

SIEMENS

SINUMERIK

SINUMERIK 828D PPU

Manual

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Valid for: SINUMERIK 828D PPU 24x.3 BASIC PPU
26x.3 PPU 28x.3

01/2014

6FC5397-2DP40-3BA3

System description

2.1 Controller features

Features

The SINUMERIK 828D is a tailor-made CNC solution for milling and turning machines in the medium performance range.

SINUMERIK 828D is a panel-based CNC (panel processing unit). A CNC, PLC, operator panel and axis control for six drives (standard) are combined in a single unit. This design provides a high degree of robustness by eliminating the need for hardware interfaces between the CNC electronics board and the operator panel. In order to guarantee that operation is as low-maintenance as possible, there are no wearing parts such as fans or back-up batteries.

- CNC operator panel with tailor-made system software versions for turning and milling technologies. PPU 28x, PPU 26x and PPU 24x BASIC
- Two operator panel versions for horizontal and vertical operator panel housings.
- Integrated full QWERTY CNC keyboard with mechanical short-stroke keys.
This enables the user to enter text for part-program names or tool identifiers and plain-text language commands directly, without using the keys of the second input level (shift key). The keys have IP65 degree of protection.
- USB, CompactFlash card and Ethernet interface on the operator panel front.
- Additional Ethernet interface on the rear of the CNC for a permanent factory network.
- PLC I/O Interface based on PROFINET for the connection of PLC I/O devices and a machine control panel.
- PP 72/48D PN and PP 72/48D 2/2A PN as PLC I/O module.
- Three handwheels can be connected.
- Optional GSM modem connection possible.
- Up to six axes/spindles for milling applications and up to eight axes/spindles for turning applications.
- One machining channel / mode group.
- Integrated PLC based on the SIMATIC S7-200 command set with ladder logic programming.
- Standardized 3/8" threads are embedded in the upper edges of the operator panel. These threads can be used for attaching commercially available additional components such as holders for diagrams or similar.

Control system versions

The SINUMERIK 828D is available in different versions (horizontal or vertical; turning or milling).

The SINUMERIK 828D is available in the following versions:

- PPU 240.3 BASIC (vertical operator panel)
- PPU 241.3 BASIC (horizontal operator panel)
- PPU 260.3 (vertical operator panel)
- PPU 261.3 (horizontal operator panel)
- PPU 280.3 (vertical operator panel)
- PPU 281.3 (horizontal operator panel)

Quantity structure

The following table shows the quantity structures for the different control versions:

Function	PPU 240.3 / 241.3 BASIC		PPU 260.3 / 261.3		PPU 280.3 / 281.3	
	Turning	Milling	Turning	Milling	Turning	Milling
Non-volatile memory (NVRAM):						
• For OEM data	512 KB	512 KB	512 KB	512 KB	512 KB	512 KB
• For user data	3 MB	3 MB	5 MB	5 MB	8 MB	8 MB
Number of axes/spindles	3	4	3	4	3	4
Maximum number of axes/spindles	5	5	6	6	6 / 8 *	6
Maximum number of axes with drive-based Safety Integrated	5	5	6	6	6 / 8 *	6
Axis expansion with NX10.3	--	--	--	1	1	1
Number of DRIVE-CLiQ interfaces	3	3	3	3	3	3
Maximum number of I/O modules (digital/analog)	3	3	4	4	5	5

