

SIEMENS

SIMATIC

ET 200SP CM PtP communications module (6ES7137-6AA01-0BA0)

Equipment Manual

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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
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


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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

Purpose of the documentation

This documentation provides important information on installing, wiring and commissioning the ET 200SP point-to-point communications module.

This device manual complements the system manual ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>). General functions of the ET 200SP are described in the system manual ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>).

Conventions

This documentation contains figures of the described device. The figures may differ slightly from the devices supplied.

Please also observe notes marked as follows:

Note

A note contain important information on the product described in the documentation, on the handling of the product and on the section of the documentation to which particular attention should be paid.

Document history

The following table shows the most important changes to the documentation compared to the previous edition.

Manual edition	Comments
03/2021	The following sections have been revised: <ul style="list-style-type: none">• Product overview (Page 11)• Connecting (Page 19)• Parameters/address space (Page 26)• Programming (Page 35)• Interrupts/diagnostics alarms (Page 37)• Technical specifications (Page 41)
01/2013	First edition

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You can find catalogs for all automation and drive products on the Internet (<https://mall.industry.siemens.com>) and in the Information and Download Center (<https://www.siemens.com/automation/infocenter>).

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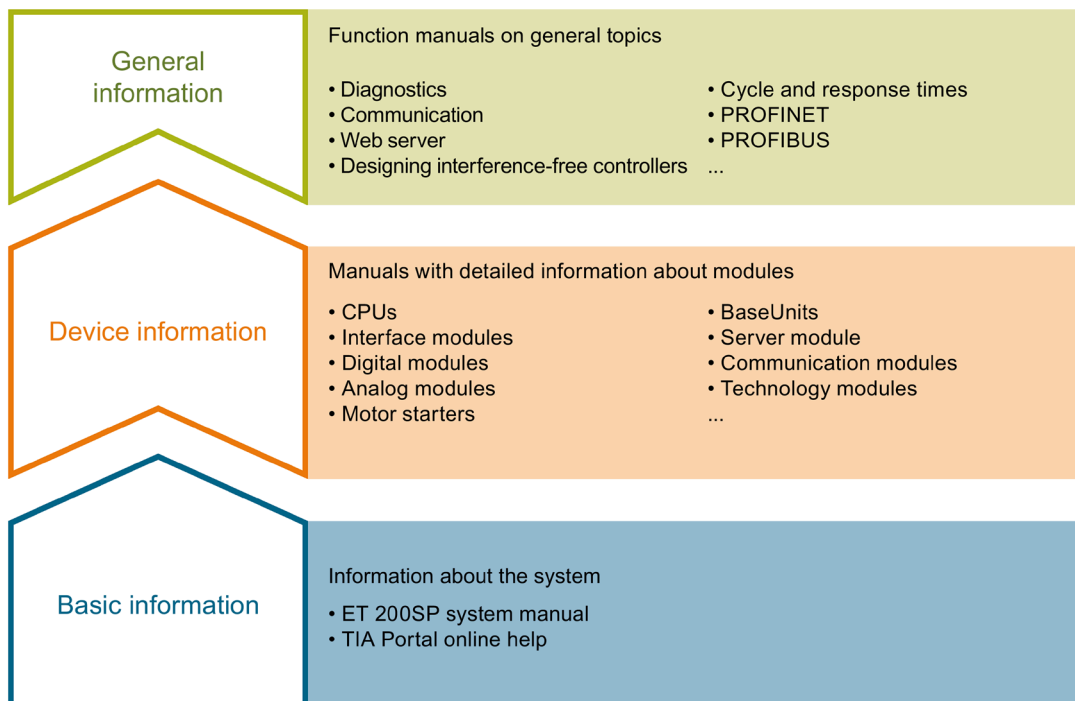
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Documentation guide

The documentation for the SIMATIC ET 200SP distributed I/O system is arranged into three areas.

This arrangement enables you to access the specific content you require.



Basic information

The System Manual and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC ET 200SP distributed I/O system. The STEP 7 online help supports you in the configuration and programming.

Device information

Product manuals contain a compact description of the module-specific information, such as properties, wiring diagrams, characteristics and technical specifications.

General information

The function manuals contain detailed descriptions on general topics regarding the SIMATIC ET 200SP distributed I/O system, e.g. diagnostics, communication, Web server, motion control and OPC UA.

You can download the documentation free of charge from the Internet (<https://support.industry.siemens.com/cs/ww/en/view/109742709>).

Changes and supplements to the manuals are documented in a Product Information.

You can download the product information free of charge from the Internet (<https://support.industry.siemens.com/cs/us/en/view/73021864>).

Manual Collection ET 200SP

The Manual Collection contains the complete documentation on the SIMATIC ET 200SP distributed I/O system gathered together in one file.

You can find the Manual Collection on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/84133942>).

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You can find "mySupport" on the Internet (<http://support.industry.siemens.com/My/ww/en/documentation>).

"mySupport" - CAx data

In the CAx data area of "mySupport", you can access the latest product data for your CAx or CAe system.

You configure your own download package with a few clicks.

In doing so you can select:

- Product images, 2D dimension drawings, 3D models, internal circuit diagrams, EPLAN macro files
- Manuals, characteristics, operating manuals, certificates
- Product master data

You can find "mySupport" - CAx data on the Internet (<http://support.industry.siemens.com/my/ww/en/CAxOnline>).

Application examples

The application examples support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus on individual products.

You will find the application examples on the Internet (<https://support.industry.siemens.com/sc/ww/en/sc/2054>).

TIA Selection Tool

With the TIA Selection Tool, you can select, configure and order devices for Totally Integrated Automation (TIA).

This tool is the successor of the SIMATIC Selection Tool and combines the known configurators for automation technology into one tool.

With the TIA Selection Tool, you can generate a complete order list from your product selection or product configuration.

You can find the TIA Selection Tool on the Internet (<http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool>).

SIMATIC Automation Tool

You can use the SIMATIC Automation Tool to perform commissioning and maintenance activities simultaneously on various SIMATIC S7 stations as a bulk operation independent of TIA Portal.

