Communication Interfaces - Overview

Products

TRUSTED WIRELESS

PROFI BUS®

Technologies

PoE

HART

Everything
for industrial networks

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Communication Interfaces - Our product portfolio

Fieldbus Communication

Ethernet Infrastructure

Wireless

Remote Communication

Fieldbus Communication 1

Converter Isolator

Repeater Segment Coupler

Fast connectors (SUBCON)

Fiber optic converter

Modular hub

Extender Serial/Profibus

Fieldbus Communication 2

Protocol converter

Radioline Multipoint-Multiplexer

Terminator resistor

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Infrastructure

Ethernet Extender

Media Converter

Ethernet Isolator

Ethernet HART Multiplexer

Patch Panel

PoE Injector

Serial Device Server

Data connectors

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Wireless

Radioline

Wireless Multiplexer

Wireless HART

Radioline Outdoor solution

WLAN

Bluetooth EPA

Ethernet Infrastructure

Remote communication

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Remote communication

TC Mobile I/O

TC MGuard

DSL Router

TC Router

TC Cloud Client

mGuard Secure Cloud

Wireless

Technologies

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Technologies

HART Technology

PoE Power over Ethernet

TRUSTED WIRELESS

Remote communication

PROFIBUS

PHOENIX CONTACT
INSPIRING INNOVATIONS

Converter and isolator

Integrated power supply unit
The device can be supplied directly with 24 V AC/DC
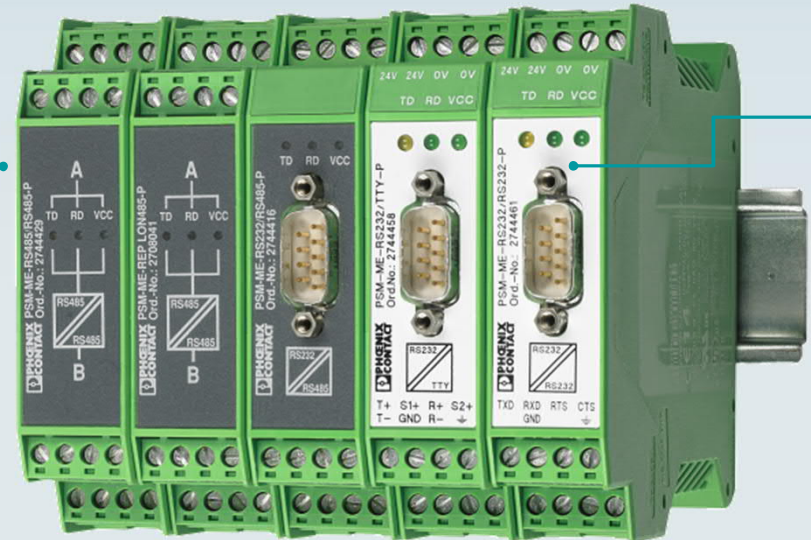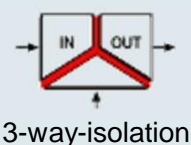
Interference-free and robust
High-grade 2 kV electrical isolation between the power supply and the data interfaces

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

3-way-isolation

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Converter and isolator
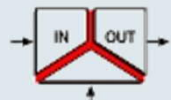
3-way-isolation

- 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Converter and isolator

Up to 115,2 kbit/s, 1200 m

RS-422

RS-232

RS-232

Up to 115,2 kbit/s, 15m

RS-232

RS-485 2-/4-wire
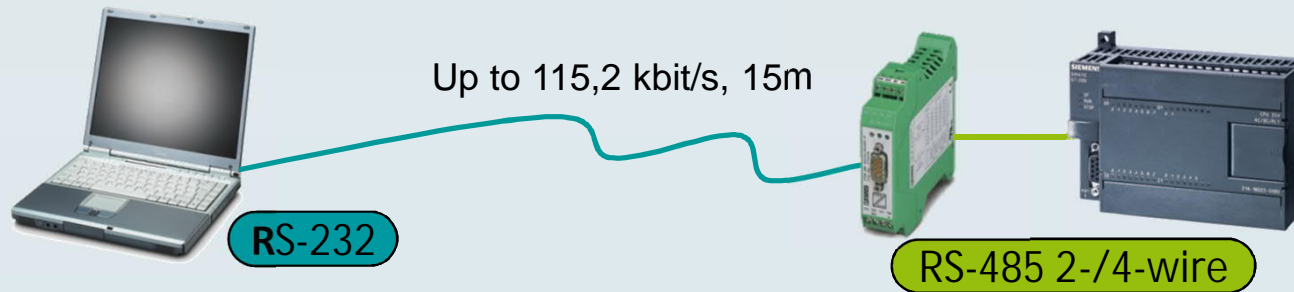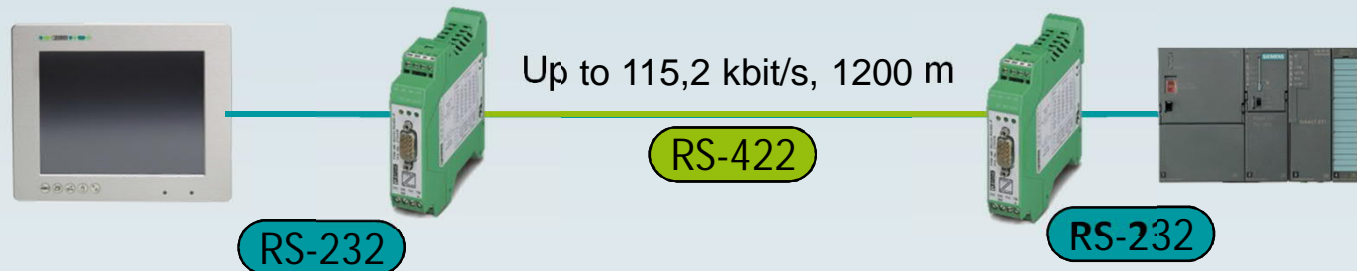
- Interference-free point-to-point connection

- Increase distances of RS-232 from 15 m up to 1200m by converting to RS-422

VCC

RS-232

RS-422/485

Product overview

PHŒNIX CONTACT

INSPIRING INNOVATIONS
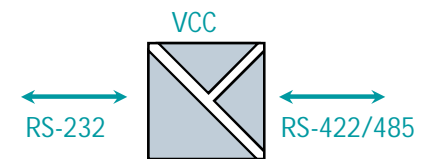
Converter and isolator

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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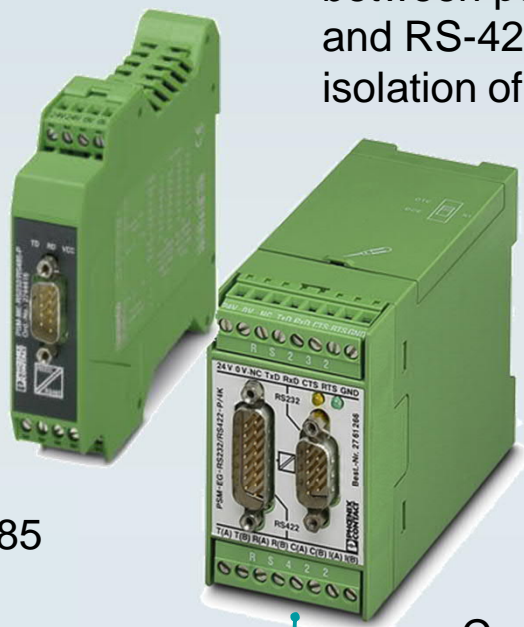
Converter
RS-232 (V.24) to RS-485

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

VCC

RS-232 ⟷ ⟷ RS-422/485

3-way-isolation

PHŒNIX CONTACT
INSPIRING INNOVATIONS
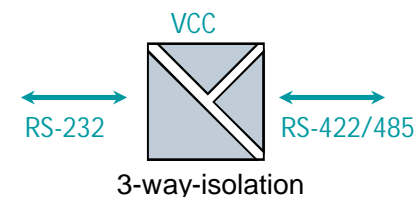
Interface converter

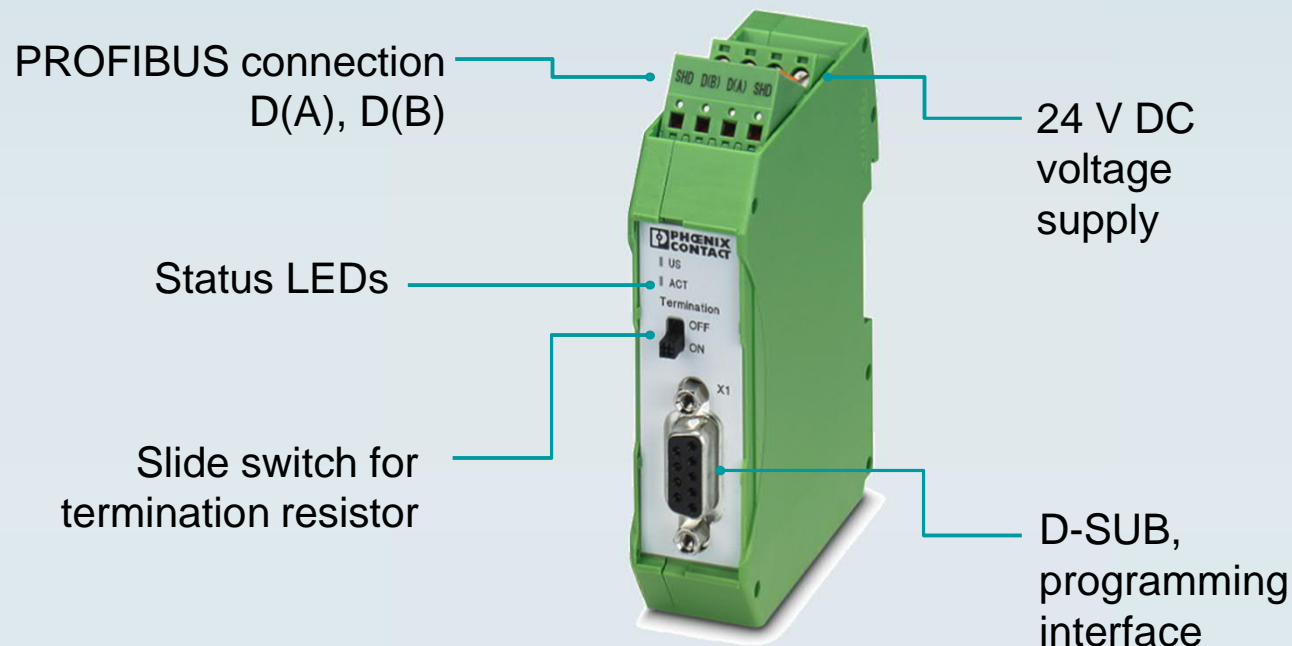|	PSM-ME-RS232/RS485-P	PSM-EG-RS232/RS422-P/4K	ME-SAS (Accessorie)
Description	Interface converter, for converting RS-232 (V.24) to RS-422 (V.11) and RS-485, with electrical isolation 2 channels	Interface converter, for converting RS-232 (V.24) to RS-422 (V.11), with electrical isolation, 4 channels,	
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	Shield connection clip for printed circuit terminal block
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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Termination resistor

PROFIBUS connection D(A), D(B)

24 V DC voltage supply

Status LEDs

Slide switch for termination resistor

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
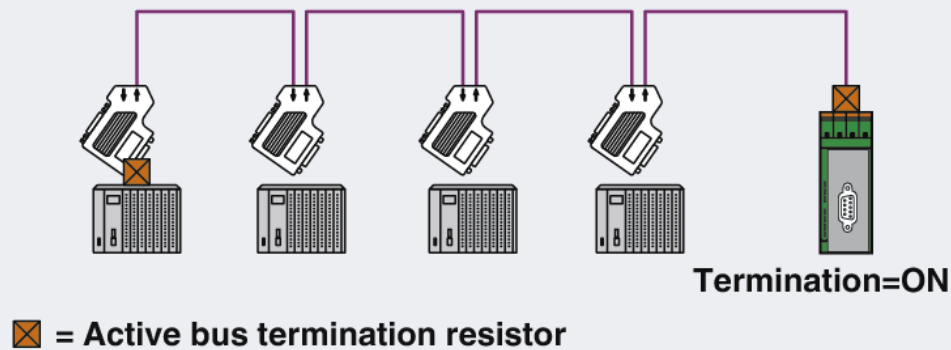
- T-Bus functionality for power supply

Product overview
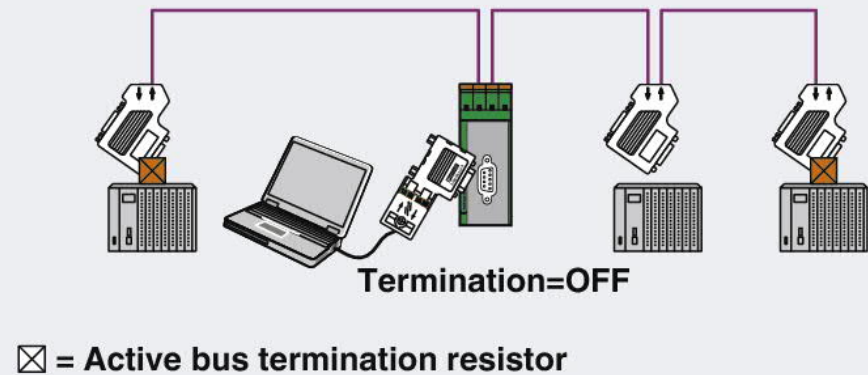
Termination resistor

Application examples:

Termination operation

Termination=ON

⊠ = 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

Termination=OFF

⊠ = 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.

PHŒNIX CONTACT

INSPIRING INNOVATIONS

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

The modular hub

Simply snap the devices onto the DIN rail and go!
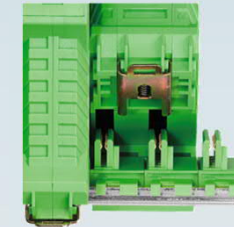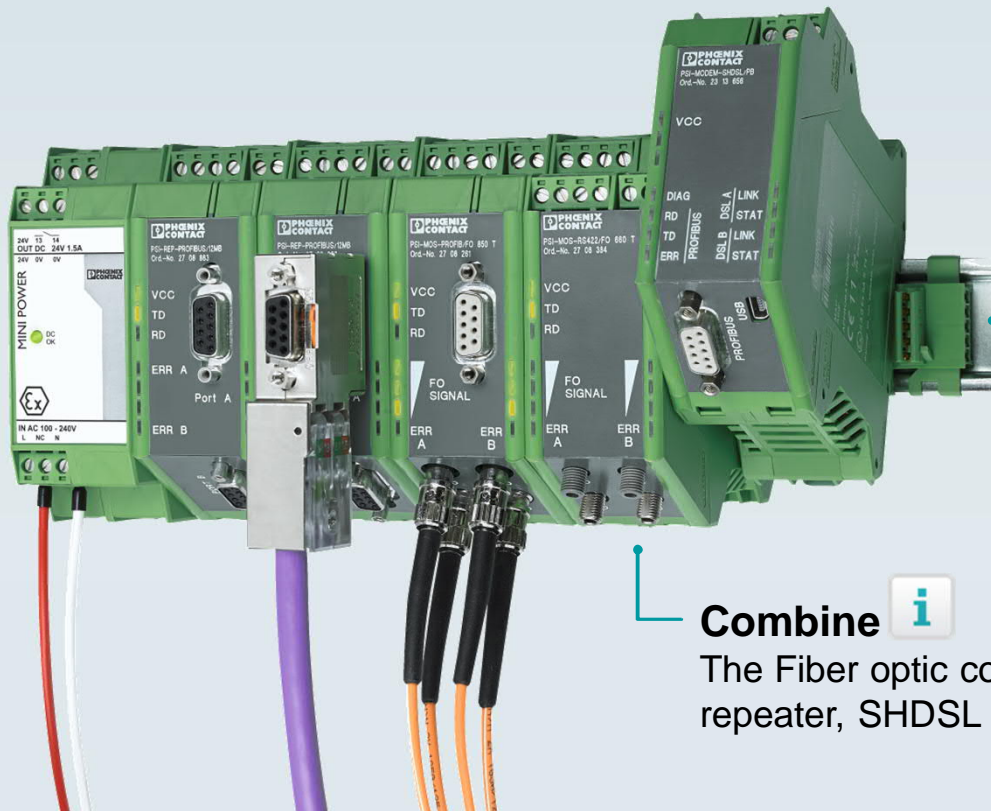
Smooth installation
The DIN rail connector instantly provides data and the supply voltage to each device associated with the station
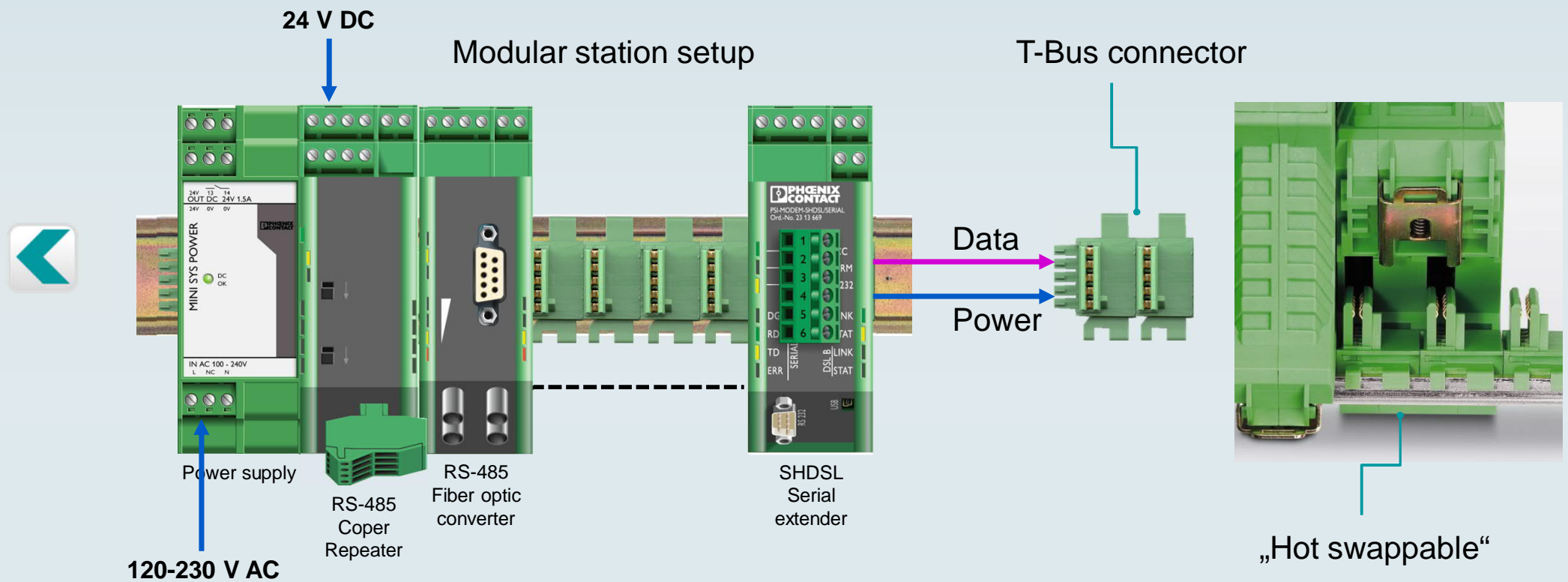
Combine ℹ️
The Fiber optic converter can be combined with copper repeater, SHDSL devices in whichever way you choose

The modular hub

Combine copper, fiber and SHDSL however you choose

24 V DC

Modular station setup

T-Bus connector

Data

Power

Power supply

RS-485
Coper
Repeater

RS-485
Fiber optic
converter

SHDSL
Serial
extender

120-230 V AC

„Hot swappable"

Repeater – Copper transmission

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

ℹ️ Extend and distribute channels as required

ℹ️ Modular station with T-Bus connector

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

ℹ️ Different topologies

Features Repeater:

ℹ️ Bit-Oversampling

ℹ️ Bit-Retiming

ℹ️ Start-delimiter detection for PROFIBUS **PROFI BUS®**

ℹ️ Potential segmentation

PHŒNIX CONTACT
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

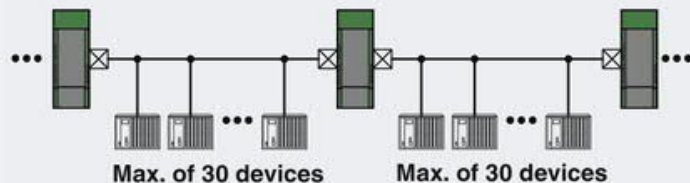- Approvals: ATEX, cULus Listed 508, Class1, Zone 2 and Class 1, Div2

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Copper transmission

Topologies

Linear structure

Max. of 30 devices   Max. of 30 devices

⊠ = Switch on bus terminating resistor

Star structure

...
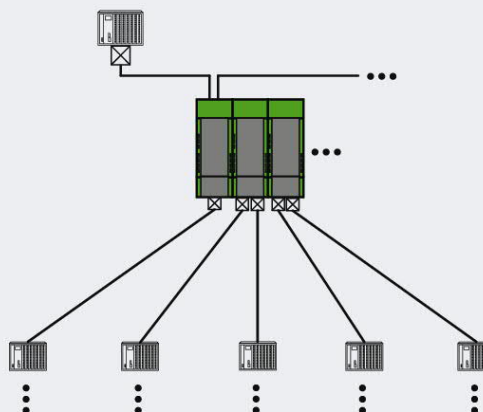
⊠ = Switch on bus termination resistor

Tree structure

...   ...
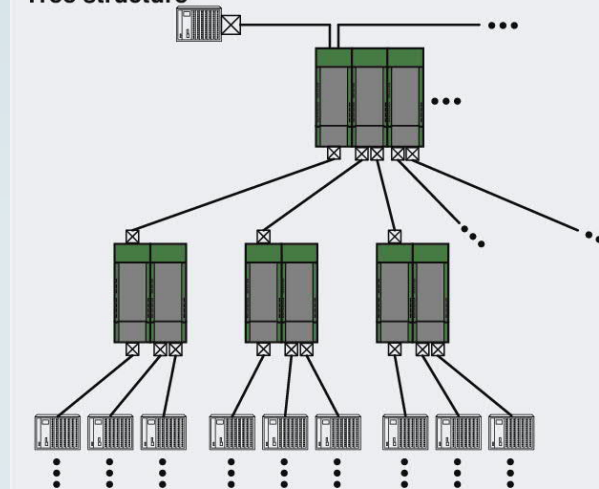
⊠ = Switch on bus terminating resistor

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.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Copper transmission

Control room

Controller

- Max 32 devices in one segment

- Each repeater port counts as one device, but has no node address
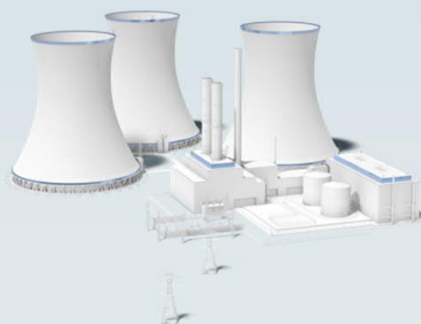
Segment 1

Repeater

+30

| Device 1 | | Device 2 | ⋯⋯▸ | Device 31 | Device 32 |

Slave

Slave

Repeater

Segment 2

+31

| Device 1 | Device 2 | ⋯⋯▸ | Device 32 |

Slave

Slave

Product overview

Repeater – Bit-Oversampling

16x Bit-Oversampling

Bit refreshing!

Interference

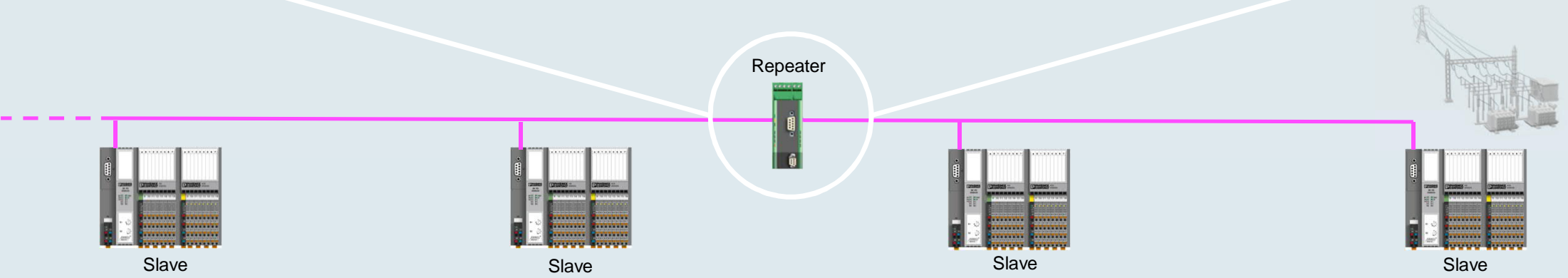Interference

Repeater

Slave

Slave

Slave

Slave

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Bit-Retiming

max. 35%

Bit-Retiming

Correct bit detection even up to 35% bit time deformation

Creation of a "brand-new" bit pattern

Repeater

Slave   Slave   Slave   Slave

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Start-Delimiter Detection

Detection of the PROFIBUS telegram start-delimiter

Start-delimiter → Start-delimiter

Telegram **without** start-delimiter

Invalid telegrams or interferences will not be transferred

Repeater

Slave

Slave

Slave

Slave

Repeater – Distance vs. Segment length

The maximum segment length depends on the transmission speed!

200 m @ 1,5 Mbps PROFIBUS®

100 m @ 12 Mbps PROFIBUS®   **100 m**

Repeater

PHŒNIX CONTACT
INSPIRING INNOVATIONS
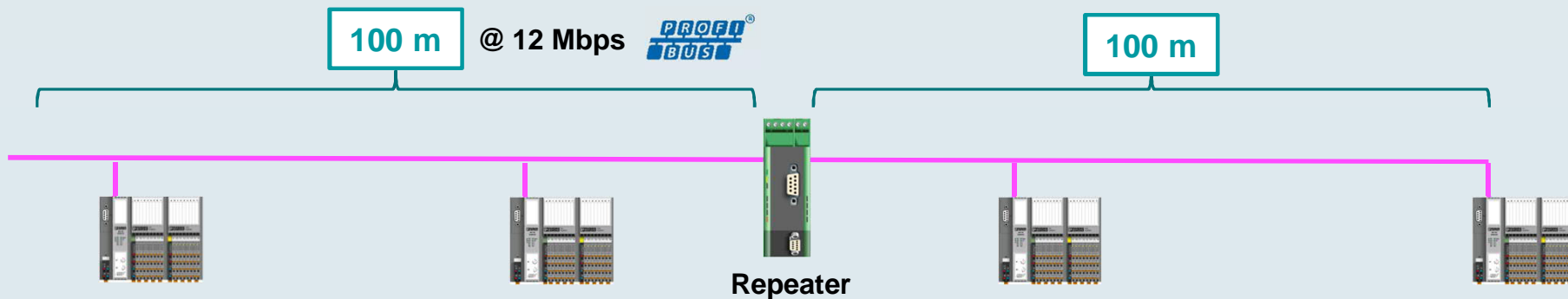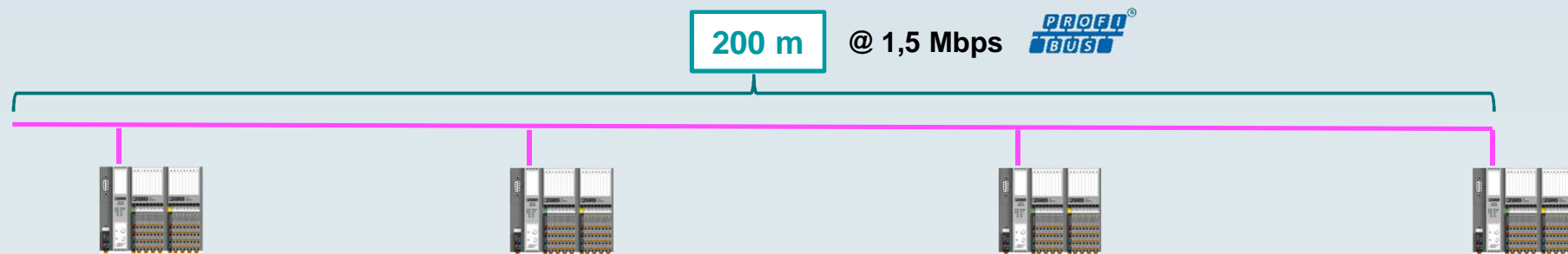
Transmission rate vs. Segment length

The max. transmisson rate depends on the segment length
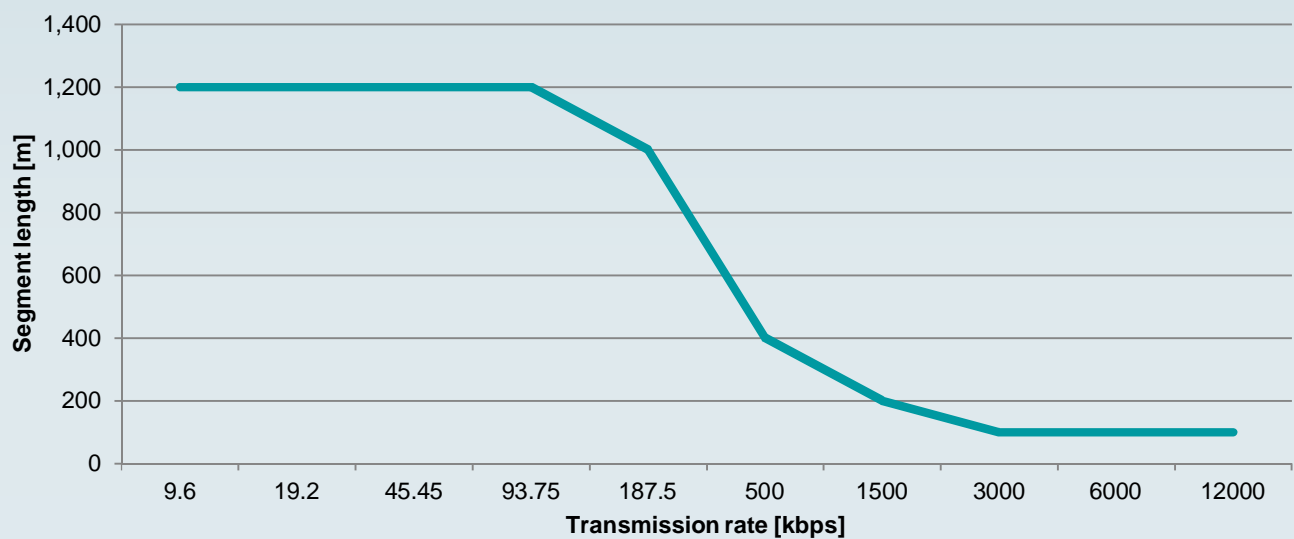
Transmission rate [kbps]	9.6	19.2	45.45	93.75	187.5	500	1,500	3,000	6,000	12,000
Segment length [m]	1,200	1,200	1,200	1,200	1,000	400	200	100	100	100

Repeater – Modular station

Data

Ports

Extend and distribute channels as required

Data

1 3 5 19

2 4 6 20

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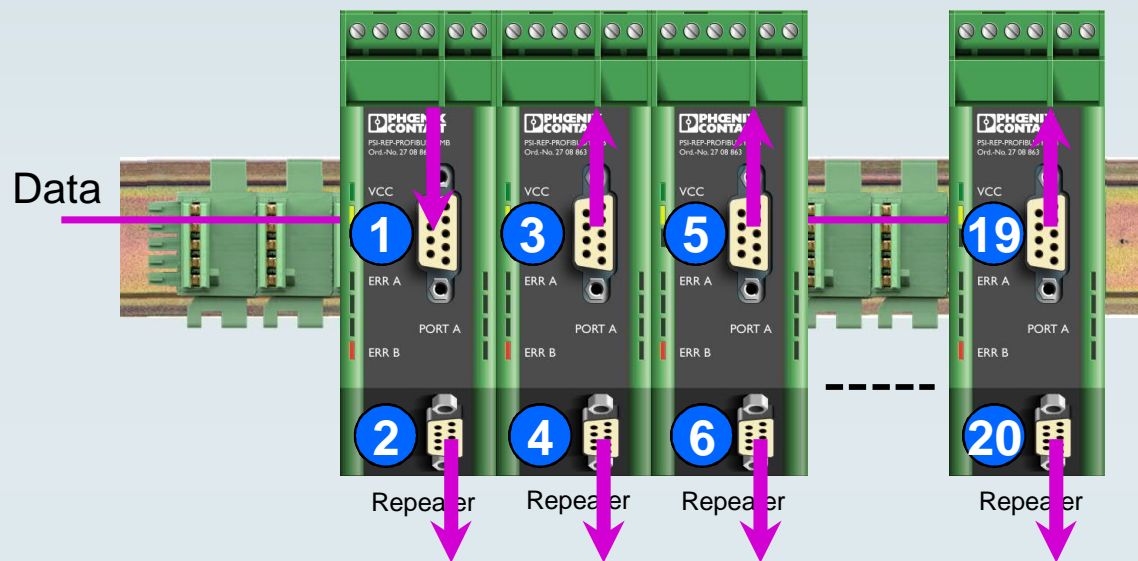
Up to 10 repeater can be connected via the T-Bus

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Modular station

24 V DC

Modular station setup

T-Bus connector

Data

Power

Power supply Repeater Repeater Repeater Repeater

Up to 10 repeater connected over the T-Bus

120-230 V AC

„Hot swappable"

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Repeater – Potential segmentation

Repeater

Potential segmentation

Repeater

Segment 1

Segment 2

Segment 2

Segment 3

Galvanic isolation

Galvanic isolation

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Fiber optic converter

- Permanent monitoring of the fiber optic signal quality (*Worldwide unique*)

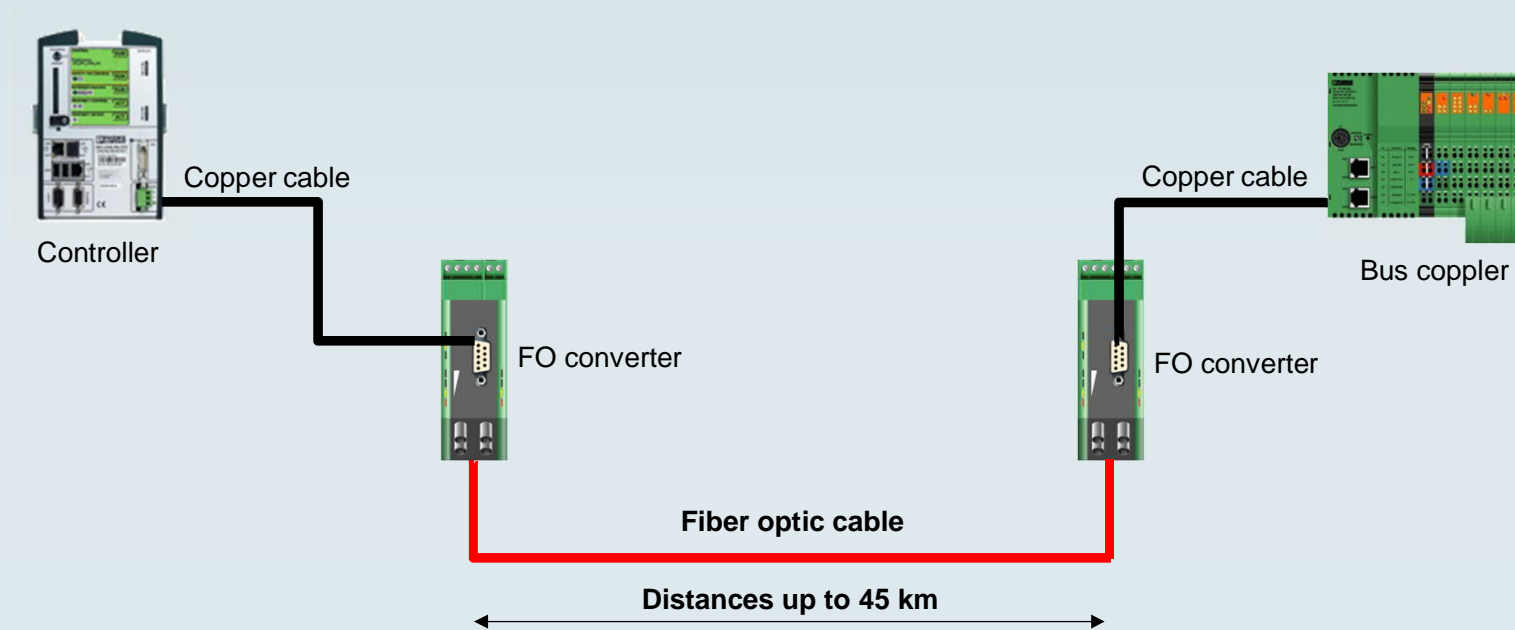- Long transmission distances up to 45 km

- Topologies: Point-to-Point, Star, Line, Ring

- Modular station

- Resistant against electromagnetic interferences (EMI)

Fiber optic converter - Distance

Controller

Copper cable

FO converter

Copper cable

Bus coppler

FO converter

Fiber optic cable

Distances up to 45 km

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Fiber optic converter - Topologies
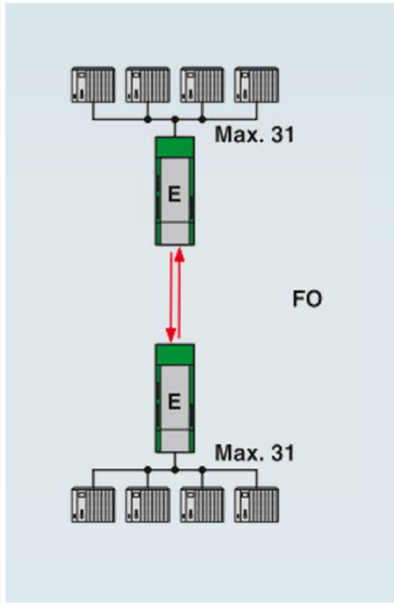
Point-to-Point
connection
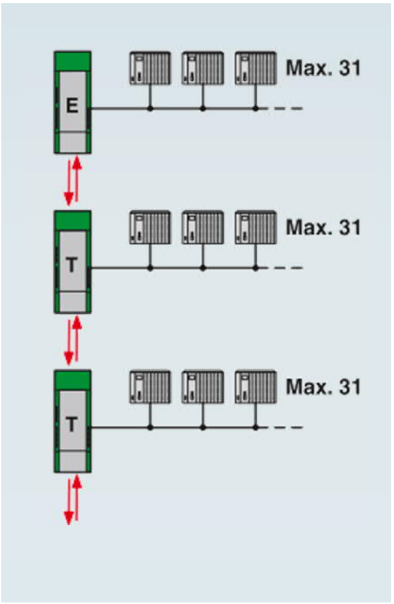
Linear structure
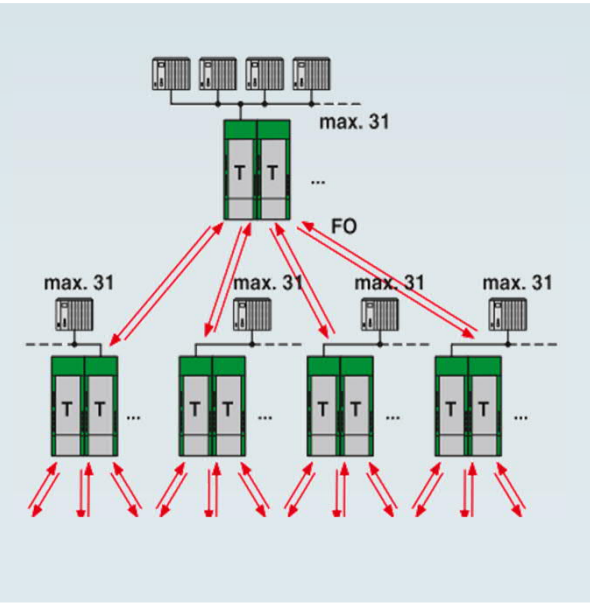
Star & Tree structure
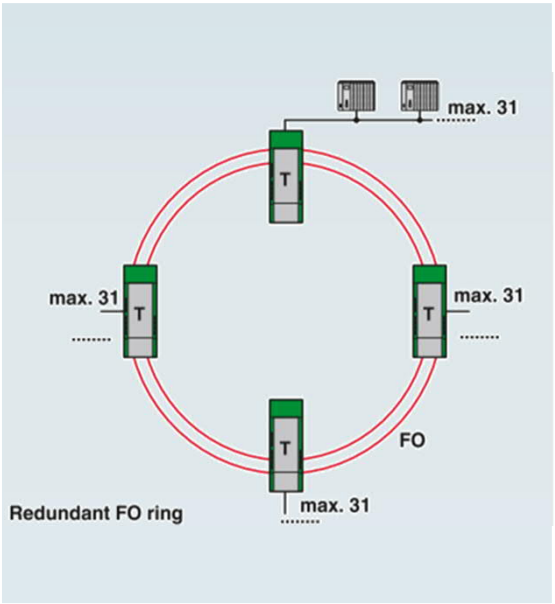
Redundant ring

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

Fiber optic converter – Modular station

24 V DC

Modular station setup

T-Bus connector

Data

Power

"Hot swappable"

Power supply

120-230 V AC

FO converter

FO converter

FO converter

FO converter

Up to 10 converter connected over the T-Bus

PHŒNIX CONTACT
INSPIRING INNOVATIONS
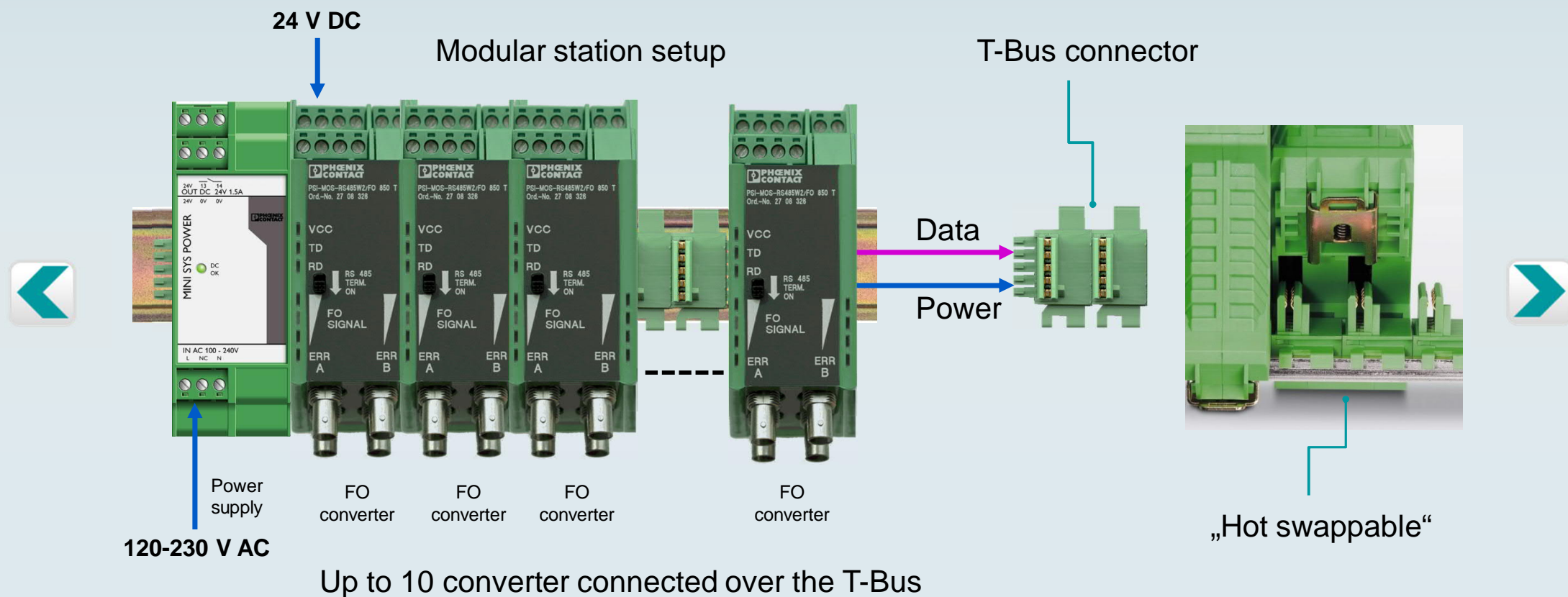
Fiber optic converter – Modular station

Diagnosis without PLC possible!

