Siemens S7 PPI

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Siemens S7 PPI

5.25 Siemens S7 PPI

5.25.1 General Information

Operating terminals can be easily connected to Siemens S7-200 controllers. The protocol S7-PPI is used in this case.
The PPI protocol is a multipoint-capable master - slave - protocol at which the operator terminal always acts as a master of the communication.
The operator terminal can be connected to several controllers of the type S7-200.
The operator terminal always acts as the communication master.

5.25.1.1 Hardware

TesiMod operator terminals are connected via the RS485 interface. In this case attend to the rules for the setup of a PPI bus system.

5.25.2 Protocol Parameters

The parameters of the communications interface are tunable on following values.

Baud rate: 300, 600, 1200, 2400, 4800, **9600**, 19200, 38400, 375000, 500000
Data bits: 5, 6, 7, **8**
Parity: none, **even**, odd
Stop bits: **1**, 1.5, 2
Handshake: **no handshake**, software handshake, hardware handshake

The default settings are printed in **bold**.
The maximally supported baud rate is 19200 bauds.

5.25.2.2 Parameter Maximum Waiting Time for Response

This parameter indicates the length of time that the operating terminal waits for the response from the PLC.
Permitted values are in the range of 50 ms to 65535 ms.
The default value is 100 ms.

5.25.2.3 Parameter Delay Until Connection Setup

This parameter specifies the time the operating terminal waits before initiating communication.
Permitted values are in the range of 1 s to 255 s.
The default value is 5 s.

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5.25.2.4 Parameter Station Number of the Terminal

This parameter specifies the station number for the operator terminal.
Permitted values are in the range of 0 to 126.
The default value is 0.

The station number of the operator terminal can be patched during the operation. For this purpose it is necessary to install the **ComSlaveNr** system variable in an arbitrary I/O - mask. After the modification at the operator terminal the device must be reinitialized. It is for this purpose necessary to install the **Boot** system variable in an arbitrary I/O - mask. By modification of the value to 1 the initialization starts. By a further download of the application the value is overlaid again by the value that was specified in TSwin.

By input of a station number >126 the communication with the operation is decoupled.
This is necessary if, in addition to a connected operator terminal to the controller via the PPI - interface also the PU is supposed to be connected. In this case before, by decoupling of the communication between operator terminal and controller, the interface must be decoupled. Two masters can not access simultaneously the controller.

5.25.3 Data Types

The following data types are available to the user for direct access.

Type	Description	Access
AEW	Analogue Input	Read Only
Z	Counter	Read Only
ZS	Counter Status	Read Only
T	Timer	Read Only
TS	Timer Status	Read Only
E	Input	
EB	Input	
EW	Input	
ED	Input	
A	Output	
AB	Output	
AW	Output	
AD	Output	
M	Flag	
MB	Flag	
MW	Flag	
MD	Flag	
V	Variable	
VB	Variable	
VW	Variable	
VD	Variable	

Table 5.25-1: Data types

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5.25.3.1 Orientation of the Data Types

a) Alphanumeric texts
At text strings a specific byte order is to be kept.
The string "abcdefgh" is oriented in the PLC as follows.

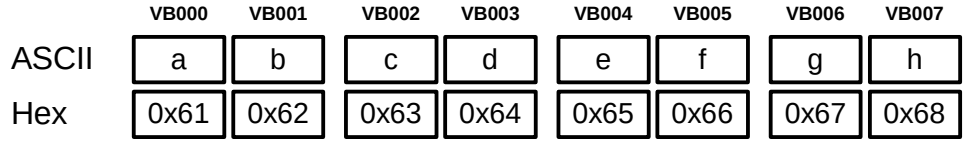


Figure 5.25-1: Byte address

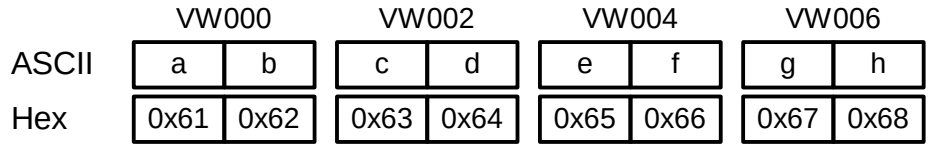


Figure 5.25-2: Word address

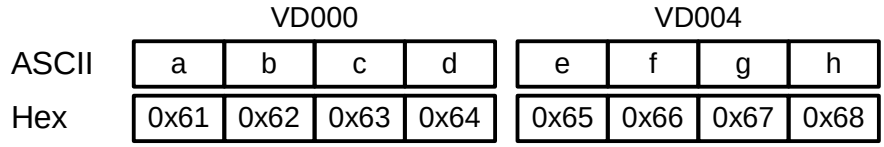


Figure 5.25-3: Double word address

b) Floating decimal
Floating point numbers are interpreted in the IEEE floating point format.

