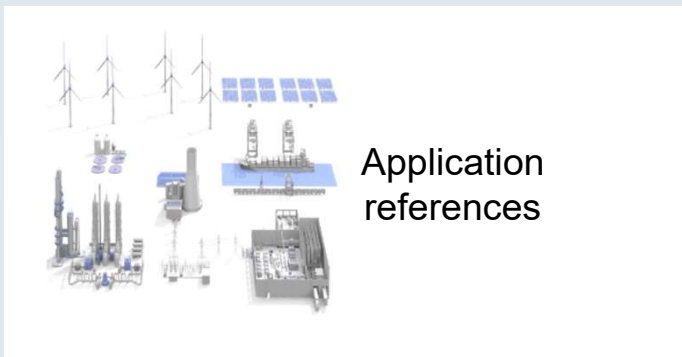
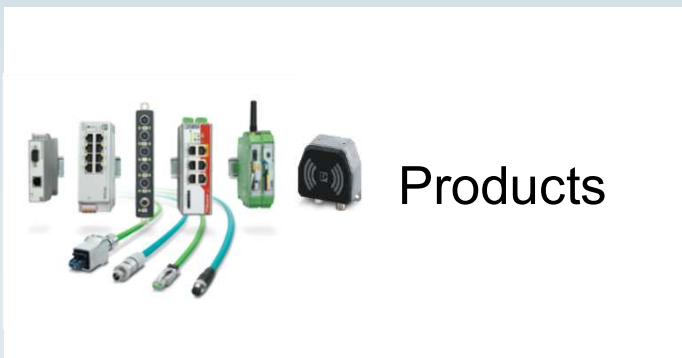


Communication Interfaces – Overview 2021



Communication Interfaces - Our product portfolio



Fieldbus
Communication



Ethernet
Infrastructure



Smart Camera Box



new

Wireless



new

Remote
Communication



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



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



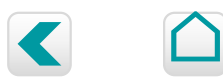
Profibus PA
I/O
Multiplexer



Ethernet
HART
Multiplexer

Fieldbus
Communication 1

Ethernet
Infrastructure



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



Wireless



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



Ethernet Infrastructure



Remote communication



Remote communication



TC Mobile
I/O



TC MGuard



new
TC Router



new
TC Cloud
Client



mGuard
Secure
Remote
Service



Technologies



Wireless



Technologies

HART
Technology

PoE Power
over
Ethernet

**TRUSTED
WIRELESS**

**PROFI[®]
BUS**

5G

NearFi Technology
Designed by Phoenix Contact

new

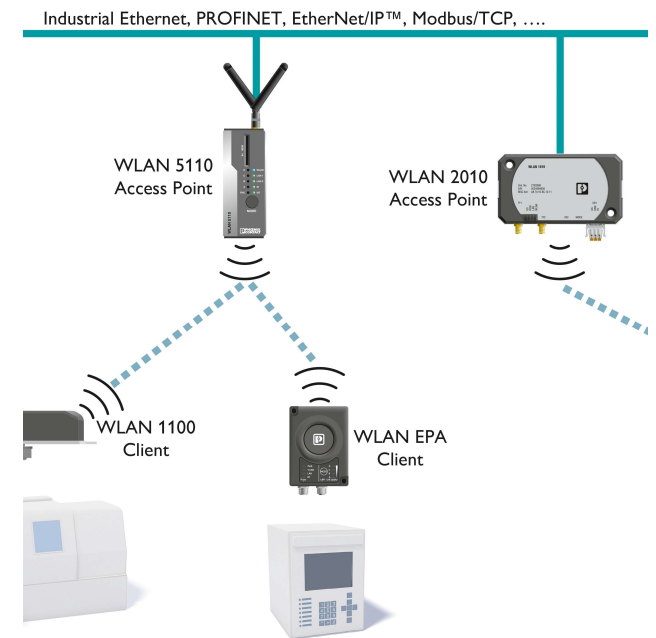


Remote
communication

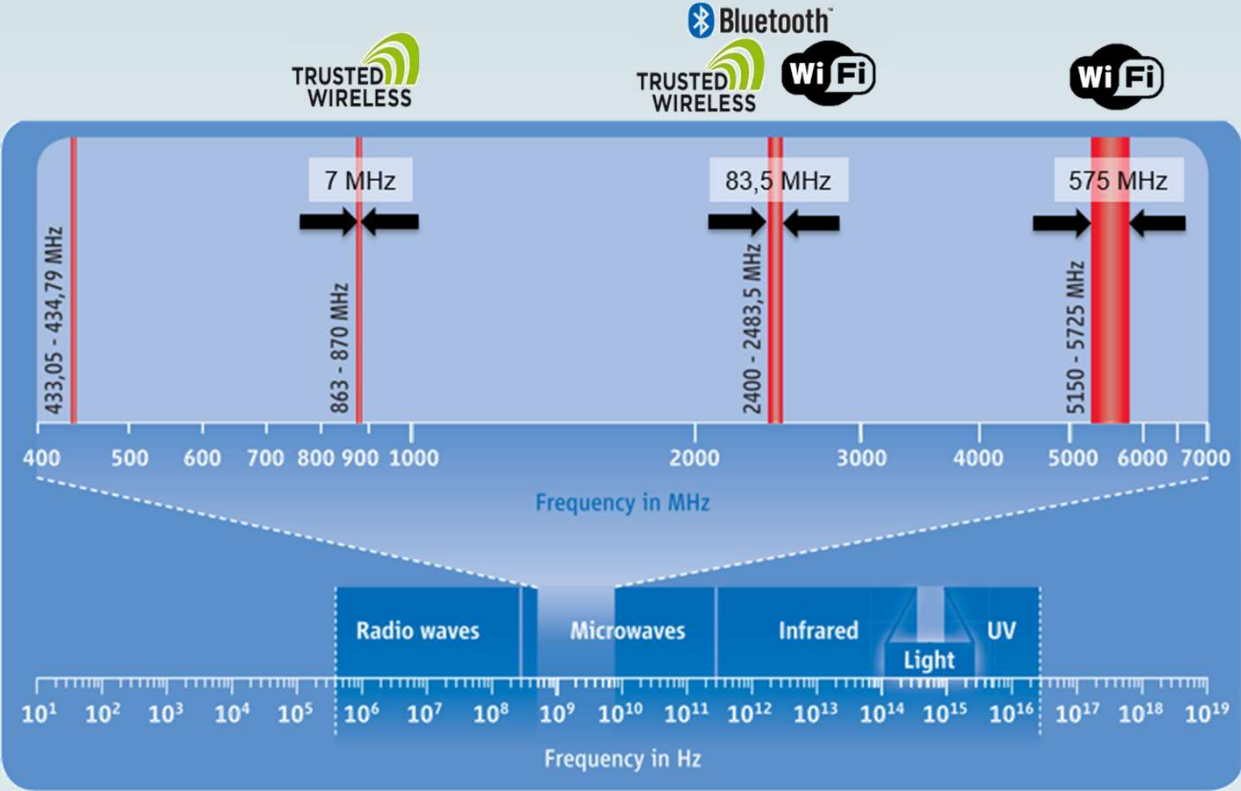


Agenda

- WLAN Basic
- WLAN Products
- WLAN Applications

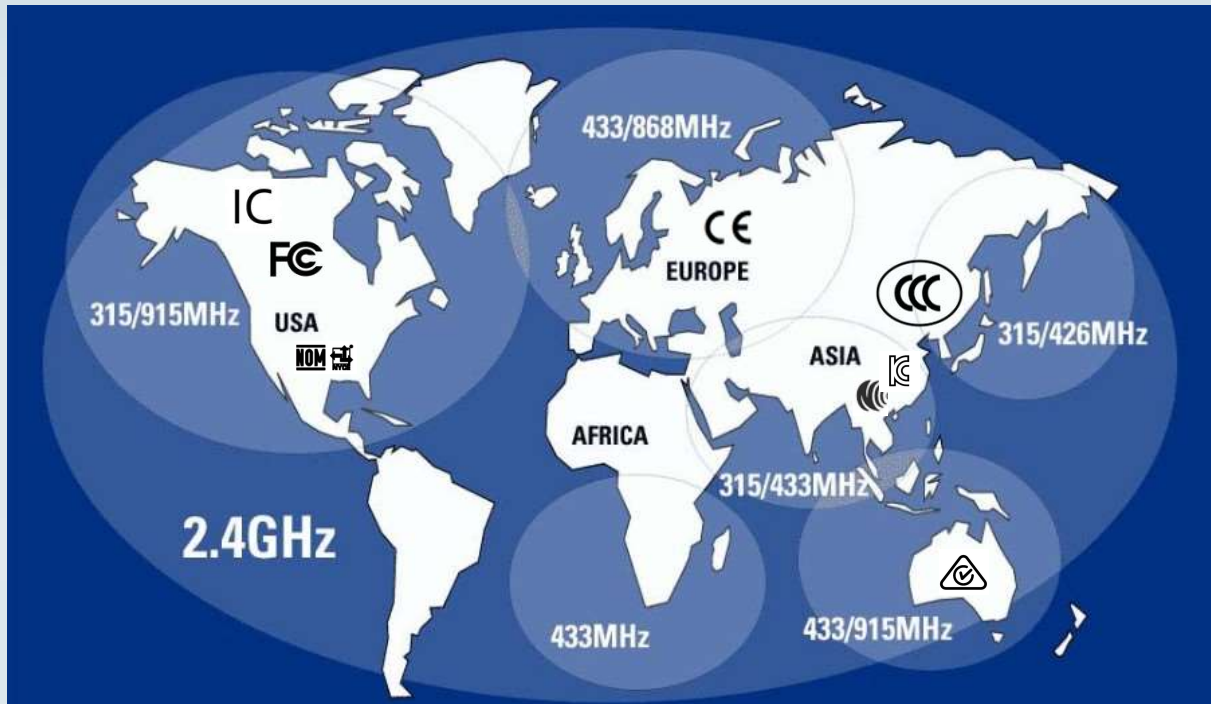


License free frequency bands





Country approval / notification



Germany

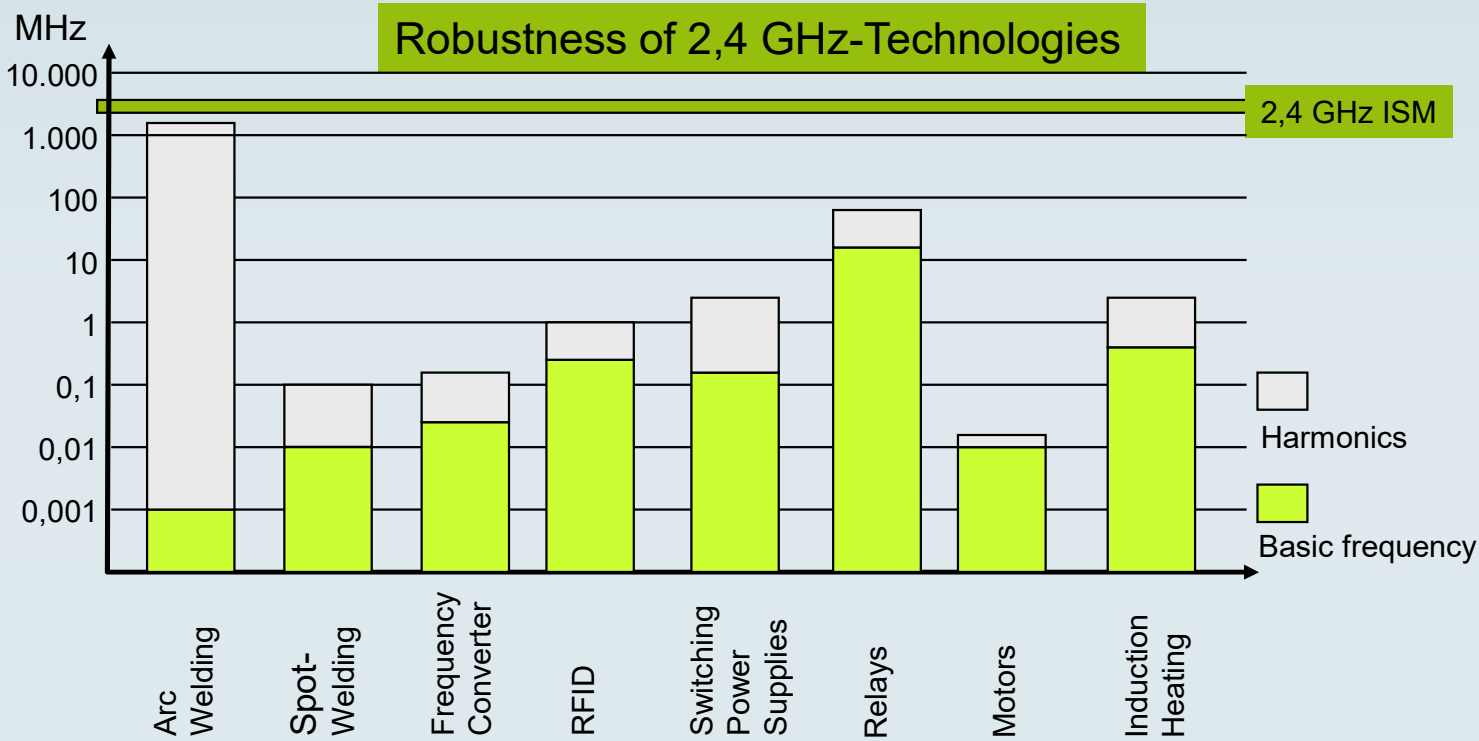
- ✓ Radio applications can be used on the shared frequencies without application and formal approval
- ✓ The user does not incur any costs in the form of fees or contributions due to the frequency usage

International




- ✓ Country specific
- ✓ Registration with the regulatory authority



Spectrum of typical industrial applications



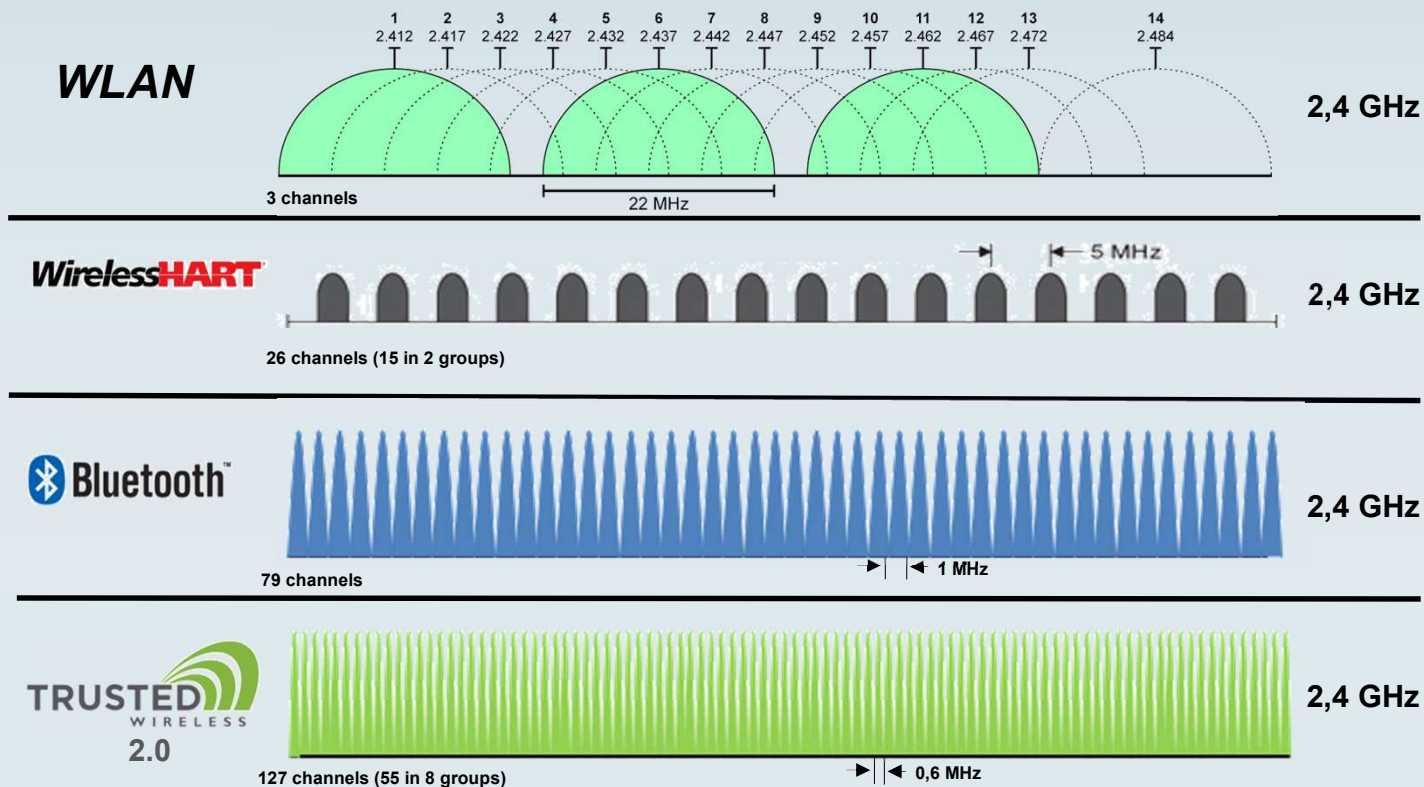
Wireless Technologies

	 Bluetooth™	 Wi-Fi	 TRUSTED WIRELESS	WirelessHART™
	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	Proprietär 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 several 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



[More Details](#)

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



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
- Data encryption (128 Bit AES)
- Frequency hopping

Bluetooth

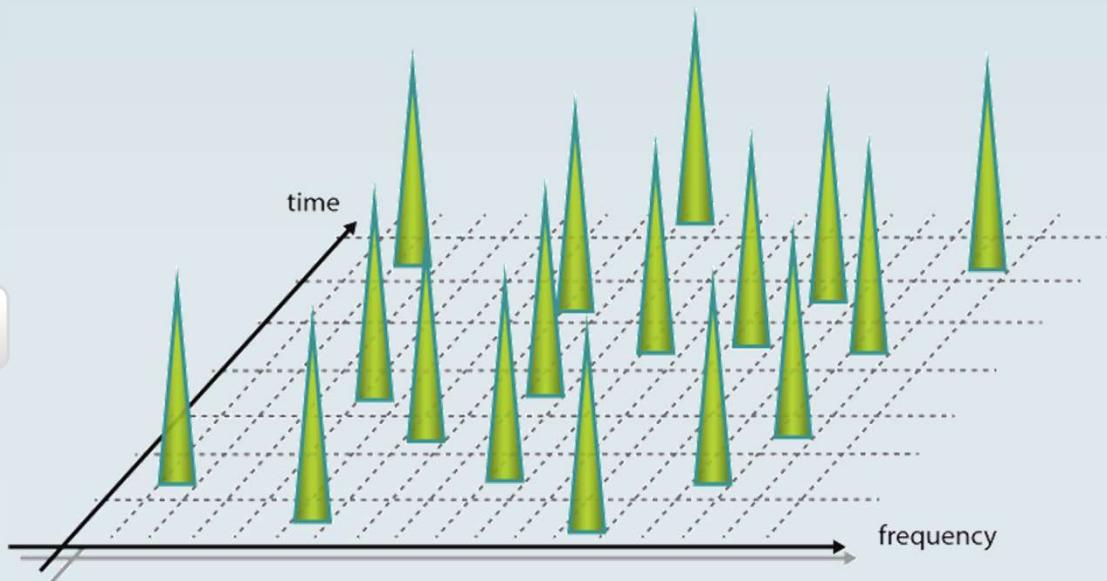
- Pairing with only authorized devices
- Data encryption (128 Bit AES)
- Frequency hopping
- Hide Bluetooth name
- Password protection