Fiber optic
cable
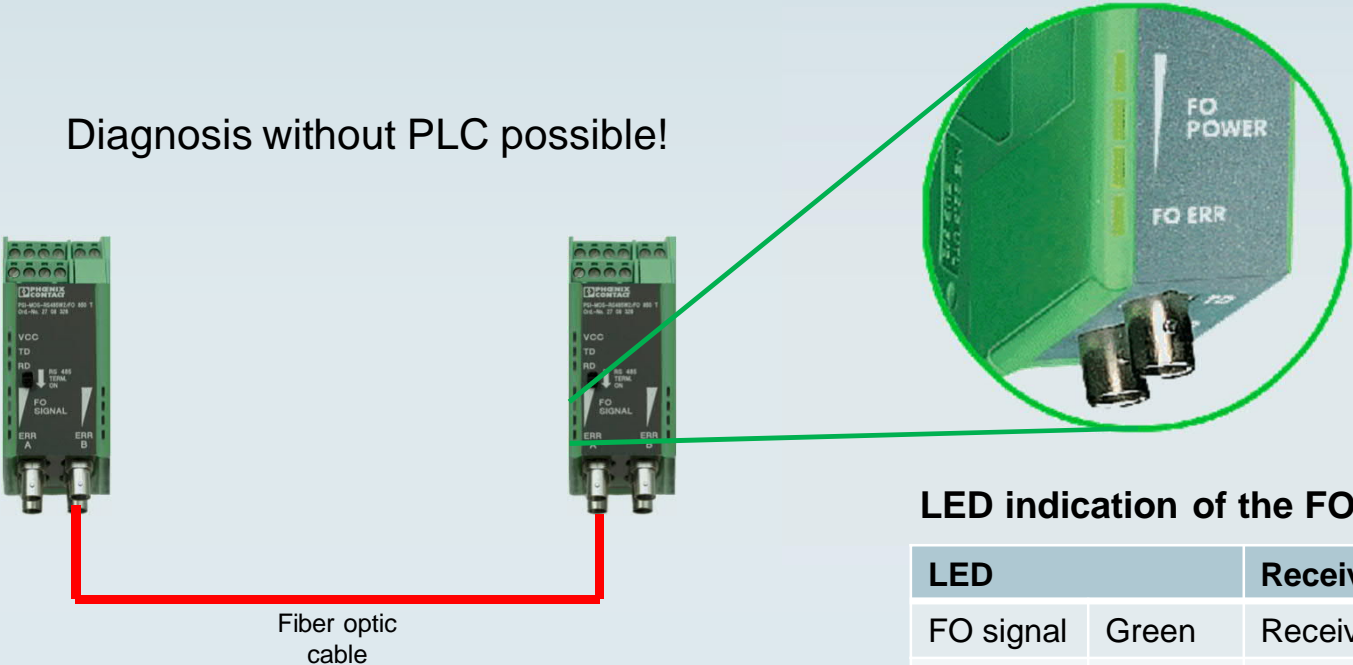
LED indication of the FO interface:

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

	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

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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Extender – Serial & PROFIBUS
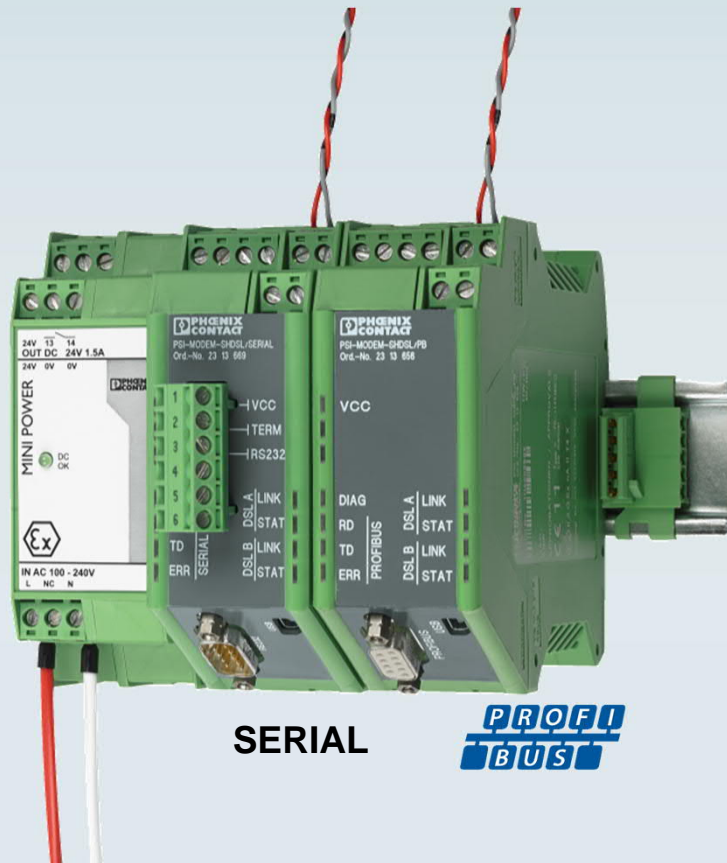
SERIAL

- 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

Extender - PROFIBUS

Supply voltage
24 V DC

2 Switching
digital outputs

D-SUB 9-plug

DSL port A

DSL port B

Status and
diagnostic LEDs for
DSL ports
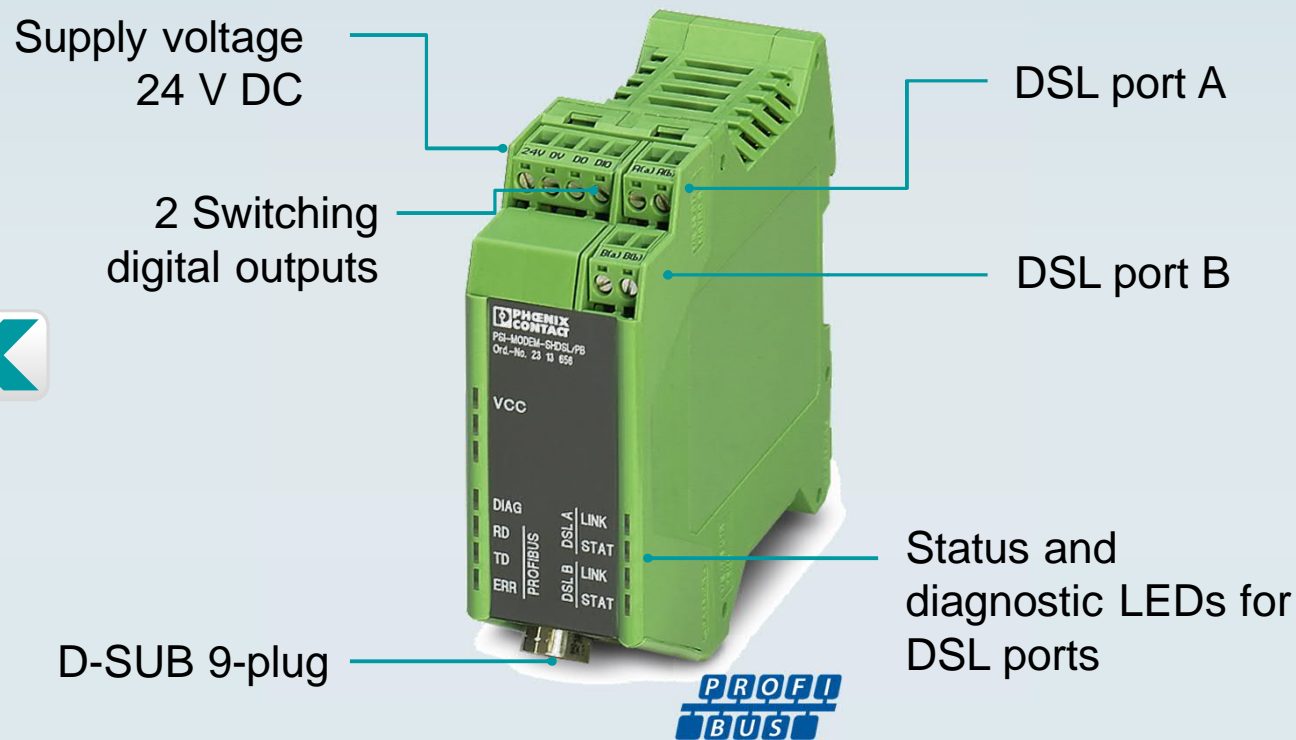
- PROFIBUS bus segments on existing on-site lines

- 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Extender – PROFIBUS

Example:

2-/4-wire cable

Up to 20 km

PLC

Profibus
Master

Profibus
Extender

Profibus
Extender

Axioline
Profibus bus coupler

Extender – PROFIBUS

Topologies:
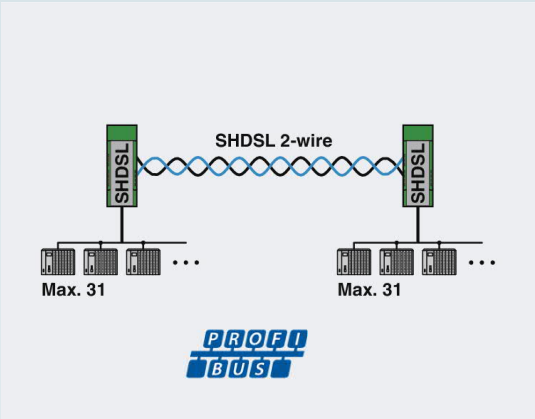
Point-to-Point
2-wire

PROFIBUS data rate for point-to-point
is up to 1,5 Mbps
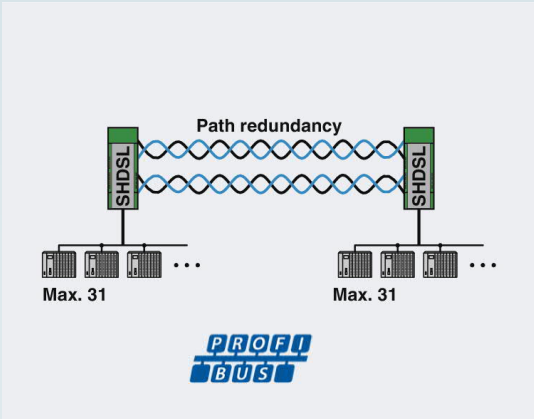
Point-to-Point
4-wire
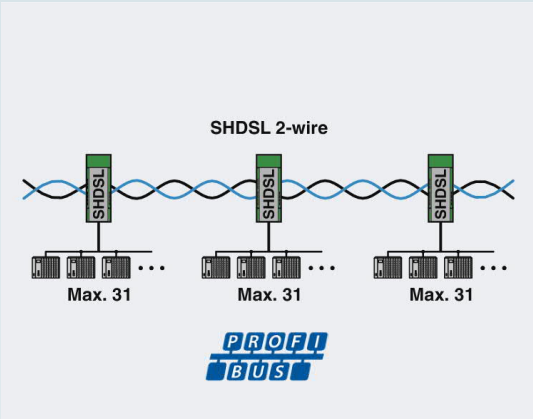
Line
2-wire

PROFIBUS data rate for linear
structure is up to 500 kbps

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Extender - Serial

Supply voltage
24 V DC

2 Switching
digital outputs

RS-422 / RS-485
(Combicon plug)

RS-232 (9-pos. D-SUB)

DSL port A

DSL port B

Status and
diagnostic LEDs for
DSL ports
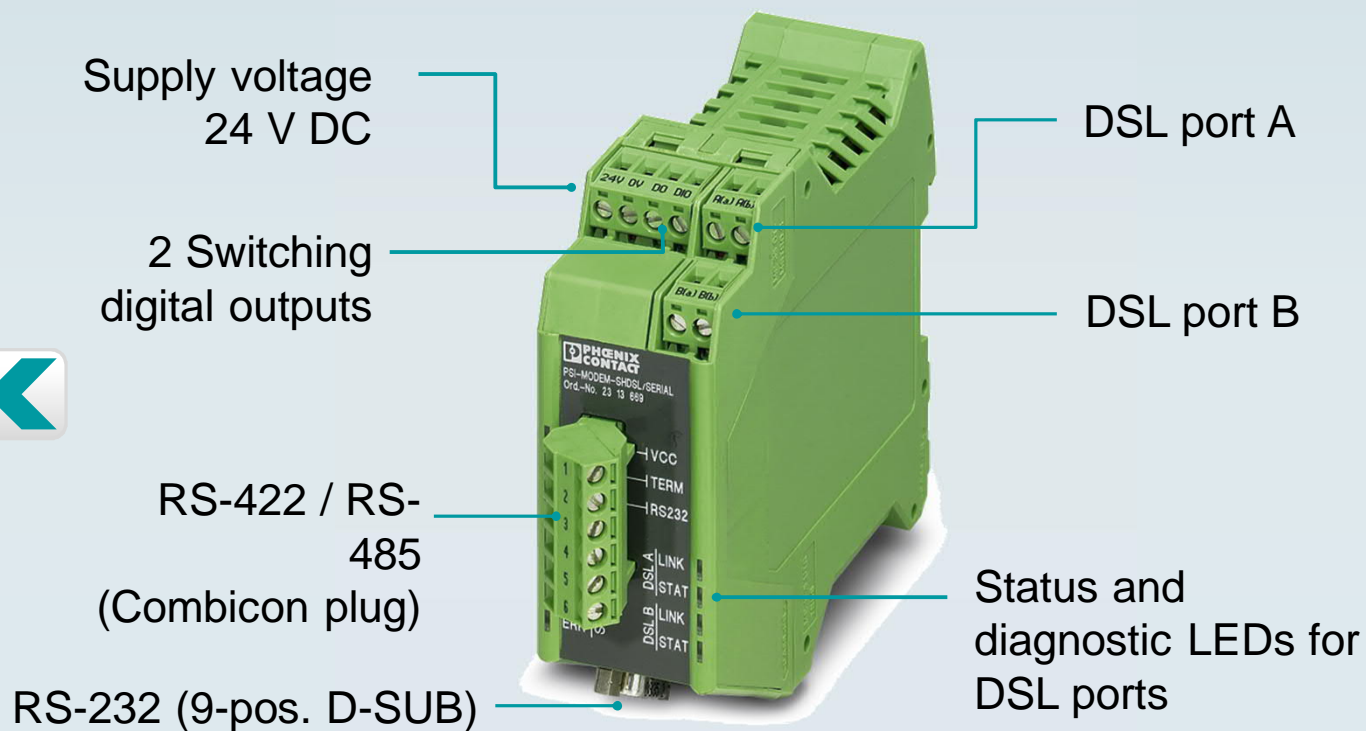
- Distances up to 20 km

- 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
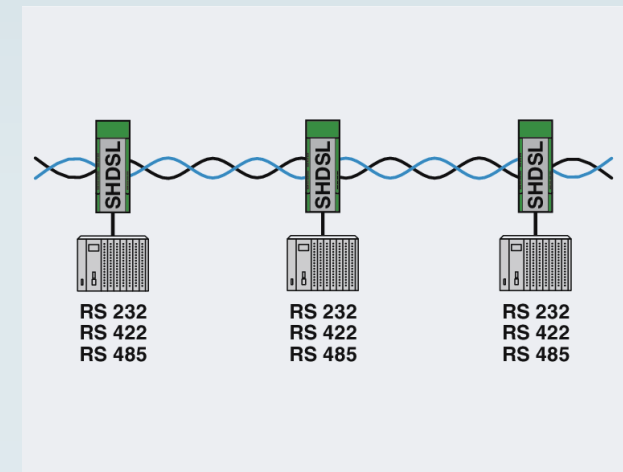
- Configuration software

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Extender – Serial

Topologies:
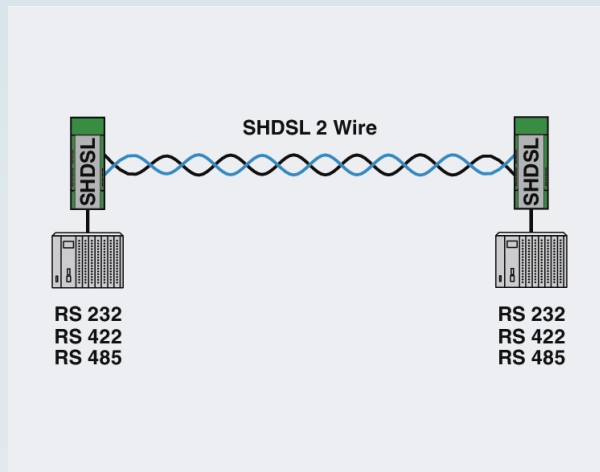
Point-to-Point
2-wire

Point-to-Point
4-wire

Line
2-wire

PHŒNIX CONTACT
INSPIRING INNOVATIONS
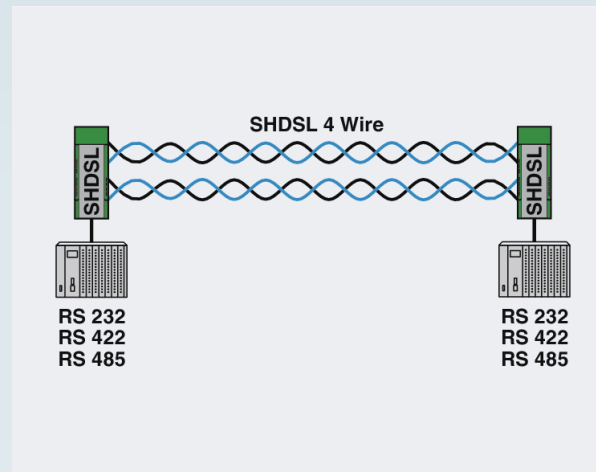
Extender – Serial and PROFIBUS
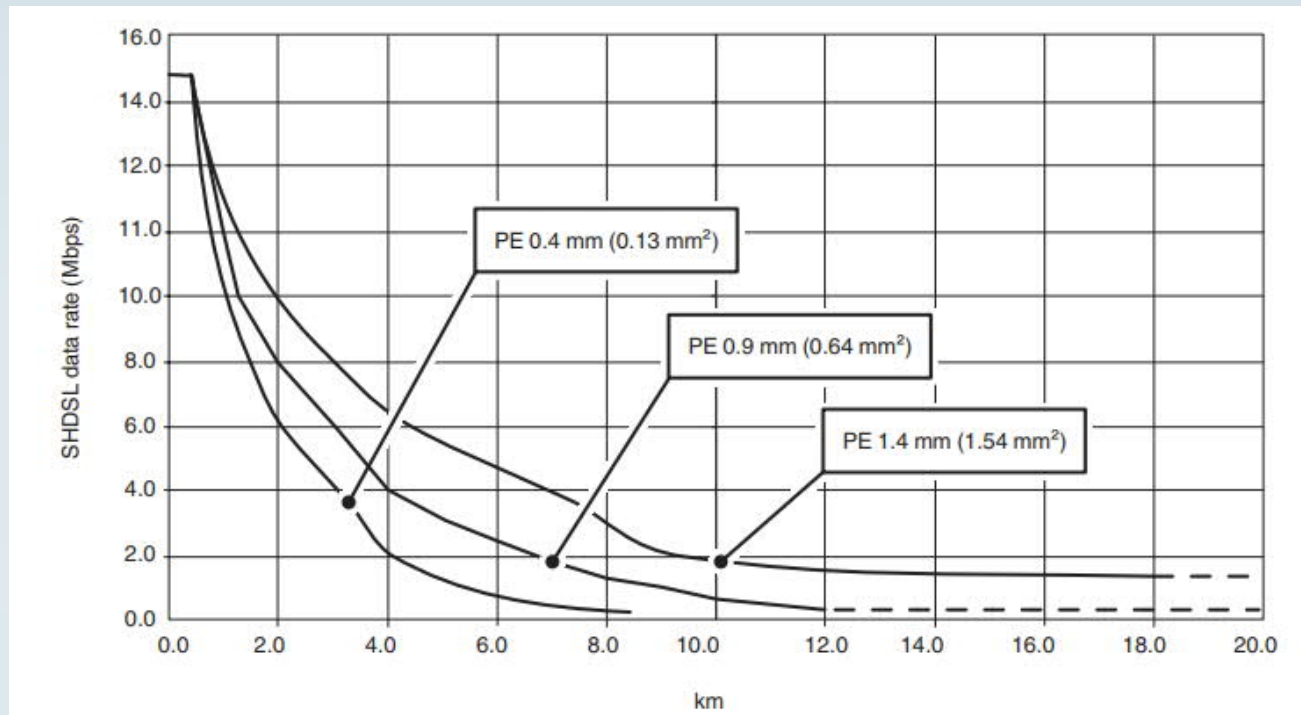
Dependency of the maximum SHDSL data rate (Mbps) on the distance for a 2-wire connection

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

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°

PHŒNIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors

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

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

i **Specifically for PROFIBUS**

i **Specifically for CANopen**

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

i **Stripping tool** for PROFIBUS cable

i **Termination resistor** included

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

D-SUB connectors – Termination resistor

Termination resistor inside

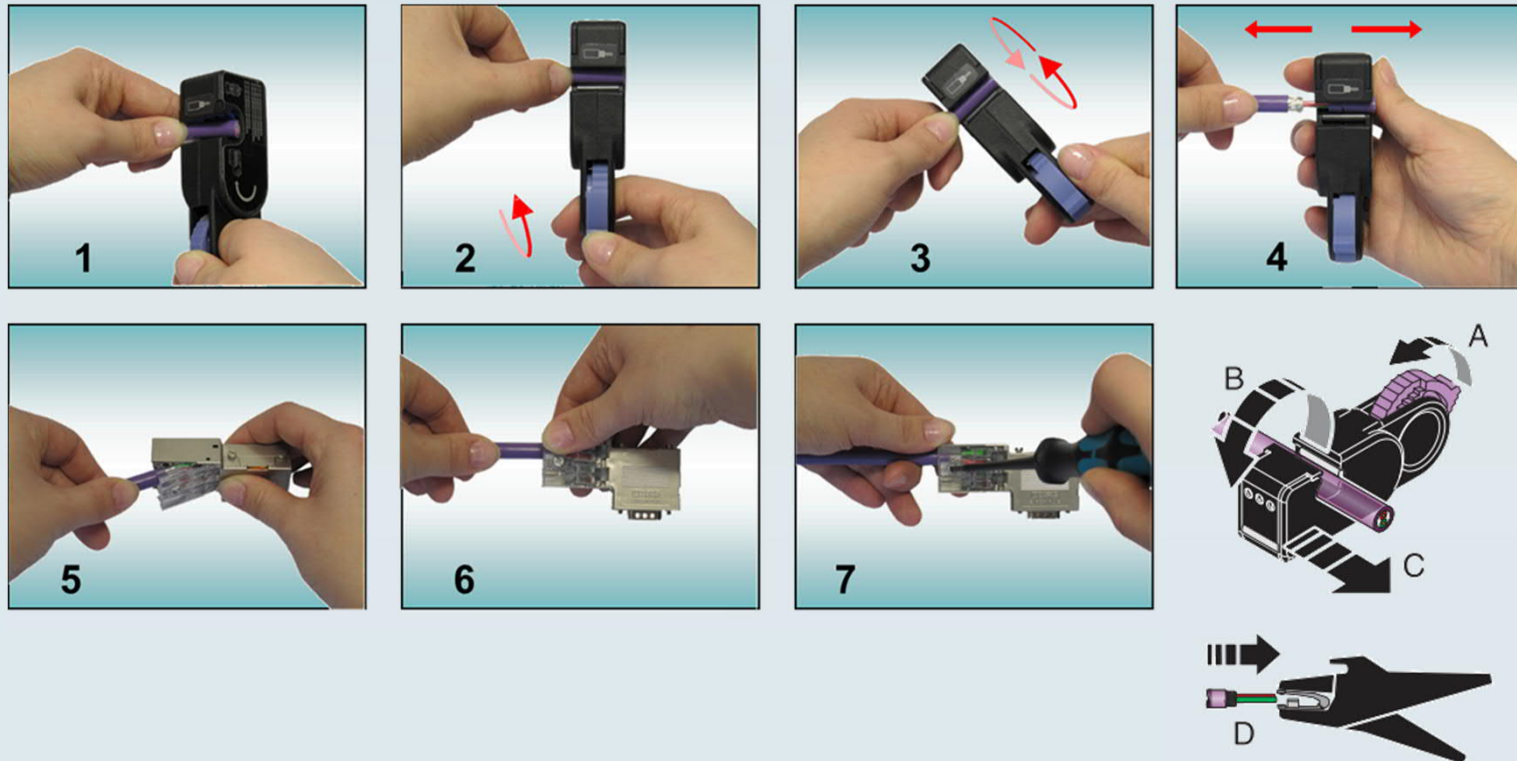Slide switch to active the termination resistor
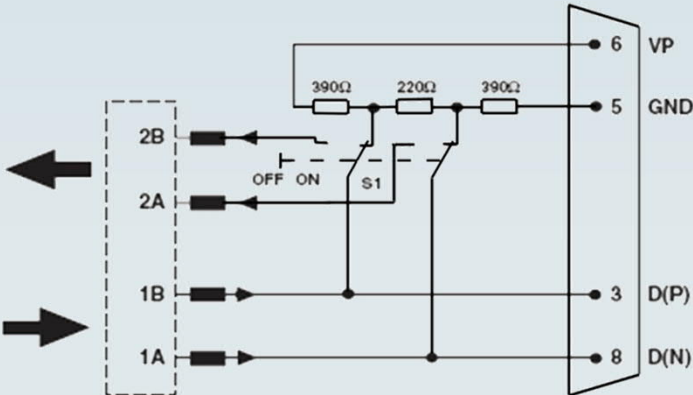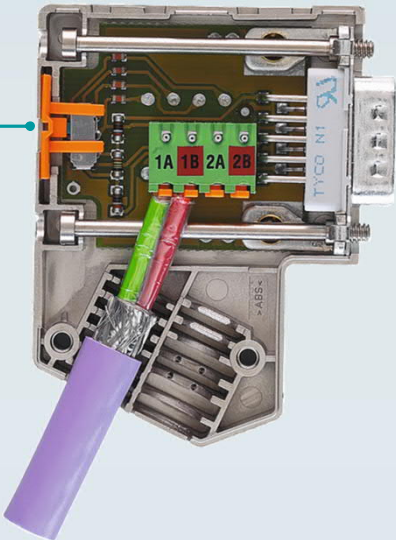
OFF
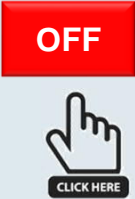
ON

CLICK HERE

PHŒNIX CONTACT
INSPIRING INNOVATIONS

D-SUB connectors – Termination resistor

D-Sub connector

ON   OFF   OFF   OFF   OFF   ON

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
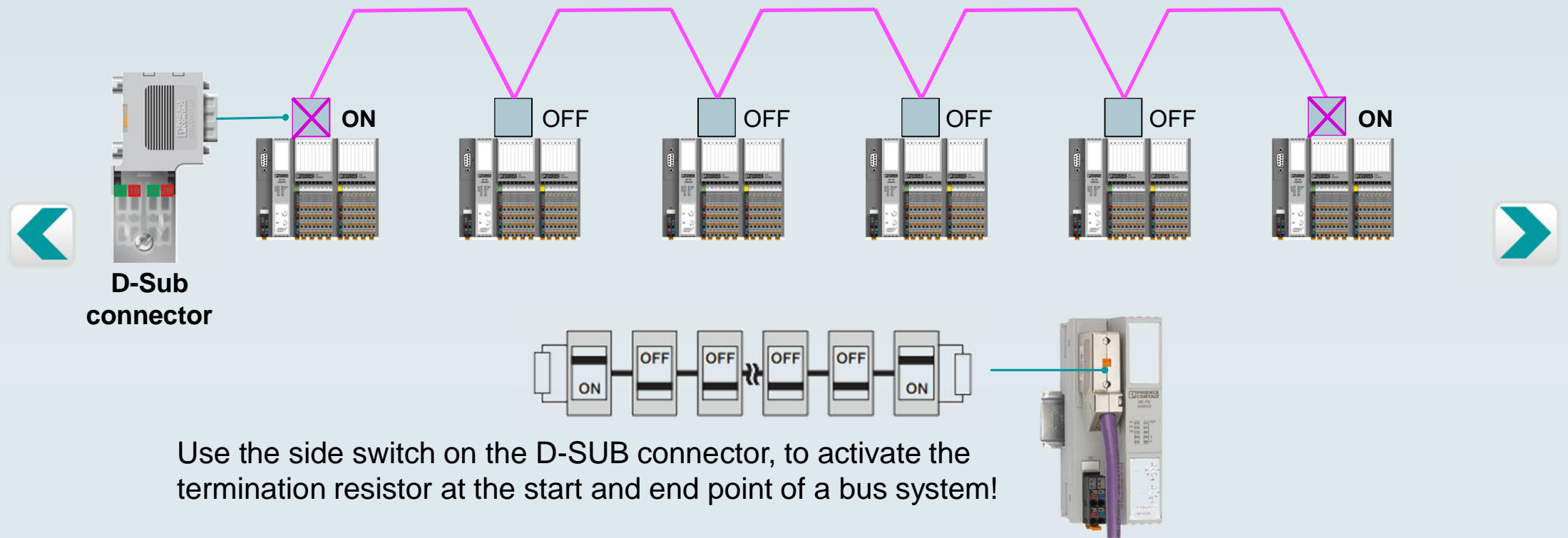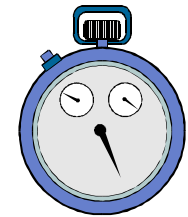
Stripping tool

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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

D-SUB fast connectors M12

SPEEDCON LOCKING

- **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

PROFI BUS   CANopen

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

D-SUB plug with M12 SPEEDCON – Termination resistor

M12 Termination resistor

M12 Termination resistor

INSPIRING INNOVATIONS
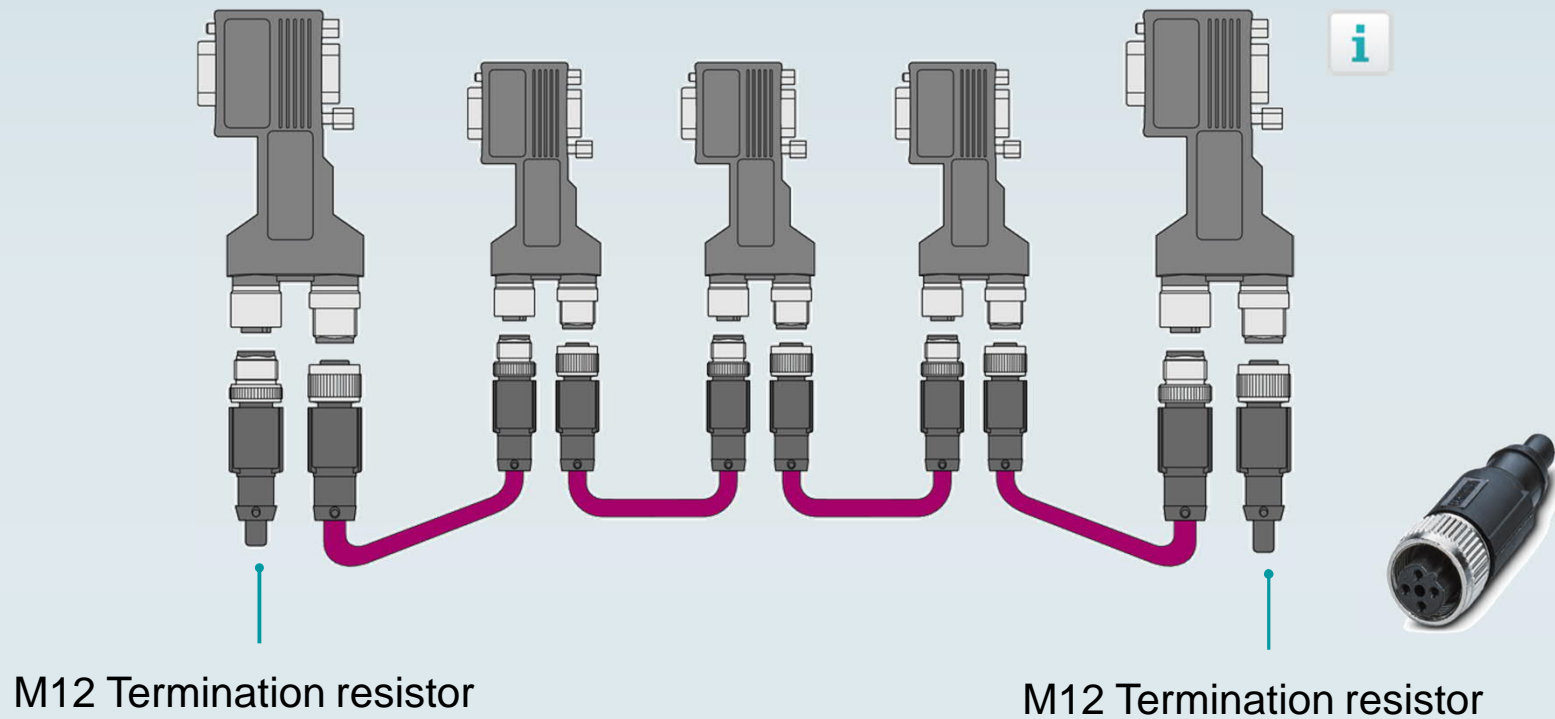
D-SUB fast connectors M12

		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

PHŒNIX 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

PHŒNIX 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	-

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	-

PHŒNIX 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

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 assignemnt 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Radioline Multipoint Multiplexer

I/O-Mapping via 2-wire-cables

I/O's

I/O's

2-wire cable

i Multipoint multiplexer (I/O to I/O)

i Multipoint multiplexer and Wireless

i Modbus RTU slave (I/O to serial)

i Modbus RTU slave and Wireless

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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
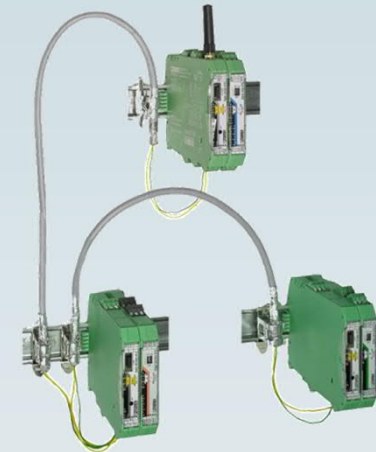
Intermedia communication
Wireless and wired modules form a combined system.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX 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

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

RS-485

MODBUS/RTU - RS-485

Product overview

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

FOUNDATION Fieldbus Power
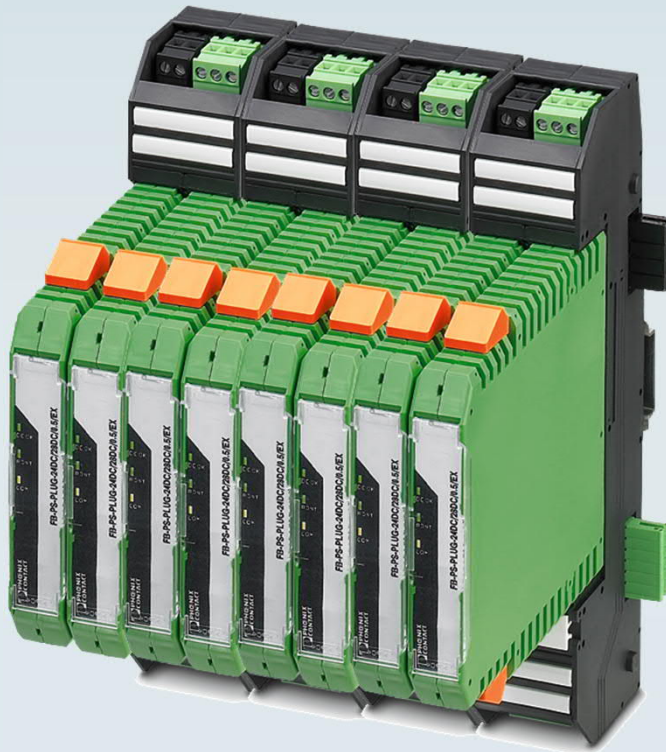
ACB TECHNOLOGY

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
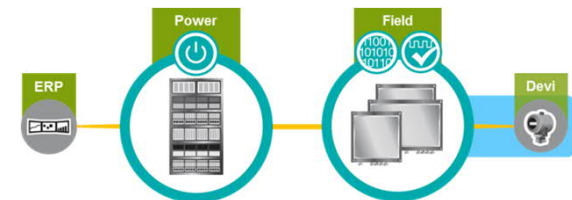
FOUNDATION Fieldbus Power
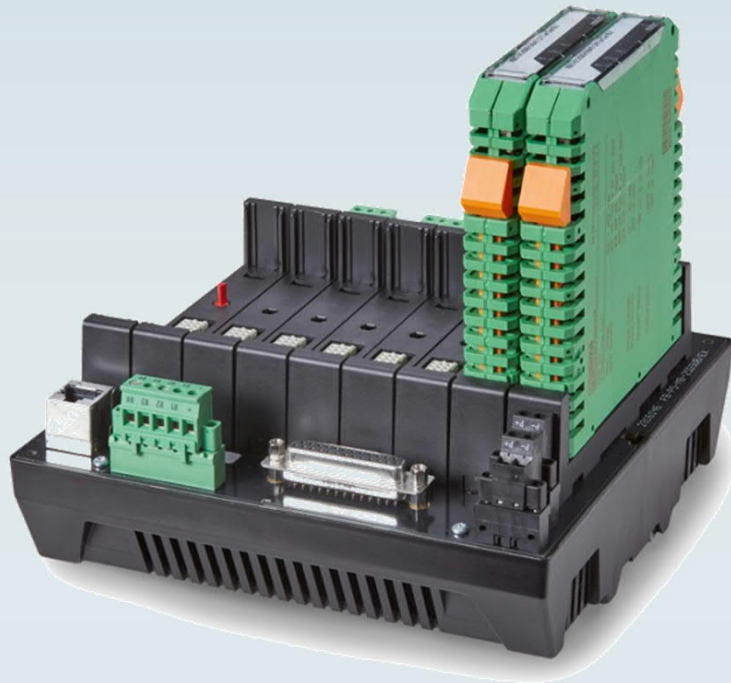
ISA G3 Harsh Severity Level tested

- 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)

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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 Provides 500 mA @ 28 V DC to couplers along the trunk.	Base for fieldbus power supply plugs. Provides redundancy when 2 plugs are installed. Redundancy is maintained across multiple bases via internal power buses. Additional internal bus provides remote indication.	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
Order number	2316132	2316145	2316146	2316148	2316149	2316226	1793260

PHŒNIX 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.
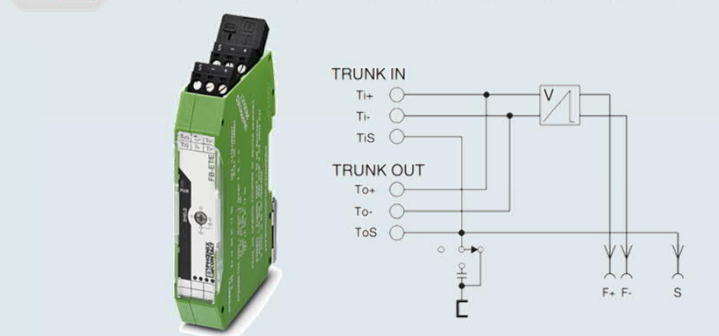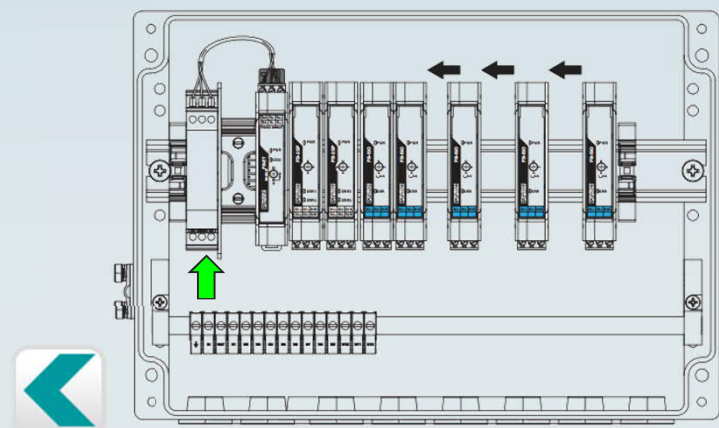
Fieldbus Device Couplers

FB-ET/E

FB-2SP/E

FB-ISO

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

Description	FB-ET/E	FB-2SP/E	FB-2SP/24DC	FB-ISO	FB-DIAG/FF/LI	FB-DIAG/FF/NC
	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

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

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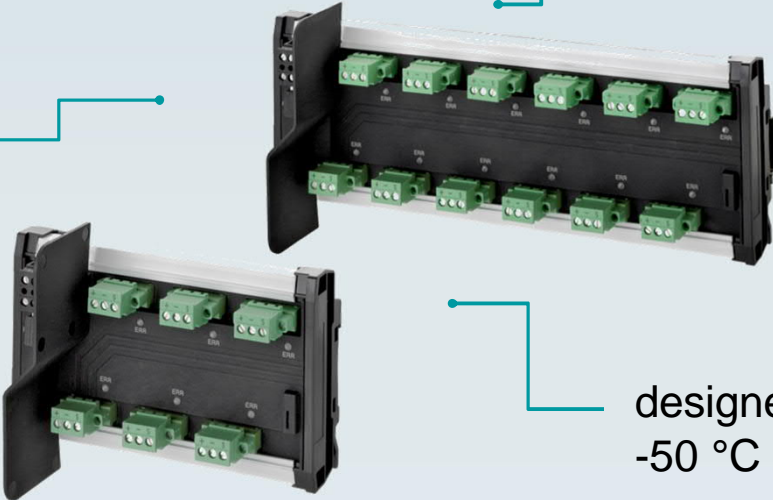
designed for ambient temperatures of
-50 °C to +90 °C.

