PSI-MOS-RS232/FO...

RS-232

FO converter for RS-232 interfaces



Data sheet
101811_en_05

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1 Description

The **PSI-MOS-RS232/FO...** devices convert RS-232 interfaces to fiber optics.

As a result of the simple and interference-free networking via fiber optics, bus cable short circuits only affect the actual potential segment concerned. This increases overall availability and improves flexibility in terms of the bus topology.

The PSI-MOS-RS232/FO...E end devices convert an RS-232 interface to a fiber-optic cable. They are ideal for point-to-point connections.

The PSI-MOS-RS232/FO...T T-couplers convert to two fiber-optic cables.

In addition, you can create modular joining stations from both device versions. You can combine devices with the different transmission technologies polymer, PCF, and fiberglass freely within a joining station.

Features

- Supply voltage and data signals routed through the DIN rail connectors
- Connections can be plugged in via a COMBICON screw terminal block
- Redundant power supply possible by means of optional system power supply unit
- High-quality electrical isolation between all interfaces (RS-232 // fiber optic ports // power supply // DIN rail connector)
- Approved for use in zone 2
- Intrinsically safe fiber optic interface (Ex op is) for direct connection to devices in zone 1
- Integrated optical diagnostics for continuous monitoring of FO paths
- Floating switch contact for advance warning of critical FO paths
- Automatic data rate detection for all data rates up to 115.2 kbps
- Shipbuilding approval in accordance with DNV GL

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/2708368

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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
FO converter with integrated optical diagnostics, alarm contact, for RS-232 interfaces up to 115.2 kbps, terminal device with one FO interface (FSMA), 660 nm, for polymer/PCF fiber cable	PSI-MOS-RS232/FO 660 E	2708368	1
FO converter with integrated optical diagnostics, alarm contact, for RS-232 interfaces up to 115.2 kbps, T-coupler with two FO interfaces (FSMA), 660 nm, for polymer/PCF fiber cable	PSI-MOS-RS232/FO 660 T	2708410	1
FO converter with integrated optical diagnostics, alarm contact, for RS-232 interfaces up to 115.2 kbps, terminal device with one FO interface (BFOC), 850 nm, for PCF/ fiberglass cable (multimode)	PSI-MOS-RS232/FO 850 E	2708371	1
FO converter with integrated optical diagnostics, alarm contact, for RS-232 interfaces up to 115.2 kbps, T-coupler with two FO interfaces (BFOC), 850 nm, for PCF/ fiberglass cable (multimode)	PSI-MOS-RS232/FO 850 T	2708423	1

Accessories	Type	Item no.	Pcs./Pkt.
F-SMA plug set for polymer fiber, for self assembly consisting of 4 quick mounting connectors with bend protection sleeve	PSM-SET-FSMA/4-KT	2799720	1
F-SMA plug set for PCF fiber, for self assembly consisting of 4 quick mounting connectors with bend protection sleeve	PSM-SET-FSMA/4-HCS	2799487	1
Polymer fiber cable, duplex 980 µm/1000 µm, medium-weight version for installation in stationary systems and machines, by the meter without male connector	PSM-LWL-KDHEAVY-980/ 1000	2744319	1
Polymer fiber cable, duplex 980µm/1000µm, heavy-weight version for installation in stationary systems and machines, by the meter without male connector	PSM-LWL-RUGGED-980/ 1000	2744322	1
Polymer fiber cable, duplex 980/1000 µm, heavy-weight, highly flexible version for flexible conduit applications, by the meter, without connector	PSM-LWL-RUGGED-FLEX-980/1000	2744335	1
PCF cable, duplex 200 µm/230 µm, by the meter without male connector, for installation in stationary systems and machines	PSM-LWL-HCS-RUGGED-200/230	2799885	1
PCF cable, duplex 200/230 µm, by the meter, without connector, for outdoor installation	PSM-LWL-HCSO-200/230	2799445	1
Primary-switched power supply unit, QUINT POWER, screw connection, DIN rail mounting, input: 1-phase, output: 24 V DC / 2.5 A	QUINT4-SYS-PS/1AC/24DC/ 2.5/SC	2904614	1
DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.	ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 2-pos.	ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10

