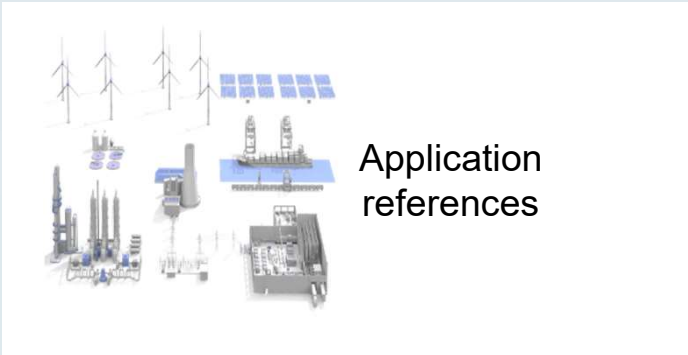


Communication Interfaces – Overview 2021



NearFi TechnologyTM
Designed by Phoenix Contact

**PROFI[®]
BUS**

TRUSTED WIRELESS

Technologies

PoE HART 5G

“PAVE THE WAY FOR FUTURE BUSINESS”
by addressing relevant trends

SPE & APL 5G TSN OPC UA

Communication Interfaces - Our product portfolio



Fieldbus
Communication



Ethernet
Infrastructure



Smart Camera Box



new

Wireless



new

Remote
Communication



Fieldbus Communication 1



Converter Isolator



Repeater Segment Coupler



Fast connectors (SUBCON)



Fiber optic converter



Modular hub



Extender Serial/Profibus



Protocol converter



Radioline Multipoint-Multiplexer



Terminator resistor



Fieldbus Communication 2



Fieldbus Communication 2



Serial Device Server / Gateways



Foundation fieldbus Power



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 2



Fieldbus Device Coupler Zone 1



Fieldbus Device Terminal box



Profibus DP/PA Converter



Profibus PA I/O Multiplexer



Ethernet HART Multiplexer



Fieldbus Communication 1



Ethernet Infrastructure



Ethernet Infrastructure



Ethernet Extender



Media Converter



Ethernet Isolator



Ethernet HART Multiplexer



Patch Panel



PoE Injector



Serial Device Server / Gateways



Data connectors



TIME SERVER



Fieldbus communication 2



Wireless



Wireless



Radioline



Wireless Multiplexer



Essential Wireless



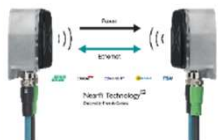
Radioline Outdoor solution



WLAN 5110



WLAN 1100 / 2100



new
NearFi Energy and data coupler



new
Bluetooth LowEnergy



new
WLAN 1010 / 2010



Bluetooth EPA



Ethernet Infrastructure



Remote communication



Remote communication



TC Mobile I/O




TC MGuard



new
TC Router



new
TC Cloud Client



mGuard Secure Remote Service



Wireless



Technologies



Technologies



HART[®]
Technology



PoE Power
over
Ethernet



**TRUSTED
WIRELESS**




PROFIBUS[®]



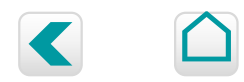
5G



NearFi Technology[®]
Designed by Phoenix Contact



Remote
communication



**PHOENIX
CONTACT**
INSPIRING INNOVATIONS

- Basic Wireless
- Trusted Wireless
- Radioline
- Radioline Multipoint Multiplexer
- Applications
- Service and Support
- Tools of Radioline



Selection topics



Basics



Antenna technology



Wireless technology and coexistence



Products



Applications

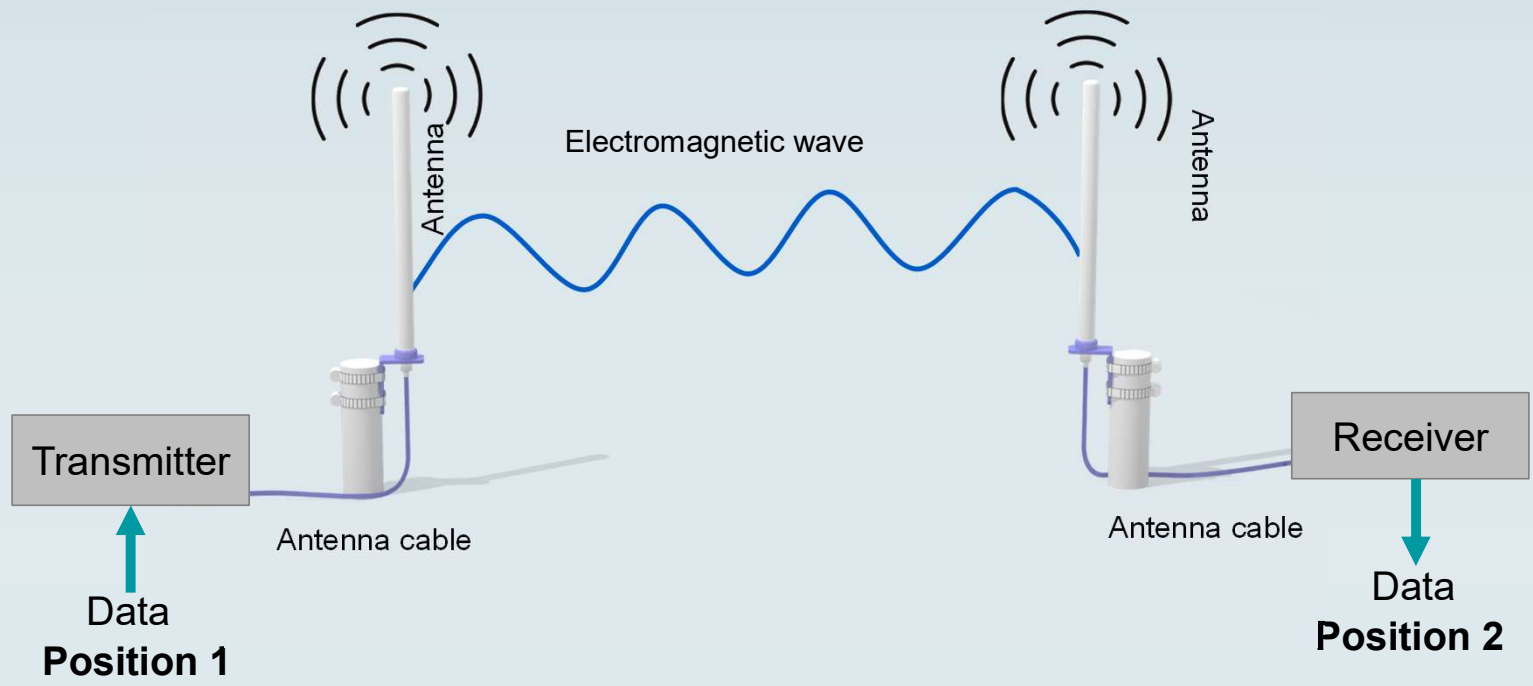


References



Services

Wireless link



Dezibel (dB)

P_1/P_2	dB	Description
0,001	-30 dB	Attenuation
0,01	-20 dB	
0,1	-10 dB	
1	0 dB	1:1 transmission
10	10 dB	Gain
100	20 dB	
1000	30 dB	

- Decibel is a logarithmic value which describes the relation of Power P1 compare to power P2, e.g. 1 mW

$$L_P(\text{dB}) = 10 \log_{10} \left(\frac{P_1}{P_2} \right)$$

Tip:
A change of 3 dB always corresponds to a doubling or halving.



Power rating in dBm

Power	dBm
1 fW	-120 dBm
1 pW	-90 dBm
1 nW	-60 dBm
1 μ W	-30 dBm
1 mW	0 dBm
10 mW	10 dBm
100 mW	20 dBm
1 W	30 dBm

- The unit decibel milliwatt (dBm) is a power level based on one milliwatt.
- The transmission power is regulated by regulatory authority



Receiver sensitivity and transmission power

Technology / Frequency band	Data rate	Receiver sensitivity	Transmission -power
WLAN	54 MBit/s	- 84 dBm	+ 19 dBm
Bluetooth	1 MBit/s	- 88 dBm	+ 14 dBm
Trusted Wireless 2,4 GHz	Max. 250 kBit/s	- 93 dBm	+ 20 dBm
Trusted Wireless 2,4 GHz	Min. 16 kBit/s	- 106 dBm	+ 20 dBm
Trusted Wireless 868 MHz	Max. 120 kBit/s	- 103 dBm	+ 27 dBm
Trusted Wireless 868 MHz	Min. 1,2 kBit/s	- 122 dBm	+ 27 dBm

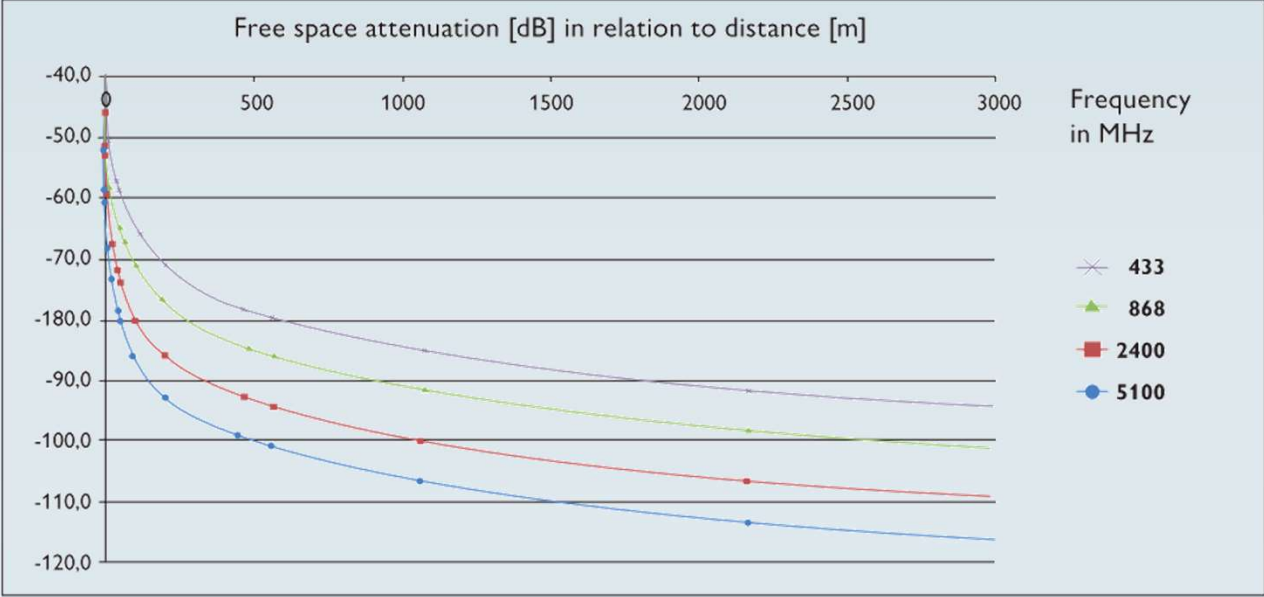
- The lower the data rate, the higher the receiver sensitivity
- The higher the receiver sensitivity, the bigger the achievable distance

Example:

- The maximum transmission power is 100 mW / 20 dBm @ 2,4 GHz.
- The signal strength at the receiver should be better than the receiver sensitivity of the used radio module.