ISA G3 Harsh Severity Level tested

PROFI BUS PA

Product
overview

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

Zone 1 Installation

IP 30 Trunk cover

1 kilogram

2g Vibration
15g shock

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
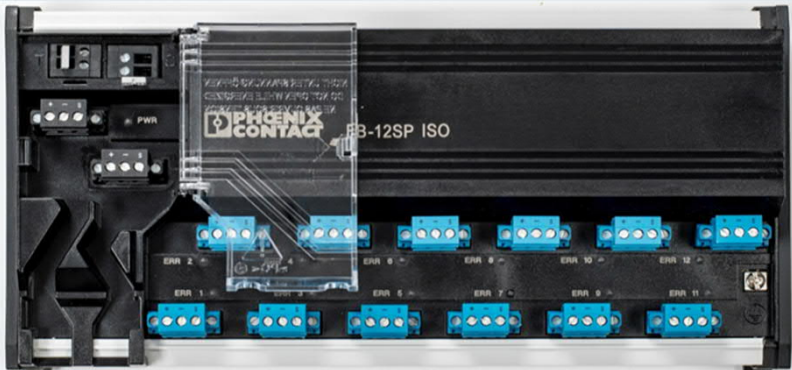
Fieldbus Device Couplers

	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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers – Terminal box

Enclosure Solution for Zone 2 / Division 2

Grounding Lug

316 Stainless Steel

Removable Hinges

6 and 12 channel

Pad lock capable

Available with Terminal blocks or Surge base for Trunk Connection

Single piece gasket – IP66

ATEX, IEC Ex , Class 1 Div 2 System

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Profibus PA Exi Connection Solution

- FDT/DTM application
- Web server
- ProfiTrace
- Oscilloscope, etc

External Power supply for the PA voltage

PLC/DCS

Profibus PA

Zone 1

Hazardous Area **Zone 1/0**

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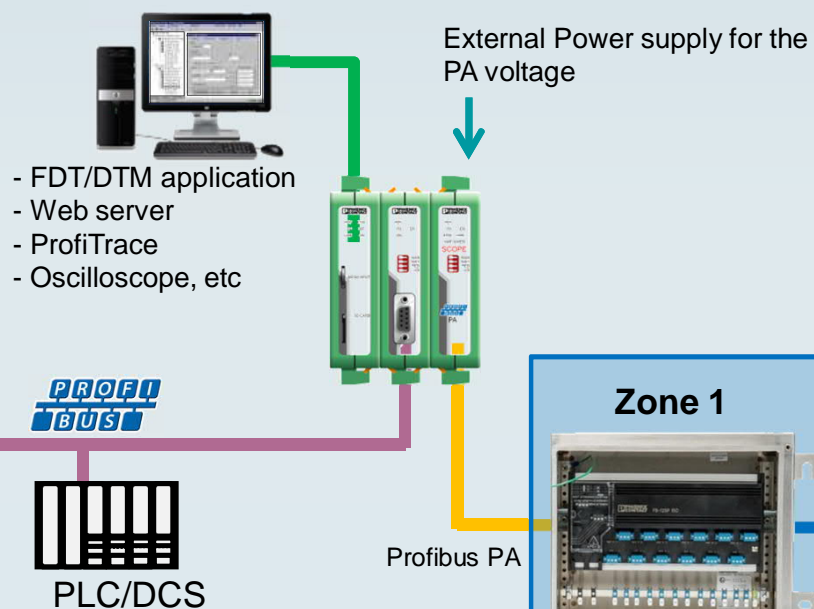
- 9.6 kbps .. **12 Mbps** on the PROFIBUS DP side
- Integrated PA termination
- Standard 500 mA PA current and up to 6A with power module
- Customizable PA voltage
- Maximum 9 modules (1 module for the PLC/DCS)
- Exi device connections using **FB-ISO coupler**

Product overview

PROFIBUS DP/PA Converter – Web-Based Management

Telegram Anaylsis

Signal Analysis

DC Analysis

Bar Graphs

FDT / DTM

Profi Trace

Product overview

PROFIBUS DP/PA Converter

Description	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

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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
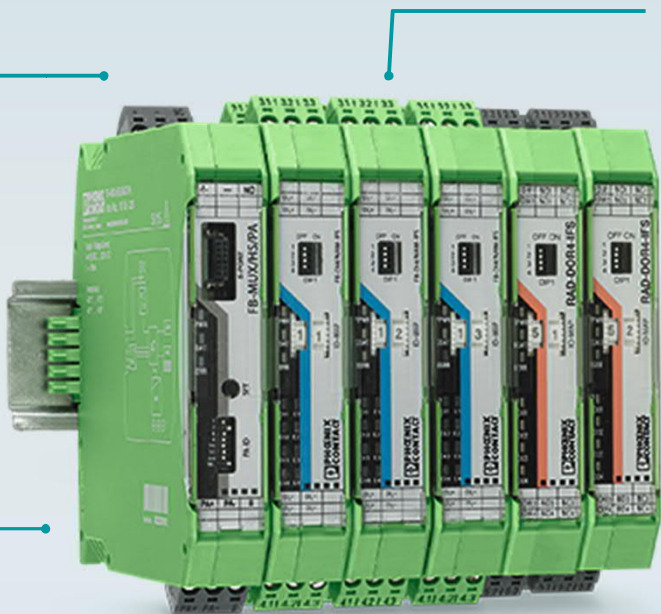
Profibus PA I/O Multiplexer

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

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

HART

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

PROFI BUS® DP

PROFI BUS® PA

Fieldbus Foundation

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

Ethernet Extender

Any medium

- 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Extender

Managed Ethernet Extender ℹ️

Status / diagnosis display ℹ️

Unmanaged Ethernet Extender ℹ️

Replaceable surge protection ℹ️

new

VLAN (virtually/logically separate IP networks) ℹ️
Firmware v5.xx or later

Remote diagnostics of all devices and paths ℹ️

Line, Star and Ring topologies are possible ℹ️

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Extender

Point-to-Point and Line network structure

Ethernet

Controler

Switch

Ethernet Extender

Central

2-or 4 wire
Leitung

Up to zu 20 km

Station 1

Ethernet Extender

Ethernet

Switch

Up to 20 km

Ethernet Extender

Station 2

Up to 20 km

Ethernet Extender

Station 3
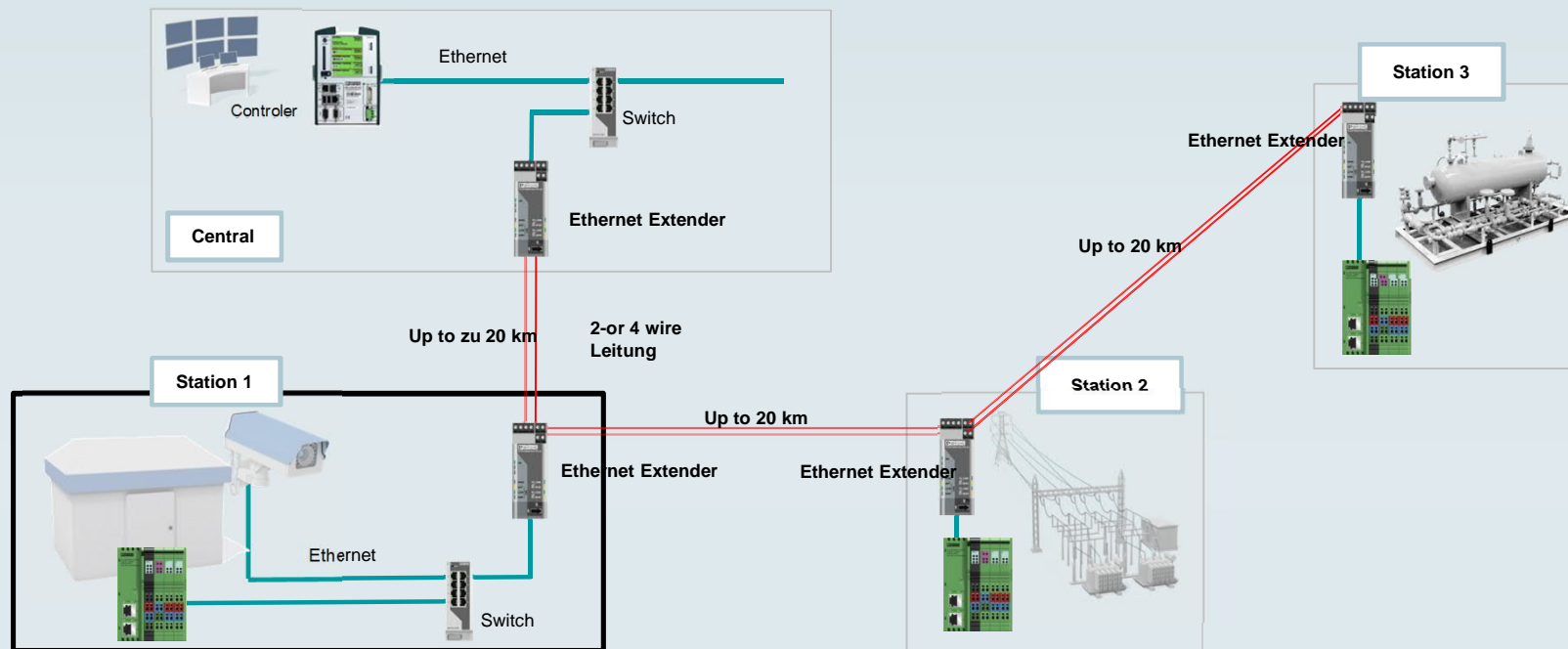
Product
overview

Ethernet Extender

Ring network structure

Ethernet

Controller

Switch

Ethernet Extender

Central

Redundant ring structure

Up to 20 km

Station 2

Ethernet Extender

Up to 20 km

2-wire

Station 1

Ethernet Extender

Up to 20 km

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Managed Ethernet extender

Integrated display

SD card slot

Replaceable
surge protection

4 Port Ethernet switch
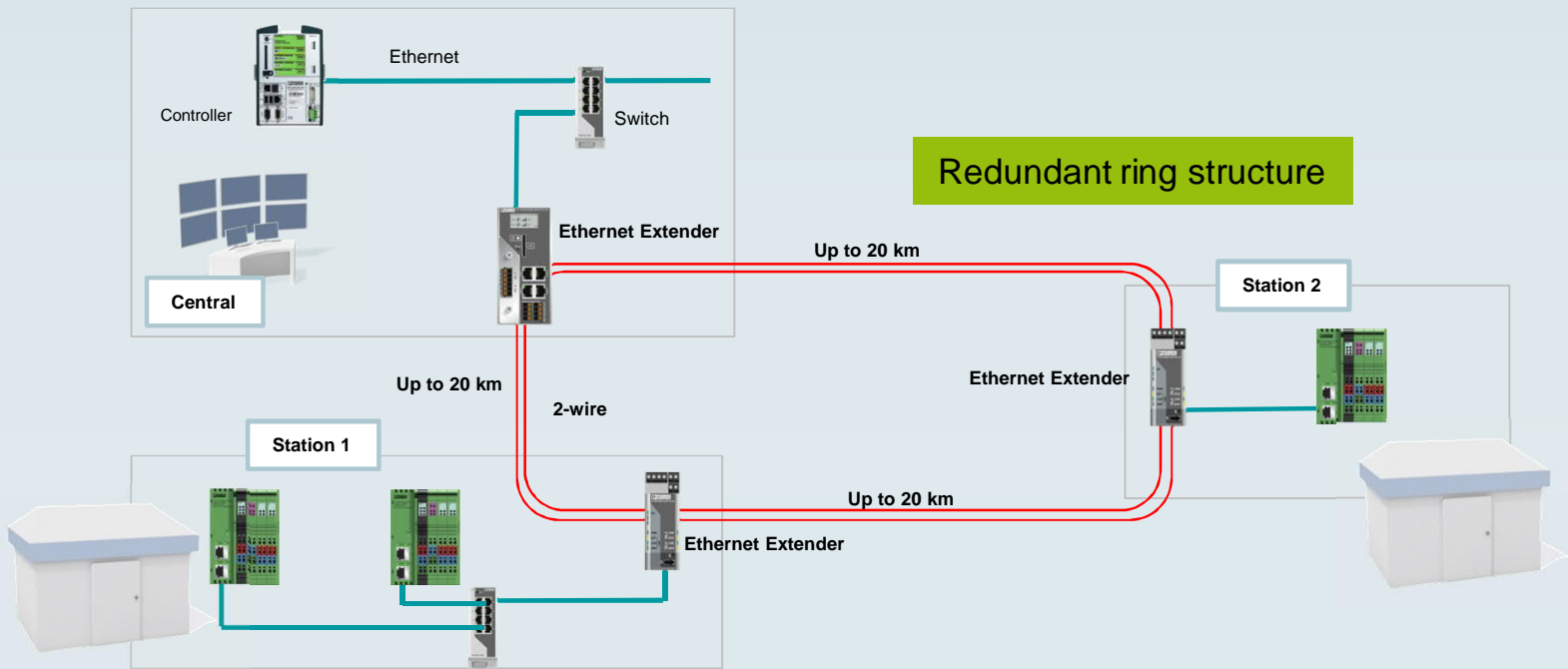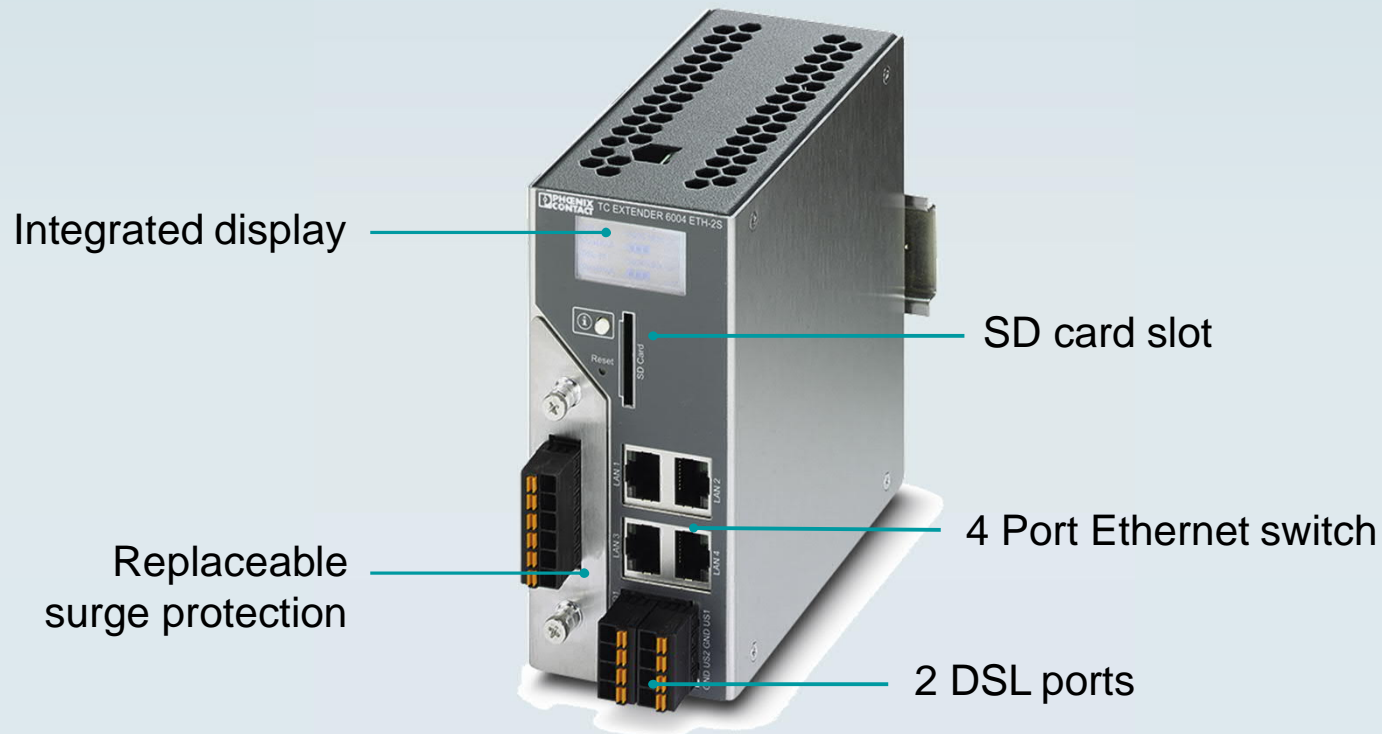
2 DSL ports

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Managed Ethernet extender

Status LEDs

SD card slot

Replaceable
surge protection

1 Ethernet port
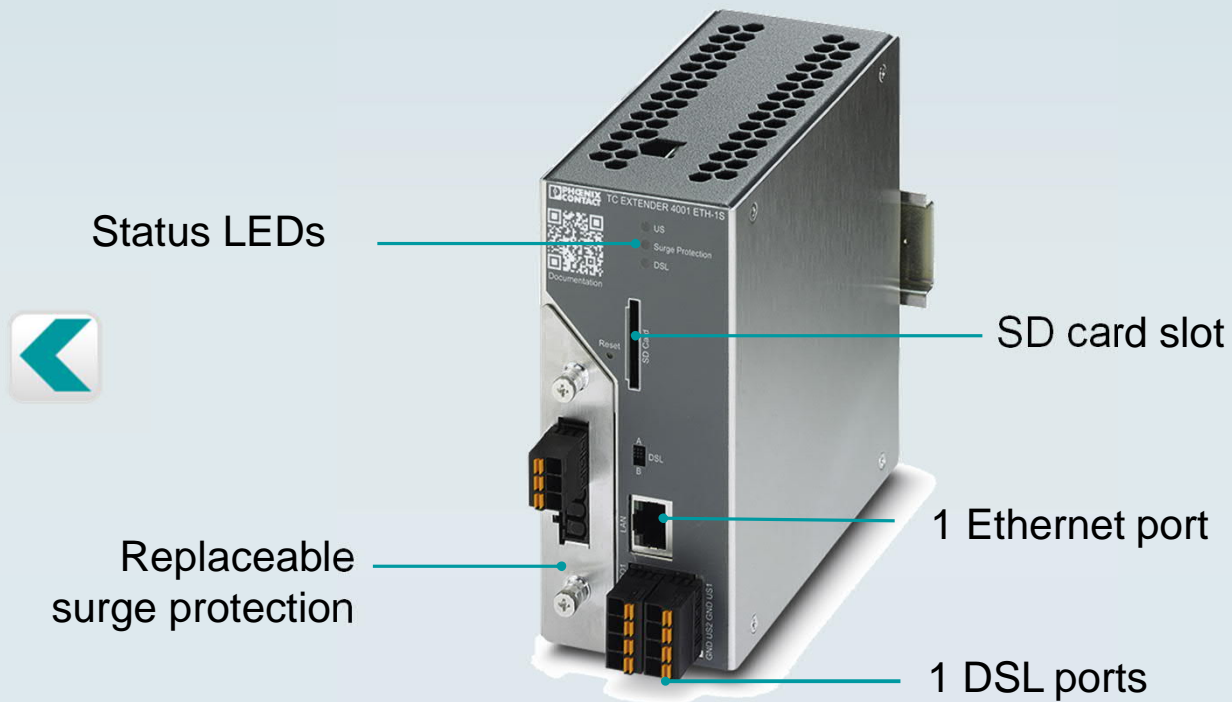
1 DSL ports

TC EXTENDER 4001 ETH-1S

- 1 DSL ports

- Topology: Point-to-Point

- Integrated surge protection

PHŒNIX 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

PHŒNIX 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
Remote device found	**Point-to-Point**	- Both outputs ⇒ low
Initialization	**Line**	**Protection module OK ⇒ OK**
Current data rate	**Redundant Ring**	
Current data rates		

Individually configurable via web server

Mode: Static
IP: 192.168.0.1
Mask: 255.255.255.0
Gateway: 192.168.0.1

Device name:
TC EXTENDER 6004 ETH-2S
Serial No.: 1894439434
HW: 98111
Master Fw: 4.03.00

Service & Support
Muster GmbH
Muster Str.1
Musterhausen
Deutschland
Mr. Mustermann
+49 171 123 456 789

2702258 / TC PT-IQ SHDSL

Product overview

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

Product overview

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
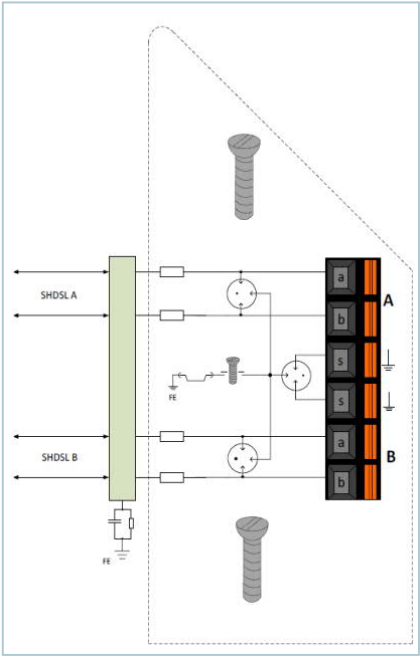
VLAN – Unmanaged extender

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"
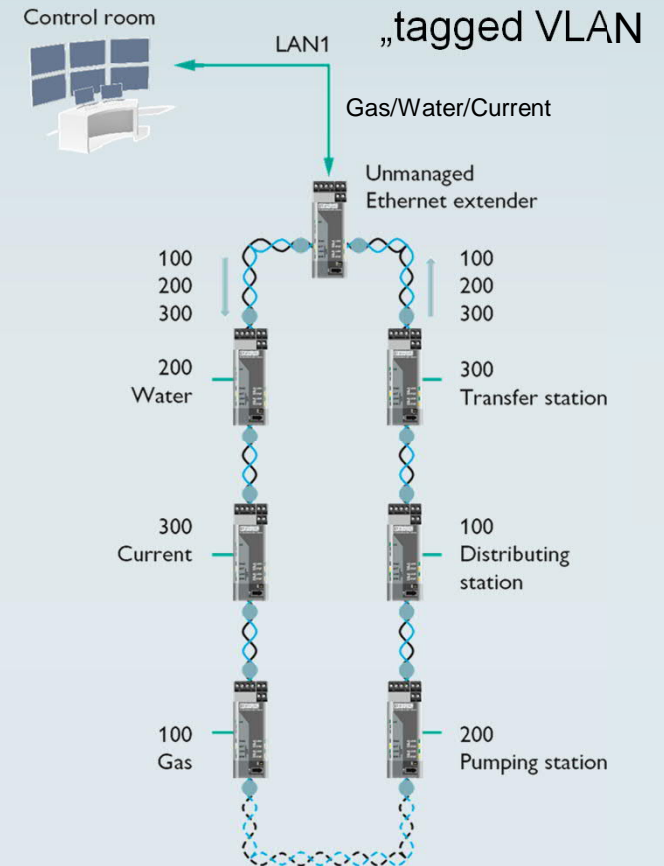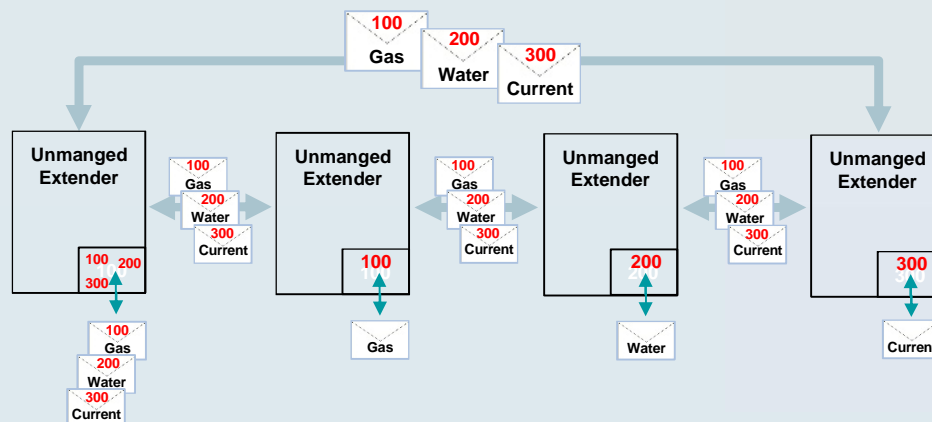
VLAN – Managed and unmanged extender

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"
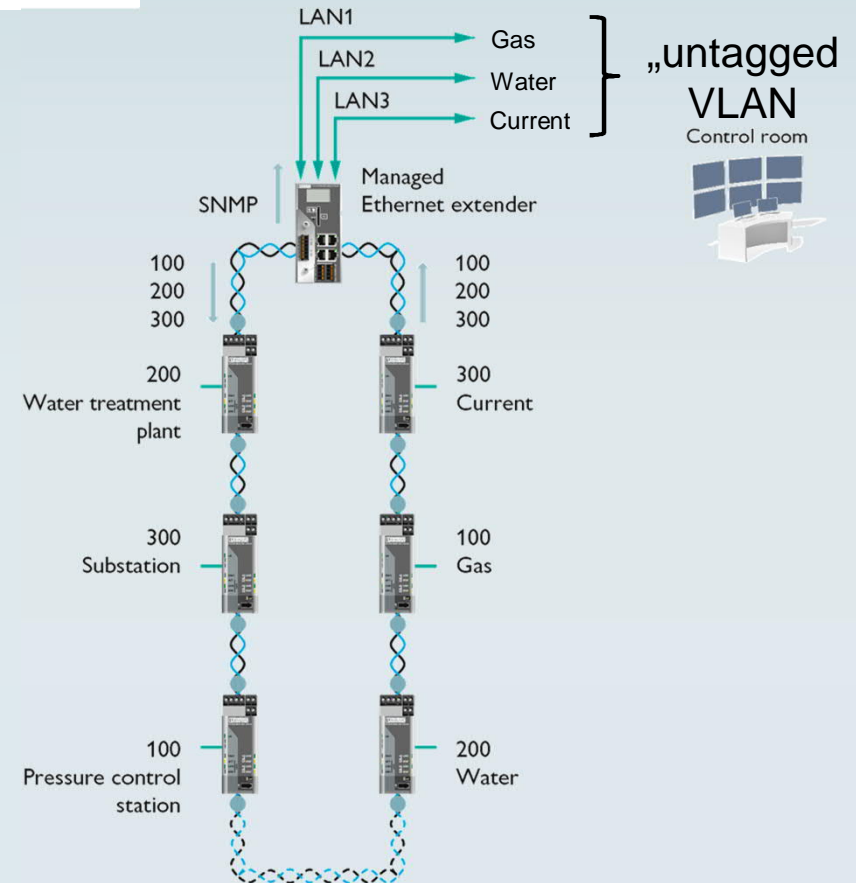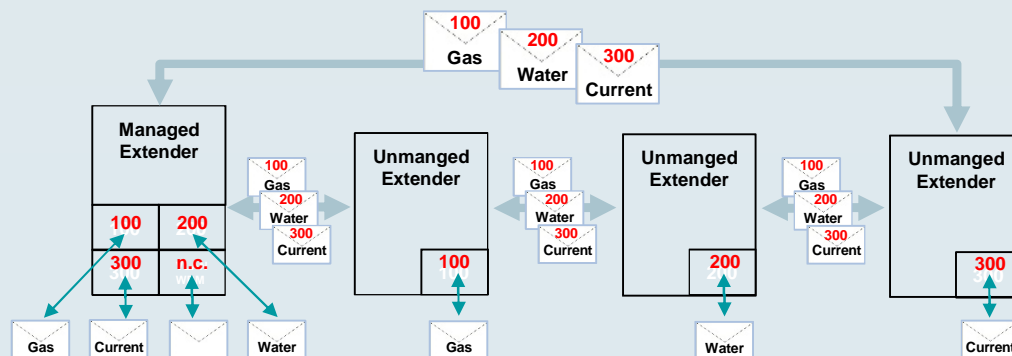
Extension of complex IT networks

	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	Replaceable surge protection module
Topologies	Ring, Line, Point-to-point	Point-to-point	Ring, Line, Point-to-point	Only for Ethernet extender 4001 ETH-1S (2702253)	Only for Ethernet extender 6004 ETH-2S (2702255)
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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Media Converter

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

very short delays (latency)

Maximum interference immunity,

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

approved for zone 2

PHŒNIX CONTACT
INSPIRING INNOVATIONS
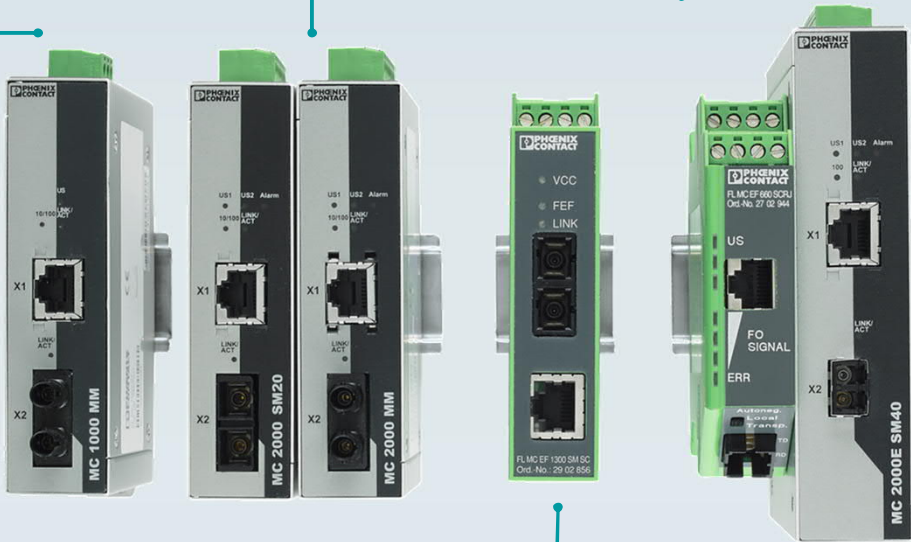
Ethernet Media Converter

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.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Media Converter WDM

Simplex LWL Faser

TX (1310 nm)   RX (1310 nm)
RX (1550 nm)   TX (1550 nm)

VCC
FEF
LINK

FL MC EF WDM-A SC
Ord.-Nr.: 29 02 658

FL MC EF WDM-B SC
Ord.-Nr.: 29 02 659
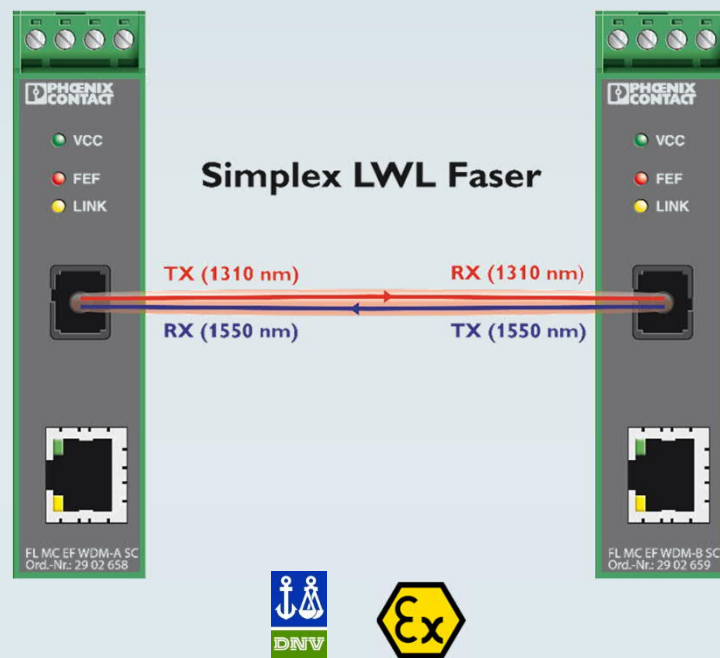
- Full duplex transmission via a single optical fiber

- 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Link Fault Pass Through (LFP)
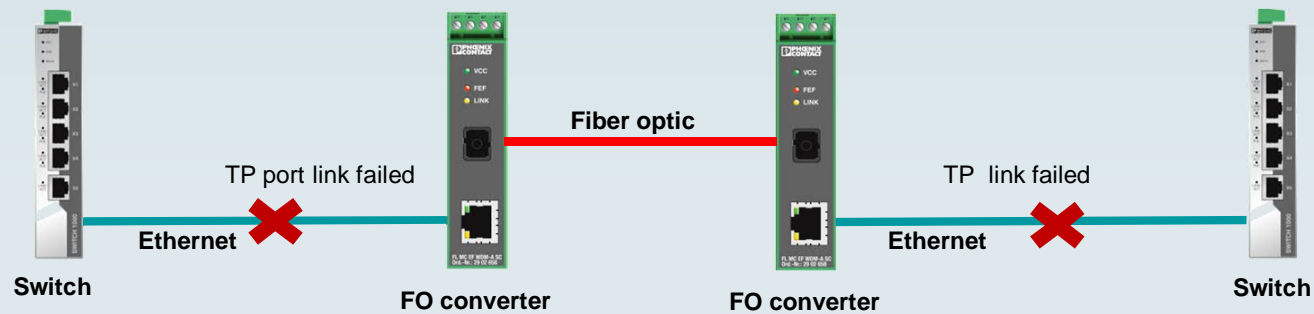
The LFP function provides permanent connection monitoring

- 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

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

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Patch panels

Terminal assignment for Ethernet ℹ️

Length for cable stripping ℹ️

Shield current detection ℹ️

Different connection technologies
- Screw
- Push-In
- IDC
- RJ45

Integrated surge protection

Covered cable installation

Cable shield contact spring
(shield contacting with strain relief) ℹ️

PHŒNIX CONTACT
INSPIRING INNOVATIONS
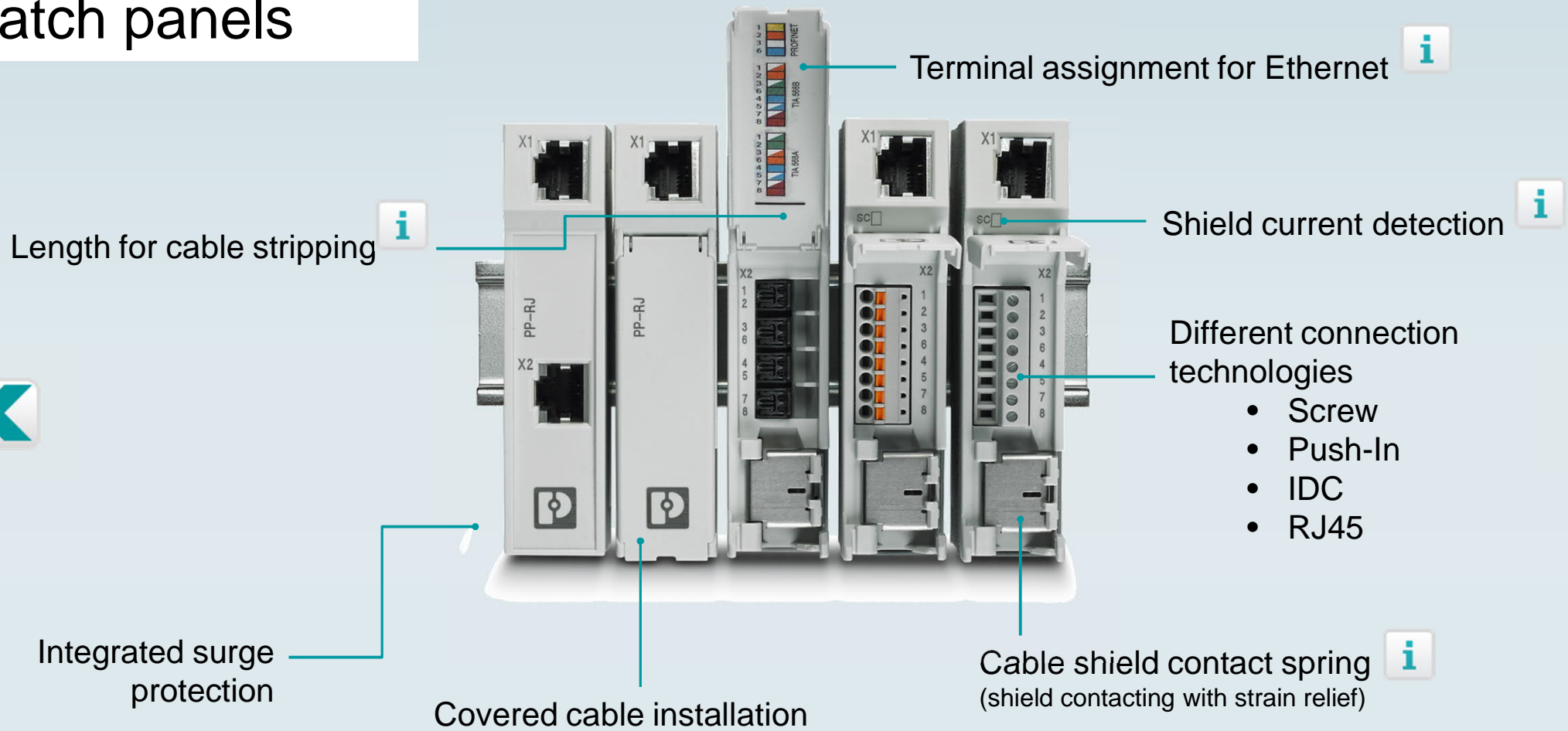
Patch Panel Application

Typical applications

Machine building –
switching cabinet pre-assembly

- Pre-assembly with patch cable

- Field cable installation on site
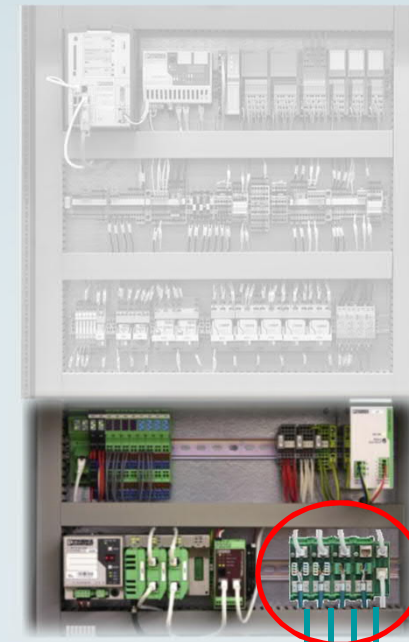
Patch Panel

Ethernet cable

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Terminal assignment

PROFINET

| 1 2 3 6 |

1	YE
2	OG
3	WH
6	BU

Ethernet

TIA 568 A

| 1 2 3 6 4 5 7 8 |

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

TIA 568 B

| 1 2 3 6 4 5 7 8 |

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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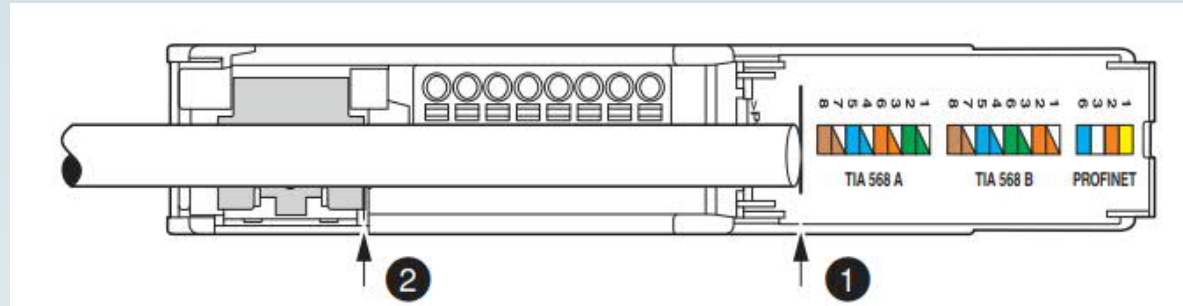
The edge off the shield contact spring indicates the correct length for stripping (5,5 cm)

Place the cable end on the marking line

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Shield current detection

Shield current detection
Indicated by LED

Patch panel

Potential differences

Generators/
Transformers

Inductive load/motor

Ethernet

PoE Injector

Ethernet+Power

Ethernet CATx

I_{shield} > 30 mA
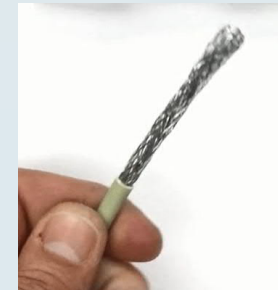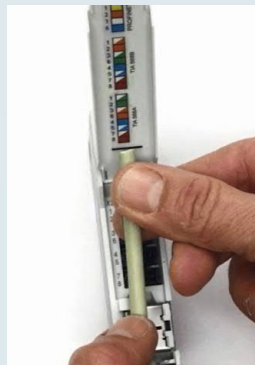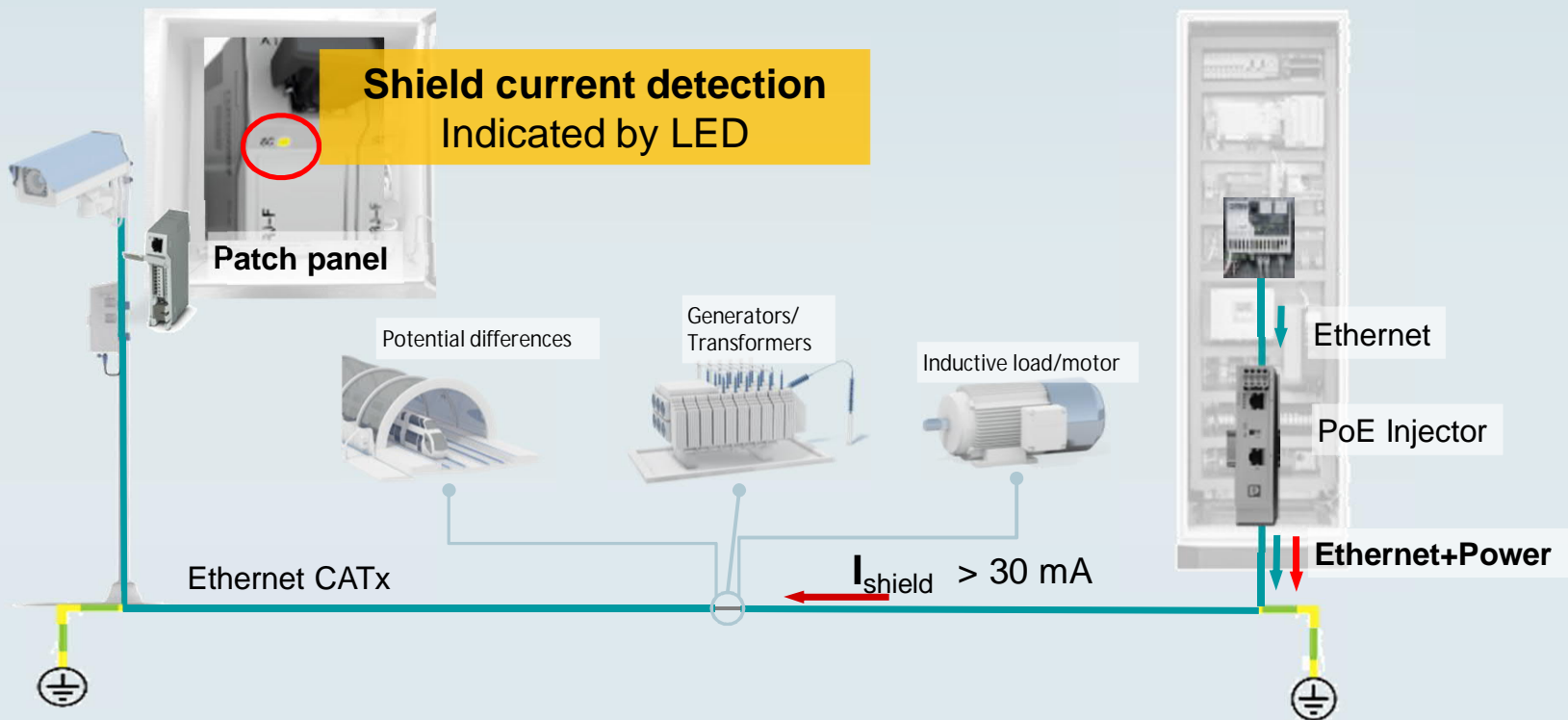
- If there are different potential references within an installation, equalization currents can flow via the cable shielding.

