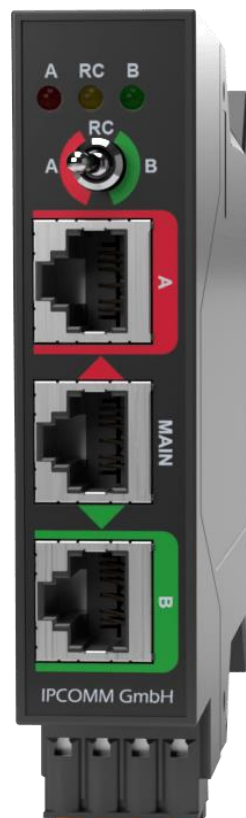


# ERM1

## The Network Selector

### General Operating, Maintenance, and Installation Manual



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# 1 Introduction

All technical information, descriptions and illustrations contained in this 'Operating, Maintenance, and Installation Manual' remain our property and shall not be used differently than for operating this system, nor shall they be copied, reproduced or passed on to third parties or brought to their notice without our prior written consent.

The information represented in this manual is in keeping with current standards and is subject to subsequent alterations.

This manual contains important instructions referring to safe installation, commissioning, operation, and maintenance.

Read this manual thoroughly, before starting up the gateway, and observe the instructions.

In order to comply with the guidelines for electro-magnetic compatibility, only CE-certified components are used in compliance with project-specific requirements.

Please note that the hardware platform is not protected against lightning and the operator should, if desired, take appropriate protective precautions.

The addition of our RS-232 isolator provides efficient protection of your data and equipment against external influences. We will be pleased to draw up a non-binding offer for you.

Finally we want to draw your attention to the fact that any warranties will be invalid in the event that:

- Operation, servicing, and maintenance are not carried out accurately according to the instructions; repairs are not carried out by our personnel or without our prior written consent.
- Commissioning is not carried out by our personnel or we have not given our approval for the commissioning or the commissioning is carried out by untrained personnel.
- The unit is used inadequately, incorrectly, negligently, or inappropriately or for a purpose other than originally intended.
- The serial number is removed from the product.

**For your protection, observe the following safety precautions when setting up your equipment:**

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

*All trade names or trademarks mentioned in this document are used for identification purposes only and are property of their respective owners.*

## 2 Hardware Description

### 2.1 General

The network selector has been designed for industrial environments. All components are cooled passively. Factors like quality, availability, and high durability are of particular importance for the selection of our components.

Exhaustive tests of the network selector are performed by our company. Each device undergoes an in-depth function test. Quality assurance is conducted according to the four-eye principle. Each device passes a number of quality inspections.

Due to the functional tests carried out, the mounting brackets may show slight signs of usage.