TRUSTED WIRELESS 2.0

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



Frequency Allocation



900 MHz, 2,4 GHz, 5 GHz

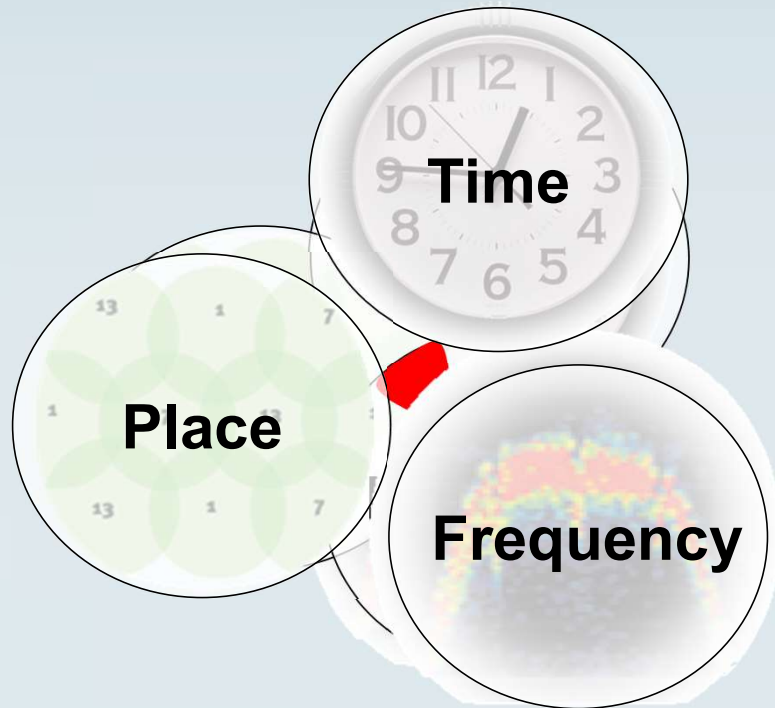
- **Frequency Static Systems (e.g., WLAN)**
Each system is assigned a fixed frequency range
- **Frequency-dynamic systems (for example Bluetooth, Trusted Wireless, WirelessHART)**
Constant change of frequency according to different hopping patterns

868 MHz

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



Coexistence – Interference

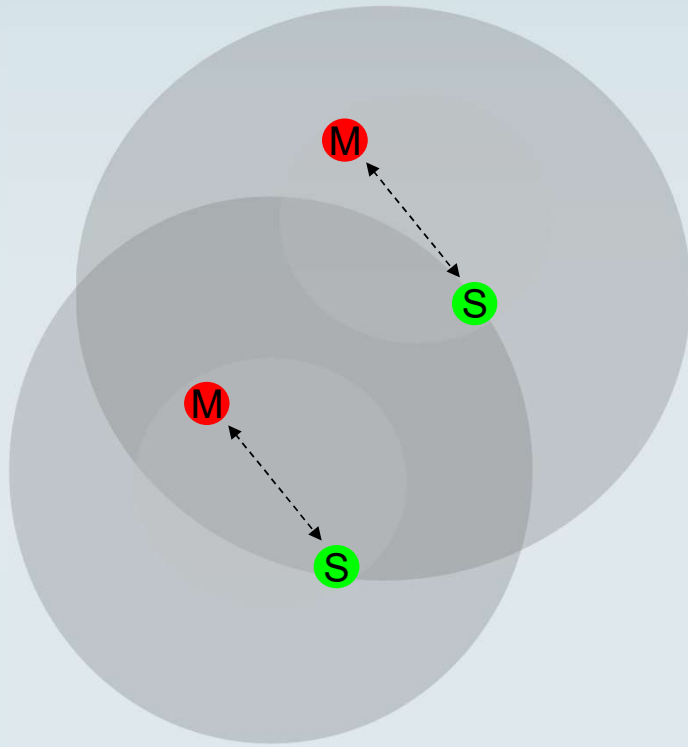


Influencing of radio operation only happens if several radio systems are transmitting ...

- ...at the same place
- ...at the same time
- ...at the same frequency



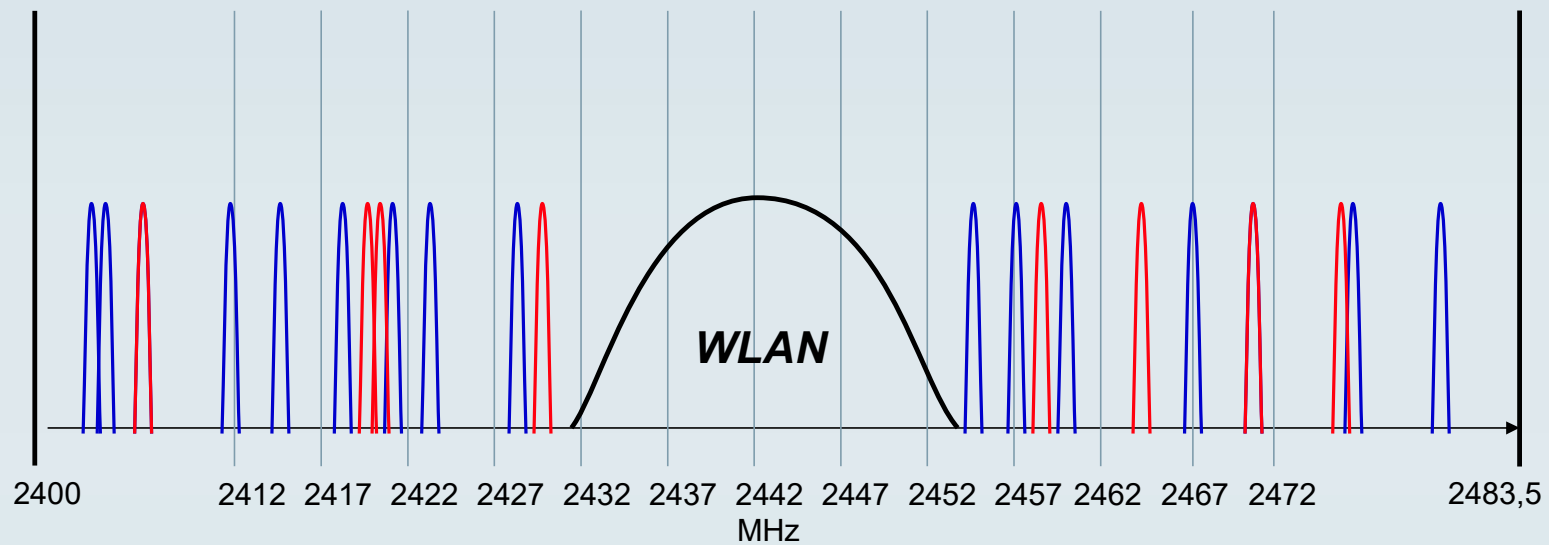
Coexistence – spatial decoupling



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



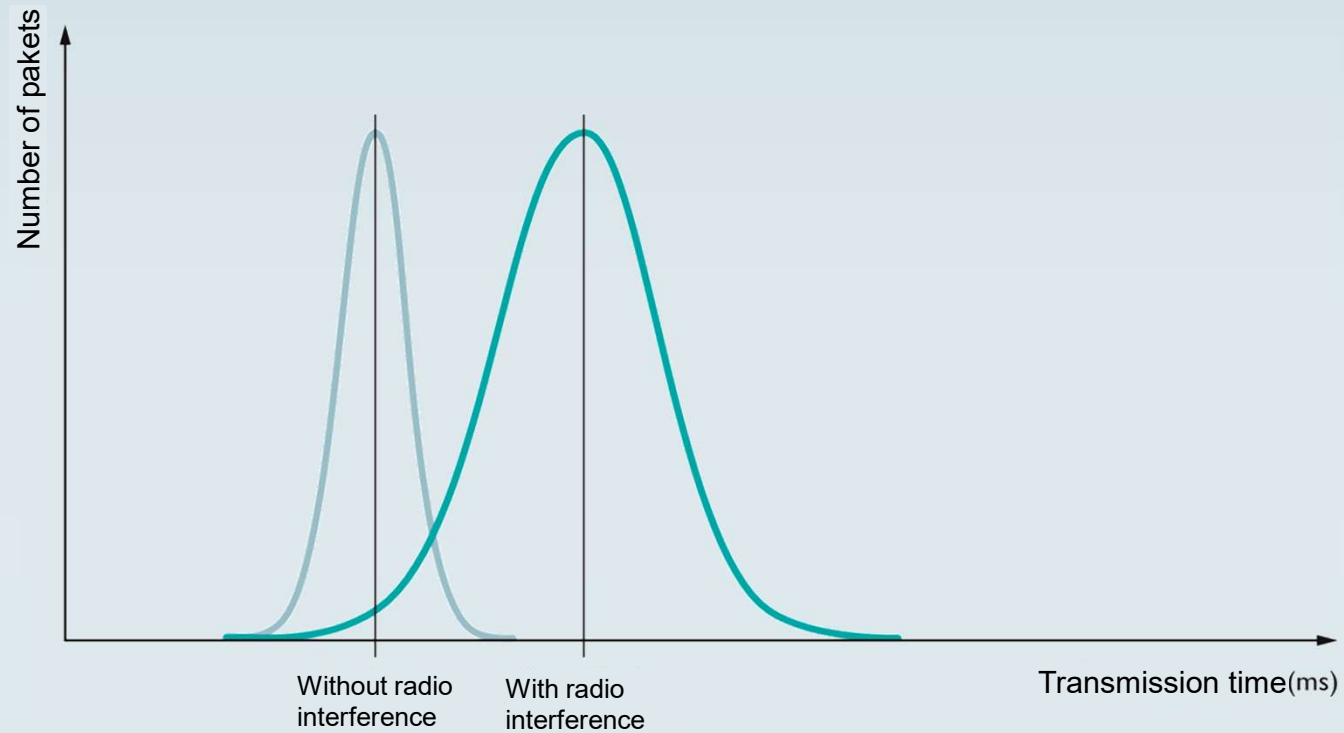
Coexistence – Inteferece-free parallel operation



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



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



Industrial Bluetooth – FL EPA 2



Interference-free parallel operation with WLAN networks

Integrated special antennas for reliable wireless connections



Optimized for operation in PROFINET networks



Various application areas

Quick and easy startup



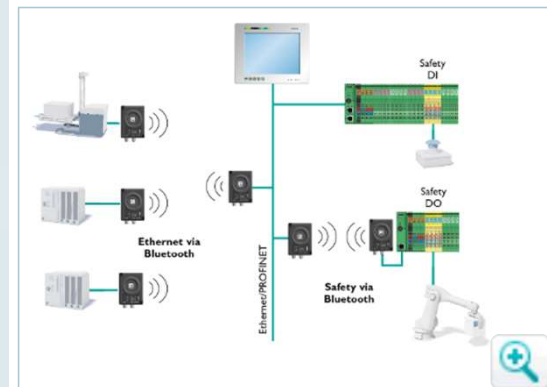
Product overview

Industrial Bluetooth – FL EPA 2

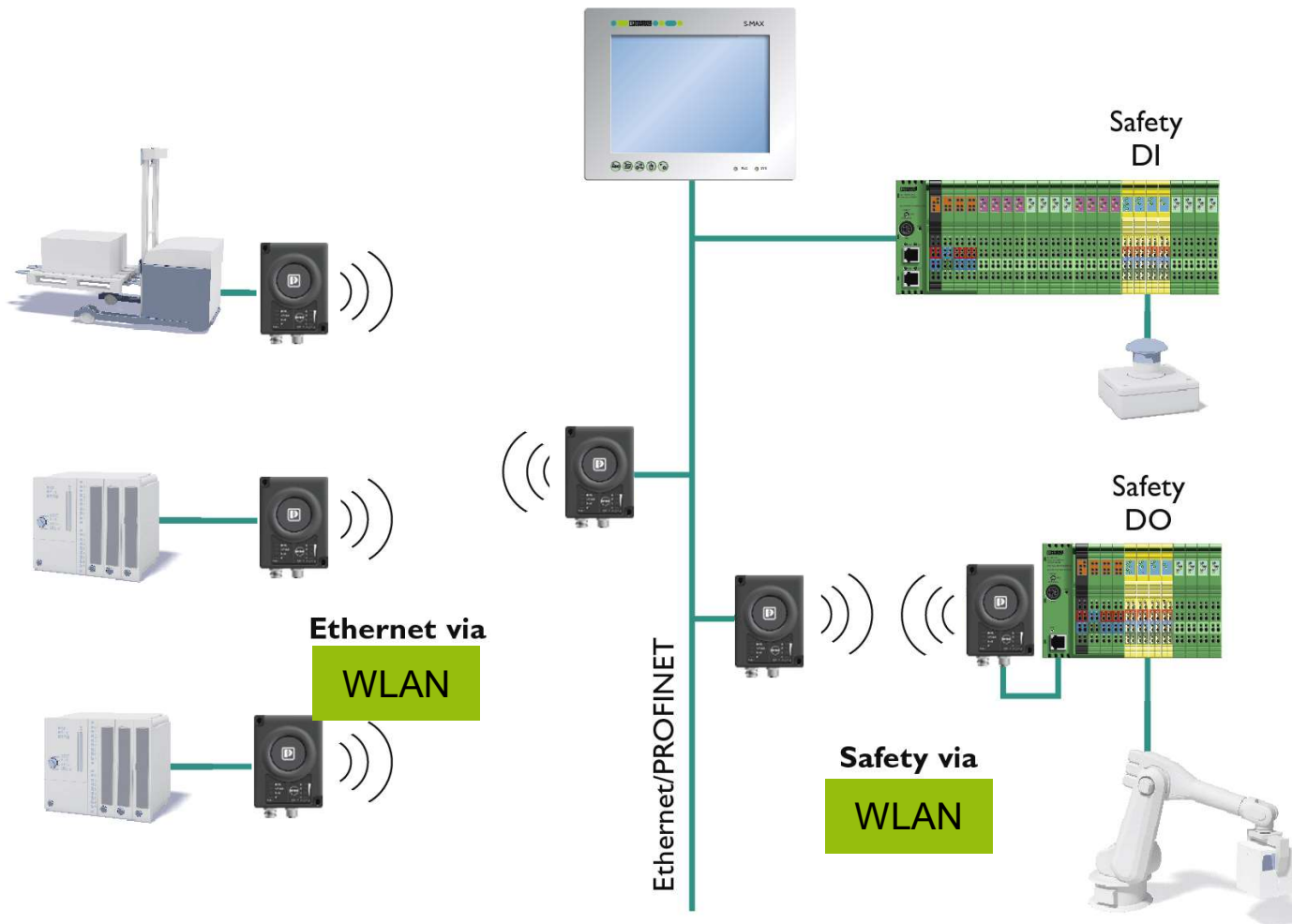


Various
application areas

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



Product
overview



Product
overview

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



Industrial WLAN 1100 & 2100

Integrated antennas and wireless module in one single device

Easy to mount



Reliable communication thanks to MIMO technology

All-in-one-solution



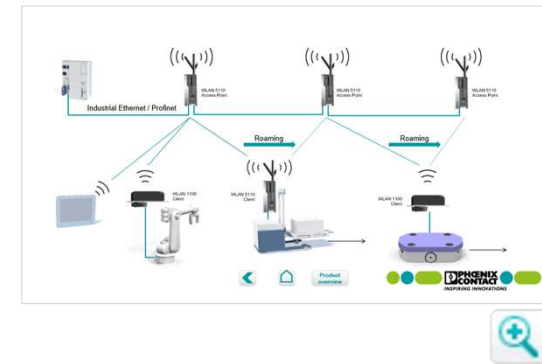
Product overview

Industrial WLAN 1100 & 2100

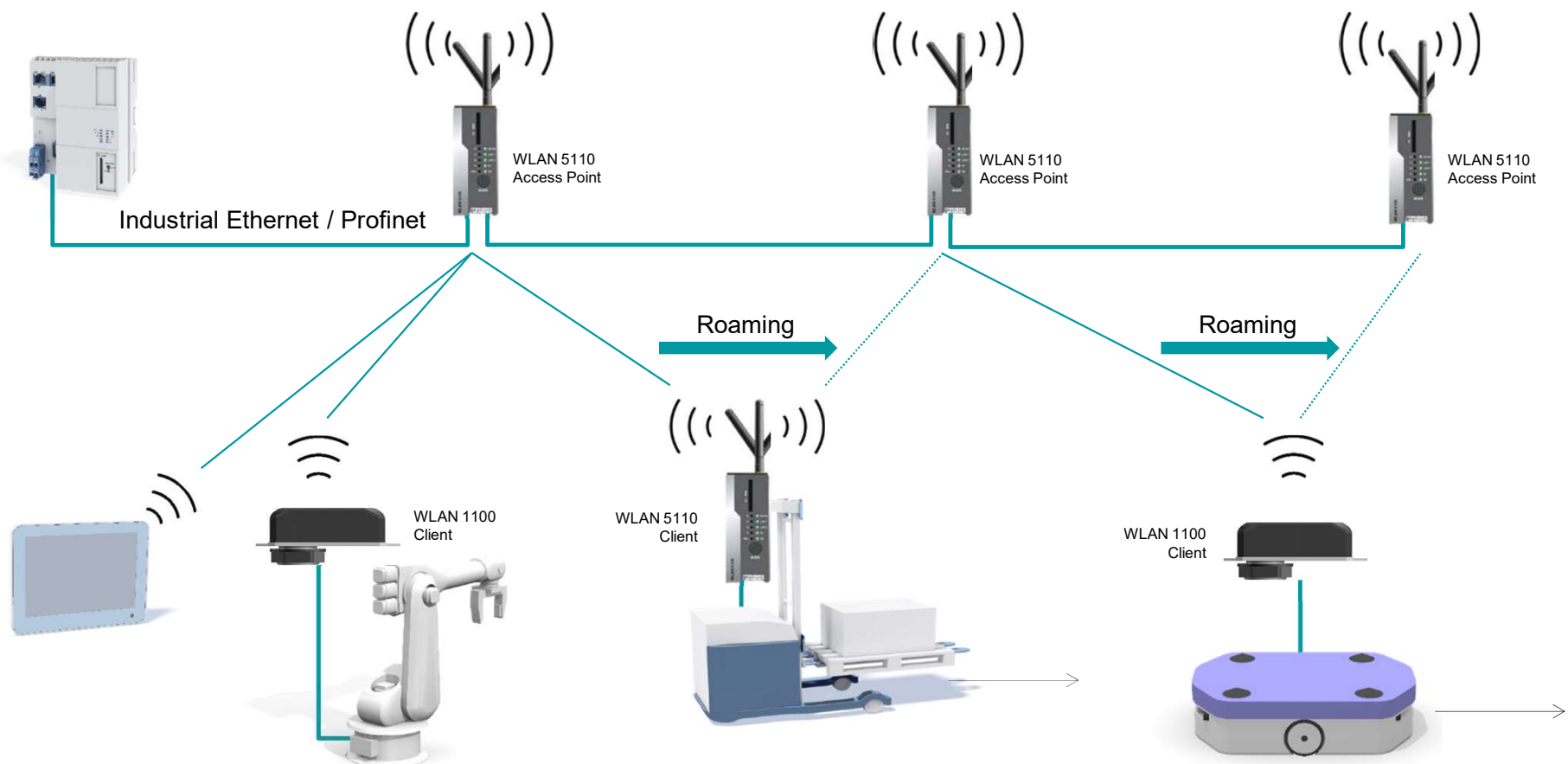
Reliable
communication
thanks to MIMO
technology



