2025

Industrial Wireless

Wireless from the sensor to the network

PHOENIX CONTACT

Industrial Wireless products

Always the ideal solution

Phoenix Contact is a leading international supplier for automation infrastructure. Industrial Wireless products from Phoenix Contact provide reliability and security for the transmission of data and signals. Wireless systems enable users to easily and efficiently negotiate the many challenges of an industrial communication infrastructure.

1

NearFi

The contactless real-time transmission technology from Phoenix Contact in the near-field range.

- **NearFi couplers** – Power and real-time Ethernet data transmission via an air gap or even via glass, plastic, or wood.

› More information starting on page 6

2

Bluetooth

Wireless Ethernet and Wireless I/O for transmitting control data in factory automation.

- **Bluetooth EPA** – Ethernet and PROFINET via Bluetooth
- **Wireless MUX** – I/O signals via Bluetooth

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3

WLAN

Wireless Ethernet for high-performance and industrial-grade Ethernet networks.

- **WLAN 1100 series** – the all-in-one WLAN solution for machine building
- **WLAN 1010 series** – the WLAN solution for compact machine systems

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LoRaWAN

Sensor/actuator wireless network for data transmission in urban infrastructure.

- **LoRaWAN gateways** – network infrastructure for integrating any LoRaWAN sensors
- **LCU/SCU switching devices** – for switching lighting solutions

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5

Trusted Wireless

Wireless I/O and Wireless Serial for signal and data transmission in large systems.

- **Radioline wireless system** – for I/O signals and serial data
- **Radioline outdoor box** – the modular solution for outdoor use

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Cellular communication

Our portfolio of products for wireless remote access.

- **TC ROUTER** – cellular router for worldwide network access
- **TC Mobile** – SMS relays for monitoring sensors via cellular communication

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Contents

Wireless technologies

Different wireless technologies for special industrial requirements

In industry, there is a vast range of applications for wireless technologies, from the transmission of a simple sensor value all the way to a powerful network with hundreds of devices.

This means that the requirements for wireless technology differ significantly. This broad range of requirements is not satisfied entirely by one single wireless technology. Phoenix Contact provides products and solutions for different license-free and free-of-charge wireless technologies which can cover virtually all industrial areas of application.

The key requirement for the use of wireless technologies in industrial applications is that the technology must be as robust and reliable as a cable connection, even under harsh conditions. With wireless communication, the data is transmitted with electromagnetic waves through free space that is not available exclusively. The wireless connection is therefore subjected to interference, such as electromagnetic interference fields, which can adversely affect transmission. In addition, reflections, fading, interference, and shadowing can occur. The wireless systems from Phoenix Contact operate without interference even under external influences.

Wireless technologies		
NearFi Technology Designed by Phoenix Contact	Bluetooth®	WLAN 802.11 n, ax Wi-Fi 4, 6 (6E) 00028154
Range with line of sight		
• Up to 100 mm (data transmission) • Up to 10 mm (power transmission)	• Up to 200 m (Ethernet data) • Up to 400 m (I/O signals)	Up to 500 m
Frequency band		
60 GHz	2.4 GHz	2.4 GHz, 5 GHz, 6 GHz
Description		
Contactless real-time communication of Ethernet data (protocol-independent) and power (up to 100 W) across an air gap in the centimeter range.	Bluetooth for the fast and efficient transmission of I/O and Ethernet data in machine building and systems manufacturing.	WLAN is a wireless standard in accordance with IEEE 802.11 for establishing wireless Ethernet networks.
Fields of application		
Replacement of wear-prone connectors and slip rings in moving or rotating machines, systems, and robot systems.	Fast transmission of I/O signals or Ethernet data (also PROFINET and PROFIsafe).	Setup of high-performance Ethernet wireless networks suitable for industrial applications (including PROFINET and PROFIsafe communication).
Applications		
• Tool changes on robots • Material transport systems • Automated guided vehicle systems • Handling/lightweight robots • Turntables • Press shops	• Moving machine parts • Cranes and lifting equipment	• Autonomous mobile robots (AMR) • Automated guided vehicles (AGV)
More information starting on page 6	More information starting on page 10	More information starting on page 18

Industrial 5G – wireless networking for efficient processes

In the future, Industrial 5G will enable reliable, wireless networking with high data rates, high numbers of devices, and extremely low latency. It provides the foundation for scenarios of the future, including Industry 4.0 and the All Electric Society, in which comprehensive networking and smart factories are standard. As the 5th generation of wireless broadband technology, 5G provides users with reliable connectivity and enables more flexible, autonomous, and efficient processes from production through to logistics.

Industrial 5G – opportunities and capabilities of a new technology

LoRaWAN	TRUSTED WIRELESS™	5G lte GSM 5G 4G 3G 2G
Up to 20 km (868 MHz)	• Up to 32 km (900 MHz) • Up to 20 km (868 MHz) • Up to 5 km (2.4 GHz)	Worldwide
868 MHz; LoRaWAN EU 868	868 MHz, 900 MHz, 2.4 GHz	0.6 ... 7.1 GHz
LoRaWAN is a wireless system for encrypted sensor and actuator data transmission in urban environments over large distances.	Trusted Wireless was designed specifically for the reliable transmission of data and signals over ranges of up to several kilometers.	Communication is via private or public cellular networks. In public networks, the telecommunications providers provide the necessary infrastructure.
Sensors with low energy consumption, data acquisition of measured values, and control of lighting solutions.	Non-time-critical transmission of I/O signals and serial data (RS-232/485) in widespread systems.	• Wireless I/O: Analog and digital I/O signals • Wireless Ethernet: Ethernet data
• Lighting solutions • Battery-operated sensor technology • Sensors for environmental data	• Connection of remote pump stations • Rotating parts (e.g., in scraper bridges) • Level monitoring in reservoirs • Pipeline monitoring	• Temporary remote maintenance access to machines and systems • Continuous transmission of process data • Monitoring signal states
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NearFi

1

NearFi is the contactless real-time transmission technology from Phoenix Contact. It enables wireless, protocol-independent, and latency-free Ethernet communication.

NearFi couplers enable power (up to 100 W) and real-time Ethernet data (100 Mbps, full duplex) to be transmitted across an air gap of a few centimeters – even through materials such as wood, glass, and plastic. This allows you to use this technology to replace wear-prone connections and slip rings in industrial applications while minimizing costly outages.

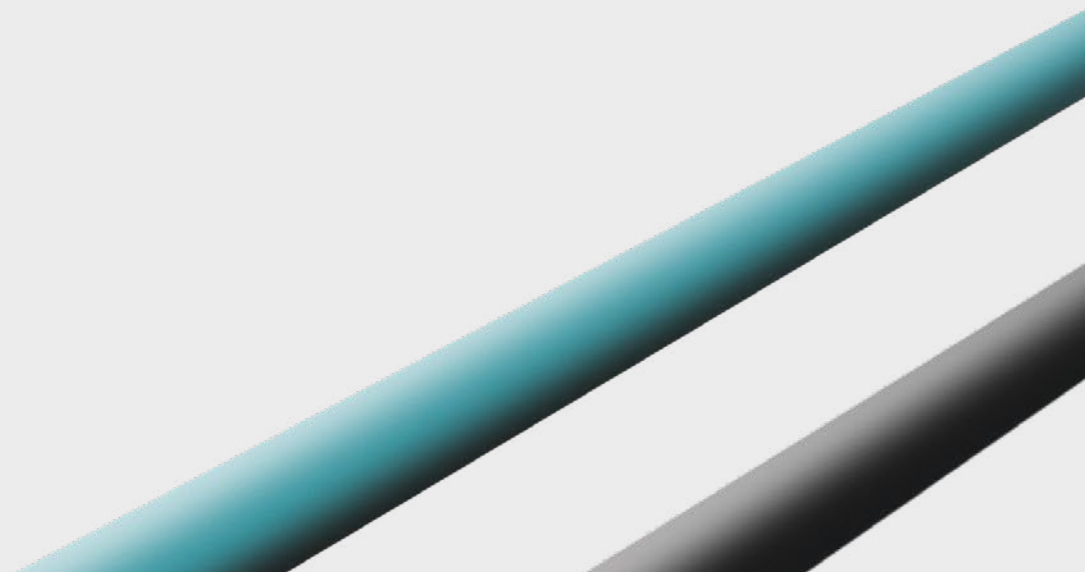
Universal

Protocol-independent and latency-free Ethernet real-time communication

PROFINET EtherCAT EtherNet/IP Modbus

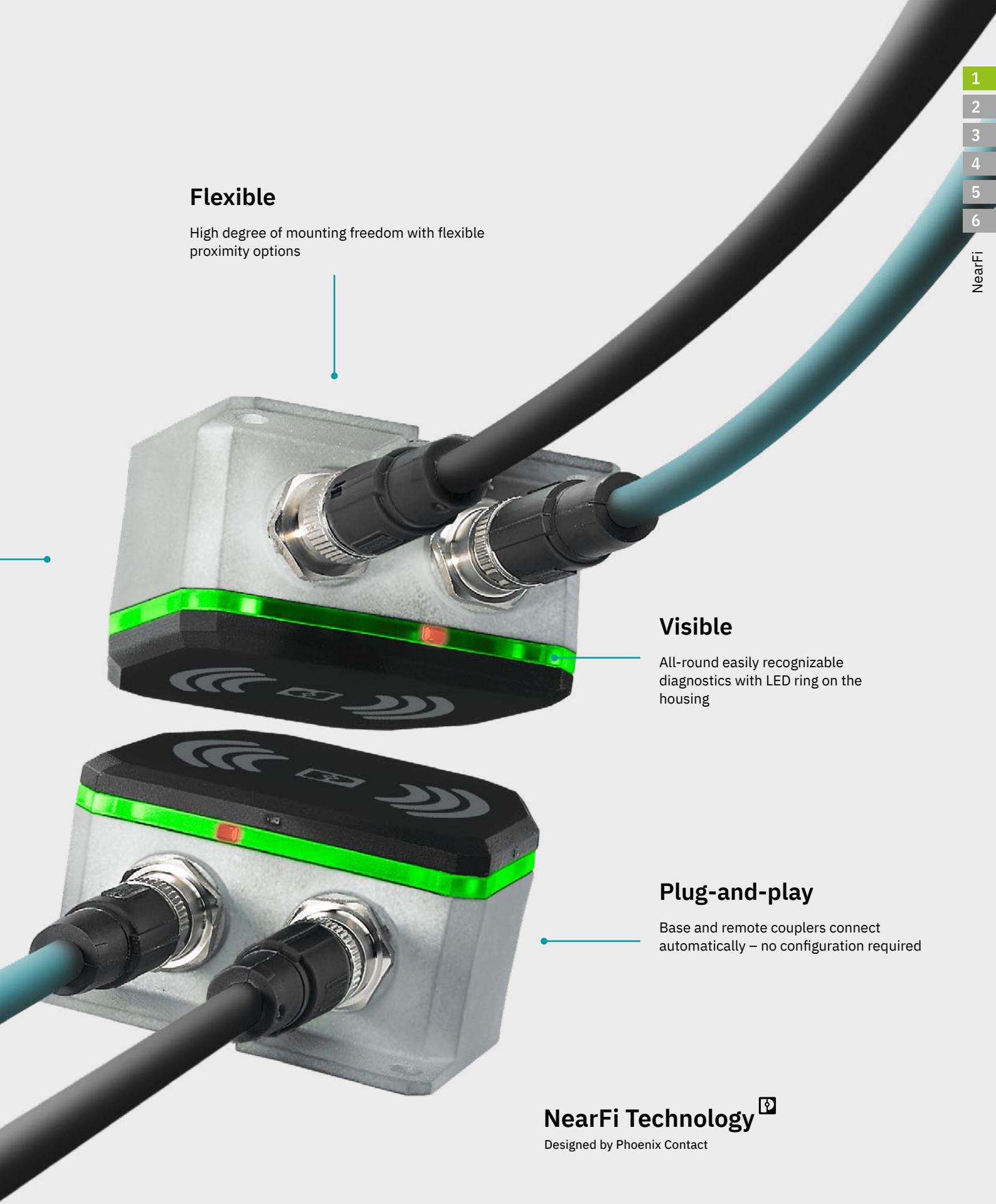
Contactless

No wear and no maintenance



Flexible

High degree of mounting freedom with flexible proximity options



Visible

All-round easily recognizable diagnostics with LED ring on the housing

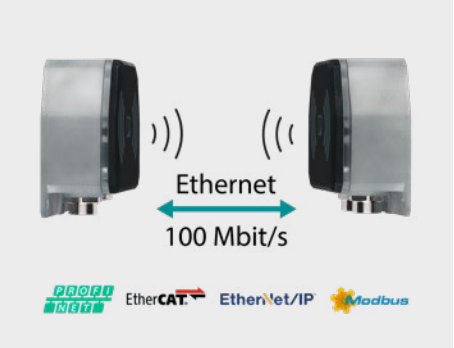
Plug-and-play

Base and remote couplers connect automatically – no configuration required

NearFi Technology

Designed by Phoenix Contact

Main features



Ethernet in real time

NearFi transmits Ethernet data at speeds of up to 100 Mbps without latency and regardless of protocol. You can therefore use all conventional Ethernet protocols with NearFi.

