

Basic components

CNC controls

SINUMERIK 840Di sl

Overview



The SINUMERIK 840Di sl is a fully PC-integrated numerical control and works in combination with the SINAMICS S120 drive system. The control, which is open with regard to both hardware and software, is particularly suited to customers who are looking for distributed automation solutions in the field of PLC I/O and drives and/or prefer a fully PC-integrated control.

Benefits

- Robust industrial PC
- Flexible communication via USB and Ethernet interfaces
- System-wide openness as regards operation
- For use in machine tools, special machines and retrofits

Application

The technological areas of application for the SINUMERIK 840Di sl range from machine tools and special machines through handling devices to retrofits.

The SINUMERIK 840DiE sl is available as an export version for use in countries where approval is required.

Design

The SINUMERIK 840Di sl consists of the PCU 50.3 industrial PC, the MCI2 board and the system software for 6 or 20 axes. The PROFIBUS DP interface on the MCI2 board enables the connection of the SINAMICS S120 drive system and the SIMATIC DP ET 200 I/O. The PROFIBUS DP with Motion Control functionality (isochronous, equidistant) is operated at a transfer rate of 12 Mbit/s.

The mounting brackets for installation behind an operator panel front must be ordered separately.

SINUMERIK PCU 50.3 including MCI2 board with integrated SIMATIC PLC 317-2 DP

- The latest Intel Mobile processor technology
- PCU 50.3-C: Intel Celeron M Mobile processor
1.5 GHz/512 MB/1 MB L2 Cache/400 MHz FSB
- PCU 50.3-P: Intel Pentium M Mobile processor
2.0 GHz/1024 MB/2 MB L2 Cache/533 MHz FSB
- Replaceable 40 GB hard disk with transport mechanism:
12 GB for applications (HMI-Advanced, MCIS software) and data (part programs, documentation, other data)
15 GB for local back-up and software to be installed
- Max. memory configuration 2048 MB incl. graphics memory on 2 memory module slots
- Integral 2D/3D graphics; dynamic graphics memory (8 to 96 MB); the graphics memory is taken from the main memory
- Windows XP ProEmbSys operating system
- Data backup/restore using the Ghost data backup software
- Ports:
 - 2 x Ethernet 10/100 Mbit/s (RJ45)
 - 4 x USB 2.0
 - 1 x PROFIBUS/MPI interface
 - 1 x PROFIBUS DP master for I/Os and drive (on MCI2 board)
 - 1 x PROFIBUS DP slave or master for I/Os or MPI (on MCI2 board)
- Expansion slots:
 - 1 x PCI (175 mm (6.89 in)) or MCI board extension
 - 1 x CF card

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Function

Performance and flexibility

The SINUMERIK 840Di sl is available with different system software for up to 6 or 20 axes. Two hardware variants of the SINUMERIK 840Di sl are available depending on performance requirements.

The MCI board extension (optional) can be plugged in to connect handwheels, probes and high-speed inputs and outputs.

The SINAMICS drive system is connected through the CU320 Control Unit. The connection to the SINUMERIK 840Di sl is established over PROFIBUS. A CU320 can control up to 6 axes. If more axes are needed, several CU320s can be connected to PROFIBUS.

Openness for HMI and PLC

Thanks to openness for HMI and PLC, users can apply their special know-how such that they achieve the individual technology solution desired.

Well-proven operator software and programming software

SINUMERIK 840Di sl Startup is included in the system software. Startup is a Windows program for easy familiarization with SINUMERIK 840Di sl and supports simple operating procedures as well as creating and activating application programs.

Function (continued)

SINUMERIK 840Di sl Startup is not specially designed for machine tool operation. The user interface software HMI-Advanced is available as an option as the user interface for machine tools. The SINUMERIK HMI programming package or the SINUMERIK HMI engineering package can be used to modify this user interface.

ShopMill or ShopTurn are also available for genuine workshop CNC and Motion Control Information System products (MCIS products).

