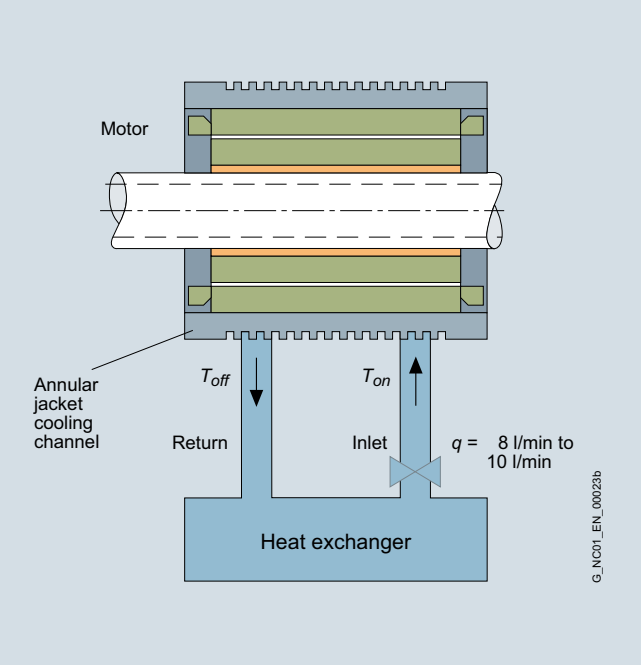
Description	Article No.
Voltage Protection Module	
• VPM 120	**6SN1113-1AA00-1JA1**
• VPM 200	**6SN1113-1AA00-1KA1**
• VPM 200 DYNAMIK For large cable cross-sections up to 50 mm^2	**6SN1113-1AA00-1KC1**

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Overview

Cooling principle

For design of the cooling units, see Configuration Manual.



Liquid cooling

These are non-Siemens products whose fundamental suitability is familiar to us. It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or dictates. We do not warrant the composition, nature, state or quality of non-Siemens products.

Please get in touch with the contact persons of the cooler manufacturers listed below for technical information.

Cooler manufacturers
ait-deutschland GmbH www.kkt-chillers.com
BKW Kälte-Wärme-Versorgungstechnik GmbH www.bkw-kuema.de
DELTATHERM Hirmer GmbH www.deltatherm.com
Glen Dimplex Deutschland GmbH **RIEDEL Kältetechnik Division** www.riedel-cooling.com
Helmut Schimpke und Team Industriekühlanlagen GmbH + Co. KG www.schimpke.com
Hydac System GmbH www.hydac.com
Hyfra Industriekühlanlagen GmbH www.hyfra.com
Pfannenberg GmbH www.pfannenberg.com

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2SP1 motor spindles

Overview



The 2SP1 motor spindle product range comprises compact standard motor spindles for milling machines that can be used as an alternative to belt-driven spindles for rough cutting and precise fine machining applications.

The 2SP1 motor spindle contains all the classical elements of a motor spindle, such as a tool interface, tool clamping and release mechanism, spindle bearings suitable for absorbing the machining forces, water-cooled drive motor, spindle casing for fixing and sensors for indexing and monitoring tool changeover.

The motor spindles are available in 2 diameters of 200 mm (7.87 in) (2SP120) and 250 mm (9.84 in) (2SP125) and are offered with a range of different torques and speeds to match the respective milling machine family. The motor spindles are ideally matched to the performance levels of SINAMICS S120.

The complete product range of 2SP1 motor spindles was developed in cooperation with and is manufactured at Weiss Spindeltechnologie GmbH.

Benefits

The 2SP1 motor spindles offer the following important user benefits over conventional belt-driven solutions:

- Compact spindle solution and everything integrated in the spindle box
- Fewer components and easy installation
- Economical standard solution as compared with today's belt-driven solutions
- Drive train with high degree of rigidity
- High torque and speed and therefore high productivity thanks to high cutting efficiency and reduction of non-productive time
- Higher speed and shorter start-up times as compared with conventional belt-driven or gear solutions
- Economical pneumatic tool release mechanism or optional fast hydraulic tool release mechanism
- Worldwide system delivery including spindle mechanics from a single source – from Siemens
- Extremely short tool change times with 2SP210 thanks to 2-channel technology and clamping set with optional latching capability

Application

The main application area for 2SP1 motor spindles are main spindles for milling machines and machining centers in the job shop area of the machine tools sector.

The 2SP120 motor spindles are particularly suitable for the area of light metal machining at low torque and high speeds.

The 2SP125 motor spindles are characterized by a high torque. The main area of application is in the machining of steel and castings.

Design

A key feature of 2SP1 motor spindles is their rugged design.

Depending on the version, the following options are available for 2SP1 motor spindles:

- Various tool interfaces
- Internal tool cooling
- External tool cooling

Integration

2SP1 motor spindles are generally compatible with:

- SINAMICS S120
- SINUMERIK 840D sl

For the synchronous version of 2SP1 motor spindles, a VPM Voltage Protection Module or the Internal Voltage Protection IVP must be used as an integrated SINAMICS function, see Voltage Protection Module VPM.

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Technical specifications

	2SP120	2SP125
Product name	Motor spindles	Motor spindles
Standard functions		
Speed, max.	15000 rpm	10000 rpm
Enclosure	Cartridge with flange mounting	Cartridge with flange mounting
Operating position	Horizontal/vertical	Horizontal/vertical
Tool holder	HSK A63	SK 40 for tools with asymmetrical slot nuts
Tool clamping device	• Release using pneumatic cylinder, 6 bar • Clamp using cup-spring assembly	• Release using pneumatic cylinder, 6 bar • Clamp using cup-spring assembly
Tool taper cleaning	Compressed air through the draw bar 5 ... 6 bar	Compressed air through the draw bar 5 ... 6 bar
Cooling with water	• Max. 5 bar, 10 l/min (2.64 US gallons/min) • Max. 25 % anti-corrosion agent Clariant Antifrogen N or Tyfocor • Filter grade 100 µm	• Max. 5 bar, 10 l/min (2.64 US gallons/min) • Max. 25 % anti-corrosion agent Clariant Antifrogen N or Tyfocor • Filter grade 100 µm
Recommended coolant inlet temperature, approx.	25 °C (77 °F) (depending on the ambient temperature)	25 °C (77 °F) (depending on the ambient temperature)
Standard protection – temperature monitoring	• Motor thermal sensor KTY84-130 • PTC for full thermal protection • NTC PT3-51F • NTC K227	• Motor thermal sensor KTY84-130
Stator winding insulation in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a coolant inlet temperature of 25 °C (77 °F)	Temperature class 155 (F) for a coolant inlet temperature of 25 °C (77 °F)
Degree of protection in accordance with IEC 60034-5	IP64 (in working area) IP53 (behind the spindle flange)	IP64 (in working area) IP53 (behind the spindle flange)
Bearing lubrication	Grease, permanent lubrication	Grease, permanent lubrication
Front bearing seal	Sealing air 1 ... 1.5 m^3/h, filter grade 8 µm	Sealing air 1 ... 1.5 m^3/h, filter grade 8 µm
Encoder system	Hollow-shaft measuring system, incremental, sin/cos 1 V_{pp} 256 S/R with zero mark	Hollow-shaft measuring system, incremental, sin/cos 1 V_{pp} 256 S/R with zero mark
Clamping status monitoring		
• Analog sensors	• Tool clamped • Draw bar in the release position • Clamped without tool	–
• Digital sensors	• Position of release piston	• Tool clamped • Draw bar in the release position • Clamped without tool
Connections for media		
• Cooling	2 × hose plug-in connector, Ø 12/10 mm (0.47/0.39 in)	2 × G 1/2" (Ø 9 mm (0.35 in))
• Sealing air	1 × G 1/8" radial/Ø 5 mm (0.20 in) axial	1 × G 1/8" (Ø 8 mm (0.31 in))
• Air purge	1 × G 1/4"	1 × G 1/4"
• Release tool	1 × G 1/4"	1 × M16×1.5
• Clamp tool	1 × G 1/8"	1 × G 1/8"
Electrical connections	• Power via cable 1.5 m (4.92 ft) • Sensors through signal plug	• Power via cable 1.5 m (4.92 ft) • Sensors through signal plug
Options		
Increased max. speed	18000 rpm	15000 rpm (with HSK A63)
Internal tool cooling	• 50 bar, up to 54 l/min (11.89 US gallons/min) • Filter grade 50 µm according to -/16/13 ISO 4406 • 1 × G 1/4" cooling lubricant • 1 × G 1/8" leakage	• 50 bar, up to 54 l/min (11.89 US gallons/min) • Filter grade 50 µm according to -/16/13 ISO 4406 • 1 × G 1/4" cooling lubricant • 1 × G 1/8" leakage
External tool cooling	• Ring with 6 adjustable nozzles • 5 bar • Filter grade 50 µm according to -/16/13 ISO 4406	–
Tool clamping device	• Release using hydraulic cylinder, 80 bar • Clamp using cup-spring assembly • 1 × G 1/4", release tool • 1 × G 1/4", clamp tool	–
Tool interface	–	BT 40, CAT 40, HSK A63

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2SP1 standard type motor spindles – Water cooling

Selection and ordering data

Spindle diameter	Rated power Star/delta for duty type		Rated torque Star/delta for duty type		Rated speed Star/delta	Maximum speed	2SP1 motor spindles Standard type
	P_{rated}		M_{rated}		n_{rated}	n_{max}	
	S1	S6-40 %	S1	S6-40 %			
mm	kW (HP)	kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	rpm	rpm	Article No.
2SP1 synchronous – water cooling							
200	12.0/– (16.1/–)	12.0/– (16.1/–)	42/– (372/–)	55/– (487/–)	2700/–	15000	**2SP1202-1HA■ ■-1D ■ ■**
	15.5/– (20.8/–)	15.5/– (20.8/–)	42/– (372/–)	55/– (487/–)	3500/–	18000	**2SP1202-1HB■ ■-2D ■ ■**
	26.4/– (35.4/–)	26.4/– (35.4/–)	84/– (744/–)	110/– (974/–)	3000/–	15000	**2SP1204-1HA■ ■-1D ■ ■**
	35.0/– (46.9/–)	35.0/– (46.9/–)	78/– (690/–)	110/– (974/–)	4300/–	18000	**2SP1204-1HB■ ■-2D ■ ■**
2SP1 asynchronous – water cooling							
250	13.2/13.2 (17.7/17.7)	18.9/18.9 (25.3/25.3)	70/32 (620/283)	100/45 (885/398)	1800/4000	10000	**2SP1253-8HA 0 ■-0■ ■ 2**
	13.2/13.2 (17.7/17.7)	18.9/18.9 (25.3/25.3)	70/32 (620/283)	100/45 (885/398)	1800/4000	15000	**2SP1253-8HA 0 ■-1D ■ 2**
	11.7/11.7 (15.7/15.7)	16.7/16.7 (22.4/22.4)	140/62 (1239/549)	200/89 (1170/788)	800/1800	10000	**2SP1255-8HA 0 ■-0■ ■ 2**
	11.7/11.7 (15.7/15.7)	16.7/16.7 (22.4/22.4)	140/62 (1239/549)	200/89 (1170/788)	800/1800	15000	**2SP1255-8HA 0 ■-1D ■ 2**
2SP1 synchronous – water cooling							
250	26.0/– (34.9/–)	29.0/– (38.9/–)	100/– (885/–)	130/– (1151/–)	2500/–	10000	**2SP1253-1HA 0 ■-0■ ■ 2**
	35.0/– (46.9/–)	38.0/– (50.9/–)	100/– (885/–)	130/– (1151/–)	3300/–	15000	**2SP1253-1HB 0 ■-1D ■ 2**
	46.3/– (62.1/–)	55.0/– (73.7/–)	170/– (1505/–)	236/– (2089/–)	2600/–	10000	**2SP1255-1HA 0 ■-0■ ■ 2**
	53.4/– (71.6/–)	64.0/– (85.8/–)	170/– (1505/–)	236/– (2089/–)	3000/–	15000	**2SP1255-1HB 0 ■-1D ■ 2**

Tool clamping and release mechanism:	
Pneumatic (only for 2SP125)	**0**
Pneumatic (only for 2SP120)	**2**
Hydraulic (only for 2SP120)	**3**
Cooling:	
Closed cooling jacket	**1**
Closed cooling jacket and internal tool cooling	**3**
Closed cooling jacket and ring for external tool cooling (only for 2SP120)	**4**
Closed cooling jacket, internal tool cooling and ring for external tool cooling (only for 2SP120)	**5**
Tool interfaces:	
Tool interface SK 40	**A**
Tool interface BT 40 45°	**B**
Tool interface CAT 40	**C**
Tool interface HSK A63	**D**
Tool interface BT 40 30°	**E**
Tool interface HSK A63, latching (only for 2SP120)	**R**
Sensors:	
Sensor: Tool clamped/draw bar in the release position/clamped without tool	**D**
As for D + sensor: Position release piston (only for 2SP120)	**F**
Type of connection:	
Permanently connected cable, sensor cable with signal connector, length: 1.5 m (4.92 ft)	
Power cable with exposed core ends	**2**
Power cable with connector (2SP1202: Connector size 1.5 / 2SP1204: Connector size 3)	**6**

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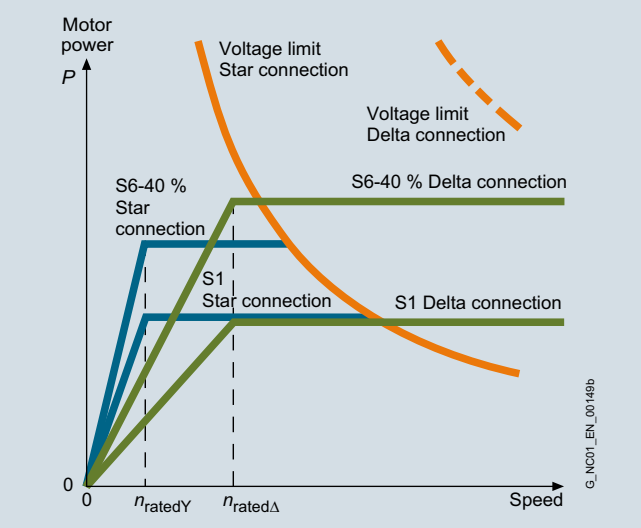
Motor type (repeated)	Moment of inertia	Weight,[1] approx.	Rated current Star/delta for duty type		Voltage Protection Module	SINAMICS S120 Motor Module	
						Required rated current for S1 duty	Booksize format
	J	m	I_{rated}			I_{rated}	
			S1	S6-40 %			
	kgm^2 (lb$_f$-in-s^2)	kg (lb)	A	A		A	Article No.
2SP1 synchronous – water cooling							
2SP1202-1HA...	0.015 (0.1327)	83 (183)	30/–	43/–	VPM 120	30	**6SL312 ■-1TE23-0AA.**
2SP1202-1HB...	0.015 (0.1327)	83 (183)	42/–	60/–	VPM 120	45	**6SL312 ■-1TE24-5AA.**
2SP1204-1HA...	0.023 (0.2035)	101 (223)	60/–	85/–	VPM 120	60	**6SL312 ■-1TE26-0AA.**
2SP1204-1HB...	0.023 (0.2035)	101 (223)	79/–	120/–	VPM 120	85	**6SL312 ■-1TE28-5AA.**
2SP1 asynchronous – water cooling							
2SP1253-8HA0.-0...	0.037 (0.3274)	130 (287)	28/29	39/39	–	30	**6SL312 ■-1TE23-0AA.**
2SP1253-8HA0.-1...	0.037 (0.3274)	130 (287)	28/29	39/39	–	30	**6SL312 ■-1TE23-0AA.**
2SP1255-8HA0.-0...	0.055 (0.4867)	165 (364)	30/29	40/37	–	30	**6SL312 ■-1TE23-0AA.**
2SP1255-8HA0.-1...	0.055 (0.4867)	165 (364)	30/29	40/37	–	30	**6SL312 ■-1TE23-0AA.**
2SP1 synchronous – water cooling							
2SP1253-1HA...	0.037 (0.3274)	130 (287)	53/–	75/–	VPM 120	60	**6SL312 ■-1TE26-0AA.**
2SP1253-1HB...	0.037 (0.3274)	130 (287)	68/–	98/–	VPM 120	85	**6SL312 ■-1TE28-5AA.**
2SP1255-1HA...	0.055 (0.4867)	165 (364)	95/–	135/–	VPM 120	132	**6SL312 ■-1TE31-3AA.**
2SP1255-1HB...	0.055 (0.4867)	165 (364)	120/–	180/–	VPM 200	132	**6SL312 ■-1TE31-3AA.**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**

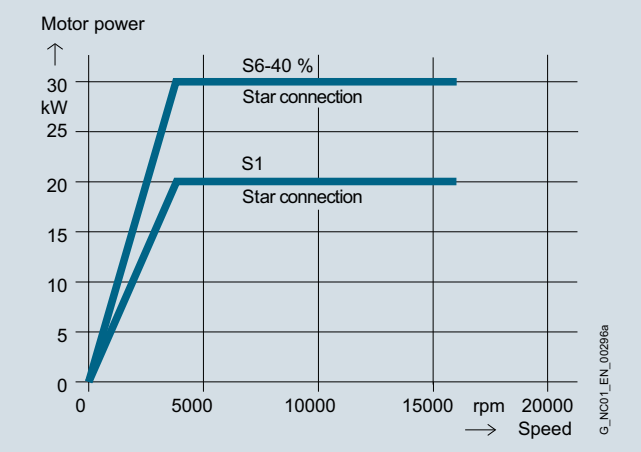
[1] No options included.
Internal tool cooling: + 1 kg (2.21 lb)
External tool cooling: + 8 kg (17.6 lb)

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Characteristic curves



2SP1 motor spindles in asynchronous design with star-delta changeover



2SP1 motor spindles in synchronous design

More information

For names of cooler manufacturers, refer to Main spindle motors – Liquid cooling.

In addition to the standard motor spindles in the 2SP1 product range, it is also possible to use individually customized motor spindle designs.

For information about other motor spindles for turning, grinding, milling and drilling, please contact:

WEISS Spindeltechnologie GmbH
A Siemens Company
Rudolf-Diesel-Strasse 35
97424 SCHWEINFURT, Germany

Telephone: +49 9721 7701-0
Fax: +49 9721 7701-133
www.weissgmbh.com

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Application

Gearboxes increase the drive torque at low motor speeds and extend the range of constant power that the main spindle motor can deliver. The full cutting capacity of modern machine tools can therefore be utilized throughout the entire speed range.

Benefits

The performance features of the two-speed gearbox for SIMOTICS M-1PH8 asynchronous motors are as follows:

- Drive power up to 100 kW (134 HP)
- Constant power range at drive shaft up to 1:24
- Suitable for both directions of rotation
- Motor shaft heights SH 100 to SH 225
- Types of construction IM B35 and IM V15 (IM V35 available on request)

The advantages listed below are gained by mounting the gearbox outside the spindle box:

- Easy adaptation to the machine tool
- Low noise and no temperature fluctuations due to gearing inside the headstock
- Separate lubrication systems for the main spindle (grease) and the change-speed gearbox (oil)
- Gear efficiency > 95 %
- The drive power can also be transferred from the gearbox output via a gear wheel (on request) or coaxially via a flexible coupling rather than by a V-belt.

Design

The two-speed gearboxes have a planetary design. The power is distributed among several planet wheels from the central sun gear. Thanks to this gearing design, the gearboxes are extremely compact. The gear-changing device, a splined sleeve that moves axially, is of form-fit design.

Position 1: Gear ratio $i_1 = 4$
Position 2: Gear ratio $i_2 = 1$

The motor is flanged onto the gearbox by an adapter plate. The three-phase motor must be suitably prepared for gearbox mounting.

With shaft height AH 160 and above, motors in frame sizes IM B35 and IM V15 must be supported at the NDE to eliminate any mechanical stress.

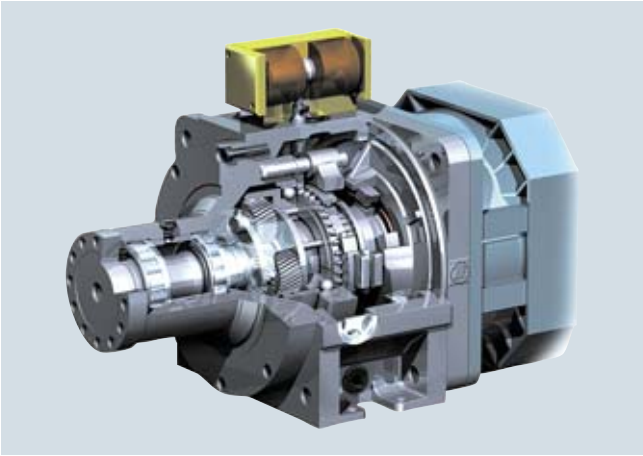
Any transverse force imported into the gearbox has to be borne by the gearbox and transmitted to the machine base.

The motors for all 2K gearboxes must be full-key balanced with a feather key. The 2K 120, 2K 250, 2K 300, 2K 450 gearboxes are sealed so that the motor flange is also adequately sealed in the standard version.
Vertical mounting positions IM V15 and IM V35 require circulating lubrication of the gearboxes.

The standard version of the change-speed gearboxes up to and including the 2K 300 has a maximum circumferential backlash of 30 angular minutes (measured at the gear output). Several special versions suitable for milling or machining with cut interruption can be supplied on request:

- Reduced backlash with special features: max. 20'
- Reduced backlash for high performance: max. 15'

Design (continued)



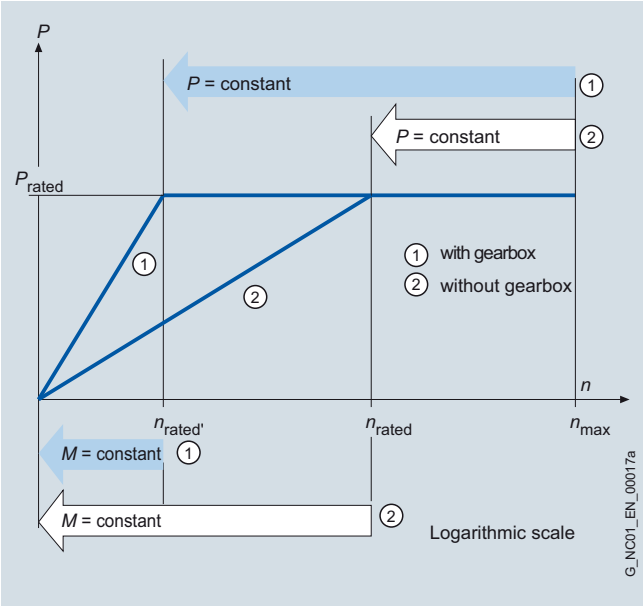
Profile of a planetary gearbox

The power unit (motor and gearbox) is supplied with vibration severity grade R in accordance with EN 60034-14 (IEC 60034-14). This is also the case when the motor is ordered with vibration severity grade S.

The belt pulley[1)] must be a cup wheel type pulley. For mounting the belt pulley, the output shaft on the gearbox has a flange with an external centering spigot and tapped holes for easy fitting and removal of the pulley.

Characteristic curves

The use of a change-speed gearbox permits the constant power range to be greatly increased.



Power-speed graph

Legend:

n_{rated}	Rated speed
$n_{rated'}$	Rated speed with two-stage gearbox
n_{max}	Max. permissible speed
P_{rated}	Rated power and constant power of motor in the speed range from n_{rated} to n_{max} or $n_{rated'}$ to n_{max}
M	Torque

[1)] Not included in scope of delivery.

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Two-speed gearbox for SIMOTICS M-1PH8 asynchronous motors

Technical specifications

Motor 1PH	Gear-box												
	ZF identi-fier	Type	Speed, max.[1]	Rated torque, permissible (S1 duty)			Maximum torque, permissible (S6-60 % duty)			Moment of inertia Gearbox		Weight Gearbox, approx.
Shaft height			Drive	Drive	Output $i = 1$	Output $i = 4$	Drive	Output $i = 1$	Output $i = 4$	Output $i = 1$	Output $i = 4$	
SH			n_{max}	M	M	M	M	M	M	J	J	m
			rpm	Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	kgm^2 (lb_f-in-s^2)	kgm^2 (lb_f-in-s^2)	kg (lb)
100	2K 120	2LG4312-...	8000	120 (88.5)	120 (88.5)	480 (354)	140 (103)	140 (103)	560 (413)	0.0110 (0.10)	0.0114 (0.10)	30 (66.2)
132	2K 250	2LG4315-...	6300	250 (184)	250 (184)	1000 (738)	400 (295)	400 (295)	1600 (1180)	0.0270 (0.24)	0.0570 (0.50)	62 (137)
160	2K 300	2LG4320-...	6300	300 (221)	300 (221)	1200 (885)	400 (295)	400 (295)	1600 (1180)	0.0270 (0.24)	0.0570 (0.50)	70 (154)
	2K 450	2LG4330-...	5000	450 (332)	450 (332)	1800 (1328)	630 (465)	630 (465)	630 (465)	not specified	not specified	80 (176)
180	2K 800	2LG4250-...	5000	800 (590)	800 (590)	3200 (2360)	900 (664)	900 (664)	3600 (2655)	0.1956 (1.73)	0.1766 (1.56)	110 (176)
	2K 801	2LG4260-...										
225	2K 802	2LG4270-...	On request									

For further binding technical specifications and configuring aid (e.g. lubrication, temperature rise and typical applications), please refer to the latest catalog supplied by ZF (Zahnradfabrik Friedrichshafen). The permissible characteristics of the motor and the gearbox must be taken into account in the design of the complete drive unit (motor and gearbox).
For further information, refer to:
https://support.industry.siemens.com/cs/ww/en/view/98710138

With motor 1PH8166-1..2, for example, the rated torque must be reduced to 300 Nm (221 lb_f-ft). With motors of shaft height SH 132, please note that the maximum permissible speed of the 2K 250 gearbox for splash lubrication is 6300 rpm.

Option **K90** with motor shaft diameter 42 mm is also required for the 2K 250 gearbox.

Selection and ordering data

Type of construction for the complete unit	Output flange dimension D_2	**Two-speed gearbox (standard version)**[2] Gear stage $i_1 = 4$	
	mm (in)	Article No.	ZF identifier
For 1PH810.-1. motors[3]			
IM B5, IM B35, IM V1, IM V15	100 (3.94)	**2LG4312-3CC31**	2K 120
For 1PH813.-1. motors[3]			
IM B5, IM B35	118 (4.65)	**2LG4315-3FD11**	2K 250
IM V1, IM V15	118 (4.65)	**2LG4315-3FC11**	2K 250
For 1PH816.-1. motors[3]			
IM B35	130 (5.12)	**2LG4320-3JD11**	2K 300
IM V15	130 (5.12)	**2LG4320-3JC11**	2K 300
For 1PH8184-1. motors[4]			
IM B35, IM V15	180 (7.09)	**2LG4250-1JC11**	2K 800
For 1PH8186-1. motors[4]			
IM B35, IM V15	180 (7.09)	**2LG4260-1JC21**	2K 801

[1] Higher drive speeds are allowed in some instances (refer to the ZF Catalog) with oil-cooled gearboxes and for gear ratios $i = 1$.

[2] Special versions, such as gearboxes with different torsional backlash, or other gear ratios ($i = 3.17$ or $i = 5.5$), are available on request.

[3] Preconditions: DE shaft extension with feather key and full-key balancing.

[4] Preconditions: DE shaft extension with feather key and full-key balancing. Bearing version for coupling output. Shaft and flange accuracy tolerance R. DE flange with shaft sealing ring.

Motors with built-on planetary gearbox

The SIMOTICS M-1PH8 motors are also available with a flange-mounted planetary gearbox. The motor/gearbox unit is function-tested. The entire drive unit, i.e. the SIMOTICS M-1PH8 asynchronous motor with flanged-on ZF gearbox, can be ordered directly from Siemens:

Siemens AG
Contact: Mr. Britz

Im Schiffelland 10
66386 ST. INGBERT, Germany

Fax: +49 6894 891-112
E-mail: hans-peter.britz@siemens.com

The following details must be specified with the order:

Ordering example for 1PH8 motor:

Motor complete with gearbox

1PH8186-1DF03-1CA1-Z K18

2LG4260-1JC21

1PH8163-1DF03-1HA1

2LG4320-3JD11

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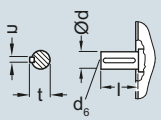
Dimensional drawings

For motor — Dimensions in mm (inches)

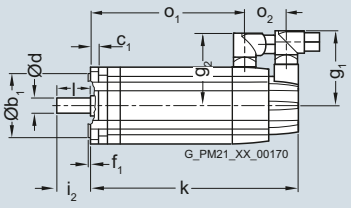
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	o_2 –	s_2 S	g_1 –	Connector size Size 1 g_2 –	Connector size Size 1.5 g_2 –	Shaft extension DE **d** **D**	d_6 –	l E	t GA	u F
1FT7 natural cooling, with connector, without/with brake																		
36	1FT703 . -5A		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	48 (1.89)	6.5 (0.26)	77 (3.03)	80 (3.15)	–	**14 (0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
48	1FT704 . -5A		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	53 (2.09)	6.5 (0.26)	93 (3.66)	90 (3.54)	–	**19 (0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FT706 . -5A		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	53 (2.09)	9 (0.35)	93 (3.66)	104 (4.09)	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FT708 . -5A		195 (7.68)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	51 (2.01)	11 (0.43)	93 (3.66)	119 (4.69)	140 (5.51)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
100	1FT710 . -5A		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	56 (2.20)	14 (0.55)	93 (3.66)	–	160 (6.30)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

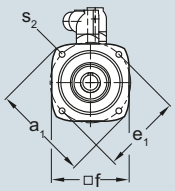
Shaft height	Type	DIN IEC	Flange 0 f_2 –	Flange 0 i_2 –	Flange 0 without brake k LB	Flange 0 without brake o_1 –	Flange 0 with brake k LB	Flange 0 with brake o_1 –	Flange 1 (1FT6-compatible) i_2 –	Flange 1 without brake k LB	Flange 1 without brake o_1 –	Flange 1 with brake k LB	Flange 1 with brake o_1 –
36	1FT7034		5.5 (0.22)	36.5 (1.44)	189 (7.44)	127 (5.00)	216 (8.50)	154 (6.06)	30 (1.18)	195 (7.68)	133 (5.24)	222 (8.74)	160 (6.30)
	1FT7036				237 (9.33)	175 (6.89)	264 (10.39)	202 (7.95)		243 (9.57)	181 (7.13)	270 (10.63)	208 (8.19)
48	1FT7042		5.5 (0.22)	46 (1.81)	163 (6.42)	96 (3.78)	195 (7.68)	128 (5.04)	40 (1.57)	169 (6.65)	102 (4.02)	201 (7.91)	134 (5.28)
	1FT7044				213 (8.39)	146 (5.75)	245 (9.65)	178 (7.01)		219 (8.62)	152 (5.98)	251 (9.88)	184 (7.24)
	1FT7046				253 (9.96)	186 (7.32)	285 (11.22)	218 (8.58)		259 (10.20)	192 (7.56)	291 (11.46)	224 (8.82)
63	1FT7062		6 (0.24)	56.5 (2.22)	167 (6.57)	99 (3.90)	202 (7.95)	135 (5.31)	50 (1.97)	173 (6.81)	106 (4.17)	208 (8.19)	141 (5.55)
	1FT7064				198 (7.80)	131 (5.16)	233 (9.17)	166 (6.54)		205 (8.07)	137 (5.39)	240 (9.45)	173 (6.81)
	1FT7066				230 (9.06)	162 (6.38)	265 (10.43)	198 (7.80)		236 (9.29)	169 (6.65)	272 (10.71)	204 (8.03)
	1FT7068				277 (10.91)	210 (8.27)	312 (12.28)	245 (9.65)		284 (11.18)	216 (8.50)	319 (12.56)	252 (9.92)
80	1FT7082		6 (0.24)	64.5 (2.54)	184 (7.24)	124 (4.88)	241 (9.49)	176 (6.93)	58 (2.28)	196 (7.72)	130 (5.12)	248 (9.76)	183 (7.20)
	1FT7084				236 (9.29)	175 (6.89)	293 (11.54)	228 (8.98)		247 (9.72)	182 (7.17)	299 (11.77)	234 (9.21)
	1FT7086				287 (11.30)	227 (8.94)	345 (13.58)	279 (10.98)		299 (11.77)	234 (9.21)	351 (13.82)	286 (11.26)
100	1FT7102		6.5 (0.26)	87 (3.43)	209 (8.23)	144 (5.67)	266 (10.47)	196 (7.72)	80 (3.15)	221 (8.70)	151 (5.94)	273 (10.75)	203 (7.99)
	1FT7105				296 (11.65)	231 (9.09)	353 (13.90)	283 (11.14)		307 (12.09)	238 (9.37)	360 (14.17)	290 (11.42)
	1FT7108				365 (14.37)	300 (11.81)	422 (16.61)	352 (13.86)		377 (14.84)	307 (12.09)	429 (16.89)	359 (14.13)

Shaft version with feather key

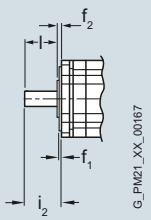


Flange 1





Flange 0



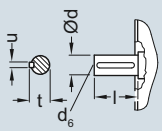
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Dimensional drawings

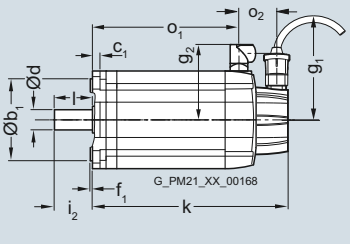
For motor		Dimensions in mm (inches)											Connector size		Shaft extension DE				
													Size 1	Size 1.5					
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	o_2 –	s_2 S	g_1 –	g_2 –	g_2 –	**d** **D**	d_6 –	l E	t GA	u F
1FT7 natural cooling, with connector, without/with brake																			
36	1FT703 . -5A		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	48 (1.89)	6.5 (0.26)	104.5 (4.11)	80 (3.15)	–	**14** **(0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
48	1FT704 . -5A		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	53 (2.09)	6.5 (0.26)	104.5 (4.11)	90 (3.54)	–	**19** **(0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FT706 . -5A		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	53 (2.09)	9 (0.35)	104.5 (4.11)	104 (4.09)	–	**24** **(0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FT708 . -5A		195 (7.68)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	51 (2.01)	11 (0.43)	104.5 (4.11)	119 (4.69)	140 (5.51)	**32** **(1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
100	1FT710 . -5A		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	56 (2.20)	14 (0.55)	104.5 (4.11)	–	160 (6.30)	**38** **(1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

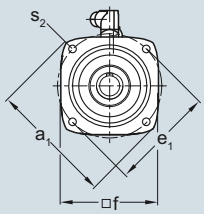
			Flange 0						Flange 1 (1FT6-compatible)				
					without brake		with brake			without brake		with brake	
Shaft height	Type	DIN IEC	f_2 –	i_2 –	k LB	o_1 –	k LB	o_1 –	i_2 –	k LB	o_1 –	k LB	o_1 –
36	1FT7034		5.5 (0.22)	36.5 (1.44)	189 (7.44)	127 (5.00)	216 (8.50)	154 (6.06)	30 (1.18)	196 (7.72)	133 (5.24)	223 (8.78)	160 (6.30)
	1FT7036				237 (9.33)	175 (6.89)	264 (10.39)	202 (7.95)		244 (9.61)	181 (7.13)	271 (10.67)	208 (8.19)
48	1FT7042		5.5 (0.22)	46 (1.81)	158 (6.22)	96 (3.78)	190 (7.48)	128 (5.04)	40 (1.57)	164 (6.46)	102 (4.02)	196 (7.72)	134 (5.28)
	1FT7044				208 (8.19)	146 (5.75)	240 (9.45)	178 (7.01)		214 (8.43)	152 (5.98)	246 (9.69)	184 (7.24)
	1FT7046				248 (9.76)	186 (7.32)	280 (11.02)	218 (8.58)		254 (10.00)	192 (7.56)	286 (11.26)	224 (8.82)
63	1FT7062		6 (0.24)	56.5 (2.22)	161 (6.34)	99 (3.90)	197 (7.76)	135 (5.31)	50 (1.97)	168 (6.61)	106 (4.17)	203 (7.99)	141 (5.55)
	1FT7064				193 (7.60)	131 (5.16)	228 (8.98)	166 (6.54)		200 (7.87)	137 (5.39)	235 (9.25)	173 (6.81)
	1FT7066				225 (8.86)	162 (6.38)	260 (10.24)	198 (7.80)		231 (9.09)	169 (6.65)	267 (10.51)	204 (8.03)
	1FT7068				272 (10.71)	210 (8.27)	307 (12.09)	245 (9.65)		279 (10.98)	216 (8.50)	314 (12.36)	252 (9.92)
80	1FT7082		6 (0.24)	64.5 (2.54)	189 (7.44)	124 (4.88)	236 (9.29)	176 (6.93)	58 (2.28)	191 (7.52)	130 (5.12)	243 (9.57)	183 (7.20)
	1FT7084				236 (9.29)	175 (6.89)	288 (11.34)	228 (8.98)		242 (9.53)	182 (7.17)	294 (11.57)	234 (9.21)
	1FT7086				287 (11.30)	227 (8.94)	340 (13.39)	279 (10.98)		294 (11.57)	234 (9.21)	346 (13.62)	286 (11.26)
100	1FT7102		6.5 (0.26)	87 (3.43)	209 (8.23)	144 (5.67)	261 (10.28)	196 (7.72)	80 (3.15)	216 (8.50)	151 (5.94)	268 (10.55)	203 (7.99)
	1FT7105				296 (11.65)	231 (9.09)	348 (13.70)	283 (11.14)		303 (11.93)	238 (9.37)	355 (13.98)	290 (11.42)
	1FT7108				365 (14.37)	300 (11.81)	417 (16.42)	352 (13.86)		372 (14.65)	307 (12.09)	424 (16.69)	359 (14.13)

Shaft version with feather key

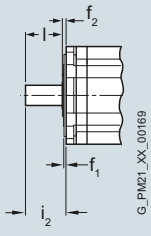


Flange 1





Flange 0



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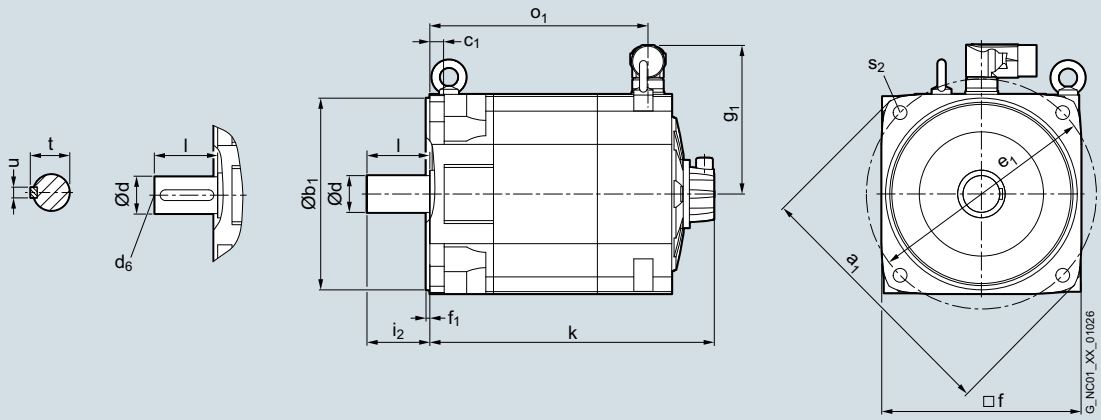
Dimensional drawings

For motor			Dimensions in mm (inches)																
												Connector size		Terminal box	Shaft extension DE				
												Size 1.5	Size 3						
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	i_2 –	s_2 S	g_1 –	g_1 –	g_1 –	d D	d_6 –	l E	t GA	u F
1FT7 natural cooling, with connector/with terminal box, without/with brake																			
132	1FT713 . -5A		340 (13.39)	250 (9.84)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	82 (3.23)	18 (0.71)	193.5 (7.62)	203 (7.99)	215.5 (8.48)	**48 (1.89)**	M16	82 (3.23)	51.5 (2.03)	14 (0.55)

			without brake			with brake		
				Connector size			Connector size	
				Size 1.5	Size 3		Size 1.5	Size 3
Shaft height	Type	DIN IEC	k LB	o_1 –	o_1 –	k LB	o_1 –	o_1 –
132	1FT7132-5A		370.5 (14.59)	284.5 (11.20)	265.5 (10.45)	431 (16.97)	345 (13.58)	326 (12.83)
	1FT7134-5A		415.5 (16.36)	329.5 (12.97)	310.5 (12.22)	476 (18.74)	390 (15.35)	371 (14.61)
	1FT7136-5A		460.5 (18.13)	374.5 (14.74)	355.5 (14.00)	521 (20.51)	435 (17.13)	416 (16.38)
	1FT7138-5A		500.5 (19.70)	414.5 (16.32)	395.5 (15.57)	561 (22.09)	475 (18.70)	456 (17.95)

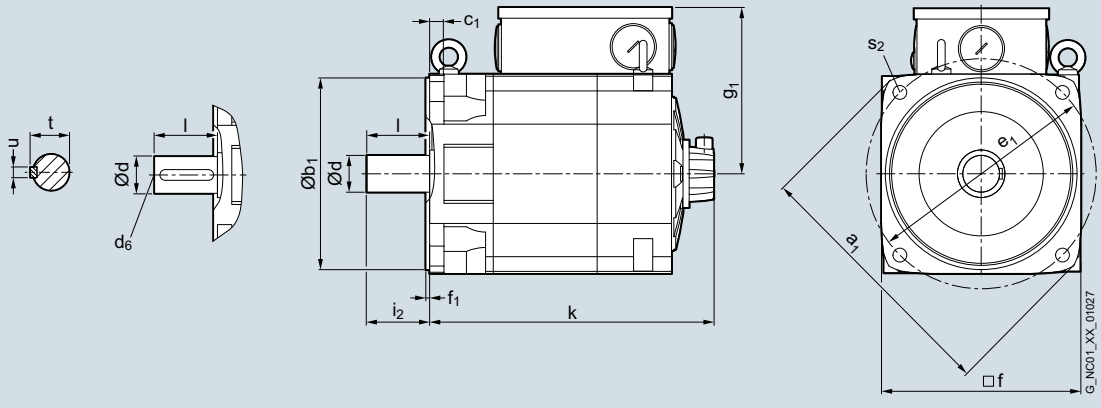
Version with connector

Shaft design
with feather key



Version with terminal box

Shaft design
with feather key



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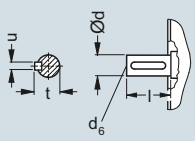
Dimensional drawings

For motor — Dimensions in mm (inches)

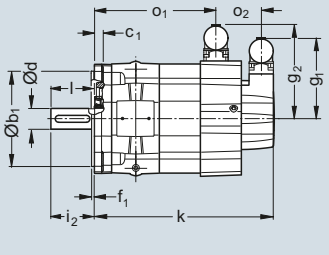
Shaft height	Type	DIN IEC	a_1 P	b –	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	s_2 S	Signal connector g_1 –	Power connector Size 1 g_2 –	Power connector Size 1.5 g_2 –	Power connector Size 3 g_2 –	Connector Size 1 o_2 –	Connector Size 1.5 o_2 –	Connector Size 3 o_2 –
1FT7 water cooling, with connector, without/with brake																	
63	1FT706 . - . W		155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	9 (0.35)	93 (3.66)	108 (4.25)	132.5 (5.22)	–	52 (2.05)	57 (2.24)	–
80	1FT708 . - . W		194 (7.68)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)	93 (3.66)	–	140.5 (5.53)	168.5 (6.63)	–	50 (1.97)	67 (2.64)
100	1FT710 . -5W		245 (9.65)	206 (8.11)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)	93 (3.66)	–	159.5 (6.28)	187.5 (7.38)	–	55 (2.17)	72 (2.83)

			Flange 1 (1FT6-compatible) without/with brake					Flange 0 without/with brake						Shaft extension DE				
					Power connector						Power connector							
					Size 1	Size 1.5	Size 3				Size 1	Size 1.5	Size 3					
Shaft height	Type	DIN IEC	i_2 –	k LB	o_1 –	o_1 –	o_1 –	f_2 –	i_2 –	k LB	o_1 –	o_1 –	o_1 –	d D	d_6 –	l E	t GA	u F
63	1FT7062		50 (1.97)	208 (8.19)	141 (5.55)	–	–	6 (0.24)	56.5 (2.22)	202 (7.95)	135 (5.31)	–	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064			240 (9.45)	173 (6.81)	–	–			233 (9.17)	166 (6.54)	–	–					
	1FT7065			292 (11.50)	220 (8.66)	–	–			286 (11.26)	214 (8.43)	–	–					
	1FT7066			272 (10.71)	204 (8.03)	–	–			265 (10.43)	198 (7.80)	–	–					
	1FT7067			332 (13.07)	260 (10.24)	–	–			325 (12.80)	254 (10.00)	–	–					
	1FT7068			319 (12.56)	252 (9.92)	–	–			312 (12.28)	245 (9.65)	–	–					
80	1FT7082		58 (2.28)	248 (9.76)	–	183 (7.20)	–	6 (0.24)	64.5 (2.54)	241 (9.49)	–	176 (6.93)	–	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084			299 (11.77)	–	234 (9.21)	–			293 (11.54)	–	228 (8.98)	–					
	1FT7085			319 (12.56)	–	254 (10.00)	237 (9.33)			312.5 (12.30)	–	247 (9.72)	231 (9.09)					
	1FT7086			351 (13.82)	–	286 (11.26)	–			345 (13.58)	–	279 (10.98)	–					
	1FT7087			379 (14.92)	–	314 (12.36)	297 (11.69)			372.5 (14.67)	–	307 (12.09)	291 (11.46)					
100	1FT7102		80 (3.15)	273 (10.75)	–	203 (7.99)	187 (7.36)	6.5 (0.26)	87 (3.43)	266 (10.47)	–	196 (7.72)	180 (7.09)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105			360 (14.17)	–	290 (11.42)	273 (10.75)			353 (13.90)	–	283 (11.14)	266 (10.47)					
	1FT7108			429 (16.89)	–	359 (14.13)	342 (13.46)			422 (16.61)	–	352 (13.86)	335 (13.19)					

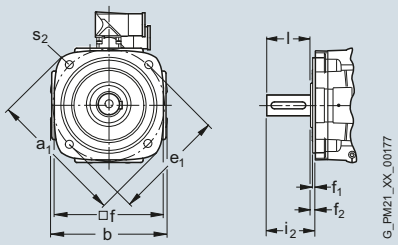
Flange 1 (1FT6-compatible)



Shaft version with feather key



Flange 0



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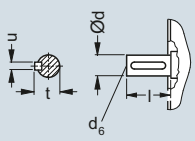
Dimensional drawings

For motor — Dimensions in mm (inches)

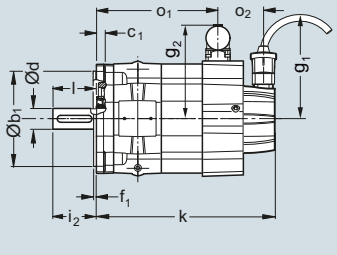
Shaft height	Type	DIN IEC	a_1 P	b –	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	s_2 S	Signal connector g_1 –	Power connector Size 1 g_2 –	Power connector Size 1.5 g_2 –	Power connector Size 3 g_2 –	Connector Size 1 o_2 –	Connector Size 1.5 o_2 –	Connector Size 3 o_2 –
1FT7 water cooling, with connector, without/with brake																	
63	1FT706 . - . W		155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	9 (0.35)	104.5 (4.11)	108 (4.25)	132.5 (5.22)	–	50 (1.97)	55 (2.17)	–
80	1FT708 . - . W		194 (7.68)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)	104.5 (4.11)	–	140.5 (5.53)	168.5 (6.63)	–	48 (1.89)	63 (2.48)
100	1FT710 . -5W		245 (9.65)	206 (8.11)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)	104.5 (4.11)	–	159.5 (6.28)	187.5 (7.38)	–	53 (2.09)	69 (2.72)

			Flange 1 (1FT6-compatible) without/with brake					Flange 0 without/with brake						Shaft extension DE				
			Power connector					Power connector										
			Size 1	Size 1.5	Size 3			Size 1	Size 1.5	Size 3								
Shaft height	Type	DIN IEC	i_2 –	k LB	o_1 –	o_1 –	o_1 –	f_2 –	i_2 –	k LB	o_1 –	o_1 –	o_1 –	d D	d_6 –	l E	t GA	u F
63	1FT7062		50 (1.97)	204 (8.03)	141 (5.55)	–	–	6 (0.24)	56.5 (2.22)	197 (7.76)	135 (5.31)	–	–	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064			235 (9.25)	173 (6.81)	–	–			229 (9.02)	166 (6.54)	–	–					
	1FT7065			287 (11.30)	220 (8.66)	–	–			281 (11.06)	214 (8.43)	–	–					
	1FT7066			267 (10.51)	204 (8.03)	–	–			260 (10.24)	198 (7.80)	–	–					
	1FT7067			327 (12.87)	260 (10.24)	–	–			321 (12.64)	254 (10.00)	–	–					
	1FT7068			314 (12.36)	252 (9.92)	–	–			308 (12.13)	245 (9.65)	–	–					
80	1FT7082		58 (2.28)	243 (9.57)	–	183 (7.20)	–	6 (0.24)	64.5 (2.54)	237 (9.33)	–	176 (6.93)	–	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084			295 (11.61)	–	234 (9.21)	–			288 (11.34)	–	228 (8.98)	–					
	1FT7085			314 (12.36)	–	254 (10.00)	237 (9.33)			308 (12.13)	–	247 (9.72)	231 (9.09)					
	1FT7086			346 (13.62)	–	286 (11.26)	–			340 (13.39)	–	279 (10.98)	–					
	1FT7087			374 (14.72)	–	314 (12.36)	297 (11.69)			368 (14.49)	–	307 (12.09)	291 (11.46)					
100	1FT7102		80 (3.15)	267 (10.51)	–	203 (7.99)	187 (7.36)	6.5 (0.26)	87 (3.43)	262 (10.31)	–	196 (7.72)	180 (7.09)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105			355 (13.98)	–	290 (11.42)	273 (10.75)			348 (13.70)	–	283 (11.14)	266 (10.47)					
	1FT7108			424 (16.69)	–	359 (14.13)	342 (13.46)			417 (16.42)	–	352 (13.86)	335 (13.19)					

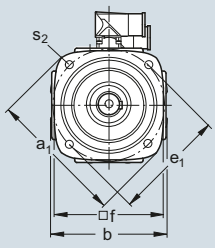
Flange 1 (1FT6-compatible)

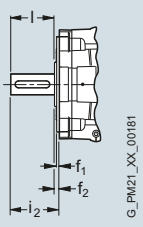


Shaft version with feather key



Flange 0





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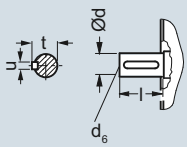
Dimensional drawings

For motor		Dimensions in mm (inches)														
											Connector size					Fan
											Size 1.5	Size 3				
Shaft height	Type	DIN IEC	a_1 P	b –	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	s_2 S	g_2 –	g_2 –	g_3 –	h H	h_1 –	h_2 –
1FT7 forced ventilation, with connector, without/with brake																
63	1FT706 . - . S		155 (6.10)	158 (6.22)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	11 (0.43)	125 (4.92)	–	102 (4.02)	26 (1.02)	143 (5.36)	135 (5.31)
80	1FT708 . - . S		194 (7.68)	186 (7.32)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	11 (0.43)	139 (5.47)	167 (6.57)	137.5 (5.41)	27 (1.06)	177 (6.97)	186.5 (7.34)
100	1FT710 . -5S		245 (9.65)	224 (8.82)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	14 (0.55)	159 (6.26)	187 (7.36)	151 (5.94)	27 (1.06)	220 (8.66)	222 (8.74)

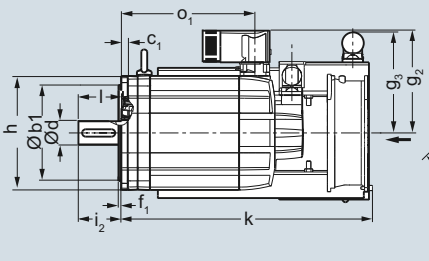
			Flange 1 (1FT6-compatible)					Flange 0						Shaft extension DE				
				without brake		with brake				without brake		with brake						
Shaft height	Type	DIN IEC	i_2 –	k LB	o_1 –	k LB	o_1 –	f_2 –	i_2 –	k LB	o_1 –	k LB	o_1 –	d D	d_6 –	l E	t GA	u F
63	1FT7065-7S		50 (1.97)	380 (14.96)	220 (8.66)	380 (14.96)	220 (8.66)	6 (0.24)	56.5 (2.22)	373.5 (14.70)	214 (8.43)	373.5 (14.70)	214 (8.43)	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7067-7S			420 (16.54)	260 (10.24)	420 (16.54)	260 (10.24)			413.5 (16.28)	254 (10.00)	413.5 (16.28)	254 (10.00)					
80	1FT7084-5S		58 (2.28)	342 (13.46)	182 (7.17)	394 (15.51)	234 (9.21)	6 (0.24)	64.5 (2.54)	336 (13.23)	175 (6.89)	387 (15.24)	228 (8.98)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7085-7S			414 (16.30)	254 (10.00)	414 (16.30)	254 (10.00)			408 (16.06)	247 (9.72)	408 (16.06)	247 (9.72)					
	1FT7086-5S			394 (15.51)	234 (9.21)	446 (17.56)	286 (11.26)			387 (15.24)	227 (8.94)	440 (17.32)	379 (14.92)					
	1FT7087-7S			474 (18.66)	314 (12.36)	474 (18.66)	314 (12.36)			468 (18.43)	307 (12.09)	468 (18.43)	307 (12.09)					
100	1FT7105		80 (3.15)	404 (15.91)	238 (9.37)	456 (17.95)	290 (11.42)	6.5 (0.26)	87 (3.43)	397 (15.63)	231 (9.09)	449 (17.68)	283 (11.14)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7108			473 (18.62)	307 (12.09)	525 (20.67)	359 (14.13)			466 (18.35)	300 (11.81)	518 (20.39)	352 (13.86)					

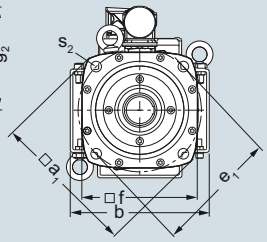
1FT706
1FT708
1FT710

Shaft design with feather key

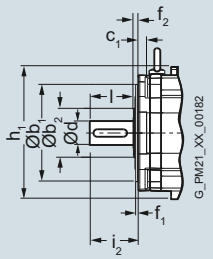


Flange 1





Flange 0



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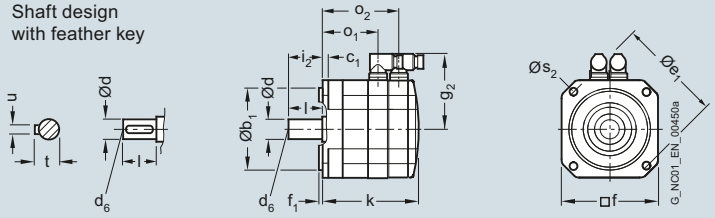
Dimensional drawings

For motor		Dimensions in mm (inches)													
											Shaft extension DE				
Shaft height	Type	DIN IEC	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	i_2 –	s_2 S	**d** **D**	d_6 –	l E	t GA	u F
1FK7 natural cooling, without/with brake															
20	1FK701		30 (1.18)	7 (0.28)	46 (1.81)	40 (1.57)	2.5 (0.10)	66 (2.60)	18 (0.71)	4.5 (0.18)	**8** **(0.31)**	– (0.59)	18 (0.71)	8.8 (0.35)	2 (0.08)
28	1FK702		40 (1.57)	10 (0.39)	63 (2.48)	55 (2.17)	2.5 (0.10)	75 (2.95)	20 (0.79)	5.4 (0.21)	**9** **(0.35)**	M3	20 (0.79)	10.2 (0.40)	3 (0.12)

For motor		Encoder system: Resolver Absolute encoders AM16S/R / AM15DQ Dimensions in mm (inches)						Encoder system: Incremental encoders IC2048S/R / IC22DQ Absolute encoders AM2048S/R / AM22DQ AM512S/R / AM20DQ AM32S/R / AM16DQ					
		without brake			with brake			without brake			with brake		
Shaft height	Type	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –
20	1FK7011	140 (5.51)	89 (3.50)	118 (4.65)	140 (5.51)	89 (3.50)	118 (4.65)	155 (6.10)	89 (3.50)	118 (4.65)	155 (6.10)	89 (3.50)	118 (4.65)
	1FK7015	165 (6.50)	114 (4.59)	143 (5.63)	165 (6.50)	114 (4.49)	143 (5.63)	180 (7.09)	114 (4.49)	143 (5.63)	180 (7.09)	114 (4.49)	143 (5.63)
28	1FK7022	153 (6.02)	95 (3.74)	128 (5.04)	175 (6.89)	95 (3.74)	150 (5.91)	178 (7.01)	95 (3.74)	128 (5.04)	200 (7.87)	95 (3.74)	150 (5.91)

1FK701
1FK702

Shaft design
with feather key



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Dimensional drawings

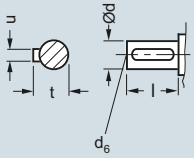
For motor: DQI encoder with DRIVE-CLiQ interface (without resolver)/ Encoder system without DRIVE-CLiQ interface (without resolver)

Dimensions in mm (inches)

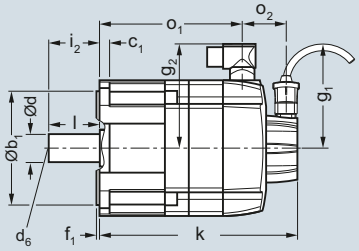
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	i_2 –	s_2 S	Shaft extension DE: **d** **D**	d_6 –	l E	t GA	u F
1FK7 Compact/High Dynamic, without/with brake – Dimensions dependent on shaft height															
36	1FK703		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	30 (1.18)	6.5 (0.26)	**14 (0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
1FK7 Compact/High Dynamic/High Inertia, without/with brake – Dimensions dependent on shaft height															
48	1FK704		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	40 (1.57)	6.5 (0.26)	**19 (0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FK706		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	50 (1.97)	9 (0.35)	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FK708		194 (7.64)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	58 (2.28)	11 (0.43)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
1FK7 Compact/High Inertia, without/with brake – Dimensions dependent on shaft height															
100	1FK710		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	192 (7.56)	4 (0.16)	80 (3.15)	14 (0.55)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

1FK703
1FK704
1FK706
1FK708
1FK710

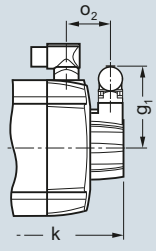
Shaft design with feather key

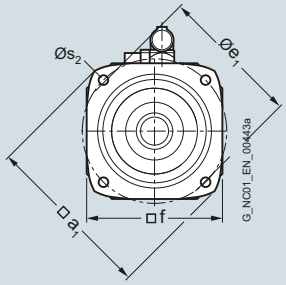


Version with DRIVE-CLiQ interface



Version without DRIVE-CLiQ interface





For motor: DQI encoder with DRIVE-CLiQ interface (without resolver) / Encoder system without DRIVE-CLiQ interface (without resolver)

Dimensions in mm (inches)

Shaft height	Type	DQI: g_1 –	g_2 –	o_2 –	without brake: k LB	without brake: o_1 –	with brake: k LB	with brake: o_1 –	Encoder: g_1 –	g_2 –	o_2 –	without brake: k LB	without brake: o_1 –	with brake: k LB	with brake: o_1 –
1FK7 High Inertia – Dimensions dependent on overall length															
48	1FK7042-3B	104.5 (4.11)	90 (3.54)	50 (1.97)	187 (7.36)	125 (4.92)	219 (8.62)	157 (6.18)	93 (3.66)	90 (3.54)	52 (2.05)	192 (7.56)	125 (4.92)	224 (8.82)	157 (6.18)
63	1FK7060-3B	104.5 (4.11)	104 (4.09)	50 (1.97)	182 (7.17)	120 (4.72)	217 (8.54)	155 (6.10)1	93 (3.66)	104 (4.09)	52 (2.05)	187 (7.36)	120 (4.72)	222 (8.74)	155 (6.10)
	1FK7062-3B				216 (8.50)	153 (6.02)	251 (9.88)	189 (7.44)				221 (8.70)	153 (6.02)	256 (10.08)	189 (7.44)
80	1FK7081-3B	104.5 (4.11)	119 (4.69)	48 (1.89)	211 (8.31)	151 (5.94)	264 (10.39)	203 (7.99)	93 (3.66)	119 (4.69)	50 (1.97)	216 (8.50)	151 (5.94)	269 (10.59)	203 (7.99)
	1FK7084-3B				270 (10.63)	209 (8.23)	322 (12.68)	262 (10.31)				275 (10.83)	209 (8.23)	327 (12.87)	262 (10.31)
100	1FK7100-3B	104.5 (4.11)	137 (5.39)	53 (2.09)	183 (7.20)	118 (4.65)	220 (8.66)	170 (6.69)	93 (3.66)	137 (5.39)	55 (2.17)	188 (7.40)	118 (4.65)	225 (8.86)	170 (6.69)
	1FK7101-3B		158 (6.22)		209 (8.23)	144 (5.67)	261 (10.28)	196 (7.72)		158 (6.22)		214 (8.43)	144 (5.67)	266 (10.47)	196 (7.72)
	1FK7103-3B				235 (9.25)	170 (6.69)	287 (11.30)	222 (8.74)				240 (9.45)	170 (6.69)	292 (11.50)	222 (8.74)
	1FK7105-3B				287 (11.30)	222 (8.74)	339 (13.35)	274 (10.79)				292 (11.50)	222 (8.74)	344 (13.54)	274 (10.79)

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Dimensional drawings

For motor		DQI encoder with DRIVE-CLiQ interface (without resolver) Dimensions in mm (inches)							Encoder system without DRIVE-CLiQ interface (without resolver)						
					without brake		with brake					without brake		with brake	
Shaft height	Type	g_1 –	g_2 –	o_2 –	k LB	o_1 –	k LB	o_1 –	g_1 –	g_2 –	o_2 –	k LB	o_1 –	k LB	o_1 –
1FK7 Compact – Dimensions dependent on overall length															
36	1FK7032-2A	104.5 (4.11)	78 (3.07)	50 (1.97)	173 (6.81)	111 (4.37)	200 (7.87)	138 (5.43)	77 (3.03)	78 (3.07)	47 (1.85)	173 (6.81)	111 (4.37)	200 (7.87)	138 (5.43)
	1FK7034-2A				198 (7.80)	136 (5.35)	225 (8.86)	263 (6.42)				198 (7.80)	136 (5.35)	225 (8.86)	163 (6.42)
48	1FK7040-2A	104.5 (4.11)	90 (4.09)	50 (1.97)	147 (6.61)	85 (4.17)	179 (7.99)	117 (5.55)	93 (3.66)	90 (4.09)	52 (2.05)	152 (6.81)	85 (4.17)	184 (8.19)	117 (5.55)
	1FK7042-2A				174 (6.85)	112 (4.41)	206 (8.11)	144 (5.67)				179 (7.05)	112 (4.41)	211 (8.31)	144 (5.57)
63	1FK7060-2A	104.5 (4.11)	104 (4.09)	50 (1.97)	168 (6.61)	106 (4.17)	203 (7.99)	141 (5.55)	93 (3.66)	104 (4.09)	52 (2.05)	173 (6.81)	106 (4.17)	208 (8.19)	141 (5.55)
	1FK7062-2A				190 (7.48)	128 (5.04)	226 (8.90)	163 (6.42)				195 (7.68)	128 (5.04)	231 (9.09)	163 (6.42)
	1FK7063-2A				213 (8.39)	151 (5.94)	248 (9.76)	186 (7.32)				218 (8.58)	151 (5.94)	253 (9.96)	186 (7.32)
80	1FK7080-2A	104.5 (4.11)	119 (4.69)	48 (1.89)	171 (6.73)	111 (4.37)	223 (8.78)	163 (6.42)	93 (3.66)	119 (4.69)	50 (1.97)	176 (6.93)	111 (4.37)	228 (8.98)	163 (6.42)
	1FK7081-2A				190 (7.48)	130 (5.12)	242 (9.53)	182 (7.17)				196 (7.68)	130 (5.12)	247 (9.72)	182 (7.17)
	1FK7083-2A				209 (8.23)	149 (5.87)	261 (10.28)	201 (7.91)				214 (8.43)	149 (5.87)	266 (10.47)	201 (7.91)
	1FK7084-2A				229 (9.02)	168 (6.61)	281 (11.06)	221 (8.70)				234 (9.21)	168 (6.61)	286 (11.26)	221 (8.70)
100	1FK7100-2A	104.5 (4.11)	137 (5.39)	53 (2.09)	183 (7.20)	118 (4.65)	220 (8.66)	170 (6.69)	93 (3.66)	137 (5.39)	55 (2.17)	188 (7.40)	118 (4.65)	225 (8.86)	170 (6.69)
	1FK7101-2A		158 (6.22)		209 (8.23)	144 (5.67)	261 (10.28)	196 (7.72)		158 (6.22)		214 (8.43)	144 (5.67)	266 (10.47)	196 (7.72)
	1FK7103-2A				235 (9.25)	170 (6.69)	287 (11.30)	222 (8.74)				240 (9.45)	170 (6.69)	292 (11.50)	222 (8.74)
	1FK7105-2A				287 (11.30)	222 (8.74)	339 (13.35)	274 (10.79)				292 (11.50)	222 (8.74)	344 (13.54)	274 (10.79)
1FK7 High Dynamic – Dimensions dependent on overall length															
36	1FK7033-4C	104.5 (4.11)	78 (3.07)	50 (1.97)	183 (7.20)	121 (4.76)	210 (8.27)	148 (5.83)	77 (3.03)	78 (3.07)	47 (1.85)	183 (7.20)	121 (4.76)	210 (8.27)	148 (5.83)
48	1FK7043-4C	104.5 (4.11)	90 (3.54)	56 (2.20)	200 (7.87)	132 (5.20)	232 (9.13)	164 (6.46)	93 (3.66)	90 (3.54)	58 (2.28)	205 (8.07)	132 (5.20)	237 (9.33)	164 (6.46)
	1FK7044-4C				225 (8.86)	157 (6.18)	257 (10.12)	189 (7.44)				230 (9.06)	157 (6.18)	262 (10.31)	189 (7.44)
63	1FK7061-4C	104.5 (4.11)	104 (4.09)	50 (1.97)	203 (7.99)	141 (5.55)	238 (9.37)	176 (6.93)	93 (3.66)	104 (4.09)	52 (2.05)	208 (8.19)	141 (5.55)	243 (9.57)	176 (6.93)
	1FK7064-4C				267 (10.51)	205 (8.07)	302 (11.89)	240 (9.45)				272 (10.71)	205 (8.07)	307 (12.09)	240 (9.45)
80	1FK708.-4CC	104.5 (4.11)	119 (4.69)	48 (1.89)	257 (10.12)	197 (7.76)	309 (12.17)	249 (9.80)	93 (3.66)	119 (4.69)	50 (1.97)	262 (10.31)	197 (7.76)	314 (12.36)	249 (9.80)
	1FK708.-4CF		139 (5.47)							139 (5.47)					

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Dimensional drawings

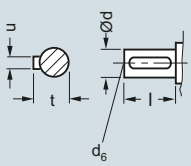
For motor: Resolver with/without DRIVE-CLiQ interface

Dimensions in mm (inches)

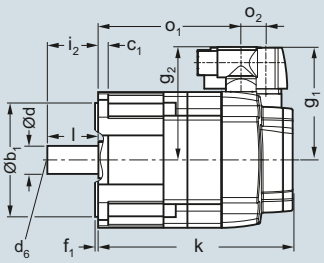
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	i_2 –	s_2 S	Shaft extension DE: **d D**	d_6 –	l E	t GA	u F
1FK7 Compact/High Dynamic, with/without brake – Dimensions dependent on shaft height															
36	1FK703		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	30 (1.18)	6.5 (0.26)	**14 (0.55)**	M5	30 (1.18)	16 (0.63)	5 (0.20)
48	1FK704		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	40 (1.57)	6.5 (0.26)	**19 (0.75)**	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
63	1FK706		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	50 (1.97)	9 (0.35)	**24 (0.94)**	M8	50 (1.97)	27 (1.06)	8 (0.31)
80	1FK708		194 (7.64)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	58 (2.28)	11 (0.43)	**32 (1.26)**	M12	58 (2.28)	35 (1.38)	10 (0.39)
1FK7 Compact, without/with brake – Dimensions dependent on shaft height															
100	1FK710		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	192 (7.56)	4 (0.16)	80 (3.15)	14 (0.55)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)

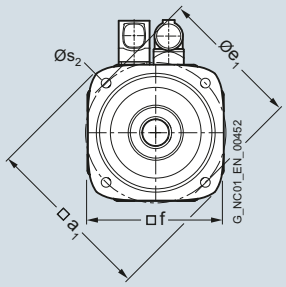
1FK703
1FK704
1FK706
1FK708
1FK710

Shaft design
with feather key



Version
with resolver





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Dimensional drawings

For motor		Resolver with/without DRIVE-CLiQ interface Dimensions in mm (inches)						
					without brake		with brake	
Shaft height	Type	g_1 –	g_2 –	o_2 –	k LB	o_1 –	k LB	o_1 –
1FK7 Compact – Dimensions dependent on overall length								
36	1FK7032-2A	80 (3.15)	80 (3.15)	15 (0.59)	153 (6.02)	117 (4.61)	180 (7.09)	144 (5.67)
	1FK7034-2A				178 (7.01)	142 (5.59)	205 (8.07)	169 (6.65)
48	1FK7040-2A	90 (3.54)	90 (3.54)	23 (0.91)	132 (5.20)	85 (3.35)	164 (6.46)	117 (4.61)
	1FK7042-2A				160 (6.30)	112 (4.41)	192 (7.56)	144 (5.67)
63	1FK7060-2A	103 (4.06)	104 (4.09)	23 (0.91)	153 (6.02)	106 (4.17)	189 (7.44)	141 (5.55)
	1FK7062-2A				176 (6.93)	128 (5.04)	211 (8.31)	163 (6.42)
	1FK7063-2A				198 (7.80)	151 (5.94)	234 (9.21)	186 (7.32)
80	1FK7080-2A	118 (4.65)	119 (4.69)	21 (0.83)	157 (6.18)	111 (4.37)	209 (8.23)	163 (6.42)
	1FK7081-2A				176 (6.93)	130 (5.12)	228 (8.98)	182 (7.17)
	1FK7083-2A				195 (7.68)	149 (5.87)	247 (9.72)	201 (7.91)
	1FK7084-2A				214 (8.43)	168 (6.61)	266 (10.47)	221 (8.70)
100	1FK7100-2A	136 (5.35)	137 (5.39)	26 (1.02)	169 (6.65)	118 (4.65)	206 (8.11)	155 (6.10)
	1FK7101-2A		158 (6.22)		195 (7.68)	144 (5.67)	247 (9.72)	196 (7.72)
	1FK7103-2A				221 (8.70)	170 (6.69)	273 (10.75)	222 (8.74)
	1FK7105-2A				273 (10.75)	222 (8.74)	325 (12.80)	274 (10.79)
1FK7 High Dynamic – Dimensions dependent on overall length								
36	1FK7033-4C	81 (3.19)	80 (3.15)	15 (0.59)	163 (6.42)	127 (5.00)	190 (7.48)	154 (6.06)
48	1FK7043-4C	90 (3.54)	90 (3.54)	23 (0.9)	186 (7.32)	138 (5.43)	218 (8.58)	170 (6.69)
	1FK7044-4C				211 (8.31)	163 (6.42)	243 (9.57)	195 (7.68)
63	1FK7061-4C	103 (4.06)	104 (4.09)	23 (0.9)	188 (7.40)	141 (5.55)	224 (8.82)	176 (6.93)
	1FK7064-4C				252 (9.92)	205 (8.07)	288 (11.34)	240 (9.45)
80	1FK708.-4CC	118 (4.65)	119 (4.69)	21 (0.83)	243 (9.57)	197 (7.76)	295 (11.61)	250 (9.84)
	1FK708.-4CF		139 (5.47)					

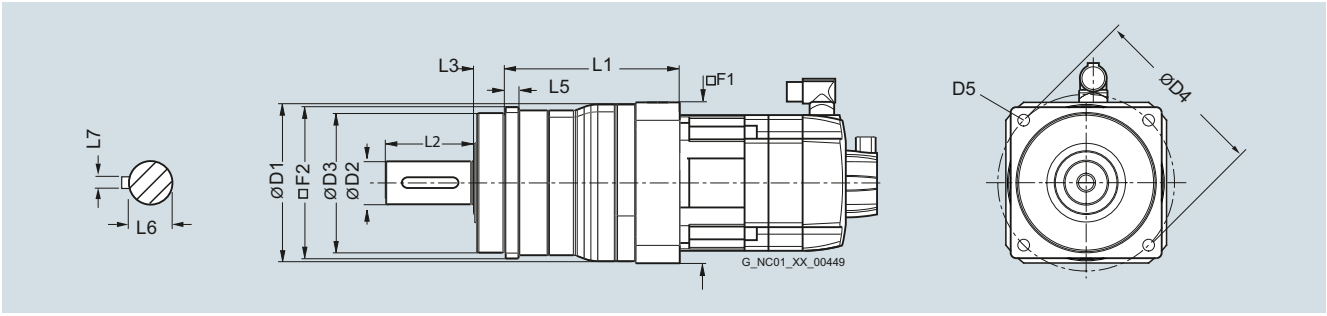
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Dimensional drawings

For SP+ series planetary gearboxes on SIMOTICS S-1FT7/-1FK7 motors

Dimensions in mm (inches)

Planetary gearbox Type	D2	D3	D4	D5	F2	L2	L3	L5	L6	L7
1FT7/1FK7 with planetary gearbox series SP+ single-stage/two-stage										
SP060S-MF1/-MF2	16 (0.63)	60 (2.36)	68 (2.68)	5.5 (0.22)	62 (2.48)	28 (1.10)	20 (0.79)	6 (0.24)	18 (0.71)	5 (0.20)
SP075S-MF1/-MF2	22 (0.87)	70 (2.76)	85 (3.35)	6.6 (0.26)	76 (2.99)	36 (1.42)	20 (0.79)	7 (0.28)	24.5 (0.96)	6 (0.24)
SP100S-MF1/-MF2	32 (1.26)	90 (3.54)	120 (4.72)	9 (0.35)	101 (3.98)	58 (2.28)	30 (1.18)	10 (0.39)	35 (1.38)	10 (0.39)
SP140S-MF1/-MF2	40 (1.57)	130 (5.12)	165 (6.50)	11 (0.43)	141 (5.55)	82 (3.23)	30 (1.18)	12 (0.47)	43 (1.69)	12 (0.47)
SP180S-MF1/-MF2	55 (2.17)	160 (6.30)	215 (8.46)	13.5 (0.53)	182 (7.17)	82 (3.23)	30 (1.18)	15 (0.59)	59 (2.32)	16 (0.63)
SP210S-MF1/-MF2	75 (2.95)	180 (7.09)	250 (9.84)	17 (0.67)	215 (8.46)	105 (4.13)	38 (1.50)	17 (0.67)	79.5 (3.13)	20 (0.79)
SP240S-MF1/-MF2	85 (3.35)	200 (7.87)	290 (11.42)	17 (0.67)	245 (9.65)	130 (5.12)	40 (1.57)	20 (0.79)	90 (3.54)	22 (0.87)



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Dimensional drawings

For SP+ series planetary gearboxes on SIMOTICS S-1FT7/-1FK7 motors

Dimensions in mm (inches)

