

# PSM-ME-RS232/TTY-P

## Interface converter for TTY transmission systems

Data sheet  
100275\_en\_02

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### 1 Description

The interface converter **PSM-ME-RS232/TTY-P** converts RS-232 interface signals bidirectionally to the TTY standard.

The interface converter is snapped onto standard EN DIN rails in the switch cabinet and supplied with 24 V DC or AC.

Possible applications:

- Interface adaptation to TTY devices
- Permanent line for process data evaluation
- Temporary programming connections

### Features

- Transmission distances of up to 1000 m in active TTY mode
- High-quality 3-way isolation up to 2 kV (VCC // V.24 (RS-232) // TTY)
- Integrated surge protection with transient discharge to the DIN rail
- Conversion of RS-232 Tx/D/RxD full duplex data signals to the TTY current loop standard
- Semi-active, active or passive TTY mode, depending on pin assignment
- Logical signal position can be inverted via plug-in bridge
- Active data transmission indicated by separate data indicators for the transmit and receive channels
- RS-232 connection via 9-pos. D-SUB and standard RS-232 cable
- Transmission speed of up to 19.2 kbps



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### 3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Interface converter, for converting RS-232 (V.24) to TTY, with electrical isolation, 2 channels, rail-mountable	PSM-ME-RS232/TTY-P	2744458	1
Accessories	Type	Order No.	Pcs./Pkt.
RS-232 cable, 9-pos. D-SUB socket 25-pos on D-SUB socket	PSM-KA 9 SUB 25/BB/2METER	2761059	1
RS-232 cable, 9-pos. D-SUB socket on 9-pos. D-SUB socket, 9-wire, 1:1	PSM-KA9SUB9/BB/2METER	2799474	1
Shield connection clip for printed circuit terminal block	ME-SAS	2853899	10
Actuation tool, for ST terminal blocks, also suitable for use as a bladed screwdriver, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip	SZF 1-0,6X3,5	1204517	10
D-SUB connector, 9-pos., male connector, one cable entry < 35°, universal type for all systems, pin assignment: 1, 2, 3, 4, 5, 6, 7, 8, 9 to screw connection terminal block	SUBCON 9/M-SH	2761509	1

### 4 Technical data

Supply	
Nominal supply voltage	24 V AC/DC ±20 % (via pluggable COMBICON screw terminal block)
Typical current consumption	75 mA (24 V DC)
Protective circuit	Surge protection (Suppressor diode)
Electrical isolation	VCC // V.24 (RS-232) // TTY
Test voltage data interface/power supply	2 kV <sub>rms</sub> (50 Hz, 1 min.)
Torque	0.56 Nm ... 0.79 Nm
V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1	
Transmission channels	2 (1/1), RxD, TxD, full duplex
Connection method	D-SUB 9 plug
Conductor cross section	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> (24 AWG ... 13 AWG)
Serial transmission speed	≤ 19.2 kbps
Transmission length	15 m (shielded twisted pair)
Protocols supported	transparent protocol
Pin assignment	DTE/DCE switchover via switch

**TTY interface, CL2 in acc. with DIN 66348-1**

Connection method	Pluggable screw connection
Conductor cross section	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> (24 AWG ... 13 AWG)
Serial transmission speed	≤ 19.2 kbps
Transmission length	1000 m (shielded twisted pair)
Operating mode	Active, semi active, passive
Load/output load, current output	≤ 500 Ω
Output current	2x 20 mA ±10 % (Loop current)
Impedance	≤ 117 Ω (Output) 126 Ω (Input)

**General data**

Degree of protection	IP20
Dimensions (W/H/D)	22.5 mm x 99 mm x 118.6 mm
Housing material	PA green
Bit distortion	< 5 %
Bit delay	< 3 μs
Noise emission according to	EN 61000-6-4
Noise immunity according to	EN 61000-6-2:2005
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Transmission channels	2 (1/1), RxD, TxD, full duplex

**Ambient conditions**

Ambient temperature (operation)	0 °C ... 55 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Altitude	5000 m (For restrictions see manufacturer's declaration)

**Approvals / Certificates**

Conformance	CE-compliant EAC
UL, USA/Canada	508 recognized Class I, Div. 2, Groups A, B, C, D Class I, Zone 2, AEx nA IIC T4 Class I, Zone 2, Ex nA IIC T4 Gc X
Shipbuilding approval	DNV

