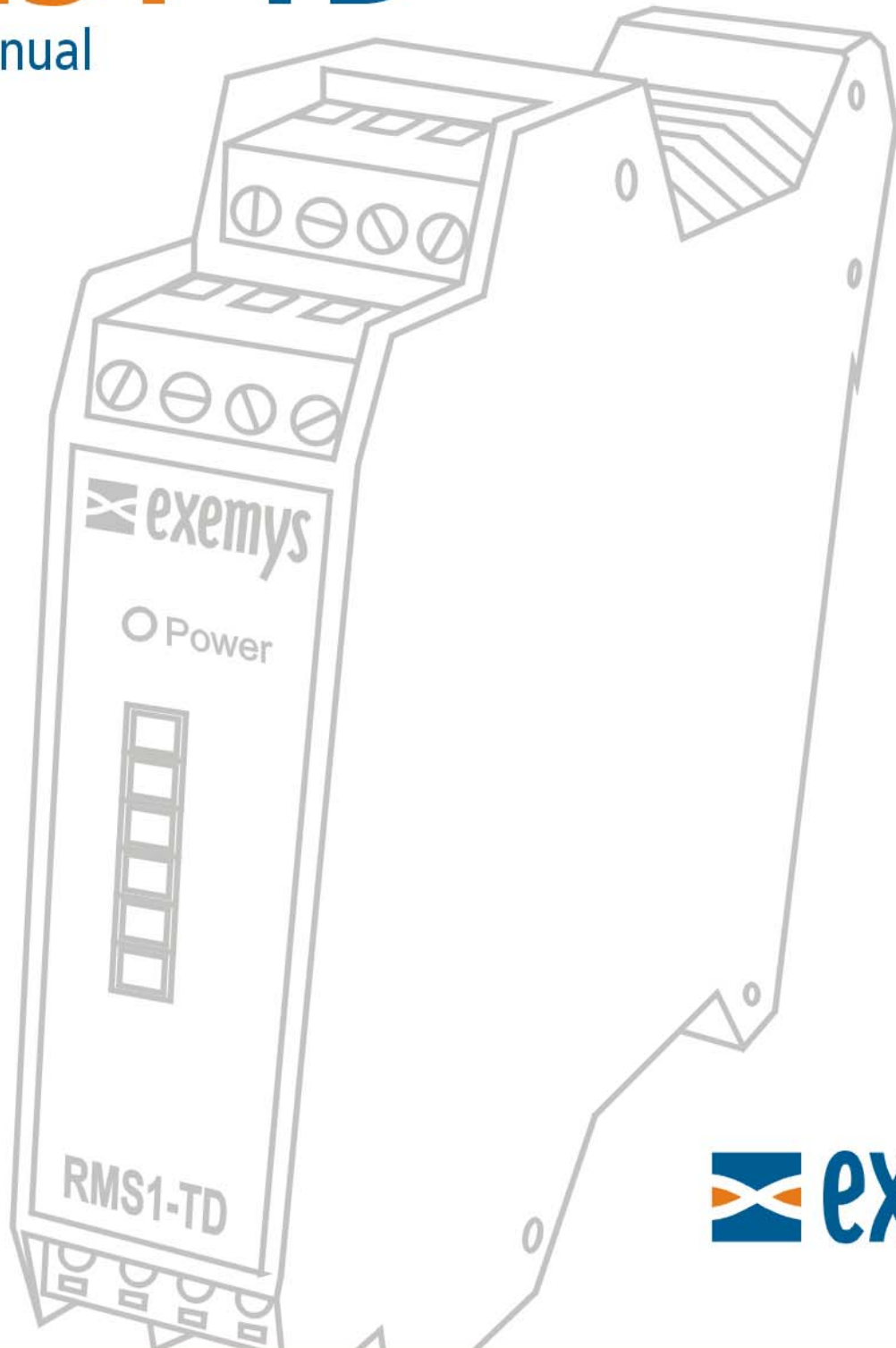


QUAD TEMPERATURE METER WITH MODBUS INTERFACE
(-55 to +125°C)

RMS1-TD

User's Manual



ISO 9001:2000



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Chapter 1

Introduction

1.1 Purpose of this manual

The purpose of this manual is to provide instructions for a quick, easy installation and operation of the RMS1-TD temperature module.

