Mitsubishi MelsecA

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Mitsubishi MelsecA

5.11 Mitsubishi MelsecA

5.11.1 General Information

The operating terminals allow for a simple connection to every Mitsubishi PLC of the An / AnA series.

The operating terminal is connected to the **communication module AJ71C24**.

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

This offers the user the following advantages:

– Random write and read access to any data within the PLC. Data of existing PLC programs can be displayed and modified directly in the operating terminal. It is not necessary to adapt the PLC program to the operating terminal in any respect since it is not required that communications data be stored in a specified address area or data type area.

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

– No configuration is required in the PLC.

– The protocol is handled entirely by the operating system of the communications module. A PLC program in the PLC is not required for the handling of the communication.

– The protocol provides error control. Transmission errors are detected and, if possible, eliminated by repeating the transmission. A noise-immune interface hardware in accordance with the RS485 standard permits the application even in a harsh industrial environment.

– The interface parameters are stored in the application description. Modifying of the parameters is possible in the setup mask or in each other I/O mask of the terminal at any time.

– The programming system provides a maximum of support to the operator in programming the operating terminal. The definitions (abbreviations) used here are identical with the definitions used within the PLC program (e.g. M3 corresponds to flag 3).

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5.11.2 Technical Description

The interfacing of the operating terminal to the Mitsubishi A - PLC is effected by means of the protocol type "**Protocol 1**" of the communication module.

This allows random read and write access to all PLC data. Any bit-operands can be accessed in bit-mode or word mode. The size of the address area depends on the respective PLC.

5.11.3 Protocol Parameters Mitsubishi MelsecA

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, 357000, 500000 Baud
Parity:	none, **even**, odd
Data bits:	5, 6, **7**, 8
Stopbits:	**1**, 1.5, 2
Handshake:	**no handshake**, hardware, software

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

5.11.3.1 Parameter Maximum Waiting Time for Response

This timer indicates the length of time that the operating terminal (master) will wait for the response from the PLC (slave).
Permitted values are in the range of 0 ms to 65535 ms.
The default value is 500 ms.

5.11.3.2 Parameter Delay Until Connection Setup

Specifies the period of time that the terminal allows to elapse after an unsuccessful attempt to establish communication and before making another attempt.
Permitted values are in the range of 0 ms to 65535 ms.
The default value is 1000 ms.

5.11.3.3 Parameter CPU Type

This parameter defines the CPU type of the PLC. The CPU types An-CPU and AnA-CPU are selectable.

5.11.4 Parameters of the AJ71C24

5.11.4.1 Mode Selection Switch

The mode selection switch permits selection of the protocol format corresponding to the respective interfaces.

The protocol "**Protocol 1**" must be selected for the RS422 / RS485 interface to the terminal.

5.11.4.2 Station Number

The station number is used to specify the various communication modules within a multipoint connection. The specified station number must coincide with the specification in the variable list.

It is not necessary to comply with a specific sequence when assigning the station numbers, i.e. the numbering does not need to be sequential or contiguous.

Valid values for station numbers are: 0 to 31

5.11.4.3 DIP Switches

The following interface settings must be defined:

RS422 / RS485 as forward channel, to which the terminal is connected (if available)
Data length 7 bits
19200 Baud
Parity check, activated
Even parity
1 stop bit
Check sum, activated
Write access, permitted
Resistance for Termination Transmit-line, activated (if available)
Resistance for Termination Receive-line, activated (if available)



The functions of the DIP switches vary with the respective AJ71C24 model. Therefore, please consult the manual of the respective communications processor type for information on the specific functions of the switches.

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5.11.5 Data Types

Type	Description	Input Type	Access
X	Inputs	Hexadecimal Input	Bit, Word
Y	Outputs	Hexadecimal Input	Bit, Word
M	Flags	Decimal Input	Bit, Word
L	Latch Flags	Decimal Input	Bit, Word
S	Step Flags	Decimal Input	Bit, Word
B	Link Flags	Hexadecimal Input	Bit, Word
F	Error Flags	Decimal Input	Bit, Word
TS	Timer Contact	Decimal Input	Bit, Word
TC	Timer Coil	Decimal Input	Bit, Word
CS	Counter Contact	Decimal Input	Bit, Word
CC	Counter Coil	Decimal Input	Bit, Word
TN	Timer Actual Value	Decimal Input	Word, Double Word
CN	Counter Actual Value	Decimal Input	Word, Double Word
D	Data Register	Decimal Input	Word, Double Word
W	Link Register	Hexadecimal Input	Word, Double Word

Table 5.11-1: Data types

5.11.6 Additional Functions

In addition to the random write and read access to PLC variables, a memory area comprising 12 bytes is specified in the application description as cyclic data area.

This data area must be assigned to an address which can be accessed in word-mode. Therefore, the size of the poll area should comprise an equal number of bytes.

Word-structured Memory Mapping

The data area comprises a maximum of 12 bytes.

