# SINUMERIK & SINAMICS
Equipment for
Machine Tools

Catalog News NC 61 N · August 2012

Motion Control

Answers for industry.

SIEMENS

Related catalogs

SINUMERIK & SINAMICS   NC 61
Equipment for Machine Tools

E86060-K4461-A101-A3-7600

SINUMERIK 840D sl Type 1B   NC 62
Equipment for Machine Tools

E86060-K4462-A101-A1-7600

SIMATIC   ST 70
Products for
Totally Integrated Automation
and Micro Automation

E86060-K4670-A101-B3-7600

SIMATIC HMI /   ST 80/ST PC
PC-based Automation
Human Machine Interface Systems
PC-based Automation

E86060-K4680-A101-B8-7600

Industrial Communication   IK PI
SIMATIC NET

E86060-K6710-A101-B7-7600

SITOP   KT 10.1
Power supply
SITOP

E86060-K2410-A111-A8-7600

SITRAIN   ITC
Training for Automation and
Industrial Solutions

Only available in German
E86060-K6850-A101-C3

Products for Automation   CA 01
and Drives
Interactive Catalog

DVD: E86060-D4001-A510-D2-7600

Industry Mall
Information and Ordering Platform
in the Internet:

www.siemens.com/industrymall

CD-ROM for Catalog News
NC 61 N · August 2012

In the CD-ROM that accompanies Catalog News
NC 61 N · August 2012, you will find:
- Information about planning/configuring based on
  the technical documentation; additional technical
  documentation can be found at:
  www.siemens.com/automation/doconweb
- Dimensional drawings of our motors in PDF/
  DXF format or via CAD CREATOR
  www.siemens.com/cadcreator
- Glossary for the explanation of terms and
  functions
- Catalog NC 61 · 2010 in electronic form
  (PDF format)
- Catalog News NC 61 N · August 2012 in
  electronic form (PDF format)

Hardware and software requirements:
- Intel Pentium 1 GHz or higher
- Minimum 512 MB of RAM
- Screen resolution 1024 x 768 pixels
- CD-ROM drive, at least 16x
- Windows XP/Vista
- Acrobat Reader 7.0 or higher
- MS Internet Explorer V6.0 (SP2) or higher

Start
Insert the CD-ROM into the CD-ROM drive.
The program starts automatically.
If the AutoRun function is not activated in your system, start file
start.hta from the CD-ROM using the Windows Explorer.

Note
Installation is not necessary to view the information on this
CD-ROM. This does not apply, however, when using dimensional
drawings in DXF format.

Hotline
Please send any questions or suggestions to:
docu.motioncontrol@siemens.com

Motion Control
SINUMERIK & SINAMICS Equipment for Machine Tools
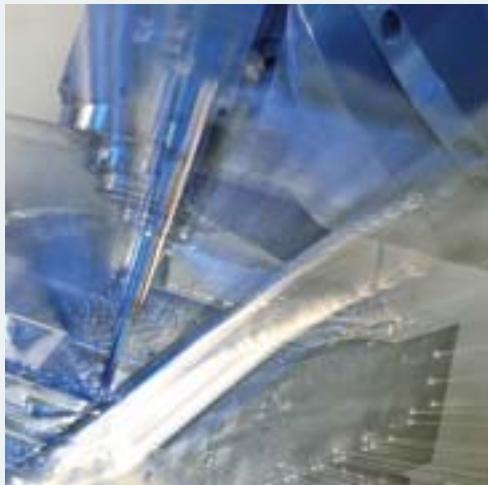
Catalog News NC 61 N · August 2012

Supersedes:
Catalog NC 61 · 2010 chapters 2 and 10

Refer to the Industry Mall for current updates of this catalog:
www.siemens.com/industrymall

The products contained in this catalog can also be found in the electronic catalog CA 01.
Order No.:
E86060-D4001-A510-D2-7600

Please contact your local
Siemens branch

© Siemens AG 2012

Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

ERP – Enterprise Resource Planning

PLM – Product Lifecycle Management
- Product Design
- Production Planning and Simulation
- Data Management

Management Level

MES – Manufacturing Execution Systems

SIMATIC IT

Operations Level

SIMATIC PCS 7
Operator System

Maintenance/
Asset Management

Engineering
Station

Energy
Management

TIA Portal

Control Level

SIMATIC PCS 7
Automation
Systems

SINUMERIK
Computer Numeric Control

SIMOTION
Motion Control

SIMATIC NET
Industrial
Communication

SIMATIC Controllers
Modular / PC-based

Field Level

■ PROFIBUS PA

Process Instrumentation

SIMATIC Ident
Industrial Identification

SIMATIC Distributed I/O

**Totally
Integrated
Automation**

☐ HART

☐ IO-Link

Setting standards in productivity and competitiveness.

Totally Integrated Automation.

Plant Engineering
COMOS

■ Ethernet

SIMATIC WinCC
SCADA System

■ Industrial Ethernet

SIMATIC HMI
Human Machine Interface

SIRIUS Industrial Controls

■ PROFINET

■ Industrial Ethernet

■ PROFIBUS

□ AS-Interface

■ KNX GAMMA instabus

SINAMICS Drive Systems

Low-Voltage Distribution

**Totally
Integrated
Power**

SIMOTICS Motors
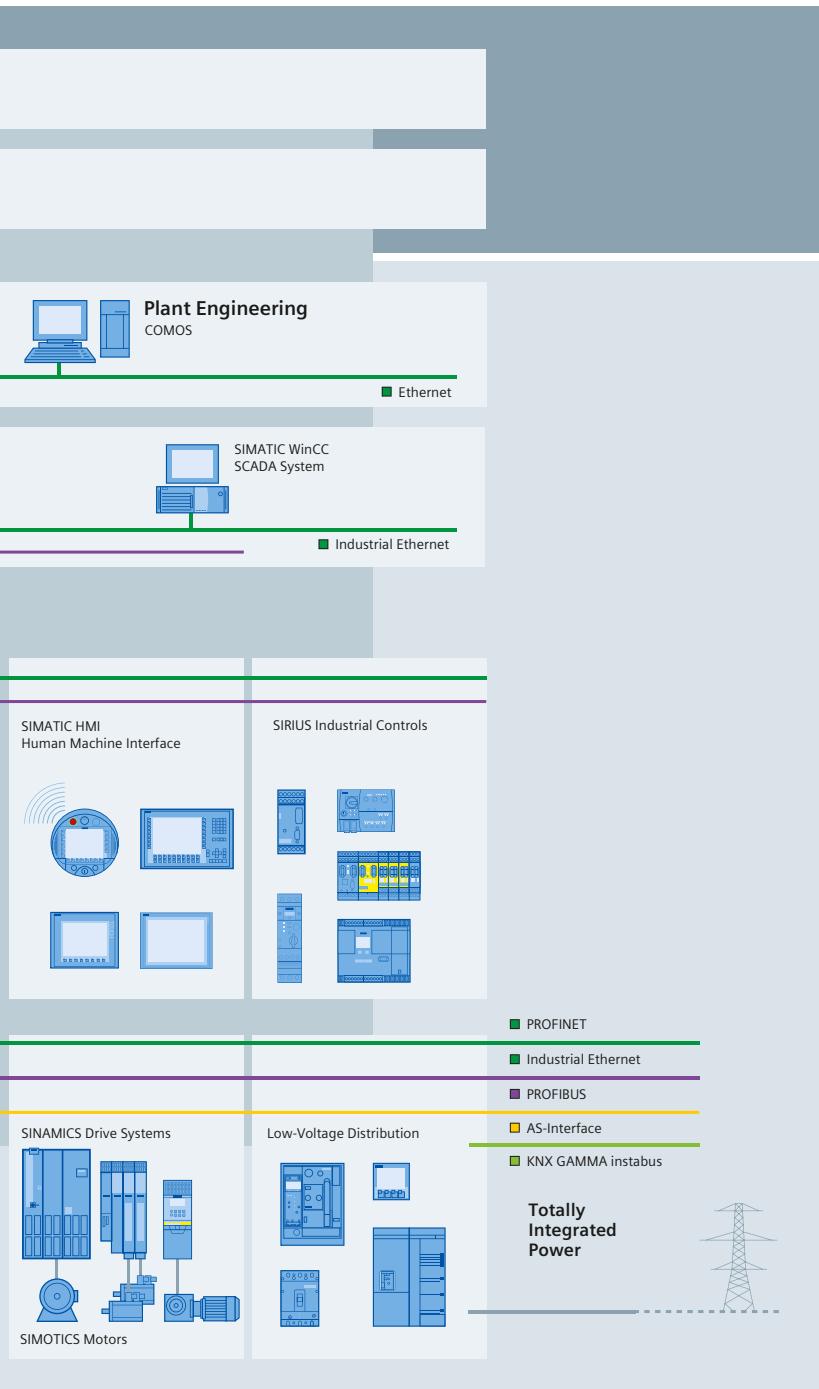
TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.

Thanks to Totally Integrated Automation, Siemens provides an integrated basis for the implementation of customized automation solutions – in all industries from inbound to outbound.

Overview of functions

2

The most important functions of the SINUMERIK 802D sl, SINUMERIK 840Di sl and SINUMERIK 840D sl are listed in the Overview of functions.

Permits quick and selective access to individual functions.

The designation E in the name of the control 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 overview of functions of SINUMERIK controls is based on the following software versions:

Control	Software version
SINUMERIK 802D sl	1.4 SP7
SINUMERIK 840Di sl	1.5 SP4
SINUMERIK 840D sl	2.7 SP1

Overview of functions
SINUMERIK CNCs

2

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), SINUMERIK 840Di sl and SINUMERIK 840D sl are available in two versions.

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

The **standard versions** of SINUMERIK 840Di sl and SINUMERIK 840D sl offer the full scope of control functions, but **require official approval** in accordance with the export list item 2D002 when exported to countries outside the EU.

The **export versions** SINUMERIK 802D sl, SINUMERIK 840DiE sl and SINUMERIK 840DE sl are limited in their 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 labeled here with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods labeled 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 legislation 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 List of Items (Auskunft zur Güterliste (AZG))" pertaining to the official export authorization process is available for each export version (e.g. Federal Office of Economics and Export Control (BAFA), Customs). You can obtain a copy of this list from your local Siemens sales office.

When the standard variant is used, it is important to note that 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 for delivery of software updates and upgrades. This also applies in particular in cases where the control is exported after the machine manufacturer 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 control system is to be exported as an installed component in a machine tool, we recommend that machine manufacturers include any components 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 components is applied for in advance.

Spare parts 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.

Functional restrictions for export versions

The designation E in the name of the control 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 AL item 2D002.

For further details on restricted functionality for the export versions, see the Glossary on the CD-ROM for Catalog NC 61 or go to: www.siemens.com/industrymall

Overview (continued)

Functional restrictions for export versions (continued)

Function	Order No.	SINUMERIK 840DiE sl	SINUMERIK 840DE sl
3-axis transformation PACO for parallel kinematics (1st channel)	6FC5800-0AM44-0YB0	–	–
Axial coupling in the machine coordinate system MCSC	6FC5800-0AM23-0YB0	–	–
Axis collision protection PROT	6FC5800-0AN06-0YB0	–	–
Clearance control CLC, 1D/3D in position control cycle	6FC5800-0AM40-0YB0	▦ 4)	▦ 4)
Compensation of a forced mechanical coupling AXCO	6FC5800-0AM81-0YB0	–	–
Crank interpolation CRIP	6FC5800-0AN04-0YB0	–	–
Double generic transformation DGEN	6FC5800-0AN34-0YB0	–	–
Electronic gear EG	6FC5800-0AM22-0YB0	▦ 2)	▦ 2)
Electronic transfer	6FC5800-0AM35-0YB0	▦ 2)	▦ 2)
Electronic transfer CP	6FC5800-0AM76-0YB0	▦ 2)	▦ 2)
Extrapolated switching signals XOUT	6FC5800-0AN51-0YB0	–	–
Generic coupling CP Basic	6FC5800-0AM72-0YB0	▦ 2)	▦ 2)
Generic coupling CP Comfort	6FC5800-0AM73-0YB0	▦ 2)	▦ 2)
Generic coupling CP Expert	6FC5800-0AM74-0YB0	▦ 2)	▦ 2)
Generic transformation	●	–	–
Handling package	6FC5800-0AS31-0YB0	–	–
Helical interpolation 2D+6	●	–	–
Linear interpolating axes	●	▦ 1)	▦ 1)
Machining package 5 axes	6FC5800-0AM30-0YB0	–	–
Machining package 5 axes, additional function 7th axis	6FC5800-0AS01-0YB0	–	–
Machining package milling	6FC5800-0AM26-0YB0	–	–
Master value coupling and curve table interpolation (LEAD)	6FC5800-0AM20-0YB0	▦ 2)	▦ 2)
Multi-axis interpolation (> 4 interpolating axes)	6FC5800-0AM15-0YB0	–	–
Sag compensation, multi-dimensional	6FC5800-0AM55-0YB0	▦ 5)	▦ 5)
SINUMERIK Integrate Run MyCC (SINUMERIK NCK runtime OA)	6FC5800-0AM04-0YB0	–	–
Space error compensation for kinematic transformations SEC	6FC5800-0AM57-0YB0	–	–
Spatial compensation VCS Rotary	6FC5800-0AN31-0YB0	–	–
Spatial compensation VCS A3	6FC5800-0AN15-0YB0	–	–
Spatial compensation VCS A5	6FC5800-0AN16-0YB0	–	–
Spatial compensation VCS A5 plus	6FC5800-0AN17-0YB0	–	–
Synchronized actions stage 2	6FC5800-0AM36-0YB0	▦ 3)	▦ 3)
Technology package milling SINUMERIK MDynamics 5 axes	6FC5800-0AS33-0YB0	–	–
Tool orientation interpolation	●	–	–
Transformation DOUBLETRANSMIT 2TRA	6FC5800-0AM25-0YB0	–	–
Transformation for pantograph kinematics 2 axes SCIS	6FC5800-0AM51-0YB0	–	–
Transformation handling RCTRA	6FC5800-0AM31-0YB0	–	–
Transformation robotics extended ROBX	6FC5800-0AN54-0YB0	–	–
Transformation TRIPOD HYBRID basis, 5 axes, THYK	6FC5800-0AN36-0YB0	–	–
Vibration extinction VIBX	6FC5800-0AN11-0YB0	–	–

● Basic version
▦ Functional restrictions for export versions
– Not possible

1) The number of simultaneously interpolating axes is restricted to four.
2) The number of simultaneously traversing axes is restricted to four.
3) The number of simultaneously traversing axes is limited to four (path and positioning axes).

4) 1D clearance control only in the position control cycle, and the number of simultaneously interpolating axes is restricted to four.
5) The correctable tolerance band is restricted to 1 mm (0.04 in)

Overview of functions
SINUMERIK CNCs

Control structure and configuration

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
Control structure and configuration			
SINUMERIK 840D sl:			
● NCU 710.2 with PLC 317-2DP		**6FC5371-0AA10-0AA1**	
● NCU 720.2 with PLC 317-2DP		**6FC5372-0AA00-0AA2**	
● NCU 730.2 with PLC 317-2DP		**6FC5373-0AA00-0AA2**	
● NCU 730.2 PN with PLC 319-3PN/DP		**6FC5373-0AA01-0AA2**	
● Seal for external cooling of NCUs		**6FC5348-0AA07-0AA0**	
● Numeric Control Extension NX10		**6SL3040-0NC00-0AA0**	
● Numeric Control Extension NX15		**6SL3040-0NB00-0AA0**	
● Maximum configuration NX10/NX15			
NCU 710.2			
NCU 720.2/NCU 730.2/NCU 730.2 PN			
● Maximum configuration NCU + NX10/NX15 + CU3xx			
NCU 710.2			
NCU 720.2			
NCU 730.2/NCU 730.2 PN			
● Maximum configuration CU3xx			
NCU 710.2	x = no. of NX +1		
NCU 720.2	x = no. of NX +1		
NCU 730.2/NCU 730.2 PN	x = no. of NX +1		
COM01.2 R232C (V.24) module	For NCU 710.2/NCU 720.2/NCU 730.2	**6FC5312-0FA01-0AA0**	
Software for SINUMERIK NCU 710.2/NCU 720.2/NCU 730.2:			
● CNC software 6-3 with HMI-Embedded, export version, on CF card, with license	See Basic components.	**6FC5840-1YG..-.YA0**	
● CNC software 6-3 with HMI-Embedded, on CF card, with license	See Basic components.	**6FC5840-1XG..-.YA0**	
● CNC software 31-5 with HMI-Embedded, export version, on CF card, with license	See Basic components.	**6FC5840-3YG..-.YA0**	
● CNC software 31-5 with HMI-Embedded, on CF card, with license	See Basic components.	**6FC5840-3XG..-.YA0**	
● CNC software 6-3/31-5 with HMI-Embedded, export version, on DVD-ROM, without license	See Basic components.	**6FC5840-3YC..-.YA8**	
● CNC software 6-3 with HMI-Embedded, export version, license		**6FC5840-1YF00-0YB0**	
● CNC software 31-5 with HMI-Embedded, export version, license		**6FC5840-3YF00-0YB0**	
● CNC software 6-3/31-5 with HMI-Embedded, on DVD-ROM, without license	See Basic components.	**6FC5840-3XC..-.YA8**	
● CNC software 6-3 with HMI-Embedded, license		**6FC5840-1XF00-0YB0**	
● CNC software 31-5 with HMI-Embedded, license		**6FC5840-3XF00-0YB0**	
● CNC software 6-3/31-5 with HMI-Embedded, export version, software update service, without license		**6FC5840-3YP00-0YL8**	
● CNC software 6-3/31-5 with HMI-Embedded, software update service, without license		**6FC5840-3XP00-0YL8**	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
						Control structure and configuration				
–	–	–	–	○	○	○		○	○	○
–	–	–	–	○	○	○		○	○	○
–	–	–	–	○	○	○		○	○	○
–	–	–	–	○	○	○		–	–	–
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	3	3					
–	–	–	–	5	5					
–	–	–	–							
–	–	–	–	9	9					
–	–	–	–	13	13					
–	–	–	–	15	15					
–	–	–	–							
–	–	–	–	9 - x	9 - x					
–	–	–	–	13 - x	13 - x					
–	–	–	–	15 - x	15 - x					
–	–	–	–	○	○	●	–	–	–	–
–	–	–	–	○	–	–		●		
–	–	–	–	–	○	–		●		
–	–	–	–	○	–	–		●		
–	–	–	–	–	○	–		●		
–	–	–	–	○	–	–		●		
–	–	–	–	○	–	–		●		
–	–	–	–	○	–	–		●		
–	–	–	–	–	○	–		●		
–	–	–	–	–	○	–		●		
–	–	–	–	–	○	–		●		
–	–	–	–	○	–	–		●		
–	–	–	–	–	○	–		●		

Overview of functions
SINUMERIK CNCs

Control structure and configuration

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Control structure and configuration (continued)

	Notes	Order No.	Order code
Software for SINUMERIK NCU 710.2/NCU 720.2/NCU 730.2 (continued):			
• CNC software 6-3 and ShopMill HMI, export version, on CF card, with license	See Basic components.	6FC5841-1YG..-.YA0	
• CNC software 6-3 and ShopMill HMI, on CF card, with license	See Basic components.	6FC5841-1XG..-.YA0	
• CNC software 31-5 and ShopMill HMI, export version, on CF card, with license	See Basic components.	6FC5841-3YG..-.YA0	
• CNC software 31-5 and ShopMill HMI, on CF card, with license	See Basic components.	6FC5841-3XG..-.YA0	
• CNC software 6-3/31-5 and ShopMill HMI, export version, on DVD-ROM, without license	See Basic components.	6FC5841-3YC..-.YA8	
• CNC software 6-3 and ShopMill HMI, export version, license		6FC5841-1YF00-0YB0	
• CNC software 31-5 and ShopMill HMI, export version, license		6FC5841-3YF00-0YB0	
• CNC software 6-3/31-5 and ShopMill HMI, on DVD-ROM, without license	See Basic components.	6FC5841-3XC..-.YA8	
• CNC software 6-3 and ShopMill HMI, license		6FC5841-1XF00-0YB0	
• CNC software 31-5 and ShopMill HMI, license		6FC5841-3XF00-0YB0	
• CNC software 6-3/31-5 and ShopMill HMI, export version, software update service, without license		6FC5841-3YP00-0YL8	
• CNC software 6-3/31-5 and ShopMill HMI, software update service, without license		6FC5841-3XP00-0YL8	
• CNC software 6-3 and ShopTurn HMI, export version, on CF card, with license	See Basic components.	6FC5842-1YG..-.YA0	
• CNC software 6-3 and ShopTurn HMI, on CF card, with license	See Basic components.	6FC5842-1XG..-.YA0	
• CNC software 31-5 and ShopTurn HMI, export version, on CF card, with license	See Basic components.	6FC5842-3YG..-.YA0	
• CNC software 31-5 and ShopTurn HMI, on CF card, with license	See Basic components.	6FC5842-3XG..-.YA0	
• CNC software 6-3/31-5 and ShopTurn HMI, export version, on DVD-ROM, without license	See Basic components.	6FC5842-3YC..-.YA8	
• CNC software 6-3 and ShopTurn HMI, export version, license		6FC5842-1YF00-0YB0	
• CNC software 31-5 and ShopTurn HMI, export version, license		6FC5842-3YF00-0YB0	
• CNC software 6-3/31-5 and ShopTurn HMI, on DVD-ROM, without license	See Basic components.	6FC5842-3XC..-.YA8	
• CNC software 6-3 and ShopTurn HMI, license		6FC5842-1XF00-0YB0	
• CNC software 31-5 and ShopTurn HMI, license		6FC5842-3XF00-0YB0	
• CNC software 6-3/31-5 and ShopTurn HMI, export version, software update service, without license		6FC5842-3YP00-0YL8	
• CNC software 6-3/31-5 and ShopTurn HMI, software update service, without license		6FC5842-3XP00-0YL8	

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Control structure and configuration (continued)										
–	–	–	–	○	–	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	○	–	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	○	–	–		●	●	
–	–	–	–	○	–	–		●	●	
–	–	–	–	○	–	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	○	–	–		●	●	
–	–	–	–	–	○	–		●	●	
–	–	–	–	○	–	–		●		●
–	–	–	–	–	○	–		●		●
–	–	–	–	○	–	–		●		●
–	–	–	–	–	○	–		●		●
–	–	–	–	○	–	–		●		●
–	–	–	–	○	–	–		●		●
–	–	–	–	○	–	–		●		●
–	–	–	–	–	○	–		●		●
–	–	–	–	–	○	–		●		●
–	–	–	–	–	○	–		●		●
–	–	–	–	○	–	–		●		●
–	–	–	–	–	○	–		●		●

Overview of functions
SINUMERIK CNCs

Control structure and configuration

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Control structure and configuration (continued)			
Software for SINUMERIK NCU 710.2/NCU 720.2/NCU 730.2/NCU 730.2 PN:			
• CNC software 6-3 with SINUMERIK Operate, export version, on CF card, with license	See Basic components.	**6FC5850-1YG..-.YA0**	
• CNC software 31-5 with SINUMERIK Operate, export version, on CF card, with license	See Basic components.	**6FC5850-3YG..-.YA0**	
• CNC software 6-3 with SINUMERIK Operate, on CF card, with license	See Basic components.	**6FC5850-1XG..-.YA0**	
• CNC software 31-5 with SINUMERIK Operate, on CF card, with license	See Basic components.	**6FC5850-3XG..-.YA0**	
• CNC software 6-3/31-5 with SINUMERIK Operate, export version, on DVD-ROM, without license	See Basic components.	**6FC5850-3YC..-.YA8**	
• CNC software 6-3 with SINUMERIK Operate, export version, license		**6FC5850-1YF00-0YB0**	
• CNC software 31-5 with SINUMERIK Operate, export version, license		**6FC5850-3YF00-0YB0**	
• CNC software 6-3/31-5 with SINUMERIK Operate, on DVD-ROM, without license	See Basic components.	**6FC5850-3XC..-.YA8**	
• CNC software 6-3 with SINUMERIK Operate, license		**6FC5850-1XF00-0YB0**	
• CNC software 31-5 with SINUMERIK Operate, license		**6FC5850-3XF00-0YB0**	
• CNC software 6-3/31-5 with SINUMERIK Operate, export version, software update service, without license		**6FC5850-3YP00-0YL8**	
• CNC software 6-3/31-5 with SINUMERIK Operate, software update service, without license		**6FC5850-3XP00-0YL8**	
Data carrier for CNC software:			
• CompactFlash card 1 GB		**6FC5313-5AG00-0AA1**	
• CompactFlash card 8 GB		**6FC5313-6AG00-0AA0**	
SINUMERIK 840Di sl/840DiE sl hardware with CNC software and licenses installed:			
• Current CNC software, export version, on hard disk of the SINUMERIK 840DiE sl (PCU 50.3B-C 1.5 GHz/512 MB + MCI2 board, Windows XP ProEmbSys)	6 axes: L11 20 axes: L12	**6FC5220-0YA31-2AB0-Z L1■ + Q00 + R00**	
• Current CNC software on hard disk of the SINUMERIK 840Di sl (PCU 50.3B-C 1.5 GHz/512 MB + MCI2 board, Windows XP ProEmbSys)	6 axes: L11 20 axes: L12	**6FC5220-0XA31-2AB0-Z L1■ + Q00 + R00**	
• Current CNC software, export version, on hard disk of the SINUMERIK 840DiE sl (PCU 50.3B-P 2.0 GHz/1 GB + MCI2 board, Windows XP ProEmbSys)	6 axes: L11 20 axes: L12	**6FC5220-0YA33-2AB0-Z L1■ + Q00 + R00**	
• Current CNC software on hard disk of the SINUMERIK 840Di sl (PCU 50.3B-P 2.0 GHz/1 GB + MCI2 board, Windows XP ProEmbSys)	6 axes: L11 20 axes: L12	**6FC5220-0XA33-2AB0-Z L1■ + Q00 + R00**	
• CNC software 6-3/20-5, export version, software update service, without license		**6FC5820-3YP00-0YL8**	
• CNC software 6-3/20-5, software update service, without license		**6FC5820-3XP00-0YL8**	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Control structure and configuration (continued)				
–	–	–	–	○	–	●		–	–	–
–	–	–	–	○	–	●		–	–	–
–	–	–	–	–	○	●		–	–	–
–	–	–	–	–	○	●		–	–	–
–	–	–	–	○	–	●		–	–	–
–	–	–	–	○	–	●		–	–	–
–	–	–	–	○	–	●		–	–	–
–	–	–	–	–	○	●		–	–	–
–	–	–	–	–	○	●		–	–	–
–	–	–	–	–	○	●		–	–	–
–	–	–	–	○	–	●		–	–	–
–	–	–	–	–	○	●		–	–	–
○	○	–	–	○	○					
–	–	–	–	○	○					
–	–	○	–	–	–	–	●		●	●
–	–	–	○	–	–	–	●		●	●
–	–	○	–	–	–	–	●		●	●
–	–	–	○	–	–	–	●		●	●
–	–	○	–	–	–	–	○			
–	–	–	○	–	–	–	○			

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Control structure and configuration (continued)				
–	–	○	○	–	–	–				
–	–	○	○	–	–	–	○	–	◆	◆
–	–	○	○	–	–	–				
–	–	○	–	–	–	–	●		●	●
–	–	○	–	–	–	–				
–	–	○	–	–	–	–				
–	–	–	○	–	–	–	●		●	●
–	–	–	○	–	–	–				
–	–	–	○	–	–	–				
●	–	–	–	–	–					
●	–	–	–	–	–					
●	–	–	–	–	–					
–	●	–	–	–	–					
–	●	–	–	–	–					
● 1	● 1	● 1	● 1	● 1	● 1					
1	1					10	10	10	1	1
–	–	2	2	2	2					
–	–	10	10	10	10					
–	–	–	–	4	4					
–	–	–	–	10	10					
–	–	○	○	○	○	○	○	○	–	–
–	–	○	○	○	○	○	○	○	–	–
● 3[1]	● 3[1]	● 5	● 5	● 3	● 3					
–	–	–	–	○	○					
3[1]	3[1]	5	5	15[2]	15[2]					

Overview of functions
SINUMERIK CNCs

Control structure and configuration

2

Basic version ● Option ○ Function is dependent on operating software ◇ Precondition: HMI-Advanced operating software ◆ Not possible –	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
Control structure and configuration (continued)			
HMI user memory, additional on CF card of NCU	[1] On external CF card on front panel. [2] On CF card of NCU, not with HMI on PCU 50.3.	**6FC5800-0AP12-0YB0**	**P12**
Axes/spindles or positioning axes/auxiliary spindle:	[1] With value version: 3/1.		
CNC software 6-3			
CNC software 20-5/31-5			
• Maximum configuration of axes	[1] With value version: 3/1. [2] Display: 3 geometry axes + 2 additional axes + 1 spindle. [3] Display: 3 geometry axes + 2 additional axes + 3 spindles.		
NCU 710.2			
NCU 720.2/NCU 730.2/NCU 730.2 PN			
• Maximum configuration of spindles	[1] With value version: 1.		
NCU 710.2			
NCU 720.2/NCU 730.2/NCU 730.2 PN			
• Maximum configuration axes/spindles, numerically controlled	[1] With value version: 3/1.		
NCU 710.2			
NCU 720.2/NCU 730.2/NCU 730.2 PN			
• Configuration per channel axes incl. spindles	[1] With value version: 3/1.		
NCU 710.2			
NCU 720.2/NCU 730.2/NCU 730.2 PN			
Axis/spindle, each additional	Example: 12 additional axes/spindles: A12	**6FC5800-0AA00-0YB0**	**A01 ... A26**
Positioning axis/auxiliary spindle, each additional		**6FC5800-0AB00-0YB0**	**B01 ... B26**
Multi-axis package (expansion to 31 axes/spindles and 10 channels)	SW 2.7 and higher.	**6FC5800-0AM10-0YB0**	**M10**
PLC-controlled axis	[1] With plus and pro versions.		
PLC positioning axis via PROFIBUS DP			
• Maximum configuration axes/spindles, numerically and PLC-controlled			
NCU 710.2			
NCU 720.2			
NCU 730.2/NCU 730.2 PN			
• Maximum configuration axes/spindles, PLC-controlled	[1] No CNC options required.		
NCU 710.2	[1] Max.15 minus numerically controlled axes/spindles.		
NCU 720.2	[1] Max. 40 minus numerically controlled axes/spindles.		
NCU 730.2/NCU 730.2 PN	[1] Max. 50 minus numerically controlled axes/spindles.		

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Control structure and configuration (continued)										
• 1)	• 1)	–	–	◇ 2)	◇ 2)	○ 2)	–	○	○ 2)	○ 2)
4/1 3/2 1)	4/1 3/2									
–	–	• 3	• 3	• 3	• 3					
–	–	• 5	• 5	• 5	• 5					
4/1 3/2 1)	4/1 3/2	20	20			31	31	31	12 2)	12 3)
–	–	–	–	6	6					
–	–	–	–	31	31					
2 1)	2	20	20			31	31	31	1	3+2C
–	–	–	–	6	6					
–	–	–	–	31	31					
4/1 3/2 1)	4/1 3/2	20	20			31	31	31	12	12
–	–	–	–	6	6					
–	–	–	–	31	31					
4/1 3/2 1)	4/1 3/2	12	12			20 / 20	20 / 20	12 / 12	12 / 1	12 / 3
–	–	–	–	6	6					
–	–	–	–	20	20					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	–	–	○	○					
1 1)	1 1)	•	•	•	•					
–	–	•	•	•	•					
						50	50	–	–	–
–	–	–	–	15	15					
–	–	–	–	40	40					
–	–	–	–	50	50					
						50	50	–	–	–
–	–	–	–	9 ... 15	9 ... 15					
–	–	–	–	9 ... 40	9 ... 40					
–	–	–	–	19 ... 50	19 ... 50					

Overview of functions
SINUMERIK CNCs

Drives

2

		Notes (footnotes are applicable line by line)	Order No.	Order code
●	Basic version			
○	Option		Type (for complete Order No., see notes)	
◇	Function is dependent on operating software			
◆	Precondition: HMI-Advanced operating software			
–	Not possible			

Drives			
SINAMICS S120 booksize compact format			
SINAMICS S120 booksize format, Motor Modules via DRIVE-CLiQ	See SINAMICS S120 drive system.		
SINAMICS S120 CU320 Control Unit via PROFIBUS DP (without CompactFlash card)	See SINAMICS S120 drive system.	6SL3040-0MA00-0A..	
SINAMICS S120 CU320 Control Unit with CBE20 via PROFINET (without CompactFlash card)	See SINAMICS S120 drive system. For positioning tasks via PLC.	6SL3040-0MA00-0A..	
CompactFlash card with current SINAMICS FW version			
• License for basic performance		6SL3054-0AA00-1AA0	
• License with Performance extension firmware option		6SL3054-0AA01-1AA0	
SINAMICS S120 CU310 DP closed-loop control	See SINAMICS S120 drive system. 1) For positioning tasks via PLC with blocksize Power Module.	6SL3040-0LA00-0AA.	
SINAMICS S120 CU310 PN closed-loop control	See SINAMICS S120 drive system. 1) For positioning tasks via PLC with blocksize Power Module.	6SL3040-0LA01-0AA.	
SINAMICS S120 CUA31 Control Unit Adapter	See SINAMICS S120 drive system.	6SL3040-0PA00-0A..	
SINAMICS S120 Sensor Modules Cabinet-Mounted			
• SINAMICS S120 SMC10	See SINAMICS S120 drive system. 1) No SINUMERIK Safety Integrated.	6SL3055-0AA00-5AA.	
• SINAMICS S120 SMC20	See SINAMICS S120 drive system.	6SL3055-0AA00-5BA.	
• SINAMICS S120 SMC30	See SINAMICS S120 drive system. 1) No SINUMERIK Safety Integrated.	6SL3055-0AA00-5CA.	
SINAMICS S120 Sensor Modules External			
• SINAMICS S120 SME20	See SINAMICS S120 drive system.	6SL3055-0AA00-5EA.	
• SINAMICS S120 SME25	See SINAMICS S120 drive system.	6SL3055-0AA00-5HA.	
• SINAMICS S120 SME120	See SINAMICS S120 drive system.	6SL3055-0AA00-5JA.	
• SINAMICS S120 SME125	See SINAMICS S120 drive system.	6SL3055-0AA00-5KA.	
SINAMICS S120 TB/TM Terminal Module			
• SINAMICS S120 TB30		6SL3055-0AA00-2T..	
• SINAMICS S120 TM31	See SINAMICS S120 drive system.	6SL3055-0AA00-3A..	
• SINAMICS S120 TM41	See SINAMICS S120 drive system. 1) SW version 1.5 HF5, SW version 2.5 HF2 and higher.	6SL3055-0AA00-3P..	
• SINAMICS S120 TM15	See SINAMICS S120 drive system.	6SL3055-0AA00-3FA.	
• SINAMICS S120 TM17	1) SW version 2.6 SP1 HF2 and higher plus option N51.	6SL3055-0AA00-3HA.	

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
										Drives
–	–	–	–	–	–					
●	●	–	–	●	●					
–	–	●	●	○	○					
–	–	–	–	○	○					
–	–	○ 1)	○ 1)	○	○					
–	–	–	–	○ 1)	○ 1)					
○	○	–	–	○	○					
○	○	○	○	○	○					
				1)	1)					
				1)	1)					
–	–	○	○	○	○					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	○ 1)	○ 1)					
–	–	○	○	○	○					
–	–	–	–	–	○ 1)					

Overview of functions
SINUMERIK CNCs

Drives

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
Drives (continued)			
SINAMICS S120 expansion modules			
• SINAMICS S120 VSM10	See SINAMICS S120 drive system.	**6SL3053-0AA00-3A..**	
• SINAMICS S120 DMC20	See SINAMICS S120 drive system.	**6SL3055-0AA00-6AA.**	
• SINAMICS S120 DME20	See SINAMICS S120 drive system.	**6SL3055-0AA00-6AB.**	
SINAMICS S120 booksize format Motor Modules, internal air cooling	See SINAMICS S120 drive system.	**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..**	
SINAMICS S120 booksize format Motor Modules, external air cooling	See SINAMICS S120 drive system.	**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..**	
SINAMICS S120 booksize format Motor Modules, cold plate cooling	See SINAMICS S120 drive system.	**6SL3126-1TE13-0A..** **6SL3126-1TE15-0A..** **6SL3126-1TE21-0A..** **6SL3126-1TE21-8A..** **6SL3126-1TE23-0A..** **6SL3126-1TE24-5A..** **6SL3126-1TE26-0A..** **6SL3126-1TE28-5A..** **6SL3126-1TE31-3A..** **6SL3126-1TE32-0A..** **6SL3126-2TE13-0A..** **6SL3126-2TE15-0A..** **6SL3126-2TE21-0A..** **6SL3126-2TE21-8A..**	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software					
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI	
						Drives (continued)					
–	–	–	–	–	–						
○	○	○	○	○	○						
○	○	○	○	○	○						
○	○	○	○	○	○						
○	○	○	○	○	○						
–	–	○	○	○	○						

Overview of functions
SINUMERIK CNCs

Drives

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			
		Type (for complete Order No., see notes)	

Drives (continued)

	Notes	Order No. / Type	Order code
SINAMICS S120 booksize format Active Line Modules, internal air cooling	See SINAMICS S120 drive system.	6SL3130-7TE21-6A.. 6SL3130-7TE23-6A.. 6SL3130-7TE25-5A.. 6SL3130-7TE28-0A.. 6SL3130-7TE31-2A..	
SINAMICS S120 booksize format Active Line Modules, external air cooling	See SINAMICS S120 drive system.	6SL3131-7TE21-6A.. 6SL3131-7TE23-6A.. 6SL3131-7TE25-5A.. 6SL3131-7TE28-0A.. 6SL3131-7TE31-2A..	
SINAMICS S120 booksize format Active Line Modules, cold plate cooling	See SINAMICS S120 drive system.	6SL3136-7TE21-6A.. 6SL3136-7TE23-6A.. 6SL3136-7TE25-5A.. 6SL3136-7TE28-0A.. 6SL3136-7TE31-2A..	
SINAMICS S120 booksize format Active Interface Modules	See SINAMICS S120 drive system.	6SL3100-0BE21-6A.. 6SL3100-0BE23-6A.. 6SL3100-0BE25-5A.. 6SL3100-0BE28-0A.. 6SL3100-0BE31-2A..	
SINAMICS S120 booksize format Smart Line Modules, internal air cooling	See SINAMICS S120 drive system.	6SL3130-6AE15-0A.. 6SL3130-6AE21-0A.. 6SL3130-6TE21-6A.. 6SL3130-6TE23-6A..	
SINAMICS S120 booksize format Smart Line Modules, external air cooling	See SINAMICS S120 drive system.	6SL3131-6AE15-0A.. 6SL3131-6AE21-0A..	
SINAMICS S120 booksize format Smart Line Modules, cold plate cooling	See SINAMICS S120 drive system.	6SL3136-6AE15-0A.. 6SL3136-6AE21-0A..	
SINAMICS S120 chassis format Motor Modules, internal air cooling (rated pulse frequency 2 kHz)	See SINAMICS S120 drive system.	6SL3320-1TE32-1AA. 6SL3320-1TE32-6AA. 6SL3320-1TE33-1AA. 6SL3320-1TE33-8AA. 6SL3320-1TE35-0AA.	
SINAMICS S120 chassis format Motor Modules, internal air cooling (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, internal air cooling (up to 300 kW)	See SINAMICS S120 drive system. 1) SW version 2.6 and higher, max. 2 ALM	6SL3330-7TE32-1AA. 6SL3330-7TE32-6AA. 6SL3330-7TE33-8AA. 6SL3330-7TE35-0AA.	
SINAMICS S120 chassis format Active Line Modules, internal air cooling (up to 900 kW)		6SL3330-7TE36-1AA. 6SL3330-7TE38-4AA. 6SL3330-7TE41-0AA. 6SL3330-7TE41-4AA.	
SINAMICS S120 chassis format Active Interface Modules	See SINAMICS S120 drive system.	6SL3300-7TE32-6AA. 6SL3300-7TE33-8AA. 6SL3300-7TE35-0AA.	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
									Drives (continued)	
○	○	○	○	○	○					
○	○	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	–	–	–	–					
–	–	○	○	○ 1)	○ 1)					
–	–	–	–	–	–					
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Drives

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

Drives (continued)

	Notes	Order No. / Type	Order code
SINAMICS S120 blocksize format Power Modules 230 V 1 AC, internal air cooling	No SINUMERIK Safety Integrated.	6SL3210-1SB10-9UA0 6SL3210-1SB12-3UA0 6SL3210-1SB13-9UA0 6SL3210-1SB10-9AA0 6SL3210-1SB12-3AA0 6SL3210-1SB13-9AA0	
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 6SL3210-1SE16-0UA0 6SL3210-1SE17-7UA0 6SL3210-1SE21-0UA0 6SL3210-1SE21-8UA0 6SL3210-1SE22-5UA0 6SL3210-1SE23-2UA0 6SL3210-1SE23-8UA0 6SL3210-1SE24-5UA0 6SL3210-1SE26-0UA0 6SL3210-1SE27-5UA0 6SL3210-1SE31-0UA0 6SL3210-1SE31-1UA0 6SL3210-1SE31-5UA0 6SL3210-1SE31-8UA0 6SL3210-1SE11-3AA0 6SL3210-1SE11-7AA0 6SL3210-1SE12-2AA0 6SL3210-1SE13-1AA0 6SL3210-1SE14-1AA0 6SL3210-1SE15-9AA0 6SL3210-1SE17-7AA0 6SL3210-1SE21-0AA0 6SL3210-1SE21-8AA0 6SL3210-1SE22-5AA0 6SL3210-1SE23-2AA0 6SL3210-1SE23-8AA0 6SL3210-1SE24-5AA0 6SL3210-1SE26-0AA0 6SL3210-1SE27-5AA0 6SL3210-1SE29-0AA0 6SL3210-1SE29-0UA0 6SL3210-1SE31-1AA0 6SL3210-1SE31-1UA0 6SL3210-1SE31-5AA0 6SL3210-1SE31-5UA0 6SL3210-1SE31-8AA0 6SL3210-1SE31-8UA0	
SINAMICS S120 chassis format Power Modules, 400 V 3 AC, internal air cooling		6SL3310-1TE32-1AA3 6SL3310-1TE32-6AA3 6SL3310-1TE33-1AA3 6SL3310-1TE33-8AA3 6SL3310-1TE35-0AA3	
Hydraulic axis (distributed) for connection as interpolating CNC axis	Coupled via PROFIBUS DP V2 with PROFIdrive V4.1, isochronous for electrical drives, e.g. IAC-R. No SINUMERIK Safety Integrated.	External drive	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI

Drives (continued)

802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
○	○	○	○	○	○					
○	○	○	○	○	○					
–	–	–	–	–	–					
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Drives

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

Drives (continued)			
Synchronous motors			
• SIMOTICS M-1PH8			
• SIMOTICS S-1FT6	1) Not for new applications.		
• SIMOTICS S-1FT7			
• SIMOTICS S-1FK7			
• SIMOTICS L-1FN3			
• SIMOTICS L-1FN6			
• SIMOTICS T-1FW6			
• SIMOTICS M-1FE1			
• 2SP1 motor spindles			
Asynchronous motors (induction motors)			
• SIMOTICS M-1PH8	1) On request.		
• SIMOTICS M-1PH7			
• SIMOTICS M-1PH2			
SINAMICS S120 DRIVE-CLiQ on motor			
• Resolver			
• sin/cos 1 V_{pp} and EnDat			
Connectable measuring systems • Two measuring systems per axis			
• Absolute/incremental encoder installed in SIMOTICS S-1FT6/-1FT7/-1FK7/ SIMOTICS M-1PH7/-1PH8	Integrated in motor via SINAMICS S120 Sensor Modules.		
• Resolver installed in SIMOTICS S-1FT6/-1FK7/ SIMOTICS M-1PH7	Integrated in motor via SINAMICS S120 Sensor Modules.		
• Incremental rotary measuring systems with RS422 (TTL)	Via SINAMICS S120 SMC30 Sensor Modules. 1) For analog spindle, setpoint via MCPA. 2) For analog axes via ADI 4.		
• Linear scale LMS with sin/cos 1 V_{pp}	Via SINAMICS S120 SMC20/SME20 Sensor Modules.		
• Rotary measuring systems with sin/cos 1 V_{pp}	Via SINAMICS S120 SMC20/SME20 Sensor Modules.		
• Linear scale LMS with distance-coded reference marks with sin/cos 1 V_{pp}	Via SINAMICS S120 SMC20/SME20 Sensor Modules.		
• Rotary measuring systems with distance-coded reference marks	Via SINAMICS S120 SMC20/SME20 Sensor Modules.		
• Linear scale LMS with EnDat 2.1	Via SINAMICS S120 SMC20/SME25 Sensor Modules.		
• Rotary measuring systems with EnDat 2.1	Via SINAMICS S120 SMC20/SME25 Sensor Modules.		
• Absolute encoder with SSI interface	For analog axes via ADI 4.		
• Resolver as external machine encoder	Via SINAMICS S120 SMC10 Sensor Modules.		

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Drives (continued)				
–	–	○	○	○	○					
○	○	○ 1)	○ 1)	○ 1)	○ 1)					
–	–	○	○	○	○					
○	○	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
1)	1)	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
● 1)2)	● 1)2)	● 2)	● 2)	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
									Drive functions	
●	●	●	●	●	●					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	–	–	–	–					
–	–	●	●	●	●					
–	–	–	–	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Drive functions

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
Drive functions (continued)			
Full hub functionality DMC20 – Sensor Module Integrated with automatic commissioning behind hub module			
Motor/winding switchover	Not for Sensor Module Integrated.		
Suspended axis/electronic counterweight			
Dynamic energy management (DC link voltage management)			
Runtime meter			
I^2t monitoring for motors			
Changing reference parameters/scaling			
Automatic restart mechanism (servo/infeed)			
Technology function: friction characteristic curve			
Position tracking			
Drive Control Chart DCC			
Drive Based Open Architecture			
Basic positioner			
2 command data sets			
Parallel connection of Motor Modules			
200 V 3 AC possible for booksize/blocksize modules			
Maximum configuration			
• Axes/spindles for current/speed controller cycle of 125 μs			
• Axis/spindles for current/speed controller cycle of 62.5 μs			
• Axes/spindles per NCU/NX for current/ speed controller cycle of 125 μs			
• Axes/spindles per NCU/NX for current/ speed controller cycle of 62.5 μs			
• Direct measuring systems per NCU/NX			
• SINAMICS S120 Motor Modules in chassis format			
Current/speed controller cycle			
• Minimum			
• Maximum			
PROFIBUS DP cycle (corresponds to FIPO cycle)			
• Minimum			
Maximum number			
• Measuring points per NCU/NX			
• Drive data sets			
• Motor data sets			
• Encoder data sets			

2

2/27

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Drive functions (continued)				
–	–	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
–	–	–	–	●	●					
●	●	●	●	●	●					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	●	●					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	–	–					
–	–	–	–	●	●					
4	4			31	31					
–	–			11	11					
–	–			6	6					
–	–			2	2					
–	–	3	3	3	3					
				2	2					
–	–			62.5 μs	62.5 μs					
–	–			250 μs	250 μs					
1.5 ms	1.5 ms			0.5 ms	0.5 ms					
				3	3					
				32	32					
				8	8					
				8	8					

Overview of functions
SINUMERIK CNCs

Axis functions
Spindle functions

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible			
Axis functions			
Traversing range ± 9 decades			
Rotary axis, continuously turning	[1] With plus and pro versions.		
Velocity, max. 300 m/s (984 ft/s)			
Acceleration with jerk limitation			
Programmable acceleration			
Follow-up mode			
Measuring system 1 and 2, selectable			
Feedrate interpolation			
Separate path feed for corners and chamfers			
Travel to fixed stop	[1] With plus and pro versions.		
Travel to fixed stop with Force Control		**6FC5800-0AM01-0YB0**	**M01**
Analog axis	With ADI 4.		
Setpoint exchange		**6FC5800-0AM05-0YB0**	**M05**
Tangential control		**6FC5800-0AM06-0YB0**	**M06**
Position switching signals/cam controller:	[1] Position switching signals only.	**6FC5800-0AM07-0YB0**	**M07**
• Max. number of pairs			
Axis container	SW version 2.6 and higher within 31 axes.		
Advanced Position Control APC		**6FC5800-0AM13-0YB0**	**M13**
Spindle functions			
Analog spindle speed	[1] With MCPA. [2] With ADI 4.		
Digital spindle speed			
Spindle speed, max. programmable value range: 10^6 ... 0.0001 (display: ±999999999.9999)			
5 gear stages			
Automatic gear stage selection			
Oriented spindle stop			
Spindle speed limitation (min./max.)			
Constant cutting rate			
Spindle control via PLC (positioning, oscillation)	[1] With plus and pro versions.		
Changeover to axis mode	[1] With plus and pro versions.		

| SINUMERIK 802D sl | | SINUMERIK 840Di sl/840D sl | | | | Blank field:
Function is not dependent on operating software | | | | |
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Axis functions										
●	●	●	●	●	●					
● 1)	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
● 1)	●	●	●	●	●					
–	–	○	○	○	○					
–	–	●	●	●	●					
–	–	–	–	○	○					
–	–	○	○	○	○					
–	● 1)	○	○	○	○					
	8	16	16	16	16					
–	–	–	–	●	●					
–	–	–	–	○	○					
Spindle functions										
● 1)	● 1)	● 2)	● 2)	–	–					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
● 1)	●	●	●	●	●					
● 1)	●	●	●	●	●					

Overview of functions
SINUMERIK CNCs

Spindle functions
Interpolations

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			
Spindle functions (continued)			
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			
Interpolations			
Floating point accuracy (80 bit floating point accuracy)			
Linear interpolating axes	[1] With value version: 3.		
• Maximum	[1] With value version: 3.		
Circle via center point and end point			
Circle via interpolation point			
Helical interpolation	[1] With value version: 2D+1.		
Universal interpolator NURBS (non-uniform rational B-splines)			
Continuous-path mode with programmable rounding clearance			
Multi-axis interpolation (> 4 interpolating axes)		6FC5800-0AM15-0YB0	M15
Motion control: Advanced Surface		6FC5800-0AS07-0YB0	S07
3-axis compressor	SW version 2.6 and higher in basic version.		
5-axis compressor	SW version 2.6 and higher in basic version.		
Spline interpolation (A, B and C splines)	SW version 2.6 and higher.	6FC5800-0AS16-0YB0	S16
Spline interpolation (A, B and C splines/compressor) for 3-axis machining	Up to SW version 2.5.	6FC5800-0AM16-0YB0	M16
Spline interpolation (A, B and C splines/compressor) for 5-axis machining	Up to SW version 2.5.	6FC5800-0AM17-0YB0	M17
Polynomial interpolation		6FC5800-0AM18-0YB0	M18
Involute interpolation		6FC5800-0AM21-0YB0	M21
Continue machining at the contour (retrace support)	Precondition: Loadable compile cycle and cross-mode actions M43.	6FC5800-0AM24-0YB0	M24
Crank interpolation CRIP	Precondition: Loadable compile cycle.	6FC5800-0AN04-0YB0	N04

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Spindle functions (continued)										
–	–	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
Interpolations										
●	●	●	●	●	●					
● 4[1)	● 4	● 4	● 4	● 4	● 4					
4[1)	4	4	12	4	12					
●	●	●	●	●	●					
●	●	●	●	●	●					
2D+2[1)	2D+2	2D+2	2D+6	2D+2	2D+6					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	–	○	–	○					
–	–	–	–	○	○	○	○	–	–	–
●	–	–	–	●	●					
–	–	–	–	●	●					
●	–	–	–	○	○					
●	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	–	○	–	○	○	○	○	–	–

Overview of functions
SINUMERIK CNCs

Couplings

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			
Couplings			
TRAIL coupled-motion axes			
Synchronous spindle/multi-edge turning COUP		6FC5800-0AM14-0YB0	**M14**
Axial coupling in the machine coordinate system MCSC	Precondition: Loadable compile cycle.	6FC5800-0AM23-0YB0	**M23**
Master value coupling and curve table interpolation (LEAD)	[1] With restricted functionality, see export versions.	6FC5800-0AM20-0YB0	**M20**
Electronic gear EG	[1] With restricted functionality, see export versions.	6FC5800-0AM22-0YB0	**M22**
Pair of synchronized axes (gantry axes) Max. number		6FC5800-0AM02-0YB0	**M02**
Master/slave for drives		6FC5800-0AM03-0YB0	**M03**
Generic couplings CP			
Generic coupling Standard, CP Standard			
• 4 axis pairs in simultaneous coupled motion			
Generic coupling Static, CP Static		6FC5800-0AM75-0YB0	**M75**
• 1 × simple synchronous spindle coupling ratio 1:1			
Generic coupling Basic, CP Basic		6FC5800-0AM72-0YB0	**M72**
• 4 axis pairs in simultaneous coupled motion and • 1 × synchronous spindle/multi-edge turning or master value coupling/curve table interpolation or axial coupling in the machine coordinate system	[1] With restricted functionality, see export versions.		
Generic coupling Comfort, CP Comfort		6FC5800-0AM73-0YB0	**M73**
• 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] With restricted functionality, see export versions.		
Generic coupling Expert, CP Expert		6FC5800-0AM74-0YB0	**M74**
• 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) • 5 × electronic gear for 5 leading axes (with curve tables, with cascading)	[1] With restricted functionality, see export versions. [2] Precondition: NCU 720.2/ NCU 730.2/NCU 730.2 PN.		
Compensation of a forced mechanical coupling AXCO	Precondition: Loadable compile cycle	6FC5800-0AM81-0YB0	**M81**

2

	SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
	802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Couplings											
	–	–	●	●	●	●					
	–	–	○	○	○	○					
	–	–	–	○	–	○					
	–	–	○ 1)	○	○ 1)	○					
	–	–	○ 1)	○	○ 1)	○					
	○ 1	○ 1	○ 8	○ 8	○ 8	○ 8					
	○	○	○	○	○	○					
	–	–	●	●	●	●	●	●	●	–	–
	–	–	–	–	○	○	○	○	○	–	–
	–	–	○ 1)	○	○ 1)	○	○	○	○	–	–
	–	–	○ 1)	○	○ 1)	○	○	○	○	–	–
	–	–	○ 1)	○	○ 1)2)	○ 2)	○	○	○	–	–
	–	–	–	○	–	○	○		–	–	–

Overview of functions
SINUMERIK CNCs

Transformations
Measuring functions/measuring cycles

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

Transformations

	Notes	Order No.	Order code
Cartesian point-to-point (PTP) travel			
TRANSMIT and cylinder surface transformation	[1] With plus and pro versions.	**6FC5800-0AM27-0YB0**	**M27**
Inclined axis		**6FC5800-0AM28-0YB0**	**M28**
Concatenated transformations (inclined axis TRAANG after TRAORI/ cardan millhead/TRANSMIT/TRACYL)			
Transformation handling RCTRA	Precondition: Loadable compile cycle.	**6FC5800-0AM31-0YB0**	**M31**
Transformation robotics extended ROBX	Precondition: Loadable compile cycle	**6FC5800-0AN54-0YB0**	**N54**
Generic transformation	Precondition: Machining package 5 axes or machining package milling.		
Transformation DOUBLETRANSMIT 2TRA	Precondition: Loadable compile cycle.	**6FC5800-0AM25-0YB0**	**M25**
Transformation for pantograph kinematics 2 axes SCIS	Precondition: Loadable compile cycle.	**6FC5800-0AM51-0YB0**	**M51**
3-axis transformation PACO for parallel kinematics (1st channel)	Precondition: Loadable compile cycle.	**6FC5800-0AM44-0YB0**	**–**
Transformation TRIPOD HYBRID basis, 5 axes, THYK	Precondition: Loadable compile cycle.	**6FC5800-0AN36-0YB0**	**N36**
Double generic transformation DGEN	Precondition: Loadable compile cycle.	**6FC5800-0AN34-0YB0**	**N34**

Measuring functions/measuring cycles

	Notes	Order No.	Order code
Measuring stage 1 2 probes (switching) with/without deletion of distance-to-go	See HMI software. [1] 1 probe. [2] With plus and pro versions only. [3] Precondition: MCI board extension.		
Measuring stage 2 Axial measuring, measuring from synchronized actions, cyclic measuring	[1] Precondition: MCI board extension.	**6FC5800-0AM32-0YB0**	**M32**
Measuring cycles for drilling/milling and turning Calibrate workpiece probe, workpiece measurement, tool measurement	[1] SW version 2.6 and higher.	**6FC5800-0AP28-0YB0**	**P28**
Measure kinematics (determine transformation data of rotary axis)		**6FC5800-0AP18-0YB0**	**P18**

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl								
						Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Transformations										
–	●	●	●	●	●					
● 1)	–	○	○	○	○					
–	●	○	○	○	○					
–	–	●	●	●	●					
–	–	–	○	–	○					
–	–	–	○	–	○					
–	–	–	●	–	●					
–	–	–	–	–	○					
–	–	–	–	–	○					
–	–	–	–	–	○					
–	–	–	○	–	○					
–	–	–	○	–	○					
Measuring functions/measuring cycles										
● 1)2)	● 1)	● 3)	● 3)	●	●					
–	–	○ 1)	○ 1)	○	○					
–	–	–	–	○	○	○ 1)	○	○	○	○
–	–	–	–	○	○	○	○	○	○	○

.

