Communication Interfaces - Overview



Products

Technologies

PoE



Everything
for industrial networks

PHOENIX CONTACT
INSPIRING INNOVATIONS

Communication Interfaces - Our product portfolio



Fieldbus Communication



Ethernet Infrastructure



Wireless



Remote Communication

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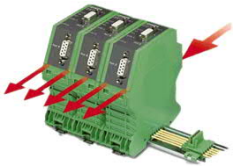
Fieldbus Communication 1



Converter
Isolator



Repeater
Segment
Coupler



Fast
connectors
(SUBCON)



Fiber optic
converter



Modular hub



Extender
Serial/Profibus



Protocol
converter



Radioline
Multipoint-
Multiplexer



Terminator
resistor



Fieldbus
Communication 2





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Fieldbus Communication 2



Serial Device Server



Foundation fieldbus Power



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 1



Fieldbus Device Terminal box



Profibus DP/PA Converter



Profibus PA I/O Multiplexer



Ethernet HART Multiplexer

Fieldbus Communication 1

Ethernet Infrastructure

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Ethernet Infrastructure



Ethernet Extender



Media Converter



Ethernet Isolator



Ethernet HART Multiplexer



Patch Panel



PoE Injector



Serial Device Server



Data connectors

Fieldbus communication 2

Wireless

Wireless



Radioline



Wireless Multiplexer



Wireless HART



Radioline Outdoor solution



WLAN



Bluetooth EPA

Ethernet Infrastructure

Remote communication

INSPIRING INNOVATIONS

Remote communication



TC Mobile I/O



TC MGuard



DSL Router



TC Router



TC Cloud Client



mGuard Secure Cloud

Wireless

Technologies

Technologies

HART Technology

PoE Power over Ethernet

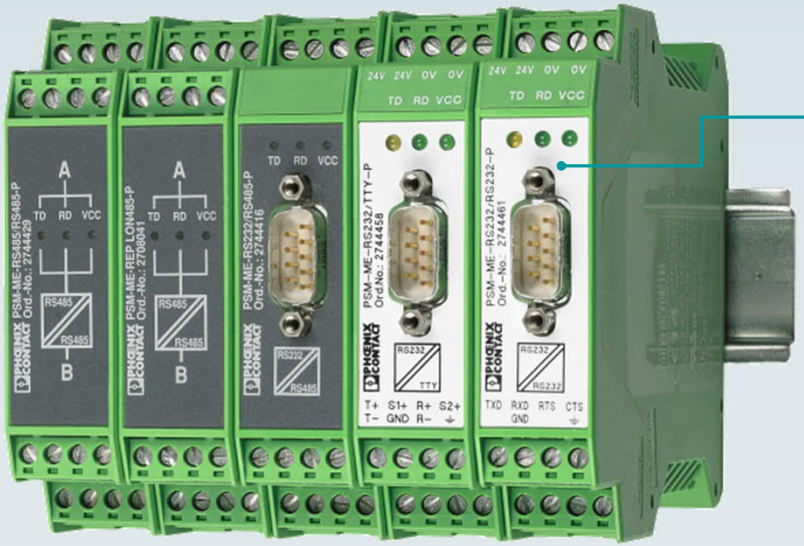
TRUSTED WIRELESS

Remote communication

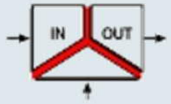
PROFIBUS

Converter and isolator

Integrated power supply unit
The device can be supplied directly with 24 V AC/DC



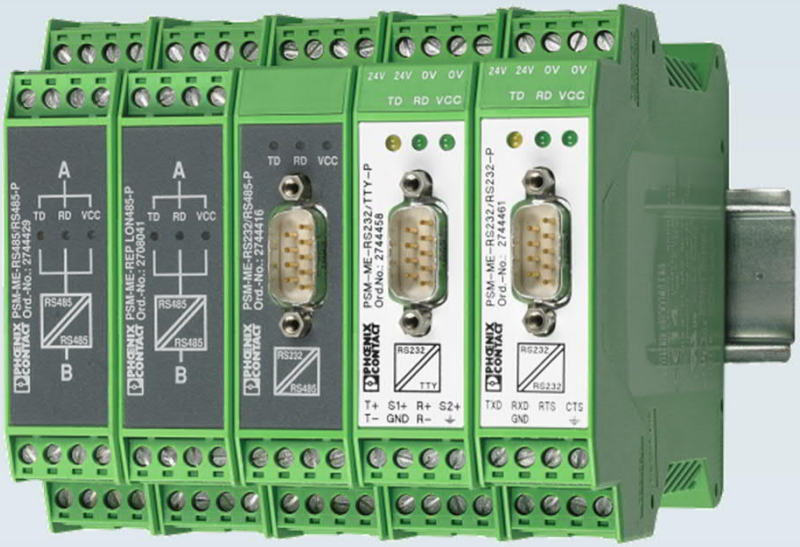
Interference-free and robust
High-grade 2 kV electrical isolation between the power supply and the data interfaces

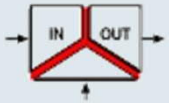


3-way-isolation

Improve performance
Thanks to integrated signal amplification, you can achieve a significant improvement in the transmission speed and range of your network.

Converter and isolator





3-way-isolation

- Isolator for RS-232
- Repeater RS 485
- Repeater LON
- Converter for RS-232 to
  - RS-422
  - RS-485 2-wire
  - RS-485 4-wire
- Converter for RS-232 to TTY
- Device-specific approvals:

  DNV, UL HazLoc, ATEX, operation at altitudes of up to 5,000 m, railway applications acc. EN 50121-4

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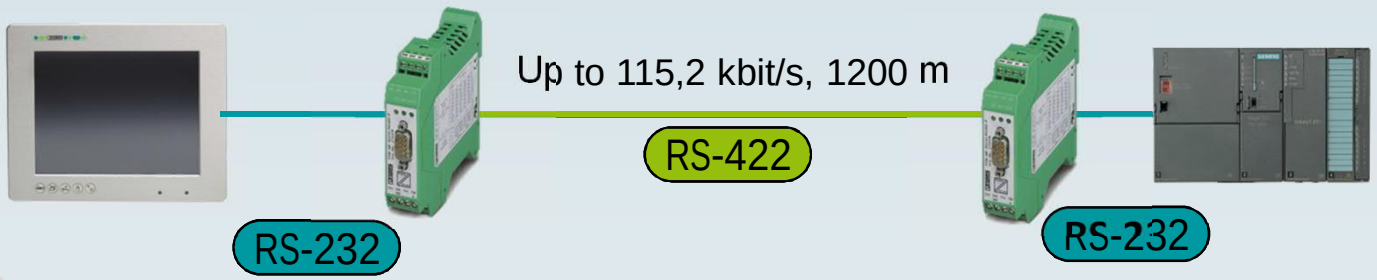
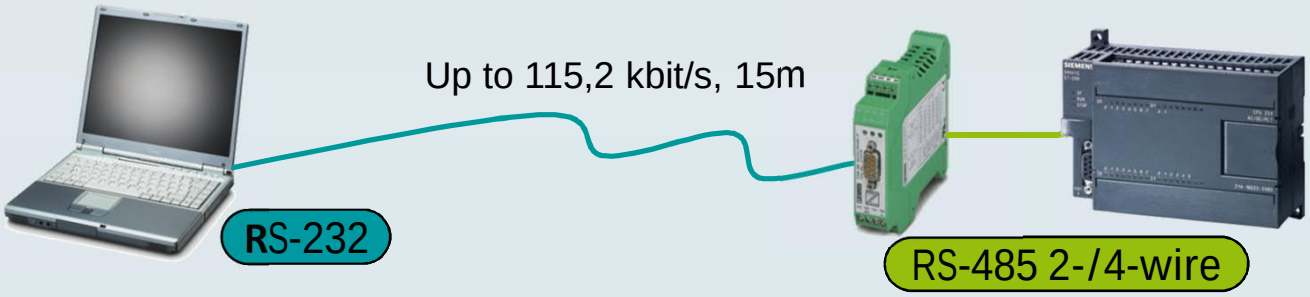
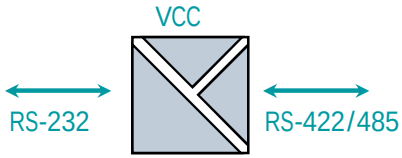
INSPIRING INNOVATIONS

Converter and isolator





- Interference-free point-to-point connection
- Increase distances of RS-232 from 15 m up to 1200m by converting to RS-422



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Converter and isolator








	PSM-ME-RS232/RS232-P	PSM-ME-RS232/TTY-P	PSM-ME-RS232/RS485-P	PSM-ME-RS485/RS485-P	SM-ME-REP LON485-P
Type	RS-232 isolator	RS-232 on TTY converter	RS-232 on RS-485/RS-422 converter	RS-485 on RS-485 repeater	LON repeater
Interface 1	RS-232	RS-232	RS-232	RS-485	RS-485
Interface 2	RS-232	TTY	RS-485 / RS-422	RS-485	RS-485
Range (max.)	15 m	1000 m	1200 m	1200 m	1200 m
Data rate (max.)	115,2 kbps	19,2 kbps	115,2 kbps	1500 kbps	2000 kbps
Order number	2744461	2744458	2744416	2744429	2708041

ME-SAS (Accessorie)
Shield connection clip for printed circuit terminal block
2863899

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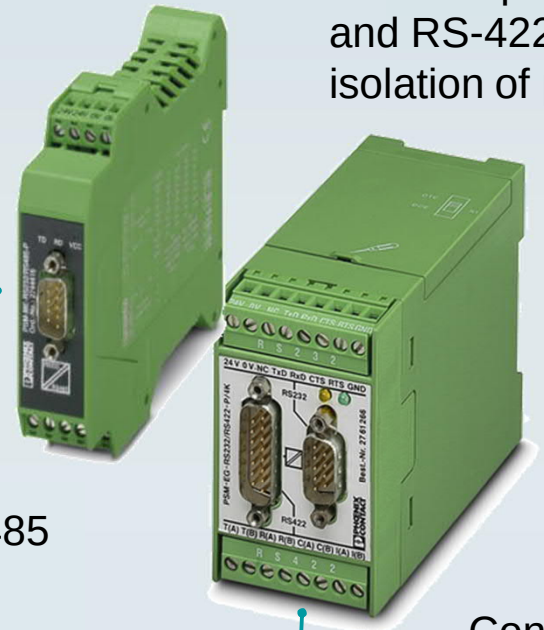
Interface converter

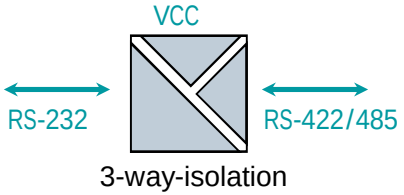
High-quality 3-way isolation between power supply, RS-232, and RS-422 for safe electrical isolation of potentials with 2.5 kV



Converter
RS-232 (V.24) to RS-485

Converter
RS-232 (V.24) to RS-422 (V.11)

- Converting the RS-232 point-to-point interface into the bus-capable RS-485 standard makes it possible to networks up to 32 devices via 2- or 4- wire cable.
- Increase range or remote transmission up to 1200 m
- Point-to-point connection between two RS-232 interfaces vis RS-422



3-way-isolation

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Interface converter







	PSM-ME-RS232/RS485-P	PSM-EG-RS232/RS422-P/4K	ME-SAS (Accessorie)
Description	Interface converter, for converting RS-232 (V.24) to RS-422 (V.11) and RS-485, with electrical isolation 2 channels	Interface converter, for converting RS-232 (V.24) to RS-422 (V.11), with electrical isolation, 4 channels,	Shield connection clip for printed circuit terminal block
Interface 1	V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1 D-SUB 9 plug	V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1 Screw connection	
Transmission lenght (Interface 1)	15 m (shielded twisted pair)	15 m (twisted pair)	
Interface 2	RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1 Screw connection	RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1 D-SUB-15 male connector	
Transmission lenght (Interface 2)	1200 m (shielded twisted pair)	1200 m (twisted pair)	
Order number	2744416	2761266	2863899

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Termination resistor



PROFIBUS connection D(A), D(B)

Status LEDs

Slide switch for termination resistor

24 V DC voltage supply

D-SUB, programming interface

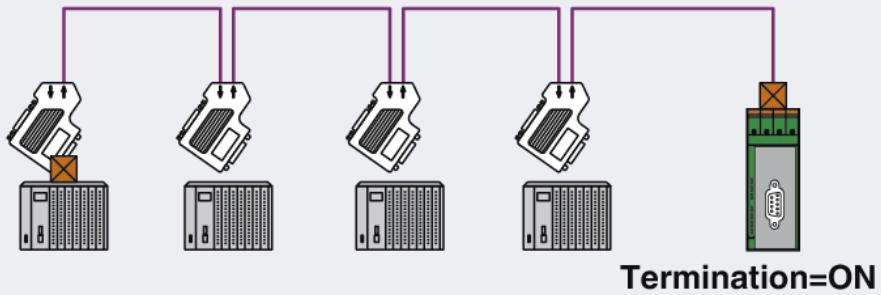
- PROFIBUS or other RS-485 networks can be actively terminated at the bus end using the PSI-TERMINATOR-PB-TBUS device
- Active Line termination
- Redundant power supply: 24 VDC
- Diagnostic LED’s for power and data activity
- T-Bus functionality for power supply

PHOENIX CONTACT INSPIRING INNOVATIONS

Termination resistor

Application examples:

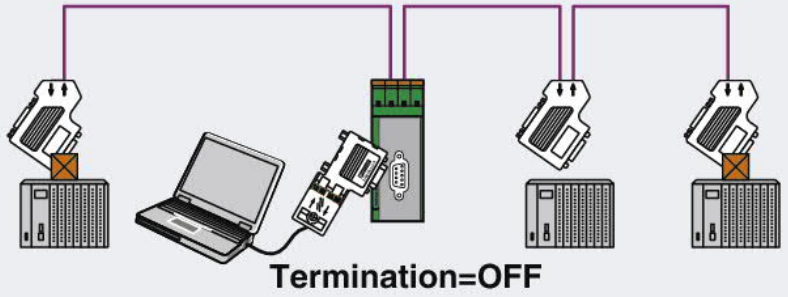
Termination operation



☒ = Active bus termination resistor

The terminator is suitable for ensuring bus termination when changing Profibus slave devices. In this application, the terminator is installed after the last bus device in the cabel. The bus cable is permanently terminated when the termination resistor at the device is switched on.

Programming access



☒ = Active bus termination resistor

The terminator can be integrated into the bus system as a fixed programming interface. Termination is deactivated in this mode of operation. Passive and active programming devices are supported.

Termination resistor





	PSI-TERMINATOR-PB-TBUS	ME 22,5 TBUS 1,5/ 5-ST-3,81 G (Accessory)
Description	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	DIN rail connector for routing the power supply voltage
Interface	PROFIBUS acc. to IEC 61158, RS-485 2-conductor	
Termination resistor	390 Ohm / 220 Ohm / 390 Ohm (can be connected)	
Serial transmission speed	up to 12 Mbps	
Order number	2702636	2707437

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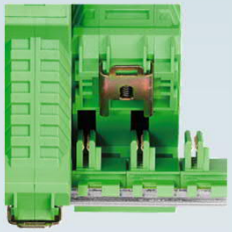
The modular hub

Simply snap the devices onto the DIN rail and go!





Smooth installation
The DIN rail connector instantly provides data and the supply voltage to each device associated with the station

Combine
The Fiber optic converter can be combined with copper repeater, SHDSL devices in whichever way you choose

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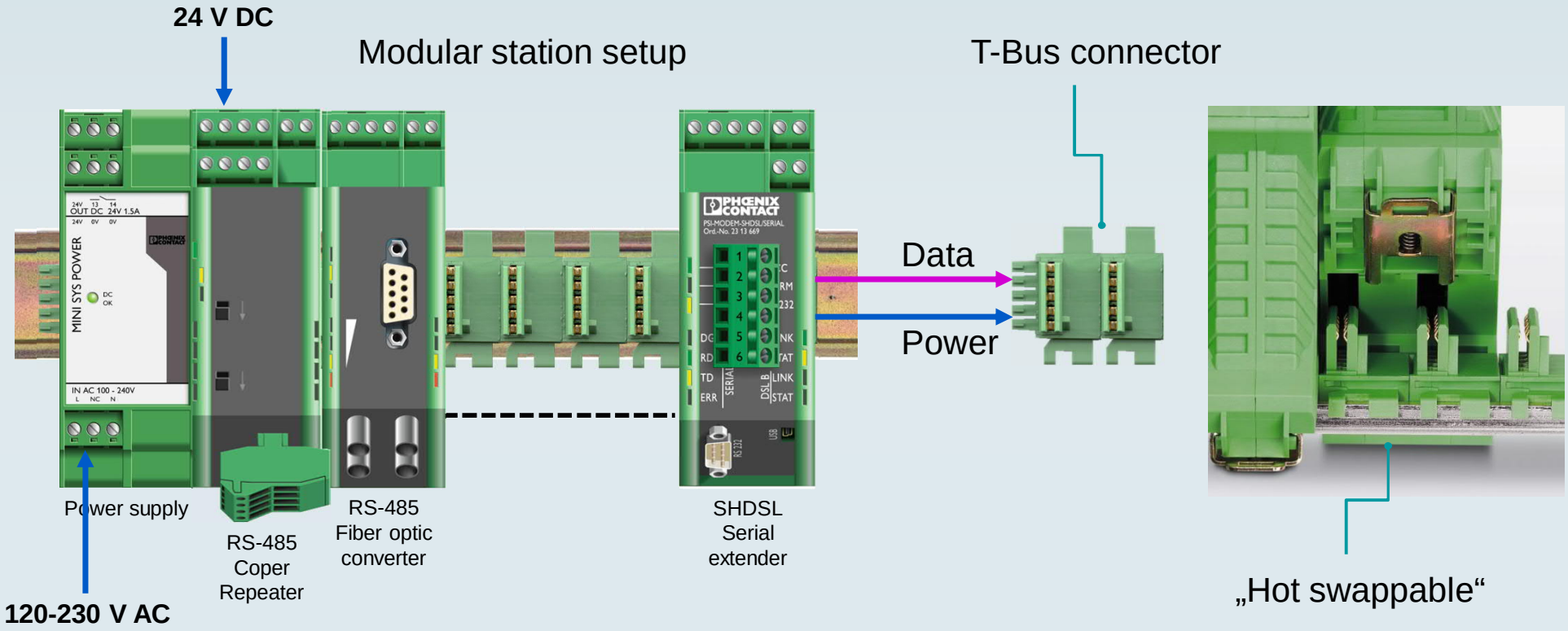
INSPIRING INNOVATIONS

The modular hub

Combine copper, fiber and SHDSL however you choose



INSPIRING INNOVATIONS

Repeater – Copper transmission

Extend your network over a wide area regardeless of the data rate



Extend and distribute channels as required

Modular station with T-Bus connector

The number of devices in a network can be extended by segmenting with repeaters

Different topologies

Features Repeater:

- Bit-Oversampling
- Bit-Retiming
- Start-delimiter detection for PROFIBUS
- Potential segmentation

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INSPIRING INNOVATIONS

Repeater – Copper transmission



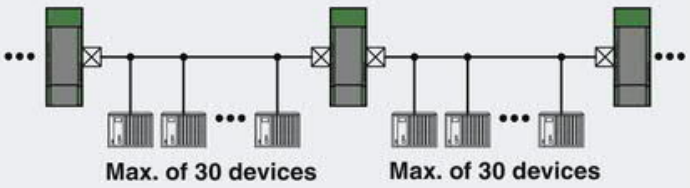
- Transmission speed: <=12 Mbps
- Electrical isolation between all ports
- Operation altitudes of up to 5000m and rail application in line with EN 50121-4
- Wide temperature range: -20°C…+60°C
- Approvals: ATEX, cULus Listed 508, Class1, Zone 2 and Class 1, Div2

INSPIRING INNOVATIONS

Repeater – Copper transmission

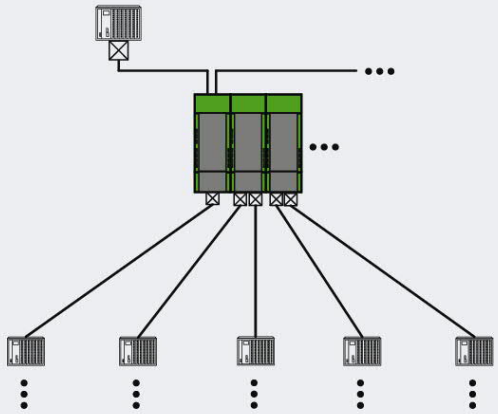
Topologies

Linear structure



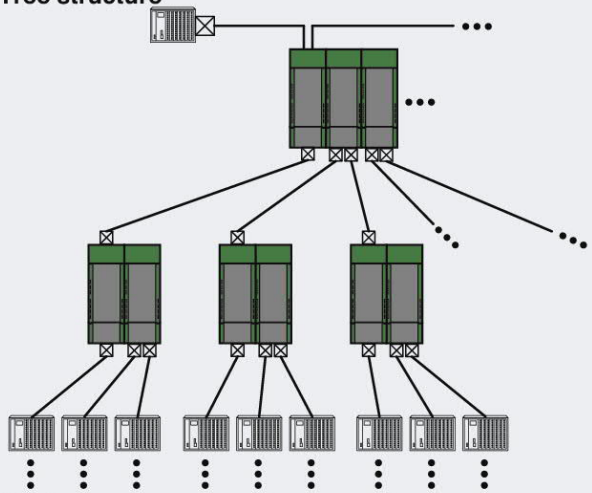
☒= Switch on bus terminating resistor

Star structure



☒= Switch on bus termination resistor

Tree structure



☒= Switch on bus terminating resistor

Bus segmentation with repeater makes it possible to multiply the permission coverage of the network and to extend the number of devices.

Mixes / network structures, star and tree structures can be created using repeaters.

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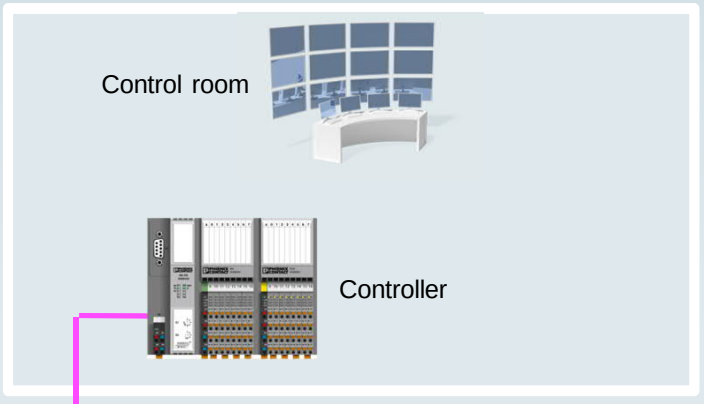
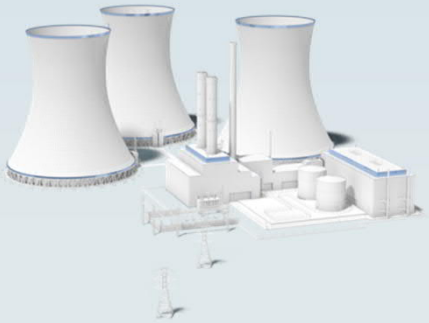
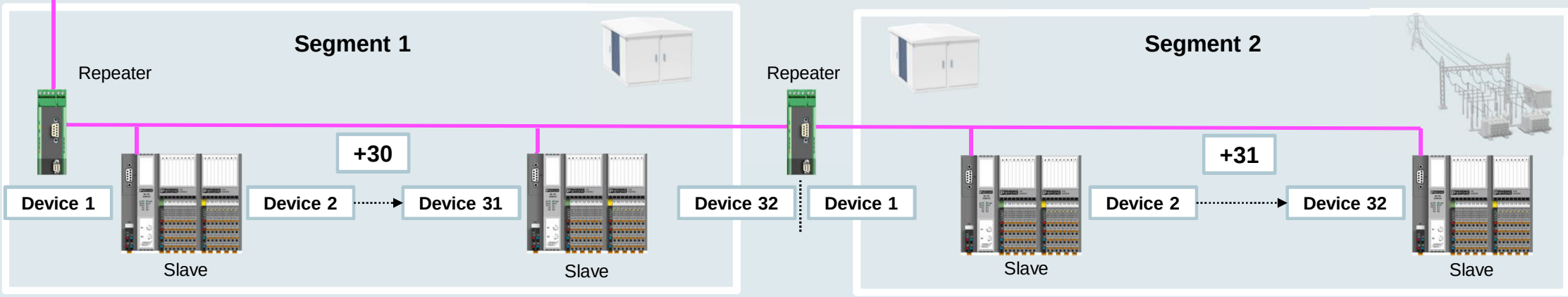
INSPIRING INNOVATIONS

Repeater – Copper transmission





- Max 32 devices in one segment
- Each repeater port counts as one device, but has no node address



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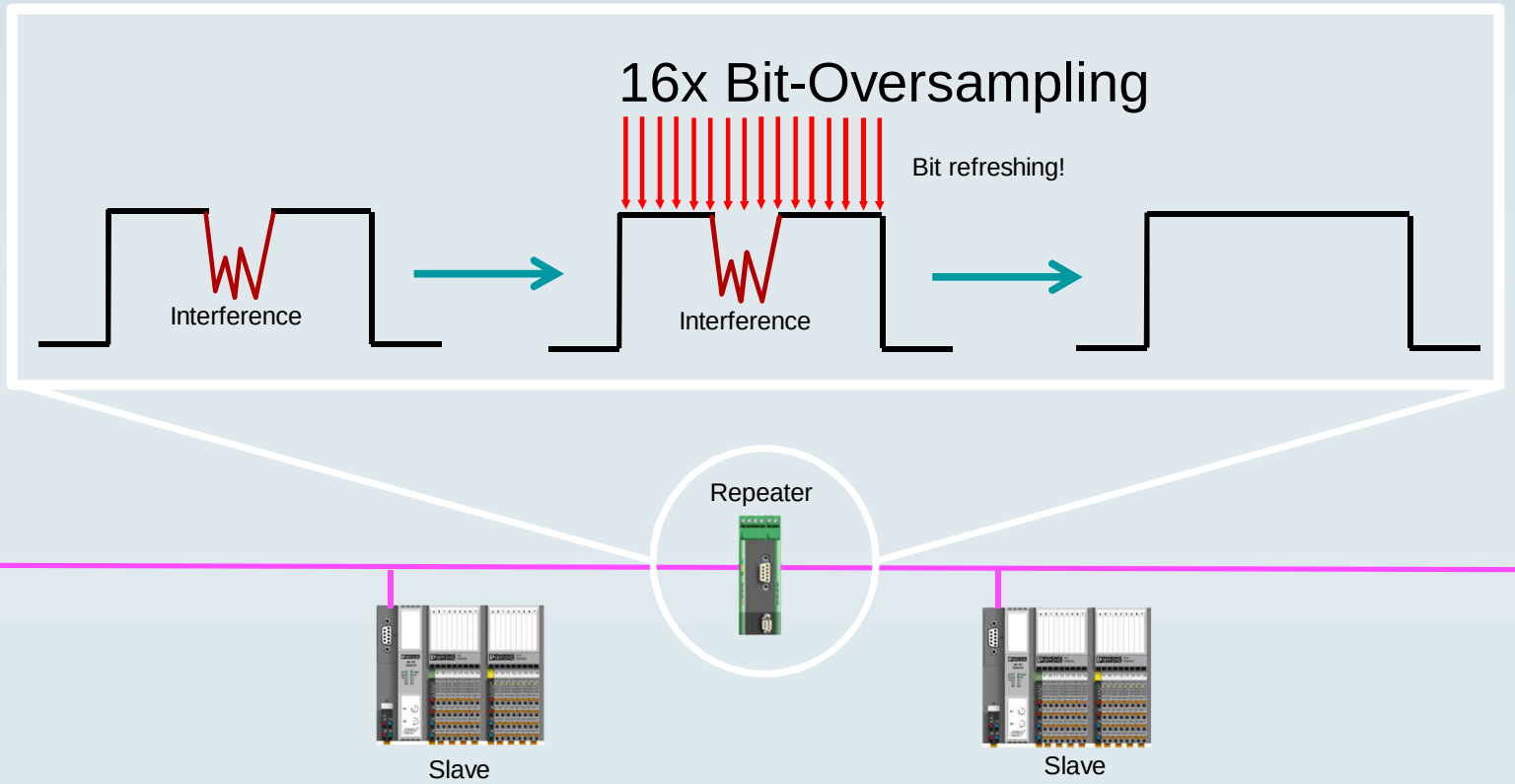
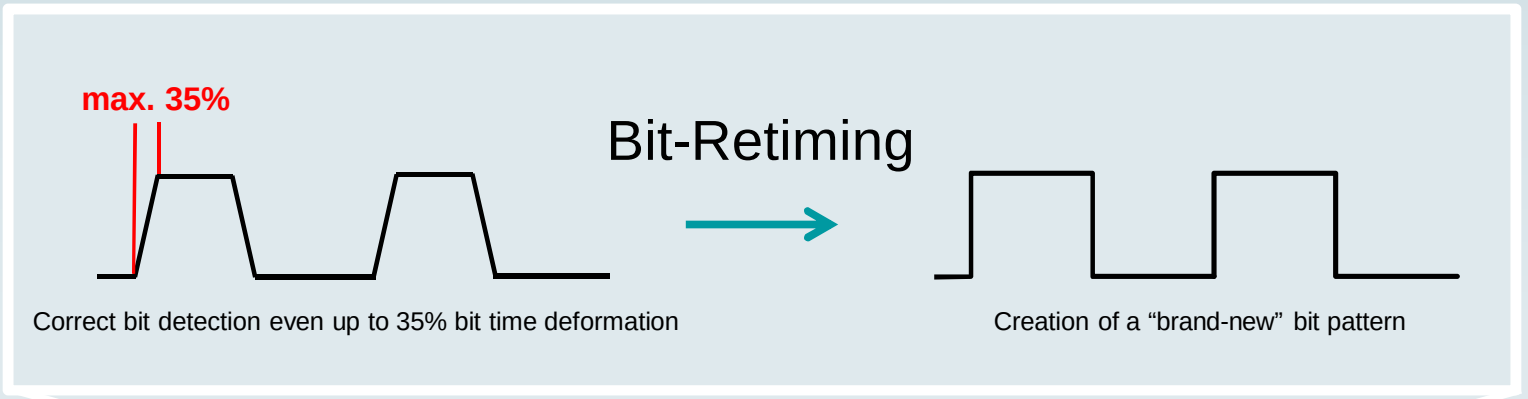
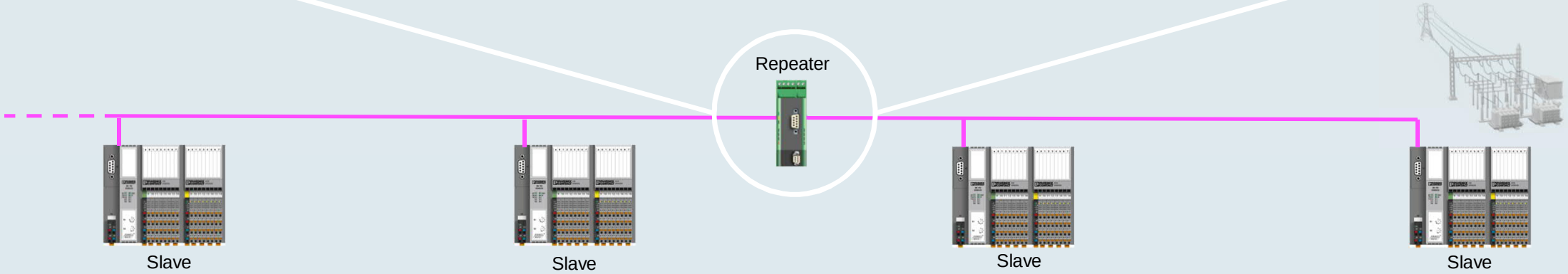
Repeater – Bit-Oversampling



Repeater – Bit-Retiming





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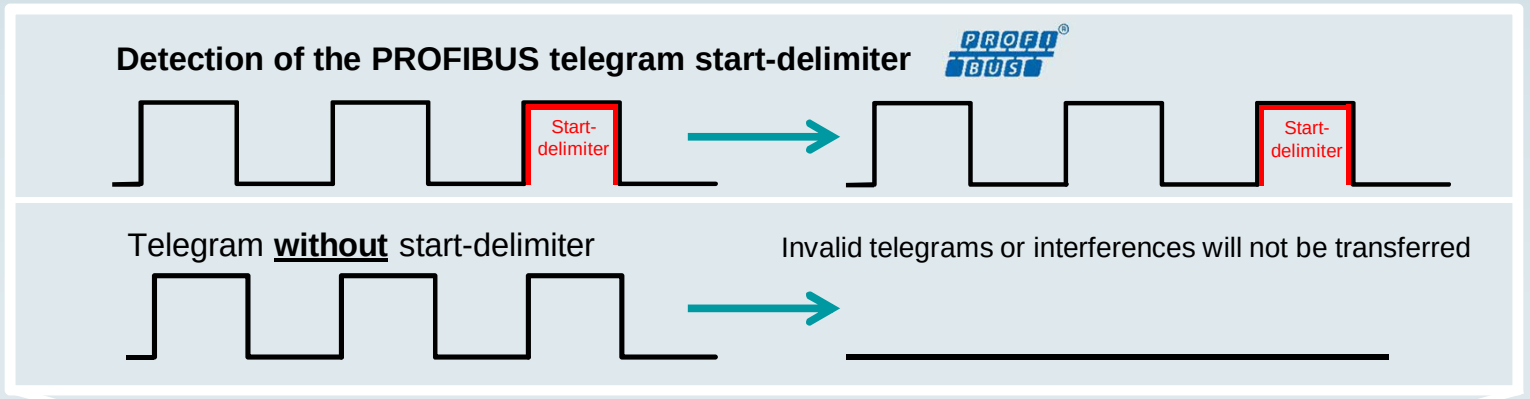
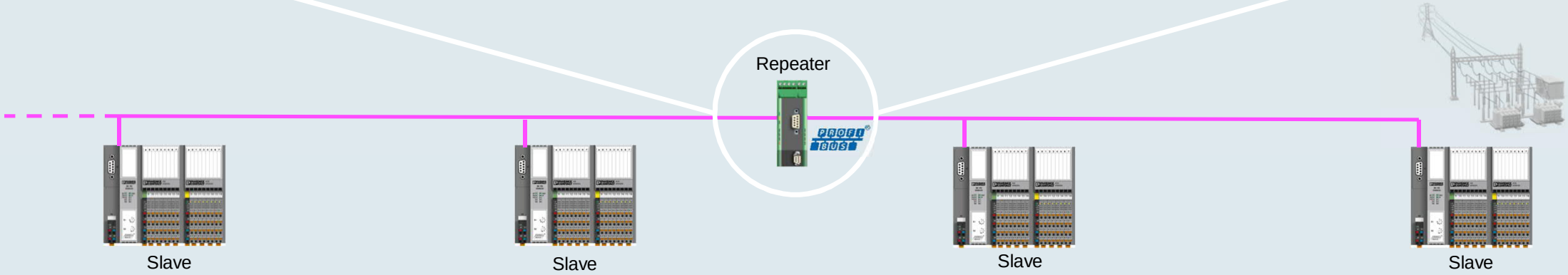
Repeater – Start-Delimiter Detection





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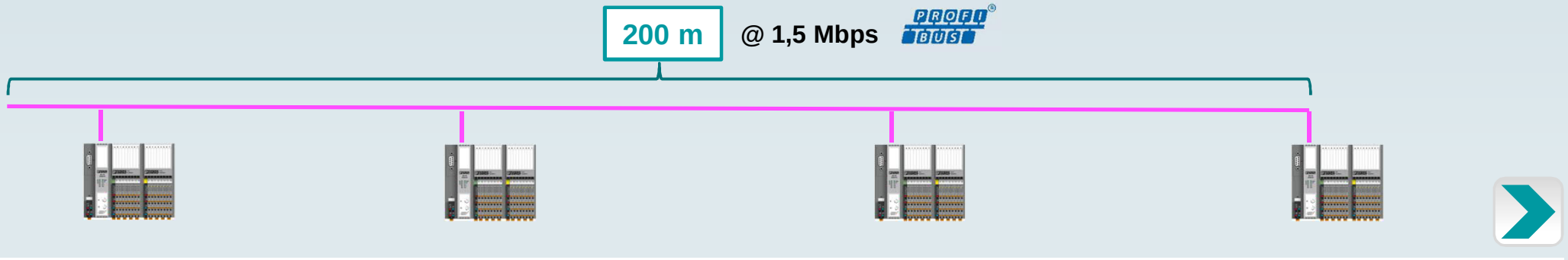
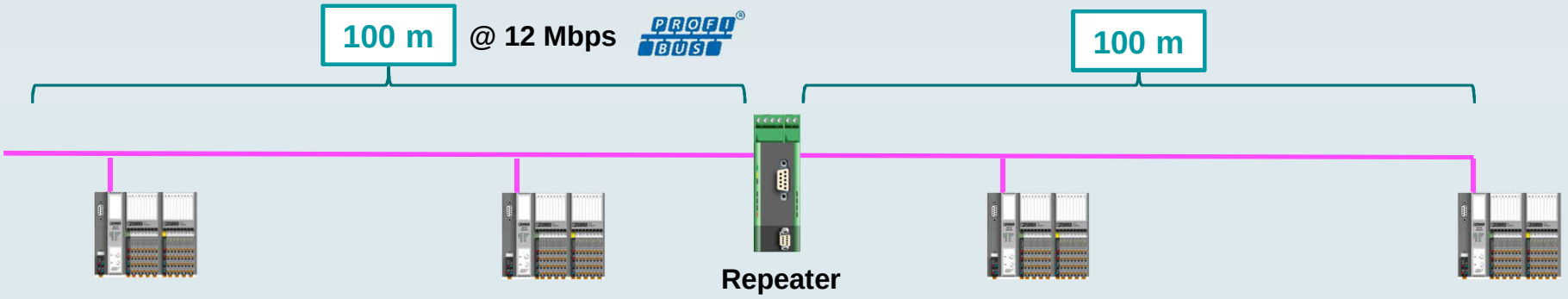
INSPIRING INNOVATIONS

Repeater – Distance vs. Segment length

The maximum segment length depends on the transmission speed!





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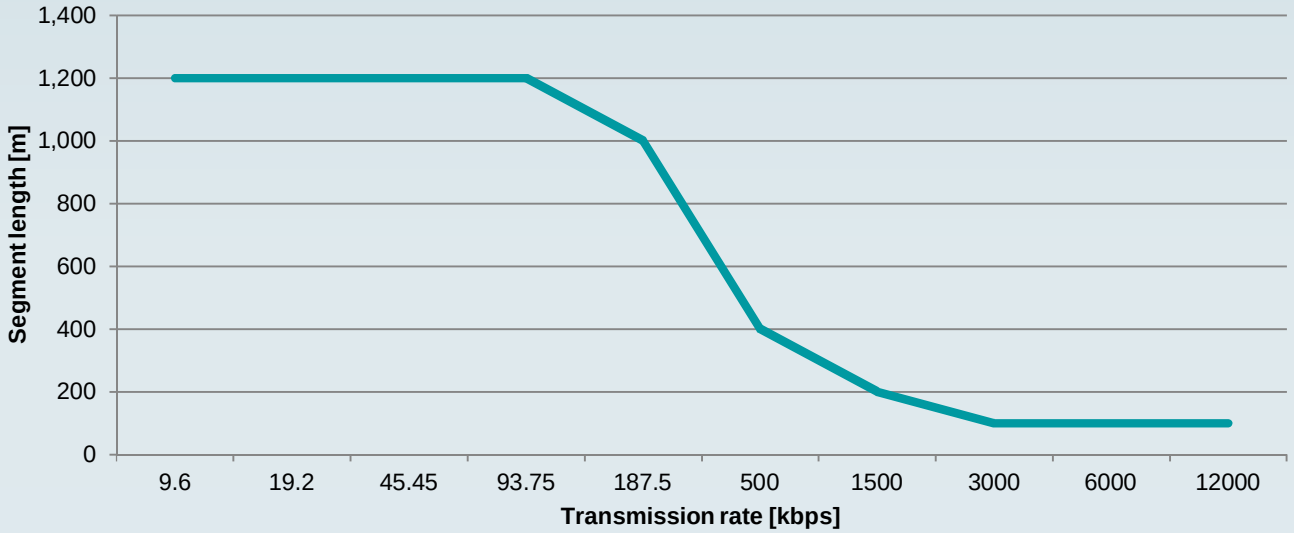
Transmission rate vs. Segment length

The max. transmisson rate depends on the segment length

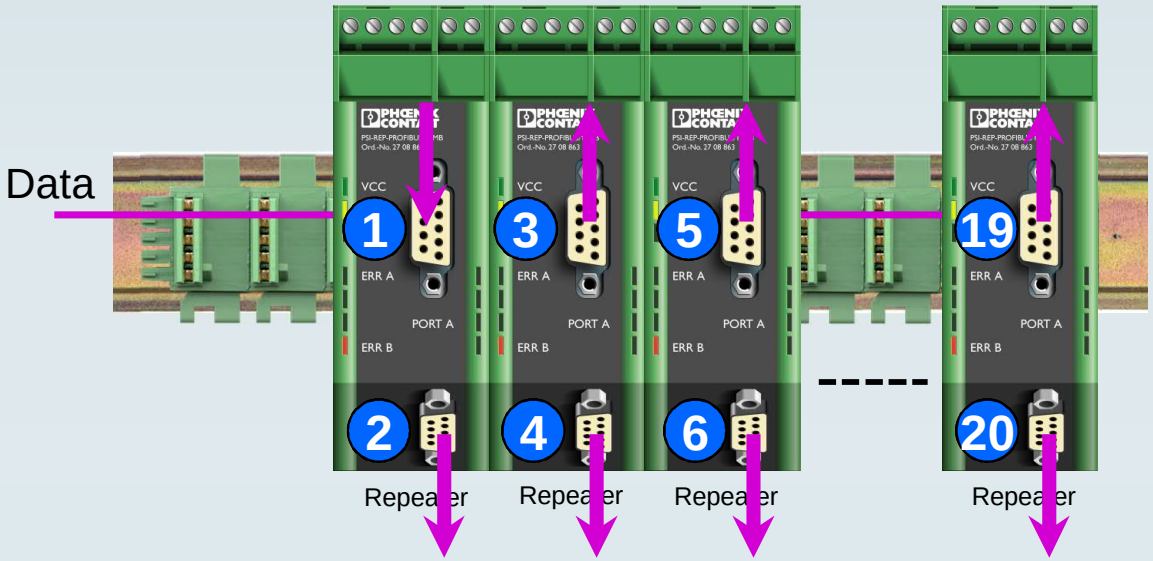


Transmission rate [kbps]	9.6	19.2	45.45	93.75	187.5	500	1,500	3,000	6,000	12,000
Segment length [m]	1,200	1,200	1,200	1,200	1,000	400	200	100	100	100

Repeater – Modular station

Data

Ports



Extend and distribute channels as required

Up to 10 repeater can be connected via the T-Bus

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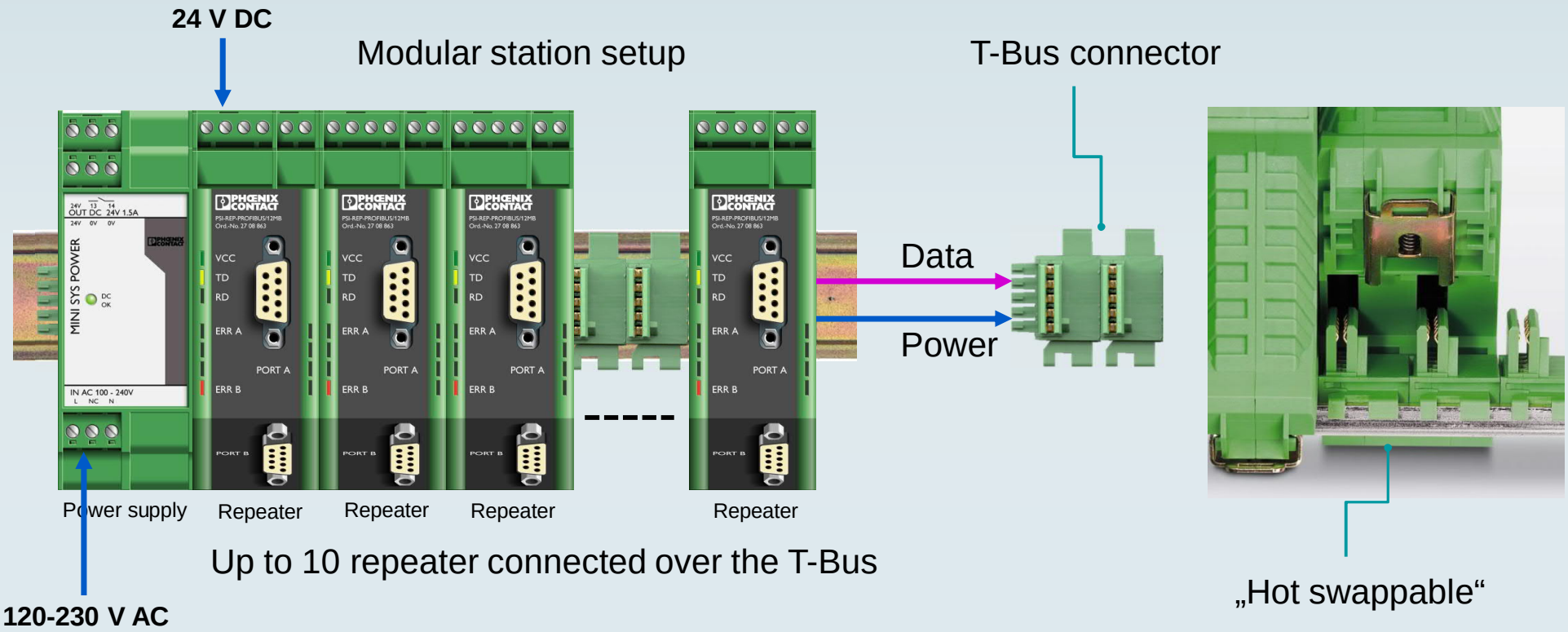
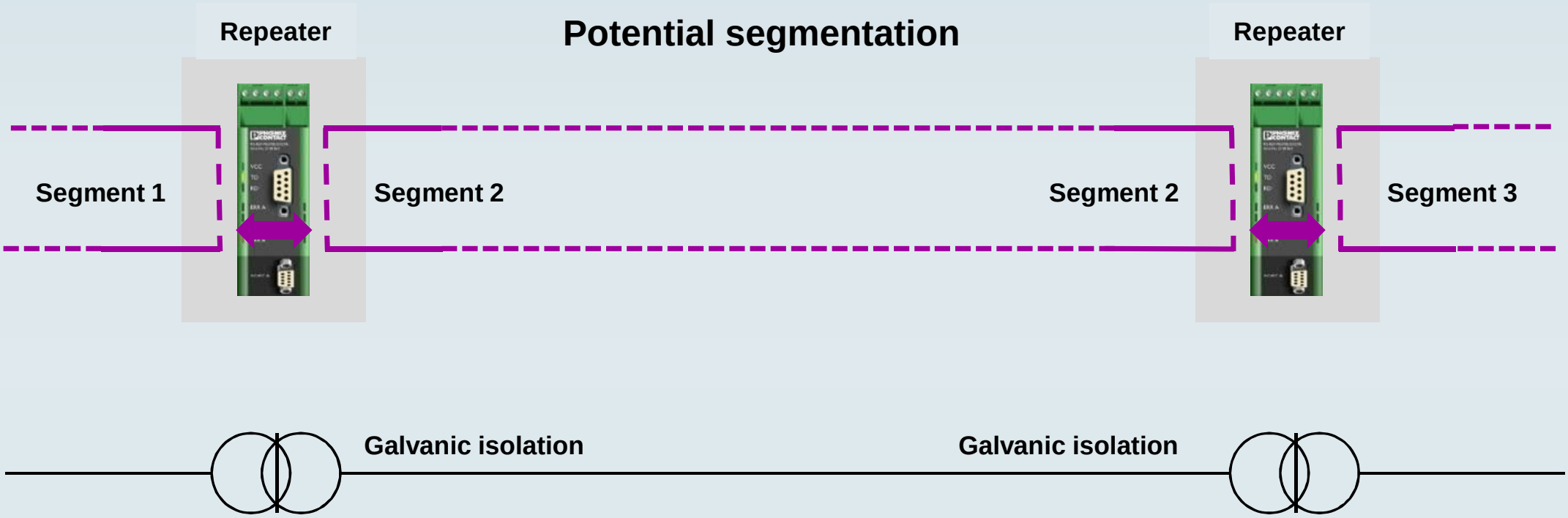
Repeater – Modular station



Repeater – Potential segmentation



Repeater – Copper transmission







	PSI-REP-DNET CAN	PSI-REP-PROFIBUS/12MB	PSI-REP-RS485W2
Device type	CANopen/Device Net repeater	PROFIBUS repeater	RS-485 repeater
Data rate	1000 kbps	up to 12Mbps	500 kbps
Copper range	1000 m	1200 m	1200 m
Interfaces	2 x copper	2 x copper	2 x copper
Order number	2313423	2708863	2313096

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Fiber optic converter



- Permanent monitoring of the fiber optic signal quality (***Worldwide unique***)
- Long transmission distances up to 45 km
- Topologies: Point-to-Point, Star, Line, Ring
- Modular station

Resistant against electromagnetic interferences (EMI)

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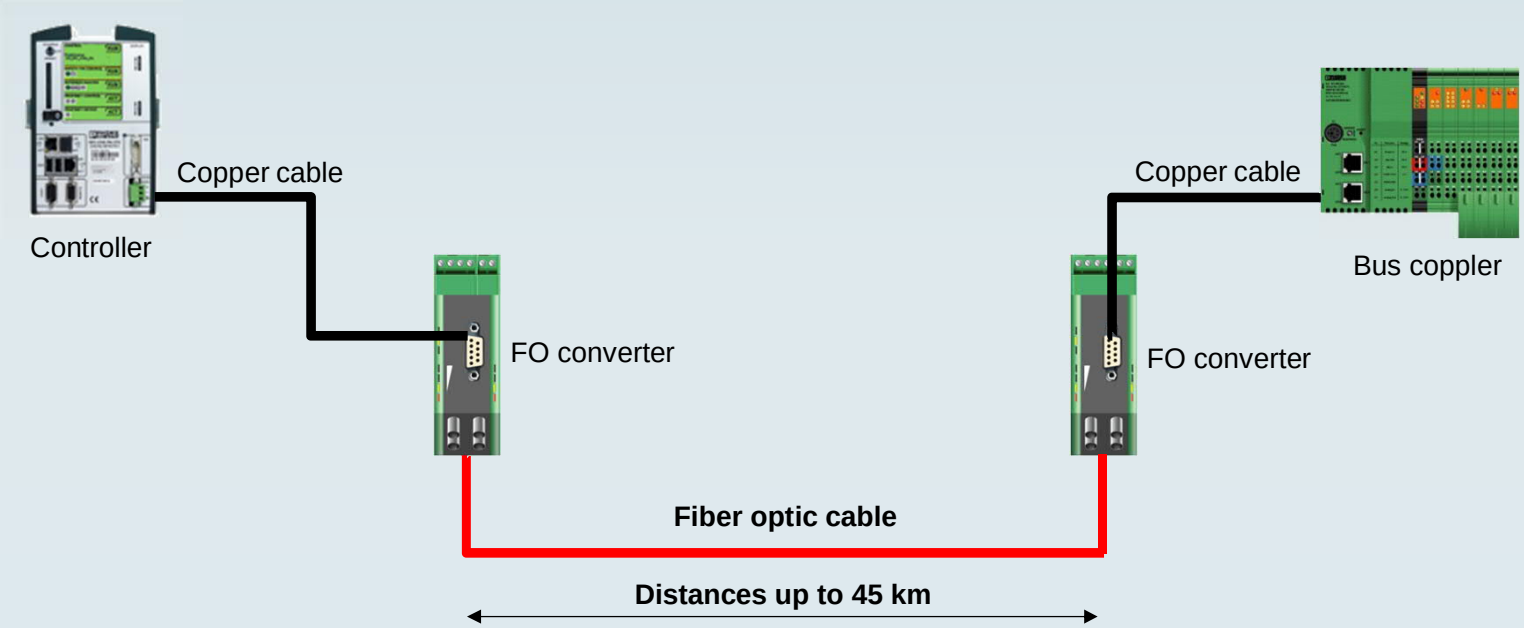
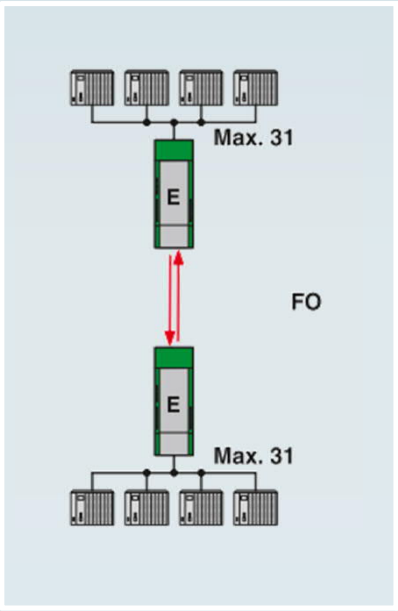
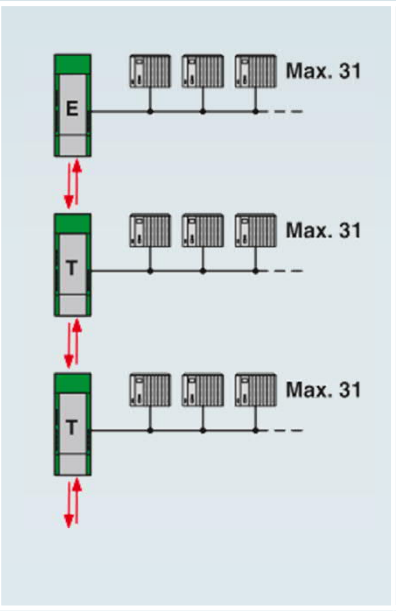
Fiber optic converter - Distance



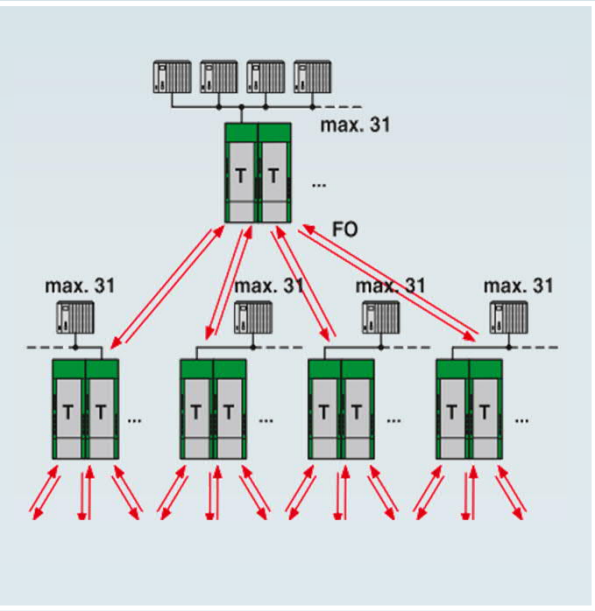
Fiber optic converter - Topologies



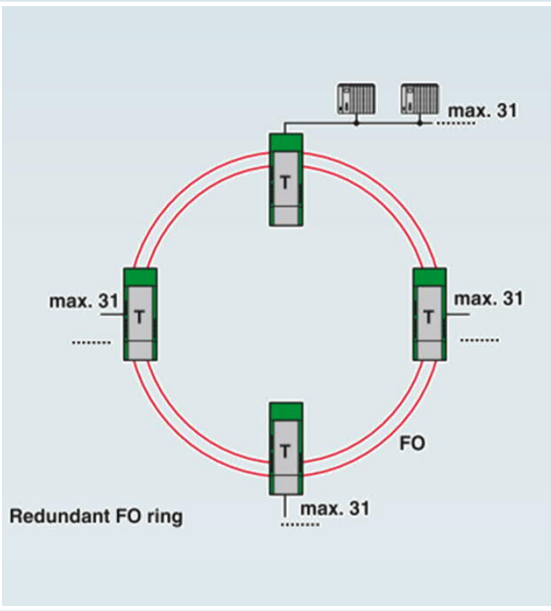
Point-to-Point connection



Linear structure

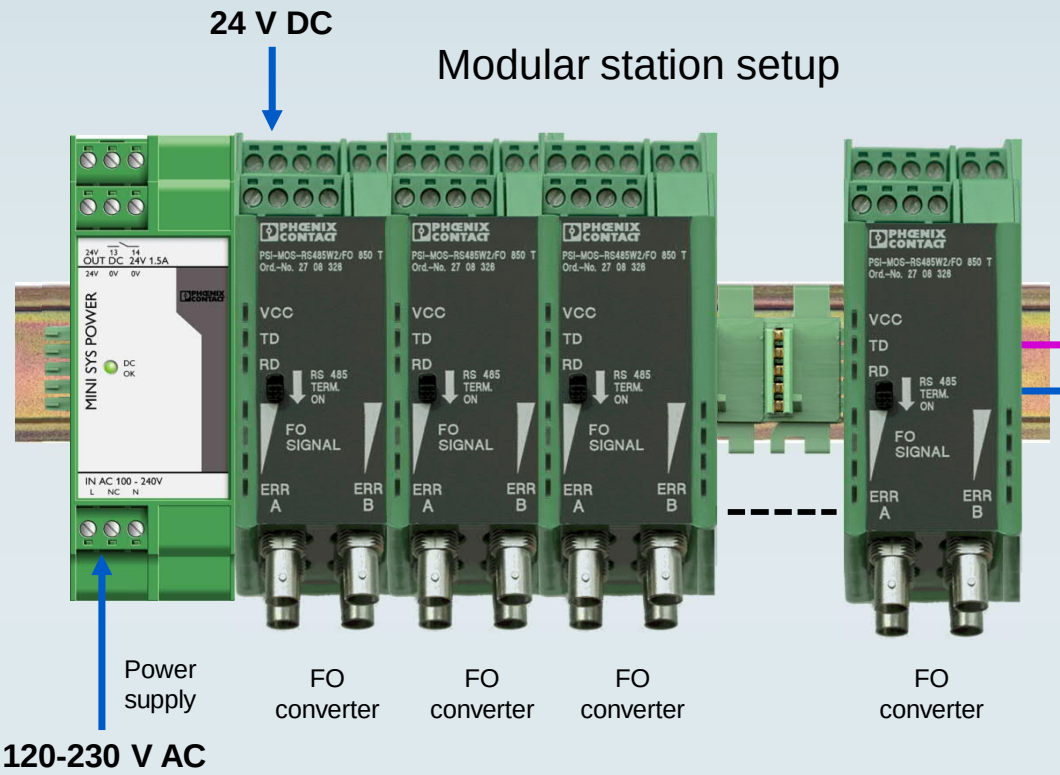


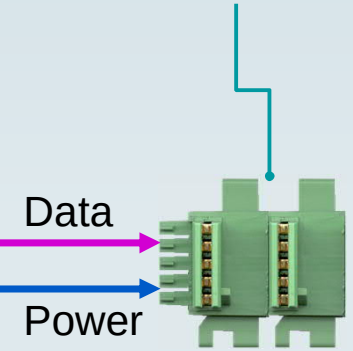
Star & Tree structure

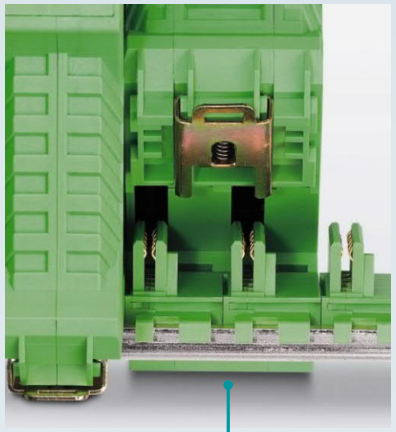


Redundant ring

Fiber optic converter – Modular station



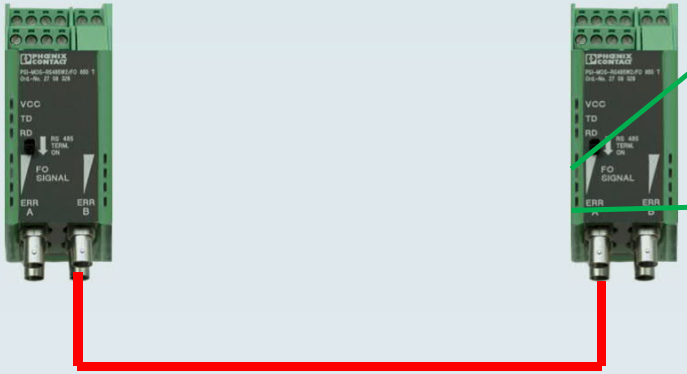




Up to 10 converter connected over the T-Bus

Fiber optic converter – Modular station

Diagnosis without PLC possible!