Inductive power transmission

The NearFi couplers enable inductive power transmission up to 50 W (with parallel connection, up to 100 W). Active closed-loop control enables constant power transmission over the entire working area.

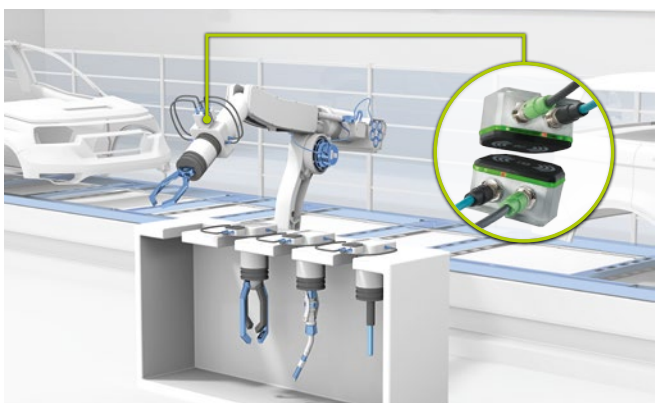
High degree of mounting freedom

The NearFi couplers can be brought together from any direction or in rotation. They can face each other with an offset or at a tangential angle.

NearFi coupler in use

In industrial automation, power and data are often transmitted via connectors. Wherever connectors are connected and disconnected frequently, for example during tool changes on robots, connector service life is limited because contacts can become soiled or warped.

In addition to contactless power and real-time Ethernet transmission, application-specific functions such as Fast Startup and the transmission of two electrically isolated voltages (US= communications power/sensor supply and UA= actuator supply) are also possible.



Tool changes on industrial robots

Typical areas of application

- Tool changes on robots
- Transport systems such as cargo and workpiece carriers
- Turntables, rotary tables
- Modular production systems
- Automated guided vehicle systems (AGVs)

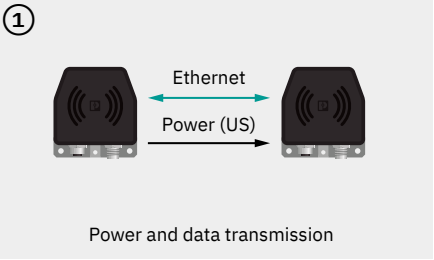
NearFi technology in the automotive industry

Overview of NearFi couplers

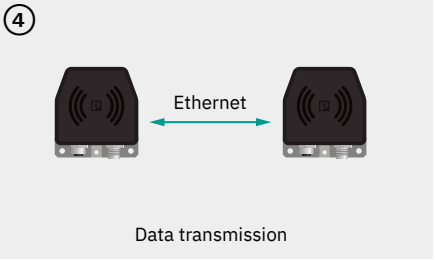
Operating modes

1. Transmission of power (24 V, 2 A, US) and real-time Ethernet data (100 Mbps, full duplex).
2. By combining two NearFi coupler paths, the power can be increased to 100 W with automatic current equalization, or two electrically isolated voltages (US/UA) with 50 W each can be transmitted.
3. Transmission of power up to 50 W (24 V, 2 A, US, or UA).
4. Transmission of real-time Ethernet data (100 Mbps, full duplex) over a distance of up to 100 mm.

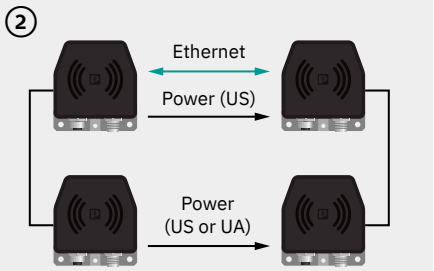
US = communications power/sensor supply,
UA = actuator supply



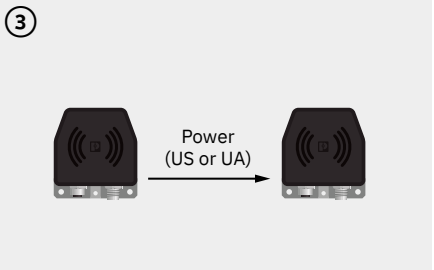
Power and data transmission



Data transmission



Power and data transmission parallel operation



Power transmission

NearFi couplers				
				
Description	**Power and data coupler**	**Data coupler**	**Power coupler, communications power**	**Power coupler, actuator supply**
Wireless standard	NearFi			
Range	≤10 mm	≤100 mm (can be set via DIP switch)	≤10 mm	
Interfaces	Ethernet Inductive interface (power transmission)	Ethernet	Inductive interface (power transmission)	
Transmission speed	100 Mbps			
Delay time (typical)	≤1 µs (typical)			
Output power	50 W (communications power)		50 W (communications power)	50 W (actuator supply)
Output voltage	24 V DC ±5%		24 V DC ±5%	
Output current	≤2 A (typical)		≤2 A (typical)	
Degree of protection	IP65 (manufacturer's declaration)			
Ambient temperature (operation)	-20°C ... +55°C (observe derating)	-20°C ... +65°C (observe derating)	-20°C ... +55°C (observe derating)	-20°C ... +60°C (observe derating)
Remote coupler	NEARFI 2200 R	NEARFI 2000 R	NEARFI 200 R	NEARFI 300 R
	1433049 NEW	1433040 NEW	1433046 NEW	1509989 NEW
Base coupler	NEARFI 2200 B	NEARFI 2000 B	NEARFI 200 B	NEARFI 300 B
	1433050 NEW	1433041 NEW	1433047 NEW	1464614 NEW

Industrial Bluetooth

2

Bluetooth is extremely resistant to interference in the frequency band and enables reliable operation in parallel with other Bluetooth or WLAN applications. This means that it can be used to establish very reliable wireless connections, which are essential for safety communication (PROFIsafe, SafetyBridge, etc.), among other things. Bluetooth is particularly suitable for small, static wireless network applications with a small number of devices (point-to-point application and small networks with up to seven devices).

FL EPA

The FL EPA combines a reliable wireless module with an integrated antenna in a robust IP65 housing. This allows you to establish functionally secure communication via PROFIsafe or SafetyBridge Technology.

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Industrial Bluetooth

Bluetooth is ideal for transmitting Ethernet and PROFINET data and I/O signals to moving or rotating machine parts.

Wireless MUX

The Wireless Multiplexer (MUX) is used in places where you want to transmit I/O signals without using cables. The system transmits 16 digital and two analog signals bidirectionally. This means that it can replace a 40-wire signal cable.

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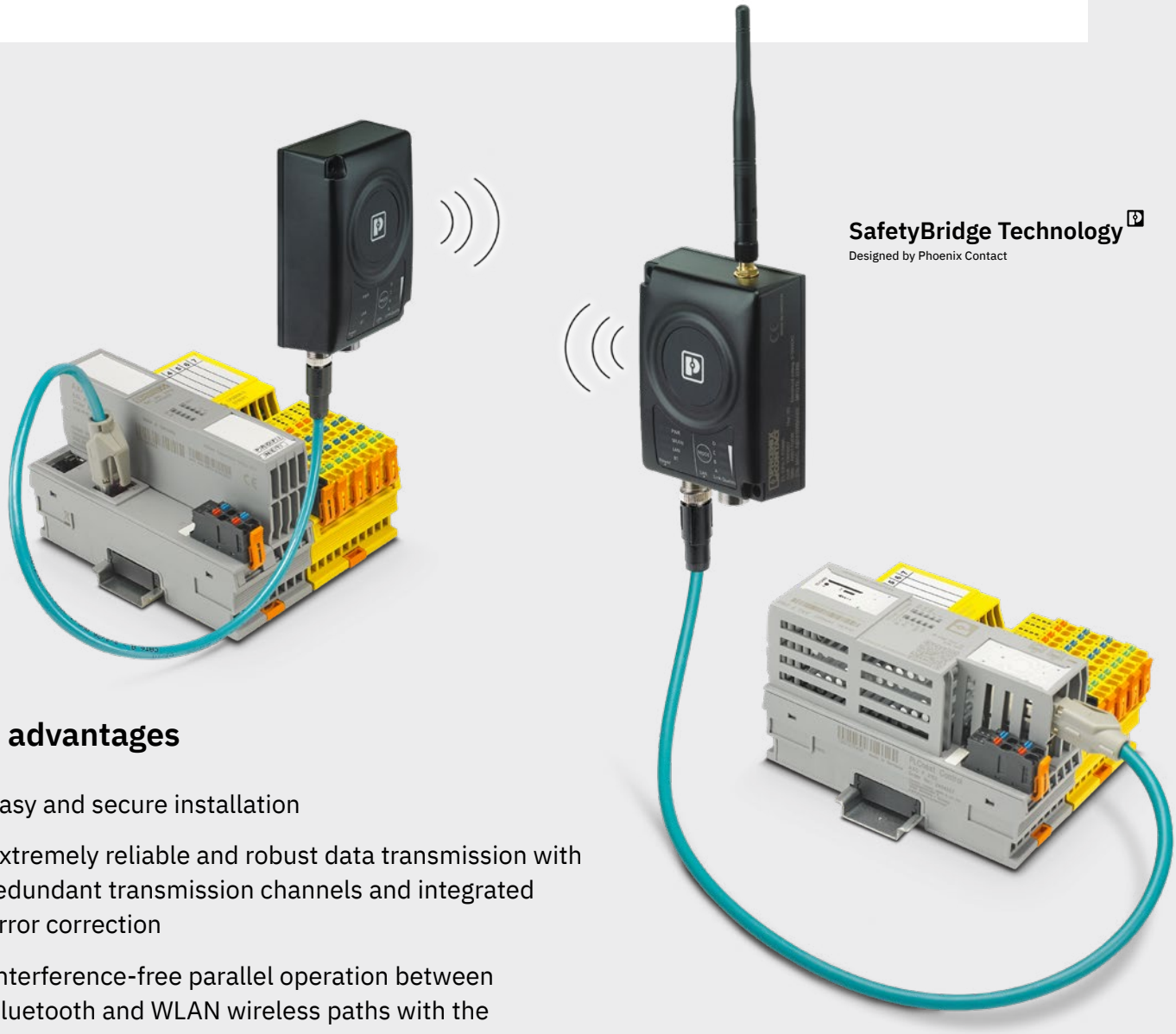
Bluetooth EPA

Ethernet and PROFINET over Bluetooth

The industrial Bluetooth modules allow you to wirelessly transmit control data to mobile or difficult to access automation devices quickly and easily. Bluetooth communication is characterized by particularly robust transmission under difficult ambient conditions. The FL EPA 2 wireless modules allow you to transmit industrial protocols such as PROFINET without any problems. You can also realize functionally secure communication, via PROFIsafe or SafetyBridge Technology.



SafetyBridge Technology
Designed by Phoenix Contact

Your advantages

- Easy and secure installation
- Extremely reliable and robust data transmission with redundant transmission channels and integrated error correction
- Interference-free parallel operation between Bluetooth and WLAN wireless paths with the efficient use of frequency gaps

Overview of Bluetooth EPA

Easy installation

The Ethernet port adapter is the simple solution for enabling the Bluetooth capability of industrial automation devices with Ethernet connection quickly and easily. This comprehensive IP65 solution is installed directly in the field and connected to the automation device via an M12 Ethernet cable.

Robust data transmission

The EPA modules have been developed for reliable and fault-free communication of control signals, for example via PROFINET. The advantage of using Bluetooth technology is that it provides extremely robust wireless communication, which is particularly reliable even under harsh industrial conditions.

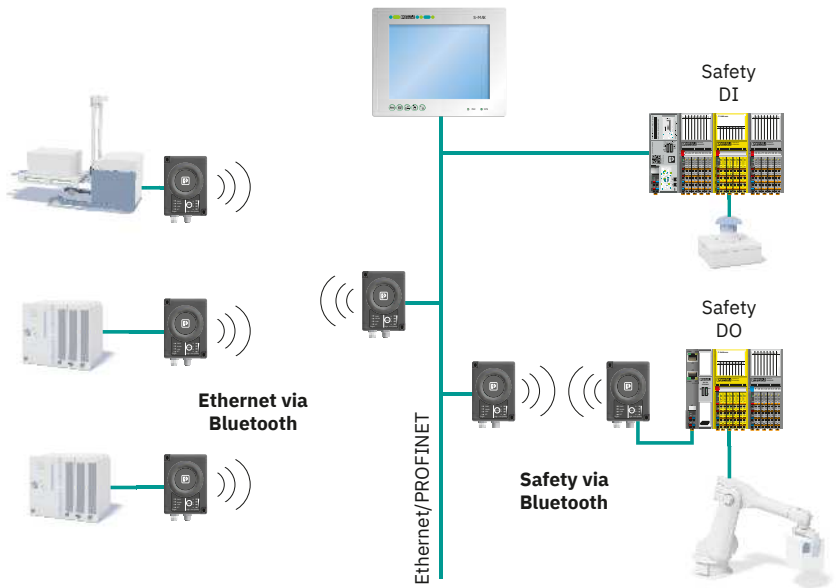
Automatic configuration

Secure point-to-point and small networks can be set up quickly and easily without configuration with the MODE button. Alternatively, configuration can also be conveniently carried out via web browser.

