

PSI-MOS-RS422/FO 1300 E

Fiber optic converter for RS-422 interfaces



Data sheet
103267_en_02

© PHOENIX CONTACT 2016-09-09

1 Description

The PSI-MOS-RS422/FO ... modular fiber optic transmission system converts RS-422/RS-485 4-wire and INTERBUS interfaces to fiber optics. A transparent protocol is used to convert all transmission speeds up to a maximum of 2000 kbps. The integrated optical diagnostics enable fiber optic paths to be monitored continuously during installation and even 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 for point-to-point connections and in star structures.

The PSI-MOS-RS422/FO 1300 E operates with a wavelength of 1300 nm and enables the use of multi-mode and single-mode fiberglass cable. Extension is possible by means of PSI-MOS converters for 660 nm (polymer/HCS fiber cable) and 850 nm (HCS/multi-mode fiberglass cable).

The devices are also equipped with comprehensive diagnostic functions to increase system availability and to simplify startup. The integrated fiber optic diagnostics permanently monitor the optical transmission quality.

Ranges:

- Up to 45 km with single-mode fiberglass
- Up to 27 km 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.



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

2 Table of contents

| | | |
|------|---|----|
| 1 | Description..... | 1 |
| 2 | Table of contents | 2 |
| 3 | Ordering data..... | 3 |
| 4 | Technical data | 4 |
| 5 | Safety regulations and installation notes..... | 8 |
| 5.1 | Installation notes | 8 |
| 5.2 | Installation in zone 2..... | 8 |
| 6 | Supported network structures | 9 |
| 6.1 | Point-to-point connections..... | 9 |
| 6.2 | Star structures | 9 |
| 6.3 | INTERBUS networks | 9 |
| 7 | Function elements | 10 |
| 8 | Definition of fiber optic diagnostics | 11 |
| 8.1 | Point-to-point connections..... | 11 |
| 8.2 | Star structures | 11 |
| 9 | Configuration | 12 |
| 9.1 | Operation in a point-to-point connection (DIP 1)..... | 12 |
| 9.2 | Operation in a star structure (DIP 1) | 12 |
| 9.3 | Operation in an INTERBUS System | 12 |
| 9.4 | Connection to fiber optic interfaces from third-party suppliers (DIP 2) | 13 |
| 9.5 | Switches with no function (DIP 3, 4, and 5) | 13 |
| 9.6 | Adjusting the transmission power (DIP 6)..... | 13 |
| 10 | Connection notes | 14 |
| 10.1 | Combined assembly (modular star coupler)..... | 14 |
| 10.2 | Assembly as an individual device in the control cabinet (stand-alone) | 15 |
| 10.3 | Assembly in potentially explosive areas | 15 |
| 10.4 | Dismantling | 15 |
| 11 | Cabling notes..... | 16 |
| 11.1 | Connecting the supply voltage | 16 |
| 11.2 | Connecting the data cables | 16 |
| 11.3 | Wiring the switch contact..... | 18 |
| 12 | Connecting the fiber optic cables (SC duplex)..... | 19 |

3 Ordering data

FO converter

| 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 | PSI-MOS-RS422/FO 1300 E | 2708575 | 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 |
| Power supply unit for use in zone 2 potentially explosive areas (ATEX) | 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 |
| 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 |

Other fiber optic converters in the PSI-MOS system

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

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

Connection: FSMA fast connector

PSI-MOS RS422/FO 850 ... devices are available for longer distances:

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

Connection: B-FOC(ST[®])

