MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7340-1BH00-0AE0

TTY Serial Communication Processor. Relevant section pages: 3, 12, 18, 20, 90, 91, 93, 94, 95, 96, 98, 162, 163, 164, 165, 166, 180, 181, 182, 183, 184, 185, 186. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

CP 340 Point-to-Point Communication: Installation and Parameter Assignment; 06/2002, A5E00053578-05

Siemens original documentation and product reference

Original Siemens 2002 publication, hosted by the ADEGIS document mirror, not a Siemens website. The exact BH00 TTY interface is limited to 9.6 kbaud. Family RS232 headlines and later BH02 ratings do not apply.

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SIEMENS

SIMATIC

CP 340 Point-to-Point Communication Installation and Parameter Assignment

Manual

This manual has the order number:

6ES7340-1AH00-8BA0

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2 Basic Principles of Serial Data Transmission

3 Starting Up the CP 340

4 Mounting the CP 340

5 Configuring and Parameterizing the CP 340

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Edition 06/2002

A5E00053578-05

Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:



Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.



Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.



Caution

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

Note

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

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The device/system may only be set up and operated in conjunction with this manual.

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

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Note the following:



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Technical data subject to change.
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Preface

Purpose

This manual explains how to establish and operate a point-to-point connection.

Contents

The manual, which is divided into a main section and a reference section (appendices), describes the hardware and software of the CP 340 communications processor and how it is integrated into the S7-300 programmable controller.

The following subjects are covered:

- The basics of point-to-point connections with the CP 340
- Starting up the CP 340
- Mounting the CP 340
- Communication via the CP 340
- Debugging
- Application example
- Attributes and technical specifications

Scope of This Manual

The manual is relevant for:

Product	Order Number	From Edition
CP 340-RS 232C	6ES7 340-1AH01-0AE0	01
CP 340-20mA TTY	6ES7 340-1BH00-0AE0	01
CP 340-RS 422/485	6ES7 340-1CH00-0AE0	01

Note

The description of the CP 340 communications processor contained in this manual is correct at the date of publication. We reserve the right to describe changes to module functionality in a product information sheet.

1.1 Uses of the CP 340

Introduction

The CP 340 communications processor allows you to exchange data between programmable controllers or computers by means of a point-to-point connection.

Functionality of the CP 340

The CP 340 communications processor provides the following functionality:

- Integrated serial interface according to RS 232C
- Transmission rate up to 19.2 Kbaud, half duplex
- Integration of the most important transmission protocols in the module firmware
  - 3964(R) procedure
  - ASCII driver
  - Printer driver
- Adaptation of the transmission protocols by parameterization using the *CP 340: Point-to-Point Communication, Parameter Assignment* interface.
- Integrated serial interface:

  Three module variants are available, each having a different interface type that is suitable for different communication partners (see Table 1-1).

Module Variants

The following variants of the CP 340 communications processor are available:

Table 1-1 CP 340 Module Variants

Module	Order Number	Integrated Interface
CP 340-RS 232C	6ES7 340-1AH01-0AE0	RS 232C interface
CP 340-20mA TTY	6ES7 340-1BH00-0AE0	20 mA TTY interface
CP 340-RS 422/485	6ES7 340-1CH00-0AE0	X27 (RS 422/485) interface

LED displays

The following LED displays are located on the front panel of the CP 340:

- **SF** (red) Indicates fault
- **TxD** (green) Interface transmitting
- **RxD** (green) Interface receiving

The operating modes and errors indicated by these LEDs are described in Section 8.2.

Integrated Interface

The CP 340 is available in three variants with different interface types:

- RS 232C
- X27 (RS 422/485)
- 20 mA TTY

The interface type is indicated on the front of the CP 340. You will find a detailed description of the interfaces in Section 1.4.

Backplane Connector for S7 Backplane Bus

A bus connector is supplied with the CP 340. The bus connector is plugged onto the back panel of the CP 340 when mounting the CP 340 (see Section 4.2). The S7-300 backplane bus is connected via the bus connector.

The S7-300 backplane bus is a serial data bus via which the CP 340 communicates with the modules of the programmable controller and is supplied with the necessary voltage.

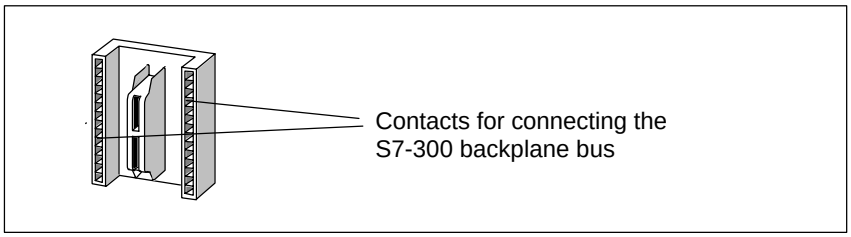


Figure 1-2 Bus Connector

1.4.2 20 mA TTY Interface of the CP 340-20mA TTY

Definition

The 20 mA TTY interface is a current-loop interface for serial data transmission.

