

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

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FO converter with integrated optical diagnostics, alarm contact, for PROFIBUS up to 12 Mbps, terminal device with one FO interface (FSMA), 660 nm, for polymer/PCF fiber cable

### Product Description

The PSI-MOS-PROFIB/FO... devices convert copper-based PROFIBUS interfaces to fiber optics. The integrated optical diagnostics allow permanent monitoring of the FO paths during installation and also during operation. The floating switch contact is activated when the signal output on the fiber optic paths drops to a critical level. The PSI-MOS-PROFIB/FO... E terminal devices convert a PROFIBUS interface for a FO cable. They are ideal for point-to-point connections.

### Your advantages

- ✔ Can be combined with the PSI copper repeater in a modular way using DIN rail connectors
- ✔ Supply voltage and data signals routed through the DIN rail connectors
- ✔ Connections can be plugged in via a COMBICON screw terminal block
- ✔ Automatic data rate detection or fixed data rate setting via DIP switches
- ✔ Redundant power supply
- ✔ High-quality electrical isolation between all interfaces (PROFIBUS // fiber optic ports // power supply // DIN rail connector)
- ✔ Approved for use in zone 2
- ✔ Integrated optical diagnostics for continuous monitoring of FO paths
- ✔ Intrinsically safe fiber optic interface (Ex op is) for direct connection to devices in zone 1
- ✔ Floating switch contact for advance warning of critical FO paths
- ✔ Suitable for all data rates up to 12 Mbps
- ✔ Bit retiming for any cascading depth
- ✔ Shipbuilding approval in accordance with DNV GL



### Key Commercial Data

Packing unit	1 pc
GTIN	
GTIN	4017918973995
Weight per Piece (excluding packing)	241.900 g
Weight per piece (including packing)	246.800 g
Custom tariff number	85176200

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

Country of origin	Germany
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### Technical data

#### Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
	Use in potentially explosive areas is not permitted in China.

#### Dimensions

Width	35 mm
Height	99 mm
Depth	106 mm

#### Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	30 % ... 95 % (non-condensing)
Altitude	≤ 5000 m (For restrictions, see the manufacturer's declaration for altitude operation)
Degree of protection	IP20
Noise immunity	EN 61000-6-2:2005

#### General

Bit delay	< 1 bit ()
	11 bit ()
Bit distortion, input	± 35 % (permitted)
Bit distortion, output	< 6.25 %
Electrical isolation	VCC // RS-485
Test voltage data interface/power supply	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Noise emission	EN 55011
Mounting type	DIN rail mounting
Net weight	241.9 g
Housing material	PA 6.6-FR
Color	green
MTBF	324 Years (Telcordia standard, 25°C temperature, 21% operating cycle (5 days a week, 8 hours a day))
	70 Years (Telcordia standard, 40°C temperature, 34.25% operating cycle (5 days a week, 12 hours a day))
MTTF	243 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)
	178 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%)
	110 Years (SN 29500 standard, temperature 40°C, operating cycle 100%)

#### Power supply

Nominal supply voltage	24 V DC (in acc. with UL)
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## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Technical data

#### Power supply

Supply voltage range	18 V DC ... 30 V DC (via pluggable COMBICON screw terminal block)
Max. current consumption	130 mA
	≤ 2 A (For operation in a connection station, via the DIN rail connector)
Typical current consumption	100 mA (24 V DC)
Connection method	COMBICON plug-in screw terminal block

#### Interfaces

Interface 1	PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control
Interface	PROFIBUS
Operating mode	Semi-duplex
Connection method	D-SUB-9 female connector
File format/coding	UART (11 Bit, NRZ)
Data direction switching	Automatic control
Transmission medium	Copper
Transmission length	≤ 1200 m (depending on the data rate, with shielded, twisted pair data cable)
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	14
Serial transmission speed	≤ 12 Mbps
Output nominal voltage	5 V ±0.25 (50 mA)

#### Optical interface FO

No. of channels	1
Transmit capacity, minimum	-3 dBm (980/1000 μm)
	-15.4 dBm (200/230 μm)
Minimum receiver sensitivity	-30 dBm
Overrange receiver	-3 dBm (980/1000 μm)
Wavelength	660 nm
Transmission length incl. 3 dB system reserve	70 m (With F-P 980/1000 230 dB/km with quick mounting connector)
	400 m (With F-K 200/230 10 dB/km with quick mounting connector)
Transmission length	min. 1 m ( )
Transmission medium	Polymer fiber
	PCF fiber
Transmission protocol	Protocol-transparent to the RS-485 interface
Connection method	F-SMA

