SIEMENS

SIMATIC

S7
S7-1200 Programmable controller

System Manual

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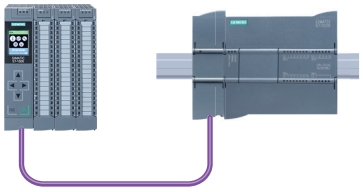
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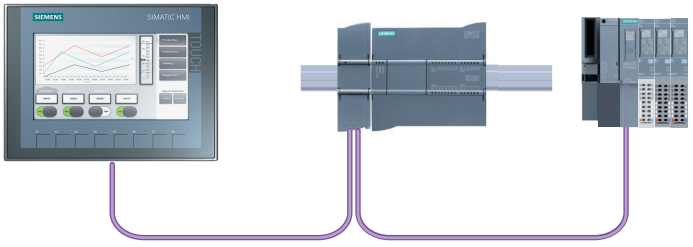
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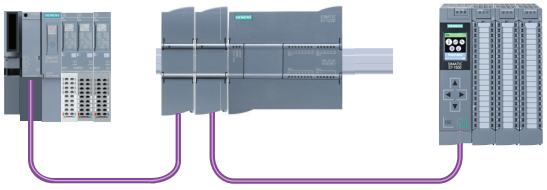
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The S7-1200 is connected to a PROFIBUS network as a DP master with the CM 1243-5 communication module. The CM 1243-5 (DP master) module can be the communications partner of DP V0/V1 slaves. In the figure below, the S7-1200 is a master controlling an ET 200SP DP slave:



If a CM 1242-5 and a CM 1243-5 are installed together, an S7-1200 can perform as both a slave of a higher-level DP master system and a master of a lower-level DP slave system, simultaneously:



As of V3.0, you can configure a maximum of three PROFIBUS CMs per station, in which there can be any combination of DP master or DP slave CMs. DP masters in a V3.0 or greater CPU firmware implementation can each control a maximum of 32 slaves.

The configuration data of the PROFIBUS CMs is stored on the local CPU. This allows simple replacement of these communications modules when necessary.

To use PROFIBUS with S7-1200 V4.0 or later CPUs, you must upgrade the PROFIBUS Master CM firmware to at least V1.3.

Note

Always update the PROFIBUS CM firmware to the latest version available (http://support.automation.siemens.com/WW/view/en/42131407). You can perform a firmware update by any of these methods:

- Using the online and diagnostic tools of STEP 7 (Page 1144)
- Using a SIMATIC memory card (Page 123)
- Using the Web server "Module Information" standard Web page (Page 826)
- Using the SIMATIC Automation Tool (https://support.industry.siemens.com/cs/ww/en/view/98161300)

11.6.1 Communications services of the PROFIBUS CMs

The PROFIBUS CMs use the PROFIBUS DP-V1 protocol.

Types of communication with DP-V1

The following types of communication are available with DP-V1:

- Cyclic communication (CM 1242-5 and CM 1243-5)
  Both PROFIBUS modules support cyclic communication for the transfer of process data between DP slave and DP master.
  Cyclic communication is handled by the operating system of the CPU. No software blocks are required for this. The I/O data is read or written directly from/to the process image of the CPU.
- Acyclic communication (CM 1243-5 only)
  The DP master module also supports acyclic communication using software blocks:
  - The "RALRM" instruction is available for interrupt handling.
  - The "RDREC" and "WRREC" instructions are available for transferring configuration and diagnostics data.

Functions not supported by the CM 1243-5: SYNC/FREEZE and Get_Master_Diag

Other communications services of the CM 1243-5

The CM 1243-5 DP master module supports the following additional communications services:

- S7 communication
  - PUT/GET services
    The DP master functions as a client and server for queries from other S7 controllers or PCs via PROFIBUS.
  - PG/OP communication
    The PG functions allow the downloading of configuration data and user programs from a PG and the transfer of diagnostics data to a PG.
    Possible communications partners for OP communication are HMI panels, SIMATIC panel PCs with WinCC flexible or SCADA systems that support S7 communication.

11.6.2 Reference to the PROFIBUS CM user manuals

Further information

You can find detailed information on the PROFIBUS CMs in the manuals for the devices. You can find these on the Internet in the pages of Siemens Industrial Automation Customer Support under the following entry IDs:

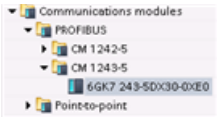
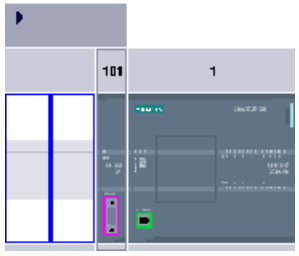
- CM 1242-5 (https://support.industry.siemens.com/cs/ww/en/ps/15667)
- CM 1243-5 (https://support.industry.siemens.com/cs/ww/en/ps/15669)

11.6.3 Configuring a DP master and slave device

11.6.3.1 Adding the CM 1243-5 (DP master) module and a DP slave

In the "Devices and networks" portal, use the hardware catalog to add PROFIBUS modules to the CPU. These modules are connected to the left side of the CPU. To insert a module into the hardware configuration, select the module in the hardware catalog and either double-click or drag the module to the highlighted slot.

