MDACM1

Mounting and operating instructions

MDACM1 | DIGITAL TO ANALOGUE CONVERTER

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SAFETY AND PRECAUTIONS

Read all the information, the datasheet, Modbus map, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using, or maintaining this product.

For safety and licensing (CE) reasons, unauthorised conversion and / or modifications of the product are inadmissible.

The product should not be exposed to abnormal conditions, such as extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.

All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.

Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.

Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.

Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.

In case there are any questions that are not answered, please contact your technical support or consult a professional.

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SENTERA CONTROLS

PRODUCT DESCRIPTION

The MDACM1 is intended for converting a Modbus RTU (RS485) signal into an analogue / modulating output signal (0—10 VDC / 0—20 mA / PWM). It is Power over Modbus supplied and all parameters are accessible via Modbus RTU. It needs a master unit, such as the Sentera RDPU or any BMS or master module that is able to write a value in Modbus Holding registers.

INTENDED AREA OF USE

- BMS and controlled ventilation systems
- Modbus signal conversion

TECHNICAL DATA

- Power supply: 24 VDC, Power over Modbus
- Selectable analogue / modulating output types:
  - ▸ 0—10 VDC mode: min. load 50 kΩ (R_L ≥ 50 kΩ)
  - ▸ 0—20 mA mode: max. load 500 Ω (R_L ≤ 500 Ω)
  - ▸ PWM mode: PWM Frequency: 1 kHz, min. load 50 kΩ (R_L ≥ 50 kΩ)
- Maximum power consumption: 0,72 W
- Nominal power consumption in normal operation: 0,54 W
- Imax: 30 mA
- Protection class: IP65
- Operating ambient conditions:
  - ▸ Temperature: -10—60 ºC
  - ▸ Rel. humidity: 5—85 % rH (non-condensing)
- Storage temperature: -20—70 ºC

STANDARDS

CE

- EMC Directive 2014/30/EC:
  - ▸ EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
  - ▸ EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
- WEEE Directive 2012/19/EC
- RoHs Directive 2011/65/EC

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OPERATIONAL DIAGRAM
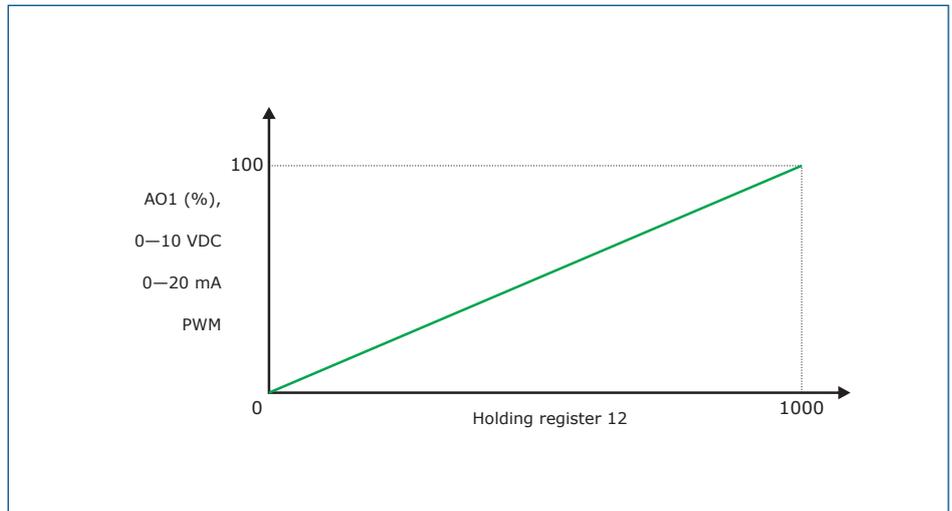
WIRING AND CONNECTIONS

RJ45 connection	
24 VDC	Supply voltage 24 VDC
GND	Ground
A	Modbus RTU communication, signal A
/B	Modbus RTU communication, signal /B

| Terminal block connection	
VIN	Supply voltage 24 VDC
GND	Ground, supply voltage
AO1	Analogue / modulating output (0—10 VDC / 0—20 mA / PWM)
GND	Ground, AO1
Output connection	Spring contact terminal blocks, cable cross section: 1,5 mm²

⚠ **ATTENTION**

MDACM1 needs to be supplied either via the RJ45 connector or via the connection terminals. Do not supply the device via the RJ45 connector and the connection terminals simultaneously!

