

# PSI-MOS-RS422/FO...

## Fiber optic converter for RS-422/RS-485 4-wire/INTERBUS

Data sheet  
101974\_en\_05

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### 1 Description

**PSI-MOS-RS422/FO...** devices convert RS-422/RS-485 4-wire and INTERBUS interfaces to fiber optics. The conversion is performed using a transparent protocol for all data rates up to max. 2000 kbps. The integrated optical diagnostics allow permanent monitoring of the FO paths during installation and also during operation. The floating switch contact is activated when the signal level on the fiber optic paths reaches a critical level. This early alarm generation enables critical system states to be detected before they result in failure.

The main advantage of this system is the electrically isolated connection of devices, which prevents the negative effects of voltage equalization currents and electromagnetic interference on the data cables. Result: Increases the overall availability of the system, and improves flexibility in terms of the design of the network topology in a linear or star structure.

**PSI-MOS RS422/FO 660 ...** devices have the following possible ranges:

- Up to 100 m with polymer fiber
- Up to 800 m with HCS fiber

The connection is made using FSMA fast connectors that can be directly assembled on site within a few minutes.

**PSI-MOS RS422/FO 850 ...** devices with B-FOC(ST®) fast connection technology are available for longer distances:

- Up to 2800 m with HCS fiber
- Up to 4800 m with multi-mode fiberglass



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

This 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/products](https://phoenixcontact.net/products).



This data sheet is valid for all products listed on the following page:

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### 3 Ordering data

#### FO converter

Description	Type	Order No.	Pcs./Pkt.
Terminal device with integrated optical diagnostics for converting the RS-422 interface to one fiber optic cable			
660 nm	PSI-MOS-RS422/FO 660 E	2708342	1
850 nm	PSI-MOS-RS422/FO 850 E	2708355	1
T-couplers with integrated optical diagnostics for converting the RS-422 interface to two fiber optic cables			
660 nm	PSI-MOS-RS422/FO 660 T	2708384	1
850 nm	PSI-MOS-RS422/FO 850 T	2708397	1

#### Accessories

Description	Type	Order No.	Pcs./Pkt.
System power supply unit for supplying a modular star coupler topology	MINI-SYS-PS 100-240AC/24DC/1.5	2866983	1
System power supply unit for supplying a modular star coupler topology, for potentially explosive areas	MINI-PS-100-240AC/24DC/1.5/EX	2866653	1
End bracket	CLIPFIX 35	3022218	50
DIN rail connector, power supply and data (2 per device)	ME 17.5 TBUS1.5/5-ST-3.81GN	2709561	10
DIN rail connector, power supply only (2 per device)	ME 17.5 TBUS1.5/PP000-3.81BK	2890014	10
Polymer fiber connectors (4 connectors in the set)	PSM-SET-FSMA/4-KT	2799720	1
Polishing set for polymer fiber connectors (required to assemble polymer fiber connectors)	PSM-SET-FSMA-POLISH	2799348	1
Polymer fiber cable (fiber optic) for indoor installation	PSM-LWL-KDHEAVY	2744319	1
FSMA HCS fiber connectors (4 connectors in the set)	PSM-SET-FSMA/4-HCS	2799487	1
B-FOC(ST <sup>®</sup> ) HCS fiber connectors (4 connectors in the set)	PSM-SET-B-FOC/4-HCS	2708481	1
Tool set for HCS connectors, FSMA, (required for HCS connector assembly)	PSM-HCS-KONFTOOL	2799526	1
Tool set for HCS connectors, B-FOC(ST <sup>R</sup> ) (required for HCS connector assembly)	PSM-HCS-KONFTOOL/B-FOC	2708465	1
HCS cable (fiber optic) for indoor installation	PSM-LWL-HCS RUGGED-200/230	2799885	1
HCS cable (fiber optic) for outdoor installation	PSM-LWL-HCSO-200/230	2799445	1
Fiber optic fiberglass cable for indoor installation	PSM-LWL-GDM-RUGGED-50/125	2799322	1
Fiber optic fiberglass cable for outdoor installation	PSM-LWL-GDO-50/125	2799432	1
Measuring instrument for fiber optic power measurement	PSM-FO-POWERMETER	2799539	1

**Other fiber optic converters**

Description	Type	Order No.	Pcs./Pkt.
FO converter with integrated optical diagnostics, alarm contact, for RS-422/RS-485 4-wire and INTERBUS interfaces, terminal device with one FO interface (SC duplex), 1300 nm, for multi-mode and single-mode fiberglass cable Transmission length: – Up to 27 km with multi-mode fiberglass – Up to 45 km with single-mode fiberglass	PSI-MOS-RS422/FO 1300 E	2708575	1