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Technologies										
–	●	○	○	○	○					
–	●	○	○	○	○					
–	●	●	●	●	●					
–	●	●	●	●	●					
–	–	○	○	○	○					
–	–	○ [1]	○	○ [1]	○					
–	–	○ [1]	○	○ [1]	○					
–	–	–	○	–	○					
–	–	–	○	–	○					
–	–	–	–	–	○					
–	–	–	–	○	○	○	–	–	–	–
–	–	–	–	–	○ [1]	○	–	–	–	–
–	–	–	–	–	○			–	–	–
–	–	–	–	–	○					
–	–	–	–	–	○			–	–	–
–	–	–	○	–	○					
–	–	–	–	–	○					
–	–	–	–	○	○					

Overview of functions
SINUMERIK CNCs

Motion-synchronized actions

2

		Notes (footnotes are applicable line by line)	Order No.	Order code
●	Basic version			
○	Option		**Type** (for complete Order No., see notes)	
◇	Function is dependent on operating software			
◆	Precondition: HMI-Advanced operating software			
–	Not possible			

Motion-synchronized actions			
High-speed CNC inputs/outputs			
• Digital inputs on-board	[1] Precondition: MCPA. [2] Precondition: MCI board extension.		
• Digital inputs or outputs on-board	[1] Precondition: MCPA. [2] Precondition: MCI board extension.		
• Expansion via SIMATIC S7 I/O 32 digital inputs/32 digital outputs 4 analog inputs/4 analog outputs			
Synchronized actions (max. 24) and high-speed auxiliary function output incl. 3 synchronized functions	Max. 159 elements for synchronized actions. [1] With restricted functionality, see export versions.		
Synchronized actions stage 2	[1] With restricted functionality, see export versions.	**6FC5800-0AM36-0YB0**	**M36**
Positioning axes and spindles via synchronized actions (command axes)			
Analog value control in interpolation cycle (IPO cycle) (Precondition: analog output)	[1] Precondition: SIMATIC DP ET 200 analog module.		
Analog output, path-velocity-dependent Laser power control	[1] Precondition: SIMATIC DP ET 200 analog module.	**6FC5800-0AM37-0YB0**	**M37**
Laser switching signal, high-speed HSLC	Precondition: Loadable compile cycle.	**6FC5800-0AM38-0YB0**	**M38**
Clearance control:			
• 1D in interpolation cycle via synchronized actions			
• Clearance control CLC 1D/3D in position control cycle including in the interpolation cycle	Precondition: Loadable compile cycle [1] With restricted functionality, see export versions.	**6FC5800-0AM40-0YB0**	**M40**
• Clearance control 1D/3D in position control cycle, free direction	Precondition: Loadable compile cycle and M40.	**6FC5800-0AM65-0YB0**	**M65**
Evaluation of internal drive variables (precondition for Adaptive Control)		**6FC5800-0AM41-0YB0**	**M41**
Continuous dressing (parallel dressing, online modification of the tool offset)			
Asynchronous subroutines ASUB:	High-speed CNC inputs/outputs required.		
• Interrupt routines with fast retraction from the contour		**6FC5800-0AM42-0YB0**	**M42**
Cross-mode actions (ASUBs and synchronized actions in all operating modes)		**6FC5800-0AM43-0YB0**	**M43**

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Motion-synchronized actions				
8 1)	8 1)	4 2)	4 2)	4	4					
8 1)	8 1)	4 2)	4 2)	4	4					
–	–	○	○	○	○					
–	–	● 1)	●	● 1)	●					
–	–	○ 1)	○	○ 1)	○					
–	–	●	●	●	●					
–	–	● 1)	● 1)	●	●					
–	–	○ 1)	○ 1)	○	○					
–	–	○	○	○	○					
–	–	●	●	●	●					
–	–	○ 1)	○	○ 1)	○					
–	–	○	○	○	○					
–	–	–	–	○	○					
–	●	●	●	●	●					
–	–	●	●	●	●					
–	–	○	○	○	○					
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Open Architecture
CNC programming language

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

2

Open Architecture			
SINUMERIK Operate Program screens, operating areas and user interfaces			
SINUMERIK Operate programming package (Create MyHMI/3GL) (OEM contract required)	See HMI software for CNC controls.	**6FC5861-1YC00-0YA0**	
		6FC5861-1YC..-.YA0	
		6FC5861-1YP00-0YB0	
		6FC5861-1YP00-0YL8	
		6FC5861-1YC..-.YA8	
SINUMERIK Operate runtime license OA Programming (Run MyHMI/3GL)		**6FC5800-0AP60-0YB0**	**P60**
SINUMERIK HMI copy license CE (Run MyHMI/SIMATIC OP)	For SIMATIC Basic/Comfort Panels	**6FC5800-0AP03-0YB0**	**P03**
SINUMERIK Operate runtime license OA .net		**6FC5800-0AP66-0YB0**	**P66**
SINUMERIK Operate runtime license OA Easy Screen (SINUMERIK Integrate Run MyScreens)	1) Free screens: 5	**6FC5800-0AP64-0YB0**	**P64**
HMI-Advanced			
User interface expansion • Free screens			
SINUMERIK HMI programming package (OEM contract required)	See HMI software for CNC controls. 1) Precondition: PCU 50.3.	**6FC5253-0BX20-0AG0**	
		6FC5253-. BX20-. AG0	
		6FC5253-0BX20-0AG1	
		6FC5253-0BX20-0AG2	
		6FC5253-. BX20-. AG3	
SINUMERIK HMI configuring package WinCC flexible 2008 (OEM contract required)	See HMI software for CNC controls. 1) Precondition: PCU 50.3.	**6FC5253-0CX25-0AG0**	
		6FC5253-. CX25-. AG0	
		6FC5253-0CX25-0AG1	
		6FC5253-0CX25-0AG2	
		6FC5253-. CX25-. AG3	
SINUMERIK HMI copy license OA and Expand User Interface from the 21st screen		**6FC5800-0AP02-0YB0**	**P02**
NCK Open Architecture (SINUMERIK Integrate Create MyCC)			
OA package NCK (Create MyCC)	OEM contract required. 1) On request.		
COA package NCK (Create MyCCI) • Based on Customized Interface	COA contract required.	**6FC5863-1YP00-0YB8**	
COA package NCK Light (Create MyCCI/Interpreter) • Based on Interpreter Interface	COA contract required.	**6FC5863-0YP00-0YB8**	
SINUMERIK NCK runtime OA (Run MyCC)	Precondition: Create MyCC 1) On request.	**6FC5800-0AM04-0YB0**	**M04**
CNC programming language			
Programming language (DIN 66025 and high-level language expansion)			
Main program call from main program and subroutine			
Subroutine levels/interrupt routines, max.	1) SW version 1.5/2.5 and higher.		
Number of subroutine passes ≤ 9999			
Number of levels for skip blocks (/0 to /...)			

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Open Architecture										
–	–	–	–	O	O	O	–	–	–	–
–	–	–	–	O	O	O	–	–	–	–
–	–	O	O	O	O					
–	–	–	–	O	O	O	–	–	–	–
–	–	O	O	O 1)	O 1)	O 1)	–	–	–	–
–	–	◇	◇	◇	◇	–	● 20	● 20	● 20	● 20
–	–	O	O	O 1)	O 1)	–	O	–	–	–
–	–	O	O	O 1)	O 1)	–	O	–	–	–
–	–	O	O	O	O	–	O	O	O	O
–	–	–	–	–	O 1)					
–	–	–	–	–	O					
–	–	–	–	–	O					
–	–	–	O 1)	–	O					
CNC programming language										
●	●	●	●	●	●					
●	●	●	●	●	●					
8/0	8/0	11/4	11/4	16/2 1)	16/2 1)					
●	●	●	●	●	●					
1	1	8	8	8	8					

Overview of functions
SINUMERIK CNCs

CNC programming language

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

CNC programming language (continued)

	Notes (footnotes are applicable line by line)	Order No. Type	Order code
Polar coordinates			
1/2/3-point contours	[1] With value version.		
Dimensions metric/inch, changeover manually or via program			
Inverse time feedrate			
Auxiliary function output:			
• Via M word, max. programmable value range: INT $2^{31}-1$			
• Via H word, max. programmable value range: REAL ± 3.4028 ex 38 (display: ± 999999999.9999) INT $-2^{31}...2^{31}-1$	[1] With plus and pro versions.		
High-level CNC language with:			
• User variables, configurable			
• Predefined user variables (arithmetic parameters)			
• Predefined user variables (arithmetic parameters), configurable			
• Read/write system variables	[1] Restricted scope.		
• Indirect programming			
• Program jumps and branches			
• Program coordination with WAIT, START, INIT			
• Arithmetic and trigonometric functions			
• Compare operations and logic operations			
• Macro technique			
• Control structures IF-ELSE-ENDIF			
• Control structures WHILE, FOR, REPEAT, LOOP			
• Commands to HMI			
• STRING functions			
Program functions:			
• Dynamic preprocessing memory (FIFO)			
• Look ahead			
• Frame concept			
• Inclined-surface machining with frames			
• Axis/spindle replacement			
• Geometry axes, switchable online in the CNC program			
• Program preprocessing	[1] SW version 1.5/2.5 and higher in basic version.	**6FC5800-0AM00-0YB0**	**M00**
Online ISO dialect interpreter			

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						CNC programming language (continued)				
●	●	●	●	●	●					
● 1)	–	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
● 1)	●	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
● 1)	● 1)	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●	–	●	●	●	●
–	–	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	○	○	○ 1)	○ 1)					
●	–	●	●	●	●					

Overview of functions
SINUMERIK CNCs

CNC programming language

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
CNC programming language (continued)			
Program/workpiece management:			
• Part programs on NCU, max. number	In total max. 512 files per directory.		
• Workpieces on NCU, max. number	In total max. 256 directories.		
• Workpieces on hard disk, max. number	In total max. 100000 user files.		
• In additional HMI user memory on CF card of the NCU	In total max. 100000 user files and directories.		
• On additional plug-in CF card	[1] On the front. [2] With PCU 50.3.		
• On integral hard disk of PCU 50.3			
• On USB storage medium, e.g. floppy disk drive, memory stick			
• On network drive	[1] With pro version. [2] Precondition: Managing of network drives. [3] SW version 2.6 and higher in basic version.		
• Templates for workpieces, programs and INI files			
• Job lists			
Number of basic frames, max.			
Number of settable offsets, max.			
Work offsets, programmable (frames)			
Scratching, determining work offset			
Work offsets, external (PLC)			
Global and local user data			
Global program user data			
Display system variables (also via online configurable display) and log them	[1] With PCU 50.3.		

CNC programming language

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
CNC programming language (continued)										
99	99	500	500	1000	1000					
–	–	250	250	250	250	250	250	250	250	250
–	–	1000	1000	○	○	100000	1000		1000	1000
–	–	–	–	○	○					
● 1)	● 1)	◆ 2)	◆ 2)	◆ 2)	◆ 2)					
–	–	●	●	◇	◇	–	●	–	●	●
–	–	○	○	○	○	●	●	●	●	●
● 1)	● 1)	◇	◇	● 3)	● 3)	○ 2)	○ 2)	○ 2)	○ 2)	○ 2)
–	–	◆	◆	◇	◇	–	●	–	–	–
–	–	◆	◆	◇	◇	–	●	–	–	–
1	1	◆	◆	16	16	16	16	16	1	1
6	6	◆	◆	100	100	100	100	100	100	100
–	–	●	●	●	●					
●	●	◆	◆	◇	◇	–	●	●	●	●
–	–	●	●	●	●	●	●	●	●	●
–	–	◆	◆	●	●	●	●	●	●	●
–	–	◆	◆	●	●	●	●	●	●	●
–	–	◆	◆	◇	◇	●	●	–	● 1)	● 1)

Overview of functions
SINUMERIK CNCs

Programming support

2

Basic version Option Function is dependent on operating software Precondition: HMI-Advanced operating software Not possible	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
Programming support			
Program editor:			
• Text editor with editing functions: Selecting, copying, deleting			
• Dual editor			
• Multi-editor, max. 4	Precondition: OP 019		
• Write protection for lines			
• Suppression of lines in the display			
• Machining step programming		**6FC5800-0AP04-0YB0**	**P04**
Multiple clamping of various workpieces	[1] Precondition: P04 [2] Precondition: P17	**6FC5800-0AP14-0YB0**	**P14**
ShopMill/ShopTurn			
• Machining step programming		**6FC5800-0AP17-0YB0**	**P17**
programSYNC			
• Machining step programming		**6FC5800-0AP05-0YB0**	**P05**
Programming support for geometry entries:			
• ProgramGUIDE (programming support for cycles, 1 dynamic programming graphics, animated elements)	[1] SW version 2.5 and higher.		
Geometry processor with programming graphics/ Free contour input (contour calculator)	[1] With plus and pro versions.		
• Screens for 1/2/3-point contours (contour definition programming)			
Programming support for cycles:			
• Screens and stationary auxiliary displays			
• Dynamic programming graphics during programming			
• Programming support can be extended, e.g. customer cycles	[1] On request. [2] With Expand User Interface, see HMI/MMC Commissioning Manual. [3] With SINUMERIK Operate runtime license OA Easy Screen.		
Technology cycles for drilling/milling and turning	[1] SW version 2.5 and higher.		
Pocket milling with free contour definition and islands			
Residual material detection and machining for contour pockets and cutting	[1] Precondition: Machining step programming. [2] SW version 2.6 and higher.	**6FC5800-0AP13-0YB0**	**P13**
Access protection for cycles			
Cycle protection (OEM)	[1] SW version 2.6 and higher.	**6FC5800-0AP54-0YB0**	**P54**
Programming and operator support for machines:			
• ShopTurn HMI			
• Manual machine (ShopTurn manual)		**6FC5800-0AP11-0YB0**	**P11**
• ShopMill HMI			
• ShopTurn HMI/ShopMill HMI for SINUMERIK 840Di sl incl. HMI-Advanced	[1] Up to SW version 1.4.	**6FC5800-0AP15-0YB0**	**–**

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Programming support				
●	●	●	●	◇	◇	●	●	●	●	●
–	–	◆	◆	◇	◇	●	●	●	–	–
–	–	–	–	○	○	●	–	–	–	–
–	–	◆	◆	◇	◇	●	●	●	●	●
–	–	◆	◆	◇	◇	●	●	●	●	●
–	–	◇	◇	◇	◇	–	–	–	○	○
–	–	◇	◇	◇	◇	○ 2)	–	–	○ 1)	–
–	–	◇	◇	◇	◇	○	–	–	–	–
–	–	–	–	◇	◇	○	–	–	–	–
–	–	◆	◆	◇	◇	● 1)	–	–	–	–
● 1)	●	◆	◆	◇	◇	–	●	●	●	●
●	●	◆	◆	◇	◇	–	●	●	●	●
–	–	◆	◆	◇	◇	–	●	●	●	●
–	–	◇	◇	◇	◇	●	–	–	●	●
1)	1)	◆	◆	◇	◇	● 3)	● 2)	● 2)	● 2)	● 2)
●	–	◆	◆	◇	◇	● 1)	●	●	●	●
–	–	◆	◆	◇	◇	–	–	–	●	●
–	–	◇	◇	◇	◇	○ 2)	–	–	○ 1)	○ 1)
●	●	●	●	●	●	●	●	●	●	●
–	–	–	–	○ 1)	○ 1)	○	○	–	–	–
–	–	◇	◇	◇	◇	–	–	–	–	●
–	–	◇	◇	◇	◇	–	–	–	–	○
–	–	◇	◇	◇	◇	–	–	–	●	–
–	–	○ 1)	○ 1)	–	–					

Overview of functions
SINUMERIK CNCs

Programming support
Simulation

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Programming support (continued)

CAD Reader for PC	See HMI software for CNC controls.	**6FC5260-0AY00-0AG1**	
		6FC5260-0AY00-0AG0	
		6FC5260-.AY00-.AG0	
		6FC5260-0AY00-0AG2	
		6FC5260-.AY00-.AG8	

Simulation

Up to *n* channels can be simulated	1) Precondition: programSync option.		
Up to *n* channels can be simulated sequentially			
Several channels and programs can machine the same blank part in succession			
Simulation of program X, while program Y is being executed	1) With NCU 720/NCU 730.		
Quick view for mold-making programs	1) With PCU 50.3. 2) SW version 2.7 and higher.		
Drilling/milling (tool carrier vertical to the workpiece):			
• Single-sided 2D view, dynamic			
• Simulation of milling multiple sides 2D dynamic, 3D static		**6FC5800-0AP21-0YB0**	**P21**
• ShopMill simultaneous recording Real-time simulation of current machining operation		**6FC5800-0AP23-0YB0**	**P23**
Turning (tool carrier vertical to the workpiece):			
• Traverse path simulation without model, broken-line graphics			
• Contour of blank part can be specified			
• Simulation in working plane G18			
• Simulation in working planes G17/G19			
• Full cut/partial cut with circumferential edges, face and cylinder surface, milling and drilling machining operations			
• Counterspindle			
• 3D simulation of the finished part		**6FC5800-0AP20-0YB0**	**P20**
• ShopTurn simultaneous recording Real-time simulation of current machining operation		**6FC5800-0AP24-0YB0**	**P24**
Drilling/milling/turning (tool carrier vertical to the workpiece):			
• Turning			
• Turn-milling			
• Mill-turning with supported kinematics	1) Application-specific by the machine manufacturer.		
• Milling up to 5-axis machining with TRAORI			
• Simultaneous recording (real-time simulation of current machining)		**6FC5800-0AP22-0YB0**	**P22**
• 2D simulation (finished part)			
• 3D simulation 1 (finished part)		**6FC5800-0AP25-0YB0**	**P25**
Grinding and nibbling: • Traverse path simulation without model (broken-line graphics)			

Programming support
Simulation

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Programming support (continued)										
–	–	○	○	○	○					
Simulation										
–	–	2	2	10	10	4 1)	–	–	–	–
–	–	2	2	10	10	1	10	1	1	1
–	–	◆	◆	◇	◇	–	●	–	–	–
–	–	◆	◆	◇	◇	● 1)	●	–	–	–
–	–	◇	◇	◇	◇	● 2)	●	–	● 1)	–
●	–	–	–	–	–	–	–	–	–	–
–	–	◆	◆	◇	◇	–	●	○	●	–
–	–	◇	◇	◇	◇	–	–	–	○	–
●	–	◆	◆	◇	◇	–	●	●	–	–
–	–	◆	◆	◇	◇	–	●	–	–	●
–	–	◆	◆	◇	◇	–	●	●	–	●
–	–	◆	◆	◇	◇	–	●	–	–	●
–	–	◆	◆	◇	◇	–	●	–	–	●
–	–	◆	◆	◇	◇	–	●	–	–	●
–	–	◇	◇	◇	◇	–	–	–	–	○
–	–	◇	◇	◇	◇	–	–	–	–	○
–	–	◆	◆	◇	◇	●	–	–	–	–
–	–	◆	◆	◇	◇	●	–	–	–	–
–	–	◆	◆	◇	◇	● 1)	–	–	–	–
–	–	◆	◆	◇	◇	●	–	–	–	–
–	–	◆	◆	◇	◇	○	–	–	–	–
–	–	◆	◆	◇	◇	●	–	–	–	–
–	–	◆	◆	◇	◇	○	–	–	–	–
–	●	–	–	–	–	–	–	–	–	–

Overview of functions
SINUMERIK CNCs

Operating modes

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Operating modes

	Notes	Order No.	Order code
JOG:			
• Handwheel selection			
• Switchover: inch/metric			
• Manual measurement of work offset			
• Manual measurement of tool offset			
• Automatic tool/workpiece measurement	1) Tool measuring only.		
• Dressing grinding wheels			
• Reference point approach automatic/via CNC program			
MDI:			
• Input in text editor			
• Save MDI program			
• Input screen forms for technology and positioning, cycle support			
Teach-in:			
• Teach positions in MDI buffer			
• Teach-in function handling			
Automatic:			
• Execution from storage medium on rear USB interface of TCU/PCU, e.g. card reader, memory stick			
• Execution of HMI memory on NCU's CF card	1) External CF card on front panel. 2) On external CF card in PCU 50.3. 3) On CF card of NCU, not with HMI on PCU 50.3.	6FC5800-0AP12-0YB0	P12
• Execution from network drive	1) With pro version. 2) Precondition: Managing of network drives. 3) SW version 2.6 and higher.	6FC5800-0AP01-0YB0	P01
• Execution from hard disk	1) On PCU 50.3.		
• Program control			
• Program editing			
• Overstoring			
• DRF offset			
• Block search with/without calculation			
Repos (repositioning on the contour)			
• With operator command/semi-automatically			
• Program-controlled			
Preset			
Set actual value			

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Operating modes										
●	●	●	●	●	●	●	●	●		
●	●	◆	◆	●	●	●	●	●	–	–
●	●	◆	◆	●	●	●	●	●	●	●
●	–	◆	◆	◇	◇	●	●	●	●	●
●	–	◇	◇	◇	◇	●	–	–	●	●
● 1)	–	◆	◆	◆	◆	●	●	–	●	● 1)
–	●	–	–	–	–	–	–	–	–	–
●	●	●	●	●	●	●	●	●	●	●
●	●	◆	◆	●	●	●	●	●		
●	●	◆	◆	●	●	●	●	●	●	●
●	●	◆	◆	●	●	●	●	●	–	–
–	–	◆	◆	●	●	–	–	–	●	●
●	–	◆	◆	●	●	●	●	●	–	–
●	–	◆	◆	●	●	●	●	●	–	–
–	–	–	–	●	●	●	●	●	–	–
●	●	●	●	●	●	●	●	●	●	●
–	–	◆	◆	●	●	●	●	●	●	●
● 1)	● 1)	● 2)	● 2)	○ 3)	○ 3)	○ 3)	–	○	○ 3)	○ 3)
● 1)2)	● 1)2)	◆	◆	● 2)3)	● 2)3)	○ 3)	○ 2)	○ 2)	○	○
–	–	◆	◆	◇	◇	● 1)	●	–	● 1)	● 1)
●	●	◆	◆	●	●	●	●	●	●	●
●	●	◆	◆	●	●	●	●	●	●	●
–	–	◆	◆	●	●	–	●	●	●	●
–	–	◆	◆	●	●	●	●	●	●	●
●	●	◆	◆	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
–	–	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●	●	◆	◆	●	●	–	●	●	●	●
–	–	◆	◆	●	●	–	●	●	●	●

Overview of functions
SINUMERIK CNCs

Tools

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
Tools			
Tool types:			
• Turning			
• Drilling/milling			
• Grinding			
• Nibbling			
• Groove sawing			
Tool radius compensations in plane:			
• With approach and retract strategies			
• With transition circle/ellipse on outer edges			
Configurable intermediate blocks with tool radius compensation active			
3D tool radius compensation		**6FC5800-0AM48-0YB0**	**M48**
Tool change via T number			
Tool carrier with orientation capability			
Look-ahead detection of contour violations			
Grinding-specific tool offset with grinding wheel surface speed			
Tool orientation interpolation	Precondition: Machining package 5 axes.		
Online tool length compensation			
Operation without tool 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			
• Number of tools/cutting edges in tool list	[1] With value version: 32. With plus version: 64.		
Operation with tool management, up to 3 tool magazines (corresponding to one real magazine)	[1] SW version 1.5/2.5 and higher.		
Operation with tool management with more than 3 magazines	[1] SW version 1.5/2.5 and higher.	**6FC5800-0AM88-0YB0**	**M88**
• System displays in standard software			
• User-friendly commissioning via system displays	[1] Precondition: PCU 50.3.		
• Tool list			
• Configurable tool lists	[1] One configured list is possible.		
• Number of tools/cutting edges in tool list			

2

	SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
	802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Tools											
	•	–	◆	◆	•	•	•	•	•	–	•
	•	–	◆	◆	•	•	•	•	•	•	•
	–	•	◆	◆	•	•	–	•	•	–	–
	–	•	◆	◆	•	•	–	•	•	–	–
	–	–	◆	◆	•	•	–	•	•	–	–
	–	–	•	•	•	•					
	•	•	•	•	•	•					
	–	–	•	•	•	•					
	–	–	○	○	○	○	○	○	○	○	–
	•	•	•	•	•	•	•	•	•	•	•
	–	–	•	•	•	•	•	•	•	•	–
	•	•	•	•	•	•					
	–	•	•	•	•	•	•	•	•	–	–
	–	–	–	•	–	•					
	–	–	–	–	•	•					
	•	•	◆	◆	•	•	•	•	•	–	–
	–	–	◆	◆	•	•	–	•	•	–	–
	•	•	◆	◆	•	•	•	•	•	–	–
	•	•	•	•	•	•	•	•	•	–	–
	128 1)	128 1)	◆ 600/1500	◆ 600/1500	600/1500	600/1500				–	–
	–	–	–	–	• 1)	• 1)					
	–	–	–	–	○ 1)	○ 1)					
	–	–	–	–	•	•	•	•	•	•	•
	–	–	–	–	◆	◆	•	•	–	• 1)	• 1)
	–	–	–	–	•	•	•	•	•	•	•
	–	–	–	–	•	•	• 1)	•	–	• 1)	• 1)
	–	–	◆ 600/1500	◆ 600/1500	600/1500	600/1500					

Overview of functions
SINUMERIK CNCs

Tools

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Tools (continued)

	Notes (footnotes are applicable line by line)	Order No.	Order code
Operation with tool management with more than 3 magazines (continued)			
• Unambiguous D number structure			
• Tool offset selection via T and D numbers			
• Editing of tool data			
• Editing of OA data	1) In configured list.		
• Magazine list			
• Configurable magazine list			
• Max. number of magazines			
• Magazine data			
• Vacant position search and positioning			
• Easy vacant position search using softkeys			
• Loading and unloading of tools			
• More than one loading and unloading point per magazine			
• Tool cabinet and tool catalog			
• Loading and unloading via code carrier system			
• Adapter data			
• Local compensations			
• Monitoring of tool life and workpiece count			
• Monitoring for max. tool speed/ acceleration	1) SW version 2.6 SP1 and higher.	**6FC5800-0AS08-0YB0**	**S08**
Operation with tool management:	1) Up to SW version 1.4. 2) Up to SW version 1.4./2.4	**6FC5800-0AM50-0YB0**	**M50**
• System displays in standard software			
• Comfortable commissioning via system displays	1) Precondition: PCU 50.3.		
• Tool list			
• Configurable tool lists	1) One configured list is possible.		
• Number of tools/cutting edges in tool list			
• Unambiguous D number structure			
• Tool offset selection via T and D numbers			
• Editing of tool data			
• Editing of OA data	1) In configured list.		

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
									Tools (continued)	
–	–	◆	◆	◆	◆	●	●	–	–	–
–	–	●	●	●	●					
–	–	◆	◆	●	●					
–	–	◆	◆	●	●	●	●	●	● 1)	● 1)
–	–	◆	◆	●	●	●	●	●	●	●
–	–	◆	◆	●	●	●	●	–	–	–
–	–	32	32	32	32					
–	–	◆	◆	●	●	●	●	○	●	●
–	–	◆	◆	●	●	●	●	○	●	●
–	–	◆	◆	●	●	●	●	–	–	–
–	–	◆	◆	●	●	●	●	○	●	●
–	–	◆	◆	●	●	●	●	–	–	–
–	–	◆	◆	●	●	–	●	–	–	–
–	–	◆	◆	●	●	–	●	–	–	–
–	–	◆	◆	●	●	–	●	–	–	–
–	–	◆	◆	●	●	–	●	–	–	–
●	●	◆	◆	●	●	●	●	●	●	●
–	–	–	–	○ 1)	○ 1)	○	–	–	–	–
–	–	◆ 1)	◆ 1)	○ 2)	○ 2)	○	○	○	●	●
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	–	○	–	● 1)	● 1)
–	–	○	○	○	○	○	○	○	●	●
–	–	○	○	○	○	○ 1)	○	–	● 1)	● 1)
–	–	◆ 600/1500	◆ 600/1500	600/1500	600/1500					
–	–	◆	◆	○	○	–	○	–	–	–
–	–	●	●	●	●	○	○	○	●	●
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	○	○	○	● 1)	● 1)

Overview of functions
SINUMERIK CNCs

Tools

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Tools (continued)

Operation with tool management (continued):			
• Magazine list			
• Configurable magazine list			
• More than one magazine is possible			
• Magazine data			
• Vacant position search and positioning			
• Easy vacant position search using softkeys			
• Loading and unloading of tools			
• More than one loading and unloading point per magazine			
• Tool cabinet and tool catalog			
• Loading and unloading via code carrier system			
• Adapter data			
• Local compensations			
• Monitoring of tool life and workpiece count			
TDI – Tool management functions for individual machines and networked machines:	See HMI software for CNC controls – MCIS software. [1] On PCU 50.3.	6FC5800-0AP33-0YB0	P33
• TDI IFC Tool management, version with network capability	On request. [1] On PCU 50.3.		
• TDI Overview Overview of actual tool data, local version	[1] On PCU 50.3.	6FC5800-0AP34-0YB0 6FC6000-2EC00-0AA8 6FC6000-2EC0. - . AA8	P34
• TDI Toolhandling Tool handling, local version	[1] On PCU 50.3.	6FC5800-0AP35-0YB0 6FC6000-2FC00-0AA8 6FC6000-2FC0. - . AA8	P35
• TDI Planning Tool planning, local version	[1] On PCU 50.3.	6FC5800-0AP36-0YB0 6FC6000-2GC00-0AA8 6FC6000-2GC0. - . AA8	P36
• TDI Statistic Tool statistics, local version	[1] On PCU 50.3.	6FC5800-0AP51-0YB0 6FC6000-2KC00-0AA8 6FC6000-2KC0. - . AA8	P51
• TDI Cell		6FC6000-2BF00-0AB0 6FC6000-2BC00-0AA0 6FC6000-2BC0. - . AA0	
• TDI Machine Tool management, local version	[1] On PCU 50.3.	6FC5800-0AP37-0YB0 6FC6000-2AC00-0AA8 6FC6000-2AC0. - . AA8	P37
• TDI Toolplan Generation Tool plan generation, local version	[1] On PCU 50.3.	6FC5800-0AP38-0YB0 6FC6000-2JC00-0AA8 6FC6000-2JC0. - . AA8	P38
• TDI Ident Connection Interfacing of tool identification systems	[1] On PCU 50.3.	6FC6000-2HF00-0AB0 6FC6000-2HC00-0AA0 6FC6000-2HC0. - . AA0	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
										Tools (continued)
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	○	○	–	–	–
–	–	32	32	32	32	32	32	32	32	32
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	–	○	–	–	–
–	–	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	○	○	○	○	–	–	–
–	–	◆	◆	○	○	–	○	–	–	–
–	–	◆	◆	○	○	–	○	–	–	–
–	–	◆	◆	○	○	–	○	–	–	–
–	–	◆	◆	○	○	–	○	–	–	–
●	●	◆	◆	○	○	○	○	○	●	●
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–				
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]
–	–	◆	◆	◇	◇	–	○	–	○ [1]	○ [1]

Overview of functions
SINUMERIK CNCs

Communication/data management

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

2

Communication/data management

	Notes	Order No.	Order code
HMI user memory, additional on CF card of NCU	See Basic components. 1) On external CF card on front panel. 2) On external CF card in PCU 50.3. 3) On CF card of NCU, not with HMI on PCU 50.3. 4) Not in combination with PCU 50.3/PCU 50.5.	6FC5800-0AP12-0YB0	P12
Data on storage medium on rear USB interface of TCU/PCU, e.g. card reader, memory stick	1) Two plant HMIs can be accessed per plant network.		
Data on storage medium on front USB interface of operator panel, e.g. memory stick	1) One is possible per operator panel.		
Additional network drive management:			
• Via Ethernet, max. 4	1) With pro version. 2) SW version 2.6 and higher.	6FC5800-0AP01-0YB0	P01
• Via USB			
• Via CF card of the PCU			
RS232C serial interface	1) On PCU 50.3. 2) On PCU 50.3/NCU with SW version 2.6 SP1 and higher 3) Precondition: COM01 module		
I/O interfacing via PROFIBUS DP			
Axis data output via PROFIBUS ADAS	Precondition: Loadable compile cycle.	6FC5800-0AN07-0YB0	N07
Reading of actual positions correlated with output signal COPA	Precondition: Loadable compile cycle.	6FC5800-0AN61-0YB0	N61
Data backup on hard disk	1) On PCU 50.3.		
Data backup with Ghost (Backup/Restore) on hard disk/network	1) On PCU 50.3.		
Data backup for NCU CF card (Backup/Restore) on memory stick or via network	1) With pro version.		
DNC – Direct Numeric Control:	See HMI software for CNC controls – MCIS software.		
• DNC Machine CNC program transfer	1) On PCU 50.3.	6FC5800-0AP40-0YB0 6FC6000-0AC00-0AA8 6FC6000-0AC0.-.AA8 6FC6000-0AC0.-.AE0 6FC6000-0AC00-0AT7 6FC6000-0AC0.-.AT7	P40
• DNC Cell CNC program management		6FC6000-0BF00-0AB0 6FC6000-0BC00-0AA0 6FC6000-0BC0.-.AA0 6FC6000-0BC0.-.AE0	
• DNC Plant CNC program management		6FC6000-0CF00-0AB0 6FC6000-0CC00-0AA0 6FC6000-0CC0.-.AA0	

2

	SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
	802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Communication/data management											
	● 1)	● 1)	● 2)	● 2)	○ 3)	○ 3)	○ 3) 4)	–	○	○ 3)	○ 3)
	–	–	◆	◆	●	●	● 1)	● 1)	● 1)	● 1)	● 1)
	–	–	◆	◆	●	●	● 1)	● 1)	● 1)	● 1)	● 1)
	● 1)	● 1)	◆	◆	◇	◇	○ 2)	○ 2)	○	○	○
	–	–	◆	◆	◇	◇	●	●	●	●	●
	–	–	◆	◆	◇	◇	●	●	●	●	●
	●	●	●	●	○ 3)	○ 3)	● 2)	● 1)	–	● 1)	● 1)
	●	●	●	●	●	●					
	–	–	–	–	○	○					
	–	–	–	–	○	○					
	–	–	◆	◆	◇	◇	● 1)	●	–	● 1)	● 1)
	–	–	●	●	◇	◇	● 1)	●	–	● 1)	● 1)
	● 1)	● 1)	–	–	●	●					
	–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
	–	–	○	○	○	○	–				
	–	–	○	○	○	○	–				

Communication/data management
Production data evaluation

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Communication/data management (continued)

DNC – Direct Numeric Control (continued):	See HMI software for CNC controls – MCIS software.		
• DNC HMI Additional PC user interface		**6FC6000-0DF00-0AB0**	
• DNC IFC SINUMERIK CNC program transfer via network on the control	[1] On PCU 50.3.	**6FC5800-0AP41-0YB0**	**P41**
• DNC IFC Serial Connection for serial CNC	[1] On PCU 50.3.	**6FC6000-0FF00-0AB0**	
• DNC IFC Dialog Option for serial CNC	[1] On PCU 50.3.	**6FC6000-0GF00-0AB0**	
• DNC IFC Filesystem Connection for network-capable CNC machines	[1] On PCU 50.3.	**6FC6000-0KF00-0AB0**	
• DNC Compare CNC program comparison	[1] On PCU 50.3.	**6FC6000-0HF00-0AB0**	
RPC SINUMERIK:	See HMI software for CNC controls – MCIS software.		
• RPC SINUMERIK Data exchange between CNC and host computer (computer link)	[1] On PCU 50.3.	**6FC5800-0AP50-0YB0** **6FC6000-7AC00-0AA8** **6FC6000-7AC0.-.AA8** **6FC6000-7AC0.-.AE0**	**P50**
ADDM – Automation Data Management:	See HMI software for CNC controls – MCIS software.		
• ADDM – Data Management Data management system	Precondition: SIMATIC STEP 7	**6BQ3030-1AA00-3AD0** **6BQ3030-1AA10-0AD0** **6BQ3030-1AA20-1AC0** **6BQ3030-1AA30-3AD0** **6BQ3030-1AA70-3AD0**	
• ADDM Agent Client for data backup	[1] On PCU 50.3.	**6FC5800-0AP48-0YB0**	**P48**

Production data evaluation

MDA – Machine Data Acquisition (machine and production data acquisition):	See HMI software for CNC controls – MCIS software.		
• MDA Cell Machine and production data management		**6FC6000-3BF00-0AB0** **6FC6000-3BC00-0AA0** **6FC6000-3BC0.-.AA0** **6FC6000-3BC0.-.AE0**	
• MDA IFC (interface client) Production data acquisition for network-capable controls	[1] On PCU 50.3.	**6FC5800-0AP43-0YB0**	**P43**
• MDA Machine Production data acquisition, local version	[1] On PCU 50.3.	**6FC5800-0AP42-0YB0** **6FC6000-3AC00-0AA8** **6FC6000-3AC0.-.AA8** **6FC6000-3AC0.-.AE0** **6FC6000-3AC00-0AT7** **6FC6000-3AC0.-.AT7**	**P42**

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
Communication/data management (continued)										
–	–	○	○	○	○					
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	○	○	○	○					
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
Production data evaluation										
–	–	○	○	○	○	–				
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)

Overview of functions
SINUMERIK CNCs

Operation

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Operation			
Operator panels:			
• SINUMERIK 802D sl, 10.4" color			
Operator panel fronts:			
• OP 019, 19" color	Precondition: PCU 50.5 with SINUMERIK Operate with SW version 2.7 and higher.	6FC5303-0AF13-0AA0	
• OP 015, 15" color		6FC5203-0AF03-0AA0	
• OP 015A, 15" color		6FC5203-0AF05-0AB0	
• TP 015A, 15" color, touch		6FC5203-0AF08-0AB2	
• OP 012, 12.1" color		6FC5203-0AF02-0AA1	
• OP 010, 10.4" color		6FC5203-0AF00-0AA1	
• OP 010C, 10.4" color		6FC5203-0AF01-0AA0	
• OP 010S, 10.4" color		6FC5203-0AF04-0AA0	
Thin Client Unit for operator panel fronts:			
• TCU		6FC5312-0DA00-0AA1	
Operator panel fronts with integrated TCU:			
• OP 08T, 8" color		6FC5203-0AF04-1BA0	
• OP 015AT, 15" color		6FC5203-0AF05-1AB0	
• TP 015AT, 15" color, touch		6FC5203-0AF08-1AB2	
Additional components for Thin Client:			
• Switch SCALANCE XB005 unmanaged		6GK5005-0BA00-1AB2	
• Switch SCALANCE X005 unmanaged		6GK5005-0BA00-1AA3	
• Switch SCALANCE X108 unmanaged		6GK5108-0BA00-2AA3	
• Switch SCALANCE X208 managed		6GK5208-0BA10-2AA3	
• Switch SCALANCE X208 PRO managed		6GK5208-0HA00-2AA6	
Industrial PC for operator panel fronts:			
• PCU 50.5-C 1.86 GHz/1 GB, Windows XP ProEmbSys		6FC5210-0DF52-2AA0	
• PCU 50.5-P 2.4 GHz/2 GB, Windows XP ProEmbSys		6FC5210-0DF53-2AA0	
• PCU 50.3-C 1.5 GHz/512 MB, Windows XP ProEmbSys		6FC5210-0DF31-2AB0	
• PCU 50.3-P 2.0 GHz/1 GB, Windows XP ProEmbSys		6FC5210-0DF33-2AB0	
• Memory expansion 512 MB for PCU 50.3		6ES7648-2AG30-0GA0	
• Memory expansion 1 GB for PCU 50.3		6ES7648-2AG40-0GA0	
• Memory expansion 1 GB for PCU 50.5		6ES7648-2AJ40-1KA0	
• Memory expansion 2 GB for PCU 50.5		6ES7648-2AJ50-1KA0	
Mounting hardware for PCU/TCU:			
• Mounting bracket for PCU/TCU behind operator panel front		6FC5248-0AF20-2AA0	
• Upright mounting bracket for PCU in control cabinet		6FC5248-0AF20-1AA0	
• Upright mounting bracket for PCU in control cabinet with/without video link		6FC5248-0AF20-1AA1	
• Flat mounting bracket for PCU in control cabinet		6FC5248-0AF20-0AA0	

2

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Operation				
●	●	–	–	–	–	–	–	–	–	–
–	–	–	–	○	○	○	–	–	–	–
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	–	–	○	○	○	–	–	–	–
–	–	–	–	○	○	○	–	–	–	–
–	–	●	●	○	○					
–	–	●	●	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Operation

2

Basic version ● / Option ○ / ◇ Function is dependent on operating software / ♦ Precondition: HMI-Advanced operating software / − Not possible	Notes (footnotes are applicable line by line)	Order No. / Type (for complete Order No., see notes)	Order code
Operation (continued)			
Software for:	See HMI software for CNC controls.		
• SINUMERIK PCU 50.3 for machine operation with SINUMERIK Operate		6FC5860-1YF00-0YA0	
		6FC5860-1YF2.-.YA0	
		6FC5860-1YC00-0YA0	
		6FC5860-1YC2.-.YA0	
		6FC5860-1YC2.-.YA8	
		6FC5860-1YF00-0YB0	
		6FC5860-1YP00-0YL8	
• PC for machine operation with SINUMERIK Operate		6FC5860-2YC00-0YA0	
		6FC5860-2YC2.-.YA0	
		6FC5860-2YC2.-.YA8	
		6FC5860-2YF00-0YB0	
		6FC5860-2YP00-0YL8	
• SINUMERIK PCU 50.3 for machine operation with HMI Startup			
• SINUMERIK PCU 50.3 for machine operation with HMI-Advanced	[1] SW version 1.4 SP1 and higher incl. ShopMill HMI/ShopTurn HMI.	6FC5253-7BX10-.AF0	
		6FC5253-0BX10-0AF0	
		6FC5253-7BX10-.AG0	
		6FC5253-0BX10-0AG1	
		6FC5253-0BX10-0AG2	
		6FC5253-7BX10-.AG3	
• PC for machine operation with HMI-Advanced	See HMI software for CNC controls.	6FC5253-7BX40-.AG0	
		6FC5253-0BX40-0AG1	
		6FC5253-0BX40-0AG2	
		6FC5253-7BX40-.AG3	
• SINUMERIK PCU 50.3 for machine operation with ShopMill HMI	Only data carrier without license required. Precondition: CNC software with ShopMill HMI. See Basic components.	6FC5841-3YC .. - . YA8 / 6FC5841-3XC .. - . YA8	
• SINUMERIK PCU 50.3 for machine operation with ShopTurn HMI	Only data carrier without license required. Precondition: CNC software with ShopTurn HMI. See Basic components.	6FC5842-3YC .. - . YA8 / 6FC5842-3XC .. - . YA8	
• SINUMERIK 840Di sl for machine operation with ShopMill HMI or ShopTurn HMI	Only data carrier without license required. See Basic components.	6FC5820-3YC .. - . YA8 / 6FC5820-3XC .. - . YA8	
Connection for:			
• SIMATIC Thin Client Touch 10" and 15" units via Industrial Ethernet	SW version 2.6 SP1 and SIMATIC version 1.4 and higher.		
• Standard monitor (DVI), VGA via ext. adapter for PCU 50.3			
• SIMATIC OP 177B/TP 177B, OP 277/TP 277 and MP 277/MP 377	WinCC flexible is required for OA applications.		
• SIMATIC OP 170B/TP 170B and OP 270/TP 270 with 6"/10" display and MP 170/MP 270B/MP 370 with keys/touch	WinCC flexible is required for OA applications.		

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
Operation (continued)										
–	–	–	–	○	○	○				
–	–	–	–	○	○	○				
–	–	●	●	–	–					
–	–	● 1)	● 1)	○	○		○			
–	–	○	○	○	○		○			
–	–	–	–	◆	◆					
–	–	–	–	◆	◆					
–	–	◆	◆	–	–					
–	–	–	–	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	●	●	●	●					

Overview of functions
SINUMERIK CNCs

Operation

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

Operation (continued)

	Notes	Order No. / Type	Order code
Software for:			
• SINUMERIK NCU 710.2/720.2/720.2 PN/730.2/730.2 PN for machine operation with HMI PRO sl RT	See HMI software for CNC controls. 1) P47 on request	**6FC5800-0AP47-0YB0** **6FC5867-3YC00-0YA8** **6FC5867-3YC2. - . YA8**	**P47**
• SIMATIC OP 177B/TP 177B/MP 277 operator panel for machine operation with HMI Lite CE	See HMI software for CNC controls.	**6FC5263-0PY11-0AG0** **6FC5263-. PY11-. AG0** **6FC5263-0PY11-0AG1**	
Control unit management:			
• Identical display on all OPs with TCU			
- Simultaneous operation interlock			
- Activate/deactivate MCP/MPP			
- Different resolutions, e.g. OP 010/OP 012			
- Up to 2 operator panel fronts, each with one TCU on an NCU 710.2			
- Up to 4 operator panel fronts, each with one TCU on an NCU 720.2/NCU720.2 PN/NCU 730.2/NCU 730.2 PN			

- Up to 4 operator panel fronts with one TCU each
    on a PCU 50.3 plus 1 additional operator panel front
    directly on the PCU 50.3
	1) A number of proven configurations (see documentation for SINUMERIK 840Di sl).		

- From 2/4 operator panel fronts, as many operator panel fronts as required due to intelligent suppression	1) SW version 2.x and higher.		
• One or several TCUs which can be switched over via several NCUs and PCUs			
• One HMI-Advanced switchable via several NCUs			
• One integrated HMI and one external HMI-Advanced simultaneously on one NCU			
• Operator control without SINUMERIK operator panel		**6FC5800-0AP00-0YB0**	**P00**
• Operation via a VNC viewer			
Handheld units:			
• SINUMERIK HT 8 handheld terminal		**6FC5403-0AA20-0AA0**	
• SINUMERIK HT 8 handheld terminal (with handwheel)		**6FC5403-0AA20-1AA0**	
- Touch pen with holding loop		**6FC5348-0AA08-4AA0**	
- Wall holder for SINUMERIK HT 8 handheld terminal		**6AV6574-1AF04-4AA0**	
• SINUMERIK HT 2 handheld terminal		**6FC5303-0AA00-2AA0**	
- Magnetic clamp for SINUMERIK HT 2		**6FC5348-0AA08-0AA0**	
- Holder for SINUMERIK HT 2		**6FC5348-0AA08-1AA0**	
- Slide-in labels for inscribing (3 A4 sheets) for SINUMERIK HT 2		**6FC5348-0AA08-2AA0**	

• PN Basic connection module without emergency
  stop override, with switch, control cabinet mounting
  for SINUMERIK HT 8/HT 2
		6FC5303-0AA01-1AA0	

• PN Basic connection box without emergency stop override, for SINUMERIK HT 8/HT 2		**6AV6671-5AE01-0AX0**	
• PN Plus connection box with emergency stop override, for SINUMERIK HT 8/HT 2		**6AV6671-5AE11-0AX0**	

	SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
	802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Operation (continued)											
	–	–	–	–	○	○	○	○ 1)	–	○	–
	–	–	–	–	○	○					
	–	–	●	●	●	●					
	–	–	●	●	●	●					
	–	–	●	●	●	●					
	–	–	–	–	●	●					
	–	–	–	–	●	●					
	–	–	● 1)	● 1)	●	●					
	–	–	–	–	● 1)	● 1)	●	●	●	–	–
	–	–	●	●	●	●					
	–	–	–	–	●	●					
	–	–	–	–	●	●					
	–	–	–	–	○	○	○		–	–	–
	–	–	●	●	●	●					
	–	–	○	○	○	○	○	○	–	–	–
	–	–	○	○	○	○	○	○	–	–	–
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					
	–	–	○	○	○	○					

© Siemens AG 2012

Overview of functions
SINUMERIK CNCs

Operation

2

Basic version ● Option ○ Function is dependent on operating software ◇ Precondition: HMI-Advanced operating software ◆ Not possible −	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
Operation (continued)			
Handheld units (continued):			
• Handheld unit type B-MPI with coiled connecting cable		**6FX2007-1AE04**	
• Handheld unit type B-MPI with straight connecting cable		**6FX2007-1AE14**	
- Distributor		**6FX2006-1BH01**	
- Handwheel connection module for PROFIBUS	Not required for handwheel connection via machine control panel.	**6FC5303-0AA02-0AA0**	
• Mini handheld unit with coiled connecting cable		**6FX2007-1AD03**	
• Mini handheld unit with straight connecting cable		**6FX2007-1AD13**	
- Connection kit for mini handheld unit		**6FX2006-1BG03**	
- Handwheel connection module for PROFIBUS	Not required for handwheel connection via machine control panel.	**6FC5303-0AA02-0AA0**	
Machine control panels:			
• MCP		**6FC5603-0AD00-0AA2**	
• MCP 802D sl		**6FC5303-0AF30-1AA0**	
- MCPA module for MCP 802D sl connection and with ± 10 V interface		**6FC5312-0DA01-0AA0**	
• MCP 310 C PN		**6FC5303-0AF23-0AA1**	
• MCP 310 PN		**6FC5303-0AF23-1AA1**	
- Actuating element, 22 mm, latching mushroom pushbutton, red		**3SB3000-1HA20**	
- Contact block		**3SB3400-0A**	
- Cable set for additional control devices		**6FC5247-0AA35-0AA0**	
- Spindle/rapid traverse override rotary switch 1 × 16G, T = 24, cap, button, pointer, rapid traverse and spindle dials		**6FC5247-0AF12-1AA0**	
• MCP 483C PN - Cable set for additional control devices		**6FC5303-0AF22-0AA1** **6FC5247-0AA35-0AA0**	
• MCP 483 PN		**6FC5303-0AF22-1AA1**	
Push Button Panel with machine control panel functions:			
• MPP 310 IEH with connection for SINUMERIK HT 8		**6FC5303-1AF20-8AA1**	
• MPP 483		**6FC5303-1AF00-0AA1**	
• MPP 483 H for handheld unit		**6FC5303-1AF00-1AA1**	
• MPP 483 A without override		**6FC5303-1AF01-0AA1**	
• MPP 483 HTC with connection for SINUMERIK HT 8		**6FC5303-1AF00-8AA1**	
• MPP 483 IE		**6FC5303-1AF10-0AA0**	
• MPP 483 IEH with connection for SINUMERIK HT 8		**6FC5303-1AF10-8AA0**	
Electronic Key System EKS • Software option, delivery of a license		**6FC5800-0AP53-0YB0**	**P53**
Direct key module • Direct key module mounting kit		**6FC5247-0AF11-0AA0** **6FC5247-0AF30-0AA0**	

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
						Operation (continued)				
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
○	○	–	–	–	–					
○	○	–	–	–	–					
○	○	–	–	–	–					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○	○	○	–	–	–
–	–	○	○	○	○					

Overview of functions
SINUMERIK CNCs

Operation

2

Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
Operation (continued)			
Connection for electronic handwheels:	1) Precondition: MCI board extension. 2) Third handwheel can be operated as a contour handwheel.		
• With 120 mm × 120 mm (4.72 in × 4.72 in) front panel, 5 V DC		**6FC9320-5DB01**	
• With 76.2 mm × 76.2 mm (3 in × 3 in) front panel, 5 V DC		**6FC9320-5DC01**	
• With 76.2 mm × 76.2 mm (3 in × 3 in) front panel, 24 V DC, HTL		**6FC9320-5DH01**	
• Without front panel, without setting wheel, 5 V DC		**6FC9320-5DF01**	
• Without front panel, with setting wheel, 5 V DC		**6FC9320-5DM00**	
• Portable in housing, 2.5 m (8.2 ft) coiled cable, 5 V DC		**6FC9320-5DE02**	
Flange socket for portable handwheel		**6FC9341-1AQ**	
Handwheel connection module for PROFIBUS	Not required for handwheel connection via machine control panel.	**6FC5303-0AA02-0AA0**	
Cable distributor	Not required for handwheel connection via machine control panel.	**6FX2006-1BA02**	
Connection for keyboards:			
• Full CNC keyboard, vertical format		**6FC5303-0DT12-1AA0**	
• Full CNC keyboard, horizontal format		**6FC5303-0DM13-1AA0**	
• KB 483C		**6FC5203-0AF20-0AA1**	
• KB 310C		**6FC5203-0AF21-0AA1**	
• KBPC CG US standard PC keyboard		**6FC5203-0AC01-3AA0**	
- Keyboard tray for standard PC keyboard		**6FC5247-0AA40-0AA0**	
Connection for memory/storage devices:			
• Floppy disk drive 3.5"/1.44 MB with USB connection		**6FC5235-0AA05-1AA2**	
• Card reader for CF/SD memory media, with USB connection		**6FC5335-0AA00-0AA0**	
• Industrial USB Hub 4	With PCU 50.3.	**6AV6671-3AH00-0AX0**	
• CompactFlash card 1 GB	1) Precondition: Card reader.	**6FC5313-5AG00-0AA1**	
• CompactFlash card 8 GB	1) Precondition: Card reader.	**6FC5313-6AG00-0AA0**	
• SIMATIC USB FlashDrive 2 GB	1) With pro version.	**6ES7648-0DC40-0AA0**	
• SIMATIC USB FlashDrive 8 GB		**6ES7648-0DC50-0AA0**	

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
									Operation (continued)	
2	2	2 [1]	2 [1]	2/3 [2]	2/3 [2]					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
○	○	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	–	–					
○	○	–	–	–	–					
○	○	–	–	–	–					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○	○	○	○	○	○
–	–	○	○	○	○	○	○	○	○	○
–	–	○	○	○	○					
○	○	○	○	●	●	○ [1]	○	○ [1]	○ [1]	○ [1]
–	–	○	○	●	●	○ [1]	○	○ [1]	○ [1]	○ [1]
○ [1]	○ [1]	○	○	○	○	○	○	○	○	○
–	–	○	○	○	○	○	○	○	○	○

Overview of functions
SINUMERIK CNCs

Operation

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

Operation (continued)

	Notes (footnotes are applicable line by line)	Order No.	Order code
Plain text display of user variables			
Multi-channel display	[1] With OP 019 up to 4 channels.		
2D representation of 3D protection areas/ working areas			
Actual-value system for workpiece			
Menu selection via the PLC	Not for two simultaneously active HMIs.		
CNC program messages			
Online help for programming, alarms and machine data (expandable)	[1] With PCU 50.3.		
Screen blanking			
Access protection, 8 levels			
Operating software languages:			
• Chinese Simplified, English, French, German, Italian, Spanish	[1] Other languages on request.		
• Language switchover online			
• Maximum configuration for installed languages	[1] All available languages are supplied on-board. [2] Unrestricted with PCU 50.3.		
802D sl operating software languages Chinese Traditional, Czech, Dutch, Finnish, Hungarian, Korean, Polish, Portuguese/Brazilian, Romanian, Russian, Swedish, Turkish	Component of SINUMERIK 802D sl Toolbox.		
Additional languages for operating software HMI-Advanced, HMI-Embedded, ShopMill HMI, ShopTurn HMI on DVD-ROM, without license Chinese Traditional, Czech, Danish, Dutch, Finnish, Hungarian, Japanese, Korean, Polish, Portuguese/Brazilian, Romanian[1], Russian, Slovak[1], Swedish, Turkish	See Basic components. [1] For HMI-Advanced only.	6FC5253-7BX10-.XG8	
Additional languages for operating software SINUMERIK Operate on DVD-ROM, without license Chinese Traditional, Czech, Danish, Dutch, Finnish, Hungarian, Japanese, Korean, Polish, Portuguese/Brazilian, Russian, Slovak, Slovene, Swedish, Turkish	See Basic components.	6FC5860-0YC..-.YA8	
Additional languages Software option for use of additional languages	[1] Included on the DVD-ROM with additional languages for HMI; please enquire about available SW versions.	6FC5800-0AN00-0YB0	N00
Other languages	[1] On request.		