| 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 |

4 Technical data

| Interfaces | |
|---|---|
| Power supply | 24 V DC (18 V DC ... 32 V DC) |
| Typical current consumption | 110 mA (24 V DC) |
| Standby indicator | "VCC" LED (green) |
| Maximum star coupler expansion | 10 |
| Serial RS-422/RS-485 4-wire interface | 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 | 1000 m, maximum (depending on the transmission speed) |
| Connection | Plug-in screw connection |
| Optical interface | |
| Transmission protocol | Transparent protocol to RS-422 interface |
| Connection technology | SC duplex |
| Wavelength | 1300 nm |
| Minimum transmission power (fiber type) | -5.5 dBm (9/125 μm), single-mode fiberglass -3.4 dBm (50/125 μm), multi-mode fiberglass -4.7 dBm (62.5/125 μm), multi-mode fiberglass |
| Receiver sensitivity | |
| Minimum (single-mode fiberglass) | -26.5 dBm |
| Minimum (multi-mode fiberglass) | -25.5 dBm |
| Maximum (both fibers) | > 0 dBm |
| Transmission length including 3 dB system reserve | 45 km with F-E 9/125; 0.4 dB/km 27 km with F-G 50/125; 0.7 dB/km 22 km with F-G 62.5/125; 0.8 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 _{rms} , 50 Hz, 1 min. |
| Signaling output | 60 V DC/42 V AC, 1 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 | 190 g, approximately |
| MTBF according to Telcordia standard | |
| Ambient temperature 25 °C | 544 years |
| Ambient temperature 40 °C | 113 years |
| Free from substances that would hinder coating with paint or varnish | According to P-VW 3.10.7 57 65 0 VW-AUDI-Seat central standard |
| Vibration resistance | 5 g 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 | |
| CE | CE-compliant |
| ATEX (Please follow the special installation instructions in the documentation.) | ⊕ II 3 G Ex nA nC IIC T4 Gc X |
| UL | 508 listed 508 recognized |
| Shipbuilding | DNV |

Conformity with EMC Directive 2014/30/EU**Immunity test according to EN 61000-6-2¹**

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

Noise emission test according to EN 61000-6-4

| | | | |
|---------------------------|-----------------------|--|--|
| Noise emission of housing | EN 55011 ⁴ | Class A, Industrial application, without special installation measures | |
|---------------------------|-----------------------|--|--|

¹ EN 61000 corresponds to IEC 61000

² Criterion B: Temporary adverse effects on the operating behavior, which the device corrects automatically