Planetary gearbox	Motor	Planetary gearbox series SP+ Single-stage **-MF1**			Planetary gearbox series SP+ Two-stage **-MF2**		
Type	Type	D1	F1	L1	D1	F1	L1
1FT7/1FK7 with planetary gearbox series SP+ single-stage/two-stage							
SP060S-	1FT702/1FK702	68 (2.68)	70 (2.76)	89.3 (3.52)	70 (2.76)	60 (2.36)	108 (4.25)
	1FT703/1FK703	68 (2.68)	70 (2.76)	94 (3.70)	68 (2.68)	70 (2.76)	116 (4.57)
	1FT704/1FK704	91 (3.58)	90 (3.54)	106 (4.17)	–	–	–
SP075S-	1FT702/1FK702	91 (3.58)	90 (3.54)	107.8 (4.24)	95 (3.74)	70 (2.76)	119 (4.69)
	1FT703/1FK703	91 (3.58)	90 (3.54)	107.8 (4.24)	95 (3.74)	70 (2.76)	123.4 (4.86)
	1FT704/1FK704	91 (3.58)	90 (3.54)	111.5 (4.39)	91 (3.58)	90 (3.54)	135.6 (5.34)
SP100S-	1FT702/1FK702	–	–	–	118 (4.65)	90 (3.54)	142.3 (5.60)
	1FT703/1FK703	–	–	–	118 (4.65)	90 (3.54)	142.3 (5.60)
	1FT704/1FK704	115 (4.53)	120 (4.72)	122 (4.80)	118 (4.65)	90 (3.54)	146 (5.75)
	1FT704/1FK706	115 (4.53)	120 (4.72)	129 (5.08)	115 (4.53)	120 (4.72)	164 (6.46)
SP140S-	1FT704/1FK704	–	–	–	152 (5.98)	120 (4.72)	186.3 (7.33)
	1FT706/1FK706	146 (5.75)	150 (5.91)	162.3 (6.39)	152 (5.98)	120 (4.72)	193.3 (7.61)
	1FT708/1FK708	146 (5.75)	150 (5.91)	171.3 (6.74)	146 (5.75)	150 (5.91)	220 (8.66)
	1FT710/1FK710	146 (5.75)	190 (7.48)	171.3 (6.74)	–	–	–
SP180S-	1FT706/1FK706	–	–	–	212 (8.35)	150 (5.91)	234 (9.21)
	1FT708/1FK708	207 (8.15)	210 (8.27)	198 (7.80)	212 (8.35)	150 (5.91)	242.9 (9.56)
	1FT710/1FK710	207 (8.15)	210 (8.27)	203.5 (8.01)	212 (8.35)	190 (7.48)	242.9 (9.56)
SP210S-	1FT708/1FK708	–	–	–	215 (8.46)	210 (8.27)	272 (10.71)
	1FT710/1FK710	215 (8.46)	190 (7.48)	242 (9.53)	215 (8.46)	210 (8.27)	272 (10.71)
	1FT713	215 (8.46)	260 (7.48)	242 (9.53)	–	–	–
SP240S-	1FT708/1FK708	–	–	–	245 (9.65)	210 (8.27)	297.5 (11.71)
	1FT710/1FK710	245 (9.65)	240 (9.45)	273 (10.75)	245 (9.65)	210 (8.27)	297.5 (11.71)
	1FT713	245 (9.65)	260 (9.45)	273 (10.75)	245 (9.65)	260 (8.27)	297.5 (11.71)

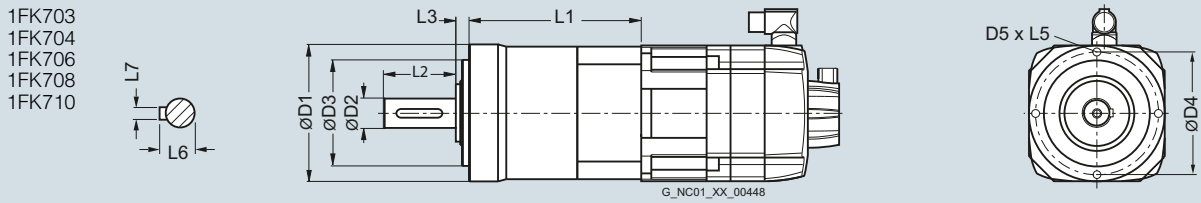
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Dimensional drawings

For LP+ series planetary gearboxes on SIMOTICS S-1FK7 motors

Dimensions in mm (inches)

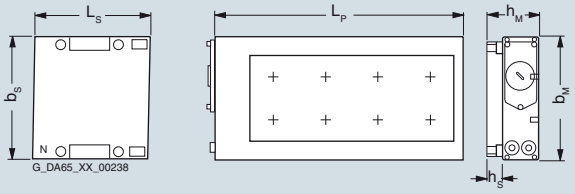
Planetary gearbox Type	Motor Type	L1	L2	L3	L5	L6	L7	D1	D2	D3	D4	D5
1FK7 with planetary gearbox series LP+												
LP050-MO1	1FK702	63 (2.48)	18 (0.71)	6.5 (0.26)	8 (0.31)	13.5 (0.53)	4 (0.16)	50 (1.97)	12 (0.47)	35 (1.38)	44 (1.73)	M4
LP070-MO1	1FK702	83 (3.27)	28 (1.10)	8 (0.31)	10 (0.39)	18 (0.71)	5 (0.20)	70 (2.76)	16 (0.63)	52 (2.05)	62 (2.44)	M5
	1FK703	90 (3.54)										
LP090-MO1	1FK704	112 (4.41)	36 (1.42)	10 (0.39)	12 (0.47)	24.5 (0.96)	6 (0.24)	90 (3.54)	22 (0.87)	68 (2.68)	80 (3.15)	M6
	1FK706	122 (4.80)										
	1FK708	132 (5.20)										
LP120-MO1	1FK706	140 (5.51)	58 (2.28)	12 (0.47)	16 (0.63)	35 (1.38)	10 (0.39)	120 (4.72)	32 (1.26)	90 (3.54)	108 (4.25)	M8
	1FK708	150 (5.91)										
LP155-MO1	1FK708	168.5 (6.63)	82 (3.23)	15 (0.59)	20 (0.79)	43 (1.69)	12 (0.47)	155 (6.10)	40 (1.57)	120 (4.72)	140 (5.51)	M10
	1FK710	188.5 (7.42)										



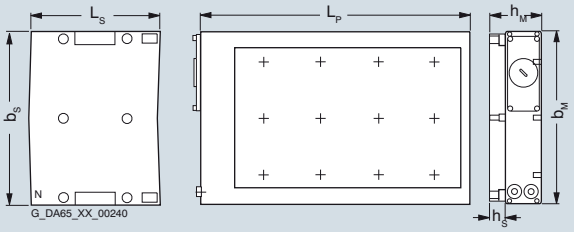
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Dimensional drawings

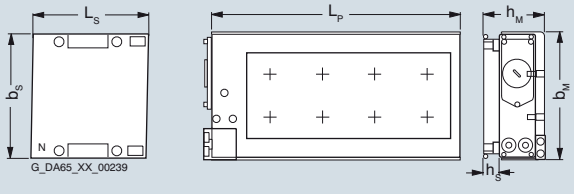
Primary section	Dimensions in mm (inches)					Secondary section	Dimensions in mm (inches)				
	without precision cooling		with precision cooling		Primary section length		without precision cooling		with precision cooling and cover		Secondary section length
Type	b_M	h_M	b_M	h_M	L_P	Type	b_S	h_S	b_S	h_S	L_S
SIMOTICS L-1FN3 linear motors, version for peak load – Water cooling											
1FN3050-2W	67 (2.64)	48.5 (1.91)	76 (2.99)	63.4 (2.50)	255 (10.04)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (15.82) (0.46)	75 (2.95)	14.8 (0.58)	120 (4.72)
1FN3100-1W	96 (3.78)	48.5 (1.91)	–	–	150 (5.91)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (15.82) (0.46)	105 (4.13)	14.8 (0.58)	120 (4.72)
1FN3100-2W			105 (4.13)	63.4 (2.50)	255 (10.04)						
1FN3100-3W					360 (14.17)						
1FN3100-4W					465 (18.31)						
1FN3100-5W					570 (22.44)						
1FN3150-1W	126 (4.96)	50.5 (1.99)	–	–	150 (5.91)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	135 (5.31)	16.8 (0.66)	120 (4.72)
1FN3150-2W			135 (5.31)	65.4 (2.57)	255 (10.04)						
1FN3150-3W					360 (14.17)						
1FN3150-4W					465 (18.31)						
1FN3150-5W					570 (22.44)						
1FN3300-1W	141 (5.55)	64.1 (2.52)	–	–	221 (8.70)	1FN3300-4SA00-0AA0	134 (5.28)	16.5 (0.65)	151 (5.94)	19.5 (0.77)	184 (7.24)
1FN3300-2W			150 (5.91)	79 (3.11)	382 (15.04)						
1FN3300-3W					543 (21.38)						
1FN3300-4W					704 (27.72)						
1FN3450-2W	188 (7.40)	66.1 (2.60)	197 (7.76)	81 (3.19)	382 (15.04)	1FN3450-4SA00-0AA0	180 (7.09)	18.5 (0.73)	197 (7.76)	21.5 (0.85)	184 (7.24)
1FN3450-3W					543 (21.38)						
1FN3450-4W					704 (27.72)						
1FN3600-2W	248 (9.76)	64.1 (2.52)	257 (10.12)	86 (3.39)	382 (15.04)	1FN3600-4SA00-0AA0	240 (9.45)	16.5 (0.65)	247 (9.72)	26.5 (1.04)	184 (7.24)
1FN3600-3W					543 (21.38)						
1FN3600-4W					704 (27.72)						
1FN3900-2W	342 (13.46)	66.1 (2.60)	351 (13.82)	88 (3.78)	382 (15.04)	1FN3900-4SA00-0AA0	334 (13.15)	18.5 (0.73)	341 (13.43)	28.5 (1.12)	184 (7.24)
1FN3900-3W					543 (21.38)						
1FN3900-4W					704 (27.72)						



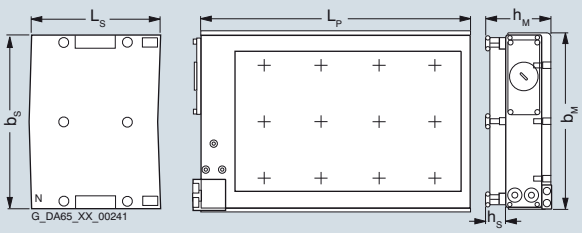
1FN3050 to 1FN3450 without precision cooling



1FN3600 to 1FN3900 without precision cooling
Note: 4-row drill pattern with 1FN3900 for fixing the primary section



1FN3050 to 1FN3450 with precision cooling

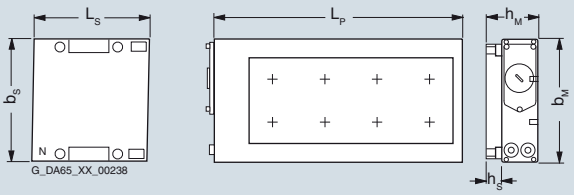


1FN3600 to 1FN3900 with precision cooling
Note: 4-row drill pattern with 1FN3900 for fixing the primary section

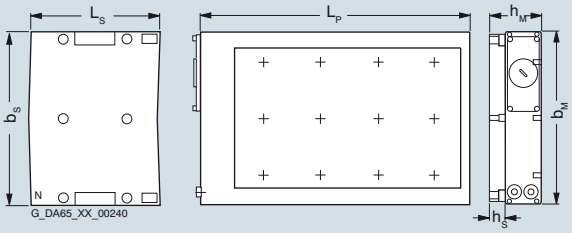
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Dimensional drawings

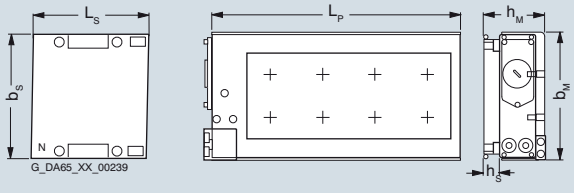
Primary section	Dimensions in mm (inches)					Secondary section	Dimensions in mm (inches)				
	without precision cooling		with precision cooling		Primary section length		without precision cooling		with precision cooling		Secondary section length
Type	b_M	h_M	b_M	h_M	L_P	Type	b_S	h_S	b_M	h_M	L_S
SIMOTICS L-1FN3 linear motors, version for continuous load – Water cooling											
1FN3050-1ND	67 (2.64)	59.4 (2.34)	76 (2.99)	74.3 (2.93)	162 (6.38)	1FN3050-4SA00-0AA0	58 (2.28)	11.8 (0.46)	75 (2.95)	14.8 (0.58)	120 (4.72)
1FN3050-2NB					267 (10.51)						
1FN3100-1NC	96 (3.78)	59.4 (2.34)	105 (4.13)	74.3 (2.93)	162 (6.38)	1FN3100-4SA00-0AA0	88 (3.46)	11.8 (0.46)	105 (4.13)	14.8 (0.58)	120 (4.72)
1FN3100-2NC					267 (10.51)						
1FN3100-3NC					372 (14.65)						
1FN3100-4NC					477 (18.78)						
1FN3150-1NC	126 (4.96)	61.4 (2.42)	135 (5.31)	76.3 (3.00)	162 (6.38)	1FN3150-4SA00-0AA0	118 (4.65)	13.8 (0.54)	135 (5.31)	16.8 (0.66)	120 (4.72)
1FN3150-2NB					267 (10.51)						
1FN3150-3NC					372 (14.65)						
1FN3150-4NB					477 (18.78)						
1FN3300-1NC	141 (5.55)	78 (3.07)	150 (5.91)	92.9 (3.66)	238 (9.37)	1FN3300-4SA00-0AA0	134 (5.28)	16.5 (0.65)	151 (5.94)	19.5 (0.77)	184 (7.24)
1FN3300-2NC					399 (15.71)						
1FN3300-3NC					560 (22.05)						
1FN3300-4NB					721 (28.39)						
1FN3450-2NC	188 (7.40)	80 (3.15)	197 (7.76)	94.9 (3.74)	399 (15.71)	1FN3450-4SA00-0AA0	180 (7.09)	18.5 (0.73)	197 (7.76)	21.5 (0.85)	184 (7.24)
1FN3450-3NC					560 (22.05)						
1FN3450-4NB					721 (28.39)						
1FN3600-2NB	248 (9.76)	78 (3.07)	257 (10.12)	99.9 (3.93)	399 (15.71)	1FN3600-4SA00-0AA0	240 (9.45)	16.5 (0.65)	247 (9.72)	26.5 (1.04)	184 (7.24)
1FN3600-3NB					560 (22.05)						
1FN3600-4NB					721 (28.39)						
1FN3900-2NB	342 (13.46)	80 (3.15)	351 (13.82)	101.9 (4.01)	399 (15.71)	1FN3900-4SA00-0AA0	334 (13.15)	18.5 (0.73)	341 (13.43)	28.5 (1.12)	184 (7.24)
1FN3900-3NB					560 (22.05)						
1FN3900-4NB					721 (28.39)						



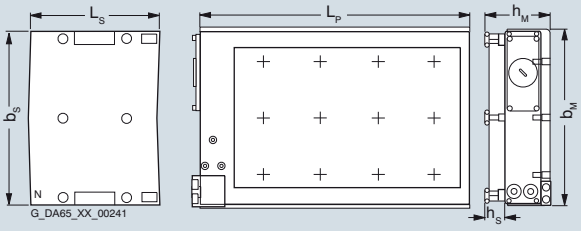
1FN3050 to 1FN3450 without precision cooling



1FN3600 to 1FN3900 without precision cooling
Note: 4-row drill pattern with 1FN3900 for fixing the primary section



1FN3050 to 1FN3450 with precision cooling



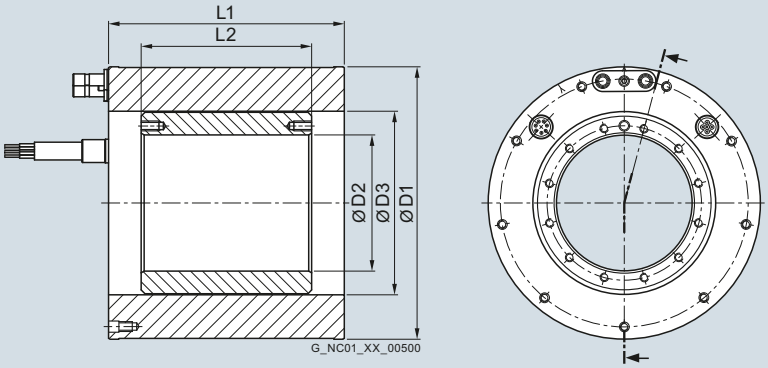
1FN3600 to 1FN3900 with precision cooling
Note: 4-row drill pattern with 1FN3900 for fixing the primary section

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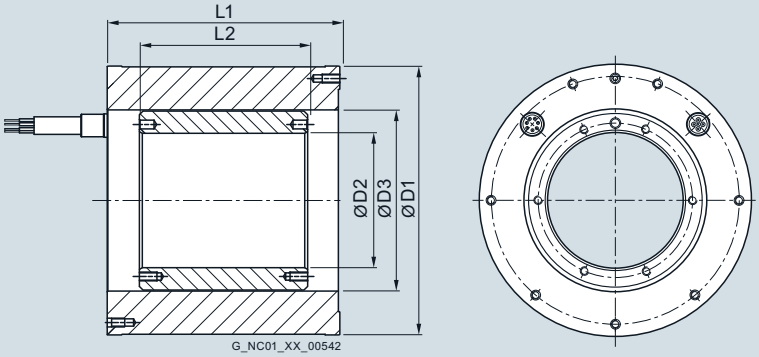
Dimensional drawings

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors, individual components, water cooling or natural cooling					
1FW605.-0.B03	159 (6.26)	64 (2.52)	96 (3.78)	89 (3.50)	35 (1.38)
1FW605.-0.B05				109 (4.29)	65 (2.56)
1FW605.-0.B07				129 (5.08)	85 (3.35)
1FW605.-0.B10				159 (6.26)	115 (4.53)
1FW605.-0.B15				209 (8.23)	165 (6.50)
1FW606.-0.B03	184 (7.24)	92 (3.62)	124 (4.88)	89 (3.50)	35 (1.38)
1FW606.-0.B05				109 (4.29)	65 (2.56)
1FW606.-0.B07				129 (5.08)	85 (3.35)
1FW606.-0.B10				159 (6.26)	115 (4.53)
1FW606.-0.B15				209 (8.23)	165 (6.50)

Water cooling
1FW6050
1FW6060



Natural cooling
1FW6053
1FW6063



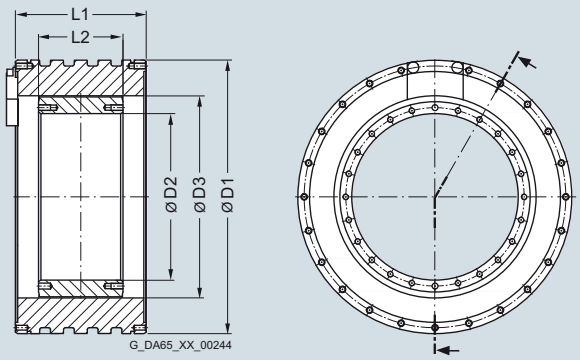
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SIMOTICS T-1FW6 – Water cooling

Dimensional drawings

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors, individual components, water cooling					
1FW6090-0.B05	230 (9.06)	140 (5.51)	170 (6.69)	90 (3.54)	51 (2.01)
1FW6090-0.B07				110 (4.33)	71 (2.80)
1FW6090-0.B10				140 (5.51)	101 (3.98)
1FW6090-0.B15				190 (7.48)	151 (5.94)
1FW6130-0.B05	310 (12.20)	220 (8.66)	254 (10.00)	90 (3.54)	51 (2.01)
1FW6130-0.B07				110 (4.33)	71 (2.80)
1FW6130-0.B10				140 (5.51)	101 (3.98)
1FW6130-0.B15				190 (7.48)	151 (5.94)
1FW6150-0.B05	385 (15.16)	265 (10.43)	300 (11.81)	110 (4.33)	51 (2.01)
1FW6150-0.B07				130 (5.12)	71 (2.80)
1FW6150-0.B10				160 (6.30)	101 (3.98)
1FW6150-0.B15				210 (8.27)	151 (5.94)

Water cooling
1FW6090
1FW6130
1FW6150

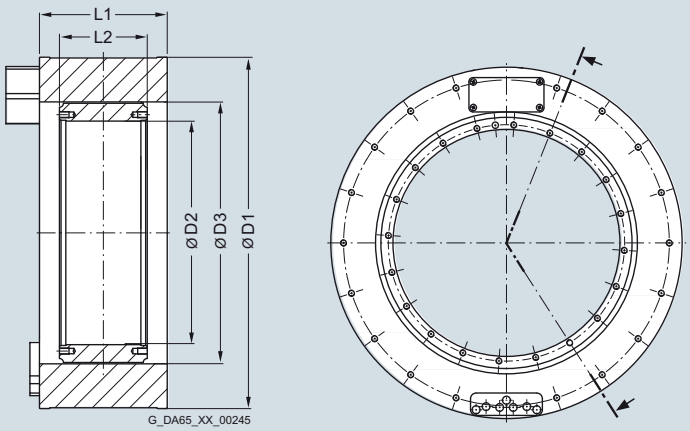


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Dimensional drawings

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
SIMOTICS T-1FW6 built-in torque motors, individual components, water cooling					
1FW6160-0.B05	440 (17.32)	280 (11.02)	328 (12.91)	110 (4.33)	60 (2.36)
1FW6160-0.B07				130 (5.12)	80 (3.15)
1FW6160-0.B10-.J.2/-5G.2/-8FB2				160 (6.30)	110 (4.33)
1FW6160-0.B10-2PB2				170 (6.69)	110 (4.33)
1FW6160-0.B15-2J.2/-5G.2/-8FB2				210 (8.27)	160 (6.30)
1FW6160-0.B15-2PB2/-0WB2				220 (8.66)	160 (6.30)
1FW6160-0.B20-5G.2/-8FB2				260 (10.23)	210 (8.27)
1FW6160-0.B20-2PB2/-0WB2				270 (10.63)	210 (8.27)
1FW6190-0.B05	502 (19.76)	342 (13.46)	389 (15.31)	110 (4.33)	60 (2.36)
1FW6190-0.B07				130 (5.12)	80 (3.15)
1FW6190-0.B10-.J.2/-5G.2/-8FB2				160 (6.30)	110 (4.33)
1FW6190-0.B10-2PB2				170 (6.69)	110 (4.33)
1FW6190-0.B15-2J.2/-5G.2/-8FB2				210 (8.27)	160 (6.30)
1FW6190-0.B15-2PB2/-0WB2				220 (8.66)	160 (6.30)
1FW6190-0.B20-5G.2/-8FB2				260 (10.24)	210 (8.27)
1FW6190-0.B20-2PB2/-0WB2				270 (10.63)	210 (8.27)
1FW6230-0.B05	576 (22.68)	416 (16.38)	463 (18.23)	110 (4.33)	60 (2.36)
1FW6230-0.B07				130 (5.12)	80 (3.15)
1FW6230-0.B10				160 (6.30)	110 (4.33)
1FW6230-0.B15-4C.2/-5G.2/-8FB2/-2PB2				210 (8.27)	160 (6.30)
1FW6230-0.B15-0WB2				220 (8.66)	160 (6.30)
1FW6230-0.B20-5G.2/-8FB2/-2PB2				260 (10.24)	210 (8.27)
1FW6230-0.B20-0WB2				270 (10.63)	210 (8.27)
1FW6290-0.B07-5G.2/-0LB2	730 (28.74)	520 (20.47)	580 (22.83)	140 (5.51)	90 (3.54)
1FW6290-0.B07-2PB2				160 (6.30)	90 (3.54)
1FW6290-0.B11-7A.2/-0LB2				180 (7.09)	130 (5.12)
1FW6290-0.B11-2PB2				200 (7.87)	130 (5.12)
1FW6290-0.B15-7A.2/-0LB2				220 (8.66)	170 (6.69)
1FW6290-0.B15-2PB2				240 (9.45)	170 (6.69)
1FW6290-0.B20-0LB2				260 (10.24)	210 (8.27)
1FW6290-0.B20-2PB2				280 (11.02)	210 (8.27)

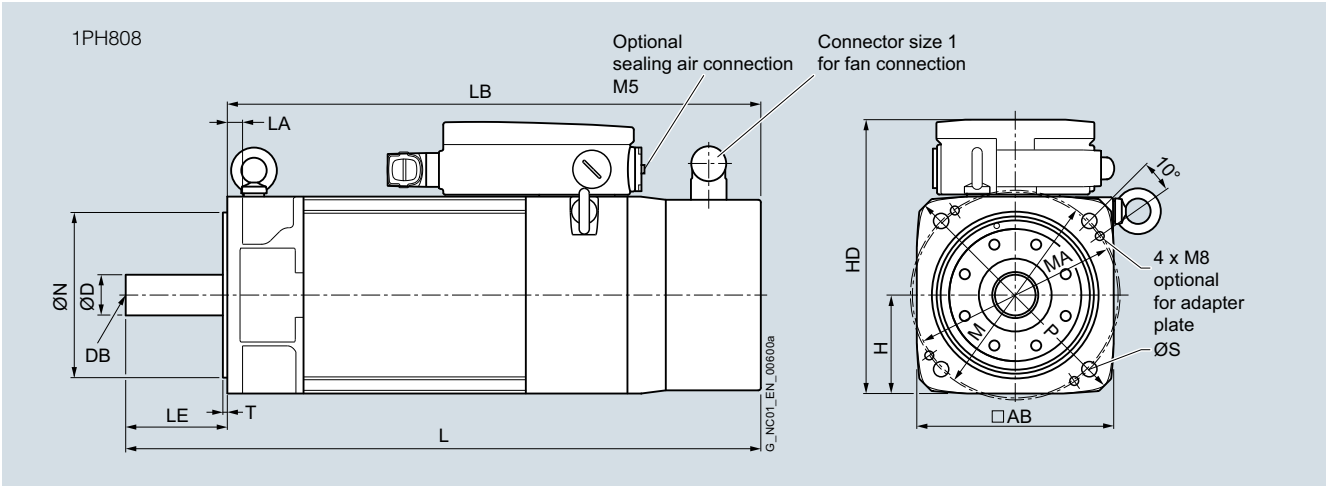
Water cooling
1FW6160
1FW6190
1FW6230
1FW6290



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Dimensional drawings

For motor		Dimensions in mm (inches)												Shaft extension DE		
Shaft height	Type	IEC	AB	H	HD	L	LA	LB	M	N	P	S	T	**D**	DB	LE
1PH8 Premium Performance, type of construction IM B5, forced ventilation, solid shaft																
80	1PH8081		155 (6.10)	77.5 (3.05)	213.5 (8.41)	375 (14.75)	12 (0.45)	325 (12.80)	165 (6.50)	130 (5.12)	200 (7.87)	12 (0.47)	3.5 (0.14)	**24 (0.94)**	M6	50 (1.97)
	1PH8083					425 (16.73)		375 (14.75)								
	1PH8087					475 (18.70)		425 (16.73)								

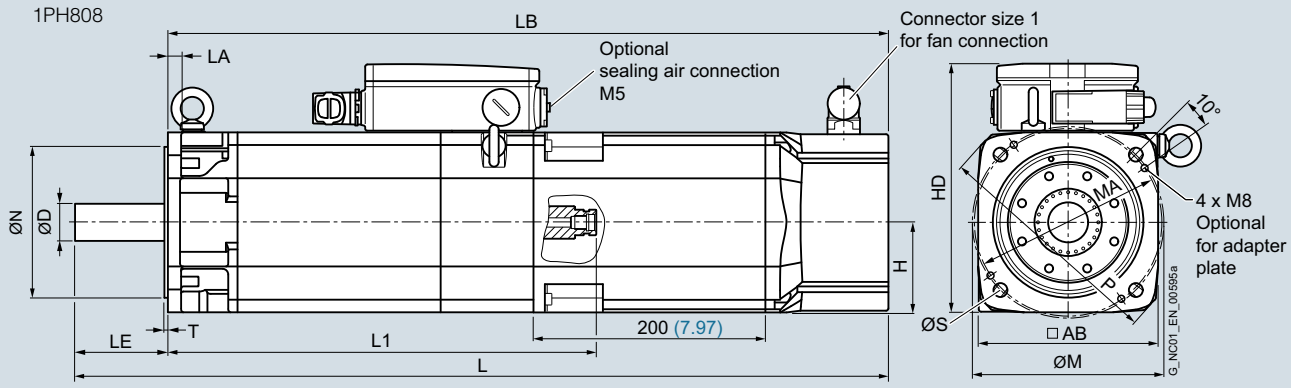


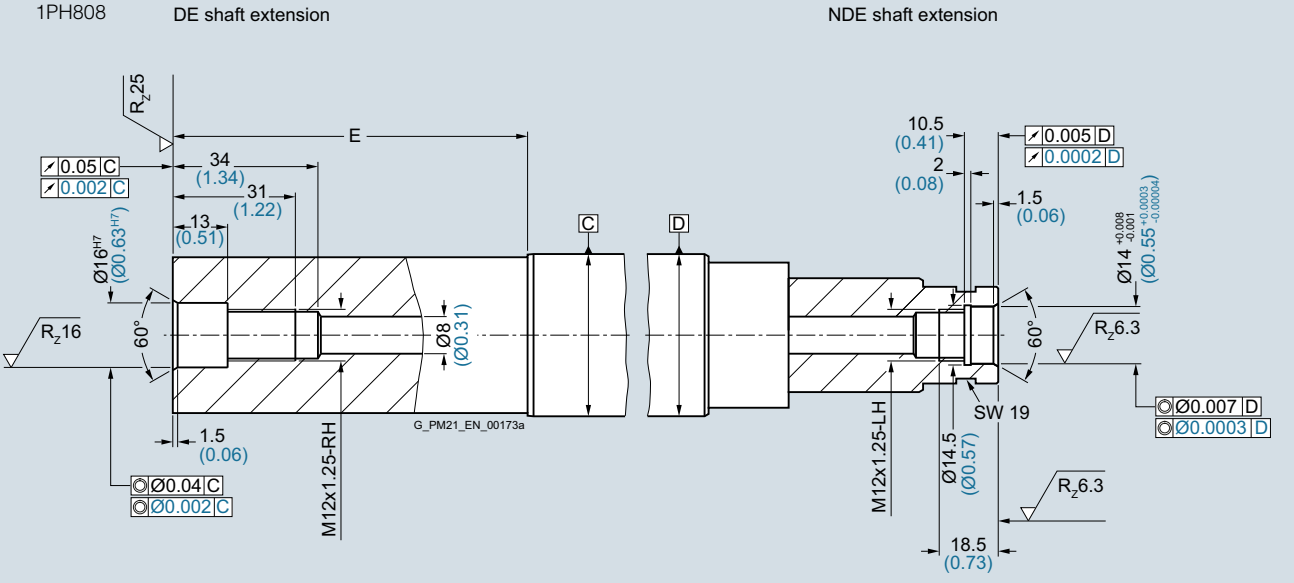
6

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Dimensional drawings

For motor		Dimensions in mm (inches)														Shaft extension DE		
Shaft height	Type	IEC	AB	H	HD	L	LA	LB	L1	M	MA	N	P	S	T	**D**	E	LE
1PH8 Premium Performance, type of construction IM B5, forced ventilation, hollow shaft																		
80	1PH8081		155 (6.10)	77.5 (3.05)	213.5 (8.41)	575 (22.64)	12 (0.45)	525 (20.67)	269.3 (10.60)	165 (6.50)	162 (6.38)	130 (5.12)	200 (7.87)	12 (0.47)	3.5 (0.14)	**24 (0.94)**	50 (1.97)	50 (1.97)
	1PH8083					625 (24.61)		575 (22.64)	319.3 (12.57)									
	1PH8087					675 (26.57)		625 (24.61)	369.3 (14.54)									





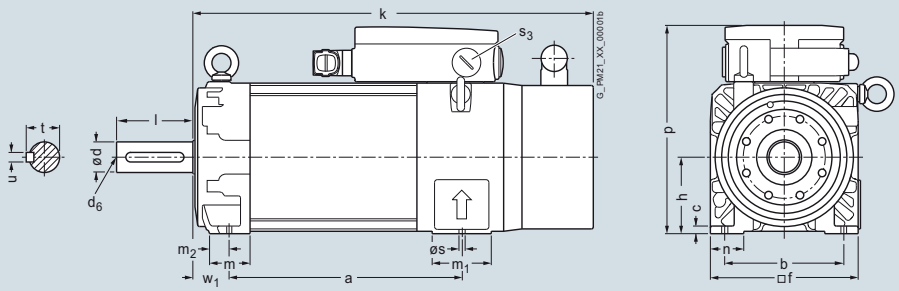
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Dimensional drawings

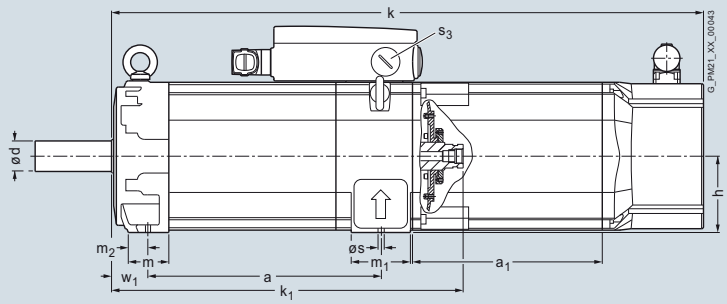
For motor			Dimensions in mm (inches)														
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	h H	k LB	m BA	m_1 –	m_2 –	n AA	p HD	p_1 –	s K	s_3 –	w_1 C
1PH8 type of construction IM B3, forced ventilation																	
80	1PH8083		194 (7.64)	125 (4.92)	8 (0.31)	155 (6.10)	80 (3.15)	375 (14.76)	42 (1.65)	62 (2.44)	20 (0.79)	35 (1.38)	216 (8.5)	253.5 (9.98)	10 (0.39)	M25×1.5	38 (1.50)
	1PH8087		244 (9.61)					425 (16.73)									

			Shaft extension DE					Version with hollow shaft	
Shaft height	Type	DIN IEC	**d** **D**	l E	d_6 –	t GA	u F	k LB	k_1 –
80	1PH8083		**32** **(1.26)**	80 (3.15)	M12	35 (1.39)	10 (0.39)	575 (22.64)	319.3 (12.57)
	1PH8087							625 (24.61)	369.3 (14.54)

1PH808



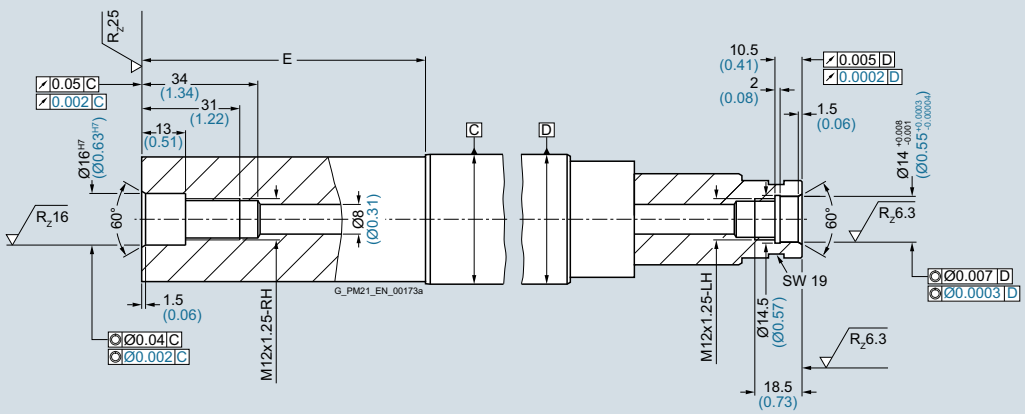
Version with hollow shaft



Hollow shaft

DE shaft extension

NDE shaft extension



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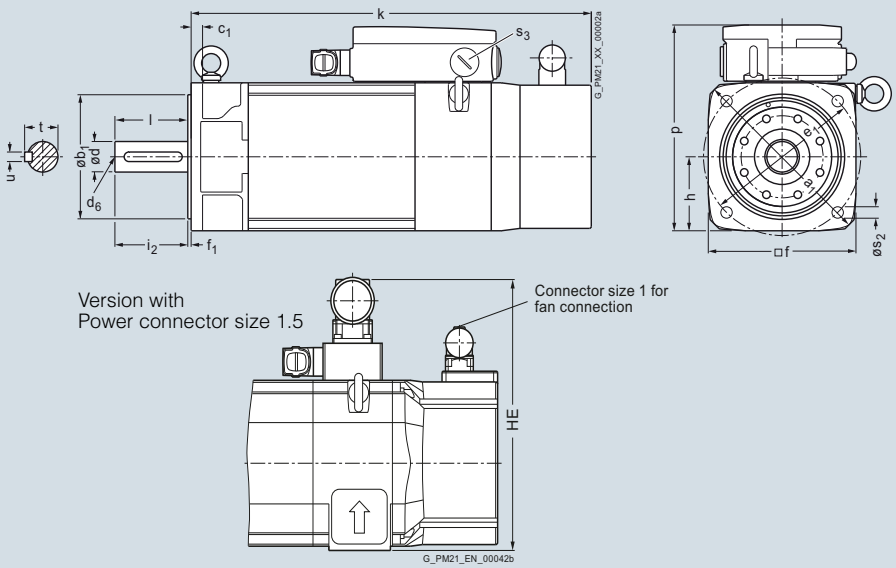
Dimensional drawings

For motor — Dimensions in mm (inches)

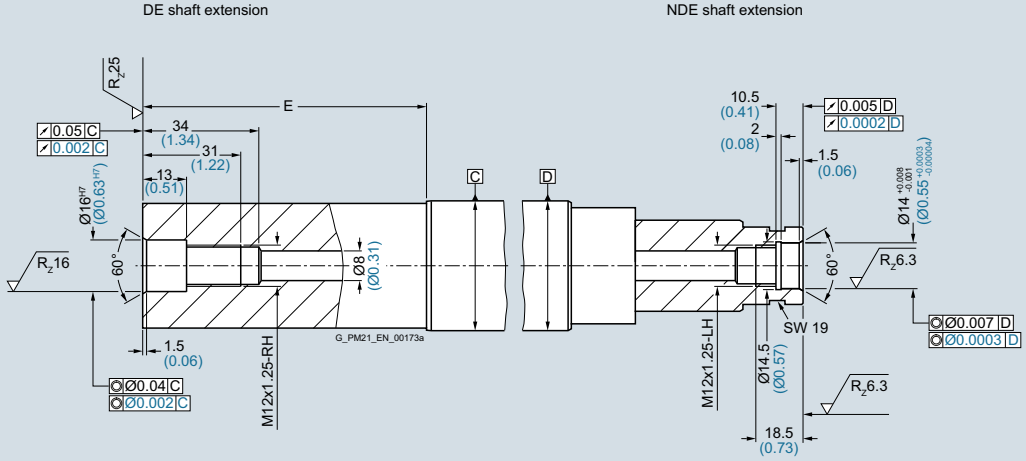
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	p HD	p_1 –	s_2 –	s_3 –
1PH8 type of construction IM B5, forced ventilation														
80	1PH8083		200 (7.87)	130 (5.12)	12 (0.47)	165 (6.50)	155 (6.10)	3.5 (0.14)	77.5 (3.05)	375 (14.76)	213.5 (8.41)	251 (9.88)	12 (0.47)	M25×1.5
	1PH8087									425 (16.73)				

			Shaft extension DE						Version with hollow shaft	
Shaft height	Type	DIN IEC	**d** **D**	l E	d_6 –	i_2 E	t GA	u F	k LB	k_1 –
80	1PH8083		**32** **(1.26)**	80 (3.15)	M12	80 (3.15)	35 (1.38)	10 (0.39)	575 (22.64)	319.3 (12.57)
	1PH8087								625 (24.61)	369.3 (14.54)

1PH808



Hollow shaft



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Dimensional drawings

For motor — Dimensions in mm (inches)

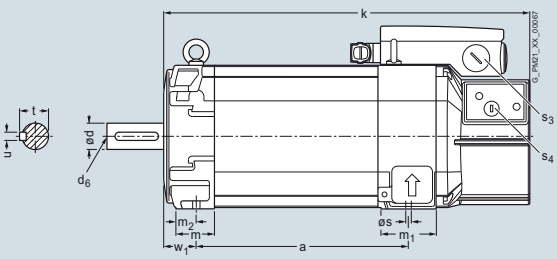
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	h H	k LB	m BA	m_1 –	m_2 –	n AA	p HD	p_1 –	p_2 –	p_3 –
1PH8 type of construction IM B3, forced ventilation																
100	1PH8101		167 (6.57)	160 (6.30)	11 (0.43)	196 (7.72)	100 (3.94)	369.5 (14.55)	49 (1.93)	74 (2.91)	24 (0.94)	40 (1.57)	252 (9.92)	294 (11.6)	198 (7.80)	276.5 (10.89)
	1PH8103		202.5 (7.97)					405 (15.94)								
	1PH8105		262 (10.31)					464.5 (18.29)								
	1PH8107		297.5 (11.71)					500 (19.69)								
132	1PH8131		220.5 (8.68)	216 (8.50)	15 (0.59)	260 (10.24)	132 (5.2)	439 (17.28)	57 (2.24)	93 (3.66)	27 (1.06)	52 (2.05)	317.5 (12.50)	347 (13.66)	262 (10.31)	357.5 (14.07)
	1PH8133		265.5 (10.45)					484 (19.06)								
	1PH8135		310.5 (12.22)					529 (20.83)								
	1PH8137		350.5 (13.80)					569 (22.40)								

							Shaft extension DE					Version with hollow shaft				
Shaft height	Type	DIN IEC	s K	s_3 –	s_4 –	w_1 C	**d D**	l E	d_6 –	t GA	u F	k LB	k_1 –	p HD	p_3 –	s_3 –
100	1PH8101		12 (0.47)	M32×1.5	M20×1.5	43 (1.69)	**38 (1.50)**	80 (3.15)	M12	41 (1.61)	10 (0.39)	569.5 (22.42)	312.3 (12.30)	266.5 (10.49)	276.5 (10.89)	M32×1.5
	1PH8103											605 (23.82)	347.8 (13.69)			
	1PH8105											664.5 (26.16)	407.3 (16.04)			
	1PH8107											700 (27.56)	442.8 (17.43)			
132	1PH8131		12 (0.47)	M40×1.5	M20×1.5	53 (2.09)	**48 (1.89)**	110 (4.33)	M16	51.5 (2.03)	14 (0.55)	639 (25.16)	372.8 (14.68)	347.5 (13.68)	357.5 (14.07)	M50×1.5
	1PH8133											684 (26.93)	417.8 (16.45)			
	1PH8135											729 (28.70)	462.8 (18.22)			
	1PH8137											769 (30.28)	502.8 (19.80)			

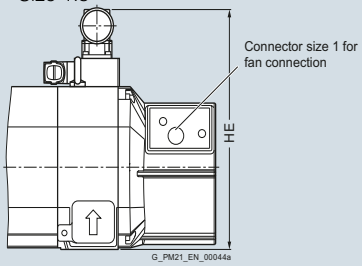
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Dimensional drawings

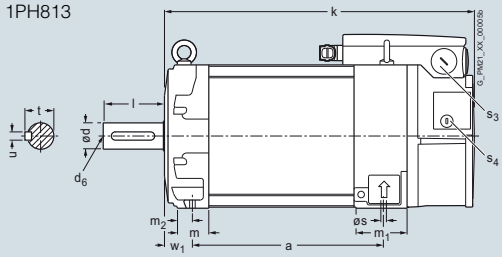
1PH810



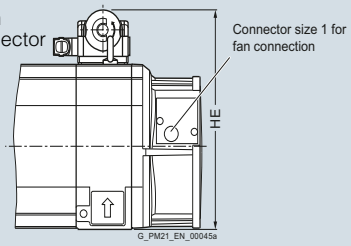
Version with Power connector Size 1.5



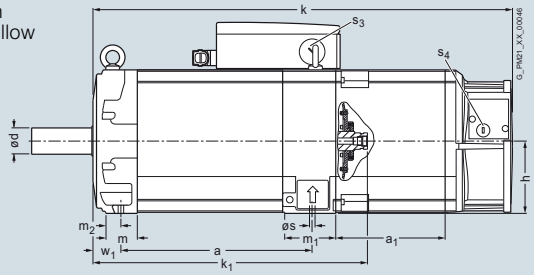
1PH813



Version with Power connector Size 3



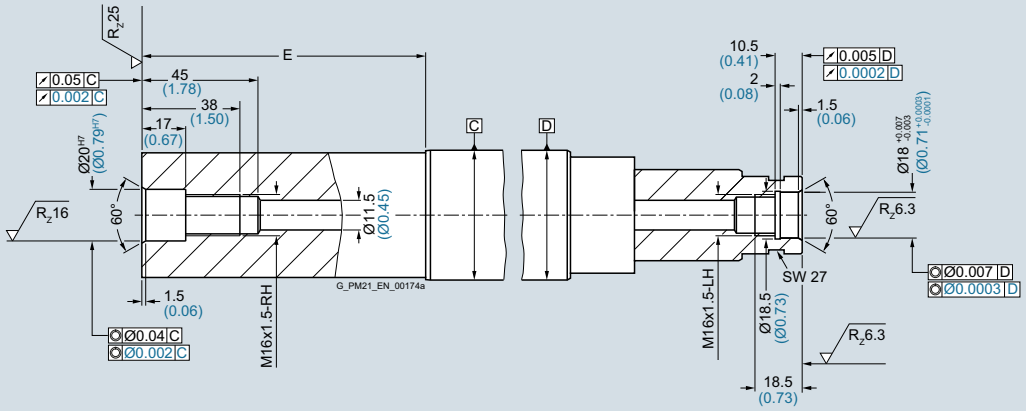
Version with hollow shaft



Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension



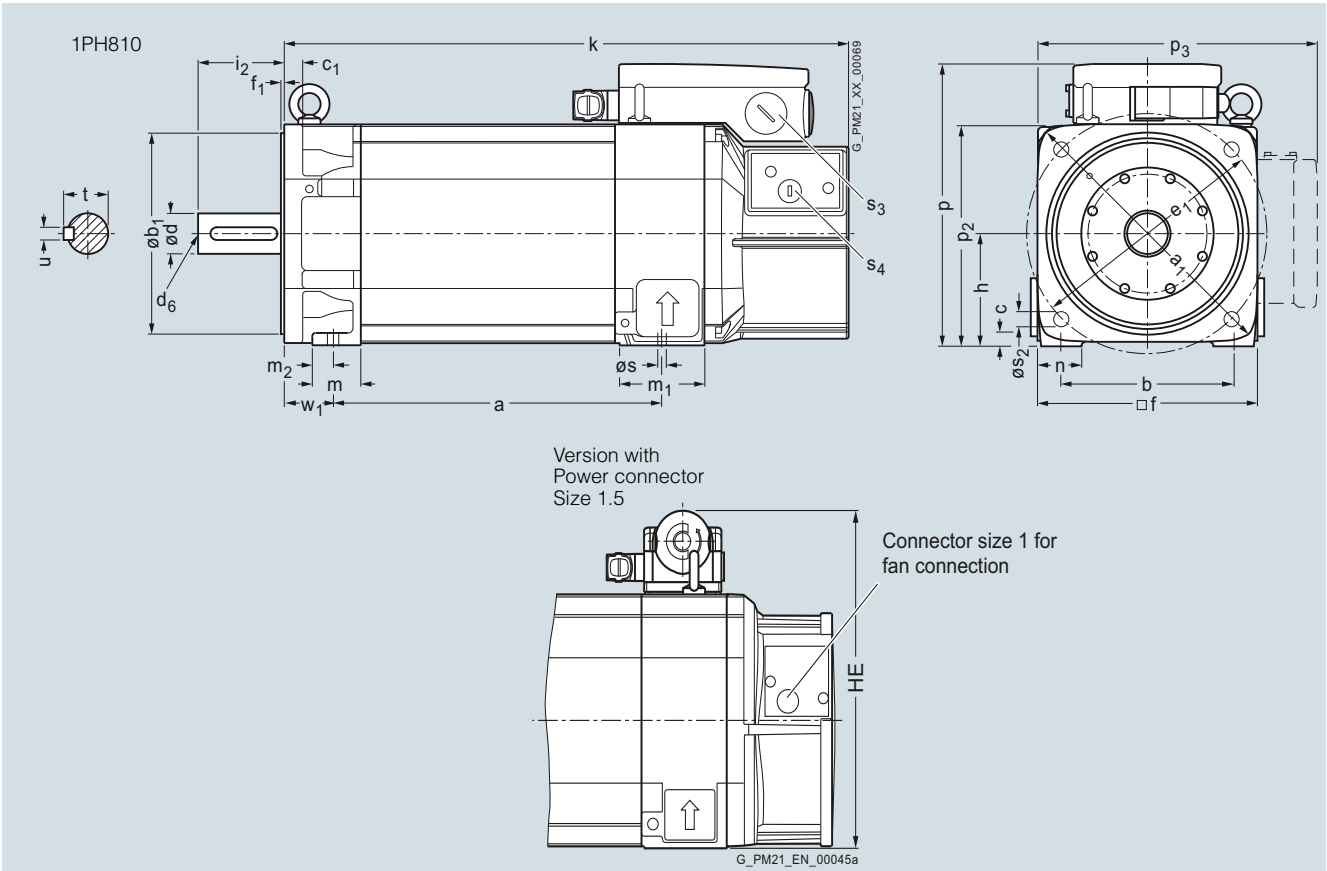
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Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA	p HD	– HE
1PH8 type of construction IM B35, forced ventilation																			
100	1PH8101		167 (6.57)	250 (9.84)	160 (6.30)	180 (7.09)	11 (0.43)	16 (0.63)	215 (8.46)	196 (7.72)	4 (0.16)	100 (3.94)	369.5 (14.55)	44 (1.73)	74 (2.91)	19 (0.75)	40 (1.57)	252 (9.92)	294 (11.57)
	1PH8103		202.5 (7.97)										405 (15.94)						
	1PH8105		262 (10.31)										464.5 (18.29)						
	1PH8107		297.5 (11.71)										500 (19.69)						

			Shaft extension DE											Version with hollow shaft				
Shaft height	Type	DIN IEC	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	**d D**	l L	d_6 –	i_2 E	t GA	u F	k LB	k_1 –	p HD	p_3 –	s_3 –
100	1PH8101		198 (7.80)	276.5 (10.89)	12 (0.47)	14 (0.55)	M32×1.5	M20×1.5	43 (1.69)	**38 (1.50)**	80 (3.15)	M12	80 (3.15)	41 (1.61)	10 (0.39)	569.5 (22.42)	312.3 (12.30)	266.5 (10.49)	276.5 (10.89)	M32×1.5
	1PH8103															605 (23.82)	347.8 (13.69)			
	1PH8105															664.5 (26.16)	407.3 (16.04)			
	1PH8107															700 (27.56)	442.8 (17.43)			



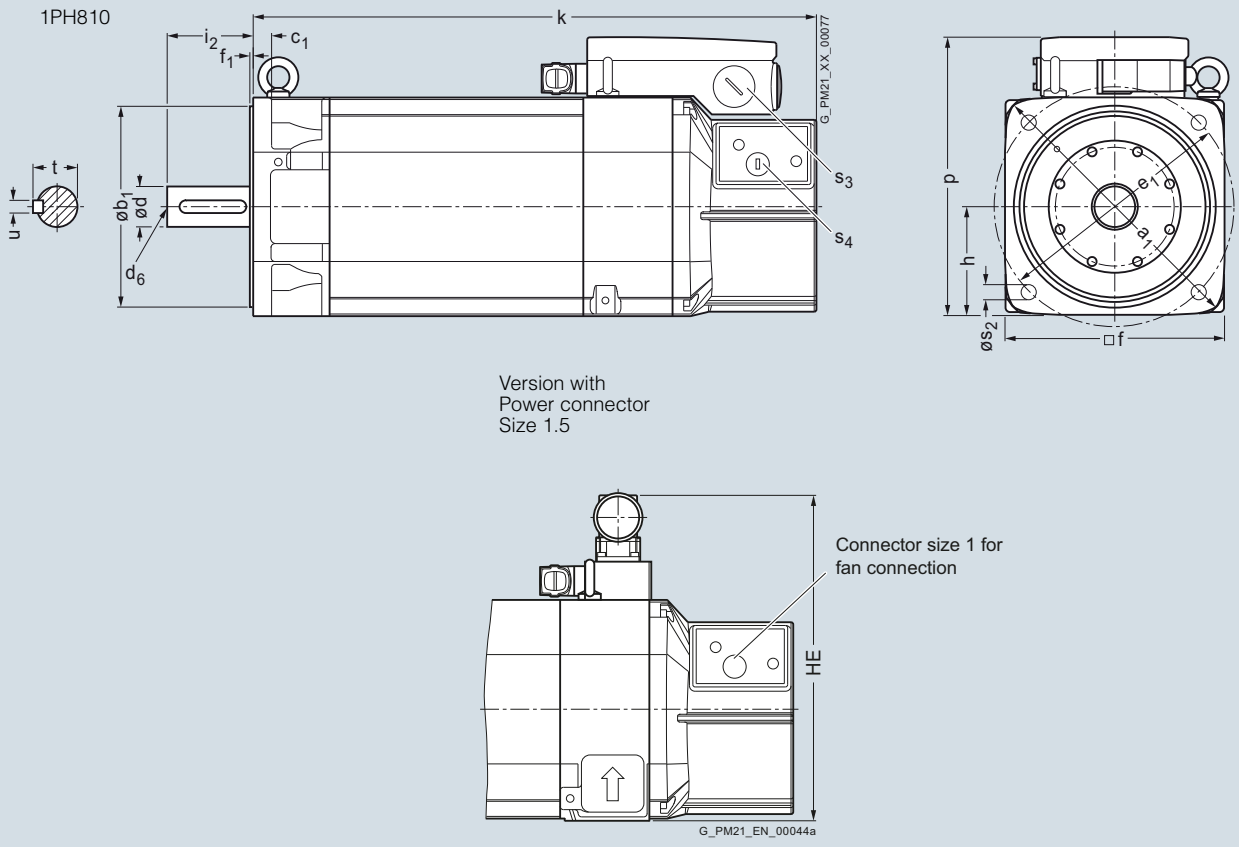
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Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	p HD	– HE
1PH8 type of construction IM B5, forced ventilation												
100	1PH8101		250 (9.84)	180 (7.09)	16 (0.63)	215 (8.46)	196 (7.72)	4 (0.16)	98 (3.86)	369.5 (14.55)	250 (9.84)	292 (11.50)
	1PH8103									405 (15.94)		
	1PH8105									464.5 (18.29)		
	1PH8107									500 (19.69)		

						Shaft extension DE						Version with hollow shaft			
Shaft height	Type	DIN IEC	s_2 –	s_3 –	s_4 –	**d** **D**	l L	d_6 –	i_2 E	t GA	u F	k LB	k_1 –	p HD	s_3 –
100	1PH8101		14 (0.55)	M32×1.5	M20×1.5	**38** **(1.50)**	80 (3.15)	M12	80 (3.15)	41 (1.61)	10 (0.39)	569.5 (22.42)	312.3 (12.30)	264.5 (10.41)	M32×1.5
	1PH8103											605 (23.82)	347.8 (13.69)		
	1PH8105											664.5 (16.16)	407.3 (16.04)		
	1PH8107											700 (17.56)	442.8 (17.43)		

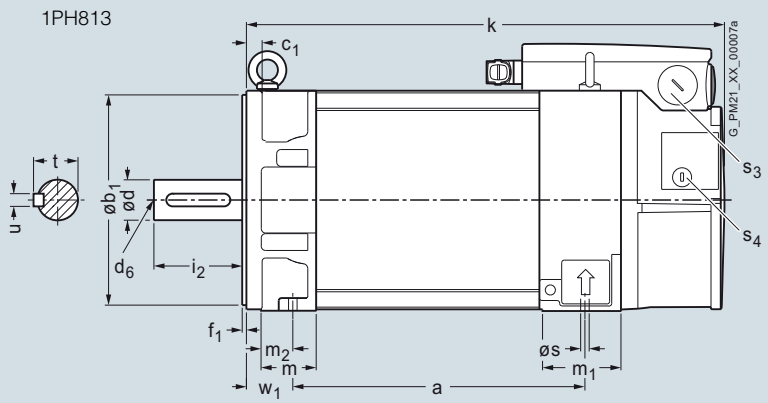


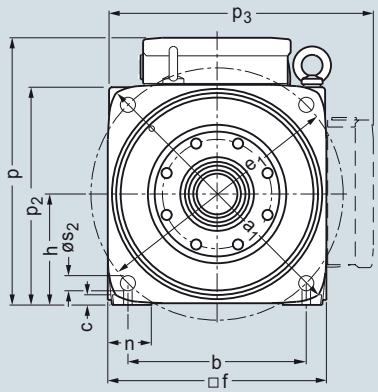
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Dimensional drawings

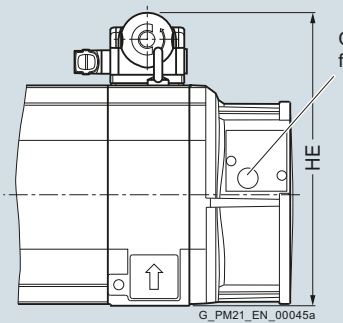
For motor		Dimensions in mm (inches)																	
Shaft height	Type	DIN IEC a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA	p HD	– HE
1PH8 type of construction IM B35, forced ventilation																		
132	1PH8131	220.5 (8.68)	340 (13.39)	216 (8.50)	250 (9.84)	15 (0.59)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	132 (5.20)	439 (17.28)	65 (2.56)	93 (3.66)	35 (1.38)	52 (2.05)	317.5 (12.50)	347 (13.66)
	1PH8133	265.5 (10.45)										484 (19.06)						
	1PH8135	310.5 (12.22)										529 (20.83)						
	1PH8137	350.4 (13.80)										569 (22.40)						

									Shaft extension DE						Version with hollow shaft				
Shaft height	Type	DIN IEC p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	**d** **D**	l L	d_6 –	i_2 E	t GA	u F	k LB	k_1 –	p HD	p_3 –	s_3 –
132	1PH8131	262 (10.31)	357.5 (14.07)	12 (0.47)	18 (0.71)	M40×1.5	M20×1.5	53 (2.09)	**48** **(1.89)**	110 (4.33)	M16	110 (4.33)	51.5 (2.03)	14 (0.55)	639 (25.16)	372.8 (14.68)	347.5 (13.68)	357.5 (14.07)	M50×1.5
	1PH8133														684 (26.93)	417.8 (16.45)			
	1PH8135														729 (28.70)	462.8 (18.22)			
	1PH8137														769 (30.28)	502.8 (19.80)			





Version with
Power connector
Size 3



Connector size 1 for
fan connection

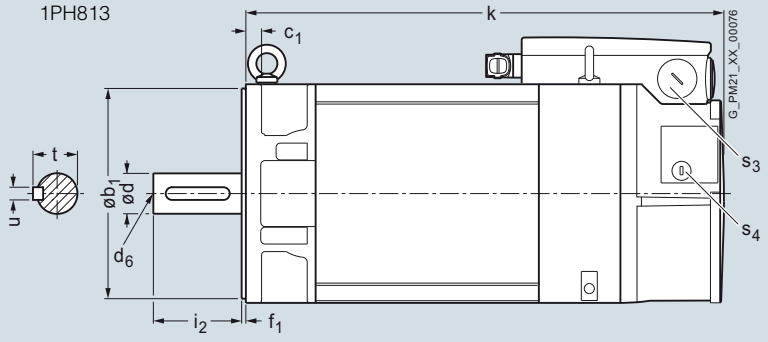
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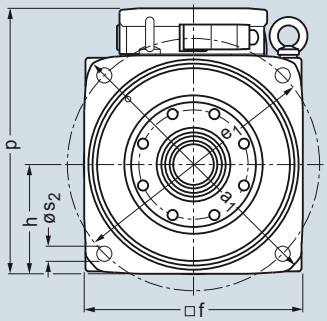
Dimensional drawings

For motor			Dimensions in mm (inches)									
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	p HD	– HE
1PH8 type of construction IM B5, forced ventilation												
132	1PH8131		340 (13.39)	250 (9.84)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	130 (5.12)	439 (17.28)	315.5 (12.42)	345 (13.58)
	1PH8133									484 (19.06)		
	1PH8135									529 (20.83)		
	1PH8137									569 (22.40)		

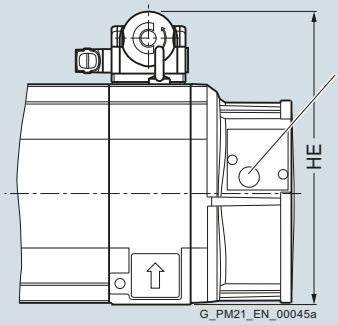
						Shaft extension DE						Version with hollow shaft			
Shaft height	Type	DIN IEC	s_2 –	s_3 –	s_4 –	**d** D	l L	d_6 –	i_2 E	t GA	u F	k LB	k_1 –	p HD	s_3 –
132	1PH8131		18 (0.71)	M40×1.5	M20×1.5	**48 (1.89)**	110 (4.33)	M16	110 (4.33)	51.5 (2.03)	14 (0.55)	639 (25.16)	372.8 (14.68)	345.5 (13.60)	M50×1.5
	1PH8133											684 (26.93)	417.8 (16.45)		
	1PH8135											729 (28.70)	462.8 (18.22)		
	1PH8137											769 (30.28)	502.8 (19.80)		

1PH813





Version with
Power connector
Size 3



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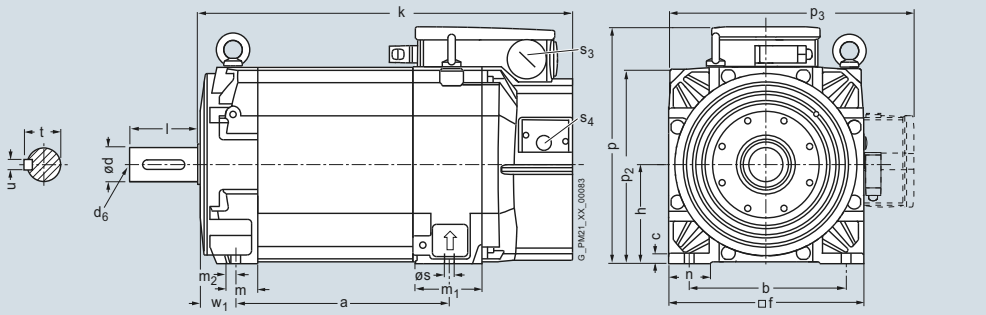
Dimensional drawings

For motor — Dimensions in mm (inches)

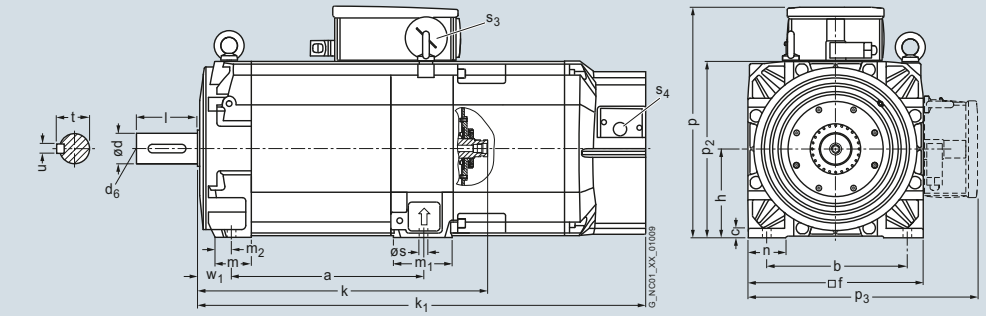
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, forced ventilation																	
160	1PH8163		346.5 (13.64)	–	254 (10.00)	–	17 (0.67)	23 (0.91)	–	314 (12.36)	–	160 (6.30)	610.5 (24.04)	64 (2.52)	99.5 (3.92)	28 (1.10)	70 (2.76)
	1PH8165		406.5 (16.00)										670.5 (26.40)				

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 Cv	Shaft extension DE: **d D**	d_6 –	l E	t GA	u F	Version with hollow shaft: k LB	k_1 –	p HD	s_3 –
160	1PH8163		382.5 (15.06)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	–	M50×1.5	M20×1.5	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)	810.5 (31.91)	520.8 (20.50)	415.5 (16.36)	M63×1.5
	1PH8165																870.5 (34.27)	580.8 (22.87)		

1PH816

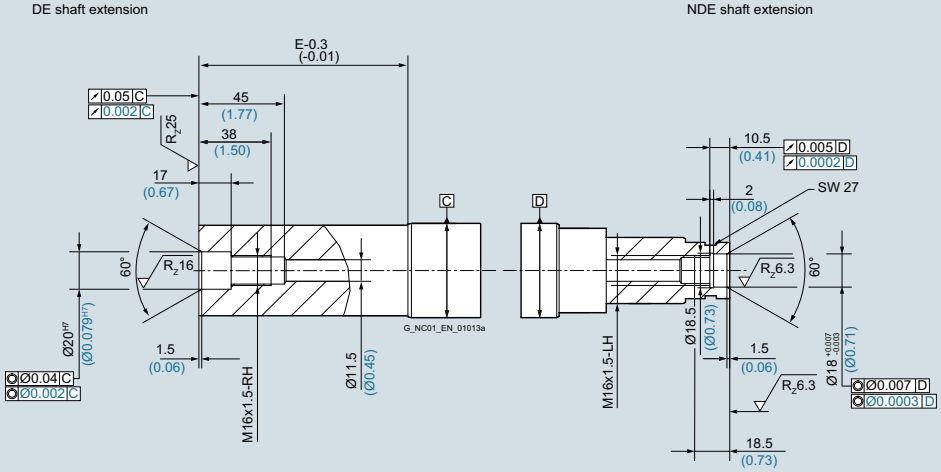


Version with hollow shaft



Hollow shaft

DE shaft extension



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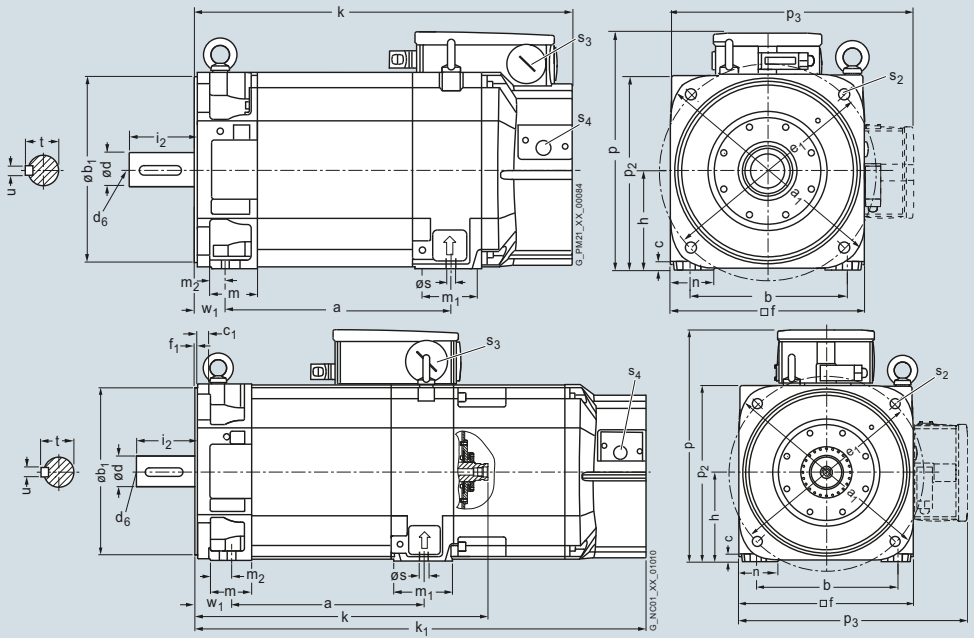
Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B5/IM B35, forced ventilation																	
160	1PH8163		346.5 (13.64)	393 (15.47)	254 (10.00)	300 (11.81)	17 (0.67)	–	350 (13.78)	314 (12.36)	5 (0.20)	160 (6.30)	610.5 (24.04)	55 (2.17)	99.5 (3.92)	19 (0.75)	70 (2.76)
	1PH8165		406.5 (16.00)										670.5 (26.40)				

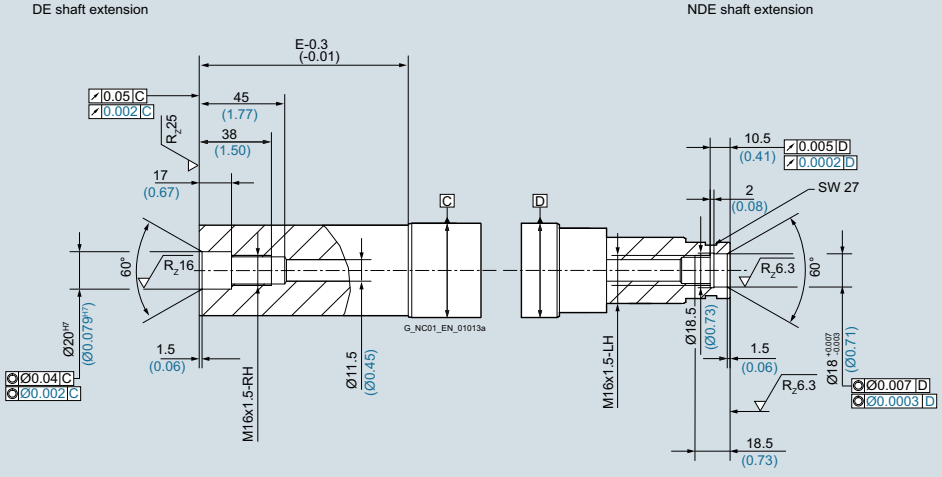
Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	Shaft extension DE: **d D**	d_6 –	i_2 E	t GA	u F	Version with hollow shaft: k LB	k_1 –	p HD	s_3 –
160	1PH8163		382.5 (15.06)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	18 (0.71)	M50×1.5	M20×1.5	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)	810.5 (31.91)	520.8 (20.50)	415.5 (16.36)	M63×1.5
	1PH8165																870.5 (34.27)	580.8 (22.87)		

1PH816



Version with hollow shaft

Hollow shaft

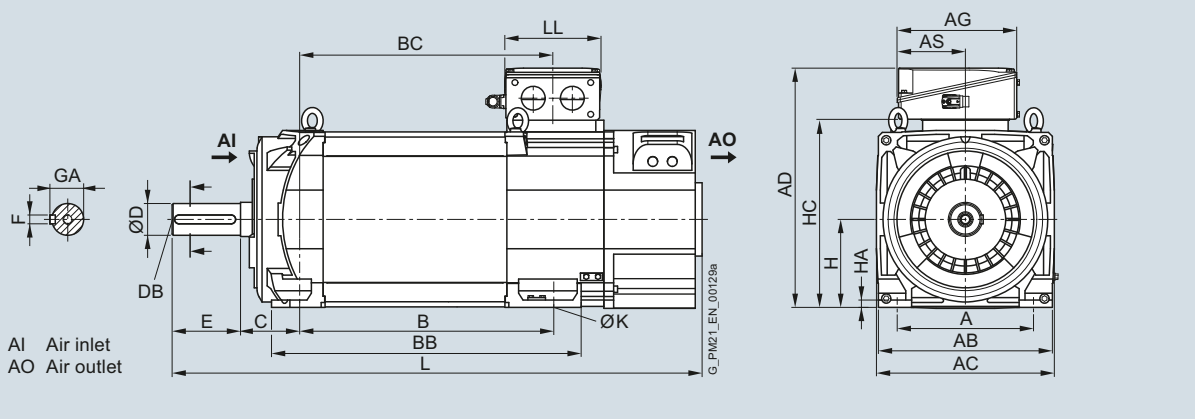


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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																	
180	1PH8184	279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)
	1PH8186				520 (20.47)	635 (25.00)											1085 (42.72)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC AD	AG	AS	BC	LL	
Terminal box type 1XB7 322							
180	1PH8184	490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)	
	1PH8186				519 (20.43)		
Terminal box type 1XB7 422							
180	1PH8184	533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)	
	1PH8186				519 (20.43)		
Terminal box type 1XB7 700							
180	1PH8184	586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)	
	1PH8186				519 (20.43)		

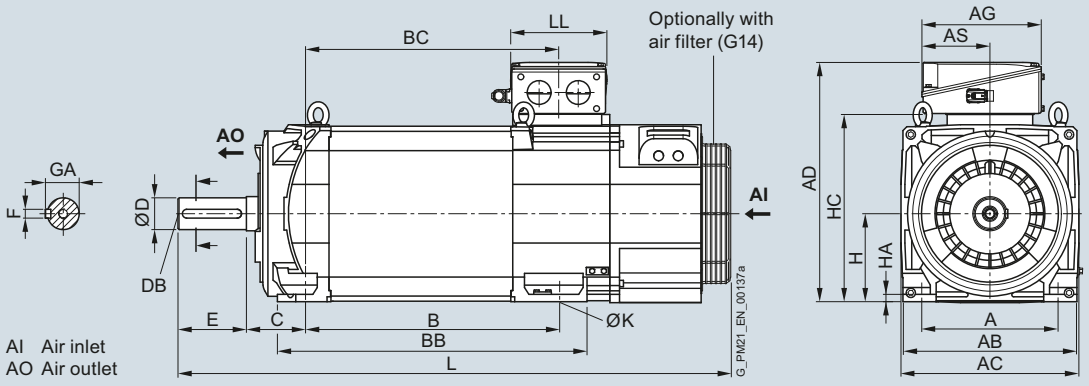


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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																	
180	1PH8184	279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)
	1PH8186				520 (20.47)	635 (25.00)											1137 (44.76)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC AD	AG	AS	BC	LL	
Terminal box type 1XB7 322							
180	1PH8184	490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)	
	1PH8186				519 (20.43)		
Terminal box type 1XB7 422							
180	1PH8184	533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)	
	1PH8186				519 (20.43)		
Terminal box type 1XB7 700							
180	1PH8184	586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)	
	1PH8186				519 (20.43)		

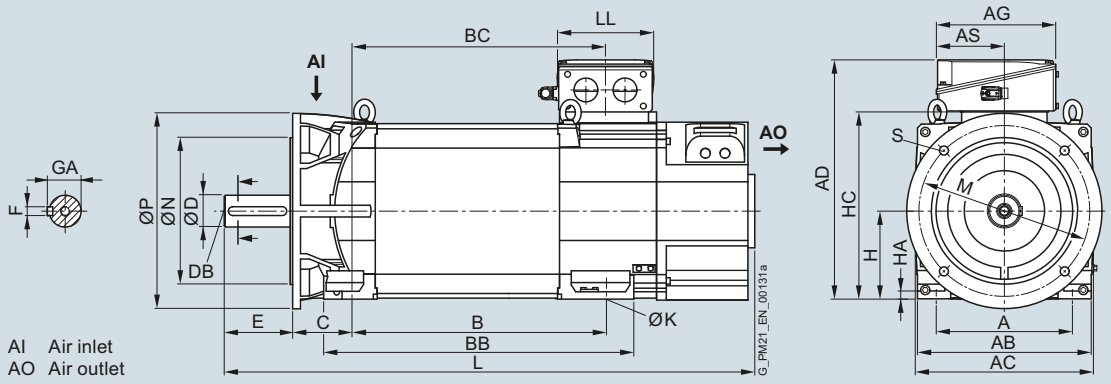


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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, flange A400 (option K90)																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1085 (42.72)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	



AI Air inlet
AO Air outlet

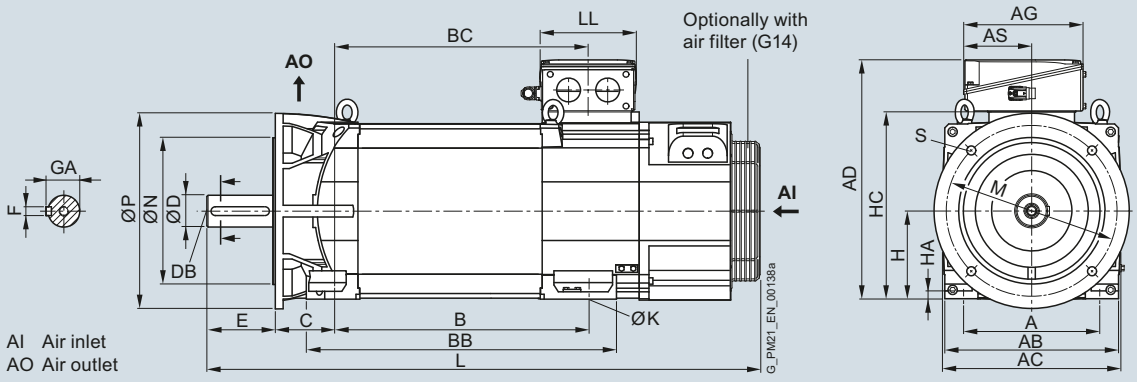
6

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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A400																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1137 (44.76)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	