The manual begins with the product description and then provides instructions for proper installation of its hardware. Later on, it includes detailed information on RMS1-TD's configuration and operation.

This manual applies to firmware version v1.0

1.2 Conventions, terms and acronyms

This manual uses the following acronyms:

Table 1 - Acronyms

Acronyms	Description
Bps	Bits per second
LED	Visual signal

1.3 General description

RMS1-TD is a quadruple temperature meter with Modbus RTU interface. It can measure up to four temperatures through its digital sensors and provide the result through a Modbus slave connection.

Temperature range is -55°C / $+125^{\circ}\text{C}$.

Modbus connection parameters are adjusted to 9600 bps, 8 databits, no parity and one stop bit. (9600, 8, N, 1). Thus, the Master Modbus RTU must be configured accordingly.

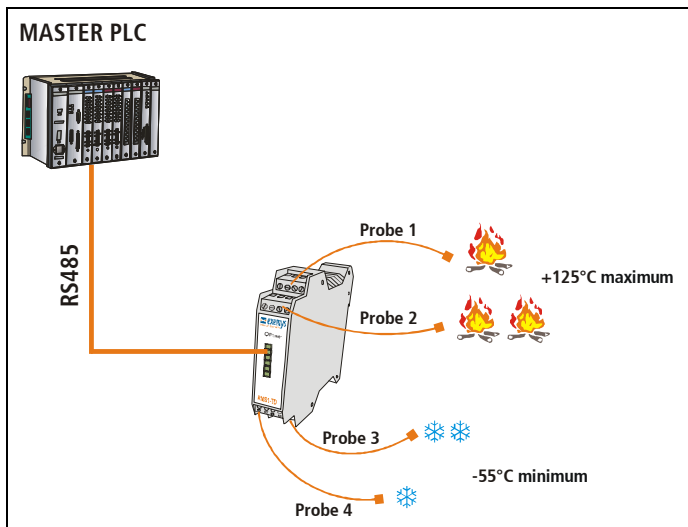


Figure 1 – RMS1-TD measuring 4 temperatures, connected through RS485

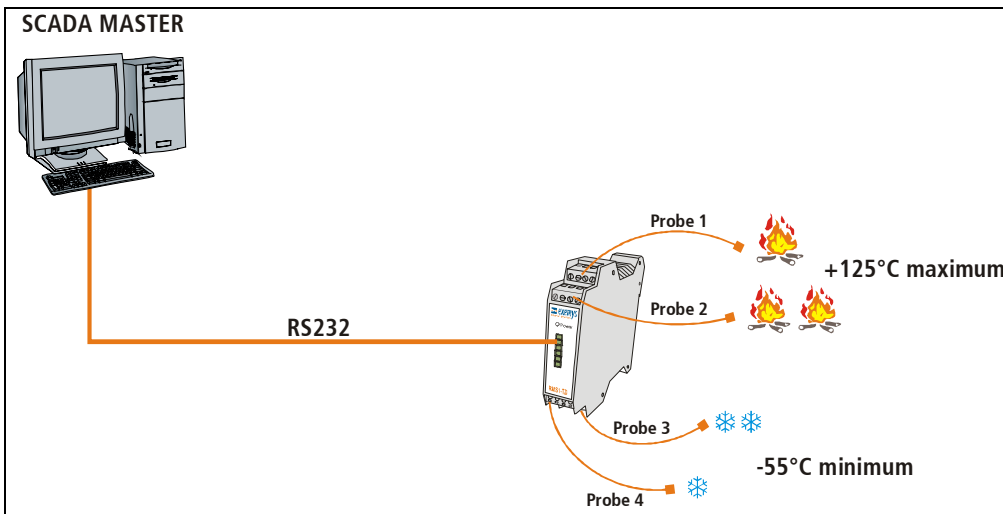


Figure 2 - RMS1-TD measuring 4 temperatures, connected through RS232

1.4 Product naming

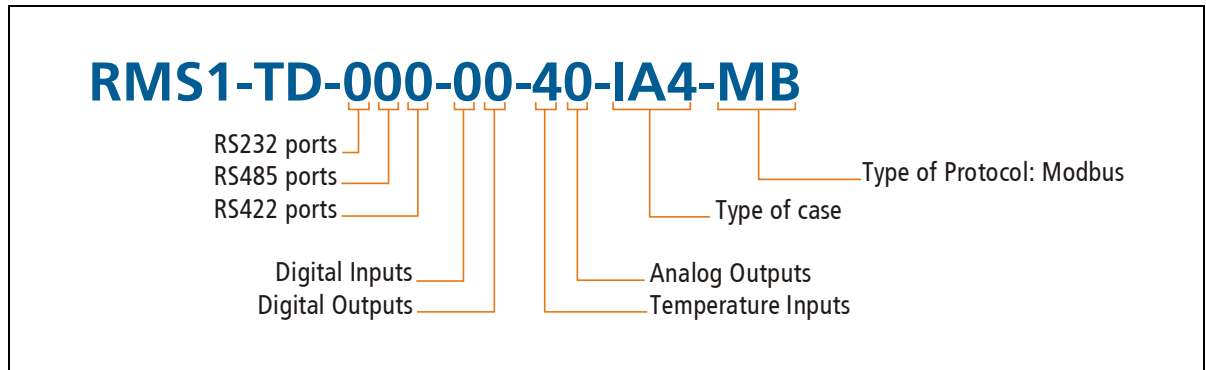


Figure 3- Naming of available models

1.5 Available Models

- **With RS232 communication:** RMS1-TD-100-00-40-IA4-MB
- **With RS485 communication:** RMS1-TD-010-00-40-IA4-MB

Chapter 2

Installation

2.1 Wiring

Figures 4, 5 show the wiring required by the device to be operated. Naming order is top-down: top connectors host probes one and two, while the rest provide connectivity to probes three and four.