**4 Technical data**

Interfaces		
Power supply	24 V DC (18 V DC ... 32 V DC)	
Typical current consumption	100 mA	
Maximum current consumption	130 mA	
Standby indicator	LED VCC (green)	
Maximum star coupler expansion	10	
<b>Serial RS-422/RS-485 4-wire interface</b>	According to ITU-T V.11, EIA/TIA-422, DIN 66348-1	
Operation mode	Full duplex	
Data format/coding	UART (11 bits, NRZ)	
Termination resistors	220 Ω / 100 Ω / 220 Ω	
Transmission speed (automatic detection)	0 kbps ... 2000 kbps (NRZ)	
Transmission length	Max. 1000 m (depending on the transmission speed)	
Connection	Plug-in screw terminal block	
<b>Optical interface</b>		
Transmission protocol	Transparent protocol to RS-422 interface	
Connection technology	<b>FSMA</b>	<b>B-FOC(ST<sup>®</sup>)</b>
Wavelength	660 nm	850 nm
Minimum transmission power (fiber type)	-4.6 dBm (980/1000 μm)	-4.6 dBm (200/230 μm)
	-16.6 dBm (200/230 μm)	-17.6 dBm (50/125 μm)
		-13.6 dBm (62.5/125 μm)
Minimum receiver responsiveness	-31.2 dBm	-33.2 dBm
Transmission length including 3 dB system reserve	100 m with F-P 980/1000; 230 dB/km with quick mounting connector	2800 m with F-K 200/230; 10 dB/km with quick mounting connector
	800 m with F-K 200/230; 10 dB/km with quick mounting connector	4200 m with F-G 50/125; 2.5 dB/km 4800 m with F-G 62.5/125; 3.0 dB/km

General data					
Bit distortion, input		±35%, maximum			
Bit distortion, output		< 6.25 %			
Bit delay		< 1 bits			
Electrical isolation		RS-422//supply			
Test voltage		1.5 kV <sub>rms</sub> , 50 Hz, 1 min.			
Signaling output		60 V DC/42 V AC, 0.46 A, maximum			
Status and diagnostics indicators		Power supply (VCC), transmit/receive data RS-422, fiber optic bar graph (FO SIGNAL), fiber optic error (FO ERR)			
Enclosure material		PA 6.6-FR			
Ambient temperature					
Operation		-20°C ... +60°C			
Storage/transport		-40°C ... +85°C			
Humidity		30% to 95%, no condensation			
Dimensions (W x H x D)		35 mm x 105 mm x 99 mm			
Degree of protection		IP20			
Weight		200 g, approximately			
MTBF according to Telcordia standard		Terminal devices (E)		T-coupler (T)	
		660 nm	850 nm	660 nm	850 nm
Ambient temperature 25 °C		493 years	320 years	284 years	178 years
Ambient temperature 40 °C		92 years	48 years	52 years	26 years
Vibration resistance		5g according to IEC 60068-2-6, 2.5 h each in XYZ direction, criterion A			
Shock resistance		15g according to IEC 60068-2-27 with 11 ms pulse length, criterion C			
Free fall		1 m without packaging according to IEC60950			
Air clearances and creepage distances		DIN EN 60664-1/VDE 0110-1, DIN EN 50178, DIN EN 60950			
Tests/approvals					
Conformance		CE-compliant			
ATEX (Please follow the special installation instructions in the documentation)		⚡ II 3 G Ex nA nC IIC T4 Gc X ⚡ II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U) ⚡ II (2) D [Ex op is Db] IIIC (PTB 06 ATEX 2042 U)			
UL, USA/Canada		Class I, Zone 2, AEx nc IIC T5 Class I, zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D			

**Conformity with EMC Directive 2014/30/EU****Immunity test according to EN 61000-6-2<sup>1</sup>**

Electrostatic discharge (ESD)	EN 61000-4-2	Criterion B <sup>2</sup>	
Air discharge			8 kV
Contact discharge			6 kV
Electromagnetic HF field	EN 61000-4-3	Criterion A <sup>3</sup>	
Amplitude modulation			10 V/m
Fast transients (burst)	EN 61000-4-4	Criterion B <sup>2</sup>	
Signal			2 kV/5 kHz
Power supply			2 kV/5 kHz
Surge current loads (surge)	EN 61000-4-5	Criterion B <sup>2</sup>	
Signal			1 kV/42 Ω
Power supply			0.5 kV/2 Ω
Conducted disturbance variables	EN 61000-4-6	Criterion A <sup>3</sup>	10 V

**Noise emission test according to EN 61000-6-4**

Noise emission of housing	EN 55011 <sup>4</sup>	Class A, Industrial application, without special installation measures
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<sup>1</sup> EN 61000 corresponds to IEC 61000<sup>2</sup> Criterion B: Temporary adverse effects on the operating behavior, which the device corrects automatically<sup>3</sup> Criterion A: Normal operating behavior within the specified limits<sup>4</sup> EN 55011 corresponds to CISPR11