Bluetooth applications

The Bluetooth EPA 2 modules replace individual Ethernet or PROFINET cables leading to automation devices with a reliable wireless connection.

They allow up to seven Bluetooth modules to be connected to the Ethernet network at the same time.



Areas of application

Bluetooth enables mobile devices to be integrated into industrial control networks wirelessly. This avoids expensive and wear-prone cable runs.

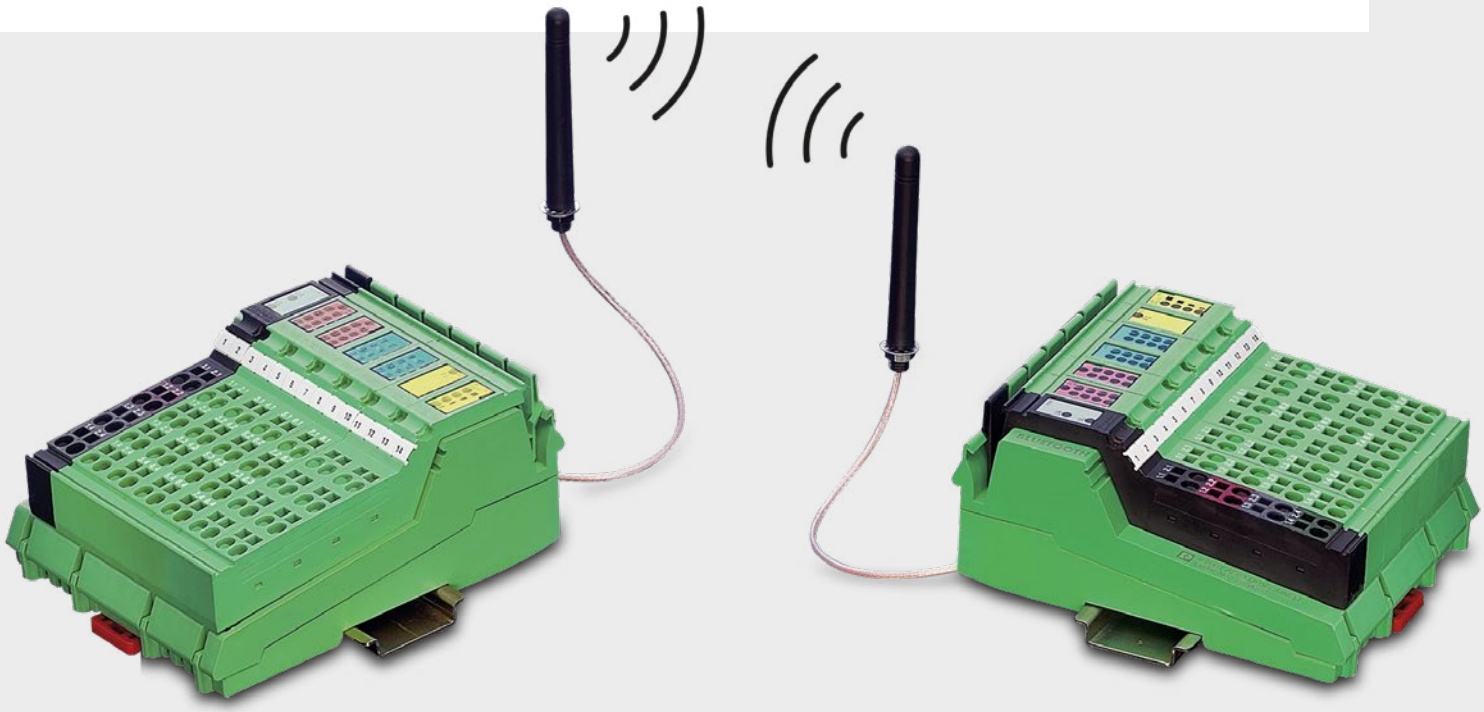
- Robots and traveling robots
- Handling machines, packaging machines, pallet wrapping machines
- Moving machine parts
- Cranes and lifting equipment

Industrial Bluetooth on a crane

Wireless MUX

The wireless signal cable

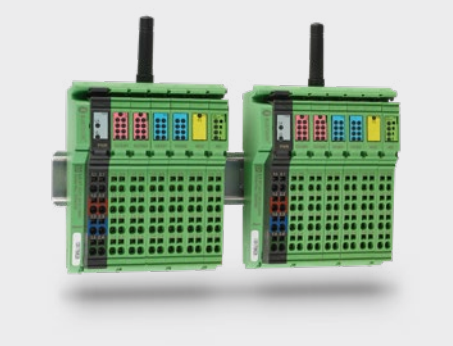
The Wireless MUX transmits 16 digital and two analog signals bidirectionally, i.e., in both directions, which means that it can replace a 40-wire signal cable. Also, the connection is monitored continuously. If there is severe interference or the connection is interrupted, the outputs are reset to the defined LOW state. This is indicated on the module by a diagnostic LED. The link quality display provides the user with constant information on the quality of the link.



Your advantages

- Connections established and signal transmission automatically based on fixed pairing
- No configuration or settings required
- Typical transmission time of less than 10 ms
- Extremely robust and reliable
- Interference-free operation alongside WLAN

Overview of wireless multiplexers



Plug-and-play

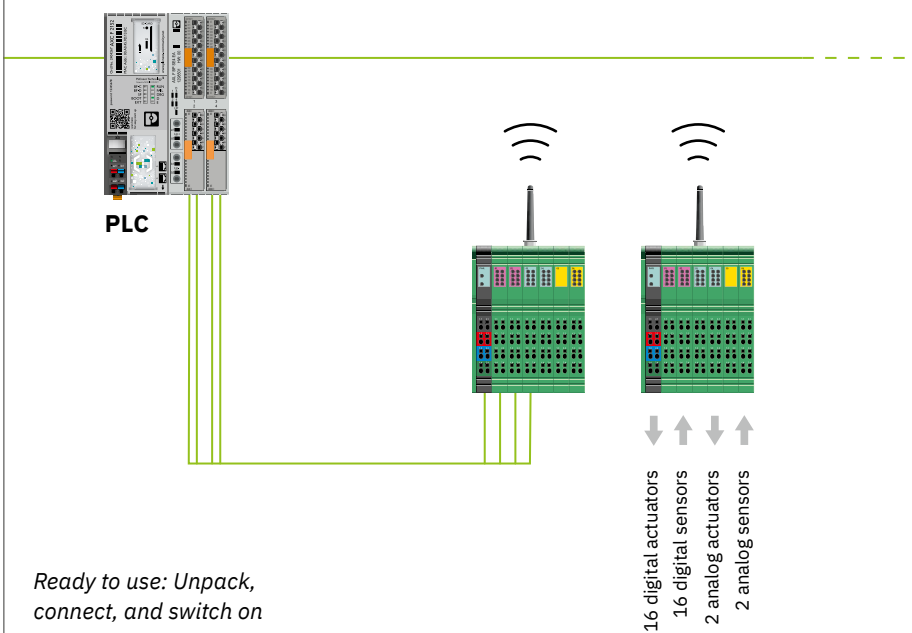
The devices are easy to commission, as they do not need to be configured and no settings are required. The wireless connection diagnostics function is simple with the LED bar graph.

Reliable transmission

Transmit your I/O signals reliably to hard-to-reach or rotating stations with Wireless MUX. Ranges of up to 200 m with omnidirectional antennas or up to 400 m with directional antennas with a free line of sight can be achieved. The wireless set is available with or without antennas.

Wireless MUX, the wireless signal cable

Connection to the controller is quick and easy using existing input and output channels.



Ready to use: Unpack, connect, and switch on

Typical areas of application

The Wireless MUX is often used where a small number of digital or analog input and output signals need to be exchanged wirelessly with a remote or movable station:

- Mobile applications
- Conveyor technology systems
- Handling/packaging machines
- Water treatment plants

Dynamic applications

Industrial Bluetooth – product overview

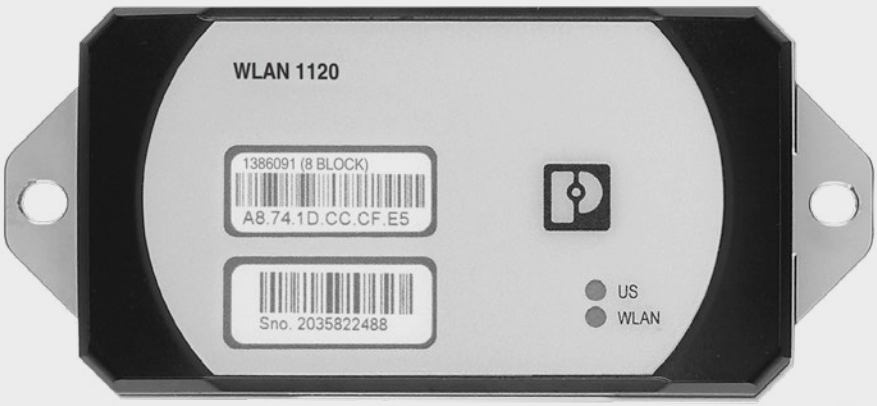
Bluetooth EPA wireless modules			
			
Description	**Bluetooth wireless module with external antenna**	**Bluetooth wireless module with internal antenna**	
Function	Access point / client / P2P		P2P / client
Wireless standard	Bluetooth 2.1 + EDR / WLAN (IEEE 802.11 a/b/g/n)		Bluetooth 2.1 + EDR
Frequency band	2.4 GHz / 5 GHz		2.4 GHz
Wireless approval	Europe, USA, Canada, additional countries in the e-shop / RED (Radio Equipment Directive) / FCC 47 CFR part 15, subpart B		
Approval	Ex:		
Number of network devices	7		1
Interfaces	Ethernet		
Transmission speed	10/100 Mbps		
Connection method	M12 connector (D-coded, female)		
Antenna connection method	RSMA (female)	(Internal)	
Degree of protection	IP65		
Ambient temperature (operation)	-40°C … +65°C		
Supply voltage	24 V DC		
Connection method	M12 connector (A-coded, male)		
Mounting	Wall mounting		
Type	FL EPA 2 RSMA	FL EPA 2	FL BT EPA 2
Item no.	1005957	1005955	1005869

Bluetooth multiplexers		
		
Description	**Wireless set without antennas**	**Wireless set with omnidirectional antenna**
Function	Multiplexer	
Wireless standard	Bluetooth	
Frequency band	2.4 GHz	
Range	≤200 m (in industrial workshops with omnidirectional antennas) ≤400 m (outdoors with directional antennas)	
Wireless approval	Europe, USA, Canada, additional countries in the e-shop	
Approval		
Delay time (typical)	≤10 ms (latency time, typical) / ≤800 ms (failsafe function in the event of wireless interruption)	
Inputs	2 (analog inputs) / 16 (digital inputs)	
Outputs	2 (analog outputs) / 16 (digital outputs)	
Antenna connection method	RSMA (female)	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C … +60°C	
Supply voltage	24 V DC	
Connection method	Inline connector	
Mounting	DIN rail mounting	
Type	ILB BT ADIO MUX	ILB BT ADIO MUX-OMNI
Item no.	2702875	2884208

WLAN

3

Wireless LAN enables reliable and high-performance wireless Ethernet communication. The robust WLAN modules are particularly suitable for use in automation networks. They are continuously being optimized in terms of reliability, real-time capability, and fast roaming. Special functions such as triggered roaming enable the controller to switch WLAN wireless cells reliably and quickly based on positions. In addition to the proven WLAN modules with Wi-Fi 4 (IEEE 802.11n) technology, the modules are now also available with the latest Wi-Fi 6 technology (IEEE 802.11ax).



WLAN 1100 and 2100 series

The WLAN 1100 series wireless modules make it easy to install a fast and stable WLAN network on your machines. The devices feature two integrated antennas and single-hole mounting, and are therefore particularly easy to mount.

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Wi-Fi 6

The new WLAN standard features increased performance, real-time capability, and efficiency.

WLAN 1000 and 2000 series

The devices in the FL WLAN 1000 range offer an IP20 solution with external antennas and connections.

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WLAN 1100 and 2100 series

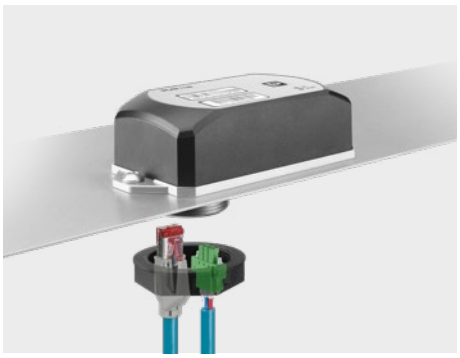
The WLAN solution for machine building

The modules of the WLAN 1100 series are inexpensive comprehensive WLAN solutions with integrated antennas and a wireless module in a single device. The wireless module is easily mounted on machines or automated guided vehicle (AGV) systems via single-hole mounting. The WLAN modules are available with both Wi-Fi 4 (IEEE 802.11n) and the new Wi-Fi 6 (IEEE 802.11ax) technology.