Free space loss



- The lower the frequency the lower the free space attenuation
- The lower the free space attenuation, the bigger the achievable distance



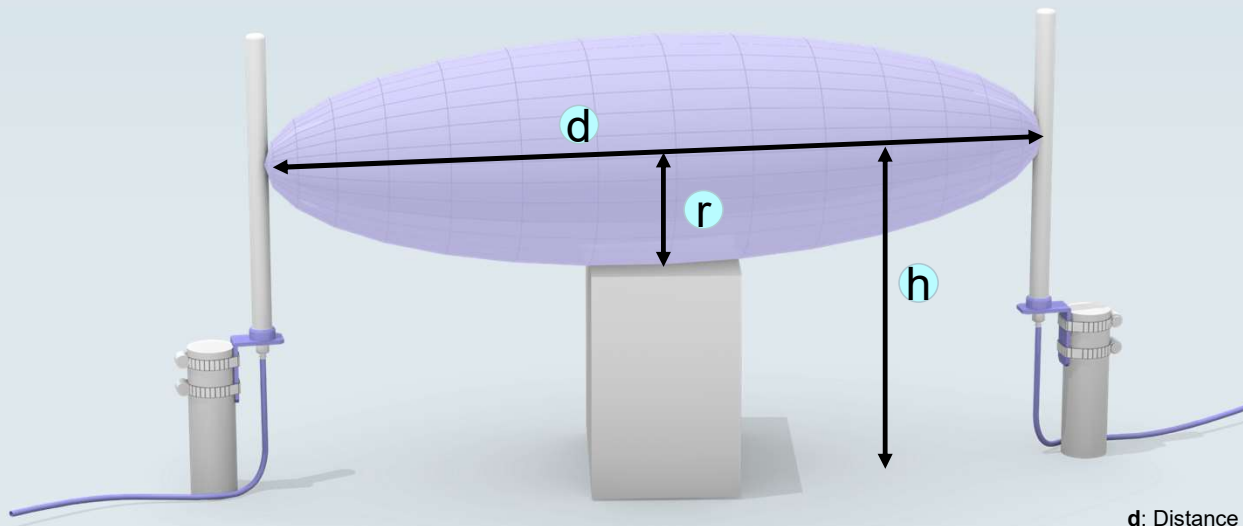
Material attenuation

- The lower the frequency, the lower the material attenuation
- The lower the material attenuation, the bigger the achievable distance

Obstacles	Typ. attenuation @ 868/900 MHz	Typ. attenuation @ 2,4 GHz
Window	1 – 2 dB	3 dB
Sand-lime brick (24 cm)	5 – 6 dB	9 – 10 dB
Hedge (2 m)	8 dB	15 dB
Reinforced concrete wall (16 cm)	12 – 15 dB	20 – 25 dB
Forest (25 m)	20 dB	40 dB



Fresnel Zone

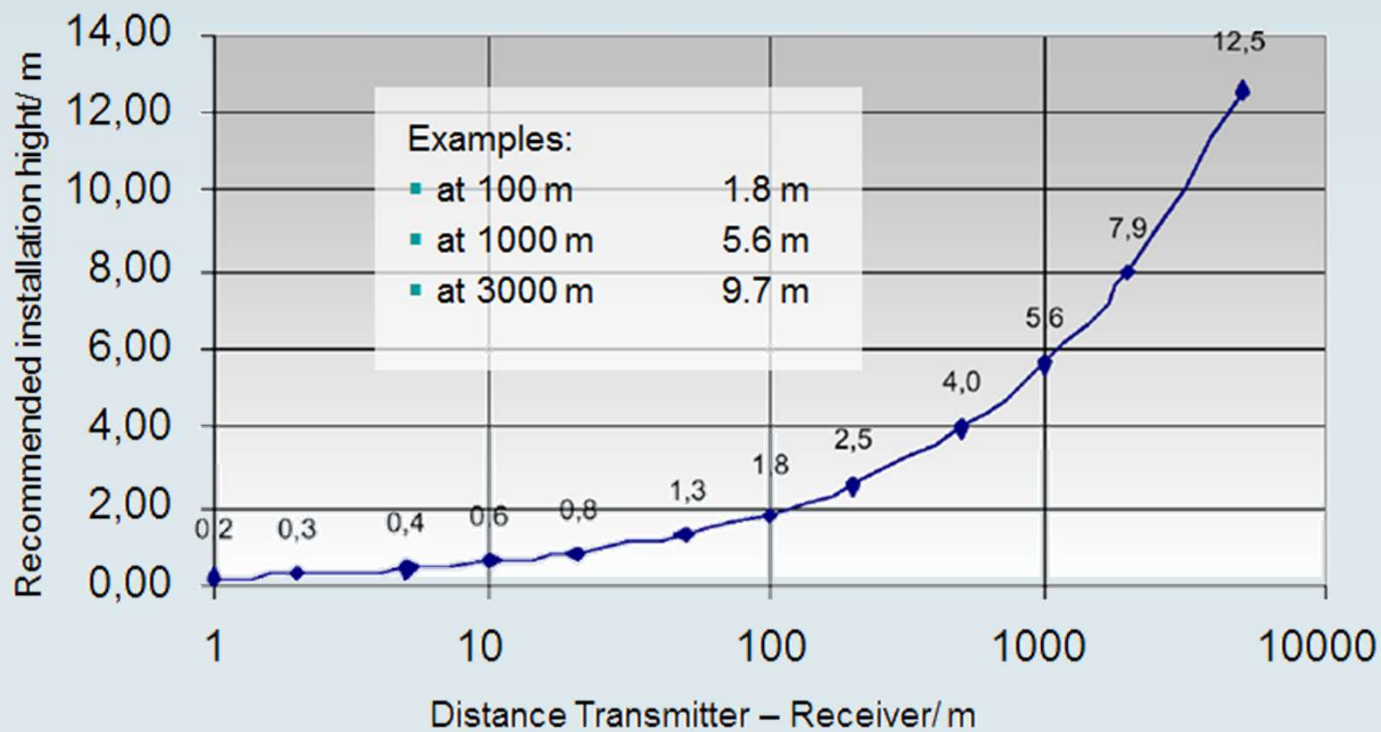


The antenna height increases with the distance!

- d: Distance between antennas
- r: Radius of the Fresnel-Zone in the middle
- h: Necessary total height of the antennas
(Obstacle height + radius Fresnel Zone)



Antenna height @ 2,4 GHz



- The higher the antenna, the bigger the achievable distance



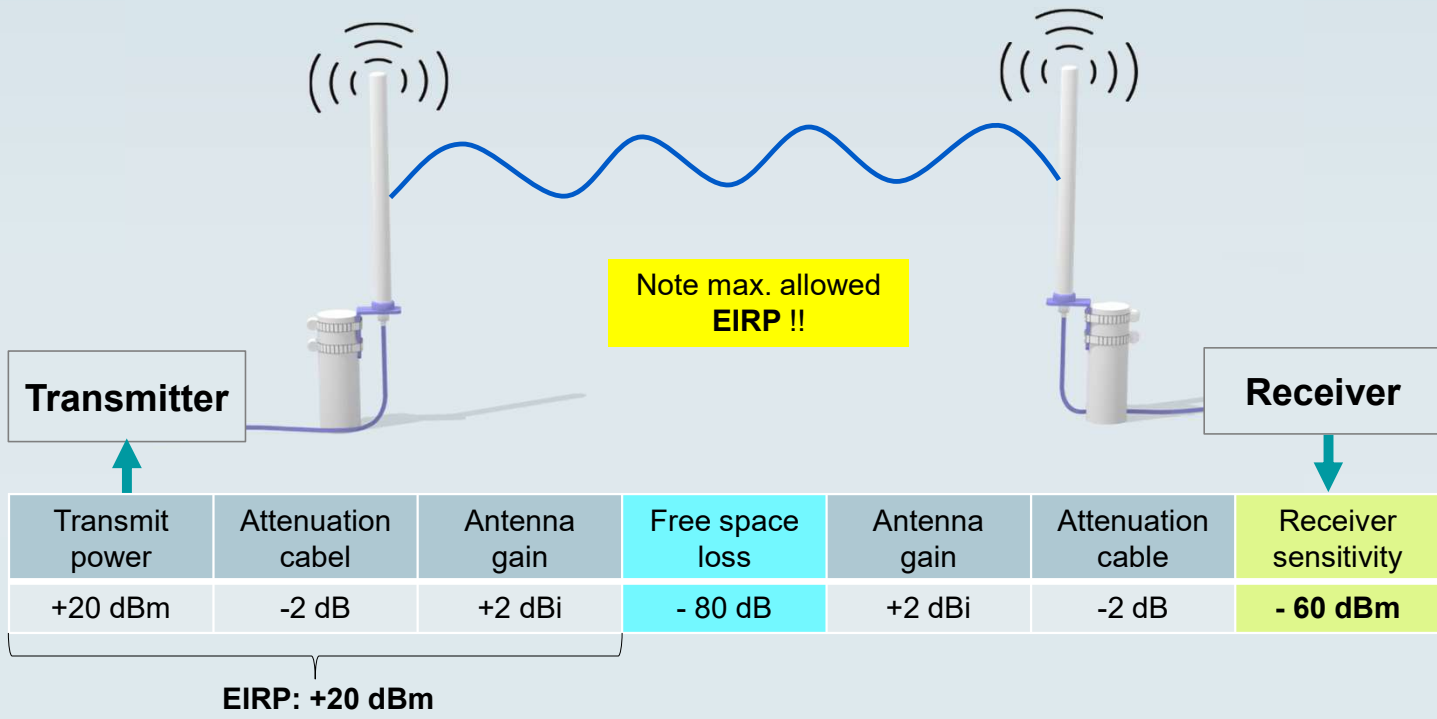
Affected by weathering



- Rain, snow have only minimal impact
 - Attenuation of 50 l / m²h is 0,02 dB / km
- Wind has no direct influence, but taken into account when fixing the antenna!



Calculating with decibels (dB)





Max. permissible radiated power EIRP

Effective Isotropic Radiated Power (EIRP)



Sender

Transmission power	Attenuation cable	Antenna gain	EIRP
+16 dBm	-2 dB	+6 dBi	+20 dBm
+20 dBm	-2 dB	+2 dBi	+20 dBm

