Digital I/O module
Short guide

1. Overview

MK210-302/312 is an extension module with 12 inputs and 4 digital outputs (relays).

The module has two Ethernet ports for connection within the daisy chain scheme. If the module fails or the power is turned off, the data transmission will be fed directly from port 1 to port 2 without disconnecting.

The full User Guide is available on the device page at www.akytec.de .

2. Environmental conditions

Table 1 Operating conditions

Condition	Permissible range
Ambient temperature	-40…+55 °C
Transportation and storage	
Relative humidity	up to 95 % (at +35 °C, non-condencing)
Attitude	up to 2000 m ASL
IP code	IP20
Vibration / shock resistance	conforms to IEC 61131-2
EMC emission / immunity	conforms to IEC 61131-2

3. Specifications

Table 2 General specifications

Parameter	Value
Electrical	
Power supply	24 (10 ... 48) V DC
Power consumption	6 W at 24 V DC
Polarity protection	Yes
Appliance class	II
Interfaces	
Data transfer	Double Ethernet 10/100 Mbps
Protocols	Modbus TCP, MQTT, SNMP, NTP
Configuration interface	USB 2.0 (MicroUSB) Ethernet 10/100 Mbps
Digital inputs	
Inputs number	12
Input signal	contact sensor NPN and PNP transistor
Functions	logical level detection high frequency pulse counter (DI1-DI8) frequency measurement (DI1-DI8) encoder signal processing
Pulse length, min, (DI1-8)	5 µs (up to 100 kHz)
Pulse length, min, (DI9-12)	1 ms (up to 400 Hz)
LOW level (current), max.	1.2 mA
HIGH level (current). max.	5.5 mA
LOW level (voltage range).	0.0…6.1 V
HIGH level (voltage range)	8.8…30.0 V
Digital outputs	
Outputs number	4
Output type	Relay, NO
Control	On-Off or PWM
Switching capacity AC	5 A, 250 VAC, resistive load
Switching capacity DC	3 A, 30 VDC
Switching current, min.	10 mA at 5 VDC
Switching time	15 ms
PWM frequency, max.	1 Hz with 0.05 duty cycle
PWM pulse length, min.	50 ms
Optional functions	Safe state Output diagnostics (only MK210-312)
Service life, electrical 3 A, 30 VDC	35,000 switching cycles
Service life, electrical 5 A, 250 VAC	50,000 switching cycles
Service life, mechanical	5,000,000 switching cycles
Flash-memory (log file storage)	
File size, max.	2 kB
Number of log files, ,max.	1000
Logging interval, min.	10 s
Real time clock	
Accuracy	±3 s/day at +25 °C ±10 s/day at -40 °C
Backup battery	CR2032
Mechanical	
Dimensions	42 × 124 × 83 mm
Weight	approx. 260 g

4. Installation and connection

Before installation make sure there is enough free space for connecting the module and placing the wires. The module is mounted on a DIN rail or on a vertical surface using screws.

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

For stranded wires, use end sleeves.

After installation, put the wires into the cable channel of the module housing and close the cover.

If necessary, in order to remove the terminal blocks of the module, loosen the two screws at the corners of the terminal blocks.

CAUTION
Connection and maintenance is performed only when the module power and the power to all devices connected to it is turned off.

Table 3 Network parameters

Parameter	Description	Default value
IP address	IPv4 Internet Protocol address	192.168.1.99
Subnet mask	IP address recognition area in the subnet	255.255.255.0
Gateway	IP address of the gateway	192.168.1.1
DNS server 1	Primary DNS server	77.88.8.8
DNS server 2	Secondary DNS server	8.88.8.8

5. Connection diagrams

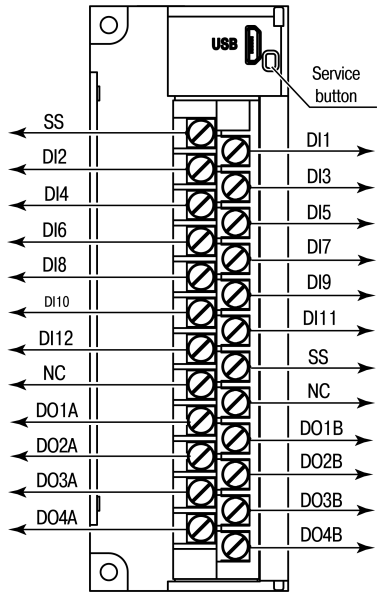


Fig. 1 Terminal block layout

Table 4 Terminal assignments

Marking	Description
DI1…DI12	Input terminals
SS	Common input power supply point
NC	Not connected
DO1A…DO4A, DO1B…DO4B	Output terminal

The service button performs the following functions:

- Factory settings restore
- IP-address assignment

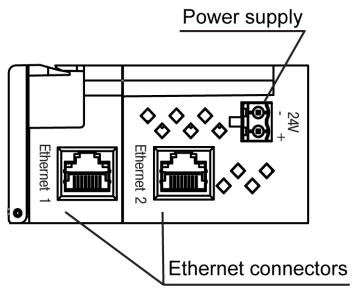


Fig. 2 Device connectors

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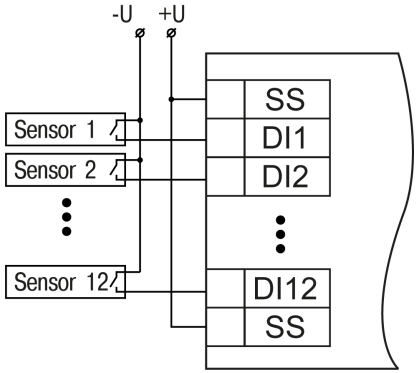


Fig. 3 Switch contact wiring

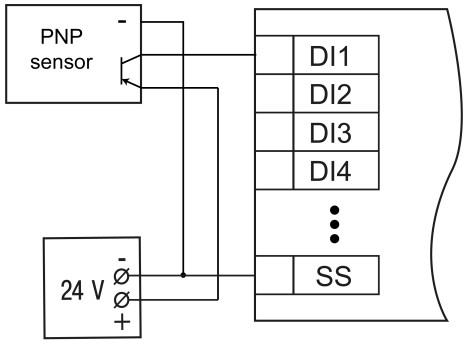


Fig. 4 3-wire sensor with PNP output

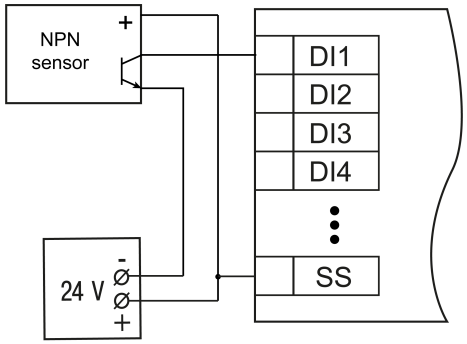


Fig. 5 3-wire sensor with NPN output

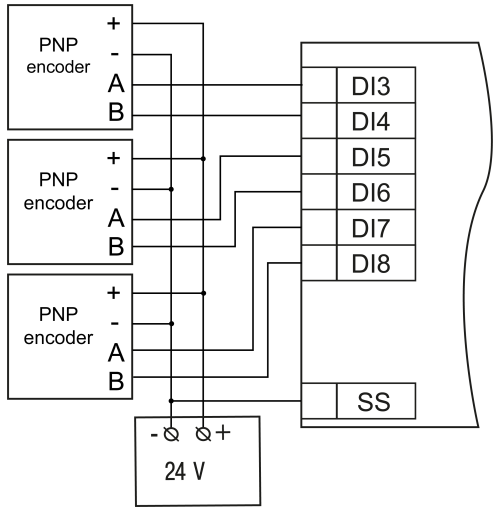


Fig. 6 AB encoder with PNP output

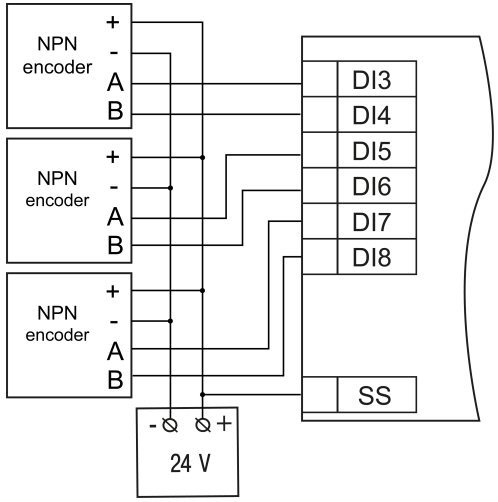


Fig. 7 AB encoder with NPN output

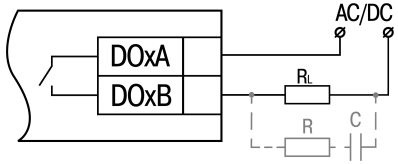


Fig. 8 Relay output wiring

6. Settings

The module is configured via the Modbus TCP protocol or in the akYtec Tool Pro program via the USB interface (see User Guide). If the module is connected to the USB port, the main module power supply is not required.

7. Indication

Table 5 LEDs

LED	Color	LED State	Description
⏻	green	Off	Power off
		On	Power on
Eth 1	green	Off	Not connected
		Flashing	Data transfer over Ethernet 1 interface
Eth 2	green	Off	Not connected
		Flashing	Data transfer over Ethernet 2 interface
⚠	red	Off	No errors
		On	Program / configuration error
		Flashing (0.1 s / 2 s)	Low battery (Sect. 4.3, App. C)
		Flashing (0.1 s / 0.5 s)	No requests from master. Safe state activated
		Flashing (0.9 s / 1 s)	Hardware peripherals error (Flash, RTC, Ethernet Switch)
Input LEDs (12)	green	Off	LOW on the input
		On	HIGH on the input
Output LEDs (4)	green	Off	Output relay off
		On	Output relay on
	red	On	Fault status (only MK210-312)

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