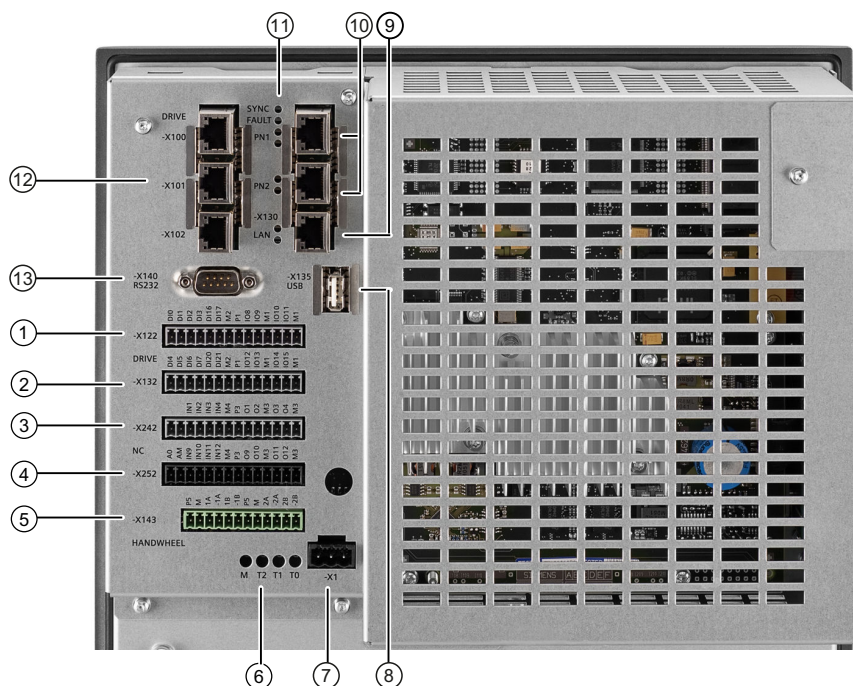
Note

Axis extensions for PPU 28x.3

With the help of a NX10.3, the following extensions can be connected:

- The maximum number of axes can be increased to eight, six of which can be connected to the PPU and two to the NX10.3.
- One high-speed spindle (e.g. 24,000 rpm with four pole pairs) can be connected to the NX10.3 and five axes to the PPU.

Rear of the PPU versions 26x.3 and 28x.3



- | | | |
|-----|------------------|--|
| ① ② | X122, X132 | Digital inputs/outputs, drive |
| ③ ④ | X242, X252 | Digital inputs/outputs for NC; controller of the analog spindle (X252) |
| ⑤ | X143 | Handwheels |
| ⑥ | M, T2, T1, T0 | Measuring sockets |
| ⑦ | X1 | Power supply |
| ⑧ | X135 | USB interface: For service purposes only |
| ⑨ | X130 | Ethernet LAN |
| ⑩ | PN 1, PN 2 | PLC I/O Interface |
| ⑪ | SYNC, FAULT | Status LEDs |
| ⑫ | X100, X101, X102 | DRIVE-CLiQ interfaces |
| ⑬ | X140 | Serial interface RS232 |

Figure 2-4 Interfaces at the rear of the PPU

2.4 Operator controls and display elements

TFT color display

The TFT color display has a diagonal size of 10.4" (PPU 26x.3/28x.3) or 8.4" (PPU 24x.3). The resolution is 800 x 600 pixels. The softkeys are arranged in an 8 + 8 layout; this makes the CNC easy to operate using only a very small number of menu levels.

Note

Pixel error acc. to DIN EN ISO 13406-2 Class II.

Keyboard

Several keys and key pads are installed on the operator panel front:

- The alphabetic key group contains the letters A ... Z and the space character for entering text.
- The numeric key group contains the digits 0 - 9, arithmetic/special characters and the decimal point for entering numeric characters and operators.
- The cursor key group is used to navigate on the screen.
- The control key group includes special functions.
- The area changeover displays the operating areas.
- The menu forward key allows the horizontal softkey bar to be extended in the same menu.
- The softkeys call up functions that are available on screen via a menu bar.
- The machine area key switches directly into the "Machine" operating area.
- The menu back key returns to the superordinate menu, one window is closed.

The keys used on the operator panel front along with the corresponding function keys on the PC keyboard are shown in the following overview:

Key	Function corresponds to PC key function	Key	Function corresponds to PC key function
	Esc		End
	F11		Backspace
	F12		Tabulator
	Spaces		(only for internal keyboard changeover)