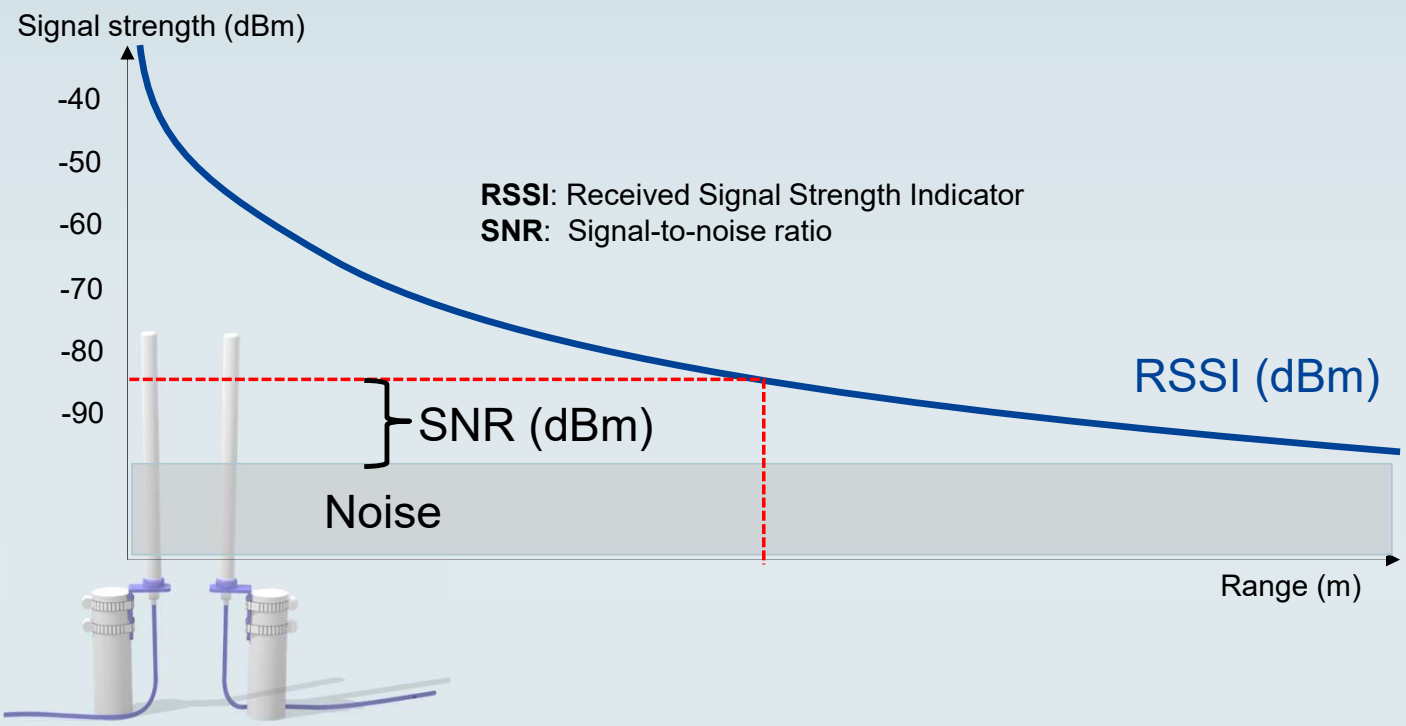
For Europe:

- 868 MHz-Band: max. 27 dBm (EIRP)
- 2,4-GHz-Band: max. 20 dBm (EIRP)
- 5,150 GHz bis 5,350 GHz max. 23 dBm (EIRP)
- 5,470 GHz bis 5,725 GHz max. 30 dBm (EIRP)

The legally prescribed radiated power (EIRP) must not be exceeded.



Indications of signal quality

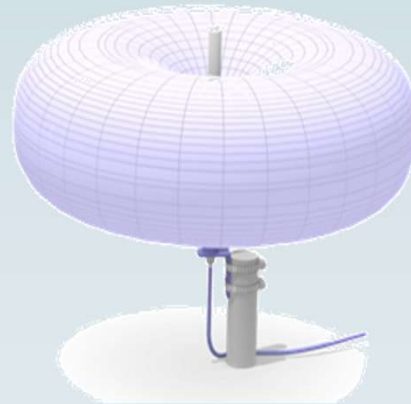


- The lower the data rate, the more "robust" is the communication or the higher the achievable distance
- The lower the SNR, the poorer the signal quality, and transmission problems due to loss of frames must be expected



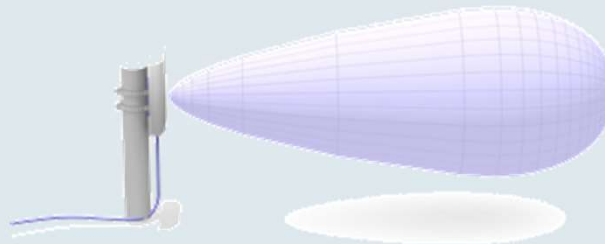
Antenna types

Omnidirectional antenna (OMNI)

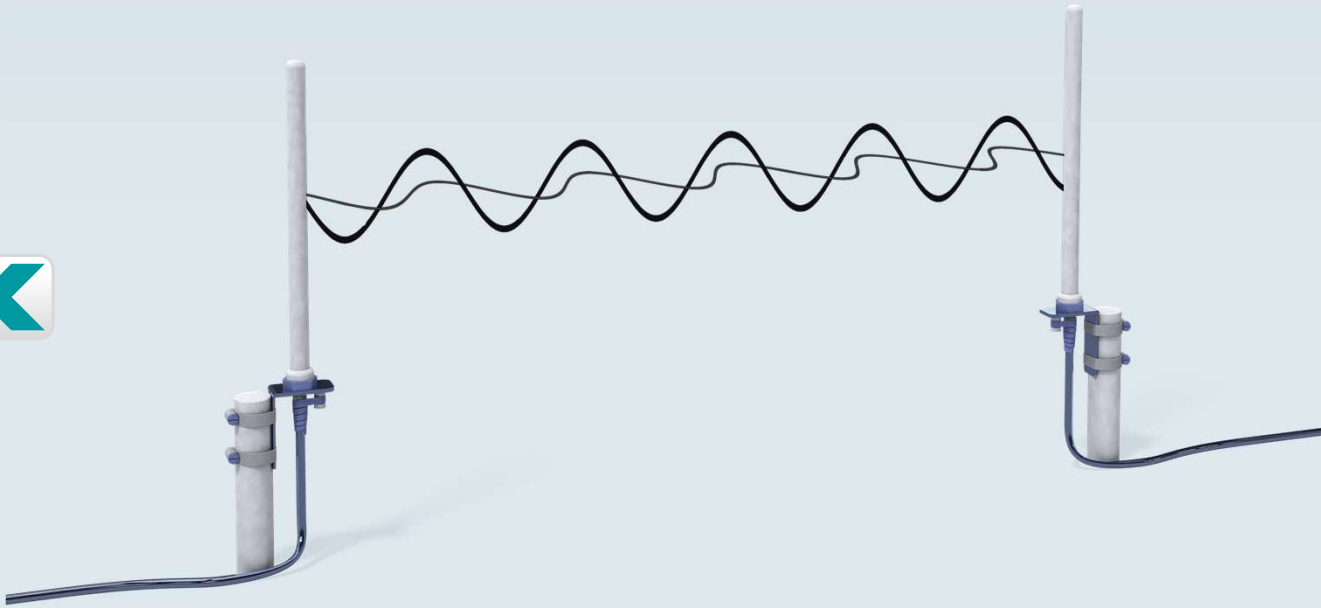


- The larger the opening angle, the easier the antenna alignment
- The smaller the opening angle the greater the antenna gain

Directional antenna (Yagi)



Antenna characteristic

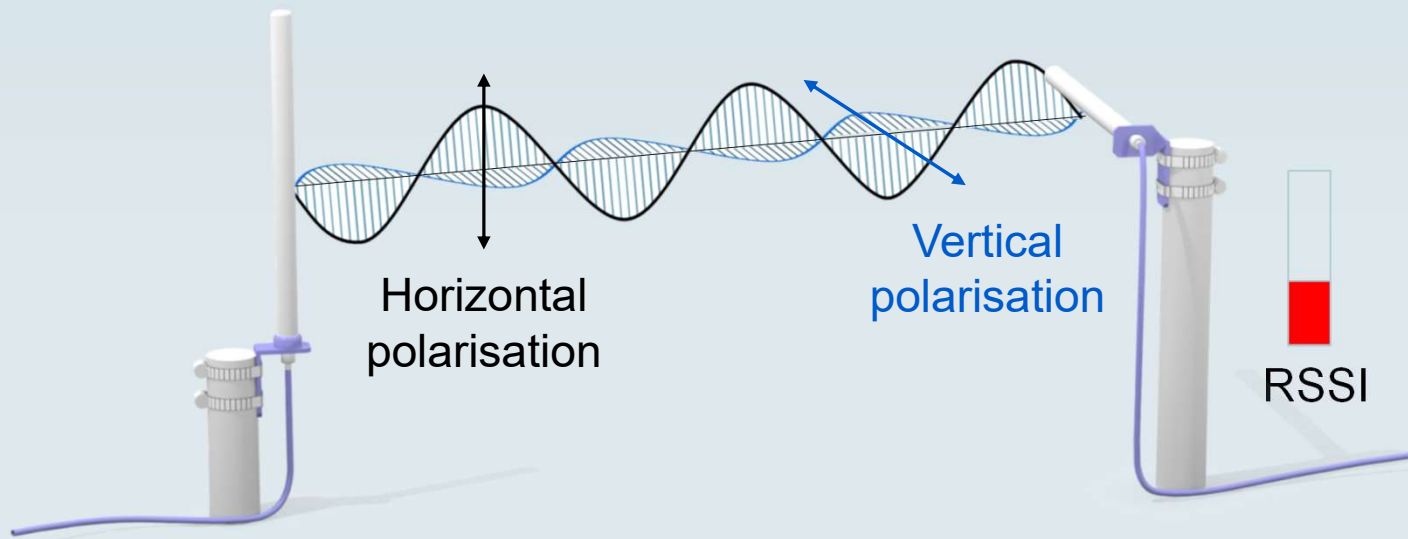


- The characteristic of an antenna can be compared with various light sources :
 - Light bulb → Omni antenna
 - Pocket lamp → Directional antenna
 - Laser pointer → Strong directional antenna e. g. Yagi
- You can also combine omnidirectional and directional antennas. Ensure the same polarization of the antennas.

Tip: You can also combine circular and vertical polarized antennas in certain applications! Example: Antenna installation near the ground.



Polarisation



At 90 ° theoretically no reception possible.



Selection of the right antenna



Omnidirectional antenna

- Wireless modules facing different directions
- Mobile applications
- Applications without sight (reflective environments)

Directional antenna

- Cover large distances
- Point-to-point connections
- Stationary or linearly movable applications
- Decoupling due to directivity in the case of multiple point-to-point paths
























Product
overview

Omnidirectional antenna

Article	RAD-ISM-2400-ANT-OMNI-2-1-RSMA	RAD-ISM-2400-ANT-VAN-3-0-RSMA	ANT-OMNI-2459-02	RAD-ISM-2400-ANT-OMNI-6-0	ANT-OMNI-5900-01	RAD-ISM-2459-ANT-FOOD-6-0	RAD-900-ANT-OMNI-2-N	ANT-OMNI-868-01
Article No.	2701362	2701358	2701408	2885919	2701347	2692526	2904802	2702136
Picture								
Frequency	2.4 GHz	2.4 GHz	2.4 + 5 GHz	2.4 GHz	5 GHz	2.4 + 5 GHz	868 MHz	868 MHz
Gain	2 dBi	3 dBi	2.5 / 5 dBi	6 dBi	5 dBi	>3 / >5 dBi	2 dBi	4 dBi
Polarization	vertical	vertical	vertical	vertical	vertical	vertical	vertical	vertical
Beamwidth horizontal	360°	360°	360° (2.4 / 5 GHz)	360°	360°	360°	360°	360°
Beamwidth vertical	75°	85°	30° (2.4 GHz) 16° (5 GHz)	30°	25°	30° (2.4 GHz) 25° (5 GHz)	50°	30°
Connector	RSMA (m)	RSMA (m)	N (m)	N (f)	N (f)	N (f)	N (f)	N (f)
Protection class	IP 65	IP 55	IP 68	IP 65	IP 64	IP 68	IP 65	IP 65
Temperature range	-20...+65°C	-40...+80 °C	-40...+70°C	-40...+75°C	-45...+70°C	-40...+80°C	-45...+70°C	-40...+75°C
Dimension	82,5x7,8 mm	86 x 43 mm	180 x 23 mm	250 x 22 mm	16 x 160 mm	92 x 52 mm	84 x 36 mm	620 x 20 mm
	Incl. 1,5m cable	Incl. 1,5m cable	Enclosure fitting	Wall & pole fitting	Wall & pole fitting	Enclosure fitting	Enclosure fitting	Wall & pole fitting



