

Overview of functions



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The functionality of SINUMERIK 828 CNCs complies with the export list restrictions. Accordingly, these CNCs do not require official approval as a result of their type in accordance with EU or German law.

The following overview lists all the functions that are available with SINUMERIK 828 controls.

The information in the overview of SINUMERIK 828 functions is based on the following software versions:

CNC	Software version
SINUMERIK 828D BASIC	4.7
SINUMERIK 828D	4.7

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Control structure and configuration

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Control structure and configuration					
Panel-based compact CNC comprising:		✓	✓	✓	✓
• Compact operator-panel CNC		✓	✓	✓	✓
• CNC/PLC control unit		✓	✓	✓	✓
• Closed-loop control for drives		5	6	6	6
Design, drive-based/PC-based		–	–	–	–
Operator-panel CNC:					
• Horizontal		✓	✓	✓	✓
• Vertical		✓	✓	✓	✓
• Color display		10.4"	10.4"/15.6"	10.4"/15.6"	10.4"/15.6"
• Integrated QWERTY keyboard with short-stroke keys		✓	✓	✓	✓
SINUMERIK operator panels with TCU		–	–	–	–
SINUMERIK operator panels with PCU		–	–	–	–
SINUMERIK 828D:					
• PPU 240.3	6FC5370-4AA30-0AA1	○	–	–	–
• PPU 241.3	6FC5370-3AA30-0AA1	○	–	–	–
• PPU 280.3	6FC5370-8AA30-0AA1	–	○	○	○
• PPU 281.3	6FC5370-7AA30-0AA1	–	○	○	○
• PPU 290.3	6FC5370-8AA30-0BA0	–	○	○	○
System software, export version, on CF card, with license					
• SINUMERIK 828D with PPU 240/PPU 241:					
- Turning	6FC5835-1GY40-4YA0	○	–	–	–
- Milling	6FC5835-2GY40-4YA0	○	–	–	–
- G-Tech Cylindrical/G-Tech Surface	6FC5835-3GY40-4YA0	○	–	–	–
• SINUMERIK 828D with PPU 280/PPU 281/PPU 290:					
- Turning	6FC5834-1GY40-4YA0	–	○	–	–
- Milling	6FC5834-2GY40-4YA0	–	○	–	–
- G-Tech Cylindrical/G-Tech Surface	6FC5834-3GY40-4YA0	–	○	–	–
- Turning	6FC5833-1GY40-4YA0	–	–	○	–
- Milling	6FC5833-2GY40-4YA0	–	–	○	–
- G-Tech Cylindrical/G-Tech Surface	–	–	–	–	–
- Turning advanced	6FC5836-1GY40-4YA0	–	–	–	○
- Milling advanced	6FC5836-2GY40-4YA0	–	–	–	○
- G-Tech Cylindrical advanced/G-Tech Surface advanced	6FC5836-3GY40-4YA0	–	–	–	○
SINUMERIK Operate Embedded HMI		✓	✓	✓	✓
Windows-based HMI		–	–	–	–
DRIVE-CLiQ drive interface		✓	✓	✓	✓
Numeric Control Extension NX10.3 for applications with up to 8 axes or for reducing the current controller cycle clock to 62.5 μs:	6SL3040-1NC00-0AA0				
• Turning		–	–	○	○
• Milling		–	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	○
Numeric Control Extension NX15.3 for applications with up to 10 axes or for reducing the current controller cycle clock to 62.5 μs:	6SL3040-1NB00-0AA0				
• Turning		–	–	–	○
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	○

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Control structure and configuration

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
Control structure and configuration (continued)					
Machining channel, maximum:					
• Turning	Basic scope for SW 28xA	1	1	1	2
• Milling		1	1	1	1
• G-Tech Cylindrical/G-Tech Surface		1	1	–	2
Mode group, maximum:					
• Turning	Basic configuration: 1 mode group	1	1	1	2
• Milling	Basic configuration: 1 mode group	1	1	1	1
• G-Tech Cylindrical/G-Tech Surface	Basic configuration: 1 mode group	1	1	–	2
Mode group, each additional:					
• Turning	6FC5800-0AC00-0YB0	–	–	–	○
• Milling		–	–	–	–
• G-Tech		–	–	–	○
CNC user memory (buffered) for CNC part programs:					
• Turning		3 MB	5 MB	8 MB	10 MB
• Milling		3 MB	5 MB	8 MB	10 MB
• G-Tech Cylindrical/G-Tech Surface		3 MB	5 MB	–	10 MB
CNC user memory expanded for programs					
	6FC5800-0AP77-0YB0	–	○	○	○
			100 MB	100 MB	100 MB
Execution from external storage EES With EES (option P75) or CNC user memory expansion (option P77) only limited by available memory.					
	6FC5800-0AP75-0YB0	–	○	○	○
	Includes option P77				
CNC user memory additionally on user CompactFlash card					
	CompactFlash card must be ordered separately	✓	✓	✓	✓
HMI user memory additional 256 MB on CompactFlash card of the PPU					
		–	–	–	–
Axes/spindles or positioning axis/auxiliary spindle:					
• Basic quantity of axes/spindles:					
- Turning		3	3	3	3
- Milling		4	4	4	4
- G-Tech Cylindrical/G-Tech Surface		3	3	–	3
• Maximum configuration axes/spindles + PLC positioning axes:					
- Turning		5	6 + 2	8 + 2	10 + 2
- Milling		5	6 + 2	6 + 2	8 + 2
- G-Tech Cylindrical/G-Tech Surface		5	6 + 2	–	10 + 2
Axis/spindle, each additional					
	6FC5800-0AC20-0YB0	○	○	○	○
Positioning axis/auxiliary spindle, each additional					
	6FC5800-0AC30-0YB0	○	○	○	○
PLC-controlled axis					
		✓	✓	✓	✓
PLC positioning axis, e.g. CU310-2 PN via PROFINET, maximum					
		–	2	2	2
Systems and number of the TOOLCARRIER:					
• Turning		–	–	–	–
• Milling		1	1	1	1
• G-Tech Cylindrical/G-Tech Surface		2	2	–	4
CNC lock function					
	6FC5800-0AP76-0YB0	○	○	○	○

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Connectable drives

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D				
		BASIC	SW 24x	SW 26x	SW 28x	SW 28xA
	Note					
Connectable drives						
	SINAMICS S120 Motor Modules via DRIVE-CLiQ	See Catalog NC 62	✓	✓	✓	✓
	SINAMICS S120 DRIVE-CLiQ on motor	See Measuring systems	✓	✓	✓	✓
	SINAMICS S120 Sensor Module Cabinet:	See Catalog NC 62				
•	SMC20	6SL3055-0AA00-5BA3	○	○	○	○
•	SMC30	6SL3055-0AA00-5CA2	○	○	○	○
•	SMC40	6SL3055-0AA00-5DA0	○	○	○	○
	SINAMICS S120 Sensor Module External:	See Catalog NC 62				
•	SME20	6SL3055-0AA00-5EA3	○	○	○	○
•	SME25	6SL3055-0AA00-5HA3	○	○	○	○
•	SME120	6SL3055-0AA00-5JA3	○	○	○	○
•	SME125	6SL3055-0AA00-5KA3	○	○	○	○
	SINAMICS S120, supplementary system components:					
•	DMC20 DRIVE-CLiQ Hub Module	6SL3055-0AA00-6AA1	○	○	○	○
•	DME20 DRIVE-CLiQ Hub Module	6SL3055-0AA00-6AB0	○	○	○	○
	SINAMICS S120 Combi	See SINAMICS S120 drive system	○	○	○	○
	SINAMICS S120 Motor Modules in booksize format:	See SINAMICS S120 drive system				
•	Internal air cooling	6SL3120-...	○	○	○	○
•	External air cooling	6SL3121-...	○	○	○	○
	SINAMICS S120 Active Line Modules in booksize format:	See SINAMICS S120 drive system				
•	Internal air cooling	6SL3130-...	○	○	○	○
•	External air cooling	6SL3131-...	○	○	○	○
	SINAMICS S120 Smart Line Modules in booksize format:	See SINAMICS S120 drive system				
•	Internal air cooling	6SL3130-...	○	○	○	○
•	External air cooling	6SL3131-...	○	○	○	○
	SINAMICS S120 Motor Modules in booksize compact format, only as expansion axes for SINAMICS S120 Combi:	See SINAMICS S120 drive system				
•	Internal air cooling	3SL3420-...	○	○	○	○
	SINAMICS S120 Motor Modules in chassis format Internal air cooling (rated pulse frequency 2 kHz)	On request	○	○	○	○
	Analog Drive Interface for 4 axes ADI 4		–	–	–	–