2.8 Ordering data

Ordering data of the components

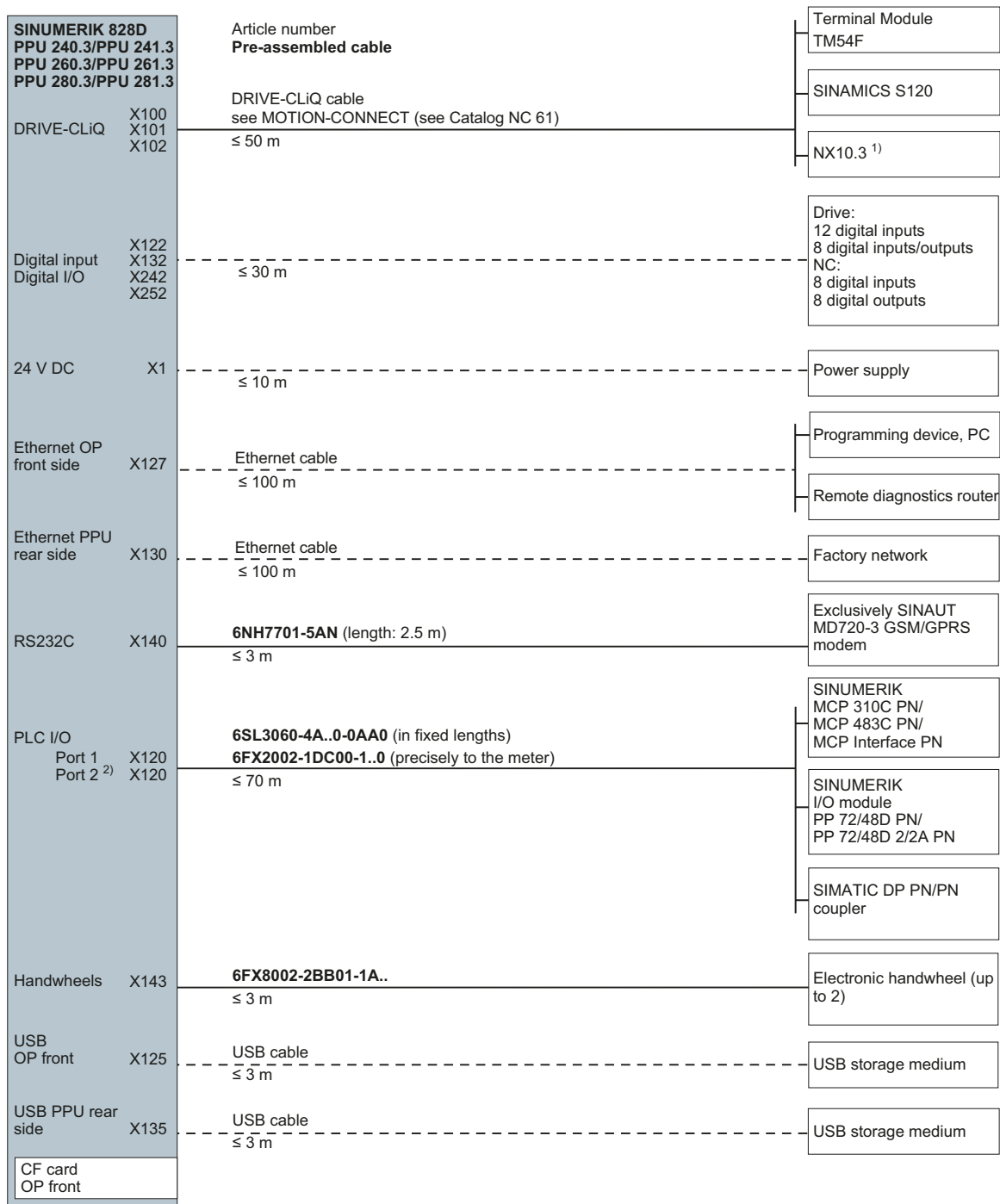
SINUMERIK 828D is generally marketed in sales packages with drives, motors and accessories. For orders, please contact your local Siemens sales representative.

Table 2-1 Components

Designation	Article number
Panel Processing Unit without system software	
• PPU 241.3 BASIC horizontal	6FC5370-3AA30-0AA0
• PPU 240.3 BASIC vertical	6FC5370-4AA30-0AA0
• PPU 261.3 horizontal	6FC5370-5AA30-0AA0
• PPU 260.3 vertical	6FC5370-6AA30-0AA0
• PPU 281.3 horizontal	6FC5370-7AA30-0AA0
• PPU 280.3 vertical	6FC5370-8AA30-0AA0
CompactFlash card with system software and license	
• For PPU 241.3 / PPU 240.3: Turning	6FC5835-1GY40- □ YA0
• For PPU 241.3 / PPU 240.3: Milling	6FC5835-2GY40- □ YA0
• For PPU 261.3 / PPU 260.3: Turning	6FC5834-1GY40- □ YA0
• For PPU 261.3 / PPU 260.3: Milling	6FC5834-2GY40- □ YA0
• For PPU 281.3 / PPU 280.3: Turning	6FC5833-1GY40- □ YA0
• For PPU 281.3 / PPU 280.3: Milling	6FC5833-2GY40- □ YA0
Axis extension:	
• Numeric Control Extension NX10.3	6SL3040-1NC00-0AA0
Machine control panels:	
• MCP 483C PN	6FC5303-0AF22-0AA1
• MCP 310C PN	6FC5303-0AF23-0AA1
Interface module	
• MCP Interface PN	6FC5303-0AF03-0AA0
Mini handheld unit:	
• With spiral connection cable	6FX2007-1AD03
• With straight cable	6FX2007-1AD13
I/O modules:	
• PP 72/48D PN (digital)	6FC5311-0AA00-0AA0
• PP 72/48D 2/2A PN (analog)	6FC5311-0AA00-1AA0