Integration

The following components can be connected to the SINUMERIK 840Di sl:

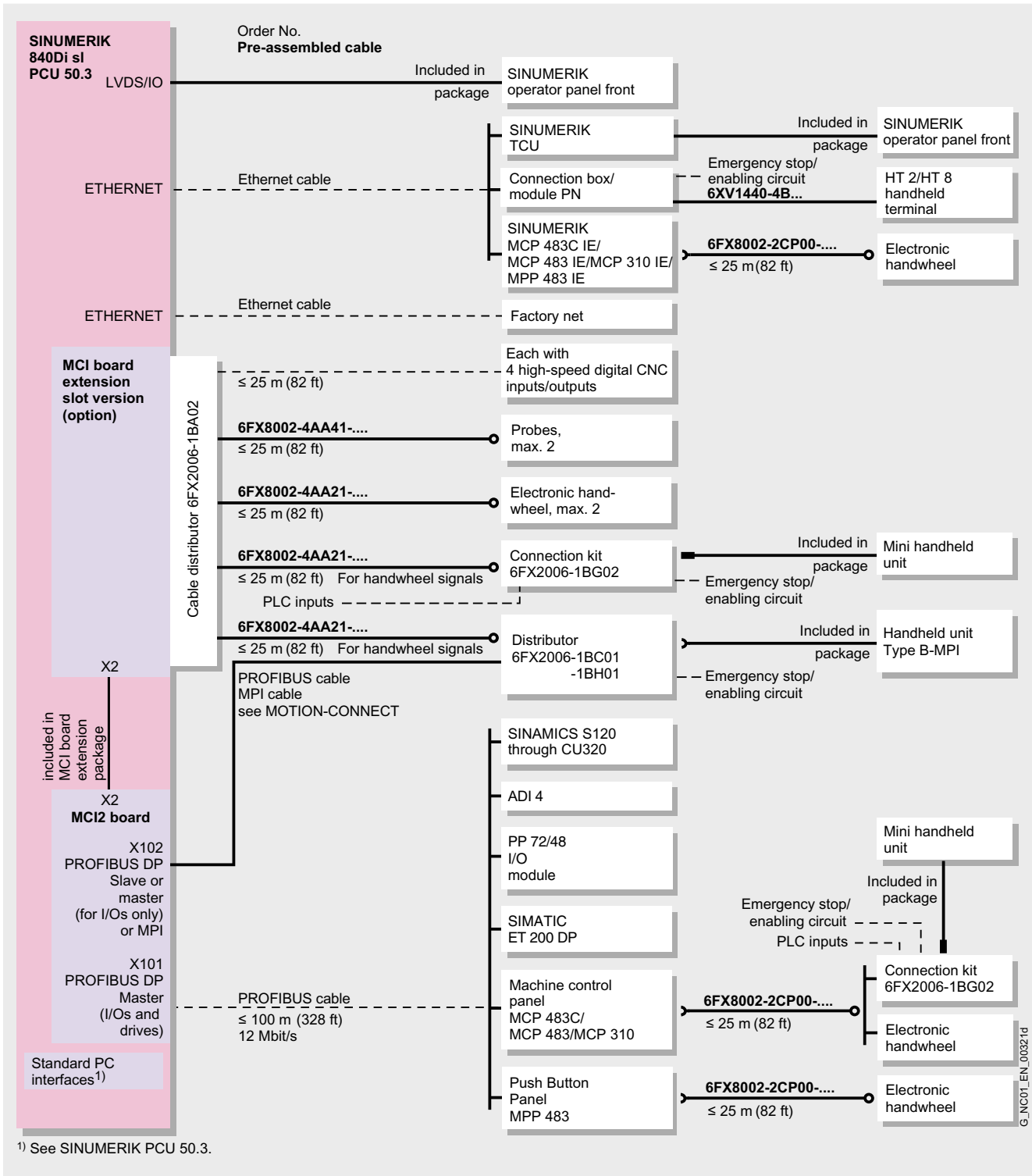
- SINUMERIK operator panel front with/without TCU, machine control panel, Push Button Panel
- SINUMERIK handheld units
- Distributed SIMATIC PLC I/O via PROFIBUS DP connection
- PP 72/48 I/O module
- ADI 4 Analog Drive Interface for 4 axes
- SINAMICS S120 drive system via CU320 Control Unit
- Feed and main spindle motors

Technical specifications

Order No.	6FC5220-0AA31-2AA0	6FC5220-0AA33-2AA0
Product name	SINUMERIK 840Di sl PCU 50.3 with MCI2 board	
Processor		
• Clock frequency	1.5 GHz	2 GHz
Input voltage	24 V DC	
Power consumption, max.	190 W	
Power loss ride-through time	20 ms	
Degree of protection to EN 60529 (IEC 60529)	IP20	
Humidity rating in accordance with EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (32 °F).	
Relative humidity		
• Storage	5 ... 95% at 25 °C (77 °F)	
• Transport	5 ... 95% at 25 °C (77 °F)	
• Operation	10 ... 80% at 25 °C (77 °F)	
Ambient temperature		
• Storage	-20 ... +60 °C (-4 ... +140 °F)	
• Transport	-20 ... +60 °C (-4 ... +140 °F)	
• Operation		
- With 9 W electronic output for expansion boards ¹⁾	5 ... 55 °C (41 ... 131 °F)	
- With 14 W electronic output for expansion boards ¹⁾	5 ... 50 °C (41 ... 122 °F)	
- With 24 W electronic output for expansion boards ¹⁾	5 ... 45 °C (41 ... 113 °F)	
Dimensions		
• Width	297 mm (11.7 in)	
• Height	267 mm (10.5 in)	
• Depth	81.7 mm (3.22 in)	
Weight, approx.	7.2 kg (15.9 lb)	

¹⁾ MCI2 board already inserted, in addition, for example, floppy disk drive or expansion cards such as MCI board extension.