### 2.2 Controls and Display Elements

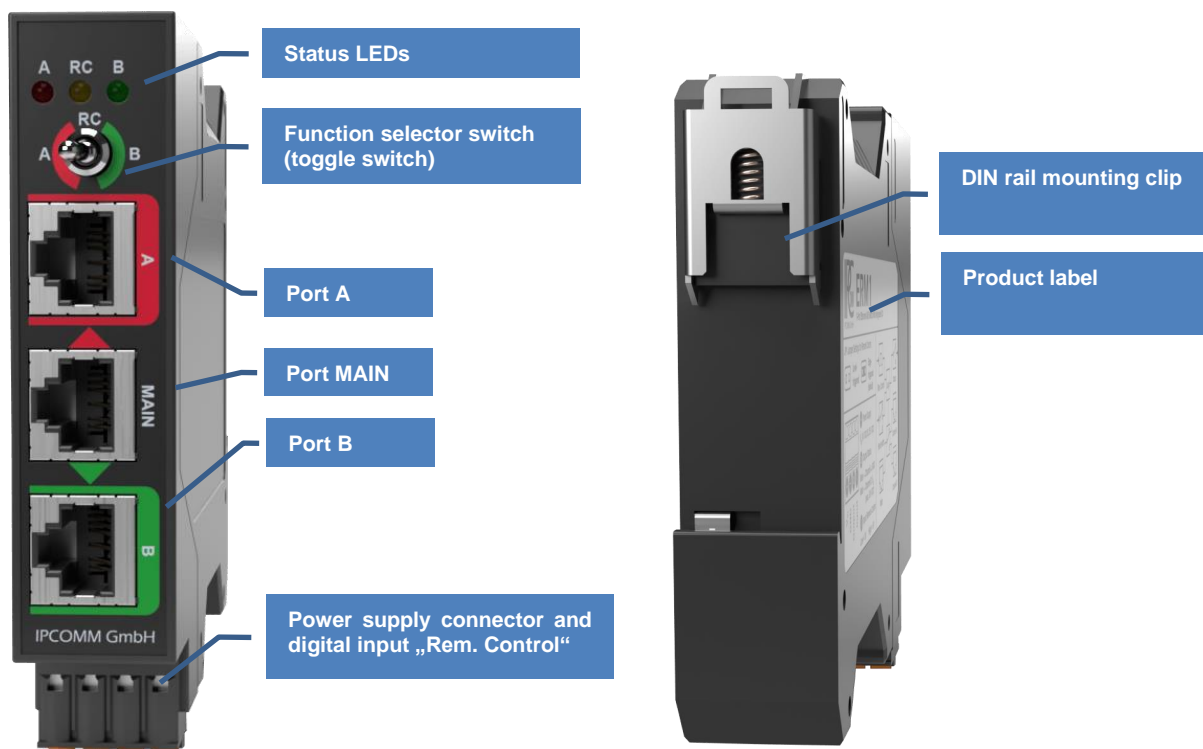


Figure 1: ERM1 front and rear view

### 2.3 RJ45 Ports (MAIN, Channel A & B)

ERM1 offers three RJ45 interfaces (MAIN, Channel A and Channel B). Either MAIN <> Channel A or MAIN <> Channel B are interconnected. All eight lines of the RJ45 port are interconnected via bistable relays and remain in their current state even in the event of a power failure. The RJ45 ports are not electrically active interfaces. Ethernet, Power-over-Ethernet or serial connections can be switched.

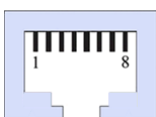


Figure 2: Pin assignment RJ45 port

## 2.4 Power Supply

Please be sure to observe the polarity and the maximum input voltage.

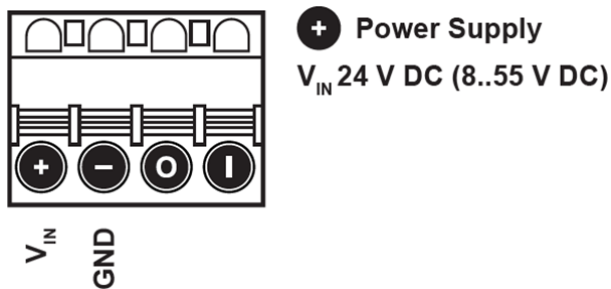


Figure 3: Power supply

- To ensure the power supply, cables with a cross-section of at least 0.5 mm<sup>2</sup> must be used.
- The input voltage cannot be used if the polarity is reversed.
- Protective earthing is provided via the DIN rail clamp.
- The ground (GND) is galvanically connected directly to the protective earth (PE).
- Further data such as current consumption or absolute values can be found in the data sheet.

## 2.5 Digital Input / Digital Output

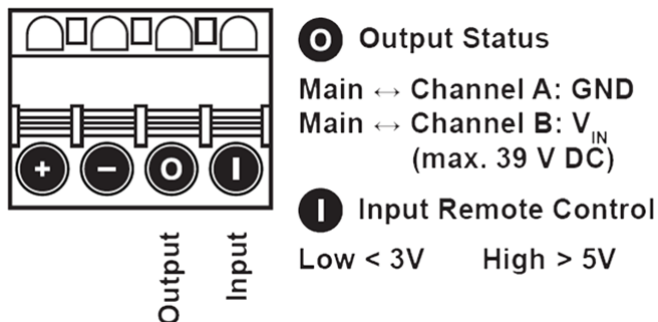


Figure 4: Digital I/O

Digital input:    Signal level "low" is detected if less than 3 V DC is applied.  
                      Signal level "high" is detected if more than 5 V DC is applied.  
                      The control is done depending on the jumper configuration for the operating mode (see 3.1.3 Function selector switch position "RC")

Digital output:    There is ~0 V DC at the output if the ports MAIN <> A are interconnected.  
                      There is ~ $V_{IN}$  at the output (max. 39 V DC) if the ports MAIN <> B are interconnected.