Your advantages

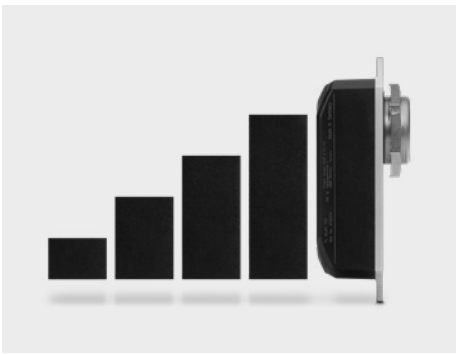
- All-in-one module concept – no extra antenna accessories required
- Easy installation on control cabinets and machines
- Integrated special antennas for optimum wireless connections
- Reliable, high-performance, and real-time-capable WLAN communication with Wi-Fi 6 technology

Overview of the WLAN 1100 and 2100 series



Easy mounting

For quick and space-saving installation, the WLAN 1100 wireless module is easily installed like an antenna by means of single-hole mounting. A 40 mm hole on the machine or the control cabinet is all that is required.



Optimized antenna technology

Two powerful, integrated antennas with MIMO technology ensure fast and stable wireless reception. This significantly increases the robustness, speed, and range of your wireless communication.

For harsh environments

The WLAN 1100 housing is extremely robust and also withstands high mechanical loads and impacts (IK08 impact resistance). Your advantage: long service life, even in harsh environments.

Wi-Fi 6 (IEEE 802.11ax)

IEEE 802.11ax is the sixth generation WLAN standard and is designated by the Wi-Fi Alliance accordingly as Wi-Fi 6. Wi-Fi 6 offers many advantages for industrial applications in particular, including significantly higher performance, and above all, greater efficiency, better real-time properties, and higher security. All WLAN modules of the WLAN 1000 series are also available with Wi-Fi 6 (IEEE 802.11ax).

More efficient and real-time-capable

With OFDMA (Orthogonal Frequency-Division Multiple Access), a new transmission technology is available that now enables more efficient and real-time-capable communication with multiple WLAN devices. Instead of communicating sequentially with the WLAN devices as was the case before, an access point can now communicate in parallel with multiple WLAN devices on the same channel at the same time.

WLAN 1000 and 2000 series

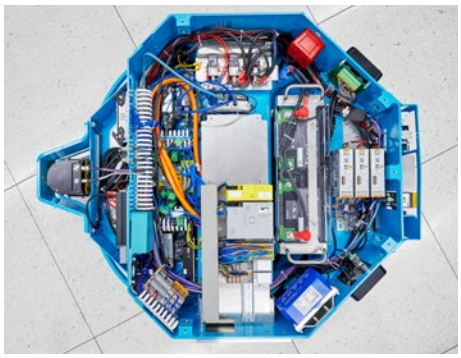
The WLAN solution for compact machine systems

The industrial wireless modules of the WLAN 1000 series have special features including their compact IP20 housing and external antenna connections. They were developed for applications that demand a high level of flexibility in selecting and positioning the antennas. These include, for example, compact machine systems, warehouse shuttles, and mobile robots. The WLAN modules are available with both Wi-Fi 4 (IEEE 802.11n) and the new Wi-Fi 6 (IEEE 802.11ax) technology.

Your advantages

- Easy creation of industrial WLAN networks
- Space-saving, flexible installation and universal mounting options with the compact design
- Fast roaming in cellular applications
- Suitable for time-critical applications such as PROFINET or SafetyBridge

Overview of the WLAN 1000 series



Space-saving installation

Also suitable for use in narrow AGVs and machines: the compact WLAN 1000 and 2000 series can be mounted on walls and sheets or simply snapped onto a DIN rail. The metal base plate ensures secure attachment and reliable heat dissipation.

External antenna connections

The WLAN 1000 and 2000 series wireless modules are equipped with two antenna connections. This means you can always choose the ideal antenna solution and have the best reception, even in difficult spaces.

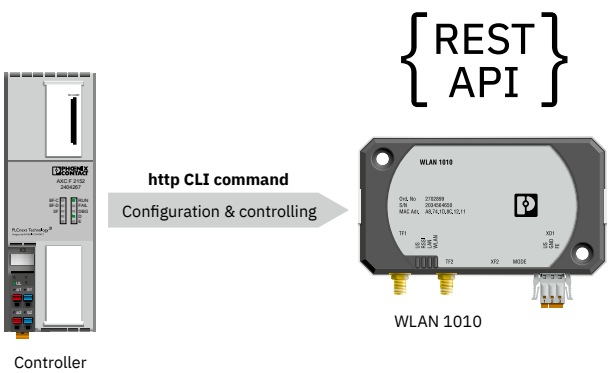
High security

All modules of the WLAN 1000, 1100, 2000, and 2100 series support the current WLAN security standards such as WPA2 (Wi-Fi 4) and WPA3 (Wi-Fi 6). In addition, the WLAN modules are continuously monitored for security vulnerabilities as part of the Phoenix Contact PSIRT process and the possible security vulnerabilities are published. PSIRT stands for Product Security Incident Response Team.

Easy integration via REST API

All modules of the WLAN 1000, 1100, 2000, and 2100 series can be easily integrated into your own applications via a REST API. REST stands for Representational State Transfer and is a user-friendly interface that communicates via HTTP(S). Configuration options and information on the status of the WLAN module can be integrated easily into your own web or control applications. This means that a controller can easily control roaming processes and automatically start up the WLAN module, for example.

Your advantage: full control for machine programming.



Managed roaming

Mobile applications such as AGVs (automated guided vehicles), AMRs (autonomous mobile robots), and track-guided transport systems such as single-rail conveyors often have location determination. Based on this location data, the controller can initiate a quick and reliable switch to another wireless cell via CLI or REST command.

Your advantage: fast, reliable, and reproducible roaming between wireless cells.

WLAN – product overview

WLAN 1100 and 2100 series						
						
Description	**WLAN wireless module with internal antennas**					
Function	Client / soft access point / repeater		Client / soft access point		Access point / client / repeater / MESH	
Wireless standard	WLAN (IEEE 802.11 a/b/g/n) / Wi-Fi 4		WLAN (IEEE 802.11 a/b/g/n/ac/ax) / Wi-Fi 6		WLAN (IEEE 802.11 a/b/g/n) / Wi-Fi 4	
Frequency band	2.4 GHz / 5 GHz					
Wireless approval	Europe, additional countries in the e-shop	USA, Canada	Europe, additional countries in the e-shop	USA, Canada	Europe, additional countries in the e-shop	USA, Canada
Approval	EAC	Ex:		Ex:	EAC	Ex:
Number of network devices	10				60	
Interfaces	Ethernet (RJ45)					
Transmission speed	10/100 Mbps		10/100/1,000 Mbps		10/100 Mbps	
Connection method	RJ45					
Antenna connection method	(Internal)					
Degree of protection	IP54		IP65 / IP66 / IP67 / IP68			
Ambient temperature (operation)	0°C … +60°C		-30°C … +60°C		-40°C … +60°C	
Supply voltage	24 V DC					
Connection method	Push-in spring connection					
Mounting	Single-hole mounting					
Type	FL WLAN 1100	FL WLAN 1101	FL WLAN 1120	FL WLAN 1121	FL WLAN 2100	FL WLAN 2101
Item no.	2702534	2702538	NEW 1386091	NEW 1386092	2702535	2702540

WLAN 1000 and 2000 series						
						
Description	**WLAN wireless module with external antenna connection**					
Function	Client / soft access point				Access point / client / MESH	
Wireless standard	WLAN (IEEE 802.11 a/b/g/n) / Wi-Fi 4		WLAN (IEEE 802.11 a/b/g/n/ac/ax) / Wi-Fi 6		WLAN (IEEE 802.11 a/b/g/n) / Wi-Fi 4	
Frequency band	2.4 GHz / 5 GHz					
Wireless approval	Europe, additional countries in the e-shop	USA, Canada	Europe, additional countries in the e-shop	USA, Canada	Europe, additional countries in the e-shop	USA, Canada
Approval		Ex:		Ex:	Ex:	Ex:
Number of network devices	10				60	
Interfaces	Ethernet (RJ45)					
Transmission speed	10/100 Mbps		10/100/1,000 Mbps		10/100 Mbps	
Connection method	RJ45					
Antenna connection method	RSMA (female)					
Degree of protection	IP20					
Ambient temperature (operation)	0°C ... +60°C		-30°C ... +60°C		-40°C ... +60°C	
Supply voltage	24 V DC					
Connection method	Push-in spring connection					
Mounting	Wall mounting, optional DIN rail adapter					
Type	FL WLAN 1010	FL WLAN 1011	FL WLAN 1020	FL WLAN 1021	FL WLAN 2010	FL WLAN 2011
Item no.	2702899	2702900	NEW 2702992	NEW 2702993	1119246	1119248

WLAN 1000 and 2000 series			
	Description	**Item no.**	**Type**
Accessories			
	DIN rail adapter for IP20 WLAN devices	1178237	FL RMS 20

LoRaWAN

4

LoRaWAN – short for Long Range Wide Area Network – is a Low Power Wide Area Network specification (LPWAN) for wireless battery-powered systems in a wireless network in accordance with IEEE 802.15.4.

The network enables seamless data exchange between end devices (nodes), sensors, gateways, and the IT infrastructure via a uniform transmission protocol. As the first open standard, LoRaWAN considers the requirements of IoT applications.

Your advantages

- Wireless network for IoT applications
- Range of up to several kilometers
- Protected data with encrypted and secure transmission
- Low energy consumption from 100 nA to 10 mA in stand-by mode
- Use of the public ISM band (in Europe: 868 MHz)

LoRaWAN luminaire control unit

The Zhaga-capable control devices (LCU) are used for managing and controlling lights and LED drivers.

LoRaWAN segment control device

The built-in devices for the classic lighting control cabinets (SCU) can replace the timer switch or the ripple control device, and therefore control entire streets.

LoRaWAN features low power consumption, a wide range, and cost-effective connectivity for devices that do not require high data rates.

LoRaWAN gateway

The basis for location-independent communication in the LoRaWAN network.

- Based on a standardized stack, the LoRaWAN gateway acts as a transparent media converter between the LoRaWAN server and the end device.
- The end-to-end encryption of the LoRaWAN gateway during transmission ensures security and protected data.
- The LoRaWAN gateway operates with an internal 4G/LTE modem, but can also be connected to the Internet via Ethernet.

LoRaWAN – product overview

Gateway	
	
Description	**LoRaWAN gateway**
Function	Wireless gateway
Wireless standard	LoRaWAN® / GSM / GPRS / EDGE / UMTS / HSPA / LTE (FDD)
Wireless approval	Europe
Interfaces	Ethernet (PoE)
Transmission speed	10/100 Mbps
Connection method	RJ45 jack, shielded and insulated (IP67)
Antenna connection method	LoRaWAN: N (female) / cellular communication: N (female)
Degree of protection	IP67
Ambient temperature (operation)	-40°C ... +60°C
Supply voltage	37 V DC ... 57 V DC (802.3af PoE or passive PoE)
Connection method	RJ45 jack, shielded and insulated (IP67)
Mounting	Mast mounting or wall mounting
Type	LPWAN GATEWAY ETH/4G 8CH EU
Item no.	1552291

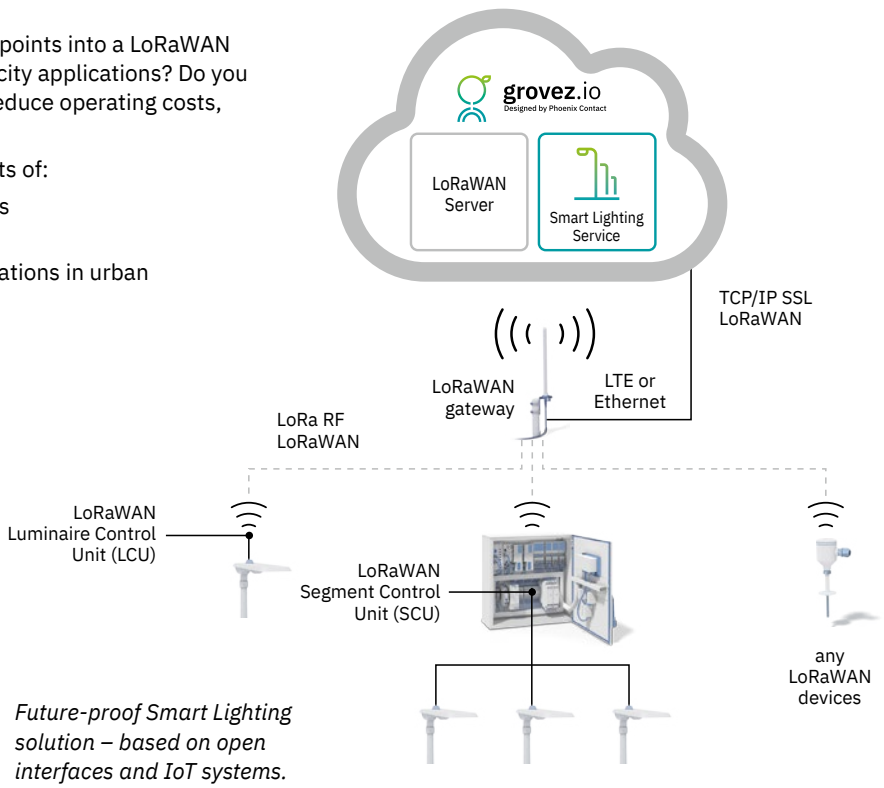
LoRaWAN-based street lighting

Would you like to integrate individual lighting points into a LoRaWAN network and combine them with other smart city applications? Do you want to improve the quality of your lighting, reduce operating costs, and optimize energy consumption?