Accessories	Type	Item no.	Pcs./Pkt.
DIN rail connector, color: light gray, nominal current: 8 A (parallel contacts), rated voltage (III/2): 125 V, number of positions: 5, pitch: 3.81 mm, mounting: DIN rail mounting, Locking: without, mounting: without, type of packaging: packed in cardboard, Item with gold-plated contacts, bus connectors for connecting with electronics housings, 5 parallel contacts	ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY	2713645	50
Polymer fiber DIY case, consisting of: Stripping knife, stripping pliers, polishing wheels for F-SMA and SC-RJ quick mounting connectors, polishing pad and emery paper	PSM-POF-KONFTOOL	2744131	1
PCF assembly kit for F-SMA quick mounting connectors, including stripping blade, stripping pliers, aramide yarn scissors, fiber stripper, microscope, fiber cleaving tool for standard HCS fibers, four F-SMA connectors for standard PCF fibers, and documentation	PSM-HCS-KONFTOOL	2799526	1
Polymer fiber polishing set, for F-SMA quick mounting connectors	PSM-SET-FSMA-POLISH	2799348	1
Fiber optic measuring case, consisting of an optical power meter, F-SMA, B-FOC adapters, reference fibers and operating instructions	PSM-FO-POWERMETER	2799539	1
Coupling; set consisting of 2 couplings for connecting F-SMA plugs	PSM-SET-FSMA-LINK/2	2799416	1
D-SUB connector, 9-pos. female connector, two 35° cable entries, universal type for all systems, pin assignment: 1, 2, 3, 4, 5, 6, 7, 8, 9 to one screw connection terminal block	SUBCON-PLUS 9/F	2744241	1
D-SUB connector, 9-pos., male connector, two 35° cable entries, universal type for all systems, pin assignment: 1, 2, 3, 4, 5, 6, 7, 8, 9 to one screw connection terminal block	SUBCON-PLUS 9/M	2744018	1
Screwdriver, slot-headed, VDE insulated, size: 0.4 x 2.5 x 80 mm, 2-component grip, with non-slip grip	SZS 0,4X2,5 VDE	1205037	10
RS-232 cable, 9-pos. D-SUB socket on 9-pos. D-SUB socket, 9-wire, 1:1	PSM-KA9SUB9/BB/2METER	2799474	1
Interface converter, for converting RS-232 (V.24) to RS-422 (V.11) and RS-485, with electrical isolation, 2 channels, rail-mountable	PSM-ME-RS232/RS485-P	2744416	1
Robust POF installation cable for assembly (IP20 heads only) for installation in stationary systems and machines with individual elements made of polyamide (PA), halogen-free, ozone and UV resistant, with reinforced polyurethane (PUR) outer sheath	FOC-RUGGED-1012/IP20/...	2901548	1
Highly flexible POF round cable (IP20 heads only) for use in drag chains. Individual elements made from extremely wear-resistant polyamide (PA). The cable is halogen-free, ozone and UV resistant, and has a rugged polyurethane (PUR) outer sheath.	FOC-RUGGED-FLEX-1013/ IP20/...	2901549	1

Accessories	Type	Item no.	Pcs./Pkt.
POF installation cable for assembly (IP20 heads only) for installation in stationary systems and machines with individual elements made of polyamide (PA), halogen-free, ozone and UV resistant, with a polyurethane (PUR) outer sheath	FOC-KDHEAVY-1011/IP20/...	2901553	1
Robust PCF installation cable for assembly (IP20 heads only) for installation in stationary systems and machines, aramid strain relief elements, with individual elements made from FRNC material, halogen-free, ozone and UV resistant, with a polyurethane (PUR) outer sheath	FOC-HCS-RUGGED-1014/ IP20/...	2901555	1
Rugged PCF installation cable for inner areas with highly tear-proof aramid strain-relief elements. Individual elements made from highly flexible FRNC material. The cable is halogen-free, ozone and UV resistant and has a rugged polyurethane (PUR) outer sheath.	FOC-HCS-RUGGED-1014/...	1402191	1
Highly rugged PCF round cable (IP20 heads only) for assembly and for outdoor installation with integrated moisture barrier as well as rodent-proof scrim. Individual elements made from highly flexible FRNC material. The wire is ozone and UV resistant with a very rugged polyethylene outer sheath.	FOC-HCSO-1015/IP20/...	2901557	1



You can find additional accessories at phoenixcontact.net/product/<Item No.>.

4 Technical data

Supply	PSI-MOS-RS232/FO 660 E	PSI-MOS-RS232/FO 850 E
Supply voltage range	18 V DC ... 30 V DC	18 V DC ... 30 V DC
Nominal supply voltage	24 V DC (in acc. with UL)	24 V DC (in acc. with UL)
Typical current consumption	100 mA (24 V DC)	120 mA (24 V DC)
Max. current consumption	120 mA	120 mA
Electrical isolation	VCC // V.24 (RS-232)	VCC // V.24 (RS-232)
Test voltage data interface/power supply	1.5 kV_{rms} (50 Hz, 1 min.)	1.5 kV_{rms} (50 Hz, 1 min.)
Connection method	COMBICON plug-in screw terminal block	COMBICON plug-in screw terminal block
Torque	0.56 Nm ... 0.79 Nm	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	
flexible	0.2 mm^2 ... 2.5 mm^2
rigid	0.2 mm^2 ... 2.5 mm^2
AWG	24 AWG ... 14 AWG
Data format/encoding	UART (11 Bit, NRZ)
Data direction switching	Automatic control
Serial transmission speed	4.8 Kbps ... 115.2 Kbps
Transmission length	≤ 15 m
Transmission medium	Copper

FO interface	PSI-MOS-RS232/FO 660 E	PSI-MOS-RS232/FO 850 E
Transmission protocol	Transparent to protocol for RS-232 interface	Transparent to protocol for RS-232 interface
Connection method	F-SMA	B-FOC (ST®)
Wavelength	660 nm	850 nm
Transmission length incl. 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 8 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)
Transmit capacity, minimum	-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 sensitivity	-31.2 dBm	-33.2 dBm

Relay output	
Number of outputs	1
Maximum switching voltage	60 V DC 42 V AC
Limiting continuous current	0.46 A

General data	
Degree of protection	IP20
Dimensions (W/H/D)	35 mm x 99 mm x 105 mm
Housing material	PA 6.6-FR green
Vibration resistance in acc. with EN 60068-2-6/ IEC 60068-2-6	5g, 10...150 Hz, 2.5 h, in XYZ direction
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	15g, 11 ms period, half-sine shock pulse
Bit distortion, input	± 35 % (permitted)
Bit distortion, output	< 6.25 %
Bit delay in standard operation	< 1 bit
Noise emission according to	EN 55011
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

MTTF (mean time to failure)	PSI-MOS-RS232/FO 660 E	PSI-MOS-RS232/FO 660 T	PSI-MOS-RS232/FO 850 E	PSI-MOS-RS232/FO 850 T
SN 29500 standard, temperature 25°C, operating cycle 21%	1093 Years	781 Years	1092 Years	789 Years
SN 29500 standard, temperature 40°C, operating cycle 34.25%	468 Years	322 Years	468 Years	324 Years
SN 29500 standard, temperature 40°C, operating cycle 100%	194 Years	133 Years	194 Years	134 Years

