

# PSM-ME-REP LON485-P

## Repeater for LONWORKS RS-485 bus systems

Data sheet  
100272\_en\_04

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### 1 Description

The LONWORKS **PSM-ME-REP LON485-P** repeater was developed for the high requirements of fieldbus systems. The device is snapped onto standard DIN rails in the control cabinet and supplied with 24 V DC or AC.

Possible applications:

- Electrical isolation and bus segmentation
- Increasing system availability
- Increasing the range
- Increasing the transmission speed
- Creation of mixed and network structures

#### Features

- Automatic transmit/receive changeover
- Transmission speed 39.1 kbps ... 2000 kbps
- Integrated, connectable termination resistors
- High-quality 3-way isolation between all interfaces
- Integrated surge protection with transient discharge to the DIN rail
- Supply voltage of 24 V DC or AC to suit the control cabinet
- Plug-in screw connection terminal blocks



**WARNING: Explosion hazard when used in potentially explosive areas**

The device is a category 3 item of electrical equipment. Follow the instructions provided here during installation and observe the safety notes.



Make sure you always use the latest documentation.

It can be downloaded at: [phoenixcontact.net/product/2708041](https://www.phoenixcontact.net/product/2708041)



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### 3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater, for potential isolation and increasing the range in RS-485 2-wire LON bus systems, 3-way isolation, rail-mountable	PSM-ME-REP LON485-P	2708041	1
Accessories	Type	Order No.	Pcs./Pkt.
Shield connection clamp 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

### 4 Technical data

Supply	
Nominal supply voltage	24 V AC/DC $\pm$ 20 %
Typical current consumption	90 mA (24 V DC)
Max. current consumption	100 mA
Electrical isolation	VCC // RS-485 (A) // RS-485 (B)
Test voltage data interface/power supply	2 kV
Torque	0.56 Nm ... 0.79 Nm
RS-485 interface in acc. with EIA/TIA-485, DIN 66259-4	
Transmission channels	2 (1/1), RxD, TxD, full duplex
Operating mode	Semi-duplex
Connection method	Pluggable screw connection
Conductor cross section	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> (24 AWG ... 14 AWG)
Data format/encoding	Manchester, slip-tolerant
Data direction switching	Automatic control
Termination resistor	120 $\Omega$
Serial transmission speed	39.1/ 78.1/ 500/ 625/ 1000/ 1250/ 2000 kbps
Transmission length	$\leq$ 1200 m (depends on transmission speed, bus system and cable type)
Transmission medium	2-wire twisted pair, shielded

<b>General data</b>	
Degree of protection	IP20
Degree of pollution	2
Dimensions (W/H/D)	22.5 mm x 99 mm x 114.5 mm
Housing material	PA green
MTTF (mean time to failure) SN 29500 standard, temperature 25 °C, operating cycle 21 % (5 days a week, 8 hours a day)	1808 Years
MTTF (mean time to failure) SN 29500 standard, temperature 40 °C, operating cycle 34.25 % (5 days a week, 12 hours a day)	796 Years
MTTF (mean time to failure) SN 29500 standard, temperature 40 °C, operating cycle 100 % (7 days a week, 24 hours a day)	334 Years
Bit distortion	< 1.5 % (applies to device: distortions caused by system-specific cables are not accounted for)
Noise emission according to	EN 50 081-1
Noise immunity according to	EN 61000-6-2:2005
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
<b>Ambient conditions</b>	
Ambient temperature (operation)	-40 °C ... 70 °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)
<b>Approvals / Certificates</b>	
Conformance	CE-compliant EAC
ATEX Please follow the special installation instructions in the documentation!	Ⓔ II 3 G Ex nA IIC T4 Gc (IBExU16ATEXB004 X)
IECEX	Ex nA IIC T4 Gc (IECEX IBE 15.0034X)
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
Noxious gas test	ISA-S71.04-1985 G3 Harsh Group A

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

Electrostatic discharge	EN 61000-4-2	
	Contact discharge	$\pm 6$ kV (Test Level 3)
	Discharge in air	$\pm 8$ kV (Test Level 3)
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	80 MHz ... 3 GHz (Test Level 3)
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	$\pm 4$ kV (Test Level 3)
	Signal	$\pm 2$ kV (Test Level 3)
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	$\pm 0.5$ kV
	Signal	$\pm 2$ kV
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Frequency range	0.15 MHz ... 80 MHz
	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

### 5.1 Installation notes



**WARNING:**

Observe the following safety notes when using the device.