MOUNTING INSTRUCTIONS IN STEPS

Before you start mounting the MDACM1, read carefully **"Safety and Precautions"**. Choose a smooth surface for installation (a wall, panel, etc.) and follow these steps:

1. Unscrew the front cover of the enclosure and remove it.
2. Fix the enclosure onto the surface by means of suitable fasteners while adhering to the mounting dimensions shown in **Fig. 1** *Mounting dimensions* and the correct mounting position shown in **Fig. 2** *Mounting position*.

Fig. 1 Mounting dimensions	Fig. 2 Mounting position	
	Correct	**Incorrect**
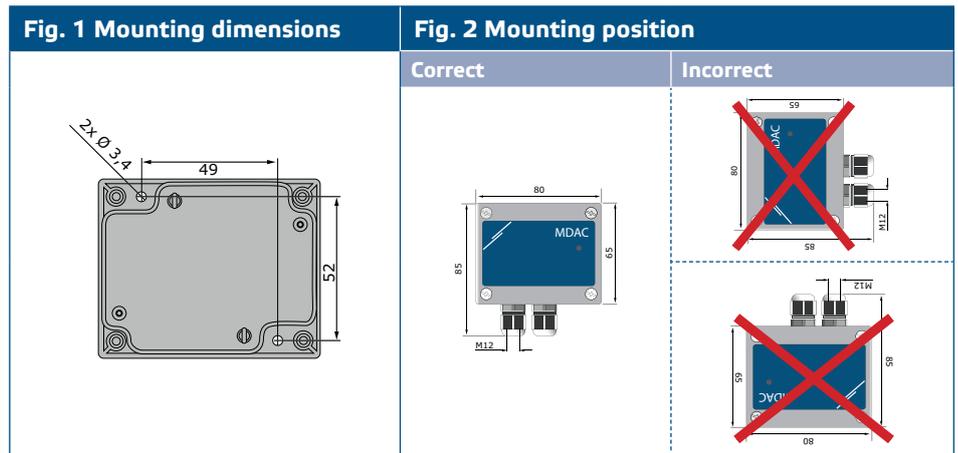
3. Insert the cables though the cable glands.

4. Crimp the RJ45 cable and plug it into the socket, then connect the output wires as shown in **Fig. 3.** *Connections* adhering to the information in section "**Wiring and connections**".
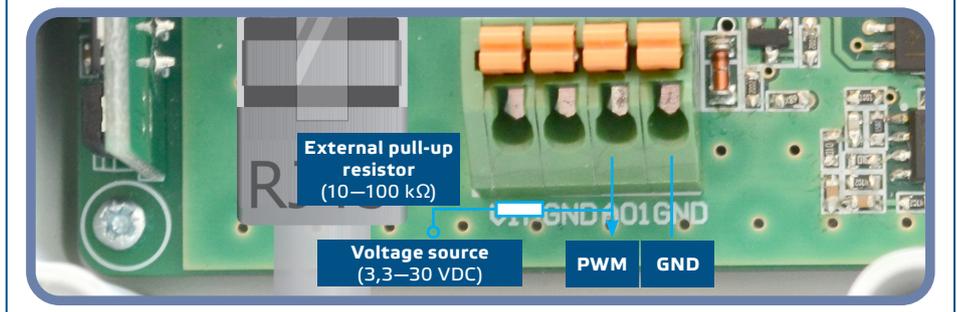
Fig. 3 Connections
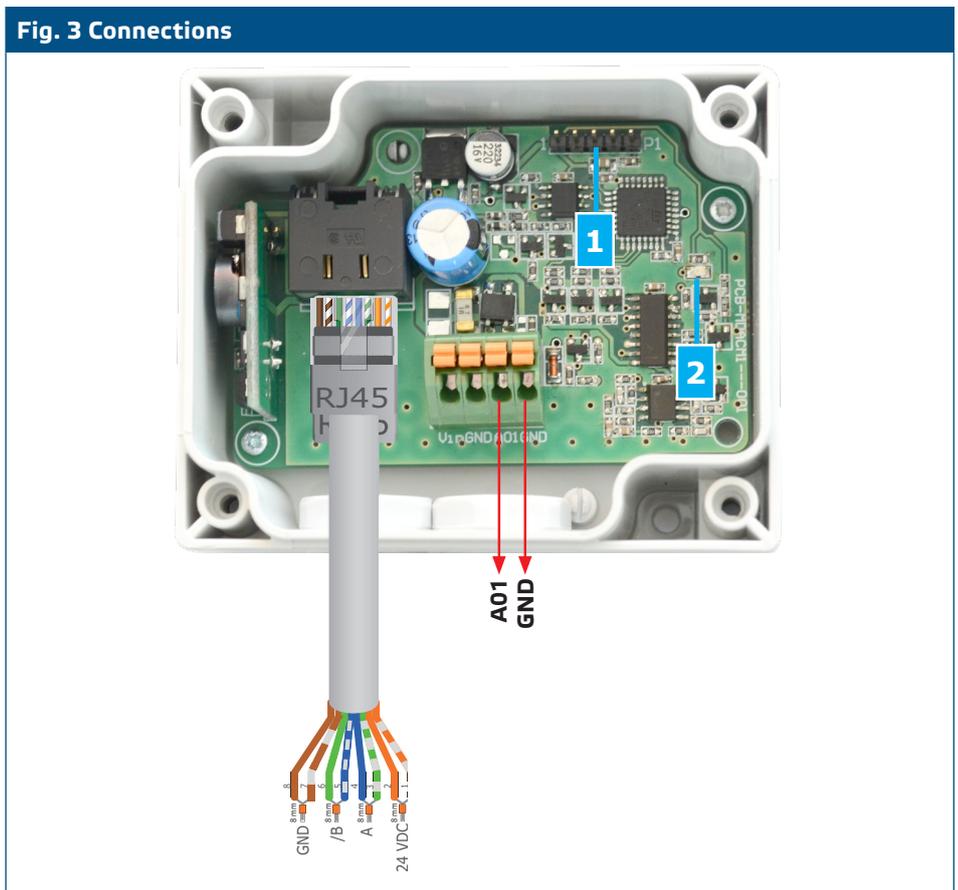
5. Put back the front cover and secure it with the screws. Tighten the cable glands.

