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5.23 ABB T200

5.23.1 General Information

Operating terminals can be easily connected to ABB T200 controllers.
The programming interface or the communication module is used to connect the operating terminal. Data traffic on the interface is handled by the ASCII plain text protocol.

The software components of the system are fully adapted to the parameters and marginal conditions of the PLC interface.

This offers the user the following advantages:

– Random read and write access to all data within the PLC.

– The operating terminal automatically polls the freely definable data areas for cyclic data.

– No configuration effort required within the PLC.

– The protocol is handled entirely by the firmware of the PLC. A PLC program (function blocks, etc.) in the PLC is not required for communication handling.

– The interface parameters of the interface SER1 are defined in the programming software in a protocol-specific manner and are stored in the application description. The parameters can also be modified in the setup mask or any other I/O mask of the operating terminal at any time.

– The programming system offers the user a maximum of support in programming the operating terminal. The definitions (abbreviations) used here are identical with the definitions used in the PLC program.

5.23.2 Technical Description

The connection between operating terminals and ABB T200 controllers is established via the programming unit (PU) interface (RS232) as a point-to-point connection (1:1) or via the communication module (RS485) as a multipoint connection (1:N).

The protocol used for the connection is the „One-Way-Activation-Procedure“ which is based on the „Communication Protocol“ and operates on the master/slave principle.
The operating terminal acts as a master while the ABB T200 functions as a slave.

This protocol allows random read and write access - in bit, word and double-word mode - to all relevant PLC data.

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5.23.3 Protocol Parameters ABB T200

The interface parameters of the operating terminal are adapted to the default parameters of the PU interface.

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

The default settings are printed in **bold**.

5.23.3.1 Parameter Maximum Waiting Time for Response

This parameter indicates the length of time that the operating terminal (master) waits for the response from the PLC (slave).
Permitted values are in the range of 1 ms to 65535 ms.
The default value is 1000 ms.

5.23.3.2 Parameter Delay Until Connection Setup

This parameter specifies the time the operating terminal waits before initiating communication.
Permitted values are in the range of 100 ms to 25500 ms
The default value is 5000 ms.

5.23.3.3 Additional Parameters

A network address is assigned to every variable by means of the slave number. This assignment is carried out in the programming software via the variable list. This address is used to exchange data between the operating terminal and controller.

Enter the corresponding information into the additional parameters to establish an assignment between the L.U.M.P. address and slave number. When using multipoint connections (1:N), also enter the office numbers.

If the check box **1:N Communication** is selected, the protocol also transfers the office numbers.

The check box **Access Authorization Control** ensures that the operating terminal is checked for an access authorization (whether it has or will receive this access authorization) prior to every access to the controller. The access authorization control feature is only required if more than four devices access the memory of the controller via the protocol.

Slave No.	Office No.	L.	U.	M.	P.
1	0	255	255	0	0
2	0	255	255	0	0
3	0	255	255	0	0
4	0	255	255	0	0
5	0	255	255	0	0
6	0	255	255	0	0
7	0	255	255	0	0
8	0	255	255	0	0

Table 5.23-1: Additional parameters

5.23.4 Data Type Structure

a) Alphanumerical Texts
The texts are interpreted in accordance with the following byte order:

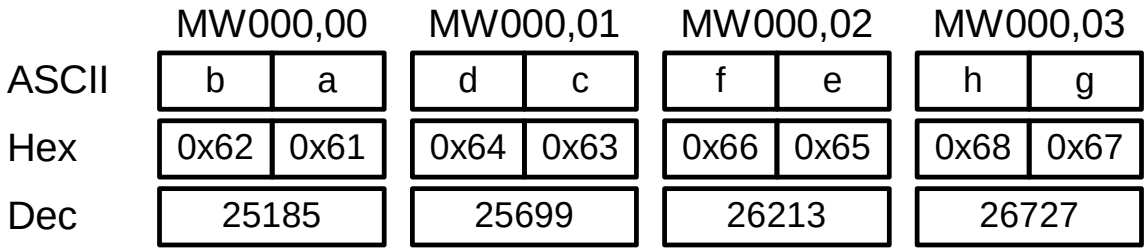


Figure 5.23-1: Word address

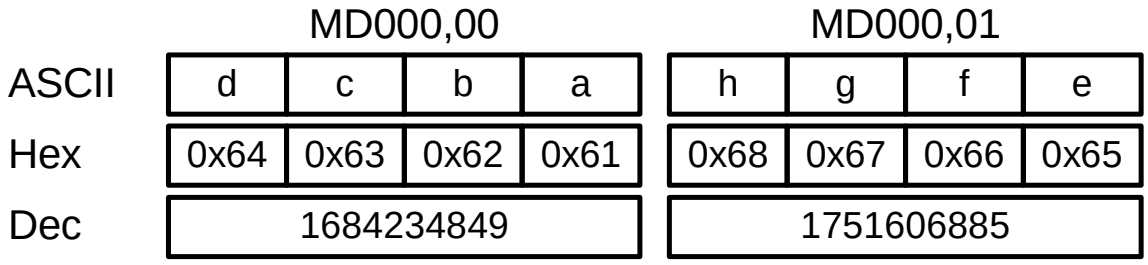


Figure 5.23-2: Double word address

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5.23.4.1 Data Types

Direct user access is possible to the following data types:

Type	Description	Address	Access
E	Input	Bit	Read/Write
EW	Input	Word	Read/Write
ED	Input	Double Word	Read/Write
E’	Input	Communication Bit	Read/Write
EW’	Input	Communication Word	Read/Write
ED’	Input	Communication Double Word	Read/Write
A	Output	Bit	Read/Write
AW	Output	Word	Read/Write
AD	Output	Double Word	Read/Write
A’	Output	Communication Bit	Read/Write
AW’	Output	Communication Word	Read/Write
AD’	Output	Communication Double Word	Read/Write
M	Flag	Bit	Read/Write
MW	Flag	Word	Read/Write
MD	Flag	Double Word	Read/Write
M’	Flag	Bit from Bit/Word Area	Read/Write
MW’	Flag	Word from Bit/Word Area	Read/Write
MD’	Flag	Double Word from Bit/Word Area	Read/Write
T	Timer	Status	Read-only
TI	Timer	Actual Value	Read-only
Z	Counter	Status	Read-only
ZI	Counter	Actual Value	Read-only

Table 5.23-2: Data types

5.23.4.2 Range of Values

The range of values below applies to the following data types:

Data Type	Range of Values	Specific Characteristics
Bit	00 and 01	none
Word	0x7FF to 0x8001	The Value 0x8000 is Not Permitted
Double Word	0x7FFFFFFF to 0x80000001	The Value 0x80000000 is Not Permitted

Table 5.23-3: Range of values

5.23.4.3 Additional Functions

In addition to the random read and write access to PLC variables, a 12 byte memory area is specified in the application description as a poll area.

The only marginal conditions regarding this memory area are that the PLC must be able to access in bit-mode and the terminal in word-mode and the memory area must be contiguous.
This poll area must point to the **flag word area** (MW).

Example: The cyclic poll area is set to MW'000,10 in the programming system.

Word Address	Reference	High Byte	Low Byte
Word Address + 0	MW´000,10	Write Coordination Byte	Reserved
Word Address + 1	MW´000,11	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	MW´000,12	Function Keys LED 1 to 4	Function Keys LED 5 to 8
Word Address + 3	MW´000,13	Function Keys LED 9 to 12	Function Keys LED 13 to 16
Word Address + 4	MW´000,14	Function Keys LED 17 to 20	Function Keys LED 21 to 24
Word Address + 5	MW´000,15	Function Keys LED 25 to 28	Function Keys LED 29 to 32

Table 5.23-4: Word structured poll area



To switch LED 1 on, the value -32768 (0x8000) must be entered in the address +2. However, the ASCII plain text protocol does not transfer this value.



SOLUTION:
Enter -32767 (0x8001) instead of -32768. This will set the flash bit of LED 8 which has no effect on the output.

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5.23.5 Physical Interfacing

Pin	Designation	Function
1	nc	not connected
2	RD	Receive Data
3	TD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	nc	not connected
7	RTS	Request To Send
8	CTS	Clear To Send
9	nc	not connected

Table 5.23-5: Pin assignment X2 RS232

Pin	Designation	Function
6	TD	Transmit Data
15	CTS	Clear To Send
17	RTS	Request To Send
18	RD	Receive Data
25	SGND	Signal Ground

Table 5.23-6: Pin assignment universal interface SER1 RS232

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 5.23-7: 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 5.23-8: Pin assignment universal interface SER1 RS485