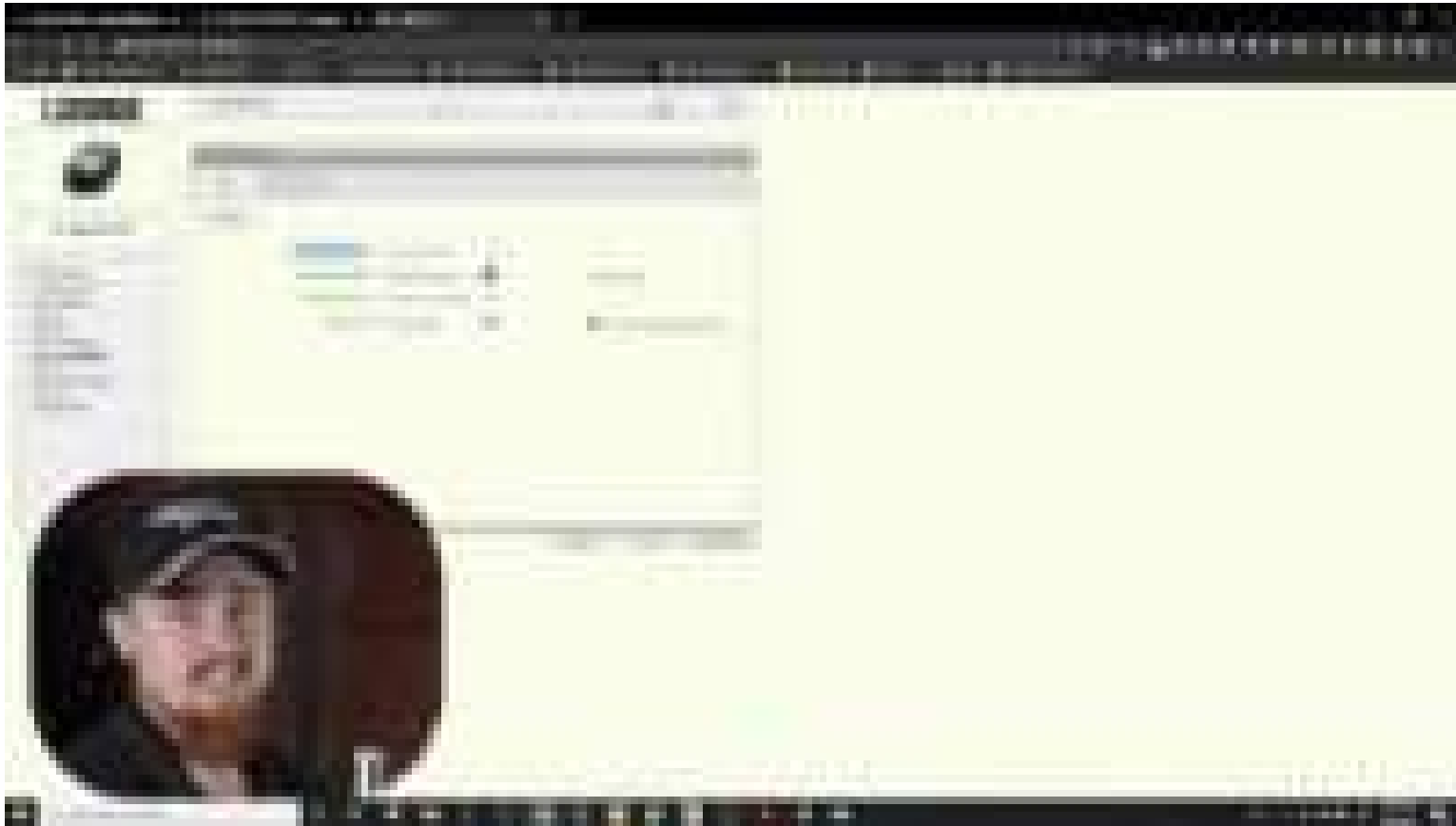
- Interruption-free roaming



Product
overview



[Product overview](#)



Phoenix Contact FL WLAN 1100 Industrial WiFi Set Up

Industrial WLAN 1100 & 2100

All-in-one-
solution

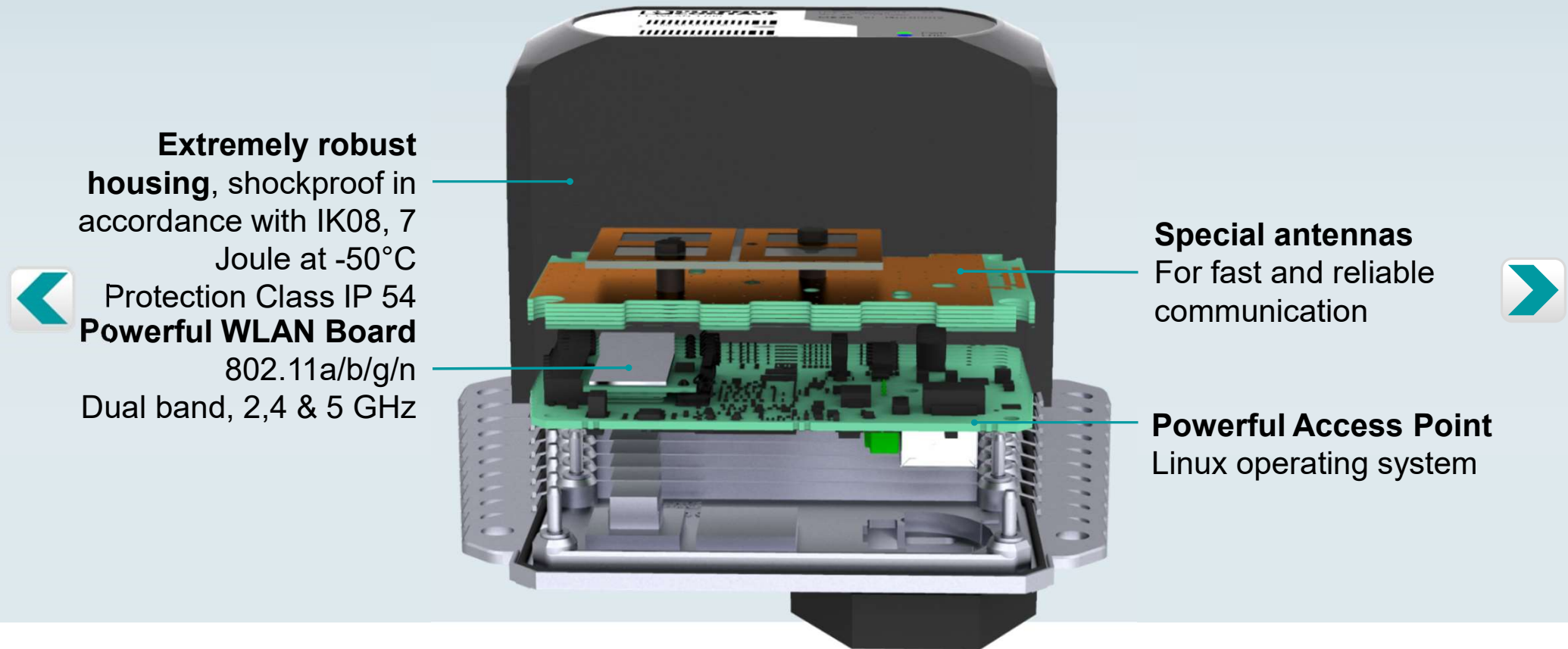


- Integrated antennas and wireless module in one single device
- Single-hole mounting directly on machines, mobile vehicles or control cabinets
- Shockproof according to IK08



Product
overview

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

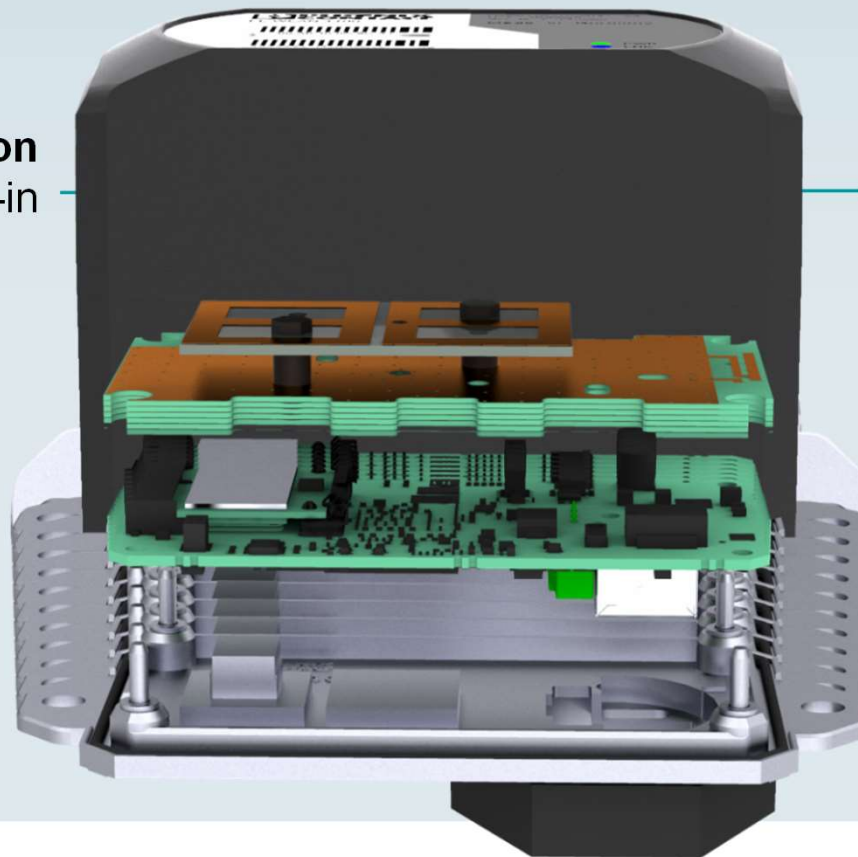


Product overview

Industrial WLAN

Power connection
Push-in

Ethernet connection
Standard RJ45



Product
overview

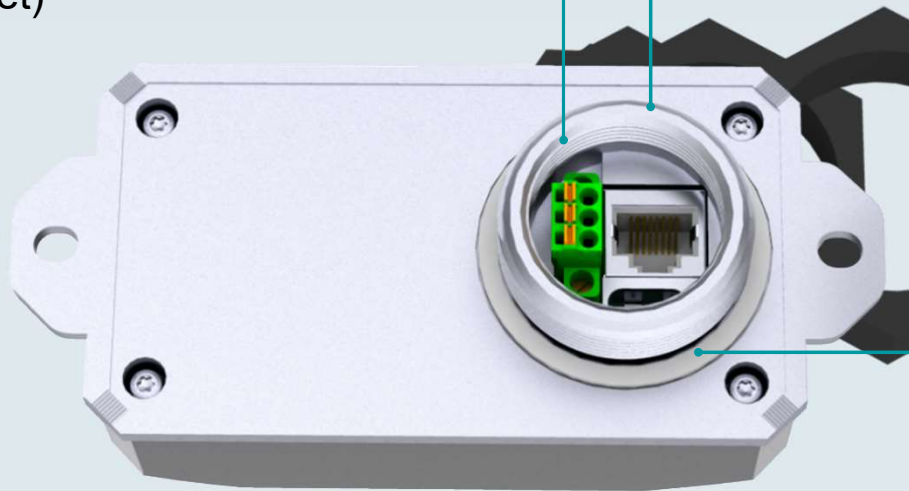
Industrial WLAN

M32 inside thread

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

M40 external thread
for mounting

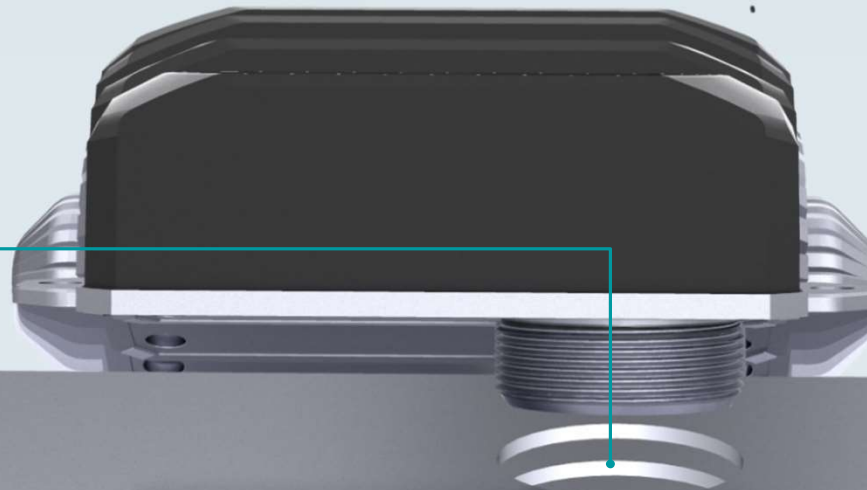
Seal
up to IP67



Product
overview

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

Industrial WLAN



Product
overview

Industrial WLAN



Product
overview

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



Product overview

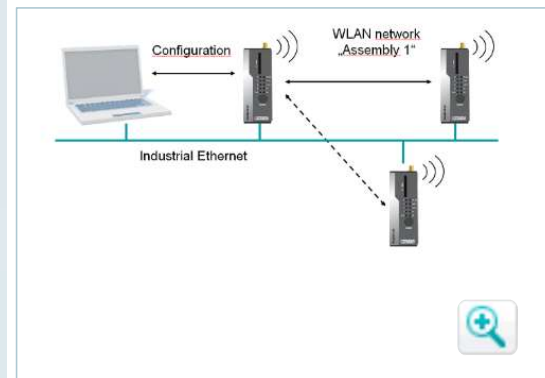
Industrial WLAN 5100



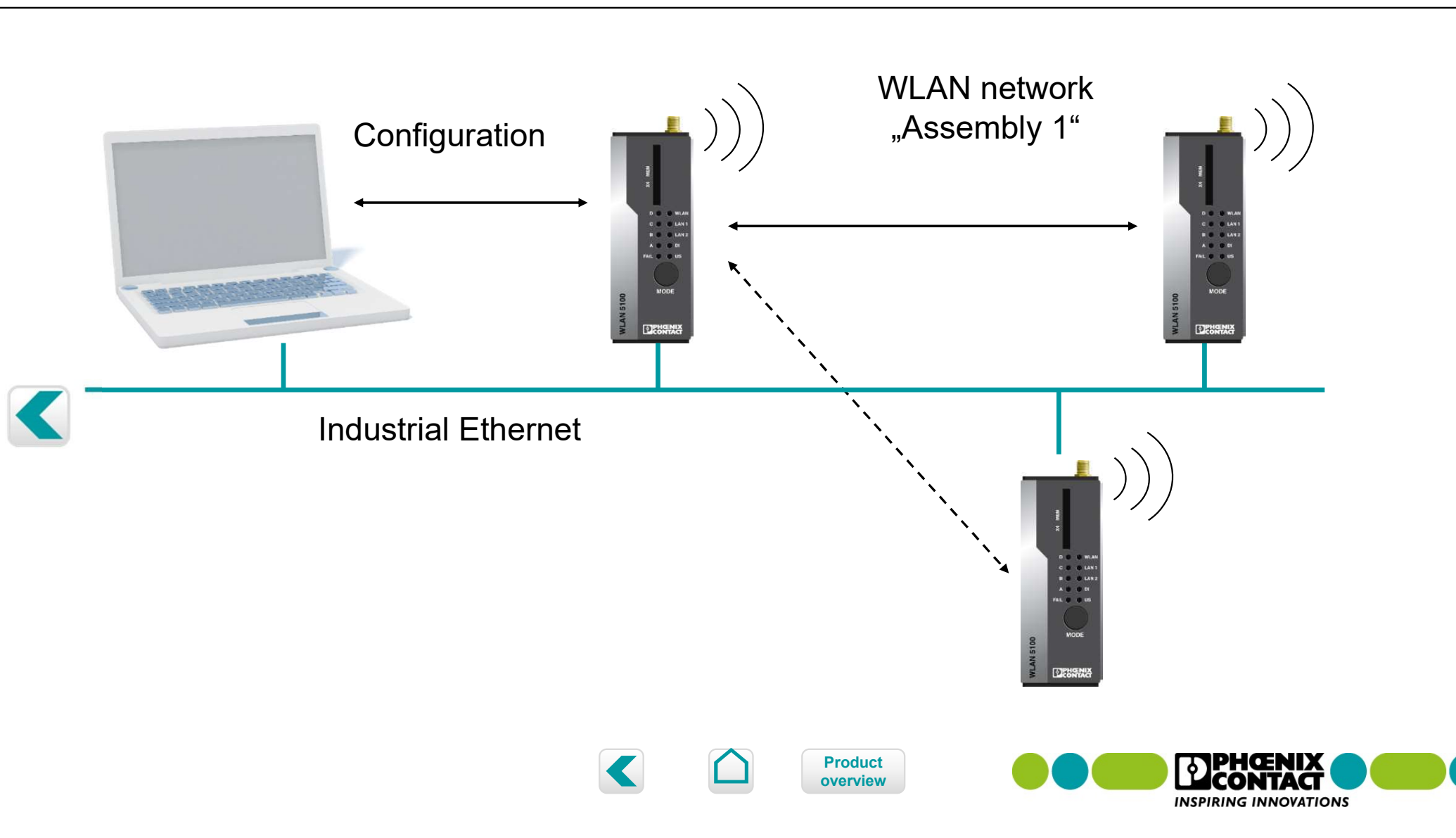
Compatible with
standards IEEE
802.11 a/b/g/n

Quick and
easy startup

Cluster Management



Product
overview



Product
overview

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



Industrial WLAN

Reliable communication thanks to MIMO technology

All-in-one-solution

Optimized for operation in PROFINET and EtherNet/IP networks

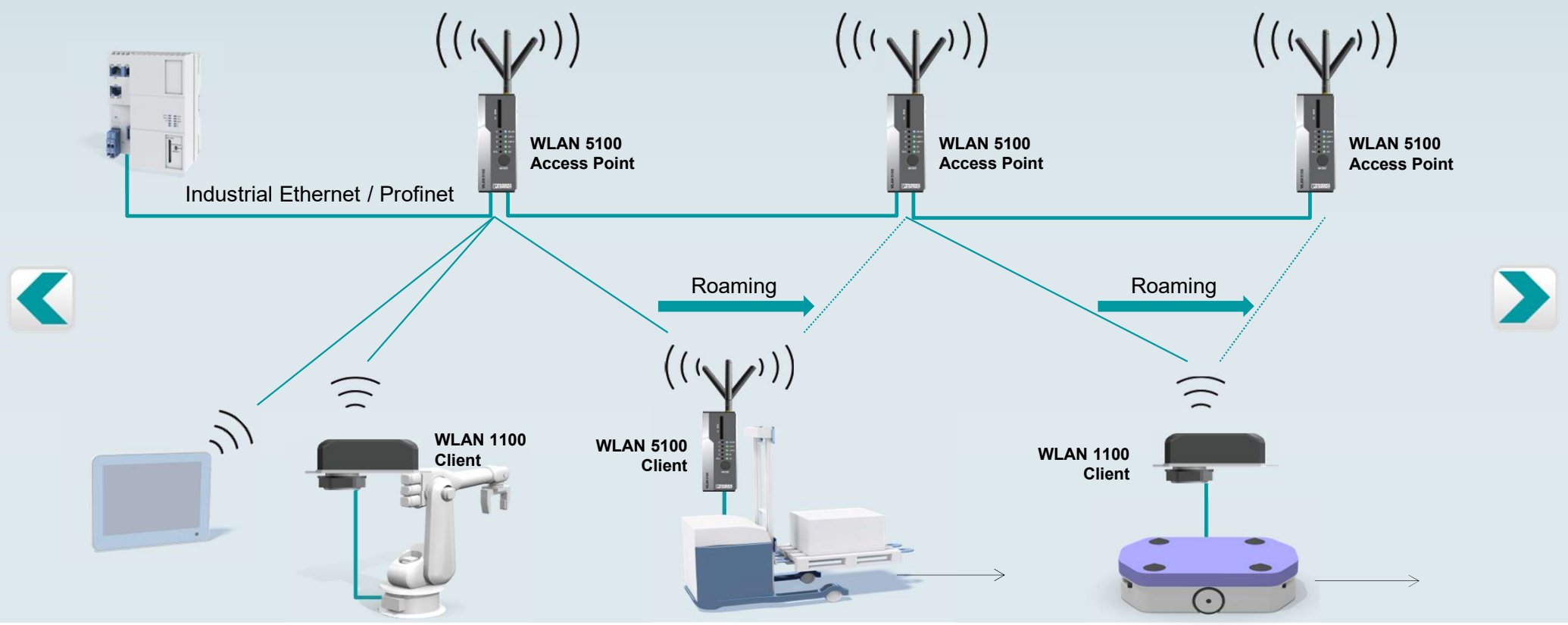
Compatible with standards IEEE 802.11 a/b/g/n