³ Criterion A: Normal operating behavior within the specified limits

⁴ EN 55011 corresponds to CISPR11

Housing dimensions

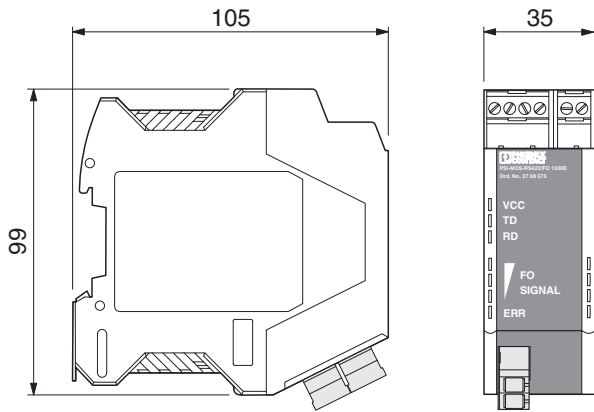


Figure 1 Housing dimensions

Block diagram

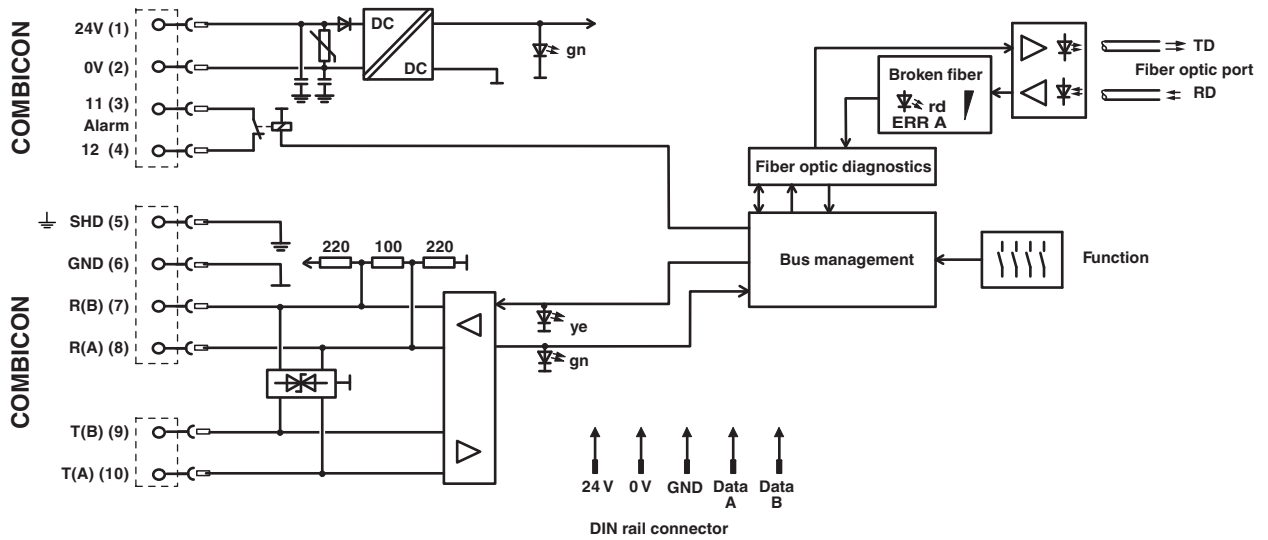


Figure 2 Block diagram

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.
- 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.
- This device is not designed for use in atmospheres with a risk of dust explosions.

- 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



INDUSTRIAL CONTROL EQUIPMENT 11AE

Wire Range: 24-14 AWG

Cu Copper Wire, 60/75C

Terminal tightening torque value: 5-7 (Lbs-Ins)

Environmental designation: "Open Type Device"

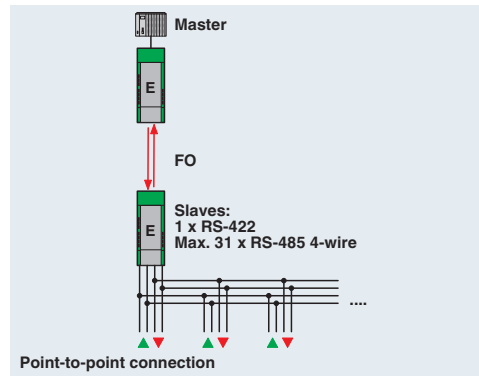
"Pollution Degree 2 Installation Environment"

6 Supported network structures

The PSI-MOS-RS422/FO 1300 E can be used to create network topologies that are ideally adapted to the relevant application.

6.1 Point-to-point connections

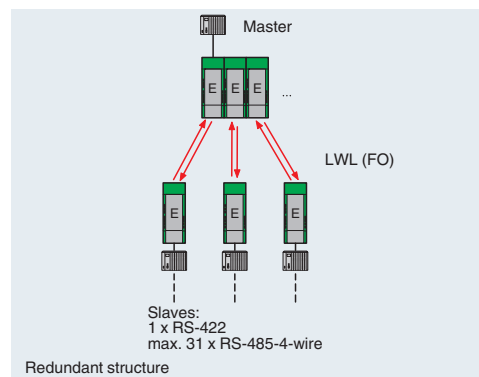
You can use two PSI-MOS-RS422/FO 1300 E FO terminal devices to easily convert a data link from copper cable to fiber optics.



6.2 Star structures

You can network addressable RS-422/RS-485 4-wire devices within a star structure as a master/slave network. Depending on the number of star lines, several terminal devices are connected to an active star coupler.

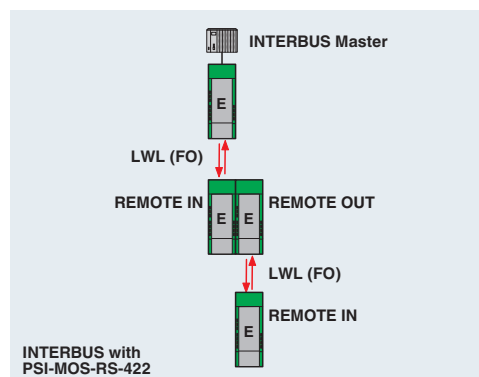
Up to ten fiber optic ports are available per star coupler. Cross-wiring for RS-422 data and for the supply voltage is provided automatically by the DIN rail connector (installation accessory, see Page 3).



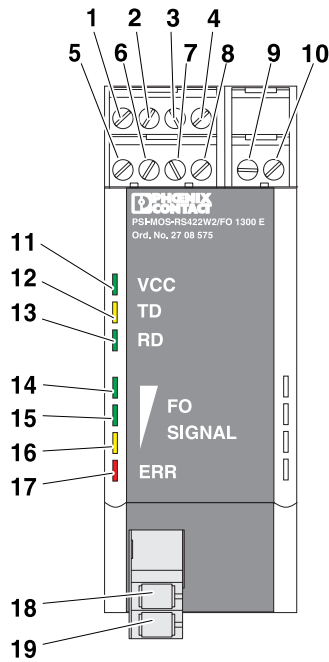
6.3 INTERBUS networks

The PSI-MOS-RS422/FO 1300 E also allows 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 1300 E terminal device each.