Properties

The 20 mA interface has the following properties and fulfills the following requirements:

- Type: Current-loop interface
- Front connector: 9-pin sub D female with screw fixing
- 20 mA TTY signals: Two isolated 20 mA current sources, receive loop (RX) ”-” and ”+”, transmit loop (TX) ”-” and ”+”; all isolated against the S7-internal power supply
- Max. transmission rate: 9.6 Kbaud
- Max. cable length: 100 m active, 1000 m passive; cable type LIYCY 7 × 0.14
- Standards: DIN 66258 Part 1
- Degree of protection: IP 00

4.1 CP 340 Slots

Introduction

The following section describes the rules you must observe when positioning the CP 340 in the rack.

Position of the CP 340 in the Rack

The following rules apply when positioning the CP 340 in the rack:

- A maximum of 8 communications modules can be inserted to the right of the CPU.
- The number of pluggable communications modules is limited:
  - by the current consumption of the CP 340 from the S7-300 backplane bus (depending on CPU and IM) and
  - by the expandability of the CPU (for instance CPU 312 IFM in first tier) or of the ET 200M (IM 153) in a distributed configuration (single-tier mounting only).

For further information on slots, see /2/.

Note

The CP 340 can be operated in expansion tiers only from the following CPU versions:

- CPU 314: Version 6
- CPU 614: Version 6
- CPU 315: Version 3
- CPU 315DP: Version 3

/2/ *S7-300 Programmable Controller, Hardware and Installation* Manual

4.2 Mounting and Dismounting the CP 340

Introduction

When mounting and dismounting the CP 340, you must observe certain rules.

Tool

For mounting and dismounting the CP 340 you require a 4.5 mm cylindrical screwdriver.

Mounting Sequence

To insert the CP 340 in a rack, proceed as follows:

1. Switch the CPU to STOP mode.
2. The CP 340 is accompanied by an expansion bus. Plug this onto the backplane connector of the module to the left of the CP 340.
3. If more modules are to be mounted to the right of the CP 340, plug the expansion bus of the next module onto the right backplane connector of the CP 340.
4. Mount the CP 340 on the rail and tilt it downward.
5. Screw the CP 340 tight.

Dismounting Sequence

To dismount the CP 340 from the rack, proceed as follows:

1. Switch the CPU to STOP mode.
2. Open the front doors.
3. Detach the sub D connector from the integrated interface.
4. Undo the fastening screw on the module.
5. Tilt the module and remove it from the rail, and then remove it from the PLC.

Note

Before you mount or dismount the CP 340, you must switch the CPU to STOP mode. The power supply module does not need to be in POWER OFF mode.

You can plug in or unplug the cable to the integrated submodule on the CP 340 at any time. However, you must make sure that there is no data being transmitted via the integrated interface when you do this, otherwise data may be lost.

Configuring and Parameterizing the CP 340

5

Section Overview

This chapter is divided into the following sections:

In Section	You Will Find	on Page
5.1	Configuring the CP 340	5-2
5.2	Parameterizing the Communications Protocols	5-3
5.3	Managing the Parameter Data	5-4

Parameterization Options

You configure and parameterize the module variants of the CP 340 using STEP 7 or the *CP 340: Point-to-Point Communication, Parameter Assignment* parameterization interface.

Table 5-1 Configuration Options for the CP 340

Product	Order Number	Parameterized Using the Parameterization Interface	Under STEP 7
CP 340-RS 232C	6ES7 340-1AH00-0AE0*	As of V1.0	As of V2.1
CP 340-RS 232C	6ES7 340-1AH01-0AE0**	As of V3.0	As of V3.0
CP 340-20mA TTY	6ES7 340-1BH00-0AE0**		
CP 340-RS 422/485	6ES7 340-1CH00-0AE0**		

* You can also configure this module using the parameterization interface as of V3.0, but only the drivers integrated in the module firmware can be parameterized (not the printer driver) in this case.

** You can also configure these modules using the parameterization interface V1.0, but only the drivers offered in the parameterization interface can be parameterized (not the printer driver).

5.1 Configuring the CP 340

Introduction

Once you have mounted the CP 340 you must inform the programmable controller that it is there. This process is known as ”configuration”.

Configuration

In the following, ”configuration” refers to the entry of the CP 340 in the configuration table of the STEP 7 software. In the configuration table you enter the rack, the slot and the order number of the CP 340. STEP 7 then automatically assigns an address to the CP 340.

The CPU is now able to find the CP 340 in its slot in the rack by way of its address.

