

# User Manual

## Connection to Siemens S7 PPI

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<b>Version</b>	<b>Date</b>	<b>Modifications</b>
1	18.07.2005	First edition
2	21.11.2005	Validation extended, Chapter „Important Notes“ added

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# 1 Important Notes

## 1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.



### **Danger**

This symbol is used to refer to instructions which, if ignored or not carefully followed could result in personal injury.



### **Note**

This symbol indicates application tips or supplementary notes.



### **Reference to source of information**

This symbol refers to detailed sources of information on the current topic.

## 1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

## 1.3 Intended Use

- The device is designed for use in the industry.
- The device is state-of-the-art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
- The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.

## **1.4 Target Group**

All configuration and programming work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.

## 2 Siemens S7 PPI

The Siemens S7 PPI protocol provides random read and write access to almost all data of the controller.

This protocol supports a connection to the Siemens S7-200 controller.

You have the option of establishing either a point-to-point connection (1:1) or a multipoint connection (1:N). In this case, the operating device is the master and the controller is the slave.

The RS485 interface is used to connect the operating device to the controller(s).



Make sure to follow the guidelines for setting up a PPI system!

### 2.1 Data Types

Direct access is possible to the following data types.

Table 2-1 Siemens S7 PPI data types

Type	Mnemonic	Address	Access
Input	E	Bit	Read/Write
	EB	Byte	
	EW	Word	
	ED	Double word	
Output	A	Bit	
	AB	Byte	
	AW	Word	
	AD	Double Word	
Flag	M	Bit	
	MB	Byte	
	MW	Word	
	MD	Double Word	
Variable	V	Bit	
	VB	Byte	
	VW	Word	
	VD	Double Word	
Timer	T	Actual Value	Read-only
Timer Status	TS	Status	Read-only
Counter	Z	Actual Value	Read-only
Counter Status	ZS	Status	Read-only
Analog Input	AEW	Word	Read-only

## 2.2 Programming

### 2.2.1 Protocol parameters

With the protocol parameters, you can adapt the communication of the controller used.

#### 2.2.1.1 Baud Rate

This parameter specifies the communication rate.

Table 2-2 Baud rate

Configurable Values (Baud)	Default value
300	
600	
1200	
2400	
4800	
9600	X
19200	
38400	
57600	
76800	
115200	

#### 2.2.1.2 Parity

This parameter specifies the parity used to control the communication.

Table 2-3 Parity

Configurable Values	Default Value
None	
Even	X
Odd	

#### 2.2.1.3 Handshake

This parameter specifies the method used to control the communication.

Table 2-4 Handshake

Configurable values	Default Value
No Handshake	X
Hardware	
Software	

**2.2.1.4 Data Bits**

This parameter specifies the number of data bits.

Table 2-5 Data bits

Configurable Values	Default Value
5	
6	
7	
8	X

**2.2.1.5 Stop Bits**

This parameter specifies the number of stop bits.

Table 2-6 Stop bits

Configurable Values	Default Value
1	
1.5	
2	X

**2.2.1.6 Maximum Waiting Time For Response**

This parameter specifies how long the operating device waits for a response from the controller.

Table 2-7 Maximum waiting time for response

Configurable Values	Default Value
50 ms to 65535 ms	100 ms

**2.2.1.7 Delay until Connection Set-Up**

This parameter specifies the waiting time after which the operating device starts the communication.

Table 2-8 Delay until connection set-up

Configurable Values	Default Value
1 s to 255 s	5 s

### 2.2.1.8 Station Number of the Terminal

This parameter specifies the station address of the TesiMod operating device.

Table 2-9 Station number of the terminal

Configurable Values	Default Value
0 to 127	0



The station number of the TesiMod operating device can be changed during operation. This requires that you set up the system variable **ComSlaveNr** in a mask. After changing the value of the system variable on the operating device, reinitialize the operating device. You can do this by:

- powering the device down and up again or
- using the system variable **Boot**.

Change the value of the system variable **Boot** to "1" to reinitialize the operating device immediately. The value of the system variable **ComSlaveNr** is overwritten when the project is downloaded again.

The communication with the controller is terminated when you enter a value >127 for the system variable **ComSlaveNr**. This is necessary if you wish to use a programming device (also master) to access the PPI interface of the controller.

## 2.2.2 Input Syntax

The following image illustrates the structure of the input syntax for variables in the programming software.