Fiber optic cable



LED indication of the FO interface:

LED		Receive signal
FO signal	Green	Received power is very good
	Green	Received power is good
	Yellow	Received power is critical (system reserve)
ERR	Red	Received power is insufficient, broken fiber

Fiber optic converter

DeviceNet
CANopen








	PSI-MOS-DNET CAN/FO 660/BM	PSI-MOS-DNET CAN/FO 660/EM	PSI-MOS-DNET CAN/FO 850/BM	PSI-MOS-DNET CAN/FO 850/EM	PSI-MOS-DNET/FO 850 E	PSI-MOS-DNET/FO 850 T
Device type	FO converter 660 nm	FO converter 660 nm	FO converter 850 nm	FO converter 850 nm	FO converter 850 nm	FO converter 850 nm
Data rate	800 kbps	800 kbps	800 kbps	800 kbps	1000 kbps	1000 kbps
Polymer fiber range	100 m	100 m	-	-	-	-
HCS fiber range	800 m	800 m	2800 m	2800 m	1800 m	1800 m
Glass MM range	-	-	4800 m	4800 m	4600 m	4600 m
Glass SM range	-	-	-	-	-	-
Copper range	1000 m	1000 m	1000 m	1000 m	1000 m	1000 m
Interfaces	1x FO, 1x copper	1x FO, 1x copper	1x FO, 1x copper	1x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper
Order number	2708054	2708067	2708083	2708096	2313999	2313986

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fiber optic converter








	PSI-MOS-PROFIB/FO 660 E	PSI-MOS-PROFIB/FO 660 T	PSI-MOS-PROFIB/FO 850 E	PSI-MOS-PROFIB/FO 850 T	PSI-MOS-PROFIB/FO 1300 E	PSI-MOS-PROFIB/FO 1300 T
Device type	FO converter 660 nm	FO converter 660 nm	FO converter 850 nm	FO converter 850 nm	FO converter 1300 nm	FO converter 1300 nm
Data rate	up to 12 Mbps	up to 12 Mbps	up to 12 Mbps	up to 12 Mbps	up to 12 Mbps	up to 12 Mbps
Polymer fiber range	70 m	70 m	-	-	-	-
HCS fiber range	400 m	400m	800 m	800 m	-	-
Glass MM range	-	-	2600 m	2600 m	25 km	25 km
Glass SM range	-	-	-	-	45 km	45 km
Copper range	1200 m	1200 m	1200 m	1200 m	1200 m	1200 m
Interfaces	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper
Order number	2708290	2708287	2708274	2708261	2708559	2708892

INSPIRING INNOVATIONS

Fiber optic converter

RS-232







	PSI-MOS-RS232/FO 660 E	PSI-MOS-RS232/FO 660 T	PSI-MOS-RS232/FO 850 E	PSI-MOS-RS232/FO 850 T	PSI-MOS-RS232/FO 1300 E
Device type	FO converter 660 nm	FO converter 660 nm	FO converter 850 nm	FO converter 850 nm	FO converter 1300 nm
Data rate	115,2 kbps	115,2 kbps	115,2 kbps	115,2 kbps	115,2 kbps
Polymer fiber range	100 m	100 m	-	-	-
HCS fiber range	800 m	800 m	2800 m	2800 m	-
Glass MM range	-	-	4200 m	4200 m	27 km
Glass SM range	-	-	-	-	45 km
Copper range	15 m	15 m	15 m	15 m	15 m
Interfaces	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper
Order number	2708368	2708410	2708371	2708423	2708588

Fiber optic converter

RS-422







	PSI-MOS-RS422/FO 660 E	PSI-MOS-RS422/FO 660 T	PSI-MOS-RS422/FO 850 E	PSI-MOS-RS422/FO 850 T	PSI-MOS-RS422/FO 1300 E
Device type	FO converter 660 nm	FO converter 660 nm	FO converter 850 nm	FO converter 850 nm	FO converter 1300 nm
Data rate	2 Mbps	2 Mbps	2 Mbps	2 Mbps	2 Mbps
Polymer fiber range	100 m	100 m	-	-	-
HCS fiber range	800 m	800 m	2800 m	2800 m	-
Glass MM range	-	-	4200 m	4200 m	27 km
Glass SM range	-	-	-	-	45 km
Copper range	1000 m	1000 m	1000 m	1000 m	1000 m
Interfaces	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper
Order number	2708342	2708384	2708355	2708397	2708575

Fiber optic converter

RS-485







	PSI-MOS-S485W2/FO 660 E	PSI-MOS-RS485W2/FO 660 T	PSI-MOS-RS485W2/FO 850 E	PSI-MOS-RS485W2/FO 850 T	PSI-MOS-RS485W2/FO 1300 E
Device type	FO converter 660 nm	FO converter 660 nm	FO converter 850 nm	FO converter 850 nm	FO converter 1300 nm
Data rate	500 kbps	500 kbps	500 kbps	500 kbps	500 kbps
Polymer fiber range	100 m	100 m	-	-	-
HCS fiber range	800 m	800 m	2800 m	2800 m	-
Glass MM range	-	-	4200 m	4200 m	25 km
Glass SM range	-	-	-	-	45 km
Copper range	1200 m	1200 m	1200 m	1200 m	1200 m
Interfaces	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper	2x FO, 1x copper	1x FO, 1x copper
Order number	2708313	2708300	2708339	2708326	2708562

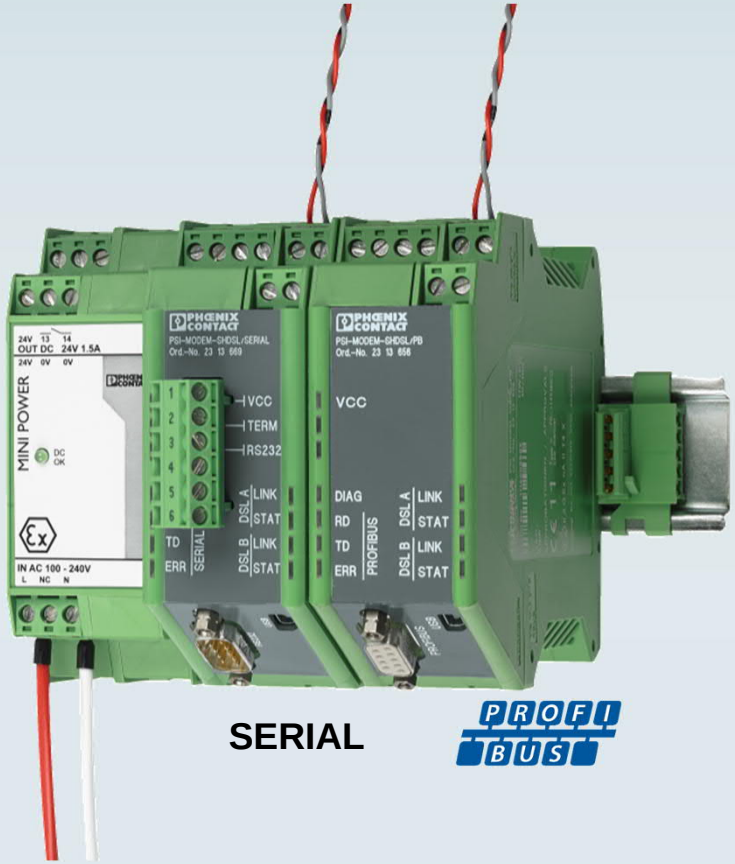
PHOENIX CONTACT
INSPIRING INNOVATIONS

Fiber optic converter

Accessories

				
	MINI-PS-100-240AC/24DC/1.5/EX	**MINI-SYS-PS-100-240AC/24DC/1.5**	**ME 17,5 TBUS 1,5/ 5-ST-3,81 GN**	**ME 17,5 TBUS 1,5/PP000-3,81 BK**
Device type	System power supply	System power supply	DIN rail connector	DIN rail connector
Description	For providing the supply voltage via the foot element (Din rail connector) In ex areas	For providing the supply voltage via the foot element (Din rail connector)	For bridging the **supply voltage and for data communication**	For bridging **only** the **supply voltage**
Output voltage	24 V DC	24 V DC	-	-
Output current	1,5 A	1,5 A	-	-
Order number	2866653	2866983	2709561	2890014

Extender – Serial & PROFIBUS



SERIAL

- PROFIBUS and Serial extender for copper-based transmission up to 20 km
- Robust SHDSL modulation method
- Does not required a special cable
- Any 2- or 4-wire cable can be used
- Point-to-Point, line and star structures

INSPIRING INNOVATIONS

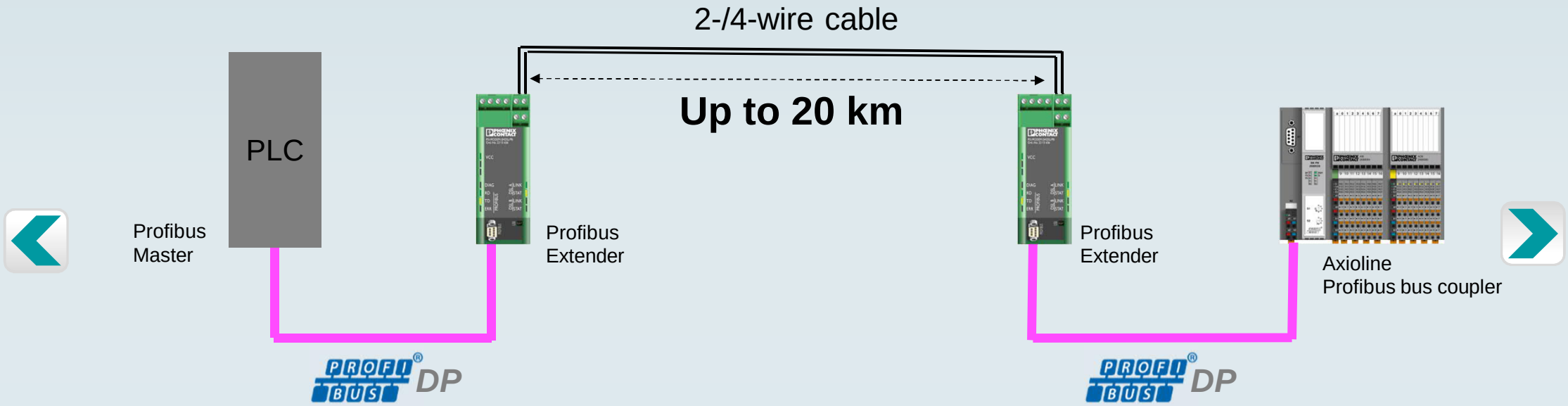
Extender - PROFIBUS



- PROFIBUS bus segments on existing on-site lines
- Distances up to 20 km possible with lower data rates and with good cable quality
- Line structure up to 30 SHDSL devices
- PROFIBUS
  - Linear structure: up to 500 kbps
  - Point-to-Point: up to 1,5 Mbps
- Diagnostic via USB port or LEDs
- Configuration software

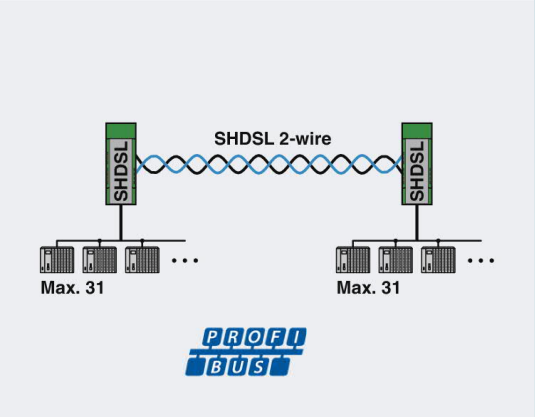
Extender – PROFIBUS

Example:

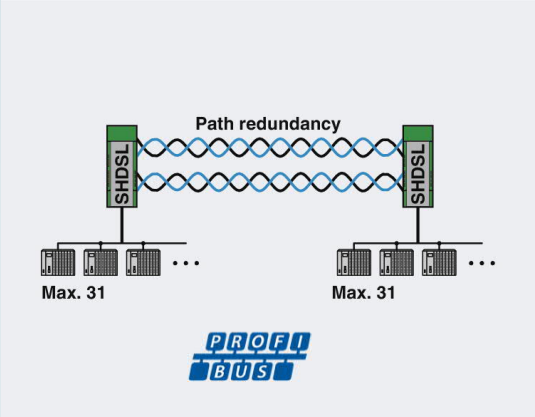


Extender – PROFIBUS

Topologies:

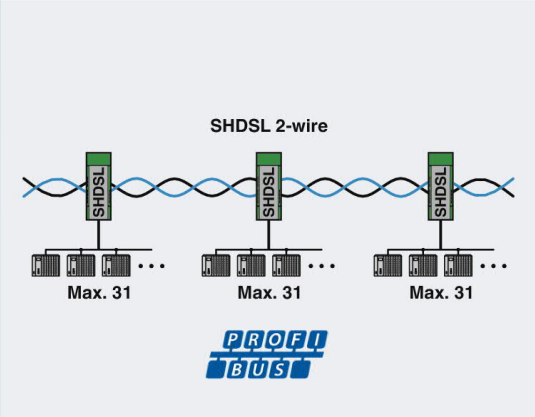


Point-to-Point
2-wire



Point-to-Point
4-wire

PROFIBUS data rate for point-to-point
is up to 1,5 Mbps



Line
2-wire

PROFIBUS data rate for linear
structure is up to 500 kbps

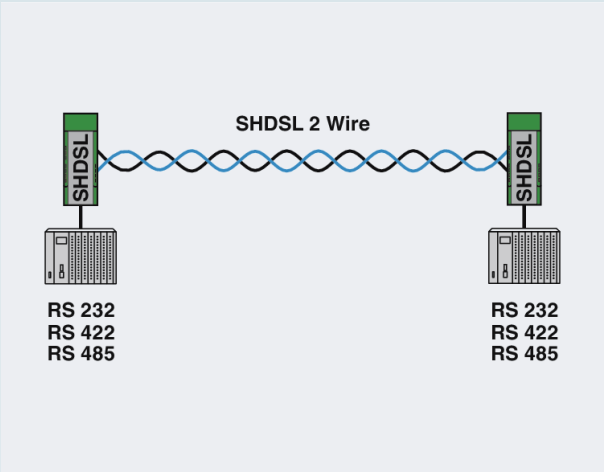
Extender - Serial



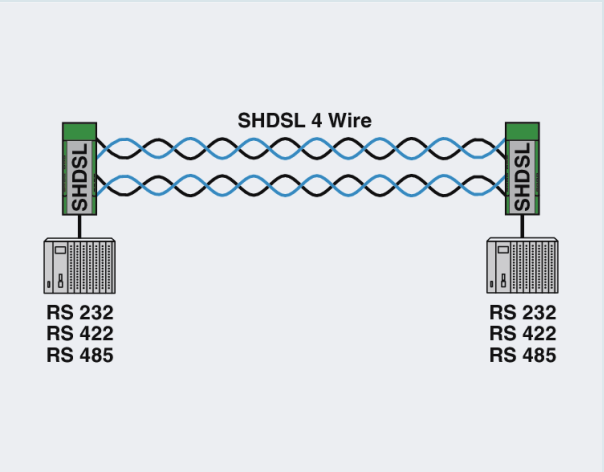
- Distances up to 20 km
- Transparent protocol
- Point-to-Point and line structures
- RS-232, up to 230,4 kbps
- RS-422, up to 2000 kbps
- RS-485 W2, up to 2000 kbps
- Diagnostic via USB port or LEDs
- Configuration software

Extender – Serial

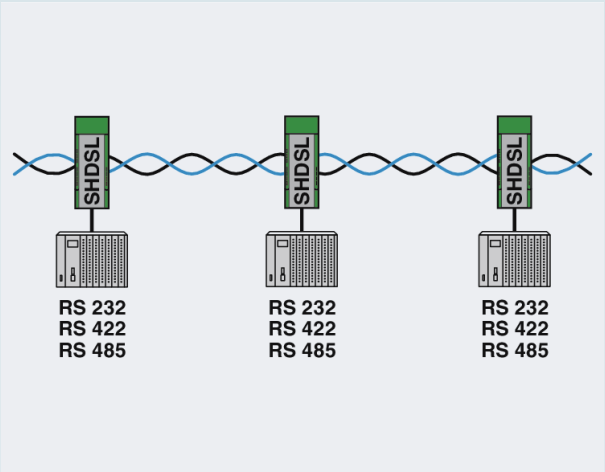
Topologies:



Point-to-Point
2-wire

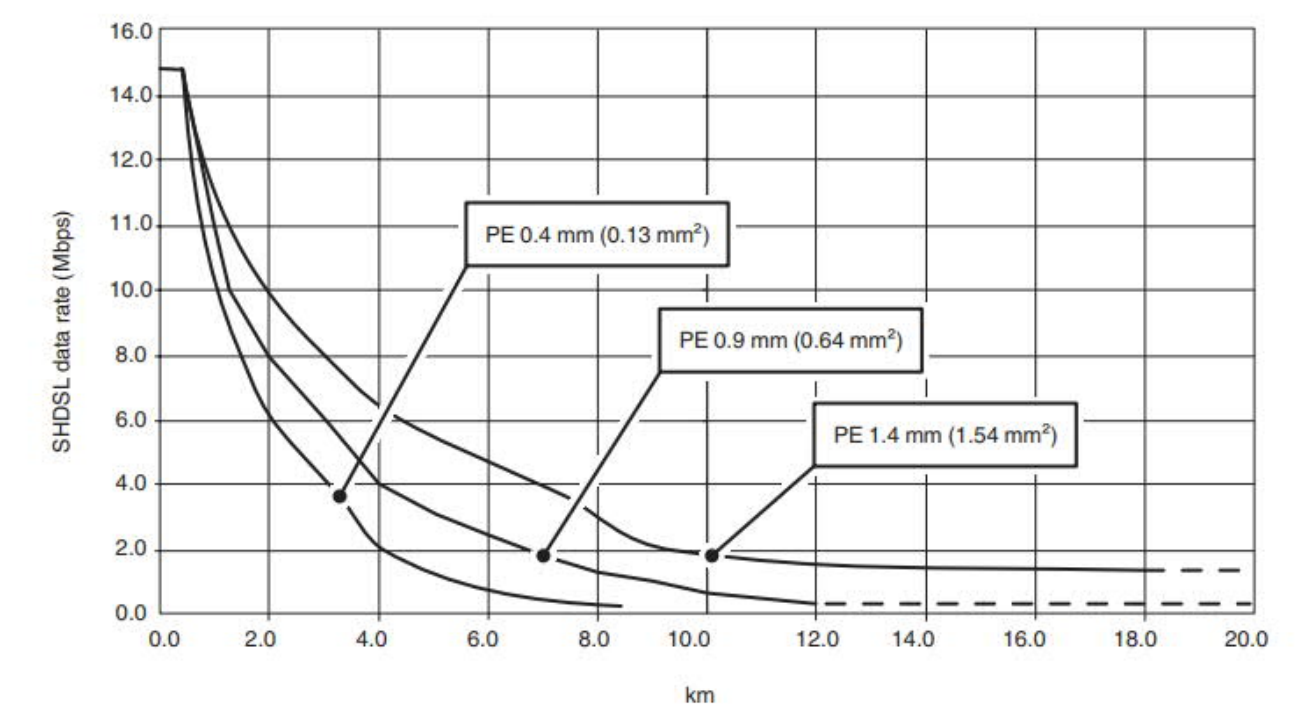


Point-to-Point
4-wire



Line
2-wire

Extender – Serial and PROFIBUS



Dependency of the maximum SHDSL data rate (Mbps) on the distance for a 2-wire connection

Extender – Serial & PROFIBUS







	PSI-MODEM-SHDSL/SERIAL	PSI-MODEM-SHDSL/PB	DT-TELE-SHDSL (Accessory)
Function	Industrial SHDSL extender for serial RS-232/422/485 interfaces	Industrial SHDSL extender for PROFIBUS	Surge protection for two SHDSL telecommunications interfaces
Topologies	Point-to-point, Line structure	Point-to-point, Line structure	-
Interfaces	RS-232 (D-SUB 9 plug), RS-422 (Screw connector), RS-485 (Screw connector)	PROFIBUS D-SUB 9 female connector	RJ 45 an plug-in screw termnal block
Transmission lenght (SHDSL Interface)	20 km	20 km	-
Serial transmission speed	Up to 2000 kbps	Up to 1,5 Mbps	-
Order number	2313669	2313656	2801593

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors

Reliable Plug and Play connectors
M12 connection technology for PROFIBUS and CANopen – preventing installation errors

The classic, flexible choice
Screw or spring connection, for bus systems or as a universal version



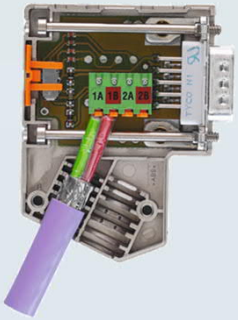
Specifically for PROFIBUS
It only takes a minute: user-friendly cable connection via screw or IDC terminal block technology

Maximum flexibility thanks to various cable outlets of 35°, 90° and 180°

D-SUB fast connectors

Maximum flexibility thanks to various cable outlets of 35°, 90° and 180°





Universal plugs
Versions with 9, 15 or 25 contacts for all commonly used interfaces

Specifically for PROFIBUS

Specifically for CANopen

M12 plugs
Direct assembly of M12 cables
Secure and easy detachable connections

Stripping tool for PROFIBUS cable

Termination resistor included

Universal plugs



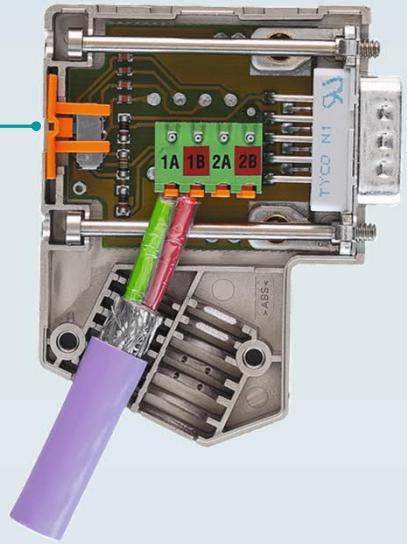
- Easy mounting, thanks to user-friendly connection methods
- High electromagnetic resistance, thanks to metalized housing
- Flexible cable entry at 35-degrees, thanks to reversible PCB's
- Comprehensive product range: versions with different numbers of positions and angles for cable entry
- Versions with 9, 15 or 25 contacts for all commonly used interfaces, such as RS-232/RS-422/RS-485, TTY and many more.

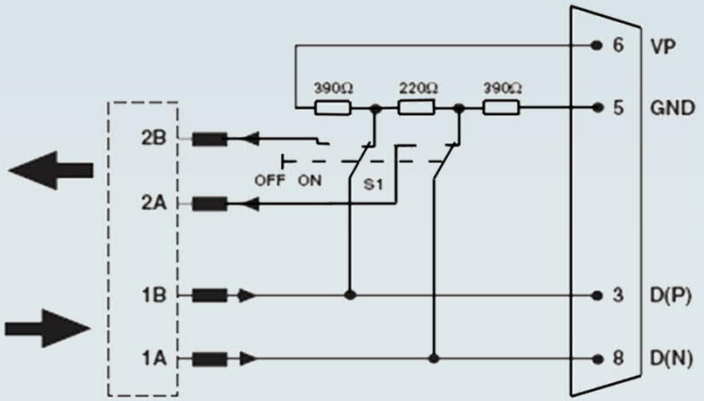
D-SUB connectors – Termination resistor



Slide switch to active the termination resistor

Termination resistor inside







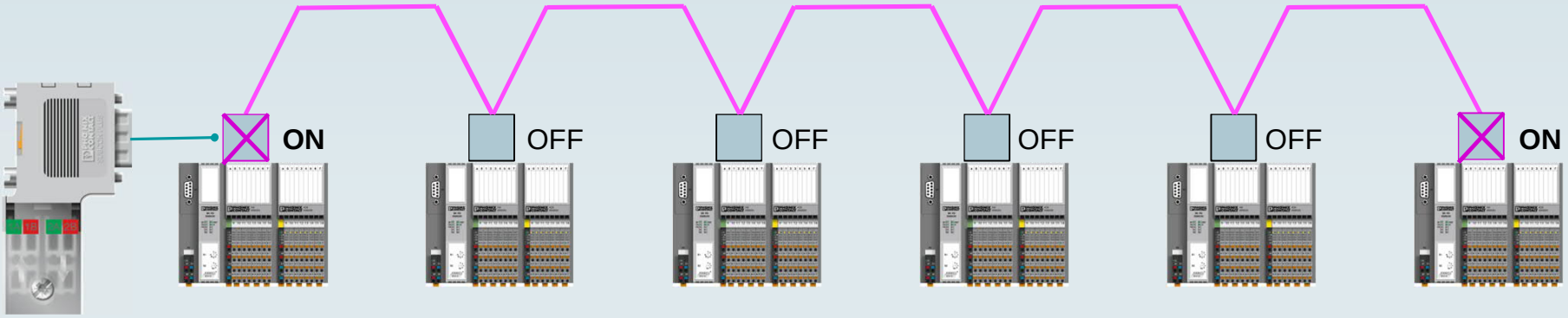
ON

OFF

CLICK HERE

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB connectors – Termination resistor



D-Sub connector

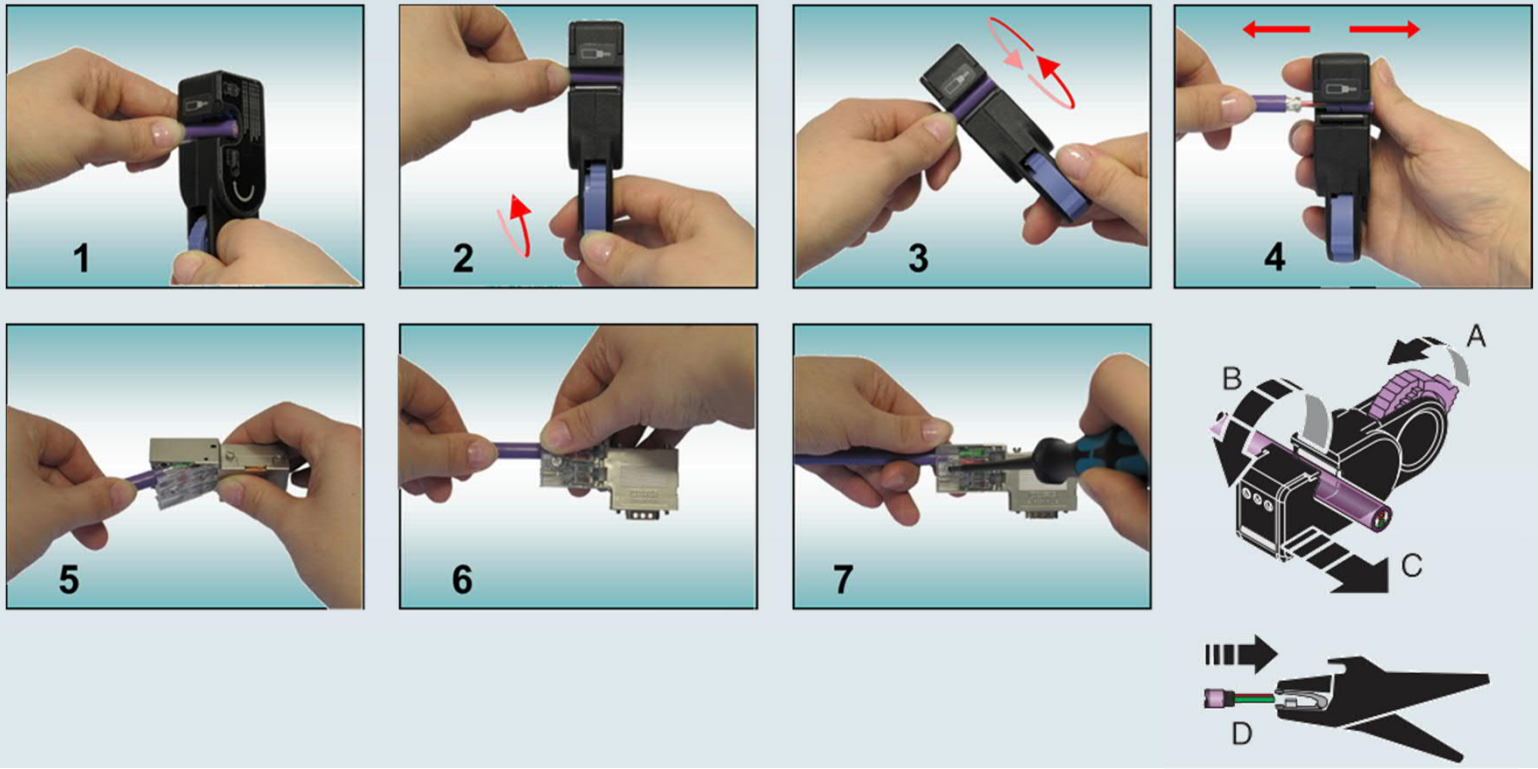


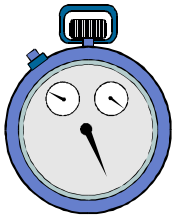


Use the side switch on the D-SUB connector, to activate the termination resistor at the start and end point of a bus system!

PHOENIX CONTACT
INSPIRING INNOVATIONS

Stripping tool





The easiest on side termination in **< 1 min.**



Quick stripping tool
PSM-STRIP-FC/PROFIB
Order number: 2744623

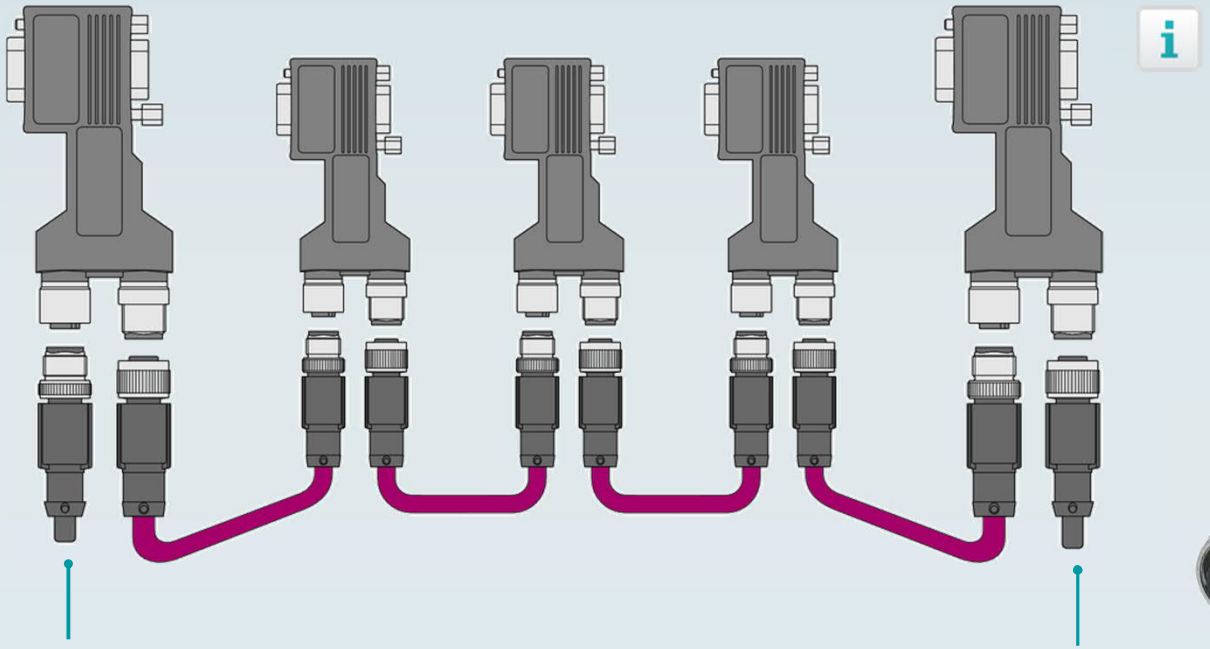
INSPIRING INNOVATIONS

D-SUB fast connectors M12



- **Direct assembly of M12 cables**
  Secure and easy detachable connections
- **Variants for every requirement**
  Different angles of M12 orientation for every application
- **Fault-free Installation**
  by using 100% pre-tested components
- **Full moulded housing**
  resistance against harmful environment
- **M12 SPEEDCON interlock system**
  M12 locking with just a half-turn
- **Complete product range**
  with 14 types for PROFIBUS and CANopen

D-SUB plug with M12 SPEEDCON – Termination resistor



M12 Termination resistor



M12 Termination resistor

D-SUB fast connectors M12









PROFIBUS CANopen	SUBCON-PLUS-PROFIB/90X/M12 SUBCON-PLUS-CAN/90X/M12	SUBCON-PLUS-PROFIB/90X/PG/M12 SUBCON-PLUS-CAN/90X/PG/M12	SUBCON-PLUS-PROFIB/90/M12 SUBCON-PLUS-CAN/90/M12	SUBCON-PLUS-PROFIB/90/PG/M12 SUBCON-PLUS-CAN/90/PG/M12	SUBCON-PLUS-PROFIB/35/M12 SUBCON-PLUS-CAN/35/M12	SUBCON-PLUS-PROFIB/35/PG/M12 SUBCON-PLUS-CAN/35/PG/M12	SUBCON-PLUS-PROFIB/AX/M12 SUBCON-PLUS-CAN/AX/M12
Description	Long version for Siemens S7 controller		Compact connector for universal operation		Universal version with angular M12 connector		For limited space requirements
Cable inlet	90°	90°	90°	90°	35°	35°	180°
Version	Long	Long with PG	Compact	Compact with PG	Universal	Universal with PG	Axial
Order number PROFIBUS	2902729	2902728	2902318	2902317	2902320	2902319	2902321
Order number CANopen	2902731	2902730	2902323	2902322	2902325	2902324	2902326

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors M12 Accessories

							
	Termination resistor M12	**Termination resistor M12**	**Bus system cable 0,3 m**	**Bus system cable 1 m**	**Bus system cable 2 m**	**Bus system cable 5 m**	**Bus system cable Free input**
Type	SAC-5P-M12MS PB TR	SAC-5P-M12FS PB TR	SAC-2P-MSB/0,3-910/FSB SCO	SAC-2P-MSB/1,0-910/FSB SCO	SAC-2P-MSB/2,0-910 SCO	SAC-2P-MSB/5,0-910/FSB SCO	SAC-2P-MSB-FSB SCO/910/...
Description	PROFIBUS M12	PROFIBUS M12, female connector	Bus system cable, Profibus (12 Mbps)	Bus system cable, Profibus (12 Mbps)	Bus system cable, Profibus (12 Mbps)	Bus system cable, Profibus (12 Mbps)	Bus system cable, Profibus (12 Mbps)
Cable lenght	-	-	0,3 m	1 m	2 m	5 m	0,2 ….40 m
Order number	1507803	1403911	1518106	1518122	1518025	1518148	1538092

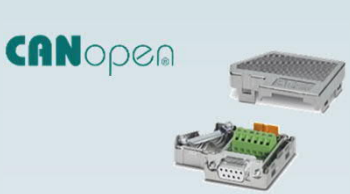
PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors

						
	SUBCON-PLUS-PROFIB/90/IDC	**SUBCON-PLUS-PROFIB/90/SC**	**SUBCON-PLUS-PROFIB/SC2**	**SUBCON-PLUS-PROFIB/AX/SC**	**SUBCON-PLUS-PROFIB/PG**	**SUBCON-PLUS-PROFIB/AX**
Description	IDC terminal block connection	Screw connection teminal blocks	Screw connection teminal blocks	Screw connection teminal blocks	Spring connection terminal blocks	Spring connection terminal blocks
Cable inlet	90°	90°	35°	180° (axial)	35°	180° (axial)
Order number	2313672	2313698	2708232	2744380	2744403	2744377
Order number with Programming Interface	2313685	2313708	2708245	-	2744348	-

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors







	SUBCON-PLUS-CAN	SUBCON-PLUS-CAN/SC2	SUBCON-PLUS-CAN/AX
Description	Screw connection terminal blocks, CAN, CANopen®, SafetyBUS p up to 1 Mbps	Screw connection terminal blocks, CAN, CANopen®, SafetyBUS p up to 1 Mbps	Screw connection terminal blocks, CAN, CANopen®, SafetyBUS p up to 1 Mbps
Cable inlet	35° Cable diameter 6…10 mm	35° Cable diameter 7,6…8,4 mm	180° (axial)
Order number	2744694	2708999	2306566
Order number with Programming Interface	-	2708119	-

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors - Universal



	SUBCON 9/M-SH	SUBCON 15/M-SH	SUBCON 15 HD/M-SH	SUBCON 25/M-SH	SUBCON 37/M-SH	SUBCON 9/F-SH	SUBCON 15/F-SH	SUBCON 15 HD/F-SH	SUBCON 25/F-SH	SUBCON 37/F-SH
Housing	With one cable entry									
Pin assignment	All contacts (pin / socket) to terminal block									
D-SUB/ No. of pos.	9-pos. pin	15-pos. pin	15-pos- pin HD	25-pos.pin	37-pos. pin	9-pos. socket	15-pos. socket	15-pos. socket HD	25-pos. socket	37-pos. socket
Order number	2761509	2761606	5604602	2761622	2300973	2761499	2761596	5604603	2761619	2300986

PHOENIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors - Universal













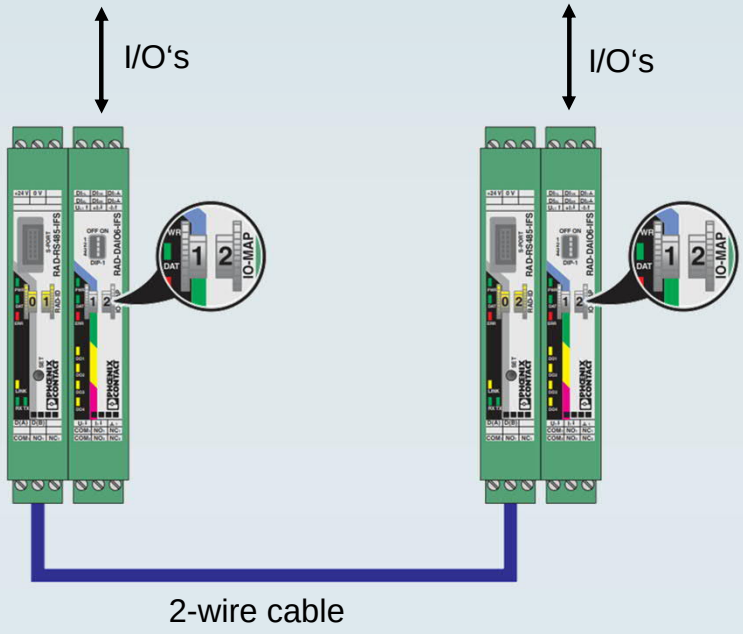
	SUBCON-PLUS 9/M	SUBCON-PLUS M1	SUBCON-PLUS M2	SUBCON-PLUS 9/F	SUBCON-PLUS F1	SUBCON-PLUS F2	SUBCON-PLUS F3	SUBCON-PLUS F4	SUBCON-PLUS F5	SUBCON-PLUS-M/AX 9	SUBCON-PLUS-F/AX 9
Housing	With two cable entries									180° (axial)	180° (axial)
Pin assignment	Full assignment to one terminal block	1,2,3,5,6,8 to two terminal blocks	2,3,4,5,7,9 to two terminal blocks	Full assignment to one terminal block	1,2,3,5,6,8 to two terminal blocks	2,3,4,5,7,9 to two terminal blocks	2,3,6,7,8,9 to two terminal blocks	2,3,4,5,6,7 to two terminal blocks	1,1,2,3,6,7 to two terminal blocks	Full assignemnet to one terminal block	
D-SUB/ No. of pos.	9.pos. pin			9.pos. socket						9. Pos pin	9.pos. socket
Order number	2744018	2761826	2761839	2744241	2744267	2799490	2761871	2744089	2744102	2904467	2311797

INSPIRING INNOVATIONS

Radioline Multipoint Multiplexer



I/O-Mapping via 2-wire-cables



- Multipoint multiplexer (I/O to I/O)
- Multipoint multiplexer and Wireless
- Modbus RTU slave (I/O to serial)
- Modbus RTU slave and Wireless

Radioline Multipoint Multiplexer

I/O-Mapping via 2-wire-cables



Multipoint-Multiplexer
Distribution of I/O signals via existing 2-wire-cables

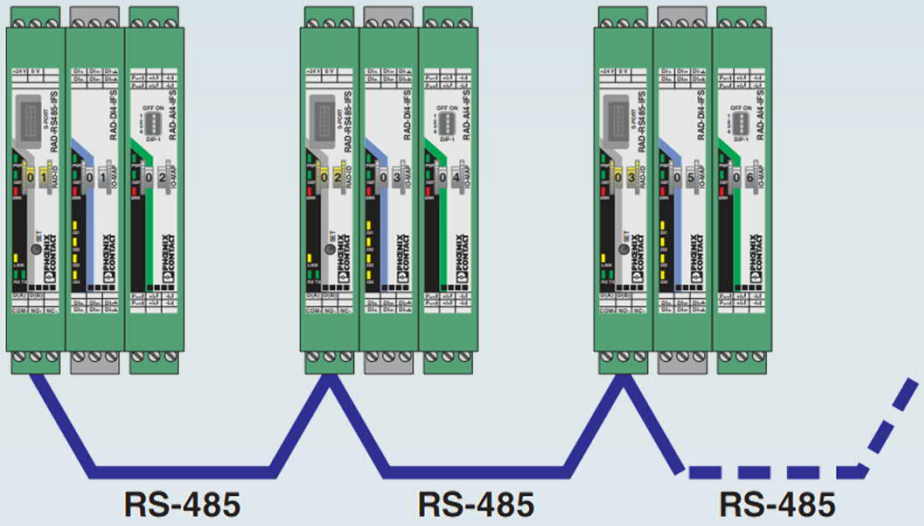


Stand-Alone as Modbus-Slave
Operation on any Modbus/RTU-Master

Intermedia communication
Wireless and wired modules form a combined system.



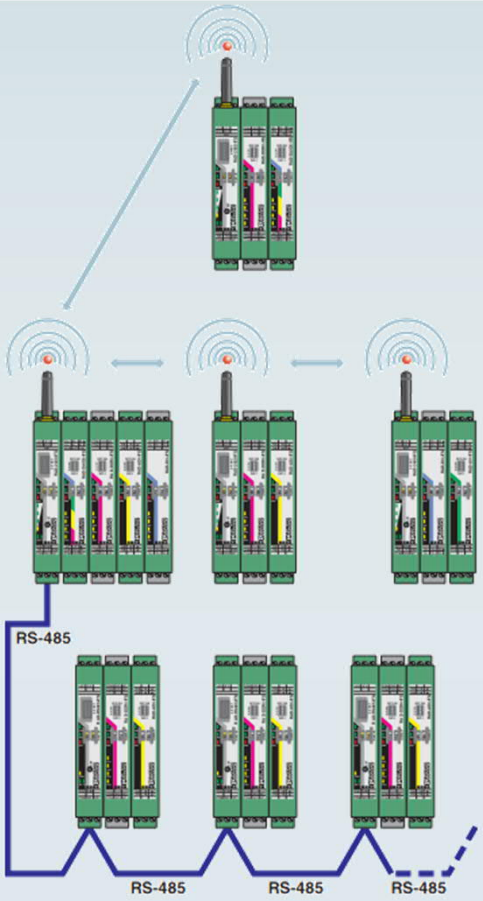
Radioline Multipoint Multiplexer I/O to I/O



- Multipoint multiplexer – easy I/O distribution between multiple stations
- Up to 99 stations via RS-485
- Addressing using yellow thumbweel
- Easy I/O mapping using white thumbwheel on the extention modules
- Fast startup via Plug and Play

PHOENIX CONTACT
INSPIRING INNOVATIONS

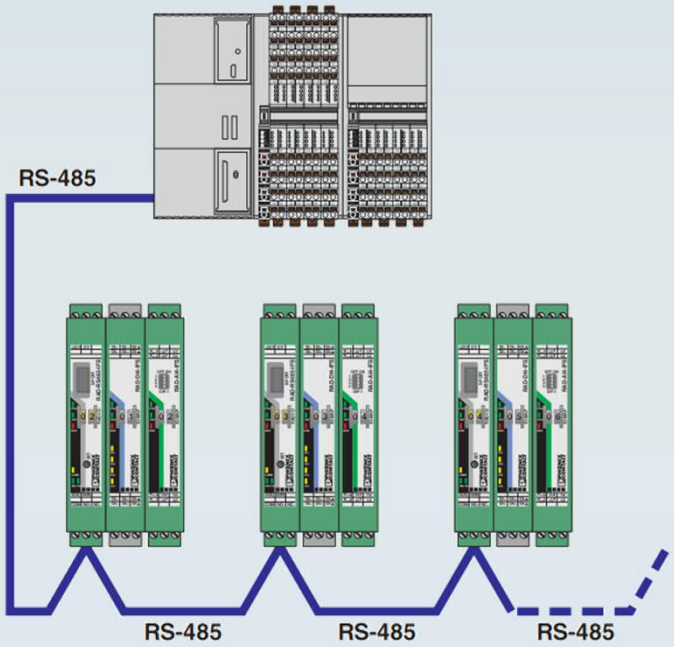
Radioline Multipoint Multiplexer and Wireless



- Cross-media distribution of I/O signals
- Up to 250 stations in total:
  - 98 RS-485 stations and
  - 152 wireless stations
- Easy I/O mapping using white thumbwheel on the extention modules
- Fast startup via Plug and Play

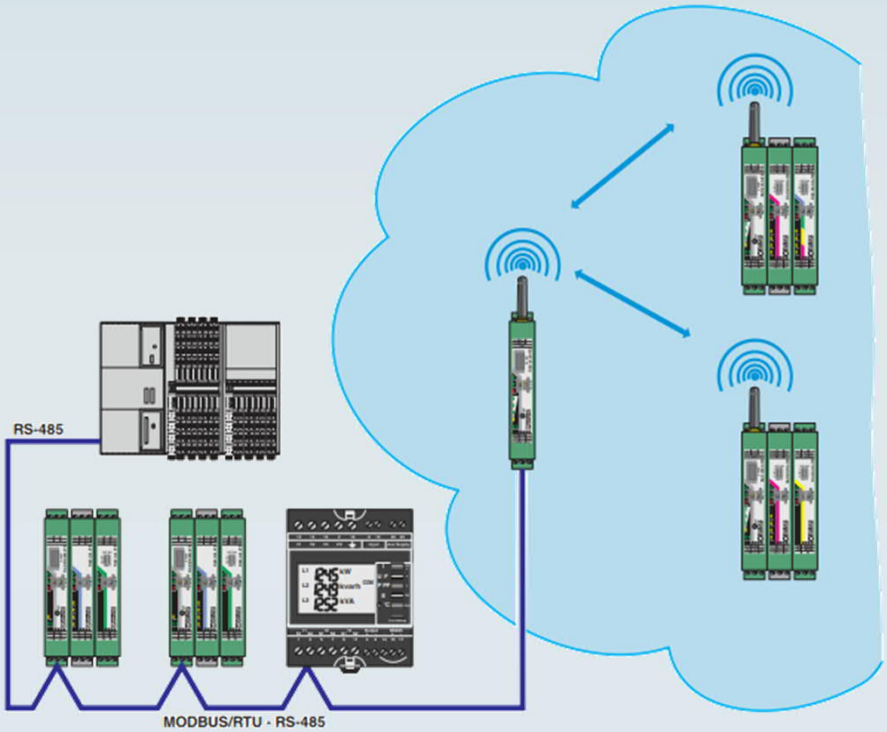
PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline Modbus RTU slave (I/O to serial)



- Operation as a bus coupler for Modbus RTU with Radioline extendsion modules
- As a Modbus slave to any master
- Up to 98 stations per Modbus newtork
- Integration in existing Modbus newtorks
- Fast startup via Plug and Play
- Default setting of the RS-485 interface: 19.2/8/E/1

Radioline Modbus RTU slave (I/O to serial)



- Radioline wireless system and RS-485 stations at a Modbus master (I/O to serial)
- Support for all Radioline wireless systems (2,4 GHz, 868 MHz, 900 MHz)
- Up to 98 RS-485 stations and up to 250 wireless stations
- The wireles network acts like a single Modbus RTU slave
- All devices in the RS-485 network are standard Modbus RTU slaves
- Integration in existing Modbus networks

Radioline Multipoint Multiplexer – Extension modules







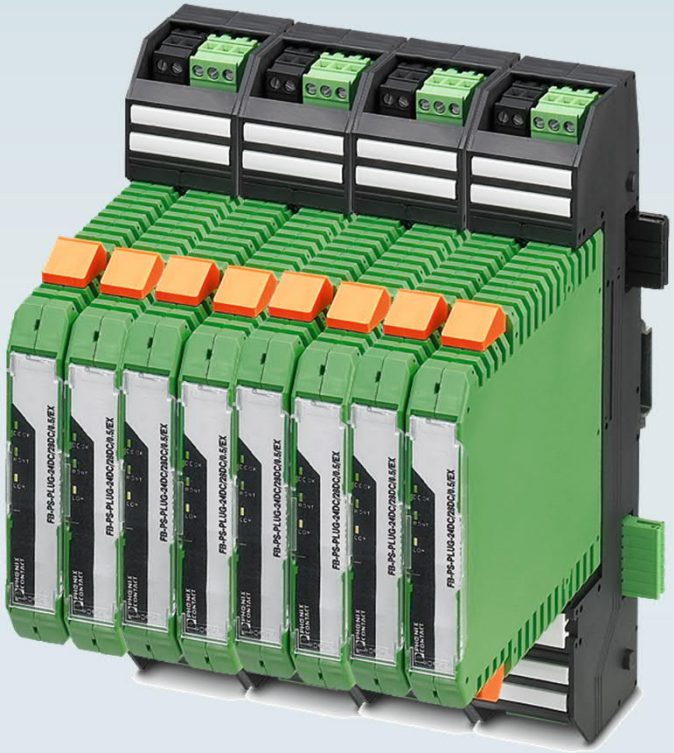




	Communication module	Digital In 4 channel	Digital Out 4 channel	Digital In 8 channel	Digital Out 8 channel	Analog In 4 channel	Analog Out 4 channel	Analog / digital	PT 100 4 channel
Type	RAD-RS485-IFS	RAD-DI4-IFS (Input)	RAD-DOR4-IFS (Output)	RAD-DI8-IFS (Input)	RAD-DO8-IFS (Output)	RAD-AI4-IFS (Input)	RAD-AO4-IFS (Output)	RAD-DAIO6-IFS (Input / output)	RAD-PT100-4-IFS
Description	RS-485 multipoint multiplexer, can be extended with I/O modules	4 digital wide range inputs 0…250V AC/DC	4 digital relay outputs 24 V DC / 250 V AC / 5 A	8 digital inputs 0…30,5 V DC	8 digital transistor outputs 30,5 V DC / 200 mA	4 analog input 0/4…20 mA	4 analog outputs Alternatively 0/4…20 mA or 0…10 V DC	1 analog input/output 0/4…20 mA 2 digital wide range inputs/outputs 0…250 V AC/DC	4 Pt100 inputs Temperature measuring range: -50°C…+250°C
Order number	2702184	2901535	2901536	2901539	2902811	2901537	2901538	2901533	2904035

PHOENIX CONTACT
INSPIRING INNOVATIONS

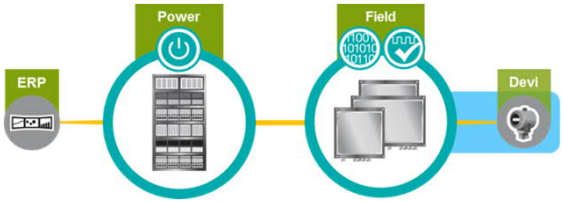
FOUNDATION Fieldbus Power



ACB TECHNOLOGY

ISA G3 Harsh Severity Level tested

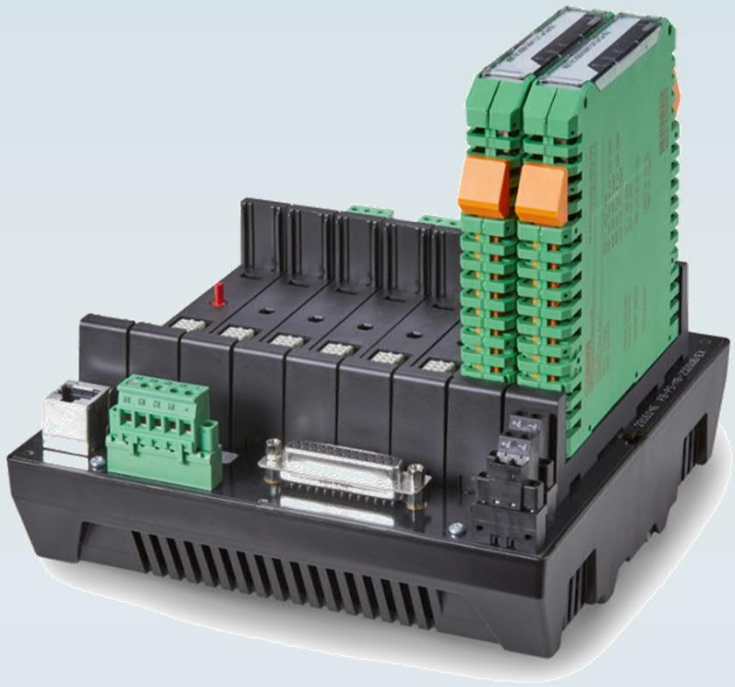
- Utilizes Key Features of QUINT line with the reliability of Fieldbus
- Modular base eliminates unused capacity
- Integrated diagnostic relay in each plug
- Bulk power distribution and common error messaging between bases
- ACB Technology maximizes the service life of the power supplies
- 500 mA @ 28 VDC



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

FOUNDATION Fieldbus Power



ISA G3 Harsh Severity Level tested

- Class 1 Division 2, Zone 2 Installation
- -40C….+70C operating temperature range
- 180mm x 77mm x 180mm
- Integrated Relay diagnostics
- Host Connection options
  - D-SUB 25 socket connector
  - Invensys® D-SUB 25 cable
  - Two Yokogawa AKB336 20-pin cables
  - Four terminal block connections (no approvals)

FOUNDATION Fieldbus Power

							
	FB-PS-PLUG-24DC/28DC/0.5/EX	**FB-PS-BASE/EX**	**FB-PS-MB-25DSUB/EX**	**FB-PS-MB-Y/EX**	**FB-PS-MB-I/EX**	**D-FB-PS**	**ZEC 1,5/ 4-LPV-5,0 C2,4 BK**
Description	Power supply plug for fieldbus system in hazardous locations	Base for fieldbus power supply plugs.	Universal four-channel, redundant fieldbus power supply base with D-SUB 25 host connector. **Universal four channel redundant fieldbus power supply base with Host Terminal blocks available (2316155)**	Yokogawa four-channel, redundant fieldbus power supply base with host connectors for two AKB336 Yokogawa 20-pin cables.	Invensys four-channel, redundant, fieldbus power supply base with host connector for Invensys D-SUB 25 cable.	End cover for FB-PS-BASE/EX base. Use in power and indicator bus at each end base.	PCB connector, nominal current: 10 A, rated voltage (III/2): 320 V, number of positions: 4, pitch: 5 mm, color: black, contact surface: Tin, mounting: Direct plug-in method
	Provides 500 mA @ 28 V DC to couplers along the trunk.	Provides redundancy when 2 plugs are installed. Redundancy is maintained across multiple bases via internal power buses. Additional internal bus provides remote indication.					
Order number	2316132	2316145	2316146	2316148	2316149	2316226	1793260

PHOENIX CONTACT
INSPIRING INNOVATIONS

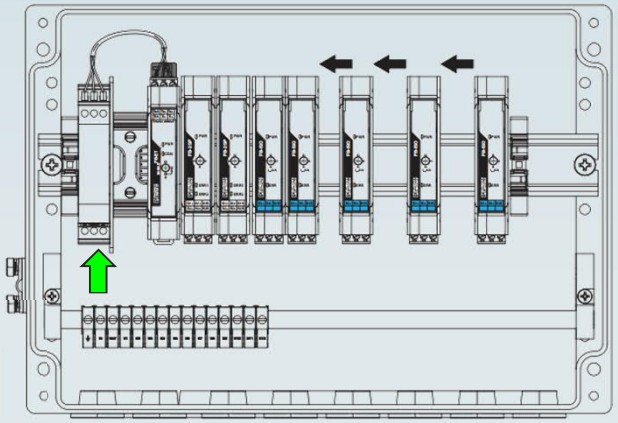
Fieldbus Device Couplers



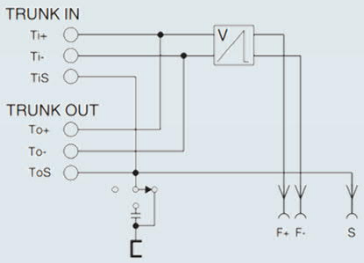
Modular field device coupler for Zone 2

- For PROFIBUS PA and Foundation Fieldbus
- Three main devices:
  - Trunk line module
  - Coupling module
  - Diagnostic module
- For Zone 2 installations, with connection of Zone 0, 1 and 2 instruments in the same housing
- Integration in the control level is carried out via standard H1 (FF) communication and device management using DD, EDDL and DTM.

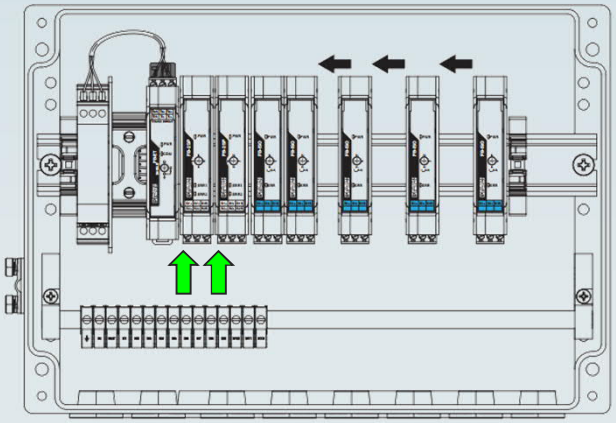
Fieldbus Device Couplers



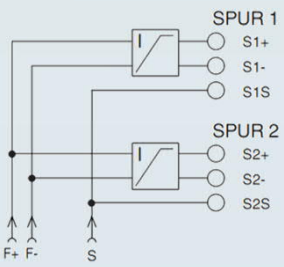




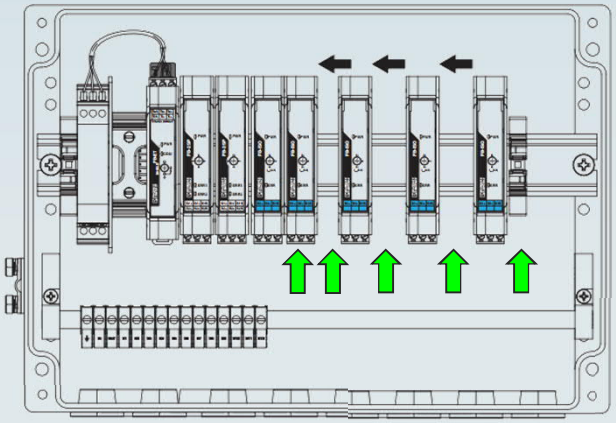
FB-ET/E



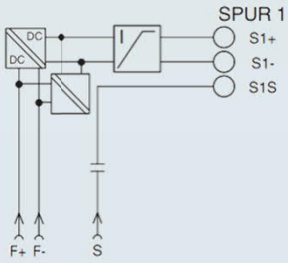




FB-2SP/E







FB-ISO

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

	 FB-ET/E	 FB-2SP/E	 FB-2SP/24DC	 FB-ISO	 FB-DIAG/FF/LI	 FB-DIAG/FF/NC
Description	Trunk module for Foundation Fieldbus and PROFIBUS PA modular device couplers with terminator	Device coupler for Foundation Fieldbus and PROFIBUS PA with terminal connections for 2 spurs connected to fieldbus end devices	Foundation Fieldbus isolator for Zone 2 installation using the intrinsically safe [ic] protection method.	Device coupler for Foundation Fieldbus and PROFIBUS PA. Provides intrinsically safe FISCO connection to a single end device.	Field diagnostics module, legacy installation, includes pluggable side connector. For Foundation Fieldbus	Field diagnostic module, includes TBUS connector. For Foundation Fieldbus
	Redundancy (High Reliability)		ATEX ic Zone 2	Ex ia, Zone 0		
Order number	2316050	2316052	2316352	2316064	2316284	2316297

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers





	FB-MODULAR-PP	FIELDBUS TERMINATOR
Description	Partition plate used between two fieldbus modular device couplers and provides the required 50 mm spacing between an **intrinsically safe** electrical connection and a **non-intrinsically safe** electrical connection.	The fieldbus terminator plug is pre-installed in the trunk out connection of device couplers. It is required to be installed at the end of each fieldbus segment to realize impedance matching of the network.
Order number	2316061	2316034



Example of non-intrinsically safe and intrinsically safe signal connections on same t-bus back plane

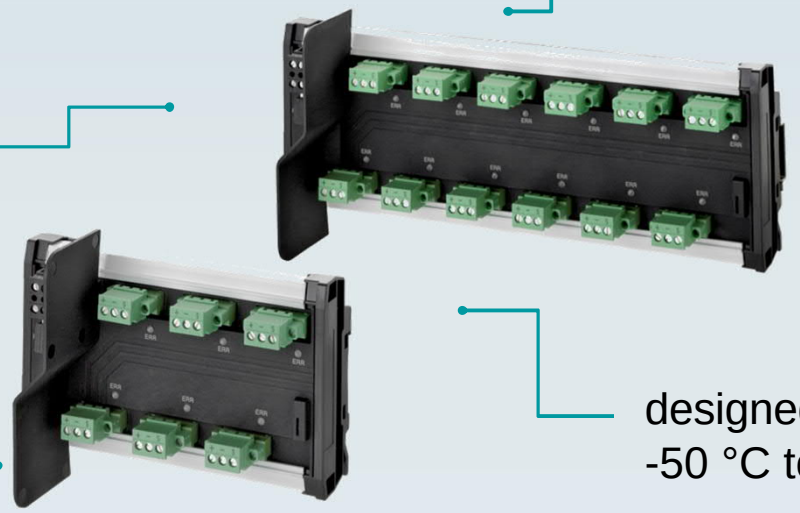
PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

Field device coupler for Zone 2 / Division 2

Field device couplers for **PROFIBUS PA** and **FOUNDATION Fieldbus** with **6 and 12 channels**

Save space
highly compact and connection takes place on one side from below



Terminator preinstalled

designed for ambient temperatures of -50 °C to +90 °C.