**Conformance with EMC Directive 2014/30/EU****Noise immunity according to EN 61000-6-2**

Electrostatic discharge	EN 61000-4-2	
	Contact discharge	± 6 kV (Test Level 3)
	Discharge in air	± 8 kV (Test Level 3)
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	Test Level 3
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	± 4 kV (5 kHz)
	Signal	± 2 kV (5 kHz)
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	± 0.5 kV (2 Ω)
	Signal	± 2 kV (42 Ω)
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Voltage	10 V
	Comments	Criterion A

**Emitted interference in acc. with EN 61000-6-4**

Interference emission	EN 55011
	Class A, industrial applications
Criterion A	Normal operating behavior within the specified limits
Criterion B	Temporary impairment of operating behavior that is corrected by the device itself

## 5 Safety notes

**WARNING:**

Observe the following safety notes when using the device.

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described.
- When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations, must be observed. The technical data is provided in the package slip and on the certificates (conformity assessment, additional approvals where applicable).
- With the exception of configuring the switches and jumpers, opening or modifying the device is not permitted. Do not repair the device yourself; replace it with an equivalent device. Repairs may only be performed by the manufacturer. The manufacturer is not liable for damage resulting from noncompliance.
- The IP20 protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to mechanical strain and/or thermal loads, which exceed the limits described.
- The switches of the device that can be accessed may only be actuated when the power supply to the device is disconnected.
- The device is designed exclusively for SELV operation according to IEC 60950/EN 60950/VDE 0805. The device may only be connected to devices, which meet the requirements of EN 60950.

### 5.1 UL Notes

#### PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 31ZN

- A) All wiring of these devices must be in accordance with the national electric code article 501.4(B) for Class 1, Division 2.
- B) Product must be installed in Class I, Zone 2 certified at least an IP54 enclosure.
- C) Product must be used in no more than a pollution degree 2 environment as defined by IEC 60664-1
- D) Provisions must be made to provide transient protection to the product so that voltage levels do not exceed 40% of the rated voltage at the power supply terminals.

Wire Range: 30-12 AWG,

Torque: 5-7 Lbs-In

Supply voltage range 24 V DC  $\pm 20\%$   $\leq 75$  mA

## 6 Application examples

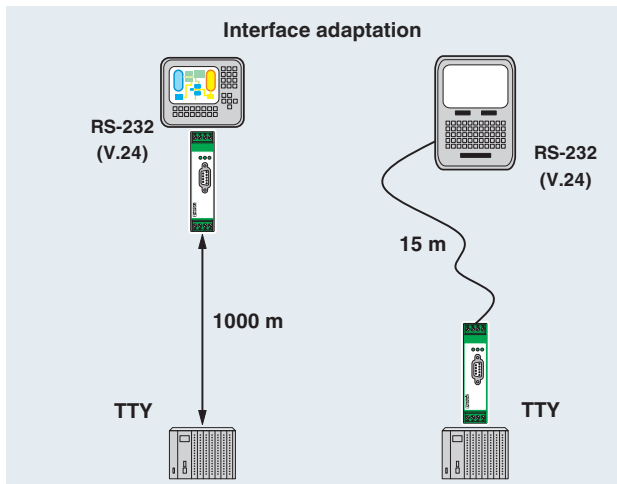


Figure 1 Application example

Interface adaptation between RS-232 and TTY standard

- TTY dedicated line for visualization and process data capture
- Programming/parameterization connection

### TTY basics

The TTY current loop interface is used, for example, in programmable logic controllers (PLCs), on displays, and printers. Separate cable pairs are needed for the transmit data and the receive data.

Data is transmitted in full duplex mode using a software handshake. No provision is made for control cables.

A loop current of 20 mA represents the "Logic 1" state. If the circuit is interrupted, this is interpreted as "Logic 0". Each loop requires a current source which is coupled to either the transmitting or the receiving side. The current sourcing side is described as active and the passive side is always opposite it.

There are three possible interface configurations:

- Fully active TTY interface with current sources in both the transmitter and receiver branch
- Passive TTY interface without the relevant constant current sources
- Semi-active TTY interface with source currents only on the transmitter side (TD). The receiver (RD) is passive.