Ambient conditions	
Ambient temperature	
Operation	-20 °C ... 60 °C
Storage/transport	-40 °C ... 85 °C
Humidity	
Operation	30 % ... 95 % (non-condensing)
Altitude	≤ 5000 m (for restrictions, see the manufacturer's declaration for altitude operation)

Conformance/Approvals	
CE	CE-compliant
EAC	EAC
ATEX	Ⓔx II 3 G Ex nA nC IIC T4 Gc X Please follow the special installation instructions in the documentation!
ATEX, FO interface	Ⓔx II (2) G [Ex op is Gb] IIC Ⓔx II (2) D [Ex op is Db] IIIC PTB 06 ATEX 2042 U Please follow the special installation instructions in the documentation!
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
KC (only Item No. 2708368)	KCC-REI-PCK-FL2708368
Corrosive gas test	ISA-S71.04-1985 G3 Harsh Group A
Shipbuilding	DNV GL
Temperature	B
Humidity	A
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules shall be provided upon installation on board
Free from substances that could impair the application of coating	according to P-VW 3.10.7 57 65 0 VW-AUDI-Seat central standard

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
	Discharge in air	± 8 kV
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	± 2 kV
	Signal	± 2 kV
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	± 0.5 kV
	Signal	± 1 kV
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Voltage	10 V
	Comments	Criterion A

Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.

Emitted interference in acc. with EN 61000-6-4	
Interference emission	EN 55011 Class A, industrial applications

5 Safety regulations and installation notes

WARNING:

Observe the following safety notes when using the FO converter.

- 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.
- The FO components of type PSI-MOS transmitter control 660 or 850 are a part of the module. The fiber-optic interface is used for optical communication with devices, which are 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, observe the applicable regulations and safety directives (including national safety directives), as well as the generally recognized technical regulations. 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. 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/EN 60529) specifies that the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal stress that exceeds the specified limits.
- 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 operation with SELV/PELV from a Class ES1 “electrical energy source” in accordance with EN/IEC 62368-1 and VDE 0868-1. The device may only be connected to devices that meet the requirements of class ES1 in accordance with EN/IEC 62368-1.

5.1 Installation in Zone 2

WARNING: Explosion hazard when used in potentially explosive areas

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

- Use in potentially explosive areas is not permitted in China.
- Observe the specified conditions for use in potentially explosive areas.
- At the time of installation, use an approved housing (minimum protection IP54), which meets the requirements of EN 60079-15. Within this context, observe the requirements of IEC 60079-14/EN 60079-14.
- 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.
- 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 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.
- Connection to the D-SUB interface is only permitted if the screw connection is securely tightened.

5.2 UL note



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) 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.

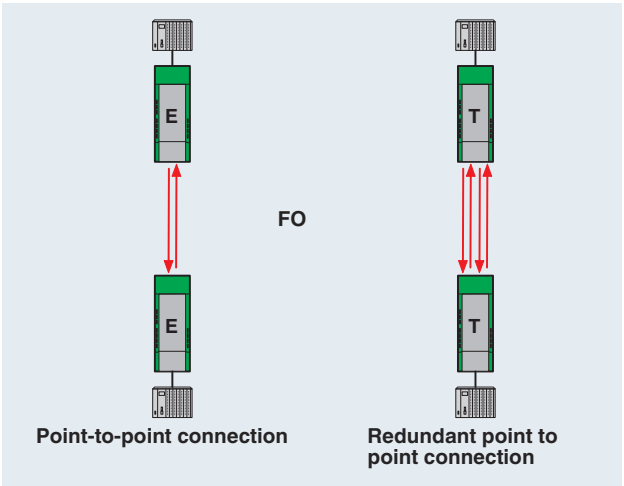
D) This device must be installed in an enclosure rated IP54 and used in an area of not more than pollution degree 2.

6 Network structures

The PSI-MOS-RS232/FO... system can be used to create network structures that are tailored to the relevant application. To create the illustrated network structures, you will need:

– T-couplers (PSI-MOS-RS232/FO...**T**)
– End devices (PSI-MOS-RS232/FO...**E**)

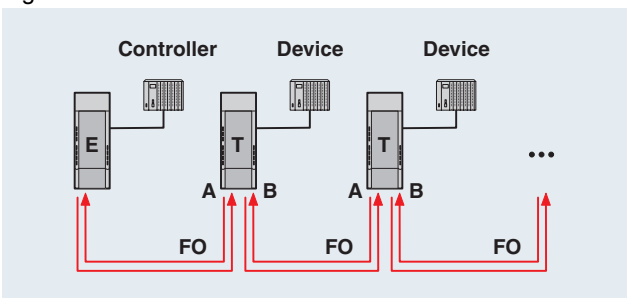
Figure 1 Point-to-point connection



Two termination devices can be used to easily convert a data link from copper cable to fiber optics.

For increased availability, the point-to-point connection can also be designed redundantly. To do so, you will need two T-couplers.

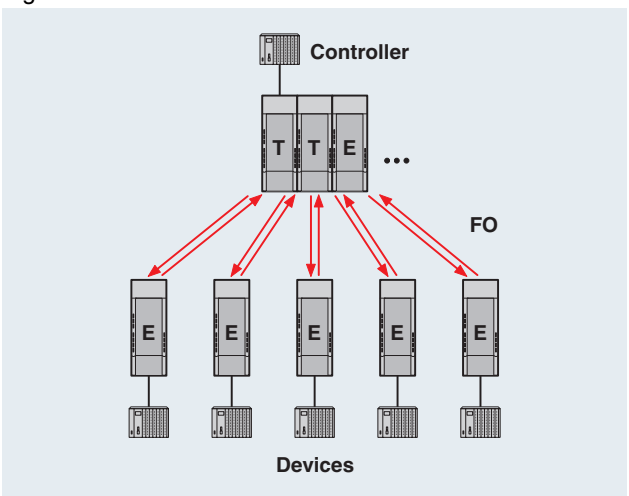
Figure 2 Line structure



You can network several RS-232 devices to form a controller-device structure.

