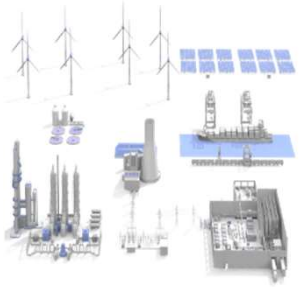
Communication Interfaces – Overview 2021



Products



Application references

NearFi Technology
Designed by Phoenix Contact

PROFIBUS

TRUSTED WIRELESS

Technologies

PoE

HART

5G

"PAVE THE WAY FOR FUTURE BUSINESS"
by addressing relevant trends

SPE & APL

5G

TSN

OPC UA

PHOENIX CONTACT
INSPIRING INNOVATIONS

Communication Interfaces - Our product portfolio



Fieldbus Communication



Ethernet Infrastructure



Smart Camera Box



new

Wireless



new

Remote Communication



PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Communication 1



Converter
Isolator



Repeater
Segment
Coupler



Fast
connectors
(SUBCON)



Fiber optic
converter



Modular hub



Extender
Serial/Profibus



Protocol
converter



Radioline
Multipoint-
Multiplexer



Terminator
resistor

Fieldbus
Communication 2

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Communication 2



Serial Device Server / Gateways



Foundation fieldbus Power



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 1



Fieldbus Device Terminal box



Profibus DP/PA Converter



Profibus PA I/O Multiplexer



Ethernet HART Multiplexer

Fieldbus Communication 1

Ethernet Infrastructure

PHOENIX CONTACT
INSPIRING INNOVATIONS

Ethernet Infrastructure



Ethernet Extender



Media Converter



Ethernet Isolator



Ethernet HART Multiplexer



Patch Panel



PoE Injector



Serial Device Server / Gateways



Data connectors



TIME SERVER

Fieldbus communication 2

Wireless

INSPIRING INNOVATIONS

Wireless

Ethernet Infrastructure

Remote communication



Radioline



Wireless Multiplexer



Essential Wireless



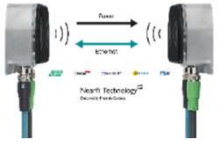
Radioline Outdoor solution



WLAN 5110



WLAN 1100 / 2100



new

NearFi

Energy and data coupler



new

Bluetooth LowEnergy



new

WLAN 1010 / 2010



Bluetooth EPA

Remote communication



TC Mobile I/O



TC MGuard



new

TC Router



new

TC Cloud Client

mGuard Secure Remote Service

Wireless

Technologies

Technologies

HART Technology

PoE Power over Ethernet

TRUSTED WIRELESS

Remote communication

PROFIBUS

5G

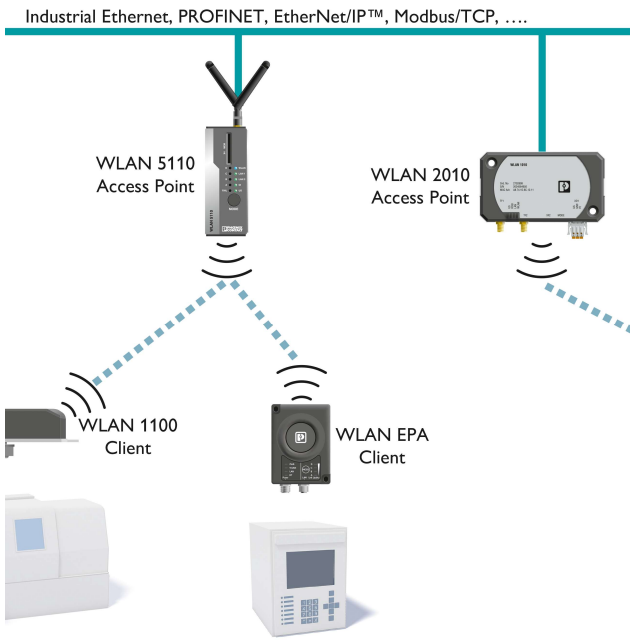
new

NearFi Technology
Designed by Phoenix Contact

PHOENIX CONTACT
INSPIRING INNOVATIONS

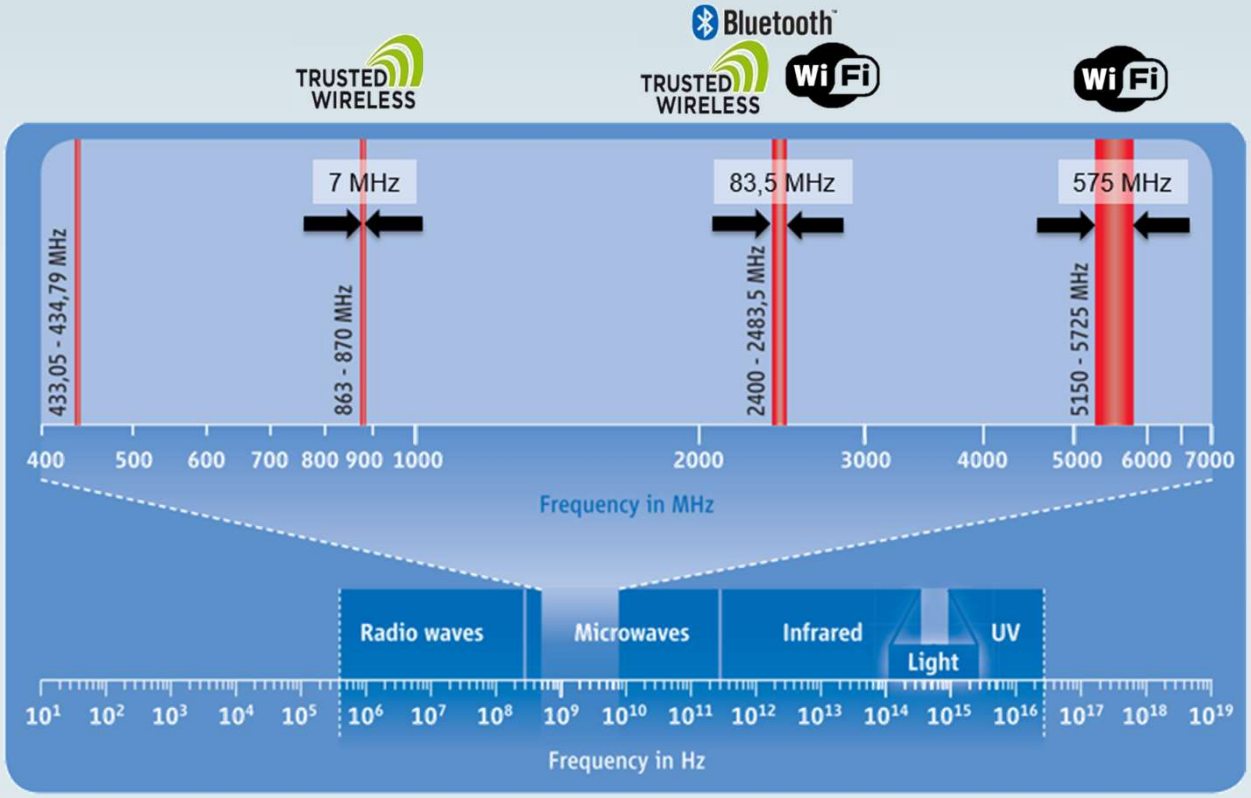
Agenda

- WLAN Basic
- WLAN Products
- WLAN Applications



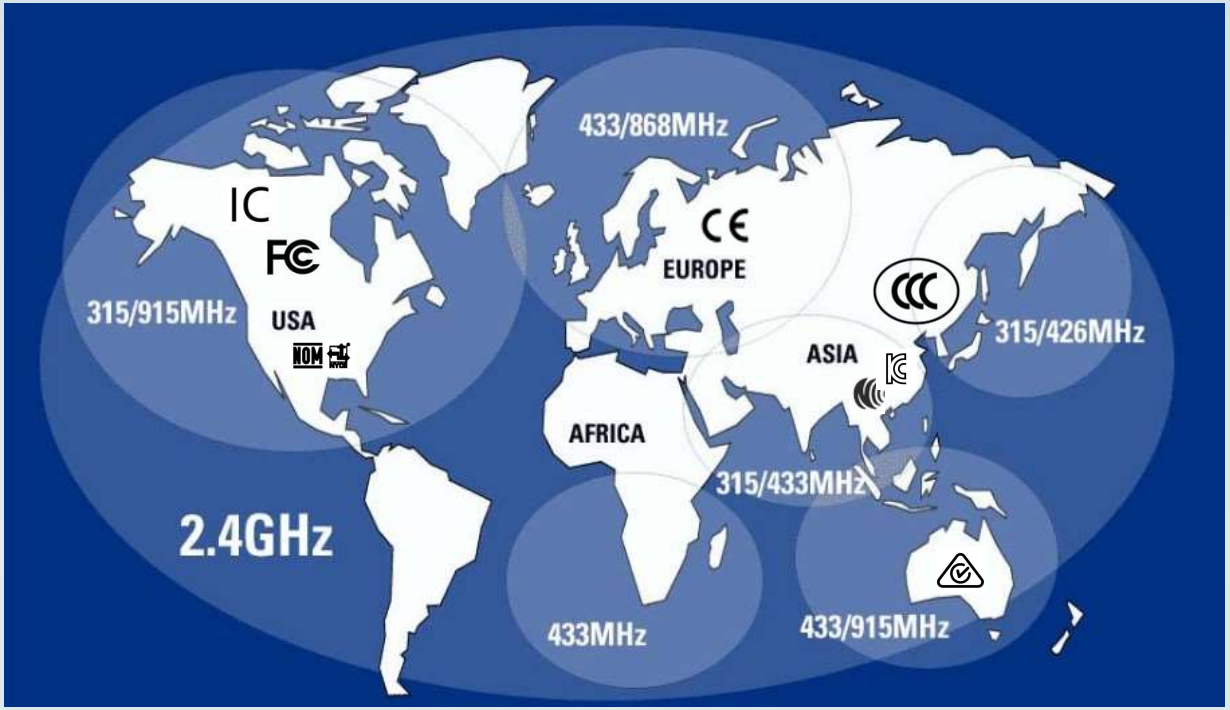
PHOENIX CONTACT
INSPIRING INNOVATIONS

License free frequency bands



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INSPIRING INNOVATIONS

Country approval / notification



Germany

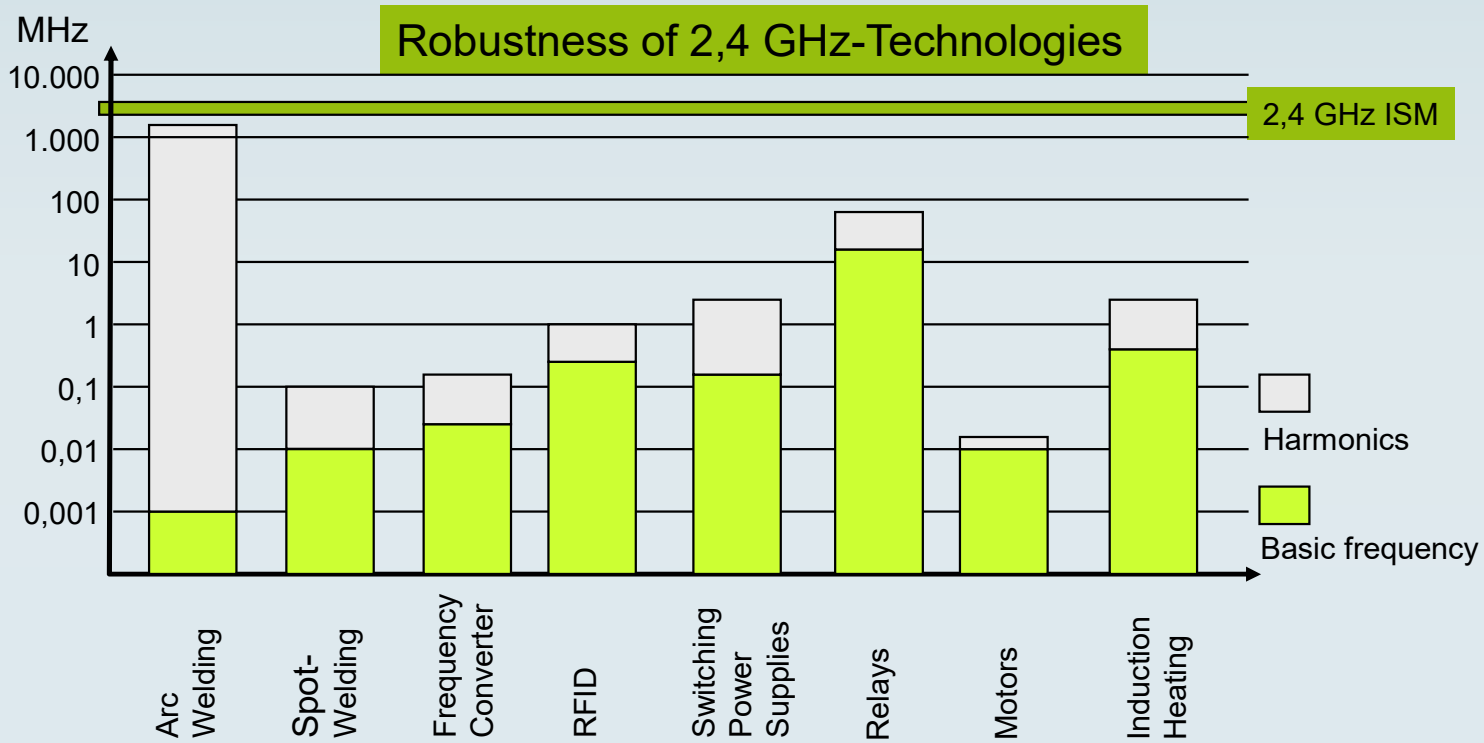
- Radio applications can be used on the shared frequencies without application and formal approval
- The user does not incur any costs in the form of fees or contributions due to the frequency usage

International

- Country specific
- Registration with the regulatory authority

PHOENIX CONTACT
INSPIRING INNOVATIONS

Spectrum of typical industrial applications

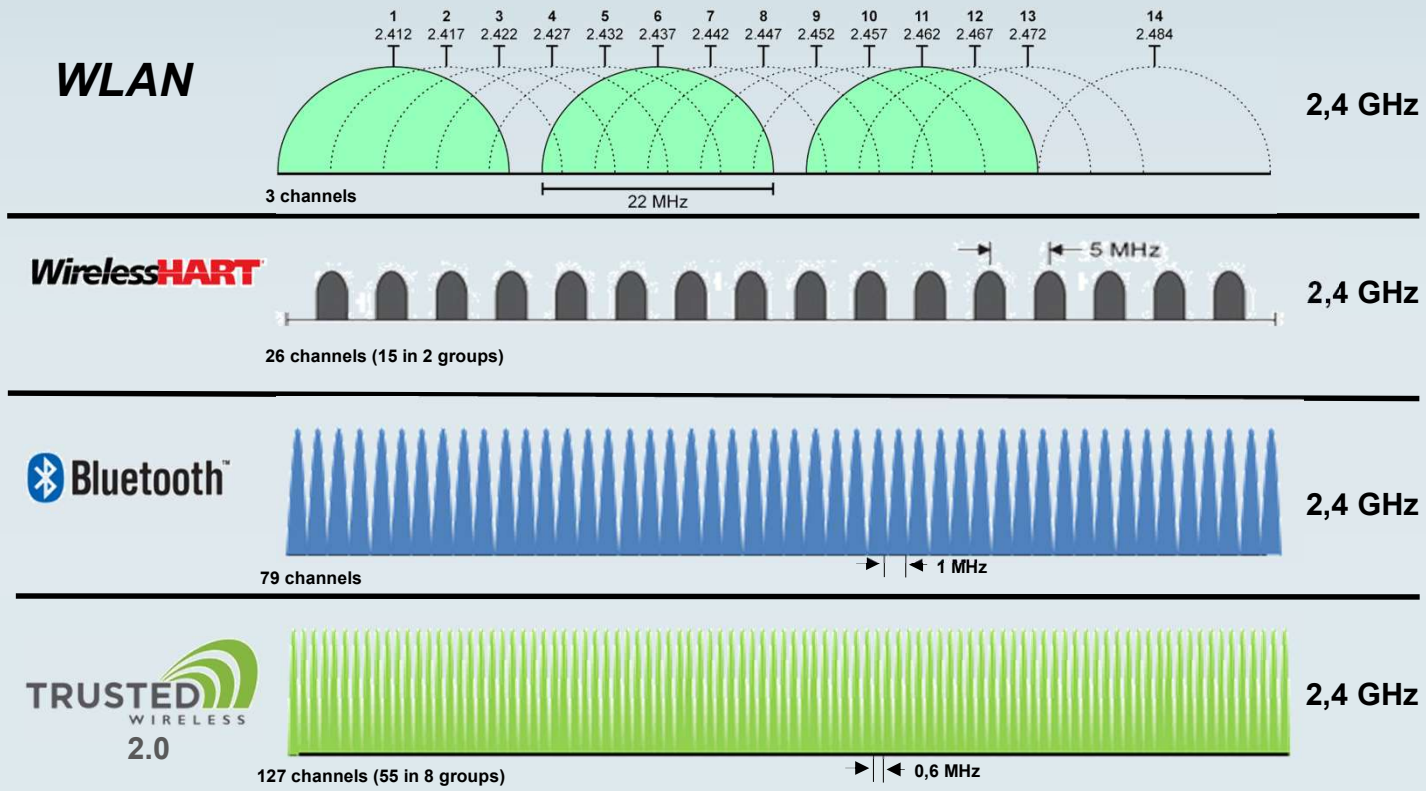


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INSPIRING INNOVATIONS

Wireless 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	Propritär by Phoenix Contact	IEEE 802.15.4 HART 7
Transmission method	Frequency hopping (FHSS)	Direct Sequence Spread Spectrum (DSSS)	Frequency hopping (FHSS)	Frequency hopping (FHSS)
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

Transmission channels



- The wider the transmission channel the higher the data rate or the faster the data transmission
- The higher the number of channels, the more wireless systems can be operated in parallel

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INSPIRING INNOVATIONS

Security Mechanisms



WLAN

- Use MAC-Filter
- Hide WLAN name
- Password protection
- Various types of encryption possible (WEP, WPA2, 802.11i, etc.)

WirelessHART

- Authentication and integrity check
- Frequency hopping
- Data encryption (128 Bit AES)

Bluetooth

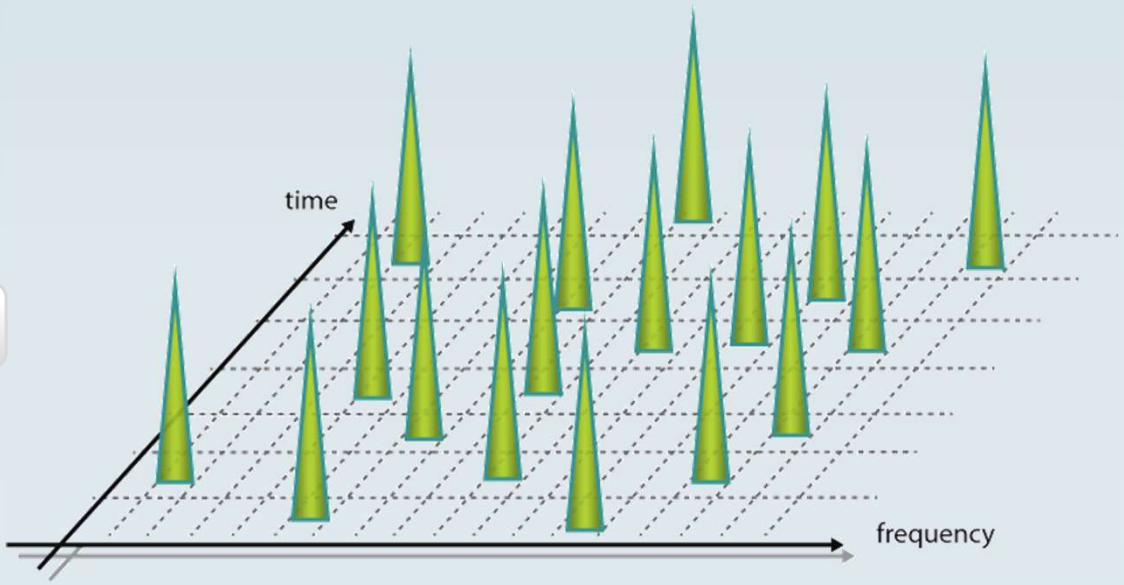
- Pairing with only authorized devices
- Frequency hopping
- Password protection
- Data encryption (128 Bit AES)
- Hide Bluetooth name

TRUSTED WIRELESS 2.0

- Proprietary technology
- Frequency hopping
- Network ID (unique)
- Authentication
- Data encryption (128 Bit AES)
- WLAN-Blacklist

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INSPIRING INNOVATIONS

Frequency Allocation



900 MHz, 2,4 GHz, 5 GHz

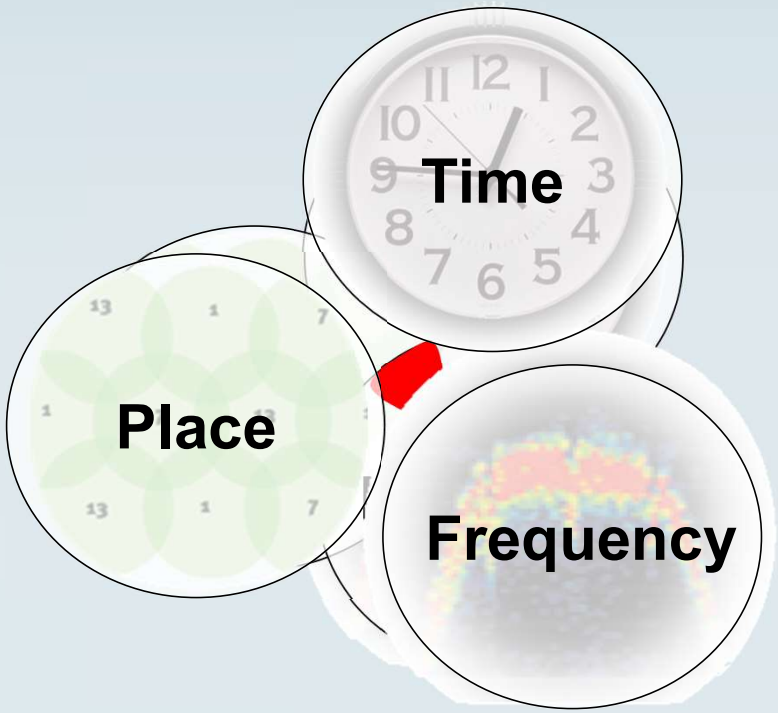
- **Frequency Static Systems (e.g., WLAN)**
  Each system is assigned a fixed frequency range
- **Frequency-dynamic systems (for example Bluetooth, Trusted Wireless, WirelessHART)**
  Constant change of frequency according to different hopping patterns

