

# Overview of functions

## SINUMERIK 802D sl CNC system

2

- Standard (basic functionality)
- Option
- Not available

Order No.

### SINUMERIK 802D sl

T/M  
plus

T/M  
pro

#### Control structure/application

Panel-based design			
Drives	See Drive System		
• SINAMICS S120 Motor Module linked via DRIVE-CLiQ		●	●
Channels/mode groups (MGs)		1	1
• Maximum configuration		1	1
CNC <u>main</u> memory (buffered) for programs and data in MB		1	10
CNC <u>main</u> memory, maximum configuration		1	10
Axes/spindles		● 1)	● 1)
• Maximum configuration of axes		● 1)	● 1)
• Maximum configuration of spindles		● 1)	● 1)
• Maximum configuration of axes and spindles		● 1)	● 1)
• Configuration per channel axes incl. spindles		● 1)	● 1)
PLC-controlled axis		● 4)	● 4)

#### Measuring systems that can be connected

Max. number		2)	2)
Incremental rotary measuring systems with RS 422 (TTL)		● 3)	● 3)
Linear scale LMS with sin/cos 1 V <sub>pp</sub>			
• via SINAMICS Sensor Module SMC/SME		–	–
Linear scale LMS with distance-coded reference marks			
• via SINAMICS Sensor Module SMC/SME		–	–
Linear scale LMS with EnDat			
• via SINAMICS Sensor Module SMC/SME		–	–
Rotary measuring systems with distance-coded reference marks			
• via SINAMICS Sensor Module SMC/SME		–	–
Absolute encoder connection with EnDat linear/rotary			
• via SINAMICS Sensor Module SMC/SME		–	–
Absolute/incremental encoder installed in 1FT6/1FK			
• integrated in motor via SINAMICS S120 + Sensor Module		●	●
Incremental encoder with sin/cos 1 V <sub>pp</sub>			
• via SINAMICS Sensor Module SMC/SME		–	–
Resolver integrated in 1FT6/1FK via SINAMICS S120 with Sensor Module SMC/SME/motor-integrated		–	–

- 1) 4 axes + 1 spindle or 3 axes + 1 spindle + 2nd spindle for rotating tool.
- 2) One measuring system per axis.
- 3) SINAMICS SMC Sensor Module required for max. one measuring system (spindle).
- 4) Available soon.

	Order No.	SINUMERIK 802D sl	
		T/M plus	T/M pro
<ul style="list-style-type: none"> <li>● Standard (basic functionality)</li> <li>○ Option</li> <li>– Not available</li> </ul>			

### CNC functionality: Program functions

Dynamic preprocessing memory (FIFO)		●	●
Look ahead		50	100
Frame system		●	●

### CNC functionality: Axis functions

Feedrate override of 0 ... 200%		●	●
Traversing range ± 9 decades		●	●
Rotary axis, turning endlessly		–	–
Velocity, max. 300 m/s		●	●
Acceleration with jerk limitation		●	●
Programmable acceleration		●	●
Follow-up mode		●	●
Separate path feed for corners and chamfers		●	●
Traversing to fixed stop		● 1)	● 1)

### CNC functionality: Spindle functions

Digital spindle speed		●	●
Spindle speed, max. programmable value range: REAL ±3.4028 ex 38 (display: ± 999 999 999.9999)		●	●
Spindle override of 0 ... 200%		●	●
5 gear stages		●	●
Automatic gear stage selection		●	●
Oriented spindle stop		●	●
Spindle speed limitation (min. and max.)		●	●
Constant cutting rate		●	●
Spindle control via PLC (positioning, oscillation)		–	–
Changeover to axis mode		●	●
Thread cutting with constant or variable pitch		●	●
Tapping with compensating chuck/rigid tapping		●	●

### CNC functionality: Interpolations

Linear interpolation axes		● 4	● 4
• Maximum		4	4
Circle via center point and end point		●	●
Circle via interpolation point		●	●
Helical interpolation		2D+2	2D+2

1) Available soon.