The SIMATIC Automation Tool provides a multitude of functions:

- Scanning of a PROFINET/Ethernet system network and identification of all connected CPUs
- Address assignment (IP, subnet, gateway) and station name (PROFINET device) to a CPU
- Transfer of the date and the programming device/PC time converted to UTC time to the module

- Program download to CPU
- RUN/STOP mode switchover
- CPU localization by means of LED flashing
- Reading out of CPU error information
- Reading of the CPU diagnostics buffer
- Reset to factory settings
- Firmware update of the CPU and connected modules

You can find the SIMATIC Automation Tool on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/98161300>).

PRONETA

SIEMENS PRONETA (PROFINET network analysis) allows you to analyze the plant network during commissioning. PRONETA features two core functions:

- The topology overview automatically scans the PROFINET and all connected components.
- The IO check is a fast test of the wiring and the module configuration of a plant.

You can find SIEMENS PRONETA on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/67460624>).

SINETPLAN

SINETPLAN, the Siemens Network Planner, supports you in planning automation systems and networks based on PROFINET. The tool facilitates professional and predictive dimensioning of your PROFINET installation as early as in the planning stage. In addition, SINETPLAN supports you during network optimization and helps you to exploit network resources optimally and to plan reserves. This helps to prevent problems in commissioning or failures during productive operation even in advance of a planned operation. This increases the availability of the production plant and helps improve operational safety.

The advantages at a glance

- Network optimization thanks to port-specific calculation of the network load
- Increased production availability thanks to online scan and verification of existing systems
- Transparency before commissioning through importing and simulation of existing STEP 7 projects
- Efficiency through securing existing investments in the long term and the optimal use of resources

You can find SINETPLAN on the Internet (<https://www.siemens.com/sinetplan>).

Product overview

2.1 Properties

Article number

6ES7137-6AA01-0BA0 (packing unit: pack of 1)

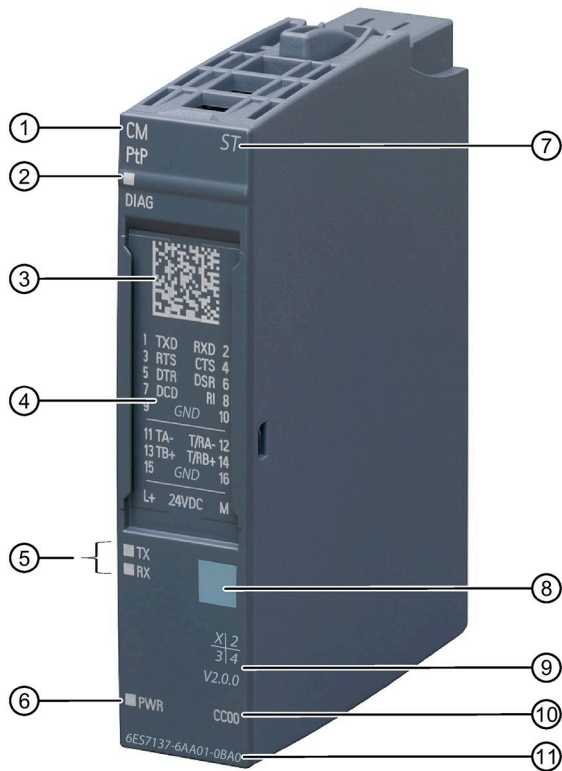
6ES7137-6AA01-2BA0 (packing unit: pack of 10)

The CM PtP communications module with article number 6ES7137-6AA01-0BA0 and firmware version V2.0 replaces the CM PtP with article number 6ES7137-6AA00-0BA0.

Firmware version

This manual describes the properties of firmware version V2.0 of the module.

View of the module



- | | |
|-------------------------------|--|
| ① Module type and designation | ⑦ Function class |
| ② LED for diagnostics | ⑧ Module type color coding |
| ③ 2D matrix code | ⑨ Function and firmware version |
| ④ Terminal diagram | ⑩ Color code for selection of the color-coded labels and BaseUnit type |
| ⑤ LED for status indicators | ⑪ Article number |
| ⑥ LED for supply voltage | |

Figure 2-1 View of the CM PtP module as an example

Properties

The communications module has the following properties:

- Technical properties
 - RS232 interface (via BaseUnit)
 - RS422/485 interface (via BaseUnit)
 - short-circuit proof
 - electrically disconnected
 - Protocols: 3964(R), Modbus master (RTU), Modbus slave (RTU), Freepoint and USS with instructions

The module supports the following functions:

Table 2- 1 Version dependencies of the functions

Function	Firmware version of the module	Configurable as of		
		STEP 7 (TIA Portal)	GSD	
			PROFINET IO	PROFIBUS DP
Firmware update	V1.0 or higher	V12	X	—
Identification data I&M0	V1.0 or higher	V12	X	X
Parameter reassignment in RUN (using instructions)	V1.0 or higher	V12	X	X
Diagnostics interrupts	V1.0 or higher	V12	X	X
Data transmission rate up to 250 kbit/s ¹ with RS485; DMX512 protocol	V1.0.5 or higher	V17	X	X
Option for performance optimization	V2.0 or higher	V17	X	X

¹ 250 kbit/s with firmware versions <V2.0 can only be configured with instructions or data records

Firmware versions V1.0 to V1.0.5 are available for the article number 6ES7137-6AA00-0BA0. Firmware version V2.0 is available for the article number 6ES7137-6AA01-0BA0.

Accessories

A **BaseUnit of type A0** is needed for operation of the communications module. You will find an overview of the BaseUnits you can use with the communications module in Product information on the documentation of the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/73021864>).

You can find additional information on the accessories in the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual.

Additional information

Additional information on the properties of the CM PtP can be found in the function manual CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>).

You can find additional information on the design of the ET 200SP and the associated modules in the system manual ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>).

Additional information on using the CM PtP without the prepared instruction libraries is available in the programming and operating manual CM PtP operation with PROFINET controller (<http://support.automation.siemens.com/WW/view/en/59062563>).

2.2 Functions

Introduction

The communications module allows you to exchange data between your own and other programmable controllers or computers by means of a point-to-point connection, and to connect various devices from a variety of manufacturers.