Prerequisite

Before you can enter the CP 340 in the configuration table of the STEP 7 software, you must have created a project and a terminal with STEP 7.

Further Information

How to configure S7-300 modules is described in detail in the STEP 7 manual /3/.

In addition, the on-line help for STEP 7 provides sufficient support for configuring an S7-300 module.

/3/ *Configuring Hardware and Communication Connections STEP 7*, Manual

5.2 Parameterizing the Communications Protocols

Introduction

Once you have entered the CP 340 in the configuration table, you must supply its interface with parameters. In the case of the printer driver, you can also configure message texts for printer output. This process is known as ”parameterization”.

Parameterization

The term ”parameterization” is used in the following to describe the setting of protocol-specific parameters and the configuration of message texts. This is done using the *CP 340: Point-to-Point Communication, Parameter Assignment* parameterization interface.

Double-click on the CP 340 in the configuration table of STEP 7 or mark the CP 340 and select the menu item **Edit > Object Properties** to call the “Properties - CP 340 ” dialog.

Here you can set the basic parameter of the CP 340 (see Section 2.3.1). By selecting the “Parameter” button, you can start the *CP 340: Point-to-Point Communication, Parameter Assignment* interface.

Prerequisite

The *CP 340: Point-to-Point Communication, Parameter Assignment* parameterization interface must be installed on the programming device/PC under STEP 7 V (see Table 5-1).

Installation

The *CP 340: Point-to-Point Communication, Parameter Assignment* parameterization interface, the function blocks and the programming example are stored on a 3.5” diskette. Process as follows to install the parameterization interface:

1. Insert the diskette into the diskette drive of your programming device/PC.
2. Under Windows 95, start the dialog for installing software by double-clicking on the “software” icon in “Control panel”.
3. In the dialog, select the diskette drive and the **setup.exe** file and start installation.
4. Now follow the step-by-step instructions of the installation program.

Further Information

The basic operation of the *CP 340: Point-to-Point Communication, Parameter Assignment* parameterization interface is the same for all communications processors and is self-explanatory. For this reason, the parameterization interface is not described in detail here.

Also, the on-line help provides sufficient support for working with the parameterization interface.

5.3 Managing the Parameter Data

Introduction

The configuration and parameterization data of the CP 340 is stored in the current project (on the hard disk of the programming device/PC).

Data Management

When you quit the configuration table (see Section 5.1) via the menu item **Station > Save** or **Station > Save As**, the configuration and parameterization data (including the module parameters) is automatically stored in the project/user file you have created.

Loading the Configuration and Parameters

You can now load the configuration and parameterization data on-line from the programming device onto the CPU (menu item **PLC > Download**). The CPU puts the parameters into effect as soon as they are loaded.

The module parameters are automatically transmitted to the CP 340

- when they are loaded onto the CPU and as soon as the CP 340 can be reached via the S7-300 backplane bus,

  or

- when the CPU's operating mode changes from STOP to RUN (CPU start-up).

Unchanged parameters have the default value (see Section 2.3).

Further Information

The STEP 7 user manual /3/ describes in detail how to

- store the configuration and the parameters
- load the configuration and the parameters into the CPU
- read, modify, copy and print the configuration and the parameters.

/3/ *Configuring Hardware and Communication Connections STEP 7*, Manual

6.1 Communication via Function Blocks

Introduction

Communication between the CPU, the CP 340 and a communication partner takes place via the function blocks and the protocols of the CP 340.

Communication between CPU and CP 340

The function blocks form the software interface between the CPU and the CP 340. They must be called up cyclically from the user program.

Communication between CP 340 and a Communication Partner

The protocol conversion takes place on the CP 340. Via the protocol (3964(R) procedure, ASCII driver or printer driver) the interface of the CP 340 is adjusted to suit the interface of the communication partner.

This enables the CP 340 to be linked to all communication partners which support the standard protocols (3964(R) procedure, ASCII driver or printer driver).

A.1 Technical Specifications of the CP 340

General Technical Specifications

The following table contains the general technical specifications of the CP 340.

Table A-1 General Technical Specifications

Technical Specifications	
Power supply via S7-300 backplane bus (5V)	CP 340-RS 232C: max. 220 mA CP 340-20mA TTY: max. 220 mA CP 340-RS 422/485: max. 220 mA
Operating temperature	0°C to +60°C
Storage temperature	–40°C to +70°C
Power loss	typ. 0.85 W
Dimensions W × H × D	40 × 125 × 120 mm
Weight	0.3 kg
Display elements	LEDs for transmitting (TXD), receiving (RXD) and group faults (SF)
Supplied protocol drivers	ASCII driver 3964(R) driver Printer driver
Transmission speed with 3964(R) protocol	2400, 4800, 9600, 19200 bits/s (half-duplex)
Transmission speed with ASCII driver	2400, 4800, 9600 bits/s (full-duplex)
Transmission speed with printer driver	2400, 4800, 9600 bits/s
Character frames (10 bit or 11 bit)	No. of bits per character (7 or 8) No. of start/stop bits (1 or 2) Parity (none, even, odd, any)
Quantity of user data transported per program cycle	Sending: 14 bytes Receiving: 13 bytes
Storage space requirements of the standard blocks (FBs)	Sending and receiving approx. 2700 bytes

Technical Specifications of the RS 232C Interface

The table below contains the technical specifications of the RS 232C interface of the CP 340-RS 232C.