- LED (SC) lights up in the event of cable shield currents greater than +30 mA and less than -30 mA

PHŒNIX 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

PHŒNIX 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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Power over Ethernet Injectors

Surge protection and shield current monitoring on the field cable side

Multiple connection technologies and covered wiring space

Different performance standards and electrical isolation

Tool-free shield connection

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Power over Ethernet Injectors

Camera

Power

PoE Injector

Ethernet

Save installation costs

Power over
Ethernet
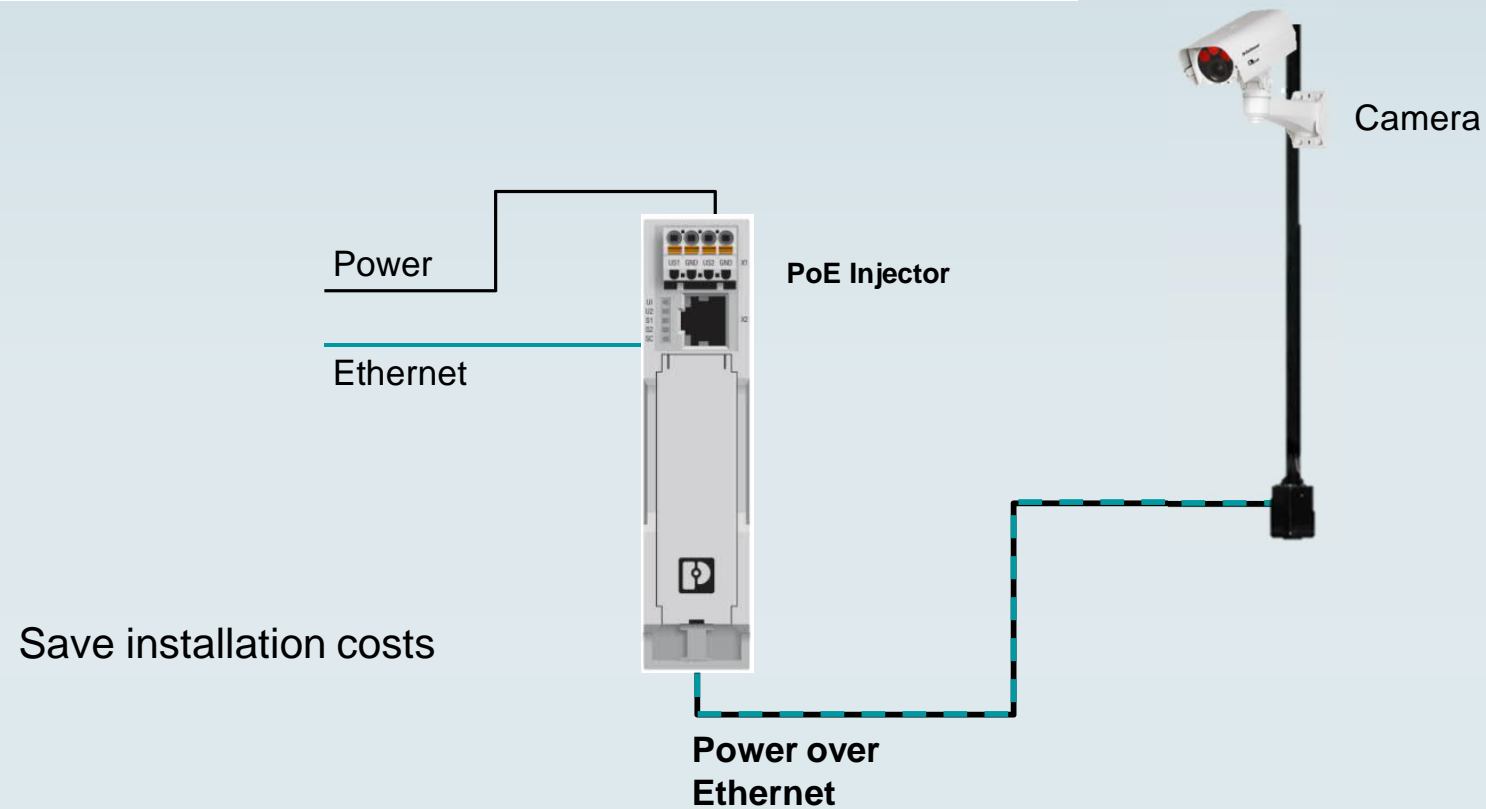
Product
overview

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

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Multiple connection technologies

RJ45   Push-in

Multiple connection
technologies and
covered wiring space

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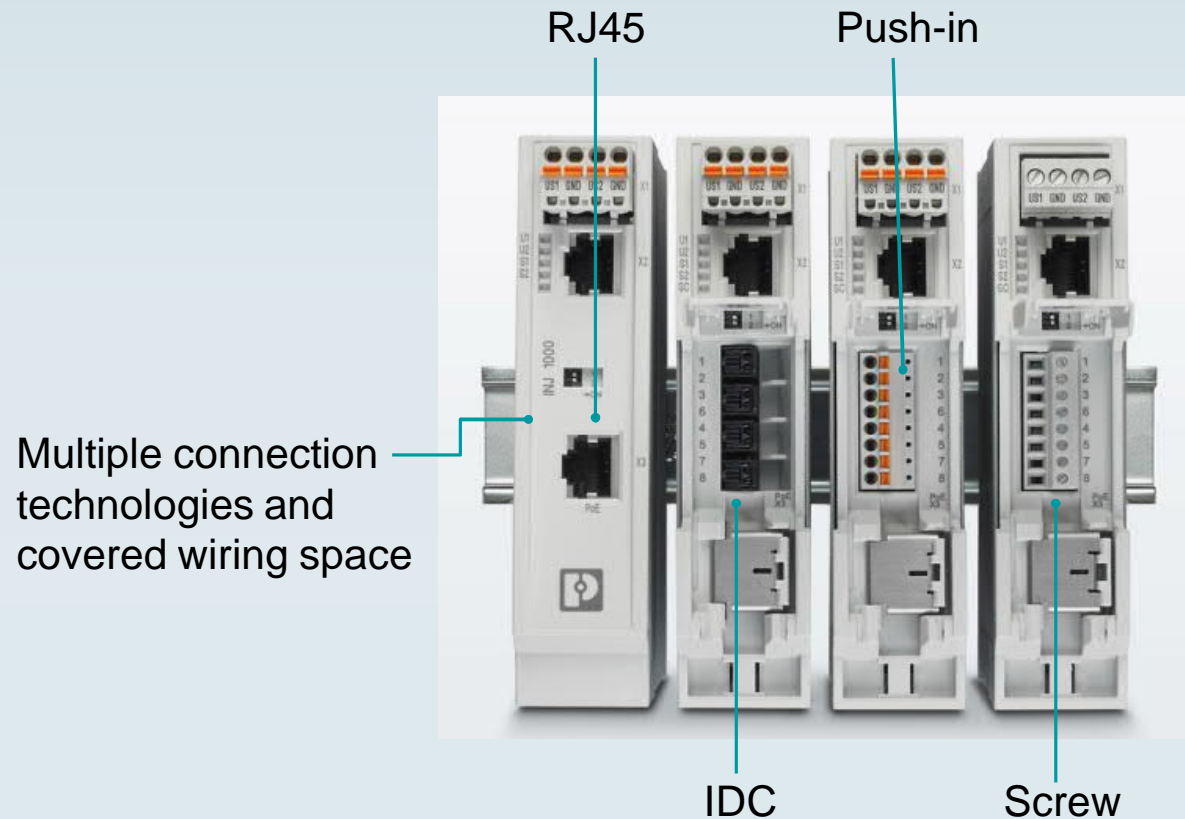
- IDC, Push-in, screw, and
  RJ45 connections.
- Covered cable wiring
  space

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

Tool-free shield connection

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

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS
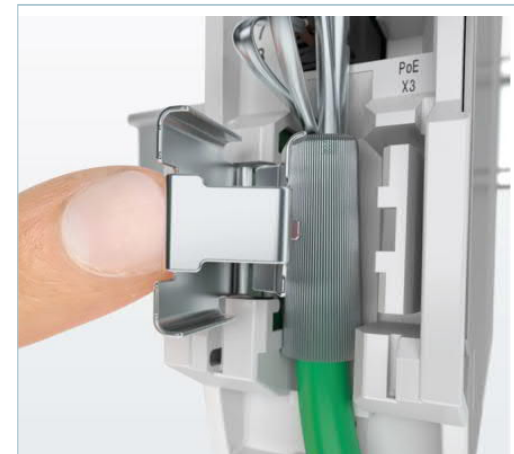
Power over Ethernet Injectors

	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	-

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Network Isolator
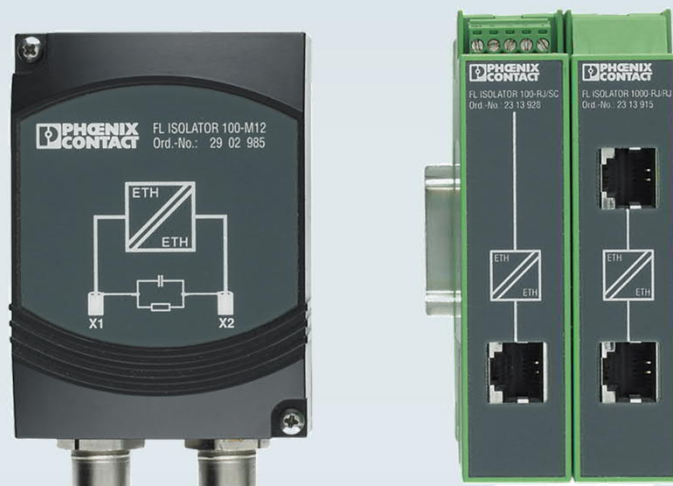
- Protection against aggressive environmental influences, particularly harsh industrial environments, thanks to coated PCB

- Dielectric strength of up to 4 kV

- No power supply required

- Approval for railway applications (rolling stock) according to EN 50155 and EN 50121

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Ethernet Network Isolator

Without power supply

4000 V AC electrical isolation

Wall or DIN rail mounting
Optional with DIN Rail mounting kit

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

Vibration-resistant M12 connection

Ethernet Network Isolator

Railway application
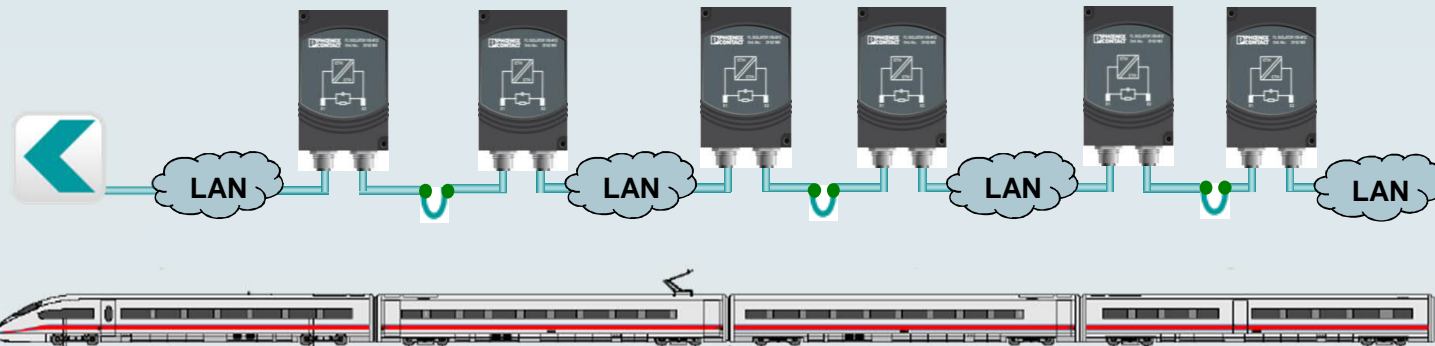
- Avoids high potential equalizing currents between individual sections of the train up to 4 kV

- Approval for EN 50121 (track)

- Approval for EN 50155 (rolling stock)

Ethernet Network Isolator

Reliable protection in case of potential differences

4,000 VAC galvanic isolation

Passive device

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

10/100 MBit/s

Screw terminal

RJ-45 connector

PHŒNIX 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	
Port 1	RJ-45	RJ-45	RJ-45	M12 D-coded	Set for mounting devices with EPA design on a DIN rail for FL Isolator 100-M12
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

PHŒNIX 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).

PHŒNIX CONTACT

INSPIRING INNOVATIONS

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:

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Device servers - Application example

Modbus RTU/ASCII to Modbus TCP
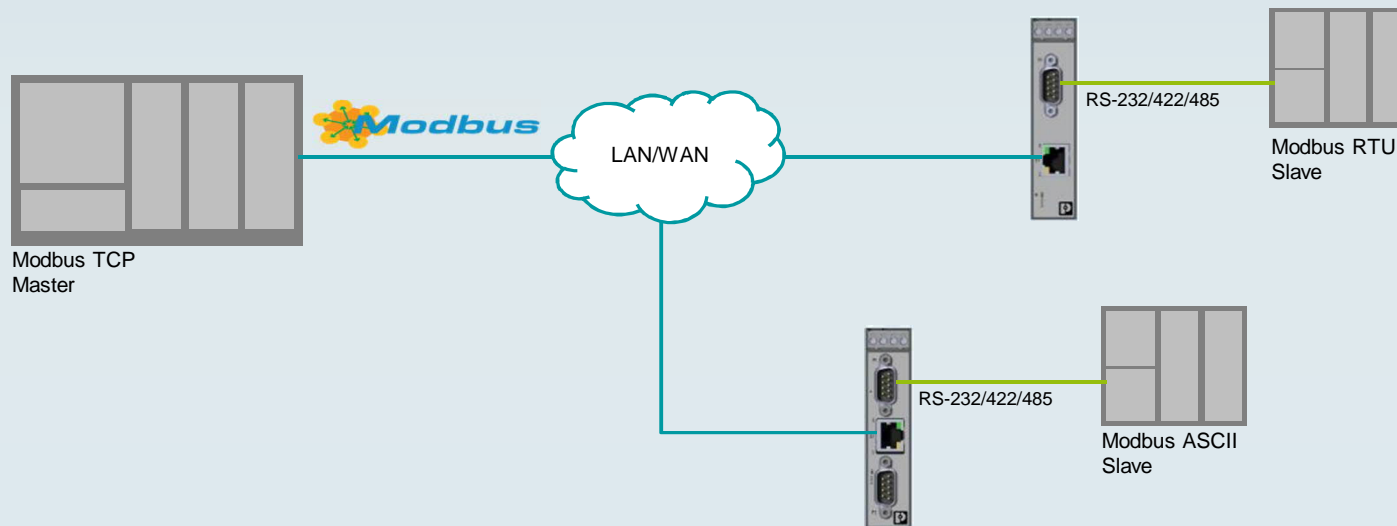
Modbus TCP Master

LAN/WAN

RS-232/422/485

Modbus RTU Slave

RS-232/422/485

Modbus ASCII Slave

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Device servers - Application example

Serial Tunneling (point to point)

LAN/WAN

RS-232/422/485

100.00lbs

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

Device servers - Application example

Serial Tunneling (multiplexing)

RS-232/422/485

LAN/WAN

100.00lbs

100.00lbs

PHŒNIX CONTACT
INSPIRING INNOVATIONS
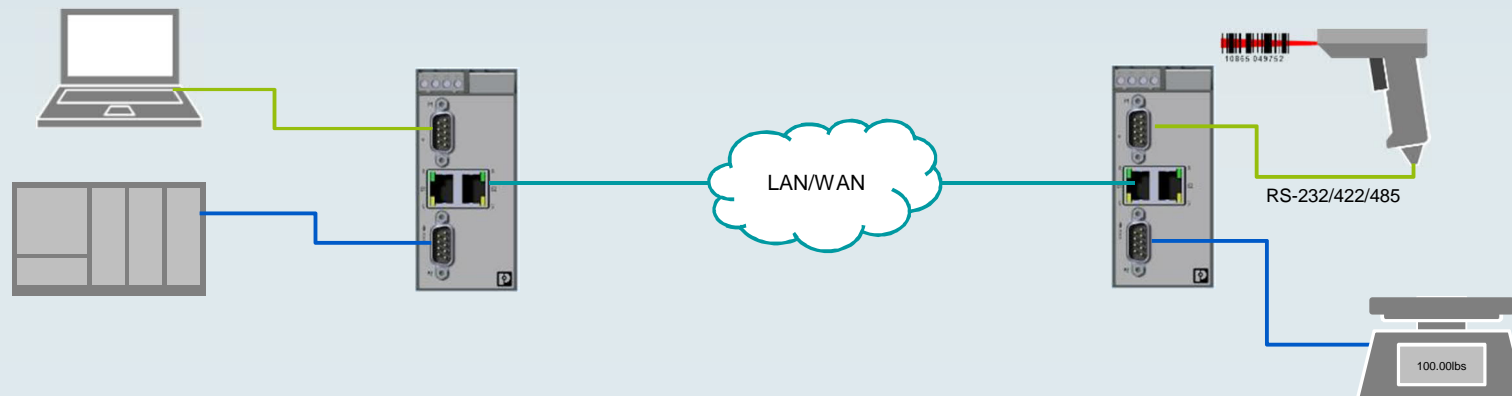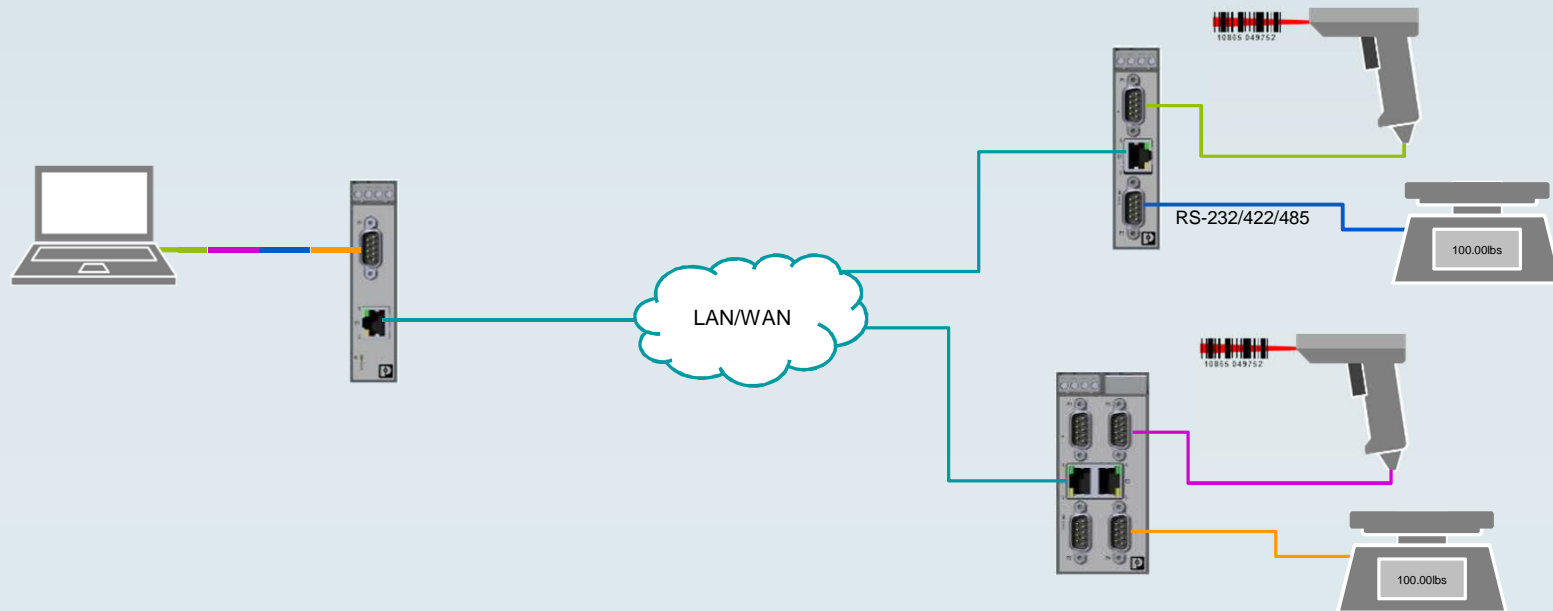
Device servers - Application example

Multiple devices with the same Device ID

RS-232/422/485

LAN/WAN

Modbus TCP
Master

Modbus RTU Slave
Device ID = 1

Modbus RTU Slave
Device ID = 1

Device ID Offset

Port 1 Device ID Offset = 0
Port 2 Device ID Offset = +1
Port 3 Device ID Offset = +2
Port 4 Device ID Offset = +3

PHŒNIX
CONTACT
INSPIRING INNOVATIONS
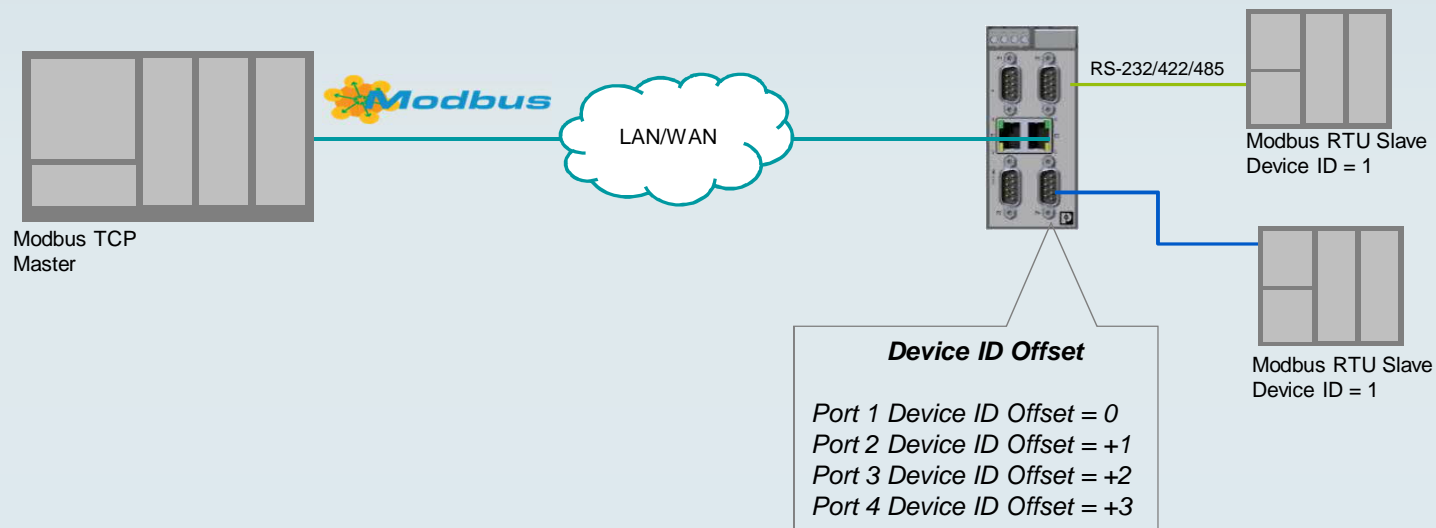
Device servers - Application example

Private Modbus Networks

Modbus RTU Master
Device ID = 1

RS-485

Modbus RTU Slave
Device ID = 2

Modbus RTU Slave
Device ID = 3

Private Device ID Range

Min = **2**   Max = **3**

LAN/WAN

Device ID 1 Read Request ✓
Device ID 2 Read Request ✗
Device ID 3 Read Request ✗

Modbus TCP
Master

Modbus TCP
Slave

PHŒNIX CONTACT
INSPIRING INNOVATIONS
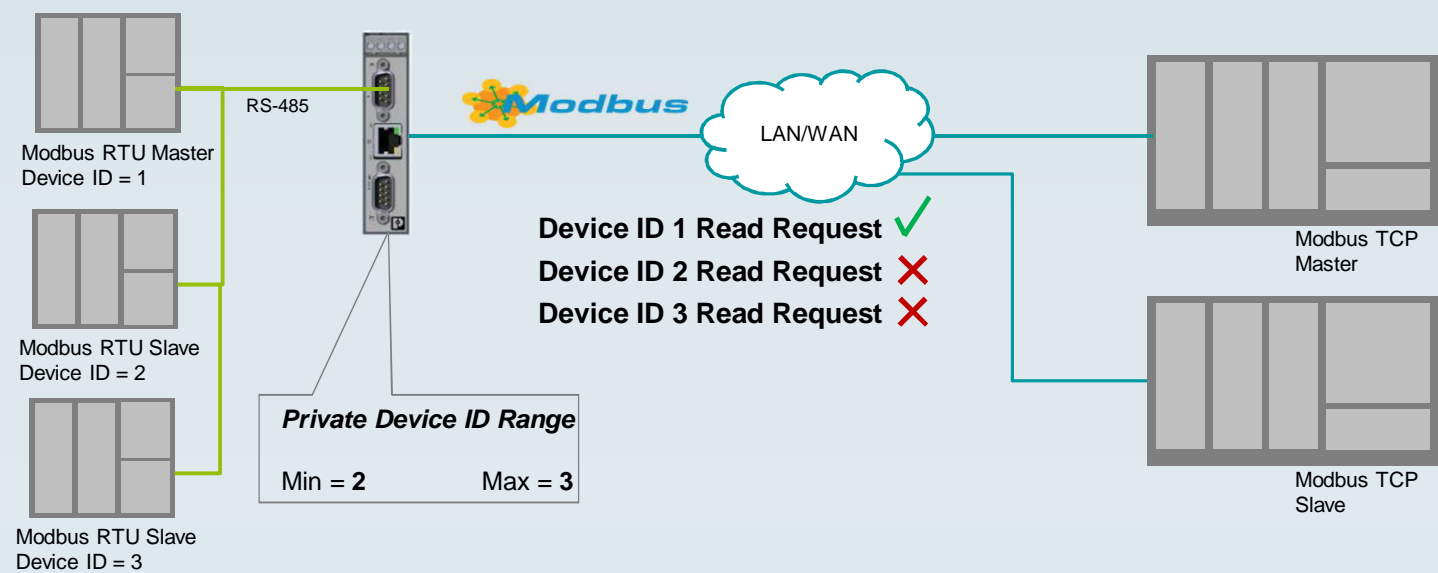
Device servers - Application example

Virtual COM Port

LAN/WAN

RS-232/422/485

**COM Port Redirector or
Windows Driver**

COM 3 = 192.168.254.254:8000

COM 4 = 192.168.254.254:8001

IP = 192.168.254.254
Serial Port 1 = TCP Port 8000
Serial Port 2 = TCP Port 8001

100.00lbs

10865 049752

Product
overview

PHŒNIX
CONTACT
INSPIRING INNOVATIONS
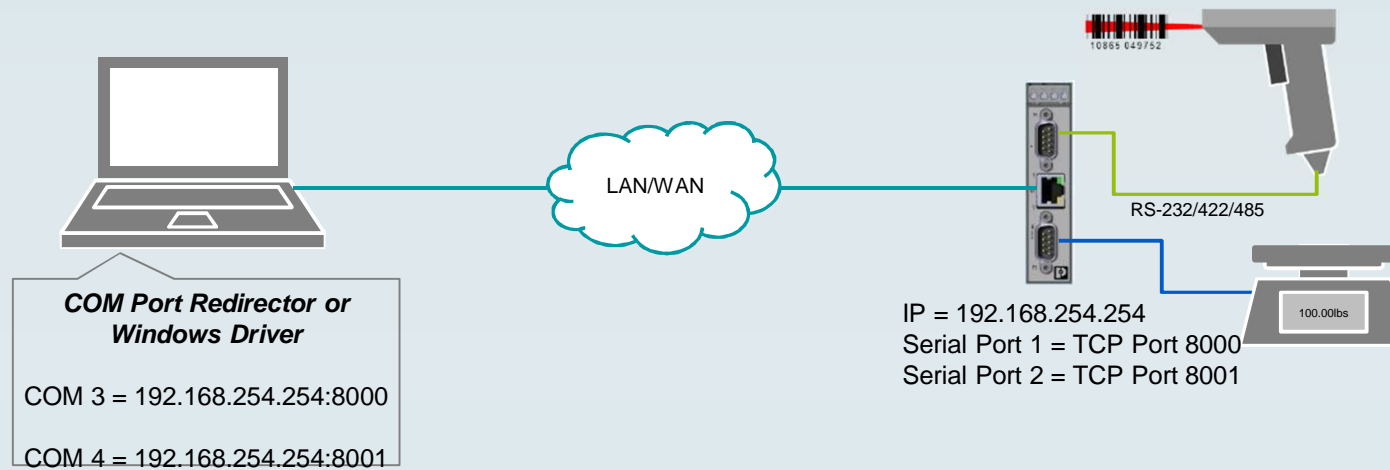
Device servers - Application example

ASCII to Ethernet/IP

Serial ASCII/Raw device

RS-232/422/485

TCP/IP ASCII/Raw device

LAN/WAN
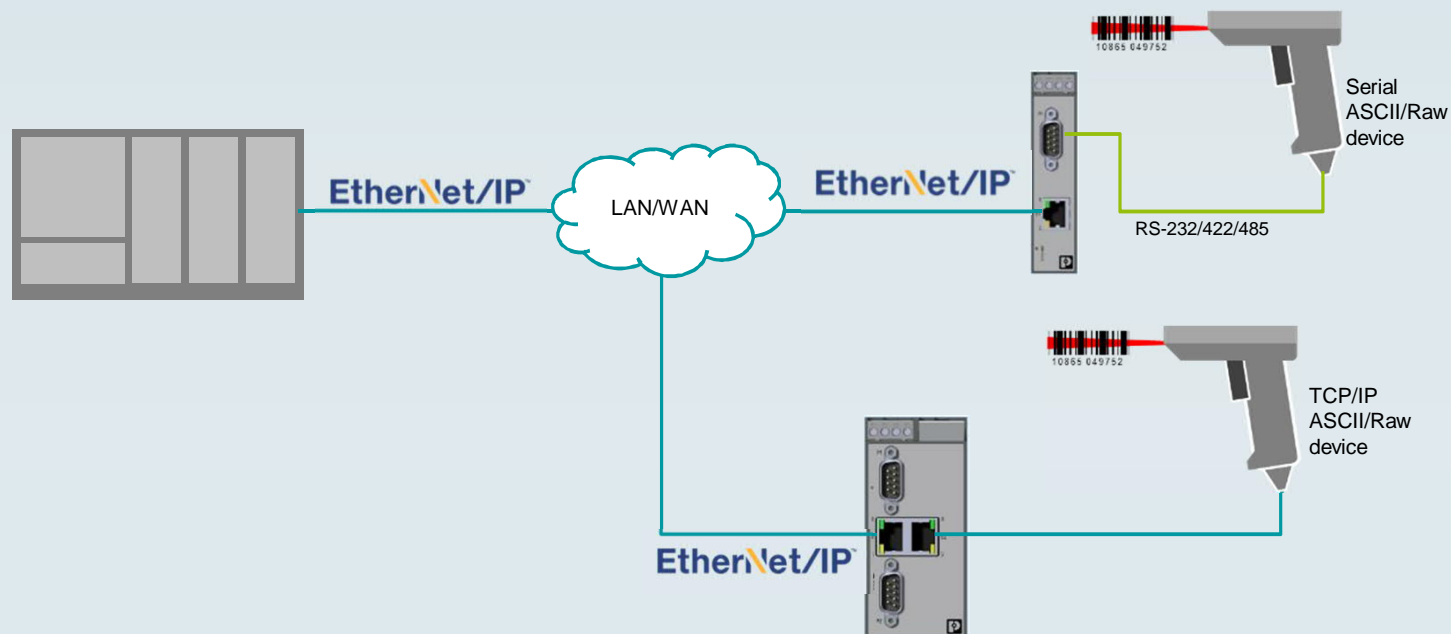
Device servers - Application example

ASCII to Modbus TCP

Modbus TCP
Master

LAN/WAN

Serial
ASCII/Raw
device

RS-232/422/485

TCP/IP
ASCII/Raw
device

PHŒNIX
CONTACT
INSPIRING INNOVATIONS
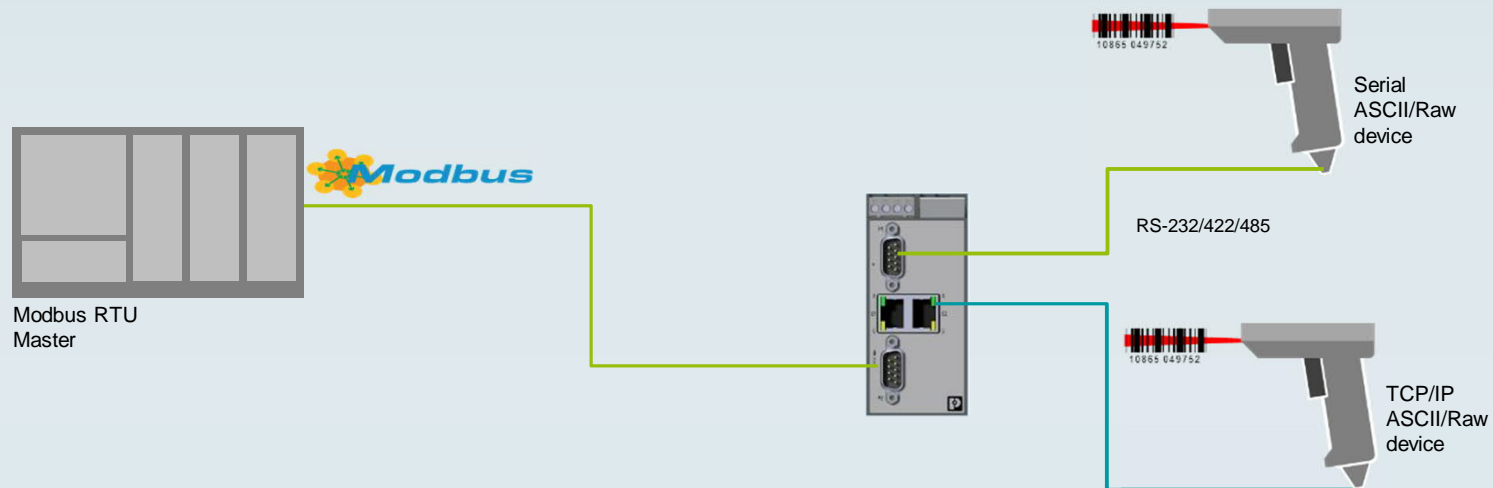
Serial Device Server

	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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Gateways
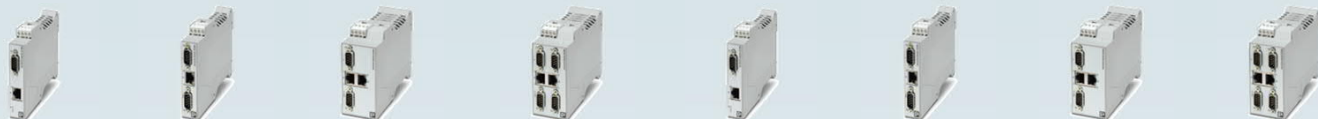
	GW PN/ASCII 1E/1DB9	GW PN/ASCII 1E/2DB9	GW PN/ASCII 2E/2DB9	GW PN/ASCII 2E/4DB9	GW EIP/ASCII 1E/1DB9	GW EIP/ASCII 1E/2DB9	GW EIP/ASCI 2E/2DB9	GW EIP/ASCII 2E/4DB9
Protocol	RAW, ASCII to PROFINET				RAW, ASCII to EtherNet/IP			
Ethernet interface	1x RJ45		2x RJ45		1x RJ45		2x RJ45	
Serial interface (RS-232/422/485)	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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Gateways

new

EtherNet/IP   Modbus

	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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Modular Ethernet HART multiplexer
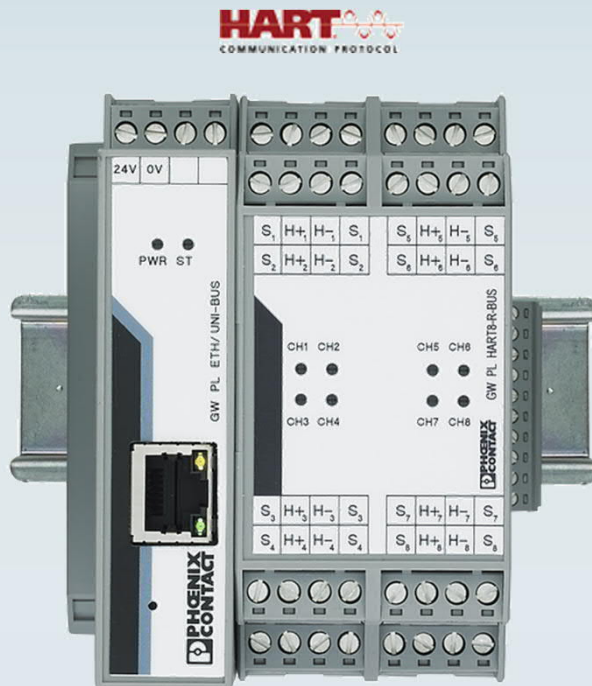
Converting HART protocol

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)
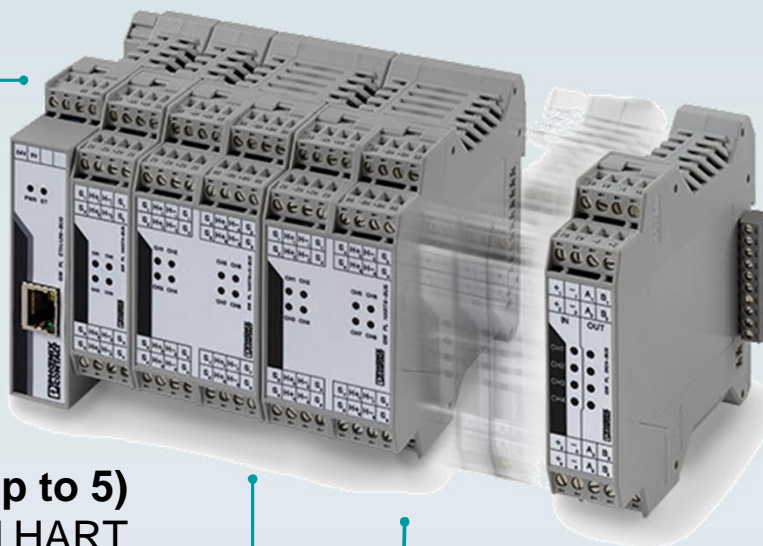
1 HART master per channel ensures maximum update rate

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Modular Ethernet HART multiplexer

Installation options

Ethernet HART multiplexer

engineering station or
asset management system

HART-IP

Group
FDT

Ethernet network

(Modbus TCP, HART IP or Profinet)

HART devices

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Modular Ethernet HART multiplexer

Installation options

(PV, SV, TV, QV, loop current)

PLC

PROFINET Modbus *TCP*

PACTware

engineering station or
asset management system

HART-IP

FDT Group

Ethernet HART multiplexer

Ethernet network

**(Modbus TCP, HART IP or
Profinet)**

HART devices

Product
overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS
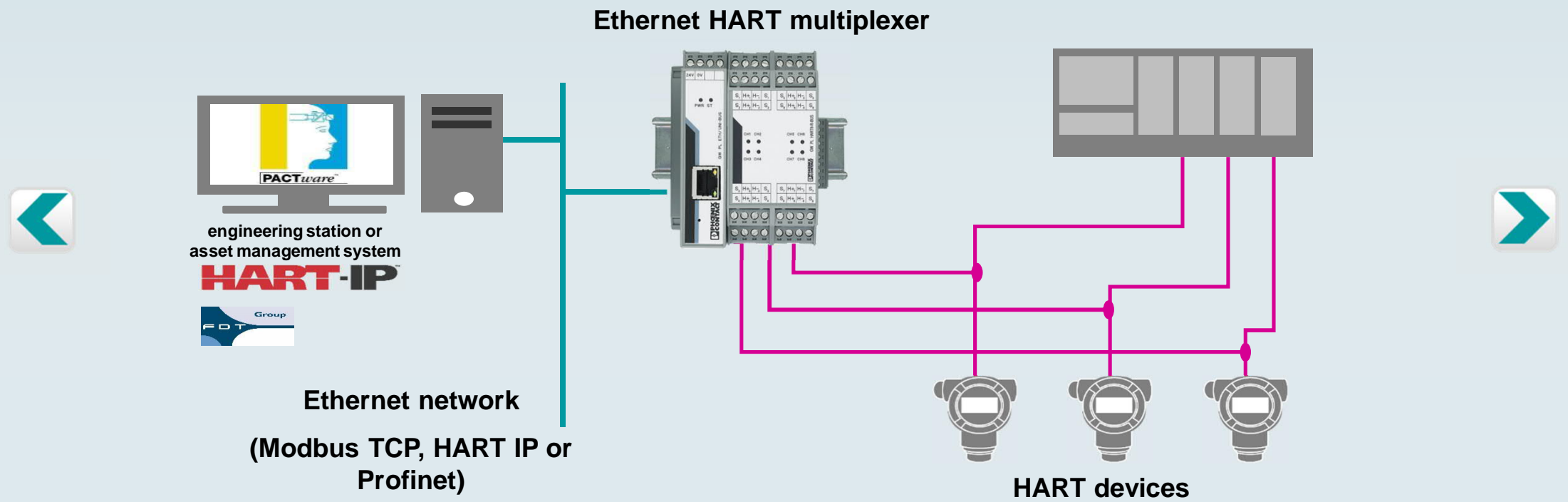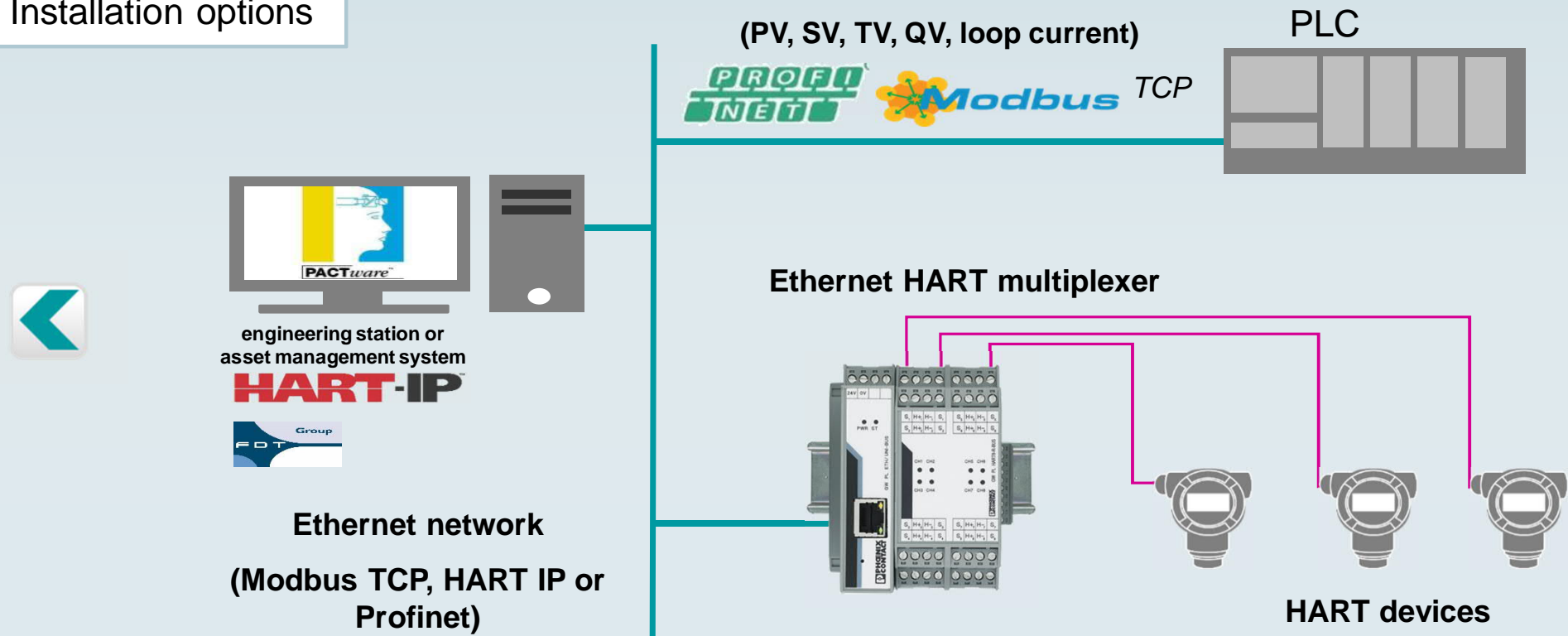
Modular Ethernet HART multiplexer

	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

Radioline

TRUSTED WIRELESS

Easy startup ℹ
- Without programming
- Adjustable via thumbwheel
- I/O mapping

Universal applications ℹ
- 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
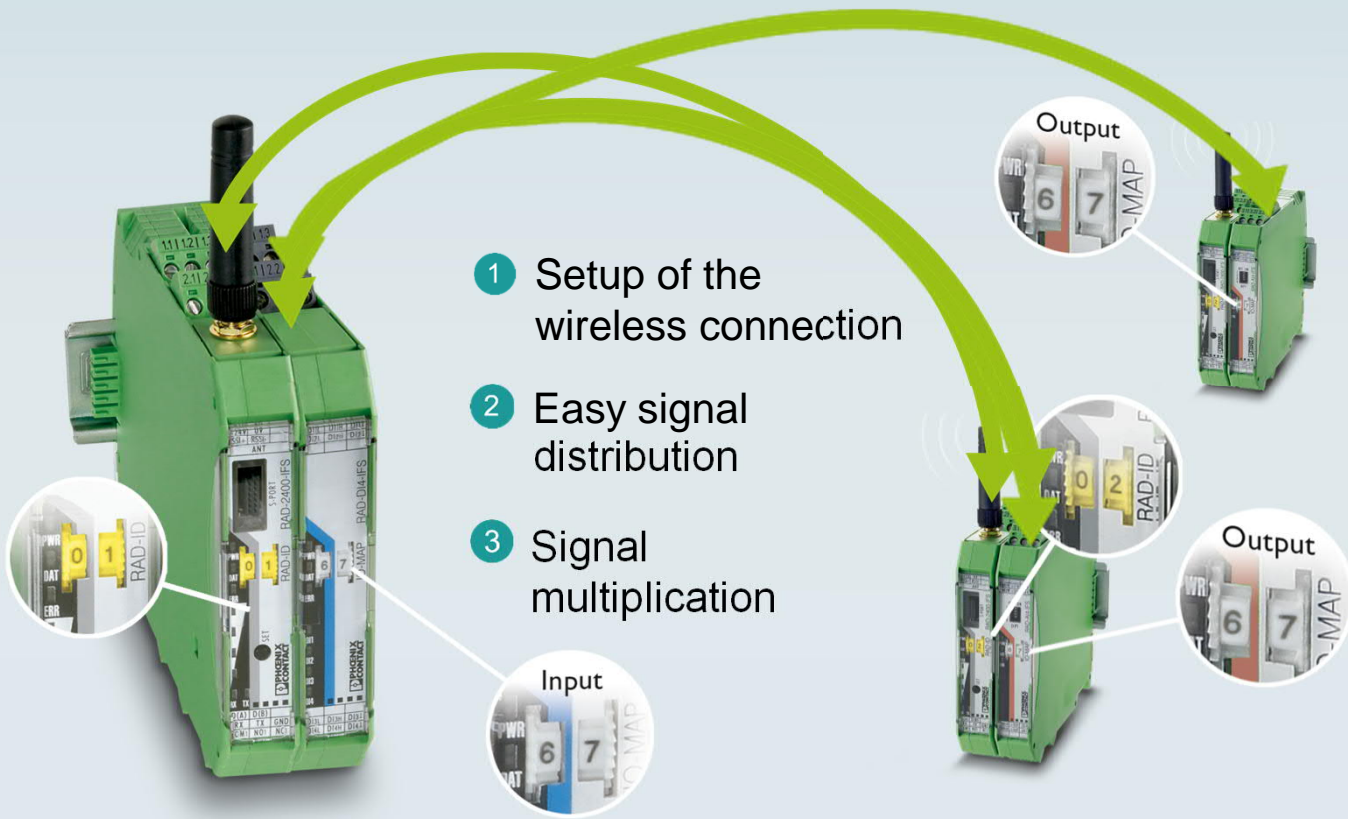- Ranges up to 5, 20 or 32 km