Directional antenna

Article	ANT-DIR-2459-01	ANT-DIR-5900-01	RAD-ISM-5200-ANT-PAR-18-N	RAD-ISM-5200-ANT-PAR-22-N	ANT-DIR-868-01	RAD-ISM-900-ANT-YAGI-6.5-N	RAD-ISM-900-ANT-YAGI-10-N
Article No.	2701186	2701348	5606613	5606174	2702137	2867814	5606614
Picture							
Frequency	2.4 + 5 GHz	5 GHz	5 GHz	5 GHz	868 MHz	868 MHz	868 MHz
Gain	9 / 9 dBi	9 dBi	18 dBi	22 dBi	3,5 dBi	8.5 dBi	12.15 dBi
Polarization	vertical	+/- 45° dual slant	vertical	vertical	circular	vertical	vertical
Beamwidth horizontal	 75° (2.4 GHz) 55° (5 GHz)	 70°	 18°	 12°	 135°	 100°	 56°
Beamwidth vertical	 55° (2.4 GHz) 55° (5 GHz)	 60°	 18°	 12°	 90°	 62°	 46°
Connector	N (f)	2 x N (f)	N (f)	N (f)	N (f)	N (f)	N (f)
Protection class	IP 67	IP 67	IP 55	IP 55	IP67	IP65	IP65
Temperature range	-40...+80°C	-40...+80°C	-40...+70 °C	-40...+70°C	-40...+80°C	-40...+80°C	-40...+70°C
Dimension	80x101x35 mm	80x101x35 mm	152,4x152,4 mm	304 mm diam.	80 x 101 x 35 mm	170 x 60 mm	172 x 60.5 mm
	Wand & Mast Montage	Wand & Mast Montage	Wand&Mast Montage	Wand & Mast Montage	Wand & Mast Montage	Wand & Mast Montage	Wand & Mast Montage



Antenna connector



Cable side

Radio side

SMA



Antenna cable and accessories

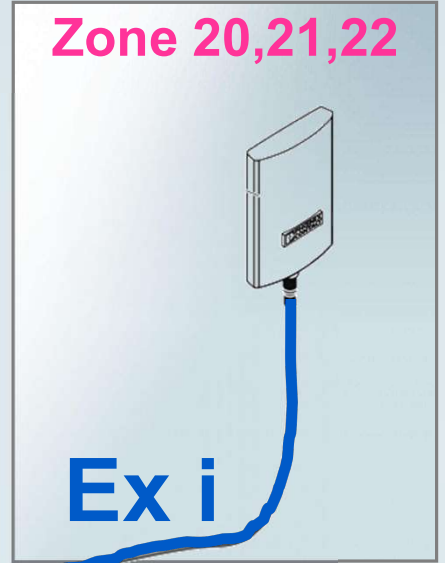
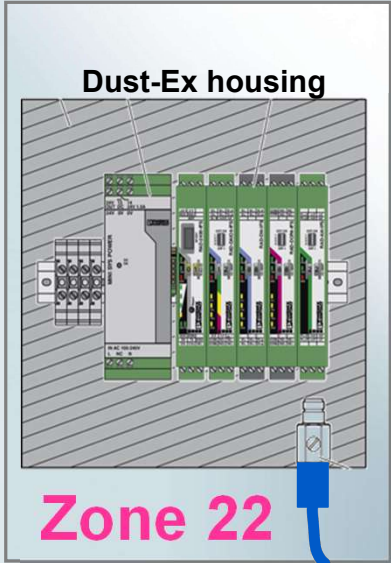
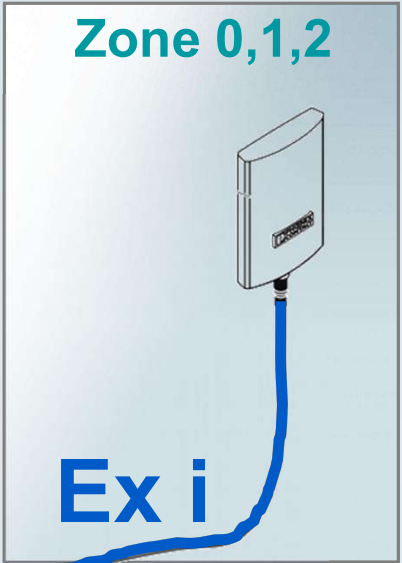
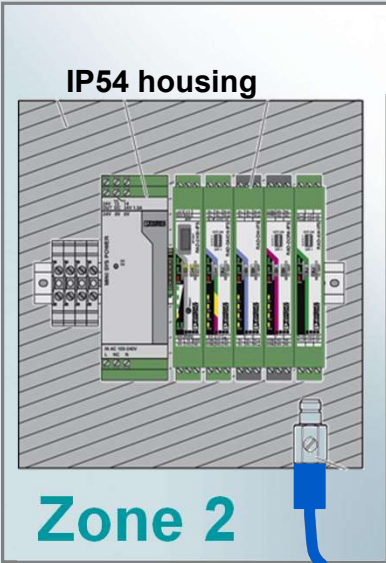


	Antenna cable for the control cabinet lead through	Antenna cable	Antenna cable	Surge protection 2,4 / 5 GHz	Surge protection 868 / 900 MHz	Antenna barrier
Frequency range	0,3 ... 6 GHz	0,3 ... 6 GHz	0,3 ... 6 GHz	2,4 ... 5,9 GHz	0,8 ... 2,25 GHz	0,3 ... 6 GHz
Connector	RSMA (m) -> N (m)	RSMA (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)
Characteristics	Easy install through flexible inner conductor, UV-resistant, oil-resistant	Solid inner conductor, low attenuation, UV-resistant	Easy install through flexible inner conductor, UV-resistant, oil-resistant	Overvoltage protection for coaxial signal interfaces with Lambda / 4 technology		Antenna barrier for control cabinet operation, type of protection: Ex i, installation barrier: zone 2, installation antenna: zone 0, 1 or 2
Length / Article No.	0,5 m / 2701402	0,5 m / 2903263 1 m / 2903264 2 m / 2903265 3 m / 2903266 5 m / 2702140	3 m / 2867649 5 m / 2867652 10 m / 2867665 15 m / 2885634	2838490	2801057	2702198

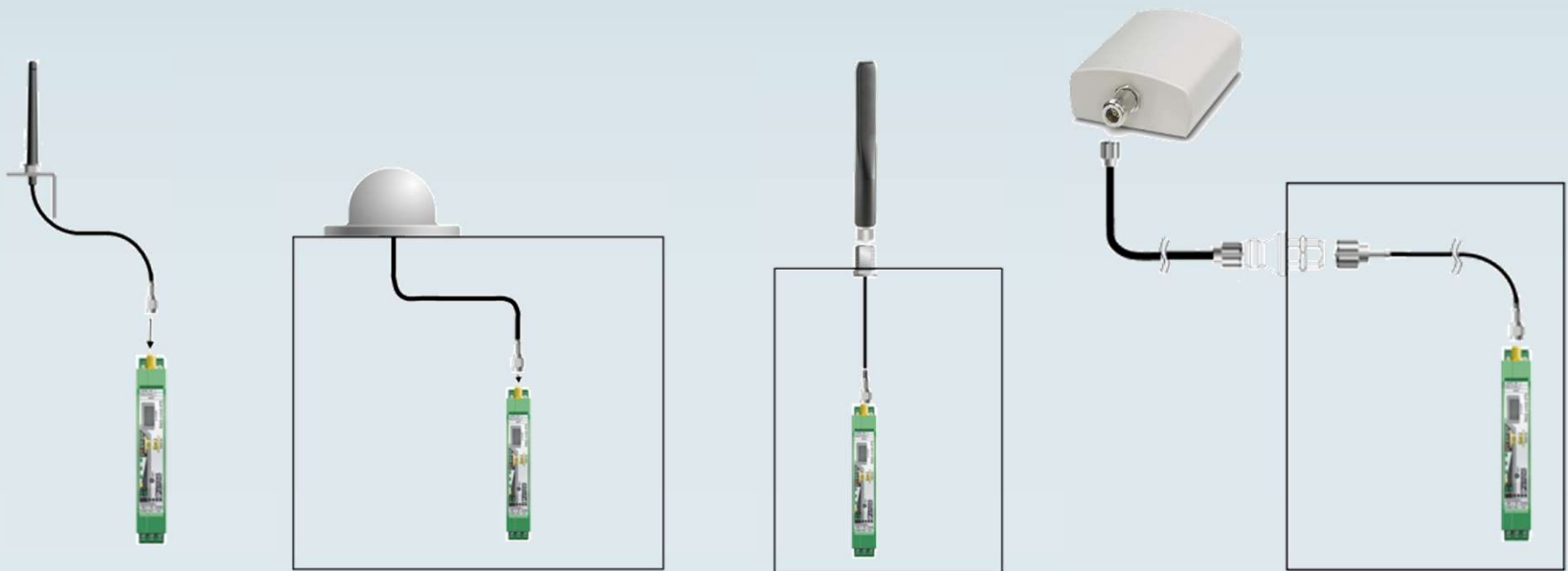


Antenna installation in Ex areas

new



Installation examples



Tip: Use an antenna overvoltage protection outdoors!



Wrong antenna installation



Wrong !



Better



Best solution!



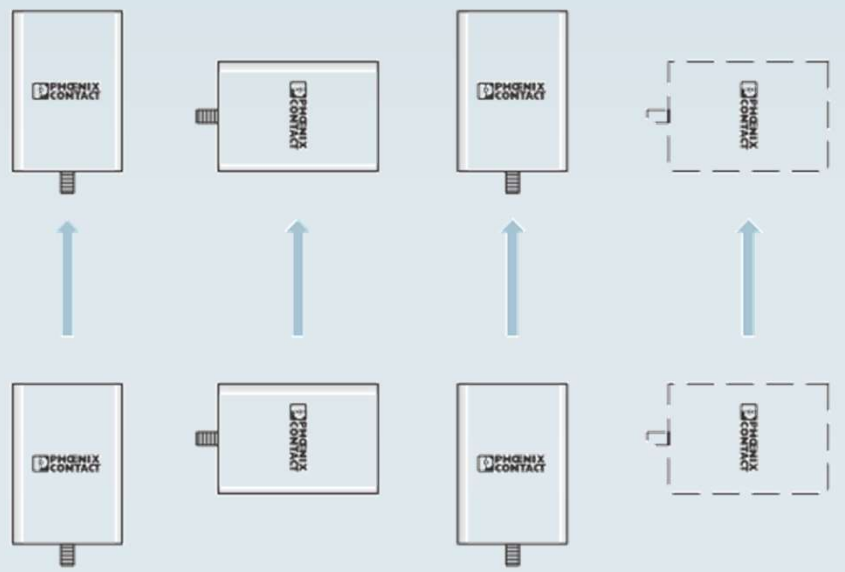
The right distance between antennas

Frequency	Minimum distance (vertical and horizontal)
868/900 MHz	1.5 – 2.5 m
2.4 GHz	0.5 – 1.0 m
5 GHz	0.5 – 0.8 m

Tip: The best way is to mount the antenna on top of each other!