868 MHz

- **Frequency dynamic / static depending on the data rate**
  Legally regulated channel occupation duration (transmission time 10%)

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INSPIRING INNOVATIONS

Coexistence – Interference

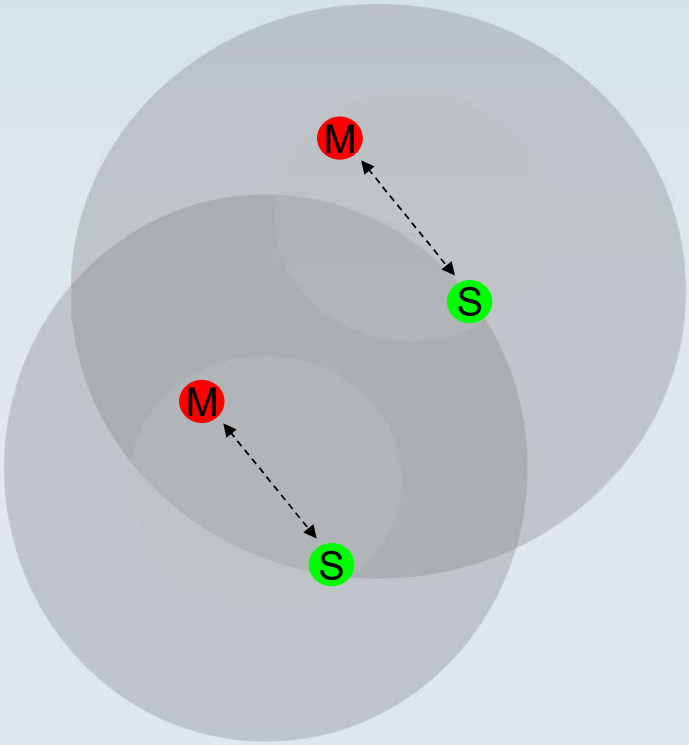


Influencing of radio operation only happens if several radio systems are transmitting …

- …at the same place
- …at the same time
- …at the same frequency

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INSPIRING INNOVATIONS

Coexistence – spatial decoupling

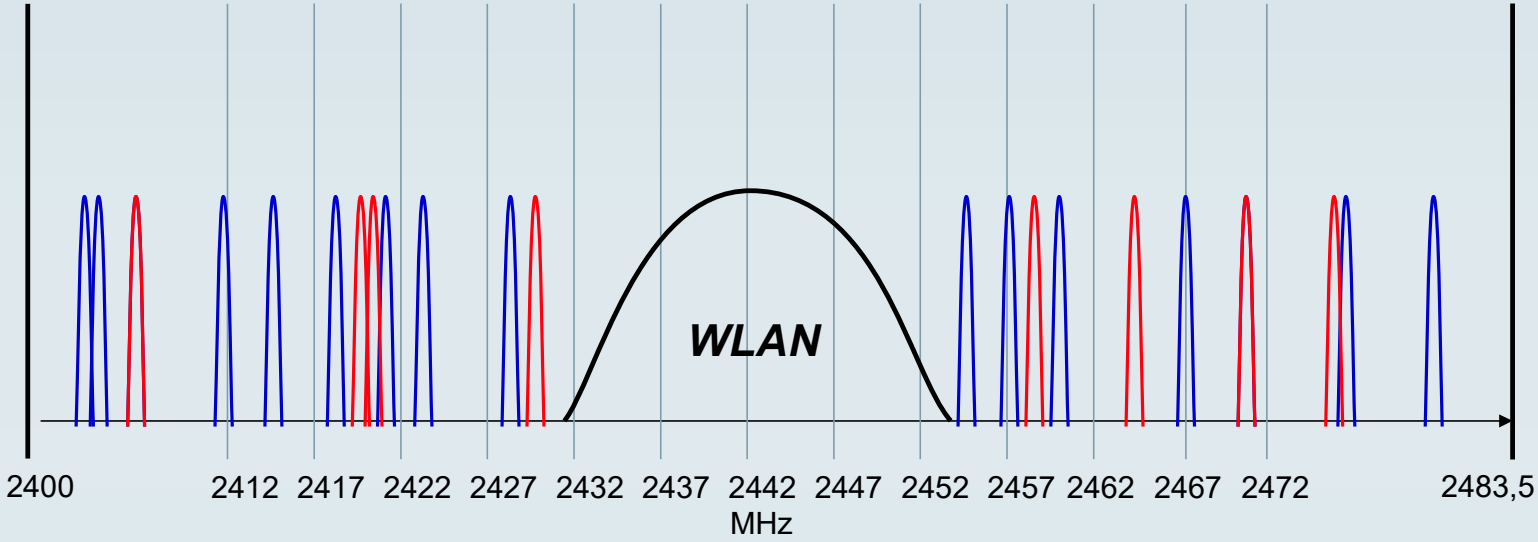


- Transmission power determined spatial extent
- Reduction of transmission power enables use of the same frequency bands
- Optimization of the spatial extent by directional antennas

PHOENIX CONTACT
INSPIRING INNOVATIONS

Coexistence – Inteference-free parallel operation

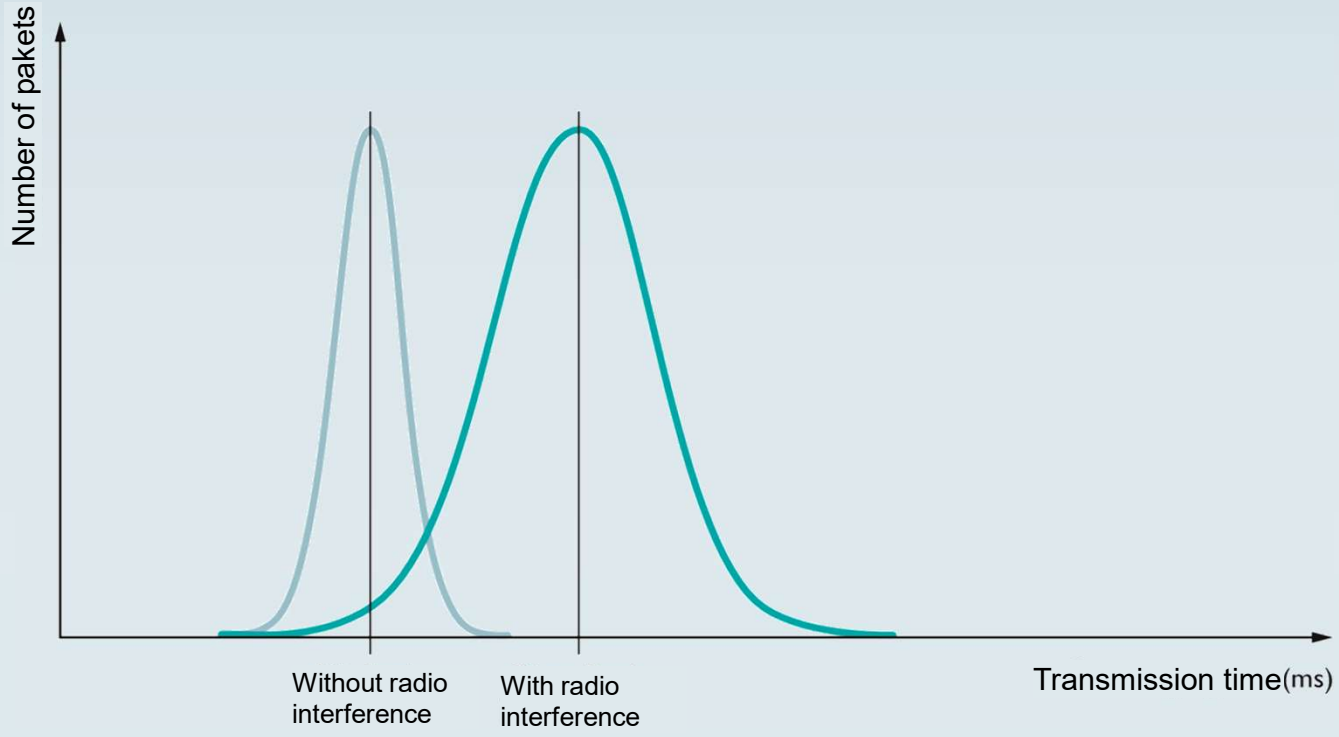
Bluetooth
TRUSTED WIRELESS
WLAN



Tip: WLAN channels can be hidden in Bluetooth and Trusted Wireless systems (blacklisting)

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INSPIRING INNOVATIONS

Impact of radio interference



Reduce earthworks, thanks to wireless technology!



- No complicated cable laying
- Bridging problematic distances and areas
- More flexibility
- Mobility and freedom of movement of participants
- Disturbance-free communication, no electromagnetic influences

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Industrial Bluetooth – FL EPA 2



Interference-free parallel operation with WLAN networks

Various application areas

Integrated special antennas for reliable wireless connections

Quick and easy startup

Optimized for operation in PROFINET networks

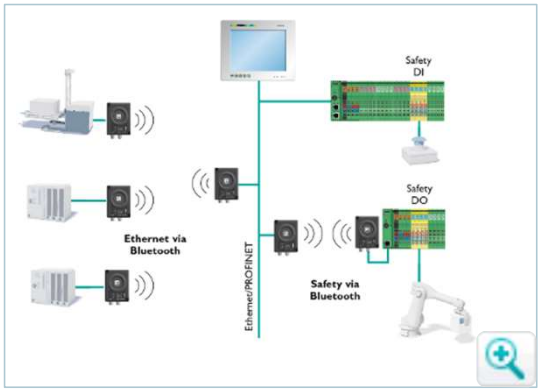
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial Bluetooth – FL EPA 2

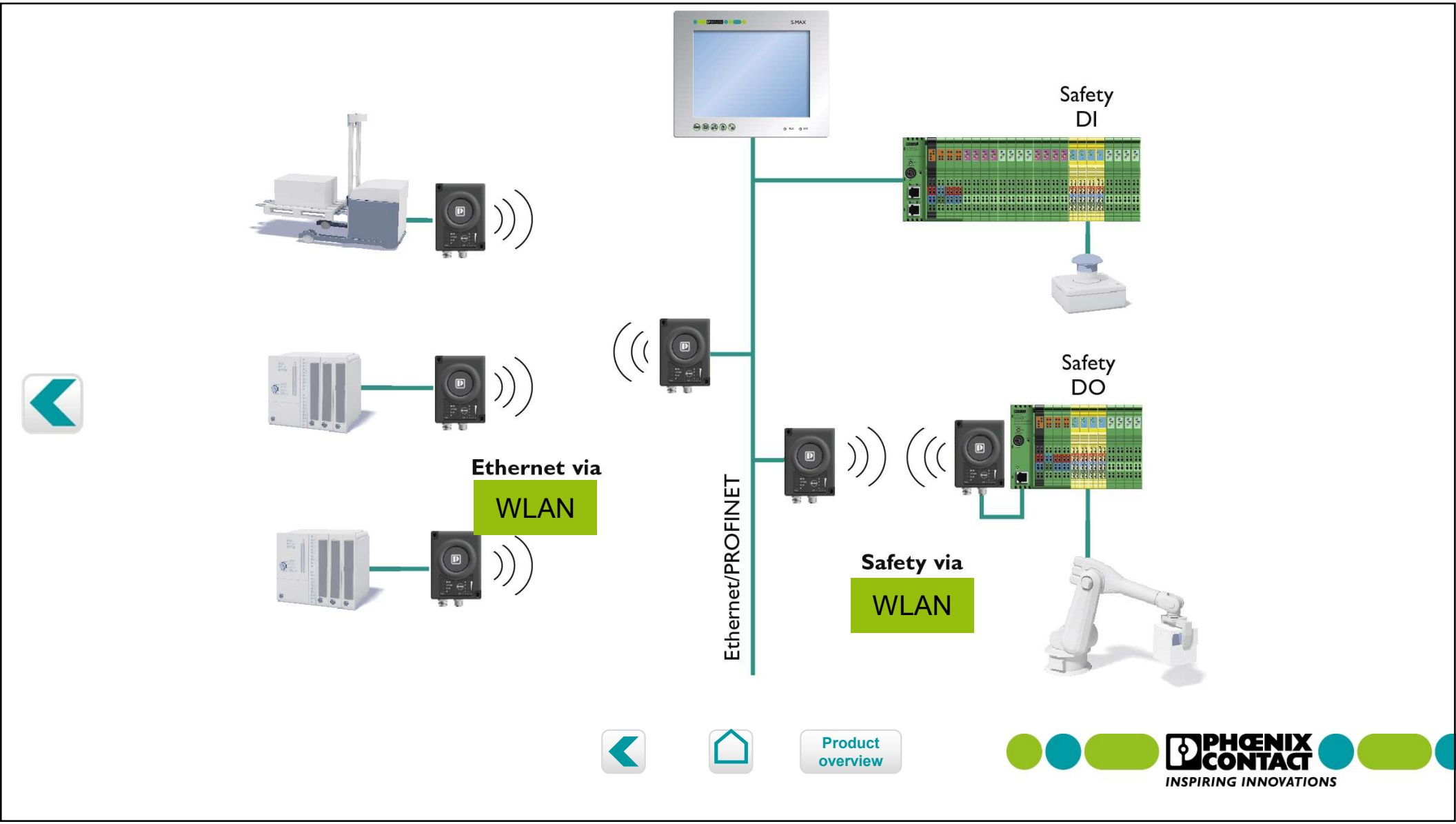


Various application areas

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



INSPIRING INNOVATIONS


Safety
DI
Safety
DO
Ethernet via
WLAN
Ethernet/PROFINET
Safety via
WLAN

Industrial Bluetooth





	FL EPA 2 (WLAN Mode)	FL EPA 2 RSMA (WLAN Mode)
Function	Bluetooth Ethernet Client Adapter	Bluetooth Access Point
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

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INSPIRING INNOVATIONS

Industrial WLAN 1100 & 2100

Integrated antennas and wireless module in one single device



Reliable communication thanks to MIMO technology

Easy to mount

All-in-one-solution

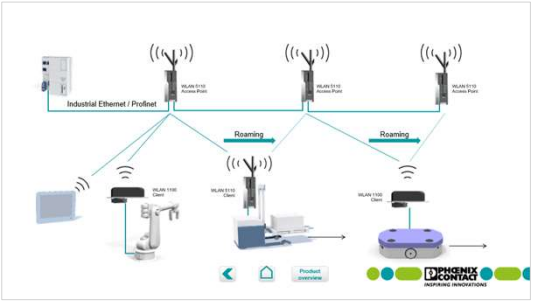
INSPIRING INNOVATIONS

Industrial WLAN 1100 & 2100

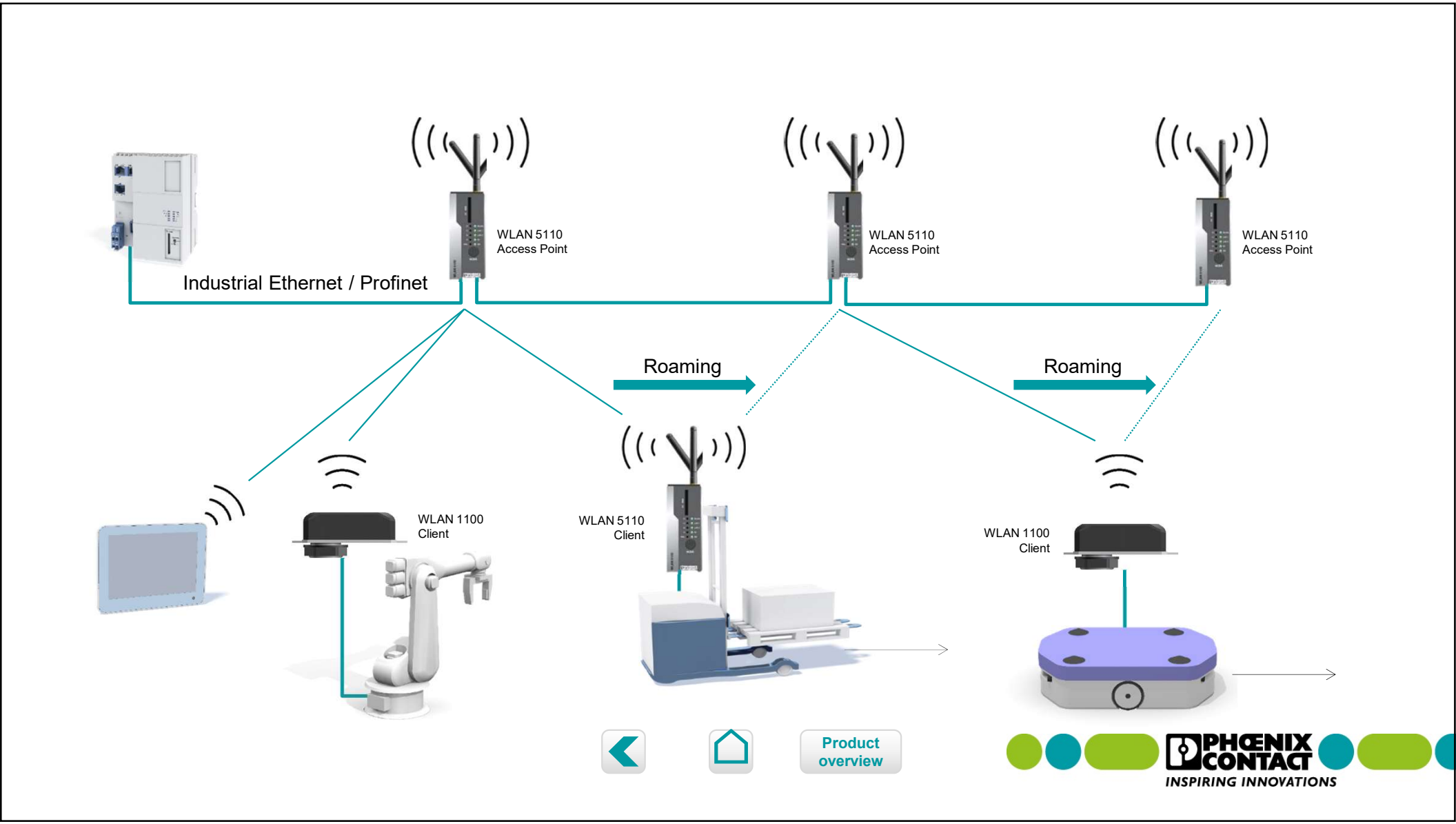
Reliable communication thanks to MIMO technology

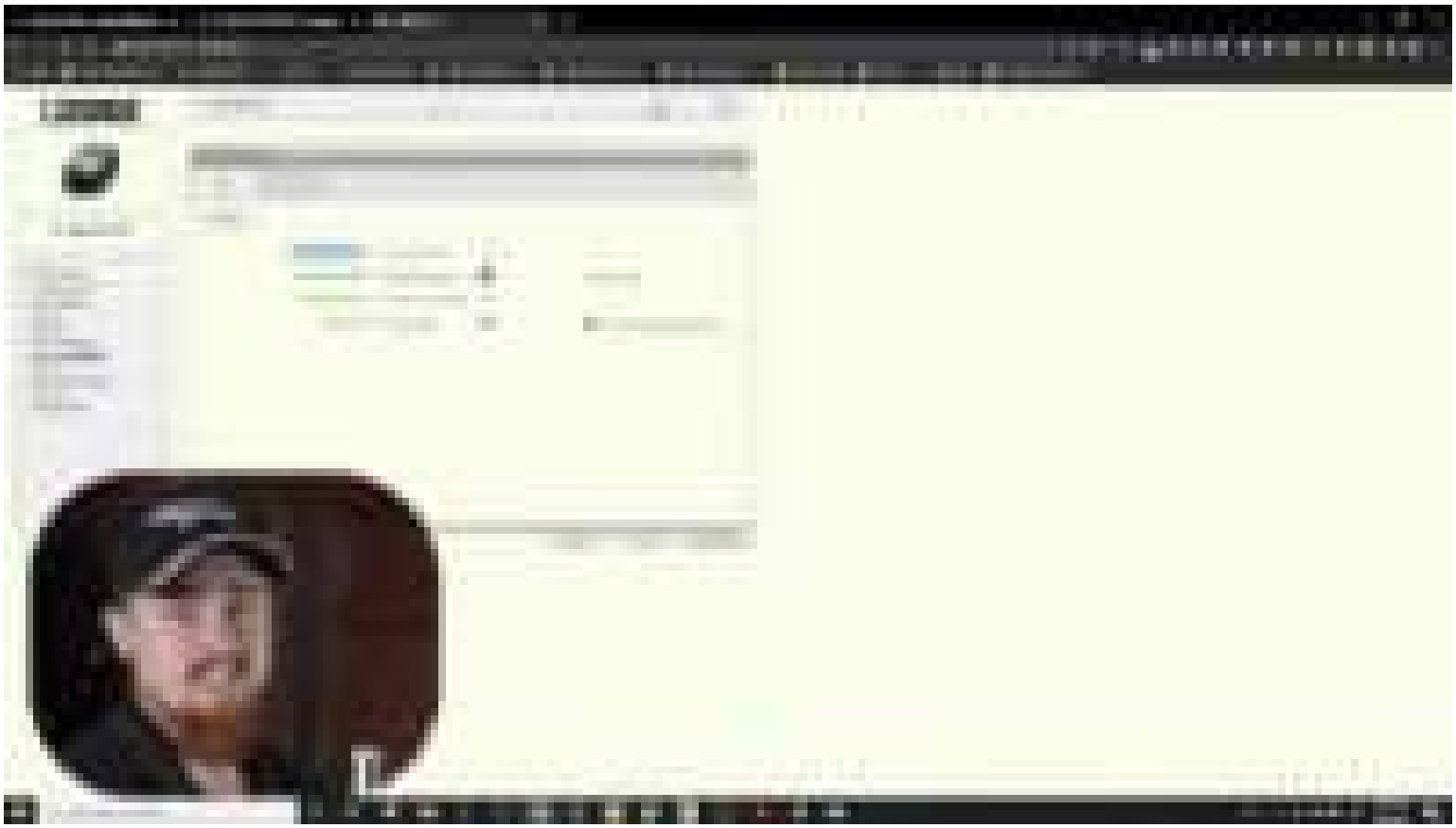


- Interruption-free roaming



INSPIRING INNOVATIONS


WLAN 5110
Access Point
WLAN 5110
Access Point
WLAN 5110
Access Point
Industrial Ethernet / Profinet
Roaming
Roaming
WLAN 1100
Client
WLAN 5110
Client
WLAN 1100
Client
Product
overview
PHOENIX
CONTACT
INSPIRING INNOVATIONS