ISA G3 Harsh Severity Level tested

Fieldbus Device Couplers

Zone 1 Installation

2g Vibration
15g shock

IP 30 Trunk cover

1 kilogram

NAMUR NE 21
FF-846
ISA G3 tested



1500 V AC Isolation
between Trunk and Spur

-40º ... 80º Celsius
operating temperature

35mA maximum current draw per spur

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers






	FB-6SP	FB-12SP	FB-8SP ISO	FB-12SP ISO
Interface 1	Foundation Fieldbus and PROFIBUS PA Segment			
No. of ports	6	12	8	12
Located in	Zone 2	Zone 2	Zone 1	Zone 1
Order number	2316307	2316310	2316311	2316312

INSPIRING INNOVATIONS

Fieldbus Device Couplers – Terminal box

Enclosure Solution for Zone 2 / Division 2

Grounding Lug

316 Stainless Steel

Removable Hinges





Pad lock capable

6 and 12 channel



Available with Terminal blocks or Surge base for Trunk Connection

Single piece gasket – IP66

ATEX, IEC Ex , Class 1 Div 2 System

Fieldbus Device Couplers – Terminal box






	FB1-S1-6SP-T-0-10-00-0-0	FB1-S1-6SP-S-0-10-00-0-0	FB2-S1-12SP-T-0-16-00-0-0	FB2-S1-12SP-S-0-16-00-0-0
Description	FF/PA - 6-spur block junction box	FF/PA - 6-spur block junction box	FF/PA - 12-spur block junction box	FF/PA - 12-spur block junction box
Connect up to	6 field devices	6 field devices	12 field devices	12 field devices
Surge protection	No	**Trunk cable (+, -, S) is connected to a Plugtrab surge base (PT 4+F-BE)**	No	**Trunk cable (+, -, S) is connected to a Plugtrab surge base (PT 4+F-BE)**
Features	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur
Order number	2316420	2316446	2316417	2316433

PHOENIX CONTACT
INSPIRING INNOVATIONS

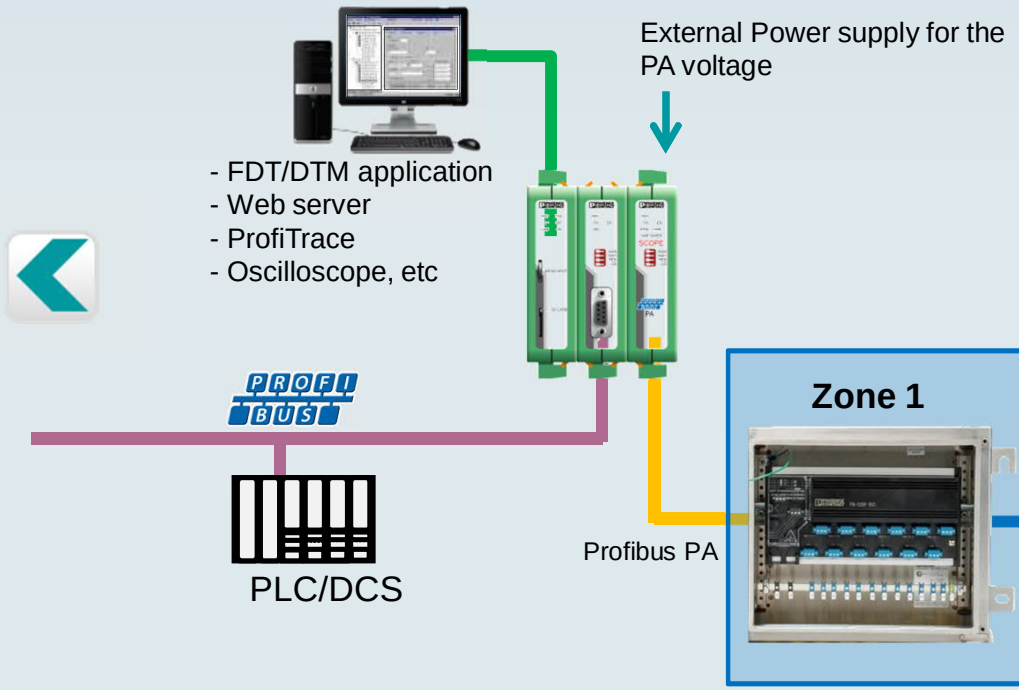
PROFIBUS DP/PA Converter

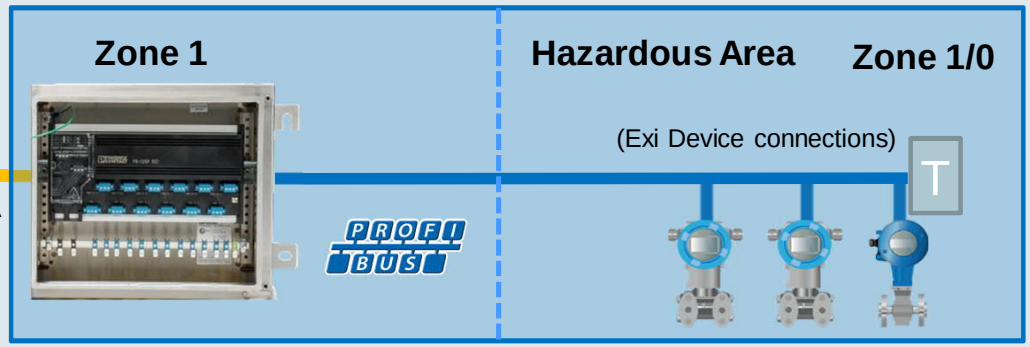


- One communication interface module can drive up to ten individual PROFIBUS DP or PROFIBUS PA modules
- Powerful, embedded web server for configuration and
  access to network diagnostics
- PROFIBUS PA link can auto-detect any baud rate up to 12 Mbps transparently
- Built-in ProfiTrace® OE for monitoring network status
- System is completely hot swappable
- Manage and configure PROFIBUS field devices using FDT/DTM
- Redundancy installation

PHOENIX CONTACT
INSPIRING INNOVATIONS

Profibus PA Exi Connection Solution

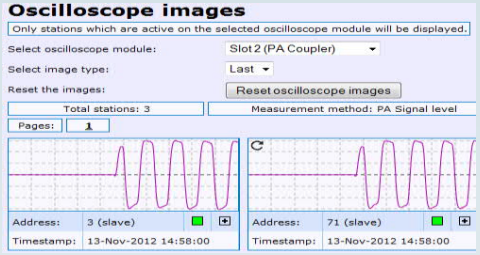




- 9.6 kbps .. **12 Mbps** on the PROFIBUS DP side
- Integrated PA termination
- Standard 500 mA PA current and up to 6A with power module
- Customizable PA voltage
- Maximum 9 modules (1 module for the PLC/DCS)
- Exi device connections using **FB-ISO coupler**

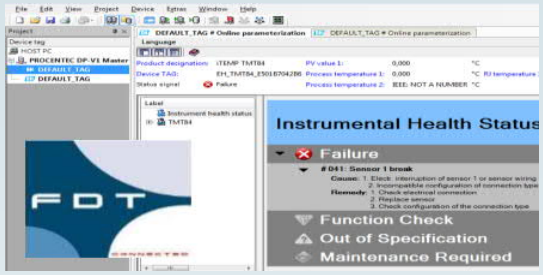
PHOENIX CONTACT
INSPIRING INNOVATIONS

PROFIBUS DP/PA Converter – Web-Based Management

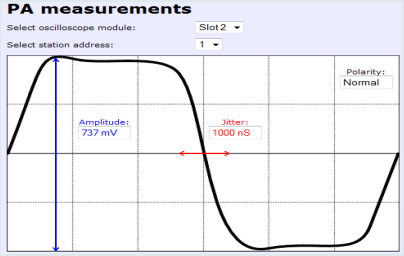


Telegram Anaylsis





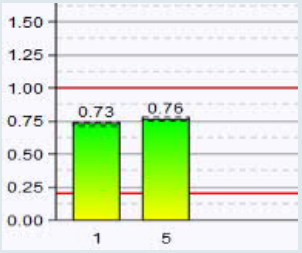
FDT / DTM



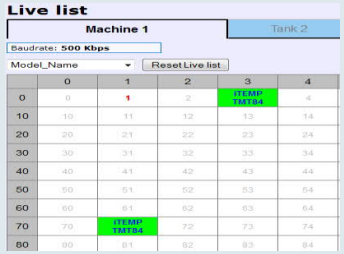
Signal Analysis

Channel 1	
Network:	1 (Machine 1)
Baudrate:	500 Kbps
Station count active on channel:	2
Link function:	Off
Setting:	Dipswitch
DC voltage:	23.59 V
DC plus:	12.16 V
DC min:	-11.43 V
DC noise:	23 mV
DC unbalance:	-7 %
Current consumption:	0.029 A

DC Analysis



Bar Graphs



Profi Trace

PHOENIX CONTACT
INSPIRING INNOVATIONS

PROFIBUS DP/PA Converter





	FB-HSB-DP/PA	FB-HSP-PLUG/24DC/6A
Description	**PROFIBUS DP to PROFIBUS PA coupler**	**PROFIBUS power module 6A**
	Auto detect any baud rate up to 12 Mbps transparently	The PROFIBUS power module adds additional power to the backplane of a PROFIBUS network when the headstation is no longer capable of supporting all of the DP or PA modules. Power modules can be used to create power redundancy on the backplane.
	Manage and configure PROFIBUS field devices using FDT/DTM	Adds additional power to the PROFIBUS backplane Backplane power redundancy
Order number	2316370	2316383

INSPIRING INNOVATIONS

PROFIBUS DP/PA Converter

				
	FB-HSC	**FB-DP-RPTR**	**FB-DP-RPTR/SC**	**FB-PA/SC**
Description	**Head station for monitoring up to four PROFIBUS networks**	**PROFIBUS DP interface/repeater module**	**PROFIBUS DP repeater expansion module for the PROFIBUS DP/PA coupler system**	**PROFIBUS PA interface module with oscilloscope**
	One communication interface module can drive up to ten individual PROFIBUS DP or PROFIBUS PA modules	Automatic detection of baud rate up to 12 Mbps Integrated switchable terminator	Oscilloscope and bar graph functionality Automatic detection of baud rate up to 12 Mbps	
	Manage and configure PROFIBUS field devices using FDT/DTM	Supported protocols: DP-V0, V1, V2, FDL, MPI, FMS and Profisafe No bus addressing of device required	Supported protocols: DP-V0, V1, V2, FDL, MPI, FMS and Profisafe No bus addressing of device required	
Order number	2316371	2316373	2316374	2316375

PHOENIX CONTACT
INSPIRING INNOVATIONS

Profibus PA I/O Multiplexer

Collecting I/O data from PROFIBUS PA fieldbus systems

Easy integration into host system with an EDD-, GSD-, or DTM-data file



No software needed thanks to a pre-configured head station

Five application-specific head stations allow simple implementation in the field

UL listed

Suitable for ATEX zone 2, IECEx CoC

PHOENIX CONTACT
INSPIRING INNOVATIONS

Profibus PA I/O Multiplexer



Five head stations enable different combinations of I/O modules to exist on a Profibus PA networks.

The table shows the maximum possible I/O modules per head station.

			Maximum I/O extension modules per head station								
			FB-DI4/NAMUR-IFS 2316275	RAD-DAIO6-IFS 2901533	RAD-DI4-IFS 2901535	RAD-DOR4-IFS 2901536	RAD-DI8-IFS 2901539	RAD-AI4-IFS 2901537	RAD-AO4-IFS 2901538	PT100-4-IFS 2904035	
Ord. No.	**Head station**	**Station Profile**	**NAMUR digital Input**	**Digital/ analog In-/output**	**Digital Input**	**Digital Output**	**Digital Input**	**Analog Input**	**Analog Output**	**PT 100**	
2316270	FB-MUX/HS/DIO-NAM/PA	Valve Coupler solution to open and close, monitor, the position of a valve	**3**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	
1005331	FB-MUX/HS/AI/PA	Temperature and / or Analog In	**-**	**-**	**-**	**-**	**-**	**(5)***	**-**	**(5)***	Up to 5 AI or PT100
1005330	FB-MUX/HS/AIOTEMP/PA	Analog I/Os & Temperature	**-**	**-**	**-**	**-**	**-**	**(3)***	**2**	**(3)***	3 AI or 3 PT00
1005329	FB-MUX/HS/DAIO/PA	Combo Digital & Analog I/Os	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	
1005332	FB-MUX/HS/DI24/PA	High Density Digital Inputs or NAMUR digital inputs	**(6)***	**-**	**-**	**-**	**(3)***	**-**	**-**	**-**	

*see also Headstation description on the next slide!

Profibus PA I/O Multiplexer – Head stations

					
	FB-MUX/HS/AI/PA	**FB-MUX/HS/AI/PA**	**FB-MUX/HS/AIOTEMP/PA**	**FB-MUX/HS/DAIO/PA**	**FB-MUX/HS/DI24/PA**
Description	Can be used with up to five 4-channel analog input modules (RAD-AI4-IFS), five 4-channel PT100 temperature sensing modules (PT100-4-IFS), or any combination of modules for a maximum of 20 channels. This configuration can be used as an analog input and temperature control solution.	Can be used with up to five 4-channel analog input modules (RAD-AI4-IFS), five 4-channel PT100 temperature sensing modules (PT100-4-IFS), or any combination of modules for a maximum of 20 channels. This configuration can be used as an analog input and temperature control solution.	Can be used with up to three 4-channel analog input modules (RAD-AI4-IFS) or three 4-channel PT100 temperature sensing modules (RAD-PT100-4-IFS), and two 4-channel analog output modules (RAD-AO4-IFS). This configuration can be used as an analog input/output and temperature control solution.	Can be used with up to three, 6-channel Digital-Analog-Input-Output modules (RAD-DAIO6-IFS). This configuration can be used as a combination digital and analog I/O solution.	Can be used with up to six 4-channel digital input modules (RAD-DI4-IFS), six 4-channel NAMUR digital input modules (FB-DI4/NAMUR-IFS), three 8-channel digital input modules (RAD-DI8-IFS), or any combination of modules for maximum of 24 total channels. This configuration can be used as a high-density digital input solution.
Order number	2316270	1005331	1005330	1005329	1005332

Profibus PA I/O Multiplexer – Extension modules

	NAMUR digital In 4 channel	Digital In 4 channel	Digital Out 4 channel	Digital In 8 channel	Analog In 4 channel	Analog Out 4 channel	Analog / digital	PT 100 4 channel
								
Type	FB-DI4/NAM-IFS (Input)	RAD-DI4-IFS (Input)	RAD-DOR4-IFS (Output)	RAD-DI8-IFS (Input)	RAD-AI4-IFS (Input)	RAD-AO4-IFS (Output)	RAD-DAIO6-IFS (Input / output)	RAD-PT100-4-IFS
Description	4 digital NAMUR inputs EN 60947-5-6	4 digital wide range inputs 0…250V AC/DC	4 digital relay outputs 24 V DC / 250 V AC / 5 A	8 digital inputs 0…30,5 V DC	4 analog input 0/4…20 mA	4 analog outputs Alternatively 0/4…20 mA or 0…10 V DC	1 analog input/output 0/4…20 mA 2 digital wide range inputs/outputs 0…250 V AC/DC	4 Pt100 inputs Temperature measuring range: -50°C…+250°C
Order number	2316275	2901535	2901536	2901539	2901537	2901538	2901533	2904035

PHOENIX CONTACT
INSPIRING INNOVATIONS

Protocol Converter



A **Protocol converter** is a device used to convert the protocol of one device to the protocol suitable for the other device or tools to achieve the interoperability. This is sometimes referred to as a gateway, although a gateway typically has higher functionality.

Protocol Converter - MODBUS – DP/PA/FF

Converts Modbus RTU variables to modern digital Fieldbus signals



Set up and Parameterization via DD, EDD, GSD, & DTM from the Host/Asset Management System

Connect up to 4 legacy Modbus RTU devices to a fieldbus (maximum of 16 total registers per converter)

2-wire RS485 interface (1200…115.2kbps)

MODBUS RTU
to Profibus DP, Profibus PA or Fieldbus Foundation converter

Protocol Converter HART – DP/PA/FF

Set up and Parameterization via DD, EDD, GSD, & DTM from the Host/Asset Management System

Converts HART instrument data to modern digital Fieldbus signals



Connects up to 4 HART instruments to a Fieldbus (4 process variables maximum per converter)

2-wire HART loop signal connections using terminal blocks

Digital HART data to Profibus DP, Profibus PA or Fieldbus Foundation converter

PROFIBUS DP PROFIBUS PA Fieldbus Foundation

Protocol Converter













	GW PL FF/MODBUS	GW PL PA/MODBUS	GW PL DP/MODBUS	GW PL FF/HART	GW PL PA/HART	GW PL DP/HART
Description	Modbus/RTU to FOUNDATION Fieldbus protocol converter	Protocol converter capable of connecting four Modbus/RTU devices to a PROFIBUS PA network	Modbus/RTU to PROFIBUS DP protocol converter	Protocol converter capable of connecting four HART (4-20 mA) devices to a Foundation Fieldbus network	Protocol converter capable of connecting four HART (4-20 mA) devices to a PROFIBUS PA network	Protocol converter capable of connecting four HART (4-20 mA) devices to a PROFIBUS DP network
Interface 1	Foundation Fieldbus	Profibus PA	Profibus DP	Foundation Fieldbus	Profibus PA	Profibus DP
Interface 1 connector	Combicon	Combicon	D-SUB 9, Combicon	Combicon	Combicon	D-SUB 9, Combicon
Interface 2	HART FSK	HART FSK	Modbus RTU	HART FSK	HART FSK	HART FSK
Interface 2	Combicon	Combicon	Combicon	Combicon	Combicon	Combicon
Order number	2316363	2316364	2316365	2316360	2316361	2316362

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Extender





- SHSDL technology
- Ranges of up to 20 kilometers
- Existing two-wire cables can be used
- Data rates of up to 30 Mbps
- Easy installation via Plug and Play
- Automatic topology and data rate detection
- Point-to-point, line and ring structures
- System extension during operation

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Extender

Managed Ethernet Extender

Unmanaged Ethernet Extender

Status / diagnosis display



new

VLAN (virtually/logically separate IP networks)

Firmware v5.xx or later

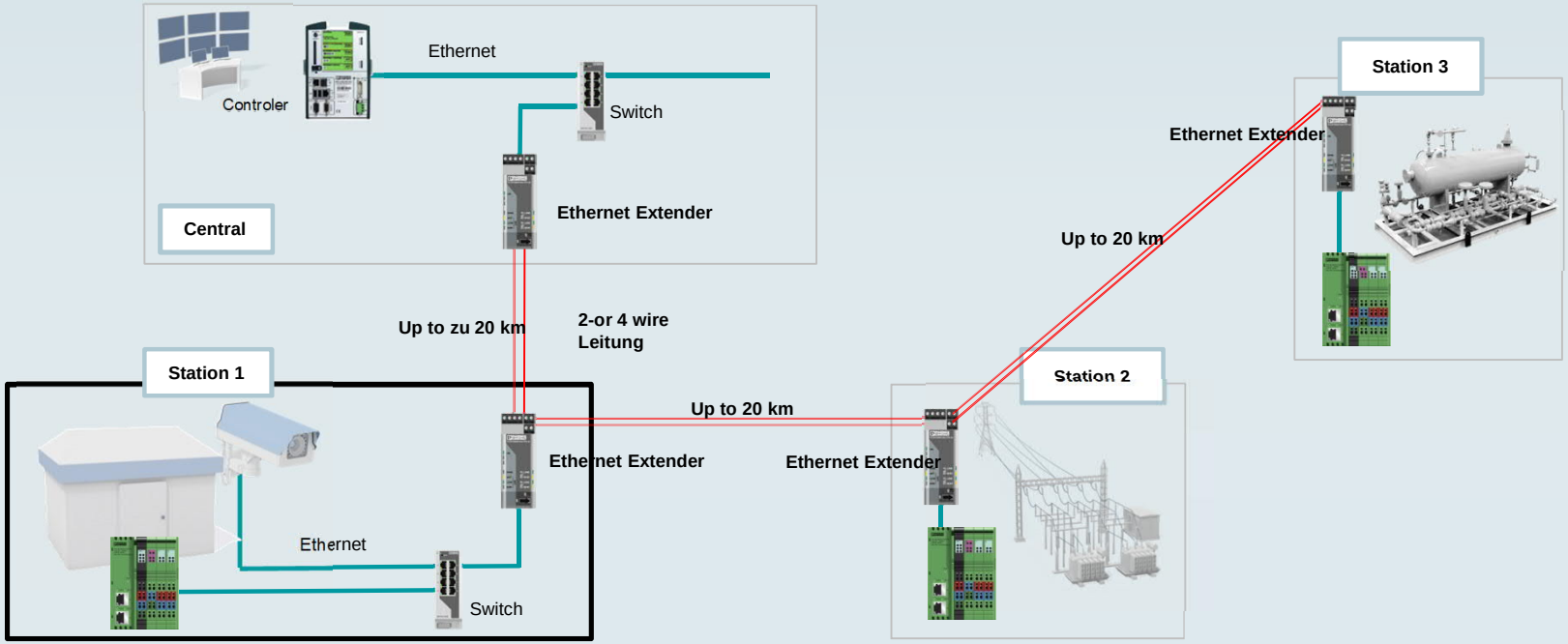
Replaceable surge protection

Remote diagnostics of all devices and paths

Line, Star and Ring topologies are possible

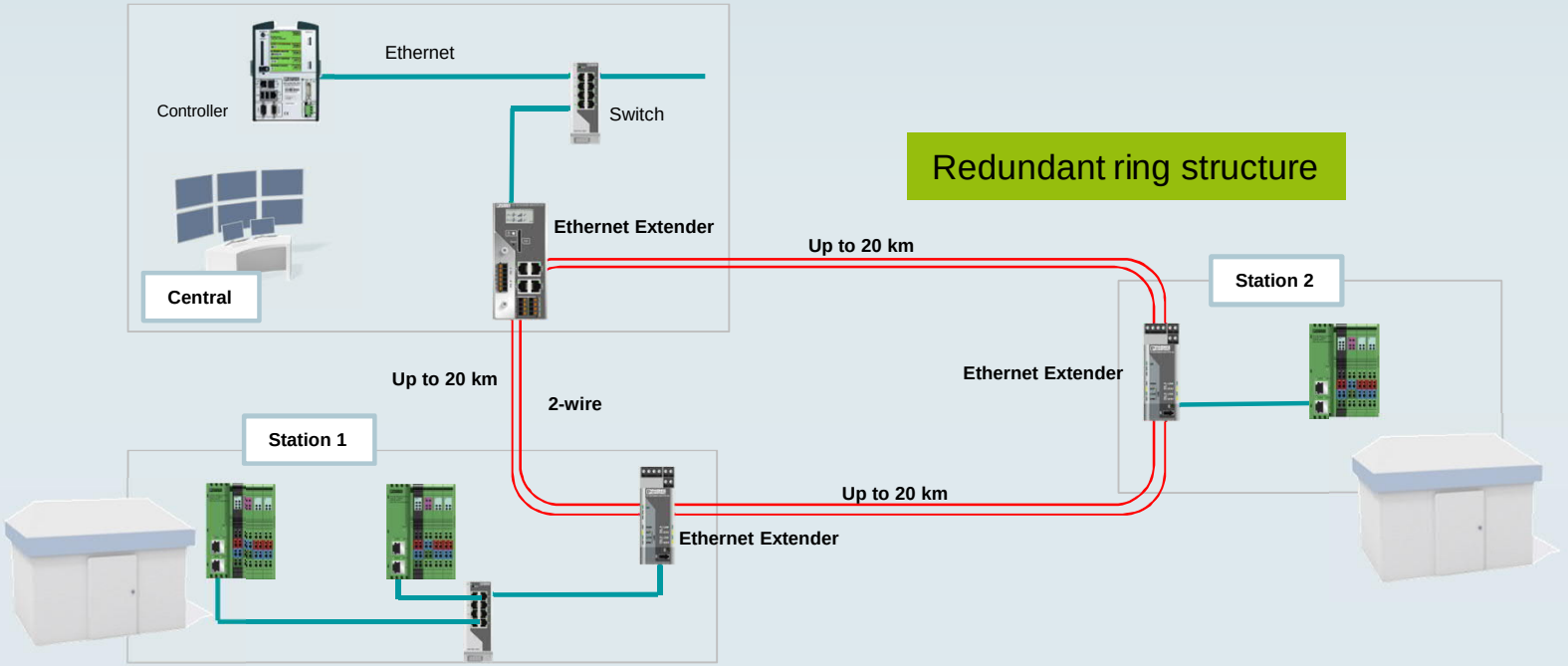
Ethernet Extender

Point-to-Point and Line network structure

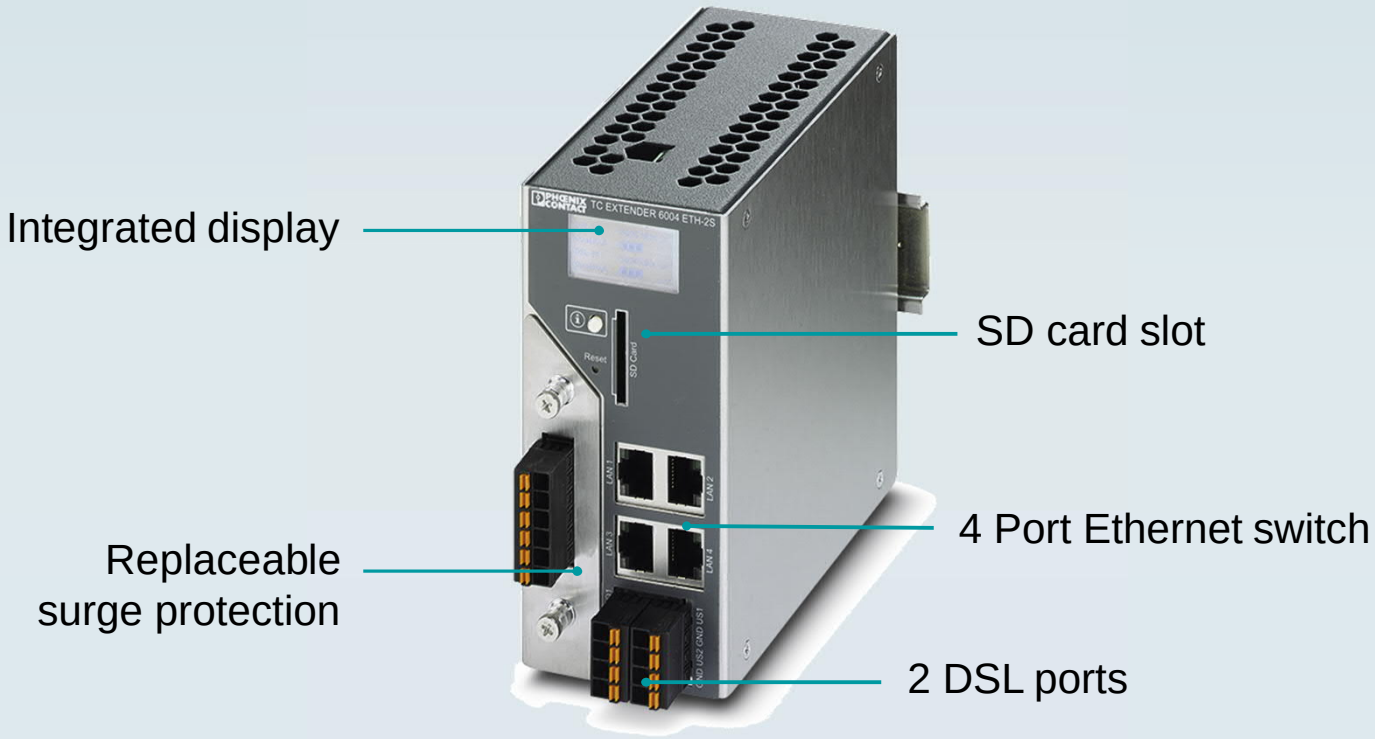


Ethernet Extender

Ring network structure



Managed Ethernet extender

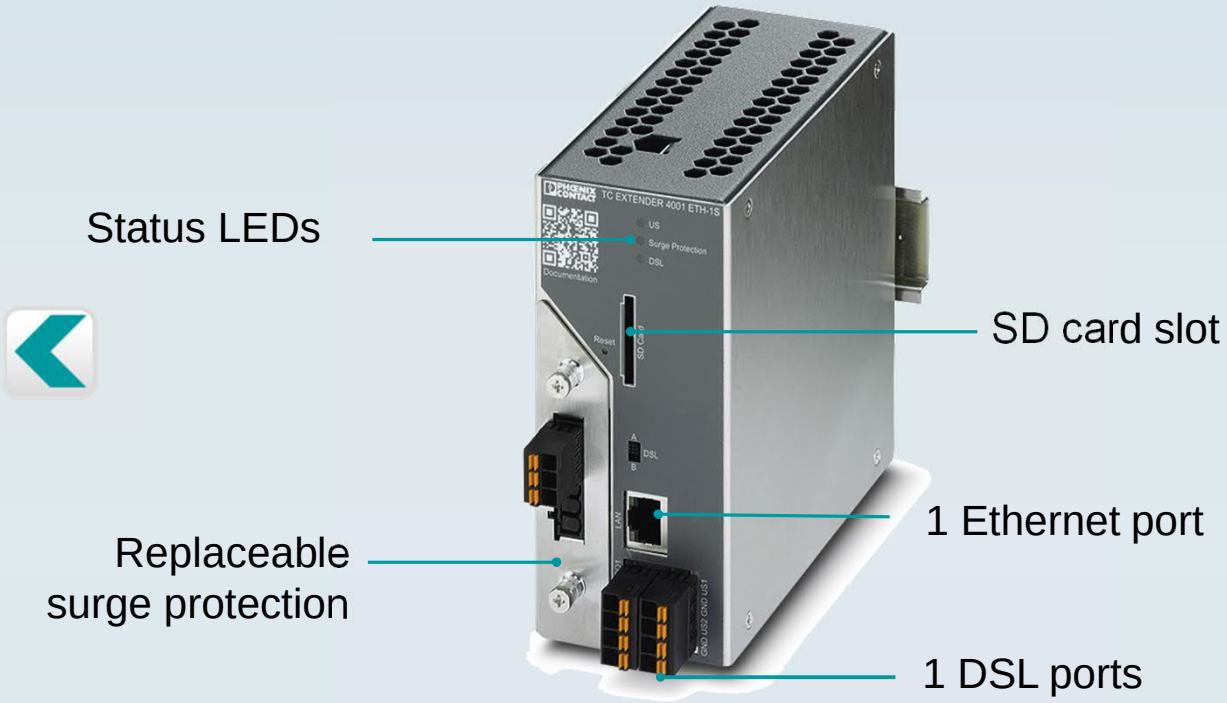


TC EXTENDER 6004 ETH-2S

- 2 DSL ports
- Integrated surge protection
- Topology: Point-to-Point, line, redundant ring
- Unique at the market: Plug-&-Play at ring application

PHOENIX CONTACT INSPIRING INNOVATIONS

Managed Ethernet extender



TC EXTENDER 4001 ETH-1S

- 1 DSL ports
- Topology: Point-to-Point
- Integrated surge protection

PHOENIX CONTACT
INSPIRING INNOVATIONS

Unmanaged Ethernet extender



2 DSL ports

Status LEDs

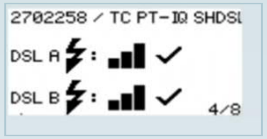
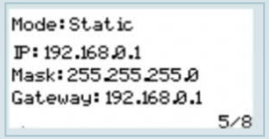
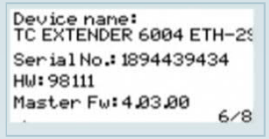
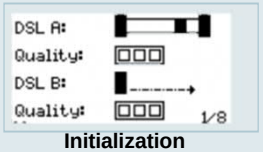
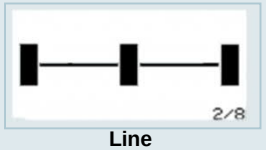
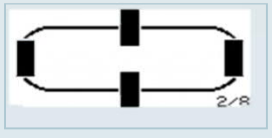
DSL Status/Link LEDs

TC EXTENDER 2001 ETH-2S

- 2 DSL ports
- 1 Ethernet port
- Topology: Point-to-Point, line, redundant ring
- Unique at the market: Plug-&-Play at ring application

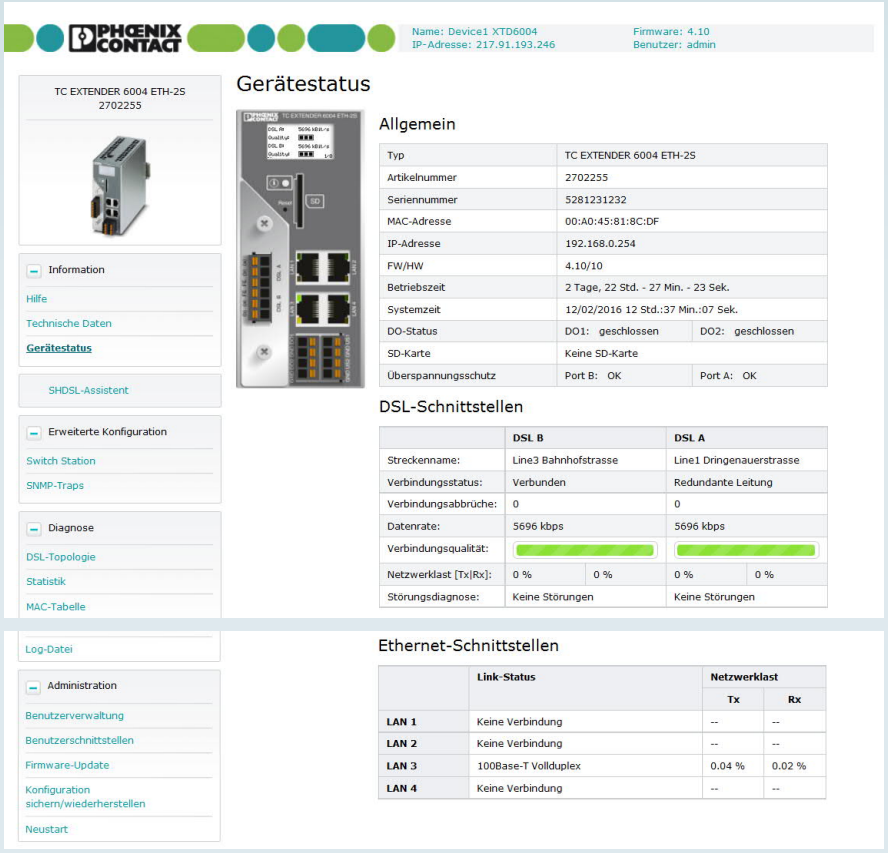
PHOENIX CONTACT INSPIRING INNOVATIONS

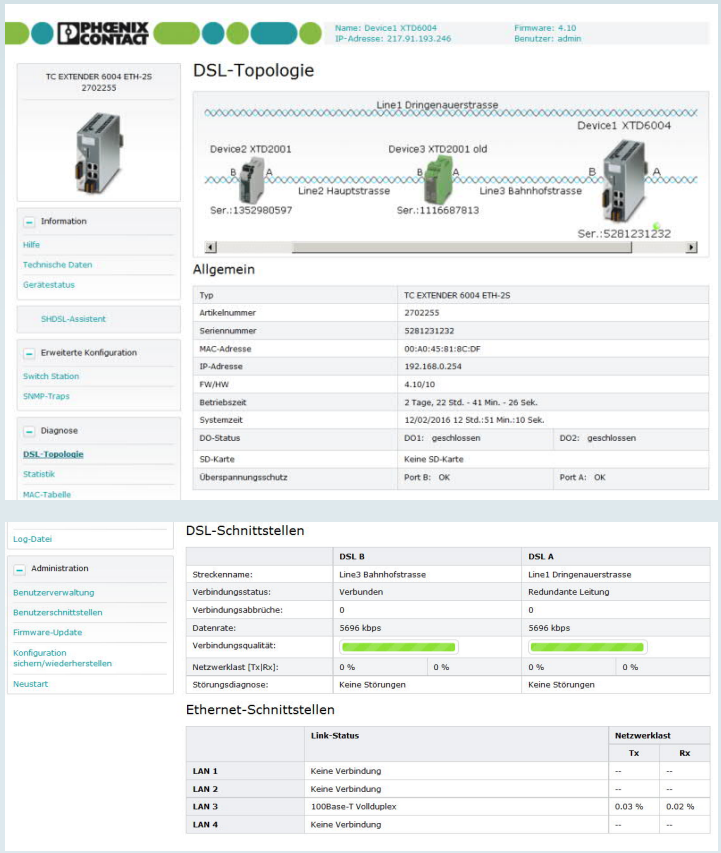
Status- / diagnosis display

SHDSL-connection	System topology	- Power supply - Outputs DO	Surge protection	Ethernet parameter	Device information	Link documentation	optional
							
No remote device	No remote device	- Both power supplies ⇒ OK - Both outputs ⇒ low	Protection module OK ⇒ OK				Individually configurable via web server
							
Remote device found	Point-to-Point						
							
Initialization	Line						
							
Current data rate	Redundant Ring						
							
Current data rates							

PHOENIX CONTACT
INSPIRING INNOVATIONS

Remote diagnosis via IP (Web based management)





Live test link to an Ethernet Extender in Bad Pyrmont:

http://217.91.193.246:1000

Login:
User Name: user
Password: user

INSPIRING INNOVATIONS

Integrated surge protection

Alarm via SNMP

(Simple Network Management Protocol):

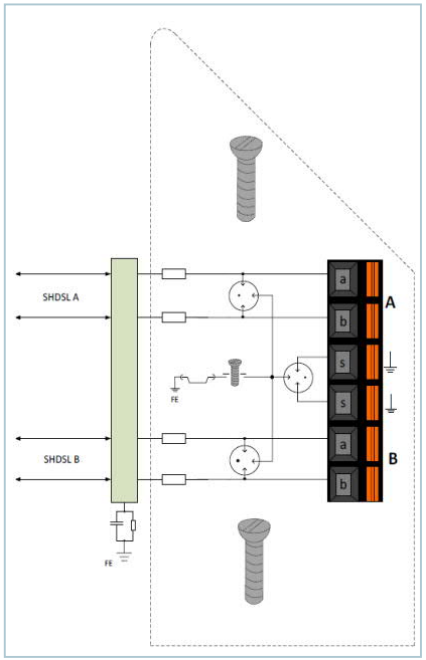
Status	Action
Protective module ok	-------
Performance limit reached	DSL port is at performance limit, replacement of protective module is recommended
Module overloaded	DSL port is overloaded, replacement required, Replace protective module



Surge protection



Circuit diagram



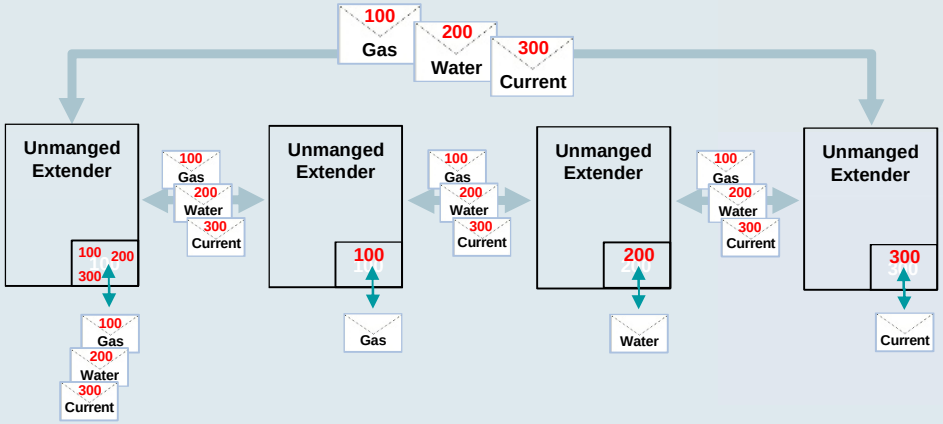
VLAN – Unmanaged extender

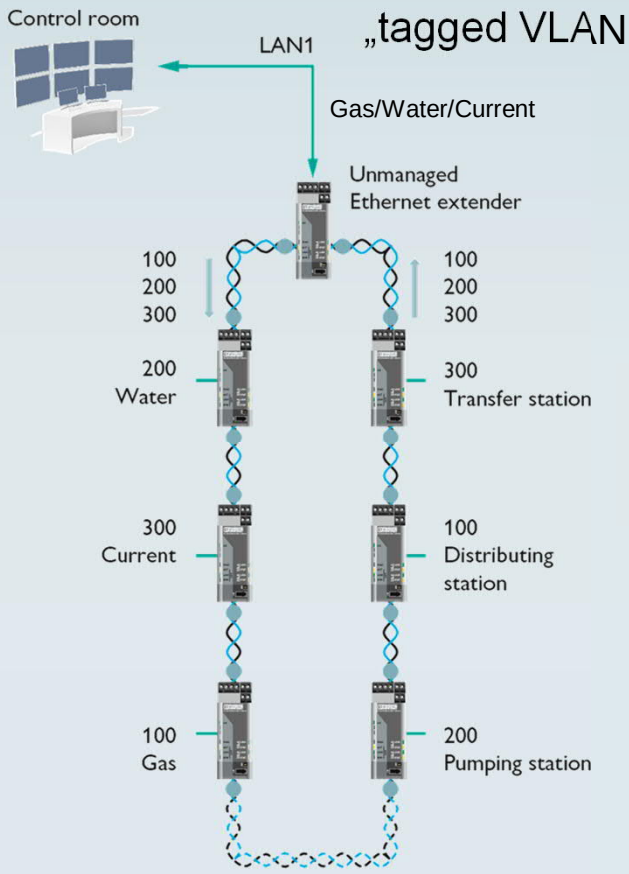
new

Using VLAN to virtually separate critical IP networks and make them secure

In firmware version v5.xx and later, VLAN (virtual local area network) can be used to virtually isolate critical IP networks.

Communication with a combination of „tagged and untagged VLAN“





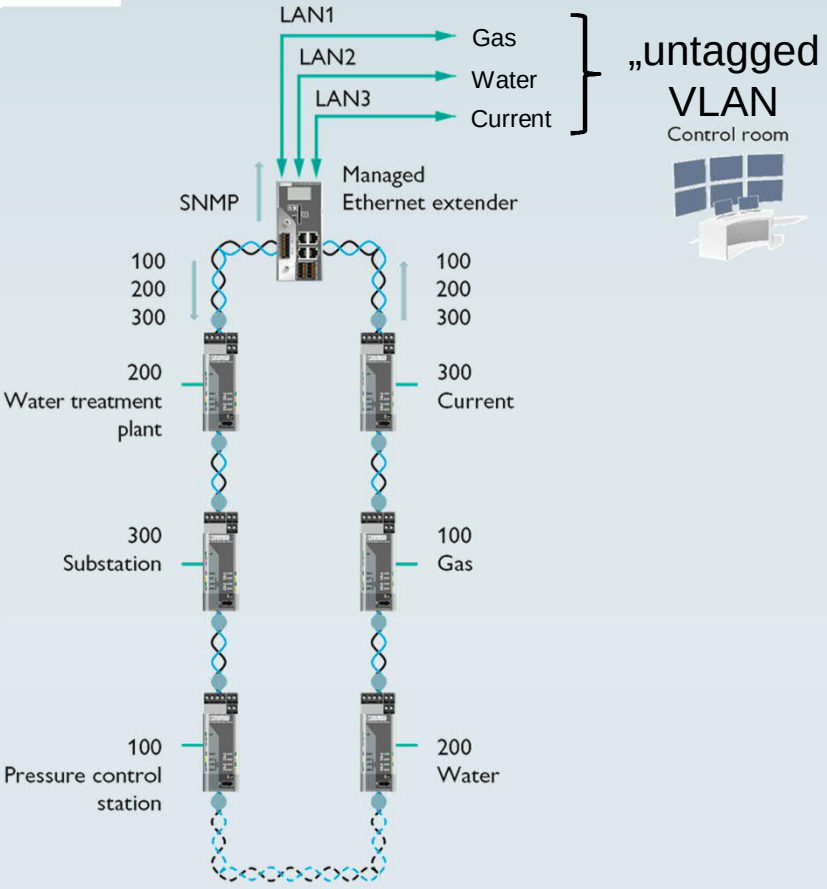
PHOENIX CONTACT
INSPIRING INNOVATIONS

VLAN – Managed and unmanged extender

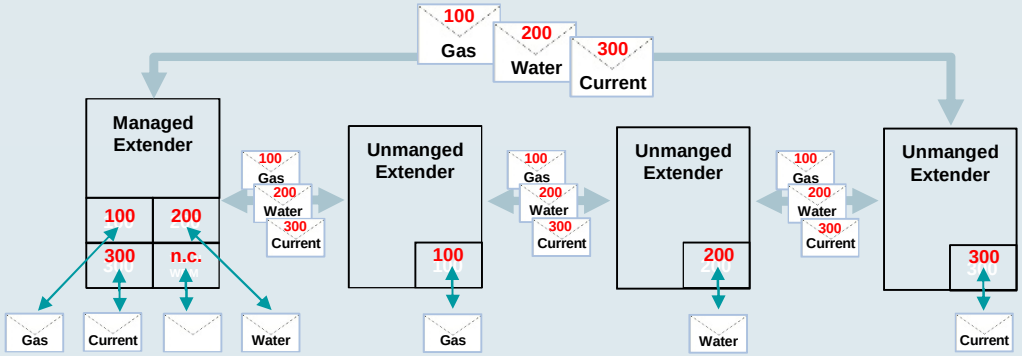
new

Using VLAN to virtually separate critical IP networks and make them secure

In firmware version v5.xx and later, VLAN (virtual local area network) can be used to virtually isolate critical IP networks.



Communication with „untagged VLAN“



Extension of complex IT networks







	TC EXTENDER 2001 ETH-2S	TC EXTENDER 4001 ETH-1S	TC EXTENDER 6004 ETH-2S	TC EXTENDER PT-IQ-1S	TC EXTENDER PT-IQ-2S
Function	Unmanaged Ethernet-Extender	Managed Ethernet-Extender	Managed Ethernet-Extender	Replaceable surge protection module Only for Ethernet extender 4001 ETH-1S (2702253)	Replaceable surge protection module Only for Ethernet extender 6004 ETH-2S (2702255)
Topologies	Ring, Line, Point-to-point	Point-to-point	Ring, Line, Point-to-point		
Replaceable surge protection	No	Yes	Yes		
Diagnostic indicators	LEDs	LEDs	Display		
Ports	2x SHDSL, 1x Ethernet	1x SHDSL, 1x Ethernet	2x SHDSL, 4x Ethernet		
Order number	2702409	2702253	2702255	2702257	2702258

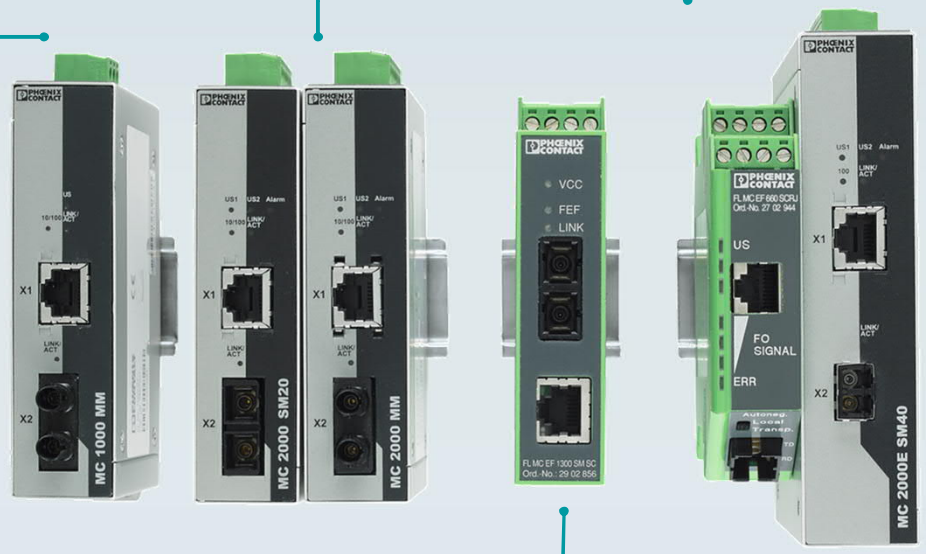
PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Media Converter

Maximum interference immunity,

very short delays (latency)

Link-fault-pass-through function: constant connection monitoring



Maximum transmission distances with an extremely high data rate up to 40 km

approved for zone 2

PHOENIX CONTACT INSPIRING INNOVATIONS

Ethernet Media Converter



For standard application
Class 1000 media converter
They offer an easy and inexpensive entry-level solution for converting to FO technology



For realtime protocols
Class 2000 media converter
Time cricial Ethernet protocols such as Powerlink, EtherCAT or Sercos. Thanks to the switch-over to pass through operation, they enable very short delays (latency)

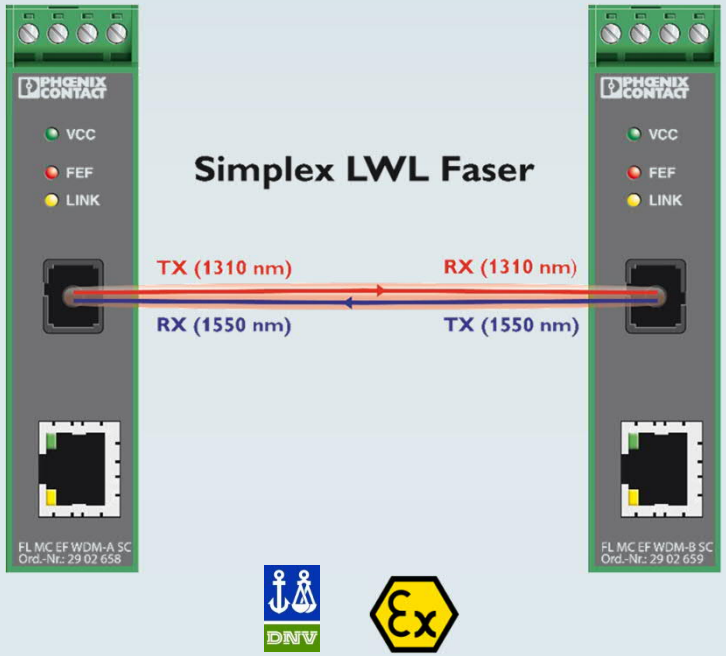


With special approvals
ATEX and DNV shipbuilding approval for e.g. process industry, machine building and wind power, through to shipbuilding.



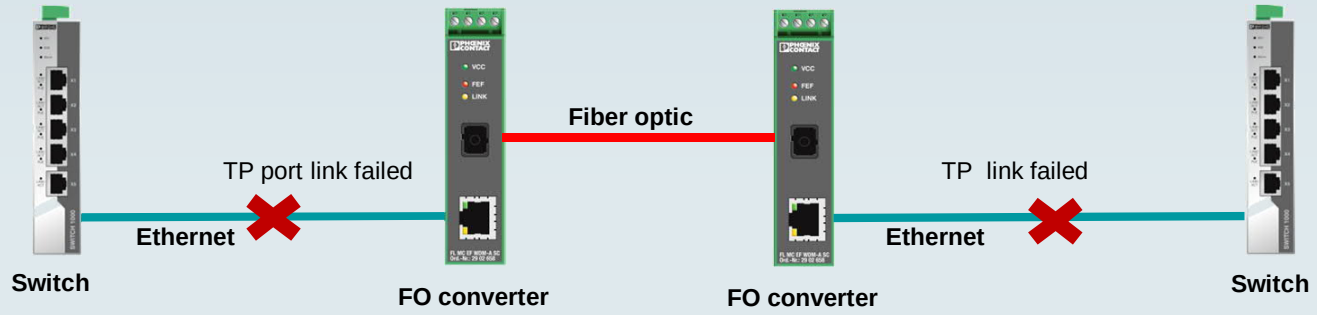
For special application
Provide perfect solution, even for special applications such as rotating applications, PROFINET networks or use in the energy industry.