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

PHŒNIX CONTACT
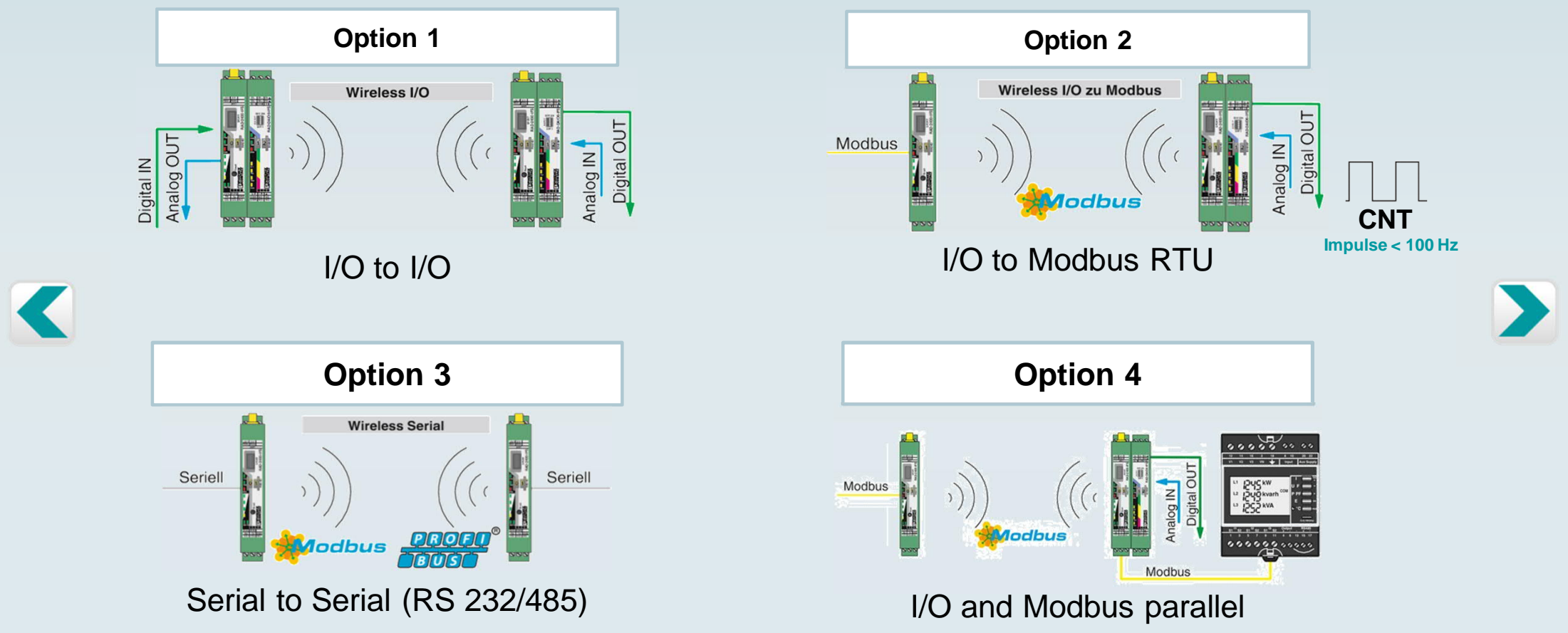*INSPIRING INNOVATIONS*

Radioline

1. Setup of the wireless connection
2. Easy signal distribution
3. Signal multiplication
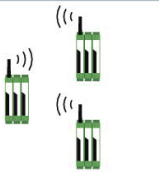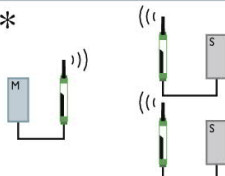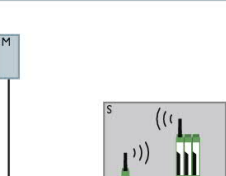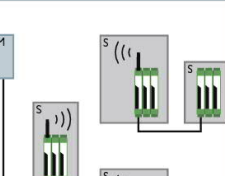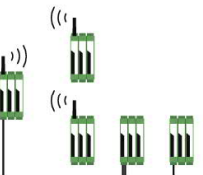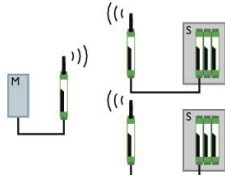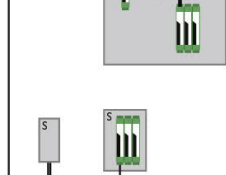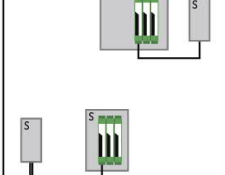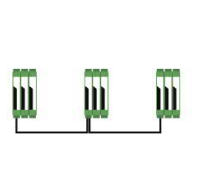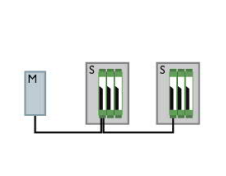
Radioline - One System for different applications

Option 1

Wireless I/O

I/O to I/O

Option 2

Wireless I/O zu Modbus

I/O to Modbus RTU

CNT
Impulse < 100 Hz

Option 3

Wireless Serial

Seriell — Seriell

Serial to Serial (RS 232/485)

Option 4

I/O and Modbus parallel

PHŒNIX 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

Radioline function blocks for PCWORX / STEP 7 / TIA Portal
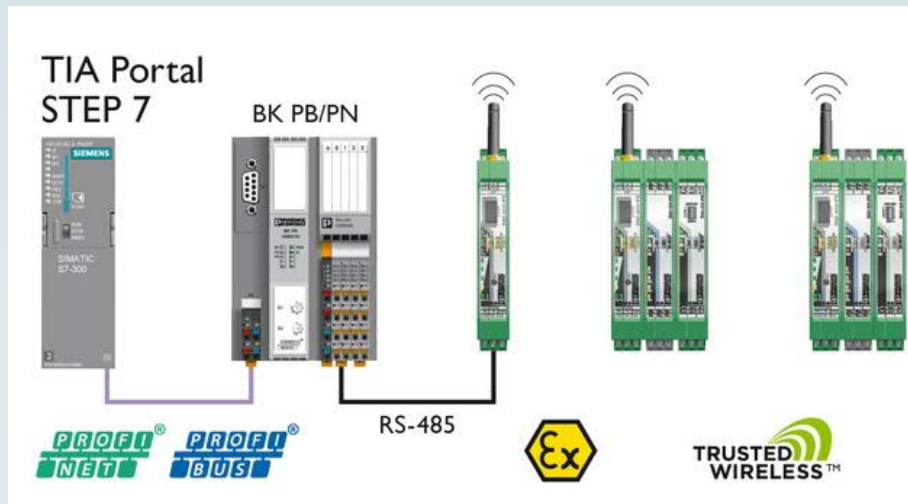
Supported hardware and software
- Siemens: S7-3xx, S7-12xx, S7-15xx PLCs, STEP 7, TIA Portal
- Phoenix Contact: Inline + Axioline PLCs, PCWORX

- 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

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

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

PHŒNIX 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

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Radioline – Configuration sticks
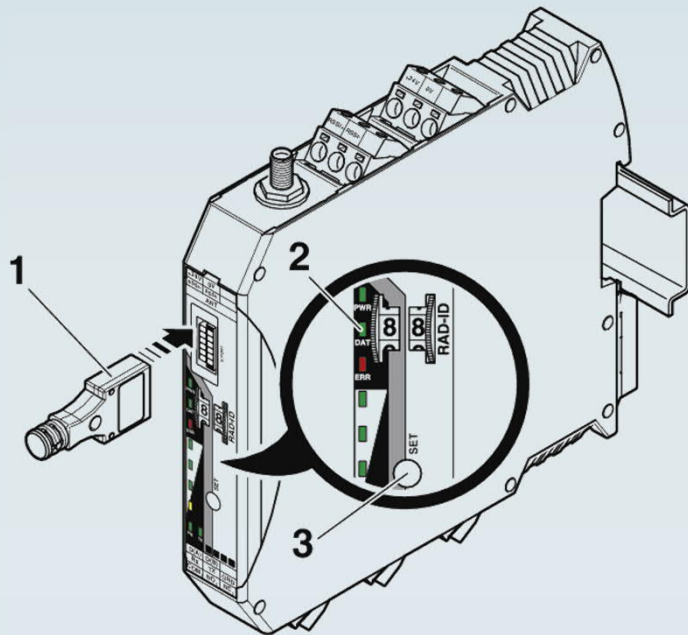
1. CONFIGSTICK RAD-CONF-RF….
2. Status LEDs
3. SET button

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.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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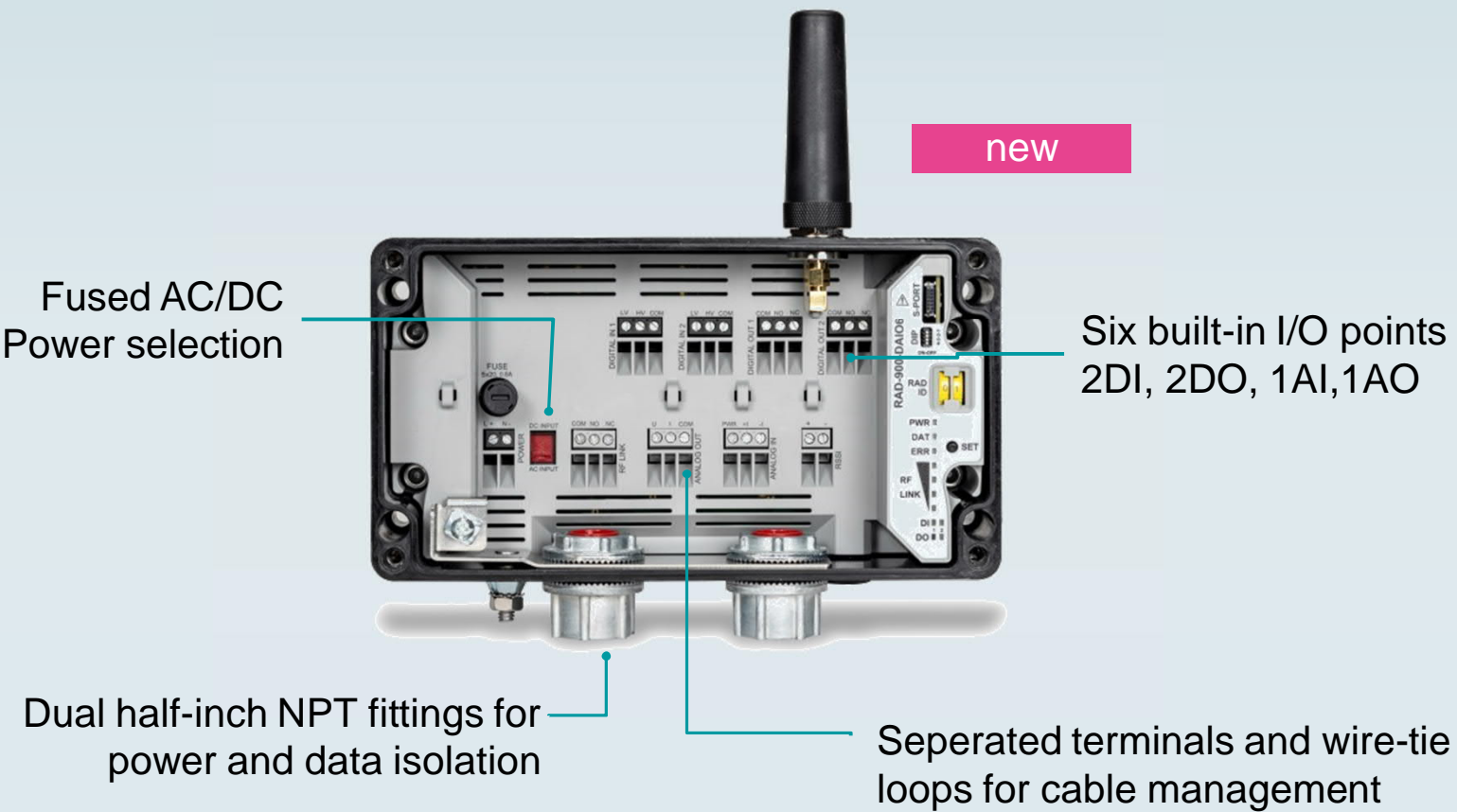
Directional antenna
- Bridging large distances
- Point-to-point connections
- Stationary or linear applications
- Decoupling due to directivity in the case of multiple point-to-point paths

PHŒNIX 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

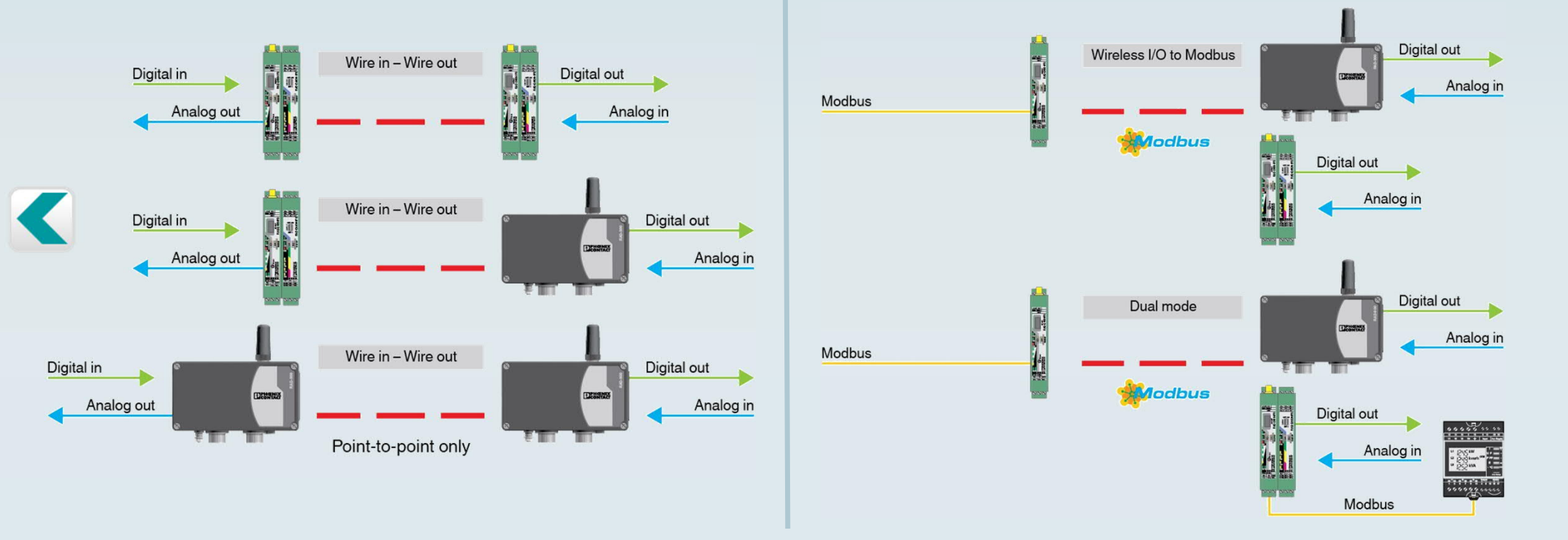Seperated terminals and wire-tie loops for cable management

- 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**

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-900-DAIO6

Modes of operation

Wire in – Wire out

Digital in → Digital out →
Analog out ← Analog in ←

Wire in – Wire out

Digital in → Digital out →
Analog out ← Analog in ←

Wire in – Wire out

Digital in → Digital out →
Analog out ← Analog in ←

Point-to-point only

Wireless I/O to Modbus

Modbus
Digital out →
Analog in ←

Modbus

Digital out →
Analog in ←

Dual mode

Modbus
Digital out →
Analog in ←

Modbus

Digital out →
Analog in ←

Modbus

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-RUGGED-BOX-CONF

Outdoor box solution (configurable)

new

- 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

For worldwide use

868 MHz   900 MHz   2,4 GHz

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Radioline – RAD-RUGGED-BOX-CONF

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

Power supply

Wireless module

Surge protection

I/O module (optional)
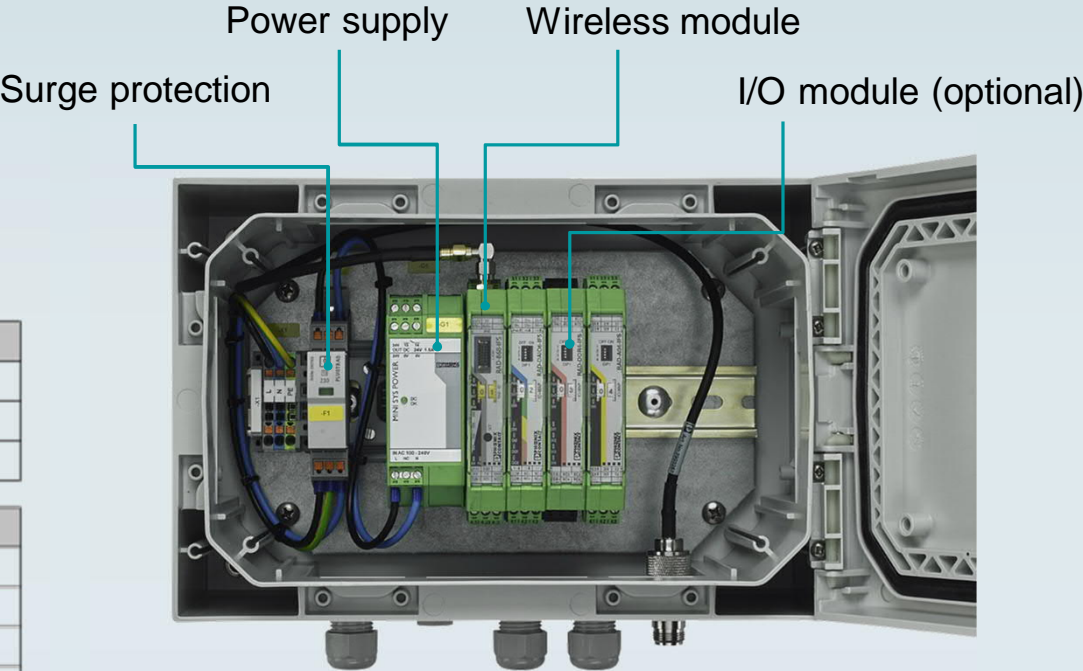
For worldwide use

| 868 MHz | 900 MHz | 2,4 GHz |

Product overview

PHŒNIX 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

Bluetooth™
4.0
Low Energy

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

High number of channels in a compact housing
- Analog / digital

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Wireless Multiplexer

PLC

16 digital actuators
16 digital sensors
2 analog actuators
2 analog sensors
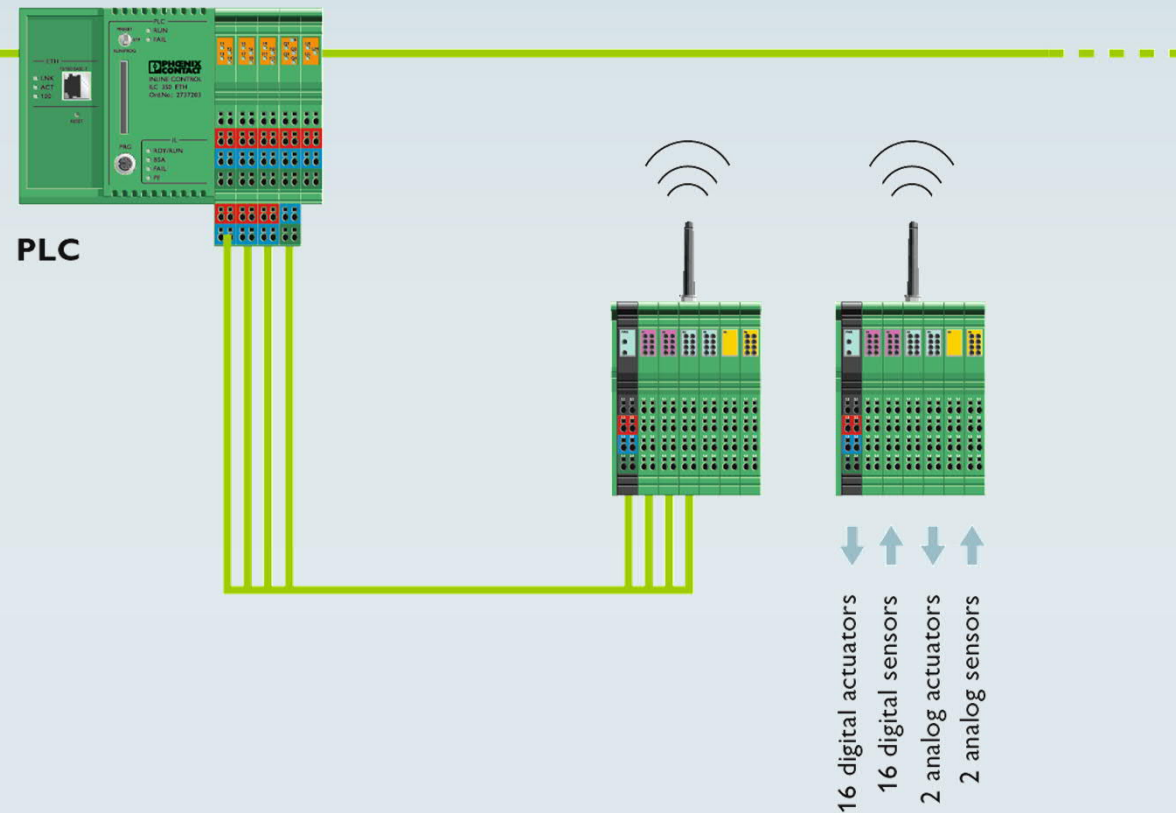
- Point-to-point communication

- 16 digital inputs/outputs
- 2 analog inputs/outputs
  0-20 mA, 0-10 V

- Transmission time
  ≥ 10 ms

- Bluetooth 4.0 technology

Product overview

PHŒNIX 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

PHŒNIX 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
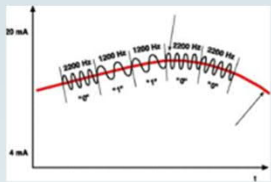
global RF band

security

mesh networking

time synchronized

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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:
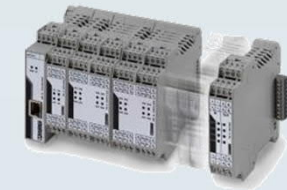
2007
HART 7 was released, and included the WirelessHART standard.

2012
HART 7 was enhanced with additional functionality, including HART IP.

Product overview

Wireless HART Gateway

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

Integrated WLAN
Redundant connection as backup for
ethernet cable

Mobile access for programming and
diagnostic

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
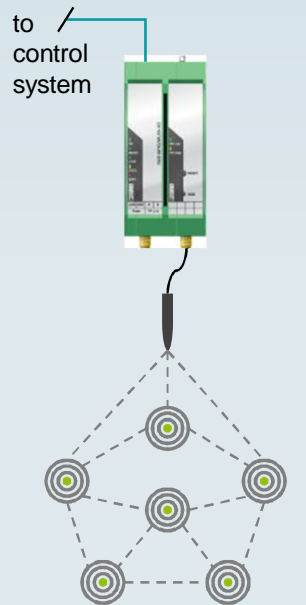(supports up to 250 field devices)

PHŒNIX CONTACT
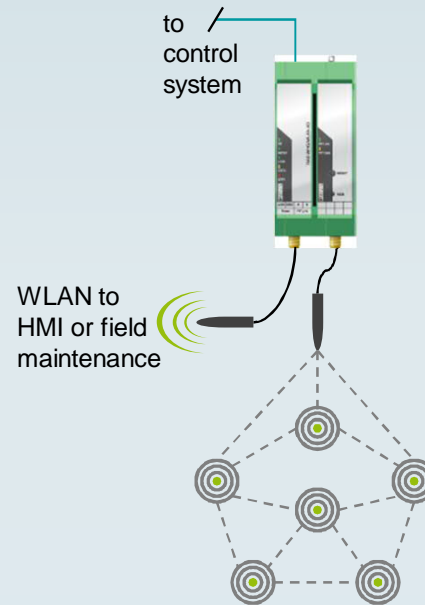INSPIRING INNOVATIONS

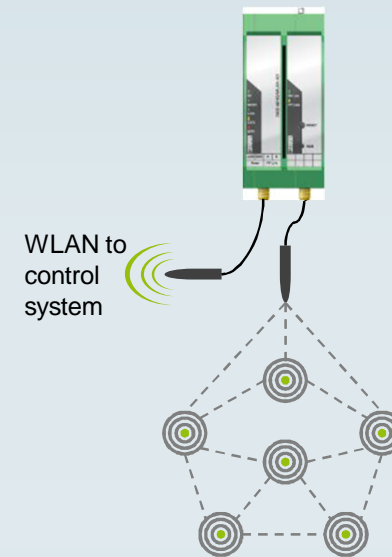# Wireless HART Gateway - Installation options

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

to control system

WLAN to HMI or field maintenance

WLAN to control system

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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
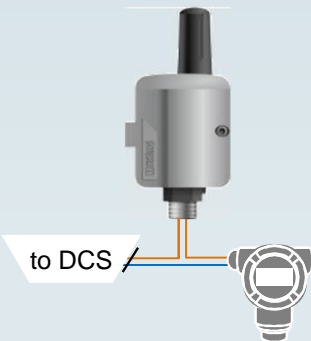Direct supply of one HART- device (loop-powered)

Product overview

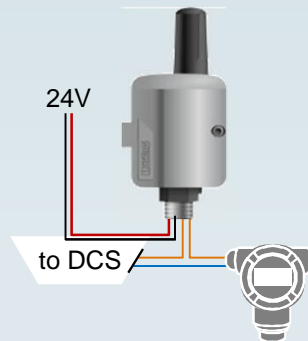**PHŒNIX CONTACT**
INSPIRING INNOVATIONS

Wireless HART Adapter - Installation options

retrofit existing installations
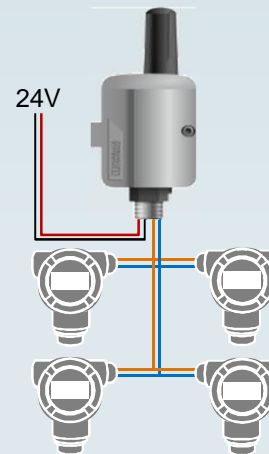
loop powered

retrofit an existing device

the loop stays intact

WHA is loop powered
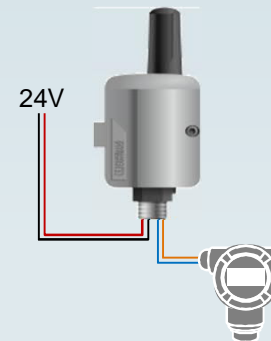
line powered

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

Product overview

Wireless HART
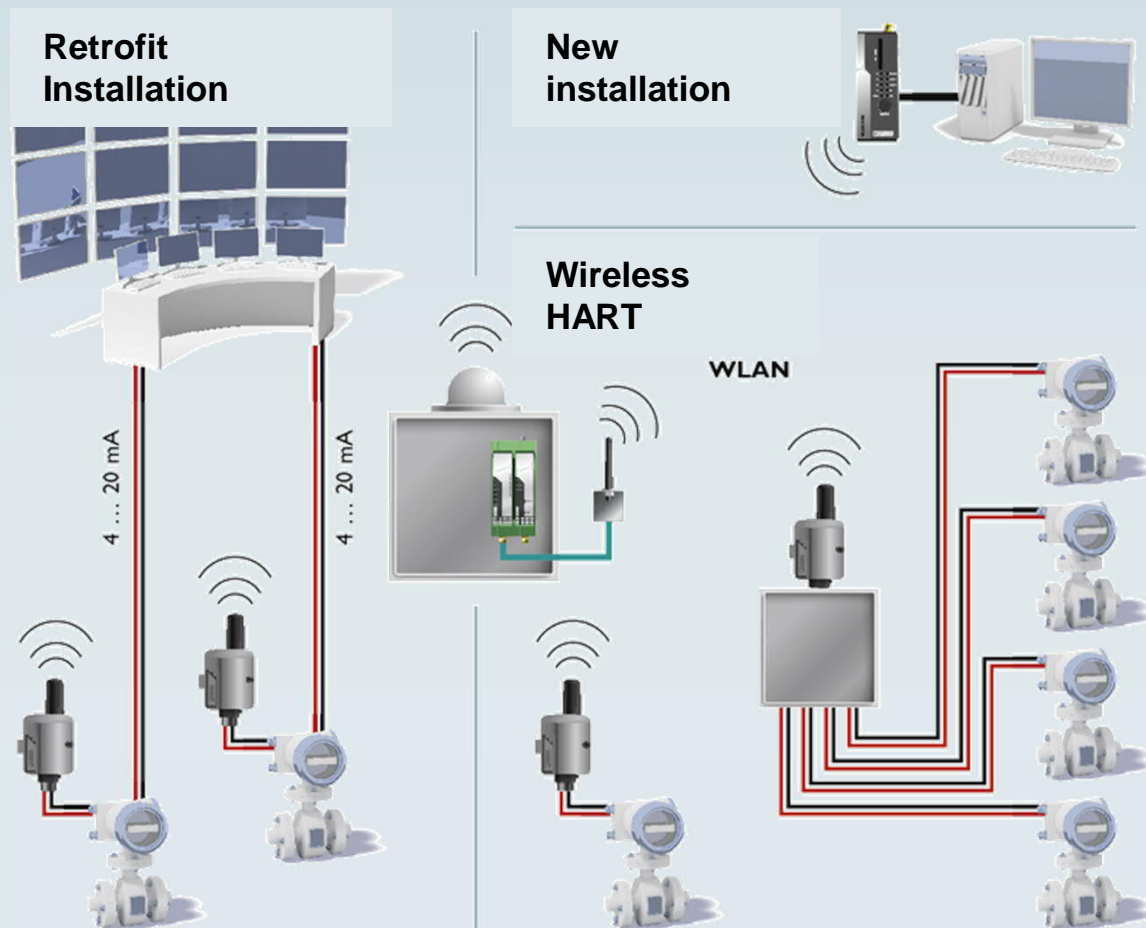
Wireless HART can:

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

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

Retrofit Installation

New installation

Wireless HART

WLAN

4 ... 20 mA

Product overview

PHŒNIX CONTACT

INSPIRING INNOVATIONS

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Wireless HART

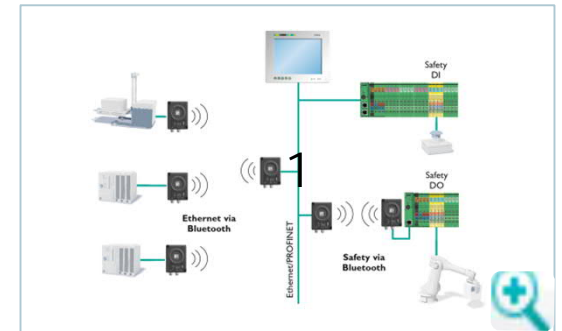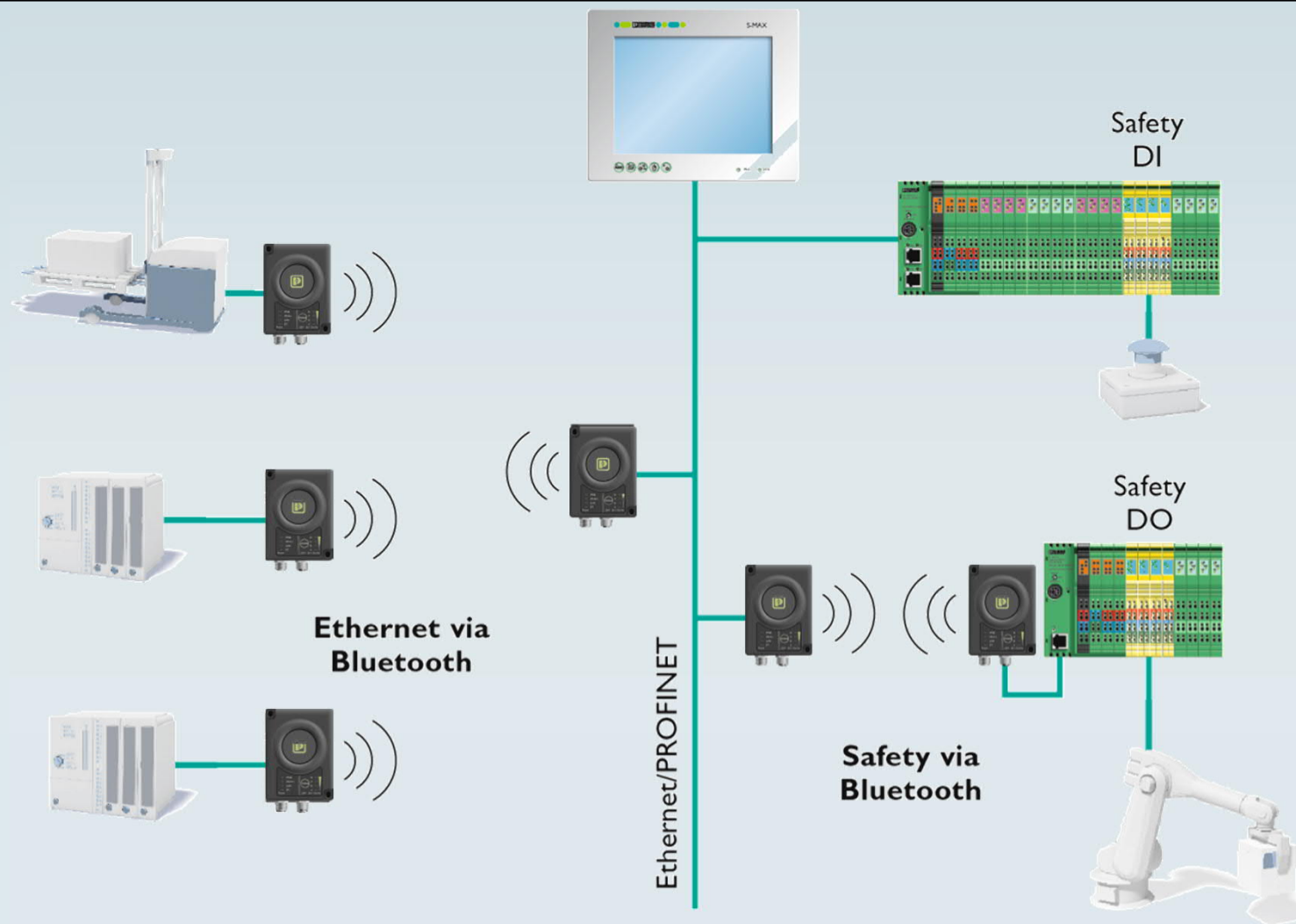|	RAD-WHG/WLAN-XD	RAD-WHA-1/2NPT	GW HART USB MODEM (Accessoire)
Description	Gateway between WirelessHART field devices and 802.11b/g	Adapter that can be used to interface HART field devices into a WirelessHART network.	USB modem for configuration and commissioning HART devices The GW HART USB MODEM is 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

Industrial Bluetooth

Various
application areas

- Point-to-point connection (Cranes, traveling bridge collectors, robots)

- Multipoint connection (I/O components, scanners, PCs)

Safety
DI

Safety
DO

Ethernet via
Bluetooth

Ethernet/PROFINET

Safety via
Bluetooth

Product
overview

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth

Interference-free parallel operation with WLAN networks

- Adaptive frequency hopping (AFH)

- Low emission mode (LEM)

- Black channel list (BCL)

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Reliable communication thanks to MIMO technology

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

All-in-one-solution

Quick and easy startup

Optimized for operation in PROFINET and EtherNet/IP networks

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Reliable communication thanks to MIMO technology

- Interruption-free roaming

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

WLAN 5100 Access Point

WLAN 5100 Access Point

WLAN 5100 Access Point

Industrial Ethernet / Profinet

Roaming

Roaming

WLAN 1100 Client

WLAN 5100 Client

WLAN 1100 Client

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

All-in-one-solution ℹ

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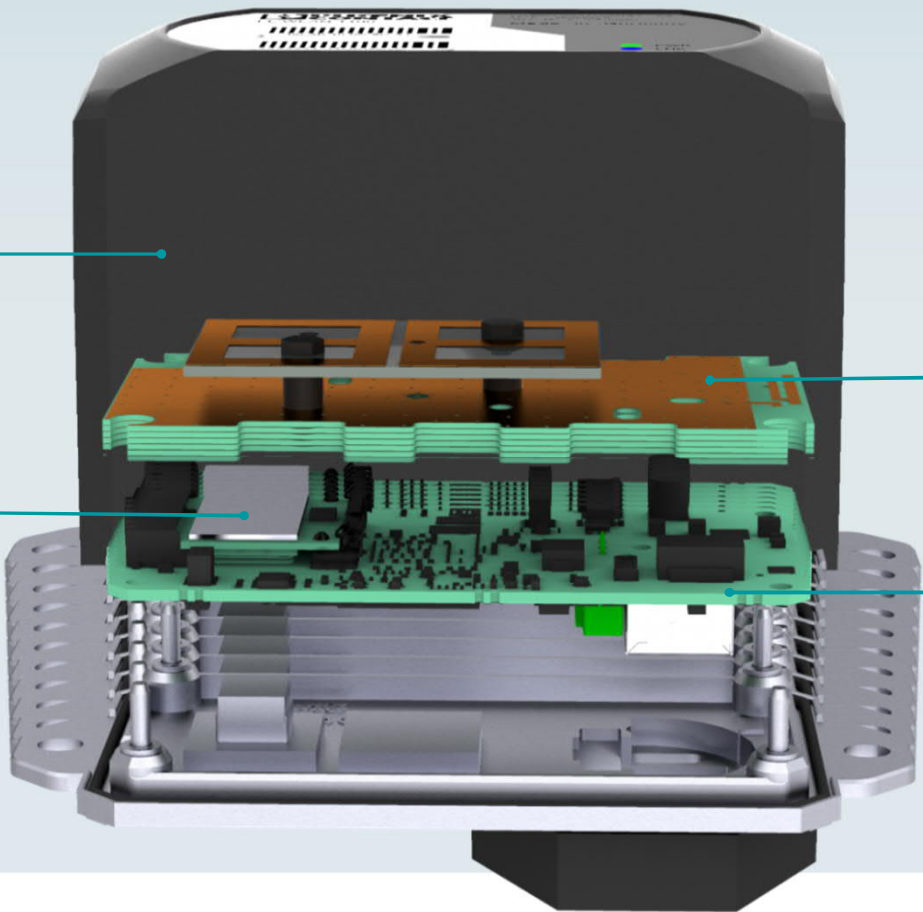- Shockproof according to IK08

PHŒNIX 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

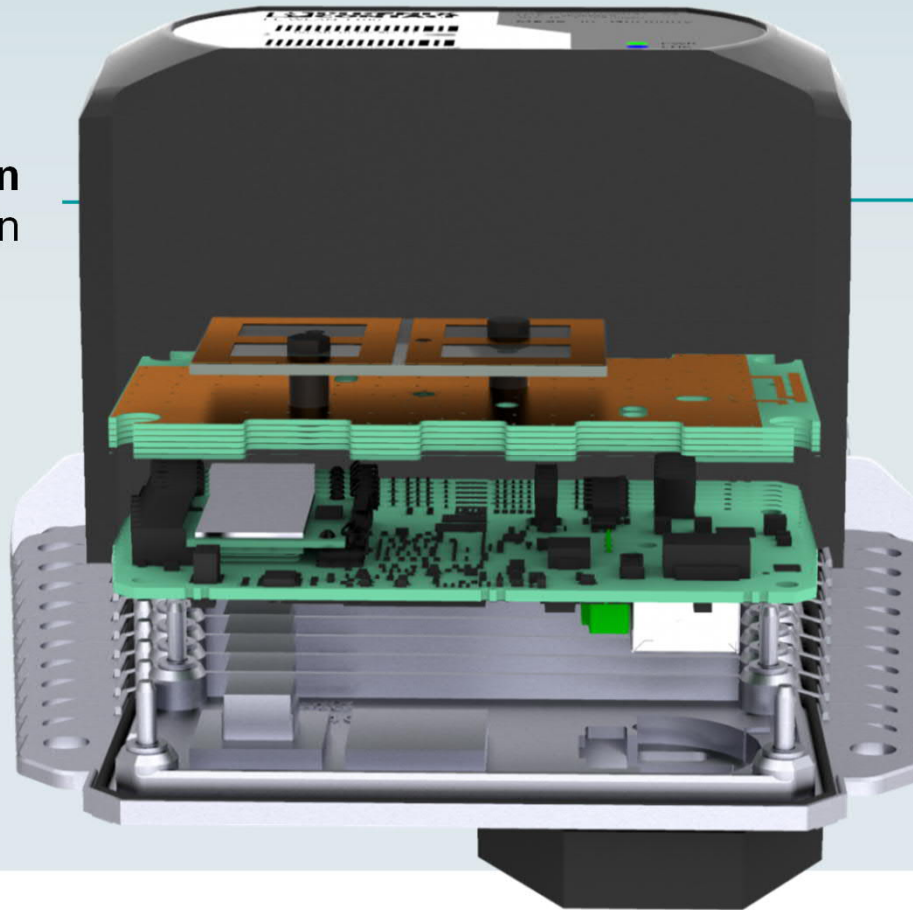**Powerful Access Point** Linux operating system

Product overview

PHŒNIX CONTACT *INSPIRING INNOVATIONS*

Industrial WLAN

Power connection
Push-in

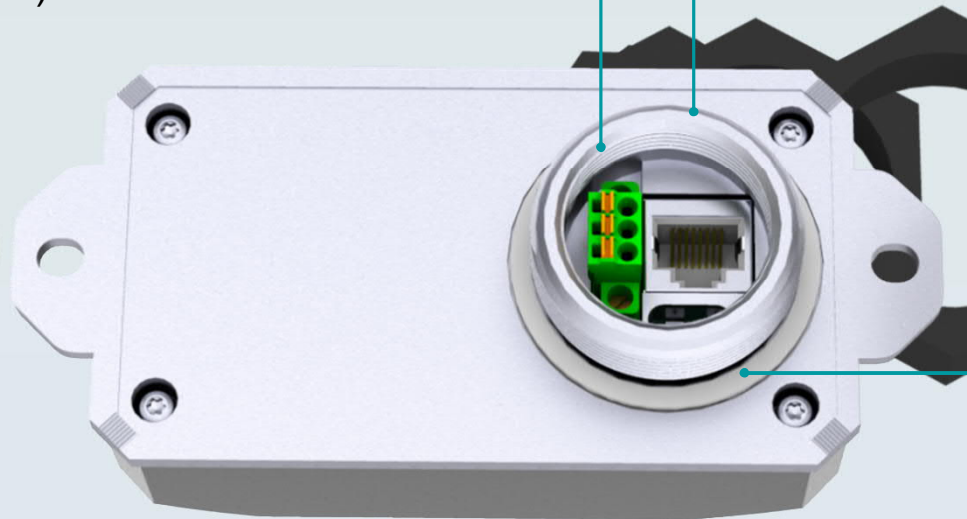**Ethernet connection**
Standard RJ45

Industrial WLAN

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

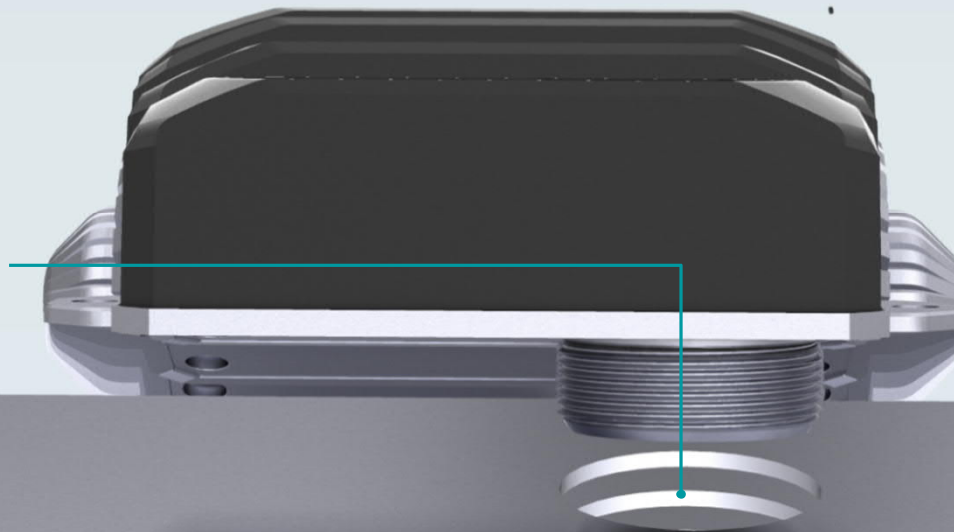**M40 external thread**
for mounting

Seal
up to IP67

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Fast and easy connection
thanks to single-hole mounting

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Fast and easy connection
thanks to single-hole mounting

Quick fastening

Product overview

Industrial WLAN

Industrial WLAN

Industrial WLAN

Quick and
easy startup

- Cluster Management

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX 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

PHŒNIX 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

PHŒNIX 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Remote maintenance via public telephone network

Configuration via web-based management

Can be used worldwide

Up to three VPN tunnels simultaneously

Switchover between DSL router (default) and DSL modem

Firewall
IPsec and OpenVPN

Connect remote stations via ADSL
(Asymmetric Digital Subscriber Line)

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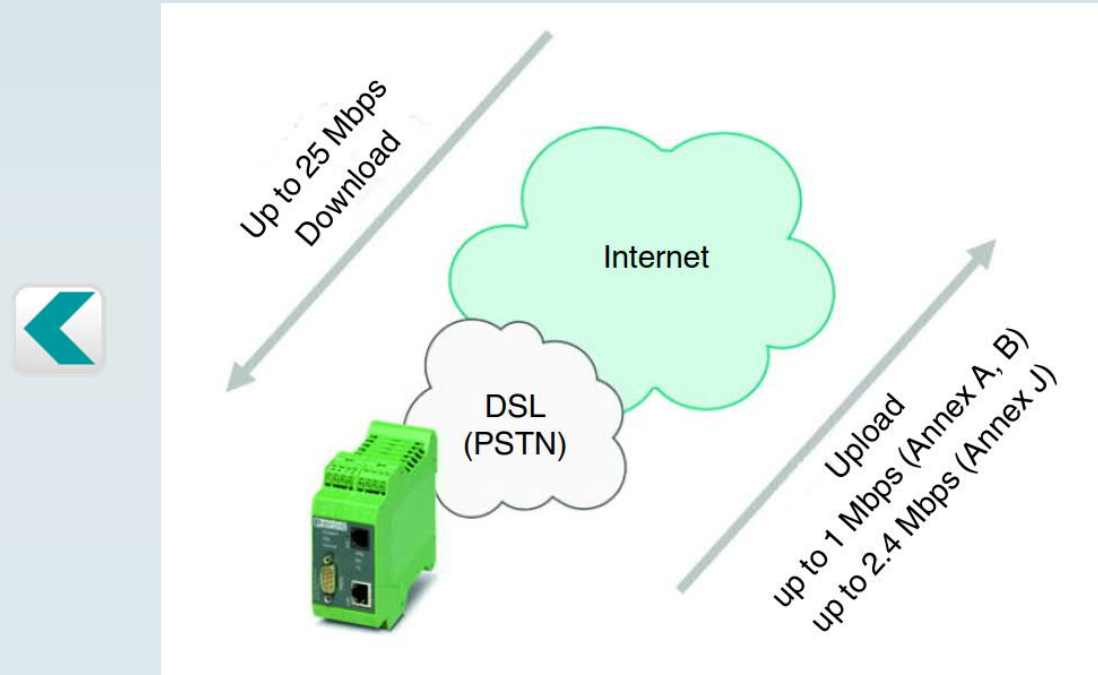
Country	Annex A, B, J
Austria	Mixed, primarily Annex A
Belgium	Mixed, primarily Annex A
Denmark	Primarily Annex A
France	Primarily Annex A
Germany	Annex B, Annex J
Great Britain	Annex A
Iceland	Annex A
Italy	Primarily Annex A
Netherlands	Mixed, primarily Annex A
North America	Annex A
Norway	Primarily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