Decoupling of wireless links



- Decoupling of spark gaps by directivity and different polarisation planes
- The Signals of different radio links are decoupled

The right installation

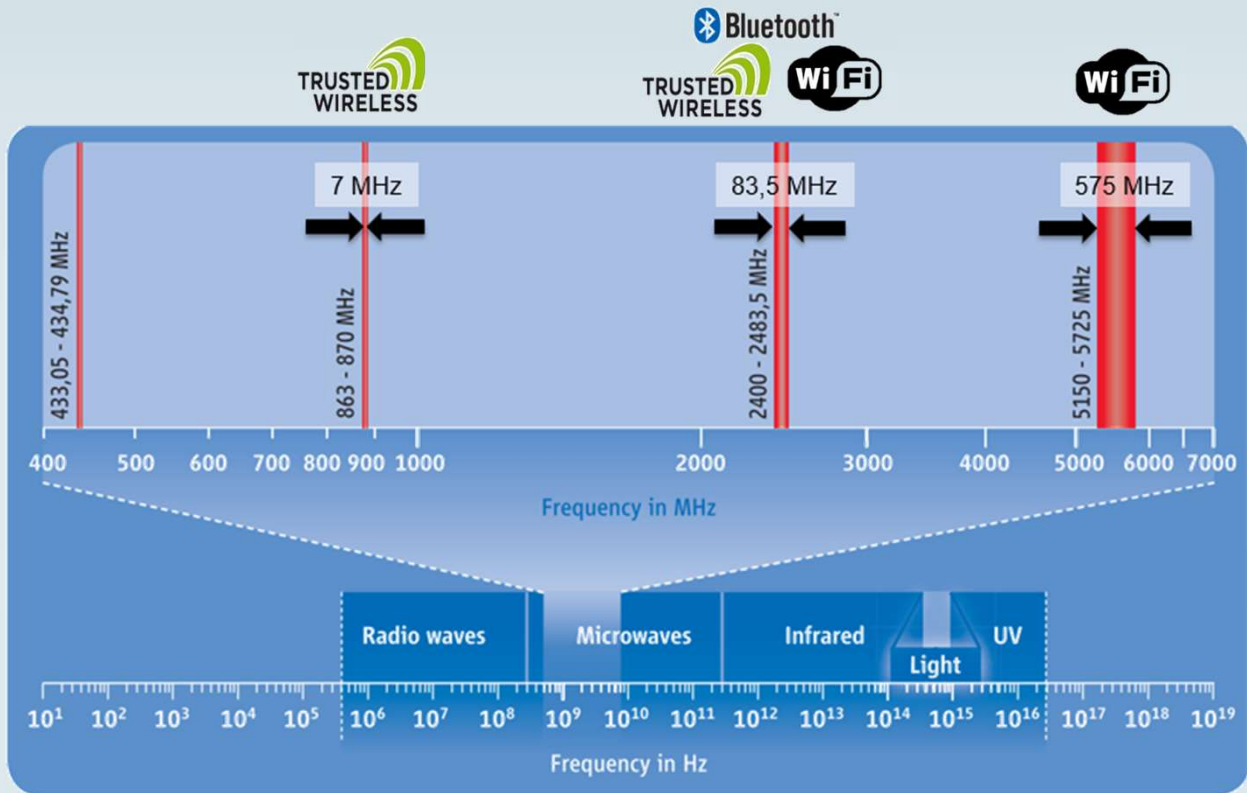


- An omnidirectional antenna must always be installed with enough distance to an obstacle (mast, building wall or metallic wall)
- An antenna should be installed, especially outdoors, as high as possible position. With it you can improve the range. Keep the Fresnel zone free.
- The antenna cable should be as short as possible so that there are as few losses on the cable. Attach the wireless module closer to the antenna, e.g. in a small box.
- Always protect connections on the outside cables, junctions and antennas with protective tape.



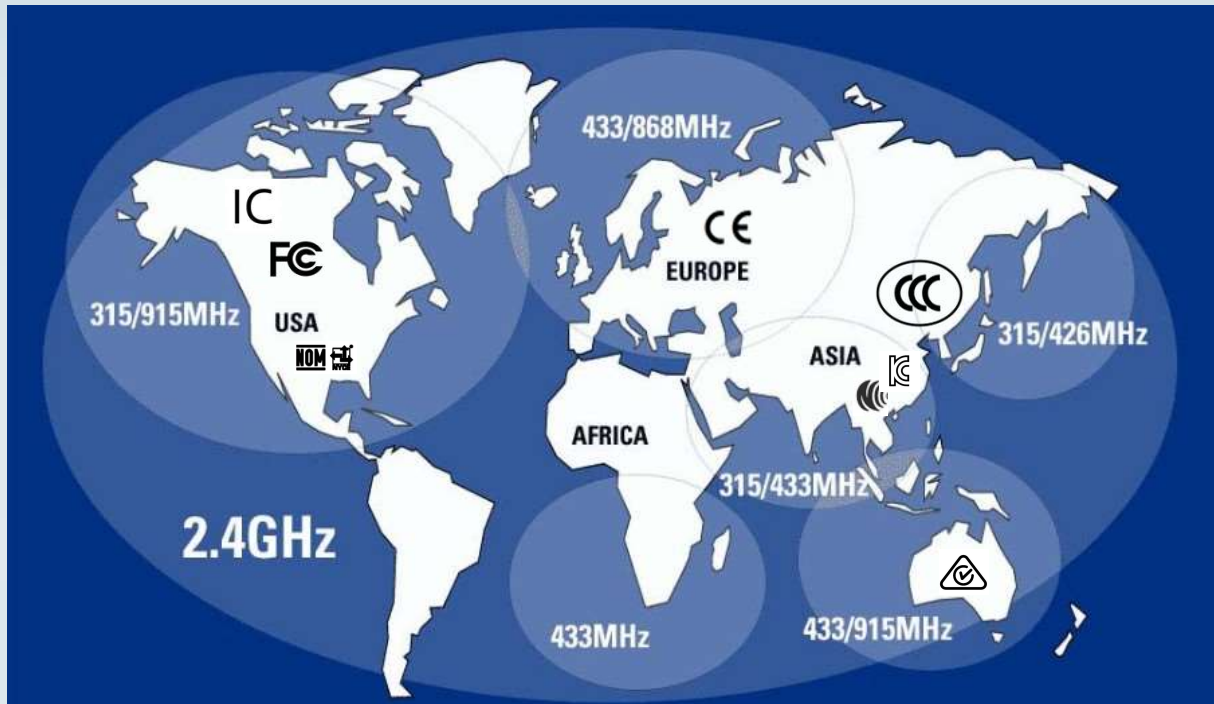
[More Details](#)

License free frequency bands





Country approval / notification



Germany

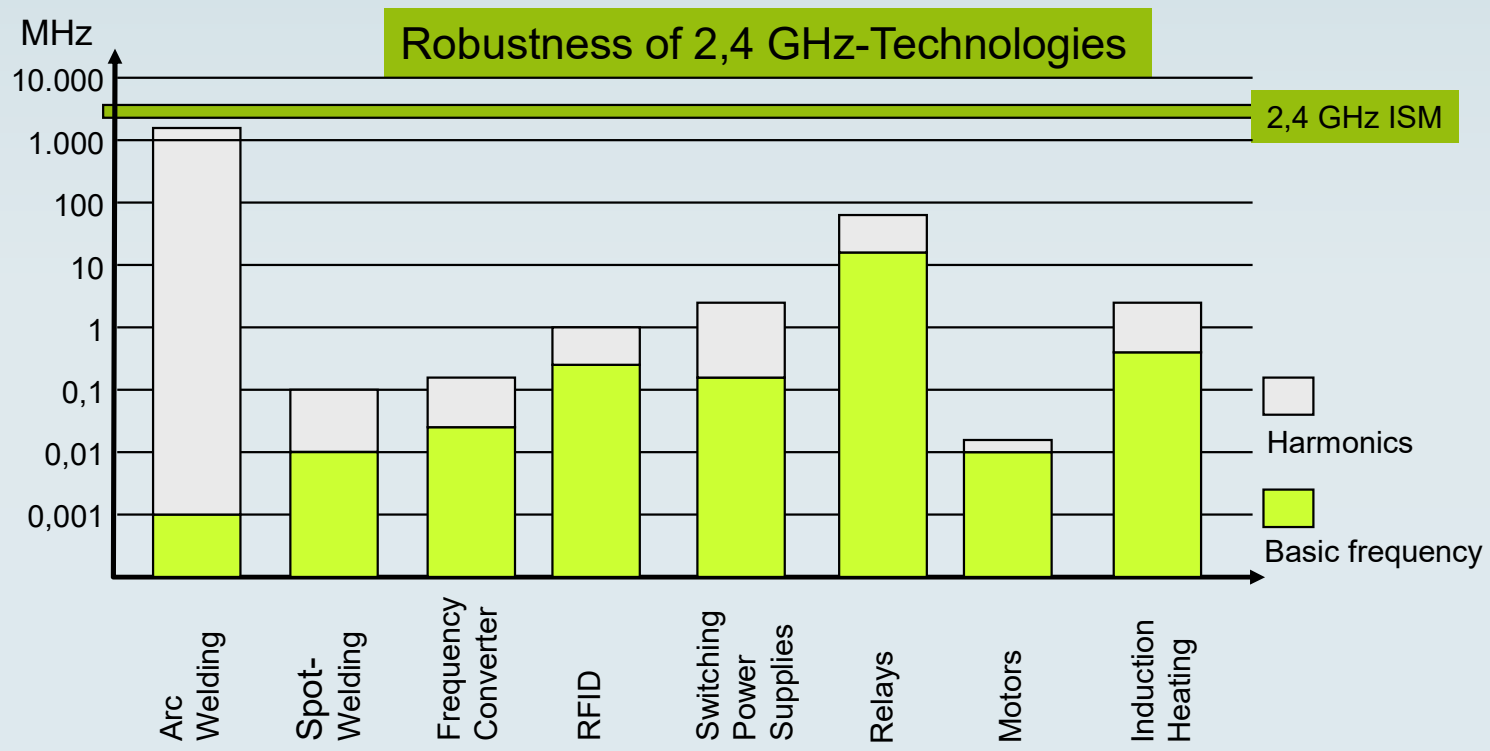
- ✓ Radio applications can be used on the shared frequencies without application and formal approval
- ✓ The user does not incur any costs in the form of fees or contributions due to the frequency usage