Connectable measuring systems/Connectable motors

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D				
		BASIC	SW 24x	SW 26x	SW 28x	SW 28xA
	Note					
Connectable measuring systems						
	Number of measuring systems per axis, maximum	Not valid for PLC drives	2	2	2	2
	Absolute encoders installed in the motors:					
	• SIMOTICS S-1FT7		○	○	○	○
	• SIMOTICS S-1FK7		○	○	○	○
	• SIMOTICS M-1PH8		○	○	○	○
	Incremental encoders installed in the motors:					
	• SIMOTICS S-1FT7		○	○	○	○
	• SIMOTICS S-1FK7		○	○	○	○
	• SIMOTICS M-1PH8		○	○	○	○
	Resolvers installed in SIMOTICS S-1FK7 motors		○	○	○	○
	Rotary measuring systems with:					
	• sin/cos 1 V _{pp}	6FX2001-3...	○	○	○	○
	• RS422 (TTL)	6FX2001-2...	○	○	○	○
	• Distance-coded reference marks		○	○	○	○
	• EnDat 2.1/EnDat 2.2		○	○	○	○
	• DRIVE-CLiQ	6FX2001-5...	○	○	○	○
	Linear measuring systems LMS with:	See Catalog NC 62				
	• sin/cos 1 V _{pp}		○	○	○	○
	• Distance-coded reference marks RS422 (TTL)		○	○	○	○
	• EnDat 2.1		○	○	○	○
	Absolute encoder connection with SSI interface		–	–	–	–
	Certified DQI encoder (DQI 100)	See Measuring systems	○	○	○	○
Connectable motors (preferred versions)						
	SIMOTICS S-1FK7 servomotor		○	○	○	○
	SIMOTICS S-1FT7 servomotor		○	○	○	○
	SIMOTICS M-1PH8 spindle motor		○	○	○	○
	SIMOTICS M-1FE1 built-in motor	Not with SINAMICS S120 Combi	○	○	○	○
	SIMOTICS L-1FN3 linear motor		–	–	–	–
	SIMOTICS T-1FW6 built-in torque motor		○	○	○	○
	Hybrid spindle/motor spindle 2SP1	www.siemens.com/spindles	○	○	○	○
	Third-party motor	On request	○	○	○	○

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Interpolations					
Linear interpolating axes, maximum	Simultaneously interpolating	4	4	4	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		✓	✓	✓	✓
Multi-axis interpolation > 4 interpolating axes		–	–	–	–
Advanced Surface:	6FC5800-0AS07-0YB0				
• Turning		–	–	–	–
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Top Surface:	6FC5800-0AS17-0YB0				
	Requirement: Advanced Surface				
• Turning		–	–	–	–
• Milling		–	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Spline interpolation (A, B and C splines)	6FC5800-0AS16-0YB0	○	○	○	○
Compressor for 3-axis machining COMPCAD:					
• Turning		–	–	–	–
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface	Without CYCLE832	✓	✓	–	✓
Polynomial interpolation		–	–	–	–
Involute interpolation		–	–	–	–
Crank interpolation CRIP		–	–	–	–
Couplings					
Pair of synchronized axes (gantry axes), Basic:	6FC5800-0AS51-0YB0	○	○	○	○
• Turning		1	1	1	1
• Milling		1	1	1	2
• G-Tech Cylindrical/G-Tech Surface		1	1	–	1
Master-slave Basic for drives	6FC5800-0AS52-0YB0	○	○	○	○
Generic coupling, CP-Static, e.g. counterspindle:	6FC5800-0AM75-0YB0				
• 1 x simple synchronous spindle, coupling ratio 1:1, no multi-edge machining:					
- Turning		–	–	○	○
- Milling		○	○	○	○
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
Generic coupling, CP-Basic, e.g. multi-edge turning:	6FC5800-0AM72-0YB0				
• 4 axis pairs in simultaneous coupled motion:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• 1 x synchronous spindle/multi-edge turning:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Master-value coupling/curve table interpolation		–	–	–	–

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Couplings/Transformations

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Couplings (continued)					
Generic coupling CP-Comfort, e.g. electronic gear:	6FC5800-0AM73-0YB0				
• 4 axis pairs in simultaneous coupled motion:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• 1 x synchronous spindle/multi-edge turning:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Electronic gear for 3 leading axes, without curve table, without cascading:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Axial coupling in the machine coordinate system		–	–	–	–
• Master-value coupling/curve table interpolation		–	–	–	–
Transformations					
Cartesian point-to-point travel PTP		✓	✓	✓	✓
TRANSMIT/cylinder surface transformation	6FC5800-0AM27-0YB0	○	○	○	○
TRANSMIT/TRACYL Transformation without Y axis	6FC5800-0AS50-0YB0	○	○	○	○
Inclined axis:	6FC5800-0AM28-0YB0				
• Turning	For non-orthogonal Y axis	–	–	○	○
• Milling		–	–	–	–
• G-Tech Cylindrical	For non-orthogonal X axis	○	○	–	○
• G-Tech Surface		–	–	–	–
Inclined axis Basic, fixed angle:	6FC5800-0AS54-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface	For non-orthogonal X axis	○	○	–	○
Simple oscillation function, modal:					
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
Oscillation function, block-related, modal and asynchronous:	6FC5800-0AM34-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface	CYCLE4071-CYCLE4079	○	○	–	○
Concatenated transformations inclined axis TRAANG after cardanic milling head/TRANSMIT/TRACYL:					
• Turning		–	–	✓	✓
• Milling		–	–	–	–
• G-Tech Cylindrical		✓	✓	–	✓
• G-Tech Surface		–	–	–	–

Measuring functions and measuring cycles/Technologies

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Measuring functions and measuring cycles					
Measuring stage 1 Two probes switching with/without deletion of distance-to-go		✓	✓	✓	✓
Measuring stage 2 Axial measurement, measurements form synchronized actions, cyclic measuring	6FC5800-0AM32-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	○	–	○
Measuring cycles for drilling/milling and turning Calibration of workpiece probe, workpiece measurement, tool measurement:	6FC5800-0AP28-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Measure kinematics Determine transformation data of rotary axes:	6FC5800-0AP18-0YB0				
• Turning		–	–	–	–
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Logging of measurement results		✓	✓	✓	✓
Technologies					
Handwheel override		✓	✓	✓	✓
Contour handwheel	6FC5800-0AM08-0YB0	○	○	○	○
Multiple feedrates in one block:					
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		✓	✓	✓	✓
Continuous dressing, parallel dressing Online modification of tool offset:					
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
SINUMERIK MDynamics:					
• Advanced Surface:	6FC5800-0AS07-0YB0				
- Turning		–	–	–	–
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Top Surface:	6FC5800-0AS17-0YB0				
- Turning		–	–	–	–
- Milling		–	○	○	○
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• High speed settings:					
- Turning		–	–	–	–
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Expansion of user memory with user CompactFlash card:	CompactFlash card must be ordered separately				
- Turning		–	–	–	–
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
SINUMERIK Integrate for engineering Run MyRobot /EasyConnect for easy connection of robots and handling systems		✓	✓	✓	✓
SINUMERIK Integrate for engineering Run MyRobot /Handling	6FC5800-0AP74-0XYB0	–	–	–	–
SINUMERIK Integrate for engineering Run MyRobot /Machining	6FC5800-0AP73-0XYB0	–	–	–	–