- The category 3 device is designed for installation in zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-15:2010.
- 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).
- Changing or modifying the device beyond the configuration 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 device is designed exclusively for SELV operation according to IEC 60950-1/EN 60950-1/VDE 0805. The device may only be connected to devices, which meet the requirements of EN 60950-1.

### 5.2 Installation in Zone 2



**WARNING: Explosion hazard when used in potentially explosive areas**

Please make sure that the following notes and instructions are observed.

- Observe the specified conditions for use in potentially explosive areas.
- The devices must be installed in a housing which is designed in a type of protection in accordance with EN 60079-0, section 1 and has a minimum protection rating of IP54.
- In zone 2, only connect devices to the supply and signal circuits that are suitable for operation in the Ex zone 2 and the conditions at the installation location.
- The switches of the device that can be accessed may only be actuated when the power supply to the device is disconnected.
- The device must be stopped and immediately removed from the Ex area if it is damaged, was subject to an impermissible load, stored incorrectly or if it malfunctions.
- In potentially explosive areas, terminals may only be snapped onto or off the DIN rail connector and wires may only be connected or disconnected when the power is switched off.
- The device is not designed for use in atmospheres with a danger of dust explosions.

### 5.3 UL notes

**WARNING: Explosion hazard when used in potentially explosive areas**

Please make sure that the following notes and instructions are observed.

**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  $\pm 20\%$  ---90 mA

## 6 Transport and unpacking

- Check the delivery for visible damage caused by transportation.
- Submit claims for any transport damage immediately. Inform Phoenix Contact or your supplier as well as the shipping company without delay.
- Read the complete packing slip carefully.
- Retain the packing slip.
- Keep the packaging for a possible later transport.

## 7 Application examples

The repeater can be used to create network structures that are tailored to the relevant application.

The limits set by the RS-485 standard are therefore extended. The standard defines the following basic specifications:

- Up to 32 devices per potential segment
- Only line structures
- Maximum bus cable length: 1200 m
- Maximum branch line length without termination resistor: 5 m, depending on the transmission speed
- Bus cable termination at the start and end of the bus cable



Please note that in each potential segment, the port of the repeater must be considered as a device.

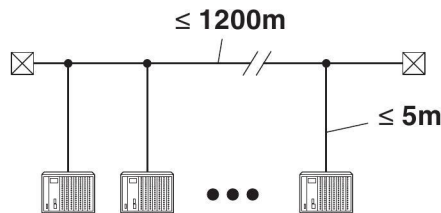
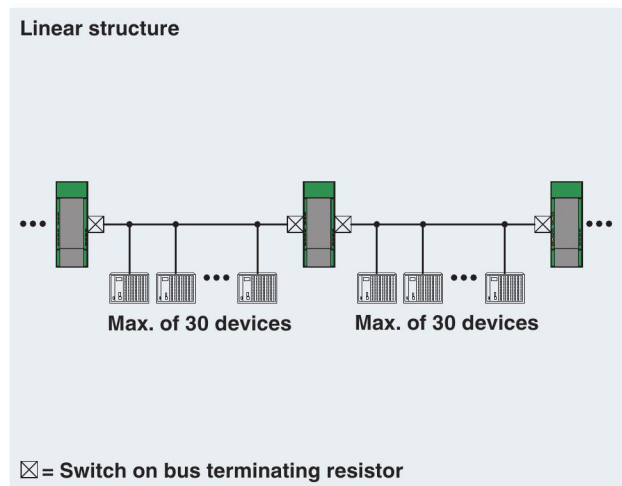


Figure 1 Cable lengths according to the RS-485 standard



### 7.1 Cable lengths

For bridging larger distances you can connect multiple segments, separated by repeaters, in series.

ECHELON recommends connecting a maximum of two repeaters in series for time-critical LON applications.