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
Operation (continued)										
–	–	◆	◆	●	●	●	●	●	●	●
–	–	◆	◆	◆	◆	● 1)	●	–	–	–
–	–	◆	◆	●	●	–	●	●	–	–
–	–	●	●	●	●	●	●	●	–	–
–	–	◆	◆	◇	◇	–	●	●	●	●
●	●	◆	◆	●	●	●	●	●	●	●
●	●	◆	◆	◇	◇	–	●	–	● 1)	● 1)
–	–	●	●	●	●	–	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
● 1)	● 1)	◆	◆	◇	◇	●	●	●	●	●
18	18	2	2	2	2	2	2	2	2	2
1)	1)	◆	◆	◇	◇	8 2)	2)	8	8	8
●	●	–	–	–	–					
–	–	○	○	○	○	–	○	○	○	○
–	–	○	○	○	○	○	–	–	–	–
–	–	◆	◆	◇	◇	○ 1)	○ 1)	○ 1)	○ 1)	○ 1)
1)	1)	◆	◆	◇	◇	1)	1)	1)	1)	1)

Overview of functions
SINUMERIK CNCs

Monitoring functions
Compensations

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version O Option ◇ Function is dependent on operating software ♦ Precondition: HMI-Advanced operating software – Not possible			
Monitoring functions			
Working area limitation			
Clamp protection for nibbling			
Limit switch monitoring Software and hardware limit switches			
Position monitoring			
Standstill (zero-speed) monitoring			
Clamping monitoring			
2D/3D protection areas			
Contour monitoring			
Contour monitoring using tunnel function		6FC5800-0AM52-0YB0	M52
Path length evaluation		6FC5800-0AM53-0YB0	M53
Axis limitation from the PLC			
Spindle speed limitation			
Axis collision protection PROT	Precondition: Loadable compile cycle.	6FC5800-0AN06-0YB0	N06
Extended stop and retract ES, numerically controlled		6FC5800-0AM61-0YB0	M61
PROFIBUS tool and process monitoring	Precondition: Loadable compile cycle.	6FC5800-0AM62-0YB0	M62
Integrated tool monitoring and diagnostics			
• IMD light	Precondition: Loadable compile cycle.	6FC5800-0AN12-0YB0	N12
• IMD base	Precondition: Loadable compile cycle.	6FC5800-0AN13-0YB0	N13
• Monitoring for maximum tool speed/ acceleration		6FC5800-0AS08-0YB0	S08
Compensations			
Backlash compensation			
Lead screw error compensation			
Measuring system error compensation			
Feedforward control, velocity-dependent			
Feedforward control, acceleration-dependent	[1] From SW 2.6 SP1 and higher.		
Electronic weight counterbalance	Function of SINAMICS S120.		
Temperature compensation			
Quadrant error compensation			
Circularity test	[1] Precondition: HMI-Advanced on PCU 50.3.		
Bidirectional leadscrew error compensation	[1] With restricted functionality, see export versions	6FC5800-0AM54-0YB0	M54
Sag compensation, multi-dimensional	[1] With restricted functionality, see export versions.	6FC5800-0AM55-0YB0	M55
Space error compensation (SEC) for kinematic transformations	Precondition: Loadable compile cycle.	6FC5800-0AM57-0YB0	M57
Spatial compensation VCS A3	Precondition: Loadable compile cycle.	6FC5800-0AN15-0YB0	N15

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Monitoring functions										
●	●	●	●	●	●					
–	●	–	–	–	–					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	●	●	●	●					
●	●	●	●	●	●					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	●	●	●	●					
●	●	●	●	●	●					
–	–	–	○	–	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
Compensations										
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
●	●	●	●	●	●					
–	–	–	–	● 1)	● 1)					
–	–	●	●	●	●					
–	–	●	●	●	●					
–	–	◆	◆	●	●	●	●			
–	–	◇	◇	◇	◇	●	●	○ 1)	○ 1)	○ 1)
–	–	–	–	○ 1)	○					
○ 1)	○ 1)	○ 1)	○	○ 1)	○					
–	–	–	–	–	○					
–	–	–	–	–	○					

Overview of functions
SINUMERIK CNCs

Compensations
PLC

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software − Not possible		Type (for complete Order No., see notes)	
Compensations (continued)			
Spatial compensation VCS A5	Precondition: Loadable compile cycle.	**6FC5800-0AN16-0YB0**	**N16**
Spatial compensation VCS A5 plus	Precondition: Loadable compile cycle.	**6FC5800-0AN17-0YB0**	**N17**
Spatial compensation VCS Rotary	Precondition: Loadable compile cycle.	**6FC5800-0AN31-0YB0**	**N31**
Vibration extinction VIBX	Precondition: Loadable compile cycle.	**6FC5800-0AN11-0YB0**	**N11**
Magnetic cogging torque compensation COCO	Precondition: Loadable compile cycle.	**6FC5800-0AN46-0YB0**	**–**
PLC			
SIMATIC S7-200 (integrated)			
SIMATIC S7-300 CPU 317-2 DP (integrated)			
• NCU 710.2/NCU 720.2/NCU 730.2			
SIMATIC S7-300 PLC 319-3PN/DP (integrated)			
• NCU 730.2 PN			
Machining time, typically in ms/KI for bit operations	1) 1 KI = 1024 instructions, corresponds to approx. 3 KB.		
• NCU 710.2/NCU 720.2/NCU 730.2			
• NCU 730.2 PN			
Machining time, typically in ms/KI for word operations	1 KI = 1024 instructions, corresponds to approx. 3 KB.		
• NCU 710.2/NCU 720.2/NCU 730.2			
• NCU 730.2 PN			
Ladder steps memory configuration	1) With value version: 4000.		
PLC user memory in KB, incl. basic PLC program	1) SW version 1.4 and higher.		
PLC user memory, maximum configuration in KB			
• NCU 710.2/NCU 720.2/NCU 730.2			
• NCU 730.2 PN			
Expansion of the PLC user memory by 128 KB in each case	D11 to D12 only with SW version 1.4 and higher.	**6FC5800-0AD10-0YB0**	**D11 ... D12**
• NCU 710.2/NCU 720.2/NCU 730.2	D11 to D12 only with SW version 1.4 and higher.		**D11 ... D12**
• NCU 730.2 PN			**D11 ... D18**
SIMATIC STEP 7 programming language:			
• LAD ladder diagram			
• FBD function block diagram			
• STL statement list			
PLC programming with HiGraph (add-on package for STEP 7)			
PLC programming tool, PLC program examples, standard machine data and alarm text editor on Toolbox			
PP 72/48 I/O module	1) No PROFIBUS certification.	**6FC5611-0CA01-0AA1**	
• PP 72/48 I/O module, max. number			
• PP 72/48 PN I/O module	1) Quantity limited by I/Os. Quantity structure of PLC.	**6FC5311-0AA00-0AA0**	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Compensations (continued)										
–	–	–	–	–	○					
–	–	–	–	–	○					
–	–	–	–	–	○					
–	–	–	–	–	○					
–	–	–	–	–	○					
PLC										
●	●	–	–	–	–					
–	–	●	●							
				●	●					
–	–	–	–							
				●	●					
0.1	0.1	0.03	0.03							
				0.03	0.03					
				0.01	0.01					
0.2	0.2	0.1	0.1							
				0.1	0.1					
				0.03	0.03					
6000 [1]	6000	–	–	–	–					
–	–	● 128	● 128	● 512 [1]	● 512 [1]					
–	–	768	768							
				768	768					
				1536	1536					
–	–	○	○							
				○	○					
				○	○					
●	●	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
–	–	○	○	○	○					
●	●	–	–	–	–					
○	○	○ [1]	○ [1]	○ [1]	○ [1]					
3	3	125	125	125	125					
○	○	–	–	○ [1]	○ [1]					

Overview of functions
SINUMERIK CNCs

PLC

2

Basic version Option Function is dependent on operating software Precondition: HMI-Advanced operating software Not possible	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
PLC (continued)			
Analog Drive Interface for 4 axes ADI 4	No PROFIBUS certification. 1) Not possible with NCU 730.2 PN.	**6FC5211-0BA01-0AA4**	
MCI board extension slot version with cable distributor		**6FC5222-0AA00-0AA1** **6FX2006-1BA02**	
Distributed I/O via PROFIBUS DP	See Catalog ST 70 or Siemens Industry Mall for further information.		
• Via integrated interface, data transfer rates up to 12 Mbit/s			
• Distributed DP slaves, max. number			
Distributed I/O via PROFINET	See Catalog ST 70 or Siemens Industry Mall for further information.		
• Component-based Automation			
- NCU 710.2/NCU 720.2/NCU 730.2			
- NCU 730.2 PN			
• Distributed PN slaves, max. number			
- NCU 730.2 PN			
Digital inputs, number in bytes	1) No. = Process image inputs.		
Digital outputs, number in bytes	1) No. = Process image outputs.		
I/O inputs, number in bytes	1) Logical address range inputs.		
I/O outputs, number in bytes	1) Logical address range outputs.		
Bit memories, number in bytes	1) With value version: 128.		
- NCU 710.2/NCU 720.2/NCU 730.2			
- NCU 730.2 PN			
Timers, number	1) With value and plus versions: 40.		
- NCU 710.2/NCU 720.2/NCU 730.2			
- NCU 730.2 PN			
Counters, number	1) With value and plus versions: 32.		
- NCU 710.2/NCU 720.2/NCU 730.2			
- NCU 730.2 PN			
Subroutines			
FB, FC (largest number per type)			
DB, largest number			
- NCU 710.2/NCU 720.2/NCU 730.2			
- NCU 730.2 PN			
Cyclic function block			
Time-controlled function blocks			
Equipment for PLC programming and program test with PG/PC			
User machine data for configuring the PLC user program			

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
PLC (continued)										
○	○	○	○	○ 1)	○ 1)					
–	–	○	○	–	–					
●	●	●	●	●	●					
–	–	125	125	125	125					
–	–	○	○							
				–	–					
				●	●					
–	–	–	–							
				256	256					
27	27	256 1)	256 1)	256 1)	256 1)					
18	18	256 1)	256 1)	256 1)	256 1)					
–	–	8192 1)	8192 1)	4096 1)	4096 1)					
–	–	8192 1)	8192 1)	4096 1)	4096 1)					
384 1)	384	4096	4096							
				4096	4096					
				8192	8192					
64 1)	64 1)	512	512							
				512	512					
				2048	2048					
64 1)	64 1)	512	512							
				512	512					
				2048	2048					
64	64	–	–	–	–					
–	–	2048	2048	2048	2048					
–	–	2047	2047							
				2047	2047					
				4095	4095					
●	●	●	●	●	●					
–	–	●	●	●	●					
○	○	○	○	○	○					
●	●	–	–	–	–					

Overview of functions
SINUMERIK CNCs

Safety functions

2

	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible			

Safety functions			
SINUMERIK Safety Integrated Safety functions for personnel and machine protection	Preconditions: See Basic components.		
• Safe shutdown			
• SBR (safe braking ramp)			
• SH (safe standstill)			
• SBH (safe operation stop)			
• SG (safely reduced speed)			
• SE (safe software limit switch)			
• SN (safe software cams)			
• SGE/SGA (safety-related input/output signals)			
• SPL (safe programmable logic)			
• SBM (safe brake management)			
• Safety-related output $n < n_x$			
• Safety-oriented communication via standard bus (PROFIsafe with ET 200S, ET 200pro, ET 200eco)	See Catalog ST 70 or Siemens Industry Mall for further information.		
• Safe integration of sensors via DP ASi F-Link	See Catalog IK PI or Siemens Industry Mall for further information.		
Safety Integrated SI-Basic incl. 1 axis/spindle; up to 4 inputs and up to 4 outputs for safe programmable logic		6FC5800-0AM63-0YB0	M63
Safety Integrated SI-Comfort incl. 1 axis/spindle; up to 64 inputs and up to 64 outputs for safe programmable logic		6FC5800-0AM64-0YB0	M64
Safety Integrated SI axis/spindle extra for each additional axis/spindle	Example: 4 additional axes/ spindles: C74	6FC5800-0AC70-0YB0	C71 ... C78
Safety Integrated SI axis/spindle package additional 15 axes/spindles		6FC5800-0AC60-0YB0	C61, C62
Safety Integrated automated acceptance test with SinuCom NC SI	See HMI software for CNC controls – SinuCom.		
SINAMICS S120 Safety Integrated, drive-independent safety functions			
• SBC (Safe Brake Control)			
• STO (Safe Torque Off)			
• SS1 (Safe Stop 1)			

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Safety functions										
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	●	●					
–	–	–	–	●	●					
–	–	–	–	●	●					

Overview of functions
SINUMERIK CNCs

Commissioning

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	

2

Commissioning			
Commissioning software for drive system is integrated:			
• SINAMICS S120			
• SINAMICS S120 with CU320	With STARTER commissioning tool (included in scope of supply).		
Trace	[1] SW version 2.7 and higher.		
Circularity test	[1] SW version 2.7 and higher.		
Auto Servo Tuning AST Fully automatic speed and position controller optimization	[1] SW version 2.6 and higher.		
Commissioning trace (drive optimization without an additional oscilloscope)	[1] With PCU 50.3.		
Series start-up via serial interface			
Series start-up via USB interface with storage medium, e.g. memory stick			
Series start-up of network drive	[1] Precondition: Management of network drives.		
Series start-up via programming of CF card offline or online	[1] Precondition: Additional HMI user memory on CF card of the NCU.		
STARTER commissioning tool on PC/PG for SINAMICS S120	On Toolbox.		
Commissioning software on PC/PG for SINAMICS S120 (and SIMODRIVE 611 digital)	See HMI software for CNC controls – SinuCom.		
SINUMERIK 840Di sl Startup (SinuCom)			
SINUMERIK 840Di sl Toolbox on hard disk of the PCU			
SINUMERIK 840Di sl/840D sl Toolbox on CNC system software DVD-ROM			
PLC example library (PLC templates)			

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Commissioning										
●	●	–	–	◇	◇	–	●	–	–	–
–	–	●	●	–	–	–	–	–	–	–
–	–	◆	◆	● 1)	● 1)	●	–	–	–	–
–	–	◆	◆	● 1)	● 1)	●	–	–	–	–
–	–	◆	◆	● 1)	● 1)	●	–	–	–	–
–	–	◆	◆	◇	◇	–	●	–	● 1)	● 1)
●	●	–	–	–	–					
–	–	◆	◆	●	●	●	●	●	●	●
●	●	◆	◆	● 1)	● 1)	● 1)	● 1)	● 1)	● 1)	● 1)
●	●	–	–	● 1)	● 1)					
●	●	–	–	–	–					
–	–	○	○	○	○					
–	–	●	●	–	–					
–	–	●	●	–	–					
–	–	○	○	○	○					
●	●	–	–	–	–					

Overview of functions
SINUMERIK CNCs

Commissioning
Diagnostic functions

2

	Notes (footnotes are applicable line by line)	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible		Type (for complete Order No., see notes)	
Commissioning (continued)			
SinuCom Commissioning/service tools for SINUMERIK 840Di sl/840D sl	See HMI software for CNC controls – SinuCom.	**6FC5250-0AY00-0AG1** **6FC5250-0AY00-0AG0** **6FC5250-7AY00-.AG0** **6FC5250-0AY00-0AG2** **6FC5250-7AY00-.AG3**	
• 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 CFS Creation of an image for the CF card in Ext3 format			
• SinuCom ARC Reading, deleting, inserting and changing series start-up files			
SinuCom Update Agent for series production and software upgrades	See HMI software for CNC controls – SinuCom Update Agent.	**6FC5862-2YC00-0YA0** **6FC5862-2YC..-.YA0**	
SinuCom UPExpert			
SinuCom UPShield			
SinuCom UPDiff			
SinuCom UPTopo			
SinuCom Protector			
STARTER commissioning tool for SINAMICS and MICROMASTER	[1] On Toolbox. [2] For topology and diagnostics.	**6SL3072-0AA00-0AG0**	
Diagnostic functions			
Alarms and messages			
Action log for diagnostic purposes, can be activated	[1] Logbook for alarms/keys.		
PLC status	[1] Generally possible via STEP 7 on PG/PC.		
LAD display	[1] Generally possible via STEP 7 on PG/PC.		
SIMATIC STEP 7 for SINUMERIK hardware for service functions	See HMI software for CNC controls – Tools. [1] With PCU 50.3.	**6FC5252-0AY00-0AG0** **6FC5252-0AY00-0AG1** **6FC5252-.AY01-.AG0**	
RCS 802 (Remote Control System) remote diagnostics, snap shot, license for PC	With pro version.	**6FC6000-6DA51-0AA0**	
• PLC remote diagnostics via modem	Programming tool and modem required. [1] With pro and plus versions.		
• Remote diagnostics via Ethernet on the control	RCS 802 and modem required. For pro version.		

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI-Advanced	HMI-Embedded	ShopMill HMI	ShopTurn HMI
Commissioning (continued)										
–	–	●	●	○	○					
–	–	●	●	○	○					
–	–	●	●	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
–	–	–	–	○	○					
● 1)	● 1)	○ 2)	○ 2)	–	–					
Diagnostic functions										
●	●	●	●	●	●					
● 1)	● 1)	◆	◆	●	●	●	●	●	●	●
●	●	◆ 1)	◆ 1)	● 1)	● 1)	●	●	●	●	●
●	●	– 1)	– 1)	– 1)	– 1)	–	–	–	–	–
–	–	○	○	○ 1)	○ 1)					
○	○	–	–	–	–	–	–	–	–	–
● 1)	●	–	–	–	–					
●	●	–	–	–	–					

© Siemens AG 2012

Overview of functions
SINUMERIK CNCs

Diagnostic functions
Service and maintenance

2

	Basic version / Notes	Order No.	Order code
● Basic version ○ Option ◇ Function is dependent on operating software ◆ Precondition: HMI-Advanced operating software – Not possible	Notes (footnotes are applicable line by line)	Order No. Type (for complete Order No., see notes)	Order code

Diagnostic functions (continued)

RCS (Remote Control System) remote diagnostics:	See HMI software for CNC controls – MCIS software.		
• RCS Host Remote diagnostics software	1) With PCU 50.3.	6FC5800-0AP30-0YB0	P30
• RCS Viewer for PC/PG		6FC6000-6DF00-0BB0	
		6FC6000-6DC00-0BA0	
		6FC6000-6DC0.-.BA0	
• RCS Viewer Embedded for PC/PG		6FC6000-6DF88-8BB0	
		6FC6000-6DC80-0BA0	
		6FC6000-6DC8.-.BA0	
• RCS Commander for PC/PG Supports basic file transfer between PC/PG and CNC controls	Precondition for modem: RCS host for image transfer 1) SW version 2.6 and higher for NCU or SINUMERIK Operate for PCU.	6FC5860-7YC00-0YA0	
		6FC5860-7YC..-.YA0	

Service and maintenance

ePS Network Services: - Company Account and - Value Account are required for using the services	1) With PCU 50.3.	6FC6001-0EE00-0CA1 6FC6001-0EE00-0AF8	
• ePS Diagnostic Services for diagnostic functions with machine faults and Workflow Services, remote operation and remote monitoring of machine controls	1) With PCU 50.3. 2) HMI-Advanced is also required for remote access functionality.	6FC6001-0EE00-0DS0	
• ePS Condition Monitoring Basic for condition-oriented maintenance	1) With PCU 50.3.	6FC6001-0EE00-0MB0	
• ePS Combi Package Diagnostic Services and Condition Monitoring Basic	1) With PCU 50.3. 2) HMI-Advanced is also required for remote access functionality.	6FC6001-0EE00-0KP0	
TPM – Total Productive Maintenance Servicing and maintenance support:	See HMI software for CNC controls – MCIS software.		
• TPM Machine for SINUMERIK Maintenance management	1) With PCU 50.3.	6FC5800-0AP32-0YB0	P32
		6FC6000-1AC00-0AA8	
		6FC6000-1AC0.-.AA8	
		6FC6000-1AC0.-.AF0	
• TPM Cell Maintenance management on PC		6FC6000-1BF00-0AB0	
		6FC6000-1BC00-0AA0	
		6FC6000-1BC0.-.AA0	
• TPM IFC for SINUMERIK Preventive maintenance for network-capable controls	1) With PCU 50.3.	6FC5800-0AP46-0YB0	P46
• TPM HMI Additional user interface for Windows-based PC		6FC6000-1DF00-0AB0	
• TPM demo version		6FC6000-1AC00-0AT7	

2

SINUMERIK 802D sl		SINUMERIK 840Di sl/840D sl				Blank field: Function is not dependent on operating software				
802D sl T/M	802D sl G/N	840DiE sl	840Di sl	840DE sl	840D sl	SINUMERIK Operate	HMI- Advanced	HMI- Embedded	ShopMill HMI	ShopTurn HMI
Diagnostic functions (continued)										
–	–	◇	◇	◇	◇	○	○	○	○ 1)	○ 1)
–	–	–	–	◇	◇					
–	–	–	–	◇	◇					
–	–	–	–	◇ 1)	◇ 1)					
Service and maintenance										
–	–	◆	◆	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◆	◆	◇	◇	○ 2)	○	○ 2)	○ 1)	○ 1)
–	–	◆	◆	◇	◇	○	○	○	○ 1)	○ 1)
–	–	◆	◆	◇	◇	○ 2)	○	○ 2)	○ 1)	○ 1)
–	–	◇	◇	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◇	◇	◇	◇	–	○	–	–	–
–	–	◇	◇	◇	◇	–	○	–	○ 1)	○ 1)
–	–	◇	◇	◇	◇	–	○	–	–	–
–	–	◇	◇	◇	◇	–	○	–	–	–

Overview of functions
SINUMERIK CNCs

Overview of options for SINUMERIK 840D sl

2

■ Overview

Option	Page	Order No.
3-axis transformation PACO for parallel kinematics	2/34	**6FC5800-0AM44-0YB0**
3D tool radius compensation	2/52	**6FC5800-0AM48-0YB0**
Advanced Position Control APC	2/28	**6FC5800-0AM13-0YB0**
Analog output	2/38	**6FC5800-0AM37-0YB0**
Axial coupling in the machine coordinate system MCSC	2/32	**6FC5800-0AM23-0YB0**
Axis/spindle, each additional	2/12	**6FC5800-0AA00-0YB0**
Clearance control CLC 1D/3D in position control cycle including in the interpolation cycle	2/38	**6FC5800-0AM40-0YB0**
Clearance control 1D/3D in position control cycle, free direction	2/38	**6FC5800-0AM65-0YB0**
CNC user memory for programs, OEM cyles and data, expansion by 2 MB in each case	2/10	**6FC5800-0AD00-0YB0**
Compensation of a forced mechanical coupling AXCO	2/32	**6FC5800-0AM81-0YB0**
Continue machining at the contour (retrace support)	2/30	**6FC5800-0AM24-0YB0**
Contour handwheel	2/36	**6FC5800-0AM08-0YB0**
Crank interpolation CRIP	2/30	**6FC5800-0AN04-0YB0**
Cross-mode actions	2/38	**6FC5800-0AM43-0YB0**
Electronic gear EG	2/32	**6FC5800-0AM22-0YB0**
Electronic transfer	2/36	**6FC5800-0AM35-0YB0**
Electronic transfer CP	2/36	**6FC5800-0AM76-0YB0**
Evaluation of internal drive variables	2/38	**6FC5800-0AM41-0YB0**
Generic couplings	2/32	
• CP Basic		**6FC5800-0AM72-0YB0**
• CP Comfort		**6FC5800-0AM73-0YB0**
• CP Expert		**6FC5800-0AM74-0YB0**
• CP Static		**6FC5800-0AM75-0YB0**
Handling package	2/36	**6FC5800-0AS31-0YB0**
HMI user memory, additional on CF card of NCU	2/12, 2/50, 2/58	**6FC5800-0AP12-0YB0**
Inclined axis	2/34	**6FC5800-0AM28-0YB0**
Interrupt routines with fast retraction from the contour	2/38	**6FC5800-0AM42-0YB0**
Involute interpolation	2/30	**6FC5800-0AM21-0YB0**
Laser switching signal	2/38	**6FC5800-0AM38-0YB0**
Machining channel, each additional	2/10	**6FC5800-0AC10-0YB0**
Machining package 5 axes	2/36	**6FC5800-0AM30-0YB0**
Machining package 5 axes Additional function 7th axis	2/36	**6FC5800-0AS01-0YB0**
Machining package milling	2/36	**6FC5800-0AM26-0YB0**
Master value coupling and curve table interpolation (LEAD)	2/32	**6FC5800-0AM20-0YB0**
Master/slave for drives	2/32	**6FC5800-0AM03-0YB0**
Measure kinematics	2/34	**6FC5800-0AP18-0YB0**
Measuring cycles for drilling/milling and turning	2/34	**6FC5800-0AP28-0YB0**
Measuring stage 2	2/34	**6FC5800-0AM32-0YB0**
Mode group (MG), each additional	2/10	**6FC5800-0AC00-0YB0**

Option	Page	Order No.
Monitoring for max. tool speed/acceleration	2/54, 2/74	**6FC5800-0AS08-0YB0**
Motion control: Advanced Surface	2/30	**6FC5800-0AS07-0YB0**
Multi-axis interpolation	2/30	**6FC5800-0AM15-0YB0**
Operation with tool management	2/54	**6FC5800-0AM50-0YB0**
Operation with tool management with more than 3 magazines	2/52	**6FC5800-0AM88-0YB0**
Oscillation functions	2/36	**6FC5800-0AM34-0YB0**
Pair of synchronized axes (gantry axes)	2/32	**6FC5800-0AM02-0YB0**
Polynomial interpolation	2/30	**6FC5800-0AM18-0YB0**
Positioning axis/auxiliary spindle, each additional	2/12	**6FC5800-0AB00-0YB0**
Position switching signals/ cam controller	2/28	**6FC5800-0AM07-0YB0**
Program preprocessing	2/42	**6FC5800-0AM00-0YB0**
Punching/nibbling	2/36	**6FC5800-0AM33-0YB0**
Safety Integrated	2/80	
• SI axis/spindle		**6FC5800-0AC70-0YB0**
• SI axis/spindle package		**6FC5800-0AC60-0YB0**
• SI-Basic		**6FC5800-0AM63-0YB0**
• SI-Comfort		**6FC5800-0AM64-0YB0**
Setpoint exchange	2/28	**6FC5800-0AM05-0YB0**
Spline interpolation	2/30	**6FC5800-0AS16-0YB0**
Spline interpolation for 3-axis machining	2/30	**6FC5800-0AM16-0YB0**
Spline interpolation for 5-axis machining	2/30	**6FC5800-0AM17-0YB0**
Synchronized actions stage 2	2/38	**6FC5800-0AM36-0YB0**
Synchronous spindle/multi-edge turning COUP	2/32	**6FC5800-0AM14-0YB0**
Tangential control	2/28	**6FC5800-0AM06-0YB0**
Technology package milling SINUMERIK MDynamics 3 axes	2/36	**6FC5800-0AS32-0YB0**
Technology package milling SINUMERIK MDynamics 5 axes	2/36	**6FC5800-0AS33-0YB0**
Transformation DOUBLETRANSMIT 2TRA	2/34	**6FC5800-0AM25-0YB0**
Transformation for pantograph kinematics 2 axes SCIS	2/34	**6FC5800-0AM51-0YB0**
Transformation handling RCTRA	2/34	**6FC5800-0AM31-0YB0**
Transformation robotics extended ROBX	2/34	**6FC5800-0AN54-0YB0**
Transformation TRIPOD HYBRID basis, 5 axes, THYK	2/34	**6FC5800-0AN36-0YB0**
TRANSMIT and cylinder surface transformation	2/34	**6FC5800-0AM27-0YB0**
Travel to fixed stop with Force Control	2/28	**6FC5800-0AM01-0YB0**
Velocity adaptation VADA	2/36	**6FC5800-0AN05-0YB0**

Operator components for CNC controls

3

Operator components for CNC controls
Operator panels

SINUMERIK OP 019

3

Overview

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

- SINUMERIK 840D sl with PCU 50.5

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

The optional SINUMERIK direct key module provides an additional connection of the 2 × 8 vertical softkeys as direct keys to the PROFIBUS DP if no SINUMERIK machine pushbutton panel or machine control panel with connection of the direct keys is available or if the direct key commands cannot be transferred over the Thin Client.

Technical specifications

	6FC5303-0AF13-0AA0
Product name	SINUMERIK operator panel front OP 019
Input voltage	5 V DC over PCU
Power consumption, max.	24 W
Degree of protection acc. to EN 60529 (IEC 60529)	
• Front	IP65/IP66
• Rear	IP20
Humidity rating based on EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity	
• Storage	5 ... 95 % at 25 °C (77 °F)
• Transport	5 ... 95 % at 25 °C (77 °F)
• Operation	5 ... 80 % at 25 °C (77 °F)
Ambient temperature	
• Storage	-20 ... +60 °C (-4 ... +140 °F)
• Transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	
- Front	0 ... 45 °C (32 ... 113 °F)
- Rear	0 ... 55 °C (32 ... 131 °F)
Dimensions	
• Width	483 mm (19.02 in)
• Height	399 mm (15.71 in)
• Depth	58.5 mm (2.30 in)
Depth	
• Without PCU	47.5 mm (1.87 in)
• With PCU 50.5	131.5 mm (5.18 in)
- Clearance	10 mm (0.39 in)
Weight, approx.	11.5 kg (25.36 lb)
Approvals, according to	CE, UL

Selection and ordering data

Description	Order No.
SINUMERIK operator panel front OP 019 48 cm/19" TFT (1280 × 1024) with capacitive keys	**6FC5303-0AF13-0AA0**
SINUMERIK direct key module PROFIBUS DP With mounting kit for SINUMERIK OP 012	**6FC5247-0AF11-0AA0**
Direct key module mounting kit For SINUMERIK OP 015A/OP 019/TP 015A	**6FC5247-0AF30-0AA0**
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 (39.37 in)	**6FC5347-0AF01-1AA0**
Set of clamps (9 units) For operator components with 2.5 mm (0.10 in) profile, length 20 mm (0.79 in)	**6FC5248-0AF14-0AA0**

Overview

The powerful SINUMERIK PCU 50.5 offers maximum HMI performance and openness. It has all interfaces for communication over Ethernet and PROFIBUS (device-dependent) already onboard – leaving the integrated slots free for other tasks.

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

The operating software can be ordered additionally.

The SINUMERIK Service Pack Recovery Media WIN XP ProEmbSys is available for the PCU with Windows XP ProEmbSys for reinstalling Windows software components and for restoring the delivery status.

Benefits

- Powerful and energy-efficient thanks to Intel Dual Core processor technology
- Reliable in operation through the use of error correction 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
- Highly compact design for space-saving installation thanks to compact housing design (6 liter (1.58 gal.) volume)
- Service-friendly thanks to the support of a USB boot device, for example, for booting USB flash drives, USB floppy or USB hard disks

Design

- Intel Dual Core processor technology
  - SINUMERIK PCU 50.5-P:
    Intel Core i5-520E Dual Core/2.4 GHz/
    2 GB ECC RAM/3 MB Smart Cache
  - SINUMERIK PCU 50.5-C:
    Intel Celeron P4505 Dual Core/1.86 GHz/
    1 GB ECC RAM/2 MB Smart Cache
- Replaceable 40 GB solid-state drive
- 12 GB for applications
  (SINUMERIK Operate, HMI-Advanced, MCIS software) and data (part programs, documentation, miscellaneous data)
- 15 GB for local backups and software to be installed
- Max. memory configuration 8 GB incl. graphics memory on 2 memory module slots (with Windows XP, a maximum of up to 4 GB is usable.)
- Integral 2D/3D graphics; dynamic graphics memory (up to 256 MB); the graphics memory is taken from the main memory
- Windows XP ProEmbSys 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 × PROFIBUS/MPI interface (only PCU 50.5-C)

Expansion slots:
- PCU 50.5-P
  - 1 × PCI-Express ×16 (1 × 185 mm (7.28 in))
  - 1 × PCI (1 × 185 mm (7.28 in))
- PCU 50.5-C
  - 2 × PCI (1 × 185 mm (7.28 in))

Operator components for CNC controls

Operator panels

SINUMERIK PCU 50.5

■ **Technical specifications**

	6FC5210-0DF53-2AA0	6FC5210-0DF52-2AA0
Product name	SINUMERIK PCU 50.5-P	SINUMERIK PCU 50.5-C
Processor	Intel Core i5-520E Dual Core/2.4 GHz	Intel Celeron P4505 Dual Core/1.86 GHz
RAM	2 GB ECC RAM	1 GB ECC RAM
Input voltage	24 V DC	
Power consumption, max.		
• Maximum	190 W	
• Typical	48 W	
Power loss ride-through time	20 ms	
Degree of protection acc. to EN 60529 (IEC 60529)	IP20	
Humidity rating based on EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C.	
Relative humidity		
• Storage/transport	5 ... 95 % at 25 °C (77 °F)	
• Operation	5 ... 80 % at 25 °C (77 °F)	
Ambient temperature		
• Storage/transport	-20 ... +60 °C (-4 ... +140 °F)	
• Operation		
- Max. 15 W for expansions	5 ... 55 °C (41 ... 131 °F)	
- Max. 20 W for expansions	5 ... 50 °C (41 ... 122 °F)	
- Max. 30 W for expansions	5 ... 45 °C (41 ... 113 °F)	
Dimensions		
• Width	297 mm (11.69 in)	
• Height	267 mm (10.51 in)	
• Depth	82 mm (3.23 in)	
Weight, approx.	4.5 kg (9.92 lb)	
Approvals, according to	CE, UL	

3

3

Integration

SINUMERIK PCU 50.5 can be used for:

- SINUMERIK 840D sl
  (operating software HMI-Advanced version 7.6 or higher and
  SINUMERIK Operate version 2.6 SP1 or higher)
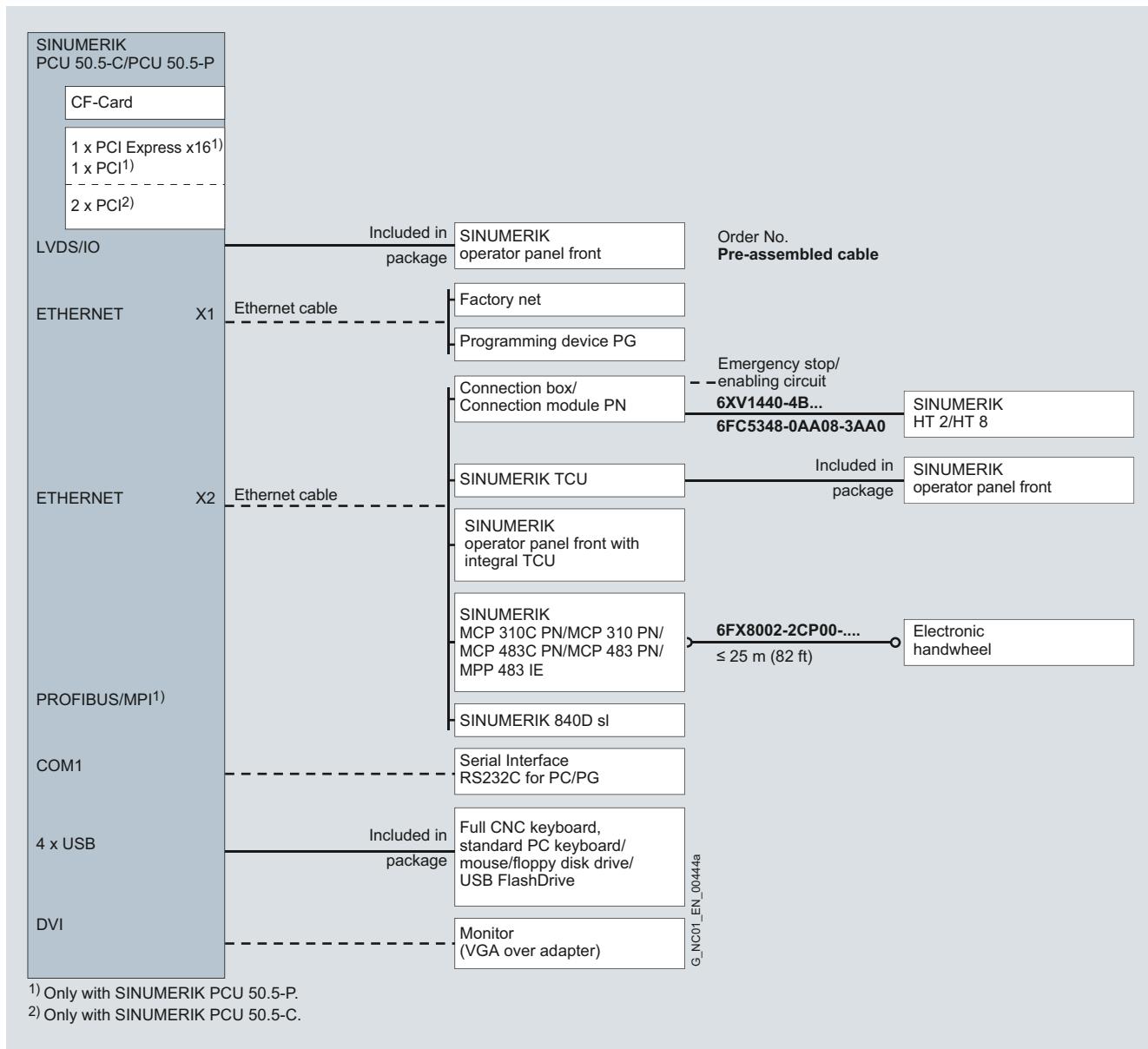
Connection overview of SINUMERIK PCU 50.5-C/PCU 50.5-P

For information about application, configuration and cable extensions see Connection system MOTION-CONNECT.

Operator components for CNC controls
Operator panels

SINUMERIK PCU 50.5

3

■ **Selection and ordering data**

Description	Order No.
SINUMERIK PCU 50.5-C	**6FC5210-0DF52-2AA0**
1.86 GHz/1 × 1 GB, Windows XP ProEmbSys	
SINUMERIK PCU 50.5-P	**6FC5210-0DF53-2AA0**
2.4 GHz/1 × 2 GB, Windows XP ProEmbSys	
Operating software SINUMERIK Operate	
On hard disk of the SINUMERIK PCU[1]	
Languages: Chinese Simplified, English, French, German, Italian, Spanish	
• Single license for current software version	**6FC5860-1YF00-0YA0**
• Single license for specific software version[2]	**6FC5860-1YF■■-■YA0**
HMI-Advanced operating software	
On hard disk of the SINUMERIK PCU[1]	
Languages: Chinese Simplified, English, French, German, Italian, Spanish	
• Single license for current software version	**6FC5253-0BX10-0AF0**
• Single license for specific software version	**6FC5253-■BX10-■AF0**

Description	Order No.
Accessories	
Memory expansion	
For SINUMERIK PCU 50.5	
• 1 GB	**6ES7648-2AJ40-1KA0**
• 2 GB	**6ES7648-2AJ50-1KA0**
Mounting bracket	**6FC5248-0AF20-2AA0**
For SINUMERIK PCU, video link receiver or TCU behind operator panel front	
Upright mounting bracket	**6FC5248-0AF20-1AA1**
For SINUMERIK PCU 50.5 without video link transmitter.	
CompactFlash card 8 GB	**6FC5313-6AG00-0AA0**
Empty	
SIMATIC IPC USB flash drive	**6ES7648-0DC50-0AA0**
8 GB, USB 2.0, metal enclosure, boot capability, incl. SIMATIC IPC BIOS Manager	
SIMUMERIK hard disk	**6FC5247-0AF08-2AA0**
40 GB SSD (solid-state-drive) on mounting plate, with shock absorber and connection cables	
SINUMERIK Service Pack	**6FC5253-1CX10-1XU8**
Recovery Media Windows XP ProEmbSys	
For SINUMERIK PCU 50.5 with Windows XP ProEmbSys on DVD-ROM	
Contents:	
• Windows XP ProEmbSys including SP3	
• Ghost image of basic software; emergency boot	
• Multilingual User Interface Pack Chinese Simplified, Chinese Traditional, Czech, Danish, Dutch, Finnish, French, German, Hungarian, Italian, Japanese, Korean, Polish, Portuguese/Brazilian, Rumanian, Russian, Slovak, Spanish, Swedish, Turkish.	
• Documentation (English/German)	

[1] Please ensure that the order number for the software to be delivered on the hard disk directly follows the order number for the SINUMERIK PCU on the order form.

[2] Order number for software version 2.7 SP1 for operating software SINUMERIK Operate: 6FC5860-1YF**23-0**YA0

HMI software for
CNC controls

Tools
Create MyConfig

Security note

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

HMI software for CNC controls

Tools

Create MyConfig

■ Overview
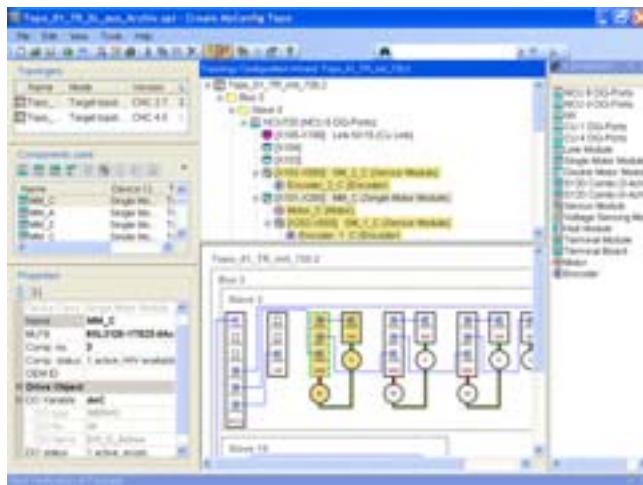
Create MyConfig is used by the machine manufacturer to create and run a project for automated commissioning/production of machines with SINUMERIK 840D sl control systems. Even upgrades of those CNC systems at the end customer can be configured and executed automatically.

Thanks to its modular concept, Create MyConfig allows 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

■ Significant reduction of the required commissioning or upgrade time

■ Avoidance of errors during commissioning or upgrade processes through structured preparation and automation of process steps

■ Reproducibility of the automatic commissioning or upgrade process

■ Simplification of the commissioning or upgrade process at the system

■ Detailed knowledge of the control system is essential only to configure the InstallerUpdate package, but not to perform commissioning or upgrades at the machine

■ Design

Create MyConfig comprises the following components:

• Expert
  Configuring an Installer package, which contains a configurable sequence of production or upgrade steps and the associated data

• Diff
  Data comparison between folders, SINUMERIK archives, files and CNC data

• Topo
  Creating an image of the SINAMICS topology and a library of SINAMICS components

■ Function

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

• HMI installations

• OEM applications

• NCK area (CNC software, archives)

• ShopMill/ShopTurn applications

• Standard cycles

• Measuring cycles

• Languages

• PLC (for CNC software, function blocks)

• OEM screen forms

• Machine data manipulations

• 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

Preconditions:

• SINUMERIK 840D sl with SINUMERIK Operate

Preconditions for PC/PG:

• Windows XP/Windows 7 operating system

• Drive with 100 MB of free memory space

• Network/Ethernet connection

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

• Microsoft .NET Framework

• Microsoft Internet Explorer, version 6 or later

• Acrobat Reader, version 4 or later

■ Selection and ordering data

Description	Order No.
SINUMERIK Integrate Create MyConfig	
For series start-up and software upgrades	
• Single license on CD-ROM Software version 4.5	**6FC5862-2YC41-0YA0**

Synchronous motors

7

CAD CREATOR

Dimension drawing and
2D/3D CAD generator

www.siemens.com/cadcreator

Synchronous motors
Introduction

Type overview and rated data

Motor type		Designation	Degree of protection	Cooling method
	SIMOTICS M-1PH8	Synchronous motor, permanent-magnet Feed motor	IP55[1] IP55/IP65[2]	Forced ventilation Water cooling
	SIMOTICS S-1FT7 Compact	Synchronous motor, permanent-magnet Feed motor – Compact Low torque-ripple and very high power density	IP64[3] (optional IP65, IP67)	Natural cooling Forced ventilation Water cooling
	SIMOTICS S-1FT7 High Dynamic	Synchronous motor, permanent-magnet Feed motor – High Dynamic Very low rotor moment of inertia	IP64 (optional IP65, IP67)	Forced ventilation Water cooling
	SIMOTICS S-1FK7 Compact	Synchronous motor, permanent-magnet Feed motor – Compact High power density	IP64 (optional IP65)	Natural cooling
	SIMOTICS S-1FK7 High Dynamic Compact/High Dynamic for Power Modules 230 V 1 AC	Synchronous motor, permanent-magnet Feed motor – High Dynamic Very low rotor moment of inertia	IP64 (optional IP65)	Natural cooling
	SIMOTICS S-1FK7 High Inertia	Synchronous motor, permanent-magnet Feed motor – High Inertia High or variable load moment of inertia	IP64 (optional IP65)	Natural cooling

Gearboxes	Page
Planetary gearboxes SP+ for SIMOTICS S-1FT7 motors	**7/63**
Planetary gearboxes SP+ for SIMOTICS S-1FK7 motors	**7/68**
Planetary gearboxes LP+ for SIMOTICS S-1FK7 motors	**7/74**

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] Fans: IP55, option: IP65.
[2] From SH 180: IP55.
[3] Core type: IP65.

© Siemens AG 2012

Shaft height	Rated power P_{rated} for S1 duty kW (HP)						Rated torque M_{rated}	Selection and ordering data
	0.01	0.1	1	10	100	1000		Page
SH 132/SH 160/ SH 180/SH 225				15.7 (21.1)	168 (225)		96 ... 1091 Nm (70.8 ... 805 lb$_f$-ft)	7/14 ... 7/19
SH 132/SH 160/ SH 180/SH 225				17.6 (23.6)	228 (306)		109 ... 1651 Nm (80.4 ... 1218 lb$_f$-ft)	7/14 ... 7/21
SH 36/SH 48/SH 63/ SH 80/SH 100			0.85 (1.14)	10.5 (14.1)			1.4 ... 61 Nm (12.4 ... 540 lb$_f$-in)	7/28 ... 7/33
SH 80/SH 100			5 (6.71)	18.8 (25.2)			21 ... 73 Nm (186 ... 646 lb$_f$-in)	7/34 ... 7/35
SH 63/SH 80/SH 100			3.1 (4.16)	34.2 (45.9)			9.2 ... 125 Nm (81.4 ... 1106 lb$_f$-in)	7/36 ... 7/39
SH 63/SH 80			3.8 (5.10)	10.8 (14.5)			11 ... 33 Nm (97.4 ... 292 lb$_f$-in)	7/40 ... 7/41
SH 63/SH 80			5.7 (7.64)	21.7 (29.1)			16.5 ... 51 Nm (146 ... 451 lb$_f$-in)	7/40 ... 7/41
SH 20/SH 28/SH 36/ SH 48SH 63/SH 80/ SH 100		0.05 (0.07)	8.2 (11)				0.08 ... 37 Nm (0.7 ... 327 lb$_f$-in)	7/46 ... 7/51
SH 36/SH 48/SH 63/ SH 80		0.6 (0.8)	3.8 (5.1)				0.6 ... 18 Nm (5.3 ... 159 lb$_f$-in)	7/52 ... 7/53
SH 20/SH 28/SH 36/ SH 48		0.05 (0.07)	0.9 (1.21)				0.08 ... 3 Nm 0.7 ... 27 lb$_f$-in)	7/56 ... 7/61
SH 48/SH 63/SH 80		0.9 (1.21)	3.1 (4.16)				1.5 ... 15 Nm (13.3 ... 133 lb$_f$-in)	7/54 ... 7/55

7

Synchronous motors
Introduction

Type overview and rated data

Motor type	Designation	Degree of protection	Cooling method
SIMOTICS L-1FN3	Synchronous linear motor, permanent-magnet Direct drive	IP65	Water cooling
SIMOTICS L-1FN6	Synchronous linear motor, permanent-magnet Direct drive	Primary section: IP65[1]	Natural cooling Water cooling

Motor type	Designation	Degree of protection	Cooling method
SIMOTICS T-1FW6	Synchronous motor with permanent magnet rotor, multi-pole Built-in torque motor for direct drive	IP23[2]	Water cooling

Motor type	Designation	Degree of protection	Cooling method
SIMOTICS M-1FE1	Synchronous spindle with permanent-magnet-excited rotor Built-in motor Main spindle motor	IP00	Water cooling
2SP1	Motor spindle, synchronous and asynchronous versions Main spindle motor	Working area: IP64 Behind the spindle flange: IP53	Water cooling

Application

The applications for the SIMOTICS M-1PH8/S-1FT7/S-1FK7/L-1FN3/L-1FN6/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.

The motors are referred to generally in this documentation as synchronous motors, due to their principle of operation.

The SIMOTICS M-1FE1 built-in motors are used as motor spindles in machine tools for turning, milling, or grinding. The 2SP1 motor spindles are a motorized spindle series used in machine tools for milling.

[1] Degree of protection of the motor is determined by the design of the motor's installation in the machine. Minimum requirement: IP23.
[2] The final degree of protection (minimum degree of protection is IP54) for the installed motor is determined by the machine manufacturer.

Type overview and rated data

Primary section width mm	Feedrate 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 system without/with 67/96/76/105/ 126/141/135/150/ 188/248/197/257/ 342/351				**Peak load** 200 (45) — 8100 (1821)			105 ... 836 m/min (345 ... 2743 ft/min)	Catalog NC 61 · 2010 7/92 ... 7/95
				Continuous load 150 (33.7) — 10375 (2332)			129 ... 435 m/min (423 ... 1427 ft/min)	Catalog NC 61 · 2010 7/96 ... 7/97
80/115/130/ 209/289				66.3 (14.9) — 3000 (674)			93.9 ... 1280 m/min (308 ... 4200 ft/min)	Catalog NC 61 · 2010 7/104 ... 7/107
80/115				119 (26.8) — 1430 (321)			57.5 ... 852 m/min (189 ... 2795 ft/min)	Catalog NC 61 · 2010 7/108 ... 7/109

Diameter mm	Rated torque M_{rated} Nm (lb_f-in)						Max. speed n_{max} at M_{rated}	Selection and ordering data
	0.1	1	10	100	1000	10000		Page
External diameter 159/184/230/310/ 385/440/502/576/ 730			22 (195) — 5760 (50982)				38 ... 940 rpm	7/78 ... 7/89

Diameter mm	Rated power P_{rated} for S1 duty kW (HP)						Rated torque M_{rated}	Selection and ordering data
	0.01	0.1	1	10	100	1000		Page
Outer diameter (cooling jacket) High-Torque series 95/115/130/190/ 205/250/310			4 (5.36) — 104 (139)				4.5 ... 820 Nm (39.8 ... 7258 lb_f-in)	Catalog NC 61 · 2010 7/124 ... 7/127
High-Speed series 120/155/180/205/ 230/270			6.5 (8.72) — 94 (126)				5 ... 300 Nm (44.3 ... 2655 lb_f-in)	Catalog NC 61 · 2010 7/128 ... 7/131
Spindle diameter 200/250			12 (16.1) 53.4 (71.6)				42 ... 170 Nm (372 ... 1505 lb_f-in)	Catalog NC 61 · 2010 7/136 ... 7/137

■ **Application** (continued)

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.

7

Synchronous motors
Introduction

Technical definitions for AC motors

■ **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 to a digital signal. For these motors as well as 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 the commissioning and diagnostics, for example, due to automatic identification of the encoder system.

The different encoder types, incremental, absolute or resolver, are uniformly 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 is specified (for encoders with DRIVE-CLiQ interface).

Type	Resolution/interface	
AM AS IC IN HTL	xxxxSR	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 bits (2^{xx})
AM		Absolute encoder, multi-turn
AS		Absolute encoder, single-turn
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 order number (_without_ DRIVE-CLiQ interface)			Identification letter in the motor order number (_with_ DRIVE-CLiQ interface)		
					1FT7	1FK7	1PH8	1FT7	1FK7	1PH8
AM2048S/R	AM24DQI	Yes	Yes	Yes				C	C	
	AM20DQI	Yes	Yes	Yes					R	
	AS24DQI	Yes	No	Yes				B	B	
	AS20DQI	Yes	No	Yes					Q	
	AM22DQ	Yes	Yes	Yes	M	E	E	F	F	F
AM512S/R	AM20DQ	Yes	Yes	Yes	–	H	–	–	L	–
AM32S/R	AM16DQ	Yes	Yes	No	–	G	–	–	K	–
AM16S/R	AM15DQ	Yes	Yes	No	–	J	–	–	V	–
AS2048S/R	AS22DQ	Yes	No	No	–	–	–	–	–	–
IC2048S/R	IC22DQ	No	No	Yes	N	A	M	D	D	D
IN2048S/R	IN22DQ	No	No	Yes	–	–	–	–	–	–
HTL1024S/R	–	No	No	No	–	–	H	–	–	–
HTL2048S/R	–	No	No	No	–	–	J	–	–	–
Resolver p=1	R14DQ	Yes	No	No	–	T	–	–	P	–
Resolver p=3	R15DQ	No	No	No	–	S	–	–	U	–
Resolver p=4	R15DQ	No	No	No	–	S	–	–	U	Q

Not every encoder is available for every motor frame size.

– Not possible

7

■ 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.
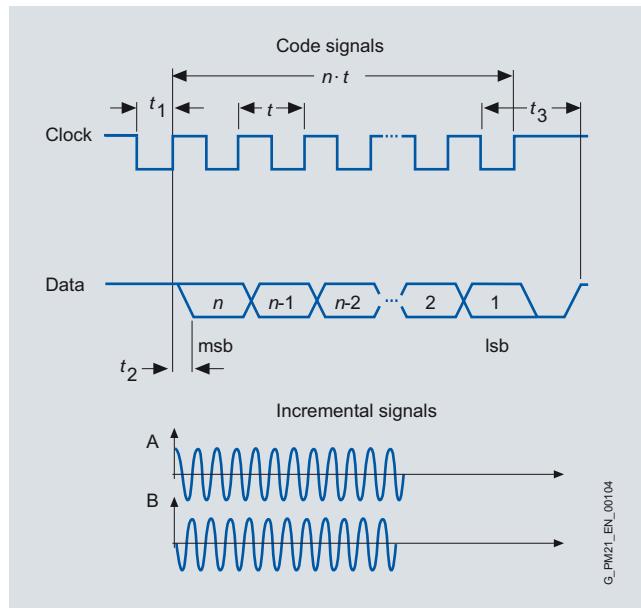
Absolute encoder, multi-turn

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	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM512S/R	Absolute encoder 512 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM32S/R	Absolute encoder 32 S/R, 4096 revolutions, multi-turn, with EnDat interface
AM16S/R	Absolute encoder 16 S/R, 4096 revolutions, multi-turn, with EnDat interface
AS2048S/R	Absolute encoder single-turn 2048 S/R
Absolute encoders with DRIVE-CLiQ interface	
AM24DQI	Absolute encoder, 24 bit + 12 bit multi-turn
AM20DQI	Absolute encoder, 20 bit + 12 bit multi-turn
AM22DQ	Absolute encoder, 22 bit + 12 bit multi-turn
AM20DQ	Absolute encoder, 20 bit + 12 bit multi-turn
AM16DQ	Absolute encoder, 16 bit + 12 bit multi-turn
AM15DQ	Absolute encoder, 15 bit + 12 bit multi-turn
AS24DQI[2]	Absolute encoder, 24 bit + 12 bit multi-turn
AS20DQI[2]	Absolute encoder, 20 bit + 12 bit multi-turn
AS22DQ	Absolute encoder, single-turn, 22 bit

Technical specifications	
Angular error	
• AM2048S/R and AM22DQ	± 40"
• AM512S/R and AM20DQ	± 120"
• AM32S/R and AM16DQ	± 280"
• AM16S/R and AM15DQ	± 480"
• AS2048S/R and AS22DQ	± 40"

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	$2^{22}/2^{20}/2^{16}/2^{15}$ 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 previous incremental encoders.

Synchronous motors
Introduction

Technical definitions for AC motors

■ **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.
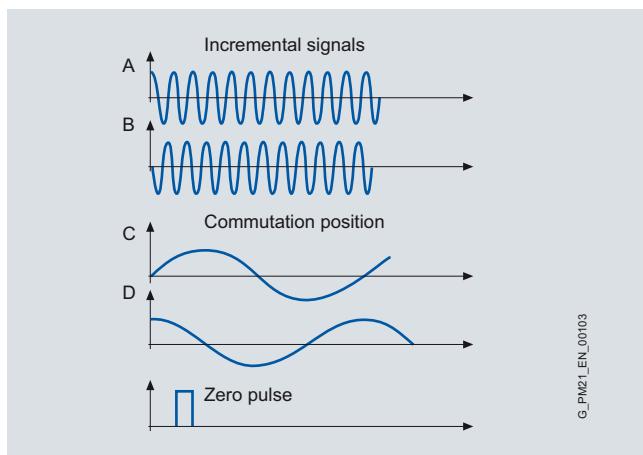
Incremental encoder IC/IN (sin/cos), commutation position only for IC

HTL incremental encoder

The encoder outputs square wave signals. The direction of rotation can be evaluated by means of edge evaluation.

The resolution is four times the number of encoder pulses. This encoder type is preferred for long signal cables.
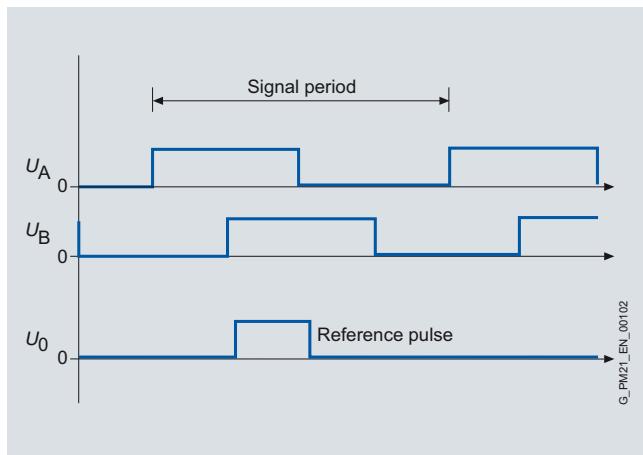
HTL incremental encoder

Incremental encoder **without** DRIVE-CLiQ interface	
IC2048S/R	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks
IN2048S/R	Incremental encoder sin/cos 1 V_{pp}, 2048 S/R without C or D tracks
HTL2048S/R	Incremental encoder HTL 2048 S/R
HTL1024S/R	Incremental encoder HTL 1024 S/R

Incremental encoder **with** DRIVE-CLiQ interface[1]	
IC22DQ	Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit
IN22DQ	Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) without commutation position

Technical specifications	
Angular error	
• IC2048S/R and IC22DQ	± 40"
• IN2048S/R and IN22DQ	± 120"
• HTL2048S/R	± 60"
• HTL1024S/R	± 60"

Incremental encoder IC/IN (sin/cos) without DRIVE-CLiQ interface	
Supply voltage	5 V
Incremental signals per revolution	
• Resolution (sin/cos)	2048
• Commutation position (for IC only)	1 sin/cos
• Reference signal	1

Incremental encoder IC/IN (sin/cos) with DRIVE-CLiQ interface	
Supply voltage	24 V
Incremental signals per revolution	
• Resolution	2^{22} bit
• Commutation position in bit (for IC only)	11
• Reference signal	1

Incremental encoder 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 incremental encoder IC22DQ, the single-turn absolute encoder AS24DQI is used for SIMOTICS S-1FK7/1FT7.

7

■ **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 pairs of poles. For multi-pole resolvers, the motor and resolver must always have the same numbers of pole pairs. The resolution is correspondingly higher than with 2-pole resolvers.
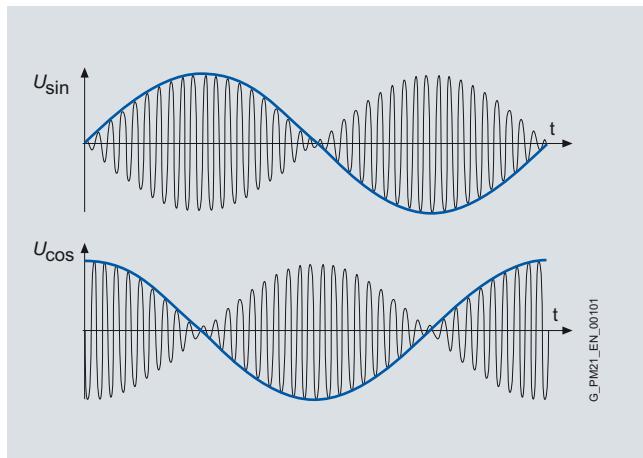
Resolvers **without** DRIVE-CLiQ interface[1]	
Resolver p = 1	2-pole resolver
Resolver p = 3	6-pole resolver
Resolver p = 4	8-pole resolver

Resolvers **with** DRIVE-CLiQ interface	
R15DQ	Resolver 15 bit (resolution 32768, internal, multi-pole)
R14DQ	Resolver 14 bit (resolution 16384, internal, 2-pole)

Technical specifications	
Angular error	
• Resolver p = 1 and R14DQ	± 840"[2]
• Resolver p = 3 and R15DQ	± 420"
• Resolver p = 4 and R15DQ	± 240"

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

7

---

[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
[2] For the 1FK701/1FK702 motors: 1200"

Synchronous motors
Feed motors for SINAMICS S120
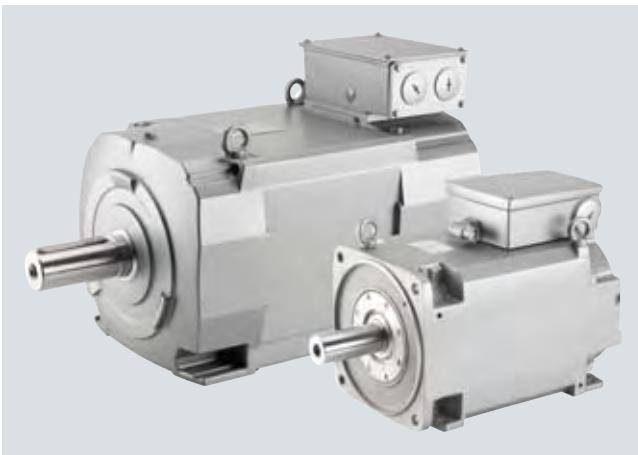
SIMOTICS M-1PH8 motors

Overview

SIMOTICS M-1PH8 motors are compact permanent-magnet synchronous motors with IP55/IP65 degree of protection and they extend/replace the current range of the well-proven 1FT series. The motors are available in different cooling types:

- Forced ventilation for SH 132 to SH 225
- Water cooling for SH 132 to SH 225

They 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 magnitudes
  - High dynamic response (short acceleration times)
- Low noise emissions
- Simple, 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

Characteristic curves
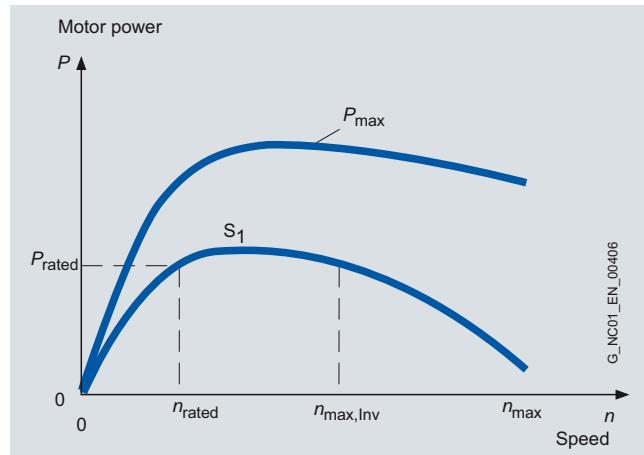
Typical speed/power graph for synchronous motors SIMOTICS M-1PH8[1]

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.