Use our Smart Lighting solution, which consists of:

- The LoRaWAN gateways and control devices
- Comprehensive service and support
- grovez.io – the open IoT platform for applications in urban infrastructure
- The Smart Lighting Service software

Further information is available at:



Future-proof Smart Lighting solution – based on open interfaces and IoT systems.

LoRaWAN			
	Description	**Item no.**	**Type**
Accessories			
	Accessories for the LPWAN GATEWAY ETH/4G 8CH EU (item no.: 1552291), consisting of PoE+ injector, antenna cable, type N (male) connection, and 868 MHz omnidirectional antenna (LoRaWAN® EU band).	1629754	LPWAN GATEWAY ANT/CAB/POE

Light control			
			
Description	**Wireless module with internal antennas**		**Wireless module with external antenna connection**
Function	Wireless transceiver / bidirectional / light control unit, single light		Wireless transceiver / bidirectional / light control unit, segment
Wireless standard	LoRaWAN®		
Frequency band	868 MHz		
Range	Up to 15 km		
Wireless approval	Europe		
Number of network devices	= 1 (via DALI communication with internal power supply) / ≤64 (via DALI communication with external power supply)		
Antenna connection method			SMA (female)
Degree of protection	IP66		IP43
Ambient temperature (operation)	-40°C … +70°C		
Supply voltage	Typically 24 V DC ±2 V (≥1 W)		
Connection method	Zhaga Book 18 socket		Screw connection with tension sleeve
Mounting	Zhaga Book 18 connector		Wall mounting or DIN rail mounting
Type	LPWAN LCU D4I ZHAGA EU	LPWAN LCU D4I ZHAGA BULK 48 EU	LPWAN SCU DOR2 230V EU
Item no.	1639790 NEW	1639836 NEW	1427695

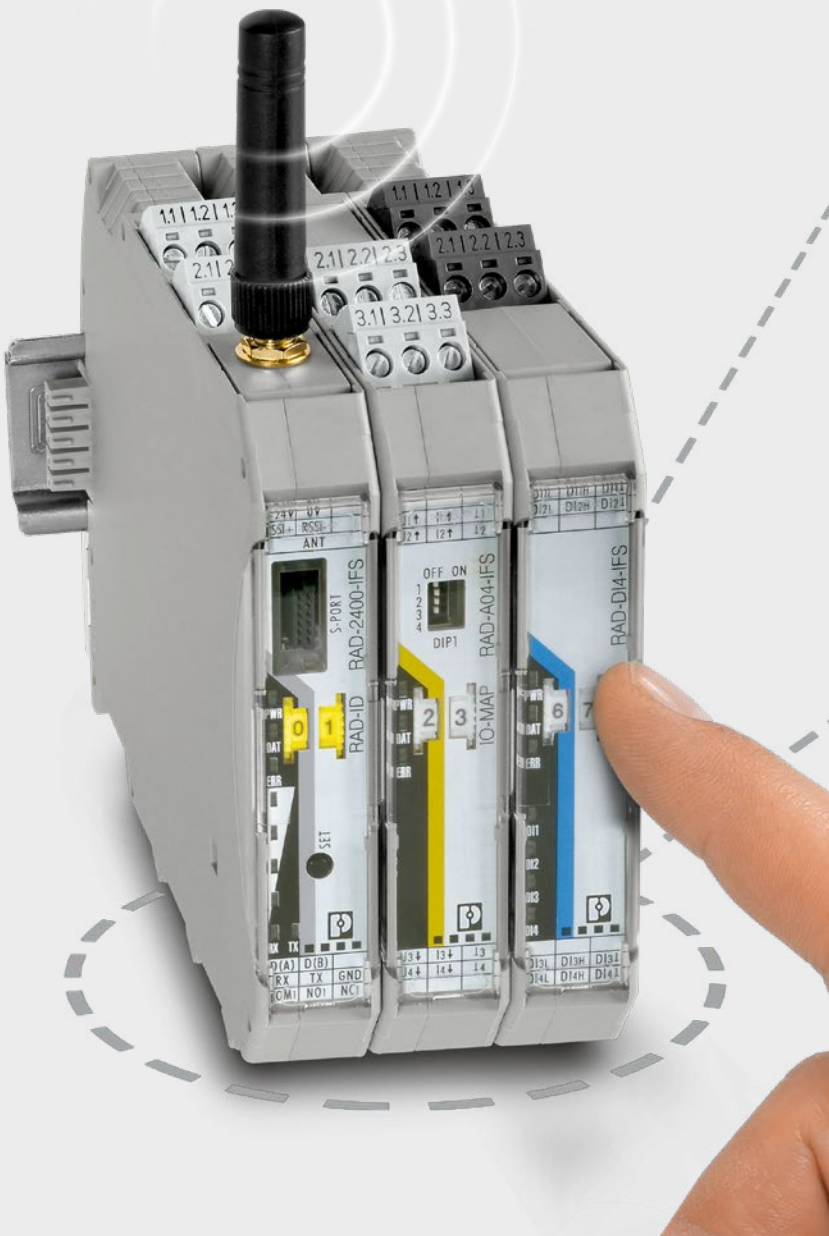
Trusted Wireless

5

Phoenix Contact specifically developed the proprietary Trusted Wireless technology for industrial use. It is particularly suitable for forwarding sensor and actuator information wirelessly as well as transmitting low to medium volumes of data in large systems. With a clear line of sight, distances ranging from several hundred meters up to several kilometers can be covered between two wireless devices. The technology is used in the Radioline industrial wireless system from Phoenix Contact.

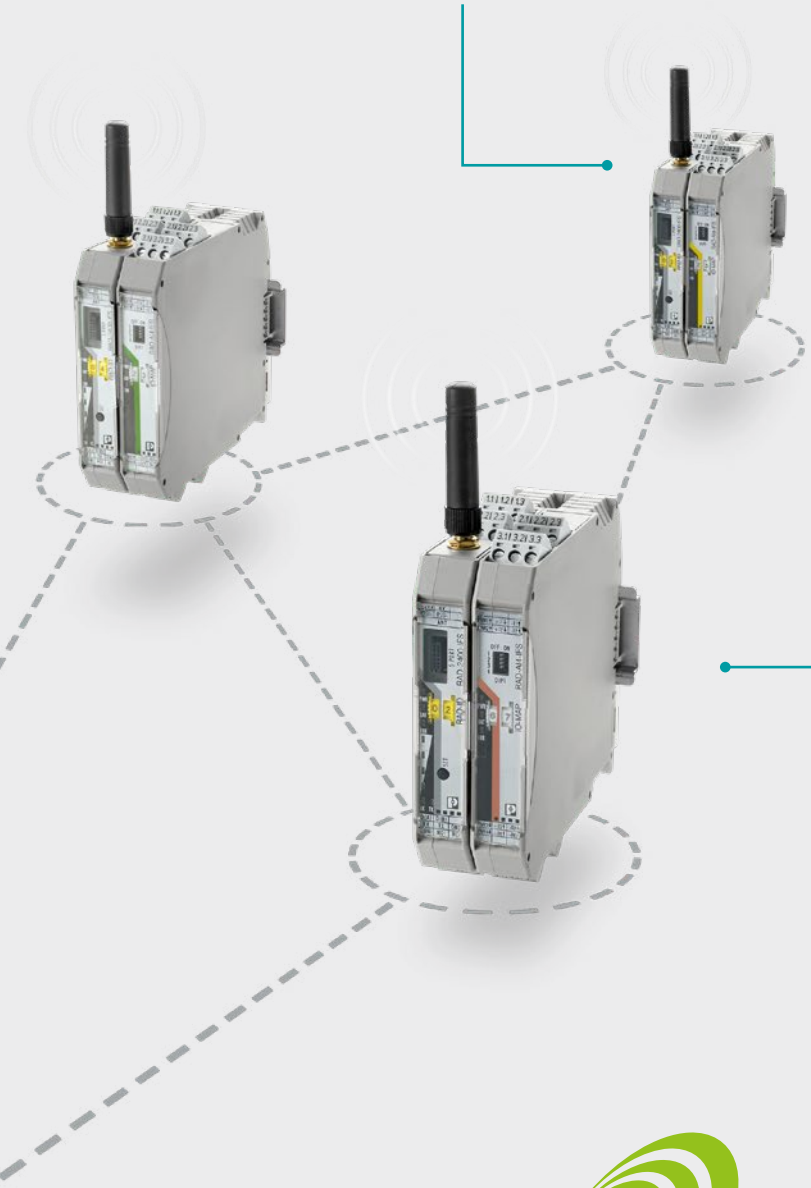
Versatile use

One device for a wide range of applications



Flexible network configuration

Point-to-point connections as well as complex mesh networks with up to 250 devices



Outdoor solutions

The Radioline Outdoor boxes can be installed outdoors to remotely transfer I/O signals or serial data quickly and easily.

Save on the number of devices

Transmit I/O signals or serial data using a single device with the integrated RS-232/RS-485 interface

TRUSTED WIRELESS™

Radioline at a glance

Distribute signals easily with I/O mapping

Radioline is the wireless system for large systems and networks. Special features include extremely easy assignment of inputs and outputs by simply turning the thumbwheel - without any programming.

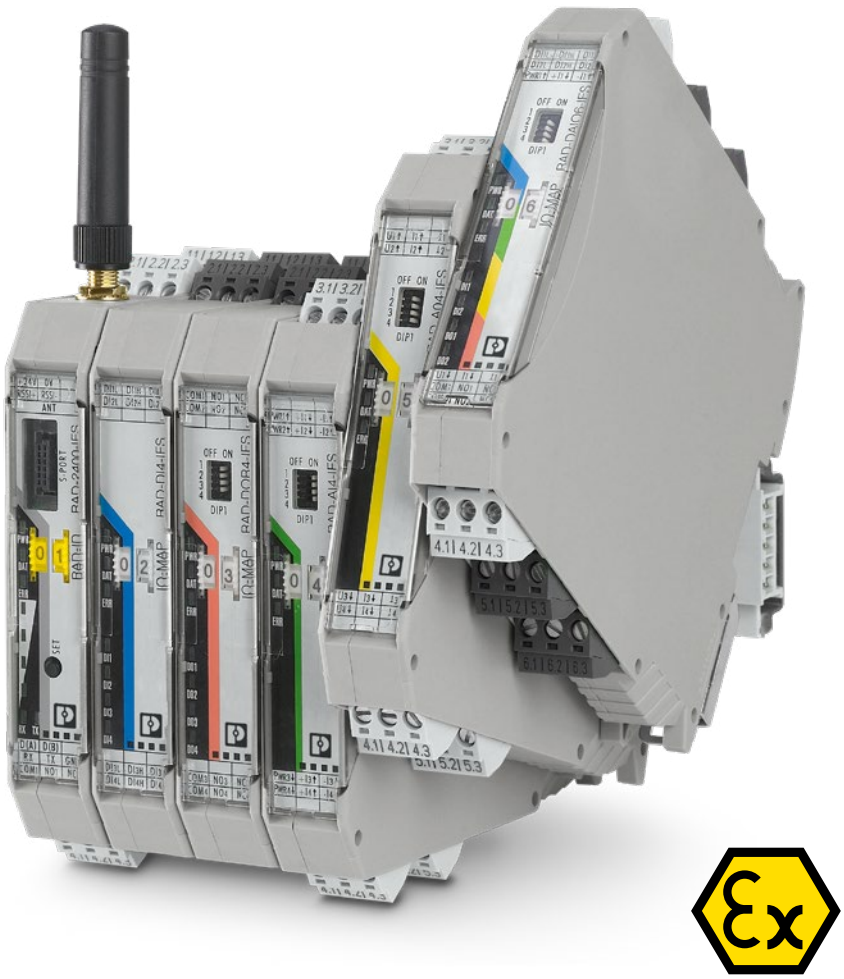
Radioline can transmit both I/O signals and serial data, and can therefore be used in a variety of applications. In addition, you can implement various network structures: from a simple point-to-point connection to complex networks.