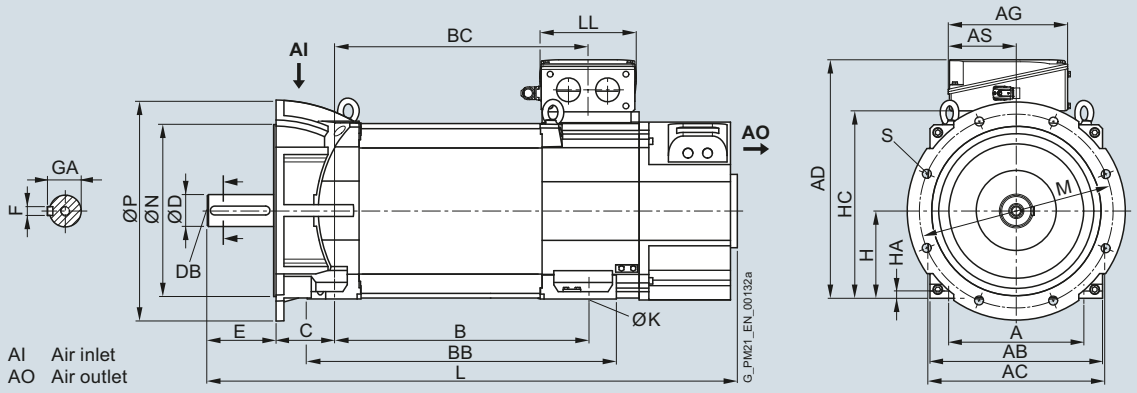
6

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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, flange A450																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1085 (42.72)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

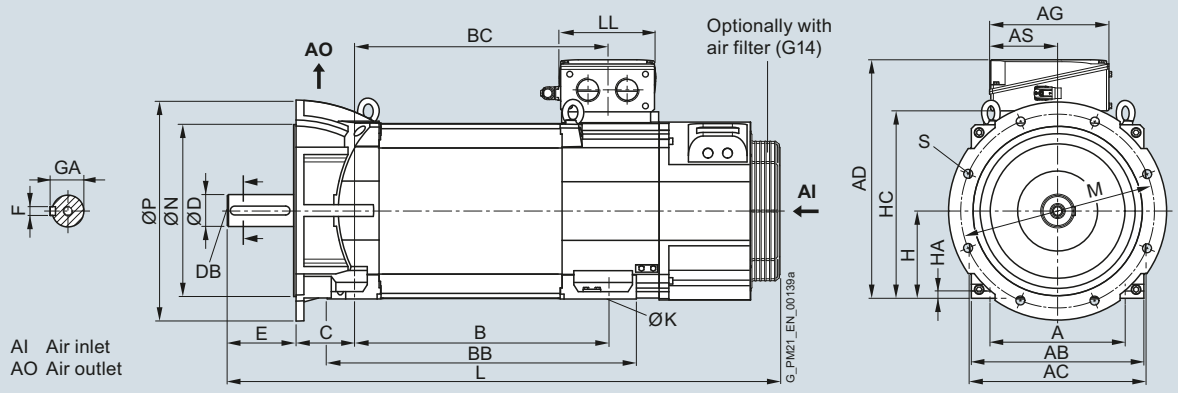


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Dimensional drawings

For motor		Dimensions in mm (inches)																			
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A450																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1137 (44.76)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		490 (19.29)	245 (9.65)	140 (5.51)	429 (16.89)	196 (7.72)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		533 (20.98)	281 (11.06)	176 (6.93)	429 (16.89)	233 (9.17)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		586 (23.07)	297 (11.69)	156 (6.14)	429 (16.89)	310 (12.20)
	1PH8186					519 (20.43)	

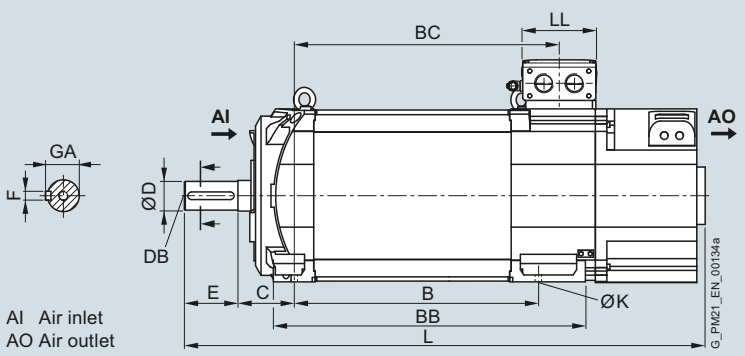


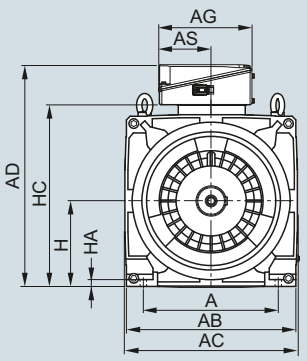
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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																		
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)
	1PH8226					545 (21.46)	725 (28.54)											1271 (40.04)
	1PH8228					635 (25.00)	815 (32.09)											1361 (53.58)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	



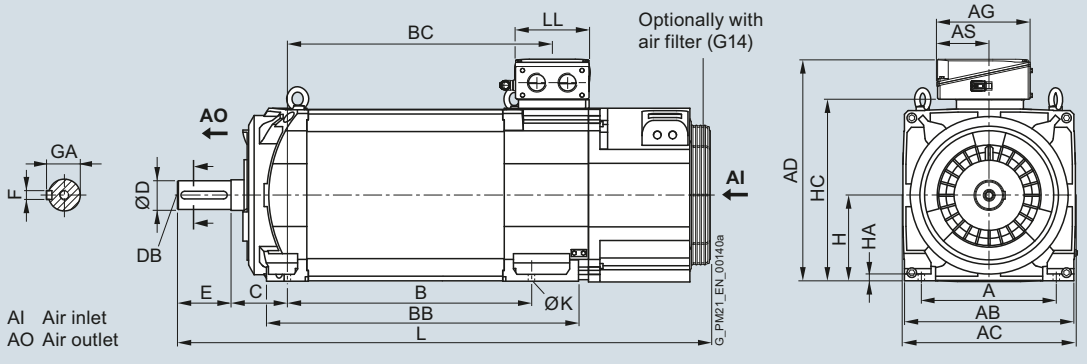


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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																	
225	1PH8224	356	446	454	445	625	149	75	M20	140	20	79.5	225	18	475	18.5	1206 (889.5)
		(14.02)	(17.56)	(17.87)	(17.52)	(24.61)	(5.87)	(2.95)		(5.51)	(0.79)	(3.13)	(8.86)	(0.71)	(18.70)	(0.73)	(47.48)
	1PH8226				545 (21.46)	725 (28.54)											1306 (51.42)
	1PH8228				635 (25.00)	815 (32.09)											1396 (54.96)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC AD	AG	AS	BC	LL	
Terminal box type 1XB7 322							
225	1PH8224	582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)	
	1PH8226				581 (22.87)		
	1PH8228				671 (26.42)		
Terminal box type 1XB7 422							
225	1PH8224	625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)	
	1PH8226				581 (22.87)		
	1PH8228				671 (26.42)		
Terminal box type 1XB7 700							
225	1PH8224	678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)	
	1PH8226				581 (22.87)		
	1PH8228				671 (26.42)		

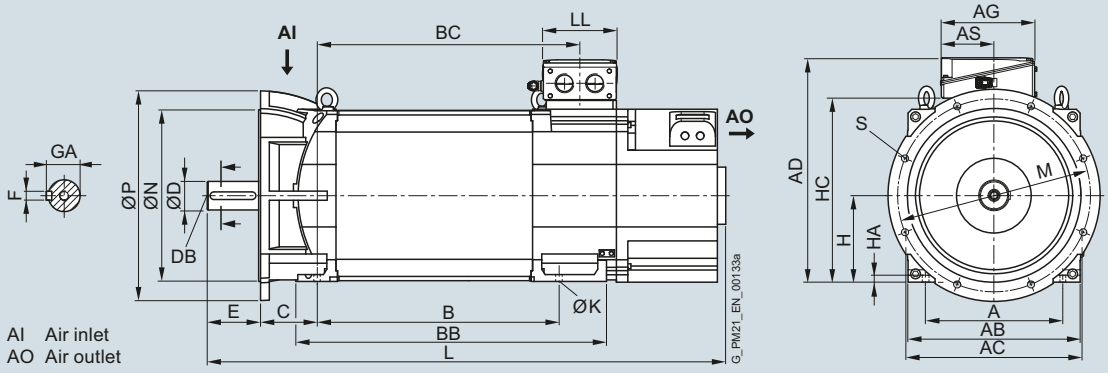


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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, flange A550																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)
	1PH8226					545 (21.46)	725 (28.54)											1271 (50.04)				
	1PH8228					635 (25.00)	815 (32.09)											1361 (53.58)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

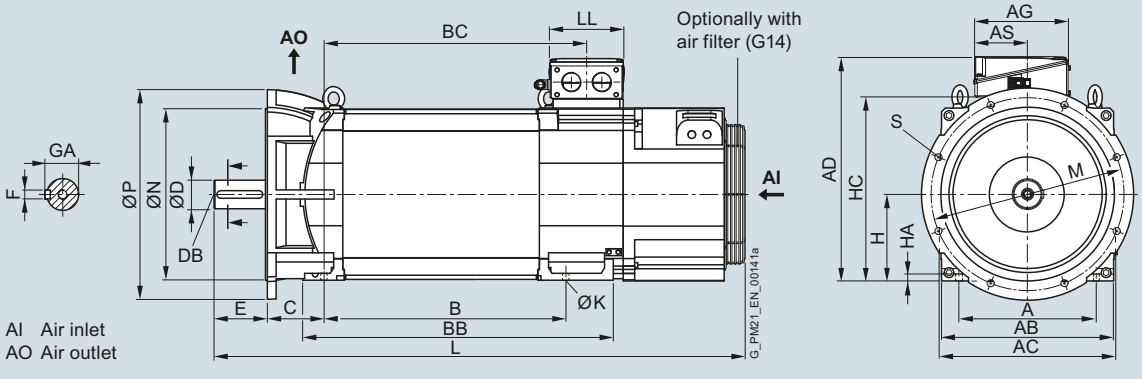


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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A550																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1206 (47.48)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)
	1PH8226					545 (21.46)	725 (28.54)											1306 (51.42)				
	1PH8228					635 (25.00)	815 (32.09)											1396 (54.96)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		582 (22.91)	245 (9.65)	140 (5.51)	481 (18.94)	196 (7.72)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		625 (24.61)	281 (11.06)	176 (6.93)	481 (18.94)	233 (9.17)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		678 (26.69)	297 (11.69)	156 (6.14)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

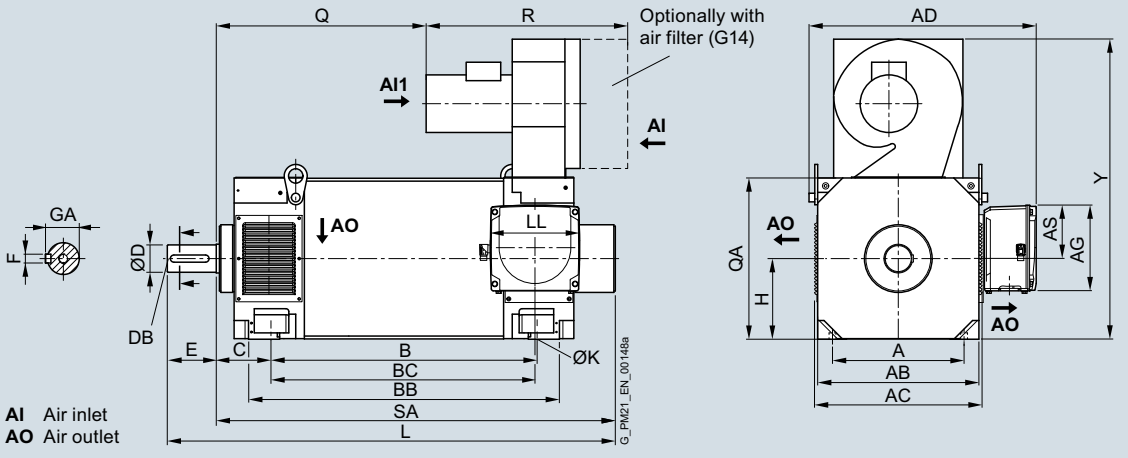


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Dimensional drawings

For motor		Dimensions in mm (inches)																			
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	K	L	Q	QA	R	SA	Y
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																					
280	1PH8284		457 (17.99)	560 (22.05)	582 (22.91)	684 (26.93)	840 (33.07)	190 (7.48)	95 (3.74)	M24	170 (6.69)	25 (0.98)	100 (3.94)	280 (11.02)	24 (0.94)	1316 (51.81)	489 (19.25)	560 (22.05)	700 (27.56)	1146 (45.12)	1042 (41.02)
	1PH8286					794 (31.26)	950 (37.40)									1426 (56.14)	599 (23.58)			1256 (49.45)	
	1PH8288					924 (36.38)	1080 (42.52)									1556 (61.26)	729 (28.70)			1386 (54.57)	

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 700							
280	1PH8284		789 (31.06)	297 (11.69)	186 (7.32)	677 (26.65)	310 (12.20)
	1PH8286					787 (30.98)	
	1PH8288					917 (36.10)	
Terminal box type 1XB7 712							
280	1PH8284		836 (32.91)	371 (14.61)	201 (7.91)	691 (27.20)	370 (14.57)
	1PH8286					801 (31.54)	
	1PH8288					931 (36.65)	

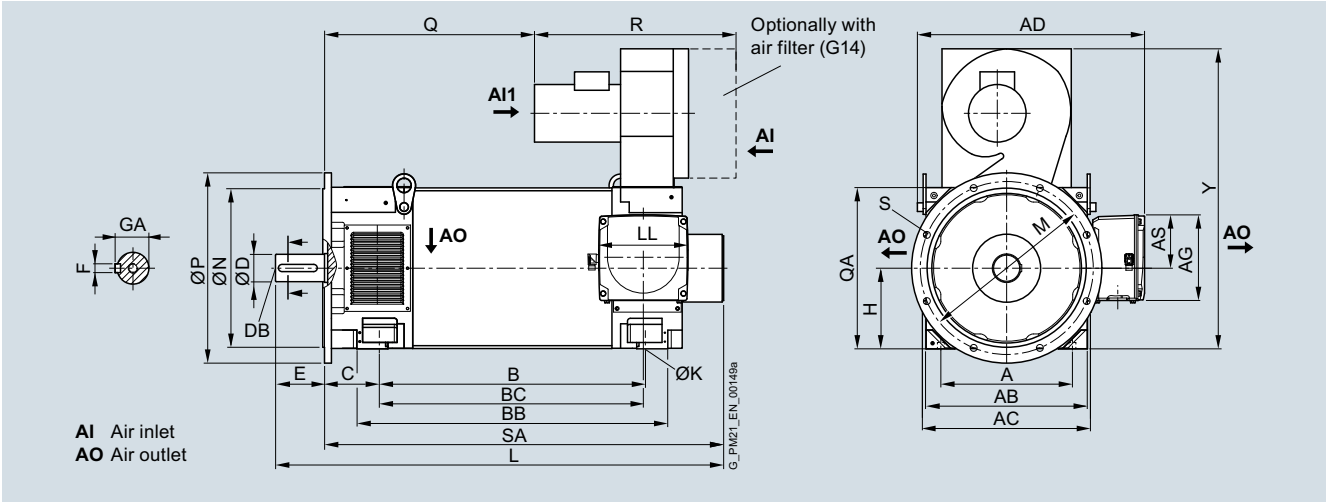


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Dimensional drawings

For motor		Dimensions in mm (inches)											
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A660														
280	1PH8284		457 (17.99)	560 (22.05)	582 (22.91)	684 (26.93)	840 (33.07)	190 (7.48)	95 (3.74)	M24	170 (6.69)	25 (0.98)	100 (3.94)	280 (11.02)
	1PH8286					794 (31.26)	950 (37.40)							
	1PH8288					924 (36.38)	1080 (42.52)							
			K	L	M	N	P	Q	QA	R	S	SA	Y	
	1PH8284		24 (0.94)	1316 (51.81)	600 (23.62)	550 (21.65)	660 (25.98)	489 (19.25)	560 (22.05)	700 (27.56)	24 (0.94)	1146 (45.12)	1042 (41.02)	
	1PH8286			1426 (56.14)				599 (23.58)				1256 (49.45)		
	1PH8288			1556 (61.26)				729 (28.70)				1386 (54.57)		

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 700							
280	1PH8284		789 (31.06)	297 (11.69)	186 (7.32)	677 (26.65)	310 (12.20)
	1PH8286					787 (30.98)	
	1PH8288					917 (36.10)	
Terminal box type 1XB7 712							
280	1PH8284		836 (32.91)	371 (14.61)	201 (7.91)	691 (27.20)	370 (14.57)
	1PH8286					801 (31.54)	
	1PH8288					931 (36.65)	



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Dimensional drawings

For motor — Dimensions in mm (inches)

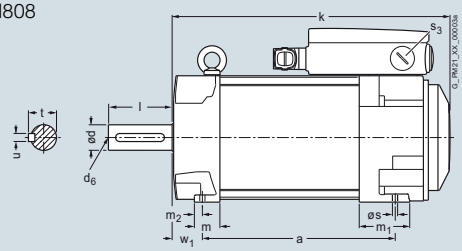
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	h H	k LB (Standard/ Advanced/ Performance)	k LB (High Performance/ hollow shaft encoder, without hollow shaft)	k LB (High Performance/ hollow shaft encoder, with hollow shaft)	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, water cooling														
80	1PH8083		194 (7.64)	125 (4.92)	8 (0.31)	155 (6.10)	80 (3.15)	301.5 (11.87)	306.3 (12.06)	319.3 (12.57)	37 (1.46)	63.5 (2.50)	15 (0.59)	35 (1.38)
	1PH8087		244 (9.61)					351.5 (13.84)	356.3 (14.03)	369.3 (14.54)				
100	1PH8101		167 (6.57)	160 (6.30)	11 (0.43)	196 (7.72)	100 (3.94)	289.5 (11.40)	294.5 (11.59)	312.3 (12.30)	44 (1.73)	68 (2.68)	19 (0.75)	43 (1.69)
	1PH8103		202.5 (7.97)					325 (12.80)	330 (12.99)	347.8 (13.69)				
	1PH8105		262 (10.31)					384.5 (15.14)	389.5 (15.33)	407.3 (16.04)				
	1PH8107		297.5 (11.71)					420 (16.54)	425 (16.73)	442.8 (17.43)				
132	1PH8131		220.5 (8.68)	216 (8.50)	15 (0.59)	260 (10.24)	132 (5.20)	347.5 (13.68)	355 (13.98)	372.8 (14.68)	43 (1.69)	81 (3.19)	13 (0.51)	43 (1.69)
	1PH8133		265.5 (10.45)					392.5 (15.45)	400 (15.75)	417.8 (16.45)				
	1PH8135		310.5 (12.22)					437.5 (17.22)	445 (17.52)	462.8 (18.22)				
	1PH8137		350.5 (13.80)					477.5 (18.80)	485 (19.09)	502.8 (19.80)				
	1PH8138		350.5 (13.80)					477.5 (18.80)	485 (19.09)	502.8 (19.80)				

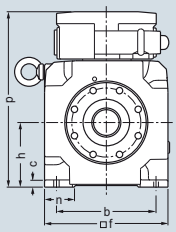
Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_3 –	w_1 C	Shaft extension DE: **d D**	d_6 –	t GA	u F	l E
80	1PH8083		216 (8.50)	253.5 (9.98)	–	–	10 (0.39)	M25×1.5	38 (1.50)	**32 (1.26)**	M12	35 (1.38)	10 (0.39)	80 (3.15)
	1PH8087													
100	1PH8101		266.5 (10.49)	294 (11.57)	198 (7.80)	276.5 (10.89)	12 (0.47)	M32×1.5	43 (1.69)	**38 (1.50)**	M12	41 (1.61)	10 (0.39)	80 (3.15)
	1PH8103													
	1PH8105													
	1PH8107													
132	1PH8131		347.5 (13.68)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	M50×1.5	53 (2.09)	**48 (1.89)**	M16	51.5 (2.03)	14 (0.55)	110 (4.33)
	1PH8133													
	1PH8135													
	1PH8137													
	1PH8138													

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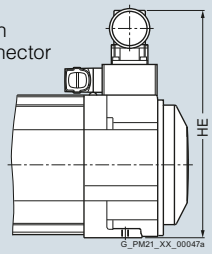
Dimensional drawings

1PH808





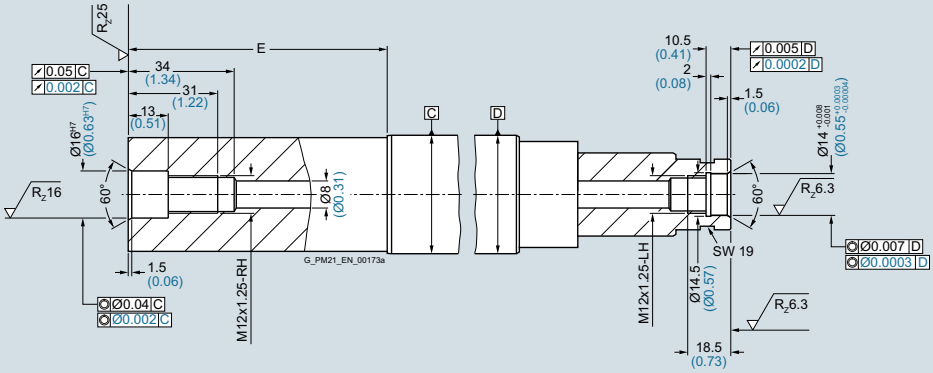
Version with
Power connector
Size 1.5



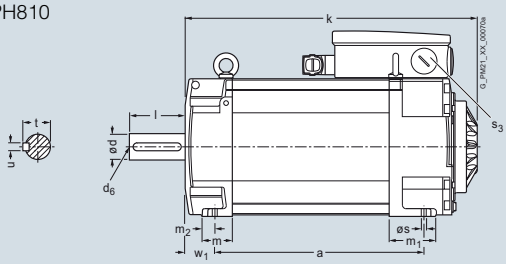
Hollow shaft
1PH808

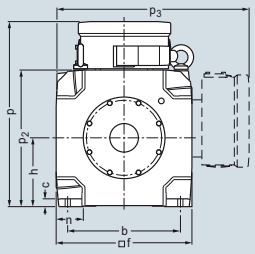
DE shaft extension

NDE shaft extension

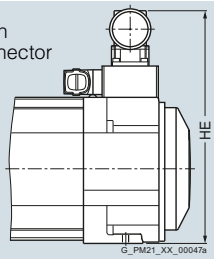


1PH810

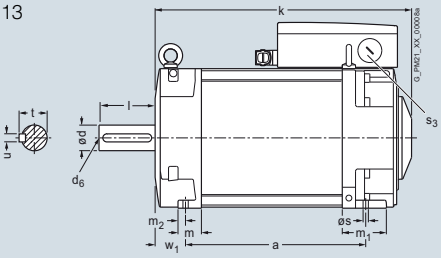


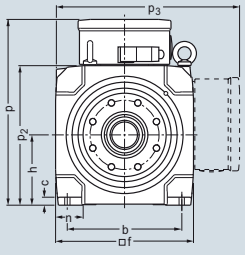


Version with
Power connector
Size 1.5

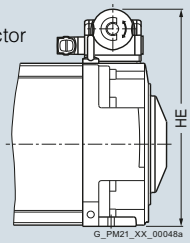


1PH813





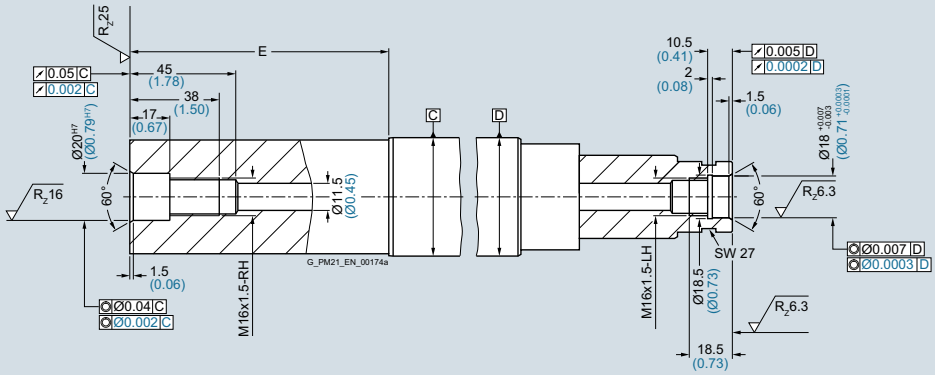
Version with
Power connector
Size 3



Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension



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Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	Standard/ Advanced/ Performance: k LB	High Performance/ hollow shaft encoder: without hollow shaft k LB	High Performance/ hollow shaft encoder: with hollow shaft k LB
1PH8 type of construction IM B5, water cooling												
80	1PH8083		199 (7.83)	130 (5.12)	12 (0.47)	165 (6.50)	155 (6.10)	3.5 (0.14)	77.5 (3.05)	301.5 (11.87)	306.3 (12.06)	319.3 (12.57)
	1PH8087									351.5 (13.84)	356.3 (14.03)	369.3 (14.51)
100	1PH8101		250 (9.84)	180 (7.09)	16 (0.63)	215 (8.46)	196 (7.72)	4 (0.16)	98 (3.86)	289.5 (11.40)	294.5 (11.59)	312.3 (12.30)
	1PH8103									325 (12.80)	330 (12.99)	347.8 (13.69)
	1PH8105									384.5 (15.14)	389.5 (15.33)	407.3 (16.04)
	1PH8107									420 (16.54)	425 (16.73)	442.8 (17.43)
132	1PH8131		340 (13.39)	250 (9.84)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	130 (5.12)	347.5 (13.68)	355 (13.98)	372.8 (14.68)
	1PH8133									392.5 (15.45)	400 (15.75)	417.8 (16.45)
	1PH8135									437.5 (17.22)	445 (17.52)	462.8 (18.22)
	1PH8137									477.5 (18.80)	485 (19.09)	502.8 (19.80)
	1PH8138									477.5 (18.80)	485 (19.09)	502.8 (19.80)

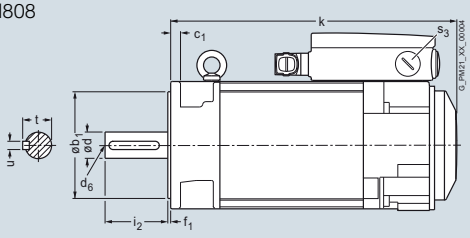
Shaft extension DE

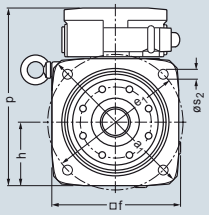
Shaft height	Type	DIN IEC	p HD	– HE	s_2 –	s_3 –	**d** **D**	d_6 –	i_2 E	t GA	u F
80	1PH8083		213.5 (8.41)	251 (9.88)	12 (0.47)	M25×1.5	**32 (1.25)**	M12	80 (3.15)	35 (1.38)	10 (0.39)
	1PH8087										
100	1PH8101		264.5 (10.41)	292 (11.50)	14 (0.55)	M32×1.5	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1PH8103										
	1PH8105										
	1PH8107										
132	1PH8131		345.5 (13.6)	345 (13.58)	18 (0.71)	M50×1.5	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133										
	1PH8135										
	1PH8137										
	1PH8138										

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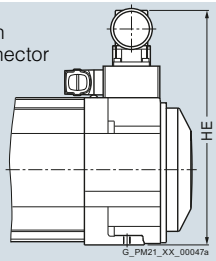
Dimensional drawings

1PH808





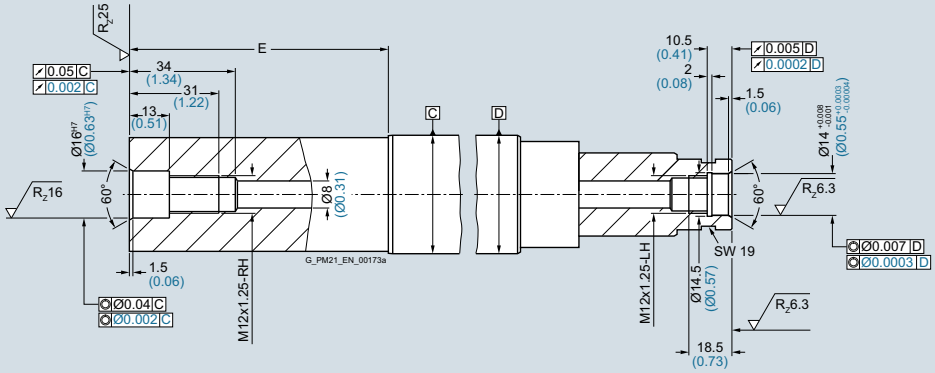
Version with
Power connector
Size 1.5



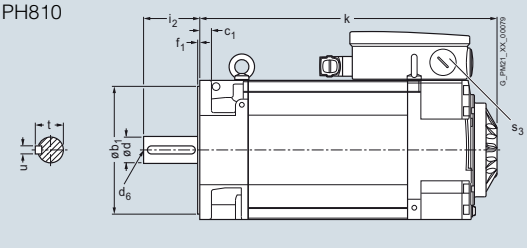
Hollow shaft
1PH808

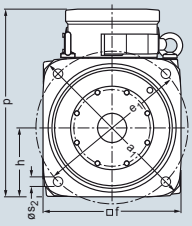
DE shaft extension

NDE shaft extension

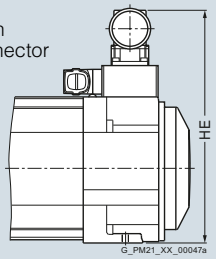


1PH810

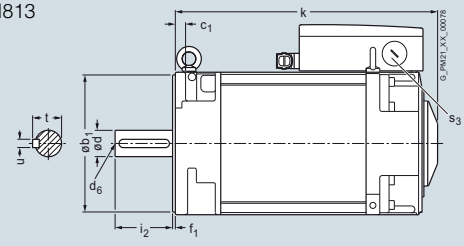


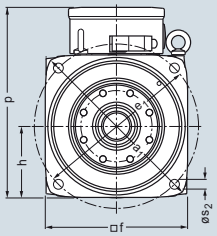


Version with
Power connector
Size 1.5

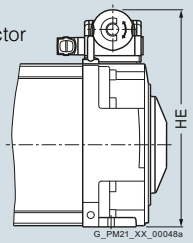


1PH813





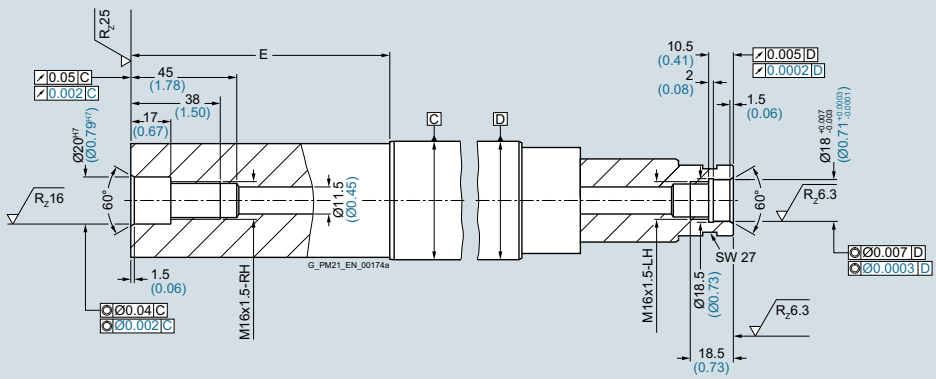
Version with
Power connector
Size 3



Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension



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Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB (Standard/ Advanced/ Performance)	k LB (High Performance without hollow shaft)	k LB (High Performance with hollow shaft)	m BA
1PH8 type of construction IM B35, water cooling																
100	1PH8101		167 (6.57)	250 (9.84)	160 (6.30)	180 (7.09)	11 (0.43)	16 (0.63)	215 (8.46)	196 (7.72)	4 (0.16)	100 (3.94)	289.5 (11.40)	294.5 (11.59)	312.3 (12.30)	37 (1.46)
	1PH8103		202.5 (7.97)										325 (12.80)	330 (12.99)	347.8 (13.69)	
	1PH8105		262 (10.31)										384.5 (15.14)	389.5 (15.33)	407.3 (16.04)	
	1PH8107		297.5 (11.71)										420 (16.54)	425 (16.73)	442.8 (17.43)	
132	1PH8131		220.5 (8.68)	340 (13.39)	216 (8.50)	250 (9.84)	15 (0.59)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	132 (5.20)	347.5 (13.68)	355 (13.98)	372.8 (14.68)	42 (1.65)
	1PH8133		265.5 (10.45)										392.5 (15.45)	400 (15.75)	417.8 (16.45)	
	1PH8135		310.5 (12.22)										437.5 (17.22)	445 (17.52)	462.8 (18.22)	
	1PH8137		350.5 (13.80)										477.5 (18.80)	485 (19.09)	502.8 (19.80)	
	1PH8138		350.5 (13.80)										477.5 (18.80)	485 (19.09)	502.8 (19.80)	

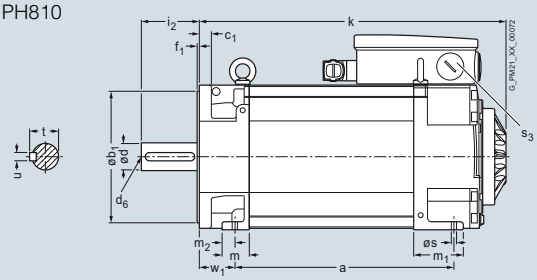
Shaft extension DE

Shaft height	Type	DIN IEC	m_1 –	m_2 –	n AA	p HD	– HE	p_2 –	p_3 –	s K	s_2 –	s_3 –	w_1 C	**d D**	d_6 –	i_2 E	t GA	u F
100	1PH8101		68 (2.68)	12 (0.47)	43 (1.69)	266.5 (10.49)	294 (11.57)	198 (7.80)	276.5 (10.89)	12 (0.47)	14 (0.55)	M32×1.5	43 (1.69)	**38 (1.50)**	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1PH8103																	
	1PH8105																	
	1PH8107																	
132	1PH8131		81 (3.19)	12 (0.47)	43 (1.69)	347.5 (13.68)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	18 (0.71)	M50×1.5	53 (2.09)	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133																	
	1PH8135																	
	1PH8137																	
	1PH8138																	

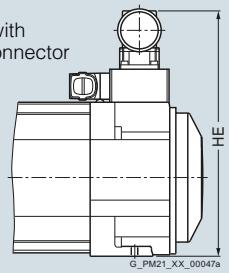
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Dimensional drawings

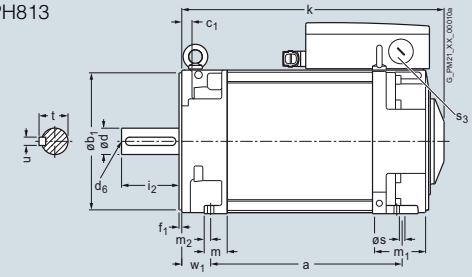
1PH810



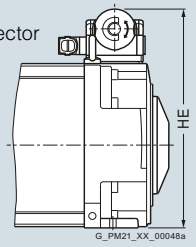
Version with
Power connector
Size 1.5



1PH813



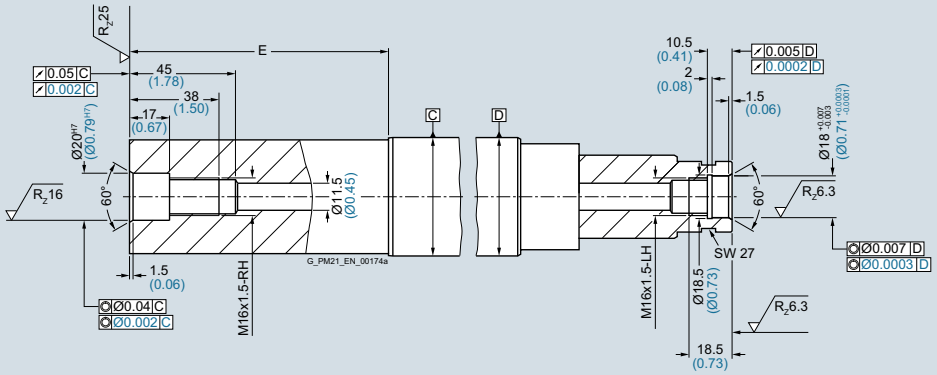
Version with
Power connector
Size 3



Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension



6

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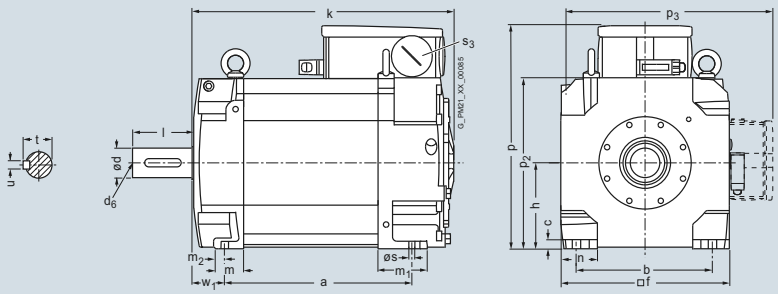
Dimensional drawings

For motor — Dimensions in mm (inches)

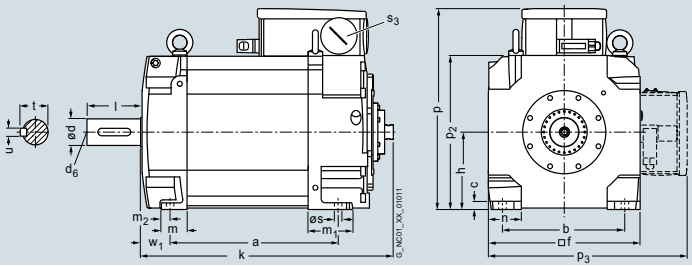
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, water cooling																	
160	1PH8163		346.5 (13.64)	–	254 (10.00)	–	17 (0.67)	23 (0.91)	–	314 (12.36)	–	160 (6.30)	488.5 (19.23)	53 (2.09)	91 (3.58)	17 (0.67)	70 (2.76)
	1PH8165		406.5 (16.00)										548.5 (21.59)				
	1PH8166																

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	Shaft extension DE: d D	Shaft extension DE: d_6 –	Shaft extension DE: l E	Shaft extension DE: t GA	Shaft extension DE: u F	Version with hollow shaft: k LB
160	1PH8163		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	–	M63 × 1.5	–	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)	520.8 (20.50)
	1PH8165																580.8 (22.87)
	1PH8166																580.8 (22.87)

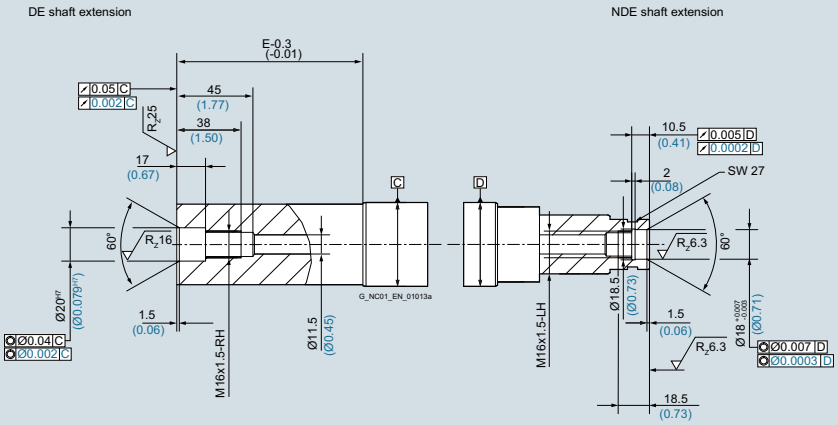
1PH816



Version with hollow shaft



Hollow shaft



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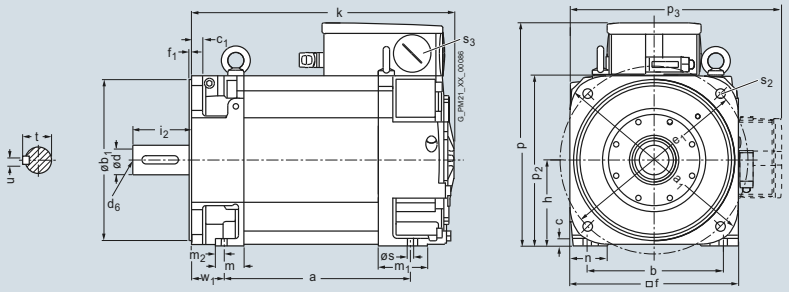
Dimensional drawings

For motor — Dimensions in mm (inches)

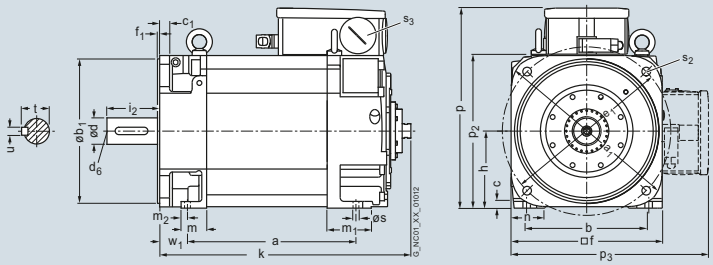
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h Hv	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B5/IM B35, water cooling																	
160	1PH8163		346.5 (13.64)	393 (15.47)	254 (10.00)	300 (11.81)	17 (0.67)	–	350 (13.78)	314 (12.36)	5 (0.20)	160 (6.30)	488.5 (19.23)	53 (2.09)	91 (3.58)	17 (0.67)	70 (2.76)
	1PH8165		406.5 (16.00)										548.5 (21.59)				
	1PH8166																

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	Shaft extension DE: **d D**	Shaft extension DE: d_6 –	Shaft extension DE: i_2 E	Shaft extension DE: t GA	Shaft extension DE: u F	Version with hollow shaft: k LB
160	1PH8163		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	18 (0.71)	M63 × 1.5	–	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)	520.8 (20.50)
	1PH8165																580.8 (22.87)
	1PH8166																580.8 (22.87)

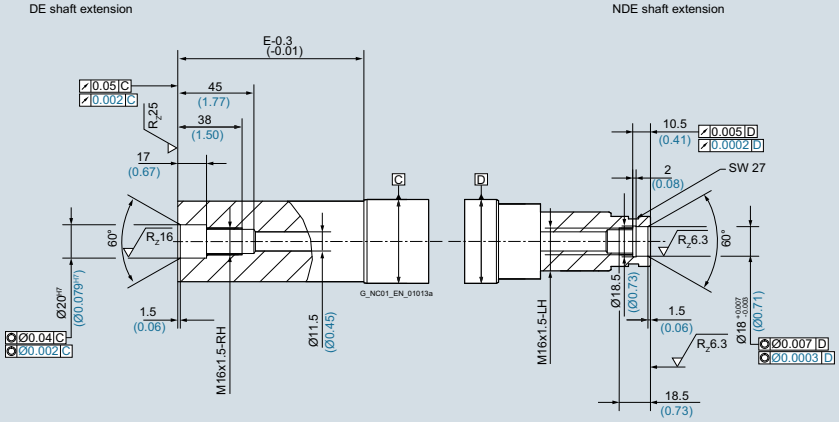
1PH816



Version with hollow shaft



Hollow shaft



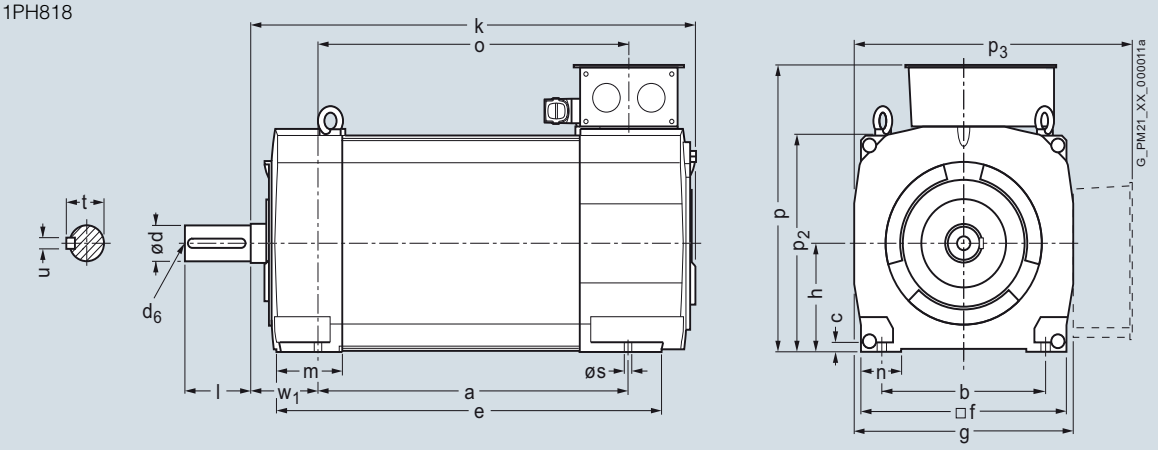
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Dimensional drawings

For motor			Dimensions in mm (inches)											
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	g AC	h H	k LB	m BA	n AA	p_2 –	s K	w_1 C
1PH8 types of construction IM B3/IM V5, water cooling														
180	1PH8184		430 (16.93)	279 (10.98)	15 (0.59)	356 (14.02)	384 (15.12)	180 (7.09)	670 (26.38)	138 (5.43)	73 (2.87)	372 (14.65)	14.5 (0.57)	121 (4.76)
	1PH8186		520 (20.47)						760 (29.92)					

			Shaft extension DE					Terminal box type												
								1XB7322				1XB7422				1XB7700				
Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F	p HD	p_3 –	r LL	x_1 AG	p HD	p_3 –	r LL	x_1 AG	p HD	p_3 –	r LL	x_1 AG
180	1PH8184		**65m6**	M20	140 (5.51)	69 (2.72)	18 (0.71)	484 (19.06)	485 (19.09)	197 (7.76)	258 (10.16)	539 (21.22)	540 (21.26)	230 (9.06)	303 (11.93)	588 (23.15)	574 (22.60)	310 (12.20)	295 (11.61)
	1PH8186																		

1PH818



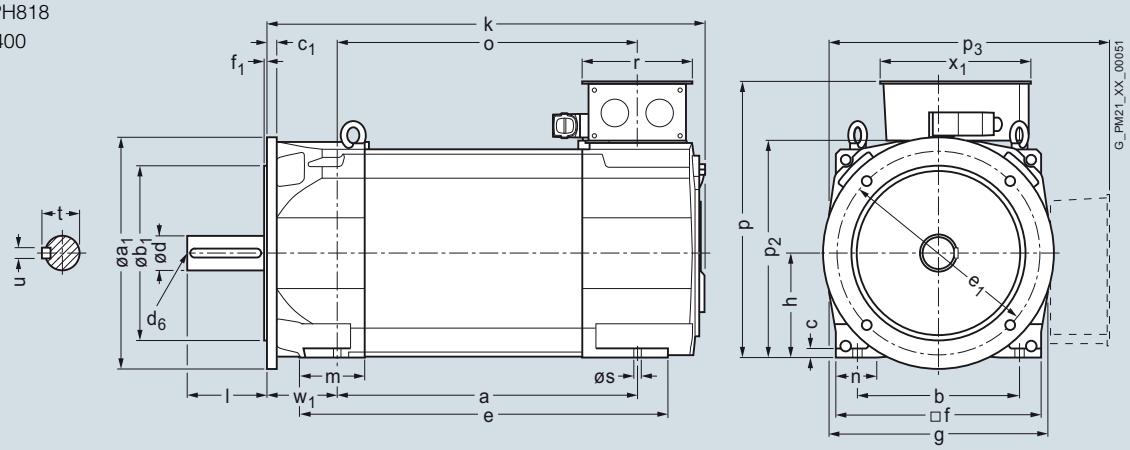
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Dimensional drawings

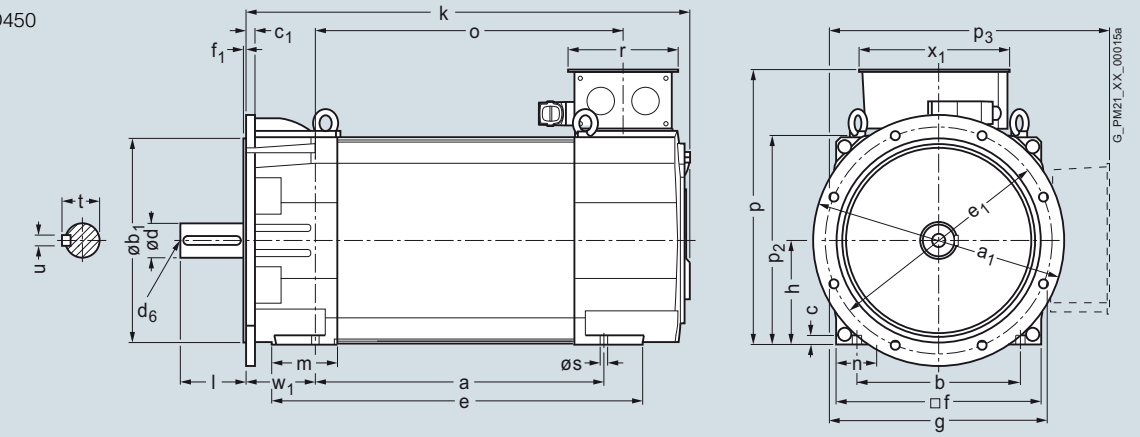
For motor		Dimensions in mm (inches)																	
				D400	D450		D400	D450				D400	D450						
Shaft height	Type	DIN IEC	a B	a_1 P		b A	b_1 N		c HA	c_1 LA	e_1 M			f AB	f_1 T	g AC	h H	k LB	m BA
1PH8 types of construction IM B5/IM B35/IM V15, water cooling																			
180	1PH8184		430 (16.93)	400 (15.75)	450 (17.72)	279 (10.98)	300 (11.81)	350 (13.78)	15 (0.59)	16 (0.63)	350 (13.78)	400 (15.75)		356 (14.02)	5 (0.20)	384 (15.12)	180 (7.09)	670 (26.38)	123 (4.84)
	1PH8186		520 (20.47)															760 (29.92)	

			Shaft extension DE									Terminal box type
												Dimensions as for types of construction IM B3/IM V5
Shaft height	Type	DIN IEC	n AA	p_2 –	s K	w_1 C	**d D**	d_6 –	l E	t GA	u F	
180	1PH8184		73 (2.87)	372 (14.65)	14.5 (0.57)	121 (4.76)	**65m6**	M20	140 (5.51)	69 (2.72)	18 (0.71)	
	1PH8186											

1PH818
D400



D450



6

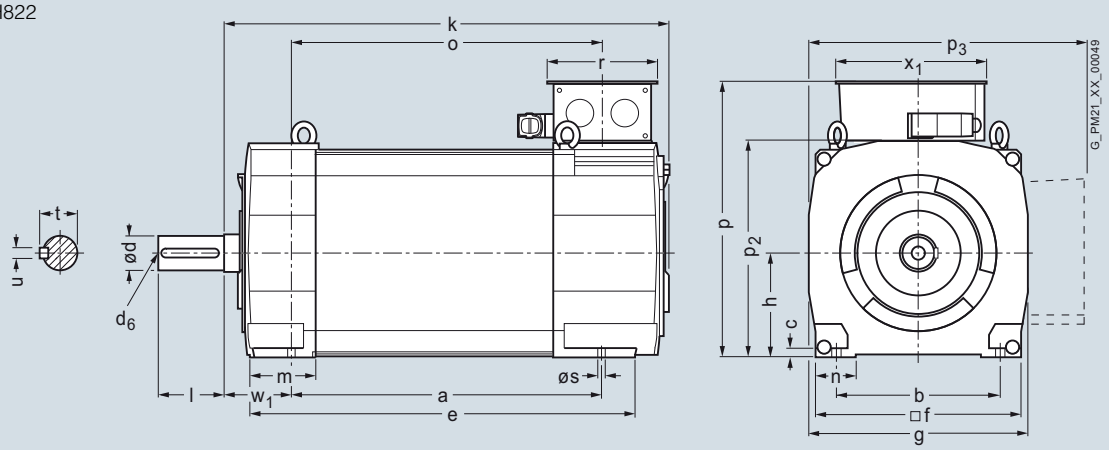
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Dimensional drawings

For motor			Dimensions in mm (inches)											
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	g AC	h H	k LB	m BA	n AA	p_2 _	s K	w_1 C
1PH8 types of construction IM B3/IM V5, water cooling														
225	1PH8224		445 (17.52)	356 (14.02)	18 (0.71)	446 (17.56)	474 (18.66)	225 (8.86)	775 (30.51)	154 (6.06)	88 (3.46)	462 (18.19)	18.5 (0.73)	149 (5.87)
	1PH8226		545 (21.46)						875 (34.45)					
	1PH8228		635 (25.0)						965 (37.99)					

			Shaft extension DE					Terminal box type												
								1XB7322				1XB7422				1XB7700				
Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F	p HD	p_3 _	r LL	x_1 AG	p HD	p_3 _	r LL	x_1 AG	p HD	p_3 _	r LL	x_1 AG
225	1PH8224		**75m6**	M20	140 (5.51)	79.5 (3.13)	20 (0.79)	579 (22.80)	577 (22.72)	197 (7.76)	258 (10.16)	634 (24.96)	632 (24.88)	230 (9.06)	303 (11.93)	683 (26.89)	666 (26.22)	310 (12.20)	295 (11.61)
	1PH8226																		
	1PH8228																		

1PH822



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Dimensional drawings

For motor — Dimensions in mm (inches)

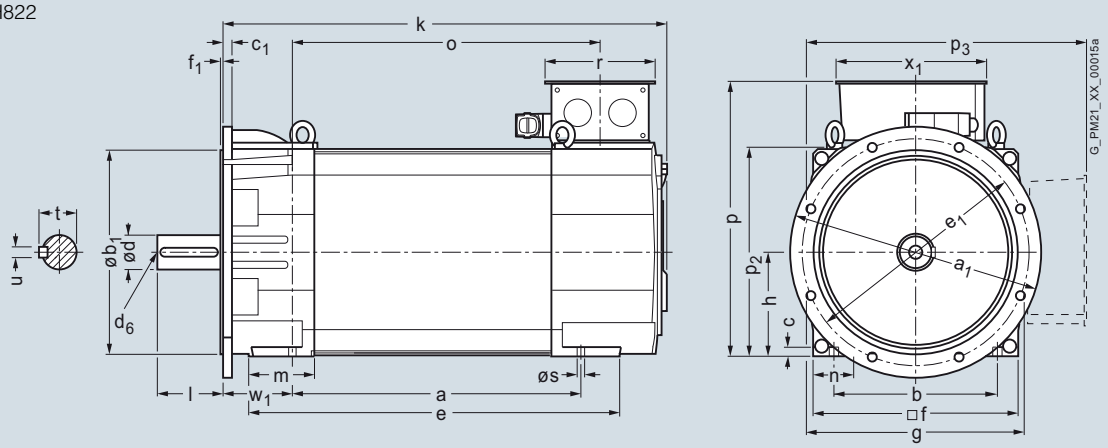
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	g AC	h H	k LB	m BA	n AA	p_2 –	w_1 C
1PH8 types of construction IM B5/IM B35/IM V15 D550, water cooling																		
225	1PH8224		445 (17.52)	550 (21.65)	356 (14.02)	450 (17.72)	18 (0.71)	20 (0.79)	500 (19.69)	446 (17.56)	5 (0.20)	474 (18.66)	225 (8.86)	770 (30.31)	144 (5.67)	88 (3.46)	462 (18.19)	149 (5.87)
	1PH8226		545 (21.46)											872 (34.33)				
	1PH8228		635 (25.00)											962 (37.87)				

Shaft extension DE — Terminal box type

Dimensions as for types of construction IM B3/IM V5

Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F
225	1PH8224		**75m6**	M20	140 (5.51)	79.5 (3.13)	20 (0.79)
	1PH8226						
	1PH8228						

1PH822



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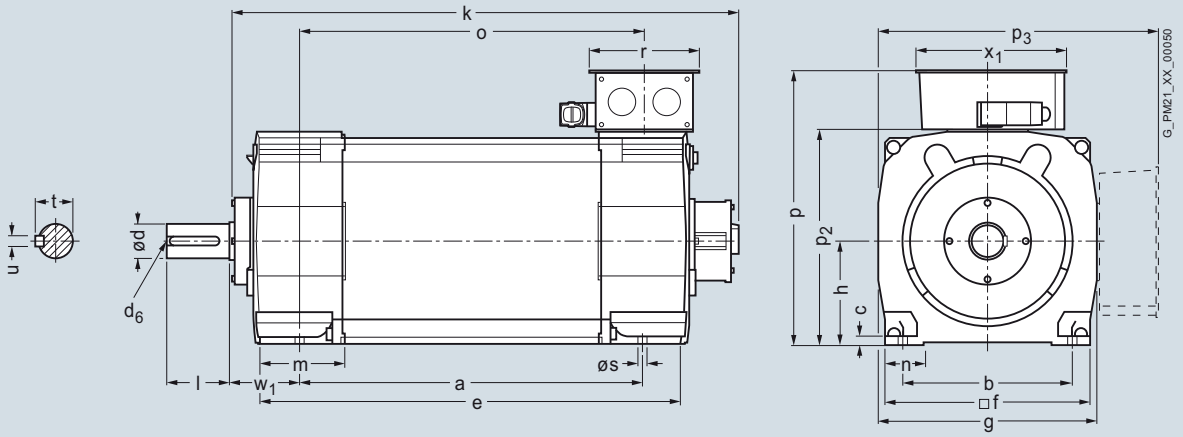
Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	b A	c LA/HA	f AB	g AC	h H	k LB	m BA	n AA	p_2 –	s K	w_1 C	Shaft extension DE **d** **D**	d_6 –	l E	t GA	u F
1PH8 types of construction IM B3/IM V5, water cooling																			
280	1PH8284		684 (26.93)	457 (17.99)	21 (0.83)	556 (21.89)	588 (23.15)	280 (11.02)	1134 (44.65)	220 (8.66)	105 (4.13)	574 (22.60)	24 (0.94)	190 (7.48)	**95m6**	M24	170 (6.69)	100 (3.94)	25 (0.98)
	1PH8286		794 (31.26)						1244 (48.98)										
	1PH8288		924 (36.38)						1374 (54.09)										

Shaft height	Type	DIN IEC	Terminal box type 1XB7322 p HD	p_3 –	r LL	x_1 AG	1XB7422 p HD	p_3 –	r LL	x_1 AG	1XB7700 p HD	p_3 –	r LL	x_1 AG	1XB7712 p HD	p_3 –	r LL	x_1 AG
280	1PH8284		709 (27.91)	716 (28.19)	197 (7.76)	258 (10.16)	724 (28.5)	731 (28.78)	230 (9.06)	303 (11.93)	770 (30.31)	777 (30.59)	310 (12.2)	318 (12.52)	820 (32.28)	827 (32.56)	377 (14.84)	370 (14.57)
	1PH8286																	
	1PH8288																	

1PH828



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Dimensional drawings

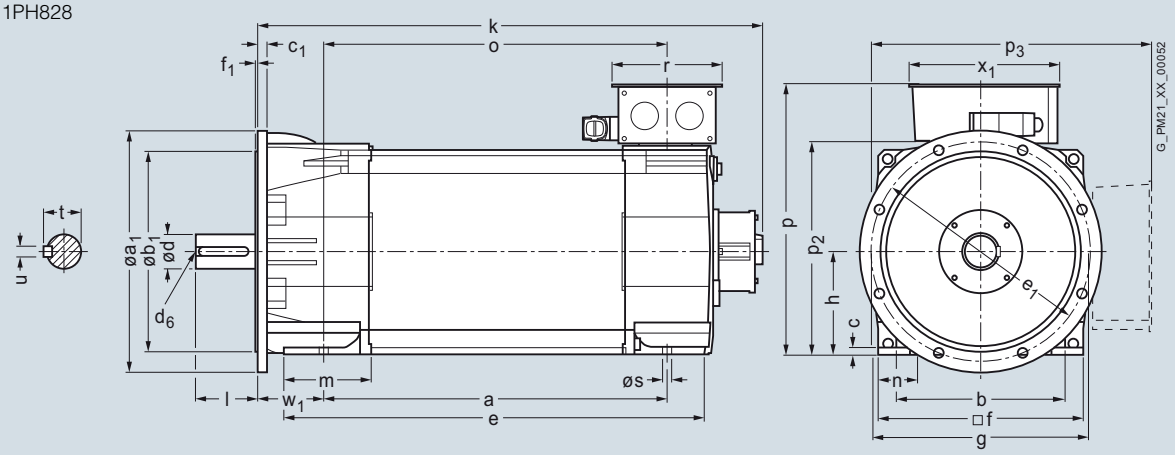
For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	g AC	h H	i_2 EB	k LB	m BA	n AA	p_2 –	s K
1PH8 types of construction IM B5/IM B35/IM V15 D660, water cooling																			
280	1PH8284		684 (26.93)	660 (25.98)	457 (17.99)	550 (21.65)	21 (0.83)	24 (0.94)	600 (23.62)	556 (21.89)	6 (0.24)	588 (23.15)	280 (11.02)	140 (5.51)	1134 (44.65)	220 (8.66)	105 (4.13)	574 (22.60)	24 (0.94)
	1PH8286		794 (31.26)												1244 (48.98)				
	1PH8288		924 (36.38)												1374 (54.09)				

Shaft extension DE — Terminal box type: Dimensions as for types of construction IM B3/IM V5

Shaft height	Type	DIN IEC	m BA	n AA	s K	w_1 C	**d D**	d_6 –	l E	t GA	u F
280	1PH8284		220 (8.66)	105 (4.13)	24 (0.94)	190 (7.48)	**95m6**	M24	170 (6.69)	100 (3.94)	25 (0.98)
	1PH8286										
	1PH8288										

1PH828



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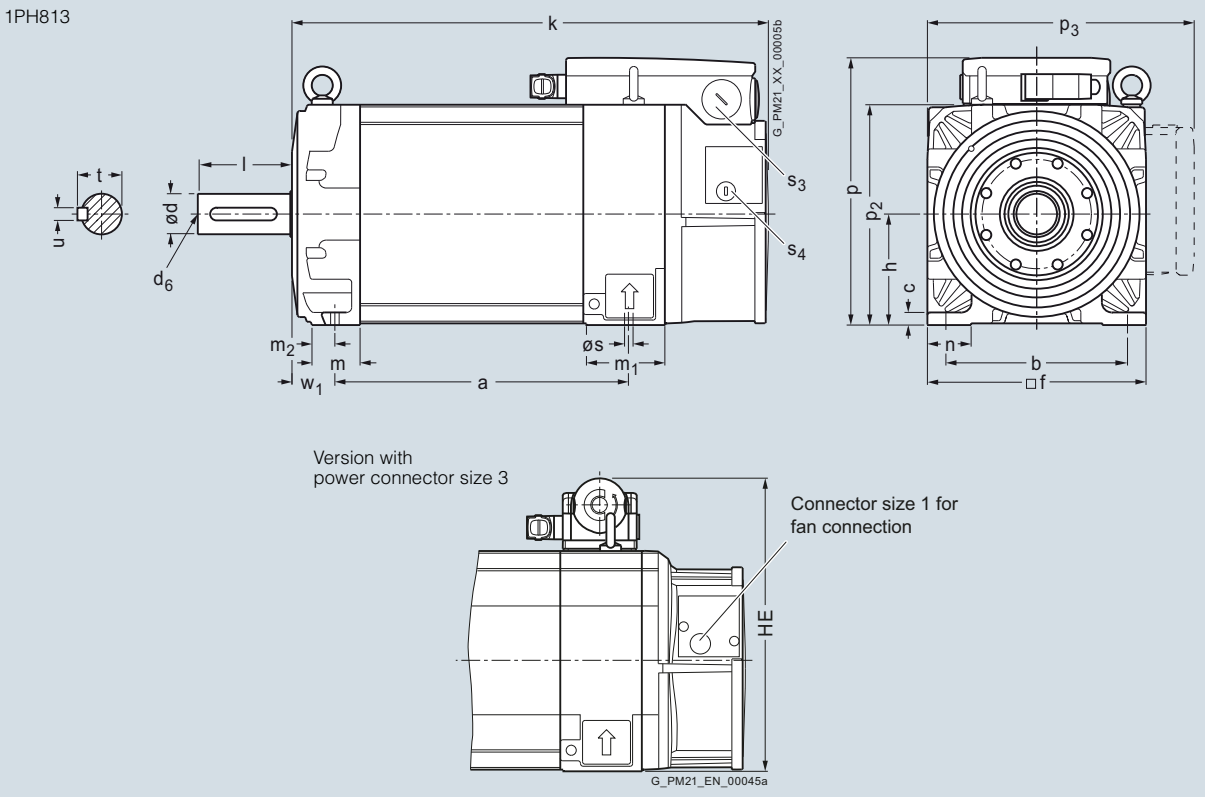
Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	b A	c HA	c_1 LA	f AB	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, forced ventilation													
132	1PH8131		220.5 (8.68)	216 (8.50)	15 (0.59)	18 (0.71)	260 (10.24)	132 (5.20)	439 (17.28)	57 (2.24)	93 (3.66)	27 (1.06)	52 (2.05)
	1PH8133		265.5 (10.45)						484 (19.06)				
	1PH8135		310.5 (12.22)						529 (20.83)				
	1PH8137		350.5 (13.80)						569 (22.40)				

Shaft extension DE

Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_3 –	s_4 –	w_1 C	**d D**	d_6 –	l L	t GA	u F
132	1PH8131		317.5 (12.50)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	M40 × 1.5	M20 × 1.5	53 (2.09)	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133														
	1PH8135														
	1PH8137														

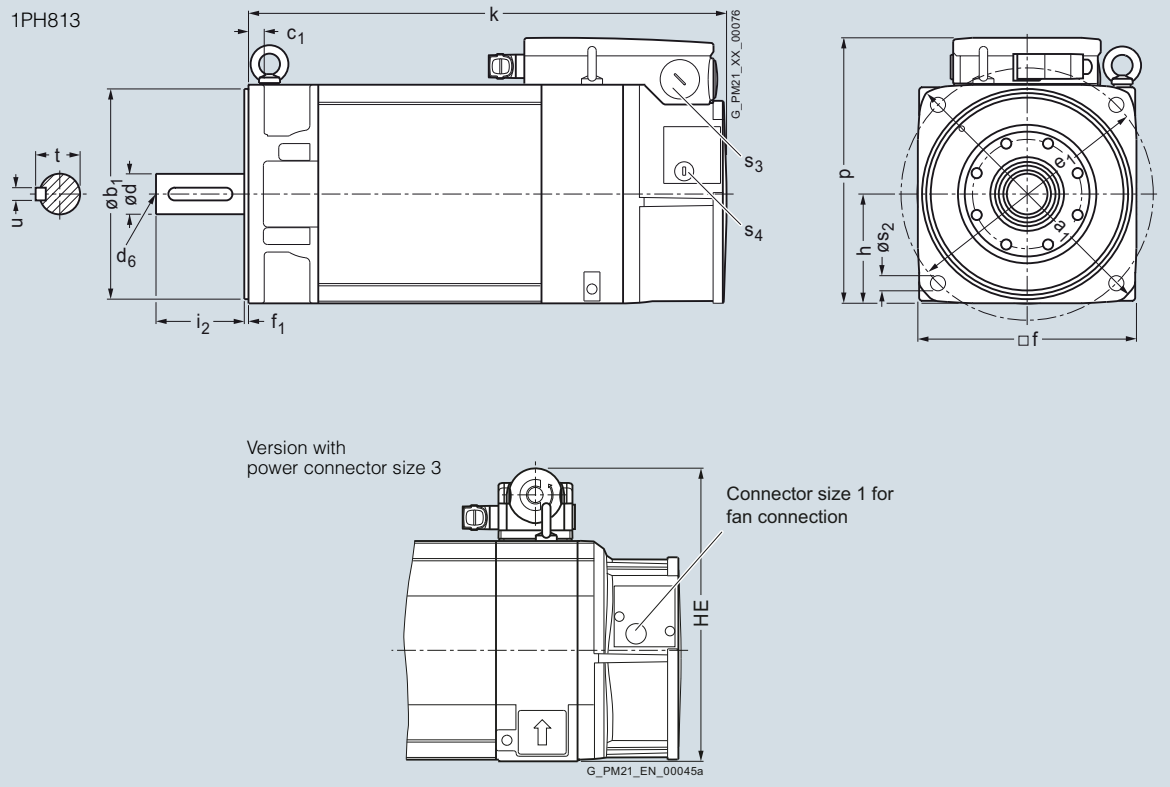


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Dimensional drawings

For motor		Dimensions in mm (inches)								
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB
1PH8 type of construction IM B5, forced ventilation										
132	1PH8131		340 (13.39)	250 (9.84)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	130 (5.12)	439 (17.28)
	1PH8133									484 (19.06)
	1PH8135									529 (20.83)
	1PH8137									569 (22.40)

								Shaft extension DE				
Shaft height	Type	DIN IEC	p HD	– HE	s_2 –	s_3 –	s_4 –	**d D**	d_6 –	i_2 E	t GA	u F
132	1PH8131		315.5 (12.42)	345 (13.58)	18 (0.71)	M40 × 1.5	M20 × 1.5	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133											
	1PH8135											
	1PH8137											

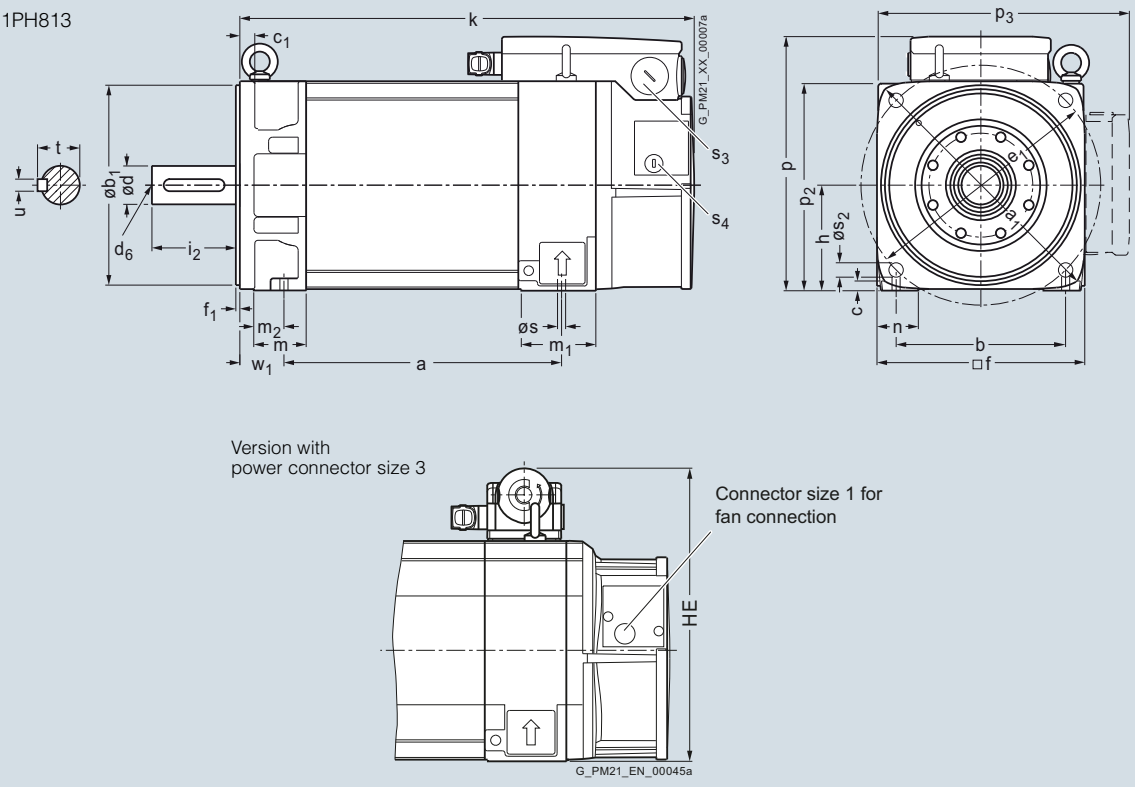


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Dimensional drawings

For motor		Dimensions in mm (inches)														
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B35, forced ventilation																
132	1PH8131		220.5 (8.68)	340 (13.39)	216 (8.50)	250 (9.84)	15 (0.59)	300 (11.81)	260 (10.24)	5 (0.20)	132 (5.20)	439 (17.28)	65 (2.56)	93 (3.66)	35 (1.38)	52 (2.05)
	1PH8133		265.5 (10.45)									484 (19.06)				
	1PH8135		310.5 (12.22)									529 (20.83)				
	1PH8137		350.5 (13.80)									569 (22.40)				

												Shaft extension DE					
Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_2 –	s_3 –		s_4 –	w_1 C	**d D**	d_6 –	i_2 E	t GA	u F
132	1PH8131		317.5 (12.42)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	18 (0.71)	M40 × 1.5		M20 × 1.5	53 (2.09)	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133																
	1PH8135																
	1PH8137																



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Dimensional drawings

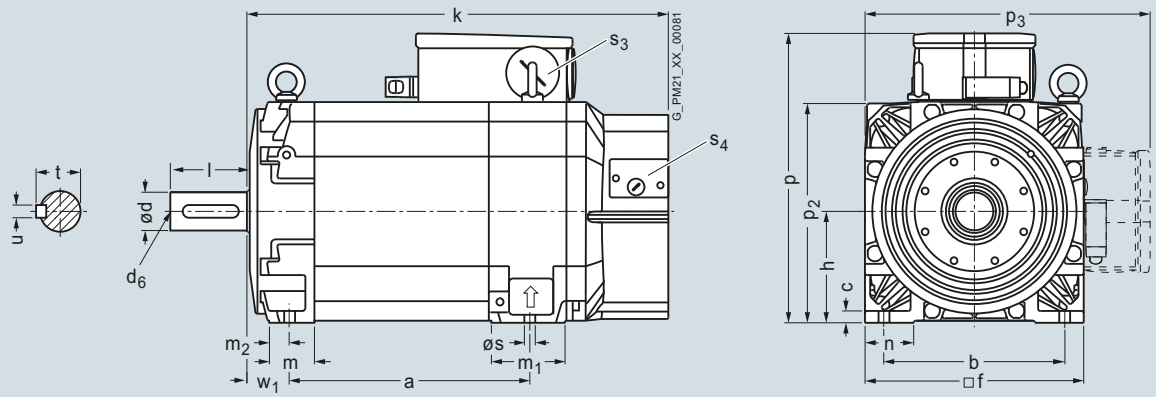
For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, forced ventilation																	
160	1PH8165		406.5 (16.00)	–	254 (10.00)	–	17 (0.67)	23 (0.91)	–	314 (12.36)	–	160 (6.30)	670.5 (26.40)	64 (2.52)	99.5 (3.92)	28 (1.10)	70 (2.76)
	1PH8167		446.5 (17.58)										710.5 (27.97)				

Shaft extension DE

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	**d D**	d_6 –	l L	t GA	u F
160	1PH8165		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	–	M63 × 1.5	M20 × 1.5	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)
	1PH8167															

1PH816



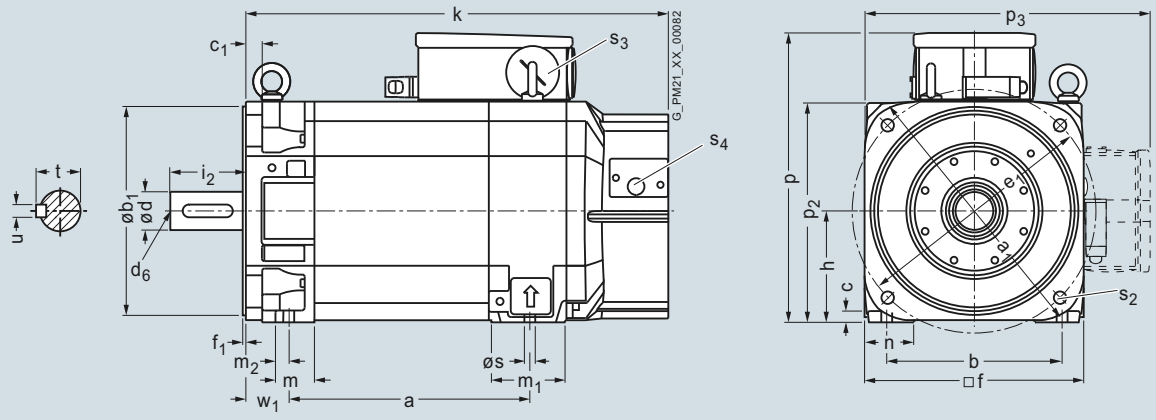
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Dimensional drawings