Transmission speed in kbps	Cable length in m
39.1	1000
78.1	1000
500	400
625	400
1000	200
1250	200
2000	100



The bus and spur line lengths depend on the transmission speed and cable type. For specifications, refer to the manufacturer's manual for the bus system used.

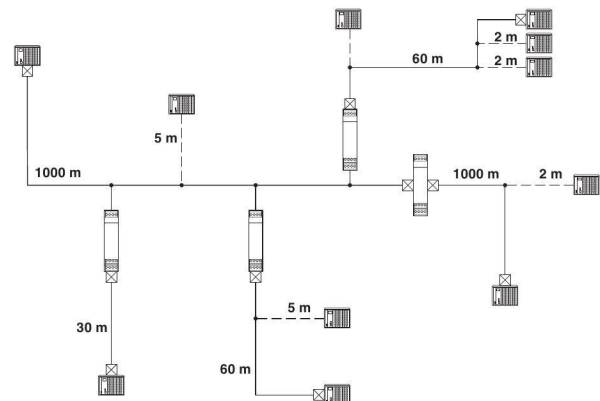


Figure 2 Cable lengths



## 8 Product description

### 8.1 Dimensions

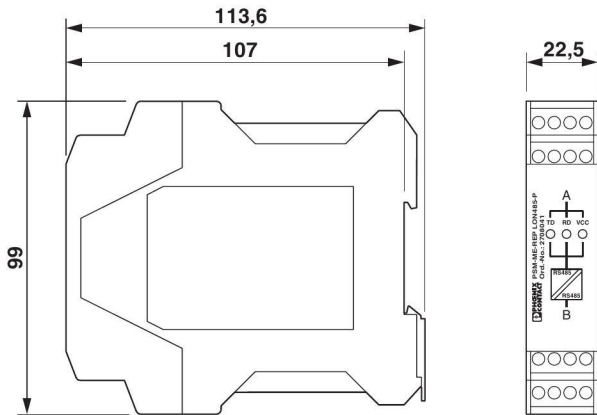


Figure 3 Housing dimensions

### 8.2 Block diagram

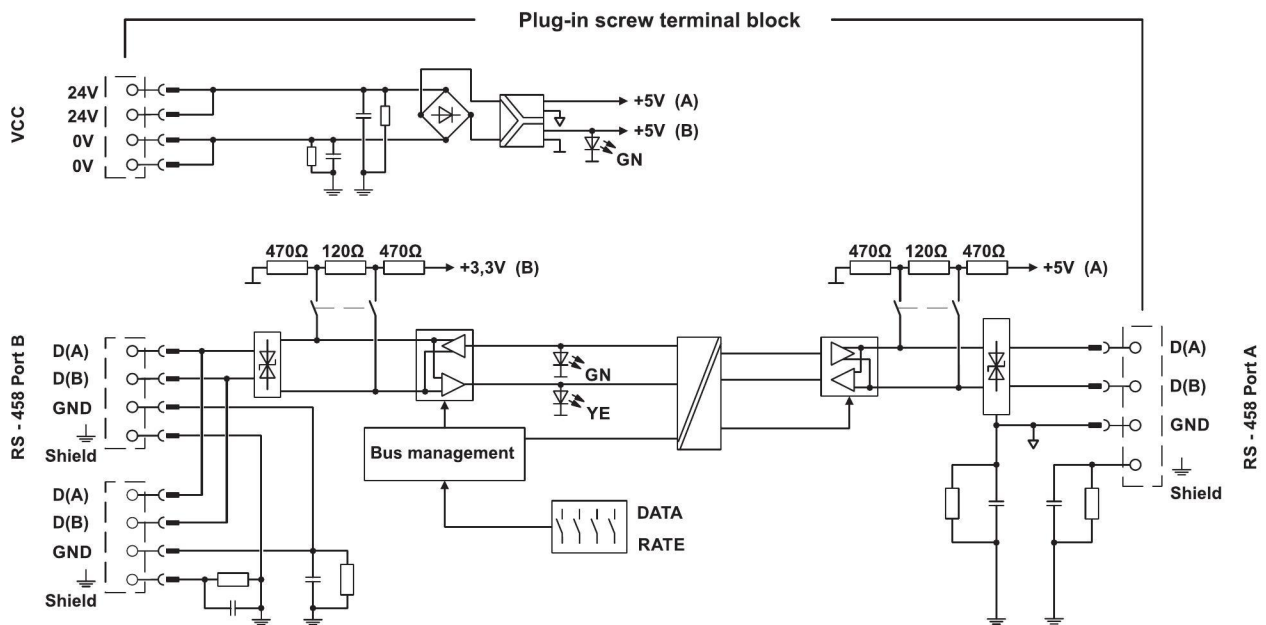


Figure 4 Block diagram

### 8.3 Function elements

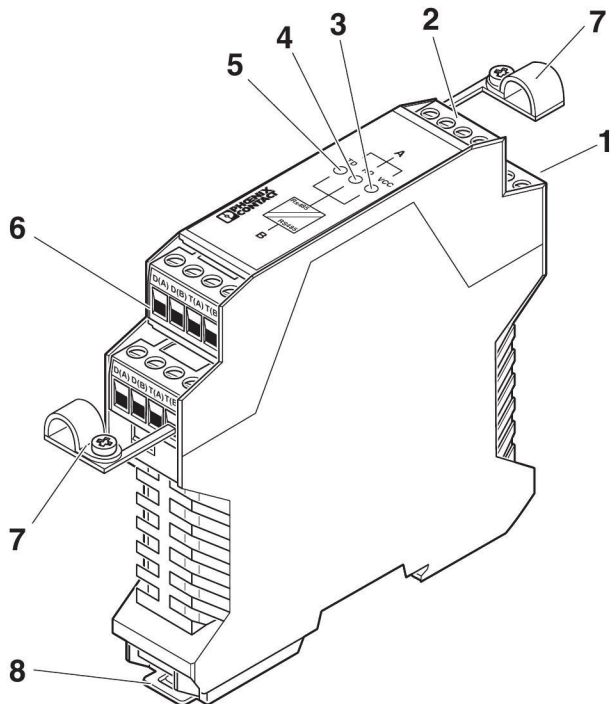


Figure 5 Function elements

#### COMBICON plug-in screw terminal blocks

- 1 Power supply (pin 1 + pin 3)
- 2 RS-485 interface, port A
- 6 RS-485 interface, port B

#### Diagnostics and status indicators

- 3 VCC (green) Supply voltage
- 4 RD (green) RS-485 (A) Data received
- 5 TD (yellow) RS-485 (A) Data transmission

#### Operating elements

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