In order to establish a TTY transmission path, the type of interface must be known. There are two options for a connection path:

- A fully active device and a passive device
- Two semi-active devices

Technical data	
Standards	DIN 66258-1, DIN 66348-1
Transmission speed	19.2 kbps
Transmission length	1000 meter
Procedure	Current loop
Principle	Full duplex, point-to-point

# 7 Structure

## 7.1 Dimensions

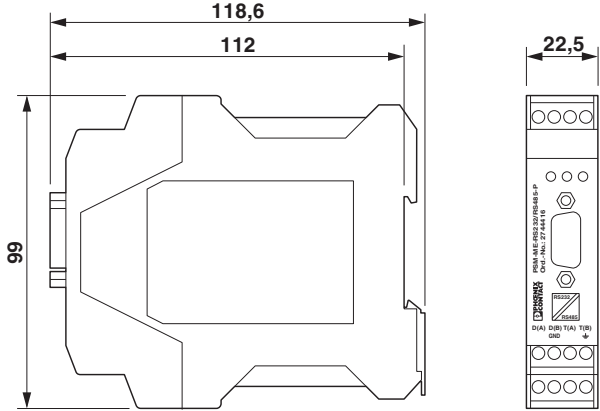


Figure 2 Housing dimensions

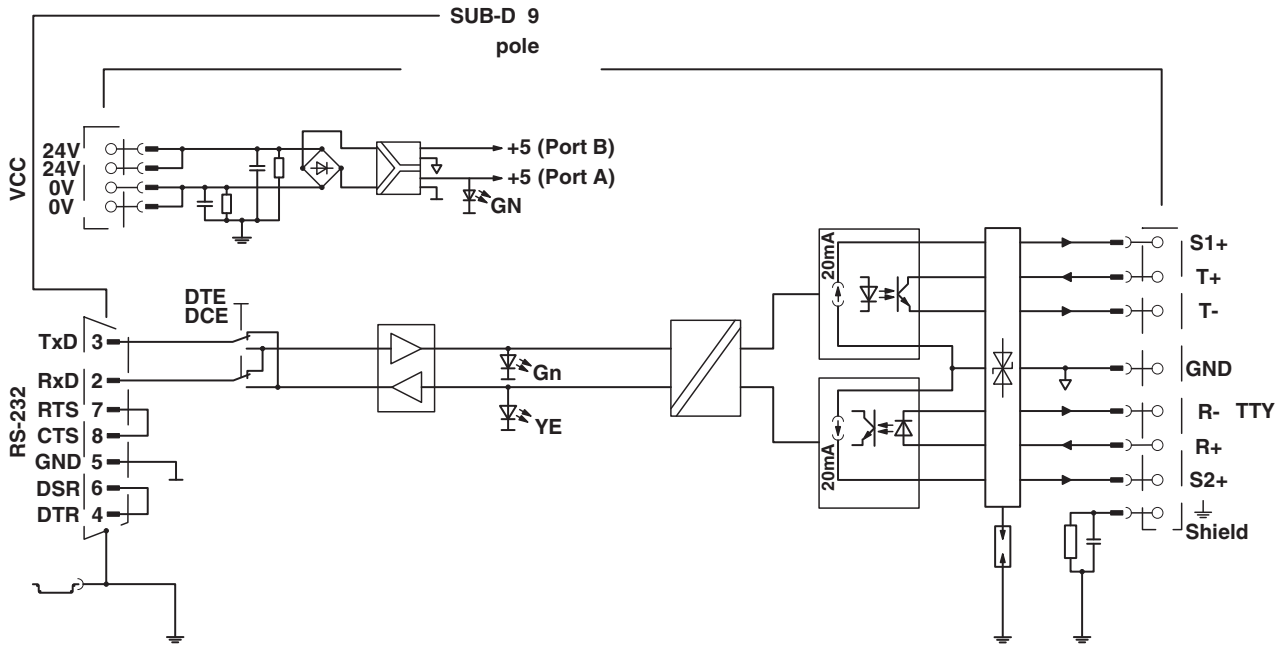


Figure 3 Block diagram



7.2 Function elements

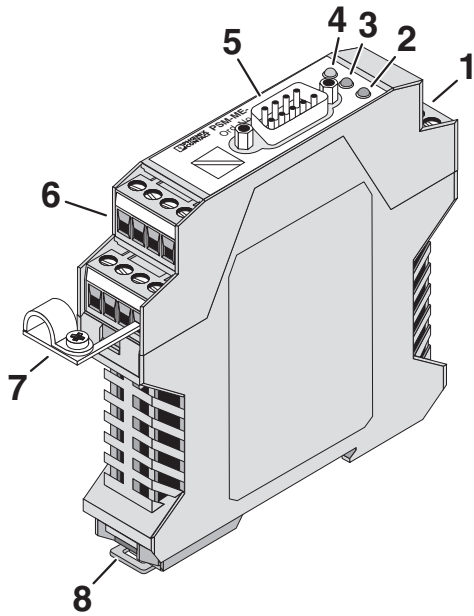


Figure 4 Function elements

**COMBICON plug-in screw terminal blocks**

- 1 Power supply (pin 1 + pin 3)
- 6 TTY interface

**D-SUB pin strip**

- 5 RS-232 interface

**Diagnostics and status indicators**

- 2 VCC (green) Supply voltage
- 3 RD (green) RS-232 Data reception
- 4 TD (yellow) RS-232 Data transmission

**Operating elements**

- 7 Shield connection clip
- 8 Locking latch for DIN rail mounting

8 RS-232 interface

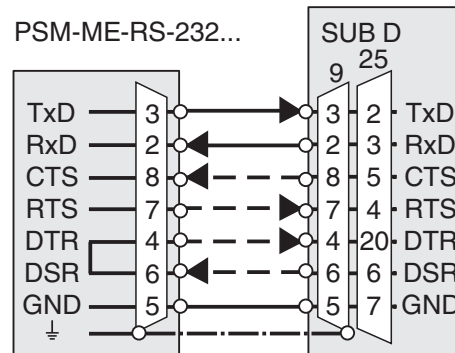


Figure 5 RS-232 interface

Pin	D-SUB 9	Designation
