

Industrial communication technology – Industrial Wireless

Signals that could previously only be acquired with a great deal of effort, or not at all, can now be acquired and transmitted quickly and efficiently using wireless systems.

Wireless LAN

WLAN is a wireless standard in accordance with IEEE 802.11 a/b/g/n for creating wireless networks.

- High data rates of up to 300 Mbps
- Fast roaming
- Device mobility in wide area networks
- High degree of reliability, thanks to MIMO (multiple input, multiple output) technology

Trusted Wireless

Trusted Wireless is a form of wireless technology that has been designed specifically for industrial applications.

- Long range from a few hundred meters to several kilometers
- Robust and reliable communication in industrial environments
- License-free ISM band
- High local system density of several hundred networks possible
- Can be operated in parallel with WLAN 802.11 and Bluetooth systems without interference
- FHSS method for high immunity to interference

WirelessHART

WirelessHART is a transmission technology intended for process automation.

- Wireless module in accordance with IEEE 802.15.4
- Time-synchronized communication
- Supports fully meshed networks
- Secure data transfer

Bluetooth

With Bluetooth, you can configure local wireless networks with up to seven devices.

- Range of up to 100 m in industrial halls and up to 200 m outdoors
- Cyclic and fast data transmission of small data packets
- High local system density, i.e., WLAN 802.11 systems can be operated in parallel without interference
- High data security, thanks to 128-bit data encryption
- FHSS method for high immunity to interference

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Industrial Wireless

Product overview

Wireless Ethernet



Industrial WLAN – 5110 series
WLAN access points

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Industrial WLAN – 1100 and 2100 series
WLAN access points

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Industrial WLAN –
WLAN Ethernet adapter

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Wireless I/O / Wireless Serial



2.4 GHz – Wireless transceiver for
serial interfaces

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868 MHz – Wireless transceiver for
serial interfaces

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900 MHz – Wireless transceiver for
serial interfaces

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900 MHz – Wireless transceiver for
outdoor installation (NEMA 4X)

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Fieldbus communication



Multipoint multiplexer for RS-485 bus system

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PROFIBUS PA I/O multiplexer

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Wireless I/O



Analog/digital I/O module,
2 digital I/Os and 1 analog I/O

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Digital I/O modules,
4 inputs or 4 relay outputs,
8 inputs or 8 transistor outputs

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Analog I/O modules,
4 inputs or 4 outputs

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Temperature I/O module,
4 Pt 100 inputs

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Trusted Wireless Ethernet



900 MHz – Wireless transceiver with Trusted Wireless, for Ethernet
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Wireless I/O



Wireless multiplexer with antennas
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WirelessHART



WirelessHART gateway
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WirelessHART adapter
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Wired HART



Ethernet HART multiplexer
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Remote communication



Alerts – Remote signaling and remote control system
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Remote maintenance – mGuard security router
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Remote control – Mobile router
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Antennas and cables



Antennas
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Adapters, extension cables
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5110 series WLAN access points

The latest generation of WLAN modules offers maximum reliability, data throughput, and range.

Features:

- The **FL WLAN 5110** brings WLAN 802.11n to industrial applications and with it a data rate of up to 300 Mbps
- Central cluster management enables the entire wireless network to be set up in just minutes
- MIMO technology with two antennas for wireless communication that is more robust, faster, and covers a wider range
- Optimized for fast roaming under industrial conditions

WLAN



WLAN access point / client
2.4 GHz / 5 GHz

Wireless interface	
Wireless standard	IEEE 802.11 / a / b / g / n
Frequency band	2.4 GHz / 5 GHz
Transmission power	max. 20 dBm
Antenna connection method	RSMA (female)
Number	2
Antenna	
Assembly instructions	Antennas not included in scope of supply
Ethernet ports	
Number	2
Connection method	RJ45
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	Via COMBICON
Supply voltage range	10 V DC ... 36 V DC
Supply current	200 mA (at 24 V DC)
Security	
	802.11i WPA PSK (pre-shared key) WPA2 AES TKIP Supports 802.1X/RADIUS MAC filter
Function	
Operating modes	Access Point / Client Adapter / Repeater
Basic functions	SNMP (V2/V3), CLI, WPS, DHCP, DCP, BootP, HTTP, HTTPS, Syslog, SD card, dual FW image, 1 x DI, 1 x DO, 2 x Ethernet 10/100 Mbit, auto crossover, auto negotiation, MODE button
Configuration	
General data	
Wireless licenses	EU, more countries in e-shop
Dimensions	40 mm / 109 mm / 109 mm W / H / D
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C (extended temperature range on request)
Permissible humidity (operation)	10% ... 95% (non-condensing)
Air pressure (operation)	800 hPa ... 1080 hPa (up to 2000 m above sea level)
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	30g, 11 ms half-sine shock pulse
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g, 10 ... 150 Hz

Technical data

Technical data		
IEEE 802.11 / a / b / g / n		
2.4 GHz / 5 GHz		
max. 20 dBm		
RSMA (female)		
2		
Antennas not included in scope of supply		
2		
RJ45		
24 V DC		
Via COMBICON		
10 V DC ... 36 V DC		
200 mA (at 24 V DC)		
802.11i WPA PSK (pre-shared key) WPA2 AES TKIP Supports 802.1X/RADIUS MAC filter		
Access Point / Client Adapter / Repeater		
SNMP (V2/V3), CLI, WPS, DHCP, DCP, BootP, HTTP, HTTPS, Syslog, SD card, dual FW image, 1 x DI, 1 x DO, 2 x Ethernet 10/100 Mbit, auto crossover, auto negotiation, MODE button		

Cluster management, web-based management, WPS

Cluster management, web-based management, WPS		
EU, more countries in e-shop		
40 mm / 109 mm / 109 mm W / H / D		
IP20		
-25°C ... 60°C (extended temperature range on request)		
10% ... 95% (non-condensing)		
800 hPa ... 1080 hPa (up to 2000 m above sea level)		
30g, 11 ms half-sine shock pulse		
5g, 10 ... 150 Hz		

Ordering data

Type	Order No.	Pcs./Pkt.
FL WLAN 5110	1043193	1
FL WLAN 5111	1043201	1

Accessories

SD FLASH 2GB	2988162	1
FL RUGGED BOX	2701204	1
FL RUGGED BOX OMNI-1	2701430	1
FL RUGGED BOX OMNI-2	2701439	1
FL RUGGED BOX DIR-1	2701440	1

Description	
Wireless LAN access point	
- WLAN 802.11 a,b,g,n, frequency 2.4 GHz, 5 GHz, IP20	
- Approval for the USA and Canada	
Parameterization memory, Flash card without license	
Control cabinet set, IP66, including DIN rail, plugs, and screw connections	
- With 3 omnidirectional antennas and antenna cables	
- With 3 omnidirectional antennas, antenna cables, and 100 ... 240 V AC power supply	
- With one panel antenna, antenna cable, and 100 ... 240 V AC power supply	

**1100 and 2100 series
WLAN access points**

The **FL WLAN 1100** and **2100** make it easy to install a fast and stable WLAN network on machinery. The powerful integrated antennas enable space-saving and robust installation combined with low solution costs.

Features:

- Fast and easy connection, thanks to single-hole mounting
- Extremely robust housing, shockproof in accordance with IK08
- Optimized for fast roaming under industrial conditions

WLAN



WLAN access point / client – 2.4 GHz / 5 GHz, internal MIMO antennas, IP54 protection

ERC

WLAN



WLAN access point / client – 2.4 GHz / 5 GHz, internal MIMO antennas, IP65 / IP66 / IP67 / IP68 protection

ERC

Wireless interface	
Wireless standard	IEEE 802.11 / a / b / g / n
Frequency band	2.4 GHz / 5 GHz
Transmission power	max. 20 dBm (EIRP)
Antenna connection method	(Internal)
Ethernet ports	
Number	1
Connection method	RJ45
Power supply for module electronics	
Supply voltage	24 V DC (SELV)
Connection method	Push-in spring connection
Supply voltage range	18 V DC ... 32 V DC (PELV/SELV)
Supply current	typ. 120 mA (at 24 V DC)
Security	
	802.11i WPA PSK (preshared key) WPA2 AES TKIP MAC filter
Function	
Operating modes	Access Point / Client Adapter / Repeater
Configuration	Web-based management, automated CLI
General data	
Wireless licenses	EU, more countries in e-shop
Dimensions	W / H / D 62.8 mm / 36.5 mm / 113.2 mm
Degree of protection	IP54
Ambient temperature (operation)	0°C ... 60°C
Permissible humidity (operation)	5% ... 95% (non-condensing)
Air pressure (operation)	800 hPa ... 1080 hPa (up to 2000 m above sea level)
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	30g, 11 ms half-sine shock pulse
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g, 10 ... 150 Hz