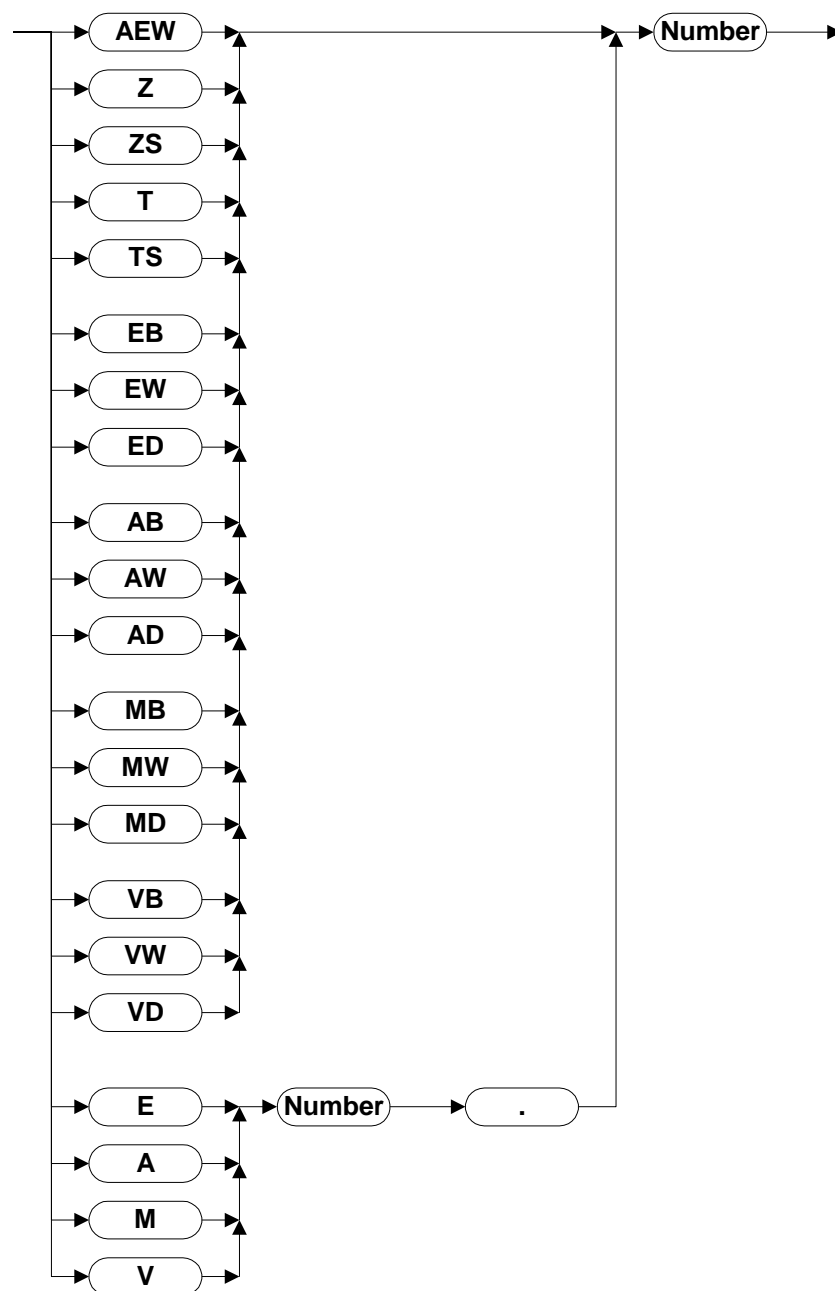


Figure 2-1 Syntax diagram

### 2.2.3 Polling Area

For the address of the poll area, you must specify a variable word address.

Table 2-10 Word-oriented poll area for Siemens S7 PPI

Word Address	Reference	High Byte	Low Byte
Word Address + 0	VW 20	WCB	Reserved
Word Address + 2	VW 22	Message Channel High-Byte	Message Channel Low-Byte
Word Address + 4	VW 24	LEDs 1 to 4	LEDs 5 to 8
Word Address + 6	VW 26	LEDs 9 to 12	LEDs 13 to 16
Word Address + 8	VW 28	LEDs 17 to 20	LEDs 21 to 24
Word Address + 10	VW 30	LEDs 25 to 28	LEDs 29 to 32

### 2.2.4 Status Messages

For the address of the parallel message system, you must specify a variable word address.