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Motion-synchronous actions/Engineering

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D				
		BASIC	SW 24x	SW 26x	SW 28x	SW 28xA
	Note					
Motion-synchronous actions						
	CNC inputs/outputs, high-speed:					
•	Digital inputs drives onboard		12	12	12	12
•	Digital inputs or outputs drives onboard, parameterizable		8	8	8	8
•	Digital inputs CNC onboard		8	8	8	8
•	Digital outputs CNC onboard		8	8	8	8
	Synchronized actions and fast auxiliary function output incl. 3 synchronous functions		✓	✓	✓	✓
	Positioning axes and spindles via synchronized actions (command axes)		✓	✓	✓	✓
	Analog value control in the interpolation cycle		–	–	–	–
	Evaluation of internal drive variables, Basic	6FC5800-0AS53-0YB0	○	○	○	○
	Asynchronous subprograms ASUB		✓	✓	✓	✓
	Interrupt routines with fast retraction from the contour (with subprogram/ASUB/LIFTFAST)		✓	✓	✓	✓
	Cross-mode actions (ASUBs and synchronized actions in all operating modes)		✓	✓	✓	✓
	Online tool correction:					
•	Turning		–	–	–	–
•	Milling		–	–	–	–
•	G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
	Display active synchronized actions in HMI:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
•	Turning		○	○	○	✓
•	Milling		○	○	○	✓
•	G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
Engineering						
	Integrate screens in SINUMERIK Operate					
	SINUMERIK Integrate for engineering					
	Run MyScreens					
•	Free screens		5	5	5	5
•	> 5 screens, extended functions:	6FC5800-0AP64-0YB0				
-	Turning		○	○	○	○
-	Milling		○	○	○	○
-	G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
	Easy XML:					
•	Turning		✓	✓	✓	✓
•	Milling		✓	✓	✓	✓
•	G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓

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CNC programming language

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
CNC programming language					
Programming language DIN 66025 and high-level language expansion		✓	✓	✓	✓
Main program call from main program and subprogram		✓	✓	✓	✓
Subprogram levels, maximum		11	11	11	11
Interrupt routines, maximum		4	4	4	4
Number of subprogram passes		≤ 9999	≤ 9999	≤ 9999	≤ 9999
Number of levels for skip blocks		2	2	2	2
Number of levels for skip blocks, maximum:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0	10	10	10	10
• Turning		○	○	○	✓
• Milling		○	○	○	✓
• G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
Polar coordinates		✓	✓	✓	✓
1/2/3-point contours		✓	✓	✓	✓
Dimensions metric/inch, changeover via operator action or program		✓	✓	✓	✓
Inverse-time feedrate		✓	✓	✓	✓
Auxiliary function output via:					
• M word, max. programmable value range: INT $2^{31} - 1$... 2^{31}		✓	✓	✓	✓
• H word, max. programmable value range: REAL $\pm 3.4028 \text{ ex}38$, INT $-2^{31} \dots 2^{31} - 1$	Display: ± 999999999.9999	✓	✓	✓	✓
CNC high-level language with:					
• User variables, GUD, configurable		✓	✓	✓	✓
• Predefined user variables (R parameters), commentable		300	300	300	300
• Predefined global user variables (global R parameters), commentable:					
- Turning		–	–	–	100
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	–	–	100
• Predefined user variables LUD (R parameters), configurable		✓	✓	✓	✓
• Read/write system variables		✓	✓	✓	✓
• Indirect programming		✓	✓	✓	✓
• Program jumps and branches		✓	✓	✓	✓
• Dynamic jumps RETB		✓	✓	✓	✓
• Program coordination with WAIT, START, INIT:					
- Turning		–	–	–	✓
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	–	–	✓
• Arithmetic and trigonometric functions		✓	✓	✓	✓
• Comparison operations and logic combinations		✓	✓	✓	✓
• Macro techniques		✓	✓	✓	✓
• Control structures IF-ELSE-ENDIF		✓	✓	✓	✓
• Control structures WHILE, FOR, REPEAT, LOOP		✓	✓	✓	✓
• Commands to HMI		✓	✓	✓	✓
• STRING functions		✓	✓	✓	✓

Overview of functions

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CNC programming language

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
CNC programming language (continued)					
Program functions:					
• Preprocessing memory, dynamic FIFO		✓	✓	✓	✓
• Look Ahead, recorded part program blocks:					
- Turning		1	1	1	1
- Milling with MDynamics Advanced Surface	COMPCAD active	150	300	450	450
- Milling with MDynamics Top Surface	COMPSURF active	–	600	600	600
- G-Tech Cylindrical		1	1	–	1
- G-Tech Surface		150	300	–	450
• Look Ahead, IPO blocks, buffered:					
- Turning		1	1	1	1
- Milling with MDynamics Advanced Surface	COMPCAD active	50	100	150	150
- Milling with MDynamics Top Surface	COMPSURF active	–	200	200	200
- G-Tech Cylindrical		1	1	–	1
- G-Tech Surface		50	100	–	150
• Frame concept		✓	✓	✓	✓
• Inclined-surface machining with swivel cycle:					
- Turning		–	–	–	–
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
• Axis/spindle interchange		✓	✓	✓	✓
• Geometry axes, switchable online in the CNC program		✓	✓	✓	✓
• Program preprocessing		✓	✓	✓	✓
Online ISO dialect interpreter:					
• Turning		✓	✓	✓	✓
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Program/workpiece management:					
• Part programs on PPU, maximum number With EES (option P75) or CNC user memory expansion (option P77) only limited by available memory.	In total maximum 512 files per directory.	750	750	750	750
• Workpieces on PPU, maximum number With EES (option P75) or CNC user memory expansion (option P77) only limited by available memory.	In total maximum 256 directories	250	250	250	250
• On additional plug-in CompactFlash card		✓	✓	✓	✓
• On USB storage medium, e.g. USB flash drive	Hard disk not possible	✓	✓	✓	✓
• On network drive (Windows Share/FTP)	Included in option: Network drive management via Ethernet 6FC5800-0AP01-0YB0	○	○	○	○
• Templates for workpieces, programs and INI files		✓	✓	✓	✓
• Job lists		✓	✓	✓	✓
Basic frames, maximum number		1	1	1	1
Settable offsets, maximum number		50	100	100	100
Work offsets, programmable (frames)		✓	✓	✓	✓
Seat-dependent correction:					
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓