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#### CNC functionality: Transformations

TRANSMIT/peripheral surface transformation

●

●

#### CNC functionality: Measuring

Measuring Stage 1  
Probe (touch trigger)

●

●

#### CNC functionality: Motion-synchronous actions

High-speed CNC inputs/outputs

- Digital inputs onboard
- Digital inputs or outputs onboard

–

–

–

–

#### CNC programming: Language

Programming language (DIN 66025 and high-level language expansion)

●

●

Subroutine levels and interrupt routines, max.

8/0

8/0

Number of subroutine repetitions ≤ 9999

●

●

Number of levels for skippable blocks (/0 to /...)

1

1

Polar coordinates

●

●

1/2/3-point contours

●

●

Dimensions metric/inch, changeover manually or via program

●

●

Auxiliary function output

- Via M word, max. programmable value range: INT  $2^{31} - 1$
- Via H word, max. programmable value range:  
REAL  $\pm 3.4028 \times 38$  (display:  $\pm 999\,999\,999.9999$ ) INT  $-2^{31}$  to  $2^{31} - 1$

●

●

●

●

High-level language CNC with

- Predefined user variables (arithmetic parameters)
- Indirect programming
- Program jumps and branches
- Arithmetic and trigonometric functions
- Comparing operations and logic combinations
- Control structures IF-ELSE-ENDIF

●

●

●

●

●

●

●

●

●

●

●

●

Online ISO dialect interpreter

●

●

Program/workpiece management

- Number of part programs on NC, max.  
on supplementary CF card  
on network drive

99

99

●

●

–

●

1)

#### CNC programming: Cycles

Process-oriented cycles for drilling/milling and turning

●

●

Access protection for cycles

●

●

1) Available soon.

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### CNC programming: Programming support

		T/M plus	T/M pro
Program editor			
• Text editor with editing functions: Marking, copying, deleting, ...		●	●
Programming support for geometry entries			
• Screens for 1/2/3-point contours		●	●
Programming support for cycles			
• Screens and stationary auxiliary displays		●	●
• Programming support expandable (e.g. customer cycles)		1)	1)

### Parameters

		T/M plus	T/M pro
Number of basic frames, max.		1	1
Number of settable offsets, max.		6	6
Scratching, determining work offset		●	●

### Simulation

		T/M plus	T/M pro
Drilling/milling (toolholder vertical to the workpiece)			
• Single-sided 2D view, dynamic		●	●
Turning (toolholder vertical to the workpiece)			
• Traverse path simulation without model (broken-line graphics)		●	●

### Operating modes

		T/M plus	T/M pro
JOG		●	●
• Handwheel selection		●	●
• Inch/metric changeover		●	●
• Manual measurement of work offset		●	●
• Manual measurement of tool compensation		●	●
• Automatic tool measurement		●	●
• Reference point approach, automatic/via CNC program		●	●
MDA		●	●
• Input in text editor		●	●
• Save MDA program		●	●
Teach In		●	●
• Teach positions in MDA buffer		●	●
		2)	2)
Automatic		●	●
• Execute from internal memory and/or CF card		●	●
• Execute from RS 232 C interface		–	–
• Execute from network drive		–	●
			2)
• Program control		●	●
• Program editing		●	●
• Block search with/without calculation		●	●

(02/05)

1) On request.  
2) Available soon.