Technical data		
Wireless interface		
Wireless standard	IEEE 802.11 / a / b / g / n	
Frequency band	2.4 GHz / 5 GHz	
Transmission power	max. 20 dBm (EIRP)	
Antenna connection method	(Internal)	
Ethernet ports		
Number	1	
Connection method	RJ45	
Power supply for module electronics		
Supply voltage	24 V DC (SELV)	
Connection method	Push-in spring connection	
Supply voltage range	18 V DC ... 32 V DC (PELV/SELV)	
Supply current	typ. 120 mA (at 24 V DC)	
Security		
	802.11i WPA PSK (preshared key) WPA2 AES TKIP MAC filter	
Function		
Operating modes	Access Point / Client Adapter / Repeater	
Configuration	Web-based management, automated CLI	
General data		
Wireless licenses	EU, more countries in e-shop	
Dimensions	W / H / D 62.8 mm / 36.5 mm / 113.2 mm	
Degree of protection	IP54	
Ambient temperature (operation)	0°C ... 60°C	
Permissible humidity (operation)	5% ... 95% (non-condensing)	
Air pressure (operation)	800 hPa ... 1080 hPa (up to 2000 m above sea level)	
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	30g, 11 ms half-sine shock pulse	
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g, 10 ... 150 Hz	

Technical data		
Wireless interface		
Wireless standard	IEEE 802.11 / a / b / g / n	
Frequency band	2.4 GHz / 5 GHz	
Transmission power	max. 20 dBm (EIRP)	
Antenna connection method	(Internal)	
Ethernet ports		
Number	1	
Connection method	RJ45	
Power supply for module electronics		
Supply voltage	24 V DC (SELV)	
Connection method	Push-in spring connection	
Supply voltage range	18 V DC ... 32 V DC (PELV/SELV)	
Supply current	typ. 120 mA (at 24 V DC)	
Security		
	802.11i WPA PSK (preshared key) WPA2 AES TKIP MAC filter	
Function		
Operating modes	Access Point / Client Adapter / Repeater	
Configuration	Web-based management, automated CLI	
General data		
Wireless licenses	EU, more countries in e-shop	
Dimensions	W / H / D 62.8 mm / 36.5 mm / 113.2 mm	
Degree of protection	IP65 / IP66 / IP67 / IP68	
Ambient temperature (operation)	-40°C ... 60°C	
Permissible humidity (operation)	5% ... 95% (non-condensing)	
Air pressure (operation)	800 hPa ... 1080 hPa (up to 2000 m above sea level)	
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	30g, 11 ms half-sine shock pulse	
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g, 10 ... 150 Hz	

Ordering data	
Description	Type
Wireless LAN access point	FL WLAN 1100
- WLAN 802.11 a,b,g,n, frequency 2.4 GHz, 5 GHz, IK08	FL WLAN 1101
- Approval for the USA and Canada	

Ordering data		
Type	Order No.	Pcs./Pkt.
FL WLAN 1100	2702534	1
FL WLAN 1101	2702538	1

Ordering data		
Type	Order No.	Pcs./Pkt.
FL WLAN 2100	2702535	1
FL WLAN 2101	2702540	1

Accessories	
Mechanical adapter , for protecting the rear connector when not mounted directly on control cabinets, etc.	FL M32 ADAPTER

Accessories		
Type	Order No.	Pcs./Pkt.
FL M32 ADAPTER	2702544	1

Wireless Ethernet

Industrial WLAN – WLAN Ethernet adapter

The **FL EPA 2** modules wirelessly connect Ethernet-capable automation devices to the control network.

Features:

- Robust housing with M12 connections in IP65
- WLAN and Bluetooth in a single device as an option
- Particularly robust with integrated antenna or flexible use with external antenna connection



With external antenna connection, including antenna

Technical data		
Wireless interface	Bluetooth 2.1 + EDR / IEEE 802.11 / b / g / a	
Wireless standard	2.4 GHz / 5 GHz	
Frequency band	max. 16 dBm (Bluetooth: 10 dBm)	
Transmission power	RSMA (female)	
Antenna connection method	RSMA (male)	
Antenna	External OMNI omnidirectional antenna supplied as standard, antennas can be exchanged	
Connection method		
Assembly instructions		
Ethernet ports		
Connection method	M12 connector (D-coded, female)	
Power supply for module electronics		
Supply voltage	24 V DC	
Connection method	M12 connector (A-coded, male)	
Supply voltage range	9 V DC ... 30 V DC	
Supply current	typ. 54 mA (at 24 V DC)	
Security	802.11i WPA PSK (preshared key) WPA2 AES TKIP PIN Non-discoverable	
Function		
Operating modes	Access point/client adapter for WLAN and Bluetooth	
Configuration	Web interface, MODE button, AT commands (TCP/IP), SSC	
General data		
Wireless licenses	Europe, USA, Canada, additional countries in the e-shop	
Dimensions	W / H / D 67.8 mm / 92.7 mm / 33.2 mm	
Degree of protection	IP65	
Ambient temperature (operation)	-40°C ... 65°C	
Permissible humidity (operation)	5% ... 93% (non-condensing)	
Mounting type	Wall mounting	
Description		
Combined Ethernet wireless module , with Bluetooth and WLAN		
- External RSMA antenna connection (female)		
- Internal 2.4 GHz/5 GHz directional antenna		
Bluetooth/Ethernet wireless module		
Mounting material, for wall or mast mounting		
Mounting material, for DIN rail mounting		
Ordering data		
Type	Order No.	Pcs./Pkt.
FL EPA 2 RSMA	1005957	1
Accessories		
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1



With internal panel antenna



With internal panel antenna

Technical data
Bluetooth 2.1 + EDR / IEEE 802.11 / b / g / a 2.4 GHz / 5 GHz max. 16 dBm (Bluetooth: 10 dBm) (Internal)
- Internal antenna
M12 connector (D-coded, female)
24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC typ. 54 mA (at 24 V DC)
802.11i WPA PSK (preshared key) WPA2 AES TKIP PIN Non-discoverable
Access point/client adapter for WLAN and Bluetooth
Web interface, MODE button, AT commands (TCP/IP), SSC
Europe, USA, Canada, additional countries in the e-shop
67.8 mm / 92.7 mm / 33.2 mm IP65 -40°C ... 65°C 5% ... 93% (non-condensing) Wall mounting

Technical data
Bluetooth 2.1 + EDR 2.4 GHz max. 10 dBm (Internal)
- Internal antenna
M12 connector (D-coded, female)
24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC typ. 36 mA (at 24 V DC)
PIN Non-discoverable
-
Web interface, MODE button, AT commands (TCP/IP), SSC
Europe, USA, Canada, additional countries in the e-shop
67.8 mm / 92.7 mm / 33.2 mm IP65 -40°C ... 65°C 5% ... 93% (non-condensing) Wall mounting

Ordering data		
Type	Order No.	Pcs./Pkt.
FL EPA 2	1005955	1

Ordering data		
Type	Order No.	Pcs./Pkt.
FL BT EPA 2	1005869	1

Accessories		
Type	Order No.	Pcs./Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

Accessories		
Type	Order No.	Pcs./Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

Radioline wireless system



Easy startup with I/O mapping

Radioline is the transmission system from Phoenix Contact for extended systems and networks with up to 250 stations.

Radioline transmits I/O signals as well as serial data.

With a slight turn of the thumbwheel, you can distribute and multiply I/O signals freely in your network.

The range* depends on the wireless system selected:

- 2.4 GHz - up to 5 km
- 868 MHz - up to 20 km
- 900 MHz - up to 32 km

Network applications

- I/O data mode: simple I/O signal distribution in the network
- PLC/Modbus RTU mode: I/O integration into the control level using the Modbus protocol
- PLC/Modbus RTU dual mode: I/O integration into the control level using the Modbus protocol.
- Parallel connection of additional Modbus/RTU slaves
- Serial data mode: networking of controllers and serial I/O devices, simple RS-232/RS-485 cable replacement

Radioline NEMA 4X

- For outdoor installation
- 2 digital inputs, 2 relay outputs, 1 analog input (cannot be extended)
- Interoperable with RAD-900-IFS

Notes:
*The range may be considerably above or below that stated. It is dependent on the environment, antenna technology, transmission power, and the product used.
The latest country registrations for the relevant product can be found on the Internet at phoenixcontact.com .