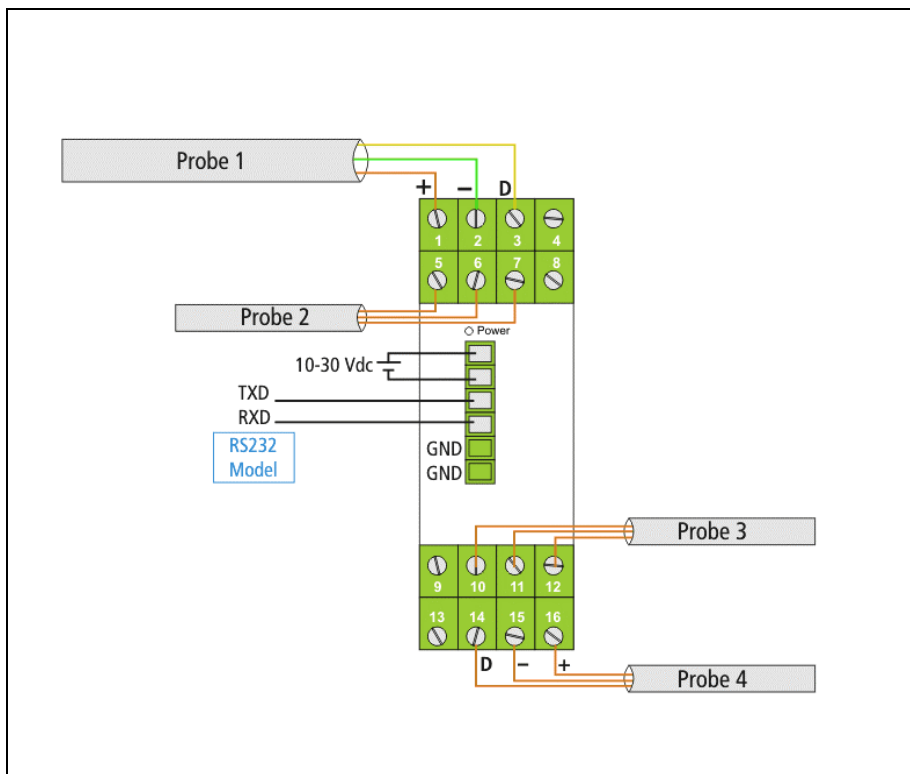


Figure 4 – RS232 Model wiring

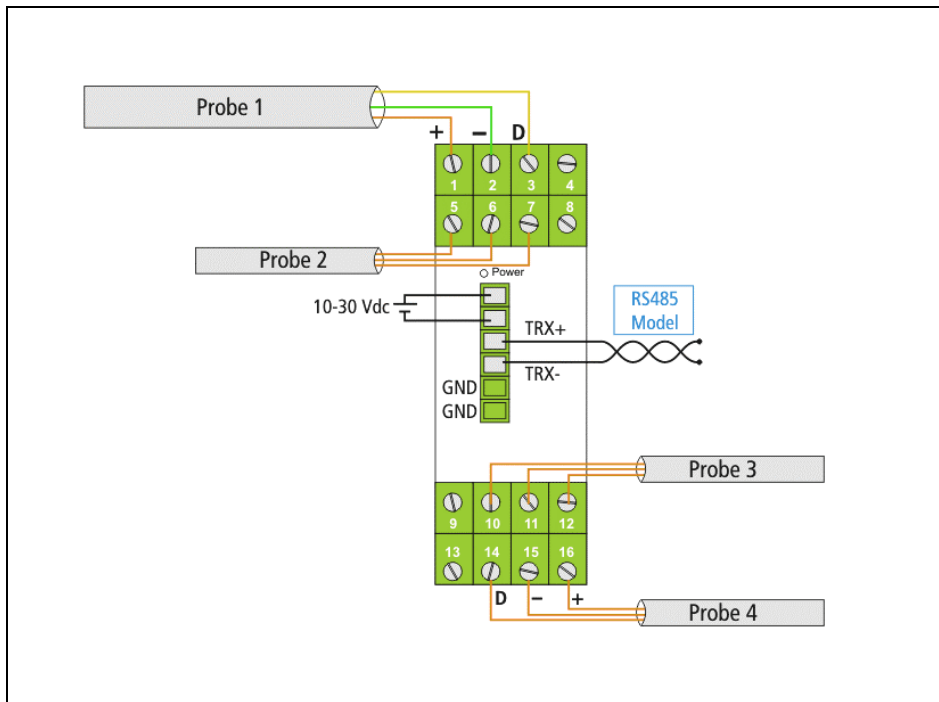


Figure 5 – RS485 Model Wiring

2.2 Wiring the probes

The sensors are located within the probes, as shown in Figure 6. The length of the cables provided at factory can be overridden by cabling the probe again, according to user's needs. (Maximum length is 60 meters). The cable will be coated and it will contain 3 wires of 0,25 mm² as a minimum. The coat must be grounded.