3	TxD	Transmit data
2	RxD	Receive data
8	CTS	Clear to send
7	RTS	Request to send
5	GND	Operating ground
4	DTR	DTE ready
6	DSR	Ready to operate
Shield	⏏	Shield connection

Create a 1:1 connection between the PSM module's RS-232 interface and the peripheral.

**Note:** The minimum configuration only requires one connection for TxD, RxD and GND (software handshake)!

- Plug the 9-pos. D-SUB connector onto the device.

## 8.1 Configuration

You must open the housing to access the slide switch and jumper.



**NOTE: electrostatic discharge!**

The device contains components that can be damaged or destroyed by electrostatic discharge. When handling the device, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

- Disengage the housing cover with a screwdriver (A).
- Carefully pull the PCB out of the housing as far as possible.

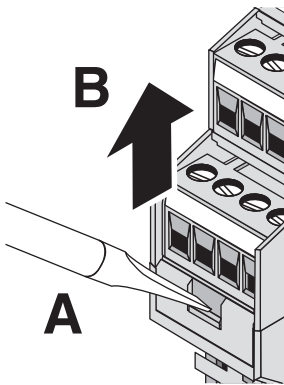


Figure 6 Opening the housing

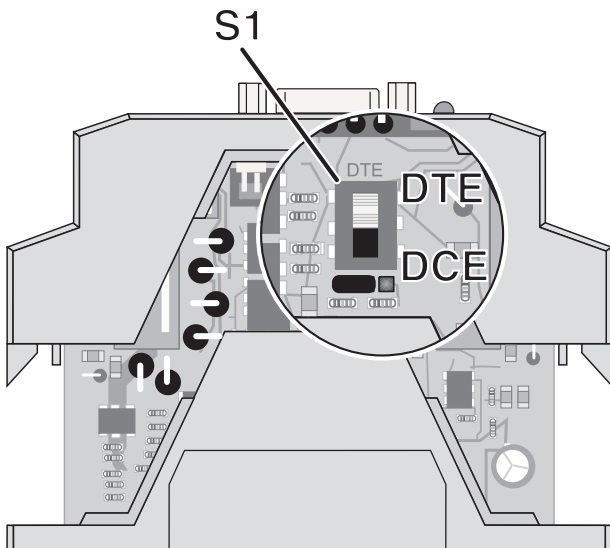


Figure 7 Remove the PCB

## 8.2 DTE/DCE adjustment

The TxD and RxD can be crossed internally via the S1 DTE/DCE slide switch so that you are able to conveniently adapt to DTE or DCE interfaces.