Product overview

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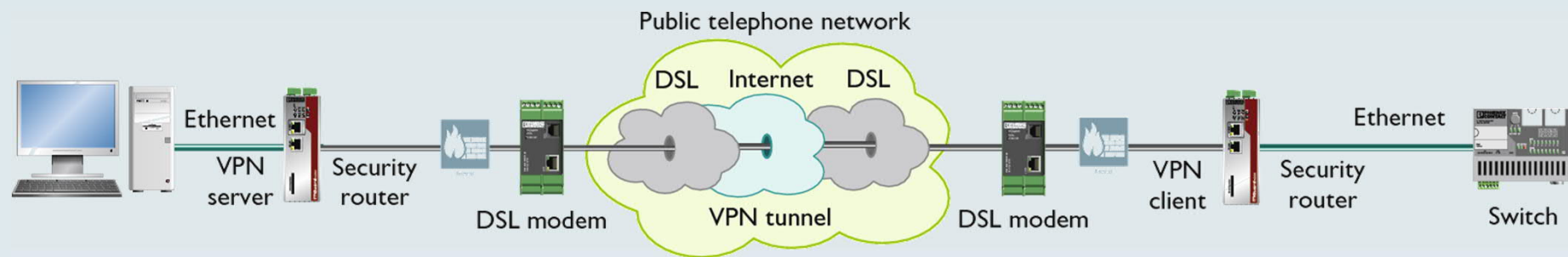
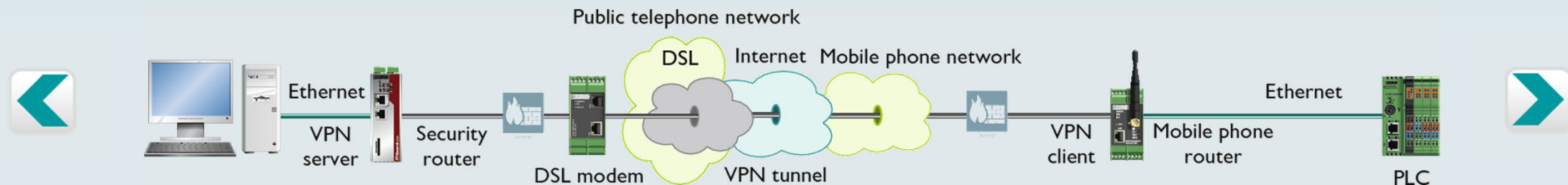Use as a DSL modem, a downstream router handles the VPN router and firewall functions

Remote maintenance via public telephone network

Modem - Application example:

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

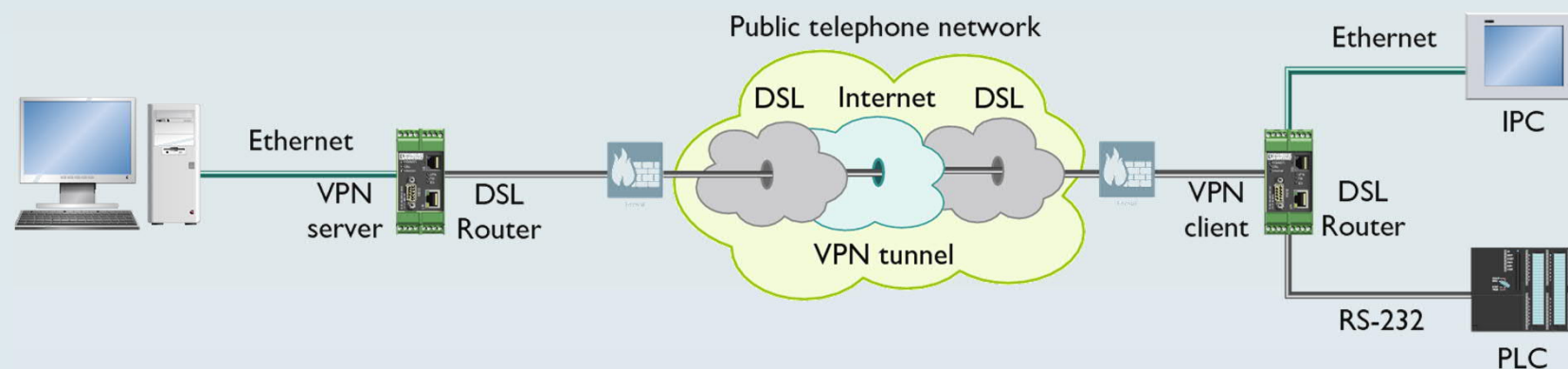Use as a DSL modem in combination with a mobile router

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

TC Mobile I/O

new

Lte

2G and 4G

TC Mobile I/O APP

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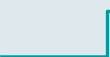4 relay outputs
4 digital & 2 analog inputs

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

Alerting at power failure
Sends SMS message

Device to Device communication

Product overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

TC Mobile I/O X200 App

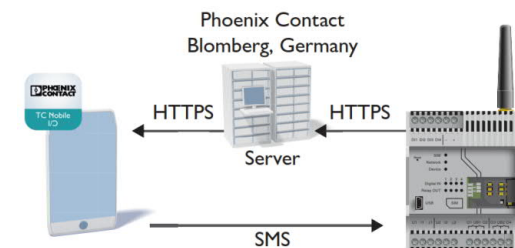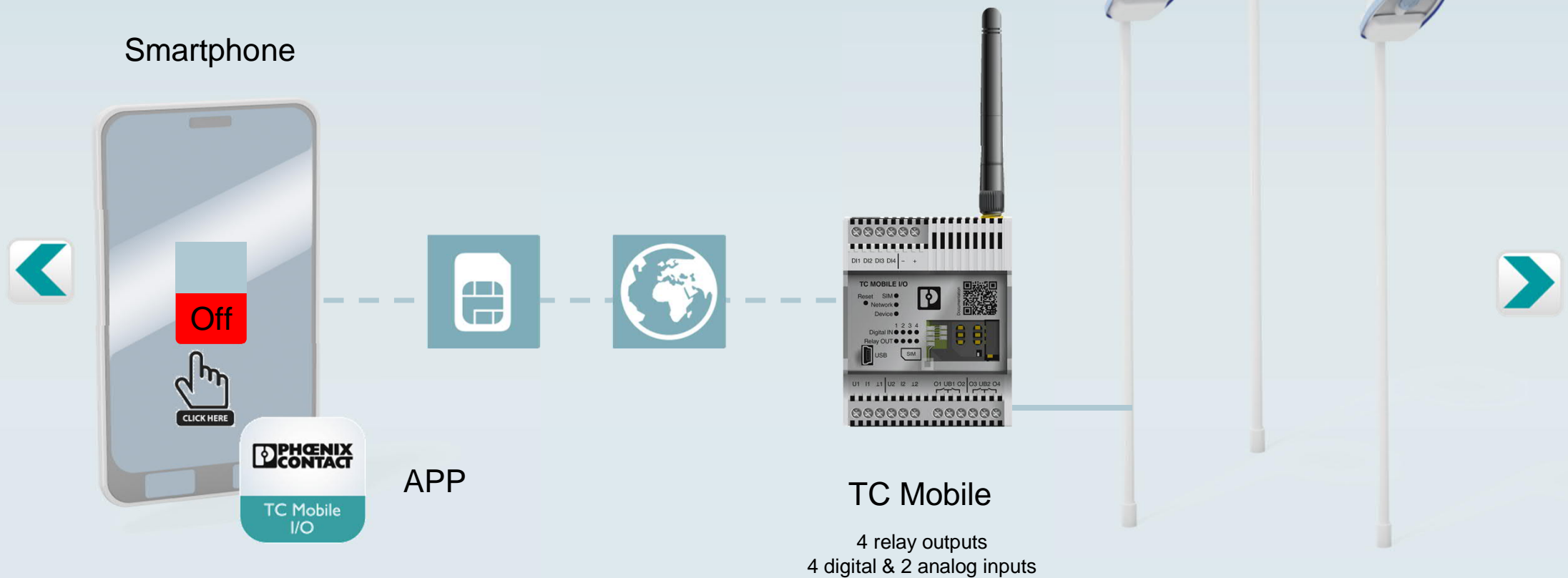Get the APP on

Google play or Apple Store

iOS

Android

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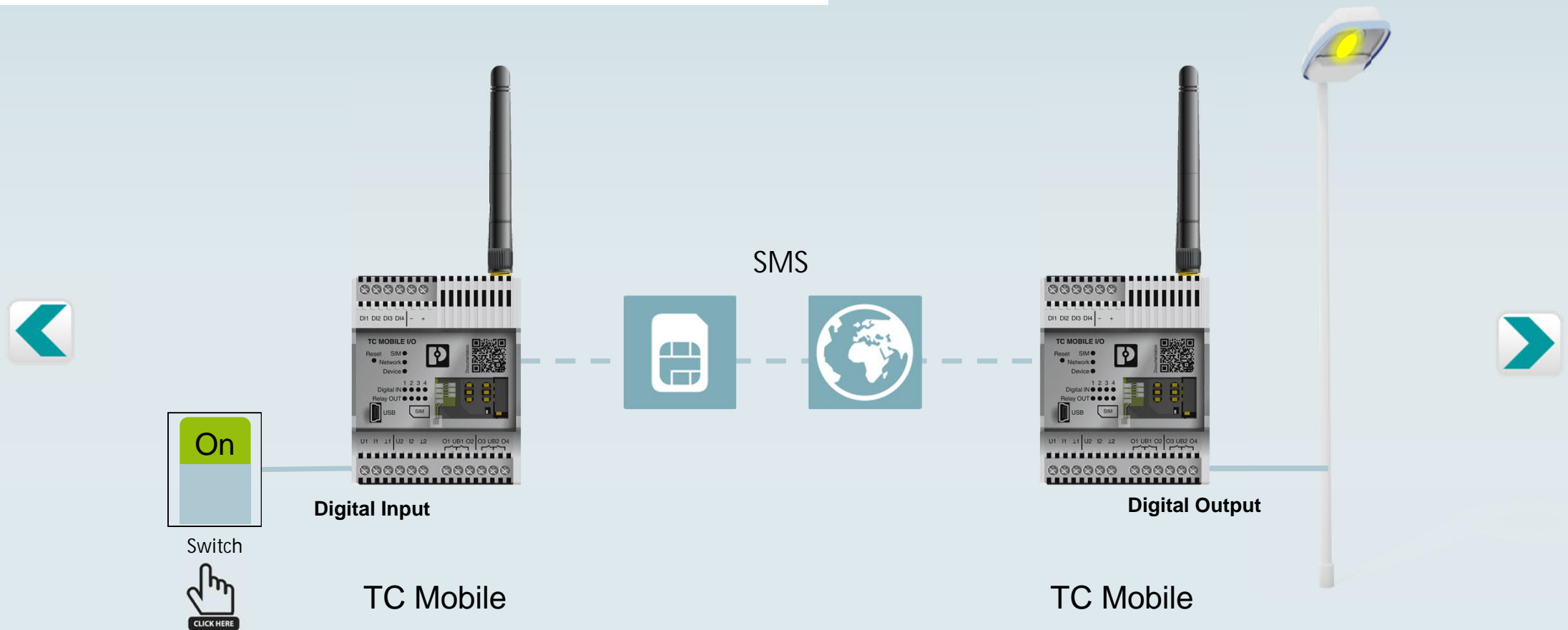- Full cost control
- Easy to use

Phoenix Contact
Blomberg, Germany

HTTPS   HTTPS

Server

SMS

Product
overview

PHŒNIX CONTACT
INSPIRING INNOVATIONS

X200: Switching relays remotely via APP

Smartphone

Off

CLICK HERE

PHŒNIX CONTACT

TC Mobile I/O

APP

TC MOBILE I/O

Reset SIM
Network
Device
Digital IN 1 2 3 4
Relay OUT
USB SIM

DI1 DI2 DI3 DI4 − +

U1 I1 ⊥1 U2 I2 ⊥2   O1 UB1 O2 O3 UB2 O4

TC Mobile

4 relay outputs
4 digital & 2 analog inputs

PHŒNIX CONTACT
INSPIRING INNOVATIONS

X200: Switching relays remotely

SMS

On

Switch

CLICK HERE

Digital Input

TC Mobile

Digital Output

TC Mobile

PHŒNIX CONTACT
INSPIRING INNOVATIONS

X200: Sending e-mails / SMS

E-mail

TC Mobile I/O X200
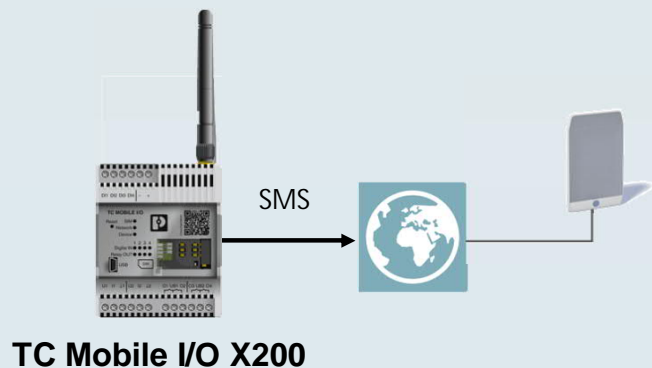
- The device can send alarms and cyclical messages by e-mail.

- Also the entire log book can be send as an e-mail.

- E-Mail communication can take place without encryption or with SSL encryption.
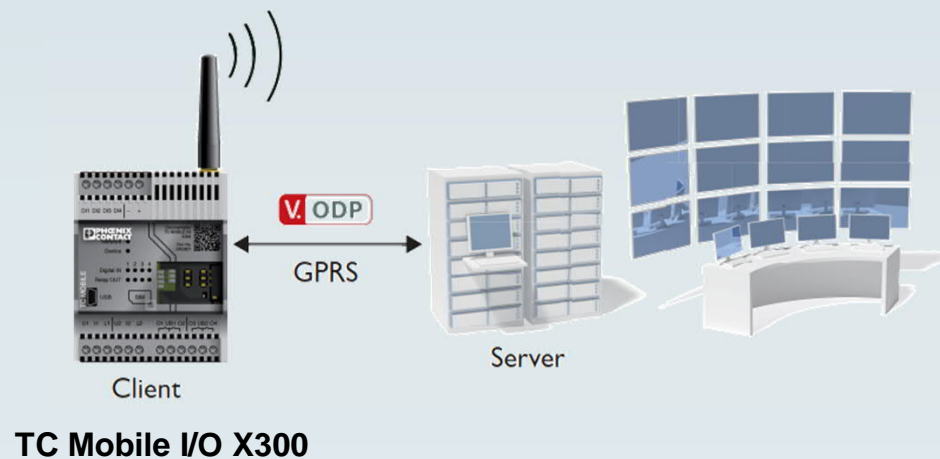
SMS

TC Mobile I/O X200

- 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!**

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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
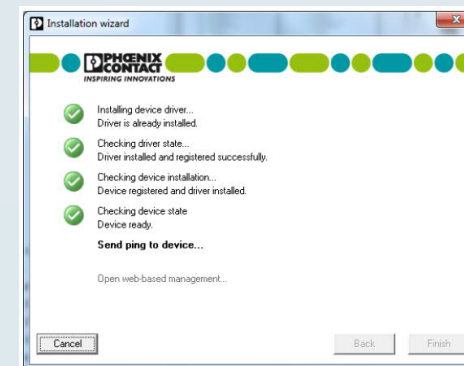
- Configuration via web browser

PHŒNIX CONTACT
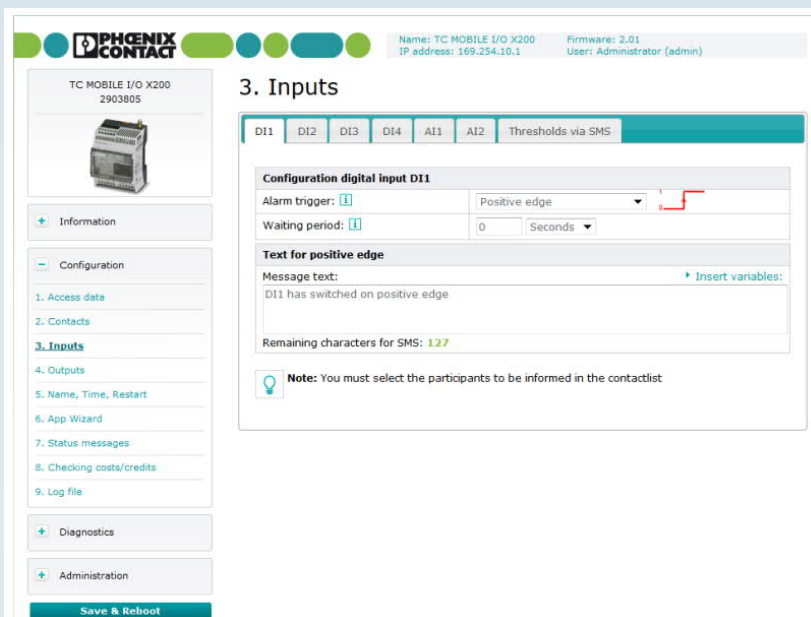INSPIRING INNOVATIONS
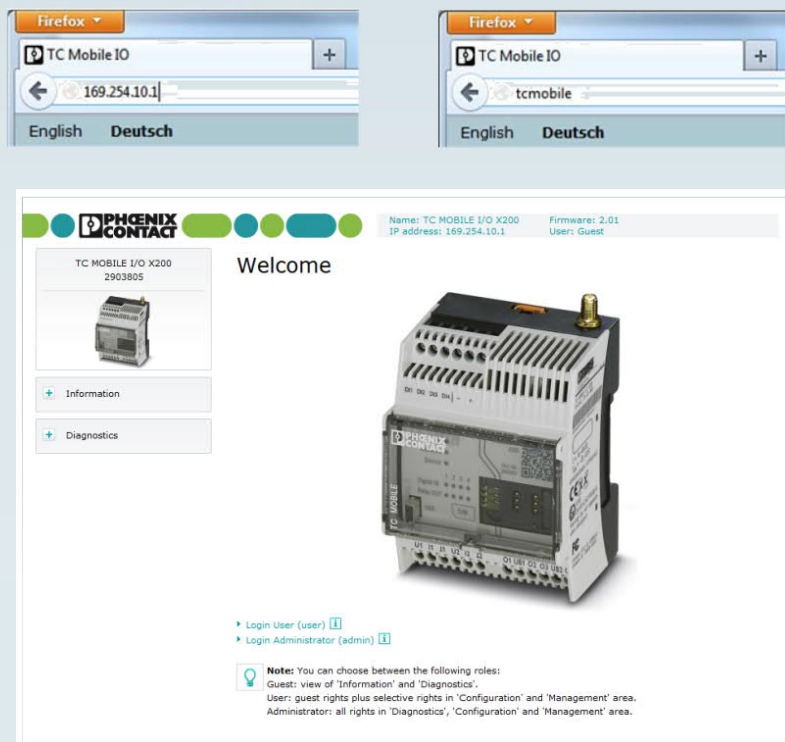
Web browser

- 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
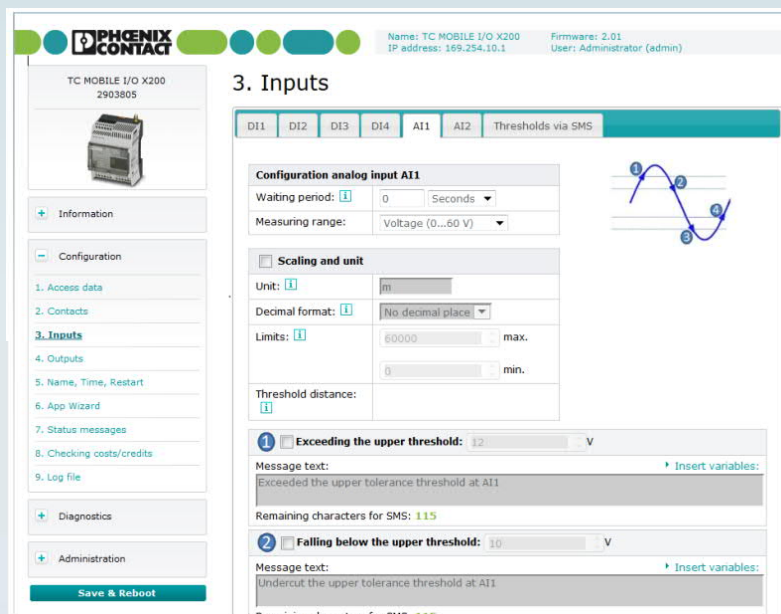

4 digital inputs

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Web browser – Relay Output
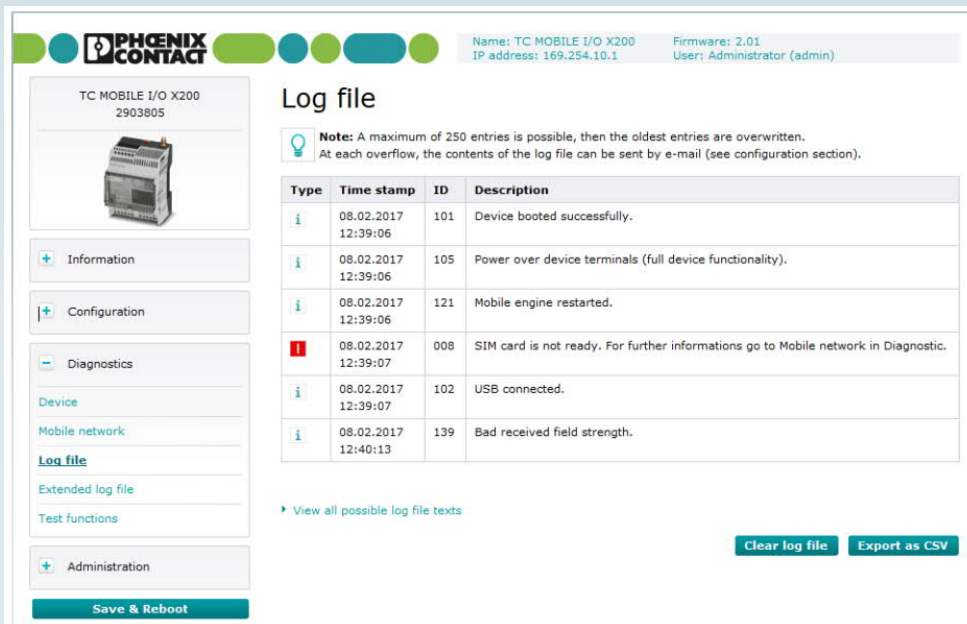
Relay Outputs

- 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

4 relay outputs

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

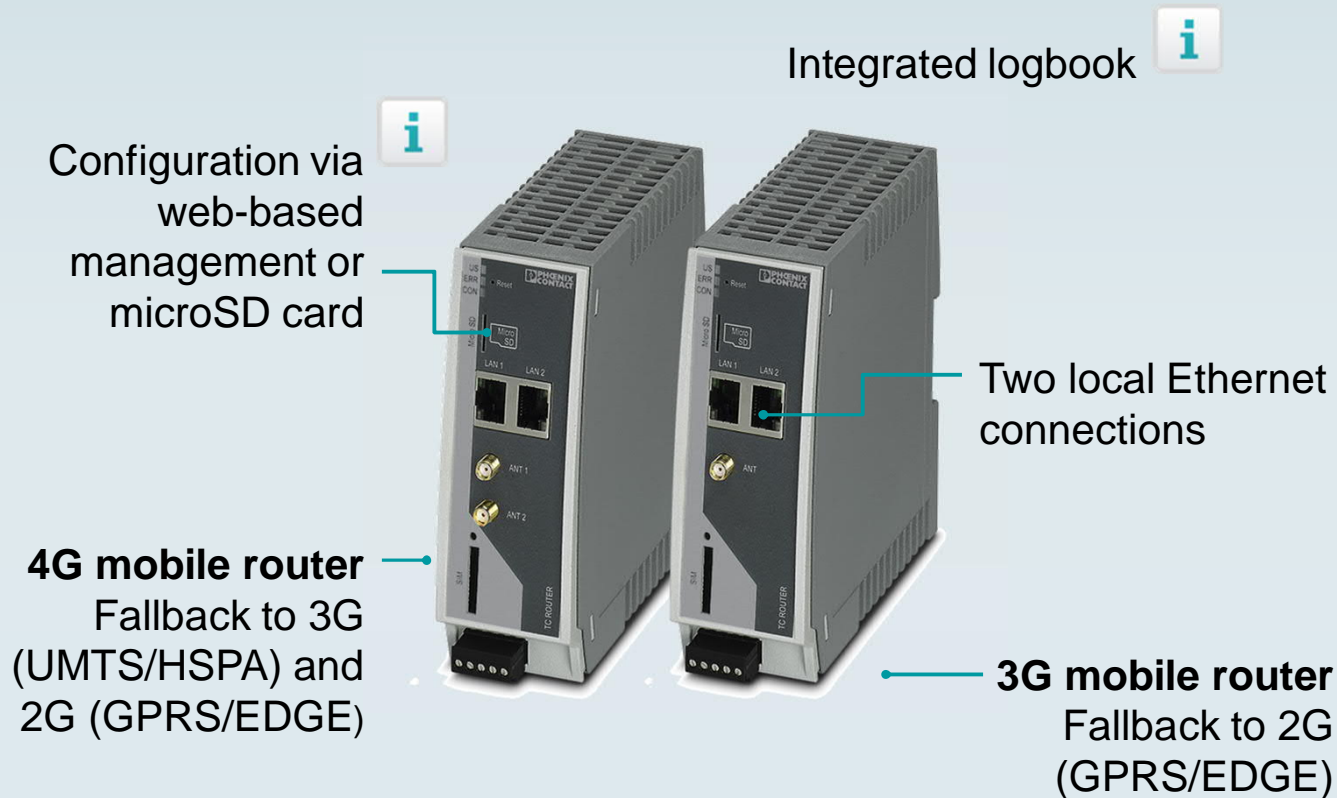- The content of the log book are not saved in the event of power failure

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

PHOENIX CONTACT
INSPIRING INNOVATIONS

TC Router

Integrated logbook [i]

Configuration via web-based management or microSD card [i]

Two local Ethernet connections

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

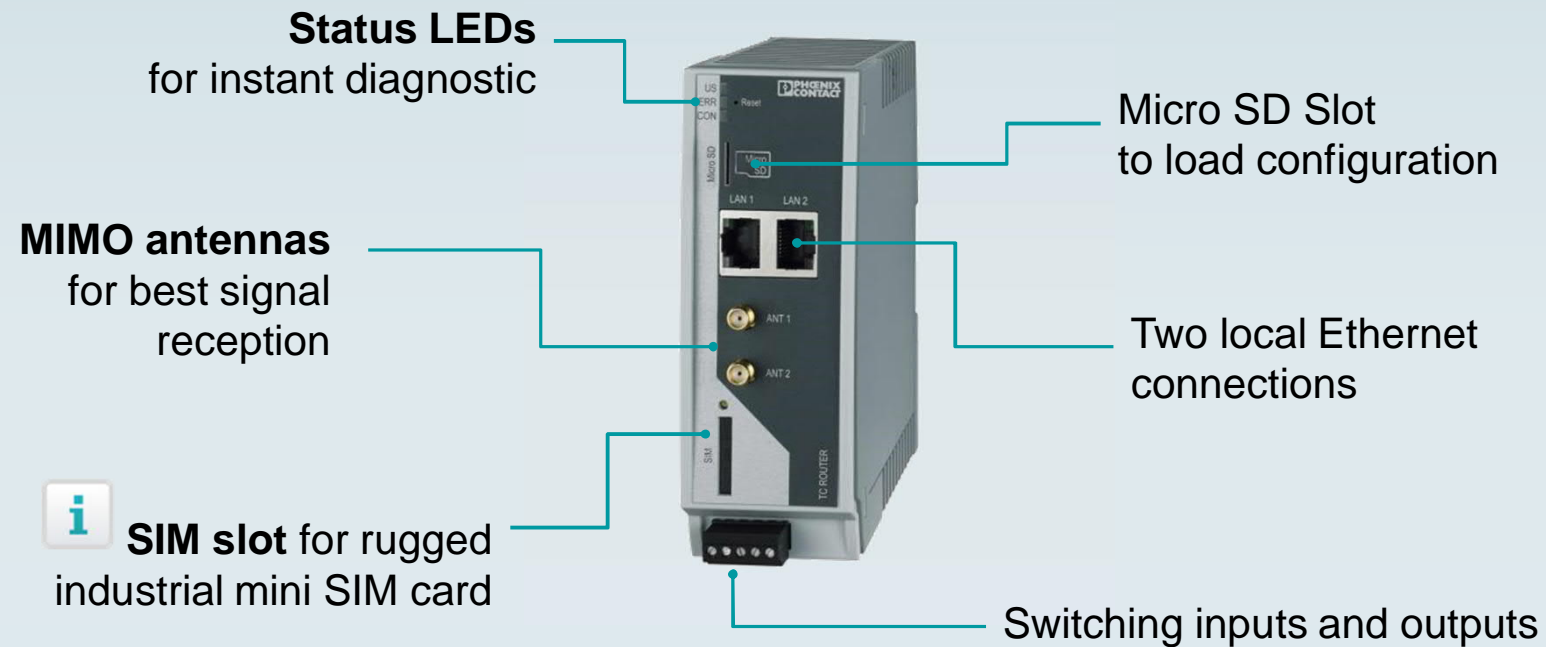**3G mobile router**
Fallback to 2G (GPRS/EDGE)

- 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 [i]

- Up to three VPN tunnels simultaneously

- VPN remote start via call or SMS

- Stateful inspection firewall for dynamic filtering [i]

PHŒNIX CONTACT
INSPIRING INNOVATIONS

TC Router

Status LEDs
for instant diagnostic

MIMO antennas
for best signal
reception

SIM slot for rugged
industrial mini SIM card

Micro SD Slot
to load configuration

Two local Ethernet
connections

Switching inputs and outputs

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS
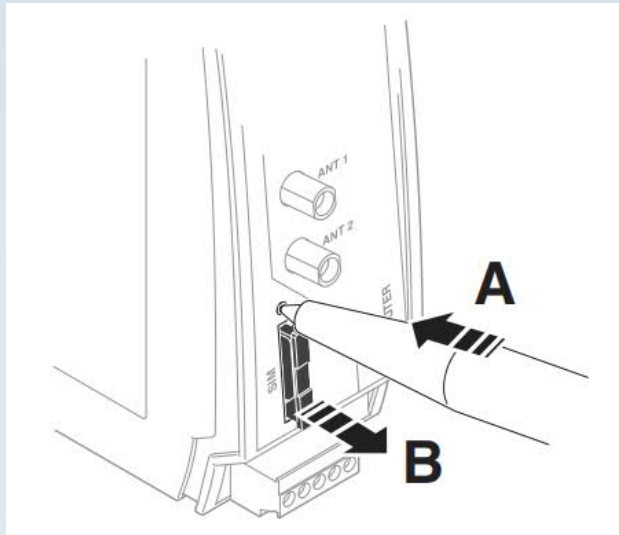
SIM card

Remove the SIM card holder, inside the SIM card
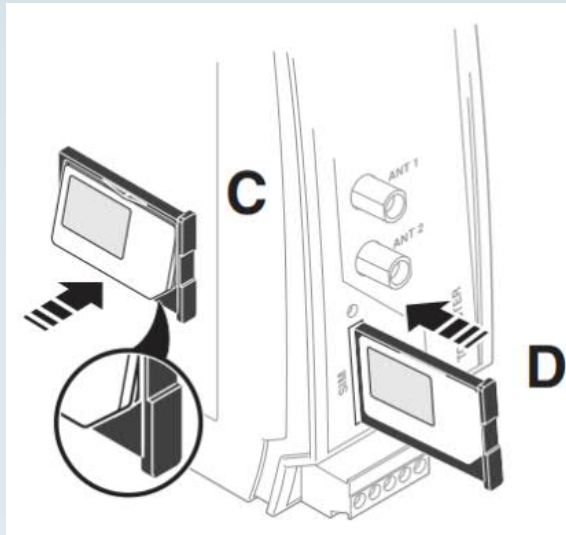
SIM slot for rugged industrial mini SIM card

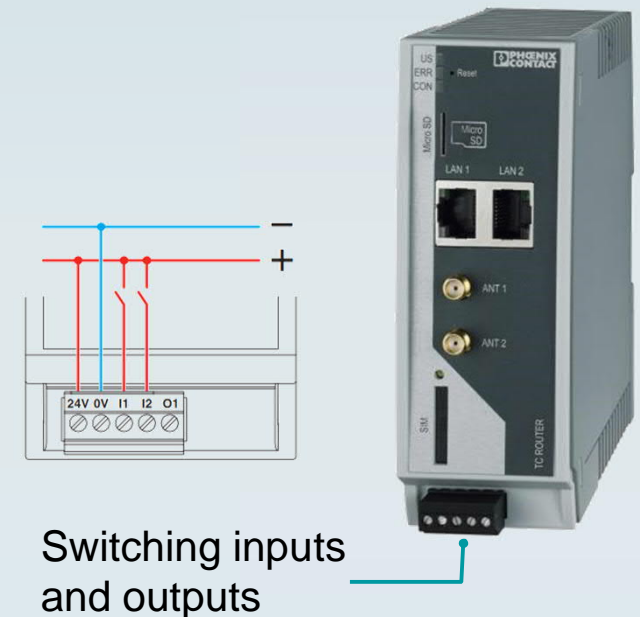**PHŒNIX CONTACT**
INSPIRING INNOVATIONS

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

Switching inputs
and outputs

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
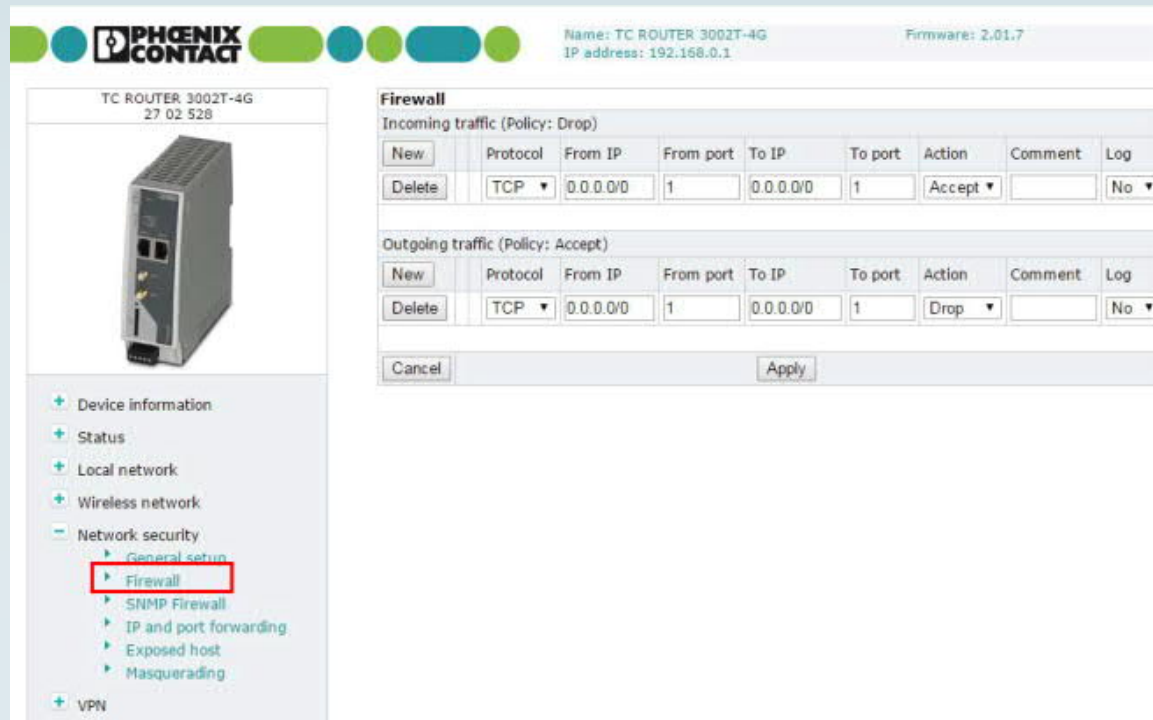
Firewall

- 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:

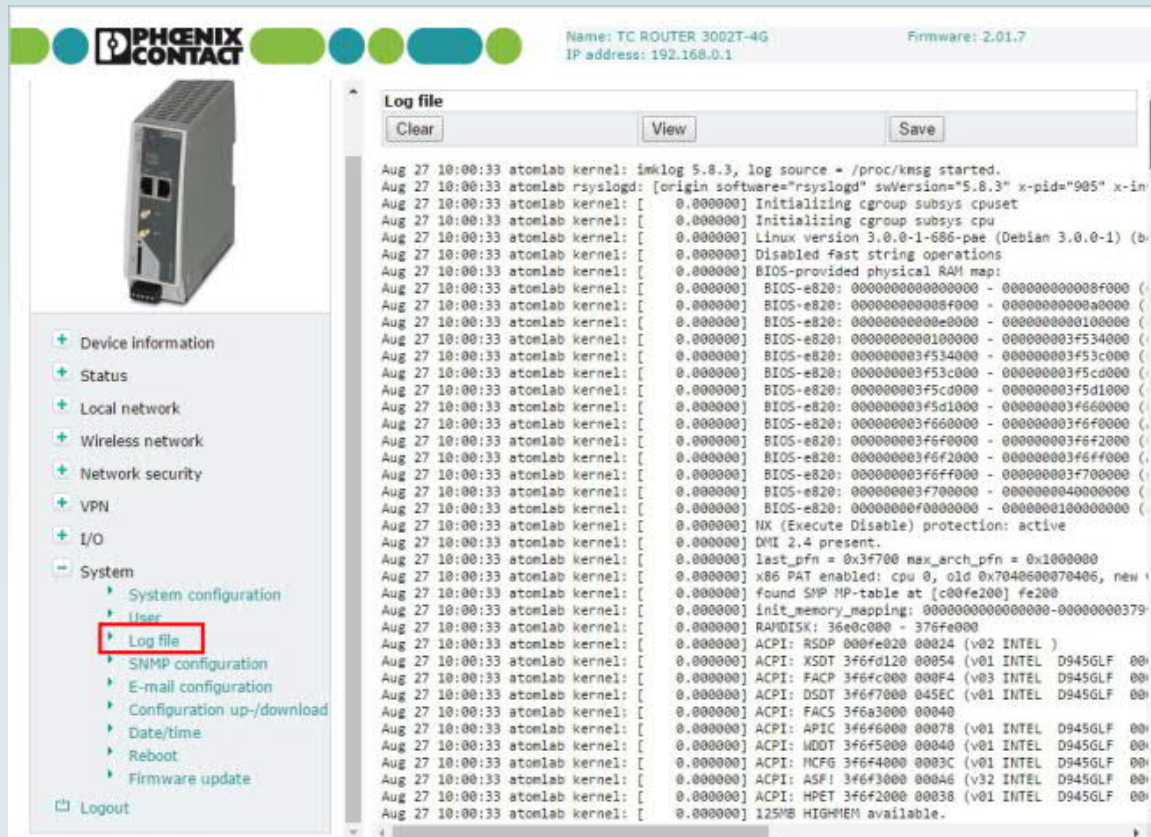- OpenVPN client
- TUN device
- Authentication via X.509 certificate or pre shared secret key (PSK)
- Static key
- TCP and UDP transmission protocol
- Keep Alive

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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)

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

TC Router

	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

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

TC CLOUD CLIENT 1002-TX/TX

Status LEDs for instant diagnosis

2 Ethernet ports

Micro SD Slot to load configuration

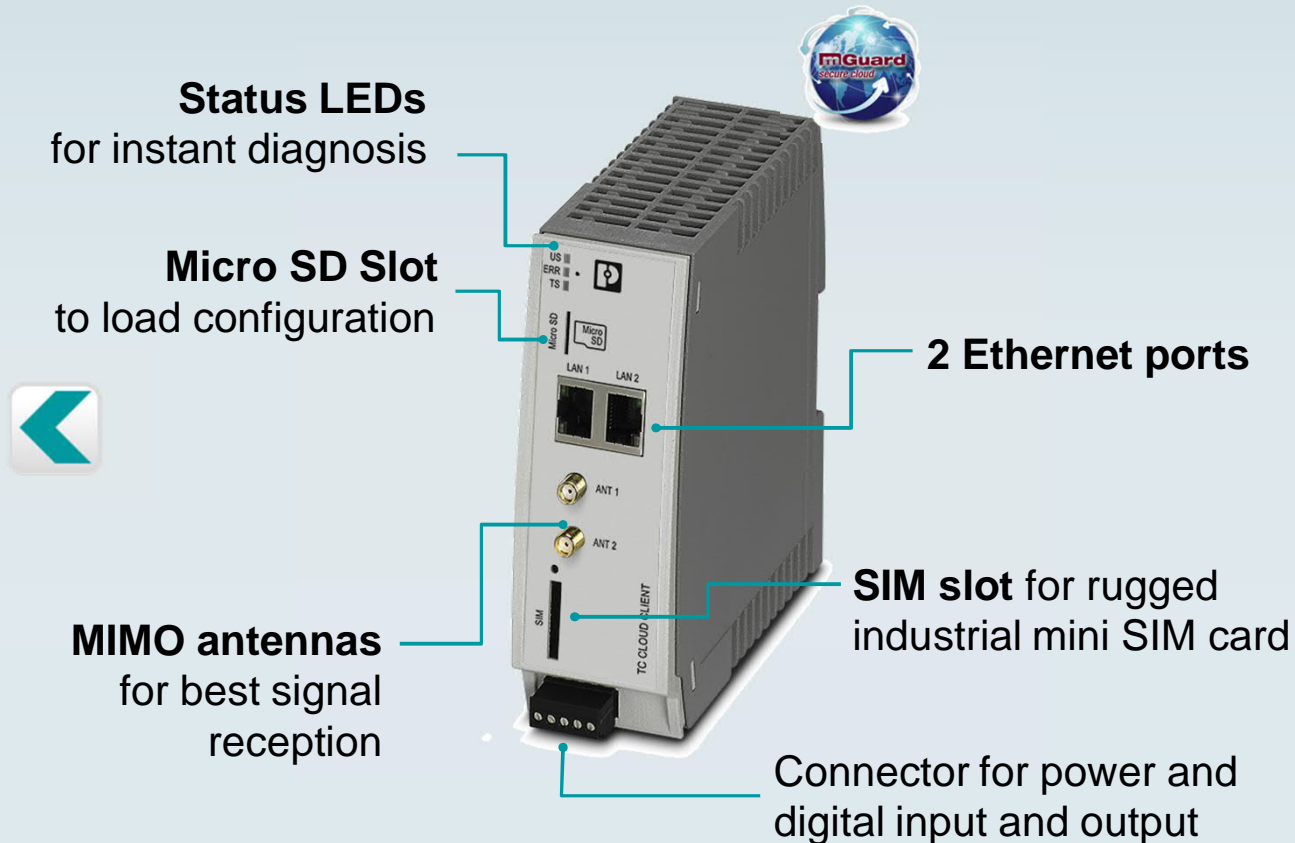Connector for power and digital input and output