The pins for the probes are summarized in the following table:

Table 2 –Probes connection

Acronyms	Vcc	Ground	Data
Probe 1	1	2	3
Probe 2	5	6	7
Probe 3	12	11	10
Probe 4	16	15	14

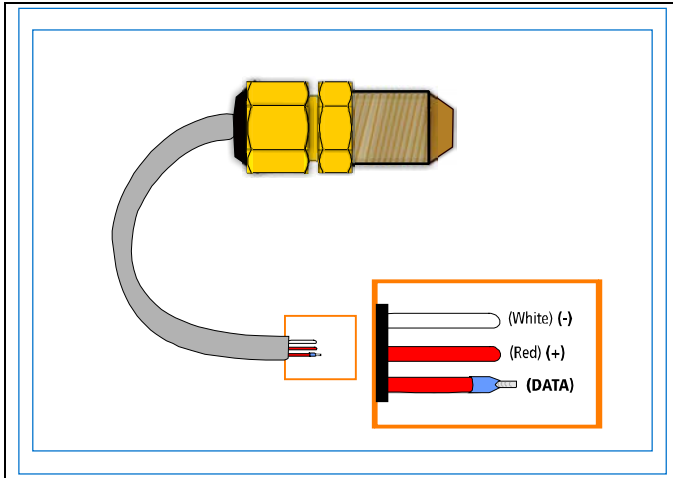


Figure 6 – Wiring of the probe

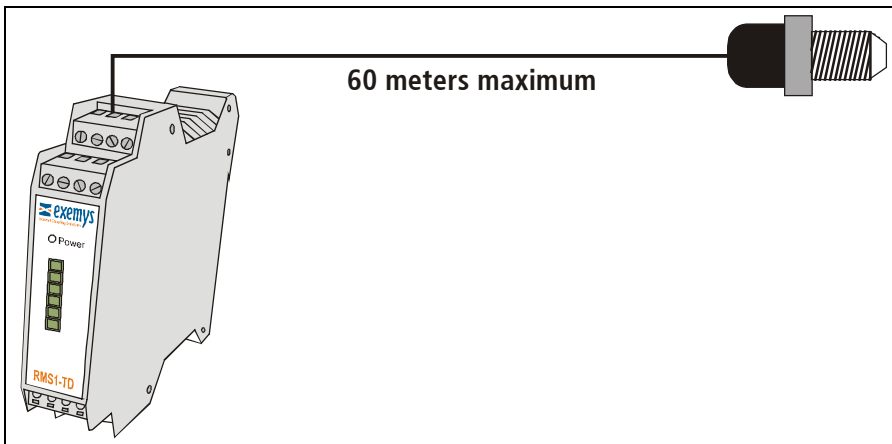


Figure 7 – Maximum length of the probe

2.3 LED signaling

The RMS1-TD provides a LED in the front panel, which remains on indicating power supply. Besides, the LED blinks when a valid Modbus packet is received.

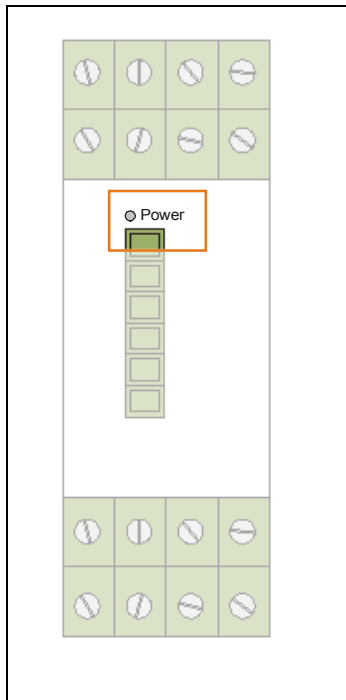


Figure 8 – Signaling LED

Chapter 3

Configuration

3.1 Adjust the Modbus master

RMS1-TD factory defaults are shown in the table below.

Table 3 – Factory defaults

Baud rate:	9600 bps
Parity	None
Data bits:	8
Stop bits	1

These values are static, thus the Modbus master must be configured accordingly in order to poll the RMS1-TD. For the RS485 version, keep in mind that cables have polarity. An inverted connection will avoid any kind of communication, but still will not cause any damage to the device.