Integration (continued)



Connection overview for SINUMERIK 840Di sl

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

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Selection and Ordering Data



With SINUMERIK 840DiE sl/840 Di sl, there are essentially two methods for ordering software (see also the ordering examples).

Ordering as a bundle (hardware, software, and options)

Order No. with order code

License key included in delivery

For this type of order, the SINUMERIK 840Di sl system software is supplied on the hard disk of the SINUMERIK 840Di sl. The license key is included in the scope of supply as well as the CoL (Certificate of License).

If options are ordered for this using order codes according to the Overview of functions, the license keys will also be included in the scope of supply and the appropriate CoLs will be supplied.

Ordering individually

Ordering with complete order numbers

License key is obtained over the Internet

The hardware components are ordered individually.

The system software of the SINUMERIK 840Di sl is ordered on a CD-ROM, the corresponding license must be ordered separately, a CoL is included in the package. The software must then be installed.

When options are ordered (indicating the complete order numbers), the appropriate CoLs are supplied. The license key must be obtained over the Internet for both the system software and the options.

The order numbers of possible software options are listed in the Overview of functions.

Ordering as a bundle

Designation	Order No.	Order code
SINUMERIK 840Di sl hardware with system software on hard disk and licenses installed		
SINUMERIK 840DiE sl with system software Export		
• PCU 50.3-C 1.5 GHz/512 MB + MC12 board, Windows XP ProEmbSys	6FC5220-0YA31-2AA0-Z	Order codes required
• PCU 50.3-P 2.0 GHz/1024 MB + MC12 board, Windows XP ProEmbSys	6FC5220-0YA33-2AA0-Z	Order codes required
SINUMERIK 840Di sl with system software standard		
• PCU 50.3-C 1.5 GHz/512 MB + MC12 board, Windows XP ProEmbSys	6FC5220-0XA31-2AA0-Z	Order codes required
• PCU 50.3-P 2.0 GHz/1024 MB + MC12 board, Windows XP ProEmbSys	6FC5220-0XA33-2AA0-Z	Order codes required
Single license for software version		
• 6 axes		L11
• 20 axes		L12
• Current software version		Q00+R00
• Specific software version		Q0 ■+R ■■
For further options, see Overview of functions.		Order codes required
System software on hard disk, appropriate software version for machine operation incl. single license		
• HMI-Advanced		L00
• ShopMill/ShopTurn incl. HMI-Advanced		L40
Accessories		
Ordering with complete order numbers		
For order numbers, refer to single orders		

The possible software options are listed in the Overview of functions. Software options shown with an order code can be ordered in combination with the system software.

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Selection and Ordering Data (continued)

Ordering hardware and accessories individually

Designation	Order No.
SINUMERIK 840Di sl Comprising of: hardware with Windows XP ProEmbSys	
• PCU 50.3-C with MCI2 board	6FC5220-0AA31-2AA0
• PCU 50.3-P with MCI2 board	6FC5220-0AA33-2AA0

Accessories

Mounting bracket For PCU, video link receiver or TCU behind operator panel front	6FC5248-0AF20-2AA0
Memory expansion For PCU 50.3	
• 512 MB	6ES7648-2AG30-0GA0
• 1024 MB	6ES7648-2AG40-0GA0
MCI2 board For SINUMERIK 840Di sl	6FC5222-0AA02-2AA0
Hard disk For PCU 50.3 with support plate and damper	6FC5247-0AF08-4AA0
CompactFlash card 512 MB Empty	6FC5313-4AG00-0AA2
USB FlashDrive 1 GB	6ES7648-0DC30-0AA0

