

PSI-MOS-RS232/FO...

Fiber optic converter for V.24 (RS-232) interfaces

INTERFACE

Data sheet
101811_en_02

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1 Description

The **PSI-MOS-RS232/FO...** can be used to convert V.24 (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. This 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.

Up to ten fiber optic modules can be connected side by side to form optical star couplers, which are tailored to the specific application. Cross-wiring within a modular star coupler is created automatically via the backplane. The system supports progressive transmission speeds from 4.8 kbps to 115.2 kbps.

When the devices are in redundancy mode, a minimum data rate of 9.6 kbps must be observed.

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... E termination devices convert a V.24 (RS-232) interface to a fiber optic cable. They are ideal for point-to-point connections.

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

PSI-MOS-RS232/FO 660... devices are networked using polymer fiber cable for distances up to 100 m and HCS fiber cable for up to 800 m. They are connected via F-SMA quick mounting connectors, which can be assembled locally within a few minutes.

PSI-MOS-RS232/FO 850 ... devices are available for longer paths and can be used for distances up to 2800 m using HCS fiber cable and B-FOC (ST®) fast connection technology and up to 4800 m using multi-mode glass fiber cable.

The PSI-MOS system can be used with input voltages from 18 V DC to 32 V DC and in a temperature range from -20°C to +60°C.



If you have any technical problems, which you cannot resolve with the aid of this documentation, please contact us during the usual office hours at:

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

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2 Ordering data

Fiber optic converters

Description	Type	Order No.	Pcs./Pkt.
Termination device with integrated optical diagnostics for converting the V.24 (RS-232) interface to one fiber optic cable			
660 nm, for polymer/HCS fiber cable, F-SMA	PSI-MOS-RS232/FO 660 E	2708368	1
850 nm, for HCS/glass fiber cable, B-FOC (ST®)	PSI-MOS-RS232/FO 850 E	2708371	1
T-coupler with integrated optical diagnostics for converting the V.24 (RS-232) interface to two fiber optic cables			
660 nm, for polymer/HCS fiber cable, F-SMA	PSI-MOS-RS232/FO 660 T	2708410	1
850 nm, for HCS/glass fiber 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 clamps	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
Fiber optic polymer fiber cable for indoor installation	PSM-LWL-KDHEAVY	2744319	1
F-SMA 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 (F-SMA) (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
Fiber optic HCS cable for indoor installation	PSM-LWL-HCS RUGGED-200/230	2799885	1
Fiber optic HCS cable for outdoor installation	PSM-LWL-HCSO-200/230	2799445	1
Fiber optic glass fiber cable for indoor installation	PSM-LWL-GDM-RUGGED-50/125	2799322	1
Fiber optic glass fiber cable for outdoor installation	PSM-LWL-GDO-50/125	2799432	1
Measuring device for fiber optic power measurement	PSM-FO-POWERMETER	2799539	1

Other fiber optic converters in the PSI-MOS system

The PSI-MOS-RS232/FO 1300 E is networked for distances **up to 27 km using multi-mode glass fiber** and **up to 45 km using single mode glass fiber**. Connection is via SC duplex connectors.

Other fiber optic converters

Description	Type	Order No.	Pcs./Pkt.
Fiber optic converter with integrated optical diagnostics, alarm contact, for V.24 (RS-232) interfaces, termination device with one fiber optic interface (SC duplex), 1300 nm, for multi-mode and single mode glass fiber cable	PSI-MOS-RS232/FO 1300 E	2708588	1

