SINUMERIK 808D
SINAMICS V60 and G120
SIMOTICS 1FL5 and 1LE1

Catalog NC 81.1 · 2012

Motion Control

Answers for industry.

SIEMENS

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Motion Control
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SINAMICS V60 and G120
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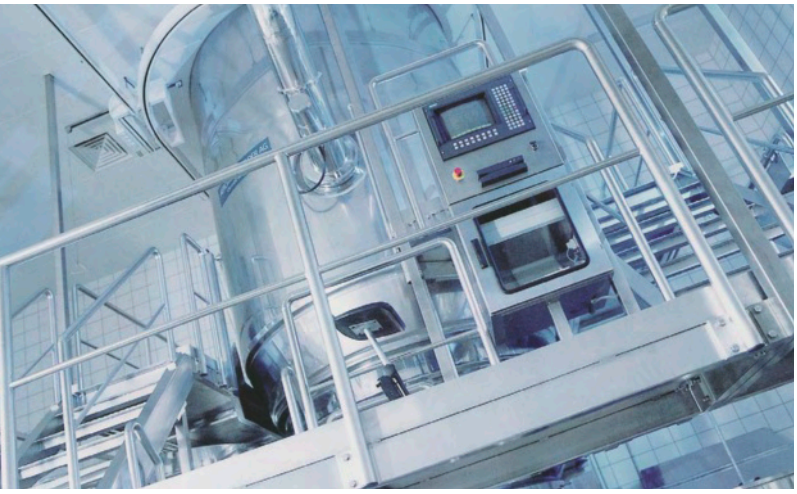

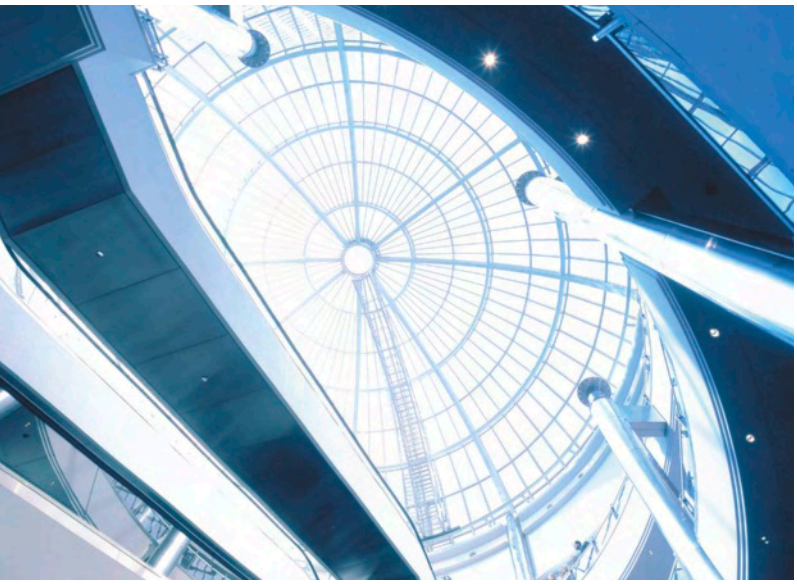

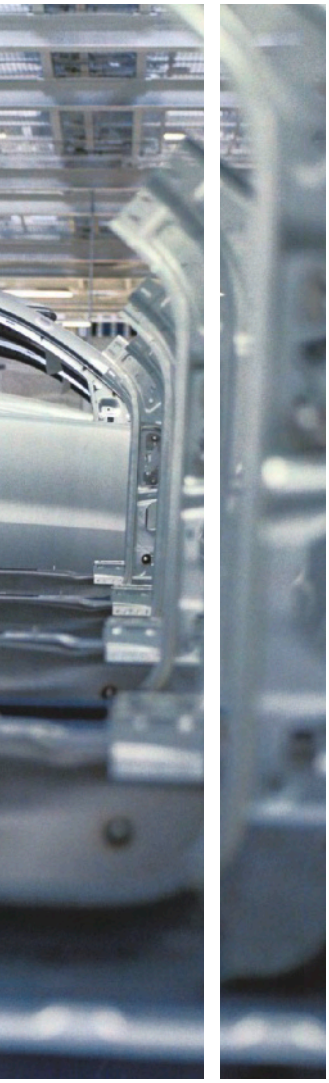

Answers for industry.

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.

Notes

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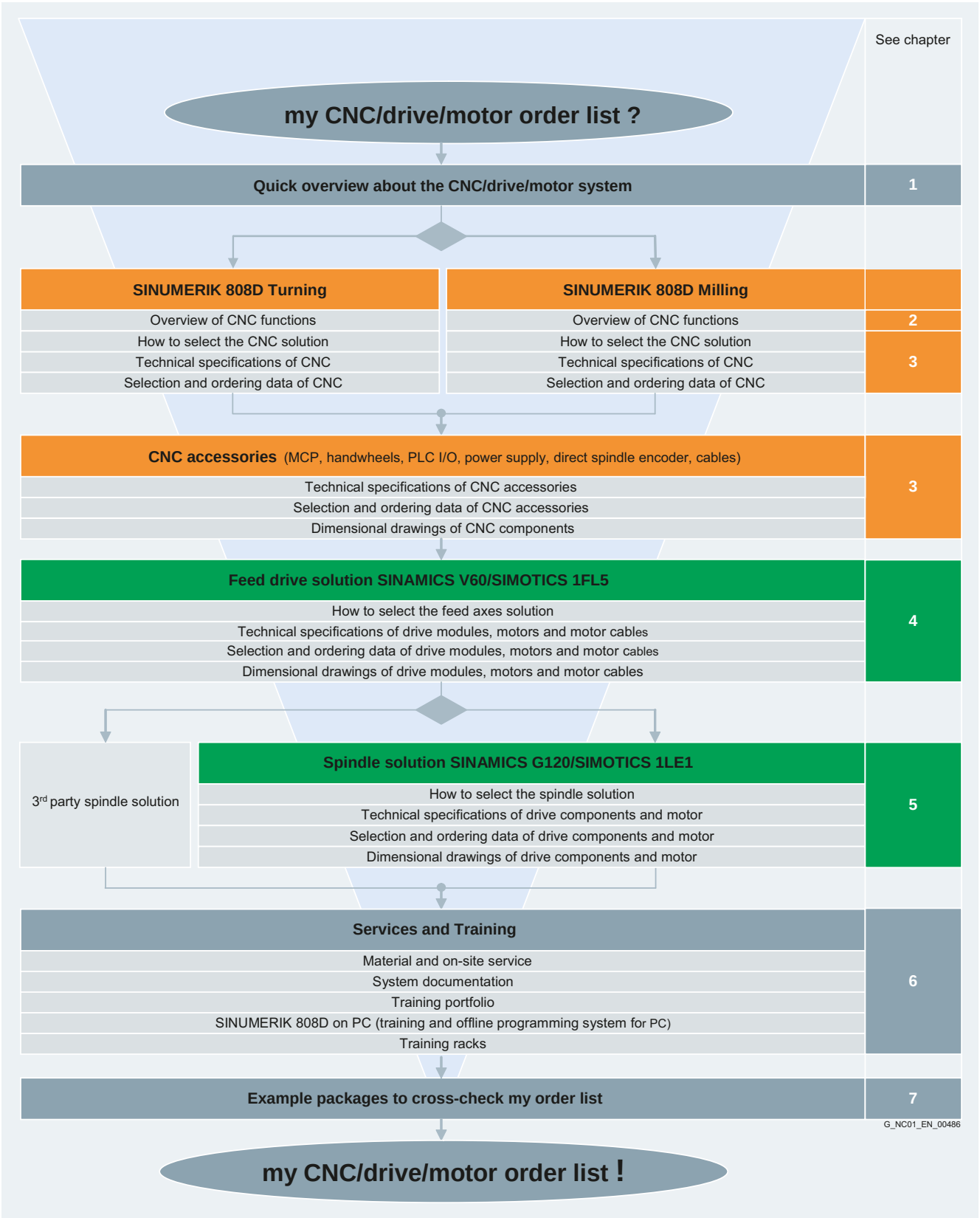
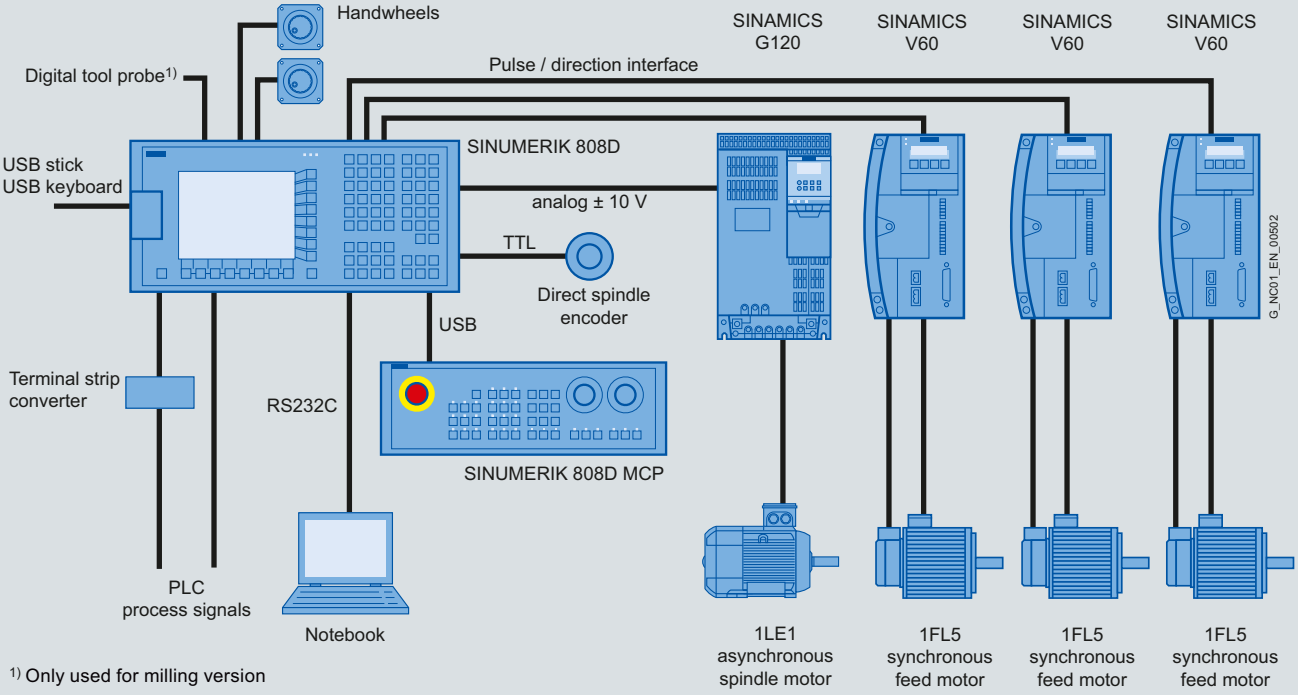
Overview



Overview



1) Only used for milling version

1

Overview

Small, robust, easy, easily smart

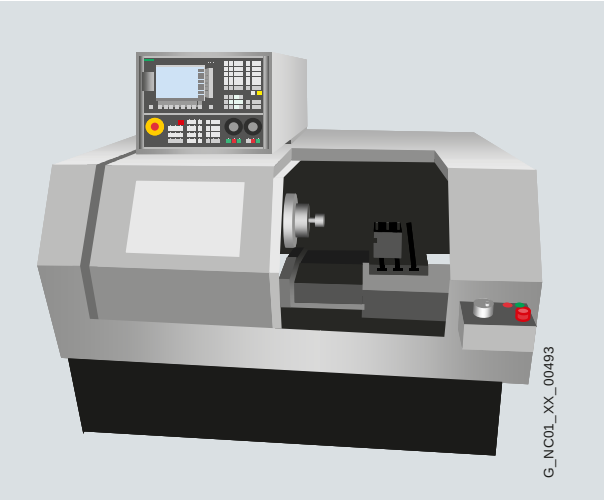
The operator-panel-based CNCs SINUMERIK 808D Milling and SINUMERIK 808D Turning are extremely compact, rugged and very easy to maintain. Powerful CNC functions permit excellent workpiece precision to be achieved in very short machining times. Thanks to SINUMERIK 808D startGUIDE, all process steps of the machine – from engineering and production via sales to operation – can be managed with a minimum of training efforts.

Tailored for standard turning machines …

The SINUMERIK 808D Turning CNC is perfectly tailored to meet the requirements of modern standard turning machines. Intelligent CNC features such as full servo controlled rigid tapping or flying spindle/C axis switchover enable most precise and fastest turning operation.

Perfectly tailored and preconfigured for:

- Up to 4 axes/spindles in one machining channel
- Tailored system software for inclined bed full-CNC and flatbed manual controlled semi-CNC lathes

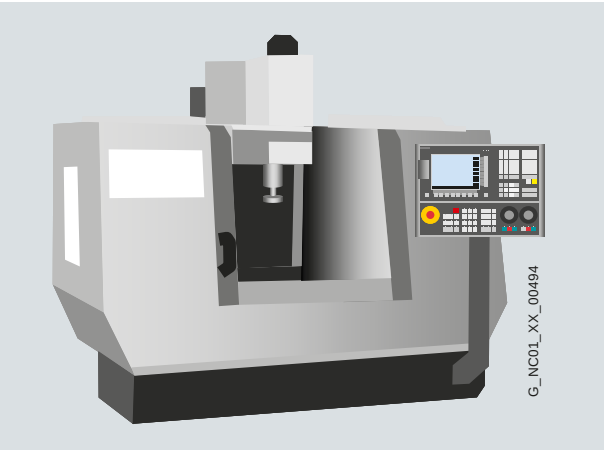


... and standard milling machines

The SINUMERIK 808D Milling CNC is perfectly tailored to meet the requirements of modern standard milling machines. Thanks to SINUMERIK MDynamics with its intelligent look ahead function and dynamic block compression, the SINUMERIK 808D Milling is also ideal for the machining of molded workpieces.

Perfectly tailored and preconfigured for:

- 4 axes/spindles in one machining channel
- Tailored system software for vertical machining centers
- Prepared for mold and die applications



Overview

Maximum feed axes dynamics

SINAMICS V60 Controlled Power Modules and SIMOTICS 1FL5 feed motors are the perfect partners in order to achieve maximum dynamics and accuracy for feed axes in standard turning and milling machine tool applications.
With its closed-loop speed and current control, SINAMICS V60 is perfectly tailored for economic but powerful feed axes and guarantees easiest commissioning without any PC tools.
With a robust design, SINAMICS V60 as well as SIMOTICS 1FL5 feed motors are perfectly prepared for maximum availability even in harsh environments.

Economic spindle power

SINAMICS G120 drive modules and SIMOTICS 1LE1 spindle motors are the perfect partners in order to enable economic but powerful spindle solutions.
With its regenerative power supply, SINAMICS G120 sets the standard for energy efficient spindle solutions.
High-efficiency SIMOTICS 1LE1 spindle motors are tailored for converter fed operations. This guarantees perfect characteristics for the use as spindle motors.

Up to 36 months material warranty and on-site service

For the worst-case scenario, you will receive a material warranty and a free on-site service period for the SINUMERIK 808D and the associated components of 24 months by Siemens Industry Sector, IA & DT. With an end-user registration, this time period can be extended up to 36 months after delivery.

You benefit because we eliminate any defects on our components free of charge on site, i.e. directly at the site of installation of your machine.

Further information about the conditions and the scope of the warranty and the on-site service can be found at:
www.siemens.com/automation/rsc

Overview

The MOTION-CONNECT cables in this catalog are suitable for the use with standard turning and milling machine tool applications.

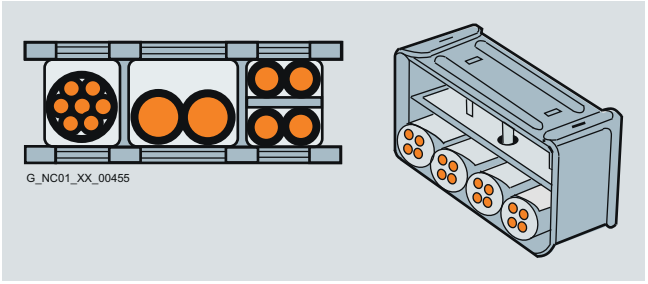
The use of pre-assembled MOTION-CONNECT cables will ensure high quality and system-tested, problem-free operation.

Degree of protection of pre-assembled power and signal cables and their extensions is IP54 when closed and connected unless otherwise stated.

MOTION-CONNECT cables are not suitable for outdoor use.

MOTION-CONNECT cables are approved for a maximum horizontal travel distance of 5 m without support.

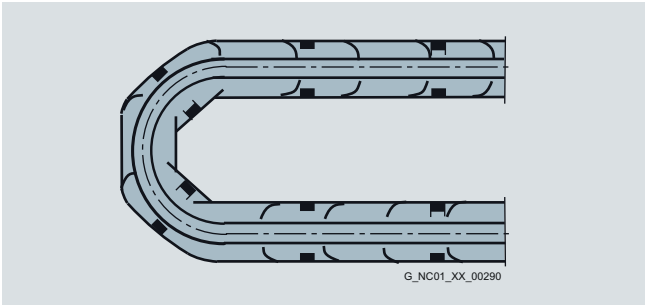
The cables must be unwound without twisting.



To maximize the service life of the cable carrier and cables, cables in the carrier made from different materials must be separated in the cable carrier using spacers. 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 be separated by spacers as well.

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.

Cables must be installed in accordance with the instructions supplied by the cable carrier manufacturer.

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.

Derating factors for power and signal cables

Ambient air temperature °C	**Derating factor** according to EN 60204-1 Table D.1
30	1.15
35	1.08
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

Overview of functions

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The following overview lists all the functions which are available with the SINUMERIK 808D Turning and SINUMERIK 808D Milling.

The functionality of the SINUMERIK 808D Turning and SINUMERIK 808D Milling complies with the export list restrictions. Accordingly, these CNC controls do not require official approval in accordance with EU or German law.

The information in the overview of functions of SINUMERIK 808D Turning and SINUMERIK 808D Milling controls is based on the following software version:

Control	Software version
PPU 141.1	4.4 SP1

Overview of functions
CNC control SINUMERIK 808D

Control structure and configuration/ Drives/Connectable measuring systems

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Control structure and configuration			
Panel-based control system comprising			
• Compact operator panel		✓	✓
• CNC/PLC Control Unit		✓	✓
• Onboard digital PLC inputs/outputs		✓	✓
• CF card with system software Export version		Turning	Milling
SINUMERIK operator-panel CNC			
• Operator panel layout		Horizontal	Horizontal
• Color display		7.5"	7.5"
• Display resolution		640 × 480	640 × 480
• Integrated CNC keyboard with hard keys		✓	✓
• Specific CNC keyboard layout for		Turning	Milling
• Operator panel with Simplified Chinese layout		✓	✓
• Operator panel with English layout		✓	✓
SINUMERIK Operate BASIC		✓	✓
Quantity of pulse/direction interfaces for feed axis converter		3	3
Quantity of analog ± 10 V interfaces for spindle converter		1	1
Channels/mode groups MG			
• Maximum configuration		1	1
CNC user memory (buffered) for CNC part programs		1.25 MB	1.25 MB
Axes/spindles			
• Basic quantity of axes/spindles		3	4
• Maximum configuration axes/spindles		4	4
• Axis/spindle, each additional	**6FC5800-0AC20-0YB0**	O	–
Drives			
Feed drives			
• SINAMICS V60 CPM60.1 via pulse/direction interface		O	O
• 3rd-party feed axis converter via pulse/direction interface		O	O
Spindles			
• SINAMICS G120 via analog ± 10 V interface		O	O
• 3rd-party spindle converter via analog ± 10 V interface		O	O
Connectable measuring systems			
Number of measuring systems per axis, max.		1	1
Incremental TTL encoder installed in SIMOTICS 1FL5 feed motors		✓	✓
RS422 (TTL) direct incremental spindle encoder	**6FX2001-2EB02**	O	O

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Connectable CNC accessories			
Machine control panel			
• SINUMERIK 808D MCP via USB interface			
- English layout	**6FC5303-0AF35-0AA0**	O	O
- Simplified Chinese layout	**6FC5303-0AF35-0CA0**	O	O
• 3rd-party MCP via onboard digital PLC inputs/outputs		O	O
Number of digital tool probes, max.		0	1
Number of electronic handwheels RS422 5 V DC, max.		2	2
Electronic handwheels, 5 V DC			
• With 120 mm × 120 mm front panel	**6FC9320-5DB01**	O	O
• With 76.2 mm × 76.2 mm front panel	**6FC9320-5DC01**	O	O
• Without front panel, without setting wheel	**6FC9320-5DF01**	O	O
• Without front panel, with setting wheel	**6FC9320-5DM00**	O	O
Axis functions			
Feedrate override		0 ... 200 %	0 ... 200 %
Feedrate override axis-specific		0 ... 200 %	0 ... 200 %
Traversing range decades		± 9	± 9
Rotary axis, turning endlessly		✓	✓
Velocity, max.		300 m/s	300 m/s
Acceleration with jerk limitation		✓	✓
Programmable acceleration		✓	✓
Feedrate interpolation		✓	✓
Separate path feed for corners and chamfers		✓	✓
Travel to fixed stop		✓	✓
Velocity-dependent feed forward control		✓	✓
Spindle functions			
Spindle speed, analog		✓	✓
Spindle speed, max. programmable value range (display ± 999999999.9999)		10^6 ... 0.0001	10^6 ... 0.0001
Spindle override		0 ... 200 %	0 ... 200 %
Gear stages		5	5
Intermediate gear		✓	✓
Automatic gear stage selection		✓	✓
Oriented spindle stop (requires direct spindle encoder)		✓	✓
Spindle speed limitation min./max.		✓	✓
Constant cutting rate		✓	✓
Spindle control via PLC (positioning, oscillation)		✓	✓
Changeover to axis mode (requires servo spindle and direct encoder)		✓	✓
Axis synchronization on-the-fly (requires servo spindle and direct encoder)		✓	✓
Thread run-in and run-out programmable		✓	✓
Thread cutting with constant or variable pitch		✓	✓
Tapping with compensating chuck/rigid tapping		✓	✓

Overview of functions
CNC control SINUMERIK 808D

Interpolations/Measuring functions/ Motion-synchronous actions/Open Architecture

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Interpolations			
Linear interpolation axes, max.		3	3
Circle via center point and end point		✓	✓
Circle via interpolation point		✓	✓
Helical interpolation		✓	✓
Universal interpolator NURBS (non-uniform rational B splines)		✓	✓
Continuous-path mode with programmable rounding clearance		✓	✓
SINUMERIK MDynamics Advanced Surface look ahead, velocity control and CNC block compression		–	✓
High-speed setting cycle (CYCLE 832)		–	✓
Look ahead (number of blocks)		1	50
Measuring functions			
Measuring in JOG Number of probes (switching) with/without deletion of distance-to-go		–	1
Motion-synchronous actions			
CNC inputs/outputs, high-speed			
• Digital inputs CNC onboard		3	3
• Digital outputs CNC onboard		1	1
Synchronized actions and high-speed auxiliary function output incl. 3 synchronous functions		✓	✓
Positioning axes and spindles via synchronized actions (command axes)		✓	✓
Interrupt routines with fast retraction from the contour		✓	✓
Open Architecture			
Customizable HMI			
• Customizable screens in the HMI		✓	✓
• Input screens for customized user cycles		✓	✓