Quick and easy startup



Product
overview

Industrial WLAN



[Product overview](#)

Industrial WLAN

Integrated antennas 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

[Video](#)



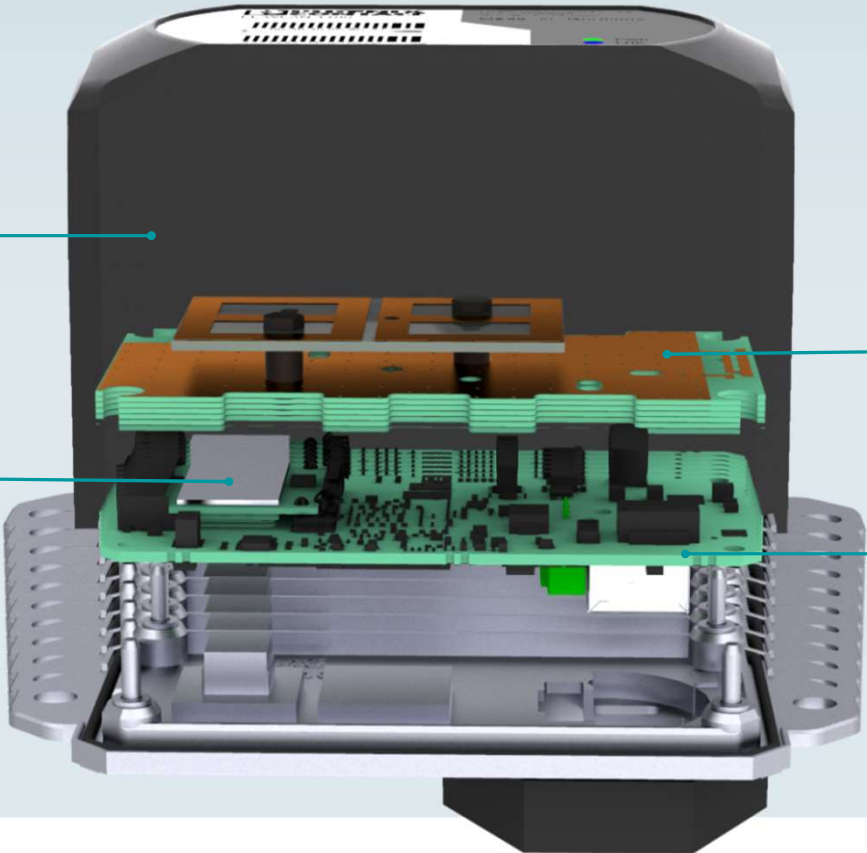
[Product overview](#)

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

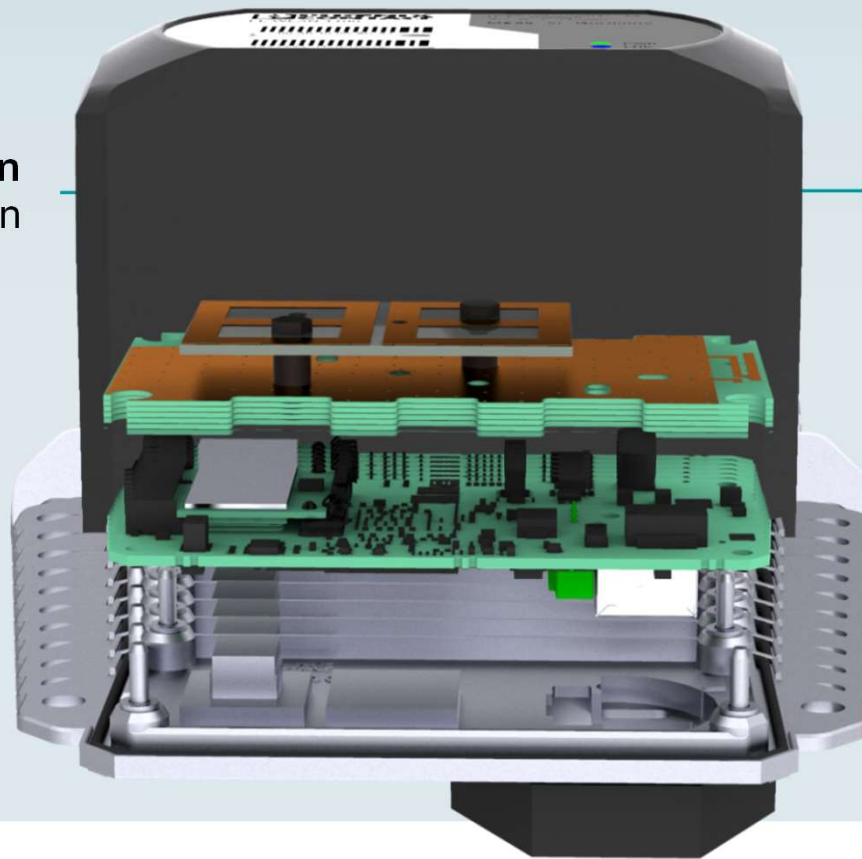


Product
overview

Industrial WLAN

Power connection
Push-in

Ethernet connection
Standard RJ45



Product
overview

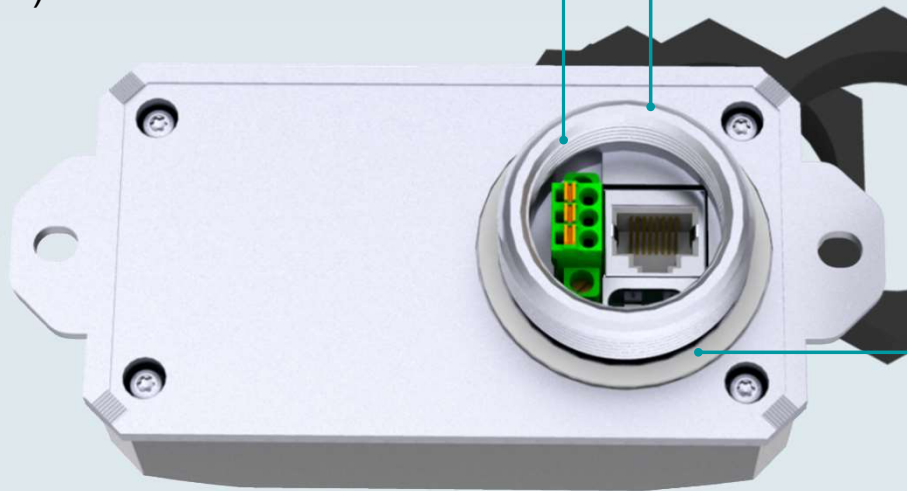
Industrial WLAN

M32 inside thread

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

M40 external thread
for mounting

Seal
up to IP67



Product
overview

Industrial WLAN



**Fast and easy
connection**
thanks to single-hole
mounting



Product
overview

Industrial WLAN



Fast and easy connection
thanks to single-hole mounting

Quick fastening

Product overview

Industrial WLAN



Product
overview

Industrial WLAN



Product
overview

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



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 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



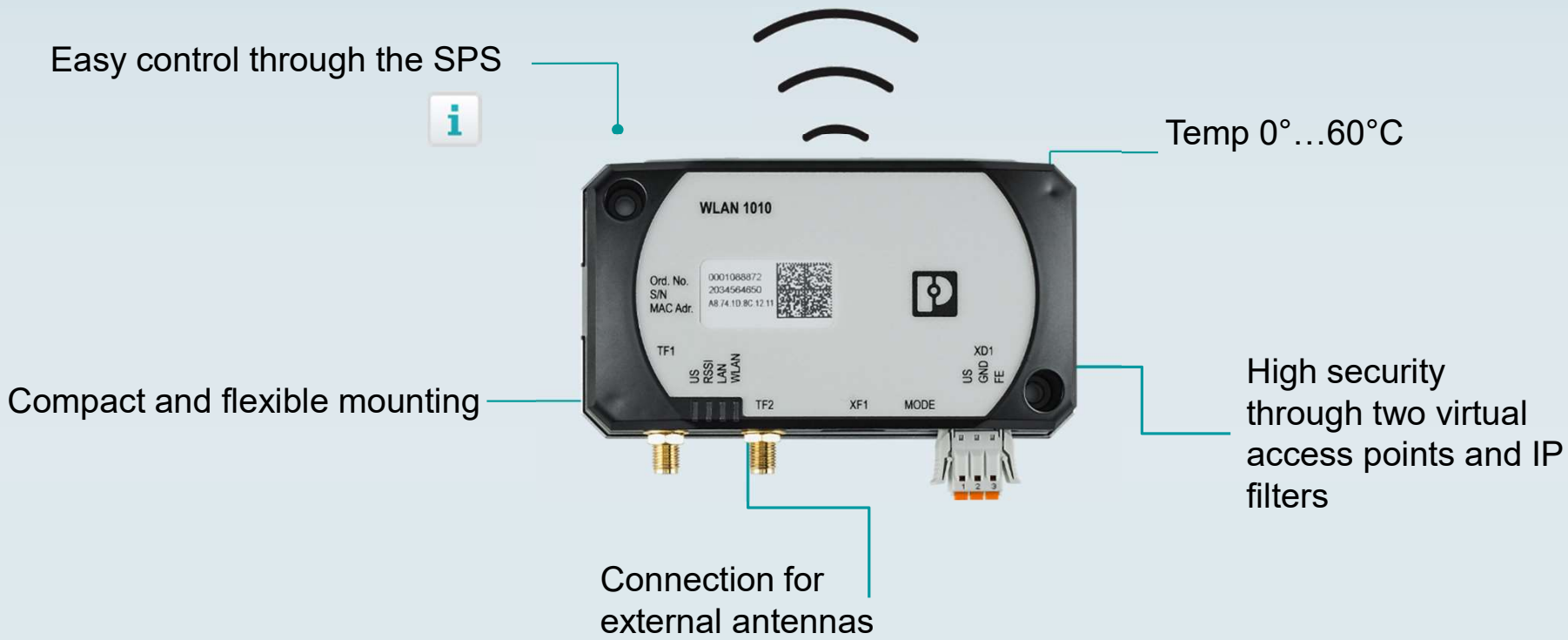
Industrial WLAN Rugged Box



	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



Industrial WLAN 1010 & 2010



Product
overview

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



Product
overview





Controller

http CLI command
Configuration & controlling



WLAN 1010



Product
overview

Industrial WLAN



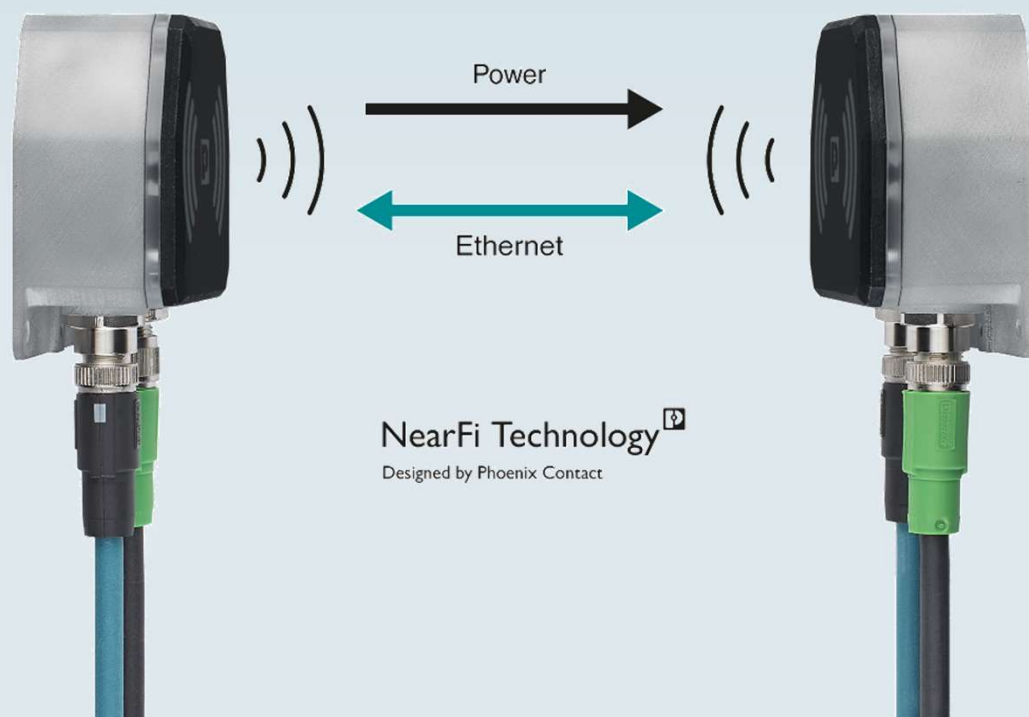
FL WLAN 1010 (Europe)	FL WLAN 1011 (USA, Canada)	FL WLAN 2010 (Europe)	FL WLAN 2011 (USA, Canada)
--------------------------	-------------------------------	--------------------------	-------------------------------

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



NearFi – Energy and data coupler

new



Introduction



Benefits



Basics



Applications



Product / Portfolio



Product
overview

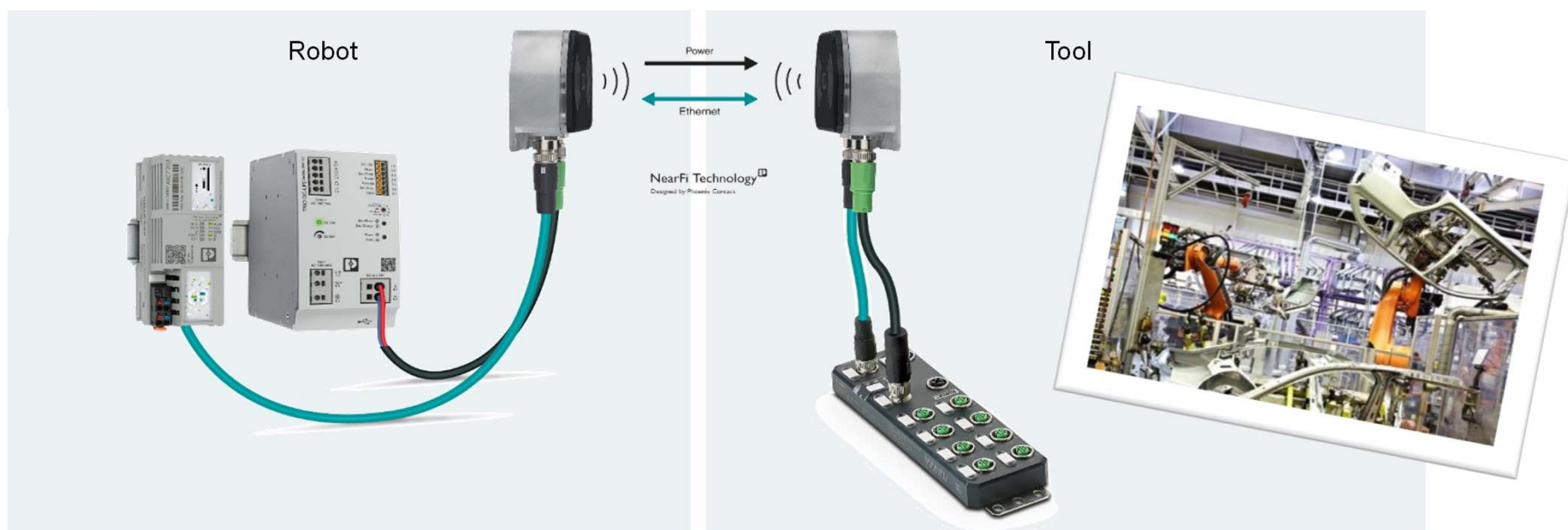


new

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



Product
overview



INTRODUCTION

NearFi coupler

[Product
overview](#)



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



Product
overview



NearFi coupler

Today's problems with connectors

Problem:

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

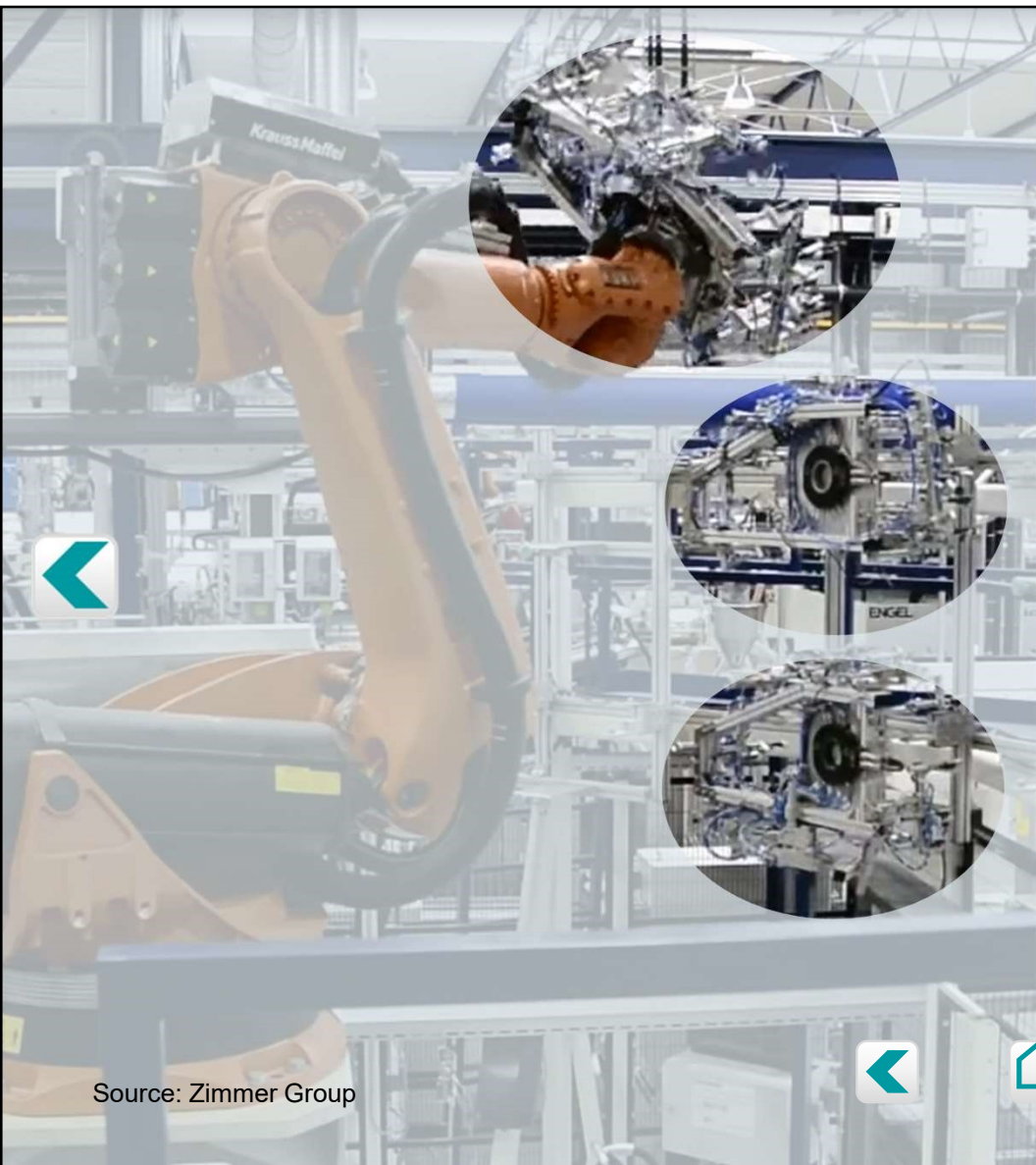


Consequences:

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



Product
overview



NearFi coupler

Example: Tool change on the robot

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

Source: Zimmer Group

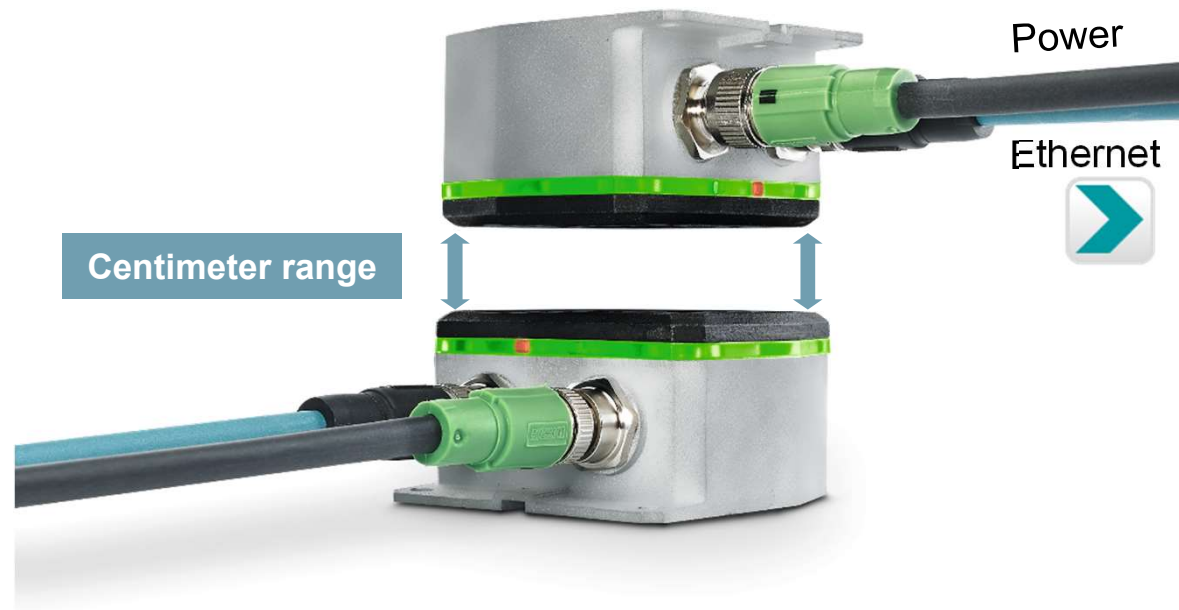
[Product
overview](#)



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



Product
overview



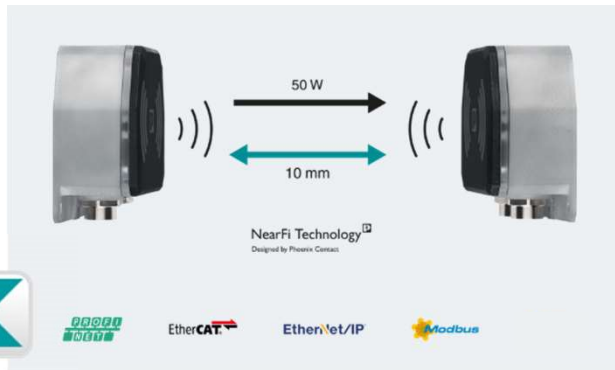
BENEFITS

NearFi coupler

[Product
overview](#)

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



Product
overview

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

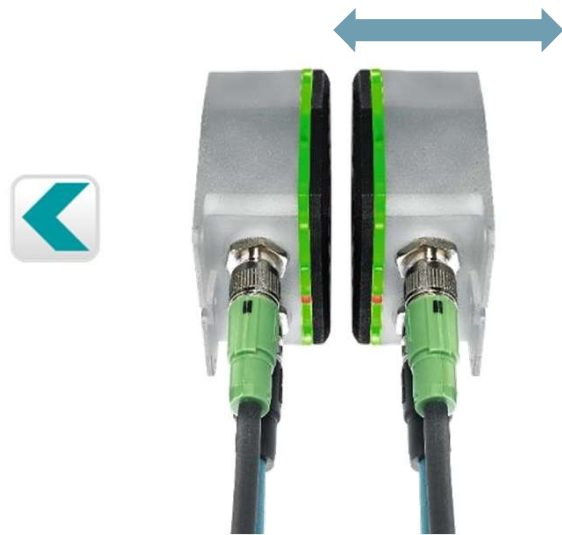


Product
overview

NearFi coupler

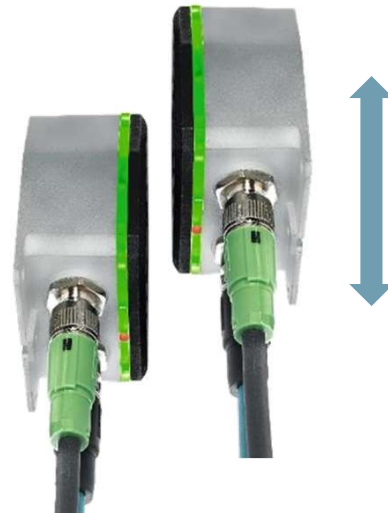
Flexible approach

Linear approach frontal



Example:
Robot tool change

Linear approach lateral



Example:
Conveyor belt, goods transport system

Rotating approach frontal



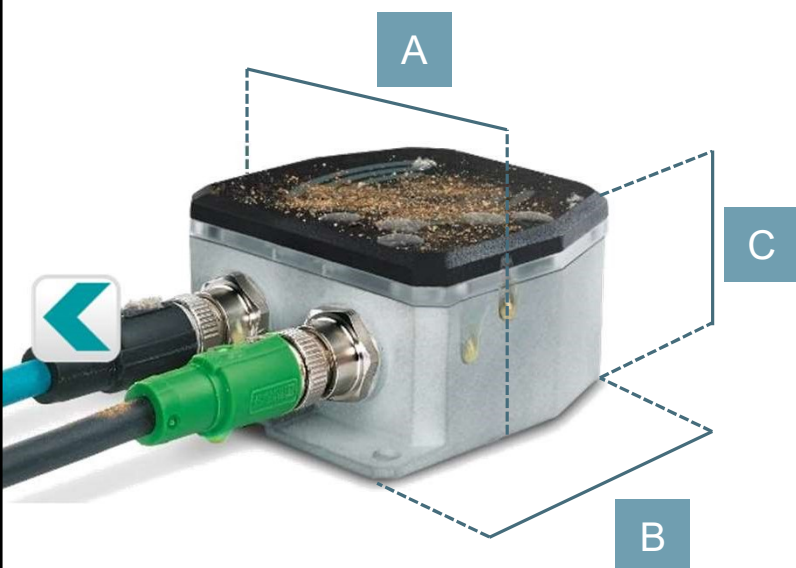
Example:
Rotating equipment



Product
overview

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



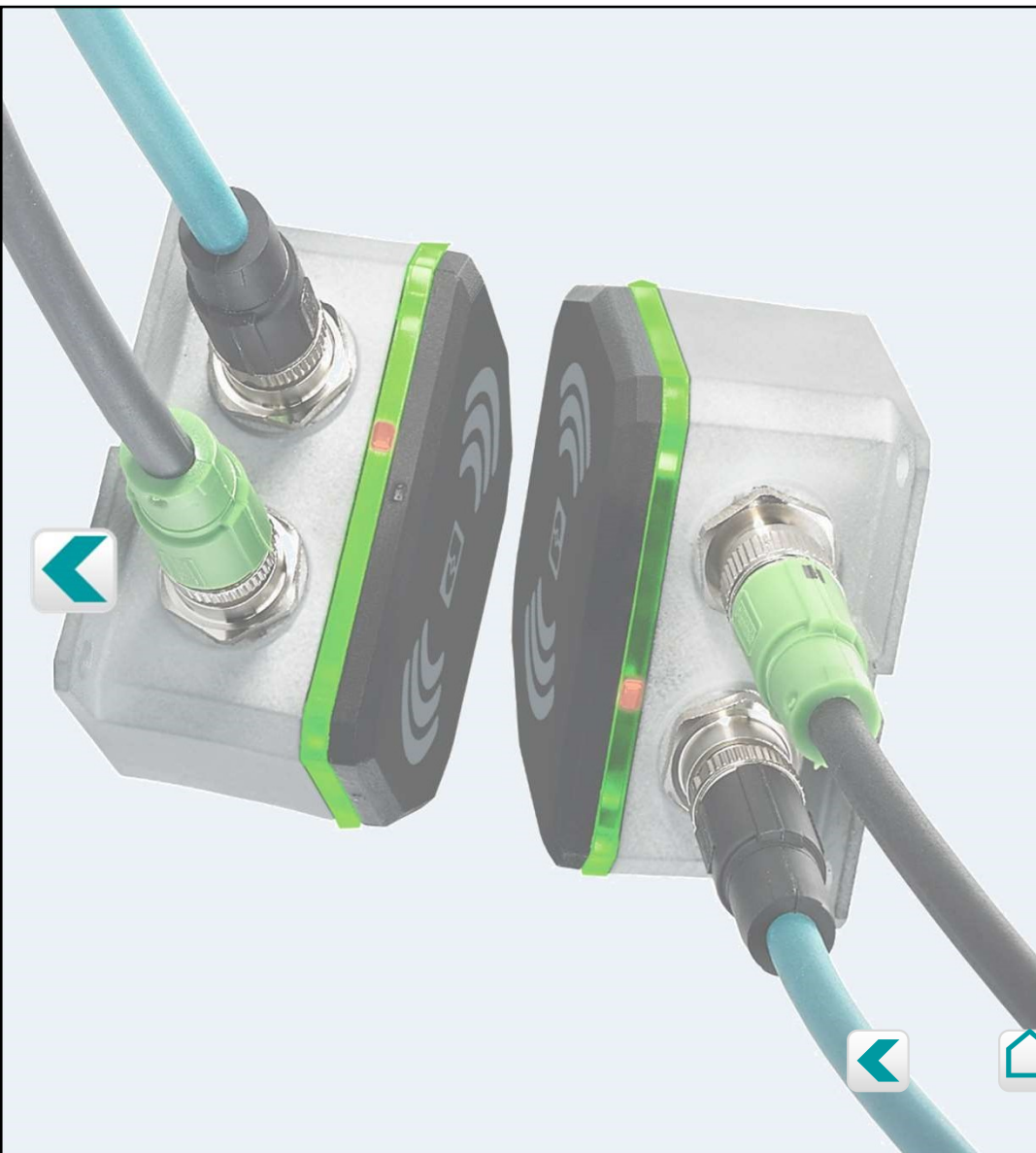
2 Mounting hole $\varnothing 5,5$ mm

3 Ground connection for M4 screw

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



Product
overview



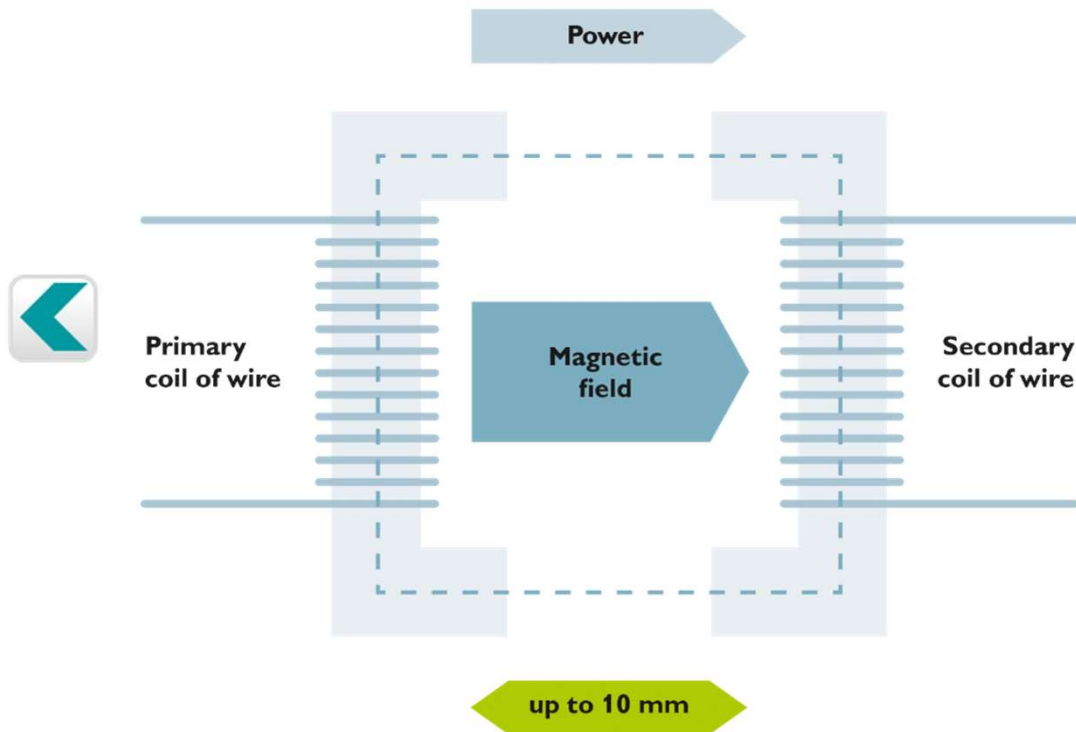
BASICS

NearFi coupler

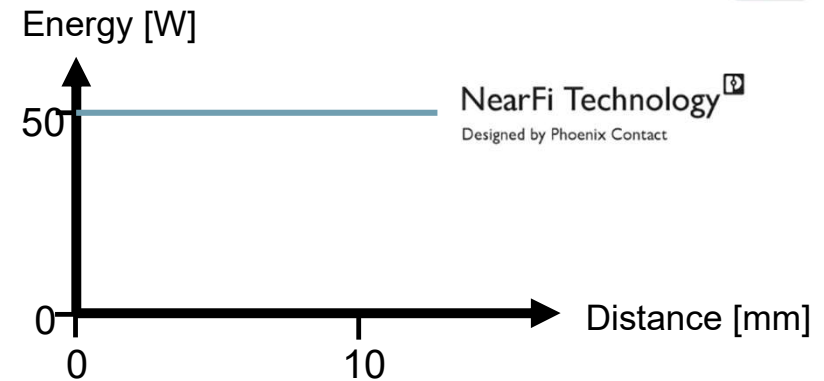
[Product
overview](#)

NearFi coupler

Inductive power transmission



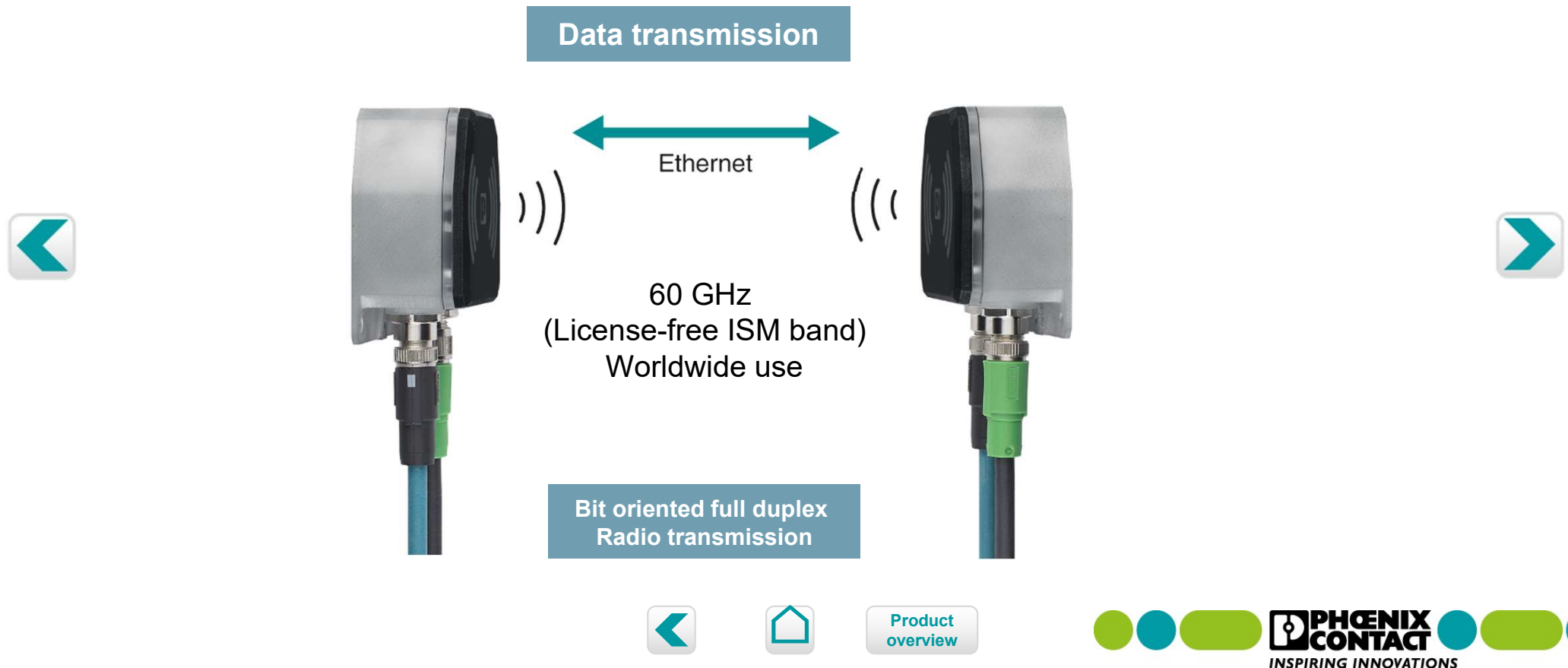
- Inductive power transmission up to 50 W (24 V / 2 A)
- **Constant** energy transfer in the centimeter air gap due to active control



Product
overview

NearFi coupler

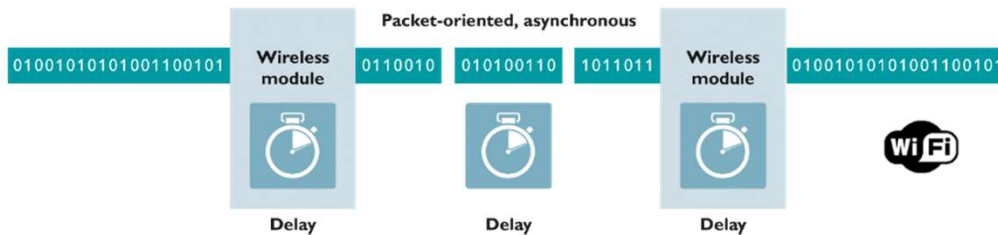
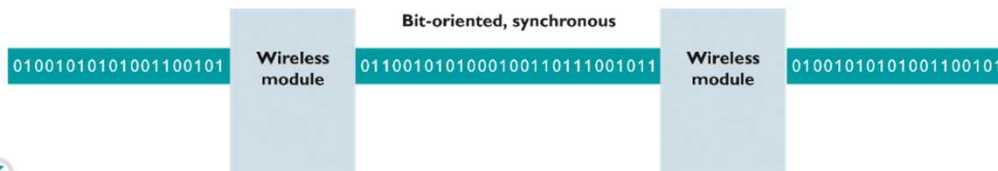
Contactless real-time Ethernet communication