Various extension modules are available for extending the Radioline wireless system quickly and easily. They allow the transmission of digital and analog signals as well as temperature signals.

All extension modules are certified according to 94/9/EC (ATEX) directives and can therefore be used internationally in potentially explosive areas.

Your advantages

- Easy startup without programming
- Integrated RS-232 and RS-485 interface
- Trusted Wireless 2.0 technology
- Adjustable data rates for the wireless interface
- 128-bit data encryption (AES)

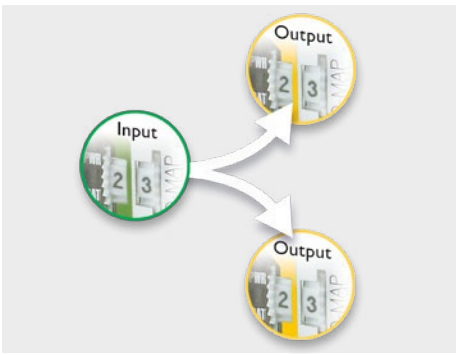


Easy installation

Create a modular wireless station in the control cabinet and extend or replace it easily during operation.

Unique addresses for front modules

Set a unique address on the front module by simply turning the thumbwheel.



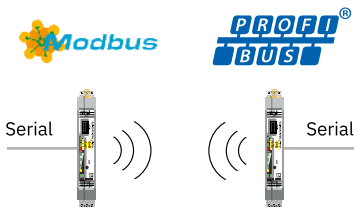
Distribute inputs and outputs

On the I/O module, the thumbwheel is used to assign the inputs and outputs by creating pairs, thereby easily distributing the I/O signals in the system (I/O mapping).

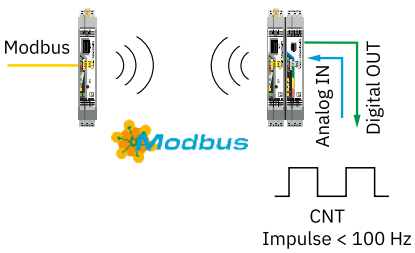
One device – a wide range of applications

Radioline can transmit both I/O signals and serial data, and can therefore be used in a variety of applications – the Trusted Wireless technology ensures reliable transmission even in harsh industrial environments, regardless of the protocol type. Function blocks are available for easy integration into control systems. Gateways and protocol converters are available for systems such as the TIA Portal.

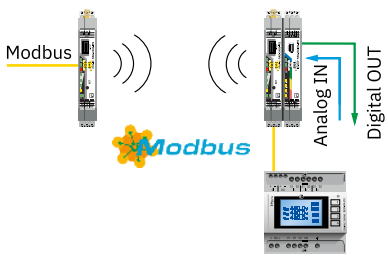
I/O data mode



Serial data mode



PLC/Modbus RTU mode



PLC/Modbus RTU dual mode

Trusted Wireless – product overview

Radioline wireless modules					
					
Description	**Wireless module for worldwide use**	**Wireless module for Japan**	**Wireless module for Europe**	**Wireless module for North and South America**	**Wireless module for Australia and New Zealand**
Function	Wireless transceiver / bidirectional / MESH				
Wireless standard	Trusted Wireless				
Frequency band	2.4 GHz		868 MHz	900 MHz	
Range	≤5 km		≤20 km	≤32 km	
	The range may be considerably above or below that stated, and depends on the environment, antenna technology, and the product used.				
Wireless approval	Europe, USA, Canada, additional countries in the e-shop	Japan	Europe, additional countries in the e-shop	America, additional countries in the e-shop	Australia / New Zealand
Approval	NOM Ex: KC-s		Ex:	NOM Ex:	ANATEL
Number of network devices	≤250 (addressing via PSI-CONF software) / ≤99 (addressing via thumbwheel)		≤99 (per wireless network)		
Interfaces	RS-232 RS-485 Configuration interface				RS-232 RS-485
Antenna connection method	RSMA (female)				
Degree of protection	IP20				
Ambient temperature (operation)	-40°C … +70°C (>55°C derating, see technical documentation)			-40°C … +70°C	
Supply voltage	24 V DC				
Connection method	Screw connection				
Mounting	DIN rail mounting				
Type	RAD-2400-IFS	RAD-2400-IFS-JP	RAD-868-IFS	RAD-900-IFS	RAD-900-IFS-AU
Item no.	2901541	2702863	2904909	2901540	2702878

Radioline extension modules					
					
Description	**I/O extension module, 4 digital inputs**	**I/O extension module, 8 digital inputs and 2 pulse inputs**	**I/O extension module, 4 NAMUR inputs**	**I/O extension module, 8 digital transistor outputs**	**I/O extension module, 4 digital relay outputs**
Function	Digital input			Digital output	
Approval	Ex:	Ex:	Ex:	Ex:	Ex:
Connection method	Screw connection				
Inputs	4 (digital input)	8 (digital input)	4 (digital input)		
Outputs				8 (transistor output, active)	4 (relay output)
Degree of protection	IP20				
Ambient temperature (operation)	-40°C ... +70°C				
Type	RAD-DI4-IFS	RAD-DI8-IFS	RAD-NAM4-IFS	RAD-DO8-IFS	RAD-DOR4-IFS
Item no.	2901535	2901539	2316275	2902811	2901536

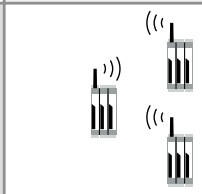
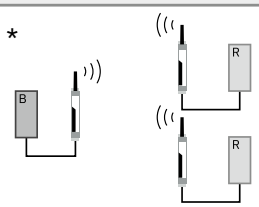
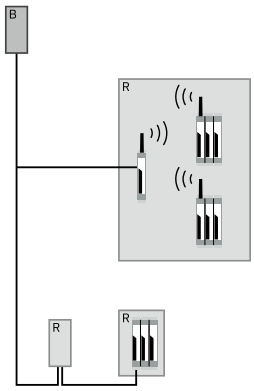
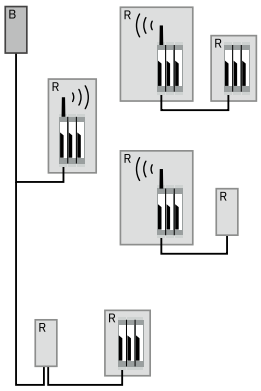
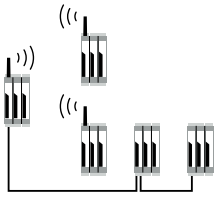
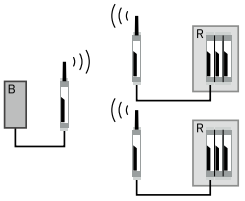
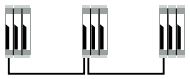
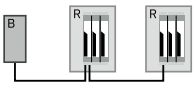
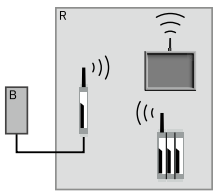
Radioline extension modules					
					
Description	**I/O extension module, 4 analog current inputs**	**I/O extension module, 4 analog voltage inputs**	**I/O extension module, 4 temperature inputs**	**I/O extension module, 4 analog current/voltage outputs**	**I/O extension module, 2 digital inputs/outputs and 1 analog input/output**
Function	Analog input		Temperature input	Analog output	Digital input / digital output / analog input / analog output
Approval	Ex: KC-s	Ex:	Ex: KC-s	Ex: KC-s	Ex:
Connection method	Screw connection				
Inputs	4 (analog input)	4 (voltage input)	4 (Pt 100 input)		1 (analog input) / 2 (digital input)
Outputs				4 (analog outputs)	1 (analog output) / 2 (relay output)
Degree of protection	IP20				
Ambient temperature (operation)	-40°C ... +70°C				
Type	RAD-AI4-IFS	RAD-AI4-U-IFS	RAD-PT100-4-IFS	RAD-AO4-IFS	RAD-DAIO6-IFS
Item no.	2901537	2702290	2904035	2901538	2901533

Trusted Wireless – product overview

Radioline outdoor solutions		
		
Description	**Configurable outdoor box for worldwide use, with surge protection**	**Outdoor box for use in America, with antenna**
Function	Wireless transceiver / bidirectional / MESH	
Wireless standard	Trusted Wireless	Trusted Wireless
Frequency band	2.4 GHz / 868 MHz / 900 MHz	900 MHz
Range	Depending on the selected wireless module	±32 km (the range may be considerably above or below that stated, and depends on the environment, antenna technology, and the product used)
Inputs	Depending on the selected I/O extension module	1 (analog input) / 2 (digital input)
Outputs	Depending on the selected I/O extension module	1 (analog output) / 2 (relay output)
Antenna connection method	N (female)	N (female)
Degree of protection	IP66	NEMA 4
Ambient temperature (operation)	-25°C … +55°C (>48°C derating)	-40°C … +70°C (DC), -40°C … +65°C (AC)
Supply voltage	100 V AC … 240 V AC	10.8 V DC … 30.5 V DC / 100 V AC … 240 V AC
Type	RAD-RUGGED-BOX-CONF	RAD-900-DAIO6
Item no.	1091638	2702877

Radioline bus modules	
	
Description	**RS-485 bus module, can be used as Modbus RTU bus coupler or combined with Radioline wireless system**
Function	Communication module
Approval	
Interfaces	RS-485 Configuration interface
Connection method	Screw connection
Degree of protection	IP20
Ambient temperature (operation)	-40°C … +70°C
Mounting	DIN rail: 35 mm
Type	RAD-RS485-IFS
Item no.	2702184

Possible applications with the Radioline system

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

Explanation

B Base-Station (Modbus RTU Client)

R Remote-Station (Modbus RTU Server)

Radioline wireless module

Radioline wireless station with I/Os

Radioline RS-485 station with I/Os

Outdoor box

*In addition to Modbus, more serial protocols are supported

Cellular communication

6

In industrial applications, system parts are often spread over wide areas, and may even be mobile. Cellular communication is a globally available solution for wireless remote communication – whether for generating simple alarms in the field, for temporary access to a machine for remote maintenance, or for where process data must also be transmitted continuously to the control system.

Industrial cellular routers

The cellular routers of the TC ROUTER product family from Phoenix Contact enable robust data connections over 4G or 5G cellular networks. This allows you to establish a mobile broadband connection even in demanding environments where a wired Internet connection is not available.

› More information starting on page 40

SMS relays

Monitor analog and digital values easily and securely via the cellular network. The TC MOBILE I/O X200 SMS relay keeps you up to date on the status or error state of your system, even in the field. You can send text messages via SMS or email and set switching outputs, for example, to disconnect machines.

› More information starting on page 42

Industrial cellular routers

For worldwide remote access

The 4G and 5G cellular routers enable high-performance remote connections to industrial Ethernet networks. This means that sensitive data from machines can be transmitted continuously via broadband connection via the Internet or via text messages as required. The integrated firewall and the support of IPsec and OpenVPN tunnels protect against unauthorized access.

Your advantages

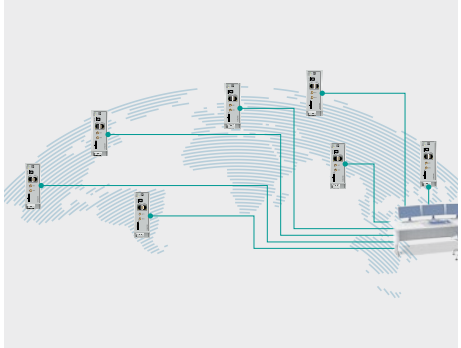
- Digital inputs and SMS commands for triggering events such as energy-saving mode
- Digital outputs for controlling the application
- Function as an SMS gateway or for sending individual SMS or emails
- Serial RS-232/RS-485 interface in TC ROUTER 4202T-4G EU WLAN
- Uplink via Ethernet/WLAN and provider fallback for maximum flexibility and failsafe performance of the TC ROUTER 4000 range

Overview of industrial cellular routers

Integrated WLAN interface

Thanks to the integrated WLAN interface, the TC ROUTER 4102T-4G EU WLAN can act as an access point and easily integrate surrounding devices into the network via WLAN. Therefore, an additional WLAN access point on the DIN rail is no longer necessary.

Moreover, during maintenance, the WLAN network can be used separately from the application to access the Internet. You are therefore no longer dependent on a cellular solution when using a laptop or smartphone.



Device management and mass startup

The TC ROUTER Online Manager (TOM) enables automated regular updates for all devices in the TC Router family from Phoenix Contact.

Security updates, the latest firmware versions, and configuration changes can be transmitted to all devices worldwide as a mass rollout in defined time windows. TOM also documents the online status of all TC ROUTERS over several years.