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
CNC programming			
Programming methods			
• SINUMERIK style programming language (DIN 66025 and high-level language expansion)		✓	✓
• ISO code		✓	✓
Main program call from main program and subroutine		✓	✓
Subroutine levels, max.		11	11
Number of subroutine passes		≤ 9999	≤ 9999
Number of levels for skip blocks		1	1
Polar coordinates		✓	✓
Dimensions metric/inch, changeover			
• manually		✓	✓
• via program		✓	✓
Inverse-time feedrate		✓	✓
Auxiliary function output			
• Via M word, max. programmable value range:		INT 231^{-1}	INT 231^{-1}
• Via H word, max. programmable value range REAL ± 3.4028 ex 38 (display ± 999999999.9999)		INT -231 to 231^{-1}	INT -231 to 231^{-1}
Basic frames, max. number		1	1
Settable offsets, max. number		6	6
Zero/work offsets, programmable (frames)		✓	✓
Global and local user data		✓	✓
Global program user data		✓	✓
SINUMERIK high-level CNC language with			
• Frame concept TRANS/ROT/SCALE/MIRROR		✓	✓
• User variables, configurable		✓	✓
• Predefined user variables (arithmetic parameters)		✓	✓
• Predefined user variables (arithmetic parameters), configurable		✓	✓
• Read/write system variables		✓	✓
• Indirect programming		✓	✓
• Program jumps and branches		✓	✓
• Program coordination with WAIT, START, INIT		–	–
• Arithmetic and trigonometric functions		✓	✓
• Compare operations and logic combinations		✓	✓
• Macro techniques		✓	✓
• Control structures IF-ELSE-ENDIF		✓	✓
• Control structures WHILE, FOR, REPEAT, LOOP		✓	✓
• STRING functions		✓	✓

Technology cycles/canned cycles

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Technology cycles/canned cycles			
Technology cycles for SINUMERIK style programming language			
• Drilling, centering – CYCLE81		✓	✓
• Drilling, counterboring – CYCLE82		✓	✓
• Deep-hole drilling – CYCLE83		✓	✓
• Rigid tapping – CYCLE84		✓	✓
• Tapping with compensating chuck – CYCLE840		✓	✓
• Reaming 1 – CYCLE85		✓	✓
• Boring – CYCLE86		✓	✓
• Boring with stop – CYCLE87		✓	✓
• Drilling with stop – CYCLE88		✓	✓
• Reaming 2 – CYCLE89		✓	✓
• Position pattern: Row/grid of holes – HOLES1		–	✓
• Position pattern: Circle of holes – HOLES2		–	✓
• CYCLE 92 cut-off		✓	–
• Groove – CYCLE93		✓	–
• Undercut (forms E and F according to DIN) – CYCLE94		✓	–
• Contour cutting with relief cut – CYCLE95		✓	–
• Thread undercut – CYCLE96		✓	–
• Thread cutting – CYCLE99		✓	–
• Chaining of threads – CYCLE98		✓	–
• Face milling – CYCLE71		–	✓
• Contour milling – CYCLE72		–	✓
• Rectangular spigot milling – CYCLE76		–	✓
• Circular spigot milling – CYCLE77		–	✓
• Long holes located on a circle – LONGHOLE		–	✓
• Slots on a circle – SLOT1		–	✓
• Circumferential slot – SLOT2		–	✓
• Milling a rectangular pocket – POCKET3		–	✓
• Milling a circular pocket – POCKET4		–	✓
• Thread milling – CYCLE90		–	✓
Canned cycles for ISO code milling			
• Thread cutting with constant lead (G33)		–	✓
• Deep hole drilling cycle with chip breakage (G73)		–	✓
• Left tapping cycle (G74)		–	✓
• Fine boring cycle (G76)		–	✓
• Drilling cycle counterboring (G81)		–	✓
• Countersink drilling cycle (G82)		–	✓
• Deep hole drilling cycle with chip removal (G83)		–	✓
• Right tapping cycle (G84)		–	✓
• Drilling cycle (G85)		–	✓
• Drilling cycle, retraction with G00 (G86)		–	✓
• Reverse countersinking (G87)		–	✓
• Drilling cycle, retraction with machining feedrate (G89)		–	✓
Canned cycles for ISO code turning (G code system A)			
• Thread cutting with constant lead (G33)		✓	–
• Thread cutting with variable lead (G34)		✓	–
• Finishing cycle (G70)		✓	–
• Stock removal cycle longitudinal axis (G71)		✓	–
• Stock removal cycle transverse axis (G72)		✓	–

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Technology cycles/canned cycles (continued)			
Canned cycles for ISO code turning (G code system A) (continued)			
• Repeat contour (G73)		✓	–
• Deep hole drilling and recessing in longitudinal axis (G74)		✓	–
• Deep hole drilling and recessing in facing axis (G75)		✓	–
• Multiple thread cutting (G76)		✓	–
• Axial cutting (G90)		✓	–
• Thread cutting (G92)		✓	–
• Radial cutting (G94)		✓	–
Program/workpiece management			
Part programs on PPU 141.1, max. number		255	255
Readable part program names		✓	✓
Sub-folders for part programs with readable names		✓	✓
Programming support			
Background editing		✓	✓
Program editor			
• Full screen CNC editor with cut, copy and paste functionality		✓	✓
• Programming support programGUIDE BASIC for SINUMERIK technology cycles		✓	✓
• Contour computer with programming graphics/free contour input (contour calculator)		✓	✓
Simulation			
2D simulation		✓	✓
Real-time simulation of current machining operation		✓	✓
Operating modes			
Manual Machine plus for manual controlled semi-CNC lathes	**6FC5800-0AP07-0YB0**	O	–
JOG			
• T,S,M screen for quick activation of machine functions		✓	✓
• Face milling cycle for workpiece preparation		–	✓
• Cutting cycle for workpiece preparation		✓	–
• Handwheel selection		✓	✓
• Switchover: inch/metric		✓	✓
• Manual measurement of zero/work offset		✓	✓
• Manual measurement of tool offset		✓	✓
• Semi-automatic tool measurement with tool probe		–	✓
MDA			
• Input in text editor		✓	✓
Automatic			
• Execution from memory stick connected to USB interface on operator panel front		✓	✓
• Program control (dry-run feed, block skip etc.)		✓	✓
• Program editing		✓	✓
• Block search with/without calculation		✓	✓
Repos (repositioning on the contour)			
• With operator command/semi-automatically		✓	✓
• Program-controlled		✓	✓
Preset			
• Set actual value		✓	✓

Overview of functions
CNC control SINUMERIK 808D
Tools/Communication/data management/ HMI functions

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Tools			
Tools/cutting edges, max.		64/128	64/128
Tool types			
• Turning		✓	–
• Drilling		✓	✓
• Milling		–	✓
Tool radius compensations in plane			
• With approach and retract strategies		✓	✓
• With transition circle/ellipse on outer edges		✓	✓
Tool offset selection via T and D numbers		✓	✓
Look-ahead detection of contour violations		✓	✓
Communication/data management			
USB interface on panel front for memory stick and USB PC keyboard • Transfer of - Machine and setting data - PLC data - Compensation data - Tool and work offset data - R parameter - HMI data - User cycles - Part programs - PLC program (*.pte)		✓	✓
• Execute part program		✓	✓
Serial interface RS232C			
• Part program send/receive		✓	✓
• PLC program upload/download		✓	✓
• PLC status monitoring		✓	✓
HMI functions			
SINUMERIK 808D startGUIDE			
• Startup assistant Built-in graphical interactive assistant for 1st commissioning of machines with SINUMERIK 808D		✓	✓
• Series startup assistant Built-in graphical interactive assistant for the series production of machines with SINUMERIK 808D		✓	✓
• Sales assistant Built-in viewer for bitmaps with sales arguments for SINUMERIK 808D, extendable by customer-specific sales arguments for the machine		✓	✓
Online help for programming, alarms and machine data		✓	✓
CNC program messages		✓	✓
Screen saver		✓	✓
Access protection level support		✓	✓
Chinese input method editor for part program names, sub-directory names and CNC comments		✓	✓
Operating software languages			
• Simplified Chinese, English, Russian, Portuguese		✓	✓
• Language switchover online		✓	✓
• Additional languages, use of language extensions		In preparation	In preparation

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Monitoring functions			
Working area limitation		✓	✓
Limit switch monitoring Software and hardware limit switches		✓	✓
Position monitoring		✓	✓
Standstill (zero-speed) monitoring		✓	✓
Clamping monitoring		✓	✓
Contour monitoring		✓	✓
Axis limitation from the PLC		✓	✓
Spindle speed limitation		✓	✓
Compensations			
Backlash compensation		✓	✓
Leadscrew error compensation		✓	✓
PLC			
Integrated PLC		✓	✓
Style of PLC program			
• Prepared and ready to run PLC program on board		✓	✓
• Fully customized PLC-programs by offline PLC programming tool		✓	✓
Fixed cycle time for PLC		12 ms	12 ms
Maximum number of ladder steps		6000	6000
PLC programming language			
• LAD ladder diagram		✓	✓
Offline PLC programming tool	On toolbox CD-ROM **6FC5811-0CY00-0YA8**	O	O
PLC Ladder Viewer on PPU 141.1		✓	✓
PLC I/O			
• Onboard digital PLC inputs, 24 V, connection via screw-clamp connector on PPU 141.1		24	24
• Onboard digital PLC outputs, 24 V, 0.2 A, connection via screw-clamp connector on PPU 141.1		16	16
• Onboard digital PLC inputs, 24 V, connection via 50-pole ribbon cable connector		48	48
• Onboard digital PLC outputs, 24 V, 0.2 A, connection via 50-pole ribbon cable connector		32	32
Terminal strip converter, connection via 50-pole ribbon cable connector to PPU 141.1	**6EP5406-5AA00** **6EP5306-5BG00**	O	O
PLC alarms/messages, max. number		128	128
Bit memories, number		256 bytes	256 bytes
Timers, number		64	64
Counters, number		64	64
Subroutines		64	64
User machine data for configuring the PLC user program		✓	✓

Overview of functions
CNC control SINUMERIK 808D
Commissioning/serial production/ Diagnostic functions/Service/Training

✓ Basic version O Option – Not available	Order No.	SINUMERIK 808D Turning	SINUMERIK 808D Milling
Commissioning/serial production			
SINUMERIK 808D startGUIDE		✓	✓
• Startup assistant Built-in graphical interactive assistant for 1st commissioning of machines with SINUMERIK 808D		✓	✓
• Series startup assistant Built-in graphical interactive assistant for the series production of machines with SINUMERIK 808D		✓	✓
Backup/restore of system data via USB memory stick		✓	✓
Cloning of serial startup files for serial production via USB memory stick		✓	✓
SINUMERIK 808D, PPU 141.1 T/M, Toolbox with: • Offline PLC programming tool • Default PLC program • MCP strip template • MCP icon library • User manuals	On toolbox CD-ROM **6FC5811-0CY00-0YA8**	O	O
Offline PLC programming tool		✓	✓
Diagnostic functions			
Alarms and messages		✓	✓
Action log can be activated for diagnostic purposes		✓	✓
PLC status		✓	✓
LAD display		✓	✓
Service and maintenance			
Integrated service planner for monitoring of service intervals		✓	✓
One touch system backup (Ctrl + S)		✓	✓
CNC memory buffering via battery		✓	✓
Training and offline programming			
SINUMERIK 808D on PC (free download from www.cnc4you.com)	**6FC5548-0YC20-0YA0**	✓	✓
SINUMERIK 808D Turning CNC training kit	**6AG1067-1AA26-0AA0**	O	O
SINUMERIK 808D Milling CNC training kit	**6AG1067-1AA27-0AA0**	O	O
SINUMERIK 808D V60 drive training kit	**6AG1067-1AA28-0AA0**	O	O

CNC control

3

3/2 **How to select the CNC solution**

3/3 **SINUMERIK 808D**
3/3 SINUMERIK 808D Turning
3/5 SINUMERIK 808D Milling

3/7 **Operator components**
3/7 SINUMERIK 808D MCP
3/8 Electronic handwheel

3/9 **Supplementary components**
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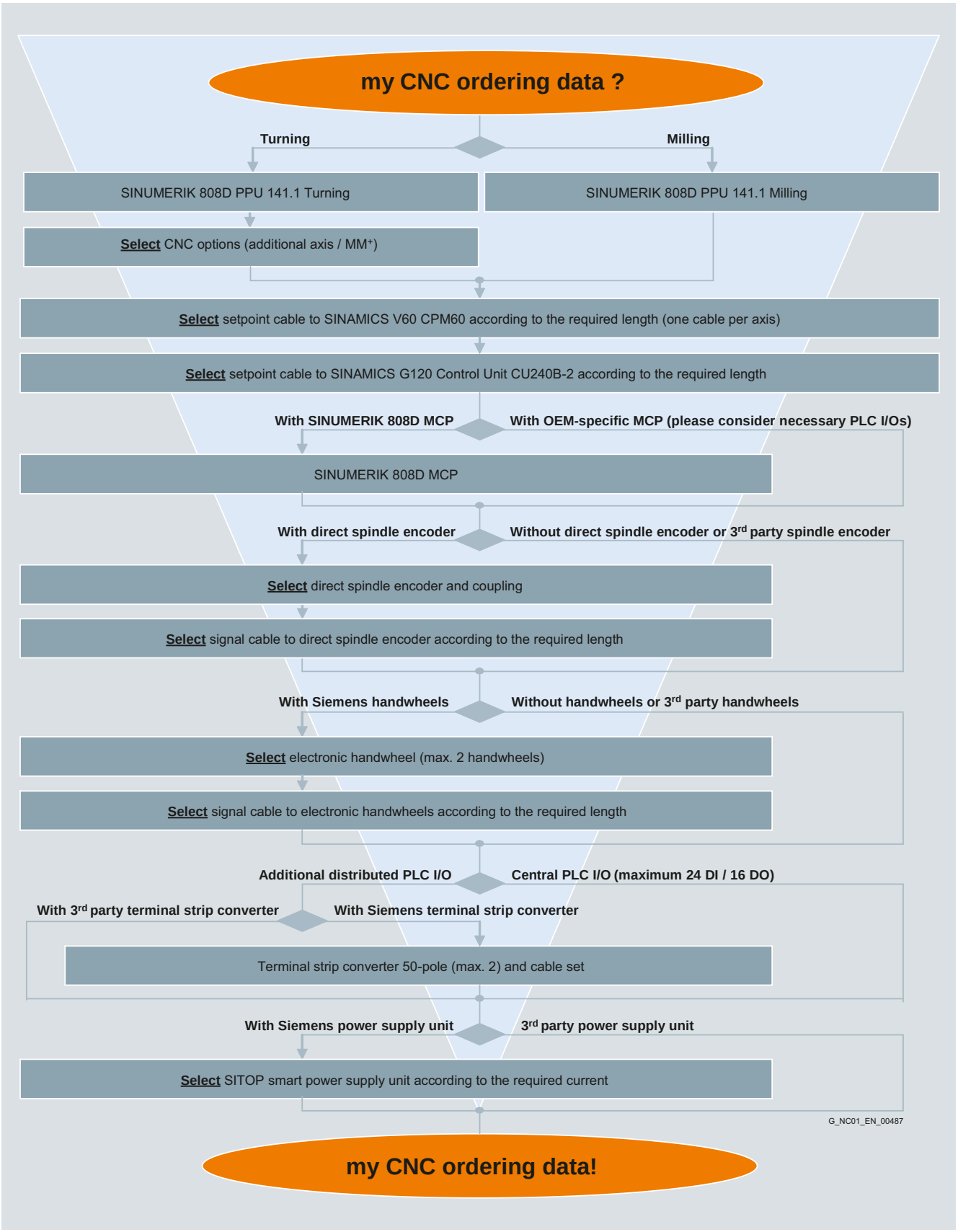
3/21 Direct spindle encoder

Overview



Overview

SINUMERIK 808D Turning PPU 141.1 horizontal

The SINUMERIK 808D Turning is an operator-panel-based CNC, tailored for use in modern standard turning machines.

Benefits

- Compact, rugged, and maintenance-friendly operator-panel CNC with dedicated system software for turning technologies
- Intelligent clamp mounting without drilling holes into the cabinet
- Minimum commissioning efforts due to plug and play machine control panel connected via USB interface
- Maximum performance and accuracy due to most modern CNC features
- SINUMERIK 808D startGUIDE: learn, explore and simplify most modern CNC techniques by the push of a button
- SINUMERIK Operate BASIC: maximum operator convenience similar to SINUMERIK 828D and 840D sl
- SINUMERIK programGUIDE BASIC: wide range of technology cycles for turning and drilling with graphical input screens
- Manual Machine plus: easy semi-automatic machining with handwheel controlled flat-bed lathes
- Easy data transmission via USB stick

Function

- IP65 protection for CNC front panel and machine control panel
- Integrated CNC keyboard with mechanical keys
- Simplified Chinese or English panel layout
- 7.5” color LCD display
- USB user interface on the operator panel front
- Pulse/direction interface for feed drives
- Analog ± 10 V interface for spindle drive
- Data buffering with battery (> 3 years)
- Pre-configured system software for turning technologies
- 1 machining channel/mode group
- Up to 4 axes/spindles
- Graphically guided SINUMERIK CNC programming and standard ISO-code programming with canned cycles
- Graphical CNC simulation
- Integrated contour computer
- Integrated PLC based on the SIMATIC S7-200 command set with ladder logic programming
- Integrated/distributed PLC I/O concept with 72 digital PLC inputs and 48 digital PLC outputs
- CNC options subject to license
- Configurable user screens
- Integrated service planner for machine maintenance tasks
- Faults will be remedied for a period of 24 months following 2nd commissioning/registration on all system components in accordance with the repair service contract performance description.

Integration

The following components can be connected to the SINUMERIK 808D Turning:

- Up to 2 electronic handwheels
- Up to 72 digital PLC inputs and 48 digital PLC outputs
- 1 TTL direct spindle encoder
- SINUMERIK 808D MCP via USB interface
- SINAMICS V60 drive system for feed axes
- SINAMICS G120 drive system or other spindle drives via ± 10 V analog output
- PC via RS232C interface

SINUMERIK 808D Turning

Technical specifications

Product name	SINUMERIK 808D Turning PPU 141.1 horizontal 6FC5370-1AT00-0.A0
Input voltage	24 V DC + 20 %/- 15 %
Power consumption, max.	50 W
Mains buffering time	3 ms (20 ms with SITOP smart)
Degree of protection according to EN 60529 (IEC 60529)	
• Operator panel front, with closed front cover	IP65
• PPU, rear	IP20
Relative humidity	
• Storage	5 … 95 % at 25 °C
• Transport	5 … 95 % at 25 °C
• Operation	5 … 90 % at 25 °C (no condensation)
Ambient temperature	
• Storage	-20 … +60 °C
• Transport	-20 … +60 °C
• Operation	
- Front	0 ... 45 °C
- Rear	0 ... 50 °C
Dimensions	
• Width	420 mm
• Height	200 mm
• Depth	104 mm
Panel cutout	
• Width	406 mm
• Height	186 mm
• Tolerance	+1 mm
Weight, approx.	3.06 kg
Approvals, according to	CE

Selection and ordering data

Description	Order No.
Hardware components	
SINUMERIK 808D Turning PPU 141.1 horizontal	
• English layout	**6FC5370-1AT00-0AA0**
• Simplified Chinese layout	**6FC5370-1AT00-0CA0**
Software components	
SINUMERIK 808D Turning/ SINUMERIK 808D Milling toolbox	**6FC5811-0CY00-0YA8**
Spare parts	
SINUMERIK/SIMOTION battery	**6FC5247-0AA18-0AA0**

Options

Description	Order No.
Additional NC Axis	**6FC5800-0AC20-0YB0**
Manual Machine plus (MM+)	**6FC5800-0AP07-0YB0**

Overview

SINUMERIK 808D Milling PPU 141.1 horizontal

The SINUMERIK 808D Milling is an operator-panel-based CNC, tailored for use in modern standard milling machines.

Benefits

- Compact, rugged, and maintenance-friendly operator-panel CNC with dedicated system software for milling technologies
- Intelligent clamp mounting without drilling holes into the cabinet
- Minimum commissioning efforts due to plug & play machine control panel connected via USB interface
- Maximum performance and accuracy due to most modern CNC features
- SINUMERIK 808D startGUIDE: learn, explore and simplify most modern CNC techniques by the push of a button
- SINUMERIK Operate BASIC: maximum operator convenience similar to SINUMERIK 828D and 840D sl
- SINUMERIK programGUIDE BASIC: wide range of technology cycles for milling and drilling with graphical input screens
- SINUMERIK MDynamics: perfectly prepared for mold & die applications
- Easy data transmission via USB stick

Function

- IP65 protection for CNC front panel and machine control panel
- Integrated CNC keyboard with mechanical keys
- Simplified Chinese or English panel layout
- 7.5” color LCD display
- USB user interface on the operator panel front
- Pulse/direction interface for feed drives
- Analog ± 10 V interface for spindle drive
- Data buffering with battery (> 3 years)
- Pre-configured system software for milling technologies
- 1 machining channel/mode group
- 4 axes/spindles
- Graphically guided SINUMERIK CNC programming and standard ISO-code programming with canned cycles
- Graphical CNC simulation
- Integrated contour computer
- Integrated PLC based on the SIMATIC S7-200 command set with ladder logic programming
- Integrated/distributed PLC I/O concept with 72 digital PLC inputs and 48 digital PLC outputs
- Configurable user screens
- Integrated service planner for machine maintenance tasks
- Faults will be remedied for a period of 24 months following 2nd commissioning/registration on all system components in accordance with the repair service contract performance description.

Integration

The following components can be connected to the SINUMERIK 808D Milling:

- Up to 2 electronic handwheels
- 1 digital tool probe
- Up to 72 digital PLC inputs and 48 digital PLC outputs
- 1 TTL direct spindle encoder
- SINUMERIK 808D MCP via USB interface
- SINAMICS V60 drive system for feed axes
- SINAMICS G120 drive system or other spindle drives via ± 10 V analog output
- PC via RS232C interface

SINUMERIK 808D Milling

Technical specifications

Product name	SINUMERIK 808D Milling PPU 141.1 horizontal 6FC5370-1AM00-0.A0
Input voltage	24 V DC + 20 %/- 15 %
Power consumption, max.	50 W
Mains buffering time	3 ms (20 ms with SITOP smart)
Degree of protection according to EN 60529 (IEC 60529)	
• Operator panel front, with closed front cover	IP65
• PPU, rear	IP20
Relative humidity	
• Storage	5 … 95 % at 25 °C
• Transport	5 … 95 % at 25 °C
• Operation	5 … 90 % at 25 °C (no condensation)
Ambient temperature	
• Storage	-20 … +60 °C
• Transport	-20 … +60 °C
• Operation	
- Front	0 ... 45 °C
- Rear	0 ... 50 °C
Dimensions	
• Width	420 mm
• Height	200 mm
• Depth	104 mm
Panel cutout	
• Width	406 mm
• Height	186 mm
• Tolerance	+1 mm
Weight, approx.	3.06 kg
Approvals, according to	CE

Selection and ordering data

Description	Order No.
Hardware components	
SINUMERIK 808D Milling PPU 141.1 horizontal	
• English layout	**6FC5370-1AM00-0AA0**
• Simplified Chinese layout	**6FC5370-1AM00-0CA0**
Software components	
SINUMERIK 808D Turning/ SINUMERIK 808D Milling toolbox	**6FC5811-0CY00-0YA8**
Spare parts	
SINUMERIK/SIMOTION battery	**6FC5247-0AA18-0AA0**

Overview

SINUMERIK 808D MCP

The SINUMERIK 808D MCP machine control panel with mechanical keys is designed to permit user-friendly, well-structured operation of the machine functions. It is suitable for machine level operation of milling and turning machines. Customized keys can be individually labeled using slide-in strips.
The machine control panel can be mounted from the rear using special clamps without drilling holes into the cabinet.

