

PSI-MOS-RS232/FO...

Fiber optic converter for RS-232 interfaces

Data sheet
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1 Description

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

The main advantage of the PSI-MOS fiber optic transmission 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 bus topology for point-to-point connections and in star structures.

Optical star couplers can be combined for a specific application by serially connecting up to ten FO modules. Cross-wiring within a modular star coupler occurs automatically via the backplane. The system supports progressive transmission speeds from 4.8 kbps to 115.2 kbps.

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.

PSI-MOS-RS232/FO 660... devices have the following optional 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-RS232/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 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:

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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-232 interface to one fiber optic cable			
660 nm, for polymer/HCS fiber cable, FSMA	PSI-MOS-RS232/FO 660 E	2708368	1
850 nm, for HCS/fiberglass cable, B-FOC(ST [®])	PSI-MOS-RS232/FO 850 E	2708371	1
T-couplers with integrated optical diagnostics for converting the RS-232 interface to two fiber optic cables			
660 nm, for polymer/HCS fiber cable, FSMA	PSI-MOS-RS232/FO 660 T	2708410	1
850 nm, for HCS/fiberglass cable, B-FOC(ST [®])	PSI-MOS-RS232/FO 850 T	2708423	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
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 [®]) 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 [®]) (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-232 interfaces, terminal device with one FO interface (SC duplex), 1300 nm, for multimode and single-mode fiberglass cable Transmission length: – Up to 27 km with multimode fiberglass – Up to 45 km with singlemode fiberglass	PSI-MOS-RS232/FO 1300 E	2708588	1

4 Technical data

Interfaces		
Power supply	24 V DC (18 V DC ... 30 V DC)	
Typical current consumption	100 mA (24 V DC)	
Maximum current consumption	120 mA	
Standby indicator	"VCC" LED (green)	
Maximum star coupler expansion	10	
Serial RS-232 interface	According to ITU-T V.28, EIA/TIA-232, DIN 66259-1	
Operation mode	Full duplex	
Data format/coding	UART (11 bits, NRZ)	
Data direction changeover	Automatic control	
Transmission speed (automatic detection)	4.8 kbps ... 115.2 kbps	
Transmission length	Max. 15 m	
Connection	D-SUB 9-pos. (male)	
Optical interface	Transparent protocol to RS-232 interface	
Transmission protocol	Transparent protocol to RS-232 interface	
Connection technology	FSMA	B-FOC(ST®)
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)
Receiver sensitivity		
Minimum	-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 connectors 800 m with F-K 200/230; 10 dB/km with quick mounting connectors	2800 m with F-K 200/230; 8.0 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

General data			
Bit distortion, input	±35%, maximum		
Bit distortion, output	< 6.25%		
Bit delay	< 1 bits		
Electrical isolation	RS-232//power supply		
Test voltage	1.5 kV _{rms} , 50 Hz, 1 min.		
Signaling output	max. 60 V DC / 42 V AC, 0.46 A, relay contact opens if supply voltage fails		
Status and diagnostics indicators	Power supply (VCC), transmit/receive data RS-232, fiber optic bar graph (FO SIGNAL), fiber optic error (FO ERR)		
Enclosure material	PA 6.6 FR, green		
Ambient temperature			
Operation	-20°C ... +60°C		
Storage/transport	-40°C ... +85°C		
Humidity	30% to 95%, non-condensing		
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	Terminal devices (E)		T-coupler (T)
	660 nm	850 nm	660 nm 850 nm
Ambient temperature 25 °C	485 years	320 years	284 years 177 years
Ambient temperature 40 °C	91 years	48 years	53 years 66 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	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 IEC 60950		
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 61000-6-2¹**

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	
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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