2.4 GHz wireless transceiver, for worldwide use



Technical data	
Wireless path	Bi-directional
Direction	2.4002 GHz ... 2.4785 GHz
Frequency range	16 kbps / 125 kbps / 250 kbps
Data rate (adjustable)	
Number of channels	8 x 55
Security	128-bit data encryption
Connection method	RSMA (female)
Serial port	RS-232 RS-485
Connection method	COMBICON plug-in screw terminal block COMBICON plug-in screw terminal block
Serial transmission speed	0.3 ... 115.2 kbps 0.3 ... 187.5 kbps
Termination resistor (switchable via DIP switches)	- 390 Ω / 150 Ω / 390 Ω
Analog output	RSSI voltage output
Signal range	0 V ... 3 V
Digital output	RF link relay output
Contact type	PDT
Switching voltage	30 V AC/DC / 60 V DC
Switching current	500 mA (30 V AC/DC)
General data	
Supply voltage	19.2 V DC ... 30.5 V DC
Current consumption	≤ 65 mA (at 24 V DC, at 25°C, stand-alone)
Degree of protection	IP20
Ambient temperature range	-40°C ... 70°C (>55°C derating) -40 °F ... 158 °F (>131°F derating)
Permissible humidity (operation)	20% ... 85%
Dimensions	W / H / D 17.5 / 116 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm ² / 0.2 ... 2.5 mm ² / 24 - 14
EMC note	Class A product, see page 527
Conformance/approvals	
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc
IECEX	Ex nA nC IIC T4 Gc
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4

Description
Wireless module , can be extended with I/O extension modules
- With Japan approval (no ATEX, IECEx or UL approval)
- For use in North America
- For use in Australia
Wireless module
- For use in North America

CONFSTICK , configuration memory for the safe parallel operation of several wireless paths or networks	RF band 1 RF band 3 RF band 5 RF band 7
Memory stick , for saving custom configuration data	
USB cable , for diagnostics and extended configuration	

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-2400-IFS	2901541	1
RAD-2400-IFS-JP	2702863	1

Accessories		
Type	Order No.	Pcs./Pkt.
RAD-CONF-RF3	2902814	1
RAD-CONF-RF5	2902815	1
RAD-CONF-RF7	2902816	1
RAD-MEMORY	2902828	1
RAD-CABLE-USB	2903447	1

new



868 MHz wireless transceiver, for license-free use in Europe



900 MHz wireless transceiver, for license-free use in America and Australia



900 MHz wireless transceiver, for outdoor installation (NEMA 4X)

Ex:

Ex:

Ex:

Technical data

Bi-directional	
869.4 MHz ... 869.65 MHz	
1.2 kbps / 9.6 kbps / 19.2 kbps / 60 kbps / 120 kbps	
14	
128-bit data encryption	
RSMA (female)	RS-485
RS-232	COMBICON plug-in screw terminal block
0.3 ... 115.2 kbps	0.3 ... 115.2 kbps
-	390 Ω / 150 Ω / 390 Ω
RSSI voltage output	
0 V ... 3 V	
RF link relay output	
PDT	
30 V AC / 60 V DC	
500 mA	
19.2 V DC ... 30.5 V DC	
≤ 65 mA (at 24 V DC, at 25°C, stand-alone)	
IP20	
-40°C ... 70°C	
-40 °F ... 158 °F	
20% ... 85%	
17.5 / 116 / 114.5 mm	
0.2 ... 2.5 mm ² / 0.2 ... 2.5 mm ² / 24 - 14	
Class A product, see page 527	
II 3 G Ex nA nC IIC T4 Gc	
Ex nA nC IIC T4 Gc	
-	

Technical data

RAD-900-IFS	RAD-900-IFS-AU
Bi-directional	Bi-directional
902 MHz ... 928 MHz	915 MHz ... 928 MHz
16 kbps / 125 kbps / 250 kbps / 500 kbps	16 kbps / 125 kbps / 250 kbps / 500 kbps
-	-
128-bit data encryption	128-bit data encryption
RSMA (female)	RSMA (female)
RS-232	RS-485
COMBICON plug-in screw terminal block	COMBICON plug-in screw terminal block
0.3 ... 115.2 kbps	0.3 ... 115.2 kbps
-	390 Ω / 150 Ω / 390 Ω
RSSI voltage output	
0 V ... 3 V	
RF link relay output	
PDT	
30 V AC/DC	
500 mA	
10.8 V DC ... 30.5 V DC	
328 mA (@24 V DC)	
IP20	
-40°C ... 70°C	
-40 °F ... 158 °F	
20% ... 85%	
35 / 116 / 114.5 mm	
0.2 ... 2.5 mm ² / 0.2 ... 2.5 mm ² / 24 - 14	
-	
-	
Class I, Div. 2, Groups A, B, C, D	

Technical data

Bi-directional	
902 MHz ... 928 MHz	
16 kbps / 125 kbps / 250 kbps / 500 kbps	
-	
128-bit data encryption	
N (female)	
-	
-	
RSSI voltage output	
0 V ... 3 V	
RF link relay output	
PDT	
30 V AC/DC	
500 mA	
10.8 V DC ... 30.5 V DC / 100 V AC ... 240 V AC	
110 mA (120 V AC) / 368 mA (10.8 V DC)	
NEMA 4	
-40°C ... 70°C (DC)	
-40°C ... 65°C (AC)	
20% ... 85%	
220 / 90 / 120 mm	
0.14 ... 2.5 mm ² / 0.14 ... 2.5 mm ² / 26 - 14	
-	
-	
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	

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-868-IFS	2904909	1

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-900-IFS	2901540	1
RAD-900-IFS-AU	2702878	1

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-900-DAIO6	2702877	1

Accessories

Type	Order No.	Pcs./Pkt.
RAD-868-CONF-RF1	2702197	1
RAD-MEMORY	2902828	1
RAD-CABLE-USB	2903447	1

Accessories

Type	Order No.	Pcs./Pkt.
RAD-900-CONF-RF1	2702122	1
RAD-MEMORY	2902828	1
RAD-CABLE-USB	2903447	1

Accessories

Type	Order No.	Pcs./Pkt.

Radioline – I/O mapping now in wired format too

The popular, straightforward method of distributing I/O information using white thumbwheels on the front of the equipment is now also available for RS-485 networks.

Addressing the 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 it to be used for solutions in even more applications.

The device supports three functions:

Supplementing a wireless system

A Radioline wireless system on an existing master can be expanded to include new RS-485 stations. RS-485 and wireless modules form a combined system.

Operation in a purely RS-485 network

In an RS-485 network with up to 99 Radioline stations, you can now distribute I/O signals between the stations. This is done without the need for software configuration by simply turning the thumbwheel.

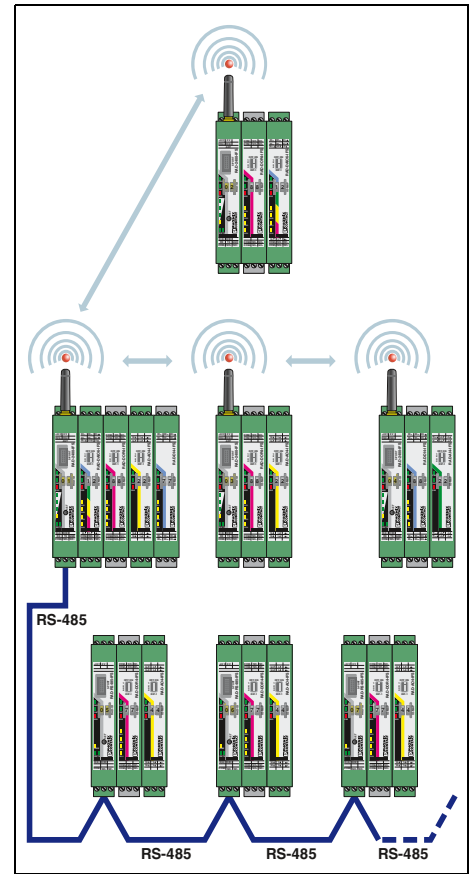
Stand-alone operation as a Modbus slave

The new Radioline RS-485 stations can also be operated on any Modbus/RTU master.

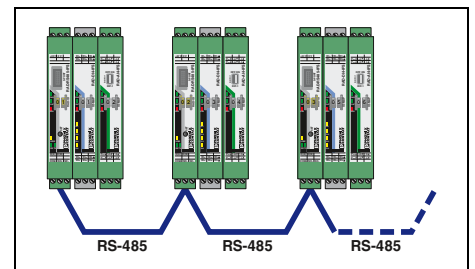
Alternative transmission media

To increase the range, it is of course possible to replace the RS-485 line with alternative transmission media.

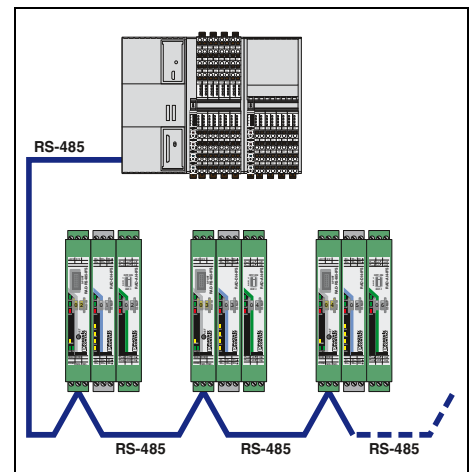
Phoenix Contact offers a range of converters for fiber optic cables, SHDSL, wireless or Ethernet technology.