Design

Control elements

- Mode and function keys
  - 39 keys (30 keys with LEDs)
  - Direction keys for machines with rapid traverse override (MCP is pre-assembled with turning slide-in strips. Milling slide-in strips are supplied in the included accessory pack)
  - Pre-defined MCP keys for common functions like handwheel selection, turret skip, coolant control or program test
- Spindle control with spindle override (rotary switch with 15 positions)
- Feed control with feed/rapid traverse override (rotary switch with 18 positions)
- 7-segment tool number display

Layout:

- English or Simplified Chinese

Key type:

- Mechanical keys with protection foil

Interface to CNC:

- USB

Expansion facilities:

- 1 slot for emergency stop button (d = 22 mm)
- 3 slots for control devices (d = 16 mm)

Integration

The SINUMERIK 808D MCP machine control panel can be used for:

- SINUMERIK 808D Turning
- SINUMERIK 808D Milling

Technical specifications

Product name	SINUMERIK 808D MCP machine control panel 6FC5303-0AF35-0.A0
Input voltage	5 V DC provided by PPU 141.1 via USB interface
Power consumption, max.	5 W
Degree of protection according to EN 60529 (IEC 60529)	
• Front	IP65
• Rear	IP20
Humidity rating based on EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C.
Relative humidity	
• Storage	5 … 95 % at 25 °C
• Transport	5 … 95 % at 25 °C
• Operation	5 … 90 % at 25 °C
Ambient temperature	
• Storage	-20 … +60°C
• Transport	-20 … +60 °C
• Operation	
- Front	0 ... 45 °C
- Rear	0 ... 50 °C
Distance	0.5 m
Dimensions	
• Width	420 mm
• Height	120 mm
• Depth	58 mm
Panel cutout	
• Width	406 mm
• Height	106 mm
• Tolerance	+1 mm
Weight, approx.	0.86 kg
Approvals, according to	CE

Selection and ordering data

Description	Order No.
SINUMERIK 808D MCP machine control panel With USB cable	
• English layout	**6FC5303-0AF35-0AA0**
• Simplified Chinese layout	**6FC5303-0AF35-0CA0**
Spare parts	
Actuating element, 22 mm Latching mushroom pushbutton, red and non-illuminated with 40 mm protection against lifting and tilting, incl. holder	**3SB3000-1HA20**
Contact block with 2 contacts 1 NO + 1 NC, 2-pole screw terminal	**3SB3400-0A**

The scope of supply of the SINUMERIK 808D MCP includes:

- USB cable 0.5 m
- Mounting clamps
- Slide-in strips for turning application (already inserted)
- Slide-in strips for milling application
- Blank slide-in strip for individual labeling

Electronic handwheel

Overview

Electronic handwheel

This encoder generates signals which correspond to the movements of the handwheel as it is turned. The axis selected via the control can be positioned. The handwheels are equipped with a magnetic latching mechanism that supports traversing with incremental accuracy. The front panel can be removed.

Selection and ordering data

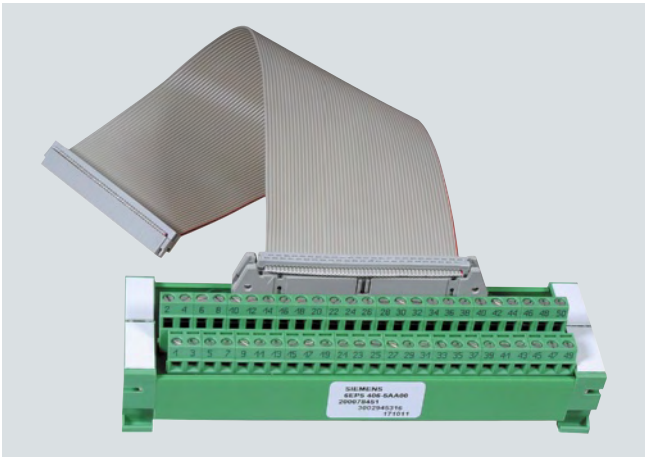
Description	Order No.
Electronic handwheel 5 V DC, RS422	
• With front panel 120 mm × 120 mm, with setting wheel	**6FC9320-5DB01**
• With front panel 76.2 mm × 76.2 mm, with setting wheel	**6FC9320-5DC01**
• Without front panel, with small setting wheel	**6FC9320-5DM00**
• Without front panel, without setting wheel, for installation	**6FC9320-5DF01**
Adapter set For installation in front panel with 3-hole fixing	**6FC9320-5DN00**

Technical specifications

Product name	Electronic handwheel 6FC9320-5DB01	6FC9320-5DC01/ 6FC9320-5DF01/ 6FC9320-5DM00
Rated voltage	5 V DC ± 5 %	5 V DC ± 5 %
Rated current, max.	60 mA	60 mA
Interface	RS422 (TTL)	RS422 (TTL)
Phase angle of pulse sequence A to B	90° electrical	90° electrical
Pulses	2 × 100 S/R	2 × 100 S/R
Actuating force	8 Ncm	4 Ncm
Output frequency, max.	2 kHz	2 kHz
Distance to PPU 141.1, max.	25 m	25 m
Degree of protection according to EN 60529 (IEC 60529)		
• Front	IP65	IP65
• Rear	IP50	IP50
Relative humidity		
• Storage	10 ... 95 % at 25 °C	10 ... 95 % at 25 °C
• Transport	10 ... 95 % at 25 °C	10 ... 95 % at 25 °C
• Operation	5 ... 80 % at 25 °C	5 ... 80 % at 25 °C
Ambient temperature		
• Storage	-40 ... +85 °C	-40 ... +85 °C
• Transport	-40 ... +85 °C	-40 ... +85 °C
• Operation	0 ... 70 °C	0 ... 70 °C
Weight, approx.	0.6 kg	0.4 kg
Approvals, according to	cULus	cULus

S/R = Signals/Revolution

Overview



Terminal strip converter

The SINUMERIK 808D PPU 141.1 features 24 digital PLC inputs and 16 digital PLC outputs which can be connected directly using screw-clamps on the PPU.
In addition, the PPU 141.1 features 48 digital PLC inputs and 32 digital PLC outputs which can be connected via 2 terminal strip converters.
This allows the connection of process signals directly in the cabinet with significantly reduced wiring efforts.

Design

Connection of PLC process signals

- Screw-clamps
  - 24 digital inputs
  - 16 digital outputs

Connection to PPU 141.1

- Ribbon cable, 50-pole
- Insulation displacement connectors

Cabinet mounting

- Standard mounting rails

Selection and ordering data

Description	Order No.
Terminal strip converter 50-pole	**6EP5406-5AA00**
Cable set Ribbon cable, 50-pole, length: 6 m 8 insulation displacement connectors, 50-pole	**6EP5306-5BG00**

SITOP power supply

Overview

Stabilized power supply units

SITOP smart power supply units

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

SITOP smart

Slimline dimensions, strong performance. SITOP smart requires little space on the mounting rail and offers high performance at a reasonable price. With its tolerant overload response, even loads with a high inrush current can be smoothly switched on. If required, 50 % extra power is made available for 5 seconds.

Benefits

- High efficiency
- Low space requirements and easy installation
- Exact output voltage and low residual ripple
- Integrated short-circuit protection and safe electrical separation
- National and international approvals
- No release of silicone

Selection and ordering data

Description	Order No.
Stabilized power supply SITOP smart 5 A 24 V DC, 1-phase Input voltage: 120 V/230 V AC (85 … 132 V/170 ... 264 V AC) Output voltage: 24 V DC ± 3 % Approvals: cULus, CSA	**6EP1333-3BA00**
Stabilized power supply SITOP smart 10 A 24 V DC, 1-phase Input voltage: 120 V/230 V AC (85 … 132 V/170 ... 264 V AC) Output voltage: 24 V DC ± 3 % Approvals: cULus, CSA	**6EP1334-2BA01**

More information

You can find additional information in Catalog KT 10.1 or on the Internet at:

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

Application

RS422 (TTL) incremental encoder

The optoelectronic incremental TTL encoders are tailored for the use as direct spindle encoders in conjunction with the SINUMERIK 808D CNCs.

Design

The direct incremental spindle encoder features a Synchro flange and can be attached to the machine with 3 clamp straps and a spring disk coupling.

The encoder supply voltage of 5 V DC is provided by the SINUMERIK 808D CNC.

The direct incremental spindle encoder delivers 1024 pulses per revolution which are multiplied by the SINUMERIK 808D by the factor of 4 internally to reach the precision level suitable for standard lathes and milling machines.

Incremental encoders operate on the principle of optoelectronic scanning of dividing disks with the transmitted light principle. With an appropriate arrangement of the line pattern on the dividing disk connected to the shaft and the fixed aperture, the optoelectronic elements provide two trace signals A and B at 90° to one another, as well as a reference signal R. The encoder electronics amplify these signals and convert them into different output levels.

Technical specifications

Product name	RS422 (TTL) incremental encoder for spindle 6FX2001-2EB02
Operating voltage U_p on encoder	5 V DC ± 10 %
Scanning frequency, max.	300 kHz
No-load current consumption, max.	150 mA
Signal level	TTL (RS422)
Outputs protected against short-circuit to 0 V	Yes
Switching time (10 ... 90 %) (1 m cable and recommended input circuit)	Rise/fall time $t_+/t_- \leq 50$ ns
Phase angle, signal A to B **Edge spacing, min. at 90°** **± 10°el. 90°** • 300 kHz	90° ≥ 0.45 µs
Cable length to downstream electronics, max. [1]	100 m
LED failure monitoring	High-resistance driver
Resolution	1024 S/R
Accuracy (in angular seconds)	± 18 mech. × 3600/ number of signals/revolution z
Speed, max.	
• Electrical	$(18 \times 10^6$ rpm)/ number of signals/revolution
• Mechanical	12000 rpm
Shaft loading capacity	
• n > 6000 rpm	
- Axial	10 N
- Radial at shaft extension	20 N
• n ≤ 6000 rpm	
- Axial	40 N
- Radial at shaft extension	60 N
Angular acceleration, max.	105 rad/s^2
Moment of inertia of rotor	1.45×10^{-6} kgm^2
Vibration (55 ... 2000 Hz) to EN 60068-2-6	≤ 300 m/s^2
Shock to EN 60068-2-27	
• 2 ms	≤ 2000 m/s^2
• 6 ms	≤ 1000 m/s^2
Degree of protection to EN 60529 (IEC 60529)	
• Without shaft input	IP67
• With shaft input	IP64
Ambient temperature	
Operation	
• Flange outlet	
- At U_p = 5 V ± 10 %	-40 ... +100 °C
Weight, approx.	0.25 kg
EMC	Tested in accordance with the guidelines for electromagnetic compatibility 89/336/EEC and the regulations of the EMC guidelines (applicable basic standards)
Approvals, according to	CE, cULus

S/R = Signals/Revolution

[1] With recommended cable and input circuitry of the downstream electronics, observe max. permissible cable length of module to be evaluated.

Direct spindle encoder

Technical specifications (continued)

Product name	Spring disk coupling 6FX2001-7KF10
Transmission torque, max.	0.8 Nm
Shaft diameter	6 mm both ends
Center offset of shafts, max.	0.4 mm
Axial offset	± 0.4 mm
Angular displacement of shafts, max.	3°
Torsional rigidity	150 Nm/rad
Lateral spring stiffness	6 N/mm
Moment of inertia	19 gcm^2
Speed, max.	12000 rpm
Ambient temperature • Operation	 -40 ... +150 °C
Weight, approx.	16 g

Selection and ordering data

Description	Order No.
RS422 (TTL) incremental encoder Synchro flange 5 V DC supply voltage Radial flange outlet 1024 S/R	**6FX2001-2EB02**
Spring disk coupling Shaft diameter 6 mm/6 mm	**6FX2001-7KF10**
Clamp strap (1 unit) For encoders with Synchro flange (3 units are required)	**6FX2001-7KP01**

S/R = Signals/Revolution

Technical specifications

Product name	Setpoint cable PPU 141.1 - CPM60.1 6FC5548-0BA00-....	Setpoint cable PPU 141.1 - CU240B-2 6FC5548-0BA05-....
No. of cores	15	4
Approvals, according to		
• cURus or UR/CSA[1)]	UL20276	UL2576
• RoHS conformity	Yes	Yes
Rated voltage	30 V	30 V
Test voltage, rms	500 V	500 V
Operating temperature on the surface		
• Fixed installation	-20 … +80 °C	-20 … +80 °C
• Flexible installation	0 … 60 °C	0 … 60 °C
Smallest bending radius		
• Fixed installation	100 mm	60 mm
• Flexible installation	200 mm	120 mm
Insulation material, incl. jacket	PVC	PVC
Oil resistance	70 °C X 4hr	70 °C X 4hr
Outer jacket	PVC Gray	PVC Gray
Flame-retardant	VW-1	VW-1

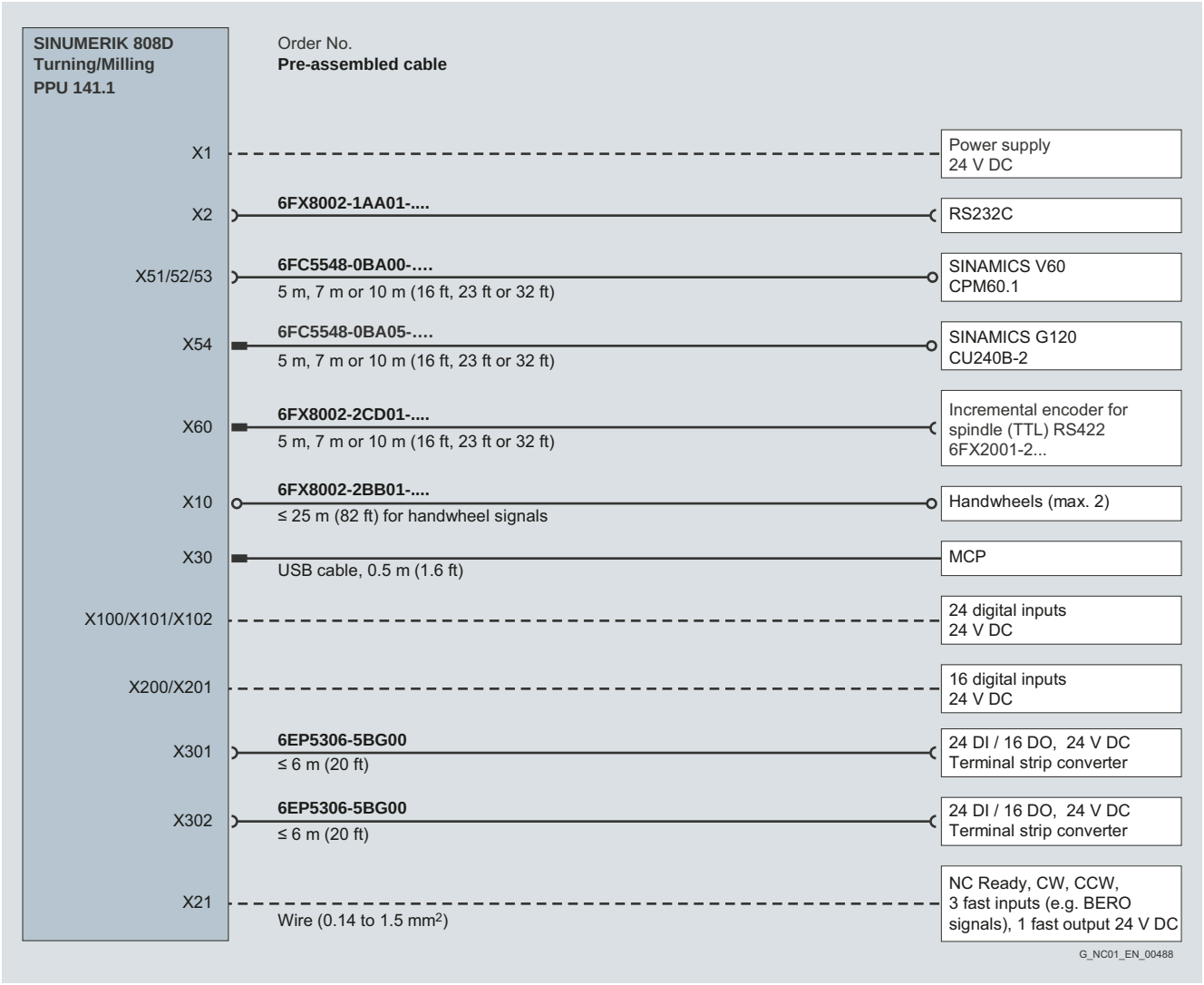
Product name	Signal cable PPU 141.1 - incremental encoder for spindle (TTL) 6FX8002-2CD01-....	Signal cable PPU 141.1 - handwheel 6FX8002-2BB01-....	RS232C data cable PPU 141.1 - personal computer 6FX8002-1AA01-....
Approvals, according to			
• cURus or UR/CSA[1)]	UL758-CSA-C22.2-N.210.2-M90	UL758-CSA-C22.2-N.210.2-M90	UL758-CSA-C22.2-N.210.2-M90
• RoHS conformity	Yes	Yes	Yes
Rated voltage	30 V	30 V	30 V
Test voltage, rms	500 V	500 V	500 V
Operating temperature on the surface			
• Fixed installation	-50 … +80 °C	-50 … +80 °C	-50 … +80 °C
• Flexible installation	-20 … +60 °C	-20 … +60 °C	-20 … +60 °C
Tensile stress, max.			
• Fixed installation	50 N/mm^2	50 N/mm^2	50 N/mm^2
• Flexible installation	20 N/mm^2	20 N/mm^2	20 N/mm^2
Smallest bending radius			
• Fixed installation	35 mm	35 mm	35 mm
• Flexible installation	70 mm	70 mm	70 mm
Torsional stress	Absolute 30°/m	Absolute 30°/m	Absolute 30°/m
Bending	10 million	10 million	10 million
Traversing velocity	300 m/min	300 m/min	300 m/min
Acceleration	5 m/s^2	5 m/s^2	5 m/s^2
Insulation material, incl. Jacket	CFC/silicone-free IEC 60754-1/DIN VDE 0472-815	CFC/silicone-free IEC 60754-1/DIN VDE 0472-815	CFC/silicone-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1	EN 60811-2-1	EN 60811-2-1
Outer jacket	PVC DESINA color green RAL 6018	PVC DESINA color green RAL 6018	PVC 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

For general information about MOTION-CONNECT please refer to Introduction.

[1)] The respective registration number is printed on the cable jacket.

Pre-assembled cables

Integration



Connection overview of SINUMERIK 808D Turning/SINUMERIK 808D Milling PPU 141.1

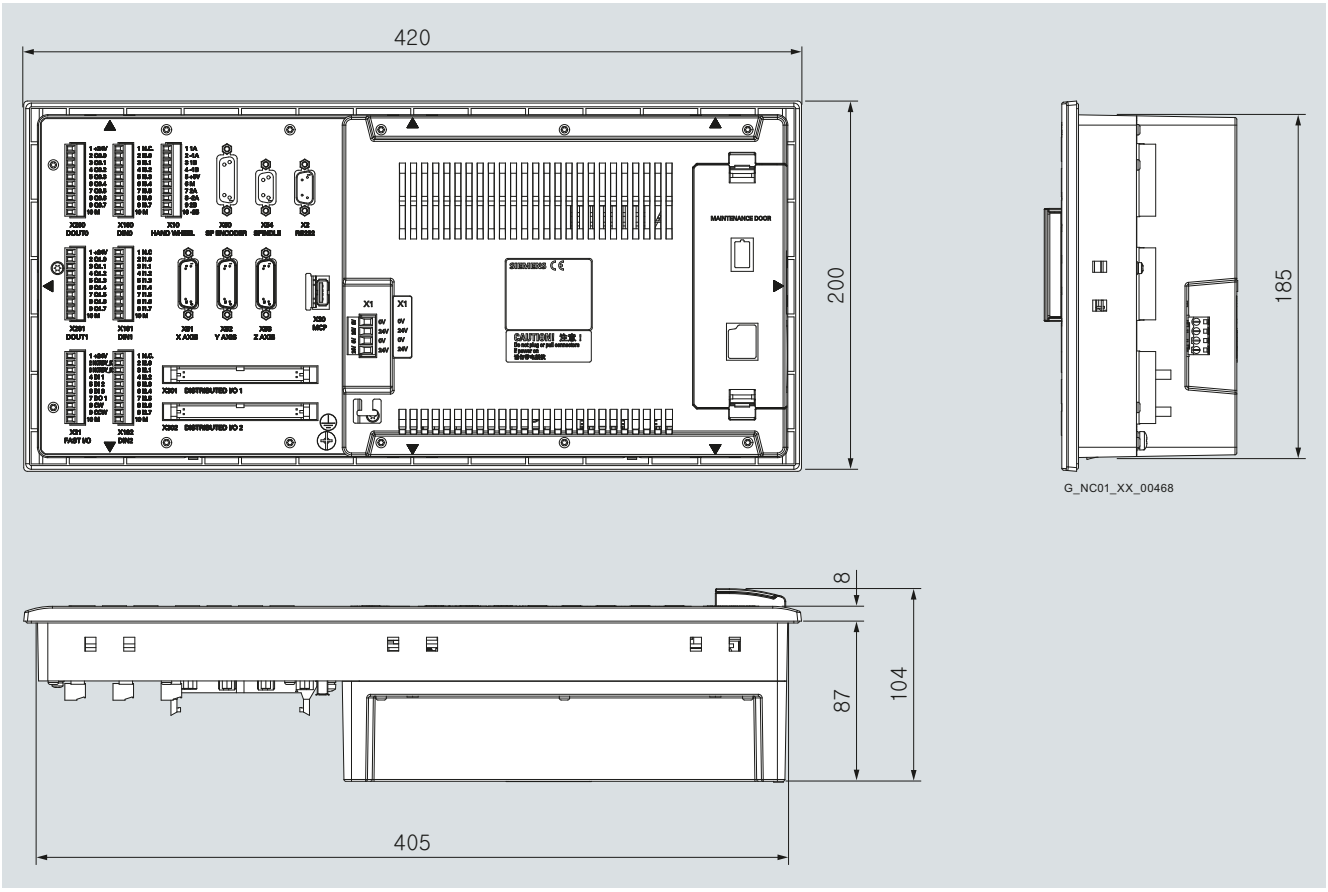
Selection and ordering data

Description	Order No.
Pre-assembled setpoint cable PPU 141.1 - CPM60.1	
Length	
• 5 m	**6FC5548-0BA00-1AF0**
• 7 m	**6FC5548-0BA00-1AH0**
• 10 m	**6FC5548-0BA00-1BA0**
Pre-assembled setpoint cable PPU 141.1 - CU240B-2	
Length	
• 5 m	**6FC5548-0BA05-1AF0**
• 7 m	**6FC5548-0BA05-1AH0**
• 10 m	**6FC5548-0BA05-1BA0**
Pre-assembled signal cable PPU 141.1 - incremental encoder for spindle (TTL)	
Length	
• 5 m	**6FX8002-2CD01-1AF0**
• 7 m	**6FX8002-2CD01-1AH0**
• 10 m	**6FX8002-2CD01-1BA0**

Description	Order No.
Pre-assembled signal cable PPU 141.1 - handwheel	
Length	
• 1 m	**6FX8002-2BB01-1AB0**
• 5 m	**6FX8002-2BB01-1AF0**
• 7 m	**6FX8002-2BB01-1AH0**
• 10 m	**6FX8002-2BB01-1BA0**
Pre-assembled RS232C data cable - personal computer	
Length	
• 5 m	**6FX8002-1AA01-1AF0**
• 10 m	**6FX8002-1AA01-1BA0**

▬	Connector with pin contacts
⊃	Connector with socket contacts
○	Exposed core ends
– – – –	Cable is not included in the scope of delivery. It must be provided by the customer.