– Termination devices are used at the beginning and end of the fiber optic path.
– T-couplers with two fiber optic ports are used along the line.
– Up to ten PSI-MOS-RS232... devices in a line structure
– All RS-232 devices must be addressable via communication software.

Figure 3 Star structure

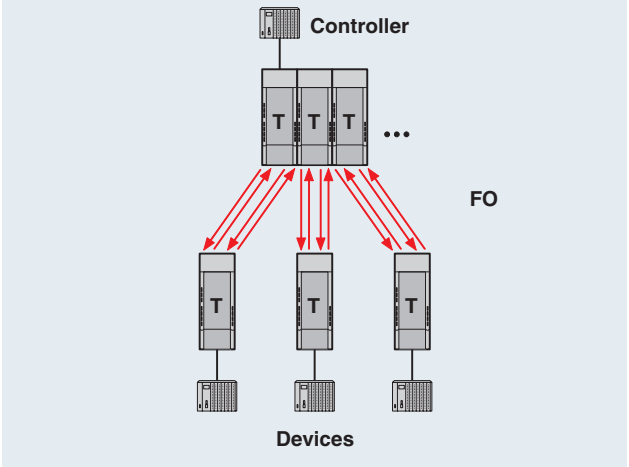


You can network addressable RS-232 devices in a star structure as a controller-device network. To do so, connect several end devices to an active star coupler.

You can connect up to ten devices per star coupler. Cross-wiring for the RS-232 data and the power supply is provided by the DIN rail connector.

You can connect only **one** copper-based device to a star coupler.

Figure 4 Redundant structure



You can also create redundant star structures with T-couplers.

6.1 Other FO converters in the PSI-MOS system

Designation	Item No.
PSI-MOS-RS232/FO1300 E	2708588

Possible distances:

– 27 km using multimode fiberglass cables
– 45 km with singlemode fiberglass cable

FO converter with integrated optical diagnostics, alarm contact, for RS-232 interfaces up to 115.2 Kbps, end device with one FO interface (SC duplex), 1300 nm, for fiberglass cable

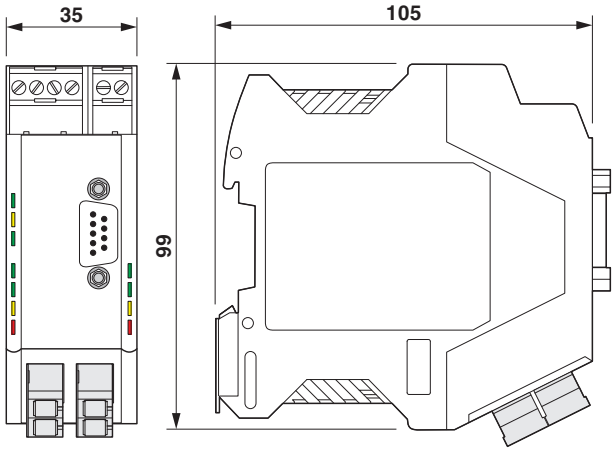
7 Transport and unpacking

- 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.