Table 2-11 Parallel message system for Siemens S7 PPI

Word Address	Reference	High Byte	Low Byte
Word Address + 0	VW 10	Messages 9 to 15	Messages 0 to 8
Word Address + 1	VW 12	Messages 24 to 31	Messages 16 to 23
Word Address + 2	VW 14	Messages 40 to 47	Messages 32 to 39

## 2.2.5 Physical Connection

Plug-in connectors on the operating device for connection to the controller.

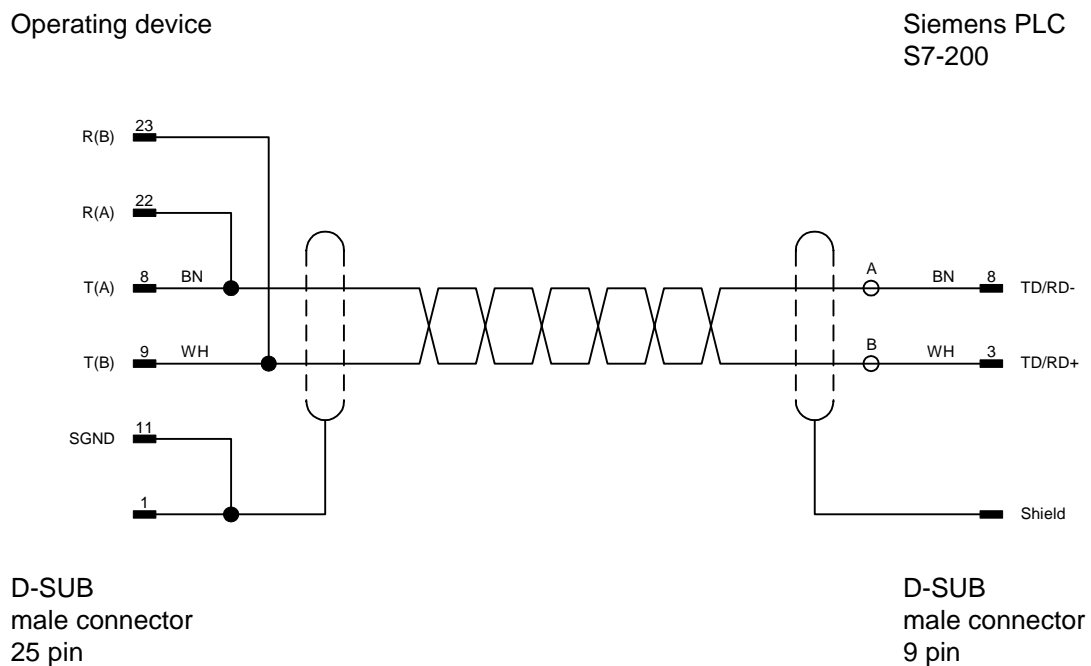
### 2.2.5.1 Pin Assignment for Operating Devices with an Universal Interface

Table 2-12 Pin assignment RS485

Pin	Designation	Function
8	T(A)	Transmitted Data (-)
9	T(B)	Transmitted Data (+)
11	SGND	Signal Ground
22	R(A)	Received Data (-)
23	R(B)	Received Data (+)