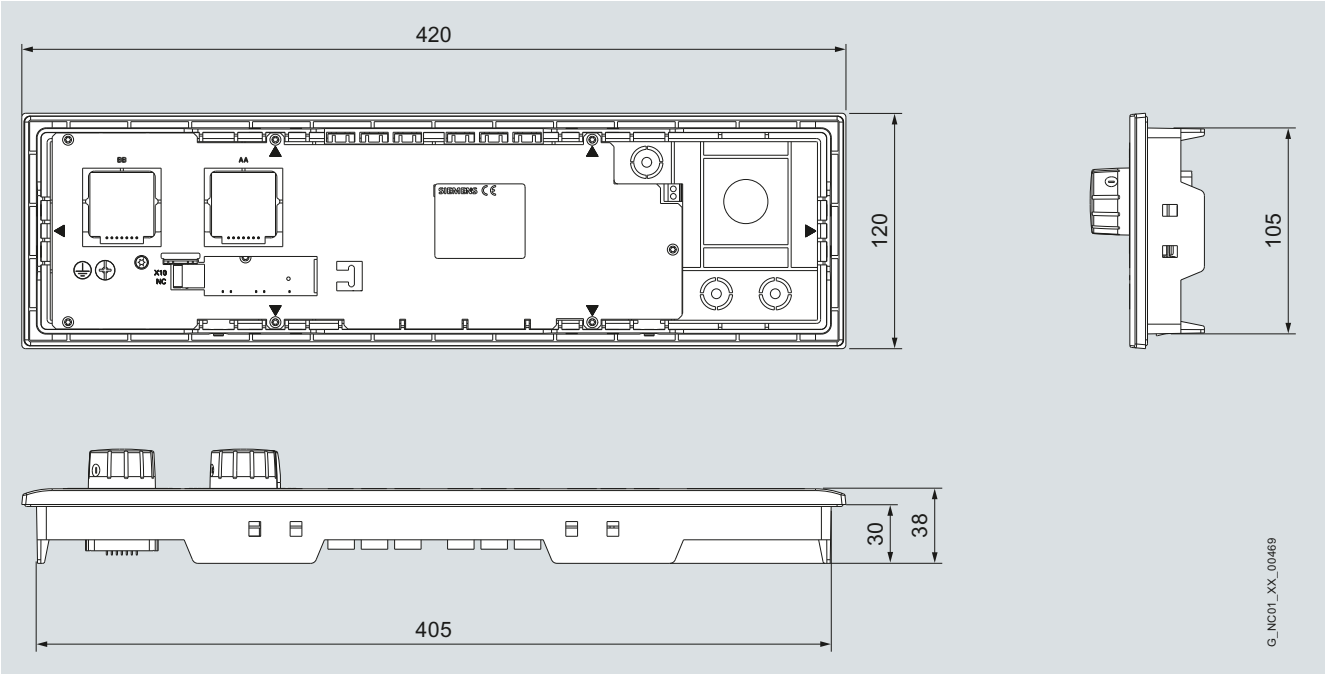
Dimensional drawings



SINUMERIK 808D Turning/Milling PPU 141.1 horizontal

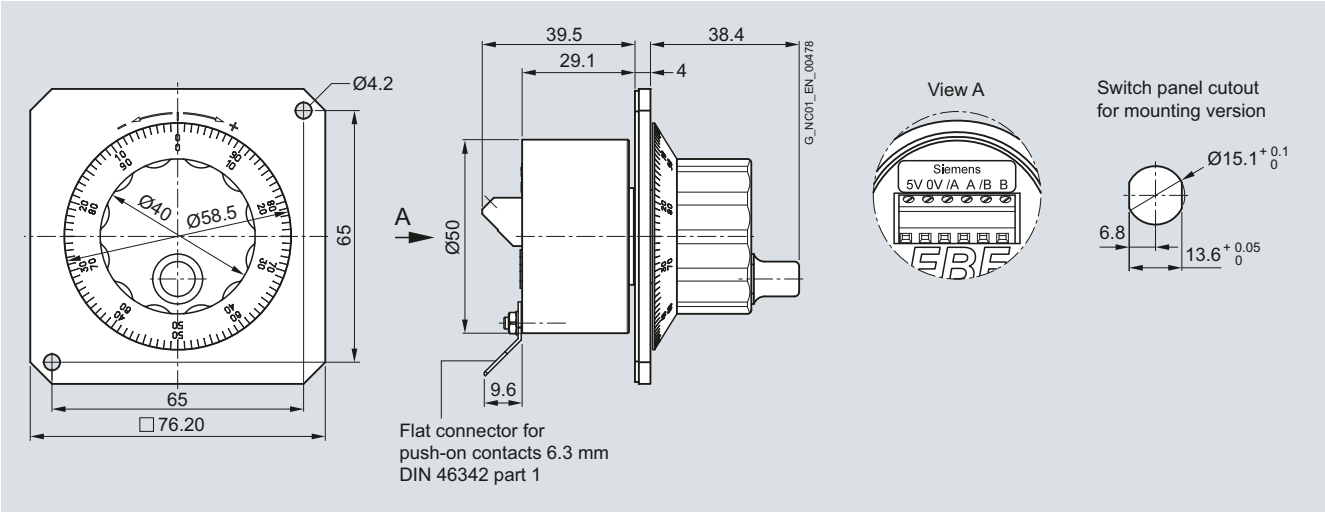
SINUMERIK 808D MCP

Dimensional drawings

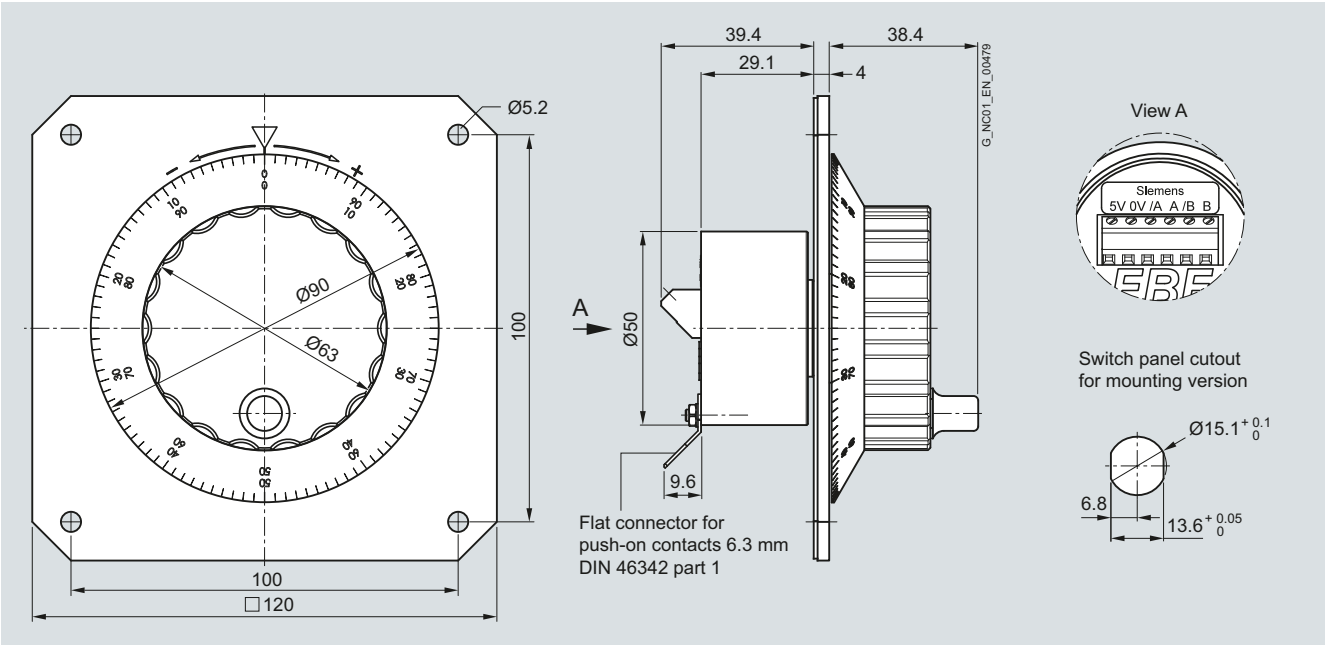


SINUMERIK 808D MCP

Dimensional drawings



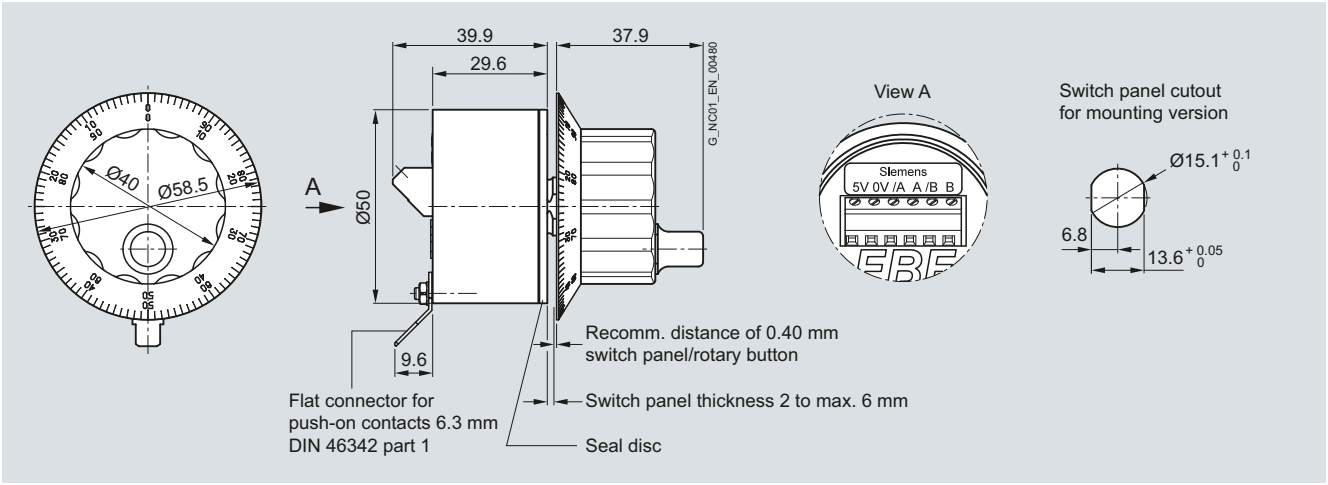
Electronic handwheel with front panel 76.2 mm × 76.2 mm



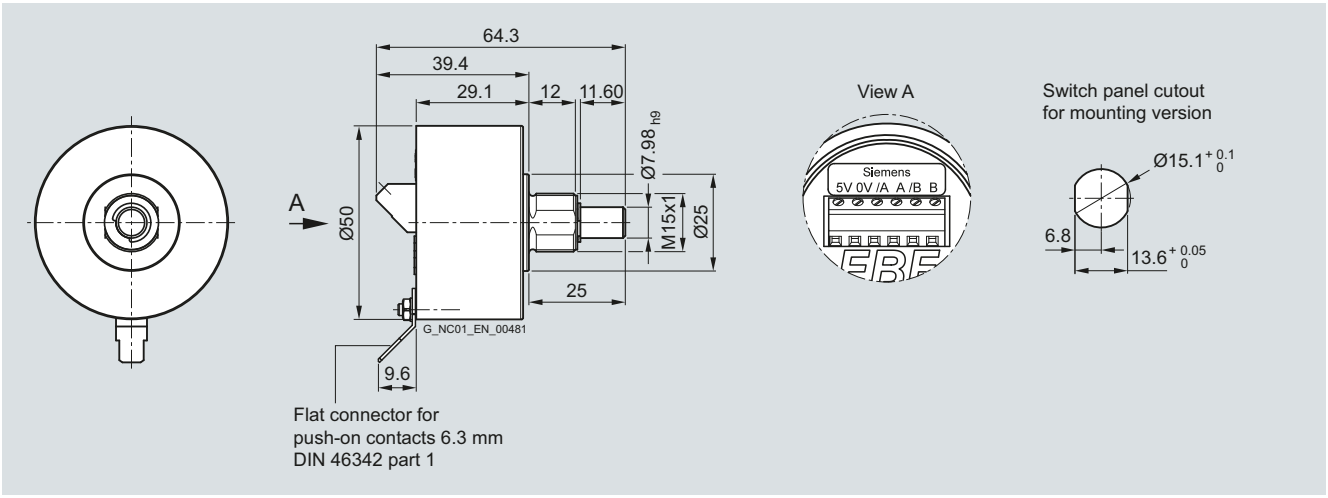
Electronic handwheel with front panel 120 mm × 120 mm