Ethernet Media Converter WDM



- Full duplex transmission via a single optical fiber
- 10/100Base-T(X) auto negotiation
- Link fault pass through (LFP)
- Fare End Fault signaling (FEF)
- SC simplex connection
- Redundant power supply possible
- Operation mode and speed can be set manually

Link Fault Pass Through (LFP)



The LFP function provides permanent connection monitoring

- The link on the fiber optic connection switches off, if the connection is lost on the copper side of the FO converter
- The FO converter on the other side registers the aborted link via the fiber optic path and likewise interrupts the connection for the twisted pair segment

Ethernet Media Converter








	FL MC 1000 SC	FL MC 1000 ST	FL MC 2000T SC	FL MC 2000T ST	FL MC 2000T SM20 SC	FL MC 2000T SM40 SC
Transmission	Multimode fiberglass				Singlemode fiberglass	
Connection method	SC duplex	B-FOC (ST*)	SC duplex	B-FOC (ST*)	SC duplex	
Temperature range	0°C…+60°C		-40°C…+75°C			
Range	Up to 9.6 km				Up to 20 km	Up to 40 km
Light wavelength	1310 nm					
Special features	Auto negotiation and MDI (x)		Store-and-forward or pass through mode can be selected via DIP switch with a short latency time of 835 ns. They can therefore be used for realtime Ethernet protocols			
Order number	2891320	2891321	2891315	2891316	2891317	2891318

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Media Converter







	FL MC EF 1300 MM SC	FL MC EF 1300 MM ST	FL MC EF 1300 SM SC	FL MC 2000E	FL MC 2000E SM40 LC
Transmission	Multimode fiberglass		Singlemode fiberglass	Multimode fiberglass	Singlemode fiberglass
Connection method	SC duplex	B-FOC (ST*)	SC duplex	LC duplex	
Temperature range	-40°C…+65°C			-40°C…+75°C	
Range	Up to 10 km		Up to 36 km	Up to 9.6 km	Up to 40 km
Light wavelength	1310 nm				
Special features	LFPT and FEF diganostic functions, auto negotiation and auto MDI (x), backplane bus for redundant or alternative power supply			Accordance to IEC 61850/IEEE1613 4 kV insulation voltage, high EMC protection	
Order number	2902853	2902854	2902856	2891056	2891156

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Media Converter







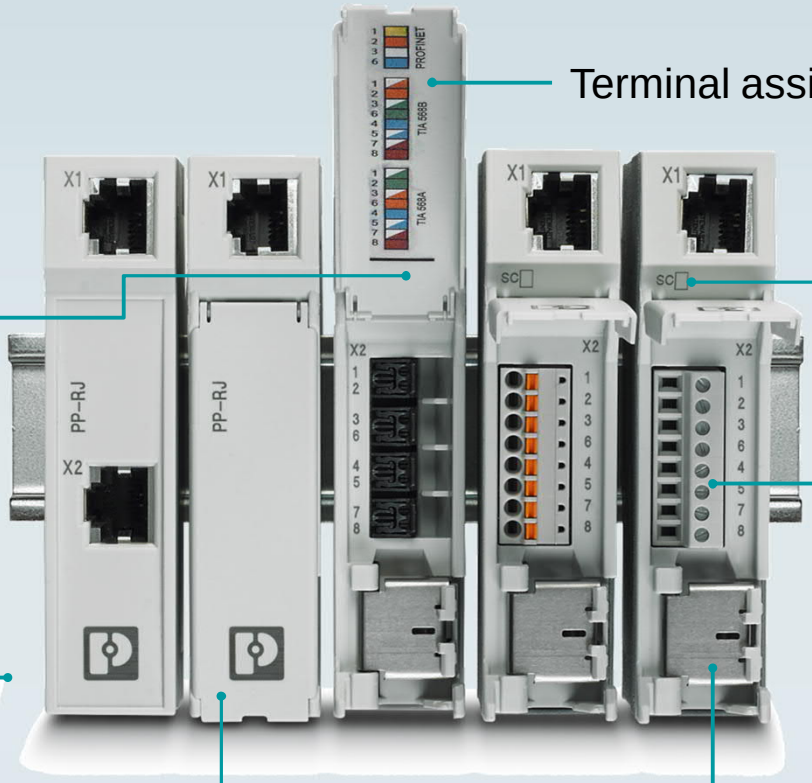
	FL MC EF WDM-SET SC	FL MC EF WDM-A SC	FL MC EF WDM-B SC	FL MC ETH/FO 660 T	FL MC EF 660 SCRJ
Transmission	Multimode and single mode glass fiber			Polymer fiber PCF	
Connection method	SC simplex			SC-RJ	
Temperature range	-40°C…+65°C			-20 °C ... 55 °C	
Range	Up to 38 km			Up to 100 m	
Light wavelength	1310/1550 nm			660 nm	
Special features	Converters A and B	Converter A	Converter B	T-coupler with two FO connections and two RJ45 sockets	Single-port media converter
Order number	2902660	2902658	2902659	2313164	2702944

Patch panels



- Patch panels serve as an interface module between the field and control cabinet cabling
- Large selection of different connection technologies
- Protective functions for high system availability
- Concealed wiring space, thanks to front cover
- 10 / 100 / 1000 Mbps

Patch panels



Terminal assignment for Ethernet

Length for cable stripping

Shield current detection

Different connection technologies

- Screw
- Push-In
- IDC
- RJ45

Integrated surge protection

Covered cable installation

Cable shield contact spring
(shield contacting with strain relief)

PHOENIX CONTACT
INSPIRING INNOVATIONS

Patch Panel Application

Typical applications

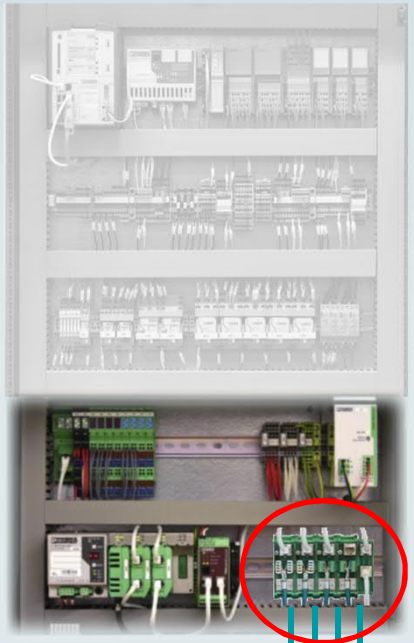






Machine building –
switching cabinet pre-assembly

- Pre-assembly with patch cable
- Field cable installation on site

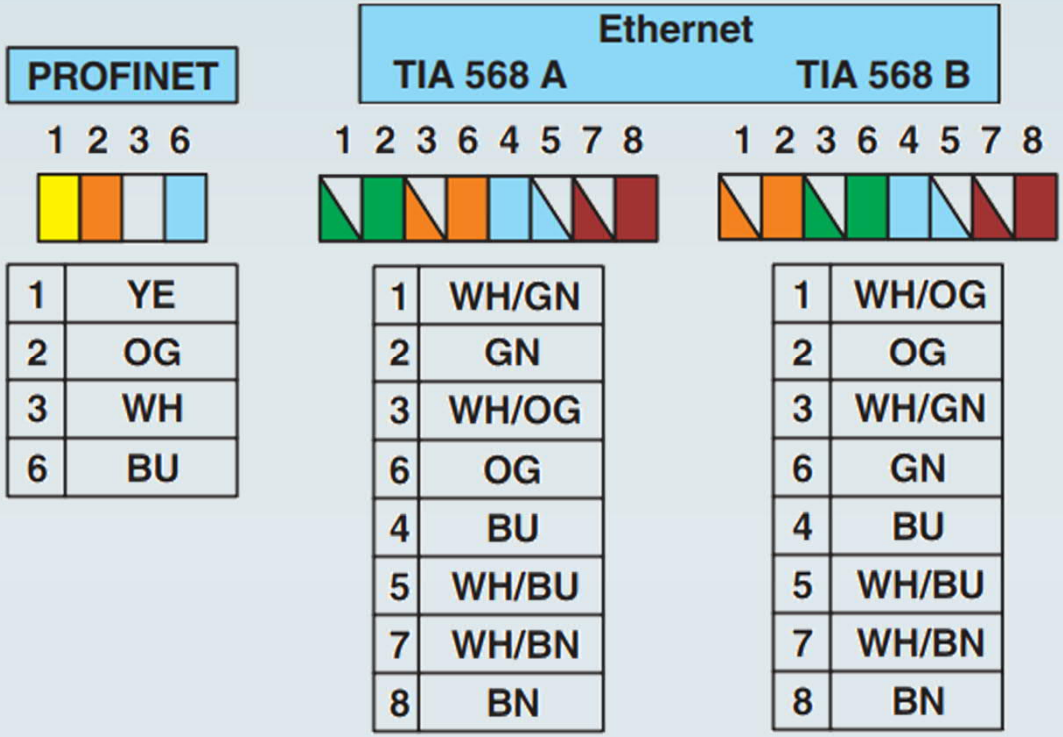


Patch Panel

Ethernet cable

PHOENIX CONTACT
INSPIRING INNOVATIONS

Terminal assignment



1	YE
2	OG
3	WH
6	BU

1	WH/GN
2	GN
3	WH/OG
6	OG
4	BU
5	WH/BU
7	WH/BN
8	BN

1	WH/OG
2	OG
3	WH/GN
6	GN
4	BU
5	WH/BU
7	WH/BN
8	BN

Terminal assignment for Ethernet (IEC 80.3u: TIA 568 A, TIA 568 B) and Profinet

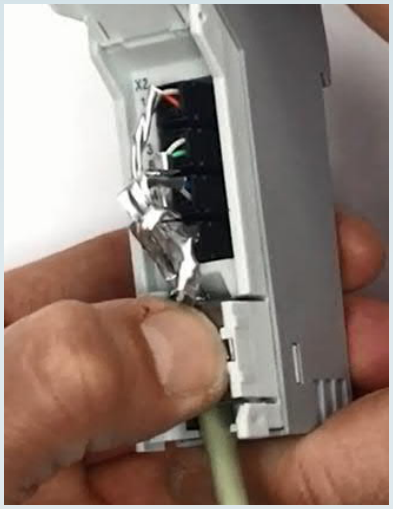
Key:

OG	Orange
WH	White
GN	Green
YE	Yellow
BU	Blue
BN	Brown

Cable shield connection



Laying the cable jacket and shielding underneath the shielding clamp





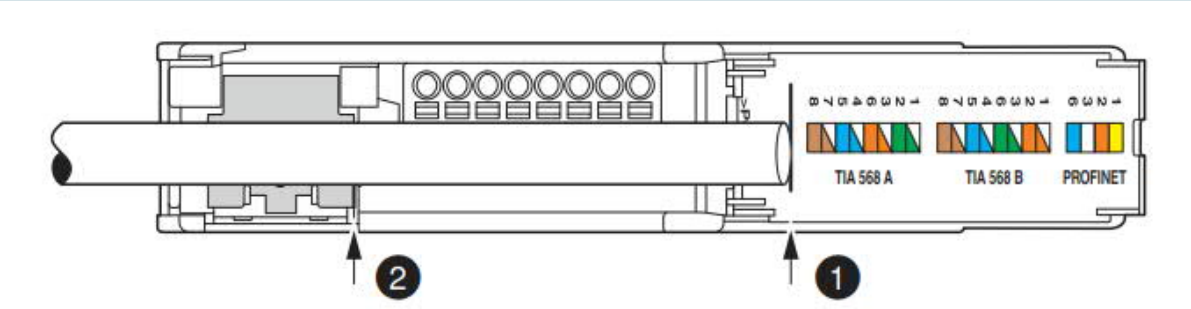
Closing the shield clamp with one finger





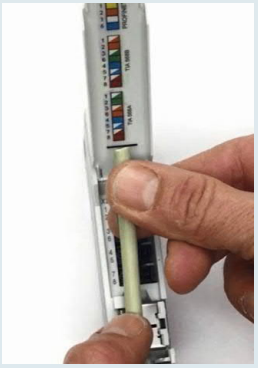
Closing the cover ensures a clean installation

Crimping length



The edge off the shield contact spring indicates the correct length for stripping (5,5 cm)

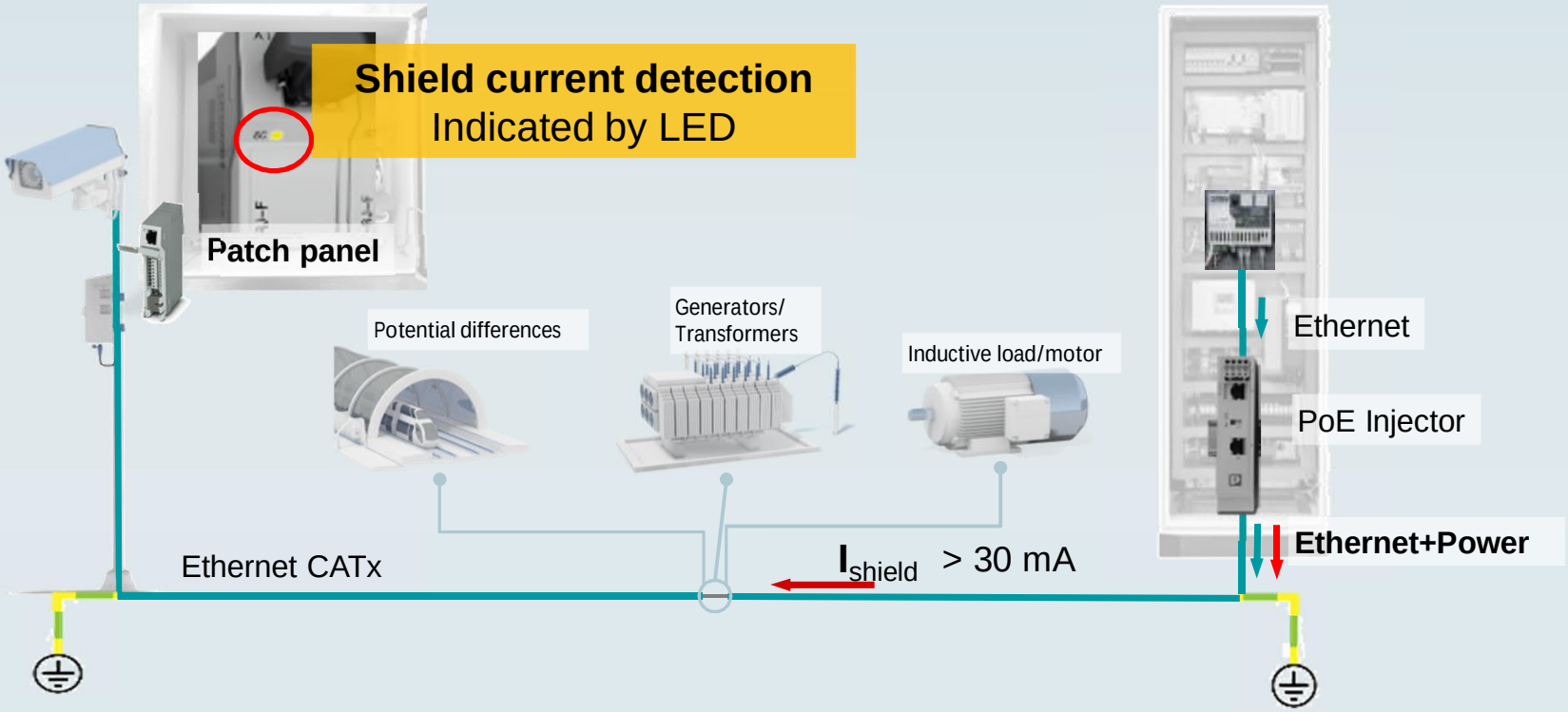
Place the cable end on the marking line







Shield current detection



- If there are different potential references within an installation, equalization currents can flow via the cable shielding.
- LED (SC) lights up in the event of cable shield currents greater than +30 mA and less than -30 mA

PHOENIX CONTACT
INSPIRING INNOVATIONS

Patch panels



	PP-RJ-RJ	PP-RJ-SC	PP-RJ-SCC	PP-RJ-IDC	PP-RJ-RJ-F	PP-RJ-SC-F	PP-RJ-SCC-F	PP-RJ-IDC-F
Function	Standard patch-panel	Standard patch-panel	Standard patch-panel	Standard patch-panel	Functional patch-panel	Functional patch-panel	Functional patch-panel	Functional patch-panel
Cable connection	RJ45/ RJ45	RJ45/ Screw	RJ45/ Push-In	RJ45/ IDC	RJ45/ RJ45	RJ45/ Screw	RJ45/ Push-In	RJ45/ IDC
Surge protection	No	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**
Shield current detection	No	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**
Order number	2703015	2703016	2703018	2703019	2703020	2703021	2703022	2703023

PHOENIX CONTACT
INSPIRING INNOVATIONS

Patch panels






	FL CAT5 TERMINAL BOX	FL-PP-RJ45-SC	FL-PP-RJ45-SCC	FL-PP-RJ45-LSA
Connection type	RJ45/Screw	RJ45/Screw	spring-cage connection	LSA-connection
Description	4-pole, 10/100 MBit/s	8-pole, 10/100/1000 MBit/s		
Shielding	Directly on the DIN-rail	directly on the DIN rail or optionally via RC combination		
Shield connection	Bracket clamp with screws			
Order number	2744610	2901643	2901642	2901645

PHOENIX CONTACT
INSPIRING INNOVATIONS

Patch panels






	FL-PP-RJ45/RJ45	FL-PP-RJ45/ RJ45-B	FL-PP-RJ45-SCC/ SC041	FL-PP-RJ45-SCC/ SC045
Connection type	RJ45/Screw	RJ45/Screw	spring-cage connection	LSA-connection
Description	8-pole, 10/100/1000 MBit/s	Extended temperature range -40 °C ... 85 °C, narrow width	Cable sharing module with cable outlet to the front	Cable sharing module with cable outlet upwards
Shielding	Directly on the DIN rail or optionally via RC combination	Continuous shield	Directly on the DIN rail or optionally via RC combination	
Shield connection	Via RJ45 port		Bracket clamp with screws	
Order number	2901646	2904933	2903532	2904577

PHOENIX CONTACT
INSPIRING INNOVATIONS

Power over Ethernet Injectors

Surge protection and shield current monitoring on the field cable side



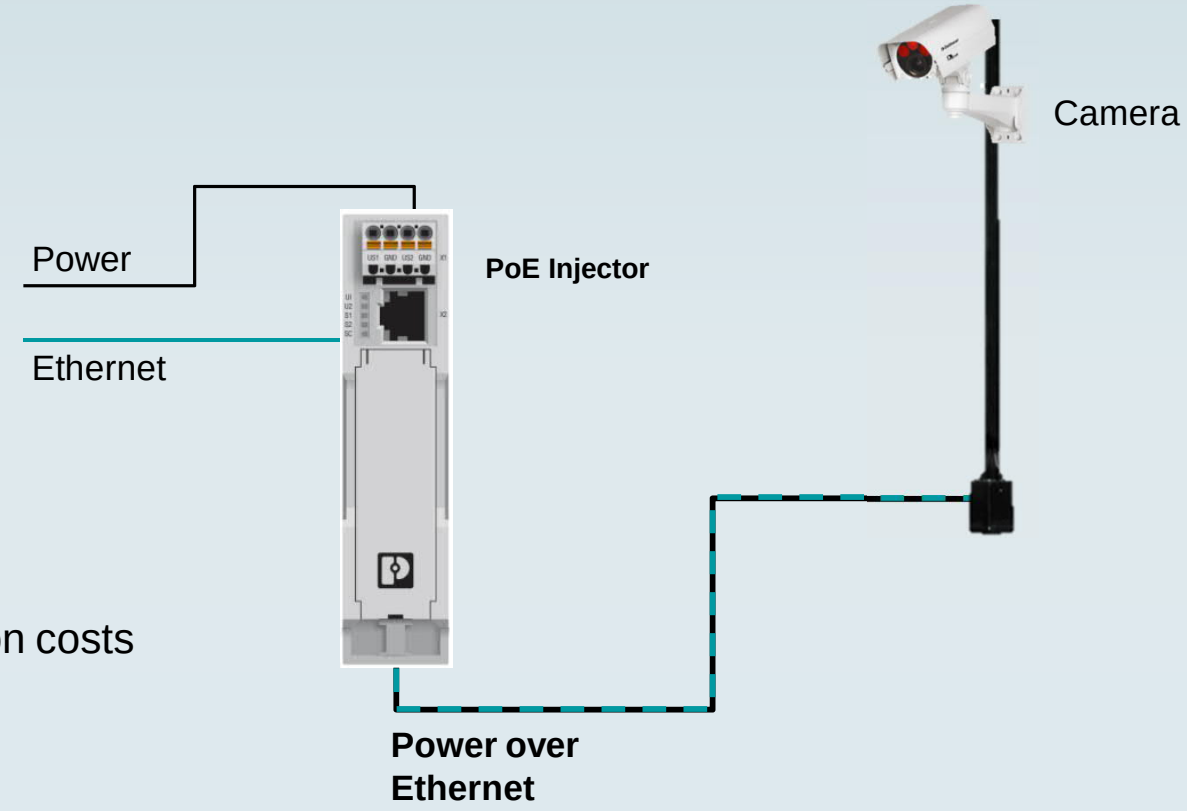
Different performance standards and electrical isolation

Multiple connection technologies and covered wiring space

Tool-free shield connection

PHOENIX CONTACT
INSPIRING INNOVATIONS

Power over Ethernet Injectors



Different performance standards



Different performance standards and electrical isolation

- IEEE 802.3 at, up to 15 W
- IEEE 802.3 af, up to 30 W
- IEEE 802.3 bt, up to 60 W

- supply voltage and Power over Ethernet port are electrically isolated in certain Injector´s

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection and shield current monitoring

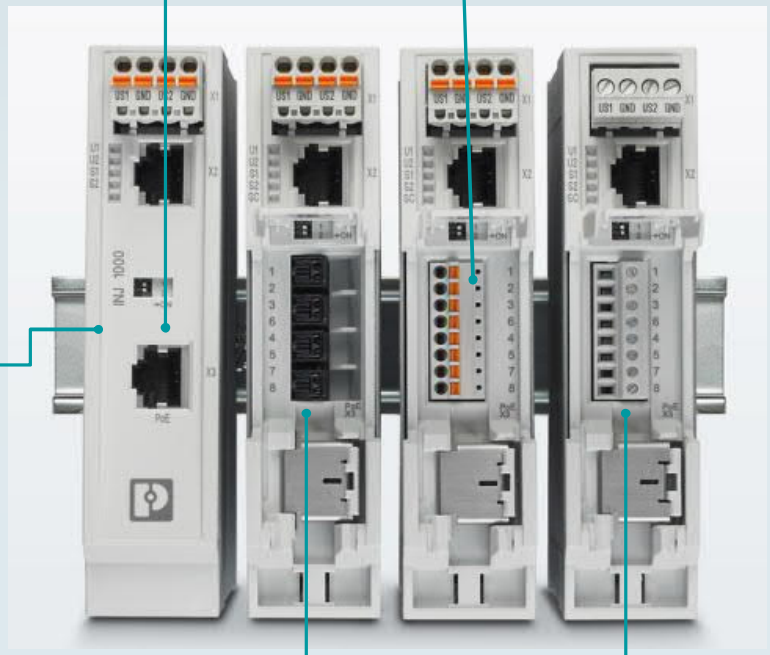
Surge protection and shield current monitoring on the field cable side



- integrated surge protection protects devices and application against sudden high voltages in the data cables
- An LED indicates differences in potential or other shield currents caused by the effects of EMC

PHOENIX CONTACT
INSPIRING INNOVATIONS

Multiple connection technologies



- IDC, Push-in, screw, and RJ45 connections.
- Covered cable wiring space

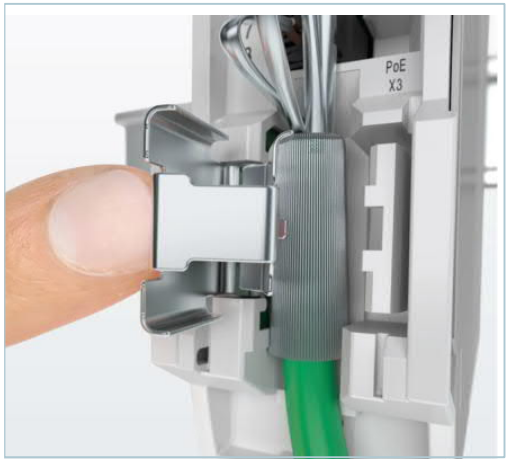


PHOENIX CONTACT
INSPIRING INNOVATIONS

Tool-free shield connection



- Quick and easy connection of the cable shielding without tools
- strain relief is assured
- Simply lay the cable in the shaft provided and close the shroud



PHOENIX CONTACT
INSPIRING INNOVATIONS

Power over Ethernet Injectors





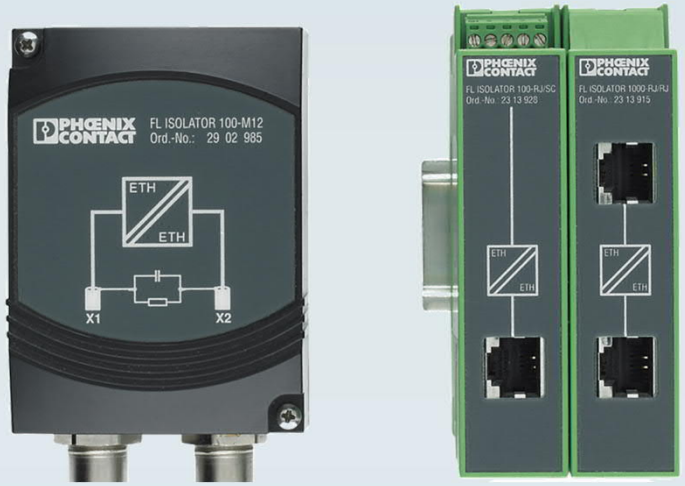




	INJ 1000 INJ 1010	INJ 1000-T INJ 1010-T	INJ 1100-T INJ 1110-T	INJ 2102-T INJ 2112-T	INJ 2103-T INJ 2113-T	INJ 2101-T INJ 2111-T	FL PSE 2TX
Connection technology	RJ45 / RJ45	RJ45 / RJ45	RJ45 / RJ45	RJ45 / IDC	RJ45 / Push-In	RJ45 / Screw	2 x RJ45/RJ45
Temperatur range	0°C … +60°C	-40 °C … +75 °C					0°C … +55°C
Galvanic isolation	No			Yes			
Overvoltage protection, shield current diagnosis	No			Yes			No
Order number PoE af*/at, 15*/30W	2703005	2703006	2703009	2703012	1004065	2703011	*2891013
Order number PoE bt, 60W	2703007	2703008	2703010	2703014	1004066	2703013	-

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Network Isolator



- Protection against aggressive environmental influences, particularly harsh industrial environments, thanks to coated PCB
- Dielectric strength of up to 4 kV
- No power supply required
- Approval for railway applications (rolling stock) according to EN 50155 and EN 50121

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Network Isolator

Without power supply

4000 V AC electrical isolation

Approval for
- EN 50121 (track)
  EN 50155 (rolling stock)



Wall or DIN rail mounting
Optional with DIN Rail mounting kit

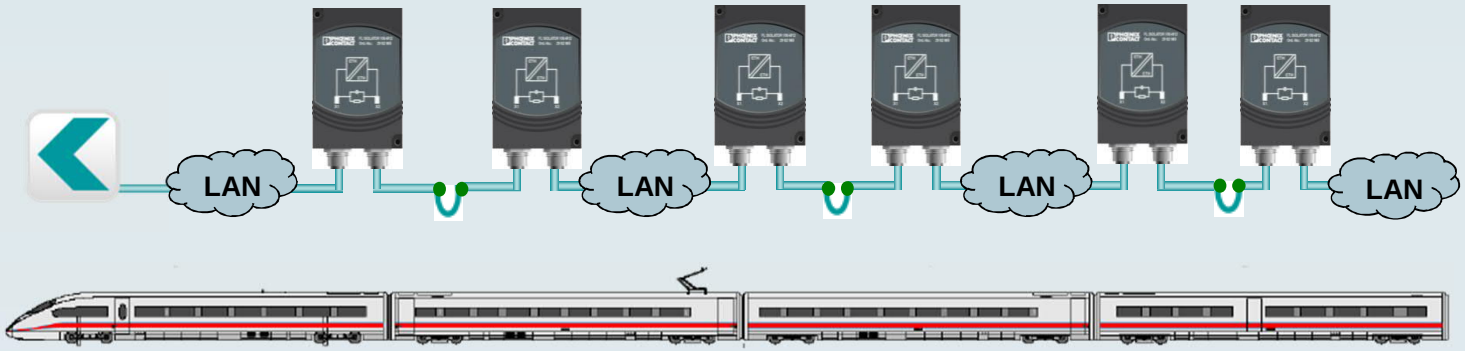
Vibration-resistant M12 connection

SPEEDCON LOCKING

PHOENIX CONTACT INSPIRING INNOVATIONS

Ethernet Network Isolator

Railway application



- Avoids high potential equalizing currents between individual sections of the train up to 4 kV
- Approval for EN 50121 (track)
- Approval for EN 50155 (rolling stock)



PHOENIX CONTACT
INSPIRING INNOVATIONS

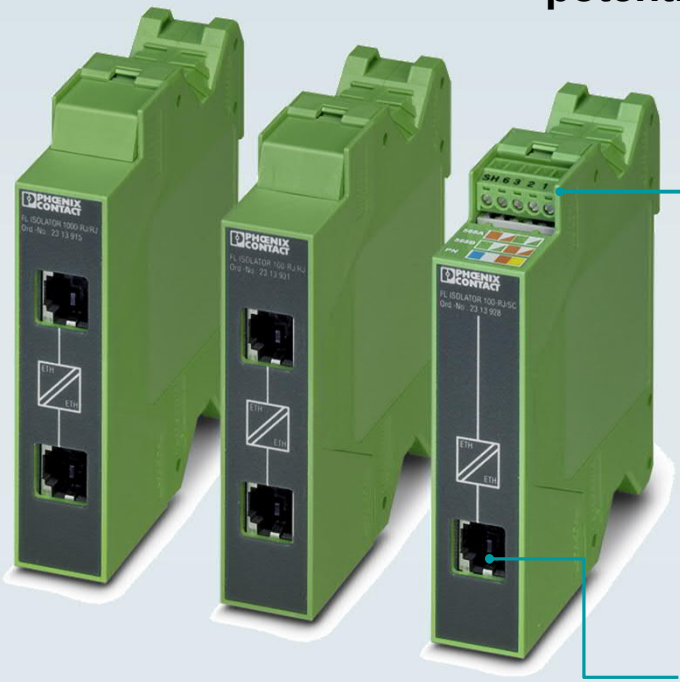
Ethernet Network Isolator

Reliable protection in case of potential differences

4,000 VAC galvanic isolation

Passive device

10/100/**1000** MBit/s



Screw terminal

RJ-45 connector

10/100 MBit/s

PHOENIX CONTACT INSPIRING INNOVATIONS

Ethernet Network Isolator







	FL Isolator 1000-RJ/RJ	FL Isolator 100-RJ/RJ	FL Isolator 100-RJ/SC	FL Isolator 100-M12	FL EPA RMS
EN 50155–rolling stock EN 50121- wayside	Yes	Yes	Yes	Yes	Set for mounting devices with EPA design on a DIN rail for FL Isolator 100-M12
Port 1	RJ-45	RJ-45	RJ-45	M12 D-coded	
Port 2	RJ-45	RJ-45	Screw	M12 D-coded	
Baudrate im Mbps	10 / 100 / 1000	10 / 100	10 / 100	10 / 100	
Galvanic isolation up to	4000 V	4000 V	4000 V	4000 V	
Mounting on	DIN Rail	DIN Rail	DIN Rail	Wall	
Order number	2313915	2313931	2313928	2902985	2701133

PHOENIX CONTACT
INSPIRING INNOVATIONS

Device server



A **DEVICE SERVER**

(also referred to a serial server or terminal server) enables you to connect devices with an RS-232, RS-422 or RS-485 serial interface to a local area network (LAN).

Device server

256-bit AES encryption for secure transfer of sensitive data

User authentication to prevent unauthorized access

Simple configuration and built-in diagnostics

Compact, DIN rail mount form factor

Windows COM port driver for seamless integration

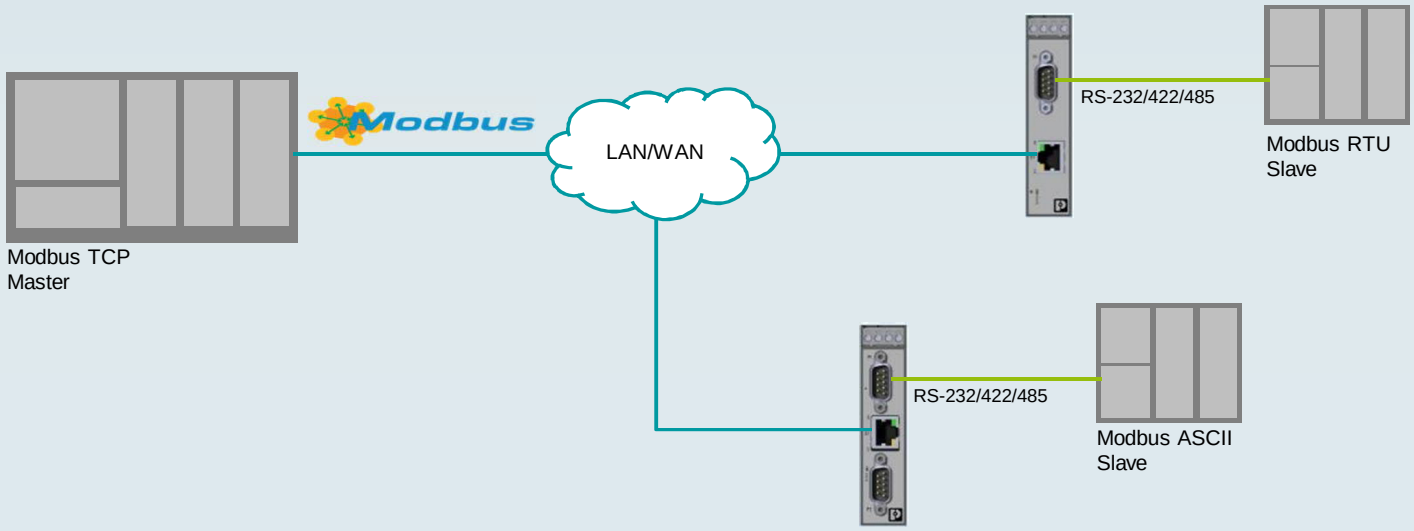


Application example:

- Modbus RTU/ASCII to Modbus TCP
- Serial Tunneling (point to point)
- Serial Tunneling (multiplexing)
- Multiple devices with the same Device ID
- Private Modbus Networks
- Virtual COM Port
- ASCII to Ethernet/IP
- ASCII to Modbus RTU

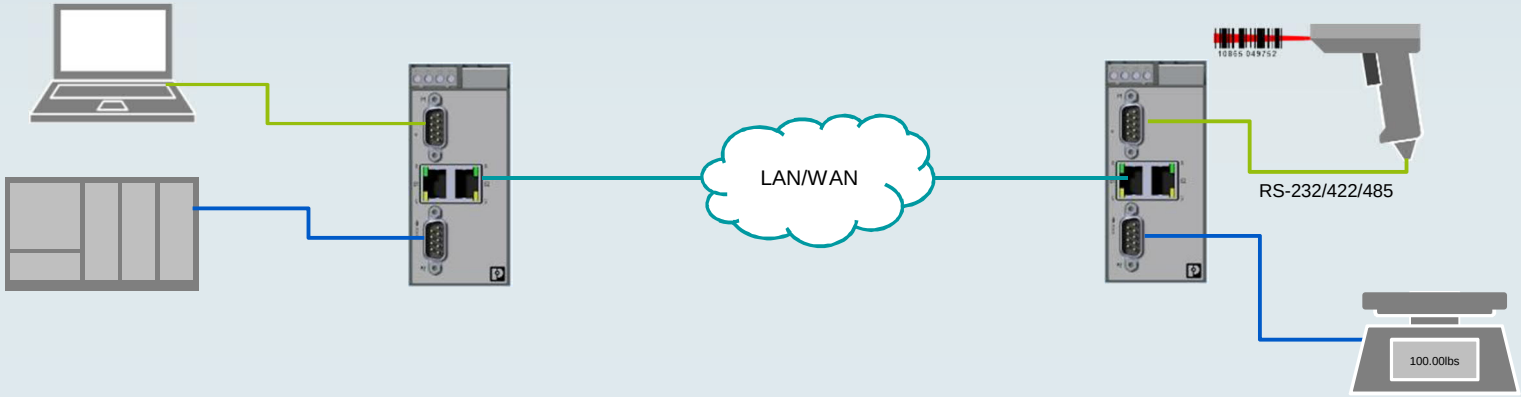
Device servers - Application example

Modbus RTU/ASCII to Modbus TCP



Device servers - Application example

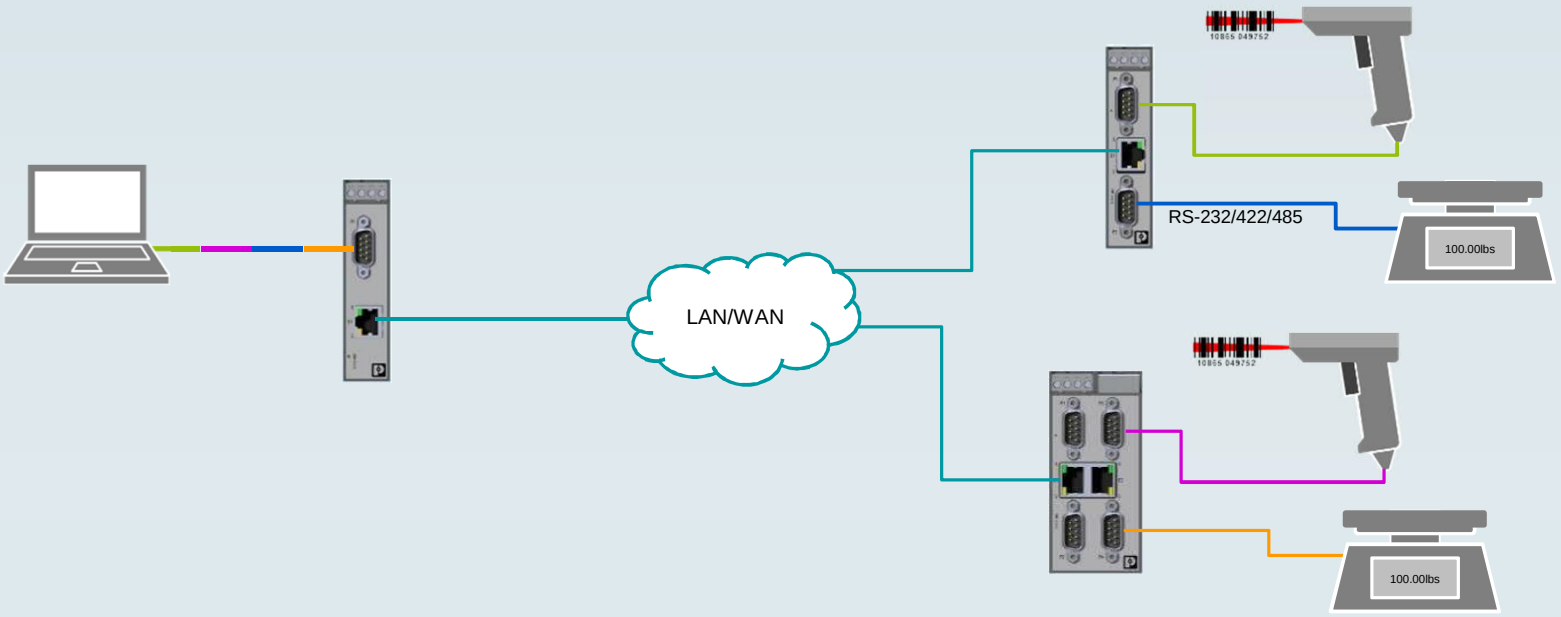
Serial Tunneling (point to point)



PHOENIX CONTACT
INSPIRING INNOVATIONS

Device servers - Application example

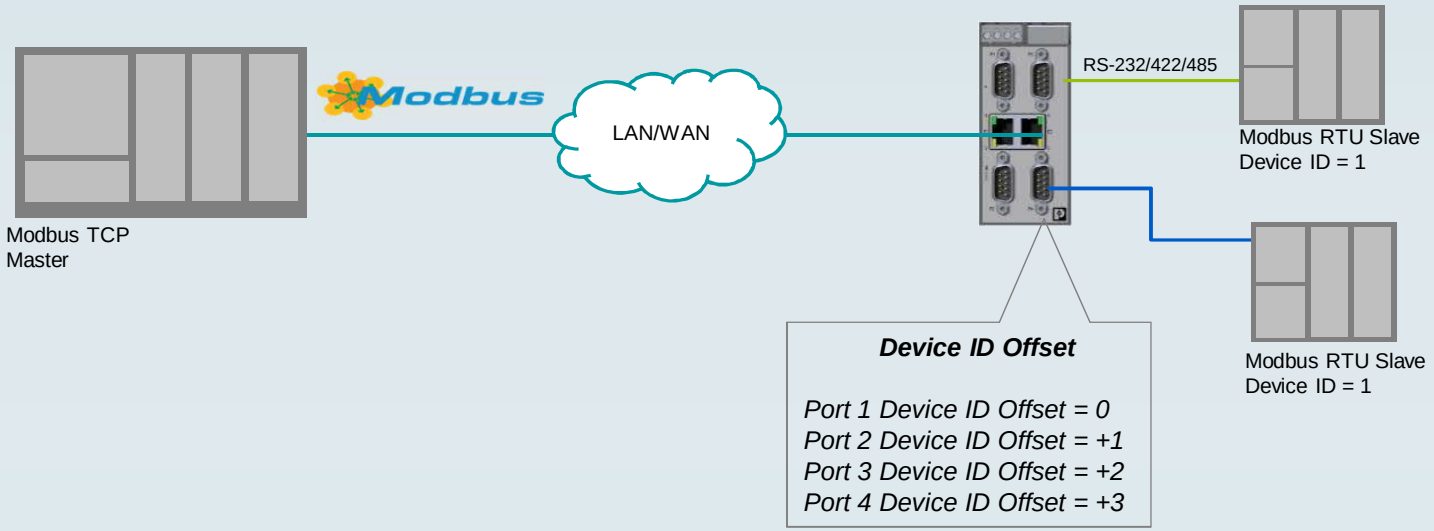
Serial Tunneling (multiplexing)



PHOENIX CONTACT
INSPIRING INNOVATIONS

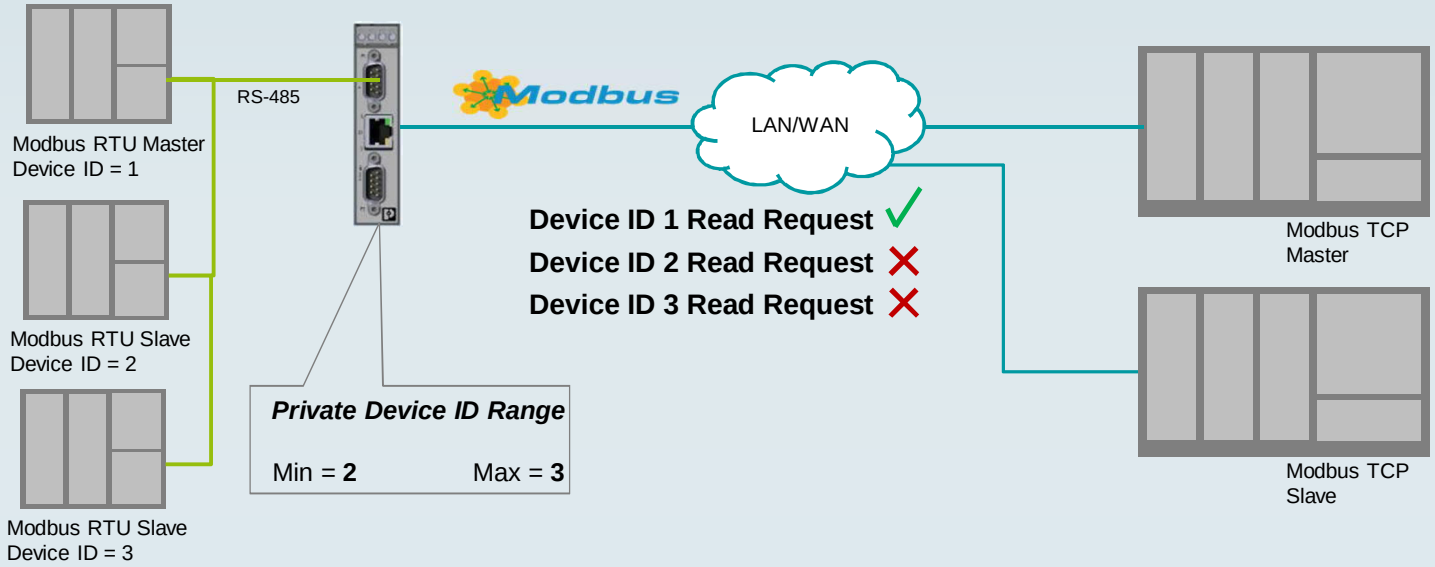
Device servers - Application example

Multiple devices with the same Device ID



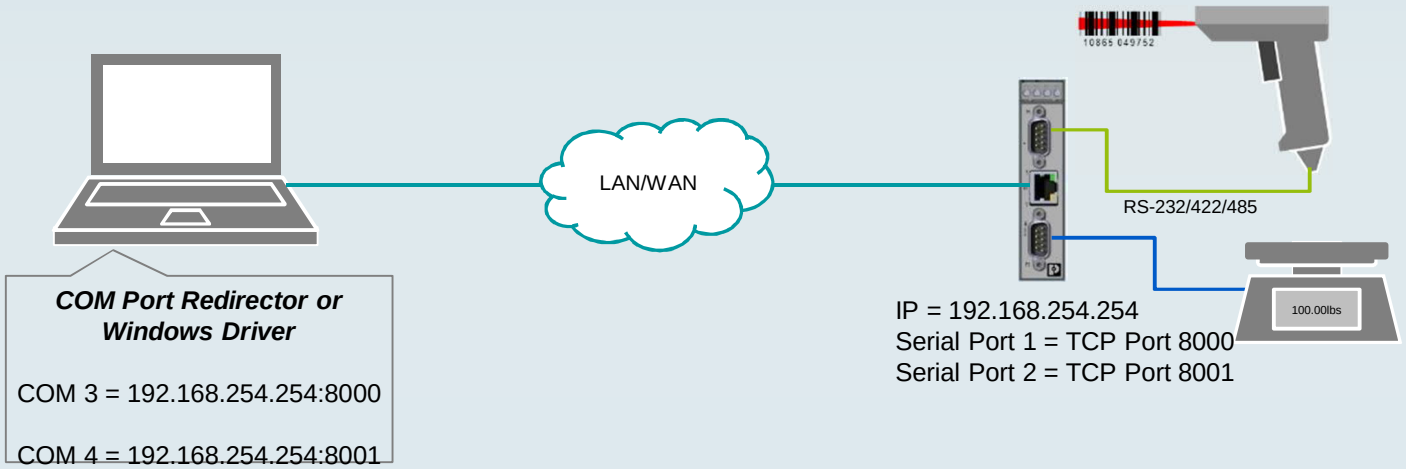
Device servers - Application example

Private Modbus Networks



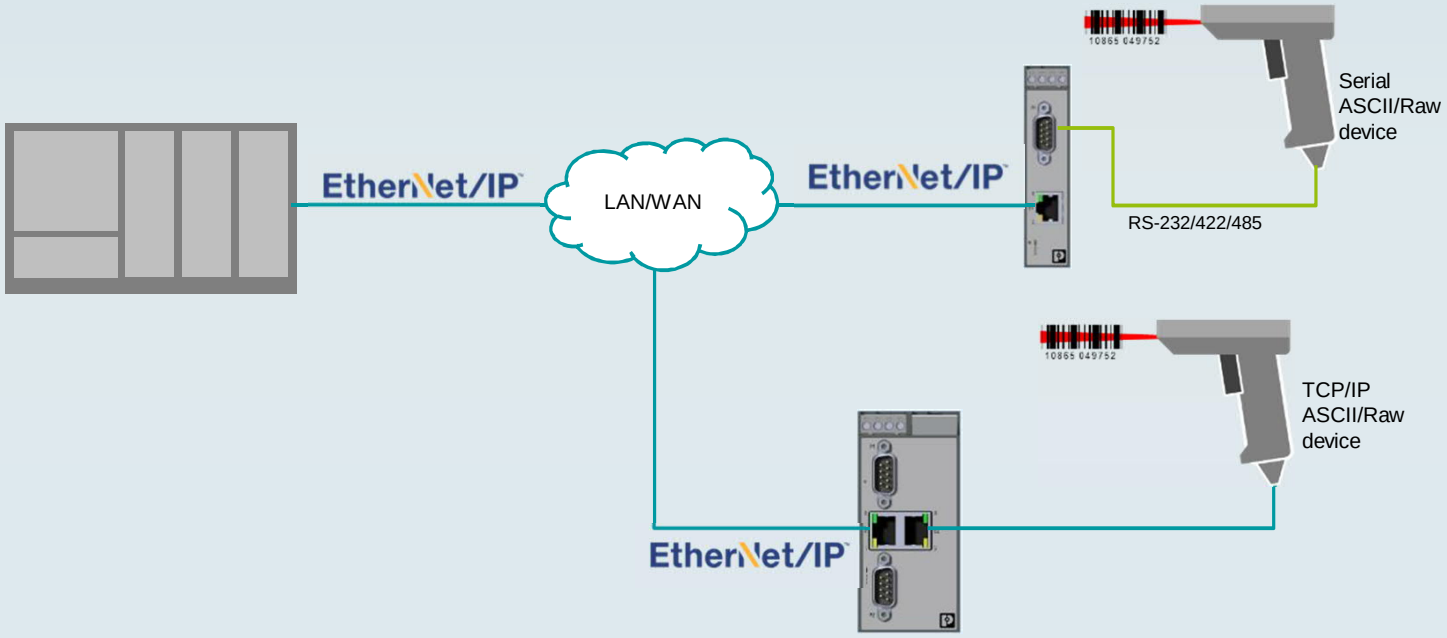
Device servers - Application example

Virtual COM Port



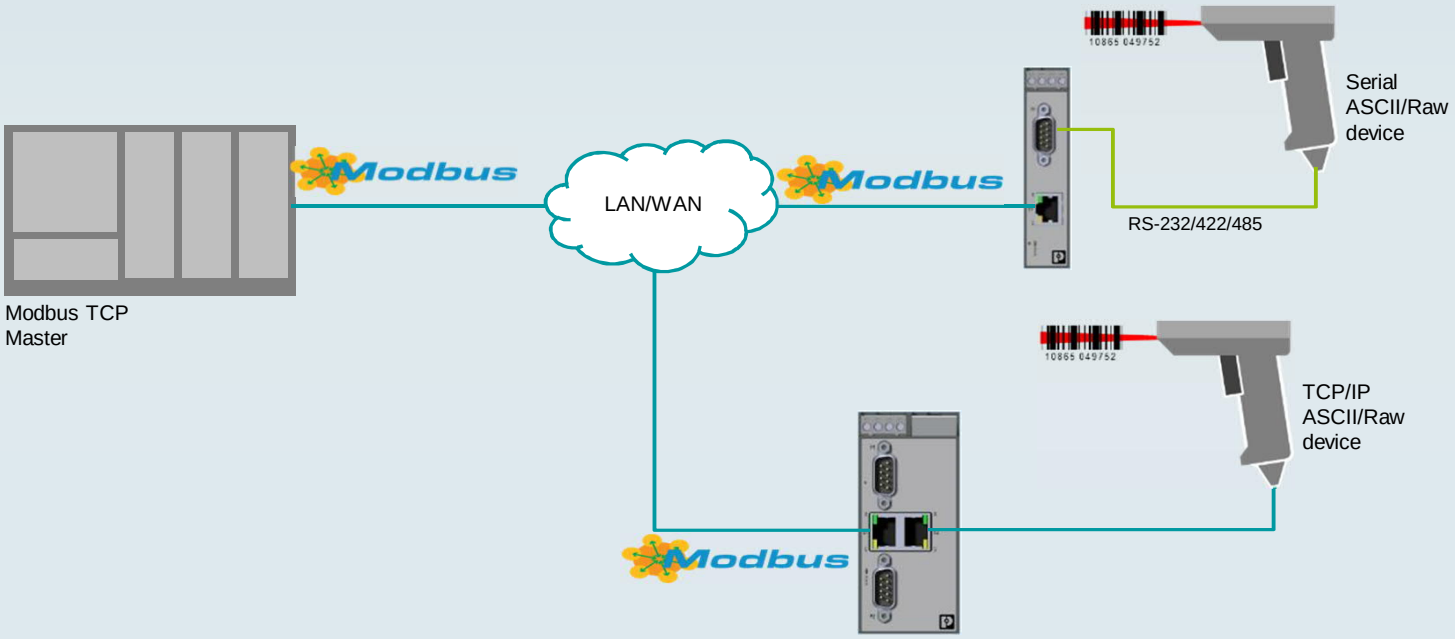
Device servers - Application example

ASCII to Ethernet/IP



Device servers - Application example

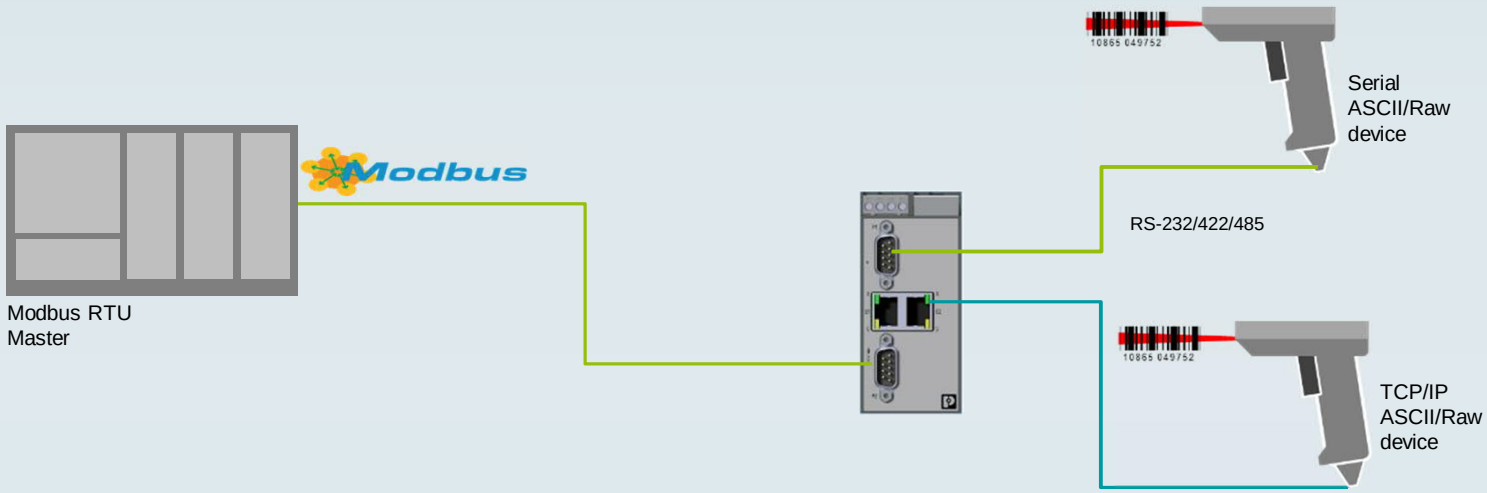
ASCII to Modbus TCP



PHOENIX CONTACT
INSPIRING INNOVATIONS

Device servers - Application example

ASCII to Modbus RTU



Serial Device Server








	FL COMSERVER BASIC	FL COMSERVER BASIC-T	GW DEVICE SERVER 1E/1DB9	GW DEVICE SERVER 1E/2DB9	GW DEVICE SERVER 2E/2DB9	GW DEVICE SERVER 2E/4DB9
Protocol	**Protocol transparent**					
Ethernet interface	1x RJ45		1x RJ45		2x RJ45	
Serial interface (RS-232/422/485)	1x D-SUB 9		1x D-SUB 9	2x D-SUB 9		4x D-SUB 9
Special features	ATEX. UL (Class I, Division 2)		ATEX, IECEx, UL (Class I, Division 2)			
Order no.	2313478	2904681	2702758	2702760	2702761	2702763

INSPIRING INNOVATIONS

Gateways



	FL COMSERVER UNI	FL COMSERVER UNI-T	GW MODBUS TCP/RTU 1E/1DB9	GW MODBUS TCP/RTU 1E/2DB9	GW MODBUS TCP/RTU 2E/2DB9	GW MODBUS TCP/RTU 2E/4DB9	GW MODBUS TCP/ASCII 1E/1DB9	GW MODBUS TCP/ASCII 1E/2DB9	GW MODBUS TCP/ASCII 2E/2DB9	GW MODBUS TCP/ASCII 2E/4DB9
Protocol	**Modbus/RTU to Modbus/TCP**						**RAW, ASCII to Modbus/TCP**			
Ethernet interface	1x RJ45		1x RJ45		2x RJ45		1x RJ45		2x RJ45	
Serial interface (RS-232/422/485)	1x D-SUB 9		1x D-SUB 9	2x D-SUB 9		4x D-SUB 9	1x D-SUB 9	1x D-SUB 9		4x D-SUB 9
Special features	ATEX, UL (Class I, Divisson 2)		ATEX, IECEx, UL (Class I, Division 2)							
Order no.	2313452	2904817	2702764	2702765	2702766	2702767	2702768	2702769	2702770	2702771

PHOENIX CONTACT
INSPIRING INNOVATIONS

Gateways










	GW PN/ASCII 1E/1DB9	GW PN/ASCII 1E/2DB9	GW PN/ASCII 2E/2DB9	GW PN/ASCII 2E/4DB9	GW EIP/ASCII 1E/1DB9	GW EIP/ASCII 1E/2DB9	GW EIP/ASCI 2E/2DB9	GW EIP/ASCII 2E/4DB9
Protocol	**RAW, ASCII to PROFINET**				**RAW, ASCII to EtherNet/IP**			
Ethernet interface	1x RJ45		2x RJ45		1x RJ45		2x RJ45	
Serial interface (RS-232/422/485)	1x D-SUB 9	2x D-SUB 9	2x D-SUB 9	4x D-SUB 9	1x D-SUB 9	2x D-SUB 9	2x D-SUB 9	4x D-SUB 9
Special features	ATEX, IECEx, UL (Class I, Division 2)							
Order no.	1021080	1021058	1021056	1020882	2702772	2702773	2702774	2702776

PHOENIX CONTACT
INSPIRING INNOVATIONS

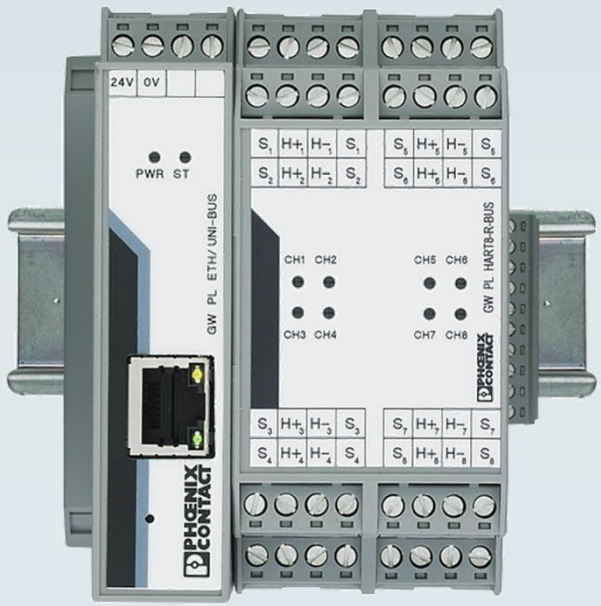
Gateways

new



	GW PN/ASCII 1E/1DB9	GW PN/ASCII 1E/2DB9	GW PN/ASCII 2E/2DB9	GW PN/ASCII 2E/4DB9
Protocol	**Modbus to Ethernet/IP**			
Ethernet interface	1x RJ45		2x RJ45	
Serial interface (RS-232/422/485)	1x D-SUB 9	2x D-SUB 9	2x D-SUB 9	4x D-SUB 9
Special features	ATEX, IECEx, UL (Class I, Division 2)			
Order no.	1062540	1062423	1062380	1062388

Modular Ethernet HART multiplexer



PROFINET Modbus TCP HART-IP

Converting HART protocol

The HART gateway converts the digital HART protocol into Ethernet protocols: HART-IP, Modbus TCP or PROFINET.

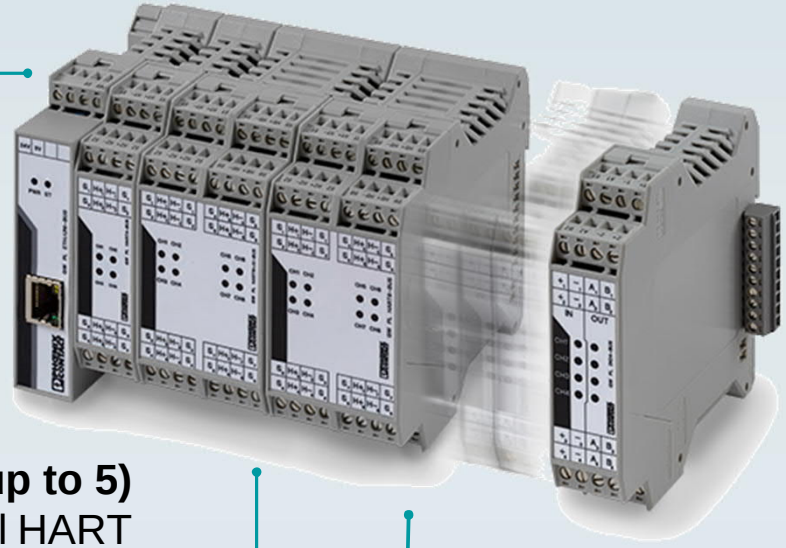
Easily parameterize and monitor HART field devices via Ethernet networks.

The modularity of the HART to Ehernet gateway, allows you to connect up to 40 HART devices.