#### Digital outputs

Output name	Relay output
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## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Technical data

#### Digital outputs

Output description	Alarm output
Number of outputs	1
Maximum switching voltage	60 V DC
	42 V AC (peak)
Limiting continuous current	0.46 A

#### Conformance/approvals

Designation	CE
Designation	EAC
Identification	EAC
Designation	ATEX
Identification	# II 3 G Ex nA nC IIC T4 Gc X
Additional text	Please follow the special installation instructions in the documentation!
Designation	ATEX, FO interface
Identification	# II (2) G [Ex op is Gb] IIC
	# II (2) D [Ex op is Db] IIIC
Certificate	PTB 06 ATEX 2042 U
Additional text	Please follow the special installation instructions in the documentation!
Designation	UL, USA/Canada
Identification	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
Designation	Corrosive gas test
Identification	ISA-S71.04-1985 G3 Harsh Group A
Designation	Shipbuilding
Identification	DNV GL
Temperature	B
Humidity	A
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules shall be provided upon installation on board

#### Standards and Regulations

Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Type of test	Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6
Test result	5g, 10...150 Hz, 2.5 h, in XYZ direction
Type of test	Shock in acc. with EN 60068-2-27/IEC 60068-2-27
Test result	15g, 11 ms period, half-sine shock pulse
Type of test	Free fall in acc. with IEC 60068-2-32
Test result	1 m
Noise emission	EN 55011

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## Technical data

### Standards and Regulations

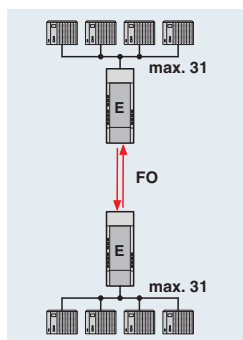
Noise immunity	EN 61000-6-2:2005
Free from substances that could impair the application of coating	according to P-VW 3.10.7 57 65 0 VW-AUDI-Seat central standard
Connection in acc. with standard	CUL
Standards/regulations	EN 61000-4-2
Contact discharge	± 6 kV
Standards/regulations	EN 61000-4-3
	EN 61000-4-4
Comments	Criterion B
Standards/regulations	EN 61000-4-5
Signal	± 1 kV
Standards/regulations	EN 55011
	EN 61000-4-6
Designation	Air clearances and creepage distances
Standards/regulations	DIN EN 60664-1
	VDE 0110-1
	DIN EN 50178
	EN 60950

### Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

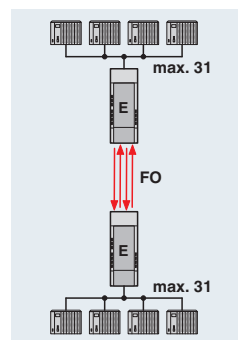
## Drawings

Application drawing



Point-to-point connection

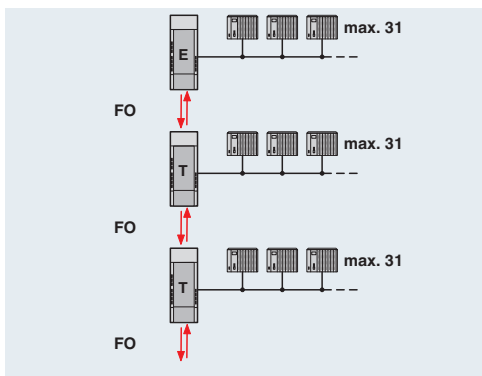
Application drawing



Redundant point-to-point connection

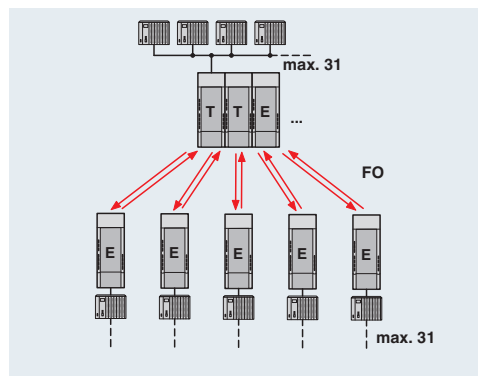
# FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