Electronic handwheel

Dimensional drawings

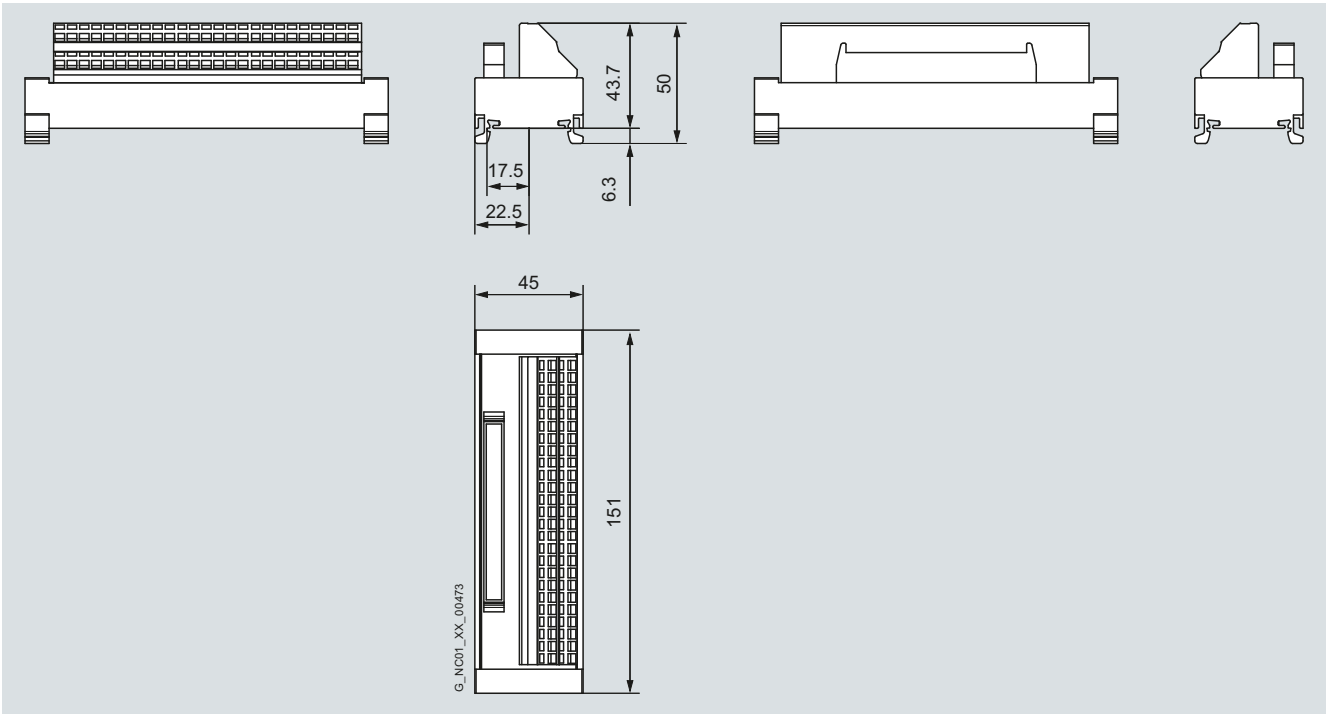


Electronic handwheel without front panel with small setting wheel



Electronic handwheel without front panel without setting wheel

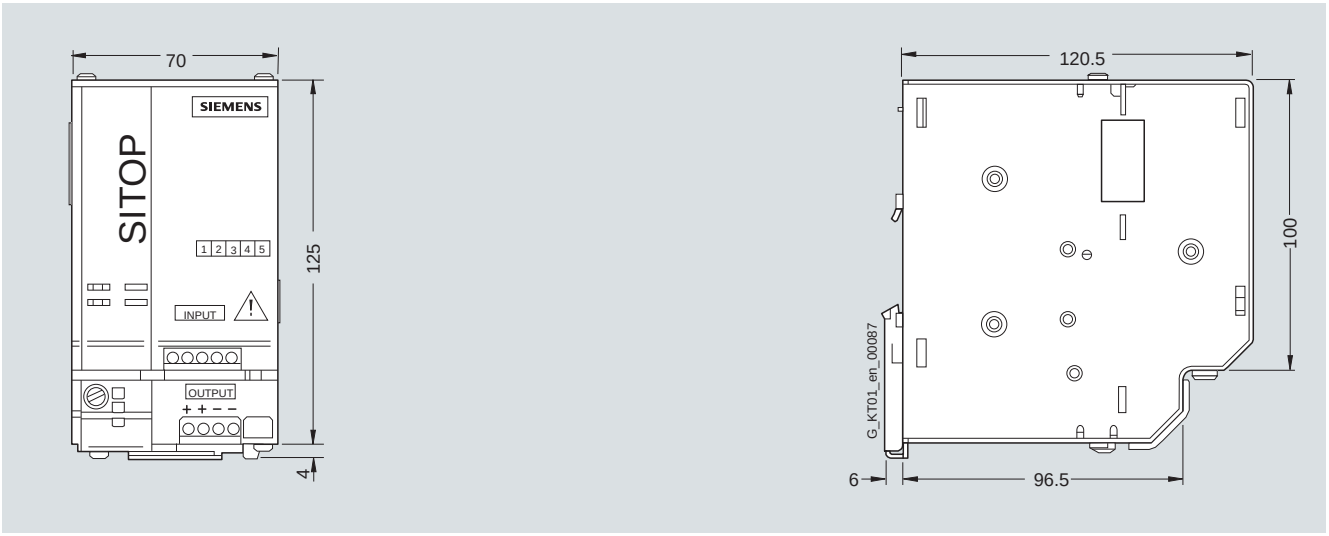
Dimensional drawings



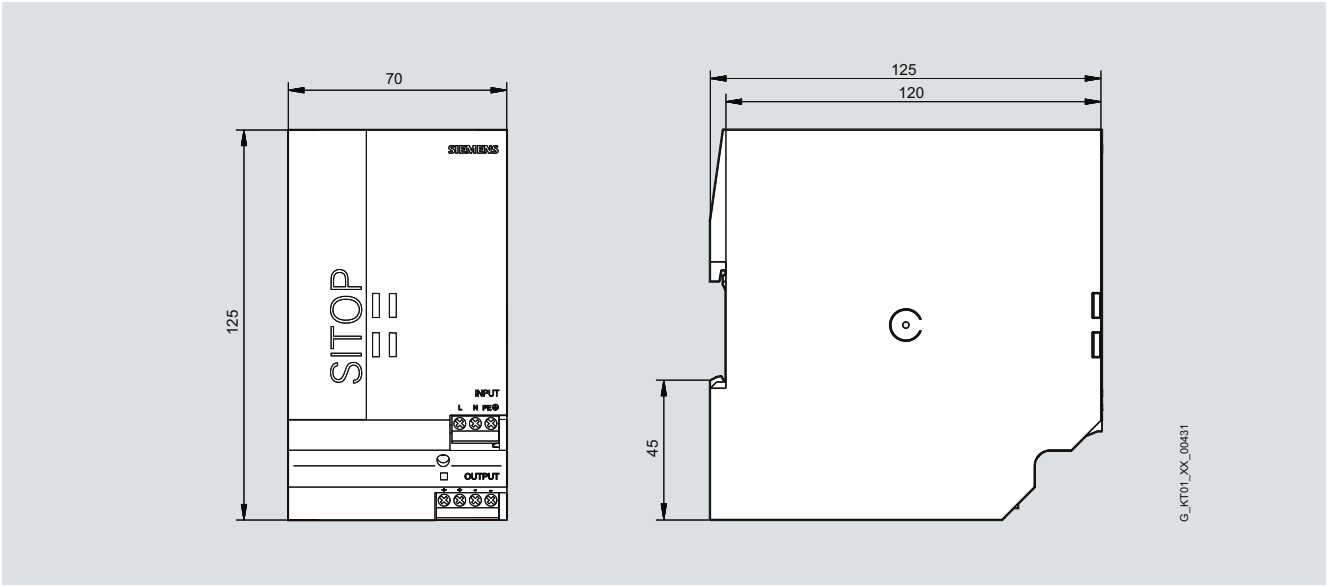
Terminal strip converter

SITOP power supply

Dimensional drawings

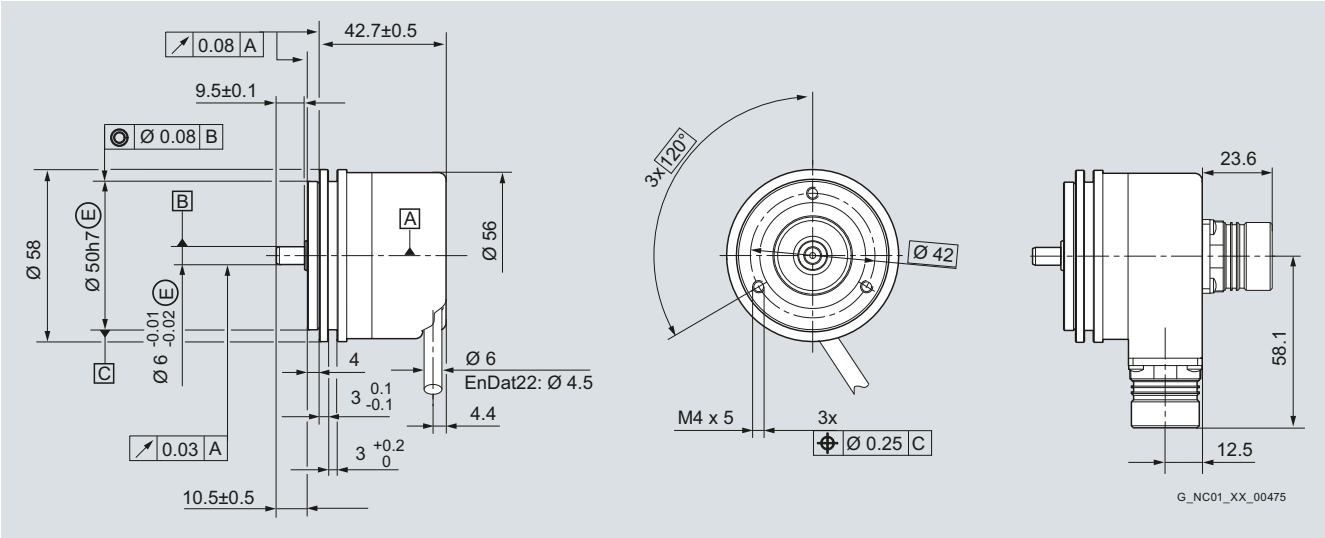


Stabilized power supply SITOP smart 5 A

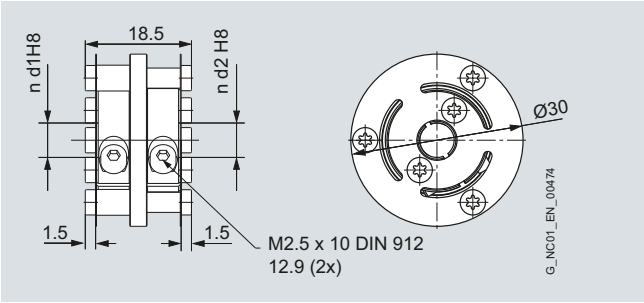


Stabilized power supply SITOP smart 10 A

Dimensional drawings



RS422 (TTL) incremental encoder



Spring disk coupling, $d1$ = $d2$ = 6 mm

Notes

Feed axis solutions

4

4/2 **How to select the feed axis solution**

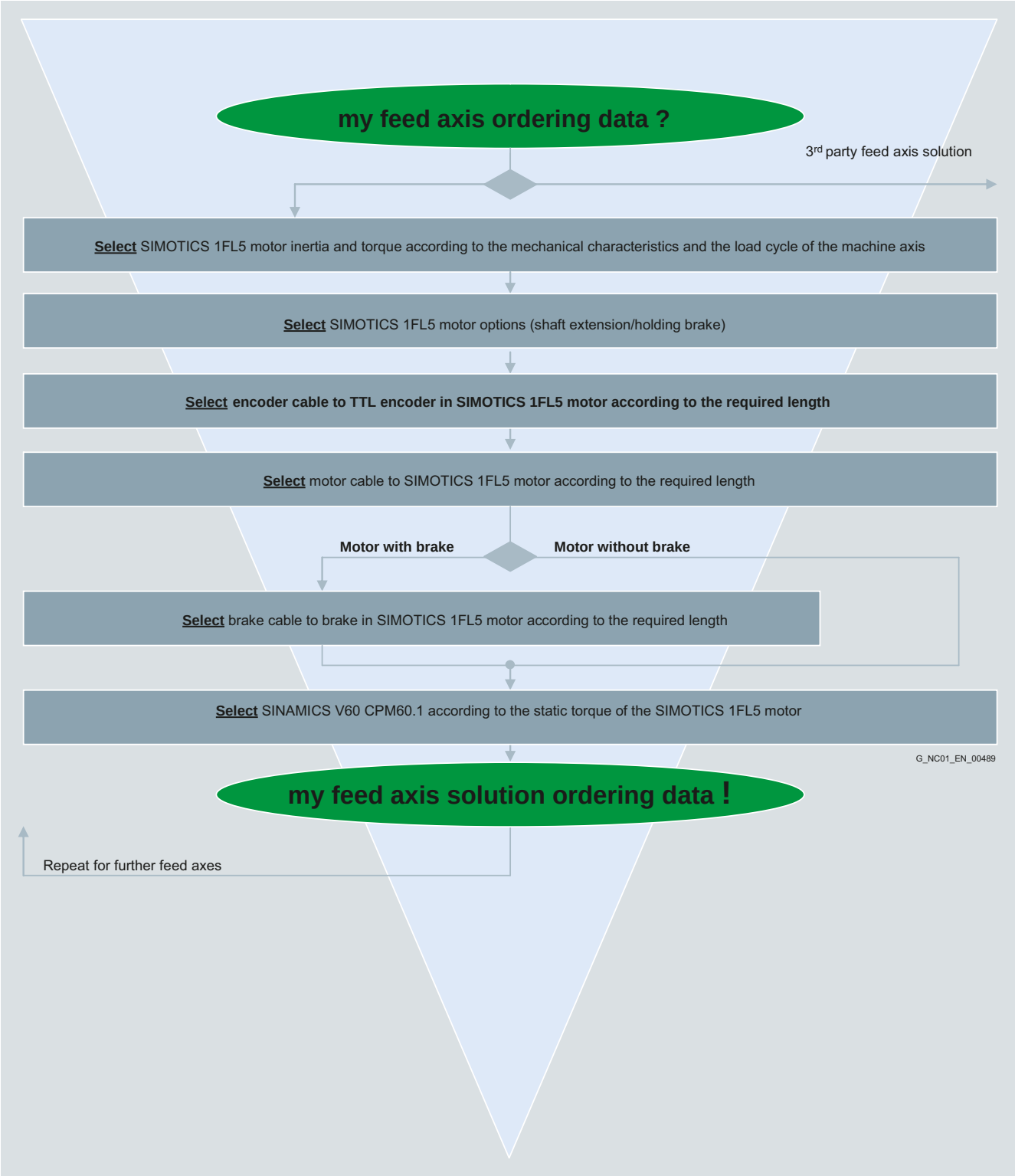
4/3 **SINAMICS V60 servo drive**
4/3 Controlled Power Module

4/5 **SIMOTICS 1FL5 feed motor**

4/8 **MOTION-CONNECT cables for SINAMICS V60 servo drive**
4/8 Pre-assembled cables

4/10 **Dimensional drawings**
4/10 SINAMICS V60 CPM60.1
4/12 SIMOTICS 1FL5 feed motor

Overview



Overview

SINAMICS V60 CPM60.1

The SINAMICS V60 CPM60.1 servo drive is specially designed to control the feed axes in standard machine tool applications. The system is designed primarily for applications where cost effectiveness is the primary consideration. The key performance data of the drive are aligned to perfectly fit to the SINUMERIK 808D offering a system solution.

Benefits

- Compact module with integrated infeed, inverter and closed-loop position control for one feed axis
- No cooling fans needed thanks to large heat sink made of die-cast aluminum
- Coated electronic modules
- Commissioning and configuring without PC-based tools
- Very simple commissioning using keys/7-segment display
- Pre-configured motor data stored in the drive
- CE certified

Function

- 4 versions with output currents of 4 A, 6 A, 7 A and 10 A
- Supply voltage 220 V to 240 V 3 AC
- 200 % overload capability
- Pulse/direction interface (5 V difference signals) to the SINUMERIK 808D
- Integrated motor brake terminal
- Alarm relay contact

Integration

The following components can be connected to the SINAMICS V60 CPM60.1:

- SINUMERIK 808D Turning PPU 141.1 horizontal
- SINUMERIK 808D Milling PPU 141.1 horizontal
- SIMOTICS 1FL5 feed motor
- TTL encoder in SIMOTICS 1FL5 feed motor
- Brake in SIMOTICS 1FL5 feed motor

Selection and ordering data

SINAMICS V60 CPM60.1		SIMOTICS 1FL5 feed motor
Rated output current		Static torque
I_{rated}		M_0 at ΔT = 100 K
A	Order No.	Nm
4	**6SL3210-5CC14-0UA0**	4
6	**6SL3210-5CC16-0UA0**	6
7	**6SL3210-5CC17-0UA0**	7.7
10	**6SL3210-5CC21-0UA0**	10

Controlled Power Module

Technical specifications

Product name	SINAMICS V60 CPM60.1 Controlled Power Module			
	6SL3210-5CC14-0UA0	6SL3210-5CC16-0UA0	6SL3210-5CC17-0UA0	6SL3210-5CC21-0UA0
Input voltage	220 ... 240 V 3 AC -15 %/+10 %			
Input frequency	50 … 60 Hz ± 10 %			
Infeed	Non-stabilized			
Electronics power supply	24 V DC -15 %/+20 %			
24 V DC supply	0.8 A (1.4 A) combined with motors without brake (with brake)			
Input voltage				
Pulse/direction interface				
• Rated value	5 V DC			
• Frequency range	≤ 333 kHz			
Cooling	Natural cooling			
Ambient temperature				
• Storage/transport	-20 ... 80 °C			
• Operation	0 ... 45 °C without derating, > 45 ... 55 °C derating to 70 %			
Air humidity	< 95 %			
Site altitude	Up ... 1000 m without derating, > 1000 ... 2000 m derating to 80 %			
Conductor cross-section, max.	2.5 mm^2			
Connectable motors	SIMOTICS 1FL5			
Degree of protection	IP20			
Encoder evaluation	TTL encoder with 2500 S/R (13 bit resolution through electronic multiplication)			
Output current				
• Rated current I_{rated}	4 A	6 A	7 A	10 A
• Peak current I_{max}	8 A	12 A	14 A	20 A
Rated power P_{rated}	0.8 kW	1.2 kW	1.4 kW	2 kW
Power loss	36 W	47 W	54 W	70 W
Cooling air required	0.005 m^3/s	0.005 m^3/s	0.005 m^3/s	0.005 m^3/s
Sound pressure level L_{pA} (1 m)	< 45 dB	< 45 dB	< 45 dB	< 45 dB
Dimensions[1]				
• Width	106 mm	106 mm	106 mm	123 mm
• Height	226 mm	226 mm	226 mm	226 mm
• Depth	200 mm	200 mm	200 mm	200 mm
Weight	2.63 kg	2.63 kg	2.63 kg	3.44 kg
Certification	CE			

S/R = Signals/Revolution

[1] Minimum distances: 25 mm between drive modules, 100 mm from other control cabinet components.

Overview

SIMOTICS 1FL5 feed motors

The SIMOTICS 1FL5 feed motor is optimized for operation with the SINAMICS V60 CPM60.1 servo drive and provides the dynamic performance required by machine tools.

Benefits

- High performance rare earth magnet material
- Rugged design with IP54 degree of protection and military style connectors
- Maximum flexibility due to variants with/without brake and plain shaft/fitted key

Function

- 4 motor types with 4 Nm, 6 Nm, 7.7 Nm and 10 Nm
- Rated speed of 2000 rpm
- Integrated TTL encoder with 2500 S/R (13 bit resolution through electronic multiplication of the CPM60.1 module)
- Degree of protection IP54, natural cooling
- Optional holding brake
- With plain shaft or fitted key

Technical specifications

Product name	SIMOTICS 1FL5 feed motors			
	1FL5060-…	1FL5062-…	1FL5064-…	1FL5066-…
Type of motor	Synchronous motor			
Rated speed	2000 rpm			
Encoder	TTL encoder with 2500 S/R			
Infeed	Non-stabilized			
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)	IP54			
Cooling	Natural cooling			
Shaft end in accordance with DIN 748-3 (IEC 60072-1)	Plain shaft/Shaft key (C type)			
Paint finish	Black			
Insulation of the stator winding in accordance with EN 600034-1 (IEC 60034-1)	Temperature class 130 (B)			
Ambient temperature				
• Storage/transport	-20 ... 80 °C			
• Operation	0 ... 45 °C without derating, > 45 ... 55 °C derating to 70 %			
Torque				
• Static torque M_{rated}	4 Nm	6 Nm	7.7 Nm	10 Nm
• Torque, max. M_{max} (converter)	8 Nm	12 Nm	15.4 Nm	20 Nm
Rated power	0.8 kW	1.2 kW	1.5 kW	2 kW
Static current	4 A	6 A	7 A	10 A
Rated speed	2000 rpm	2000 rpm	2000 rpm	2000 rpm
Efficiency η	91.1 %	93.3 %	92.0 %	93.7 %
Moment of inertia without brake	11.01×10^{-4} kgm^2	15.44×10^{-4} kgm^2	20.17×10^{-4} kgm^2	25.95×10^{-4} kgm^2
Moment of inertia with brake	12.68×10^{-4} kgm^2	17.11×10^{-4} kgm^2	21.84×10^{-4} kgm^2	27.62×10^{-4} kgm^2
Shaft height	65 mm	65 mm	65 mm	65 mm
Dimensions				
• Edge dimension	130 mm	130 mm	130 mm	130 mm
• Length (without/with brake)	221/263 mm	239/281 mm	253/295 mm	277/319 mm
Weight (without/with brake)	6/8.6 kg	7.6/10.2 kg	8.6/11.2 kg	10.6/13.2 kg
Certification	CE			

S/R = Signals/Revolution

Selection and ordering data

SIMOTICS 1FL5 feed motors			SINAMICS V60 CPM60.1
Static torque	Rated speed		Rated output current
M_0 at ΔT = 100 K	n_{rated}		I_{rated}
Nm	rpm	Order No.	A
4	2000	**1FL5060-0AC21-0A ■ 0**	4
6	2000	**1FL5062-0AC21-0A ■ 0**	6
7.7	2000	**1FL5064-0AC21-0A ■ 0**	7
10	2000	**1FL5066-0AC21-0A ■ 0**	10

Shaft extension:	**Holding brake:**	
Fitted key and keyway	Without	**A**
Fitted key and keyway	With	**B**
Plain shaft	Without	**G**
Plain shaft	With	**H**

Pre-assembled cables

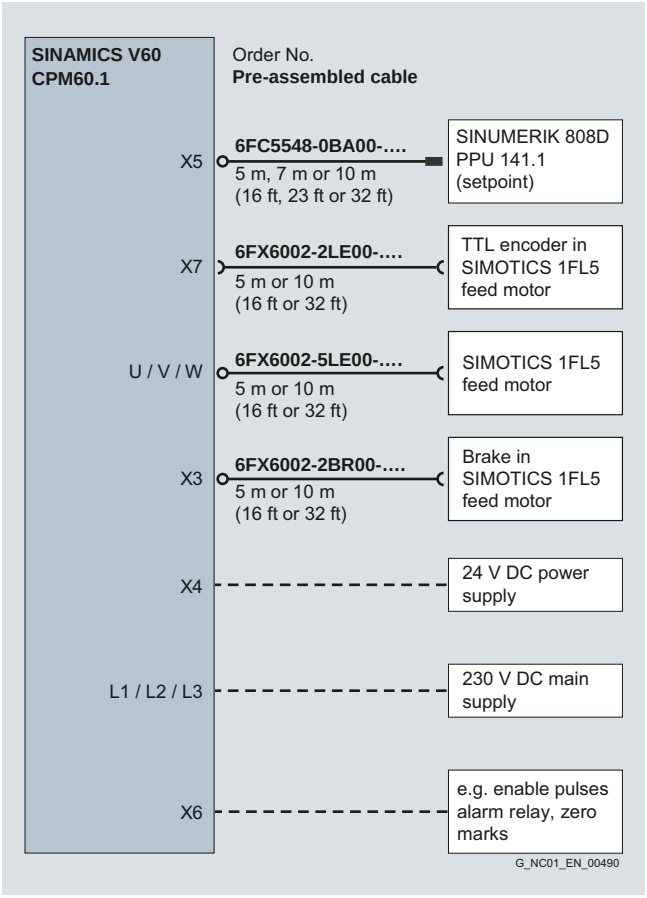
Technical specifications

Product name	Encoder cable SINAMICS V60 CPM60.1 - TTL encoder in SIMOTICS 1FL5 feed motor 6FX6002-2LE00-….	Power cable SINAMICS V60 CPM60.1 - SIMOTICS 1FL5 feed motor 6FX6002-5LE00-….	Brake cable SINAMICS V60 CPM60.1 - brake in SIMOTICS 1FL5 feed motor 6FX6002-2BR00-….
Degree of protection (when closed and connected)	IP54	IP54	IP54
Approvals, acc. to • VDE[1] /RoHS conformity	Yes RoHS	Yes RoHS	Yes RoHS
Rated voltage U0/U	30 V/30 V	300 V/500 V	30 V/30 V
Test voltage, rms	500 V	2 kV	500 V
Operating temperature on the surface • Fixed installation	-20 … +80 °C	-20 … +80 °C	-20 … +80 °C
Tensile stress, max. • Fixed installation • Flexible installation	50 N/mm^2 20 N/mm^2	50 N/mm^2 20 N/mm^2	50 N/mm^2 20 N/mm^2
Smallest bending radius • Fixed installation • Flexible installation	40 mm 160 mm	50 mm 200 mm	25 mm 100 mm
Torsional stress	Absolute 30°/m	Absolute 30°/m	Absolute 30°/m
Bending	100000	100000	100000
Insulation material, incl. Jacket	PVC	PVC	PVC
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1 (mineral oil only)	EN 60811-2-1 (mineral oil only)
Outer jacket	PVC	PVC	PVC
Flame-retardant	FT1	FT1	FT1

For general information about MOTION-CONNECT please refer to Introduction.

[1] The respective registration number is printed on the cable jacket.

Integration



Connection overview of SINAMICS V60 drive system

▬—	Connector with pin contacts
)—	Connector with socket contacts
o—	Exposed core ends
- - - -	Cable is not included in the scope of delivery. It must be provided by the customer.

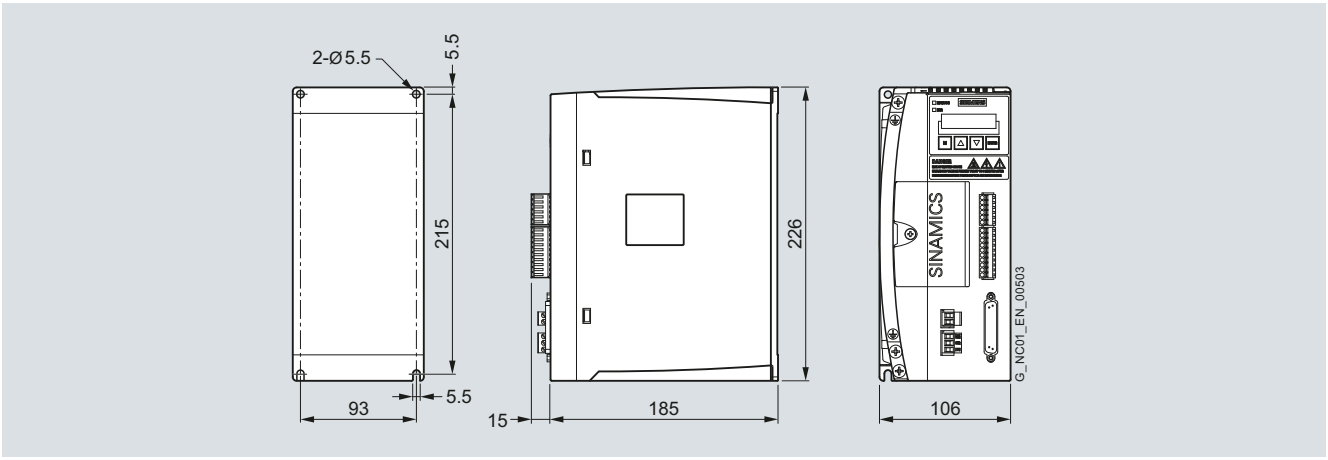
Selection and ordering data

Description	Order No.
Pre-assembled setpoint cable PPU 141.1 - CPM60.1	
Length	
• 5 m	**6FC5548-0BA00-1AF0**
• 7 m	**6FC5548-0BA00-1AH0**
• 10 m	**6FC5548-0BA00-1BA0**
Pre-assembled encoder cable SINAMICS V60 CPM60.1 - TTL encoder in SIMOTICS 1FL5 feed motor	
Length	
• 5 m	**6FX6002-2LE00-1AF0**
• 10 m	**6FX6002-2LE00-1BA0**
Pre-assembled power cable SINAMICS V60 CPM60.1 - SIMOTICS 1FL5 feed motor	
Length	
• 5 m	**6FX6002-5LE00-1AF0**
• 10 m	**6FX6002-5LE00-1BA0**
Pre-assembled brake cable SINAMICS V60 CPM60.1 - brake in SIMOTICS 1FL5 feed motor	
Length	
• 5 m	**6FX6002-2BR00-1AF0**
• 10 m	**6FX6002-2BR00-1BA0**