- When connecting a DTE device (Data Terminal Equipment), slide the S1 switch to the DTE position.
- When connecting a DCE device (Data Communication Equipment) slide the S1 switch to the DCE position.



If the connected interface type is not known, you can determine the right configuration by **testing** the S1 DTE /DCE-slide switch.

## 9 TTY interface

Assignment	COMBICON plug-in screw terminal block		
Current source 1	negative	GND	Pin 6
	positive	S1+	Pin 2
Current source 2	negative	GND	Pin 6
	positive	S2+	Pin 4
Transmit data	negative	T-	Pin 5
	positive	T+	Pin 1
Receive data	negative	R-	Pin 7
	positive	R+	Pin 3
Ground/shield connection	⏚		Pin 8

### 9.1 Operating modes

You can connect a fully active interface to a passive interface or you can connect two semi-active interfaces.

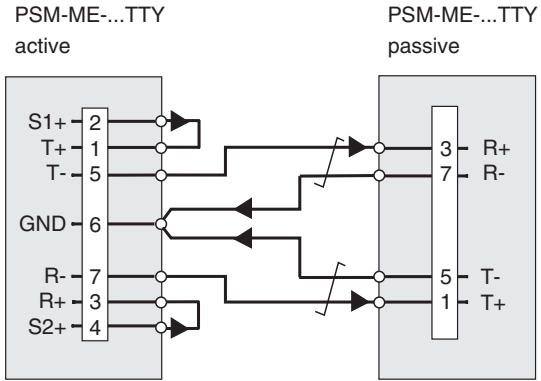


Figure 8 An active and a passive device

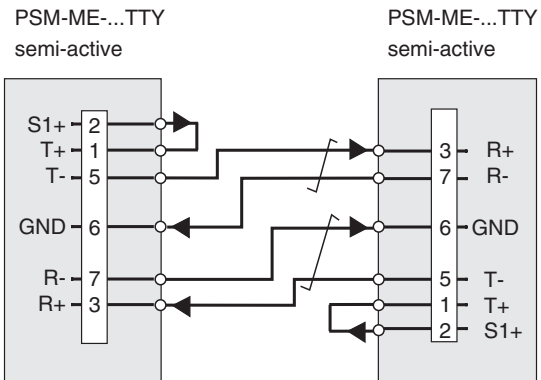


Figure 9 Two semi-active devices

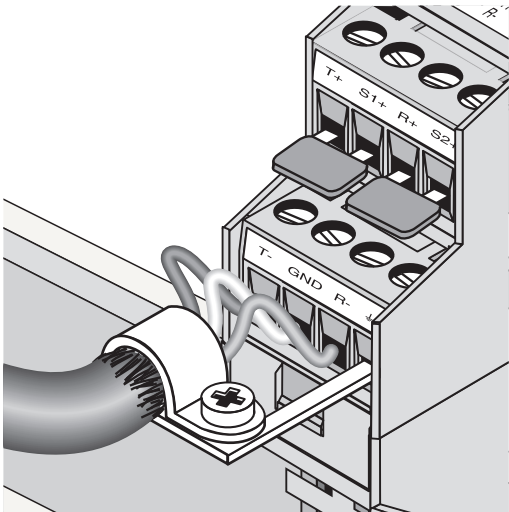


Figure 10 External cable bridges (fully active)

- Use external cable jumpers to set the desired operating mode **active**, **passive**, or **semi-active**.

The jumpers are included with the goods. We recommend shielded twisted pair cables (2 x 2 cores twisted) as connecting cable.

## 9.2 Inversion of signal layer

The logical signal layer is configured for normal operations as delivered.

Logical 1 = TTY current flow 20 mA

If necessary, you can invert the signal layer by locating the jumper beneath the slide switch.