# Block diagram

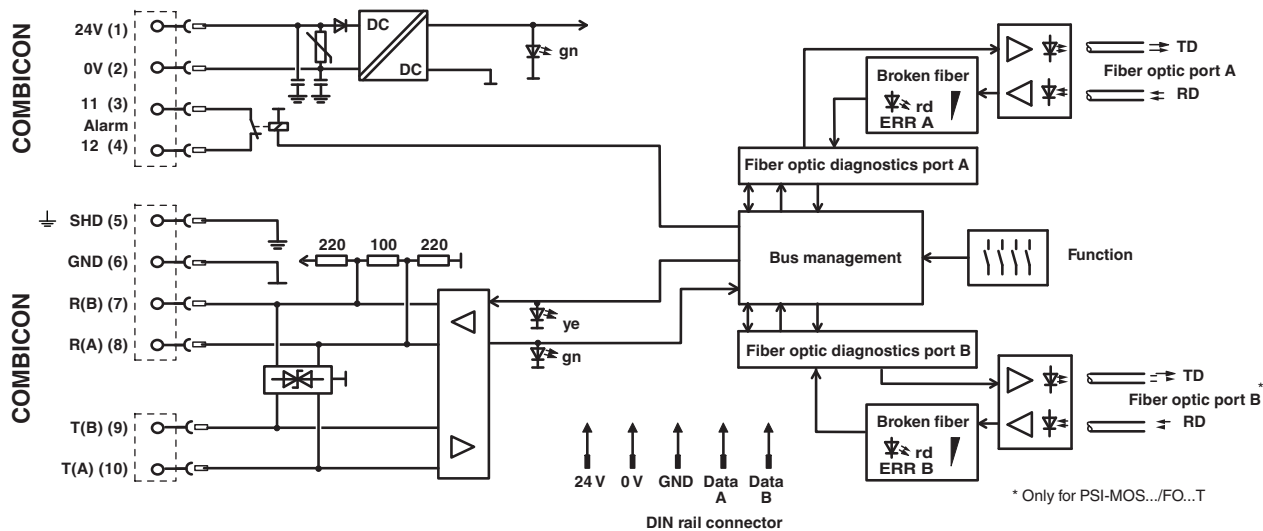


Figure 1 Block diagram

# Housing dimensions

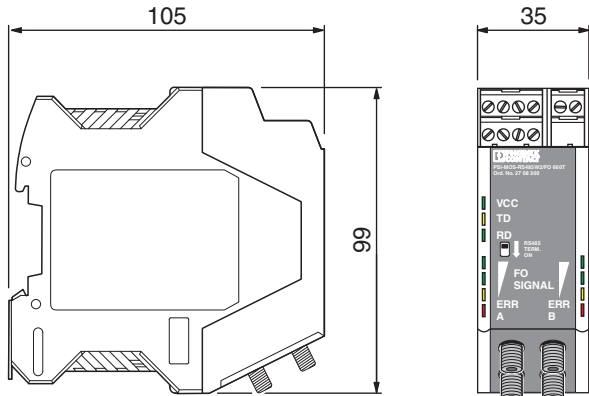


Figure 2 Housing dimensions

## 5 Safety regulations and installation notes

### 5.1 Installation notes



**WARNING:**

Observe the following safety notes when using the FO converter.

- The category 3 device is suitable for installation in Zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-15:2010.
- The FO components of type PSI-MOS transmitter control 660 or 850 are a part of the module. The fibre optics interface is used for optical communication with devices used in the potentially explosive area of zone 1 or zone 21. It is used in accordance with the EC examination certificate.
- 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 the general codes of practice, must be observed. The safety data is provided in the packing slip and on the certificates (conformity assessment, additional approvals where applicable).
- The device must not be opened or modified apart from the configuration of the DIP switches. Do not repair the device yourself; replace it with an equivalent device instead. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from non-compliance.
- The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.

- The switches of the device that can be accessed may only be actuated when power to the device is disconnected.
- The device is only intended for operation with SELV according to IEC 60950/EN 60950/VDE 0805. The device may only be connected to devices that meet the requirements of EN 60950.

### 5.2 Installation in zone 2



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

Make sure that the following notes and instructions are observed.

- Observe the specified conditions for use in potentially explosive areas!
- Install the device in a suitable, approved housing (with at least IP54 protection) that meets the requirements of EN 60079-15. For this purpose, observe the requirements of IEC 60079-14 / EN 60079-14.
- Only connect devices to the supply and signal circuits in zone 2 that are suitable for operation in Ex zone 2 and for the conditions at the installation location.
- In potentially explosive areas, only snap the device onto or off the DIN rail connector and connect/disconnect cables when the power is disconnected.
- The device must be stopped and immediately removed from the Ex area if it is damaged, was subjected to an impermissible load, stored incorrectly or if it malfunctions.

### 5.3 UL notes

**PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 312N**

- A) This equipment is suitable for use in Class I, Zone 2, AEx nC IIC T5, Ex nC nL IIC T5 X; and Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.
- B) WARNING - EXPLOSION HAZARD - substitution of components may impair suitability for Class I, Zone 2/Division 2.
- C) WARNING - EXPLOSION HAZARD - do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- D) This device must be installed in an enclosure rated IP54 and used in an area of not more than pollution degree 2.



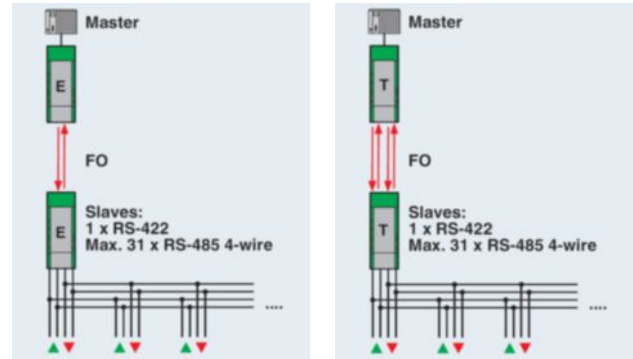
## 6 Supported network structures

The PSI-MOS-RS422/FO... system can be used to create network topologies that are ideally adapted to the relevant application. The structures are described briefly below.

### 6.1 Point-to-point connections

You can use two PSI-MOS-RS422/FO... E FO terminal devices to easily convert a data link from copper cable to fiber optics.

If necessary, you can also configure the point-to-point connection redundantly to increase availability using PSI-MOS-RS422/FO... T T-couplers.



