Industrial Wireless

Wireless from the sensor to the network
Our Industrial Wireless products for your automation infrastructure

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 allow you to easily and efficiently negotiate the many challenges faced in an industrial communication infrastructure.

Your advantages

✓ Flexibility, easy installation, and cost savings compared to cable-based installations
✓ Bypassing of obstacles
✓ Alternative to slip rings that are prone to wear, and to cable lines on mobile devices
✓ Reduced maintenance costs
✓ Monitoring and control of remote stations without cable access
Find out more with the web code

For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

**Web code:** #1234 (example)

Or use the direct link: phoenixcontact.net/webcode/#1234
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. Despite the impacts described, the wireless systems work without interference.

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<th>Wireless technologies</th>
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<td><strong>Bluetooth Low Energy</strong></td>
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<td><strong>Range with line of sight</strong></td>
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<td>• Up to 10 mm</td>
<td>• Up to 200 m</td>
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<td><strong>Description</strong></td>
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<tr>
<td>NearFi is a contactless real-time transmission technology for transmitting power and data across an air gap of up to 10 mm.</td>
<td>Bluetooth Low Energy enables energy-saving wireless communication with battery-operated sensors.</td>
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<td><strong>Fields of application</strong></td>
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</table>
| • Wireless real-time Ethernet data and power | • Wireless I/O data and measured values | • Wireless I/O: Analog and digital I/O signals  
  • Wireless Ethernet: Ethernet data |
|  |
| **Applications** |  |
| • Robots  
  • Material transport systems  
  • Automated guided vehicle systems  
  • Handling/lightweight robots  
  • Cleanroom systems | • Integration of Bluetooth Low Energy sensor technology  
  • Battery-operated sensor technology | • Replacement of cables for wireless PROFINET and PROFIsafe communication  
  • Replacement of signal lines |
|  |
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### Industrial 5G – wireless networking for efficient processes

In the future, Industrial 5G will enable reliable, wireless networking with high data speeds, high numbers of participants, and extremely low latency times. 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. 5G, the 5th generation of wireless broadband technology, allows users to establish reliable connectivity, which in turn allows flexible, autonomous, and efficient processes from production to logistics.

![Industrial 5G – opportunities and capabilities of a new technology](image)

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<th>WLAN AX</th>
<th>TRUSTED WIRELESS™</th>
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<td>WiFi 6</td>
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</table>

- Up to 1 km
- Up to 32 km (900 MHz)
- Up to 20 km (868 MHz)
- Up to 5 km (2.4 GHz)

WLAN is a wireless standard in accordance with IEEE 802.11 for establishing wireless local area networks. 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.

- Wireless Ethernet: Ethernet communication with moving and mobile devices
- Wireless I/O: Analog and digital I/O signals (modular extension possible)
- Wireless Serial: Serial RS-232 and RS-485 data
- Wireless I/O: Analog and digital I/O signals
- Wireless Ethernet: Ethernet data

- Autonomous mobile robots and Automated Guided Vehicles (AGVs)
- PROFINET and PROFIsafe communication
- Connection of remote pump stations
- Rotating parts (e.g., in scraper bridges)
- Level monitoring on reservoirs
- Pipeline monitoring
- Remote access to machines and systems
- Monitoring signal states

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![Web code: #2719](image)
Wireless I/O

TC Mobile I/O for monitoring sensors via cellular communication

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, e-mail, or app (https, SMS). The broad voltage range and the various inputs means that the signaling system can be used in a wide range of applications.

Your advantages

- Future-proof with 4G cellular technology (LTE)
- 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
Product overview TC Mobile I/O

Cellular communication module, DC
TC MOBILE I/O X200-4G
Order No. 1038567

4G (LTE) SMS relay and remote signaling system, European version, communication via SMS or cellular communication data connection (e-mail transmission, app)
- 4 digital inputs
- 4 relay outputs
- 2 analog inputs (voltage or current)
- Voltage range: 10 V DC ... 60 V DC
- Compact design (4TE, DIN 43880)
- Temperature range: -25°C ... 70°C
- Easy configuration with conventional USB cable and web browser

Cellular communication module, AC
TC MOBILE I/O X200-4G AC
Order No. 1038568

4G (LTE) SMS relay and remote signaling system, European version, communication via SMS or cellular communication data connection (e-mail transmission, app)
- 4 digital inputs
- 4 relay outputs
- Voltage range: 93 V AC ... 250 V DC
- Compact design (4TE, DIN 43880)
- Temperature range: -25°C ... 70°C
- Easy configuration with conventional USB cable and web browser

Cellular communication module, DC
TC MOBILE I/O X200-4G
Order No. 1038567

4G (LTE) SMS relay and remote signaling system, European version, communication via SMS or cellular communication data connection (e-mail transmission, app)
- 4 digital inputs
- 4 relay outputs
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- Easy configuration with conventional USB cable and web browser

Monitoring sensors via cellular communication

The TC Mobile I/O product family allows you to monitor analog current levels and analog voltage values and switch relays remotely. Communication is via SMS, e-mail, or app (https, SMS).

