

SIEMENS

SINUMERIK

SINUMERIK 828D PPU

Manual

Valid for:
SINUMERIK 828D
PPU 24x.2 BASIC T
PPU 24x.2 BASIC M
PPU 26x.2
PPU 28x.2

02/2012

6FC5397-2DP40-3BA0

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury will result if proper precautions are not taken.
--

WARNING
--

indicates that death or severe personal injury may result if proper precautions are not taken.

CAUTION
--

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
--

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING
--

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.
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Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

SINUMERIK documentation

The SINUMERIK documentation is organized into the following categories:

- General documentation
- User documentation
- Manufacturer/service documentation

Additional information

You can find information on the following topics under the link (www.siemens.com/motioncontrol/docu):

- Ordering documentation / current documentation overview
- Additional links to download documents
- Using documentation online (finding and searching in manuals/information)

Please send any questions about the technical documentation (e.g. suggestions for improvement, corrections) to the following address:

(<mailto:docu.motioncontrol@siemens.com>)

My Documentation Manager (MDM)

Under the following link you will find information to individually compile OEM-specific machine documentation based on the Siemens content: MDM (www.siemens.com/mdm)

Training

For information about the range of training courses, refer to:

- SITRAIN (www.siemens.com/sitrain) - training courses from Siemens for automation products, systems and solutions
- SinuTrain (www.siemens.com/sinutrain) - training software for SINUMERIK

FAQs

You can find Frequently Asked Questions in the Service&Support pages under Product Support (www.siemens.com/automation/service&support).

SINUMERIK

You can find information on SINUMERIK under the following link: (www.siemens.com/sinumerik)

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 one 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 and PPU 26x as well as PPU 24x in the versions: BASIC T and BASIC M.
- 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 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.
- Two connectable handwheels.
- 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 Steps 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.

Controller versions

The SINUMERIK 828D is available in different versions (horizontal or vertical; turning or milling) as well as with different performance levels.

For the PPU 24x.2 a distinction is made between the turning and milling versions. When booting, the preconfigured technology-specific system software automatically scales itself as a result of the hardware that is found. As a consequence, e.g. a PPU 24x.2 BASIC T cannot be used for milling.

The SINUMERIK 828D is available in the following versions:

- PPU 240.2 BASIC T (vertical operator panel)
- PPU 240.2 BASIC M (vertical operator panel)
- PPU 241.2 BASIC T (horizontal operator panel)
- PPU 241.2 BASIC M (horizontal operator panel)
- PPU 260.2 (vertical operator panel)
- PPU 261.2 (horizontal operator panel)
- PPU 280.2 (vertical operator panel)
- PPU 281.2 (horizontal operator panel)

Performance

The following table shows the difference between the different versions based on characteristic technical data/features:

Function	PPU 240.2 / 241.2		PPU 260.2 / 261.2		PPU 280.2 / 281.2	
	BASIC T	BASIC M	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	1 MB	1 MB	3 MB	3 MB	5 MB	5 MB
Number of DRIVE-CLiQ interfaces	3	3	3	3	3	3
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
Maximum number of I/O modules (digital/analog)	3	3	4	4	5	5
IPO cycle for maximum configuration	9 ms	9 ms	6 ms	6 ms	6 ms	3 ms
Minimum block change time	~9 ms	~9 ms	~6 ms	~6 ms	~6 ms	~3 ms
Position-control cycle	3 ms	3 ms	3 ms	3 ms	1.5 ms	3 ms
PLC cycle time	9 ms	9 ms	6 ms	6 ms	6 ms	3 ms
Reaction time to process interrupts (terminal to terminal)	7.5 ms	7.5 ms	7.5 ms	7.5 ms	7.5 ms	7.5 ms
Speed/current controller cycle	125 µs	125 µs	125 µs	125 µs	125 µs	125 µs
Reduced speed/current controller cycle (see note)	--	--	--	62.5 µs	--	62.5 µs