8 Product description

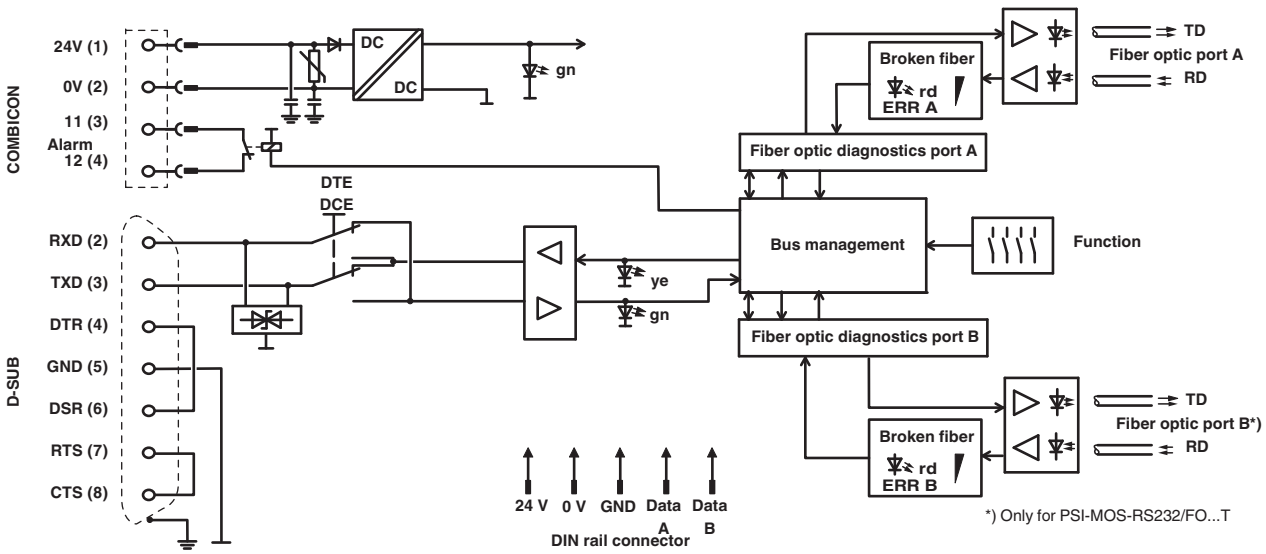
8.1 Dimensions

Figure 5 Housing dimensions



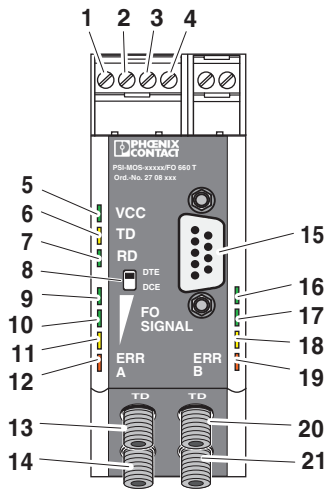
8.2 Basic circuit diagram

Figure 6 *) only with PSI-MOS.../FO...T



8.3 Function elements

Figure 7 Function elements



1 24 V DC supply voltage
2 0 V DC supply voltage
3 Switch contact, connection 11
4 Switch contact, connection 12
5 LED VCC Supply voltage
6 LED TD Dynamic transmission data to D-SUB
7 LED RD Dynamic receive data to D-SUB
8 Switch DTE/DCE adjustment
9 LED Port A FO signal
10 LED Port A FO signal
11 LED Port A FO signal
12 LED Port A ERR
13 FO transmitter, Port A
14 FO receiver, Port A
15 D-SUB 9 RS-232 interface

Port B only with PSI-MOS...T T-couplers

16 LED Port B FO signal
17 LED Port B FO signal
18 LED Port B FO signal
19 LED Port B ERR
20 FO transmitter, Port B
21 FO receiver, Port B

8.4 Diagnostics and status indicators

LED	Color	Meaning
VCC	Green	Ready to operate
TD	Yellow	Data is sent to the RS-232 interface (D-SUB 9).
RD	Green	Receiving data at the RS-232 interface.

LED indicators of the FO interface

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

In the factory default setting, DIP 2 is set to OFF (inverse). In the rest period between transmitting data (idle phase), the transmitters switch to permanent light to enable continuous FO diagnostics.

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

LED		Receive signal	Optical power P_{opt}
FO signal	Green	Receiving power is very good	Significantly greater than system reserve
	Green	Receiving power is good	Still greater than system reserve
	Yellow	Receiving power is critical	P_{opt} has reached the system reserve.
ERR	Red	Receiving power is insufficient, broken fiber	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 alarm relay drops out and opens the switching output. Data communication is still possible.

If operation of the path is no longer possible, the red ERR LED lights up.

If DIP 2 = 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.

8.5 Interfaces

The devices have three or four interfaces:

– Electrical interface (D-SUB)
– DIN rail connector
– FO port A
– FO port B (only with PSI-MOS...T T-couplers)

• You can change the communication between the ports via DIP 1. You can thus create line or star structures.

Line structure, DIP 1 = OFF

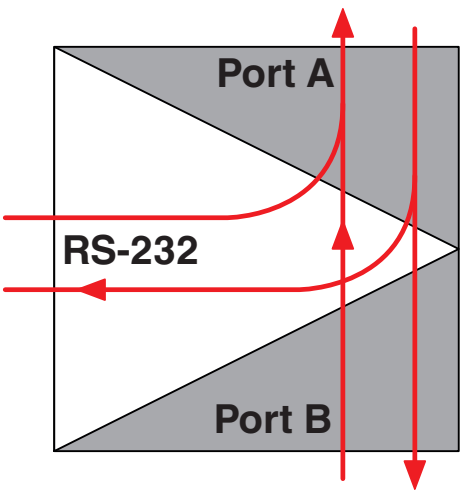
The RS-232 interface and port A communicate bidirectionally. Port B only sends and receives in the direction of port A.

Therefore, communication for the connected RS-232 devices is generally in the direction of the controller. The backplane is not used.

Conditions:

– DIP 1 = OFF: Line
– You may only connect one RS-232 device per RS-232 interface.
– The RS-232 devices are addressable via communication software.
– FO ports A always communicate in the direction of the controller.
– Up to 10 FO converters in a line structure

Figure 8 Port assignment in a line structure



Star structure, DIP 1 = ON

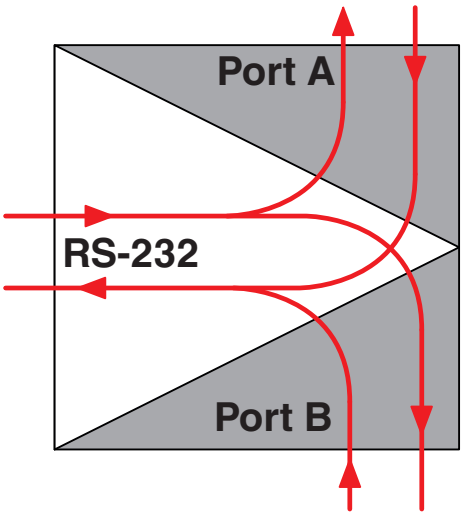
The RS-232 interface communicates bidirectionally with port A and port B. The two ports are not connected to each other.

Therefore, communication for the connected RS-232 devices is generally in the direction of the controller. In the star coupler, the backplane is used to connect all the FO ports to all the RS-232 interfaces.

Conditions:

– DIP 1 = ON: Star
– You may only connect one RS-232 device to each RS-232 interface. This is also true for the star coupler to which the controller is usually connected. The RS-232 interfaces of the star coupler are connected to each other via the backplane. Therefore, the position of the controller can be freely selected.
– The RS-232 devices are addressable via communication software.

