SIEMENS

SINUMERIK 808

Equipment for Machine Tools

Motion Control

| Catalog NC 81.1 | Edition 2013 |

Answers for industry.

Related catalogs

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

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SINUMERIK 828
Equipment for Machine Tools

E86060-K4482-A101-A2-7600

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Motion Control

SINUMERIK 808
Equipment for Machine Tools

Catalog NC 81.1 · 2013

Supersedes:
Catalog NC 81.1 · 2012

Refer to the Industry Mall for current updates of this catalog:
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The products contained in this catalog can also be found in the Interactive Catalog CA 01.
Article No.:
E86060-D4001-A510-D2-7600

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Answers for industry.

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

The Siemens Industry Sector is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility. With a global workforce of more than 100 000 employees, the Industry Sector comprises the Industry Automation, Drive Technologies, and Customer Services divisions, as well as the Metals Technologies Business Unit.

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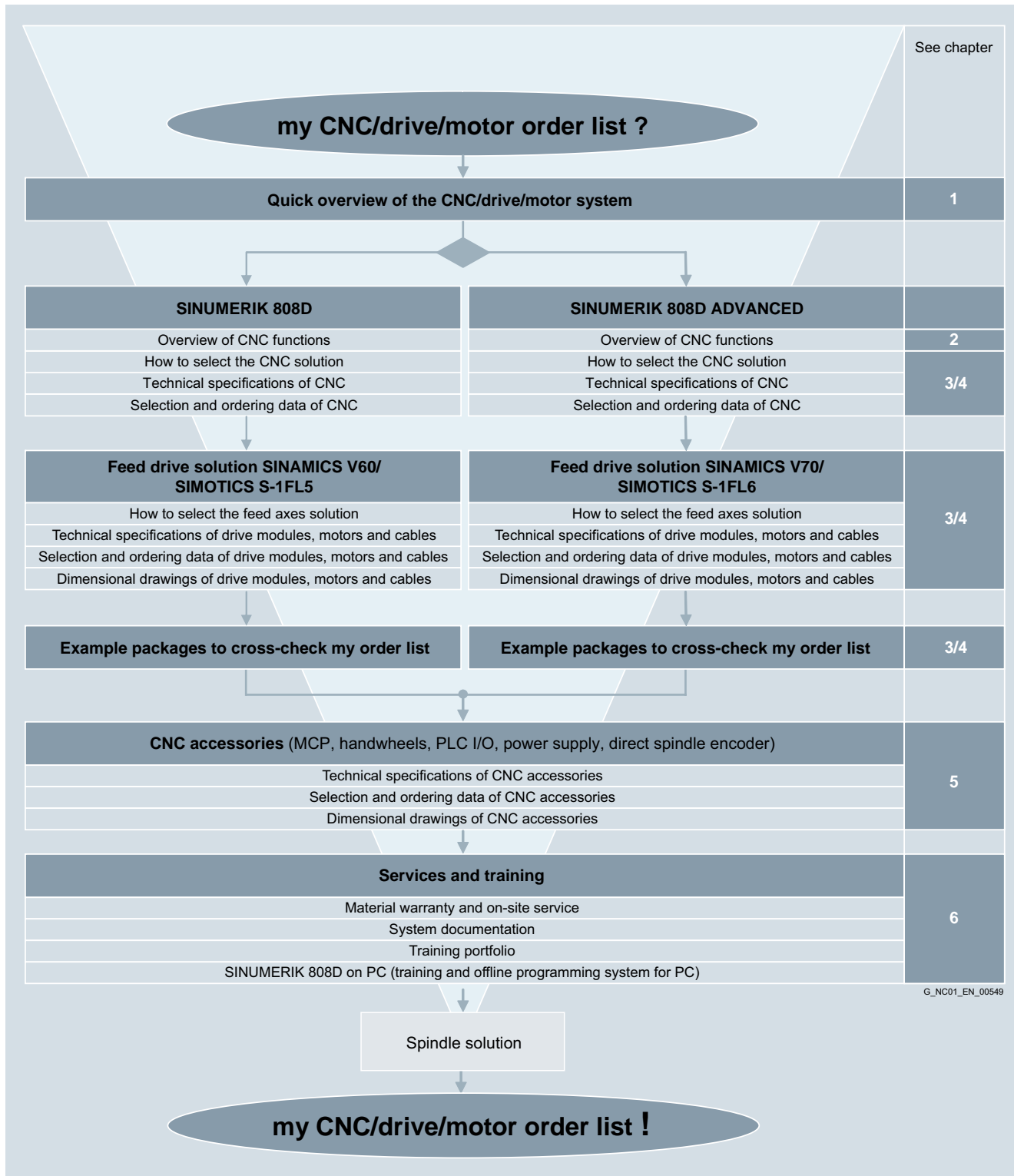
1

Introduction

Introduction
How to use this catalog

1

■ **Overview**

	See chapter
my CNC/drive/motor order list ?	
Quick overview of the CNC/drive/motor system	**1**

SINUMERIK 808D	**SINUMERIK 808D ADVANCED**	
Overview of CNC functions	Overview of CNC functions	**2**
How to select the CNC solution	How to select the CNC solution	
Technical specifications of CNC	Technical specifications of CNC	**3/4**
Selection and ordering data of CNC	Selection and ordering data of CNC	

Feed drive solution SINAMICS V60/ SIMOTICS S-1FL5	**Feed drive solution SINAMICS V70/ SIMOTICS S-1FL6**	
How to select the feed axes solution	How to select the feed axes solution	**3/4**
Technical specifications of drive modules, motors and cables	Technical specifications of drive modules, motors and cables	
Selection and ordering data of drive modules, motors and cables	Selection and ordering data of drive modules, motors and cables	
Dimensional drawings of drive modules, motors and cables	Dimensional drawings of drive modules, motors and cables	

Example packages to cross-check my order list	**Example packages to cross-check my order list**	**3/4**

CNC accessories (MCP, handwheels, PLC I/O, power supply, direct spindle encoder)	
Technical specifications of CNC accessories	**5**
Selection and ordering data of CNC accessories	
Dimensional drawings of CNC accessories	

Services and training	
Material warranty and on-site service	**6**
System documentation	
Training portfolio	
SINUMERIK 808D on PC (training and offline programming system for PC)	

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Spindle solution

my CNC/drive/motor order list !

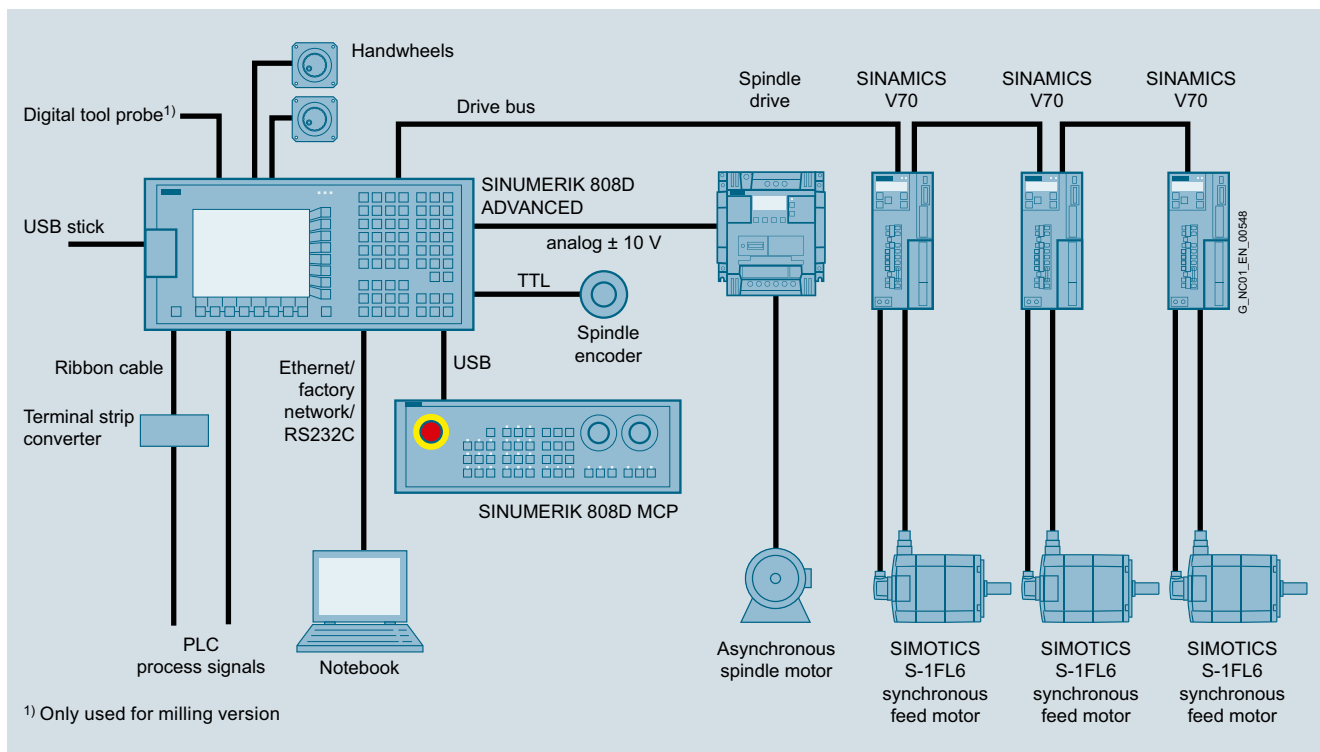## Overview

SINUMERIK 808D system

SINUMERIK 808D ADVANCED system

Introduction
SINUMERIK 808D/808D ADVANCED

1

■ **Overview**

Small, robust, easy, simply smart

The operator-panel-based CNCs SINUMERIK 808D and SINUMERIK 808D ADVANCED are extremely compact, rugged and very easy to maintain. SINUMERIK 808D is suitable for machines needed for economic CNC solutions. With variable software options and high-dynamic servo drive systems, the SINUMERIK 808D ADVANCED system is offering the latest CNC solution for high-performance basic machines.

Preconfigured for basic standard turning machines …

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

Perfectly preconfigured for:

■ SINUMERIK 808D Turning:
   Up to 4 axes/spindles in one machining channel;

■ SINUMERIK 808D ADVANCED T:
   Up to 5 axes/spindles in one machining channel with/without a driven tool

■ Preconfigured system software for inclined bed fully automated lathes and flat bed semi-automatic lathes
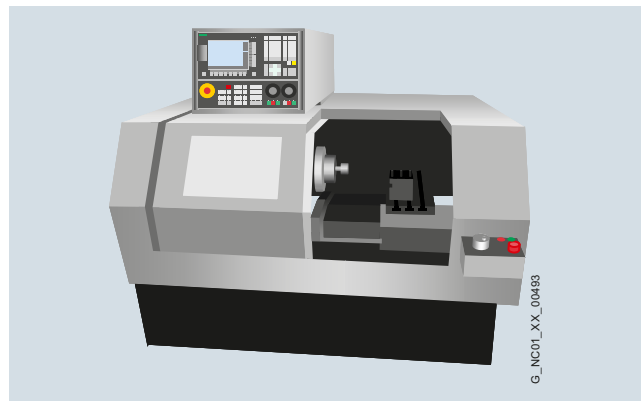

… and basic standard milling machines

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

Perfectly preconfigured for:

■ SINUMERIK 808D Milling:
   4 axes/spindles in one machining channel

■ SINUMERIK 808D ADVANCED M:
   Up to 5 axes/spindles in one machining channel

■ Preconfigured system software for vertical machining centers

■ Prepared for mold and die applications

1
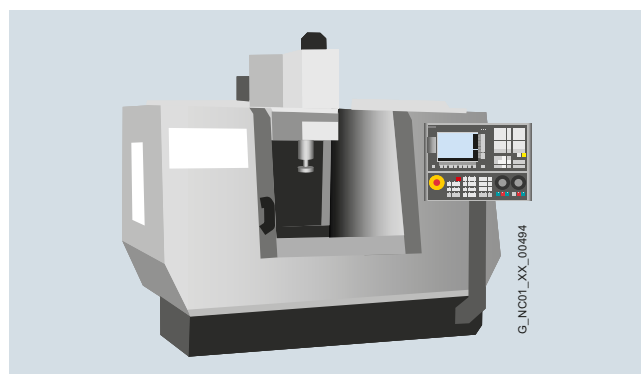
■ Overview

SINAMICS V60 and SIMOTICS S-1FL5

SINAMICS V60 servo drives and SIMOTICS S-1FL5 feed motors are the perfect partners as an economic solution to achieve maximum dynamics and accuracy for feed axes in standard turning and milling machine tool applications with SINUMERIK 808D.

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 together with SIMOTICS S-1FL5 feed motors are perfectly prepared for maximum availability even in harsh environments.

SINAMICS V70 and SIMOTICS S-1FL6

SINAMICS V70 servo drives and SIMOTICS S-1FL6 feed motors are designed for the maximum cutting performance for the basic turning and milling machine tool applications. Thanks to the bus communication with the SINUMERIK 808D ADVANCED CNC system, threefold overload capacity and the 20 bit high-resolution absolute encoder allow to increase the precision and efficiency of the machines.

With a robust design, SINAMICS V70 together with SIMOTICS S-1FL6 feed motors are perfectly prepared for maximum availability even in harsh environments.

Up to 36 months material warranty and on-site service

Siemens offers a standard material warranty and free on-site service period of 24 months for the SINUMERIK 808D, SINUMERIK 808D ADVANCED and the associated components. Warranty can be easily extended up to 36 months by end user registration.

Moreover, Siemens ensures elimination of any defects on the components free of cost on site during the warranty period.

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

1

■ **Overview**

Connection system MOTION-CONNECT 300

The MOTION-CONNECT 300 cables in this catalog are suitable for the use with standard turning and milling machines.

The use of pre-assembled MOTION-CONNECT 300 cables ensures high quality and system-tested, problem-free operation.

Degree of protection of pre-assembled power and signal cables and their extensions is IP65 when closed and connected unless otherwise stated.

MOTION-CONNECT 300 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.

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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 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.
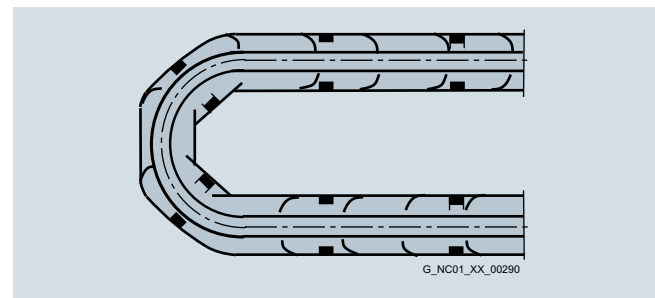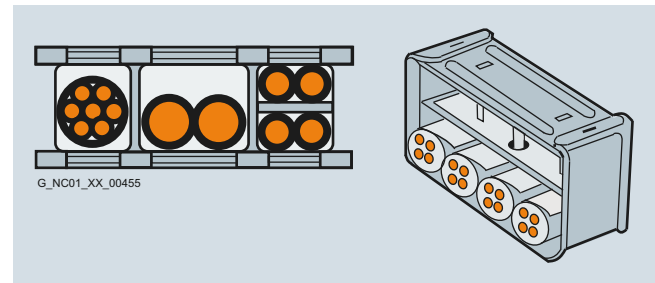

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The cables must be able to be moved without applying force, specifically in the bending radii of the carrier. The specified minimum bending radii must be adhered to.

The cable fixings must be attached at both ends at an appropriate distance 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 (°F)	Derating factor according to EN 60204-1 Table D.1
30 (86)	1.15
35 (95)	1.08
40 (104)	1.00
45 (113)	0.91
50 (122)	0.82
55 (131)	0.71
60 (140)	0.58

Overview of functions

2

The functionality of the SINUMERIK 808D family (SINUMERIK 808D, SINUMERIK 808D ADVANCED) 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 and SINUMERIK 808D ADVANCED controls is based on the following software version:

Control system	Software version
SINUMERIK 808D PPU 141.1	4.4 SP2
SINUMERIK 808D ADVANCED PPU 160.2/PPU161.2	4.6

Overview of functions
SINUMERIK 808D family

**Control structure and configuration/Drives/
Connectable measuring systems**

2

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	**Milling**	**Turning**	**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	Turning	Milling
SINUMERIK operator panel CNC:					
• Operator panel layout horizontal/vertical		✓/–	✓/–	✓/✓	✓/✓
• Color display		7.5"	7.5"	7.5"	7.5"
• Display resolution		640 × 480	640 × 480	640 × 480	640 × 480
• Integrated CNC keyboard with hard keys		✓	✓	✓	✓
• Specific CNC keyboard layout for		Turning	Milling	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 bus interfaces for feed axis converter		–	–	1	1
Quantity of analog ±10 V interfaces for spindle converter		1	1	1	1
Channels/mode groups MG:					
• Maximum configuration		1	1	1	1
CNC user memory (buffered) for CNC part programs	The 1.25 MB memory is for storing and editing the user program. There is another 500 MB memory for NC program storage.	1.25 MB	1.25 MB	1.25 MB	1.25 MB
Axes/spindles:					
• Basic quantity of axes/spindles		3	4	3	4
• Maximum configuration axes/spindles		4	4	5	5
• Axis/spindle, each additional	**6FC5800-0AK70-0YB0**	O	–	O	O
Drives					
Feed drives:					
• SINAMICS V60 via pulse/direction interface		O	O	–	–
• SINAMICS V70 via bus interface		–	–	O	O
• 3rd-party feed axis converter via pulse/direction interface		O	O	–	–
Spindles:					
• Analog Drive Interface		O	O	O	O
Connectable measuring systems					
Number of measuring systems per axis, max.		1	1	1	1
Incremental encoder installed in SIMOTICS S-1FL5 feed motors		✓	✓	–	–
Incremental encoder installed in SIMOTICS S-1FL6 feed motors		–	–	✓	✓
Absolute encoder installed in SIMOTICS S-1FL6 feed motors		–	–	✓	✓
RS422 (TTL) direct incremental spindle encoder	**6FX2001-2EB02**	O	O	O	O

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	Milling	Turning	Milling
Connectable CNC accessories					
Machine Control Panel:					
• SINUMERIK 808D MCP horizontal:					
- English layout	6FC5303-0AF35-0AA0	O	O	O	O
- Simplified Chinese layout	6FC5303-0AF35-0CA0	O	O	O	O
• SINUMERIK 808D MCP vertical:					
- English layout	6FC5303-0AF35-2AA0	O	O	O	O
- Simplified Chinese layout	6FC5303-0AF35-2CA0	O	O	O	O
• SINUMERIK 808D MCP vertical: with handwheel slot					
- English layout	6FC5303-0AF35-3AA0	O	O	O	O
- Simplified Chinese layout	6FC5303-0AF35-3CA0	O	O	O	O
• 3rd-party MCP via onboard digital PLC inputs/outputs		O	O	O	O
Number of digital tool probes, max.		–	1	–	1
Number of electronic handwheels RS422 5 V DC, max.		2	2	2	2
Electronic handwheels 5 V DC:					
• With 120 mm × 120 mm front panel	6FC9320-5DB01	O	O	O	O
• With 76.2 mm × 76.2 mm front panel	6FC9320-5DC01	O	O	O	O
• Without front panel, without setting wheel	6FC9320-5DF01	O	O	O	O
• Without front panel, with setting wheel	6FC9320-5DM00	O	O	O	O
Axis functions					
Feedrate override		0 ... 200 %	0 ... 200 %	0 ... 200 %	0 ... 200 %
Feedrate override axis-specific		0 ... 200 %	0 ... 200 %	0 ... 200 %	0 ... 200 %
Traversing range decades		± 9	± 9	± 9	± 9
Rotary axis, turning endlessly		✓	✓	✓	✓
Velocity, max.		300 m/s	300 m/s	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 forwad control		✓	✓	✓	✓
Friction compensation		–	–	✓	✓
Auto servo tuning (AST)		–	–	✓	✓
Direct servo control (DSC)		–	–	✓	✓
TRANSMIT/TRACYL without Y axis	6FC5800-0AS50-0YB0	–	–	O	O
Pair of synchronized axes (gantry axes), basic	6FC5800-0AS51-0YB0	–	–	O	O

2

Overview of functions
SINUMERIK 808D family

**Spindle functions/Interpolations/Measuring functions/
Motion-synchronous actions**

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	**Milling**	**Turning**	**Milling**
Spindle functions					
Spindle speed, analog		✓	✓	✓	✓
Spindle speed, max. programmable value range (display ± 999999999.9999)		10^6 ... 0.0001	10^6 ... 0.0001	10^6 ... 0.0001	10^6 ... 0.0001
Spindle override		0 ... 200 %	0 ... 200 %	0 ... 200 %	0 ... 200 %
Gear stages		5	5	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	Requires servo spindle and direct encoder.	✓	✓	✓	✓
Interpolations					
Linear interpolation axes, max.		3	3	3	4
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		✓	✓	✓	✓
Advanced Surface		–	✓	–	✓
Advanced Surface look ahead, velocity control and CNC block compression		–	✓	–	✓
High-speed setting cycle CYCLE 832		–	✓	–	✓
Look ahead (number of blocks)		1	50	1	50
Measuring functions					
Measuring in JOG: • Number of probes (switching) with/without deletion of distance-to-go		– 1	 1	– 1	 1
Motion-synchronous actions					
CNC inputs/outputs, high-speed: • Digital inputs CNC onboard		 3	 3	 3	 3
• Digital outputs CNC onboard		1	1	1	1
Synchronized actions and high-speed auxiliary function output incl. 3 synchronous functions		✓	✓	✓	✓
Positioning axes and spindles via synchronized actions (command axes)		✓	✓	✓	✓