Block diagram

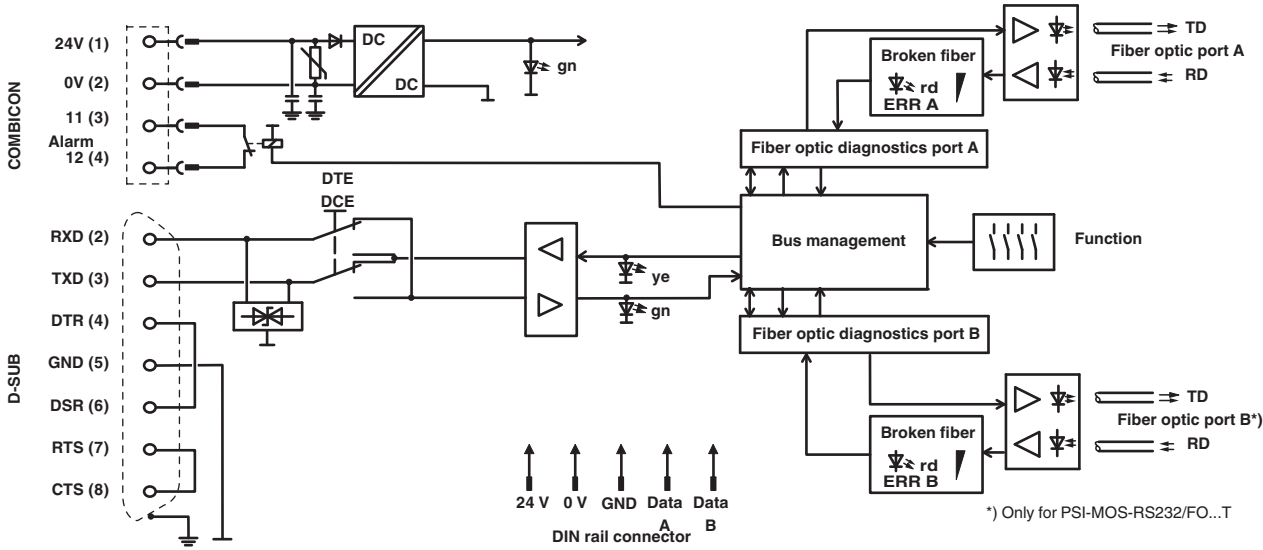


Figure 1 Block diagram

Housing dimensions

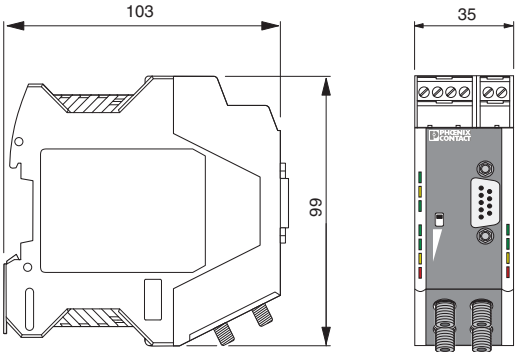


Figure 2 Housing dimensions (in mm)

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.
- Connection to the D-SUB interface is only permitted if the screw connection is tightened.

5.3 UL notes

PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 31ZN

- 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.
- WARNING - EXPLOSION HAZARD - substitution of components may impair suitability for Class I, Zone 2/Division 2.
- WARNING - EXPLOSION HAZARD - do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- This device must be installed in an enclosure rated IP54 and used in an area of not more than pollution degree 2.

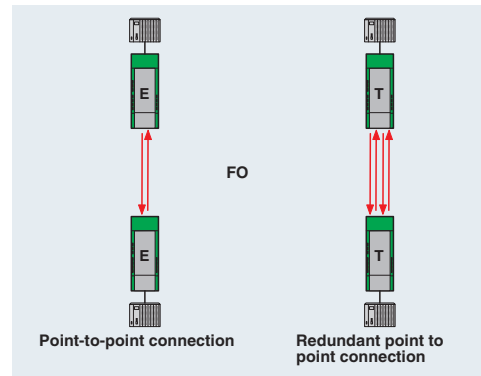
6 Supported network structures

The PSI-MOS-RS232/FO... 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-RS232/FO... 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-RS232/FO... T T-couplers.



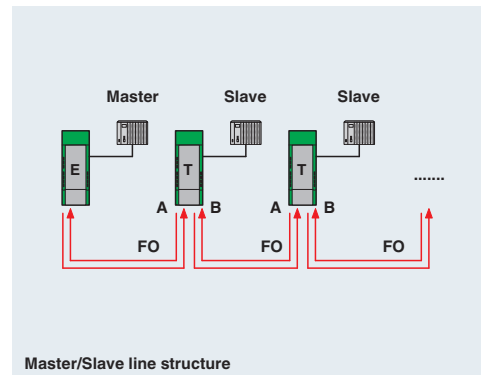
6.2 Linear structures

The fiber optic linear structure can be used to network several RS-232 devices to form a master/slave structure. In this case, it must be possible to address all the RS-232 devices via communication software.