Possible areas of application:
- Machine, building, and system monitoring
- Pumps, wastewater treatment plants, and water supply
- Lighting control systems and remote switching devices
- Street lighting
- Elevators and gates
- Alarm technology and building services
- HVAC technology
- Battery monitoring up to 60 V
- Railway applications in accordance with EN 50121-4

TC Mobile I/O app

Switch your outputs conveniently using the app. This means that you can check the status of your device at any time. The TC Mobile I/O app makes it even easier to handle the text message version and saves you from having to write a text message. You will receive the alarm as usual via SMS and e-mail. This ensures the best accessibility in the field.
Wireless I/O

The Wireless MUX wireless signal cable

The wireless multiplexer transmits 16 digital and two analog signals bi-directionally, 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 gross interference in the link or it 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 signals transmitted 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
Product overview wireless sets

Wireless set with antennas
ILB BT ADIO MUX-OMNI
Order No. 2884208
- Standard package consisting of two permanently paired modules, two omnidirectional antennas with 1.5 m cable
- Ranges between 50 and 100 m in halls and over 200 m outdoors
- Antenna connection: RSMA (female)
- Approvals: FCC, UL 508, MIC (Japan)

Wireless set without antennas
ILB BT ADIO MUX
Order No. 2702875
- Package consisting of two permanently paired modules
- Ranges of over 400 m with directional antennas with a free line of sight
- Antenna connection: RSMA (female)
- Approvals: FCC, UL 508, MIC (Japan)

Technical data for wireless sets:
- Current Bluetooth 4.0 technology
- Supply voltage: 19.2 V DC ... 30 V DC
- 16 digital inputs
- 16 digital outputs up to 500 mA
- 2 analog inputs/outputs 0 ... 20 mA or 0 ... 10 V

Possible areas of application
The Wireless MUX is used wherever a small number of digital or analog input and output signals need to be exchanged wirelessly with a remote or movable station. Factory automation in particular is characterized by machine parts that are constantly in motion.

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
Radioline – easy signal distribution 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 transmits I/O signals as well as serial data, and is therefore very versatile. In addition, you can implement various network structures: From a simple point-to-point connection to complex networks.

Your advantages

- Easy startup without programming
- One device for a wide range of applications
- Integrated RS-232 and RS-485 interface
- Trusted Wireless 2.0 technology
- Adjustable data rates for the wireless interface
- 128-bit data encryption (AES)
Product overview Radioline front modules

868 MHz wireless module
RAD-868-IFS (Europe) Order No. 2904909
• Supply voltage: 19.2 V DC ... 30.5 V DC
• Adjustable transmission power of up to 500 mW
• Can be extended with I/O modules via DIN rail connectors
• Extended temperature range: -40°C ... +70°C
• Antenna connection: RSMA (female)
• Approvals: ATEX, IECEx
• Suitable for large distances with obstacles

900 MHz wireless module
RAD-900-IFS (America) Order No. 2901540
RAD-900-IFS-AU (Australia, New Zealand) Order No. 2702878
• Supply voltage: 10.8 V DC ... 30.5 V DC
• Adjustable transmission power of up to 1,000 mW
• Can be extended with I/O modules via DIN rail connectors
• Extended temperature range: -40°C ... +70°C
• Antenna connection: RSMA (female)
• Approvals: UL 508, HazLoc, FCC
• Suitable for large distances with obstacles

2.4 GHz wireless module
RAD-2400-IFS (worldwide) Order No. 2901541
RAD-2400-IFS-JP (Japan) Order No. 2702863
• Supply voltage: 19.2 V DC ... 30.5 V DC
• Adjustable transmission power of up to 100 mW
• Can be extended with I/O modules via DIN rail connectors
• Extended temperature range: -40°C ... +70°C
• Antenna connection: RSMA (female)
• Approvals: ATEX, IECEx, UL 508, HazLoc, FCC (RAD-2400-IFS only)

Radioline accessories can be found on page 33.

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. The Radioline function blocks for PC Worx, STEP 7, and TIA Portal allow easy I/O integration in the control level.

PC Worx/STEP 7 function blocks
• Free Radioline library
• Central monitoring of wireless stations in the control system
Wireless I/O

Radioline – I/O mapping now also available in wired format

The popular, straightforward method of distributing I/O information using thumbwheels on the front of the equipment is now also available for RS-485 networks. Addressing the new RS-485 front module is quick and easy too – all it takes is a turn of the yellow thumbwheel. This enhances the Radioline system’s flexibility, allowing you to use it for solutions in even more applications.

Alternative transmission media

To increase the range, you can of course replace the RS-485 line with alternative transmission media. Phoenix Contact provides a range of converters for fiber-optic cables, SHDSL, wireless, or Ethernet technology.
Product overview Radioline bus module

RS-485 bus module
RAD-RS485-IFS  Order No. 2702184

- Extended temperature range: -40°C ... +70°C
- RS-485 2-wire connection (screw terminal block)
- Can be used worldwide
- Range: 1,200 m or more with converter or repeater
- Can be extended with I/O modules via DIN rail connectors
- Supply voltage: 19.2 V DC ... 30.5 V DC

Connection to the wireless system
A Radioline wireless system on an existing base station can be extended to include new RS-485 stations. The wireless and RS-485 modules form a combined system.

Multipoint multiplexer
In an RS-485 network with up to 99 Radioline stations, you can now distribute I/O signals between stations entirely without the need for software configuration – all it takes is a turn of the thumbwheel.

Stand-alone operation as a Modbus server
The new Radioline RS-485 stations can also be operated on any Modbus RTU client.