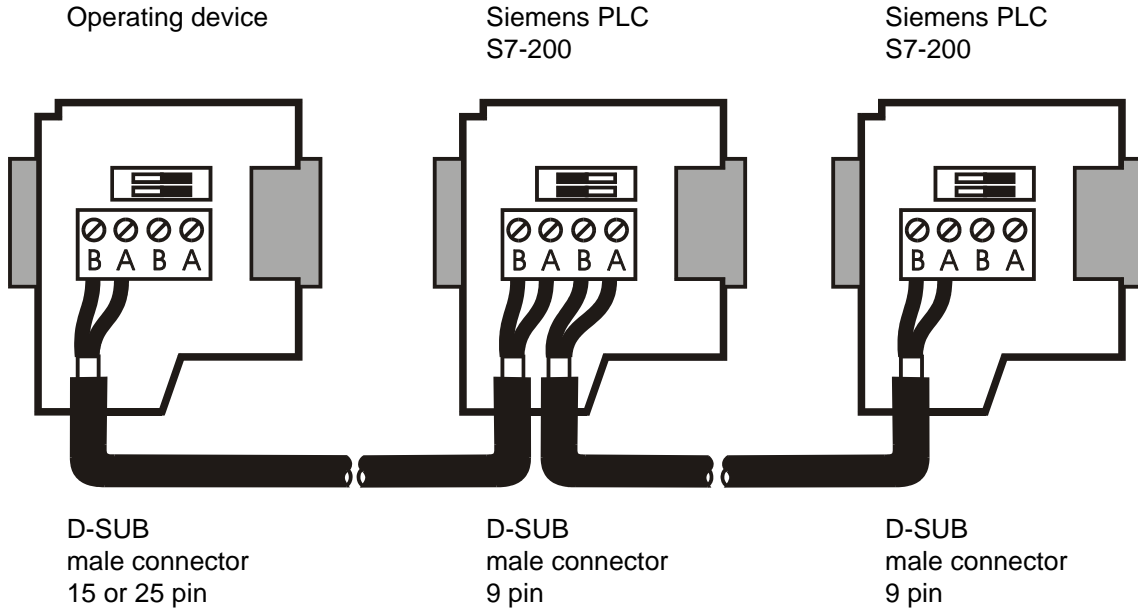
### 2.2.5.2 Cable SER1 RS485 - Siemens S7 PPI

The following cabling diagram applies to operating devices with an universal interface **only**.



**2.2.5.3 Cable for Siemens S7 PPI Bus Connection**

The wiring diagram below shows an example of a setup with Siemens S7 PPI connectors.



**Terminating resistors**

The connectors are fitted with terminating resistors which you can switch on or off. If you are using your own cable assembly, you must place terminating resistors at the cable ends as shown in the figure below.

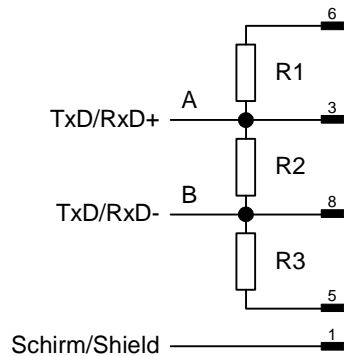


Figure 2-2 Termination of cable ends for Siemens S7 PPI



For further information on the "Siemens S7-200 bus connection?", refer to the Siemens manual on how to setup a S7-200.

## 2.3 Error Messages

Error messages are displayed on the operating device along with a code and sub-code. Error messages are composed as follows:

Communication Error  
 Code           XXXXX  
 Subcode       XXXXX  
 Retries        XXXXX

Table 2-13 Error messages for Siemens S7-PPI

Code	Subcode	Error Type	Possible Cause
1		Slave not ready	
2		Packets out of sequence	
3		Error in protocol frame	
4		Waiting time elapsed (timeout)	Connection broken.
5		CRC error	
6		Wrong parity	
7		Send process aborted	
8		Receive process aborted	
9		Cyclic buffer overrun	Cyclic buffer too small
10		No cyclic data defined	
12		Cyclic data already defined	
15		Protocol error	The selected protocol is not supported.
16		Receive buffer overrun	
40		System variable error	Undefined system variable
Communication error on hardware level			
50	1	No response on check request	
	2	No acknowledgment on data request	
	3	No data response	
Communication error on protocol level			
60	10	Wrong response checksum	
	11	Wrong response telegram length	
Communication error on protocol level - wrong telegram sequence			
61	20	Wrong response telegram	
Communication error on timeout level			
70	1	No response on check request	
	2	No acknowledgment on data request	
	3	No data response	

Table 2-13 Error messages for Siemens S7-PPI

Code	Subcode	Error Type	Possible Cause
Error in response in expected 0xE5			
80	3	Error from controller 03 = parameter error	
	5	Error from controller 05 = illegal address	
	6	Error from controller 06 = data type not compatible with operand	
	10	Error from controller 10 = string length not compatible with data length	
Error in response to read request			
81	3	Error from controller 03 = parameter error	
	5	Error from controller 05 = illegal address	
	6	Error from controller 06 = data type not compatible with operand	
	10	Error from controller 10 = string length not compatible with data length	
Error in response to write request			
82	3	Error from controller 03 = parameter error	
	5	Error from controller 05 = illegal address	
	6	Error from controller 06 = data type not compatible with operand	
	10	Error from controller 10 = string length not compatible with data length	

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