3 Technical data

Interfaces				
Power supply	24 V DC (18 V DC ... 30 V DC)			
Nominal current consumption	120 mA, maximum			
Ready-to-operate indicator	"VCC" LED (green)			
Maximum star coupler expansion	10			
Serial V.24 (RS-232) interface	According to ITU-T V.28, EIA/TIA-232, DIN 66259-1			
Operating mode	Full duplex			
Data format/encoding	UART (11 bits, NRZ)			
Data direction changeover	Automatic control			
Transmission speed (automatic detection)	4.8 kbps ... 115.2 kbps			
Transmission length	15 m, maximum			
Connection	9-pos. D-SUB (male)			
Optical interface				
Transmission protocol	Transparent protocol to V.24 (RS-232) interface			
Connection method	F-SMA	B-FOC (ST@)		
Wavelength	660 nm	850 nm		
Minimum transmission power (fiber type)	-4.6 dBm (980/1000 μ m)	-4.6 dBm (200/230 μ m)		
	-16.6 dBm (200/230 μ m)	-17.6 dBm (50/125 μ m)		
Receiver sensitivity		-13.6 dBm (62.5/125 μ m)		
	Minimum	-31.2 dBm	-33.2 dBm	
Minimum transmission length including 3 dB system reserve	100 m with F-P 980/1000; 230 dB/km 800 m with F-K 200/230; 10 dB/km with quick mounting connectors	4200 m with F-G 50/125; 2.5 dB/km 4800 m with F-G 62.5/125; 3.0 dB/km 2800 m with F-K 200/230; 8.0 dB/km		
General data				
Bit distortion input	$\pm 35\%$, maximum			
Bit distortion output	< 6.25%			
Bit delay	< 1 bit			
Electrical isolation	V.24 (RS-232)//power supply			
Test voltage	1.5 kV _{rms} , 50 Hz, 1 min.			
Alarm output	60 V DC/42 V AC, 1 A, maximum; relay contact opens if supply voltage fails			
Status and diagnostic indicators	Power supply (VCC), transmit/receive data V.24 (RS-232), fiber optic bar graph (FO SIGNAL), fiber optic error (FO ERR)			
Housing material	PA V0, green			
Ambient temperature				
Operation	-20°C ... +60°C			
Storage/transport	-40°C ... +85°C			
Humidity	30% ... 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	Termination devices (E)		T-couplers (T)	
	660 nm	850 nm	660 nm	850 nm
	485 years	320 years	284 years	177 years
	91 years	48 years	53 years	66 years
Chloroform test	Free from substances that would hinder coating with paint or varnish (according to VW/Audi/Seat specification)			
Vibration resistance	5g according to IEC 60068-2-6, 2.5 h each in x, y, and z direction, criterion A			

General data (continued)

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 and creepage distances	DIN EN 60664-1/VDE 0110-1, DIN EN 50178, DIN EN 60950

Tests/approvals

CE



UL/CUL 1604 Ex listed



PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS
31ZN

Ex

Fiber optic interface

II (2) GD [EX op is] IIC (PTB 06 ATEX 2042 u)

Device

II 3G Ex nAC IIC T4 X

Conformance with EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC**Noise 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 load (surge)	EN 61000-4-5	Criterion B ²	
Signal			1 kV/42 Ω
Power supply			0.5 kV/2 Ω
Conducted interference	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 ⁵
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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

⁵ Class A: Industrial application, without special installation measures.