Further data such as absolute values can be found in the data sheet.

### 3 The Application / Function

The network selector ERM1 with one switching port is designed for disconnecting, connecting or switching an Ethernet connection. Either MAIN <> Channel A or MAIN <> Channel B are interconnected. All eight lines of the RJ45 ports are interconnected via bistable relays and remain in their current state even in the event of a power failure. Power-over-Ethernet (from a PoE power supply unit) or serial connections can therefore also be switched.

For remote control, a digital input is available. The current status can be fed back to the control unit via a corresponding digital output.

Manual control is performed via the function selector switch (toggle switch), with positions "A" / "B" being prioritized over the remote control. For visual feedback, there are three LEDs that indicate the current status.

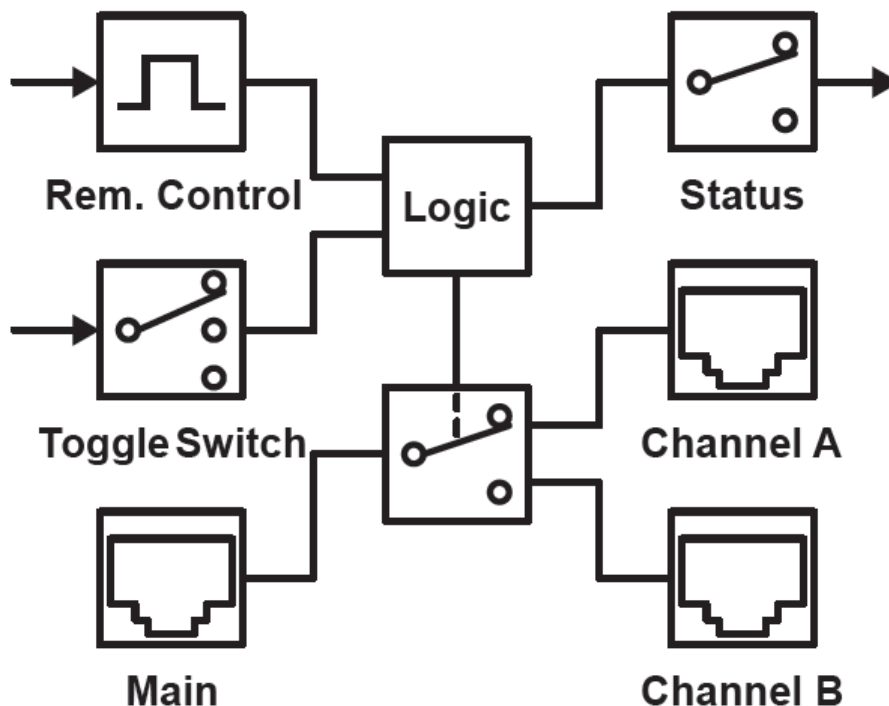


Figure 5: Control logic

#### 3.1 The Toggle Switch

The mode of operation is defined via the integrated function selector switch (3-way manual switch) and indicated by a status LED.



Figure 6: CPU LED display

### 3.1.1 Position „A“

Function selector switch in position "A" = The MAIN and A ports are electrically connected. The status LED A lights up.

### 3.1.2 Position “B”

Function selector switch in position "B" = The MAIN and B ports are electrically connected. The status LED B lights up.

### 3.1.3 Position “RC”

Function selector switch in position "RC" = **R**emote **C**ontrol via digital input is active. The RC status LED lights up. The electrical connection of the MAIN <> A / B ports depends on the digital input.

Triggering of the switchover (MAIN<>A, MAIN<>B) at the digital input can be level-controlled or edge-controlled.

The behavior is set with jumper JP1. The housing must be opened to check or change the set operating mode. The cup-shaped housing is locked with two latching hooks. The PCB can only be pulled out of the housing when the latching hooks are unlocked (see figure below).

The housing may only be opened by qualified personnel. The device must be voltage-free and ESD protective measures must be taken. Improper handling will invalidate the warranty (and any further warranty).