Table A-2 Technical Specifications of the RS 232C Interface

RS 232C Interface	
Interface	RS 232C, 9-pin sub D male connector
RS 232C signals	TXD, RXD, RTS, CTS, DTR, DSR, RI, DCD, GND All isolated against the S7 internal power supply
Max. transmission distance	15 m

Technical Specifications of the 20 mA TTY Interface

The table below contains the technical specifications of the 20 mA TTY interface of the CP 340-20mA TTY.

Table A-3 Technical Specifications of the 20 mA TTY Interface

Technical Specifications	
Interface	20 mA current-loop TTY 9-pin sub D female connector
TTY signals	Two isolated 20 mA current sources Receive loop (RX) ”-” and ”+” Send loop (TX) ”-” and ”+” All isolated against the S7 internal power supply
Max. transmission distance	100 m active, 1000 m passive

Technical Specifications of the X27 (RS 422/485) Interface

The table below contains the technical specifications of the X27 (RS 422/ 485) interface of the CP 340-RS 422/485.

Table A-4 Technical Specifications of the X27 (RS 422/485) Interface

Technical Specifications	
Interface	RS 422 or RS 485 15-pin sub D female connector
RS 422 signals RS 485 signals	TXD (A), RXD (A), TXD (B), RXD (B), GND R/T (A), R/T (B), GND All isolated against the S7 internal power supply
Max. transmission distance	1200 m

Technical Specifications of the 3964(R) Protocol

The table below contains the technical specifications of the 3964(R) protocol.

Table A-5 Technical Specifications of the 3964(R) Protocol

3964(R) Protocol with Default Values	
Max. message frame length	1024 bytes
Parameters	The following can be parameterized: • With/without block check character • Priority: low/high • Transmission speed: 2400, 4800, 9600, 19200 bits/s • Character frame: 10 or 11 bits • Delete CP receive buffer at start-up: yes/no
3964(R) Protocol with Parameterization	
Max. message frame length	1024 bytes
Parameters	The following can be parameterized: • With/without block check character • Priority: low/high • Transmission speed: 2400, 4800, 9600, 19200 bits/s • Character frame: 10 or 11 bits • Character delay time: 20 ms to 655350 ms in a 10 ms matrix • Acknowledgment delay time: 10 ms to 655350 ms in a 10 ms matrix • Number of setup attempts: 1 to 255 • Number of transmission attempts: 1 to 255 • Delete CP receive buffer at start-up: yes/no

Technical Specifications of the ASCII Driver

The table below contains the technical specifications of the ASCII driver.

Table A-5 Technical Specifications of the ASCII Driver

ASCII driver	
Max. message frame length	1024 bytes
Parameters	The following can be parameterized: • Transmission peed: 2400, 4800, 9600 bits/s • Character frame: 10 or 11 bits • Character delay time: 4 ms to 65535 ms in 1 ms steps • Flow control: None, XON/XOFF, RTS/CTS; automatic use of the V.24 signals • XON/XOFF character (only when flow control = ”XON/XOFF”) • Wait for XON after XOFF (waiting time for CTS=ON): 20 ms to 655350 ms in 10 ms steps • Time to RTS OFF: 20 ms to 655350 ms in 10 ms steps (only in the case of automatic use of the V.24 signals) • Data output waiting time: 20 ms to 655350 ms in 10 ms steps (only in the case of automatic use of the V.24 signals) • Delete CP receive buffer at start-up: yes/no • Number of message frames to be buffered: 1 to 250 • Prevent overwriting: yes/no (only when buffered receive message frames = 1) • End detection of a receive message frame: – After expiration of the character delay time – After receipt of the end code(s) – After receipt of a fixed number of characters
ASCII Driver with Message Frame End Detection After Expiration of the Character Delay Time	
Parameters	No further parameters need to be set. The end of the message frame is detected when the parameterized character delay time expires.
ASCII Driver with Message Frame End Detection on the Basis of Parameterized End Codes	
Parameters	The following can also be parameterized: • Number of end codes: 1 or 2 • Hex code for first/second end identifier
ASCII Driver with Message Frame End Detection on the Basis of the Configured Message Frame Length	
Parameters	The following can also be parameterized: • Message frame length: 1 to 1024 bytes

Technical Specifications of the Printer Driver

The table below contains the technical specifications of the printer driver.