Table 11-62 Adding a PROFIBUS CM 1243-5 (DP master) module to the device configuration

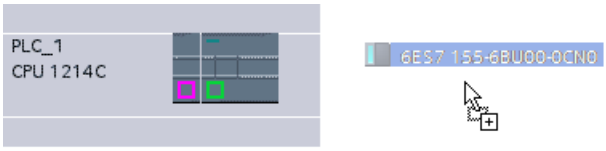
Module	Select the module	Insert the module	Result
CM 1243-5 (DP master)			

Use the hardware catalog to add DP slaves as well. For example, to add an ET 200SP DP slave, in the Hardware Catalog, expand the following containers:

- Distributed I/O
- ET 200SP
- Interface modules
- PROFIBUS

Next, select "6ES7 155-6BU00-0CN0" (IM155-6 DP HF) from the list of part numbers, and add the ET 200SP DP slave as shown in the figure below.

Table 11-63 Adding an ET 200SP DP slave to the device configuration

Insert the DP slave	Result
	

11.6.3.2 Configuring logical network connections between two PROFIBUS devices

After you configure the CM 1243-5 (DP master) module, you are now ready to configure your network connections.

In the Devices and Networks portal, use the "Network view" to create the network connections between the devices in your project. To create the PROFIBUS connection, select the purple (PROFIBUS) box on the first device. Drag a line to the PROFIBUS box on the second device. Release the mouse button and your PROFIBUS connection is joined.

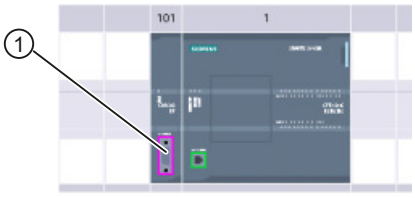
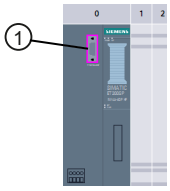
Refer to "Device Configuration: Creating a network connection" (Page 565) for more information.

11.6.3.3 Assigning PROFIBUS addresses to the CM 1243-5 module and DP slave

Configuring the PROFIBUS interface

After you configure logical network connections between two PROFIBUS devices, you can configure parameters for the PROFIBUS interfaces. To do so, click the purple PROFIBUS box on the CM 1243-5 module, and the "Properties" tab in the inspector window displays the PROFIBUS interface. The DP slave PROFIBUS interface is configured in the same manner.

Table 11-64 Configuring the CM 1243-5 (DP master) module and ET 200SP DP slave PROFIBUS interfaces

CM 1243-5 (DP master) module	ET 200SP DP slave
	

① PROFIBUS port

Assigning the PROFIBUS address

In a PROFIBUS network, each device is assigned a PROFIBUS address. This address can range from 0 through 127, with the following exceptions:

- Address 0: Reserved for network configuration and/or programming tools attached to the bus
- Address 1: Reserved by Siemens for the first master
- Address 126: Reserved for devices from the factory that do not have a switch setting and must be re-addressed through the network
- Address 127: Reserved for broadcast messages to all devices on the network and may not be assigned to operational devices

Thus, the addresses that may be used for PROFIBUS operational devices are 2 through 125.

In the Properties window, select the "PROFIBUS address" configuration entry. STEP 7 displays the PROFIBUS address configuration dialog, which is used to assign the PROFIBUS address of the device.

A.16.1.2 Pinout of the D-sub socket of the CM 1242-5

PROFIBUS interface

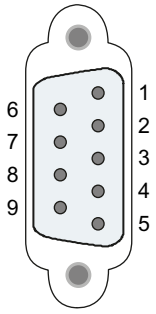


Table A-244 Pinout of the D-sub socket

Pin	Description	Pin	Description
1	- not used -	6	P5V2: +5V power supply
2	- not used -	7	- not used -
3	RxD/TxD-P: Data line B	8	RxD/TxD-N: Data line A
4	RTS	9	- not used -
5	M5V2: Data reference potential (ground DGND)	Housing	Ground connector