Phoenix Contact FL WLAN 1100 Industrial WiFi Set Up

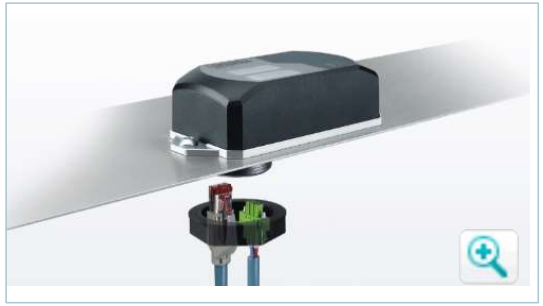
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN 1100 & 2100

All-in-one-solution



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

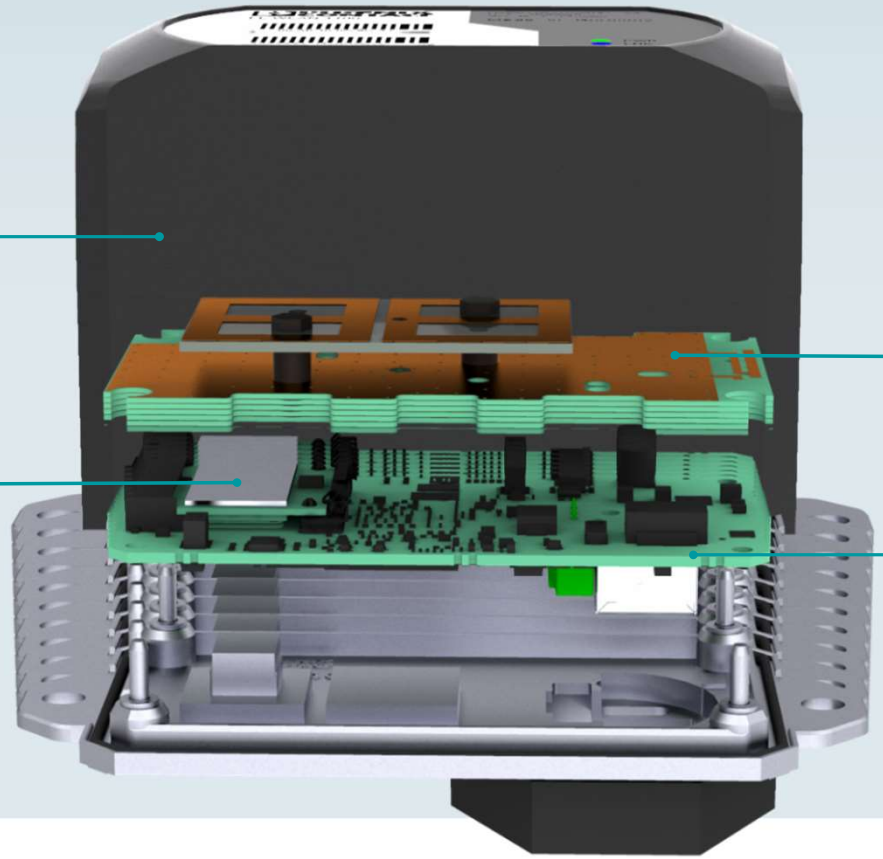


PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

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

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



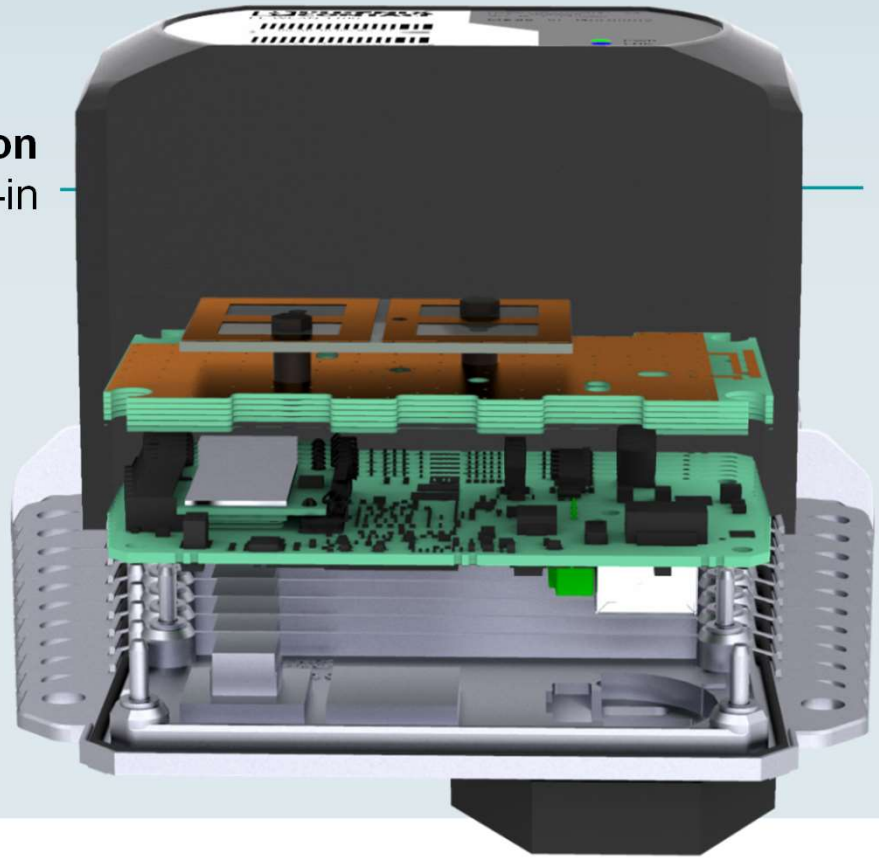
Special antennas
For fast and reliable communication

Powerful Access Point
Linux operating system

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Power connection
Push-in



Ethernet connection
Standard RJ45

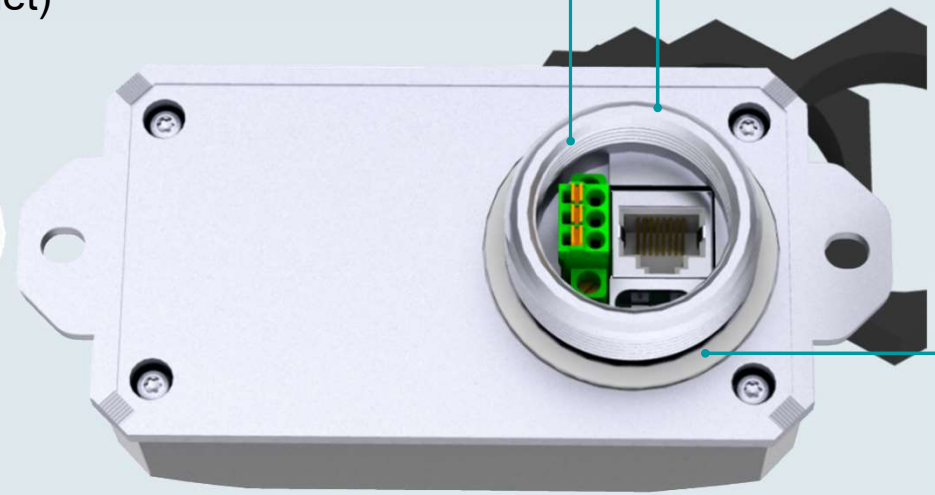
PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

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

M40 external thread
for mounting





Seal
up to IP67

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Fast and easy connection
thanks to single-hole mounting



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Fast and easy connection
thanks to single-hole mounting

Quick fastening

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

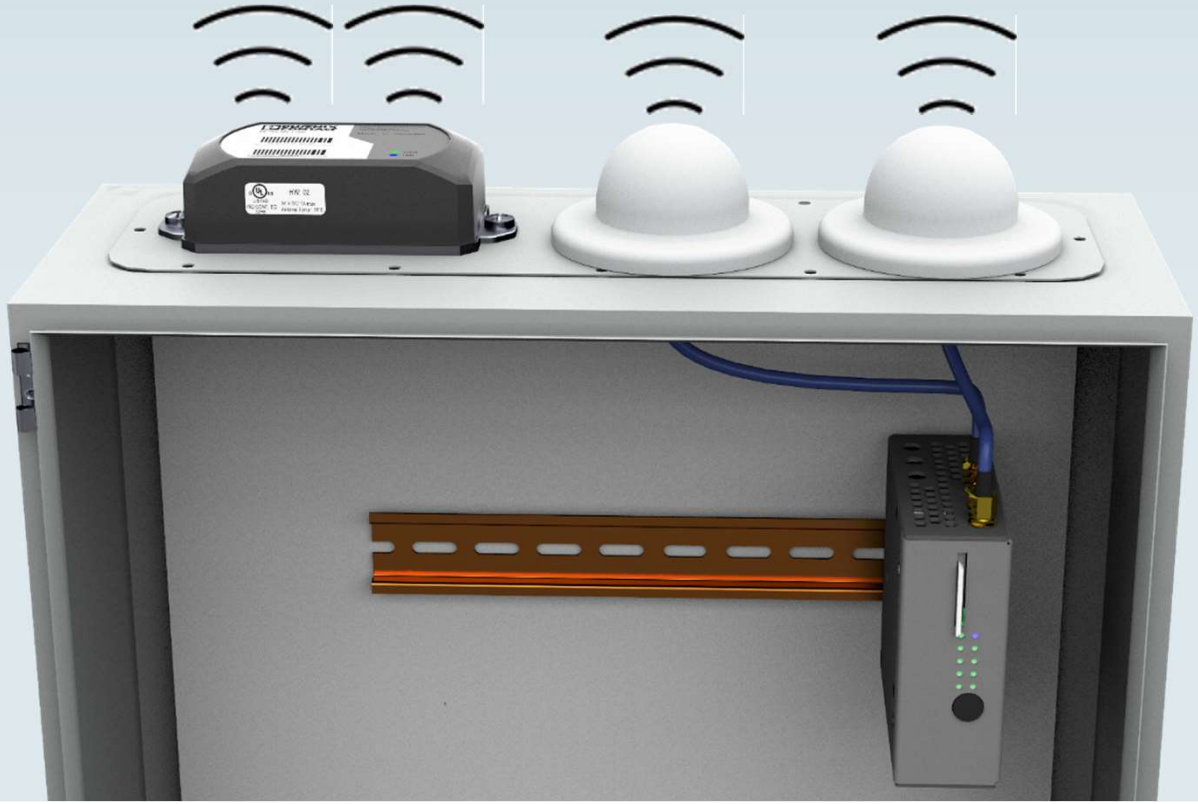
Industrial WLAN



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Product overview

PHOENIX 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

Industrial WLAN 5110

Compact design – also suitable for control boxes in the field

External antenna connections for the flexible use of antennas



Secure and compatible

Powerful WLAN IEEE 802.11n module for more range

Cluster Management

PHOENIX CONTACT
INSPIRING INNOVATIONS

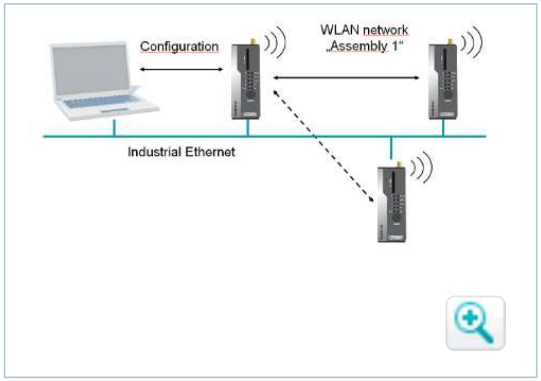
Industrial WLAN 5100



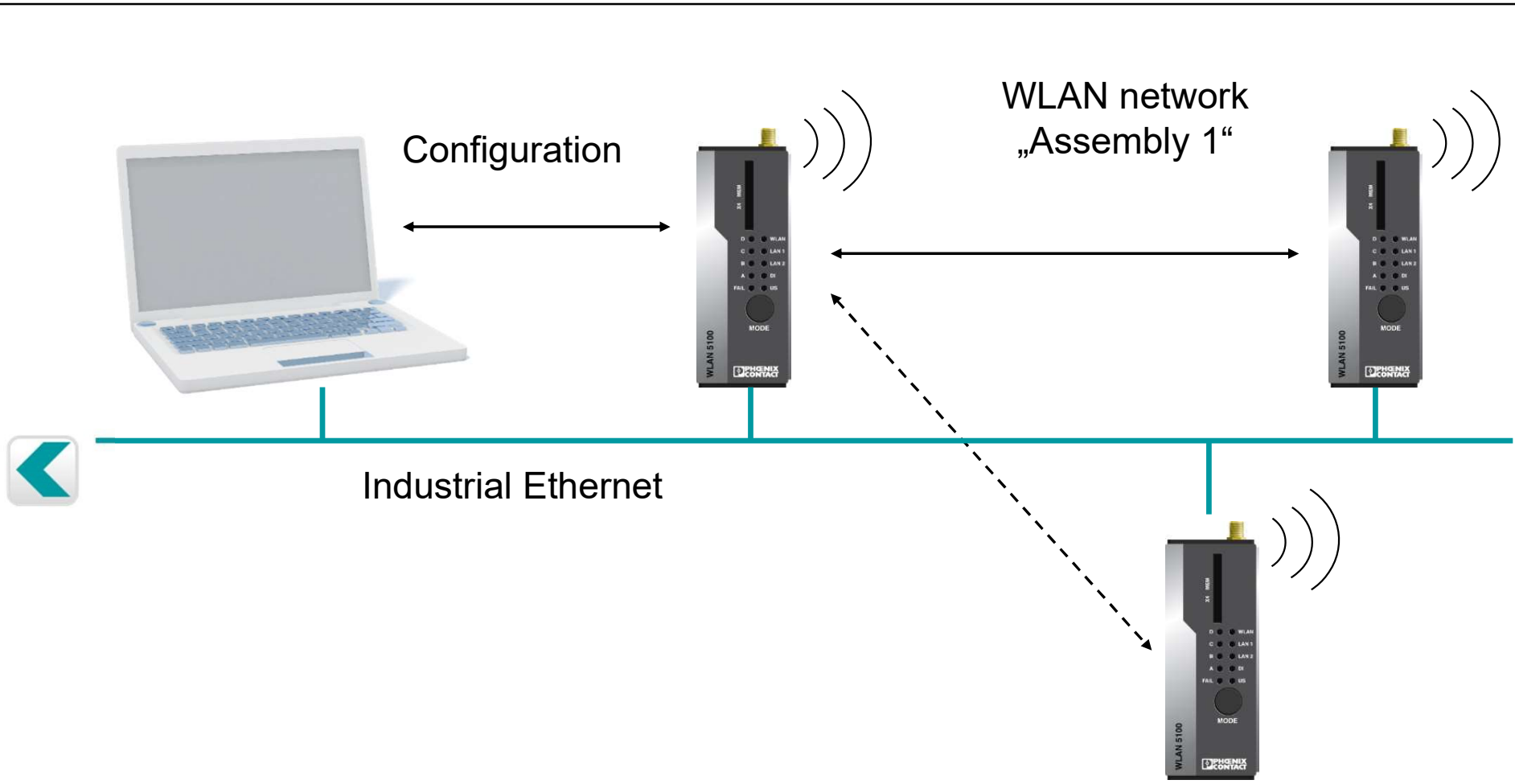
Compatible with standards IEEE 802.11 a/b/g/n

Quick and easy startup

- Cluster Management



INSPIRING INNOVATIONS



Product overview

INSPIRING INNOVATIONS

Industrial WLAN





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

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Reliable communication thanks to MIMO technology

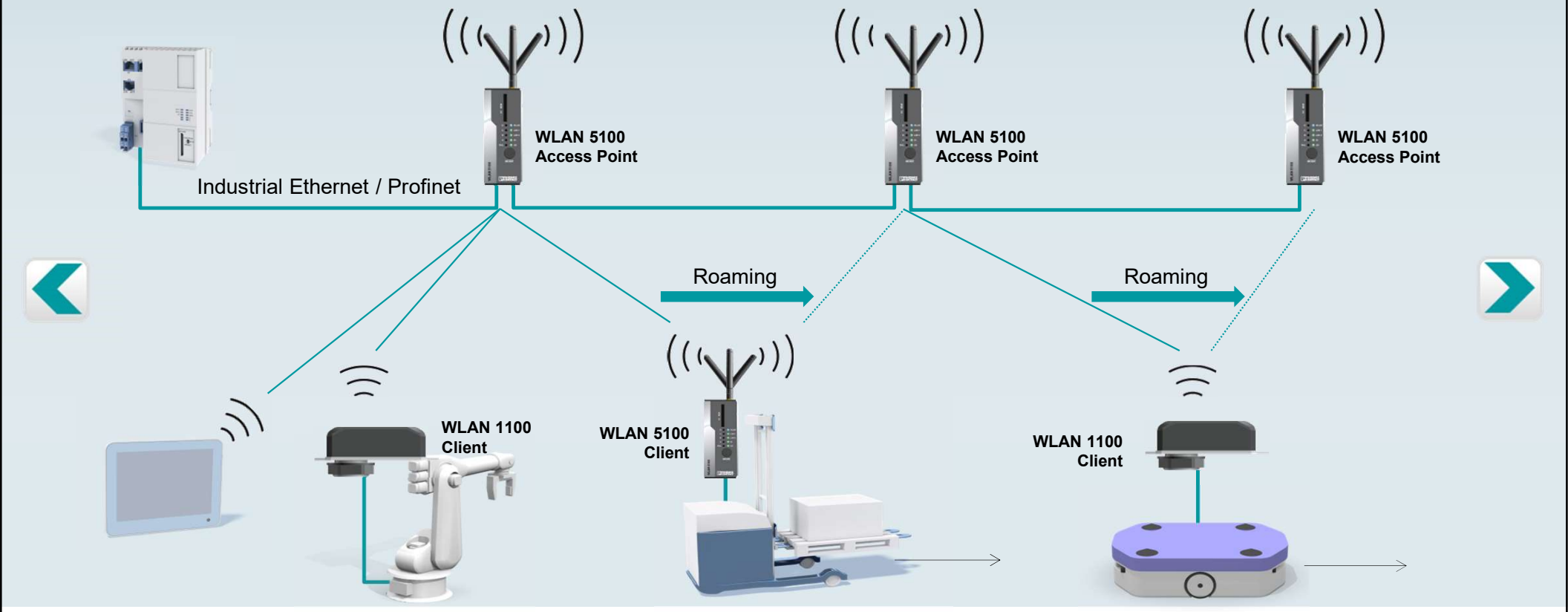
Compatible with standards IEEE 802.11 a/b/g/n

All-in-one-solution

Quick and easy startup

Optimized for operation in PROFINET and EtherNet/IP networks

Industrial WLAN



INSPIRING INNOVATIONS

Industrial WLAN

Integrated antannas and wireless module in one single device

- Space-saving
- Cost-saving

Easy to mount

- Single-hole mounting via M40-thread
- Power connection: Combicon
- Ethernet connection: RJ45



All-in-one-solution

Robust

- Shockproof in accordance to IK08, 7 Joule at -50 °C
- Seal up to P67 (with connecting adapter)

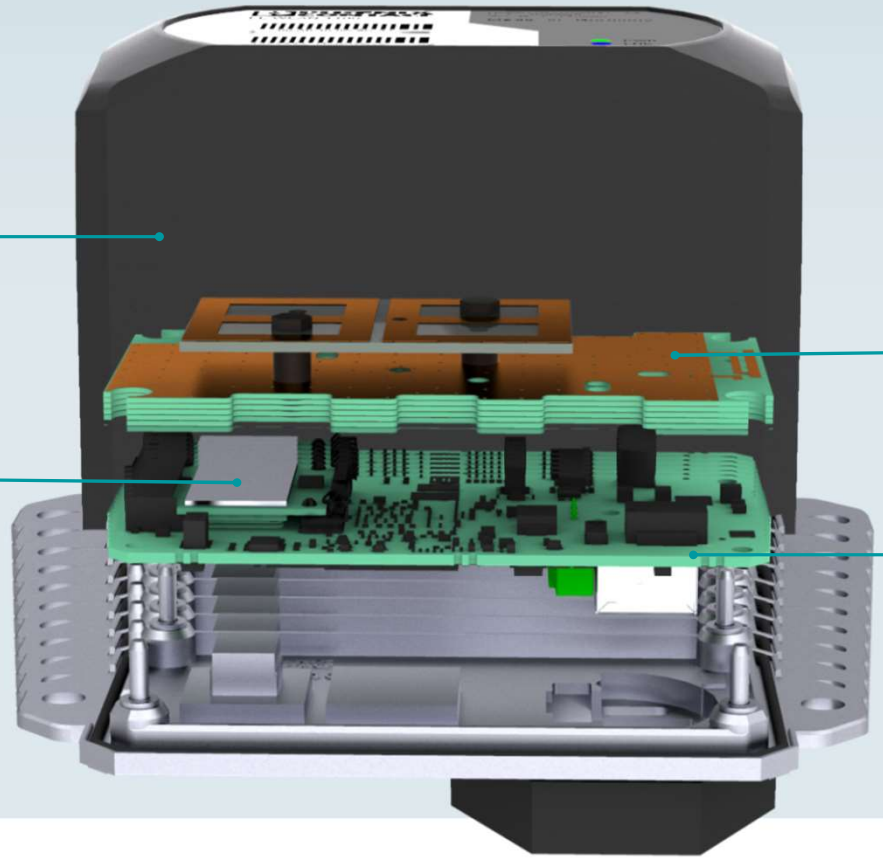
Reliable

- Two antennas with MIMO technology
- Powerful WLAN board 802.11 a/b/g/n
- Linux operating system