6. Switch on the power supply.

PWM mode (open collector connection):

■ When PWM mode is selected and the PWM output is set to "open collector", an external pull-up resistor needs to be used. See **Fig. 4** below.
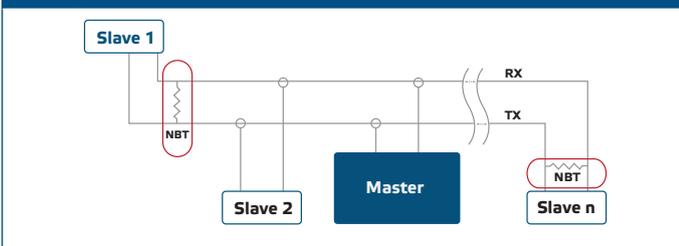
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Fig. 4 PWM (Open collector) connection

External pull-up resistor (10—100 kΩ)
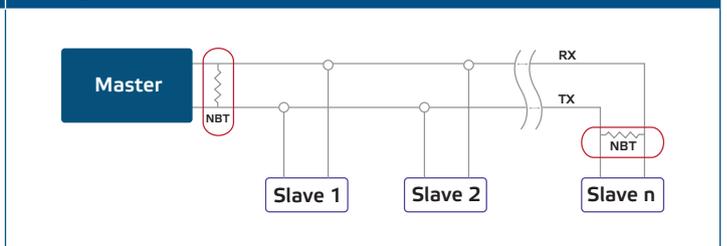
Voltage source (3,3—30 VDC)

PWM | GND

Optional settings

To assure correct communication, the NBT needs to be activated in only two devices on the Modbus RTU network. If necessary, enable the NBT resistor via 3SModbus or Sensistant (*Holding register 9*).

Example 1

Example 2

NOTE

On a Modbus RTU network, two bus terminators (NBTs) need to be activated.

VERIFICATION OF INSTALLATION INSTRUCTIONS

Continuous green LED indication means the unit is supplied. If the LED is not on, check the connections again.

Blinking green LED indicates active Modbus communication. If the LED does not blink, check the connections again.

OPERATING INSTRUCTIONS

The MDACM1 is operated via Modbus RTU. To monitor and configure its settings, you can either download the free 3SModbus software from Sentera's website or use the Sensistant tool. Refer to the **Modbus Register Map**.

NOTE

For the complete Modbus register data, refer to the product Modbus Register Map, which is a separate document attached to the article code on the website and contains the registers list. Products with earlier firmware versions may not be compatible with this list.

Bootloader

Thanks to the bootloader functionality, the unit firmware can be updated via Modbus RTU communication. With 3SM boot Application (part of 3SM center software suite), 'boot mode' is automatically activated and the firmware can be updated.

NOTE

Make sure the power supply does not get interrupted during "bootload" procedure, otherwise you risk losing unsaved data.

TRANSPORT AND STORAGE

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY AND RESTRICTIONS

Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

MAINTENANCE

In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.