Block diagram

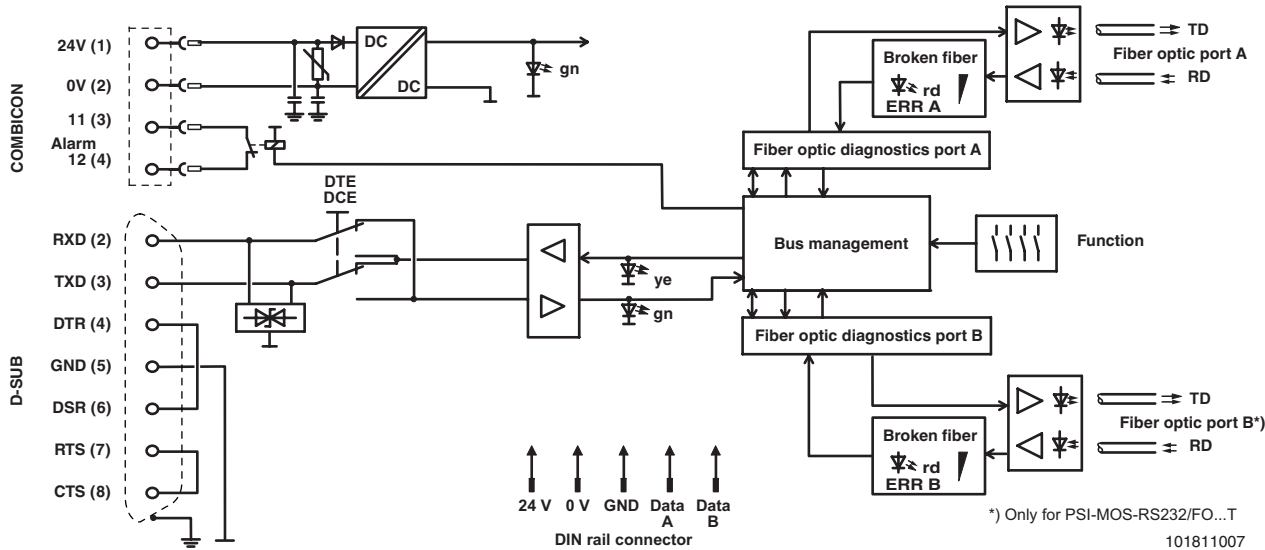


Figure 1 Block diagram

Housing dimensions

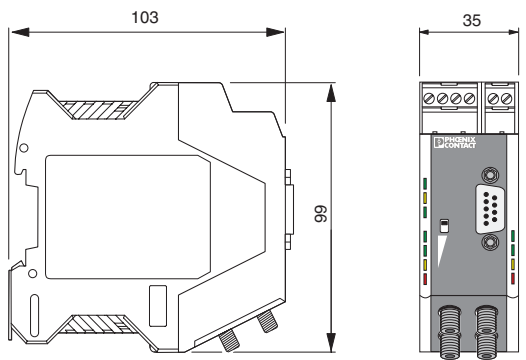


Figure 2 Housing dimensions (in mm)

4 Safety regulations and installation notes

4.1 Installation and operation

Follow the installation instructions.



NOTE: Installation, operation, and maintenance may only be carried out by qualified specialist personnel.

When installing and operating the device, the applicable safety directives (including national safety directives), accident prevention regulations, as well as general technical regulations, must be observed.



NOTE: The device must not be opened or modified apart from the configuration of the DIP switches.



NOTE: The switches that can be accessed may only be actuated when the power supply to the device is disconnected.

Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer.



NOTE: The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to mechanical strain and/or thermal loads, which exceed the limits described.

For the safety data, please refer to the operating instructions and certificates (EC-type examination certificate, other approvals, if necessary).

4.2 Installation in zone 2



WARNING: Explosion hazard

The device is designed for installation in zone 2 potentially explosive areas.

Observe the specified conditions for use in potentially explosive areas.



WARNING: Explosion hazard

Install the device in suitable **housing with IP54 protection, minimum**, that meets the requirements of EN 60079-15.

Observe the requirements of EN 60079-14.



WARNING: Explosion hazard

Disconnect the block power supply **before**:

- Snapping it on or disconnecting it.
- Connecting or disconnecting cables.



WARNING: Explosion hazard

Only devices which are designed for operation in zone 2 potentially explosive areas and are suitable for the conditions at the installation location may be connected to the supply and signal circuits in zone 2.



WARNING: Explosion hazard

The device must be stopped and immediately removed from the Ex area if it is damaged or was subject to an impermissible load or stored incorrectly or if it malfunctions.

Installation in areas with a danger of dust explosions



WARNING: Explosion hazard

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.

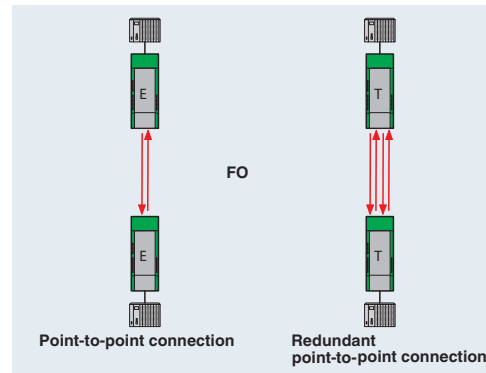
5 Supported network structures

The PSI-MOS-RS232/FO... can be used to create network topologies that are ideally adapted to the relevant application. The structures are described briefly below:

5.1 Point-to-point connections

Two PSI-MOS-RS232/FO... fiber optic termination devices can be used to easily convert a data link from copper cable to fiber optics.