CNC programming language/Programming support

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
CNC programming language (continued)					
	Scratching, determining work offset	✓	✓	✓	✓
	Work offsets, external via PLC	✓	✓	✓	✓
	Global and local user data	✓	✓	✓	✓
	Global program user data	✓	✓	✓	✓
	Display and log system variables also via online configurable display	–	–	–	–
Programming support					
	Program editor:				
	• Programming support for cycles, programGUIDE	✓	✓	✓	✓
	• CNC editor with editing functions: selecting, copying, deleting	✓	✓	✓	✓
	• Geometry processor with programming graphics/free contour input (contour calculator)	✓	✓	✓	✓
	• Screens for 1/2/3-point contours (contour definition programming)	–	–	–	–
	• Machining step programming ShopTurn/ShopMill:	6FC5800-0AP17-0YB0			
	- Turning	○	○	○	○
	- Milling	○	○	○	○
	- G-Tech Cylindrical/G-Tech Surface	–	–	–	–
	• programSYNC – multi-channel step sequence programming:	6FC5800-0AP05-0YB0			
	- Turning	–	–	–	○
	- Milling	–	–	–	–
	- G-Tech Cylindrical/G-Tech Surface	–	–	–	–
	• Manual machine functions:	Included in option: Machining step programming ShopTurn/ShopMill 6FC5800-0AP17-0YB0			
	- Turning	○	○	○	○
	- Milling	○	○	○	○
	- G-Tech Cylindrical/G-Tech Surface	–	–	–	–
	• Backup workpiece setup data:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0			
	- Turning	○	○	○	✓
	- Milling	○	○	○	✓
	- G-Tech Cylindrical/G-Tech Surface	○	○	–	✓
	• Multiple clamping of various workpieces:	Included in option: Machining step programming ShopTurn/ShopMill 6FC5800-0AP17-0YB0			
	- Turning	–	–	–	–
	- Milling	○	○	○	○
	- G-Tech Cylindrical/G-Tech Surface	–	–	–	–

Overview of functions

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Programming support

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
Programming support (continued)					
Technology cycles for drilling/milling:	Basic scope				
• Turning		✓	✓	✓	✓
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Technology cycles for turning:	Basic scope				
• Turning		✓	✓	✓	✓
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Technology cycles for grinding		–	–	–	–
Grinding Basic					
Extended functions for grinding	6FC5800-0AS35-0YB0				
Grinding Advanced:					
• Dressing (paraxial form-truing) with stock removal cycles (basic CYCLE95)					
• Cylinder error compensation					
- Turning		–	–	–	–
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
Advanced technology functions (expansion of the technology cycles for turning and milling):	6FC5800-0AP58-0YB0				
• Pocket milling with free contour definition and islands:					
- Turning		○	✓	✓	✓
- Milling		○	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Stock removal cycles with free contour definition:					
- Turning		○	✓	✓	✓
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Residual material detection and machining for contour pockets and stock removal:	6FC5800-0AP13-0YB0				
	Requirement: Advanced technology functions option 6FC5800-0AP58-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Access protection for cycles	6FC5800-0AP54-0YB0	○	○	○	○
Programming support can be extended, e.g. customer cycles		✓	✓	✓	✓
DXF Reader for PC integrated in SINUMERIK Operate	6FC5800-0AP56-0YB0	○	○	○	○
Balance Cutting:	6FC5800-0AS05-0YB0				
• Turning		–	–	–	○
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–

Overview of functions

CNC controls SINUMERIK 828

Simulations/Operating modes

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Simulations					
Simulation of program X, while program Y is being executed (simulation parallel to machining)		–	–	–	–
Simulation (finished part) in 2D representation		✓	✓	✓	✓
Simulation 1 (finished part) in 3D representation:	6FC5800-0AP25-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Simulation finished part and working area in 3D representation		–	–	–	–
Simulation finished part with collision check in 3D representation		–	–	–	–
Simultaneous recording (Real-time simulation of current machining operation)	6FC5800-0AP22-0YB0	○	○	○	○
Operating modes					
JOG:					
• Handwheel selection		✓	✓	✓	✓
• Inch/metric changeover		✓	✓	✓	✓
• Manual measurement of work offset:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Additional measuring version beyond standard scope: Standard scope workpiece zero: Set edge, align edge, right-angled corner, 1 hole, 1 circular spigot and rectangular spigot Expansion of the measurement screens via combo box	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
- Turning		–	–	–	–
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Manual measurement of tool offset:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface	Manual dresser setup	✓	✓	–	✓
• Automatic tool/workpiece measurement:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface	Manual workpiece setup	✓	✓	–	✓
• Reference point approach, automatic/via CNC program		✓	✓	✓	✓
MDI:					
• Input in text editor		✓	✓	✓	✓
• Load/save MDI program:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
• Input screen forms for technology and positioning, cycle support		✓	✓	✓	✓

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CNC controls SINUMERIK 828

Operating modes

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Operating modes (continued)					
Teach-in:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
• Turning		○	○	○	✓
• Milling		○	○	○	✓
• G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
Automatic:					
• Execution from storage medium connected to CompactFlash card interface on the operator panel front		✓	✓	✓	✓
• Execution from storage medium connected to the front USB interface of the operator panel, e.g. card reader, USB flash drive	Hard disk not possible	✓	✓	✓	✓
• Execution from storage medium connected to the rear USB interface of the operator panel, e.g. card reader, USB flash drive	Hard disk not possible	✓	✓	✓	✓
• Execution from network drive	Included in option: Network drive management via Ethernet 6FC5800-0AP01-0YB0	○	○	○	○
• Program control		✓	✓	✓	✓
• Program editing		✓	✓	✓	✓
• Overstore:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
• DRF offset:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
• Block search with/without calculation		✓	✓	✓	✓
• Extended block search program, search pointer, step up and down, interrupt function:	Included in option: Extended operator functions 6FC5800-0AP16-0YB0				
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		○	○	–	✓
Repos (repositioning on the contour):					
• With operator command/semi-automatically		✓	✓	✓	✓
• Program		✓	✓	✓	✓
Preset:					
• Set actual value		✓	✓	✓	✓

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Tools					
Tool types:					
• Turning:					
- Turning		✓	✓	✓	✓
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Drilling/milling:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Groove sawing:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Grinding/dressing:					
- Turning		–	–	–	–
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
• Multi-tool:					
- Turning		✓	✓	✓	✓
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Tool radius compensations in plane with:					
• Approach and retract strategies		✓	✓	✓	✓
• Transition circle/ellipse on outer edges		✓	✓	✓	✓
Configurable intermediate blocks with tool radius compensation active					
Tool radius compensation in 3D representation					
		–	–	–	–
Tool carrier with orientation capability:					
• Turning		–	–	–	–
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
Look-ahead detection of contour violations					
		✓	✓	✓	✓
Constant grinding wheel peripheral speed GWPS:					
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓

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Tool management

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Tool management					
Operation with tool management:					
• Real magazines, maximum number:					
- Turning		1	1	2	2
- Milling		1	1	2	2
- G-Tech Cylindrical/G-Tech Surface		1	2	–	2
• Tool list					
• Expandable tool list					
• Tools in tool list:					
- Turning		128	256	512	768
- Milling		128	256	512	768
- G-Tech Cylindrical/G-Tech Surface		128	256	–	768
• Cutting edges in tool list:					
- Turning		256	512	1024	1536
- Milling		256	512	1024	1536
- G-Tech Cylindrical/G-Tech Surface		256	512	–	1536
• Tool offset selection via T and D numbers					
• Magazine list					
• Configurable magazine list					
• Magazine data					
• Empty location search and place positioning					
• Easy empty location search using softkeys					
• Loading and unloading of tools					
• Tool cabinet and tool catalog					
• Loading and unloading via code carrier system					
• Adapter data:					
- Turning		✓	✓	✓	✓
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	✓	–	✓
• Location-dependent offsets, reference point on disk:					
- Turning		–	–	–	–
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		✓	✓	–	✓
• Tool life monitoring and workpiece count					
• Replacement tools for tool management: 6FC5800-0AM78-0YB0					
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Multi-tool tool holder					
Manage tools					
SINUMERIK Integrate for production Manage MyTools					