[1] For further configuration information, see the 1PH8 Motors Configuration Manual.

■ **Technical specifications**

Product name	SIMOTICS M-1PH8 motor	
Cooling	Forced ventilation	Water cooling
• Cooling water pressure at inlet, max.	–	6 bar
• Cooling water flow volume		
- 1PH813	–	12 l/min (3.17 US gallons/min)
- 1PH816	–	15 l/min (3.96 US gallons/min)
- 1PH818	–	15 l/min (3.96 US gallons/min
- 1PH822	–	25 l/min (6.61 US gallons/min)
• Connecting thread at NDE[1]		
- 1PH813	–	G 3/8"
- 1PH816	–	G 1/2"
- 1PH818/1PH822	–	G 3/8"
Ambient temperature, permissible	-15 ... +40 °C (5 ... 104 °F)[2]	
Coolant inlet temperature	–	< 30 °C (86 °F)
Temperature monitoring	KTY 84 temperature sensor in stator winding	
• 1PH818/1PH822	–	Additional KTY 84 as reserve
Insulation of the stator winding 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]	
Motor fan ratings		
• 1PH813/1PH816	400 V 3 AC ± 10 %, 50/60 Hz 480 V 3 AC ± 10 %, 60 Hz	
• 1PH818/1PH822	EC fan: 200 ... 277 V 1 AC ± 10 %, 50/60 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 Tolerance + 3 dB		
• 1PH813	70 dB[4]	68 dB[4]
• 1PH816	73 dB[4]	69 dB[4]
• 1PH818/1PH822	73 dB[5]	70 dB[6]
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)[7]	Tolerance R	
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)		
• 1PH813/1PH816	IP55	IP65
• 1PH818/1PH822	IP55	IP55
Rating plate	1 unit attached to motor 1 unit supplied loose in terminal box	
Paint finish	Anthracite RAL 7016	
Approvals, according to	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 should 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] For rated pulse frequency of 4 kHz and speed range up to 5000 rpm.

[5] For rated pulse frequency of 4 kHz or 2 kHz and speed range up to 5000 rpm (1PH818) or 3500 rpm (1PH822).

[6] For rated pulse frequency of 4 kHz or 2 kHz and speed range up to 5000 rpm (1PH818) or 4500 rpm (1PH822).

[7] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 132 – Forced ventilation/Water cooling

■ **Selection and ordering data**

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power[3]	Rated torque[3]	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)	Order No.
Shaft height 132 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
1500	4500	2550	15.7 (21.1)	100 (73.8)	105 (77.4)	**1PH8131-2■ F ■■-■■■1**
2500	4500	4050	25 (33.5)	96 (70.8)	105 (77.4)	**1PH8131-2■ L ■■-■■■1**
1500	4500	3050	19.9 (26.7)	127 (93.7)	131 (96.6)	**1PH8133-2■ F ■■-■■■1**
2500	4500	3950	31.7 (42.5)	121 (89.2)	131 (96.6)	**1PH8133-2■ L ■■-■■■1**
1500	4500	2450	23.7 (31.8)	151 (111)	158 (117)	**1PH8135-2■ F ■■-■■■1**
2000	4500	3500	31.4 (42.1)	150 (111)	158 (117)	**1PH8135-2■ G ■■-■■■1**
1500	4500	2700	30.6 (41.0)	195 (144)	203 (150)	**1PH8137-2■ F ■■-■■■1**
2500	4500	3900	48.4 (64.9)	185 (136)	203 (150)	**1PH8137-2■ L ■■-■■■1**
3000	4500	4500	57.5 (77.1)	183 (135)	203 (150)	**1PH8137-2■ M ■■-■■■1**
Shaft height 132 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
1500	4500	3150	17.6 (23.6)	112 (82.6)	115 (84.8)	**1PH8131-2■ F 2■-■■■1**
2500	4500	4500	28.5 (38.2)	109 (80.4)	115 (84.8)	**1PH8131-2■ L 2■-■■■1**
1500	4500	2450	23.1 (31.0)	147 (108)	155 (114)	**1PH8133-2■ F 2■-■■■1**
2000	4500	3450	30.6 (41.0)	146 (108)	155 (114)	**1PH8133-2■ G 2■-■■■1**
1500	4500	2650	29.7 (39.8)	189 (139)	196 (145)	**1PH8135-2■ F 2■-■■■1**
2000	4500	3800	39 (52.3)	186 (137)	196 (145)	**1PH8135-2■ G 2■-■■■1**
1500	4500	2350	34.1 (45.7)	217 (160)	226 (167)	**1PH8137-2■ F 2■-■■■1**
2000	4500	3500	44.4 (59.5)	212 (156)	226 (167)	**1PH8137-2■ G 2■-■■■1**
1500	4500	3500	44.9 (60.2)	286 (211)	290 (214)	**1PH8138-2■ F 2■-■■■1**
2000	4500	3900	59.7 (80.1)	285 (210)	290 (214)	**1PH8138-2■ G 2■-■■■1**

For versions, see Order No. supplement and options.

7

Motor type (repeated)	Effi-ciency	Moment of inertia	Weight, approx.	Rated current[3]	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[3][4]	For additional versions and components, see section 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	Order No.
1PH8131-2.F...	94.4	0.0446 (0.39)	85 (187)	29	30	gk833	30	**6SL312■-1TE23-0AA3**
1PH8131-2.L...	94.8	0.0446 (0.39)	85 (187)	44	48	gk833	45	**6SL312■-1TE24-5AA3**
1PH8133-2.F...	94.8	0.0600 (0.53)	103 (227)	44	45	gk833	45	**6SL312■-1TE24-5AA3**
1PH8133-2.L...	95.1	0.0600 (0.53)	103 (227)	55	59	gk833	60	**6SL312■-1TE26-0AA3**
1PH8135-2.F...	95.2	0.0750 (0.66)	120 (265)	43	44	gk833	45	**6SL312■-1TE24-5AA3**
1PH8135-2.G...	95.3	0.0750 (0.66)	120 (265)	59	63	gk833	60	**6SL312■-1TE26-0AA3**
1PH8137-2.F...	95.2	0.0885 (0.78)	136 (300)	60	62	gk833	60	**6SL312■-1TE26-0AA3**
1PH8137-2.L...	95.4	0.0885 (0.78)	136 (300)	83	89[5]	gk833	85	**6SL312■-1TE28-5AA3**
1PH8137-2.M...	95.3	0.0885 (0.78)	136 (300)	104	115[5]	gk833	132	**6SL312■-1TE31-3AA3**
1PH8131-2.F2...	94.6	0.0446 (0.39)	102 (225)	40	41	gk843	45	**6SL312■-1TE24-5AA3**
1PH8131-2.L2...	94.8	0.0446 (0.39)	102 (225)	57	60	gk843	60	**6SL312■-1TE26-0AA3**
1PH8133-2.F2...	94.7	0.0600 (0.53)	120 (265)	42	43	gk843	45	**6SL312■-1TE24-5AA3**
1PH8133-2.G2...	95.0	0.0600 (0.53)	120 (265)	57	61	gk843	60	**6SL312■-1TE26-0AA3**
1PH8135-2.F2...	95.0	0.0750 (0.66)	138 (304)	57	59	gk843	60	**6SL312■-1TE26-0AA3**
1PH8135-2.G2...	95.2	0.0750 (0.66)	138 (304)	81	85[5]	gk843	85	**6SL312■-1TE28-5AA3**
1PH8137-2.F2...	95.1	0.0885 (0.78)	153 (337)	58	60	gk843	60	**6SL312■-1TE26-0AA3**
1PH8137-2.G2...	95.4	0.0885 (0.78)	153 (337)	85	90[5]	gk843	85	**6SL312■-1TE28-5AA3**
1PH8138-2.F2...	95.8	0.0885 (0.78)	156 (344)	118	120[5]	gk843	132	**6SL312■-1TE31-3AA3**
1PH8138-2.G2...	96.0	0.0885 (0.78)	156 (344)	131	133[5]	gk843	132	**6SL312■-1TE31-3AA3**

Format: Booksize	**1**
Cooling: Internal air cooling	**0**
External air cooling	**1**
Motor Module: Single Motor Module	**1**

7

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the induced voltage in the motor and the voltage stability of the Motor Module (without protective circuit).

[3] For duty type S1.

[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz.

[5] From approximately 85 A, the top power connector connection type is not possible (15th data position E to H).

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 160 – Forced ventilation/Water cooling

■ **Selection and ordering data**

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power[3]	Rated torque[3]	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)	Order No.
Shaft height 160 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
1500	4000	2600	61 (81.1)	390 (288)	440	**1PH8165-2■F■■-■■■1**
2500	4000	3900	84 (113)	320 (236)	440	**1PH8165-2■L■■-■■■1**
1500	4000	2600	69 (92.5)	435 (321)	500	**1PH8167-2■F■■-■■■1**
2500	4000	4000	95 (127)	360 (266)	500	**1PH8167-2■L■■-■■■1**
Shaft height 160 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
1500	4000	2400	59 (79.1)	375 (277)	440	**1PH8164-2■F 2■-■■■1**
2500	4000	4000	88 (118)	335 (247)	440	**1PH8164-2■L 2■-■■■1**
1500	4000	2600	74 (99.2)	475 (350)	550	**1PH8166-2■F 2■-■■■1**
2500	4000	3900	102 (137)	390 (288)	550	**1PH8166-2■L 2■-■■■1**
1500	4000	2600	84 (113)	530 (391)	620	**1PH8168-2■F 2■-■■■1**
2500	4000	4000	119 (160)	455 (336)	520	**1PH8168-2■L 2■-■■■1**

For versions, see Order No. supplement and options.

7

Motor type (repeated)	Effi-ciency	Moment of inertia	Weight, approx.	Rated current	Stall current[3]	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[3][4]	For additional versions and components, see section 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	Order No.
1PH8165-2.F...	94	0.216 (1.912)	218 (481)	119	126	gk874	132	**6SL312■-1TE31-3AA3**
1PH8165-2.L...	95.5	0.216 (1.912)	218 (481)	148	188	gk874	200	**6SL312■-1TE32-0AA4**
1PH8167-2.F...	94	0.244 (2.160)	240 (529)	133	143	gk874	132[5]	**6SL312■-1TE31-3AA3**
1PH8167-2.L...	95.5	0.244 (2.160)	240 (529)	177	230	gk874	200[5]	**6SL312■-1TE32-0AA4**
1PH8164-2.F2...	94	0.175 (1.549)	224 (494)	111	118	gk874	132	**6SL312■-1TE31-3AA3**
1PH8164-2.L2...	95.5	0.175 (1.549)	224 (494)	165	205	gk874	200[5]	**6SL312■-1TE32-0AA4**
1PH8166-2.F2...	94	0.216 (1.912)	257 (567)	148	159	gk874	200	**6SL312■-1TE32-0AA4**
1PH8166-2.L2...	95.5	0.216 (1.912)	257 (567)	188	240	gk874	200[5]	**6SL312■-1TE32-0AA4**
1PH8168-2.F2...	94	0.244 (2.160)	279 (615)	169	179	gk874	200	**6SL312■-1TE32-0AA4**
1PH8168-2.L2...	95.5	0.244 (2.160)	279 (615)	225	240	gk874	260[5]	**6SL332 0-1TE32-6AA3**

Format:
Booksize ... **1**
Chassis ... **3**

Cooling:
Internal air cooling ... **0**
External air cooling ... **1**

Motor Module:
Single Motor Module ... **1**

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the induced voltage in the motor and the voltage stability of the Motor Module (without protective circuit).

[3] For duty type S1.

[4] The rated pulse frequencies must be taken into account. The rated motor data is valid for 4 kHz.

[5] At 4 kHz, the rated output current of the Motor Module is lower than the rated motor current or the motor stall current.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180/SH 225 – Forced ventilation

■ **Selection and ordering data**

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power[3]	Rated torque[3]	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)	Order No.
Shaft height 180 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
700	3800	1450	33 (44.3)	450 (332)	480 (354)	**1PH8184-2■C■■-■■■1**
1000	3800	1950	46 (61.7)	439 (324)	480 (354)	**1PH8184-2■D■■-■■■1**
1500	3800	2700	70 (93.9)	446 (329)	480 (354)	**1PH8184-2■F■■-■■■1**
700	3800	1450	44 (59.0)	600 (443)	640 (472)	**1PH8186-2■C■■-■■■1**
1000	3800	2050	62 (83.1)	592 (437)	640 (472)	**1PH8186-2■D■■-■■■1**
1500	3800	2950	93 (125)	592 (437)	640 (472)	**1PH8186-2■F■■-■■■1**
Shaft height 225 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module						
700	3500	1450	48 (64.4)	655 (483)	708 (522)	**1PH8224-2■C■■-■■■1**
1000	3500	2050	68 (91.2)	649 (479)	708 (522)	**1PH8224-2■D■■-■■■1**
1500	3500	2900	101 (135)	643 (474)	708 (522)	**1PH8224-2■F■■-■■■1**
700	3500	1550	64 (85.8)	873 (644)	944 (696)	**1PH8226-2■C■■-■■■1**
1000	3500	1950	91 (122)	869 (641)	944 (696)	**1PH8226-2■D■■-■■■1**
1500	3500	2700	134 (180)	853 (629)	944 (696)	**1PH8226-2■F■■-■■■1**
700	3500	1450	80 (107)	1091 (805)	1180 (870)	**1PH8228-2■C■■-■■■1**
1000	3500	1950	113 (151)	1079 (796)	1180 (870)	**1PH8228-2■D■■-■■■1**
1500	3500	2900	168 (225)	1070 (789)	1180 (870)	**1PH8228-2■F■■-■■■1**

For versions, see Order No. supplement and options.

7

Motor type (repeated)	Efficiency	Moment of inertia	Weight, approx.	Rated current	Stall current[3]	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[3][4]	For additional versions and components, see section 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	Order No.
1PH8184-2.C...	93.2	0.46 (4.07)	330 (728)	80	84	1XB7322-P05	85	**6SL312■-1TE28-5AA3**
1PH8184-2.D...	93.7	0.46 (4.07)	330 (728)	106	115	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8184-2.F...	95.1	0.46 (4.07)	330 (728)	148	157	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-2.C...	92.4	0.60 (5.31)	400 (882)	108	115	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8186-2.D...	94.3	0.60 (5.31)	400 (882)	148	157	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-2.F...	95.2	0.60 (5.31)	405 (893)	215	229	1XB7422-P06	260	**6SL332 0-1TE32-6AA3**
1PH8224-2.C...	96.1	1.28 (11.33)	580 (1279)	120	128	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8224-2.D...	96.4	1.28 (11.33)	580 (1279)	170	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8224-2.F...	96.5	1.28 (11.33)	580 (1279)	235	256	1XB7422-P06	260	**6SL332 0-1TE32-6AA3**
1PH8226-2.C...	96.3	1.66 (14.69)	700 (1544)	170	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8226-2.D...	96.7	1.66 (14.69)	700 (1544)	215	233	1XB7422-P06	260	**6SL332 0-1TE32-6AA3**
1PH8226-2.F...	96.7	1.66 (14.69)	700 (1544)	295	320	1XB7700-P02	310[5]	**6SL332 0-1TE33-1AA3**
1PH8228-2.C...	96.5	2.02 (17.88)	810 (1786)	200	213	1XB7322-P05	200[5]	**6SL312■-1TE32-0AA4**
1PH8228-2.D...	96.8	2.02 (17.88)	810 (1786)	265	284	1XB7422-P06	310	**6SL332 0-1TE33-1AA3**
1PH8228-2.F...	96.7	2.02 (17.88)	810 (1786)	395	427	1XB7700-P02	490	**6SL332 0-1TE35-0AA3**

Format:	
Booksize	**1**
Chassis	**3**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**

Motor Module:	
Single Motor Module	**1**

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the induced voltage in the motor and the voltage stability of the Motor Module (without protective circuit).

[3] For duty type S1.

[4] 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).

[5] At 2 kHz, the rated output current of the Motor Module is lower than the rated motor current or the motor stall current.

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180/SH 225 – Water cooling

■ **Selection and ordering data**

Rated speed	Speed, max.[1]	Operating speed, max.[2]	Rated power[3]	Rated torque[3]	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)	Order No.
Shaft height 180 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
700	3800	1450	42 (56.3)	573 (423)	590 (435)	**1PH8184-2■C2■-■■■1**
1000	3800	1950	61 (81.8)	583 (430)	600 (443)	**1PH8184-2■D2■-■■■1**
1500	3800	2700	90 (121)	573 (423)	600 (443)	**1PH8184-2■F2■-■■■1**
2500	3800	3800	127 (170)	485 (358)	530 (391)	**1PH8184-2■L2■-■■■1**
700	3800	1450	58 (77.8)	791 (583)	800 (590)	**1PH8186-2■C2■-■■■1**
1000	3800	2050	80 (107)	764 (564)	800 (590)	**1PH8186-2■D2■-■■■1**
1500	3800	2950	119 (160)	758 (559)	800 (590)	**1PH8186-2■F2■-■■■1**
2500	3800	3800	168 (225)	642 (474)	720 (531)	**1PH8186-2■L2■-■■■1**
Shaft height 225 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module						
700	3500	1450	72 (96.6)	982 (724)	1007 (743)	**1PH8224-2■C2■-■■■1**
1000	3500	2050	101 (135)	964 (711)	1007 (743)	**1PH8224-2■D2■-■■■1**
1500	3500	2900	151 (203)	961 (709)	1007 (743)	**1PH8224-2■F2■-■■■1**
2500	3500	3500	182 (244)	695 (513)	855 (631)	**1PH8224-2■L2■-■■■1**
700	3500	1550	95 (127)	1296 (956)	1330 (981)	**1PH8226-2■C2■-■■■1**
1000	3500	1950	135 (181)	1289 (951)	1330 (981)	**1PH8226-2■D2■-■■■1**
1500	3500	2700	201 (270)	1280 (944)	1330 (981)	**1PH8226-2■F2■-■■■1**
2500	3500	3500	228 (306)	871 (642)	1170 (863)	**1PH8226-2■L2■-■■■1**
700	3500	1450	121 (162)	1651 (1218)	1680 (1239)	**1PH8228-2■C2■-■■■1**
1000	3500	1950	169 (227)	1614 (1190)	1680 (1239)	**1PH8228-2■D2■-■■■1**

For versions, see Order No. supplement and options.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180/SH 225 – Water cooling

Motor type (repeated)	Effi-ciency	Moment of inertia	Weight, approx.	Rated current[3]	Stall current[3]	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[3][4]	For additional versions and components, see section 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	Order No.
1PH8184-2.C2...	91.9	0.457 (4.04)	330 (728)	100	103	1XB7322-P05	132	**6SL312■-1TE31-3AA3**
1PH8184-2.D2...	93.7	0.457 (4.04)	330 (728)	140	143	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8184-2.F2...	95.1	0.457 (4.04)	330 (728)	190	196	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8184-2.L2...	95.7	0.457 (4.04)	330 (728)	260	278	1XB7700-P02	260[5]	**6SL3320-1TE32-6AA0**
1PH8186-2.C2...	92.4	0.599 (5.30)	400 (882)	142	143	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-2.D2...	94.3	0.599 (5.30)	400 (882)	190	196	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8186-2.F2...	95.2	0.599 (5.30)	400 (882)	275	285	1XB7700-P02	310	**6SL3320-1TE33-1AA0**
1PH8186-2.L2...	95.7	0.599 (5.30)	400 (882)	370	405	1XB7700-P02	380[5]	**6SL3320-1TE33-8AA0**
1PH8224-2.C2...	94.7	1.28 (11.3)	580 (1279)	180	183	1XB7322-P05	200	**6SL312■-1TE32-0AA4**
1PH8224-2.D2...	95.6	1.28 (11.3)	580 (1279)	255	262	1XB7700-P02	260[5]	**6SL3320-1TE32-6AA0**
1PH8224-2.F2...	96.2	1.28 (11.3)	580 (1279)	355	367	1XB7700-P02	380	**6SL3320-1TE33-8AA0**
1PH8224-2.L2...	96.1	1.28 (11.3)	580 (1279)	365	460	1XB7700-P02	380[5]	**6SL3320-1TE33-8AA0**
1PH8226-2.C2...	95.2	1.66 (14.7)	700 (1544)	255	260	1XB7700-P02	260	**6SL3320-1TE32-6AA0**
1PH8226-2.D2...	96.0	1.66 (14.7)	700 (1544)	325	330	1XB7700-P02	380	**6SL3320-1TE33-8AA0**
1PH8226-2.F2...	96.5	1.66 (14.7)	700 (1544)	445	454	1XB7700-P02	490	**6SL3320-1TE35-0AA0**
1PH8226-2.L2...	96.2	1.66 (14.7)	700 (1544)	400	532	1XB7700-P02	490	**6SL3320-1TE35-0AA0**
1PH8228-2.C2...	95.5	2.02 (17.9)	810 (1786)	305	306	1XB7700-P02	310	**6SL3320-1TE33-1AA0**
1PH8228-2.D2...	96.2	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**

7

[1] Maximum speed that must not be exceeded.

[2] Maximum permissible operating speed based on the induced voltage in the motor and the voltage stability of the Motor Module (without protective circuit).

[3] For duty type S1.

[4] 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).

[5] At 2 kHz, the rated output current of the Motor Module is lower than the rated motor current or the motor stall current.

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 132/SH 160 – Forced ventilation/Water cooling

■ **Order No. supplement for shaft heights 132 and 160**

Data position of the Order 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 <u>without</u> 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 <u>with</u> 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**
Fitted key	Full-key	**1**
Fitted key	Half-key	**2**

Bearing version	**Vibration severity acc. to Siemens[1]/EN 60034-14**	**Shaft and flange accuracy**	
Standard	R/A	R	**B**
Standard	S/A	R	**C**
Advanced lifetime[2]	S/A	R	**Q**

Power connection (view of DE)	**Cable entry**	**Signal connection**	
Terminal box top	Right	DE	**A**
Terminal box top	Left	DE	**B**
Terminal box top	NDE	Left	**C**
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 are required for options)		**Z**

[1] For definition of the vibration severity according to Siemens, see the 1PH8 Motors Configuration Manual.

[2] For 1PH813 limited to n_{max} = 4500 rpm.
For 1PH816 limited to n_{max} = 4000 rpm.

[3] For the 1PH813, power connector only possible up to a maximum stall current of I_0 = 85 A.
Power connector not possible for 1PH816.

7

Synchronous motors
Feed motors for SINAMICS S120

**SIMOTICS M-1PH8 motors
Forced ventilation/Water cooling**

■ **Options**

Order code	Description of option When ordering a motor with options, **-Z** should be added to the order number. The order code should also be specified for each additional 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
G14	Fan unit with air filter (Only possible if 10th data position is 1.)	✔	✔
K08	Encoder connector mounted opposite	–	✔
K09	Terminal box or power connector NDE right (For terminal box type, see selection guides or CAD CREATOR.)	✔ 1)	–
	Terminal box NDE right, cable entry DE/signal connection top (Only possible if 15th data position is A.)	–	✔
K10	Terminal box or power connector NDE left (For terminal box type, see selection guides or CAD CREATOR.)	✔ 1)	–
	Terminal box NDE left, cable entry DE/signal connection top (Only possible if 15th data position is A.)	–	✔
K18	Radial shaft sealing ring DE2) (Not possible if 14th data position is F.)	✔	✔
K40	Regreasing system, DE and NDE	–	✔
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.)	–	✔ With 1PH818 only
L00	Replace terminal box (standard) with the next largest terminal box (Note dimension implications, see CAD CREATOR.)	–	✔
P00	Undrilled cable entry plate	–	✔
P01	Cable entry plate 3 × M63 × 1.5 (Only with terminal box type 1XB7700-P02)	–	✔
L27	NDE bearing in insulated version	–	✔ With 1PH818 only Standard for 1PH822
L74	Fan in IP65 degree of protection3)	✔	–
V91	1FT6-compatible shaft extension ($d \times l$: 48 mm × 82 mm) (1.89 in × 3.23 in) (Only possible for 1PH813.)	✔	–
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
X01	Normal paint finish: jet black RAL 9005	✔	✔
X02	Normal paint finish: cream white RAL 9001	✔	✔
X03	Normal paint finish: reseda green RAL 6011	✔	✔
X04	Normal paint finish: pebble gray RAL 7032	✔	✔
X05	Normal paint finish: sky blue RAL 5015	✔	✔
X06	Normal paint finish: light ivory RAL 1015	✔	✔
X08	Normal 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	✔	✔

1) With options K09 or K10, another terminal box type is used for side mounting. gk843 is used instead of gk833.
Only possible for IM B3 or IM B35 types of construction.

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.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors

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 optically attractive design.

The 1FT7 motors fulfill the highest demands on 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 types. With the natural cooling method, heat is dissipated through the surface of the motor, whereas with the forced ventilation method, heat is forced out by means of built-on fans. Maximum cooling, and thus maximum power ratings can be achieved using water cooling.

Benefits

■ Excellent dynamic performance in a wide speed range thanks to high overload capability $\geq 4 \times M_0$ with natural cooling
■ Wide speed setting range
■ High robustness against vibratory and shock loads thanks to vibration-isolated encoder mounting
■ High degree of protection – allows operation even with demanding ambient conditions
■ Quick and easy mounting due to cross-profile and rotatable connectors with quick-release locks
■ Zero-backlash holding brake
■ Extremely high efficiency
■ Due to their low torque ripple, 1FT7 Compact motors are especially suited for use in machine tools that require maximum surface quality and optimum machining quality. Their compact dimensions permit mounting in confined spaces
■ 1FT7 High Dynamic motors have very low rotor moments of inertia to achieve extremely good dynamic performance and very short cycle times. The 1FT7 High Dynamic motors are available with forced ventilation and with water cooling, they possess high continuous performance capabilities.

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

7

■ Technical specifications

SIMOTICS S-1FT7 Compact/High Dynamic motor

Type of motor	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnet material
Cooling	Natural cooling, forced ventilation, water cooling
Temperature monitoring	KTY84 temperature sensor in the stator winding
Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)	Temperature class 155 (F) for a winding temperature rise of $\Delta T = 100$ 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 on the drive end in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft/fitted 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 DIN EN ISO 1680, max. Tolerance + 3 dB	
• 1FT703	60 dB
• 1FT704 ... 1FT706	65 dB
• 1FT708 ... 1FT710	70 dB
Connection	Connectors for signals and power rotatable
Paint finish	Pearl dark gray RAL 9023
2nd rating plate	Enclosed separately
Holding brake	Without/with
Approvals, according to	cURus

Built-in encoder systems without DRIVE-CLiQ interface

Incremental encoders	
IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks

Absolute encoders	
AM2048S/R encoder	Absolute encoder 2048 S/R, 4096 revolutions, multi-turn

Built-in encoder systems with DRIVE-CLiQ interface

Absolute encoders, single-turn[2]	
AS24DQI encoder	Absolute encoder, single-turn, 24 bit (resolution 16777216, internal 2048 S/R)

Absolute encoders, multi-turn	
AM24DQI encoder	Absolute encoder 24 bit (resolution 16777216, internal 2048 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)

S/R = signals/revolution

■ Options

Order code	Description
N05	Non-standard shaft extension (dimensions as for 1FT5 motors)
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
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 paint finish selectable from X01 to X09
K24	Primed (unpainted)
Q12	Sealing air connection (Only in conjunction with IP67 degree of protection. Not in combination with terminal box.)
J..	Mounting of SP+ planetary gearbox (see Gearboxes)
Y84	Customer specifications on the rating plate

When ordering a motor with options, **-Z** should be added to the order number.

N05
Non-standard shaft extension
(dimensions as for 1FT5 motors)

For the following order numbers, naturally cooled 1FT7 servomotors (Compact) can be delivered with the shaft dimensions compatible with 1FT5 motors:

• 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 x length) according to shaft height (SH) with Option N05:

• 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) (not compatible with flange)
• SH 80: 24 × 50 mm (0.94 × 1.97 in)
• SH 100: 32 × 58 mm (1.26 × 2.28 in)

7

[1] Shaft extension run-out, concentricity of centering ring and shaft, and perpendicularity of flange to shaft.

[2] The single-turn absolute encoder is applied for the previously used incremental encoders.

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
Compact core type – Natural cooling

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FT7 Compact synchronous motors **Core type**	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (4.0)	3.9	**1FT7062-1AF7■-1 ■ ■ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	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 (7.60)	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 (1.18)	2 (1.5)	1.4 (1.0)	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	Flange 0		**0**
		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:**		
Plain shaft	Tolerance N	Without	**G**	
Plain shaft	Tolerance N	With	**H**	
Vibration severity:	**Degree of protection:**			
Grade A	IP65			**1**

To select the type of construction and degree of protection, see Technical definitions.

Some 1FT7 Compact 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.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
Compact core type – Natural cooling

Motor type (repeated)	Effi-ciency [4]	Stall current	Calculated power P_{calc}[7]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[5]	Booksize format For additional versions and components, see section SINAMICS S120 drive system	Power connector	Cable cross-section[6]	Pre-assembled cable
	η	I_0 at M_0 $\Delta T=100$ K	P_{calc} at M_0 $\Delta T=100$ K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
1FT7102-1AC7...	93	12.5	6.28 (8.42)	18	6SL312■-■TE21-8AA3	1.5	4 × 1.5	6FX■002-5■N21-....
1FT7105-1AC7...	93	18	10.47 (14.0)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7044-1AF7...	92	2.8	1.57 (2.11)	3	6SL312■-■TE13-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7062-1AF7...	91	3.9	1.88 (2.52)	5	6SL312■-■TE15-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7064-1AF7...	93	5.7	2.83 (3.80)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7082-1AF7...	93	7.6	4.08 (5.47)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7084-1AF7...	93	11	6.28 (8.42)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7086-1AF7...	93	15.5	8.8 (11.8)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7084-1AH7...	93	15.6	9.42 (12.6)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7086-1AH7...	91	22.4	13.19 (17.7)	30	6SL312■-1 TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7034-1AK7...	90	2.7	1.26 (1.69)	3	6SL312■-■TE13-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7062-1AK7...	90	8.4	3.77 (5.06)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7064-1AK7...	91	9	5.65 (7.58)	9	6SL312■-■TE21-0AA3	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 800   **8**
MOTION-CONNECT 500   **5**

Without brake cores   **C**
With brake cores   **D**

Length code   **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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] $P_{calc} \text{ [kW]} = \dfrac{M_0 \text{[Nm]} \times n_{rated}}{9550}$ $P_{calc} \text{ [hp]} = \dfrac{M_0 \text{[lb}_f\text{-ft]} \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
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	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (31.0)	13	1FT7105-5AB7■-1■ ■ ■	5	178 (157)	44.2 (97.5)
		9.58 (12.8)	70 (51.6)	61 (45.0)	16	1FT7108-5AB7■-1■ ■ ■	5	248 (219)	59 (130)
2000	80	2.39 (3.20)	13 (9.6)	11.4 (8.4)	4.9	1FT7082-5AC7■-1■ ■ ■	5	26.5 (23.5)	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 (17.7)	10	1FT7102-5AC7■-1■ ■ ■	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38 (28.0)	15	1FT7105-5AC7■-1■ ■ ■	5	178 (157)	44.2 (97.5)
		10.5 (14.1)	70 (51.6)	50 (36.9)	18	1FT7108-5AC7■-1■ ■ ■	5	248 (219)	59 (130)
3000	48	0.85 (1.14)	3 (2.2)	2.7 (2.0)	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 (3.20)	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 (8.0)	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 (6.10)	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)

Type of construction:	IM B5	Flange 0	**0**
		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:	
Fitted key and keyway	Tolerance N	Without	**A**
Fitted key and keyway	Tolerance N	With	**B**
Fitted key and keyway	Tolerance R	Without	**D**
Fitted 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.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
Compact – Natural cooling

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 additional versions and components, see section 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	Order No.	Size	mm²	Order No.
1FT7102-5AB7...	93	9	4.71 (6.32)	9	6SL312■-■TE21-0AA3	1.5	4 × 1.5	6FX■002-5■N21-....
1FT7105-5AB7...	93	15	7.85 (10.5)	18	6SL312■-■TE21-8AA3	1.5	4 × 1.5	6FX■002-5■N21-....
1FT7108-5AB7...	93	18	10.99 (14.7)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7082-5AC7...	93	5	2.72 (3.65)	5	6SL312■-■TE15-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7084-5AC7...	93	9	4.19 (5.62)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7086-5AC7...	93	10.6	5.86 (7.86)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7102-5AC7...	93	12.5	6.28 (8.42)	18	6SL312■-■TE21-8AA3	1.5	4 × 1.5	6FX■002-5■N21-....
1FT7105-5AC7...	93	18	10.47 (14.0)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7108-5AC7...	93	25	14.66 (19.7)	30	6SL312■-1 TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7042-5AF7...	92	2.1	0.94 (1.26)	3	6SL312■-■TE13-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7044-5AF7...	92	2.8	1.57 (2.11)	3	6SL312■-■TE13-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7046-5AF7...	92	4	2.2 (2.95)	5	6SL312■-■TE15-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7062-5AF7...	91	3.9	1.88 (2.52)	5	6SL312■-■TE15-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7064-5AF7...	93	5.7	2.83 (3.80)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7066-5AF7...	92	8.4	3.77 (5.06)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7068-5AF7...	92	8.3	4.71 (6.32)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7082-5AF7...	93	7.6	4.08 (5.47)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7084-5AF7...	93	11	6.28 (8.42)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7086-5AF7...	93	15.5	8.8 (11.8)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7102-5AF7...	93	18	9.42 (12.6)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7105-5AF7...	94	26	15.71 (21.0)	30	6SL312■-1 TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7108-5AF7...	93	36	21.99 (29.5)	45	6SL312■-1 TE24-5AA3	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 800	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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).

[4] $P_{calc}\,[\text{kW}] = \dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ $\qquad P_{calc}\,[\text{hp}] = \dfrac{M_0\,[\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
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	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (23.5)	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 (1.0)	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 (11.0)
	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 (2.86)[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** |
| | | 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:	
Fitted key and keyway	Tolerance N	Without	**A**
Fitted key and keyway	Tolerance N	With	**B**
Fitted key and keyway	Tolerance R	Without	**D**
Fitted 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.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
Compact – Natural cooling

Motor type (repeated)	Efficiency [5] η %	Stall current I_0 at M_0 $\Delta T=100$ K A	Calculated power P_{calc}[8] P_{calc} at M_0 $\Delta T=100$ K kW (HP)	SINAMICS S120 Motor Module Rated output current[6] I_{rated} A	Booksize format For additional versions and components, see section SINAMICS S120 drive system Order No.	Power cable with complete shield Motor connection (and brake connection) via power connector Power connector Size	Cable cross-section[7] mm²	Pre-assembled cable Order No.
1FT7046-5AH7...	90	8.1	3.3 (4.43)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7066-5AH7...	90	13.6	5.65 (7.58)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7082-5AH7...	93	12.3	6.13 (8.22)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7084-5AH7...	93	15.6	9.42 (12.6)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-5AH7...	91	22.4	13.19 (17.7)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7034-5AK7...	90	2.7	1.26 (1.69)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7036-5AK7...	90	4.0	1.88 (2.52)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7042-5AK7...	91	3.9	1.88 (2.52)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7044-5AK7...	91	5.7	3.14 (4.21)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7062-5AK7...	90	8.4	3.77 (5.06)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-....**
1FT7064-5AK7...	91	9	5.65 (7.59)	9	**6SL312■-■TE21-0AA3**	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 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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] $= \dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ P_{calc} [hp] $= \dfrac{M_0\,[\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
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	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (67.1)	73 (53.8)	33	**1FT7108-5SC7■-1 ■ ■ ■**	5	248 (219)	64 (141)
3000	80	7.2 (9.66)	27 (19.9)	23 (17.0)	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 (67.1)	60 (44.3)	38	**1FT7108-5SF7■-■ ■ ■ ■**	5	248 (219)	64 (141)
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 | Flange 0 | **0** |
| | | Flange 1 (compatible with 1FT6) | **1** |

Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector		**1**
	Connector size 3[1]	Transverse right	**1**
		Transverse left	**2**
		Axial NDE	**3**
		Axial DE	**4**

Terminal box/cable entry:[1]	Top/transverse from right	**5**
	Top/transverse from left	**6**
	Top/axial from NDE	**7**
	Top/axial from DE	**8**

| **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:**	
Fitted key	Tolerance N	Without	**A**
Fitted key	Tolerance N	With	**B**
Fitted key	Tolerance R	Without	**D**
Fitted 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.

7

Motor type (repeated)	Effi-ciency [3]	Stall current	Calculated power P_{calc} [6]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current [4]	**Booksize format** For additional versions and components, see section SINAMICS S120 drive system	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	Order No.	Size	mm^2	Order No.
1FT7084-5SC7...	93	15	5.7 (7.64)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7086-5SC7...	93	19.5	7.5 (10.1)	30	**6SL312■-1TE23-0AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7105-5SC7...	93	31	13.6 (18.2)	45	**6SL312■-1TE24-5AA3**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7108-5SC7...	93	39	19.1 (42.2)	45	**6SL312■-1TE24-5AA3**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7084-5SF7...	94	21	8.5 (11.4)	30	**6SL312■-1TE23-0AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7086-5SF7...	93	29	11.3 (15.2)	30	**6SL312■-1TE23-0AA3**	1.5	4 × 6	**6FX■002-5■N51-....**
1FT7105-5SF7...	94	45	20.4 (27.4)	45	**6SL312■-1TE24-5AA3**	3	4 × 10	**6FX■002-5■S14-....**
1FT7108-5SF7...	94	57	28.6 (63.1)	60	**6SL312■-1TE26-0AA3**	3	4 × 16	**6FX■002-5■S23-....**
1FT7084-5SH7...	94	30.5	12.7 (17.0)	30	**6SL312■-1TE23-0AA3**	1.5	4 × 6	**6FX■002-5■N51-....**
1FT7086-5SH7...	93	34	17.0 (22.8)	45	**6SL312■-1TE24-5AA3**	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 800	**8**
MOTION-CONNECT 500	**5**

Without brake cores	**C**
With brake cores	**D**

Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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] $P_{calc}\ [\text{kW}] = \dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ $\qquad P_{calc}\ [\text{hp}] = \dfrac{M_0\,[\text{lb}_\text{f}\text{-ft}] \times n_{rated}}{5250}$

SIMOTICS S-1FT7 motors
Compact – Water cooling

© Siemens AG 2012

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FT7 Compact synchronous motors	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (60.0)	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 | Flange 0 | **0** |
| | | Flange 1 (compatible with 1FT6) | **1** |

Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1]	Transverse right	**1**
		Transverse left	**2**
		Axial NDE	**3**
		Axial DE	**4**

Terminal box/cable entry:[1]	Top/transverse from right	**5**
	Top/transverse from left	**6**
	Top/axial from NDE	**7**
	Top/axial from DE	**8**

| 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:**	
Fitted key and keyway	Tolerance N	Without	**A**
Fitted key and keyway	Tolerance N	With	**B**
Fitted key and keyway	Tolerance R	Without	**D**
Fitted 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.

7

Motor type (repeated)	Effi-ciency [2] η %	Stall current I_0 at M_0 ΔT=100 K A	Calculated power P_{calc}[5] P_{calc} at M_0 ΔT=100 K kW (HP)	Rated output current[3] I_{rated} A	Booksize format Order No.	Power connector Size	Cable cross-section[4] mm²	Pre-assembled cable Order No.
1FT7102-5WB7...	93	17.8	7.9 (10.6)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7105-5WB7...	94	28	14.1 (18.9)	30	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7108-5WB7...	94	39	19.6 (26.3)	45	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX■002-5■N64-....
1FT7082-5WC7...	93	10.7	4.4 (5.90)	18	6SL312■-■TE21-8AA3	1.5	4 × 1.5	6FX■002-5■N21-....
1FT7084-5WC7...	94	16.5	7.3 (9.79)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7086-5WC7...	94	23	10.5 (14.1)	30	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7102-5WC7...	94	25.5	10.5 (14.1)	30	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7105-5WC7...	94	39	18.8 (25.2)	45	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX■002-5■N64-....
1FT7108-5WC7...	95	45.3	26.2 (35.1)	45	6SL312■-1TE24-5AA3	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 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

[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] $P_{calc} [kW] = \dfrac{M_0 [Nm] \times n_{rated}}{9550}$ $P_{calc} [hp] = \dfrac{M_0 [lb_f\text{-}ft] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
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	Number of pole pairs	Moment of inertia of 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	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FT7 Compact for DC link voltage 510 ... 720 V DC									
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 (22.0)	20.1 (44.3)
	80	6.28 (8.42)	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 (60.0)	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 (14.0)	20.8	1FT7066-5WH7■-1 ■ ■ ■	5	17.7 (15.7)	16.3 (35.9)
	80	8.95 (12.0)	21 (15.5)	19 (14.0)	23.9	1FT7082-5WH7■-1 ■ ■ ■	5	28.9 (25.6)	20.7 (45.6)
		14.6 (19.6)	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 (60.0)	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 | Flange 0 | **0** |
| | | Flange 1 (compatible with 1FT6) | **1** |

Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**
	Connector size 3[1]	Transverse right	**1**
		Transverse left	**2**
		Axial NDE	**3**
		Axial DE	**4**

Terminal box/cable entry:[1]	Top/transverse from right	**5**
	Top/transverse from left	**6**
	Top/axial from NDE	**7**
	Top/axial from DE	**8**

| 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:	
Fitted key and keyway	Tolerance N	Without	**A**
Fitted key and keyway	Tolerance N	With	**B**
Fitted key and keyway	Tolerance R	Without	**D**
Fitted 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.

7

Motor type (repeated)	Efficiency [2] η %	Stall current I_0 at M_0 $\Delta T = 100$ K A	Calculated power P_{calc}[6] P_{calc} at M_0 $\Delta T = 100$ K kW (HP)	SINAMICS S120 Motor Module Rated output current[3] I_{rated} A	Booktree format / Booksize format For additional versions and components, see section SINAMICS S120 drive system Order No.	Power cable with complete shield Motor connection (and brake connection) via power connector — Power connector Size	Cable cross-section[4] mm²	Pre-assembled cable Order No.
1FT7062-5WF7...	91	7.4	3.1 (4.16)	9	6SL312■-■TE21-0AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7064-5WF7...	91	11.9	5.0 (6.71)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7066-5WF7...	91	14	6.3 (8.45)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7068-5WF7...	93	19	9.4 (12.6)	18[5]	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX■002-5■N11-....
1FT7082-5WF7...	94	16	6.6 (8.85)	18	6SL312■-■TE21-8AA3	1.5	4 × 2.5	6FX■002-5■N31-....
1FT7084-5WF7...	94	23	11.0 (14.8)	30	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7086-5WF7...	94	34	15.7 (21.1)	45	6SL312■-1TE24-5AA3	1.5	4 × 6	6FX■002-5■N54-....
1FT7102-5WF7...	95	40	15.7 (21.1)	45	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX■002-5■N64-....
1FT7105-5WF7...	94	53.2	28.3 (38.0)	60	6SL312■-1TE26-0AA3	3	4 × 16	6FX■002-5■S23-....
1FT7108-5WF7...	95	65	39.3 (52.7)	85	6SL312■-1TE28-5AA3	3	4 × 16	6FX■002-5■G23-....
1FT7066-5WH7...	91	19.7	9.4 (12.6)	30	6SL312■-1TE23-0AA3	1	4 × 2.5	6FX■002-5■N11-....
1FT7082-5WH7...	94	24	9.9 (13.3)	30	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX■002-5■N41-....
1FT7084-5WH7...	94	34.3	16.5 (22.1)	45	6SL312■-1TE24-5AA3	1.5	4 × 6	6FX■002-5■N54-....
1FT7086-5WH7...	94	40.5	23.6 (31.6)	45	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX■002-5■N64-....
1FT7062-5WK7...	92	12.5	6.3 (8.5)	18	6SL312■-■TE21-8AA3	1	4 × 1.5	6FX■002-5■N01-....
1FT7064-5WK7...	92	20.2	10.1 (13.5)	30	6SL312■-1TE23-0AA3	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 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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 $\Delta T = 100$ 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] $P_{calc} \text{ [kW]} = \dfrac{M_0 \text{ [Nm]} \times n_{rated}}{9550}$ $P_{calc} \text{ [hp]} = \dfrac{M_0 \text{ [lb}_f\text{-ft]} \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FT7 motors
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 synchronous motors	Number of pole pairs	Moment of inertia of 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	Order 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	**1FT7065-7S F 7■-1 ■ ■ ■**	5	6.4 (5.66)	19 (41.9)
		4.4 (5.90)	17 (12.5)	14 (10.3)	13	**1FT7067-7S F 7■-1 ■ ■ ■**	5	8.3 (7.35)	23 (50.7)
	80	7.2 (9.66)	34 (25.1)	23 (17.0)	20	**1FT7085-7S F 7■-1 ■ ■ ■**	5	20.7 (18.3)	34 (75.0)
		10.4 (13.9)	48 (35.4)	33 (24.3)	29	**1FT7087-7S F 7■-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 (11.0)	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	**1FT7065-7W F 7■-1 ■ ■ ■**	5	6.4 (5.66)	16 (35.3)
		7.4 (9.92)	25 (18.4)	23.5 (17.3)	21	**1FT7067-7W F 7■-1 ■ ■ ■**	5	8.3 (7.35)	22 (48.5)
	80	11.9 (16.0)	43 (31.7)	38 (28.0)	32	**1FT7085-7W F 7■-1 ■ ■ ■**	5	20.7 (18.3)	32 (70.6)
		16.0 (21.5)	61 (45.0)	51 (37.6)	43	**1FT7087-7W F 7■-■ ■ ■ ■**	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	Flange 0		**0**	
		Flange 1 (compatible with 1FT6)		**1**	
Connector outlet direction:	Connector sizes 1 and 1.5	Rotatable connector	**1**		
	Connector size 3[1]	Transverse right	**1**		
		Transverse left	**2**		
		Axial NDE	**3**		
		Axial DE	**4**		
Terminal box/cable entry:[1]	Top/transverse from right		**5**		
	Top/transverse from left		**6**		
	Top/axial from NDE		**7**		
	Top/axial from DE		**8**		
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:	
Fitted key and keyway	Tolerance N	Without	**A**
Fitted key and keyway	Tolerance N	With	**B**
Fitted key and keyway	Tolerance R	Without	**D**
Fitted 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 for water cooling)	**2**
Grade R	IP64	**3**
Grade R	IP65	**4**
Grade R	IP67 (only for water cooling)	**5**

To select the type of construction and degree of protection, see Technical definitions.

7

Motor type (repeated)	Efficiency [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 additional versions and components, see section SINAMICS S120 drive system	Power connector	Conductor cross-section [4]	Pre-assembled cable
	η	I_0 at M_0 $\Delta T=100$ K	P_{calc} at M_0 $\Delta T=100$ K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm²	Order No.
1FT7065-7SF7...	92	12	4.4 (5.90)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7067-7SF7...	94	15	5.3 (7.11)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 1.5	**6FX■002-5■N21-....**
1FT7085-7SF7...	92	28	10.7 (14.3)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7087-7SF7...	93	40	15.1 (20.2)	45	**6SL312■-1 TE24-5AA3**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7065-7SH7...	92	16	6.6 (8.85)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7067-7SH7...	94	19	8.0 (10.7)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7085-7SH7...	92	40	16.0 (21.5)	45	**6SL312■-1 TE24-5AA3**	1.5	4 × 10	**6FX■002-5■N64-....**
1FT7087-7SH7...	93	45	22.6 (30.3)	45	**6SL312■-1 TE24-5AA3**	3	4 × 10	**6FX■002-5■S14-....**
1FT7065-7WF7...	92	16	6.0 (8.05)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 2.5	**6FX■002-5■N31-....**
1FT7067-7WF7...	94	22	7.9 (10.6)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7085-7WF7...	93	36	13.5 (18.1)	45	**6SL312■-1 TE24-5AA3**	1.5	4 × 6	**6FX■002-5■N54-....**
1FT7087-7WF7...	94	51	19.2 (25.7)	60	**6SL312■-1 TE26-0AA3**	3	4 × 16	**6FX■002-5■S23-....**
1FT7065-7WH7...	92	22	9.0 (12.1)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7067-7WH7...	94	28	11.8 (15.8)	30	**6SL312■-1 TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-....**
1FT7085-7WH7...	94	58	20.3 (27.2)	60	**6SL312■-1 TE26-0AA3**	3	4 × 16	**6FX■002-5■S23-....**
1FT7087-7WH7...	94	67	28.7 (38.5)	85	**6SL312■-1 TE28-5AA3**	3	4 × 25	**6FX■002-5 D G33-....**

Cooling:
Internal air cooling	**0**
External air cooling	**1**

Motor Module:
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:
MOTION-CONNECT 800	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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] $= \dfrac{M_0 \, [\text{Nm}] \times n_{rated}}{9550}$ P_{calc} [hp] $= \dfrac{M_0 \, [\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors

■ 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 ventilation as the heat is dissipated through the motor surface.
1FK7 motors have a high overload capability.

■ Benefits

1FK7 Compact motors offer:
- Space-saving installation due to extremely high power density
- For universal applications
- Wide range of motors

1FK7 High Dynamic motors offer:
- Extremely high dynamic response thanks to the very low rotor moment of inertia

1FK7 High Inertia motors offer:
- Robust closed-loop control properties for high or variable load moment of inertia
- Minimal optimization and commissioning overhead for the compensation of disturbances

■ Application

- Machine tools
- Robots and handling systems
- Wood, glass, ceramics and stone working
- Packaging, plastics and textile machines
- Printing machines
- Auxiliary axes

7

■ Technical specifications

SIMOTICS S-1FK7 Compact/High Dynamic/High Inertia motor

Type of motor	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnet material
Cooling	Natural cooling
Temperature monitoring	KTY84 temperature sensor in the stator winding
Insulation of the stator winding 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 on the drive end in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft, optional shaft with fitted 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 DIN 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)
Approvals, according to	cURus

Built-in encoder systems without DRIVE-CLiQ interface

Incremental encoders

IC2048S/R encoder	Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks

Absolute encoders

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

Resolvers

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 encoders/absolute encoders, single-turn[4]

IC22DQ encoder	Incremental encoder 22 bit (resolution 4194304, internal 2048 S/R) + commutation position 11 bit
AS24DQI encoder	Absolute encoder, single-turn, 24 bit (resolution 16777216, internal 2048 S/R)
AS20DQI encoder	Absolute encoder, single-turn, 20 bit (resolution 1048576, internal 512 S/R)

Absolute encoders, multi-turn

AM24DQI encoder	Absolute encoder 24 bit (resolution 16777216, internal 2048 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)
AM20DQI/ AM20DQ encoder	Absolute encoder 20 bit (resolution 1048576, internal 512 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)
AM15DQ encoder	Absolute 15 bit (resolution 32768, internal 16 S/R) + 12 bit multi-turn (traversing range 4096 revolutions)

Resolvers

R15DQ resolver	Resolver 15 bit (resolution 32768, internal, multi-pole)
R14DQ resolver	Resolver 14 bit (resolution 16384, 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 applied for the previously used incremental encoders.

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors

■ **Options**

Order code	Description
N05	Non-standard shaft extension (dimensions as for 1FT5 motors)
N16	Nickel-plated connectors and special paint application (PS Premium) for increased chemical resistance, e.g. in the food industry. (Only for 1FK7 Compact/1FK7 High Dynamic without DRIVE-CLiQ interface).
Q31	Metal rating plate instead of adhesive label
X01	Paint finish: jet black, matt RAL 9005[1]
X02	Paint finish: cream white RAL 9001[1]
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: pale ivory RAL 1015[1]
X08	Paint finish: suitable for food grade applications White aluminum RAL 9006[1]
X27	Paint finish: dark pearl gray RAL 9023[1]
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 paint finish selectable from X01 to X27[2]
K24	Primed (unpainted)
J..	Mounting of SP+ planetary gearbox (see Gearboxes)
V..	Mounting of LP+ planetary gearbox (see Gearboxes)

When ordering a motor with options, **-Z** should be added to the order number.

7

---

[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 on the 16th data position.

■ **Options** (continued)

N05
Non-standard shaft extension
(dimensions as for 1FT5 motors)

1FK7 motors are shipped with the following shaft dimensions
that are compatible with 1FT5 motors:

- 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)

Note:
1FK706 motors with Option N05 <u>do not</u> have a compatible flange
with 1FT506 motors.

N16
Version for increased chemical resistance with protective
properties checked according to DIN EN ISO 4628-1

Suitable for all areas with increased demands on the protective
properties of the paint system. These requirements may include
applications with acids (e.g. phosphoric acid), alkalis (e.g.
active chlorine), disinfectants (e.g. hydrogen peroxide and per-
acetic acid), saltwater and more.

Note:
The paint application PS Premium has been tested with a broad
spectrum of industrial cleaning products with pH values ranging
from 1.5 – 13. Resistance against the acidic and alkali cleaning
products used, as well as disinfectants, was proved by a mate-
rial resistance test performed by ECOLAB Deutschland GmbH.

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
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 Natural cooling	Number of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No. **Standard type**		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC									
2000	48	0.6 (0.80)	3.0 (26.6)	2.8 ((24.8)	1.55	**1FK7042-2AC71-1■ ■ ■**	4	2.9 (2.57)	4.6 (10.1)
	63	1.1 (1.48)	6.0 (53.1)	5.3 (46.9)	2.95	**1FK7060-2AC71-1■ ■ ■**	4	7.7 (6.82)	7.1 (15.7)
		1.5 (2.01)	8.5 (75.2)	7.0 (62.0)	2.65	**1FK7062-2AC71-1■ ■ ■**	4	11.2 (9.91)	9.1 (20.1)
		1.9 (2.55)	11.0 (97.4)	8.9 (78.8)	4.4	**1FK7063-2AC71-1■ ■ ■**	4	14.7 (13.0)	11.1 (24.5)
	80	2.1 (2.82)	12.0 (106)	10.0 (88.5)	4.4	**1FK7081-2AC71-1■ ■ ■**	4	20 (17.7)	12.9 (28.4)
		2.6 (3.49)	16.0 (142)	12.5 (111)	6.3	**1FK7083-2AC71-1■ ■ ■**	4	26 (23.0)	15.6 (34.4)
		3.1 (4.16)	20.0 (177)	15.0 (133)	6.7	**1FK7084-2AC71-1■ ■ ■**	4	32.5 (28.8)	18.3 (40.4)
	100	3 (4.02)	18.0 (159)	14.5 (128)	7.1	**1FK7100-2AC71-1■ ■ ■**	4	54 (47.8)	17.6 (38.8)
		4.3 (5.77)	27.0 (239)	20.5 (181)	9.7	**1FK7101-2AC71-1■ ■ ■**	4	79 (69.9)	23.0 (50.7)
		5.2 (6.97)	36.0 (319)	25.0 (221)	11.0	**1FK7103-2AC71-1■ ■ ■**	4	104 (92.1)	28.5 (62.8)
		7.7 (10.3)	48.0 (425)	37.0 (327)	16.0	**1FK7105-2AC71-1■ ■ ■**	4	154 (136)	39.0 (86.0)
3000	48	0.8 (1.07)	3.0 (26.6)	2.6 (23.0)	2.0	**1FK7042-2AF71-1■ ■ ■**	4	2.9 (2.57)	4.6 (10.1)
	63	1.5 (2.01)	6.0 (53.1)	4.7 (41.6)	3.7	**1FK7060-2AF71-1■ ■ ■**	4	7.7 (6.82)	7.1 (15.7)
		1.9 (2.55)	8.5 (75.2)	6.0 (53.1)	4.0	**1FK7062-2AF71-1■ ■ ■**	4	11.2 (9.91)	9.1 (20.1)
		2.3 (3.08)	11.0 (97.4)	7.3 (64.6)	5.6	**1FK7063-2AF71-1■ ■ ■**	4	14.7 (13.0)	11.1 (24.5)
	80	2.1 (2.82)	8.0 (70.8)	6.8 (60.2)	4.4	**1FK7080-2AF71-1■ ■ ■**	4	14.2 (12.6)	10.3 (22.7)
		2.7 (3.62)	12.0 (106)	8.7 (77.0)	6.8	**1FK7081-2AF71-1■ ■ ■**	4	20 (17.7)	12.9 (28.4)
		3.3 (4.43)	16.0 (142)	10.5 (92.9)	7.2	**1FK7083-2AF71-1■ ■ ■**	4	26 (23.0)	15.6 (34.4)
		3.1 (4.16)	20.0 (177)	10.0 (88.5)	6.5	**1FK7084-2AF71-1■ ■ ■**	4	32.5 (28.8)	18.3 (40.4)
	100	3.8 (5.10)	18.0 (159)	12.0 (106)	8.0	**1FK7100-2AF71-1■ ■ ■**	4	54 (47.8)	17.6 (38.8)
		4.9 (6.57)	27.0 (239)	15.5 (137)	11.6	**1FK7101-2AF71-1■ ■ ■**	4	79 (69.9)	23.0 (50.7)
		4.4 (5.90)	36.0 (319)	14.0 (124)	11.5	**1FK7103-2AF71-1■ ■ ■**	4	104 (92.1)	28.5 (62.8)
		8.2 (11.0)	48.0 (425)	26.0 (230)	18.0	**1FK7105-2AF71-1■ ■ ■**	4	154 (136)	39.0 (86.0)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder Multi-pole resolver 2-pole resolver	A E S T
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder AS20DQI encoder AM20DQI encoder R15DQ resolver R14DQ resolver	B C Q R U P

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

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 additional 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	Order No.	Size	mm²	Order No.
				Line voltage 380 ... 480 V 3 AC				
1FK7042-2AC71-...	88	1.6	0.6 (0.80)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7060-2AC71-...	90	3.15	1.3 (1.74)	3 [4]	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7062-2AC71-...	91	3.0	1.8 (2.41)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7063-2AC71-...	91	5.3	2.3 (3.08)	5 [4]	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7081-2AC71-...	93	5.0	2.5 (3.35)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7083-2AC71-...	93	7.5	3.4 (4.56)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7084-2AC71-...	93	8.5	4.2 (5.63)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7100-2AC71-...	92	8.4	3.8 (5.10)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7101-2AC71-...	93	12.3	5.7 (7.64)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 1.5	**6FX■002-5■N21-...**
1FK7103-2AC71-...	93	14.4	7.5 (10.1)	18	**6SL312■-■TE21-8AA3**	1.5	4 × 1.5	**6FX■002-5■N21-...**
1FK7105-2AC71-...	93	20.0	10.1 (13.5)	30	**6SL312■-■TE23-0AA3**	1.5	4 × 2.5	**6FX■002-5■N31-...**
1FK7042-2AF71-...	89	2.2	0.9 (1.21)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7060-2AF71-...	90	4.45	1.9 (2.55)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7062-2AF71-...	91	5.3	2.7 (3.62)	9 [4]	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7063-2AF71-...	91	8.0	3.5 (4.69)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7080-2AF71-...	92	4.9	2.5 (3.35)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7081-2AF71-...	93	8.7	3.8 (5.10)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7083-2AF71-...	93	10.1	5 (6.71)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7084-2AF71-...	93	12.1	6.3 (8.45)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7100-2AF71-...	92	11.1	5.7 (7.64)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7101-2AF71-...	93	18.8	8.5 (11.4)	18 [4]	**6SL312■-■TE23-8AA3**	1.5	4 × 2.5	**6FX■002-5■N31-...**
1FK7103-2AF71-...	93	26.0	11.3 (15.1)	30	**6SL312■-■TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-...**
1FK7105-2AF71-...	94	31.0	15.1 (20.2)	30 [4]	**6SL312■-■TE24-0AA3**	1.5	4 × 6	**6FX■002-5■N51-...**

Cooling:			**Power cable:**	
Internal air cooling	**0**		MOTION-CONNECT 800 PLUS	**8**
External air cooling	**1**		MOTION-CONNECT 500	**5**
Motor Module:			Without brake cores	**C**
Single Motor Module	**1**		With brake cores	**D**
Double Motor Module	**2**		Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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 x 1.5 mm².