Modbus registers used for temperature presentation are also static. They are adjusted according to the following table:

Table 4 – Modbus Registers

PROBE 1	40001
PROBE 2	40002
PROBE 3	40003
PROBE 4	40004

As shown, the four measurements are presented into four Holding Registers. Data is represented in centesimals of degrees Celsius. For example, if a Holding Register reads 295, it corresponds to 29.5 °C. In order to understand readings below 0 °C, the Modbus master will have to be able to understand the signed data. If a reading cannot be taken (for example, the probe is unplugged or data errors are detected) the Holding Register will read 9999.

3.2 Addresses

The RMS1-TD Modbus address can be configured. To do so, the enclosure must be opened. The address will change by modifying the position of the internal jumpers, which are identified in the board.

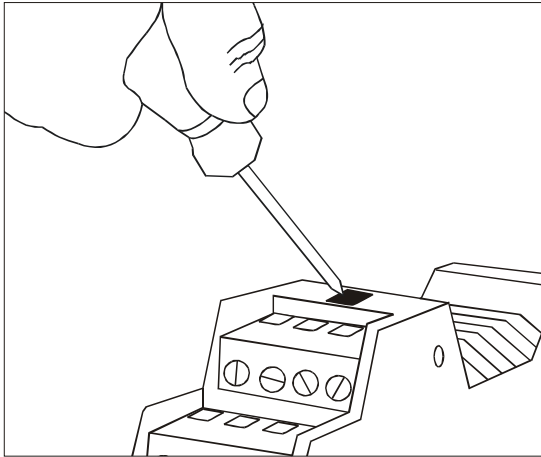


Figure 9 – Opening the enclosure

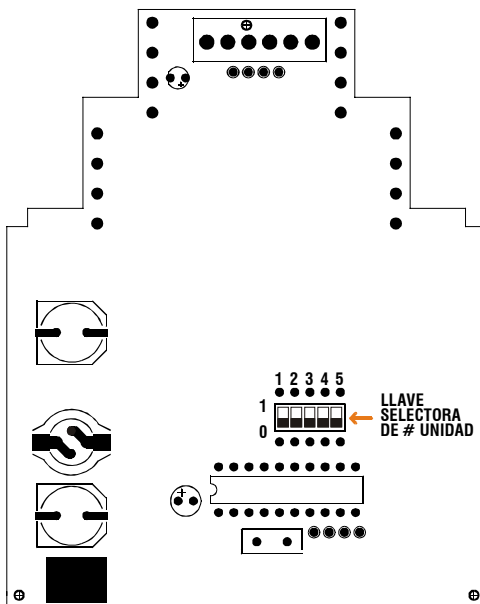


Figure 10 - Internal layout, highlighting the jumpers

The table below describes the address range offered by the RMS1-TD:
(Notation: Jumper down = 0, Jumper Up = 1)

Table 5 – Jumper configuration

Unit	1	2	3	4	5	Unit	1	2	3	4	5
1	0	0	0	0	1	17	1	0	0	0	1
2	0	0	0	1	0	18	1	0	0	1	0
3	0	0	0	1	1	19	1	0	0	1	1
4	0	0	1	0	0	20	1	0	1	0	0
5	0	0	1	0	1	21	1	0	1	0	1
6	0	0	1	1	0	22	1	0	1	1	0
7	0	0	1	1	1	23	1	0	1	1	1
8	0	1	0	0	0	24	1	1	0	0	0
9	0	1	0	0	1	25	1	1	0	0	1
10	0	1	0	1	0	26	1	1	0	1	0
11	0	1	0	1	1	27	1	1	0	1	1
12	0	1	1	0	0	28	1	1	1	0	0
13	0	1	1	0	1	29	1	1	1	0	1
14	0	1	1	1	0	30	1	1	1	1	0
15	0	1	1	1	1	31	1	1	1	1	1
16	1	0	0	0	0						