Table A-6 Technical Specifications of the Printer Driver

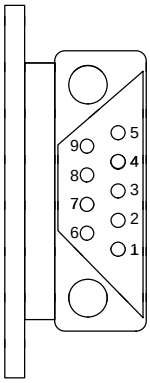
Printer Driver	
Size of the text SDB	8 kbytes
Parameters	The following can be parameterized: • Transmission speed: 2400, 4800, 9600 bits/s • Character frame: 10 or 11 bits • Flow control: none, XON/XOFF, RTS/CTS • XON/XOFF character (only when flow control = ”XON/XOFF”) • Wait for XON after XOFF (waiting time for CTS=ON): 20 ms to 655350 ms in 10 ms steps • Message text: max. 150 characters (max. 250 characters with display of variables) • Left margin (number of blanks): 0 to 255 • Lines per page (with header and footer): 1 to 255 or 0 (continuous printing) • Separators/line end: CR, LF, CRLF, LF CR • Character set: IBM-Proprinter or user-defined • Printer emulation for bold, condensed, expanded and italic type and underlining: HP DeskJet, HP LaserJet, IBM-Proprinter or user-defined • 1/2 header and/or footer lines

B.2 20 mA TTY Interface of the CP 340-20mA TTY

Pin Allocation

The table below shows the pin allocation for the 9-pin sub D female connector in the front panel of the CP 340-20mA TTY.

Table B-2 Pin Allocation for the 9-Pin Sub D Female Connector of the Integrated Interface of the CP 340-20mA TTY

Female Connector on CP 340-20mATTY*	Pin	Designation	Input/Output	Meaning
	1	TxD –	Output	Transmitted data
	2	20 mA –	Input	5 V ground
	3	20 mA + (I_1)	Output	20 mA generator 1
	4	20 mA + (I_2)	Output	20 mA generator 2
	5	RxD +	Input	Received data +
	6	–		
	7	–		
	8	RxD –	Output data	Received data –
	9	TxD +	Input	Transmitted data +

* View from the front

Block Diagram

The figure below is a block diagram of an IF963-TTY 20 mA TTY interface.

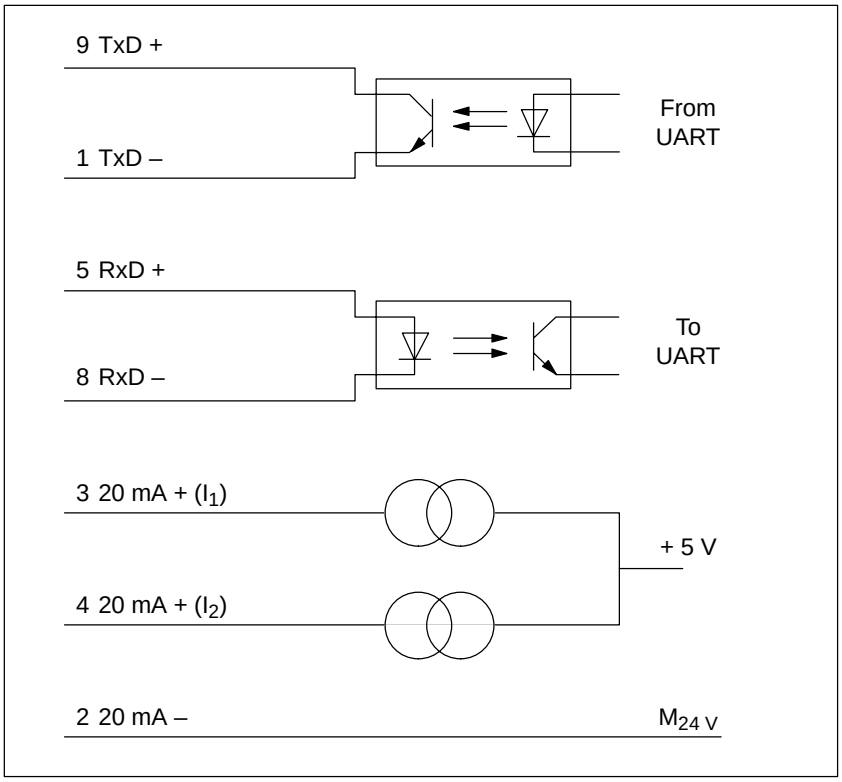


Figure B-8 Block Diagram of the IF963-TTY 20 mA TTY Interface

Connecting Cables

If you make your own connecting cables you must remember that unconnected inputs at the communication partner may have to be connected to open-circuit potential.