Application drawing



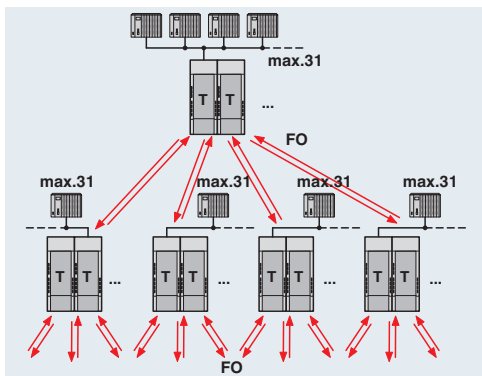
Line structure

Application drawing



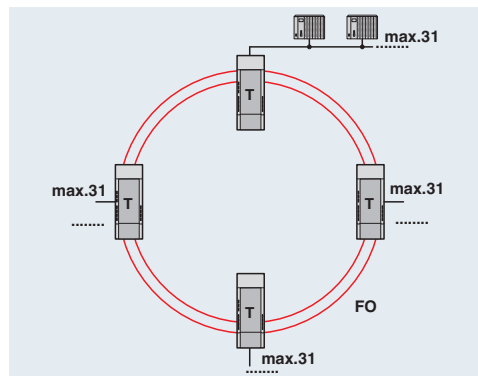
Star structure

Application drawing



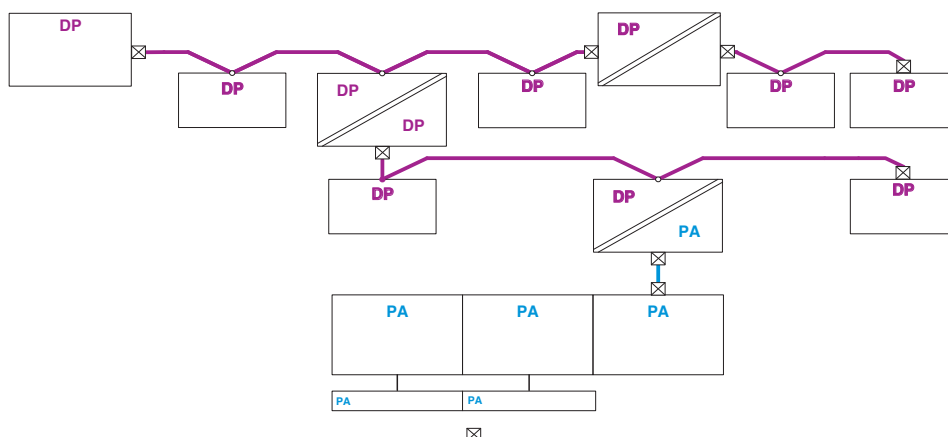
Tree structure

Application drawing



Redundant FO ring

Application drawing



## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Classifications

#### eCl@ss

eCl@ss 10.0.1	19170132
eCl@ss 11.0	19170411
eCl@ss 4.0	27230200
eCl@ss 4.1	27230200
eCl@ss 5.0	27230200
eCl@ss 5.1	27230200
eCl@ss 6.0	19179200
eCl@ss 7.0	19179290
eCl@ss 9.0	19170114

#### ETIM

ETIM 2.0	EC001423
ETIM 3.0	EC001423
ETIM 4.0	EC001423
ETIM 6.0	EC001467
ETIM 7.0	EC001467

#### UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	43222604
UNSPSC 18.0	43223323
UNSPSC 19.0	43223323
UNSPSC 20.0	43223323
UNSPSC 21.0	43223323

### Approvals

#### Approvals

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##### Approvals

DNV GL / UL Recognized / cUL Recognized / EAC / UL Recognized / cUL Recognized / DNV GL / EAC

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##### Ex Approvals

UL Listed / cUL Listed / UL Listed / cUL Listed / ATEX / ATEX / ATEX / ATEX

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#### Approval details

# FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

## Approvals

DNV GL		<a href="https://approvalfinder.dnvgl.com/">https://approvalfinder.dnvgl.com/</a>	TAA00001KR
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UL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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cUL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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EAC			EAC-Zulassung
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UL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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cUL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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DNV GL		<a href="https://approvalfinder.dnvgl.com/">https://approvalfinder.dnvgl.com/</a>	TAA00001KR
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EAC			EAC-Zulassung
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## Accessories

### Accessories

#### Adapter

Connection distributor - PSM PTK - 2760623



Passive RS-485 T-distributor, fitted with one 9-pin D-SUB pin strip and two 9-pin D-SUB socket strips



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### Accessories

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Connection distributor - PSM PTK-4 - 2799364



Passive RS-485 T-distributor, fitted with one 9-pin D-SUB pin strip and five 9-pin D-SUB socket strips

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### Data cable by the meter

FO cable - PSM-LWL-KDHEAVY-980/1000 - 2744319



Polymer fiber cable, duplex 980  $\mu\text{m}$ /1000  $\mu\text{m}$ , medium-weight version for installation in stationary systems and machines, by the meter without male connector

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FO cable - PSM-LWL-RUGGED-980/1000 - 2744322