If necessary, the point-to-point connection can also be designed redundantly to increase availability using PSI-MOS-RS232/FO... T T-couplers.



5.2 Linear structures

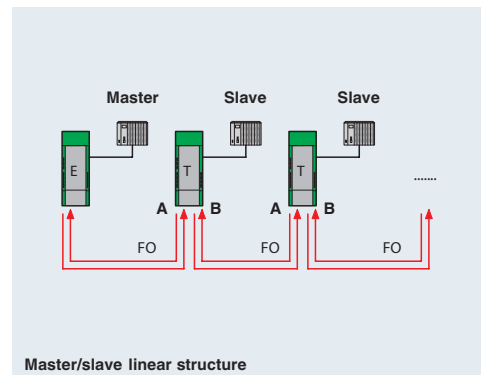
The fiber optic linear structure (Figure 2) can be used to network several V.24 (RS-232) devices to form a master/slave structure.

In this case, it must be possible to address all the V.24 (RS-232) devices via communication software.

PSI-MOS-RS232/FO... E termination 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.

Up to ten PSI-MOS-RS232/FO... devices can be used along the line in a linear structure.

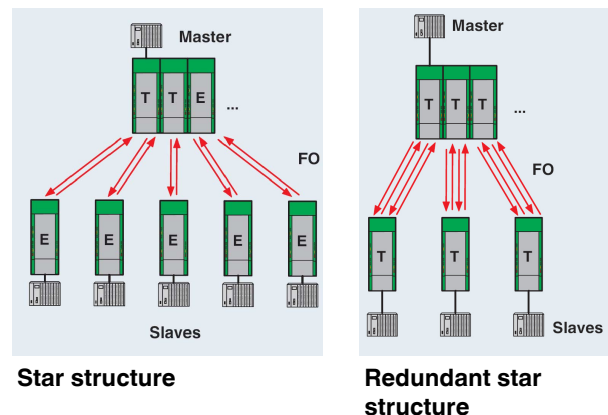


5.3 Star structures

Addressable V.24 (RS-232) devices can be networked within a star structure as a master/slave network. Depending on the number of star lines required, several termination devices are connected to an active star coupler.

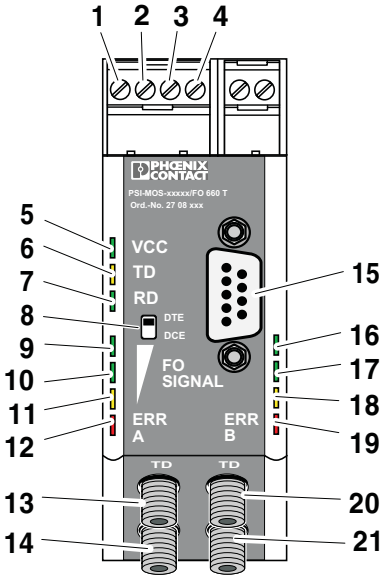
Up to 20 fiber optic ports are available per star coupler. Cross-wiring for V.24 (RS-232) data and for the supply voltage is provided automatically by the DIN rail connector.

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



NOTE: Only one copper-based device may be connected to a star coupler.

6 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 9-pos. D-SUB: V.24 (RS-232) interface
- 16 "FO SIGNAL" LED (port B)¹
- 17 "FO SIGNAL" LED (port B)¹
- 18 "FO SIGNAL" LED (port B)¹
- 19 "ERR" LED (port B)¹
- 20 Fiber optic transmitter (port B)¹
- 21 Fiber optic receiver (port B)¹

Figure 3 Function elements

Diagnostic and status indicators

Des.	Color	Meaning	
VCC	Green	Ready-to-operate	
TD	Yellow	Sending data at the V.24 (RS-232) copper interface (9-pos. D-SUB)	
RD	Green	Receiving data at the V.24 (RS-232) copper interface (9-pos. D-SUB)	
FO SIGNAL	Green	Receiving power at the fiber optic port (see page 10)	Very good
	Green		Good
	Yellow		Critical
ERR	Red	Insufficient, broken fiber	

¹ Only for PSI-MOS-RS232/FO... T

7 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. DIP 2 is used to switch the transmitters in the idle state (rest period between transmitting data) to steady light (INVERS), to enable continuous fiber optic diagnostics.