[4] With the specified Motor Module, the motor cannot be fully utilized with M_0 at ΔT = 100 K winding temperature rise. 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] = $\dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0\,[\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

SIMOTICS S-1FK7 motors
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 Natural cooling	Number of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No. **Standard type**		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC									
4500	63	1.7 (2.28)	6.0 (53.1)	3.7 (32.7)	4.3	**1FK7060-2AH71-1**■ ■ ■	4	7.7 (6.82)	7.1 (15.7)
		1.4 (1.88)	8.5 (75.2)	3.0 (26.6)	3.3	**1FK7062-2AH71-1**■ ■ ■	4	11.2 (9.91)	9.1 (20.1)
		1.4 (1.88)	11.0 (97.4)	3.0 (26.6)	3.8	**1FK7063-2AH71-1**■ ■ ■	4	14.7 (13.0)	11.1 (24.5)
	80	2.1 (2.82)	8.0 (70.8)	4.5 (39.8)	4.8	**1FK7080-2AH71-1**■ ■ ■	4	14.2 (12.6)	10.3 (22.7)
		1.8 (2.41)	12.0 (106)	3.8 (33.6)	4.9	**1FK7081-2AH71-1**■ ■ ■	4	20 (17.7)	12.9 (28.4)
		1.4 (1.88)	16.0 (142)	3.0 (26.6)	3.6	**1FK7083-2AH71-1**■ ■ ■	4	26 (23.0)	15.6 (34.4)
6000	36	0.5 (0.67)	1.15 (10.2)	0.8 (7.08)	1.3	**1FK7032-2AK71-1**■ ■ ■	3	0.65 (0.58)	2.7 (5.95)
		0.6 (0.80)	1.6 (14.2)	1.0 (8.85)	1.3	**1FK7034-2AK71-1**■ ■ ■	3	0.9 (0.80)	3.5 (7.72)
	48	0.7 (0.94)	1.6 (14.2)	1.1 (9.74)	1.85	**1FK7040-2AK71-1**■ ■ ■	4	1.6 (1.42)	3.2 (7.06)
		0.9 (1.21)	3.0 (26.6)	1.5 (13.3)	2.5	**1FK7042-2AK71-1**■ ■ ■	4	2.9 (2.57)	4.6 (10.1)

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:	
Fitted key	Tolerance N	Without	A
Fitted 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

7

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 additional 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	Order No.	Size	mm²	Order No.
Line voltage 380 ... 480 V 3 AC								
1FK7060-2AH71-...	90	6.3	2.8 (3.75)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7062-2AH71-...	91	8.0	4 (5.36)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7063-2AH71-...	90	12.0	5.2 (6.97)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7080-2AH71-...	92	7.4	3.8 (5.10)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7081-2AH71-...	93	13.1	5.7 (7.64)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7083-2AH71-...	93	15.0	7.5 (10.1)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7032-2AK71-...	88	1.7	0.7 (0.94)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7034-2AK71-...	88	1.9	1 (1.34)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7040-2AK71-...	88	2.35	1 (1.34)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7042-2AK71-...	89	4.4	1.9 (2.55)	5	**6SL312■-■TE15-0AA3**	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 800 PLUS	**8**
MOTION-CONNECT 500	**5**

Without brake cores	**C**
With brake cores	**D**

Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

[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 x 1.5 mm².

[4] P_{calc} [kW] = $\dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0\,[\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

7

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
Compact – Natural cooling – 1FK701/1FK702

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FK7 Compact synchronous motors Natural cooling	Num-ber of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 510 ... 720 V DC									
6000	20	0.05 (0.07)	0.18 (1.59)	0.08 (0.71)	0.85	**1FK7011-5AK71-1■■ ■**	4	0.064 (0.06)	0.9 (1.98)
		0.1 (0.13)	0.35 (3.10)	0.16 (1.42)	0.85	**1FK7015-5AK71-1■■ ■**	4	0.083 (0.07)	1.1 (2.43)
	28	0.38 (0.51)	0.85 (7.52)	0.6 (5.31)	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 AM512S/R encoder (only for 1FK702) AM16S/R encoder multi-pole resolver 2-pole resolver	A H J S T
Encoder systems for motors with DRIVE-CLiQ interface: (Only for 1FK702)[1]	IC22DQ encoder AM20DQ encoder AM15DQ encoder R15DQ resolver R14DQ resolver	D L V U P

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

[1] 1FK701 motors are not available with a DRIVE-CLiQ interface. The encoder systems are connected via the SMC (Sensor Module Cabinet-Mounted).

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 additional 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	Order No.	Size	mm²	Order No.
Line voltage 380 ... 480 V 3 AC								
1FK7011-5AK71-...	62	1.5	0.1 (0.13)	3	6SL312■-■TE13-0AA3	0.5	4 × 1.5	6FX5002-5DN20-...
1FK7015-5AK71-...	68	1.5	0.2 (0.27)	3	6SL312■-■TE13-0AA3	0.5	4 × 1.5	6FX5002-5DN20-...
1FK7022-5AK71-...	86	1.8	0.5 (0.67)	3	6SL312■-■TE13-0AA3	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 800 PLUS **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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 x 1.5 mm².

[4] P_{calc} [kW] = $\dfrac{M_0 [Nm] \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0 [lb_f\text{-}ft] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
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	Num-ber of pole pairs	Moment of inertia of 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$_f$-in)	Nm (lb$_f$-in)	A	Order 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									
2000	63	2.1 (2.82)	12.0 (106)	10.0 (88.5)	7.1	**1FK7064-4CC71-1**■ ■ ■	3	7.5 (6.64)	15.4 (34.0)
	80	3.1 (4.16)	22.0 (195)	15.0 (133)	10.0	**1FK7085-4CC71-1**■ ■ ■	4	22 (19.5)	23.0 (50.7)
		3.8 (5.10)	28.0 (248)	18.0 (159)	9.0	**1FK7086-4CC71-1**■ ■ ■	4	22 (19.5)	23.0 (50.7)
3000	48	1.2 (1.61)	4.5 (39.8)	3.7 (32.7)	3.45	**1FK7044-4CF71-1**■ ■ ■	3	1.26 (1.12)	7.4 (16.3)
	63	1.7 (2.28)	6.4 (56.6)	5.4 (47.8)	5.3	**1FK7061-4CF71-1**■ ■ ■	3	4.1 (3.63)	9.5 (20.9)
		2.5 (3.35)	12.0 (106)	8.0 (70.8)	7.6	**1FK7064-4CF71-1**■ ■ ■	3	7.5 (6.64)	15.4 (34.0)
	80	2 (2.68)	22.0 (195)	6.5 (57.5)	7.0	**1FK7085-4CF71-1**■ ■ ■	4	22 (19.5)	23.0 (50.7)
		2 (2.68)	28.0 (248)	6.5 (57.5)	5.7	**1FK7086-4CF71-1**■ ■ ■	4	22 (19.5)	23.0 (50.7)
4500	48	1.2 (1.61)	3.5 (31.0)	2.6 (23.0)	3.3	**1FK7043-4CH71-1**■ ■ ■	3	1 (0.89)	6.0 (13.2)
		1.4 (1.88)	4.5 (39.8)	3.0 (26.6)	3.9	**1FK7044-4CH71-1**■ ■ ■	3	1.26 (1.12)	7.4 (16.3)
	63	2 (2.68)	6.4 (56.6)	4.3 (38.1)	6.2	**1FK7061-4CH71-1**■ ■ ■	3	4.1 (3.63)	9.5 (20.9)
		2.4 (3.22)	12.0 (106)	5.0 (44.3)	7.0	**1FK7064-4CH71-1**■ ■ ■	3	7.5 (6.64)	15.4 (34.0)
6000	36	0.6 (0.80)	1.3 (11.5)	0.9 (7.97)	1.6	**1FK7033-4CK71-1**■ ■ ■	3	0.25 (0.22)	3.0 (6.62)
	48	1.3 (1.74)	3.5 (31.0)	2.0 (17.7)	3.5	**1FK7043-4CK71-1**■ ■ ■	3	1 (0.89)	6.0 (13.2)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder Multi-pole resolver 2-pole resolver	A E S T
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder AS20DQI encoder AM20DQI encoder R15DQ resolver R14DQ resolver	B C Q R U P

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

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 additional 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	Order No.	Size	mm^2	Order No.
Line voltage 380 ... 480 V 3 AC
1FK7064-4CC71-...	93	8.1	2.5 (3.35)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7085-4CC71-...	92	13.5	4.6 (6.17)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7086-4CC71-...	93	13.2	5.9 (7.91)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7044-4CF71-...	91	4.0	1.4 (1.88)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7061-4CF71-...	93	6.1	2 (2.68)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7064-4CF71-...	93	10.8	3.8 (5.10)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7085-4CF71-...	92	22.0	6.9 (9.25)	30	**6SL312■-■TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-...**
1FK7086-4CF71-...	93	21.5	8.8 (11.8)	30	**6SL312■-■TE23-0AA3**	1.5	4 × 4	**6FX■002-5■N41-...**
1FK7043-4CH71-...	90	4.1	1.6 (2.15)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7044-4CH71-...	91	5.4	2.1 (2.82)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7061-4CH71-...	93	8.7	3 (4.02)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7064-4CH71-...	93	15.0	5.7 (7.64)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7033-4CK71-...	88	2.1	0.8 (1.07)	3	**6SL312■-■TE13-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7043-4CK71-...	90	5.6	2.2 (2.95)	9	**6SL312■-■TE21-0AA3**	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 800 PLUS   **8**
MOTION-CONNECT 500   **5**

Without brake cores   **C**
With brake cores   **D**

Length code   **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

7

[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 x 1.5 mm^2.

[4] P_{calc} [kW] = $\dfrac{M_0 \text{[Nm]} \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0 \text{[lb}_f\text{-ft]} \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
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 Natural cooling	Num- ber of pole pairs	Moment of inertia of 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$_f$-in)	Nm (lb$_f$-in)	A	Order No. **Standard type**		10^{-4} kgm^2 (10^{-3} lb$_f$-in-s^2)	kg (lb)
1FK7 High Inertia for DC link voltage 510 ... 720 V DC									
2000	80	3.1 (4.16)	20 (14.8)	15 (11.1)	6.7	**1FK7084-3BC71-1**■ ■ ■	4	99 (33.8)	23.0 (50.7)
3000	63	1.5 (2.01)	6.0 (4.43)	4.7 (3.47)	3.7	**1FK7060-3BF71-1**■ ■ ■	4	12.5 (4.27)	7.9 (17.4)
		1.9 (2.55)	8.5 (75.2)	6.0 (53.1)	4.0	**1FK7062-3BF71-1**■ ■ ■	4	23.5 (8.06)	10.7 (23.6)
	80	2.7 (3.62)	12.0 (8.85)	8.7 (6.42)	6.8	**1FK7081-3BF71-1**■ ■ ■	4	49 (16.7)	15.2 (33.5)
		3.1 (4.16)	20.0 (14.8)	10.0 (7.38)	6.5	**1FK7084-3BF71-1**■ ■ ■	4	99 (33.8)	23.0 (50.7)
6000	48	0.9 (1.21)	3.0 (2.21)	1.5 (1.11)	2.5	**1FK7042-3BK71-1**■ ■ ■	4	5.1 (4.51)	5.1 (11.2)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder	A E
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder AS20DQI encoder AM20DQI encoder	B C Q R

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

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 additional versions and components see SINAMICS S120 drive system	Power connector	Cable cross-section [3]	Pre-assembled cable
	η	I_0 at M_0 $\Delta T=100$ K	P_{calc} at M_0 $\Delta T=100$ K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
Line voltage 380 ... 480 V 3 AC								
1FK7084-3BC71-...	93	8.5	4.2 (5.63)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7060-3BF71-...	90	4.45	1.9 (2.55)	5	**6SL312■-■TE15-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7062-3BF71-...	91	5.3	2.7 (3.62)	5 [4]	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7081-3BF71-...	93	8.7	3.8 (5.10)	9	**6SL312■-■TE21-0AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7084-3BF71-...	93	12.1	6.3 (8.45)	18	**6SL312■-■TE21-8AA3**	1	4 × 1.5	**6FX■002-5■N01-...**
1FK7042-3BK71-...	89	4.4	1.9 (2.55)	5	**6SL312■-■TE15-0AA3**	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 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

For information on the cables refer to section Connection system MOTION-CONNECT.

[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 x 1.5 mm^2.

[4] With the specified Motor Module, the motor cannot be fully utilized with M_0 at ΔT = 100 K winding temperature rise. 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] = $\dfrac{M_0\,[Nm] \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0\,[lb_f\text{-}ft] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
Compact for Power Modules 230 V 1 AC

■ **Selection and ordering data**

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FK7 Compact synchronous motors Natural cooling	Number of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No.		10^{-4} kgm² (10^{-3} lb_f-in-s²)	kg (lb)
1FK7 Compact for DC link voltage 270 V ... 330 V DC									
3000	36	0.3 (0.40)	1.15 (10.2)	1.0 (8.85)	1.6	**1FK7032-2AF21-1**■ ■ ■	3	0.65 (0.53)	2.7 (5.95)
		0.5 (0.67)	1.6 (14.2)	1.45 (12.8)	1.8	**1FK7034-2AF21-1**■ ■ ■	3	0.9 (0.80)	3.5 (7.72)
	48	0.8 (1.07)	3.0 (26.6)	2.6 (23.0)	3.5	**1FK7042-2AF21-1**■ ■ ■	4	2.9 (2.57)	4.6 (10.1)

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:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

Motor type (repeated)	Efficiency [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			
	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	Order No.	Size	mm^2	Order 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 800 PLUS	**8**		
MOTION-CONNECT 500	**5**		
Without brake cores		**C**	
With brake cores		**D**	
Length code			**....**

For information on the cables refer to section
Connection system MOTION-CONNECT.

7

[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 x 1.5 mm^2.

[4] With the specified Motor Module, the motor cannot be fully utilized with M_0 at ΔT = 100 K winding temperature rise. 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] = $\dfrac{M_0 \text{[Nm]} \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0 \text{[lb}_f\text{-ft]} \times n_{rated}}{5250}$

SIMOTICS S-1FK7 motors
Compact for Power Modules 230 V 1 AC

■ Selection and ordering data

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	SIMOTICS S-1FK7 Compact synchronous motors Natural cooling	Number of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 Compact for DC link voltage 270 ... 330 V DC									
6000	20	0.05 (0.07)	0.18 (1.59)	0.08 (0.71)	0.5	1FK7011-5AK21-1■ ■ ■	4	0.064 (0.057)	0.9 (1.98)
		0.1 (0.13)	0.35 (3.10)	0.16 (1.42)	0.5	1FK7015-5AK21-1■ ■ ■	4	0.083 (0.073)	1.1 (2.43)
	28	0.38 (0.51)	0.85 (7.52)	0.6 (5.31)	1.4	1FK7022-5AK21-1■ ■ ■	3	0.28 (0.248)	1.8 (3.97)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder	A
	AM512S/R encoder	H
	AM16S/R encoder (only for 1FK702)	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	L
	AM15DQ encoder	V
	R15DQ resolver	U
	R14DQ resolver	P

Shaft extension:	Shaft and flange accuracy:	Holding brake:	
Fitted key	Tolerance N	Without	A
Fitted 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

7

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	Order No.	Size	mm^2	Order 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-...	86	1.8	0.5 (0.67)	2.3	**6SL3210-1SB12-3■A0**	1	4 × 1.5	**6FX■002-5■G10-...**

Line filter:	
Without	**U**
Integrated	**A**

Power cable:	
MOTION-CONNECT 800 PLUS	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

For information on the cables refer to section Connection system MOTION-CONNECT.

[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 x 1.5 mm^2.

[4] P_{calc} [kW] = $\dfrac{M_0 [\text{Nm}] \times n_{rated}}{9550}$ P_{calc} [hp] = $\dfrac{M_0 [\text{lb}_f\text{-ft}] \times n_{rated}}{5250}$

Synchronous motors
Feed motors for SINAMICS S120

SIMOTICS S-1FK7 motors
High Dynamic for Power Modules 230 V 1 AC

■ **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	Num-ber of pole pairs	Moment of inertia of 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-in)	Nm (lb_f-in)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
1FK7 High Dynamic for DC link voltage 270 V ... 330 V DC									
3000	36	0.4 (0.54)	1.3 (11.5)	1.2 (10.6)	2.05	**1FK7033-4CF21-1**■ ■ ■	3	0.25 (0.22)	3.0 (6.62)
	48	0.9 (1.21)	3.3 (29.2)	3.0 (26.6)	3.7	**1FK7043-4CF21-1**■ ■ ■	3	1 (0.89)	6.0 (13.2)

Encoder systems for motors without DRIVE-CLiQ interface:	IC2048S/R encoder AM2048S/R encoder Multi-pole resolver 2-pole resolver	A E S T
Encoder systems for motors with DRIVE-CLiQ interface:	AS24DQI encoder AM24DQI encoder AS20DQI encoder AM20DQI encoder R15DQ resolver R14DQ resolver	B C Q R U P

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted 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

7

Synchronous motors
Feed motors for SINAMICS S120

**Built-in holding brakes for
SIMOTICS S-1FT7/1FK7 motors**

Overview

Many drives need a holding brake with an emergency stop function for safety reasons or to meet process requirements.

The permanent magnet single-surface brakes used on the SIMOTICS S-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.

In the event of an emergency stop or power outage, approximately 2000 braking operations can be performed with the 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 already included.

Technical specifications

Motor		Built-in holding brake					
Shaft height SH	Type	Holding torque [1] Nm	Direct current A	Opening time with varistor ms	Closing time with varistor ms	Moment of inertia J 10^{-4} kgm^2 (10^{-3} lb$_f$-in-s^2)	Maximum switched energy per brake operation from $n = 3000$ rpm
1FT7 with permanent-magnet brake, free from backlash							
36	1FT703	3	0.3	60	25	0.12 (0.11)	30
48	1FT704	8	0.6	90	30	0.87 (0.77)	270
63	1FT706	18	0.8	150	50	2.84 (2.51)	880
80	1FT708	48	1.0	220	65	15.4 (13.6)	1900
100	1FT710	85	1.6	250	70	27.6 (24.4)	5300
1FK7 Compact with permanent-magnet brake, free from backlash							
20	1FK701	0.4	0.3	30	20	0.019 (0.02)	2
28	1FK7022	1.0	0.3	30	20	0.07 (0.06)	8
36	1FK7032	1.9	0.3	50	30	0.08 (0.07)	40
48	1FK704	4.0	0.5	70	30	0.72 (0.64)	150
63	1FK706	13	0.8	100	50	2.25 (1.99)	380
80	1FK708	22	0.9	200	60	8.6 (7.61)	1400
100	1FK7100	23	1.0	300	70	8.6 (7.61)	3380
100	1FK7101 1FK7103 1FK7105	43	1.0	300	70	13.5 (11.9)	3380

7

[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).

■ Overview
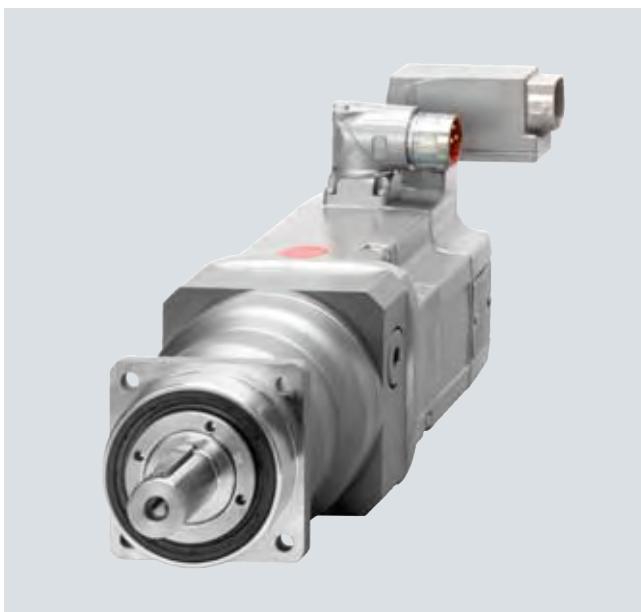
SIMOTICS S-1FT7 motor with mounted SP+ series planetary gearbox

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 at 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

SIMOTICS S-1FT703 to 1FT710 motors can be supplied ex factory (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and gear ratios i available for these motor/gearbox combinations are listed in the subsequent selection table. When making a selection, account must be taken of the maximum permissible input speed of the gearbox (this is the same as the maximum motor speed).

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.

7

Synchronous motors
Gearboxes

Planetary gearboxes series SP+
for SIMOTICS S-1FT7 motors

■ **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}	M_{G2}	F_r	F_a
								(n_1)	(T_{2B})	(F_{2Rmax})	(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 (295)	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 (442)	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 (810)	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)		

Gear shaft	Order code			
With fitted key	J02	J03	J05	J09
Without fitted 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 level A/IP65 degree of protection

SP+ planetary gearboxes can therefore only be ordered with these 1FT7 motors:
1FT7...-5..71-..G1
1FT7...-5..71-..H1
1FT7...-7..71-..G1
1FT7...-7..71-..H1

When ordering a motor with gearbox, **-Z** should be added to the order number.

Example:

1FT7042 motor without holding brake with single-stage SP+ planetary gearbox
with i = 5 and gear shaft without fitted key.
1FT7042-5AF71-1NG1**-Z**
J23

✔ Possible
– Not possible
[1] In reference to the output shaft center.

■ **Technical specifications**

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

Single-stage	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)				
Type		Continuous duty S1[1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.
	i	n_{N1} rpm	M_{N2} (T_{2N}) Nm (lb$_f$-ft)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 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	10	2000	1000 (738)	–	–	–	–	53.1 (18.1)

7

[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).

Synchronous motors
Gearboxes

**Planetary gearboxes series SP+
for SIMOTICS S-1FT7 motors**

■ **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}	M_{G2}	F_r	F_a
		arcmin	kg						(n_1) rpm	(T_{2B}) Nm (lb$_f$-ft)	(F_{2Rmax}) N (lb$_f$)	(F_{2Amax}) 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 (442)	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				–	✔	✔	–	–				
	Gear shaft			**Order code**								
	With fitted key			**J12**	**J13**	**J15**	**J16**	**J17**				
	Without fitted key			**J32**	**J33**	**J35**	**J36**	**J37**				

7

✔ Possible

– Not possible

[1] In reference to the output shaft center.

■ **Technical specifications**

SIMOTICS S-1FT7 motor with SP+ planetary gearbox

Two-stage	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)				
Type		Continuous duty S1[1]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.
	i	n_{N1} rpm	M_{N2} (T_{2N}) Nm (lb$_f$-ft)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 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 (0.15)	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	20	2500	2500 (1844)	–	–	–	–	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)

7

[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).

Synchronous motors
Gearboxes

Planetary gearboxes series SP+
for SIMOTICS S-1FK7 motors

■ Overview

SIMOTICS S-1FK7 motor with mounted series 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 at 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

SIMOTICS S-1FK702 to 1FK710 motors can be supplied ex factory (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and gear ratios i available for these motor/gearbox combinations are listed in the subsequent selection table. When making a selection, account must be taken of the maximum permissible input speed of the gearbox (this is the same as the maximum motor speed).

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.

7

■ **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}	M_{G2}	F_r	F_a
								(n_1)	(T_{2B})	(F_{2Rmax})	(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 (7.9)	✔	✔	✔	✔	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 (811)	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 fitted key			**J02**	**J03**	**J05**	**J09**
	Without fitted 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 1FK7 motors:

1FK7 ■■■ **-** ■■■■ **-** ■■■ **1**
　　　　2 A Compact 　**G** without brake
　　　　3 B High 　　　**H** with brake
　　　　　　 Inertia
　　　　4 C High
　　　　　　 Dynamic

or

1FK7 0 2 ■ **- 5 A** ■■■ **-** ■■■ **5**
　　　　　　　　　G 　without brake
　　　　　　　　　H 　with brake

When ordering a motor with gearbox, **-Z** should be added to the order number.

Example:

1FK7042 motor without holding brake with single-stage SP+ planetary gearbox
with *i* = 7 and gear shaft without fitted key.
1FK7042-2AF71-1AG1**-Z**
J25

✔ Possible

– Not possible

[1] In reference to the output shaft center.

Synchronous motors
Gearboxes

Planetary gearboxes series SP+
for SIMOTICS S-1FK7 motors

■ **Technical specifications**

SIMOTICS S-1FK7 motor with SP+ planetary gearbox

Single-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)					
			Continuous duty S1[1]	1FK702.	1FK703.	1FK704.	1FK706.	1FK708.	1FK710.
	i	n_{N1} rpm	M_{N2} (T_{2N}) Nm (lb$_f$-ft)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 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 (0.03)	0.18 (0.06)	–	–	–	–
	10	4000	17 (12.5)	0.09 (0.03)	0.17 (0.06)	–	–	–	–
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 (265)	–	–	–	–	11.0 (3.76)	–
	5	2100	360 (265)	–	–	–	–	9.95 (3.40)	–
	7	2600	360 (265)	–	–	–	–	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).

Synchronous motors
Gearboxes

**Planetary gearboxes series SP+
for SIMOTICS S-1FK7 motors**

■ **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}	M_{G2}	F_r	F_a
		arcmin	kg (lb)						(n_1) rpm	(T_{2B}) Nm (lb$_f$-ft)	(F_{2Rmax}) N (lb$_f$)	(F_{2Amax}) N (lb$_f$)
1FK7022	SP 060S-MF2	≤ 6	2 (4.4)	✔	✔	✔	–	–	6000	40 (295)	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 (1270)
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 fitted key			**J12**	**J13**	**J15**	**J16**	**J17**				
	Without fitted 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 1FK7 motors:

1FK7■■■-■■■■■-■■■1
- **2 A** Compact   **G**   without brake
- **3 B** High   **H**   with brake
  Inertia
- **4 C** High
  Dynamic

or

1FK7 0 2■-5 A■■■-■■■5
- **G**   without brake
- **H**   with brake

When ordering a motor with gearbox, **-Z** should be added to the order number.

Example:

1FK7042 motor without holding brake with two-stage SP+ planetary gearbox
with i = 28 and gear shaft without fitted key.
1FK7042-2AF71-1AG1-**Z**
J35

✔ Possible

– Not possible

[1] Referred to the center of the output shaft at 100 rpm.

7

Synchronous motors
Gearboxes

**Planetary gearboxes series SP+
for SIMOTICS S-1FK7 motors**

■ 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	Order code				
With fitted key	**J12**	**J13**	**J15**	**J16**	**J17**
Without fitted 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 1FK7 motors:

1FK7■■■-■■■■■-■■■1

2 A	Compact	**G**	without brake
3 B	High Inertia	**H**	with brake
4 C	High Dynamic		

or

1FK7 0 2■-5 A■■■-■■■5

G	without brake
H	with brake

When ordering a motor with gearbox, **-Z** should be added to the order number.

Example:

1FK7042 motor without holding brake with two-stage SP+ planetary gearbox
with i = 16 and gear shaft without fitted key.
1FK7103-2AC71-1AG1-**Z**
J32

✔ Possible

– Not possible

[1] In reference to the output shaft center.

7

Technical specifications

SIMOTICS S-1FK7 motor with SP+ planetary gearbox

| Two-stage Type | Gear ratio | Motor speed | Output torque | Moments of inertia of gearbox (referred to the drive) | | | | | |
| | | | Continuous duty S1[1] | 1FK702. | 1FK703. | 1FK704. | 1FK706. | 1FK708. | 1FK710. |
	i	n_{N1} rpm	M_{N2} (T_{2N}) Nm (lb$_f$-ft)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 kgcm^2 (lb$_f$-in^2)	J_1 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 (0.02)	0.16 (0.06)	–	–	–	–
	28	4400	26 (19.2)	0.06 (0.02)	–	–	–	–	–
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 (0.19)	–	–	–
	28	3500	75 (55.3)	–	0.18 (0.06)	0.50 (0.17)	–	–	–
	40	3500	75 (55.3)	0.10 (0.03)	0.17 (0.06)	–	–	–	–
	50	3800	75 (55.3)	0.10 (0.03)	0.16 (0.06)	–	–	–	–
SP 100S-MF2	16	3100	180 (132)	–	–	0.81 (0.28)	2.18 (0.75)	–	–
	20	3100	180 (132)	–	–	0.70 (0.24)	2.07 (0.71)	–	–
	28	3100	180 (132)	–	–	0.60 (0.20)	1.97 (0.67)	–	–
	40	3100	180 (132)	–	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 (266)	–	–	–	3.19 (1.09)	10.3 (3.52)	–
	20	2900	360 (266)	–	–	–	2.71 (0.93)	9.77 (3.34)	–
	28	2900	360 (266)	–	–	–	2.34 (0.80)	9.41 (3.22)	–
	40	2900	360 (266)	–	–	–	2.10 (0.72)	9.16 (3.13)	–
	50	3200	360 (266)	–	–	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 (10.8)
	28	2500	1500 (1106)	–	–	–	–	30.0 (10.3)	30.0 (10.3)
	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)

7

[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).

Synchronous motors

Gearboxes

**Planetary gearboxes series LP+
for SIMOTICS S-1FK7 motors**

■ Overview

SIMOTICS S-1FK7 motor with mounted series 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 a non-balanced design and with fitted 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

SIMOTICS S-1FK702 to 1FK710 motors can be supplied ex factory (Siemens AG) complete with flange-mounted planetary gearbox.

The gearboxes assigned to the individual motors and gear ratios *i* available for these motor/gearbox combinations are listed in the subsequent selection table. When making a selection, account must be taken of the maximum permissible input speed of the gearbox (this is the same as the maximum motor speed).

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.

7

■ 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. kg (lb)	**5**	**10**	n_{G1} rpm	M_{G2} at i = 5 Nm (lb$_f$-ft)	M_{G2} at i = 10 Nm (lb$_f$-ft)	F_r N (lb$_f$)	J_G at i = 5/10 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 fitted 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 1FK7 motors:

1FK7■■■**-**■■ . 7 1 1 - . ■ 0
   2 A Compact   **G** without brake
   3 B High   **H** with brake
        Inertia
   4 C High
        Dynamic

or

1FK7 0 2■**-5 A** . 7 1 1 - . ■ 3
                  G without brake
                  H with brake

When ordering a motor with gearbox, **-Z** should be added to the order number.

Example:

1FK7042 motor with holding brake with single-stage LP+ planetary gearbox with i = 5 and gear shaft with fitted key.
1FK7042-3BK71-1AH0-**Z**
V40

Continuous duty

Continuous duty is permissible at the 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} rpm	M_{G2} at i = 5 Nm (lb$_f$-ft)	M_{G2} at i = 10 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 the center of the output shaft at 100 rpm.

7

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors

■ Overview
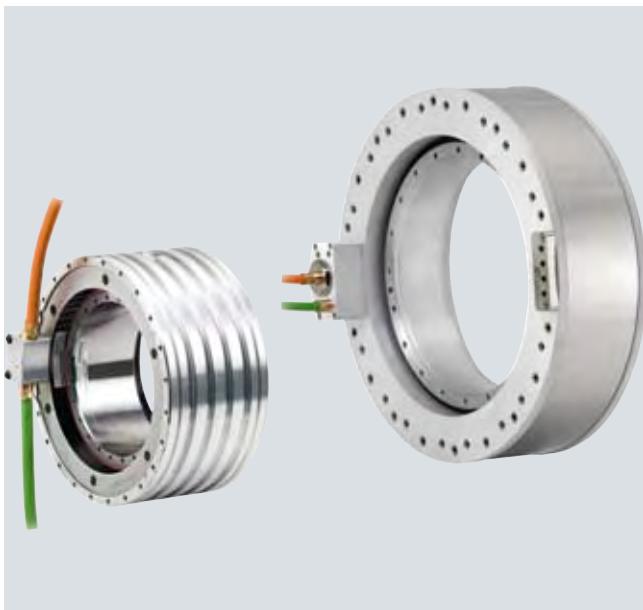
Built-in torque motors SIMOTICS T-1FW6 are liquid-cooled, multi-pole permanent-magnet AC synchronous motors with hollow-shaft rotor. The SIMOTICS T-1FW6 motors are supplied as built-in components that are held together in the delivered state by transport locks. For a complete drive unit, an additional 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.

■ Application

In conjunction with the SINAMICS S120 drive system, the built-in torque motors can be used as direct drive for the following machine applications:

• Rotary indexing machines, rotary tables, swivel axes
• Rotary axes (A, B, C axis in 5-axis machine tools)
• Turret indexing and cylinder indexing for single-spindle and multi-spindle machines
• Dynamic tool magazines
• Rotating spindles in milling machines
• Roller and cylinder drives
• Infeed and handling axes

■ 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

■ Design

The SIMOTICS T-1FW6 built-in torque motor comprises the following components:

Stator

Iron core with a 3-phase AC winding. To improve dissipation of the heat loss, the motor can be force-cooled by means of a liquid cooler (main cooler).

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 heat exchanger, a cooling connection adapter (accessory) can be ordered separately for simpler connection.

Cooler types

The design of the cooling system is dependent on the size (external diameter) of the motor.

SIMOTICS T-1FW6 motor Type	Cooling method
1FW6050 and 1FW6060	Integrated cooling (1 cooling circuit)
1FW6090 to 1FW6150	Jacket cooling
1FW6160 to 1FW6290	Integrated cooling (2 cooling circuits)

Motors with jacket cooling

The coolant inlet/return flow circuit must be provided by the machine manufacturer in the surrounding construction.

Motor components of sizes 1FW6090 to 1FW6150 with jacket cooling (rotor, stator)

Design (continued)

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.

Motor components of sizes 1FW6050 and 1FW6060 with integrated single-circuit cooling (rotor, stator)

Motors with integrated dual-circuit cooling

These motors feature a ready-to-connect, integrated dual-circuit cooling system and are therefore thermally insulated against the mechanical axis construction to a considerable extent.
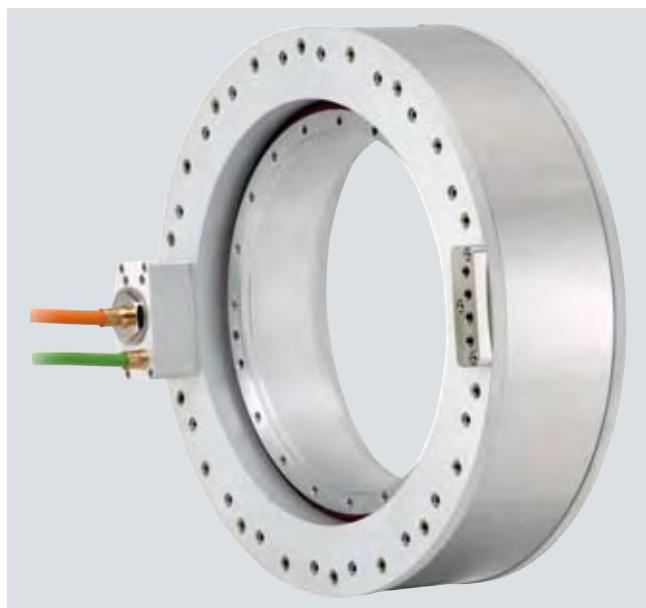
Motor components of sizes 1FW6160 to 1FW6290 with integrated dual-circuit cooling (rotor, stator)

Integration

The 1FW6 motors which must be fed from the SINAMICS S120 drive system are designed for operation on a 600 V DC link voltage level and require a sinusoidal current.

The cable connection is brought out of the front face of the stator and the free cable end must be connected to a terminal box provided by the machine manufacturer. The length of the power and signal cables from the motor to the drive system must not exceed 50 m (164 ft).

Technical specifications

Product name	SIMOTICS T-1FW6 built-in torque motors
Type of motor	Synchronous motor with permanent magnet rotor multi-pole (number of rotor poles 22 ... 98)
Torque ripple	≤ 1.5 % M_0
Coolant inlet temperature, max.	35 °C (95 °F)
Pressure in cooling circuit, max.	10 bar (static)
Temperature monitoring	1FW6050 and 1FW6060: 1 × PTC thermistor triplet with response threshold +130 °C (266 °F) (according to DIN 44081/44082) 1FW6090 to 1FW629: 2 × PTC thermistor triplet with response threshold +130/150 °C (266/302 °F) (according to DIN 44081/44082) All motors: 1 × KTY84 thermistor (according to DIN EN 60034-11) in the stator Evaluation via Sensor Module: SME120/SME125/TM120 (see SINAMICS S120 drive system)
Insulation of stator winding according to DIN EN 60034-1	Temperature class 155 (F)
Type of construction	Individual components: Stator, rotor
Degree of protection to DIN 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.
Encoder 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
Approvals, according to	cURus

7

Synchronous motors
Direct drives for SINAMICS S120

**SIMOTICS T-1FW6 built-in torque motors
Water cooling**

Selection and ordering data

Maximum torque	Static torque[1][3]	Rated torque[2][3]	Max. speed at maximum torque[2]	Max. speed at rated torque[2]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max} Nm (lb_f-ft)	M_0 Nm (lb_f-ft)	M_{rated} Nm (lb_f-ft)	n_{max} at M_{max} rpm	n_{max} at M_{rated} rpm	Order No.	J 10^{-2}kgm^2 (lb_f-in-s^2)	m kg (lb)
1FW6, standard type, water cooling							
34.4 (25.4)	24.2 (17.8)	22.3 (16.4)	670	940	**1FW6050-0■B03-0F■1**	0.139 (0.0123)	3.1 (6.8)
57.5 (42.4)	40.4 (29.8)	38.6 (28.5)	360	520	**1FW6050-0■B05-0F■1**	0.267 (0.0236)	5.9 (13.0)
80.6 (59.5)	56.6 (41.7)	54.9 (40.5)	220	340	**1FW6050-0■B07-0F■1**	0.39 (0.0345)	7.9 (17.4)
81.2 (59.9)	53 (39.1)	48.8 (36.0)	660	880	**1FW6050-0■B07-0K■1**		
116 (85.6)	75.8 (55.9)	71.8 (53.0)	420	570	**1FW6050-0■B10-0K■1**	0.488 (0.0432)	11.4 (25.1)
174 (128)	114 (84.1)	110 (81.1)	220	340	**1FW6050-0■B15-0K■1**	0.691 (0.0612)	19.2 (42.3)
		105 (77.4)	640	840	**1FW6050-0■B15-1J■1**		
64.5 (47.6)	33.3 (24.6)	30.7 (22.6)	340	660	**1FW6060-0■B03-0F■1**	0.347 (0.0307)	7.1 (15.7)
123 (90.7)	63.1 (46.5)	60.7 (44.8)	130	320	**1FW6060-0■B05-0F■1**	0.665 (0.0589)	9.9 (21.8)
		57.9 (42.7)	410	690	**1FW6060-0■B05-0K■1**		
166 (122)	85.4 (63.0)	83.2 (61.4)	46	210	**1FW6060-0■B07-0F■1**	0.904 (0.0800)	12.5 (27.6)
		80.5 (59.4)	260	480	**1FW6060-0■B07-0K■1**		
231 (170)	119 (87.8)	114 (84.1)	140	310	**1FW6060-0■B10-0K■1**	1.21 (0.1071)	16.2 (35.7)
226 (167)	116 (85.6)	106 (78.2)	500	740	**1FW6060-0■B10-1J■1**		
339 (250)	174 (128)	171 (126)	31	180	**1FW6060-0■B15-0K■1**	1.72 (0.1522)	22.4 (49.4)
332 (245)	171 (126)	161 (119)	270	460	**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] 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**

7

Synchronous motors
Direct drives for SINAMICS S120
SIMOTICS T-1FW6 built-in torque motors
Water cooling

Motor type (repeated)	Stall current [1)3)] I_0 A	Rated current [2)3)] I_{rated} A	Maximum current[2)] I_{max} A	Calculated power $P_{el,\,max}$ kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector[5)]		
					Required rated current I_{rated}/I_{max} A	Booksize format For additional versions and components see SINAMICS S120 drive system Order No.	Power connector Size	Cable cross-section[6)] mm^2	Pre-assembled basic cable to the drive system Order No.
1FW6050-0.B03-0F..	5	4.6	7.6	4.18 (5.61)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B05-0F..	5	4.8	7.6	4.54 (6.09)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B07-0F..	5.1	4.9	7.6	4.82 (6.46)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B07-0K..	9.3	8.6	14	8.68 (11.6)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B10-0K..	9.3	8.8	14	9.06 (12.1)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B15-0K..	9.3	9	14	9.58 (12.8)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6050-0.B15-1J..	18	17	29	17.2 (23.1)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B03-0F..	4.5	4.1	9.8	5.85 (7.84)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B05-0F..	4.5	4.3	9.8	6.62 (8.88)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B05-0K..	8.1	7.4	17	10.2 (13.7)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B07-0F..	4.5	4.3	9.8	7.06 (9.47)	5/10	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B07-0K..	8.1	7.6	17	10.8 (14.5)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B10-0K..	8.1	7.8	17	11.7 (15.7)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B10-1J..	15	13	31	19.4 (26.0)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B15-0K..	8.1	7.9	17	12.9 (17.3)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6060-0.B15-1J..	15	14	31	20.6 (27.6)	18/36	6SL312■-■TE21-8AA3	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 section Connection system MOTION-CONNECT.

7

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 (see Accessories).

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).

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

■ Selection and ordering data

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Max. speed at maximum torque[2)]	Max. speed at rated torque[2)]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{max} at M_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Order No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
1FW6, standard type, water cooling							
179 (132)	119 (87.8)	113 (83.3)	46	140	**1FW6090-0■B05-0F■2**	1.52 (0.13)	9.2 (20.3)
		109 (80.4)	140	250	**1FW6090-0■B05-0K■2**		
251 (185)	166 (122)	154 (114)	120	220	**1FW6090-0■B07-0K■2**	2.2 (0.19)	12.2 (27)
		142 (105)	270	430	**1FW6090-0■B07-1J■2**		
358 (264)	238 (176)	231 (170)	8.7	82	**1FW6090-0■B10-0K■2**	3.09 (0.27)	17.2 (37.9)
		216 (159)	170	270	**1FW6090-0■B10-1J■2**		
537 (396)	357 (263)	338 (249)	78	150	**1FW6090-0■B15-1J■2**	4.65 (0.41)	27.2 (60)
		319 (235)	200	310	**1FW6090-0■B15-2J■2**		
439 (324)	258 (190)	241 (178)	47	130	**1FW6130-0■B05-0K■2**	6.37 (0.56)	13.2 (29.1)
		217 (160)	180	310	**1FW6130-0■B05-1J■2**		
614 (453)	361 (266)	344 (254)	21	96	**1FW6130-0■B07-0K■2**	8.92 (0.79)	18.2 (40.1)
		324 (239)	110	200	**1FW6130-0■B07-1J■2**		
878 (648)	516 (381)	484 (357)	50	120	**1FW6130-0■B10-1J■2**	12.7 (1.12)	25.2 (55.6)
		450 (332)	150	250	**1FW6130-0■B10-2J■2**		
1320 (974)	775 (572)	744 (549)	14	78	**1FW6130-0■B15-1J■2**	19.1 (1.69)	38.2 (84.2)
		714 (527)	77	150	**1FW6130-0■B15-2J■2**		
710 (524)	360 (266)	338 (249)	110	230	**1FW6150-0■B05-1J■2**	10.1 (0.8939)	21.7 (47.8)
		298 (220)	330	650	**1FW6150-0■B05-4F■2**		
994 (733)	504 (372)	470 (347)	130	260	**1FW6150-0■B07-2J■2**	14.2 (1.2568)	33.5 (73.9)
		445 (328)	230	450	**1FW6150-0■B07-4F■2**		
1420 (1047)	720 (531)	668 (493)	76	170	**1FW6150-0■B10-2J■2**	20.9 (1.8498)	46.5 (103)
		664 (490)	150	300	**1FW6150-0■B10-4F■2**		
2130 (1571)	1080 (797)	1050 (774)	32	100	**1FW6150-0■B15-2J■2**	31.3 (2.7703)	70.8 (156)
		1030 (760)	89	190	**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**

7

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

Motor type (repeated)	Stall current [1)3] I_0 A	Rated current [2)3] I_{rated} A	Maximum current [2] I_{max} A	Calculated power $P_{el, max}$ kW (HP)	SINAMICS S120 Motor Module Required rated current I_{rated}/I_{max} A	Booksize format For additional versions and components see SINAMICS S120 drive system Order No.	Power cable with complete shield Motor connection via power connector [5] Power connector Size	Cable cross-section [6] mm²	Pre-assembled basic cable to the drive system Order No.
1FW6090-0.B05-0F..	5.9	5.6	9.5	6.55 (8.78)	5/10[4]	6SL312■-■TE15-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B05-0K..	8.2	7.4	13	8.12 (10.88)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B07-0K..	10	9.5	16	10.3 (13.8)	9/18[4]	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B07-1J..	16	13	26	14.1 (18.9)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B10-0K..	8.2	7.9	13	9.43 (12.6)	9/18	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B10-1J..	16	14	26	15.3 (20.5)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B15-1J..	16	15	26	17.1 (22.9)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6090-0.B15-2J..	26	23	43	24.1 (32.3)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6130-0.B05-0K..	9.7	9	18	12.2 (16.4)	9/18[4]	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B05-1J..	17	14	32	18.3 (24.5)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B07-0K..	10	10	20	14.2 (19)	9/18[4]	6SL312■-■TE21-0AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B07-1J..	17	15	32	19.7 (26.4)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B10-1J..	17	16	32	21.4 (28.7)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B10-2J..	28	24	53	30.6 (41)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6130-0.B15-1J..	19	18	36	25.4 (34.1)	18/36[4]	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6130-0.B15-2J..	28	26	54	34.1 (45.7)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6150-0.B05-1J..	18	17	44	22.8 (30.6)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6150-0.B05-4F..	44	36	100	39.4 (52.8)	45/85	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX8002-5CS64-....
1FW6150-0.B07-2J..	27	25	66	32.0 (42.9)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6150-0.B07-4F..	44	38	100	42.7 (57.3)	45/85	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX8002-5CS64-....
1FW6150-0.B10-2J..	27	26	66	36.2 (48.5)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6150-0.B10-4F..	44	40	100	47.3 (63.4)	45/85	6SL312■-1TE24-5AA3	1.5	4 × 10	6FX8002-5CS64-....
1FW6150-0.B15-2J..	27	26	66	42.4 (56.9)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6150-0.B15-4F..	44	41	100	54.5 (73.1)	45/85	6SL312■-1TE24-5AA3	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 section Connection system MOTION-CONNECT.

7

[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 (see Accessories).

[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).

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

■ **Selection and ordering data**

Maximum torque	Static torque[1][3]	Rated torque[2][3]	Max. speed at maximum torque[2]	Max. speed at rated torque[2]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{max} at M_{rated}		J	m
Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	rpm	rpm	Order No.	10^{-2}kgm^2 (lb_f-in-s^2)	kg (lb)
1FW6, standard type, water cooling							
716 (528)	467 (344)	431 (318)	84	140	**1FW6160-0■B05-1J■2**	19.0 (1.68)	36.3 (80.0)
		404 (298)	150	250	**1FW6160-0■B05-2J■2**		
		314 (232)	320	590	**1FW6160-0■B05-5G■2**		
1000 (738)	653 (482)	620 (457)	53	96	**1FW6160-0■B07-1J■2**	25.8 (2.28)	48.3 (107)
		594 (438)	100	170	**1FW6160-0■B07-2J■2**		
		514 (379)	230	390	**1FW6160-0■B07-5G■2**		
		432 (319)	330	610	**1FW6160-0■B07-8F B2**		
1430 (1055)	933 (688)	903 (666)	29	60	**1FW6160-0■B10-1J■2**	36.0 (3.19)	66.3 (146)
		878 (648)	65	110	**1FW6160-0■B10-2J■2**		
		804 (593)	160	260	**1FW6160-0■B10-5G■2**		
		732 (540)	230	390	**1FW6160-0■B10-8F B2**		
		622 (459)	330	600	**1FW6160-0■B10-2PB2**		67.4 (149)
2150 (1586)	1400 (1033)	1350 (996)	34	66	**1FW6160-0■B15-2J■2**	53.1 (4.70)	95.3 (210)
		1280 (944)	97	160	**1FW6160-0■B15-5G■2**		
		1220 (900)	150	240	**1FW6160-0■B15-8F B2**		
		1120 (826)	220	360	**1FW6160-0■B15-2PB2**		96.4 (213)
		961 (709)	320	560	**1FW6160-0■B15-0WB2**		
2860 (2110)	1870 (1379)	1750 (1291)	68	110	**1FW6160-0■B20-5G■2**	70.1 (6.20)	124.3 (274)
		1690 (1247)	110	170	**1FW6160-0■B20-8F B2**		
		1600 (1180)	160	260	**1FW6160-0■B20-2PB2**		125.4 (277)
		1460 (1077)	240	400	**1FW6160-0■B20-0WB2**		

7

Cable outlet <u>only</u> for 1FW6160 to 1FW6290:
Axial — **W**
Radially outwards — **V**
Tangential (<u>only</u> for types of connection C and D) — **T**

Type of connection:
Permanently connected power and signal cables with exposed core ends[4]
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**

Type of connection <u>only</u> for specific motors (<u>Not</u> configurable):
Permanently connected power and signal cables with exposed core ends[4]
Length: 1 m (3.28 ft) — **B**

Motor type (repeated)	Stall current [1][3] I_0 A	Rated current [2][3] I_{rated} A	Maxi-mum current[2] I_{max} A	Calculated power $P_{el, max}$ kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector[4]		
					Required rated current I_{rated}/I_{max} A	Booksize format For additional versions and components see SINAMICS S120 drive system Order No.	Power con-nector Size	Cable cross-section[5] mm²	Pre-assembled basic cable to the drive system Order No.
1FW6160-0.B05-1J..	17	16	31	15.1 (20.2)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6160-0.B05-2J..	28	24	49	20 (26.8)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6160-0.B05-5G..	56	36	98	33.1 (44.4)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6160-0.B07-1J..	17	16	31	16.7 (22.4)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6160-0.B07-2J..	28	25	49	21.8 (29.2)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6160-0.B07-5G..	56	43	98	35.2 (47.2)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6160-0.B07-8FB.	80	51	140	46.7 (62.6)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6160-0.B10-1J..	17	17	31	19 (25.5)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6160-0.B10-2J..	28	26	49	24.4 (32.7)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6160-0.B10-5G..	56	47	98	38.1 (51.1)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6160-0.B10-8FB.	80	61	140	49.8 (66.8)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6160-0.B10-2PB.	110	73	190	64.6 (86.6)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6160-0.B15-2J..	28	26	49	28.2 (37.8)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6160-0.B15-5G..	56	50	98	42.6 (57.1)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6160-0.B15-8FB.	80	68	140	54.6 (73.2)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6160-0.B15-2PB.	110	88	190	69.5 (93.2)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6160-0.B15-0WB.	160	100	280	92.8 (124)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6160-0.B20-5G..	56	52	98	46.9 (62.9)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6160-0.B20-8FB.	80	72	140	59.2 (79.4)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6160-0.B20-2PB.	110	95	190	74.2 (99.5)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6160-0.B20-0WB.	160	120	280	97.7 (131)	200/282	6SL312■-1TE32-0AA3	–	–	–

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 section Connection system MOTION-CONNECT.

7

[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 (see Accessories).

[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).

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

■ **Selection and ordering data**

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Max. speed at maximum torque[2)]	Max. speed at rated torque[2)]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{max} at M_{rated}		J	m
Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	rpm	rpm	Order No.	10^{-2}kgm^2 (lb$_f$-in-s^2)	kg (lb)
1FW6, standard type, water cooling							
990 (730)	672 (496)	633 (467)	54	97	**1FW6190-0■B05-1J■2**	35.8 (3.17)	42.8 (94.4)
		605 (446)	96	160	**1FW6190-0■B05-2J■2**		
		509 (375)	210	380	**1FW6190-0■B05-5G■2**		
1390 (1025)	941 (694)	905 (668)	33	63	**1FW6190-0■B07-1J■2**	48.6 (4.30)	55.8 (123)
		879 (648)	64	110	**1FW6190-0■B07-2J■2**		
		791 (583)	150	250	**1FW6190-0■B07-5G■2**		
		704 (519)	220	390	**1FW6190-0■B07-8F B2**		
1980 (1460)	1340 (988)	1310 (966)	14	38	**1FW6190-0■B10-1J■2**	67.8 (6.0)	75.8 (167)
		1290 (952)	39	70	**1FW6190-0■B10-2J■2**		
		1210 (892)	100	170	**1FW6190-0■B10-5G■2**		
		1130 (833)	150	260	**1FW6190-0■B10-8F B2**		
		955 (704)	250	450	**1FW6190-0■B10-2PB2**		77.1 (170)
2970 (2191)	2020 (1490)	1970 (1453)	17	40	**1FW6190-0■B15-2J■2**	99.8 (8.83)	107.8 (238)
		1890 (1394)	62	100	**1FW6190-0■B15-5G■2**		
		1820 (1342)	97	160	**1FW6190-0■B15-8F B2**		
		1670 (1232)	160	270	**1FW6190-0■B15-2PB2**		109.1 (241)
		1540 (1136)	210	370	**1FW6190-0■B15-0WB2**		
3960 (2921)	2690 (1984)	2570 (1896)	42	73	**1FW6190-0■B20-5G■2**	132.0 (11.68)	136.2 (300)
		2500 (1844)	68	110	**1FW6190-0■B20-8F B2**		
		2360 (1741)	120	200	**1FW6190-0■B20-2PB2**		137.5 (303)
		2250 (1660)	160	260	**1FW6190-0■B20-0WB2**		

7

Cable outlet <u>only</u> for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (<u>only</u> for types of connection 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 <u>only</u> for specific motors (<u>Not</u> configurable): Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

Motor type (repeated)	Stall current [1][3] I_0 A	Rated current [2][3] I_{rated} A	Maxi-mum current[2] I_{max} A	Calculated power $P_{el,\,max}$ kW (HP)	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection via power connector[4]		
					Required rated current I_{rated}/I_{max} A	Booksize format For additional versions and components see SINAMICS S120 drive system Order No.	Power con-nector Size	Cable cross-section[5] mm²	Pre-assembled basic cable to the drive system Order No.
1FW6190-0.B05-1J..	18	17	31	16.3 (21.9)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6190-0.B05-2J..	27	24	47	20.6 (27.6)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6190-0.B05-5G..	54	40	95	32.9 (44.1)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6190-0.B07-1J..	18	17	31	18.2 (24.4)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6190-0.B07-2J..	27	25	47	22.7 (30.4)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6190-0.B07-5G..	54	44	95	35.4 (47.5)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6190-0.B07-8FB.	78	56	130	46.3 (62.1)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6190-0.B10-1J..	18	17	31	20.7 (27.8)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6190-0.B10-2J..	27	26	47	25.7 (34.5)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6190-0.B10-5G..	54	48	95	38.7 (51.9)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6190-0.B10-8FB.	78	64	130	49.9 (66.9)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6190-0.B10-2PB.	120	84	210	69.9 (93.7)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6190-0.B15-2J..	27	26	47	30.1 (40.4)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6190-0.B15-5G..	54	50	95	44.1 (59.1)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6190-0.B15-8FB.	78	69	130	55.6 (74.6)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6190-0.B15-2PB.	120	99	210	75.8 (102)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6190-0.B15-0WB.	150	110	270	91.5 (123)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6190-0.B20-5G..	54	51	95	49 (54.7)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6190-0.B20-8FB.	78	71	130	61.1 (81.9)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6190-0.B20-2PB.	120	100	210	81.5 (109)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6190-0.B20-0WB.	150	120	270	97.4 (131)	200/282	6SL312■-1TE32-0AA3	–	–	–

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 section Connection system MOTION-CONNECT.