Figure 9 Port assignment in star structures



9 Configuration

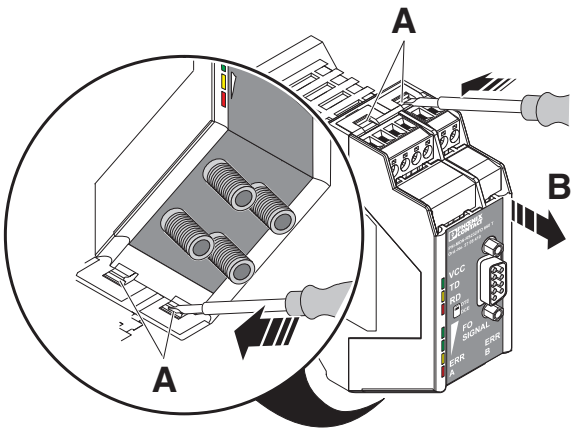
NOTE: electrostatic discharge!

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.

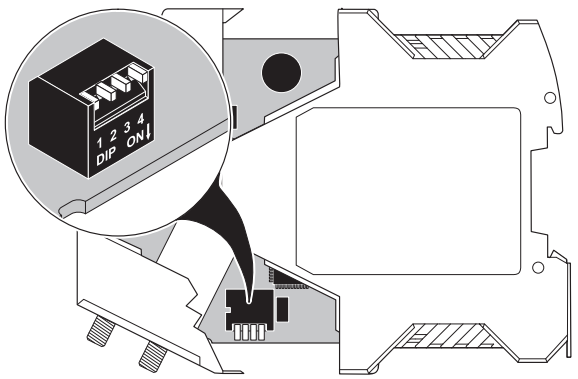
Only select the mode of operation when the power is disconnected! The change is activated after renewed power up.

Figure 10 Opening the housing



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

Figure 11 Position of DIP switches



At delivery, all DIP switches are in the "OFF" position.

- Set the DIP switches.

DIP	ON	OFF (default setting)
1	Star	Line
2	Norm	Inverse
3*	Redundancy	-
4*	End	Next

*No function for PSI-MOS...E termination devices

9.1 Setting the topology (DIP 1)

9.1.1 Point-to-point connection

When two end devices are used, no additional settings are required in the factory settings (all DIP switches in "OFF" position).

- Leave all DIP switches in the “OFF” position.

If you do not use port B with PSI-MOS...T T-couplers, you have to switch it off. Otherwise the red ERR LED will light up.

- Set DIP 4 to ON.

9.1.2 Redundant point-to-point connection

Redundant point-to-point structures can only be created with T-couplers.

When the devices are in redundancy operation, you must observe a minimum data rate of 9.6 Kbps.

- Set DIP 3 to ON (Redundancy).
- Set DIP 4 to OFF (Next).

9.1.3 Line structure

Addressable RS-232 devices and a suitable communication protocol are required for a line structure.

First and last device in a line

When two end devices are used, no additional settings are required in the factory settings (all DIP switches in "OFF" position).

- Leave all DIP switches in the “OFF” position.

If you do not use port B with PSI-MOS...T T-couplers, you have to switch it off. Otherwise the red ERR LED will light up.

- Set DIP 4 to ON.

Devices along the line

T-couplers must be used along the line.

No further settings are required when in the factory default setting.

- Leave all DIP switches in the “OFF” position.

9.1.4 Star structure

Addressable RS-232 devices and a suitable communication protocol are required for a star structure.

Devices in a joining station (star coupler)

- Set DIP 1 to ON on all the devices in the joining station.
- If you use T-couplers in a joining station, for which only FO port A is used, you must disable FO port B. Set DIP 4 to ON (End).

Devices at the end of a star line

- If end devices are used, no further settings are required when in the factory default settings.
- If you use T-couplers at the end of a star line, you must disable FO port B. Set DIP 4 to ON (End).

9.1.5 Redundant star structure

Redundant star structures can only be created with T-couplers.

- On each device, set DIP 1 to ON (Star).
- Activate the redundancy function on each device by setting DIP 3 to ON.
- Make sure that FO port B is active on each device (DIP 4 = ON).

9.2 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. As fiber-optic interfaces can only be operated together if they have the same idle setting, this should be set in mixed operation with third-party devices using the DIP switches.

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

In redundancy operation (DIP 3 = ON), the idle setting is always “Inverse”. DIP 2 then has no function. This can limit mixed operation with devices from other manufacturers.

DIP	ON	OFF (default setting)
2	Norm	Inverse
	Logic 1 = Light off	Logic 1 = Light on

If DIP 2 = 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.

For mixed operation with devices of other manufacturers, observe the receiver sensitivity and overrange limits of the fiber-optic interfaces.

9.3 Redundancy (DIP 3)

In redundancy operation, mixed operation with devices from other manufacturers is **not** supported.

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

For increased availability, you can create redundant fiber-optic connections. To do so, you will need T-couplers.

You must activate the redundancy function at the beginning and the end of a redundant fiber optics connection.

- Set DIP 3 to ON (Redundancy).

When the redundancy function is switched on, data communication takes place via the FO ports A by default.

If the signal level of the standard cable drops to a critical level, it automatically switches to port B.

9.4 Switch off FO port B (DIP 4)

If you do not use port B with PSI-MOS...T T-couplers, you have to switch it off. Otherwise the red ERR LED will light up.

- Set DIP 4 to ON.