Industrial WLAN

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

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



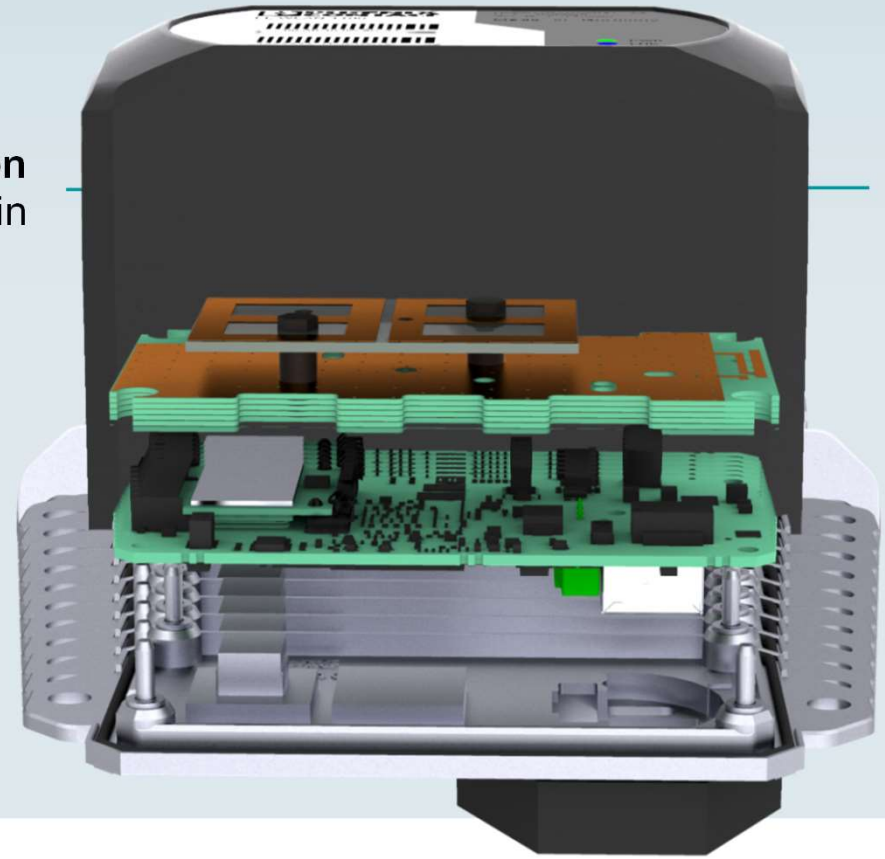
Special antennas
For fast and reliable
communication

Powerful Access Point
Linux operating system

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

Power connection
Push-in



Ethernet connection
Standard RJ45

Product overview

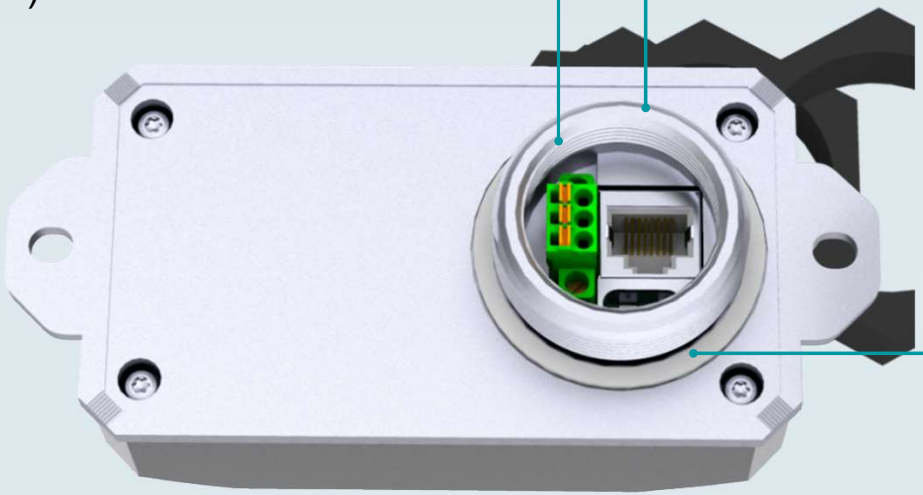
INSPIRING INNOVATIONS

Industrial WLAN

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

M40 external thread
for mounting





Seal
up to IP67

Industrial WLAN

Fast and easy connection
thanks to single-hole mounting



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN



Fast and easy connection
thanks to single-hole mounting

Quick fastening

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

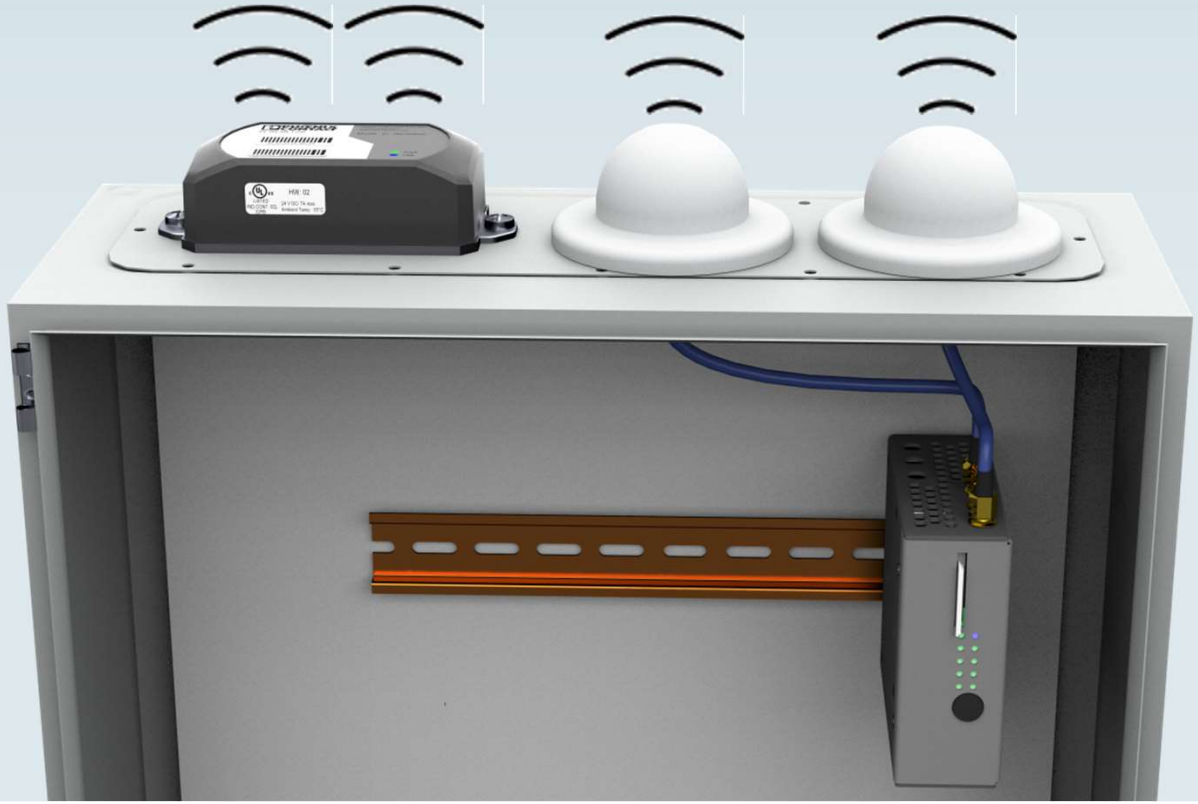
Industrial WLAN



Product overview

INSPIRING INNOVATIONS

Industrial WLAN



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN





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

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN

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

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial 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

Industrial WLAN Rugged Box









	FL RUGGED BOX	FL RUGGED BOX OMNI-1	FL RUGGED BOX OMNI-2	FL RUGGED BOX DIR-1
Included	incl. mounting rail, plugs and screw connections, without WLAN devices	incl. three omnidirectional antennas 2,4 / 5 GHz, which can be screwed on directly, with mounting rail, plugs and screw connections, without WLAN devices	incl. three omnidirectional antennas 2.4 / 5 GHz, with mounting rail, plugs and screw connections, with power supply 100 ... 240 V, without WLAN devices	incl. directional antenna and antenna cable 3 m for 2.4 / 5 GHz, with mounting rail, plugs and screw connections, with power supply 100 ... 240 V, without WLAN devices
Degree of protection	IP66			
Dimension	25 x 18 x 13 cm			
Material	Polycarbonat			
Order number	2701204	2701430	2701439	2701440

INSPIRING INNOVATIONS

Industrial WLAN 1010 & 2010

Easy control through the SPS

Temp 0°…60°C



Compact and flexible mounting

High security through two virtual access points and IP filters

Connection for external antennas

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industrial WLAN 1010/2010

Easy control through the SPS



- Can be easily configured by a PC or PLC via a REST-API or controlled during runtime



INSPIRING INNOVATIONS



Controller

http CLI command

Configuration & controlling



WLAN 1010

Product overview

INSPIRING INNOVATIONS

Industrial WLAN



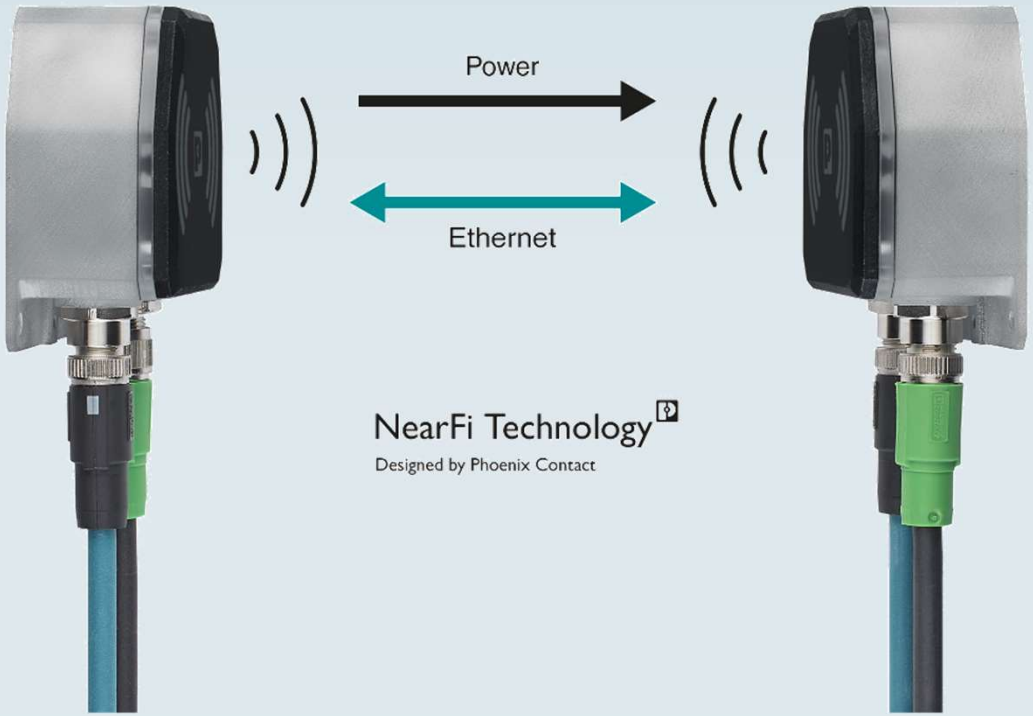



	FL WLAN 1010 (Europe)	FL WLAN 1011 (USA, Canada)	FL WLAN 2010 (Europe)	FL WLAN 2011 (USA, Canada)
Function	Wireless access point and client		Wireless access point and client	
Operating modes	Access Point, Client, 2 virtual Access Points		Access Point, Client, 2 virtual Access Points, Mesh	
Wireless standard	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	
Max. Number of WLAN clients	10 Clients		60 Clients	
Degree of protection	IP20		IP20	
Temperature range	0 °C ... 60 °C		-40 °C … 60 °C	
Order number	2702899	2702900	1119246	1119248

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi – Energy and data coupler

new



- Introduction
- Benefits
- Basiscs
- Applications
- Product / Portfolio

Product overview

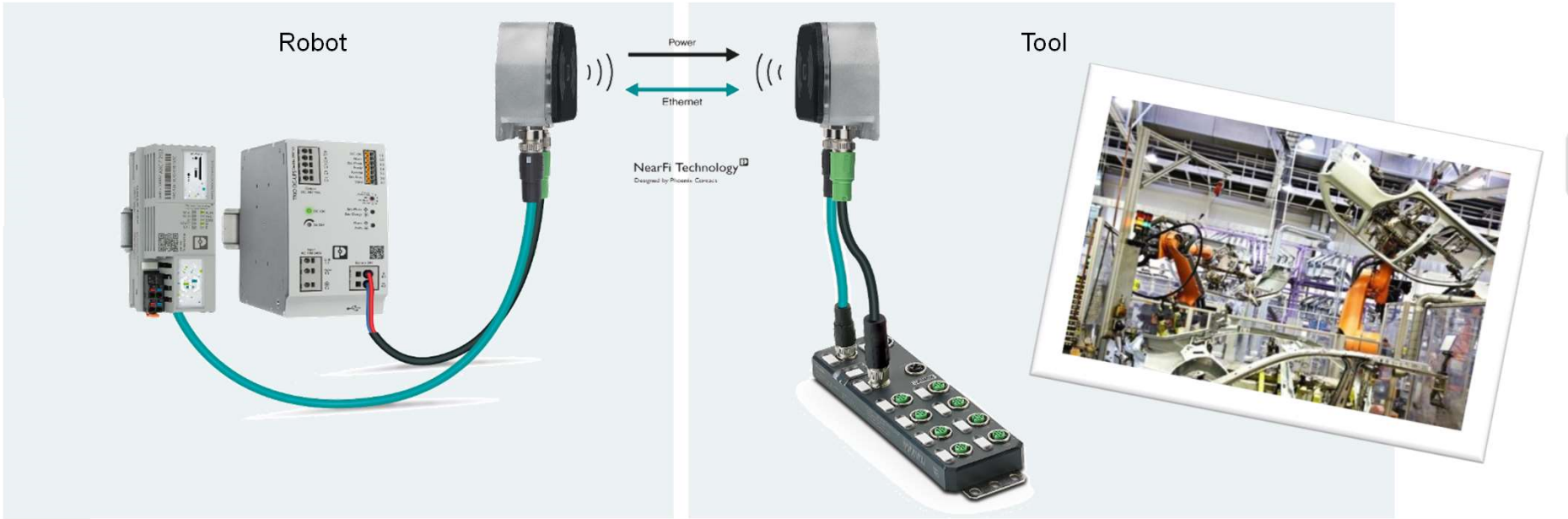
PHOENIX CONTACT
INSPIRING INNOVATIONS

new

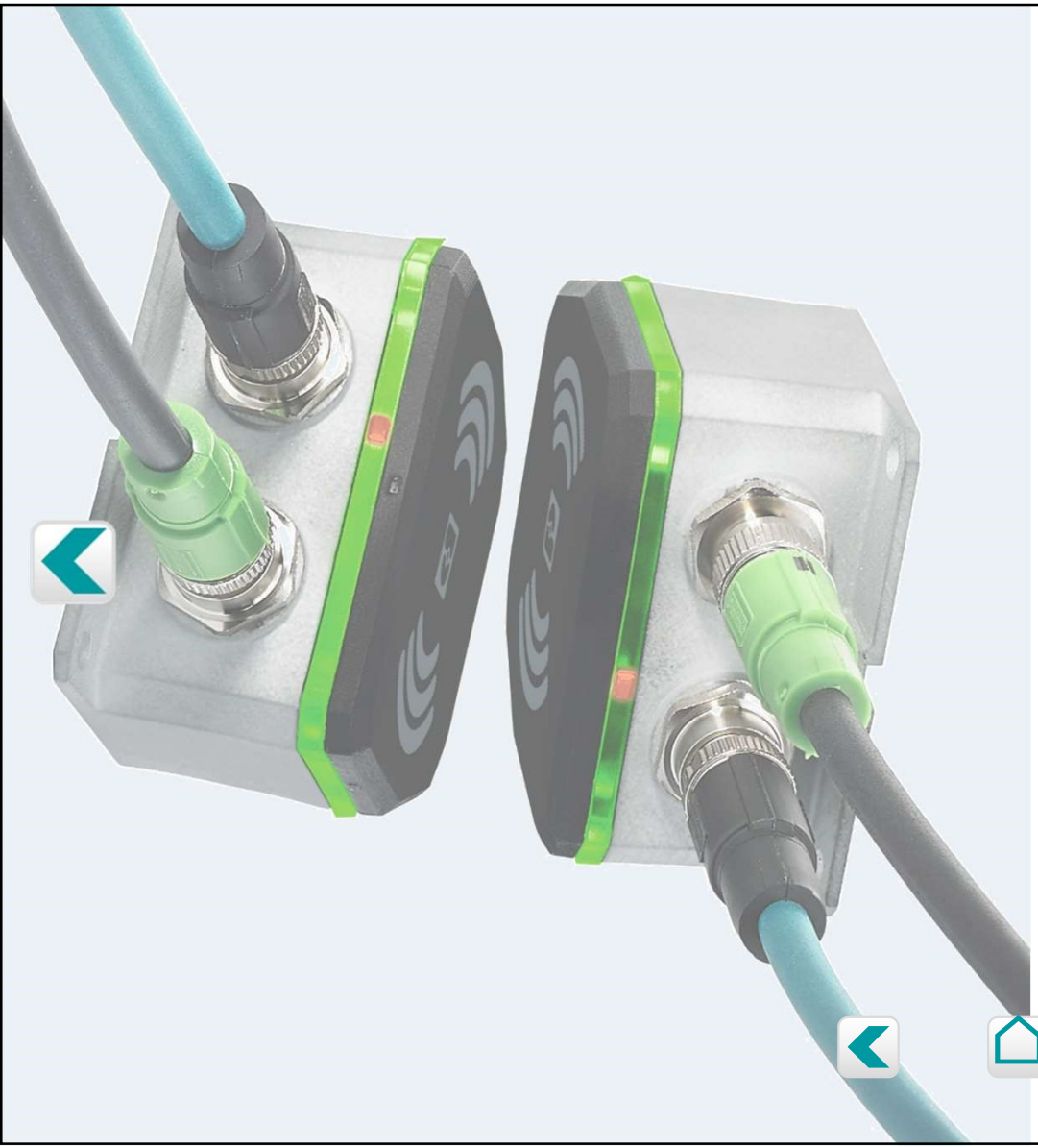
NearFi coupler

The solution for connectors subject to wear and maintenance

Contactless power transmission and Ethernet data communication from the robot to the change tool



INSPIRING INNOVATIONS



INTRODUCTION

NearFi coupler

Product overview

INSPIRING INNOVATIONS

NearFi Technology

Designed by Phoenix Contact

NearFi coupler

NearFi Technology

- Contactless transmission of energy and real-time ethernet data
- Transmission across an air gap in the centimeter range
- Simple as a plug

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Today's problems with connectors

Problem:

- Frequent mating cycles cause
  - Contact bends
  - Mechanical wear
  - Pollution



Consequences:

- Unplanned failure (replacement/repair)
- Regular maintenance intervals



Source: Zimmer Group

NearFi coupler

Example:
Tool change on the robot

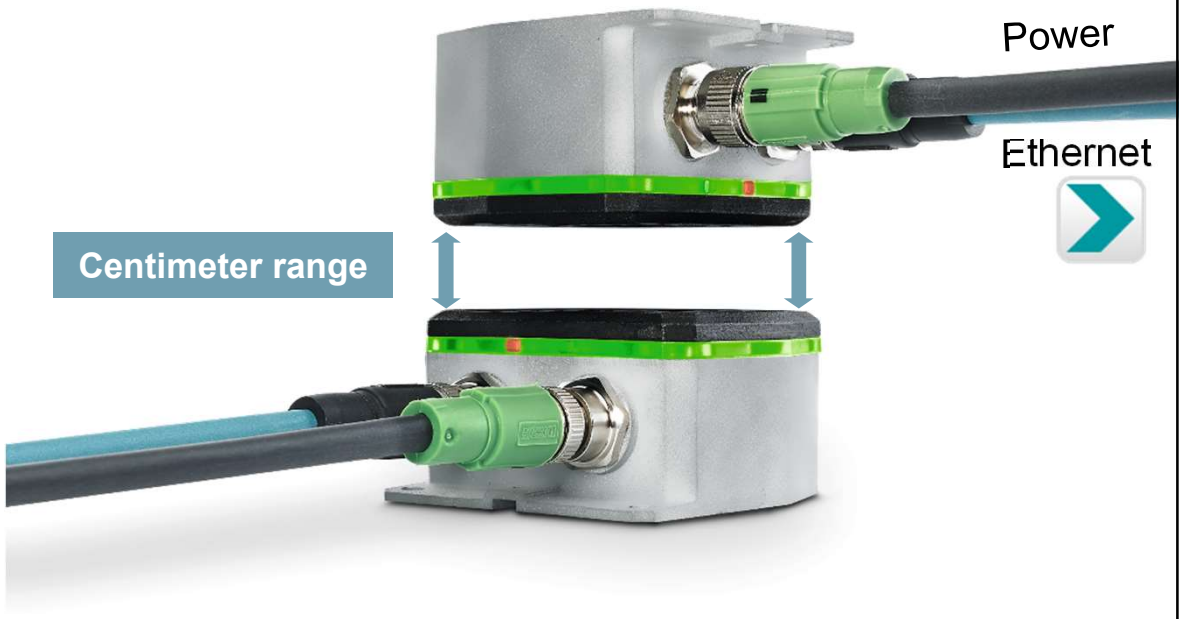
- **3** tools per robot (ø)
- **> 500** change/day (ø)
- Max. **100,000** mating cycles