### 6.2 Linear structures

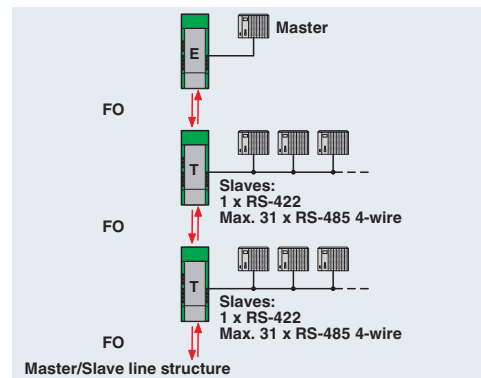
The PSI-MOS-RS422/FO... device can be used to network several RS-422/RS-485 4-wire devices to form a linear structure.

In this case, it must be possible to address all the terminal devices via communication software.

PSI-MOS-RS422/FO... E terminal devices are used at the beginning and end of the fiber optic line.

PSI-MOS-RS422/FO... T T-couplers with two fiber optic ports are used along the line.

The cascability of the fiber optic devices is limited by the data rate.



Data Rate	Number of devices
≤115.2 kbps	15
≤187.5 kbps	7
≤375 kbps	5

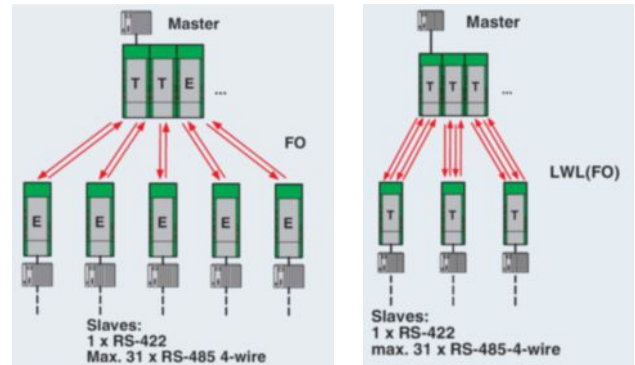
Data Rate	Number of devices
≤500 kbps	3
≤2000 kbps	2

### 6.3 Star structures

You can also network RS-422/RS-485 4-wire devices in a star structure. Depending on the number of star lines required, several T-couplers or terminal devices are connected to an active star coupler.

You can connect up to ten PSI-MOS-RS422/FO... devices per star coupler. Cross-wiring for data and for the supply voltage is provided automatically by the DIN rail connector (installation accessory, see Page 3).

If increased availability is required, redundant star distributors can also be created using PSI-MOS-RS422/FO... T T-couplers.

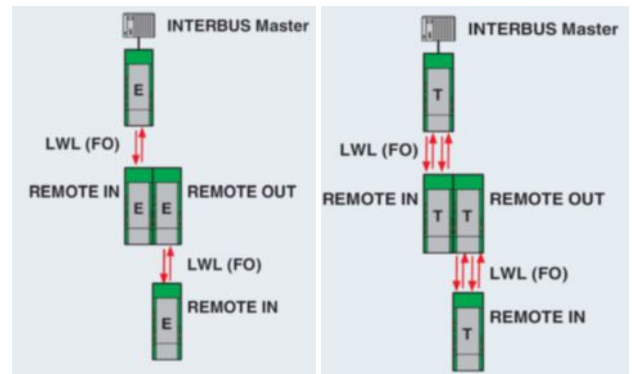


### 6.4 Use in INTERBUS networks

PSI-MOS-RS422/FO... converters also allow you to create INTERBUS networks with FO technology.

For standard INTERBUS connections, the REMOTE IN and REMOTE OUT interfaces are converted to fiber optics using one PSI-MOS-RS422/FO... E terminal device each.

Redundant fiber optic connections can also be implemented for INTERBUS using PSI-MOS-RS422/FO... T T-couplers.



7 Function elements

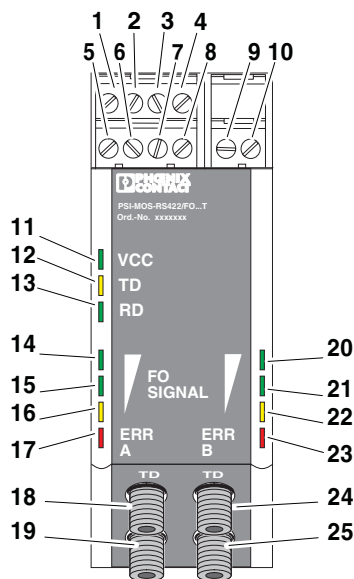


Figure 3 Function elements

- 1 24 V DC supply voltage connection
- 2 0 V DC supply voltage connection
- 3 Switch contact, connection 11
- 4 Switch contact, connection 12
- 5 SHD, shield
- 6 GND
- 7 Receive +: R(B)
- 8 Receive -: R(A)
- 9 Transmit +: T(B)
- 10 Transmit -: T(A)
- 11 "VCC" LED
- 12 "TD" LED
- 13 "RD" LED
- 14 "FO SIGNAL" LED (port A)
- 15 "FO SIGNAL" LED (port A)
- 16 "FO SIGNAL" LED (port A)
- 17 "ERR" LED (port A)
- 18 Fiber optic transmitter (port A)
- 19 Fiber optic receiver (port A)

Port B only with PSI-MOS-RS422/FO... T T-couplers:

- 20 "FO SIGNAL" LED (port B)
- 21 "FO SIGNAL" LED (port B)
- 22 "FO SIGNAL" LED (port B)
- 23 "ERR" LED (port B)
- 24 Fiber optic transmitter (port B)
- 25 Fiber optic receiver (port B)

Diagnostic and status indicators

Des.	Color	Meaning	
VCC	Green	Ready to operate	
TD	Yellow	Sending data at the RS-422 copper interface	
RD	Green	Receiving data at the RS-422 copper interface	
FO SIGNAL	Green	Receiving power at fiber optic port A/B (see Page 12)	Very good
	Green		Good
	Yellow		Critical
ERR	Red		Insufficient, broken fiber

## 8 Definition of fiber optic diagnostics

The quality of the path is determined using the incoming optical power  $P_{opt}$  and displayed using the LED bar graph.