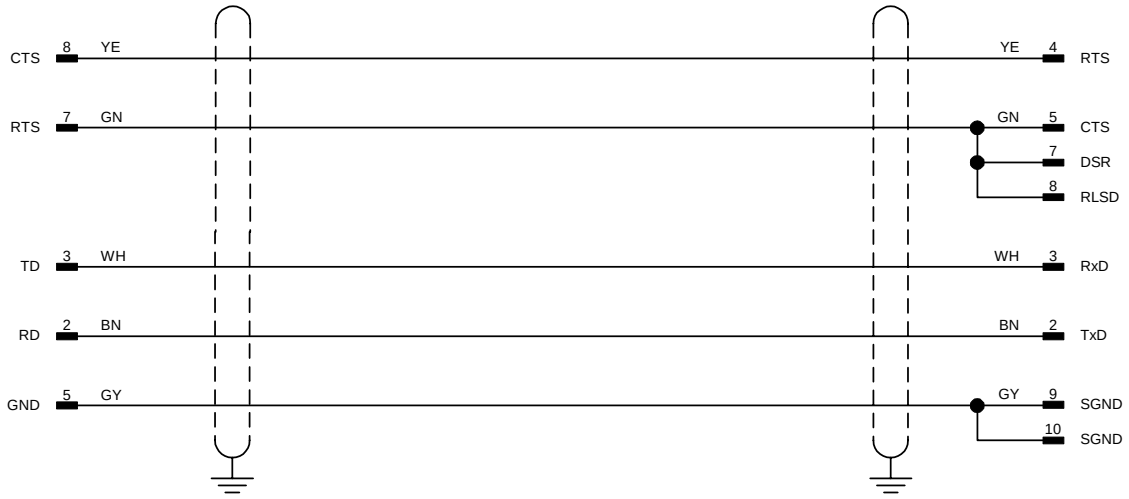
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5.23.5.1 Connecting Cable RS232 - ABB T200

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

TesiMod
Operating Terminal

ABB T200



D-Subminiature
Male Connector
9-pin

D-Subminiature
Male Connector
9-pin

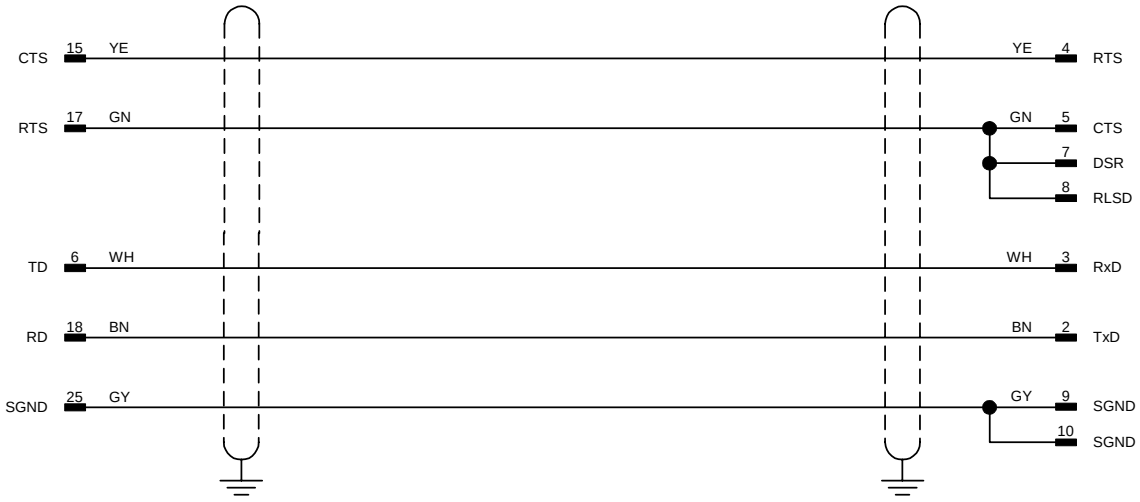
Each end of the shield is connected to the metallic enclosure.

5.23.5.2 Connecting Cable Universal Interface SER1 RS232 - ABB T200

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

TesiMod
Operating Terminal

ABB T200



D-Subminiature
Male Connector
25-pin

D-Subminiature
Male Connector
9-pin

Each end of the shield is connected to the metallic enclosure.

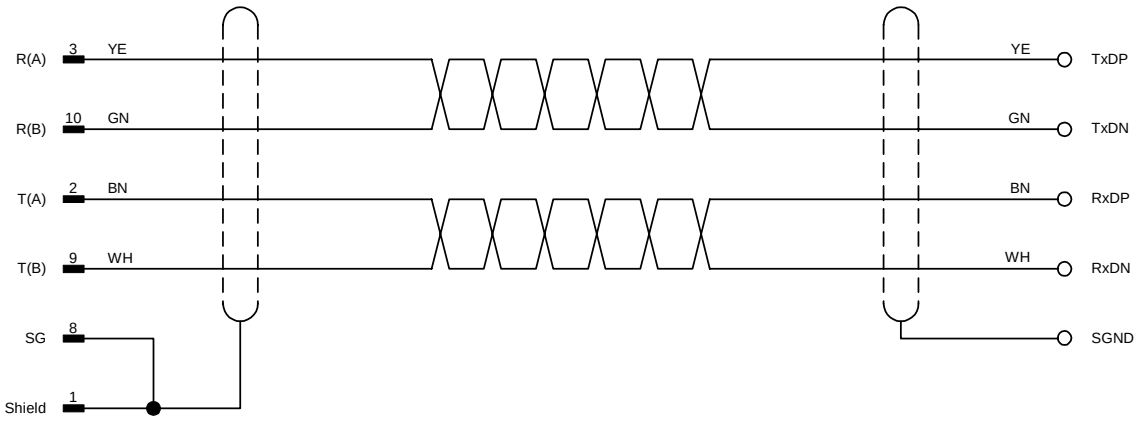
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5.23.5.3 Connecting Cable RS485 - ABB T200