Please note that you must only use shielded connector casings. A large surface area of both sides of the cable shield must be in contact with the connector casing. You are advised to use Siemens V42 254 shielded connector casings.



Caution

Never connect the cable shield with the GND, as this could destroy the submodules.

In the Following

On the following pages you will find examples of connecting cables for a point-to-point connection between the CP 340-20mA TTY and S7 modules or SIMATIC S5.

20 mA TTY Connecting Cable (S7/M7 (CP 340) – S7/M7 ((CP 340/CP 441))

The figure below illustrates the connecting cable for a point-to-point connection between a CP 340 and a CP 340/CP 441.

For the connecting cables you require the following male connectors:

- At CP 340: 9-pin sub D male with screw fixing
- At communication partner: 9-pin sub D male with screw fixing

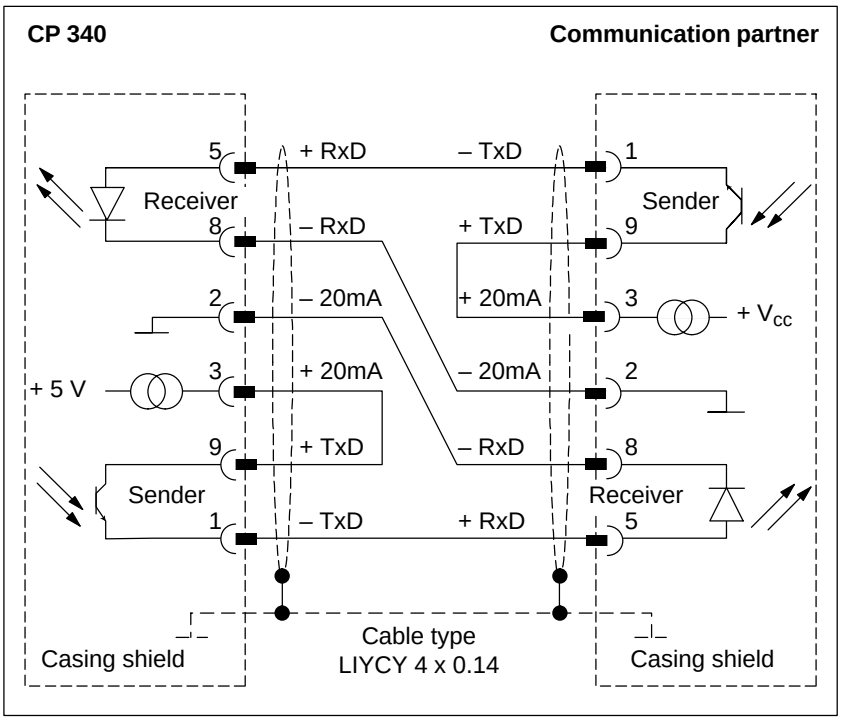


Figure B-9 20 mA TTY Connecting Cable CP 340 – CP 340/CP 441

You can order the connecting cable using the order number given in Appendix D.

20 mA TTY Connecting Cable (S7/M7 (CP 340) – CP 544, CP 524, CPU 928B, CPU 945, CPU 948)

The figure below illustrates the connecting cable for a point-to-point connection between a CP 340 and a CP 544, CP 524, CPU 928B, CPU 945, CPU 948.

For the connecting cables you require the following male connectors:

- At CP 340: 9-pin sub D male with screw fixing
- At communication partner: 25-pin sub D male with screw fixing