Signal transmission with the Radioline RS-485 bus module
A network may consist either entirely of wireless stations or entirely of RS-485 stations. Alternatively, it is also possible to combine a wireless network with RS-485 stations.

I/O to I/O
I/O to serial (Modbus RTU)
I/O to I/O in a combined system
Wireless I/O

Radioline extension modules

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 in accordance with 94/9/EC (ATEX) directives, and can therefore be used internationally in potentially explosive areas.

Your advantages

✓ I/O extension modules can be used on all front modules (see page 7)
✓ Modular expansion possible
✓ Easy module replacement, even during operation (hot-swap capability)
✓ Channel-to-channel electrical isolation
✓ Extended temperature range: -40°C ... +70°C
**Product overview Radioline extension modules**

### Digital extension modules

- **RAD-DI4-IFS** Order No. 2901535
- **RAD-DOR4-IFS** Order No. 2901536
  - 4 digital wide-range inputs: 0 V AC/DC ... 250 V AC/DC
  - 4 digital relay outputs: 24 V DC/250 V AC/5 A

- **RAD-DIB-IFS** Order No. 2901539
- **RAD-DOB-IFS** Order No. 2902811
  - 8 digital inputs: 0 V DC ... 30.5 V DC
  - 2 pulse inputs: 100 Hz, 32 bit
  - 8 digital transistor outputs: 30.5 V DC/200 mA

- **RAD-NAM4-IFS** Order No. 2316275
  - 4 digital NAMUR inputs
  - Line break detection
  - Short-circuit detection
  - Can be combined with RAD-DO8-IFS

### Analog/Pt 100 extension module

- **RAD-AI4-IFS** Order No. 2901537
  - 4 analog inputs: alternatively 0/4 ... 20 mA

- **RAD-AI4-U-IFS** Order No. 2702290
  - 4 analog inputs: 0 ... 5/10 V

- **RAD-AO4-IFS** Order No. 2901538
  - 4 analog outputs: alternatively 0/4 ... 20 mA, 0 ... 10 V DC

- **RAD-PT100-4-IFS** Order No. 2904035
  - 4 Pt 100 inputs
  - Temperature measuring range: -50°C ... +250°C
  - 2-/3-conductor connection
  - Can be combined with RAD-AO4-IFS

### Analog/digital extension module

- **RAD-DAIO6-IFS** Order No. 2901533
  - 1 analog input: alternatively 0/4 ... 20 mA
  - 1 analog output: alternatively 0/4 ... 20 mA, 0 ... 10 V DC
  - 2 digital wide-range inputs/outputs: 0 ... 250 V AC/DC

### 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).
Wireless Serial

Radioline for wireless networking of serial interfaces

The wireless module can be used to wirelessly network multiple controllers or serial I/O devices quickly and easily via RS-232 and RS-485 serial interfaces. Data transmission is transparent, which means that any protocols, such as Modbus, can be forwarded. Furthermore, various network structures can be realized: From a simple point-to-point connection all the way to complex mesh networks.

Your advantages

- Quick and easy startup
- Easy point-to-point or network connections (star, mesh)
- Can be extended with up to 32 I/O modules per station via DIN rail connector (hot-swap capability)
- I/O-to-I/O, I/O-to-serial, serial-to-serial
- Trusted Wireless 2.0 technology
- Adjustable data rates for the wireless interface (16 kbps ... 500 kbps)
- 128-bit data encryption (AES)
Product overview Radioline

Wireless module
RAD-868-IFS (Europe) Order No. 2904909
RAD-900-IFS (Canada, North/South America) Order No. 2901540
RAD-2400-IFS (worldwide) Order No. 2901541
RAD-2400-IFS-JP (Japan) Order No. 2702863
- Integrated RS-232 and RS-485 interface
- Can be extended with I/O modules via DIN rail connectors
- Extended temperature range: -40°C ... +70°C

I/O extension modules
Digital IN:
RAD-DI4-IFS Order No. 2901535
RAD-DI8-IFS Order No. 2901539
RAD-NAM4-IFS Order No. 2316275

Digital OUT:
RAD-DOR4-IFS Order No. 2901536
RAD-DO8-IFS Order No. 2902811

Analog/digital IN/OUT:
RAD-DAIO6-IFS Order No. 2901533

Analog IN:
RAD-AI4-IFS Order No. 2901537
RAD-AI4-U-IFS Order No. 2702290

Analog OUT:
RAD-AO4-IFS Order No. 2901538

Temperature IN:
RAD-PT100-4-IFS Order No. 2904035

Radioline accessories are to be found on page 33.

Replacement for serial cabling
Connect your controller to serial field devices using wireless technology. The remote stations are connected directly or via repeater intermediate stations. This means that you can connect up to 250 repeater stations in series in order to extend the wireless path. Serial I/O devices and I/O extension modules can be connected to the intermediate stations.

Convenient software diagnostics
All network devices can be monitored conveniently via the base station.
- Online diagnostics:
  Network structure design, signal quality of each network station (RSSI), recording of RSSI signal and I/O status of each networked station
  Exclusion of up to two frequency bands (WLAN channels)
- Extended network settings

Wireless networking of serial devices

Comprehensive diagnostics
Wireless Serial

Radioline – solutions for use in outdoor applications

The Radioline Outdoor boxes can be installed outdoors in order to remotely transfer I/O signals or serial data quickly and easily. The device combinations are freely selectable. This enhances the Radioline system’s flexibility, allowing you to use it for solutions in even more applications.