If DIP 2 is set to "ON" (NORM), fiber optic diagnostics are not available.

LED bar graph	Receive status	Optical power P_{opt}
Green Green Yellow	Very good	P_{opt} is considerably 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.



NOTE: If DIP 2 is set to "ON", fiber optic 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.

7.1 Port assignment

The port assignment of the PSI-MOS-RS232/FO... can be adapted via DIP 1. It is thus possible to adapt the direction of data communication between the V.24 (RS-232) interface and the fiber optic ports to the desired application.

Port assignment for a linear structure

The V.24 (RS-232) interface and port A communicate bidirectionally with one another. Port B only sends and receives in the direction of port A. Therefore communication for the connected V.24 (RS-232) devices is generally in the direction of the master. The backplane is not used.

Requirements

- Only one V.24 (RS-232) device may be connected to a V.24 (RS-232) interface
- The V.24 (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 are supported in the line
- DIP 1 = OFF (LINE)

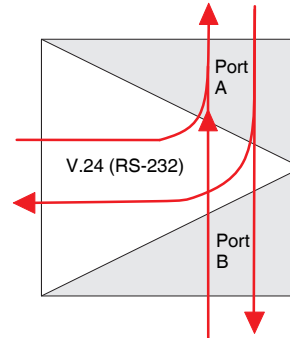


Figure 4 Port assignment for a linear structure

Port assignment for a star structure

The V.24 (RS-232) interface communicates bidirectionally with port A and port B. Port A and port B are not connected. Therefore communication for the connected V.24 (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 V.24 (RS-232) interfaces.

Requirements

- Only one V.24 (RS-232) device may be connected to a V.24 (RS-232) interface. This is also true for the star coupler to which the master is usually connected. The V.24 (RS-232) interfaces of the star coupler are connected via the backplane, which means that the position of the master can be freely selected.
- The V.24 (RS-232) devices can be addressed via communication software.
- DIP 1 = "ON" (STAR)

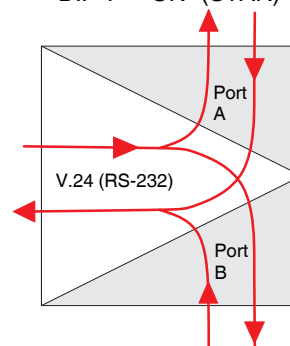


Figure 5 Port assignment for a star structure

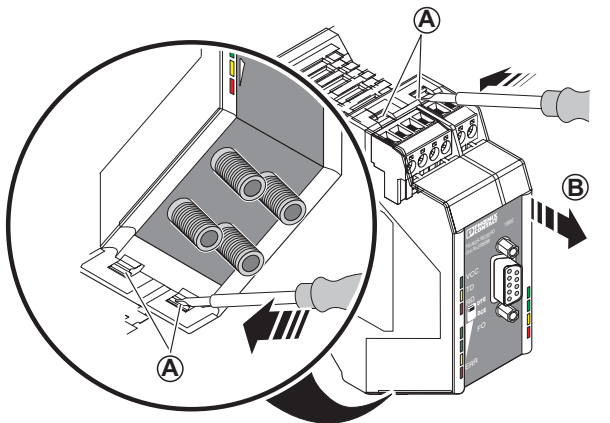
8 Configuration



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).



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Figure 6 Opening the housing

DIP switches 1 to 4 are then freely accessible.

- Configure the DIP switches according to the planned application.