#### JP1 Jumper Settings for Remote Control



Level-triggered



Edge-triggered (default)

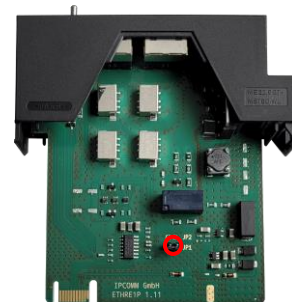


Figure 7: Jumper JP1



Figure 8: Latching hooks – opening the housing

### 3.1.4 “RC” Level-Triggered Operation

In level-triggered operation, a switchover occurs when a “low”-“high” or “high”-“low” change is detected at the digital input (DI) (detection of a static status).

Level-triggered operation	Condition	DI = “low”	DI = “high”
	-Switch is set to RC -Jumper JP1 not set	Switches to MAIN <> A when “low” (< 3 V DC) is present	Switches to MAIN <> B when “high” (> 5 V DC) is present

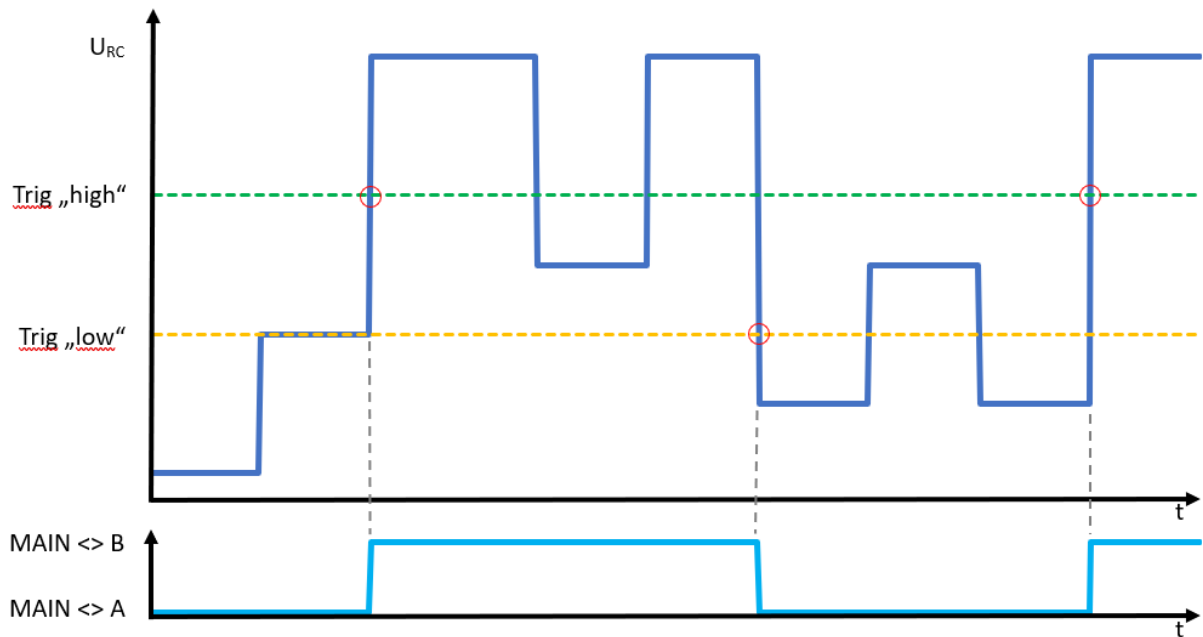


Figure 9: Level-triggered operation

If the ports MAIN <> A are connected, they remain connected until Trig “high” is exceeded and the connection from MAIN <> B is established. MAIN <> B remains active from this point until the “low” trigger is undershot.



### 3.1.5 “RC” Edge-Triggered Operation

In edge-triggered operation, the system switches over when a “low”-“high” change is detected at the digital input (DI) (detection of the positive edge of a pulse).

Edge-triggered operation	Condition	Digital Input
	-Switch is set to RC -Jumper JP1 is set	Toggles between MAIN <> A and MAIN <> B when a "low" - "high" pulse (positive edge) is detected.