## 9 Configuration via DIP switches

You must open the housing to access the DIP switches and slide switches.



**NOTE: electrostatic discharge!**

Electrostatic discharge can damage or destroy components.

- 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.

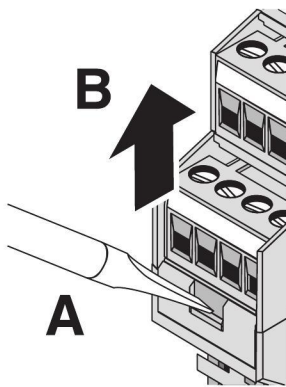


Figure 6 Opening the housing

### 9.1 Transmission speed

	ON $\cong$ <input type="checkbox"/>	DIP					
		1	2	3	4	5	6
Speed	2000	•	•				
kbit/s	1250						
	1000	•	•		•		
	625					•	
	500	•	•	•			
	78,1		•				
	39,1		•	•			

Figure 8 DIP switches 1 ... 4, transmission speed

- Set the transmission speed using the DIP switches.



Set all PSM repeaters and bus devices to the same data speed.

### 9.2 Termination resistor

To terminate the RS-485 bus line, the device incorporates a connectable termination resistor for each port.

- Activate the termination resistor by setting the TERMINATE slide switch to ON.



Terminate the RS-485 bus line at the two furthest ends of the bus.