PSI-MOS-RS232/FO... E terminal devices are used at the beginning and end of the fiber optic line.

PSI-MOS-RS232/FO... T T-couplers with two fiber optic ports are used along the line.

You can use up to ten PSI-MOS-RS232/FO... devices along the line in a linear structure.

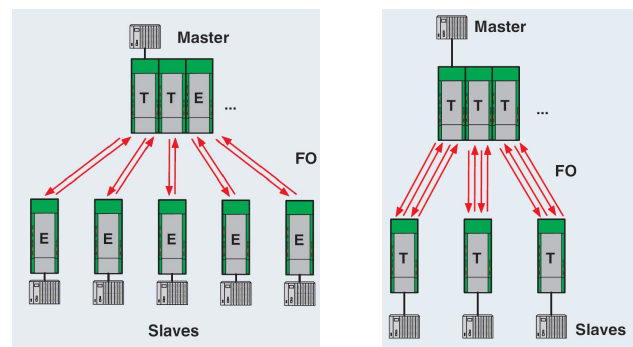


6.3 Star structures

You can network addressable RS-232 devices within a star structure as a master/slave network. Depending on the number of star lines required, several terminal devices are connected to an active star coupler.

Up to 20 fiber optic ports are available per star coupler. Cross-wiring for RS-232 data and for the supply voltage is provided automatically by the DIN rail connector.

If increased availability is required, redundant star distributors can also be created using PSI-MOS-RS232/FO... T T-couplers.



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

7 Function elements

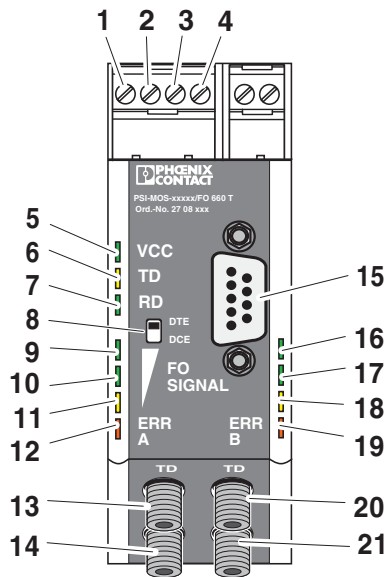


Figure 3 Function elements

- 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 "VCC" LED
- 6 "TD" LED
- 7 "RD" LED
- 8 Slide switch for DTE/DCE adaptation
- 9 "FO SIGNAL" LED (port A)
- 10 "FO SIGNAL" LED (port A)
- 11 "FO SIGNAL" LED (port A)
- 12 "ERR" LED (port A)
- 13 Fiber optic transmitter (port A)
- 14 Fiber optic receiver (port A)
- 15 D-SUB 9: RS-232 interface

Port B only with PSI-MOS-RS232/FO... T T-couplers:

- 16 "FO SIGNAL" LED (port B)
- 17 "FO SIGNAL" LED (port B)
- 18 "FO SIGNAL" LED (port B)
- 19 "ERR" LED (port B)
- 20 Fiber optic transmitter (port B)
- 21 Fiber optic receiver (port B)

Diagnostic and status indicators

Des.	Color	Meaning	
VCC	Green	Ready to operate	
TD	Yellow	Sending data at the RS-232 (D-SUB 9) copper interface	
RD	Green	Receiving data at the RS-232 (D-SUB 9) 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 (INVERSE). This allows for continuous fiber optic diagnostics.

If you switch DIP 2 to "ON" (NORM), no fiber optic diagnostics are available.

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.



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.

8.1 Port assignment

You can adjust the port assignment of the PSI-MOS-RS232/FO... via DIP 1. It is thus possible to adapt the direction of data communication between the RS-232 interface and the fiber optic ports to the desired application.

Port assignment linear structure

The RS-232 interface and port A communicate bi-directionally. 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 master. The back-plane is not used.