International




- ✓ Country specific
- ✓ Registration with the regulatory authority



Spectrum of typical industrial applications



Wireless Technologies

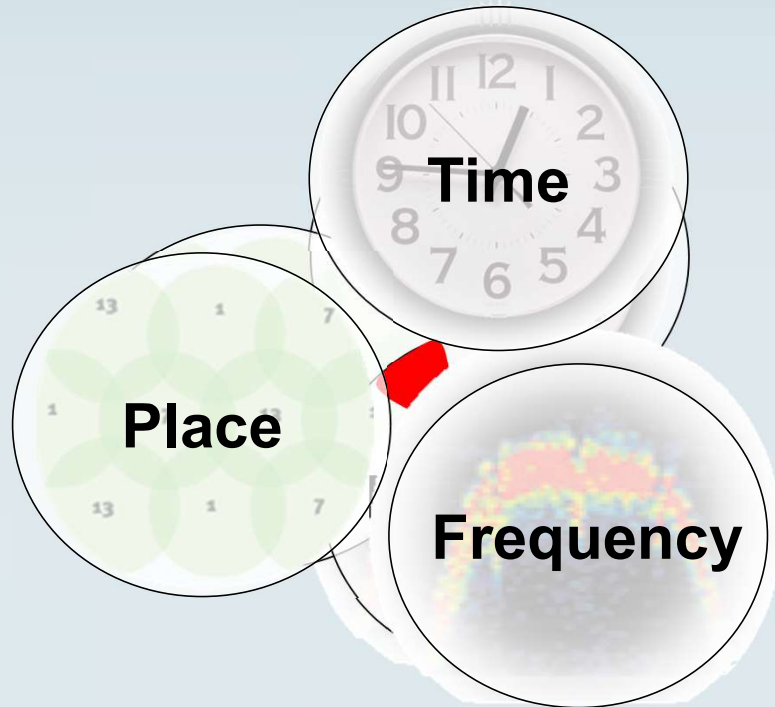
	 Bluetooth™	 Wi-Fi	 TRUSTED WIRELESS	WirelessHART™
	Bluetooth	WLAN (Wireless Local Area Network)	Trusted Wireless 2.0	Wireless HART
Network structure	Star structure - 1 Master up to 7 Slaves	Access point can handle endless clients	Mesh network – 1 Master up to 249 Slaves	Full-Mesh network – 1 Master up to 249 Slaves
Standard	IEEE 802.15.1	IEEE 802.11	Proprietär by Phoenix Contact	IEEE 802.15.4 HART 7
Transmission method	Frequency hopping (FHSS)	Direct Sequence Spread Spectrum (DSSS)	Frequency hopping (FHSS)	Frequency hopping (FHSS)
Application	fast, small networks	Fast, high data volume, Ethernet	Low/medium data rate, large networks, best for infrastructure application	HART signal, Process industry, short distances
Frequency	2,4 GHz	2,4 GHz, 5 GHz,	868 MHz, 900 MHz, 2,4 GHz	2,4 GHz
Latency time (typical)	>10 ms (IO) > 50ms (Serial)	>16 ms (depending on the data rate / Distance)	0,1 – > 2 s, depending on the OTA data rate / network structure	> 3 s up to several minutes
Distance (free line of sight)	Typ. <= 150 m	Typ. <= 150 m	<= 5 km (2,4 GHz) <= 20 km (868 MHz) <= 32 km (900 MHz)	Typ. <= 250 m



[More Details](#)



Coexistence – Interference

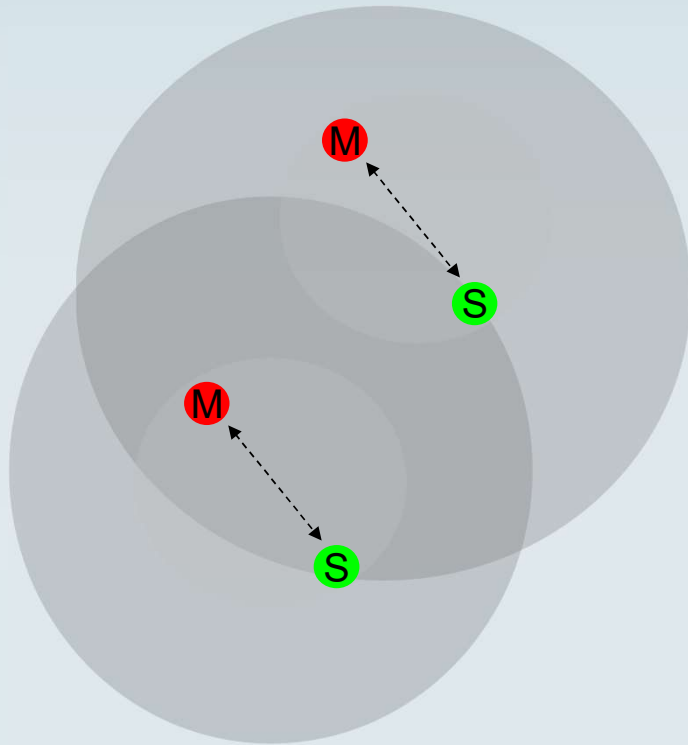


Influencing of radio operation only happens if several radio systems are transmitting ...

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



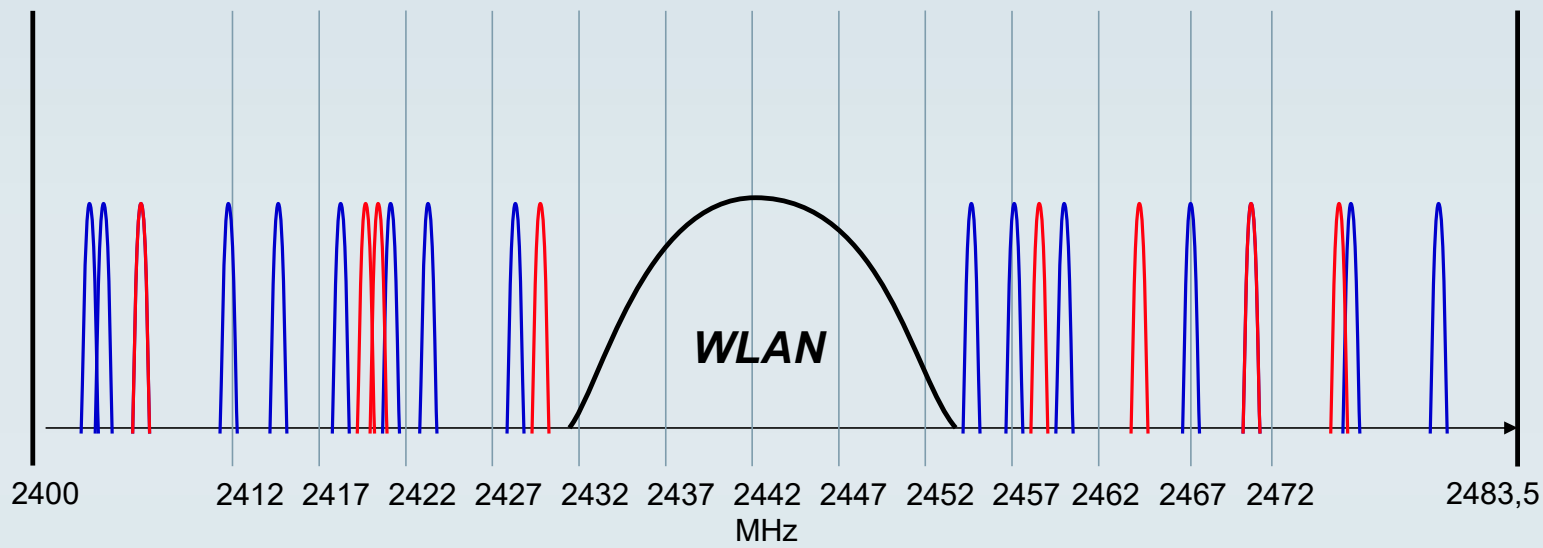
Coexistence – spatial decoupling



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



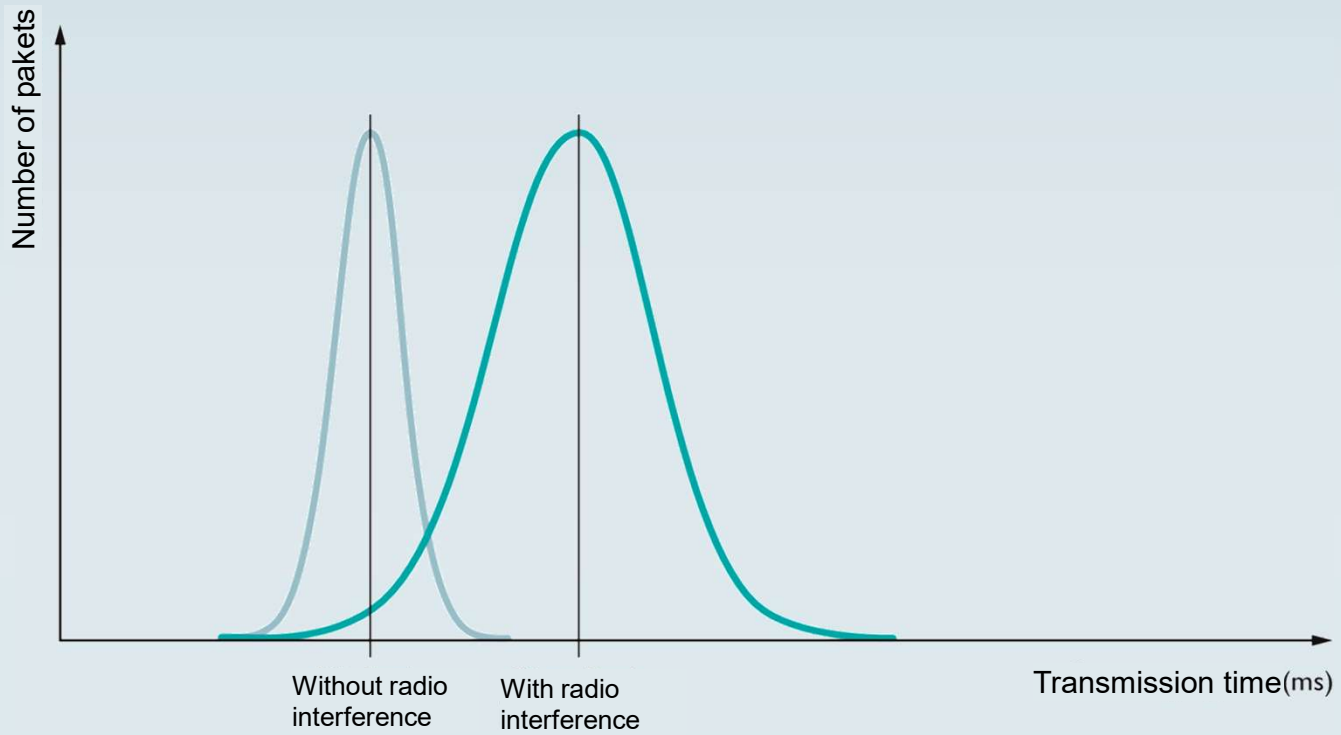
Coexistence – Inteference-free parallel operation



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



Impact of radio interference



Reduce earthworks, thanks to wireless technology!



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



Trusted Wireless 2.0



Global RF Technology
2.4 GHz, 900 MHz, 868 MHz license-free ISM- Band
Increase distance by adjustable data rates
Optimal adaption to the respective application



Secure data communication
Proprietary, „not-open“ Technology
Encryption: 128-Bit AES
Authentication / Integrity check: Unique encryption key for each message verifies the validity of the transmitter



Flexible network structures
Automatic network formation
Self-organizing and self-healing
Point-to-Point, Star, Mesh- and Line structures



Robust data communication
Coexistence mechanism: FHSS, WLAN-Blacklist, adjustable RF bands
Unique NET-ID via CONF-Stick
Multiple transmissions



Trusted Wireless 2.0



Areas of application for Trusted Wireless 2.0

Trusted Wireless is a wireless technology which has been developed especially for the industrial use!