Your advantages

- Robust, impact-resistant, UV-resistant, and splash-proof outdoor housing (IP66/NEMA 4X)
- Pre-wired box allows immediate installation
- Intuitive startup and configuration
- Flexible in physical terms with ranges of up to several kilometers
Product overview Radioline Outdoor boxes

For worldwide use
RAD-RUGGED-BOX-CONF
Order No. 1091638

- Wireless module (selectable): 868 MHz, 900 MHz, or 2,400 MHz
- Can be extended with up to three selectable I/O extension modules
- Serial RS-232/RS-485 interface
- Including surge protection, antenna feed-through, and a pressure compensation element
- Ambient temperature: -25°C ... 55°C
- Universal power supply unit: 100 V AC ... 240 V AC
- Degree of protection: IP66
- Antenna connection: N (female)
- Approvals: CE

For use in America
RAD-900-DAIO6
Order No. 2702877

- Integrated 900 MHz wireless module
- 6 integrated I/O channels (2 x DI/DO, 1 x AI/0)
- Connection to RAD-900-IFS wireless modules possible
- Ambient temperature: -40°C ... 65°C
- Universal power supply unit: 100 V AC ... 240 V AC /
  10.8 V DC ... 30.5 V DC
- Degree of protection: NEMA 4X (IP66)
- Antenna connection: N (female)
- Approvals: ANSI/ISA/CSA 22.2 61010-2-201, UL 50E Type 4, Class I, Div. 2, Groups A, B, C, D T4, Class I, Zone 2, IIC T4

Radioline accessories can be found on page 33.

Application examples for Radioline Outdoor boxes

Point-to-point connection with two Outdoor boxes
Point-to-point/star/mesh connection with standard wireless modules and Outdoor boxes
Mesh network with one Outdoor box as a simple repeater
Wireless Ethernet

NearFi coupler

The new NearFi technology extends the Phoenix Contact wireless portfolio. It transmits power and real-time Ethernet data contactlessly, and therefore allows completely new latency-free communication capabilities in the close-proximity range of up to 10 mm. The new NearFi couplers are a simple replacement for connections subject to wear and slip rings in industrial applications and will minimize costs caused by failures.

Your advantages

- Contactless – no wear, no maintenance
- Protocol-independent, latency-free real-time communication with 100 Mbps (full duplex)
- High power in a compact housing
- High degree of mounting freedom with flexible proximity options
- All-around visible diagnostics with LED ring on the housing
Product overview NearFi couplers

Power and data couplers
NEARFI PD 2A ETH B
Base
Order No. 1234224
NEARFI PD 2A ETH R
Remote
Order No. 1234225

• Power up to 50 W (24 V / 2 A)
• Data speed up to 100 Mbps (full duplex)

Power couplers
NEARFI P 2A B
Base
Order No. 1234226
NEARFI P 2A R
Remote
Order No. 1234229

• Power up to 50 W (24 V / 2 A)

Data couplers
NEARFI D ETH B
Base
Order No. 1234232
NEARFI D ETH R
Remote
Order No. 1234234

• Data speed up to 100 Mbps (full duplex)

Possible areas of application
The main fields of application for the new NearFi power and data couplers are in the following industries:
• Automotive industry
• Machine building and systems manufacturing
• Industrial robots
• Logistics

NearFi couplers in an application
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. The new NearFi power and data couplers in an IP65 housing with M12 connection technology make wear and maintenance-free communication without contact possible across air gaps of up to 10 mm.
Wireless Ethernet

Bluetooth Low Energy

Industrial sensors with Bluetooth Low Energy interface provide new opportunities for condition monitoring, predictive maintenance, and the documentation of production parameters.

The robust BLE 1300 wireless module makes the data acquired from these sensors available to PLCs and cloud applications. The BLE 1300 can also perform a simple evaluation of the sensor data itself – for cost-effective solutions without a PC or controller.

Your advantages

- Reduction of downtimes with maintenance- and wear-free transmission
- Future-proof integration of almost all Bluetooth Low Energy sensors
- Reliable and long-term operation, even in industrial environments
- Connection of up to eight sensors
- Space-saving use in industrial environments
Product overview BLE 1300 wireless module

Wireless module
FL BLE 1300 Order No. 1118418

The compact FL BLE 1300 wireless module with integrated antenna can be installed practically anywhere. The device is also ideally suited for harsh ambient conditions – precisely where the sensors are also located. Easy mounting via two drill-holes directly onto a housing wall saves time and money.

- Bluetooth Low Energy 5.0
- Degree of protection: IP65
- Integrated antenna
- LEDs for diagnostics and status indicator
- Central and peripheral mode
- QUICKON M12 fast connection technology

Possible areas of application
In the field of predictive maintenance, Bluetooth Low Energy supplies sensor data on vibrations and temperatures over a long time period, and can provide key information on how wear develops. A large number of tools and measuring equipment already have an integrated Bluetooth Low Energy wireless interface. These are used for acquiring key production data on critical components.