You use DIP 2 to switch idle senders (reset period between sending data) to continuous illumination (INVERS). This allows for continuous fiber optic diagnostics.

If you switch DIP 2 to "ON" (NORM), the diagnostics are not available via the LED bar graph.

LED bar graph	Receive status	Optical power $P_{opt}$
Green Green Yellow	Very good	$P_{opt}$ is significantly greater than the system reserve
Green Yellow	Good	$P_{opt}$ is still greater than the system reserve
Yellow	Critical	$P_{opt}$ has reached the system reserve
Red	Error	$P_{opt}$ has sapped the system reserve/broken fiber

As soon as the system reserve is reached, only the yellow LED remains lit. At the same time, the signaling relay drops and the switch contact opens. Data communication is still possible.

### Basic method of operation

The device has a maximum of three interfaces for the RS-422 signal:

- Electrical interface (COMBICON)
- Fiber optic port
- DIN rail connector

#### 8.1 Point-to-point connections

The COMBICON interface communicates with the FO port. Communication with the DIN rail connector is switched off.

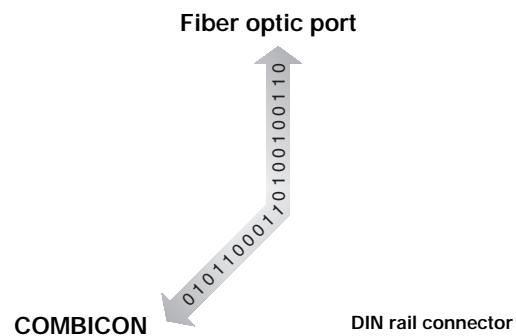


Figure 4 Communication between the interfaces for point-to-point connections, DIP 1 = OFF (LINE)

#### 8.2 Star structures

All three interfaces (COMBICON, fiber optic port, and DIN rail connector) communicate directly with one another.

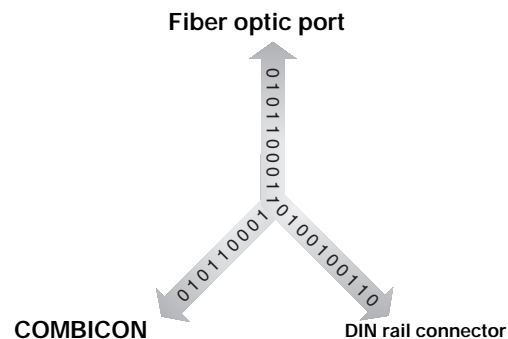


Figure 5 Communication between the interfaces for the star structure, DIP 1 = ON (STAR)

# 9 Configuration



## 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 EN 61340-5-2.

- For configuration, release the housing cover using a screwdriver.
- Then carefully pull the PCB out of the housing as far as possible.

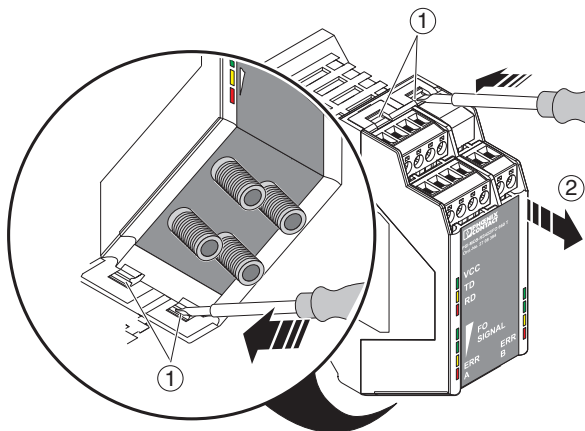


Figure 6 Opening the housing

DIP switches 1 to 4 are then freely accessible.

- Configure the DIP switches according to the planned application.

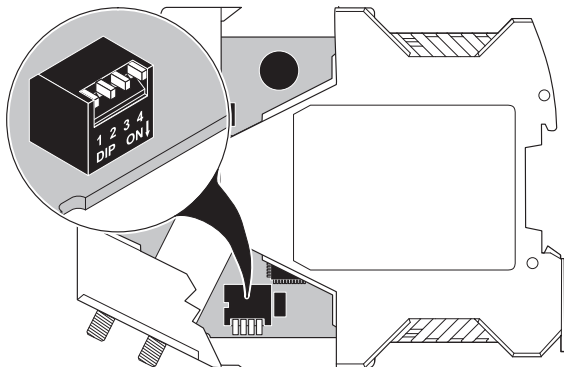


Figure 7 Setting the DIP switches

The following tables provide an overview of the DIP switch functions. By default, all DIP switches are in the "OFF" position.



After changing the device settings, disconnect the power to the device so that the settings can be applied.



## NOTE: Malfunction

If you use T-couplers with an INTERBUS line with 2 Mbps and redundancy mode activated (DIP 3 = "ON"), leave DIP 4 set to "OFF." Otherwise a bus reset will be triggered.

DIP switch	ON	OFF
1	STAR	LINE
2	STANDARD	INVERSE
3	REDUNDANCY	–
4	END	NEXT

## 9.1 Operation in a point-to-point connection (DIP 1)

No further settings are required in the default setting.