Communication and data management

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D				
		BASIC	SW 24x	SW 26x	SW 28x	SW 28xA
	Note					
Communication and data management						
Transfer data to storage medium on rear USB interface of operator panel, e.g. card reader, USB flash drive:	Hard disk not possible	✓	✓	✓	✓	✓
Transfer data to storage medium on front USB interface of operator panel, e.g. card reader, USB flash drive	Hard disk not possible	✓	✓	✓	✓	✓
Transfer data to the front CF card interface of the operator panel		✓	✓	✓	✓	✓
Transfer process data (WRITE ISOPRINT) to the CF card, USB flash drive or via RS232C interface		✓	✓	✓	✓	✓
Manage additional drives via:						
• Ethernet (Windows Share/Linux/FTP), maximum	6FC5800-0AP01-0YB0	○ 21	○ 21	○ 21	○ 21	○ 21
• USB interface		✓	✓	✓	✓	✓
• CF card interface on the operator panel front		✓	✓	✓	✓	✓
RS232C serial interface		✓	✓	✓	✓	✓
Data backup of the system software and user data (backup/restore) on the user CF card		✓	✓	✓	✓	✓
I/O interface via PROFINET	Only via PP 72/48D PN or PP 72/48D 2/2A PN I/O modules.	✓	✓	✓	✓	✓
Connection to an external PROFINET network with SIMATIC DP PN/PN coupler	6ES7158-3AD01-0XA0	○	○	○	○	○
SINUMERIK Integrate for production Create MyInterface		–	–	–	–	–
SINUMERIK Integrate for production Access MyBackup		–	–	–	–	–
Production data evaluation:						
• SINUMERIK Integrate for production Analyze MyPerformance		–	–	–	–	–
Host computer connection Server for OPC UA in SINUMERIK Operate SINUMERIK Integrate for engineering Access MyMachine:						
• Access MyMachine /OPC UA Variables, maximum	6FC5800-0AP67-0YB0	○ 100	○ 100	○ 100	○ 100	○ 100

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Operation

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Operation					
SINUMERIK operator panels with PCU/TCU					
		–	–	–	–
SINUMERIK PCU 50.5					
		–	–	–	–
Connection for:					
• Standard monitor (DVI), VGA via ext. adapter, as for PCU 50.5		–	–	–	–
• SIMATIC OPs		–	–	–	–
Control unit management:					
• One operator panel per CNC		✓	✓	✓	✓
• Combinations of several operator panels and several CNCs		–	–	–	–
Handheld units:					
• SINUMERIK HT 2/HT 8 handheld terminal		–	–	–	–
• Mini handheld unit with coiled connecting cable	6FX2007-1AD03	○	○	○	○
• Mini handheld unit with straight cable	6FX2007-1AD13	○	○	○	○
• Connection kit for mini handheld unit, non-assembled without Industrial Ethernet	6FX2006-1BG03	○	○	○	○
• Connection kit for mini handheld unit, assembled with PROFINET	6FX2006-1BG20	○	○	○	○
• 90° angle socket	6FX2006-1BG56	○	○	○	○
• Holder for mini handheld unit	6FX2006-1BG70	○	○	○	○
Machine control panels:					
• SINUMERIK MCP 310C PN	6FC5303-0AF23-0AA1	○	○	○	○
• SINUMERIK MCP 310 USB	6FC5303-0AF33-0AA0	○	○	○	○
• SINUMERIK MCP 416 USB	6FC5303-0AF34-0AA0	–	○	○	○
• SINUMERIK MCP 483C PN	6FC5303-0AF22-0AA1	○	○	○	○
• SINUMERIK MCP 483 USB	6FC5303-0AF32-0AA0	○	○	○	○
• SINUMERIK MCP Interface PN for customer-specific machine control panel	6FC5303-0AF03-0AA0	○	○	○	○
• SINUMERIK MPP Machine Push Button Panel		–	–	–	–
Electronic handwheels:					
• With 120 mm × 120 mm front panel, 5 V DC	6FC9320-5DB01	○	○	○	○
• With 76.2 mm × 76.2 mm front panel, 5 V DC	6FC9320-5DC01	○	○	○	○
• With 76.2 mm × 76.2 mm front panel, 24 V DC	6FC9320-5DH01	–	–	–	–
• Without front panel, without setting wheel, 5 V DC	6FC9320-5DF01	○	○	○	○
• Without front panel, with setting wheel, 5 V DC	6FC9320-5DM00	○	○	○	○
• Portable in housing, coiled cable	6FC9320-5DE02	○	○	○	○
• Flange socket for portable handwheel	6FC9341-1AQ	○	○	○	○
Connection for electronic handwheels to, max.:					
• SINUMERIK PPU		3	3	3	3
• SINUMERIK MCP Interface PN	Application: manual machine	2	2	2	2
		1	1	1	1
Keyboards:					
• Integrated QWERTY keyboard with short-stroke keys		✓	✓	✓	✓
• SINUMERIK keyboards		–	–	–	–
• KBPC CG US standard PC keyboard		–	–	–	–
Connection for external storage devices via USB:					
• Card reader USB 2.0 for storage media CF/SD/MMC:	6FC5335-0AA00-0AA0	○	○	○	○
- CompactFlash card 2 GB	6FC5313-5AG00-0AA2	○	○	○	○
• Memory stick SIMATIC IPC USB flash drive 8 GB Output current, maximum 100 mA	6ES7648-0DC50-0AA0	○	○	○	○

Overview of functions

CNC controls SINUMERIK 828

Operation/Monitoring functions

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Operation (continued)					
Extended operator functions	6FC5800-0AP16-0YB0	○	○	○	✓
Plain text display of user variables		✓	✓	✓	✓
Multi-channel display:					
• Turning		–	–	–	✓
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	✓
2D representation of the 3D protection/working areas		–	–	–	–
Workpiece-related actual value system		✓	✓	✓	✓
Menu selection via the PLC		✓	✓	✓	✓
CNC program messages		✓	✓	✓	✓
Online help for programming, alarms and machine data, expandable		✓	✓	✓	✓
Screen blanking		✓	✓	✓	✓
Access protection		8 levels	8 levels	8 levels	8 levels
Operating software languages:					
• Chinese Simplified, Chinese Traditional, English, French, German, Italian, Korean, Portuguese, Spanish		✓	✓	✓	✓
• Additional languages, use of language extensions		✓	✓	✓	✓
• Language extensions on DVD-ROM: e.g. Czech, Danish, Dutch, Finnish, Hungarian, Japanese, Polish, Romanian, Russian, Slovakian, Slovenian, Swedish, Thai, Turkish - SINUMERIK Operate operating software - SINUMERIK 828	6FC5860-0YC40-0YA8	○	○	○	○
Monitoring functions					
Working area limitation		✓	✓	✓	✓
Limit switch monitoring Software and hardware limit switches		✓	✓	✓	✓
Position monitoring		✓	✓	✓	✓
Standstill monitoring		✓	✓	✓	✓
Clamping monitoring		✓	✓	✓	✓
2D/3D protection areas		✓	✓	✓	✓
Contour monitoring		✓	✓	✓	✓
Contour monitoring with tunnel function		–	–	–	–
Path length evaluation		–	–	–	–
Axis limitation from the PLC		✓	✓	✓	✓
Spindle speed limitation		✓	✓	✓	✓
Generator operation		✓	✓	✓	✓
Extended stop and retract ESR, incl. generator operation	6FC5800-0AM61-0YB0	–	–	–	–
Drive-autonomous extended stop and retract ESR, incl. generator operation	6FC5800-0AM60-0YB0	○	○	○	○
IDM integrated tool monitoring and diagnostics		–	–	–	–