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#### Operating modes (continued)

Repos (repositioning on the contour)

- With operator command/semi-automatically
- Program-controlled

#### Tools

Tool types:

- Turning
- Drilling/milling

Tool radius compensations in plane

- With transition circle/ellipse on outer edges

Tool change via T number

Look-ahead detection of contour violations

Operation without tool management

- Editing of tool data
- Tool compensation selection via T and D numbers
- Number of tools/cutting edges in tool list

Monitoring of tool life and workpiece count

#### Communication and data management

Serial interfaces RS 232 C

Ethernet connection

I/O interfacing via PROFIBUS DP

Save data to internal memory and/or CF card

Save data via RS 232 C interface

Save data to network drive (Ethernet)

#### Operation

SINUMERIK 802D sl operator panel, 10.4", color

Handheld units

- Mini handheld unit with coiled connecting lead
- Mini handheld unit with straight connecting lead

Machine control panels

- Machine Control Panel MCP
- Machine Control Panel MCP 802D sl <sup>1)</sup>

See CNC

**6FX2007-1AD01**

**6FX2007-1AD11**

**6FC5603-0AD00-0AA1**

**6FC5303-0AF30-1AA0**

1) Available soon.

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### Operation (continued)

Connection of electronic handwheels		2	2
• with 120 mm x 120 mm front panel, 5 V operating voltage	<b>6FC9320-5DB00</b>	○	○
• with 76 mm x 76 mm front panel, 5 V operating voltage	<b>6FC9320-5DC00</b>	○	○
Keyboards			
• Full CNC keyboard 802D sl, horizontal format	<b>6FC5303-ODM13-1AA0</b>	○	○
• Full CNC keyboard 802D sl, vertical format	<b>6FC5303-ODT12-1AA0</b>	○	○
CNC program messages		●	●
Online help for programming, alarms and machine data (expandable)		●	●
Access protection, 8 levels		●	●
Operating software languages			
• 2 languages switchable online		●	●
• Chinese Simplified, German, English		●	●
• Chinese Traditional, Korean		● 2)	● 2)
• Other languages		○ 1)	○ 1)

### Axis monitoring

Working area limitation		●	●
Software and hardware limit switch monitoring		●	●
Position monitoring		●	●
Standstill monitoring		●	●
Clamping monitoring		●	●
Contour monitoring		●	●

### Compensations

Backlash compensation		●	●
Leadscrew error compensation		●	●
Measuring system error compensation		●	●
Feedforward control, speed-dependent		–	●
Friction compensation		●	●

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#### PLC area

SIMATIC S7-200 (integrated)		●	●
Machining time, typically in ms/KI for bit operations <sup>1)</sup>		0.1	0.1
Machining time, typically in ms/KI for word operations <sup>1)</sup>		0.2	0.2
Ladder steps memory configuration		6000	6000
• LAD ladder diagram		●	●
PLC programming tool, PLC program examples, standard machine data and alarm text editor on Toolbox		●	●
PP 72/48 I/O module max. number	<b>6FC5611-0CA01-0AA0</b>	○ 3	○ 3
Digital inputs, maximum		216	216
Digital outputs, maximum		144	144
Bit memories, max. number		3072	3072
Timers, max. number		40	64
Counters, max. number		32	64
Subroutines		64	64
Cyclic function block		●	●
Equipment for PLC programming and program test with PG/PC		○	○
User machine data for configuring the PLC user program		●	●

#### Monitoring functions

Spindle speed limitation		●	●
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#### Start-up

Start-up software integrated for SINAMICS S120 drive system		●	●
Series start-up via a serial interface		●	●
Series start-up via CF card		●	●
PLC samples library (PLC templates)		●	●
Starter start-up tool for SINAMICS	<b>6SL3072-0AA00-0AG0</b>	●	●

#### Diagnostic functions

Alarms and Messages		●	●
Trip recorder can be activated for diagnostic purposes		● 2) 5)	● 2) 5)
PLC status		●	●
LAD display		●	●
PLC remote diagnostics via modem		○ 3) 5)	○ 3) 5)
PLC remote diagnostics via Ethernet		–	● 4) 5)
RCS 802 (Remote Control System, remote diagnostics for SINUMERIK 802D sl)		○ 5)	○ 5)

1) 1 KI = 1024 instructions, corresponds to approx. 3 KB.

2) Logbook for alarms/keys.

3) RCS 802 and modem required.

4) RCS 802 required.

5) Available soon.