Polymer fiber cable, duplex 980 $\mu\text{m}$ /1000 $\mu\text{m}$ , heavy-weight version for installation in stationary systems and machines, by the meter without male connector

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FO cable - PSM-LWL-RUGGED-FLEX-980/1000 - 2744335



Polymer fiber cable, duplex 980/1000  $\mu\text{m}$ , heavy-weight, highly flexible version for flexible conduit applications, by the meter, without connector

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FO cable - PSM-LWL-HCS-RUGGED-200/230 - 2799885



PCF cable, duplex 200  $\mu\text{m}$ /230  $\mu\text{m}$ , by the meter without male connector, for installation in stationary systems and machines

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## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

FO cable - PSM-LWL-HCSO-200/230 - 2799445



PCF cable, duplex 200/230  $\mu\text{m}$ , by the meter, without connector, for outdoor installation

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Bus system cable - PSM-CABLE-PROFIB/FC - 2744652



By the meter, Bus system cable, PROFIBUS (12 Mbps), shielded, PVC FR VI/PVC, Violet, 2-wire (1X2XAWG22/1), color single wire: Red, green, cable length: Free entry (1.0 ... 1000.0 m)

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### Data cable preassembled

FO patch cable - FOC-RUGGED-1012/IP20/... - 2901548



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

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FO patch cable - FOC-RUGGED-1012/... - 1402185



rugged POF installation cable for fixed installation in the inner area with individual elements made of highly durable polyamide (PE). Dimensioned for higher requirements in respect of tensile load and lateral pressure, with individual elements made of highly wear-resistant polyamide (PE). The cable is halogen-free, ozone and UV resistant and has a reinforced (PUR) outer sheath.

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FO patch cable - FOC-RUGGED-FLEX-1013/IP20/... - 2901549



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.

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

FO patch cable - FOC-RUGGED-FLEX-1013/... - 1402187



Highly flexible POF round cable for use in drag chains for an alternating bending frequency of up to 5 million cycles with individual elements made of highly wear-resistant polyamide (PE). The cable is halogen-free, ozone and UV resistant and has a rugged polyurethane (PUR) outer sheath.

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FO patch cable - FOC-KDHEAVY-1011/IP20/... - 2901553



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

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FO patch cable - FOC-KDHEAVY-1011/... - 1402188



POF installation cable for fixed installation in the inner area with individual elements made of highly durable polyamide (PA). The cable is halogen-free, ozone and UV resistant and has a rugged polyurethane (PUR) outer sheath.

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FO patch cable - FOC-HCS-RUGGED-1014/IP20/... - 2901555



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

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FO patch cable - FOC-HCS-RUGGED-1014/... - 1402191



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.

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## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

FO patch cable - FOC-HCSO-1015/IP20/... - 2901557



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.

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### Data plug

FO connectors - PSM-SET-FSMA/4-KT - 2799720



F-SMA plug set for polymer fiber, for self assembly consisting of 4 quick mounting connectors with bend protection sleeve

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FO connectors - PSM-SET-FSMA/4-HCS - 2799487



F-SMA plug set for PCF fiber, for self assembly consisting of 4 quick mounting connectors with bend protection sleeve

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Assembly tool - PSM-POF-KONFTOOL - 2744131



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

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Assembly tool - PSM-HCS-KONFTOOL - 2799526



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

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

Assembly tool - PSM-SET-FSMA-POLISH - 2799348



Polymer fiber polishing set, for F-SMA quick mounting connectors

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Measuring instrument - PSM-FO-POWERMETER - 2799539



Fiber optic measuring case, consisting of an optical power meter, F-SMA, B-FOC adapters, reference fibers and operating instructions

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Fiber optic coupling - PSM-SET-FSMA-LINK/2 - 2799416



Coupling; set consisting of 2 couplings for connecting F-SMA plugs

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D-SUB bus connector - SUBCON-PLUS-PROFIB/SC2 - 2708232



D-SUB connector, 9-pos., male connector, cable entry < 35°, bus system: PROFIBUS DP up to 12 Mbps, termination resistor can be switched on via slide switch, pin assignment: 3, 5, 6, 8; screw connection terminal blocks

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D-SUB bus connector - SUBCON-PLUS-PROFIB/PG/SC2 - 2708245



D-SUB connector, 9-pos., male connector, cable entry < 35°, bus system: PROFIBUS DP up to 12 Mbps with PG D-SUB socket for connecting a programming device, termination resistor can be switched on via slide switch, pin assignment: 3, 5, 6, 8; screw connection terminal blocks

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## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