- Rugged communication thanks to FHSS
- Automatic and manual coexistence mechanismus
- Secure communication thanks to 128 bit AES encryption and authentication
- Long range thanks to high reciever sensitiviity and variable sata transmission rates
- Flexible networks with automatic connection management
- Distributed network maintenance makes things easier and faster
- Extensive diagnostic properties
- Adaptable to the desired application



Radioline

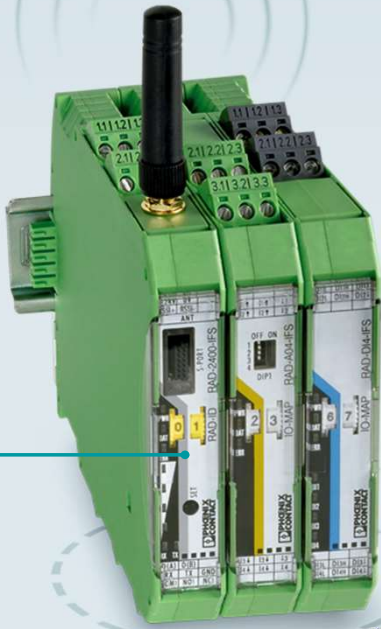


Easy startup

- Without programming
- Adjustable via thumbwheel
- I/O mapping

Universal applications

- I/O-to-I/O cable replacement
- Serial cable replacement RS-232/485
- I/O integration in Modbus RTU PLCs
- RS-485 extension possible



Worldwide use

- 2,4 GHz, 868 MHz, 900 MHz and wired head stations
- Adjustable baud rates
- Ranges up to 5, 20 or 32 km

Flexibly expandable

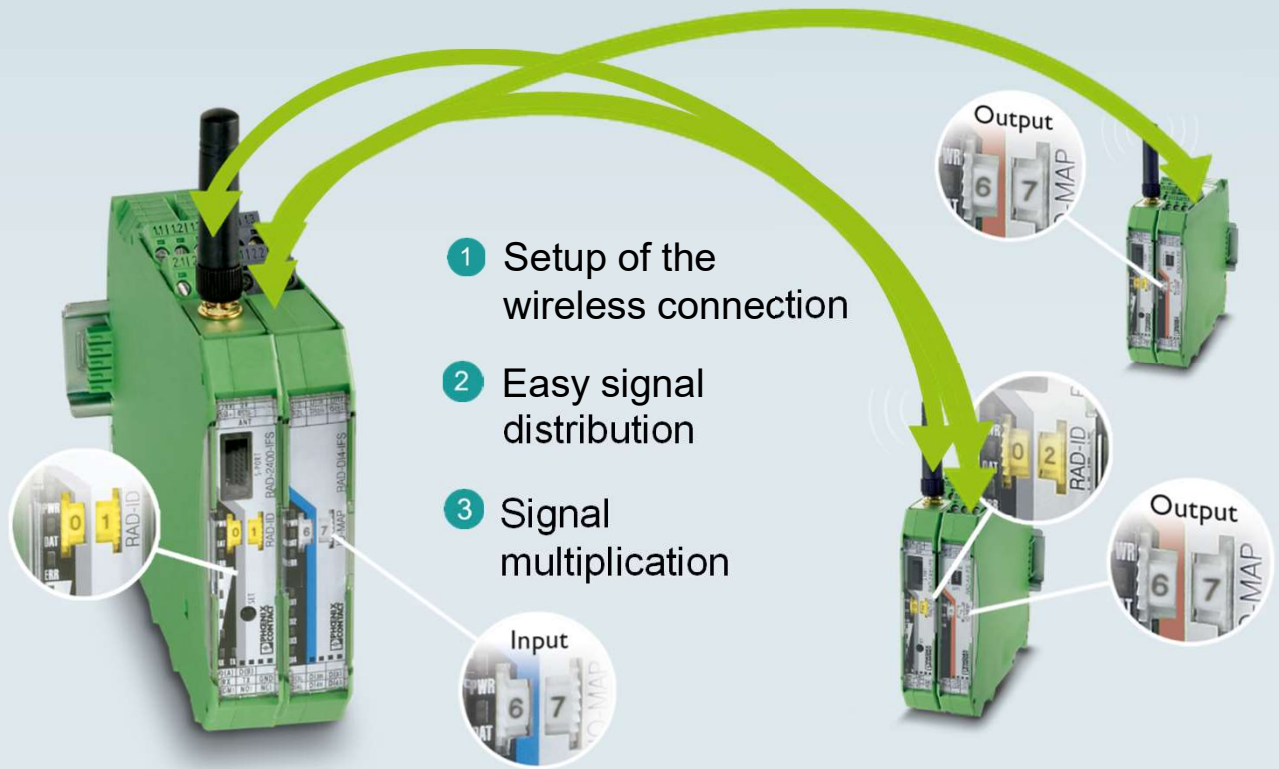
- Up to 250 Stations in a network
- Up to 32 I/O modules per station
- Various digital and analog extension modules
- Hot-Swapping
- Galvanic channel-to-channel isolation



Product overview



Radioline

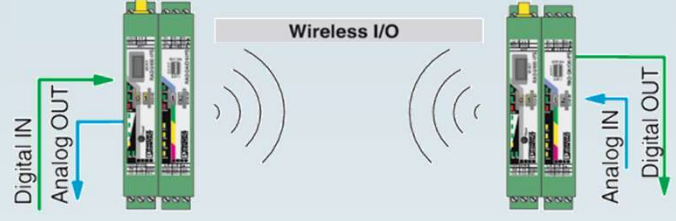


Product overview



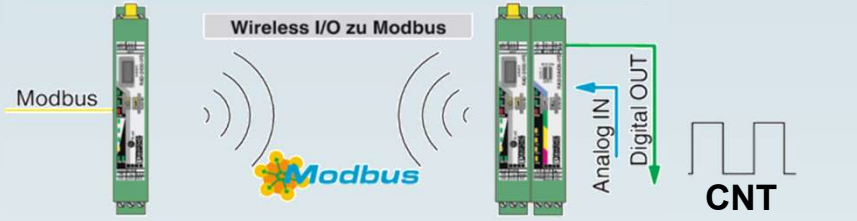
Radioline - One System for different applications

Option 1



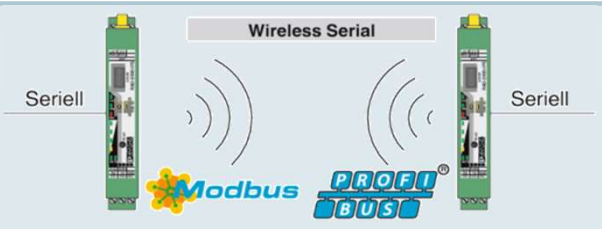
I/O to I/O

Option 2



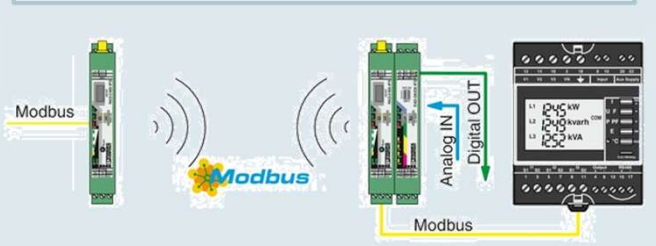
I/O to Modbus RTU

Option 3



Serial to Serial (RS 232/485)

Option 4



I/O and Modbus parallel



Product overview



Radioline System – Application overview

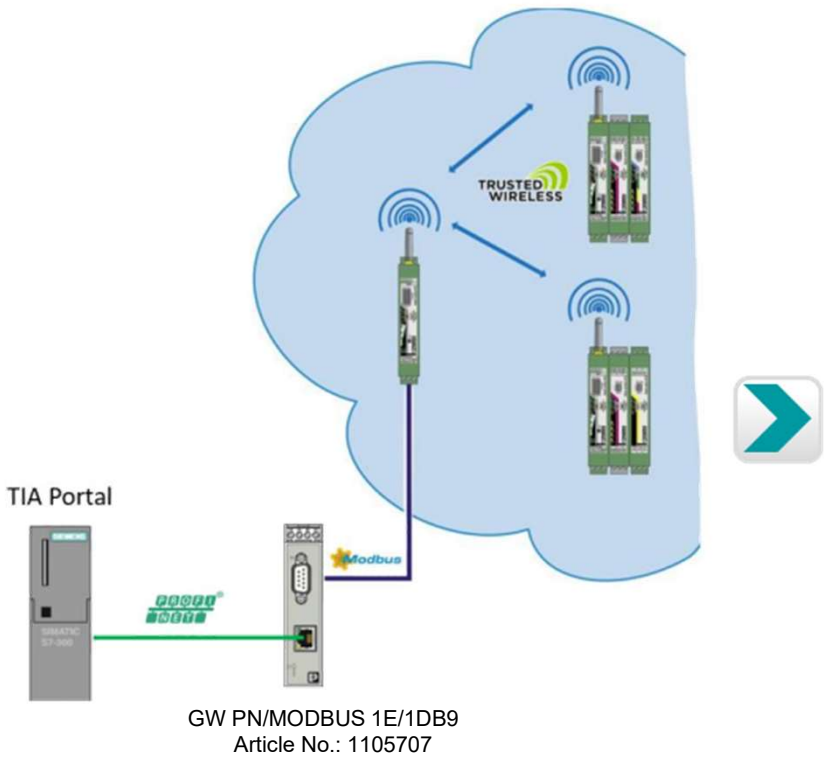
Application overview for the Radioline system	I/O to I/O	Serial to Serial	I/O to Serial	
	I/O data mode	Serial data mode	PLC/Modbus RTU mode	PLC/Modbus RTU Dual mode
Communication between wireless stations		*		
Combined communication between wireless- and RS-485 stations				
Communication between RS-485 stations				
Explanation	<p>* In addition to Modbus, more serial protocols are supported</p>			



Product overview

Radioline – IO Integration in TIA Portal

- Radioline IO Integration into PROFINET networks via PROFINET / MODBUS protocol converter
- Integration in TIA-Portal via GSDML files
- Simple reading of process data, status and diagnostic parameters of the individual radio stations



Product overview



Radioline



Region	Worldwide	Japan	America	Australia	Europe	Worldwide (no radio)
Type	RAD-2400-IFS (Radio)	RAD-2400-IFS-JP (Radio)	RAD-900-IFS (Radio)	RAD-900-IFS-AU (Radio)	RAD-868-IFS (Radio)	RAD-RS485-IFS (RS485 bus module)
Frequency range	2,4002 ... 2,4785 GHz		902 ... 928 MHz	915 ... 928 MHz	869,4 ... 869,65 MHz	-
Range up to	< 5 km (suitable for big mesh networks with line of sight)		< 32 km (suitable for big distances with obstacles)		< 20 km (suitable for big distances with obstacles)	< 1,2 km (over existing 2-wire copper lines or more with converter or repeater)
Transmit power	20 dBm		30 dBm		27 dBm	-
Air data rate	16...250 kBit/s		16...500 kBit/s		9,6 ... 120 kBit/s	-
Transmission time (typ.)	> 200 ms (I/O mode) > 25 ms (Serial mode)		> 200 ms (I/O mode) > 25 ms (Serial mode)		> 2 s (I/O mode) > 390 ms (Serial mode)	> 80 ms (I/O mode)
Article No.	2901541	2702863	2901540	2702878	2904909	2702184



Radioline



	Outdoor box for use in America	Outdoor box for worldwide use (configurable)
Type	RAD-900-DAIO6	RAD-RUGGED-BOX-CONF
Integrated	900 MHz radio, 6 integrated IO channels (2 x digital IN and OUT, 1 x analog IN and OUT), power supply	Fully pre-wired box with integrated power supply, over-voltage protection, selectable radio module and up to three selectable IO extension modules
Degree of protection	NEMA 4X (IP 66)	IP 66
Range up to	32 km	Depends on selected radio
Supply voltage	10,8 ...30,5 V DC, 100 ... 240 V AC	100 ... 240 V AC
Temperature range	-40°C...+70°C	-25°C...+55°C
Order number	2702877	1091638