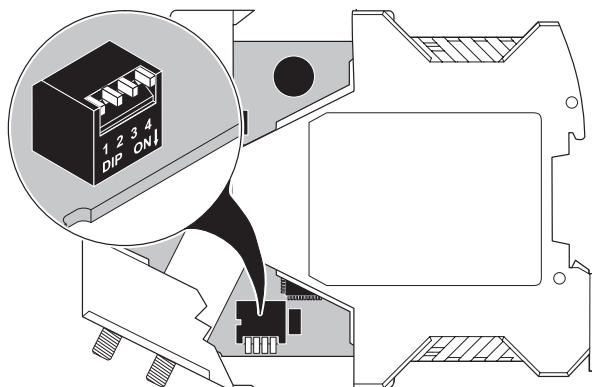


Figure 7 Setting the DIP switches

The following table provides an overview of the DIP switch functions. By default upon delivery, all DIP switches are in the "OFF" position.



NOTE: 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	NORM	INVERS ¹
3 ²	REDUNDANCY	-
4 ²	END	NEXT ¹

¹ Default setting

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

8.1 Operation in a point-to-point connection

In the default setting, no further settings are required when two termination devices are used.

- When using T-couplers, fiber optic port B must be deactivated.
Set DIP 4 to "ON" (END).

8.2 Operation in a redundant point-to-point connection



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



NOTE: When the devices are in redundancy mode, a minimum data rate of 9.6 kbps must be observed.

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

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

8.3 Operation in a linear structure (DIP 1)



Addressable V.24 (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

- In the default setting, no further settings are required when two termination devices are used. (DIP 1 = "OFF" (LINE), DIP 4 = "OFF" (NEXT))
- When using T-couplers, fiber optic port B must be deactivated.
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))

8.4 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

- In the default setting, no further settings are required when **termination devices** are used.
- When using **T-couplers**, fiber optic port B must be deactivated.
Set DIP 4 to "ON" (END).

8.5 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").

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



NOTE: In redundancy mode (DIP 3 = "ON"), the idle setting is always INVERS. 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
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



NOTE: If DIP 2 is set to "ON", fiber optic 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.



NOTE: When connecting third-party devices, observe the receiver sensitivity and overrange of the fiber optic interfaces.

8.7 Activating the redundancy function (DIP 3)



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

For increased availability, redundant fiber optic connections can be created using T-couplers.

In this case, the redundancy function must be activated 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. In the event that the signal level of the standard cable drops to a critical level, it automatically switches to port B.



NOTE: 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.

8.8 Disabling the second fiber optic port (DIP 4)

If the second fiber optic port (B) is not used for PSI-MOS-RS232/FO... T T-couplers, it must be disabled. Otherwise the red "ERR" LED will light up.

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

9 Connection notes



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



WARNING: PSI-MOS-... devices are designed for SELV operation according to IEC 60950/EN 60950/VDE 0805.

- 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 clamps can be mounted on both sides of the device to stop the devices from slipping on the DIN rail (for ordering data, see page 3).



WARNING: Connect the DIN rail to protective earth ground using 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.

9.1 Combined assembly with a system power supply unit (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.

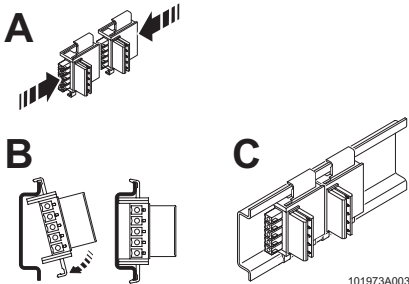


Figure 8 Combined assembly

9.2 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.

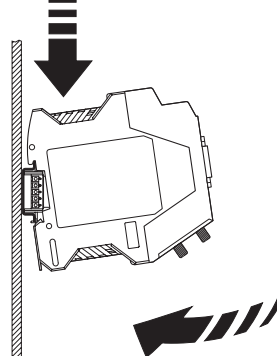


Figure 9 Assembly in the control cabinet

9.3 Assembly in potentially explosive areas



WARNING: Observe the safety notes on page 7.

- 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.
- Areas 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.

9.4 Removal

- Pull the locking latch down 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.

10 Cabling notes

10.1 Connecting the supply voltage



WARNING: The device is operated with a +24 V DC SELV.