Modular Ethernet HART multiplexer

Transmit critical HART process data over Ethernet (Modbus TCP, HART IP or Profinet)

1 HART master per channel ensures maximum update rate



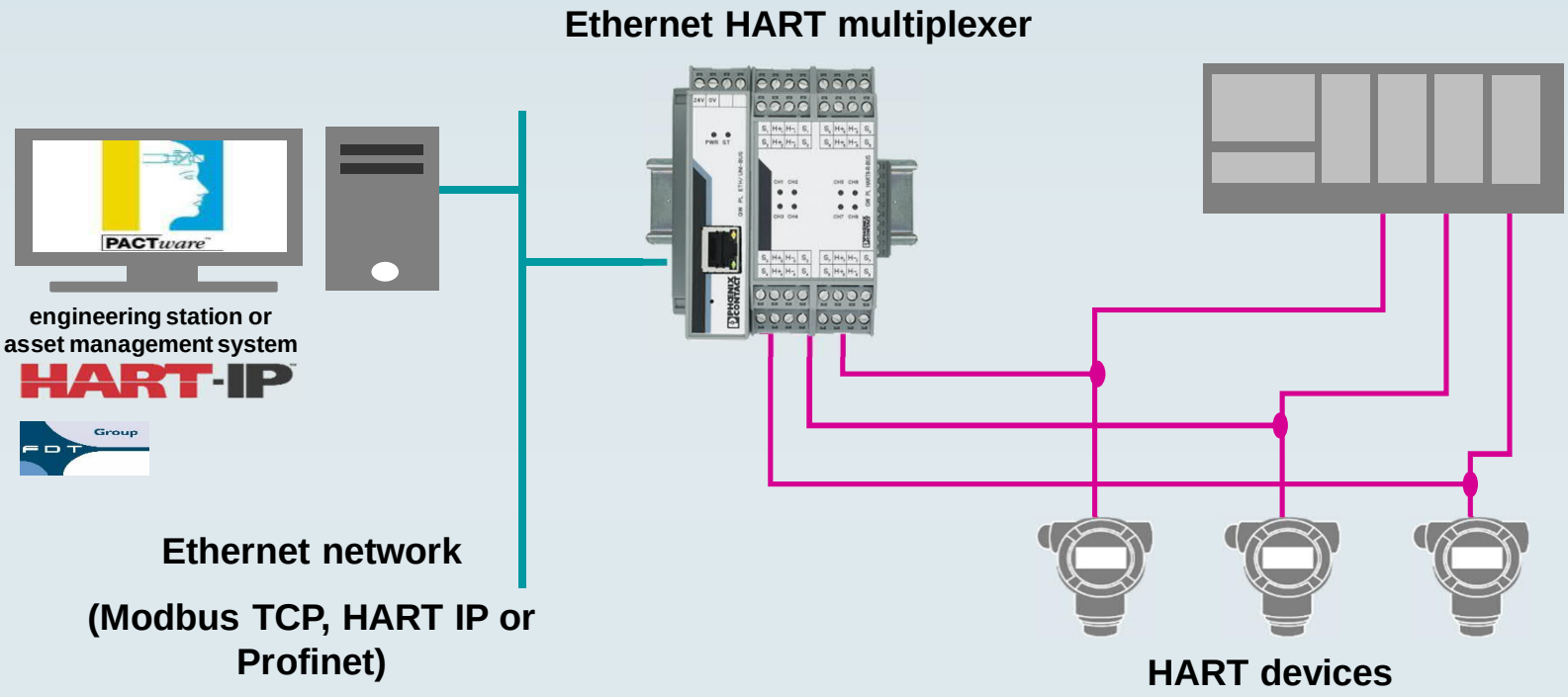
Enviromental
-40…70°C
ATEX, IECEx, UL Zone 2

Connect expansion modules (up to 5)
4 channel HART
8 channel HART
8 channel HART with loop supply
4 channel digital in/4 channel digital out

Access process data via
HART IP, Modbus TCP, Profinet, FDT/DTM
configure with a web browser

Modular Ethernet HART multiplexer

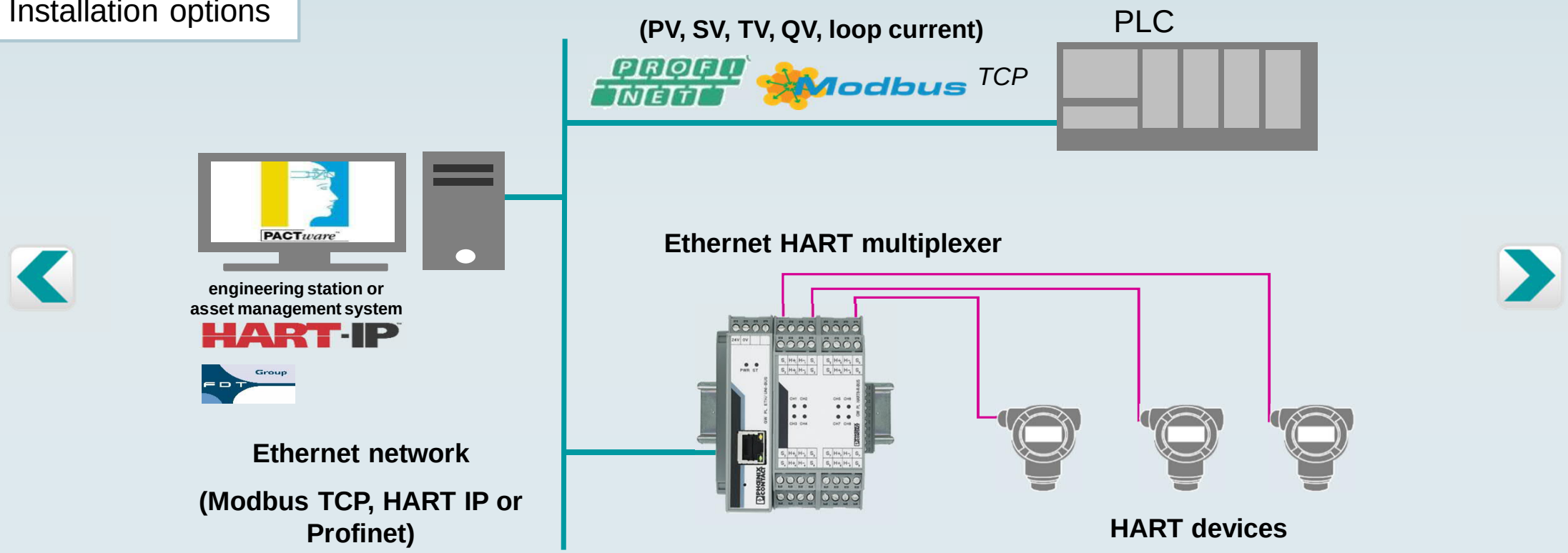
Installation options



PHOENIX CONTACT
INSPIRING INNOVATIONS

Modular Ethernet HART multiplexer

Installation options



PHOENIX CONTACT
INSPIRING INNOVATIONS

Modular Ethernet HART multiplexer



	Modular gateway Ethernet head station		Expansion modules			
Type	GW PL ETH/BASIC-BUS	GW PL ETH/UNI-BUS	GW PL HART8-BUS	GW PL HART4-BUS	GW PL HART8+AI-BUS	GW PL DIO4-BUS
Order number	2702321	2702233	2702235	2702234	2702236	2702237
Description	Head station with Modbus TCP, HART IP, FDT/DTM	Head station with Profinet, Modbus TCP, HART IP, FDT/DTM	8 channel HART module	4 channel HART module	8 channel HART module with analog loop supply	4 channel digital I/O

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline

TRUSTED WIRELESS



Easy startup

- Without programming
- Adjustable via thumbwheel
- I/O mapping

Universal applications

- I/O-to-I/O cable replacement
- Serial cable replacement RS-232/485
- I/O integration in Modbus RTU PLCs
- RS-485 extension possible

Worldwide use

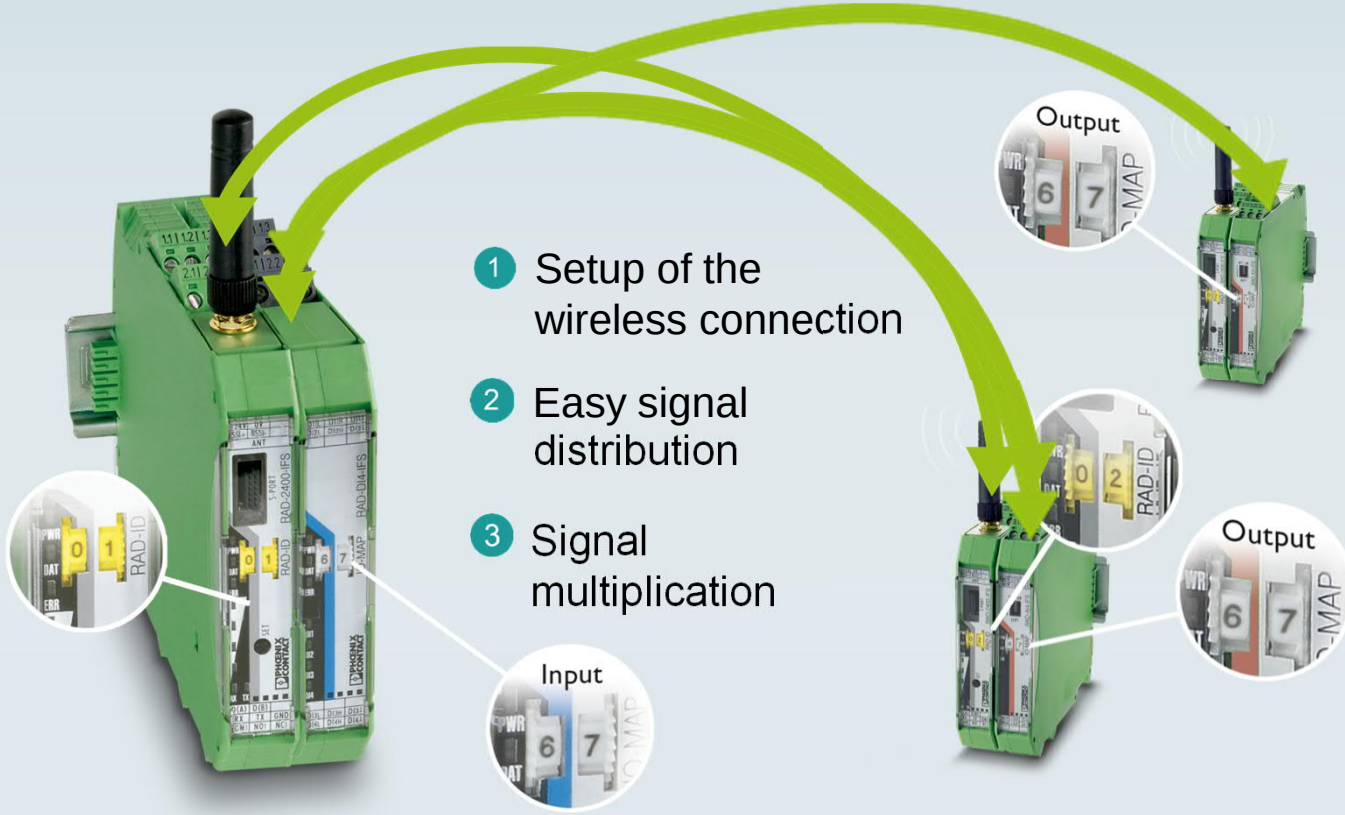
- 2,4 GHz, 868 MHz, 900 MHz and wired head stations
- Adjustable baud rates
- Ranges up to 5, 20 or 32 km

Flexibly expandable

- Up to 250 Stations in a network
- Up to 32 I/O modules per station
- Various digital and analog extension modules
- Hot-Swapping
- Galvanic channel-to-channel isolation

Radioline

TRUSTED WIRELESS



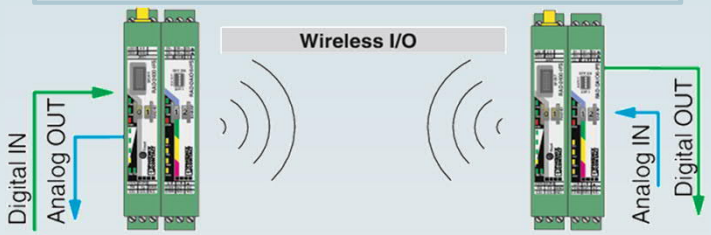
1. Setup of the wireless connection
2. Easy signal distribution
3. Signal multiplication

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline - One System for different applications

Option 1



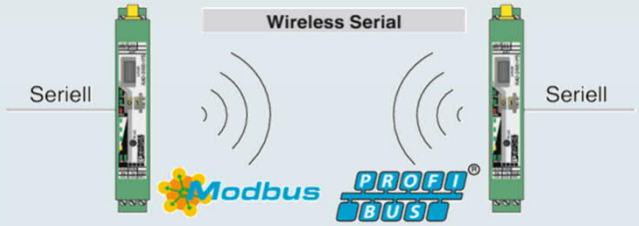
I/O to I/O

Option 2



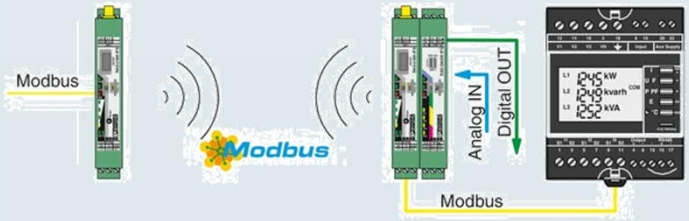
I/O to Modbus RTU

Option 3



Serial to Serial (RS 232/485)

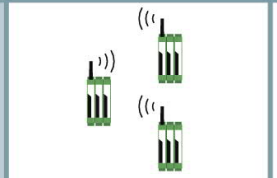
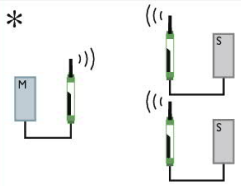
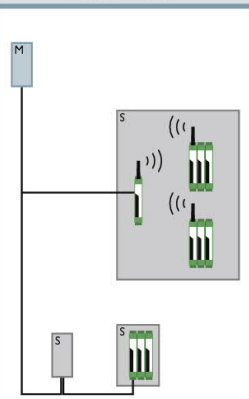
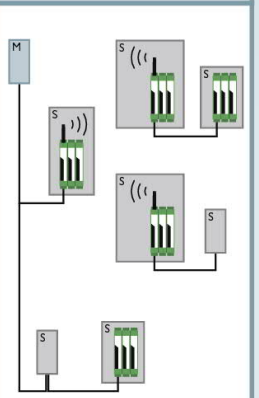
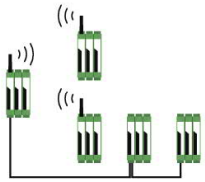
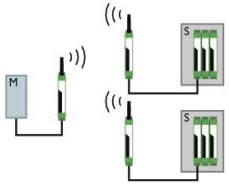
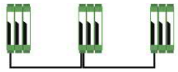
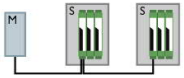
Option 4



I/O and Modbus parallel

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline System – Application overview

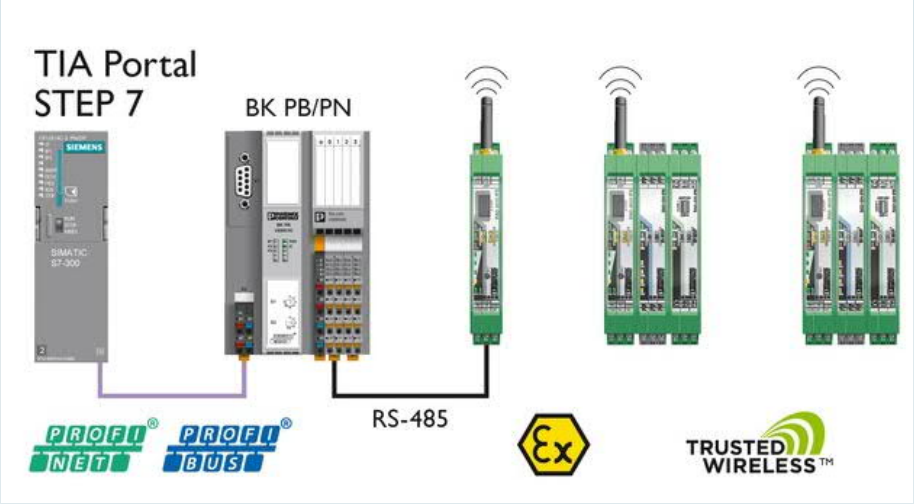
Application overview for the Radioline system	I/O to I/O	Serial to Serial	I/O to Serial	
	I/O data mode	Serial data mode	PLC/Modbus RTU mode	PLC/Modbus RTU **Dual** mode
Communication between wireless stations				
Combined communication between wireless- and RS-485 stations				
Communication between RS-485 stations				

Explanation

- M — Modbus Master
- S — Modbus Slave
- Radioline wireless module
- Radioline wireless station with I/Os
- Radioline RS-485 station with I/Os
- * In addition to Modbus, more serial protocols are supported

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline function blocks for PCWORX / STEP 7 / TIA Portal



- Monitoring and control of remote stations without cable access
- Simple reading of process data, status and diagnostic parameters of the individual radio stations
- Flexibility, simple installation and cost savings compared to wired installations
- Reduced development times
- License free and cost free function blocks

Supported hardware and software

- Siemens: S7-3xx, S7-12xx, S7-15xx PLCs, STEP 7, TIA Portal
- Phoenix Contact: Inline + Axioline PLCs, PCWORX

Radioline








International Ex approval	868 MHz	900 MHz America	900 MHz Australia	2,4 GHz worldwide	2,4 GHz Japan	RS485 Interface
Type	RAD.868-IFS	RAD-900-IFS	RAD-900-IFS-AU	RAD-2400-FS	RAD-2400-IFS-JP	RAD-RS485-IFS
Can be use in	Europe	North and South America and Canada	Australia	Worldwide	Japan	Worldwide (No radio)
Range up to	**20 km**	**32 km**	**32 km**	**5 km**	**5 km**	**cable**
Supply voltage	19,2 …30,5 V DC	10,8 …30,5 V DC	10,8 …30,5 V DC	19,2 …30,5 V DC	19,2 …30,5 V DC	19,2 …30,5 V DC
Temperature range	-40°C…+70°C					
Order number	2904909	2901540	2702878	2901541	2702863	2702184

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline



new



	Outdoor box for use in America	Outdoor box for worldwide use (configurable)
Type	RAD-900-DAIO6	RAD-RUGGED-BOX-CONF
Integrated	900 MHz radio, 6 integrated IO channels (2 x digital IN and OUT, 1 x analog IN and OUT), power supply	Fully pre-wired box with integrated power supply, over-voltage protection, selectable radio module and up to three selectable IO extension modules
Degree of protection	**NEMA 4X (IP 66)**	**IP 66**
Range up to	**32 km**	**Depends on selected radio**
Supply voltage	10,8 …30,5 V DC, 100 … 240 V AC	100 … 240 V AC
Temperature range	-40°C…+70°C	-25°C…+55°C
Order number	2702877	1091638

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – Extension modules

International Ex approval	 Digital In 4 channel	 Digital Out 4 channel	 Digital In 8 channel	 Digital Out 8 channel	 Analog In 4 channel	 Analog Out 4 channel	 Analog / digital	 PT 100 4 channel
Type	RAD-DI4-IFS (Input)	RAD-DOR4-IFS (Output)	RAD-DI8-IFS (Input)	RAD-DO8-IFS (Output)	RAD-AI4-IFS (Input)	RAD-AO4-IFS (Output)	RAD-DAIO6-IFS (Input / output)	RAD-PT100-4-IFS
Description	4 digital wide range inputs 0…250V AC/DC	4 digital relay outputs 24 V DC / 250 V AC / 5 A	8 digital inputs 0…30,5 V DC	8 digital transistor outputs 30,5 V DC / 200 mA	4 analog input 0/4…20 mA	4 analog outputs Alternatively 0/4…20 mA or 0…10 V DC	1 analog input/output 0/4…20 mA 2 digital wide range inputs/outputs 0…250 V AC/DC	4 Pt100 inputs Temperature measuring range: -50°C…+250°C
Order number	2901535	2901536	2901539	2902811	2901537	2901538	2901533	2904035

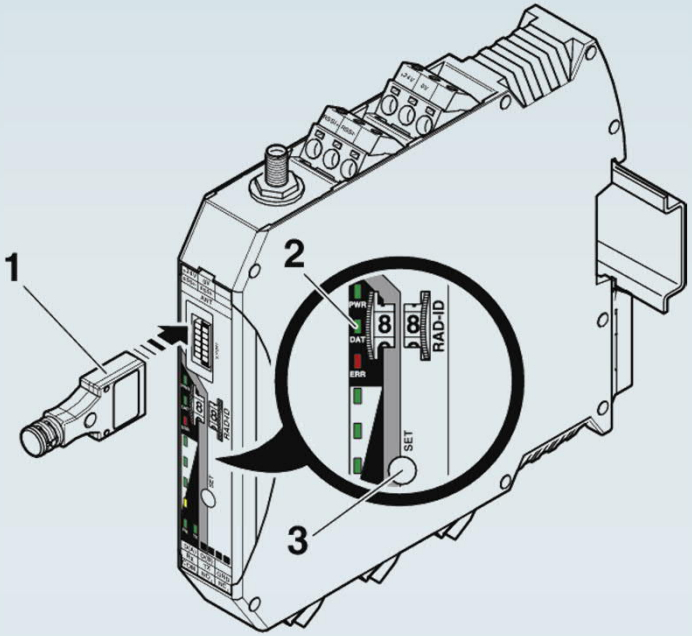
PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – accessories

							
	RAD-CONF-RF3	**RAD-CONF-RF5**	**RAD-CONF-RF7**	**RAD-CONF-RF1**	**RAD-CONF-RF1**	**RAD-MEMORY**	**RAD-CABLE-USB**
Frequency	**2,4 GHz**	**2,4 GHz**	**2,4 GH**	**868 MHz**	**900 MHz**	For all Radioline front modules	For all Radioline front modules
Description	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 3	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 5	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 7	Configuration stick for the 868 MHz wireless module unique network ID, RF band 1	Configuration stick for for the 900 MHz wireless module, unique network ID, RF band 1	Memory stick for saving custom configuration data	Data cable for communication between the PC and Radioline devices
Features	For easy and secure network addressing with unique network ID					Freely configurable	for diagnostics and configuration, 2m cable
Order No.:	2902814	2902815	2902816	2702197	2702122	2902828	2903447

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – Configuration sticks



1. CONFIGSTICK RAD-CONF-RF….
2. Status LEDs
3. SET button

Using a CONFIGSTICK, you can configure a **unique and secure** network. This enables the parallel operation of multiple networks (using different RF bands).

Reading in the device configuration using the CONFSTICK

- Insert the CONFSTICK into the S-PORT of the wireless module.
- Press and hold down the SET button on the wireless module for 1 second.
- Parameter read in is started
- Read-in has been completed when the DAT LED lights up once. The new parameters are activated.
- Remove the CONFIGSTICK from the wireless module.

Wireless Accessories

Cable and adapter
- Cable length 0,5 … 15 m
- Frequency range 0 … 6 GHz



Surge protection
- 2,4 GHz & 5 GHz
- 868 MHz & 900 MHz



Antenna barrier (Ex-i)
- Use of standard antennas in areas (Zone 0,1,2)
- Installation as enclosure lead-through in Zone 2
- Frequency range 0,7 … 6 GHz
- Protection class IP65



Omnidirectional antenna
- For short and medium distances
- Numerous devices in different directions
- Versatile applications



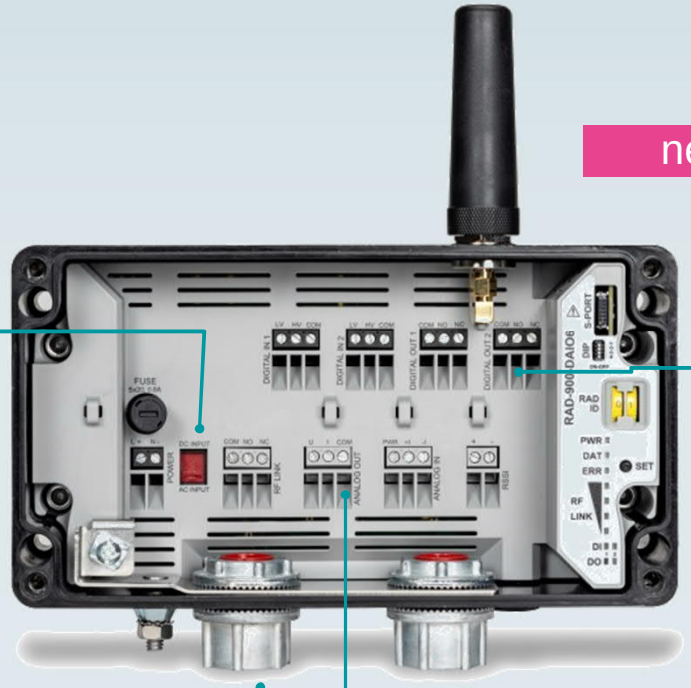
Directional antenna
- Bridging large distances
- Point-to-point connections
- Stationary or linear applications
- Decoupling due to directivity in the case of multiple point-to-point paths



PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-900-DAIO6

new



Fused AC/DC Power selection

Six built-in I/O points 2DI, 2DO, 1AI,1AO

Dual half-inch NPT fittings for power and data isolation

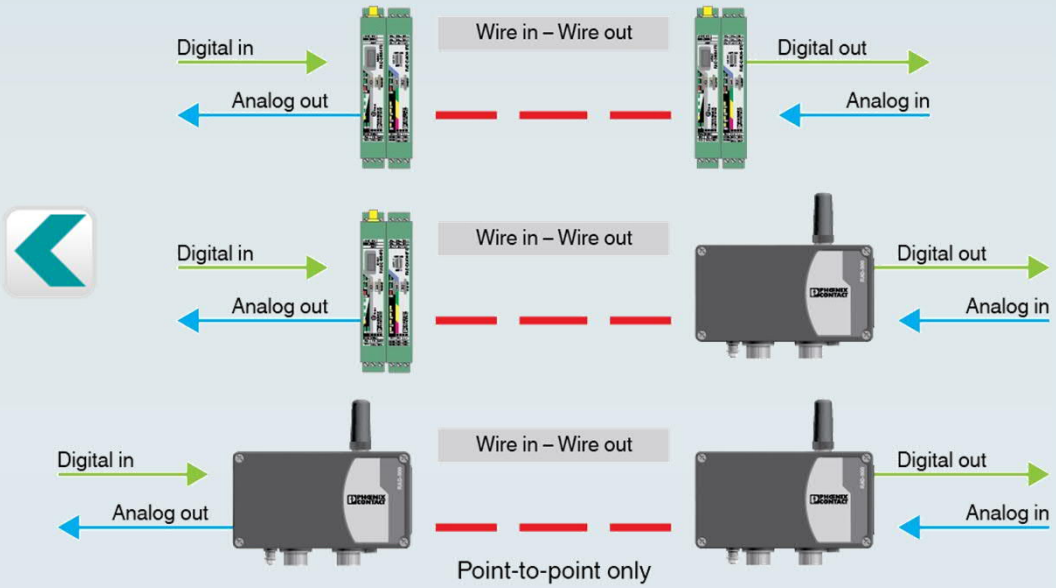
Seperated terminals and wire-tie loops for cable management

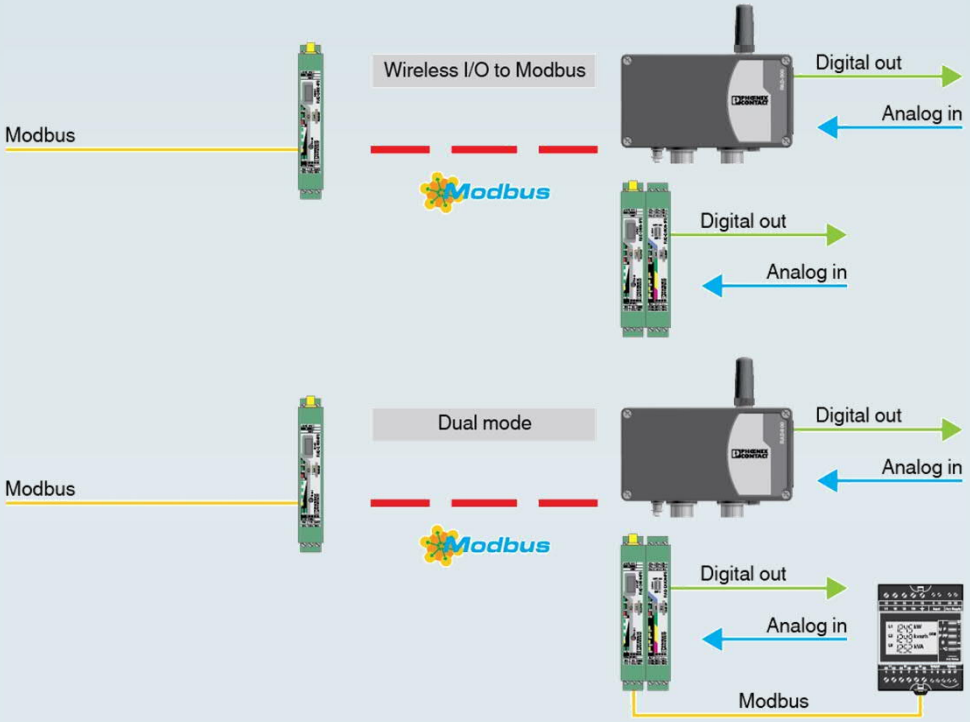
- Compact NEMA4X housing
- Compatible with existing RAD-900-IFS installations
- Class I Division 2
- Up to 1000 ft out of the box
- Software-free installation for I/O-to-I/O applications
- **Only for North and South America and Canada**

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-900-DAIO6

Modes of operation





PHOENIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-RUGGED-BOX-CONF

Outdoor box solution (configurable)

- Fully pre-wired control box with integrated 230V power supply, over-voltage protection, selectable radio module and up to three selectable IO extension modules
- Quick and easy connection of power supply and IO signals
- Outdoor use thanks to robust UV-resistant and impact-resistant IP-66 housing

new



For worldwide use

868 MHz | 900 MHz | 2,4 GHz

Radioline – RAD-RUGGED-BOX-CONF

new

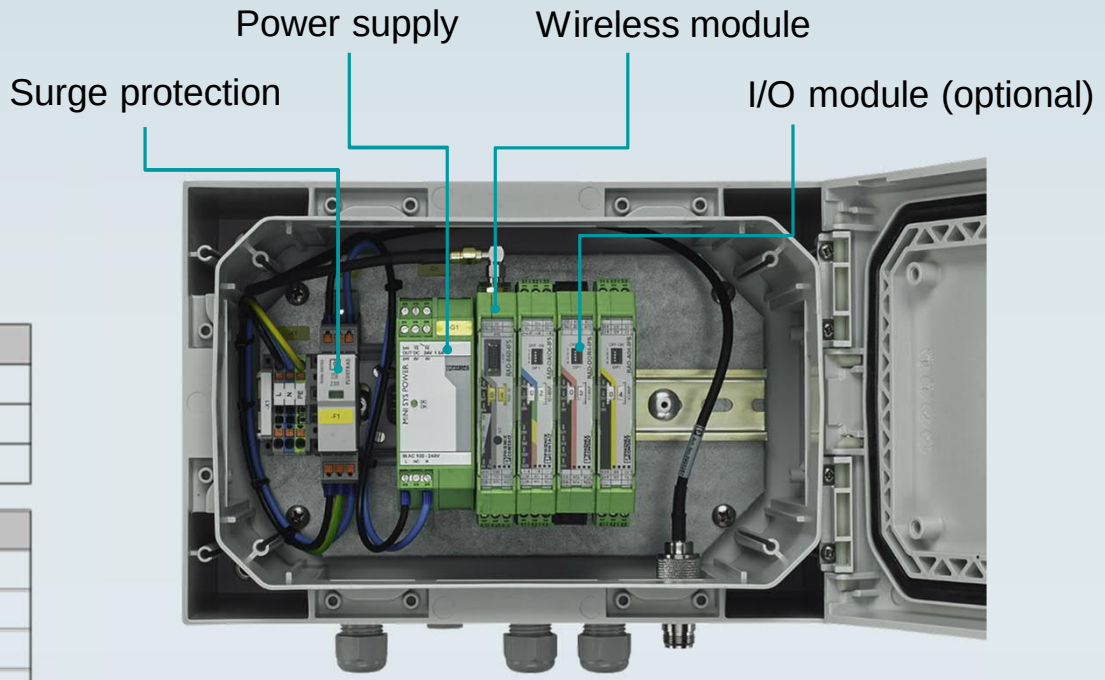
Order key

Example:

Order No.	Wireless module	I/O module (optional)		
		1	2	3
1091638	2400	DI4	AI4	DO8

Wireless module (1 unit)	Area of application	Order key
2.4 GHz	Worldwide	2400
868 MHz	Europe	868
900 MHz	America	900

Type of I/O extension module (optional, up to 3 units)	Order key
2 digital inputs/outputs and 1 analog input/output	DAIO6
4 digital inputs	DI4
8 digital inputs	DI8
4 analog current inputs	AI4
4 Pt 100 inputs	PT100
4 digital relay outputs	DO4
8 digital transistor outputs	DO8
4 analog current or voltage outputs	AO4



For worldwide use

868 MHz | 900 MHz | 2,4 GHz

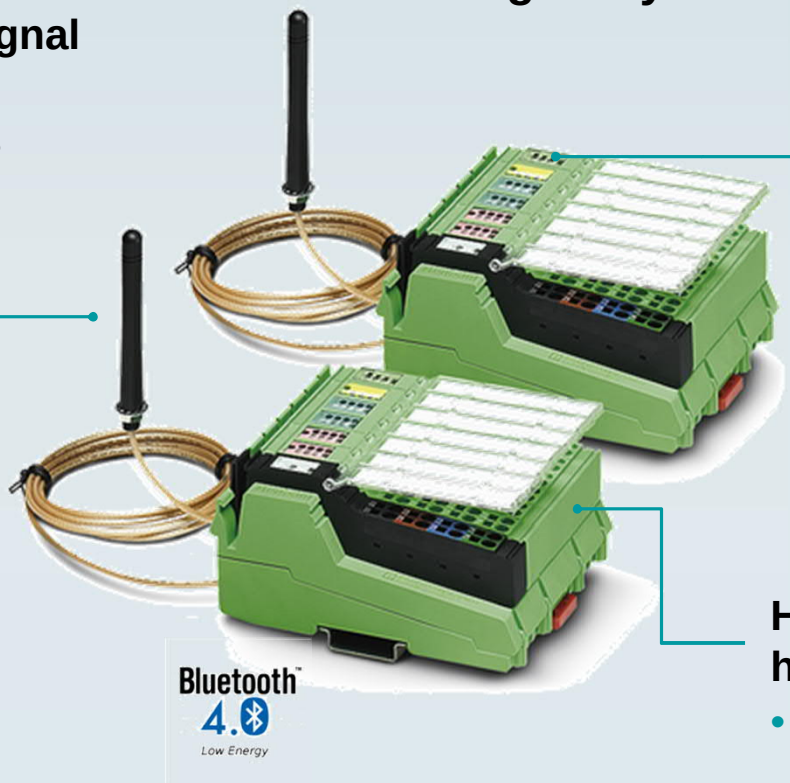
PHOENIX CONTACT
INSPIRING INNOVATIONS

Wireless Multiplexer

Plug&Play - startup without configuration

Suitable for time-critical signal transmission

- Transmission time < 10 ms



Diagnose

- Radio link diagnostics via LED bargraph

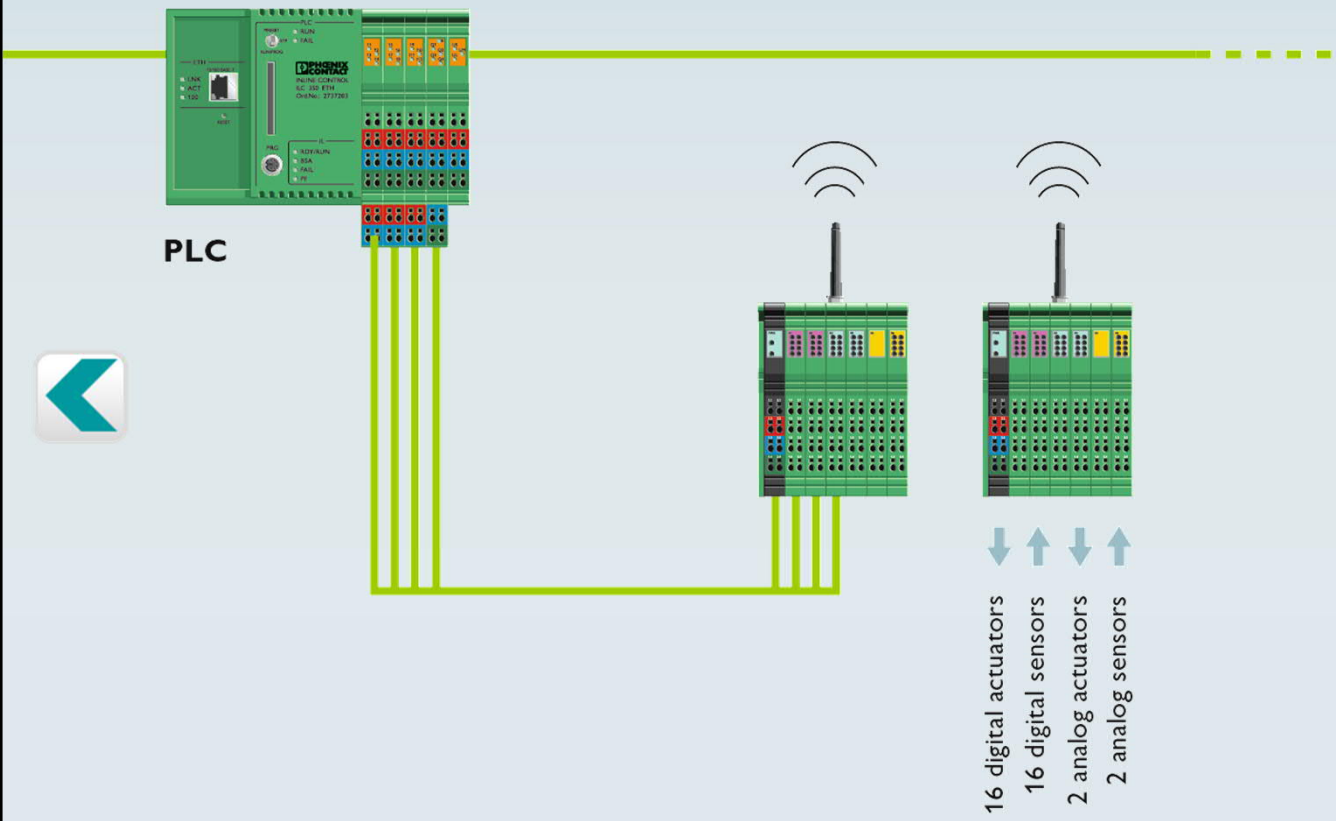
Distances

- 50 m – 100 m indoors
- 200 m – 400 m outdoors

High number of channels in a compact housing

- Analog / digital

Wireless Multiplexer



- Point-to-point communication
- 16 digital inputs/outputs
- 2 analog inputs/outputs
  0-20 mA, 0-10 V
- Transmission time
  ≥ 10 ms
- Bluetooth 4.0 technology

PHOENIX CONTACT
INSPIRING INNOVATIONS

Wireless Multiplexer





	ILB BT ADIO MUX-OMNI	ILB BT ADIO MUX
Description	Wireless set including omnidirectional antennas with 1,5 m cable	Wireless set without antennas
Transmission power	20 dBm / 100 mW	
Number of I/O channels	16 DI/DO + 2 AI/AO (0-20 mA / 0-10 V) Not expandable	
Temperature range	-25°C … 60°C	
Network structure	Point-to-Point	
Order number	2884208	2702875

PHOENIX CONTACT
INSPIRING INNOVATIONS

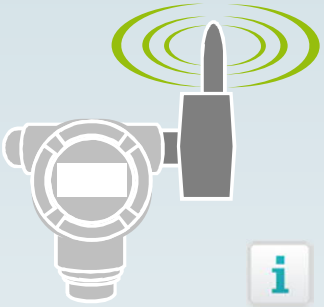
Wireless HART



WirelessHART gateway

manages the WirelessHART network

connects to the control system



WirelessHART adapter

retrofit wired instruments to WirelessHART

may be loop, line, or battery powered



WirelessHART device

add new measurement or control devices without any wires

may be line or battery powered

WirelessHART



global RF band



security



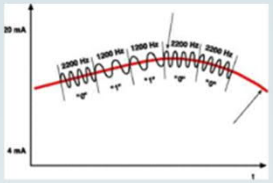
mesh networking



time synchronized

HART technology

the world’s most broadly supported protocol for the process industry



1986

HART became an open standard.

1993

The HART Communication Foundation was formed to manage the standard.

1999

The *HART Server*, an easy-to-use, OPC-compliant software application for accessing real-time process and diagnostic information was released.

2001

HART 6 was released, including features to enable AMS (Asset Management System) integration:

2007

HART 7 was released, and included the WirelessHART standard.

2012

HART 7 was enhanced with additional functionality, including HART IP.











Wireless HART Gateway

Integrated WLAN
Redundant connection as backup for ethernet cable

Mobile access for programming and diagnostic



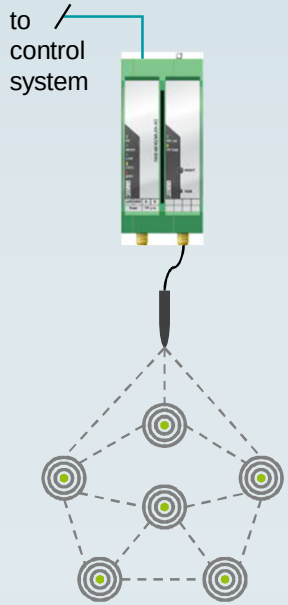
Ethernet-Port
For easy programming and diagnostics with integrated web server

Environmental
-40…70°C
ATEX, IECEx, CSA Zone 2

Access process data via
HART IP, Modbus TCP,
FDT/DTM
(supports up to 250 field devices)
configure with a web browser

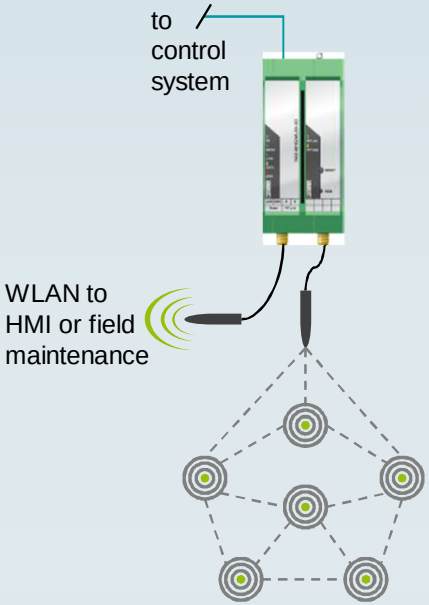
Process data access
HART IP, Modbus TCP, FDT/DTM
(supports up to 250 field devices)

Wireless HART Gateway - Installation options



WLAN disabled

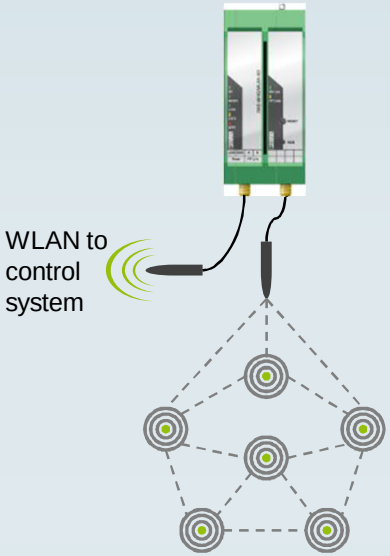
Ethernet connection to control system



WLAN maintenance port

Ethernet connection to control system

WLAN connection to HMI, maintenance PC or tablet



WLAN backhaul

WLAN connection to control system

Wireless HART Adapter

Removable outdoor antenna
Can optionally be replaced for increased performance by antennas with more gain



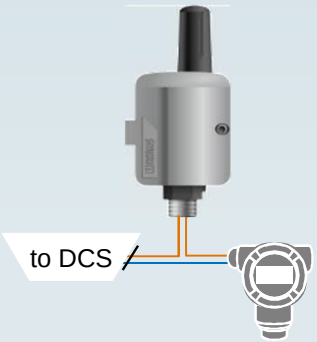
Environmental
-40…70°C
ATEX, IECEx, CSA Zone 2

Mechanical
rugged cast aluminum housing
1/2NPT or M20 fitting

Sensor connection
Connection of up to 4 HART devices
Direct supply of one HART- device (loop-powered)

Wireless HART Adapter - Installation options

retrofit existing installations

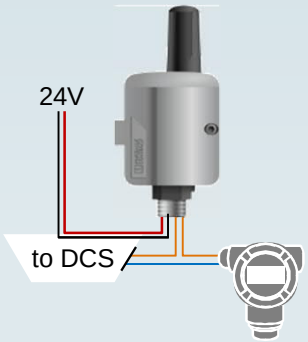


loop powered

retrofit an existing device

the loop stays intact

WHA is loop powered



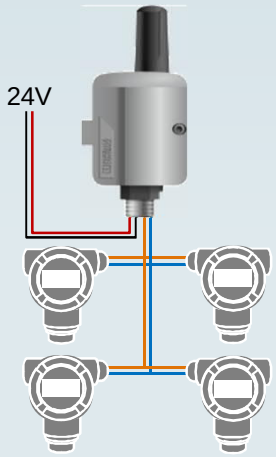
line powered

retrofit an existing device

the loop stays intact

WHA is 24V powered

add new measurement points

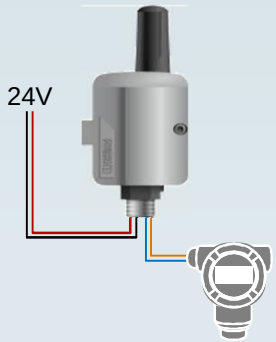


multidrop

connect up to 4 HART devices

WHA is 24V powered

WHA supplies loop power for the HART devices



4…20mA

WHA is 24V powered

WHA supplies loop power for a 4…20mA device

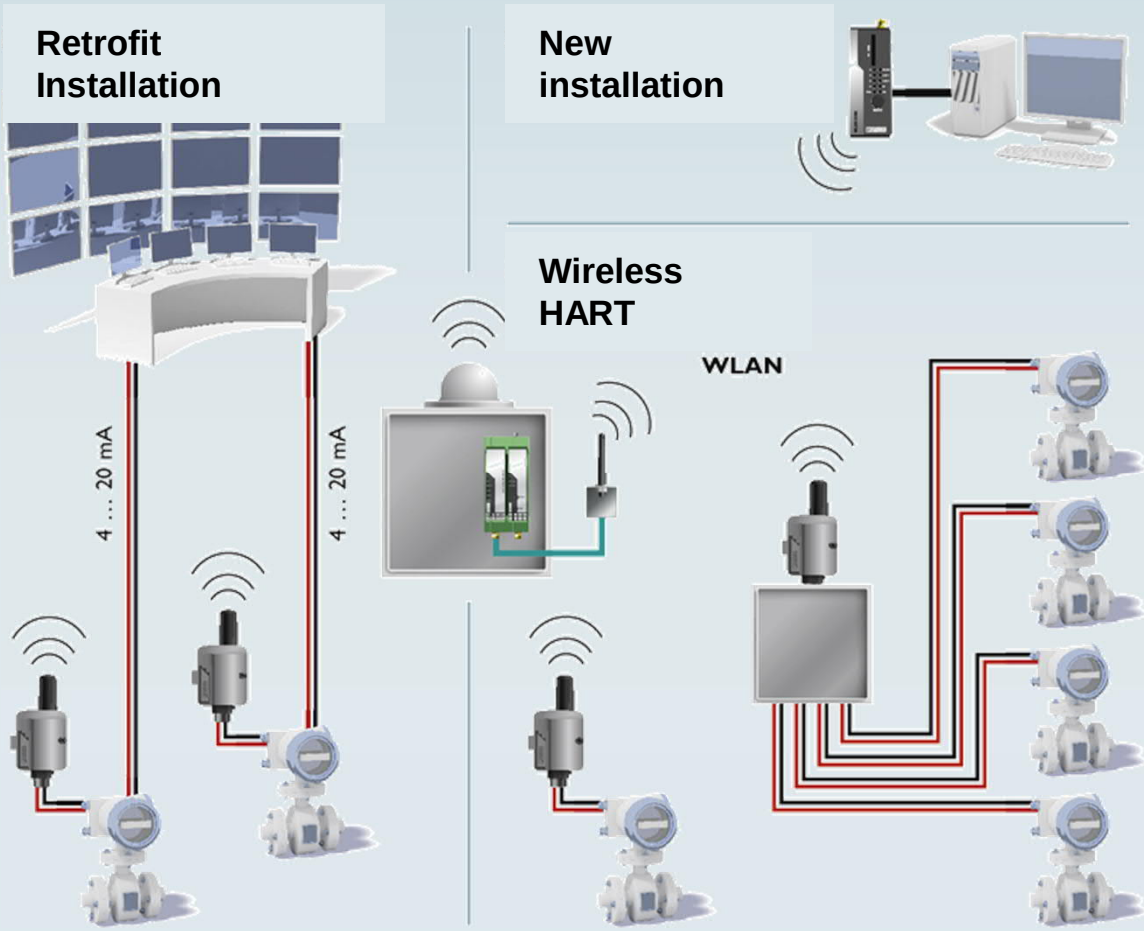
WHA reports 4…20mA loop value as PV

Wireless HART

Wireless HART can:

New installation
- Accelerate system extension
- Reduce start time
- Lower investment costs

Retrofit installation
- Meet new directives
- Increase efficiency
- Lower maintenance costs



HART USB MODEM



USB modem for configuration and commissioning HART devices

The GW HART USB MODEM is suitable as a replacement for old RS232 HART modems or a cost effective alternative to expensive handheld devices.

Main Features

- Includes test utility to diagnose connection or configuration errors
- USB powered
- Unique form factor eliminates tangled cables
- Compatible with all major software packages

Ord. no 1003824 GW HART USB MODEM

Wireless HART







	RAD-WHG/WLAN-XD	RAD-WHA-1/2NPT	GW HART USB MODEM (Accessoire)
Description	Gateway between WirelessHART field devices and 802.11b/g	Adapter that can be used to interface HART field devices into a WirelessHART network.	USB modem for configuration and commissioning HART devices The GW HART USB MODEM is suitable as a replacement for old RS232 HART modems or a cost effective alternative to expensive handheld devices.
Wireless Interface	2,4 GHz…2,4835 GHz		
Interface	Supports 250 Wireless HART devices	Up to 4 HART devices can be connected to one adapter	
Antenna connection	RSMA (female) (without antenna)	N (female) (Removable antenna)	
Degree of protection	IP20	IP65	
Order number	2900178	2900100	1003824

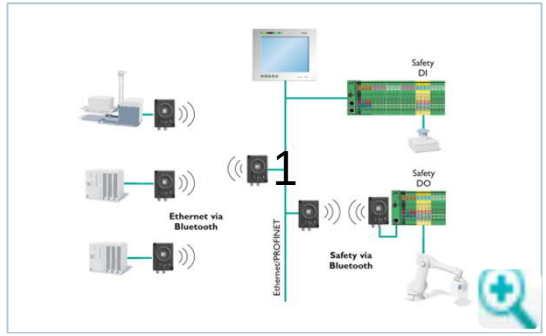
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth

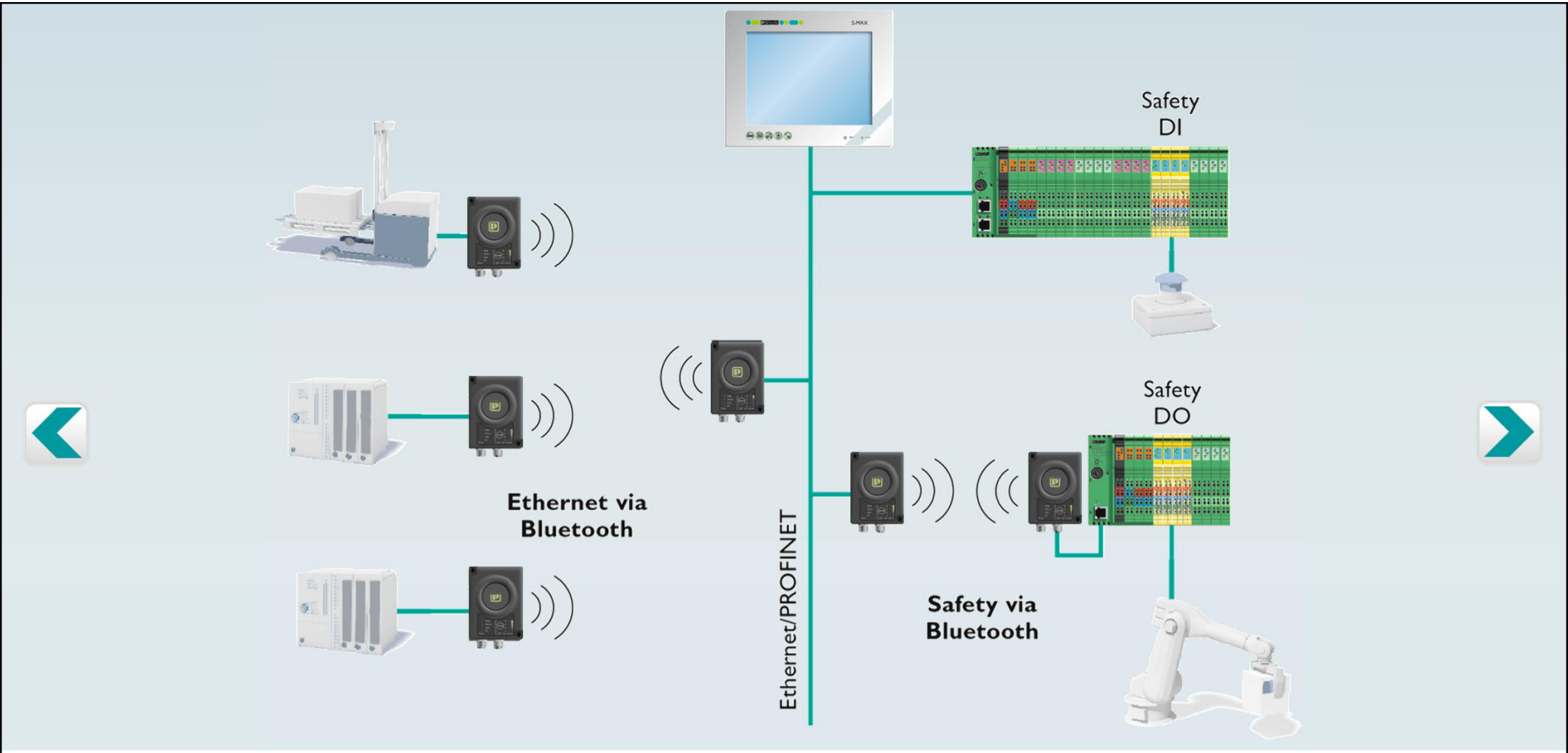


Various application areas

- Point-to-point connection (Cranes, traveling bridge collectors, robots)
- Multipoint connection (I/O components, scanners, PCs)



PHOENIX CONTACT
INSPIRING INNOVATIONS



PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth

Interference-free parallel operation with WLAN networks



- Adaptive frequency hopping (AFH)
- Low emission mode (LEM)
- Black channel list (BCL)

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth

			
	FL EPA 2 (BT Mode)	**FL EPA 2 RSMA (BT Mode)**	**FL BT EPA 2**
Function	Bluetooth Ethernet Client Adapter	Bluetooth Access Point	Bluetooth Ethernet Client Adapter
Antenna	Internal panel antenna	Omnidirectional antenna supplied as standard	Internal panel antenna
Frequency band	2,4 GHz	2,4 GHz	2,4 GHz
Connection type	M12 connection	M12 connection	M12 connection
Degree of protection	IP65	IP65	IP65
Temperature range	-40 °C … 65 °C	-40 °C … 65 °C	-40 °C … 65 °C
Order number	1005955	1005957	1005869

Industrial WLAN

Reliable communication thanks to MIMO technology

All-in-one-solution



Compatible with standards IEEE 802.11 a/b/g/n

Quick and easy startup

Optimized for operation in PROFINET and EtherNet/IP networks

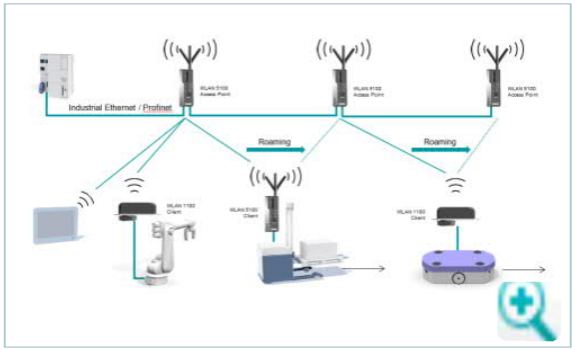
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Reliable communication thanks to MIMO technology

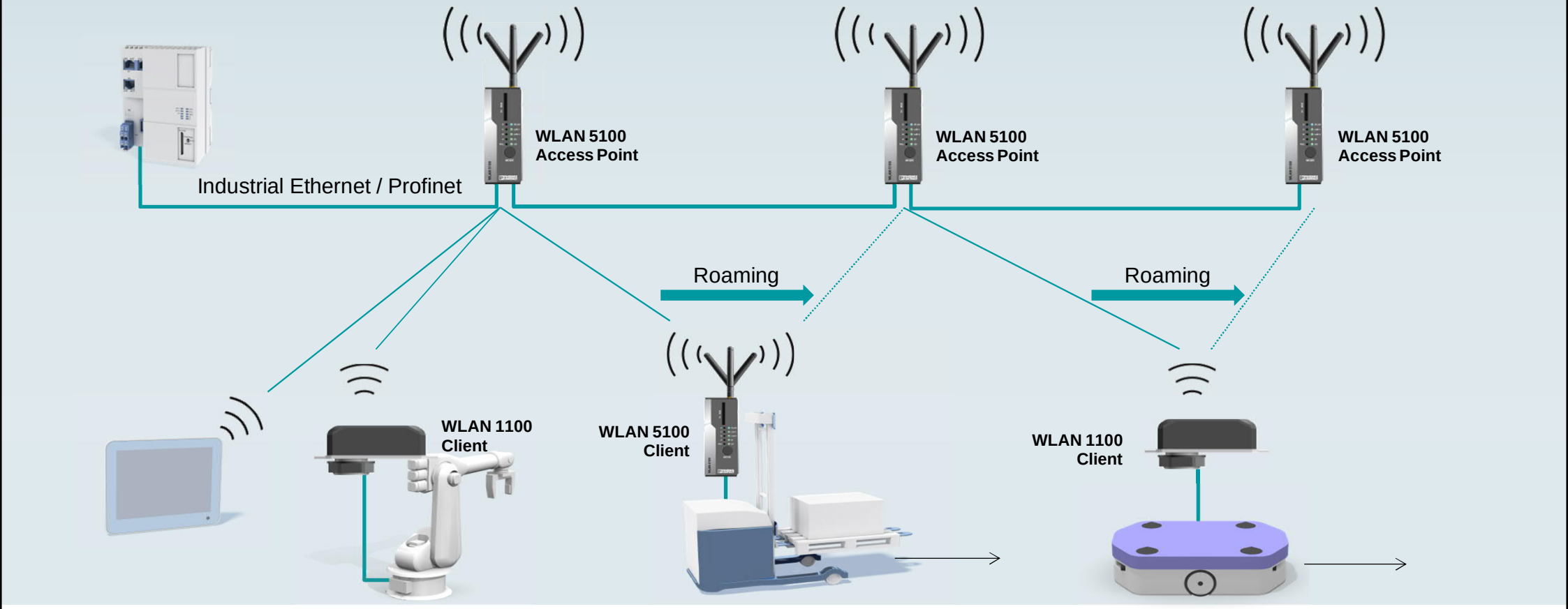


- Interruption-free roaming



PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



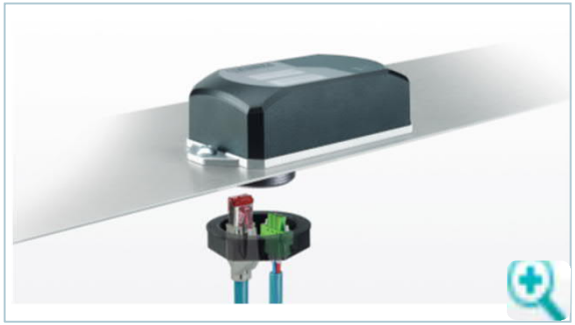
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

All-in-one-solution



- Integraded antennas and wireless module on one single device
- Single-hole mounting directly on machines, mobile vehicles or control cabinets
- Shockproof according to IK08

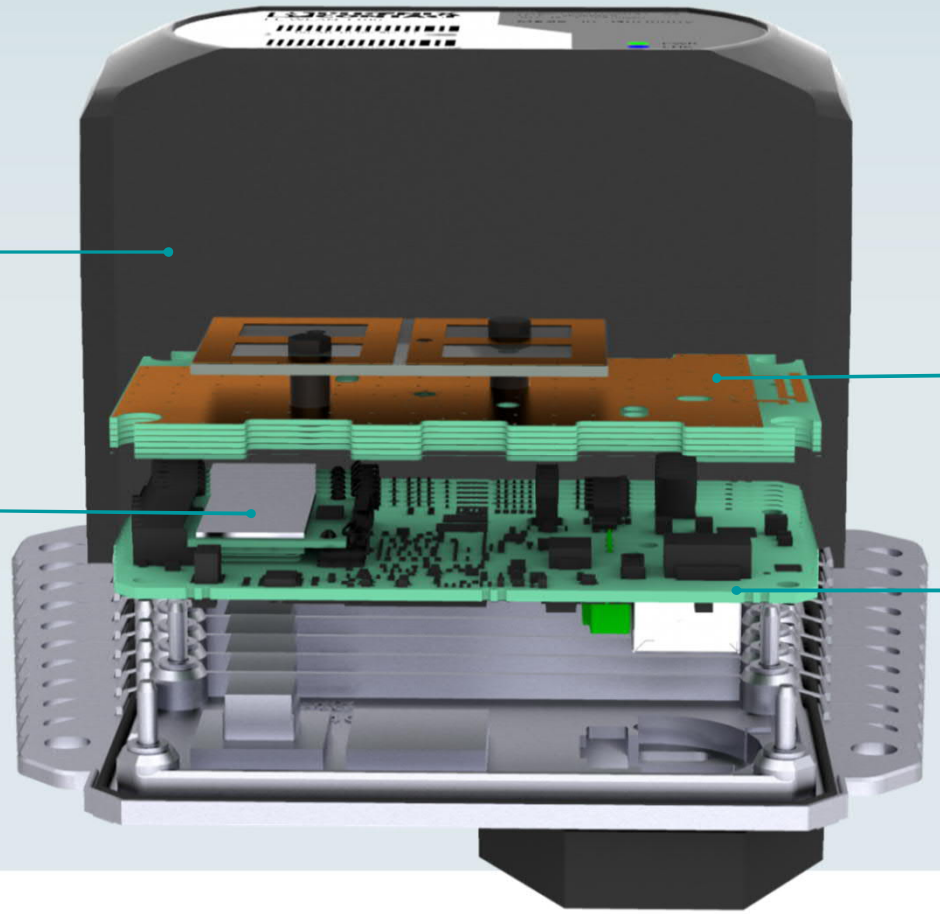


PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Extremely robust housing,
shockproof in accordance
with IK08, 7 Joule at -50°C
Protection Class IP 54

Powerful WLAN Board
802.11a/b/g/n
Dual band, 2,4 & 5 GHz



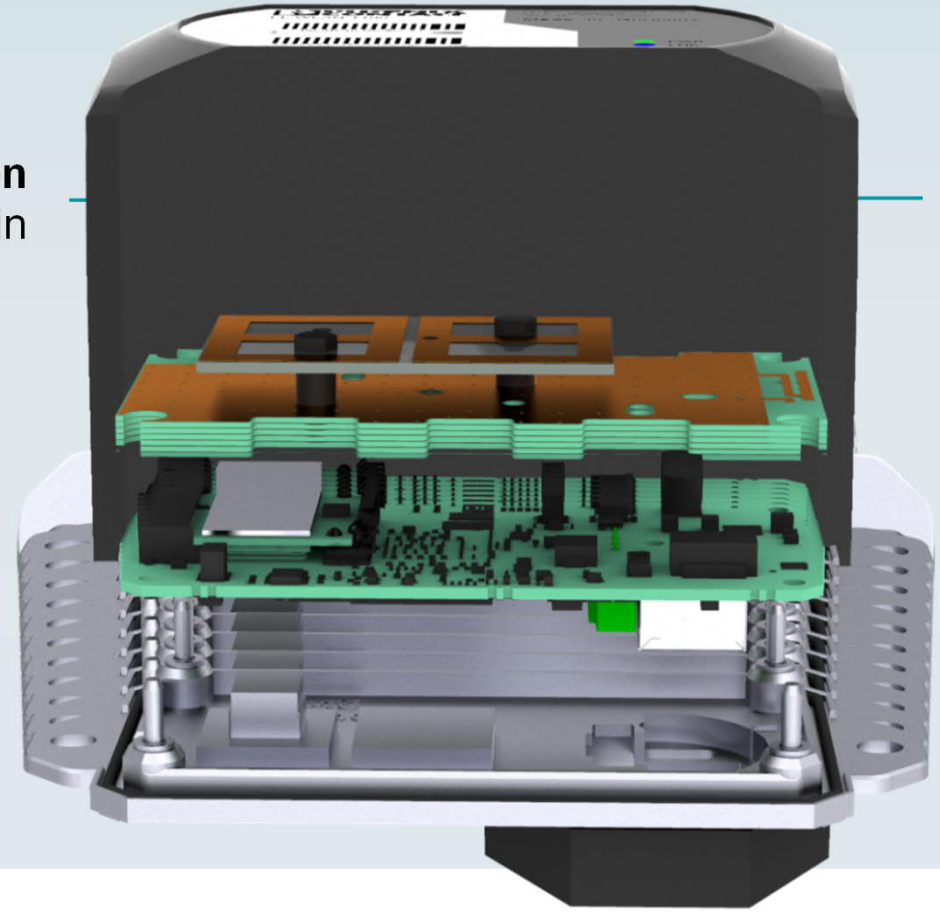
Special antennas
For fast and reliable
communication

Powerful Access Point
Linux operating system

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Power connection
Push-in



Ethernet connection
Standard RJ45

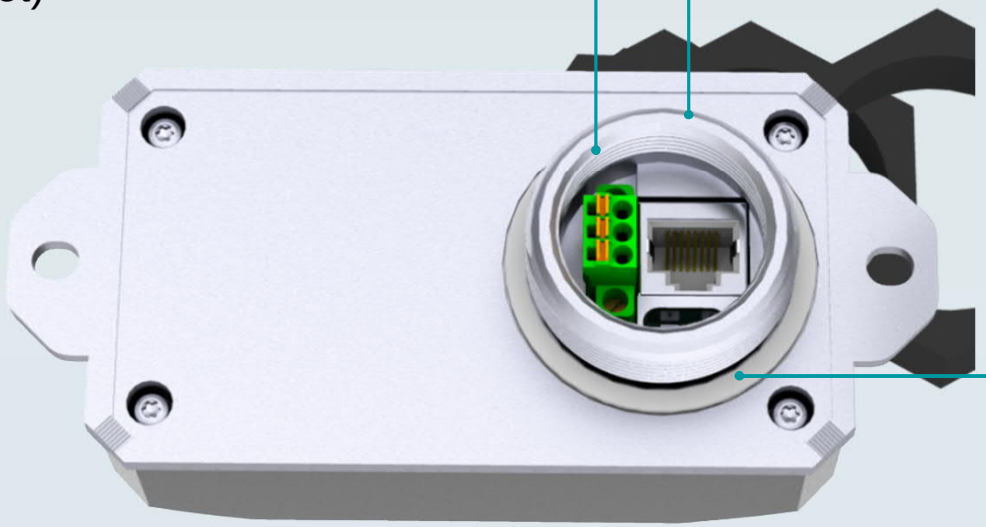
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

M32 inside thread
For optional IP67-connection adapter
(if not mounted on cabinet)



M40 external thread
for mounting



Seal
up to IP67

Industrial WLAN

Fast and easy connection
thanks to single-hole mounting



PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Fast and easy connection
thanks to single-hole mounting