- 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

MIMO antennas
for best signal
reception

2 Ethernet ports

SIM slot for rugged
industrial mini SIM card

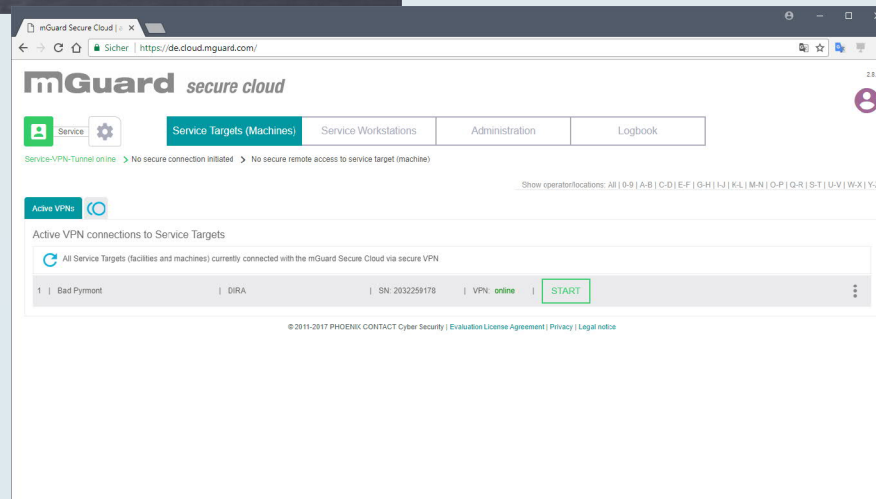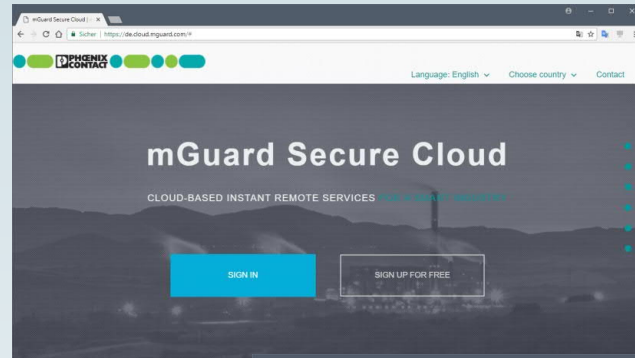Connector for power and
digital input and output

- 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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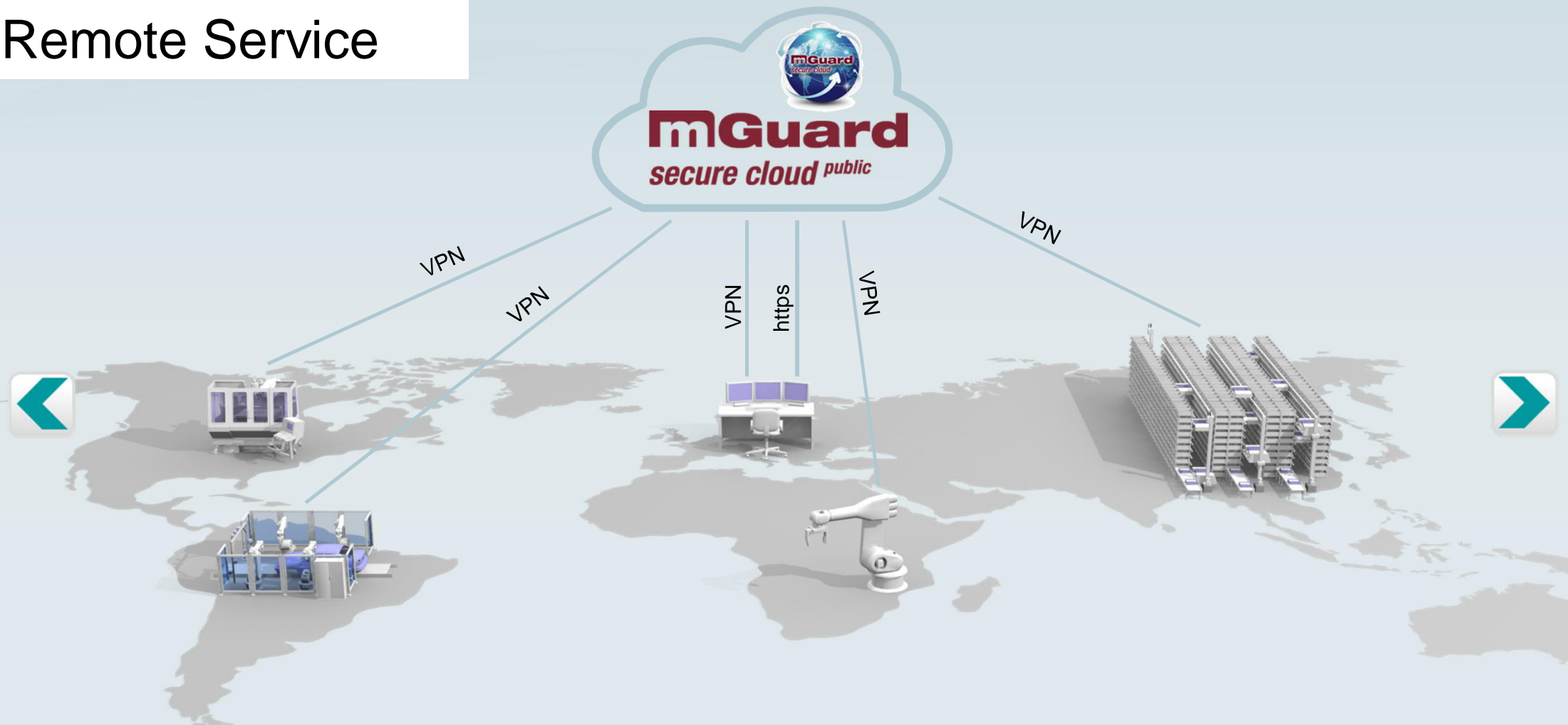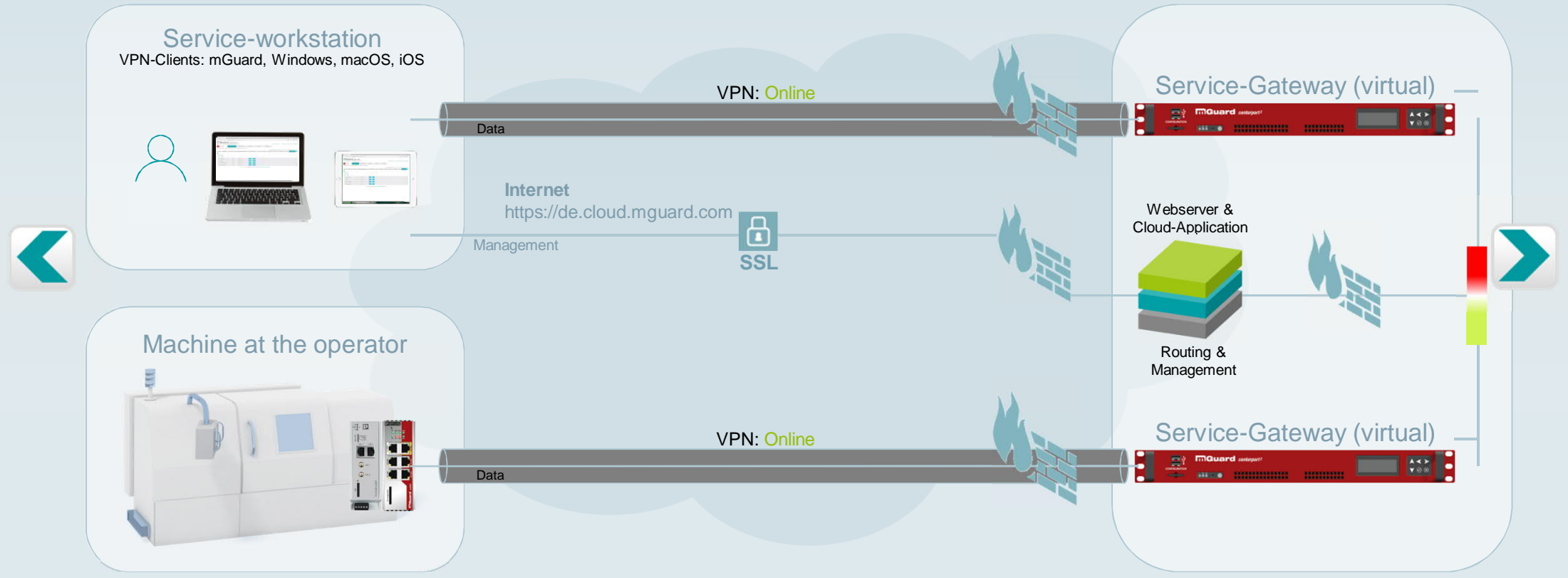
https://de.cloud.mguard.com/

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Remote Service

mGuard
secure cloud public

VPN   VPN   VPN   https   VPN   VPN

Product
overview

PHŒNIX
CONTACT
INSPIRING INNOVATIONS

mGuard secure Cloud

TC Cloud Client

Service technican

Machine A

Machine B

Machine C

PHŒNIX CONTACT
INSPIRING INNOVATIONS

TC Cloud Client

VPN-Gateway
(TC Cloud Client)

Switch

Service
workstation

IPC

Controler

Ethernet

VPN-Connection
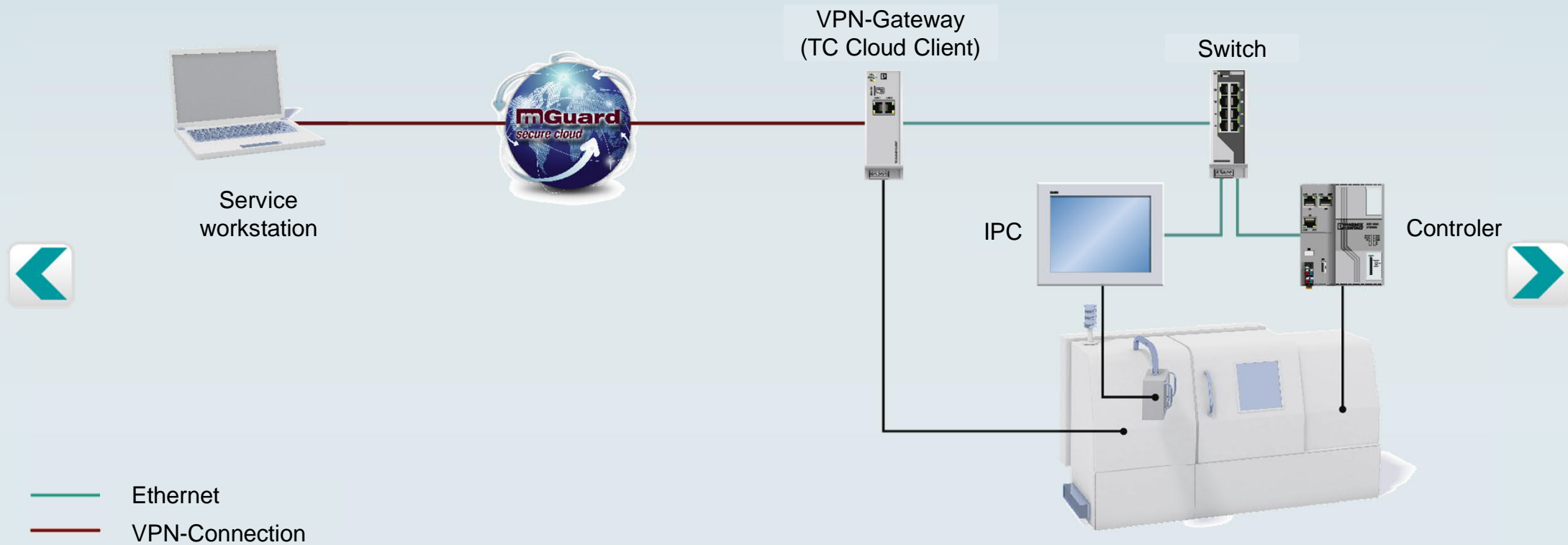
TC Cloud Client

	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

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.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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

PHŒNIX CONTACT
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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Everything for industrial networks

Fieldbus communication
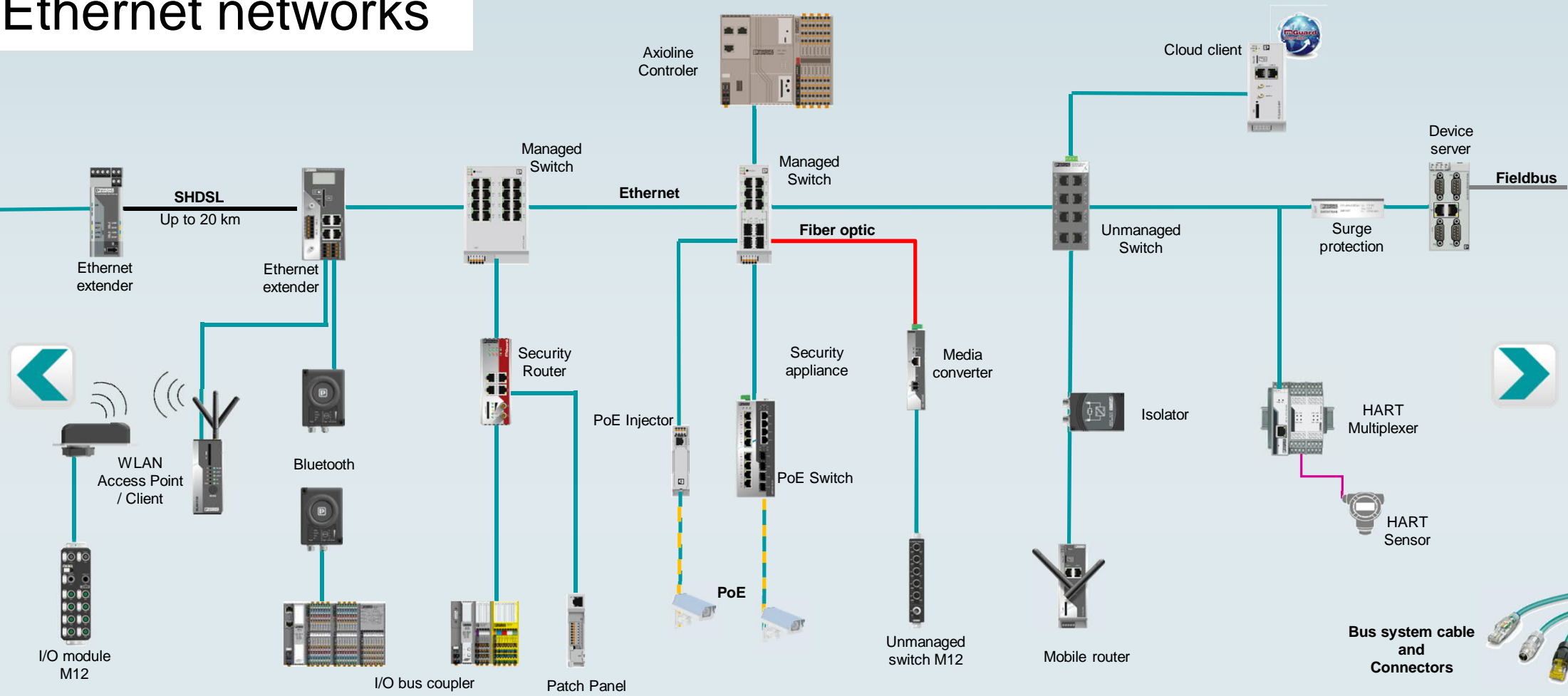
Industrial data communication

Everything for industrial networks

Fieldbus communication

Fieldbus extenders and repeaters

Multiplexer

Fiber-optic transmission

FF / Profibus PA

Converter and isolator

D-SUB connectors

Terminator

PHŒNIX CONTACT

Fieldbus networks

I/O bus coupler

Fiber optic converter

Fiber optics

Fiber optic converter

Fieldbus

Fieldbus repeater

Fieldbus

Terminator resistor

Bus system cable and Connectors

I/O bus coupler

SHDSL

SHDSL extender

I/O bus coupler

Inline Controler

RS 485

Modular I/O module

RS 485

Modular I/O module

Device server

Ethernet

PROFIBUS DP

PROFIBUS PA gateway

PROFIBUS PA

Modular field device coupler

EX

Zone 2

EX

Zone 2

Multi channel Field device coupler

EX

Zone 1

Multi channel Field device coupler

PHŒNIX CONTACT

Ethernet networks

Axioline Controler

Cloud client

Device server

Managed Switch

Managed Switch

Ethernet

Fieldbus

SHDSL
Up to 20 km

Fiber optic

Unmanaged Switch

Surge protection

Ethernet extender

Ethernet extender

Security Router

Security appliance

Media converter

PoE Injector

Isolator

HART Multiplexer

WLAN Access Point / Client

Bluetooth

PoE Switch

PoE

HART Sensor

I/O module M12

I/O bus coupler

Patch Panel

Unmanaged switch M12

Mobile router

Bus system cable and Connectors

PHŒNIX CONTACT

Everything for industrial networks

Industrial Wireless

Wireless Serial

Wireless I/O
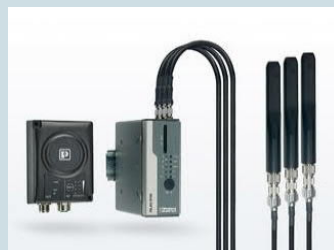
Wireless Ethernet

Industrial Wireless

Wireless Ethernet
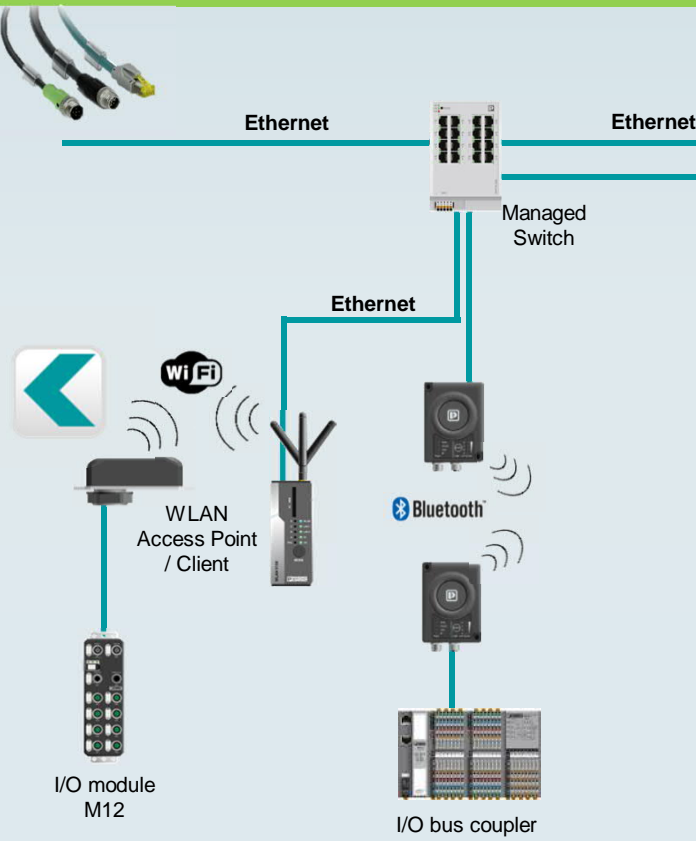
Wireless I/O
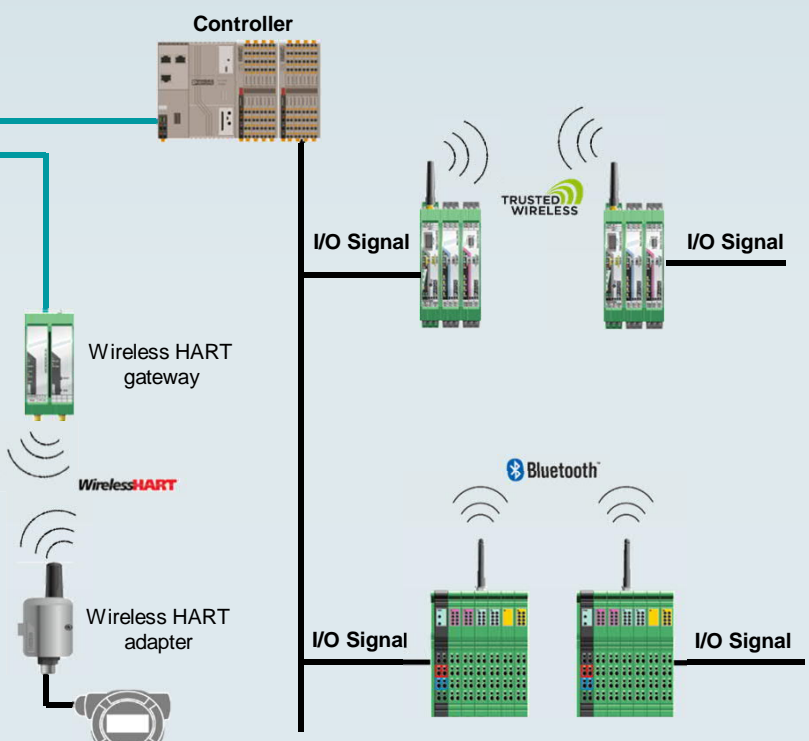
Wireless Serial
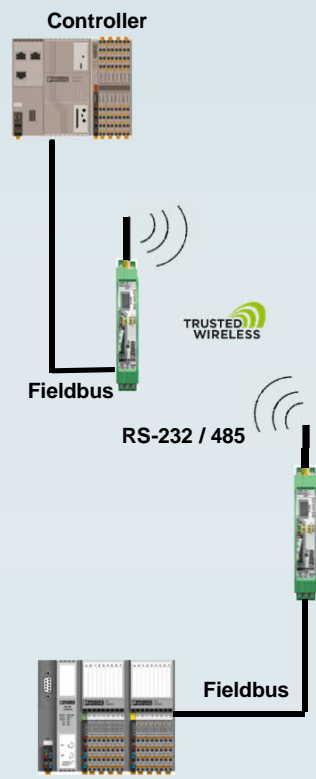
Ethernet

Ethernet

Controller

Managed Switch

Ethernet

WLAN Access Point / Client

I/O module M12

I/O bus coupler

Wireless HART gateway

Wireless HART adapter

Controller

I/O Signal

TRUSTED WIRELESS

I/O Signal

Bluetooth

I/O Signal

I/O Signal

Controller

TRUSTED WIRELESS

Fieldbus

RS-232 / 485

Fieldbus

WirelessHART

PHŒNIX CONTACT

Everything for industrial networks

Cyber Security

Device managemend software

Security-Router and Firewalls

PHŒNIX CONTACT

Cyber Security

Secure site networking via VPN

Internet router

VPN tunnel

Office network

Device managemend software

Secure service access

Secure production network

mGuard firewall, router, VPN

Secure station

FL Network Manager
Network startup and monitoring

Service technician A

Service technician B

VPN tunnel

mGuard firewall, router, VPN

VPN tunnel

Service interface with user-defined firewall rules

mGuard firewall,

Secure automation cell 1

mGuard firewall, router, VPN, 1:1 NAT

Secure automation cell 2

mGuard firewall, router, VPN, 1:1 NAT

Unsecure outer area

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

PHŒNIX CONTACT

Everything for industrial networks

Alarm generation

Remote communication

Remote maintenance

Remote control

PHŒNIX CONTACT
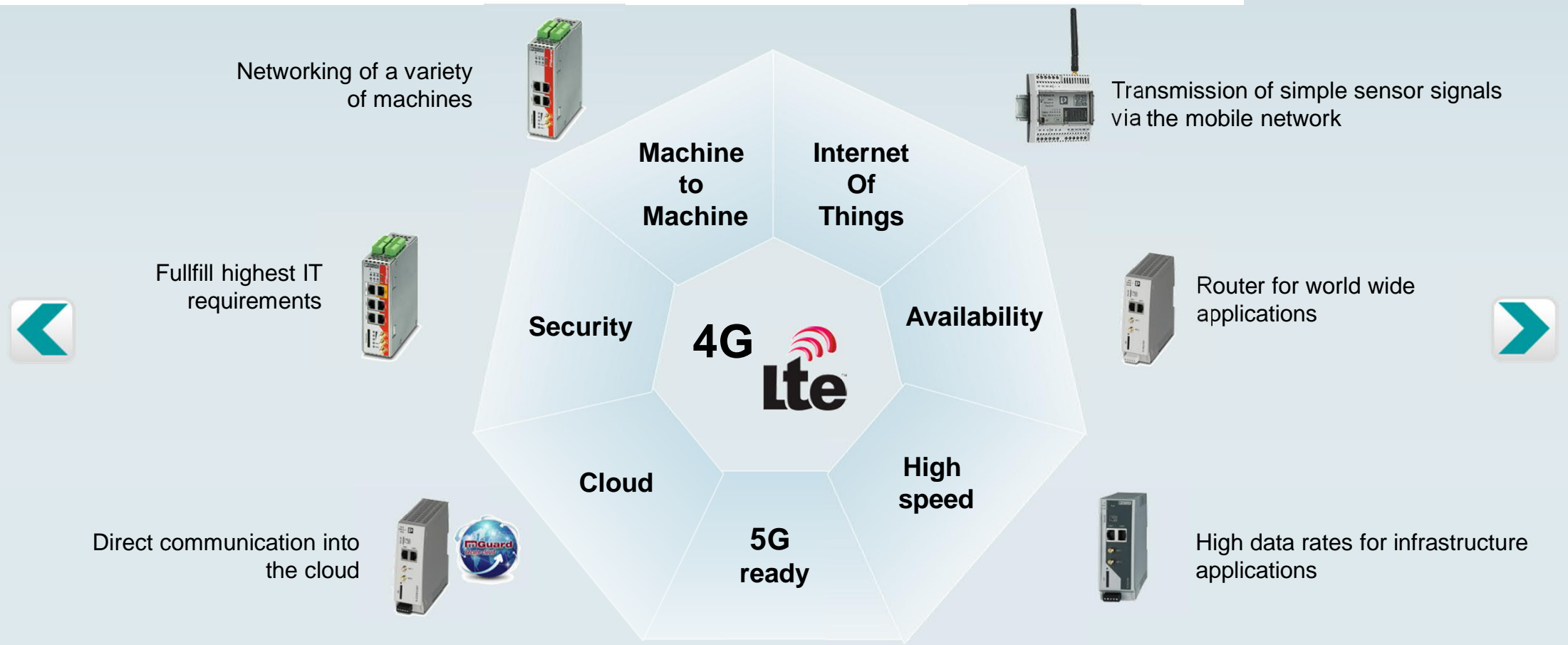
Mobile networks product in every application

TC MOBILE I/O

Alarming and Monitoring
for infrastructure applications

TC ROUTER 4G

Universal cellular router for infrastructure applications

TC MGUARD RS2000

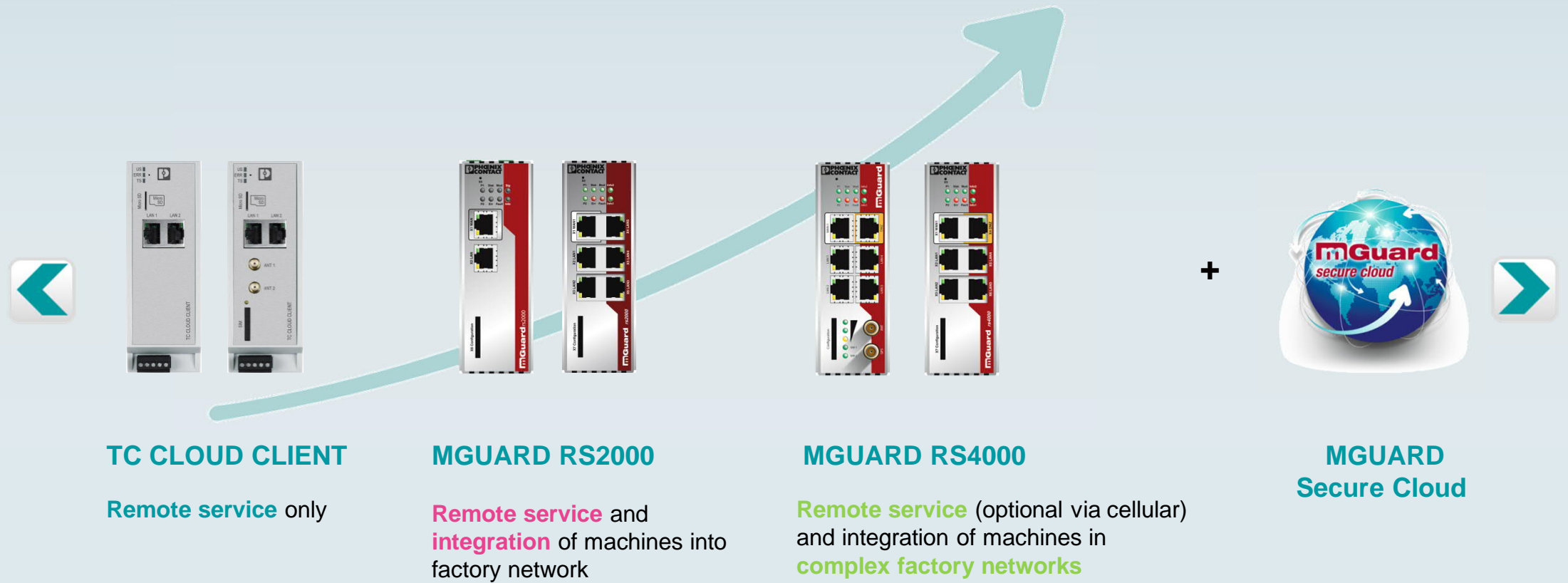**Remote communication** for infrastructure applications with redundant provider

TC MGUARD RS4000

Remote communication for infrastructure applications with fallback WAN to mobile network

PHŒNIX CONTACT

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

PHŒNIX CONTACT

Everything for industrial networks

Isolator

Overvoltage Protection

Network availability

Patch panel

Redundance

PHŒNIX CONTACT

Everything for industrial networks

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

PHŒNIX CONTACT

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
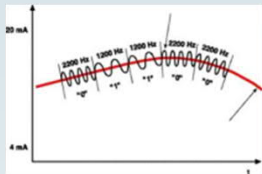- For POF,PCF and GOF
- For all common fiber-optic interfaces

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
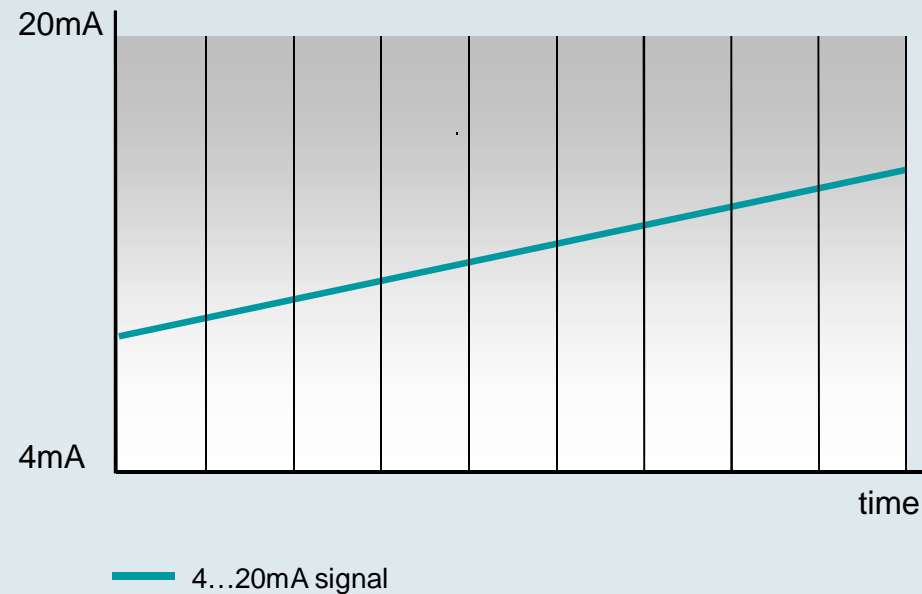HART 7 was released, and included the WirelessHART standard.

2012
HART 7 was enhanced with additional functionality, including HART IP.

HART Technology

What is a 4…20mA signal?

4…20mA signal

- 4…20mA signal represents a physical measurement range
  - e.g., 0…100°F

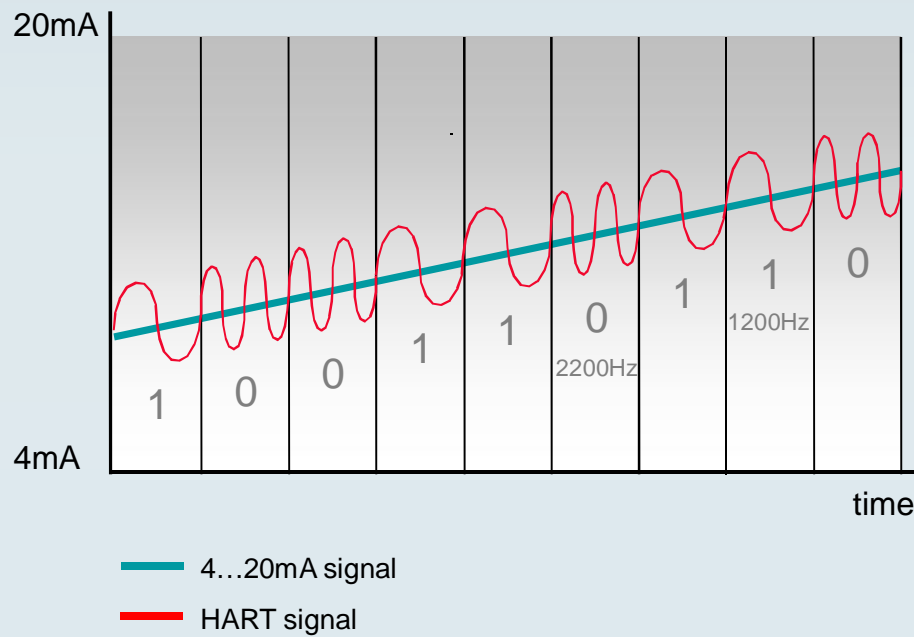- a signal less than 4mA or greater than 20mA indicates a problem

HART Technology

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

20mA

1   0   0   1   1   0   1   1   0

2200Hz

1200Hz

4mA

time

— 4…20mA signal

— HART signal

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

- FSK modulation

  (frequency shift keying)

- 1200bps

PHŒNIX CONTACT

HART devices

Most process measurement instruments are HART capable

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

3.5 psi
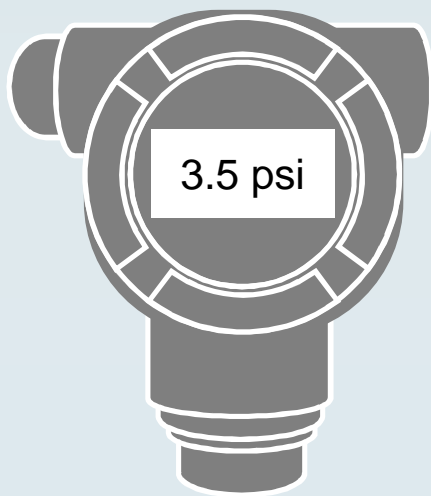
4…20mA — represents the process variable

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
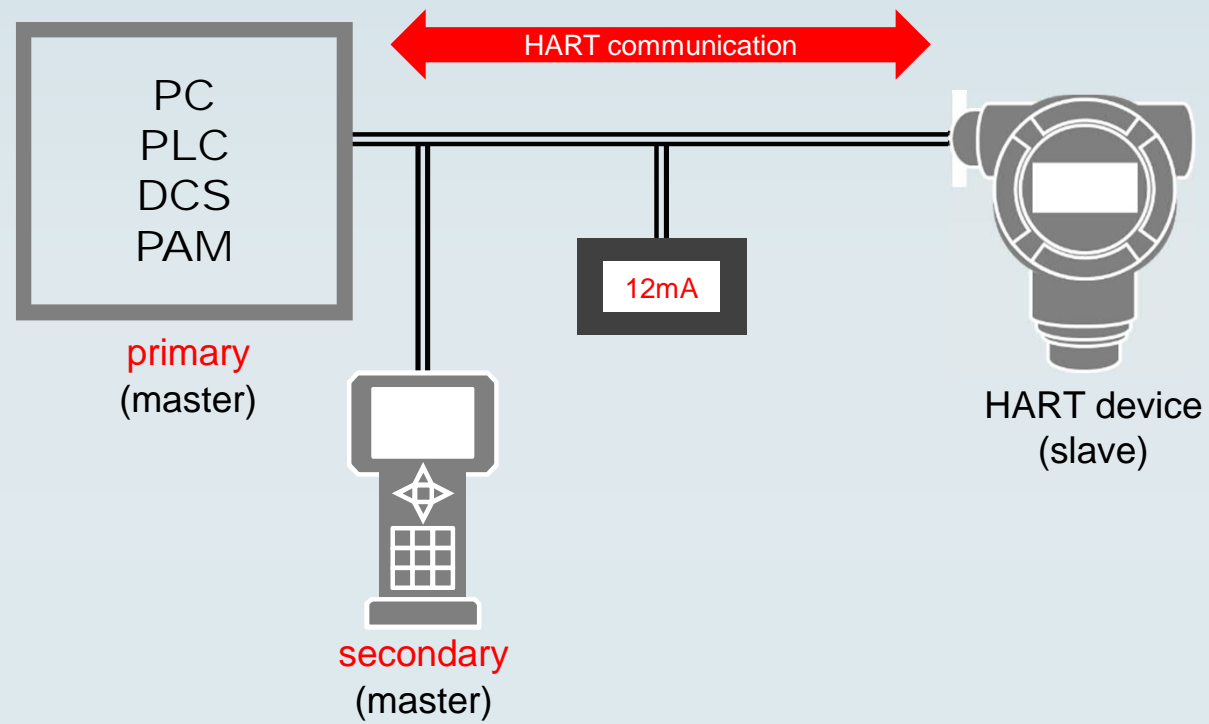
- Write device range values

- 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
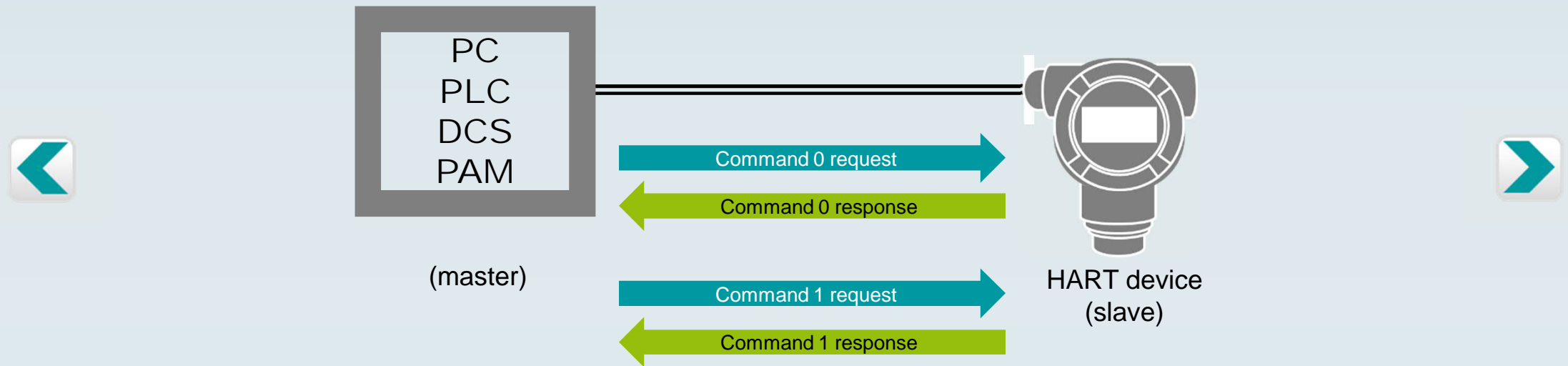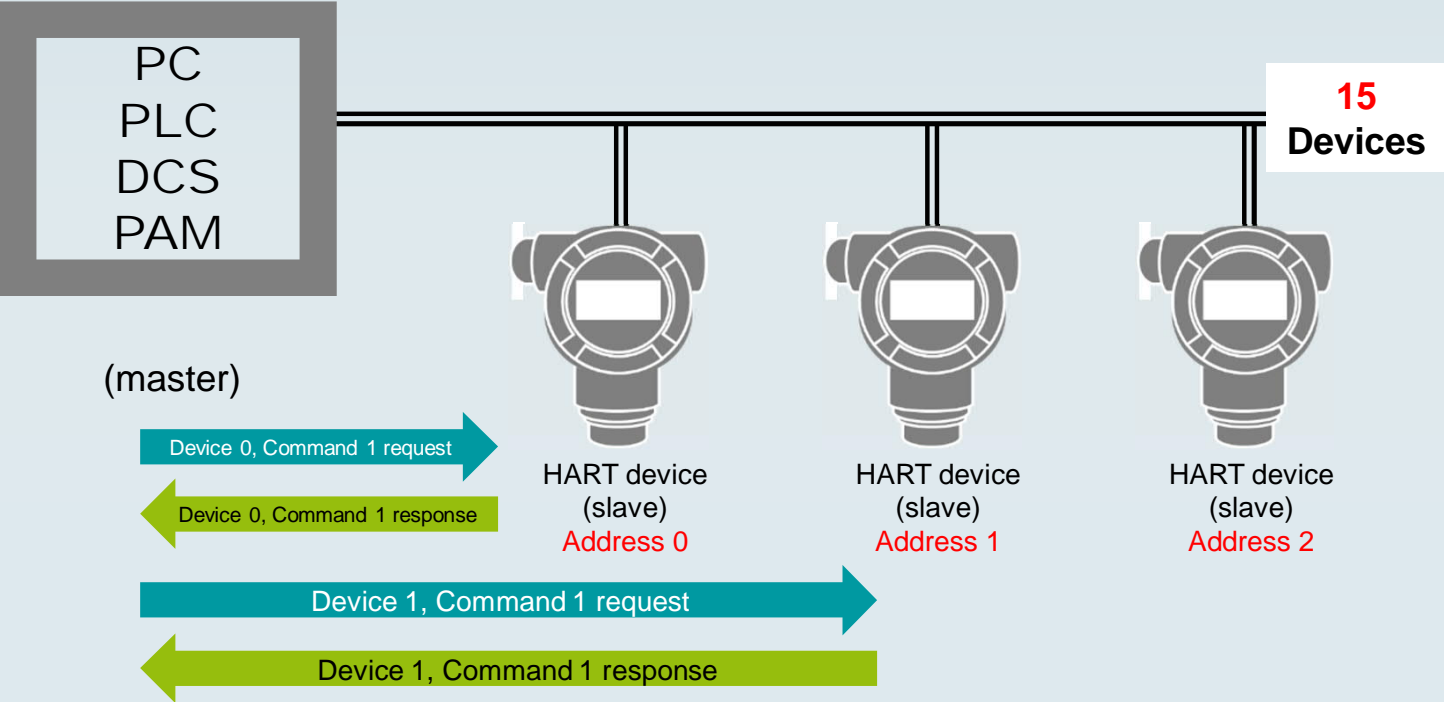
- Valve characterization
- Valve set point

PHŒNIX CONTACT

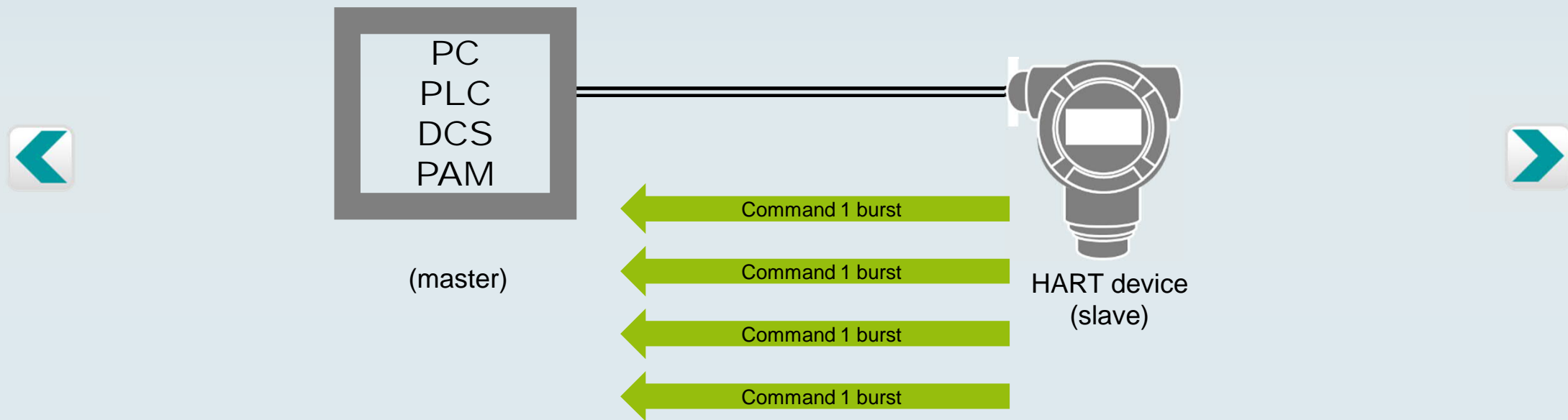# HART communication

HART communication modes

Poll and response

HART communication modes

Multidrop

PC
PLC
DCS
PAM

15 Devices

(master)

Device 0, Command 1 request →

← Device 0, Command 1 response

HART device (slave) Address 0

HART device (slave) Address 1

HART device (slave) Address 2

Device 1, Command 1 request →

← Device 1, Command 1 response

PHŒNIX CONTACT

HART communication modes

Burst

PC
PLC
DCS
PAM

(master)

Command 1 burst

Command 1 burst

Command 1 burst

Command 1 burst

HART device
(slave)