I/O to I/O in a combined system



I/O to I/O via RS-485



I/O to serial (Modbus/RTU slave)

Multipoint multiplexer

Your advantages

- Up to 99 bus stations in the network
- Modular extension with up to 32 I/O extension modules supported
- Quick and easy startup without programming
- Can be combined with Radioline wireless modules



RS-485 serial interface



Technical data	
Serial port	RS-485
Connection method	COMBICON plug-in screw terminal block
Serial transmission speed	0.3 ... 115.2 kbps (default setting: 19.2/8/E/1)
Termination resistor (switchable via DIP switches)	390 Ω / 150 Ω / 390 Ω
Digital output	Link relay output
Contact type	PDT
Switching voltage	30 V AC/DC / 60 V DC
Switching current	500 mA (30 V AC/DC)
General data	
Supply voltage	19.2 V DC ... 30.5 V DC
Current consumption	≤ 65 mA (at 24 V DC, at 25°C, stand-alone)
Degree of protection	IP20
Ambient temperature range	-40°C ... 70°C (>55°C derating) -40 °F ... 158 °F (>131°F derating)
Permissible humidity (operation)	20% ... 85%
Dimensions	W / H / D 17.5 / 113 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm ² / 0.2 ... 2.5 mm ² / 24 - 14
EMC note	Class A product, see page 527
Conformance/approvals	
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc
IECEX	Ex nA nC IIC T4 Gc
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4

Description
Multipoint multiplexer

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-RS485-IFS	2702184	1

Shield connection terminal block , with snap-on foot, for mounting on NS 35... DIN rail, for shield support on busbars Ø 3-8 mm
Plug-in terminal , for connecting the incoming and outgoing bus line
USB cable , for diagnostics and extended configuration

Accessories		
Type	Order No.	Pcs./Pkt.
SKS 8-SNS35	3062786	10
TVFKC 1,5/ 3-ST	1713842	50
RAD-CABLE-USB	2903447	1

I/O extension modules

- Easy I/O mapping via thumbwheel
- Digital wide-range inputs (0 ... 250 V AC/DC)
- 0 ... 100 Hz digital pulse inputs
- Relay or transistor outputs
- Easy module replacement even during operation (hot swap)
- Extended temperature range (-40°C ... +70°C)



2 digital inputs/outputs and 1 analog input/output



4 digital inputs



		Technical data		Technical data	
Analog input					
Number of inputs		1		-	
Resolution		16 bit		-	
Signal range (configurable using the DIP switch)		0 mA ... 20 mA / 4 mA ... 20 mA		-	
Accuracy		≤ 0.02% (at 25°C)		-	
Supply voltage		≥ 12 V DC (for passive sensors (via terminal PWR1, +11))		-	
Digital input					
Number of inputs		2		4	
Switching level	1 signal ("H")	10 V AC/DC ... 50 V AC/DC (low-voltage input) 50 V AC/DC ... 250 V AC/DC (high-voltage input)		10 V AC/DC ... 50 V AC/DC (low-voltage input) 50 V AC/DC ... 250 V AC/DC (high-voltage input)	
Switching level	0 signal ("L")	0 V AC/DC ... 4 V AC/DC (low-voltage input) 0 V AC/DC ... 20 V AC/DC (high-voltage input)		0 V AC/DC ... 4 V AC/DC (low-voltage input) 0 V AC/DC ... 20 V AC/DC (high-voltage input)	
Input frequency		≤ 2 Hz		≤ 2 Hz	
Pulse input					
Number of inputs		-		-	
Signal range		-		-	
Input frequency		-		-	
Pulse length		-		-	
Analog output					
Number of outputs		1		-	
Signal range		0 mA ... 20 mA 0 V ... 10 V 4 mA ... 20 mA		-	
Accuracy		≤ 0.02% (at 25°C)	typ. 0.5%	-	
Load R _B		≤ 500 Ω	≥ 10 kΩ	-	
Digital output					
Contact type		2 x Relay output		-	
Switching voltage		250 V AC 24 V DC		-	
Switching current	min./max.	≥ 10 mA / 2 A (per channel)		-	
Switching frequency		2 Hz		-	
General data					
Supply voltage		19.2 V DC ... 30.5 V DC (DIN rail connector)		19.2 V DC ... 30.5 V DC (DIN rail connector)	
Current consumption		≤ 95 mA (at 24 V DC, at 25°C)		≤ 11 mA (at 24 V DC, at 25°C)	
Degree of protection		IP20		IP20	
Ambient temperature range		-40°C ... 70°C		-40°C ... 70°C	
Dimensions	W / H / D	17.5 / 113 / 114.5 mm		17.5 / 113 / 114.5 mm	
EMC note		Class A product, see page 527		Class A product, see page 527	
Conformance/approvals					
ATEX		Ex II 3 G Ex nA nC IIC T4 Gc		Ex II 3 G Ex nA nC IIC T4 Gc	
IECEX		Ex nA nC IIC T4 Gc		Ex nA nC IIC T4 Gc	
UL, USA/Canada		UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4		UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4	

		Ordering data			Ordering data		
Description		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Analog/digital I/O module		RAD-DAIO6-IFS	2901533	1	RAD-DI4-IFS	2901535	1
Digital input module							
Digital relay output module							
Digital/pulse input module							
Digital transistor output module							

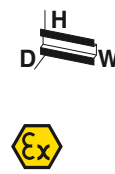
		Accessories			Accessories		
Description		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Analog/digital I/O module		RAD-DAIO6-IFS	2901533	1	RAD-DOR4-IFS	2901536	1
Digital relay output module							
Digital input module							
Digital transistor output module							
Digital/pulse input module							



4 digital relay outputs



8 digital inputs and 2 pulse inputs



8 digital transistor outputs



Technical data

-
-
-
-
-
-
8
10 V DC ... 30.5 V DC
0 V DC ... 4 V DC
≤ 10 Hz (Static mode)
2
0 V DC ... 30.5 V DC
< 100 Hz (Pulse counter mode)
≥ 5 ms (Pulse/pause ratio 1:1)
-
-
-
-
-
4 x Relay output
250 V AC/DC
≥ 10 mA / 5 A (per channel)
2 Hz
19.2 V DC ... 30.5 V DC (DIN rail connector)
≤ 55 mA (at 24 V DC, at 25°C)
IP20
-40°C ... 70°C
17.5 / 113 / 114.5 mm
Class A product, see page 527
Ex II 3 G Ex nA nC IIC T4 Gc
Ex nA nC IIC T4 Gc
UL 508 Listed
Class I, Div. 2, Groups A, B, C, D T4A
Class I, Zone 2, IIC T4

Technical data

-
-
-
-
-
8
10 V DC ... 30.5 V DC
0 V DC ... 4 V DC
≤ 10 Hz (Static mode)
2
0 V DC ... 30.5 V DC
< 100 Hz (Pulse counter mode)
≥ 5 ms (Pulse/pause ratio 1:1)
-
-
-
-
-
-
8 x Transistor output, active
30.5 V DC
- / 200 mA (per channel)
10 Hz
19.2 V DC ... 30.5 V DC (DIN rail connector)
≤ 18 mA (at 24 V DC, at 25°C)
IP20
-40°C ... 70°C
17.5 / 113 / 114.5 mm
Class A product, see page 527
Ex II 3 G Ex nA nC IIC T4 Gc
Ex nA nC IIC T4 Gc
UL 508 Listed
Class I, Div. 2, Groups A, B, C, D T4A
Class I, Zone 2, IIC T4

Technical data

-
-
-
-
-
-
8 x Transistor output, active
30.5 V DC
- / 200 mA (per channel)
10 Hz
19.2 V DC ... 30.5 V DC (DIN rail connector)
≤ 22 mA (at 24 V DC, at 25°C)
IP20
-40°C ... 70°C
17.5 / 113 / 114.5 mm
Class A product, see page 527
Ex II 3 G Ex nA nC IIC T4 Gc
Ex nA nC IIC T4 Gc
UL 508 Listed
Class I, Div. 2, Groups A, B, C, D T4A
Class I, Zone 2, IIC T4

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-DOR4-IFS	2901536	1

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-DI8-IFS	2901539	1

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-DO8-IFS	2902811	1

Accessories

RAD-DI4-IFS	2901535	1
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Accessories

RAD-DO8-IFS	2902811	1
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Accessories

RAD-DI8-IFS	2901539	1
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I/O extension modules

- Easy I/O mapping via thumbwheel
- Analog inputs (0/4 ... 20 mA)
- Temperature inputs for Pt 100 sensors
- Analog outputs (0/4 ... 20 mA or 0 ... 10 V)
- Easy module replacement even during operation (hot swap)
- Extended temperature range (-40°C ... +70°C)



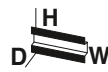
4 analog current inputs



Technical data			
Analog input			
Number of inputs	4		
Resolution	16 bit		
Signal range (configurable using the DIP switch)	0 mA ... 20 mA / 4 mA ... 20 mA		
Accuracy	≤ 0.02% (at 25°C)		
Supply voltage	≥ 12 V DC (for passive sensors (via terminal PWR1, +I1))		
Analog input			
Description of the input	-		
Number of inputs	-		
Temperature measuring range	-		
Analog output			
Number of outputs	-		
Signal range	-		
Accuracy	-		
Load R _B	-		
General data			
Supply voltage	19.2 V DC ... 30.5 V DC (DIN rail connector)		
Current consumption	≤ 120 mA (at 24 V DC, at 25°C)		
Degree of protection	IP20		
Ambient temperature range	-40°C ... 70°C		
Dimensions	17.5 / 113 / 114.5 mm		
EMC note	Class A product, see page 527		
Conformance/approvals			
ATEX	Ex II 3 G Ex nA IIC T4 Gc		
IECEX	Ex nA IIC T4 Gc		
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4		
Ordering data			
Description	Type	Order No.	Pcs./Pkt.
Analog input module	RAD-AI4-IFS	2901537	1
Temperature input module			
Analog output module			
Accessories			
Analog output module	RAD-AO4-IFS	2901538	1
Analog input module			
Temperature input module			