PHOENIX CONTACT
INSPIRING INNOVATIONS

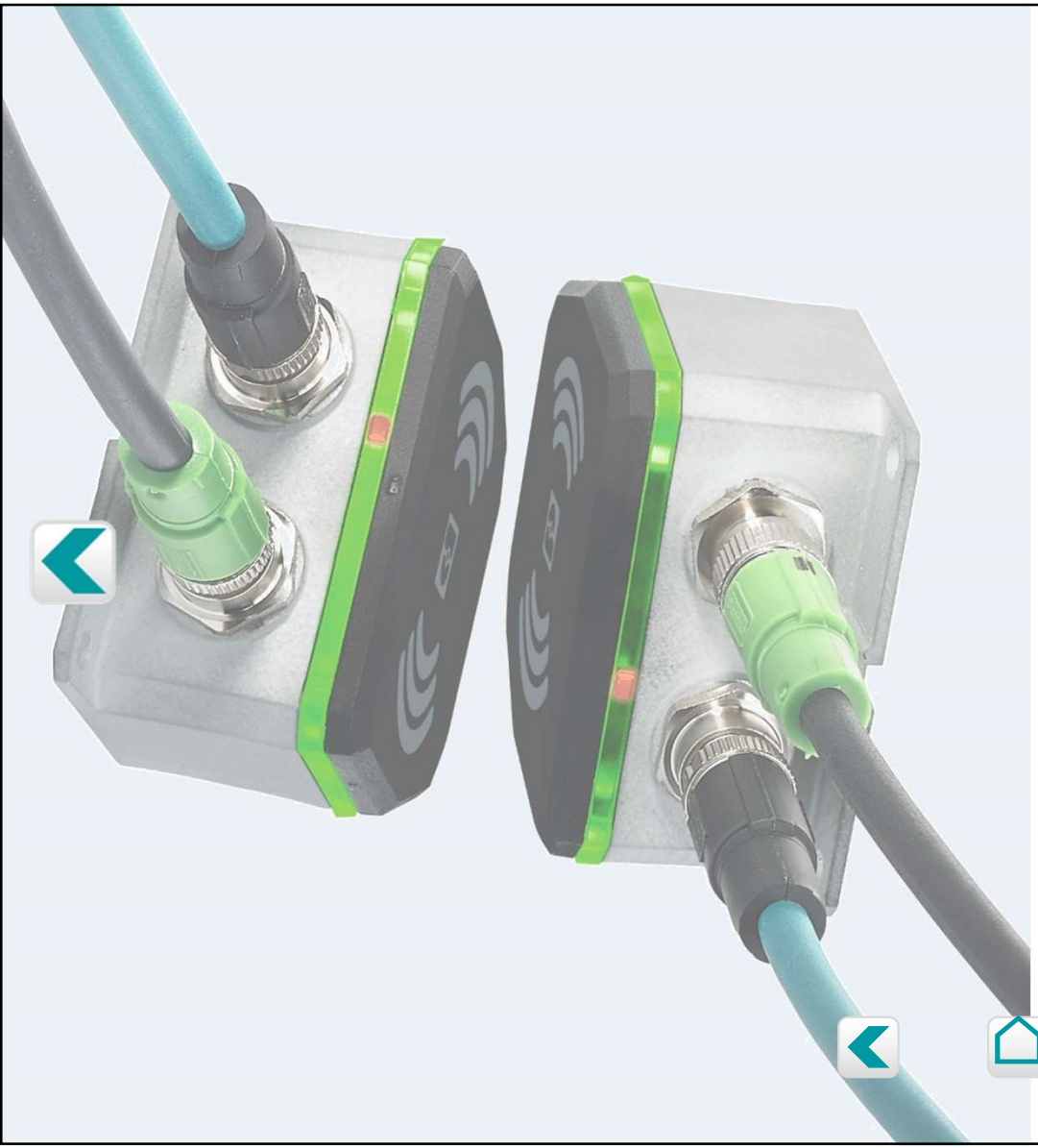
NearFi coupler

The solution for connectors subject to wear and maintenance

1. Reduction of downtime
2. No mechanical wear
3. No pollution
4. No tilting during coupling
5. High mounting freedom
6. Accelerated coupling process
7. Protocol-independent real-time communication



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BENEFITS

NearFi coupler

Product overview

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INSPIRING INNOVATIONS

NearFi coupler

Main features







Ethernet in real time

- 100 Mbit/s Ethernet (full duplex)
- Protocol-independent
- Latency-free

Inductive power transmission

- Up to 50 W (24 V /2 A)
- Constant power in the centimeter working range thanks to active control

Commissioning and diagnostics

- Plug & Play
- Circumferential LED ring for quick diagnosis
- Digital control input
- Digital diagnostic output

NearFi coupler

Main features



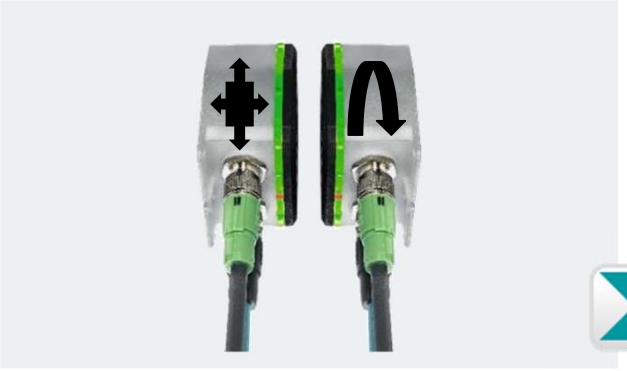
Wear and maintenance free

- Can be used in harsh conditions
- Robust housing (IP65, IK06)
- M12 connection technology



Transmission

also possible through **non-metallic obstacles**



Flexible installation

- Insensitive to vibrations
- No cable break
- Rotation possible

NearFi coupler

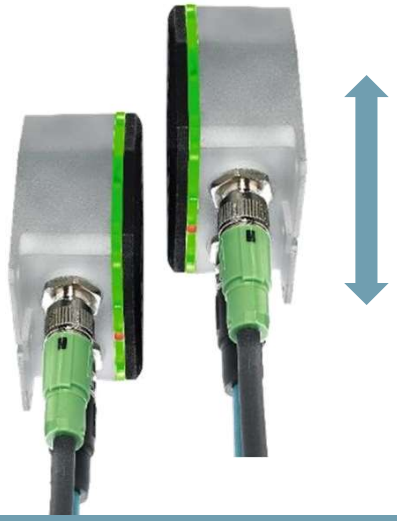
Flexible approach

Linear approach frontal



Example:
Robot tool change

Linear approach lateral



Example:
Conveyor belt, goods transport system

Rotating approach frontal



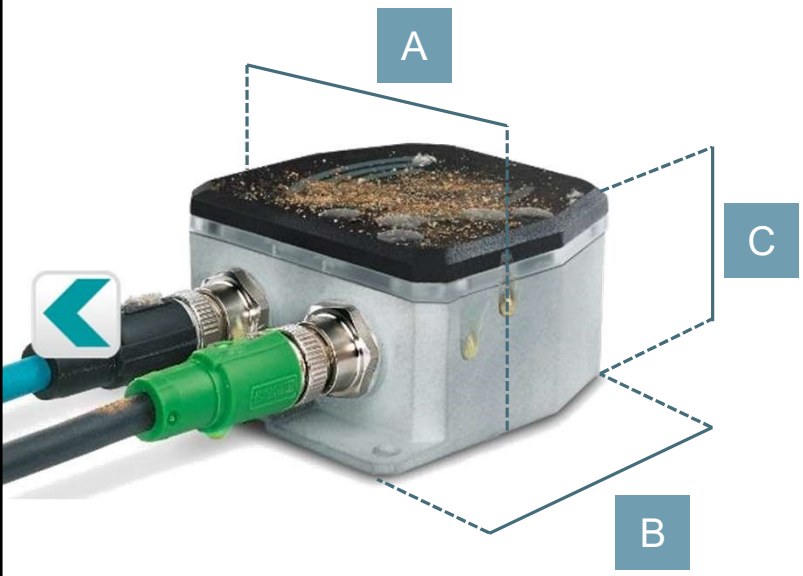
Example:
Rotating equipment

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Robust and flexible use



A	WIDTH	79 mm
B	HEIGHT	87 mm
C	DEPTH	40 mm

Zinc die-cast housing

IP65

IK05

M12



1 M6 thread with 7mm thread depth

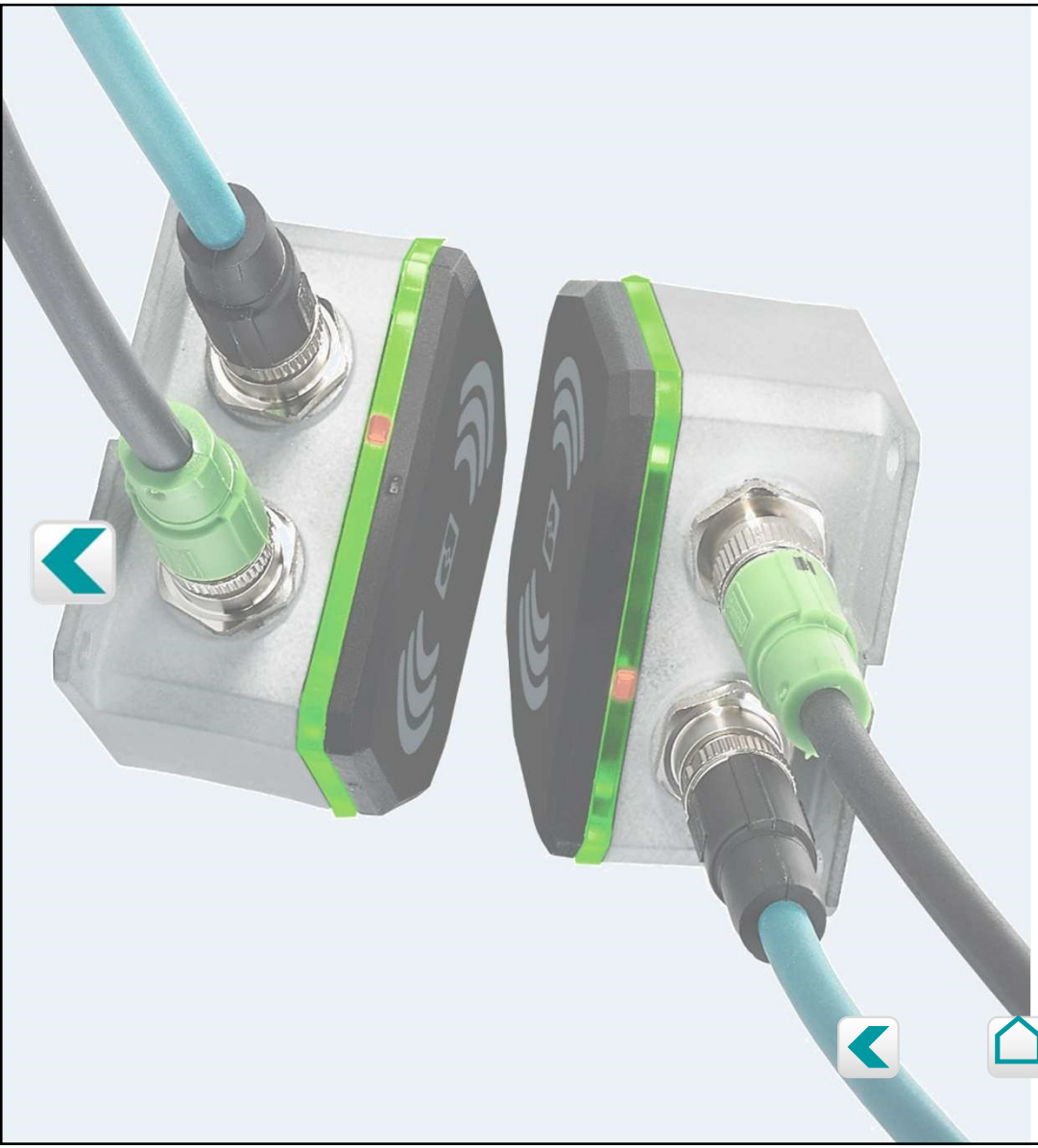


2 Mounting hole ∅5,5mm

3 Ground connection for M4 screw

The couplers must be mounted on metal surfaces for optimum heat dissipation

PHOENIX CONTACT
INSPIRING INNOVATIONS



BASICS

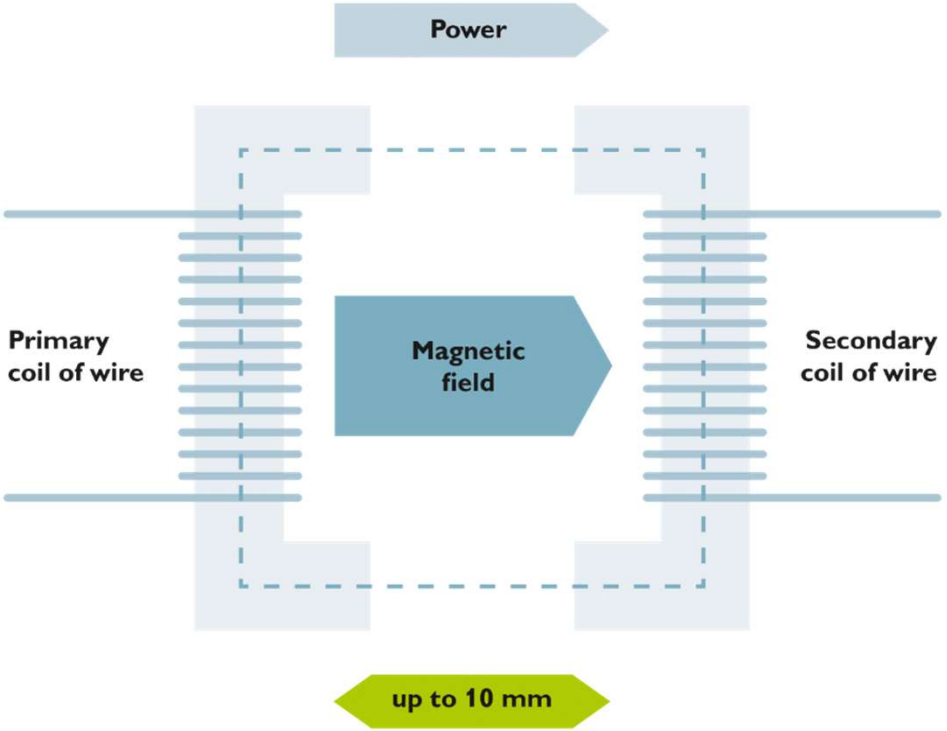
NearFi coupler

Product overview

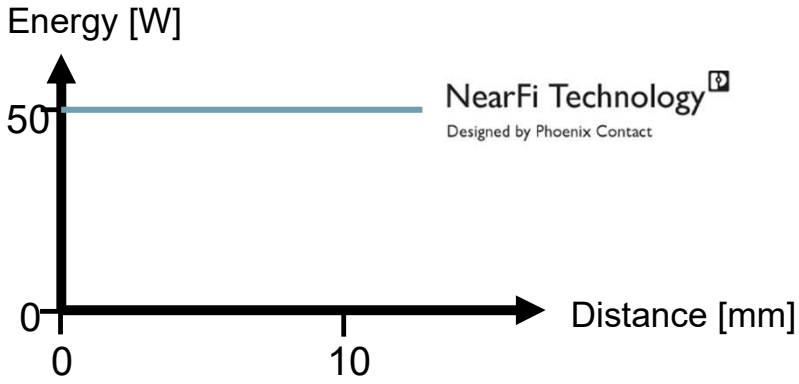
PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Inductive power transmission



- Inductive power transmission up to 50 W (24 V /2 A)
- **Constant** energy transfer in the centimeter air gap due to active control

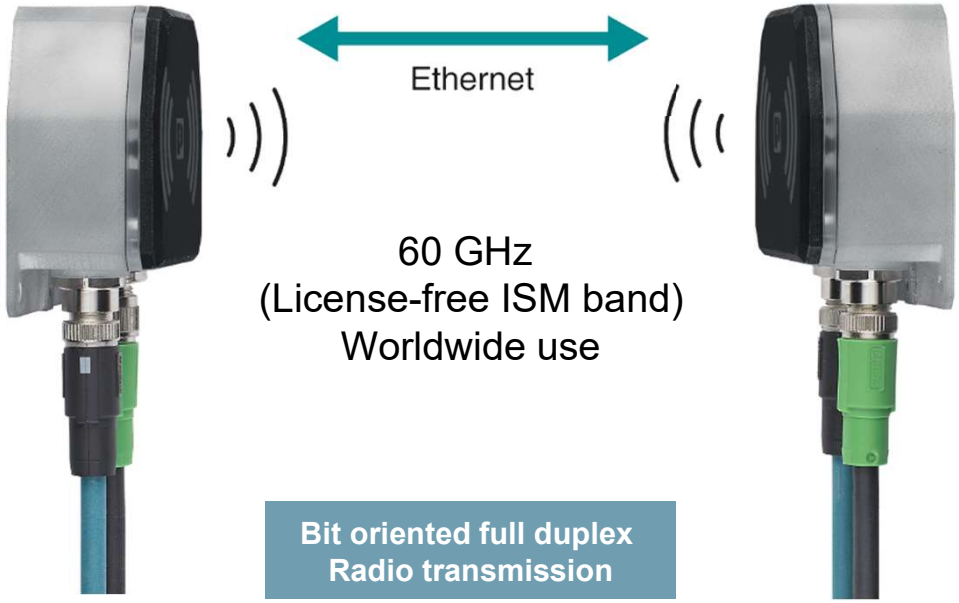


PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Contactless real-time Ethernet communication

Data transmission



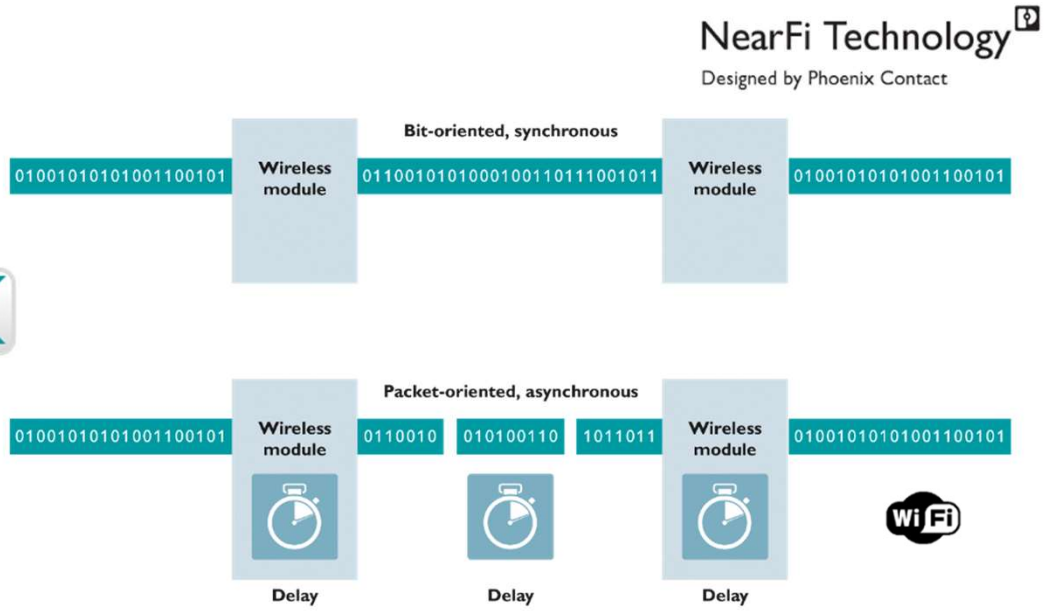
60 GHz
(License-free ISM band)
Worldwide use

Bit oriented full duplex Radio transmission

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Contactless real-time Ethernet communication



Bit-oriented synchronous transmission

- Bit-oriented - Immediate synchronous transfer of data
- Full duplex - Simultaneously in both directions (parallel on separate frequency bands)
- Delay typ. **2 µs**

Packet-oriented asynchronous transmission

- Packet-oriented - process includes many asynchronous and latency-causing operations
- Half duplex - alternating in both directions (one after the other on one frequency band)
- Delay typ. **16,000 µs**

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Contactless real-time communication

PATENTED

Real-time Ethernet transmission

- Bit-oriented full duplex transmission
- Ethernet protocol independent
- Latency-free
- 500 times faster than 5G
- Fast start-up (Fast start-up)
- Worldwide use (license-free 60 GHz ISM band)
- Near-field communication in the millimeter range
- Trouble-free operation next to WLAN