A.16.1.3 CM 1243-5 PROFIBUS DP Master

Table A-245 Technical specifications of the CM 1243-5

Technical specifications	
Article number	6GK7243-5DX30-0XE0
Interfaces	
Connection to PROFIBUS	9-pin D-sub female connector
Maximum current consumption on the PROFIBUS interface when connecting network components (for example optical network components)	15 mA at 5 V (only for bus termination) *)
Permitted ambient conditions	
Ambient temperature	
• during storage	• -40 °C to 70 °C
• during transportation	• -40 °C to 70 °C
• during operation with a vertical installation (DIN rail horizontal)	• 0 °C to 55 °C
• during operation with a horizontal installation (DIN rail vertical)	• 0 °C to 45 °C

Technical specifications	
Relative humidity at 25 °C during operation, without condensation, maximum	95 %
Degree of protection	IP20
Power supply, current consumption and power loss	
Type of power supply	DC
Power supply / external • minimum • maximum	24 V • 19.2 V • 28.8 V
Current consumption (typical) • from 24 V DC • from the S7-1200 backplane bus	 • 100 mA • 0 mA
Effective power loss (typical) • from 24 V DC • from the S7-1200 backplane bus	 • 2.4 W • 0 W
Power supply 24 V DC / external • Min. cable cross section • Max. cable cross section • Tightening torque of the screw terminals	 • min.: 0.14 mm^2 (AWG 25) • max.: 1.5 mm^2 (AWG 15) • 0.45 Nm (4 lb-in)
Electrical isolation • PROFIBUS interface to ground • PROFIBUS interface to internal circuit	710 V DC for 1 minute
Dimensions and weights	
• Width • Height • Depth	• 30 mm • 100 mm • 75 mm
Weight • Net weight • Weight including packaging	 • 134 g • 171 g

*)The current load of an external consumer connected between VP (pin 6) and DGND (pin 5) must not exceed a maximum of 15 mA (short-circuit proof) for bus termination.

Note

The CM 1243-5 (PROFIBUS master module) must receive power from the 24 V DC sensor supply of the CPU.

A.16.1.4 Pinout of the D-sub socket of the CM 1243-5

PROFIBUS interface

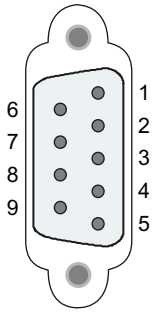


Table A-246 Pinout of the D-sub socket

Pin	Description	Pin	Description
1	- not used -	6	VP: Power supply +5 V only for bus terminating resistors; not for supplying external devices
2	- not used -	7	- not used -
3	RxD/TxD-P: Data line B	8	RxD/TxD-N: Data line A
4	CNTR-P: RTS	9	- not used -
5	DGND: Ground for data signals and VP	Housing	Ground connector

PROFIBUS cable

Note

Contacting the shield of the PROFIBUS cable

The shield of the PROFIBUS cable must be contacted.

To do this, strip the insulation from the end of the PROFIBUS cable and connect the shield to functional earth.

A.16.2 CP 1242-7

Note

The CP 1242-7 is not approved for Maritime applications

The CP 1242-7 does not have Maritime approval.

Signal and battery boards		Article number
Analog	SB 1232 1 Analog Output	6ES7232-4HA30-0XB0
	SB 1231 1 Analog Input	6ES7231-4HA30-0XB0
	SB 1231 1 Analog Input Thermocouple	6ES7231-5QA30-0XB0
	SB 1231 1 Analog Input RTD	6ES7231-5PA30-0XB0
Battery	BB 1297 Battery Board (battery type CR1025 not included)	6ES7297-0AX30-0XA0

C.3 Communication

Table C-4 Communication module (CM)

Communication module (CM)			Article number
RS232, RS422, and RS485	CM 1241 RS232	RS232	6ES7241-1AH32-0XB0
	CM 1241 RS422/485	RS422/485	6ES7241-1CH32-0XB0
PROFIBUS	CM 1243-5	PROFIBUS Master	6GK7243-5DX30-0XE0
	CM 1242-5	PROFIBUS Slave	6GK7242-5DX30-0XE0
AS-i Master	CM 1243-2	AS-i Master	3RK7243-2AA30-0XB0

Table C-5 Communication board (CB)

Communication board (CB)			Article number
RS485	CB 1241 RS485	RS485	6ES7241-1CH30-1XB0

Table C-6 Communication Processor (CP)

CP	Interface	Article number
CP 1242-7 GPRS V2	GPRS	6GK7242-7KX31-0XE0
CP 1243-7 LTE-US	LTE	6GK7243-7SX30-0XE0
CP 1243-7 LTE-EU	LTE	6GK7243-7KX30-0XE0
CP 1243-1	IE-interface	6GK7243-1BX30-0XE0
CP 1243-8 IRC	IE- and serial interface	6GK7243-8RX30-0XE0

Table C-7 TeleService

TS Adapter	Article number
TS Module RS232	6ES7972-0MS00-0XA0
TS Module Modem	6ES7972-0MM00-0XA0