Terms

- DIP 1 = OFF (LINE)
- You may only connect one RS-232 device to each RS-232 interface.
- The RS-232 devices can be addressed via communication software.
- Fiber optic ports A always communicate in the direction of the master.
- Up to 10 fiber optic converters in a linear structure

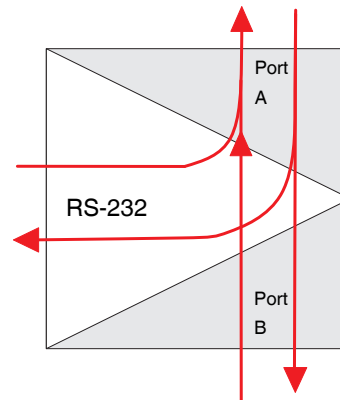


Figure 4 Port assignment linear structure

Star structure port assignment

The RS-232 interface communicates bi-directionally with port A and port B. Port A and port B are not connected. Therefore communication for the connected RS-232 devices is generally in the direction of the master. In the star coupler, the backplane is used to connect all the fiber optic ports to all the RS-232 interfaces.

Terms

- 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 master is usually connected. The RS-232 interfaces of the star coupler are connected via the backplane. Therefore, the position of the master can be freely selected.
- The RS-232 devices can be addressed via communication software.

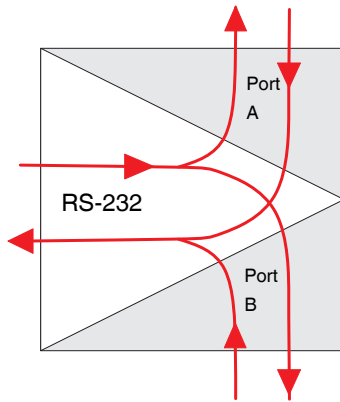


Figure 5 Star structure port assignment

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).

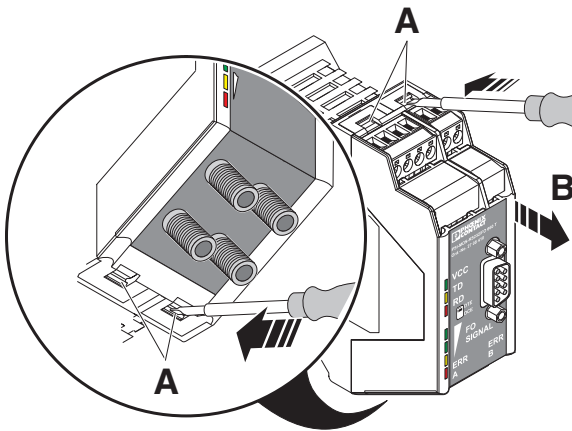


Figure 6 Opening the housing

DIP switches 1 to 4 are then freely accessible.

- Configure the DIP switches according to the planned application.

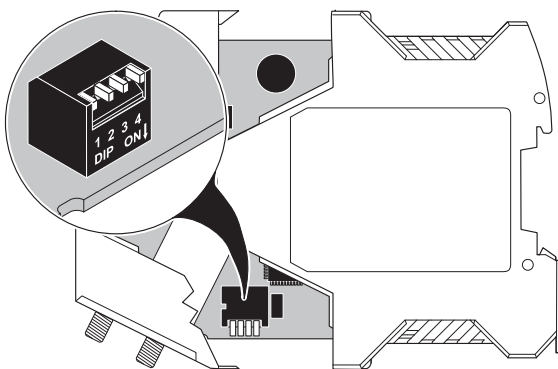


Figure 7 Setting the DIP switches

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 ¹
2	STANDARD	INVERSE ¹
3 ²	REDUNDANCY	-
4 ²	END	NEXT ¹

¹ Default setting

² No function for PSI-MOS-RS232/FO... E end devices

9.1 Operation in a point-to-point connection

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

- If you use T-couplers, you must disable FO Port B. Set DIP 4 to "ON" (END).

9.2 Operating in a redundant point-to-point connection



Redundant star structures can only be created with PSI-MOS-RS232/FO...-T T-couplers. When the devices are in redundancy mode, you must observe a minimum data rate of 9.6 kbps.

By default upon delivery, DIP 4 = "OFF" (NEXT).

- Set DIP 3 = "ON" (REDUNDANCY).