Ordering software individually

Designation	Order No.
Software version 6 and 20 axes on CD-ROM, incl. ShopMill HMI and ShopTurn HMI Export software SINUMERIK 840DiE sl	
• Specific software version on CD-ROM without single license	6FC5820-3YC ■■■ - ■YA8
• 6 axes, single license	6FC5820-1YP00-0YB0
• 20 axes, single license	6FC5820-3YP00-0YB0
• Software update service	6FC5820-3YP00-0YL8
Standard software SINUMERIK 840Di sl	
• Specific software version on CD-ROM without single license	6FC5820-3XC ■■■ - ■YA8
• 6 axes, single license	6FC5820-1XP00-0YB0
• 20 axes, single license	6FC5820-3XP00-0YB0
• Software update service	6FC5820-3XP00-0YL8
Software for machine operation ShopMill HMI/ShopTurn HMI incl. HMI-Advanced for SINUMERIK 840DiE sl/840Di sl (the HMI-Advanced for the system software must be ordered as update 6FC5253-7BX10-.AG3.)	
• Single license	6FC5800-0AP15-0YB0
HMI-Advanced	See HMI software for CNC controls

Example of specific software version, e.g. 1.4:
6FC5820-3YC**10-2**YA8

Example of ordering as a bundle

Order using Order No. with order codes
Software installed on hard disk of hardware
License key included in delivery

Order item	Remarks
Item 1: 1 x 6FC5220-0YA31-2AA0-Z L11+Q01+R01+L00+A01+C11	SINUMERIK 840DiE sl with system software Export and options
Explanation	
6FC5220-0YA31-2AA0	SINUMERIK 840DiE sl PCU 50.3-C/ 1.5 GHz with MCI2 board with system software Export
-Z	Followed by order codes (options)
L11	System software 6 axes on hard disk
Q01+R01	Single license of specific software version, name of software version Q01+R01 corresponds to version 1.1
L00	HMI-Advanced on hard disk, the software version suitable for 840DiE sl system software is selected automatically.
A01	1 x additional axis/spindle
C11	1 x additional machining channel
6FC5248-0AF20-2AA0	Mounting bracket

Example of ordering individually

Order using the complete Order No. (no order codes)
Installation of the software on the hardware by the user
License key via the Internet

Order item	Remarks
Item 1: 1 x 6FC5220-0AA31-2AA0	SINUMERIK 840Di sl PCU 50.3-C/ 1.5 GHz with MCI2 board
Item 2: 1 x 6FC5248-0AF20-2AA0	Mounting bracket for PCU, video link receiver or TCU behind operator panel front
Item 3: 1 x 6FC5820-3YC10-2YA8	System software 6/20 axes Export 840DiE sl, without single license on CD-ROM, specific software version 1.4
Item 4: 1 x 6FC5820-1YP00-0YB0	System software 6 axes Export 840DiE Single license (CoL) without data carrier
Item 5: 1 x 6FC5253-7BX10-3AG0	HMI-Advanced for PCU 50.3 Single license with CD-ROM, software version 7.3
Item 6: 1 x 6FC5800-0AA00-0YB0	1 x additional axis/spindle
Item 7: 1 x 6FC5800-0AC10-0YB0	1 x additional machining channel

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SINUMERIK 840Di sl MCI board extension, slot version

Overview



The MCI board extension slot version is offered as an option for connecting 2 handwheels (encoders with either differential signals or TTL signals), 2 probes and 4 high-speed digital CNC inputs and outputs.

Selection and Ordering Data

Designation	Order No.
MCI board extension, slot version	6FC5222-0AA00-0AA1
Cable distributor Without DU box connector for connection of 2 handwheels (encoders with differential or TTL signals, as required), 2 probes and 4 high-speed CNC inputs/outputs each	6FX2006-1BA02
DU box connector (10 units) ²⁾ For connecting devices to cable distributor	6FX2003-0FA00

Technical specifications

Order No.	6FC5222-0AA00-0AA1
Product name	MCI board extension, slot version
Power consumption, max.¹⁾	2.1 W
Degree of protection to EN 60529 (IEC 60529)	IP00
Humidity rating in accordance with EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity	
• Storage	5 ... 95% at 25 °C (77 °F)
• Transport	5 ... 95% at 25 °C (77 °F)
• Operation	5 ... 80% at 25 °C (77 °F)
Ambient temperature	
• Storage	-20 ... +60 °C (-4 ... +140 °F)
• Transport	-20 ... +60 °C (-4 ... +140 °F)
• Operation	5 ... 55 °C (41 ... 131 °F)
Dimensions	
• Width	90 mm (3.54 in)
• Height	120 mm (4.72 in)
• Depth	15 mm (0.59 in)
Weight, approx.	0.1 kg (0.22 lb)

¹⁾ Increase of power consumption by additional max. 5 W (max. 1 A; 5 V) depends on connected handwheels.

²⁾ The pre-assembled cable 6FX8002-4AA21-.... is supplied with a DU box connector.