Product overview

2

2.1 Properties

Article number

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

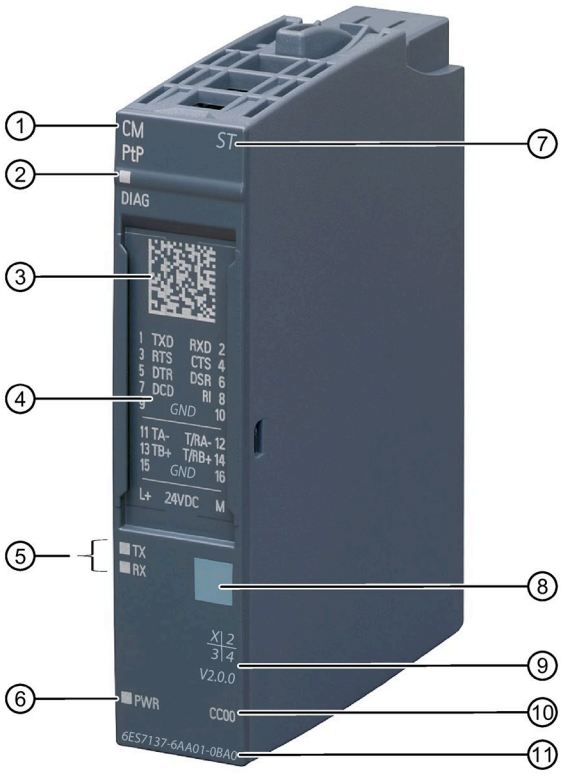
6ES7137-6AA01-2BA0 (packing unit: pack of 10)

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

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), Freeport 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

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

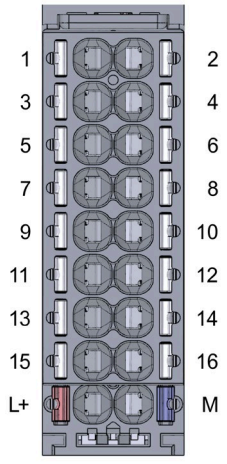
RS232 interface

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

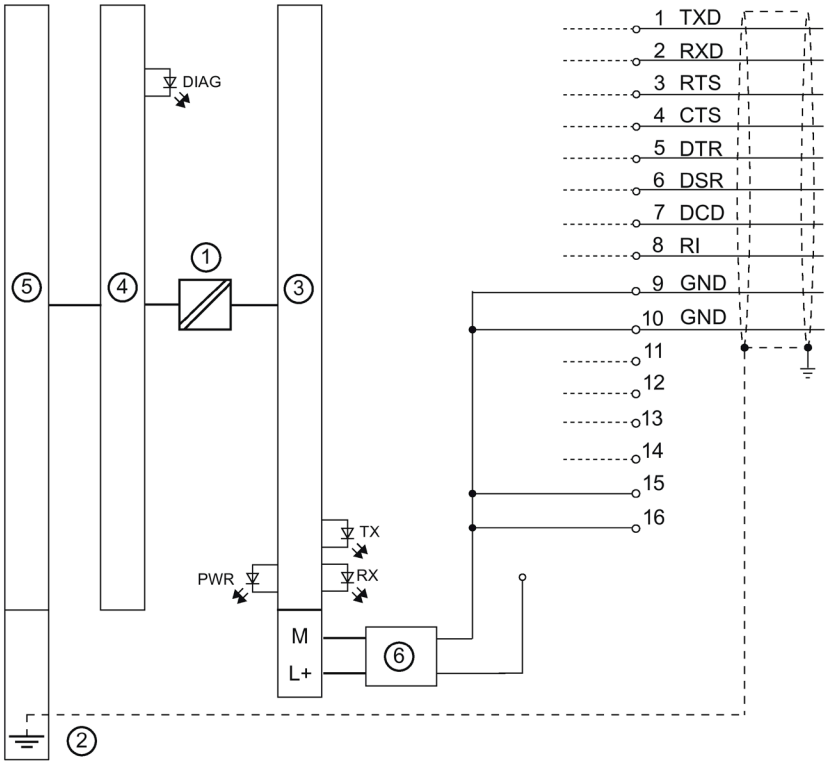
Table 3- 1 RS232 connection

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.



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 3-1 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

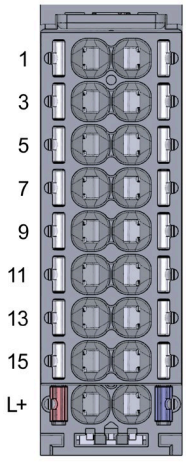
RS422/485 interface

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

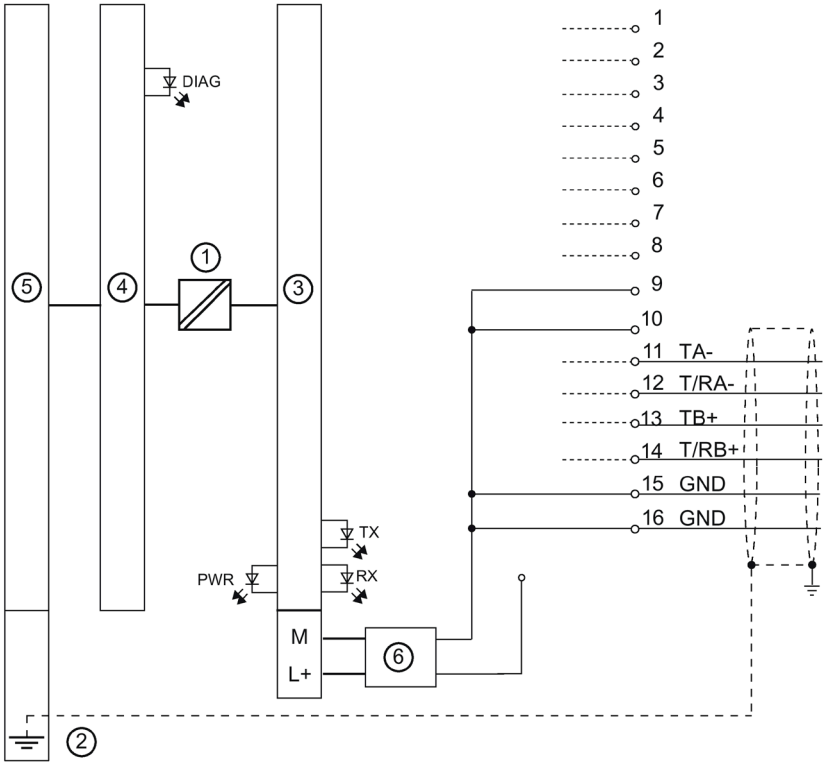
Table 3- 2 RS422/485 connection

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			
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.

Technical specifications

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

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