Connection options

The overview below shows the interfaces and their connection possibilities:



¹⁾ Only for PPU 280.3/PPU 281.3

²⁾ Not for PPU 240.3/PPU 241.3

Figure 6-1 Connection options of the PPU

Note

If your axis grouping contains a Smart Line Module without DRIVE-CLiQ (5 kW or 10 kW), you must assign the Smart Line Module enabling signal to the X122.1 digital input on the PPU.

Definition

The abbreviations used in "Signal type" column in the tables showing the pin assignment have the following meaning:

B	Bidirectional
GND	Grounding
I	Input
O	Output
VI	Voltage input (supply voltage)
VO	Voltage output (supply voltage)

6.2 Power supply connection

6.2.1 Requirements for the power supply

Pin assignment at X1 screw-type terminal block

Table 6-1 Pin assignment

Pin	Signal name	Signal type	Meaning
1	P24	VI	24 VDC power supply
2	M	VO	Ground
3	PE	GND	Protective ground

Requirements of DC power supplies

Interface X1 is intended exclusively for the connection of the external 24 V power supply, e.g.

- SITOP (stabilized 24 V power supplies)
- CSM (Control Supply Module)

The following power consumption values for the PPU provide a configuration basis for calculating the 24 VDC power supply.

Use

The interfaces are designed for operation in full-duplex mode; in other words, the ports can be used for the sending as well as for the receiving of data packets. The ports are connected as an Ethernet terminal with 10/100 Mbit:

- X130 connects the PPU to the plant network.
 - The IP address can be freely selected.
 - MAC address, see also: Type plate (Page 22).
- X127 is used to connect the following components:
 - PG/PC via peer-to-peer with permanently assigned IP address 192,168,215 .1, for example, for the commissioning software, RCS Commander
 - Modem for remote diagnostics

LED status displays

For diagnostic purposes, the RJ45 sockets are each equipped with a green and a yellow LED. This allows the following status information about the respective Ethernet port to be displayed:

Table 6-5 LED status displays

LEDs	Status	Meaning
Green	Lit	10 or 100 Mbit link available
	Off	Missing or faulty link
Yellow	Lit	Receive or transmit activity
	Off	No activity

Cable specification for X130 and X127

Feature	Version
Connector type	RJ45 socket with 180° cable outlet
Cable type	Industrial Ethernet cable (CAT5)
Max. cable length	100 m

Note

The X127 interface does not support auto crossing. If the Ethernet port of the connected PC or modem does not support auto-crossing, a crossed Ethernet cable must be used.

6.4 PLC I/O Interface based on PROFINET

Pin assignment PN1, PN2

Pin	Signal name	Signal type	Meaning
1	TX+	O	Transmit data +
2	TX-	O	Transmit data -
3	RX+	I	Receive data +
4	N.C.	-	Not assigned
5	N.C.	-	Not assigned
6	RX-	I	Receive data -
7	N.C.	-	Not assigned
8	N.C.	-	Not assigned

The interfaces have the following properties:

- The interfaces are designed for full-duplex mode; in other words, the ports can both transmit and receive.
- The two 100 Mbit Ethernet ports and the internal Ethernet controller are connected to an integrated 3-port switch. The MAC address of the Ethernet controller is stamped on the type plate.

Wiring the PLC I/O Interface

Interfaces PN1 and PN2 can be used to establish the PLC I/O Interface communication network, which is based on PROFINET IO:

- To connect a machine control panel (MCP 310C PN, MCP 483C PN or MCP Interface PN)
- To connect to the PLC I/Os

Note

The PPU has one MAC address for both PLC I/O Interface ports that is the printed on the type plate of the PPU, see section "Type plate (Page 22)". The same applies for the MAC addresses of the operator components.

When connecting I/O devices (I/O modules, machine control panel) to the I/O Controller (PPU), please use the pre-assembled SINAMICS S120 DRIVE-CLiQ signal cables; from a technical point of view, these are also suitable for use with PLC I/O Interface.

- Article number: 6FX2002-1DC00-1□□0
- Max. cable length: 70 m