2

2

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	Milling	Turning	Milling
Open Architecture					
Customizable HMI:					
• Customizable screens in the HMI		✓	✓	✓	✓
• Input screens for customized user cycles		✓	✓	✓	✓
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		✓	✓	✓	✓
Subprogram levels, max.		11	11	11	11
Number of subprogram repetitions		≤ 9999	≤ 9999	≤ 9999	≤ 9999
Number of levels for skip blocks		1	1	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}	INT 231^{-1}	INT 231^{-1}
• Via H word, max. programmable value range REAL ± 3.4028 ex 38 (display ± 999999999.9999)		INT -231 ... 231^{-1}	INT -231 to 231^{-1}	INT -231 to 231^{-1}	INT -231 to 231^{-1}
Basic frames, max. number		1	1	1	1
Settable offsets, max. number		6	6	6	6
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		✓	✓	✓	✓
• Arithmetic and trigonometric functions		✓	✓	✓	✓
• Compare operations and logic combinations		✓	✓	✓	✓
• Macro techniques		✓	✓	✓	✓
• Control structures IF-ELSE-ENDIF		✓	✓	✓	✓
• Control structures WHILE, FOR, REPEAT, LOOP		✓	✓	✓	✓
• STRING functions		✓	✓	✓	✓

Overview of functions
SINUMERIK 808D family

**Technology cycles/
Canned cycles**

✓ Basic version O Option – Not available	Article No.	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
	Instructions	**Turning**	**Milling**	**Turning**	**Milling**
Technology 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					
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)		–	✓	–	✓

✓ Basic version O Option – Not available	Article No.	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
	Instructions	**Turning**	**Milling**	**Turning**	**Milling**
Canned cycles (continued)					
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)		✓	–	✓	–
• 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 and workpiece management					
Part programs on PPU, max. number		255	255	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		✓	✓	✓	✓

2

Overview of functions
SINUMERIK 808D family

**Operating modes/
Tools**

✓ Basic version O Option – Not available	Article No.	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
	Instructions	Turning	Milling	Turning	Milling
Operating modes					
Manual Machine plus for manual controlled semi-CNC lathes	**6FC5800-0AP07-0YB0**	O	–	O	–
JOG:					
• T, S, M screen for quick activation of machine functions		✓	✓	✓	✓
• Face milling cycle for workpiece preparation		–	✓	–	✓
• Handwheel selection		✓	✓	✓	✓
• Switchover: inch/metric		✓	✓	✓	✓
• Manual measurement of work offset		✓	✓	✓	✓
• Manual measurement of tool offset		✓	✓	✓	✓
• Semi-automatic tool measurement with tool probe		–	✓	–	✓
MDI:					
• 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		✓	✓	✓	✓
Tools					
Tools/cutting edges, max.		64/128	64/128	64/128	64/128
Tool types:					
• Turning		✓	–	✓	–
• Drilling		✓	✓	✓	✓
• Milling		–	✓	In preparation	✓
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		✓	✓	✓	✓

✓ Basic version O Option – Not available	Article No.	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
	Instructions	Turning	Milling	Turning	Milling
Communication and 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		✓	✓	✓	✓
Ethernet interface:					
• Transfer of:		–	–	✓	✓
- Machine and setting data		–	–	✓	✓
- PLC data		–	–	✓	✓
- Compensation data		–	–	✓	✓
- Tool and work offset data		–	–	✓	✓
- R parameter		–	–	✓	✓
- HMI data		–	–	✓	✓
- User cycles		–	–	✓	✓
- Part programs		–	–	✓	✓
• Execute part program		–	–	✓	✓
• Part program send/receive		–	–	✓	✓
• PLC program upload/download		–	–	✓	✓
• PLC status monitoring		–	–	✓	✓

2

Overview of functions
SINUMERIK 808D family

HMI functions/Monitoring functions/ Compensations

2

✓ Basic version O Option – Not available	Article No.	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
	Instructions	**Turning**	**Milling**	**Turning**	**Milling**
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, German, Portuguese, Russian		✓	✓	✓	✓
• Language switchover online		✓	✓	✓	✓
• Additional languages, use of language extensions		In preparation	In preparation	In preparation	In preparation
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		✓	✓	✓	✓
Bidirectional leadscrew error compensation	6FC5800-0AM54-0YB0	–	–	O	O

PLC area

2

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	**Milling**	**Turning**	**Milling**
PLC area					
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	12 ms	12 ms
Maximum number of ladder steps		6000	6000	6000	6000
PLC programming language:					
• LAD ladder diagram		✓	✓	✓	✓
Offline PLC programming tool	**6FC5811-0CY00-0YA8** On toolbox DVD-ROM	O	O	O	O
PLC Ladder Viewer on PPU		✓	✓	✓	✓
PLC I/O:					
• On-board digital PLC	Connection via screw-clamp connector on PPU.				
- Inputs 24 V		24	24	24	24
- Outputs 24 V, 0.2 A		16	16	16	16
• On-board digital PLC	Connection via 50-pole ribbon cable connector.				
- Inputs 24 V		48	48	48	48
- Outputs 24 V, 0.2 A		32	32	32	32
Connection via 50-pole ribbon cable connector to PPU					
• Terminal strip converter	**6EP5406-5AA00**	O	O	O	O
• Cable set	**6EP5306-5BG00**	O	O	O	O
PLC alarms/messages, max. number		128	128	128	128
Bit memories, number		256 bytes	256 bytes	256 bytes	256 bytes
Timers, number		64	64	64	64
Counters, number		64	64	64	64
Subroutines		64	64	64	64
User machine data for configuring the PLC user program		✓	✓	✓	✓

Overview of functions
SINUMERIK 808D family

**Commissioning and serial production/Diagnostic functions/
Service and maintenance/Training and offline programming**

2

✓ Basic version O Option – Not available	Article No. Instructions	SINUMERIK 808D PPU 141.1		SINUMERIK 808D ADVANCED PPU 160.2/PPU 161.2	
		Turning	**Milling**	**Turning**	**Milling**
Commissioning and serial production					
SINUMERIK 808D startGUIDE					
• Startup assistant Built-in graphical interactive assistant for 1st commissioning of machines with SINUMERIK 808D family		✓	✓	✓	✓
• Series startup assistant Built-in graphical interactive assistant for the se- ries production of machines with SINUMERIK 808D family		✓	✓	✓	✓
Backup/restore of system software via USB memory stick		✓	✓	✓	✓
Cloning of serial startup files for serial production via USB memory stick		✓	✓	✓	✓
SINUMERIK 808D family Toolbox with:	**6FC5811-0CY00-0YA8** On toolbox DVD-ROM.	O	O	O	O
• Offline PLC programming tool		O	O	O	O
• Sample PLC program		O	O	O	O
• MCP strip template		O	O	O	O
• MCP icon library		O	O	O	O
• User manuals		O	O	O	O
• Access My Machine (AMM)		✓	✓	✓	✓
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	**6FC5548-0YC20-0YA0** Free download of trial version from: www.cnc4you.com	O	O	O	O

SINUMERIK 808D system

3

SINUMERIK 808D system
CNC control

How to select the CNC solution

■ **Overview**

my CNC ordering data ?

Turning ◇ Milling

| SINUMERIK 808D PPU 141.1 Turning | SINUMERIK 808D PPU 141.1 Milling |

Select CNC options (additional axis / MM[+])

Select signal cable to SINAMICS V60 according to the required length (one cable per axis)

Select signal cable to analog spindle according to the required length

With **SINUMERIK 808D MCP** ◇ With **OEM-specific MCP (please consider necessary PLC I/Os)**

SINUMERIK 808D MCP

With **direct spindle encoder** ◇ Without **direct spindle encoder or 3rd party spindle encoder**

Select direct spindle encoder and coupling

Select signal cable to direct spindle encoder according to the required length

With **Siemens handwheels** ◇ Without **handwheels or 3rd party handwheels**

Select electronic handwheel (max. 2 handwheels)

Select signal cable to electronic handwheels according to the required length

Additional **distributed PLC I/O** ◇ **Central PLC I/O (maximum 24 DI / 16 DO)**

With **3rd party terminal strip converter** ◇ With **Siemens terminal strip converter**

Terminal strip converter 50-pole (max. 2) and cable set

With **Siemens power supply unit** ◇ **3rd party power supply unit**

Select SITOP smart power supply unit according to the required current

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my CNC ordering data!

Overview

SINUMERIK 808D Turning PPU 141.1 horizontal

The SINUMERIK 808D Turning is an operator-panel-based CNC, tailored for use in modern basic 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: assists all process steps of the machine – from engineering to production, from sales to operation and programming at 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
- Machine maintenance tasks are accomplished by integrated service planner.

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
- Spindle drives via ± 10 V analog output
- PC via RS232C interface

3

SINUMERIK 808D system
CNC control

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	Article 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 T/M toolbox	**6FC5811-0CY00-0YA8**
Spare parts	
SINUMERIK/SIMOTION battery	**6FC5247-0AA18-0AA0**

Options

Description	Article No.
Additional NC axis	**6FC5800-0AK70-0YB0**
Manual Machine plus (MM+)	**6FC5800-0AP07-0YB0**

3

Dimensional drawings
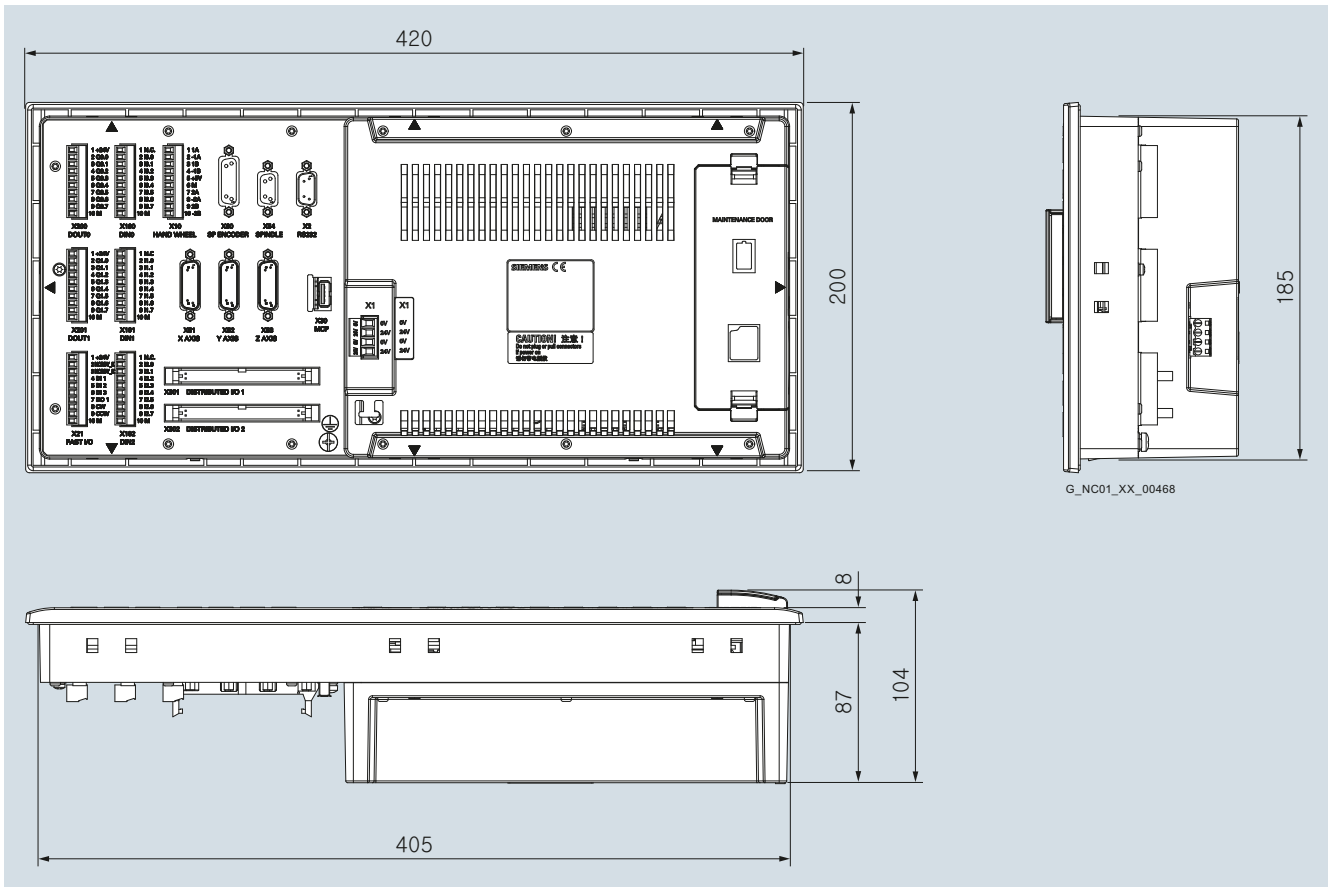
SINUMERIK 808D Turning/Milling PPU 141.1 horizontal

SINUMERIK 808D system
CNC control

SINUMERIK 808D Milling

■ Overview

SINUMERIK 808D Milling PPU 141.1 horizontal

The SINUMERIK 808D Milling is an operator-panel-based CNC, tailored for use in modern basic 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
- Advanced Surface: 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
- Machine maintenance tasks are accomplished by integrated service planner.

■ 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
- Spindle drives via ± 10 V analog output
- PC via RS232C interface

3

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	Article 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 T/M toolbox	**6FC5811-0CY00-0YA8**
Spare parts	
SINUMERIK/SIMOTION battery	**6FC5247-0AA18-0AA0**

3

SINUMERIK 808D system
CNC control

■ Dimensional drawings
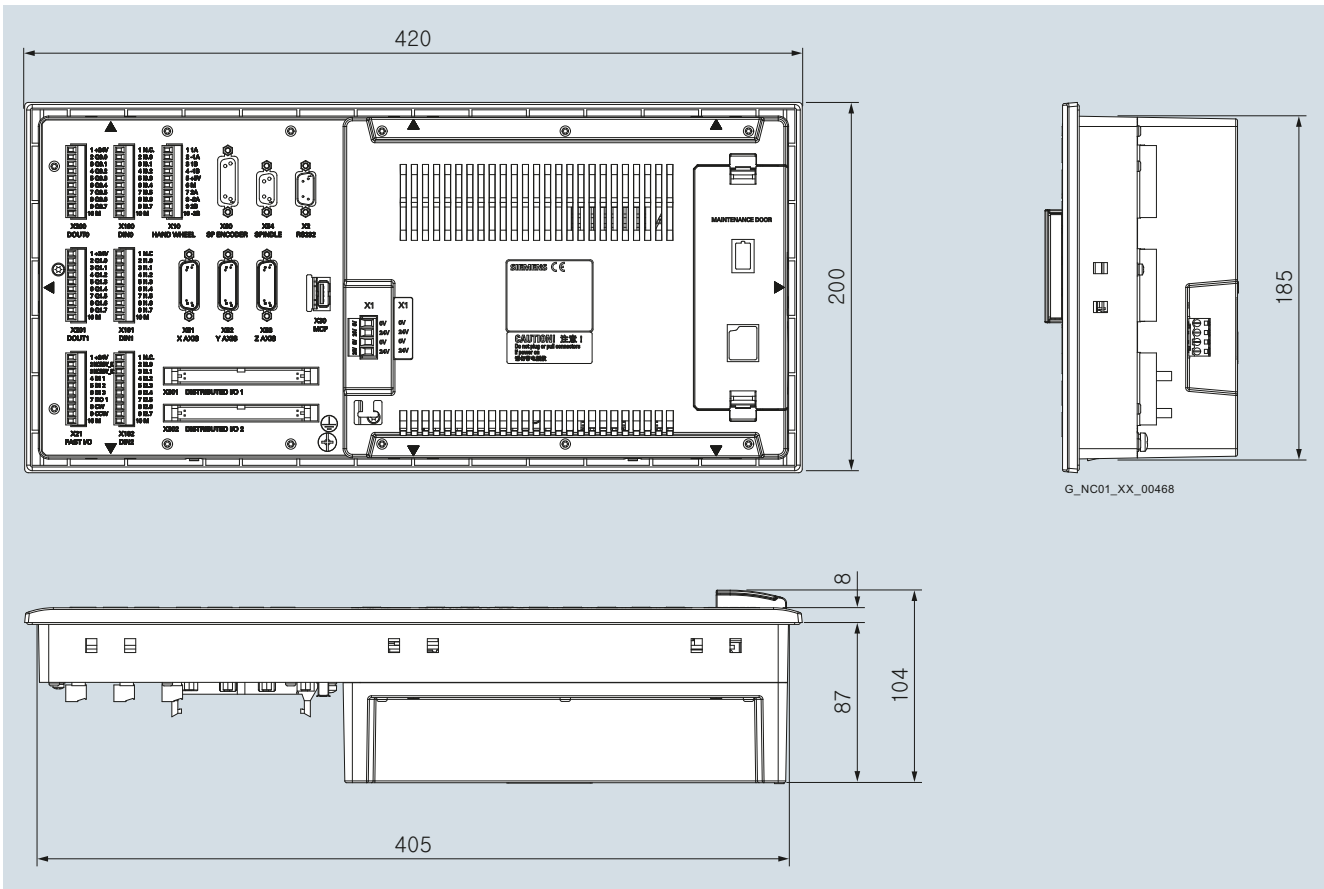
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SINUMERIK 808D Turning/Milling PPU 141.1 horizontal

SINUMERIK 808D MCP

Overview

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
- SINUMERIK 808D ADVANCED

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	Article No.
SINUMERIK 808D MCP machine control panel With USB cable	
• English layout	**6FC5303-0AF35-0AA0**
• Simplified Chinese layout	**6FC5303-0AF35-0CA0**
Accessories	
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

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SINUMERIK 808D system
Operator components

SINUMERIK 808D MCP

■ Dimensional drawings

SINUMERIK 808D MCP

■ **Overview**

my feed axis ordering data ?

3rd party feed axis solution

Select SIMOTICS S-1FL5 motor inertia and torque according to the mechanical characteristics and the load cycle of the machine axis

Select SIMOTICS S-1FL5 motor options (shaft extension/holding brake)

Select encoder cable to TTL encoder in SIMOTICS S-1FL5 motor according to the required length

Select power cable to SIMOTICS S-1FL5 motor according to the required length

Motor with brake — Motor without brake

Select brake cable to brake in SIMOTICS S-1FL5 motor according to the required length

Select SINAMICS V60 according to the SIMOTICS S-1FL5 motor

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my feed axis solution ordering data !

Repeat for further feed axes

3

SINUMERIK 808D system
Feed axis solutions

SINAMICS V60 servo drive

Overview

SINAMICS V60

The SINAMICS V60 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 solution provided by the SINUMERIK 808D.

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

■ Faster commissioning thanks to 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 switch

• Alarm relay contact

Integration

The following components can be connected to the SINAMICS V60:

• SINUMERIK 808D Turning PPU 141.1 horizontal

• SINUMERIK 808D Milling PPU 141.1 horizontal

• SIMOTICS S-1FL5 feed motor

• TTL encoder in SIMOTICS S-1FL5 feed motor

• Brake in SIMOTICS S-1FL5 feed motor

Selection and ordering data

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

■ **Technical specifications**

Product name	SINAMICS V60			
	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 • Frequency range	5 V DC ≤ 333 kHz			
Cooling	Natural cooling			
Ambient temperature • Storage/transport • Operation	-20 ... 80 °C 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 S-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} • Peak current I_{max}	4 A 8 A	6 A 12 A	7 A 14 A	10 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 • Height • Depth	106 mm 226 mm 200 mm	106 mm 226 mm 200 mm	106 mm 226 mm 200 mm	123 mm 226 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.