Bluetooth Low Energy in an application
Access to the BLE 1300, and therefore to up to eight sensors via TCP, allows the simple and flexible integration of almost all controllers and PC-based software systems. The wireless module therefore closes the gap between sensors and the machine. Alternatively, the BLE 1300 can also perform simple monitoring tasks independently, without an additional PLC.
Wireless Ethernet

Industrial 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 safe communication, via PROFIsafe or SafetyBridge Technology.

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

Web code: #2795

SafetyBridge Technology
Designed by Phoenix Contact
Product overview Industrial Bluetooth

Bluetooth Ethernet adapter
FL BT EPA 2
Order No. 1005869
- Internal antenna
- Bluetooth (PAN profile)

Wireless Ethernet adapter
FL EPA 2
Order No. 1005955
- Internal antenna
- Bluetooth (PAN profile)
- WLAN 80211 a/b/g/n (access point and client)

Wireless Ethernet adapter
FL EPA 2 RSMA
Order No. 1005957
- External, replaceable antenna (supplied, connection: RSMA (male))
- Bluetooth (PAN profile)
- WLAN 80211 a/b/g/n (access point and client)

Technical data:
- Frequency band: 2.4 GHz / 5 GHz
- 128-bit data encryption, WLAN black channel list, low emission mode (LEM)
- Degree of protection IP65
- M12 connections for power and LAN
- Auto crossing, PROFINET prioritization, LLDP
- Power supply: 9 V DC .. 30 V DC
- Temperature range: -40°C .. +65°C
- UL/cUL Class 1 Div 2 Hazardous location
- Configuration via MODE button, web interface, SNMP and AT commands
- Accessories: Assembly adapter (2701134), DIN rail adapter (2701133)

Bluetooth applications
The Bluetooth BT 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.

Possible areas of application
Bluetooth allows mobile devices to be integrated into industrial control networks wirelessly, thereby eliminating the need for expensive cable runs that are prone to wear:
- Robots and traveling robots
- Handling machines, packaging machines, pallet wrapping machines
- Moving machine parts
- Cranes and lifting equipment

Industrial Bluetooth on cranes
Wireless Ethernet

Industrial WLAN

Use industrial WLAN components for wireless machine access with smart devices or as robust communication with mobile machine parts. Industrial wireless systems also provide for more flexibility and efficiency for reliable communication between controller and autonomous transport systems, warehouse shuttles, or carry systems. The industrial WLAN components support you with the implementation of high-performance and modern MIMO technology.

Your advantages

✓ Easy and reliable creation of industrial WLAN networks
✓ Particularly secure with the latest security standards and encryption
✓ Ideal for networks with a large number of devices
✓ Maximum mobility with fast roaming functions
✓ Suitable for time-critical applications such as PROFINET or Safety
Product overview Industrial WLAN

### WLAN 5110 access point
- FL WLAN 5110 (EU) Order No. 1043193
- FL WLAN 5110 (USA, CAN) Order No. 1043201
- SD-FLASH 2 GB

- IEEE 802.11 a/b/g/n, WLAN access point, client, repeater, frequency band 2.4 GHz and 5 GHz, MIMO technology 2x2:2, up to 300 Mbps, cluster management

### WLAN 1100 wireless module
- IPS4:
  - FL WLAN 1100 (EU) Order No. 2702534
  - FL WLAN 1101 (USA, CAN) Order No. 2702538
- IP65/IP66/IP67/IP68, extended temperature range:
  - FL WLAN 2100 (EU) Order No. 2702535
  - FL WLAN 2101 (USA, CAN) Order No. 2702540

- IEEE 802.11 a/b/g/n, WLAN access point and client, frequency band: 2.4 GHz and 5 GHz, 2 integrated antennas with MIMO technology, power supply: 9 ... 32 V DC, WLAN mesh with WLAN 210x

### WLAN 1010/2010 wireless module
- FL WLAN 1010 (EU) Order No. 2702899
- FL WLAN 1011 (USA, CAN) Order No. 2702900
- FL WLAN 2010 (EU) Order No. 1119246
- FL WLAN 2011 (USA, CAN) Order No. 1119248

- Degree of protection: IP20
- 2 external antenna connections
- 2 virtual WLAN interfaces
- MAC and IP filter
- IEEE 802.11 a,b,g,n (2.4 GHz and 5 GHz)
- Data rates of up to 300 Mbps
- WLAN Mesh with WLAN 201x

### Typical WLAN network structure
The powerful WLAN 5110 and the compact WLAN 1100 are the perfect complements for wireless communication in the machine environment.

### Connecting smart devices
The WLAN 1100 facilitates easy connection of smart devices to machines and systems.
Wireless Ethernet

Cellular routers and remote maintenance gateways for worldwide network access

Cellular routers and remote maintenance gateways allow high-performance remote connections to industrial Ethernet networks. This makes it possible to transmit sensitive data from machines and systems securely via the Internet. The integrated firewall and support for VPN (Virtual Private Network) protect against unauthorized access.