Functionality of the CM PtP

The CM PtP communications module offers the following functionality:

- RS232 and RS422/485 interface
- Data transmission rate: 300 to 250000 bit/s
- Maximum frame length:
 - Without performance optimization: 2 kbyte
 - With performance optimization: 24 bytes for receiving, 30 bytes for sending
- Transmission protocols: Freeport, 3964(R) and Modbus RTU

Note

The USS protocol can be implemented with instructions included in STEP 7 (TIA Portal).

Hardware components of a point-to-point connection

You require certain hardware components for a point-to-point connection with the CM PtP.

Components	Function
Automation system	... contains the CPU and PROFINET interface, and the central I/O, if applicable, and executes the user program.
ET 200SP Distributed I/O System	... contains the distributed I/O.
Interface module (IM)	... connects the ET 200SP distributed I/O system with PROFINET IO or any other fieldbus system and supports all ET 200SP I/O modules.
CM PtP communications module	... communicates via the interface with one or more communication partners (point-to-point or multipoint connection).
BaseUnit (6ES7193-6BPx0-0xA0)	... connects the communications module with the I/O system and the supply voltage.
Server module	... completes the setup of the ET 200SP.

Additional information

Information on configuration and programming of the CM PtP communications module is available in the function manual CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>) and in the information system of STEP 7 (TIA Portal).

2.3 Properties of the interfaces

Interfaces of the CM PtP

The CM PtP has the following interfaces, which are connected (Page 19) by means of the associated BaseUnit:

- RS232 interface
- RS422/485 interface

2.3.1 Properties of the RS232 interface

Definition

The RS232 interface is a voltage interface used for serial data transmission.

Properties

The RS232 interface has the following properties and meets the following requirements:

Type	Voltage interface
BaseUnit terminals	Terminals connected to the electronics module (see RS232 interface of the communications module (Page 20) for assignment)
RS232 signals	TXD, RXD, RTS, CTS, DTR, DSR, RI, DCD, GND; all signals isolated against the backplane bus and load voltage
Max. data transmission rate	115.2 kbps
max. cable length	15 m, cable type LIYCY 9 x 0.14
Standard	DIN 66020, DIN 66259, EIA-RS 232C, CCITT V.24/V.28

RS232 signals

The table below shows the meaning of the individual RS232 accompanying signals.

Table 2- 2 Signals of the RS232 interface

Signal	Designation	Meaning
TXD	Transmit Data	Transmit data; transmit cable logically held to "1" by communications module in idle state.
RXD	Receive Data	Receive data; receive cable logically held to "1" by communication partner in idle state.
RTS	Request To Send	Request to send RTS set to "ON": communications module ready to send; signals to the communication partner that there is data ready to send RTS set to "OFF": communications module does not send
CTS	Clear To Send	Clear to send CTS set to "ON": Signals "clear to send" to the communication partner CTS set to "OFF": Signals "Not clear to send" to the communication partner
DTR	Data Terminal Ready	DTR set to "ON": Communications module switched on, ready for operation DTR set to "OFF": Communications module not switched on, not ready for operation
DSR	Data Set Ready	DSR set to "ON": Communication partner signals "ready for operation" DSR set to "OFF": Communication partner not switched on, not ready for operation
RI	Ring Indicator	Incoming call when connecting a modem
DCD	Data Carrier Detect	Carrier signal when connecting a modem. The communication partner signals with a high level that it detects incoming data on the cable.

2.3.2 Properties of the RS422/485 interface

Definition

The RS422/485 (X27) interface is a differential voltage interface for serial data transmission.

Properties

The RS422/485 (X27) interface has the following properties and meets the following requirements:

Type	Differential voltage interface
BaseUnit terminals	Terminals connected to the electronics module (see RS422/485 interface of the communications module (Page 23) for assignment)
RS422 signals	T (A), R (A), T (B), R (B), GND; all signals are isolated against the backplane bus and the load voltage
RS485 signals	R/T (A), R/T (B), GND; all signals isolated against backplane bus and load voltage
Max. data transmission rate	250 kbps
Max. cable length	1200 m for 0.3...19.2 kbps, 500 m for 38.4 kbps, 350 m for 76.8 kbps, 250 m for 115.2 kbps, 200 m for 250 kbps; cable type LIYCY 3 x 2 x 0.14. T(A)/T(B) and R(A)/R(B) twisted in pairs To ensure interference-free operation for cable lengths > 50 m, you must install a terminating resistor of approx. 330 Ω at the receiver end.
Standard	DIN 66259 Parts 1 and 3, EIA-RS422/485, CCITT V.11

Connecting

3.1 Introduction

The CM PtP communications module is used with a BaseUnit of type A0 (article number 6ES7193-6BPx0-0xA0).

You connect the input and output signals to the BaseUnit of the communications module. The supply voltage feed on the light-colored BaseUnit BU...D of the associated potential group supplies the module.

BaseUnit

The BaseUnit is not included in the scope of delivery of the module and must be ordered separately.

You will find an overview of the BaseUnits you can use with the communications module in Product information on the documentation of the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/73021864>).

You can find information about selecting a suitable BaseUnit in the ET 200SP Distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual and ET 200SP BaseUnits (<http://support.automation.siemens.com/WW/view/en/58532597/133300>) manual.

You can find information on wiring the BaseUnit, connecting cable shields, etc. in the Wiring section of the ET 200SP Distributed I/O system (<http://support.automation.siemens.com/WW/view/en/73021864>) system manual.

Supply voltage L+/M

With a light-colored BaseUnit, you connect the supply voltage to the L+ and M terminals. With a dark BaseUnit, the supply voltage of the left-hand module is used. An internal protective circuit protects the communications module from polarity reversal of the supply voltage. The communications module monitors the connection of the supply voltage.

3.2 RS232 interface of the communications module

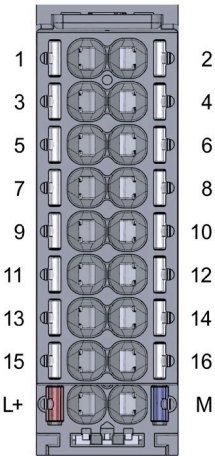
RS232 interface

The RS232 interface is a voltage interface used for serial data transmission.

The inputs and outputs are not isolated from each other. The inputs and outputs are electrically isolated from the backplane bus.