For motor			Dimensions in mm (inches)														
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B5/IM B35, forced ventilation																	
160	1PH8165		406.5 (16.00)	393 (15.47)	254 (10.00)	300 (11.81)	17 (0.67)	–	350 (13.78)	314 (12.36)	5 (0.20)	160 (6.30)	670.5 (26.40)	55 (2.17)	99.5 (3.92)	19 (0.75)	70 (2.76)
	1PH8167		446.5 (17.58)										710.5 (27.97)				

												Shaft extension DE				
Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	**d D**	d_6 –	i_2 E	t GA	u F
160	1PH8165		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	18 (0.71)	M63 × 1.5	M20 × 1.5	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)
	1PH8167															

1PH816

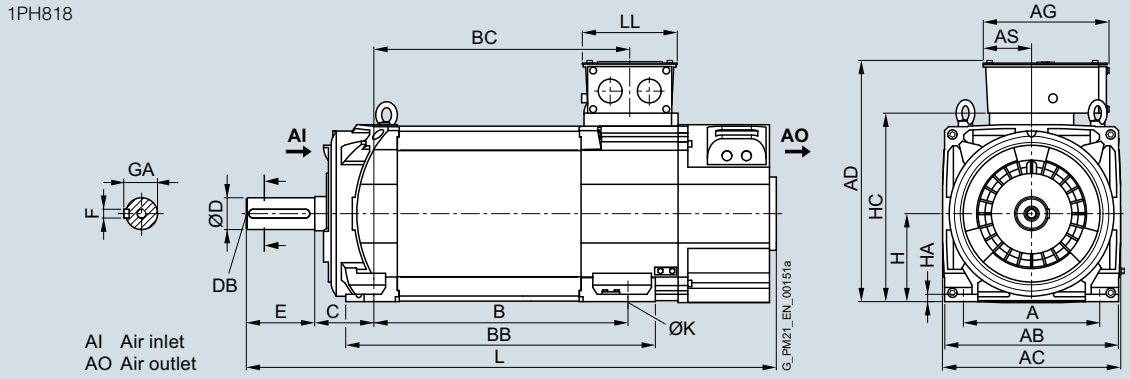


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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																		
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)
	1PH8186					520 (20.47)	635 (25.00)											1085 (42.72)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186					519 (20.43)	

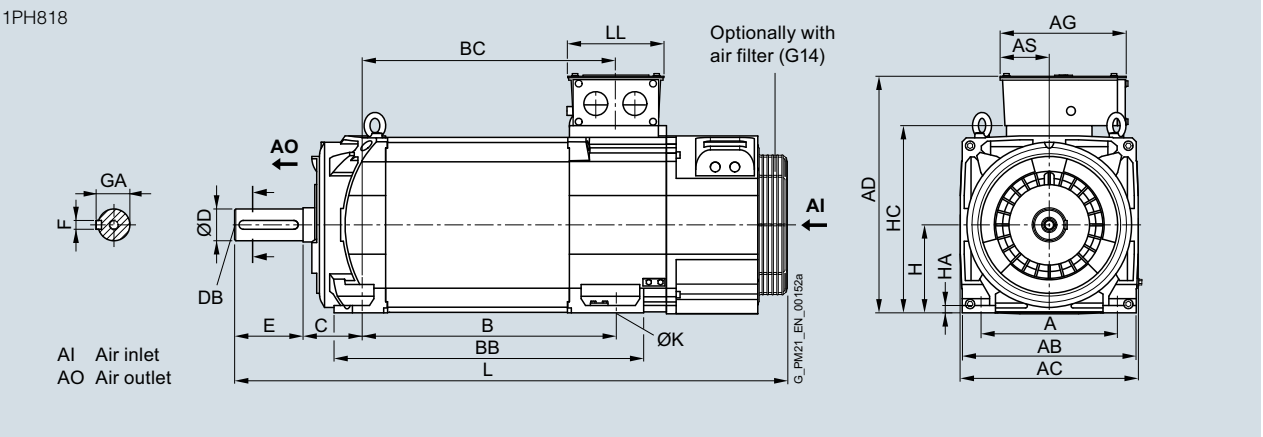


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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																	
180	1PH8184	279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)
	1PH8186				520 (20.47)	635 (25.00)											1137 (44.76)

Terminal box		Dimensions in mm (inches)				
Shaft height	Type	IEC AD	AG	AS	BC	LL
Terminal box type 1XB7 322						
180	1PH8184	484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186				519 (20.43)	
Terminal box type 1XB7 422						
180	1PH8184	499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186				519 (20.43)	
Terminal box type 1XB7 700						
180	1PH8184	525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186				519 (20.43)	

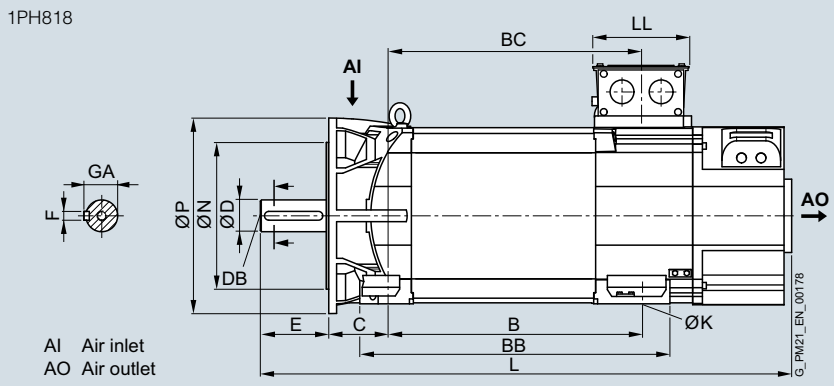


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Dimensional drawings

For motor		Dimensions in mm (inches)																			
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, flange A400 (option K90)																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1085 (42.72)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186					519 (20.43)	

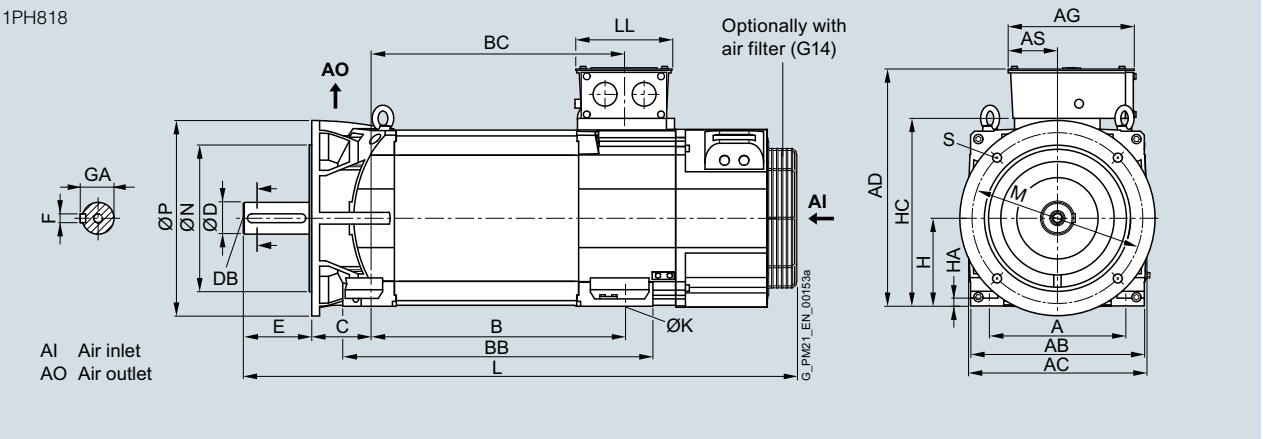


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Dimensional drawings

For motor		Dimensions in mm (inches)																			
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A400 (option K90)																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	350 (13.78)	300 (11.81)	400 (15.75)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1137 (44.76)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186					519 (20.43)	

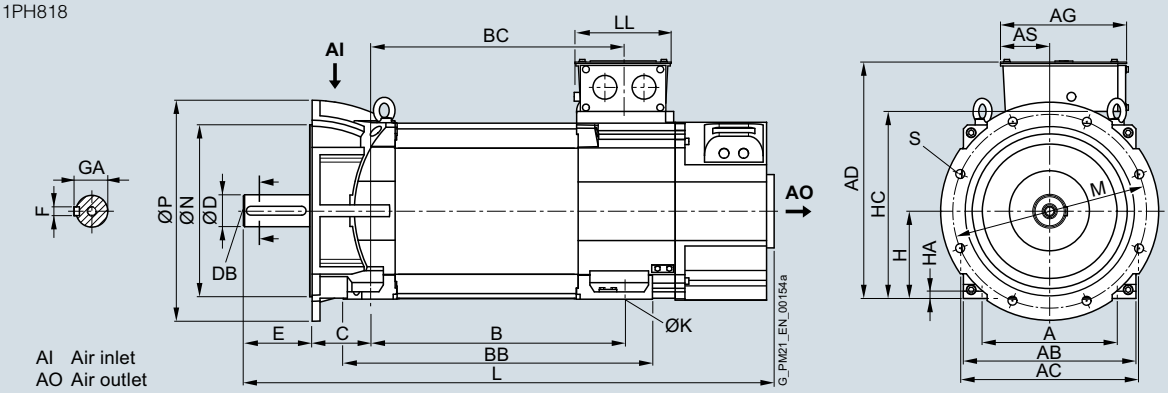


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Dimensional drawings

For motor		Dimensions in mm (inches)																			
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE, flange A450																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	995 (39.17)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1085 (42.72)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186					519 (20.43)	



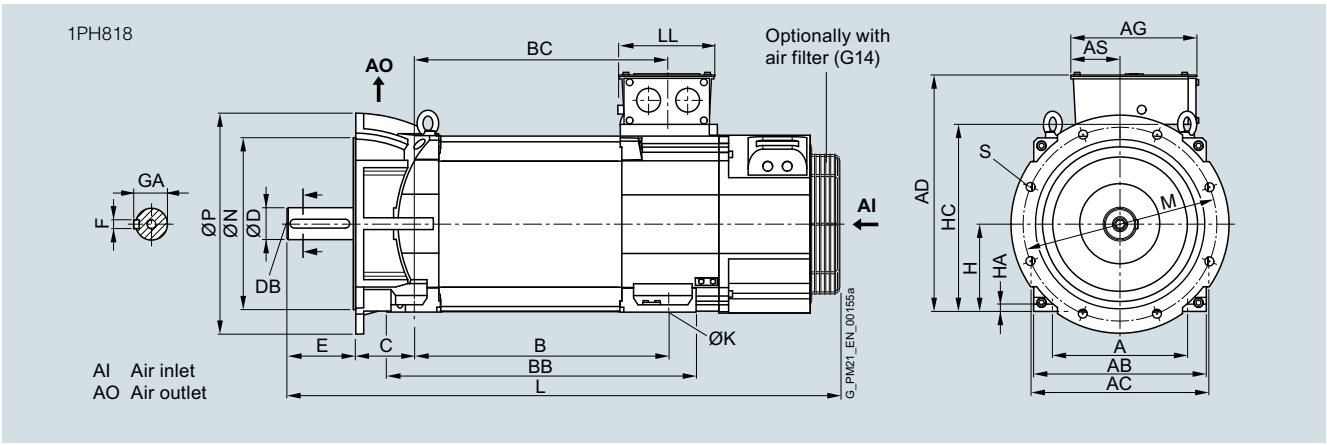
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Dimensional drawings

For motor		Dimensions in mm (inches)																		
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE, flange A450																						
180	1PH8184		279 (10.98)	356 (14.02)	364 (14.33)	430 (16.93)	545 (21.46)	121 (4.76)	65 (2.56)	M20	140 (5.51)	18 (0.71)	69 (2.72)	180 (7.09)	15 (0.59)	383 (15.08)	14.5 (0.57)	1047 (41.22)	400 (15.75)	350 (13.78)	450 (17.72)	18.5 (0.73)
	1PH8186					520 (20.47)	635 (25.00)											1137 (44.76)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
180	1PH8184		484 (19.06)	258 (10.16)	100 (3.94)	429 (16.89)	197 (7.76)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 422							
180	1PH8184		499 (19.65)	303 (11.93)	120 (4.72)	429 (16.89)	230 (9.06)
	1PH8186					519 (20.43)	
Terminal box type 1XB7 700							
180	1PH8184		525 (20.67)	310 (12.20)	185 (7.28)	429 (16.89)	295 (11.61)
	1PH8186					519 (20.43)	



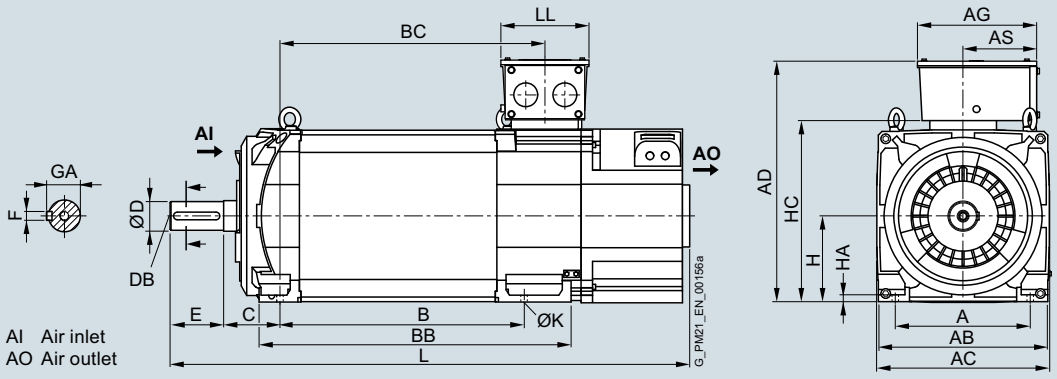
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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow DE → NDE																		
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)
	1PH8226					545 (21.46)	725 (28.54)											1271 (50.04)
	1PH8228					635 (25.00)	815 (32.09)											1361 (53.58)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		613 (24.13)	258 (10.16)	100 (3.94)	481 (18.94)	197 (7.76)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		628 (24.72)	303 (11.93)	120 (4.72)	481 (18.94)	230 (9.06)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		654 (25.75)	295 (11.61)	185 (7.28)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

1PH822



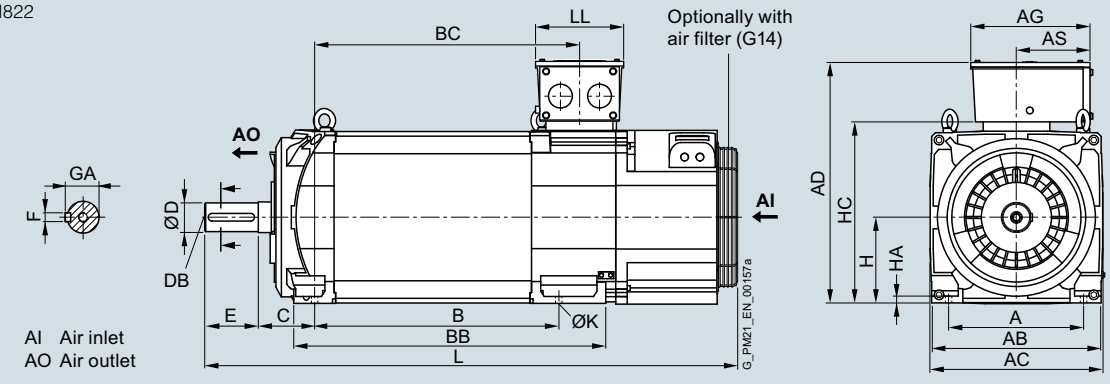
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Dimensional drawings

For motor		Dimensions in mm (inches)															
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L
1PH8 type of construction IM B3, forced ventilation – direction of air flow NDE → DE																		
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1206 (47.48)
	1PH8226					545 (21.46)	725 (28.54)											1306 (51.42)
	1PH8228					635 (25.00)	815 (32.09)											1396 (54.96)

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		613 (24.13)	258 (10.16)	100 (3.94)	481 (18.94)	197 (7.76)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		628 (24.72)	303 (11.93)	120 (4.72)	481 (18.94)	230 (9.06)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		654 (25.75)	295 (11.61)	185 (7.28)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

1PH822



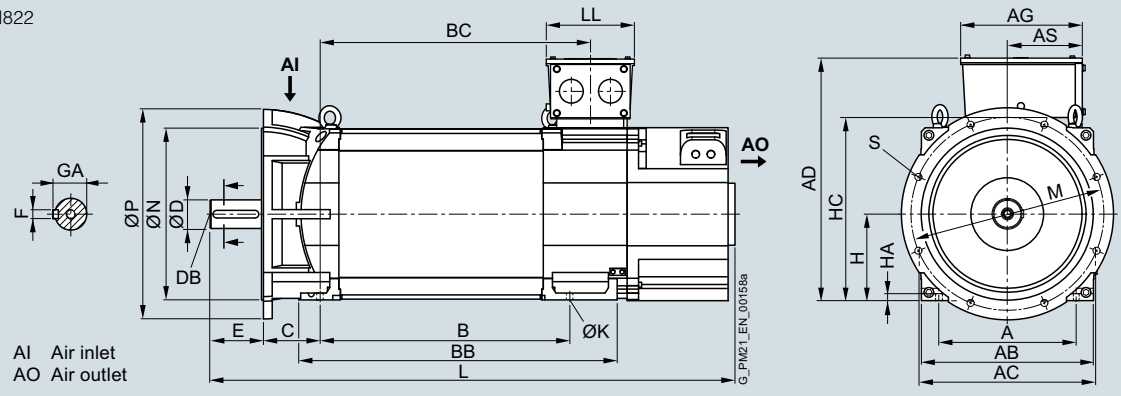
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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow DE → NDE, flange A550																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1171 (46.10)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)
	1PH8226					545 (21.46)	725 (28.54)											1271 (50.04)				
	1PH8228					635 (25.00)	815 (32.09)											1361 (53.58)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		613 (24.13)	258 (10.16)	100 (3.94)	481 (18.94)	197 (7.76)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		628 (24.72)	303 (11.93)	120 (4.72)	481 (18.94)	230 (9.06)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		654 (25.75)	295 (11.61)	185 (7.28)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	

1PH822



AI Air inlet
AO Air outlet

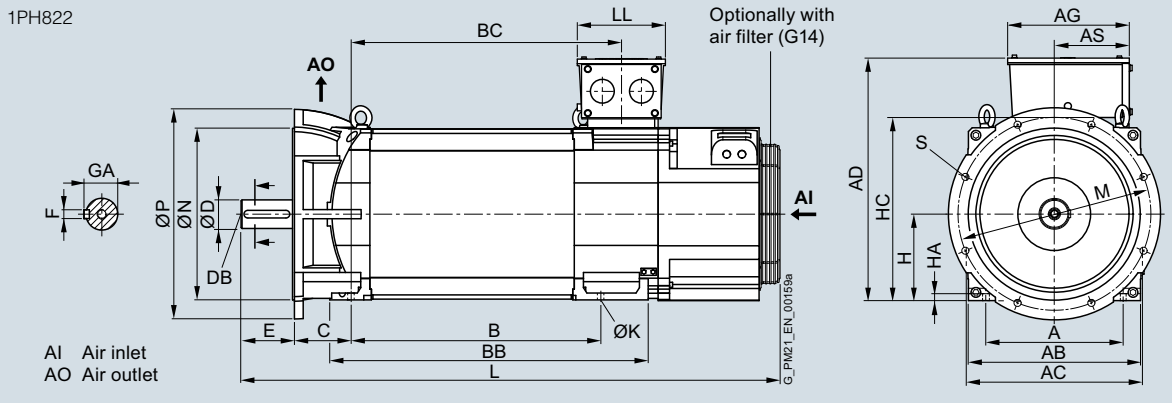
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Dimensional drawings

For motor		Dimensions in mm (inches)																				
Shaft height	Type	IEC	A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
1PH8 type of construction IM B35, forced ventilation – direction of air flow NDE → DE, flange A550																						
225	1PH8224		356 (14.02)	446 (17.56)	454 (17.87)	445 (17.52)	625 (24.61)	149 (5.87)	75 (2.95)	M20	140 (5.51)	20 (0.79)	79.5 (3.13)	225 (8.86)	18 (0.71)	475 (18.70)	18.5 (0.73)	1206 (47.48)	500 (19.69)	450 (17.72)	550 (21.65)	18.5 (0.73)
	1PH8226					545 (21.46)	725 (28.54)											1306 (51.42)				
	1PH8228					635 (25.00)	815 (32.09)											1396 (54.96)				

Terminal box		Dimensions in mm (inches)					
Shaft height	Type	IEC	AD	AG	AS	BC	LL
Terminal box type 1XB7 322							
225	1PH8224		613 (24.13)	258 (10.16)	100 (3.94)	481 (18.94)	197 (7.76)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 422							
225	1PH8224		628 (24.72)	303 (11.93)	120 (4.72)	481 (18.94)	230 (9.06)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	
Terminal box type 1XB7 700							
225	1PH8224		654 (25.75)	295 (11.61)	185 (7.28)	481 (18.94)	310 (12.20)
	1PH8226					581 (22.87)	
	1PH8228					671 (26.42)	



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Dimensional drawings

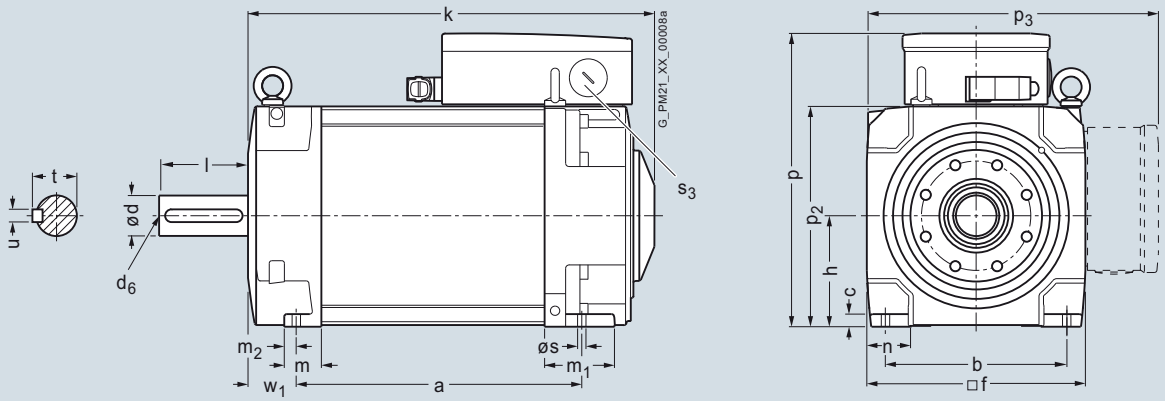
For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, water cooling																	
132	1PH8131		220.5 (8.68)	–	216 (8.50)	–	15 (0.59)	–	–	260 (10.24)	–	132 (5.20)	347.5 (13.68)	42 (1.65)	81 (3.19)	12 (0.47)	43 (1.69)
	1PH8133		265.5 (10.45)										392.5 (15.45)				
	1PH8135		310.5 (12.22)										437.5 (17.22)				
	1PH8137		350.5 (13.80)										477.5 (18.80)				

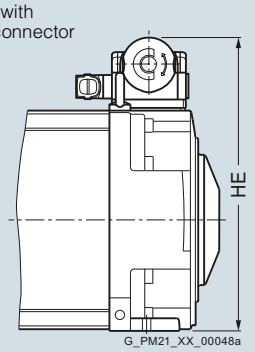
Shaft extension DE

Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_2 –	s_3 –	w_1 C	**d D**	d_6 –	l E	t GA	u F
132	1PH8131		347.5 (13.68)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	–	M50 × 1.5	53 (2.09)	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133														
	1PH8135														
	1PH8137														

1PH813



Version with
Power connector
Size 3



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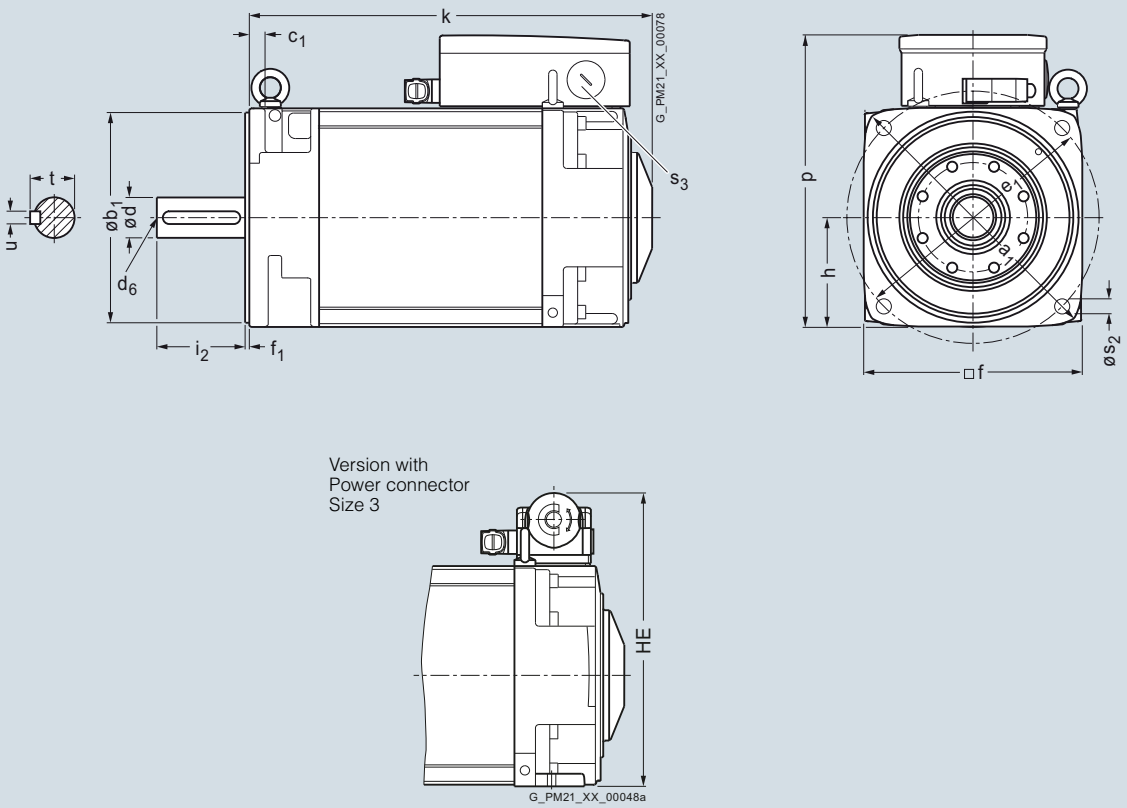
Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B5, water cooling																	
132	1PH8131		–	340 (13.39)	–	250 (9.84)	–	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	132 (5.20)	347.5 (13.68)	–	–	–	–
	1PH8133												392.5 (15.45)				
	1PH8135												437.5 (17.22)				
	1PH8137												477.5 (18.80)				

Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_2 –	s_3 –	w_1 C	Shaft extension DE **d** **D**	d_6 –	i_2 E	t GA	u F
132	1PH8131		345.5 (13.60)	345 (13.58)	–	–	–	18 (0.71)	M50 × 1.5	–	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133														
	1PH8135														
	1PH8137														

1PH813



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Dimensional drawings

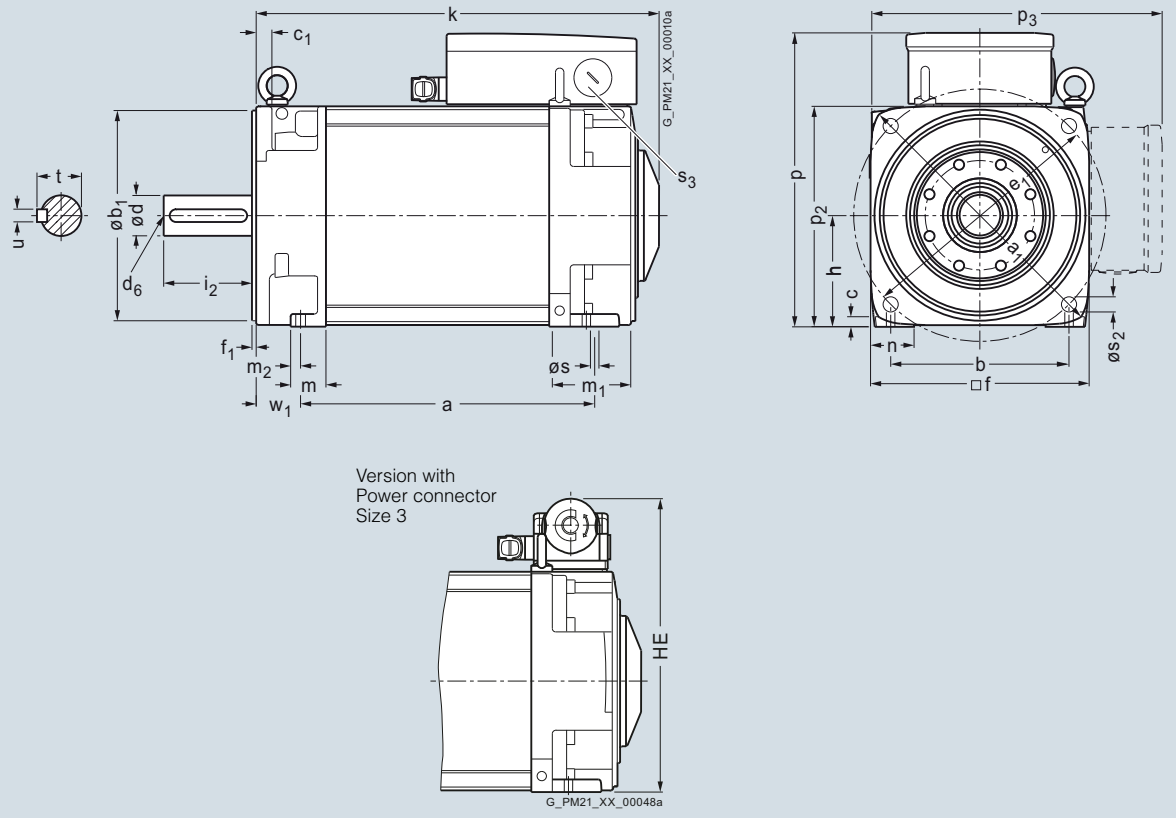
For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B35, water cooling																	
132	1PH8131		220.5 (8.68)	340 (13.39)	216 (8.50)	250 (9.84)	15 (0.59)	18 (0.71)	300 (11.81)	260 (10.24)	5 (0.20)	132 (5.20)	347.5 (13.68)	42 (1.65)	81 (3.19)	12 (0.47)	43 (1.69)
	1PH8133		265.5 (10.45)										392.5 (15.45)				
	1PH8135		310.5 (12.22)										437.5 (17.22)				
	1PH8137		350.5 (13.80)										477.5 (18.80)				

Shaft extension DE

Shaft height	Type	DIN IEC	p HD	– HE	p_2 –	p_3 –	s K	s_2 –	s_3 –	w_1 C	**d D**	d_6 –	i_2 E	t GA	u F
132	1PH8131		347.5 (13.68)	347 (13.66)	262 (10.31)	357.5 (14.07)	12 (0.47)	18 (0.71)	M50 × 1.5	53 (2.09)	**48 (1.89)**	M16	110 (4.33)	51.5 (2.03)	14 (0.55)
	1PH8133														
	1PH8135														
	1PH8137														

1PH813



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Dimensional drawings

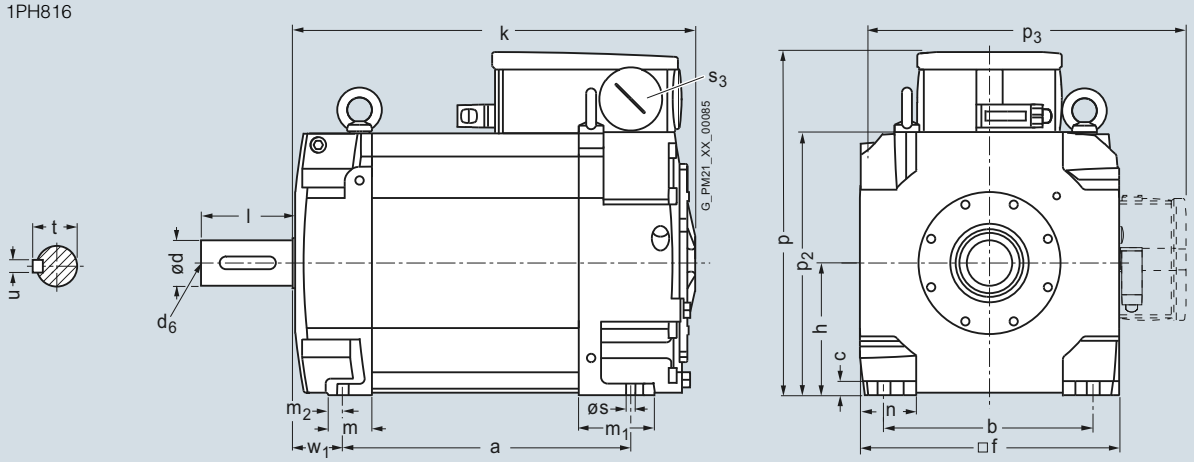
For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B3, water cooling																	
160	1PH8164		346.5 (13.64)	–	254 (10.00)	–	17 (0.67)	23 (0.91)	–	314 (12.36)	–	160 (6.30)	488.5 (19.23)	53 (2.09)	91 (3.58)	17 (0.67)	70 (2.76)
	1PH8166		406.5 (16.00)										548.5 (21.59)				
	1PH8168		446.5 (17.58)										588.5 (23.17)				

Shaft extension DE

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	**d D**	d_6 –	l L	t GA	u F
160	1PH8164		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	–	M63 × 1.5	–	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)
	1PH8166															
	1PH8168															

1PH816



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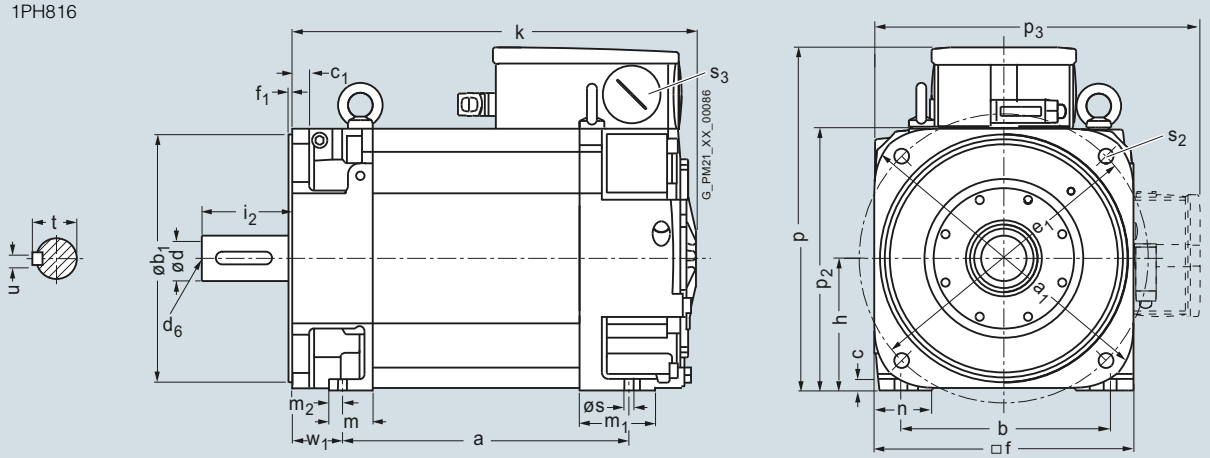
Dimensional drawings

For motor — Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	h H	k LB	m BA	m_1 –	m_2 –	n AA
1PH8 type of construction IM B5/IM B35, water cooling																	
160	1PH8164		346.5 (13.64)	393 (15.47)	254 (10.00)	300 (11.81)	17 (0.67)	–	350 (13.78)	314 (12.36)	5 (0.20)	160 (6.30)	488.5 (19.23)	53 (2.09)	91 (3.58)	17 (0.67)	70 (2.76)
	1PH8166		406.5 (16.00)										548.5 (21.59)				
	1PH8168		446.5 (17.58)										588.5 (23.17)				

Shaft height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	Shaft extension DE: **d D**	d_6 –	i_2 E	t GA	u F
160	1PH8164		415.5 (16.36)	–	317 (12.48)	412.5 (16.24)	14 (0.55)	18 (0.71)	M63 × 1.5	–	61 (2.40)	**55 (2.17)**	M20	110 (4.33)	59 (2.32)	16 (0.63)
	1PH8166															
	1PH8168															

1PH816



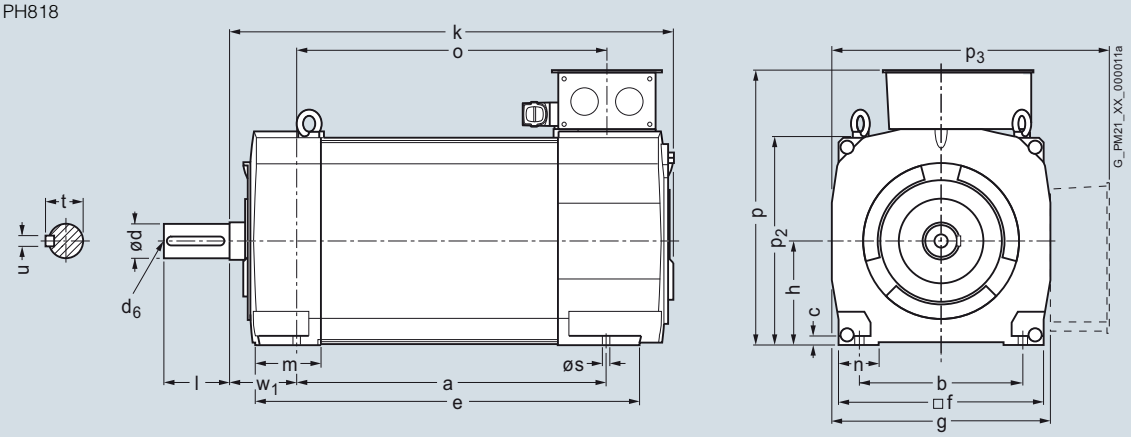
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Dimensional drawings

For motor		Dimensions in mm (inches)													
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	g AC	h H	k LB	m BA	n AA	p_2 –	s K	w_1 C	
1PH8 types of construction IM B3/IM V5, water cooling															
180	1PH8184		430 (16.93)	279 (10.98)	15 (0.59)	356 (14.02)	384 (15.12)	180 (7.09)	670 (26.38)	138 (5.43)	73 (2.87)	372 (14.65)	14.5 (0.57)	121 (4.76)	
	1PH8186		520 (20.47)						760 (29.92)						

			Shaft extension DE					Terminal box type											
								1XB7322				1XB7422				1XB7700			
Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F	p HD	p_3 –	r LL	x_1 AG	p HD	p_3 –	r LL	x_1 AG	p HD	p_3 –	r LL	x_1 AG
180	1PH8184		**65m6**	M20	140 (5.51)	69 (2.72)	18 (0.71)	484 (19.06)	485 (19.09)	197 (7.76)	258 (10.16)	539 (21.22)	540 (21.26)	230 (9.06)	303 (11.93)	588 (23.15)	574 (22.60)	310 (12.20)	295 (11.61)
	1PH8186																		

1PH818



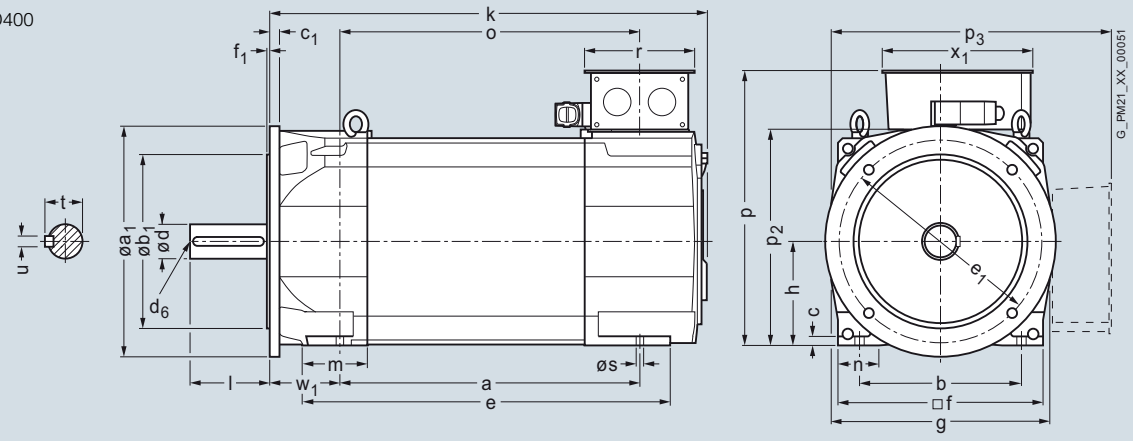
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Dimensional drawings

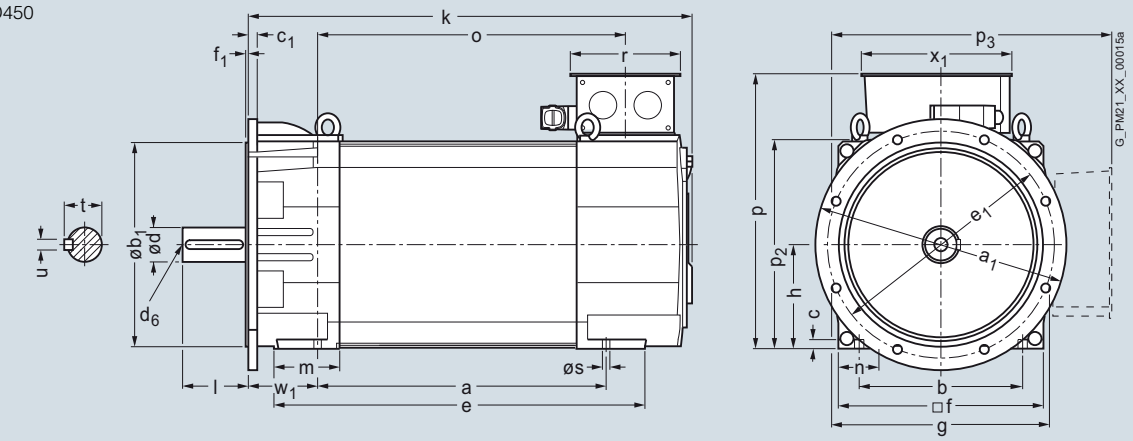
For motor		Dimensions in mm (inches)																	
				D400	D450		D400	D450				D400	D450						
Shaft height	Type	DIN IEC	a B	a_1 P		b A	b_1 N		c HA	c_1 LA	e_1 M			f AB	f_1 T	g AC	h H	k LB	m BA
1PH8 types of construction IM B5/IM B35/IM V15, water cooling																			
180	1PH8184		430 (16.93)	400 (15.75)	450 (17.72)	279 (10.98)	300 (11.81)	350 (13.78)	15 (0.59)	16 (0.63)	350 (13.78)	400 (15.75)		356 (14.02)	5 (0.20)	384 (15.12)	180 (7.09)	670 (26.38)	123 (4.84)
	1PH8186		520 (20.47)															760 (29.92)	

			Shaft extension DE									Terminal box type
												Dimensions as for types of construction IM B3/IM V5
Shaft height	Type	DIN IEC	n AA	p_2 –	s K	w_1 C	**d D**	d_6 –	l E	t GA	u F	
180	1PH8184		73 (2.87)	372 (14.65)	14.5 (0.57)	121 (4.76)	**65m6**	M20	140 (5.51)	69 (2.72)	18 (0.71)	
	1PH8186											

1PH818
D400



D450



6

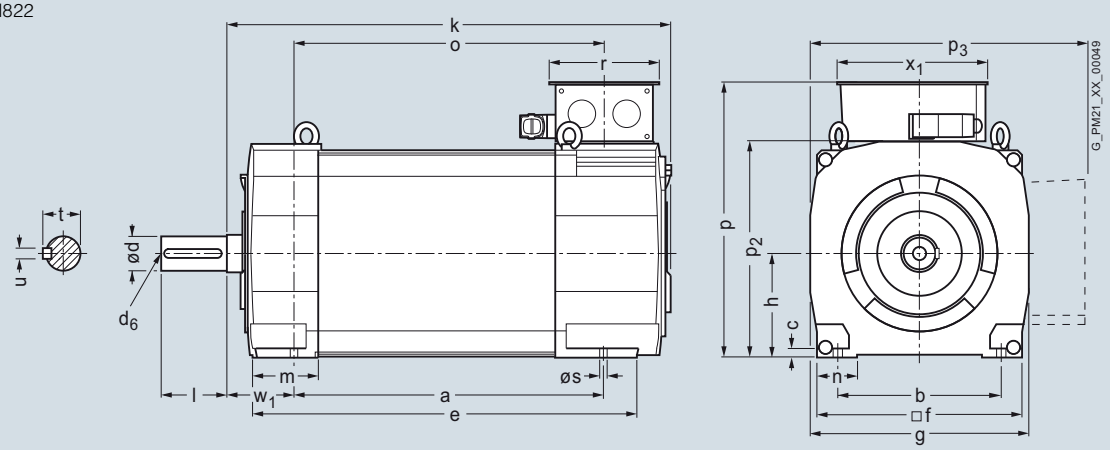
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Dimensional drawings

For motor			Dimensions in mm (inches)												
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	g AC	h H	k LB	m BA	n AA	p_2 _	s K	w_1 C	
1PH8 types of construction IM B3/IM V5, water cooling															
225	1PH8224		445 (17.52)	356 (14.02)	18 (0.71)	446 (17.56)	474 (18.66)	225 (8.86)	775 (30.51)	154 (6.06)	88 (3.46)	462 (18.19)	18.5 (0.73)	149 (5.87)	
	1PH8226		545 (21.46)						875 (34.45)						
	1PH8228		635 (25.0)						965 (37.99)						

			Shaft extension DE					Terminal box type											
								1XB7322				1XB7422				1XB7700			
Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F	p HD	p_3 _	r LL	x_1 AG	p HD	p_3 _	r LL	x_1 AG	p HD	p_3 _	r LL	x_1 AG
225	1PH8224		**75m6**	M20	140 (5.51)	79.5 (3.13)	20 (0.79)	579 (22.80)	577 (22.72)	197 (7.76)	258 (10.16)	634 (24.96)	632 (24.88)	230 (9.06)	303 (11.93)	683 (26.89)	666 (26.22)	310 (12.20)	295 (11.61)
	1PH8226																		
	1PH8228																		

1PH822



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Dimensional drawings

For motor — Dimensions in mm (inches)

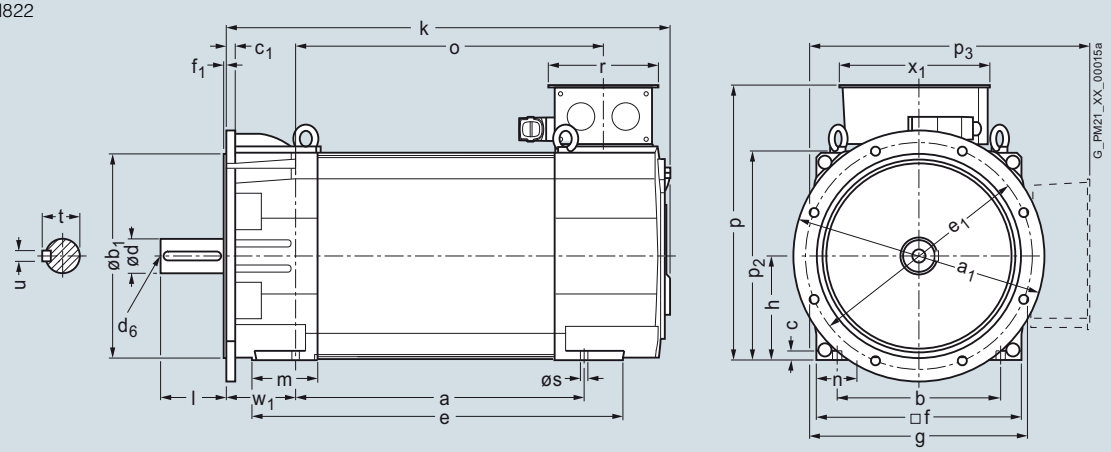
Shaft height	Type	DIN IEC	a B	a_1 P	b A	b_1 N	c HA	c_1 LA	e_1 M	f AB	f_1 T	g AC	h H	k LB	m BA	n AA	p_2 –	w_1 C
1PH8 types of construction IM B5/IM B35/IM V15 D550, water cooling																		
225	1PH8224		445 (17.52)	550 (21.65)	356 (14.02)	450 (17.72)	18 (0.71)	20 (0.79)	500 (19.69)	446 (17.56)	5 (0.20)	474 (18.66)	225 (8.86)	770 (30.31)	144 (5.67)	88 (3.46)	462 (18.19)	149 (5.87)
	1PH8226		545 (21.46)											872 (34.33)				
	1PH8228		635 (25.00)											962 (37.87)				

Shaft extension DE — Terminal box type

Dimensions as for types of construction IM B3/IM V5

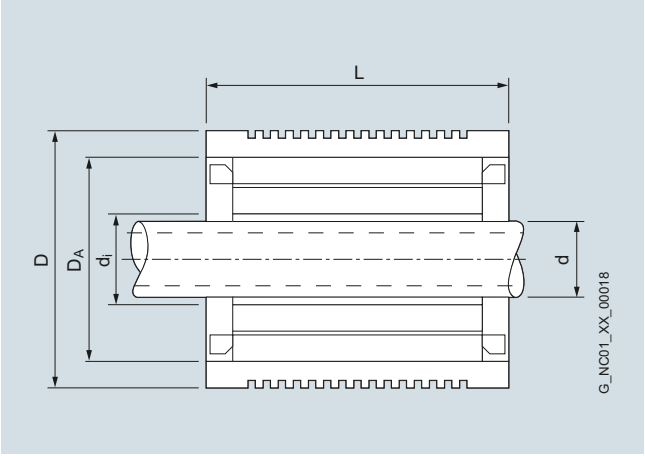
Shaft height	Type	DIN IEC	**d** **D**	d_6 –	l E	t GA	u F
225	1PH8224		**75m6**	M20	140 (5.51)	79.5 (3.13)	20 (0.79)
	1PH8226						
	1PH8228						

1PH822



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Dimensional drawings



For motor Type	Dimensions in mm (inches) Total length	Total outer diameter	Stator outer diameter	Rotor inner diameter
	L	D	D_A	d_i
1FE1 High-Speed series				
1FE1051-4....-1BA.	130 (5.12)	120 (4.72)	106 (4.17)	46 (1.81)
1FE1052-4....-1BA.	180 (7.09)			
1FE1053-4....-1BA.	230 (9.06)			
1FE1072-4W...-1BA.	185 (7.28)	155 (6.10)	135 (5.31)	58 (2.28)
1FE1073-4W...-1BA.	235 (9.25)			
1FE1074-4W...-1BA.	285 (11.22)			
1FE1075-4W...-1BA.	335 (13.19)	155 (6.10)	135 (5.31)	58 (2.28)
1FE1082-4W...-1BA.	190 (7.48)	180 (7.09)	160 (6.30)	68 (2.68)
1FE1083-4W...-1BA.	240 (9.45)			
1FE1084-4W...-1BA.	290 (11.42)			
1FE1085-4W...-1BA.	340 (13.39)			
1FE1092-4W...-1BR.	200 (7.87)	205 (8.07)	180 (7.09)	80 (3.15)
1FE1093-4W...-1BA.	250 (9.84)	72 (2.83)		
1FE1093-4W...-1BR.	250 (9.84)	80 (3.15)		
1FE1094-4W...-1BA.	300 (11.81)	72 (2.83)		
1FE1094-4W...-1BR.	300 (11.81)	80 (3.15)		
1FE1095-4W...-1BA.	350 (13.78)	72 (2.83)		
1FE1095-4W...-1BR.	350 (13.78)	80 (3.15)		
1FE1096-4W...-1BA.	400 (15.75)	72 (2.83)		
1FE1096-4W...-1BR.	400 (15.75)	80 (3.15)		
1FE1103-4W...-1BA.	265 (10.43)	230 (9.06)	200 (7.87)	96 (3.78)
1FE1104-4W...-1BA.	315 (12.40)			
1FE1105-4W...-1BA.	365 (14.37)			
1FE1106-4W...-1BA.	415 (16.34)			
1FE1124-4W...-1BA.	315 (12.40)	270 (10.63)	240 (9.45)	110 (4.33)
1FE1125-4W...-1BA.	365 (14.37)			
1FE1126-4W...-1BA.	415 (16.34)			

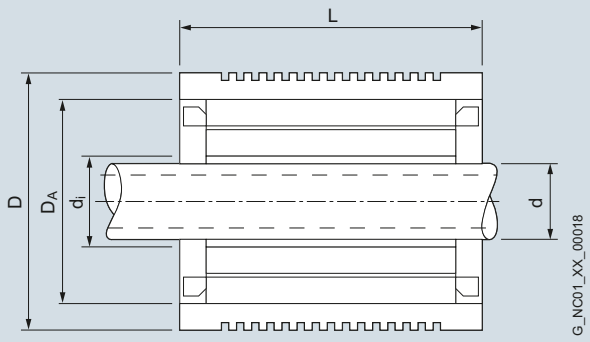
For motor Type	Dimensions in mm (inches) Total length	Total outer diameter	Stator outer diameter	Rotor inner diameter	Rotor inner diameter with sleeve			
	L	D	D_A	d_i -..A.	d -..B.	d -..C.	d -..D.	d -..E.
1FE1 High-Torque series								
1FE1041-6W...-1BA.	107 (4.21)	95 (3.74)	85 (3.35)	44 (1.73)	–	–	–	–
1FE1042-6W...-1BA.	157 (6.18)	95 (3.74)	85 (3.35)	44 (1.73)	–	–	–	–
1FE1051-6W...-1B..	170 (6.69)	115 (4.53)	103.5 (4.07)	42 (1.65)	–	33 (1.30)	–	–
1FE1052-6W...-1B..	220 (8.66)	115 (4.53)	103.5 (4.07)	42 (1.65)	–	33 (1.30)	–	–
1FE1054-6W...-1BA.	320 (12.60)	115 (4.53)	103.5 (4.07)	42 (1.65)	–	33 (1.30)	–	–
1FE1061-6W...-1B..	130 (5.12)	130 (5.12)	118 (4.65)	58 (2.28)	48 (1.89)	–	–	–
1FE1062-6W...-1B..	180 (7.09)	130 (5.12)	118 (4.65)	58 (2.28)	–	–	–	–
1FE1064-6W...-1BA.	280 (11.02)	130 (5.12)	118 (4.65)	58 (2.28)	–	–	–	–
1FE1082-6W...-1B..	195 (7.68)	190 (7.48)	170 (6.69)	93 (3.66)	67 (2.64)	74 (2.91)	80 (23.15)	–
1FE1083-6W...-1B..	245 (9.65)	190 (7.48)	170 (6.69)	93 (3.66)	67 (2.64)	74 (2.91)	–	–
1FE1084-6W...-1B..	295 (11.61)	190 (7.48)	170 (6.69)	93 (3.66)	67 (2.64)	74 (2.91)	–	–
1FE1091-6W...-1B..	150 (5.91)	205 (8.07)	180 (7.09)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1092-6W...-1B..	200 (7.87)	205 (8.07)	180 (7.09)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1093-6W...-1B..	250 (9.84)	205 (8.07)	180 (7.09)	92 (3.62)	67 (2.64)	80 (3.15)	–	–
1FE1113-6W...-1B..	260 (10.24)	250 (9.84)	220 (8.66)	120 (4.72)	–	–	80 (23.15)	105.2 (4.14)
1FE1114-6W...-1B..	310 (12.20)	250 (9.84)	220 (8.66)	120 (4.72)	82 (3.23)	102 (4.02)	–	–
1FE1115-6W...-1BC.	360 (14.17)	250 (9.84)	220 (8.66)	120 (4.72)	–	102 (4.02)	–	–
1FE1116-6W...-1B..	410 (16.14)	250 (9.84)	220 (8.66)	120 (4.72)	82 (3.23)	102 (4.02)	–	–
1FE1143-8W...-1BA.	290 (11.42)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	–	–	–
1FE1144-8W...-1B..	340 (13.39)	310 (12.20)	280 (11.02)	166.7 (6.56)	–	150.3 (5.92)	–	–
1FE1145-8W...-1B..	390 (15.35)	310 (12.20)	280 (11.02)	–	–	150.3 (5.92)	140.3 (5.52)	125 (4.92)
1FE1147-8W...-1B..	490 (19.29)	310 (12.20)	280 (11.02)	–	–	150.3 (5.92)	140.3 (5.52)	–

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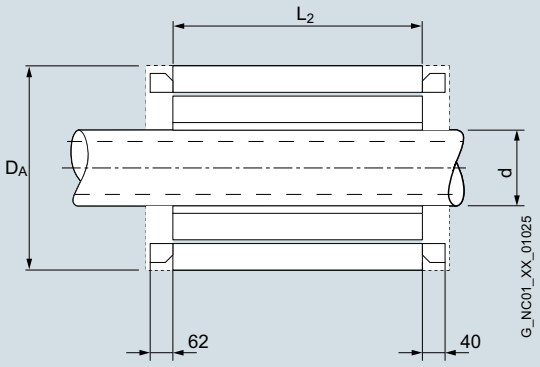
Dimensional drawings

For motor	Dimensions in mm (inches)				
	Total length	Length	Total outer diameter	Stator outer diameter	Rotor inner diameter
Type	L	L_2	D	D_A	d
1FE2 High-Torque series					
1FE2182-8...	320 (12.60)	200 (7.87)	400 (15.75)	359 (14.13)	200 (7.78)
1FE2183-8...	370 (14.57)	250 (9.54)			
1FE2184-8...	420 (16.54)	300 (11.81)			
1FE2185-8...	470 (18.50)	350 (13.78)			
1FE2186-8...	520 (20.47)	400 (15.75)			
1FE2187-8...	570 (22.44)	450 (17.72)			

With cooling jacket



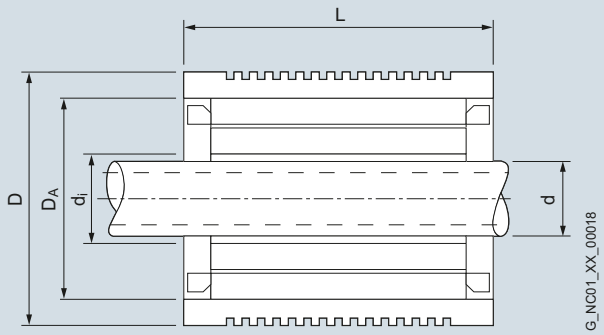
Without cooing jacket



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Dimensional drawings

For motor	Dimensions in mm (inches)				
Type	Standard spindle diameter	Rotor inner diameter	Stator outer diameter	Total outer diameter	Total length
	d	d_i	D_A	D	L
1PH2 water cooling					
1PH2093	67 (2.64)	85 (3.35)	180 (7.09)	205 (8.07)	250 (9.84)
1PH2095					300 (11.81)
1PH2113	82 (3.23)	100 (3.94)	220 (8.66)	250 (9.84)	290 (11.42)
1PH2115					310 (12.20)
1PH2117					330 (12.99)
1PH2118					390 (15.35)

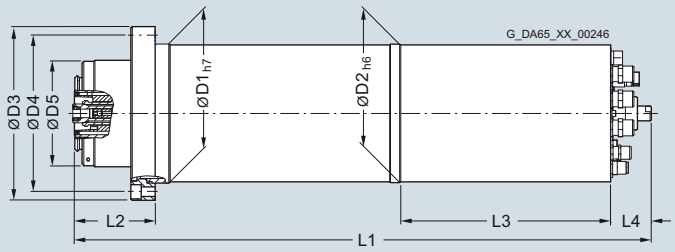


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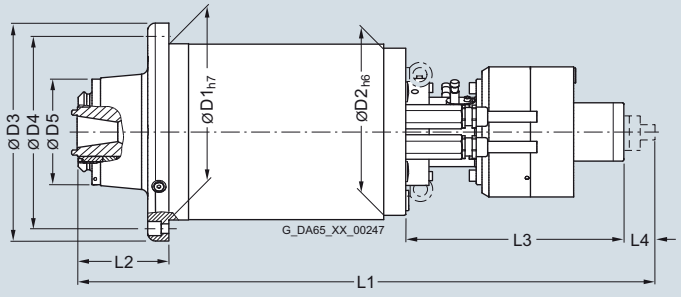
Dimensional drawings

For motor Type	Dimensions in mm (inches) D1	D2	D3	D4	D5	L1[1]	L2	L3	L4
2SP1 water cooling									
2SP1202	200 (7.88)	199 (7.84)	250 (9.85)	225 (8.87)	150 (5.91)	735[4] (28.94)	115.5 (4.55)	309[4] (12.17)	58[4] (2.28)
2SP1204						835[4] (32.87)			
2SP1253[2]	250 (9.85)	237 (9.34)	310 (12.21)	275 (10.84)	150 (5.91)	813 (32.03)	124.4 (4.90)	310 (12.21)	43 (1.69)
2SP1255[2]						913 (35.97)			
2SP1253[3]						819 (32.27)	130.0 (5.12)		
2SP1255[3]						919 (36.21)			

2SP120



2SP125



[1] The spindle is approx. 43 mm (1.69 in) shorter without turning bushing.

[2] HSK A63 tool interface.

[3] SK40, CAT40, BT40 tool interfaces.

[4] Spindle length L1 is approx. 118 mm (4.65 in) shorter, L3 approx. 147 mm (5.79 in) shorter and L4 approx. 30 mm (1.18 in) longer with a hydraulic tool clamping device.

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Notes

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MOTION-CONNECT connection systems



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7/12	with full-thread connector
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	DRIVE-CLiQ signal cables
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7/51	DRIVE-CLiQ coupler

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Cable	For motor	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SIMOTICS	Average	High	
Environmental requirements		Average	High	
UL/CSA		✔	✔	
Halogen-free		–	✔	
RoHS		✔	✔	
Power cables with SPEED-CONNECT connector				
	S-1FT7	✔	✔	**7/9**
	S-1FK7	✔	✔	**7/10**
	M-1PH808 M-1PH810	✔	✔	**7/9**
Power cables with full-thread connector				
	S-1FT7	✔	✔	**7/12 ... 7/14**
	S-1FK7	✔	✔	**7/14**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**7/12, 7/14**
	L-1FN3	–	✔	**7/19**
	T-1FW6	–	✔	**7/20**
Extensions for power cables with SPEED-CONNECT or full-thread connector				
	S-1FT7	✔	✔	**7/15**
	S-1FK7	✔	✔	**7/15**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**7/15**
	L-1FN3	–	✔	**7/19**
	T-1FW6	–	✔	**7/20**
Power cables for motors with terminal box				
	M-1PH808 M-1PH810 M-1PH813 M-1PH816	✔ 35 mm^2 or larger	✔ 16 mm^2 or smaller	**7/16, 7/17**

✔ = Possible
– = Not possible

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Cable	For motor	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SIMOTICS	Average	High	
Environmental requirements		Average	High	
UL/CSA		✔	✔	
Halogen-free		–	✔	
RoHS		✔	✔	
MOTION-CONNECT DRIVE-CLiQ signal cables				
	S-1FT7	✔	✔	**7/25**
	S-1FK7	✔	✔	**7/25**
	M-1PH8	✔	✔	**7/25**
	L-1FN3	✔	✔	**7/25**
	T-1FW6	✔	✔	**7/25**
DRIVE-CLiQ signal cables for connecting third-party direct measuring systems				
	Third-party direct measuring systems with DRIVE-CLiQ interface	✔	✔	**7/25**
Extensions for connecting third-party direct measuring systems				
	with DRIVE-CLiQ interface	✔	✔	**7/25**
Signal cables with SPEED-CONNECT connector				
	S-1FT7	✔	✔	**7/28**
	S-1FK7	✔	✔	**7/28**
	M-1PH8	✔	✔	**7/28**
Extensions for signal cables with SPEED-CONNECT connector				
	S-1FK7	✔	✔	**7/28**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**7/28**
Signal cables with full-thread connector				
	M-1PH8	✔	✔	**7/28, 7/29**
	L-1FN3	–	✔	**7/28, 7/29**
	T-1FW6	–	✔	**7/28, 7/29**
Extensions for signal cables with full-thread connector				
	S-1FT7	✔	✔	**7/29**
	S-1FK7	✔	✔	**7/28, 7/29**
	M-1PH8	✔	✔	**7/28, 7/29**
	L-1FN3	–	✔	**7/28**
	T-1FW6	–	✔	**7/28**

✔ = Possible
– = Not possible

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General information

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 travel distances of up to 5 m (16.41 ft)
- **MOTION-CONNECT 800PLUS**
  - Meets requirements for use in cable carriers
  - Suitable for high mechanical loading
  - Oil resistance
  - Tested for travel distances of up to 50 m (164 ft)

Benefits

Pre-assembled MOTION-CONNECT cables provide high quality and perfect, system-tested functionality.

SPEED-CONNECT

Fast, stable and reliable connections can be made with the new, pre-assembled cables with SPEED-CONNECT connectors. With a short rotation as far as the stop, the cap nut of the connector secures the connection.

The cables with SPEED-CONNECT connectors supplement the established range of MOTION-CONNECT cables with fully-threaded connectors.

Application

MOTION-CONNECT cables are intended for use in machines. They are not suitable for building technology applications or outdoor installation.

MOTION-CONNECT cables are tested in a cable carrier with horizontal travel distance and are also designed for cable carrier installation. 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.

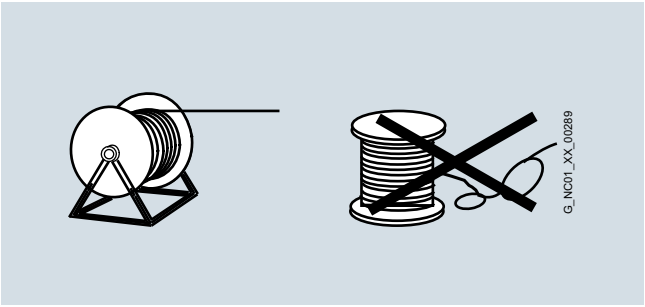
When cable lengths (basic cables and extensions) are determined for the systems and applications described in this catalog, the technically permissible maximum cable lengths (e.g. 25 m (82 ft)) specified in the catalog must be observed. Malfunctions can occur if longer cables are used.

Siemens assumes no liability for correct transmission of signals or power in this case.

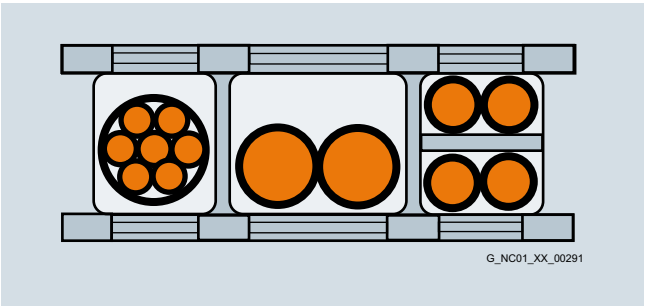
Compatibility between SPEED-CONNECT and full-thread connectors:

Connector on motor with external thread	Connector with cap nut on cable	Compatibility
SPEED-CONNECT	SPEED-CONNECT	✔
SPEED-CONNECT	Full thread	✔
Full thread	Full thread	✔
Full thread	SPEED-CONNECT	–

Function



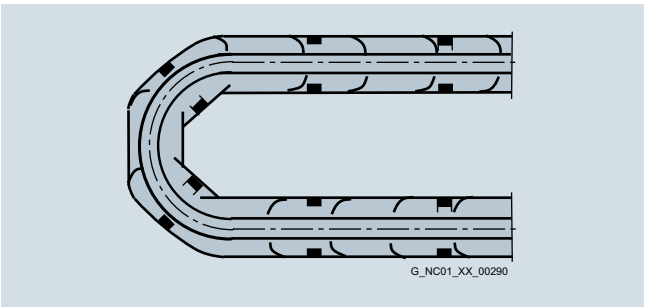
The cables must be removed from the drum without twisting, i.e. the cables must be unwound and must never be lifted over the drum flange in loops.



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.

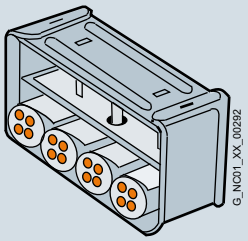


The cables must be able to be moved without application of force in particular in the bending radii of the carrier. The specified minimum bending radii must be adhered to.

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.

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Function (continued)



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.

Notes:

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[1]). In this case, the contacts of the cables are crimped and the connector enclosure is supplied separately. After installing the cables, the customer assembles the connector enclosure.

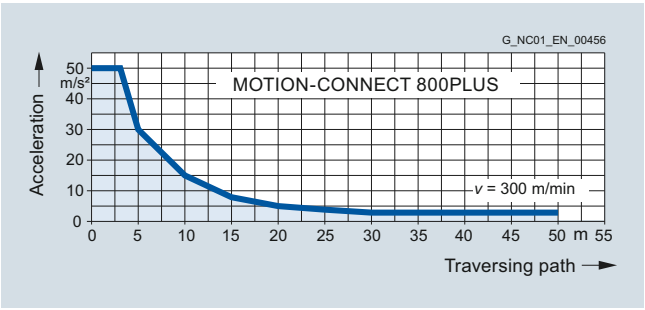
In case of vibration load and with horizontal or vertical cable entries, we recommend that the cable is additionally fixed if between the cable strain relief on the cable carrier and the terminal at the motor part of the cable is hanging loose or is not routed. To prevent machine vibrations being transmitted to the connectors, the cable should be fixed at the moving part where the motor is mounted.

Representation in connection overviews

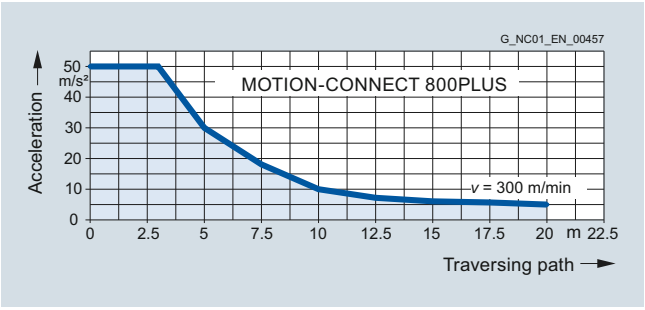
Symbol	Explanation
	Connector with pin contacts
	Connector with socket contacts
	Exposed core ends

Characteristic curves for MOTION-CONNECT 800PLUS

The shaded area beneath the characteristic represents the potential range of use for the cables. The characteristic curves represent the tested operating points.



Permissible acceleration for signal and power cables MOTION-CONNECT 800PLUS up to 16 mm^2



Permissible acceleration for power cables MOTION-CONNECT 800PLUS of 25 mm^2, 35 mm^2 and 50 mm^2

7

[1] Not in the case of DRIVE-CLiQ signal cables.

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More information

Current carrying capacity for power and signal cables

The current carrying capacity of PVC/PUR-insulated copper cables is specified for installation types B1, B2, C and E under continuous operating conditions in the table 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	**Current carrying capacity** rms AC 50/60 Hz or DC in amps for installation type			
	B1 Single-core cables in protection tubes or installation ducts	**B2** Multi-core cables in protection tubes or installation ducts	**C** Multi-core cables, vertically or horizontally on walls / open, without protection tubes and installation ducts / with contact	**E** Multi-core cables, horizontally or vertically on perforated cable racks / open, without protection tubes and installation ducts / with contact
mm^2				
Electronics[1]				
0.20	–	4.3	4.4	4.4
0.50	–	7.5	7.5	7.8
0.75	–	9	9.5	10
Power[2]				
0.75	8.6	8.5	9.8	10.4
1.00	10.3	10.1	11.7	12.4
1.50	13.5	13.1	15.2	16.1
2.50	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
25	77	70	84	88
35	96	86	104	110
50	117	103	125	133
70	149	130	160	171
95	180	165	194	207
120	208	179	225	240

Derating factors for power and signal cables

Ambient air temperature °C (°F)	**Derating factor** according to EN 60204-1, Table D.1
30 (86)	1.15
35 (95)	1.08
40 (104)	1.00
45 (113)	0.91
50 (122)	0.82
55 (131)	0.71
60 (140)	0.58

[1] One control circuit pair.

[2] One symmetrically loaded three-phase AC cable.

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Overview



Power cable for connecting a SIMOTICS M-1PH8 motor with terminal box to a SINAMICS S120 Motor Module

The synchronous and asynchronous motors are connected to the Motor Modules or Power Modules by means of MOTION-CONNECT power cables.

The pre-assembled MOTION-CONNECT power cables are of high quality and offer safety with problem-free functioning.

Depending on the design, the MOTION-CONNECT power cables are either pre-assembled at one end or at both ends.

If pre-assembled power cables are to be 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. In this case, the contacts of the cables are crimped and the connector enclosure is supplied separately. After installing the cables, the customer assembles the connector enclosure.

The 6FX.002-5.... power cables are available with crimped contacts and with the connector enclosure supplied separately (not for power cables with exposed core ends or cable lugs).

Power cables with separately supplied **module-end** connector enclosure. In this case, the 6th position of the Article No. must be changed from **0** to **1**: 6FX.0**1**2-5....-.... (not for power cables for SINAMICS S120 Power Modules or booksize compact format).

Power cables with separately supplied **motor-end** connector enclosure. In this case, the 6th position of the Article No. must be changed from **0** to **4**: 6FX.0**4**2-5....-.... (not for power cables with exposed core ends on the motor side).



Power cable with supplied connector for connecting a SIMOTICS S-1FT7/-1FK7/SIMOTICS M-1PH8 motor to a SINAMICS S120 Motor Module

Type of delivery for pre-assembled power cables

Pre-assembled power cables can be ordered in units of 10 cm (3.94 in) up to a maximum length of 299 m (981 ft).

The cables are supplied on reels up to 30 kg or 100 m (66.2 lb or 328 ft). Above 30 kg or 100 m (66.2 lb or 328 ft), cable drums are used instead of reels. This applies to both pre-assembled power cables and for cables sold by the meter.

Type of delivery for power cables sold by the meter

Fixed lengths

Cross-section	Brake cores	**MOTION-CONNECT 500 MOTION-CONNECT 800PLUS**
1.5 mm^2	with/without	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)
2.5 mm^2	with/without	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)

Variable length, available in exact meter lengths

Cross-section	Brake cores	**MOTION-CONNECT 500**	**MOTION-CONNECT 800PLUS**
4 mm^2	with/without	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
6 mm^2	with/without	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
10 mm^2	with/without	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
16 mm^2	with/without	≤ 200 m (656 ft)	≤ 200 m (656 ft)
25 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
35 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
50 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
70 mm^2	without	≤ 100 m (328 ft)	–
95 mm^2	without	≤ 100 m (328 ft)	–
120 mm^2	without	≤ 100 m (328 ft)	–

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Technical specifications

Power cables	MOTION-CONNECT 500 6FX500.-.....-....	MOTION-CONNECT 800PLUS 6FX800.-.....-....
Certificate of suitability		
• VDE[1)]	Yes	Yes
• cURus or UR/CSA	UL 758, CSA-C22.2-N.210.2-M90	UL 758, CSA-C22.2-N.210.2-M90
• UR-CSA File No.[2)]	Yes	Yes
• RoHS conformity	Yes	Yes
Rated voltage V_0/V in accordance with EN 50395		
• Power conductors	600 V/1000 V	600 V/1000 V
• Signal conductors	24 V (EN) 1000 V (UL/CSA)	24 V (EN) 1000 V (UL/CSA)
Test voltage, rms		
• Power conductors	4 kV	4 kV
• Signal conductors	2 kV	2 kV
Operating temperature on the surface		
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)
• Flexible installation	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.		
• Fixed installation	50 N/mm^2 (7252 lb$_f$/in^2)	50 N/mm^2 (7252 lb$_f$/in^2)
• Flexible installation	20 N/mm^2 (2901 lb$_f$/in^2)	20 N/mm^2 (2901 lb$_f$/in^2)
Smallest bending radius		
• Fixed installation	5 × D_{max}	4 × D_{max}
• Flexible installation	See selection and ordering data	See selection and ordering data
Torsional stress	Absolute 30°/m	Absolute 30°/m
Bending	100000	10 million
Traversing velocity	30 m/min (98.4 ft/min)	Up to 300 m/min (984 ft/min)
Acceleration	2 m/s^2 (6.56 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 7/5
Insulation material, incl. jacket	CFC/silicone-free	CFC/halogen/silicone-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1
Outer jacket	PVC DESINA color orange RAL 2003	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color orange RAL 2003
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of pre-assembled power cables and their extensions when closed and connected: IP67.

1) The respective registration number is printed on the cable jacket (only applies to power cables).
2) The File No. is printed on the cable jacket.