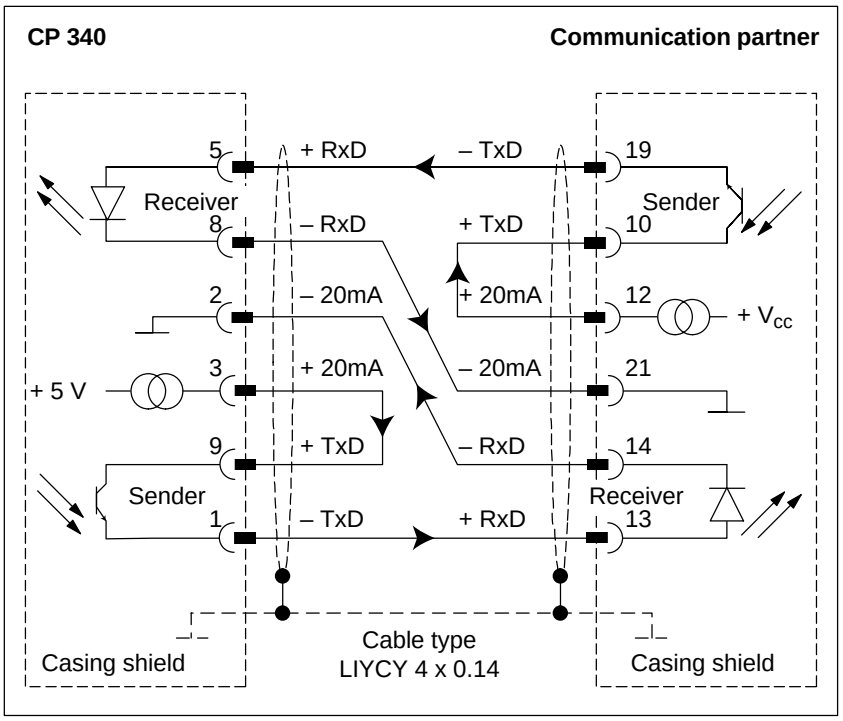


Figure B-10 20 mA TTY Connecting Cable CP 340 – CP 544, CP 524, CPU 928B, CPU 945, CPU 948

20 mA TTY Connecting Cable (S7/M7 (CP 340) – CP 523)

The figure below illustrates the connecting cable for a point-to-point connection between a CP 340 and a CP 523.

For the connecting cables you require the following male connectors:

- At CP 340: 9-pin sub D male with screw fixing
- At communication partner: 25-pin sub D male with screw fixing

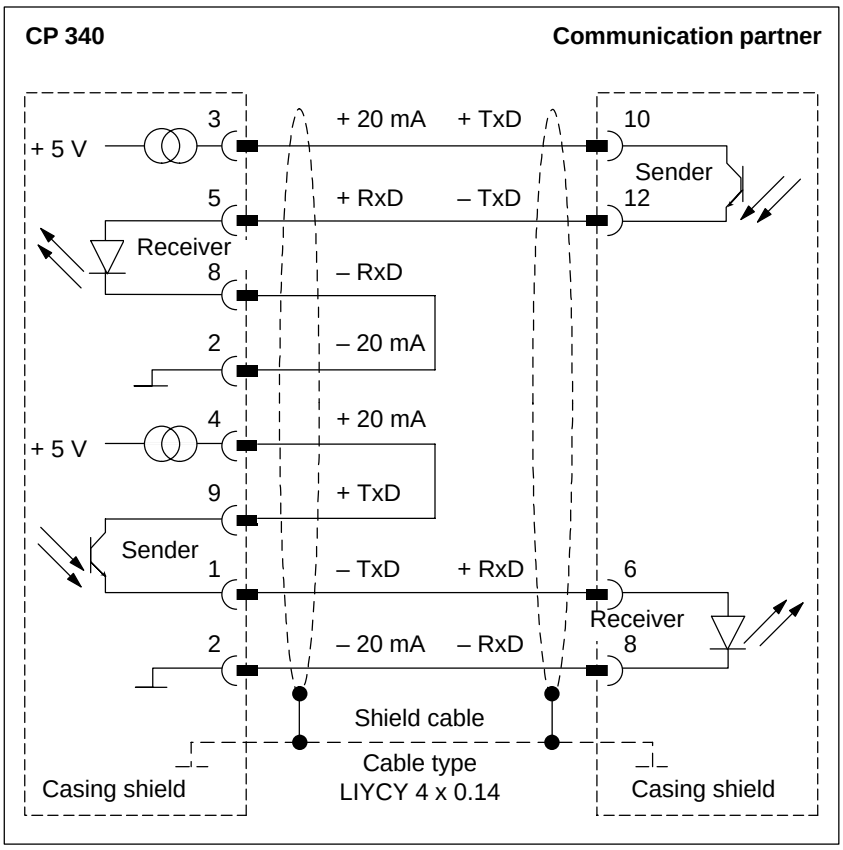


Figure B-11 20 mA TTY Connecting Cable CP 340 – CP 523

20 mA TTY Connecting Cable (S7/M7 (CP 340) – CP 521 SI/ CP 521 BASIC/ IBM-compatible Printer)

The figure below illustrates the connecting cable for a point-to-point connection between a CP 340 and a CP 521 SI/CP 521 BASIC.

For the connecting cables you require the following male connectors:

- At CP 340: 9-pin sub D male with screw fixing
- At communication partner: 25-pin sub D male with screw fixing