4 temperature inputs



4 analog current/voltage outputs



Technical data	
-	
-	
-	
-	
-	
-	
Pt 100 input	-
4	-
-50°C ... 250°C	-
-	
-	
-	
19.2 V DC ... 30.5 V DC (DIN rail connector)	
≤ 38 mA (at 24 V DC, at 25°C)	
IP20	
-40°C ... 70°C	
17.5 / 113 / 114.5 mm	
Class A product, see page 527	
Ex II 3 G Ex nA IIC T4 Gc Ex nA IIC T4 Gc UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4	

Technical data	
-	
-	
-	
-	
-	
4	
0 mA ... 20 mA	0 V ... 10 V
4 mA ... 20 mA	
≤ 0.02% (at 25°C)	typ. 0.5%
≤ 500 Ω	≥ 10 kΩ
-	
19.2 V DC ... 30.5 V DC (DIN rail connector)	
≤ 115 mA (at 24 V DC, at 25°C)	
IP20	
-40°C ... 70°C	
17.5 / 113 / 114.5 mm	
Class A product, see page 527	
Ex II 3 G Ex nA IIC T4 Gc Ex nA IIC T4 Gc UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, IIC T4	

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-PT100-4-IFS	2904035	1

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-AO4-IFS	2901538	1

Accessories		
Type	Order No.	Pcs./Pkt.
RAD-AO4-IFS	2901538	1

Accessories		
Type	Order No.	Pcs./Pkt.
RAD-AI4-IFS	2901537	1
RAD-PT100-4-IFS	2904035	1

WirelessHART gateway

The **RAD-WHG/WLAN-XD** is a WirelessHART gateway with integrated 802.11b/g WLAN transceiver. It converts HART data to Modbus/TCP for easy integration into almost any host system.

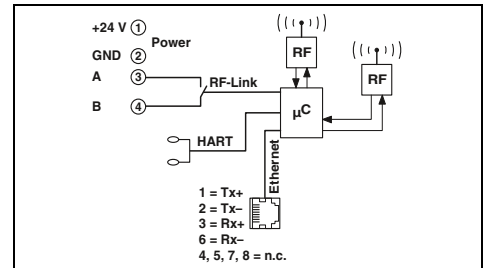
Features:

- Simple programming and diagnostics using an embedded web server or HART programmer
- WirelessHART gateway supports 250 WirelessHART devices
- 802.11b/g client can be used as WirelessHART backhaul connection with 802.11i (WPA2) 128-bit AES encryption
- Fully meshed routing (self-organizing and self-healing network) with WirelessHART
- WirelessHART uses channel hopping as a means of tolerating interference



WirelessHART gateway, for worldwide use

Ex:

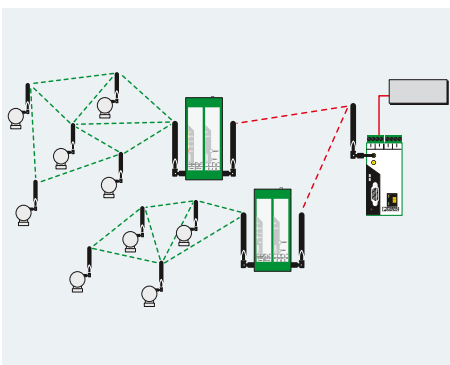


Technical data

Wireless path		
Interface description		WLAN in accordance with IEEE 802.11 b/g
Direction		Bi-directional
Frequency range		2.4 GHz ... 2.472 GHz
Number of channels		13
Connection method		RSMA (female)
Wireless path		
Interface description		WirelessHART
Frequency range		2.4 GHz ... 2.4835 GHz
Transmission power		0 ... 10 dBm
Number of channels		15
Connection method		RSMA (female)
Ethernet interface		
Connection method		RJ45
Transmission speed		10/100 Mbps
General data		
Supply voltage		9 V DC ... 30 V DC
Current consumption	typ. / max.	125 mA (at 24 V DC) / 300 mA (at 24 V DC)
Degree of protection		IP20
Ambient temperature range		-40°C ... 70°C
Housing material		Polyamide PA non-reinforced
Dimensions	W / H / D	45 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 4 mm ² / 0.2 ... 2.5 mm ² / 24 - 14
Conformance/approvals		
CSA, USA		Class I, Zone 2, Group IIC; AEx nA IIC T4
CSA, Canada		Class I, Div. 2 Groups A,B,C,D Ex nA IIC T4

Ordering data

Description	Type	Order No.	Pcs./Pkt.
WirelessHART gateway	RAD-WHG/WLAN-XD	2900178	1



WirelessHART adapter

The **RAD-WHA-1/2NPT** is an adapter that allows up to 4 HART devices to be connected to a WirelessHART network.

Features:

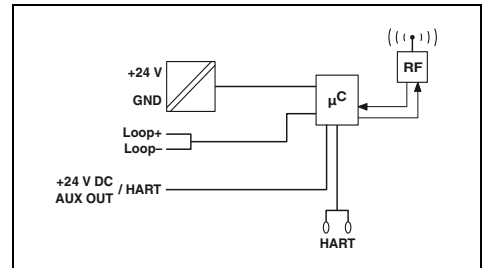
- Allows wired HART devices to transfer data on a WirelessHART network
- Connect up to 4 HART device to one adapter
- Allows connection of one standard 4... 20 mA signal for easy integration of non-HART devices into a WirelessHART network
- 1/2-inch NPT fitting for distributed or direct device connection
- Removable antenna for connection of coaxial cable and high gain antenna

Wireless**HART**



WirelessHART adapter, for worldwide use

Ex:



Wireless path		Technical data	
Interface description		WirelessHART	
Direction		Bi-directional	
Frequency range		2.4 GHz ... 2.4835 GHz	
Number of channels		15	
Connection method		N (female)	
Analog input			
Number of inputs		1	
Signal range		4 mA ... 20 mA	
General data			
Supply voltage		11 V DC ... 30 V DC	
Current consumption	max.	95 mA	
Degree of protection		IP65	
Ambient temperature range		-40°C ... 70°C	
Housing material		Aluminum, die-cast, corrosion resistant, powder-coated	
Dimensions	W / H / D	87.2 / 161 / 65.3 mm	
Connection method		Flying leads, 20 AWG	

Ordering data			
Description	Type	Order No.	Pcs./Pkt.
WirelessHART adapter	RAD-WHA-1/2NPT	2900100	1

Wireless multiplexer

Wireless MUX – The wireless signal cable

The Wireless MUX transmits 16 digital and 2 analog signals bidirectionally. The Wireless MUX is supplied ready to use: Unpack – connect – switch on – and you have a working wireless path.

– Range*:

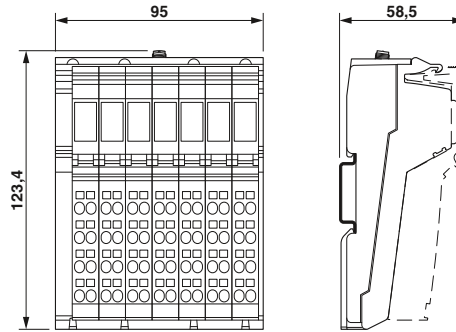
With omnidirectional antenna, 50 m to 100 m in halls, up to 200 m outdoors.

Features:

- Automatic establishment of the connection and signal exchange, thanks to fixed device pairing
- No configuration or settings necessary
- Extremely robust and reliable
- Interference-free operation alongside WLAN
- Typical transmission time of 10 ms

Notes:

* The range may be significantly above or below that stated, and depends on the environment, antenna technology, and the product used.



Wireless set

ERICSSON MIC

Technical data

Wireless interface	
Wireless standard	Based on Bluetooth 4.0
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Antenna connection method	RSMA (female)
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30.5 V DC (via power connector)
Digital inputs	
Connection technology	1-conductor
Number of inputs	16
Digital outputs	
Connection technology	1-conductor
Number of outputs	16
Analog inputs	
Number of inputs	2
Voltage input signal	0 V ... 10 V
Current input signal	0 mA ... 20 mA
Measured value resolution	12 bits
Analog outputs	
Number of outputs	2
Voltage output signal	0 V ... 10 V
Current output signal	0 mA ... 20 mA
DAC resolution	12 Bit
General data	
Dimensions	W / H / D 95 mm / 123.4 mm / 57 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C
EMC note	Class A product, see page 527
Conformance/approvals	
Conformance	CE-compliant (RED Directive 2014/53/EU) FCC Directive, Part 15.247 ISC Directive RSS 210 UL 508 Listed
UL, USA/Canada	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Wireless MUX set , consisting of two modules including antennas, each with 16 digital and 2 analog inputs and outputs			
- With OMNI antennas	ILB BT ADIO MUX-OMNI	2884208	1
- Without antennas	ILB BT ADIO MUX	2702875	1

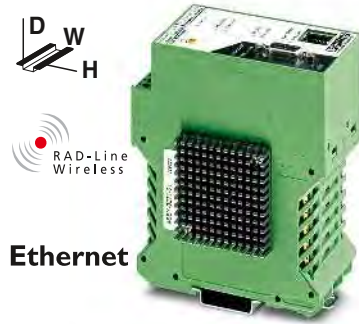
RAD-Line Ethernet with Trusted Wireless

The **RAD-ISM-900-EN-BD...** wireless transceiver enables the wireless connection of several distributed controllers to a central location (controller) via an Ethernet or serial connection.