7 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
- 15 "FO SIGNAL" LED
- 16 "FO SIGNAL" LED
- 17 "ERR" LED
- 18 Fiber optic transmitter
- 19 Fiber optic receiver

Figure 3 Function elements

| 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 | Power received at fiber optic port (see Page 11) | 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 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.

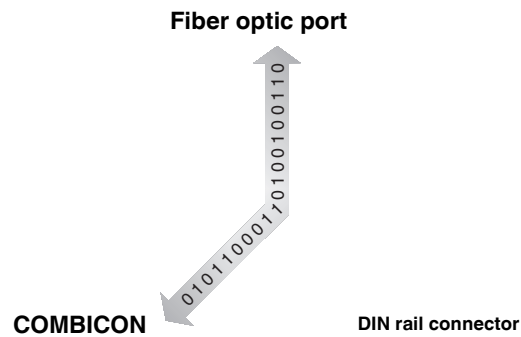


Figure 4 Communication between the interfaces for point-to-point connections, DIP 1 = OFF (LINE)

8.2 Star structures

All three interfaces communicate directly with one another.

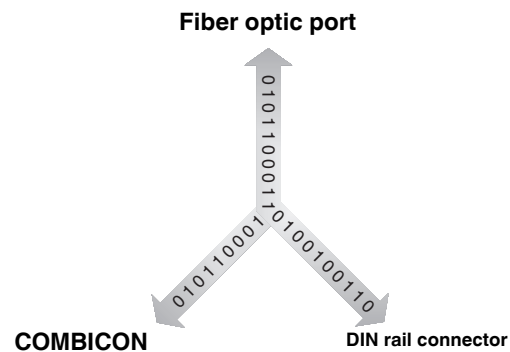


Figure 5 Communication between the interfaces for the star structure, DIP 1 = ON (STAR)

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 (A in Figure 6).
- Then carefully pull the PCB out of the housing as far as possible (B).

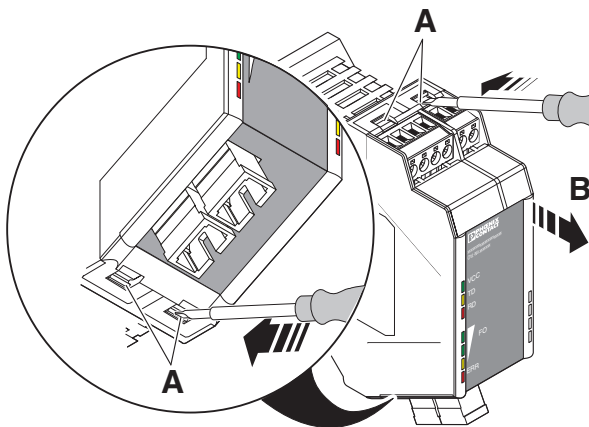


Figure 6 Opening the housing

DIP switches 1 to 6 are then freely accessible.

- Configure the DIP switches according to the planned application.

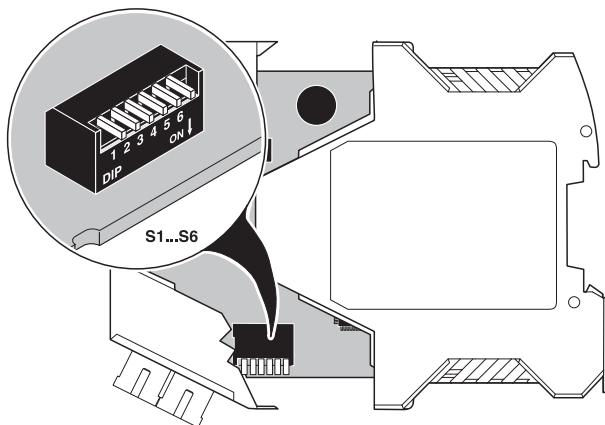


Figure 7 Setting the DIP switches

The following table provides an overview of the DIP switch functions. By default upon delivery, 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.

| DIP switch | ON | OFF |
|------------|---|-------------|
| 1 | STAR | LINE |
| 2 | STANDARD | INVERSE |
| 3 | N.C., not used, leave in OFF position | |
| 4 | | |
| 5 | | |
| 6 | Multi mode | Single mode |

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.