Overview of functions

CNC controls SINUMERIK 828

Compensations/PLC area

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Compensations					
	Backlash compensation	✓	✓	✓	✓
	Leadscrew error compensation	✓	✓	✓	✓
	Leadscrew error compensation, bidirectional	○	○	○	○
	6FC5800-0AM54-0YB0 The correctable tolerance band is restricted to 1 mm.				
	Measuring system error compensation	✓	✓	✓	✓
	Sag compensation, multi-dimensional	○	○	○	○
	6FC5800-0AM55-0YB0 The correctable tolerance band is restricted to 1 mm.				
	Quadrant error compensation:				
	• Conventional	✓	✓	✓	✓
	• With neural networks	✓	✓	✓	✓
	Graphic monitoring of the quadrant error compensation using circularity test	✓	✓	✓	✓
	Friction compensation with adaptive characteristics	○	○	○	○
	6FC5800-0AS06-0YB0				
	Temperature compensation	✓	✓	✓	✓
	Feedforward control, velocity-dependent	✓	✓	✓	✓
	Feedforward control, acceleration-dependent				
	• Turning	✓	✓	✓	✓
	• Milling	✓	✓	✓	✓
	• G-Tech Cylindrical/G-Tech Surface	–	–	–	–
	Backlash compensation, dynamic	✓	✓	✓	✓
	Cylinder error compensation:				
	Included in option: Technology cycles for grinding Grinding Advanced 6FC5800-0AS35-0YB0				
	• Turning	–	–	–	–
	• Milling	–	–	–	–
	• G-Tech Cylindrical/G-Tech Surface	○	○	–	○
PLC area					
	SIMATIC S7-300	–	–	–	–
	SIMATIC S7-200 based (integrated)	✓	✓	✓	✓
	Cycle time for PLC	9 ms	6 ms	6 ms	6 ms
	Reaction time to process events, terminal to terminal:				
	• Turning	7.5 ms	7.5 ms	4.5 ms	4.5 ms
	• Milling	7.5 ms	7.5 ms	7.5 ms	7.5 ms
	• G-Tech Cylindrical	7.5 ms	7.5 ms	–	4.5 ms
	• G-Tech Surface	7.5 ms	7.5 ms	–	7.5 ms
	Memory expansion Ladder Steps, maximum	Basic configuration: 24000	32000	32000	32000
	Memory expansion to 32000 Ladder Steps	6FC5800-0AD40-0YB0	○	○	○
	PLC programming language:				
	• Ladder diagram LAD	✓	✓	✓	✓
	• Function block diagram FBD	–	–	–	–
	• Statement list STL	–	–	–	–
	PLC programming tool for integrated PLC	On toolbox DVD-ROM	○	○	○
	PLC Ladder Viewer in SINUMERIK Operate	✓	✓	✓	✓
	PLC re-wire Editor in SINUMERIK Operate	INT100/101 only	✓	✓	✓
	PLC Ladder Editor in SINUMERIK Operate	PLC program editor	✓	✓	✓

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
PLC area (continued)					
I/O modules:					
• PP 72/48D PN digital I/O module, maximum number:	6FC5311-0AA00-0AA0	0	0	0	0
- Turning		3	4	5	5
- Milling		3	4	5	5
- G-Tech Cylindrical/G-Tech Surface		3	5	–	5
• PP 72/48D 2/2A PN I/O module digital/analog, maximum number:	6FC5311-0AA00-1AA0	0	0	0	0
- Turning		3	4	5	5
- Milling		3	4	5	5
- G-Tech Cylindrical/G-Tech Surface		3	5	–	5
• General I/Os via PROFIBUS/PROFINET		–	–	–	–
• General SIMATIC PROFINET PLC I/Os		–	–	–	–
• Analog Drive Interface for 4 axes ADI 4		–	–	–	–
Digital inputs, maximum number		216	288	360	360
Digital outputs, maximum number		144	192	240	240
Analog inputs, maximum number:					
• Turning		6	8	10	10
• Milling		6	8	10	10
• G-Tech Cylindrical/G-Tech Surface		6	10	–	10
Analog outputs, maximum number:					
• Turning		6	8	10	10
• Milling		6	8	10	10
• G-Tech Cylindrical/G-Tech Surface		6	10	–	10
PLC alarms/messages, maximum number		248	248	248	248
Bit memories, number		512 bytes	512 bytes	512 bytes	512 bytes
Timers, number		128	128	128	128
Counters, number		64	64	64	64
Subroutines		256	256	256	256
FB, FC		–	–	–	–
DB, highest number, maximum number		64	64	64	64
Cyclic function block		✓	✓	✓	✓
Cyclic block, servo-synchronous:		✓	✓	✓	✓
User machine data for configuring the PLC user program		✓	✓	✓	✓
NCVar selector:		✓	✓	✓	✓
Import and export of PLC projects PLC file handling via archives:		✓	✓	✓	✓
Freely configurable PLC interface		✓	✓	✓	✓

Overview of functions

CNC controls SINUMERIK 828

Safety functions/Commissioning

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
Safety functions					
SINUMERIK Safety Integrated Safety functions for personnel and machine protection:					
• Safe Torque Off (STO)		✓	✓	✓	✓
• Safe Brake Control (SBC)		✓	✓	✓	✓
• Safe Stop 1 (SS1)		✓	✓	✓	✓
• SINAMICS S120 Terminal Module Cabinet TM54F for controlling extended Safety Integrated functions	6SL3055-0AA00-3BA0 Required for each PPU and NX.	○	○	○	○
• Safety Integrated, extended functions for one CNC axis: - Safe Operating Stop (SOS) - Safe Stop 2 (SS2) - Safely Limited Speed (SLS) - Safe Speed Monitor (SSM) - Safe Acceleration Monitor (SAM) - Safe Direction (SDI) - Safely Limited Position (SLP) - Safe Brake Management (SBM) - Safe Brake Control (SBC) - Safe Brake Test (SBT)	6FC5800-0AC50-0YB0	○	○	○	○
Commissioning					
Commissioning software for the drive system integrated:					
• SINAMICS S120		✓	✓	✓	✓
Auto Servo Tuning AST Fully automatic speed and position controller optimization		✓	✓	✓	✓
Commissioning trace integrated Drive optimization without an additional oscilloscope		✓	✓	✓	✓
Standard commissioning via:					
• RS232C serial interface		–	–	–	–
• USB interface with storage medium, e.g. USB flash drive	Hard disk not possible Read-in/out INI file	✓	✓	✓	✓
• Network drive		✓	✓	✓	✓
• User CompactFlash card		✓	✓	✓	✓
• SINUMERIK Integrate for engineering Access MyMachine /P2P for PC/PG	6FC5860-7YC00-0YA0	○	○	○	○
STARTER commissioning tool for PC/PG for SINAMICS S120	On toolbox DVD-ROM	○	○	○	○
SinuCom commissioning/service tools for SINUMERIK 840D sl		–	–	–	–

Overview of functions

CNC controls SINUMERIK 828

Diagnostic functions/Service and maintenance/SINUMERIK Ctrl-Energy

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
Diagnostic functions					
Alarms and messages		✓	✓	✓	✓
Action log can be activated for diagnostic purposes		✓	✓	✓	✓
PLC status		✓	✓	✓	✓
LAD display		✓	✓	✓	✓
PLC remote diagnostics via modem		✓	✓	✓	✓
PLC remote diagnostics via Ethernet		✓	✓	✓	✓
Integrated spindle monitor (S-Monitor):	6FC5800-0AP55-0YB0				
• Turning		–	○	○	○
• Milling		–	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Easy Message Machine status transfer using text messages (SMS) requires a telecontrol system with antenna and modem cable:					
• MODEM MD720 GSM/GPRS, 2G	6NH9720-3AA01-0XX0	○	○	○	○
• ANT 794-4MR antenna	6NH9860-1AA00	○	○	○	○
• Modem cable	6NH7701-5AN	○	○	○	○
Remote diagnostics and file transfer:					
• SINUMERIK Integrate for engineering Access MyMachine /P2P	6FC5800-0AP30-0YB0	○	○	○	○
	Connection of a modem router to X127				
• SINUMERIK Integrate for engineering Access MyMachine /P2P for PC/PG – data transfer between PC/PG and CNCs	6FC5860-7YC00-0YA0	○	○	○	○
Service and maintenance					
Integrated service planner for the monitoring of service intervals		✓	✓	✓	✓
Easy Extend Simply extend optional machine components		✓	✓	✓	✓
SINUMERIK Ctrl-Energy					
Intelligent standby control of the machine Ctrl-E profiles		✓	✓	✓	✓
Measurement and evaluation of the total energy consumption of the machine and the drive system Ctrl-E analysis:					
• Transfer of manual values from the PLC		✓	✓	✓	✓
• SENTRON PAC3200 power monitoring device for front panel mounting records 50 measured values	7KM2112-0BA00-3AA0	○	○	○	○
• SENTRON PAC4200 power monitoring device for front panel mounting records 200 measured values	7KM4212-0BA00-3AA0	○	○	○	○
Flux reduction:					
• Turning		✓	✓	✓	✓
• Milling		✓	✓	✓	✓
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Reactive-current compensation	Only with SINAMICS S120 Active Line Module	–	–	–	–