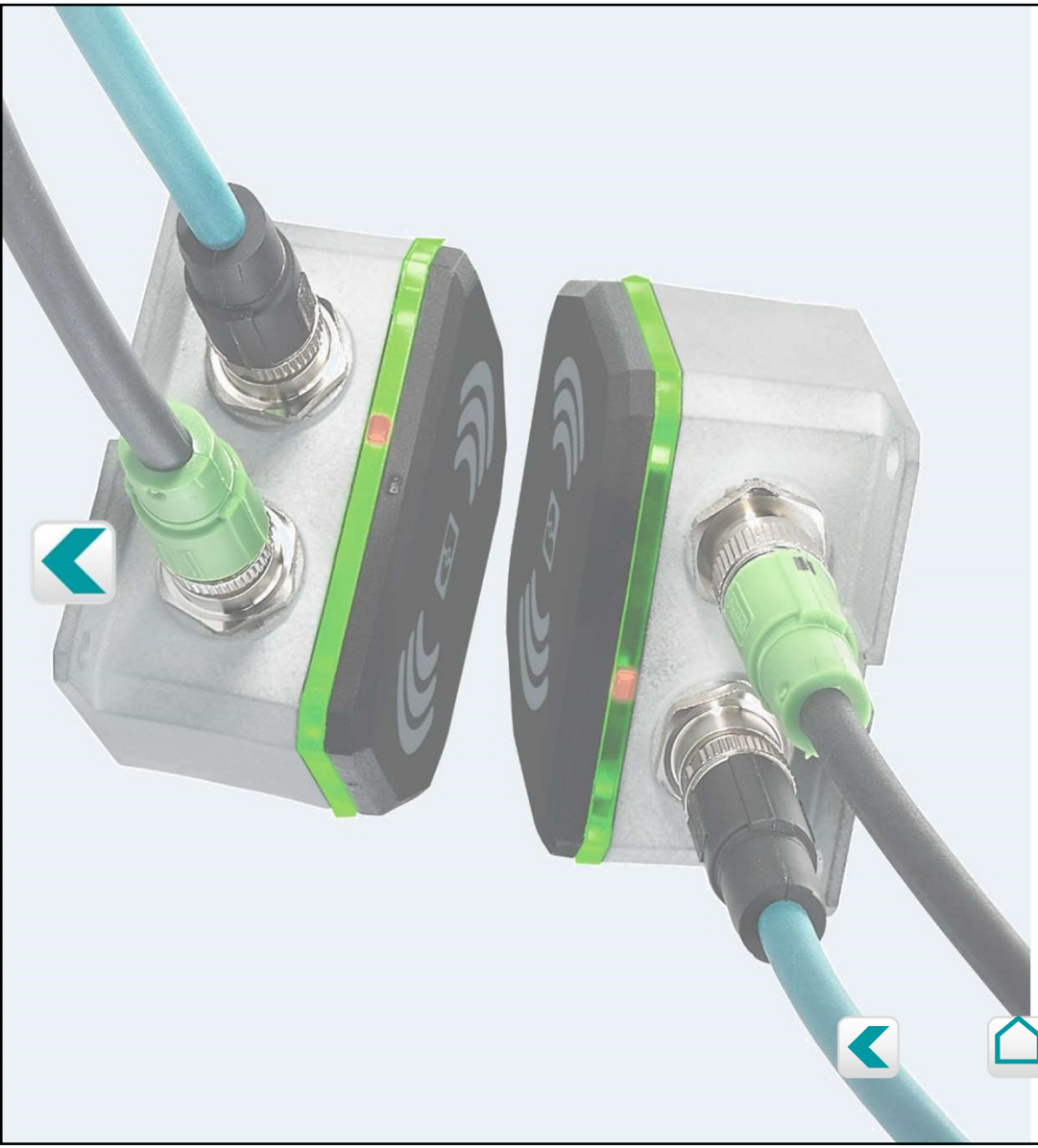
Inductive power transmission

- High power density
- Constant power over large working range due to active control

Wear and maintenance free

- No mechanical wear
- No bending
- No soiling
- No canting
- High mounting freedom due to flexible approach options

PHOENIX CONTACT
INSPIRING INNOVATIONS



APPLICATION EXAMPLES

NearFi coupler

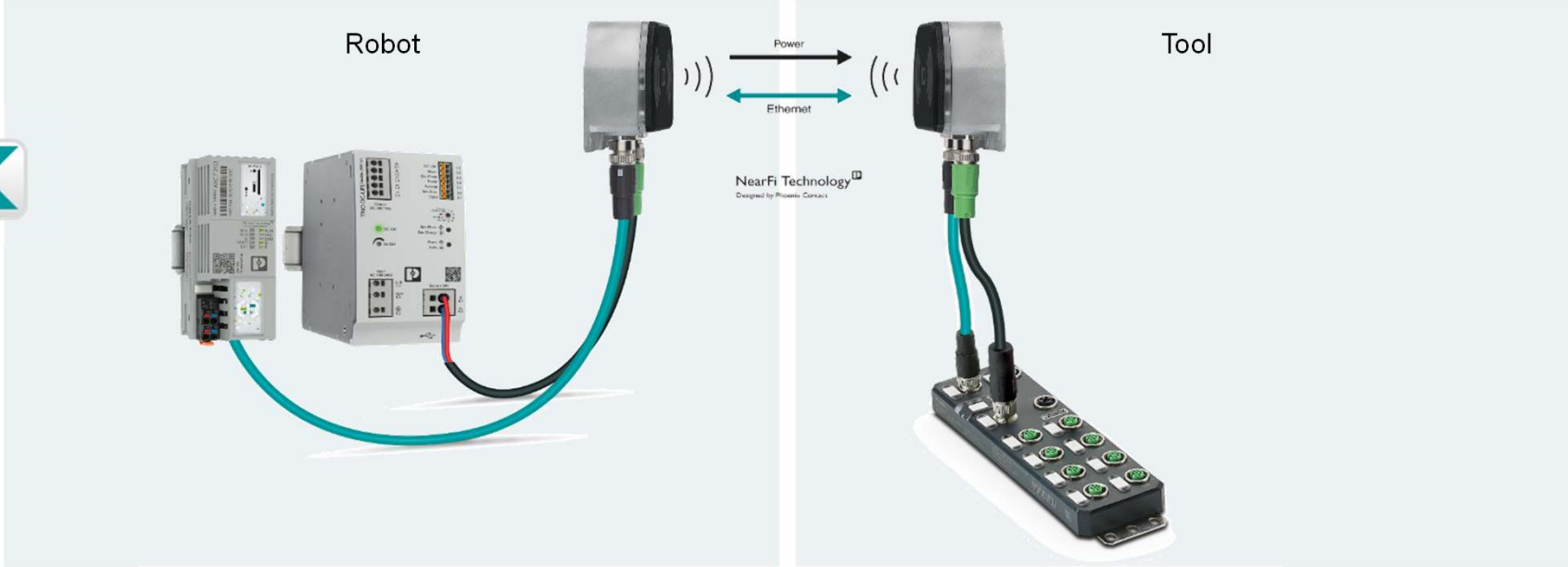
Product overview

INSPIRING INNOVATIONS

NearFi coupler

The solution for connectors subject to wear and maintenance

Contactless power transmission and Ethernet data communication from the robot to the change tool



INSPIRING INNOVATIONS

NearFi coupler

Target industries and applications

Automotive industry



Target applications:
- Robot with Change tools
- Turntables, Rotary indexing tables, presses
- Transport systems (framer)
- Load and workpiece carriers

Key Requirements:
- Real-time communication
- Fast Startup
- Coexistence with WLAN
- Robust
- Low solution costs

Mechanical and plant engineering



Target applications:
- Slip ring set
- Machine tools
- Beverage filling machines
- Packaging machines

Key Requirements:
- High performance
- Compact design
- Robust
- Real-time communication
- Low solution costs

NearFi coupler

Target industries and applications

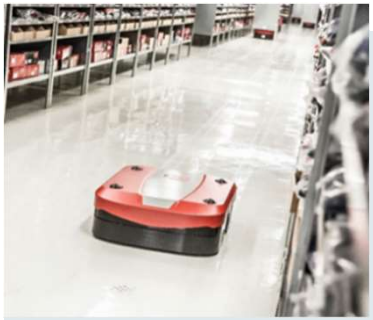
Transport systems



Target application:
- Identification of workpieces in goods distribution and material flow systems

Key Requirements:
- Coexistence with existing WLAN systems
- High mounting freedom due to flexible approach options

Logistics



Target applications:
- Driverless Transport systems
- Pallet identification in transport systems
- Goods distribution and Material Handling Systems

Key Requirements:
- Real-time communication
- Coexistence to WLAN
- Compact design
- Robust
- Low solution costs

NearFi coupler

More applications

Cleanroom systems



Target applications:
- Medical technology, food, Electrical industry
- Avoidance of Particle load due to Plug connections
- Transmission through glass or other materials

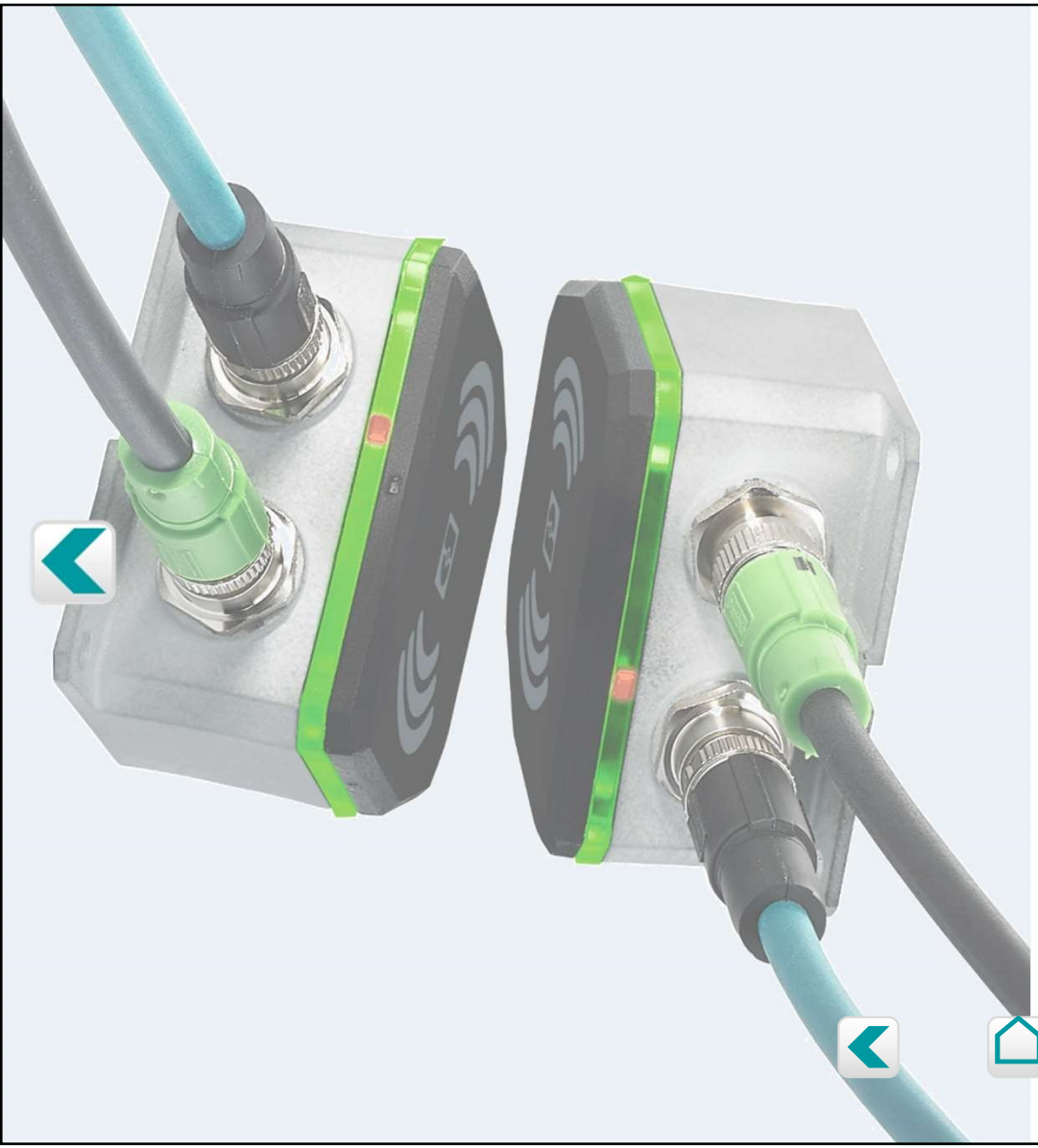
Key Requirements:
- Real-time communication
- Coexistence with WLAN
- Robust
- Obstacle penetration

Industrial robot



Target application:
- Human-Robot-Collaboration
- Lightweight robot
- Regular docking to various Workstations

Key Requirements:
- High performance
- Compact design
- Robust
- Real-time communication
- Low solution costs



PRODUCT PORTFOLIO

NearFi coupler

Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Commissioning

For the transmission basically
two devices are required:
one **base** coupler and one **remote** coupler



Base-
coupler



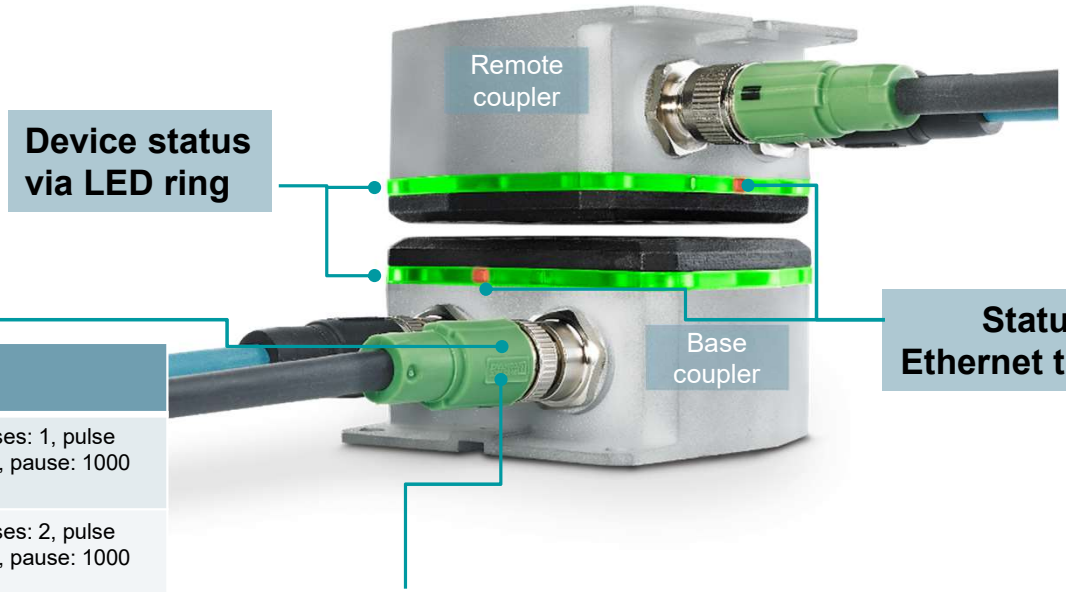
Remote-
coupler

Procedure:

- Remove the coupler from the packaging
- Supply the coupler with voltage
- **No configuration necessary**
- Green LED ring flashing - devices are ready for operation, no transmission -> reduce air gap
- Approach base and remote coupler
- **Green LED ring is permanently on – devices are connected and transmitting!**

NearFi-Koppler

Diagnosis / Control



Digital status output (M12- Pin4)

Signal Code	Zustand	Signalform
1	Base Error: External supply voltage outside the nominal range (19-30V)	Number of pulses: 1, pulse length: 100 ms, pause: 1000 ms,
2	Base Error: Internal supply voltage, current consumption, or temperature outside nominal range	Number of pulses: 2, pulse length: 100 ms, pause: 1000 ms,
3	Remote Error: Output voltage outside nominal range or distance too large	Number of pulses: 3, pulse length: 100 ms, pause: 1000 ms,
4	Remote Error: Voltage output overload/short circuit	Number of pulses: 4, pulse length: 100 ms, pause: 1000 ms,
5	Base and remote not coupled (Energy and data transmission inactive)	Number of pulses: 5, pulse length: 100 ms, pause: 1000 ms,
OFF	Base and Remote coupled (Energy and data transmission active)	None

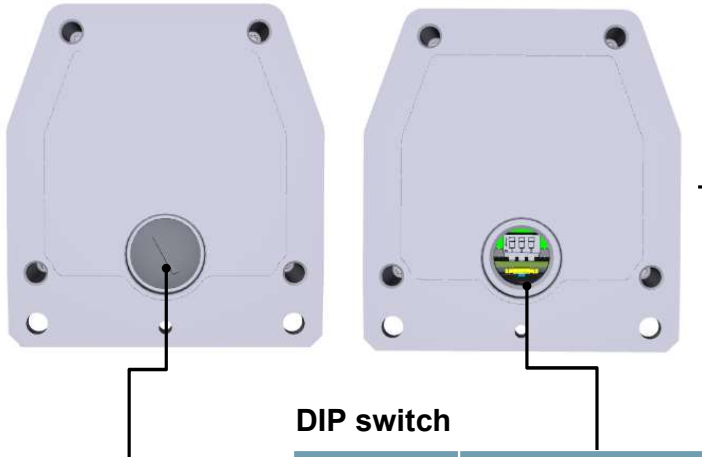
Digital control input (M12- Pin 2)

PIN 2	Zustand
24 V / NC	Energy transmission activated
0 V	Energy transfer disabled

INSPIRING INNOVATIONS

NearFi coupler

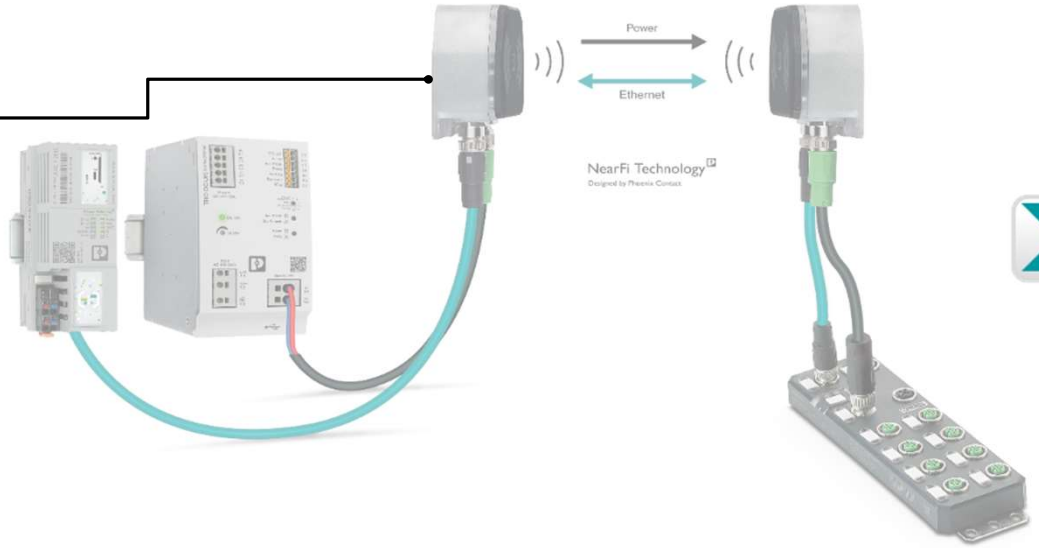
Configuration (optional)



M16 screw plug

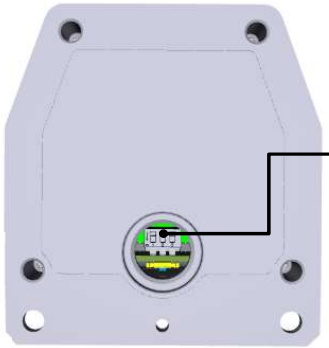
DIP switch

Position	Mode
DIP 1 ON OFF	Fast Power Coupling Power Polling
DIP 2 ON OFF	Ethernet Full Duplex Ethernet Autoneg



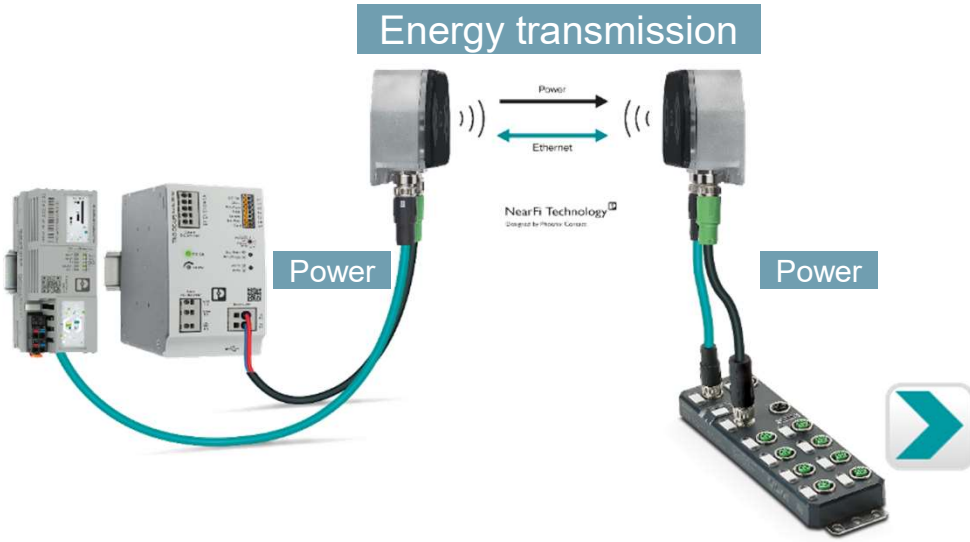
NearFi coupler

Fast Power Coupling



DIP switch

Position	Mode
DIP 1 ON	Fast Power Coupling
OFF	Power Polling
DIP 2 ON	Ethernet Full Duplex
OFF	Ethernet Autoneg

