Digital I/O-Module
Short guide

1. Overview

Digital input/output module MK110-24.8D.4R is an expansion module with 8 digital inputs and 4 digital outputs.

The module functions as follows:

- Connection of peripherals with digital outputs
- Digital signal processing
- Pulse counter
- Connection of actuators with digital inputs
- Control of digital outputs (via RS485 network or with internal logic)
- Pulse-width modulation
- Diagnostics of RS485 Network status
- Generation of the appropriate error signals or alarm signals
- Slave device in Modbus protocol structure

CAUTION
This device must not be used for medical devices which receive, control or otherwise affect human life or physical health.

2. Specification

Table 1 Specification

Characteristic		Value
Power supply		
Power supply		24 (20 … 28) V DC
Power consumption, max.		6 W
Inputs		
Number of inputs		8
Pulse frequency, max.		1 kHz
Pulse width, min.		0.5 ms
Current, max.		7 mA
Line resistance, max.		100 Ω
Signal types		switch contacts, NPN
Outputs		
Number of outputs		4
Type		Relays (NO and CO)
Control		On-Off or PWM
Maximum voltage on relay contacts		264 V AC or 30 V DC
Switching capacity		6 A at 250 V AC or 6 A at 30 V DC
Switching current, min.		100 mA
Service lifetime, mechanical		10,000,000 switches
Service lifetime, electric (changeover contact)	6 A, 30 V DC	10,000 switches
	6 A, 250 V AC	10,000 switches
Service lifetime, electric (NO contact)	6 A, 30 V DC	30,000 switches
	6 A, 250 V AC	30,000 switches
Switching time		15 ms
PWM frequency, max.		1 Hz with 0.05 duty cycle
PWM pulse length, min.		50 ms
Interfaces		
Data transfer interface		RS-485
Baud rate, max.		115.2 kBd
Protocols		akYtec, ModBus-RTU/ ASCII
Galvanic isolation		2300 V
Flash memory overwrites, max.*		10,000
General specification		
Dimensions		(63 × 110 × 75) ± 1 mm
IP code: Faceplate Terminal block		 IP20 IP00
Average service lifetime		10 years
Weight, max.		500 g

* Flash memory stores configuration parameters.

3. Environmental conditions

Table 2 Environmental conditions

Condition	Permissible range
Ambient temperature	–20 … +55 °C
Transportation and storage	–25 … +55 °C
Relative humidity	up to 80% (at +25 °C, non-condensing)
Altitude	up to 2000 m above sea level

CAUTION
The following environmental conditions must be observed:
- low-dust, dry and controlled environment
- closed explosion-proof rooms without aggressive vapors and gases

4. Settings

The module can be configured with the akYtecToolPro software using a RS485-USB interface adapter (not included).

NOTE
The latest version of the configuration software is available for download on www.akytec.de.

Full list of the parameters is given in *User guide* (available on the device page at www.akytec.de).

5. Installation and connection

Before installation make sure there is enough free space for connecting the module and placing the wires.

The module is designed for DIN rail mounting in a control cabinet or for wall mounting.

CAUTION
Improper installation can cause serious or minor injuries and damage the module.
Installation must be performed only by fully qualified personnel.

Installation of external connections is carried out by a wire with a cross section of not more than 0.75 mm².

Powering any devices from the network contacts of the module is prohibited

The device is powered from a local power supply unit of suitable capacity.

The power supply unit should be installed in the same electrical cabinet in which the device is installed.

CAUTION
All electrical connections must be performed by a fully qualified electrician.
Switch on the power supply only after the wiring of the device has been completely performed.

6. Electrical connection

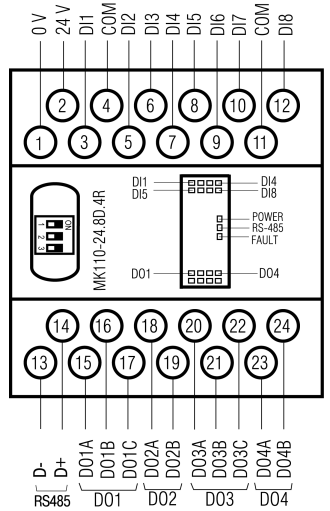

Fig. 1 Electrical connections

Table 3 Terminal assignments

No.	Description	No.	Description
1	Power supply (0 V)	13	RS-485 (D-)
2	Power supply (24 V)	14	RS-485 (D+)
3	Input 1 (DI1)	15	Output 1A (DO1A)
4	Common negative terminal (COM)	16	Output 1B (DO1B)
5	Input 2 (DI2)	17	Output 1C (DO1C)
6	Input 3 (DI3)	18	Output 2A (DO2A)

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No.	Description	No.	Description
7	Input 4 (DI4)	19	Output 2B (DO2B)
8	Input 5 (DI5)	20	Output 3A (DO3A)
9	Input 6 (DI6)	21	Output 3B (DO3B)
10	Input 7 (DI7)	22	Output 3C (DO3C)
11	Common negative terminal (COM)	23	Output 4A (DO4A)
12	Input 8 (DI8)	24	Output 4B (DO4B)

NOTICE
For outputs 1 and 3, the assignment of the contacts (A, B, C) is as follows: A - normally closed, B - changeover, C - normally open. For outputs 2 and 4, the assignment of contacts (A, B) is as follows: A - changeover, B - normally open.