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Power cables for SIMOTICS S-1FT7/-1FK7/SIMOTICS M-1PH8 motors with SPEED-CONNECT connector

Selection and ordering data

For SIMOTICS S-1FT7 motors without holding brake/SIMOTICS M-1PH808/-1PH810 motors with SPEED-CONNECT connector on SINAMICS S120 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter[1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector[3]	4 × 1.5	1	6FX■002-5CN01-....	6FX■008-1BB11-....	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		1.5	6FX■002-5CN21-....							
	4 × 2.5	1	6FX■002-5CN11-....	6FX■008-1BB21-....	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		1.5	6FX■002-5CN31-....							
	4 × 4	1.5	6FX■002-5CN41-....	6FX■008-1BB31-....	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	1.5	6FX■002-5CN51-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	1.5	6FX■002-5CN61-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
Ring cable lugs[4]	4 × 6	1.5	6FX■002-5CN54-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	1.5	6FX■002-5CN64-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)

MOTION-CONNECT 500			**5**			**5**				
MOTION-CONNECT 800PLUS			**8**			**8**				
Length code			....			....				

For SIMOTICS S-1FT7 motors with holding brake and with SPEED-CONNECT connector on SINAMICS S120 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter[1] with brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector[3]	4 × 1.5+2 × 1.5	0.5	6FX■002-5DN20-....	6FX■008-1BA11-....	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.11)	195 (7.68)	90 (3.54)
		1	6FX■002-5DN01-....							
		1.5	6FX■002-5DN21-....							
	4 × 2.5+2 × 1.5	1	6FX■002-5DN11-....	6FX■008-1BA21-....	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		1.5	6FX■002-5DN31-....							
	4 × 4+2 × 1.5	1.5	6FX■002-5DN41-....	6FX■008-1BA31-....	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	1.5	6FX■002-5DN51-....	6FX■008-1BA41-....	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	6FX■002-5DN61-....	6FX■008-1BA51-....	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
Ring cable lugs[4]	4 × 6+2 × 1.5	1.5	6FX■002-5DN54-....	6FX■008-1BA41-....	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	6FX■002-5DN64-....	6FX■008-1BA51-....	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)

MOTION-CONNECT 500			**5**			**5**				
MOTION-CONNECT 800PLUS			**8**			**8**				
Length code			....			....				

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For SINAMICS S120 Motor Modules 3 A to 30 A in booksize format.
[4] For SINAMICS S120 Motor Modules 45 A and 60 A in booksize format.

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Power cables for SIMOTICS S-1FT7/-1FK7/SIMOTICS M-1PH8 motors with SPEED-CONNECT connector

Selection and ordering data (continued)

For SIMOTICS S-1FK7 motors without holding brake and with SPEED-CONNECT connector on SINAMICS S120 Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable without brake cores**	**Cable sold by the meter[1] without brake cores**	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5	1	**6FX■002-5CG10-....**	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		1.5	**6FX■002-5CG22-....**							
	4 × 2.5	1	**6FX■002-5CG12-....**	**6FX■008-1BB21-....**	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		1.5	**6FX■002-5CG32-....**							
	4 × 4	1.5	**6FX■002-5CG42-....**	**6FX■008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	1.5	**6FX■002-5CG52-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	1.5	**6FX■002-5CG62-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
MOTION-CONNECT 500			**5**				**5**			
MOTION-CONNECT 800PLUS			**8**				**8**			
Length code			**....**				**....**			

For SIMOTICS S-1FK7 motors with holding brake and with SPEED-CONNECT connector on SINAMICS S120 Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable with brake cores**	**Cable sold by the meter[1] with brake cores**	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5+2 × 1.5	0.5	**6FX■002-5DN30-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
	4 × 1.5+2 × 1.5	1	**6FX■002-5DG10-....**							
		1.5	**6FX■002-5DG22-....**							
	4 × 2.5+2 × 1.5	1	**6FX■002-5DG12-....**	**6FX■008-1BA21-....**	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		1.5	**6FX■002-5DG32-....**							
	4 × 4+2 × 1.5	1.5	**6FX■002-5DG42-....**	**6FX■008-1BA31-....**	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	1.5	**6FX■002-5DG52-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	**6FX■002-5DG62-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
MOTION-CONNECT 500			**5**				**5**			
MOTION-CONNECT 800PLUS			**8**				**8**			
Length code			**....**				**....**			

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Selection and ordering data (continued)

For SIMOTICS S-1FK7 motors without holding brake and with SPEED-CONNECT connector on SINAMICS S120 Combi Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter[1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5	1	**6FX■002-5CF10-....**	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		1.5	**6FX■002-5CF14-....**							

MOTION-CONNECT 500			**5**			**5**				
MOTION-CONNECT 800PLUS			**8**			**8**				
Length code			**....**			**....**				

For SIMOTICS S-1FK7 motors with holding brake and with SPEED-CONNECT connector on SINAMICS S120 Combi Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter[1] with brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5+2 × 1.5	1	**6FX■002-5DF10-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		1.5	**6FX■002-5DF14-....**							

MOTION-CONNECT 500			**5**			**5**				
MOTION-CONNECT 800PLUS			**8**			**8**				
Length code			**....**			**....**				

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Power cables for SIMOTICS S-1FT7/-1FK7/SIMOTICS M-1PH8 motors with full-thread connector

Selection and ordering data

For SIMOTICS S-1FT7 motors without holding brake/SIMOTICS M-1PH808/-1PH810/-1PH813 motors with full-thread connector on SINAMICS S120 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable without brake cores**	**Cable sold by the meter**[1] **without brake cores**	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	**6FX8**	**6FX5**	**6FX8**	**6FX5**	**6FX8**
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector[3]	4 × 1.5	1	**6FX■002-5CS01-....**	**6FX■008-1BB11-....**	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		1.5	**6FX■002-5CS21-....**							
		e. c.[4]	**6FX5002-5CS02-....**							
	4 × 2.5	1	**6FX■002-5CS11-....**	**6FX■008-1BB21-....**	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		1.5	**6FX■002-5CS31-....**							
		e. c.[4]	**6FX5002-5CS12-....**							
	4 × 4	1.5	**6FX■002-5CS41-....**	**6FX■008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
		e. c.[4]	**6FX5002-5CS42-....**							
	4 × 6	1.5	**6FX■002-5CS51-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
		e. c.[4]	**6FX5002-5CS52-....**							
	4 × 10	1.5	**6FX■002-5CS61-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
		3	**6FX■002-5CS13-....**							
		e. c.[4]	**6FX5002-5CS62-....**							
Ring cable lugs[5]	4 × 6	1.5	**6FX■002-5CS54-....**	**6FX■008-1BB41-....**	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	1.5	**6FX■002-5CS64-....**	**6FX■008-1BB51-....**	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
		3	**6FX■002-5CS14-....**							
	4 × 16	1.5	**6FX8002-5CS24-....**	**6FX■008-1BB61-....**	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)
		3	**6FX■002-5CS23-....**							

MOTION-CONNECT 500			**5**				**5**			
MOTION-CONNECT 800PLUS			**8**				**8**			
Length code				**....**				**....**		

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For SINAMICS S120 Motor Modules 3 A to 30 A in booksize format.
[4] e. c. = exposed core ends; suitable for motors with terminal box.
[5] For SINAMICS S120 Motor Modules 45 A and 60 A in booksize format.

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Selection and ordering data (continued)

For SIMOTICS S-1FT7 motors with holding brake and with full-thread connector on SINAMICS S120 Motor Modules in booksize format

Connection method, Motor Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter[1] with brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Connector[3]	4 × 1.5+2 × 1.5	0.5	**6FX5002-5DA20-....**	**6FX5008-1BA11-....**	10.8 (0.43)	–	0.22 (0.15)	–	195 (7.68)	–
		1	**6FX■002-5DS01-....**	**6FX■008-1BA11-....**	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		1.5	**6FX■002-5DS21-....**							
	4 × 2.5+2 × 1.5	1	**6FX■002-5DS11-....**	**6FX■008-1BA21-....**	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		1.5	**6FX■002-5DS31-....**							
	4 × 4+2 × 1.5	1.5	**6FX■002-5DS41-....**	**6FX■008-1BA31-....**	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	1.5	**6FX■002-5DS51-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	**6FX■002-5DS61-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
		3	**6FX■002-5DS13-....**							
Ring cable lugs[4]	4 × 6+2 × 1.5	1.5	**6FX■002-5DS54-....**	**6FX■008-1BA41-....**	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	**6FX■002-5DS64-....**	**6FX■008-1BA51-....**	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
		3	**6FX■002-5DS14-....**							
	4 × 16+2 × 1.5	3	**6FX■002-5DS23-....**	**6FX■008-1BA61-....**	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
Exposed core ends[5]	4 × 16+2 × 1.5	3	**6FX■002-5DG23-....**	**6FX■008-1BA61-....**	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
	4 × 25+2 × 1.5	3	**6FX■002-5DG33-....**	**6FX■008-1BA25-....**	29.4 (1.16)	27.6 (1.09)	1.62 (1.09)	1.47 (0.99)	530 (20.87)	280 (11.02)
	4 × 35+2 × 1.5	3	**6FX■002-5DG43-....**	**6FX■008-1BA35-....**	32.6 (1.28)	31.9 (1.26)	2.06 (1.38)	1.92 (1.29)	590 (23.23)	320 (12.60)
	4 × 50+2 × 1.5	3	**6FX■002-5DG53-....**	**6FX■008-1BA50-....**	38.0 (1.50)	35.0 (1.38)	3.04 (2.04)	2.56 (1.72)	685 (26.97)	350 (13.78)

MOTION-CONNECT 500	**5**			**5**		
MOTION-CONNECT 800PLUS	**8**			**8**		
Length code		**....**			**....**	

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For SINAMICS S120 Motor Modules 3 A to 30 A in booksize format.
[4] For SINAMICS S120 Motor Modules 45 A and 60 A in booksize format.
[5] Length of core ends: 300 mm (11.81 in). 4 M8 cable lugs, 1 M6 cable lug and 1 spring-loaded terminal are also included in the scope of supply of the cables.

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Power cables for SIMOTICS S-1FT7/-1FK7/SIMOTICS M-1PH8 motors with full-thread connector

Selection and ordering data (continued)

For SIMOTICS S-1FT7 motors without holding brake/SIMOTICS S-1FK7 motors without holding brake/SIMOTICS M-1PH808/ -1PH810/ -1PH813 motors with full-thread connector on SINAMICS S120 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter[1] without brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5	1	6FX■002-5CG01-....	6FX■008-1BB11-....	8.4 (0.33)	9.5 (0.37)	0.12 (0.08)	0.15 (0.10)	155 (6.10)	75 (2.95)
		1.5	6FX■002-5CG21-....							
	4 × 2.5	1	6FX■002-5CG11-....	6FX■008-1BB21-....	10.0 (0.39)	11.0 (0.43)	0.21 (0.14)	0.20 (0.13)	180 (7.09)	90 (3.54)
		1.5	6FX■002-5CG31-....							
	4 × 4	1.5	6FX■002-5CG41-....	6FX■008-1BB31-....	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.27 (0.18)	210 (8.27)	100 (3.94)
	4 × 6	1.5	6FX■002-5CG51-....	6FX■008-1BB41-....	13.6 (0.54)	14.9 (0.59)	0.37 (0.25)	0.41 (0.28)	245 (9.65)	120 (4.72)
	4 × 10	1.5	6FX■002-5CG61-....	6FX■008-1BB51-....	20.0 (0.79)	18.2 (0.72)	0.73 (0.49)	0.62 (0.42)	360 (14.17)	140 (5.51)
		3	6FX■002-5CG13-....							
	4 × 16	3	6FX■002-5CG23-....	6FX■008-1BB61-....	24.2 (0.95)	22.3 (0.88)	1.10 (0.74)	1.01 (0.68)	440 (17.32)	170 (6.69)

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		....			....

For SIMOTICS S-1FT7 motors with holding brake/SIMOTICS S-1FK7 motors with holding brake and with full-thread connector on SINAMICS S120 Motor Modules in booksize compact format and Power Modules

Connection method, Power Module end	No. of cores × cross-section	Connector size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter[1] with brake cores	D_{max}		Weight (without connector)		Smallest bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Article No.	Article No.	mm (in)	mm (in)	kg/m (lb/ft)	kg/m (lb/ft)	mm (in)	mm (in)
Exposed core ends	4 × 1.5+2 × 1.5	0.5	6FX5002-5DA30-....	6FX5008-1BA11-....	10.8 (0.43)	–	0.22 (0.15)	–	195 (7.68)	–
		1	6FX■002-5DG01-....	6FX■008-1BA11-....	10.8 (0.43)	12.0 (0.47)	0.22 (0.15)	0.23 (0.15)	195 (7.68)	90 (3.54)
		1.5	6FX■002-5DG21-....							
	4 × 2.5+2 × 1.5	1	6FX■002-5DG11-....	6FX■008-1BA21-....	12.4 (0.49)	13.8 (0.54)	0.25 (0.17)	0.30 (0.20)	225 (8.86)	105 (4.13)
		1.5	6FX■002-5DG31-....							
	4 × 4+2 × 1.5	1.5	6FX■002-5DG41-....	6FX■008-1BA31-....	14.0 (0.55)	15.2 (0.60)	0.35 (0.24)	0.38 (0.26)	255 (10.04)	115 (4.53)
	4 × 6+2 × 1.5	1.5	6FX■002-5DG51-....	6FX■008-1BA41-....	16.1 (0.63)	17.3 (0.68)	0.49 (0.33)	0.50 (0.34)	290 (11.42)	130 (5.12)
	4 × 10+2 × 1.5	1.5	6FX■002-5DG61-....	6FX■008-1BA51-....	21.7 (0.85)	20.1 (0.79)	0.81 (0.54)	0.71 (0.48)	395 (15.55)	150 (5.91)
		3	6FX■002-5DG13-....							
	4 × 16+2 × 1.5	3	6FX■002-5DG23-....	6FX■008-1BA61-....	25.0 (0.98)	23.8 (0.94)	1.12 (0.75)	1.03 (0.69)	450 (17.72)	180 (7.09)
	4 × 25+2 × 1.5	3	6FX■002-5DG33-....	6FX■008-1BA25-....	29.4 (1.16)	27.6 (1.09)	1.62 (1.09)	1.47 (0.99)	530 (20.87)	280 (11.02)
	4 × 35+2 × 1.5	3	6FX■002-5DG43-....	6FX■008-1BA35-....	32.6 (1.28)	31.9 (1.26)	2.06 (1.38)	1.92 (1.29)	590 (23.23)	320 (12.60)
	4 × 50+2 × 1.5	3	6FX■002-5DG53-....	6FX■008-1BA50-....	38.0 (1.50)	35.0 (1.38)	3.04 (2.04)	2.56 (1.72)	685 (26.97)	350 (13.78)

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		....			....

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Accessories

Extensions for power cables with SPEED-CONNECT or full-thread connector

No. of cores × cross-section		Connector size, motor end	Basic cable for motors on SINAMICS S120		**Extension**
without brake cores	with brake cores		Motor Modules	Power Modules	
mm²	mm²		Type	Type	Article No.
–	4 × 1.5+2 × 1.5	0.5	6FX . 002-5DA20-....	6FX . 002-5DA30-....	**6FX■002-5ME05-....**
4 × 1.5	4 × 1.5+2 × 1.5	1	6FX . 002-5 . S01-....	6FX . 002-5 . G01-....	**6FX■002-5■A05-....**
			6FX . 002-5 . N01-....	6FX . 002-5 . G10-....	**6FX■002-5■N05-....**
		1.5	6FX . 002-5 . S21-....	6FX . 002-5 . G21-....	**6FX■002-5■A28-....**
			6FX . 002-5 . N21-....	6FX . 002-5 . G22-....	**6FX■002-5■Q28-....**
4 × 2.5	4 × 2.5+2 × 1.5	1	6FX . 002-5 . S11-....	6FX . 002-5 . G11-....	**6FX■002-5■A15-....**
			6FX . 002-5 . N11-....	6FX . 002-5 . G12-....	**6FX■002-5■Q15-....**
		1.5	6FX . 002-5 . S31-....	6FX . 002-5 . G31-....	**6FX■002-5■A38-....**
			6FX . 002-5 . N31-....	6FX . 002-5 . G32-....	**6FX■002-5■Q38-....**
4 × 4	4 × 4+2 × 1.5	1.5	6FX . 002-5 . S41-....	6FX . 002-5 . G41-....	**6FX■002-5■A48-....**
			6FX . 002-5 . N41-....	6FX . 002-5 . G42-....	**6FX■002-5■Q48-....**
4 × 6	4 × 6+2 × 1.5	1.5	6FX . 002-5 . S51-....	6FX . 002-5 . G51-....	**6FX■002-5■A58-....**
			6FX . 002-5 . S54-....	–	**6FX■002-5■A58-....**
			6FX . 002-5 . N51-....	6FX . 002-5 . G52-....	**6FX■002-5■Q58-....**
			6FX . 002-5 . N54-....	–	**6FX■002-5■Q58-....**
4 × 10	4 × 10+2 × 1.5	1.5	6FX . 002-5 . S61-....	6FX . 002-5 . G61-....	**6FX■002-5■A68-....**
			6FX . 002-5 . S64-....	–	**6FX■002-5■A68-....**
			6FX . 002-5 . N61-....	6FX . 002-5 . G62-....	**6FX■002-5■Q68-....**
			6FX . 002-5 . N64-....	–	**6FX■002-5■Q68-....**
		3[1)]	6FX . 002-5 . S13-....	6FX . 002-5 . G13-....	**6FX■002-5■X18-....**
			6FX . 002-5 . S14-....	–	**6FX■002-5■X18-....**
4 × 16	4 × 16+2 × 1.5	3[1)]	6FX . 002-5 . S23-....	6FX . 002-5 . G23-....	**6FX■002-5■X28-....**
			6FX . 002-5CS24-....	–	**6FX■002-5■X28-....**
			6FX . 002-5 . G23-....	–	**6FX■002-5■X28-....**
–	4 × 25+2 × 1.5	3[1)]	6FX . 002-5DG33-....	6FX . 002-5DG33-....	**6FX■002-5DX38-....**
–	4 × 35+2 × 1.5	3[1)]	6FX . 002-5DG43-....	6FX . 002-5DG43-....	**6FX■002-5DX48-....**
–	4 × 50+2 × 1.5	3[1)]	6FX . 002-5DG53-....	6FX . 002-5DG53-....	**6FX■002-5DX58-....**

MOTION-CONNECT 500	**5**
MOTION-CONNECT 800PLUS	**8**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

The maximum specified cable length (basic cable and extensions) must not be exceeded. The permissible maximum length of power cables with brake cores is reduced by 2 m (6.56 ft) for each interruption point.

[1)] Motor-end connector with full thread only.

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Power cables for SIMOTICS M-1PH8 motors with terminal box

Selection and ordering data

For SIMOTICS M-1PH808/-1PH810/-1PH813/-1PH816 motors with terminal box on SINAMICS S120 Motor Modules

Motor Type SIMOTICS	Thread	No. of cores × cross-section mm²	Connection method Motor Module end	**Pre-assembled cable** Article No.	**Cable sold by the meter**[1] Article No.	D_{max} mm (in)	Weight (without gland) kg/m (lb/ft)	Smallest bending radius[2] mm (in)
M-1PH808	M25	4 × 2.5	Connector[3]	**6FX8002-5CP10-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
		4 × 4		**6FX8002-5CP20-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
M-1PH810	M32	4 × 2.5	Connector[3]	**6FX8002-5CP11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
		4 × 4		**6FX8002-5CP21-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
		4 × 10		**6FX8002-5CP41-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
		4 × 10	Exposed core ends[4]	**6FX8002-5CR41-....**				
M-1PH813	M40	4 × 10	Connector[3]	**6FX8002-5CP42-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
			Exposed core ends[4]	**6FX8002-5CR42-....**				
	M50	4 × 10	Connector[3]	**6FX8002-5CP43-....**				
			Exposed core ends[4]	**6FX8002-5CR43-....**				
	M40	4 × 16	Exposed core ends[4]	**6FX8002-5CR52-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
	M50	4 × 16		**6FX8002-5CR53-....**				
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
M-1PH816	M50	4 × 16	Exposed core ends[4]	**6FX8002-5CR53-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
				–	**6FX5008-1BB61-....**	24.2 (0.95)	1.10 (0.74)	440 (17.32)
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
					6FX8008-1BA35-....	29.6 (1.17)	2.00 (1.34)	300 (11.81)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
					6FX8008-1BA50-....	34.4 (1.35)	2.66 (1.79)	345 (13.58)
	M63	4 × 25		–	**6FX5008-1BB25-....**	28.0 (1.10)	1.62 (1.09)	505 (19.88)
					6FX8008-1BA25-....	27.6 (1.09)	1.51 (1.01)	280 (11.02)
		4 × 35		–	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
					6FX8008-1BA35-....	29.6 (1.17)	2.00 (1.34)	300 (11.81)
		4 × 50		–	**6FX5008-1BB50-....**	38.0 (1.50)	3.04 (2.04)	685 (26.97)
					6FX8008-1BA50-....	34.4 (1.35)	2.66 (1.79)	345 (13.58)
		4 × 70		–	**6FX5008-1BB70-....**	42.6 (1.68)	3.96 (2.66)	770 (30.31)

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		**....**			**....**

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] For SINAMICS S120 Motor Modules 3 A to 30 A in booksize format.
[4] Length of core ends: 300 mm (11.81 in). 4 M8 cable lugs and 4 M6 cable lugs are also included in the scope of supply of the cables.

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Selection and ordering data (continued)

For SIMOTICS M-1PH808/-1PH810/-1PH813/-1PH816 motors with terminal box on SINAMICS S120 Power Modules

Motor Type SIMOTICS	Thread	No. of cores × cross-section mm²	Connection method Power Module end	**Pre-assembled cable** Article No.	**Cable sold by the meter**[1] Article No.	D_{max} mm (in)	Weight (without gland) kg/m (lb/ft)	Smallest bending radius[2] mm (in)
M-1PH808	M25	4 × 2.5	Exposed core ends[3]	**6FX8002-5CR10-....** –	**6FX8008-1BB21-....** **6FX5008-1BB21-....**	11.0 (0.43) 10.0 (0.39)	0.20 (0.13) 0.21 (0.14)	90 (3.54) 180 (7.09)
		4 × 4		**6FX8002-5CR20-....** –	**6FX8008-1BB31-....** **6FX5008-1BB31-....**	12.3 (0.48) 11.4 (0.45)	0.27 (0.18) 0.27 (0.18)	100 (3.94) 210 (8.27)
M-1PH810	M32	4 × 2.5	Exposed core ends[3]	**6FX8002-5CR11-....** –	**6FX8008-1BB21-....** **6FX5008-1BB21-....**	11.0 (0.43) 10.0 (0.39)	0.20 (0.13) 0.21 (0.14)	90 (3.54) 180 (7.09)
		4 × 4		**6FX8002-5CR21-....** –	**6FX8008-1BB31-....** **6FX5008-1BB31-....**	12.3 (0.48) 11.4 (0.45)	0.27 (0.18) 0.27 (0.18)	100 (3.94) 210 (8.27)
		4 × 10		**6FX8002-5CR41-....** –	**6FX8008-1BB51-....** **6FX5008-1BB51-....**	18.2 (0.72) 20.0 (0.79)	0.62 (0.42) 0.73 (0.49)	140 (5.51) 360 (14.17)
M-1PH813	M40	4 × 10	Exposed core ends[3]	**6FX8002-5CR42-....** –	**6FX8008-1BB51-....** **6FX5008-1BB51-....**	18.2 (0.72) 20.0 (0.79)	0.62 (0.42) 0.73 (0.49)	140 (5.51) 360 (14.17)
	M50			**6FX8002-5CR43-....** –				
	M40	4 × 16		**6FX8002-5CR52-....** –	**6FX8008-1BB61-....** **6FX5008-1BB61-....**	22.3 (0.88) 24.2 (0.95)	1.01 (0.68) 1.10 (0.74)	170 (6.69) 440 (17.32)
	M50			**6FX8002-5CR53-....** –				
	M40	4 × 35		**6FX5002-5CR72-....**	**6FX5008-1BB35-....**	31.5 (1.24)	1.93 (1.30)	570 (22.44)
	M50			**6FX5002-5CR73-....**	**6FX8008-1BA35-....**	29.6 (1.17)	2.00 (1.34)	300 (11.81)
	M50	4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
M-1PH816	M50	4 × 16	Exposed core ends[3]	**6FX8002-5CR53-....** –	**6FX8008-1BB61-....** **6FX5008-1BB61-....**	22.3 (0.88) 24.2 (0.95)	1.01 (0.68) 1.10 (0.74)	170 (6.69) 440 (17.32)
		4 × 35		**6FX5002-5CR73-....**	**6FX5008-1BB35-....** **6FX8008-1BA35-....**	31.5 (1.24) 29.6 (1.17)	1.93 (1.30) 2.00 (1.34)	570 (22.44) 300 (11.81)
		4 × 50		**6FX5002-5CR83-....**	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
	M63	4 × 25		–	**6FX5008-1BB25-....** **6FX8008-1BA25-....**	28.0 (1.10) 27.6 (1.09)	1.62 (1.09) 1.51 (1.01)	505 (19.88) 280 (11.02)
		4 × 35		–	**6FX5008-1BB35-....** **6FX8008-1BA35-....**	31.5 (1.24) 29.6 (1.17)	1.93 (1.30) 2.00 (1.34)	570 (22.44) 300 (11.81)
		4 × 50		–	**6FX5008-1BB50-....** **6FX8008-1BA50-....**	38.0 (1.50) 34.4 (1.35)	3.04 (2.04) 2.66 (1.79)	685 (26.97) 345 (13.58)
		4 × 70		–	**6FX5008-1BB70-....**	42.6 (1.68)	3.96 (2.66)	770 (30.31)

MOTION-CONNECT 500	**5**			**5**	
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		**....**			**....**

[1] Note type of delivery.

[2] Valid for installation in a cable carrier.

[3] Length of core ends: 300 mm (11.81 in). 4 M8 cable lugs and 4 M6 cable lugs are also included in the scope of supply of the cables.

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Power cables for SIMOTICS M-1PH8 motors with terminal box

Selection and ordering data (continued)

For SIMOTICS M-1PH808/-1PH810/-1PH813 motors with terminal box on SINAMICS S120 Combi Power Modules

Motor Type SIMOTICS	Thread	No. of cores × cross-section mm²	Connection method Power Module end	Pre-assembled cable Article No.	Cable sold by the meter[1] Article No.	D_{max} 6FX5 mm (in)	D_{max} 6FX8 mm (in)	Weight (without gland) 6FX5 kg/m (lb/ft)	Weight (without gland) 6FX8 kg/m (lb/ft)	Smallest bending radius[2] 6FX5 mm (in)	Smallest bending radius[2] 6FX8 mm (in)
M-1PH808	M25	4 × 2.5	Exposed core ends[3]	**6FX■002-5CE02-....**	**6FX8008-1BB21-....**	11.0 (0.43)	11.0 (0.43)	0.21 (0.14)	0.23 (0.16)	180 (7.09)	90 (3.54)
M-1PH810	M32	4 × 4	Exposed core ends[3]	**6FX■002-5CE04-....**	**6FX8008-1BB31-....**	11.4 (0.45)	12.3 (0.48)	0.27 (0.18)	0.31 (0.21)	210 (8.27)	100 (3.94)
M-1PH813	M40	4 × 6	Exposed core ends[3]	**6FX■002-5CE06-....**	**6FX8008-1BB41-....**	20.0 (0.79)	15.1 (0.59)	0.37 (0.25)	0.42 (0.28)	245 (9.65)	120 (4.72)

MOTION-CONNECT 500	**5**				
MOTION-CONNECT 800PLUS	**8**			**8**	
Length code		**....**			**....**

Other cables sold by the meter for SIMOTICS M-1PH818/-1PH822/-1PH835 motors

No. of cores × cross-section mm²	Connection method Power Module end	Pre-assembled cable Article No.	Cable sold by the meter[1] Article No.	D_{max} mm (in)	Weight (without gland) kg/m (lb/ft)	Smallest bending radius[2] mm (in)
4 × 95		–	**6FX5008-1BB05-....**	51.7 (2.04)	5.55 (3.73)	935 (36.81)
4 × 120		–	**6FX5008-1BB12-....**	56.0 (2.20)	6.60 (4.43)	1010 (39.76)

MOTION-CONNECT 500	**5**	
Length code		**....**

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
[3] Length of core ends: 300 mm (11.81 in). 4 M8 cable lugs and 4 M6 cable lugs are also included in the scope of supply of the cables.

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Selection and ordering data

For SIMOTICS L-1FN3 linear motors, peak/continuous load versions, connection to SINAMICS S120 through adapter cable with full-thread connector

No. of cores × cross-section	Thread	**Pre-assembled adapter cable**	Connector size Interface	**Pre-assembled basic cable to the drive system**	**Cable sold by meter**[1] **for pre-assembled adapter cable**	D_{max}	Weight (without connector)	Smallest bending radius[2]
mm^2		Article No.[3]		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
4 × 2.5	M20	**6FX7002-5LM42-....** *)	1	**6FX8002-5CS11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 2.5	M20	**6FX7002-5LM62-....** **)	1	**6FX8002-5CS11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 4	M32	**6FX7002-5LM72-....**	1.5	**6FX8002-5CS41-....** ***)	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
4 × 6	M32	**6FX7002-5LM82-....**	1.5	**6FX8002-5CS54-....**	**6FX8008-1BB41-....**	14.9 (0.59)	0.41 (0.28)	120 (4.72)
4 × 10	M32	**6FX7002-5LM32-....**	1.5	**6FX8002-5CS64-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
4 × 16	M32	**6FX7002-5LM02-....**	1.5	**6FX8002-5CS24-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)

MOTION-CONNECT 700 / **MOTION-CONNECT 800PLUS**	**7**				**8**			**8**			
Length code			**....**			**....**			**....**		

Accessories

Power cable extensions for SIMOTICS L-1FN3 linear motors, peak/continuous load versions with full-thread connector

No. of cores × cross-section	Connector size	Pre-assembled basic cable to the drive system	**Extension**
mm^2		Type	Article No.
4 × 2.5	1	6FX8002-5CS11-....	**6FX8002-5CA15-....**
4 × 4	1.5	6FX8002-5CS41-.... ***)	**6FX8002-5CA48-....**
4 × 6	1.5	6FX8002-5CS54-....	**6FX8002-5CA58-....**
4 × 10	1.5	6FX8002-5CS64-....	**6FX8002-5CA68-....**
4 × 16	1.5	6FX8002-5CS24-....	**6FX8002-5YW12-....**

MOTION-CONNECT 800PLUS			**8**
Length code			**....**

The combinations of power cable extensions shown are only provided by way of example.

1) Note type of delivery.
2) Valid for installation in a cable carrier.
3) The 6FX7002-5LM.. cables comprise MOTION-CONNECT 800PLUS cables which are sold by the meter.
*) For SIMOTICS L-1FN30/-1FN31 motors only.
**) For SIMOTICS L-1FN33/-1FN34/-1FN36/-1FN39 motors only.
***) For SIMOTICS L-1FN3 linear motors in the peak load version, the pre-assembled basic cable 6FX8002-5CS54-.... (4 × 6 mm^2) to the SINAMICS S120 drive system must be used.

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Power cables for SIMOTICS T-1FW6 motors

Selection and ordering data

For SIMOTICS T-1FW6 built-in torque motors with connection via adapter cable with full-thread connector

No. of cores × cross-section	Connector size, motor end	**Pre-assembled cable to the drive system**	**Cable sold by the meter**[1]	D_{max}	Weight (without connector)	Smallest bending radius[2]
mm²		Article No.	Article No.	mm (in)	kg/m (lb/ft)	mm (in)
4 × 2.5	1	**6FX8002-5CS11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 4	1.5	**6FX8002-5CS41-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
4 × 6	1.5	**6FX8002-5CS54-....**	**6FX8008-1BB41-....**	14.9 (0.59)	0.41 (0.28)	120 (4.72)
4 × 10	1.5	**6FX8002-5CS64-....**	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
4 × 16	1.5	**6FX8002-5CS24-....**	**6FX8008-1BB61-....**	22.3 (0.88)	1.01 (0.68)	170 (6.69)
MOTION-CONNECT 800PLUS		**8**	**8**			
Length code		**....**	**....**			

Accessories

Power cable extensions for SIMOTICS T-1FW6 built-in torque motors with full-thread connector

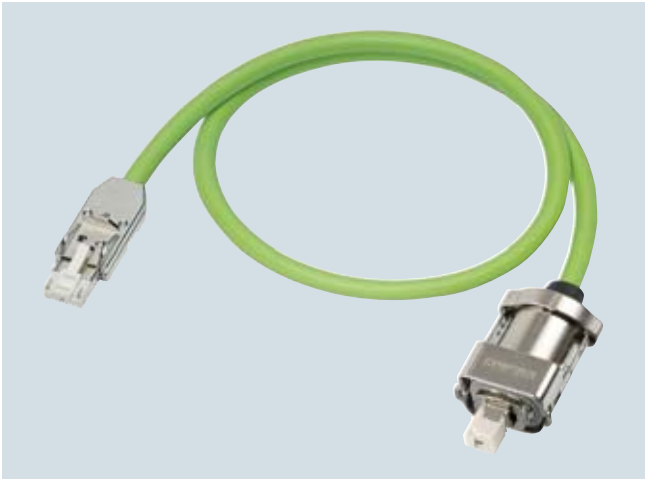
No. of cores × cross-section	Connector size	Pre-assembled cable to the drive system	**Extension**
mm²		Type	Article No.
4 × 2.5	1	6FX8002-5CS11-....	**6FX8002-5CA15-....**
4 × 4	1.5	6FX8002-5CS41-....	**6FX8002-5CA48-....**
4 × 6	1.5	6FX8002-5CS54-....	**6FX8002-5CA58-....**
4 × 10	1.5	6FX8002-5CS64-....	**6FX8002-5CA68-....**
4 × 16	1.5	6FX8002-5CS24-....	**6FX8002-5YW12-....**
MOTION-CONNECT 800PLUS			**8**
Length code			**....**

The combinations of power cable extensions shown are only provided by way of example.

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

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Overview



MOTION-CONNECT DRIVE-CLiQ signal cable with IP20/IP67 connector

Signal cables are pre-assembled and are sold by the meter for the connection of a variety of components.

The following different types of cable are available:

- DRIVE-CLiQ signal cables
- MOTION-CONNECT DRIVE-CLiQ signal cables
- MOTION-CONNECT pre-assembled signal cables

Type of delivery for pre-assembled signal cables

Pre-assembled signal cables are available in units of 10 cm (3.94 in).

The cables are supplied on reels up to 30 kg or 100 m (66.2 lb or 328 ft). Above 30 kg or 100 m (66.2 lb or 328 ft), cable drums are used instead of reels.

Application

DRIVE-CLiQ signal cables without 24 V DC cores

are used to connect components with DRIVE-CLiQ connections which have a separate or external 24 V DC power supply.

MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores

are used whenever components with DRIVE-CLiQ connections must meet high requirements such as mechanical stress and oil resistance, e.g. where a connection is made outside the cabinet between Power Modules/Motor Modules and SIMOTICS S-1FK7/ SIMOTICS M-1PH8 motors with DRIVE-CLiQ interface.

MOTION-CONNECT pre-assembled signal cables

are used whenever motor encoders on motors without DRIVE-CLiQ interface are connected to Sensor Modules.

Design

If pre-assembled signal cables are to be 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. In this case, the contacts of the cables are crimped and the connector enclosure is supplied separately. After installing the cables, the customer assembles the connector enclosure.

The 6FX.002-2....-.... signal cables are available with crimped contacts and with the connector enclosure supplied separately (not for DRIVE-CLiQ signal cables or signal cables with exposed core ends).

Signal cables with separately supplied **module-end** connector enclosure. In this case, the 6th position of the Article No. must be changed from **0** to **1**:
6FX.0**1**2-2C...-.... (not for signal cables for connection via terminals or 6FX.002-2AH00-...., 6FX.002-2CA12-....).

Signal cables with separately supplied **motor-end** connector enclosure. In this case, the 6th position of the Article No. must be changed from **0** to **4**:
6FX.0**4**2-2C...-.... (not for signal cables for connection via terminals or 6FX8002-2BA20-...., 6FX8002-2BA21-....).

Note:

Once the contacts have latched into the insulator, they can no longer be removed.

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Technical specifications

DRIVE-CLiQ signal cables	DRIVE-CLiQ 6FX2...-1DC..-....	DRIVE-CLiQ MOTION-CONNECT 500 6FX5...-.DC..-....	DRIVE-CLiQ MOTION-CONNECT 800PLUS 6FX8...-.DC..-....
Certificate of suitability			
• cURus or UR/CSA	UL STYLE 2502/CSA-N.210.2-M90	UL STYLE 2502/CSA-N.210.2-M90	UL STYLE 2502/CSA-N.210.2-M90
• UR-CSA File No.[1]	Yes	Yes	Yes
• RoHS conformity	Yes	Yes	Yes
Rated voltage according to EN 50395	30 V	30 V	30 V
Test voltage, rms	500 V	500 V	500 V
Operating temperature on the surface			
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-20 … +80 °C (-4 ... +176 °F)	-20 … +80 °C (-4 ... +176 °F)
• Flexible installation	–	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.			
• Fixed installation	45 N/mm^2 (6526 lb$_f$/in^2)	80 N/mm^2 (11603 lb$_f$/in^2)	50 N/mm^2 (7252 lb$_f$/in^2)
• Flexible installation	–	30 N/mm^2 (4351 lb$_f$/in^2)	20 N/mm^2 (2901 lb$_f$/in^2)
Smallest bending radius			
• Fixed installation	50 mm (1.97 in)	35 mm (1.38 in)	35 mm (1.38 in)
• Flexible installation	–	125 mm (4.92 in)	75 mm (2.95 in)
Torsional stress	–	Absolute 30°/m	Absolute 30°/m
Bending	–	100000	10 million
Traversing velocity	–	30 m/min (98.4 ft/min)	300 m/min (984 ft/min)
Acceleration	–	2 m/s^2 (6.56 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 7/5
Insulation material, incl. jacket	CFC/silicone-free	CFC/silicone-free	CFC/halogen/silicone-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1	EN 60811-2-1 (mineral oil only)	EN 60811-2-1
Outer jacket	PVC Gray RAL 7032	PVC DESINA color green RAL 6018	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color green RAL 6018
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of pre-assembled signal cables and their extensions when closed and connected: IP67.

[1] The File No. is printed on the cable jacket.

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Technical specifications (continued)

Signal cables	MOTION-CONNECT 500 6FX500.-.....-....	MOTION-CONNECT 800PLUS 6FX800.-.....-....
Certificate of suitability		
• cURus or UR/CSA	UL758-CSA-C22.2-N.210.2-M90	UL758-CSA-C22.2-N.210.2-M90
• UR-CSA File No.[1]	Yes	Yes
• RoHS conformity	Yes	Yes
Rated voltage according to EN 50395	30 V	30 V
Test voltage, rms	500 V	500 V
Operating temperature on the surface		
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)
• Flexible installation	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.		
• Fixed installation	50 N/mm^2 (7252 lb$_f$/in^2)	50 N/mm^2 (7252 lb$_f$/in^2)
• Flexible installation	20 N/mm^2 (2901 lb$_f$/in^2)	20 N/mm^2 (2901 lb$_f$/in^2)
Smallest bending radius		
• Fixed installation	60 mm (2.36 in)	4 × D_{max}
• Flexible installation	100 mm (3.94 in)	70 mm (2.76 in) [2]
Torsional stress	Absolute 30°/m	Absolute 30°/m
Bending	2 million	10 million
Traversing velocity	180 m/min (591 ft/min)	Up to 300 m/min (984 ft/min)
Acceleration	5 m/s^2 (16.4 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 7/5
Insulation material, incl. jacket	CFC/silicone-free	CFC/halogen/silicone-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1
Outer jacket	PVC DESINA color green RAL 6018	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color green RAL 6018
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of pre-assembled signal cables and their extensions when closed and connected: IP67.

[1] The File No. is printed on the cable jacket.

[2] Exception: 6FX8002-2SL..-....; smallest bending radius (flexible): 85 mm (3.35 in).

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DRIVE-CLiQ signal cables without 24 V DC cores

Selection and ordering data

Pre-assembled DRIVE-CLiQ signal cables without 24 V DC cores

Type	Length	D_{max}	Connector/ Degree of protection module end	Connector/ Degree of protection motor end	**DRIVE-CLiQ signal cable** without 24 V DC cores
	m (ft)	mm (in)			Article No.
Fixed lengths 	0.11 (0.36)		RJ45/IP20	RJ45/IP20	**6SL3060-4AB00-0AA0**
	0.16 (0.52)				**6SL3060-4AD00-0AA0**
	0.21 (0.69)				**6SL3060-4AF00-0AA0**
	0.26 (0.85)				**6SL3060-4AH00-0AA0**
	0.31 (1.02)				**6SL3060-4AK00-0AA0**
	0.36 (1.18)				**6SL3060-4AM00-0AA0**
	0.41 (1.35)				**6SL3060-4AP00-0AA0**
	0.60 (1.97)				**6SL3060-4AU00-0AA0**
	0.95 (3.12)				**6SL3060-4AA10-0AA0**
	1.20 (3.94)				**6SL3060-4AW00-0AA0**
	1.45 (4.76)				**6SL3060-4AF10-0AA0**
	2.80 (9.19)				**6SL3060-4AJ20-0AA0**
	5.00 (16.4)				**6SL3060-4AA50-0AA0**
To the decimeter 	max. 70 (230)	7.0 (0.28)	RJ45/IP20	RJ45/IP20	**6FX2002-1DC00-....**
To the decimeter 	max. 70 (230)	7.0 (0.28)	RJ45/IP67	RJ45/IP67	**6FX2002-1DC20-....**
Length code					**....**

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Selection and ordering data

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables for SINAMICS S120 and motors with 24 V DC cores

Type	Application	Length, max.	D_{max}	Connector/ Degree of protection module end	Connector/ Degree of protection motor end	**MOTION-CONNECT DRIVE-CLiQ signal cable** with 24 V DC cores
		m (ft)	mm (in)			Article No.
To the decimeter 	For components with DRIVE-CLiQ interface in the control cabinet.	100 (328)	7.1 (0.28)	RJ45/IP20	RJ45/IP20	**6FX5002-2DC00-....**
	For example, for making the connection between SINAMICS S120 Motor Modules or Power Modules and the DRIVE-CLiQ cabinet bushing.	75 (246)	7.1 (0.28)	RJ45/IP20	RJ45/IP20	**6FX8002-2DC00-....**
To the decimeter	For built-in or built-on encoder systems with DRIVE-CLiQ interface.	100 (328)	7.1 (0.28)	RJ45/IP20	RJ45/IP67	**6FX5002-2DC10-....**
	For example, for making the connection between SIMOTICS S-1FT7/-1FK7/ SIMOTICS M-1PH8/SIMOTICS T-1FW3 motors and SINAMICS S120 Motor Modules or Power Modules.	75 (246)	7.1 (0.28)	RJ45/IP20	RJ45/IP67	**6FX8002-2DC10-....**
To the decimeter 	For built-in or built-on encoder systems with DRIVE-CLiQ interface.	100 (328)	7.1 (0.28)	RJ45/IP67	RJ45/IP67	**6FX5002-2DC20-....**
	For example, for making the connection between SIMOTICS S-1FT7/-1FK7/ SIMOTICS M-1PH8/SIMOTICS T-1FW3 motors and SINAMICS S120 via DRIVE-CLiQ cabinet bushings, couplers or DME20 or 2 couplers or 2 DME20.	75 (246)	7.1 (0.28)	RJ45/IP67	RJ45/IP67	**6FX8002-2DC20-....**

MOTION-CONNECT 500	**5**	
MOTION-CONNECT 800PLUS	**8**	
Length code		**....**

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MOTION-CONNECT DRIVE-CLiQ signal cables with 24 V DC cores

Selection and ordering data

Pre-assembled MOTION-CONNECT DRIVE-CLiQ signal cables for SINAMICS S120 and direct measuring systems with 24 V DC cores and M12 connection

Type	Application	Length, max.	D_{max}	Connector/ Degree of protection module end	Connector/ Degree of protection motor end	**MOTION-CONNECT DRIVE-CLiQ signal cable** with 24 V DC cores
		m (ft)	mm (in)			Article No.
Fixed lengths  6FX.002-2DC30-....	For encoder systems with DRIVE-CLiQ and M12 connection. For example, as a basic cable between third-party direct measuring systems with DRIVE-CLiQ interface and SINAMICS S120 Motor Modules and Power Modules. Cable lengths available to order:	30 (98.4)	7.1 (0.28)		M12/IP67	
	1 m (3.28 ft)					**6FX■002-2DC3■-1AB0**
	2 m (6.56 ft)					**6FX■002-2DC3■-1AC0**
	3 m (9.84 ft)					**6FX■002-2DC3■-1AD0**
	4 m (13.1 ft)					**6FX■002-2DC3■-1AE0**
	5 m (16.4 ft)					**6FX■002-2DC3■-1AF0**
	6 m (19.7 ft)					**6FX■002-2DC3■-1AG0**
6FX.002-2DC36-....	7 m (23.0 ft)					**6FX■002-2DC3■-1AH0**
	8 m (26.2 ft)					**6FX■002-2DC3■-1AJ0**
	9 m (29.5 ft)					**6FX■002-2DC3■-1AK0**
	10 m (32.8 ft)					**6FX■002-2DC3■-1BA0**
	11 m (36.1 ft)					**6FX■002-2DC3■-1BB0**
	12 m (39.4 ft)					**6FX■002-2DC3■-1BC0**
	13 m (42.6 ft)					**6FX■002-2DC3■-1BD0**
	14 m (45.9 ft)					**6FX■002-2DC3■-1BE0**
	15 m (49.2 ft)					**6FX■002-2DC3■-1BF0**
	16 m (52.5 ft)					**6FX■002-2DC3■-1BG0**
	17 m (55.8 ft)					**6FX■002-2DC3■-1BH0**
	18 m (59.1 ft)					**6FX■002-2DC3■-1BJ0**
	19 m (62.3 ft)					**6FX■002-2DC3■-1BK0**
	20 m (65.6 ft)					**6FX■002-2DC3■-1CA0**
	25 m (82.0 ft)					**6FX■002-2DC3■-1CF0**
	30 m (98.4 ft)					**6FX■002-2DC3■-1DA0**
Fixed lengths 	For example, as an extension to the basic cable 6FX.002-2DC30-.... or 6FX.002-2DC36-.... Cable lengths available to order:	[1]	7.1 (0.28)	M12/IP67	M12/IP67	
	3 m (9.84 ft)					**6FX■002-2DC34-1AD0**
	6 m (19.7 ft)					**6FX■002-2DC34-1AG0**

MOTION-CONNECT 500		**5**
MOTION-CONNECT 800PLUS		**8**
Connector/Degree of protection module end	RJ45/IP20	**0**
Connector/Degree of protection module end	RJ45/IP67	**6**

[1] The total cable length (basic cable plus extension cable) must not exceed 30 m (98.4 ft).

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Selection and ordering data

Pre-assembled DRIVE-CLiQ signal cables for SIMOTICS S-1FT7/-1FK7 motors with option N16

Type	Motor type	Length, max.	D_{max}	Connector/ Degree of protection module end	Connector/ Degree of protection motor end	**Basic cable**	**Extension**
	SIMOTICS	m (ft)	mm (in)			Article No.	Article No.
To the decimeter	S-1FT7/-1FK7	100 (328)	7.1 (0.28)	RJ45/IP20	M17/IP67[1]	**6FX5002-2D■40-....**	**6FX5002-2D■44-....**
	S-1FT7/-1FK7	75 (246)	7.1 (0.28)	RJ45/IP20	M17/IP67[1]	**6FX8002-2D■40-....**	**6FX8002-2D■44-....**
To the decimeter	S-1FT7/-1FK7	100 (328)	7.1 (0.28)	M17/IP67[1]	RJ45/IP67[2]	**6FX5002-2DC42-....**	**6FX5002-2DC44-....**
	S-1FT7/-1FK7	75 (246)	7.1 (0.28)	M17/IP67[1]	RJ45/IP67[2]	**6FX8002-2DC42-....**	**6FX8002-2DC44-....**
To the decimeter	S-1FT7/-1FK7	100 (328)	7.1 (0.28)	M17/IP67[1]	M17/IP67[1]	**6FX5002-2D■44-....**	**6FX5002-2D■44-....**
	S-1FT7/-1FK7	75 (246)	7.1 (0.28)	M17/IP67[1]	M17/IP67[1]	**6FX8002-2D■44-....**	**6FX8002-2D■44-....**
Fixed lengths (1 ... 20/25/30 m (3.28 ... 65/82/98 ft)	S-1FT7/-1FK7	100 (328)	7.1 (0.28)	M17/IP67[1]	M12/IP67[3]	**6FX5002-2DC46-....**	**6FX5002-2DC44-....**
	S-1FT7/-1FK7	75 (246)	7.1 (0.28)	M17/IP67[1]	M12/IP67[3]	**6FX8002-2DC46-....**	**6FX8002-2DC44-....**
To the decimeter	S-1FT7/-1FK7	100 (328)	7.1 (0.28)	RJ45/IP67[2]	M17/IP67[1]	**6FX5002-2D■48-....**	**6FX5002-2D■44-....**
	S-1FT7/-1FK7	75 (246)	7.1 (0.28)	RJ45/IP67[2]	M17/IP67[1]	**6FX8002-2D■48-....**	**6FX8002-2D■44-....**

MOTION-CONNECT 500							**5**				**5**		
MOTION-CONNECT 800PLUS							**8**				**8**		
Connector, type:	**SPEED-CONNECT**							**C**				**C**	
Connector, type:	**Full thread**							**D**				**D**	
Length code									**....**				**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded.

[1] Max. 4 M17 disconnection points permissible without reduction in maximum total length.
[2] The permissible total maximum length is reduced by 5 m (6.56 ft) for each interruption point.
[3] Max. 3 M12 disconnection points permissible without reduction in maximum total length.

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Signal cables for motors with SPEED-CONNECT/full-thread connector

Selection and ordering data

Pre-assembled MOTION-CONNECT signal cables for motors with SPEED-CONNECT connector

Encoder system	Motor type	Connection via	Length, max.	D_{max}	Degree of protection Connector[1]	Basic cable	Extension
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Absolute encoder with EnDat	S-1FK701	SMC20	50 (164)	9.8 (0.39)	IP20/IP67	**6FX■002-2EN20-....**	**6FX8002-2EN24-....**
Absolute encoder with EnDat	S-1FK7[2]/-1FT7/ M-1PH8[3]	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■002-2EQ31-....**	**6FX■002-2EQ34-....**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R	S-1FK701	SMC20	50 (164)	9.2 (0.36)	IP20/IP67	**6FX■002-2CN20-....**	**6FX8002-2CN24-....**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks	S-1FK7/-1FT7/ M-1PH8[3]	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■002-2CQ31-....**	**6FX■002-2CQ34-....**
Incremental encoder sin/cos 1 V_{pp} 256 and 512 S/R, without C and D tracks	M-1PH8[3]	SMC20	50 (164)	9.2 (0.36)	IP20/IP67	**6FX8002-2CQ80-....**	**6FX■002-2CQ34-....**
Resolver	S-1FK701	SMC10	130 (426)	9.2 (0.36)	IP20/IP67	**6FX■002-2FN20-....**	**6FX8002-2FN24-....**
MOTION-CONNECT 500						**5**	**5**
MOTION-CONNECT 800PLUS						**8**	**8**
Length code						**....**	**....**

Pre-assembled signal cables for motors with full-thread connector

Encoder system	Motor type	Connection via	Length, max.	D_{max}	Degree of protection Connector[1]	Basic cable	Extension
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Absolute encoder with EnDat	M-1PH8/T-1FW3	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■002-2EQ10-....**	**6FX■002-2EQ14-....**
Absolute encoder with EnDat 5 V DC		SME25	3[4] (9.84)	9.2 (0.36)	IP67/IP67	**6FX■002-2AD04-....**	**–**
Absolute encoder with EnDat	L-1FN3/T-1FW6	SME125	3[4] (9.84)	9.2 (0.36)	IP67/IP67	**6FX8002-2AD04-....**	**–**
Absolute encoder with EnDat							
• 6FX2001-5.E..		SMC20	100 (328)	9.2 (0.36)	IP20/IP67	**6FX■002-2CH00-....**	**6FX■002-2AD04-....**
• 1XP8014-10/1XP8024-10		SMC20	100 (328)	9.2 (0.36)	IP20/IP67	**6FX■002-2CH00-....**	**6FX■002-2AD04-....**
Absolute encoder with SSI 5 V DC		SME25	3 (9.84)	9.2 (0.36)	IP67/IP67	**6FX■002-2AD04-....**	**–**
SSI absolute encoder							
• 6FX2001-5.S.., 24 V DC Clock-pulse rate 100 ... 250 kHz		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CC11-....**	**6FX■002-2CB54-....**
• 1XP8014-20/1XP8024-20/-21, 24 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CC06-....**	**–**
Resolver	S-1FK7[2]/T-1FW3	SMC10	130 (426)	9.2 (0.36)	IP20/IP67	**6FX■002-2CF02-....**	**6FX■002-2CF04-....**
Resolver 1XP8013-10/-11/1XP8023-10/-11		SMC10	130 (426)	9.2 (0.36)	IP20/IP67	**6FX■002-2CF06-....**	**–**
MOTION-CONNECT 500						**5**	**5**
MOTION-CONNECT 800PLUS						**8**	**8**
Length code						**....**	**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded.
The permissible total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

[1] The specified degree of protection refers to the basic cable.
[2] Not for SIMOTICS S-1FK701 motors.
[3] For SIMOTICS M-1PH808/-1PH810/-1PH813/-1PH816 motors.
[4] Up to 10 m (32.8 ft) possible, depending on the encoder current consumption.

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Selection and ordering data

Pre-assembled signal cables for motors with full-thread connector

Encoder system	Motor type	Connection via	Length, max.	D_{max}	Degree of protection Connector[1]	Basic cable	Extension
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks	M-1PH8/T-1FW3	SMC20	100 (328)	9.8 (0.39)	IP20/IP67	**6FX■002-2CA31-....**	**6FX■002-2CA34-....**
Incremental encoder sin/cos 1 V_{pp} 256 and 512 S/R, without C and D tracks	M-1PH8	SMC20	50 (164)	9.2 (0.36)	IP20/IP67	**6FX8002-2CA80-....**	**6FX■002-2CA34-....**
HTL incremental encoder	M-1PH8	SMC30	300[2] (984)	9.3 (0.37)	–/IP67	**6FX■002-2AH00-....**	**6FX■002-2AH04-....**
		SMC30	300[2] (984)	9.3 (0.37)	IP20/IP67	**6FX■002-2AH11-....**	**6FX■002-2AH04-....**
HTL incremental encoder	M-1PH8	CU310-2/ D410-2	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2AH11-....**	**–**
Incremental encoder sin/cos 1 V_{pp} without C and D tracks 6FX2001-3		SMC20	50 (164)	9.3 (0.37)	IP20/IP67	**6FX■002-2CG00-....**	**6FX■002-2CB54-....**
HTL incremental encoder, 24 V DC							
• 6FX2001-4		SMC30	100 (328)	9.3 (0.37)	–/IP67	**6FX5002-2CA12-....**	**6FX■002-2CB54-....**
• 1XP8012-10/-11, 1XP8032-10/-11/-12		SMC30	100 (328)	9.3 (0.37)	–/IP67	**6FX5002-2CA12-....**	**6FX■002-2CB54-....**
TTL incremental encoder RS422							
• 6FX2001-2, 5 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CR00-....**	**6FX■002-2CB54-....**
• 1XP8012-20/-21/-22, 1XP8032-20/-21/-22, 5 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CR00-....**	**6FX■002-2CB54-....**
• 6FX2001-2, 24 V DC		SMC30	100 (328)	9.3 (0.37)	IP20/IP67	**6FX■002-2CD24-....**	**6FX■002-2CB54-....**
Incremental encoder sin/cos 1 V_{pp} 5 V DC, without C and D tracks		SME20	3[3] (9.84)	9.3 (0.37)	IP67/IP67	**6FX■002-2CB54-....**	**–**
Direct incremental encoder sin/cos 1 V_{pp}	L-1FN3/T-1FW6	SME120	3[3] (9.84)	9.3 (0.37)	IP67/IP67	**6FX8002-2CB54-....**	**–**

MOTION-CONNECT 500							**5**				**5**		
MOTION-CONNECT 800PLUS							**8**				**8**		
Length code									**....**				**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded.
The permissible total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

[1] The specified degree of protection refers to the basic cable.
[2] With evaluation of difference signals A*, A and B*, B, otherwise ≤ 100 m (328 ft).
[3] Up to 10 m (32.8 ft) possible, depending on the encoder current consumption.

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Signal cables for motors with full-thread connector

Selection and ordering data

Pre-assembled signal cables for hydraulic axes with full-thread connector

Encoder system/valve/sensor	Connection via	Length, max.	D_{max}	Degree of protection Connector[1]	Basic cable	Extension
	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Absolute encoder with SSI	HLA	40 (131)	9.4 (0.37)	IP20/IP67	**6FX8002-2CC81-....**	**–**
TTL incremental encoder	HLA	40 (131)	9.3 (0.37)	IP20/IP67	**6FX■002-2CA11-....**	**6FX■002-2CB54-....**
Standard servo solenoid valve, directly controlled	HLA	40 (131)	9.4 (0.37)	IP20/IP67	**6FX8002-2BA00-....**	**–**
HRV servo solenoid valve (high response)[2]	HLA	40 (131)	9.4 (0.37)	IP20/IP65	**6FX8002-2BA10-....**	**–**
Pressure sensor cylinder side A/B axis 1 or 2	HLA	40 (131)	5.3 (0.21)	IP20/–	**6FX8002-2BA20-....**	**–**
Pressure sensor central shutoff valve (before/after)	HLA	40 (131)	5.3 (0.21)	IP20/–	**6FX8002-2BA20-....**	**–**
Pressure sensor axial shutoff valve (after) axis 1 or 2	HLA	40 (131)	5.3 (0.21)	IP20/–	**6FX8002-2BA21-....**	**–**
MOTION-CONNECT 500					**5**	**5**
MOTION-CONNECT 800PLUS					**8**	**8**
Length code					**....**	**....**

Pre-assembled signal cables for temperature sensors with full-thread connector

Temperature sensors	Motor type	Connection via	Length, max.	D_{max}	Degree of protection Connector[1]	Basic cable/ extension[3]	Adapter cable[3]
	SIMOTICS	SINAMICS	m (ft)	mm (in)		Article No.	Article No.
Temperature sensor	L-1FN3100/L-1FN3150[4]	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**6FX8002-2SL01-....**
Temperature sensor	L-1FN3300 ... L-1FN3900[4]	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**6FX8002-2SL02-....**
Temperature sensor	T-1FW6	SME120/SME125	10 (32.8)	11.0 (0.43)	IP67/IP67	**6FX8002-2SL10-....**	**–**
Temperature sensor	L-1FN3100/L-1FN3150[4]	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**6FX8002-2SL01-....**
Temperature sensor	L-1FN3300 ... L-1FN3900[4]	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**6FX8002-2SL02-....**
Temperature sensor	T-1FW6	TM120	100 (328)	11.0 (0.43)	–/IP67	**6FX8002-2SL20-....**	**–**
MOTION-CONNECT 800PLUS						**8**	**8**
Length code						**....**	**....**

The combinations of signal cable extensions shown are only provided by way of example.

The maximum specified cable length (basic cable and extensions) must not be exceeded.
The permissible total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

[1] The specified degree of protection refers to the basic cable.
[2] The cable is adapted to the servo solenoid valves by Bosch Rexroth AG.
[3] The smallest bending radius (flexible) for signal cables 6FX8002-2SL..-.... is 85 mm (3.35 in).
[4] Continuous load version.

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Overview

Data position in Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.

Pre-assembled at motor and module ends						**0**												
Pre-assembled at motor end, connector at module end supplied separately						**1**												
Pre-assembled at module end, connector at motor end supplied separately						**4**												
Without brake cores										**C**								
With brake cores										**D**								
Basic cable between	and																	
SINAMICS S120 Motor Module, booksize format up to 30 A	Motor full-thread connector size 0.5									**D**	**A**	**2**	**0**					
	Motor full-thread connector size 1/1.5										**S**		**1**					
	Motor full-thread connector size 3										**S**	**1**	**3**					
	Motor with terminal box (exposed core ends)										**S**		**2**					
	Motor SPEED-CONNECT connector size 0.5									**D**	**N**	**2**	**0**					
	Motor SPEED-CONNECT connector size 1/1.5										**N**		**1**					
SINAMICS S120 Motor Module, booksize format, 45 A or higher	Motor full-thread connector size 1/1.5										**S**		**4**					
	Motor full-thread connector size 3										**S**	**2**	**3**					
	Motor SPEED-CONNECT connector size 1/1.5										**N**		**4**					
SINAMICS S120 Power Module/Motor Module, booksize compact format	Motor full-thread connector size 0.5									**D**	**A**	**3**	**0**					
	Motor full-thread connector size 1/1.5										**G**		**1**					
	Motor full-thread connector size 3										**G**		**3**					
	Motor SPEED-CONNECT connector size 0.5									**D**	**N**	**3**	**0**					
	Motor SPEED-CONNECT connector size 1/1.5										**G**	**1**	**0**					
SINAMICS S120 Power Module, Combi format	Motor SPEED-CONNECT connector size 1/1.5										**F**							
SINAMICS S120 Power Module/Motor Module, booksize format	SIMOTICS M-1PH8 with terminal box									**C**	**R**							
SINAMICS S120 Power Module, Combi format	SIMOTICS M-1PH8 with terminal box									**C**	**E**							
Extension between basic cable with connector	and motor connector																	
Full-thread size 0.5	Full-thread size 0.5									**M**	**E**	**0**	**5**					
Full-thread size 1	Full-thread size 1										**A**		**5**					
Full-thread size 1.5	Full-thread size 1.5										**A**		**8**					
Full-thread size 3	Full-thread size 3										**X**		**8**					
SPEED-CONNECT size 0.5	SPEED-CONNECT size 0.5									**M**	**N**	**0**	**5**					
SPEED-CONNECT size 1	SPEED-CONNECT size 1										**Q**		**5**					
SPEED-CONNECT size 1.5	SPEED-CONNECT size 1.5										**Q**		**8**					
Adapter cable for SIMOTICS L-1FN3	**6**	**F**	**X**	**7**	**0**	**0**	**2**	**–**	**5**	**L**	**M**	.	.	**–**	.	.	.	.
Cross-section												.	.					
Length code																		
Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths															.	.	.	.

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Signal cables

Overview

Data position in Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**2**	■	■	■	■	**–**	.	.	.	.
6FX2 cables	**6**	**F**	**X**	**2**	**0**	**0**	**2**	**–**	**1**	**D**	**C**	■	**0**	**–**	.	.	.	.

Pre-assembled at motor and module ends	**0**
Pre-assembled at motor end, connector at module end supplied separately	**1**
Pre-assembled at module end, connector at motor end supplied separately	**4**

Variant: Signal cables for integrated encoder

DRIVE-CLiQ cables between	and				
Power Module/Motor Module/SMC with IP20 connector	Power Module/Motor Module/SMC with IP20 connector	**D**	**C**	**0**	**0**
Power Module/Motor Module/SMC with IP20 connector	Motor/encoder/SME IP67 connector	**D**	**C**	**1**	**0**
DME20/cabinet bushing/coupler	Motor/encoder/SME IP67 connector	**D**	**C**	**2**	**0**
Basic cable between	**and motor with**				
SMC20	Incremental encoder (sin/cos 1 V_{pp}) full-thread connector M23	**C**	**A**	**3**	**1**
SMC30	Incremental encoder (HTL) full-thread connector M23	**A**	**H**	**0**	**0**
CU310-2	Incremental encoder (HTL) full-thread connector M23	**A**	**H**	**1**	**1**
SMC20	Absolute encoder full-thread connector M23	**E**	**Q**	**1**	**0**
SMC10	Resolver full-thread connector M23	**C**	**F**	**0**	**2**
SMC20	Incremental encoder (sin/cos 1 V_{pp}) SPEED-CONNECT connector M23	**C**	**Q**	**3**	**1**
SMC20	Incremental encoder SPEED-CONNECT connector M17	**C**	**N**	**2**	**0**
SMC20	Absolute encoder SPEED-CONNECT connector M23	**E**	**Q**	**3**	**1**
SMC20	Absolute encoder SPEED-CONNECT connector M17	**E**	**N**	**2**	**0**
SMC10	Resolver SPEED-CONNECT connector M17	**F**	**N**	**2**	**0**
Extension between basic cable with connector	**and motor connector**				
Full-thread or SPEED-CONNECT	Full-thread or SPEED-CONNECT				**4**

Variant: Signal cables for external encoder

Basic cable between	and				
SMC30	Incremental encoder 6FX2001-2 (TTL/5 V supply) full-thread connector	**C**	**R**	**0**	**0**
SMC30	Incremental encoder 1XP8012-2./1XP8032-2. (TTL/24 V supply) full-thread connector	**C**	**D**	**2**	**4**
SMC20	Incremental encoder 6FX2001-3 (sin/cos 1 V_{pp}) full-thread connector	**C**	**G**	**0**	**0**
SMC30	Incremental encoder 6FX2001-4 (HTL) full-thread connector	**C**	**A**	**1**	**2**
SMC30	Incremental encoder 1XP8012-1./1XP8032-1. (HTL) full-thread connector	**C**	**A**	**1**	**2**
SMC30	Absolute encoder with SSI 1XP8014-2./1XP8024-2. full-thread connector	**C**	**C**	**0**	**6**
SMC30	Absolute encoder 6FX2001-5.S (SSI) full-thread connector	**C**	**C**	**1**	**1**
SMC20	Absolute encoder 6FX2001-5.E (EnDat) full-thread connector	**C**	**H**	**0**	**0**
SMC20	Absolute encoder 1XP8014-10/1XP8024-10 (EnDat) full-thread connector	**C**	**H**	**0**	**0**
SMC10	Resolver 1XP8013-1./1XP8023-1. full-thread connector	**C**	**F**	**0**	**6**
Extension between basic cable with connector	**and motor connector**				
Full thread	Full thread				**4**

Variant: Signal cables for temperature sensor	**6**	**F**	**X**	**8**	**0**	**0**	**2**	**–**	**2**	**S**	**L**	■	■	**–**	.	.	.	.
Adapter cable with M17 socket at SIMOTICS T-1FW6 terminals												**0**	**0**					
Adapter cable with M17 socket at SIMOTICS L-1FN3100/L-1FN3150												**0**	**1**					
Adapter cable with M17 socket at SIMOTICS L-1FN3300 ... L-1FN3900												**0**	**2**					
Extension to basic cable between SME12x and SIMOTICS L-1FN3/SIMOTICS T-1FW6												**1**	**0**					
Basic cable between TM120 and SIMOTICS L-1FN3/SIMOTICS T-1FW6												**2**	**0**					

Length code				
Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths	.	.	.	.

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Overview

Data position in Article No.	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500	**6**	**F**	**X**	**5**	**0**	**0**	**8**	**–**	**1**	**B**	■	.	.	–	.	.	.	.
MOTION-CONNECT 800PLUS	**6**	**F**	**X**	**8**	**0**	**0**	**8**	**–**	**1**	**B**	■	.	.	–	.	.	.	.

Power cable with brake cores, sold by the meter	**A**
Power cable without brake cores, sold by the meter	**B**

No. of cores and cross-sections	. .

Length code

Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths	. . . .

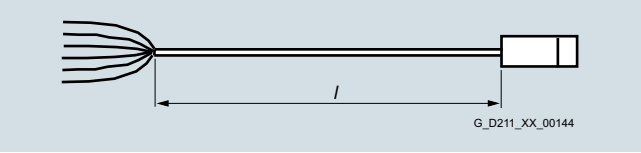
Overview

Description	Article No. supplement				
Length code for pre-assembled cables					
	6FX.0.2-.....-	■	■	■	■
0 m 100 m (328 ft) 200 m (656 ft)		**1** **2** **3**			
0 m 10 m (32.8 ft) 20 m (65.6 ft) 30 m (98.4 ft) 40 m (131 ft) 50 m (164 ft) 60 m (197 ft) 70 m (230 ft) 80 m (262 ft) 90 m (295 ft)			**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**		
0 m 1 m (3.28 ft) 2 m (6.56 ft) 3 m (9.84 ft) 4 m (13.1 ft) 5 m (16.4 ft) 6 m (19.7 ft) 7 m (23.0 ft) 8 m (26.2 ft) 9 m (29.5 ft)				**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**	
0 m 0.1 m (3.94 in) 0.2 m (7.87 in) 0.3 m (11.81 in) 0.4 m (15.75 in) 0.5 m (19.96 in) 0.6 m (23.62 in) 0.7 m (27.56 in) 0.8 m (31.5 in)					**0** **1** **2** **3** **4** **5** **6** **7** **8**
Examples:	1.0 m (3.28 ft):	1	A	B	0
	2.2 m (7.22 ft):	1	A	C	2
	8.0 m (26.3 ft):	1	A	J	0
	299.0 m (981 ft):	3	K	K	0

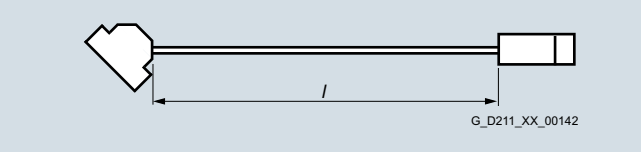
Description	Article No. supplement				
Length code for power and signal cables, sold by the meter[1)]					
	6FX.008-.....-	■	■	**A**	**0**
50 m (164 ft)		**1**	**F**		
100 m (328 ft)		**2**	**A**		
200 m (656 ft)		**3**	**A**		
500 m (1640 ft)		**6**	**A**		

More information

Definition of lengths for pre-assembled cables



Cable with exposed core ends and pre-assembled connector



Cable with pre-assembled connectors at both ends

Tolerances:

- Cable lengths up to 10 m (32.8 ft): ± 2 %
- Cable lengths of 10 m (32.8 ft) and longer: ± 1 %

7

[1)] Note type of delivery.

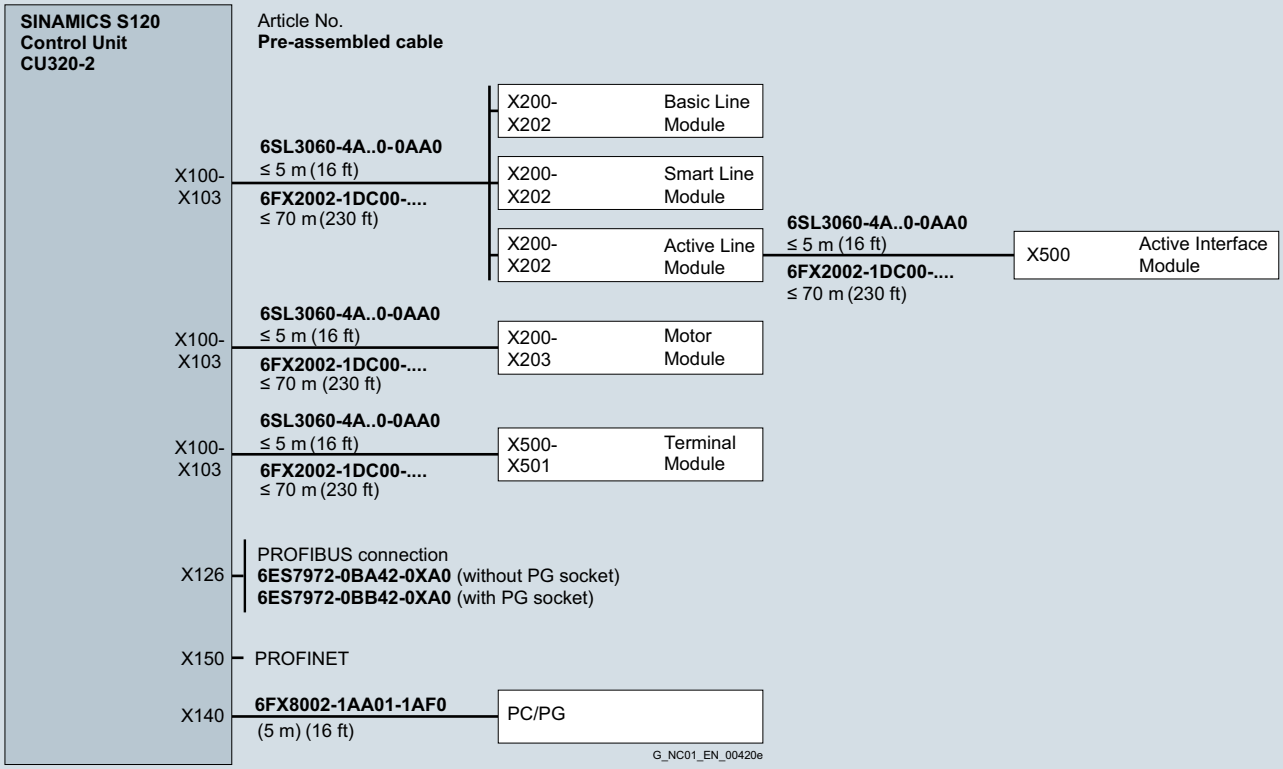
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SINAMICS S120 CU 320-2 Control Unit

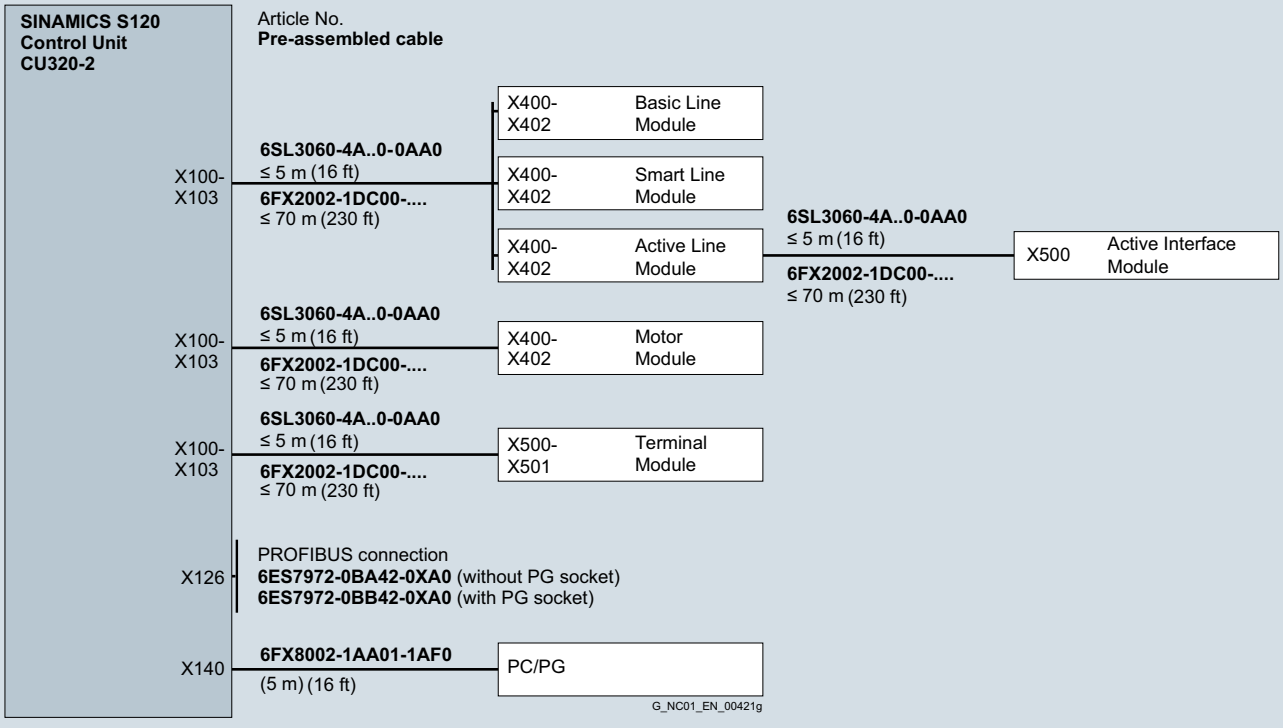
Integration

The DRIVE-CLiQ signal cables of type 6SL3060-4A..0-0AA0 required for the standard configuration are part of the scope of supply of the Line Modules and Motor Modules. In this case, the modules must be mounted directly adjacent to one another in a row.