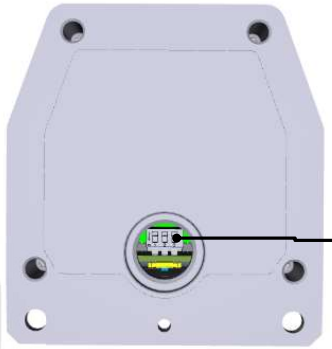


Fast Power Coupling

DIP	Position	Function
1	ON	**Fast Power Coupling enabled:** The base coupler permanently tries to establish a connection to the remote coupler. The ***energy transfer is permanently active***. **Note: Metallic foreign bodies may become hot in the air gap between the couplers.**
1	OFF (factory setting)	**Power polling enabled:** The base coupler tries to establish a connection to the remote coupler 1 time per second. ***Only when the connection is established, the energy transfer between base and remote*** coupler ***is switched active.***

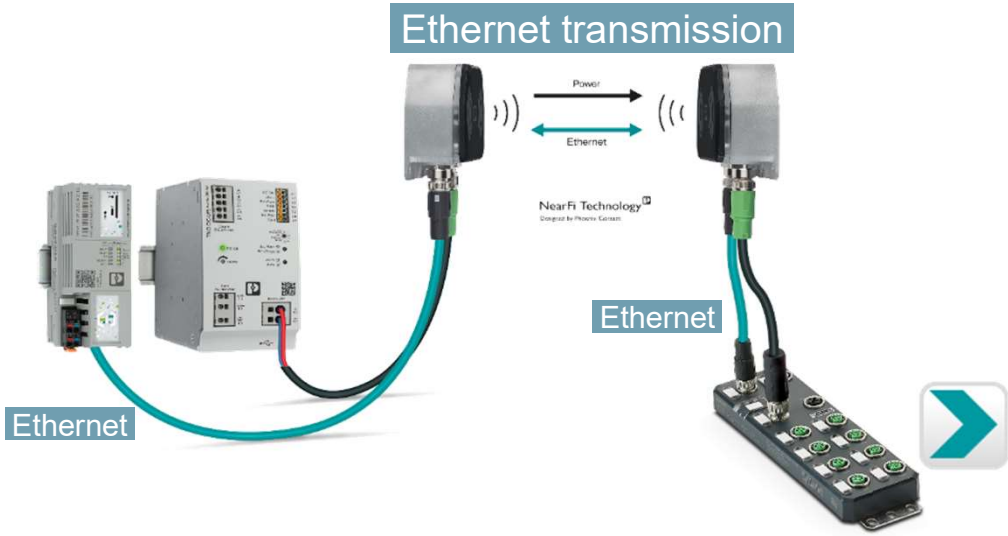
NearFi coupler

Ethernet Full Duplex / Autoneg



DIP switch

Position	Mode
DIP 1 ON OFF	Fast Power Coupling Power Polling
DIP 2 ON OFF	Ethernet Full Duplex Ethernet Autoneg



Ethernet Full Duplex / Autoneg

DIP	Position	Function
2	ON	**Ethernet Full Duplex:** The Ethernet connection is set with a transmission rate of ***100 MBit/s*** and the transmission type ***full duplex fixed.***
2	OFF (factory setting)	**Autoneg enabled:** The connected ***end devices negotiate the transmission rate 10/100 Mbit/s and the transmission type half/full duplex directly.*** The entire route thereby behaves like a directly connected copper cable

NearFi coupler

Customer benefits



Quick and easy installation

- ✓ Plug & Play with M12 - Easy installation like a connector
- ✓ Flexible - high mounting freedom due to flexible approach options
- ✓ All-round visible diagnostics due to LED ring on housing

Time and cost savings

- ✓ Contactless, thus no wear and no maintenance
  - ✓ Protocol-independent and latency-free Ethernet real-time communication
  - ✓ Constant energy transmission across an air gap, in the centimeter range, through active control

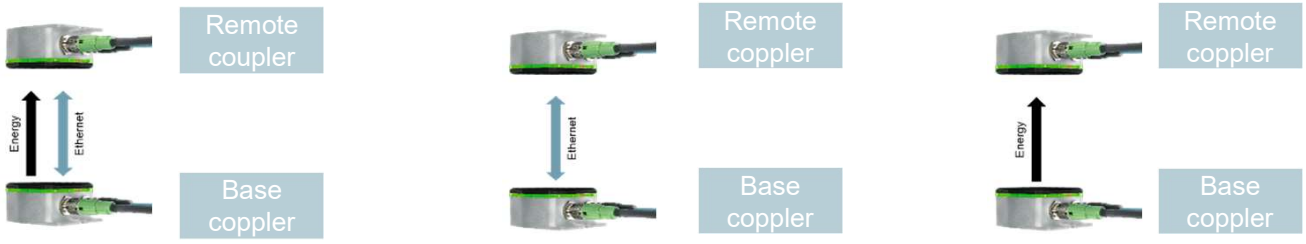
Increase in plant availability

- ✓ Shortened payback period due to falling costs
  - ✓ Reduction of service calls and elimination of maintenance costs
  - ✓ Optimized production processes

PHOENIX CONTACT
INSPIRING INNOVATIONS

NearFi coupler

Product portfolio

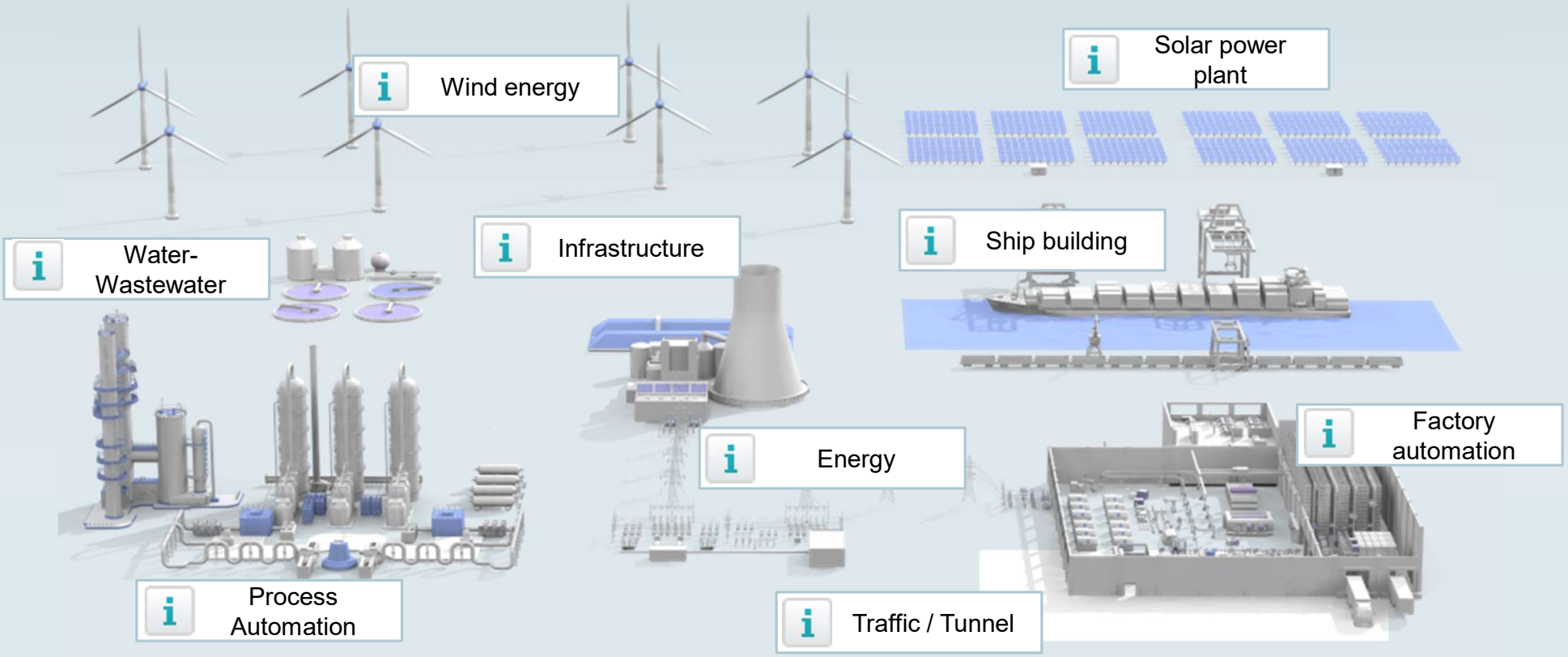


Description	Variants					
Variant	Contactless Energy and data coupler		Contactless energy couplers		Contactless data coupler	
Type	Base	Remote	Base	Remote	Base	Remote
Article description	NEARFI PD 2A ETH B	NEARFI PD 2A ETH R	NEARFI P 2A B	NEARFI P 2A R	NEARFI D ETH B	NEARFI D ETH R
Item number	1234224	1234225	1234226	1234229	1234232	1234234
Product photo						

Basically, two devices are always required for transmission:
a base coupler and a remote coupler

PHOENIX CONTACT
INSPIRING INNOVATIONS

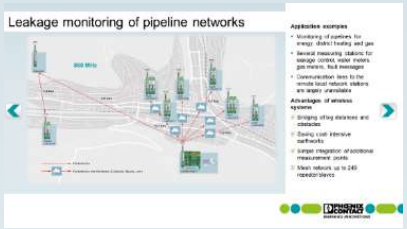
Application references



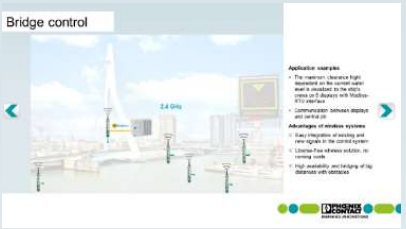
Infrastructure applications

Click on image!

Radioline

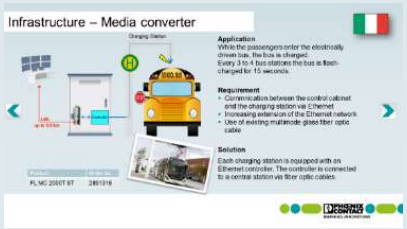






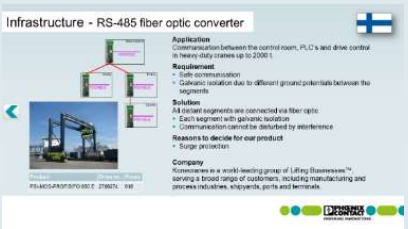


Media Converter



PSI-MOS Profibus





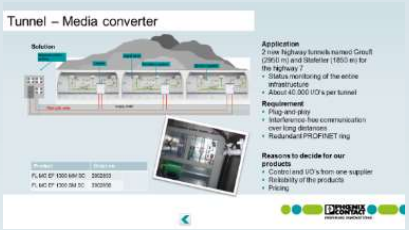
Traffic / Tunnel applications

Click on image!

Radioline



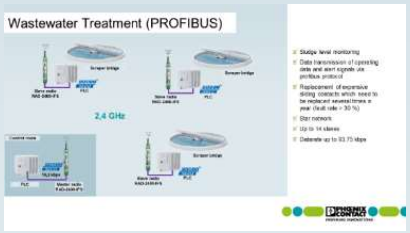
Media Converter



Water & Wastewater applications

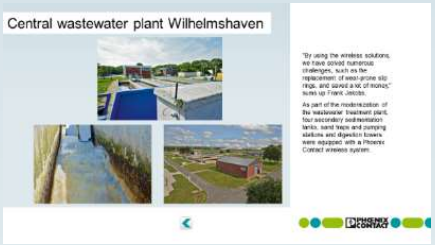
Click on image!

Radioline



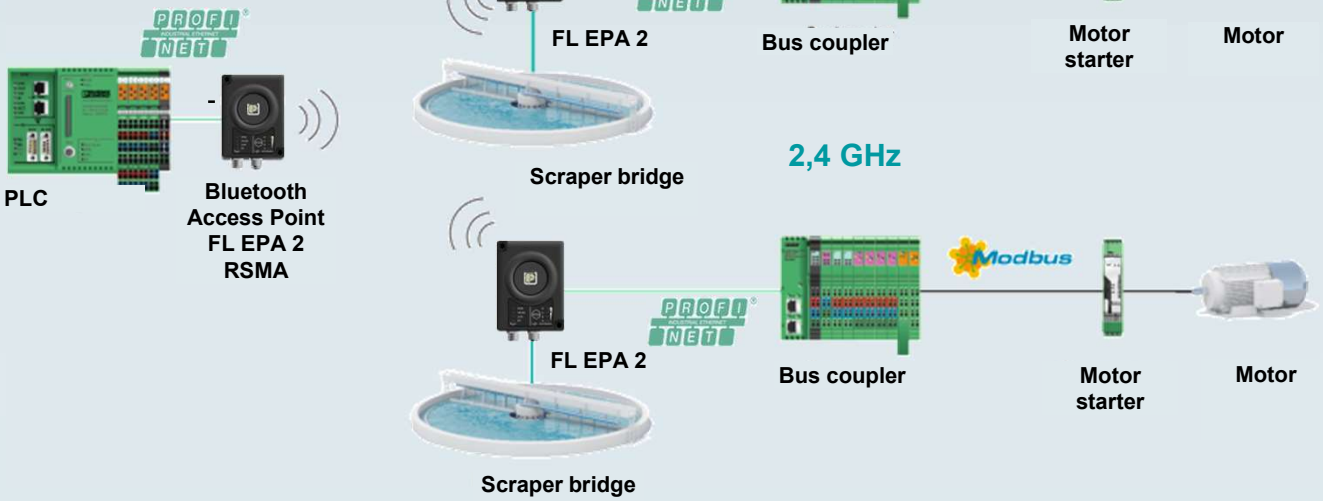






PHOENIX CONTACT
INSPIRING INNOVATIONS

Wastewater Treatment (PROFINET)

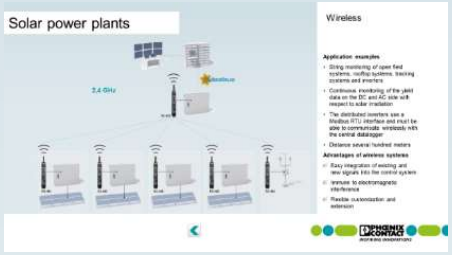


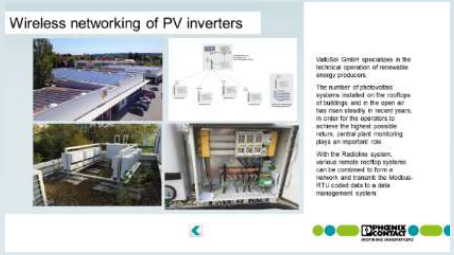
- Sludge level monitoring
- Data transmission of operating data and alert signals via Profinet protocol
- Star network
- Up to 7 slaves

Solar applications

Click on image!

Radioline



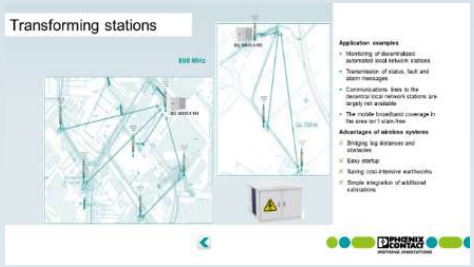


Energy applications

Click on image!

Radioline

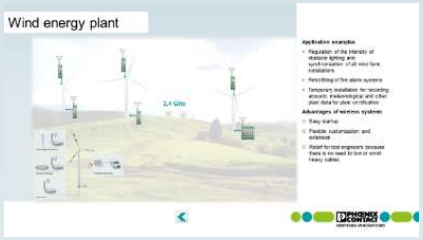




Wind applications

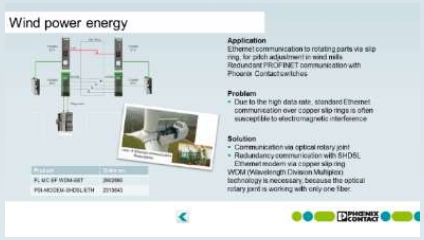
Click on image!

Radioline

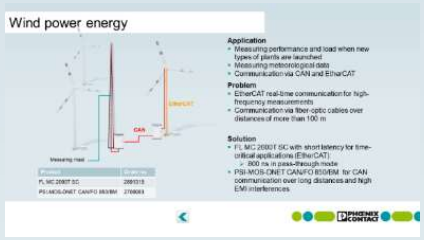




Media Converter / SHDSL



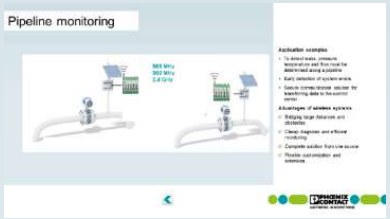
Media Converter / PSI MOS



Process applications

Click on image!

Radioline







Comserver



PSI-MOS Profibus



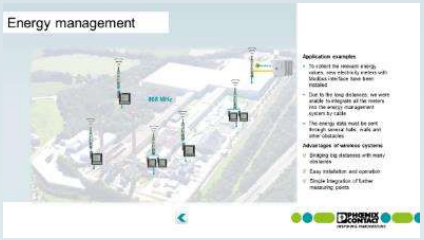
Factory automation applications

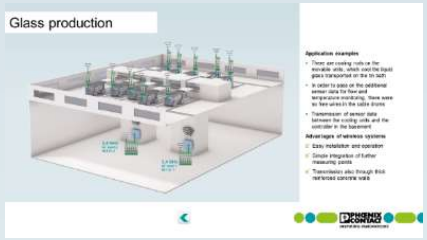
Click on image!