c) Binary variables with 1, 2 or 4 length byte
Data with a length of 2 bytes are interpreted in the PLC-conformal byte order for words.
Data with a length of 4 bytes are interpreted in the PLC-conformal byte order for long words.

5.25.4 Poll Area

The poll area must be in the data area "variable" and must be word-structured (VW).

Example: The cyclic poll area is set to VW20:

Word Address	Reference	High Byte	Low Byte
Word Address + 0	VW20	Write Coordination Byte	Reserved
Word Address + 1	VW21	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	VW22	Function Keys LED 1 to 4	Function Keys LED 5 to 8
Word Address + 3	VW23	Function Keys LED 9 to 12	Function Keys LED 13 to 16
Word Address + 4	VW24	Function Keys LED 17 to 20	Function Keys LED 21 to 24
Word Address + 5	VW25	Function Keys LED 25 to 28	Function Keys LED 29 to 32

Table 5.25-2: Word structured poll area

5.25.5 Parallel Message System

The area for the parallel messages must be in the data area "variable" and must be word-structured (VW).

Example: The parallel messages start at address VW10

Word Address	Reference	High Byte	Low Byte
Word Address + 0	VW10	Messages 0 to 7	Messages 8 to 15
Word Address + 1	VW11	Messages 16 to 23	Messages 24 to 31
Word Address + 2	VW12	Messages 32 to 39	Messages 40 to 47

Table 5.25-3: Word-structured parallel messages

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5.25.6 Physical Interfacing for Point-To-Point-Connection

Pin	Designation	Function
1	Shield	Shielding
2	T(A)	Transmit Data, Channel A
3	R(A)	Receive Data, Channel A
4	RTS(A)	Request To Send, Channel A
5	CTS(A)	Clear To Send, Channel A
6	nc	not connected
7	nc	not connected
8	SG	Signal Ground
9	T(B)	Transmit Data, Channel B
10	R(B)	Receive Data, Channel B
11	RTS(B)	Request To Send, Channel B
12	CTS(B)	Clear To Send, Channel B
13	nc	not connected
14	nc	not connected
15	nc	not connected

Table 5.25-4: Pin assignment X2 RS485

Pin	Designation	Function
8	T(A)	Transmit Data, Channel A
9	T(B)	Transmit Data, Channel B
11	SGND	Signal Ground
22	R(A)	Receive Data, Channel A
23	R(B)	Receive Data, Channel B

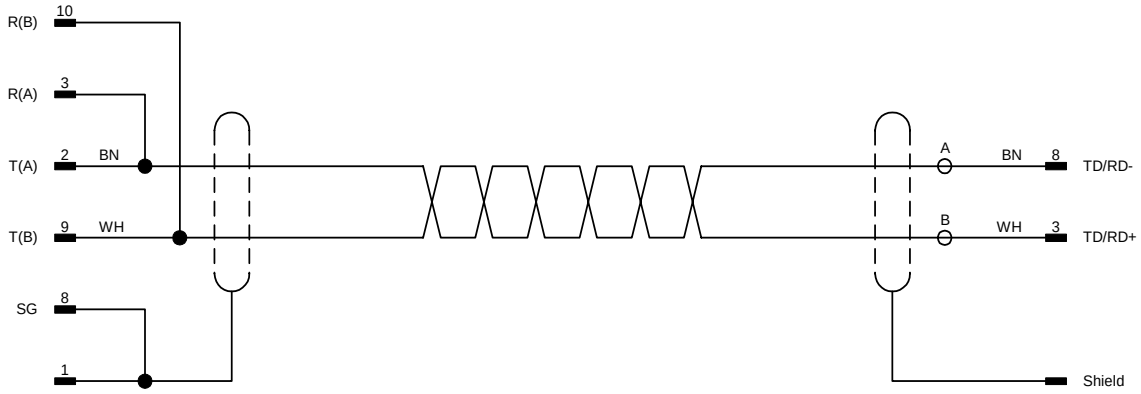
Table 5.25-4: Pin assignment universal interface SER1 RS485

5.25.6.1 Connecting Cable RS485 - Siemens S7 PPI

The following wiring diagram does not apply to terminals with universal interface.