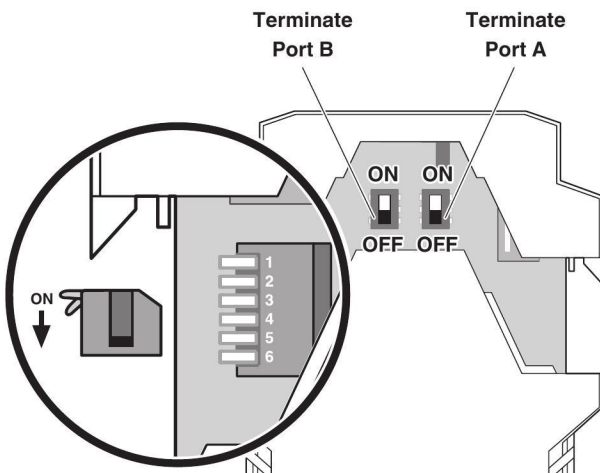


Figure 7 Remove the PCB

## 10 Connecting data cables



**NOTE: Interference**

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

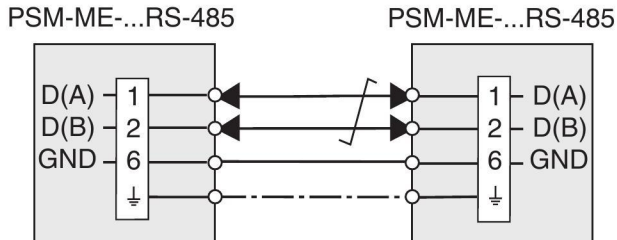


Figure 9 RS-485 interface

- To couple two RS-485 interfaces, connect them with a twisted lead pair.

D(A) = Data line -  
D(B) = Data line +

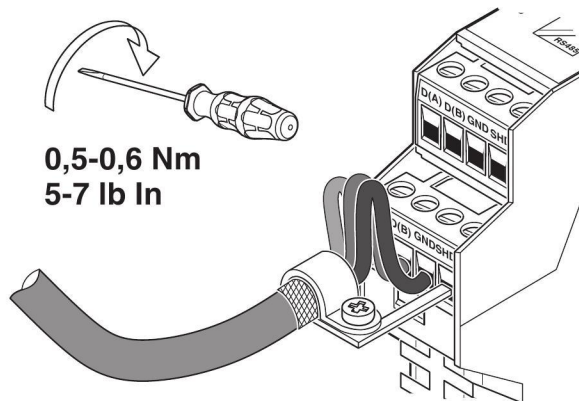


Figure 10 Install shield connection clamp

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

## 11 Installation



**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.

### 11.1 Mounting

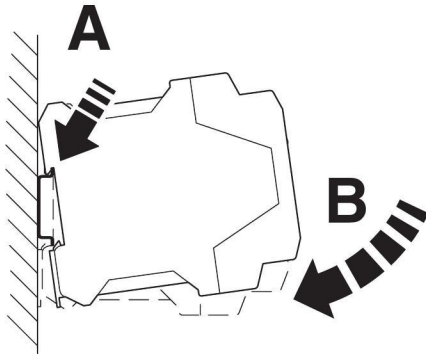


Figure 11 Mounting on a DIN rail

- 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.

### 11.2 Removal

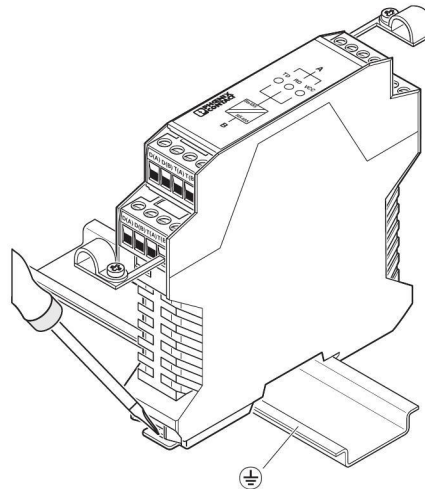


Figure 12 Removal

- 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.

### 11.3 Connecting the supply voltage

The device is supplied with 24 V DC or AC.

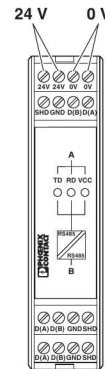


Figure 13 Connecting the supply voltage

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

## 12 Disposal



Dispose of the device separately from other waste, i.e., via an appropriate collection site.