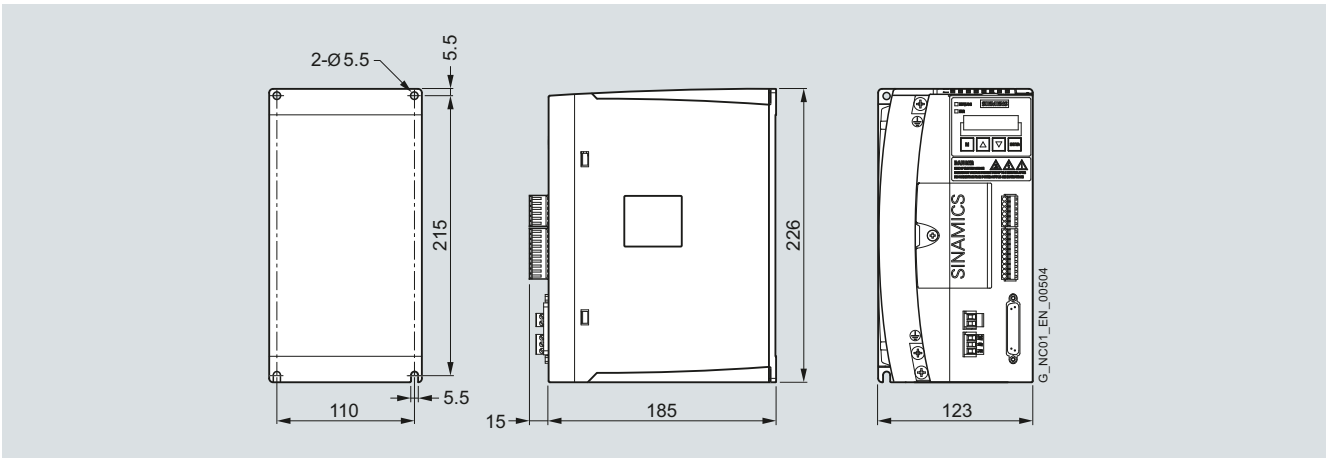
4

SINAMICS V60 CPM60.1

Dimensional drawings

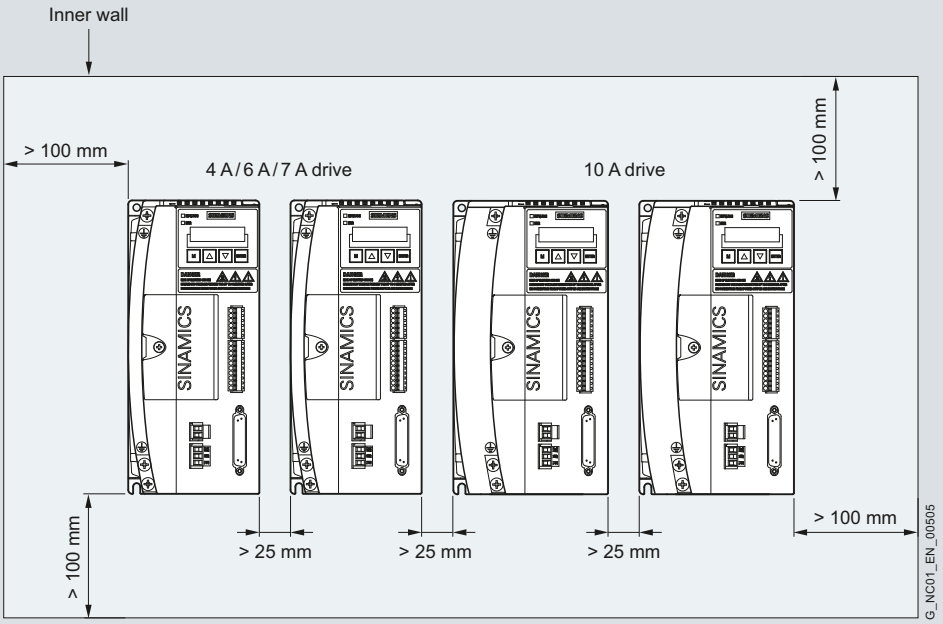


SINAMICS V60 CPM60.1, 4 A/6 A/7 A



SINAMICS V60 CPM60.1,10 A

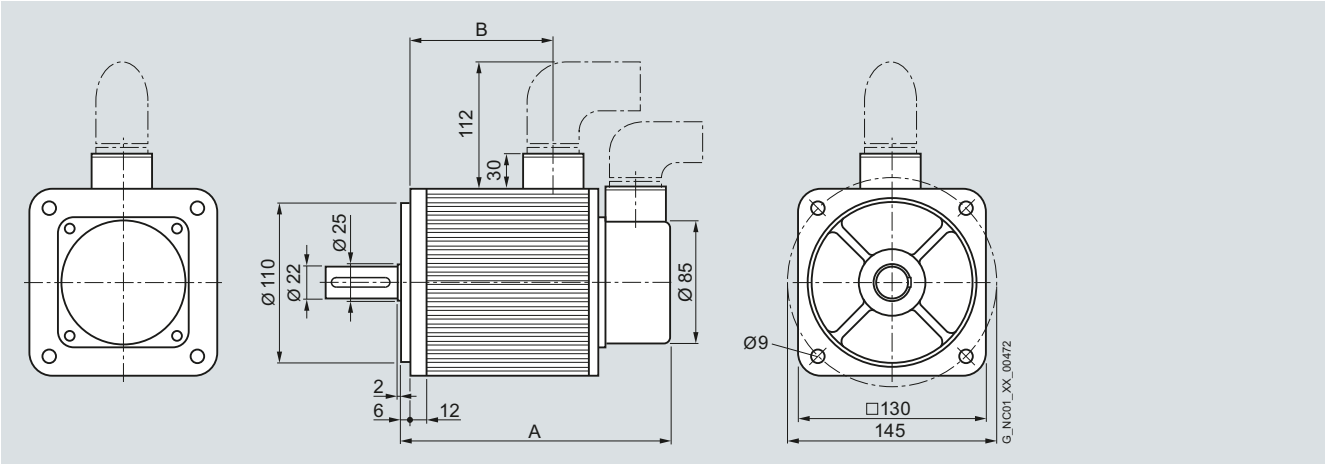
Dimensional drawings



Mounting clearance

SIMOTICS 1FL5 feed motor

Dimensional drawings



SIMOTICS 1FL5 feed motor

Motor	Dimensions in mm		
Type	A without brake	A with brake	B
1FL5060	163	205	80
1FL5062	181	223	98
1FL5064	195	237	112
1FL5066	219	261	136

Spindle solutions

5

5/2 **How to select the spindle solution**

5/3 **SINAMICS G120 spindle drive**

5/6 **SIMOTICS 1LE1 spindle motor**

5/10 **MOTION-CONNECT cables for SINAMICS G120 spindle drive**

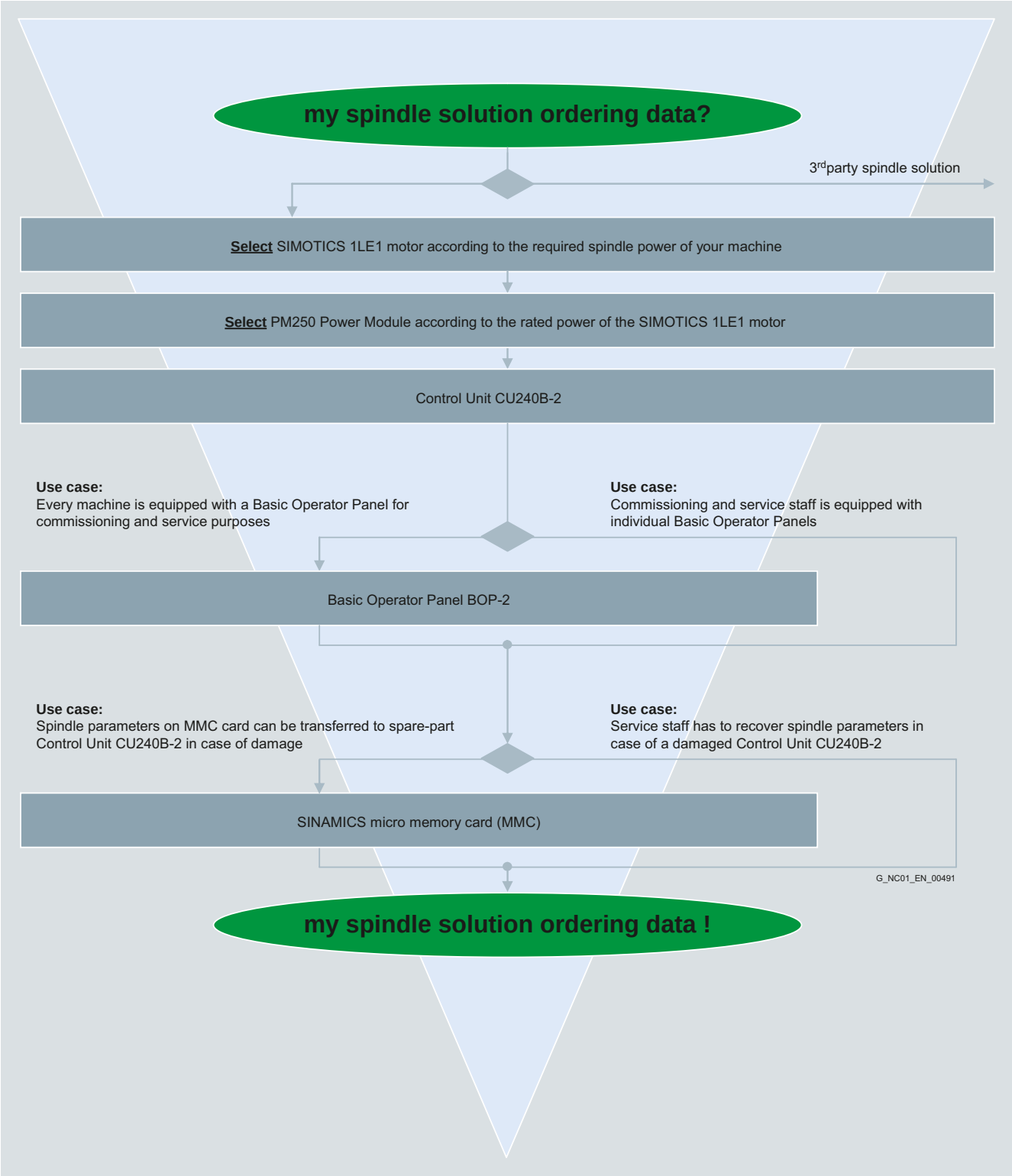
5/10 Pre-assembled cables

5/11 **Dimensional drawings**

5/11 SINAMICS G120 Power Module PM250

5/12 SIMOTICS 1LE1 spindle motor

Overview



Overview

SINAMICS G120 Power Module with Control Unit CU240B-2 and Basic Operator Panel (BOP-2)

The PM250 Power Module of SINAMICS G120 in conjunction with the CU240B-2 Control Unit, combined with a high-efficiency SIMOTICS 1LE1 spindle motor is a tailored solution for an economic but powerful spindle solution. The optional Basic Operator Panel (BOP-2) allows commissioning and servicing without a PC.

Benefits

- Maximum energy efficiency due to integrated regenerative power supply
- Compact, space-saving design
- Innovative cooling concept and coated electronic modules
- High robustness and long service life
  - External heatsink
  - Natural cooling of Control Unit
  - Additional coating of the most important components
- Quiet motor operation as a result of the high pulse frequency
- Commissioning and servicing without a PC by optional portable Basic Operator Panel (BOP-2)
- Simple unit replacement and quick copying of parameters using the optional Basic Operator Panel or the optional MMC micro memory card
- Easy to service due to separately exchangeable Power Module and Control Unit

Function

- 4 versions of Power Modules for spindle solutions with 5.5 kW, 7.5 kW, 11 kW or 15 kW
- Supply voltage 380 V to 480 V 3 AC
- Up to 200 % overload capability
- Integrated line filter for 5.5 kW/7.5 kW/11 kW versions
- Control Unit with high performance control for spindle solutions
- Analog ± 10 V setpoint interface to the CNC system
- Optional portable Basic Operator Panel for commissioning and service
- Optional memory card for data backup

Integration

The following components can be connected to the combination of SINAMICS G120 Power Module and CU240B-2 Control Unit:

- SINUMERIK 802C
- SINUMERIK 808D Turning
- SINUMERIK 808D Milling
- SINUMERIK 828D BASIC
- SINUMERIK 828D
- SIMOTICS 1LE1 high-efficiency spindle motor

Selection and ordering data

Rated power	Rated output current I_{rated}	**SINAMICS G120 PM250 Power Module with integrated line filter class A**
kW	A	Order No.
380 … 480 V 3 AC		
5.5	13.2	**6SL3225-0BE25-5AA1**
7.5	18	**6SL3225-0BE27-5AA1**
11.0	25	**6SL3225-0BE31-1AA1**
15.0	32	**6SL3225-0BE31-5AA0**

Description	Order No.
Control Unit CU240B-2	**6SL3244-0BB00-1BA1**
Accessories	
Basic Operator Panel BOP-2	**6SL3255-0AA00-4CA1**
SINAMICS micro memory card (MMC)	**6SL3254-0AM00-0AA0**

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Technical specifications

Product name	SINAMICS G120 PM250 Power Modules			
	6SL3225-0BE25-5AA1	6SL3225-0BE27-5AA1	6SL3225-0BE31-1AA1	6SL3225-0BE31-5AA0
System operating voltage	380 ... 480 V 3 AC ± 10 %			
Line supply requirements **Line short circuit voltage U_k**	U_k < 1 %			
Input frequency	47 … 63 Hz			
Degree of protection	IP20			
Possible braking methods	Regenerative feedback in generator mode			
Connectable motors	Standard motors			
Output frequency for control type Vector	0 … 200 Hz			
Power factor	0.9			
Efficiency η	0.95			
Overload capability	2 × rated output current (i.e. 200 % overload) for 3 s with a cycle time of 300 s			
Electromagnetic compatibility	Line filter class A acc. to EN 55011			
Ambient temperature	0 ... 50 °C without derating, > 50 ... 60 °C derating to 75 %			
Storage temperature	-40 … +70 °C			
Relative humidity	< 95 % RH, condensation not permissible			
Cooling	Internal ventilation, power units with increased air cooling by built-in fans			
Cooling clearance • Top/bottom • Front • Side	 125 mm 0 mm 50 mm			
Installation altitude	Up to 1000 m without derating, > 1000 ... 2000 m derating to 93 %			
Compliance with standards	UL, cUL, CE, c-tick			
CE marking	According to Low-Voltage Directive 2006/95/EC			
Output current **at 50 Hz 400 V 3 AC** • Rated current I_{rated} • Current base on I_H [1]	 18 A 13.2 A	 25 A 19 A	 32 A 26 A	 36 A 32 A
Rated power Based on I_L Based on I_H [1]	7.5 kW	11 kW	15 kW	18.5 kW
Rated pulse frequency	4 kHz	4 kHz	4 kHz	4 kHz
Power loss **at rated current**	0.24 kW	0.3 kW	0.4 kW	0.44 kW
Cooling air requirement	0.038 m^3/s	0.038 m^3/s	0.038 m^3/s	0.022 m^3/s
Input current • Rated current	 13.2 A	 19 A	 26 A	 30 A
Line supply connection U1/L1, V1/L2, W1/L3 • Conductor cross-section	Screw terminals 2.5 … 10 mm^2			
PE connection	On housing with M5 screw			
Motor cable length, max. • Shielded • Unshielded	 25 m 100 m			 50 m 100 m
Dimensions • Width • Height • Depth - Without Control Unit - With Control Unit	 189 mm 334 mm 185 mm 250 mm			 275 mm 419 mm 204 mm 260 mm
Weight, approx.	7.5 kg			13 kg

[1] The base load current I_H is based on the duty cycle for high overload applications (machine tool spindle application).

Technical specifications (continued)

Product name	Control Unit CU240B-2 6SL3244-0BB00-1BA1
Operating voltage	24 V DC via the Power Module
Current consumption, max.	0.5 A
Protective insulation	PELV according to EN 50178 Protective separation from the line supply using double/reinforced insulation
Power loss	< 5.5 W
Analog input	1 differential input Switchable using DIP switch between voltage and current: -10 ... +10 V, 0/4 ... 20 mA, 10-bit resolution Analog inputs are protected against inputs in a voltage range of ± 30 V and have a common-mode voltage in the ± 15 V range
PTC/KTY interface	1 motor temperature sensor input, sensors that can be connected: PTC, KTY and Thermo-Click, accuracy ± 5 °C
***U/f* linear/square/parameterizable**	Yes
Operator panel	BOP-2
Memory card	SINAMICS micro memory card (MMC)
PC interface	USB (connection via PC inverter connection kit 2)
Degree of protection	IP20
Signal cable cross-section	
• Min.	0.05 mm^2 (AWG30)
• Max.	1.5 mm^2 (AWG16)
Operating temperature	0 ... 50 °C
Storage temperature	-40 ... +70 °C
Relative humidity	< 95 % RH, condensation not permissible
Dimensions	
• Width	73 mm
• Height	199 mm
• Depth	46 mm
Weight, approx.	0.49 kg

Product name	Basic Operator Panel BOP-2 6SL3255-0AA00-4CA1
Operating temperature	0 ... 50 °C

Overview

SIMOTICS 1LE1 spindle motor

The SIMOTICS 1LE1 spindle motor is an asynchronous standard motor that is perfectly suitable for operation with the SINAMICS G120 drive system and enables economic but powerful spindle solutions.

Benefits

- High efficiency (IE2)
- Most compact design
- Reinforced bearing shields for long service-life
- Rugged design for harsh environments

Function

- 4 motor types with 5.5 kW, 7.5 kW, 11 kW and 15 kW
- Rated speed of approx. 1460 rpm (4-pole)
- Degree of protection IP55
- Aluminum frame
- Integrated PTC thermistor
- Efficiency class IE2
- Wiring via terminal box
- Separately-driven fan
- Compliant to: IEC, DIN, ISO, VDE, EN, UL

More information

For the whole range of SIMOTICS 1LE1 standard motors please refer to the DT Configurator at:
www.siemens.com/motors
www.siemens.com/industrymall

Selection and ordering data

SIMOTICS 1LE1 spindle motors			SINAMICS G120 PM250 Power Modules
Rated power	Rated speed n_{rated}		Rated power
kW	rpm	Order No. with options	kW
5.5	1465	**1LE1001-1CB03-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11**	7.5
7.5	1465	**1LE1001-1CB23-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11**	7.5
11	1470	**1LE1001-1DB23-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11**	11
15	1475	**1LE1001-1DB43-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11**	15

Option[1)]	Explanation
D31	According to UL with recognition mark
F70	Separately-driven fan
L01	Balancing - without key (1LE1)
L04	Located bearing NDE
L20	Located bearing DE
L22	Bearings for cantilever forces
M01	Pre-configured star connection
N20	Increased air humidity/temperature with 30 to 60 g water per m^3 of air
R11	Terminal box rotated 90° entry from non-drive end

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[1)] Options selected according to the typical use as spindle motor.

Technical specifications

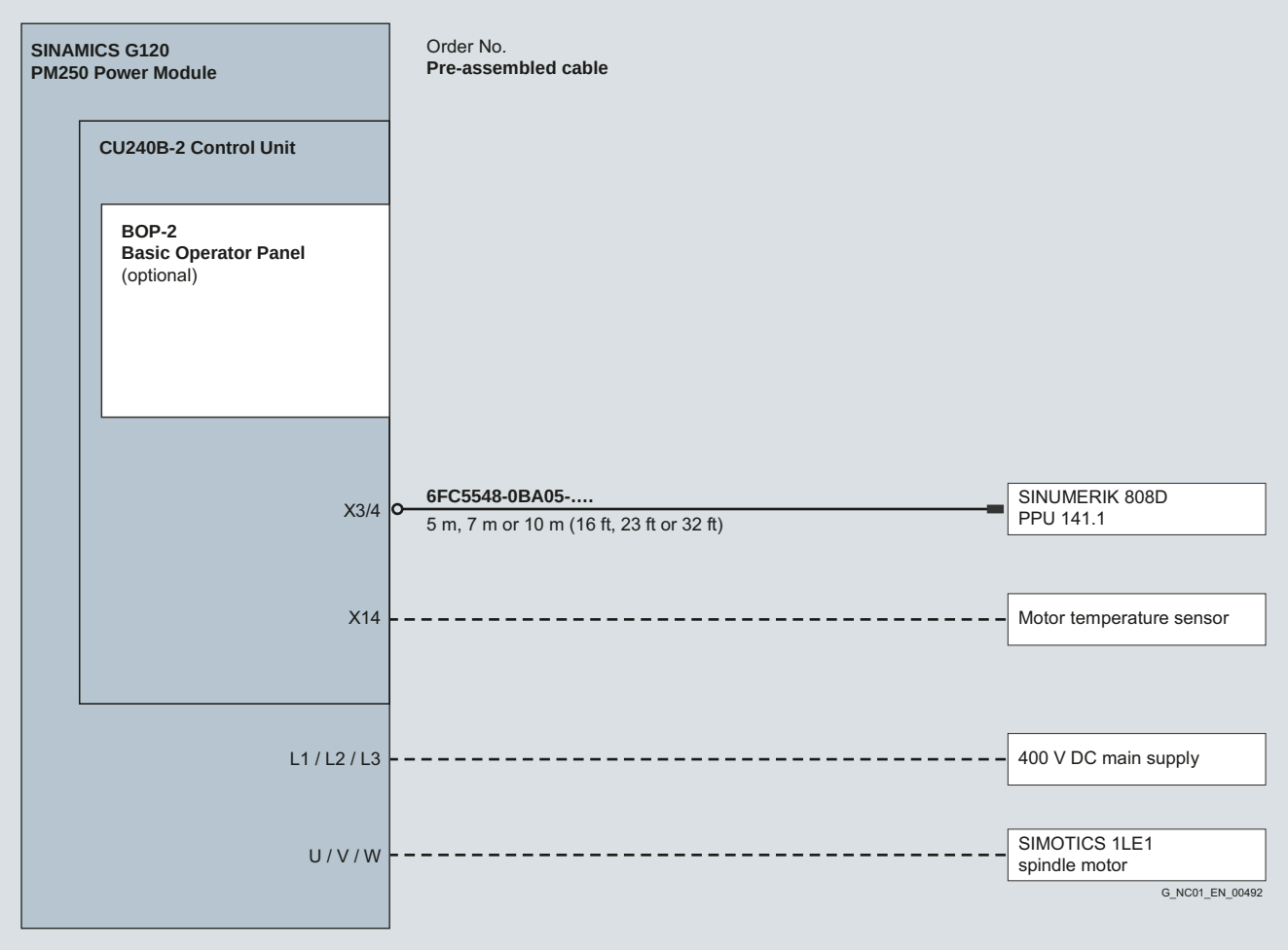
Product name	SIMOTICS 1LE1 spindle motor 1LE1001-1CB03-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11			SIMOTICS 1LE1 spindle motor 1LE1001-1CB23-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11		
Type of motor	Three-phase asynchronous standard motor			Three-phase asynchronous standard motor		
Rated motor voltage	400 VD/690 VY 50 Hz			400 VD/690 VY 50Hz		
Frequency	50 Hz			50 Hz		
Rated motor power	5.50 kW			7.50 kW		
Rated motor speed	1465 rpm			1465 rpm		
Rated motor torque	36.0 Nm			49.0 Nm		
Rated motor current (IE)	VD 11.4 A	VY 6.6 A		VD 14.8 A	VY 8.6 A	
Starting/rated motor current	6.9 A			6.9 A		
Breakdown/rated motor torque	2.9 Nm			2.9 Nm		
Starting/rated motor torque	2.3 Nm			2.3 Nm		
Efficiency class	IE2			IE2		
Efficiency %	4/4 87.7 %	3/4 87.9 %	2/4 87.7 %	4/4 88.7	3/4 89.2	2/4 88.8
Power factor	4/4 0.80	3/4 0.74	2/4 0.63	4/4 0.83	3/4 0.78	2/4 0.67
Motor protection	PTC thermistor for warning and cut-off			PTC thermistor for warning and cut-off		
Terminal box position	On top			On top		
Noise 50 Hz/60 Hz	64.00 dB			64.00 dB		
Moment of inertia	0.027000 kg m^2			0.034000 kg m^2		
Bearing DE/NDE	6308 2ZC3/6208 2ZC3			6308 2ZC3/6208 2ZC3		
Bearing arrangement	Located bearing DE (L20)			Located bearing DE (L20)		
Drain holes	No			No		
Regreasing device	No			No		
Type of lubrication	ESSO UNIREX N3			ESSO UNIREX N3		
Relubrication interval at 40 °C	40000 h			40000 h		
External earthing	No			No		
Paintwork	Standard finish in RAL 7030 stone gray			Standard finish in RAL 7030 stone gray		
Ambient temperature	-20 °C ... +40 °C			-20 °C ... +40 °C		
Altitude above sea level	1000 m			1000 m		
Standards and specifications	IEC, DIN, ISO, VDE, EN			IEC, DIN, ISO, VDE, EN		
Frame size	132S			132M		
Type of construction	IM B3			IM B3		
Weight in kg	42 kg			49 kg		
Frame material	Aluminum			Aluminum		
Degree of protection	IP55			IP55		
Method of cooling, TEFC	IC 416			IC 416		
Vibration class	A (Standard)			A (Standard)		
Insulation	155 (F) to 130 (B)			155 (F) to 130 (B)		
Duty type	S1			S1		
Direction of rotation	Bidirectional			Bidirectional		
Terminal box						
Material of terminal box	Aluminum			Aluminum		
Type	TB1 H00			TB1 H00		
Terminal screw thread	M4			M4		
Max. cable cross-sectional area	6.0 mm^2			6.0 mm^2		
Cable diameter	11.0 mm … 21.0 mm			11.0 mm … 21.0 mm		
Cable entry	2 × M32 × 1.5 - 1 × M16 × 1.5			2 × M32 × 1.5 - 1 × M16 × 1.5		
Cable gland	3 plugs			3 plugs		