SINUMERIK 808D system
Feed axis solutions

SINAMICS V60 servo drive

■ **Dimensional drawings**
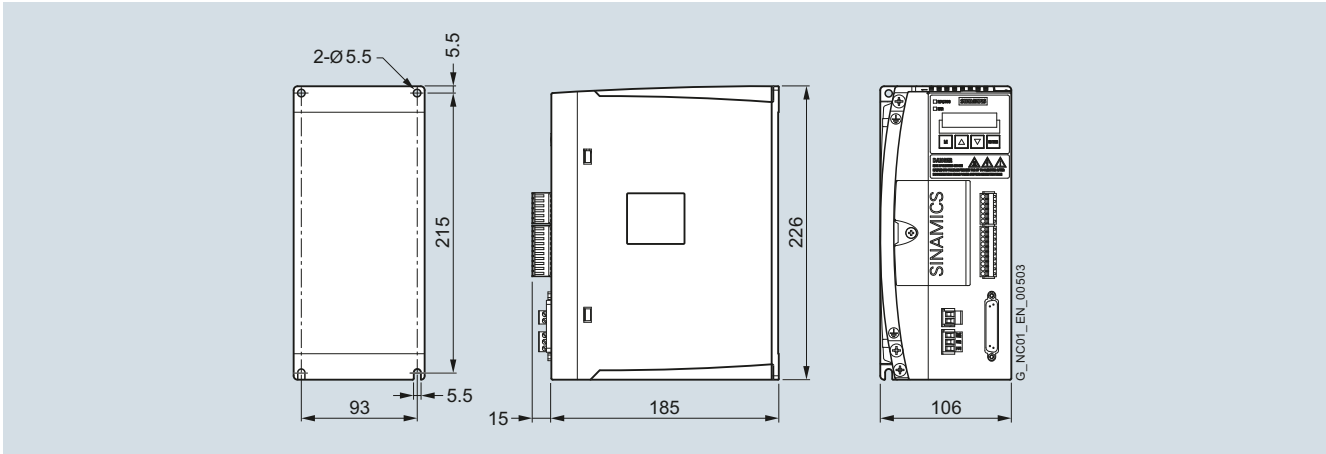
SINAMICS V60 4 A/6 A/7 A
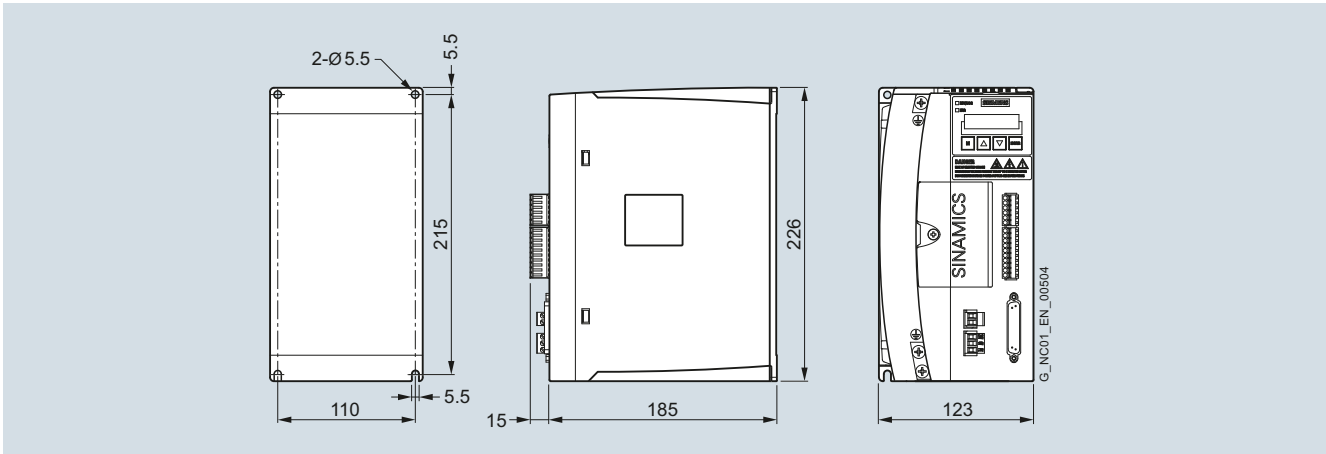
SINAMICS V60 10 A
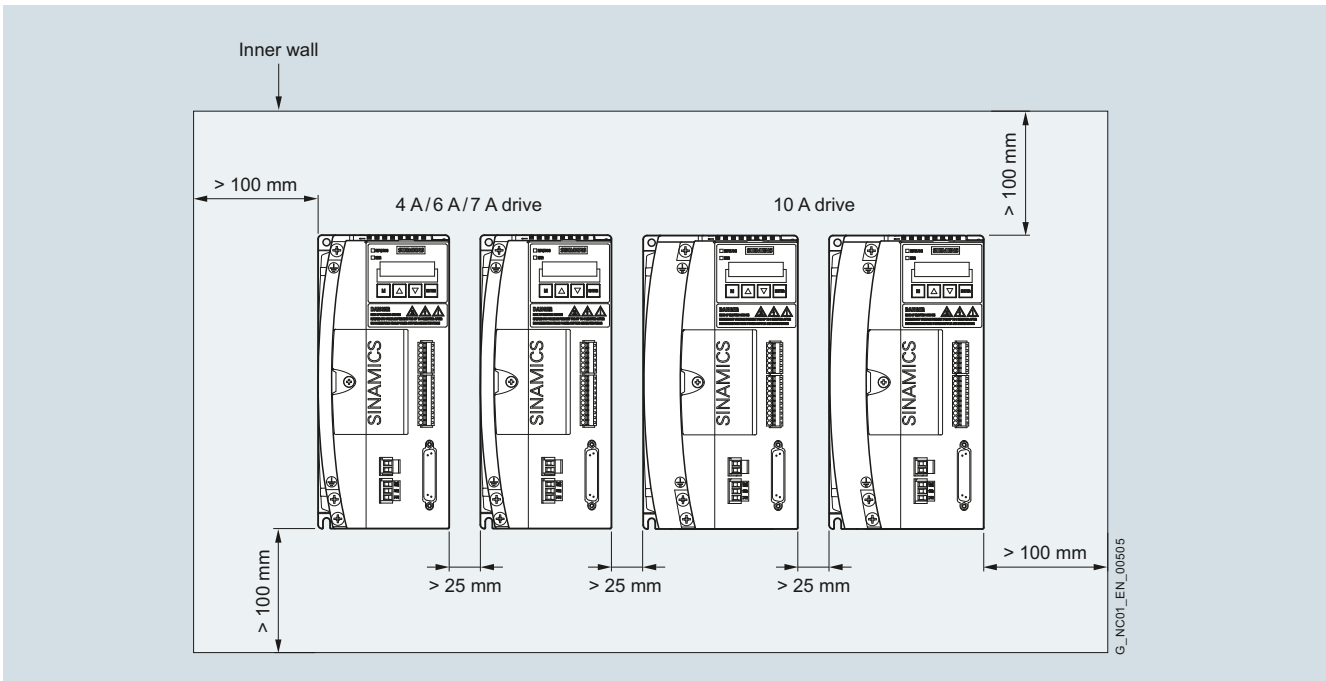
Mounting clearance

Overview

SIMOTICS S-1FL5 feed motors

The SIMOTICS S-1FL5 feed motor is optimized for operation with the SINAMICS V60 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/feather 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 feather key

3

SINUMERIK 808D system
Feed axis solutions

SIMOTICS S-1FL5 feed motor

■ **Technical specifications**

Product name	SIMOTICS S-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 • Operation	-20 ... 80 °C 0 ... 45 °C without derating, > 45 ... 55 °C derating to 70 %			
Torque • Static torque M_{rated} • Torque, max. M_{max} (converter)	4 Nm 8 Nm	6 Nm 12 Nm	7.7 Nm 15.4 Nm	10 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 • Length (without/with brake)	130 mm 221/263 mm	130 mm 239/281 mm	130 mm 253/295 mm	130 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

3

SINUMERIK 808D system
Feed axis solutions

SIMOTICS S-1FL5 feed motor

■ **Selection and ordering data**

SIMOTICS S-1FL5 feed motors			SINAMICS V60
Static torque	Rated speed		Rated output current
M_0 at ΔT = 100 K	n_{rated}		I_{rated}
Nm	rpm	Article 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:**	
Feather key and keyway	Without	**A**
Feather key and keyway	With	**B**
Plain shaft	Without	**G**
Plain shaft	With	**H**

■ **Dimensional drawings**
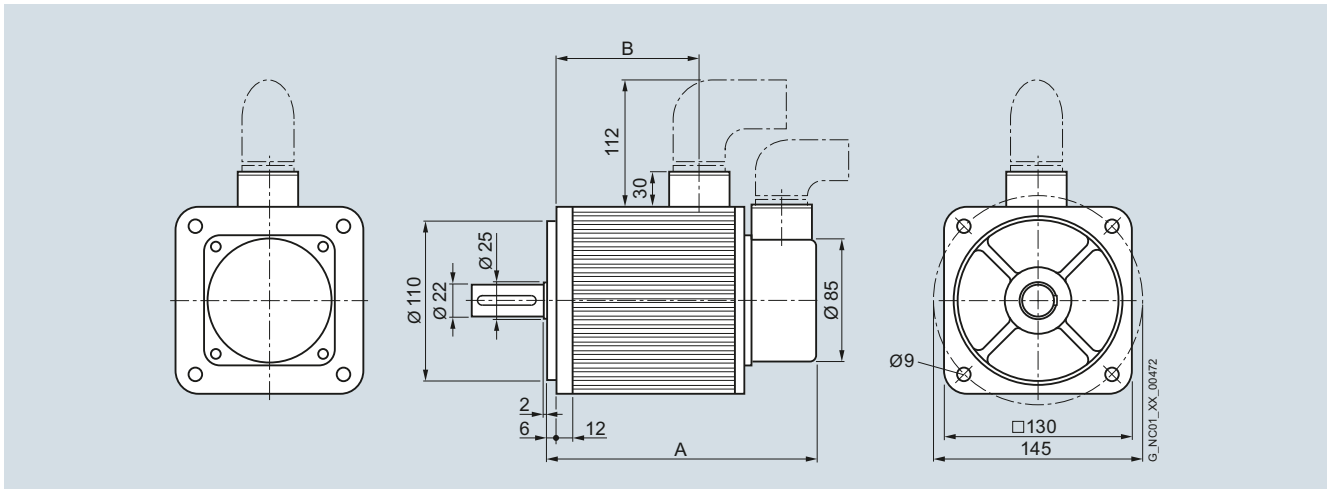
SIMOTICS S-1FL5 feed motor

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

SINUMERIK 808D system
MOTION-CONNECT connection systems

MOTION-CONNECT cables for SINUMERIK 808D

■ **Integration**

SINUMERIK 808D Turning/Milling PPU 141.1	Order No. Pre-assembled cable	
X1		Power supply 24 V DC
X2	**6FX8002-1AA01-....**	RS232C
X51/52/53	**6FC5548-0BA00-....** 5 m, 7 m or 10 m (16 ft, 23 ft or 32 ft)	SINAMICS V60
X54	**6FC5548-0BA05-....** 5 m, 7 m or 10 m (16 ft, 23 ft or 32 ft)	Spindle drive
X60	**6FX8002-2CD01-....** 5 m, 7 m or 10 m (16 ft, 23 ft or 32 ft)	Incremental encoder for spindle (TTL) RS422 6FX2001-2...
X10	**6FX8002-2BB01-....** ≤ 25 m (82 ft) for handwheel signals	Handwheels (max. 2)
X30	USB cable, 0.5 m (1.6 ft)	MCP
X100/X101/X102		24 digital inputs 24 V DC
X200/X201		16 digital inputs 24 V DC
X301	**6EP5306-5BG00** ≤ 6 m (20 ft)	24 DI / 16 DO, 24 V DC Terminal strip converter
X302	**6EP5306-5BG00** ≤ 6 m (20 ft)	24 DI / 16 DO, 24 V DC Terminal strip converter
X21	Wire (0.14 to 1.5 mm^2)	NC Ready, CW, CCW, 3 fast inputs (e.g. BERO signals), 1 fast output 24 V DC

G_NC01_EN_00488b

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

■──	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.

■ **Technical specifications**

Product name	Setpoint cable PPU 14x - SINAMICS V60 6FC5548-0BA00-….	Setpoint cable PPU 14x - analog spindle drive 6FC5548-0BA05-….
No. of cores	15	4
Approvals, according to • cURus or UR/CSA[1] • RoHS conformity	UL20276 Yes	UL2576 Yes
Rated voltage	30 V	30 V
Test voltage, rms	500 V	500 V
Operating temperature on the surface • Fixed installation • Flexible installation	-20 … +80 °C 0 … 60 °C	-20 … +80 °C 0 … 60 °C
Smallest bending radius • Fixed installation • Flexible installation	100 mm 200 mm	60 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 14x - incremental encoder for spindle (TTL) 6FX8002-2CD01-….	Signal cable PPU 14x - handwheel 6FX8002-2BB01-….	RS232C data cable PPU 14x - personal computer 6FX8002-1AA01-….
Approvals, according to • cURus or UR/CSA[1] • RoHS conformity	UL758-CSA-C22.2-N.210.2-M90 Yes	UL758-CSA-C22.2-N.210.2-M90 Yes	UL758-CSA-C22.2-N.210.2-M90 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 • Flexible installation	-50 … +80 °C -20 … +60 °C	-50 … +80 °C -20 … +60 °C	-50 … +80 °C -20 … +60 °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	35 mm 70 mm	35 mm 70 mm	35 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.

SINUMERIK 808D system
MOTION-CONNECT connection systems

MOTION-CONNECT cables for SINUMERIK 808D

Selection and ordering data

Description	Article No.
Pre-assembled setpoint cable PPU 14x - SINAMICS V60 Length	
• 5 m	6FC5548-0BA00-1AF0
• 7 m	6FC5548-0BA00-1AH0
• 10 m	6FC5548-0BA00-1BA0
Pre-assembled setpoint cable PPU 14x - analog spindle drive Length	
• 5 m	6FC5548-0BA05-1AF0
• 7 m	6FC5548-0BA05-1AH0
• 10 m	6FC5548-0BA05-1BA0
Pre-assembled signal cable PPU 14x - incremental encoder for spindle (TTL) Length	
• 5 m	6FX8002-2CD01-1AF0
• 7 m	6FX8002-2CD01-1AH0
• 10 m	6FX8002-2CD01-1BA0

Description	Article No.
Pre-assembled signal cable PPU 14x - 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

3

Integration
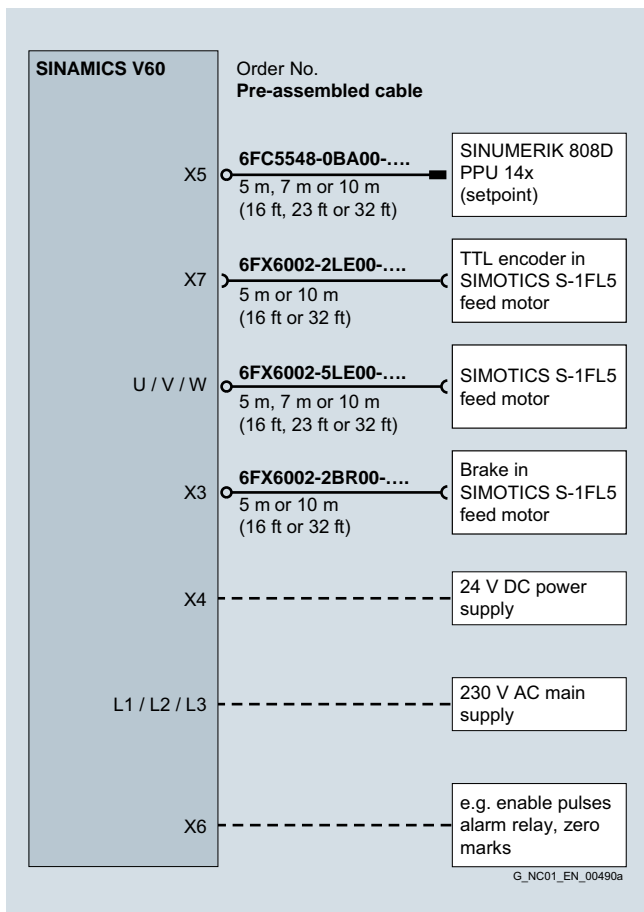
Connection overview of SINAMICS V60 drive system

▬▬▬	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.

SINUMERIK 808D system
MOTION-CONNECT connection systems

MOTION-CONNECT cables for SINAMICS V60 servo drive

■ **Technical specifications**

Product name	Encoder cable SINAMICS V60 - TTL encoder in SIMOTICS S-1FL5 feed motor 6FX6002-2LE00-….	Power cable SINAMICS V60 - SIMOTICS S-1FL5 feed motor 6FX6002-5LE00-….	Brake cable SINAMICS V60 - brake in SIMOTICS S-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.

■ **Selection and ordering data**

Description	Article No.
Pre-assembled encoder cable SINAMICS V60 - TTL encoder in SIMOTICS S-1FL5 feed motor	
Length	
• 5 m	**6FX6002-2LE00-1AF0**
• 7 m	**6FX6002-2LE00-1AH0**
• 10 m	**6FX6002-2LE00-1BA0**
Pre-assembled power cable SINAMICS V60 - SIMOTICS S-1FL5 feed motor	
Length	
• 5 m	**6FX6002-5LE00-1AF0**
• 7 m	**6FX6002-5LE00-1AH0**
• 10 m	**6FX6002-5LE00-1BA0**
Pre-assembled brake cable SINAMICS V60 - brake in SIMOTICS S-1FL5 feed motor	
Length	
• 5 m	**6FX6002-2BR00-1AF0**
• 7 m	**6FX6002-2BR00-1AH0**
• 10 m	**6FX6002-2BR00-1BA0**

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

Overview

The following composition of an equipment package is an
example of an 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

Designation	Quantity	Article 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 14x - SINAMICS V60, length 5 m	2	6FC5548-0BA00-1AF0
Pre-assembled setpoint cable PPU 14x - analog spindle drive, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 14x - handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 14x - incremental spindle encoder (TTL), length 5 m	1	6FX8002-2CD01-1AF0
SINAMICS V60		
SINAMICS V60, I_{rated} 4 A	1	6SL3210-5CC14-0UA0
SINAMICS V60, I_{rated} 6 A	1	6SL3210-5CC16-0UA0
SIMOTICS S-1FL5		
SIMOTICS S-1FL5 feed motor, 4 Nm, 2000 rpm, plain shaft, without holding brake	1	1FL5060-0AC21-0AG0
SIMOTICS S-1FL5 feed motor, 6 Nm, 2000 rpm, plain shaft, with holding brake	1	1FL5062-0AC21-0AH0
Pre-assembled encoder cable SINAMICS V60 - TTL encoder in SIMOTICS S-1FL5 feed motor, length 5 m	2	6FX6002-2LE00-1AF0
Pre-assembled power cable SINAMICS V60 - SIMOTICS S-1FL5 feed motor, length 5 m	2	6FX6002-5LE00-1AF0
Pre-assembled brake cable SINAMICS V60 - brake in SIMOTICS S-1FL5 feed motor, length 5 m	1	6FX6002-2BR00-1AF0

SINUMERIK 808D system
Example packages

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

Designation	Quantity	Article 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 14x - SINAMICS V60, length 5 m	3	6FC5548-0BA00-1AF0
Pre-assembled setpoint cable PPU 14x - analog spindle drive, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 14x - handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 14x - incremental spindle encoder (TTL), length 7 m	1	6FX8002-2CD01-1AH0
SINAMICS V60		
SINAMICS V60, I_{rated} 7 A	2	6SL3210-5CC17-0UA0
SINAMICS V60, I_{rated} 10 A	1	6SL3210-5CC21-0UA0
SIMOTICS S-1FL5		
SIMOTICS S-1FL5 feed motor, 7.7 Nm, 2000 rpm, plain shaft, without holding brake	2	1FL5064-0AC21-0AG0
SIMOTICS S-1FL5 feed motor, 10 Nm, 2000 rpm, plain shaft, with holding brake	1	1FL5066-0AC21-0AH0
Pre-assembled encoder cable SINAMICS V60 - TTL encoder in SIMOTICS S-1FL5 feed motor, length 10 m	3	6FX6002-2LE00-1BA0
Pre-assembled power cable SINAMICS V60 - SIMOTICS S-1FL5 feed motor, length 10 m	3	6FX6002-5LE00-1BA0
Pre-assembled brake cable SINAMICS V60 - brake in SIMOTICS S-1FL5 feed motor, length 10 m	1	6FX6002-2BR00-1BA0

3

SINUMERIK 808D
ADVANCED system

4

SINUMERIK 808D ADVANCED system
CNC control

How to select the CNC solution

■ **Overview**

my CNC ordering data

SINUMERIK 808D ADVANCED PPU 160.2/PPU161.2 Turning/Milling

Select CNC options, e.g. additional axis, MM+, gantry axes basic, etc.

Select drive bus cable to SINAMICS V70 and between the SINAMICS V70 drives according to the required length (only one cable)

Select signal cable to spindle drive according to the required length

With SINUMERIK 808D MCP — **With OEM-specific MCP (please consider necessary PLC I/Os)**

Select SINUMERIK 808D MCP according to the dimension requirements

With direct spindle encoder — **Without direct spindle encoder or 3rd party spindle encoder**

Select direct spindle encoder and coupling

Select signal cable to direct spindle encoder according to the required length

With Siemens handwheels — **Without handwheels or 3rd party handwheels**

Select electronic handwheel (max. 2 handwheels)

Select signal cable to electronic handwheels according to the required length

Additional distributed PLC I/O — **Central PLC I/O (maximum 24 DI / 16 DO)**

With 3rd party terminal strip converter — **With Siemens terminal strip converter**

Terminal strip converter 50-pole (max. 2) and cable set

With Siemens power supply unit — **3rd party power supply unit**

Select SITOP smart power supply unit according to the required current

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my CNC ordering data!

SINUMERIK 808D ADVANCED system
CNC control

Overview

SINUMERIK 808D ADVANCED T PPU 161.2 horizontal

SINUMERIK 808D ADVANCED T PPU 160.2 vertical

The SINUMERIK 808D ADVANCED T is an operator-panel-based CNC, preconfigured for use in modern basic standard turning machines.

Benefits

- Compact, rugged, and maintenance-friendly operator-panel CNC with dedicated system software for turning technologies
- Actual position feedback to CNC
- Intelligent clamp mounting without drilling holes into the cabinet
- Minimum commissioning efforts due to plug and play machine control panel connected via USB interface, direct commissioning on HMI for feed drives and automatic servo tuning (AST)
- Maximum performance and accuracy due to most modern CNC features
- SINUMERIK 808D startGUIDE: assists all process steps of the machine – from engineering to production, from sales to operation and programming at the push of a button
- SINUMERIK Operate BASIC: maximum operator convenience similar to SINUMERIK 828D and SINUMERIK 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
- Fast data transmission via USB stick and high-speed Ethernet interface
- More software options can cover more applications and enhance the machine performance

Function

- 2 operator panel variants for horizontal and vertical operator panel housings
- 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
- Drive bus interface for feed drives
- Analog ± 10 V interface for spindle drive
- Data buffering without battery
- Pre-configured system software for turning technologies
- Up to 5 axes/spindles in 1 machining channel/mode group
- Automatic servo tuning
- Ethernet interface for commissioning and data transfer
- 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
- Machine maintenance tasks are accomplished by integrated service planner.