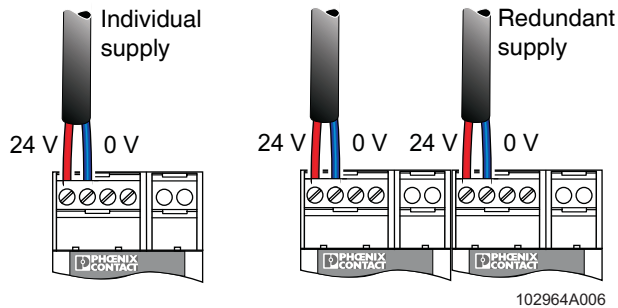


Figure 10 Individual/redundant supply

Operation as an individual device

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

Operation in a star coupler topology

When the devices are operated 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. A redundant supply concept can be created by connecting a second power supply unit to another device in the topology.

Using the MINI POWER system power supply unit

As an alternative, the star coupler topology can also be supplied 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 unit. It is connected via two DIN rail connectors.

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

10.2 Connecting the data cables .



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



NOTE: Notes on star structures:

Always connect the master station to the V.24 (RS-232) interface of the first PSI-MOS device in the star coupler topology. The other V.24 (RS-232) interfaces cannot be used.

Only ever connect one V.24 (RS-232) slave device to each fiber optic converter at the end of a star line.

- Connect the V.24 (RS-232) connection via the 9-pos. D-SUB pin strip on the top of the device (see Figure 12)

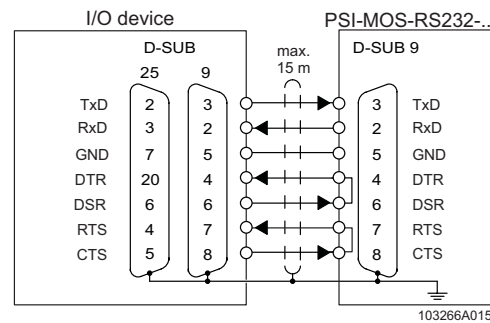


Figure 11 Wiring of the D-SUB pin strip

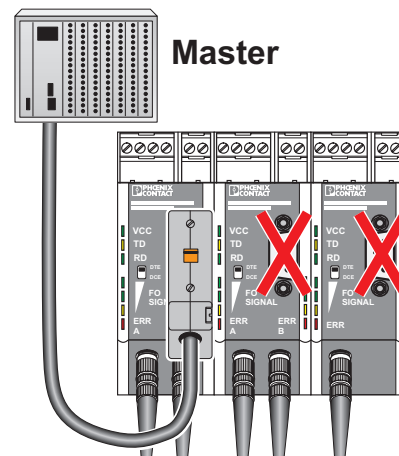


Figure 12 Connecting the data cables

10.3 DTE/DCE adaptation

The TxD and RxD cables can be crossed internally using the DTE/DCE slide switch (8 in Figure 3 on page 9), thus enabling user-friendly adaptation to DTE or DCE interfaces.

- **DTE:** Connection to data terminal equipment
Set the switch to "DTE" (default setting for the majority of 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 correct configuration by testing (DTE/DCE slide switch).

10.4 Wiring the switch contact

PSI-MOS-RS232/FO... converters are equipped with a floating switch contact for error diagnostics (connection terminal blocks 3 and 4 in Figure 3 on page 9). This contact opens on the affected device if:

- The supply voltage fails
- An interrupt is detected on the fiber optic path
- The system reserve for the fiber optic path is not reached

The switch contact is an N/C contact and can be connected to a local digital input, e.g., on the PLC, to support error detection.

When using a device topology (modular star coupler), the individual contacts can be connected to separate input points or the individual contacts can be looped to generate a group message (Figure 13).



NOTE: The maximum load capacity of the relay contact is 60 V DC/42 V AC, 1 A.