Web code: #0499
Product overview 4G cellular routers and remote maintenance gateways

Infrastructure cellular routers
TC ROUTER...
- 2002T-4G Order No. 2702530
- 3002T-4G Order No. 2702532
- 3002T-4G VZW Order No. 2702533
- 3002T-4G ATT Order No. 2702535
- 4002T-4G EU Order No. 1234352
- 4102T-4G EU WLAN Order No. 1234353
- 4202T-4G EU WLAN Order No. 1234354

- Alerts via SMS and e-mail
- Support for IPsec and OpenVPN (TC ROUTER 3002T and 4002T)
- Temperature range: -40°C ... +70°C

Remote maintenance gateways
CLOUD CLIENT...
- 1002-4G Order No. 2702886
- 1002-4G VZW Order No. 2702887
- 1002-4G ATT Order No. 2702888
- 2002T-4G EU Order No. 1234355
- 2102T-4G EU WLAN Order No. 1234357
- 2002T-WLAN Order No. 1234360
- 1101-TX/TX Order No. 1221706

- Turnkey VPN tunnel with configuration assistant for the mGuard Secure Remote Service
- Connection for key switch

Security routers 4G (LTE)
TC MGUARD...
- RS4000 4G VPN Order No. 2903586
- RS2000 4G VPN Order No. 2903588
- RS4000 4G VZW VPN Order No. 1010461
- RS2000 4G VZW VPN Order No. 1010462
- RS4000 4G ATT VPN Order No. 1010463
- RS2000 4G ATT VPN Order No. 1010464

- Central management tool
- Easy integration with integrated Ethernet switch
- Compatible with mGuard Secure Remote Service

Data links
- Worldwide Internet data link via cellular networks
- Flexible use in small machines all the way to larger system networks
- Secure VPN communication

Remote maintenance via the Cloud
The mGuard Secure Remote Service securely connects service personnel and remote maintenance locations via the Internet in the framework of an encrypted VPN complete solution. Service personnel connect quickly and securely to machines, industrial PCs, and controllers via a simple web interface. In addition, secure remote maintenance can be performed at any location and any time without requiring specialist IT knowledge.

VPN communication

mGuard Secure Remote Service
# Product overview for antennas and accessories

<table>
<thead>
<tr>
<th>Antennas</th>
<th>Description</th>
<th>Gain</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>868 MHz</strong></td>
<td>Omnidirectional antenna, vandalism proof</td>
<td>2.5 dBi</td>
<td>N (female)</td>
<td>Temperature range: -40°C ... +75°C, degree of protection: IP65, including mounting bracket</td>
<td>1090616</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna, salt water resistant</td>
<td>4 dBi</td>
<td>N (female)</td>
<td></td>
<td>2702136</td>
</tr>
<tr>
<td></td>
<td>Directional antenna for panel, saltwater-resistant</td>
<td>3.5 dBi</td>
<td>N (female)</td>
<td></td>
<td>2702137</td>
</tr>
<tr>
<td></td>
<td>Yagi directional antenna</td>
<td>8.5 dBi</td>
<td>N (female) With 0.6 m cable</td>
<td></td>
<td>2867814</td>
</tr>
<tr>
<td></td>
<td>Yagi directional antenna</td>
<td>12 dBi</td>
<td>N (female) With 0.6 m cable</td>
<td></td>
<td>5606614</td>
</tr>
<tr>
<td><strong>900 MHz</strong></td>
<td>Omnidirectional antenna</td>
<td>2 dBi</td>
<td>RSMA (male) With 1.5 m cable</td>
<td></td>
<td>2904801</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna</td>
<td>2 dBi</td>
<td>N (female)</td>
<td></td>
<td>2904802</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna</td>
<td>5 dBi</td>
<td>N (female)</td>
<td>Temperature range: -40°C ... +80°C, degree of protection: IP65, including mounting bracket</td>
<td>2867199</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna</td>
<td>7 dBi</td>
<td>N (female)</td>
<td></td>
<td>2867801</td>
</tr>
<tr>
<td></td>
<td>Yagi directional antenna</td>
<td>5 dBi</td>
<td>N (female) With 0.6 m cable</td>
<td></td>
<td>2867814</td>
</tr>
<tr>
<td></td>
<td>Yagi directional antenna</td>
<td>8.5 dBi</td>
<td>N (female) With 0.6 m cable</td>
<td></td>
<td>5606614</td>
</tr>
<tr>
<td><strong>2.4 GHz</strong></td>
<td>Omnidirectional antenna</td>
<td>2 dBi</td>
<td>RSMA (male) With 1.5 m cable</td>
<td>Temperature range: -40°C ... +70°C, degree of protection: min. IP65, including mounting bracket</td>
<td>2701362</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna, vandalism proof</td>
<td>3 dBi</td>
<td>RSMA (male) With 1.5 m cable</td>
<td></td>
<td>2701358</td>
</tr>
<tr>
<td></td>
<td>Bracket for wall mounting</td>
<td>–</td>
<td>For antennas with protection against vandalism</td>
<td></td>
<td>2885870</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna, salt water resistant</td>
<td>6 dBi</td>
<td>N (female)</td>
<td></td>
<td>2885919</td>
</tr>
<tr>
<td><strong>5 GHz</strong></td>
<td>Omnidirectional antenna</td>
<td>5 dBi</td>
<td>N (female)</td>
<td>Temperature range: -40°C ... +70°C, degree of protection: min. IP65, including mounting bracket</td>
<td>2701347</td>
</tr>
<tr>
<td><strong>2.4 GHz and 5 GHz</strong></td>
<td>Omnidirectional antenna</td>
<td>2.5 dBi at 2.4 GHz 2 dBi at 5 GHz</td>
<td>N (male)</td>
<td></td>
<td>2701408</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna, vandalism proof</td>
<td>Up to 6 dBi at 2.4 GHz Up to 8 dBi at 5.6 GHz</td>
<td>N (female)</td>
<td></td>
<td>2702898</td>
</tr>
<tr>
<td></td>
<td>Directional antenna for panel, saltwater-resistant</td>
<td>9 dBi</td>
<td>N (female)</td>
<td>Temperature range: -40°C ... +70°C, degree of protection: min. IP65</td>
<td>2701186</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna</td>
<td>2 dBi at 2.4 GHz 2 dBi at 5 GHz</td>
<td>RSMA (male)</td>
<td></td>
<td>1284777</td>
</tr>
<tr>
<td></td>
<td>Omnidirectional antenna</td>
<td>2 dBi at 2.4 GHz 2 dBi at 5 GHz</td>
<td>N (male)</td>
<td></td>
<td>1284780</td>
</tr>
</tbody>
</table>
### Antenna cable