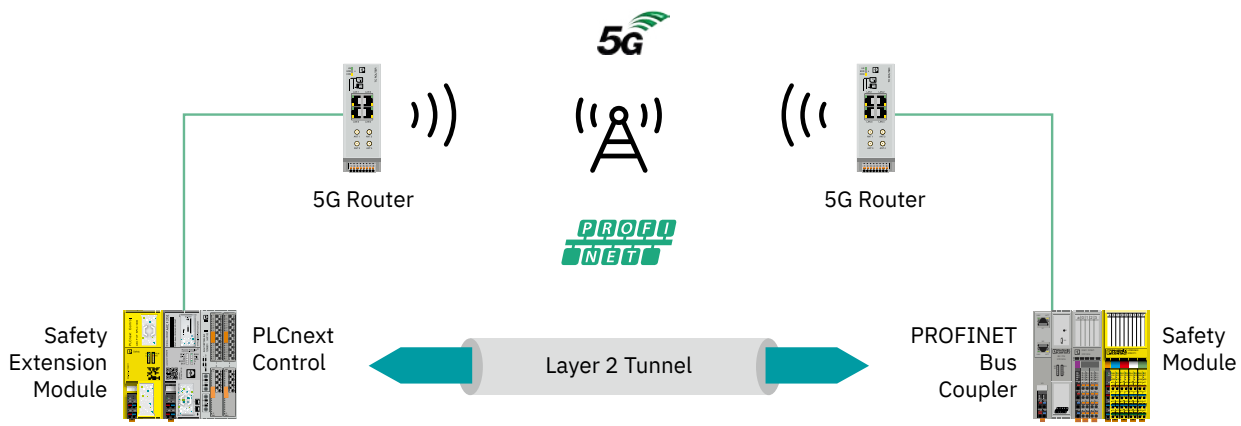
Remote monitoring via the mGuard Secure Cloud

The mGuard Secure Cloud is a complete turnkey remote maintenance solution that connects service personnel and machines securely, reliably, and without IT knowledge via the Internet. This reduces costly and time-consuming on-site service actions significantly. This provides operators and machine building companies with a cost-effective alternative for implementing intelligent service concepts.

Fieldbus communication via private 5G cellular network

The TC ROUTER 5004T-5G EU is the first member of the TC ROUTER family to feature a 5G cellular interface. It is equipped with a powerful processor platform and four Gigabit Ethernet ports to support the high data rates of 5G (5G NR) and 4G (LTE Advanced Pro). The 5G router can be used in public and private networks (SA/NSA) alike.

The 5G router also offers the option of establishing a Layer 2 tunnel. This can be used to transmit fieldbuses such as PROFIsafe in a campus network.



PROFIsafe via 5G via Layer 2 tunnel

SMS relays

Use SMS relays to prevent failures

Monitor analog and digital values easily and securely via the cellular network and switch relays remotely. The TC Mobile I/O transmits your data via SMS, email, or app (https, SMS). Thanks to the large voltage range and the various inputs, the signaling system can be used in a wide range of applications.

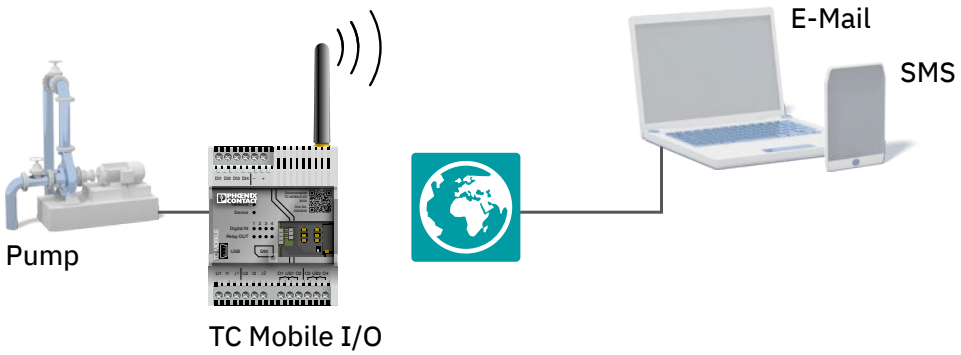
Your advantages

- Suitable for buildings and harsh industrial environments
- Monitoring of connected sensors (0/4 ... 20 mA)
- Monitoring of voltages up to 60 V
- Relay switching via cellular communication
- SMS alert in the event of power failure

Monitoring sensors via cellular communication

With the TC Mobile I/O product family, you can monitor digital signals as well as analog current and voltage levels and switch relays remotely. Communication is via SMS, email, or app (https, SMS).

Potential areas of application include machine, building, and system monitoring, pumps, wastewater treatment plants, water supply, level monitoring, lighting control systems, remote switching devices, street lighting, elevators, gates, alarm and building services, air conditioning and ventilation technology, battery monitoring up to 60 V, and railway applications in accordance with EN 50121-4.

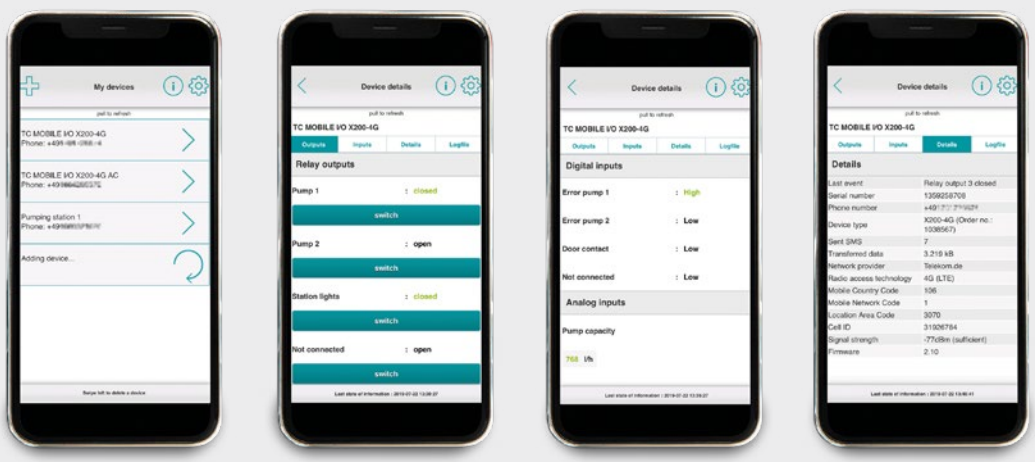


Alerts with TC Mobile I/O

Free app for the TC MOBILE I/O X200 signaling system

The TC MOBILE I/O X200 also communicates with you via smartphone app (iOS and Android). The app allows you to switch your outputs conveniently and easily check the status of the device at any time.

The TC MOBILE I/O app makes it even easier to use the device and saves you having to write a text message. You will receive the alarm as usual via SMS and email. This ensures high-level accessibility in the field.



Easy communication via smartphone app

Cellular communication – product overview

Cellular router					
					
Description	**Routers**				
Function	Cellular router / VPN gateway to mGuard Secure Cloud			Cellular router / VPN gateway to mGuard Secure Cloud / WLAN access point	
Wireless standard	5G	4G (LTE)		4G (LTE) / WLAN in accordance with IEEE 802.11 a/b/g/n	
Fallback	Fallback to 4G (LTE Advanced Pro), 3G (HSPA+)	Fallback to 3G (HSPA+), 2G (EDGE)	Fallback to 3G (HSPA+), 2G (EDGE) / Fallback of the WAN interface to Ethernet	Fallback to 3G (HSPA+), 2G (EDGE) / Fallback of the WAN interface to Ethernet, WLAN	
Cellular communication transmission speed	2.1 Gbps (5G NR SA, DL) / 900 Mbps (5G NR SA, UL) / 2.5 Gbps (5G NR NSA, DL)/ 650 Mbps (5G NR NSA, UL) / 1 Gbps (LTE, DL) / 200 Mbps (LTE, UL)	≤150 Mbps (LTE, DL) / ≤50 Mbps (LTE, UL)			
Wireless approval	Europe	Global	Europe		
Number of network devices				10	
Interfaces	Ethernet				
Transmission speed	10/100/1000 Mbps, auto negotiation	10/100 Mbps, auto negotiation			
Number of Ethernet ports	4	2			
Connection method	RJ45 jack, shielded				
Firewall rules	Stateful inspection firewall				
Number of VPN tunnels	≤3 (IPsec or OpenVPN)		IPsec or OpenVPN, no limit, limited by system resources and available bandwidth		
Additional interfaces					RS-232 RS-485
Inputs	4 (digital input)	2 (digital input)	4 (digital input)		2 (digital input)
Outputs	2 (digital output)	1 (digital output)	2 (digital output)		1 (digital output)
Antenna connection method	Cellular communication: 4 x SMA (female)	Cellular communication: 2 x SMA (female)		Cellular communication: 2 x SMA (female) / WLAN: 2 x RSMA (female)	
Degree of protection	IP20				
Ambient temperature (operation)	-40°C ... +70°C				
Supply voltage	10 V DC ... 30 V DC				
Connection method	Push-in spring connection				
Mounting	DIN rail mounting				
Type	TC ROUTER 5004T-5G EU	TC ROUTER 3002T-4G GL	TC ROUTER 4002T-4G EU	TC ROUTER 4102T-4G EU WLAN	TC ROUTER 4202T-4G EU WLAN
	NEW 1439475	NEW 1632697	1234352	1234353	1234354

SMS relays		
		
Description	**SMS relays**	
Function	SMS relay / signaling module	
Wireless standard	4G (LTE) / 2G (GSM)	
Wireless approval	Europe	
Interfaces	USB 2.0 (for configuration and diagnostics only)	
Inputs	4 (digital input) / 2 (analog input)	4 (digital input)
Outputs	4 (relay output)	
Antenna connection method	SMA (female)	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... +70°C (SMS mode only, note the derating information in the technical documentation for data connection)	
Supply voltage	10 V DC ... 60 V DC	93 V AC ... 250 V AC (47.5 Hz ... 63 Hz)
Mounting	DIN rail mounting / wall mounting	
Type	TC MOBILE I/O X200-4G	TC MOBILE I/O X200-4G AC
Item no.	1038567	1038568

Accessories – product overview

Antennas			
	Description	**Item no.**	**Type**
Antenna, 868 MHz / 900 MHz			
	Omnidirectional antenna, 868 MHz / 900 MHz, gain: 2 dBi, polarization: linear, opening angle: h/v 360°/50°, degree of protection: IP66, connection: N (female), for control cabinet mounting (optional wall mounting)	2904802	RAD-900-ANT-OMNI-2-N
	Omnidirectional antenna, 900 MHz, gain: 2 dBi, polarization: linear, degree of protection: IP65, connection: RSMA (male), incl. 1.8 m connecting cable and mounting bracket for wall mounting	2904801	RAD-900-ANT-OMNI-2-2-RSMA
	Omnidirectional antenna with protection against vandalism for control cabinet mounting, frequency band: 868 MHz, gain: 2.5 dBi, degree of protection: IP67, impact-resistant: IK08, connection: N (female)	1090616	ANT-OMNI-VAN-868-01
	Omnidirectional antenna for wall or mast mounting, 868 MHz, gain: 4 dBi, degree of protection: IP67, saltwater-resistant, connection: N (female), including mounting bracket and mast clamps, ATEX and IECEx approvals	2702136	ANT-OMNI-868-01
	Omnidirectional antenna, 900 MHz, gain: 5 dB, connection: N female, including mounting hardware	1361276	ANT-OMNI-900-5
	Directional antenna for mast or wall mounting, frequency band: 868 MHz, gain: 3.5 dBi, circular polarized, degree of protection: IP67, impact-resistant: IK06, saltwater-resistant, connection: N (female), including mounting bracket and mast clamps, ATEX and IECEx approvals	2702137	ANT-DIR-868-01
	Directional antenna, 868 MHz/900 MHz, gain: 8.5 dBi, polarization: linear, opening angle: h/v 100°/62°, degree of protection: IP65, connection: N (female), including mounting bracket and mast clamps	2867814	RAD-ISM-900-ANT-YAGI-6.5-N
	Directional antenna, 868 MHz/900 MHz, gain: 12 dBi, polarization: linear, opening angle: h/v 56°/46°, degree of protection: IP65, connection: N (female), including mounting bracket and mast clamps	5606614	RAD-ISM-900-ANT-YAGI-10-N
Antenna, 2.4 GHz			
	Omnidirectional antenna for wall mounting, frequency band: 2.4 GHz, gain: 2 dBi, degree of protection: IP65, connection: RSMA (male), incl. 1.5 m connecting cable, mounting bracket, and mounting material	2701362	RAD-ISM-2400-ANT-OMNI-2-1-RSMA
	Omnidirectional antenna with protection against vandalism for control cabinet mounting, frequency band: 2.4 GHz, gain: 3 dBi, degree of protection: IP55, impact-resistant: IK08, connection: RSMA (male), incl. 1.5 m connecting cable	2701358	RAD-ISM-2400-ANT-VAN-3-0-RSMA
	Omnidirectional antenna for wall or mast mounting, 2.4 GHz, gain: 6 dBi, degree of protection: IP67, saltwater-resistant, impact- and vibration-resistant, connection: N (female), incl. mounting bracket and mast clamps, ATEX and IECEx approval	2885919	RAD-ISM-2400-ANT-OMNI-6-0
Antenna, 5 GHz			
	Omnidirectional antenna for wall or mast mounting, 5 GHz, gain: 5 dBi, degree of protection: IP64, saltwater-resistant, impact- and vibration-resistant, connection: N (female), incl. mounting bracket and mast clamps	2701347	ANT-OMNI-5900-01