Overview of functions

CNC controls SINUMERIK 828

Industrial software for CNC/Increase service productivity

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
Industrial software for CNC					
SINUMERIK Integrate for production Complete software package on DVD-ROM Current software version	6FC5864-0YD00-0AA8	○	○	○	○
Increase service productivity					
Diagnostic functions in case of machine faults, workflow services, remote control and remote monitoring of machine control systems SINUMERIK Integrate for production Access MyMachine:					
• Access MyMachine /Ethernet - Single Access:					
- Machine Connect Single license for each machine, current software version	6FC5864-4AP00-0YB0	○	○	○	○
- Machine Connect Upgrade license for each machine, current software version	6FC5864-4AP00-0YF0	○	○	○	○
- Server Access Software update service/year per machine	6FC5864-4AP00-0YM0	○	○	○	○
• Access MyMachine /Ethernet – Conferencing:					
- Machine Connect Single license for each machine, current software version	6FC5864-4BP00-0YB0	○	○	○	○
- Machine Connect Upgrade license for each machine, current software version	6FC5864-4BP00-0YF0	○	○	○	○
- Server Access Software update service/year per machine	6FC5864-4BP00-0YM0	○	○	○	○
• Access MyMachine /Ethernet – Remote STEP 7: - Diagnostics of the PLC via Access MyMachine /Ethernet - Single Access or Access MyMachine /Ethernet - Conferencing	Possible via Ladder Editor integrated in SINUMERIK Operate. Requirement: SINUMERIK Integrate for engineering Access MyMachine /Ethernet option	✓	✓	✓	✓

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Overview of CNC options > Manufacturer options

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
	Note	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Manufacturer options					
Axis/spindle, each additional	6FC5800-0AC20-0YB0	○	○	○	○
Positioning axis/auxiliary spindle, each additional	6FC5800-0AC30-0YB0	○	○	○	○
Mode group, each additional:	6FC5800-0AC00-0YB0				
• Turning		–	–	–	○
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	○
TRANSMIT/cylinder surface transformation	6FC5800-0AM27-0YB0	○	○	○	○
TRANSMIT/TRACYL Transformation without Y axis	6FC5800-0AS50-0YB0	○	○	○	○
Inclined axis:	6FC5800-0AM28-0YB0				
• Turning	For non-orthogonal Y axis	–	–	○	○
• Milling		–	–	–	–
• G-Tech Cylindrical	For non-orthogonal X axis	○	○	–	○
• G-Tech Surface		–	–	–	–
Inclined axis Basic, fixed angle:	6FC5800-0AS54-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface	For non-orthogonal X axis	○	○	–	○
Oscillation function, block-related, modal and asynchronous:	6FC5800-0AM34-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface	CYCLE4071-CYCLE4079	○	○	–	○
Measuring stage 2 Axial measurement, measurements form synchronized actions, cyclic measuring	6FC5800-0AM32-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	○	–	○
Pair of synchronized axes (gantry axes), Basic:	6FC5800-0AS51-0YB0	○	○	○	○
• Turning		1	1	1	1
• Milling		1	1	1	2
• G-Tech Cylindrical/G-Tech Surface		1	1	–	1
Travel to fixed stop with Force Control	6FC5800-0AM01-0YB0	○	○	○	○
Tangential control:	6FC5800-0AM06-0YB0				
• Turning		–	–	–	–
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		○	○	–	○
Generic coupling, CP-Static, e.g. counterspindle:	6FC5800-0AM75-0YB0				
• 1 × simple synchronous spindle, coupling ratio 1:1, no multi-edge machining:					
- Turning		–	–	○	○
- Milling		○	○	○	○
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
Generic coupling, CP-Basic, e.g. multi-edge turning:	6FC5800-0AM72-0YB0				
• 4 axis pairs in simultaneous coupled motion:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• 1 x synchronous spindle/multi-edge turning:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Master-value coupling/curve table interpolation		–	–	–	–

Overview of functions

CNC controls SINUMERIK 828

Overview of CNC options > Manufacturer options

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
Note					
Manufacturer options (continued)					
Generic coupling CP-Comfort, e.g. electronic gear:	6FC5800-0AM73-0YB0				
• 4 axis pairs in simultaneous coupled motion:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• 1 x synchronous spindle/multi-edge turning:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Electronic gear for 3 leading axes, without curve table, without cascading:					
- Turning		○	○	○	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
• Axial coupling in the machine coordinate system		–	–	–	–
• Master-value coupling/curve table interpolation		–	–	–	–
Leadscrew error compensation, bidirectional	6FC5800-0AM54-0YB0	○	○	○	○
	The correctable tolerance band is restricted to 1 mm.				
Sag compensation, multi-dimensional	6FC5800-0AM55-0YB0	○	○	○	○
	The correctable tolerance band is restricted to 1 mm.				
Master-slave Basic for drives	6FC5800-0AS52-0YB0	○	○	○	○
Evaluation of internal drive variables, Basic	6FC5800-0AS53-0YB0	○	○	○	○
SINUMERIK Operate Runtime license OA Easy Screen					
SINUMERIK Integrate for engineering Run MyScreens					
> 5 screens, extended functions	6FC5800-0AP64-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		✓	✓	✓	✓
Safety Integrated, extended functions for one CNC axis	6FC5800-0AC50-0YB0	○	○	○	○
Access protection for cycles	6FC5800-0AP54-0YB0	○	○	○	○
Drive-autonomous extended stop and retract ESR, incl. generator operation	6FC5800-0AM60-0YB0	○	○	○	○
Integrated spindle monitor (S-Monitor):	6FC5800-0AP55-0YB0				
• Turning		–	○	○	○
• Milling		–	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Memory expansion to 32000 PC Ladder Steps	6FC5800-0AD40-0YB0	○	○	○	○
Balance Cutting:	6FC5800-0AS05-0YB0				
• Turning		–	–	–	○
• Milling		–	–	–	–
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Friction compensation with adaptive characteristics	6FC5800-0AS06-0YB0	○	○	○	○
CNC lock function	6FC5800-0AP76-0YB0	○	○	○	○