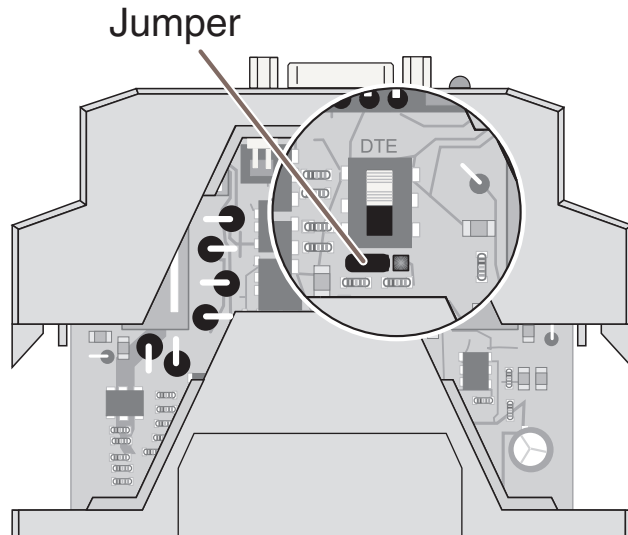


Figure 11 Inversion of signal layer

## 9.3 Connecting the data cables



### NOTE: Interference

Use shielded twisted pair data cables. Connect the cable shielding at both ends of the transmission path.

- For the shield connection, use the provided shield connection clip.

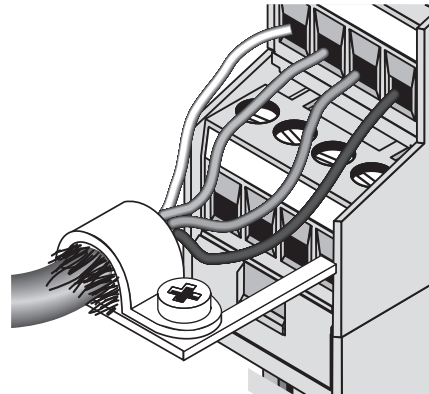


Figure 12 Install shield clip

## 10 Assembly



### CAUTION: Electric shock

The device is only intended for operation with SELV according to IEC 60950/EN 60950/VDE 0805.



### NOTE: Malfunction

Connect the DIN rail to protective earth ground using a grounding terminal block. The device is grounded when it is snapped onto the DIN rail.

This ensures the integrated surge protection is functional and that the shielding of the data cable is effective.

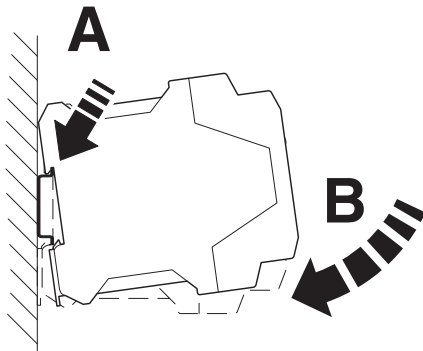


Figure 13 Mounting on a DIN rail

- To avoid contact resistance, only use clean, corrosion-free 35 mm DIN rails according to DIN EN 60715.
- Install an end bracket next to the left-hand device to prevent the devices from slipping.
- Place the device onto the DIN rail from above. Push the module from the front toward the mounting surface until it audibly engages.

### 10.1 Removal

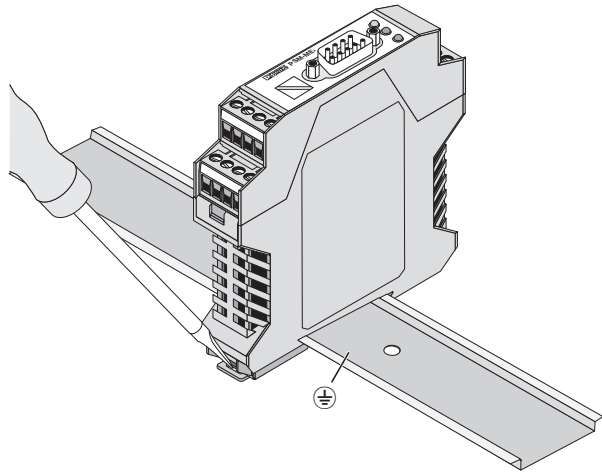


Figure 14 Removal

- Push down the locking tab with a screwdriver, needle-nose pliers or similar.
- Slightly pull the bottom edge of the device away from the mounting surface.
- Pull the device away from the DIN rail.

### 10.2 Power supply

The device is supplied with 24 V DC or AC.

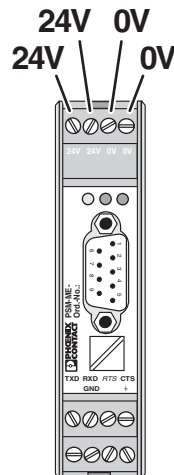


Figure 15 Power supply

- Provide supply voltage to the device via terminal 1 (pin 1 and pin 3).