#### D-SUB bus connector - SUBCON-PLUS-PROFIB/AX/SC - 2744380



D-SUB connector, 9-pos., male connector, axial version with two cable entries, bus system: PROFIBUS DP up to 12 Mbps, termination resistor can be switched on via slide switch, pin assignment: 3, 5, 6, 8; screw connection terminal blocks

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#### Stripping tool - PSM-STRIP-FC/PROFIB - 2744623

Quick stripping tool for PROFIBUS cable, type Fast Connect



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#### D-SUB bus connector - SUBCON-PLUS-PROFIB/90/PG/SC - 2313708



D-SUB connector, 9-pos., male connector, cable entry < 90°, bus system: PROFIBUS DP up to 12 Mbps with PG D-SUB socket for connecting a programming device, termination resistor can be switched on via slide switch, pin assignment: 3, 5, 6, 8; screw connection terminal blocks

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#### D-SUB bus connector - SUBCON-PLUS-PROFIB/90/PG/IDC - 2313685



D-SUB connector, 9-pos., male connector, cable entry < 90°, bus system: PROFIBUS DP up to 12 Mbps with PG D-SUB socket for connecting a programming device, termination resistor can be switched on via slide switch, pin assignment: 3, 5, 6, 8; IDC terminal block connection

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#### D-SUB bus connector - SUBCON-PLUS-PROFIB/AX/M12 - 2902321



D-SUB plug, 9-pos., pin, assignment: 3, 5, 6, 8; two M12 cable glands (B-coded) under 180° (axial). Bus system: PROFIBUS DP up to 12 Mbps. Termination resistor via separate M12 terminator.

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

#### D-SUB bus connector - SUBCON-PLUS-PROFIB/90X/M12 - 2902729



D-SUB plug, 9-pos., pin, assignment: 3, 5, 6, 8; two M12 cable glands (B-coded) under 90°. Bus system: PROFIBUS DP up to 12 Mbps. Termination resistor via separate M12 terminator. Long version; S7-compatible.

#### D-SUB bus connector - SUBCON-PLUS-PROFIB/90/M12 - 2902318



D-SUB plug, 9-pos., pin, assignment: 3, 5, 6, 8; two M12 cable glands (B-coded) under 90°. Bus system: PROFIBUS DP up to 12 Mbps. Termination resistor via separate M12 terminator.

#### D-SUB bus connector - SUBCON-PLUS-PROFIB/35/M12 - 2902320



D-SUB plug, 9-pos., pin, assignment: 3, 5, 6, 8; two M12 cable glands (B-coded) under 35°. Bus system: PROFIBUS DP up to 12 Mbps. Termination resistor via separate M12 terminator.

### DIN rail connector

#### DIN rail bus connectors - ME 17,5 TBUS 1,5/ 5-ST-3,81 GN - 2709561



DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.

#### DIN rail bus connectors - ME 17,5 TBUS 1,5/PP000-3,81 BK - 2890014



DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 2-pos.

## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

DIN rail bus connectors - ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY - 2713645



DIN rail connector, color: light gray, nominal current: 8 A (parallel contacts), rated voltage (III/2): 125 V, Number of positions per row: 5, pitch: 3.81 mm, mounting: DIN rail mounting, Locking: without, Assembly: without, type of packaging: packed in cardboard, Item with gold-plated contacts, bus connectors for connecting with electronics housings, 5 parallel contacts

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### Interface converter

Repeater - PSI-REP-PROFIBUS/12MB - 2708863



Modular repeater for electrical isolation and range increase for PROFIBUS up to 12 Mbps, 4-way isolation, rail-mountable, supply 24 V DC

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Repeater - PSM-ME-RS485/RS485-P - 2744429



Repeater, for potential separation and range increase in RS-485 2-wire bus systems, 3-way isolation, rail-mountable

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### Power supply

Power supply unit - MINI-SYS-PS-100-240AC/24DC/1.5 - 2866983



Primary-switched MINI POWER supply for DIN rail mounting, input: 1-phase, output: 24 V DC/1.5 A

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### Screwdriver tools

Screwdriver - SZS 0,4X2,5 VDE - 1205037



Screwdriver, slot-headed, VDE insulated, size: 0.4 x 2.5 x 80 mm, 2-component grip, with non-slip grip

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### Terminal resistor



## FO converters - PSI-MOS-PROFIB/FO 660 E - 2708290

### Accessories

Termination resistor - PSI-TERMINATOR-PB-TBUS - 2702636



Active termination resistor for PROFIBUS and RS-485 bus systems, redundant power supply, routing of the supply voltage via DIN rail connector, electrical isolation, switchable termination, integrated programming interface