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SINUMERIK 808D ADVANCED system

CNC control

SINUMERIK 808D ADVANCED T

■ Integration

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

- 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 V70 drive system for feed axes
- Spindle drives via ± 10 V analog output
- PC via Ethernet/RS232C interface

■ Technical specifications

Product name	SINUMERIK 808D ADVANCED T PPU 160.2 vertical 6FC5370-2BT02-0.A0	SINUMERIK 808D ADVANCED T PPU 161.2 horizontal 6FC5370-2AT02-0.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 • PPU, rear	 IP65 IP20	
Relative humidity • Storage • Transport • Operation	 5 … 95 % at 25 °C 5 … 95 % at 25 °C 5 … 90 % at 25 °C (no condensation)	

Ambient temperature
• Storage
• Transport
• Operation
  - Front
  - Rear
	
	-20 ... +60 °C
	-20 ... +60 °C
	
	0 ... 45 °C
	0 ... 50 °C	

Dimensions • Width • Height • Depth	 265 mm 330 mm 104 mm	 420 mm 200 mm 104 mm
Panel cutout • Width • Height • Tolerance	 244.1 mm 307.1 mm +1 mm	 406 mm 186 mm +1 mm
Weight, approx.	2.87 kg	2.99 kg
Approvals, according to	CE	

■ Selection and ordering data

Description	Article No.
Hardware components	
SINUMERIK 808D ADVANCED T PPU 160.2 vertical	
• English layout	**6FC5370-2BT02-0AA0**
• Simplified Chinese layout	**6FC5370-2BT02-0CA0**
SINUMERIK 808D ADVANCED T PPU 161.2 horizontal	
• English layout	**6FC5370-2AT02-0AA0**
• Simplified Chinese layout	**6FC5370-2AT02-0CA0**
Software components	
SINUMERIK 808D T/M toolbox On DVD-ROM	**6FC5811-0CY00-0YA8**

■ Options

Description	Article No.
Additional NC axis	**6FC5800-0AK70-0YB0**
Manual Machine plus (MM+)	**6FC5800-0AP07-0YB0**
TRANSMIT/TRACYL without Y axis	**6FC5800-0AS50-0YB0**
Pair of synchronized axes (gantry axes), basic	**6FC5800-0AS51-0YB0**
Bidirectional leadscrew error compensation	**6FC5800-0AM54-0YB0**
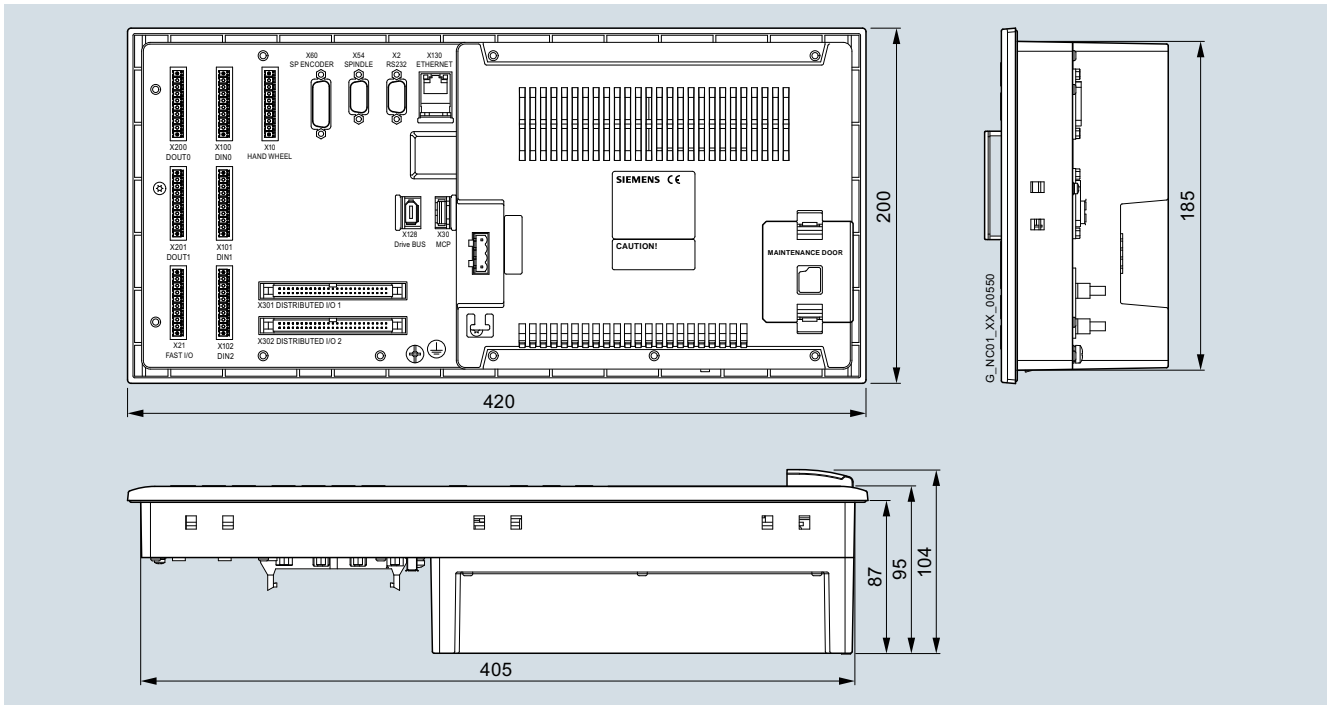
SINUMERIK 808D ADVANCED system
CNC control

■ Dimensional drawings

SINUMERIK 808D ADVANCED T/M PPU 161.2 horizontal

SINUMERIK 808D ADVANCED T/M PPU 160.2 vertical

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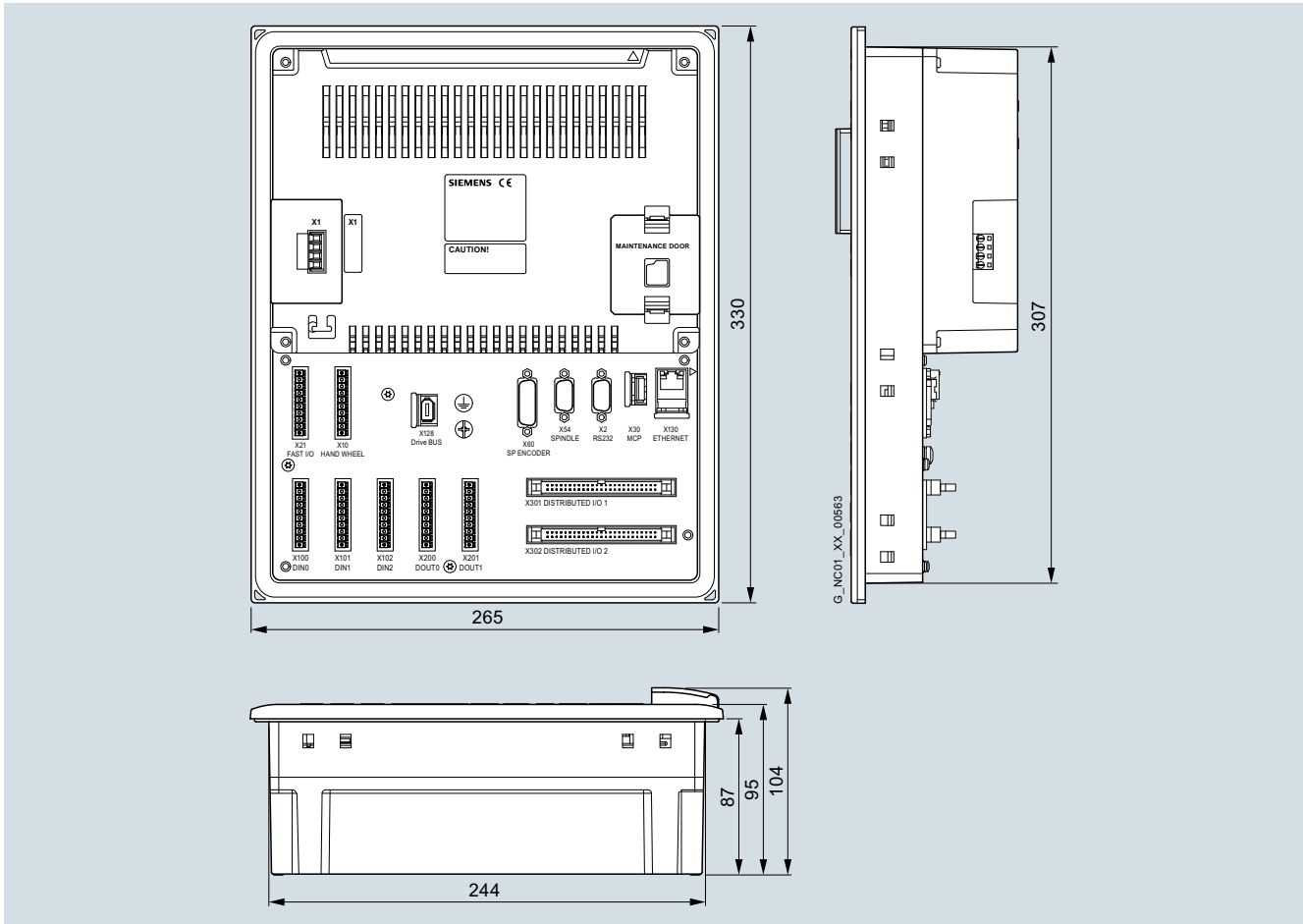
SINUMERIK 808D ADVANCED system

CNC control

SINUMERIK 808D ADVANCED M

Overview

SINUMERIK 808D ADVANCED M PPU 161.2 horizontal

SINUMERIK 808D ADVANCED M PPU 160.2 vertical

The SINUMERIK 808D ADVANCED M is an operator-panel-based CNC, preconfigured for use in modern basic standard milling machines.

Benefits

- Compact, rugged, and maintenance-friendly operator-panel CNC with dedicated system software for Milling technologies
- Actual position feedback to CNC
- Intelligent clamp mounting without drilling holes into the cabinet
- Minimum commissioning efforts due to plug and play machine control panel connected via USB interface, direct commissioning on HMI for feed drives and automatic servo tuning (AST)
- Maximum performance and accuracy due to the Advanced Surface function
- SINUMERIK 808D startGUIDE: assists all process steps of the machine – from engineering to production, from sales to operation and programming at the push of a button
- SINUMERIK Operate BASIC: maximum operator convenience similar to SINUMERIK 828D and SINUMERIK 840D sl
- SINUMERIK programGUIDE BASIC: wide range of technology cycles for turning and drilling with graphical input screens
- Advanced Surface: perfectly prepared for mold & die applications
- Fast data transmission via USB stick and high speed Ethernet interface
- More software options can cover more applications and enhance the machine performance

Function

- 2 operator panel variants for horizontal and vertical operator panel housings
- 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
- Drive bus interface for feed drives
- Analog ± 10 V interface for spindle drive
- Data buffering without battery
- Pre-configured system software for turning technologies
- Up to 5 axes/spindles in 1 machining channel/mode group
- Automatic servo tuning
- Ethernet interface for commissioning and data transfer
- Advanced Surface function
- 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
- Machine maintenance tasks are accomplished by integrated service planner.

◼ Integration

The following components can be connected to the SINUMERIK 808D ADVANCED M:
- 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 V70 drive system for feed axes
- Spindle drives via ± 10 V analog output
- PC via Ethernet/RS232C interface

◼ Technical specifications

Product name	SINUMERIK 808D ADVANCED M PPU 160.2 vertical	SINUMERIK 808D ADVANCED M PPU 161.2 horizontal
	6FC5370-2BM02-0.A0	6FC5370-2AM02-0.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	265 mm	420 mm
• Height	330 mm	200 mm
• Depth	104 mm	104 mm
Panel cutout		
• Width	244.1 mm	406 mm
• Height	307.1 mm	186 mm
• Tolerance	+1 mm	+1 mm
Weight, approx.	2.87 kg	2.99 kg
Approvals, according to	CE	

◼ Selection and ordering data

Description	Article No.
Hardware components	
SINUMERIK 808D ADVANCED M PPU 160.2 vertical	
• English layout	**6FC5370-2BM02-0AA0**
• Simplified Chinese layout	**6FC5370-2BM02-0CA0**
SINUMERIK 808D ADVANCED M PPU 161.2 horizontal	
• English layout	**6FC5370-2AM02-0AA0**
• Simplified Chinese layout	**6FC5370-2AM02-0CA0**
Software components	
SINUMERIK 808D T/M toolbox	**6FC5811-0CY00-0YA8**
On DVD-ROM	

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SINUMERIK 808D ADVANCED system
CNC control

SINUMERIK 808D ADVANCED M

■ **Dimensional drawings**
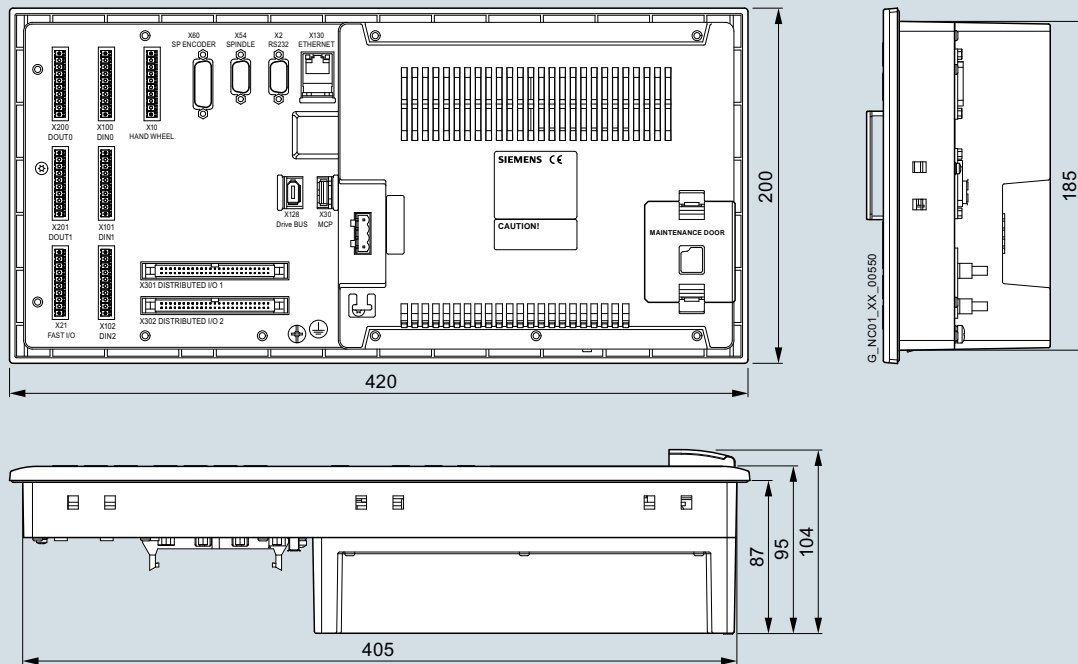
SINUMERIK 808D ADVANCED T/M PPU 161.2 horizontal

SINUMERIK 808D ADVANCED T/M PPU 160.2 vertical

SINUMERIK 808D ADVANCED system
Operator components
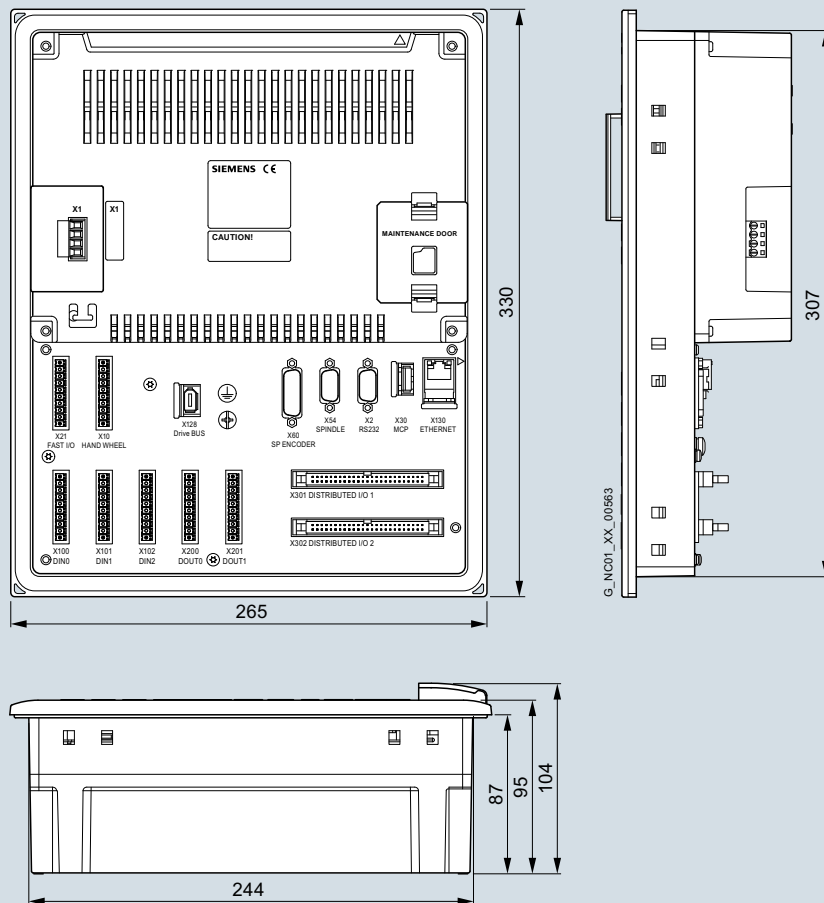
SINUMERIK 808D MCP horizontal/vertical

Overview

SINUMERIK 808D MCP horizontal

SINUMERIK 808D MCP vertical, with handwheel slot

SINUMERIK 808D MCP vertical

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.

There are different dimensions, vertical and horizontal, available for different machine designs. The MCP with handwheel slot is also possible for customers to choose according to their machine design.

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 (horizontal version: 30 keys with LEDs, vertical version: 39keys 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
- Horizontal version and vertical version without handwheel slot: 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)
- Horizontal version: 3 slots for control devices (d = 16 mm) , Vertical version: 4 slots for control devices (d = 16 mm)
- 1 slot for handwheel (d = 44 mm) (only available for 1 variant of the vertical version, no spindle override switch available and the handwheel with diameter of 44 mm should be ordered separately)

Selection and ordering data

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

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

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SINUMERIK 808D ADVANCED system
Operator components

■ **Integration**

The SINUMERIK 808D MCP machine control panel can be used for:
- SINUMERIK 808D Turning
- SINUMERIK 808D Milling
- SINUMERIK 808D ADVANCED T
- SINUMERIK 808D ADVANCED M

■ **Technical specifications**

Product name	SINUMERIK 808D MCP machine control panel horizontal version 6FC5303-0AF35-0.A0	SINUMERIK 808D MCP machine control panel vertical version 6FC5303-0AF35-..A0
Input voltage	5 V DC provided by PPU 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	265 mm
• Height	120 mm	230 mm
• Depth	58 mm	58 mm
Panel cutout		
• Width	406 mm	245 mm
• Height	106 mm	211 mm
• Tolerance	+1 mm	+1 mm
Weight, approx.	0.86 kg	0.86 kg
Approvals, according to	CE	

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Dimensional drawings
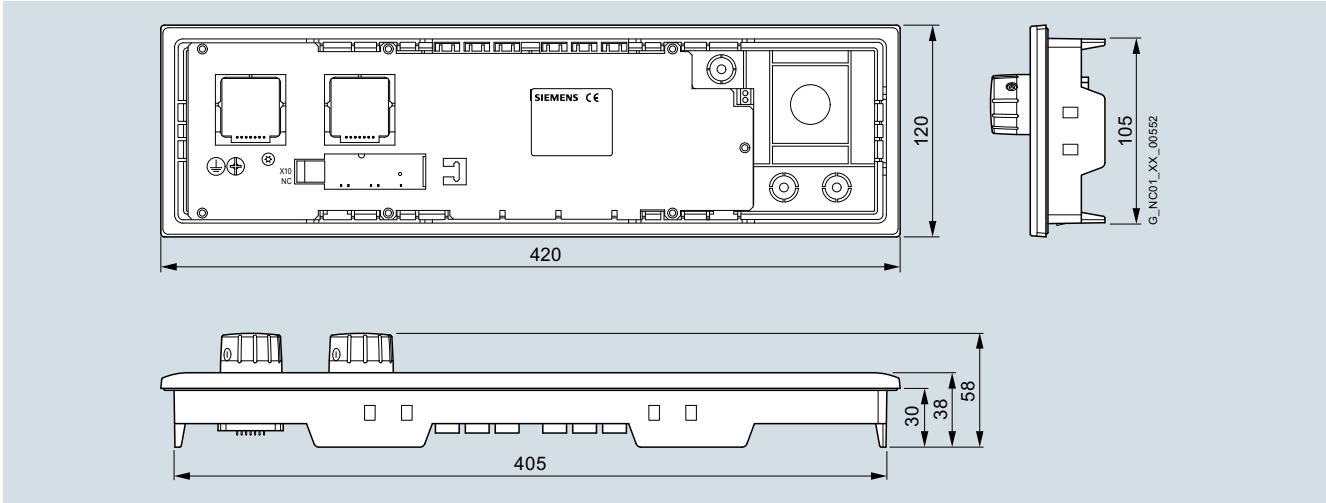
SINUMERIK 808D MCP horizontal
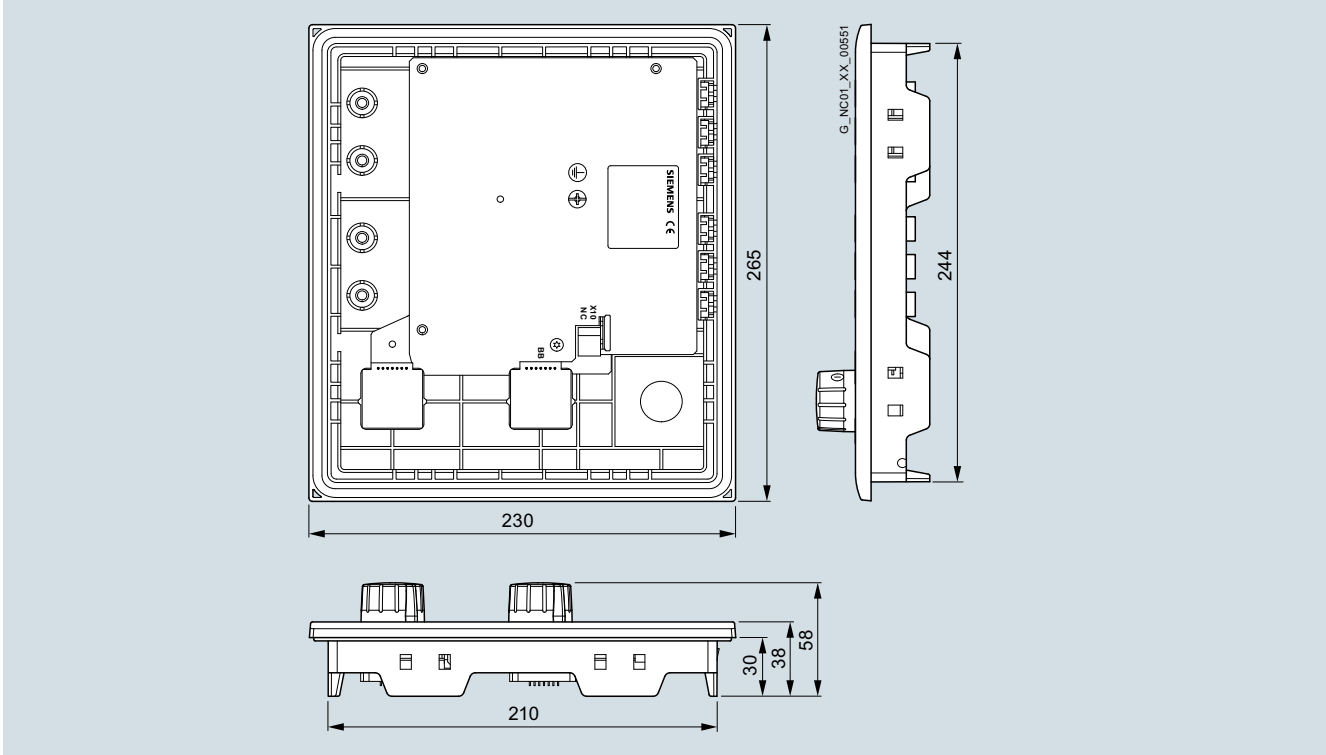
SINUMERIK 808D MCP vertical with handwheel slot/without handwheel slot

SINUMERIK 808D ADVANCED system
Feed axis solutions

How to select the feed axis solution

Overview

my feed axis ordering data ?

