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5.21 ABB CS31

5.21.1 General Information

The operating terminals can be easily connected to ABB CS31 controllers.
The programming interface COM1 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 programming unit (PU) 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 PU 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 within the PLC program.

5.21.2 Technical Description

COM1 and the ASCII plain text protocol are used to connect the operating terminal to ABB CS31 controllers.

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

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5.21.3 Protocol Parameters ABB CS31

The interface parameters of the operating terminal are adapted to the default parameters of the PU interface.
To ensure proper connection, do **not** modify the parameters in the terminal.

Baud rate:	300, 600, 1200, 2400, 4800, **9600**, 19200, 38400, 357000, 500000 Baud
Parity:	**none**, even, odd
Data bits:	5, 6, 7, **8**
Stop bits:	**1**, 1.5, 2
Handshake:	No handshake, **hardware**, software

5.21.3.1 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 1 ms to 65535 ms.
The default value is 1000 ms.

5.21.3.2 Parameter Delay Until Connection Setup

This parameter specifies the time the operating terminal waits before initiating communication.
Permitted values are in the range of 1000 ms to 65535 ms
The default value is 5000 ms.

5.21.4 Data Type Structure

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

	MW000,00		MW000,01		MW000,02		MW000,03	
ASCII	b	a	d	c	f	e	h	g
Hex	0x62	0x61	0x64	0x63	0x66	0x65	0x68	0x67
Dec	25185		25699		26213		26727	

Figure 5.21-1: Word address

	MD000,00				MD000,01			
ASCII	d	c	b	a	h	g	f	e
Hex	0x64	0x63	0x62	0x61	0x68	0x67	0x66	0x65
Dec	1684234849				1751606885			

Figure 5.21-2: Double word address

b) Binary Variables with a Length of 2 or 4 Bytes
Data with a length of 2 bytes are interpreted in the PLC-conforming byte order for words.
Data with a length of 4 bytes are interpreted in the PLC-conforming byte order for long-words.

5.21.4.1 Data Types

Direct user access is possible to the following data types:

Type	Description	Access
E	Input	Bit
EW	Input	Word
A	Output	Bit
AW	Output	Word
M	Flag	Bit
MW	Flag	Word
MD	Flag	Double Word
KW	Register	Word
KD	Register	Double Word

Table 5.21-1: Data types

The addresses to the left and right of the comma are programmed in the programming software in separate columns.
When reading from the PLC, variables that are of the same type and are located in an area of up to 50 bytes are read as a block.



If the terminal accesses the local binary inputs E62.00 - E63.07 and local analog inputs EW06.00 - EW06.03, the PLC provides correct data only if the PLC program accesses an input of the corresponding group at least once.

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5.21.5 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 MW000,10 in the programming system.

Word Address	Reference	High Byte	Low Byte
Word Address + 0	MW000,10	Write Coordination Byte	Reserved
Word Address + 1	MW000,11	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	MW000,12	Function Keys LED 1 to 4	Function Keys LED 5 to 8
Word Address + 3	MW000,13	Function Keys LED 9 to 12	Function Keys LED 13 to 16
Word Address + 4	MW000,14	Function Keys LED 17 to 20	Function Keys LED 21 to 24
Word Address + 5	MW000,15	Function Keys LED 25 to 28	Function Keys LED 29 to 32

Table 5.21-2: 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.

5.21.6 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 5.21-3: Pin assignment X2 RS232

Pin	Designation	Function
1	Shield	Shielding
6	TD	Transmit Data
18	RD	Receive Data
17	RTS	Request To Send
15	CTS	Clear To Send
25	SGND	Signal Ground
20	DTR	Data Terminal Ready

Table 5.21-4: Pin assignment universal interface SER1 RS232

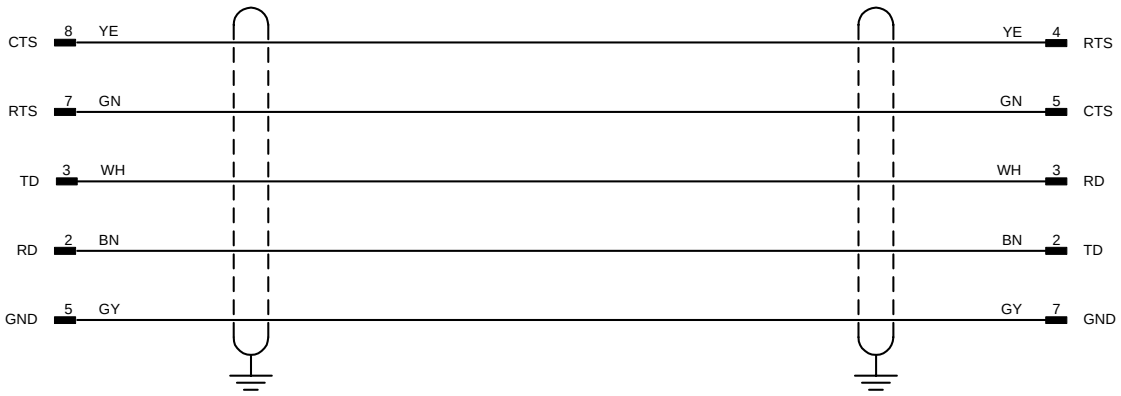
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5.21.6.1 Connecting Cable RS232 - ABB CS31

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

TesiMod
Operating Terminal

ABB CS31



D-Subminiature
Male Connector
9-pin

D-Subminiature
Male Connector
9-pin

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

5.21.6.2 Connecting Cable Universal Interface SER1 RS232 - ABB CS31

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

TesiMod
Operating Terminal

ABB CS31



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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5.21.7 Error Messages

Code 1

Subcode

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_RESPONSE_TIMEOUT	No response from PLC

Code 2

Subcode

52	E_RECEIVE_COUNT	Number of received data incorrect.

Possible errors:

- Check if a variable with an odd number of bytes is read from a word or double-word address in the mask in which the error occurs.

54	E_ECHO	Echo received and the transmitted data do not match.
70	E_RECEIVE_ERROR	Unknown error from the PLC.
71	# WRONG VALUE	
72	# WRONG INPUT	
73	# NUMBER TOO LARGE	