Connection overview of SINAMICS S120 CU320-2 Control Unit in booksize format



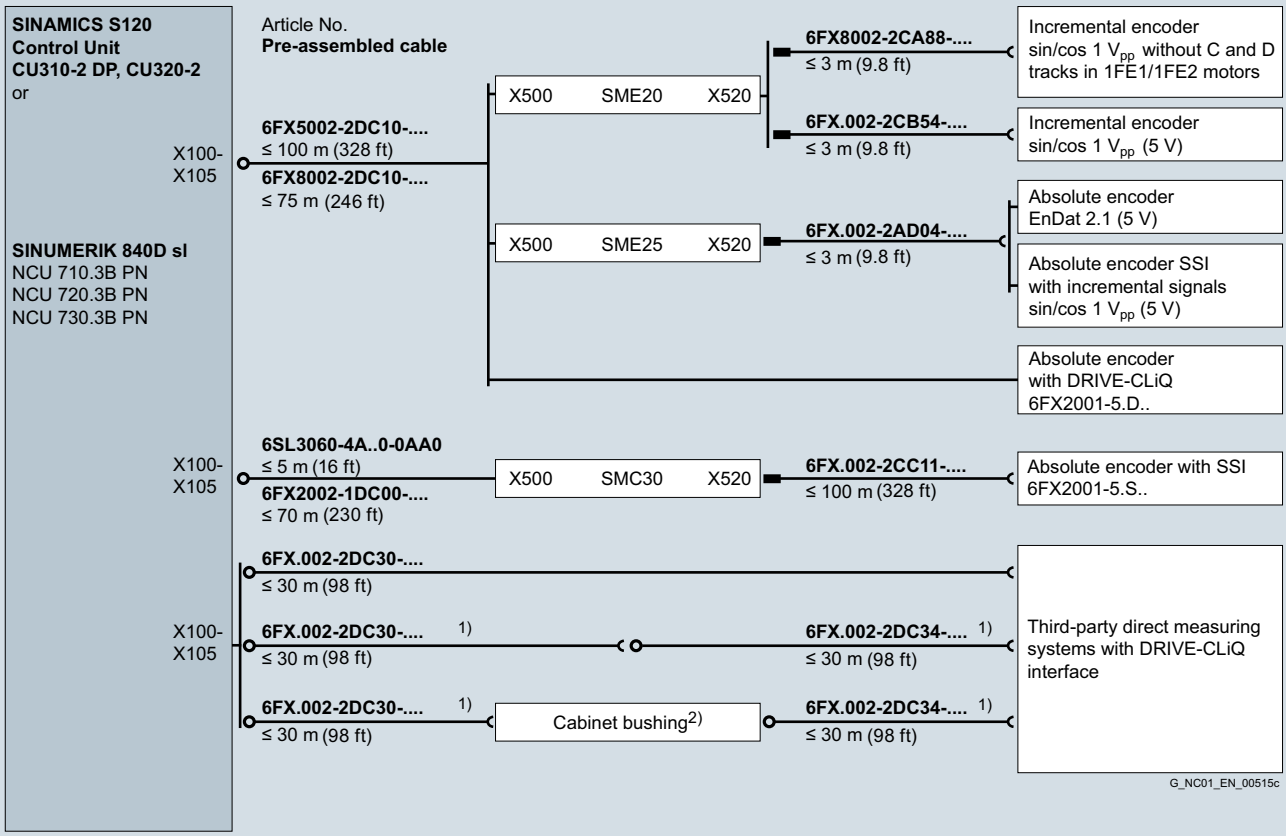
Connection overview of SINAMICS S120 CU320-2 Control Unit in chassis format



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Integration (continued)

Connection of a machine encoder (direct measuring system)



1) The total cable length (basic cable and extension cable) must not exceed 30 m (98.4 ft).

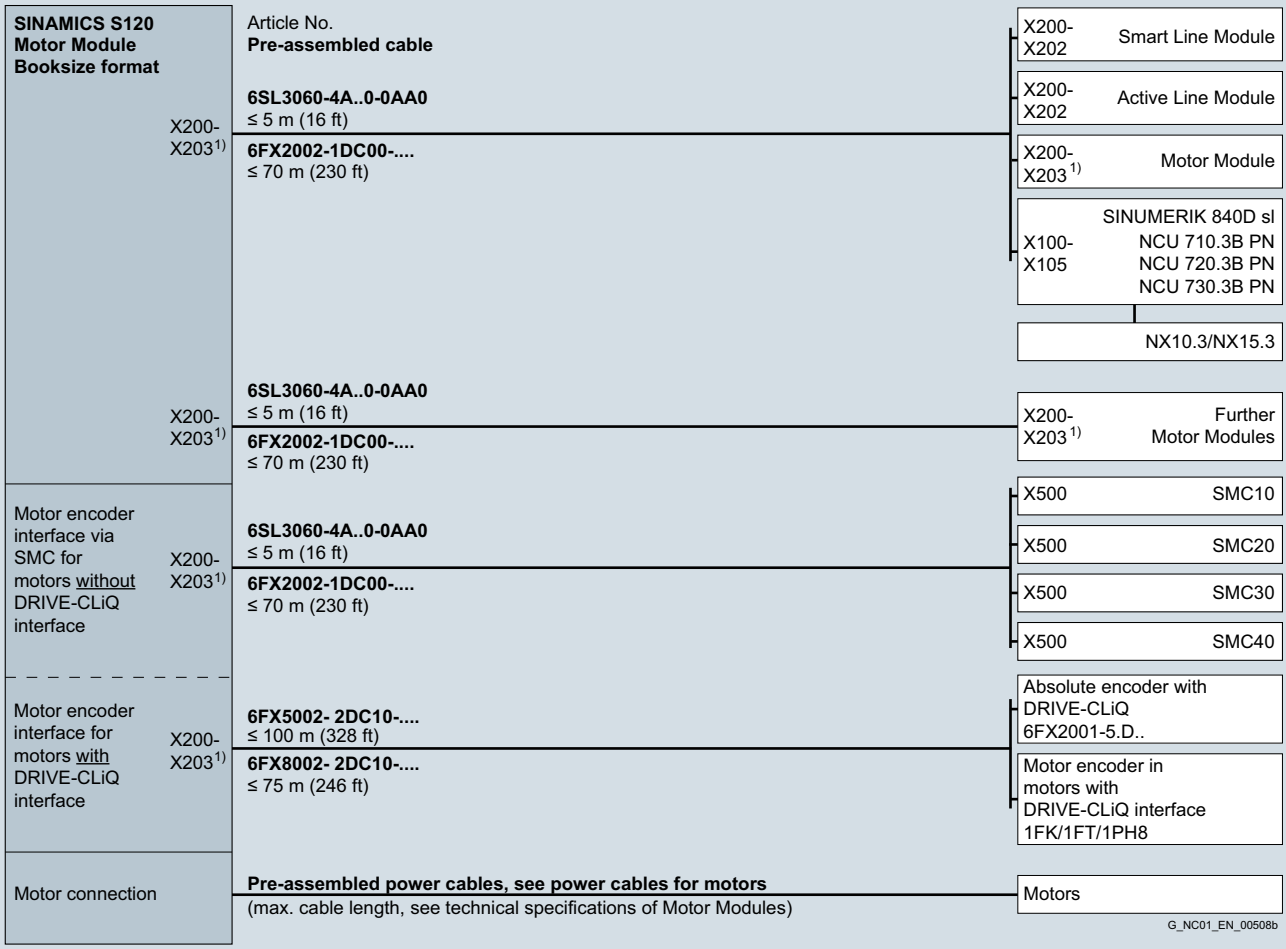
2) Optional DRIVE-CLiQ cabinet bushing M12/IP67 (6FX2003-0DT67).

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SINAMICS S120 Motor Module in booksize format

Integration (continued)

Connection overview of SINAMICS S120 Motor Modules and Line Modules in booksize format and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface

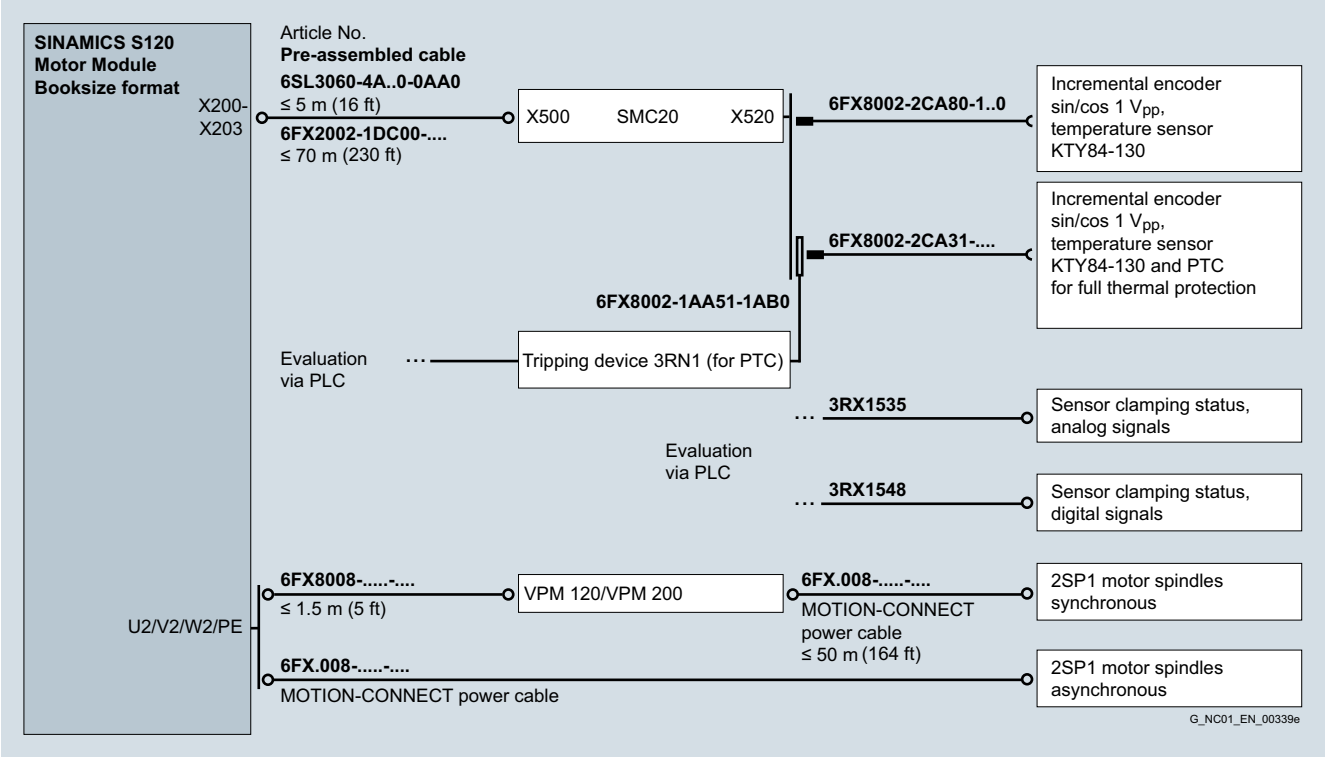


1) For Single Motor Module: X200-X202
For Double Motor Module: X200-X203

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Integration (continued)

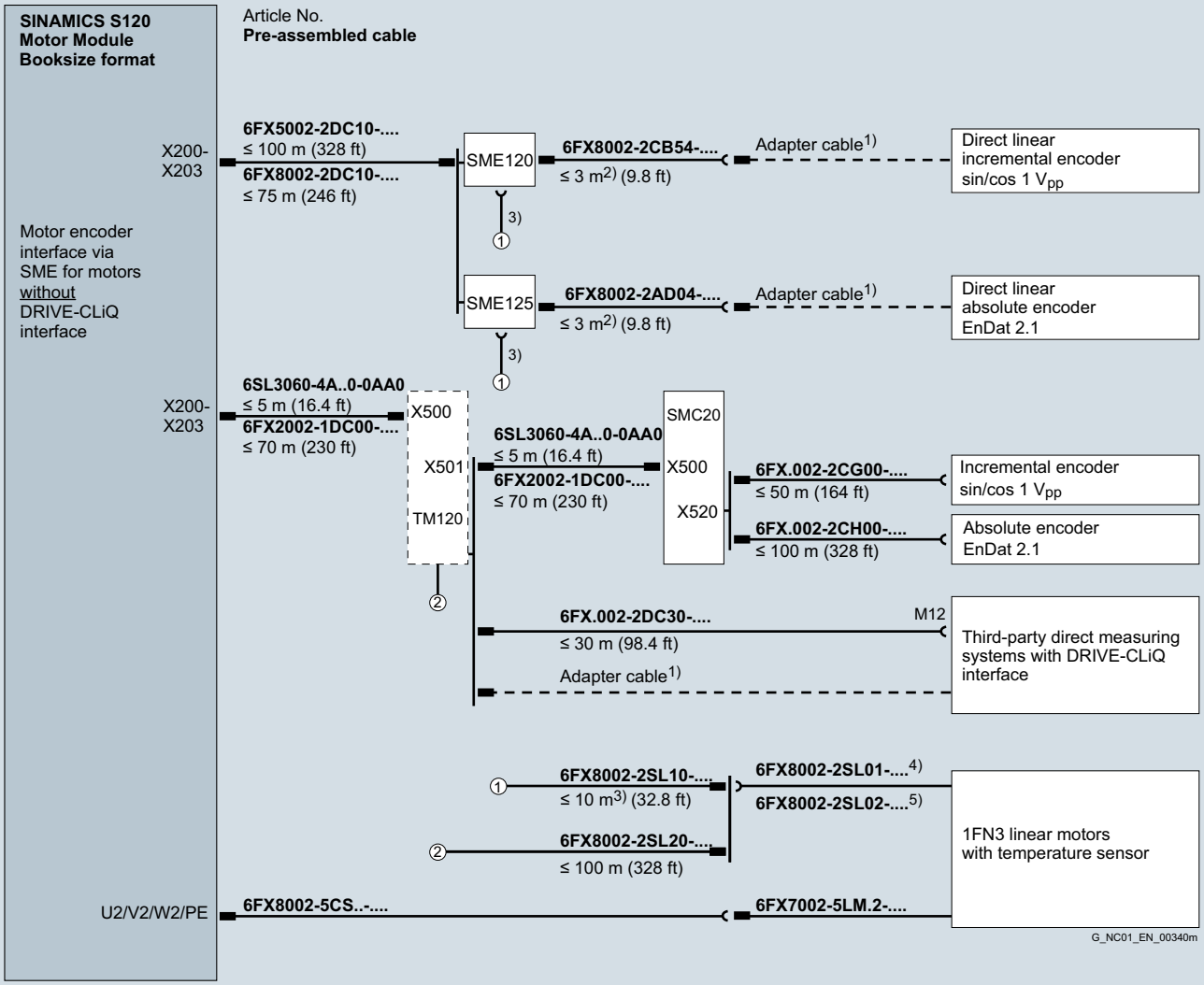
Connection overview of SINAMICS S120 Motor Modules in booksize format and SIMOTICS 2SP1 main spindle motors



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Integration (continued)

Connection overview of SINAMICS S120 Motor Modules in booksize format, with SME120/SME125 or TM120 with/without SMC20 and SIMOTICS L-1FN3 linear motors

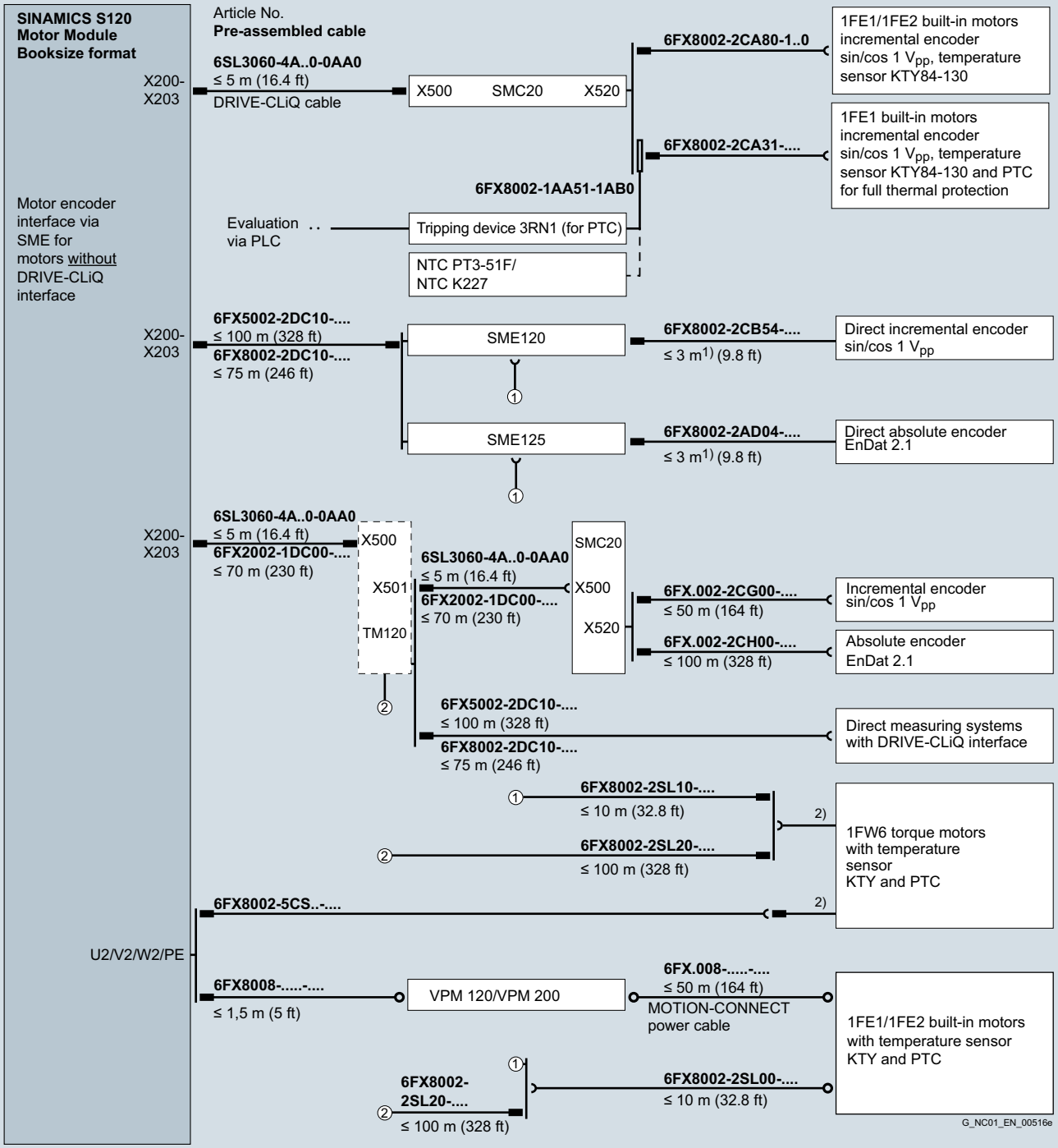


1) Adapter cable available from measuring system manufacturer.
2) Up to 10 m (32.8 ft) possible, depending on encoder current consumption.
3) The total cable length between SME120/SME125 and 1FN3 must not exceed 10 m (32.8 ft).
4) Adapter cable for 1FN3100/1FN3150 motors.
5) Adapter cable for 1FN3300 to 1FN3900 motors.

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Integration (continued)

Connection overview of SINAMICS S120 Motor Modules in booksize format, with SME120/SME125 or TM120 with/without SMC20 and SIMOTICS T-1FW6 torque motors/SIMOTICS M-1FE1/-1FE2 built-in motors



1) Up to 10 m (32.8 ft) possible, depending on encoder current consumption.

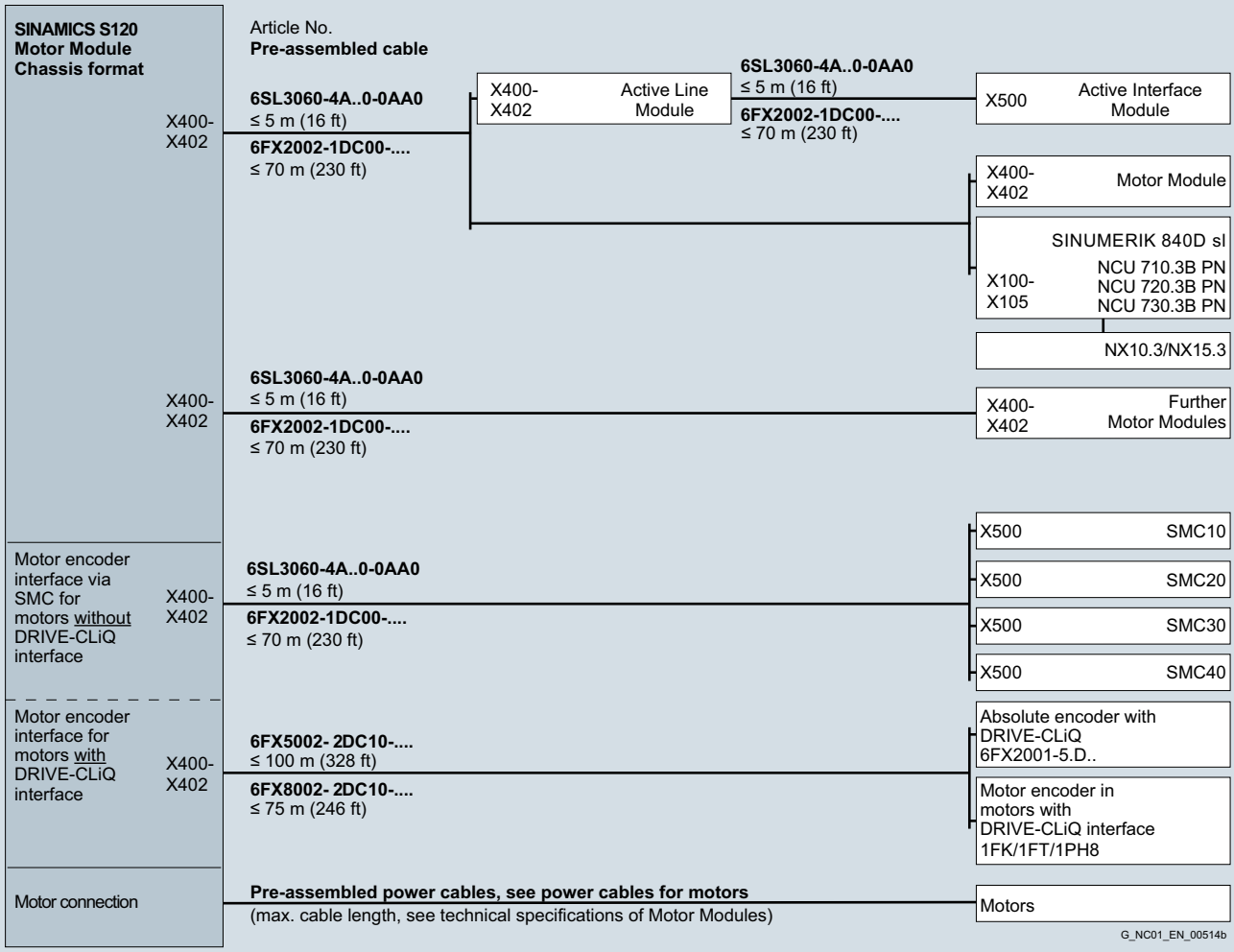
2) For type of connection with exposed core ends, power and signal connectors are not included in the scope of supply of the motor, they must be ordered separately (see Accessories for power and signal cables).

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SINAMICS S120 Motor Module in chassis format

Integration (continued)

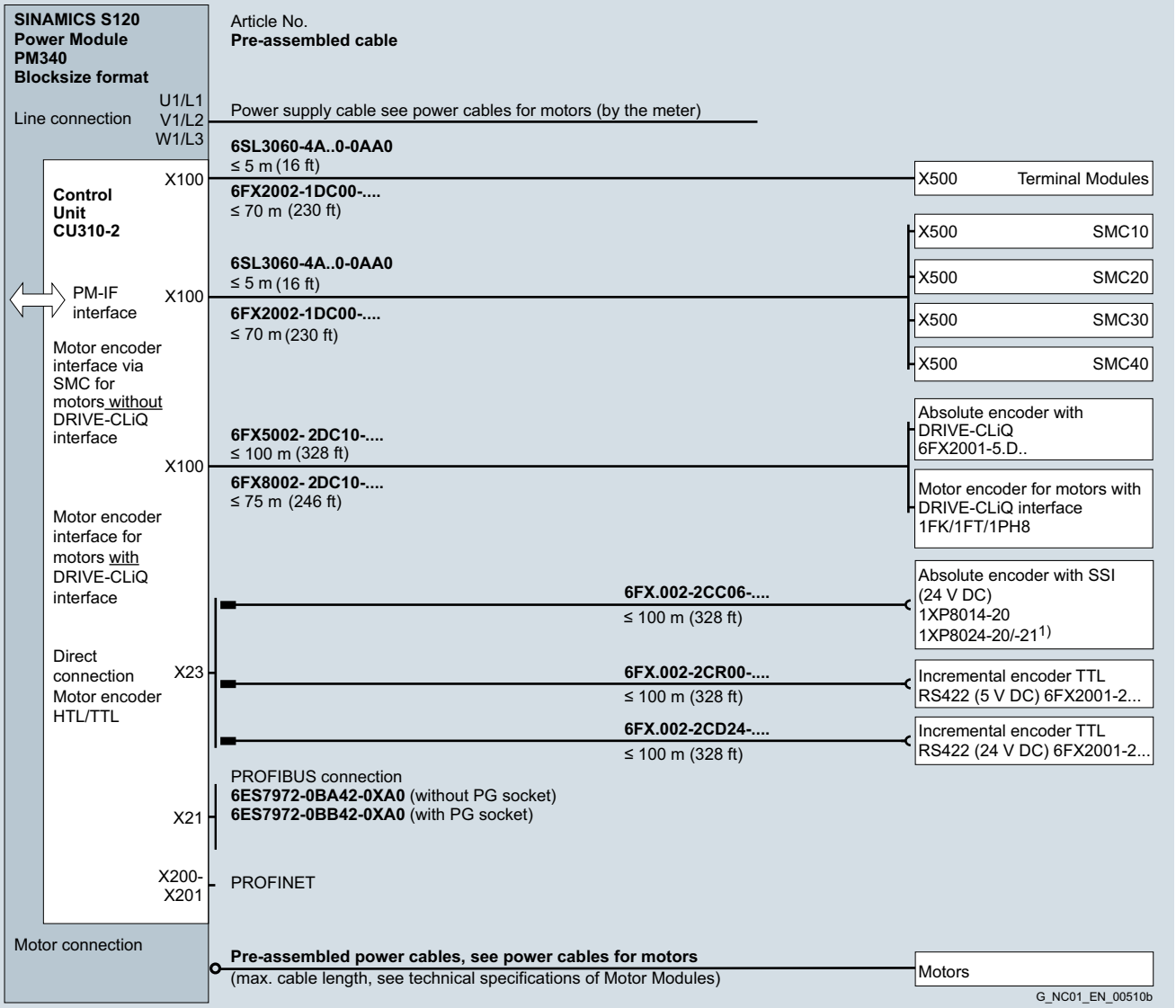
Connection overview of SINAMICS S120 Motor Modules and Line Modules in chassis format and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface



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Integration (continued)

Connection overview of SINAMICS S120 PM340 Power Modules in blocksize format with CU310-2 Control Unit for SIMOTICS motors with/without DRIVE-CLiQ interface



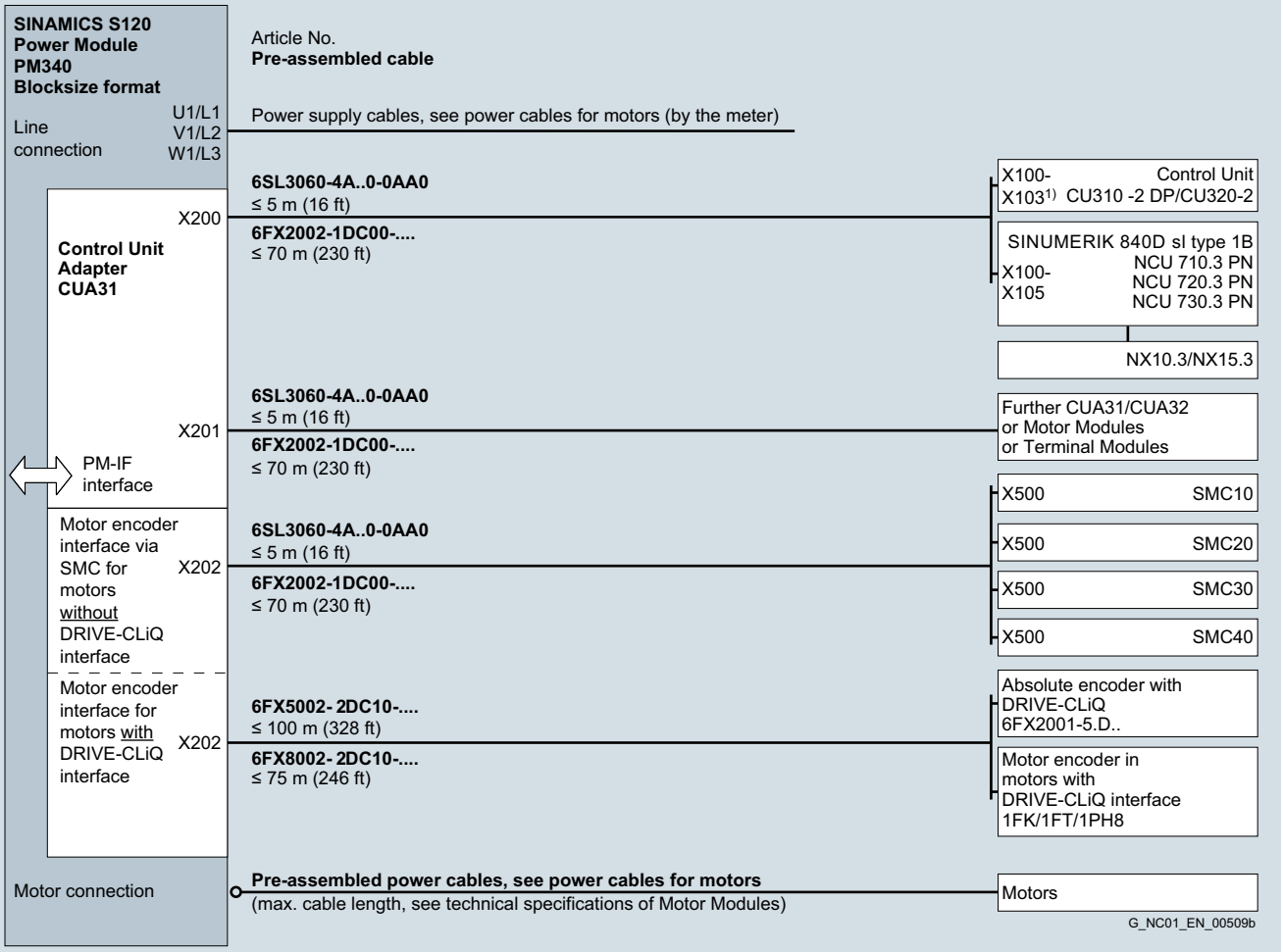
1) Not for 2KG geared motors.

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SINAMICS S120 PM340 Power Module in blocksize format

Integration (continued)

Connection overview of SINAMICS S120 PM340 Power Modules in blocksize format with CUA31 Control Unit Adapter and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface



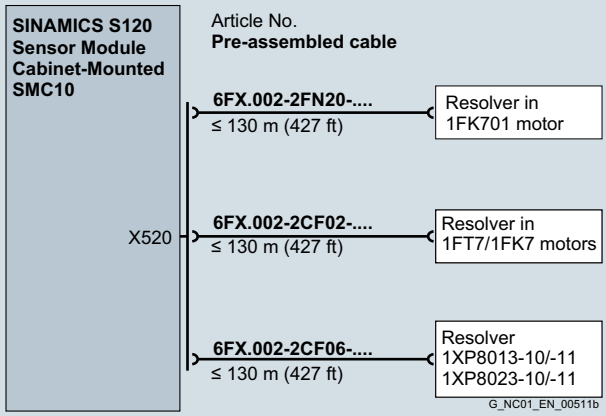
1) For Control Unit CU310 DP: X100
For Control Unit CU320: X100-X103

7

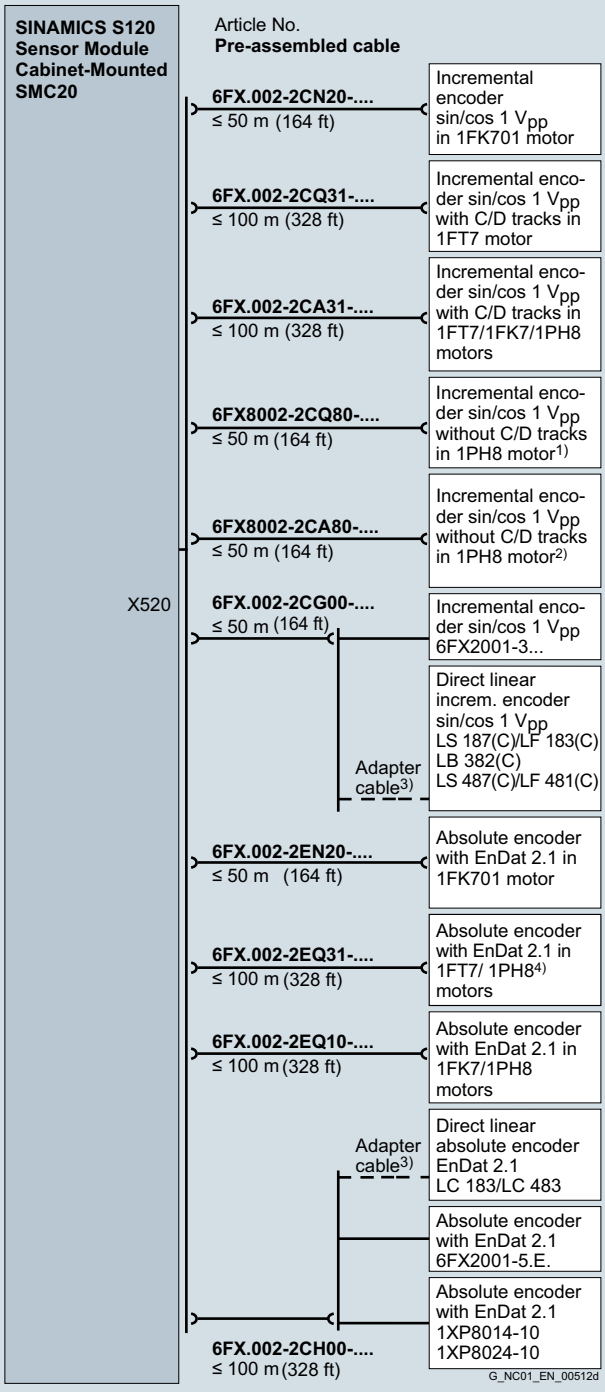
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Integration (continued)

Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC10



Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC20

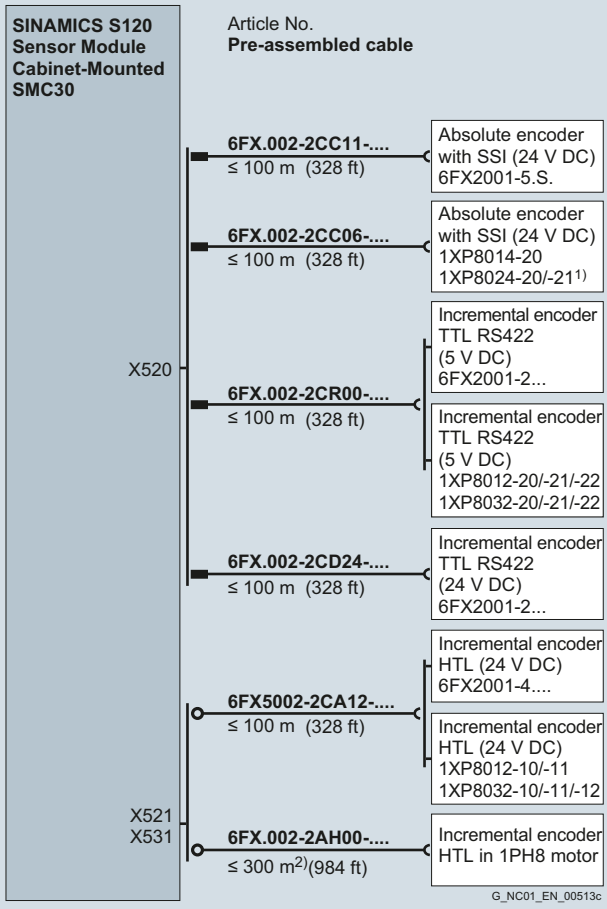


1) Possible for 1PH808/1PH810/1PH813/1PH816 motors for encoders with 512 S/R and 256 S/R.
2) Possible for 1PH8 motors for encoders with 512 S/R and 256 S/R.
3) Adapter cable available from measuring system manufacturer.
4) Possible for 1PH808/1PH810/1PH813/1PH816 motors.

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Integration (continued)

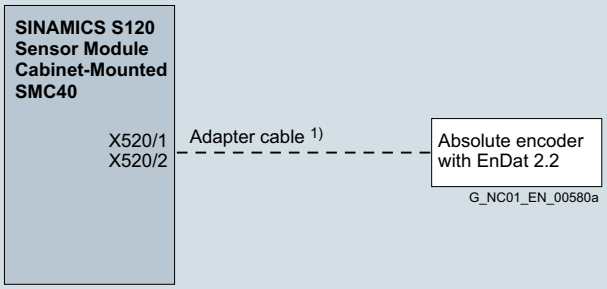
Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC30



1) For position control only.

2) Applies to HTL encoders with bipolar signal evaluation or for evaluation of difference signals A*, A and B*, B; for HTL encoders with unipolar signal evaluation the permissible cable length is reduced to 100 m (328 ft).

Connection overview of SINAMICS S120 Sensor Module Cabinet-Mounted SMC40

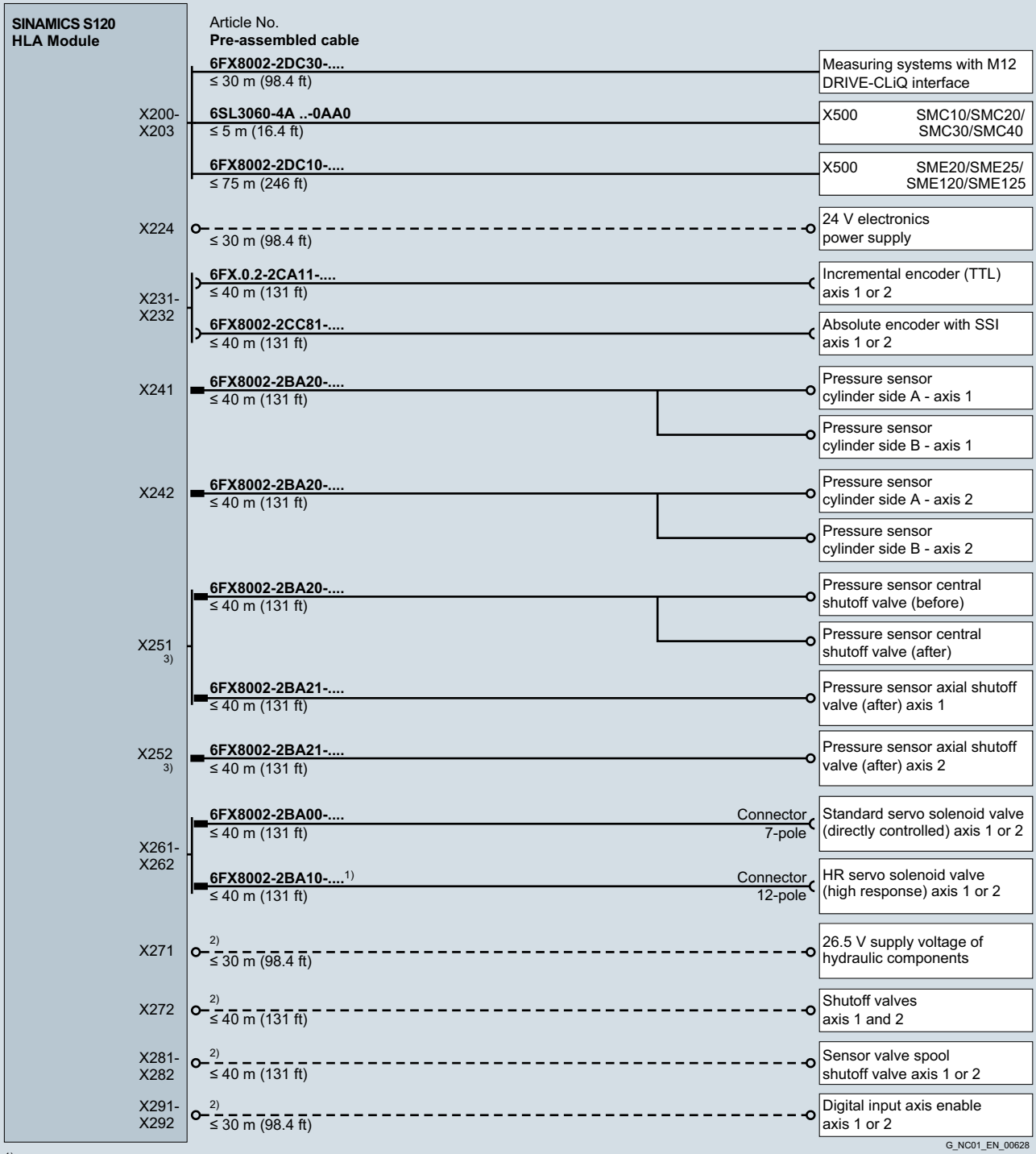


1) Adapter cable available from encoder manufacturer.

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Integration (continued)

Connection overview of SINAMICS S120 Hydraulic Linear Actor Module HLA



1) The cable is adapted to the servo solenoid valves by Bosch Rexroth AG.

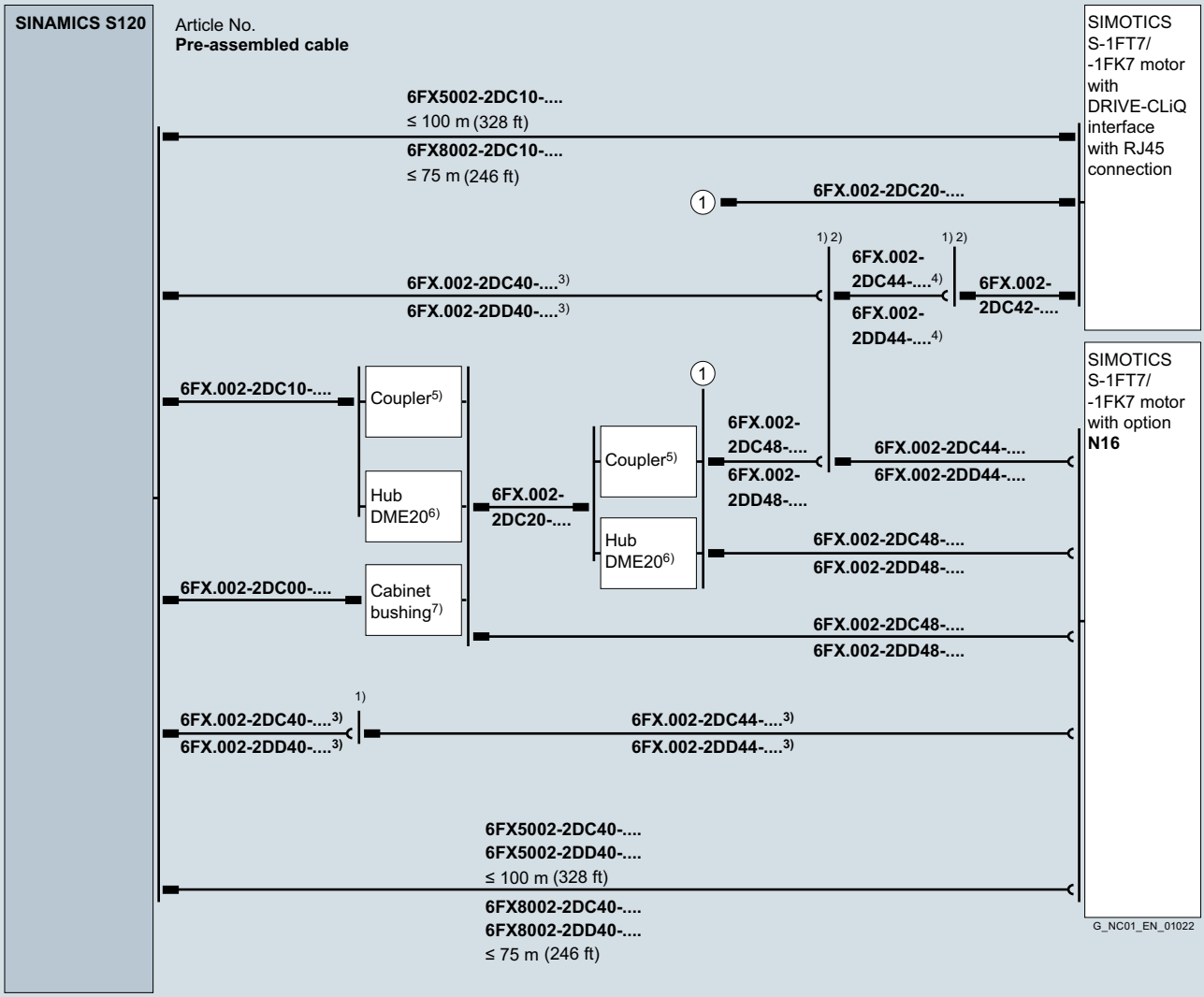
2) For cable cross-sections and pin assignment, please refer to SINAMICS S120 Hydraulic Drive System manual.

3) Only one configuration can be connected. When pressure sensors with central shutoff valve are connected to X251, no additional pressure sensor may be connected to X252.

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Integration (continued)

Connection overview of SIMOTICS S-1FT7/-1FK7 motors with RJ45 connection or with option N16 installed on SINAMICS S120

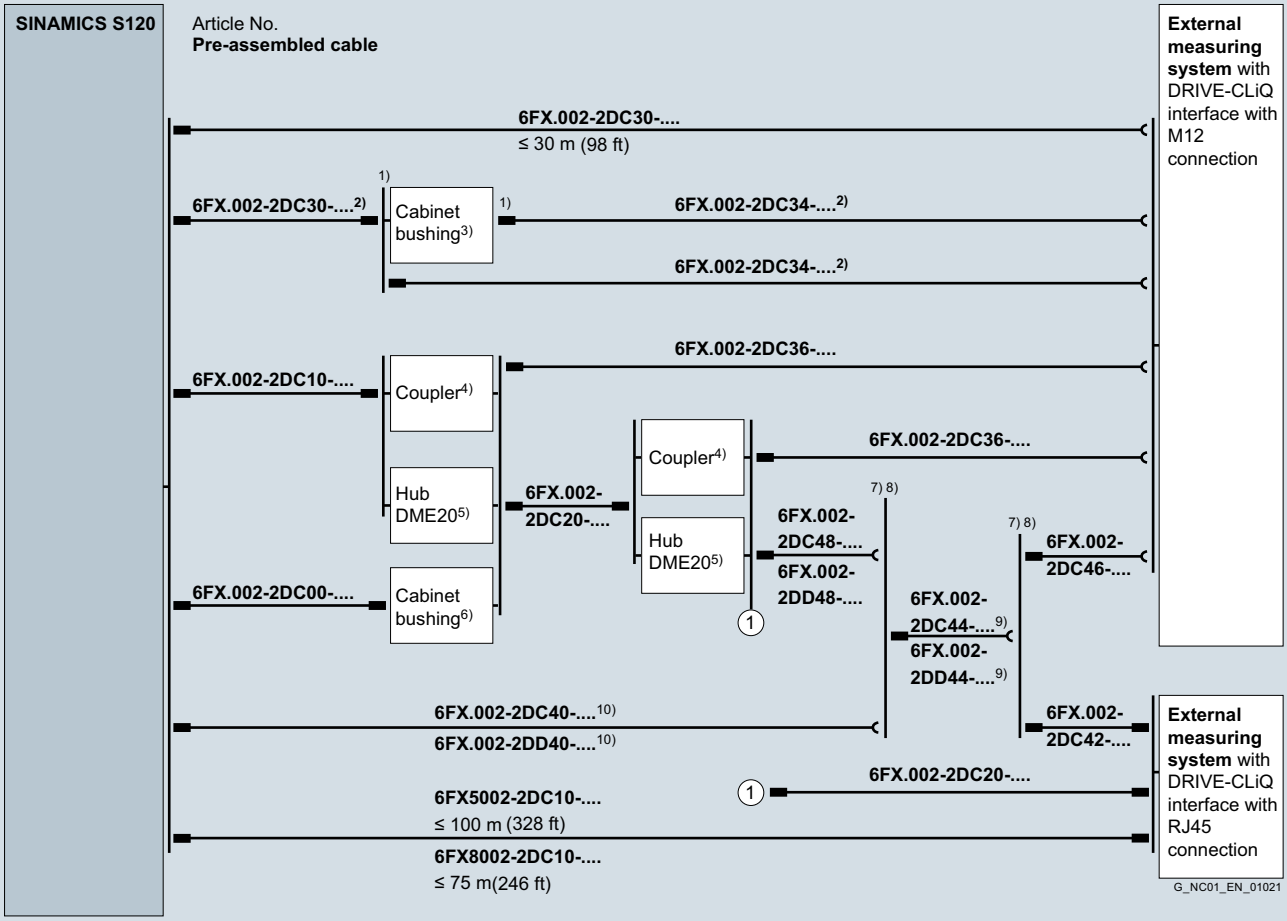


1) Max. 4 M17 disconnection points permissible without derating.
2) Optional mounting flange (6FX2003-7HX00).
3) Total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...).
4) Optional DRIVE-CLiQ cable 6FX.002-2DC44-.....
5) Optional DRIVE-CLiQ RJ45/IP67 coupler (6SL3066-2DA00-0AB0), max. 3 couplers permissible with derating (total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...) - 5 m (16.4 ft) per coupler).
6) Optional DME20 DRIVE-CLiQ Hub Module RJ45/IP67 (6SL3055-0AA00-6AB0), max. 2 DME20 Hub Modules possible.
7) Optional DRIVE-CLiQ RJ45/IP67, RJ45/IP20 cabinet bushing (6SL3066-2DA00-0AA0).

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Integration (continued)

Connection overview of external measuring systems with M12 or RJ45 connection to SINAMICS S120



1) Max. 3 M12 disconnection points permissible without derating.
2) The total length of the DRIVE-CLiQ line must not exceed 30 m (98.4 ft).
3) Optional DRIVE-CLiQ M12/IP67 cabinet bushing (6FX2003-0DT67).
4) Optional DRIVE-CLiQ RJ45/IP67 coupler (6SL3066-2DA00-0AB0), max. 3 couplers permissible with derating (total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...) - 5 m (16.4 ft) per coupler).
5) Optional DME20 DRIVE-CLiQ Hub Module RJ45/IP67 (6SL3055-0AA00-6AB0), max. 2 DME20 Hub Modules possible.
6) Optional DRIVE-CLiQ RJ45/IP67, RJ45/IP20 cabinet bushing (6SL3066-2DA00-0AA0).
7) Max. 4 M17 disconnection points permissible without derating.
8) Optional mounting flange (6FX2003-7HX00).
9) Optional DRIVE-CLiQ cable 6FX.002-2DC44-.....
10) Total permissible cable length ≤ 100 m (328 ft) (6FX5...) or ≤ 75 m (246 ft) (6FX8...).

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Power connectors/power and signal connectors for SIMOTICS T-1FW6 built-in torque motors

Overview



Power connector with screw-type connection

3 A to 30 A Motor Modules in booksize format are shipped without power connector, as this is already connected to the MOTION-CONNECT power cables.

Power connectors can also be ordered separately, e.g. for applications where installation of the motor cable would be difficult if a power connector were attached.

Selection and ordering data

Description	Article No.
Power connector For Motor Modules 3 … 30 A booksize format with screw-type connection (enclosure, insulator, 4 coding pins and 1 interlock bolt, screw-type connections Motor: 1.5 ... 10 mm^2, Holding brake: 1.5 mm^2)	**6SL3162-2MA00-0AA0**

Overview



Power and signal connectors for SIMOTICS T-1FW6 built-in torque motors

Power and signal connectors 6FX2003 are designed to ensure optimum connection of SIMOTICS T-1FW6 built-in torque motors to the drive system.

Selection and ordering data

Description	Article No.
Power connectors for SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2 connectors with pins and full external thread	**6FX2003-0LA00**
• Size 1.5 for 4 × 4 mm^2/4 × 6 mm^2/ 4 × 10 mm^2/4 × 16 mm^2 connectors with pins and full external thread	**6FX2003-0LA10**
Signal connector for SIMOTICS T-1FW6 built-in torque motors	
• M17 for 5 × 0.5 mm^2 + 1 × 1.0 mm^2 connectors with sockets and full-thread cap nut	**6FX2003-0SU07**

More information

A special tool is needed to crimp the contacts.
For further information, please go to:
www.intercontec.biz

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Overview



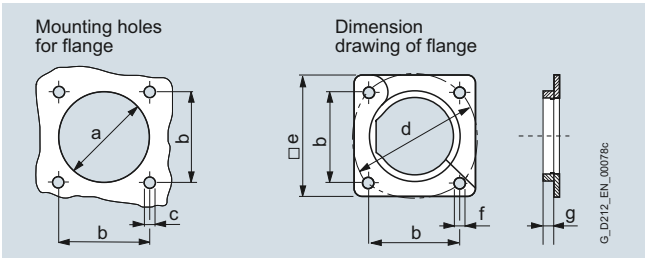
Mounting flange for power connectors

Mounting flanges are used to route or fix connectors in IP67 degree of protection, for example, in control cabinets. With the exception of angled connectors, a mounting flange can be retro-mounted on connectors with a cap nut or with external thread.

Selection and ordering data

Description	Article No.
Mounting flange for	
• Power connector, size 0.5 and signal connector M17	**6FX2003-7HX00**
• Power connector, size 1	**6FX2003-7BX00**
• Power connector, size 1.5	**6FX2003-7CX00**
• Power connector, size 3	**6FX2003-7AX00**
• Signal connector M23	**6FX2003-7DX00**

Dimensional drawings



Dimensions	Power connector				Signal connector	
	Connector size 0.5	Connector size 1	Connector size 1.5	Connector size 3	M17	M23
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
a	Ø 23 (0.91)	Ø 28.6 (1.13)	Ø 47 (1.85)	Ø 66 (2.6)	Ø 23 (0.91)	Ø 27.6 (1.09)
b	22.6 (0.89)	28.3 (1.11)	42.4 (1.67)	75 (2.95)	22.6 (0.89)	28.3 (1.11)
c	4 × M2.5	4 × M3	4 × M4	4 × M4	4 × M2.5	4 × M3
d	Ø 32 (1.26)	Ø 40 (1.57)	Ø 60 (2.36)	Ø 63 (2.48)	Ø 32 (1.26)	Ø 40 (1.57)
e	32 (1.26)	35 (1.38)	55 (2.17)	84.9 (3.34)	32 (1.26)	35 (1.38)
f	M3	M4	M5	M6	M3	M4
g	6.5 (0.26)	6.5 (0.26)	7 (0.28)	10 (0.39)	6.5 (0.26)	6.5 (0.26)

Overview



HF (high-frequency) clamp for power connectors

To ensure correct grounding at the cable duct or cabinet wall, a ground clamp is optionally available together with the flanges for large-area discharging of high-frequency interferences. An HF (high-frequency) clamp is not required for size 3 power connectors.

Selection and ordering data

Description	Article No.
HF (high-frequency) clamp for	
• Power connector, size 0.5 and signal connector M17	**6FX2003-7FA00**
• Power connector, size 1 and signal connector M23	**6FX2003-7FX00**
• Power connector, size 1.5	**6FX2003-7GX00**

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DRIVE-CLiQ cabinet bushing (RJ45)/DRIVE-CLiQ cabinet bushing (M12)

Overview



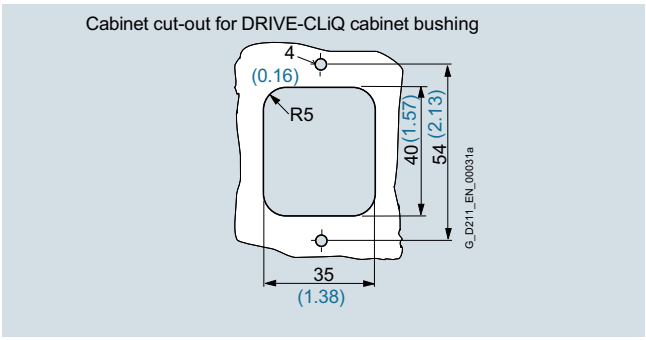
DRIVE-CLiQ cabinet bushing for signal cables (RJ45)

The DRIVE-CLiQ cabinet bushing (RJ45) provides the high IP67 degree of protection for the appropriate MOTION-CONNECT DRIVE-CLiQ signal cables routed through openings in control cabinets. The DRIVE-CLiQ cabinet bushing has IP54 degree of protection on the outside and IP20 on the inside of the control cabinet.

Selection and ordering data

Description	Article No.
DRIVE-CLiQ cabinet bushing For MOTION-CONNECT DRIVE-CLiQ signal cables (RJ45)	**6SL3066-2DA00-0AA0**

Dimensional drawings



Dimensions in mm (in)

Overview



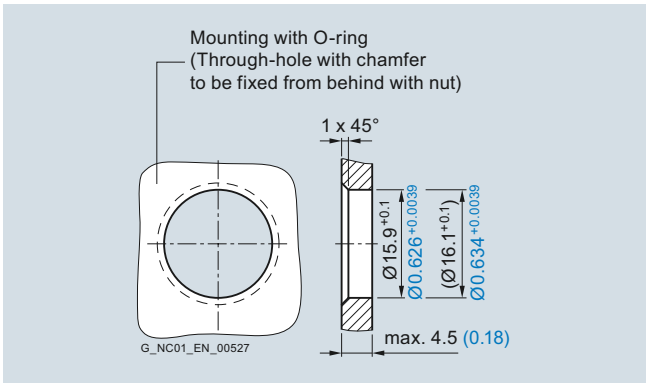
DRIVE-CLiQ cabinet bushing for signal cables (M12)

The DRIVE-CLiQ cabinet bushing (M12) provides the high IP67 degree of protection for the appropriate MOTION-CONNECT DRIVE-CLiQ signal cables routed through openings in control cabinets. The DRIVE-CLiQ cabinet bushing (M12) has degree of protection IP67 at both ends and is designed as a socket with internal thread on the outside of the cabinet and as pins with a external thread on the inside of the cabinet.

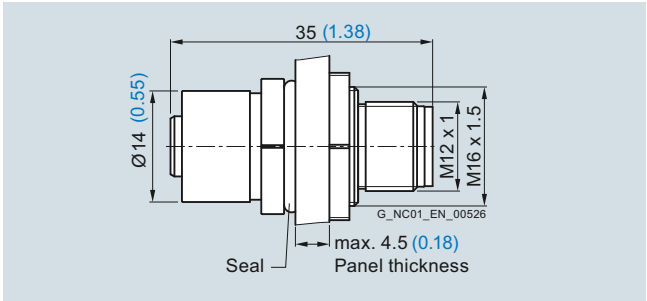
Selection and ordering data

Description	Article No.
DRIVE-CLiQ cabinet bushing For MOTION-CONNECT DRIVE-CLiQ signal cables (M12)	**6FX2003-0DT67**

Dimensional drawings



Dimensions in mm (in)



Cutout in cabinet for DRIVE-CLiQ cabinet bushing

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Overview



DRIVE-CLiQ coupler for signal cables

The DRIVE-CLiQ coupler makes it possible to join two MOTION-CONNECT DRIVE-CLiQ signal cables with degree of protection IP67.

Selection and ordering data

Description	Article No.
DRIVE-CLiQ coupler For MOTION-CONNECT DRIVE-CLiQ signal cables	**6SL3066-2DA00-0AB0**

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Notes

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8/19 Stock reduction in spare parts store
8/19 Extended spare part availability

8/20 Industry Services

8/24 SIDOOR
8/24 Automatic door control for machine tools

8/25 Sinorix al-deco PLUS
8/25 Object protection systems for machine tools

8/26 mz robolab GmbH
8/26 rcs1 robot control

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8/30 Training equipment
8/30 SINUMERIK 840D sl training case
8/30 SINUMERIK 840D sl OP training case
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Overview



SINUMERIK Manufacturing Excellence – the portfolio of services for your machines and processes

Innovative services for machines offer enormous potential for optimizing the lifecycle costs. Siemens accompanies machines over the complete lifecycle – from the initial idea and design to operation and retrofit.

The service package SINUMERIK Manufacturing Excellence plays an important role in optimizing the manufacturing process – regardless of the technologies used, the degree of automation, and the planning and manufacturing strategies.

Benefits

For the machine manufacturer:

- Shorter machine development time
- Cost-optimized machine development
- Better machine servicing
- Machines with optimized dynamic response
- Creation of new service potentials
- Reduced warranty costs

For the machine operator:

- Reduced costs per item
- Process optimization
- Increased availability and productivity
- Quality optimization

More information

More information is available on the Internet at:

www.siemens.com/sinumerik/manufacturing-excellence

or please contact your local Siemens sales office or Regional Company.

Contact information can be found on the Internet at:

www.siemens.com/automation/partner

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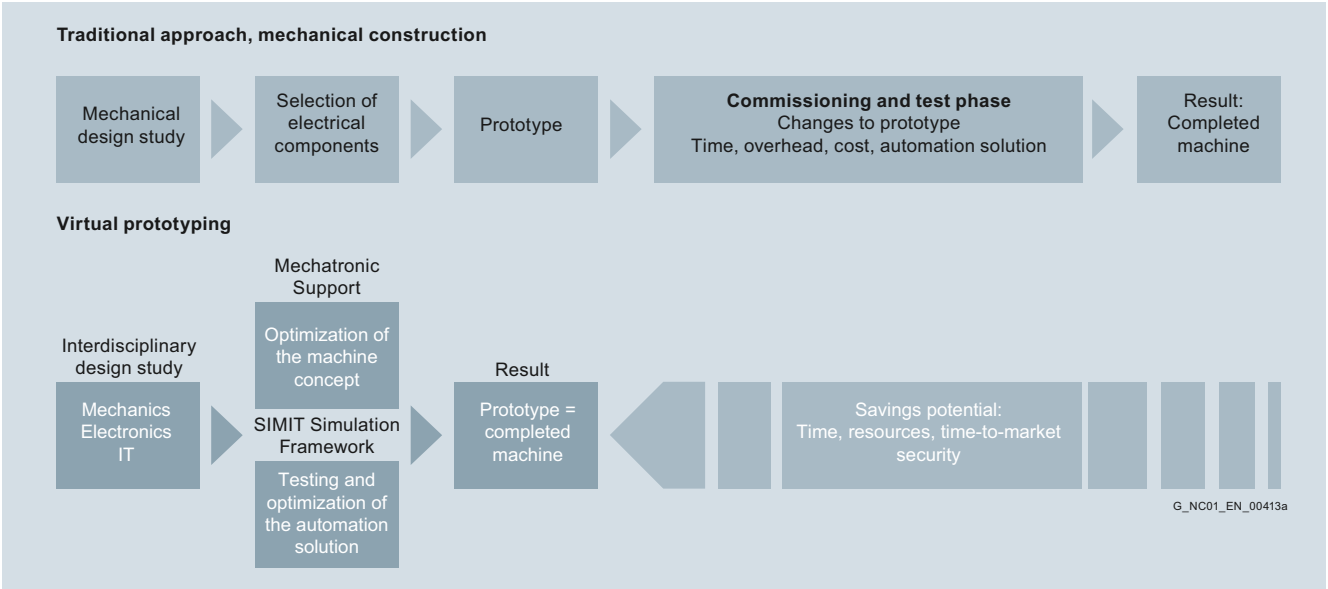
Overview

Achieve the next generation of machines faster using Machine Development

The Machine Development module has been developed in the context of SINUMERIK Manufacturing Excellence for the simulation, construction and commissioning of machines. Here, we meet the demands of machine manufacturers to minimize development risk. In addition, the first machine prototype is available much more quickly than in the traditional sequential development process.

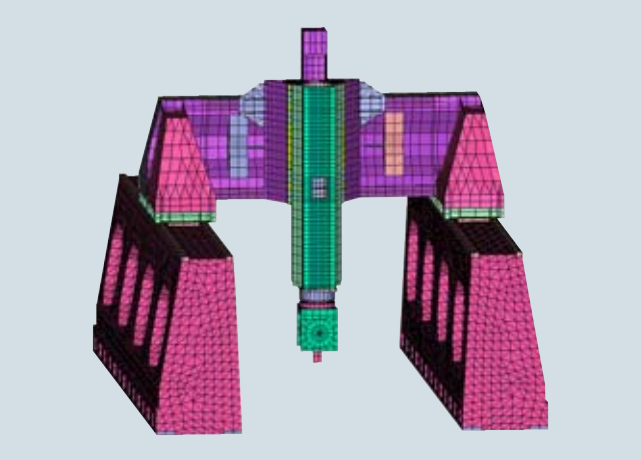
In the simplest case, we can advise you on drive design and dimensioning. Our services can also go as far as the development of the control, operation or safety concept of a new machine, configuration of the control cabinet, or complete PLC/CNC/HMI programming.





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Overview



Achieve the optimum machine quicker and more efficiently with Mechatronic Support

The Mechatronic Support service ensures that already at the design stage of new machines, all the systems involved in mechanics, electronics, and IT are tested and optimized in a simulation environment in terms of their functionality and interaction, before they are actually built.

Mechatronic Support is thus the intelligent alternative to "trial and error". Innovative machine concepts are mutually compared, modified and optimized at the outset – a process which of course also takes account of your ideas for new mechatronic components.

Virtual simulation, real construction

With the help of the Mechatronic Support service, machinery ideas and new developments can be mechatronically tested and modified in a short time at low expense. The first real prototype can be built immediately afterwards as a functioning machine.

As the machine manufacturer, you have the benefit of shorter development phases and faster time-to-market; or as the end customer, you benefit from an optimized high-performance machine solution.

Benefits

- Shorter development times – shorter time to market
- Reliable achievement of development objectives
- Risk-free testing of innovative machine concepts
- Higher quality and productivity from the outset
- Get to the finished machine more quickly with specialist support

Selection and ordering data

Description	Type
Consultation Technical consultation with customer	**6FC5088-1....**
Machine analysis and optimization Analysis of the machine and its limits. Recommendations for manufacturer	**6FC5088-3....**
Machine simulation Simulation of individual axes and the dynamic response on the machine	**6FC5088-4....**

More information

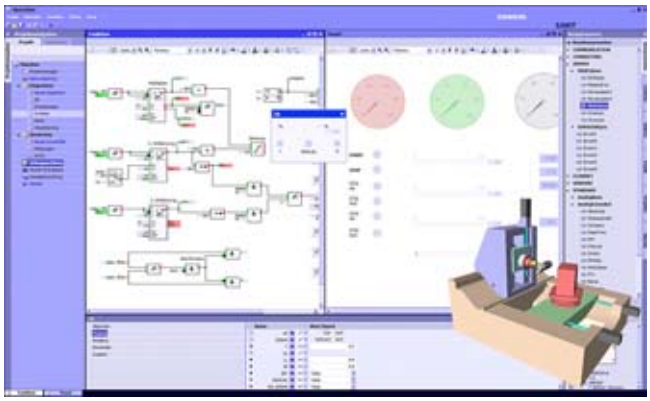
Please contact your local Siemens sales office or representative for more information.

Contact information is available on the Internet at:

www.siemens.com/automation/partner

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Overview



SIMIT for simulating new machines during development

SIMIT allows you to simulate the interaction between your machine tool or production machine and your automation system at all stages of product development, from commissioning through to sales and after-sales.

Long before you finish developing a machine and building a prototype, you can simulate its performance using SIMIT. For this purpose, the automation system is simply coupled with a virtual behavioral model of the machine. This coupling has been optimized for high-performance machine tools and production machines with state-of-the-art control technology from Siemens such as SINUMERIK and SIMATIC.

Your automation system – fully integrated

SIMIT is a simulation system that supports a wide range of hardware and software interfaces to the automation system: PROFIBUS, PROFINET, PRODAVE, PLCSIM, OPC, and Shared Memory. If you want to connect the entire Control Unit, e.g. including the CNC, PLC and the Human Machine Interface to a machine model in SIMIT, you can simply use a hardware interface for PROFIBUS. The axis values of the CNC are transferred to the PLC using the software option SINUMERIK Integrate for engineering Run MyCC /ADAS and thus become visible for SIMIT. SIMIT provides consistent support for the exchange of data with the engineering environment of your automation system.

The 2-channel interface module IM-PBDP-2 simulates PROFIBUS DP standard slaves and SIMATIC S7 slaves, including fail-safe SIMATIC slaves. Up to 125 DP slaves in a DP master system can be simulated per channel. The interface module is connected to the PC via Ethernet.

Overview (continued)

SIMIT makes simulation as simple as it can be

Even though computer simulation is often regarded as a highly complex process, you do not need to be a simulation specialist to work effectively with SIMIT. All you need to do is operate the ergonomically designed, graphical user interface of SIMIT, while the application itself processes all mathematical and IT procedures associated with the simulation invisibly in the background. Furthermore, a 3D VRML Viewer (integrated in SIMIT) permits simple visualization of machines and plants.

In addition, the shared-memory interface SIMIT Ultimate can also be connected to tools such as the Siemens PLM Mechatronics Concept Designer – for extensive 3-D physical simulation.

SIMIT – modeling the machine

Based on a modular principle, the simulation model of the machine is created on the SIMIT graphical user interface by the joining together of individual components and Control Units. Simulation elements are simply dragged from the library and dropped into the machine model. The extensive basic library supplied with SIMIT provides you not only with standard arithmetic and logic functions, but also blocks for interfacing a broad range of I/Os of your automation system.

Using SIMIT's component type editor, you can create completely new types of component and use them in your simulations. You can freely define the connections and states of these component types as well as the functional and graphical response, allowing you to work extremely efficiently even when your machine models are complex.

Benefits

- SIMIT combines savings in time and cost with enhanced product quality in machine tool and production machine building. SIMIT supports you during key phases of the development of machine tool and production machine products: development, commissioning, testing, and service.
- The automation solution used, including all of the software modules developed by the machine manufacturer, can be tested with SIMIT in advance and in a reproducible manner – all without having the real "steel and iron" version of the machine at hand.
- A new machine can be tested without being subjected to any risk since proper functioning is checked in virtual reality. After the development work on the new machine has been completed, the virtual machine that has been generated can also be used for training, pre-sales and after-sales purposes.

Integration

Requirements:

- Operating system:
  - Windows 7 Professional 32 bit/64 bit
  - Windows 7 Ultimate 32 bit/64 bit
- Software option
  SINUMERIK Integrate for engineering Run MyCC /ADAS
  Axis data output via PROFIBUS

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SIMIT – Simulation platform for virtual commissioning

Function

SIMIT Simulation Software	Standard	Professional	Ultimate
Standard components library	✓	✓	✓
3D viewer based on the Virtual Reality Modeling Language VRML	✓	✓	✓
Interfaces for PROFIBUS DP, PROFINET IO, and PRODAVE	✓	✓	✓
Trends and messages	✓	✓	✓
Scripting environment	✓	✓	✓
Editor for the creation of macro components	✓	✓	✓
Editor for the creation of dynamic graphics and animations	✓	✓	✓
Automatic Control Interface and scripts	✓	✓	✓
Automatic generation of signal lists from SIMATIC Manager data	✓	✓	✓
Runtime for components developed using SIMIT Ultimate	✓	✓	✓
SIMATIC S7-PLCSIM and OPC interfaces	–	✓	✓
Automatic generation of the actuator/sensor level based on templates/typicals	–	✓	✓
Changes during the simulation runtime	–	✓	✓
Automatic Control Interface and virtual time management	–	✓	✓
Shared Memory interface as high-performance coupling	–	–	✓
XML interface for the automatic generation of models and connections	–	–	✓
Development environment for own components CTE	–	–	✓

You can perfectly adapt SIMIT to your individual requirements by means of three software packages with graded functionality and scope.

Customers who are already using the SIMIT/SINUMERIK Machine Simulator have the following upgrade options:

- Generally, all customers can select one of the three SIMIT packages
- With regard to functionality, SIMIT/SINUMERIK MS BASIC is replaced by SIMIT Standard
- SIMIT/SINUMERIK MS OPEN is replaced by SIMIT Ultimate with regard to functionality

More information

You can find additional information on the Internet at:

www.siemens.com/simit

Or please contact:

Siemens AG

SIMIT Infoline

E-mail: simit@siemens.com

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Selection and ordering data

Description	Article No.
SIMIT Simulation Software For operating systems Windows 7 Professional/Ultimate (32 bit/64 bit) Engineering software, software class A Floating license for 1 user Type of delivery: Software and electronic documentation on CD-ROM, Certificate of License, license key dongle[1] Languages: English, German	
• Standard V8.1	**6DL5260-0AX18-0YA5**
• Professional V8.1	**6DL5260-0BX18-0YA5**
• Ultimate V8.1	**6DL5260-0CX18-0YA5**
SIMIT Demo Software V8.1 For operating systems Windows 7 Professional/Ultimate (32 bit/64 bit) Engineering software, software class A Type of delivery: Software and electronic documentation on CD-ROM[2] Languages: English, German	**6DL5260-0AX18-0YT8**
SIMIT Software Update Service For SIMIT Simulation Software Subscription contract for 1 year with automatic renewal[3] Requirement: up-to-date software version	
• Standard	**6DL5260-0AX00-0YL8**
• Professional	**6DL5260-0BX00-0YL8**
• Ultimate	**6DL5260-0CX00-0YL8**

Description	Article No.
SIMIT Simulation Software Upgrade from V7.1 to V8.1 For operating systems Windows 7 Professional/Ultimate (32 bit/64 bit) Engineering software, software class A Floating license for 1 user Type of delivery: Software and electronic documentation on CD-ROM, Certificate of License[4] Languages: English, German	
• Standard	**6DL5260-0AX18-0YF5**
• Professional	**6DL5260-0BX18-0YF5**
• Ultimate	**6DL5260-0CX18-0YF5**
SIMIT Simulation Software Upgrade from V8.0 to V8.1 For operating systems Windows 7 Professional/Ultimate (32 bit/64 bit) Engineering software, software class A Floating license for 1 user Type of delivery: Software and electronic documentation on CD-ROM, Certificate of License[4] Languages: English, German	
• Standard	**6DL5260-0AX18-0YE5**
• Professional	**6DL5260-0BX18-0YE5**
• Ultimate	**6DL5260-0CX18-0YE5**
SIMIT interface module IM-PBDP-2[5] 2-channel interface module for SIMIT For simulating up to 125 PROFIBUS DP slaves in a PROFIBUS DP master system per channel	**9AE4122-1AA00**
SIMIT Consulting Consulting on a daily basis, customer-specific training Type of delivery: written contract	**9AP1471-2AD00**

1) Use only in connection with valid license/dongle.

2) Limited functionality – no liability or warranty.

3) Under this contract, you receive all current software versions for a period of 1 year. The contract is automatically extended by a further year unless canceled 3 months prior to expiration. Period of delivery and service: 1 year from date of invoice.

4) Use only in connection with valid SIMIT V7.1 or V8.0 license/dongle. Activation through SIMIT license hotline required.

5) When ordering, please refer to use with SIMIT V8.1. Identical in design with simulation unit PROFIBUS.

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Overview



Optimize production with integrated IT processes

Within the framework of SINUMERIK Manufacturing Excellence, Manufacturing IT Services offer you a holistic approach for optimizing your production-related processes involving machine tools with integrated IT solutions.

The building blocks are the IT products from SINUMERIK Integrate for production and extensive consultancy services for IT security and data security. We support you with our know-how during project implementation and operation of your solution.

Manufacturing IT Services support your production and service processes with a wide range of consistently coordinated modular services that are based on SINUMERIK Integrate for production.

This package represents a perfectly tailored range of services for implementing SINUMERIK Integrate for production in production facilities.

Manufacturing IT Services provide assistance during all life cycle phases of a production plant, from planning and consultation to modernization.

Overview (continued)

Service

Internet service platform with SINUMERIK Integrate

Siemens is offering the functions and services described above, including the entire IT infrastructure, based on a “cloud” model:

The service platform supports you with:

- Maintaining availability of data and software functionality between different companies
- Assuring security for data access
- Avoiding the need to change the security guidelines of participating companies

The infrastructure and services are compatible with today's IT security regulations. Periodic security audits ensure that our systems are always up-to-date in terms of security technology.