10 Installation

WARNING: Explosion hazard when used in potentially explosive areas

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

CAUTION: Electric shock

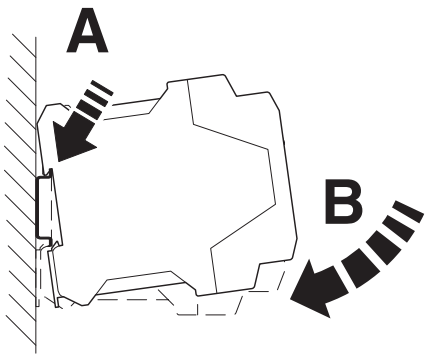
The device is designed exclusively for operation with SELV/PELV from a Class ES1 “electrical energy source” in accordance with EN/IEC 62368-1 and VDE 0868-1.

NOTE: Malfunction

Use a grounding terminal block to connect the DIN rail to protective earth ground. 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.

10.1 Mounting as single device

Figure 12 Mounting on a DIN rail

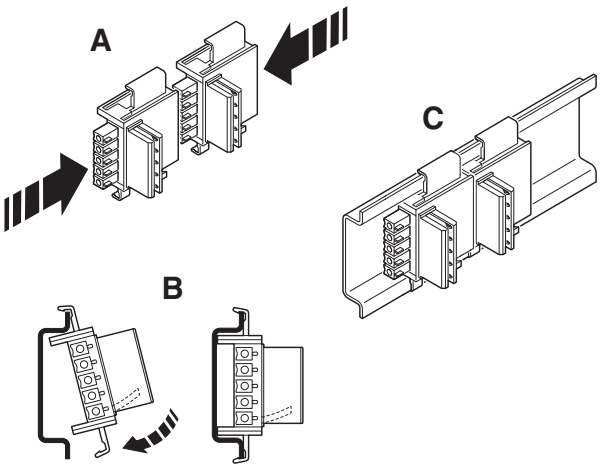


- To avoid contact resistance, only use clean, corrosion-free 35 mm DIN rails according to DIN EN 60715.
- Install an end bracket next to the left-hand device to prevent the devices from slipping.
- Place the device onto the DIN rail from above. Push the device from the front toward the mounting surface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

10.2 Combined mounting

In this case, it is vital to observe the mounting direction of the module and DIN rail connector: snap-on foot at the bottom and connector on the left!

Figure 13 Combined assembly



The DIN rail connector is used to bridge the power supply and communication.

A joining station must not consist of more than ten devices.

- For one joining station, plug the DIN rail connectors together (Item No. 2709561, 2 per device).
- Push the connected DIN rail connectors into the DIN rail.
- Place the device onto the DIN rail from above. Push the device from the front toward the mounting surface until it audibly engages.

10.3 Installation in potentially explosive areas

WARNING: Explosion hazard when used in potentially explosive areas

Observe the safety notes in the “5 Safety regulations and installation notes” section.

Areas with a danger of gas explosions

The PSI-MOS devices are suitable for use in zone 2. Devices that are installed in zone 1 must **not** be connected to the fiber-optic interface.

Areas with a danger of dust explosions

The device is not designed for use in potentially dust-explosive atmospheres.

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

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

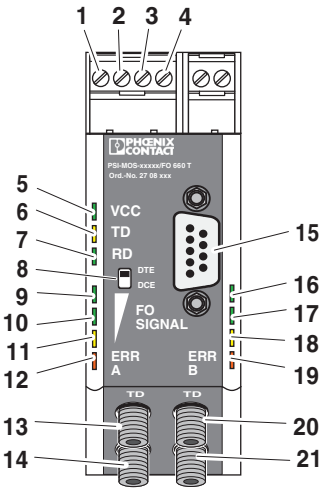
10.4 Removal

- 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.
- When dismantling a complete joining station, also remove the DIN rail connectors.

10.5 Power supply voltage

CAUTION: Electric shock

The device is designed exclusively for operation with SELV/PELV from a Class ES1 “electrical energy source” in accordance with EN/IEC 62368-1 and VDE 0868-1.



1 24 V DC supply voltage

2 0 V DC supply voltage

Single device

- Supply voltage to the device via terminal blocks **1** (24 V) and **2** (0 V).

Joining station

NOTE: device damage

The maximum current load in a joining station must not exceed 2 A.

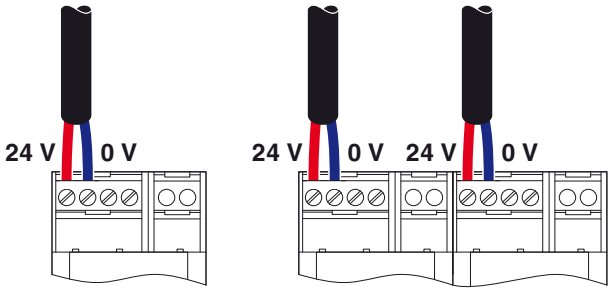
A joining station must not consist of more than ten devices.

When the devices are operated in a 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.

A second power supply unit can be used to create a redundant supply concept.

Figure 14 Individual/redundant supply



System power supply

Alternatively, the joining station can be connected to a system power supply.

- Connect the system power supply with one DIN rail connector to the left of the joining station.
  - QUINT4-SYS-PS/1AC/24DC/2.5/SC, Item No. 2904614
  - DIN rail connector, Item No. 2713645

11 RS-232 interface

NOTE: device damage

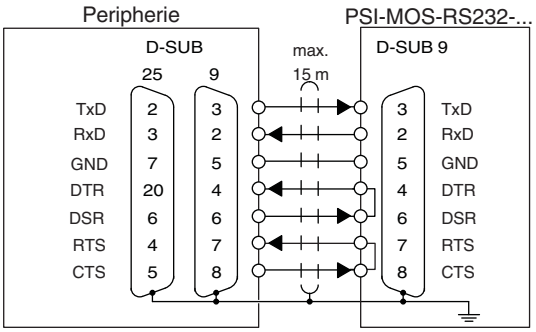
Use shielded twisted pair data cables. Connect the cable shielding at both ends of the transmission path.