Features:

- Operates in the license-free 902 - 928 MHz ISM band
- Frequency-hopping spread spectrum technology
- Provides an interface for data transfer between a 900 MHz wireless transmission system and Ethernet, RS-232, RS-422 or RS-485 interfaces
- Contains an adjustable 10 mW ... 1 W transmitter
- Supports TCP/IP, UDP and IP v4 protocols
- Programmable for point-to-point, point-to-multipoint and multipoint-to-point configurations
- Incorporates security using selectable 128/192/256-bit AES encryption
- **RAD-ISM-900-EN-BD-BUS** features an integrated bus foot to connect I/O modules (addressable via Modbus)
- Individual modules can be configured as master, slave or repeater using integrated web browser interface
- **RAD-ISM-900-EN-BD/B** is a dedicated slave wireless transceiver with no Ethernet ports

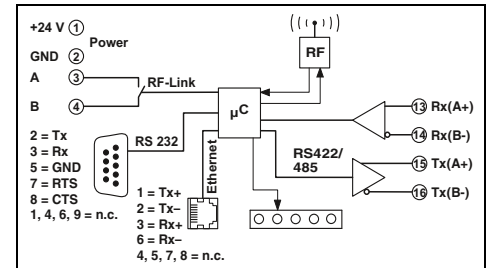
Notes:
The products are offered exclusively for export outside the European Economic Area (EEA).



Ethernet

Wireless transceiver for Ethernet and serial interfaces (RS-232, RS-422/RS-485)

Ex:



Wireless path	
Direction	
Frequency range	
Transmission power	
Serial port	
Connection method	
Serial transmission speed	
Data format/encoding	
Data flow control/protocols	
General data	
Supply voltage	
Current consumption	
Degree of protection	
Ambient temperature range	
Dimensions	W / H / D
Screw connection rigid / flexible / AWG	
Conformance/approvals	
Conformance	
UL, USA/Canada	

Technical data	
Bi-directional	
902 MHz ... 928 MHz	
10 ... 30 dBm	
RS-232	RS-485
D-SUB-9 female connector	COMBICON plug-in screw terminal block
300 ... 57.6 kbps	
Asynchronous	
RTS/CTS	
General data	
11 V DC ... 30 V DC	
250 mA (at 24 V DC)	
IP20	
-40°C ... 65°C	
52 / 99 / 115 mm	
0.2 ... 4 mm ² / 0.2 ... 2.5 mm ² / 24 - 14	
Conformance/approvals	
FCC Directive, Part 15.247	
ISC Directive RSS 210	
Class I, Div. 2, Groups A, B, C, D	

Description
Wireless module with optional Ethernet and serial interfaces
Bus foot for I/O extension modules
Cannot be extended
Without serial interfaces

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-ISM-900-EN-BD-BUS	2900017	1
RAD-ISM-900-EN-BD	2900016	1
RAD-ISM-900-EN-BD/B	2901205	1

Antennas and cables

2.4 GHz/5 GHz accessories

Omnidirectional antennas

Omnidirectional antennas to increase gain.
– Standard omnidirectional antennas



Gain 2 dBi (2.4 GHz)



Gain 2.5 dBi (2.4 GHz) / 5 dBi (5 GHz)

	Technical data			Technical data		
General data						
Ambient temperature (operation)	-20°C ... 65°C			-40°C ... 70°C		
Degree of protection	IP65			IP68		
Gain	2 dBi			2.5 dBi (2.4 GHz) 5 dBi (5 GHz)		
Impedance	50 Ω			50 Ω		
Horizontal / vertical apex angle	360° / 75°			360° / 30° (at 2.4 GHz) 360° / 16° (at 5 GHz)		
Dimensions W / H	7.8 mm / 82.5 mm			23 mm / 180 mm		
Frequency range	2.4 GHz			2.4 GHz ... 2.5 GHz / 5.15 GHz ... 5.83 GHz		
Scope of delivery	incl. mounting material			-		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Omnidirectional antenna With connection RSMA (male) With connection N (male)	RAD-ISM-2400-ANT-OMNI-2-1-RSMA	2701362	1	ANT-OMNI-2459-02	2701408	1

2.4 GHz/5 GHz accessories

Omnidirectional antennas

Omnidirectional antennas to increase gain.
– With vandalism protection, thanks to increased impact strength



Gain 3 dBi (2.4 GHz)



Dual band,
gain up to 6 dBi (2.4 GHz) / up to 8 dBi (5 GHz)

	Technical data			Technical data		
General data						
Ambient temperature (operation)	-40°C ... 80°C			-40°C ... 80°C		
Degree of protection	IP55			IP68		
Impact strength	IK08			-		
Gain	3 dBi			6 dBi (2.4 GHz, when mounted on metal surface) 8 dBi (5.6 GHz, when mounted on metal surface)		
Impedance	50 Ω			50 Ω		
Horizontal / vertical apex angle	360° / 85°			360° / -		
Dimensions W / H	86 mm / 43 mm			92 mm / 51 mm		
Frequency range	2.4 GHz			2.4 GHz / 5.15 GHz ... 5.83 GHz		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
OMNI omnidirectional antenna with protection against vandals						
With connection RSMA (male)	RAD-ISM-2400-ANT-VAN-3-0-RSMA	2701358	1	RAD-ISM-2459-ANT-FOOD-6-0-N	2702898	1
With connection N (female)						
Mounting material for wall mounting	RAD-ANT-VAN-MKT	2885870	1			

2.4 GHz/5 GHz accessories

Omnidirectional antennas

Omnidirectional antennas to increase gain.

- High-quality omnidirectional antennas for wall and mast mounting



Gain 6 dBi (2.4 GHz)



Gain 5 dBi (5 GHz)

	Technical data			Technical data		
General data						
Ambient temperature (operation)	-40°C ... 75°C			-45°C ... 70°C		
Degree of protection	IP67			IP64		
Gain	6 dBi			5 dBi		
Impedance	50 Ω			50 Ω		
Horizontal / vertical apex angle	360° / 30°			360° / 25°		
Dimensions W / H	22 mm / 250 mm			16 mm / 130 mm		
Frequency range	2.4 GHz ... 2.5 GHz			5.15 GHz ... 5.875 GHz		
Scope of delivery	incl. mounting material			incl. mounting material		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Omnidirectional antenna With connection N (female)	RAD-ISM-2400-ANT-OMNI-6-0	2885919	1	ANT-OMNI-5900-01	2701347	1

2.4 GHz/5 GHz accessories

Directional wireless antennas

Directional wireless antennas with high gain for transmission over longer distances.

- For wall or mast mounting



Gain 9 dBi (2.4 GHz / 5 GHz)



Gain: 19 dBi (2.4 GHz)

	Technical data			Technical data		
General data	ANT-DIR-2459-01	ANT-DIR-5900-01				
Ambient temperature (operation)	-40°C ... 75°C			-40°C ... 70°C		
Degree of protection	IP67			IP65		
Gain	9 dBi			19 dBi		
Impedance	50 Ω			50 Ω		
Horizontal / vertical apex angle	75° / 55° (at 2.4 GHz) 55° / 55° (at 5 GHz)		70° / 60° (at 5 GHz)	17° / 11°		
Dimensions W / H	80 mm / 101 mm		80 mm / 101 mm	610 mm / 419 mm		
Frequency range	2.4 GHz ... 2.5 GHz / 5.15 GHz ... 5.875 GHz		5.15 GHz ... 5.875 GHz	2.4 GHz		
Scope of delivery	incl. mounting material		incl. mounting material	incl. mounting material		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Panel directional wireless antenna (without cable) With connection N (female), dual band	ANT-DIR-2459-01	2701186	1			
With connection N (female), 2 emitters	ANT-DIR-5900-01	2701348	1			
Parabolic antenna With connection N (female)				RAD-ISM-2400-ANT-PAR-19-0	2867885	1

Antennas and cables

868 MHz/900 MHz accessories

Omnidirectional antennas

– For wall or mast mounting



Gain: 4 dBi (868 MHz)



Gain: 2.5 dBi (868 MHz)