NearFi coupler

Contactless real-time Ethernet communication

NearFi Technology[®]
Designed by Phoenix Contact



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**



Product
overview



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



Product
overview



APPLICATION EXAMPLES

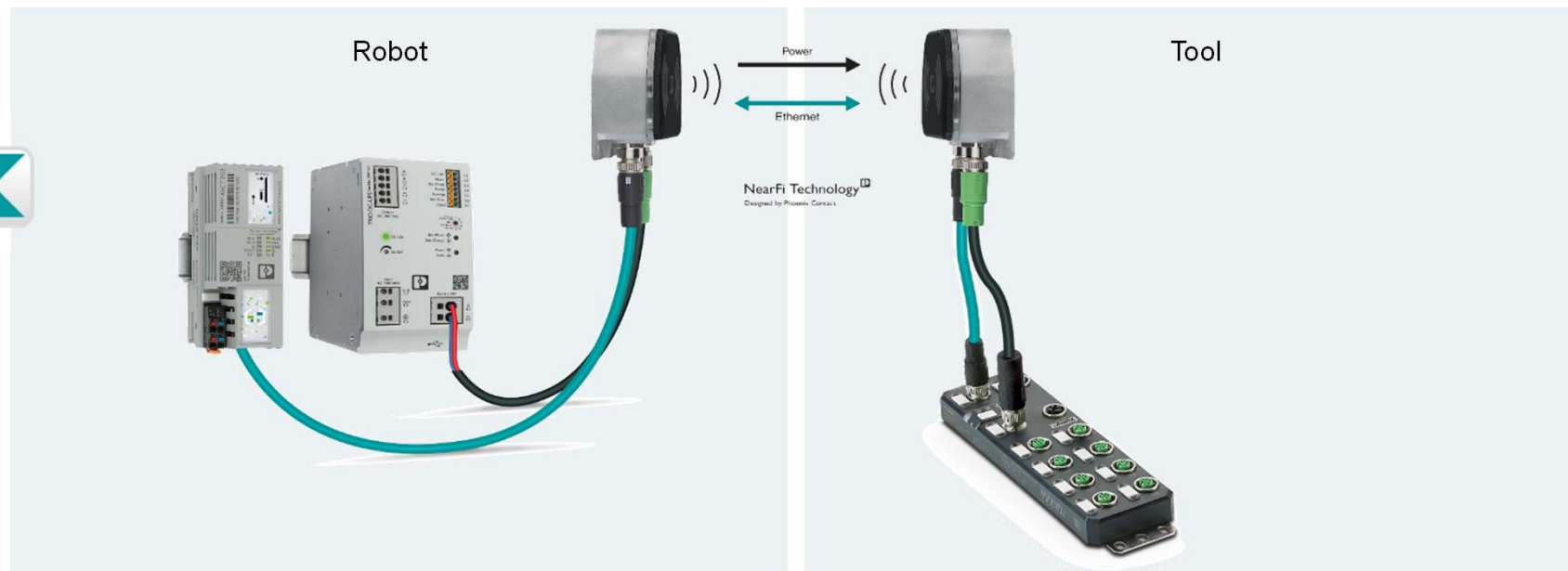
NearFi coupler

[Product
overview](#)

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



[Product overview](#)

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



Product
overview

NearFi coupler

Target industries and applications

Transport systems



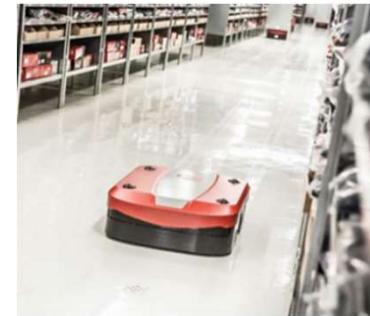
Target application:

- 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



Product
overview

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:

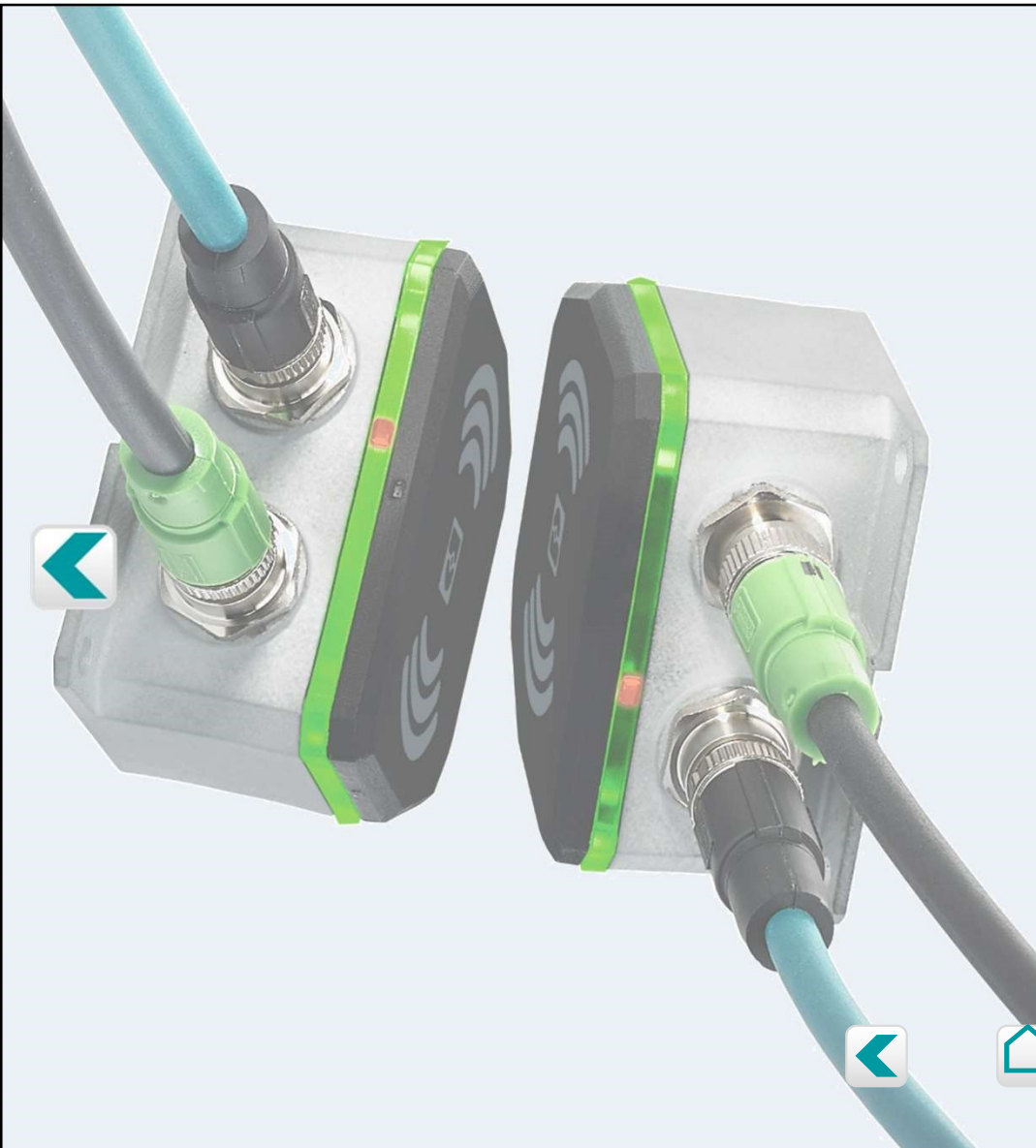
- Human-Robot-Collaboration
- Lightweight robot
- Regular docking to various Workstations

Key Requirements:

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



Product
overview



PRODUCT PORTFOLIO

NearFi coupler

[Product
overview](#)

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!**



[Product
overview](#)

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

Device status
via LED ring

Remote
coupler

Base
coupler

Status LED-
Ethernet transmission

Digital control input (M12- Pin 2)

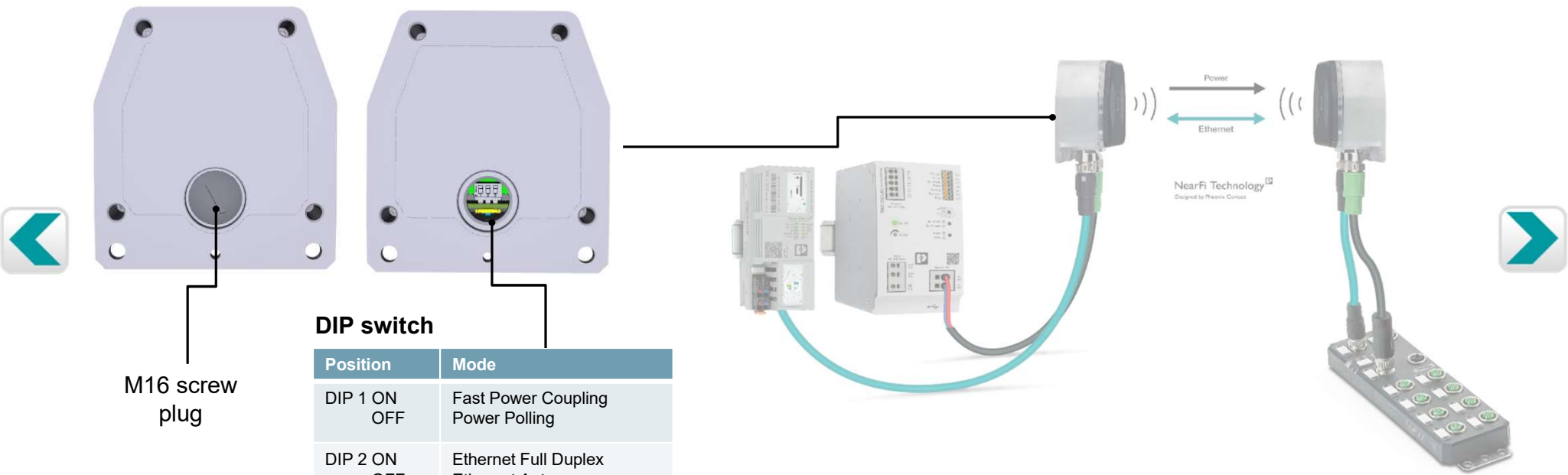
PIN 2	Zustand
24 V / NC	Energy transmission activated
0 V	Energy transfer disabled



Product
overview

NearFi coupler

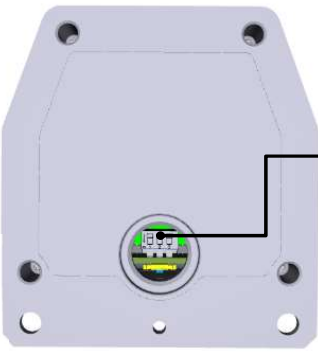
Configuration (optional)



Product overview

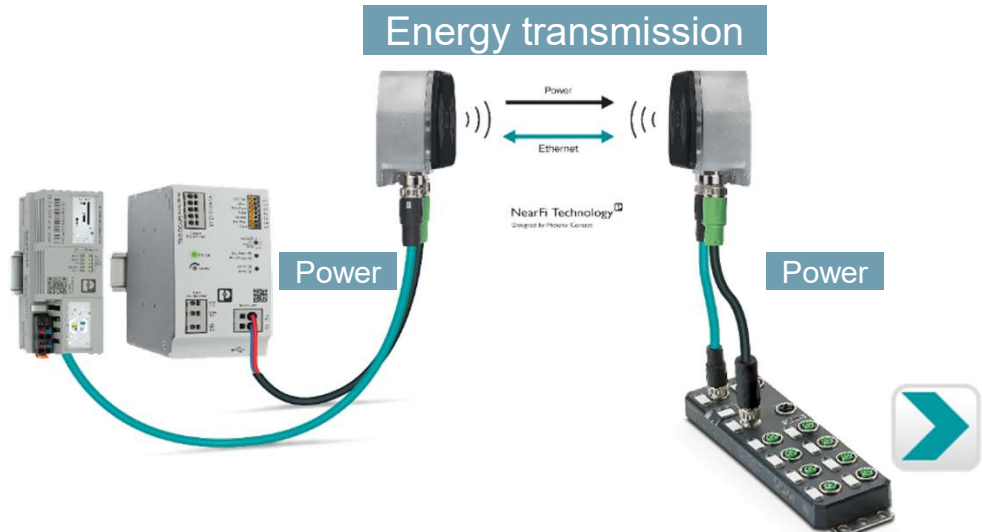
NearFi coupler

Fast Power Coupling



DIP switch

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



Product overview

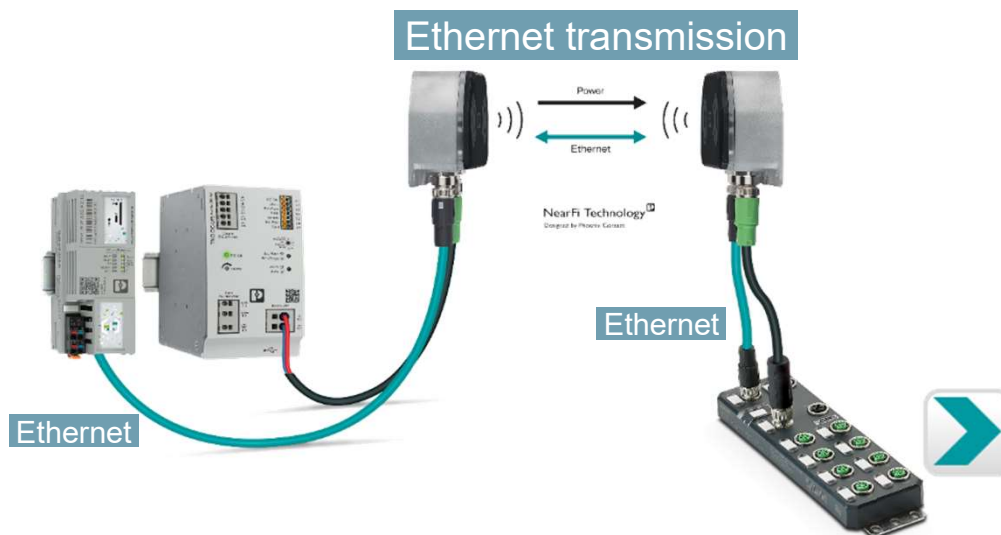
NearFi coupler

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



Product
overview

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

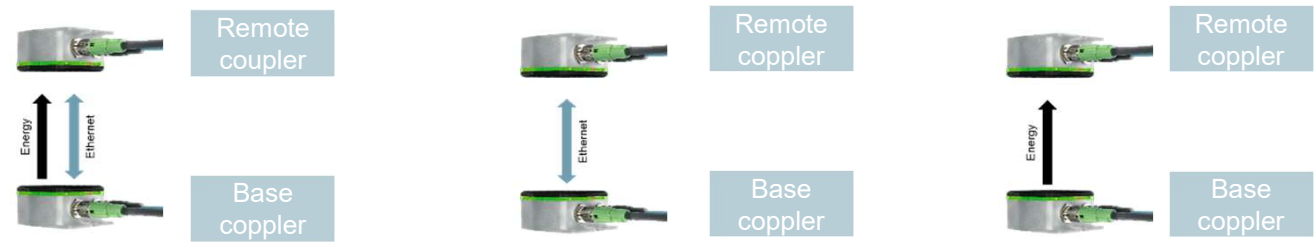


Product
overview



NearFi coupler

Product portfolio

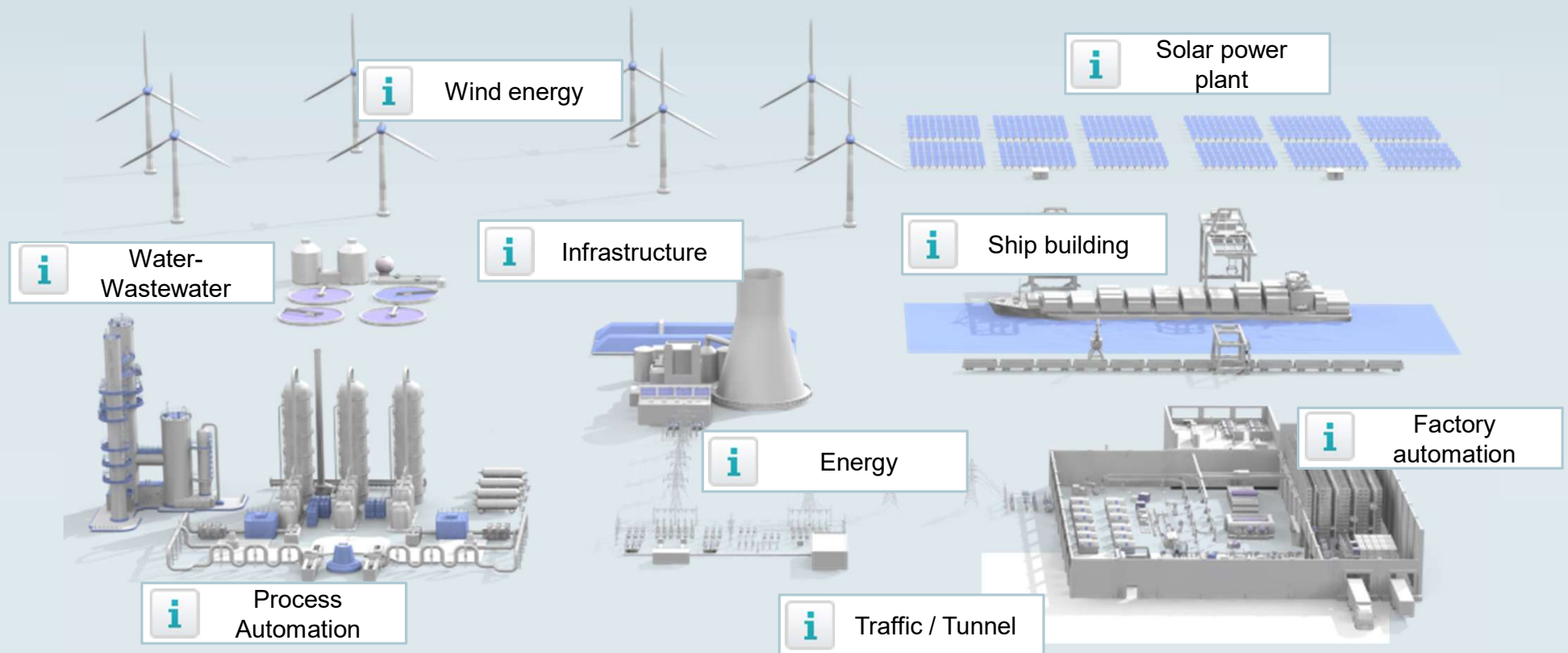


Description	Variants					
Variant	Contactless Energy and data coupler		Contactless energy couplers		Contactless data coupler	
Type	Base	Remote	Base	Remote	Base	Remote
Article description	NEARFI PD 2A ETH B	NEARFI PD 2A ETH R	NEARFI P 2A B	NEARFI P 2A R	NEARFI D ETH B	NEARFI D ETH R
Item number	1234224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

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



Application references



Infrastructure applications

 Click on image!

Radioline

Leakage monitoring of pipeline networks



Application examples

- Monitoring of pipelines for energy, data transfer and gas
- Several measuring stations for leakage control, water meters, gas meters, fuel meters
- Communication lines to the remote local network centers are easy to install

Advantages of wireless systems

- Simple installation and commissioning
- Simple cost-effective networks
- Simple integration of additional measurement points
- Simple extension up to 240 measuring devices

Leakage monitoring „Albstadtwerke“



Application examples

- Monitoring of pipelines for energy, data transfer and gas
- Several measuring stations for leakage control, water meters, gas meters, fuel meters
- Communication lines to the remote local network centers are easy to install

Advantages of wireless systems

- Simple installation and commissioning
- Simple cost-effective networks
- Simple integration of additional measurement points
- Simple extension up to 240 measuring devices

Bridge control



Application examples

- Monitoring of bridges for structural integrity and load capacity
- Several measuring stations for load capacity, structural integrity, and load capacity
- Communication lines to the remote local network centers are easy to install

Advantages of wireless systems

- Simple installation and commissioning
- Simple cost-effective networks
- Simple integration of additional measurement points
- Simple extension up to 240 measuring devices

Canal light control



Application examples


- Monitoring of canals for water level and flow rate
- Several measuring stations for water level, flow rate, and water level
- Communication lines to the remote local network centers are easy to install

Advantages of wireless systems

- Simple installation and commissioning
- Simple cost-effective networks
- Simple integration of additional measurement points
- Simple extension up to 240 measuring devices

Media Converter

Infrastructure – Media converter



Application

- While the passengers enter the electrically driven bus, the bus is charged.
- Every 3 to 4 bus stations the bus is fully charged for 15 seconds.

Requirements


- Communication between the control cabinet and the charging station via Ethernet
- Increasing extension of the Ethernet network
- Use of existing multimode glass fiber optic cable

Solution

- Each charging station is equipped with an Ethernet controller. This controller is connected to a central station via fiber optic cables.

PSI-MOS Profibus

Infrastructure



Application

- Four large flood barriers controlled by Profibus to protect the Venice and the Venetian Lagoon.