Note

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

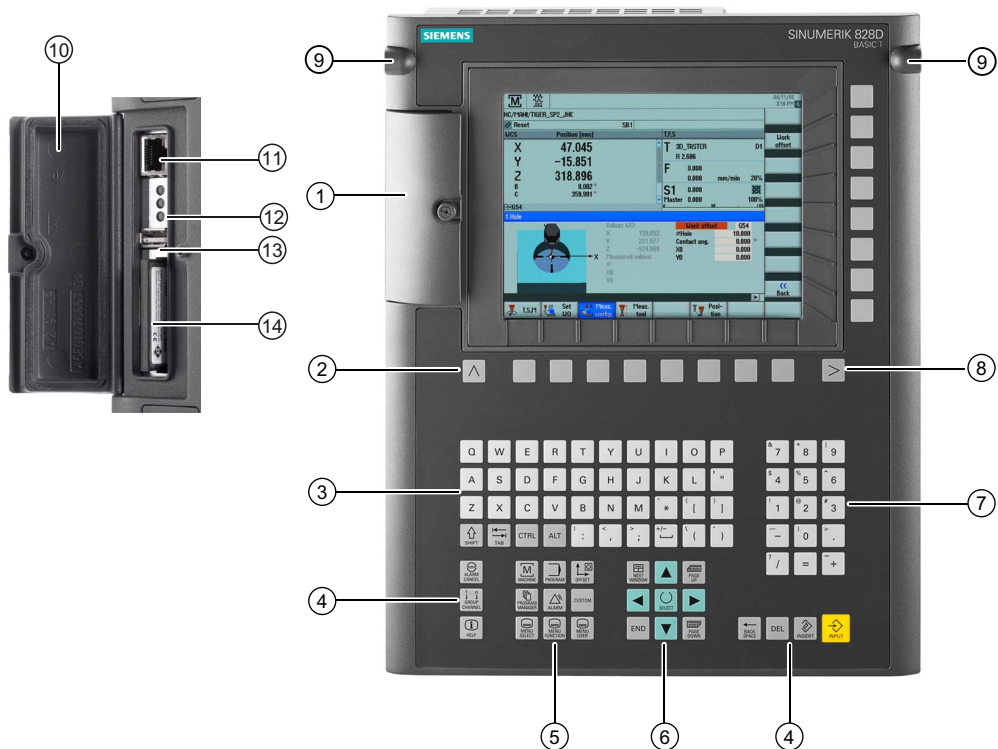
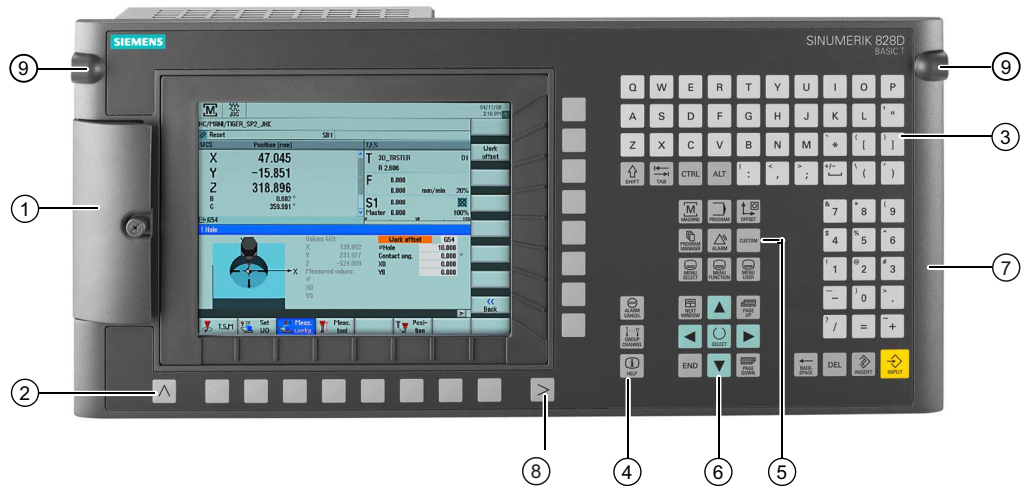
- The maximum number of axes can be increased to eight, six of which can be connected to the PPU and two to the NX10.3.
- A high-speed spindle (e.g. 24,000 rpm with four pole pairs) can be connected to the NX10.3 (62.5 µs) and five axes to the PPU (125 µs).

For the reduced speed/current controller cycle, in accordance with Topology Rules (Page 63), the following apply:

- Max. number of axes = 5 for mixed operation 4 x 125 µs and 1 x 62.5 µs
- Max. number of axes = 6 with NX10.3

2.2 System versions, BASIC T and BASIC M

Front panel of the SINUMERIK 828D BASIC T with interfaces



- ① ⑩ Protective cover for user interfaces
- ② Menu back key
- ③ Alphabetic key group
- ④ Control key group
- ⑤ Hotkey group
- ⑥ Cursor key group

- ⑦ Numerical block
- ⑧ Menu forward key
- ⑨ 3/8" threads for additional components
- ⑪ X127 Ethernet (service socket)
- ⑫ Status LED: RDY, NC, CF
- ⑬ X125 USB interface
- ⑭ Slot for CompactFlash card with user data