Technical specifications (continued)

Product name	SIMOTICS 1LE1 spindle motor 1LE1001-1DB23-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11			SIMOTICS 1LE1 spindle motor 1LE1001-1DB43-4AC4-Z D31+F70+L01+L04+L20+L22+M01+N20+R11		
Type of motor	Three-phase asynchronous standard motor			Three-phase asynchronous standard motor		
Rated motor voltage	400 VD/690 VY 50Hz			400 VD/690 VY 50Hz		
Frequency	50 Hz			50 Hz		
Rated motor power	11.00 kW			15.00 kW		
Rated motor speed	1470 rpm			1475 rpm		
Rated motor torque	71.0 Nm			97.0 Nm		
Rated motor current (IE)	VD 21.0 A	VY 12.2 A		VD 28.0 A	VY 16.2 A	
Starting/rated motor current	6.7 A			7.3 A		
Breakdown/rated motor torque	2.8 Nm			3.0 Nm		
Starting/rated motor torque	2.2 Nm			2.5 Nm		
Efficiency class	IE2			IE2		
Efficiency %	4/4 89.8	3/4 90.3	2/4 90.8	4/4 90.6	3/4 90.8	2/4 91.0
Power factor	4/4 0.85	3/4 0.81	2/4 0.71	4/4 0.85	3/4 0.81	2/4 0.72
Motor protection	PTC thermistor for warning and cut-off			PTC thermistor for warning and cut-off		
Terminal box position	On top			On top		
Noise 50 Hz/60 Hz	65.00 dB			65.00 dB		
Moment of inertia	0.065000 kg m^2			0.083000 kg m^2		
Bearing DE/NDE	6309 2ZC3/6209 2ZC3			6309 2ZC3/6209 2ZC3		
Bearing arrangement	Located bearing DE (L20)			Located bearing DE (L20)		
Drain holes	No			No		
Regreasing device	No			No		
Type of lubrication	ESSO UNIREX N3			ESSO UNIREX N3		
Relubrication interval at 40 °C	40000 h			40000 h		
External earthing	No			No		
Paintwork	Standard finish in RAL 7030 stone gray			Standard finish in RAL 7030 stone gray		
Ambient temperature	-20 °C … +40 °C			-20 °C … +40 °C		
Altitude above sea level	1000 m			1000 m		
Standards and specifications	IEC, DIN, ISO, VDE, EN			IEC, DIN, ISO, VDE, EN		
Frame size	160M			160L		
Type of construction	IM B3			IM B3		
Weight	71.0 kg			83.0 kg		
Frame material	Aluminum			Aluminum		
Degree of protection	IP55			IP55		
Method of cooling, TEFC	IC 416			IC 416		
Vibration class	A (Standard)			A (Standard)		
Insulation	155 (F) to 130 (B)			155 (F) to 130 (B)		
Duty type	S1			S1		
Direction of rotation	Bidirectional			Bidirectional		
Terminal box						
Material of terminal box	Aluminum			Aluminum		
Type	TB1 J00			TB1 J00		
Terminal screw thread	M5			M5		
Max. cable cross-sectional area	16.0 mm^2			16.0 mm^2		
Cable diameter	19.0 mm … 28.0 mm			19.0 mm … 28.0 mm		
Cable entry	2 × M40 × 1.5 - 1 × M16 × 1.5			2 × M40 × 1.5 - 1 × M16 × 1.5		
Cable gland	3 plugs			3 plugs		

Pre-assembled cables

Integration



Connection overview of SINAMICS G120 drive system

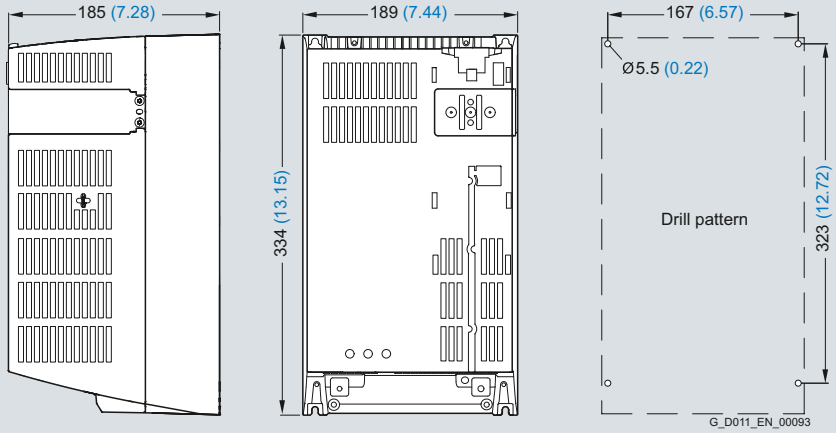
For general information about MOTION-CONNECT please refer to Introduction.

▬—	Connector with pin contacts
)—	Connector with socket contacts
o—	Exposed core ends
- - - -	Cable is not included in the scope of delivery. It must be provided by the customer.

Selection and ordering data

Description	Order No.
Pre-assembled setpoint cable PPU 141.1 - CU240B-2	
Length	
• 5 m	**6FC5548-0BA05-1AF0**
• 7 m	**6FC5548-0BA05-1AH0**
• 10 m	**6FC5548-0BA05-1BA0**

Dimensional drawings



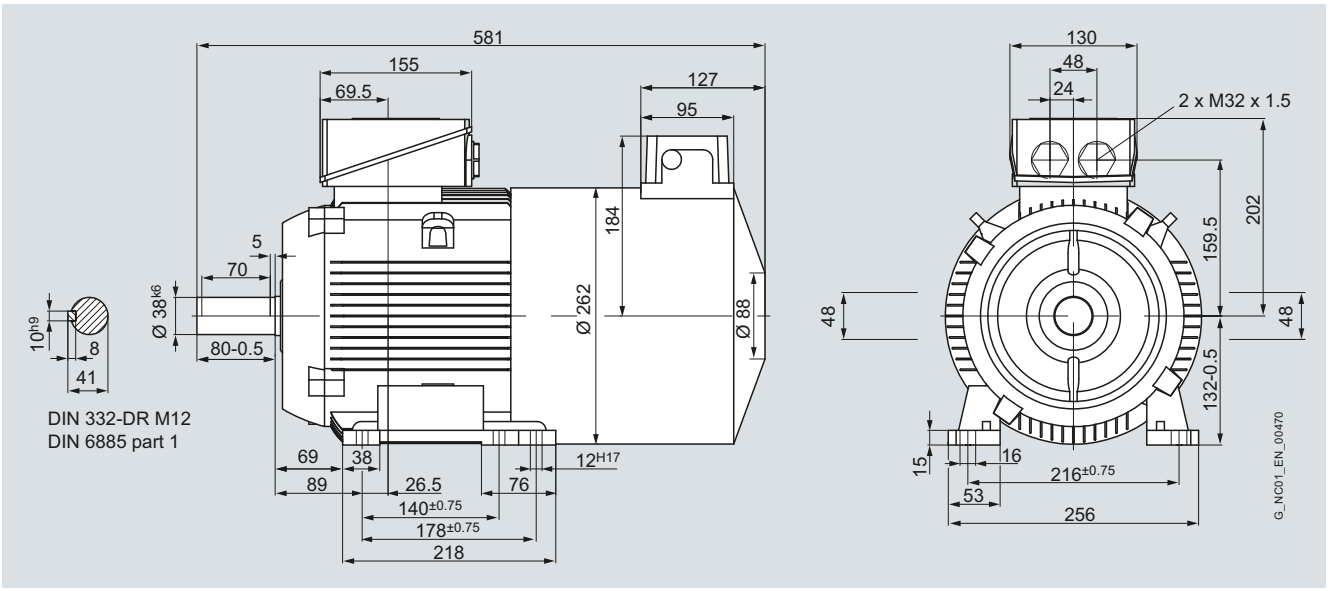
SINAMICS G120 Power Module PM250, FSC

Frame size	**Cooling clearance** in mm		
	top/bottom	front	side
FSC	125	0	50[1)]

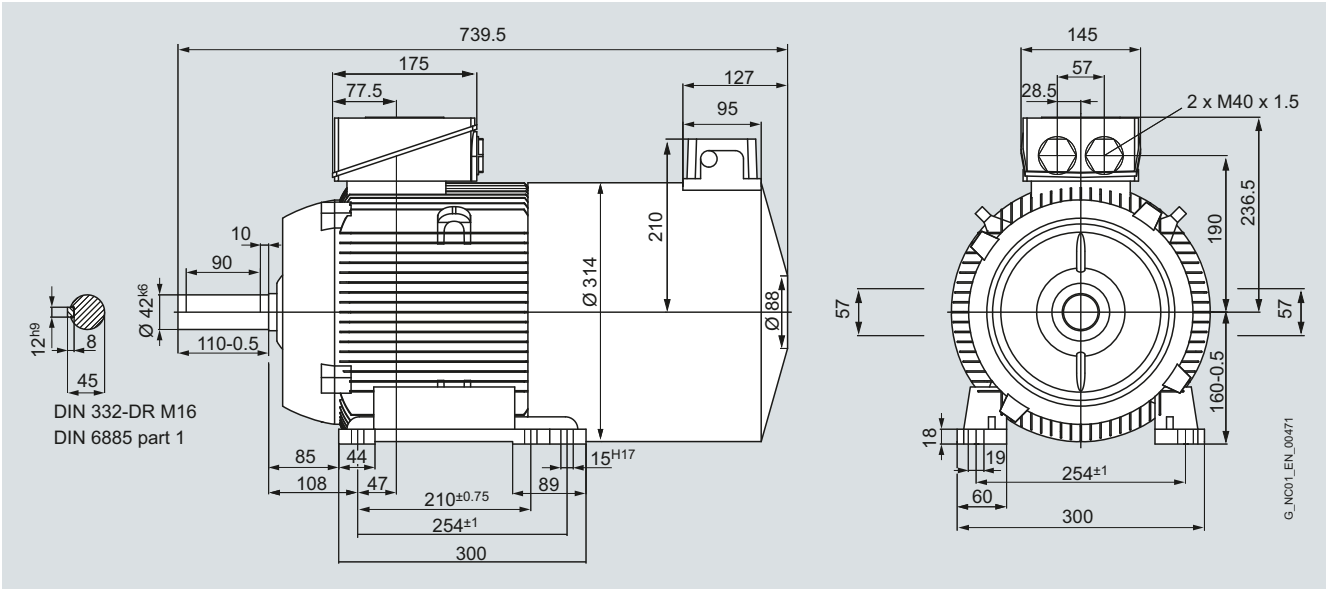
[1)] Up to 40 °C without any lateral clearance.

SIMOTICS 1LE1 spindle motor

Dimensional drawings



SIMOTICS 1LE1 spindle motor, 5.5 kW/7.5 kW



SIMOTICS 1LE1 spindle motor, 11 kW/15 kW

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Services and training

6

6/2 Services

6/2 Material warranty and on-site service

6/3 Training

6/3 SITRAIN

6/4 SINUMERIK 808D on PC

6/5 SINUMERIK 808D CNC training kits

6/5 SINUMERIK 808D V60 drive training kit

6/6 Documentation

6/6 Specific documentation for SINUMERIK 808D/ SINAMICS V60/SINAMICS G120

Material warranty and on-site service

Overview

Equipment package SINUMERIK 808D, SINAMICS V60 with SIMOTICS 1FL5 feed motors and SINAMICS G120 with SIMOTICS 1LE1 spindle motors

For the SINUMERIK 808D Turning/SINUMERIK 808 Milling and the associated components[1] by Siemens Industry Sector, IA & DT, you will receive a material warranty and free on-site service of up to 36 months[2].

Benefits

You benefit because the warranty period does not commence until the machine has received the final acceptance from your customer. So none of the warranty period expires while your machine is being shipped or stored.

More information

For the material warranty and on-site support the same scope as for Repair Service Contracts applies. Further information can be found at:
www.siemens.com/automation/rsc

[1] Not applicable to complete motor spindles.

[2] 24 months after end-user notification, maximum 36 months from delivery ex works

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SITRAIN – the Siemens Training for Industry – provides you with comprehensive support in solving your tasks.

Training by the market leader in automation and plant engineering enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

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- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:
www.siemens.com/sitrain

or let us advise you personally.

SITRAIN Customer Support Germany:

Phone: +49 (911) 895-7575

Fax: +49 (911) 895-7576

E-Mail: info@sitrain.com

SITRAIN highlights

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

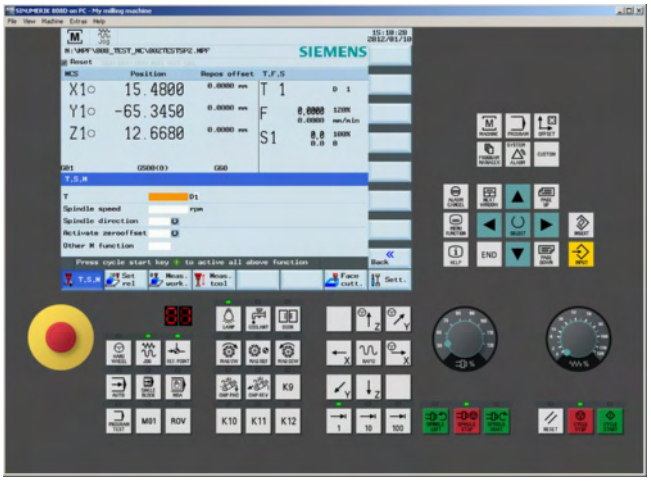
We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" means a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.

SINUMERIK 808D on PC

Overview



SINUMERIK 808D on PC is a PC-based CNC training/ programming software package. SINUMERIK 808D on PC enables completely identical CNC operation and CNC programming as on the SINUMERIK 808D Turning or SINUMERIK 808D Milling. SINUMERIK 808D on PC can be used for the following applications:

- Self-study or professional training of SINUMERIK 808D operation and CNC programming
- Offline CNC program creation and simulation
- Professional presentation of SINUMERIK 808D operation and CNC programming

Benefits

- User-friendly, control-identical simulation of operation and CNC programming of SINUMERIK controls on the PC
- Maximum compatibility thanks to integrated original SINUMERIK CNC software
- Accurate simulation of machine operation with inexpensive virtual machine control panel
- Optimum training software for the most common CNC programming styles – ISO code and SINUMERIK style CNC programming
- Easy CNC program exchange via PC and CNC of machine via USB memory stick
- Free of charge download of the fully-fledged SINUMERIK 808D on PC package

Function

Technologies and machine types

SINUMERIK 808D on PC can be used for the following most common machine types:

- Vertical machining centers or milling machines with the geometry axes X, Y, Z and a main spindle
- Lathes with the geometry axes X, Z and a main spindle

If the SINUMERIK 808D of the target machine is configured with typical parameters, CNC programs created with SINUMERIK 808D on PC can be executed on the machine without any program adaptations.

Accurate simulation of real operator control on the machine

With its fully-fledged virtual machine control panel, SINUMERIK 808D on PC offers functions such as CNC Start, CNC Stop spindle/feed override or axis direction keys and can therefore be operated just like a real machine.

Online help

Like a SINUMERIK 808D, SINUMERIK 808D on PC also offers a context sensitive online help.

Languages

The following operator languages are available:

- English
- Simplified Chinese
- Russian
- Portuguese

Free of charge download

SINUMERIK 808D on PC is available for download free of charge at:
www.cnc4you.siemens.com

Integration

SINUMERIK 808D on PC can be used for:

- SINUMERIK 808D Turning
- SINUMERIK 808D Milling

Hardware preconditions:

- PC with 1.5 GHz processor (single core)
- RAM: 1 GB
- Hard disk: 2 GB of free memory space
- DVD drive for installation from DVD
- Graphics card: Minimum resolution 640 × 480 pixels
- USB interface
- Mouse, keyboard

Software preconditions:

- Operating system Windows XP SP3 32 bit Professional/Home Edition
- Operating system Windows 7 32/64 bit
- Adobe Acrobat Reader

Selection and ordering data

Description	Order No.
SINUMERIK 808D on PC on DVD-ROM	**6FC5548-0YC20-0YA0**

SINUMERIK 808D CNC training kits

Overview

SINUMERIK 808D CNC training kit

The training kits for SINUMERIK 808D Turning and SINUMERIK 808D Milling are used to provide practical training in operation, programming, commissioning and servicing.

Design

SINUMERIK 808D CNC training kit

- SINUMERIK 808D Turning PPU 141.1 or SINUMERIK 808D Milling PPU 141.1
- SINUMERIK 808D MCP
- Robust aluminum transport case with shock protection.

The SINUMERIK 808D Turning/SINUMERIK 808D Milling training kits are designed for table set-up and can be operated optionally with a SINUMERIK 808D V60 drive training kit.

Technical specifications

Product name	SINUMERIK 808D CNC training kits 6AG1067-1AA26-0AA0 6AG1067-1AA27-0AA0
Supply voltage	230 V AC
Degree of protection to DIN VDE 0470 Part 1/ EN 60529/IEC 60529	IP00
Ambient temperature • Storage/Transport • Operation	 -20 ... +60 °C 5 ... 40 °C
Dimensions (W × H × D)	650 mm × 500 mm × 250 mm
Weight, approx.	23 kg

Selection and ordering data

Description	Order No.
SINUMERIK 808D Turning CNC training kit	**6AG1067-1AA26-0AA0**
SINUMERIK 808D Milling CNC training kit	**6AG1067-1AA27-0AA0**

SINUMERIK 808D V60 drive training kit

Overview

SINUMERIK 808D V60 drive training kit

The SINUMERIK 808D V60 drive training kit is used in conjunction with the SINUMERIK 808D CNC training kits to provide an even more practical training in operation, programming and commissioning.

Design

SINUMERIK 808D V60 drive training kit

- 2 SINAMICS V60 CPM60.1 modules
- 1 SINAMICS G120 Power Module with CU240B-2 Control Unit and Basic Operator Panel
- 2 SIMOTICS 1FL5 feed motors
- 1 SIMOTICS 1LE1 standard motor
- Robust aluminum transport case with shock protection.

The SINUMERIK 808D V60 drive training kit is designed as a standing device and can be operated only in conjunction with the SINUMERIK 808D CNC training kit.

Technical specifications

Product name	SINUMERIK 808D V60 drive training kit 6AG1067-1AA28-0AA0
Supply voltage	380 ... 480 V 3 AC
Degree of protection to DIN VDE 0470 Part 1/ EN 60529/IEC 60529	IP00
Ambient temperature • Storage/Transport • Operation	 -20 ... +60 °C 5 ... 40 °C
Dimensions (W × H × D)	615 mm × 1150 mm × 615 mm
Weight, approx.	34 kg

Selection and ordering data

Description	Order No.
SINUMERIK 808D V60 drive training kit	**6AG1067-1AA28-0AA0**

Documentation

Specific documentation for SINUMERIK 808D/ SINAMICS V60/SINAMICS G120

Overview

Comprehensive documentation is available for the SINUMERIK 808D Turning and SINUMERIK 808D Milling CNC controls and the SINAMICS V60 and SINAMICS G120 drive system. This documentation includes Operator's Guides, Programming Guides or Configuration Guides, as well as Installation Guides.

Information is available in the following formats:

- Paper version, printed copy
- PDF file available on the Internet with the MyDocumentation Manager application and can been found at: support.automation.siemens.com

Selection and ordering data

Description	Order No.
Specific documentation for SINUMERIK 808D targeting machine tool builders	
SINUMERIK 808D Operating Instructions[1]	
• English	**6FC5397-2EP10-0BA0**
• Simplified Chinese	**6FC5397-2EP10-0RA0**
Specific documentation for SINUMERIK 808D targeting end users	
SINUMERIK 808D Diagnostics Manual	
• English	**6FC5398-6DP10-0BA0**
• Simplified Chinese	**6FC5398-6DP10-0RA0**
SINUMERIK 808D Turning Programming and Operating Manual	
• English	**6FC5398-5DP10-0BA0**
• Simplified Chinese	**6FC5398-5DP10-0RA0**
• Portuguese[2]	**6FC5398-5DP10-0KA0**
• Russian[2]	**6FC5398-5DP10-0PA0**
SINUMERIK 808D Milling Programming and Operating Manual	
• English	**6FC5398-4DP10-0BA0**
• Simplified Chinese	**6FC5398-4DP10-0RA0**
• Portuguese[2]	**6FC5398-4DP10-0KA0**
• Russian[2]	**6FC5398-4DP10-0PA0**
SINUMERIK 808D Manual Machine plus (Turning) Programming and Operating Manual	
• English	**6FC5398-3DP10-0BA0**
• Simplified Chinese[2]	**6FC5398-3DP10-0RA0**
• Portuguese[2]	**6FC5398-3DP10-0KA0**
• Russian[2]	**6FC5398-3DP10-0PA0**
SINUMERIK 808D Commissioning Manual	
• English	**6FC5397-3EP10-0BA0**
• Simplified Chinese	**6FC5397-3EP10-0RA0**
• Portuguese[2]	**6FC5397-3EP10-0KA0**
• Russian[2]	**6FC5397-3EP10-0PA0**

Selection and ordering data (continued)

Description	Order No.
Specific documentation for SINAMICS V60	
SINAMICS V60 Controlled Power Module CPM60.1 Getting Started	In scope of delivery of SINAMICS V60 CPM60.1
• English	
• Simplified Chinese	
Specific documentation for SINAMICS G120	
SINAMICS Manual Collection on DVD-ROM	**6SL3097-4CA00-0YG0**
• German	
• English	
• Italian	
• French	
• Spanish	
• Simplified Chinese	
SINAMICS G120 Power Module PM250 Getting Started	In scope of delivery of Power Module PM250
• German	
• English	
• Italian	
• French	
• Spanish	
• Simplified Chinese	
SINAMICS G120 Control Unit CU240B-2 Getting Started	In scope of delivery of Control Unit CU240B-2
• German	
• English	
• Italian	
• French	
• Spanish	
• Simplified Chinese	

More information

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

[1] Includes:
- Mechanical Installation Manual
- Electrical Installation Manual
- Function Manual
- Parameter List Manual
- Diagnostics Manual
- PLC subroutines

[2] In preparation.