3rd party feed axis solution

Select SIMOTICS S-1FL6 motor inertia and torque according to the mechanical characteristics and the load cycle of the machine axis

Select SIMOTICS S-1FL6 motor options (shaft extension/holding brake, encoder type)

Select signal cable to encoder in SIMOTICS S-1FL6 motor according to the required encoder type and length)

Select power cable to SIMOTICS S-1FL6 motor according to the required length

Motor with brake   Motor without brake

Select signal cable to brake in SIMOTICS S-1FL6 motor according to the required length

Select SINAMICS V70 according to the static torque of the SIMOTICS S-1FL6 motor

G_NC01_EN_00553

my feed axis solution ordering data !

Repeat for further feed axes

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SINUMERIK 808D ADVANCED system
Feed axis solutions

Overview

SINAMICS V70

The SINAMICS V70 servo drive is specially designed to control the feed axes in standard machine tool applications. The system is designed essentially for applications where cost effectiveness is the primary consideration. The key performance data of the drive are aligned to perfectly fit to the solution provided by the SINUMERIK 808D ADVANCED.

Benefits

- Compact module with integrated infeed, inverter and closed-loop position control for one feed axis
- Coated electronic modules
- Commissioning on CNC directly
- Faster commissioning thanks to pre-configured motor data stored in the drive.
- CE certified

Function

- 7 versions cover power range from 0.4 kW to 7 kW
- Supply voltage 380 ... 480 V 3 AC
- 300 % overload capability
- Drive bus communication to the SINUMERIK 808D
- Integrated motor brake switch
- Safe Torque Off (STO)

Integration

The following components can be connected to the SINAMICS V70:

- SINUMERIK 808D ADVANCED T PPU 161.2 horizontal
- SINUMERIK 808D ADVANCED T PPU 160.2 vertical
- SINUMERIK 808D ADVANCED M PPU 161.2 horizontal
- SINUMERIK 808D ADVANCED M PPU 160.2 vertical
- SIMOTICS S-1FL6 feed motor
- Encoder in SIMOTICS S-1FL6 feed motor
- Brake in SIMOTICS S-1FL6 feed motor

Selection and ordering data

Rated output current	Frame size	SINAMICS V70 servo drive
A		Article No.
1.2	FSA	6SL3210-5DE12-4UA0
3.0	FSA	6SL3210-5DE13-5UA0
4.6	FSB	6SL3210-5DE16-0UA0
5.3	FSB	6SL3210-5DE17-8UA0
7.8	FSB	6SL3210-5DE21-0UA0
11	FSC	6SL3210-5DE21-4UA0
13.2	FSC	6SL3210-5DE21-8UA0

Description	Article No.
Spare parts	
SINAMICS V70/V90 fan kits	
• Frame size FSB	6SL3200-0WF00-0AA0
• Frame size FSC	6SL3200-0WF01-0AA0
SINAMICS V70 drive bus terminator	6FC5548-0BA21-0AA0

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SINUMERIK 808D ADVANCED system
Feed axis solutions

SINAMICS V70 servo drive

Technical specifications

Product name	SINAMICS V70						
6SL3210-...	5DE12-4UA0	5DE13-5UA0	5DE16-0UA0	5DE17-8UA0	5DE21-0UA0	5DE21-4UA0	5DE21-8UA0
Frame size	FSA		FSB			FSC	
Input voltage	380 ... 480 V 3 AC -15 %/+10 %						
Input frequency	50 ... 60 Hz ± 10 %						
Infeed	Non-stabilized						
Electronics power supply	24 V DC ± 10 %						
24 V DC supply	2.0 A (4.0 A) combined with motors without brake (with brake)						
Cooling	Natural cooling		Forced ventilation				
Ambient temperature • Storage/transport • Operation	-40 ... +70 °C 0 ... 45 °C without derating, > 45 ... 55 °C with derating (derating by 0 % at 45 °C up to 20 % at 55 °C)						
Air humidity • Storage/transport • Operation	90 % (non-condensing) < 90 % (non-condensing)						
Ambient conditions	Indoor (without sunshine), without corrosive gas, combustible gas, oil gas, nor dust						
Installation altitude	Up to 1000 m without derating						
Connectable motors	SIMOTICS S-1FL6						
Degree of protection	IP20						
Encoder evaluation	Absolute encoder 20 bit/incremental encoder with 2500 S/R (13 bit resolution through electronic multiplication)						
Output current • Rated current I_{rated} • Peak current I_{max}	1.2 A 3.6 A	3.0 A 9.0 A	4.6 A 13.8 A	5.3 A 15.9 A	7.8 A 23.4 A	11.0 A 33.0 A	13.2 A 39.6 A
Rated output power P_{rated}	0.4 kW	1 kW	1.5 kW	1.75 kW	2.5 kW	3.5 kW	7 kW
Power loss	36 W	47 W	54 W	70 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	0.005 m^3/s	0.005 m^3/s	0.005 m^3/s
Conductor cross-section, max.	1.5 mm^2		2.5 mm^2				
Dimensions[1)] • Width • Height • Depth	80 mm 180 mm 200 mm		100 mm 180 mm 200 mm			140 mm 260 mm 240 mm	
Weight, approx.	1.85 kg		2.45 kg			5.65 kg	
Certification	CE						

S/R = Signals/Revolution

1) Minimum distance between drive modules: 10 mm.

SINUMERIK 808D ADVANCED system
Feed axis solutions

SINAMICS V70 servo drive

■ **Dimensional drawings**
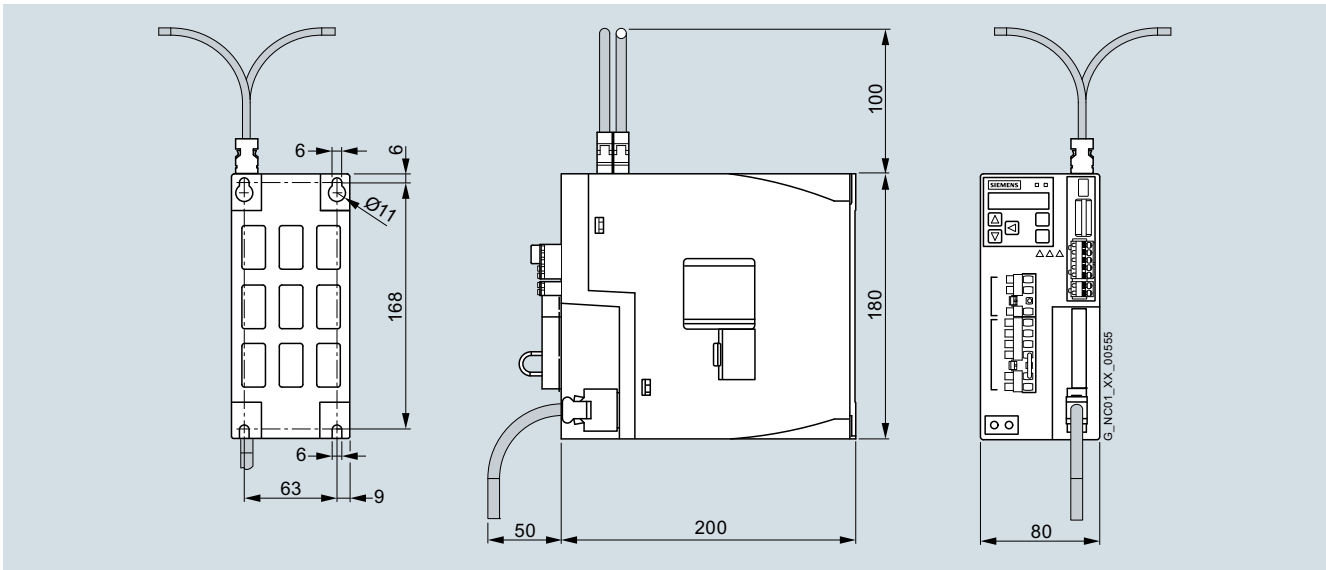
SINAMICS V70, frame size FSA
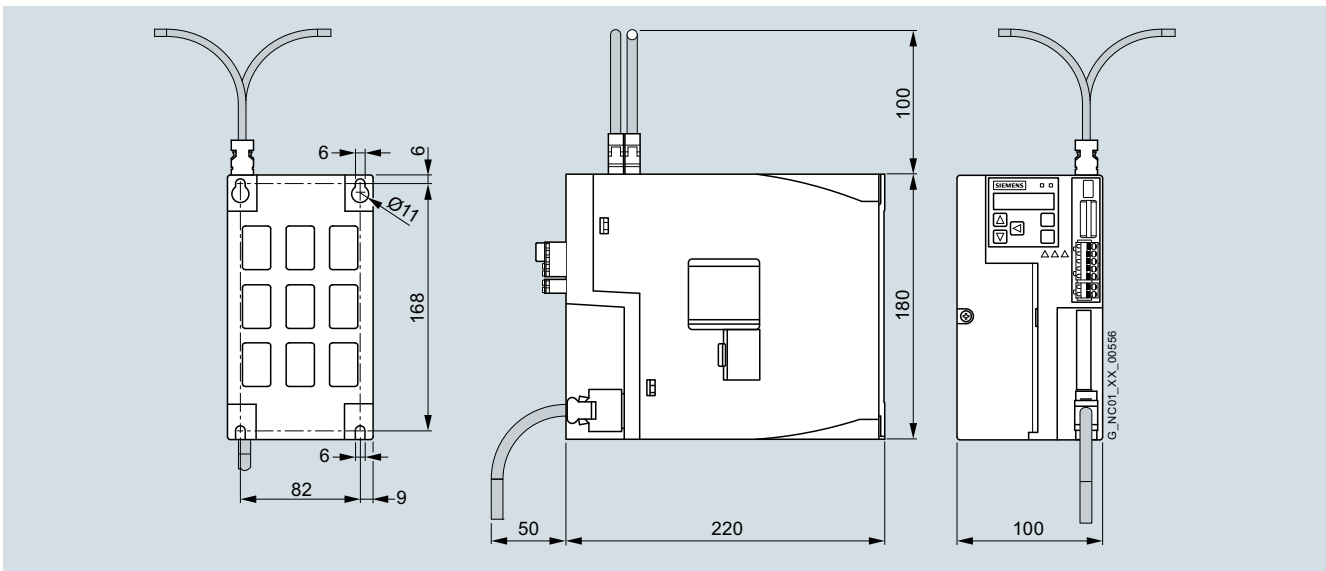
SINAMICS V70, frame size FSB

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SINAMICS V70 servo drive

■ **Dimensional drawings** (continued)

SINAMICS V70, frame size FSC

Mounting clearance

SINUMERIK 808D ADVANCED system
Feed axis solutions
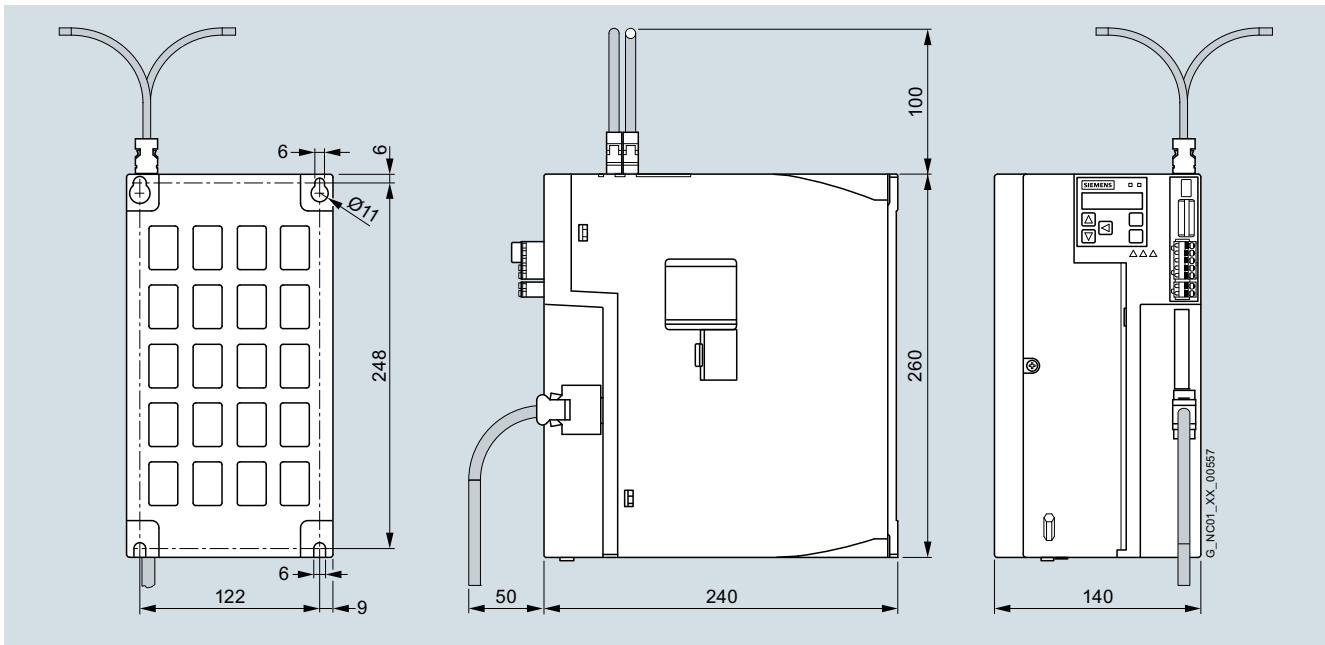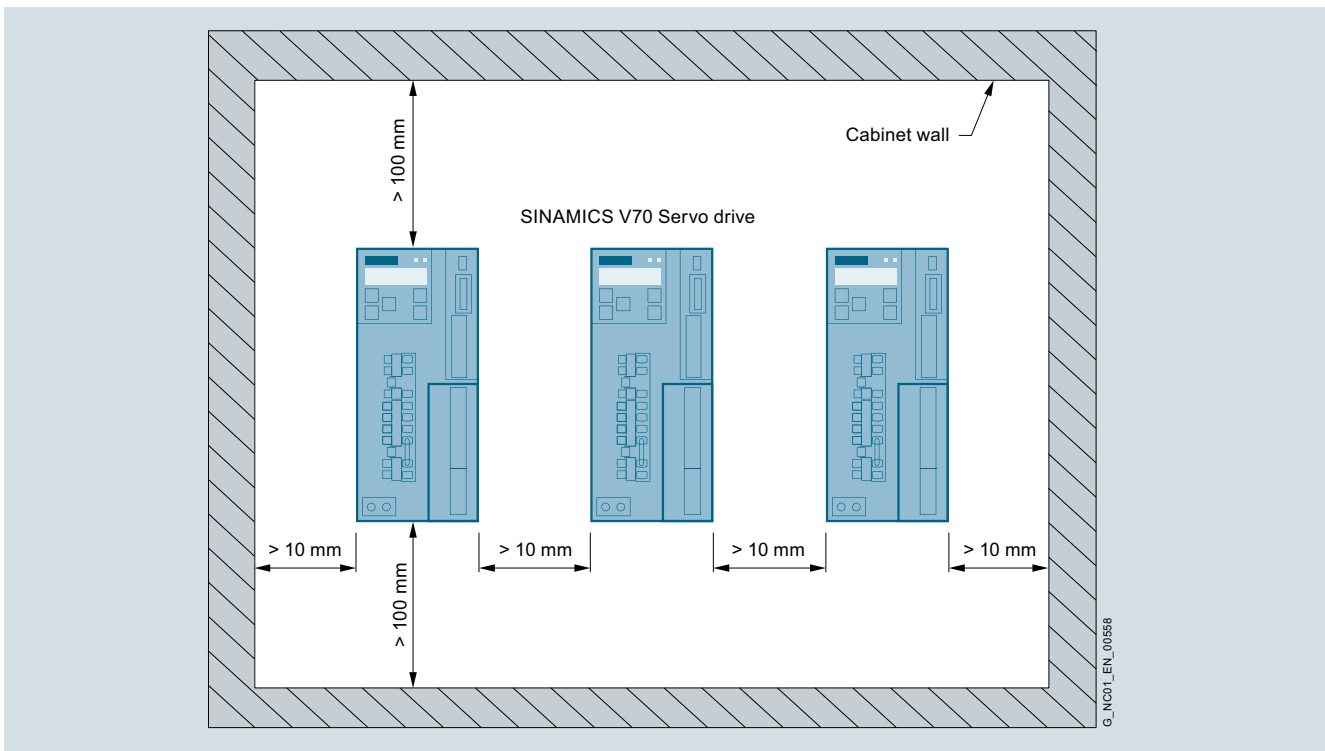
SIMOTICS S-1FL6 feed motor

Overview
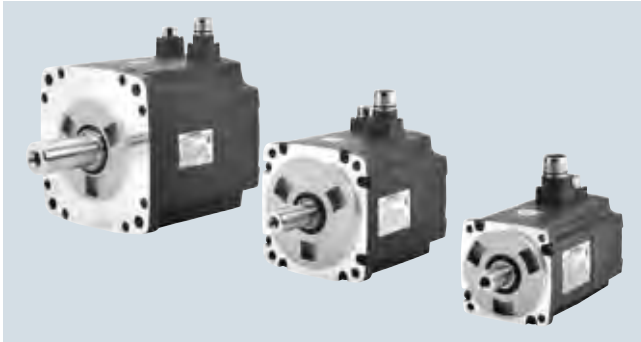
SIMOTICS S-1FL6 motors

SIMOTICS S-1FL6 motors are permanent-magnet synchronous motors and designed for operation without external cooling. The heat is dissipated through the motor surface. Thanks to the quick-lock connectors, quick and easy mounting of the motors is possible. Together with the SINAMICS V70, the SIMOTICS S-1FL6 feed motors provide a highly dynamic solution for the machine tool application.