Requirements

- Reliable transmission of data
- Long distance between flood barriers and control room
- Adverse conditions

Solution

- Communication via fiber optic cable from the barriers to the control room
- Secure connection of copper and fiber within our modular Profibus Hub

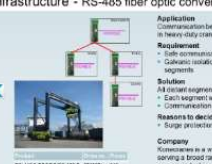
Reasons to decide for our product

- Short circuit detection of the response
- Seamless combination of copper and fiber within our modular Profibus Hub

Company

- ABB helped to develop a storm tide protection in Venice.

Infrastructure - RS-485 fiber optic converter



Application

- Communication between the control room, PLC's and drive control in heavy duty steels up to 2000 t.

Requirements

- Safe communication
- Galvanic isolation due to different ground potentials between the segments

Solution

- All device segments are connected via fiber optic
- Each segment with galvanic isolation
- Communication cannot be disturbed by interference

Reasons to decide for our product

- Surge protection

Company

- Konecranes is a world-leading group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals.



 Click on image!

Traffic / Tunnel applications

Radioline

Traffic control

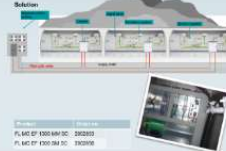


- Application examples**
- Control of signal lights for traffic jam avoidance
 - Data exchange possible during highway work
 - Power supply via solar system
 - Distance between sign boards max. 500 - 1000 m
- Advantages of wireless system**
- Easy installation of existing and new signs in the control system
 - Low per unit price compared to the cable along
 - High capacity and coverage of large distances
 - Wireless along highway route



Media Converter

Tunnel – Media converter



- Application**
- 2 new Highway tunnels named Geyß (1000 m) and Boller (1500 m) for the Highway 7
 - Status monitoring of the entire infrastructure
 - About 40.000 I/Os per tunnel

- Requirements**
- Plug and play
 - Interference-free communication over long distances
 - Redundant PROFIBET ring

- Reasons to decide for our products**
- Cost and I/Os from one supplier
 - Reliability of the products
 - Pricing



 Click on image!

Water & Wastewater applications

Radioline

Wastewater Treatment (PROFIBUS)



2.4 GHz

- Single level monitoring
- Data transmission of operating data and alarm signals via profibus protocol
- Replacement of expensive diving clocks which need to be replaced several times a year (costs over 30 %)
- 100 m range
- Up to 16 nodes
- Data rate up to 12.5 Mbps

Phoenix Contact
INSPIRING INNOVATIONS

Water Supply „Zweckverband Seebachgebiet“



The new record set of time and money by using the Radioline wireless system – says Hermann Jägel, Director of the Seebachgebiet.

The water supply „Zweckverband Seebachgebiet“ uses an industrial wireless system based on the GPRS/GSM standard. The system connects the various substations.

Phoenix Contact
INSPIRING INNOVATIONS

Water Supply „Stadtwerke Obermörlen“



The radio links are stable and have not even been since the first day – says Kottmann. Since the start of the radio links, the control of the water supply network has been simplified and the costs have been reduced.

The water supply „Stadtwerke Obermörlen“ uses an industrial wireless system based on the GPRS/GSM standard. The system connects the various substations.

Phoenix Contact
INSPIRING INNOVATIONS

Central wastewater plant Wilhelmshaven



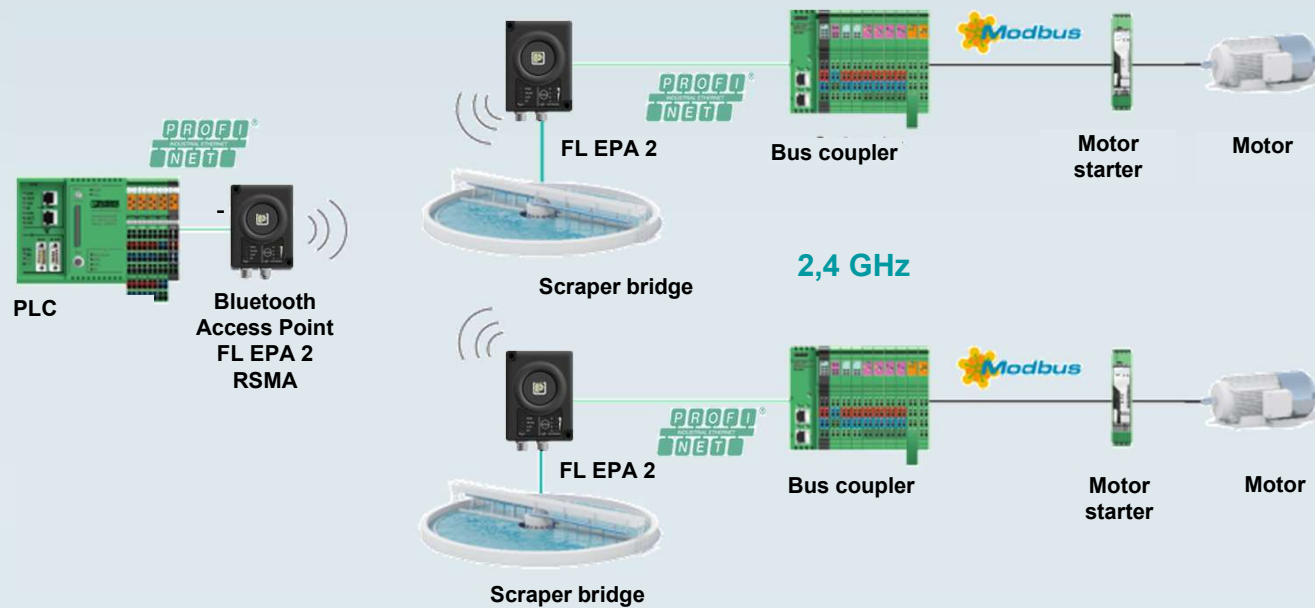
“By using the wireless solutions, we have solved various challenges, such as the replacement of expensive diving clocks, and saved a lot of money” says Kottmann.

As part of the modernization of the wastewater treatment plant, two secondary and tertiary effluent lines and control stations and dependent flows have been replaced with a Phoenix Contact wireless system.

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



[Product overview](#)

Solar applications

 Click on image!

Radioline

Solar power plants



2.4 GHz

Wireless

Application examples:

- 1. Long-term monitoring of solar field systems, cooling systems, heating systems and pumps
- 2. Continuous monitoring of the plant data on the DC and AC side with respect to solar irradiation
- 3. The distributed sources use a digital (RTU) interface and can be able to communicate wirelessly with the central database
- 4. Distance between isolated meters

Advantages of wireless systems:

- 1. Easy integration of existing and new signals into the control system
- 2. Immune to electromagnetic interference
- 3. Flexible connection and extension

Phoenix Contact
Solutions for automation

Wireless networking of PV inverters



Wireless

Application examples:

- 1. Long-term monitoring of solar field systems, cooling systems, heating systems and pumps
- 2. Continuous monitoring of the plant data on the DC and AC side with respect to solar irradiation
- 3. The distributed sources use a digital (RTU) interface and can be able to communicate wirelessly with the central database
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- 1. Easy integration of existing and new signals into the control system
- 2. Immune to electromagnetic interference
- 3. Flexible connection and extension

Phoenix Contact
Solutions for automation



Energy applications

 Click on image!

Radioline

Wastewater plant RWE Power Neurath



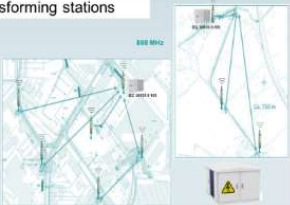
"The commissioning of the Radioline modules was proven to be really easy" sums up Gerdien Stöcker from RWE.

As part of a modernization, the treatment plant should be able to be operated via a remote control operation.

Wireless technology and other components from Phoenix Contact contribute to the flexible and reliable operation of the system.



Transforming stations



Application examples

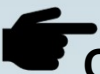
- Monitoring of decentralized distributed local network systems
- Transmission of status, fault and alarm messages

- Communication lines to the decentralized local network stations are largely not available
- The mobile broadband coverage in the area is not sufficient

Advantages of wireless systems

- Bridging big distances and obstacles
- Easy setup
- Saving considerable earthworks
- Simple integration of additional extensions





Click on image!

Wind applications

Radioline

Wind energy plant



Application examples

- Regulation of the intensity of the wind turbine and the wind speed
- Monitoring of the status of the wind turbine
- Temporary isolation in case of a fault
- Advantages of Radioline system
- Easy setup
- Flexible expansion and upgrade
- Risk-free investment because there is no need for a license



Generation plants certification - MOE



"By using the substation wireless monitoring system, we have a lot of spare time during commissioning, testing or changing the non-licensed operating Engineering Center.

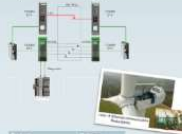
In this, three measuring points will be placed around the wind turbine. A line is drawn on the ground, which can be used for the start control and the safety of the industrial sector staff.

Measurements are recorded and sent to the control system in the power plant, which they transfer to the computer. There, the data is archived and processed.



Media Converter / SHDSL

Wind power energy



Application

Ethernet communication to rotating parts via slip ring, for cable adjustment in steel fields. Robust and PROFINET communication with Phoenix Contact devices.

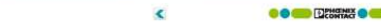
Problem

Due to the high data rate, standard Ethernet communication over copper slip rings is often susceptible to electromagnetic interference.

Solution

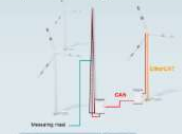
Communication via optical rotary joint
• Replacing communication with SHDSL
• Ethernet modem via copper slip ring
• WDM (Wavelength Division Multiplexing) technology is necessary, because the optical rotary joint is working with only one fiber.

Product	Order no.
PL MC 4P 100M SHDSL	288380
PPH-HDSL200-4000L-6-100	2217043



Media Converter / PSI MOS

Wind power energy



Application

- Monitoring performance and load when new types of plants are installed
- Monitoring meteorological data
- Communication via CAN and EtherCAT

Problem

EtherCAT real-time communication for high-frequency measurements

Solution

PL MC 2000T SC with short latency for time-critical applications (EtherCAT)
• 300 ns in peak-through mode
• PROFINET CANopen BSRM for CAN communication over long distances and high EMI interferences

Product	Order no.
PL MC 2000T SC	288313
PPH-HDSL200-4000L-6-100	2217043



Process applications

 Click on image!

Radioline

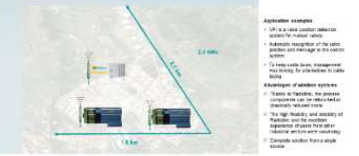
Pipeline monitoring



Application examples

- Industrial process monitoring and control
- Remote monitoring and control
- Data collection and storage
- Process control and optimization
- Safety and security
- Backup and recovery
- Data archiving and analysis
- Process optimization and control

Tank farms



Application examples

- Industrial process monitoring and control
- Remote monitoring and control
- Data collection and storage
- Process control and optimization
- Safety and security
- Backup and recovery
- Data archiving and analysis
- Process optimization and control

Oil refinery Petronor



Application examples

- Industrial process monitoring and control
- Remote monitoring and control
- Data collection and storage
- Process control and optimization
- Safety and security
- Backup and recovery
- Data archiving and analysis
- Process optimization and control

Comserver

Process - COMSERVER



Application

- Industrial process monitoring and control
- Remote monitoring and control
- Data collection and storage
- Process control and optimization
- Safety and security
- Backup and recovery
- Data archiving and analysis
- Process optimization and control

PSI-MOS Profibus

Process - PROFIBUS fiber optic converters



Application

- Industrial process monitoring and control
- Remote monitoring and control
- Data collection and storage
- Process control and optimization
- Safety and security
- Backup and recovery
- Data archiving and analysis
- Process optimization and control



Factory automation applications

 Click on image!

Wireless MUX

Radioline

Foundry MPG Mendener Präzisionsrohr

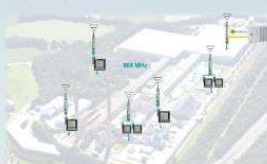


Typically, the wireless solutions, we work with to replace the infrastructure provide cable drums and avoid a lot of overhead cabling. Thanks to the high data rate, the data is transferred to the surface via charging cables.

With the Wireless MUX, the signals are sent from the charging cable to the central machine control.



Energy management



Application examples

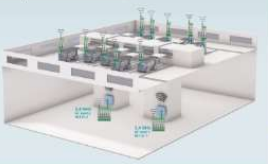
- To collect the energy data, we use the energy data from the energy management system.
- To collect the energy data, we use the energy data from the energy management system.
- To collect the energy data, we use the energy data from the energy management system.

Advantages of wireless systems

- Simple installation and operation
- Simple integration of new measuring points



Glass production



Application examples

- To collect the energy data, we use the energy data from the energy management system.
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- To collect the energy data, we use the energy data from the energy management system.

Advantages of wireless systems

- Simple installation and operation
- Simple integration of new measuring points



Comserver

Factory automation



Application

- Serial servers are connected to a computer to show speed, quality and other parameters of a factory line.

Requirement

- Conversion of Comserver into serial data
- Different serial interfaces (RS 232C/RS 485)

Reasons to decide for our product

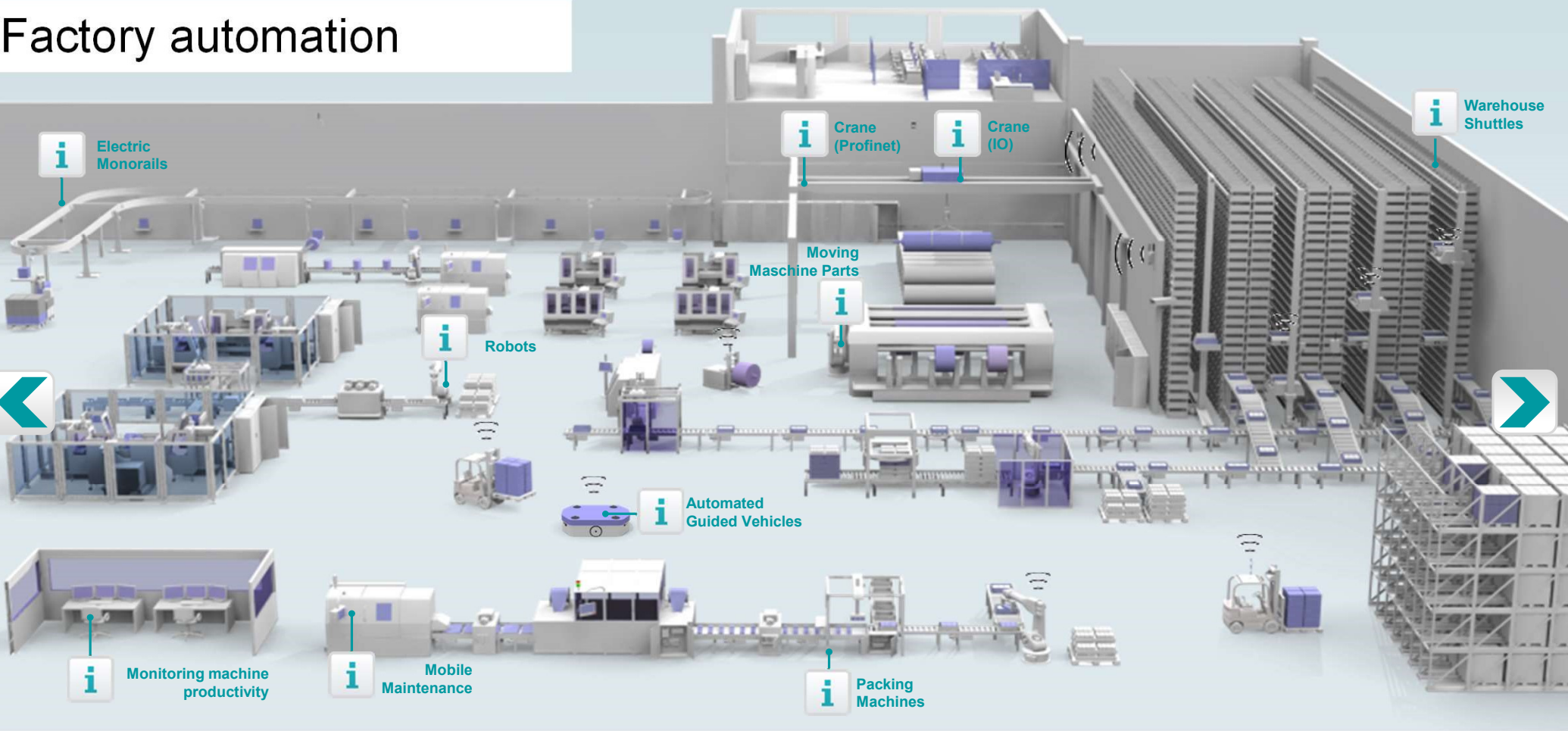
- Customer uses the Comserver for many systems worldwide

Company description

- For more than 20 years, B&B Computed has been working with the construction of corrugators and the manufacture of corrugated sheets. Thanks to years of experience B&B Computed is the world's largest provider of solutions for the Corrugated Industry.