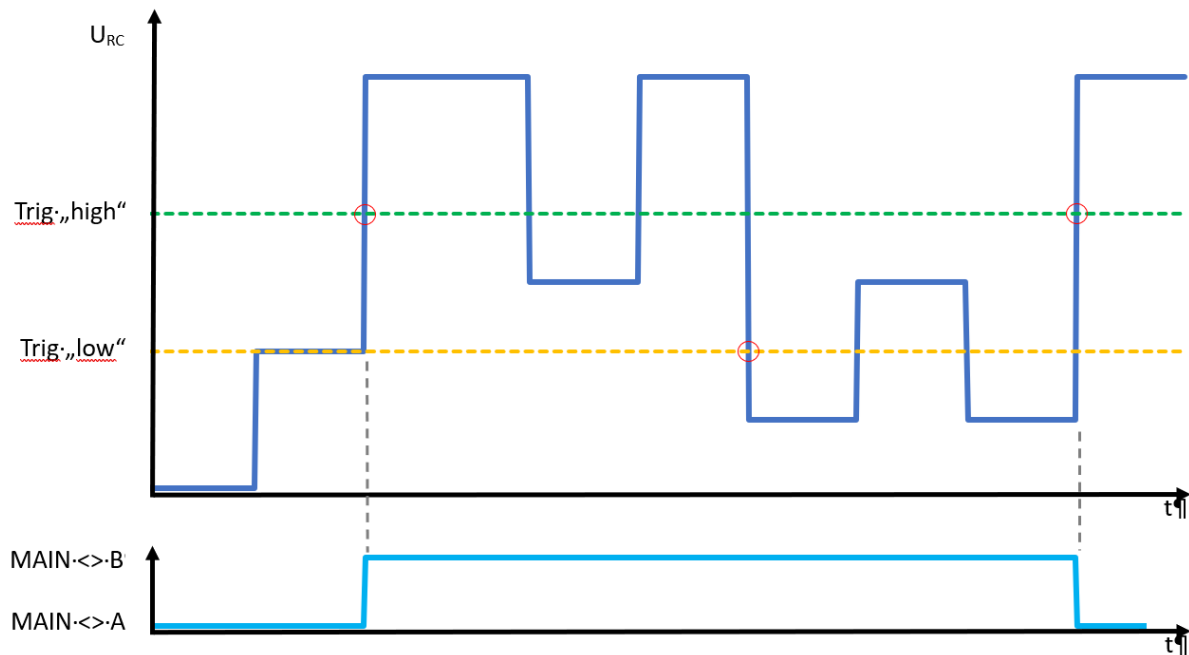


Figure 10: Edge-triggered operation

If the ports MAIN <> A are connected, they remain connected until Trig “high” is exceeded and the connection from MAIN <> B is established. MAIN <> B remains active from this point until the “low” trigger is undershot and the “high” trigger is exceeded again.

## 4 Installation – Din Rail Mounting

Installation may only be carried out by qualified personnel. The device must be voltage-free. ESD protection measures must be taken. Improper handling will invalidate the warranty (and any further warranty).



The ERM1 is mounted on a 35 mm DIN rail.

The earthing connection is made directly to the DIN rail via the clamp. It must be ensured that the DIN rail is both electrically conductive and earthed.

If several ERM1s are mounted next to each other, no minimum distance is required between the devices. They can be mounted in any position (independent of position).

Place the back of the ERM1 on the bottom edge of the DIN rail and swivel it upwards until the DIN rail clip engages on the back of the device.

To remove the ERM1 from the DIN rail, pull the DIN rail clip upwards (using a screwdriver if necessary) and swivel the ERM1 downwards off the DIN rail.

*Figure 11: Rear of housing with DIN rail clip*

## 5 Technical Data Sheet

A technical data sheet for is available separately to this document. In addition to pure technical data, the document also contains information on approval and applied standards (EMC). The current version can be found on our website under Hardware / ERM1 / Documentation:

- ERM1 <https://www.ipcomm.de/hardware/ERM1/en/sheet.html>

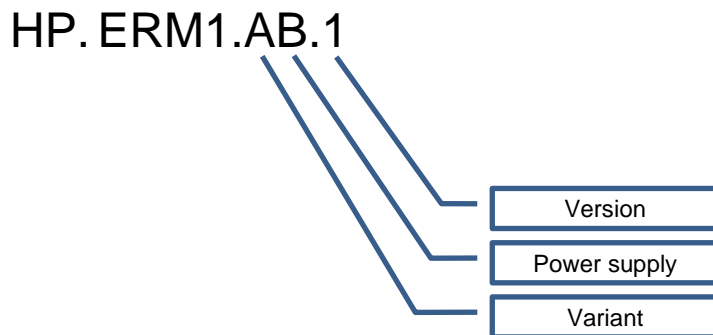
## 6 EU Declaration of Conformity

An EU Declaration of Conformity is available separately to this document. The current version can be found on our website under Hardware / ERM1 / Documentation:

- ERM1 <https://www.ipcomm.de/hardware/ERM1/en/sheet.html>

## 7 Nomenclature of Item Code

The item code provides information about the equipment features.