Quick fastening

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

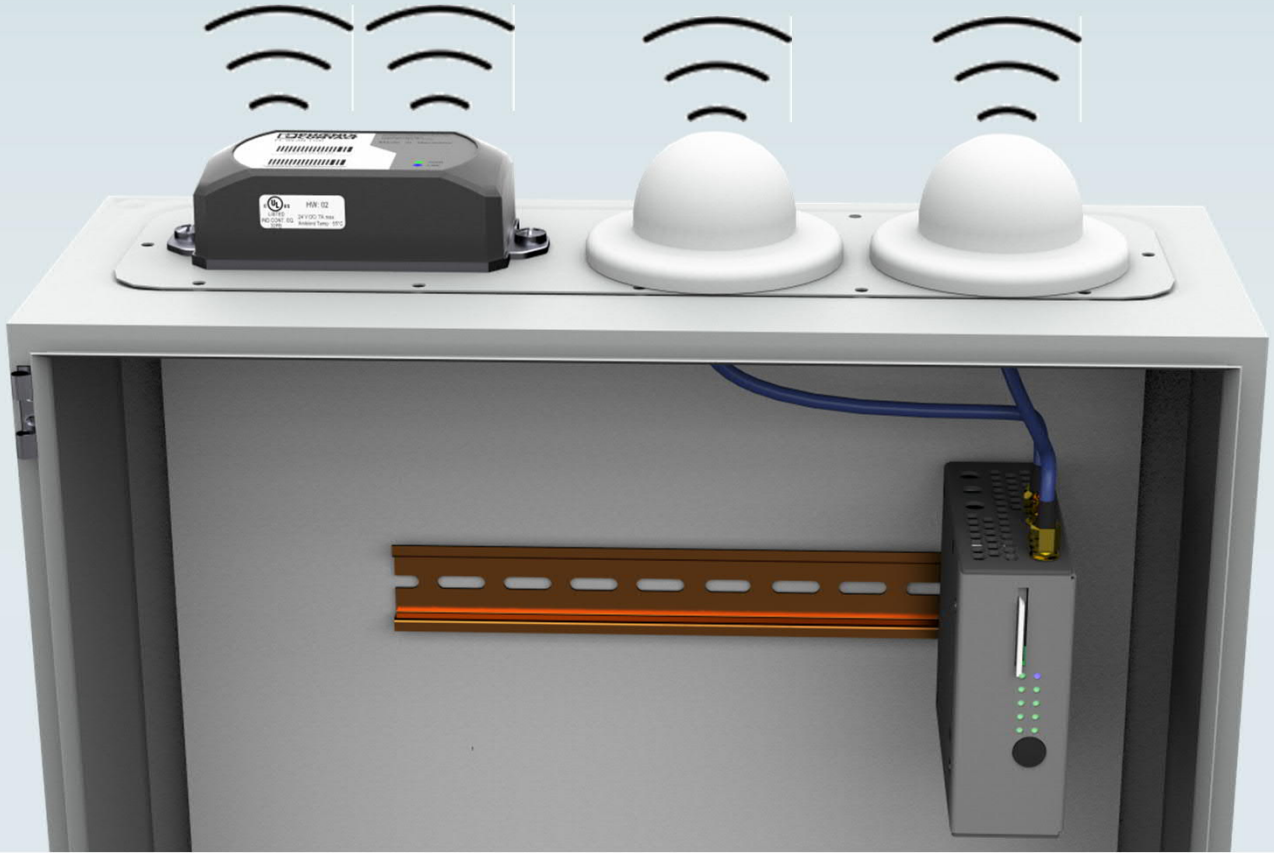
Industrial WLAN



Product overview

INSPIRING INNOVATIONS

Industrial WLAN



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Quick and
easy startup

- Cluster Management

Industrial WLAN

				
	FL WLAN 1100 (Europe)	**FL WLAN 1101 (USA, Canada)**	**FL WLAN 2100 (Europe)**	**FL WLAN 2101 (USA, Canada)**
Function	Wireless access point and client		Wireless access point and client	
Antenna	2 x integrated Antennas with MIMO technology		2 x integrated Antennas with MIMO technology	
Wireless standard	IEEE 802.11 a/b/g/n		IEEE 802.11 a/b/g/n	
Frequency band	2,4 and 5 GHz		2,4 and 5 GHz	
Connection type	RJ45		RJ45	
Degree of protection	IP54 above, IP20 below		IP66/68 above, IP20 below	
Temperature range	0 °C ... 60 °C		-40 °C … 60 °C	
Order number	2702534	2702538	2702535	2702540

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN





	FL WLAN 5110 (Europe)	FL WLAN 5111 (USA, Canada)
Function	Wireless access point an client	
Antenna	2 x external Antennas (not included in scope of supply) with MIMO technology	
Wireless standard	IEEE 802.11 a/b/g/n	
Frequency band	2,4 and 5 GHz	
Connection type	RJ45	
Degree of protection	IP20	
Temperature range	-40 °C … 60 °C	
Order number	1043193	1043201

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth and WLAN





	FL EPA 2 (WLAN Mode)	FL EPA 2 RSMA (WLAN Mode)
Function	Combined Ethernet wireless module with Bluetooth and WLAN	Combined Ethernet wireless module with Bluetooth and WLAN
Antenna	Internal antenna	Omnidirectional antenna supplied as standard
Frequency band	2,4 and 5 GHz	2,4 and 5 GHz
Connection type	M12 connection	M12 connection
Degree of protection	IP65	IP65
Temperature range	-40 °C … 65 °C	-40 °C … 65 °C
Order number	1005955	1005957

PHOENIX CONTACT
INSPIRING INNOVATIONS

Remote communication



Remote maintance via public telephone network



Remote maintance via the Internet and mobile network



Remote control via the mobile network



Remote control via in-house cables

PHOENIX CONTACT
INSPIRING INNOVATIONS

Remote maintenance via public telephone network

Configuration via web-based management

Can be used worldwide

Switchover between DSL router (default) and DSL modem



Up to three VPN tunnels simultaneously

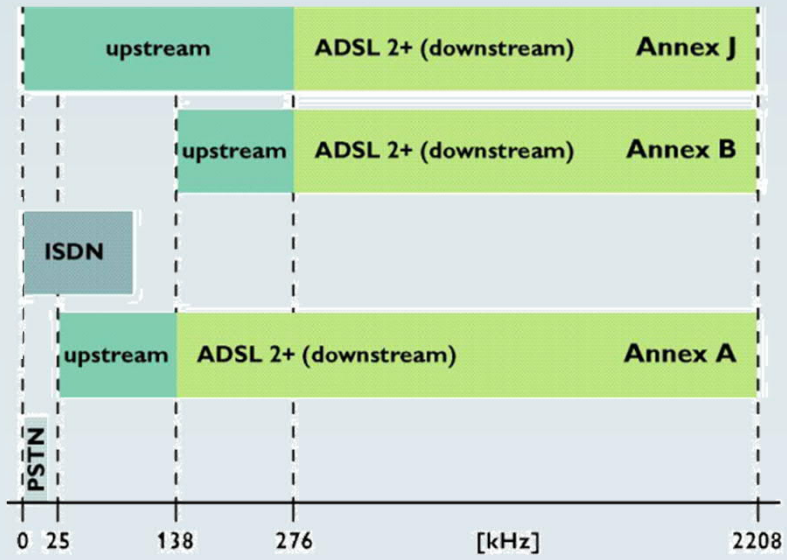
Firewall

IPsec and OpenVPN

Connect remote stations via ADSL
(Asymmetric Digital Subscriber Line)

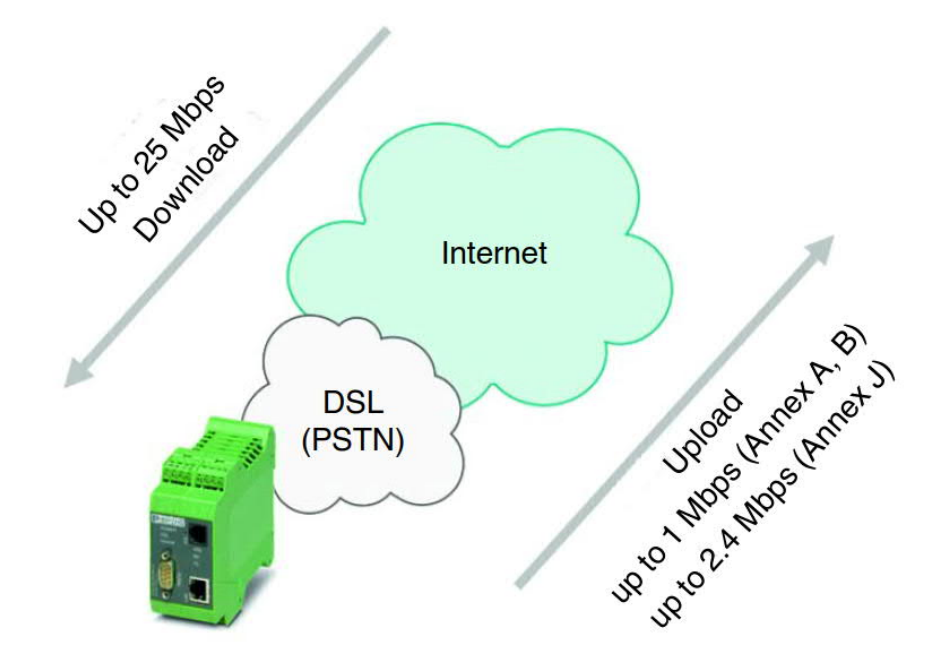
PHOENIX CONTACT
INSPIRING INNOVATIONS

Remote maintenance via public telephone network



- The DSL router is set to Annex B by default
- Switch the Annex bewteen A, B and J via a browser access
  - **Annex A:** DSL operation parallel to analog telephony (PSTN/Public Switched Telephone Network)
  - **Annex B:** DSL operation parallel to gigital telephony (ISDN/Integrated Services Digigital Network)
  - **Annex J:** IP-based connection (German only)

Maximum DSL transmission speed

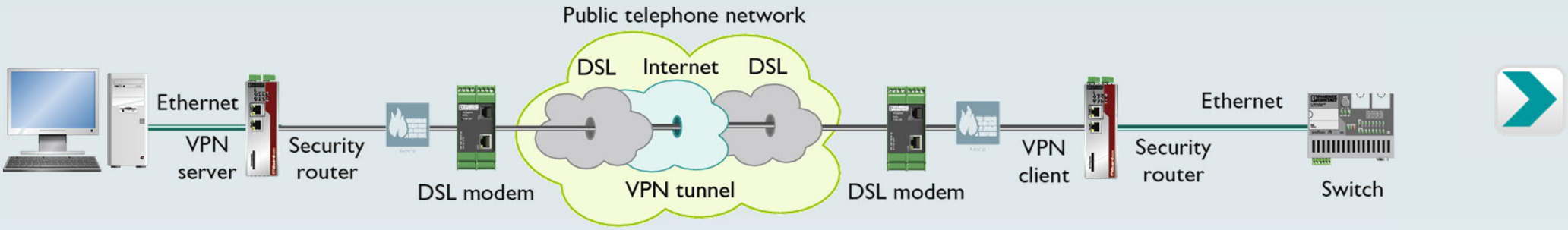


Country	Annex A, B, J
Austria	Mixed, primarily Annex A
Belgium	Mixed, primarily Annex A
Denmark	Primarily Annex A
France	Primarily Annex A
Germany	Annex B, Annex J
Great Britain	Annex A
Iceland	Annex A
Italy	Primarily Annex A
Netherlands	Mixed, primarily Annex A
North America	Annex A
Norway	Primarily Annex B
Spain	Primarily Annex A
Sweden	Primarily Annex A
Switzerland	Annex B

Remote maintenance via public telephone network

Modem - Application example:

The DSL modem handles the signal conditioning between the public DSL and the local network
The router and firewall functions are handled by a downstream router, e.g. FL MGUARD



Use as a DSL modem, a downstream router handles the VPN router and firewall functions

Remote maintenance via public telephone network

Modem - Application example:

The DSL modem handles the signal conditioning between the public DSL and the local network
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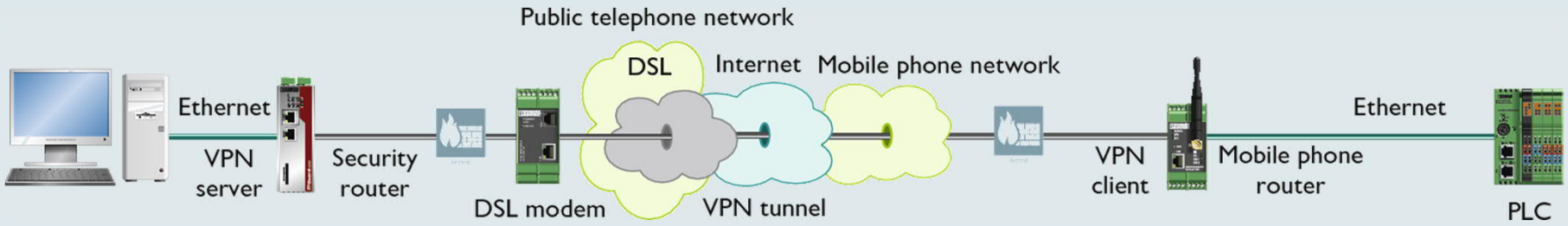
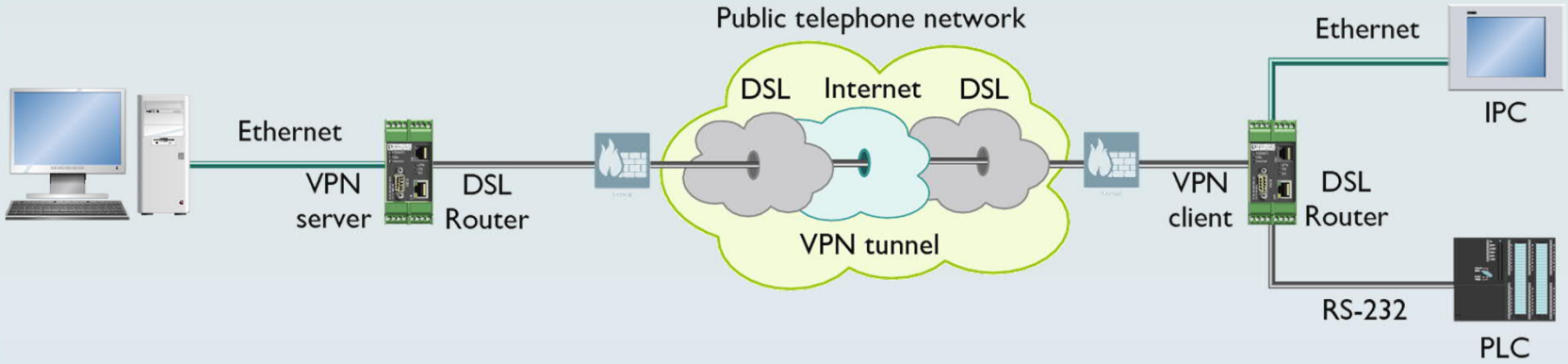


Use as a DSL modem in combination with a mobile router

Remote maintenance via public telephone network

Router - Application example:

The The broadband router handles not only the signal conditioning from DSL to LAN but also the router, VPN and NAT functions



Use as a DSL modem, the device handle the VPN router and firewall functions

Remote maintenance via public telephone network





	TC DSL ROUTER X400 A/B	TC DSL ROUTER X500 A/B
Description	Industrial ADSL broadband router/modem with integrated firewall and NAT function. The device supports the standards Annex A, B, and J (ALL-IP connections of Deutsche Telekom).	Industrial ADSL broadband router/modem with RS-232, integrated firewall, NAT and VPN support (IPsec, OpenVPN). The device supports the standards Annex A, B, and J (ALL-IP connections of Deutsche Telekom).
Function	Modem	Router
VPN Tunnel	No	Yes
Firewall	No	Yes
Transmission medium	ADSL, Annex A/B/J	ADSL, Annex A/B/J
Special feature	-	Serial device server
Order number	2902709	2902710

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Mobile I/O

new

2G and 4G

TC Mobile I/O APP

Smallest remote control or alerting station
4 relay outputs
4 digital & 2 analog inputs



Communication over the mobile network

- Alerting via SMS and E-Mail
- or constant communication with the ODP protocol

USB port
Configuration via web browser

Application example

- Switching relay via APP
- Device to Device communication

Alerting at power failure
Sends SMS message

PHOENIX CONTACT INSPIRING INNOVATIONS

TC Mobile I/O X200 App



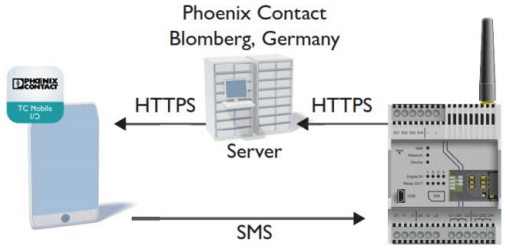
Get the APP on

Google play or Apple Store

iOS

Android

- User-friendly visualization
- Switch outputs on touch
- No SMS typing
- Query the device status automatically or manual
- Full cost control
- Easy to use



PHOENIX CONTACT
INSPIRING INNOVATIONS

X200: Switching relays remotely via APP

Smartphone



APP





TC Mobile

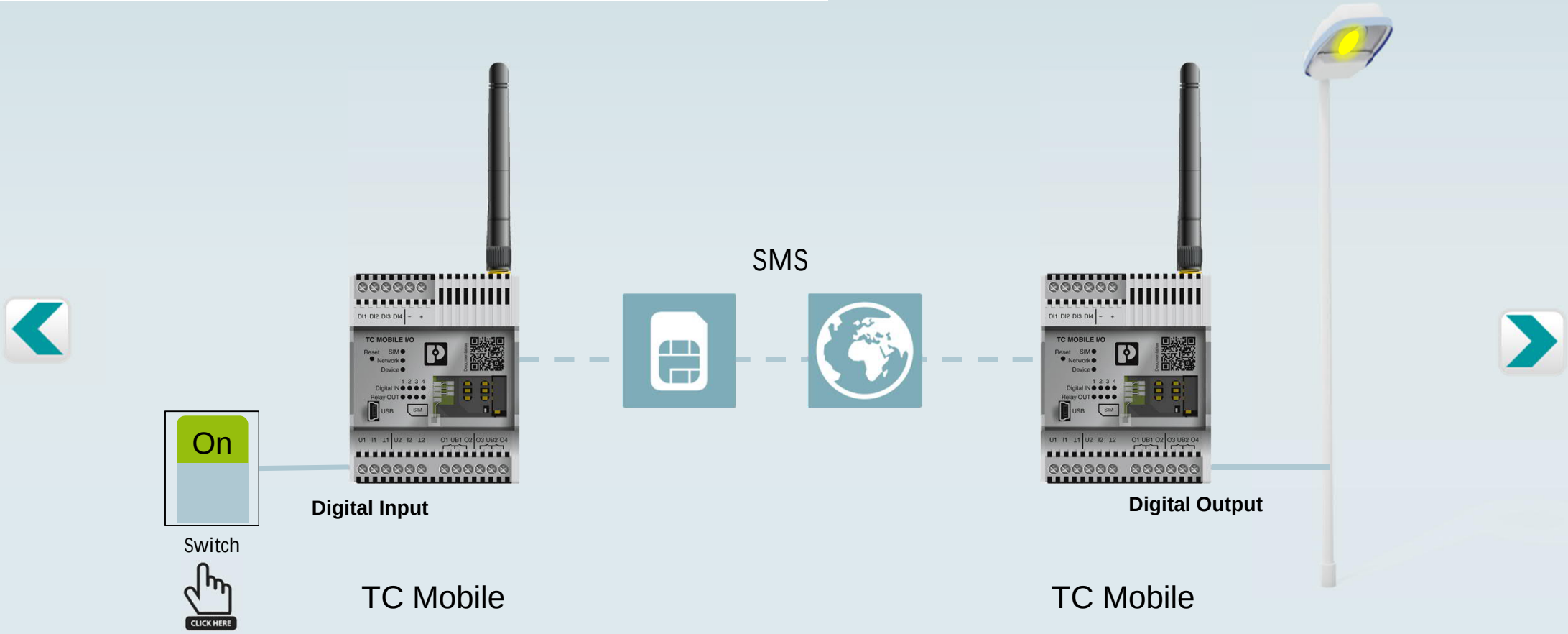
4 relay outputs
4 digital & 2 analog inputs



Product overview

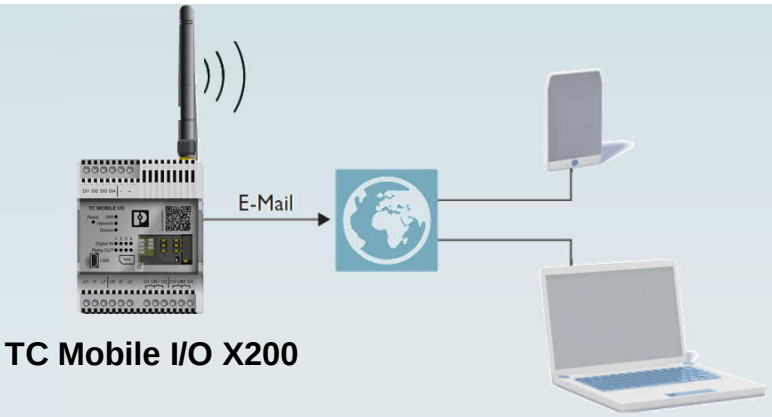
PHOENIX CONTACT
INSPIRING INNOVATIONS

X200: Switching relays remotely



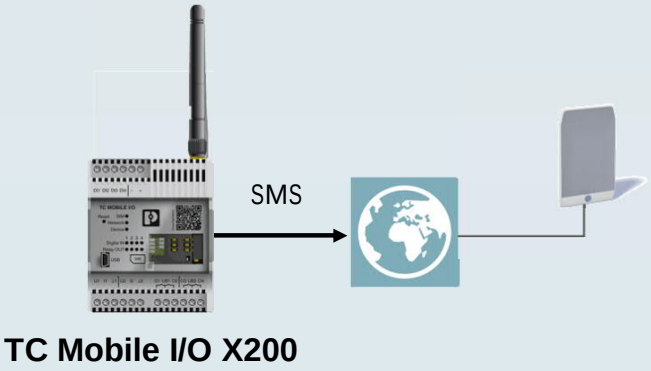
X200: Sending e-mails / SMS

E-mail



- The device can send alarms and cyclical messages by e-mail.
- Also the entire log book can be send as an e-mail.
- E-Mail communication can take place without encryption or with SSL encryption.

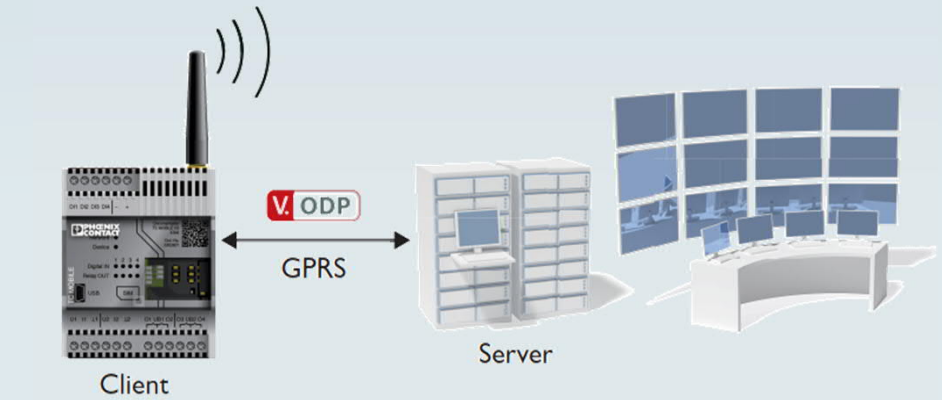
SMS



- The device can send an SMS even without an Internet connection
- Send SMS to individual devices or to device groups
- Switch the integrated relays via SMS messages

- **In the event of a power failure, one last SMS can still be sent to a selected device!**

X300: Communication with ODP server



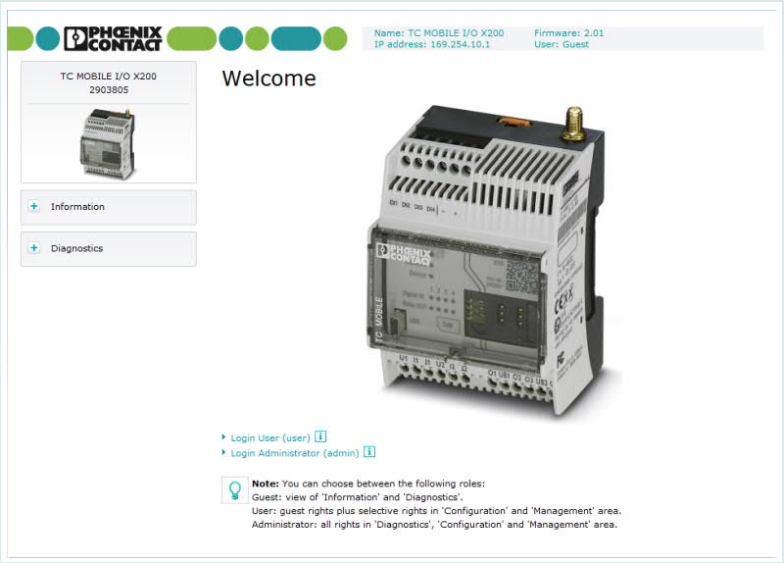
TC Mobile I/O X300

- The device communicates via the ODP protocol (Open Data Port)
- The TC Mobile I/O X300 is an ODP client
- ODP is a solution for remote transmission of data in order to adequately monitor systems transmit the data immediately or with a delay via the GPRS mobile communication service
- The ODP protocol stands for scalable and low data communication. It can therefore reduce the costs of mobile data communication
- Configuration via web browser

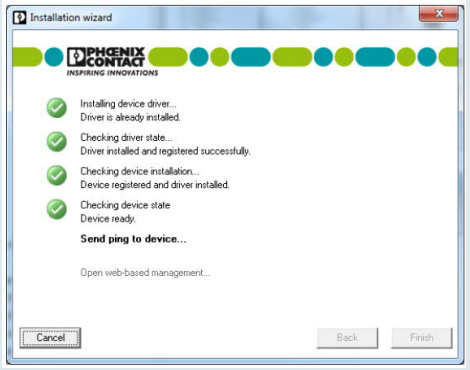
Web browser







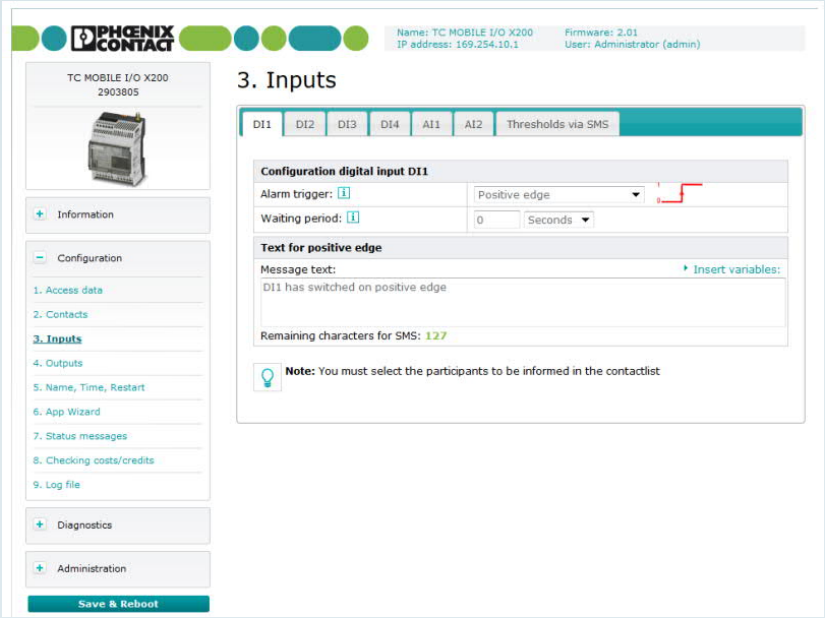
- Connect the devices via USB cable
- An installation wizard will support you during initial startup of the device.
- No additional software is required



Web browser – Digital Input



4 digital inputs



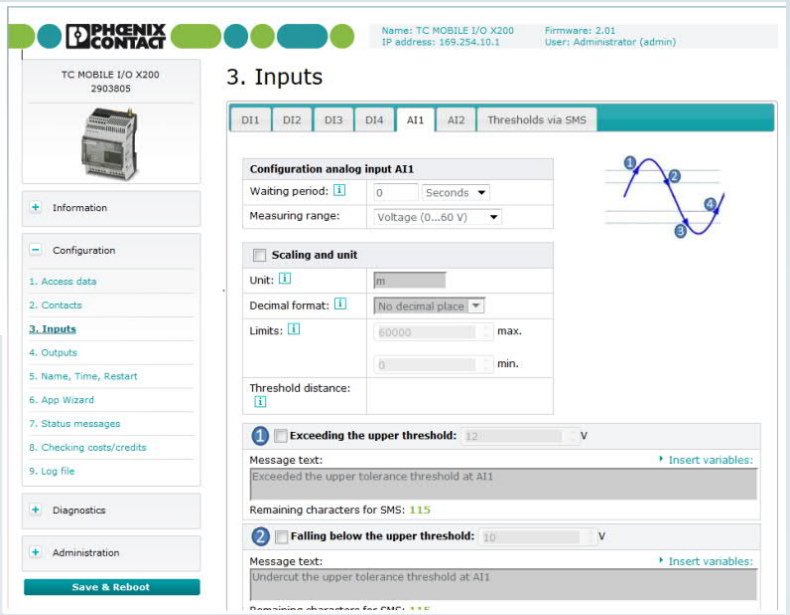
Digital Inputs

- 4 digital input channels
- The alarm can be triggered in three ways:
  - For positive edge
  - For negative edge
  - For positive and negative edge
- The alarm can be triggered immediately or after a waiting period of 1 … 999 s/min/h
- Save different message texts for each edge

Web browser – Analog Input



2 analog inputs



Scalable analog inputs (DC device only)

- 2 analog input channels
- The alarm can send up to four messages per analog input
  - Exceeding the upper tolerence
  - Falling below the upper tolerance
  - Exceeding the lower tolerance
  - Falling below the lower tolerance
- Input signal
  - 0 … 20 mA or 4 … 20 mA
  - 0 …. 60 V DC

Web browser – Relay Output

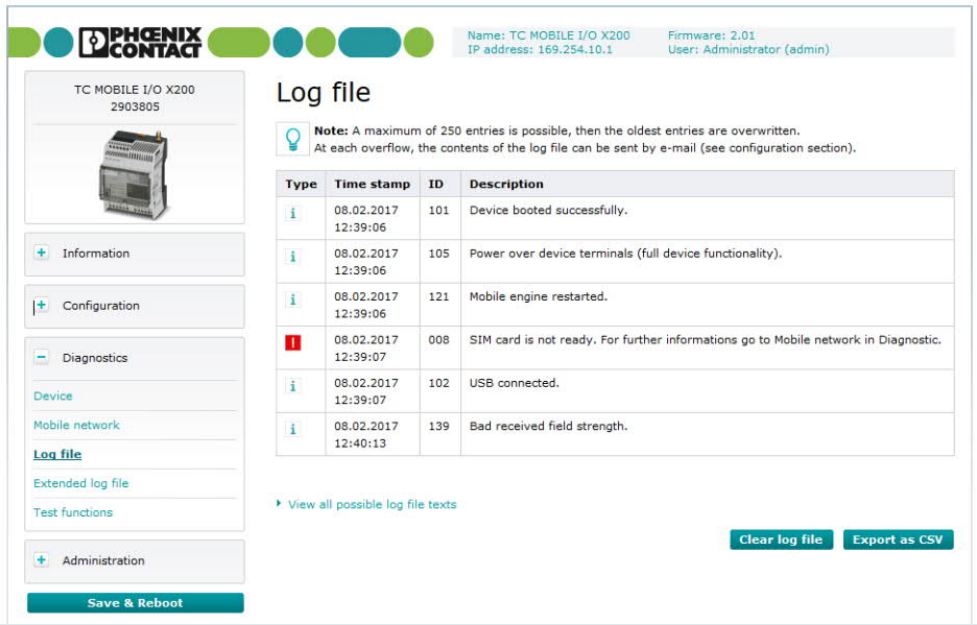


4 relay outputs

Relay Outputs

- 4 relay outputs
- Open or close the relays via telephone call or SMS
- One command can also switch several relays at the same time
- For security reason, incoming e-mails are not supported
- If a relay has been closed, it can be opened again automatically after a freely selectable waiting period (1 … 999 s/min/h)
- Send a confirmation SMS to the recipient after a relay is opened or closed

Web browser – Log book



Log book

- Important information about the device is recorded
- The device can send the contend of the log book automatically via e-mail
  - At overflow
  - At regular intervals, e.g. once a week
  - After an incoming SMS
- The content of the log book are not saved in the event of power failure

TC Mobile I/O

new













	X200 DC	X200 AC	X300 DC	X300 AC	X200-4G	X200-4G AC
	SMS, E-Mail, App	**SMS, E-Mail, App**	**ODP client**	**ODP client**	**SMS, E-Mail, App**	**SMS, E-Mail, App**
Mobile radio Interface	**2G**	**2G**	**2G**	**2G**	**LTE 4G**	**LTE 4G**
Digital relay inputs	4	4	4	4	4	4
Digital relay outputs	4	4	4	4	4	4
Analog inputs (0/4…20 mA) (0 … 60V DC)	2	-	2	-	2	-
Temperature range	-25°C .. +70°C	-25°C .. +70°C	-25°C .. +70°C	-25°C .. +70°C	-25°C .. +70°C	-25°C .. +70°C
Supply voltage	10 V DC … 60 V DC	**93 V AC…250 V AC**	10 V DC … 60 V DC	**93 V AC…250 V AC**	10 V DC … 60 V DC	**93 V AC…250 V AC**
Order number	2903805	2903806	2903807	2903808	1038567	1038568

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Router

Integrated logbook

Configuration via web-based management or microSD card



Two local Ethernet connections

4G mobile router
Fallback to 3G (UMTS/HSPA) and 2G (GPRS/EDGE)

3G mobile router
Fallback to 2G (GPRS/EDGE)

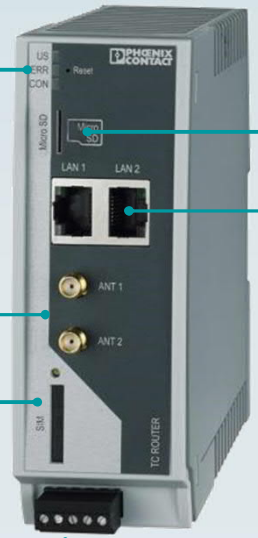
- Mobile high speed data links up to 150 Mbit/s via 4G LTE networks
- Mobile data links up to 21 Mbit/s via 3G networks
- IPsec and OpenVPN
- Up to three VPN tunnels simultaneously
- VPN remote start via call or SMS
- Stateful inspection firewall for dynamic filtering

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Router

Status LEDs
for instant diagnostic

MIMO antennas
for best signal reception



Micro SD Slot
to load configuration

Two local Ethernet connections

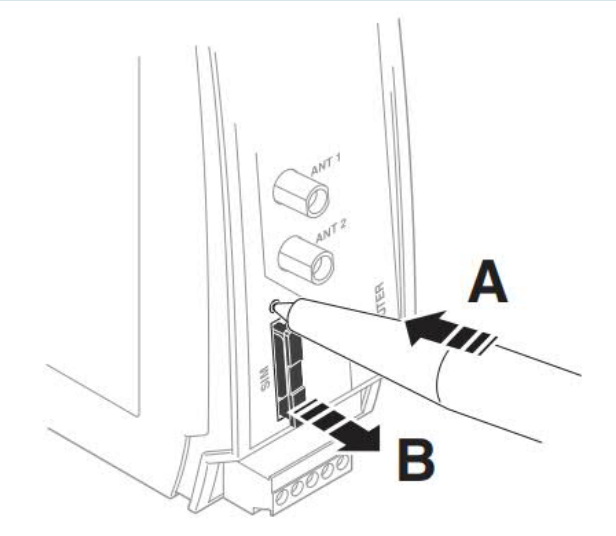
SIM slot for rugged industrial mini SIM card

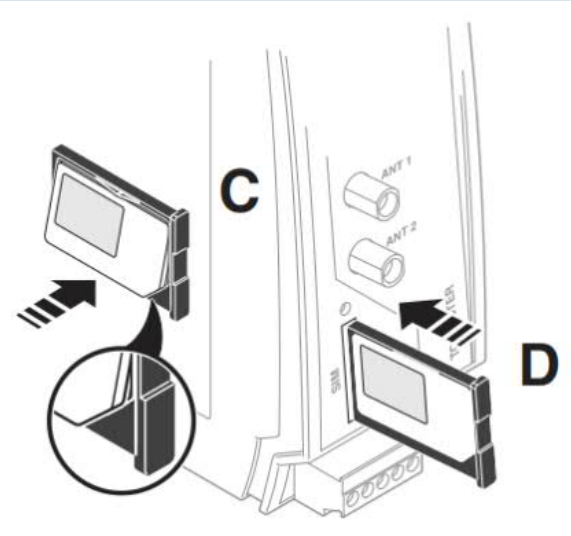
Switching inputs and outputs

Energy Saving Mode
Deactivation of the communication interfaces for max. energy saving

PHOENIX CONTACT
INSPIRING INNOVATIONS

SIM card





Remove the SIM card holder, inside the SIM card



SIM slot for rugged industrial mini SIM card

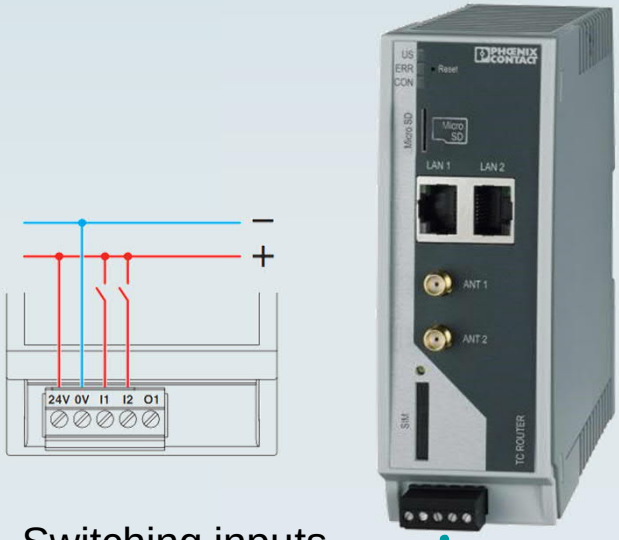
Switching inputs and outputs

Two configurable **switching inputs** for following functions:

- SMS can be sent, even to multiple recipients
- E-Mail can be sent, even to multiple recipients
- Controlling an Output at a remote station via SMS
- Restart the router
- Start or stop a mobile data connection
- Switching the Ipsec or OpenVPN connection
- Automatically loading a configuration from a microSD card
- Activating energy-saving mode

One configurable **switching output**, activated by

- Activation by the input at a remote station
- SMS
- Web-based management
- Incoming call
- Connection abort
- Status of the mobile network connection, mobile data link and VPN connection



Configuration via web-based management



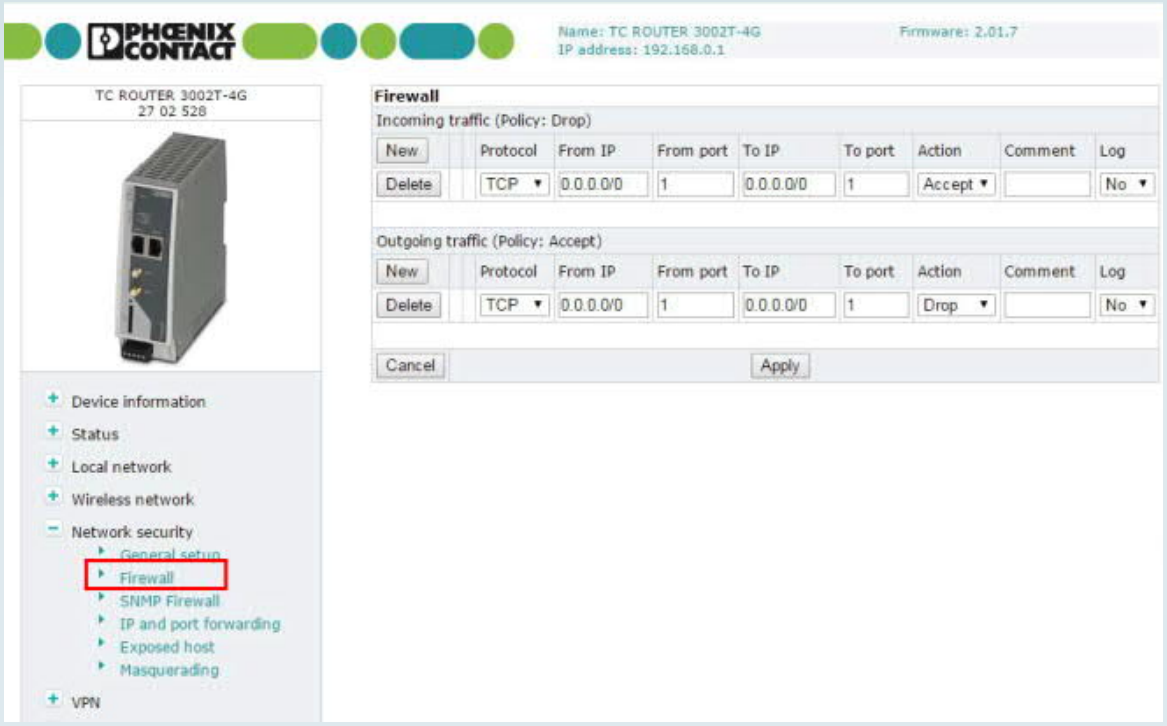
The router is configured via web-based management

- Device information
- Status
- Local network
- Wireless network
- Network security
- VPN
- I/O
- System



INSPIRING INNOVATIONS

Firewall



- The device includes a stateful inspection firewall
- The device supports a maximum of 32 rules for incoming data traffic and 32 rules for outgoing data traffic
- SNMP firewall to restrict SNMP access
- IP and port forwarding
- Exposed host (server setup)
- Masquerading

VPN

Requirements for a VPN connection

- The IP addresses of the VPN partners are known and can be accessed
- The device supports up to three Ipsec connections and up to two OpenVPN connections.

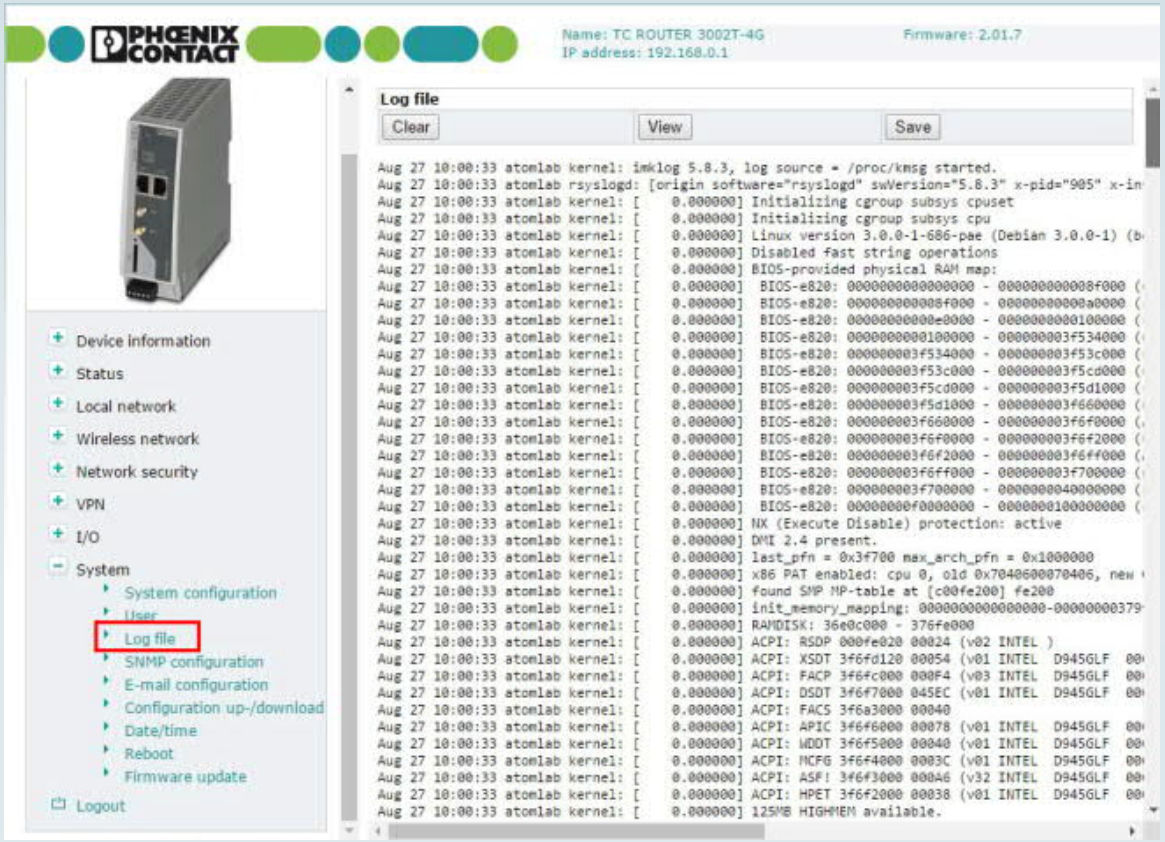
In order to successfully establish an **IPsec connection,** the VPN partner must support IPsec with the following configuration:

- Authentication via X.509 certificate or pre-shared secret key (PSK)
- Diffie-Hellman group 2 or 5
- 3DES or AES encryption
- MD5 or SHA-1 hash algorithms
- Tunnel mode
- Quick mode
- Main mode
- SA lifetime (one second to 24 hours)

The following functions are supported for **OpenVPN** connections:

- OpenVPN client
- TUN device
- Authentication via X.509 certificate or pre shared secret key (PSK)
- Static key
- TCP and UDP transmission protocol
- Keep Alive

Log file



- The router log file can be used to diagnose various events operating states
- The log file is a form of circulating storage where the oldest entries are overwritten first (FIFO)

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Router







	TC ROUTER 3002T-4G	TC ROUTER 3002T-3G	TC ROUTER 2002T-4G	TC ROUTER 2002T-3G	TC ANT MOBILE WALL 5M
Function	Industrial 4G router European version	Industrial 3G router European version	Industrial 4G router European version	Industrial 3G router European version	Multiband mobile phone antenna with mounting bracket for outdoor installation, 5m antenna cable (SMA)
Mobile radio Interface	4G	3G	4G	3G	
Transmission speed	150 Mbit/s LTE Downlink	21 Mbit/s HSPA Downlink	150 Mbit/s LTE Downlink	21 Mbit/s HSPA Downlink	
Switching inputs and outputs	2 digital Inputs, 1 digital output	2 digital Inputs, 1 digital output	2 digital Inputs, 1 digital output	2 digital Inputs, 1 digital output	
General	Firewall, NAT, **IPsec, OpenVPN** SMS and e-mail transmission	Firewall, NAT**,** **IPsec**, **OpenVPN** SMS and e-mail transmission	Firewall, NAT SMS and e-mail transmission	Firewall, NAT SMS and e-mail transmission	
Order number	2702528	2702529	2702530	2702531	2702273

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Router



verizon



AT&T



	TC ROUTER 3002T-4G VZN	TC ROUTER 3002T-4G ATT	TC ANT MOBILE WALL 5M
Function	Industrial 4G router **USA** For communication in **Verizon** Wireless mobile network	Industrial 4G router **USA** For communication in **AT&T** Wireless mobile network	Multiband mobile phone antenna with mounting bracket for outdoor installation, 5m antenna cable (SMA)
Mobile radio Interface	4G	4G	
Transmission speed	150 Mbit/s LTE Downlink	150 Mbit/s LTE Downlink	
Switching inputs and outputs	2 digital Inputs, 1 digital output	2 digital Inputs, 1 digital output	
General	Firewall, NAT, **IPsec, OpenVPN** SMS and e-mail transmission	Firewall, NAT**,** **IPsec**, **OpenVPN** SMS and e-mail transmission	
Order number	2702532	2702533	2702273

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC CLOUD CLIENT

Cost-effective entry into cloud-based remote maintenance



Intuitive operation of web interface

Simple startup due to configuration assistants in the mGuard secure cloud

Flexible communication with the cloud via operator or 4G LTE networks

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC CLOUD CLIENT 1002-TX/TX



Status LEDs for instant diagnosis

2 Ethernet ports

Micro SD Slot to load configuration

Connector for power and digital input and output

- Connecting machines to **mGuard Secure Cloud** (Cloud only) via **operator network**
- LAN link into machine network and to the cloud via operator network
- Load configuration via MicroSD card
- VPN start by key switch
- Temperature range 0 … +60°C

TC CLOUD CLIENT 1002-4G …



Status LEDs
for instant diagnosis

Micro SD Slot
to load configuration

2 Ethernet ports

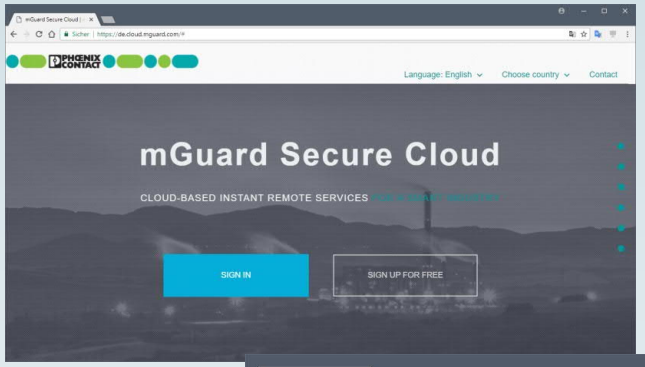
MIMO antennas
for best signal reception

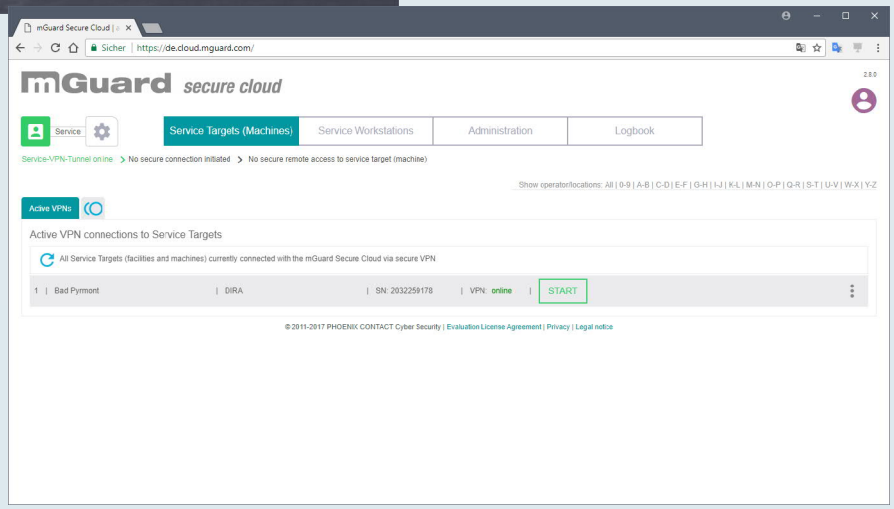
SIM slot for rugged industrial mini SIM card

Connector for power and digital input and output

- Connecting machines to mGuard Secure Cloud (Cloud only) via **4G cellular network** (EU, US)
- LAN link into machine network
  Cellular link to the cloud
- Load configuration via MicroSD card
- VPN start by key switch
- Temperature range 0 … +60°C

mGuard Secure Cloud



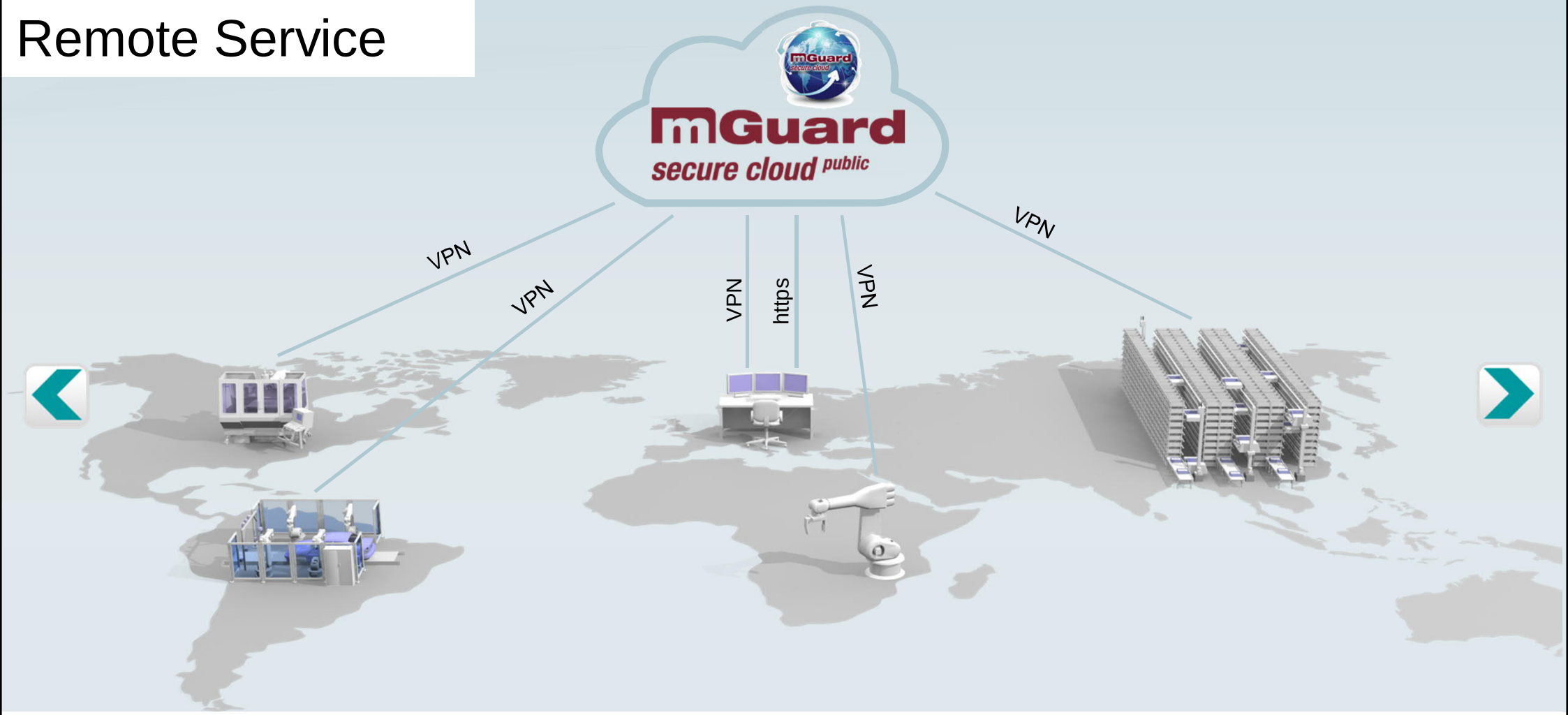


Phoenix's mGuard Secure Cloud offers operators and machine builders a highly secure, web-based method for instant remote services to any machine and production plant within a client's network.

The mGuard Secure Cloud is a professionally hosted, turnkey remote-services ecosystem for both the machine builder and the plant operator

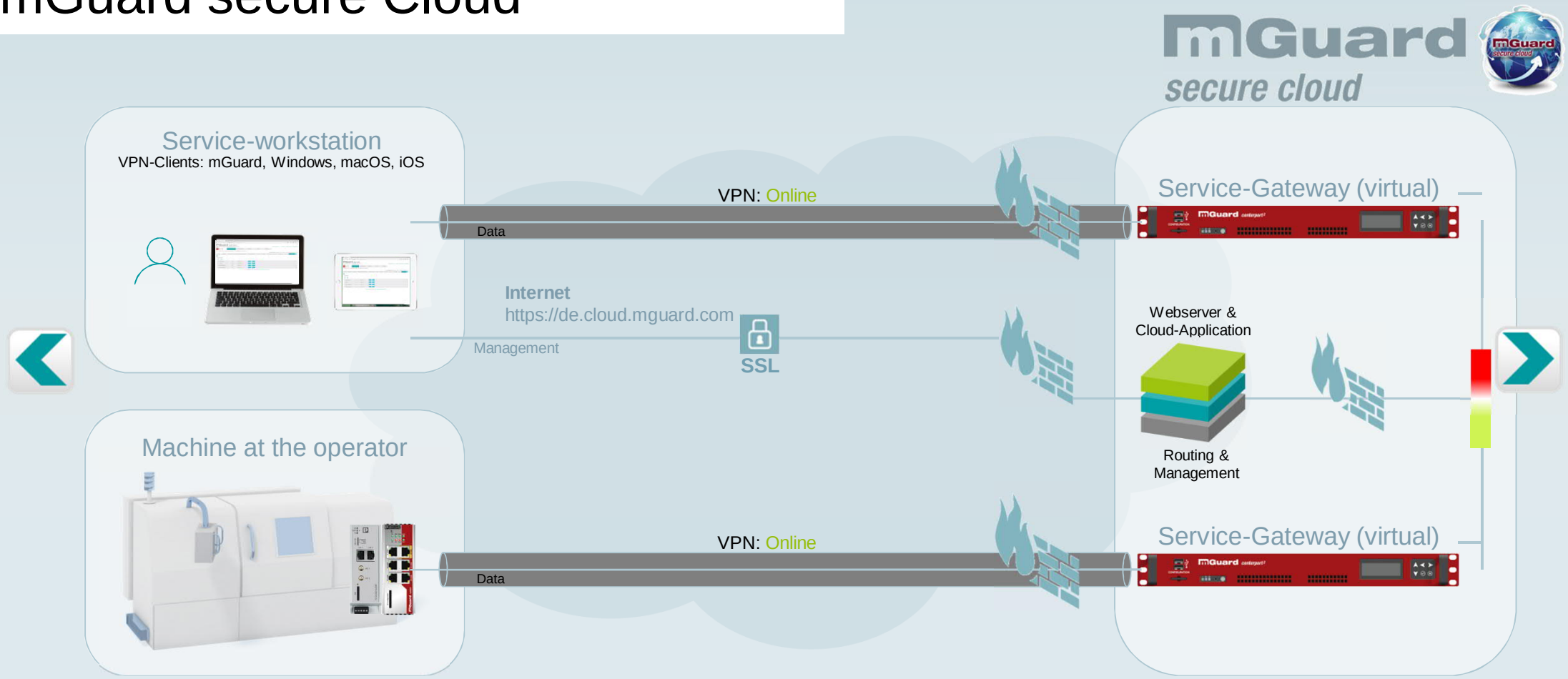
https://de.cloud.mguard.com/

Remote Service



PHOENIX CONTACT
INSPIRING INNOVATIONS

mGuard secure Cloud



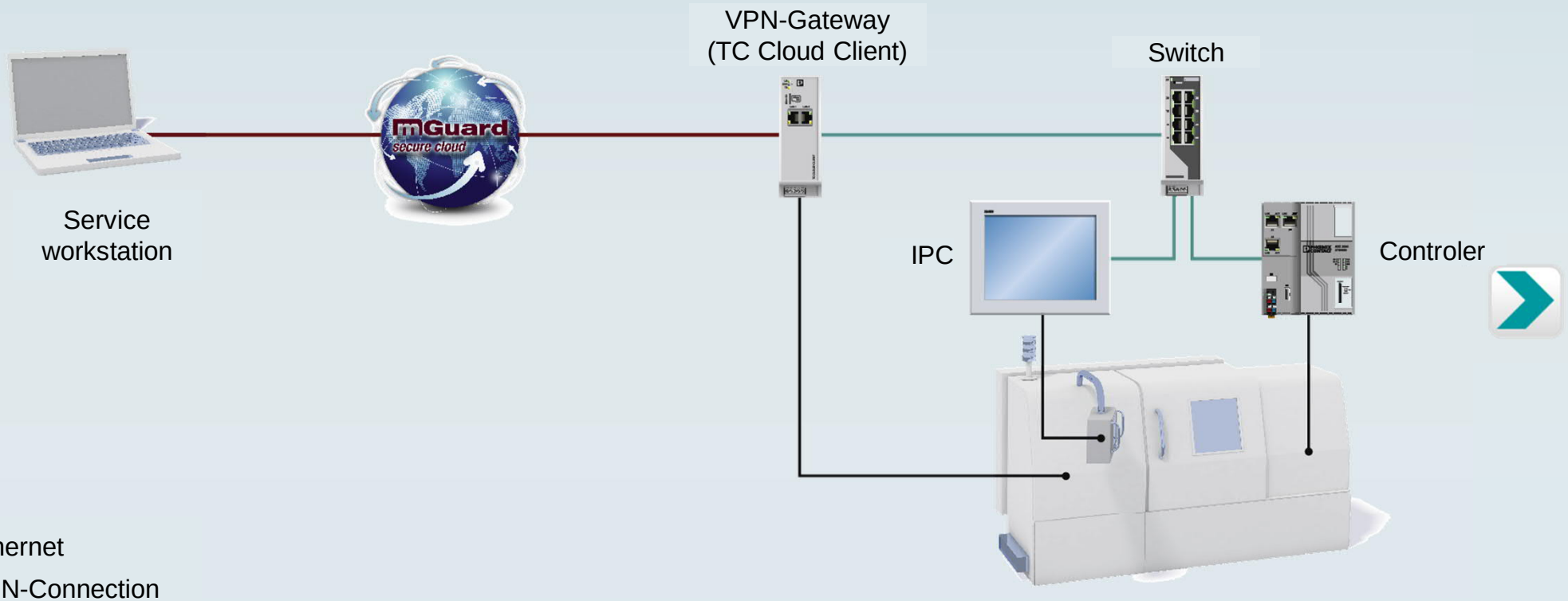
PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Cloud Client



PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Cloud Client



TC Cloud Client




verizon

AT&T

	TC CLOUD CLIENT 1002-4G	TC CLOUD CLIENT 1002-TX/TX	TC CLOUD CLIENT 1002-4G VZW	TC CLOUD CLIENT 1002-4G ATT
Transmission medium	4G LTE	Operator‘s network	4G LTE Verizon, US	4G LTE AT&T, US
Description	Industrial VPN gateway for mGuard Secure Cloud, Cloud communication via 4G LTE, European version	Industrial VPN gateway for mGuard Secure Cloud, cloud communication via operator network,	Industrial VPN gateway for mGuard Secure Cloud, cloud communication via 4G LTE, Verizon (US)	Industrial VPN gateway for mGuard Secure Cloud, cloud communication via 4G LTE, AT&T (US)
Special features	**Device configuration in mGuard secure cloud, simplified Web-Interface**			
Firewall	No	No	No	No
VPN Tunnel	1 VPN tunnel to the mGuard Secure cloud			
Order number	2702886	2702885	2702887	2702888

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial security



Protects your system against unauthorized access by people or malware with the mGuard security product range. Use industrial router/firewall solution and industrial-level virus protection to secure your automation network.