	Technical data			Technical data		
General data						
Ambient temperature (operation)	-40°C ... 75°C			-40°C ... 85°C		
Degree of protection	IP67			IP67		
Impact strength	-			IK08		
Gain	4 dBi			2.5 dBi		
Impedance	50 Ω			50 Ω		
Connection method	N (female)			N (female)		
Horizontal / vertical apex angle	360° / 30°			360° / 55°		
Dimensions W / H	20 mm / 620 mm			80 mm / 40 mm		
Frequency range	868 MHz ... 870 MHz			868 MHz ... 870 MHz		
Scope of delivery	incl. mounting material			-		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Omnidirectional antenna	ANT-OMNI-868-01	2702136	1			
OMNI omnidirectional antenna with protection against vandals				ANT-OMNI-VAN-868-01	1090616	1
With connection N (female)				RAD-ANT-VAN-MKT	2885870	1
Mounting material for wall mounting						

868 MHz/900 MHz accessories

Directional wireless antennas

– For wall or mast mounting



Gain: 3.5 dBi (868 MHz)
Circular polarized



Yagi directional antenna,
up to 12 dBi gain (868/900 MHz)

	Technical data			Technical data		
General data						
Ambient temperature (operation)	-40°C ... 75°C			...-YAGI-6.5-N ...-YAGI-10-N		
Degree of protection	IP67			-40°C ... 80°C -40°C ... 80°C		
Gain	3.5 dBi			IP65 IP65		
Impedance	50 Ω			8.5 dBi 12.15 dBi		
Connection method	N (female)			50 Ω 50 Ω		
Horizontal / vertical apex angle	135° / 90°			N (female) with cable (0.6 m) N (female) with cable (0.6 m)		
Dimensions W / H	80 mm / 101 mm			100° / 62° 56° / 46°		
Frequency range	865 MHz ... 870 MHz			60.5 mm / 172 mm 60.5 mm / 172 mm		
Scope of delivery	incl. mounting material			868 MHz ... 960 MHz 868 MHz ... 960 MHz		
				incl. mounting material incl. mounting material		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Panel directional wireless antenna (without cable)	ANT-DIR-868-01	2702137	1			
Directional wireless antenna				RAD-ISM-900-ANT-YAGI-6.5-N	2867814	1
				RAD-ISM-900-ANT-YAGI-10-N	5606614	1

Antenna cables

- Various cables for connection of different antennas
- Frequency range: 300 MHz ... 6 GHz



**Antenna adapter cable,
N (male) -> RSMA (male)**



Antenna extension cable

	Technical data			Technical data		
General data						
Ambient temperature range	-40°C ... 85°C			-40°C ... 105°C		
Impedance	50 Ω			50 Ω		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Antenna adapter cable						
0.5 m long	RAD-PIG-RSMA/N-0.5	2903263	1			
1 m long	RAD-PIG-RSMA/N-1	2903264	1			
2 m long	RAD-PIG-RSMA/N-2	2903265	1			
3 m long	RAD-PIG-RSMA/N-3	2903266	1			
5 m long	RAD-PIG-RSMA/N-5	2702140	1			
Antenna extension cable						
3 m long, N connection at both ends (male)				RAD-CAB-EF393- 3M	2867649	1
5 m long, N connection at both ends (male)				RAD-CAB-EF393- 5M	2867652	1
10 m long, N connection at both ends (male)				RAD-CAB-EF393-10M	2867665	1
15 m long, N connection at both ends (male)				RAD-CAB-EF393-15M	2885634	1

Accessories

Adapter/extension cables

- Extension or adaptation of wireless module for antenna
- Frequency range: 300 MHz ... 6 GHz



Panel feed-through

	Technical data			Technical data		
General data						
Ambient temperature range	-40°C ... 105°C			-40°C ... 105°C		
Impedance	50 Ω			50 Ω		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Antenna cable						
50 cm long, N (male) -> N (male)	FL LCX PIG-EF142-N-N	2700677	1			
Antenna adapter cable						
0.5 m, N (female) -> RSMA (male)				RAD-PIG-EF316-N-RSMA	2701402	1

Antennas and cables

Accessories

Surge protection

- For installing the antenna outside buildings from a cable length of 3 m



Antenna surge protection



Surge protective device for coaxial lines

	Technical data			Technical data		
General data						
Ambient temperature range	-40°C ... 90°C			-40°C ... 90°C		
Degree of protection	IP68			IP68		
Attenuation	typ. 0.05 dB (≤ 0.15 dB)			0.1 dB (≤ 6 GHz)		
Frequency range	2.4 GHz ... 5.9 GHz			0 Hz ... 6 GHz		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
COAXTRAB , protection adapter for antenna connections with Lambda/4 technology, 2.4 to 5.9 GHz						
Socket-socket	CN-LAMBDA/4-5.9-BB	2838490	1			
Male/female	CN-LAMBDA/4-5.9-SB	2800023	1			
COAXTRAB , protection adapter for coaxial cable systems, DC to 6 GHz						
Female-female				CN-UB-70DC-6-BB	2803166	1
Male-female				CN-UB-70DC-6-SB	2803153	1

Adapter

- For installing the antenna inside buildings

Sealing tape

- Provides additional weather protection for adapters, splitters, cable connections, etc.
- Self-vulcanizing



Adapter



Sealing tape

	Technical data			Technical data		
General data						
Ambient temperature range	-65°C ... 165°C			-40°C ... 90°C		
Degree of protection	IP20			-		
Impedance	50 Ω			-		
Features	-			Self-vulcanizing		
Width	38 mm			19 mm		
Length	-			3 m		
Thickness	-			0.75 mm		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Adapter						
N (female) -> N (female)	RAD-ADP-N/F-N/F	2867843	1			
Weather protection tape						
1.2 m long, 90° MCX (male) -> N (male)				RAD-TAPE-SV-19-3	2903182	1

Accessories

Antenna barrier

- For the safe use of standard antennas in the hazardous area

The antenna barrier limits the ignition energy at the antenna connection in an intrinsically safe way according to protection type Ex i. Standard antennas can therefore be used up to Ex zone 0.



For installation in Ex zone 2

General data	
Ambient temperature range	-40°C ... 75°C
Degree of protection	IP65
Frequency range	0.3 GHz ... 6 GHz
Conformance/approvals	
ATEX	
IECEX	

Technical data		
-40°C ... 75°C		
IP65		
0.3 GHz ... 6 GHz		
Ex I (M1) [Ex ia Ma] I Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3 (1) G Ex nA [ia Ga] IIC T6 Gc X Please follow the special installation instructions in the documentation! [Ex ia Ma] I [Ex ia Ga] IIC [Ex ia Da] IIIC Ex nA [ia Ga] IIC T6 Gc X		

Description	
Antenna barrier , universal frequency range	
N (female) -> N (female)	

Ordering data		
Type	Order No.	Pcs./Pkt.
BAR-ANT-N-N-EX	2702198	1

Accessories

Antenna splitter

- For splitting HF signals between two antennas
- For connecting two panel antennas for repeater applications
- Use the **FL LCX PIG-EF142-N-N** antenna cable to connect two directional antennas



Antenna splitter

General data	
Ambient temperature range	-40°C ... 100°C
Degree of protection	IP65, when installed
Frequency range	0.3 GHz ... 6 GHz

Technical data		
-40°C ... 100°C		
IP65, when installed		
0.3 GHz ... 6 GHz		

Description	
Antenna splitter	
Antenna cable	
50 cm long, N (male) -> N (male)	

Ordering data		
Type	Order No.	Pcs./Pkt.
RAD-SPL-2-N/N	2702293	1
FL LCX PIG-EF142-N-N	2700677	1

Antennas and cables

Leaky wave conductor and accessories

The leaky wave conductor is a cable that acts as an antenna, which emits continuously along its length. It ensures a continuous wireless connection when using track-guided systems, even in angled or difficult to reach spaces.



Leaky wave conductor



Alignment tool and cable tie

		Technical data			Technical data		
General data							
Ambient temperature (operation)		-40°C ... 85°C			-		
Cable, attenuation		14.7 dB/100 m, longitudinal attenuation (2.4 GHz)			-		
Connection method		open end			-		
		Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.	
Leaky wave conductor - 2.4 GHz frequency band - 5 GHz frequency band	FL LCX CABLE 24 E	2702553	1				
	FL LCX CABLE 5 E	2702860	1				
	FL LCX CON-N-F E	2702518	1				
Connector for leaky wave conductor							
Termination resistor - for leaky wave conductor, N (male) - for device, RSMA (male)	FL LCX 50-OHM	2884978	1				
	FL LCX 50-OHM-RSMA	2702702	1				
Alignment tool for leaky wave conductor				FL LCX TOOL E	2702519	1	
Cable tie for leaky wave conductor				FL LCX CLAMP E	2702520	100	

Control box sets

Control box set for the FL WLAN 5100 access point for use directly in industrial environments or in protected outdoor areas.