7

---

[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 (see Accessories).

[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).

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

■ **Selection and ordering data**

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Max. speed at maximum torque[2)]	Max. speed at rated torque[2)]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max}	M_0	M_{rated}	n_{max} at M_{max}	n_{max} at M_{rated}		J	m
Nm (lb_f-ft)	Nm (lb_f-ft)	Nm (lb_f-ft)	rpm	rpm	Order No.	10^{-2}kgm^2 (lb_f-in-s^2)	kg (lb)
1FW6, standard type, water cooling							
1320 (974)	841 (620)	799 (589)	34	69	**1FW6230-0■B05-1J■2**	62.2 (5.51)	44.8 (98.8)
		774 (571)	59	110	**1FW6230-0■B05-2J■2**		
		660 (487)	160	290	**1FW6230-0■B05-5G■2**		
1840 (1357)	1180 (870)	1140 (841)	19	45	**1FW6230-0■B07-1J■2**	84.3 (7.46)	58.8 (130)
		1120 (826)	38	73	**1FW6230-0■B07-2J■2**		
		1010 (745)	110	190	**1FW6230-0■B07-5G■2**		
		923 (681)	160	290	**1FW6230-0■B07-8FB2**		
2630 (1940)	1680 (1239)	1630 (1202)	21	46	**1FW6230-0■B10-2J■2**	118.0 (10.4)	81.8 (180)
		1520 (1121)	74	130	**1FW6230-0■B10-5G■2**		
		1450 (1070)	110	190	**1FW6230-0■B10-8FB2**		
		1320 (974)	160	290	**1FW6230-0■B10-2PB2**		
3950 (2914)	2520 (1859)	2440 (1800)	19	43	**1FW6230-0■B15-4C■2**	173.0 (15.3)	117.8 (260)
		2380 (1755)	44	80	**1FW6230-0■B15-5G■2**		
		2310 (1704)	67	120	**1FW6230-0■B15-8F B2**		
		2190 (1615)	100	180	**1FW6230-0■B15-2PB2**		
		2020 (1490)	150	270	**1FW6230-0■B15-0WB2**		119.4 (263)
5260 (3880)	3360 (2478)	3230 (2382)	29	56	**1FW6230-0■B20-5G■2**	228.0 (20.2)	153.8 (339)
		3160 (2331)	47	84	**1FW6230-0■B20-8FB2**		
		3050 (2250)	74	130	**1FW6230-0■B20-2PB2**		
		2890 (2132)	110	190	**1FW6230-0■B20-0WB2**		155.4 (343)

7

Cable outlet <u>only</u> for 1FW6160 to 1FW6290: Axial Radially outwards Tangential (<u>only</u> for types of connection 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 <u>only</u> for specific motors (<u>Not</u> configurable): Permanently connected power and signal cables with exposed core ends[4)] Length: 1 m (3.28 ft)	**B**

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

Motor type (repeated)	Stall current [1)3]	Rated current [2)3]	Maxi-mum 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 additional versions and components see SINAMICS S120 drive system	Power con-nector	Cable cross-section[5]	Pre-assembled basic cable to the drive system
	I_0	I_{rated}	I_{max}	$P_{el, max}$	I_{rated}/I_{max}				
	A	A	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
1FW6230-0.B05-1J..	16	15	31	17.3 (23.2)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6230-0.B05-2J..	24	22	45	21 (28.2)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6230-0.B05-5G..	53	40	100	34.1 (45.7)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6230-0.B07-1J..	16	16	31	19.4 (26.0)	18/36	6SL312■-■TE21-8AA3	1	4 × 2.5	6FX8002-5CS11-....
1FW6230-0.B07-2J..	24	22	45	23.6 (31.6)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6230-0.B07-5G..	53	44	100	36.9 (49.5)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6230-0.B07-8FB.	74	56	130	46.3 (62.1)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6230-0.B10-2J..	24	23	45	27.1 (36.3)	30/56	6SL312■-1TE23-0AA3	1.5	4 × 4	6FX8002-5CS41-....
1FW6230-0.B10-5G..	54	48	100	42 (56.3)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6230-0.B10-8FB.	74	62	130	50.6 (67.9)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6230-0.B10-2PB.	100	80	190	65.4 (87.7)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6230-0.B15-4C..	33	32	63	38 (50.9)	45/85	6SL312■-1TE24-5AA3	1.5	4 × 6	6FX8002-5CS54-....
1FW6230-0.B15-5G..	53	49	100	47.4 (63.5)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6230-0.B15-8FB.	74	66	130	57.3 (76.8)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6230-0.B15-2PB.	100	90	190	72.5 (97.2)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6230-0.B15-0WB.	140	110	270	91.2 (122)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6230-0.B20-5G..	53	51	100	53.5 (71.7)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6230-0.B20-8FB.	74	69	130	63.7 (85.4)	85/141	6SL312■-1TE28-5AA3	–	–	–
1FW6230-0.B20-2PB.	100	94	190	79.4 (106)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6230-0.B20-0WB.	140	120	270	98.1 (132)	200/282	6SL312■-1TE32-0AA3	–	–	–

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 section Connection system MOTION-CONNECT.

[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 (see Accessories).

[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).

Synchronous motors
Direct drives for SINAMICS S120

SIMOTICS T-1FW6 built-in torque motors
Water cooling

■ **Selection and ordering data**

Maximum torque	Static torque[1)3)]	Rated torque[2)3)]	Max. speed at maximum torque[2)]	Max. speed at rated torque[2)]	SIMOTICS T-1FW6 built-in torque motors Standard type	Moment of inertia of rotor	Weight, approx. stator + rotor
M_{max} Nm (lb_f-ft)	M_0 Nm (lb_f-ft)	M_{rated} Nm (lb_f-ft)	n_{max} at M_{max} rpm	n_{max} at M_{rated} rpm	Order No.	J 10^{-2}kgm² (lb_f-in-s²)	m kg (lb)
1FW6, standard type, water cooling							
4000 (2950)	2220 (1637)	2060 (1519)	59	110	**1FW6290-0■B07-5G■2**	228 (20.2)	103.6 (228)
		1910 (1409)	110	210	**1FW6290-0■B07-0L B2**		
		1810 (1335)	150	270	**1FW6290-0■B07-2P B2**		108.8 (240)
6280 (4632)	3490 (2574)	3320 (2449)	40	73	**1FW6290-0■B11-7A■2**	334 (29.6)	159 (351)
		3200 (2360)	71	130	**1FW6290-0■B11-0L B2**		
		3100 (2287)	93	170	**1FW6290-0■B11-2P B2**		164.2 (362)
8570 (6321)	4760 (3511)	4590 (3386)	28	53	**1FW6290-0■B15-7A■2**	440 (38.9)	214.6 (473)
		4480 (3304)	50	89	**1FW6290-0■B15-0L B2**		
		4390 (3238)	67	120	**1FW6290-0■B15-2P B2**		219.8 (485)
10900 (8040)	6030 (4448)	5760 (4249)	38	68	**1FW6290-0■B20-0L B2**	546 (48.3)	260.6 (575)
		5670 (4182)	51	91	**1FW6290-0■B20-2P B2**		265.8 (586)

Cable outlet only for 1FW6160 to 1FW6290:
Axial — **W**
Radially outwards — **V**
Tangential (only for types of connection C and D) — **T**

Type of connection:
Permanently connected power and signal cables with exposed core ends[4)] 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**

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**

7

Synchronous motors
Direct drives for SINAMICS S120
SIMOTICS T-1FW6 built-in torque motors
Water cooling

Motor type (repeated)	Stall current [1][3] I_0 A	Rated current [2][3] I_{rated} A	Maximum current [2] I_{max} A	Calculated power $P_{el, max}$ kW (HP)	SINAMICS S120 Motor Module Required rated current I_{rated}/I_{max} A	Booksize format For additional versions and components see SINAMICS S120 drive system Order No.	Power cable with complete shield Motor connection via power connector [4] Power connector Size	Cable cross-section [5] mm²	Pre-assembled basic cable to the drive system Order No.
1FW6290-0.B07-5G..	56	52	110	47.7 (64.0)	60/113	6SL312■-1TE26-0AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6290-0.B07-0LB.	100	86	210	70.6 (94.7)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6290-0.B07-2PB.	120	100	270	85.4 (115)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6290-0.B11-7A..	62	59	130	58 (77.8)	85/141	6SL312■-1TE28-5AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6290-0.B11-0LB.	100	91	210	78.2 (105)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6290-0.B11-2PB.	120	110	270	93.2 (125)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6290-0.B15-7A..	64	61	130	65.2 (87.4)	85/141	6SL312■-1TE28-5AA3	1.5	4 × 16	6FX8002-5CS24-....
1FW6290-0.B15-0LB.	100	94	210	85.2 (114)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6290-0.B15-2PB.	120	110	270	101 (135)	200/282	6SL312■-1TE32-0AA3	–	–	–
1FW6290-0.B20-0LB.	100	95	210	91.9 (123)	132/210	6SL312■-1TE31-3AA3	–	–	–
1FW6290-0.B20-2PB.	120	120	270	107 (144)	200/282	6SL312■-1TE32-0AA3	–	–	–

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**

Length code ....

For information on the cables refer to section Connection system MOTION-CONNECT.

■ Accessories

Description	Order No.
Cooling connection adapter for	
• Torque motors 1FW6160 to 1FW6230	**1FW6160-1BA00-0AA0**
• Torque motors 1FW6290	**1FW6290-1BA00-0AA0**

Description	Order No.
Power connector [4]	
• Size 1 for 4 × 2.5 mm²	**6FX2003-0LA00**
• Size 1.5 for 4 × 4/4 × 10/4 × 16 mm²	**6FX2003-0LA10**
Signal connector [4]	
• M17 (socket) for 6 × 0.5 + 1 × 1.0 mm²	**6FX2003-0SU07**
Signal cable, pre-assembled For built-in torque motors SIMOTICS T-1FW6	**6FX7002-2SL10-....**

7

[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 (see Accessories).

[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).

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 132 – Forced ventilation

Dimensional drawings

Shaft height	Type	DIN IEC	a B	b A	c HA	c₁ LA	f AB	h H	k LB	m BA	m₁ –	m₂ –	n AA

Dimensions in mm (inches)

Shaft height	Type	DIN IEC	a B	b A	c HA	c₁ LA	f AB	h H	k LB	m BA	m₁ –	m₂ –	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 height	Type	DIN IEC	p HD	p₁ –	p₂ –	p₃ –	s K	s₃ –	s₄ –	w₁ C	DE shaft extension				
											d D	d₆ –	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														

1PH813

Variant with power connector size 3

Connector size 1 for fan connection

G_PM21_EN_00045

■ **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)

								DE shaft extension				
Shaft height	Type	DIN IEC	p HD	p_1 –	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											
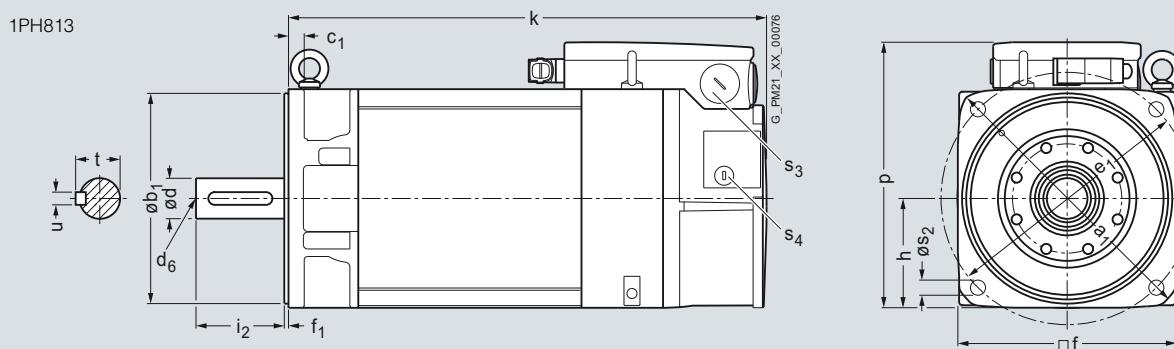
1PH813

Variant with
power connector size 3

Connector size 1 for
fan connection

G_PM21_EN_00045
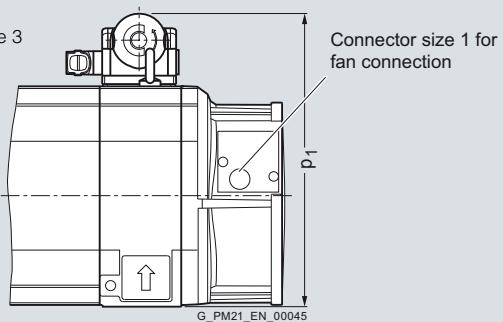
Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 132 – Forced ventilation

■ 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 height	Type	DIN IEC	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	s_4 –	w_1 C	DE shaft extension				
												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																

1PH813

Variant with power connector size 3

Connector size 1 for fan connection

G_PM21_EN_00045

■ **Dimensional drawings**

For motor		Dimensions in mm (inches)															
Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	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)				

												DE shaft extension				
Shaft height	Type	DIN IEC	p HD	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	d D	d₆ –	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

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 160 – Forced ventilation

Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
For motor			Dimensions in mm (inches)														
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 height	Type	DIN IEC	p HD	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	d D	d₆ –	i₂ E	t GA	u F
												DE shaft extension				
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

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)	

LE Air inlet
LA Air outlet

G_PM21_EN_00151a

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

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)	

LE Air inlet
LA Air outlet

■ **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)	

LE Air inlet
LA Air outlet

7

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

■ **Dimensional drawings**

For motor		IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
Shaft height	Type																				
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		IEC AD	AG	AS	BC	LL
Shaft height	Type					
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)	

LE Air inlet
LA Air outlet

■ **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)	

LE Air inlet
LA Air outlet

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

■ **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)	

LE Air inlet
LA Air outlet

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

■ **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)	

7

LE Air inlet
LA Air outlet

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

■ 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)	

LE Air inlet
LA Air outlet

■ **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)	

LE Air inlet
LA Air outlet

7

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

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)	

7

LE Air inlet
LA Air outlet

■ Dimensional drawings

For motor			Dimensions in mm (inches)														
Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	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)				

												DE shaft extension					
Shaft height	Type	DIN IEC	p HD	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –		w₁ C	d D	d₆ –	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

Variant with power connector size 3

G_PM21_XX_00048

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 132 – Water cooling

■ 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)				

											DE shaft extension				
Shaft height	Type	DIN IEC	p HD	p$_1$ –	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		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

Variant with power connector size 3

G_PM21_XX_00048

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)				

											DE shaft extension					
Shaft height	Type	DIN IEC	p HD	p_1 –	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

G_PM21_XX_00010a

Variant with power connector size 3

G_PM21_XX_00048

7

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 160 – Water cooling

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
For motor		Dimensions in mm (inches)															
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 height	Type	DIN IEC	p HD	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	d D	d₆ –	l L	t GA	u F
												DE shaft extension				
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

Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
1PH8, types 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	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	DE shaft extension d D	d₆ –	i₂ 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

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Water cooling

■ 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	p₂ –	s K	w₁ 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)					

			DE shaft extension				Terminal box type										
							1XB7322			1XB7422				1XB7700			
Shaft height	Type	DIN IEC	d D	d₆ –	l E	t GA	u F	p HD	p₃ –	r LL	x₁ AG	p HD	p₃ –	r LL	x₁ AG	p HD	p₃ –	r LL	x₁ 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

■ **Dimensional drawings**

For motor			Dimensions in mm (inches)																	
				D400	D450		D400	D450			D400	D450								
Shaft height	Type	DIN IEC	a B	a₁ P		b A	b₁ N		c HA	c₁ LA	e₁ M		f AB	f₁ T	g AC	h H	k LB	m BA		

Shaft height	Type	DIN IEC	a B	a₁ P		b A	b₁ N		c HA	c₁ LA	e₁ M		f AB	f₁ 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)	

							DE shaft extension					Terminal box type
												Dimensions as for types of construction IM B3/IM V5
Shaft height	Type	DIN IEC	n AA	p₂ –	s K	w₁ C	**d** **D**	d₆ –	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

Synchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Water cooling

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	p₂ _	s K	w₁ 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)					

			DE shaft extension					Terminal box type											
								1XB7322				1XB7422				1XB7700			
Shaft height	Type	DIN IEC	d D	d₆ _	l E	t GA	u F	p HD	p₃ _	r LL	x₁ AG	p HD	p₃ _	r LL	x₁ AG	p HD	p₃ _	r LL	x₁ 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

7

■ **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)				

			DE shaft extension					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									
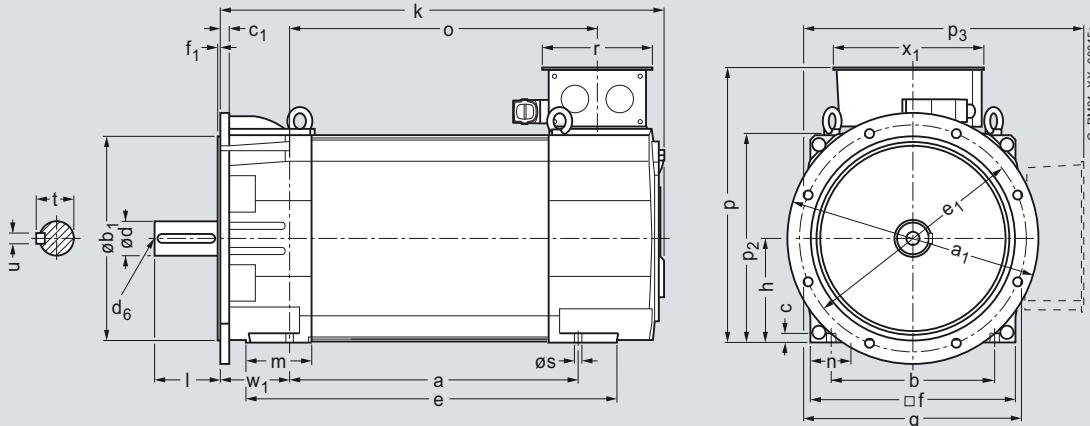
1PH822

Synchronous motors
Dimensional drawings for SIMOTICS S-1FT7 motors

**SIMOTICS S-1FT7 motors
without DRIVE-CLiQ – Natural cooling**

■ **Dimensional drawings**

For motor			Dimensions in mm (inches)									Connector Size 1	Size 1.5	DE shaft extension				
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)	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)

			Flange 0		without brake		with brake		Flange 1 (compatible with 1FT6)	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)	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)
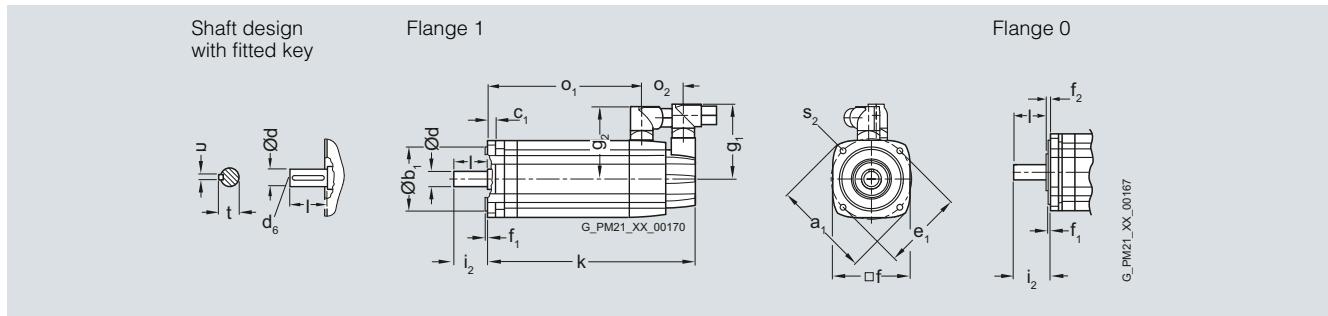
Shaft design with fitted key | Flange 1 | Flange 0

G_PM21_XX_00170

G_PM21_XX_00167

7

Synchronous motors
Dimensional drawings for SIMOTICS S-1FT7 motors

**SIMOTICS S-1FT7 motors
with DRIVE-CLiQ – Natural cooling**

■ Dimensional drawings

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 1 g_2 –	Connector Size 1.5 g_2 –	DE shaft ext. **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 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)	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)
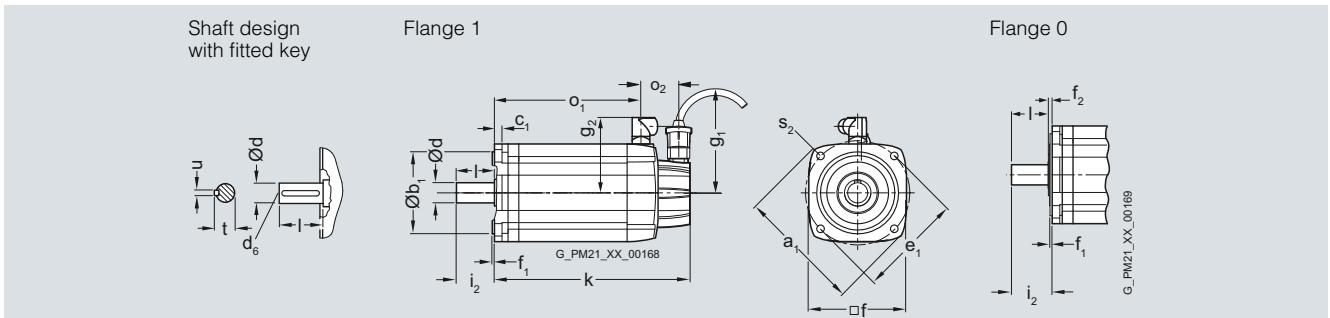
Shaft design with fitted key — Flange 1 (G_PM21_XX_00168) — Flange 0 (G_PM21_XX_00169)

7

Synchronous motors
Dimensional drawings for SIMOTICS S-1FT7 motors

SIMOTICS S-1FT7 motors
without DRIVE-CLiQ – Water cooling

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a₁ P	b –	b₁ N	c₁ LA	e₁ M	f AB	f₁ T	s₂ S	Signal con-nector g₁ –	Power connector Size 1 g₂ –	Size 1.5 g₂ –	Size 3 g₂ –	Connector Size 1 o₂ –	Size 1.5 o₂ –	Size 3 o₂ –
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)

Shaft height	Type	DIN IEC	Flange 1 (compatible with 1FT6) without/with brake i₂ –	k LB	Power connector Size 1 o₁ –	Size 1.5 o₁ –	Size 3 o₁ –	Flange 0 without/with brake f₂ –	i₂ –	k LB	Power connector Size 1 o₁ –	Size 1.5 o₁ –	Size 3 o₁ –	DE shaft extension d D	d₆ –	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 (compatible with 1FT6) · Shaft design with fitted key · Flange 0

■ **Dimensional drawings**

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)	–	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)	93 (3.66)	–	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)	93 (3.66)	–	159.5 (6.28)	187.5 (7.38)	–	53 (2.09)	69 (2.72)

Shaft height	Type	DIN IEC	Flange 1 (compatible with 1FT6) without/with brake i_2 –	k LB	Power connector Size 1 o_1 –	Size 1.5 o_1 –	Size 3 o_1 –	Flange 0 f_2 –	without/with brake i_2 –	k LB	Power connector Size 1 o_1 –	Size 1.5 o_1 –	Size 3 o_1 –	DE shaft extension 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)					
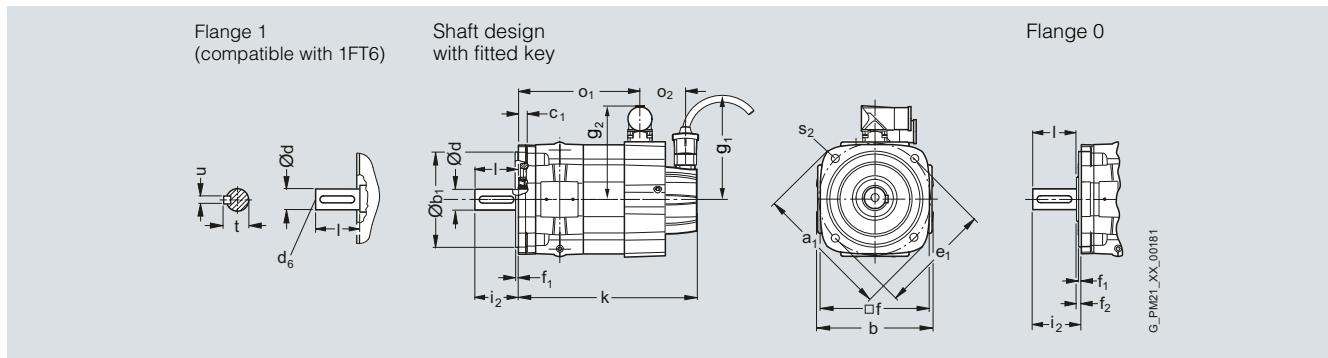
Flange 1 (compatible with 1FT6)   Shaft design with fitted key   Flange 0

G_PM21_XX_00181

Synchronous motors
Dimensional drawings for SIMOTICS S-1FT7 motors

SIMOTICS S-1FT7 motors
without/with DRIVE-CLiQ – Forced ventilation

Dimensional drawings

Shaft height	Type	DIN IEC P	a_1 P	b –	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	s_2 S	Connector Size 1.5 g_2 –	Connector Size 3 g_2 –	g_3 –	h H	h_1 –	Fan 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)

Shaft height	Type	DIN IEC i_2 –	Flange 1 (compatible with 1FT6) without brake k LB	Flange 1 without brake o_1 –	Flange 1 with brake k LB	Flange 1 with brake o_1 –	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 –	DE shaft extension d D	DE d_6 –	DE l E	DE t GA	DE 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)					

7

1FT706
1FT708
1FT710

Shaft design with fitted key — Flange 1 — Flange 0

G_PM21_XX_00182

■ Dimensional drawings

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)

Dimensions in mm (inches) — DE shaft extension

		Encoder system: Resolver Absolute encoders AM16S/R / AM15DQ						Encoder system: Incremental encoders IC2048S/R / IC22DQ Absolute encoders AM2048S/R / AM22DQ, AM512S/R / AM20DQ, AM32S/R / AM16DQ					
		Dimensions in mm (inches)										
		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 fitted key
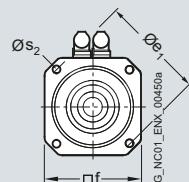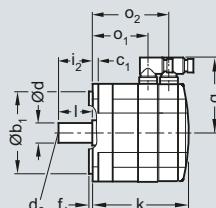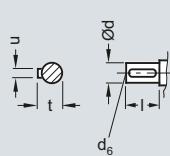
7

Synchronous motors
Dimensional drawings for SIMOTICS S-1FK7 motors

SIMOTICS S-1FK7 motors
Natural cooling

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	**d** **D**	d_6 –	l E	t GA	u F
1FK7 Compact/High Dynamic/High Inertia, without/with brake															
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)
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 fitted key

Version with DRIVE-CLiQ interface

Version without DRIVE-CLiQ interface

7

■ **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	g₁ —	g₂ —	o₂ —	k LB	o₁ —	k LB	o₁ —	g₁ —	g₂ —	o₂ —	k LB	o₁ —	k LB	o₁ —
1FK7 Compact															
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															
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)					
1FK7 High Inertia															
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)

Synchronous motors
Dimensional drawings for SIMOTICS S-1FK7 motors

SIMOTICS S-1FK7 motors
Natural cooling

Dimensional drawings

Shaft height	Type	DIN IEC	a₁ P	b₁ N	c₁ LA	e₁ M	f AB	f₁ T	i₂ –	s₂ S	DE shaft extension d D	d₆ –	l E	t GA	u F

For motor: **Resolver** with/without DRIVE-CLiQ interface
Dimensions in mm (inches)

Shaft height	Type	DIN IEC P	a₁ P	b₁ N	c₁ LA	e₁ M	f AB	f₁ T	i₂ –	s₂ S	d D	d₆ –	l E	t GA	u F
1FK7 Compact/High Dynamic															
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)
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 fitted key

Version
with resolver

7

■ **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								
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								
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)					

Synchronous motors
Dimensional drawings for gearboxes for SIMOTICS S-1FT7/1FK7 motors

**SIMOTICS S-1FT7/1FK7 motors
with SP+ series planetary gearbox**

■ 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 SP+ series planetary gearbox 1-stage/2-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/-MF285	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)
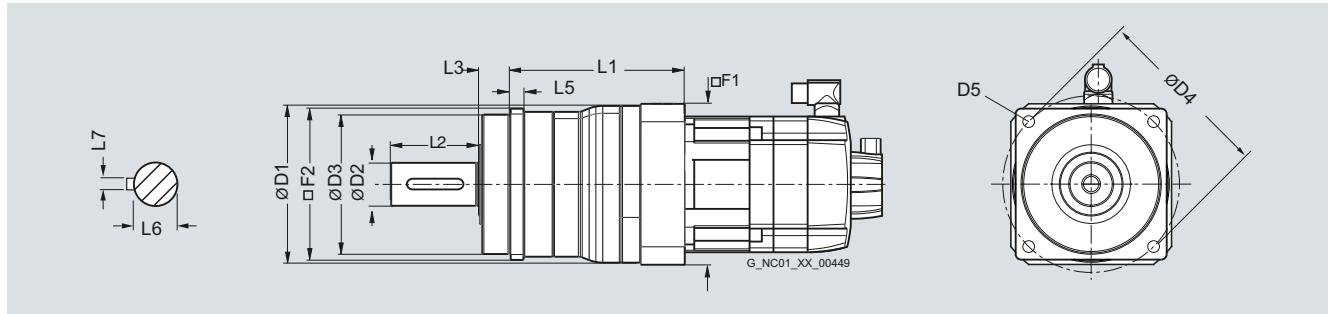
G_NC01_XX_00449

7

Synchronous motors
Dimensional drawings for gearboxes for SIMOTICS S-1FT7/1FK7 motors

**SIMOTICS S-1FT7/1FK7 motors
with SP+ series planetary gearbox**

■ **Dimensional drawings**

For SP+ series planetary gearboxes on SIMOTICS S-1FT7/-1FK7 motors

Dimensions in mm (inches)

Planetary gearbox	Motor	SP+ series planetary gearbox 1-stage -MF1			SP+ series planetary gearbox 2-stage -MF2		
Type	Type	D1	F1	L1	D1	F1	L1
1FT7/1FK7 with SP+ series planetary gearbox 1-stage/2-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)
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)

7

Synchronous motors
Dimensional drawings for gearboxes for SIMOTICS S-1FT7/1FK7 motors

**SIMOTICS S-1FK7 motors
with LP+ series planetary gearbox**

■ Dimensional drawings

For LP+ series planetary gearboxes on SIMOTICS S-1FK7 motors

Dimensions in mm (inches)

Planetary gearbox	Motor											
Type	Type	L1	L2	L3	L5	L6	L7	D1	D2	D3	D4	D5
1FK7 motors with LP+ series planetary gearbox												
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)										

7

1FK703
1FK704
1FK706
1FK708
1FK710

G_NC01_XX_00448

**SIMOTICS T-1FW6 built-in torque motors
Water cooling**

■ **Dimensional drawings**

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
1FW6, individual components, water cooling					
1FW6050-0.B03	159 (6.26)	64 (2.52)	96 (3.78)	89 (3.50)	35 (1.38)
1FW6050-0.B05				109 (4.29)	65 (2.56)
1FW6050-0.B07				129 (5.08)	85 (3.35)
1FW6050-0.B10				159 (6.26)	115 (4.53)
1FW6050-0.B15				209 (8.23)	165 (6.50)
1FW6060-0.B03	184 (7.24)	92 (3.62)	124 (4.88)	89 (3.50)	35 (1.38)
1FW6060-0.B05				109 (4.29)	65 (2.56)
1FW6060-0.B07				129 (5.08)	85 (3.35)
1FW6060-0.B10				159 (6.26)	115 (4.53)
1FW6060-0.B15				209 (8.23)	165 (6.50)

1FW6050
1FW6060

G_NC01_XX_00500

Synchronous motors
Dimensional drawings for SIMOTICS T-1FW6 built-in torque motors

**SIMOTICS T-1FW6 built-in torque motors
Water cooling**

■ **Dimensional drawings**

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
1FW6, 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)

1FW6090
1FW6130
1FW6150

G_DA65_XX_00244

7

Synchronous motors
Dimensional drawings for SIMOTICS T-1FW6 built-in torque motors

**SIMOTICS T-1FW6 built-in torque motors
Water cooling**

■ **Dimensional drawings**

For motor	Dimensions in mm (inches)				
Type	D1	D2	D3	L1	L2
1FW6, 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)

1FW6160
1FW6190
1FW6230
1FW6290

G_DA65_XX_00245

© Siemens AG 2012

Synchronous motors

Notes

7/130 Siemens NC 61 N · August 2012

Asynchronous motors

CAD CREATOR

Dimension drawing and
2D/3D CAD generator

www.siemens.com/cadcreator

Asynchronous motors
Introduction

Type overview and rated data

Motor type	Designation	Degree of protection	Cooling method
SIMOTICS M-1PH8	Asynchronous motor Three-phase squirrel-cage motor without housing Main spindle motor Solid or hollow shaft	IP55[1]	Forced ventilation
		IP55/IP65[2]	Water cooling

■ **Application**

The areas of application for the SIMOTICS M-1PH asynchronous motors are extremely varied.

In machine tools, they are usually used as main spindle motors.

In production machines, such as printing, packaging and re-forming machines, they are used as high-output asynchronous servomotors.

The motors are referred to generally in this documentation as asynchronous motors, due to their principle of operation.

[1] See options for additional versions.
[2] From SH 180: IP55.

Type overview and rated data

Shaft height	Rated power P_{rated} for S1 duty kW (HP)					Rated torque M_{rated}	Selection and ordering data
	0.1	1	10	100	1000		Page
SH 80/SH 100/SH 132 SH 160/SH 180/SH225/ SH 280		2.8 (3.75)		250 (335)		10 ... 2459 Nm (7.38 ... 1814 lb$_f$-ft)	8/8 ... 8/13
SH 80/SH 100/SH 132/ SH 160/SH 180/SH 225/ SH 280		3.5 (4.69)		227 (304)		14 ... 2602 Nm (10.3 ... 1919 lb$_f$-ft)	8/14 ... 8/17

■ **Application** (continued)

The selection and ordering data for the SINAMICS S120 Motor Modules are based on the booksize format by way of example. Blocksize and chassis formats are also possible. The detailed configuration is performed using the SIZER configuration tool.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors

■ **Overview**
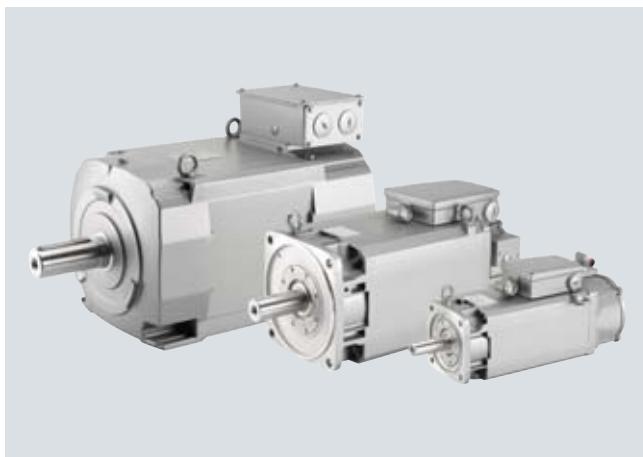
SIMOTICS M-1PH8 motors are compact squirrel-cage asynchronous motors with IP55/IP65 degree of protection and they extend or replace the current range of the well-proven 1PH/1PM series. SIMOTICS M-1PH8 motors are available in two different cooling types:

• 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 optimum version 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 20000 rpm

• Excellent rotational accuracy of up to 10 μm

• Excellent vibration magnitudes

• High dynamic response (short acceleration times)

■ Low noise emissions

■ Simple, 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

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors

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

Characteristic curves
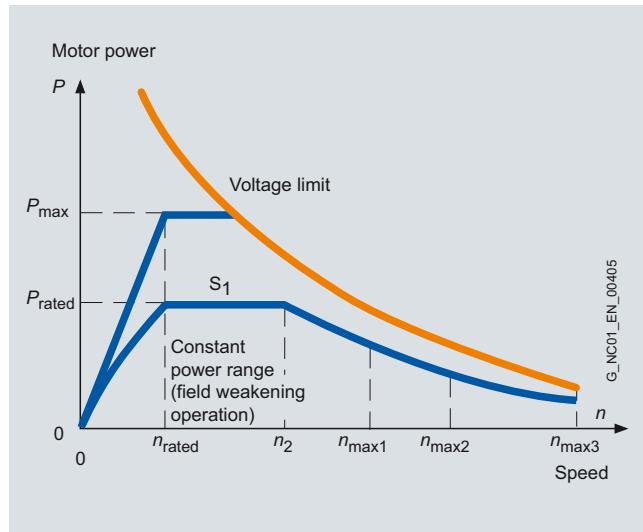
Typical speed/power graph for SIMOTICS M-1PH8 motors[1]

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.

[1] For further configuration information, see the 1PH8 Motors Configuration Manual.

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors

Technical specifications

Product name	SIMOTICS M-1PH8 motor		
Cooling	Forced ventilation	Water cooling	
• Cooling water pressure at inlet, max.	–	6 bar	
		Cooling water flow volume	Connecting 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	KTY 84 temperature sensor in the stator winding		
• 1PH818/1PH822/1PH828	Additional KTY 84 as reserve		
Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)	For an ambient temperature of up to 40 °C (104°F) Temperature class 180 (H)		
Motor fan ratings		–	
• 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 ... 277 V 1 AC, 50/60 Hz (EC fan)	–	
• 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 a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm	68 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm	
• 1PH816	73 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm	69 dB at a rated pulse frequency of 4 kHz and a speed range up to 5000 rpm	
• 1PH818/1PH822	73 dB at a rated pulse frequency of 2 kHz and a speed range: <u>Forced ventilation</u> (IP55) • 1PH818 up to 5000 rpm • 1PH822 up to 3500 rpm	70 dB at a rated pulse frequency of 2 kHz or 4 kHz and speed ranges: • 1PH818 up to 5000 rpm • 1PH822 up to 4500 rpm	
• 1PH828	74 dB at a rated pulse frequency of 2 kHz and a speed range up to 3300 rpm <u>Forced ventilation</u> (IP55) • 1PH828 up to 3300 rpm	72 dB at a rated pulse frequency of 2 kHz and a speed range up to 3300 rpm	
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		

S/R = signals/revolution

8

---

[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.

■ **Technical specifications** (continued)

Product name	SIMOTICS M-1PH8 motor	
Vibration severity	In accordance with Siemens/EN 60034-14 (IEC 60034-14)	
Shaft and flange accuracy in accordance with DIN 42955 (IEC 60072-1)[2]	Tolerance R	
Degree of protection in accordance with EN 60034-5 (IEC 60034-5)		
• 1PH808/1PH810/1PH813/1PH16	IP55	IP65
• 1PH818/1PH822/1PH828	IP55	IP55
Rating plate	1 unit attached to motor 1 unit supplied loose in terminal box	
Paint finish	Anthracite RAL 7016	
Approvals, in accordance with	cURus	

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 80 to SH 160 – Forced ventilation

■ **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 motor
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)	Order No.
Shaft height 80 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	10000	12000	–	6200	2.8 (3.75)	18 (13.3)	21 (15.5)	1PH8083-1■ F ■■-■■■1
2000	10000	15000	17000	11350	3.7 (4.96)	18 (13.3)	21 (15.5)	1PH8083-1■ G ■■-■■■1
3000	10000	15000	20000	17300	4.1 (5.50)	13 (9.59)	21 (15.5)	1PH8083-1■ M■■-■■■1
4500	10000	15000	20000	20000	4.8 (6.44)	10 (7.38)	19 (14.0)	1PH8083-1■ N ■■-■■■1
1500	10000	14000	–	6750	3.7 (4.96)	24 (17.7)	27 (19.9)	1PH8087-1■ F ■■-■■■1
2000	10000	15000	18000	10450	4.9 (6.57)	23 (17.0)	27 (19.9)	1PH8087-1■ G ■■-■■■1
3000	10000	15000	20000	20000	4.8 (6.44)	15 (11.1)	27 (19.9)	1PH8087-1■ M■■-■■■1
4500	10000	15000	20000	20000	5.8 (7.78)	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								
1500	9000	12000	–	8350	3.7 (4.96)	24 (17.7)	29 (21.4)	1PH8101-1■ F ■■-■■■1
1000	9000	12000	–	3800	3.7 (4.96)	35 (25.8)	38 (28.0)	1PH8103-1■ D ■■-■■■1
1500	9000	12000	–	5200	5.5 (7.38)	35 (25.8)	38 (28.0)	1PH8103-1■ F ■■-■■■1
2000	9000	12000	–	7200	7 (9.39)	33 (24.3)	38 (28.0)	1PH8103-1■ G ■■-■■■1
3000	9000	12000	18000	17100	8.4 (11.3)	27 (19.9)	38 (28.0)	1PH8103-1■ M■■-■■■1
1500	9000	12000	–	6700	7 (9.39)	45 (33.2)	52 (38.4)	1PH8105-1■ F ■■-■■■1
1000	9000	12000	–	5450	6.3 (8.45)	60 (44.3)	63 (46.5)	1PH8107-1■ D ■■-■■■1
1500	9000	12000	–	6250	9 (12.1)	57 (42.0)	63 (46.5)	1PH8107-1■ F ■■-■■■1
2000	9000	12000	–	7500	10.5 (14.1)	50 (36.9)	63 (46.5)	1PH8107-1■ G ■■-■■■1
3000	9000	12000	18000	18000	12 (16.1)	38 (28.0)	59 (43.5)	1PH8107-1■ M■■-■■■1
Shaft height 132 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	8000	10000	11000	6050	11 (14.8)	70 (51.6)	96 (70.8)	1PH8131-1■ F ■■-■■■1
1000	8000	10000	–	4600	12 (16.1)	115 (84.8)	128 (94.4)	1PH8133-1■ D ■■-■■■1
1500	8000	10000	13000	6900	15 (20.1)	96 (70.8)	126 (92.9)	1PH8133-1■ F ■■-■■■1
2000	8000	10000	15000	6500	20 (26.8)	96 (70.8)	126 (92.9)	1PH8133-1■ G ■■-■■■1
1500	8000	10000	14000	7500	18.5 (24.8)	118 (87.0)	157 (116)	1PH8135-1■ F ■■-■■■1
1000	8000	10000	12000	5400	17 (22.8)	162 (119)	183 (135)	1PH8137-1■ D ■■-■■■1
1500	8000	10000	15000	7000	22 (29.5)	140 (103)	172 (127)	1PH8137-1■ F ■■-■■■1
2000	8000	10000	15000	5500	28 (37.5)	134 (98.8)	176 (130)	1PH8137-1■ G ■■-■■■1
Shaft height 160 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module								
400	6500	–	–	2750	9.5 (12.3)	227 (167)	239 (176)	1PH8163-1■ B ■■-■■■1
1000	6500	9000	10000	5050	22 (29.5)	210 (155)	243 (179)	1PH8163-1■ D ■■-■■■1
1500	6500	9000	10000	5000	30 (40.2)	191 (141)	252 (186)	1PH8163-1■ F■■-■■■1
2000	6500	9000	10000	3500	36 (48.3)	172 (127)	254 (187)	1PH8163-1■ G■■-■■■1
400	6500	–	–	2300	13 (17.4)	310 (229)	329 (243)	1PH8165-1■ B■■-■■■1
1000	6500	9000	10000	5550	28 (37.5)	267 (197)	302 (223)	1PH8165-1■ D■■-■■■1
1500	6500	9000	10000	4550	37 (49.6)	236 (174)	304 (224)	1PH8165-1■ F■■-■■■1
2000	6500	9000	10000	3200	41 (55.0)	196 (145)	302 (223)	1PH8165-1■ G■■-■■■1

For versions, see Order No. supplement and options.

The values in the selection and ordering data, particularly for the constant power range with speed n_2, apply when using an Active Line Module with 400 V 3 AC.
When using a Smart Line Module, proceed according to 1PH8 Motors Configuration Manual.

[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 B to D).
[3] Bearing version for Performance (14th data position L).
[4] Bearing version for High Performance (14th data position M).
[5] n_2: Max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

8

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 additional 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	Order No.
1PH8083-1.F...	80.9	0.0064 (0.06)	32 (70.6)	7.5	8	gk803	9	**6SL312■-■ TE21-0AA3**
1PH8083-1.G...	83.2			11.6	12	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8083-1.M...	86.9			13.6	17	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8083-1.N...	86.4			17	23	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8087-1.F...	81.7	0.0089 (0.08)	39 (86.0)	10	11	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8087-1.G...	85.3			14.1	15	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8087-1.M...	87.1			17.3	23	gk803	18	**6SL312■-■ TE21-8AA3**
1PH8087-1.N...	86.8			19.5	28	gk803	30	**6SL312■- 1 TE23-0AA3**
1PH8101-1.F...	83.5	0.0138 (0.12)	42 (92.6)	12.5	14	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8103-1.D...	81.4	0.0172 (0.15)	51 (112)	10	11	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8103-1.F...	85.2			13.5	14	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8103-1.G...	87.7			17.5	19	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8103-1.M...	90.0			25.7	31	gk813	30	**6SL312■- 1 TE23-0AA3**
1PH8105-1.F...	86.7	0.0252 (0.22)	65 (143)	17.5	20	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8107-1.D...	83.4	0.0289 (0.26)	73 (161)	17.5	25	gk813	18	**6SL312■-■ TE21-8AA3**
1PH8107-1.F...	86.9			23.5	25	gk813	30	**6SL312■- 1 TE23-0AA3**
1PH8107-1.G...	89.7			26	29	gk813	30	**6SL312■- 1 TE23-0AA3**
1PH8107-1.M...	90.0			38	48	gk813	45	**6SL312■- 1 TE24-5AA3**
1PH8131-1.F...	89.9	0.059 (0.52)	89 (196)	24	30	gk833	30	**6SL312■- 1 TE23-0AA3**
1PH8133-1.D...	87.1	0.076 (0.67)	106 (234)	30	32	gk833	30	**6SL312■- 1 TE23-0AA3**
1PH8133-1.F...	89.9			34	42	gk833	45	**6SL312■- 1 TE24-5AA3**
1PH8133-1.G...	91.9			45	54	gk833	45	**6SL312■- 1 TE24-5AA3**
1PH8135-1.F...	89.8	0.094 (0.83)	125 (276)	43	53	gk833	45	**6SL312■- 1 TE24-5AA3**
1PH8137-1.D...	88.1	0.109 (0.96)	141 (311)	43	47	gk833	45	**6SL312■- 1 TE24-5AA3**
1PH8137-1.F...	90.4			56	68	gk833	60	**6SL312■- 1 TE26-0AA3**
1PH8137-1.G...	92.4			60	73	gk833	60	**6SL312■- 1 TE26-0AA3**
1PH8163-1.B...	82.3	0.216 (1.91)	196 (432)	30	30	gk863	30	**6SL312■- 1 TE23-0AA3**
1PH8163-1.D...	90.9	0.216 (1.91)	196 (432)	55	60	gk863	60	**6SL312■- 1 TE26-0AA3**
1PH8163-1.F...	92.3	0.216 (1.91)	196 (432)	71	87	gk863	85	**6SL312■- 1 TE28-5AA3**
1PH8163-1.G...	92.9	0.216 (1.91)	196 (432)	83	111	gk863	85	**6SL312■- 1 TE28-5AA3**
1PH8165-1.B...	82.6	0.232 (2.05)	230 (507)	36	37	gk863	45	**6SL312■- 1 TE24-5AA3**
1PH8165-1.D...	91.4	0.232 (2.05)	230 (507)	71	77	gk863	85	**6SL312■- 1 TE28-5AA3**
1PH8165-1.F...	92.6	0.232 (2.05)	230 (507)	78	95	gk863	85	**6SL312■- 1 TE28-5AA3**
1PH8165-1.G...	92.7	0.232 (2.05)	230 (507)	88	122	gk863	85[8]	**6SL312■- 1 TE28-5AA3**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**

Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

8

[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.

[8] The rated output current of the Motor Module is lower than the rated motor current at 4 kHz.

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 100/SH 132 – Forced ventilation

■ **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 motor
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)	Order 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 Order No. supplement and options.

The values in the selection and ordering data, particularly for the constant power range with speed n_2, apply when using an Active Line Module with 400 V 3 AC.
When using a Smart Line Module, proceed according to 1PH8 Motors Configuration Manual.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

**SIMOTICS M-1PH8 motors
SH 100/SH 132 – Forced ventilation**

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 additional 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	Order No.
1PH8101-1.S...	87.2/90.2	0.0138 (0.12)	42 (92.6)	13.2/13.5	15/20	gk826	18	**6SL312■-■TE21-8AA3**
1PH8105-1.S...	89.1/91.4	0.0252 (0.22)	65 (143)	23/24	25/34	gk826	30	**6SL312■-1 TE23-0AA3**
1PH8107-1.S...	89.4/90.9	0.0289 (0.26)	73 (161)	26.7/28	30/40	gk826	30	**6SL312■-1 TE23-0AA3**
1PH8131-1.S...	90.8/89.7	0.059 (0.52)	89 (196)	39/40	47/56	gk846	45	**6SL312■-1 TE24-5AA3**
1PH8135-1.S...	91.7/93.9	0.094 (0.83)	125 (276)	51/52	62/78	gk846	60	**6SL312■-1 TE26-0AA3**
1PH8137-1.S...	93.1/91.9	0.109 (0.96)	141 (311)	56/56	68/87	gk846	60	**6SL312■-1 TE26-0AA3**

Cooling:
Internal air cooling   **0**
External air cooling   **1**

Motor Module:
Single Motor Module   **1**
Double Motor Module   **2**

8

---

[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 B to D).

[3] Bearing version for Performance (14th data position L).

[4] Bearing version for High Performance (14th data position M).

[5] n_2: Max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

[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.

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180 to SH 280 – Forced ventilation

■ **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 motor
n_{rated}	n_{max1}[2]	n_{max2}[3]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	kW (HP)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Order No.
Shaft height 180 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module							
400	5000	7500	3700	16.3 (21.9)	389 (287)	389 (287)	1PH8184-1■B■■-■■■1
700	5000	7500	4300	27 (36.2)	368 (271)	368 (271)	1PH8184-1■C■■-■■■1
1000	5000	7500	5100	39 (52.3)	372 (274)	372 (274)	1PH8184-1■D■■-■■■1
1500	5000	7500	5600	51 (68.4)	325 (240)	325 (240)	1PH8184-1■F■■-■■■1
2500	5000	7500	5100	78 (105)	298 (220)	298 (220)	1PH8184-1■L■■-■■■1
400	5000	7500	4100	21.2 (28.4)	506 (373)	506 (373)	1PH8186-1■B■■-■■■1
700	5000	7500	4700	35 (46.9)	478 (353)	478 (353)	1PH8186-1■C■■-■■■1
1000	5000	7500	5400	51 (68.4)	487 (359)	487 (359)	1PH8186-1■D■■-■■■1
1500	5000	7500	5400	74 (99.2)	471 (347)	471 (347)	1PH8186-1■F■■-■■■1
2500	5000	7500	5000	106 (142)	405 (299)	405 (299)	1PH8186-1■L■■-■■■1
Shaft height 225 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module							
400	4500	6000	3100	30.4 (40.8)	726 (535)	726 (535)	1PH8224-1■B■■-■■■1
700	4500	6000	3900	55 (73.8)	750 (553)	750 (553)	1PH8224-1■C■■-■■■1
1000	4500	6000	4400	71 (95.2)	678 (500)	678 (500)	1PH8224-1■D■■-■■■1
1500	4500	6000	4400	95 (127)	605 (446)	605 (446)	1PH8224-1■F■■-■■■1
2500	4500	6000	3400	142 (190)	542 (400)	542 (400)	1PH8224-1■L■■-■■■1
400	4500	6000	3500	39.2 (52.6)	936 (690)	936 (690)	1PH8226-1■B■■-■■■1
700	4500	6000	4300	68 (91.2)	928 (684)	928 (684)	1PH8226-1■C■■-■■■1
1000	4500	6000	5800	92 (123)	879 (648)	879 (648)	1PH8226-1■D■■-■■■1
1500	4500	6000	3500	130 (174)	828 (611)	828 (611)	1PH8226-1■F■■-■■■1
2500	4500	6000	3500	168 (225)	642 (474)	642 (474)	1PH8226-1■L■■-■■■1
400	4500	6000	3600	48 (64.4)	1146 (845)	1146 (845)	1PH8228-1■B■■-■■■1
700	4500	6000	4300	82 (110)	1119 (825)	1119 (825)	1PH8228-1■C■■-■■■1
1000	4500	6000	4200	113 (151)	1079 (796)	1079 (796)	1PH8228-1■D■■-■■■1
1500	4500	6000	4200	160 (215)	1019 (752)	1019 (752)	1PH8228-1■F■■-■■■1
2500	4500	6000	3400	205 (275)	783 (578)	783 (578)	1PH8228-1■L■■-■■■1
Shaft height 280 – Forced ventilation – Line voltage 400 V 3 AC, operation on Active Line Module							
400	3300	–	2100	63 (84.5)	1504 (1109)	1504 (1109)	1PH8284-1■B■■-■■■1
700	3300	–	3000	110 (147)	1501 (1107)	1501 (1107)	1PH8284-1■C■■-■■■1
1000	3300	–	3300	150 (201)	1433 (1057)	1433 (1057)	1PH8284-1■D■■-■■■1
1500	3300	–	3100	196 (263)	1248 (921)	1248 (921)	1PH8284-1■F■■-■■■1
400	3300	–	2100	80 (107)	1910 (1409)	1910 (1409)	1PH8286-1■B■■-■■■1
700	3300	–	3000	138 (185)	1883 (1389)	1883 (1389)	1PH8286-1■C■■-■■■1
1000	3300	–	3300	182 (244)	1738 (1282)	1738 (1282)	1PH8286-1■D■■-■■■1
1500	3300	–	2700	250 (335)	1592 (1174)	1592 (1174)	1PH8286-1■F■■-■■■1
400	3300	–	2100	103 (138)	2459 (1814)	2459 (1814)	1PH8288-1■B■■-■■■1
700	3300	–	3100	166 (223)	2265 (1671)	2268 (1673)	1PH8288-1■C■■-■■■1
1000	3300	–	3300	226 (303)	2158 (1592)	2158 (1592)	1PH8288-1■D■■-■■■1

For versions, see Order No. supplement and options.

The values in the selection and ordering data, particularly for the constant power range with speed n_2, apply when using an Active Line Module with 400 V 3 AC.
When using a Smart Line Module, proceed according to 1PH8 Motors Configuration Manual.