The VPN-compatible devices also enable intensive data to be transmitted in encrypted form, providing secure maintenance of machine over public networks.

Mobile router for worldwide network access

Routing with NAT (Network Address Translation) and 1:1-NAT

Packet prioritization by means of Quality of Service (QoS)

3G and LTE(4G)



Maximum security level with stateful inspection firewall and deep packet inspection

Easy and secure remote maintenance, thanks to VPN connection and IPsec protocol

INSPIRING INNOVATIONS

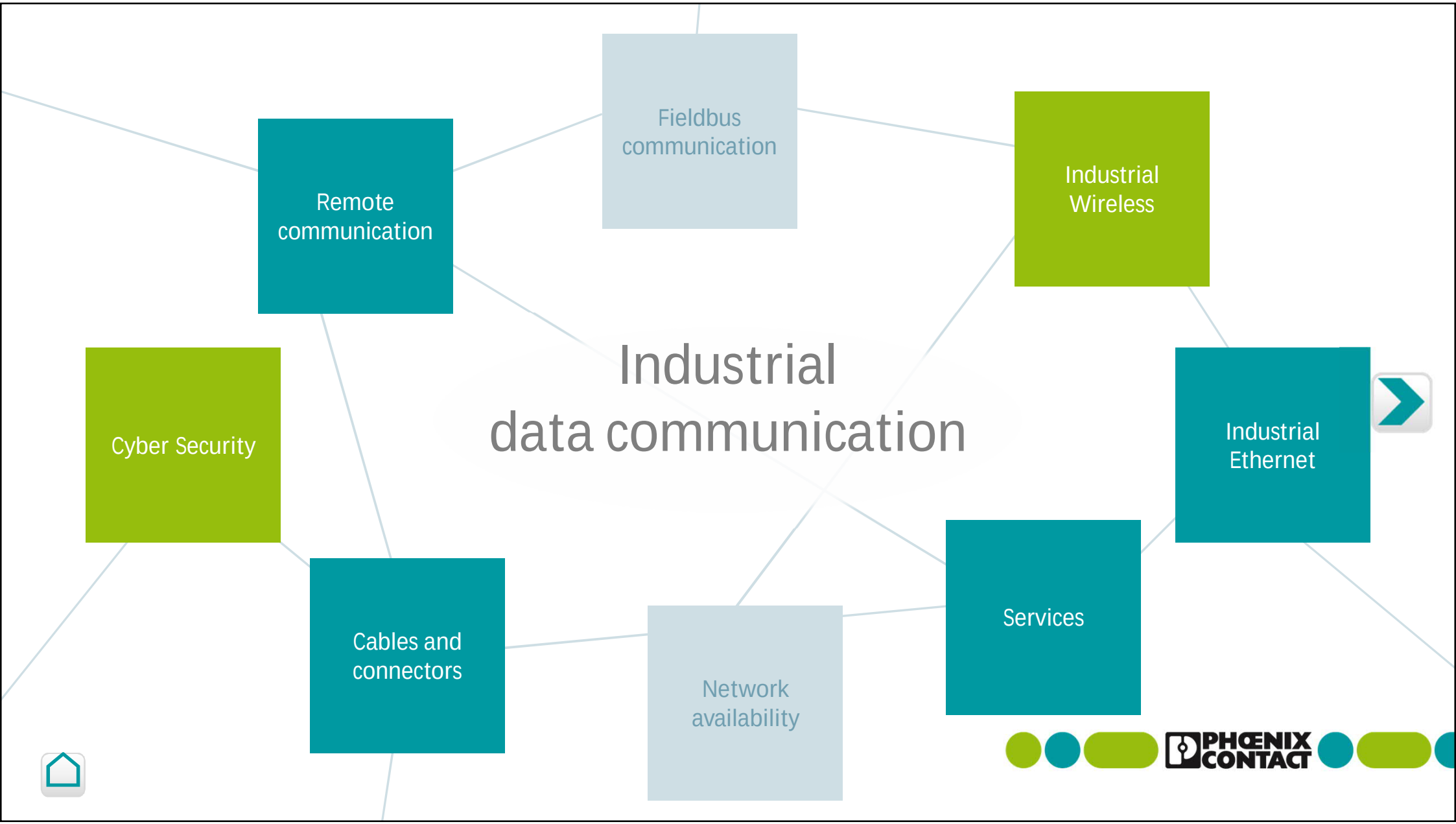
TC mGuard



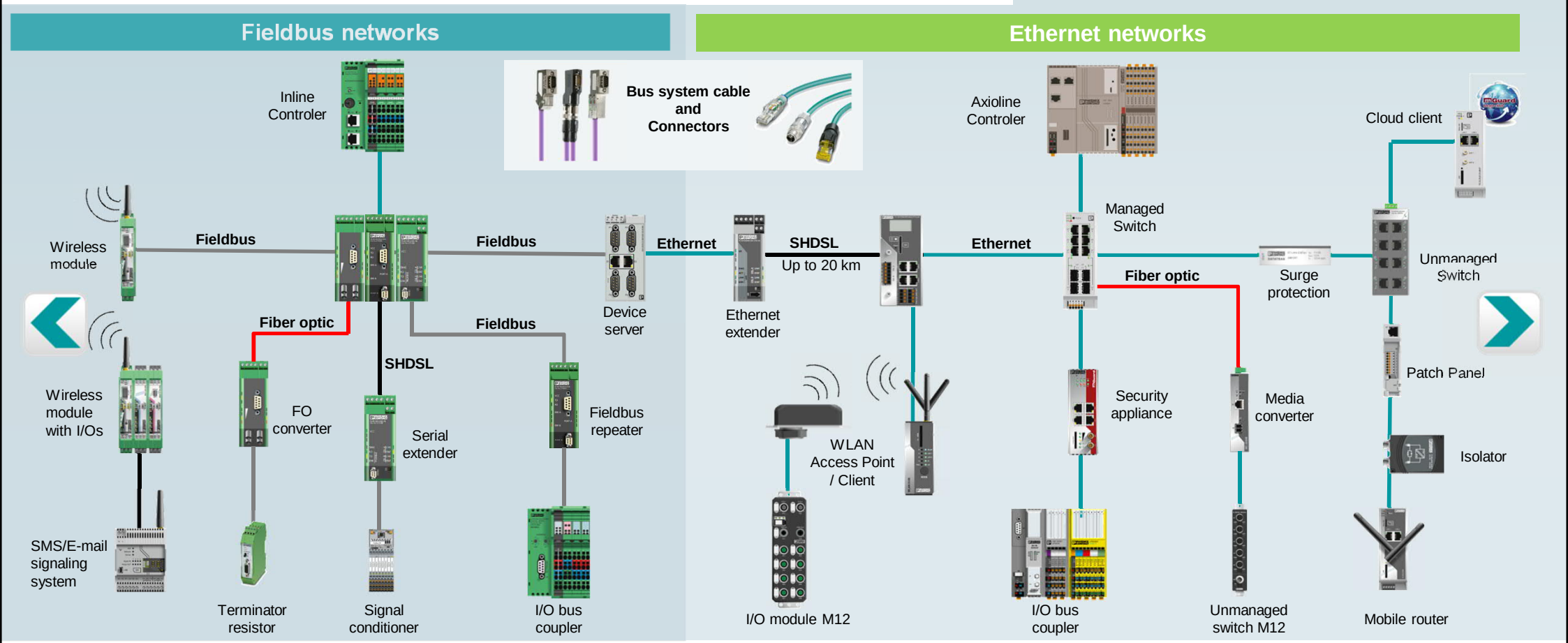



	TC MGUARD RS4000 3G VPN	TC MGUARD RS2000 3G VPN	TC MGUARD RS4000 4G VPN	TC MGUARD RS2000 4G VPN
VPN tunnel optionally expandable	Up to 10 parallel (Up to 250 with additional license)	2 parallel	Up to 10 parallel (Up to 250 with additional license)	2 parallel
Firewall	Intelligent firewall	2-click firewall	Intelligent firewall	2-click firewall
Integrated switch	4-Port managed	4-Port managed	4-Port managed	4-Port managed
Special features	WAN, GPS reciever, 2 SIM card slots, NAT/1:1 NAT	GPS reciever, 2 SIM card slots, NAT/1:1 NAT	WAN, GPS reciever, 2 SIM card slots, NAT/1:1 NAT	GPS reciever, 2 SIM card slots, NAT/1:1 NAT
Mobile interface	3G	3G	4G	4G
Order number	2903440	2903441	2903586	2903588

PHOENIX CONTACT
INSPIRING INNOVATIONS


Fieldbus communication
Remote communication
Industrial Wireless
Industrial data communication
Cyber Security
Industrial Ethernet
Cables and connectors
Network availability
Services
PHOENIX CONTACT

Everything for industrial networks



Fieldbus communication

Industrial data communication

Everything for industrial networks



Multiplexer



Fiber-optic transmission



Fieldbus extenders and repeaters



FF / Profibus PA

Fieldbus communication



Converter and isolator

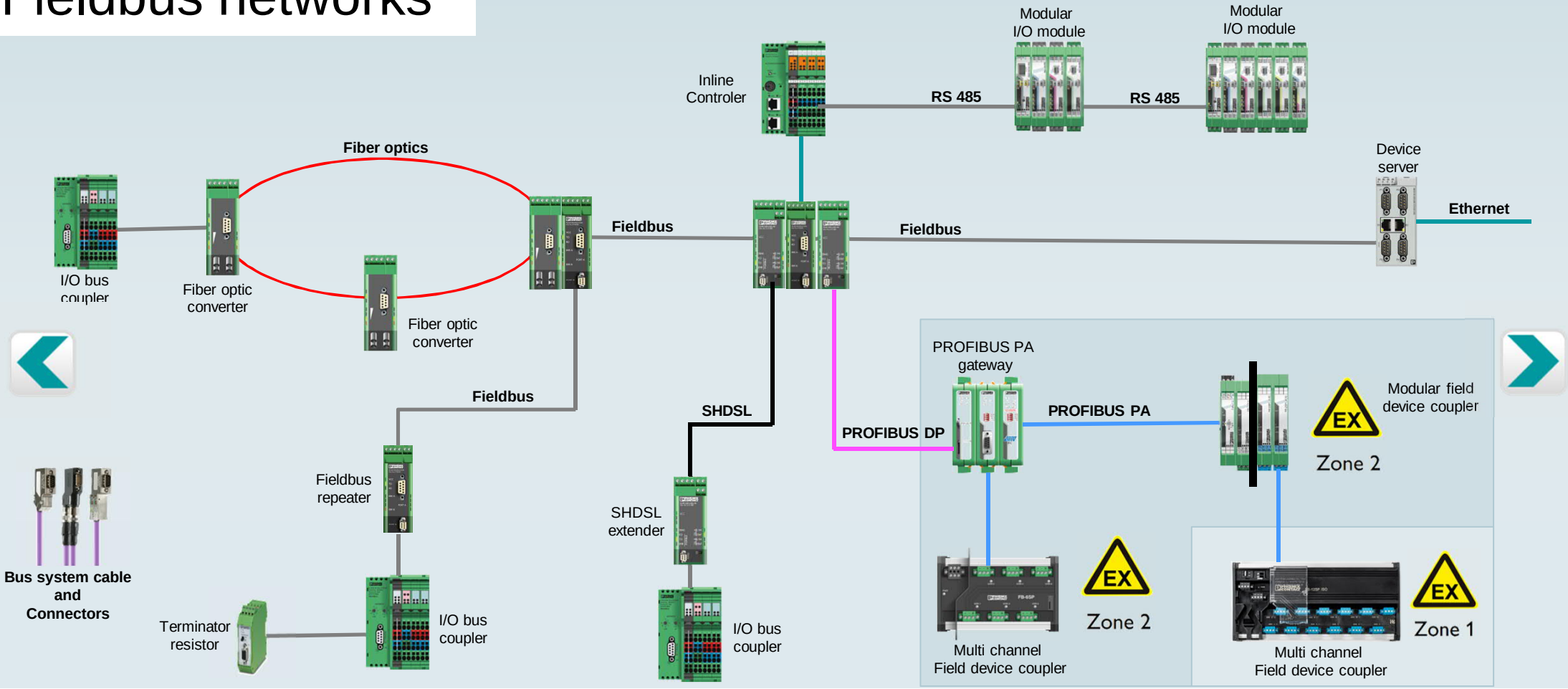


D-SUB connectors



Terminator

Fieldbus networks



Fieldbus communication

Industrial data communication

Industrial Ethernet

Everything for industrial networks



Media converter



Switches



PoE



management software



Router

Industrial Ethernet



Extender



Hubs



Serial device server, gateways and proxies



HART multiplexer

PROFINET

Modbus TCP

EtherNet/IP

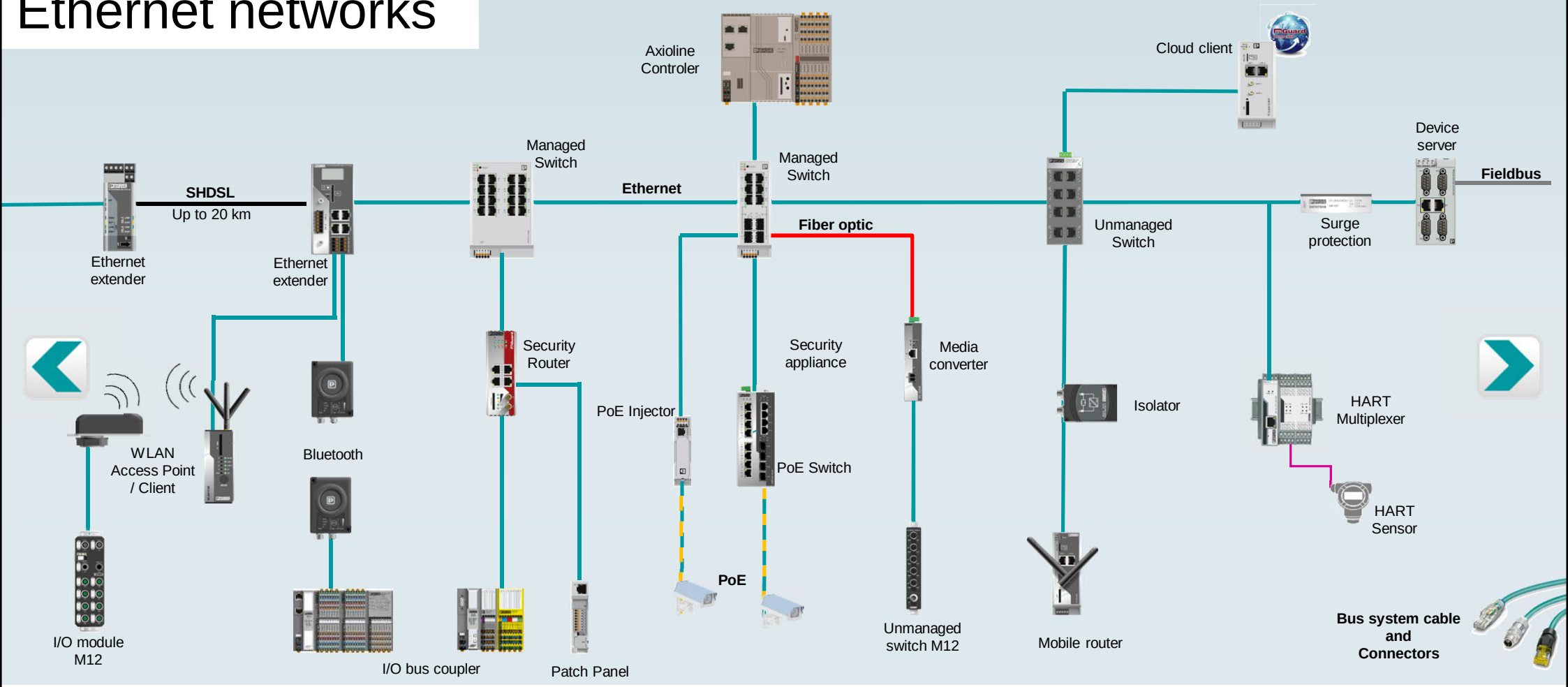
EtherCAT

CC-Link IE Field

sercos the automation bus

PHOENIX CONTACT

Ethernet networks



Fieldbus communication

Industrial Wireless

Industrial data communication

Industrial Ethernet

Everything for industrial networks



Wireless
Serial

Industrial Wireless





Wireless
I/O

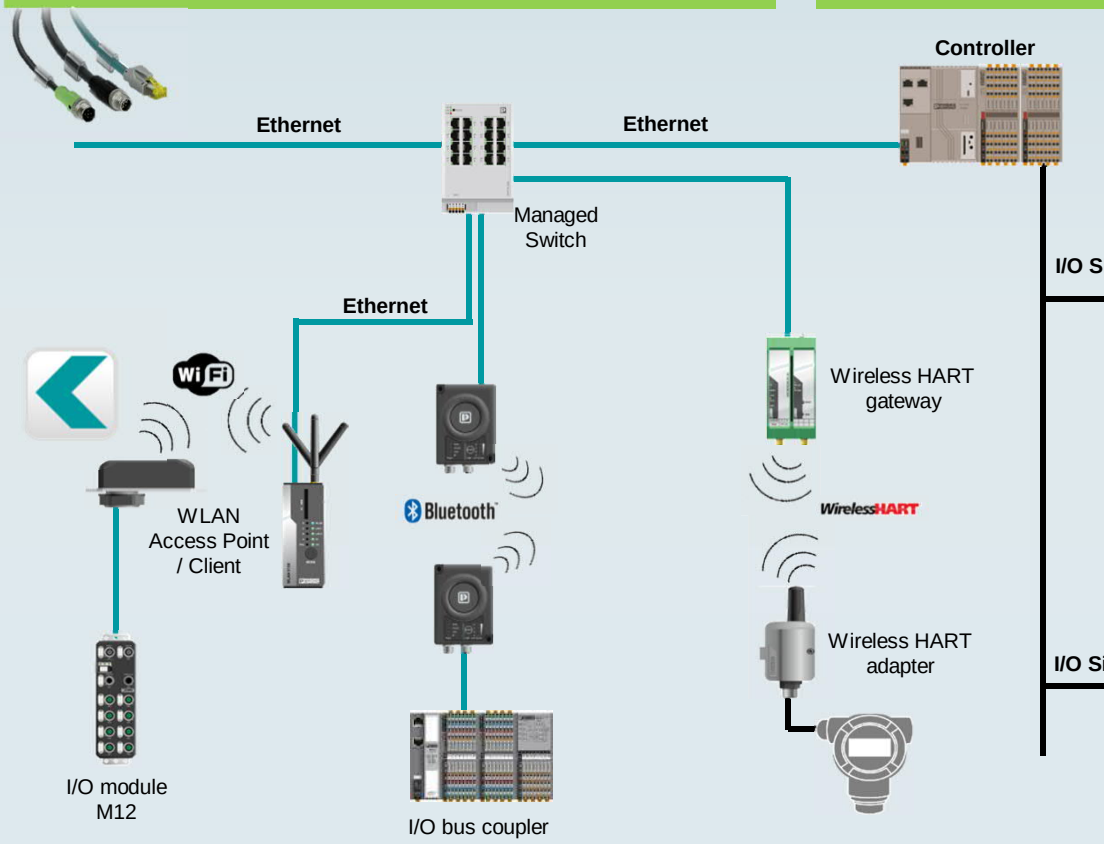




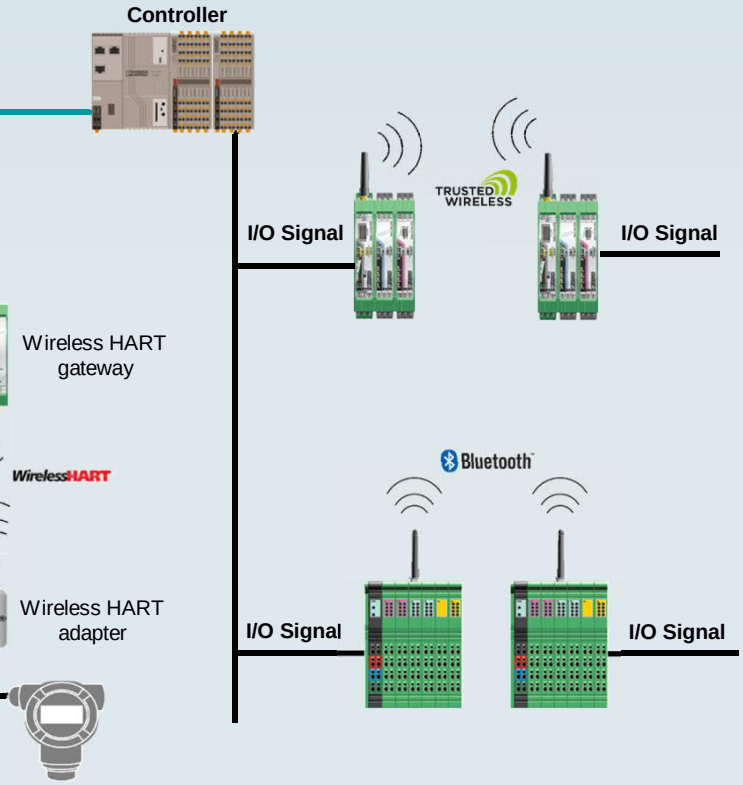
Wireless
Ethernet

Industrial Wireless

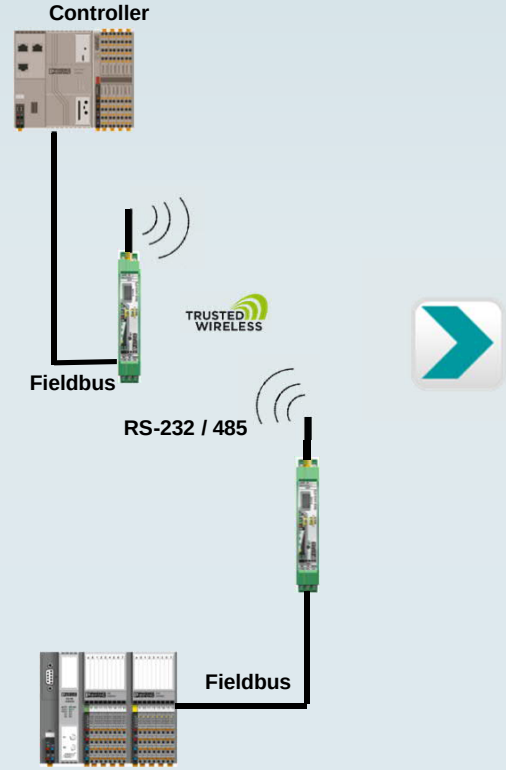
Wireless Ethernet

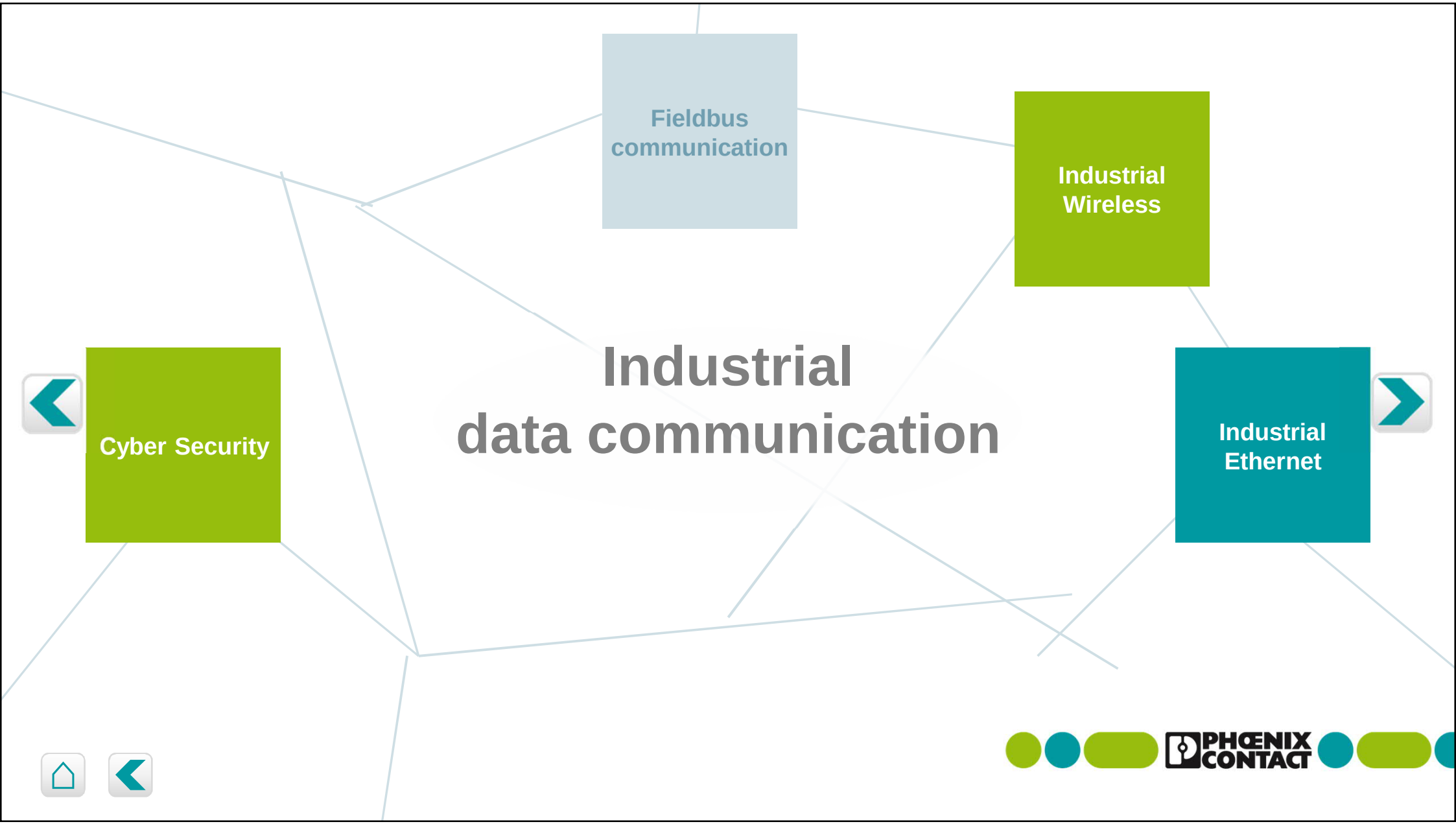


Wireless I/O



Wireless Serial




Fieldbus communication
Industrial Wireless
Industrial data communication
Cyber Security
Industrial Ethernet

Everything for industrial networks



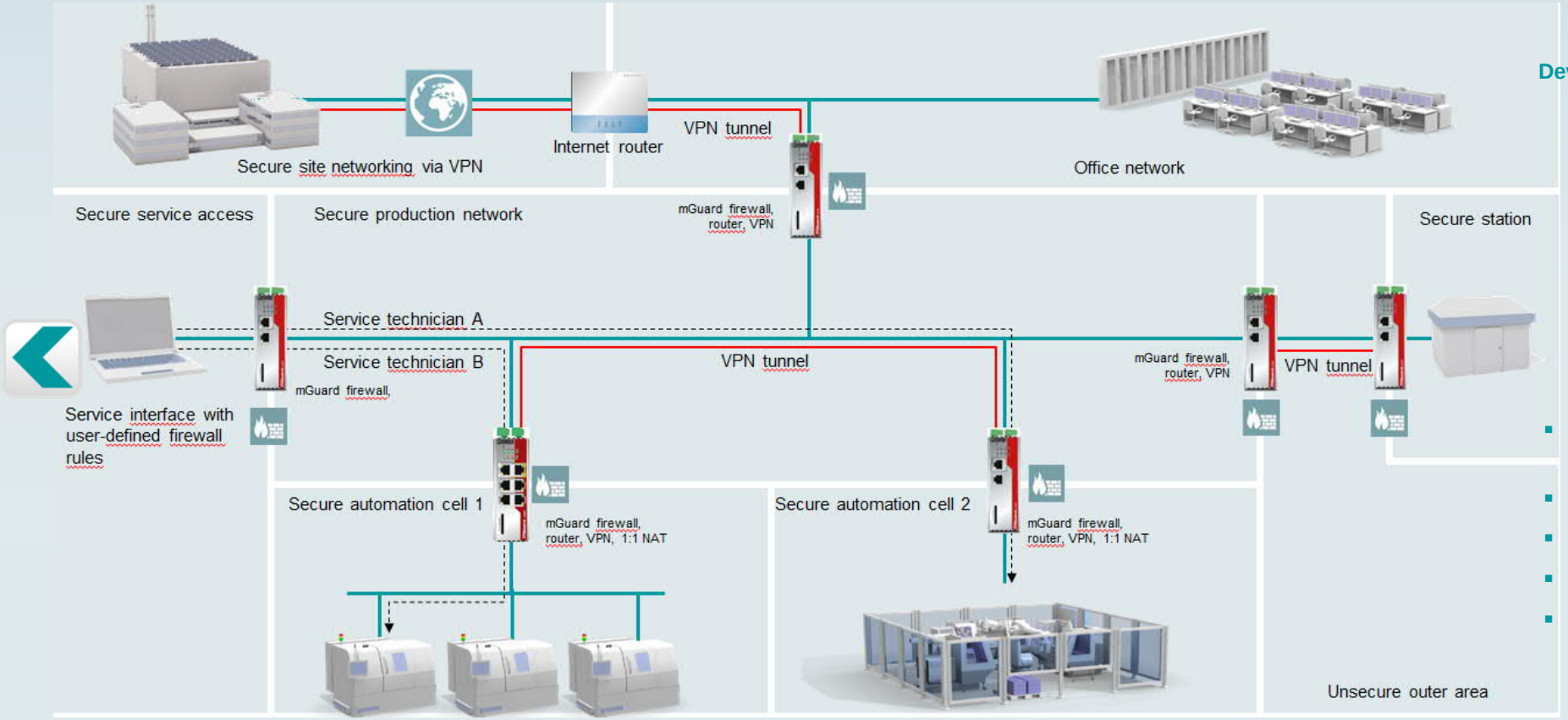
Device managemend software

Cyber Security



Security-Router and Firewalls

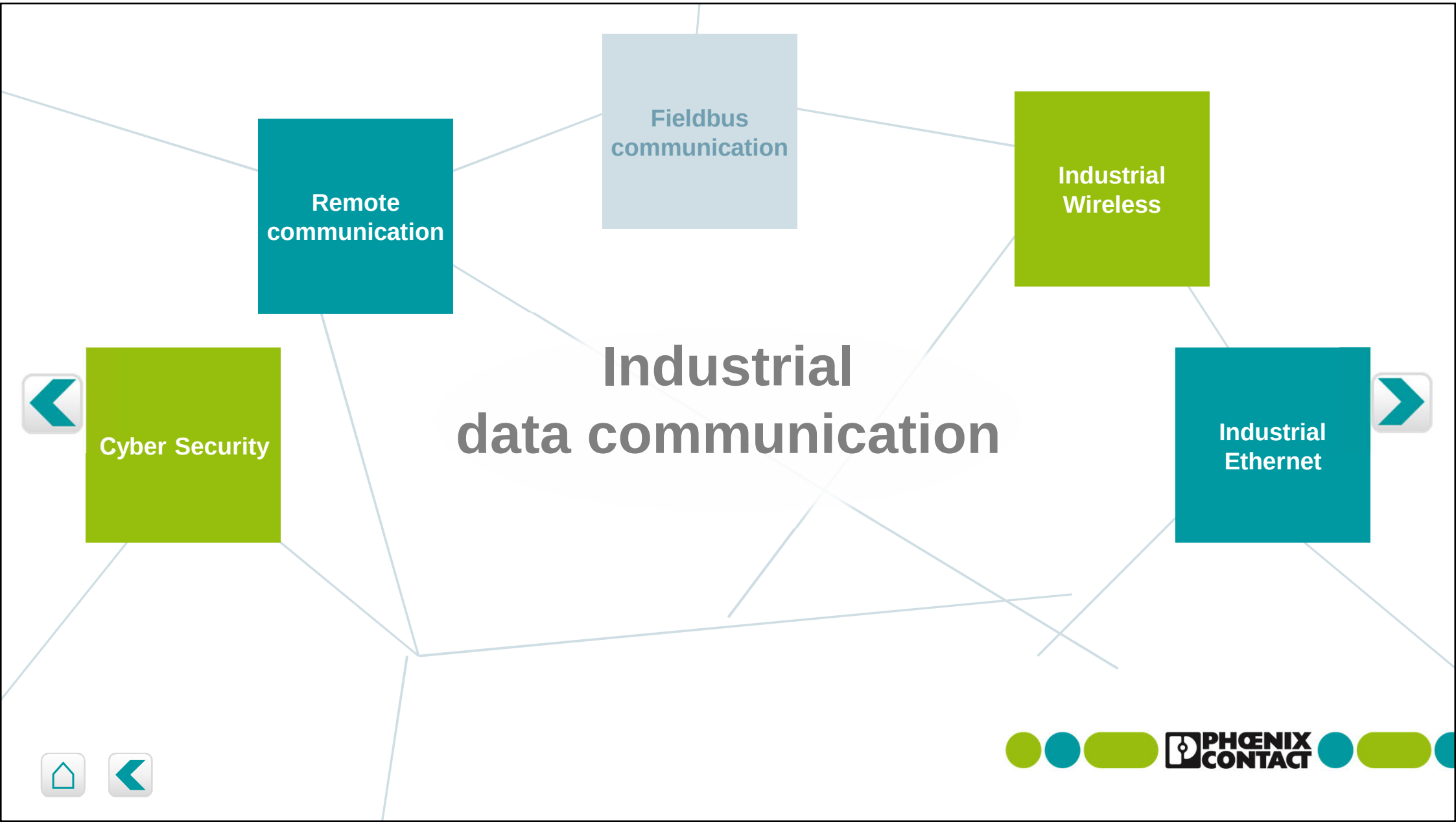
Cyber Security



Device managemend software



- Network detection for unknown IP adresses
- IP assignment
- Device availability check
- Multiple Firmware Update
- Comfortable up- and download handling for configuration files


Fieldbus communication
Remote communication
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Everything for industrial networks



Alarm generation

Remote communication





Remote maintenance





Remote control

PHOENIX CONTACT

Mobile communication products in every application

Networking of a variety of machines





Transmission of simple sensor signals via the mobile network

Fullfill highest IT requirements





Router for world wide applications



Direct communication into the cloud



High data rates for infrastructure applications

Mobile networks product in every application



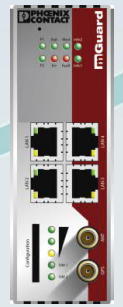
TC MOBILE I/O

Alarming and Monitoring
for infrastructure applications



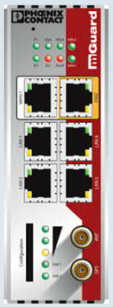
TC ROUTER 4G

Universal cellular router for infrastructure applications



TC MGUARD RS2000

Remote communication
for infrastructure applications with redundant provider

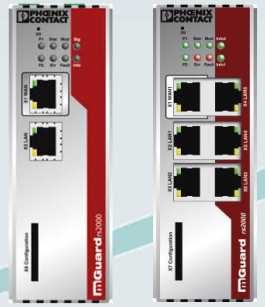


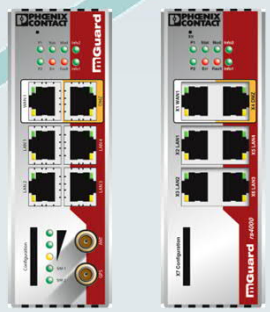
TC MGUARD RS4000

Remote communication
for infrastructure applications with fallback WAN to mobile network

Mobile networks product in every application







+



TC CLOUD CLIENT

Remote service only

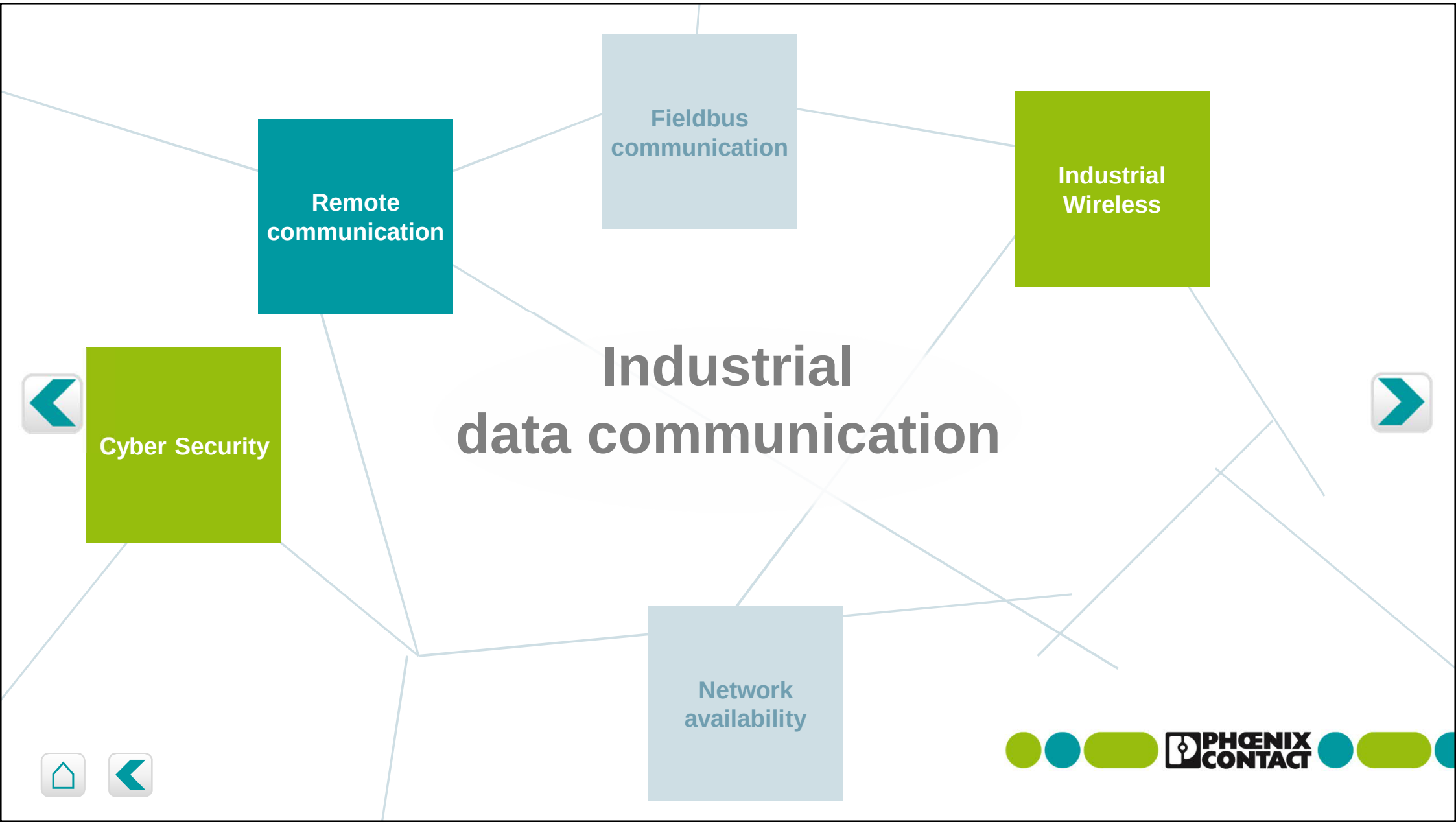
MGUARD RS2000

Remote service and **integration** of machines into factory network

MGUARD RS4000

Remote service (optional via cellular) and integration of machines in **complex factory networks**

MGUARD Secure Cloud


Fieldbus communication
Remote communication
Industrial Wireless
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Cyber Security
Network availability

Everything for industrial networks



Isolator

Network availability



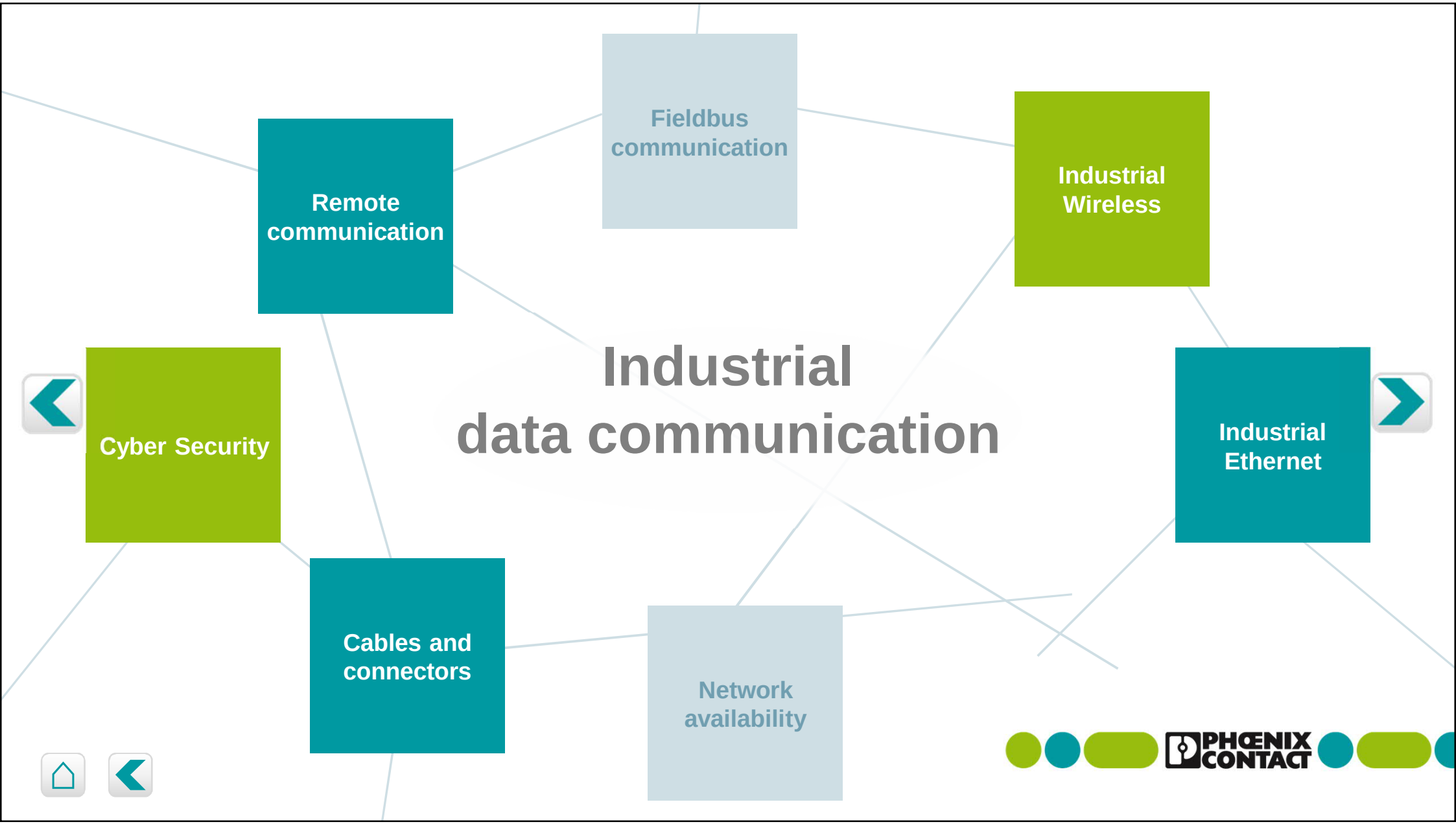
Overvoltage Protection



Patch panel



Redundance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Data connectors and cable



Pre-Assembled data connectors for copper cables



Copper based data connectors



Pre-Assembled data connectors for glass fiber



Fiber optic-based data connectors



Heavy-duty connectors

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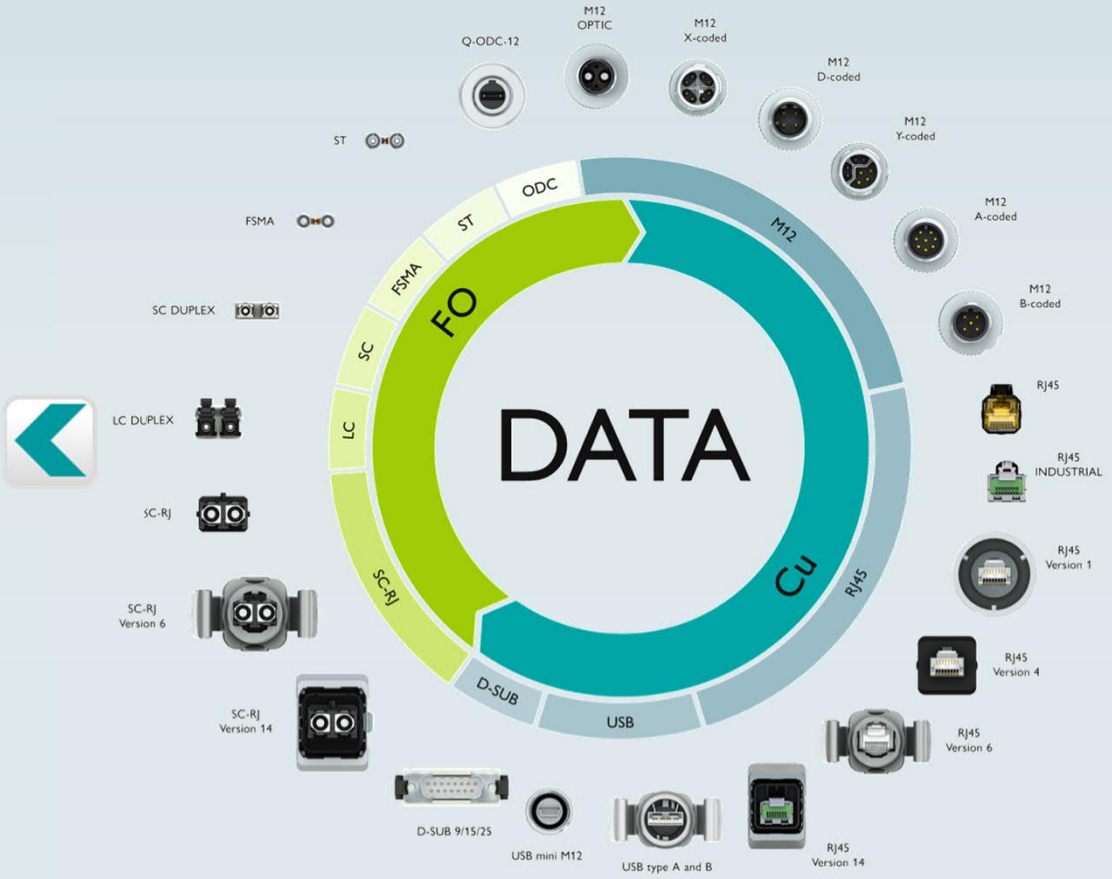
Data connectors for copper and fiber-optic cabling



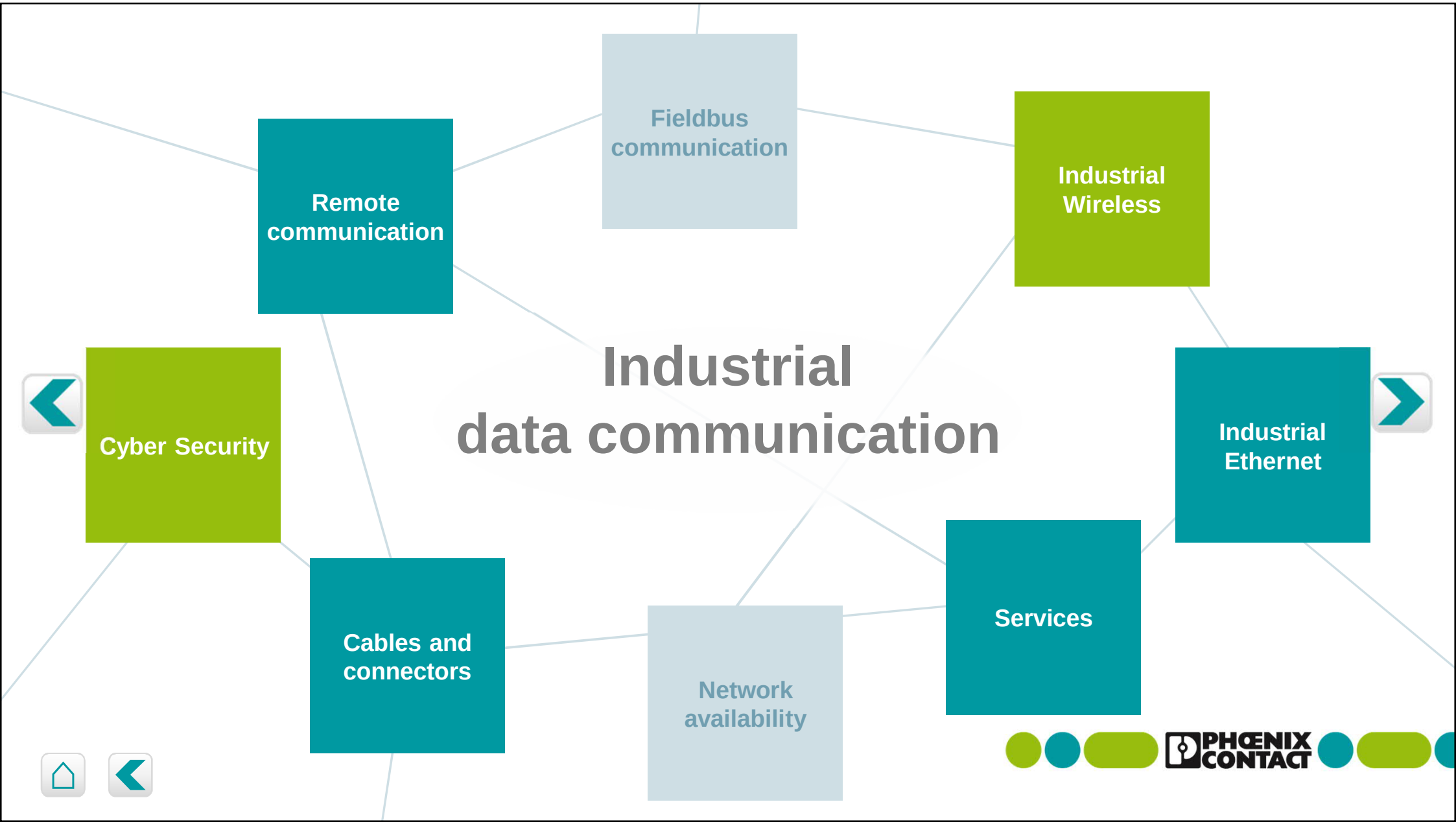


Solution for copper cabling

- Transmission rates up to 10 Gbps
- Protection class IP20 and IP69k
- Spring, pierce and IDC insulation displacement connection
- 360 shielding concept
- For all common networks and fieldbusses

Solution for fiber-optic cabling

- Transmission rates up to 40 Gbps
- Protection class IP20 and IP65/67 and IP68
- For POF,PCF and GOF
- For all common fiber-optic interfaces


Fieldbus communication
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Services
PHOENIX CONTACT

Everything for industrial networks

Services



Training and workshops



Maintenance and support



Planning and consulting



Configuration and startup

HART Technology

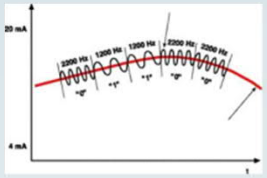
HART®

Technology



HART Technology

the world’s most broadly supported protocol for the process industry



1986

HART became an open standard.

1993

The HART Communication Foundation was formed to manage the standard.

1999

The *HART Server*, an easy-to-use, OPC-compliant software application for accessing real-time process and diagnostic information was released.

2001

HART 6 was released, including features to enable AMS (Asset Management System) integration:

2007

HART 7 was released, and included the WirelessHART standard.

2012

HART 7 was enhanced with additional functionality, including HART IP.





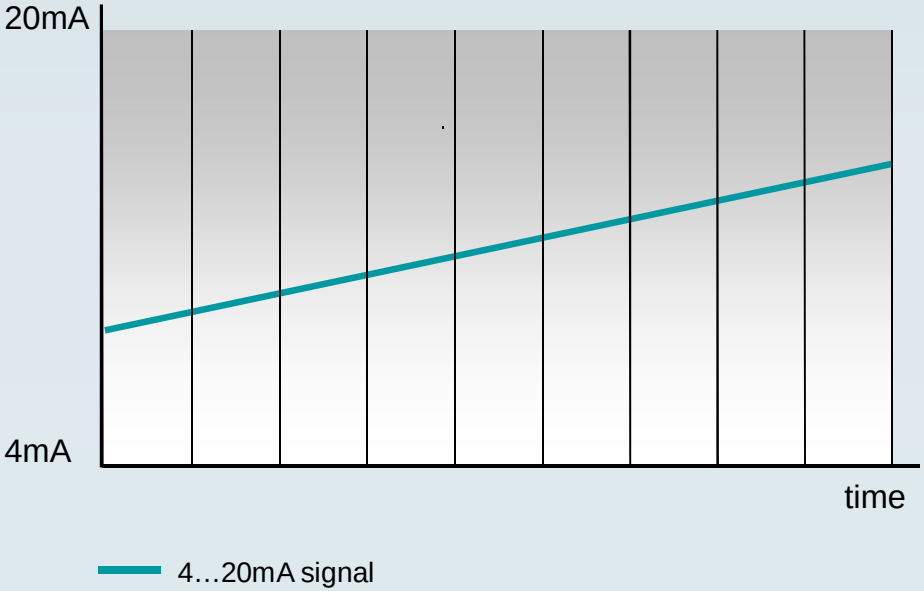






HART Technology

What is a 4…20mA signal?

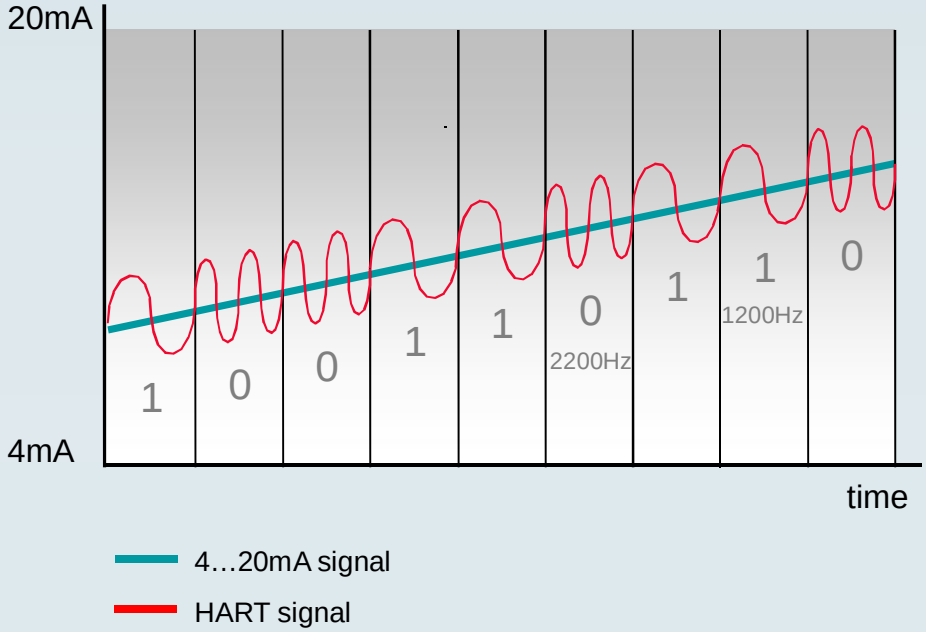


- 4…20mA signal represents a physical measurement range
  - e.g., 0…100°F
- a signal less than 4mA or greater than 20mA indicates a problem

HART Technology

What is HART?