9.3 Operation in a linear structure (DIP 1)



Addressable RS-232 devices and a suitable communication protocol are required for linear, star, and redundant star structure operating modes.

First and last device in the line

If you use two terminal devices, no additional settings are required with the factory settings. (DIP 1 = "OFF" (LINE), DIP 4 = "OFF" (NEXT))

- If you use T-couplers, you must disable FO Port B. Set DIP 4 to "ON" (END).

Devices along the line

- PSI-MOS-RS232/FO...-T fiber optic T-couplers must be used along the line.

By default upon delivery, no changes to the setting are required. (DIP 1 = "OFF" (LINE), DIP 4 = "OFF" (NEXT))

9.4 Operation in a star structure (DIP 1)

Devices in the star coupler topology

- For each device in the star coupler topology, set DIP 1 to "ON" (STAR).
- If **T-couplers** are used in the star coupler topology, for which only fiber optic port A is to be used, fiber optic port B must be deactivated.
Set DIP 4 to "ON" (END).

Devices at the end of a star line

- If you use **terminal devices**, no additional settings are required with the factory settings.
- If you use **T-couplers**, you must disable FO port B.
Set DIP 4 to "ON" (END).

9.5 Operation in a redundant star structure

Redundant star structures can only be created with PSI-MOS-RS232/FO...-T fiber optic T-couplers.

- For each device in the redundant star structure, set DIP 1 to "ON" (STAR).
- Activate the redundancy function on each device. Set DIP 3 to "ON" (REDUNDANCY).
- Make sure that fiber optic port B is active on each device (DIP 4= "ON").

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



In redundancy mode (DIP 3 = "ON"), the idle setting is always INVERSE. DIP 2 then has no function. This can limit mixed operation with third-party suppliers.

- 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 = INVERSE	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.

9.7 Activating the redundancy function (DIP 3)



- In redundancy mode, mixed operation with fiber optic converters from third-party suppliers is not supported.
- 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.

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.

9.8 Disabling the second fiber optic port (DIP 4)

If you do not use the second fiber optics port (B) with PSI-MOS-RS232/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 data).

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.

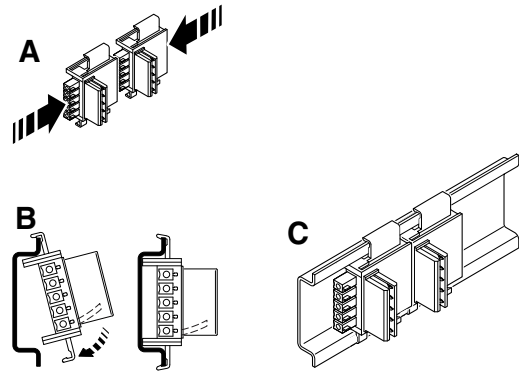


Figure 8 Combined assembly

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.

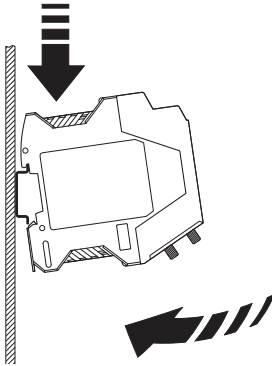


Figure 9 Assembly in the control cabinet

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 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.

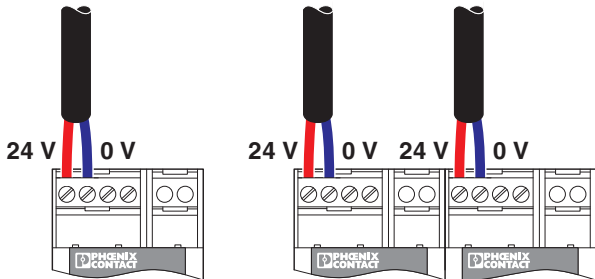


Figure 10 Individual or redundant supply

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.



Notes on star structures:

Always connect the master station to the RS-232 interface of the first PSI-MOS device in the star coupler topology. The other RS-232 interfaces cannot be used.

Always connect only one RS-232 slave device to each FO converter at the end of a star line.

- Connect the RS-232 connection via the 9-pos. D-SUB pin strip on the top of the device (see Figure 12).