Terminal assignment of the BaseUnit

Table 3- 1 RS232 connection

Terminal assignment of the BaseUnit of the communications module	Pin	Designation	Input/output	Meaning
	1	TXD Transmit Data	Output	Transmit data
	2	RXD Receive Data	Input	Receive data
	3	RTS Request To Send	Output	Request to send
	4	CTS Clear To Send	Input	Clear to send
	5	DTR Data Terminal Ready	Output	Data terminal ready
	6	DSR Data Set Ready	Input	Data set ready
	7	DCD Data Carrier Detect	Input	Received signal level
	8	RI Ring Indicator	Input	Incoming call
	9	GND Ground	---	Shared ground reference (ground)
	10			

Front view

Block diagram

You must ground the shields of the cables between communication partner and communications module both through the shield contact on the BaseUnit (shield bracket and terminal) and on the communication partner.

The figure below shows the block diagram of the communications module for operation at the RS232 connection.

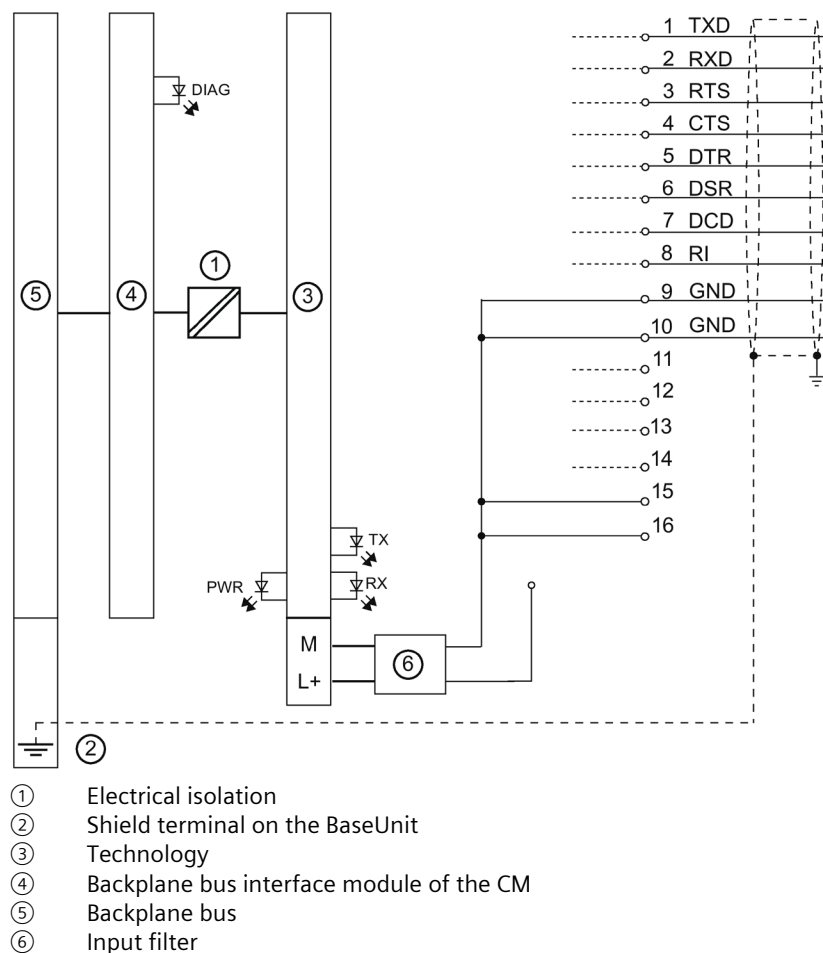


Figure 3-1 Block diagram for RS232 operation

CAUTION

Never connect cable shield with GND

Never connect the cable shield with the GND, as this could destroy the interfaces. GND must always be connected with the communications module *and* communication partner; otherwise the submodules could again be destroyed.

Note

Ensure the power supply is disconnected before you wire the communications module.

Additional information

Information on connecting the modules can be found in the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual.

3.3 RS422/485 interface of the communications module

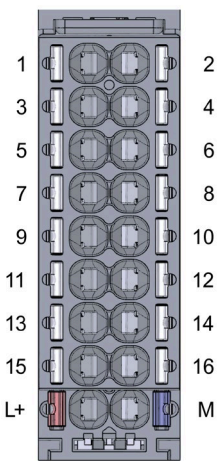
RS422/485 interface

The RS422/485 (X27) interface is a differential voltage interface for serial data transmission.

The inputs and outputs are not isolated from each other. The inputs and outputs are electrically isolated from the backplane bus.

Terminal assignment of the BaseUnit

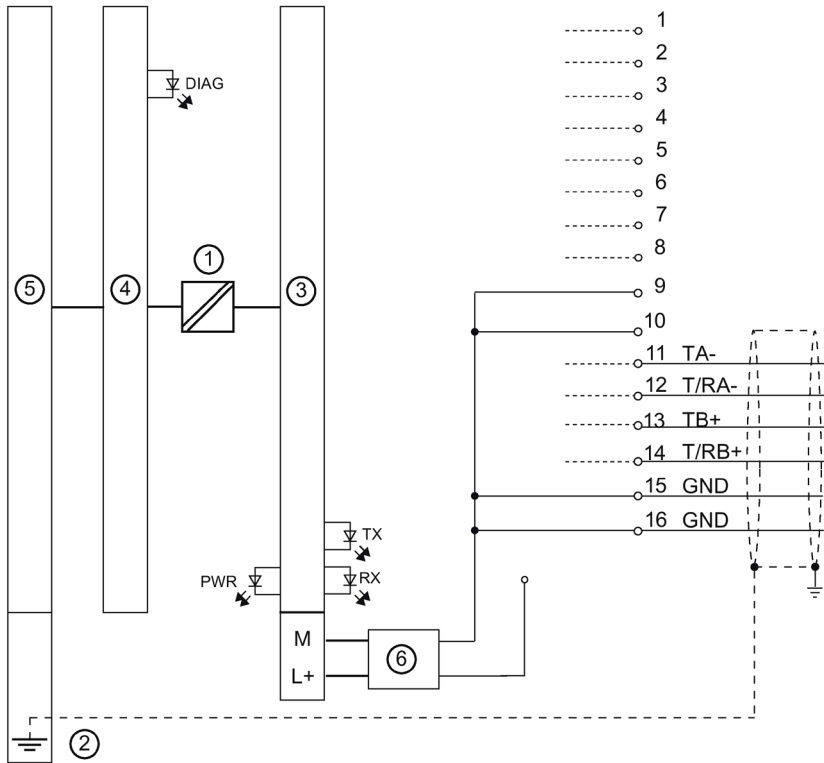
Table 3-2 RS422/485 connection

Terminal assignment of the BaseUnit of the communications module	Pin	Designation	Input/output	Meaning
	11	T (A)-	Output	Send data (four-wire mode)
	12	R (A)- T(A)/R(A)	Input Input/output	Receive data (four-wire mode) Receive/send data (two-wire mode)
	13	T (B)+	Output	Send data (four-wire mode)
	14	R (B)+ T(B)/R(B)	Input Input/output	Receive data (four-wire mode) Receive/send data (two-wire mode)
	15	GND Ground	---	Shared ground reference (ground)
	16			
	L+	M		
Front view				