Technical SPECIFICATIONS (ENCLOSURE)

• Serial Protocol:	Modbus RTU slave.
• Serial Port:	RS485/RS232 (depending on the model), detachable Industrial connector.
• Compatible Devices:	Any device enabled with Modbus RTU master
• Serial Comm Parameters:	9600, 8, N, 1
• Visual Signaling:	Power/Data reception from the RTU
• Size / Weight:	114 x 100 x 22,5 mm (HxWxL). 0,140 Kg
• Power:	10 a 30 Volts DC 200 mA max.
• Enclosure Temperature:	Operating Temperature: -5 to 65 °C Storage Temperature: -40 to 75°C
• Guarantee / Support:	One year, including tech support

Technical SPECIFICATIONS (PROBE)

• Measurement Temperature:	-55 to +125°C
• Accuracy:	+ – 0,5°C between -10 y + 85°C
• Probe Type:	Temperature sensor with digital serial data output.
• Max. Length:	60 meters.
• Cable Type:	Coated type, three wires, 0.25mm ² (minimum). Coating must be grounded.
• Screw Thread:	1/4" BSP

6.1 DIN rail mounting

The RMS1-TD can be mounted in a DIN rail.

Make the upper side of the device fit the DIN rail (A) and then push gently until you hear a Click! (B)

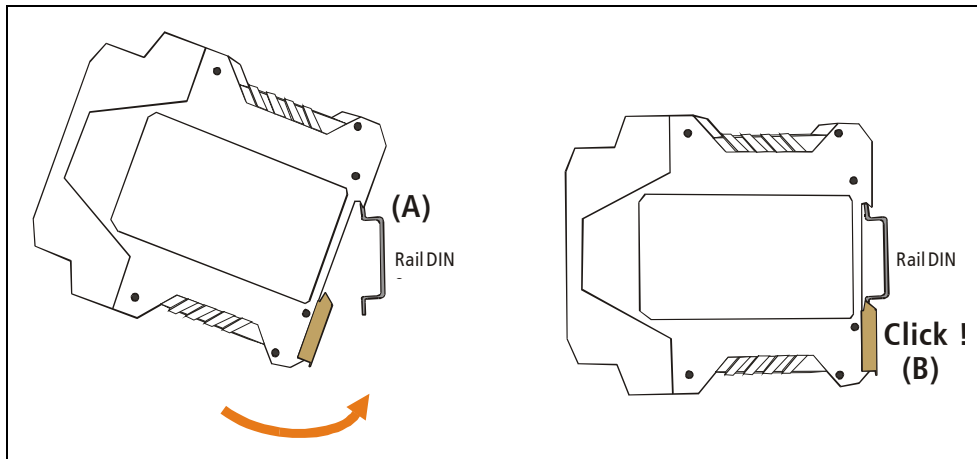


Figure 11 - DIN rail mounting

In order to detach the device from the DIN rail (figure 12), pull down the metallic clip and then remove it.

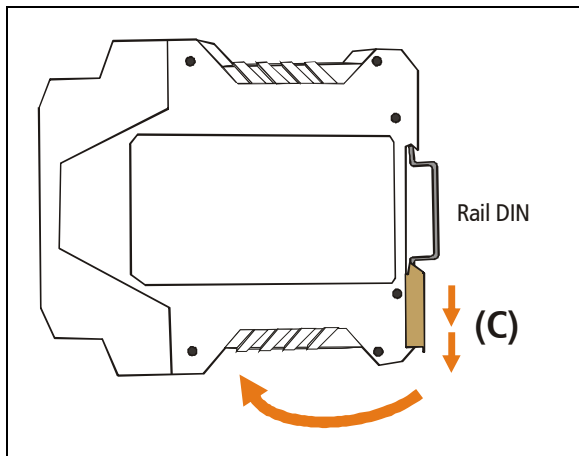


Figure 12 – Detaching the device