**N (male) > N (male)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2700677</td>
</tr>
<tr>
<td>3 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2867649</td>
</tr>
<tr>
<td>5 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2867652</td>
</tr>
<tr>
<td>10 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2867665</td>
</tr>
<tr>
<td>15 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2885634</td>
</tr>
<tr>
<td>6 m</td>
<td>900 MHz</td>
<td>5606125</td>
</tr>
<tr>
<td>15 m</td>
<td>900 MHz</td>
<td>2867225</td>
</tr>
<tr>
<td>30 m</td>
<td>900 MHz</td>
<td>2867238</td>
</tr>
</tbody>
</table>

**RSMA (male) > N (male)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 m</td>
<td>0.3 GHz ... 6 GHz For the control cabinet feed-through</td>
<td>2701402</td>
</tr>
<tr>
<td>0.5 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2903263</td>
</tr>
<tr>
<td>1 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2903264</td>
</tr>
<tr>
<td>2 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2903265</td>
</tr>
<tr>
<td>3 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2903266</td>
</tr>
<tr>
<td>5 m</td>
<td>0.3 GHz ... 6 GHz</td>
<td>2702140</td>
</tr>
</tbody>
</table>

### Accessories

#### Adapters and antenna splitters

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter</td>
<td>0.3 GHz ... 6 GHz</td>
<td>N (female) &gt; N (female)</td>
<td>For the control cabinet feed-through</td>
<td>2867843</td>
</tr>
<tr>
<td>Adapter, 90° angled</td>
<td>0.3 GHz ... 6 GHz</td>
<td>RSMA (male) &gt; RSMA (female)</td>
<td>For control cabinets with little room</td>
<td>2904790</td>
</tr>
<tr>
<td>Antenna splitter</td>
<td>0.3 GHz ... 6 GHz</td>
<td>3 x N (female)</td>
<td>2-way splitter</td>
<td>2702293</td>
</tr>
<tr>
<td>DIN rail adapter</td>
<td>–</td>
<td>–</td>
<td>DIN rail mounting, WLAN 101x/201x</td>
<td>1178237</td>
</tr>
</tbody>
</table>

#### Surge protection

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surge protection</td>
<td>868 MHz, 900 MHz</td>
<td>N (female) &gt; N (female)</td>
<td>For the control cabinet feed-through</td>
<td>2803166</td>
</tr>
<tr>
<td>Surge protection, with Lambda/4 technology</td>
<td>2.4 GHz 5 GHz</td>
<td>N (female) &gt; N (female)</td>
<td>For the control cabinet feed-through</td>
<td>2838490</td>
</tr>
</tbody>
</table>
# Product overview for antennas and accessories

## Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaky wave cable 2.4 GHz</td>
<td>Longitudinal loss: 14.7 dB/100 m, coupling attenuation 95%: 60 dB, temperature range: -40°C ... +85°C</td>
<td>2702553</td>
</tr>
<tr>
<td>Leaky wave cable 5 GHz</td>
<td>Longitudinal loss: 19.1 dB/100 m, coupling attenuation 95%: 71 dB, temperature range: -40°C ... +85°C</td>
<td>2702860</td>
</tr>
<tr>
<td>Assembly tool</td>
<td>Planning tool for precise mounting of the connectors on the leaky wave cable</td>
<td>2702519</td>
</tr>
<tr>
<td>Connector</td>
<td>Connector for leaky wave cables N (female)</td>
<td>2702518</td>
</tr>
<tr>
<td>Cable tie</td>
<td>Mounting clamp for securing the leaky wave cable</td>
<td>2702520</td>
</tr>
<tr>
<td>Termination resistor</td>
<td>N (male) required for capping the open leaky wave cable end</td>
<td>2884978</td>
</tr>
<tr>
<td>Termination resistor</td>
<td>RSMA (male) for capping the open antenna port of the WLAN APs</td>
<td>2702702</td>
</tr>
</tbody>
</table>

## Antenna impeding device for the Ex area

<table>
<thead>
<tr>
<th>Description</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N connector, double-sided, 0.7 ... 6 GHz</td>
<td>N (female) &gt; N (female)</td>
<td>Installation in Ex zone 2, installation of standard antennas in zones 0, 1, 2</td>
<td>2702198</td>
</tr>
</tbody>
</table>