9.2 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.

9.3 Operation in an INTERBUS System

No further settings are required in the default setting.

- Leave all DIP switches in the "OFF" position.
- The position of DIP 6 depends on the fiber type used.

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

- 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 ¹ | Logic 1 |
| ON = NORM | Light off | Logic 1 |

¹ 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.

9.5 Switches with no function (DIP 3, 4, and 5)

These switches are currently without function. They are reserved for later additional functions.

9.6 Adjusting the transmission power (DIP 6)

If you use multimode fiberglass cables, you can adjust the transmission power via DIP switches.

- Set DIP 6 to "ON" (multi-mode) for operation on a multimode fiberglass (50/125 μm or 62.5/125 μm).
- Leave DIP 6 set to "OFF" (single mode) for operation on a single mode fiberglass (9/125 μm) (factory setting).

If you are not sure which type of fiberglass is used in your projects, contact your cable supplier.

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)



NOTE: Device damage

The maximum current load in a star coupler must not be exceeded 2 A.

Therefore, a star coupler must not consist of more than ten (10) devices.

- 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).
- 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.

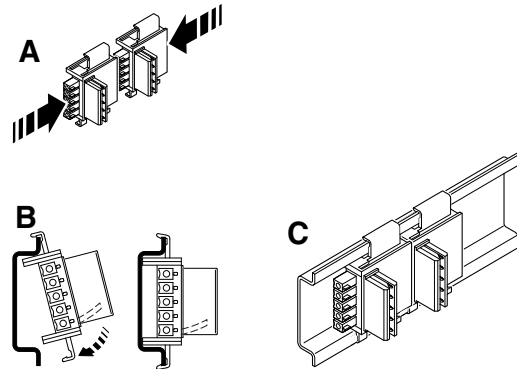


Figure 8 Combined assembly

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.

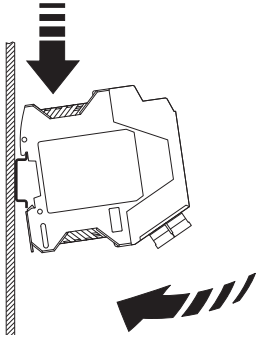


Figure 9 Assembly in the control cabinet

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 must **not** be connected to the fiber optic interface.
- **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 can 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.

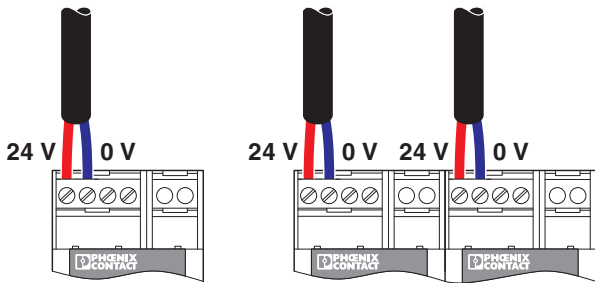


Figure 10 Individual or redundant supply

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



NOTE: Device damage

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

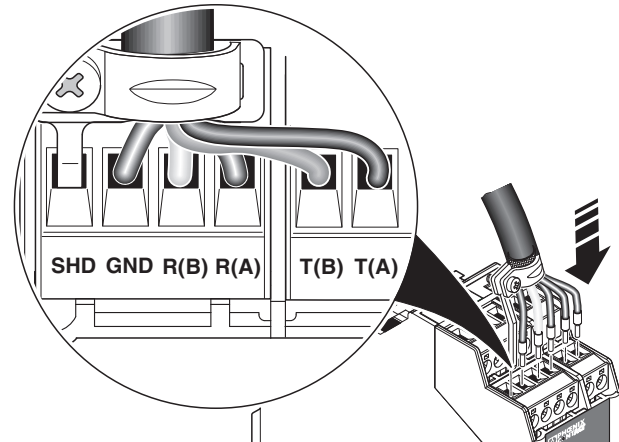


Figure 11 Shield connection

- 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.