Under the cover on the front panel of the module three DIP-switches are located:

- **1** – During normal operation, the switch should be set to OFF position
- **2** – Factory settings restoration
- **3** – Firmware–update

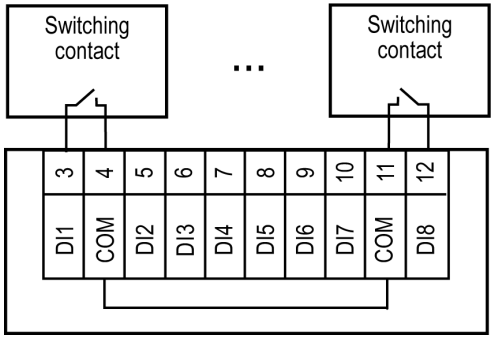

Fig. 2 DI wiring — Switching contacts

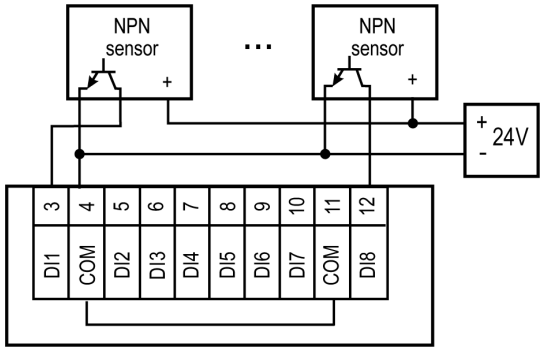

Fig. 3 DI wiring — NPN sensors

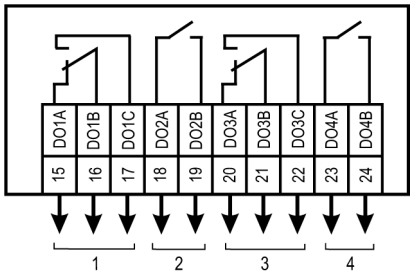

Fig. 4 DO wiring

7. Indication

On the front panel there are indication LEDs.

Table 4 Indication

LED	LED State	Description
INPUTS 1…8	ON	HIGH on input
OUTPUTS 1…4	ON	Output is on
RS-485	Flashing	Data exchange via serial port
POWER	ON	Power on
FAULT	ON	Data exchange via serial port is terminated

8. Modbus registers

Table 5 Modbus registers

Parameter	Value (Unit)	Type	Register	
			(Hex)	(Dec)
Duty cycle DO1–DO4	0…1000 (0,1 %)	Uint16	0000–0003	0000–0003
Safe output status DO1–DO4	0…1000 (0,1 %)	Uint16	0010–0013	0016–0019
PWM period DO1–DO4	1…900 c	Uint16	0020–0023	0032–0035
Bit mask of output status	0…15	Uint16	0032	0050
Bit mask of input status	0…255	Uint16	0033	0051
Counter DI1–DI8	0…65535	Uint16	0040–0047	0064–0071
Baud rate	0 – 2,4 (kBd); 1 – 4,8 (kBd); 2 – 9,6 (kBd); 3 – 14,4 (kBd); 4 – 19,2 (kBd); 5 – 28,8 (kBd); 6 – 38,4 (kBd); 7 – 57,6 (kBd); 8 – 115,2 (kBd)	Uint16	0209	0521
Data bits	0 – 7 1 – 8	Uint16	020A	0522
Stop bits	0 – 1 stop bit 1 – 2 stop bits	Uint16	020B	0523
Parity	0 – none 1 – even 2 – odd	Uint16	020C	0524
Response time-out	0…45 (ms)	Uint16	020D	0525
Device address	1…255	Uint16	020F	0527
Network address length	0 – 7 1 – 8	Uint16	0211	0529
Time-out	0…600 s	Uint16	0030	0048
Device name	—	String	F000	61440
Device version	—	String	F010	61456

Writing to the registers is performed with function 16 (0x10), reading — with functions 03 or 04 (the device supports both functions).

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