## Cellular communication accessories

### Omnidirectional antennas

<table>
<thead>
<tr>
<th>Description</th>
<th>Technology</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omnidirectional antenna</td>
<td>2G/3G</td>
<td>2 m antenna cable, with SMA circular connector</td>
<td>For mounting on the control cabinet</td>
<td>2313371</td>
</tr>
<tr>
<td>Combined omnidirectional antenna with GPS</td>
<td>2G/3G/GPS</td>
<td>2 m antenna cable, SMA for cellular communication, RSMA for GPS</td>
<td>For mounting on the control cabinet</td>
<td>2903590</td>
</tr>
<tr>
<td>Omnidirectional antenna</td>
<td>2G/3G/4G/5G</td>
<td>5 m antenna cable, with SMA circular connector</td>
<td>For wall or mast mounting</td>
<td>2702273</td>
</tr>
<tr>
<td>Omnidirectional antenna</td>
<td>2G/3G/4G/5G</td>
<td>0.5 m antenna cable, with SMA circular connector</td>
<td>For wall or mast mounting</td>
<td>2702274</td>
</tr>
<tr>
<td>Omnidirectional antenna</td>
<td>2G/3G</td>
<td>SMA circular connector (without antenna cable)</td>
<td>For mounting directly on the device</td>
<td>2313342</td>
</tr>
</tbody>
</table>

### Antenna cable

<table>
<thead>
<tr>
<th>Description</th>
<th>Attenuation</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 m</td>
<td>0.23 dB/m ... 0.44 dB/m</td>
<td>SMA (male) &gt; SMA (female)</td>
<td>Impedance: 50 Ω</td>
<td>2900980</td>
</tr>
<tr>
<td>10 m</td>
<td></td>
<td></td>
<td></td>
<td>2900981</td>
</tr>
</tbody>
</table>
### Cellular communication accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>90° adapter</td>
<td>SMA (female) &gt; SMA (male)</td>
<td>For connecting the GSM/UMTS antenna cable where space is restricted</td>
<td>2917324</td>
</tr>
</tbody>
</table>

### Surge protection set

<table>
<thead>
<tr>
<th>Description</th>
<th>Connection</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate plug</td>
<td>SMA connectors/socket</td>
<td>With Lambda/4 technology as surge protection for coaxial signal interfaces</td>
<td>2800491</td>
</tr>
</tbody>
</table>

### Sealing tape

<table>
<thead>
<tr>
<th>Description</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 m</td>
<td>Self-vulcanizing, for external protection of adapters, splitters, or cable connections; watertight</td>
<td>2903182</td>
</tr>
</tbody>
</table>

### Control box sets

For outdoor mounting

<table>
<thead>
<tr>
<th>Description</th>
<th>Features</th>
<th>Property</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set for constructing wireless systems</td>
<td>For industrial applications, IP65, with DIN rail, plugs, and screw connections, without devices</td>
<td>With omnidirectional antennas</td>
<td>1088098</td>
</tr>
<tr>
<td></td>
<td></td>
<td>With omnidir. antennas and power supply unit</td>
<td>1088095</td>
</tr>
<tr>
<td></td>
<td></td>
<td>With omnidirectional antennas and PoE splitter</td>
<td>1088097</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Without antenna accessories</td>
<td>2701204</td>
</tr>
</tbody>
</table>

### Radioline accessories

Configuration memory, memory stick, and USB cable

<table>
<thead>
<tr>
<th>Description</th>
<th>Connection</th>
<th>Frequency</th>
<th>Features</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration memory RF band 3</td>
<td>S-PORT</td>
<td>2.4 GHz</td>
<td></td>
<td>2902814</td>
</tr>
<tr>
<td>Configuration memory RF band 5</td>
<td>S-PORT</td>
<td>2.4 GHz</td>
<td></td>
<td>2902815</td>
</tr>
<tr>
<td>Configuration memory RF band 7</td>
<td>S-PORT</td>
<td>2.4 GHz</td>
<td></td>
<td>2902816</td>
</tr>
<tr>
<td>Configuration memory RF band 1</td>
<td>S-PORT</td>
<td>868 MHz</td>
<td>For easy and secure network addressing with unique network ID</td>
<td>2702197</td>
</tr>
<tr>
<td>Configuration memory RF band 1</td>
<td>S-PORT</td>
<td>900 MHz</td>
<td></td>
<td>2702122</td>
</tr>
<tr>
<td>Flash drive</td>
<td>S-PORT</td>
<td></td>
<td>For all Radioline front modules</td>
<td>2902828</td>
</tr>
<tr>
<td>USB cable</td>
<td>USB/S-PORT</td>
<td></td>
<td>For all Radioline front modules</td>
<td>2903447</td>
</tr>
</tbody>
</table>
You can count on us

You do not need to be an expert. We provide you with much more than just products. We also provide you with support whenever you need it.

Phoenix Contact offers on-demand professional support, from consultation, through network analysis and design, all the way to configuration support and startup. We not only support you over the phone or by e-mail, but also directly on site, if you so desire. Contact us for more information.
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Whether for failsafe network structures, protecting, or remotely maintaining your machinery or high-performance wireless networks, we will find the right solution for you.

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We provide support during the configuration and startup of your network and show how to optimize the performance, availability, and safety.

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phoenixcontact.com