Factory automation



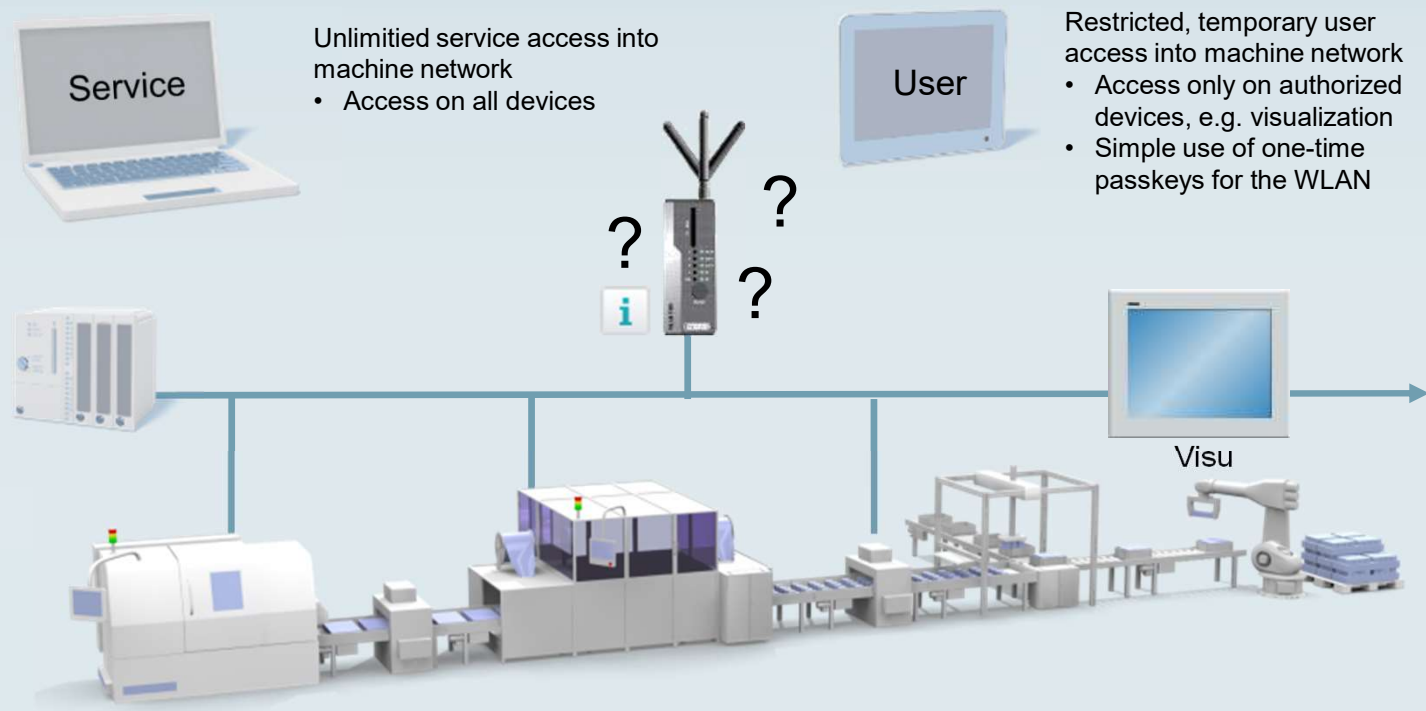
Smart Device integration



Product
overview



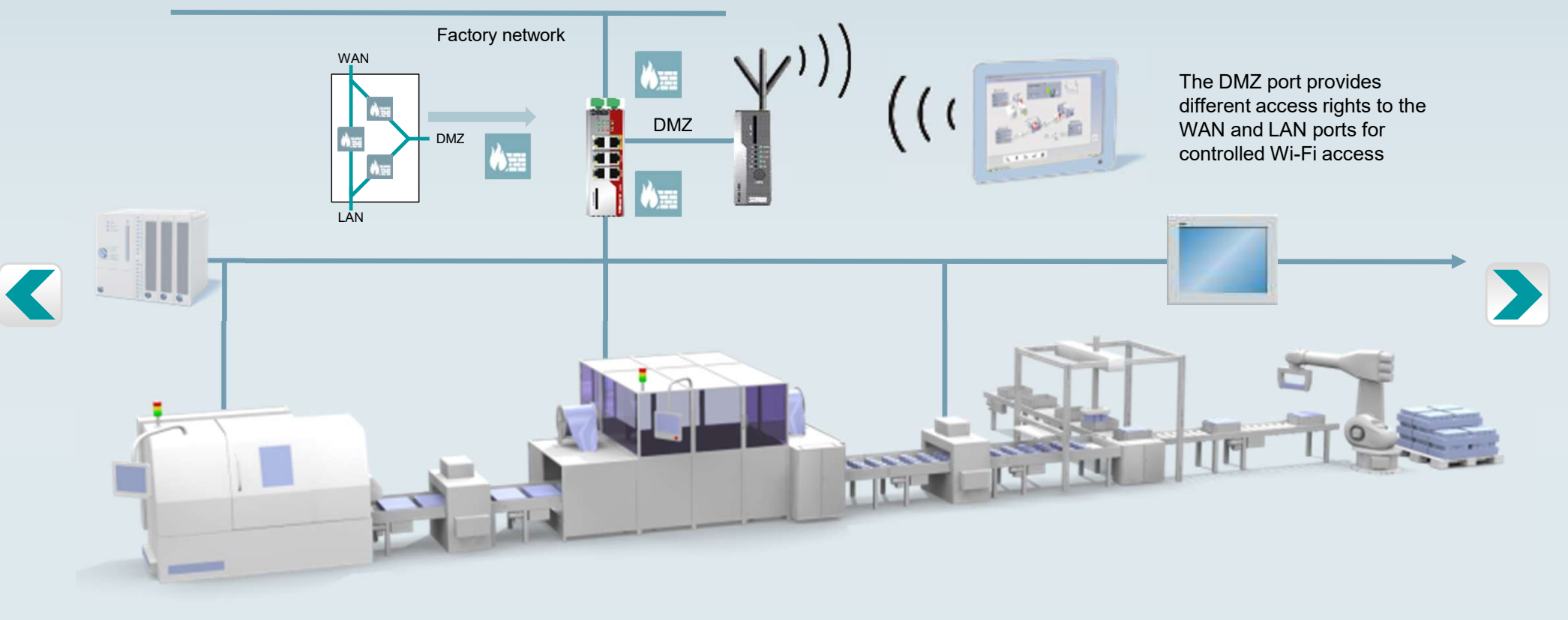
Smart Device integration



Product overview



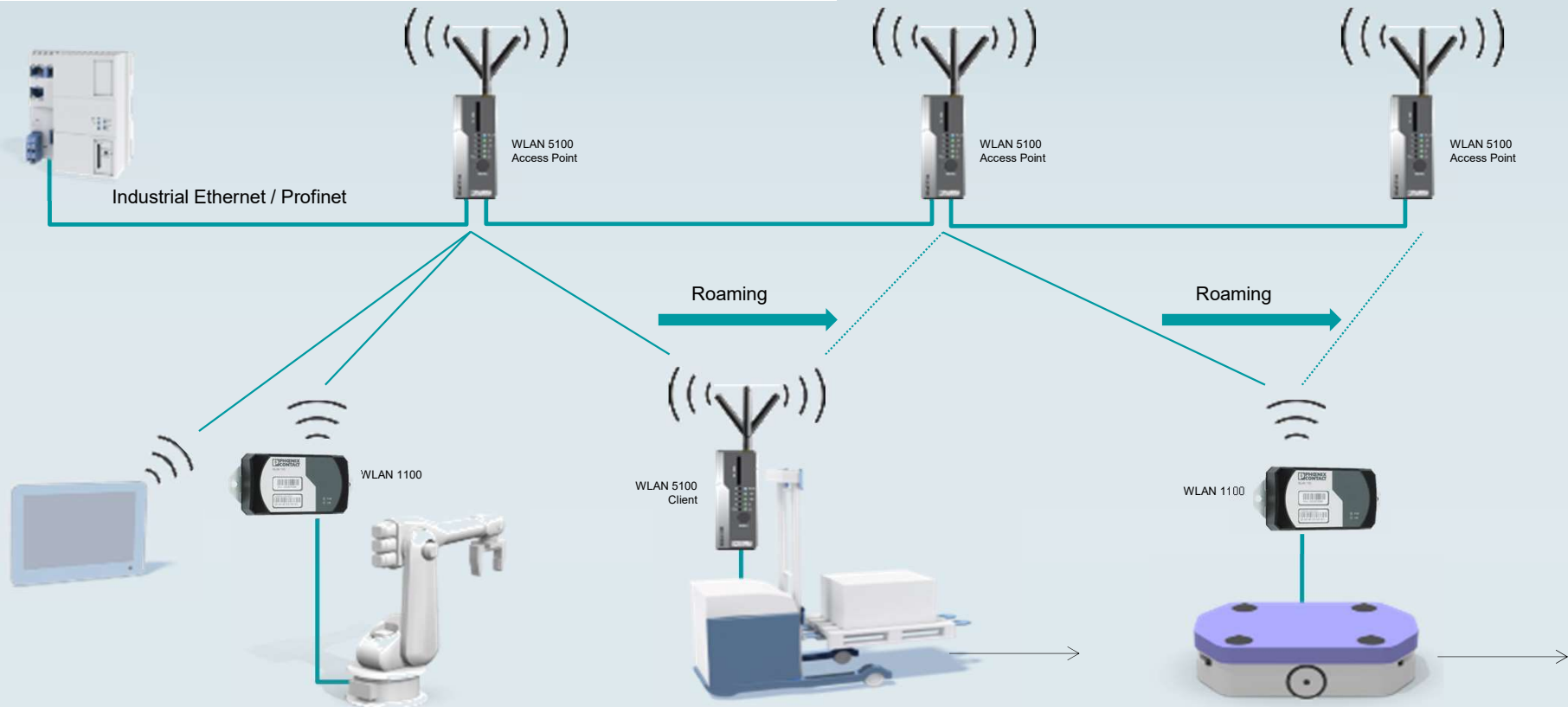
Secure machine WLAN network



Product
overview



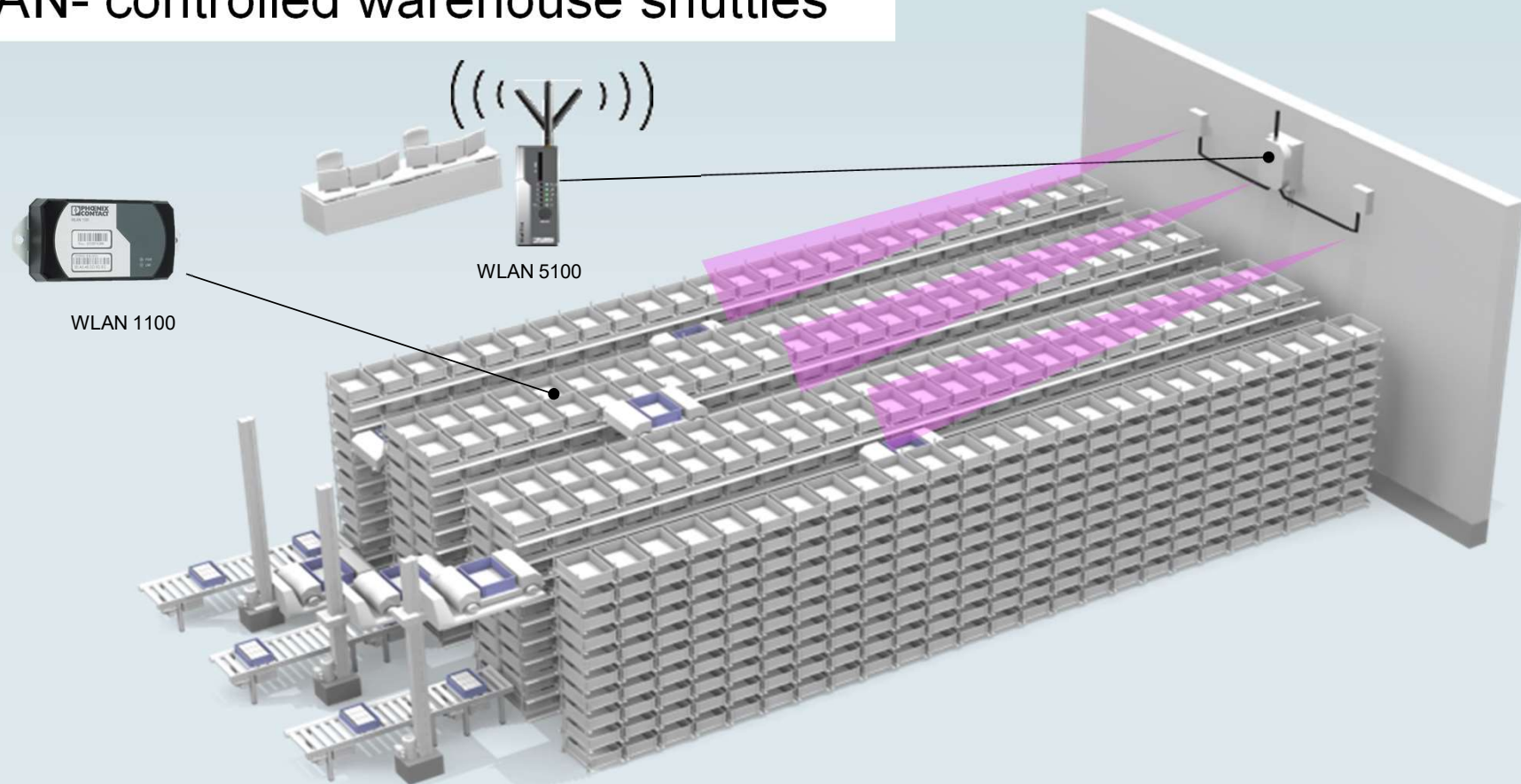
Automated Guided Vehicles



[Product overview](#)



WLAN- controlled warehouse shuttles



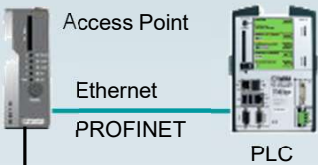
Product
overview





AS/RS to Automate Distribution Center Phoenix Contact USA

Electric monorails



Wireless LAN

Leaky cable

 Controlled Roaming



Product overview



WLAN 2010



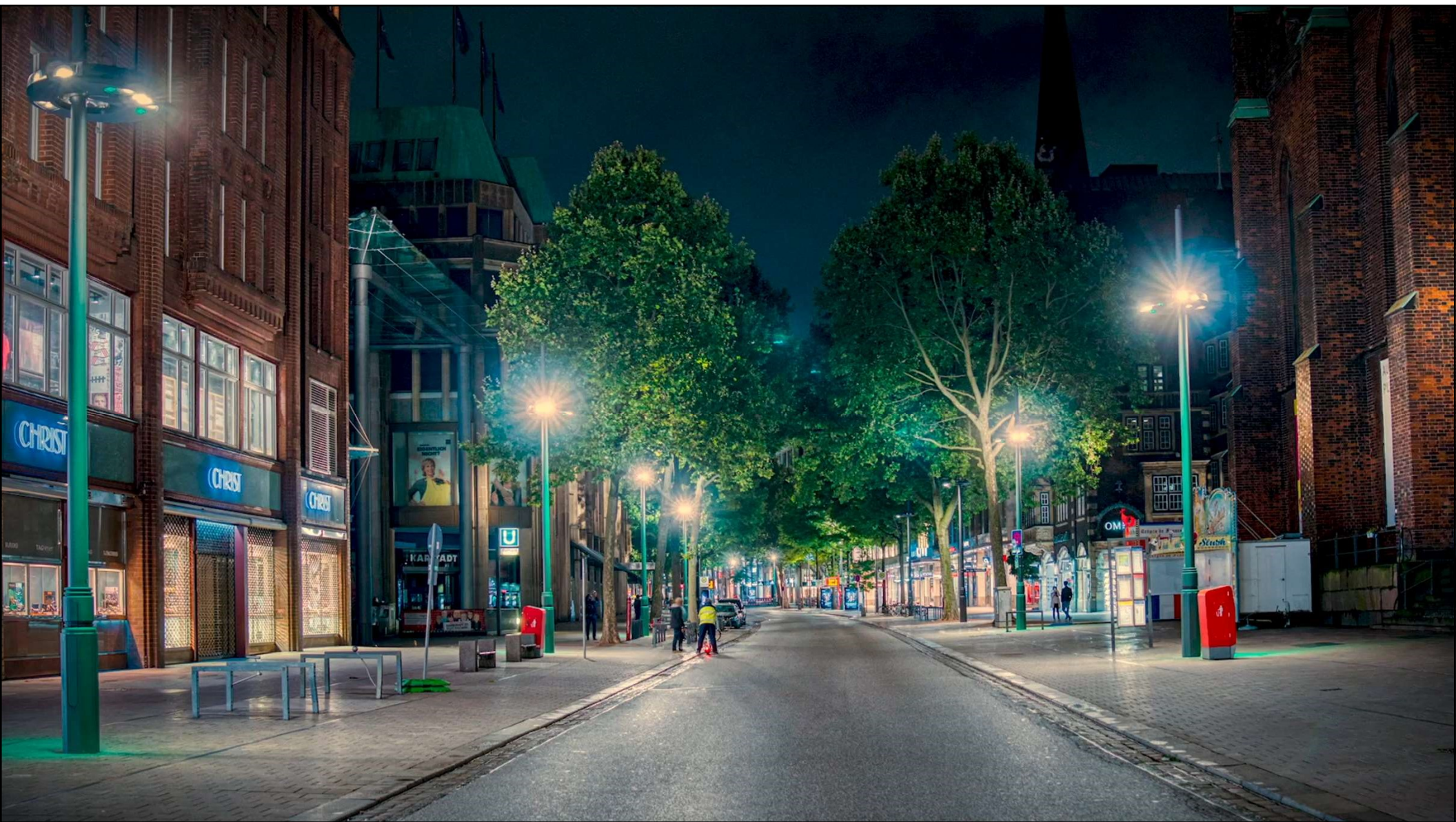
C1D2
Hazloc



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



WLAN Mesh




Ship building applications

 Click on image!

Comserver

Patch Panel

Ship building



Application

- In a vessel, different sensors capture important data such as gas flow, performance or pressure for analysis.

Requirement


- Serial data (RS-based) should be converted into Ethernet.

Reasons to decide for our product


- Familiar with the Comserver product family.

Company description

- ABB is a pioneering technology leader that is writing the future of industrial digitalisation. In this case ABB deliver solutions for marine e.g. vessels and terminals.



Ship building



Application

Preconfigured cabinets for ships. All Ethernet field devices are connected to the cabinet via patch panels.

Requirement


- Fast and easy connection of Ethernet field cables.
- Structured field cable connection without the need to assemble RJ45 connectors.

Solution

Ethernet patch panels are especially designed for the industrial use in cabinets. The patch panels are pre-installed by the cabinet builder. On site, the field cables can be easily connected to the cabinet.

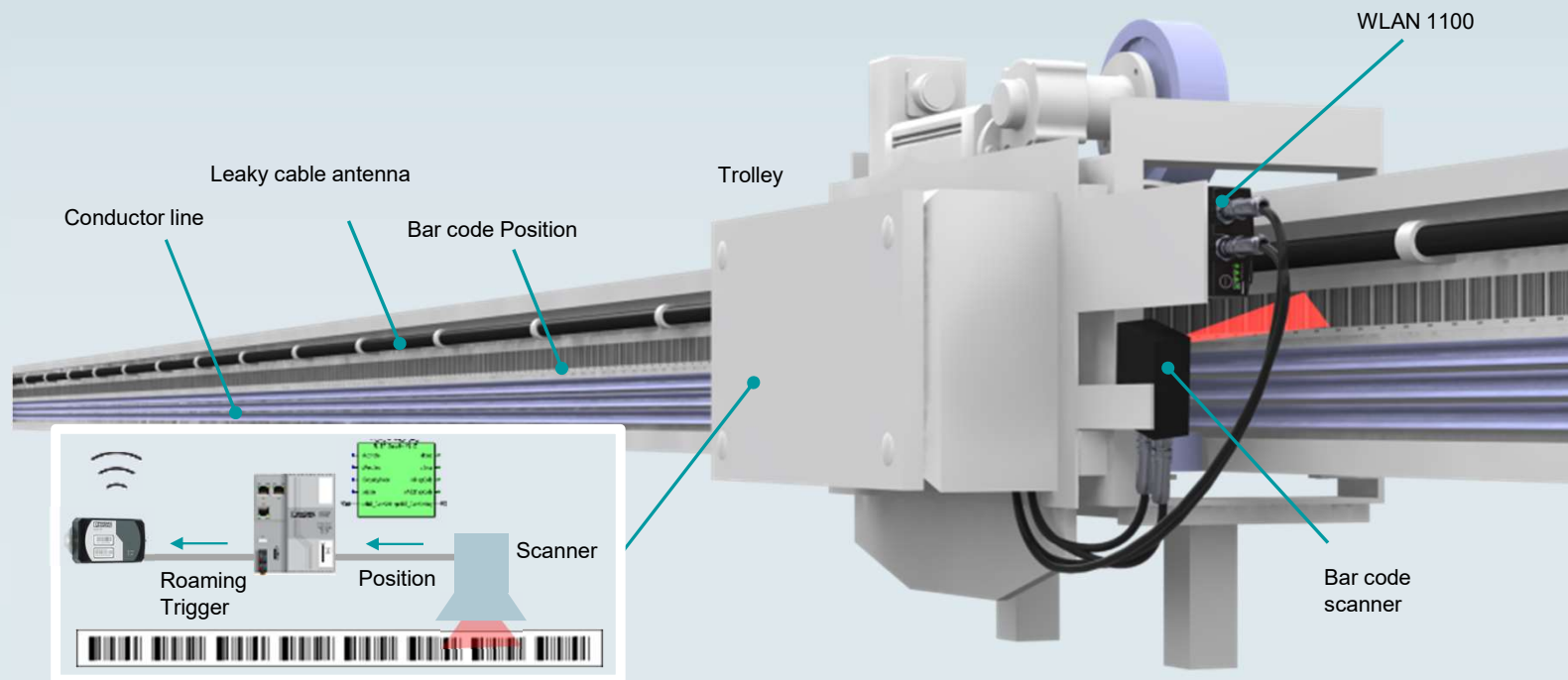
Reasons to decide for our product

- Structured cabinet cabling.
- Easy connection of the field cables without the need to assemble RJ45 connectors.





Controlled roaming depending on position



[Product overview](#)



Industrial WLAN – exemplary applications



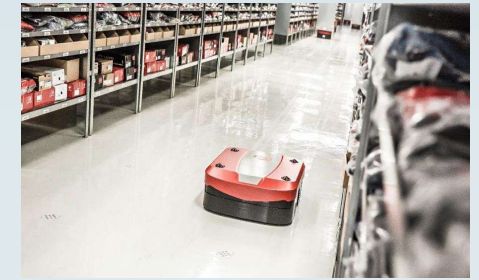
Water / Wastewater



**Wireless machine
access with smart
devices**



Warehouse logistics



**Flexible autonomous
transport systems in
intralogistics**

Applications

References



Product
overview





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



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

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



Wireless Serial



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