- Leave all DIP switches in the "OFF" position.

If you use T-couplers, you must disable FO Port B.

- Set DIP 4 to "ON" (END).

## 9.2 Operation in a linear structure (DIP 1)



Addressable RS-422/RS-485 4-wire devices and a suitable communication protocol are required for a line structure.

Please note that the number of devices that can be cascaded depends on the transmission speed (see Page 9).

### First and last device in the line:

If you use two terminal devices, no additional settings are required with the factory settings.

- Leave all DIP switches in the "OFF" position.

If you use T-couplers, you must disable FO Port B.

- Set DIP 4 to "ON" (END).

### Devices along the line:

T-couplers must be used along the line.

By default upon delivery, no changes to the setting are required.

- Leave all DIP switches in the "OFF" position.

## 9.3 Operation in a star structure (DIP 1)



Addressable RS-422/RS-485 4-wire devices and a suitable communication protocol are required for a star structure.

### Devices in the star coupler topology

- For each device in the star coupler topology, set DIP 1 to "ON" (STAR).

### Devices at the end of a star line

No further settings are required in the default setting.

- Leave all DIP switches in the "OFF" position.

## 9.4 Operation in an INTERBUS System

No further settings are required in the default setting.

- Leave DIP 1 set to "OFF" (LINE) and DIP2 set to "OFF" (INVERS).

If you use T-couplers, you must disable FO Port B.

- Set DIP 4 to "ON" (END).

## 9.5 Connection to fiber optic interfaces from third-party suppliers (DIP 2)

During the idle phase, fiber optic interfaces return to an idle setting defined by the manufacturer. This idle setting may vary for different manufacturers and devices. Since you can only operate fiber optic interfaces together if they have the same idle setting, this should be set using the DIP switches.

For mixed operation of PSI-MOS with fiber optic interfaces from other manufacturers, observe the following:

- Check the idle setting for the third-party interface:
  - Logic 1 = Light off or
  - Logic 1 = Light on
- If necessary, adjust the idle setting of PSI-MOS using DIP 2.

DIP 2	Idle setting	Meaning
OFF = INVERS	Light on <sup>1</sup>	Logic 1
ON = NORM	Light off	Logic 1

<sup>1</sup> Default setting



- If you switch DIP 2 to "ON," the FO diagnostics are not available via the LED bar graph.
- The LED bar graph can light up at high transmission speeds or flash at low transmission speeds. This display does **not** correspond to continuous evaluation of the optical power.
- When connecting third-party devices, observe the receiver sensitivity and overrange limits of the fiber optic interfaces.

### 9.6 Activating the redundancy function (DIP 3)

For increased availability, you can create redundant fiber optic connections using T-couplers. In this case, you must activate the redundancy function at the start and end of the redundant fiber optic connection.

- To do this, set DIP switch 3 (REDUNDANCY) to "ON".

When the redundancy function is enabled, data communication takes place via fiber optic port A by default. If the signal level of the standard cable drops to a critical level, it automatically switches to port B.



Always connect redundant fiber optic connections from fiber optic port A to port A of the opposite device or from port B to port B of the opposite device.

### 9.7 Disabling the second fiber optic port (DIP 4)

If you do not use the second fiber optics port (B) with PSI-MOS-RS422/FO... T T-couplers, you have to switch it off. Otherwise the red "ERR" LED will light up.

- Set DIP 4 to "ON" (END).

## 10 Connection notes


**CAUTION: Electrical voltage**

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


**NOTE: Malfunction**

Connect the DIN rail with the protective earth via a grounding terminal block. The devices are grounded when they are snapped onto the DIN rail (installation according to PELV).

This ensures that the shielding is effective. Connect protective earth ground with low impedance.


**NOTE: Device damage**

Only mount and remove devices when the power supply is disconnected.

- Install the device on a 35 mm DIN rail according to DIN EN 60715.
- To avoid contact resistance, only use clean, corrosion-free DIN rails.
- End brackets can be mounted on both sides of the device to stop the devices from slipping on the DIN rail (see Page 3 for ordering details).

### 10.1 Combined assembly (modular star coupler)

- Connect together the required number of DIN rail connectors for the connection station. Two DIN rail connectors are required for each device (see A in Figure 8). A maximum of ten devices are permitted in a connection station.
- Push the connected DIN rail connectors onto the DIN rail (B and C).
- Place the device onto the DIN rail from above. The upper holding keyway of the device must be hooked onto the top edge of the DIN rail (see Figure 9). Make sure that it is aligned correctly with the DIN rail connectors.
- Once the device has been snapped on properly, check that it is fixed securely on the DIN rail.

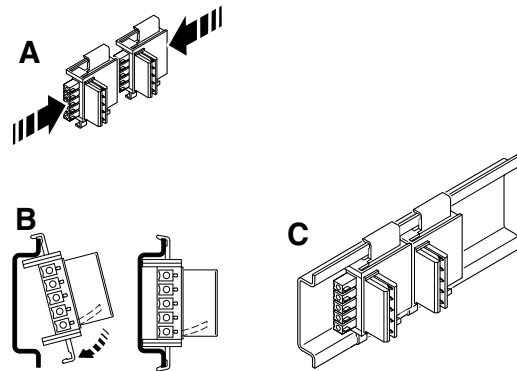


Figure 8 Combined assembly



### 10.2 Assembly as an individual device in the control cabinet (stand-alone)

- Place the device onto the DIN rail from above. The upper holding keyway of the device must be hooked onto the top edge of the DIN rail (see Figure 9).
- Push the device from the front towards the mounting surface.
- Once the device has been snapped on properly, check that it is fixed securely on the DIN rail.