Example: Cyclic data starting with D1

Word Address	Reference	High Byte	Low Byte
Word Address + 0	D1	Write Coordination Byte	Reserved
Word Address + 1	D2	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	D3	Function Keys LED 1 to 4	Function Keys LED 5 to 8
Word Address + 3	D4	Function Keys LED 9 to 12	Function Keys LED 13 to 16
Word Address + 4	D5	Function Keys LED 17 to 20	Function Keys LED 21 to 24
Word Address + 5	D6	Function Keys LED 25 to 28	Function Keys LED 29 to 32

Table 5.11-2: Word structured poll area

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5.11.7 Physical Interfacing

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 5.11-3: 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

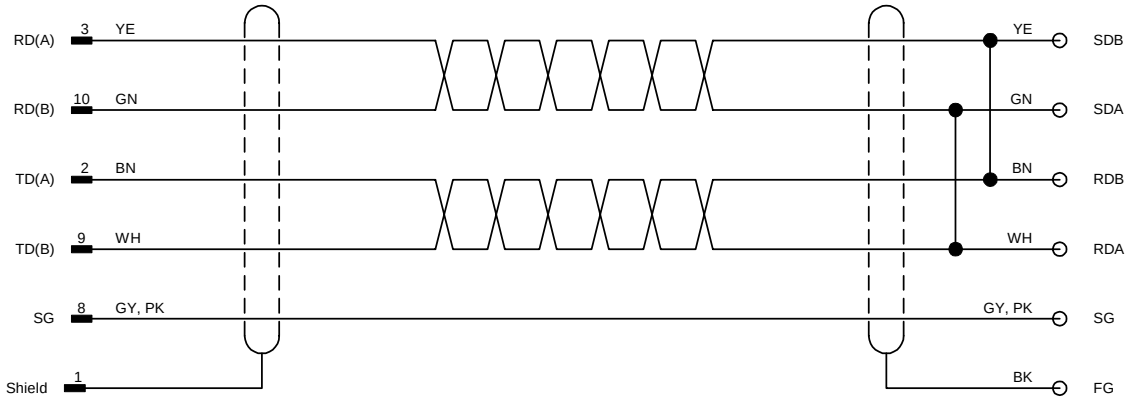
Table 5.11-4: Pin assignment universal interface SER1 RS485

5.11.7.1 Connecting Cable RS485 - Mitsubishi A Series

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

TesiMod
Operating Terminal

Mitsubishi
MelsecA



D-Subminiatur
Male Connector
15-pin

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

The shield is connected
to the metallic enclosure.

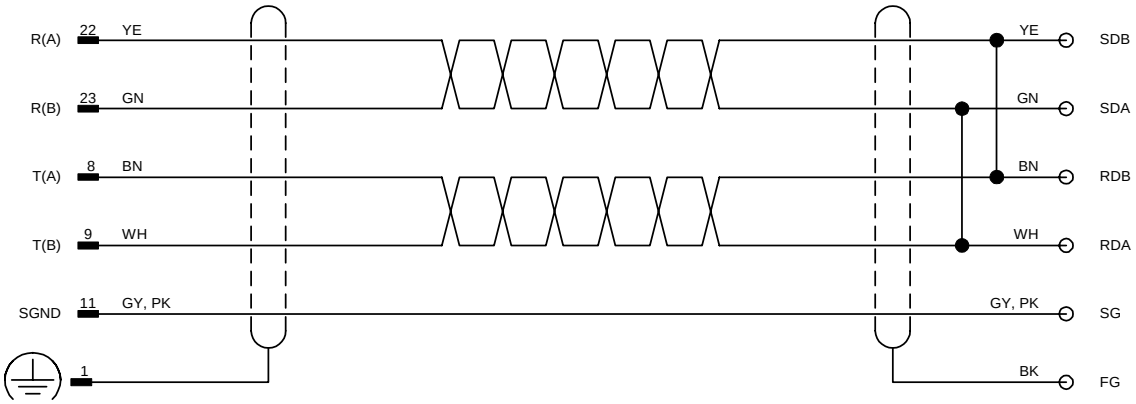
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5.11.7.2 Connecting Cable Universal Interface SER1 RS485 - Mitsubishi A Series

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

TesiMod
Operating Terminal

Mitsubishi
MelsecA



D-Subminiatur
Male Connector
25-pin

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

The shield is connected
to the metallic enclosure.

5.11.8 Error Messages

Code	1	E_SLAVE_NOT_READY	Slave not ready or defective cable or incorrect station number
	2	E_PROTOKOL	Sequence of the packets
	3	E_FRAME	Character frame error
	5	E_CRC_BCC	CRC error
	6	E_PARITY	Parity error
	9	E_BUF_SIZE	Insufficient cyclic buffer
	10	E_NO_DEFINE	No cyclic data defined
	16	E_OVERRUN	Receive buffer overrun
	40	E_SYS_ADDRESS	Incorrect system variable

Messages from the AJ71C24

50 No function in the RUN-mode.
Possible errors
– Set the respective DIP switch to the ON-position and restart or modifying of the parameters only when CPU in the STOP-mode.

51 Parity error
Possible errors:
– Set DIP-switch to correct parity setting (even parity).

52 Check sum error
Possible errors:
– Set DIP switch to correct check sum setting.

53 Protocol error
Possible errors:
– Mode switch does not correspond to the required protocol format. Correct mode switch.

54 Run-time error
Possible errors:
– The data received do not conform with the number of stop bits selected. Correct DIP switch.

55 Data overflow
Possible errors:
– New data were transmitted before the preceding transmission was completed.

56 Character set error
Possible errors:
– Invalid operand address or requested service not available.

57 Character error
Possible errors:
– Characters transmitted do not correspond to the valid character set.

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58 Faulty access to CPU
Possible errors:
– This PLC type can not be used with the AJ71C24.

66 Assigned numbers are incorrect
Possible errors:
– The PLC-CPU number does not correspond to the value FF (hex).

67 Incorrect mode
Possible errors:
– Faulty communication between AJ71C24 and the CPU.

68 Incorrect assignment of the special module
Possible errors:
– An interactive special module comprising its own buffer was configured improperly in the system.

69 Incorrect step number in the PLC program
Possible errors:
– A step control instruction is outside of the area parameterized for the PLC-CPU or the sub-program to be executed is invalid.

74 Remote error
Possible errors:
– Remote RUN/STOP mode not possible.

82 Data-Link error
Possible errors:
– An attempt was made to access a station to which the communication has already been disconnected.

83 Data bus error at the special module
Possible errors:
– The memory of a special module can not be accessed.