Benefits

■ High-performance rare-earth magnet material
■ Rugged design with IP65 degree of protection for complete motor including connectors
■ Smooth running quality thanks to low torque ripple
■ High rated speed for some variants
■ High acceleration due to the 300 % overload capacity
■ Rotatable and fast-release connectors
■ Maximum flexibility due to variants with incremental encoder/ 20 bit absolute encoder, with/without brake and plain shaft/ feather key

Function

• 3 motor shaft heights: SH 45, SH 65 and SH 90
• Rated speed of 2000 rpm/3000 rpm
• Max. speed up to 4000 rpm
• 300 % overload capacity
• Integrated 20 bit absolute encoder or incremental encoder with 2500 S/R (13 bit resolution through electronic multipli- cation of the V70 drive)
• Degree of protection IP65, natural cooling
• Optional holding brake
• With plain shaft or feather key

Technical specifications

Product name	SIMOTICS S-1FL6 feed motors
Type of motor	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnetic material
Cooling	Natural cooling
Insulation of the stator winding in accordance with EN 600034-1 (IEC 60034-1)	Temperature class 130 (B)
Thermal class	B
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)	IP65, with oil seal
Shaft extension in accordance with IEC 60072-1	Plain shaft/feather key (C type)
Sound pressure level, max.	
• 1FL604	65 dB
• 1FL606	70 dB
• 1FL609	70 dB
Ambient temperature	
• Storage/transport	-15 ... +65 °C
• Operation	0 ... 40 °C without derating
Humidity	
• Storage/transport	90 % at 30 °C
• Operation	90 % at 30 °C
Installation altitude	Up to 1000 m above sea level without derating > 1000 m ... 5000 m with derating
Paint finish	Black
Certification	CE

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SINUMERIK 808D ADVANCED system
Feed axis solutions

SIMOTICS S-1FL6 feed motor

Selection and ordering data

Rated speed	Max. speed	Shaft height	Rated power	Static torque	SIMOTICS S-1FL6 Synchronous motors Natural cooling	Moment of inertia of rotor		Weight		SINAMICS V70	
n_{rated}	$n_{max.}$	SH	P_{rated} at $\Delta T = 100$ K	M_0 at $\Delta T = 100$ K		without brake	with brake	without brake	with brake		Frame size
						J	J	m	m		
rpm	rpm		kW	Nm	Article No.	10^{-4} kgm^2	10^{-4} kgm^2	kg	kg	Article No. 6SL3210-...	
3000	4000	45	0.4	1.9	**1FL6042-1AF61-0 ■ ■1**	2.8	3.4	3.1	4.4	5DE12-4UA0	FSA
	4000		0.75	3.5	**1FL6044-1AF61-0 ■ ■1**	5.3	5.9	4.9	6.2	5DE13-5UA0	FSA
2000	3000	65	0.75	4	**1FL6061-1AC61-0 ■ ■1**	8.2	9.4	5.3	8.3	5DE13-5UA0	FSA
	3000		1	6	**1FL6062-1AC61-0 ■ ■1**	15.7	16.9	8	11	5DE13-5UA0	FSA
	3000		1.5	8	**1FL6064-1AC61-0 ■ ■1**	25.7	16.9	8	11	5DE16-0UA0	FSB
	3000		1.75	11	**1FL6066-1AC61-0 ■ ■1**	23.2	24.4	10.7	13.6	5DE17-8UA0	FSB
	3000		2	15	**1FL6067-1AC61-0 ■ ■1**	30.7	31.9	13.3	16.3	5DE21-0UA0	FSB
2000	3000	90	2.5	15	**1FL6090-1AC61-0 ■ ■1**	50.2	56.4	14.8	20.9	5DE21-0UA0	FSB
	3000		3.5	22	**1FL6092-1AC61-0 ■ ■1**	73	79.2	19.3	25.3	5DE21-4UA0	FSC
	2500		5	30	**1FL6094-1AC61-0 ■ ■1**	96.4	102.6	23.9	29.9	5DE21-8UA0	FSC
	2000		7	40	**1FL6096-1AC61-0 ■ ■1**	145.6	151.8	32.7	38.7	5DE21-8UA0	FSC

Encoder type

Incremental encoder 2500 S/R	A
Absolute encoder 20 bit	L

Shaft extension	**Holding brake**	
Feather key	Without	A
Feather key	With	B
Plain shaft	Without	G
Plain shaft	With	H

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Dimensional drawings

For motor		Dimensions in mm				DE shaft extension								Encoder system: Incremental encoder 2500 S/R									
														without brake			with brake						
Shaft height	Type	LC	LA	LZ	N	LR	T	LG	D	DB	E	QK	GA	F	LB	KB1	KB2	LB	KB1	KB2	KL1	KL2	KL3	KL4
1FL6 natural cooling without/with brake																								
45	1FL6042	90	100	7	80	35	4	10	19	M6 x 16	30	25	22	6	155	94	–	201	140	32	129	92	–	–
	1FL6044														202	141	–	248	187					
65	1FL6061	130	145	9	110	58	6	12	22	M8 x 16	50	44	25	8	148	86	–	203	140	40	151	115	23	22
	1FL6062														181	119	–	236	173					
	1FL6064														181	119	–	236	173					
	1FL6066														214	152	–	269	206					
	1FL6067														247	185	–	302	239					
90	1FL6090	180	200	14	114	80	3	18	35	M8 x 16	75	60	38	10	190	140	–	255	206	45	177	149	34	34
	1FL6092														212	162	–	281	232					
	1FL6094														238	188	–	307	258					
	1FL6096														290	240	–	359	310					
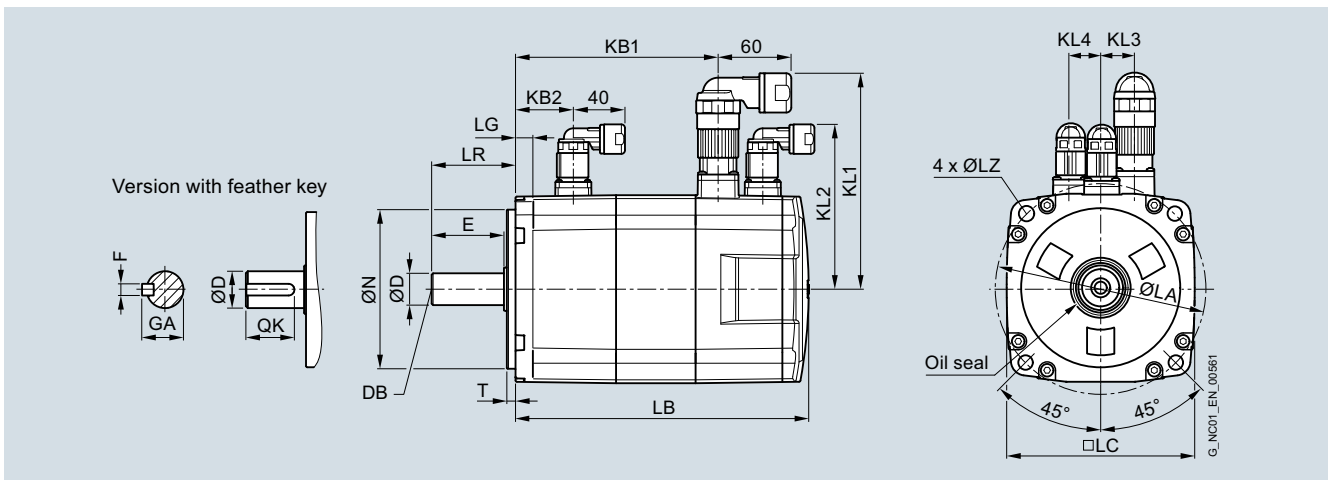
SIMOTICS S-1FL6 feed motor with incremental encoder

SINUMERIK 808D ADVANCED system
Feed axis solutions

SIMOTICS S-1FL6 feed motor

Dimensional drawings (continued)

For motor		Dimensions in mm							DE shaft extension						Encoder system: Absolute encoder 20 bit									
															without brake			with brake						
Shaft height	Type	LC	LA	LZ	N	LR	T	LG	D	DB	E	QK	GA	F	LB	KB1	KB2	LB	KB1	KB2	KL1	KL2	KL3	KL4
1FL6 natural cooling without/with brake																								
45	1FL6042	90	100	7	80	35	4	10	19	M6 × 16	30	25	22	6	157	100	–	204	147	32	129	60	–	–
	1FL6044														204	147	–	251	194				–	–
65	1FL6061	130	145	9	110	58	6	12	22	M8 × 16	50	44	25	8	151	92	–	206	147	40	151	60	–	–
	1FL6062														184	125	–	239	180				–	–
	1FL6064														184	125	–	239	180				–	–
	1FL6066														217	158	–	272	213				–	–
	1FL6067														250	191	–	305	246				–	–
90	1FL6090	180	200	14	114	80	3	18	35	M8 × 16	75	60	38	10	197	135	–	263	201	45	177	60	–	–
	1FL6092														223	161	–	289	227				–	–
	1FL6094														249	187	–	315	253				–	–
	1FL6096														301	239	–	367	305				–	–

4
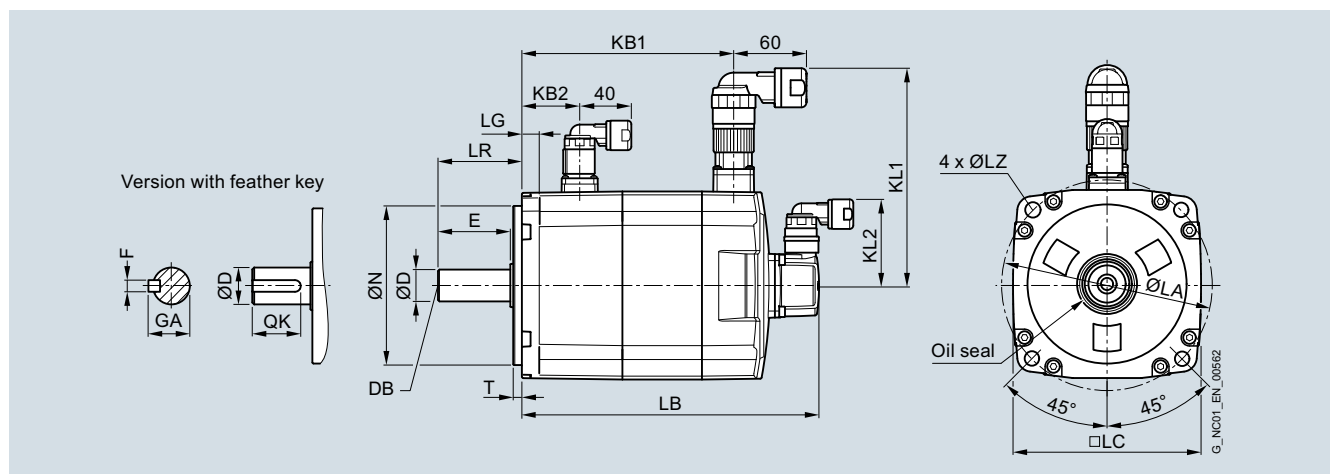
SIMOTICS S-1FL6 feed motor with absolute encoder

SINUMERIK 808D ADVANCED system
MOTION-CONNECT connection systems

■ **Integration**

SINUMERIK 808D ADVANCED Turning/Milling PPU 161.2/PPU 160.2	Article No. Pre-assembled cables	
X1		Power supply 24 V DC
X2	**6FX8002-1AA01-....**	RS232C
X126	**6FC5548-0BA20-....** 3 m, 5 m, 7 m, 10 m or 20 m (9.8 ft, 16 ft, 23 ft, 32 ft or 64 ft)	SINAMICS V70
X54	**6FC5548-0BA05-....** 5 m, 7 m or 10 m (16 ft, 23 ft or 32 ft)	Spindle drive
X60	**6FX8002-2CD01-....** 5 m, 7 m or 10 m (16 ft, 23 ft or 32 ft)	Incremental encoder for spindle (TTL) RS422 6FX2001-2...
X10	**6FX8002-2BB01-....** ≤ 25 m (82 ft) for handwheel signals	Handwheels (max. 2)
X30	USB cable, 0.5 m (1.6 ft)	MCP
X100/X101/X102		24 digital inputs 24 V DC
X200/X201		16 digital inputs 24 V DC
X301	**6EP5306-5BG00** ≤ 6 m (20 ft)	24 DI / 16 DO, 24 V DC Terminal strip converter
X302	**6EP5306-5BG00** ≤ 6 m (20 ft)	24 DI / 16 DO, 24 V DC Terminal strip converter
X21	Wire (0.14 to 1.5 mm²)	NC Ready, CW, CCW, 3 fast inputs (e.g. BERO signals), 1 fast output 24 V DC

G_NC01_EN_00559

Connection overview of SINUMERIK 808D ADVANCED T/SINUMERIK 808D ADVANCED M PPU 161.2/PPU160.2

■──	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.

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SINUMERIK 808D ADVANCED system
MOTION-CONNECT connection systems

MOTION-CONNECT cables for
SINUMERIK 808D ADVANCED

Technical specifications

Product name	Drive bus cable PPU 16x – SINAMICS V70 SINAMICS V70 – SINAMICS V70 6FC5548-0BA20-….	Setpoint cable PPU 16x – spindle drive 6FC5548-0BA05-….
No. of cores	2	4
Approvals, according to • cURus or UR/CSA[1] • RoHS conformity	UL1581 Yes	UL2576 Yes
Operating voltage	100 V	30 V
Test voltage, rms	3600 V	500 V
Operating temperature on the surface • Fixed installation • Flexible installation	-40 … +80 °C -40 … +60 °C	-20 … +80 °C 0 … 60 °C
Smallest bending radius • Fixed installation • Flexible installation	75 mm 150 mm	60 mm 120 mm
Insulation material, incl. jacket	PVC	PVC
Oil resistance	Limited mineral oil and fats resistance	70 °C × 4 h
Outer jacket	PVC Gray	PVC Gray
Flame-retardant	IEC 60332–3–24	VW-1

Product name	Signal cable PPU 16x – Incremental encoder for spindle (TTL) 6FX8002-2CD01-….	Signal cable PPU 16x – handwheel 6FX8002-2BB01-….	RS232C data cable PPU 16x – PC 6FX8002-1AA01-….
Approvals, according to • cURus or UR/CSA[1] • RoHS conformity	UL758-CSA-C22.2-N.210.2-M90 Yes	UL758-CSA-C22.2-N.210.2-M90 Yes	UL758-CSA-C22.2-N.210.2-M90 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 • Flexible installation	-50 … +80 °C -20 … +60 °C	-50 … +80 °C -20 … +60 °C	-50 … +80 °C -20 … +60 °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	35 mm 70 mm	35 mm 70 mm	35 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.

■ Selection and ordering data

Description	Article No.
Pre-assembled bus cable PPU 16x – SINAMICS V70 and SINAMICS V70 – SINAMICS V70	
Length	
• 0.35 m	**6FC5548-0BA20-1AA3**
• 3 m	**6FC5548-0BA20-1AD0**
• 5 m	**6FC5548-0BA20-1AF0**
• 7 m	**6FC5548-0BA20-1AH0**
• 10 m	**6FC5548-0BA20-1BA0**
• 20 m	**6FC5548-0BA20-1CA0**
Pre-assembled setpoint cable PPU 16x – spindle drive	
Length	
• 3 m	**6FC5548-0BA05-1AD0**
• 5 m	**6FC5548-0BA05-1AF0**
• 7 m	**6FC5548-0BA05-1AH0**
• 10 m	**6FC5548-0BA05-1BA0**
• 20 m	**6FC5548-0BA05-1CA0**
Pre-assembled signal cable PPU 16x – incremental encoder for spindle (TTL)	
Length	
• 5 m	**6FX8002-2CD01-1AF0**
• 7 m	**6FX8002-2CD01-1AH0**
• 10 m	**6FX8002-2CD01-1BA0**
Pre-assembled signal cable PPU 16x – 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 PPU 16x – personal computer	
Length	
• 5 m	**6FX8002-1AA01-1AF0**
• 10 m	**6FX8002-1AA01-1BA0**

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SINUMERIK 808D ADVANCED system
MOTION-CONNECT connection systems

**MOTION-CONNECT cables for
SINAMICS V70**

Integration
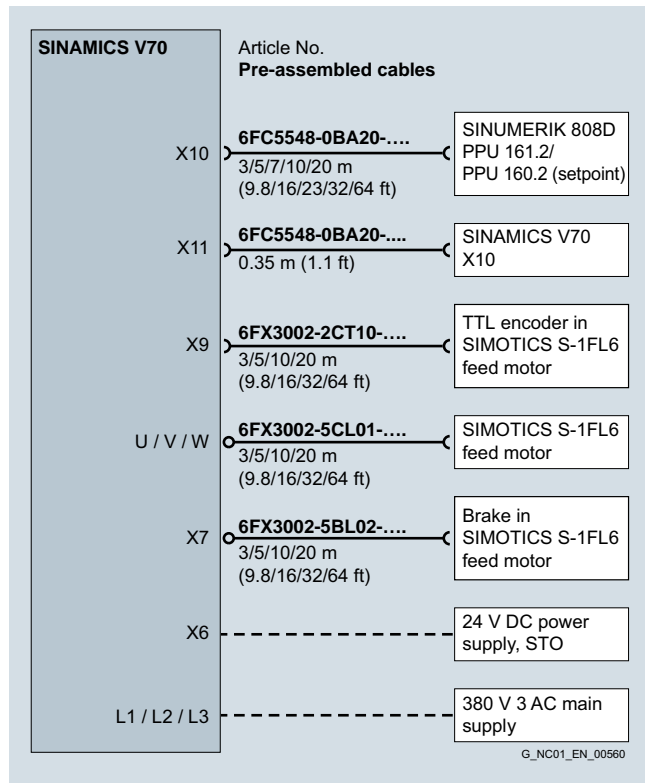
Connection overview of SINAMICS V70 drive system

■—	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	Article No.
Pre-assembled signal cable SINAMICS V70 – SIMOTICS S-1FL6 feed motor with absolute encoder Length • 3 m • 5 m • 7 m • 10 m • 20 m	6FX3002-2DB10-1AD0 6FX3002-2DB10-1AF0 6FX3002-2DB10-1AH0 6FX3002-2DB10-1BA0 6FX3002-2DB10-1CA0
Pre-assembled signal cable SINAMICS V70 – SIMOTICS S-1FL6 feed motor with incremental encoder Length • 3 m • 5 m • 7 m • 10 m • 20 m	6FX3002-2CT10-1AD0 6FX3002-2CT10-1AF0 6FX3002-2CT10-1AH0 6FX3002-2CT10-1BA0 6FX3002-2CT10-1CA0
Pre-assembled power cable 4 × 1.5 mm^2 SINAMICS V70, frame size FSA – SIMOTICS S-1FL6 feed motor Length • 3 m • 5 m • 7 m • 10 m • 20 m	6FX3002-5CL01-1AD0 6FX3002-5CL01-1AF0 6FX3002-5CL01-1AH0 6FX3002-5CL01-1BA0 6FX3002-5CL01-1CA0
Pre-assembled power cable 4 × 2.5 mm^2 SINAMICS V70, frame size FSB/FSC – SIMOTICS S-1FL6 feed motor Length • 3 m • 5 m • 7 m • 10 m • 20 m	6FX3002-5CL11-1AD0 6FX3002-5CL11-1AF0 6FX3002-5CL11-1AH0 6FX3002-5CL11-1BA0 6FX3002-5CL11-1CA0
Pre-assembled brake cable SINAMICS V70 – SIMOTICS S-1FL6 feed motor with brake Length • 3 m • 5 m • 7 m • 10 m • 20 m	6FX3002-5BL02-1AD0 6FX3002-5BL02-1AF0 6FX3002-5BL02-1AH0 6FX3002-5BL02-1BA0 6FX3002-5BL02-1CA0

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▪ Technical specifications

Product name	Signal cable SINAMICS V70 – Encoder in SIMOTICS S-1FL6 feed motor 6FX3002-2DB10-.... 6FX3002-2CT10-….	Power cable SINAMICS V70 – SIMOTICS S-1FL6 feed motor 6FX3002-5CL01-.... 6FX3002-5CL11-….	Signal cable SINAMICS V70 – brake in SIMOTICS S-1FL6 feed motor 6FX3002-5BL02-....
No. of cores	10	4	2
Degree of protection (when closed and connected)	IP65	IP65	IP65
Approvals, acc. to • RoHS • UL • CE	Yes Yes No	Yes Yes Yes	Yes Yes No
Rated voltage U_0/U	30 V/30 V	600 V/1000 V	30 V/30 V
Test voltage, rms	500 V	4 kV	500 V
Operating temperature on the surface • Fixed installation	-15 … +80 °C	-15 … +80 °C	-15 … +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	6 × diameter 155 mm	6 × diameter 155 mm	6 × diameter 155 mm
Torsional stress	Absolute 30°/m	Absolute 30°/m	Absolute 30°/m
Bending	1000000	1000000	1000000
Insulation material, incl. jacket	PVC	PVC	PVC
Oil resistance	EN 60811-2-1	EN 60811-2-1	EN 60811-2-1
Outer jacket	PVC	PVC	PVC
Flame-retardant	FT1	FT1	FT1

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

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SINUMERIK 808D ADVANCED system
Example packages

■ Overview

The following composition of an equipment package is an
example of an 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

Designation	Quantity	Article No.
SINUMERIK CNC		
SINUMERIK 808D ADVANCED T PPU 160.2 vertical, English layout	1	6FC5370-2BT02-0AA0
SINUMERIK 808D MCP vertical, with handwheel slot, English layout	1	6FC5303-0AF35-3AA0
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
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 bus cable PPU 160.2 – SINAMICS V70, length 5 m	1	6FC5548-0BA20-1AF0
Pre-assembled bus cable SINAMICS V70 – SINAMICS V70, length 0.35 m	1	6FC5548-0BA20-1AA3
Pre-assembled setpoint cable PPU 160.2 – spindle drive, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 160.2 – handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 160.2 – incremental spindle encoder (TTL), length 5 m	1	6FX8002-2CD01-1AF0
SINAMICS V70		
SINAMICS V70, I_{rated} 3.0 A	1	6SL3210-5DE13-5UA0
SINAMICS V70, I_{rated} 5.3 A	1	6SL3210-5DE17-8UA0
SIMOTICS S-1FL6		
SIMOTICS S-1FL6 feed motor, 4 Nm, 2000 rpm, absolute encoder, plain shaft, without holding brake	1	1FL6061-1AC61-0LG1
SIMOTICS S-1FL6 feed motor, 11 Nm, 2000 rpm, absolute encoder, plain shaft, with holding brake	1	1FL6066-1AC61-0LH1
Pre-assembled signal cable SINAMICS V70 – absolute encoder in SIMOTICS S-1FL6 feed motor, length 5 m	2	6FX3002-2DB10-1AF0
Pre-assembled power cable 4 × 1.5 mm² SINAMICS V70 – SIMOTICS S-1FL6 feed motor, length 5 m	1	6FX3002-5CL01-1AF0
Pre-assembled power cable 4 × 2.5 mm² SINAMICS V70 – SIMOTICS S-1FL6 feed motor, length 5 m	1	6FX3002-5CL11-1AF0
Pre-assembled brake cable SINAMICS V70 – brake in SIMOTICS S-1FL6 feed motor, length 5 m	1	6FX3002-5BL02-1AF0