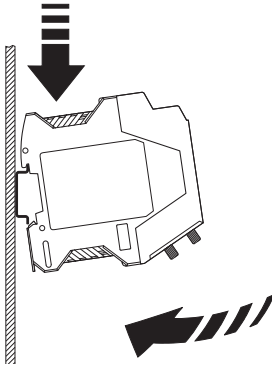


Figure 9 Assembly in the control cabinet

### 10.3 Assembly in potentially explosive areas



**WARNING:** Observe the safety notes on Page 8.

#### – Areas with a danger of gas explosions

The devices are suitable for use in zone 2. Devices that are installed in zone 1 can be connected to the fiber optics interface. The fiber optic interface is an associated item of equipment with protection type "Ex op is".

#### – Area with a danger of dust explosions

The device is **not** designed for installation in areas with a danger of dust explosions.

If dust is present, install the device in suitable, approved housing.

When installed outside areas with a danger of dust explosions, devices installed in zone 22 or 21 can also be connected to the fiber optic interface.

### 10.4 Dismantling

- Push down locking latch using a screwdriver, needle-nose pliers or similar.
- Pull the bottom edge of the module away from the mounting surface.
- Pull the module diagonally upwards away from the DIN rail.
- If removing a complete star distributor, remove the DIN rail connectors from the DIN rail as well.

## 11 Cabling notes

### 11.1 Connecting the supply voltage


**CAUTION: Electrical voltage**

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

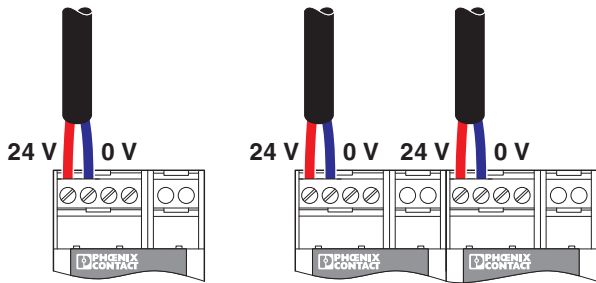


Figure 10 Individual or redundant supply

#### Operation as a single device

Supply the supply voltage to the module via terminal blocks 1 (24 V) and 2 (0 V).

#### Operation in a star coupler topology

If you operate the devices in a star coupler topology, the supply voltage must only be supplied to the first device in the station. The remaining devices are supplied via the DIN rail connector. You can create a redundant supply concept by connecting a second power supply unit to another device in the topology.

#### Supply via system power supply

Alternatively, you can supply the star coupler topology using the MINI-SYS-PS 100-240AC/24DC/1.5 (order no. 2866983) or MINI-PS-100-240AC/24DC/1.5/EX (order no. 2866653) system power supply. It is connected via two DIN rail connectors.

Usually the system power supply is mounted as the first device in a topology. A second power supply unit can be used to create a redundant supply concept.

### 11.2 Connecting the data cables and bus termination


**NOTE: Device damage**

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

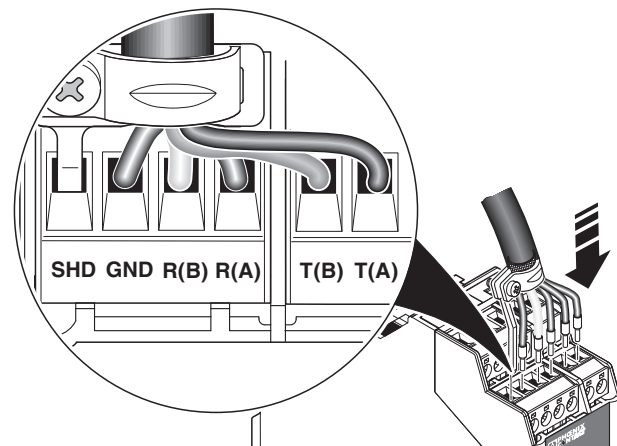


Figure 11 Shield connection

- Connect the cable shielding to terminal block 5.
- For optimum shield connection, use the shield connection clamp provided.



The maximum length of the RS-422/RS-485 cables depends on the transmission speed. Do not exceed the following maximum values.

Transmission speed [kbps]	Range [m]
187.5	1000
500	400
1500	200
12000	100

### Use in INTERBUS Systems

- Connect the INTERBUS connection to COMBICON terminal blocks 6 to 10.
- Please note the different pin assignment when connecting to REMOTE IN and REMOTE OUT.

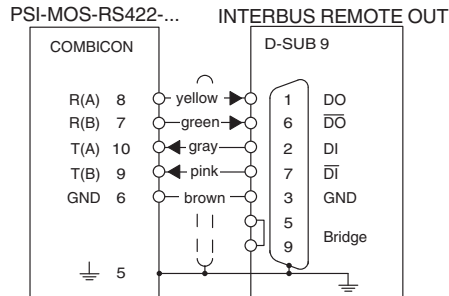


Figure 12 Connection to INTERBUS REMOTE OUT

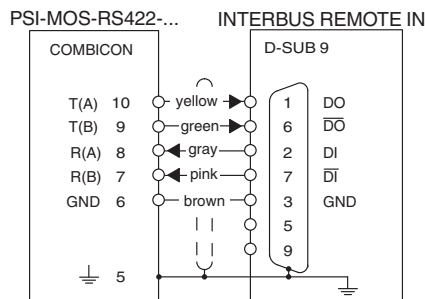


Figure 13 Connection to INTERBUS REMOTE IN

### Use in RS-422/RS-485 4-wire applications

- Connect the data cable to COMBICON terminal blocks 6 to 10.