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
User options					
Extended functions for grinding Grinding Advanced:	6FC5800-0AS35-0YB0				
<ul style="list-style-type: none"> • Dressing (paraxial form-truing) with stock removal cycles (basic CYCLE95) • Cylinder error compensation 					
- Turning		–	–	–	–
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		○	○	–	○
Advanced technology functions (expansion of the technology cycles for turning and milling) ¹⁾	6FC5800-0AP58-0YB0	○	✓	✓	✓
Extended operator functions ²⁾	6FC5800-0AP16-0YB0	○	○	○	✓
Program editor:					
• Machining step programming ShopTurn/ShopMill:	6FC5800-0AP17-0YB0				
- Turning		○	○	○	○
- Milling		○	○	○	○
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• programSYNC – multi-channel step sequence programming:	6FC5800-0AP05-0YB0				
- Turning		–	–	–	○
- Milling		–	–	–	–
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Residual material detection and machining for contour pockets and stock removal:	6FC5800-0AP13-0YB0				
	Requirement: Advanced technology functions option 6FC5800-0AP58-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Simulation 1 (finished part) in 3D representation:	6FC5800-0AP25-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Simultaneous recording (Real-time simulation of current machining operation)	6FC5800-0AP22-0YB0	○	○	○	○
Measuring cycles for drilling/milling and turning Calibration of workpiece probe, workpiece measurement, tool measurement:	6FC5800-0AP28-0YB0				
• Turning		○	○	○	○
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–

¹⁾ The CNC option Advanced technology functions provides you with technology cycles for the following additional machining operations:

- Asymmetric grooves (only turning)
- Drill and thread milling
- Thread milling
- Multi-edge milling
- Engraving
- Extended stock removal along contour with segmentation of blank (only turning)
- Contour grooving and plunge turning (only turning)
- Milling of contour pockets and spigots with up to 12 islands
- Position pattern - hide position
- Asymmetrically turn a shoulder
- DIN thread undercut

²⁾ The operator functions in the basic scope of the SINUMERIK 828D are designed for standard applications.

The CNC option Extended operator functions enables the following additional operator functions:

- Overstore
- Teach-in
- DRF function
- Extended block search
- Extended skip levels > 2
- Backup workpiece setup data
- Additional measuring version beyond standard scope (only milling)
 - Standard scope workpiece zero: Set edge, align edge, right-angled corner, 1 hole, and 1 circular spigot and rectangular spigot
 - Expansion of the measurement screens via combo box
- Synchronized actions softkey
- MDI load/save
- G code converter (turning and milling only)

Overview of functions

CNC controls SINUMERIK 828

Overview of CNC options > User options

✓ Basic version ○ Option – Not available	Article No.	SINUMERIK 828D			
		BASIC	SW 24x	SW 26x	SW 28x
	Note				
User options (continued)					
Managing of network drives via:					
• Ethernet (Windows Share/Linux/FTP), maximum	6FC5800-0AP01-0YB0	○ 21	○ 21	○ 21	○ 21
Operation with tool management:					
• Replacement tools for tool management:	6FC5800-0AM78-0YB0				
- Turning		○	○	○	✓
- Milling		○	○	○	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Remote diagnostics and file transfer:					
• SINUMERIK Integrate for engineering Access MyMachine /P2P	6FC5800-0AP30-0YB0	○	○	○	○
	Connection of a modem router to X127				
Contour handwheel	6FC5800-0AM08-0YB0	○	○	○	○
SINUMERIK MDynamics:					
• Advanced Surface:	6FC5800-0AS07-0YB0				
- Turning		–	–	–	–
- Milling		✓	✓	✓	✓
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
• Top Surface:	6FC5800-0AS17-0YB0				
- Turning		–	–	–	–
- Milling		–	○	○	○
- G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Spline interpolation (A, B and C splines)	6FC5800-0AS16-0YB0	○	○	○	○
Measure kinematics					
Determine transformation data of rotary axes:					
• Turning		–	–	–	–
• Milling		○	○	○	○
• G-Tech Cylindrical/G-Tech Surface		–	–	–	–
Host computer connection					
Server for OPC UA in SINUMERIK Operate					
SINUMERIK Integrate for engineering Access MyMachine:					
• Access MyMachine /OPC UA Variables, maximum	6FC5800-0AP67-0YB0	○ 100	○ 100	○ 100	○ 100
DXF Reader for PC integrated in SINUMERIK Operate	6FC5800-0AP56-0YB0	○	○	○	○
CNC user memory expanded for programs	6FC5800-0AP77-0YB0	–	○ 100 MB	○ 100 MB	○ 100 MB
Execution from external storage EES	6FC5800-0AP75-0YB0	–	○	○	○
	Includes option P77				

Product name	SINUMERIK 828D			
	BASIC SW 24x	SW 26x	SW 28x	SW 28xA
Number of DRIVE-CLiQ ports	3	3	3	3
Number of axes/spindles (basic scope)				
• Turning	3	3	3	3
• Milling	4	4	4	4
• G-Tech Cylindrical/G-Tech Surface	3	3	–	3
Number of axes/spindles + PLC positioning axis, maximum				
• Turning	5	6 + 2	8 + 2 ¹⁾	10 + 2 ²⁾
• Milling	5	6 + 2	6 + 2	8 + 2 ¹⁾
• G-Tech Cylindrical/G-Tech Surface	5	6 + 2	–	10 + 2 ²⁾
Number of axes with Drive Based Safety Integrated, maximum (Extended Safety Integrated functions)				
• Turning	5	6	6 / 8 ¹⁾	6 / 10 ²⁾
• Milling	5	6	6	6 / 8 ¹⁾
• G-Tech Cylindrical/G-Tech Surface	5	6	–	6 / 10 ²⁾
IPO cycle for max. configuration				
• Turning	9 ms	6 ms	6 ms	6 ms
• Milling	9 ms	6 ms	3 ms	3 ms
• G-Tech Cylindrical/G-Tech Surface	9 ms	6 ms	–	3 ms
Minimum block change time, approx.				
• Turning	9 ms	6 ms	6 ms	6 ms
• Milling	9 ms	6 ms	3 ms	3 ms
• G-Tech Cylindrical/G-Tech Surface	9 ms	6 ms	–	3 ms
Minimum block change time with compressor, approx.				
• Turning	9 ms	6 ms	6 ms	6 ms
• Milling	3 ms	2 ms	1 ms	1 ms
• G-Tech Cylindrical/G-Tech Surface	–	–	–	–
Position control cycle				
• Turning	3 ms	3 ms	1.5 ms	1.5 ms
• Milling	3 ms	3 ms	3 ms	3 ms
• G-Tech Cylindrical/G-Tech Surface	3 ms	3 ms	–	3 ms
PLC cycle time	9 ms	6 ms	6 ms	6 ms
Velocity and current controller clock cycle	125 µs	125 µs	125 µs	125 µs
Velocity and current controller clock cycle for a high-speed spindle				
Mixed operation without NX: 4 × 125 µs and 1 × 62.5 µs, max. number of axes = 5				
• Turning	–	–	–	–
• Milling	62.5 µs	62.5 µs	62.5 µs	62.5 µs
• G-Tech Cylindrical/G-Tech Surface	62.5 µs	62.5 µs	–	62.5 µs
Non-Volatile Random-Access Memory (NVRAM) for:				
• OEM	512 KB	512 KB	512 KB	512 KB
• User data	3 MB	5 MB	8 MB	10 MB
Number of Numeric Control Extensions NX10.3				
• Turning	–	–	1	1
• Milling	–	1	1	1
• G-Tech Cylindrical/G-Tech Surface	–	1	–	1
Number of Numeric Control Extensions NX15.3				
• Turning	–	–	–	1
• Milling	–	–	–	–
• G-Tech Cylindrical/G-Tech Surface	–	–	–	1
Number of I/O modules PP 72/48D PN or PP 72/48D 2/2A PN, maximum				
• Turning	3	4	5	5
• Milling	3	4	5	5
• G-Tech Cylindrical/G-Tech Surface	3	5	–	5

¹⁾ The maximum number of axes can be increased to 8, of which 6 axes can be connected to the PPU and 2 axes to the NX10.3.

²⁾ The maximum number of axes can be increased to 10, of which 6 axes can be connected to the PPU and 4 axes to the NX15.3.

Overview of functions

CNC controls SINUMERIK 828

Notes

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