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
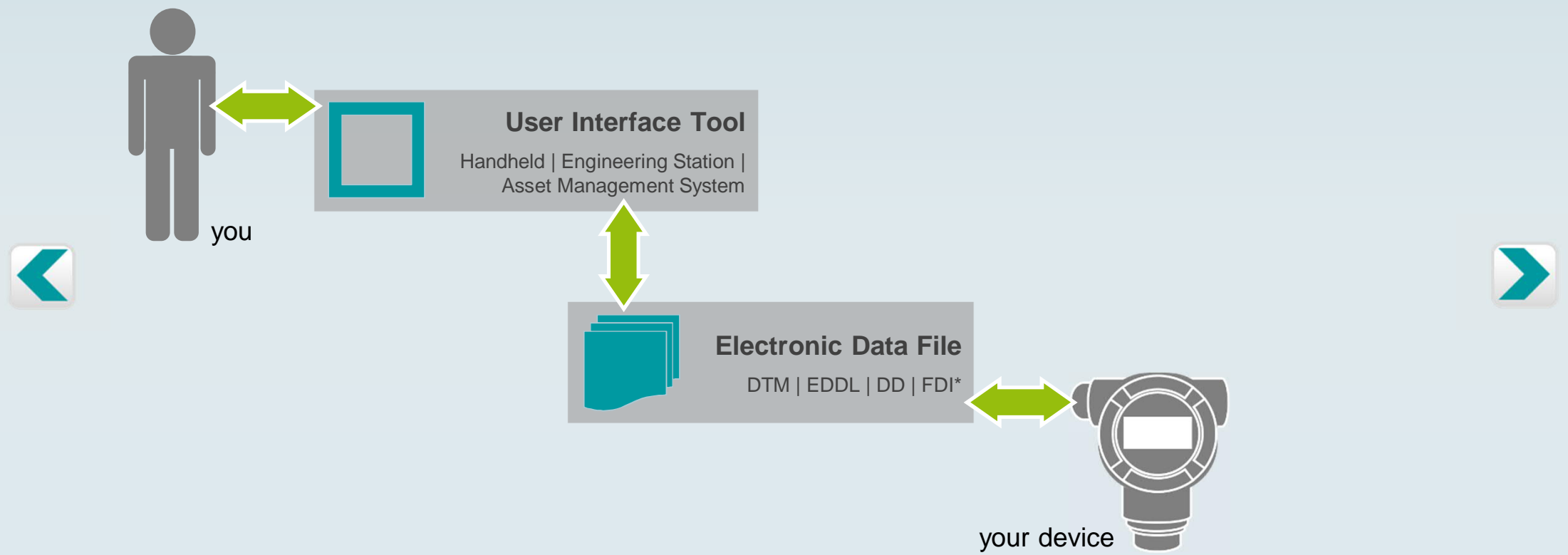- absolute pressure and temperature
- totalized flow

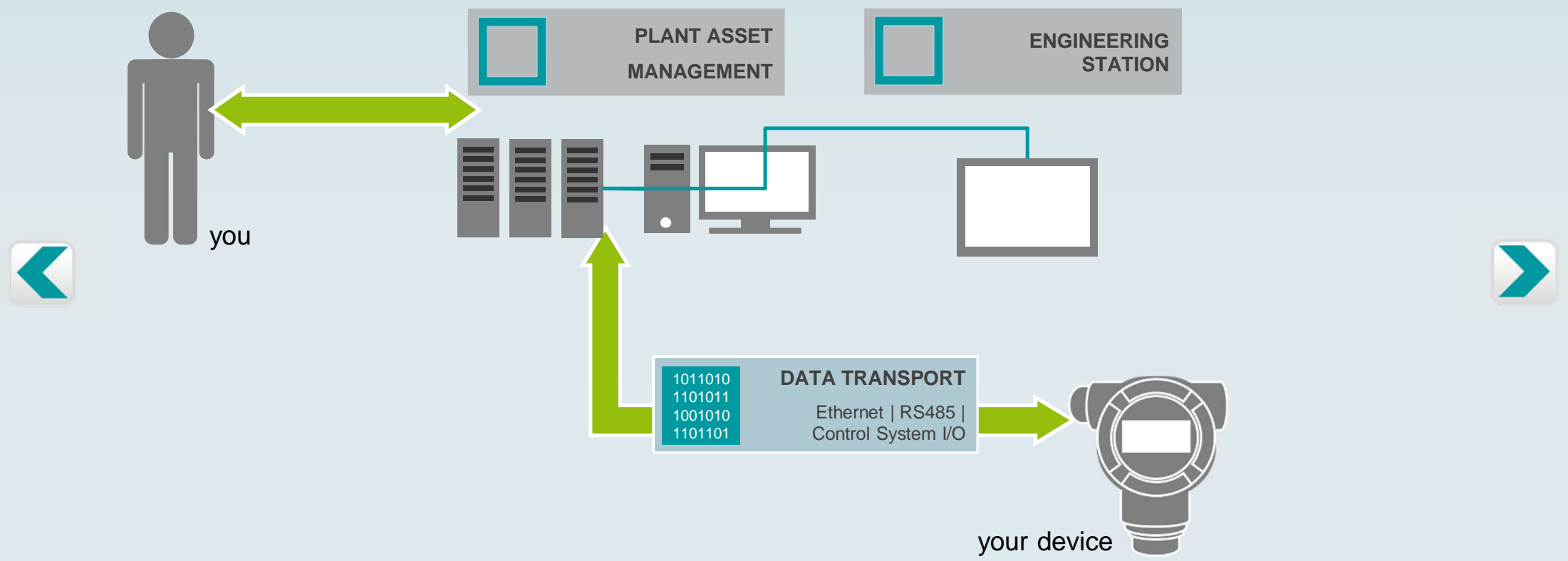**pH**
- temperature measurement
- sensor health

Accessing device data

you

User Interface Tool

Handheld | Engineering Station |
Asset Management System

Electronic Data File

DTM | EDDL | DD | FDI*

your device

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

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

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

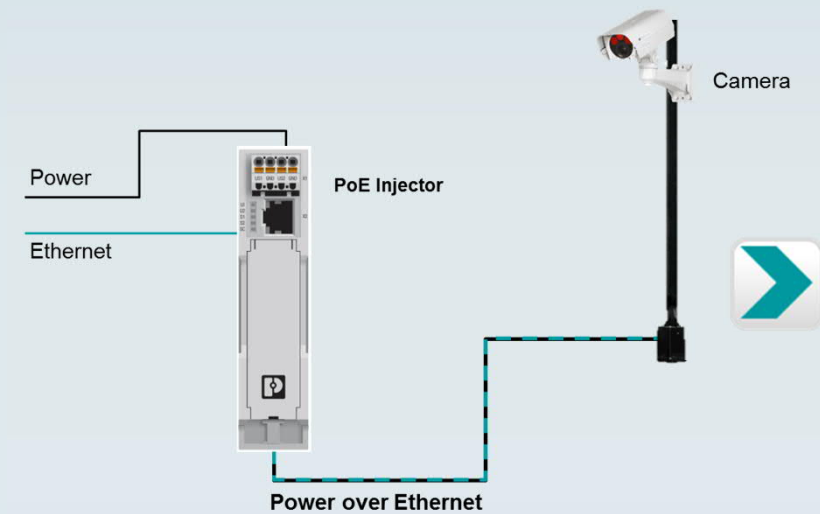- **Improve regulatory compliance**
    - enable automated record keeping of compliance data
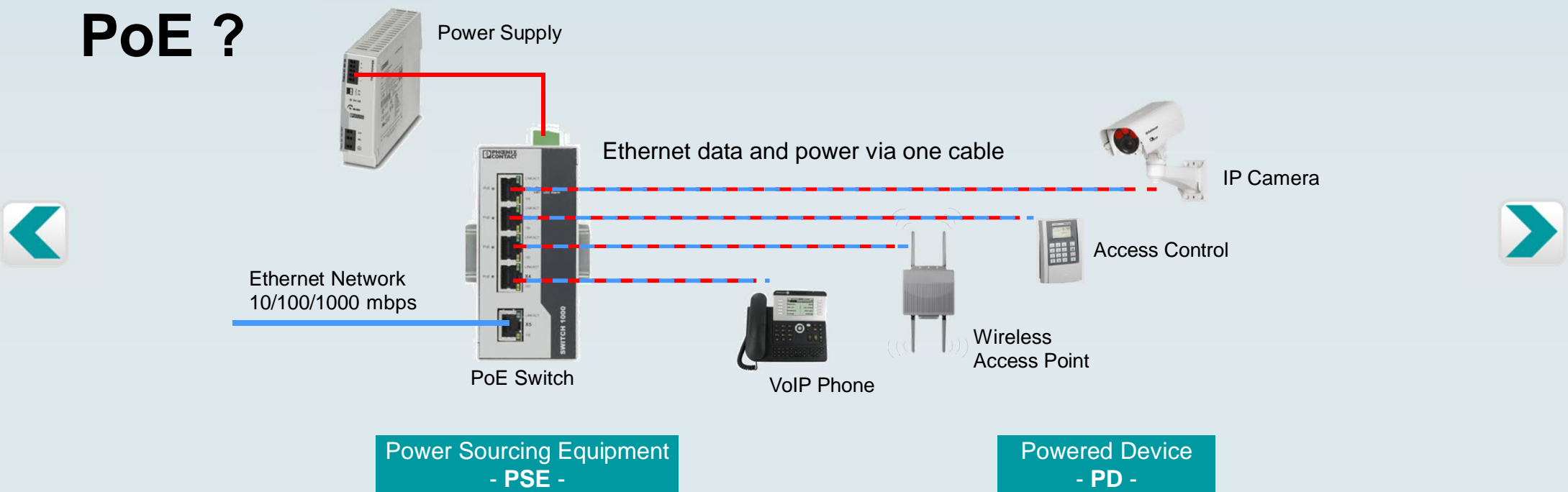   - take advantage of multivariable devices for more thorough reporting

Power over Ethernet (PoE)

Power over Ethernet (PoE)

PoE ?

Power Supply

Ethernet data and power via one cable

IP Camera

Access Control

Ethernet Network
10/100/1000 mbps

Wireless
Access Point

PoE Switch

VoIP Phone

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
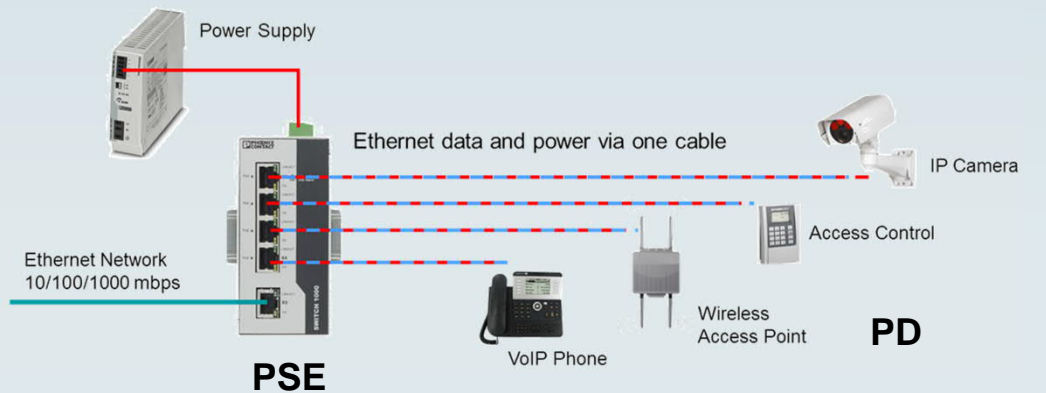
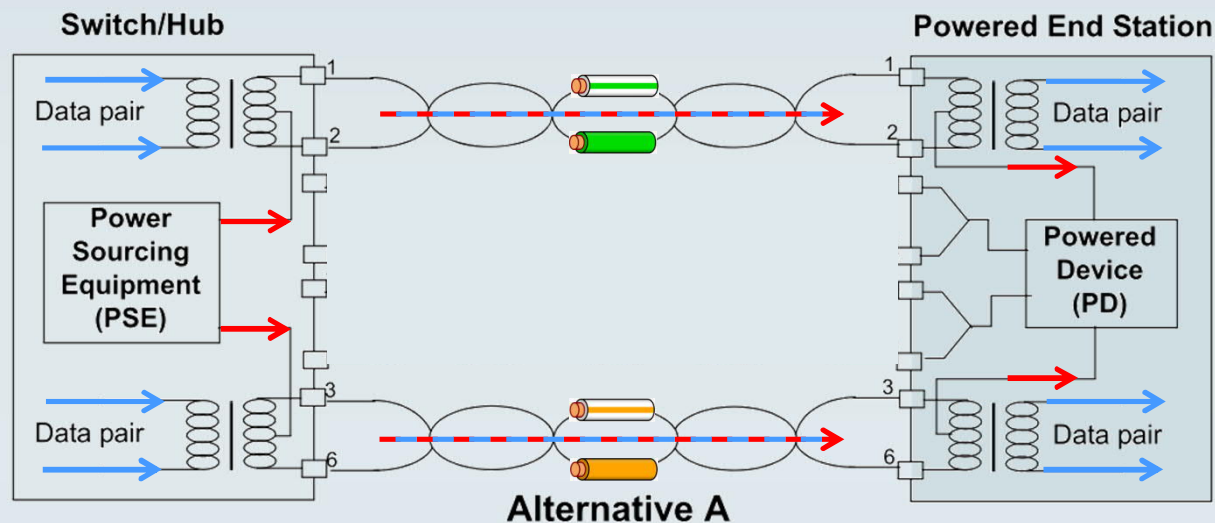Power Sourcing Equipment (PSE)

„**Endspan**" type
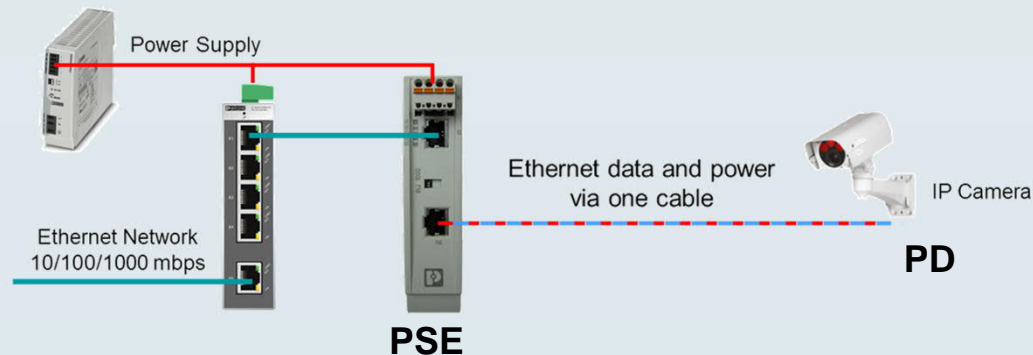
Power Sourcing Equipment (PSE)

„**Midspan**" type

Power over Ethernet (PoE)

PoE af/at Mode A

10BASE-T/100BASE-TX Endpoint PSE location overview
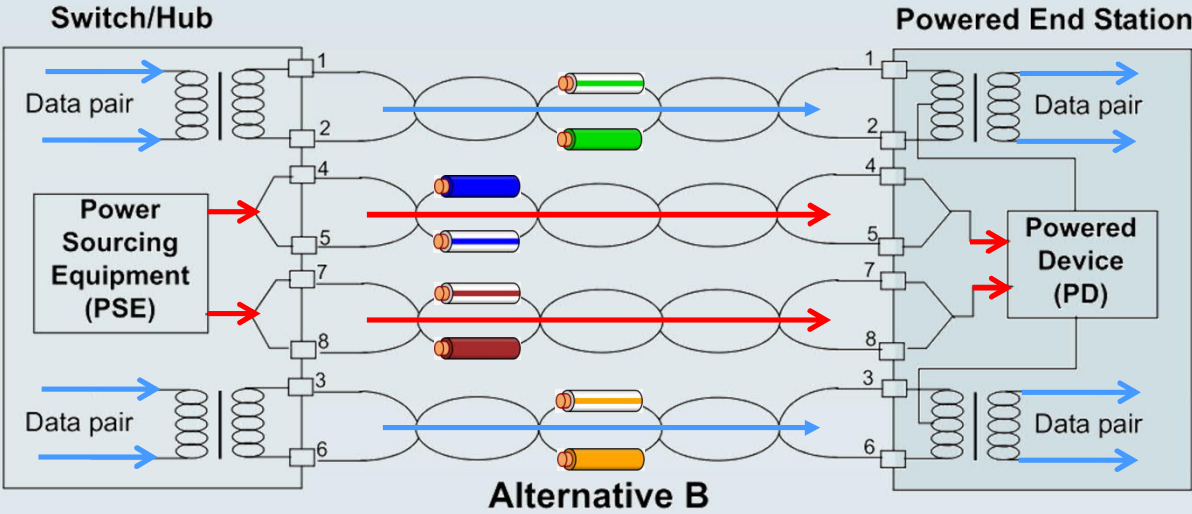
Mode A
Power is modulated
on the data pairs
- **Phantom power**
- **2-pair mode**

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
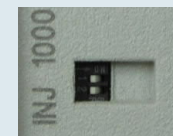   4-pair Cat cable
→ No Gigabit

Power over Ethernet (PoE)

PoE af/at Mode A or B
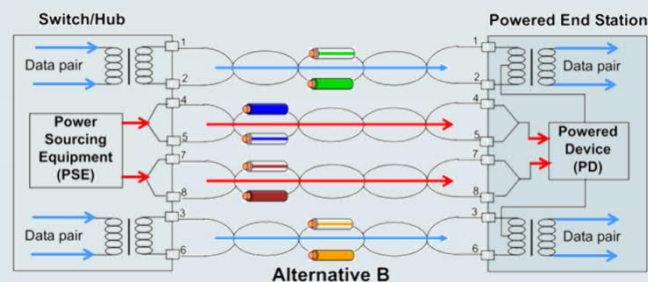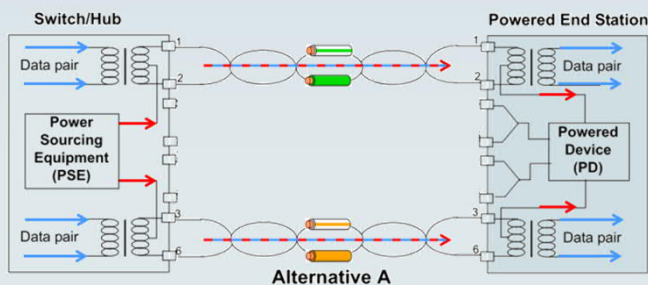
- The PD must be able for both mode → A and B

- 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

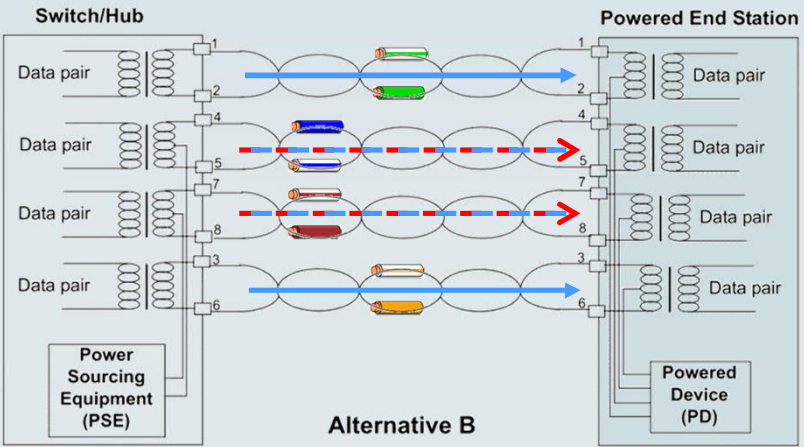- PSE devices with both modes and selection by Dip switch

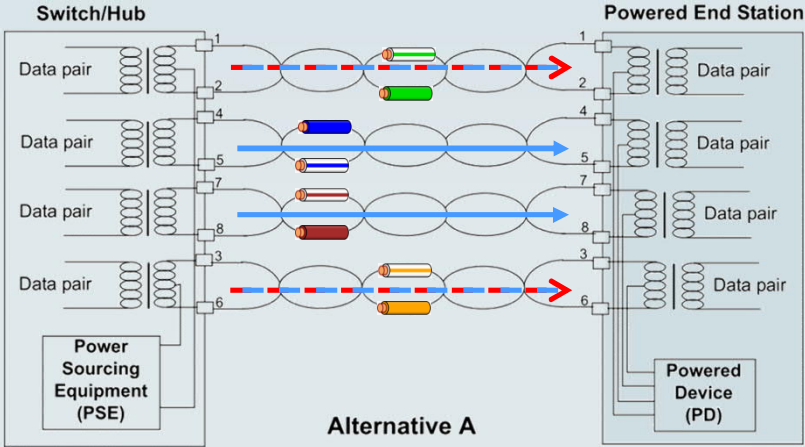| DIP 1	Function
OFF	2 pair mode A
ON	2 pair mode B

Power over Ethernet (PoE)
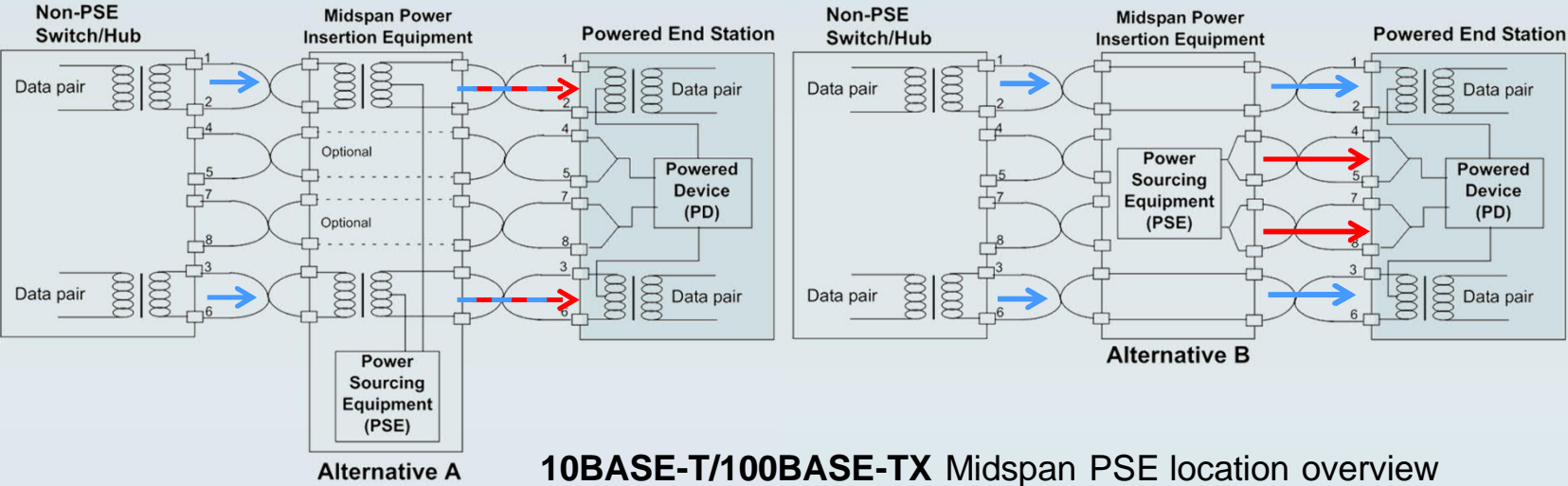
PoE af/at Gigabit

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

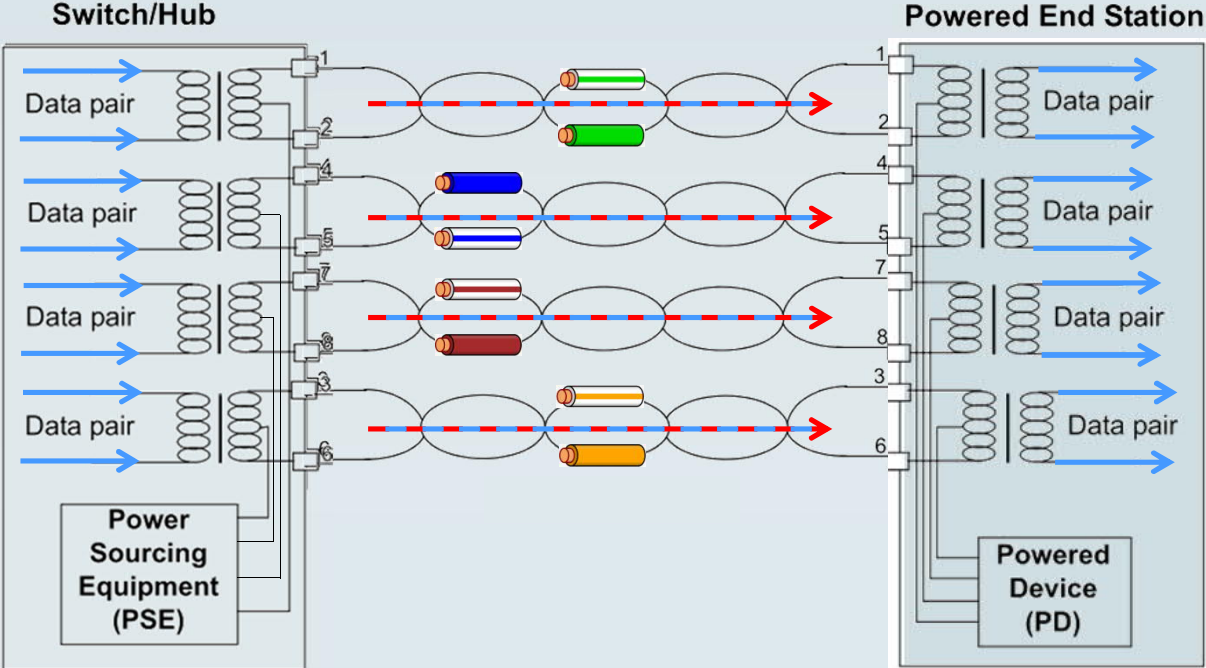# Power over Ethernet (PoE)

PoE af/at Midspan Gigabit
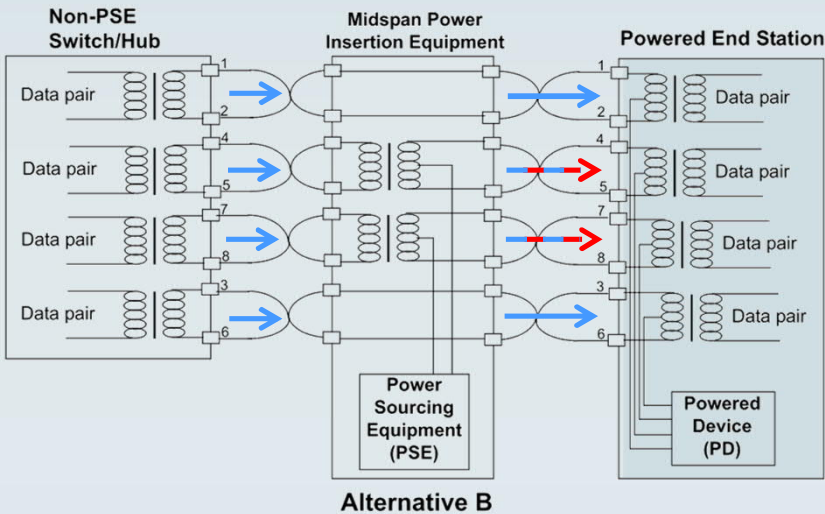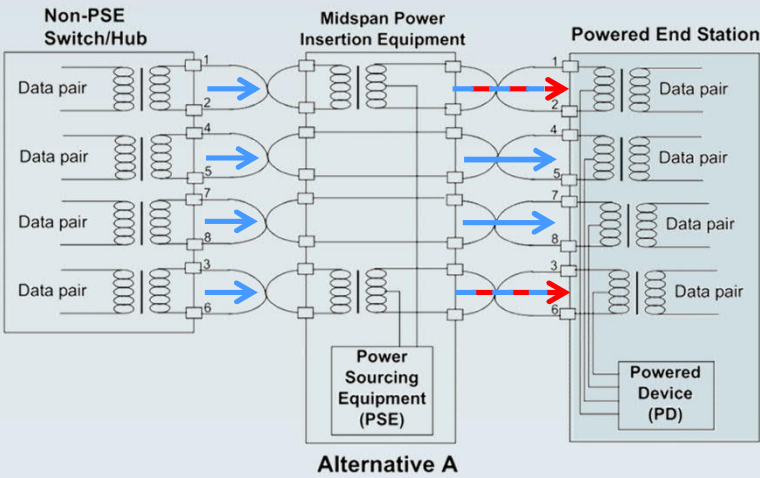
1000BASE-T Midspan PSE location overview

Power over Ethernet (PoE)

PoE bt - 4 pair mode

4-pair mode
Power is modulated on all data pairs

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

Power over Ethernet (PoE)

Parameter

PSE

802.3 af
Vout = 44 - 57 VDC
Imax = 350 mA
Pmin = 15,4 W

802.3 at
Vout = 50 - 57 VDC
Imax = 600 mA
Pmin = 30,0 W

802.3 bt, type 3
Vout = 50 - 57 VDC
Imax = 600 mA/pair
Pmin = 60,0 W

PD

802.3 af
Vin = 37 - 57 VDC
Pmax = 12,95 W

802.3 at
Vin = 42,5 - 57 VDC
Pmax = 25,5 W

802.3 bt, type 3
Vin = 42,5 - 57 VDC
Pmax = 51,0 W

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

PHŒNIX CONTACT

Power over Ethernet (PoE)

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
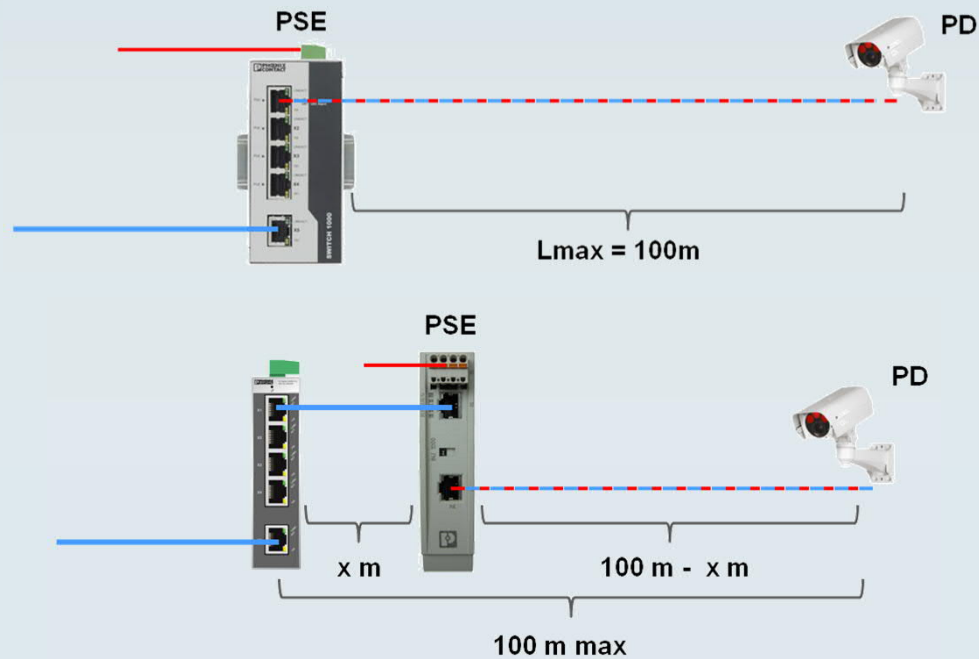
Power over Ethernet (PoE)

PoE splitter

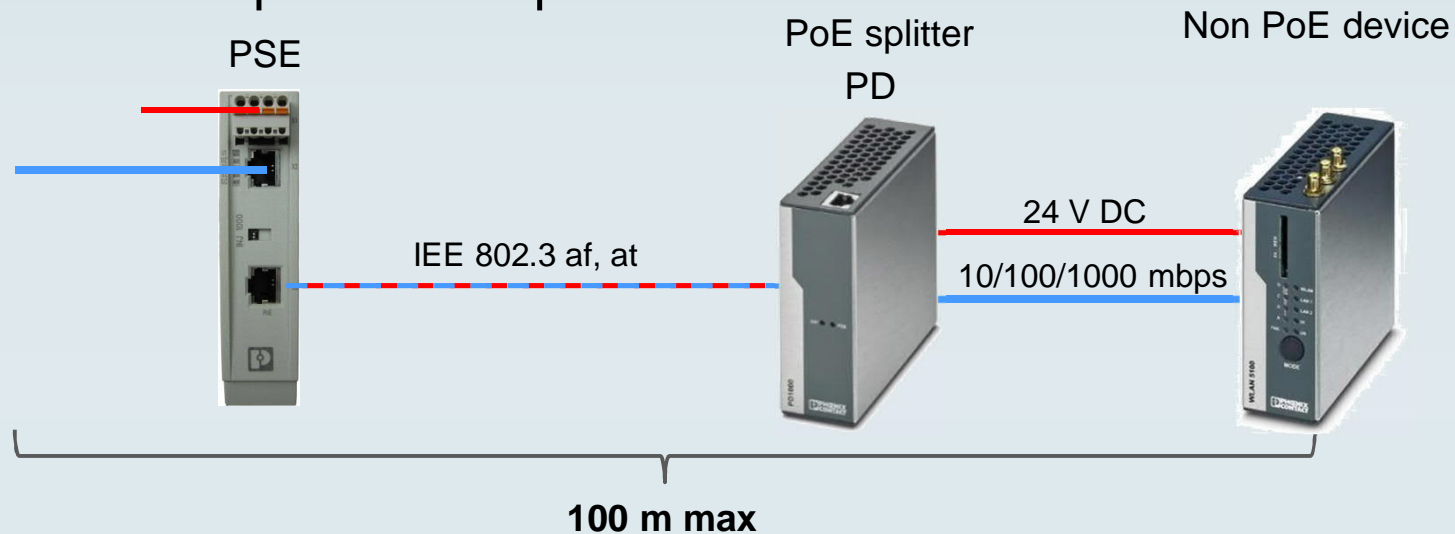- For seperation of power and data

PSE

PoE splitter
PD

Non PoE device

IEE 802.3 af, at

24 V DC

10/100/1000 mbps

100 m max

Trusted Wireless 2.0

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

PHŒNIX 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

| 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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

PROFIBUS

PROcess **F**ield **BUS**

PROFIBUS connects controllers or control

systems with a number of field devices

(sensors and actuators) via a single cable.

Source: Profibus.com
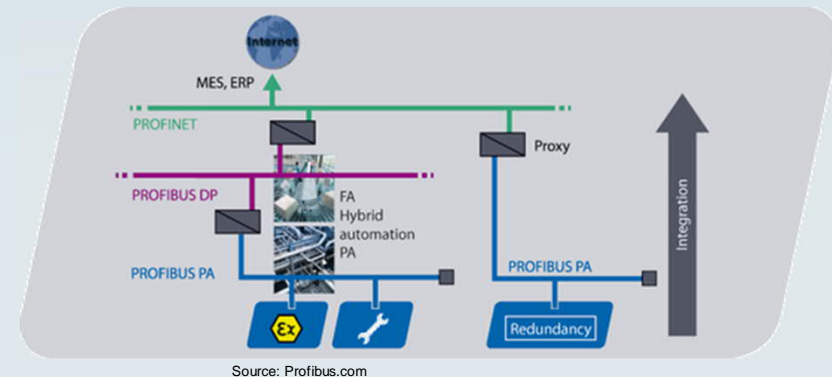
PROFIBUS · PROFINET
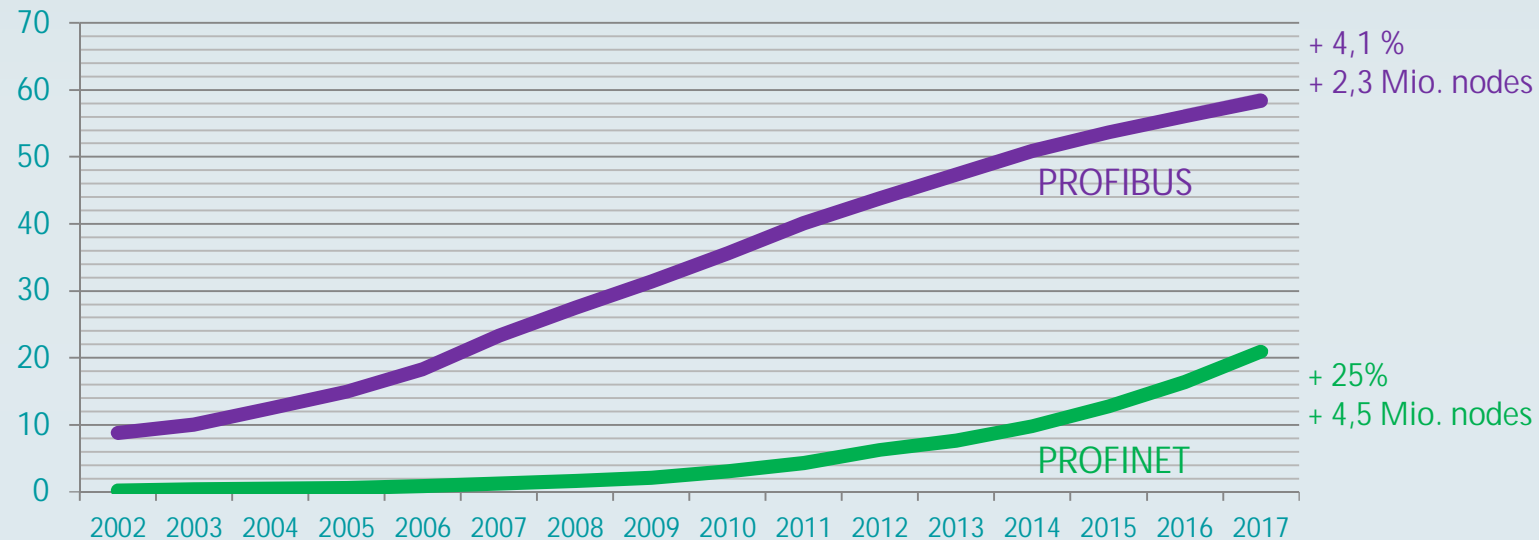
PROFIBUS

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
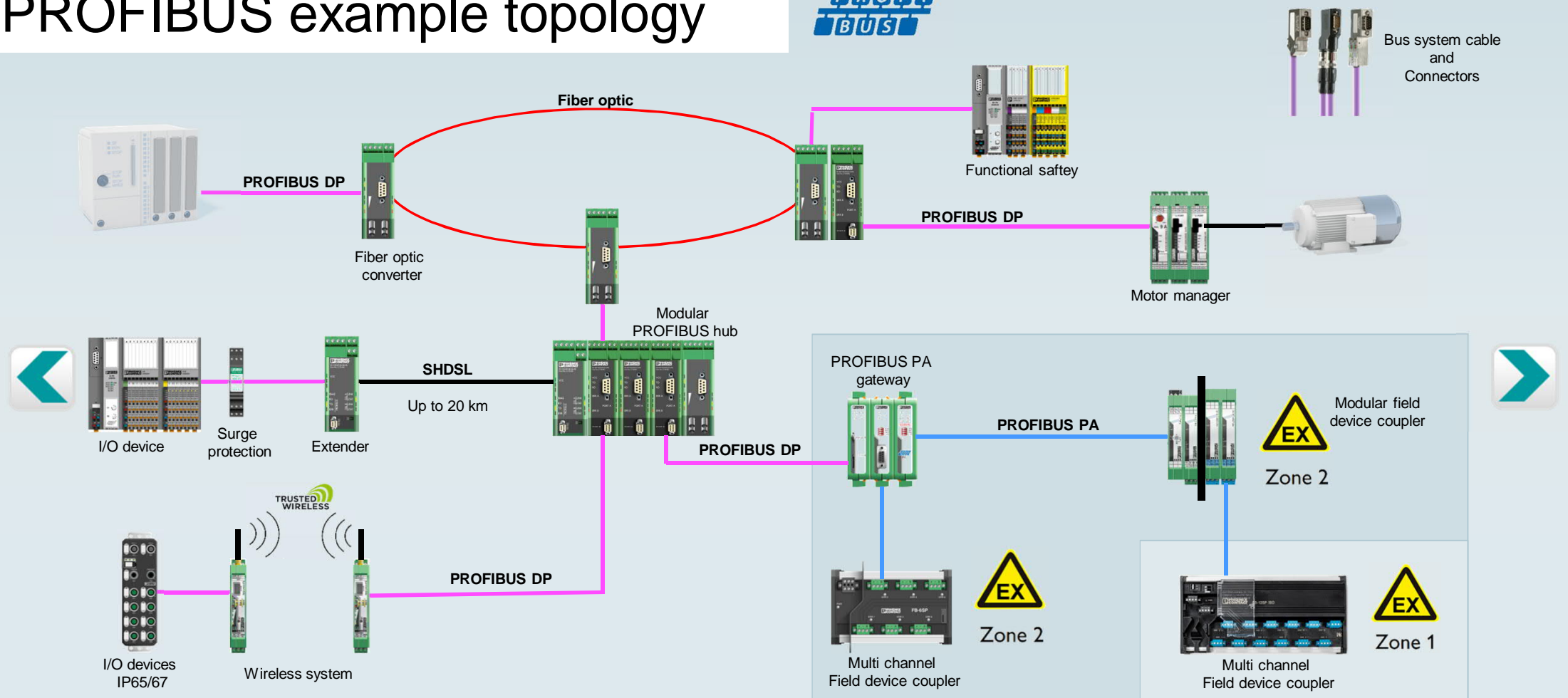
  - Device profile

PROFIBUS

Number of PROFIBUS devices worldwide (2002 – 2017)

PROFIBUS example topology

Bus system cable and Connectors

Fiber optic

PROFIBUS DP

Fiber optic converter

Functional saftey

PROFIBUS DP

Motor manager

Modular PROFIBUS hub

I/O device

Surge protection

Extender

SHDSL

Up to 20 km

PROFIBUS PA gateway

PROFIBUS PA

Modular field device coupler

Zone 2

PROFIBUS DP

TRUSTED WIRELESS

PROFIBUS DP

I/O devices IP65/67

Wireless system

EX

Zone 2

Multi channel Field device coupler

EX

Zone 1

Multi channel Field device coupler

PHŒNIX CONTACT

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
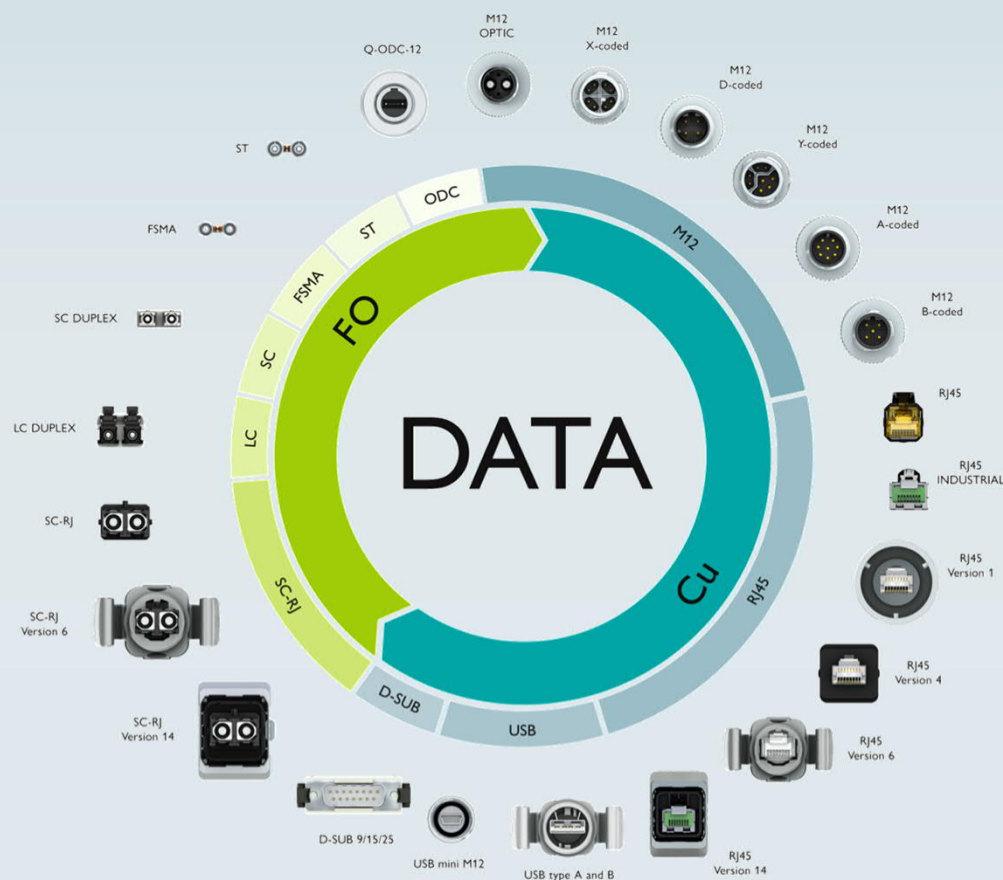- Shorter plant downtime
- More flexible production

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

PHŒNIX CONTACT
INSPIRING INNOVATIONS

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