Example packages

7/2 **Turning**
7/2 Example package for Turning

7/3 **Milling**
7/3 Example package for Milling

Example package for Turning

Overview

The following composition of an equipment package is an example of a inclined bed lathe with:

- 2 machining axes (X, Z)
- 1 main spindle with direct spindle encoder
- 24 digital PLC input signals and 16 digital PLC output signals

The SINAMICS G120 spindle drive is equipped with a MMC card for data buffering (Basic Operator Panel is only used for commissioning and not for the series machine)

Designation	Quantity	Order No.
SINUMERIK CNC		
SINUMERIK 808D Turning PPU 141.1 horizontal, English layout	1	6FC5370-1AT00-0AA0
SINUMERIK 808D MCP, English layout	1	6FC5303-0AF35-0AA0
Actuating element, 22 mm, latching mushroom pushbutton, red	1	3SB3000-1HA20
Contact block with 2 contacts, 1 NO + 1 NC, 2-pole screw terminal	1	3SB3400-0A
Electronic handwheel with front panel 120 mm × 120 mm, with setting wheel 5 V DC, RS422	1	6FC9320-5DB01
Stabilized power supply, SITOP smart 5 A, 24 V DC, 1-phase	1	6EP1333-3BA00
RS422 (TTL) incremental encoder, 1024 S/R	1	6FX2001-2EB02
Spring disk coupling, shaft diameter 6 mm/6 mm	1	6FX2001-7KF10
Clamp strap (1 unit), for encoders with Synchro flange	3	6FX2001-7KP01
Pre-assembled setpoint cable PPU 141.1 - CPM60.1, length 5 m	2	6FC5548-0BA00-1AF0
Pre-assembled setpoint cable PPU 141.1 - CU 240B-2, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 141.1 - handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 141.1 - incremental spindle encoder (TTL), length 5 m	1	6FX8002-2CD01-1AF0
SINAMICS V60		
SINAMICS V60 CPM60.1, I_{rated} 4 A	1	6SL3210-5CC14-0UA0
SINAMICS V60 CPM60.1, I_{rated} 6 A	1	6SL3210-5CC16-0UA0
SIMOTICS 1FL5		
SIMOTICS 1FL5 feed motor, 4 Nm, 2000 rpm, plain shaft, without holding brake	1	1FL5060-0AC21-0AG0
SIMOTICS 1FL5 feed motor, 6 Nm, 2000 rpm, plain shaft, with holding brake	1	1FL5062-0AC21-0AH0
Pre-assembled encoder cable CPM60.1 - TTL encoder in SIMOTICS 1FL5 feed motor, length 5 m	2	6FX6002-2LE00-1AF0
Pre-assembled power cable CPM60.1 - SIMOTICS 1FL5 feed motor, length 5 m	2	6FX6002-5LE00-1AF0
Pre-assembled brake cable CPM60.1 - brake in SIMOTICS 1FL5 feed motor, length 5 m	1	6FX6002-2BR00-1AF0
SINAMICS G120		
PM250 Power Module, 7.5 kW	1	6SL3225-0BE27-5AA1
CU240B-2 Control Unit	1	6SL3244-0BB00-1BA1
SINAMICS micro memory card (MMC)	1	6SL3254-0AM00-0AA0
SIMOTICS 1LE1		
SIMOTICS 1LE1 spindle motor, 7.5 kW	1	1LE1001-1CB23-4AC4-Z D31+F70+L01+L04+L20+ L22+M01+N20+R11

Example package for Milling

Overview

The following composition of an equipment package is an example of a vertical machining center with:

- 3 machining axes (X, Y, Z)
- 1 main spindle with direct spindle encoder
- 35 digital PLC input signals and 22 digital PLC outputs signal

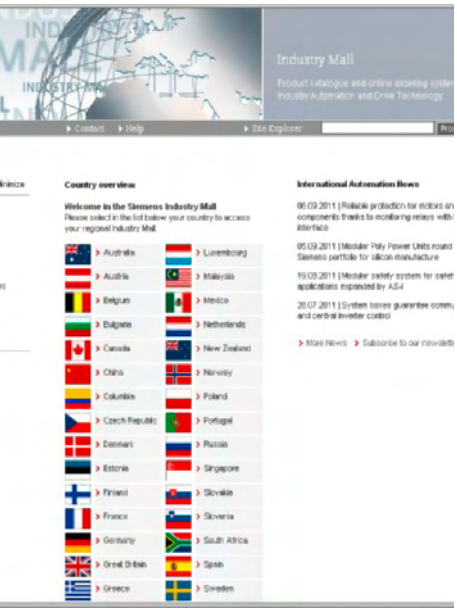
The SINAMICS G120 spindle drive is equipped with a MMC card and a Basic Operator Panel for the series machine.

Designation	Quantity	Order No.
SINUMERIK CNC		
SINUMERIK 808D Milling PPU 141.1 horizontal, English layout	1	6FC5370-1AM00-0AA0
SINUMERIK 808D MCP, English layout	1	6FC5303-0AF35-0AA0
Actuating element, 22 mm, latching mushroom pushbutton, red	1	3SB3000-1HA20
Contact block with 2 contacts, 1 NO + 1 NC, 2-pole screw terminal	1	3SB3400-0A
Electronic handwheel with front panel 120 mm × 120 mm, with setting wheel 5 V DC, RS422	1	6FC9320-5DB01
Terminal strip converter 50-pole	1	6EP5406-5AA00
Cable set ribbon cable, 50-pole, with connectors, 50-pole	1	6EP5306-5BG00
Stabilized power supply, SITOP smart 5 A, 24 V DC, 1-phase	1	6EP1333-3BA00
RS422 (TTL) incremental encoder, 1024 S/R	1	6FX2001-2EB02
Spring disk coupling, shaft diameter 6 mm/6 mm	1	6FX2001-7KF10
Clamp strap (1 unit), for encoders with Synchro flange	3	6FX2001-7KP01
Pre-assembled setpoint cable PPU 141.1 - CPM60.1, length 5 m	3	6FC5548-0BA00-1AF0
Pre-assembled setpoint cable PPU 141.1 - CU 240B-2, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 141.1 - handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 141.1 - incremental spindle encoder (TTL), length 7 m	1	6FX8002-2CD01-1AH0
SINAMICS V60		
SINAMICS V60 CPM60.1, I_{rated} 7 A	2	6SL3210-5CC17-0UA0
SINAMICS V60 CPM60.1, I_{rated} 10 A	1	6SL3210-5CC21-0UA0
SIMOTICS 1FL5		
SIMOTICS 1FL5 feed motor, 7.7 Nm, 2000 rpm, plain shaft, without holding brake	2	1FL5064-0AC21-0AG0
SIMOTICS 1FL5 feed motor, 10 Nm, 2000 rpm, plain shaft, with holding brake	1	1FL5066-0AC21-0AH0
Pre-assembled encoder cable CPM60.1 - TTL encoder in SIMOTICS 1FL5 feed motor, length 10 m	3	6FX6002-2LE00-1BA0
Pre-assembled power cable CPM60.1 - SIMOTICS 1FL5 feed motor, length 10 m	3	6FX6002-5LE00-1BA0
Pre-assembled brake cable CPM60.1 - brake in SIMOTICS 1FL5 feed motor, length 10 m	1	6FX6002-2BR00-1BA0
SINAMICS G120		
PM250 Power Module, 15 kW	1	6SL3225-0BE31-5AA0
CU240B-2 Control Unit	1	6SL3244-0BB00-1BA1
Basic Operator Panel BOP-2	1	6SL3255-0AA00-4CA1
SINAMICS micro memory card (MMC)	1	6SL3254-0AM00-0AA0
SIMOTICS 1LE1		
SIMOTICS 1LE1 spindle motor, 15 kW	1	1LE1001-1DB43-4AC4-Z D31+F70+L01+L04+L20+ L22+M01+N20+R11

Example packages

Notes

Appendix



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Overview

Many products in this catalog are in compliance with UL/CSA and FM requirements and are labeled with the appropriate certification markings.

All certifications, certificates, declarations of conformance, test certificates, e.g. CE, UL, Safety Integrated have been performed with the associated system components as they are described in the Catalogs and Configuration Manuals.

The certificates are only valid if the products are used with the described system components, are installed according to the Installation Guidelines and are used for their intended purpose.

For cases that deviate from these conditions, the company or person marketing these products is responsible in having the certificates appropriately re-issued.

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Independent public testing institution in North America

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- **cUL** for end-products, tested by UL in accordance with CSA standard
- **cULus** for end-products, tested by UL in accordance with UL and CSA standards
- **UR** for mounting parts in end products, tested by UL in accordance with UL standard
- **cUR** for mounting parts in end products, tested by UL in accordance with CSA standard
- **cURus** for mounting parts in end-products, tested by UL in accordance with UL and CSA standards

Test standards:

- SINUMERIK: Standard UL 508
- SINAMICS: Standard UL 508C
- Motors: Standard UL 547

Product category/File No.:

- SINUMERIK: E164110
- SINAMICS: E192450
- Motors: E93429

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Independent public testing institution in North America
National recognized testing laboratory (NRTL)

Approval mark:

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Independent public testing institution in Canada

Approval mark:

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Test standard:

- Standard CAN/CSA-C22.2 No. 0-M91/No. 14-05/ No. 142-M1987

FMRC: Factory Mutual Research Corporation
Independent public testing institution in North America

Approval mark:

- **FM** Tested by FM in accordance with the FM standard

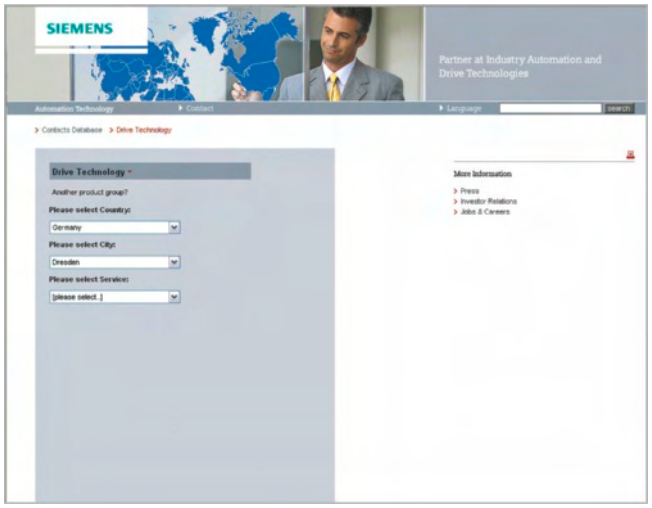
Test standard:

- Standard FMRC 3600, FMRC 3611, FMRC 3810 Class I, Div.2, Group A, B, C, D

File No.:

- SINUMERIK FM... : 4Y1A7.AX
  5B0A2.AX
  2D7A2.AX
  3007320

Partners at Industry Automation and Drive Technologies



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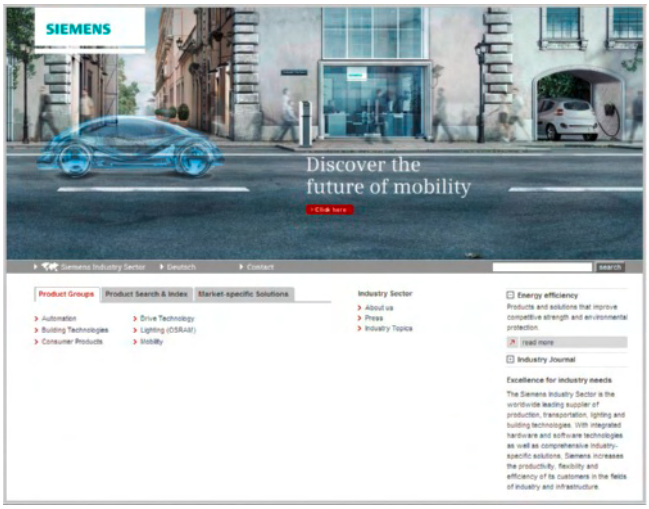

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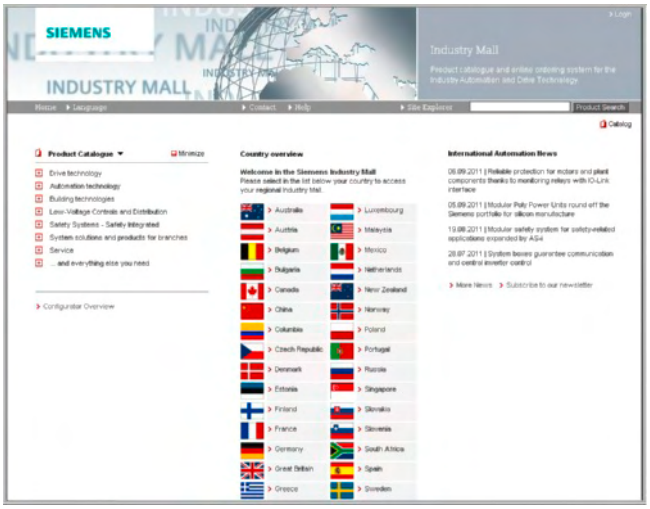

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Overview

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Software requiring a license is categorized into types.
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- Engineering software
- Runtime software

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This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

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Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Trial license
- Factory license

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The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

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The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per device, per axis, per channel, etc.

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Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

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The Certificate of License (CoL) is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

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Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

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An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Overview

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To order the software update service, an order number must be specified. The software update service can be ordered when the software products are ordered or at a later date. Subsequent orders require that the ordering party is in posession at least of a single license.

Note:
It is recommended that the software update service is ordered as early as possible. If a new software version of a software product is released for delivery by Siemens, only those customers will receive it automatically who are entered in the appropriate delivery list at Siemens at this time. Previous software versions, or the current software version are not supplied when the software update service is ordered. The software update service requires that the software product is up-to-date at the time of completion of the contract for the software update service.

Delivery
When a software update service is ordered, you will be sent the contractual conditions of this service and the price is due for payment. At the same time, you will be included in a delivery list for the software product to be updated. If Siemens releases a new software version for the corresponding software product for general sale (function version or product version), it will be delivered automatically to the goods recipient specified in the delivery address within the contract period.

More information

Security note

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

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Notes

Conversion tables

Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in^2	lb-ft^2	lb-in-s^2	lb-ft-s^2 slug-ft^2	kg-cm^2	kg-cm-s^2	gm-cm^2	gm-cm-s^2	oz-in^2	oz-in-s^2
lb-in^2	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
lb-ft^2	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
lb-in-s^2	386.08	2.681	1	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
lb-ft-s^2 slug-ft^2	4.63×10^{3}	32.17	12	1	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
kg-cm^2	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s^2	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^{5}	1000	5.36×10^{3}	13.887
gm-cm^2	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s^2	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in^2	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s^2	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^{4}	72.0	386.08	1

Torque (to convert from A to B, multiply by entry in table)

A \ B	lb-in	lb-ft	oz-in	N-m	kg-cm	kg-m	gm-cm	dyne-cm
lb-in	1	8.333×10^{-2}	16	0.113	1.152	1.152×10^{-2}	1.152×10^{3}	1.129×10^{6}
lb-ft	12	1	192	1.355	13.825	0.138	1.382×10^{4}	1.355×10^{7}
oz-in	6.25×10^{-2}	5.208×10^{-3}	1	7.061×10^{-3}	7.200×10^{-2}	7.200×10^{-4}	72.007	7.061×10^{4}
N-m	8.850	0.737	141.612	1	10.197	0.102	1.019×10^{4}	1×10^{7}
kg-cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	1	10^{-2}	1000	9.806×10^{5}
kg-m	86.796	7.233	1.388×10^{3}	9.806	100	1	1×10^{5}	9.806×10^{7}
gm-cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-3}	1×10^{-5}	1	980.665
dyne-cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.0197×10^{-6}	1.019×10^{-8}	1.019×10^{-3}	1

Length (to convert from A to B, multiply by entry in table)

A \ B	inches	feet	cm	yd	mm	m
inches	1	0.0833	2.54	0.028	25.4	0.0254
feet	12	1	30.48	0.333	304.8	0.3048
cm	0.3937	0.03281	1	1.09×10^{-2}	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	1.09×10^{-3}	1	0.001
m	39.37	3.281	100	1.09	1000	1

Power (to convert from A to B, multiply by entry in table)

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./s)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (rpm)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./s)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (rpm)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	1

Force (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	dyne	N
lb	1	16	453.6	4.448×10^{5}	4.4482
oz	0.0625	1	28.35	2.780×10^{4}	0.27801
gm	2.205×10^{-3}	0.03527	1	1.02×10^{-3}	N.A.
dyne	2.248×10^{-6}	3.59×10^{-5}	980.7	1	0.00001
N	0.22481	3.5967	N.A.	100000	1

Mass (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	kg	slug
lb	1	16	453.6	0.4536	0.0311
oz	6.25×10^{-2}	1	28.35	0.02835	1.93×10^{-3}
gm	2.205×10^{-3}	3.527×10^{-2}	1	10^{-3}	6.852×10^{-5}
kg	2.205	35.27	10^{3}	1	6.852×10^{-2}
slug	32.17	514.8	1.459×10^{4}	14.59	1

Rotation (to convert from A to B, multiply by entry in table)

A \ B	rpm	rad/s	degrees/s
rpm	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	1.745×10^{-2}	1

Temperature Conversion

°F	°C	°C	°F
0	–17.8	–10	14
32	0	0	32
50	10	10	50
70	21.1	20	68
90	32.2	30	86
98.4	37	37	98.4
212	100	100	212
subtract 32 and multiply by $^5/_9$		multiply by $^9/_5$ and add 32	

Mechanism Efficiencies

Acme-screw with brass nut	~0.35–0.65
Acme-screw with plastic nut	~0.50–0.85
Ball-screw	~0.85–0.95
Chain and sprocket	~0.95–0.98
Preloaded ball-screw	~0.75–0.85
Spur or bevel-gears	~0.90
Timing belts	~0.96–0.98
Worm gears	~0.45–0.85
Helical gear (1 reduction)	~0.92

Friction Coefficients

Materials	μ
Steel on steel (greased)	~0.15
Plastic on steel	~0.15–0.25
Copper on steel	~0.30
Brass on steel	~0.35
Aluminum on steel	~0.45
Steel on steel	~0.58

Mechanism	μ
Ball bushings	<0.001
Linear bearings	<0.001
Dove-tail slides	~0.2++
Gibb ways	~0.5++

Material Densities

Material	lb-in^3	gm-cm^3
Aluminum	0.096	2.66
Brass	0.299	8.30
Bronze	0.295	8.17
Copper	0.322	8.91
Hard wood	0.029	0.80
Soft wood	0.018	0.48
Plastic	0.040	1.11
Glass	0.079–0.090	2.2–2.5
Titanium	0.163	4.51
Paper	0.025–0.043	0.7–1.2
Polyvinyl chloride	0.047–0.050	1.3–1.4
Rubber	0.033–0.036	0.92–0.99
Silicone rubber, without filler	0.043	1.2
Cast iron, gray	0.274	7.6
Steel	0.280	7.75

Wire Gauges[1)]

Cross-section mm^2	Standard Wire Gauge (SWG)	American Wire Gauge (AWG)
0.2	25	24
0.3	23	22
0.5	21	20
0.75	20	19
1.0	19	18
1.5	17	16
2.5	15	13
4	13	11
6	12	9
10	9	7
16	7	6
25	5	3
35	3	2
50	0	1/0
70	000	2/0
95	00000	3/0
120	0000000	4/0
150	–	6/0
185	–	7/0

1) The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

Explanation of the metal factor

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded.

The surcharges will be determined based on the following criteria:

- Official price of the metal
- Official price on the day prior to receipt of the order or prior to the release order (=daily price) for
  - silver (sale price of the processed material),
  - gold (sale price of the processed material)

  Source: Umicore, Hanau
  www.metalsmanagement.umicore.com

  and for
  - copper (low DEL notation + 1 %),
  - aluminum (aluminum in cables) and
  - lead (lead in cables)

  Source: German Trade Association for Cables and Conductors
  www.kabelverband.org
- Metal factor of the products
- Certain products are assigned a metal factor. The metal factor determines the official price as of which the metal surcharges are charged 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 method of calculation refers to the list price or a discounted price (customer net price)
(L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective metal. If no surcharge is added, 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)

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 result is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (2 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

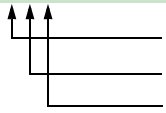
Percentage method

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.

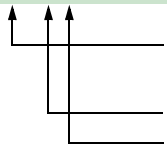
Metal factor examples

L E A – – –



Basis for % surcharge: List price
Silver: basis 150 €, step range 50 €, 0.5 %
Copper: basis 150 €, step range 50 €, 0.1 %
No surcharge for aluminum
No surcharge for lead
No surcharge for gold

N – A 6 – –



Basis for % surcharge: Customer net price
No surcharge for silver
Copper: basis 150 €, step range 50 €, 0.1 %
Aluminum acc. to weight, basic offic. price 225 €
No surcharge for lead
No surcharge for gold

– – 3 – – –

No basis necessary
No surcharge for silver
Copper acc. to weight, basic official price150 €
No surcharge for aluminum
No surcharge for lead
No surcharge for gold

Values of the metal factor

Percentage method	Basic official price	Step range	% surcharge 1st step	% surcharge 2nd step	% surcharge 3rd step	% surcharge 4th step	% surcharge per additional step
			Official price 151 € – 200 €	Official price 201 € – 250 €	Official price 251 € – 300 €	Official price 301 € – 350 €	
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
H	150	50	1.2	2.4	3.6	4.8	1.2
J	150	50	1.8	3.6	5.4	7.2	1.8
			176 € – 225 €	226 € – 275 €	276 € – 325 €	326 € – 375 €	
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
			226 € – 275 €	276 € – 325 €	326 € – 375 €	376 € – 425 €	
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
			151 € – 175 €	176 € – 200 €	201 € – 225 €	226 € – 250 €	
Y	150	25	0.3	0.6	0.9	1.2	0.3
			401 € – 425 €	426 € – 450 €	451 € – 475 €	476 € – 500 €	
Z	400	25	0.1	0.2	0.3	0.4	0.1
	Price basis (1st digit)						
L	Charged on the list price						
N	Charged on the customer net price or discounted list price						

Weight method	Basic official price	
2	100	Calculation based on raw material weight
3	150	
4	175	
5	200	
6	225	
7	300	
8	400	
9	555	
Misc.		
-	No metal surcharge	

Appendix

Notes

Fax form

To

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Is the information easy to find? ☐

How would you assess the graphics and tables? ☐

Can the texts be readily understood? ☐

Did you find any printing errors? – Improvement suggestion?

Appendix

Notes

Notes

Conditions of sale and delivery/Export regulations

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! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of 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 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/or services the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].

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2. Prices

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices.

It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminium, lead and/or gold, if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.

The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products. An exact explanation of the metal factor can be found on the page entitled "Metal surcharges".

In the event of an increase or decrease of the purchase price for Rare Earths (e.g. Neodymium, Dysprosium) or in case of a change of prices by our suppliers based on the increase or decrease of the purchase price for Rare Earths between conclusion of the contract and delivery, you or we are additionally entitled to demand for an adjustment of the agreed prices according to the proven cost change for any delivery which contains Rare Earths. The same applies for such cost changes occurred between submission of our binding offer and your acceptance.

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 only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - 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 this agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes or other sanctions.

Export of goods listed in this catalog may be subject to license. We shall 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 label is made available with the information of the respective goods on Industry Mall, our online-catalog-system, additionally. The deciding factors are the export label "AL" or "ECCN" indicated on order confirmations, delivery notes and invoices.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

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 shall comply with all applicable national and international (re-) export control regulations.

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1) The text of the Comprehensive Terms and Conditions of Sale and Delivery can 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 in the appendix or at www.siemens.com/automation/partner

Interactive Catalog on DVD	*Catalog*
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 SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS DCM Converter Units	D 23.1
SINAMICS and Motors for Single-Axis Drives	D 31
Three-phase Induction Motors • H-compact • H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
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