HART stands for **H**ighway **A**ddressable **R**emote **T**ransducer



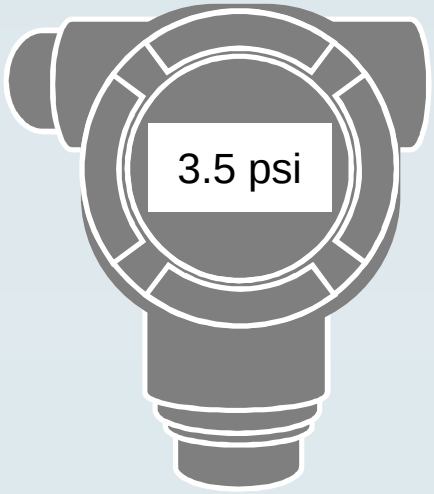
- HART is digital data superimposed onto a 4…20mA signal
- FSK modulation

  (frequency shift keying)
- 1200bps

HART devices

Most process measurement instruments are HART capable

pressure | temperature | level | flow | pH | valves | gas detectors



4…20mA

represents the process variable

4 process variables

device set up

calibration

device diagnostics

the HART protocol provides access to many additional features and capabilities

HART commands

3 commands sets

Universal
All devices must support

- Read manufacturer and device type
- Read primary variable (PV) and units
- Read or write 32-character message
- Write polling address

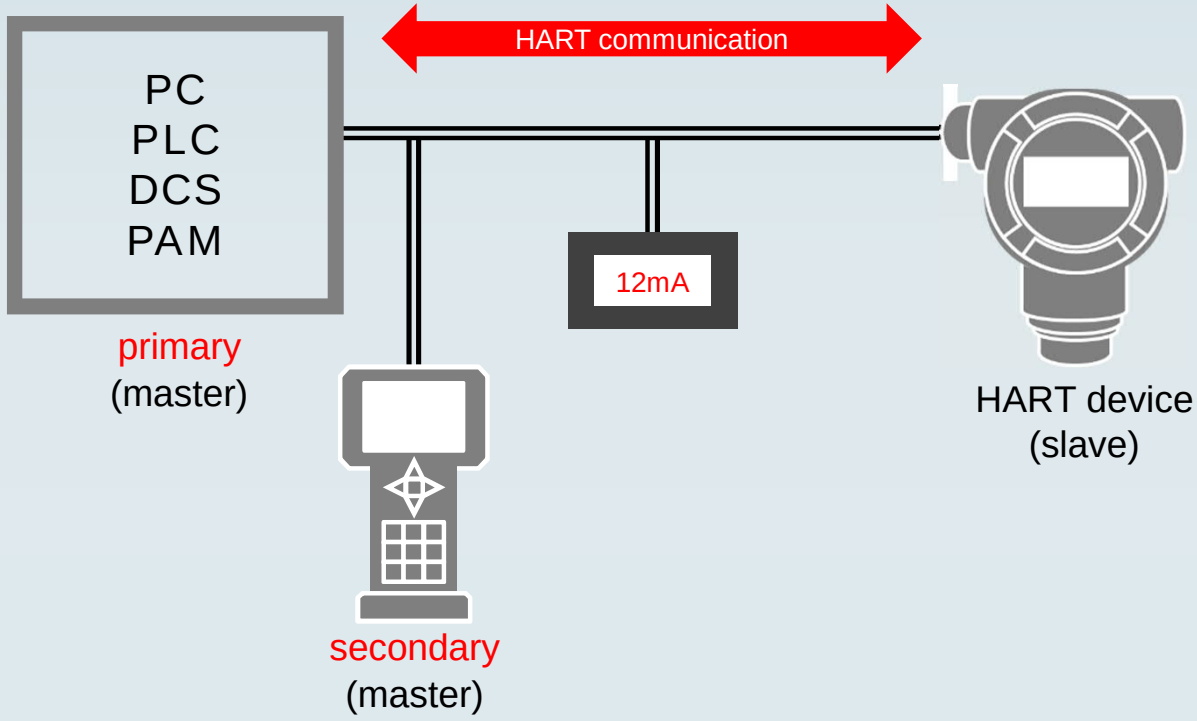
Common Practice
All devices should support

- Read selection of up to four dynamic variables
- Write device range values
- Calibrate (set zero, set span)

Device Specific
Unique to each device/manufacturer

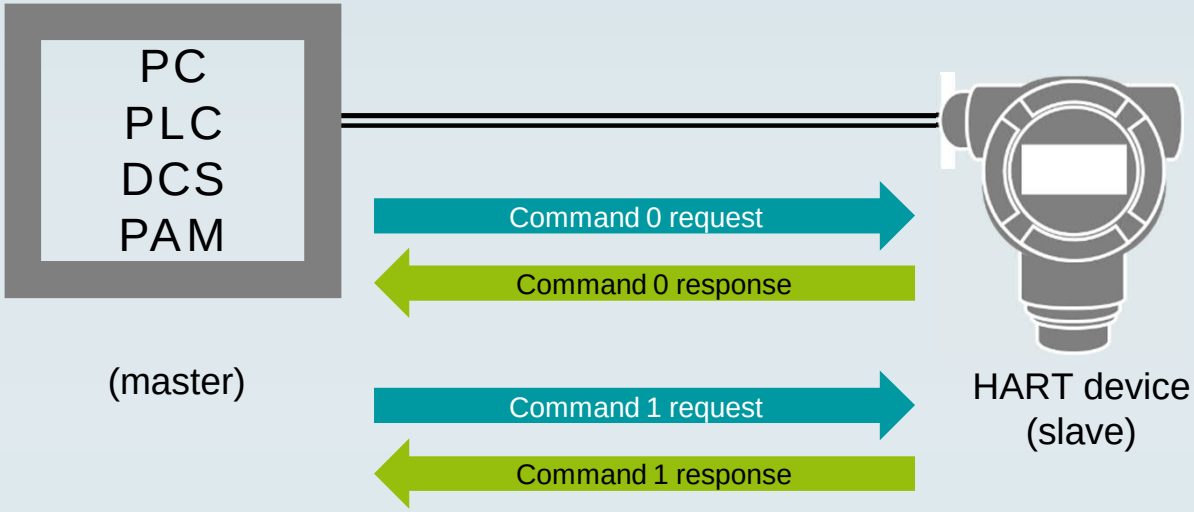
- Read or write low-flow cut-off
- Start, stop, or clear totalizer
- Read or write density calibration factor
- Choose PV (mass, flow, or density)
- PID enable
- Write PID set point
- Valve characterization
- Valve set point

HART communication



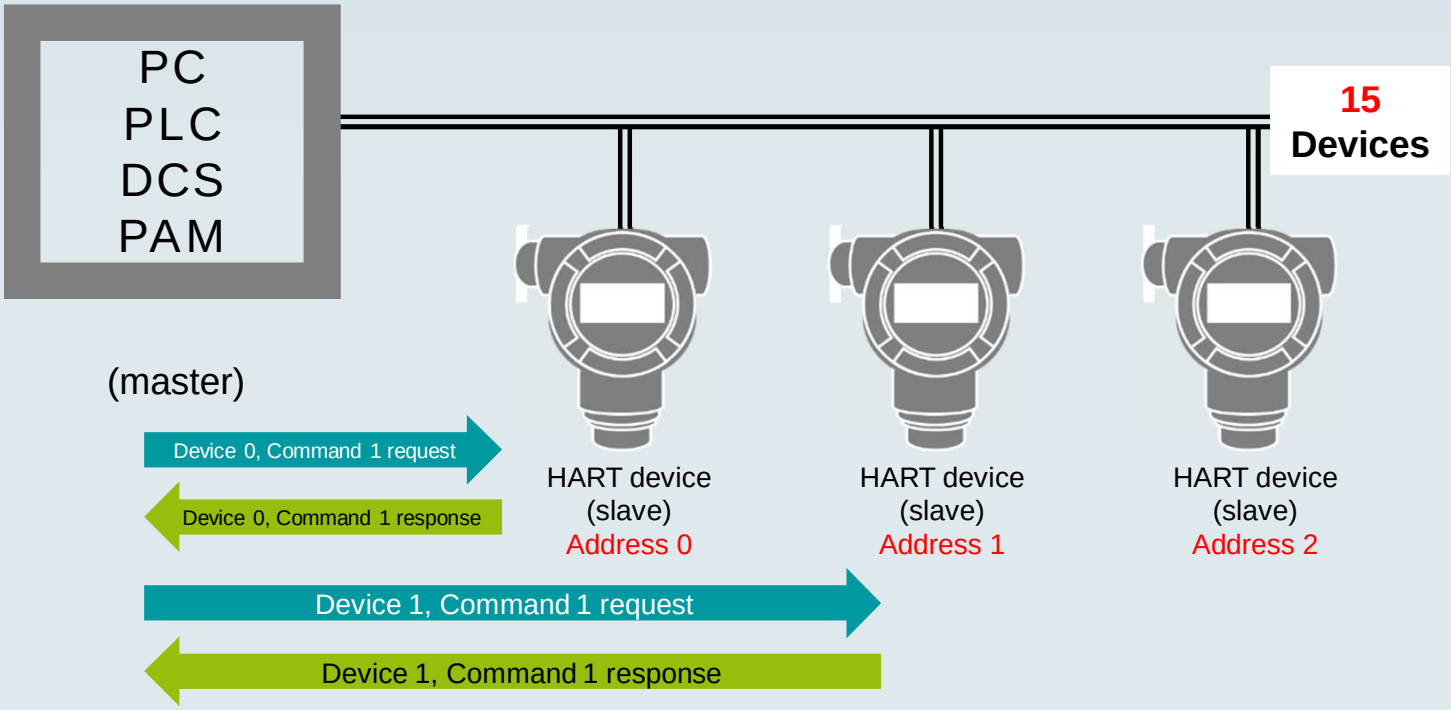
HART communication modes

Poll and response



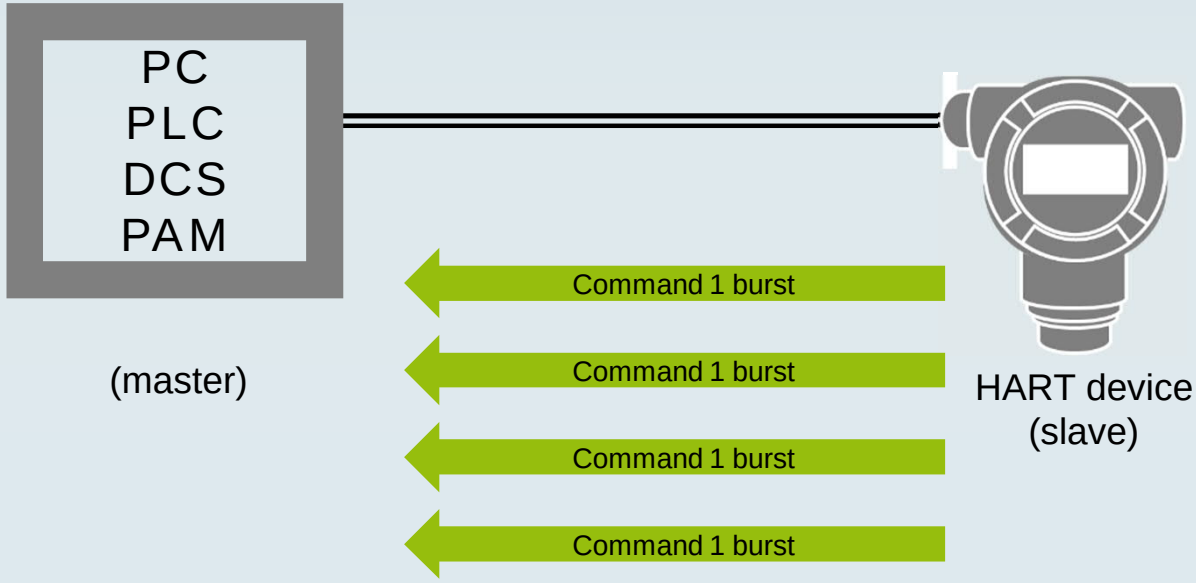
HART communication modes

Multidrop



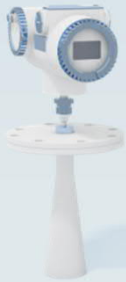
HART communication modes

Burst



HART communication

Unlock your data



Level

- sensor status
- high and low alarm setpoints



Temperature

- ambient temperature
- cold junction temperature
- sensor breakage



Valve Positioner

- actual valve position feedback
- adjust for mechanical wear
- sensor status



Pressure

- cell temperature
- static pressure
- sensor status



Flow

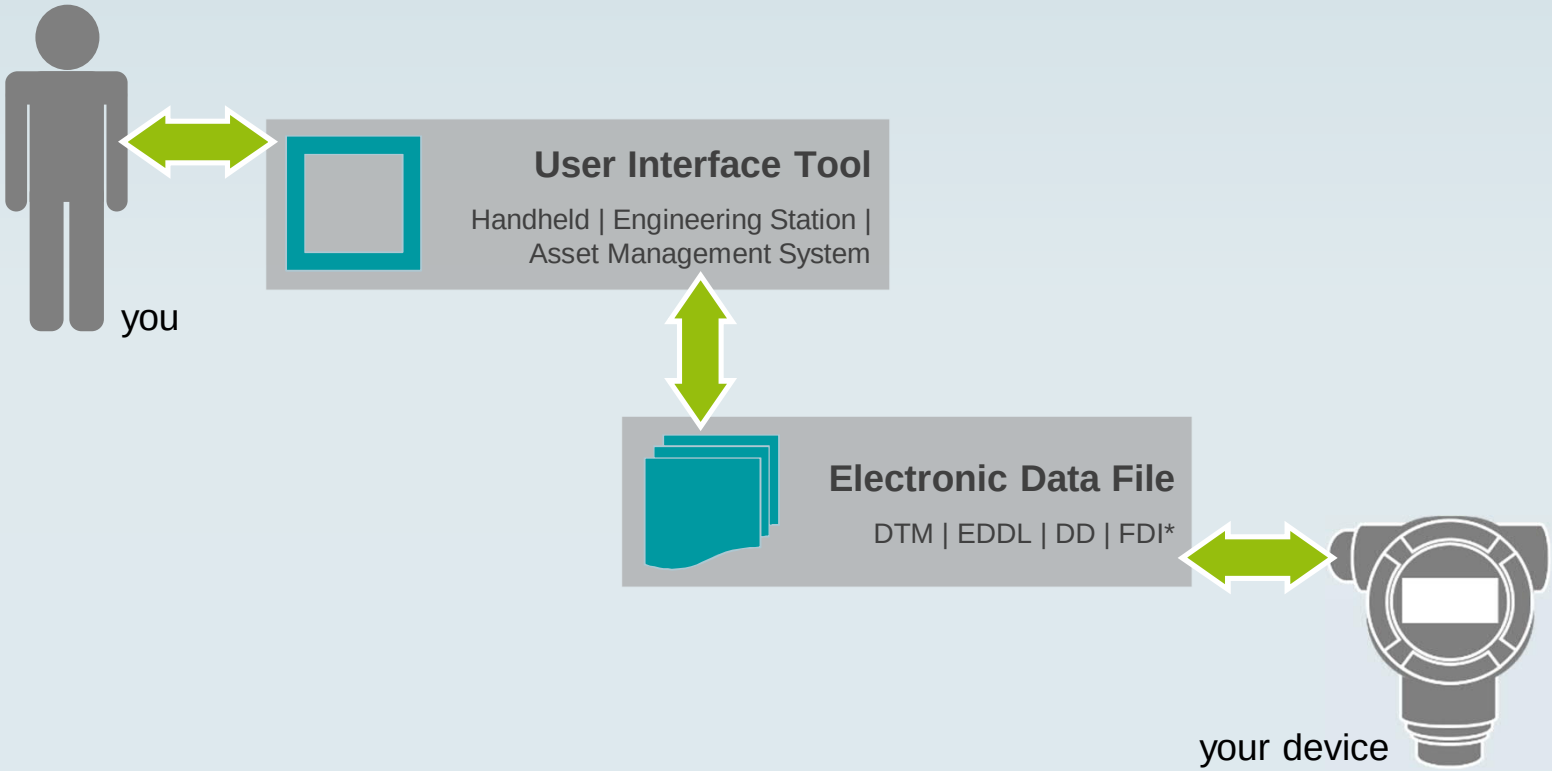
- process media density
- absolute pressure and temperature
- totalized flow



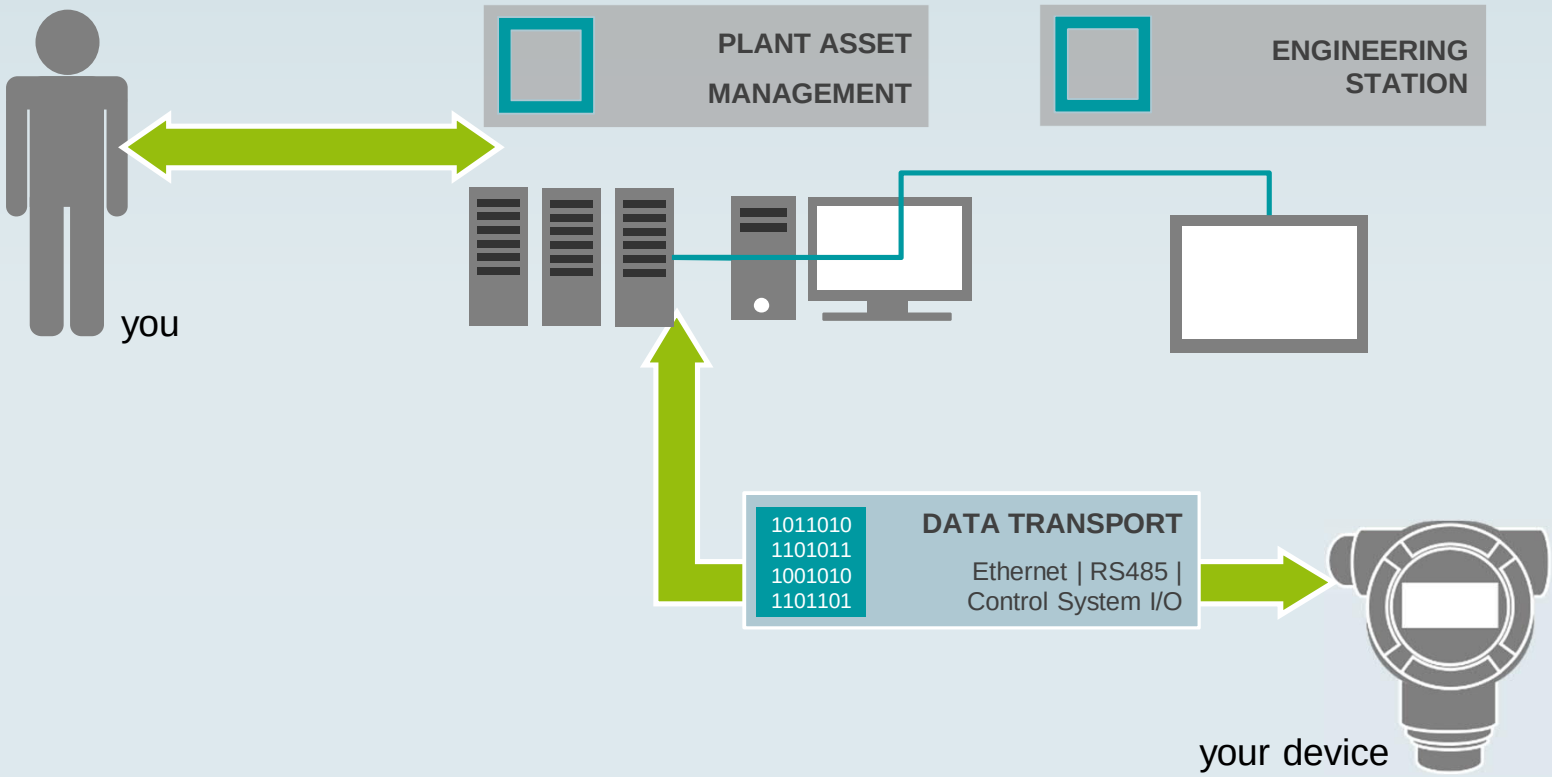
pH

- temperature measurement
- sensor health

Accessing device data



Accessing device data



HART technology can help you

- **Leverage intelligent device capabilities**
  - use unified tools for device configuration
  - gain operational improvements by reducing troubleshooting time



- **Decrease Maintenance costs**
  - use remote diagnostics to reduce field checks
  - capture performance trend data for predictive maintenance



- **Increase system availability**
  - detect device or process connection problems real time
  - avoid the high cost of unscheduled shutdowns

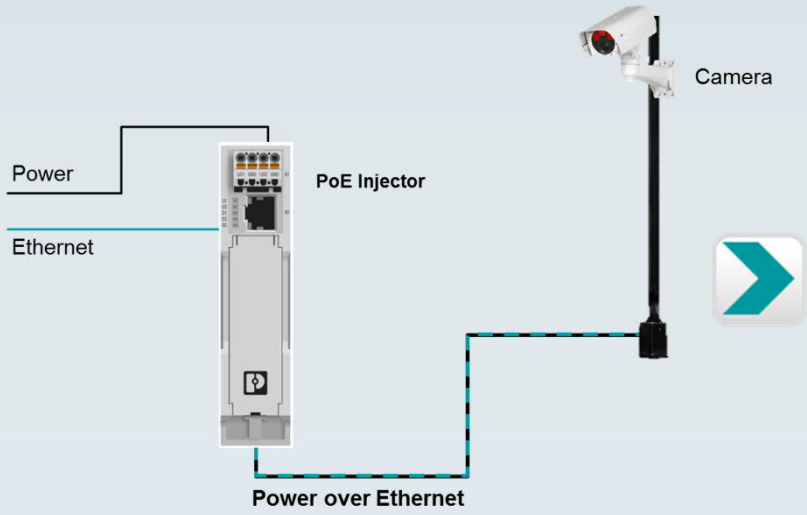


- **Improve regulatory compliance**
  - enable automated record keeping of compliance data
  - take advantage of multivariable devices for more thorough reporting



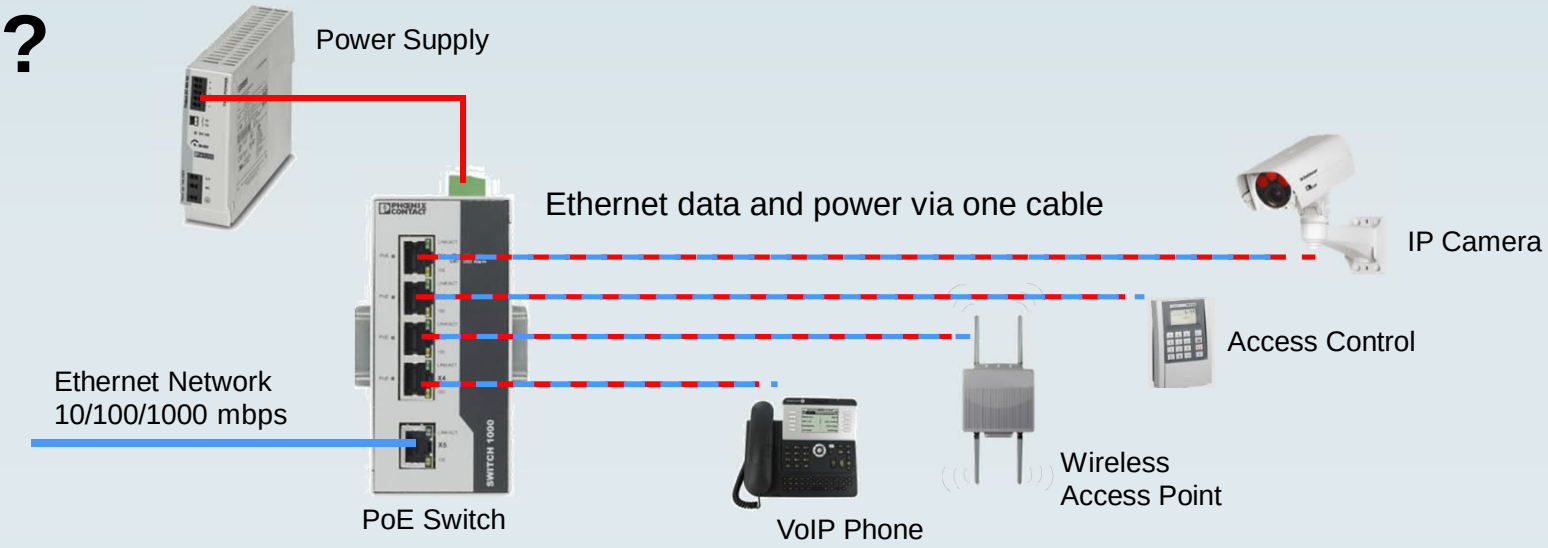
Power over Ethernet (PoE)





Power over Ethernet (PoE)

PoE ?



Power Sourcing Equipment
- **PSE** -

Powered Device
- **PD** -

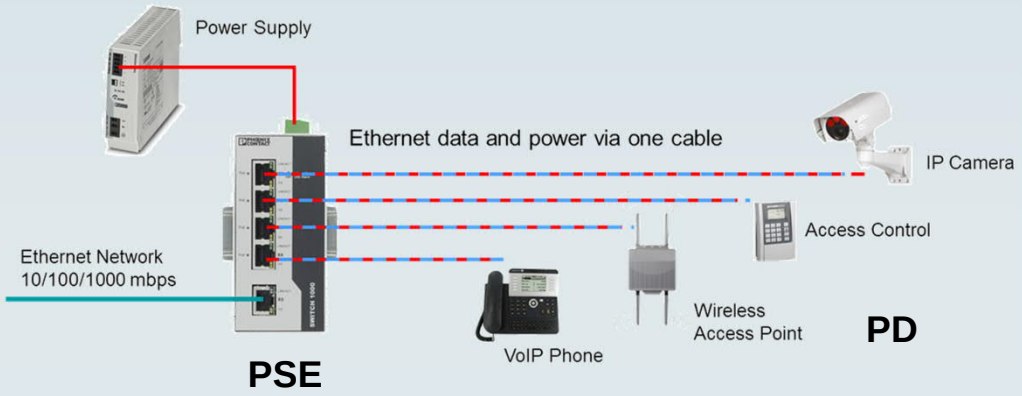
Power over Ethernet (PoE)

IEEE Standard for PoE

Type	Standards	Maximum Current	Energized Pairs	Power trans-mitted by PSE	Power available at PD
PoE	IEEE 802.3af – 2003 Type 1	350 mA	2	15,4 W	12,95 W
PoE+	IEEE 802.3at – 2009 Type 2	600 mA	2	30 W	25,5 W
PoE++ / 4PPoE	IEEE 802.3bt - 2018? Type 3	600 mA	4	60 W	51 W
PoE++ / 4PPoE	IEEE 802.3bt - 2018? Type 4	960 mA	4	100 W	71 W

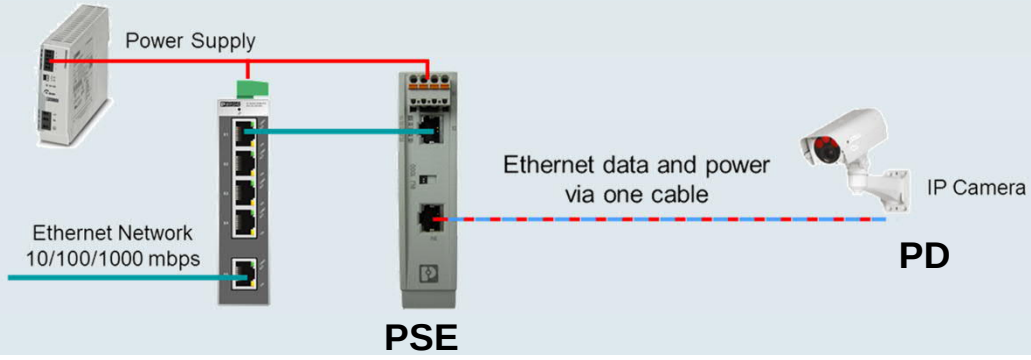
Power over Ethernet (PoE)

Endspan and Midspan



Power Sourcing Equipment (PSE)

„**Endspan**“ type

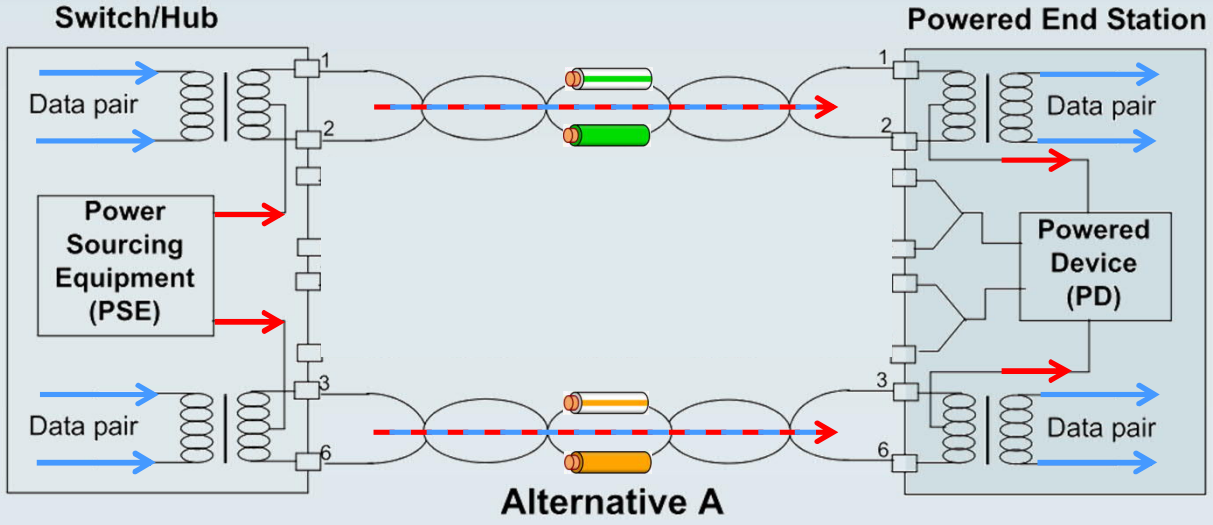


Power Sourcing Equipment (PSE)

„**Midspan**“ type

Power over Ethernet (PoE)

PoE af/at Mode A



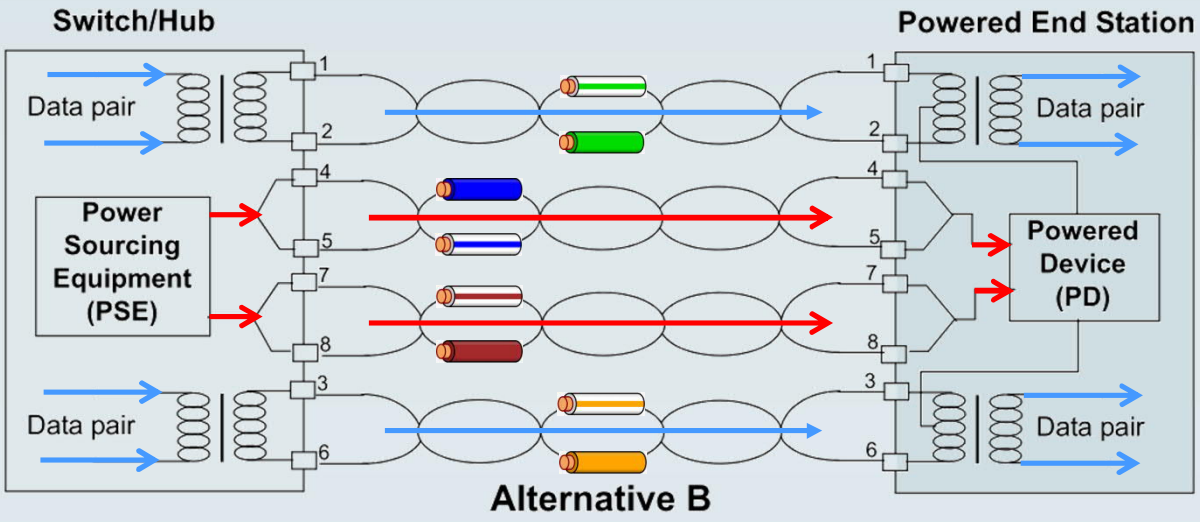
10BASE-T/100BASE-TX Endpoint PSE location overview

Mode A
Power is modulated on the data pairs

- **Phantom power**
- **2-pair mode**

Power over Ethernet (PoE)

PoE af/at Mode B

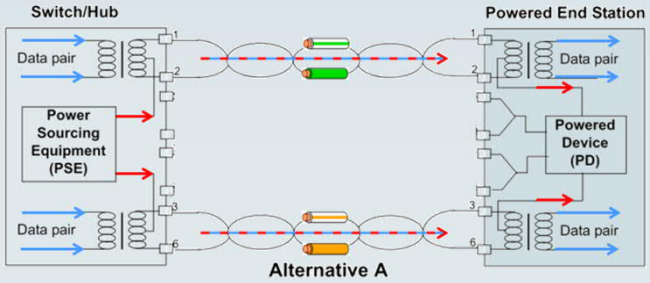


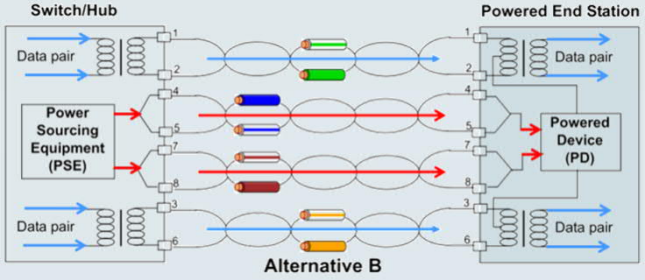
10BASE-T/100BASE-TX Endpoint PSE location overview

Mode B
Power is delivered on the spare pairs
2-pair mode
→ Only with 4-pair Cat cable
→ No Gigabit

Power over Ethernet (PoE)

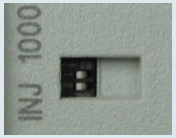
PoE af/at Mode A or B





- The PD must be able for both mode → A and B
- The PSE can implement mode A or B or both
- The PSE decides whether power mode A or B

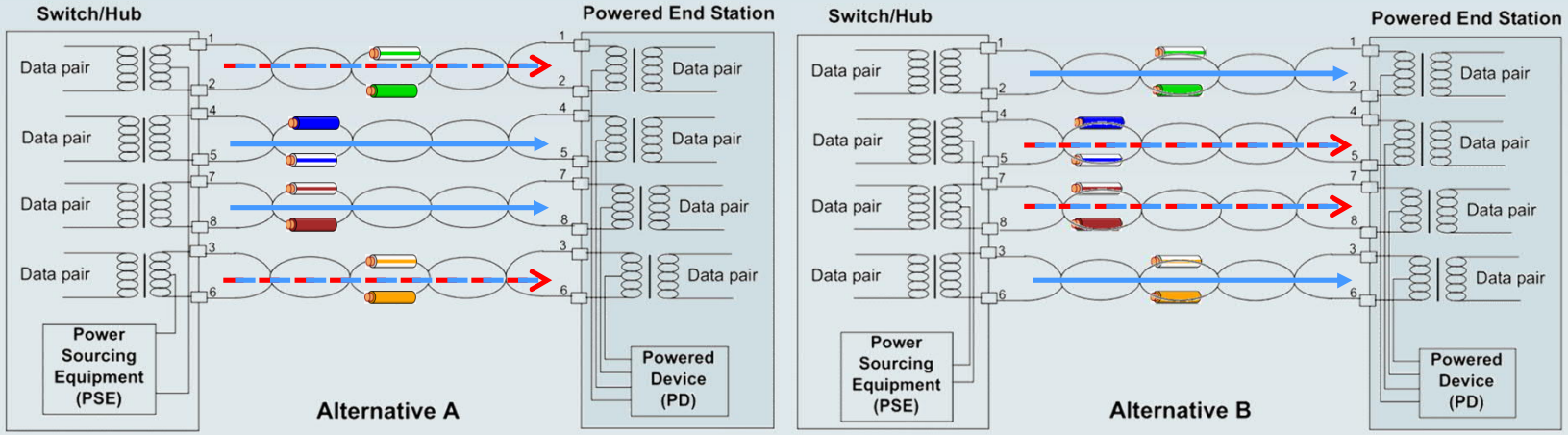
- PSE devices available with fixed A or B mode
  → B mode only for 10/100 mbps and 4 pair cable
- PSE devices with both modes and
  selection by Dip switch



DIP 1	Function
OFF	2 pair mode A
ON	2 pair mode B

Power over Ethernet (PoE)

PoE af/at Gigabit

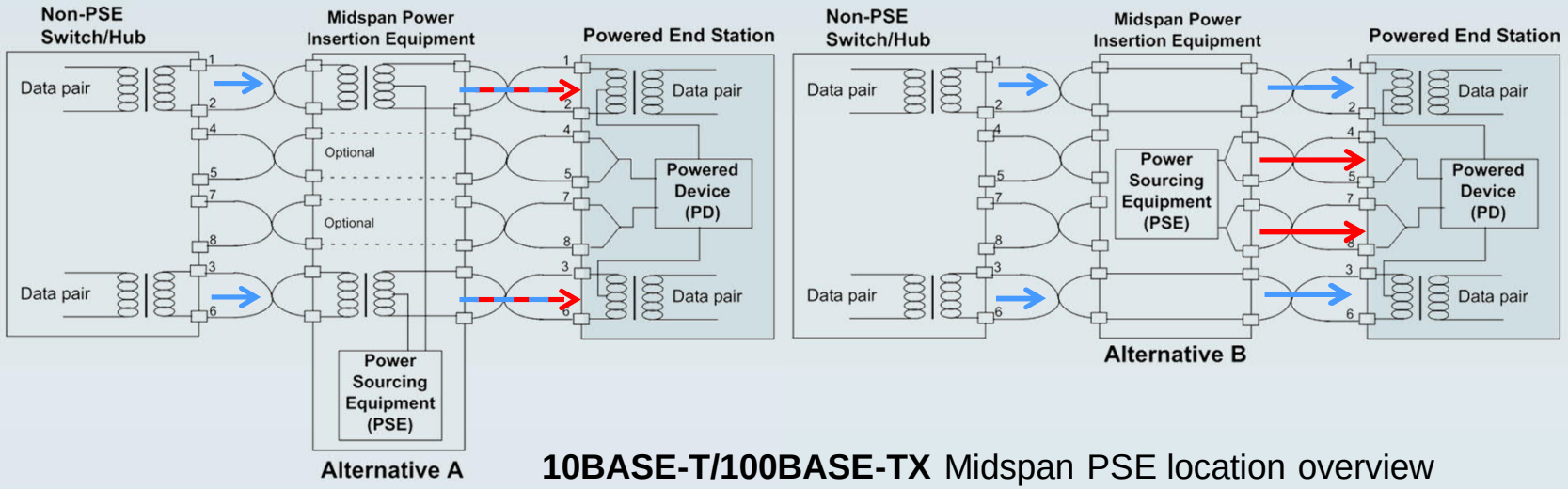


Mode A + B
Power is modulated on the data pairs → **2-pair mode**

1000BASE-T Endpoint PSE location overview

Power over Ethernet (PoE)

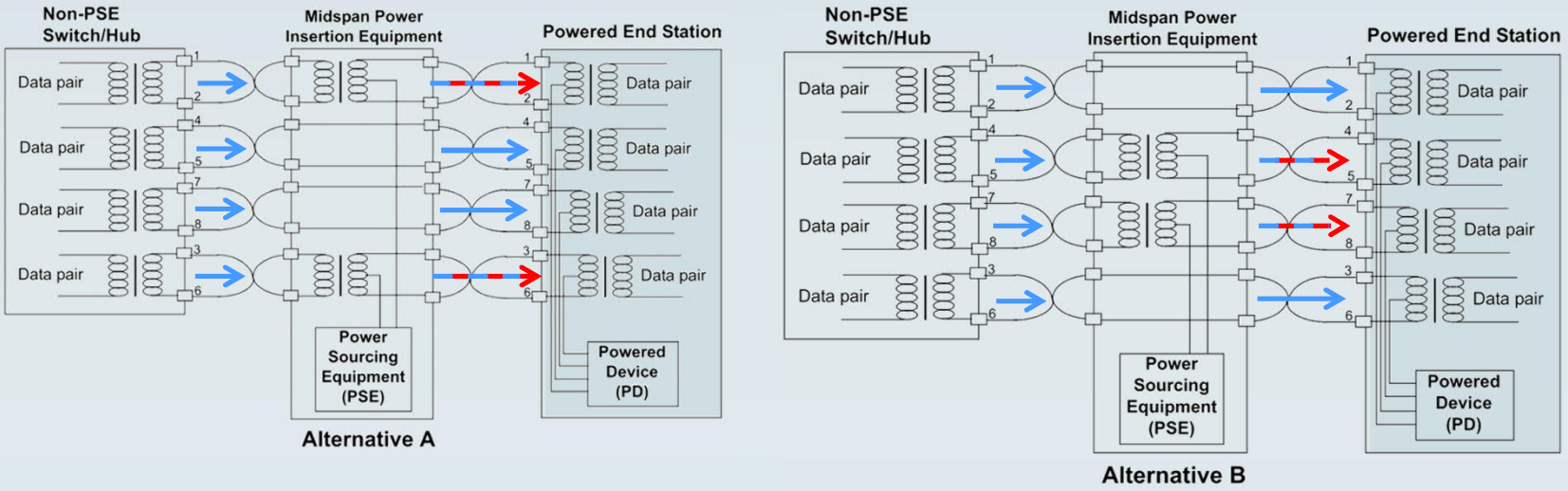
PoE af/at Midspan



10BASE-T/100BASE-TX Midspan PSE location overview

Power over Ethernet (PoE)

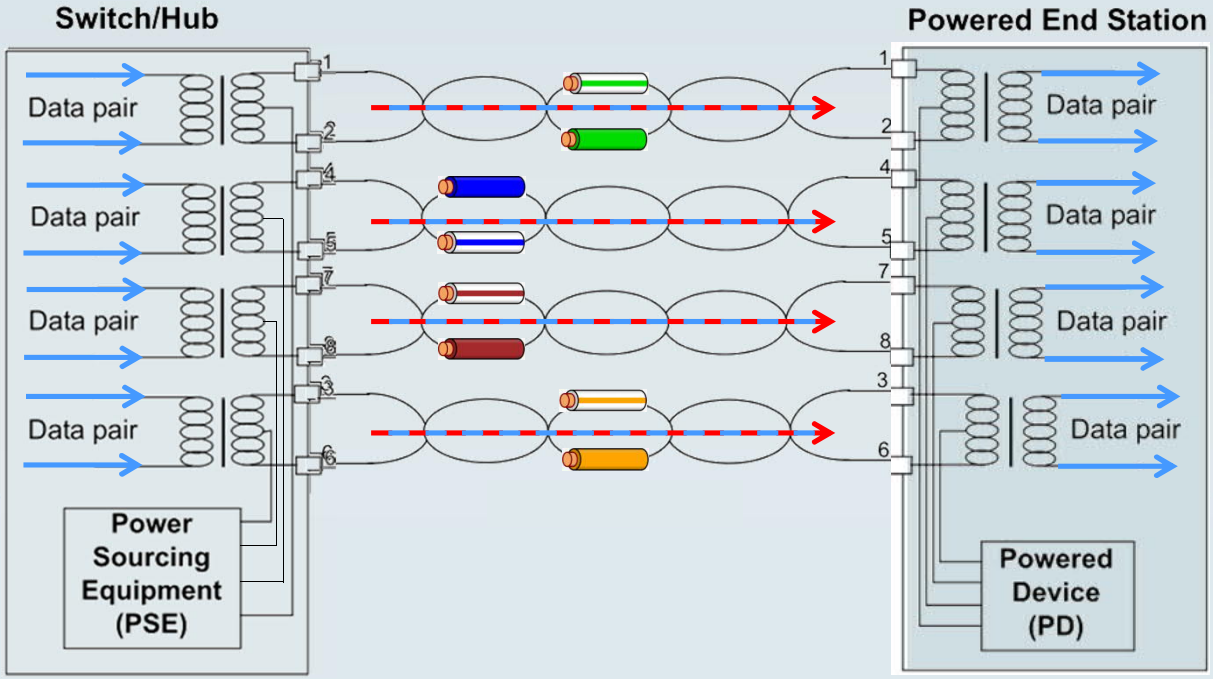
PoE af/at Midspan Gigabit



1000BASE-T Midspan PSE location overview

Power over Ethernet (PoE)

PoE bt - 4 pair mode

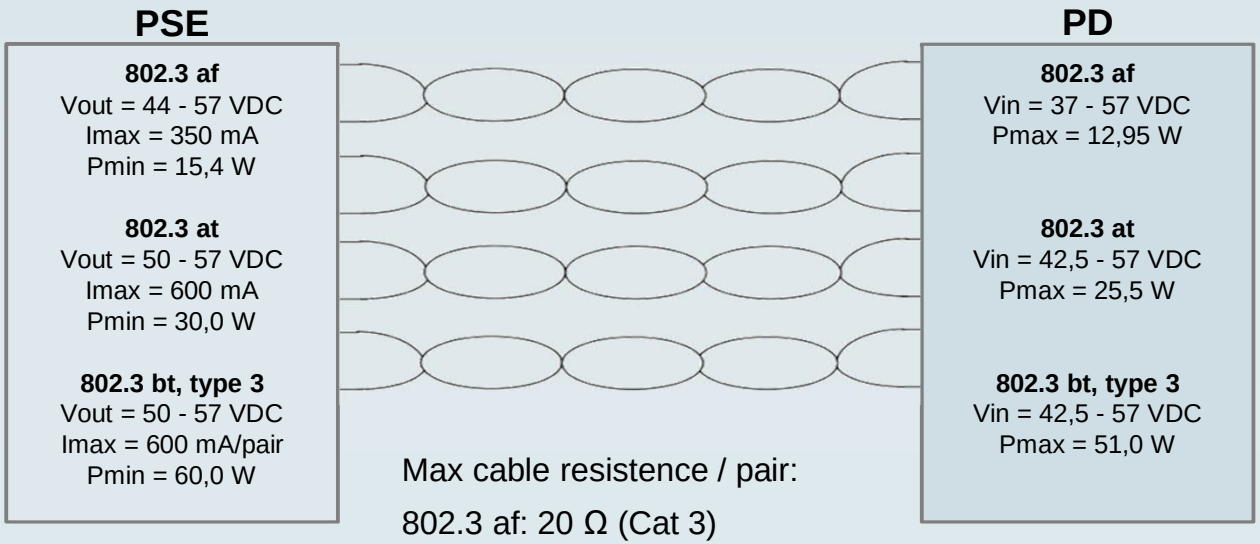


10/100/1000BASE-T/10GBASE-T **4-pair** Endpoint PSE location overview

4-pair mode
Power is modulated on all data pairs

Power over Ethernet (PoE)

Parameter



Max cable resistence / pair:

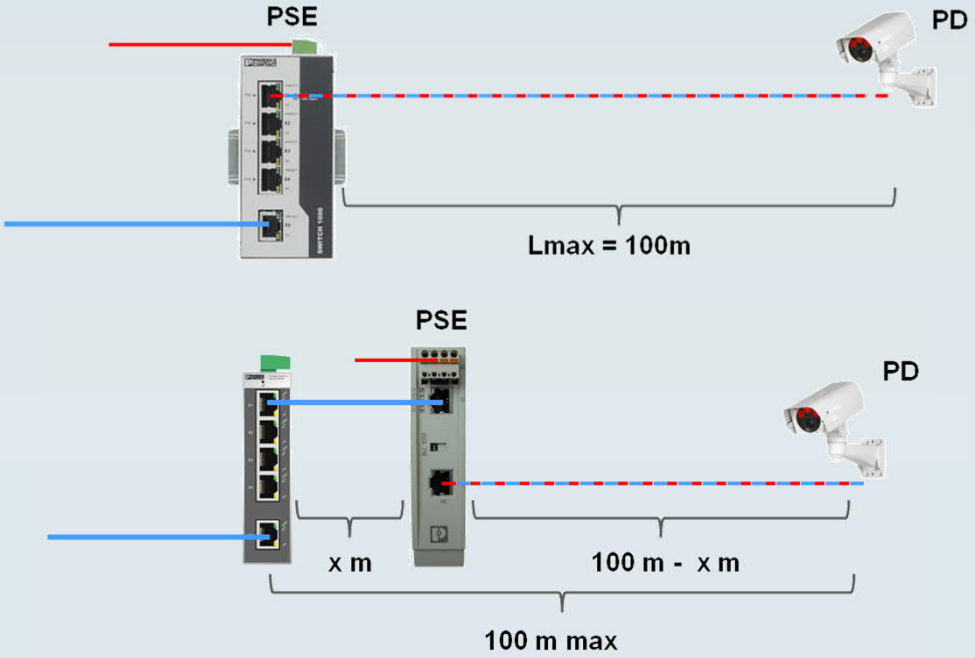
802.3 af: 20 Ω (Cat 3)
802.3 at: 12,5 Ω (Cat 5)
802.3 bt: 12,5 Ω

Physical Layer Classification

Standard	Class	Type	Classification Current	Max. Power by PSE	Max. Power at PD
IEEE 802.3 af	0	default	0 - 4 mA	15,4 W	0,44 - 12,95 W
IEEE 802.3 af	1	optional	9 – 12 mA	4,0 W	0,44 – 3,84 W
IEEE 802.3 af	2	optional	17 – 20 mA	7,0 W	3,84 – 6,49 W
IEEE 802.3 af	3	optional	26 – 30 mA	15,4 W	6,49 – 12,95 W
IEEE 802.3 at	4	optional	36 – 44 mA	30,0 W	12,95 – 25,50 W

Power over Ethernet (PoE)

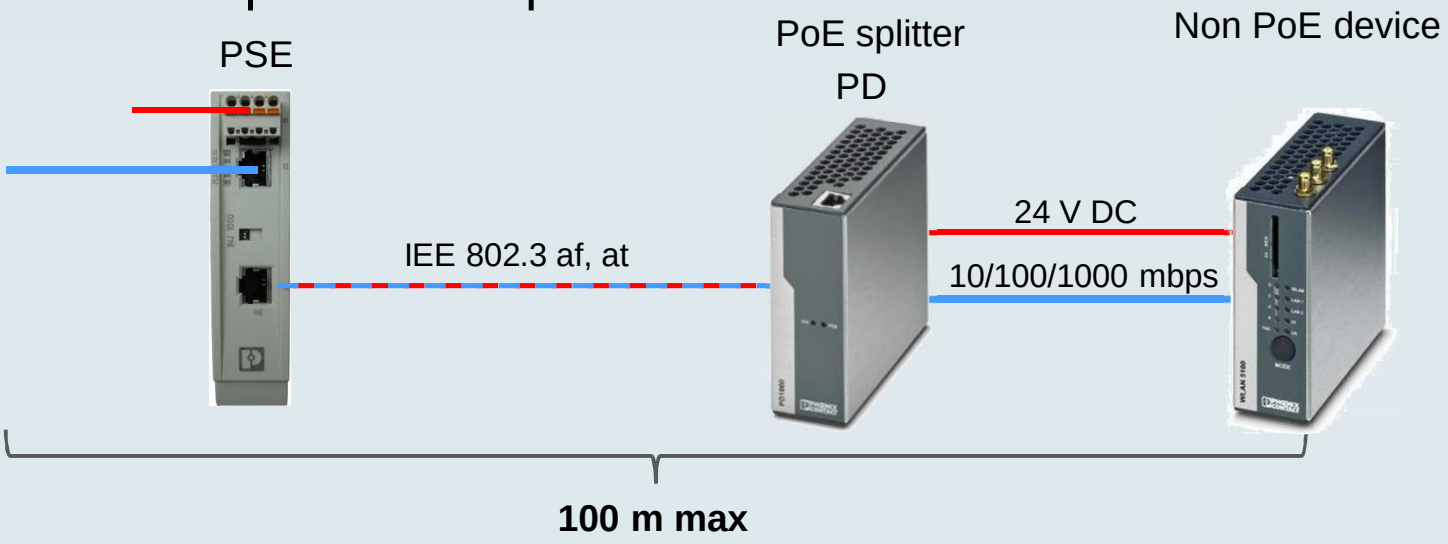
Maximum distance



Power over Ethernet (PoE)

PoE splitter

- For seperation of power and data



Trusted Wireless 2.0

TRUSTED WIRELESS

Global RF Technology

2.4 GHz, 900 MHz, 868 MHz license-free ISM- Band

Increase distance by adjustable data rates

Optimal adaption to the respective application

Secure data communication

Proprietary, „not-open“ Technology

Encryption: 128-Bit AES

Authentication / Integrity check: Unique encryption key for each message verifies the validity of the transmitter

Flexible network structures

Automatic network formation

Self-organizing and self-healing

Point-to-Point, Star, Mesh- and Line structures

Robust data communication

Coexistence mechanism: FHSS, WLAN-Blacklist, adjustable RF bands

Unique NET-ID via CONF-Stick

Multiple transmissions

PHOENIX CONTACT
INSPIRING INNOVATIONS

Trusted Wireless 2.0

Areas of application for Trusted Wireless 2.0

Trusted Wireless is a wireless technology which has been developed especially for the industrial use!

- Rugged communication thanks to FHSS
- Automatic and manual coexistence mechanismus
- Secure communication thanks to 128 bit AES encryption and authentication
- Long range thanks to high reciever sensitivitiy and variable sata transmission rates
- Flexible networks with automatic connection management
- Distributed network maintenance makes things easier and faster
- Extensive diagnostic properties
- Adaptable to the desired application

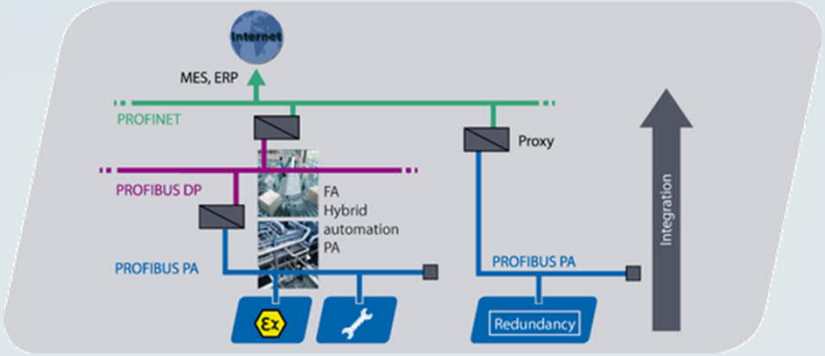
Wireless technologies

	Bluetooth	Wi Fi	TRUSTED WIRELESS	WirelessHART
Technologies	**Bluetooth**	**WLAN (Wireless Local Area Network)**	**Trusted Wireless 2.0**	**Wireless HART**
Network structure	Star structure - 1 Master up to 7 Slaves	Access point can handle endless clients	Mesh network – 1 Master up to 249 Slaves	Full-Mesh network – 1 Master up to 249 Slaves
Standard	IEEE 802.15.1	IEEE 802.11	Proprietary by Phoenix Contact	IEEE 802.15.4 HART 7
Application	fast, small networks	Fast, high data volume, Ethernet	Low/medium data rate, large networks, best for infrastructure application	HART signal, Process industry, short distances
Frequency	2,4 GHz	2,4 GHz, 5 GHz,	868 MHz, 900 MHz, 2,4 GHz	2,4 GHz
Latency time (typical)	>10 ms (IO) > 50ms (Serial)	>16 ms (depending on the data rate / Distance)	0,1 – > 2 s, depending on the OTA data rate / network structure	> 3 s up to serveral minutes
Distance (free line of sight)	Typ. <= 150 m	Typ. <= 150 m	<= 5 km (2,4 GHz) <= 20 km (868 MHz) <= 32 km (900 MHz)	Typ. <= 250 m

PROFIBUS

PROcess **Fi**eld **BUS**

PROFIBUS connects controllers or control systems with a number of field devices (sensors and actuators) via a single cable.



Source: Profibus.com

PROFIBUS • PROFINET

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INSPIRING INNOVATIONS

PROFIBUS

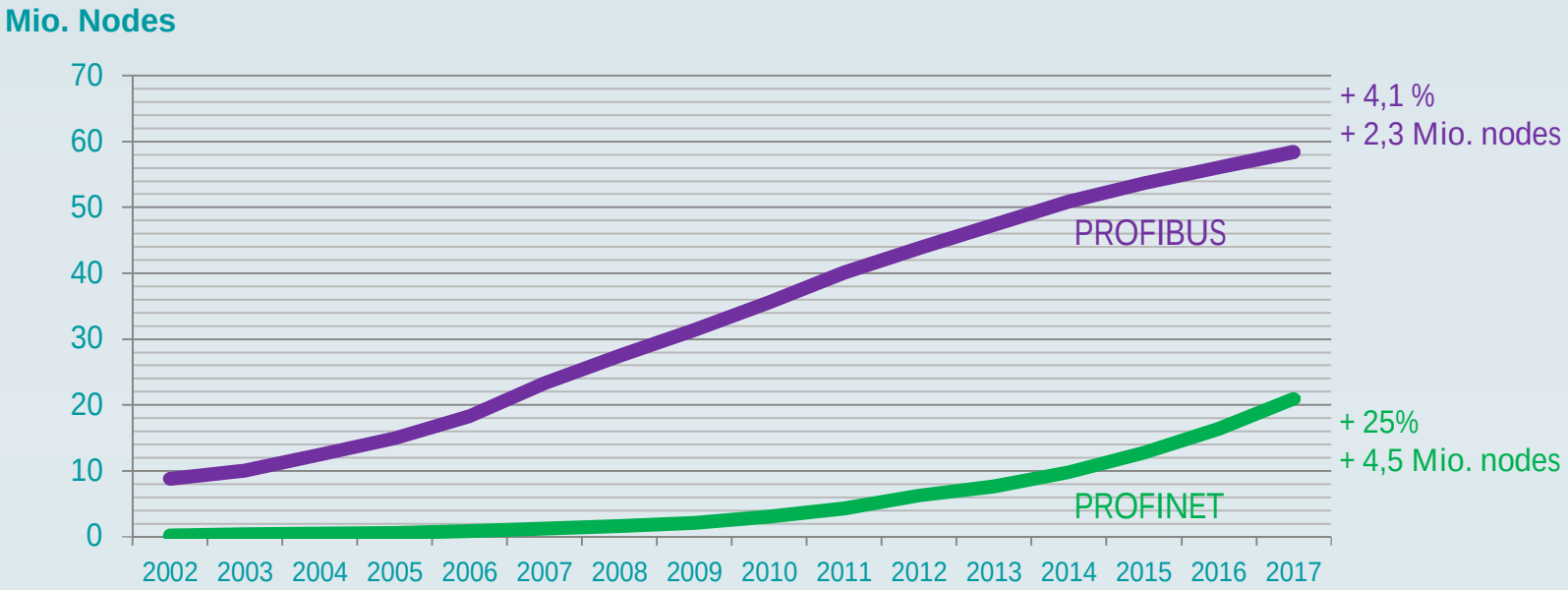
PROFIBUS DP and PROFIBUS PA

- **PROFIBUS DP** (**D**ecentralized **P**eriphery) is mainly used for high speed input/output devices and to link intelligent devices such as drives. It can use different physical layers such as RS-485, wireless or fiber optics.

- **PROFIBUS PA** (**P**rocess **A**utomation) refers to the following features:
  - Bus powered by using the Manchester encorded Bus Powered (MBP) physical layer according to IEC 61158-2
  - Intrinsically safe design
  - Configuration over the bus
  - Device profile

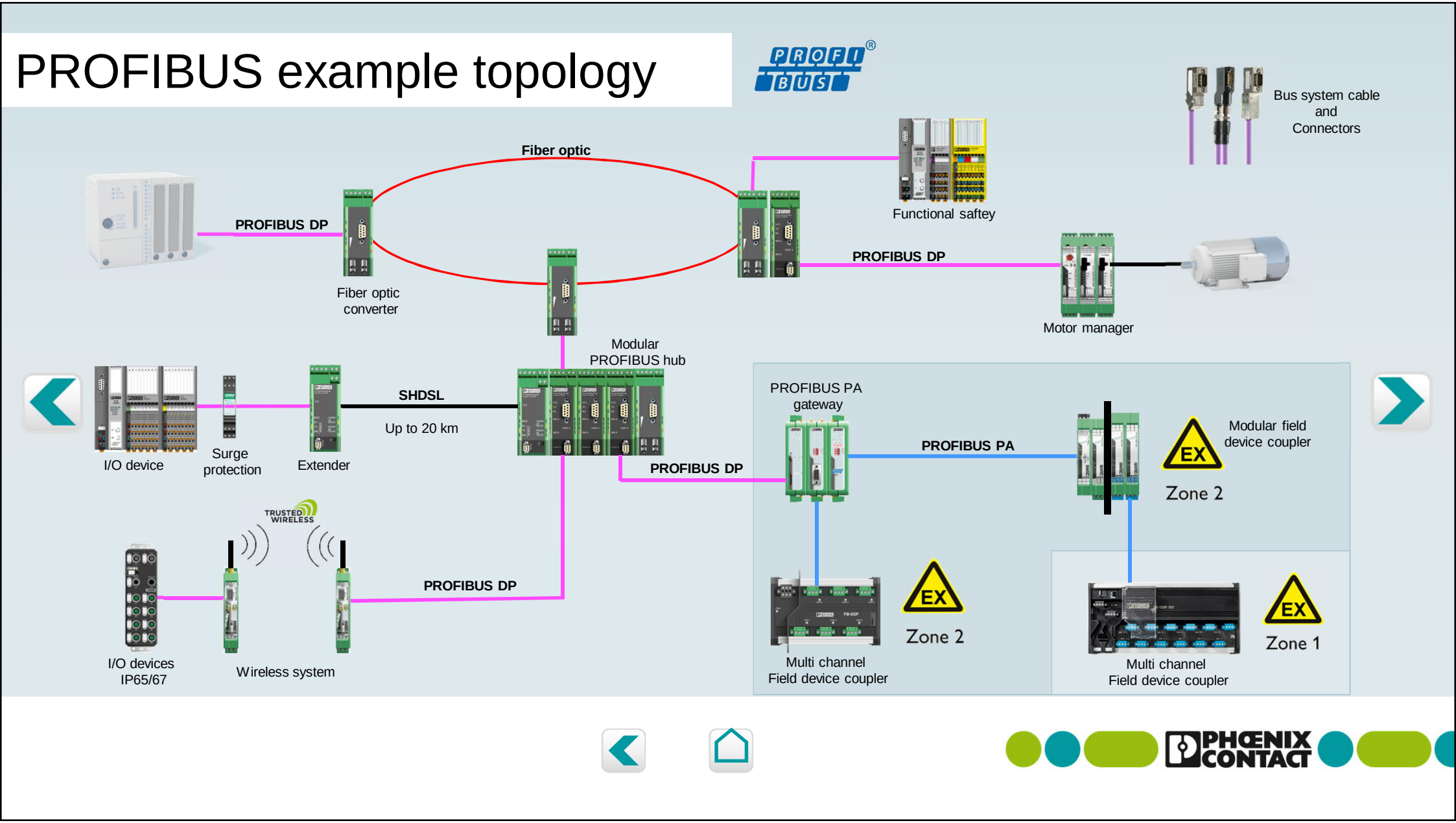
PROFIBUS

Number of PROFIBUS devices worldwide (2002 – 2017)



INSPIRING INNOVATIONS

PROFIBUS example topology



PROFIBUS

PROFIBUS benefit for….

Engineering Staff
- Less wiring, less hardware
- Faster engineering
- Huge vendor choice
- Easier commisioning
- Simpler documentation

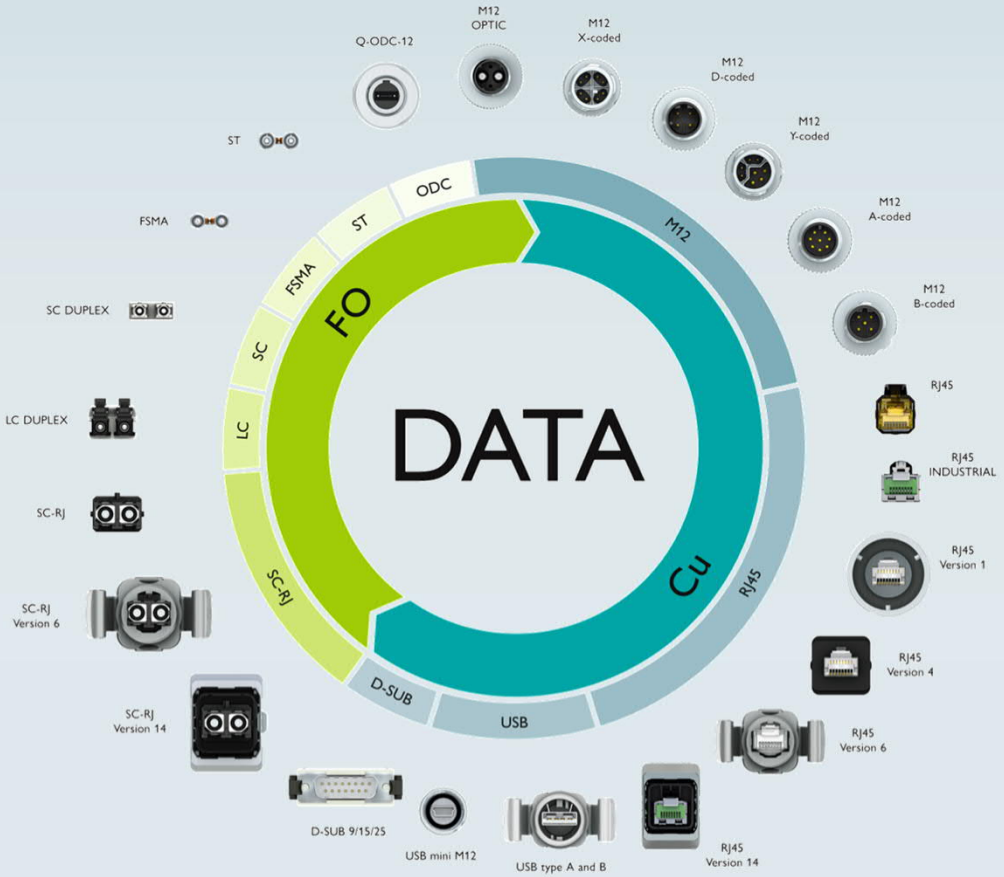
Operation Staff
- Transparency down to the sensor
- Better maintenance conditions
- Improves Asset Management
- Shorter plant downtime
- More flexible production

Plant Managers
- Lower costs
- Faster and more flexible production
- Better production quality
- Safer plants
- Increased ROI

Plants
- Advanced technology
- Easy migration
- Easier revamps
- Less expensive upgrades
- Longer Plant Lifetime

Data connectors for copper and fiber-optic cabling





Solution for copper cabling

- Transmission rates up to 10 Gbps
- Protection class IP20 and IP69k
- Spring, pierce and IDC insulation displacement connection
- 360 shielding concept
- For all common networks and fieldbusses

Solution for fiber-optic cabling

- Transmission rates up to 40 Gbps
- Protection class IP20 and IP65/67 and IP68
- For POF,PCF and GOF
- For all common fiber-optic interfaces