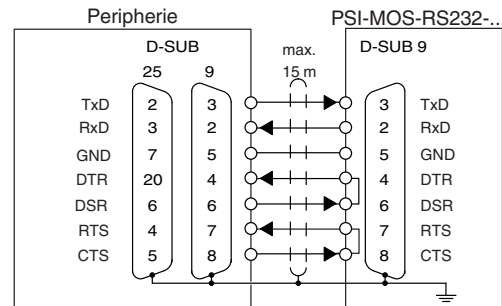


Figure 11 Wiring the D-SUB pin strip

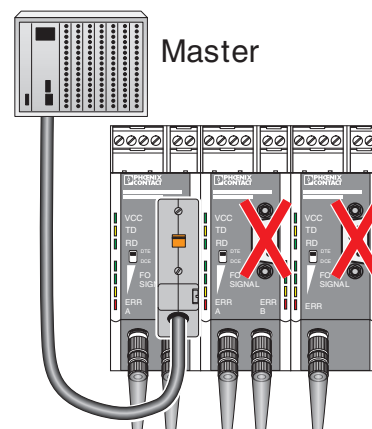


Figure 12 Connecting the data cables

11.3 DTE/DCE adjustment

You can use the DTE/DCE slide switch (8 in Figure 3 on page 10) to cross the TxD and RxD cables internally. This allows for easy adjustment to DTE or DCE interfaces.

- **DTE:** Connection to data terminal equipment
Set the switch to "DTE" (default setting for most applications).
- **DCE:** Connection to data communication equipment
Set the switch to "DCE."

If you do not know which type of interface is connected, you can determine the right configuration by testing the DTE/DCE slide switch.

11.4 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.

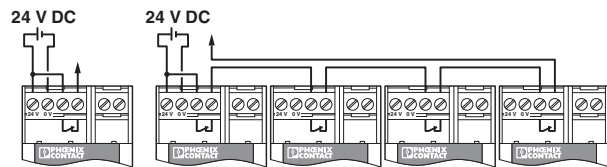


Figure 13 Individual and group message

11.5 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-RS232/FO 660 ...

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

PSI-MOS-RS232/FO 850 ...

- 2800 m with F-K 200/230; 8 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 optics, observe the fiber optic installation guidelines, DB GB IBS SYS FOC ASSEMBLY, Order No. 9423439.

FSMA connection (PSI-MOS-RS232/FO 660 ...)

PSI-MOS-RS232/FO 660 ... devices use FSMA connectors for the FO connection. FSMA is a standardized FO connection.

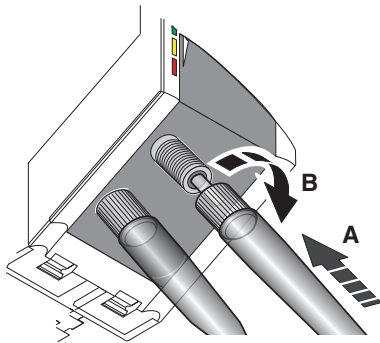


Figure 14 FSMA connection

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

B-FOC(ST®) connection (PSI-MOS-RS232/FO 850 ...)

PSI-MOS-RS232/FO 850 ... devices use standardized B-FOC(ST®) connectors.

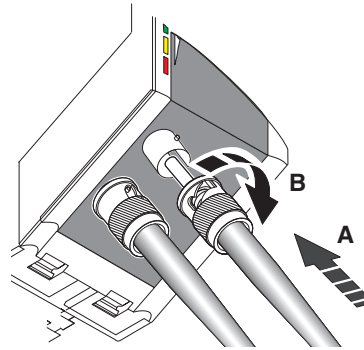


Figure 15 B-FOC(ST®) connection

- 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 by turning it 90° to the right.

Coupling the devices

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

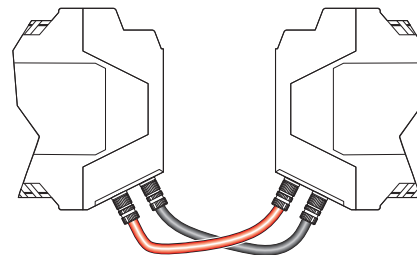


Figure 16 Crossed cables

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-RS232/FO660 ..., PSI-MOS-RS232/FO850 ... and PSI-MOS-RS232/FO 1300 E devices should not be connected directly with one another via fiber optic cables.