Additional advantages:

- Low IT costs, and therefore cost-effective from the first machine onwards
- Accounting and investment security due to fixed prices
- High level of data security due to extremely fault-tolerant servers and multi-level access protection

Siemens helps operators to set up and run a help desk.

For more information, please contact your Siemens sales office. Contact information is available on the Internet at:

www.siemens.com/automation/partner

More information

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered.

For more information about industrial security, visit
www.siemens.com/industrialsecurity

To stay informed about product updates as they occur, sign up for a product-specific newsletter.

For more information, visit
support.industry.siemens.com

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Overview

Calculable costs for maintenance and service

This is what we are offering to machine tool manufacturers, machine distributors and machine tool users with the Extended Machine Contracts option.

In these individually agreed contracts, maintenance concepts are assembled from the following modules: preventative measures, repair, access to Siemens service personnel, service intervals, and spare parts logistics/management.

Here, Siemens accepts the risk of costs through fixed-price invoicing of the services provided (contract cost). With the sole objective of providing tailor-made, efficient support with maintenance.

You remove the risk of unexpected costs and can rely on a high degree of machine availability. The joint agreement ensures access to qualified Siemens service personnel for fault elimination on site as well as professional spare parts logistics, which ensures proximity to the customer.

Additional advantages:

- Security of planning, reduced costs and transparency of costs
- Higher productivity thanks to minimal downtimes
- Service packages tailored to requirements
- Supplementing and supporting the service personnel at the manufacturer or end user
- Access to the worldwide service structure of Siemens AG

Repair Service Contract RSC: Subsequent repairs at fixed prices

We have developed the Repair Service Contract RSC especially for machine manufacturers and machine distributors. It offers subsequent rectification of defects at the site of the machine at fixed prices. With these contract-based services, you can cover the personnel costs and materials costs that are incurred for rectifying any faults on our products after the second commissioning phase at the end customer. The service period can be freely selected.

The personnel services comprise the provision of service personnel, error diagnostics and fault rectification on site as well as verification of fault rectification. The runtime of the contract can extend the period of liability for defects to up to 5 years.

In the case of services that exceed the RSC scope, you can use the regional service or add-on services. This includes extended service periods, agreed response times and preventative measures.

The benefits of the Repair Service Contract RSC:

- Risks that result from liability for defects are limited by fixed prices
- Fault rectification at the installation site of the machine, without the need for verification of the defect by the machine tool manufacturer or distributor
- Reduced downtimes at the customer site due to stored product data and final destination information

Overview (continued)

LSC local service contract: the modular service package

With the LSC local service contract, we offer machine users an individual, modular service package that ensures the availability of machine tools and manufacturing systems to a considerable extent and therefore makes an important contribution to efficient production.
The scope of the service contract is individually matched to the service concept. We can also offer you our contract-based services outside normal office hours – up to 24 hours a day, 365 days a year. Alternatively, we can offer you our services with faster response times: from the normal "next day" to a 4-hour response time.

The benefits of the local service contract LSC:

- Assured availability through reduction of the machine downtimes
- Plannable costs thanks to agreed service contract prices
- Services tailored to requirements

Life Cycle Check

Our Life Cycle Check service assists you in optimizing your spare parts strategy so as to safeguard your productivity.

Life Cycle Check – Data acquisition

Acquisition of all modules in your installation which have control or drive relevance.

Life Cycle Check – Analysis

- The acquired Siemens modules are analyzed with respect to their availability as a spare/replacement or repair part. Information about estimated phase-out and discontinuation dates and possible follow-on types is collected and recorded in a report.
- Support for an optimum spare parts strategy:
  - Demand-based ordering of the Siemens spare parts service
  - Optimization of customer's spare parts inventory (stock reduction)
  - Buyback of spare parts by Siemens on request
  - Punctual availability of upgrades
  - Definition of follow-on solutions/general overhaul
  - Retrofit scheduling

As part of the local service contract, a Life Cycle Check analysis is performed once a year and we will send you a report which specifies the spare parts availability of your components which you can use as a guide for adjusting your spare parts inventory.

The Benefits of the Life Cycle Check:

- Increased productivity because plant outages are rare: An optimized spare parts supply keeps downtimes to a minimum
- Reduction in asset and warehousing costs: Use of the Siemens spare parts service
- You only store selected spare parts on site: Reduce stocks of superfluous parts
- Extension of the plant lifecycle: Installation of suitable follow-on types

We also offer further services – for example, we compare the components in your spare parts stores with the components installed on your machines and inform you by way of a report of any components held in your stores which have become obsolete for your machines. Or we will show you which of the stored components are compatible as spare parts so that you can reduce your inventory accordingly.

More information

Please contact your local Siemens sales office or Regional Company for more information.

Contact information can be found on the Internet at:
www.siemens.com/automation/partner

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Overview



RSC description of performance

Siemens AG provides for the machine manufacturer and dealer (in the following referred to as the "Customer") at the installation site of the machine the services specified below under Scope of services for components from Siemens DF & PD contained in the parts list of the RSC Certificate.

The RSC is ordered by the Customer who states the required article numbers that can be obtained from the Siemens sales partners or found in catalogs and the Industry Mall. The Customer receives from Siemens a certificate of delivery, which thus signifies the conclusion of the RSC.

After the Customer has provided the final destination notification, Siemens sends the Customer an RSC Certificate detailing the place of performance and the service period.

The services to be provided by Siemens are requested via a service order from the Customer. The service order must be submitted within the service period of the RSC.

Place of performance

The specified service is provided at the installation site of the machine (hereinafter referred to as "on-site"). This corresponds to the country of the end customer and the latter's full address, as specified in the final destination notification. Services covered by this RSC shall only be provided in those countries named in the RSC country list.

Scope of services

The following services shall be provided:

- Provision of service personnel
  Siemens provides qualified personnel for the purpose of fault diagnostics and/or fault correction. The services are provided during the normal regional working hours in the country of installation.
- On-site fault diagnostics
  Fault diagnostics applies to components from Siemens DF & PD as stated in the parts list in the RSC Certificate.
- Fault correction on site
  Fault correction is carried out by repairing and/or replacing defective components from Siemens DF & PD.
- Documentation of the fault correction
  A service report is prepared on-site in the language of the end customer and shall be signed by the end customer. A copy of the report remains with the end customer.

Contract periods / service period

The RSC is offered for the period of liability (warranty period) of the Siemens customers to their end customers. Different RSC periods permit various market requirements to be addressed.

The service period of the RSC begins on the date notified to Siemens in the final destination notification when commissioning has been completed at the end customer's site and ends on expiry of the selected RSC term. The beginning and end of the service period are stated in the RSC Certificate[1)].

RSC Certificate

The Customer is provided with an RSC Certificate once the final destination notification has been handed over. This certificate shall contain the contract number and essential contract data such as machine number, machine type, parts list, beginning and end of the service period and the place of performance (address for the provision of services.)

Service exclusions

The following is not included in the services:

- Complete motor spindles
- Services cannot be provided for wearing parts after the first 12 months of the service period.
- Machine commissioning or optimization
- Masonry work, metalwork, breaking work and other non-electrical work
- Fault diagnostics and fault correction relating to faults that have occurred as a result of:
  - Non-compliance with the Siemens engineering and user guidelines, e.g. incorrect installation or grounding and incorrect operation or other improper treatment
  - Function-critical contamination, e.g. oil, conductive materials, rust
  - Mechanical damage
  - External electrical influences, e.g. effects of overvoltage, non-reactor-protected power factor correction
  - Wanton destruction
  - Force majeure

1) For example, in the case of an RSC with 12 months contract period, maximum of 24 months from the transfer of risk (delivery of the components).

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Overview (continued)

Country list

A repair service is offered for the following countries:

Continent	Country/region
Country group 1	
Americas	Mexico, USA
Asia	China, India, Japan, South Korea, Taiwan, Thailand
Australia	Australia
Europe	Andorra, Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Liechtenstein, Luxembourg, Monaco, the Netherlands, Poland, Portugal, Rumania, Slovakia, Spain, Sweden, Switzerland, Turkey
Country group 2	
Africa	South Africa
Americas	Brazil, Canada
Asia	Indonesia, Israel, Malaysia, Singapore
Australia	New Zealand
Europe	Bosnia-Herzegovina, Bulgaria, Estonia, Ireland, Croatia, Latvia, Lithuania, Norway, Slovenia
Country group 3	
Africa	Egypt
Americas	Argentina, Chile, Columbia, Ecuador, Peru, Venezuela
Asia	Bahrain, Hong Kong, Kuwait, Oman, Qatar, United Arab Emirates (Dubai), Saudi Arabia, Vietnam
Europe	Belarus, Greece, Malta, Russia, Serbia and Montenegro, Ukraine

Countries not listed, for customers with framework contracts only.

Overview (continued)

Response time

The following response times apply in general whenever services are provided under the RSC in the event of a machine standstill:

Country group	
CG 1	Next working day
CG 2	Within two working days
CG 3	Depending on country-specific conditions
Countries not listed	Depending on country-specific conditions, only for customers with framework contracts for the price of the individual contract.

The response time is defined as the time between Siemens receiving the service order, technically clarified in advance by the Customer, and the Siemens service personnel commencing his travel to the place of performance or until troubleshooting commences using teleservice. The response times given apply to technically clarified service orders within the normal working hours of the region (e.g. Monday to Friday 8:00 to 17:00) excluding public holidays.

Spare parts

Spare parts are provided from our central spare parts warehouse or from regional spare parts warehouses using our worldwide spare parts logistics infrastructure. All of the essential spare parts are stocked in our central spare parts stores. Regional spare parts warehouses are adapted to include the components specified in the final destination certificate[1)].

The following components are not defined as spare parts:

- Motors: They are repaired at an authorized repair workshop For selected motors, Siemens in Germany stocks components for express delivery. These motors can be manufactured and delivered within a few working days. You can obtain the current list from your Siemens sales partner.
- Cables: The delivery times known to you usually apply.
- Special or customer-specific modules and components not available from Siemens as spare parts.

The RSC shall only be processed in accordance with the terms and conditions applying to repair service contracts (RSC).

www.siemens.com/automation/rscagb

Benefits

- Protection against unknown costs with a fixed price
- RSC can be synchronized with the machine warranty period
- Planning certainty and calculable costs
- Easier processing of servicing jobs
- High machine availability thanks to a fast response to machine faults (contract priority)
- Reduced downtime thanks to stored product, final destination and contract information
- RSC can be ordered for machine deliveries to numerous countries
- Worldwide service infrastruture with experienced service personnel

1) Since the export of standard versions (components/system) is subject to a time-consuming official approval procedure, which applies in equal measure to the supply of such components for the purpose of servicing and spare parts supply, we offer **an export version** for individual components. This has usually less options than the standard version of the component and is not subject to an export authorization. Please note the **information about export.**

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Repair Service Contract RSC

Overview

Data handling

To simplify data handling, information relating to the final destination certificate for SINUMERIK Operate and later products can be stored on the CNC control. The PC tool identSNAPSHOT is needed in order to transfer the data to Siemens. The PC tool can be run directly without installing it on a computer and is available on the Internet at:

www.siemens.com/sinumerik/register

The PC tool can also be used to generate final destination certificates for older versions of SINUMERIK CNC and offers various methods for acquiring machine parts lists. The PC tool is also capable of generating machine logbooks in PDF format. The generated data can also be kept with the machine as data backup.

For further information about identSNAPSHOT and handling the parts list of components used, please contact your Siemens sales office or Regional Company.

Extension of an RSC

An RSC that has already commenced can be extended once by 6 or 12 months. The extension must be applied for during the service period of the RSC. The Customer is issued with a new RSC Certificate for this purpose.

Contract versions

The framework contract is for machine manufacturers who agree to order one RSC for all machines with Siemens equipment.

The individual contract is for machine manufacturers who order an RSC only for certain machines equipped by Siemens.

OEM service levels

To guarantee repair service for OEM applications, an assessment is necessary based on the OEM service guideline. The assessment grades the OEM application from 0 to 4. A surcharge will be levied for OEM service levels 1 to 4.

Selection and ordering data

Description	Article No.
Repair Service Contract RSC	
For Siemens DF & PD components on machine tools for countries in country groups 1 to 3	
• 12 month contract period[1]	**6FC8506-1 ■ X0 ■ -0AA0**
• 24 month contract period[2]	**6FC8506-2 ■ X0 ■ -0AA0**
• Framework contract	**R**
• Individual contract	**E**
• 0 to 4 measuring circuits[3]	**1**
• 5 to 6 measuring circuits[3]	**2**
• 7 to 8 measuring circuits[3]	**3**
• 9 measuring circuits[3] (basis for ≥ 9 measuring circuits)	**8**
• > 9 measuring circuits[3] (measuring circuit surcharge for RSC > 9 measuring circuits[4])	**0**
Contract extension by 6 or 12 months for Repair Service Contract RSC	
For Siemens DF & PD components on machine tools for countries in country groups 1 to 3	
• Basic RSC 12 months	**6FC8506-0 ■ X0 ■ - ■ AA1**
• Basic RSC 24 months	**6FC8506-0 ■ X0 ■ - ■ AA2**
• Framework contract	**R**
• Individual contract	**E**
• 0 to 4 measuring circuits[3]	**1**
• 5 to 6 measuring circuits[3]	**2**
• 7 to 8 measuring circuits[3]	**3**
• 9 measuring circuits[3] (basis for ≥ 9 measuring circuits)	**8**
• > 9 measuring circuits[3] (measuring circuit surcharge for RSC > 9 measuring circuits[4])	**0**
Contract extension (possible once per basic RSC)	
• By 6 months	**6**
• By 12 months	**1**
OEM service levels	
Surcharge for Repair Service Contract for Siemens components on machine tools with OEM applications. Measuring circuits 1 to n for countries in country groups 1 to 4	
• Surcharge for OEM service level 1	**6FC8506-3SX01-0AA0**
• Surcharge for OEM service level 2	**6FC8506-3SX02-0AA0**
• Surcharge for OEM service level 3	**6FC8506-3SX03-0AA0**
• Surcharge for OEM service level 4	**6FC8506-3SX04-0AA0**

1) Max. 24 months from the transfer of risk (delivery of components).
2) Max. 36 months from the transfer of risk (delivery of components).
3) Physical axes and spindles count as measuring circuits.
4) Example for 17 measuring circuits: 1 x (basis for ≥ 9 measuring circuits) plus 8 x (measuring circuit surcharge for RSC > 9 measuring circuits).

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Overview



Productivity Improvement

Productivity Improvement aims to improve the productivity of older machine tools with SINUMERIK 840D whose warranty period has expired. Productivity Improvement can enhance their productivity by up to around 15 %.

When is Productivity Improvement viable?

In general, Productivity Improvement pays for itself in the case of machines that are used intensively, e.g. in 2 or 3-shift operation, with high numbers of machine service hours, or long running times per part. Overall, the lifecycle costs are reduced and the manufactured quantities are increased.

Overview (continued)

Where is Productivity Improvement applied?

The Productivity Improvement service supplied by Siemens starts in the CNC: The higher computing performance achieved by modernization of the control system hardware shortens all system-related dead times and also supports the use of a new software version. This, in turn, incorporates the important technological advances of recent years. On your machines, therefore, high-quality, efficient control algorithms and new productivity-enhancing CNC functions can be used. The desired productivity improvement is often achieved with just these two measures.

Productivity can be improved even further by other measures, e.g. optimization of CNC programs or of a CAD/CAM interface.

All these measures shorten the machining times and downtimes without subjecting the overall mechanical system to higher levels of wear or the electrical system to critical thermal overloading.

How is Productivity Improvement actually performed?

The organizational process for Productivity Improvement follows a defined, quality-assured process:

The general procedure is to disturb normal operation as little as possible.

After the electrical equipment currently in use on your machine tool with SINUMERIK 840D and the machining processes have been documented, the potential for productivity improvement is assessed.

The optimization measures requested by the customer are prepared by Siemens first in the laboratory and verified in a simulation – production at the customer site continues to run normally during this phase. Implementation at the machine is then performed in the shortest possible time.

Benefits

- Selective updating of CNC components (software and hardware)
- Shorter part production time with the same quality level and therefore reduction in unit costs
- Short machine standstill time thanks to systematic and time-optimized project processing
- Suitable for improving the productivity of older machine tools with SINUMERIK 840D

More information

Please contact your local Siemens sales office or representative for more information.

Contact information is available on the Internet at:

www.siemens.com/automation/partner

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Overview



Machine retrofit: before

Machine Retrofit

With Machine Retrofit, Siemens offers machine modernization in which the individual components are modernized and the machine is upgraded to the latest state of the art.

Maintaining efficient productivity

After a machine tool has been in operation for 10 or more years, the condition of its mechanical components is generally still good. In the intervening period, however, there will also have been continuous advances in control and drive engineering – with the development of new functions that allow more precise machining and more energy-efficient, cost-effective production. Retrofits, i.e. the exchange of old for new, offer a means by which innovations of this kind can be exploited for older machines. The secret to a successful retrofit, however, is not just to replace engineering hardware, but to utilize the many benefits offered by modern control and drive systems in order to create new business opportunities for the machine owner. The primary objective in this regard is to find a drive and/or control system retrofit solution that can be perfectly integrated into the existing machine concept. The owner then gets to keep the machine that he trusts – after it has been upgraded to state of the art – but doesn't need to purchase a completely new unit.

Creating planning reliability

From the viewpoint of machine tool owners, it is not only the new potential offered by modern control systems that matters but, more importantly, it is the certainty that an investment in a modernization or upgrade is also an investment in the long-term productivity of the business. This refers in particular to spare parts availability. Spare parts for modern components will naturally remain available for longer into the future than parts for older components. This dilemma can be best illustrated by electronic components containing integrated circuits that are continuing to undergo rapid development and will be replaced by the next generation within a few years.

Higher performance and greater flexibility

The retrofit offering is in no way restricted to the use of the latest SINUMERIK CNCs, SINAMICS drive systems and SIMOTICS motors, but can be expanded by additional services to ensure that the benefits of modernization are fully exploited.

Overview (continued)



Machine retrofit: after

These include, for example, a significant boost to quality and flexibility thanks to the performance of state-of-the-art components, supported by geometric measurement and compensation of dimensional deviations on large machines. Or greater transparency in production planning through use of Siemens PLM software such as NX-CAD/CAM or Teamcenter and SINUMERIK Integrate for production with Manage MyTools and Manage MyPrograms with which tools and CNC programs can be managed and optimally integrated into the production process.

Training courses, repair or service contracts and the implementation of existing CNC part programs contribute as much to ensuring effective exploitation of benefits as precise planning and careful preparation of the retrofit by the skilled service engineers employed by Siemens.

Benefits

- Comprehensive consultation and reliable execution by specialists experienced in the fields of modernization, control and drive technology, machine tool technologies and manufacturing processes
- Tailored modernization concepts designed to maintain or improve productivity
- Increased availability of the machine thanks to reliable long-term spare parts supply and services
- Enhanced operating and programming convenience
- Greater safety for personnel and machinery thanks to Safety Integrated
- Improved energy efficiency with SINUMERIK Ctrl-Energy
- Low-cost alternative to a completely new purchase
- Complete modernization from a single source: From the CNC to the drive and motors, as well as IT integration and mechanical overhaul by Siemens partners
- Reliable, punctual execution
- Extensive additional services and functions

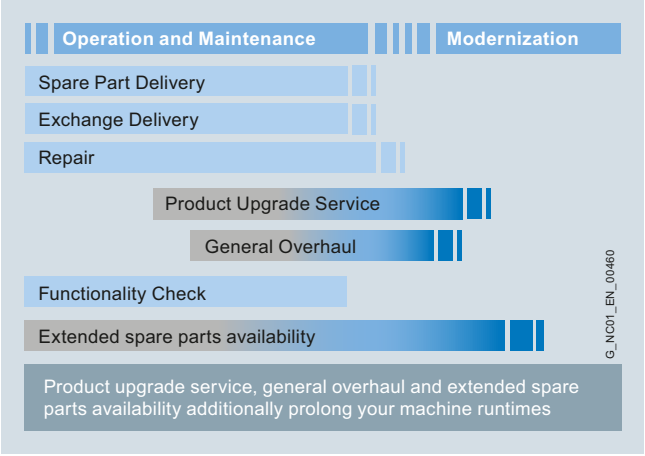
More information

Please contact your local Siemens sales office or representative for more information.
Contact information is available on the Internet at:
www.siemens.com/automation/partner

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Spare parts services during the lifecycle

Overview



Spare parts services during the lifecycle

Siemens also provides constant support to customers after delivery of the machines or plant. This includes spare parts, repairs, as well as other supplementary services, and has a positive effect on machine operating times, inventories and costs.

When customers purchase a high-quality machine or plant, they intend to use it as intensively as possible, preferably for three shifts a day over many years. Under such circumstances, it is normal for parts to fail eventually. It is essential to replace the part as quickly as possible, because every hour of a plant stoppage costs money. To satisfy the multi-faceted requirements in the different areas, we have created comprehensive spare parts services.

Overview (continued)

You can sign up for the spare parts service that suits your requirements perfectly:

- Delivery of spare parts
- Delivery as exchange product
- Repair
- Product upgrade service
- General overhaul
- Function check
- Return of diagnostic parts
- Stock reduction of your spare parts store
- Extended spare part availability

Benefits

- Optimum price/performance ratio and top quality
- Lifecycle management over the complete lifecycle
- Outstanding quality and availability of your machines and plant using Siemens original spare parts
- Global network and optimized logistics chains – 24 hours a day, 365 days a year
- Additional services from Siemens

More information

More information is available on the Internet at:

www.siemens.com/motioncontrol/spareparts

For further information, please approach your contact at your local Siemens office.

Contact information is available on the Internet at:

www.siemens.com/automation/partner

Delivery of spare parts

Overview

In every industry worldwide, plants and systems are required to operate with constantly increasing reliability. Lack of a specific spare part can result in considerable costs. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

Ordering mode	Logistics service	Note
Standard	Cost-optimized: Contracted shipping company	Delivery within the normal national delivery times through the contracted shipping company
Plant stoppage	Time-optimized: Express, courier, collection	You choose the shortest possible delivery time for your own benefit: • Delivery by means of collection or courier service • Delivery by express service
Emergency service	Special logistics: Courier	You can also order the spare parts from us outside normal working hours, as well as on weekends or national holidays round-the-clock. Your delivery will arrive by courier

Benefits

- New liability for defects for the spare part
- Long-term spare parts availability
- Optimum system compatibility

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Delivery as exchange product

Overview

In addition to the simple delivery of spare parts, with many products, we also offer you the option of an exchange. This has the advantage that you not only receive the spare part quickly, but are able to return the defective device to us for a credit. You therefore receive our spare part at the lower exchange price.

A credit will be awarded on condition that the repair code indicates that repurchasing is admissible, a replacement is obtained from the spare parts store, and that the returned product is repairable.

The ordering mode and logistics service determine the delivery of spare parts:

Ordering mode	Logistics service	Note
Standard	Cost-optimized: Contracted shipping company	Delivery within the normal national delivery times through the contracted shipping company
Plant stoppage	Time-optimized: Express, courier, collection	You choose the shortest possible delivery time for your own benefit: • Delivery by means of collection or courier service • Delivery by express service
Emergency service	Special logistics: Courier	You can also order the spare parts from us outside normal working hours, as well as on weekends or national holidays round-the-clock. Your delivery will arrive by courier

Overview (continued)

Return

For returns, we require the following information:

- Reason for return
- If defective: detailed description of the fault
- Machine number
- Machine/system manufacturer
- End customer

We will then be able to provide you with additional information in the repair report/inspection report regarding the diagnosis/inspection as well as information about the completed repair.

Benefits

- Savings thanks to the option of returning defective parts
- A spare part is available immediately in the event of failure
- New liability for defects for the spare part
- Long-term spare parts availability
- Optimum system compatibility

Repair

Overview

Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum – with our worldwide repair facilities. The advantage for you: Defects can be rectified before they cause further harm.

Repair is a favorable option when you have specific reasons for not replacing the defective device or part with a new one (delivery as exchange product).

We maintain a global network of Siemens repair shops and certified partners to ensure that we will always be able to process your repairs quickly.

We can offer you different types of repair depending on your requirements:

Normal repair

Normal repair at standard conditions normally takes 10 working days following receipt of the defective item at our repair shop.

Fast repair

In particularly urgent cases, we offer you the option of a fast repair within 1 or 2 working days for many products at additional cost.

Turnaround repair

With a turnaround repair, we organize on your behalf collection of the device/component to be repaired.

Mobile repair service

We come to you and perform the required repairs on site, for example, when the device/component cannot be removed due to its weight.

Overview (continued)

Function repair

A function repair is the same as a normal repair but excludes the repair of cosmetic defects, e.g. scratches, labels, discoloration. The conditions applicable to function repairs should be observed in this case.

For repairs, we require the following information:

- Reason for return
- If defective: detailed fault report
- Machine number
- Machine/system manufacturer
- End customer

Benefits

- Short downtimes for machines and plants
- Only certified original parts are used
- Additional services from Siemens:
  - Longer availability of your machine/plant through the preventive replacement of wear parts and aging parts
  - Highest standards of quality
  - Use of the comprehensive test concept of series production, including software, firmware, ASICs, complex function blocks, etc.
  - Implementation of all the hardware and software/firmware enhancements known by development, production, service and quality management departments, as well as suppliers
- Information supplied by repair report/inspection report

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Product upgrade service

Overview



Product upgrade service: From OLD to NEW

A long service life is expected from machines and plants. The service life of the electronic components is, however, limited and normally shorter than the planned machine/plant operating times. To ensure that the required extended availability of the machine/plant is achieved, we offer you the product upgrade service at an attractive price.

In the course of their lifecycle, electronic components are normally redesigned/upgraded several times. With the product upgrade service, you will always receive the latest technology.

Overview (continued)

A planned product upgrade from OLD to NEW helps to prevent unplanned machine stoppages and supports a safer and longer machine/plant availability. The upgrade service is mainly offered for older components that will soon be discontinued.

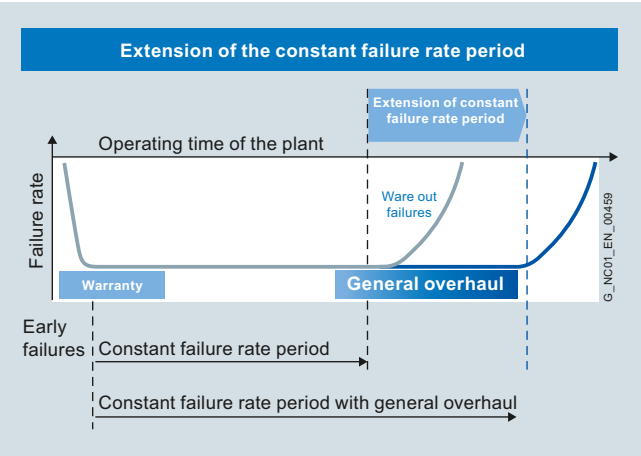
For information about potential upgrades from the latest upgrade list, please ask your regional Siemens contact.

Benefits

- Price benefit through upgrade service
- New liability for defects for the new component
- Extended availability of your machine/plant
- Prevention of component failures due to wear and aging
- Prevention of machine stoppages due to unavailability of spare parts
- Reduced spare parts inventories
- Latest technology
- Easier servicing due to fewer variants
- Industry Services through Siemens are assured for the future

General overhaul

Overview



Extension of the period with a constant failure rate

A long service life is expected from machines and plants. The service life of electronic components and mechanical parts is, however, limited and normally shorter than the planned machine/plant operating times. For higher availability of the machines or plants, we offer a general overhaul (preventive maintenance) for electronic components and motors at favorable conditions.

Overview (continued)

During the planned general overhaul, wear parts and aging parts are replaced in accordance with their stated service life so as to reduce unplanned downtimes. In the case of motors, in addition to a general overhaul, replacement of bearings and encoders is also offered.

If a fault is detected during a general overhaul, troubleshooting and repair will be performed at the repair price without requesting confirmation or interrupting the process. In the case of extensive wear or damage, a general overhaul/repair will not be performed. A fixed lump sum for expenses will be charged in this case.

Benefits

- Preventive replacement of wear parts and aging parts in accordance with their stated service life
- Reduction in unplanned plant stoppages
- Enhanced production reliability
- Extended availability of your machine/plant
- New liability for defects for 12 months for the components subjected to a general overhaul
- Low price

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Function check

Overview

It is checked that the components function reliably.

The first step involves cleaning the component. Then all the hardware and software/firmware enhancements are implemented that are known by development, production, service and quality management departments, as well as suppliers. Using the comprehensive test concept of series production, all the functions of the software, firmware, ASICs, complex and less complex function blocks are checked.

If a fault is detected during the function check, troubleshooting and repair will be performed at the repair price without requesting confirmation or interrupting the process. In the case of extensive wear or damage, no repairs will be performed. A fixed lump sum for expenses will be charged.

Benefits

- The component is checked and can be deployed again
- The component contains all the known improvements
- The customer's own spare parts stock is up-to-date
- Low price

Return of diagnostic parts

Overview



Spare parts used for diagnostic purposes from the spare parts store can be returned within 3 months and a credit note for up to 85 % is issued.

For unused spare parts in their original packaging, you will receive a credit of 100 % in which case you will be charged a fixed price for handling.

Benefits

- Can be used for diagnostics
- Reduced spare parts inventories
- Low costs

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Stock reduction in spare parts store

Overview



Thanks to fast delivery of spare parts from Siemens, manufacturers and plant operators are able to reduce their spare parts inventories. Siemens offers an analysis for this purpose to indicate exactly which parts must be available in the customer's stores for a specific combination of machines and which should be obtained directly from Siemens.

Benefits

- Reduced costs
- Stock optimization
- Minimization of fault downtimes

Extended spare part availability

Overview

We normally retain spare parts for all products and systems for a period of 10 years after discontinuation of product marketing.

In individual cases, when we do not carry spare parts, we will offer a repair.

For a wide range of products and systems, we extend the availability of spare parts. We can provide you with the current spare parts availability for your machine/plant as a service once you have registered online with identSNAPSHOT.

www.siemens.com/identsnapshot/register

If you require longer availability of spare parts, please contact your regional sales representative.

Benefits

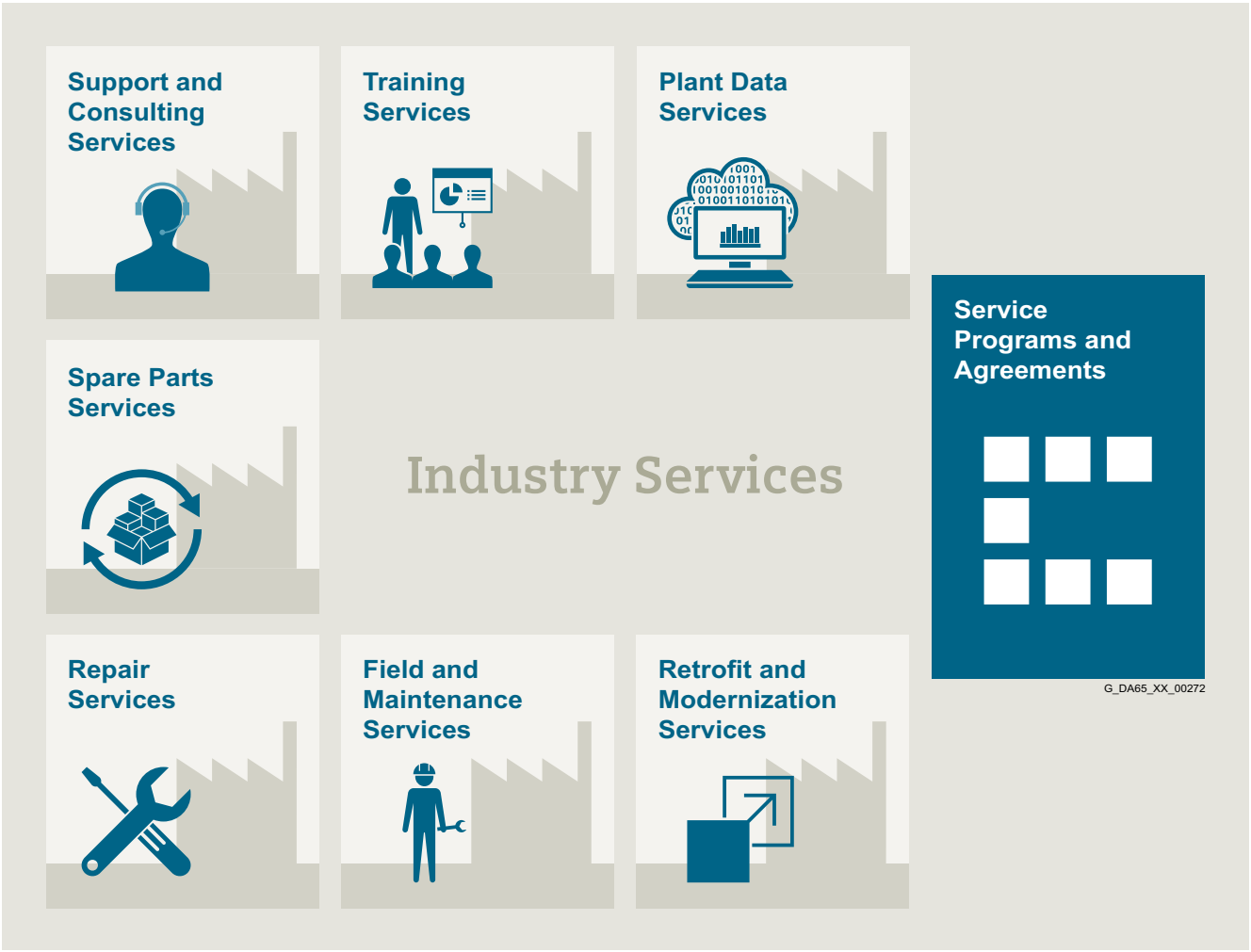
- Higher plant availability
- Investment protection
- Reduction of lifecycle costs



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Overview

Unleash potential – with services from Siemens



Increase your performance – 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.

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Overview

Plant Data Services



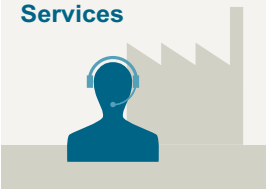
Make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

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.industry.siemens.com/services/global/en/portfolio/plant-data-services/Pages/index.aspx

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.

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.

www.industry.siemens.com/services/global/en/portfolio/support-consulting/Pages/index.aspx

Training Services

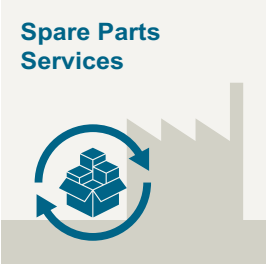


From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

www.industry.siemens.com/services/global/en/portfolio/training/Pages/index.aspx

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.

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.

www.industry.siemens.com/services/global/en/portfolio/spare_parts/Pages/index.aspx

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Overview (continued)



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.

www.industry.siemens.com/services/global/en/portfolio/repair_services/Pages/index.aspx



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

www.industry.siemens.com/services/global/en/portfolio/retrofit-modernization/Pages/index.aspx



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.

www.industry.siemens.com/services/global/en/portfolio/field_service/Pages/index.aspx



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.

www.industry.siemens.com/services/global/en/portfolio/service_programs/Pages/index.aspx

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Overview



Online Support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimedia-based – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts.
The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.

www.siemens.com/industry/onlinesupport

Online Support App

Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products – anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristic curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance.
The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code for information on our Online Support app.

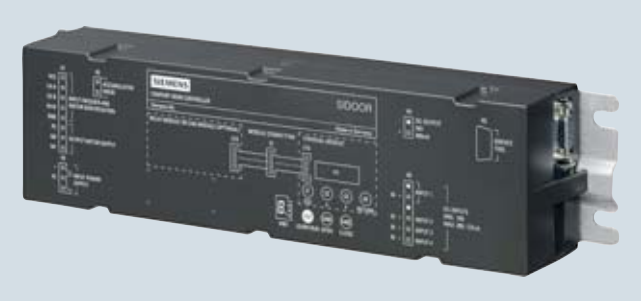
The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

https://support.industry.siemens.com/cs/ww/en/sc/2067

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Automatic door control for machine tools

Overview



Door control system is the general term for a controller of access systems.

The SIDOOR product family is primarily intended for the operation of sliding doors. These doors can be operated both horizontally and vertically.

Door control systems are characterized by the fact that there are always two defined states for the open and closed position of the door.

The door is always checked, controlled and operated between these positions according to the guidelines of the respective application.

In a defined learn run via 1-button operation, the door system independently determines the values for the door width, the dynamic door weight and the drive direction of the geared motor and stores these data in a non-volatile memory.

Benefits

- 1-button operation for the entire commissioning process
- Optimum and stable drive characteristics
- Reduced service requirements and costs
- Small footprint thanks to compact design
- Automated functions for enhanced safety

Design

The machine tool door drive is comprised of a controller and a maintenance-free drive unit, the geared motors.

Controllers are electronic controllers connected to the power supply via an external power supply unit (SIDOOR NT40, SIDOOR Transformer). They are generally connected to the higher-level controller via digital or fieldbus interfaces, and can be configured via a user interface.

Various controllers for doors weighing up to 600 kg (1323 lb) are available for machine tool doors.

Function

The safe functions - force limitation, energy limitation and end position detection - fulfill the requirements according to DIN EN ISO 13849-1:2008 for Category 2 and Performance Level d. The drives are suitable for power-operated guards according to EN 953:1997+A1:2009.

The geared motors are the maintenance-free drive unit of the door drive. The geared motors are DC motors with non-self-locking gearing, and are speed-controlled. The set force and speed limits are not exceeded.

Operation of the door drives listed here does not require a limit switch. The door width and the "OPEN/CLOSED" positions are determined automatically.

Forces are transferred via a toothed belt. The toothed belt passes over a deflector pulley, and can be fitted with 2 clutch holders. This enables it to drive both single-sided and centrally-opening doors.

More information

You can find additional information on the Internet at:

www.siemens.com/sidoor

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Overview



Sinorix al-deco PLUS are automated object protection systems for machine tools that are safe for personnel. Sinorix al-deco PLUS fights the fire where it breaks out – in the machine tool – without posing a risk to people, the environment, or technical components.

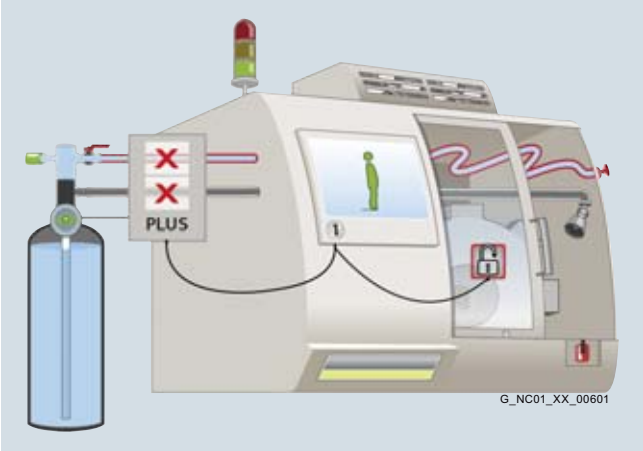
European law requires an integrated fire protection system for oil-cooled machine tools with fire risk. Sinorix al-deco PLUS object protection systems meet the highest safety requirements in accordance with the Machinery Directive 2006/42/EC. Sinorix al-deco PLUS is characterized by worldwide unique operator protection, ensures detection and extinguishing in current-free operation as well as online monitoring and automatic recording of all safety-related functions.

The Sinorix al-deco PLUS object protection system satisfies all relevant safety regulations and standards - in accordance with EN 13849-1:2008, Category 4 Performance Level e – and is therefore in possession of the CE approval including a type test certificate.

Benefits

- Fire extinguishing system with maximum safety for personnel, machine and environment
- Object protection system with safest operator protection worldwide
- Detection and extinguishing success even without cleaning and maintenance work ensured
- Insensitive to all kinds of technical interferences
- Log file of all system data for verification purposes
- Two-channel monitoring for all safety-related functions.
- Use of VdS-certified and self-monitoring components
- Double-secured blocking of extinguishing activation when machine door is open
- Only a qualified person is allowed to perform two-channel locking of the machine door after tripping of the system

Design



Two-channel signals:

Emergency Stop
Protection zone closed and locked feedback message
Interlocking of protection zone
Mode selector switch
Automatic-operation
Manual operation (without object protection system)

Function

Sinorix al-deco PLUS object protection systems correspond to the highest safety requirements in accordance with the new Machinery Directive 2006/42/EC and offer unique operator protection. This is ensured by double-secured cable routing in conjunction with redundant and self-monitoring components. Thanks to this technology, the machine tool cannot be operated until successful completion of a system check – and the machine door is unlocked only after successful and tested blocking of the extinguishing activation.

Sinorix al-deco PLUS ensures that the intended functions are carried out only if they do not endanger the safety and health of persons. This applies in particular if oxygen suppressing extinguishing media are used.

Using Sinorix al-deco PLUS, fire detection and extinguishing are purely pneumatic – without electrical power supply and independent of the machine tool. As a result, Sinorix al-deco is insensitive to all kinds of technical interferences, and it is foolproof. This ensures continuous machine operation and reduces the maintenance overhead.

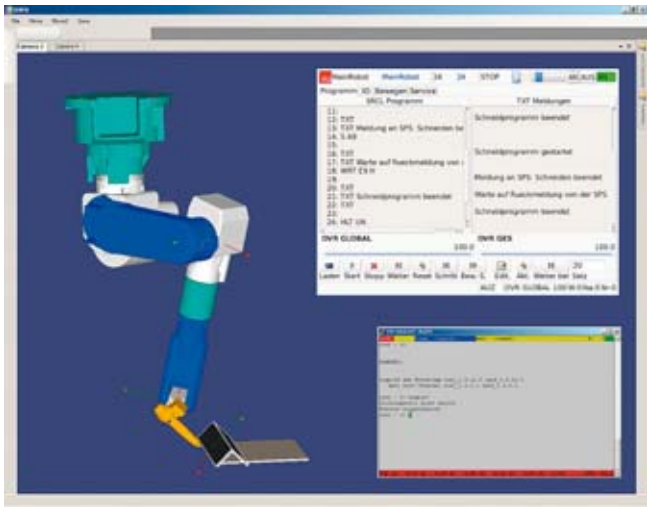
More information

You can find additional information on the Internet at:

www.siemens.com/sinorix

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Overview



Professional automation solutions with the rcs1 robot control

- Retrofitting of proven, reliable hardware (robots and machines) with the latest control technology
- New robots with the user-friendly, extremely flexible rcs1 control
- Sensory automation solutions for complex, innovative applications

Hardware concept

As an open, universal PC-based robot control, the rcs1 control is based on the latest, proven Siemens standards.

Sensor motor technology

The rcs1 is designed to allow the versatile integration of sensor-technology. A part from extensions for optical sensors, e.g. for real-time seam tracing, in particular stable processes for a hard contact force control robolab sensing system (rss1) are available as an extension, which simplify numerous robotic applications, or even make them possible for the first time.

Controllable axes

In its standard configuration, the rcs1 is designed as a 6-axis control, but it can be expanded considerably, e.g. up to a 16-axis control with coordinated control of additional axes and belt synchronization.

Kinematics

The rcs1 control is not limited to classic manipulator kinematics: Kinematics can be custom defined, e.g. for Cartesian robots, gantry robots, swivel/rotating tables.

Overview (continued)

Programming

Various user interfaces are available as options for programming the robot system:

- Hand-held unit (HHU) with touch screen
- Graphic user interface
- 3D simulation and programming system
- Programming interface in C/C++

Programming languages

- Manual programming with a 6D force sensor
- SRCL program interpreter
- C/C++ program library

More information

mz robolab GmbH

Marie-Curie-Straße 1
53359 RHEINBACH
GERMANY

Tel.: +49 2226 83600-00
E-mail: kontakt@robolab.de
Internet: www.robolab.de

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Overview

Complete equipment for machine tools and production systems

Our supplied range of products and services also includes complete equipment for machine tools and production systems with all services in the process chain from consulting through to after-sales service.

We support you in the areas of engineering, production and logistics.

Engineering support

Siemens supports you with advice on design in accordance with standards and concepts for drive systems, control, operation and safety.

Our engineers configure for you in EPLAN P8 and other commonly used CAD systems, execute projects designed to cost and adapt your documents where necessary to UL or new systems.

Our Technical Competence Center Cabinets in Chemnitz supports you with selecting and optimizing the suitable control cabinet air-conditioning system. Apart from calculation and simulation, we also use instrumentation testing in our heat laboratory with load simulation.

We also offer the following services:

- Vibration measurements and control cabinet certification in the field
- Measurement of conducted interference voltages in our laboratory

Production at a high level of quality

Complete equipment is manufactured at a high industrial level. This means:

- Examining consistency of the job documentation
- Checking for adherence to current regulations
- Collision check in 3D layout, taking into account the free space required thermally and electrically
- Automatic preparation of enclosures, cables and cable bundles
- Automated inspection and shipment free of faults
- Documentation and traceability
- Declaration of conformity regarding the Low-Voltage Directive and manufacturer's declaration on machinery directive
- UL label on request

Superior logistics

Everything from a single source offers you the following advantages:

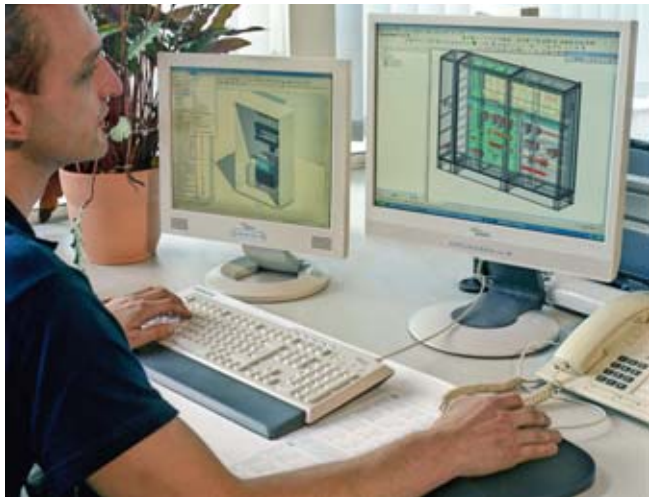
- Cost savings for procurement, stockkeeping, financing
- Reduction in throughput times
- Just-in-time delivery

Individual support and maximum flexibility

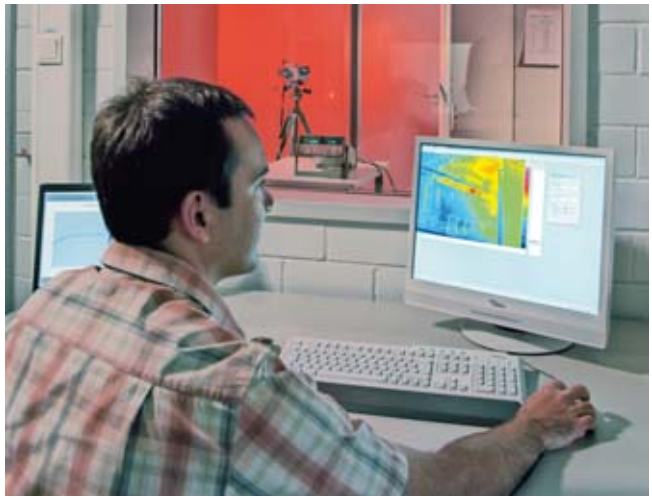
Our technical consultants for complete equipment support customers and sales departments in the various regions. Our control cabinet customers are supported in the Systems Engineering Plant Chemnitz (WKC) by ordering centers and production teams that are permanently assigned to customers.

Distance does not present a problem; we also use web cams for consulting our customers.

Customer-specific logistics models, flexible production capacity and production areas as well as change management in all process phases ensure maximum flexibility.



Cabinet engineering



Testing in the heat laboratory



Worldwide repair service

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Overview (continued)

Customized supplementary products

As part of its complete equipment program, Siemens also offers the development and construction of customized supplementary products, e.g. special operator panels and power supply systems.

Liability for defects

Of course we accept the same liability for defects for our complete equipment as for our SINUMERIK and SINAMICS products.

Furthermore, you can use our worldwide repair service anywhere and at any time.

Your benefits

One partner, one quotation, one order, one delivery, one invoice, and one contact partner for liability of defects.

For series production or individual items, Siemens is your competent partner for complete equipment.

Control cabinet certification

Overview

Increase plant availability through certification of control cabinets

With our control cabinet certification service, we offer to inspect the control cabinet documentation to ascertain compliance with the planning guidelines defined for the components. You receive the result of the inspection in the form of a report which contains specific recommendations as to how the control cabinet design needs to be improved.

With this information as a guide, the control cabinet design can be improved and the cabinet subsequently constructed to the highest quality standards.

When the machine manufacturer has completed assembling the control cabinet, the control cabinet design is inspected and subsequently certified at the manufacturer's site.

This certification process is primarily intended for series control cabinets, but could also be applied to single cabinets.

Certification sequence

- Inspection of the control cabinet documentation and presentation of results in a report
- Inspection of a fully assembled control cabinet with inspection report and certification at the manufacturer's site (single cabinet or sample of a series control cabinet)
- In the case of a series control cabinet, another inspection is performed on a cabinet from the type series after approximately 12 months.

Benefits

- The control cabinet certification service helps to ensure a high quality of cabinet design, to prevent early failure of components as a result, for example, of inadequate cooling and to detect potential EMC problems.
- Certified control cabinet quality

Selection and ordering data

Description	Article No.
Visual inspection of control cabinet schematic diagrams Inspection result report to the control cabinet designer	**6FC8500-0BX01-0AA0**



Control cabinet with SINAMICS S120 in booksize format

More information

Please contact your local Siemens sales office or Regional Company for more information.

Contact information is available on the Internet at:

www.siemens.com/automation/partner

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Overview



Flexible, uniform, successful

With this motto we offer powerful logistics for our products individually tailored to your requirements, and uniformly from order up to delivery.

We optimize the complete logistics process between Siemens DF Motion Control and you.

This helps you design your own processes faster, more simply and more cost-effectively.

Many of our customers have already chosen these solutions in various combinations.

Benefits

Customer-oriented logistics solutions

- Modular range of services
- Tailored to your own logistics
- Flexible and reliable fulfillment of demands

Customer-specific configuration

- Provision of complete packages
- Customizing

Production-based delivery

- Machine-based generation of package
- Oriented according to your assembly sequence
- Low packaging overhead due to reusable containers for scheduled deliveries

Global network for uniform logistics

- Utilization of Siemens transport network
- Tracking and tracing throughout the complete transport route
- Competence in export and customs processes

Optimized customer connections

- Delivery on exact date according to schedule
- Directly to assembly location using ship-to-line

Modules	Service	Specification
Complete delivery	• Packages, bundling • Total equipment • Procurement	Combination into complete equipment packages; procurement of material from other production locations.
Customer-specific configuration/ sorting	• Machinery package • Stowage plan • Installation • Tests	Machine packages, also assembled according to stowage plan; pre-assembly of components into units, and their testing.
Labeling Delivery documents	• Customer material number/ID No. • Customer designation • Barcode • Language	Customer specification in form of number and text on the delivery note, plus barcode (DIN 39) on product packaging. Language can be selected according to Siemens guideline.
Packaging versions	• Standard carton • Pallet • Reusable container • Air freight container • Sea freight container • Wooden boxes compliant with IPPC regulation	Application-oriented packaging from standard cartons to freight containers. Special packaging for pre-assembled units. We always select our packaging materials considering their environmental compatibility.
Export handling	• Export declaration • Customs formalities • Worldwide • Multi-partner/region handling	Export handling up to the customer and also to his partner in a third country, based on the export and customs specifications of the respective countries.
Direct shipment (volume-dependent)	• Fixed date • Tour • Ship-to-line	Direct shipment on fixed, agreed days, directly to the installation site if required. Exchange of reusable packaging.

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SINUMERIK 840D sl training case

Application



The training case is used for practicing the commissioning and servicing of the SINUMERIK 840D sl in realistic situations. It can also be used in presentations.

The SINUMERIK 840D sl training case is supplied with the PLC program ready for demonstration. The SINUMERIK 840D sl OP training case is required for operation.

Design

- Case with rollers
- SINUMERIK 840D sl with NCU 720.3 PN and CF card software version 4.4
- SINAMICS drive for 2 axes
- 2 x 1FK7022-5AK71 motors with DRIVE-CLiQ interface
- Incremental and absolute measuring system

Technical specifications

Article No.	6ZB2410-0BG00
Product type designation	SINUMERIK 840D sl training case
Supply voltage for 1 AC	230 V
Line frequency	50 Hz
Degree of protection	IP00
Ambient temperature, during	
• storage and transport	-5 ... +60 °C (23 ... 140 °F)
• operation	5 ... 40 °C (41 ... 104 °F)
Width × Height × Depth	320 × 650 × 330 mm (12.60 × 25.59 × 12.99 in)
Net weight	30 kg (66.2 lb)

Selection and ordering data

Description	Article No.
SINUMERIK 840D sl training case	**6ZB2410-0BG00**

SINUMERIK 840D sl OP training case

Application



The training case and SINUMERIK 840D sl training case are used together as an operating unit, in order to practice the commissioning and servicing of the SINUMERIK 840D sl in realistic situations. Both training cases can also be used in presentations.

The SINUMERIK 840D sl OP training case can only be used in conjunction with the SINUMERIK 840D sl training case.

Design

- Hard-top case
- SINUMERIK OP 010C operator panel with SINUMERIK PCU 50.5-P and SINUMERIK Operate software version 4.4
- SINUMERIK MCP 483C IE machine control panel

Technical specifications

Article No.	6ZB2410-0BH00
Product type designation	SINUMERIK 840D sl OP training case
Supply voltage for 1 AC	230 V
Line frequency	50 Hz
Degree of protection	IP00
Ambient temperature, during	
• storage and transport	-5 ... +60 °C (23 ... 140 °F)
• operation	5 ... 40 °C (41 ... 104 °F)
Width × Height × Depth	770 × 630 × 320 mm (30.31 × 24.80 × 12.60 in)
Net weight	23 kg (50.7 lb)

Selection and ordering data

Description	Article No.
SINUMERIK 840D sl OP training case	**6ZB2410-0BH00**

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Application



The SINUMERIK 840D sl training rack is used for the realistic practice of operating, programming, installation and service tasks.

Design

- Simulation panel including SIMATIC ET 200S input, output and IM modules
- SINUMERIK OP 012 operator panel front with SINUMERIK PCU 50.5-P
- SINUMERIK MCP 483 IE machine control panel
- SINUMERIK 840D sl with NCU 720.3 PN and CF card software version 4.4
- SINAMICS S120
  - Active Line Module 16 kW
  - 1-axis module 3 A
  - 2-axis module 2 × 5 A
- 1FK7044-7AF71 synchronous motor with incremental encoder
- 1FK7060-5AF71 synchronous motor with absolute encoder
- 1LA7070-4AB00 standard asynchronous motor with HTL encoder
- Wiring prepared for Safety Integrated functionality.

The SINUMERIK 840D sl training rack is fully equipped and carries the CE mark; the adaptation programs are installed.

Customer-specific adaptations can be made.

Technical specifications

Article No.	6ZB2410-0BJ00
Product type designation	SINUMERIK 840D sl training rack
Supply voltage for 3 AC	400 V
Line frequency	50 Hz
Degree of protection	IP00
Ambient temperature, during	
• storage	-20 ... +60 °C (-4 ... +140 °F)
• transport	-20 ... +60 °C (-4 ... +140 °F)
• operation	5 ... 40 °C (41 ... 104 °F)
Width	660 mm (25.98 in)
Height	1696 mm (66.77 in)
Depth	600 mm (23.62 in)
Net weight	150 kg (331 lb)

Selection and ordering data

Description	Article No.
SINUMERIK 840D sl training rack	**6ZB2410-0BJ00**

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Overview

You benefit from practical training right from the manufacturer

SITRAIN Training for Industry provides you with comprehensive support in solving your tasks.

Training right from the manufacturer enables you to make better choices with more confidence in your decision-making processes.

SITRAIN Training means:

- Less time for commissioning, maintenance and servicing
- Optimized production operations
- Safe engineering and commissioning
- Shorter start-up times, reduced downtimes and faster fault clearance
- Swift elimination of deficits in existing plants
- Avoidance of costly planning errors right from the start
- Flexible plant adaptation to market requirements
- Ensure quality standards in production
- Increased employee satisfaction and motivation
- Shorter orientation periods in case of technology or personnel change



Top trainers

Our trainers are skilled specialists with direct and extensive practical experience. Course developers have close contact with product development and directly pass on their knowledge to the trainers, and with that at the end to you.

Practical experience

Practice makes perfect – that's why we attach greatest importance to hands-on learning. Practical exercises can comprise up to half of the course time. You can therefore immediately implement your new knowledge in your day-to-day work.

300 courses in 62 countries

We offer a total of about 300 local attendance courses. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. To find out which course is held at which location, go to:

www.siemens.com/sitrain

Customized training

Would you prefer individual training instead? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or onsite at your company.

We instruct you using state-of-the-art training equipment which has been especially designed by our developers for the SITRAIN courses. This training approach will give you all the assurance you need.



Contact

Visit our website at:
www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

SITRAIN – Training for Industry Customer Support Germany:

Phone: +49 911 895-7575
Fax: +49 911 895-7576
E-mail: info@sitrain.com

More information on SINUMERK 840D sl and Safety Integrated can be found at:

www.siemens.com/sitrain-sinumerik

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Comprehensive teaching support for educational institutions

Cooperates with Education

Automation

SIEMENS

Siemens Automation Cooperates with Education (SCE)

SCE offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the transfer of industrial knowledge.

Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners for your lessons
- Personal contact for individual support

Training curriculums for your lessons



Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 90 didactically prepared training documents on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlight: the new SIMATIC PCS 7 curriculums and trainer packages. Using plant simulation, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester).

www.siemens.com/sce/documents

Trainer packages for hands-on learning



Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. We currently offer more than 80 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! compact controller and SIMATIC S7-1200
- PLC engineering with SIMATIC S7 hardware and STEP 7 software
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET
- Sensor systems with VISION, RFID, and SIWAREX
- Process automation with SIMATIC PCS 7
- Networked drive and motion technologies with SINAMICS and SIMOTION
- CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

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Comprehensive teaching support for educational institutions (continued)

Courses convey up-to-date specialist knowledge



Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training documents. Please inquire with your SCE contact partner.

www.siemens.com/sce/workshops

Support for your projects/textbooks



Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact
www.siemens.com/sce/books

Complete didactic solutions for your lessons



Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

Contact for individual support

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

SCE Support Finder for your Internet request

You are an educator and need support on the topic of industry automation? Send us your request now:

www.siemens.com/sce/supportfinder

Discover SCE

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Overview

A high-quality programmable control or drive system can only be used to maximum effect if the user is aware of the performance of the CNC machine tool control and the machine tool drives 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.

Comprehensive documentation is available for the SINUMERIK CNC controls and the SINAMICS S120 drive system. This documentation includes Operating Manuals, Programming Manuals or Configuration Manuals, as well as Commissioning Guides.

Information is available in printed format or as PDF file available for download on the Internet.

You can find additional information on the Internet at:

https://support.industry.siemens.com/cs/de/en/view/108464614

Customizing information

Whether for turning, milling, grinding or nibbling - machine manufacturers and machine operators can assemble their individual operating instructions on the Internet for specific topics such as programming, commissioning, etc.

Machine manufacturers and end customers are not only able to assemble their own customized technical documents for a specific product or system, they can also generate complete libraries with individually configured contents. The content that matches your topic can be found from the full range of documentation stored under Service & Support using the operator interface and assembled using drag & drop into application-based libraries, generated and even combined with your own documentation. User-generated collections can be saved in the commonly used RTF, PDF or XML formats.

You can find additional information on the Internet at:

www.siemens.com/mdm

PDF versions of the catalogs are available on the Internet at:

www.siemens.com/automation/infocenter

Selection and ordering data

Description	Article No.
SINUMERIK 808 **Equipment for Machine Tools** **Catalog NC 81.1 · 2013**	
• English	**E86060-K4481-A111-A2-7600**
SINUMERIK 828 **Equipment for Machine Tools** **Catalog NC 82 · 2015**	
• German	**E86060-K4482-A101-A4**
• English	**E86060-K4482-A101-A4-7600**

Selection and ordering data (continued)

Description	Article No.
SINUMERIK 840D sl **Equipment for Machine Tools** **Catalog NC 62 · 2016**	
• German	**E86060-K4462-A101-A2**
• English	**E86060-K4462-A101-A2-7600**
• French[1)]	**E86060-K4462-A101-A2-7700**
• Italian[1)]	**E86060-K4462-A101-A2-7200**
• Spanish[1)]	**E86060-K4462-A101-A2-7800**
SIMATIC **Products for Totally Integrated Automation** **Catalog ST 70 · 2015**	
• German	**E86060-K4670-A101-B5**
• English	**E86060-K4670-A101-B5-7600**
• French	**E86060-K4670-A101-B5-7700**
• Italian	**E86060-K4670-A101-B5-7200**
• Spanish	**E86060-K4670-A101-B5-7800**
Decentralization with PROFIBUS-DP/DPV1	Via bookstore
• German	ISBN: 978-3-89578-189-6
• English	ISBN: 978-3-89578-218-3
User and manufacturer documentation	
DOConCD SINUMERIK 828D/840D sl SINAMICS S120 SIMOTICS Motors SIMATIC User, manufacturer and service documentation on DVD-ROM Current version: 06/2015 Languages: English, German	**6FC5398-0AC10-1YA2**
• Delivery of current version	**6FC5298-0CD00-0YG0**
• Update service	**6FC5298-0CD00-0YG2**
EMC Design Guidelines SIMOTICS, SIMOTION, SINAMICS, SINUMERIK	
• Chinese Simplified	**6FC5297-0AD30-0RP3**
• German	**6FC5297-0AD30-0AP3**
• English	**6FC5297-0AD30-0BP3**
• French	**6FC5297-0AD30-0DP3**
• Italian	**6FC5297-0AD30-0CP3**
• Japanese	**6FC5297-0AD30-0TP3**
• Spanish	**6FC5297-0AD30-0EP3**
User documentation	
SINAMICS Manual Collection On DVD-ROM with full text search over the complete DVD Network-enabled (storage of the PDFs on a central server) Edition: 06/2014 Languages: English, French, German, Italian, Spanish	**6SL3097-4CA00-0YG3**
User Guide **My SINUMERIK Operate** The helpful guide for quick referencing on the machine	
• German	**6FC5095-0AA84-0AA2**
• English	**6FC5095-0AA84-0BA2**

[1)] Available soon.

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Selection and ordering data (continued)

Description	Article No.		
Training booklets for SINUMERIK Operate			
ShopMill training booklet – Milling Made Easy SINUMERIK Operate			
Printed version			
• Black/white	**6FC5095-0AB50-0**	■	**P1**
• In color	**6FC5095-0AB50-1**	■	**P1**
ShopTurn training booklet – Turning Made Easy SINUMERIK Operate			
Printed version			
• Black/white	**6FC5095-0AB80-0**	■	**P1**
• In color	**6FC5095-0AB80-1**	■	**P1**
Languages:[1]			
• Chinese Simplified		**R**	
• Chinese Traditional		**M**	
• German		**A**	
• English		**B**	
• Finnish		**H**	
• French		**D**	
• Italian		**C**	
• Japanese		**T**	
• Korean		**L**	
• Dutch		**J**	
• Polish		**N**	
• Portuguese		**K**	
• Russian		**P**	
• Swedish		**F**	
• Slovenian		**W**	
• Spanish		**E**	
• Czech		**U**	
• Hungarian		**Q**	

Description	Article No.
User documentation	
Operating Manual SINUMERIK 840D sl SINUMERIK Operate universal	
• German	**6FC5398-6AP40-5AA3**
• English	**6FC5398-6AP40-5BA3**
• French	**6FC5398-6AP40-5DA3**
• Italian	**6FC5398-6AP40-5CA3**
• Spanish	**6FC5398-6AP40-5EA3**
Operating Manual SINUMERIK 840D sl/828D SINUMERIK Operate Turning	
• German	**6FC5398-8CP40-5AA3**
• English	**6FC5398-8CP40-5BA3**
• French	**6FC5398-8CP40-5DA3**
• Italian	**6FC5398-8CP40-5CA3**
• Spanish	**6FC5398-8CP40-5EA3**
Operating Manual SINUMERIK 840D sl/828D SINUMERIK Operate Milling	
• German	**6FC5398-7CP40-5AA3**
• English	**6FC5398-7CP40-5BA3**
• French	**6FC5398-7CP40-5DA3**
• Italian	**6FC5398-7CP40-5CA3**
• Spanish	**6FC5398-7CP40-5EA3**
Operating Manual SINUMERIK 840D sl/828D SINUMERIK Operate Grinding	
• German	**6FC5398-0EP40-0AA2**
• English	**6FC5398-0EP40-0BA2**
• French	**6FC5398-0EP40-0DA2**
• Italian	**6FC5398-0EP40-0CA2**
• Spanish	**6FC5398-0EP40-0EA2**
User Manual SINUMERIK 840D sl/828D Measuring Cycles	
• German	**6FC5398-4BP40-3AA1**
• English	**6FC5398-4BP40-3BA1**
• French	**6FC5398-4BP40-3DA1**
• Italian	**6FC5398-4BP40-3CA1**
• Spanish	**6FC5398-4BP40-3EA1**
Programming Manual SINUMERIK 840D sl/828D Fundamentals	
• German	**6FC5398-1BP40-5AA3**
• English	**6FC5398-1BP40-5BA3**
• French	**6FC5398-1BP40-5DA3**
• Italian	**6FC5398-1BP40-5CA3**
• Spanish	**6FC5398-1BP40-5EA3**
Programming Manual SINUMERIK 840D sl/828D Production Planning	
• German	**6FC5398-2BP40-5AA3**
• English	**6FC5398-2BP40-5BA3**
• French	**6FC5398-2BP40-5DA3**
• Italian	**6FC5398-2BP40-5CA3**
• Spanish	**6FC5398-2BP40-5EA3**

[1] Additional languages on request.

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Selection and ordering data (continued)

Description	Article No.
User documentation *(continued)*	
Programming Manual SINUMERIK 840D sl/828D ISO Milling	
• German	**6FC5398-7BP40-5AA0**
• English	**6FC5398-7BP40-5BA0**
• French	**6FC5398-7BP40-5DA0**
• Italian	**6FC5398-7BP40-5CA0**
• Spanish	**6FC5398-7BP40-5EA0**
Programming Manual SINUMERIK 840D sl/828D ISO Turning	
• German	**6FC5398-5BP40-5AA0**
• English	**6FC5398-5BP40-5BA0**
• French	**6FC5398-5BP40-5DA0**
• Italian	**6FC5398-5BP40-5CA0**
• Spanish	**6FC5398-5BP40-5EA0**
Diagnostics Manual SINUMERIK 840D sl SINAMICS S120	
• German	**6FC5398-6BP40-5AA3**
• English	**6FC5398-6BP40-5BA3**
• French	**6FC5398-6BP40-5DA3**
• Italian	**6FC5398-6BP40-5CA3**
• Spanish	**6FC5398-6BP40-5EA3**
Manufacturer and service documentation	
Equipment Manual NCU SINUMERIK 840D sl	
• German	**6FC5397-1EP40-5AA1**
• English	**6FC5397-1EP40-5BA1**
Equipment Manual Operator Components and Networking SINUMERIK 840D sl	
• German	**6FC5397-1AP40-5AA3**
• English	**6FC5397-1AP40-5BA3**
Equipment Manual ADI 4 - Analog Drive Interface for 4 Axes	
• German	**6FC5297-0BA01-0AP5**
• English	**6FC5297-0BA01-0BP5**
Commissioning Manual CNC: NCK, PLC, Drive SINUMERIK 840D sl SINAMICS S120	
• German	**6FC5397-2AP40-5AA3**
• English	**6FC5397-2AP40-5BA3**
• French	**6FC5397-2AP40-5DA3**
• Italian	**6FC5397-2AP40-5CA3**
• Spanish	**6FC5397-2AP40-5EA3**
Commissioning Manual CNC: Base Software and Operating Software SINUMERIK 840D sl	
• German	**6FC5397-1DP40-5AA3**
• English	**6FC5397-1DP40-5BA3**
• French	**6FC5397-1DP40-5DA3**
• Italian	**6FC5397-1DP40-5CA3**
• Spanish	**6FC5397-1DP40-5EA3**

Description	Article No.
Manufacturer and service documentation *(continued)*	
Lists (Book 1) Machine Data, Setting Data, Parameters SINUMERIK 840D sl	
• German	**6FC5397-7AP40-5AA3**
• English	**6FC5397-7AP40-5BA3**
Lists (Book 2) NC Variables and Interface Signals SINUMERIK 840D sl	
• German	**6FC5397-3CP40-5AA3**
• English	**6FC5397-3CP40-5BA3**
Lists (Book 3) System Variables SINUMERIK 840D sl	
• German	**6FC5397-6AP40-5AA3**
• English	**6FC5397-6AP40-5BA3**
Function Manual SINUMERIK 840D sl / 828D Basic Functions	
• German	**6FC5397-0BP40-5AA3**
• English	**6FC5397-0BP40-5BA3**
Function Manual SINUMERIK 840D sl/828D Extended Functions	
• German	**6FC5397-1BP40-5AA3**
• English	**6FC5397-1BP40-5BA3**
Function Manual SINUMERIK 840D sl/828D Special Functions	
• German	**6FC5397-2BP40-5AA3**
• English	**6FC5397-2BP40-5BA3**
Description of Functions SINUMERIK 840D sl/828D Tool Management	
• German	**6FC5397-6BP40-5AA3**
• English	**6FC5397-6BP40-5BA3**
Description of Functions SINUMERIK 840D sl/828D Safety Integrated	
• German	**6FC5397-4BP40-5AA3**
• English	**6FC5397-4BP40-5BA3**
Description of Functions SINUMERIK 840D sl/828D Synchronized Actions	
• German	**6FC5397-5BP40-5AA3**
• English	**6FC5397-5BP40-5BA3**
Description of Functions SINUMERIK 840D sl/828D ISO Dialects	
• German	**6FC5397-7BP40-3AA0**
• English	**6FC5397-7BP40-3BA0**
System Manual SINUMERIK 840D sl/828D Ctrl-Energy	
• German	**6FC5397-0EP40-5AA3**
• English	**6FC5397-0EP40-5BA3**

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Selection and ordering data

Description	Article No.
Manufacturer and service documentation	
Getting Started SINAMICS S120	
• German	**6SL3097-4AG00-0AP3**
• English	**6SL3097-4AG00-0BP3**
• French	**6SL3097-4AG00-0DP3**
• Italian	**6SL3097-4AG00-0CP3**
• Spanish	**6SL3097-4AG00-0EP3**
Manual SINAMICS S120 Control Units and Additional System Components	
• German	**6SL3097-4AH00-0AP5**
• English	**6SL3097-4AH00-0BP5**
• French	**6SL3097-4AH00-0DP5**
• Italian	**6SL3097-4AH00-0CP5**
• Spanish	**6SL3097-4AH00-0EP5**
Manual SINAMICS S120 Booksize Power Units	
• German	**6SL3097-4AC00-0AP7**
• English	**6SL3097-4AC00-0BP7**
• French	**6SL3097-4AC00-0DP7**
• Italian	**6SL3097-4AC00-0CP7**
• Spanish	**6SL3097-4AC00-0EP7**
Manual SINAMICS S120 Chassis Power Units	
• German	**6SL3097-4AE00-0AP4**
• English	**6SL3097-4AE00-0BP4**
• French	**6SL3097-4AE00-0DP4**
• Italian	**6SL3097-4AE00-0CP4**
• Spanish	**6SL3097-4AE00-0EP4**
Manual SINAMICS S120 AC Drive	
• German	**6SL3097-4AL00-0AP4**
• English	**6SL3097-4AL00-0BP4**
• French	**6SL3097-4AL00-0DP4**
• Italian	**6SL3097-4AL00-0CP4**
• Spanish	**6SL3097-4AL00-0EP4**

Description	Article No.
Manufacturer and service documentation *(continued)*	
Function Manual SINAMICS S120 Drive Functions	
• German	**6SL3097-4AB00-0AP4**
• English	**6SL3097-4AB00-0BP4**
• French	**6SL3097-4AB00-0DP4**
• Italian	**6SL3097-4AB00-0CP4**
• Spanish	**6SL3097-4AB00-0EP4**
Function Manual SINAMICS S120 Safety Integrated	
• German	**6SL3097-4AR00-0AP5**
• English	**6SL3097-4AR00-0BP5**
• French	**6SL3097-4AR00-0DP5**
• Italian	**6SL3097-4AR00-0CP5**
• Spanish	**6SL3097-4AR00-0EP5**
Commissioning Manual SINAMICS S120	
• German	**6SL3097-4AF00-0AP4**
• English	**6SL3097-4AF00-0BP4**
• French	**6SL3097-4AF00-0DP4**
• Italian	**6SL3097-4AF00-0CP4**
• Spanish	**6SL3097-4AF00-0EP4**
SINAMICS S120/S150 List Manual	
• German	**6SL3097-4AP00-0AP5**
• English	**6SL3097-4AP00-0BP5**
• French	**6SL3097-4AP00-0DP5**
• Italian	**6SL3097-4AP00-0CP5**
• Spanish	**6SL3097-4AP00-0EP5**

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Selection and ordering data

Description	Article No.
Manufacturer and service documentation	
Configuration Manual 1FT7 Synchronous Motors	
• German	**6SN1197-0AD13-0AP5**
• English	**6SN1197-0AD13-0BP5**
Configuration Manual 1FK7 Synchronous Motors	
• German	**6SN1197-0AD16-0AP4**
• English	**6SN1197-0AD16-0BP4**
• French	**6SN1197-0AD16-0DP4**
• Italian	**6SN1197-0AD16-0CP4**
• Spanish	**6SN1197-0AD16-0EP4**
Configuration Manual 1PH8 Synchronous/ Asynchronous Motors	
• German	**6SN1197-0AD74-0AP0**
• English	**6SN1197-0AD74-0BP0**
Configuration Manual 1PH2 Asynchronous Motors	
• German	**6SN1197-0AC63-0AP0**
• English	**6SN1197-0AC63-0BP0**
• French	**6SN1197-0AC63-0DP0**
• Italian	**6SN1197-0AC63-0CP0**
• Spanish	**6SN1197-0AC63-0EP0**

Description	Article No.
Manufacturer and service documentation *(continued)*	
Configuration Manual 1FN3 Linear Motors Peak Load and Continuous Load	
• German	**6SN1197-0AB86-0AP0**
• English	**6SN1197-0AB86-0BP0**
Configuration Manual 1FE1 Synchronous Built-In Motors	
• German	**6SN1197-0AC00-1AP0**
• English	**6SN1197-0AC00-1BP0**
Configuration Manual 1FE2 Synchronous Built-In Motors	
• German	**610.43006.01**
• English	**610.43006.40**
Configuration Manual 1FW6 Built-In Torque Motors	
• German	**6SN1197-0AE00-0AP6**
• English	**6SN1197-0AE00-0BP6**
Configuration Manual 2SP1 ECS Motor Spindles	
• German	**6SN1197-0AC04-0AP6**
• English	**6SN1197-0AC04-0BP6**
• French	**6SN1197-0AC04-0DP6**
• Italian	**6SN1197-0AC04-0CP6**
• Spanish	**6SN1197-0AC04-0EP6**

Selection and ordering data

Description	Article No.
Manufacturer and service documentation	
Operating Manual Absolute encoder with PROFIBUS DP	
• German	**6SN1197-0AB10-0AP5**
• English	**6SN1197-0AB10-0BP5**

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Overview



CAD CREATOR –
Dimensional drawing and 2D/3D CAD generator

Thanks to the user-friendly operator interface of the CAD CREATOR, it is easy to configure controls, drives and motors. With the support of the CAD CREATOR, product-specific dimension drawings and 2D/3D CAD models can be created quickly. The CAD CREATOR assists the machine manufacturer's designers, offer drafting engineers and project engineers.