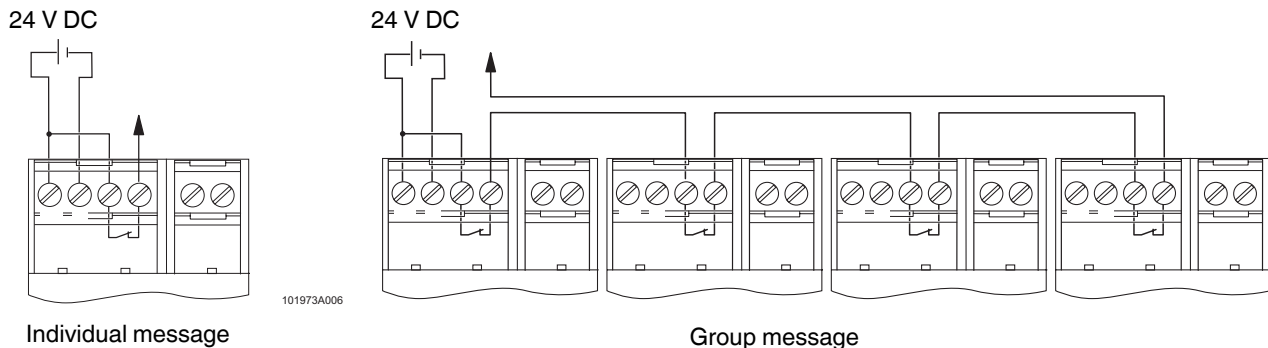


Figure 13 Individual and group message

10.5 Connecting the fiber optic cables



WARNING: Risk of eye injury

During operation, do not look directly into transmitter diodes or use visual aids to look into the glass fibers. The infrared light is not visible.



NOTE: Dust protection caps should only be removed just before the connectors are connected. They prevent contamination of the transmit and receive elements. The same applies for the protective caps on the connectors.



NOTE: The following fiber optic lengths must not be exceeded:

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
- 4200 m with F-G 62.5/125; 3.0 dB/km



NOTE: When using fiber optics, observe the fiber optic installation guidelines, DB GB IBS SYS FOC ASSEMBLY (Order No. 9393909).

F-SMA connection (PSI-MOS-RS232/FO 660 ...)

PSI-MOS-RS232/FO 660 ... devices use F-SMA connectors for the fiber optic connection. F-SMA is a standardized fiber optic connection.

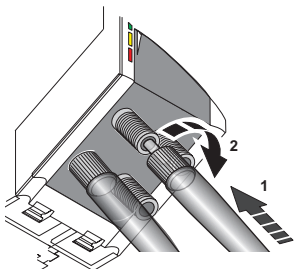


Figure 14 F-SMA connection

- The connectors are secured on the device by manually tightening the screw collar (see 2 in Figure 14).

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

Standardized B-FOC (ST®) connectors are used with PSI-MOS-RS232/FO 850 ... devices.

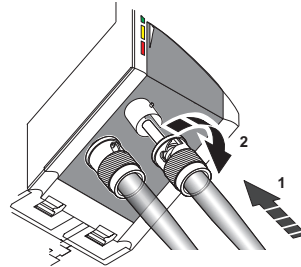


Figure 15 B-FOC connection

- Connect the fiber optic cable to the B-FOC (ST®) connector for the transmit and receive channel and push the connector clamp mechanism downwards.
- Secure the connection with a quarter turn to the right (see 2 in Figure 15).

Measuring and connecting devices

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



NOTE: Note the fiber optic cable signal direction when coupling two PSI-MOS devices:

Device 1 fiber connection "TD" (transmitter) to device 2 fiber connection "RD" (receiver) (Figure 16).



NOTE: Due to different operating wavelengths, PSI-MOS-RS232/FO 660 ..., PSI-MOS-RS232/FO 850 ..., and PSI-MOS-RS232/FO 1300 E devices should not be connected directly with one another via fiber optic cables.

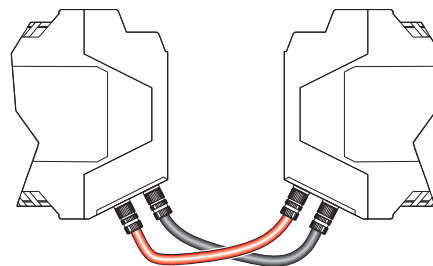


Figure 16 Crossed cables

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