Figure 2-1 System versions

Rear of the PPU 24x.2

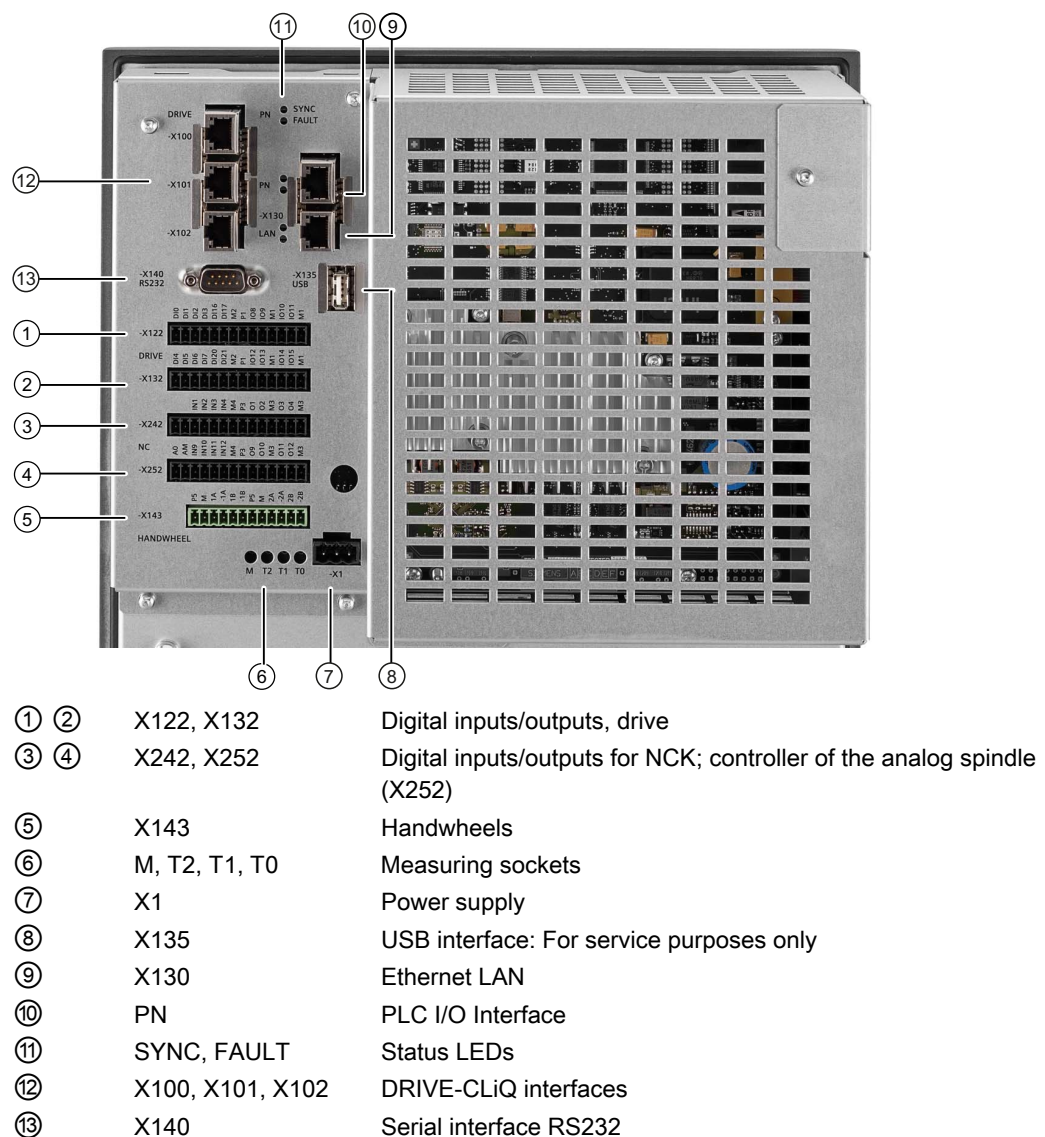


Figure 2-2 Interfaces at the rear

2.7 Connectable components

Component overview

The following components can be connected to the PPU:

- **Machine Control Panel MCP 310C PN, MCP 483C PN**

Contains the keys and switches required for the operation of a machine (turning or milling machine).

- **Handwheels**

A maximum of two handwheels can be connected to the X143.

- **Mini handheld unit**

A mini HHU can be integrated into the SINUMERIK 828D system using a connection kit.

- **I/O modules PP 72/48D PN / PP 72/48D 2/2A PN**

The modules are used to connect digital as well as analog inputs and outputs. To supply the module and the outputs, an external power supply unit (24 VDC) is required, which provides safety isolation from dangerous voltages.