Features:

- IP66 control box
- Mounting suitable for industrial use
- Bore holes, screw connections already included
- Various sets, suitable for the most common applications



		Technical data		
General data				
Dimensions		W / H / D		
		174 mm / 254 mm / 137 mm		
		Ordering data		
Description	Type	Order No.	Pcs./Pkt.	
Control box set , IP66, including DIN rail, plugs, and screw connections - With 3 omnidirectional antennas and antenna cables - With 3 omnidirectional antennas, antenna cables, and 100 ... 240 V AC power supply - With one panel antenna, antenna cable, and 100 ... 240 V AC power supply	FL RUGGED BOX	2701204	1	
	FL RUGGED BOX OMNI-1	2701430	1	
	FL RUGGED BOX OMNI-2	2701439	1	
	FL RUGGED BOX DIR-1	2701440	1	
		Accessories		
Set for mast mounting of the FL RUGGED BOX housing, including screw clamps for masts up to 89 mm in diameter	FL RUGGED BOX POLE SET	2701205	1	

900 MHz accessories

Omnidirectional antennas

- Mobile or stationary applications
- Point-to-multipoint configurations
- Small antennas are suitable for applications with a shorter range
- Large antennas are suitable for applications requiring longer range



2.15 dBi/7 dBi gain



5 dBi/8 dBi gain

		Technical data			Technical data		
General data		...-OMNI-0-6 / ...-OMNI-2-2-...	...-OMNI-5	...-OMNI-FG-3-N	...-OMNI-FG-6-N		
Ambient temperature (operation)		-40°C ... 75°C	-40°C ... 80°C	-40°C ... 80°C	-40°C ... 80°C		
Degree of protection		IP65	IP65	IP65	IP65		
Gain		2.15 dBi	7 dBi	5.15 dBi	8 dBi		
Impedance		50 Ω	50 Ω	50 Ω	50 Ω		
Horizontal / vertical apex angle		360° / N/A	360° / 30°	360° / 28°	360° / 15°		
Dimensions W / H		0.3 cm / 8.9 cm	0.3 cm / 60.9 cm	2.38 in. / 44.25 in.	6.05 cm / 180.34 cm		
Frequency range		900 MHz	900 MHz	902 MHz ... 928 MHz	900 MHz		
Scope of delivery		incl. mounting material	incl. mounting material	incl. mounting material	incl. mounting material		
		Ordering data			Ordering data		
Description		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Omnidirectional antenna							
With connection MCX (male)		RAD-ISM-900-ANT-OMNI-0-6	2867160	1	RAD-ISM-900-ANT-OMNI-FG-3-N	2867791	1
With connection RSMA (male)		RAD-900-ANT-OMNI-2-2-RSMA	2904801	1	RAD-ISM-900-ANT-OMNI-FG-6-N	2885579	1
With connection N (female)		RAD-ISM-900-ANT-OMNI-5	2867199	1			

900 MHz accessories

Directional wireless antennas (YAGI)

- Stationary applications
- Point-to-point configurations with line of sight



5 dBi gain,
with 0.6 m connecting cable



8.5 dBi/12 dBi gain,
with 0.6 m connecting cable

		Technical data			Technical data		
General data		...-YAGI-6.5-N	...-YAGI-10-N	...-YAGI-6.5-N	...-YAGI-10-N		
Ambient temperature (operation)		-40°C ... 80°C	-40°C ... 80°C	-40°C ... 80°C	-40°C ... 80°C		
Degree of protection		IP65	IP65	IP65	IP65		
Gain		5 dBi	12.15 dBi	8.5 dBi	12.15 dBi		
Impedance		50 Ω	50 Ω	50 Ω	50 Ω		
Connection method		N (female) with cable (0.6 m)	N (female) with cable (0.6 m)	N (female) with cable (0.6 m)	N (female) with cable (0.6 m)		
Horizontal / vertical apex angle		168° / 78°	100° / 62°	100° / 62°	56° / 46°		
Dimensions W / H		6 cm / 17 cm	60.5 mm / 172 mm	60.5 mm / 172 mm	60.5 mm / 172 mm		
Frequency range		900 MHz	868 MHz ... 960 MHz	868 MHz ... 960 MHz	868 MHz ... 960 MHz		
Scope of delivery		incl. mounting material	incl. mounting material	incl. mounting material	incl. mounting material		
		Ordering data			Ordering data		
Description		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Directional wireless antenna							
		RAD-ISM-900-ANT-YAGI-3-N	2867801	1	RAD-ISM-900-ANT-YAGI-6.5-N	2867814	1
					RAD-ISM-900-ANT-YAGI-10-N	5606614	1

Antennas and cables

Antenna cable

- Various cables for connection of different antennas
- Frequency range: 300 MHz ... 6 GHz



**Antenna adapter cable,
N (male) -> RSMA (male)**

General data
Ambient temperature range
Impedance

Technical data

-40°C ... 85°C
50 Ω

Description
Antenna adapter cable
0.5 m long
1 m long
2 m long
3 m long
5 m long

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-PIG-RSMA/N-0.5	2903263	1
RAD-PIG-RSMA/N-1	2903264	1
RAD-PIG-RSMA/N-2	2903265	1
RAD-PIG-RSMA/N-3	2903266	1
RAD-PIG-RSMA/N-5	2702140	1

Antenna cable

- Various cables for connection of different antennas
- Frequency range: 300 MHz ... 6 GHz



General data
Ambient temperature range
Impedance

Technical data

-40°C ... 75°C
50 Ω

Description
Antenna adapter cable
1.2 m long, MCX (male) -> N (female)
1.2 m long, 90° MCX (male) -> N (male)
1.2 m long, SMA (male) -> N (female)

Ordering data

Type	Order No.	Pcs./Pkt.
RAD-CON-MCX-N-SB	2867717	1
RAD-CON-MCX90-N-SS	2885207	1
RAD-CON-SMA-N-SS	2867403	1

Extension cable

- Various cables to extend the distance between the wireless module and antenna



Antenna extension cable, N (male)

General data	
Ambient temperature range	-40°C ... 85°C
Impedance	50 Ω

Technical data

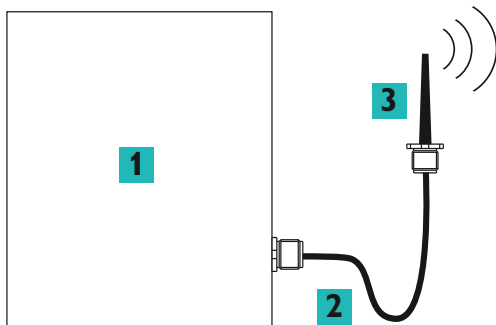
Ordering data

Description	
Antenna extension cable, N connection at both ends (male)	
3 m long, attenuation (at 900 MHz) 0.96 dB	
6 m long, attenuation (at 900 MHz) 0.98 dB	
7.5 m long, attenuation (at 900 MHz) 1 dB	
12 m long, attenuation (at 900 MHz) 0.25 dB/m	
15 m long, attenuation (at 900 MHz) 0.25 dB/m	
18 m long, attenuation (at 900 MHz) 0.13 dB/m	
24 m long, attenuation (at 900 MHz) 0.13 dB/m	
30 m long, attenuation (at 900 MHz) 0.13 dB/m	
45 m long, attenuation (at 900 MHz) 0.08 dB/m	

Type	Order No.	Pcs./Pkt.
RAD-CAB-PPF240-10	5606124	1
RAD-CAB-PPF400-20	5606125	1
RAD-CAB-PPF500-25	5606126	1
RAD-CAB-RG213-40	2867377	1
RAD-CAB-RG213-50	2867225	1
RAD-CAB-PPF400-60	2867380	1
RAD-CAB-PPF400-80	2867393	1
RAD-CAB-PPF400-100	2867238	1
RAD-CAB-PPF600-150	2885184	1

Simplified antenna connection

- All wireless modules with an RSMA connection are connected directly to the N connection of the antennas via a cable
- Various cable lengths between 50 cm and 5 m are available

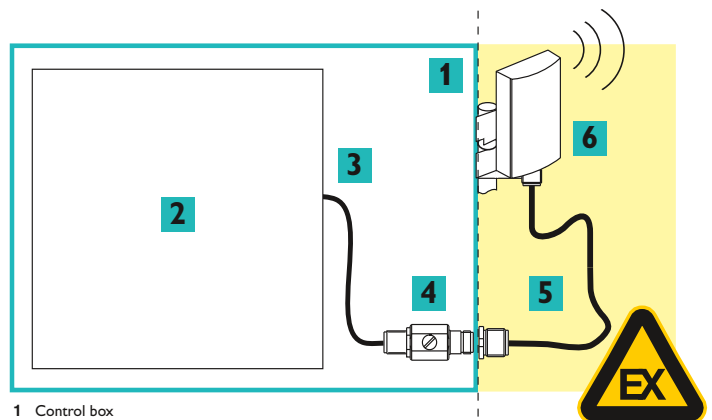


- 1 Wireless module
- 2 Adapter cable
- 3 Antenna

Installation in the Ex area

The antenna barrier makes the high-frequency outputs of wireless modules intrinsically safe in accordance with Ex i protection. It limits the ignition energy in the event of an error.

The antenna barrier is installed in an IP54 control box in zone 2 or in the safe area. This makes it possible to use standard antennas in potentially explosive areas up to zone 0.



- 1 Control box
- 2 Wireless module
- 3 Adapter cable
- 4 Antenna barrier
- 5 Antenna cable
- 6 Antenna