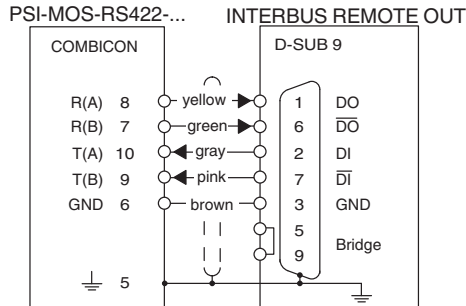


Figure 12 Connection to INTERBUS REMOTE OUT

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 mater 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.

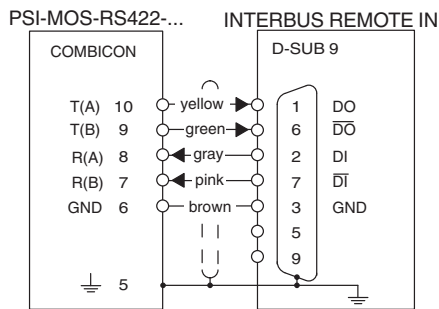


Figure 13 Connection to INTERBUS REMOTE IN

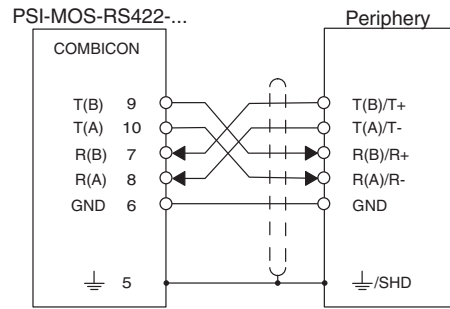


Figure 14 Connection to RS-422/RS-485 4-wire

11.3 Wiring the switch contact



NOTE: Device damage

The maximum load capacity of the relay contact is 1 A at 18...32 V DC.

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.

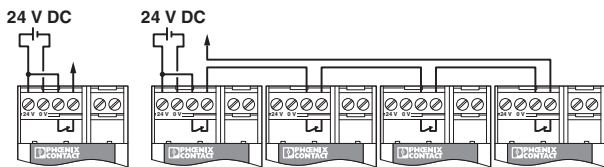


Figure 15 Individual and group message

12 Connecting the fiber optic cables (SC duplex)



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:

- 22 km with F-G 62.5/125; 0.8 dB/km
- 27 km with F-G 50/125; 0.7 dB/km
- 45 km with F-E 9/125; 0.4 dB/km



Avoid contamination.

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



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

SC duplex connectors are used with the PSI-MOS-RS422/FO 1300 E.

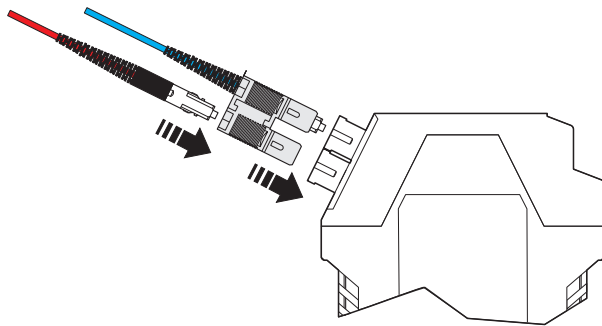


Figure 16 SC duplex connection

- Connect the fiber optic cable to the SC duplex connector for the transmit and receive channel. Push the connector down until it you hear it snap into place.

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

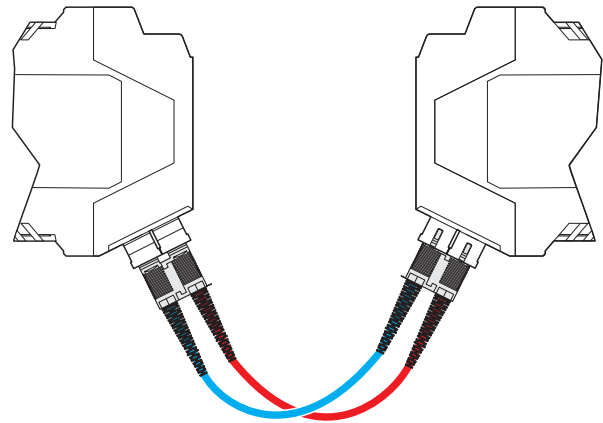


Figure 17 Crossed cables

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.