Block diagram

You must ground the shields of the cables between communication partner and communications module both through the shield contact on the BaseUnit (shield bracket and terminal) and on the communication partner.

The figure below shows the block diagram of the communications module for operation at the RS422/485 connection.



- ① Electrical isolation
- ② Shield terminal on the BaseUnit
- ③ Technology
- ④ Backplane bus interface module of the CM
- ⑤ Backplane bus
- ⑥ Input filter

Figure 3-2 Block diagram for RS422/485 operation

⚠ CAUTION

Never connect cable shield with GND

Never connect the cable shield with the GND, as this could destroy the interfaces. GND must always be connected with the communications module *and* communication partner; otherwise the submodules could again be destroyed.

Note

Ensure the power supply is disconnected before you wire the communications module.

Note

To ensure interference-free operation for cable lengths > 50 m, you must install a terminating resistor of approx. 330 Ω at the receiver end.

Additional information

Information on connecting the modules can be found in the FAQ with the entry ID 109736665 (<https://support.industry.siemens.com/cs/ww/en/view/109736665>) and in the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual.

3.4 Installation guidelines

To take into consideration

The general installation guidelines must be taken into consideration (see the EMC/EMI compatible installation of control systems (<http://support.automation.siemens.com/WW/view/en/59193566>) Function Manual).

To comply with the required EMC values (electromagnetic compatibility), the cable shields must be connected to the shield terminal.

Parameters/address space

4.1 Configuring

Introduction

You configure and assign the parameters of the communications module with STEP 7 (TIA Portal).

System environment

The communications module can be used in the following system environments:

Applications	Components required	Configuration software	In the user program
Centralized operation with a CPU 151xSP	<ul style="list-style-type: none"> ET 200SP automation system CM PtP 	STEP 7 (TIA Portal): Device configuration and parameter setting with hardware configuration	Instruction libraries PtP Communication, USS Communication and MODBUS (RTU) (Page 35)
Distributed operation with an S7-1500 CPU	<ul style="list-style-type: none"> S7-1500 automation system ET 200SP distributed I/O system CM PtP 	STEP 7 (TIA Portal): Device configuration and parameter setting with - configuration	
Distributed operation with an S7-300/400 CPU	<ul style="list-style-type: none"> S7-300/400 automation system ET 200SP distributed I/O system CM PtP 	STEP 7 (TIA Portal): Device configuration and parameter setting with hardware configuration	
		STEP 7: Device configuration and parameter setting with GSD file	Instruction libraries PtP Communication, USS Communication and MODBUS (RTU) with the entry ID 75226762 (https://support.industry.siemens.com/cs/ww/en/view/75226762) in the Siemens Industry Online Support
Distributed operation in a third-party system ¹	<ul style="list-style-type: none"> Third-party automation system ET 200SP distributed I/O system CM PtP 	Third-party configuration software: Device configuration and parameter setting with GSD file	Instructions for control and parameter assignment according to the programming manual ¹

¹ Information on using the communications module in a third-party system is available in the programming and operating manual CM PtP operation with PROFINET controller (<http://support.automation.siemens.com/WW/view/en/59062563>).

Additional information

A detailed description of the point-to-point connections and their configuration is available:

- In the Function Manual CM PtP - Configurations for point-to-point connections as download on the Internet (<http://support.automation.siemens.com/WW/view/en/59057093>)
- In the STEP 7 (TIA Portal) information system under "Edit devices and networks > Configuring devices and networks > Create configurations > Configurations for point-to-point connections (S7-1500)"
- In the FAQ with the entry ID 109477693 (<https://support.industry.siemens.com/cs/ww/en/view/109477693>) in the Siemens Industry Online Support

GSD file

The respective GSD file for the ET 200SP distributed I/O system is available for download on the Internet:

- GSD file PROFINET IO (<http://support.automation.siemens.com/WW/view/en/57138621>)
- GSD file PROFIBUS DP (<http://support.automation.siemens.com/WW/view/en/73016883>)

4.2 Reaction to CPU STOP

Ongoing transmissions are aborted when the higher-level control (CPU) goes to STOP.

Frames will continue to be received and are retained in the receive buffer. Information about this is forwarded to the CPU only after a STOP-RUN transition, provided you have configured in the properties of the communications module that the receive buffer is not cleared.

4.3 Parameter setting

You can use various parameters to define the properties of the communications module. Depending on the settings, not all parameters are available.

You set the parameters of the module as follows:

Parameter setting via ...	Basic procedure
Hardware configuration in STEP 7 (TIA Portal)	<ol style="list-style-type: none"> 1. Insert the module from the hardware catalog under "Communications modules". 2. Set the parameters of the module in the hardware configuration. 3. Download the project to the CPU.
Hardware configuration using GSD file for distributed operation on the PROFINET IO	<ol style="list-style-type: none"> 1. Install the latest PROFINET GSD file. You will then find the module in the hardware catalog under "Other field devices > PROFINET IO > I/O". 2. Set the parameters in the hardware configuration. 3. Download the project to the CPU.
Hardware configuration using GSD file for distributed operation on the PROFIBUS DP	<ol style="list-style-type: none"> 1. Install the latest PROFIBUS GSD file. You will then find the module in the hardware catalog under "Other field devices > PROFIBUS DP > I/O". 2. Set the parameters in the hardware configuration. Only the parameters marked with ¹ in the following table can be set in the PROFIBUS GSD file. 3. Download the project to the CPU. The parameters that are not marked with ¹ in the following table are downloaded with their default setting. 4. If necessary, set the parameters not marked with ¹ in the user program using the corresponding data records.