Notes on star structures:

– Always connect the controller station to the RS-232 interface of the first PSI-MOS device in a joining station. The other RS-232 interfaces of the joining station cannot be used.

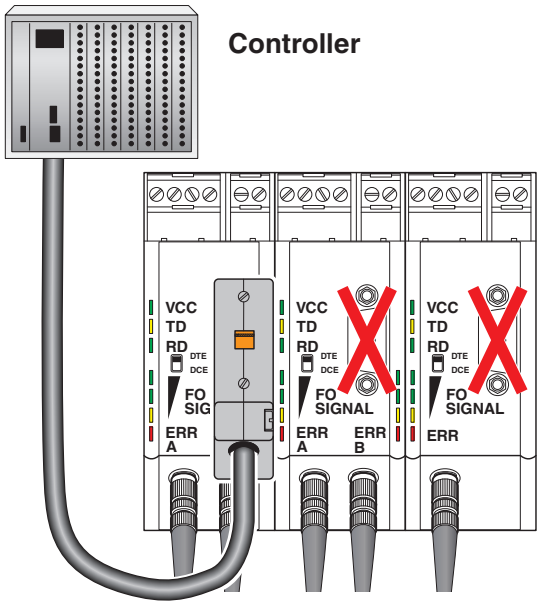
– Connect only one RS-232 device to each FO converter at the end of a star line.

Figure 15 RS-232 interface



- Use a suitable plug connector (e.g., SUBCON 9/F-SH, Item No.: 2761499) for connecting the RS-232 to the D-SUB connection of the device.

Figure 16 Connecting data cables



11.1 DTE/DCE adjustment

You can use the DTE/DCE slide switch (item 8) to cross the TxD and RxD cables internally. This allows for easy adjustment to DTE or DCE interfaces.

– When connecting to a DTE device (Data Terminal Equipment), slide the switch to the DTE position. That is the default setting for most applications.

– When connecting to a DCE device (Data Communication Equipment), slide the switch to the DCE position.

If you do not know which type of interface is connected, you can determine the right configuration by **trial and error**.

12 Fiber optic interface (FO port)

WARNING: Risk of eye injury

The light can cause damage to eyes.

– 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.

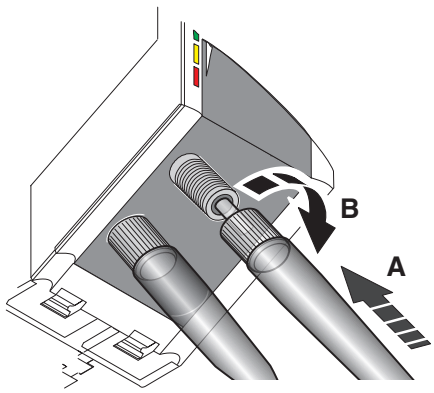
Avoid contamination.

– 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, Item No. 9423439.

F-SMA connection (PSI-MOS...660...)

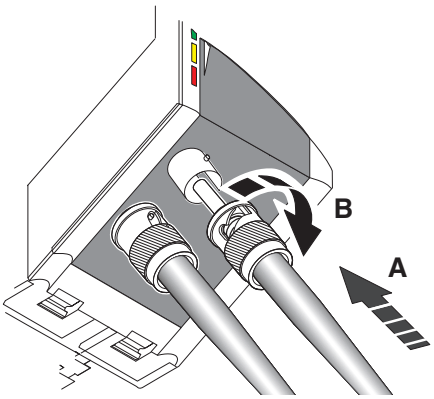
Figure 17 Connect F-SMA plug



- Insert the fiber optics cable into the F-SMA connector of the transmit and receive channel (A).
- Turn the union nut clockwise by hand to tighten (B).

B-FOC-(ST®) connection (PSI-MOS...850...)

Figure 18 Connect B-FOC (ST®) plug

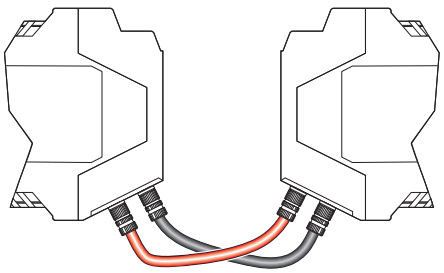


- Connect the FO cable to the B-FOC (ST®) connector for the transmit and receive channel. Push the connector spring mechanism downwards (A).
- Secure the connection with a quarter turn to the right (B).

Coupling devices

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

Figure 19 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!

Never connect the PSI-MOS.../FO 660..., PSI-MOS.../FO 850... and PSI-MOS.../FO 1300... device types to each other via fiber optic cables! The device types have different operating wavelengths.

13 Switching output

NOTE: device damage

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

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

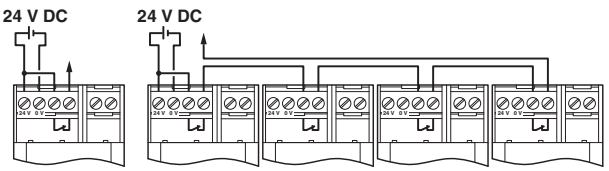
The switch contact opens on the relevant device in the event of the following:

– Supply voltage failure
– Interruption of the fiber optic interface detected
– 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 mounted in a topology, 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 20 Individual and group message



14 Disposal

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

- Dispose of packaging materials that are no longer needed (cardboard packaging, paper, bubble wrap sheets, pillow bags, etc.) with household waste in accordance with the currently applicable national regulations.