Digital output module
Short guide

1. Overview

Digital output module MU110-24.16K is an extension module with 16 digital outputs.

The module provides the following functions:

- connection of actuators with digital outputs
- output control using ModBus network
- pulse width modulation
- network diagnostic
- fault and alarm signals
- Slave in a ModBus protocol structure.

CAUTION
This device should 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.	12 W
Outputs	
Number of outputs	16
Type	NPN transistor (open collector)
Control	On-Off or PWM
Output power supply	10…60 V
DC load current, max.	0.4 A
Output voltage drop, max.	1.5 V
Power line length, max.	30 m
Pulse length, min.	5 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. Wiring

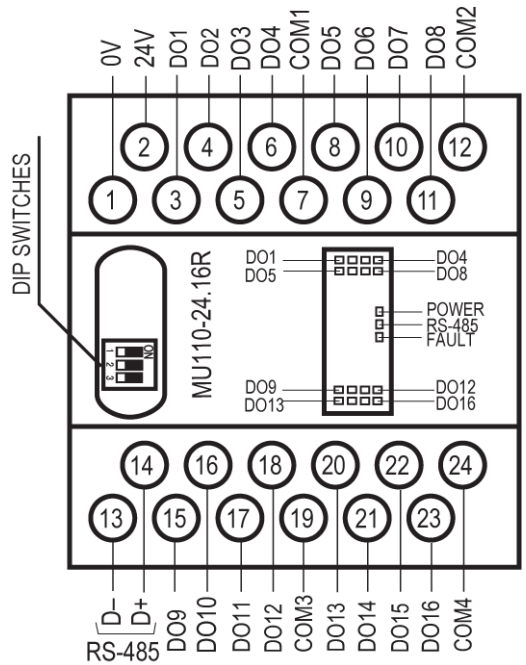


Fig. 1 Electrical connections

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	Output 1	15	Output 9
4	Output 2	16	Output 10
5	Output 3	17	Output 11
6	Output 4	18	Output 12
7	Common for outputs 1–4	19	Common for outputs 9–12
8	Output 5	20	Output 13
9	Output 6	21	Output 14
10	Output 7	22	Output 15
11	Output 8	23	Output 16
12	Common for outputs 5–8	24	Common for outputs 13–16

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

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- **3** – Firmware–update

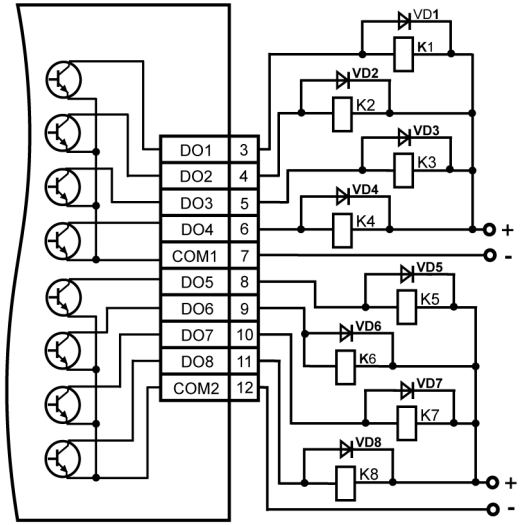


Fig. 2 Output wiring

Outputs are 4-group isolated. If connecting an inductive load, use only a common terminal (COMx) of the same group.

Table 4 Common terminals of output groups

Output group	Common terminal
DO1–DO4	COM1
DO5–DO8	COM2
DO9–DO12	COM3
DO13–DO16	COM4

7. Indication

On the front panel there are indication LEDs.

Table 5 Indication

LED	LED state	Description
OUTPUT 1...16	ON	Output is on
RS-485	Flashing	Data exchange via serial port
POWER	ON	Power on
FAULT	ON	Data exchange via serial port is interrupted

8. Modbus registers

Table 6 Modbus registers

Parameter	Value (Unit)	Type	Register	
			(Hex)	(Dec)
Duty cycle DO1–DO16	0…1000 (0,1 %)	Uint16	0000–000F	0000–0015
Safe output status DO1–DO16	0…1000 (0,1 %)	Uint16	0010–001F	0016–0031
PWM period DO1–DO16	1…900 c	Uint16	0020–002F	0032–0047
Bit mask of output status	0…65535	Uint16	0032	0050
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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