[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 B to D).
[3] Bearing version for Performance (14th data position L).
[4] n_2: Max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180 to SH 280 – Forced ventilation

Motor type (repeated)	Efficiency	Moment of inertia	Weight, approx.	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[5]	For additional 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	Order No.
1PH8184-1.B...	83.4	0.489 (4.33)	350 (772)	49	49	1XB7322	60	**6SL312■-1 TE26-0AA3**
1PH8184-1.C...	88.9	0.489 (4.33)	350 (772)	65	65	1XB7322	85	**6SL312■-1 TE28-5AA3**
1PH8184-1.D...	92.0	0.489 (4.33)	350 (772)	87	87	1XB7322	85[6]	**6SL312■-1 TE28-5AA3**
1PH8184-1.F...	94.0	0.489 (4.33)	350 (772)	116	116	1XB7322	132	**6SL312■-1 TE31-3AA3**
1PH8184-1.L...	95.2	0.489 (4.33)	350 (772)	166	166	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8186-1.B...	85.0	0.652 (5.77)	422 (931)	65	65	1XB7322	85	**6SL312■-1 TE28-5AA3**
1PH8186-1.C...	90.9	0.652 (5.77)	422 (931)	83	83	1XB7322	85	**6SL312■-1 TE28-5AA3**
1PH8186-1.D...	92.6	0.652 (5.77)	422 (931)	112	112	1XB7322	132	**6SL312■-1 TE31-3AA3**
1PH8186-1.F...	94.5	0.652 (5.77)	422 (931)	166	166	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8186-1.L...	95.5	0.652 (5.77)	422 (931)	230	230	1XB7422	260	**6SL312■-1 TE32-6AA3**
1PH8224-1.B...	87.2	1.48 (13.1)	610 (1345)	86	86	1XB7322	85[6]	**6SL312■-1 TE28-5AA3**
1PH8224-1.C...	92.5	1.48 (13.1)	610 (1345)	136	136	1XB7322	132[6]	**6SL312■-1 TE31-3AA3**
1PH8224-1.D...	94.2	1.48 (13.1)	610 (1345)	158	158	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8224-1.F...	95.3	1.48 (13.1)	610 (1345)	200	200	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8224-1.L...	95.8	1.48 (13.1)	610 (1345)	295	295	1XB7700	310	**6SL332■-1 TE33-1AA3**
1PH8226-1.B...	88.7	1.93 (17.1)	740 (1632)	112	112	1XB7322	132	**6SL312■-1 TE31-3AA3**
1PH8226-1.C...	93.2	1.93 (17.1)	740 (1632)	162	162	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8226-1.D...	94.4	1.93 (17.1)	740 (1632)	194	194	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8226-1.F...	95.7	1.93 (17.1)	740 (1632)	270	270	1XB7422	310	**6SL332■-1 TE33-1AA3**
1PH8226-1.L...	96.1	1.93 (17.1)	740 (1632)	350	350	1XB7700	380	**6SL332■-1 TE33-8AA3**
1PH8228-1.B...	89.6	2.33 (20.6)	870 (1918)	132	132	1XB7322	132	**6SL312■-1 TE31-3AA3**
1PH8228-1.C...	93.3	2.33 (20.6)	870 (1918)	188	188	1XB7322	200	**6SL312■-1 TE32-0AA3**
1PH8228-1.D...	94.8	2.33 (20.6)	870 (1918)	235	235	1XB7422	260	**6SL312■-1 TE32-6AA3**
1PH8228-1.F...	95.9	2.33 (20.6)	870 (1918)	340	340	1XB7700	380	**6SL332■-1 TE33-8AA3**
1PH8228-1.L...	96.3	2.33 (20.6)	870 (1918)	420	420	1XB7700	490	**6SL332■-1 TE35-0AA3**
1PH8284-1.B...	92.4	4.20 (37.2)	1200 (2646)	154	154	1XB7700	200	**6SL312■-1 TE32-0AA3**
1PH8284-1.C...	94.7	4.20 (37.2)	1200 (2646)	240	240	1XB7700	260	**6SL332■-1 TE32-6AA3**
1PH8284-1.D...	95.8	4.20 (37.2)	1200 (2646)	315	315	1XB7700	310[6]	**6SL332■-1 TE33-1AA3**
1PH8284-1.F...	96.3	4.20 (37.2)	1200 (2646)	390	390	1XB7700	490	**6SL332■-1 TE35-0AA3**
1PH8286-1.B...	92.8	5.20 (46.0)	1400 (3087)	186	186	1XB7700	200	**6SL312■-1 TE32-0AA3**
1PH8286-1.C...	94.9	5.20 (46.0)	1400 (3087)	295	295	1XB7700	310	**6SL332■-1 TE33-1AA3**
1PH8286-1.D...	96.0	5.20 (46.0)	1400 (3087)	410	410	1XB7700	490	**6SL332■-1 TE35-0AA3**
1PH8286-1.F...	96.5	5.20 (46.0)	1400 (3087)	490	490	1XB7700	490	**6SL332■-1 TE35-0AA3**
1PH8288-1.B...	93.1	6.30 (55.8)	1650 (3638)	245	245	1XB7700	260	**6SL332■-1 TE32-6AA3**
1PH8288-1.C...	95.3	6.30 (55.8)	1650 (3638)	365	365	1XB7700	380	**6SL332■-1 TE33-8AA3**
1PH8288-1.D...	96.2	6.30 (55.8)	1650 (3638)	495	495	1XB7700	490[6]	**6SL332■-1 TE35-0AA3**

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.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 80 to SH 160 – Water cooling

■ **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 motor
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)	Order No.
Shaft height 80 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	10000	12000	–	4850	3.5 (4.69)	22 (16.2)	23 (17.0)	1PH8083-1■ F2 ■-■■■1
2000	10000	15000	16000	9150	4.3 (5.77)	21 (15.5)	23 (17.0)	1PH8083-1■ G2 ■-■■■1
4500	10000	15000	20000	18950	6.7 (8.98)	14 (10.3)	23 (17.0)	1PH8083-1■ N2 ■-■■■1
1500	10000	15000	–	7700	4.6 (6.17)	29 (21.4)	34 (25.1)	1PH8087-1■ F2 ■-■■■1
2000	10000	15000	19000	10000	6.1 (8.18)	29 (21.4)	34 (25.1)	1PH8087-1■ G2 ■-■■■1
4500	10000	15000	20000	20000	8.5 (11.4)	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								
1500	9000	–	–	4200	5 (6.71)	32 (23.6)	34 (25.1)	1PH8101-1■ F2 ■-■■■1
2000	9000	12000	–	6800	6.4 (8.58)	31 (22.9)	34 (25.1)	1PH8101-1■ G2 ■-■■■1
1500	9000	–	–	6400	7.1 (9.52)	45 (33.2)	48 (35.4)	1PH8103-1■ F2 ■-■■■1
2000	9000	12000	–	5300	9.5 (12.7)	45 (33.2)	48 (35.4)	1PH8103-1■ G2 ■-■■■1
3000	9000	12000	18000	14600	10.6 (14.2)	34 (25.1)	46 (33.9)	1PH8103-1■ M2 ■-■■■1
1500	9000	–	–	5000	11 (14.8)	70 (51.6)	74 (54.6)	1PH8105-1■ F2 ■-■■■1
2000	9000	12000	–	6750	13 (17.4)	62 (45.7)	74 (54.6)	1PH8105-1■ G2 ■-■■■1
3000	9000	12000	18000	11700	16.8 (22.5)	53 (39.1)	71 (52.4)	1PH8105-1■ M2 ■-■■■1
1500	9000	12000	–	6400	14 (18.8)	89 (65.6)	94 (69.3)	1PH8107-1■ F2 ■-■■■1
3000	9000	12000	18000	18050	18 (24.1)	57 (42.0)	82 (60.5)	1PH8107-1■ M2 ■-■■■1
Shaft height 132 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	8000	10000	11000	3200	15 (20.1)	96 (70.8)	96 (70.8)	1PH8131-1■ F2 ■-■■■1
2000	8000	10000	14000	5500	18 (24.1)	86 (63.4)	101 (74.5)	1PH8131-1■ G2 ■-■■■1
1500	8000	10000	13000	4500	17 (22.8)	108 (79.7)	136 (100)	1PH8133-1■ F2 ■-■■■1
2000	8000	10000	15000	7000	22 (29.5)	105 (77.4)	134 (98.8)	1PH8133-1■ G2 ■-■■■1
1500	8000	10000	14000	5250	22 (29.5)	140 (103)	172 (127)	1PH8135-1■ F2 ■-■■■1
2000	8000	10000	15000	5250	29 (38.9)	138 (102)	170 (125)	1PH8135-1■ G2 ■-■■■1
1500	8000	10000	15000	6500	27 (36.2)	172 (127)	202 (149)	1PH8137-1■ F2 ■-■■■1
1500	8000	10000	15000	7000	30 (40.2)	191 (141)	223 (164)	1PH8138-1■ F2 ■-■■■1
Shaft height 160 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module								
1500	6500	9000	10000	5000	37 (49.6)	236 (174)	288 (212)	1PH8163-1■ F2 ■-■■■1
2000	6500	9000	10000	5800	42 (56.3)	201 (148)	281 (207)	1PH8163-1■ G2 ■-■■■1
1500	6500	9000	10000	4150	46 (61.7)	293 (216)	334 (246)	1PH8165-1■ F2 ■-■■■1
2000	6500	9000	10000	3900	53 (71.1)	253 (187)	306 (226)	1PH8165-1■ G2 ■-■■■1
1500	6500	9000	10000	4050	52 (69.7)	331 (244)	353 (260)	1PH8166-1■ F2 ■-■■■1
2000	6500	9000	10000	4000	64 (85.8)	306 (226)	353 (260)	1PH8166-1■ G2 ■-■■■1

For versions, see Order No. supplement and options.

The values in the selection and ordering data, particularly for the constant power range with speed n_2, apply when using an Active Line Module with 400 V 3 AC.
When using a Smart Line Module, proceed according to 1PH8 Motors Configuration Manual.

8

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 additional 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	Order No.
1PH8083-1.F2...	78.4	0.0064 (0.06)	36 (79.4)	8.9	9	gk803	9	**6SL312■-■TE21-0AA3**
1PH8083-1.G2...	83.3			12.0	13	gk803	18	**6SL312■-■TE21-8AA3**
1PH8083-1.N2...	87.7			18.0	23	gk803	18	**6SL312■-■TE21-8AA3**
1PH8087-1.F2...	81.4	0.0089 (0.08)	44 (97.0)	13.7	15	gk803	18	**6SL312■-■TE21-8AA3**
1PH8087-1.G2...	84.3			17.5	19	gk803	18	**6SL312■-■TE21-8AA3**
1PH8087-1.N2...	89.1			24.0	31	gk803	30	**6SL312■-1 TE23-0AA3**
1PH8101-1.F2...	81.3	0.0138 (0.12)	51 (113)	12.8	13	gk823	18	**6SL312■-1TE21-8AA3**
1PH8101-1.G2...	85.7			16.8	18	gk803	18	**6SL312■-■TE21-8AA3**
1PH8103-1.F2...	82.7	0.0172 (0.15)	60 (132)	19.7	20	gk823	30	**6SL312■-1 TE23-0AA3**
1PH8103-1.G2...	85.7			23.8	24	gk823	30	**6SL312■-1 TE23-0AA3**
1PH8103-1.M2...	90.0			30	35	gk823	30	**6SL312■-1 TE23-0AA3**
1PH8105-1.F2...	84.3	0.0252 (0.22)	74 (163)	28.5	29	gk823	30	**6SL312■-1 TE23-0AA3**
1PH8105-1.G2...	87.9			34.5	38	gk823	45	**6SL312■-1 TE24-5AA3**
1PH8105-1.M2...	90.0			45	52	gk823	45	**6SL312■-1 TE24-5AA3**
1PH8107-1.F2...	82.9	0.0289 (0.26)	83 (183)	43.7	44	gk823	45	**6SL312■-1 TE24-5AA3**
1PH8107-1.M2...	90.0			60	73	gk823	60	**6SL312■-1 TE26-0AA3**
1PH8131-1.F2...	88.3	0.059 (0.52)	105 (232)	30	30	gk843	30	**6SL312■-1 TE23-0AA3**
1PH8131-1.G2...	90.8			40	44	gk843	45	**6SL312■-1 TE24-5AA3**
1PH8133-1.F2...	89.7	0.076 (0.67)	123 (271)	38	45	gk843	45	**6SL312■-1 TE24-5AA3**
1PH8133-1.G2...	90.9			52	61	gk843	60	**6SL312■-1 TE26-0AA3**
1PH8135-1.F2...	90.1	0.094 (0.83)	141 (311)	51	58	gk843	60	**6SL312■-1 TE26-0AA3**
1PH8135-1.G2...	92.4			64	73	gk843	85	**6SL312■-1 TE28-5AA3**
1PH8137-1.F2...	90.0	0.109 (0.96)	157 (346)	67	73	gk843	85	**6SL312■-1 TE28-5AA3**
1PH8138-1.F2...	88.2	0.109 (0.96)	160 (353)	80	88	gk843	85	**6SL312■-1 TE28-5AA3**
1PH8163-1.F2...	91.6	0.216 (1.91)	229 (505)	84	96	gk873	85	**6SL312■-1 TE28-5AA3**
1PH8163-1.G2...	93.7	0.216 (1.91)	229 (505)	93	120	gk873	132	**6SL312■-1 TE31-3AA3**
1PH8165-1.F2...	93.0	0.232 (2.05)	264 (582)	104	112	gk873	132	**6SL312■-1 TE31-3AA3**
1PH8165-1.G2...	93.8	0.232 (2.05)	264 (582)	110	135	gk873	132	**6SL312■-1 TE31-3AA3**
1PH8166-1.F2...	93.6	0.232 (2.05)	269 (593)	116	127	gk873	132	**6SL312■-1 TE31-3AA3**
1PH8166-1.G2...	93.7	0.232 (2.05)	269 (593)	125	147	gk873	132	**6SL312■-1 TE31-3AA3**

Cooling:
Internal air cooling	0
External air cooling	1

Motor Module:
Single Motor Module	1
Double Motor Module	2

8

---

[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 B to D).

[3] Bearing version for Performance (14th data position L).

[4] Bearing version for High Performance (14th data position M).

[5] n_2: Max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.

[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.

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180 to SH 280 – Water cooling

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 motor
n_{rated}	n_{max1}[2]	n_{max2}[3]	n_2	P_{rated}	M_{rated}	M_0	
rpm	rpm	rpm	rpm	kW (HP)	Nm (lb$_f$-ft)	Nm (lb$_f$-ft)	Order No.
Shaft height 180 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module							
400	5000	7500	2500	17 (22.8)	406 (299)	406 (299)	1PH8184-1■ B2■-■■■1
700	5000	7500	3300	33 (44.3)	450 (332)	450 (332)	1PH8184-1■ C2■-■■■1
1000	5000	7500	5500	47 (63)	449 (331)	449 (331)	1PH8184-1■ D2■-■■■1
1500	5000	7500	5000	70 (93.9)	446 (329)	446 (329)	1PH8184-1■ F2■-■■■1
2500	5000	7500	5700	95 (127)	363 (268)	363 (268)	1PH8184-1■ L2■-■■■1
400	5000	7500	2900	23 (30.8)	549 (405)	549 (405)	1PH8186-1■ B2■-■■■1
700	5000	7500	3900	43 (57.7)	587 (433)	587 (433)	1PH8186-1■ C2■-■■■1
1000	5000	7500	6000	64 (85.8)	611 (451)	611 (451)	1PH8186-1■ D2■-■■■1
1500	5000	7500	6000	93 (125)	592 (437)	592 (437)	1PH8186-1■ F2■-■■■1
2500	5000	7500	5700	120 (161)	458 (338)	458 (338)	1PH8186-1■ L2■-■■■1
Shaft height 225 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module							
400	4500	6000	1750	36 (48.3)	860 (634)	860 (634)	1PH8224-1■ B2■-■■■1
700	4500	6000	2500	61 (81.8)	832 (614)	832 (614)	1PH8224-1■ C2■-■■■1
1000	4500	6000	3700	89 (119)	850 (627)	850 (627)	1PH8224-1■ D2■-■■■1
1500	4500	6000	4600	119 (160)	758 (559)	758 (559)	1PH8224-1■ F2■-■■■1
2500	4500	6000	4500	153 (205)	584 (431)	584 (431)	1PH8224-1■ L2■-■■■1
400	4500	6000	2000	47 (63)	1122 (828)	1122 (828)	1PH8226-1■ B2■-■■■1
700	4500	6000	2700	81 (109)	1105 (815)	1105 (815)	1PH8226-1■ C2■-■■■1
1000	4500	6000	3500	115 (154)	1098 (810)	1098 (810)	1PH8226-1■ D2■-■■■1
1500	4500	6000	4500	145 (194)	923 (681)	923 (681)	1PH8226-1■ F2■-■■■1
2500	4500	6000	4500	185 (248)	707 (521)	707 (521)	1PH8226-1■ L2■-■■■1
400	4500	6000	2100	58 (77.8)	1385 (1022)	1385 (1022)	1PH8228-1■ B2■-■■■1
700	4500	6000	2850	96 (129)	1310 (966)	1310 (966)	1PH8228-1■ C2■-■■■1
1000	4500	6000	2350	141 (189)	1347 (994)	1347 (994)	1PH8228-1■ D2■-■■■1
1500	4500	6000	4500	192 (257)	1222 (901)	1222 (901)	1PH8228-1■ F2■-■■■1
2500	4500	6000	4500	226 (303)	863 (637)	863 (637)	1PH8228-1■ L2■-■■■1
Shaft height 280 – Water cooling – Line voltage 400 V 3 AC, operation on Active Line Module							
400	3300	–	3100	71 (95.2)	1695 (1250)	1695 (1250)	1PH8284-1■ B2■-■■■1
700	3300	–	3100	123 (165)	1678 (1238)	1678 (1238)	1PH8284-1■ C2■-■■■1
1000	3300	–	2800	172 (231)	1643 (1212)	1643 (1212)	1PH8284-1■ D2■-■■■1
1500	3300	–	2700	227 (304)	1445 (1066)	1445 (1066)	1PH8284-1■ F2■-■■■1
400	3300	–	3300	89 (119)	2125 (1567)	2125 (1567)	1PH8286-1■ B2■-■■■1
700	3300	–	3100	153 (205)	2087 (1539)	2087 (1539)	1PH8286-1■ C2■-■■■1
1000	3300	–	2800	214 (287)	2044 (1508)	2044 (1508)	1PH8286-1■ D2■-■■■1
400	3300	–	3300	109 (146)	2602 (1919)	2602 (1919)	1PH8288-1■ B2■-■■■1
700	3300	–	3100	188 (252)	2565 (1892)	2565 (1892)	1PH8288-1■ C2■-■■■1

For versions, see Order No. supplement and options.

The values in the selection and ordering data, particularly for the constant power range with speed n_2, apply when using an Active Line Module with 380 V 3 AC.
When using a Smart Line Module, proceed according to 1PH8 Motors Configuration Manual.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
SH 180 to SH 280 – Water cooling

Motor type (repeated)	Efficiency	Moment of inertia	Weight, approx.	Rated current	Stall current	Terminal box	SINAMICS S120 Motor Module	
							Rated output current[5]	For additional 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	Order No.
1PH8184-1.B2...	83.1	0.489 (4.33)	340 (750)	50	50	1XB7322-P05	60	6SL312■-1TE26-0AA3
1PH8184-1.C2...	87.2			77	77	1XB7322-P05	85	6SL312■-1TE28-5AA3
1PH8184-1.D2...	90.4			114	114	1XB7322-P05	132	6SL312■-1TE31-3AA3
1PH8184-1.F2...	92.8			150	150	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8184-1.L2...	94.5			196	196	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8186-1.B2...	84.5	0.652 (5.77)	410 (904)	68	68	1XB7322-P05	85	6SL312■-1TE28-5AA3
1PH8186-1.C2...	89.8			97	97	1XB7322-P05	132	6SL312■-1TE31-3AA3
1PH8186-1.D2...	92.0			148	148	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8186-1.F2...	93.5			198	198	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8186-1.L2...	94.8			250	250	1XB7422-P06	260	6SL3320-1TE32-6AA3
1PH8224-1.B2...	85.8	1.45 (12.83)	610 (1345)	100	100	1XB7322-P05	132	6SL312■-1TE31-3AA3
1PH8224-1.C2...	91.4			128	128	1XB7322-P05	132	6SL312■-1TE31-3AA3
1PH8224-1.D2...	93.7			188	188	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8224-1.F2...	95.1			240	240	1XB7422-P06	260	6SL3320-1TE32-6AA3
1PH8224-1.L2...	96.1			310	310	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8226-1.B2...	87.5	1.90 (16.82)	740 (1632)	130	130	1XB7322-P05	132	6SL312■-1TE31-3AA3
1PH8226-1.C2...	92.8			184	184	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8226-1.D2...	93.8			235	235	1XB7422-P06	260	6SL3320-1TE32-6AA3
1PH8226-1.F2...	95.7			295	295	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8226-1.L2...	96.3			380	380	1XB7700-P02	380	6SL3320-1TE33-8AA3
1PH8228-1.B2...	88.6	2.35 (20.8)	870 (1918)	154	154	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8228-1.C2...	93.0			210	210	1XB7322-P05	210	6SL3320-1TE32-1AA3
1PH8228-1.D2...	94.3			280	280	1XB7700-P02	310	6SL3320-1TE33-1AA3
1PH8228-1.F2...	95.9			390	390	1XB7700-P02	380[6]	6SL3320-1TE33-8AA3
1PH8228-1.L2...	96.4			455	455	1XB7700-P02	490	6SL3320-1TE35-0AA3
1PH8284-1.B2...	91.4	4.21 (37.3)	1280 (2822)	170	170	1XB7322-P05	200	6SL312■-1TE32-0AA3
1PH8284-1.C2...	94.5			260	260	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8284-1.D2...	95.7			350	350	1XB7700-P02	380	6SL3320-1TE33-8AA3
1PH8284-1.F2...	96.4			445	445	1XB7700-P02	490	6SL3320-1TE35-0AA3
1PH8286-1.B2...	91.6	5.16 (45.7)	1490 (3285)	210	210	1XB7322-P05	210	6SL3320-1TE32-1AA3
1PH8286-1.C2...	94.8			320	320	1XB7700-P02	380	6SL3320-1TE33-8AA3
1PH8286-1.D2...	96.0			460	460	1XB7700-P02	490	6SL3320-1TE35-0AA3
1PH8288-1.B2...	92.5	6.29 (55.7)	1750 (3859)	260	260	1XB7700-P02	260	6SL3320-1TE32-6AA3
1PH8288-1.C2...	95.2			400	400	1XB7700-P02	490	6SL3320-1TE35-0AA3

8

Format:	
Booksize	1
Chassis	3

Cooling:	
Internal air cooling	0
External air cooling	1

Motor Module:	
Single Motor Module	1

[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 B to D).
[3] Bearing version for Performance (14th data position L).
[4] n_2: Max. permissible thermal speed at constant output or speed, which is at the voltage limit when $P = P_{rated}$.
[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.

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
Forced ventilation/Water cooling

■ **Order No. supplement for shaft heights 80/100/132/160**

Data position of the Order 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 IN512S/R)[2]	**T**
Incremental encoder sin/cos 1 V_{pp} 256 S/R without C and D tracks (encoder IIN256S/R)[3]	**L**
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[8]

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 (resolution 524288, internal 256 S/R)[3] without commutation position (encoder IN19DQ)	**V**
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 with SH 160 and 14th data position L or M)	**2**
IM B35 (IM V15, IM V35) (only possible for 1PH810/1PH813/1PH816)	**3**

Shaft extension DE	**Balancing**	
Plain shaft	–	**0**
Fitted key (not possible with 14th data position M)	Full-key	**1**
Fitted key (not possible with 14th data position 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	R/A	R	**B**
Standard	S/A	R	**C**
Standard	SR/A	R	**D**
Performance[5][6]	SPECIAL/B	SPECIAL	**L**
High Performance[6][7]	SPECIAL/B	SPECIAL	**M**
Advanced Lifetime[9]	S/A	R	**Q**

Power connection (view of DE)	**Cable entry**	**Signal connection**	
Terminal box top	Right	DE	**A**
Terminal box top	Left	DE	**B**
Terminal box top	NDE	Left	**C**
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 are required for options)   **Z**

[1] Limited to n_{max} = 12000 rpm.

[2] Limited to n_{max} = 15000 rpm.

[3] Only possible with 14th data position L or M and 9th data position L or V.

[4] For definition of 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] With 1PH816 not possible with 12th data position 2 (IM B5 type of construction).

[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 with 10th data position S (star delta circuit).

[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] For 1PH810, power connector is only possible up to a maximum stall current of I_0 = 36 A.
For 1PH813, power connector is only possible up to a maximum stall current of I_0= 85 A. Power connector not possible for 1PH816.

8

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
Forced ventilation/Water cooling

■ Order No. supplement for shaft heights 180/225/280

Data position of the Order 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	■	.	■	■	–	■	■	■	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 A450 flange (IM V3)[1]	• IM B5 with A550 flange (IM V3)[2]	• IM B5 with A660 flange (IM V3)[3][4]	**2**
• IM B35 with A450 flange (IM V35)	• IM B35 with A550 flange (IM V35)	• IM B35 with A660 flange (IM V35)	**3**
• IM V15 with A450 flange	• IM V15 with A550 flange	• IM V15 with A660 flange[4]	**5**

Shaft extension DE	Balancing	
Plain shaft	–	**0**
Fitted key	Full-key	**1**
Fitted 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	A	N	**E**
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 (view of 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 are required for options)	**Z**

8

---

[1] Limited to n_{max} = 3000 rpm. Not possible with 14th data position L (Performance bearing).

[2] Limited to n_{max} = 2500 rpm. Not possible with 14th data position L (Performance bearing).

[3] Limited to n_{max} = 2000 rpm. Not possible with 14th data position L (Performance bearing).

[4] Only possible with 14th data position B (Standard bearing).

[5] For definition of vibration severity according to Siemens see 1PH8 Motors Configuration Manual.

[6] For 1PH818 limited to n_{max} = 7500 rpm. Not possible with 12th data position 2 (IM B5 type of construction).
For 1PH822 limited to n_{max} = 6000 rpm. Not possible with 12th data position 2 (IM B5 type of construction).

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
Forced ventilation

■ Order No. supplement for shaft height 280

Data position of the Order No.									8	9	10	11	12		13	14	15	16	
Shaft height 280 (Only forced ventilation)	**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**										11					
Forced ventilation	IP55										**1**					

Type of construction		12
IM B3 (IM V6)		**0**
IM V5[1]		**1**
IM B35 with A660 flange (IM V35)		**3**
IM V15 with A660 flange[1]		**5**

Shaft extension DE	**Balancing**	13
Plain shaft	–	**0**
Fitted key	Full-key	**1**
Fitted key	Half-key	**2**

Bearing version	**Vibration severity acc. to Siemens[2]/EN 60034-14**	**Shaft and flange accuracy**	14
Standard	R/A	R	**B**
Increased radial forces	A	N	**E**
Increased radial forces	R/A	R	**F**

Power connection (view of DE)	**Cable entry**	**Signal connection**	**External fan NDE** Air inlet from NDE, air-flow direction NDE → DE		15		16
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**		**Z**
			Left[3]	(order code **G00** required)	**X**	**–**	**Z**
			Right[3]	(order code **G02** required)	**X**	**–**	**Z**

Version status		1
		1

Special version (order codes are required for options)	Z
	Z

---

[1] Only possible with 14th data position B (Standard bearing).
[2] For definition of vibration severity according to Siemens see 1PH8 Motors Configuration Manual.
[3] Only possible with 12th data position 0 (IM B3 type of construction) and 1 (IM V5 type of construction).
[4] Only possible for assignment with terminal box 1XB7712-P...

8

■ **Options**

Order code	Description of option When ordering a motor with options, **-Z** should be added to the order number. The order code should also be specified for each additional required option. Order codes must not be repeated in plain text in the order.	For use with SIMOTICS M motors		
		Shaft heights 80 to 160	Shaft heights 180 to 280	Shaft height 280 for forced ventilation only (11th data position 1)
A12	Additional PTC thermistor chain for alarm and tripping (<u>Only</u> possible for version with terminal box.)	✔	✔	✔
A25	Additional KTY84 temperature sensor as reserve connected to signal terminal strip (<u>Only</u> possible for version with terminal box.)	✔	Standard	Standard
G00	External fan NDE left (Possible if 15th data position is U, W or X.)	–	–	✔
G02	External fan NDE right (Possible if 15th data position is V, W or X.)	–	–	✔
G14	With air filter (<u>Only</u> possible if 10th data position is 1.)	✔ Only for SH 132 and SH 160	✔	✔
K08	Encoder connector mounted opposite (<u>Not</u> possible if 15th data position is X.)	–	✔	✔
K09	Terminal box or power connector NDE <u>right</u>	✔ Only for SH 100[1] to SH 160	–	–
	Terminal box NDE right, cable entry DE, signal connection <u>top</u> (Possible if 15th data position is A.)	–	✔	–
K10	Terminal box or power connector NDE <u>left</u>	✔ Only for SH 100[1] to SH 160	–	–
	Terminal box NDE left, cable entry DE, signal connection <u>top</u> (Possible if 15th data position is A.)	–	✔	–
K16	Second shaft extension (SH 280 $d \times l$: 95 mm × 170 mm (3.74 in × 6.69 in)) (Possible if 9th data position is A or G and 12th data position is 0 or 3.)	–	–	✔
K18	Radial shaft sealing ring DE[2]	✔	✔	–
K40	Regreasing system, DE and NDE	–	✔ Only for SH 180 and SH 225	Standard
K45	Anti-condensation heating 230 V AC	–	–	✔
K69	Pipe connection with pipe socket NDE <u>right</u> (Only possible with forced ventilation, <u>not</u> for G00 or G02.)	–	–	✔
K70	Pipe connection with pipe socket NDE <u>left</u> (Only possible with forced ventilation, <u>not</u> for G00 or G02.)	–	–	✔
K71	Pipe connection with pipe socket NDE <u>top</u> (Only possible with forced ventilation, <u>not</u> for G00 or G02.)	–	–	✔
K80	Axial pipe connection NDE (Only possible with forced ventilation.)	✔	✔ Only for SH 180 and SH 225	Options K69, K70, K71

✔	Option possible
–	Options not possible

8

[1] Not possible with 12th data position 2 (IM B5 type of construction)
[2] Only appropriate if oil spray or oil vapor is occasionally deposited on the sealing ring. Radial shaft sealing ring not possible if 14th data position is E, F or L

Asynchronous motors
Main spindle motors for SINAMICS S120

SIMOTICS M-1PH8 motors
Forced ventilation/Water cooling

■ **Options** (continued)

Order code	Description of option When ordering a motor with options, **-Z** should be added to the order number. The order code should also be specified for each additional required option. Order codes must not be repeated in plain text in the order.	For use with SIMOTICS M motors		
		Shaft heights 80 to 160	Shaft heights 180 to 280	Shaft height 280 for forced ventilation only (11th data position 1)
K83	Rotation of the terminal box by + 90° (Possible in combination with options K09 or K10 or if 15th position is U, V or W)	–	✔ 4)	✔
K84	Rotation of the terminal box by – 90° (Possible in combination with options K09 or K10 or if 15th position is U, V or W.)	–	✔ 4)	✔
K85	Rotation of the terminal box by + 180° (Possible in combination with options K09 or K10 or if 15th position is U, V or W.)	–	✔	✔
K90	Version with flange size A400 (Possible if 12th data position is 2, 3 or 5.)	–	✔ Only for SH 180	–
L00	Replace terminal box (standard) with the next largest terminal box (Note dimension implications in CAD CREATOR).	–	✔	✔
L27	NDE bearing in insulated version	–	✔ Only for SH 180	Standard
L74	Fan version in IP65 degree of protection[3]	✔	–	–
M83	Additional back-off thread on motor feet (Only possible if 12th data position is 0 or 3.)	–	–	✔
P00	Undrilled cable entry plate	–	✔	✔ Not for 1XB7820-P00
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
V90	1PH7-compatible shaft extension (d × l: 42 mm x 110 mm (1.65 in × 4.33 in)) (Note reduced radial forces!)	✔ Only for SH 132	–	–
V92	1PH7184-/1PL6184-compatible shaft extension (d × l: 60 mm x 140 mm (2.36 in × 5.51 in))	–	✔ Only for 1PH8184	–
	Paint finish (anthracite RAL 7016)	Standard	Standard	Standard
X01	Paint finish in RAL 9005 (jet black)	✔	✔	✔
X02	Paint finish in RAL 9001 (cream)	✔	✔	✔
X03	Paint finish in RAL 6011 (reseda green)	✔	✔	✔
X04	Paint finish in RAL 7032 (pebble gray)	✔	✔	✔
X05	Paint finish in RAL 5015 (sky blue)	✔	✔	✔
X06	Paint finish in RAL 1015 (light ivory)	✔	✔	✔
X08	Paint finish in RAL 9006 (white aluminum)	✔	✔	✔
K24	Primer	✔ Pale green	✔ Red brown	✔ Red brown
K23	Special paint finish worldwide (anthracite RAL 7016)	✔	✔	✔
K23 + X..	Special finish worldwide in another color (X01 to X08)	✔	✔	✔
Y64	Hollow shaft prepared for bearingless rotary unions with flange diameter 114 H6	✔	–	–
Y84	Customer specifications on rating plate (max. 30 characters)	✔	✔	✔

✔	Option possible
–	Options not possible

[3] Regardless of the degree of protection, at high levels of atmospheric pollution, the fan must be cleaned.
[4] Not possible for 1PH822 and terminal box 1XB7712-P03

8

■ **Terminal box assignment, max. connectable conductor cross-sections**

Terminal box type (See selection and ordering data for assignment)	Cable entry Power	External signals	Max. outer cable diameter 3) mm (in)	Number of main terminals		Max. cross-section per terminal mm²	Max. rated current[4] A
gk803	1 × M25 × 1.5	1 × M16 × 1.5[1]	20 (0.79)	Phases:	3 × M5	1 × 10	52
				Grounding:	2 × M5		
gk813	1 × M32 × 1.5	1 × M16 × 1.5[1]	24.2 (0.95)	Phases:	3 × M5	1 × 16	70
				Grounding:	2 × M5		
gk823	1 × M32 × 1.5	1 × M16 × 1.5[1]	24.2 (0.95)	Phases:	3 × M5	1 × 16	70
				Grounding:	2 × M5		
gk826	1 × M32 × 1.5	1 × M16 × 1.5[1]	24.2 (0.95)	Phases:	6 × M5	1 × 10	52
				Grounding:	2 × M5		
gk833	1 × M40 × 1.5	1 × M16 × 1.5[1]	32 (1.26)	Phases:	3 × M6	1 × 35	110
				Grounding:	2 × M6		
gk843	1 × M50 × 1.5	1 × M16 × 1.5[1]	38 (1.50)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk846	1 × M50 × 1.5	1 × M16 × 1.5[1]	38 (1.50)	Phases:	6 × M6	1 × 25	88
				Grounding:	2 × M6		
gk863	1 × M50 × 1.5	1 × M16 × 1.5[1]	38 (1.50)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
gk873	1 × M63 × 1.5	1 × M16 × 1.5[1]	42.6 (1.68)	Phases:	3 × M6	1 × 50	133
				Grounding:	2 × M6		
1XB7322-P05	2 × M50 × 1.5	1 × M16 × 1.5[2]	38 (1.50)	Phases:	3 × M12	2 × 50	210
				Grounding:	4 × M6		
1XB7422-P06	2 × M63 × 1.5	1 × M16 × 1.5[2]	53 (2.09)	Phases:	3 × M12	2 × 70	270
				Grounding:	4 × M8		
1XB7700-P02	3 × M75 × 1.5	1 × M16 × 1.5[2]	68 (2.68)	Phases:	3 × 2 × M12	3 × 150	700
				Grounding:	3 × 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 x M63 x 1.5

For terminal box type **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

For options **K09** and **K10**, instead of terminal box **gk863**, terminal box **gk873** is used mounted on the side.

For options **K09** and **K10**, instead of terminal box **gk833**, terminal box **gk843** is used mounted on the side.

For options **K09** and **K10**, instead of terminal box **gk813**, terminal box **gk823** is used mounted on the side.

8

[1] Thread M16 × 1.5 arranged with 90° to signal connection; thread only for options A12, A25 and 9th data position A (without encoder).

[2] Thread M16 × 1.5 arranged opposite to the signal connection (lateral to the cable entry plate); thread only for option A12 and encoder version A (without encoder).

[3] Dependent on the design of the metric cable gland.

[4] Current-carrying capacity based on EN 60204-1/IEC 60364-5-52 with installation type E.

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 80 – Forced ventilation

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	h H	k LB	m BA	m1 –	m2 –	n AA	p HD	p1 –	s K	s3 –	w1 C
For motor		Dimensions in mm (inches)															
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 height	Type	DIN IEC	DE shaft extension					Version with hollow shaft	
			d D	l L	d6 –	t GA	u F	k LB	k1 –
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

8

■ **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 height	Type	DIN IEC	DE shaft extension						Version with hollow shaft	
			d **D**	l L	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

Variant with power connector size 1.5

Connector size 1 for connection of fan

G_PM21_EN_00042a

Hollow shaft

DE shaft extension

NDE shaft extension

G_PM21_EN_00173

SIMOTICS M-1PH8 motors
SH 100/SH 132 – Forced ventilation

■ **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	m1 –	m2 –	n AA	p HD	p1 –	p2 –	p3 –
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)								

							DE shaft extension					Version with hollow shaft				
Shaft height	Type	DIN IEC	s K	s3 –	s4 –	w1 C	d D	l L	d6 –	t GA	u F	k LB	k1 –	p HD	p3 –	s3 –
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)			

8

■ Dimensional drawings

1PH810

Variant with
power connector
size 1.5

Connector size 1 for
fan connection

G_PM21_EN_00044

1PH813

Variant with
power
connector
size 3

Connector size 1 for
fan connection

G_PM21_EN_00045

Version
with hollow
shaft

Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension

R_z25

$\angle$ 0.05 C
$\angle$ 0.002 C

45
(1.78)

38
(1.50)

17
(0.67)

$\varnothing 20^{H7}$
($\varnothing 0.79^{H7}$)

60°

R_z16

L

$\varnothing 11.5$
($\varnothing 0.45$)

1.5
(0.06)

$\diameter$ $\varnothing 0.04$ C
$\diameter$ $\varnothing 0.002$ C

M16x1.5-RH

C

D

G_PM21_EN_00174

10.5
(0.41)

2
(0.08)

1.5
(0.06)

$\angle$ 0.005 D
$\angle$ 0.0002 D

$\varnothing 18^{+0.007}_{-0.003}$
($\varnothing 0.71^{+0.0003}_{-0.0001}$)

60°

$R_z6.3$

SW 27

M16x1.5-LH

$\varnothing 18.5$
($\varnothing 0.73$)

18.5
(0.73)

$R_z6.3$

$\diameter$ $\varnothing 0.007$ D
$\diameter$ $\varnothing 0.0003$ D

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 100 – Forced ventilation

Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA	p HD	p₁ –
For motor		**DIN IEC**	**Dimensions in mm (inches)**																
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 height	Type	DIN IEC	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	d D	l L	d₆ –	i₂ E	t GA	u F	k LB	k₁ –	p HD	p₃ –	s₃ –
										DE shaft extension						**Version with hollow shaft**				
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)			

1PH810

Variant with power connector size 1.5

Connector size 1 for fan connection

G_PM21_EN_00045

■ 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 –
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)		

						DE shaft extension						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)		

1PH810

Variant with power connector size 1.5

Connector size 1 for fan connection

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 132 – Forced ventilation

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA	p HD	p₁ –
									Dimensions in mm (inches)									
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 height	Type	DIN IEC	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	DE shaft extension d D	l L	d₆ –	i₂ E	t GA	u F	Version with hollow shaft k LB	k₁ –	p HD	p₃ –	s₃ –
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)			

1PH813

G_PM21_XX_00007a

Variant with power connector size 3

Connector size 1 for fan connection

G_PM21_EN_00045

■ **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 –
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 height	Type	DIN IEC	s_2 –	s_3 –	s_4 –	DE shaft extension						Version with hollow shaft			
						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

Variant with power connector size 3

Connector size 1 for fan connection

G_PM21_XX_00076

G_PM21_EN_00045

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 160 – Forced ventilation

■ Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
								Dimensions in mm (inches)									
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	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ Cv	DE shaft extension					Version with hollow shaft			
												d D	d₆ –	l L	t GA	u F	k LB	k₁ –	p HD	s₃ –
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   NDE shaft extension

■ Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
1PH8, types 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	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	**DE shaft extension** d D	d₆ –	i₂ E	t GA	u F	**Version with hollow shaft** k LB	k₁ –	p HD	s₃ –
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

DE shaft extension

NDE shaft extension

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

■ **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)	

LE Air inlet
LA Air outlet

■ **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)	

LE Air inlet
LA Air outlet

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

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)		

LE   Air inlet
LA   Air outlet

Dimensional drawings

For motor																								
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						
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)	

LE Air inlet
LA Air outlet

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

Dimensional drawings

Shaft height	Type	IEC A	AB	AC	B	BB	C	D	DB	E	F	GA	H	HA	HC	K	L	M	N	P	S
For motor		Dimensions in mm (inches)																			
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)				

Shaft height	Type	IEC AD	AG	AS	BC	LL
Terminal box		Dimensions in mm (inches)				
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)	

LE Air inlet
LA Air outlet

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Forced ventilation

■ **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)	15 (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)		

LE Air inlet
LA Air outlet

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

■ 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)	

LE Air inlet
LA Air outlet

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

■ **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	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)	

LE Air inlet
LA Air outlet

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Forced ventilation

■ **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)	

8

LE   Air inlet
LA   Air outlet

G_PM21_EN_00133a

■ **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)	

8

LE Air inlet
LA Air outlet

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 280 – Forced ventilation

■ **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)	

LE Air inlet
LA Air outlet

■ **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)	

LE Air inlet
LA Air outlet

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 80 to SH 132 – Water cooling

Dimensional drawings

Shaft height	Type	DIN IEC	Dimensions in mm (inches)					Standard/ Advanced/ Performance	High performance/ hollow shaft encoder					
									without hollow shaft	with hollow shaft				
Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	h H	k LB	k LB	k LB	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	p$_1$ –	p$_2$ –	p$_3$ –	s K	s$_3$ –	DE shaft extension					
									w$_1$ C	**d D**	d$_6$ –	t GA	u F	l L
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													

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 80 to SH 132 – Water cooling

■ Dimensional drawings

1PH808

Variant with power connector size 1.5

Hollow shaft 1PH808

DE shaft extension   NDE shaft extension

1PH810

Variant with power connector size 1.5

1PH813

Variant with power connector size 3

Hollow shaft 1PH810 1PH813

DE shaft extension   NDE shaft extension

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 80 to SH 132 – Water cooling

■ Dimensional drawings

For motor			Dimensions in mm (inches)								Standard/ Advanced/ Performance	High Performance/ hollow shaft encoder	
												without hollow shaft	with hollow shaft
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	h H	l L	k LB	k LB	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)	80 (3.15)	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)	80 (3.15)	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)	110 (4.33)	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)

							DE shaft extension				
Shaft height	Type	DIN IEC	p HD	p_1 –	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										

8

Dimensional drawings

1PH808

Variant with power connector size 1.5

Hollow shaft 1PH808

DE shaft extension

NDE shaft extension

1PH810

Variant with power connector size 1.5

1PH813

Variant with power connector size 3

Hollow shaft 1PH810 1PH813

DE shaft extension

NDE shaft extension

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 100/SH 132 – Water cooling

■ **Dimensional drawings**

For motor			Dimensions in mm (inches)												Standard/ Advanced/ Perfor-mance	High Performance without hollow shaft	with hollow shaft	
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	l L	k LB	k LB	k LB	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)	80 (3.15)	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)	110 (4.33)	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 height	Type	DIN IEC	m_1 –	m_2 –	n AA	p HD	p_1 –	p_2 –	p_3 –	s K	s_2 –	s_3 –	w_1 C	DE shaft extension 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																	

8

■ **Dimensional drawings**

1PH810

Variant with power connector size 1.5

1PH813

Variant with power connector size 3

Hollow shaft
1PH810
1PH813

DE shaft extension

NDE shaft extension

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 160 – Water cooling

■ Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h H	k LB	m BA	m₁ –	m₂ –	n AA
						Dimensions in mm (inches)											
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	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	d D	d₆ –	l L	t GA	u F	k LB
												DE shaft extension					Version with hollow shaft
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

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	h Hv	k LB	m BA	m₁ –	m₂ –	n AA
								Dimensions in mm (inches)									
1PH8, types 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	p₁ –	p₂ –	p₃ –	s K	s₂ –	s₃ –	s₄ –	w₁ C	DE shaft extension d D	d₆ –	i₂ E	t GA	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

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 180 – Water cooling

■ **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	p₂ –	s K	w₁ 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)					

			DE shaft extension					Terminal box type											
								1XB7322				1XB7422				1XB7700			
Shaft height	Type	DIN IEC	d D	d₆ –	l E	t GA	u F	p HD	p₃ –	r LL	x₁ AG	p HD	p₃ –	r LL	x₁ AG	p HD	p₃ –	r LL	x₁ 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																		

■ Dimensional drawings

For motor			Dimensions in mm (inches)															
				D400	D450		D400	D450			D400	D450						
Shaft height	Type	DIN IEC	a B	a_1 P	A	b N	b_1		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)	

						DE shaft extension				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

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 225 – Water cooling

Dimensional drawings

Shaft height	Type	DIN IEC	a B	b A	c HA	f AB	g AC	h H	k LB	m BA	n AA	p₂ _	s K	w₁ 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)					

| | | | DE shaft extension | | | | | Terminal box type | | | | | | | | | |
| | | | | | | | | 1XB7322 | | | | 1XB7422 | | | | 1XB7700 | | | |
Shaft height	Type	DIN IEC	d D	d₆ –	l E	t GA	u F	p HD	p₃ _	r LL	x₁ AG	p HD	p₃ _	r LL	x₁ AG	p HD	p₃ _	r LL	x₁ 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

■ **Dimensional drawings**

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	g AC	h H	k LB	m BA	n AA	p₂ –	w₁ C
For motor		Dimensions in mm (inches)																
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 height	Type	DIN IEC	DE shaft extension					Terminal box type
			d D	d₆ –	l E	t GA	u F	Dimensions as for types of construction IM B3/IM V5
225	1PH8224		**75m6**	M20	140 (5.51)	79.5 (3.13)	20 (0.79)	
	1PH8226							
	1PH8228							

1PH822

8

Asynchronous motors
Dimensional drawings for SIMOTICS M-1PH8 motors

SIMOTICS M-1PH8 motors
SH 280 – Water cooling

Dimensional drawings

Shaft height	Type	DIN IEC	a / B	b / A	c / LA/HA	f / AB	g / AC	h / H	k / LB	m / BA	n / AA	p₂ / –	s / K	w₁ / C	d / D	d₆ / –	l / E	t / GA	u / F
															DE shaft extension				
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	p / HD	p₃ / –	r / LL	x₁ / AG	p / HD	p₃ / –	r / LL	x₁ / AG	p / HD	p₃ / –	r / LL	x₁ / AG	p / HD	p₃ / –	r / LL	x₁ / AG
			1XB7322				**1XB7422**				**1XB7700**				**1XB7712**			
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

Dimensional drawings

Shaft height	Type	DIN IEC	a B	a₁ P	b A	b₁ N	c HA	c₁ LA	e₁ M	f AB	f₁ T	g AC	h H	i₂ EB	k LB	m BA	n AA	p₂ –	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 height	Type	DIN IEC	m BA	n AA	s K	w₁ C	**d D**	d₆ –	l E	t GA	u F	Terminal box type Dimensions as for types of construction IM B3/IM V5
							DE shaft extension					
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

G_PM21_XX_00052

8
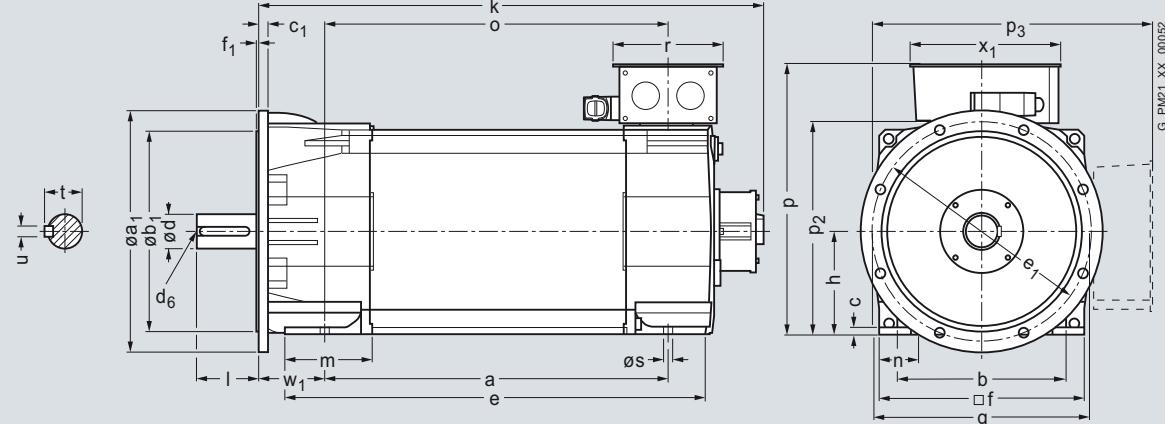
Asynchronous motors

Notes

8

Measuring systems

9

Measuring systems
Built-on optoelectronic rotary encoders

Absolute encoders with PROFINET IO

■ Function

Absolute encoders with PROFINET IO

In plants with a large number of encoders, encoders with PROFINET IO are more advantageous due to the reduced wiring overhead. The encoders with PROFINET IO are parameterizable, additionally have two ports and support the RT and IRT operating modes.

■ Technical specifications

Absolute encoders with PROFINET IO 6FX2001-5.N..	
Operating voltage U_p on encoder	10 ... 30 V DC
Current consumption, approx.	
• Single-turn	400 ... 130 mA (< 4 W)
• Multi-turn	400 ... 130 mA (< 4 W)
Interface	PROFINET IO with RT/IRT
Clock input	2 ports IRT
Data output	2 ports IRT
Short-circuit strength	Yes
Data transfer rate	100 Mbit/s
LED for diagnostics	Yes (green/red/yellow)
Max. speed	
• Electrical	
- At ± 1 bit accuracy	5800 rpm
• Mechanical	
- Single-turn	12000 rpm
- Multi-turn	6000 rpm
Cable length to downstream electronics, max.[1)]	100 m (328 ft)
Connection	2 × M12 plug connectors, 4-pole for PROFINET ports 1 × M12 plug connector, 4-pole for operating voltage
Resolution	
• Single-turn	13 bit (8192 steps)
• Multi-turn	27 bits (8192 steps × 16384 revolutions)
Frame	According to PNO encoder profile V4.1 Class 1, Class 2, Class 3, Class 4 Standard frames 81/82/83/84 Siemens frame 860

[1)] Observe the max. permissible cable length of the connected module.

■ Technical specifications (continued)

Absolute encoders with PROFINET IO 6FX2001-5.N..	
Code type	
• Sampling	Gray
• Transfer	Binary, PROFINET
Cycle time	1 ... 100 ms
Parameterization capability	
• Resolution per revolution	1 ... 8192
• Total resolution	1 ... 16384
• Preset	Yes
• Counting direction	Yes
• Speed signal	Yes
• Limit switches	No
• Isochronous mode	Yes
• Internode communication	No
Online parameterization	Yes
PNO certificate	Yes
Supported profiles	PNO encoder profile V4.1
Accuracy	± 79 arcsec with 8192 steps (± ½ LSB)
Friction torque (at 20 °C) (68 °F)	≤ 0.01 Nm (0.08 lb$_f$-in)
Starting torque (at 20 °C) (68 °F)	≤ 0.01 Nm (0.08 lb$_f$-in)
Shaft loading capacity	
• n > 6000 rpm	
- Axial	10 N (2.25 lb$_f$)
- Radial at shaft extension	20 N (4.50 lb$_f$)
• n ≤ 6000 rpm	
- Axial	40 N (8.99 lb$_f$)
- Radial at shaft extension	110 N (24.73 lb$_f$)
Angular acceleration, max.	10^5 rad/s^2
Moment of inertia of rotor	
• Solid shaft	1.90×10^{-6} kgm^2 (16.82×10^{-6} lb$_f$-in-s^2)
• Hollow shaft	2.80×10^{-6} kgm^2 (24.78×10^{-6} lb$_f$-in-s^2)
Vibration (55 ... 2000 Hz) to EN 60068-2-6	≤ 100 m/s^2 (328 ft/s^2)
Shock acc. to EN 60068-2-27	
• 2 ms	≤ 2000 m/s^2 (6562 ft/s^2)
• 6 ms	≤ 1000 m/s^2 (3281 ft/s^2)
Degree of protection acc. to DIN EN 60529 (IEC 60529)	
• Without shaft input	IP67
• With shaft input	IP64
Ambient temperature	
• Operation	-40 ... +85 °C (-40 ... +185 °F)
Weight, approx.	
• Single-turn	0.4 kg (0.88 lb)
• Multi-turn	0.5 kg (1.1 lb)
EMC	Tested in accordance with DIN EN 50081 and EN 50082
Approvals, according to	CE, cULus

9

Measuring systems
Built-on optoelectronic rotary encoders

**Absolute encoders with PROFINET IO
Accessories**

■ Selection and ordering data

Description	Order No.		
Absolute encoders with PROFINET IO			
Power supply 10 ... 30 V DC			
<u>Radial connection</u>			
• Synchro flange Solid shaft	**6FX2001-5F N** ■ ■		
• Clamping flange Solid shaft	**6FX2001-5QN** ■ ■		

• Torque arm
  Hollow shaft
  8 mm/10 mm/12 mm/15 mm
  (0.31 in/0.39 in/0.47 in/0.59 in)
	6FX2001-5WN ■ ■		

<u>Resolution</u>			
• Single-turn 8192 steps/revolution (13 bit)		**1**	**3**

• Multi-turn
  8192 steps/revolution,
  16384 revolutions (27 bit)
		2	**5**

■ Selection and ordering data

Description	Order No.
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 (16.41 ft)	**6XV1801-5DH50**
• Length: 10 m (32.81 ft)	**6XV1801-5DN10**
• Length: 15 m (49.22 ft)	**6XV1801-5DN15**
IE connecting cable	
Pre-assembled signal cable for absolute encoders PROFINET IO with M12 plug connector and RJ45 connector, D-coded, 4-pole	
• Length: 2 m (6.56 ft)	**6XV1871-5TH20**
• Length: 3 m (9.84 ft)	**6XV1871-5TH30**
• Length: 5 m (16.41 ft)	**6XV1871-5TH50**
• Length: 10 m (32.81 ft)	**6XV1871-5TN10**
• Length: 15 m (49.22 ft)	**6XV1871-5TN15**
IE FC RJ45 Plug 145 (1 unit) 2 × 2 RJ45 connector with rugged metal enclosure and FC connection technology, 145° cable outlet	**6GK1901-1BB30-0AA0**
IE FC M12 Plug PRO (1 unit) M12 connector with metal enclosure and FC connection technology, axial cable outlet, D-coded	**6GK1901-0DB20-6AA0**
IE FC TP Trailing Cable 2 × 2 (Type C) 4-wire, shielded, PROFINET-compliant, TP installation cable for trailing cable use, sold by the meter Max. length: 2000 m (6562 ft) Minimum order: 20 m (65.62 ft)	**6XV1840-3AH10**

9

Measuring systems

Notes

Connection system
MOTION-CONNECT

10

Connection system MOTION-CONNECT

Overview

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	✔	✔	**10/9**
	S-1FK7	✔	✔	**10/10**
	M-1PH808 M-1PH810	✔	✔	**10/9**
	L-1FN6	–	✔	**10/18**
Power cables with full-thread connector				
	S-1FT7	✔	✔	**10/11 ... 10/13**
	S-1FK7	✔	✔	**10/13**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/11, 10/13**
	L-1FN3	–	✔	**10/17**
	T-1FW6	–	✔	**10/19**
Extensions for power cables with SPEED-CONNECT or full-thread connector				
	S-1FT7	✔	✔	**10/14**
	S-1FK7	✔	✔	**10/14**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/14**
	L-1FN3	–	✔	**10/17**
	L-1FN6	–	✔	**10/18**
	T-1FW6	–	✔	**10/19**
Power cables for motors with terminal box				
	M-1PH808 M-1PH810 M-1PH813 M-1PH816	✔ from 35 mm^2	✔ to 16 mm^2	**10/15, 10/16**

✔ = Possible
– = Not possible

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

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	S-1FT7	✔	✔	**10/24**
	S-1FK7	✔	✔	**10/24**
	M-1PH8	✔	✔	**10/24**
	L-1FN3	✔	✔	**10/24**
	L-1FN6	✔	✔	**10/24**
	T-1FW6	✔	✔	**10/24**

DRIVE-CLiQ signal cables for connecting third-party direct measuring systems

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	Direct measuring systems with DRIVE-CLiQ interface from third parties	✔	✔	**10/24**

Extensions for connecting third-party direct measuring systems

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	With DRIVE-CLiQ interface	✔	✔	**10/24**

Signal cables with SPEED-CONNECT connector

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	S-1FK7	✔	✔	**10/25**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/25**

Extensions for signal cables with SPEED-CONNECT connector

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	S-1FK7	✔	✔	**10/25**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**10/25**

Signal cables with full-thread connector

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	S-1FT7	✔	✔	**10/25**
	S-1FK7	✔	✔	**10/25, 10/26**
	M-1PH8	✔	✔	**10/25, 10/26**
	L-1FN3	–	✔	**10/25, 10/26**
	L-1FN6	–	✔	**10/25, 10/26**
	T-1FW6	–	✔	**10/25, 10/26**

Extensions for signal cables with full-thread connector

		MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
	S-1FT7	✔	✔	**10/25**
	S-1FK7	✔	✔	**10/25, 10/26**
	M-1PH8	✔	✔	**10/25, 10/26**
	L-1FN3	–	✔ [1]	**10/25**

✔ = Possible
– = Not possible
[1] MOTION-CONNECT 700

10

Connection system MOTION-CONNECT
Introduction

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 lock 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 AG 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
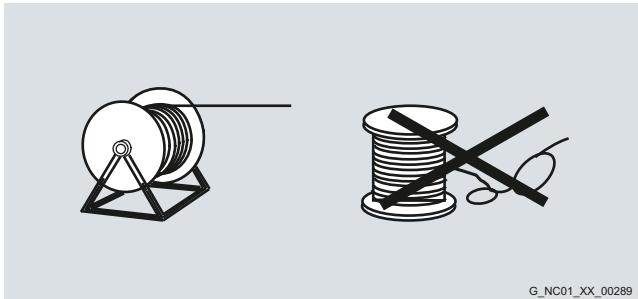
The cables must be removed from the drum without twisting, i.e. the cables must be unwound and must never be lifted over the drum flange in loops.
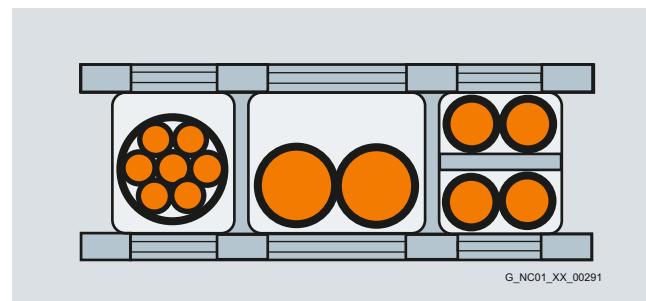
To maximize the service life of the cable carrier and cables, cables in the carrier made from different materials must be separated by spacers in the cable carrier. The spacers must be filled evenly to ensure that the position of the cables does not change during operation. The cables should be distributed 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.
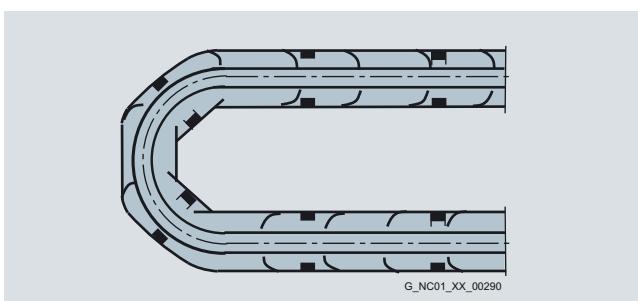
The cables must be able to be moved without applying force in particular in the bending radii of the carrier. The specified minimum bending radii must be adhered to.

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.

◾ Function (continued)
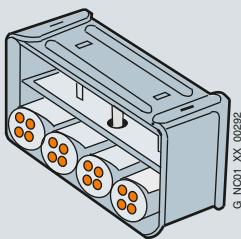
MOTION-CONNECT cables are tested in a cable carrier. The cables are attached at one end by means of strain relief to the moving ends of the cable carrier. Strain relief is applied over a wide area of the cable jacket surface without crimping the cable.

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
– – – –	Cable not included in the scope of delivery. Cable must be supplied by the customer.

◾ Characteristics for MOTION-CONNECT 800PLUS

The shaded area beneath the characteristic represents the potential range of use for the cables. The characteristics represent the tested operating points.
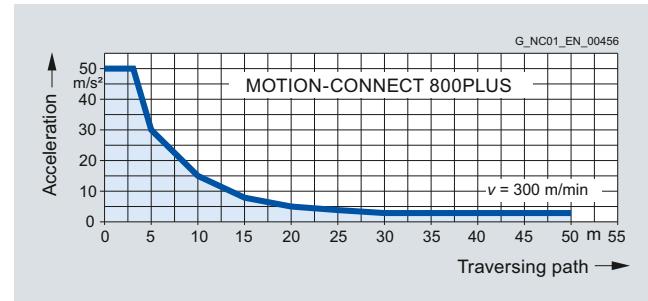
Acceleration for signal and power cables
MOTION-CONNECT 800PLUS up to 16 mm^2
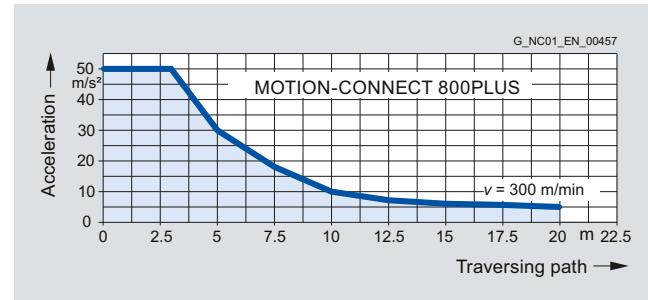
Acceleration for power cables
MOTION-CONNECT 800PLUS with 25 mm^2, 35 mm^2 and 50 mm^2

[1] Not applicable to DRIVE-CLiQ signal cables.

