

## Digital I/O Module

### Short guide

#### 1. Overview

MK210-301/311 is an extension module with 6 digital inputs (dry contact) and 8 digital outputs (relays).

The module has two Ethernet ports for connection under the daisy chain scheme.

If the module fails or the power is turned off, the data transmission will be made directly from port 1 to port 2 without disconnecting.

#### 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-condensing)
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
<b>Electrical</b>	
Power supply	24 (10 ... 48) V DC
Power consumption	6 W at 24 V DC
Polarity protection	Yes
Appliance class	II
<b>Interfaces</b>	
Data transfer	Double Ethernet 10/100 Mbps
Protocols	Modbus TCP MQTT SNMP NTP
Configuration interface	USB 2.0 (MicroUSB) Ethernet 10/100 Mbps
<b>Digital inputs</b>	
Inputs number	6
Input signal	Switch contact (potential free) NPN transistor Pulse counter Debounce filter (optional)
Functions	
Pulse length, min.	1 ms ( $f \leq 400$ Hz)
Input lines (loop) resistance, min.	100 $\Omega$
Permissible leakage resistance, min.	10 $\Omega$
<b>Digital outputs</b>	
Outputs number	8
Output type	Relay, NO

Parameter	Value	
Control	On-Off or PWM	
Switching capacity	AC	5 A, 250 VAC, resistive load
	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 MK210-311)	
Service life, electrical	3 A, 30 VDC	35,000 switching cycles
	5 A, 250 VAC	50,000 switching cycles
Service life, mechanical		5,000,000 switching cycles
<b>Flash-memory (log file storage)</b>		
File size, max.	2 kB	
Number of log files, max.	1000	
Logging interval, min.	10 s	
<b>Real time clock</b>		
Accuracy	$\pm 3$ s/day at +25 °C $\pm 10$ s/day at -40 °C	
Backup battery	CR2032	
<b>Mechanical</b>		
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 mm<sup>2</sup>.

For stranded wires, use end sleeves.

After installation, lay the wires in the cable channel of the module housing and close the cover.

If necessary, 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 Ethernet parameters

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

#### 5. Electrical connection

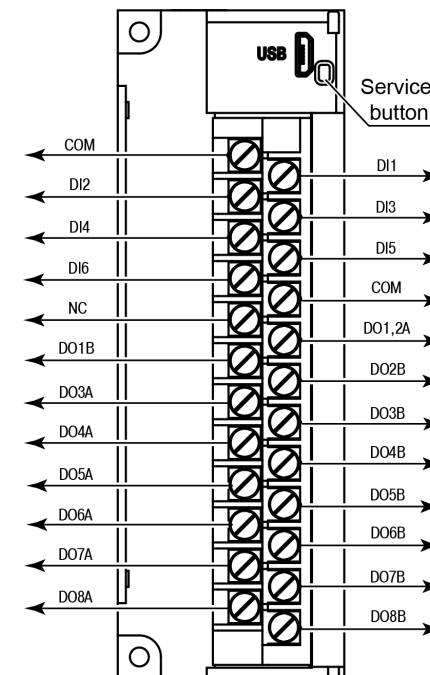


Fig. 1 Front view (open cover)

Table 4 Terminal assignments

Marking	Description
DI1...DI6	Input terminals
COM	Common input power supply point
NC	Not connected
DO 1,2A	Common terminal A for outputs 1,2
DO3A...DO8A, DO1B...DO8B	Output terminal

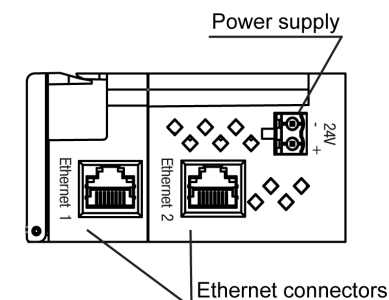


Fig. 2 Connectors

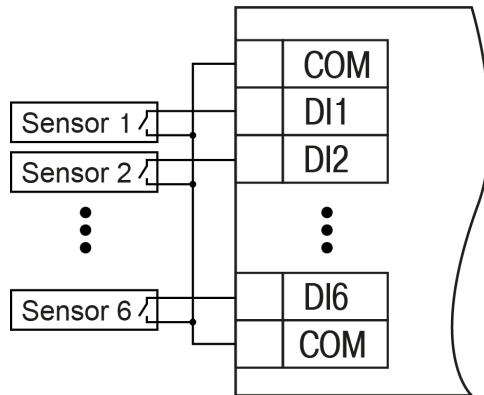


Fig. 3 Connection to inputs DI1-DI6

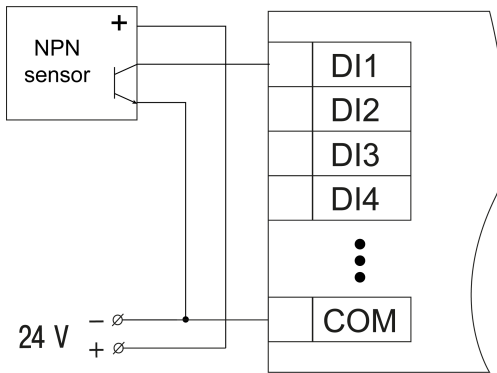


Fig. 4 Connection of NPN transistor

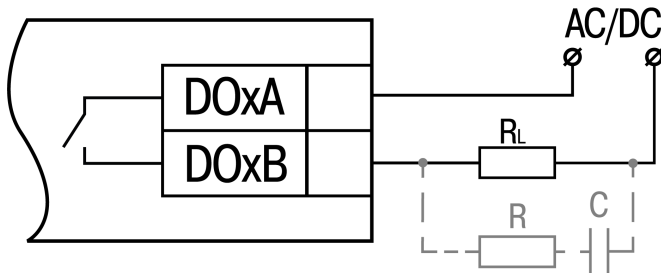


Fig. 5 External connections to digital output of the relay type

## 6. Settings

The module is configured via the Modbus TCP protocol or in 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
		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 (6)	green	Off	LOW on the input
		On	HIGH on the input
Output LEDs (8)	green	Off	Output relay off
		On	Output relay on
	red	On	Fault status