- Please note the crossover between transmit and receive cables.
- If you use **RS-422** terminal devices, you may only connect one device per PSI-MOS device to the electrical interface.
- In **RS-485** master/slave networks, you can connect either one master device or up to 31 devices to each PSI-MOS device. You may not mix master and slave devices in a common electrical segment.
- In star coupler stations, always connect the master device to the data interface of the first PSI-MOS device. Combined use of the data interfaces of the other PSI-MOS devices is not possible.

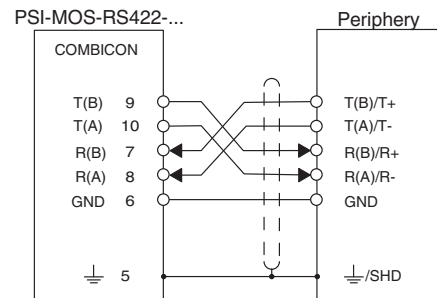


Figure 14 Connection to RS-422/RS-485 4-wire

### 11.3 Wiring the switch contact


**NOTE: Device damage**

The maximum capacity of the relay contact is 60 V DC/42 V AC, 0.46 A.

The device is equipped with a floating switching output for error diagnostics (terminals 3 (11) and 4 (12)).

The switch contact opens on the relevant device in the event of the following:

- Supply voltage failure
- An interrupt is detected on the fiber optic path
- System reserve of the fiber optic path not reached

The switching output is an N/C contact. It can be connected to a local digital input, e.g. on a PLC, for error detection.

When a topology is used, the individual switching outputs can be connected to separate input points or the individual contacts can be looped through to generate a group message.

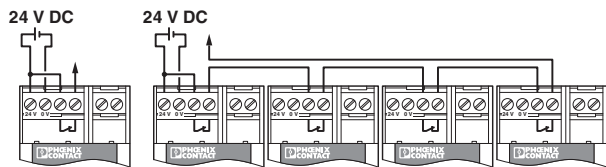


Figure 15 Individual and group message

## 11.4 Connecting the fiber optic cables



### **WARNING: Danger of eye injuries**

During operation, do not look directly into the transmitter diodes or use optical aids to look into the fiberglass! The infrared light is not visible.



### **NOTE: Malfunction**

Do not exceed the following FO lengths:

#### **PSI-MOS-RS422/FO 660 ...**

- 100 m with F-P 980/1000; 230 dB/km
- 800 m with F-K 200/230; 10 dB/km

#### **PSI-MOS-RS422/FO 850 ...**

- 2800 m with F-K 200/230; 10 dB/km
- 4200 m with F-G 50/125; 2.5 dB/km
- 4800 m with F-G 62.5/125; 3.0 dB/km



Avoid contamination.

Do not remove the dust protection caps until just before the connectors are connected.



When using fiber optic cables, observe the installation guideline  
DB GB IBS SYS FOC ASSEMBLY, Order No.  
9423439.

### **FSMA connection (PSI-MOS-RS422/FO 660 ...)**

PSI-MOS-RS422/FO 660 ... devices use FSMA connectors for the FO connection. FSMA is a standardized FO connection.

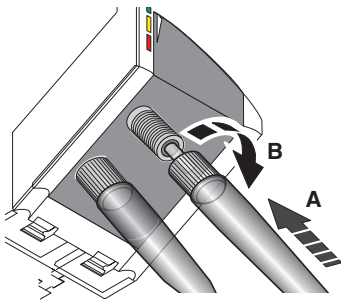


Figure 16 F-SMA connection

- To attach the connector to the device, hand-tighten the union screw.

### **B-FOC(ST®) connection (PSI-MOS-RS422/FO 850 ...)**

PSI-MOS-RS422/FO 850 ... devices use standardized B-FOC(ST®) connectors.

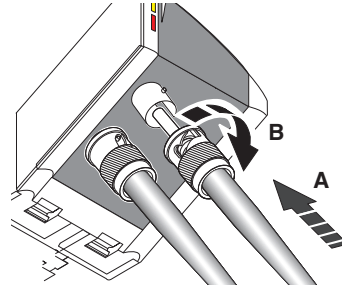


Figure 17 B-FOC(ST®) connection

- Connect the FO cable to the B-FOC(ST®) connector for the transmit and receive channel and push the spring mechanism of the connector downward. Secure the connection with a quarter turn to the right.

### **Coupling the devices**

Due to the integrated optical diagnostics, there is no need to measure the path.

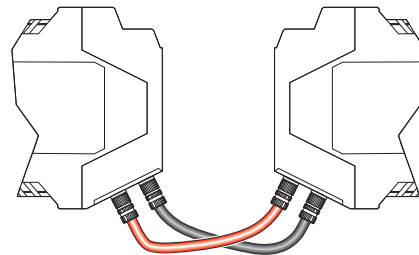


Figure 18 Crossed cables

When connecting two FO converters, note the signal direction of the fiber optics:

- Fiber connection "TD" (transmitter) at device 1
- Fiber connection "RD" (receiver) at device 2



Please note the transmit and receive channel crossover.

Due to different operating wavelengths, PSI-MOS-RS422/FO660 ..., PSI-MOS-RS422/FO850 ... and PSI-MOS-RS422/FO 1300 E devices should not be connected directly with one another via fiber optic cables.