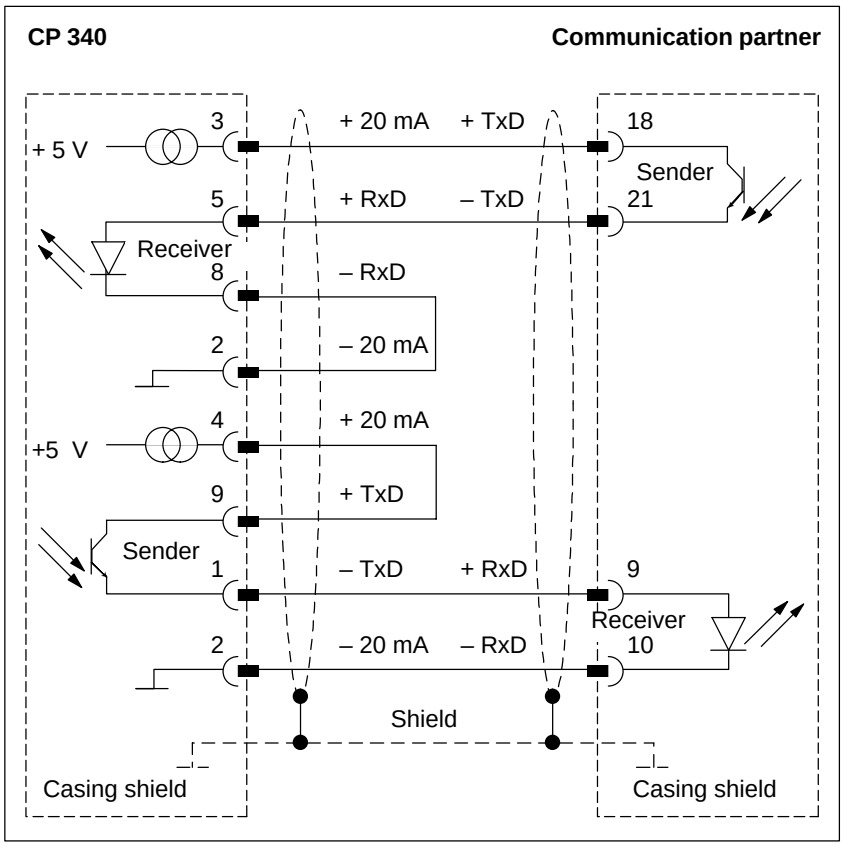


Figure B-12 20 mA TTY Connecting Cable CP 340 – CP 521SI/CP 521BASIC

20 mA TTY Connecting Cable (S7/M7 (CP 340) – CPU 944/AG 95)

The figure below illustrates the connecting cable for a point-to-point connection between a CP 340 and a CPU 944/AG 95.

For the connecting cables you require the following male connectors:

- At CP 340: 9-pin sub D male with screw fixing
- At communication partner: 15-pin sub D male with screw fixing

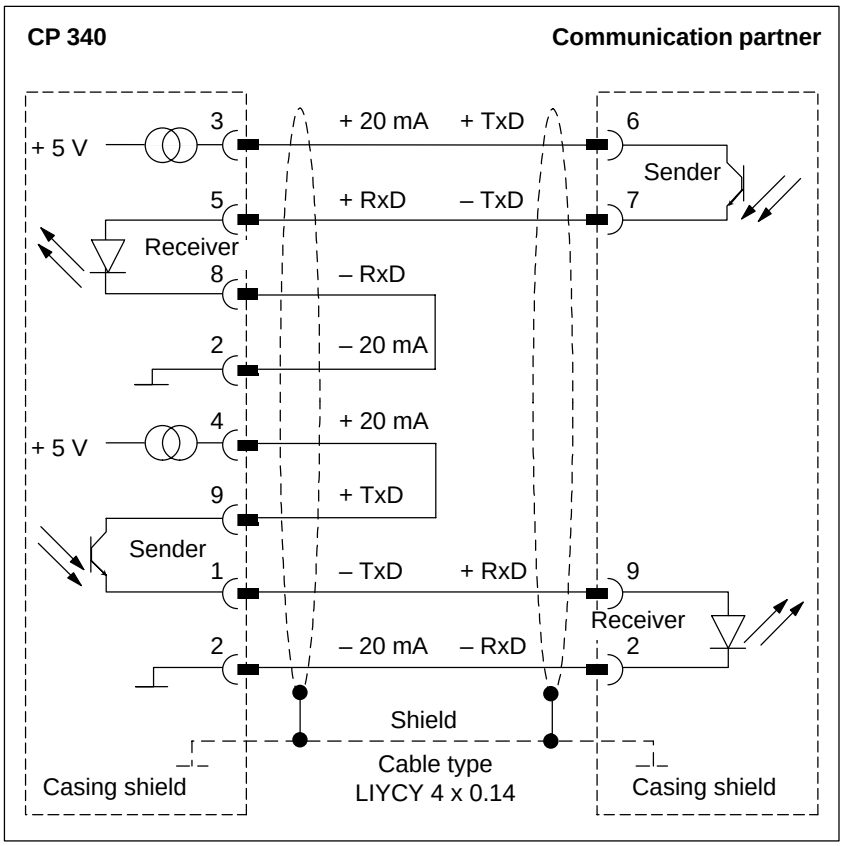


Figure B-13 20 mA TTY Connecting Cable CP 340 – CPU 944/AG 95