SINUMERIK 808D ADVANCED system
Example packages

■ 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 output signals

Designation	Quantity	Article No.
SINUMERIK CNC		
SINUMERIK 808D ADVANCED M PPU 161.2 horizontal, English layout	1	6FC5370-2AM02-0AA0
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 bus cable PPU 161.2 – SINAMICS V70, length 5 m	1	6FC5548-0BA20-1AF0
Pre-assembled bus cable SINAMICS V70 – SINAMICS V70, length 0.35 m	2	6FC5548-0BA20-1AA3
Pre-assembled setpoint cable PPU 161.2 – spindle drive, length 5 m	1	6FC5548-0BA05-1AF0
Pre-assembled signal cable PPU 161.2 – handwheel, length 1 m	1	6FX8002-2BB01-1AB0
Pre-assembled signal cable PPU 161.2 – incremental spindle encoder (TTL), length 7 m	1	6FX8002-2CD01-1AH0
SINAMICS V70		
SINAMICS V70, I_{rated} 4.6 A	2	6SL3210-5DE16-0UA0
SINAMICS V70, I_{rated} 7.8 A	1	6SL3210-5DE21-0UA0
SIMOTICS S-1FL6		
SIMOTICS S-1FL6 feed motor, 8 Nm, 2000 rpm, incremental encoder, plain shaft, without holding brake	2	1FL6064-1AC61-0AG1
SIMOTICS S-1FL6 feed motor, 15 Nm, 2000 rpm, incremental ecoder, plain shaft, with holding brake	1	1FL6067-1AC61-0AH1
Pre-assembled signal cable SINAMICS V70 – incremental encoder in SIMOTICS S-1FL6 feed motor, length 10 m	3	6FX3002-2CT10-1BA0
Pre-assembled power cable 4 × 2.5 mm² SINAMICS V70 – SIMOTICS S-1FL6 feed motor, length 10 m	3	6FX3002-5CL11-1BA0
Pre-assembled brake cable SINAMICS V70 – brake in SIMOTICS S-1FL6 feed motor, length 10 m	1	6FX3002-5BL02-1BA0

4

Notes

4

Accessories

5

Accessories
Operator components

■ Overview

Electronic handwheel

This handwheel 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	Article 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	**6FC9320-5DN00**
For installation in front panel with 3-hole fixing	

■ 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, 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

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■ Dimensional drawings
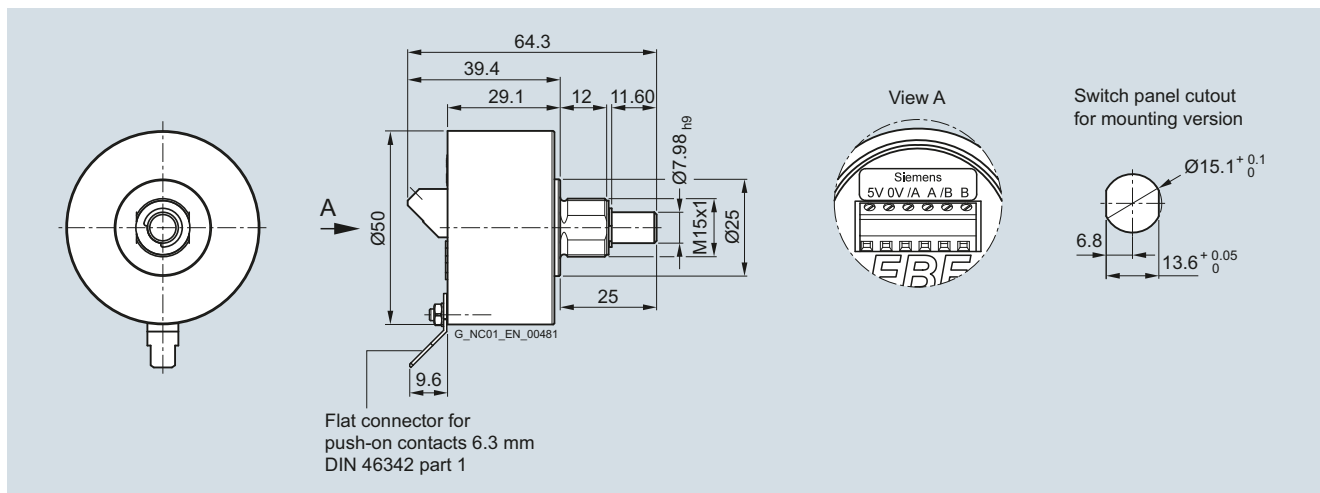
Electronic handwheel with front panel 76.2 mm × 76.2 mm
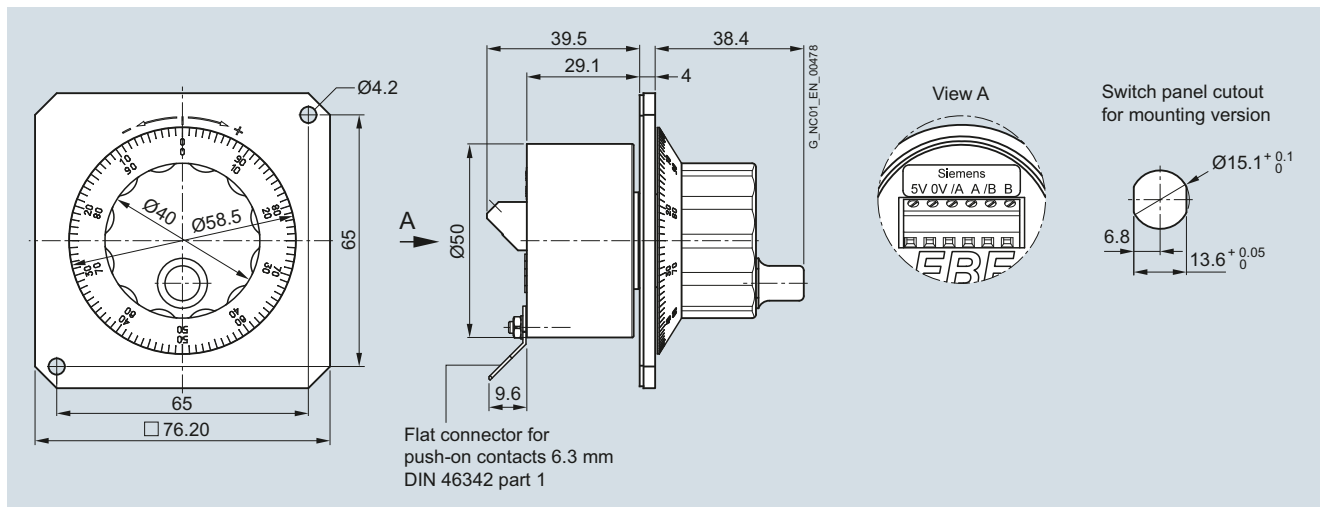
Electronic handwheel with front panel 120 mm × 120 mm

■ **Dimensional drawings** (continued)
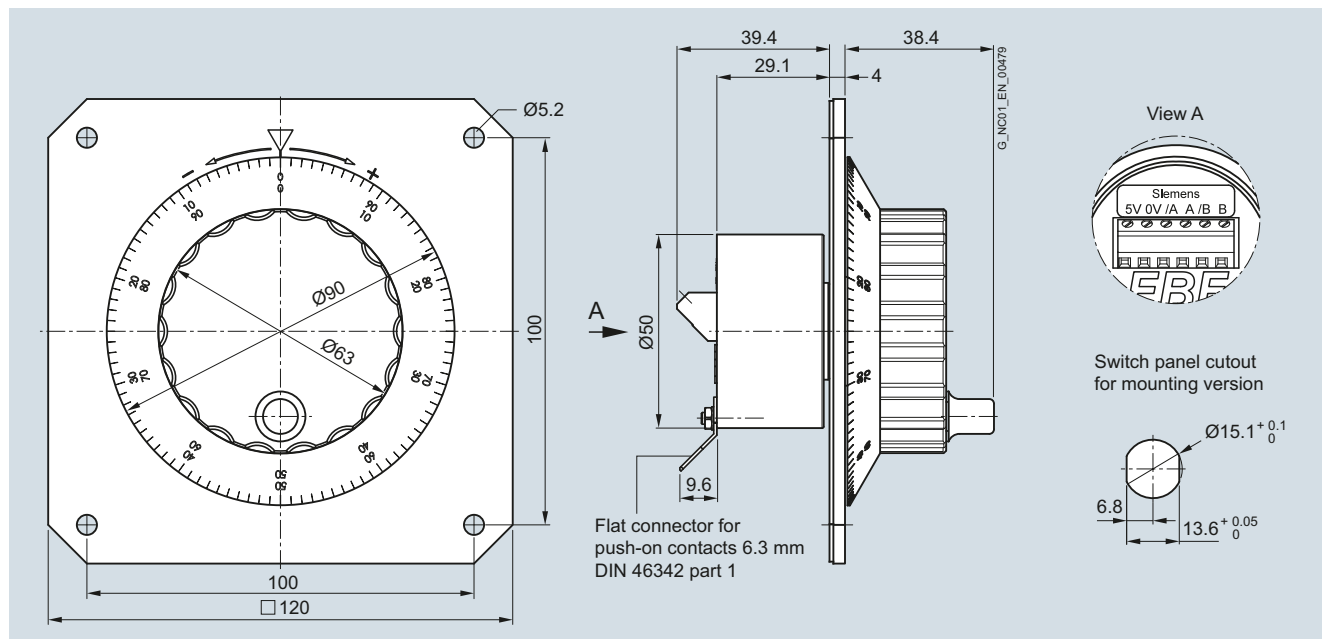
Electronic handwheel without front panel with small setting wheel
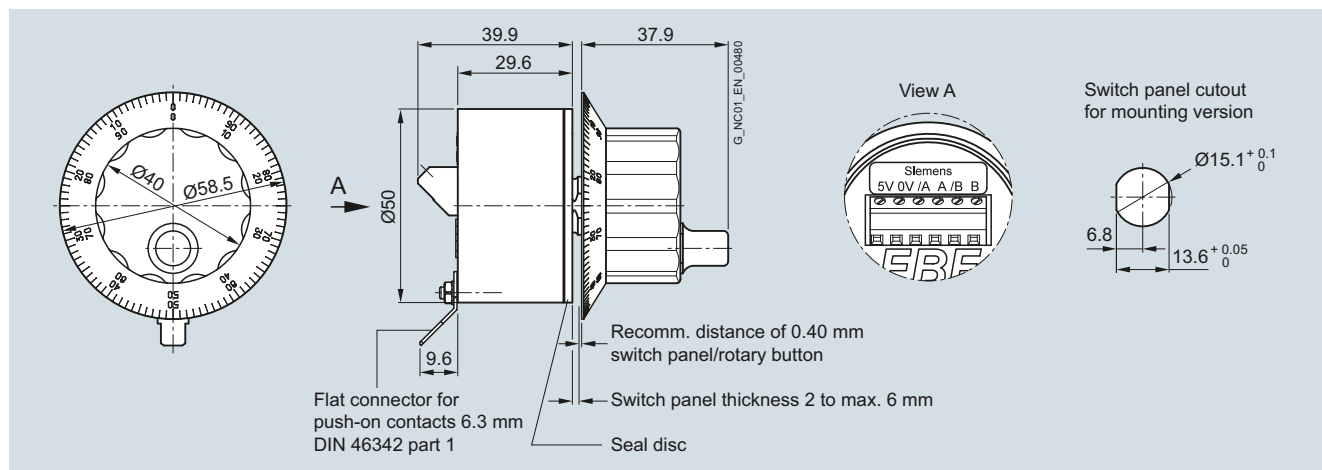
Electronic handwheel without front panel without setting wheel

Terminal strip converter

■ Overview
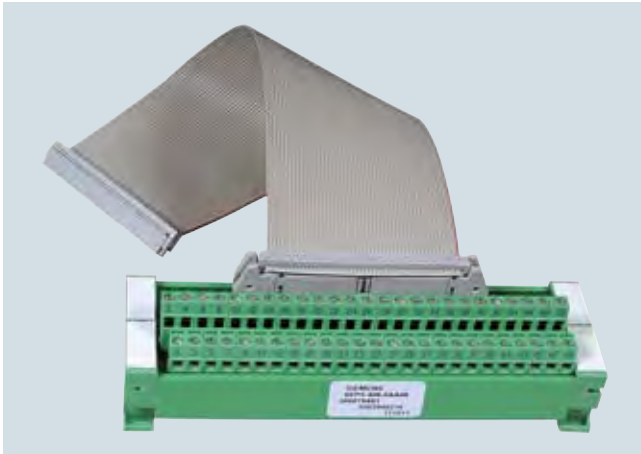
Terminal strip converter

The SINUMERIK 808D PPU 14x/SINUMERIK 808D ADVANCED PPU 16x feature 24 digital PLC inputs and 16 digital PLC outputs which can be connected directly using screw-clamps on the PPU.

In addition, the PPU 14x/PPU 16x feature 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
- Ribbon cable, 50-pole
- Insulation displacement connectors

Cabinet mounting
- Standard mounting rails

■ Selection and ordering data

Description	Article 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**

■ Dimensional drawings
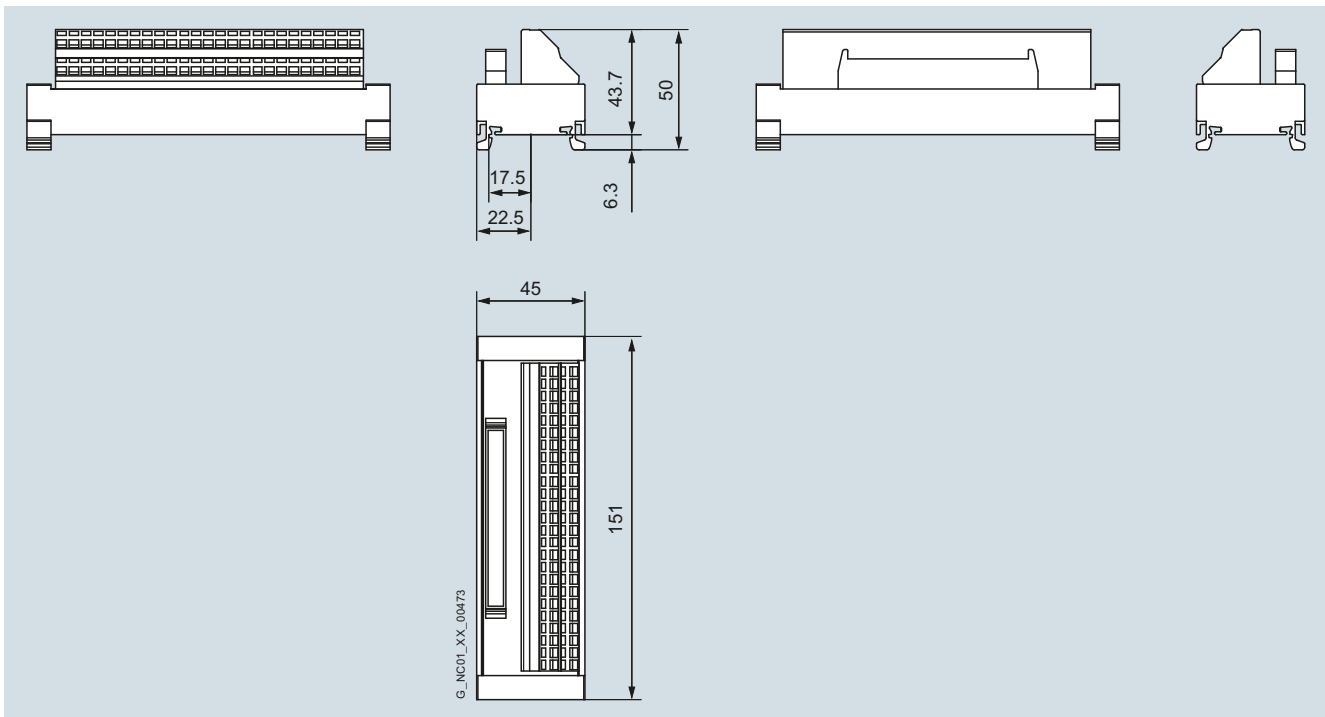
Terminal strip converter

Accessories
Supplementary components

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

■ **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

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■ Dimensional drawings
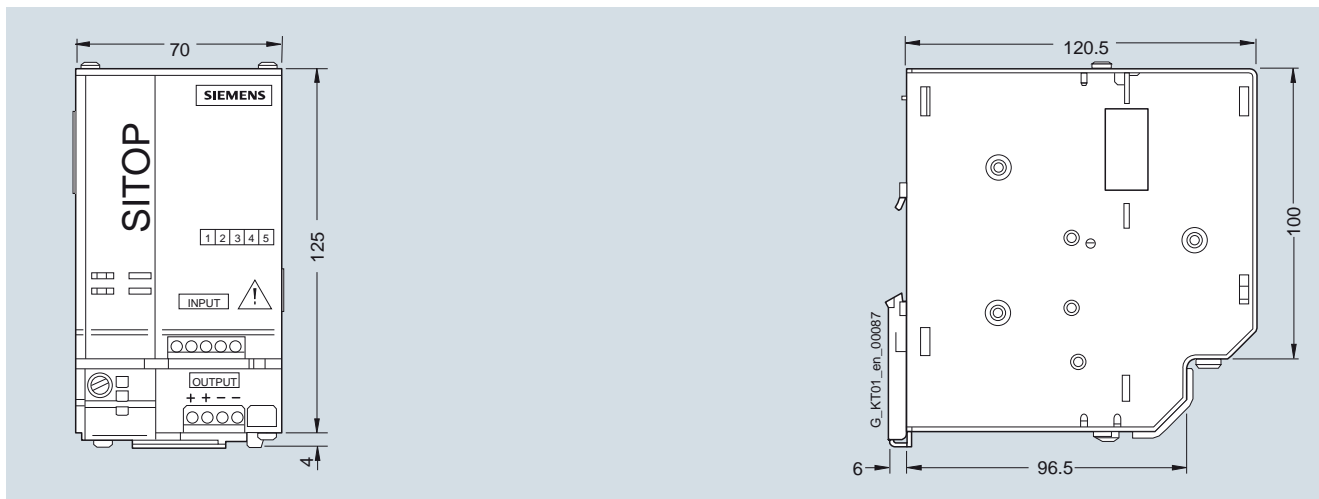
Stabilized power supply SITOP smart 5 A
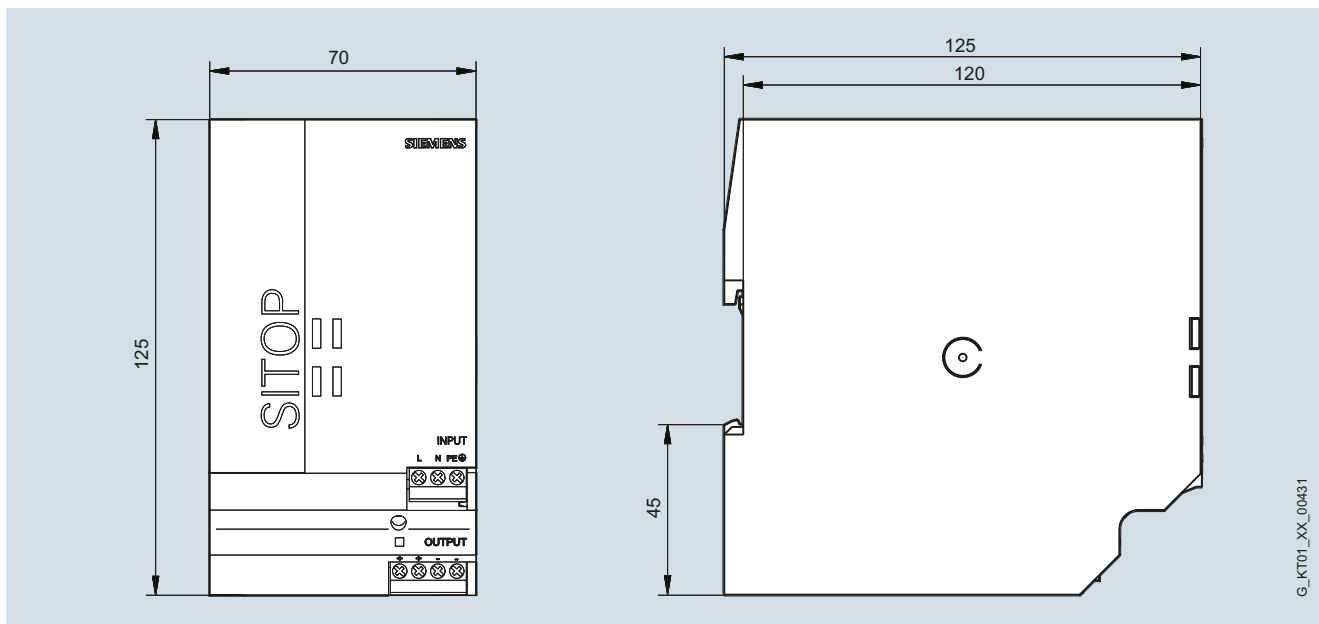
Stabilized power supply SITOP smart 10 A

5

Accessories
Direct spindle encoder

Direct spindle encoder

■ 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 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.