Parameters of CM PtP

The following parameter settings are possible. The default settings of the parameters are shown in bold in the "Value range" column.

Table 4- 1 Programmable parameters

Parameter	Value range	Scope
Potential group ¹	<ul style="list-style-type: none"> Use potential group of the left module (dark BaseUnit) Enable new potential group (light BaseUnit) 	Module
Specification of the operating mode	<ul style="list-style-type: none"> RS232C Full duplex (RS422) 4-wire operation (point-to-point) Full duplex (RS422) four wire mode (multipoint master) Full duplex (RS 422) four wire mode (multipoint slave) Half duplex (RS485) two-wire operation 	Channel
Receive line initial state	<ul style="list-style-type: none"> None Signal R(A)=5 V, signal R(B)=0 V (break detection) Signal R(A)=0 V, Signal R(B)=5 V 	Channel
Protocol	<ul style="list-style-type: none"> Freeport/Modbus 3964(R) 	Channel
Performance optimized for many short frames ²	<ul style="list-style-type: none"> Deactivated Activated 	Channel
Data transmission rate	<ul style="list-style-type: none"> 300 bps 600 bps 1200 bps 2400 bps 4800 bps 9600 bps 19200 bps 38400 bps 57600 bps 76800 bps 115200 bps 250000 bps 	Channel

4.3 Parameter setting

Parameter	Value range	Scope
Parity	<ul style="list-style-type: none"> • None • Even • Odd • Mark: Set parity bit to 1 • Space: Set parity bit to 0 • Any 	Channel
Data bits	<ul style="list-style-type: none"> • 8 bits • 7 bits 	Channel
Stop bits	<ul style="list-style-type: none"> • 1 • 2 	Channel
Data flow control	<ul style="list-style-type: none"> • None • XON/XOFF • Hardware RTS always ON • Hardware RTS always ON, ignore DTR/DSR • Hardware RTS always switched 	Channel
XON character	0... 11 ...FF	Channel
XOFF character	0... 13 ...FF	Channel
Wait for XON after XOFF	0... 20000 ...65535 ms	Channel
Activate break detection	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Enable diagnostics interrupt	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Missing supply voltage L+	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Send break before frame start	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Break duration	0... 12 ...65535 bit times	Channel
Send idle line	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Duration of the idle line	0... 384 ...65535 bit times	Channel
RTS ON delay	0...65535 ms	Channel
RTS OFF delay	0...65535 ms	Channel
Send up to and including the end delimiter	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel

Parameter	Value range	Scope
No. of end delimiters	0...1...2	Channel
1st end delimiter (Hex)	0...FF	Channel
2nd end delimiter (Hex)	0...FF	Channel
Number of appended characters	0...5	Channel
Frame default settings	<ul style="list-style-type: none"> • Start on any character • Start on special condition 	Channel
After detection of a line break	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
After detection of an idle line	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Duration of the idle line	0...40...65535 bit times	Channel
After receipt of a start character	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Start character (Hex)	0...FF	Channel
After detection of a start sequence	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Number of sequences to be defined	<ul style="list-style-type: none"> • 1 • 2 • 3 • 4 	Channel
Recognize message end by message timeout	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Message timeout	1...200...65535 ms	Channel
Recognize message end by response timeout	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Response timeout	1...200...65535 ms	Channel
After character delay time elapses	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Character delay time	1...288...65535 bit times	Channel
After receipt of a fixed frame length	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Frame length	1...2048 bytes	Channel
After receipt of a maximum number of characters	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Frame length	1...2048 bytes	Channel

4.3 Parameter setting

Parameter	Value range	Scope
Read message length from message	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Offset of length field in message	0...2047 bytes	Channel
Size of length field	<ul style="list-style-type: none"> • 1 byte • 2 bytes • 4 bytes 	Channel
Number of characters not counted in length specification	0...255 bytes	Channel
After receipt of an end sequence	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Buffered received frames	1... 255	Channel
Prevent overwriting	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Clear receive buffer on startup	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Priority	<ul style="list-style-type: none"> • High • Low 	Channel
With block check (3964R)	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Use default values	<ul style="list-style-type: none"> • Deactivated • Activated 	Channel
Connection attempts	1... 6 ...255	Channel
Transmission attempts	1... 6 ...255	Channel
Character delay time	20... 220 ...65535 ms	Channel
Acknowledgment delay	20... 2000 ...65535 ms	Channel

- ¹ Due to the limited number of parameters at a maximum of 244 bytes per station with a PROFIBUS GSD configuration, the configuration options are restricted. This parameter is visible. The other parameters are preassigned in the module with the default setting. If your PROFIBUS master supports the "Read/write data record" function, you can set the other parameters using the respective data records.
- ² When configuring with GSD file, you specify the option by selecting the module name.

Using the GSD file for PROFIBUS DP

For parameter assignment of the communications module, depending on the protocol use, you must call the following instructions (Page 35) in GSD mode:

Freeport communication:

- Port_Config (Port configuration record - data record 57)
- Send_Config (Send configuration record - data record 59)
- Receive_Config (Receive configuration record - data record 60)
- Set_Features (Activate special function - data record 58)

3964 communication:

- Port_Config (Port configuration record - data record 57)
- P3964_Config (3964 protocol configuration - data record 61)
- Set_Features (Activate special function - data record 58)

Note

The Set_Features instruction must always be called as the last configuration instruction.

Additional information

The device manual of the communications module is supplemented by the function manual CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>) and the STEP 7 (TIA Portal) information system. There you will find information on the following topics:

- Operating modes
- Performance optimization
- Receive buffer
- Data flow control
- Transmission integrity
- Data transmission - protocol specific
- Programming/configuring in STEP 7 (TIA Portal)
- Module-specific instructions
- Diagnostics

Information on using the communications module in a third-party system is available in the programming and operating manual CM PtP operation with PROFINET controller (<http://support.automation.siemens.com/WW/view/en/59062563>).

To use the communications modules in a third-party system, the CPU must support communication by means of data records.