TesiMod
Operating terminal

Siemens
S7 PPI



D-Subminiature
Male Connector
15-pin

Pin 1 is connected to
the shield / metallic enclosure.

Data Bus Connector
Siemens
Part Number
6ES7972-
0BB40-0XA0

Shield is connected to the
metallic enclosure

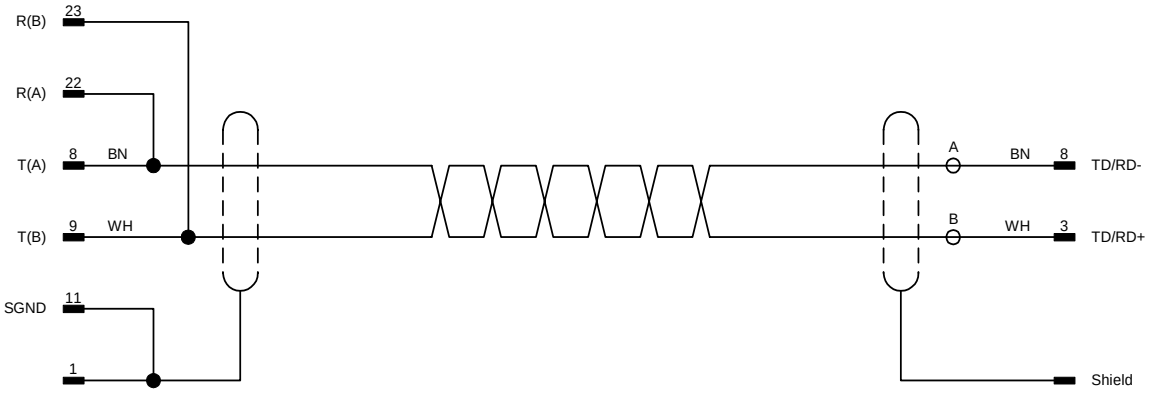
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5.25.6.2 Connecting Cable Universal Interface SER1 RS485 - Siemens S7 PPI

The following wiring diagram applies to terminals with universal interface only.

TesiMod
Operating terminal

Siemens
S7 PPI



D-Subminiature
Male Connector
25-pin

Data Bus Connector
Siemens
Part Number
6ES7972-
0BB40-0XA0

Pin 1 is connected to
the shield / metallic enclosure.

Shield is connected to the
metallic enclosure

5.25.7 Physical Interfacing for Bus Connection

The ends of the data bus cable must be locked up with a termination resistor. At use of the original Siemens S7-PPI connectors for this purpose only the terminator switches must be set on A, otherwise the terminator switch of the interface RS485 must be controlled onto ON at the operator terminal.

The following figure shows a possible configuration with Siemens S7-PPI-connector:

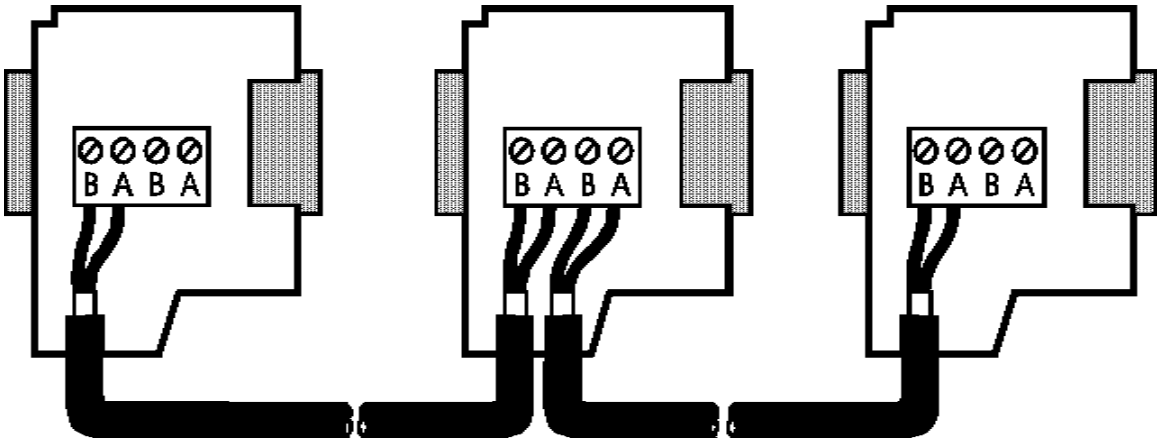


Figure 5.25-4: Connecting cable for multipoint connection

In case of use of own hardware constructions the cable ends must be locked up by the data bus as follows:

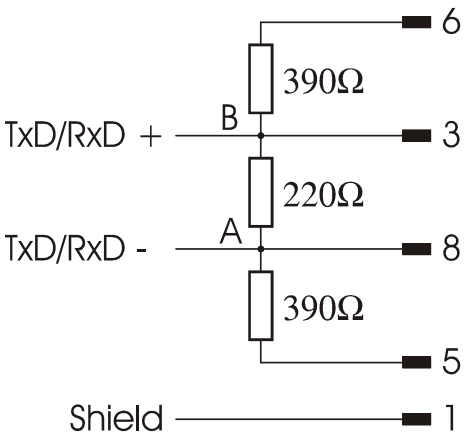


Figure 5.25-5: Termination of the bus ends

For further information on the topic “connection to several S7-200” please refer to the corresponding Siemens manual.

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5.25.8 Error Messages

The following error messages are indicated at the operator terminal as COMMUNICATION ERROR.

Code	1	E_SLAVE_NOT_READY	Slave not ready
	2	E_PROTOKOL	Sequence of the packets
	3	E_FRAME	Protocol frame error
	4	E_TIMEOUT	Timeout error
	5	E_CRC_BCC	CRC error
	6	E_PARITY	Parity error
	7	E_SEND_ABORT	Send process aborted
	8	E_REC_ABORT	Receive process aborted
	9	E_BUF_SIZE	Insufficient cyclic buffer
	10	E_NO_DEFINE	No cyclic data defined
	12	E_DEFINE	Cyclic data already defined
	15	E_NO_PROTOCOL	Selected protocol is not supported
	16	E_OVERRUN	Receive buffer overrun
	40	E_SYS_ADDRESS	Undefined system variable
Code	50	E_HARDWARE	Communication error on the hardware level
	Subcode		
	1	E_CHECK	Lack of response on check - request
	2	E_QUIT	Lack of acknowledgement on data request
	3	E_RESPONSE	Lack of data responses
Code	51	E_PROTOKOL	Communication error on the protocol level
	Subcode		
	10	E_CHECKSUM	False checksum of response
	11	E_RECEIVE_COUNT	False telegram length of response
Code	61	E_TELEGRAM	Communication error on protocol layer - false telegram string
	Subcode		
	20	E_NO_DATA_RESPONSE	False response telegram

Code 70 E_TIMEOUT_T ..... Communication error on timeout level

Subcode

1 E_CHECK ..... Lack of response on check - request

2 E_QUIT ..... Lack of acknowledgement on data request

3 E_RESPONSE ..... Lack of data responses

Code 80 E_STEUERUNG_QUIT ..... Error in the response. Expected 0xE5.

Subcode

3 E_ERR_03 ..... Errpr from controller: 03 = parameter error

5 E_ERR_05 ..... Error from controller: 05 = unauthorized address

6 E_ERR_06 ..... Error from controller: 06 = data type suits not to operand

10 E_ERR_0A ..... Error from controller: 10 = string length suits not to data length

Code 81 E_STEUERUNG_READ_RESPONSE ..... Error in the Response on read request

Subcode

3 E_ERR_03 ..... Error from controller: 03 = parameter error

5 E_ERR_05 ..... Error from controller: 05 = unauthorized address

6 E_ERR_06 ..... Error from controller: 06 = data type suits not to operand

10 E_ERR_0A ..... Error from controller: 10 = string length suits not to data length

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Code 82	E_STEUERUNG_WRITE_RESPONSE		Error in the Response on write request
Subcode			
3	E_ERR_03		Error from controller: 03 = parameter error
5	E_ERR_05		Error from controller: 05 = unauthorized address
6	E_ERR_06		Error from controller: 06 = data type suits not too operand
10	E_ERR_0A		Error from controller: 10 = string length suits not to data length