Connection system MOTION-CONNECT
Introduction

General information

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 mm²	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
Electronics[1]				
0.20	–	4.3	4.4	4.4
0.30	–	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.

■ **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 in the case of DRIVE-CLiQ power cables).

Power cables with separately supplied **motor-end** connector enclosure. In this case, the 6th position of the Order No. must be changed from **0** to **4**: 6FX.0**4**2-5...-....

Power cables with separately supplied **Module-end** connector enclosure. In this case, the 6th position of the Order No. must be changed from **0** to **1**: 6FX.0**1**2-5....-....

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 299.8 m (984 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, 100 m, 200 m, 500 m (164 ft, 328 ft, 656 ft, 1641 ft)
2.5 mm^2	with/without	50 m, 100 m, 200 m, 500 m (164 ft, 328 ft, 656 ft, 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)	≤ 100 m (328 ft)
95 mm^2	without	≤ 100 m (328 ft)	≤ 100 m (328 ft)
120 mm^2	without	≤ 100 m (328 ft)	≤ 100 m (328 ft)

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

■ Technical specifications

Power cables	MOTION-CONNECT 500 6FX500.-.....-....	MOTION-CONNECT 800PLUS 6FX800.-.....-....
Approvals, according to		
• 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	$5 \times D_{max}$	$4 \times D_{max}$
• 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 10/5
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	PUR, HD22.10 S2 (VDE 0282, Part 10)
	DESINA color orange RAL 2003	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.

10

[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.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

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 perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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 perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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)	0.16 (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.

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**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 <u>without</u> 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 perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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 <u>with</u> 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 perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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)	0.16 (0.11)	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	....	....

10

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

■ 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	Connec-tor size, motor end	Pre-assembled cable **without** brake cores	Cable sold by the meter[1] **without** brake cores	D_{max}		Weight (without connector)		Smallest perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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]	6FX 5 002-5CS02-....							
	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]	6FX 5 002-5CS12-....							
	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]	6FX 5 002-5CS42-....							
	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]	6FX 5 002-5CS52-....							
	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]	6FX 5 002-5CS62-....							
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	6FX 8 002-5CS24-....	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.

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**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 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 mm²	Connec-tor size, motor end	Pre-assembled cable with brake cores Order No.	Cable sold by the meter[1] with brake cores Order No.	D_{max} 6FX5 mm (in)	6FX8 mm (in)	Weight (without connector) 6FX5 kg/m (lb/ft)	6FX8 kg/m (lb/ft)	Smallest perm. bending radius[2] 6FX5 mm (in)	6FX8 mm (in)
Connector[3]	4 × 1.5+2 × 1.5	0.5	6FX 5 002-5DA20-....	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)	0.16 (0.11)	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.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

■ **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	Connec-tor size, motor end	Pre-assembled cable without brake cores	Cable sold by the meter[1] without brake cores	D_{max}		Weight (without connector)		Smallest perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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-....	6FX5008-1BB61-....	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	Connec-tor size, motor end	Pre-assembled cable with brake cores	Cable sold by the meter[1] with brake cores	D_{max}		Weight (without connector)		Smallest perm. bending radius[2]	
					6FX5	6FX8	6FX5	6FX8	6FX5	6FX8
	mm²		Order No.	Order 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)	0.16 (0.11)	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.

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**Extensions for power cables with
SPEED-CONNECT or full-thread connector**

■ **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	Order 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. For power cables with brake cores, the total maximum length is reduced by 2 m (6.56 ft) for each interruption point.

10

[1] Motor-end connector with full thread only.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**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 Order No.	Cable sold by the meter[1] Order No.	D_{max} mm (in)	Weight (without gland) kg/m (lb/ft)	Smallest perm. 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-.... 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	....	....

10

[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.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**Power cables for
SIMOTICS M-1PH8 motors with terminal box**

■ **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 Order No.	Cable sold by the meter[1] Order No.	D_{max} mm (in)	Weight (without gland) kg/m (lb/ft)	Smallest perm. 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.

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**Power cables for
SIMOTICS L-1FN3 motors**

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 mm²	Thread	Pre-assembled adapter cable Order No.[3]	Connector size Interface	Pre-assembled basic cable to the drive system Order No.	Cable sold by meter[1] for pre-assembled adapter cable Order No.	D_{max} mm (in)	Weight (without connector) kg/m (lb/ft)	Smallest perm. bending radius[2] 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	**7**					
MOTION-CONNECT 800PLUS			**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 mm²	Connector size	Pre-assembled basic cable to the drive system Type	Extension Order 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 mm²) to the SINAMICS S120 drive system must be used.

10

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

**Power cables for
SIMOTICS L-1FN6 motors**

■ Selection and ordering data

For SIMOTICS L-1FN6 linear motors with SPEED-CONNECT connector on SINAMICS S120

No. of cores × cross-section mm²	Connector size, motor end	Pre-assembled cable to the drive system Order No.	Cable sold by the meter[1] Order No.	D_{max} mm (in)	Weight (without connector) kg/m (lb/ft)	Smallest perm. bending radius[2] mm (in)
4 × 1.5	1	**6FX8002-5CN01-....**	**6FX8008-1BB11-....**	9.5 (0.37)	0.15 (0.10)	75 (2.95)
4 × 2.5	1	**6FX8002-5CN11-....**	**6FX8008-1BB21-....**	11.0 (0.43)	0.20 (0.13)	90 (3.54)
4 × 4	1.5	**6FX8002-5CN41-....**	**6FX8008-1BB31-....**	12.3 (0.48)	0.27 (0.18)	100 (3.94)
4 × 10	1.5	**6FX8002-5CN64-....** *)	**6FX8008-1BB51-....**	18.2 (0.72)	0.62 (0.42)	140 (5.51)
MOTION-CONNECT 800PLUS		**8**	**8**			
Length code		**....**	**....**			

■ Accessories

Power cable extensions for SIMOTICS L-1FN6 linear motors with SPEED-CONNECT connector

No. of cores × cross-section mm²	Connector size, motor end	Pre-assembled cable to the drive system Type	Extension Order No.
4 × 1.5	1	6FX8002-5CN01-....	**6FX8002-5CN05-....**
4 × 2.5	1	6FX8002-5CN11-....	**6FX8002-5CQ15-....**
4 × 4	1.5	6FX8002-5CN41-....	**6FX8002-5DQ48-....**
4 × 10	1.5	6FX8002-5CN64-.... *)	**6FX8002-5DQ68-....**
MOTION-CONNECT 800PLUS			**8**
Length code			**....**

The combinations of power cable extensions shown are only provided by way of example.

10

[1] Note type of delivery.
[2] Valid for installation in a cable carrier.
*) Module end with ring cable lugs.

Connection system MOTION-CONNECT
Power cables for SINAMICS S120

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 perm. bending radius[2]
mm^2		Order No.	Order 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
mm^2		Type	Order 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.

Connection system MOTION-CONNECT
Signal cables for SINAMICS S120

■ 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

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

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
- Motor Modules and Sensor Modules
- Motor Modules and motors with DRIVE-CLiQ interface
- Motor Modules and direct measuring systems with DRIVE-CLiQ interface (incl. third-party measuring systems)

MOTION-CONNECT DRIVE-CLiQ signal cables have 24 V DC cores.

MOTION-CONNECT pre-assembled signal cables

are used whenever motor encoders on motors without DRIVE-CLiQ interface are connected to Sensor Modules.

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.002-2C...-.... and 6FX.002-2E...-.... signal cables are available with crimped contacts and with the connector enclosure supplied separately (not in the case of DRIVE-CLiQ signal cables).

Signal cables with separately supplied **motor-end** connector enclosure. In this case, the 6th position of the Order No. must be changed from **0** to **4**:
6FX.0**4**2-2C...-....

Signal cables with separately supplied **module-end** connector enclosure. In this case, the 6th position of the Order No. must be changed from **0** to **1**:
6FX.0**1**2-2C...-....

Note:

Once the contacts have latched into the insulator, they can no longer be removed.

10

■ **Technical specifications**

DRIVE-CLiQ signal cables	DRIVE-CLiQ 6FX2...-1DC..-....	DRIVE-CLiQ MOTION-CONNECT 500 6FX5...-.DC..-....	DRIVE-CLiQ MOTION-CONNECT 800PLUS 6FX8...-.DC..-....
Approvals, according to			
• 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)	-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	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 10/5
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	PVC	PUR, HD22.10 S2 (VDE 0282, Part 10)
	Gray RAL 7032	DESINA color green RAL 6018	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.

10

[1] The File No. is printed on the cable jacket.

Connection system MOTION-CONNECT
Signal cables for SINAMICS S120

Technical specifications (continued)

Signal cables	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS
	6FX500.-.....-....	6FX800.-.....-....
Approvals, according to		
• 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)	$4 \times D_{max}$
• Flexible installation	100 mm (3.94 in)	70 mm (2.76 in)
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 (16.41 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 10/5
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	PUR, HD22.10 S2 (VDE 0282, Part 10)
	DESINA color green RAL 6018	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.

■ Selection and ordering data

Pre-assembled DRIVE-CLiQ signal cables <u>without</u> 24 V DC cores

Type	Length	D_{max}	Degree of protection Connector	DRIVE-CLiQ signal cable without 24 V DC cores Order No.
	m (ft)	mm (in)		
Fixed lengths	0.11 (0.36)		IP20/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 meter	max. 70 (230)	7.0 (0.28)	IP20/IP20	**6FX2002-1DC00-....**
To the meter	max. 70 (230)	7.0 (0.28)	IP67/IP67	**6FX2002-1DC20-....**
Length code				**....**

Connection system MOTION-CONNECT
Signal cables for SINAMICS S120

**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 motors with 24 V DC cores

Type	Application	Connector/ Degree of protection motor end	Connector/ Degree of protection Module end	Length, max.	D_{max}	Cable length	**MOTION-CONNECT DRIVE-CLiQ signal cable** with 24 V DC cores
				m (ft)	mm (in)	m (ft)	Order No.
To the meter	For components with DRIVE-CLiQ interface in the control cabinet. For example, for making the connection between SINAMICS S120 Motor Modules or Power Modules and the cabinet bushing.	RJ45/IP20	RJ45/IP20	100 (328)	7.1 (0.28)		**6FX5002-2DC00-....**
		RJ45/IP20	RJ45/IP20	75 (243)	7.1 (0.28)		**6FX8002-2DC00-....**
To the meter	For built-in or built-on encoder systems with DRIVE-CLiQ. For example, for making the connection between SIMOTICS S-1FT7/-1FK7/ SIMOTICS M-1PH8/ SIMOTICS T-1FW3 motors and SINAMICS Motor Modules or Power Modules.	RJ45/IP20	RJ45/IP67	100 (328)	7.1 (0.28)		**6FX5002-2DC10-....**
		RJ45/IP20	RJ45/IP67	75 (243)	7.1 (0.28)		**6FX8002-2DC10-....**
To the meter	For built-in or built-on encoder systems with DRIVE-CLiQ. For example, for making the connection between SIMOTICS S-1FT7/-1FK7/ SIMOTICS M-1PH8/ SIMOTICS T-1FW3 motors and SINAMICS S120 cabinet bushings, couplers or DME20 Hub Module or 2 couplers or 2 DME20 Hub Modules.	RJ45/IP67	RJ45/IP67	100 (328)	7.1 (0.28)		**6FX5002-2DC20-....**
		RJ45/IP67	RJ45/IP67	75 (243)	7.1 (0.28)		**6FX8002-2DC20-....**
	For built-on encoder systems with DRIVE-CLiQ. For example, as a basic cable between third-party direct measuring systems with DRIVE-CLiQ interface and SINAMICS S120 Motor Modules and Power Modules.	RJ45/IP20	M12/IP67	30 (98.4)	7.1 (0.28)	3 (9.84)	**6FX■002-2DC30-1AD0**
						6 (19.7)	**6FX■002-2DC30-1AG0**
						15 (49.2)	**6FX■002-2DC30-1BF0**
						30 (98.4)	**6FX■002-2DC30-1DA0**
	For example, as an extension to the basic cable 6FX.002-2DC30.[1]	M12/IP67	M12/IP67	30 (98.4)	7.1 (0.28)	3 (9.84)	**6FX■002-2DC34-1AD0**
						6 (19.7)	**6FX■002-2DC34-1AG0**

MOTION-CONNECT 500		**5**
MOTION-CONNECT 800PLUS		**8**
Length code		**....**

10

[1] The total cable length (basic cable plus extension cable) must not exceed 30 m.

Connection system MOTION-CONNECT
Signal cables for SINAMICS S120

**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	Connec-tion via	Length, max.	D_{max}	Smallest bending radius flexible	Degree of protection Connector	Basic cable	Extension
	SIMOTICS		m (ft)	mm (in)	mm (in)		Order No.	Order No.
Absolute encoder with EnDat	S-1FK701	SMC20	50 (164)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2EN20-....**	**6FX8002-2EN24-....**
Absolute encoder with EnDat	S-1FK7[1]	SMC20	100 (328)	9.8 (0.39)	70 (2.76)	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)	70 (2.76)	IP20/IP67	**6FX■002-2CN20-....**	**6FX8002-2CN24-....**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R with C and D tracks	S-1FK7[1]	SMC20	100 (328)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2CQ31-....**	**6FX■002-2CQ34-....**
Resolver								
• Multi-pole	S-1FK701	SMC10	50 (164)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX■002-2FN20-....**	**6FX8002-2FN24-....**
• 2-pole	S-1FK701	SMC10	130 (426)	9.2 (0.36)	70 (2.76)	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	Connec-tion via	Length, max.	D_{max}	Smallest bending radius flexible	Degree of protection Connector	Basic cable	Extension
	SIMOTICS		m (ft)	mm (in)	mm (in)		Order No.	Order No.
Absolute encoder with EnDat	S-1FK701	SMC20	50 (164)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2EQ20-....**	**6FX5002-2EQ24-....**
Absolute encoder with EnDat	S-1FK7[2]/M-1PH8/ 1PH7/1PL6/ T-1FW3	SMC20	100 (328)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2EQ10-....**	**6FX■002-2EQ14-....**
Absolute encoder with EnDat 5 V DC		SME25	3 (9.84)	9.2 (0.36)	70 (2.76)	IP67/IP67	**6FX■002-2AD04-....**	–
Direct absolute encoder with EnDat	L-1FN3/-1FN6/ T-1FW6	SME125	3 (9.84)	9.2 (0.36)	70 (2.76)	IP67/IP67	**6FX8002-2AD04-....**	–
Resolver	S-1FK701	SMC10	50 (164)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX■002-2CF20-....**	**6FX5002-2CF24-....**
Resolver								
• Multi-pole	S-1FT/-1FK[2]/ T-1FW3	SMC10	50 (164)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX■002-2CF02-....**	**6FX■002-2CF04-....**
• 2-pole	S-1FT/-1FK[2]/ 1PH7/1PL6	SMC10	130 (426)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX■002-2CF02-....**	**6FX■002-2CF04-....**
Absolute encoder with EnDat 6FX2001-5.E..		SMC20	100 (328)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX■002-2CH00-....**	**6FX■002-2AD04-....**
Absolute encoder with SSI 5 V DC		SME25	3 (9.84)	9.2 (0.36)	70 (2.76)	IP67/IP67	**6FX■002-2AD04-....**	–
Absolute encoder with SSI 6FX2001-5.S.. Clock-pulse rate 100 ... 250 kHz		SMC30	100 (328)	9.3 (0.37)	70 (2.76)	IP20/IP67	**6FX■002-2CC11-....**	**6FX■002-2CB54-....**
Temperature sensor	L-1FN3100... L-1FN3150[3]	SME120/ SME125	10 (32.8)	11.9 (0.47)	85 (3.35)	IP67/IP67	**6FX7002-2SL01-....**	**6FX7002-2SL10-....**
Temperature sensor	L-1FN3300... L-1FN3900[3]	SME120/ SME125	10 (32.8)	11.9 (0.47)	85 (3.35)	IP67/IP67	**6FX7002-2SL02-....**	**6FX7002-2SL10-....**
Temperature sensor	L-1FN6/T-1FW6	SME120/ SME125	10 (32.8)	11.9 (0.47)	85 (3.35)	IP67/IP67	**6FX7002-2SL10-....**	–
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] Possible for SIMOTICS M-1PH808/-1PH810/-1PH813 motors.

[2] Not for SIMOTICS S-1FK701.

[3] Continuous load version.

10

Connection system MOTION-CONNECT
Signal cables for SINAMICS S120

**Signal cables for motors
with full-thread connector**

■ Selection and ordering data

Pre-assembled signal cables for motors with <u>full-thread</u> connector

Encoder system	Motor type	Connec-tion via	Length, max.	D_{max}	Smallest bending radius flexible	Degree of protection Connec-tor	Basic cable	Extension
	SIMOTICS		m (ft)	mm (in)	mm (in)		Order No.	Order No.
Incremental encoder sin/cos 1 V_{pp} 2048 S/R	S-1FK701	SMC20	50 (164)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2CA20-....**	**6FX5002-2CA24-....**
Incremental encoder sin/cos 1 V_{pp} 2048 S/R								
• With C and D tracks	S-1FK7[1]/ M-1PH8/ 1PH7/1PL6	SMC20	100 (328)	9.8 (0.39)	70 (2.76)	IP20/IP67	**6FX■002-2CA31-....**	**6FX■002-2CA34-....**
• Without C and D tracks	M-1PH8/ 1PH7/1PL6	SMC20	50 (164)	9.2 (0.36)	70 (2.76)	IP20/IP67	**6FX8002-2CA80-....**	**6FX■002-2CA34-....**
HTL incremental encoder	M-1PH8/ 1PH7/1PL6	SMC30	100 (328) 300 (984)	9.3 (0.37)	70 (2.76)	IP20/IP67	**6FX■002-2AH00-....**	**6FX■002-2AH04-....**
HTL incremental encoder	M-1PH8/ 1PH7/1PL6	CU310-2 DP	100 (328)	9.3 (0.37)	70 (2.76)	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)	70 (2.76)	IP20/IP67	**6FX■002-2CG00-....**	**6FX■002-2CB54-....**
HTL incremental encoder 24 V DC 6FX2001-4		SMC30	100 (328)	9.3 (0.37)	70 (2.76)	–/IP67	**6FX5002-2CA12-....**	–
TTL incremental encoder RS422 6FX2001-2								
• 5 V DC		SMC30	100 (328)	9.3 (0.37)	70 (2.76)	IP20/IP67	**6FX■002-2CR00-....**	**6FX■002-2CB54-....**
• 24 V DC		SMC30	100 (328)	9.3 (0.37)	70 (2.76)	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 (9.84)[2]	9.3 (0.37)	70 (2.76)	IP67/IP67	**6FX■002-2CB54-....**	–
Direct incremental encoder sin/cos 1 V_{pp}	L-1FN3/-1FN6/ T-1FW6	SME120	3 (9.84)[2]	9.3 (0.37)	70 (2.76)	IP67/IP67	**6FX8002-2CB54-....**	–
MOTION-CONNECT 500							5	5
MOTION-CONNECT 800PLUS							8	8
Length code							....	....
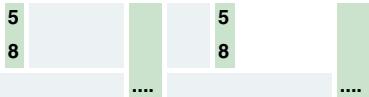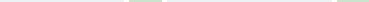
The combinations of signal cable extensions shown are only provided by way of example.

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] Not for SIMOTICS S-1FK701.
[2] Up to 10 m (32.8 ft) possible, depending on the encoder current consumption.

■ Overview

Data position in Order 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, Module-end connector supplied separately		**1**	
Motor-end connector supplied separately, pre-assembled at Module end		**4**	

Without brake cores		**C**	
With brake cores		**D**	

Basic cable between	and				
SINAMICS S120 Motor Module, booksize format up to 30 A	Motor connector, full-thread, size 0.5	**D**	**A**	**2**	**0**
	Motor connector, full-thread, size 1/1.5		**S**		**1**
	Motor connector, full-thread, size 3		**S**	**1**	**3**
	Motor with terminal box (exposed core ends)		**S**		**2**
	Motor connector, SPEED-CONNECT, size 0.5	**D**	**N**	**2**	**0**
	Motor connector, SPEED-CONNECT, size 1/1.5		**N**		**1**
SINAMICS S120 Motor Module, booksize format, 45 A or higher	Motor connector, full-thread, size 1/1.5		**S**		**4**
	Motor connector, full-thread, size 3		**S**	**2**	**3**
	Motor connector, SPEED-CONNECT, size 1/1.5		**N**		**4**
SINAMICS S120 Power Module/Motor Module, booksize compact format	Motor connector, full-thread, size 0.5	**D**	**A**	**3**	**0**
	Motor connector, full-thread, size 1/1.5		**G**		**1**
	Motor connector, full-thread, size 3		**G**		**3**
	Motor connector, SPEED-CONNECT, size 0.5	**D**	**N**	**3**	**0**
	Motor connector, SPEED-CONNECT, size 1/1.5		**G**	**1**	**0**
SINAMICS S120 Power Module/Motor Module, booksize format	SIMOTICS M-1PH8 with terminal box	**C**	**R**		

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	**L** **M**

Cross-section	

Length code

Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths

10

Connection system MOTION-CONNECT
Order number code

Overview (continued)

Data position in Order 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	–	2	.	.	.	.	–	.	.	.	.

	6
Pre-assembled at motor and Module ends	0
Pre-assembled at motor end, Module-end connector supplied separately	1
Motor-end connector supplied separately, pre-assembled at Module end	4

Variant: Signal cables for integrated encoder

DRIVE-CLiQ cables between	and	9	10	11	12
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	C	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	9	10	11	12
SMC30	Incremental encoder 6FX2001-2 (TTL/5 V supply) full-thread connector	C	R	0	0
SMC30	Incremental encoder 6FX2001-2 (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	Absolute encoder 6FX2001-5.S (SSI) full-thread connector	C	C	1	1
SMC20	Absolute encoder 6FX2001-5.E (EnDat) full-thread connector	E	Q	1	0

Extension between basic cable with connector	and motor connector				
Full thread	Full thread				4

Variant: Signal cables for temperature sensor

		1	2	3	4	5	6	7		9	10	11	12
Basic cable between SME1xx and SIMOTICS L-1FN3		6	F	X	7	0	0	2		S	L	0	
Extension to basic cable between SME1xx and SIMOTICS L-1FN3		6	F	X	7	0	0	2		S	L	1	0
Basic cable between SME1xx and SIMOTICS L-1FN6/T-1FW6		6	F	X	7	0	0	2		S	L	1	0

Length code

Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths

10

Overview

Data position in Order 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	.	.	.	–	.	.	.	.

	10
Power cable without brake cores, sold by the meter	A
Power cable with 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	Order No. supplement
Length code for pre-assembled cables	

6FX.0.2-.....- ■ ■ ■ ■

0 m (0 ft)	1			
100 m (328 ft)	2			
200 m (656 ft)	3			
0 m (0 ft)		A		
10 m (32.8 ft)		B		
20 m (65.6 ft)		C		
30 m (98.4 ft)		D		
40 m (131 ft)		E		
50 m (164 ft)		F		
60 m (197 ft)		G		
70 m (230 ft)		H		
80 m (262 ft)		J		
90 m (295 ft)		K		
0 m (0 ft)			A	
1 m (3.28 ft)			B	
2 m (6.56 ft)			C	
3 m (9.84 ft)			D	
4 m (13.1 ft)			E	
5 m (16.4 ft)			F	
6 m (19.7 ft)			G	
7 m (22.9 ft)			H	
8 m (26.3 ft)			J	
9 m (29.5 ft)			K	
0 m (0 ft)				0
0.1 m (3.94 in)				1
0.2 m (7.87 in)				2
0.3 m (11.81 in)				3
0.4 m (15.75 in)				4
0.5 m (19.96 in)				5
0.6 m (23.62 in)				6
0.7 m (27.56 in)				7
0.8 m (31.5 in)				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	Order 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

G_D211_XX_00144

Cable with exposed core ends and pre-assembled connector

G_D211_XX_00142

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 %

10

[1] Note type of delivery.

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

SINAMICS S120 Control Unit CU320-2	Order No Pre-assembled cables		
		X200-X202	Basic Line Module
X100-X103	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X200-X202	Smart Line Module
	6FX2002-1DC00-.... ≤ 70 m (230 ft)	X200-X202	Active Line Module
X100-X103	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X200-X203	Motor Module
	6FX2002-1DC00-.... ≤ 70 m (230 ft)		
X100-X103	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X500-X501	Terminal Module
	6FX2002-1DC00-.... ≤ 70 m (230 ft)		

Active Line Module: **6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) / **6FX2002-1DC00-....** ≤ 70 m (230 ft) — X500 Active Interface Module

X126	PROFIBUS connector **6ES7972-0BA42-0XA0** (without PG connection) **6ES7972-0BB42-0XA0** (with PG connection)
X150	PROFINET
X140	**6FX8002-1AA01-1AF0** — PC/PG

G_NC01_EN_00420d

10

Integration (continued)

Connection overview of SINAMICS S120 Power Modules in blocksize format with CU310-2 Control Unit for SIMOTICS motors with/without DRIVE-CLiQ interface

SINAMICS S120 Power Module PM340 Blocksize format	Order No. **Pre-assembled cables**	
Line connection U1/L1 V1/L2 W1/L3	Power supply cable see power cables for motors (by the meter)	

X100	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X500 Terminal Modules

Control Unit CU310-2

PM-IF interface X100

| **6FX2002-1DC00-....** ≤ 70 m (230 ft) |

6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)	X500 SMC10
X100	X500 SMC20
6FX2002-1DC00-.... ≤ 70 m (230 ft)	X500 SMC30

Motor encoder interface via SMC for motors without DRIVE-CLiQ interface

| **6FX5002- 2DC10-....** ≤ 100 m (328 ft) | Absolute encoder with DRIVE-CLiQ 6FX2001-5.D.. |
| X100 **6FX8002- 2DC10-....** ≤ 50 m (164 ft) | Motor encoder for motors with DRIVE-CLiQ interface 1FK/1FT/1PH8 |

Motor encoder interface for motors with DRIVE-CLiQ interface

6FX.002-2CR00-.... ≤ 100 m (328 ft) with 5 V DC	Incremental encoder TTL RS422 (5 V) 6FX2001-2...
X23 **6FX.002-2CD24-....** ≤ 100 m (328 ft) with 24 V DC	Incremental encoder TTL RS422 (24 V) 6FX2001-2...
6SX7002-0AN30-.... ≤ 100 m (328 ft) with 5 V DC	Incremental encoder HTL Type 1XP8001 on 1LA motor[1]

Direct connection Motor encoder HTL/TTL

X21 PROFIBUS connector **6ES7972-0BA42-0XA0** (without PG connection) **6ES7972-0BB42-0XA0** (with PG connection)

X200-X201 PROFINET

Motor connection | **Pre-assembled power cables, see power cables for motors** (max. cable length, see technical specifications of Motor Modules) | Motors

G_NC01_EN_00510

[1] Not for 2KG geared motors.

■ **Integration** (continued)

Connection overview of SINAMICS S120 Line Modules and Motor Modules in booksize format and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface

SINAMICS S120 Motor Module Booksize format	Order No. **Pre-assembled cables**	X200-X202 — Smart Line Module
		X200-X202 — Active Line Module
X200-X203[1]	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)	X200-X203[1] — Motor Module
		X100-X105 — SINUMERIK 840D sl / NCU 710.2 / NCU 720.2 / NCU 730.2 / NCU 730.2 PN
		NX10/NX15
X200-X203[1]	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)	X200-X203[1] — Further Motor Modules
Motor encoder interface via SMC for motors without DRIVE-CLiQ interface	X200-X203[1] **6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)	X500 — SMC10 X500 — SMC20 X500 — SMC30
Motor encoder interface for motors with DRIVE-CLiQ interface	X200-X203[1] **6FX5002- 2DC10-....** ≤ 100 m (328 ft) **6FX8002- 2DC10-....** ≤ 50 m (164 ft)	Absolute encoder with DRIVE-CLiQ 6FX2001-5.D.. Motor encoder in motors with DRIVE-CLiQ interface 1FK/1FT/1PH8
Motor connection	**Pre-assembled power cables, see power cables for motors** (max. cable length, see technical specifications of Motor Modules)	Motors

G_NC01_EN_01004

[1] For Single Motor Module: X200-X202
For Double Motor Module: X200-X203

Integration (continued)

Connection overview of SINAMICS S120 Power Modules in booksize format with CUA31 Control Unit Adapter and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface

SINAMICS S120 Power Module PM340 Blocksize format		Order No. **Pre-assembled cables**	
Line connection	U1/L1 V1/L2 W1/L3	Power supply cable see power cables for motors (by the meter)	
Control Unit Adapter CUA31	X200	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X100-X103[1] Control Unit CU310 -2 DP/CU320-2
		6FX2002-1DC00-.... ≤ 70 m (230 ft)	X100-X105 SINUMERIK 840D sl NCU 710.2 NCU 720.2 NCU 730.2 NCU 730.2 PN
			NX10/NX15
PM-IF interface	X201	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	Further CUA31/CUA32 or Motor Modules or Terminal Modules
		6FX2002-1DC00-.... ≤ 70 m (230 ft)	
Motor encoder interface via SMC for motors without DRIVE-CLiQ interface	X202	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft)	X500 SMC10
		6FX2002-1DC00-.... ≤ 70 m (230 ft)	X500 SMC20
			X500 SMC30
Motor encoder interface for motors with DRIVE-CLiQ interface	X202	**6FX5002- 2DC10-....** ≤ 100 m (328 ft)	Absolute encoder with DRIVE-CLiQ 6FX2001-5.D..
		6FX8002- 2DC10-.... ≤ 50 m (164 ft)	Motor encoder in motors with DRIVE-CLiQ interface 1FK/1FT/1PH8
Motor connection		**Pre-assembled power cables, see power cables for motors** (max. cable length, see technical specifications of Motor Modules)	Motors

G_NC01_EN_01005

[1] For Control Unit CU310 DP: X100
For Control Unit CU320: X100-X103

10

■ **Integration** (continued)

Connection overview of CU320-2 Control Unit with SINAMICS S120 in chassis format

SINAMICS S120 Control Unit CU320-2	Order No. **Pre-assembled cables**		

X100–X103
6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)
6FX2002-1DC00-.... ≤ 70 m (230 ft)

X400-X402 Basic Line Module
X400-X402 Smart Line Module
X400-X402 Active Line Module

6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)
6FX2002-1DC00-.... ≤ 70 m (230 ft)
X500 Active Interface Module

X100–X103
6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)
6FX2002-1DC00-.... ≤ 70 m (230 ft)
X400-X402 Motor Module

X100–X103
6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)
6FX2002-1DC00-.... ≤ 70 m (230 ft)
X500-X501 Terminal Module

X126 PROFIBUS connector
6ES7972-0BA42-0XA0 (without PG connection)
6ES7972-0BB42-0XA0 (with PG connection)

X140 **6FX8002-1AA01-1AF0** PC/PG

G_NC01_EN_00421e

Integration (continued)

Connection overview of SINAMICS S120 Line Modules and Motor Modules in chassis format and SINUMERIK 840D sl for SIMOTICS motors with/without DRIVE-CLiQ interface

SINAMICS S120 Motor Module Chassis format	Order No. Pre-assembled cables		
X400-X402	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)	X400-X402 Active Line Module	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft) → X500 Active Interface Module
			X400-X402 Motor Module
			X100-X105 SINUMERIK 840D sl: NCU 710.2 / NCU 720.2 / NCU 730.2 / NCU 730.2 PN
			NX10/NX15
X400-X402	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)		X400-X402 Further Motor Modules
Motor encoder interface via SMC for motors without DRIVE-CLiQ interface	X400-X402	**6SL3060-4A..0-0AA0** ≤ 5 m (16 ft) **6FX2002-1DC00-....** ≤ 70 m (230 ft)	X500 SMC10 / X500 SMC20 / X500 SMC30
Motor encoder interface for motors with DRIVE-CLiQ interface	X400-X402	**6FX5002-2DC10-....** ≤ 100 m (328 ft) **6FX8002-2DC10-....** ≤ 50 m (164 ft)	Absolute encoder with DRIVE-CLiQ 6FX2001-5.D.. / Motor encoder in motors with DRIVE-CLiQ interface 1FK/1FT/1PH8
Motor connection	**Pre-assembled power cables, see power cables for motors** (max. cable length, see technical specifications of Motor Modules)		Motors

G_NC01_EN_01006

10

Integration (continued)

Connection overview of SINAMICS S120
Sensor Module Cabinet-Mounted SMC10

SINAMICS S120 Sensor Module Cabinet-Mounted SMC10	Order No. **Pre-assembled cables**	
X520	**6FX.002-2FN20-....** ≤ 50 m (164 ft) (multi-pole resolvers) ≤ 130 m (427 ft) (2-pole resolvers)	Resolver in 1FK701 motor
	6FX.002-2CF02-.... ≤ 50 m (164 ft) (multi-pole resolvers) ≤ 130 m (427 ft) (2-pole resolvers)	Resolver in 1FT7/1FK7 motors

G_NC01_EN_00511a

Connection overview of SINAMICS S120
Sensor Module Cabinet-Mounted SMC30

SINAMICS S120 Sensor Module Cabinet-Mounted SMC30	Order No. **Pre-assembled cables**	
X520	**6FX.002-2CC11-....** ≤ 100 m (328 ft) with 24 V DC	SSI absolute encoder 6FX2001-5.S.
	6FX.002-2CR00-.... ≤ 100 m (328 ft) with 5 V DC	TTL incremental encoder RS 422 (5 V) 6FX2001-2...
	6FX.002-2CD24-.... ≤ 100 m (328 ft) with 24 V DC	TTL incremental encoder RS 422 (24 V) 6FX2001-2...
X521 X531	**6FX5002-2CA12-....** ≤ 100 m (328 ft)	HTL incremental encoder 24 V 6FX2001-4....
	6FX.002-2AH00-.... ≤ 300 m (984 ft)[1]	HTL incremental encoder in 1PH8 motor
	6SX7002-0AN00-....[2] **6SX7002-0AL00-....**[3] ≤ 300 m[1] (984 ft) **6SX7002-0AN10-....**[4]	HTL increm. encoder type 1XP8001 on 1LA motor[5]

G_D211_EN_00513

[1] With evaluation of difference signals A*, A and B*, B, otherwise ≤ 100 m (328 ft).
[2] Signals A*, A, B*, B, R*, R.
[3] Signals A, B.
[4] With right-angled connector.
[5] Not for 2KG geared motor.

Connection overview of SINAMICS S120
Sensor Module Cabinet-Mounted SMC20

SINAMICS S120 Sensor Module Cabinet-Mounted SMC20	Order No. **Pre-assembled cables**	
X520	**6FX.002-2CA20-....** ≤ 100 m (328 ft)	Incremental encoder sin/cos 1 Vpp in 1FK701 motor
	6FX.002-2CQ31-.... ≤ 100 m (328 ft)	Incremental encoder sin/cos 1 Vpp with C/D tracks in 1FT7 motor
	6FX.002-2CA31-.... ≤ 100 m (328 ft)	Incremental encoder sin/cos 1 Vpp with C/D tracks in 1FT7/1FK7/1PH8 motors
	6FX8002-2CQ80-.... ≤ 50 m (164 ft)	Incremental encoder sin/cos 1 Vpp without C/D tracks in 1PH8 motor[3]
	6FX8002-2CA80-.... ≤ 50 m (164 ft)	Incremental encoder sin/cos 1 Vpp without C/D tracks in 1PH8 motor[4]
	6FX.002-2CG00-.... ≤ 50 m (164 ft)	Incremental encoder sin/cos 1 Vpp 6FX2001-3...
	Adapter cable[1]	Direct linear increm. encoder sin/cos 1 Vpp LS 187(C)/ LF 183(C) LB 382(C) LS 487(C)/ LF 481(C)
	6FX.002-2EQ20-.... ≤ 100 m (328 ft)	Absolute encoder with EnDat in 1FK701 motor
	6FX.002-2EQ31-.... ≤ 100 m (328 ft)	Absolute encoder with EnDat in 1FT7/1PH8[2] motors
	6FX.002-2EQ10-.... ≤ 100 m (328 ft)	Absolute encoder with EnDat in 1FK7/1PH8 motors
	Adapter cable[1]	Direct linear absolute encoder EnDat LC 183/LC 483
	6FX.002-2CH00-.... ≤ 100 m (328 ft)	Absolute encoder with EnDat 6FX2001-5.E.

G_NC01_EN_00512a

[1] Adapter cable available from measuring system manufacturer.
[2] Possible for 1PH808/1PH810/1PH813/1PH816 motors.
[3] Possible for 1PH808/1PH810/1PH813/1PH816 motors for encoders with 512 S/R and 256 S/R.
[4] Possible for 1PH8 motors for encoders with 512 S/R and 256 S/R.

10

Integration (continued)

Connection overview of SINAMICS S120 Motor Modules in booksize format SME120/SME125 and
SIMOTICS L-1FN3/-1FN6 linear motors

SINAMICS S120 Motor Module Booksize format		

Order No.
Pre-assembled cables

X200-X203

Motor encoder interface via SME for motors <u>without</u> DRIVE-CLiQ interface

6FX5002-2DC10-....
≤ 100 m (328 ft)
6FX8002-2DC10-....
≤ 50 m (164 ft)

SME120

6FX8002-2CB54-....
≤ 3 m (9.8 ft)[4]

Adapter cable[1]

Direct linear incremental encoder sin/cos 1 V_{pp}

5)
①

SME125

6FX8002-2AD04-....
≤ 3 m (9.8 ft)[4]

Adapter cable[1]

Direct linear absolute encoder EnDat

5)
①

①
6FX7002-2SL10-.... [6]
≤ 10 m (32.8 ft)[5]

6FX7002-2SL01-.... [2]
6FX7002-2SL02-.... [3]

1FN3 linear motors with temperature sensor

6FX8002-5CS..-....

6FX7002-5LM.2-....

U2/V2/W2/PE

①
6FX7002-2SL10-....
≤ 10 m (32.8 ft)[5]

1FN6 linear motors with temperature sensor

6FX8002-5CN..-....

G_NC01_EN_01007a

[1] Adapter cable available from measuring system manufacturer.
[2] For motors 1FN3100/1FN3150.
[3] For motors 1FN3300 to 1FN3900.
[4] Up to 10 m (32.8 ft) possible, depending on encoder current consumption.
[5] The total cable length between SME120/SME125 and 1FN3 must not exceed 10 m (32.8 ft).
[6] Cable extension, optional.

10

■ **Integration** (continued)

Connection overview of SINAMICS S120 Motor Modules in booksize format with SME120/SME125 and SIMOTICS L-1FW6 torque motors/SIMOTICS M-1FE1 built-in motors

SINAMICS S120 Motor Module Booksize format

X200-X203

Motor encoder interface via SME for motors without DRIVE-CLiQ interface

X200-X203

U2/V2/W2/PE

Order No.
Pre-assembled cables

6SL3060-4A..0-0AA0
≤ 5 m (16 ft)
DRIVE-CLiQ-cable

X500   SMC20   X520

Evaluation ..
via PLC

6FX8002-1AA51-1AB0

3RN1 tripping device (for (PTC))

NTC PT3-51F/ NTC K227

6FX5002-2DC10-....
≤ 100 m (328 ft)
6FX8002-2DC10-....
≤ 50 m (164 ft)

SME120

①

SME125

①

①

6FX8002-5CS..-....

6FX8008-.....-....
≤ 1.5 m (5 ft)

VPM 120/VPM 200

①

6FX8002-2CA80-1..0

1FE1 built-in motors
Incremental encoder
sin/cos 1 V_{pp}, temperature
sensor KTY84-130

6FX8002-2CA31-....

1FE1 built-in motors
Incremental encoder
sin/cos 1 V_{pp}, temperature
sensor KTY84-130 and PTC
for full thermal protection

6FX8002-2CB54-....
≤ 3 m (9.8 ft)[1]

Direct incremental encoder
sin/cos 1 V_{pp}

6FX8002-2AD04-....
≤ 3 m (9.8 ft)[1]

Direct absolute encoder
EnDat

6FX7002-2SL10-....
≤ 10 m (32.8 ft)

[2]

1FW6 torque motors
with temperature
sensor KTY and PTC

[2]

6FX.008-.....-....
≤ 50 m (164 ft)
MOTION-CONNECT
power cable

1FE1 built-in motors
with temperature sensor
KTY and PTC

6FX7002-2SL00-....
≤ 10 m (32.8 ft)

G_NC01_EN_01008a

[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 delivery of the motor, they must be ordered separately (see Accessories for power and signal cables).

■ Integration (continued)

Connection overview of SINAMICS S120 Motor Modules in booksize format and SIMOTICS 2SP1 main spindle motors

G_NC01_EN_00339d

■ **Integration** (continued)

Connection of a machine encoder (direct measuring system)

SINAMICS S120 Control Unit CU310-2 DP, CU320-2 or	Order No. **Pre-assembled cables**

X100-X105

6FX5002-2DC10-.... ≤ 100 m (328 ft)
6FX8002-2DC10-.... ≤ 50 m (164 ft)

SINUMERIK 840D sl Type 1B NCU 710.3 PN NCU 720.3 PN NCU 730.3 PN

X500 SME20 X520

6FX8002-2CA88-.... ≤ 3 m (9.8 ft) — Incremental encoder sin/cos 1 V_pp without C and D tracks in 1FE1 motor

6FX.002-2CB54-.... ≤ 3 m (9.8 ft) — Incremental encoder sin/cos 1 V_pp (5 V)

X500 SME25 X520

6FX.002-2AD04-.... ≤ 3 m (9.8 ft) — Absolute encoder EnDat (5 V) / Absolute encoder SSI with incremental signals sin/cos 1 V_pp (5 V)

Absolute encoder with DRIVE-CLiQ 6FX2001-5.D..

X100-X105
6SL3060-4A..0-0AA0 ≤ 5 m (16 ft)
6FX2002-1DC00-.... ≤ 70 m (230 ft)

X500 SMC30 X520

6FX.002-2CC11-.... ≤ 100 m (328 ft) — Absolute encoder with SSI 6FX2001-5.S..

X100-X105
6FX.002-2DC30-.... ≤ 30 m (98 ft)
6FX.002-2DC30-.... [1] ≤ 30 m (98 ft) — **6FX.002-2DC34-....** [1] ≤ 30 m (98 ft)
6FX.002-2DC30-.... [1] ≤ 30 m (98 ft) — **6FX.002-2DC34-....** [1] ≤ 30 m (98 ft)

6FX2003-0DT67-.... (cabinet bushing)

3rd party direct measuring systems with DRIVE-CLiQ interface

G_NC01_EN_00515a

[1] The total cable length (basic cable and extension cable) must not exceed 30 m (98.4 ft).

10

Power connector	**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.

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	Order 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**

Selection and ordering data

Description	Order No.
Power connectors for SIMOTICS T-1FW6 built-in torque motors	
• Size 1 for 4 × 2.5 mm^2 connector 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 connector 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 connector with socket and full-thread union nut	**6FX2003-0SU07**

More information

A special tool is needed to crimp the contacts.
For further information, please go to:
www.intercontec.biz

10

Connection system MOTION-CONNECT
Accessories for power and signal cables

Mounting flange	HF (high-frequency) clamp

■ 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 union nut or with external thread.

■ Selection and ordering data

Description	Order 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

Dimen-sions	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	∅ 23 (0.91)	∅ 28.6 (1.13)	∅ 47 (1.85)	∅ 66 (2.6)	∅ 23 (0.91)	∅ 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	∅ 32 (1.26)	∅ 40 (1.57)	∅ 60 (2.36)	∅ 63 (2.48)	∅ 32 (1.26)	∅ 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	Order 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**

10

Connection system MOTION-CONNECT
Accessories for power and signal cables

| 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.

■ 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	Order No.
DRIVE-CLiQ cabinet bushing For MOTION-CONNECT DRIVE-CLiQ signal cables (RJ45)	**6SL3066-2DA00-0AA0**

■ Selection and ordering data

Description	Order No.
DRIVE-CLiQ cabinet bushing For MOTION-CONNECT DRIVE-CLiQ signal cables (M12)	**6FX2003-0DT67**

■ Dimensional drawings
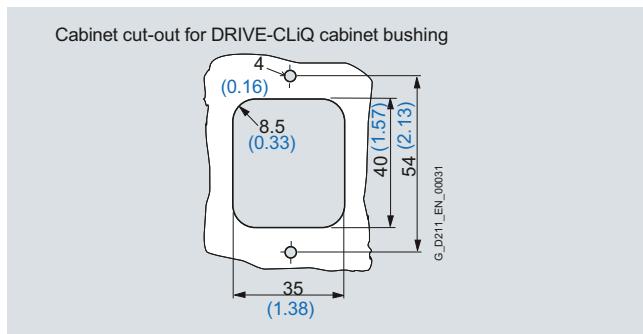
Dimensions in mm (inches)

■ Dimensional drawings
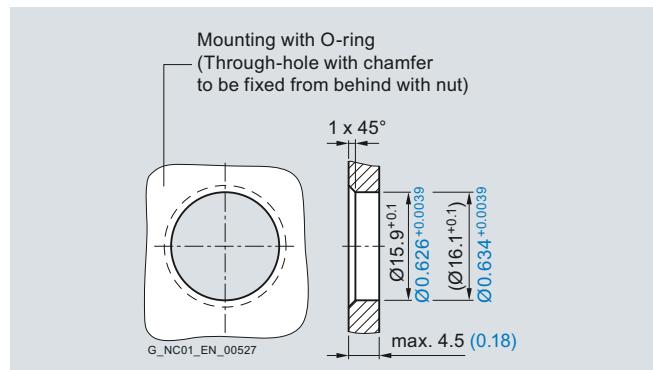
Dimensions in mm (inches)
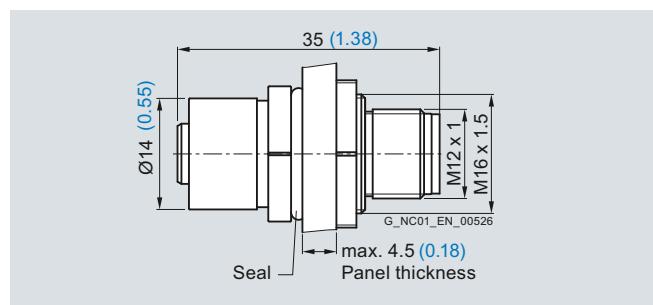
Cutout in cabinet for DRIVE-CLiQ cabinet bushing

Connection system MOTION-CONNECT
Accessories for power and signal cables

DRIVE-CLiQ coupler

■ **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	Order No.
DRIVE-CLiQ coupler For MOTION-CONNECT DRIVE-CLiQ signal cables	**6SL3066-2DA00-0AB0**

Services and supplementary products

11

Services and supplementary products
SINUMERIK Manufacturing Excellence

Spare parts services

■ Overview

G_NC01_EN_00460

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.

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
• Extended spare part availability
• Stock reduction of your spare parts store

■ Benefits

• Optimum price/performance and top quality
• Lifecycle management over the complete lifecycle
• Highest quality and availability of your machines and plants 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

Please contact your local Siemens sales office for more information.

You will find contact addresses on the Internet at:
www.siemens.com/automation/partner

Spare parts services
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	Comment
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

11

Services and supplementary products
SINUMERIK Manufacturing Excellence

■ 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	Comment
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

Product returns

For product 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/inspection report regarding the diagnosis and damage, or information about the completed repair.

■ Benefits

• Price benefit through the return of defective parts
• A spare part is available immediately in the event of failure
• Full liability for defects for the complete spare part
• Long-term spare parts availability
• Optimum system compatibility

■ Overview

Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum – and offer you 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.

Different types of repair are available to better suit your requirements:

Normal repair

Normal repair at standard conditions normally takes 10 working days following receipt at our repair shop.

Fast repair

In particularly urgent cases, we offer a fast repair within 1 or 2 working days for many products at additional cost.

Turnaround repair

We also organize 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.

Function repair

A function repair is a standard repair but without touching up work, such as the removal of scratches, renewal of inscriptions, correction of 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 early 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 about repair report/inspection report

11

Services and supplementary products
SINUMERIK Manufacturing Excellence

Spare parts services	Spare parts services
Product upgrade service	General overhaul

■ 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 machines/plants is achieved, we offer you the product upgrade service at an attractive price.

In the course of their lifecycle, electronic components are normally redesigned several times. With the product upgrade service, you will always receive the latest technology.

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.

You can ask your regional Siemens contact about the possibility of an upgrade.

■ Benefits

- Price benefit through upgrade service
- Full liability for defects for the complete new component
- Extended availability of your machines/plants
- 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
- Future service and support through Siemens is assured

■ 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 (preventative maintenance) for electronic components and motors at favorable conditions.

During the planned general overhaul, wear parts and aging parts are replaced in accordance with their stated service life, reducing 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 price will be charged in this case.

■ Benefits

- Preventative 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 machines/plants
- New liability for defects for 12 months for the components subjected to a general overhaul
- Low price

rvices and supplementary products
INUMERIK Manufacturing Excellence

Spare parts services — 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, suppliers, service and quality management departments. 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 price will be charged in this case.

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

Spare parts services — Return of diagnostic part

Overview

Spare parts used for diagnostic purposes from the spare parts stock can be returned within 3 months, i.e. 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

- Diagnostics
- Reduced spare parts inventories
- Low costs

Balance Systems S.r.l. – Measuring and monitoring system for grinding machines

Overview
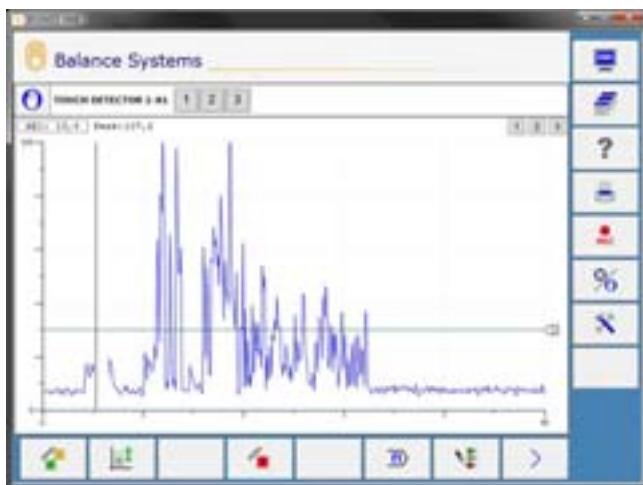
Measuring and monitoring system for grinding machines

Versatile building block system for measuring and monitoring grinding machines – VM25 for the SINUMERIK 840D/840D sl control

The VM25 system contains the hardware and software components required to ensure productivity, economy and quality of the grinding process – using either manual or automatic operations.

Software package – VM25-HMI

The user interface VM25-HMI can be easily integrated by the user into his application program, or activated as 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 at 1 or 2 planes, made possible by high precision balancing heads without torque effect (patented), to achieve the maximum surface quality of the ground workpiece

• 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

• Comparative in-process measurement of the workpiece, with immediate correction feedback signal to the CNC/PLC for the diameter, the lengths and the 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 levels 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

Benefits

Modular multi-functional system

■ Complete
Full, customized adaptation of the user interface using graphics libraries for data display, configuration and operation

■ Flexible
Creation of different application levels through to complex, user-specific structures with the help of supplied templates

■ Integrable
A Windows application enables monitoring of the control and process to be integrated into the HMI environment of the SINUMERIK 840D/840D sl without the need for additional display devices

■ Intelligent
Effective process control through acquisition of comprehensive process data

■ Available
Open for additional expansions

More information

Please contact:

Balance Systems S.r.l.

Contact: Dr. Ing. Andrea Guidotti

Via Ruffilli 2/4
20060 Pessano con Bornago (MI)
ITALY

Tel.: +39 02 9504955
Fax: +39 02 9504977
E-mail: info@balancesystems.it
www.balancesystems.com

Services and supplementary products
SINUMERIK Solution Partners with tailored services

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

Applications

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

Please contact:

KUKA Roboter GmbH

Contact: Mr. Andreas Schuhbauer
Key Technology Manager
Machine Tool Automation

Hery-Park 3000
86368 GERSTHOFEN
GERMANY

Tel.: +49 821 4533-2812
Fax: +49 821 4533-3461
E-mail: andreasschuhbauer@kuka-roboter.de
www.kuka-robotics.com/germany/de/

11

■ Comprehensive teaching support for educational institutions

Siemens Automation Cooperates with Education (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
- 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. SCE can currently offers 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! logic module and SIMATIC S7-1200 compact controller
- 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

11

Services and supplementary products
Siemens Automation Cooperates with Education

Applicable practical know-how

■ **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 are thus optimally prepared 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/contact

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

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

Scan the QR code for further information (SCE homepage)

11

12

Appendix

Appendix
Indexes

Subject index

12

12

12

12

Appendix
Indexes

© Siemens AG 2012

Order number index

12

Appendix
Indexes

Order number index

12

Appendix

Indexes

◼ Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in²	lb-ft²	lb-in-s²	lb-ft-s² slug-ft²	kg-cm²	kg-cm-s²	gm-cm²	gm-cm-s²	oz-in²	oz-in-s²
lb-in²	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-ft²	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^5	429.71	2304	5.967
lb-in-s²	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-s² slug-ft²	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-cm²	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-s²	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-cm²	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-s²	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-in²	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-s²	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

◼ 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

◼ Power (to convert from A to B, multiply by entry in table)

A \ B	HP	Watts
HP (English)	1	745.7
(lb-in) (deg./sec)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (rpm)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./sec)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (rpm)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	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/sec.	degrees/sec.
rpm	1	0.105	6.0
rad/sec.	9.55	1	57.30
degrees/sec.	0.167	1.745×10^{-2}	1

12

Appendix
Conversion tables

Temperature Conversion

°F	°C	°C	°F
0	−17.8	−10	14
32	0	0	32
50	10	10	50
70	21.1	20	68
90	32.2	30	86
98.4	37	37	98.4
212	100	100	212
subtract 32 and multiply by $^5/_9$		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

12

[1] The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

© Siemens AG 2012

Appendix
Metal surcharges

■ 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: German Trade Association for Cables and Conductors (www.kabelverband.org).

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

```
------71
```

No basis necessary

No surcharge for silver

No surcharge for copper

No surcharge for aluminum

No surcharge for lead

No surcharge for gold

Dysprosium acc. to weight, basic official price 300 €

Neodym acc. to weight, basic official price 50 €

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)

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						
2	100						
3	150						
4	175		Calculation based on raw material weight				
5	200						
6	225						
7	300						
8	400						
9	555						
Miscellaneous							
-			No metal surcharge				

12

Appendix
Conditions of sale and delivery

1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- 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 in Germany"[1] and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- 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].

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

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).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i.a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

---

[1] The text of the Terms and Conditions of Siemens AGcan be downloaded at
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

Catalogs

Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices listed at www.siemens.com/automation/partner

	Catalog
Interactive Catalog on DVD	
for Industry Automation, Drive Technologies and Low Voltage Distribution	**CA 01**

Drive Systems

Variable-Speed Drives

SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
ROBICON Perfect Harmony Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3
SINAMICS S150 Converter Cabinet Units	
SINAMICS DCM Converter Units	D 23.1
SINAMICS and Motors for Single-Axis Drives	D 31

Three-phase Induction Motors — D 84.1
- H-compact
- H-compact PLUS

Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	DA 22
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4

Note:
Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control

Low-Voltage Three-Phase-Motors

SIMOTICS Low-Voltage Motors	D 81.1
MOTOX Geared Motors	D 87.1
SIMOGEAR Geared Motors	MD 50.1

Mechanical Driving Machines

FLENDER Standard Couplings	MD 10.1
FLENDER SIG Standard industrial gear unit	MD 30.1
FLENDER SIP Standard industrial planetary gear units	MD 31.1

Low-Voltage Power Distribution and Electrical Installation Technology

SENTRON Protection, Switching, Measuring and Monitoring Devices	LV 10.1
SIVACON · ALPHA Switchboards and Distribution Systems	LV 10.2
SIVACON 8PS Busbar Trunking Systems	LV 70
GAMMA Building Control	ET G1
PDF: DELTA Switches and Socket Outlets	ET D1

Motion Control

	Catalog
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 840D sl Type 1B Equipment for Machine Tools	NC 62
SINUMERIK 808D, SINAMICS V60 and G120 and SIMOTICS 1FL5 and 1LE1 motors	NC 81.1
SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi and 1FK7/1PH8 motors	NC 82
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
Drive and Control Components for Cranes	CR 1

Power Supply and System Cabling

Power supply SITOP	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2

Process Instrumentation and Analytics

Field Instruments for Process Automation	FI 01
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
Products for Weighing Technology	WT 10
PDF: Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	PA 11

Safety Integrated

Safety Technology for Factory Automation	SI 10

SIMATIC HMI/PC-based Automation

Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC

SIMATIC Ident

Industrial Identification Systems	ID 10

SIMATIC Industrial Automation Systems

Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
PDF: Migration solutions with the SIMATIC PCS 7 Process Control System	ST PCS 7.2

SIMATIC NET

Industrial Communication	IK PI

SINVERT Photovoltaics

Inverters and Components for Photovoltaic Installations	RE 10

SIRIUS Industrial Controls

SIRIUS Industrial Controls	IC 10
SIRIUS Industrial Controls (selected content from catalog IC 10)	IC 90

System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

PDF: These catalogs are only available as pdf files.

Information and Download Center

PDF versions of the catalogs are available on the Internet at:
www.siemens.com/drives/infocenter

Get more information

SINUMERIK automation systems
for machine tools:
www.siemens.com/sinumerik

The drives family SINAMICS:
www.siemens.com/sinamics

Motion Control Systems and
Motion Control Solutions
for production machine and machine tool equipments:
www.siemens.com/motioncontrol

Local partners worldwide:
www.siemens.com/automation/partner

The information provided in this catalog contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.
All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.

Token fee: 5.00 €