Wireless MUX



Radioline

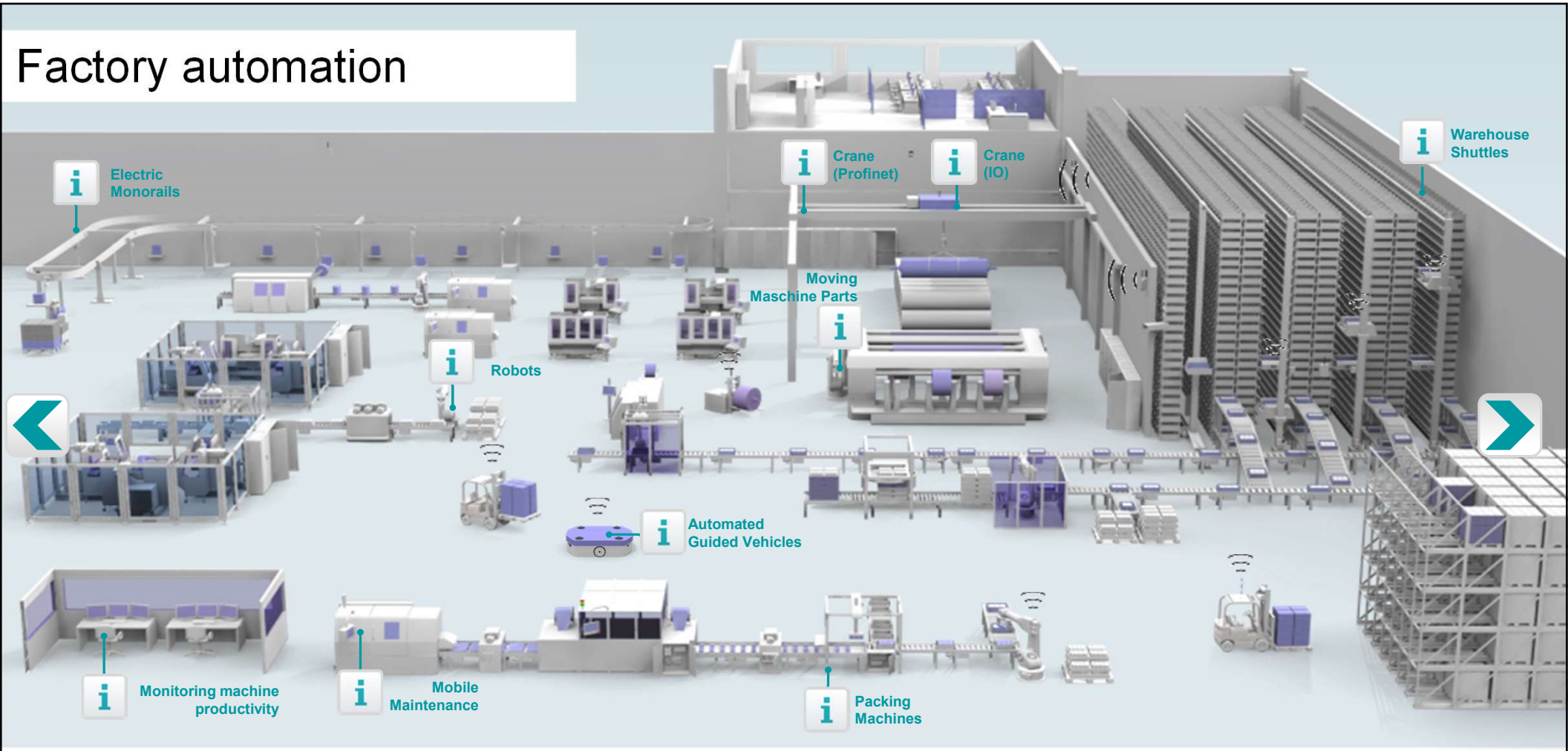




Comserver



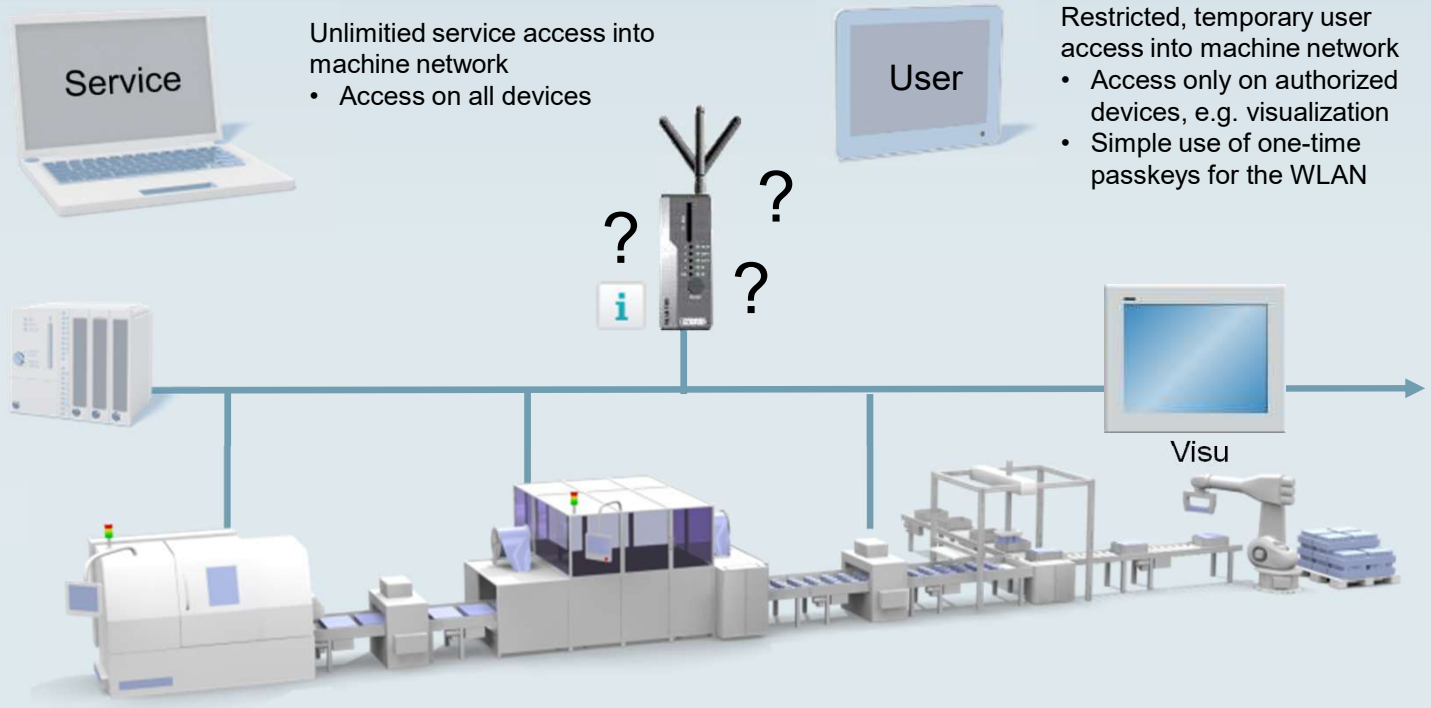
Factory automation



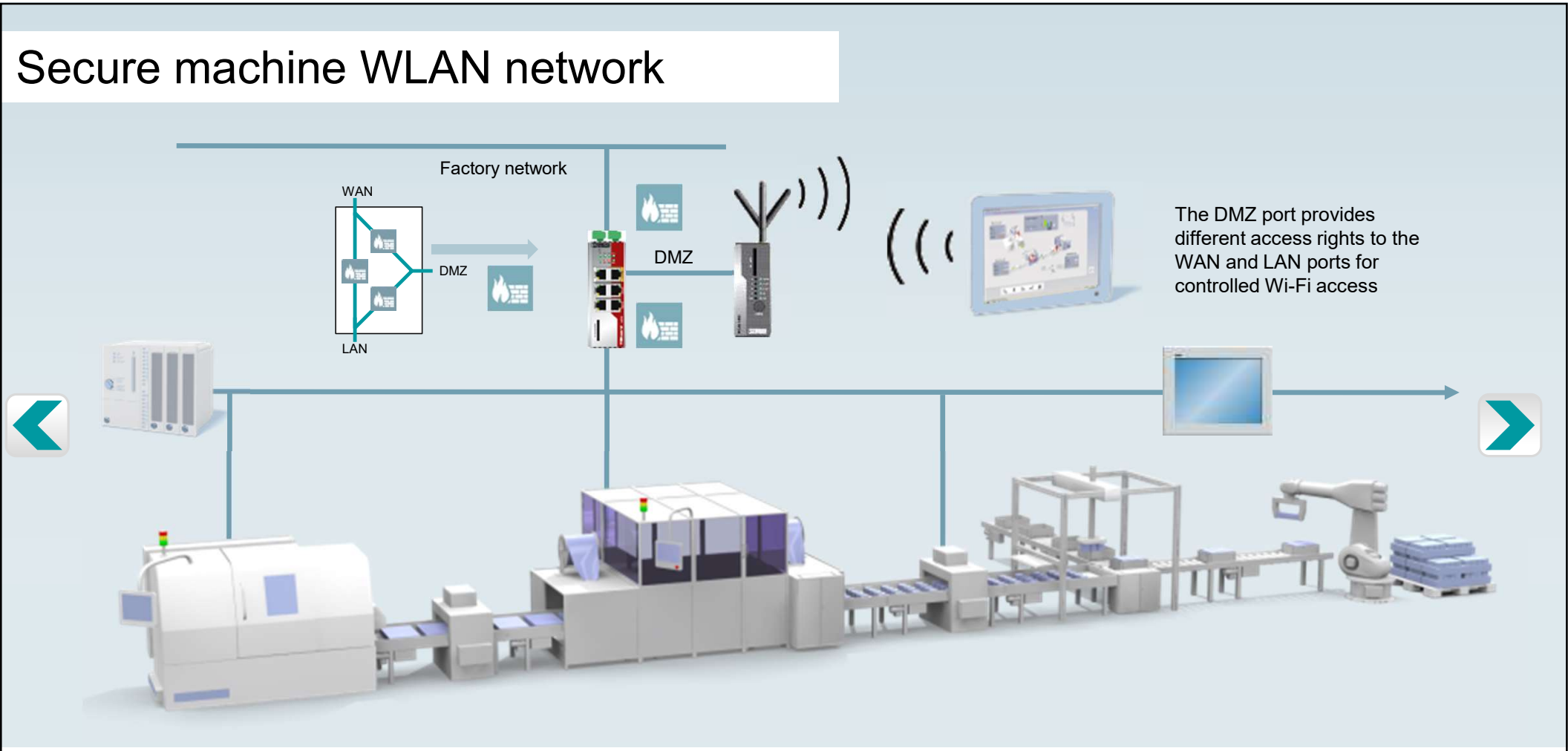
Smart Device integration



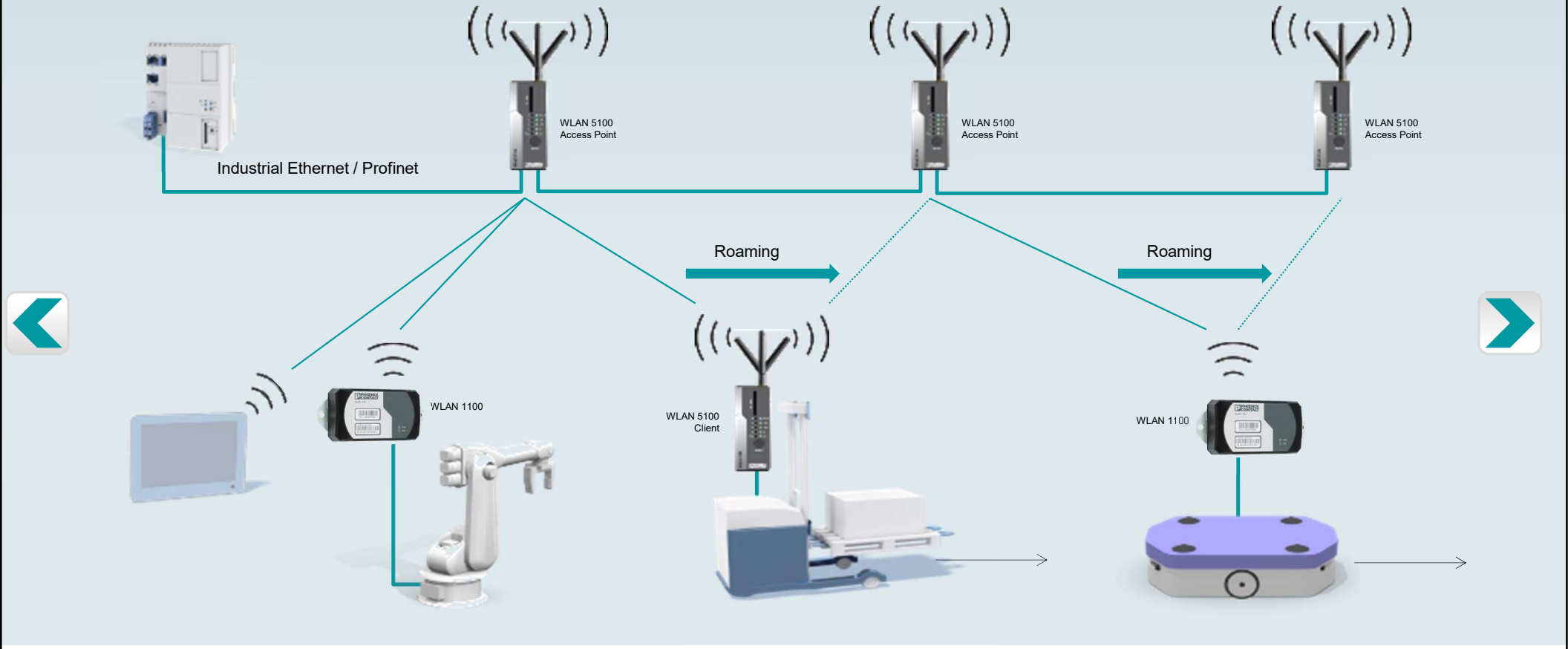
Smart Device integration



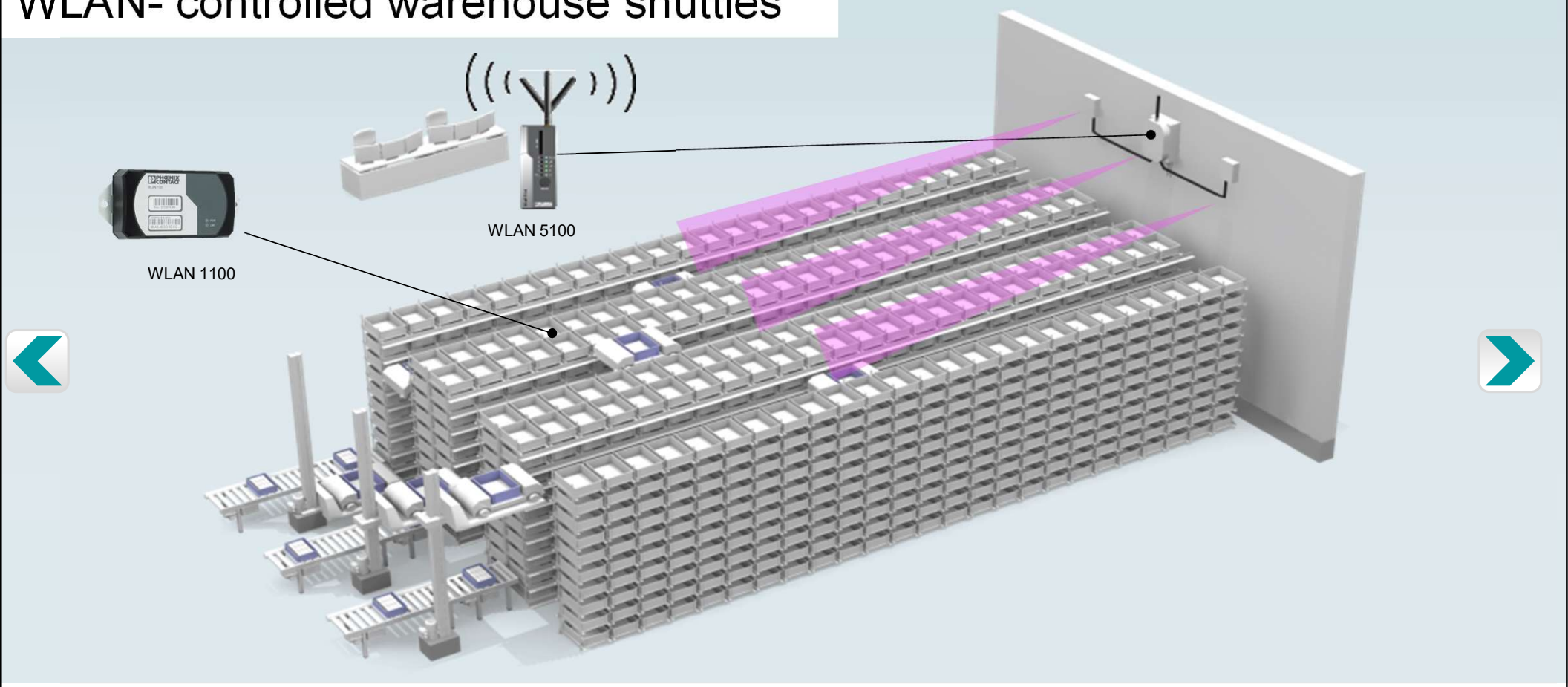
Secure machine WLAN network



Automated Guided Vehicles



WLAN- controlled warehouse shuttles

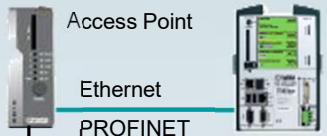




AS/RS to Automate Distribution Center Phoenix Contact USA

PHOENIX CONTACT
INSPIRING INNOVATIONS

Electric monorails



Access Point

Ethernet

PROFINET

PLC

Wireless LAN

Leaky cable

Controlled Roaming

Product overview

WLAN 2010



C1D2
Hazloc

- **-40°C up to +60°C**
- **Up to 60 Clients in Access Point mode**
- **+20% ... 40% more Performance**
- **WLAN Mesh-Mode**


WLAN Mesh


CHRIST
CHRIST
CHRIST
KARSTADT

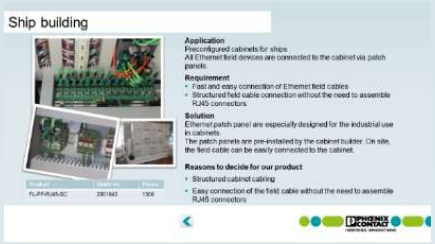
Ship building applications

Click on image!

Comserver

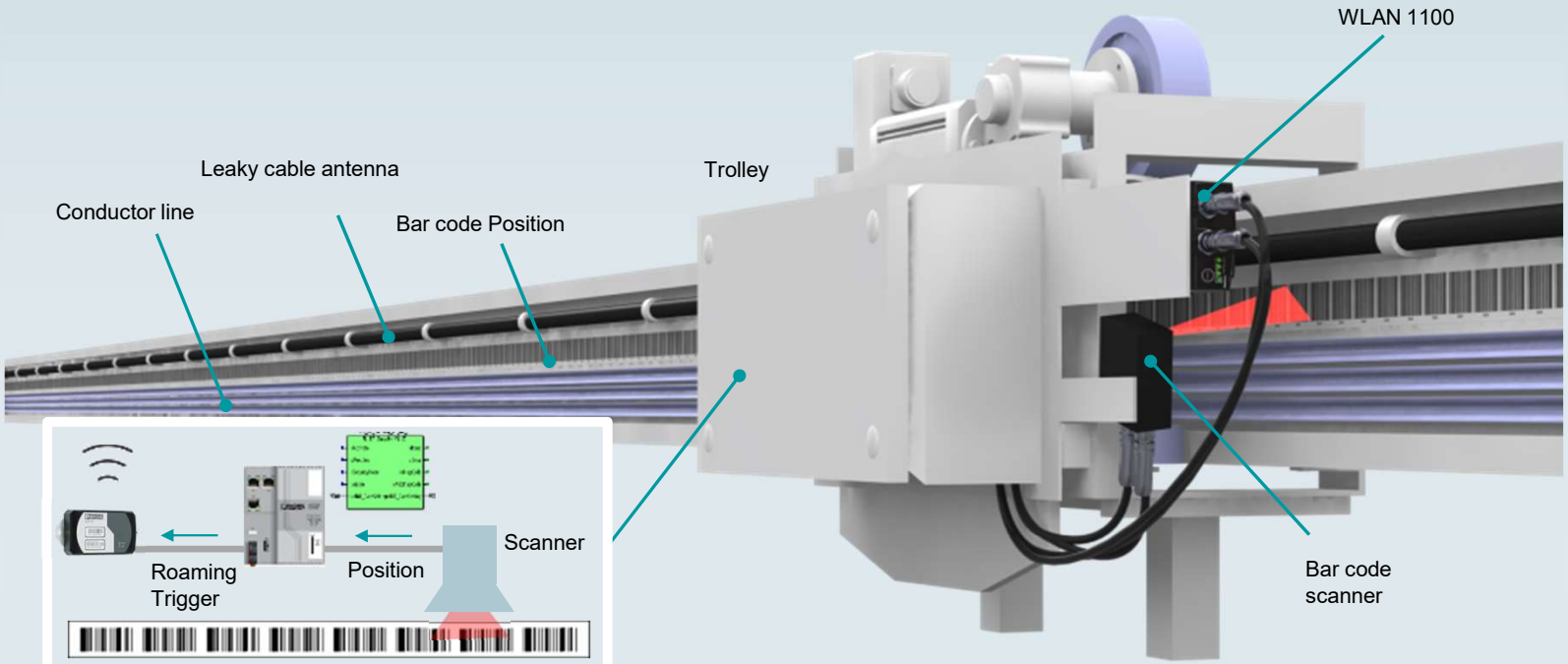


Patch Panel



INSPIRING INNOVATIONS

Controlled roaming depending on position



Industrial WLAN – exemplary applications



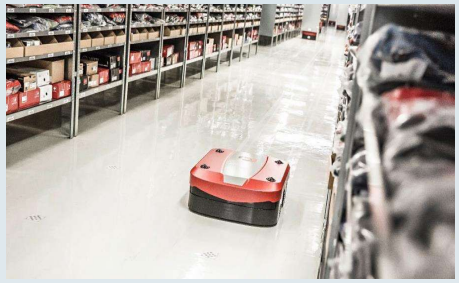
Water / Wastewater



Wireless machine access with smart devices



Warehouse logistics



Flexible autonomous transport systems in intralogistics



Automated Guided Vehicle Weasel®, E-Commerce, Supply Chain, Hermes Fulfilment GmbH

PHOENIX CONTACT
INSPIRING INNOVATIONS



Tecnología inteligente de robots de almacén y logística: automatización de siguiente nivel

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INSPIRING INNOVATIONS

Wireless from the sensor to the network



Wireless I/O

Digital signals
0 … 250 V AC/DC

Analog signals
0 … 20 mA, 4 … 20 mA
0 … 10 V, HART

Wireless Ethernet

PROFINET®
Modbus
EtherNet/IP™

Wireless Serial

PROFIBUS®
Modbus

RS-232 RS-422 RS-485

PHOENIX CONTACT
INSPIRING INNOVATIONS

Portfolio

Wireless I/O

Radioline

- Range up to 32 km
- Up to 256 x DI/DO or 128 x AI/AO
- Mesh networks up to 250 nodes

Wireless MUX

- Range up to 400 m
- 16 x DI/DO and 2 x AI/AO
- Point-to-Point connection

WirelessHART

- Range up to 250 m
- 4 x HART, 1 x AI 4…20 mA
- Mesh networks up to 250 nodes

Wireless Serial

Radioline

- Range up to 32 km
- 1 x RS232/485 (Modbus, Profibus)
- Mesh networks up to 250 nodes

ESSENTIAL edition

- Range up to 500 m
- 1 x RS485 (Modbus)
- Mesh networks up to 250 nodes

Wireless Ethernet

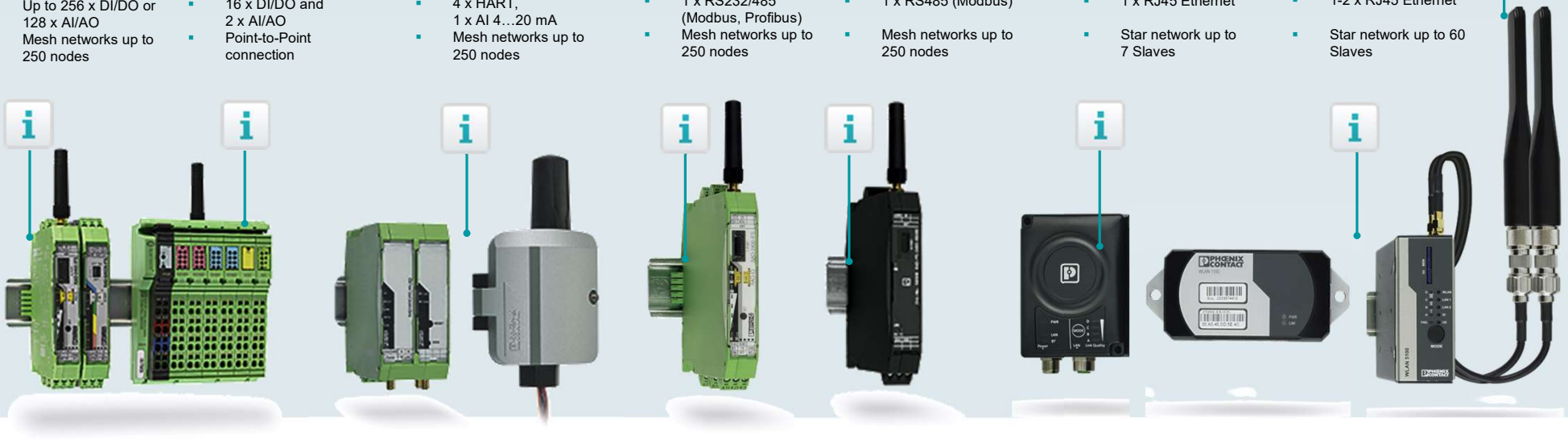
Bluetooth

- Range up to 200 m
- 1 x RJ45 Ethernet
- Star network up to 7 Slaves

WLAN

- Range up to 500 m
- 1-2 x RJ45 Ethernet
- Star network up to 60 Slaves

Antenna and cables



INSPIRING INNOVATIONS