Information on reparameterization after failure and return of the power or the PROFINET/PROFIBUS connection is available in the FAQ with the entry ID 109783576 (<https://support.industry.siemens.com/cs/ww/en/view/109783576>) in the Siemens Industry Online Support.

4.4 Address space

Address space of the communications module

The size of the input and output addresses of the communications module depends on whether the performance optimization option (Page 35) is enabled.

Table 4-2 Size of the input and output addresses

	Inputs	Outputs
Size without performance optimization (Universal)	8 bytes	0 bytes
Size with performance optimization	32 bytes	32 bytes

Programming

5.1 Programming

Data communication

Two types of data exchange between the CPU and the communications module are possible:

- Acyclic data exchange (Universal)

The point-to-point instructions communicate with the communications module asynchronously by reading or writing data records.

Data transmission takes place across several cycles.

Note

CPU configuration limits

When using the instructions with asynchronous communication, you should take into account the configuration limits of the respective CPU for reading and writing data records. If multiple instructions need to read or write data records simultaneously on a CPU, there may need to be a gap between the calls of each instruction by the user program.

- Cyclic data exchange (Performance optimized for many short frames)

The point-to-point instructions communicate with the communications module synchronously with the application cycle via the IO data of the communications module.

The input data comprises 32 bytes, of which 24 bytes are available for the frame. The output data comprises 32 bytes, of which 30 bytes are available for the frame. Using cyclic data optimizes the reaction time, especially if you are using several CM PtPs in parallel.

Note

Cyclic data exchange is available with the instruction library PtP-Communication as of V4.0.

Overview of the instructions

Communication between the CPU, the communications module and a communication partner takes place by means of special instructions and protocols that support the corresponding communications modules.

The instructions process the exchange of data between the CPU and the communications module. They must be called cyclically from the user program. When the instruction library PtP-Communication as of V4.0 is used, the instructions detect independently whether the Performance option is active and adapt the method for the data exchange.

The transmission protocols are implemented on the communications module. The protocol is used to adapt the interface of the communications module to the interface of the communication partner.

Instruction	Meaning
Port_Config	Dynamically assigning the basic interface parameters
Send_Config	Send configuration Dynamically assigning serial send parameters of a port
Receive_Config	Receive configuration Dynamically assigning serial receive parameters of a port
P3964_Config	Protocol configuration Dynamically configuring the parameters of procedure 3964(R)
Send_P2P	Send data to a communication partner
Receive_P2P	Receive data from a communication partner
Receive_Reset	Clear receive buffer of the communications module
Signal_Get	Read RS232 accompanying signals
Signal_Set	Set RS232 accompanying signals
Get_Features	Read the extended functions supported by the communications module
Set_Features	Set the extended functions supported by the communications module
USS_Port_Scan	Communication via the USS
USS_Drive_Control / USS_Drive_Control_31	Exchange data with a drive
USS_Read_Param / USS_Read_Param_31	Readout parameters from the drive
USS_Write_Param / USS_Write_Param_31	Change parameters in the drive
Modbus_Comm_Load	Configure the port of the communications module for Modbus RTU
Modbus_Master	Communicate as Modbus master via the PtP port
Modbus_Slave	Communicating as Modbus slave via the PtP port

The instructions are part of STEP 7 (TIA Portal). The instructions are available in the "Instructions" task card under Communication > Communication processor.

Additional information

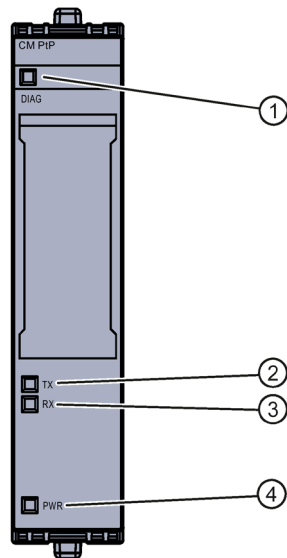
Additional information on programming the communications modules is available in the function manual CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>) and in the STEP 7 (TIA Portal) information system.

Interrupts/diagnostics alarms

6.1 Status and error displays

LEDs

The figure below shows the LEDs (status and error displays) of the CM PtP.



- ① DIAG (green/red)
- ② TX (green)
- ③ RX (green)
- ④ PWR (green)

Figure 6-1 LED displays CM PtP (without BaseUnit)

Meaning of the LED displays

The following tables explain the meaning of the status and error displays. Remedial measures for diagnostics alarms can be found in the section Diagnostic alarms (Page 39).

Table 6- 1 Status and error displays DIAG

LED DIAG	Meaning	Solution
□ Off	Backplane bus supply of the ET 200SP not OK	Check or switch on the supply voltage on the CPU or on the interface module.
⚡ Flashes	CM not configured	---
■ On	CM parameters assigned and no module diagnostics	
⚡ Flashes	CM parameters assigned and module diagnostics (at least one error pending)	Evaluate the diagnostics alarms and eliminate the error. ¹

¹ Information on communications module startup and diagnostics is available in the CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>) function manual

Table 6- 2 Status displays TXD/RXD

LED		Meaning	Solution
TX	RX		
⚡ Flashes	□ Off	Interface is transmitting	---
□ Off	⚡ Flashes	Interface is receiving	---

Table 6- 3 PWR status indicators

PWR LED	Meaning	Solution
□ Off	Supply voltage missing	<ul style="list-style-type: none"> • Check the supply voltage. • Check the BaseUnit type and the wiring of the BaseUnit.
■ On	Supply voltage is present and OK.	---

Additional information

Information on communications module startup and diagnostics is available in the CM PtP - Configurations for point-to-point connections (<http://support.automation.siemens.com/WW/view/en/59057093>) function manual.

6.2 Diagnostic alarms

Enabling of diagnostics interrupts

You enable the diagnostics interrupts in the device configuration with the basic parameters.

The communications module can trigger the following diagnostics interrupts:

Table 6- 4 Possible diagnostics interrupts

Diagnosics interrupt	Monitoring
<ul style="list-style-type: none"> Parameter assignment error Error 	Monitoring is always active. A diagnostics interrupt is triggered each time an error is detected.
<ul style="list-style-type: none"> Wire break 	Monitoring is always active. An error detected only triggers a diagnostics interrupt if "Activate break detection" and "Enable diagnostics interrupt" have been enabled in the device configuration.
<ul style="list-style-type: none"> No load voltage 	Monitoring is always active. An error detected only triggers a diagnostics interrupt if "Missing supply voltage L+" has been enabled in the device configuration.

