# 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-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<br>MQTT<br>SNMP<br>NTP |
| Configuration interface | | USB 2.0 (MicroUSB)<br>Ethernet 10/100 Mbps |
| **Digital inputs** | | |
| Inputs number | | 6 |
| Input signal | | Switch contact (potential free)<br>NPN transistor |
| Functions | | Pulse counter<br>Debounce filter (optional) |
| Pulse length, min. | | 1 ms (f ≤ 400 Hz) |
| Input lines (loop) resistance, min. | | 100 Ω |
| Permissible leakage resistance, min. | | 10 Ω |
| **Digital outputs** | | |
| Outputs number | | 8 |
| Output type | | Relay, NO |
| 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<br>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 |
| **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<br>±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, 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 |
|---|---|---|---|
| ***IP address*** | IPv4 Internet Protocol address | 192.168.1.99 | R |
| ***Subnet mask*** | IP address recognition area in the subnet | 255.255.255.0 | R |
| ***Gateway*** | IP address of the gateway | 192.168.1.1 | R |
| ***DNS server 1*** | Primary DNS server | 77.88.8.8 | RW |
| ***DNS server 2*** | Secondary DNS server | 8.88.8.8 | RW |

## 5. Electrical connection

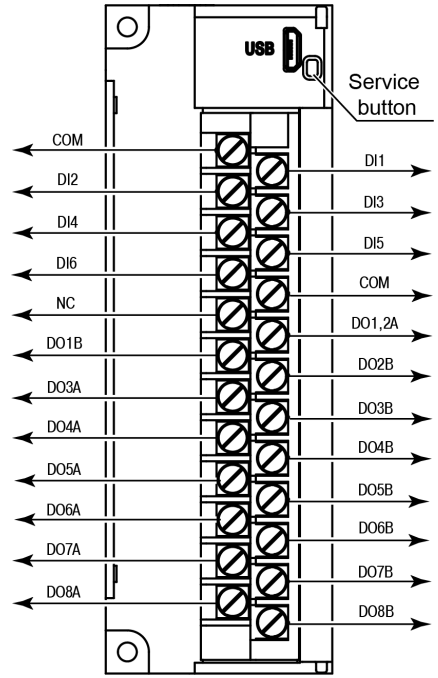



*Fig. 1 Front view (open cover)*

*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 |

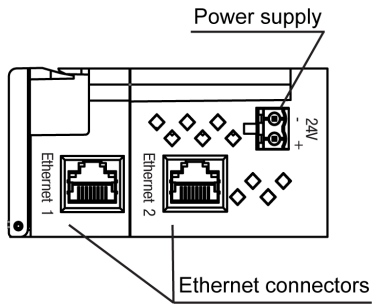



*Fig. 2 Connectors*


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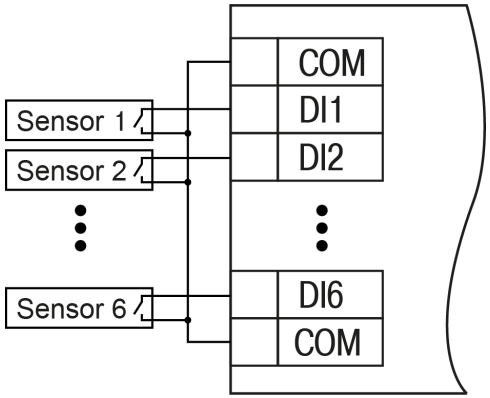



*Fig. 3 Connection to inputs DI1-DI6*

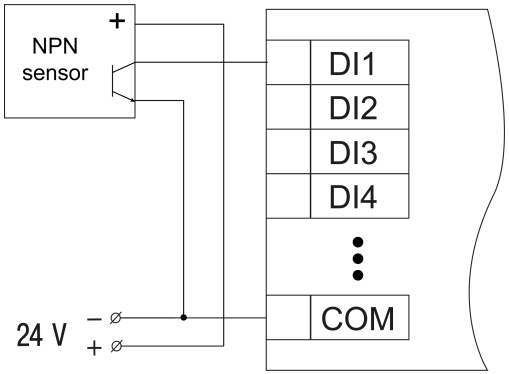



*Fig. 4 Connection of NPN transistor*

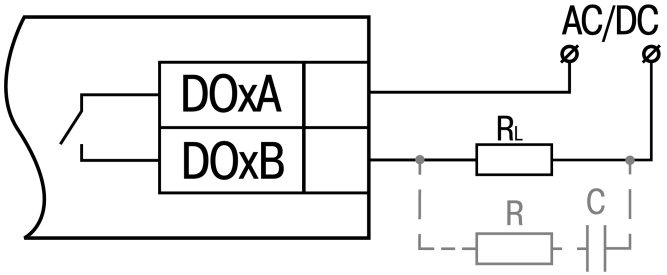



*Fig. 5 External connections to digital output of the relay type*

## 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 |

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