Antennas

	Description	Item no.	Type
Antenna, 2.4 GHz / 5 GHz			
	Omnidirectional antenna for control cabinet mounting, frequency band: 2.4 GHz / 5 GHz, gain: 2.5 dBi / 5 dBi, degree of protection: IP68, connection: N (male)	2701408	ANT-OMNI-2459-02
	Directional antenna for wall or mast mounting, 2.4 GHz / 5 GHz, gain: 9 dBi, degree of protection: IP67, impact-resistant: IK06, saltwater-resistant, connection: N (female), incl. mounting bracket and mast clamps, ATEX and IECEx approval	2701186	ANT-DIR-2459-01
Antenna, 2.4 GHz / 5 GHz / 6 GHz			
	Multiband omnidirectional antenna for freely mobile applications, compact design, frequency band: 2.4 GHz / 5 GHz / 6 GHz, gain: 2.0 dBi / 2.5 dBi / 3.0 dBi, degree of protection: IP68/IP69K, impact- and vibration-resistant, connection: N (male)	1284780	ANT-OMNI-2459-04
	Multiband omnidirectional antenna with protection against vandalism for control cabinet mounting, frequency band: 2.4 GHz/5 GHz/6 GHz, gain: 6 dBi/8 dBi/8 dBi, degree of protection: IP68, impact-resistant: IK08, resistant to cleaning agents, impact- and vibration-resistant, connection: N (female)	2702898	RAD-ISM-2459-ANT-FOOD-6-0-N
Multiband antenna			
	Multiband omnidirectional antenna for installation in plastic control cabinets not visible from the outside, frequency band: 0.6 GHz ... 7.1 GHz, gain: 1 dBi .... 2 dBi, connection: SMA (male), antenna connector with 90° articulated joint	1565400	ANT-OMNI-0671-03
	Multiband omnidirectional antenna for wall or mast mounting, 0.6 GHz ... 7.1 GHz, gain: 1 dBi ... 3 dBi, degree of protection: IP67, saltwater-resistant, connection: N (female), including mounting bracket and mast clamps	1396316	ANT-OMNI-0671-01
	Multiband omnidirectional antenna with protection against vandalism for control cabinet mounting, frequency band: 0.6 GHz ... 7.1 GHz, gain: 2 dBi ... 4 dBi, degree of protection: IP67, impact-resistant: IK10, saltwater-resistant, connection: N (female)	1396318	ANT-OMNI-0671-02

Accessories – product overview

Antenna cable				
	Length	**Frequency range**	**Item no.**	**Type**
Antenna cable, N (male) -> N (male)				
	0.5 m	0.1 GHz ... 7.25 GHz	1340122	NBC-COX-CNM/0.5-M/COX-CNM
	3.0 m		1340123	NBC-COX-CNM/3.0-L/COX-CNM
	5.0 m		1340124	NBC-COX-CNM/5.0-L/COX-CNM
	10.0 m		1340125	NBC-COX-CNM/10.0-L/COX-CNM
	15.0 m		1340126	NBC-COX-CNM/15.0-L/COX-CNM
	30.0 m		1340127	NBC-COX-CNM/30.0-L/COX-CNM
Antenna cable, SMA (male) -> N (male)				
	0.5 m	0.1 GHz ... 7.25 GHz	1340139	NBC-COX-CNM/0.5-S/COX-CKM
	1.0 m		1340143	NBC-COX-CNM/1.0-M/COX-CKM
	3.0 m		1340144	NBC-COX-CNM/3.0-M/COX-CKM
	5.0 m		1340147	NBC-COX-CNM/5.0-M/COX-CKM
Antenna cable, RSMA (male) -> N (female)				
	0.5 m	0.3 GHz ... 6 GHz	2701402	RAD-PIG-EF316-N-RSMA
Antenna cable, RSMA (male) -> N (male)				
	0.5 m	0.3 GHz ... 6 GHz	2903263	RAD-PIG-RSMA/N-0.5
	1.0 m		2903264	RAD-PIG-RSMA/N-1
	2.0 m		2903265	RAD-PIG-RSMA/N-2
	3.0 m		2903266	RAD-PIG-RSMA/N-3
	5.0 m		2702140	RAD-PIG-RSMA/N-5

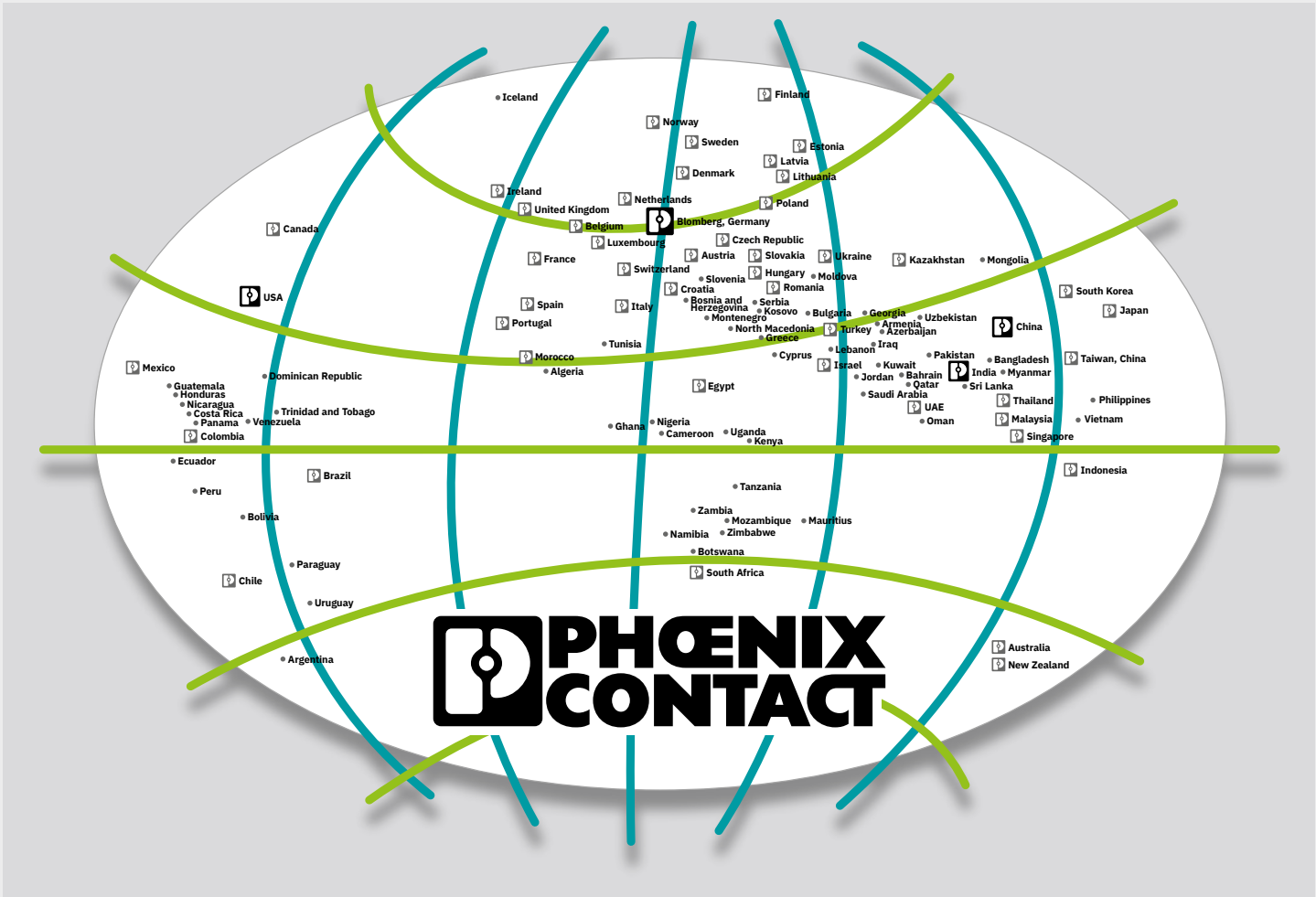
Accessories

	Description	Item no.	Type
Adapters and antenna splitters			
	Antenna adapter for control cabinet feed-through, frequency range: 0.3 GHz ... 6 GHz, degree of protection: IP65, connection: 2x N (female)	2867843	RAD-ADP-N/F-N/F
	Antenna adapter, frequency range: 0.3 GHz ... 6 GHz, Connection: RSMA (male) -> RSMA (female), angled 90°	2904790	RAD-ADP-RSMA/M-RSMA/F-90
	Antenna splitter, frequency range: 0.3 GHz ... 6 GHz, degree of protection: IP65, connection: 3 x N (female), suitable connection cable for the antenna connection (item no. 2700677)	2702293	RAD-SPL-2-N/N
	Accessories for FL WLAN 1100 series: Optional cable feed-through for sealing (IP67) the FL WLAN 110x connection (IP20), if the device is not directly integrated onto the closed housing. Not needed when mounting on a control cabinet, etc.	2702544	FL M32 ADAPTER
	DIN rail adapter for IP20 WLAN devices	1178237	FL RMS 20
	Mounting material for wall mounting the OMNI omnidirectional antenna with protection against vandalism	2885870	RAD-ANT-VAN-MKT
Surge protection			
	Intermediate plug with surge protection for coaxial signal interfaces. Connection: N connector, socket/socket	2803166	CN-UB-70DC-6-BB

Accessories – product overview

Accessories			
	Description	**Item no.**	**Type**
Leaky cables (LCX)			
	The 2.4 GHz leaky cable is a “wireless cable” that acts as an antenna and emits along its entire length. The range is limited. Track-guided systems, for example, can therefore be supplied as required, even under difficult conditions.	2702553	FL LCX CABLE 24 E
	The 5 GHz leaky cable is a “wireless cable” that acts as an antenna and emits along its entire length. The range is limited. Track-guided systems, for example, can therefore be supplied as required, even under difficult conditions.	2702860	FL LCX CABLE 5 E
	N (female) connector for leaky cables 2702553 and 2702860.	2702518	FL LCX CON-N-F E
	Termination resistor 50 Ω, N (female) connection method, for terminating the open end of a leaky wave cable.	2884978	FL LCX 50-OHM
	Termination resistor 50 Ω, RSMA (male) connection method, for the unused antenna connection of a WLAN device, for example in leaky cable applications.	2702702	FL LCX 50-OHM-RSMA
	Special dressing tool for precise mounting of the connectors on the leaky cable.	2702519	FL LCX TOOL E
	Mounting clamp for attaching the FL LCX CABLE METER leaky cable.	2702520	FL LCX CLAMP E
Antenna impeding device for the Ex area			
	Antenna barrier for control cabinet feed-through, type of protection: Ex i, degree of protection: IP65, barrier installation: zone 2 / 22, antenna installation: in dust and gas Ex area, frequency range: 0.3 GHz ... 6 GHz, connection: 2 x N (female), ATEX, IECEx approval	2702198	BAR-ANT-N-N-EX
Sealing tape			
	Vulcanizing sealing tape for external protection of adapters, cable connections, etc., against the effects of weather; roll length: 3 m	2903182	RAD-TAPE-SV-19-3
Control box set			
	Control box for robust construction of wireless systems for industrial applications, IP66, 25 x 18 x 13 cm, polycarbonate material, gray, drilled, incl. DIN rail, plugs, and screw connections, without devices	2701204	FL RUGGED BOX

Radioline accessories			
	Description	**Item no.**	**Type**
Configuration memory, memory stick, and USB cable			
	Radioline - configuration stick for easy and safe network addressing for the 2.4 GHz wireless module (RAD-2400-...), unique network ID, RF band 3	2902814	RAD-CONF-RF3
	Radioline - configuration stick for easy and safe network addressing for the 2.4 GHz wireless module (RAD-2400-...), unique network ID, RF band 5	2902815	RAD-CONF-RF5
	Radioline - configuration stick for easy and safe network addressing for the 2.4 GHz wireless module (RAD-2400-...), unique network ID, RF band 7	2902816	RAD-CONF-RF7
	Radioline - configuration stick for easy and safe network addressing for the 868 MHz wireless module (RAD-868-...), unique network ID, RF band 1	2702197	RAD-868-CONF-RF1
	Radioline - configuration stick for easy and safe network addressing for the 900 MHz wireless module (RAD-900-...), unique network ID, RF band 1	2702122	RAD-900-CONF-RF1
	Radioline - memory stick for saving custom configuration data	2902828	RAD-MEMORY
	Radioline - USB data cable for communication between the PC and Radioline devices, power supply for diagnostics and configuration via the USB port of the PC, cable length: 2 m	2903447	RAD-CABLE-USB



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Our wide range of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. This especially applies to the target markets of energy, infrastructure, industry, and mobility.

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