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

TesiMod
Operating Terminal

ABB T200



D-Subminiature
Male Connector
15-pin

End of cable with
multicore cable ends
for screw-type terminals

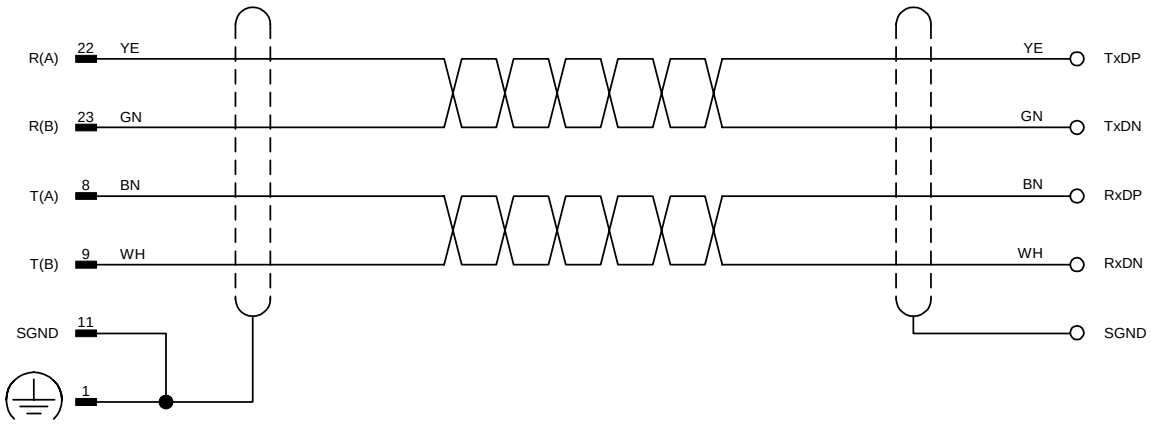
Pin 1 is connected to
the shield / metallic enclosure.

5.23.5.4 Connecting Cable Universal Interface SER1 RS485 - ABB T200

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

TesiMod
Operating Terminal

ABB T200



D-Subminiature
Male Connector
25-pin

End of cable with
multicore cable ends
for screw-type terminals

Pin 1 is connected to
the shield / metallic enclosure.

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5.23.6 Error Messages

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
	50	E_HARDWARE	Communication error on the hardware level
	Subcode		
	1	E_HW_OCCU_OPEN_QUIT	Hardware error on acknowledging Occu Open
	2	E_HW_OCCU_CLOSE_QUIT	Hardware error on acknowledging Occu Close
	3	E_HW_REQ_QUIT	Hardware error on acknowledging Response
Code	51	E_PROTOKOL	Communication error on the protocol level
	Subcode		
	1	E_RESPONSE_NAK	Response acknowledged with NAK
	2	E_OCCU_CLOSE_NAK	Response acknowledged with NAK
	3	E_OCCU_OPEN_NAK	Response acknowledged with NAK
	10	E_TO_OCCU_OPEN_QUIT	Timeout error on acknowledging Occu Open
	11	E_TO_OCCU_CLOSE_QUIT	Timeout error on acknowledging Occu Close

12	E_TO_REQ_QUIT	Timeout error on acknowledging Response
20	E_RECEIVE_COUNT	Expected a different number of data bytes
21	E_CHECKSUM	Echo and transmission do not match

Code 52 E_TELEGRAM ..... Error in the telegram

Subcode Error number from the controller

1	0 + 01 Number exceeds limit
6	0 + 06 Wrong I/O code
7	0 + 07 I/O number out of range
10	10 + 0 CPU is available, however, no access authorization
24	20 + 4 Terminal has write authorization
26	20 + 6 Read authorization in use by another controller
28	20 + 8 Write authorization in use by another controller

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