### Variant

Value	Description
1	1 port Switch (A <> MAIN <> B)

### Power Supply

Value	Description
B	24 V DC

# 8 Dimensions

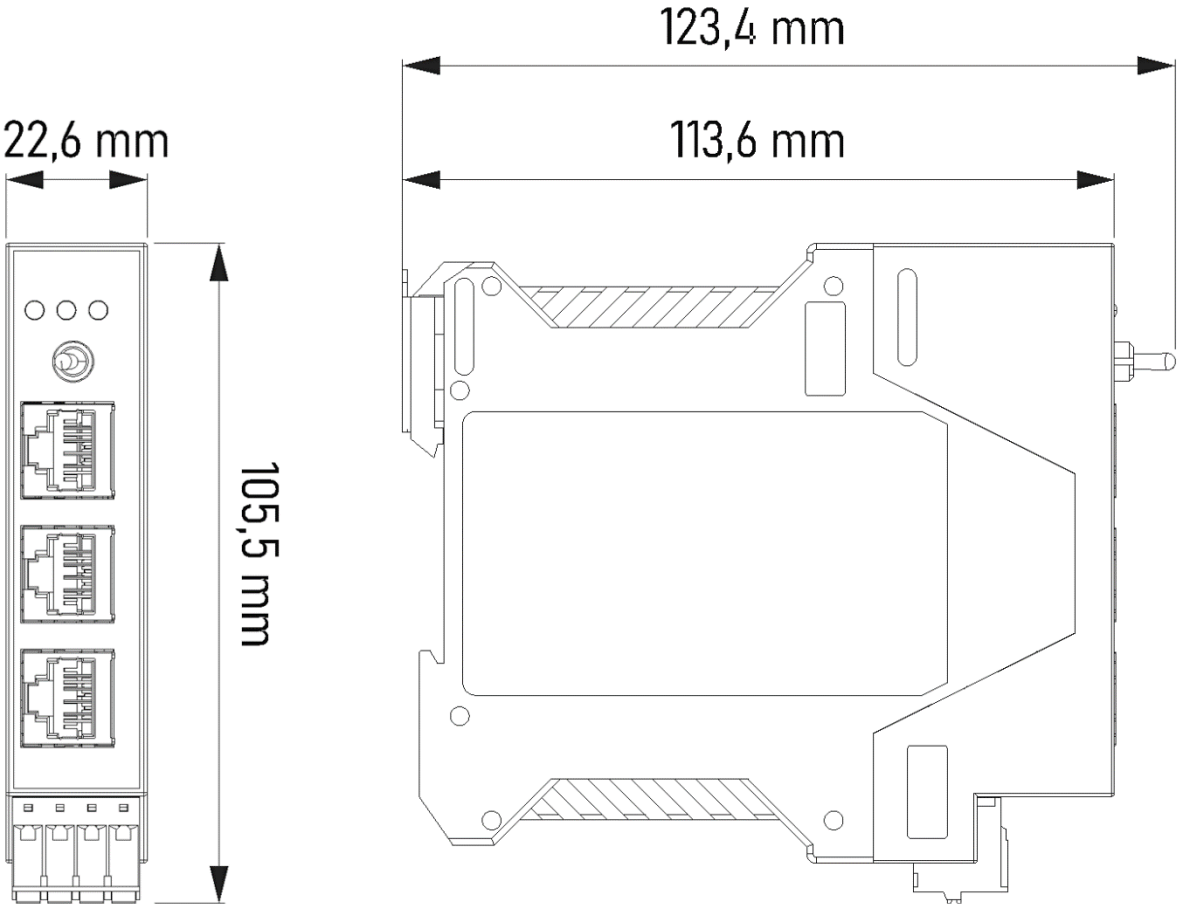


Figure 12: Dimensions – ERM1