5

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	RS422 (TTL)
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.	90°
• At 300 kHz	$\geq 0.45 \mu s$
Cable length to downstream electronics, max.[1]	100 m
LED failure monitoring	High-resistance driver
Resolution, max.	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
Friction torque (at 20 °C)	≤ 0.01 Nm
Starting torque (at 20 °C)	≤ 0.01 Nm
Shaft loading capacity	
• n ≤ 6000 rpm	
- Axial	40 N
- Radial at shaft extension	60 N
• n > 6000 rpm	
- Axial	10 N
- Radial at shaft extension	20 N
Shaft diameter	6 mm
Shaft length	10 mm
Angular acceleration, max.	10^5 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.	0.3 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

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	Article 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

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

5

Accessories
Direct spindle encoder

Direct spindle encoder

■ **Dimensional drawings**
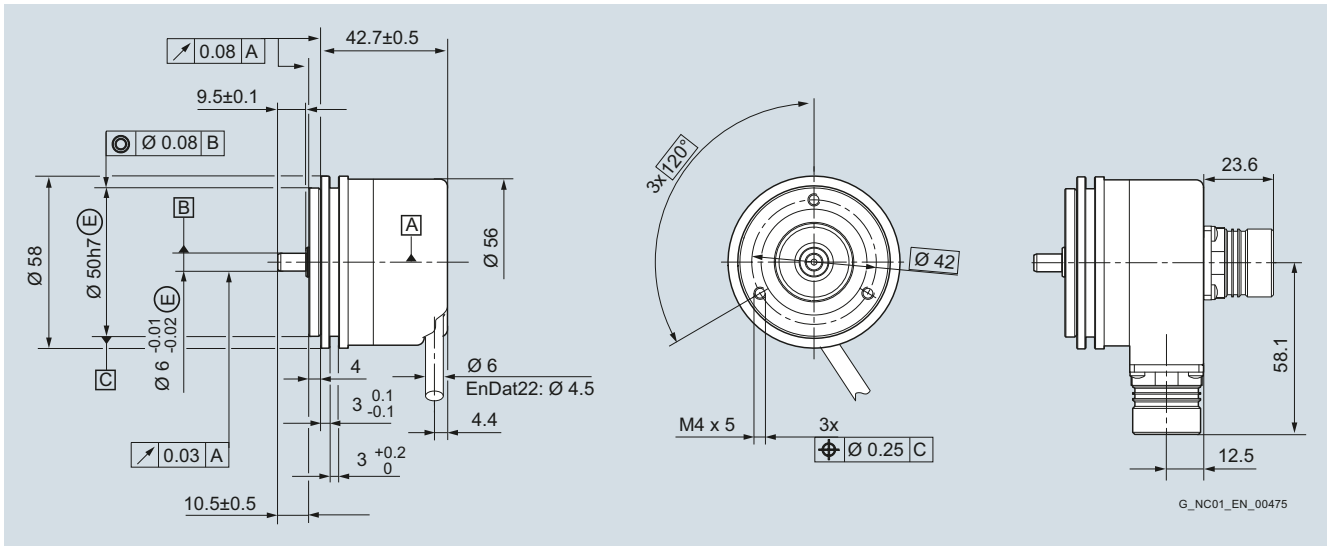
RS422 (TTL) incremental encoder
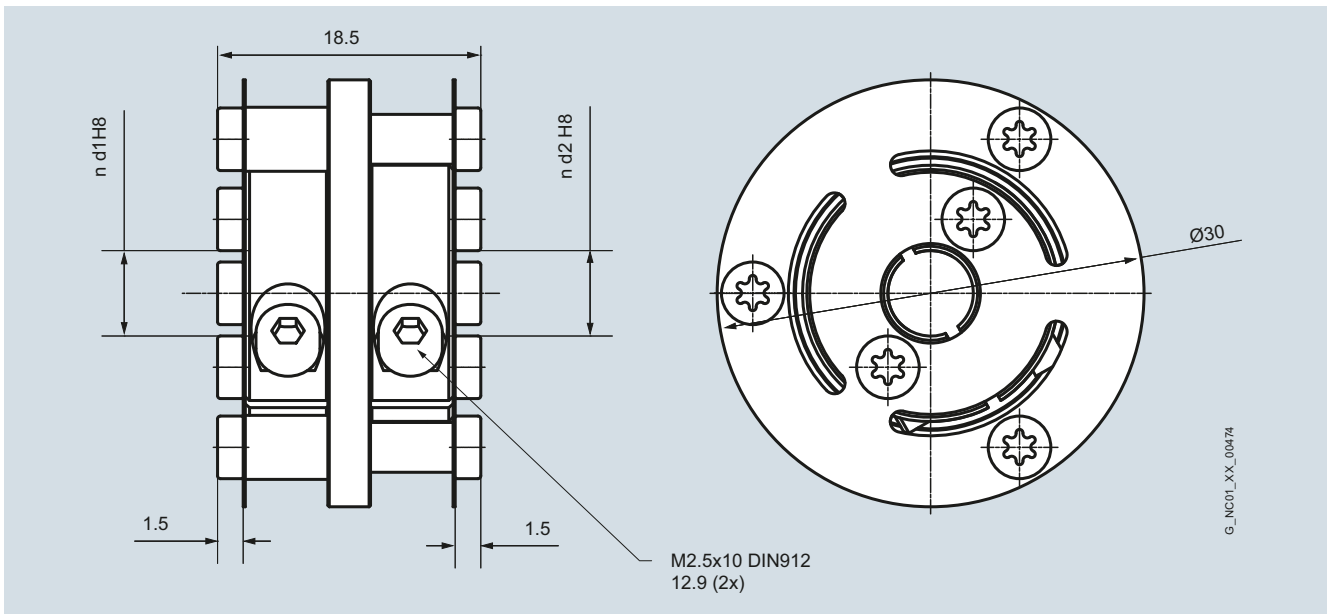
Spring disk coupling, $d1 = d2 = 6$ mm

Services and training

Services and training
Services

Material warranty and on-site service

Overview

Equipment package SINUMERIK 808D ADVANCED T PPU 161.2 with MCP, SINAMICS V70 FSA ... FSC with SIMOTICS S-1FL6 feed motors

For the SINUMERIK 808D/SINUMERIK 808D ADVANCED 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].

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/oss

[1] Not applicable to complete motor spindles.

[2] Standard warranty period: 24 months from 1st delivery of equipment package from Siemens factory.
Extended warranty period: 36 months from 1st delivery of equipment package from Siemens factory. When registration completed within standard warranty period.

Faster and more applicable know-how: Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry 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.

Achieve more with Siemens Industry Training

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- 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.

Siemens Industry Training Customer Support Germany:

Phone: +49 (911) 895-7575

Fax: +49 (911) 895-7576

E-Mail: info@sitrain.com

Highlights Siemens Industry Training

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 comprise of 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" is 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.

6

Services and training

Training

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 and SINUMERIK 808D ADVANCED. SINUMERIK 808D on PC can be used for the following applications:

• Self-study or professional training of SINUMERIK 808D/ SINUMERIK 808D ADVANCED operation and CNC programming

• Offline CNC program creation and simulation

• Professional presentation of SINUMERIK 808D/ SINUMERIK 808D ADVANCED 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/SINUMERIK 808D ADVANCED 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 ADVANCED, SINUMERIK 808D on PC also offers a context sensitive online help.

Languages

The following operator languages are available:

• English

• Chinese Simplified

• Russian[1]

• Portuguese[1]

Free of charge download

SINUMERIK 808D on PC can be downloaded free of charge at: www.cnc4you.siemens.com

■ Integration

SINUMERIK 808D on PC can be used for:
• SINUMERIK 808D Turning
• SINUMERIK 808D Milling
• SINUMERIK 808D ADVANCED T
• SINUMERIK 808D ADVANCED M

Preconditions

Hardware

• 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

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

[1] Coming soon.

6

■ **Comprehensive teaching support for educational institutions**

Cooperates
with Education

Automation

SIEMENS

Siemens Automation Cooperates with Education (SCE)
offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

Training curriculums for your lessons

Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:

- With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.

- The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

www.siemens.com/sce/documents

Trainer packages for hands-on learning

Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offers more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/ SIMOTION
- CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

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Services and training
Siemens Automation Cooperates with Education

Applicable practical know-how

■ **Comprehensive teaching support for educational institutions** (continued)

Courses convey up-to-date specialist knowledge

Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

www.siemens.com/sce/contact

Support for your projects/textbooks

Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact
www.siemens.com/sce/books

Complete didactic solutions

Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

Contact for individual support

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

SCE Support Finder for your Internet request

You are an educator and need support on the topic of industry automation? Send us your request:

www.siemens.com/sce/supportfinder

Scan the QR code for further information (SCE homepage)

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Services and training
Documentation

Specific documentation for SINUMERIK 808D

Overview

Comprehensive documentation is available for the SINUMERIK 808D and SINUMERIK 808D ADVANCED CNC controls, including the SINAMICS V60 and SINAMICS V70 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:

www.siemens.com/automation/support

You can find additional information on the Internet at:
www.siemens.com/motioncontrol/docu

More information

Please send any queries or suggestions to:

docu.motioncontrol@siemens.com

Selection and ordering data

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

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

Appendix

7

Appendix
Approvals

■ **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.

UL: Underwriters Laboratories Independent public testing institution in North America

Approval marks:
- **UL** for end-products, tested by UL in accordance with UL standard
- **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

TUV: TUV Rheinland of North America Inc. Independent public testing institution in North America National recognized testing laboratory (NRTL)

Approval mark:
- **cTUVus** tested by TUV in accordance with UL and CSA standards

CSA: Canadian Standard Association Independent public testing institution in Canada

Approval mark:
- **CSA** Tested by CSA in accordance with CSA standard

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

File No.:
- SINUMERIK FM ... : LR 102527

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

At Siemens Industry Automation and Drive Technologies, more than 85000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: www.siemens.com/automation/partner

You start by selecting a

• Country,
• City,
• Service.

Siemens Solution Partner Automation

■ **Overview**

Siemens Solution Partner Automation

Solution Partner: Highest quality – guaranteed

The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partner Automation, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

- Solution quality
  Always a good result with tried and tested solutions expertise.
- Expert quality
  Certified technical competence ensures maximum efficiency.
- Project quality
  With proven project experience straight to the target.
- Portfolio quality
  Comprehensive portfolio for state-of-the-art solutions from a single source.

Solution Partner Finder

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements.

Support is provided by the Solution Partner Finder, a comprehensive online platform that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided. Various search criteria are available for this purpose.

Once you have located a partner, you are only one small step away from contacting them.

Find the right partner here for your specific task and convince yourself of the solution competence provided:

www.siemens.com/automation/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/automation/solutionpartner

■ **Siemens Industry Automation and Drive Technologies in the WWW**

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

■ **Product Selection Using the Interactive Catalog CA 01 of Industry**

Detailed information together with convenient interactive functions:
The interactive catalog CA 01 covers more than 80000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

■ **Easy Shopping with the Industry Mall**

The Industry Mall is the virtual department store of Siemens AG on the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

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Appendix
Online services

Information and Download Center
Social Media, Mobile Media

Downloading Catalogs

In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

www.siemens.com/industry/infocenter

Social Media

Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

www.siemens.com/industry/socialmedia

Or via our product pages at:

www.siemens.com/automation

or

www.siemens.com/drives

To find out more about Siemens' current social media activities visit us at:

www.siemens.com/socialmedia

Mobile Media

Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

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

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

Runtime software

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

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

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

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

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

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

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

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

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

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of license (CoL)

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

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

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

Upgrade

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

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Appendix
Notes on software

Software licenses

■ **Overview**

ServicePack

ServicePacks are used to debug existing products.
ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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Overview

The "General License Conditions for Software Products for Automation and Drives" are applicable for supplies and deliveries of I DT software products.

Legal notes during setup for new software products

All software products feature a uniform reference to the license conditions. The license conditions are enclosed either with the documentation or in the software pack. When software is downloaded from the Internet, the license contract is displayed before the ordering procedure and must be accepted by the user before downloading can continue.

Notice:
This software is protected by German and/or US copyright laws and the regulations of international agreements. Unauthorized reproduction or sale of this software or parts of it is a criminal offense. This will lead to criminal and civil prosecution, and may result in significant fines and/or claims for damages. Prior to installing and using the software, please read the applicable license conditions for this software. You will find these in the documentation or packaging.

If you have received this software on a CD-ROM that is marked "Trial version", or accompanying software that is licensed for your use, the software is only permitted to be used for test and validation purposes in accordance with the accompanying conditions for the trial license. To this end, it is necessary for programs, software libraries, etc. are installed on your computer. We therefore urgently recommend that installation is performed on a single-user computer or on a computer that is not used in the production process or for storing important data, since it cannot be completely excluded that existing files will be modified or overwritten. We accept no liability whatsoever for damage and/or data losses that result from this installation or the non-observance of this warning. Every other type of use of this software is only permitted if you are in possession of a valid license from Siemens is obtained.

If you are not in possession of a valid license that can be proven by presenting an appropriate Certificate of License/software product certificate, please abort installation immediately and contact a Siemens office without delay to avoid claims for damages.

Overview (continued)

Software update services

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

Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates. Please find further information and newsletters on this subject at:

support.automation.siemens.com

To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account. Please find further information at:

www.siemens.com/industrialsecurity

Appendix
Indexes

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Appendix
Indexes

Article number index

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Appendix
Conversion tables

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

A \ B	lb-in²	lb-ft²	lb-in-s²	lb-ft-s² slug-ft²	kg-cm²	kg-cm-s²	gm-cm²	gm-cm-s²	oz-in²	oz-in-s²
lb-in²	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
lb-ft²	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
lb-in-s²	386.08	2.681	1	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
lb-ft-s² slug-ft²	4.63×10^{3}	32.17	12	1	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
kg-cm²	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s²	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^{5}	1000	5.36×10^{3}	13.887
gm-cm²	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s²	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in²	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s²	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^{4}	72.0	386.08	1

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

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

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

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

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

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

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

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./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

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.

Appendix
Catalog improvement suggestions

Fax form

To

Siemens AG
I DT MC RMC MK 1
NC 81.1 – 2013
Postfach 31 80
91050 ERLANGEN

Fax: +49 9131 98-1145

E-mail: docu.motioncontrol@siemens.com

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Job

Company/Department

Street/No.

Postal code/City

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Your opinion is important to us!

Our catalog should be an important and frequently used document. For this reason we are continuously endeavoring to improve it.

A small request on our part to you:
Please take time to fill in the following form and fax it to us.

Thank You!

We invite you to grade our catalog on a point system from 1 (= good) to 6 (= poor):

Do the contents of the catalog live up to your expectations?

Is the information easy to find?

Can the texts be readily understood?

Do the technical details meet your expectations?

How would you assess the graphics and tables?

Did you find any printing errors?

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■ **Explanation of the raw material/metal surcharges[1]**

Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium[2] and/or neodym[2], surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharges are calculated in accordance with the following criteria:

- Basic official price of the raw material
  Basic official price from the day prior to receipt of the order or prior to release order (daily price) for[3]
  - Silver (sales price, processed)
  - Gold (sales price, processed)

  and for[4]
  - Copper (lower DEL notation + 1 %)
  - Aluminum (aluminum in cables)
  - Lead (lead in cables)
- Metal factor of the products
  Certain products are displayed with a metal factor. The metal factor determines the official price (for those raw materials concerned) as of which the metal surcharges are applied and the calculation method used (weight or percentage method). An exact explanation is given below.

Structure of the metal factor

The metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a possible discounted price (customer net price) (L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)
3rd digit	for copper (CU)
4th digit	for aluminum (AL)
5th digit	for lead (PB)
6th digit	for gold (AU)
7th digit	for dysprosium (Dy)[2]
8th digit	for neodym (Nd)[2]

Weight method

The weight method uses the basic official price, the daily price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the daily price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

Percentage method

Use of the percentage method is indicated by the letters A-Z at the respective digit of the metal factor.

The surcharge is increased – dependent on the deviation of the daily price compared with the basic official price – using the percentage method in "steps" and consequently offers surcharges that remain constant within the framework of this "step range". A higher percentage rate is charged for each new step. The respective percentage level can be found in the table below.

Metal factor examples

L E A – – – – –

Basis for % surcharge: List price
Silver Basis 150 €, Step 50 €, 0.5 %
Copper Basis 150 €, Step 50 €, 0.1 %
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

N – A 6 – – – –

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

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No basis necessary
No surcharge for silver
Copper acc. to weight, basic official price 150 €
No surcharge for aluminum
No surcharge for lead
No surcharge for gold
No surcharge for dysprosium
No surcharge for neodym

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[1] Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).

[2] For a different method of calculation, refer to the separate explanation for these raw materials on the next page.

[3] Source: Umicore, Hanau (www.metalsmanagement.umicore.com).

[4] Source: German Trade Association for Cables and Conductors (www.kabelverband.org).

Appendix
Metal surcharges

Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

Surcharge calculation

To compensate for variations in the price of the raw materials silver[1], copper[1], aluminum[1], lead[1], gold[1], dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. The surcharge for dysprosium and neodym is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price of the raw material[2]
  Three-month basic average price (see below) in the period before the quarter in which the order was received or the release order took place (= average official price) for
  - dysprosium (Dy metal, 99 % min. FOB China; USD/kg)
  - neodym (Nd metal, 99 % min. FOB China; USD/kg)
- Metal factor of the products
  Certain products are displayed with a metal factor. The metal factor indicates (for those raw materials concerned) the basic official price as of which the surcharges for dysprosium and neodym are calculated using the weight method. An exact explanation of the metal factor is given below.

Three-month average price

The prices of rare earths vary according to the foreign currency, and there is no freely accessible stock exchange listing. This makes it more difficult for all parties involved to monitor changes in price. In order to avoid continuous adjustment of the surcharges, but to still ensure fair, transparent pricing, an average price is calculated over a three-month period using the average monthly foreign exchange rate from USD to EUR (source: European Central Bank). Since not all facts are immediately available at the start of each month, a one-month buffer is allowed before the new average price applies.

Examples of calculation of the average official price:

Period for calculation of the average price:	Period during which the order/release order is effected and the average price applies:
Sep 2012 – Nov 2012	Q1 in 2013 (Jan – Mar)
Dec 2012 – Feb 2013	Q2 in 2013 (Apr – Jun)
Mar 2013 – May 2013	Q3 in 2013 (Jul – Sep)
Jun 2013 – Aug 2013	Q4 in 2013 (Oct – Dec)

Structure of the metal factor

The metal factor consists of several digits; the first digit is not relevant to the calculation of dysprosium and neodym.

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)[1]
3rd digit	for copper (CU)[1]
4th digit	for aluminum (AL)[1]
5th digit	for lead (PB)[1]
6th digit	for gold (AU)[1]
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

Weight method

The weight method uses the basic official price, the average price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the average price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. Your Sales contact can inform you of the raw material weight.

Metal factor examples

– – – – – – 7 1

- No basis necessary
- No surcharge for silver
- No surcharge for copper
- No surcharge for aluminum
- No surcharge for lead
- No surcharge for gold
- Dysprosium acc. to weight, basic official price 300 €
- Neodym acc. to weight, basic official price 50 €

[1] For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.
[2] Source: Asian Metal Ltd (www.asianmetal.com)

Values of the metal factor

Percentage method	Basic official price in €	Step range in €	% surcharge 1st step Price in € 150.01 – 200.00	% surcharge 2nd step Price in € 200.01 – 250.00	% surcharge 3rd step Price in € 250.01 – 300.00	% surcharge 4th step Price in € 300.01 – 350.00	% surcharge per additional step
A	150	50	0.1	0.2	0.3	0.4	0.1
B	150	50	0.2	0.4	0.6	0.8	0.2
C	150	50	0.3	0.6	0.9	1.2	0.3
D	150	50	0.4	0.8	1.2	1.6	0.4
E	150	50	0.5	1.0	1.5	2.0	0.5
F	150	50	0.6	1.2	1.8	2.4	0.6
G	150	50	1.0	2.0	3.0	4.0	1.0
H	150	50	1.2	2.4	3.6	4.8	1.2
I	150	50	1.6	3.2	4.8	6.4	1.6
J	150	50	1.8	3.6	5.4	7.2	1.8
			175.01 – 225.00	225.01 – 275.00	275.01 – 325.00	325.01 – 375.00	
O	175	50	0.1	0.2	0.3	0.4	0.1
P	175	50	0.2	0.4	0.6	0.8	0.2
R	175	50	0.5	1.0	1.5	2.0	0.5
			225.01 – 275.00	275.01 – 325.00	325.01 – 375.00	375.01 – 425.00	
S	225	50	0.2	0.4	0.6	0.8	0.2
U	225	50	1.0	2.0	3.0	4.0	1.0
V	225	50	1.0	1.5	2.0	3.0	1.0
W	225	50	1.2	2.5	3.5	4.5	1.0
			150.01 – 175.00	175.01 – 200.00	200.01 – 225.00	225.01 – 250.00	
Y	150	25	0.3	0.6	0.9	1.2	0.3
			400.01 – 425.00	425.01 – 450.00	450.01 – 475.00	475.01 – 500.00	
Z	400	25	0.1	0.2	0.3	0.4	0.1
Price basis (1st digit)							
L	Calculation based on the list price						
N	Calculation based on the customer net price (discounted list price)						
Weight method	**Basic official price in €**						
1	50						
2	100						
3	150						
4	175		Calculation based on raw material weight				
5	200						
6	225						
7	300						
8	400						
9	555						
Miscellaneous							
-	No metal surcharge						

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Appendix
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 that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"[1] and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"[1] and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"[1].

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

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

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges".

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i.a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AGcan be downloaded at
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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