Benefits

- Provision of dimension drawings as 2D/3D CAD models in mm and inches
- Display of 2D/3D CAD models and dimension drawings with integrated viewers
- With the online version, 3D models and dimension drawings can also be displayed in the form of a downloadable PDF
- Support for all general geometry interfaces STEP, IGES, Parasolid, SAT, VDA, and for special interfaces such as Ideas, NX, Solid Edge, Pro/Engineer, Autocad, Inventor, Mechanical Desktop, Catia and Solidworks
- Multi-language operator interface in English, French, German, Italian and Spanish, and direct Help (English, German)
- Dimension drawings and 2D/3D CAD models for:
  - SIMOTICS motors for Motion Control
    - SIMOTICS S-1FK7, S-1FT7 servomotors
    - SIMOTICS S geared motors
    - SIMOTICS M-1PH8, M-1FE1 main motors
    - SIMOTICS L-1FN3 linear motors
    - SIMOTICS T-1FW3, T-1FW6 torque motors
    - 2SP1 motor spindles
  - Components
    - Measuring systems
    - MOTION-CONNECT connection system
  - SINAMICS S110, SINAMICS S120
    - Control Units
    - Power Modules (Blocksize/Chassis/Combi)
    - Line Modules (Booksize/Chassis)
    - Line-side components
    - Motor Modules (Booksize/Chassis)
    - DC link components
    - Supplementary system components
    - Load-side power components
    - Encoder system connection
  - SINUMERIK
    - CNC controls
    - Operator components for CNC controls
  - SIMOTION
    - SIMOTICS D
    - SIMOTICS C

Benefits (continued)

The CAD CREATOR offers a variety of options for configuring, but also different methods for searching for a product:

- According to article no.
- According to technical description

After successful configuration of the product, the dimension drawings and models are displayed with the integrated viewers and made available for export.

Selection and ordering data

Description	Article No.
CAD CREATOR Dimension drawing and 2D/3D CAD generator on DVD-ROM Languages: English, French, German, Italian, Spanish	**6SL3075-0AA00-0AG0**

More information

The CAD CREATOR is available on DVD-ROM and as an Internet application.

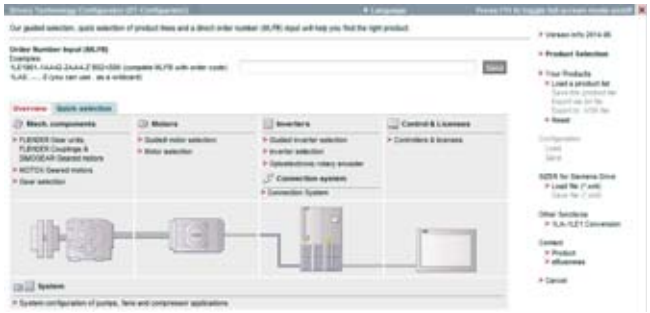
Additional information is available on the Internet at www.siemens.com/cadcreator

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Overview

The Drive Technology Configurator (DT Configurator) helps you to configure the optimum drive technology products for your application – starting with gear units, motors, inverters and the associated options and components and ending with controllers, software licenses and connection technology. Whether with little or detailed knowledge of products: You can easily, quickly and efficiently configure your particular drive using product group preselectors, targeted navigation through selection menus or by entering article numbers directly to select the products.

In addition to all this, comprehensive documentation comprising technical data sheets, 2D/3D dimensional drawings, operating instructions, certificates etc. can be selected in the DT Configurator. The products that you select can be directly ordered by transferring a parts lists to the shopping cart of the Industry Mall.



Drive Technology Configurator for efficient drive configuration with the following functions

- Quick, efficient configuration of drive products and associated components – gear units, motors, inverters, controllers, connection technology
- Configuration of drive systems for pump, fan and compressor applications from 1 kW to 2.6 MW
- Retrievable documentation for configured products and components, such as
  - Data sheets in up to 7 languages in PDF or RTF formats
  - 2D/3D dimensional drawings in various formats
  - Terminal box diagram and terminal connection diagram
  - Operating instructions
  - Certificates
  - Starting calculation for SIMOTICS motors
  - EPLAN macros
- Support for retrofit projects in conjunction with Spares On Web www.siemens.com/sow
- Products can be ordered directly through the Siemens Industry Mall

Access to the Drive Technology Configurator

The Drive Technology Configurator can be accessed without registration and login:

www.siemens.com/dt-configurator

Selection and ordering data

Description	Article No.
Interactive catalog CA 01 on DVD-ROM including Drive Technology Configurator Language: English	**E86060-D4001-A510-D6-7600**

More information

Online access to the Drive Technology Configurator

More information about the Drive Technology Configurator is available on the Internet at www.siemens.com/dtconfigurator

Offline access to the Drive Technology Configurator in the Interactive Catalog CA 01

In addition, the Drive Technology Configurator is also included in the interactive catalog CA 01 on DVD-ROM – the offline version of the Siemens Industry Mall.

The Interactive Catalog CA 01 can be ordered from the relevant Siemens sales office or via the Internet: www.siemens.com/automation/CA01

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Notes

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9/6	• Genior Modular tool and process monitoring
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9/8	Balance Systems S.r.l. VM25 system
9/9	Comara KG iCut
9/10	Conoptica AS CU2 Tool
9/11	DITTEL Messtechnik GmbH DS6000
9/12	EMUGE-FRANKEN GmbH & Co. KG Precision tools
9/13	ETALON AG LaserTRACER/LaserTRACER-MT
9/14	HAINBUCH GmbH TESTit
9/15	Hofmann GmbH & Co. KG AB 9000 ring balancing system
9/16	Hyla Soft Services
9/17	Kai Müller GmbH VIDEO VISION EVI
9/18	KUKA Roboter GmbH Industrial robots
9/19	MARPOSS S.p.A. Laser Tool Setter
9/20	MCU GmbH & Co. KG Toolinspect II
9/21	MDT Software AutoSave Automation Change Management
9/22	Mill-IT ncTOUCH
9/23	Montronix GmbH Tool and process monitoring
9/24	Nordmann GmbH & Co. KG SEM-Modul-e tool monitor
9/25	OMATIVE Systems Europe GmbH Adaptive Control & Monitoring System ACM
9/26	PROMETEC GmbH
9/26	• MCIview
9/27	• PROSIN^{PLUS}
9/28	• PROVIS (PROMOS 2)
9/29	SEQUOIA IT s.r.l. SeTAC
9/30	TechSolve Viz-Adapter MTConnect

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SINUMERIK Solution Partners

Introduction

Overview

The SINUMERIK Solution Partners supplement the open SINUMERIK CNCs with their own solutions.

The solutions of the SINUMERIK Solution Partners are certified and therefore offer a high degree of reliability and compatibility in productive use with the SINUMERIK CNC in production.

SINUMERIK Solution Partners assume responsibility for their own solutions, products and services.

More information

The systems supplied by our Solution Partners are in many cases available for earlier SINUMERIK software versions and can be installed retrospectively. For further information, please contact the Solution Partner directly.

You can find additional information in the Internet at:

www.siemens.com/solution-partner

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Overview



AfM Technology GmbH is an international solution provider in the field of mobile measurement technology based in Germany. The focus of the company lies in the metrological detection and correction of geometric guide deviations within machine tools, coordinate measuring machines, robot systems and other multi-axis machine systems.

Volumetric Compensation of geometrical deviations

Determination of geometrically reproducible translational and rotational deviations of machine axes. Based on the determined deviations a correction field is created for SINUMERIK CNCs. Depending of the machine position ensue the correction of all single deviations at the tool center point (TCP) to the running time of the machine.

Benefits

- Capture and visualize geometric deviations of machine axes
- Capture and visualize reproducibility of machine axes
- Creation of machine-specific correction fields for SINUMERIK CNCs
- Significant improvement of machine accuracy by volumetric correction at runtime
- Verification of the accuracy improvement achieved owing to the volumetric compensation

Function

Due to the manufacturing process, machine axes deviate from their ideal geometrical shape and are never exactly perpendicular to each other. The existing geometrical deviations lead to translational and rotational deviations which have the effect that the actual position deviates from the target position.

- AfM Technology GmbH acquires the existing, individual geometry deviations of all axes with special measuring methods.
- From the individual errors, AfM Technology GmbH can generate a machine-specific error map for the CNC and deposit it in the control.

By knowing the single deviations from the error map, the SINUMERIK VCS option is able to calculate the deviation at the tool center point (TCP) to the running time at every position in the volume. Based on the calculated value, the control changes its actual position in direction to the target position at the tool center point. Significant increases in machine accuracy and machined products are the result.

Integration

Volumetric compensation is available for the following CNC:

- SINUMERIK 840D sl
  with the SINUMERIK VCS option
  (Volumetric Compensation System)

More information

AfM Technology GmbH

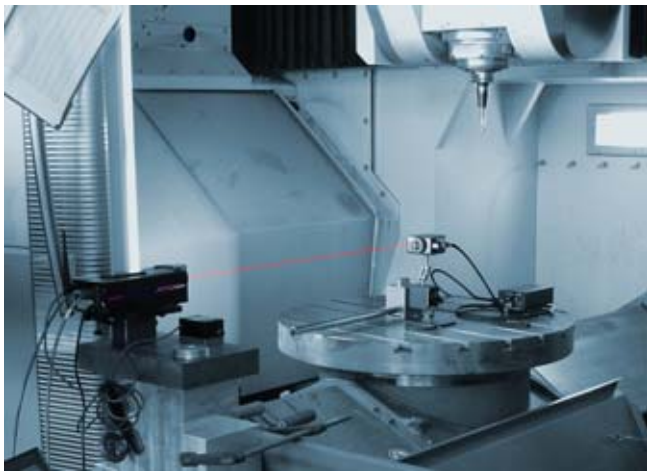
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API Services – Error Mapping Plus Siemens VCS

Overview



API Error Mapping Plus Siemens VCS –
More accurate machine means more accurate parts

Volumetric Compensation System (VCS) for machine tools – Error compensation based on the 21 parameter model

For CNC-controlled machine tools the error compensation has to be done in the interpolation cycle. With SINUMERIK 840D sl this type of calculation can be easily done.

Benefits

- Baseline tracker grid
- Error mapping with the API XD Laser
- Compensate machine with VCS
- Real-time Validate
- Map and compensate rotaries
- TRAORI for 5-axis kinematics
- Final tracker grid verification

Function

- API Services accreditation - ISO/IEC 17025-2005, ANSI/ NCLS Z540-1-1994 | An A2LA Accredited Laboratory, Certificate Number 2229.02
- Full before and after compensation reporting
- DoD clearances
- Over 100 years cumulative machine tool experience
- Calibration/Certification in accordance with B5.54 Standards
- IntelliComp software for ease of data transfer
- Typical accuracy improvements 3 to 4 times

Integration

API Error Mapping Plus Siemens VCS can be used for the following CNC:

- SINUMERIK 840D sl

More information

API Services Headquarters

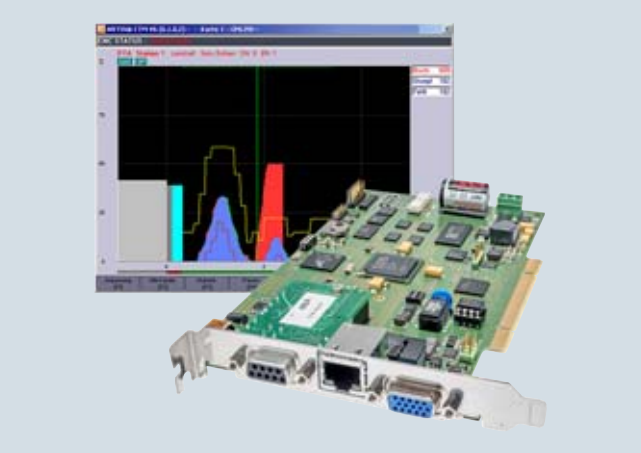
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ARTIS GmbH – CTM tool and process monitoring system

Overview



CTM tool and process monitoring system with flexible interface concept

The high-precision in-process monitoring provided by CTM protects machining processes. The CTM system detects tool breakage, tool wear and missing tools. The PCI card designed for integration in the CNC offers various methods of data capture and is equipped with suitable measuring transducers and visualization software.

Benefits

- Comprehensive protection for machine and tool
- Optimization of processes
- Reduced costs per item by elimination of rejects
- Perfect process adaptation even with complex processes
- Seamless documentation of part quality

Function

- Data are captured either electronically or via external sensors (e.g. for force, torque, vibration)
- Comparison of the current process against a learned setpoint curve, visual representation of deviations
- Specification of values for breakage limits, display and documentation of alarms
- Visualization on the CNC operator panel or on an external screen
- Integrated in the machine tool control system
- Adaptive feedrate control (option)
- A variety of monitoring strategies, e.g. specifically for long machining operations or hobbing processes
- Method of monitoring the coolant flowrate, particularly for processes involving small tools
- Flexible interface concept with solutions for PROFIBUS, PROFINET, Ethernet and a starter variant without fieldbus connection
- Flexible configuration – setup and teach-in of all limits so that they are precisely tailored to the relevant application

Integration

CTM can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with SINUMERIK TCU

More information

ARTIS GmbH

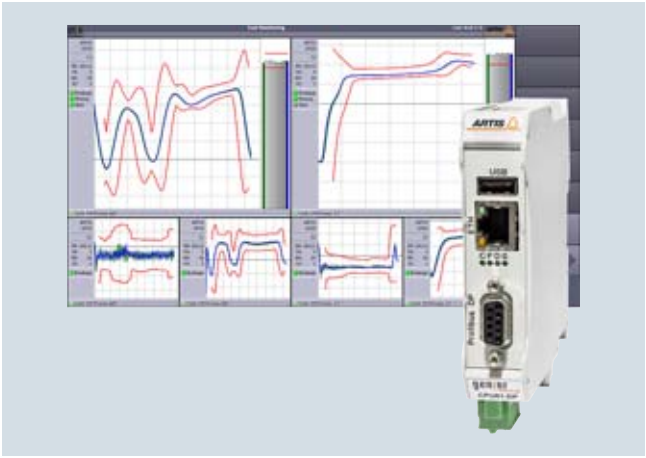
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E-mail: info@artis.marposs.com
Internet: www.artis.de

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ARTIS GmbH – Genior Modular tool and process monitoring

Overview



Genior Modular – fully automatic tool and process monitoring system

Genior Modular is a fully automatic machine and process monitoring system for machining processes and is predominantly deployed in medium and large-scale production runs.

The Genior Modular system detects tool breakage, tool wear and missing tools. Alarm limits are set and adapted automatically. The Genior Modular system comprises evaluation electronic circuitry and offers various methods of data capture, appropriate measuring transducers and visualization software.

Benefits

- Comprehensive protection for machine and tool
- Optimization of processes
- Reduced costs per item by elimination of rejects
- Automatic monitoring without operator intervention
- Simple installation

Function

- Data are captured either electronically or via external sensors (e.g. for force, torque, vibration)
- Breakage limits are set automatically and refined automatically within 10 processes
- Visualization of most recent machining operations
- Visualization on the CNC operator panel or on an external screen
- Adaptive feedrate control (option)
- Mounted on standard rails with the relevant measuring transducers

Integration

Genior Modular can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with SINUMERIK TCU

More information

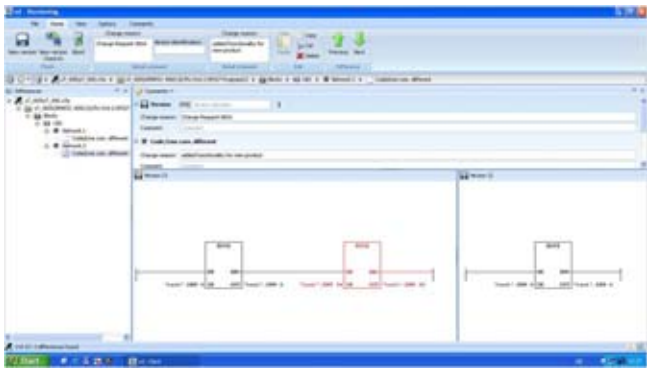
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Overview



versiondog

versiondog is the enterprise solution developed by market leader AUVESY for an integrated software and data management system in the automated production industry. versiondog creates versions and automatic backups to save and manage your planning data. Thanks to its vendor neutrality, the system provides the most comprehensive depth of integration and the largest range of supported devices and editors.

With the SINUMERIK 840D sl integration, versiondog is offering a Siemens-certified method for the automated generation of ARC archives. This system makes it especially easy to trace changes and to produce a reliable backup when needed for disaster recovery.

Benefits

- 100 % traceability – the change factors WHO, WHAT, WHERE and WHEN are stored automatically
- Automatic storage of data saves time and ensures availability of data
- Fast restoration of optimized project versions
- Shorter downtimes and prevention of outages and waste
- Detailed project handover for external companies
- Change history is documented in electronic form for audits and QM processes

Function

- Version checks and versioning of revised software releases are made easy by backing up software versions. versiondog offers support by providing a menu-assisted documentation process. This solution saves an immense amount of time and makes the daily working routine so much easier.
- versiondog provides configurable archiving functions for PLC, CNC and compensation data, compile cycles, HMI data, drive data and data from CompactFlash cards. The system also provides a tool for converting a PLC series commissioning file into a SIMATIC S7 project.
- versiondog supports simultaneous archiving of multiple control systems and allows control data from these systems to be archived while they are in operation. Monitoring of consistency conditions during archiving is available as an option. versiondog also offers a data backup strategy for 24-7 production processes.
- Any versions selected by the user can be compared with one another at the push of a button (SmartCompare) so that errors can be located or analyzed quickly. Furthermore, a detailed comparison of the SIMATIC S7 project with differences represented in graphic, tabulated or text form is available in versiondog. Changes to a new production data record are also presented clearly. It is then, for example, easy to trace directly all the modifications made by a colleague.
- Automatic backup jobs show each change made to the last valid version and make it easy to distinguish between desirable and undesirable modifications at a glance. This solution is extremely reliable by comparison with other systems which involve internal or even external modification of production-relevant data records.
- A history that includes all changes to a production plant can be called at any time so that the parameter records pertaining to a particular production cycle are easy to track. Detailed documentation of this change history can be generated at any time at the push of a button.
- The availability of all versions means that any project status can be restored quickly and conveniently after a system failure (disaster recovery).

Integration

versiondog can be used for the following CNC:

- SINUMERIK 840D sl

More information

AUVESY GmbH & Co. KG

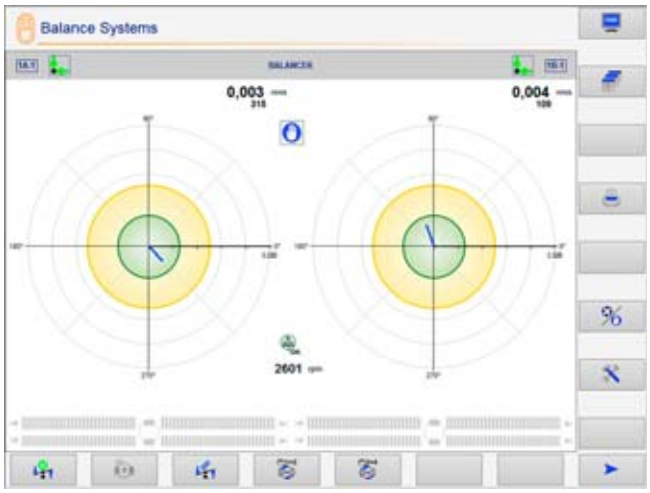
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Balance Systems S.r.l. – VM25 system

Overview



Versatile modular system for measuring and monitoring grinding machines – VM25 system

The VM25 system includes the hardware and software components required to ensure productivity, economy and quality of the grinding process – using either manual or automatic operations.

Benefits

- Complete:
  Permits comprehensive customization of the user interface, data display, setup and commands, with graphic libraries
- Flexible:
  Various application levels – from templates for immediate use to complex layouts tailored to the user's requirements
- Can be integrated:
  One Windows-based application integrates the control and process monitoring functions into the SINUMERIK HMI
- Intelligent:
  Comprehensive process data collection for effective control of the process
- Available:
  Open architecture for additional expansions

Function

The user interface VM25-HMI can be easily integrated by the user into a user application program, or activated as an independent task that can be used immediately.

Thanks to a complete programming interface based on an Active X library, the program can interact with the devices and the operator for managing the following functions:

- Balancing the grinding wheel in 1 or 2 planes, made possible by high-precision balancing heads without torque effect (patented), to achieve the best possible quality.
- Using acoustic, hydrophone and power sensors:
  - Determining the grinding wheel contact to optimize the machining and finishing cycles
  - Recording of the normal cutting characteristic patterns to monitor and signal process irregularities
- Absolute and comparative in-process measurement of the workpiece, with immediate correction feedback signal to the CNC/PLC for diameters, lengths and current positions, as well as for roundness deviations (patented), to avoid missing parts and to secure consistent production quality
- FFT analysis to monitor machine vibration and diagnose faulty components
- Data collection referred to measurements, internal and external events – with subsequent transfer of this data to other suitable media for process analysis
- Network connection to a remote PC, in the master or slave mode, via teleservice

Integration

The VM25 system can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK PCU 50.5 Windows 7

More information

Balance Systems S.r.l.

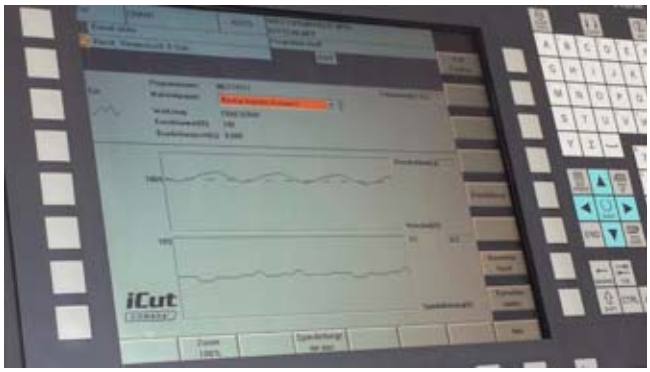
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9

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Overview



iCut – automatic feedrate adjustment according to cutting conditions

The intelligent software iCut can do a lot more than just monitor the cutting process. It also measures the spindle power and automatically adjusts the feedrate depending on the cutting conditions.

Variations in machining allowance or cutter contact angle, different depths of cut, increased hardness or tool wear – all these are taken into account to set the fastest feedrate possible and the slowest feedrate necessary. The ideal feedrate in any situation. With an unparalleled response time.

Benefits

- Up to 10 percent saving
- Higher process safety
- Overload protection

Function

Automatic feedrate adjustment according to cutting conditions

Integration

iCut can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7 and SINUMERIK Operate
  - with SINUMERIK TCU and SINUMERIK Operate

More information

Comara KG

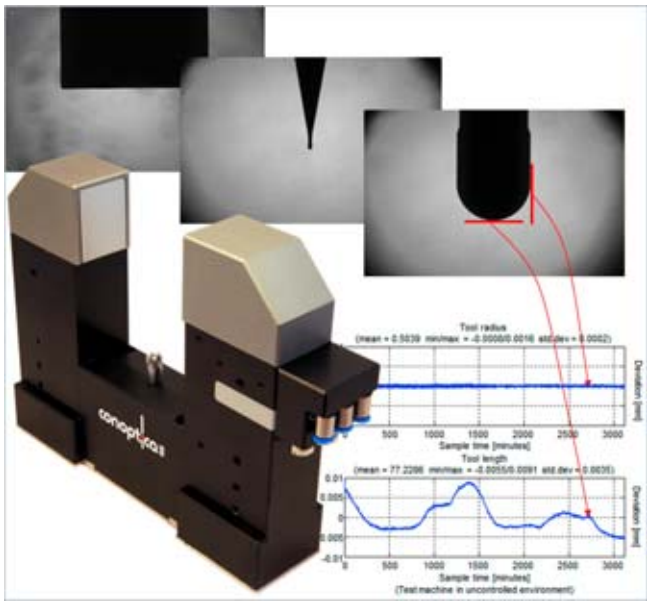
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Conoptica AS – CU2 Tool

Overview



CU2 Tool – Intelligent camera-based sensor for non-contact tool measurement

The CU2 Tool sensor head is placed inside the machine tool and communicates directly with the CNC. The camera-based CU2 Tool ensures reliable operation. Proprietary digital cleaning techniques eliminate the effects of contamination (oil, chips, water, etc.) before positions and dimensions for milling, grinding or customer-specific tools are determined.

Benefits

- High-speed position and geometry measurements for milling and grinding tools
- Digital correction procedures ensure that results are reliable and precise
- Unsupervised 24-hour operation possible
- Camera technology permits the measuring of additional tool types and geometries
- Measurement of rounded forms improves the accuracy of 5-axis milling operations

Function

- Measurement of tool width, length and radius
- Performs tool wear analyses
- Measures out-of-roundness
- Measurements at spindle operating speed
- Automatic setup for common milling tools
- Capability of creating specific measurement arrangements for measuring customer-specific tools
- Uses reference models
  - Creation of a reference for a milling tool and its sister tools
  - The measurements use the reference to ensure the quality of the result
  - Shared use of references between CU2 tool sensors
- Choice between optimization of measuring accuracy or measurement speed
- Shows a live video of the rotating tool and freeze images after tool measurement
- Flexible mounting by use of bridges or separate configuration

Integration

CU2 Tool can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with SINUMERIK TCU

More information

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9

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Overview



Modular system for balancing and process monitoring

The DS6000 has a modular and expandable design and can be combined to suit the requirements of any project. This innovative concept is highly flexible in terms of its ability to meet customer requirements, provides the user with an increased range of features and is very easy to operate.

The DSCC software (DITTEL System Control Center) was developed for Windows-based automation systems. Operators have a comprehensive range of functions at their disposal, including the display of balancing, AE and measurement control signals on the operator panel and the transfer of PC and device settings to other machines via RS232C, Ethernet or USB interfaces as XML files. This enables time-saving series commissioning as well as problem-free resetting to factory defaults.

The systems are also able to be used independently of a controller with the DITTEL RC6000 or PC6000 remote controls. The intelligent visualization of information supplied by the monitoring systems supports operators in optimally utilizing the manufacturing potential of a plant, and, as a result, allow them to achieve significant overall reductions in process costs.

Benefits

- Wide range of modular balancing and process monitoring systems with visualization directly on the operator panel
- All-in-one-solution with in-process measurement, balancing and AE-monitoring
- Convenient systems with contactless signal and power transmission, wear and maintenance-free
- Customized balancing heads are adapted to spindle installation space and required capacities – as well as high speeds
- Large selection of AE sensors for use on grinding and tool spindles as well as dresser/dressing spindles
- Collision detection, reduction of air grinding, process visualization and optimization

Function

- Simple and easy-to-use systems with operator panel display
- Flexible connection to the CNC possible via e.g. PROFIBUS and integration via ActiveX interface
- Software options for extended function analysis, e.g. envelope curve, spectrum
- Series commissioning and various storage options

Integration

The DS6000 can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK PCU 50.5 Windows 7

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EMUGE-FRANKEN GmbH & Co. KG – Precision tools

Overview



Precision tools that save time and money

EMUGE-FRANKEN is a group of companies that offers state-of-the-art thread cutting, testing, clamping and milling technology – and has done so for over 90 years.

Our products:

- Taps
- Thread gauges
- Thread cutters
- Tapping chucks
- Twist drills
- HSS milling cutters
- VHM milling cutters
- Threading dies
- Workpiece clamping

The broadly based customer sectors include, alongside the automotive industry, also the power plant and aeronautical industry, as well as mechanical and plant engineering. 50 % of the products are exported throughout the world.

Over 1000 employees in Lauf and Rückersdorf, Germany, as well as 300 employees worldwide are responsible for the extensive range of products and services offered. All activities are targeted at optimizing manufacturing processes, to show the customer solutions that will save time and money.

With a range of tools that comprises more than 110000 items, EMUGE-FRANKEN covers a broad spectrum in order to satisfy the growing requirements of the market. Apart from the ex-stock standard product range, special tools are developed in cooperation with customers which are tuned to the respective process and to the machine requirements.

Overview (continued)

A team of experts provides the following services for the products offered by EMUGE-FRANKEN:

- Worldwide hotline advice and support for the solution of technical problems
- Cooperation for planning overall concepts and suggestions for optimizing the production procedure at the customer's site
- Trials are implemented free-of-charge with customer-specific materials in a purpose-built test area for optimum tool selection and recommendation
- Development and construction of customer-specific special tools
- Deployment of service technicians
- Provision of product-related training and seminars worldwide

More information

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Overview



The ETALON solution – volumetric machine calibration with sub-micron-accuracy

Using the ETALON system, the geometric variations of a machine can be measured quickly and very accurately. The traversing paths of the machine are automatically traced in space by the LaserTRACER and evaluated using a patented process. Extremely high accuracy is achieved as a result of distance measurements in space using a high-resolution interferometer. The procedure is also used to calibrate highly accurate coordinate measuring devices.

The interferometer has a resolution of 1 nm with a maximum measuring length of 15 m. The LaserTRACER-MT with a measuring radius of between 260 and 940 mm can be used as an alternative. The automatically generated compensation data can then be directly transferred to a SINUMERIK CNC. When the option SINUMERIK VCS (Volumetric Compensation System) is installed, the systematic variations detected are compensated over the entire working range of the machine. This usually multiplies the spatial accuracy of the machine.

Benefits

- Extensive, highly accurate geometry analysis of the machine in a short time
- Significant increase in the accuracy of the machine due to full error compensation in combination with the option: SINUMERIK Volumetric Compensation System VCS
- Highest accuracy even after long periods of operation, collision or lowering of the foundation as a result of machine recalibration
- Use on machine tools with any traversing range and coordinate measuring instruments

Function

- Calibration of linear and rotary axes
- High-speed machine testing in accordance with ISO 230, implementation of the diagonal measurement according to ISO 230-6, and circularity test without manual alignment
- Calculation of compensation data with TRAC-CAL
- Verification of compensation data with TRAC-CHECK

Integration

The ETALON solution can be used for the following CNC:

- SINUMERIK 840D sl:
  - with the SINUMERIK option CEC (Cross Error Compensation)
  - with the SINUMERIK option VCS (Volumetric Compensation System) linear and rotary axes

More information

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HAINBUCH GmbH – TESTit

Overview



TESTit – clamping force measurement on the clamping device

The TESTit clamping force gauge can be used to measure clamping forces at clamping devices. The measured values are transferred via Bluetooth and displayed by the TESTit software in the SINUMERIK CNC.

Benefits

The clamping force must be very high for large, solid components and very low for delicate components. It is only by precise measurement that the ideal clamping force can be determined and then subsequently reproduced. Standards and regulations also stipulate regular evaluation of the maintenance condition of the clamping device based on clamping force measurements.

- Guarantees the perfect clamping force whatever the application
- Maintenance of the clamping devices only if required
- Rapid detection of changes in the process such as
  - Contamination on clamping device
  - Worn hydraulic unit
- Higher productivity thanks to consistent quality

Function

- Clamping force for external and internal clamping
- Suitable for rotating (at speed) and stationary applications
- Data transfer via Bluetooth to the CNC
- Li-ion rechargeable battery for operating periods in excess of 5 hours
- Software for visualization and archiving of measured data

Integration

The TESTit software can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK PCU 50.5 Windows 7

More information

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Hofmann GmbH & Co. KG – AB 9000 ring balancing system

Overview



AB 9000 ring balancing system

The AB 9000 ring balancing system is based on a brilliantly simple concept. The vibrations generated on rotating systems due to imbalance are actively and quickly eliminated as the system rotates. Two balancing rotors are permanently mounted on the tool spindle via thin ring bearings. A fast, intelligent controller uses sensors to detect the imbalance in the spindle, calculates and adjusts the position of the two balancing rotors electromagnetically until they are ideally positioned to compensate the imbalance.

Benefits

- Automatic (active) balancing of all kinds of rotors
- Balancing during operation without machine shutdown
- Implementation of test imbalance for the purpose of system identification
- Generation of unbalance for acceptance tests

Function

- Automatic (active) balancing of rotors (e.g. grinding wheels, grinding spindles, turning chucks, fans) in one or two planes with imbalance monitoring
- Active balancing during operation without machine shutdown
- Ring-shaped balancing unit for efficient, space-saving integration into the rotor
- Very fast balancing even at high rotational speeds by electromagnetic actuator and adaptive balancing process
- Non-contact, wear-free transmission of actuator energy between stator and balancing ring
- Pre-balancing software for manual correction of basic unbalance - AB 9000 then only balances the new operational unbalances.
- Balancing unit can be neutralized, e.g. for pre-balancing.
- Indication of remaining balancing capacity
- PC operating software

Integration

The AB 9000 can be used for the following CNCs:

- SINUMERIK 828D
  with separate PC
- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with separate PC

More information

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Hyla Soft – Services

Overview



Hyla Soft – world-class system integration for SINUMERIK Integrate

Hyla Soft is a world-class system integrator and solution innovator specialized in IT consulting and delivery for the manufacturing industry. Hyla Soft provides technology solutions, end to end, across diverse industry sectors including Automotive, Aerospace, Machining, Food & Beverage, Oil & Gas, Life Sciences, Healthcare and Government. Leveraging its people, global software partnerships and cutting-edge product portfolio, Hyla Soft gives manufacturers a competitive edge in access to real-time data and information from the shop floor to executive management levels.

Siemens's proven, long-running experience in CNC technology, combined with Hyla Soft's strong background in providing the highest-level consulting, implementation and support for the CNC industry's IT environment, can create a competitive advantage for clients in the machining industry. This powerful team can help customers achieve, and ultimately surpass both their production and business goals. With its international presence, Hyla Soft is in a position to provide the highest-quality technical resources and support anywhere in the world.

The SINUMERIK Integrate for production components Hyla Soft specializes in are:

- Manage MyPrograms for CNC machine integration and DNC solutions
- Manage MyTools for tool management systems

Benefits

- Machine data acquisition, DNC and tool management functions in a single software suite
- Native system integration with SINUMERIK 840D sl CNCs
- System can be expanded to include CNCs supplied by external companies
- Technical experts with extensive hands-on experience in the CNC machining production environment
- Global product maintenance and support

Function

- Automatic machine data acquisition: Downtimes, CNC alarms, part counts, scrap and reason codes
- Automatic KPI calculation: OEE, MTBF, MTTR, machine utilization, machine availability, performance
- Analysis tools for performance evaluation and cause analysis
- Central management of CNC programs and CNC tools
- Automatic transmission of CNC programs to machine control systems
- Revision management of CNC programs
- Tracking and tracing of tools
- Automatic tool balancing

More information

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Overview



VIDEO VISION EVI –
monitors your machines and production plant

VIDEO VISION EVI allows you to view the live images of up to 4 tilting and zooming cameras directly on the control interface without an additional monitor or PC. It enables you to monitor the process perfectly, particularly in setup mode, so that you can react promptly and safely in the case of an emergency when there is no one else in the machining area.

Benefits

Cameras

We can supply you with special cameras for any application, ranging from miniature cameras to high-quality, digital HDSDI cameras. These can be static devices or variants with tilt and zoom capability. We can find exactly the right camera for your application.

Recording and remote access

With our video servers, we are offering you a ring buffer. Should damage to your installation or equipment occur, you can use this buffer to trace the history of events leading up to the damage and so identify the original cause of the problem. Our video server also allows you remote access to live images or recordings.

Monitor and beamer

At your request, we can also display the image on a separate monitor or beamer. This function is particularly useful for schools, trade fairs or presentations.

Cables

Everything you need is integrated into the hybrid trailing cable that we developed ourselves. The video signal, the control signal and the camera power supply can all be transferred through this cable.

Integration

VIDEO VISION EVI can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK PCU 50.5 Windows 7

More information

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KUKA Roboter GmbH – Industrial robots

Overview



KUKA – leading global supplier of industrial robots

KUKA Roboter GmbH with headquarters in Augsburg, Germany, is part of KUKA Aktiengesellschaft and one of the leading global suppliers of industrial robots. Their core area of expertise is the development, production and marketing of industrial robots, controls and software.

The company is the market leader in Germany and Europe, and is in third place worldwide. KUKA Roboter GmbH is represented by its 25 subsidiaries in the most important markets in Europe, America and Asia.

The mxAutomation interface, a product of KUKA Roboter GmbH, enables KUKA robots to interface easily with SINUMERIK 840D sl. Operation of the robot, including parts management, is implemented on a SINUMERIK operating panel front. The operator therefore has a "single point of operation".

Benefits

- Fast integration of robot automation in production
- Easy operation and programming with SINUMERIK
- Dedicated channel for handling
- Programming in the NC program or teaching of the robot with SINUMERIK
- SINUMERIK 840D sl as a central operating station: Single point of operation
- Easy retooling
- Integration of alarm system and diagnostics

Application

Possible application areas in machine tool automation:

- Loading and unloading of machines
- Chaining several machines
- Handling workpiece pallets
- Tool change
- Cleaning workpieces
- Blowing off assemblies
- Sorting
- Quality control and measuring
- Labeling
- Deburring

Industries and target groups:

- Electrical engineering
- Plastics industry
- Clean-room sector
- Photovoltaics

More information

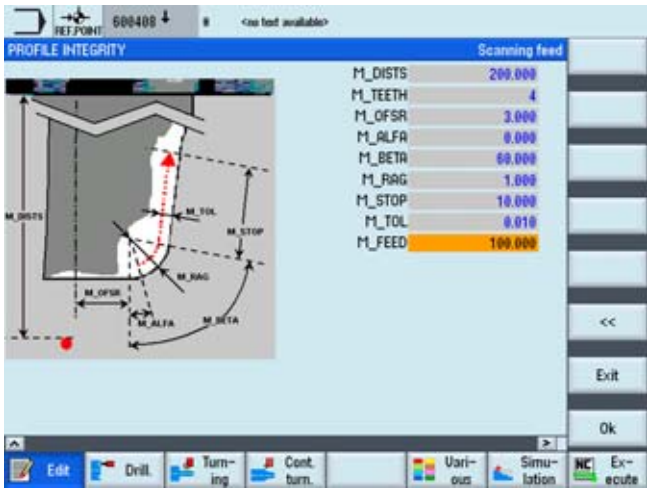
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Overview



Laser Tool Setter – Automatic non-contact tool setting, part probing, machine and tool monitoring on machine tools

Marposs provides measuring cycles for part probing and tool setting which work in synergy with Marposs Probing Systems. The specific user interface makes programming easy.

All the necessary measurements can be performed on the part and on the tool for rapid setup of the machine. High-speed monitoring of the part, before and after the machining cycle as well as continuous monitoring of the machining conditions, can be performed by Marposs Probing and Monitoring Systems.

Benefits

- Fast, automatic and precise workpiece setup
- Tool presetting in machine condition to compensate axes thermal drift
- Tool and process verification to keep high production quality
- Part inspection on machine to avoid repositioning

Function

Tool measurements with Mida laser:

- Length and diameter of the tool
- Axial breakage
- Cutters integrity
- Cutters radius
- Compensation of the thermal drift of the machine axes

Part measurements with Mida spindle probes:

- Part positioning
- Measuring of drilled holes, pins, pockets and shoulders
- Single surface measurement
- Measuring the internal and external cross-arm

Machine and tool monitoring with MMS:

- Performance (tool breakage and wear)
- Force (cutting force optimization)
- Vibrations (machine condition and tool unbalancing)
- Temperature (overheating of bearings)
- Displacement (spindle growth)

Integration

Laser Tool Setter and probing systems can be used for the following CNCs:

- SINUMERIK 828D
- SINUMERIK 840D sl

More information

MARPOSS S.p.A.

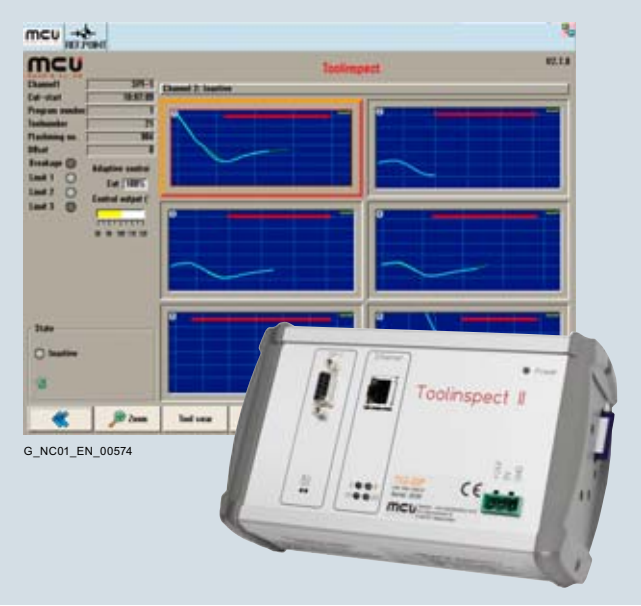
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MCU GmbH & Co. KG – Toolinspect II

Overview



Toolinspect II – Tool and process monitoring

The Toolinspect II module communicates with the SINUMERIK CNC via PROFINET or PROFIBUS DP. Visualization on the operator panel of the CNC is implemented with the module via a TCP/IP interface.

Benefits

- Easy operation using 3 function keys
- Tool damage detected immediately (real time system)
- Machine cycle time is not increased
- Automatic adaptation to any type of machining without intervention by the machine operator
- Rugged flash memory

Function

- Control-integrated tool, process and machine analysis
- 19 languages available online and selectable at any time
- Adaptive control for roughing operations to reduce machining times (option)
- Automatic system and data backup on 4 GB SD card
- Read out of torque and path actual data
- Monitoring of up to 6 channels (6 simultaneous machining operations)
- Monitoring after tool change
- Integrated process analysis and process reports in PDF/Excel files (option)
- Process analysis with evaluation capability for technologists and export function of the actual values and display of the data in Excel
- Evaluation of MDE production data and up to 250 faults (option)
- Link to SINUMERIK Integrate

Integration

Toolinspect II can be used for the following CNCs:

- SINUMERIK 828D
- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with SINUMERIK TCU

More information

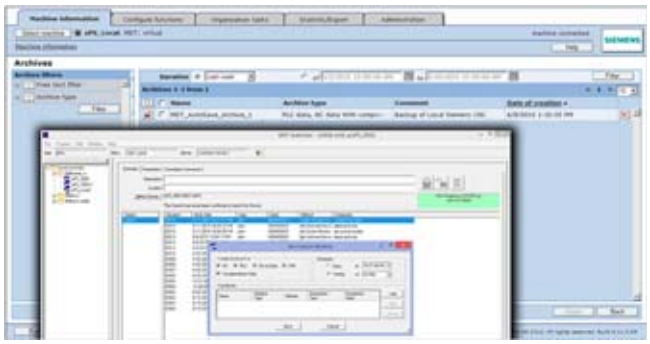
MCU GmbH & Co. KG

Max-Eyth-Straße 51
71364 WINNENDEN
GERMANY

Tel.: +49 7195 137538
E-mail: vertrieb@mcu-gmbh.de
Internet: www.mcu-gmbh.de

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Overview



MDT AutoSave Automation Change Management

MDT AutoSave is the industry's most advanced feature-rich change management for automation programs. AutoSave provides advanced version control, automatic backup and recovery, and program compare features for the most comprehensive range of devices and editors in the industry including STEP 5, STEP 7, SINUMERIK 840D sl CNC, WinCC and more.

Benefits

- Protects, restores, discovers and tracks changes in automation devices
- Automatic backup and recovery reduces downtime and errors
- Detailed change identification protects users and assets
- Supports the greatest range of devices in the industry
- Electronic approval and audit trails increases quality and compliance

Function

- Centralized version control maintains accurate records of which software version is in use, when changes were made and who made the changes.
- A designated number of previous program copies is retained. When a change is made, a new current copy is saved and the oldest copy is marked for later deletion.
- On-demand rapid recovery of failed devices is provided with access to each one's master copies and other revisions.
- Communication parameters are stored on the server for quick retrieval of the correct program.
- The system can be set to periodically check for differences between the device and the current copy of a program stored in AutoSave. If the versions are different, comparison reports detailing the difference(s) is e-mailed to designated users.
- Only authorized users are able to access programs and make changes. Access is controlled by logins and passwords, which authenticate privileges according to the user's group (e.g., maintenance, engineering).
- AutoSave utilizes module extensions to the server that interact directly and uniquely with each 3rd party programming application. This provides a superior level of change control to other products on the market without the need to edit scripts with each new release of 3rd party software.

Integration

AutoSave can be used for the following CNC:

- SINUMERIK 840D sl

More information

MDT Software

3480 Preston Ridge Road
ALPHARETTA, GA 30005
USA

Tel.: +1 678 297 1000
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Internet: www.mdt-software.com

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Mill-IT – ncTOUCH

Overview



ncTOUCH – touch my nc

Easy-to-use, integrated middleware for connecting smart devices to the SINUMERIK 840D sl CNC control.

Benefits

- Runs on any smart device (Web-based)
- Easy scripting language for rapid development
- Customer-specific adaptation of screens
- Full access to SINUMERIK resources (arithmetic parameters, PLC, alarms, etc.)
- Embedded solution for SINUMERIK, no additional hardware required

Function

- Visualization and interaction with SINUMERIK on your smart device
- Create your own screens in your corporate design
- Create apps with individual content (monitoring, alarm processing, specific views, etc.)
- Only scripting expertise is required for programming
- Flexible design functions for maximum portability on any device
- ncTOUCH dynamically creates any Web contents for you, no additional knowledge required

Integration

ncTOUCH can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK TCU

More information

Mill-IT

Johannes-Gutenberg-Straße 7
65719 HOFHEIM
GERMANY

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E-mail: sales@mill-it.de
Internet: www.mill-it.de

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Overview



Tool and process monitoring system

Montronix monitoring systems and the support of the Montronix employees will ensure that you have your machining process under control. Montronix is your competent partner worldwide for all machining tasks.

The visualization software (M-View) enables the machine operator to evaluate the machining process rapidly and precisely. The graphic display indicates process deviations, broken tools, increasing wear, and collisions which can be statistically recorded and evaluated.

The IPM (Integrated Process Monitor) operator control and visualization software combines operation and simultaneous visualization. Communication is implemented via an RS232C or RS485 interface.

It is possible to switch from the machining process to process visualization at any time. A fast, reliable working method is ensured by the clear and simple operation.

Benefits

- Tool monitoring and protection
- Shorter machine downtimes
- Avoidance of faults and reduction in rejects
- Improvement in quality
- Optimization of machining process

More information

Montronix GmbH

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E-mail: info@montronix.de
Internet: www.montronix.de

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Nordmann GmbH & Co. KG – SEM-Modul-e tool monitor

Overview



Tool monitor SEM-Modul-e – tool, process and machine monitoring

Monitoring of active power, acoustic emission, torque, current, force, hydraulic pressure, distance or laser light through various monitoring strategies (e.g. strategic and dynamic limits).

Benefits

- Control/monitoring through internal drive data via PROFIBUS
- Visualization and operation integrated in SINUMERIK NCUs
- Alternatively visualization and operation via external display
- Checking for break and wear, even for the smallest tools, using additional sensors if required
- Upgrade with acoustic sensors for monitoring of workpiece dimensions

Function

- Communication with up to 3 SINUMERIK NCUs via PROFIBUS
- Simultaneous analysis of internal drive data and analog sensor measurement values
- Display of up to 36 different measurement curves simultaneously
- Operator input integrated in the control or via touch screen
- Integrated user management

Integration

Tool Monitor SEM-Modul-e can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK PCU 50.5 Windows 7
  - with SINUMERIK TCU

More information

Nordmann GmbH & Co. KG

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50354 HÜRTH
GERMANY

Tel.: +49 2233 9688-36
E-mail: sales@nordmann.eu
Internet: www.nordmann.eu

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Overview



Adaptive Control & Monitoring System (ACM)

ACM optimizes feedrate, prevents tool breakage and optimizes tool utilization

OMATIVE's ACM is offered as a software application integrated into Siemens SINUMERIK 840D sl CNCs. A seamlessly integrated software solution, it is a real-time approach to machining optimization that addresses actual cutting conditions, tool wear level, and workpiece material characteristics. The ACM's unique expert system continuously calculates optimal feed rates for current cutting conditions, specific cutting tool and workpiece material, and adjusts cutting feeds in real-time. The ACM screen continuously displays cutting tool condition and indicates when to change worn tools.

Benefits

- Increases production
- Reduces machining costs
- Extends life of tools and machines
- Maintains higher workpiece quality
- Reduces waste and promotes sustainability

Function

Adaptive control mode:

- Reduces cycle time
- Prevents tool overload and breakage
- Extends tool life
- Protects tools, spindle, parts and machine tool
- Produces reports with machining data

Monitoring mode:

- Protects tools, spindle, parts and machine tool
- Detects conditions of:
  - Tool overload
  - Tool breakage
  - Missing tools or parts
  - Tool wear
  - Erroneously repeated part runs
- Alerts operators to dangerous conditions
- Halts machining in conditions of overload or tool breakage

Integration

The Adaptive Control & Monitoring System (ACM) can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK NCU
  - with SINUMERIK PCU 50.5 Windows 7

More information

OMATIVE Systems Europe GmbH

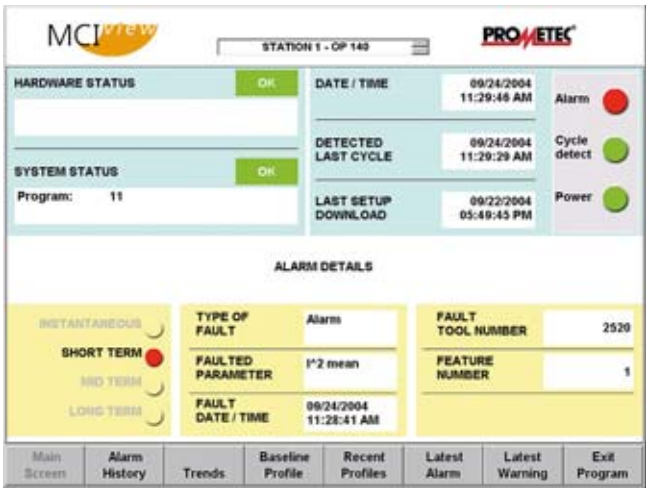
Rudolf-Diesel-Straße 12
78048 VILLINGEN SCHWENNINGEN
GERMANY

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E-mail: info@omative-europe.de
Internet: www.omative.com

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PROMETEC GmbH – MCIview

Overview



MCI – Machine Condition Indicator with MCIview software

Using a sensor mounted on the spindle housing, MCI acquires the vibration signals from a machine tool fully automatically and continuously in all the different machine states of the production process.

The objective is to generate, store and monitor trends – characteristics measured for each cycle, cut or tool are stored (maximum values, performance values, average values, standard deviations). If these characteristic values exceed a defined threshold, a warning or alarm is displayed. This system allows early detection of typical symptoms of wear on the machine and critical changes in the cutting process.

MCIview provides the machine operator with a simple overview of the functions and allows quick access to the machine data without connecting a laptop computer or any other equipment.

Benefits

- Increased reliability and faster maintenance
- Condition analysis of spindle, slide and bearings (condition-oriented maintenance)
- Process acquisition, tool for tool and cut for cut (machine and process optimization)
- Process monitoring

Function

- (Trend) signal data and warnings/alarms can be viewed on the CNC
- Alarms can be exactly allocated with MCIview; the most recent data can be viewed for a preliminary analysis
- Only 1 vibration sensor on the spindle housing
- Tool seat detection and tool imbalance monitoring (option)

Integration

MCIview can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK TCU and SINUMERIK Operate

More information

PROMETEC GmbH

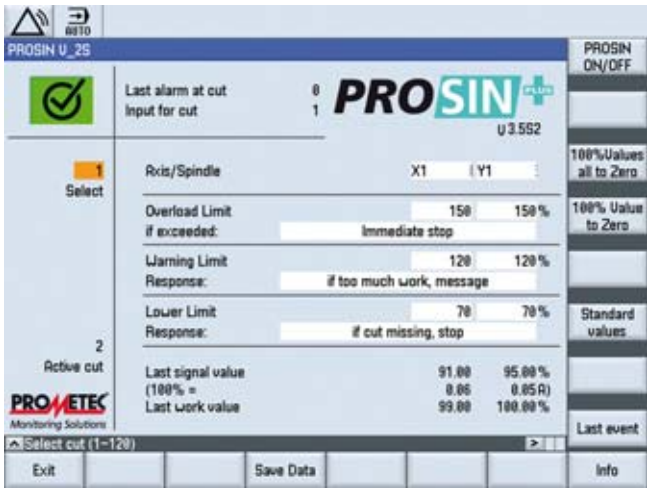
Jülicher Straße 338
52070 AACHEN
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Tel.: +49 241 16609-0
E-mail: prometec-de@prometec.com
Internet: www.prometec.com

9

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Overview



PROSIN[PLUS] tool breakage and tool wear monitoring

The low-cost PROSIN[PLUS] software permits direct access to the current values of the digital drives of the machine tool. If a tool breaks, the current of the associated drive changes; this value is increased in the case of a blunt tool. With PROSIN[PLUS], additional sensors and even complete monitoring units can be omitted.

A particular highlight of PROSIN[PLUS] is the reliable detection of wear on rough-machining tools. This assumes mass production in which the batch size is significantly larger than the number of working tools.

PROSIN[PLUS] is patented according to EP 1 276 027 and its derivations.

Benefits

- Break detection for drills, from approx. 2 mm (0.08 in) (depending on rated spindle power)
- Protects machine, tool holder and tool from overload
- Reduces secondary damage resulting from tool breakage, tool wear, incorrect CNC parameter entries, incorrect clamping of the workpieces, etc.
- Suitable for mass production as well as small batch sizes

Function

- Operator control using SINUMERIK operator panels
- No additional hardware required
- Only one operator side and extremely easy to operate
- Very easy to retrofit
- Up to 120 different cuts of a CNC program can be monitored with 3 thresholds for missing tool, tool in contact with workpiece, tool wear, and tool overload

Integration

PROSIN[PLUS] can be used for the following CNCs:

- SINUMERIK 828D
- SINUMERIK 840D sl
  with SINUMERIK TCU and SINUMERIK Operate

More information

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PROMETEC GmbH – PROVIS (PROMOS 2)

Overview



PROVIS – Modular tool and process monitoring system PROMOS 2 with PROVIS software

The modular process monitoring system PROMOS 2 provides fast collision detection and reliable tool monitoring for all machining processes.

Benefits

- Avoidance of most tool breakage incidents by prompt, automatic tool replacement
- Tool or workpiece damage is minimized, consequential damage prevented
- Increase in productivity without increased use of personnel
- Increase in quality through process optimization
- Reduction of machining times and improvement of part quality

Function

- Detection of tool breakage
- Detection of tool wear
- Detection of idle passes
- Detection of tool contact
- Functions for the visualization and, therefore, diagnosis and optimization of the machining operations
- Option: further monitoring functions, higher number of tools that can be monitored

Integration

PROVIS can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK TCU and SINUMERIK Operate

More information

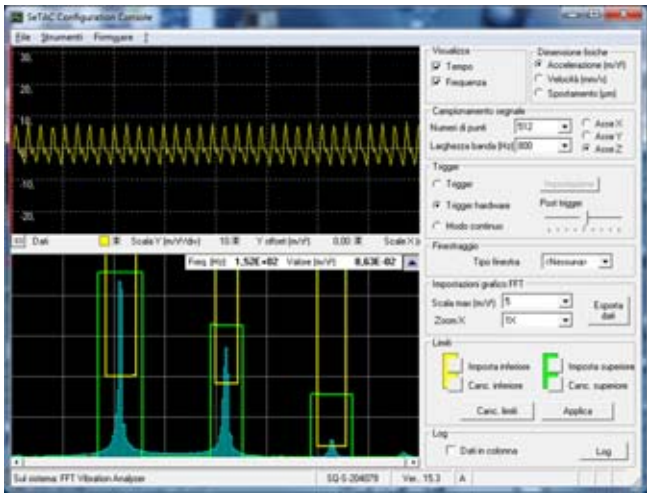
PROMETEC GmbH

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Internet: www.prometec.com

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Overview



SeTAC - Total vibration control onboard machine tools

SeTAC (SEQUOIA Triaxial Acceleration Computer) is a compact and complete device, installed onboard the machine, able to measure, analyze and store the most significant vibration phenomena of the machine tools. SeTAC is able to protect the machine, to improve the manufacturing process, to perform preventive maintenance activities and to store machine information as a black box.

The SeTAC sensor is also able to communicate directly with numeric control adapting the machine performance to real time vibration status, and to provide by remote information the vibration history of the machine and the real time situation for diagnostic.

Benefits

- Fast collision reaction and black box
- Preventive maintenance planning
- Improve your manufacturing process
- Machine protection from excessive vibration, overloads, chattering and any unexpected vibration phenomena
- Real time data and black box remotely available by Internet connection

Function

- Fast digital outputs with reaction time lower than 1 ms
- Fieldbus (PROFIBUS, PROFINET or other) communication on board
- Three axes digital accelerometer
- No need of periodical calibration
- Internal clock calendar and flash memory to catalog any alarms and vibration problem
- Extremely robust and reliable: specifically designed for machine tool environment
- Able to be connected by web thanks to Ethernet port both for black box checking and real time diagnostic
- HMI for SINUMERIK CNC

Integration

SeTAC can be used for the following CNC:

- SINUMERIK 840D sl
  with SINUMERIK PCU 50.5 Windows 7

More information

SEQUOIA IT s.r.l.

Via Einaudi 25
10024 MONCALIERI (TO)
ITALY

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E-mail: info@sequoia.it
Internet: www.sequoia.it

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TechSolve – Viz-Adapter MTConnect

Overview



Viz-Adapter MTConnect

TechSolve's VizProducts adapter software offers MTConnect support for SINUMERIK 840D sl CNCs so that information can be recorded with the open source standard of MTConnect to improve the interoperability between devices and software applications. With the adapter software, combined with tool information, users can extract the control mode, the execution status, the program name, and block, line and variable information such as messages and alarms. Customer-specific versions are available which can provide almost any SINUMERIK variable. Typical applications are machine monitoring, measuring the overall equipment efficiency (OEE), alarm tracking, and monitoring of productivity.

Benefits

- Simple integration into NCU or PCU
- Starts and runs at system boot – invisible to the operator
- Operates with the agent software from MTConnect Institute (usually installed on the CNC). This ensures long-term compatibility and support.
- Customer-specific versions are available to provide almost any CNC variable or additional functions and logic.

Function

- Axes position: actual, load
- Spindle: speed, load, speed override (%), direction, mode (INDEX or SPINDLE)
- Feedrate: actual, controlled, override (%), rapid traverse override (%)
- Control: status, mode, execution mode, program, block, line, number of parts, path positon, message, program comment, single block, tool ID, tool name, emergency stop
- Status: system (displays the alarm messages of the machine)
- Sampling rate 1/s: higher sampling rates available as customer-specific modification

Integration

The VizProducts adapter software can be used for the following CNC:

- SINUMERIK 840D sl:
  - with SINUMERIK NCU and SINUMERIK Operate
  - with SINUMERIK PCU and SINUMERIK Operate

More information

TechSolve

6705 Steger Drive
CINCINATTI, OH 45237
USA

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Internet: www.techsolve.org

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Appendix



10/2 **Certificates of suitability**

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10/4 Information and Ordering Options on the Internet and DVD
10/5 Information and Download Center Social Media, Mobile Media

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Overview



Many products in this catalog comply with UL/CSA and FM requirements and are labeled with the corresponding approval mark.

All of the certificates of suitability, approvals, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated 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 are used for their intended purpose.

In other cases, the vendor of these products is responsible for arranging for new certificates to be issued.

UL: Underwriters Laboratories
Independent testing body in North America

Test symbol:

- **UL** for end products,
  tested by UL in accordance with the UL standard
- **cUL** for end products,
  tested by UL in accordance with the CSA standard
- **cULus** for end products,
  tested by UL in accordance with the UL and CSA standards
- **UR** for built-in parts in end products,
  tested by UL in accordance with the UL standard
- **cUR** for built-in parts in end products,
  tested by UL in accordance with the CSA standard
- **cURus** for built-in parts in end products,
  tested by UL in accordance with the UL and CSA standards

Test standards:

- SINUMERIK: Standard UL 508
- SINAMICS: Standard UL 508C
- Motors: Standard UL 547

Product category/File No.:

- SINUMERIK: E164110
- SINAMICS: E192450
- Motors: E93429

TUV: TUV Rheinland of North America Inc.
Independent testing body in North America
National recognized testing laboratory (NRTL)

Test symbol:

- **cTUVus** Tested by TUV in accordance with the UL and CSA standards

CSA: Canadian Standards Association
Independent testing body in Canada

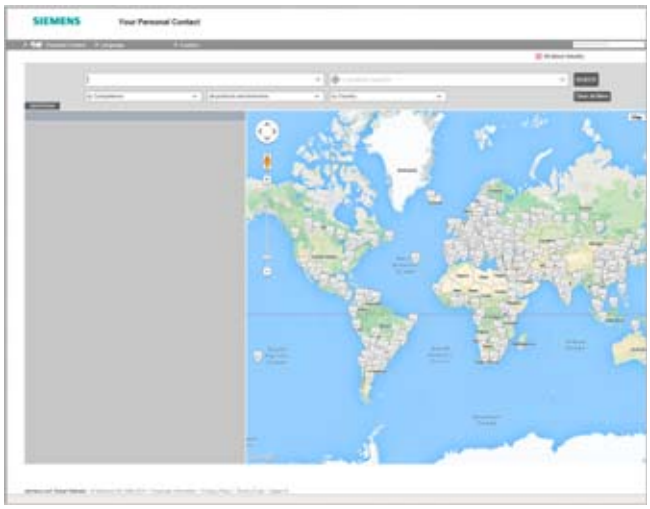
Test symbol:

- **CSA** Tested by CSA in accordance with the CSA standard

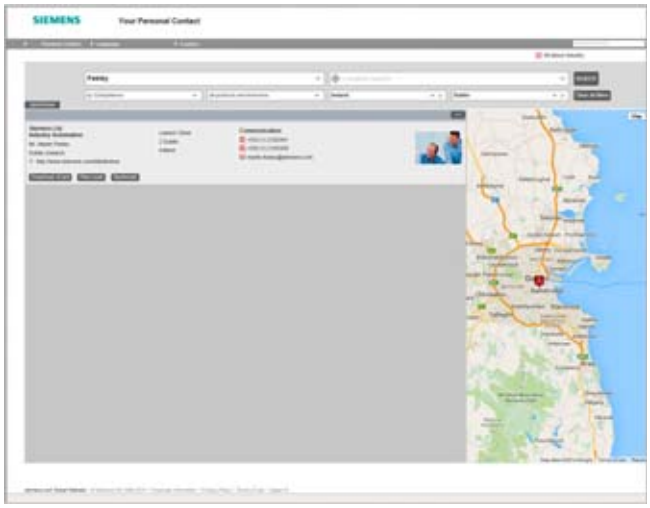
Test standard:

- Standard CAN/CSA-C22.2/No. 0-M91/No. 14-05/No. 142-M1987

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At Siemens we are resolutely pursuing the same goal: long-term improvement of your competitive ability.
We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:

www.siemens.com/automation/partner

You start by selecting

- the required competence,
- products and branches,
- a country,
- a city

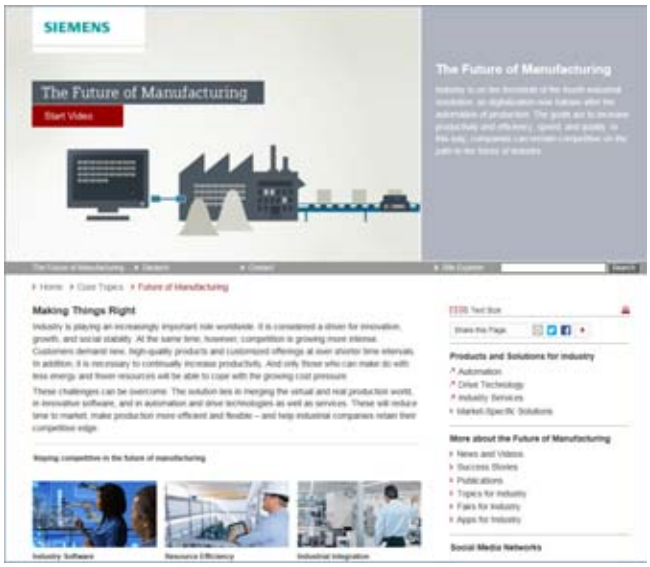
or by a

- location search or
- person search.

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Information and Ordering Options on the Internet and DVD

The Future of Manufacturing on the Internet



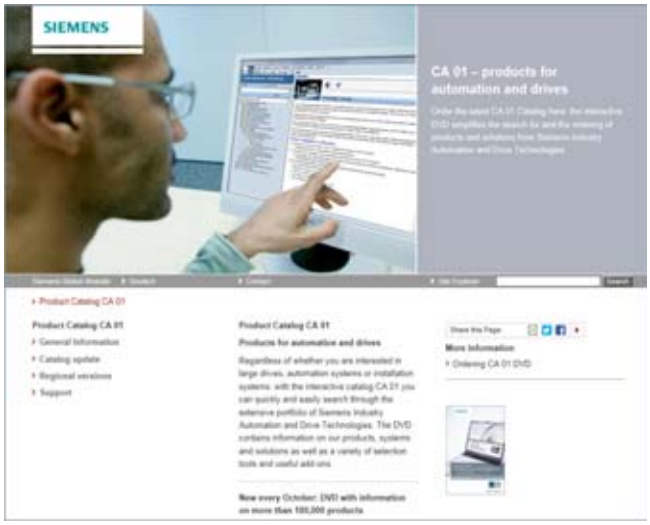
Detailed knowledge of the range of products and services available is essential when planning and engineering automation systems. It goes without saying that this information must always be as up-to-date as possible.

Industry is on the threshold of the fourth industrial revolution as digitization now follows after the automation of production. The goals are to increase productivity and efficiency, speed, and quality. In this way, companies can remain competitive on the path to the future of industry.

You will find everything you need to know about products, systems and services on the internet at:

www.siemens.com/industry

Product Selection Using the Interactive CA 01 Automation and Drives Catalog



Detailed information together with user-friendly interactive functions:
The CA 01 interactive catalog covers more than 100,000 products, thus providing a comprehensive overview of the product range provided by Siemens.

You will find everything you need here for solving tasks in the fields of automation, switching, installation and drives.
All information is provided over a user interface that is both user-friendly and intuitive.

You can order the CA 01 product catalog from your Siemens sales contact or in the Information and Download Center:

www.siemens.com/industry/infocenter

Information about the CA 01 interactive catalog can be found on the Internet at:

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure, from selection through ordering to tracking and tracing, to be carried out online. Availability checks, customer-specific discounts and bid creation are also possible.

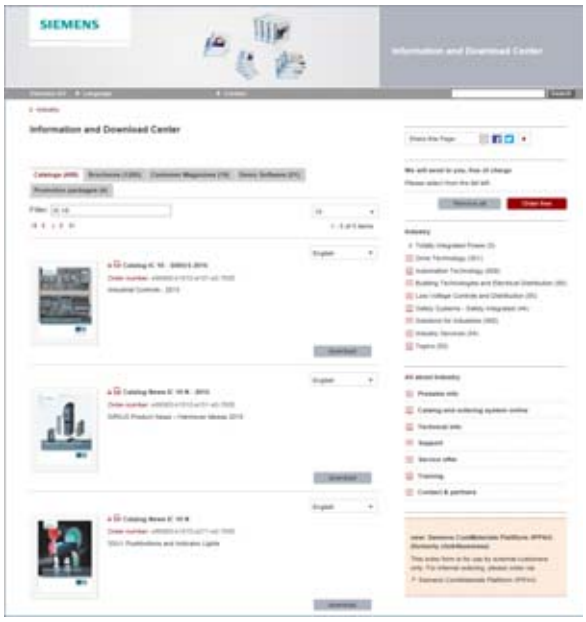
Numerous additional functions are provided for your support. For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

You can find the Industry Mall on the Internet at:

www.siemens.com/industrymall

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Downloading Catalogs



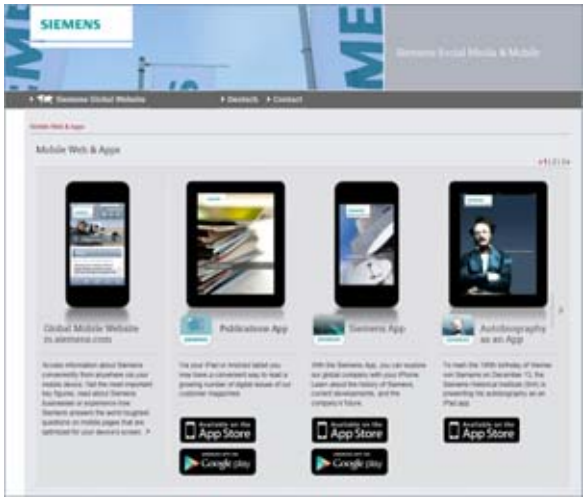
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. You can download these catalogs in PDF format without having to register.

The filter dialog above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "IC 10", both the IC 10 catalog and the associated news or add-ons are displayed.

Visit us at:

www.siemens.com/industry/infocenter

Social and Mobile Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

To find out more about Siemens' current social media activities, visit us at:

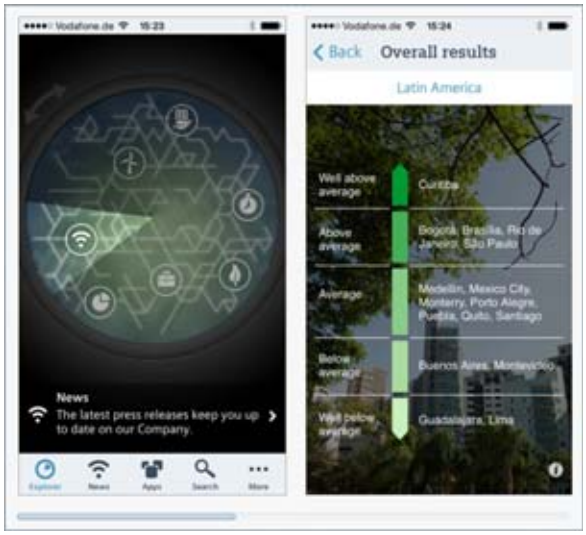
www.siemens.com/socialmedia

Or via our product pages at:

www.siemens.com/automation
www.siemens.com/drives

Connect with Siemens Industry at our central access point to read all the news on the future of manufacturing, watch current videos and inform yourself about all the latest industry developments:

www.siemens.com/future-of-manufacturing/news.html



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the App Store (iOS) or at Google Play (Android):

https://itunes.apple.com/en/app/siemens/id452698392?mt=8

https://play.google.com/store/search?q=siemens

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

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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 delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies 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.

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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

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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.

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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.

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Overview

ServicePack

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License key

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The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

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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.

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Setup texts and software update services

Overview

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Overview (continued)

Software update services

Order
To order the software update service, an article number must be specified. The software update service can be ordered when the software products are ordered or at a later date. Subsequent orders require that the ordering party is in possession at least of a single license.

Note:
It is recommended that the software update service is ordered as early as possible. If a new software version of a software product is released for delivery by Siemens, only those customers will receive it automatically who are entered in the appropriate delivery list at Siemens at this time. Previous software versions, or the current software version are not supplied when the software update service is ordered. The software update service requires that the software product is up-to-date at the time of completion of the contract for the software update service.

Delivery
When a software update service is ordered, you will be sent the contractual conditions of this service and the price is due for payment. At the same time, you will be included in a delivery list for the software product to be updated. If Siemens releases a new software version for the corresponding software product for general sale (function version or product version), it will be delivered automatically to the goods recipient specified in the delivery address within the contract period.

More information

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Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in^2	lb-ft^2	lb-in-s^2	lb-ft-s^2 slug-ft^2	kg-cm^2	kg-cm-s^2	gm-cm^2	gm-cm-s^2	oz-in^2	oz-in-s^2
lb-in^2	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
lb-ft^2	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
lb-in-s^2	386.08	2.681	1	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
lb-ft-s^2 slug-ft^2	4.63×10^{3}	32.17	12	1	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
kg-cm^2	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s^2	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^{5}	1000	5.36×10^{3}	13.887
gm-cm^2	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s^2	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in^2	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s^2	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^{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	8.333×10^{-2}	16	0.113	1.152	1.152×10^{-2}	1.152×10^{3}	1.129×10^{6}
lb-ft	12	1	192	1.355	13.825	0.138	1.382×10^{4}	1.355×10^{7}
oz-in	6.25×10^{-2}	5.208×10^{-3}	1	7.061×10^{-3}	7.200×10^{-2}	7.200×10^{-4}	72.007	7.061×10^{4}
N-m	8.850	0.737	141.612	1	10.197	0.102	1.019×10^{4}	1×10^{7}
kg-cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	1	10^{-2}	1000	9.806×10^{5}
kg-m	86.796	7.233	1.388×10^{3}	9.806	100	1	1×10^{5}	9.806×10^{7}
gm-cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-3}	1×10^{-5}	1	980.665
dyne-cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.0197×10^{-6}	1.019×10^{-8}	1.019×10^{-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	1.09×10^{-2}	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	1.09×10^{-3}	1	0.001
m	39.37	3.281	100	1.09	1000	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)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (rpm)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./s)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (rpm)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	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	4.448×10^{5}	4.4482
oz	0.0625	1	28.35	2.780×10^{4}	0.27801
gm	2.205×10^{-3}	0.03527	1	1.02×10^{-3}	N.A.
dyne	2.248×10^{-6}	3.59×10^{-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	6.25×10^{-2}	1	28.35	0.02835	1.93×10^{-3}
gm	2.205×10^{-3}	3.527×10^{-2}	1	10^{-3}	6.852×10^{-5}
kg	2.205	35.27	10^{3}	1	6.852×10^{-2}
slug	32.17	514.8	1.459×10^{4}	14.59	1

Rotation (to convert from A to B, multiply by entry in table)

A \ B	rpm	rad/s	degrees/s
rpm	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	1.745×10^{-2}	1

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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 $^5/_9$		multiply by $^9/_5$ 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	μ
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	μ
Ball bushings	<0.001
Linear bearings	<0.001
Dove-tail slides	~0.2++
Gibb ways	~0.5++

Material Densities

Material	lb-in^3	gm-cm^3
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[1)]

Cross-section mm^2	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

1) The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

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Explanation of the raw material/metal surcharges[1)]

Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium[2)] and/or neodym[2)], 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 surcharges are calculated in accordance with the following criteria:

- Basic official price of the raw material
  Basic official price from the day prior to receipt of the order or prior to release order (daily price) for[3)]
  - Silver (sales price, processed)
  - Gold (sales price, processed)

  and for[4)]
  - Copper (lower DEL notation + 1 %)
  - Aluminum (aluminum in cables)
  - Lead (lead in cables)
- 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

The metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a possible 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)[2)]
8th digit	for neodym (Nd)[2)]

Weight method

The weight method uses the basic official price, the daily price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the daily 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. The raw material weight can be found in the respective product descriptions.

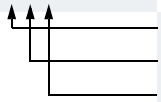
Percentage method

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 basic official price - 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.

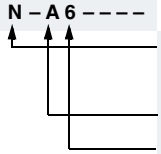
Metal factor examples

L E A – – – – –



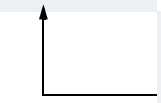
Basis for % surcharge: List price
Silver Basis 150 €, Step 50 €, 0.5 %
Copper Basis 150 €, Step 50 €, 0.1 %
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

N – A 6 – – – –



Basis for % surcharge: Customer net price
No surcharge for silver
Copper Basis 150 €, Step 50 €, 0.1 %
Aluminum acc. to weight, basic offic. price 225 €
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

– – 3 – – – – –



No basis necessary
No surcharge for silver
Copper acc. to weight, basic official price 150 €
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

1) Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).
2) For a different method of calculation, refer to the separate explanation for these raw materials on the next page.
3) Source: Umicore, Hanau (www.metalsmanagement.umicore.com).
4) Source: Schutzvereinigung DEL-Notiz e.V. (www.del-notiz.org).

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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[1)], copper[1)], aluminum[1)], lead[1)], gold[1)], dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor for products containing 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 of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price of the raw material[2)]
  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 basic official price 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.

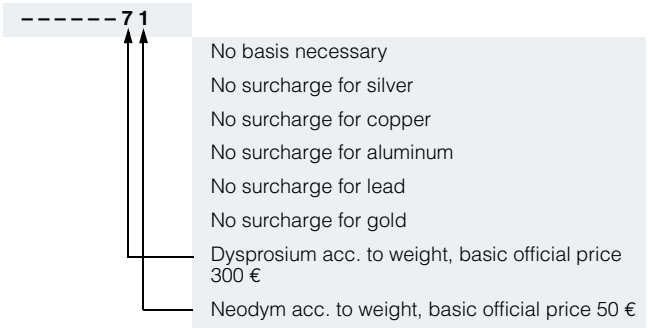
1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)[1)]
3rd digit	for copper (CU)[1)]
4th digit	for aluminum (AL)[1)]
5th digit	for lead (PB)[1)]
6th digit	for gold (AU)[1)]
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

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 basic official price 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



1) For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.
2) Source: Asian Metal Ltd (www.asianmetal.com)

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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
	Price basis (1st digit)						
L	Calculation based on the list price						
N	Calculation based on the customer net price (discounted list price)						
Weight method	**Basic official price in €**						
1	50	Calculation based on raw material weight					
2	100						
3	150						
4	175						
5	200						
6	225						
7	300						
8	400						
9	555						
Miscellaneous							
-	No metal surcharge						

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- the "General Terms of Payment"[1)] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"[1)] and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"[1)].

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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.

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 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 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).

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