- **GSM modem**

Connection of a SINAUT MD720-3 GSM modem for sending and receiving SMS messages (Easy Message) via the serial RS232 interface.

- **PN/PN coupler**

A PN/PN coupler can be connected in order to link a SINUMERIK 828D to PROFINET networks.

- **SETRON PAC 3200/PAC 4200**

The connection of a SETRON PAC 3200 / PAC 4200 makes available functions for increasing the energy efficiency of machine tools.

SINAMICS S120 drive system

Only the SINAMICS S120 Line Modules and Motor Modules are used for drive control. Motor Modules can be used to connect **feed and main spindle motors** of the 1FT7 and 1PH8 type.

See also

Connectable components (Page 93)

SINAMICS components (Page 88)

- Rules for permitted topologies (Page 53)
- Interface description (Page 67)

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	Order number (MLFB)
Panel Processing Unit without system software	
• PPU 240.2: BASIC T	6FC5370-4AT20-0AA0
• PPU 240.2: BASIC M	6FC5370-4AM20-0AA0
• PPU 241.2: BASIC T	6FC5370-3AT20-0AA0
• PPU 241.2: BASIC M	6FC5370-3AM20-0AA0
• PPU 261.2 horizontal	6FC5370-5AA20-0AA0
• PPU 260.2 vertical	6FC5370-6AA20-0AA0
• PPU 281.2 horizontal	6FC5370-7AA20-0AA0
• PPU 280.2 vertical	6FC5370-8AA20-0AA0
CompactFlash card with system software and license	
• for PPU 241.2 / PPU 240.2: Turning	6FC5835-1GY40- □ YA0
• for PPU 241.2 / PPU 240.2: Milling	6FC5835-2GY40- □ YA0
• for PPU 261.2 / PPU 260.2: Turning	6FC5834-1GY40- □ YA0
• for PPU 261.2 / PPU 260.2: Milling	6FC5834-2GY40- □ YA0
• for PPU 281.2 / PPU 280.2: Turning	6FC5833-1GY40- □ YA0
• for PPU 281.2 / PPU 280.2: 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
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

Spare parts

Table 2- 2 Spare parts

Designation	Order number (MLFB)
Set of tensioners (9 units)	6FC5248-0AF14-0AA0
CompactFlash card (empty), 1 GB	6FC5313-5AG00-0AA1

Accessories

Table 2- 3 Accessories

Designation	Order number (MLFB)
SETRON PAC3200 multifunction measuring device	7KM2111-1BA00-3AA0 7KM2112-...
SETRON PAC4200 multifunction measuring device	7KM4211-... 7KM4212-0BA00-...
PROFINET Switched Ethernet expansion module	7KM9300-0AE00-0AA0
SINAUT MD720-3 GSM/GPRS MODEM	6NH9720-3AA00
SINAUT ANT 794-4MR ANTENNA	6NH9860-1AA00
RS232 modem cable	6NH7701-5AN
SIMATIC DP PN/PN coupler	6ES7158-3AD00-0XA0
Terminal strip converter, 50-pin	6EP5406-5AA00
Cable set comprising: • 6 m ribbon cable, 50-pin • 8 insulation displacement connectors, 50-pin	6EP5306-5BG00
IP20 PLC I/O Interface connecting cable (corresponds to DRIVE-CLiQ signal cable)	6FX2002-1DC00-...
USB-FlashDrive, 8 GB	6ES7648-0DC50-0AA0
CompactFlash card (empty as user memory), 8 GB	6FC5313-6AG00-0AA0

Technical data

General technical data

Safety	
Protection class	III (DVC A, PELV) acc. to EN 61800-5-1
Degree of protection according to EN 60529	IP65 (front) ^{*)} , IP20 (rear)
Approvals	CE / cULus
Degree of pollution	2 according to 61800-5-1
Cooling	Open-circuit ventilation
Mounting position	Vertical
Mechanical stress	
Operation	3M1 according to EN 60721-3-3
Transportation (in transportation packaging)	2M3 according to EN 60721-3-2
Storage (in transport packaging)	1M2 according to EN 60721-3-1

^{*)} with closed protective flap

Electrical and mechanical data

Data	
Input voltage	24 VDC
Power consumption, max.	60 W
Power loss	28 W
Dimensions WxHxD	310 x 380 x 118 mm (PPU vertical) 482.6 x 220 x 118 mm (PPU horizontal)
Weight, approx.	4.5 kg

See also

Further technical data for the PPU can be found in the following sections:

- Transport and Storage Conditions (Page 39)
- Operating Conditions (Page 40)
- Requirements for the power supply (Page 69)

Digital inputs/outputs:

- Technical data (Page 84)