Reactions to a diagnostics interrupt

The following happens when an event occurs that triggers a diagnostics interrupt:

- The DIAG LED flashes red.
 - When you have eliminated all errors, the DIAG LED stops flashing red and turns green.
- The S7-1500 CPU interrupts the processing of the user program. The diagnostics interrupt OB (e.g. OB 82) is called. The event that triggered the interrupt is entered in the start information of the diagnostics interrupt OB.
- The S7-1500 CPU remains in RUN even if no diagnostics interrupt OB is present in the CPU. The communications module continues working unchanged if this is possible despite the error.

You can obtain detailed information on the error event in the error organization block with instruction "RALRM" (Read additional alarm information), in the information system of STEP 7 and in function manual Diagnostics

(<https://support.industry.siemens.com/cs/ww/en/view/59192926>), section "System diagnostics in user program".

If the module is being operated as a distributed module in an ET 200SP system with PROFIBUS DP, you have the option of reading out diagnostic data with the RDREC or RD_REC instruction using data record 0 and 1. You can find the structure of the data records in the manual for the IM 155-6 DP HF interface module available for download on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/73098660>).

Diagnostic messages

The diagnostics are displayed as plain text in STEP 7 (TIA Portal) in the online and diagnostics view. You can evaluate the error codes with the user program.

The following diagnostics can be signaled:

Table 6- 5 Diagnostic messages, their meaning and remedies

Diagnostic message	Error code	Meaning	Solution
Wire break	6H	Interruption of the line between communications module and communication partner	Check process wiring
Error	9H	<ul style="list-style-type: none"> • Internal module error occurred • Possible cause: <ul style="list-style-type: none"> – Firmware update was aborted – communications module defective 	<ul style="list-style-type: none"> • Repeat firmware update • Replace communications module
Parameter assignment error	10H	<ul style="list-style-type: none"> • The received parameter data record is invalid • The configured BaseUnit is not the BaseUnit being used 	<ul style="list-style-type: none"> • Check parameter data record • Check BaseUnit
No load voltage	11H	<ul style="list-style-type: none"> • No or insufficient supply voltage L+ • Wiring of supply voltage L+ faulty • Possible cause: BaseUnit type incorrect 	<ul style="list-style-type: none"> • Check BaseUnit type • Check supply voltage L+ at the BaseUnit • Check wiring of supply voltage L+ • Check total consumption of the load group

Technical specifications

Article number	6ES7137-6AA01-0BA0
General information	
Product type designation	CM PtP
Firmware version	
• FW update possible	Yes
usable BaseUnits	BU type A0
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	STEP 7 V17 or higher
• STEP 7 configurable/integrated from version	via GSD as of V5.6 HF4
• PROFIBUS from GSD version/GSD revision	GSD as of Revision 5
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	31 mA
Current consumption, max.	35 mA
Power loss	
Power loss, typ.	0.7 W
Address area	
Address space per module	
• Inputs	8 byte; performance mode: 32 byte
• Outputs	0 byte; performance mode: 32 byte
1. Interface	
Interface types	
• RS 485	Yes
• RS 422	Yes
• RS 232	Yes

Article number	6ES7137-6AA01-0BA0
Interface types	
RS 232	
<ul style="list-style-type: none"> • Transmission rate, max. • Cable length, max. • RS 232 auxiliary signals 	<p>115.2 kbit/s</p> <p>15 m</p> <p>RTS, CTS, DTR, DSR, RI, DCD</p>
RS 485	
<ul style="list-style-type: none"> • Transmission rate, max. • Cable length, max. 	<p>250 kbit/s</p> <p>1 200 m; 100 to 1200 m, depending on transmission speed</p>
RS 422	
<ul style="list-style-type: none"> • Transmission rate, max. • Cable length, max. • 4-wire full duplex connection • 4-wire multipoint connection 	<p>115.2 kbit/s</p> <p>1 200 m</p> <p>Yes</p> <p>Yes</p>
Integrated protocols	
Freeport	
<ul style="list-style-type: none"> – Telegram length, max. – Bits per character – Number of stop bits – Parity 	<p>2 kbyte; performance mode: receive data max. 24 byte and send data max. 30 byte</p> <p>7 or 8</p> <p>1 or 2 bit</p> <p>None, even, odd, always 1, always 0, any</p>
3964 (R)	
<ul style="list-style-type: none"> – Telegram length, max. – Bits per character – Number of stop bits – Parity 	<p>2 kbyte; performance mode: receive data max. 24 byte and send data max. 30 byte</p> <p>7 or 8</p> <p>1 or 2 bit</p> <p>None, even, odd, always 1, always 0, any</p>
Modbus RTU master	
<ul style="list-style-type: none"> – Address area – Number of slaves, max. 	<p>1 to 247, extended 1 to 65535</p> <p>32</p>
MODBUS RTU slave	
<ul style="list-style-type: none"> – Address area 	<p>1 to 247, extended 1 to 65535</p>
Telegram buffer	
<ul style="list-style-type: none"> • Buffer memory for telegrams • Number of telegrams which can be buffered 	<p>4 kbyte</p> <p>255</p>

Article number	6ES7137-6AA01-0BA0
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Wire-break	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• for module diagnostics	Yes; green/red DIAG LED
• Receive RxD	Yes; green LED
• Transmit TxD	Yes; green LED
Potential separation	
between backplane bus and interface	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-30°C
• vertical installation, max.	50 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g

Note

Installation heights > 2000 m

You can find information on the restrictions when using the ET 200SP distributed I/O system at more than 2000 m above sea level in the "Mechanical and climatic environmental conditions" section of the ET 200SP Distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual.

Additional general technical specifications for SIMATIC ET 200SP can be found in the ET 200SP distributed I/O system (<http://support.automation.siemens.com/WW/view/en/58649293>) system manual.

Dimension drawing

See ET 200SP BaseUnits (<http://support.automation.siemens.com/WW/view/en/58532597/133300>) manual