Radioline – I/O Extension modules



	Digital In 4 channel	Digital Out 4 channel	Digital In 8 channel	NAMUR In 4 channel	Digital Out 8 channel	Analog In 4 channel	Analog In 4 channel	Analog Out 4 channel	Analog / digital 6 channel	PT 100 4 channel
Type	RAD-DI4-IFS (Input)	RAD-DOR4-IFS (Output)	RAD-DI8-IFS (Input)	RAD-NAM4-IFS (Input)	RAD-DO8-IFS (Output)	RAD-AI4-IFS (Input)	RAD-AI4-U-IFS (Input)	RAD-AO4-IFS (Output)	RAD-DAIO6-IFS (Input / Output)	RAD-PT100-4-IFS (Input)
Details	4 digital wide range inputs 0...250V AC/DC	4 digital relay outputs 0 ... 250 V AC/DC / 5 A	8 digital inputs 0...30,5 V DC	4 digital NAMUR inputs, Line break / short circuit detection	8 digital transistor outputs 30,5 V DC / 200 mA	4 analog inputs 0/4...20 mA, Line break / short circuit detection	4 analog inputs 0...10 V	4 analog outputs 0/4...20 mA, 0...10 V DC	1 analog In-/outputs 0/4...20 mA 2 digital In-/outputs 0...250 V AC/DC	4 Pt100 inputs Temperature measuring range: -50°C...+250°C
Related IO module	RAD-DOR4-IFS	RAD-DI4-IFS	RAD-DO8-IFS	RAD-DO8-IFS	RAD-DI8-IFS	RAD-AO4-IFS	RAD-AO4-IFS	RAD-AI4, RAD-AI4-U, RAD-PT100-4-IFS	RAD-DAIO6-IFS	RAD-AO4-IFS
Order No.	2901535	2901536	2901539	2316275	2902811	2901537	2702290	2901538	2901533	2904035



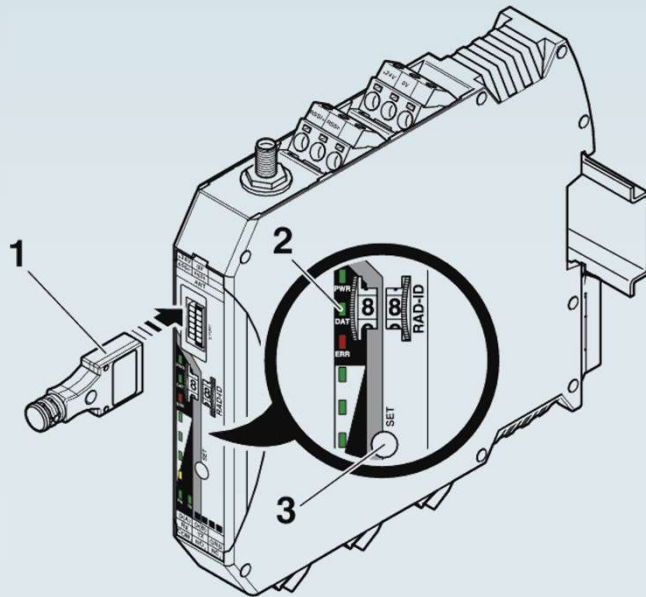
Radioline – accessories



	RAD-CONF-RF3	RAD-CONF-RF5	RAD-CONF-RF7	RAD-CONF-RF1	RAD-CONF-RF1	RAD-MEMORY	RAD-CABLE-USB
Frequency	2,4 GHz	2,4 GHz	2,4 GH	868 MHz	900 MHz	For all Radioline front modules	For all Radioline front modules
Description	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 3	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 5	Configuration stick for the 2,4 GHz wireless module unique network ID, RF band 7	Configuration stick for the 868 MHz wireless module unique network ID, RF band 1	Configuration stick for for the 900 MHz wireless module, unique network ID, RF band 1	Memory stick for saving custom configuration data	Data cable for communication between the PC and Radioline devices
Features	For easy and secure network addressing with unique network ID					Freely configurable	for diagnostics and configuration, 2m cable
Order No.:	2902814	2902815	2902816	2702197	2702122	2902828	2903447



Radioline – Configuration sticks



1. CONFIGSTICK RAD-CONF-RF....
2. Status LEDs
3. SET button

Using a CONFIGSTICK, you can configure a **unique and secure** network. This enables the parallel operation of multiple networks (using different RF bands).

Reading in the device configuration using the CONFSTICK

- Insert the CONFSTICK into the S-PORT of the wireless module.
- Press and hold down the SET button on the wireless module for 1 second.
- Parameter read in is started
- Read-in has been completed when the DAT LED lights up once. The new parameters are activated.
- Remove the CONFSTICK from the wireless module.



[Product overview](#)

Wireless Accessories

Cable and adapter

- Cable length 0,5 ... 15 m
- Frequency range 0 ... 6 GHz



Surge protection

- 2,4 GHz & 5 GHz
- 868 MHz & 900 MHz



Antenna barrier (Ex-i)

- Use of standard antennas in areas (Zone 0,1,2)
- Installation as enclosure lead-through in Zone 2
- Frequency range 0,7 ... 6 GHz
- Protection class IP65



Omnidirectional antenna

- For short and medium distances
- Numerous devices in different directions
- Versatile applications

Directional antenna

- Bridging large distances
- Point-to-point connections
- Stationary or linear applications
- Decoupling due to directivity in the case of multiple point-to-point paths



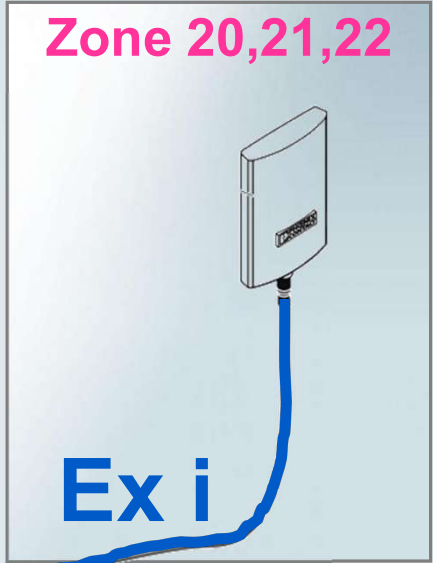
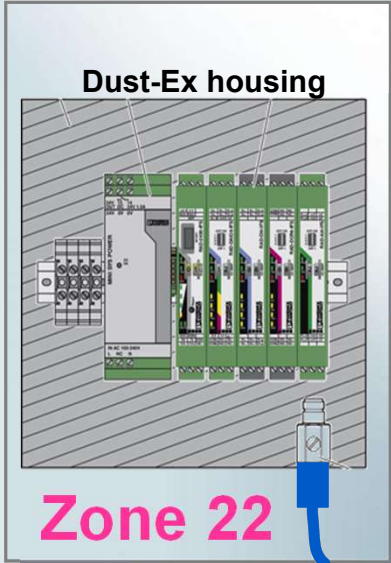
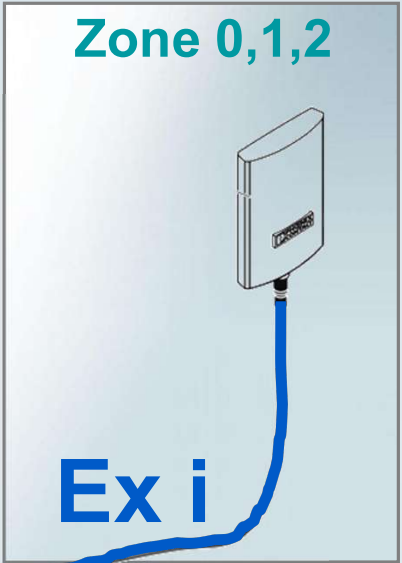
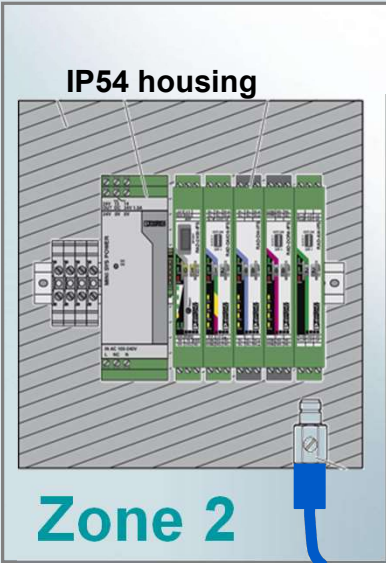
Antenna cable and accessories



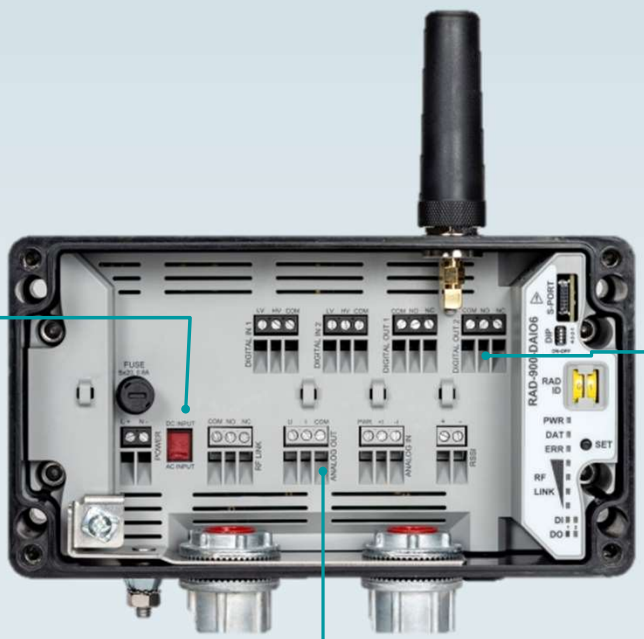
	Antenna cable for the control cabinet lead through	Antenna cable	Antenna cable	Surge protection 2,4 / 5 GHz	Surge protection 868 / 900 MHz	Antenna barrier
Frequency range	0,3 ... 6 GHz	0,3 ... 6 GHz	0,3 ... 6 GHz	2,4 ... 5,9 GHz	0,8 ... 2,25 GHz	0,3 ... 6 GHz
Connector	RSMA (m) -> N (m)	RSMA (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)	N (m) -> N (m)
Characteristics	Easy install through flexible inner conductor, UV-resistant, oil-resistant	Solid inner conductor, low attenuation, UV-resistant	Easy install through flexible inner conductor, UV-resistant, oil-resistant	Overvoltage protection for coaxial signal interfaces with Lambda / 4 technology		Antenna barrier for control cabinet operation, type of protection: Ex i, installation barrier: zone 2, installation antenna: zone 0, 1 or 2
Length / Article No.	0,5 m / 2701402	0,5 m / 2903263 1 m / 2903264 2 m / 2903265 3 m / 2903266 5 m / 2702140	3 m / 2867649 5 m / 2867652 10 m / 2867665 15 m / 2885634	2838490	2801057	2702198



Antenna installation in Ex areas



Radioline – RAD-900-DAIO6



Fused AC/DC
Power selection

Six built-in I/O points
2DI, 2DO, 1AI,1AO

Dual half-inch NPT fittings for
power and data isolation

Separated terminals and wire-tie
loops for cable management

- Compact NEMA4X housing
- Compatible with existing RAD-900-IFS installations
- Class I Division 2
- Up to 1000 ft out of the box
- Software-free installation for I/O-to-I/O applications
- **Only for North and South America and Canada**

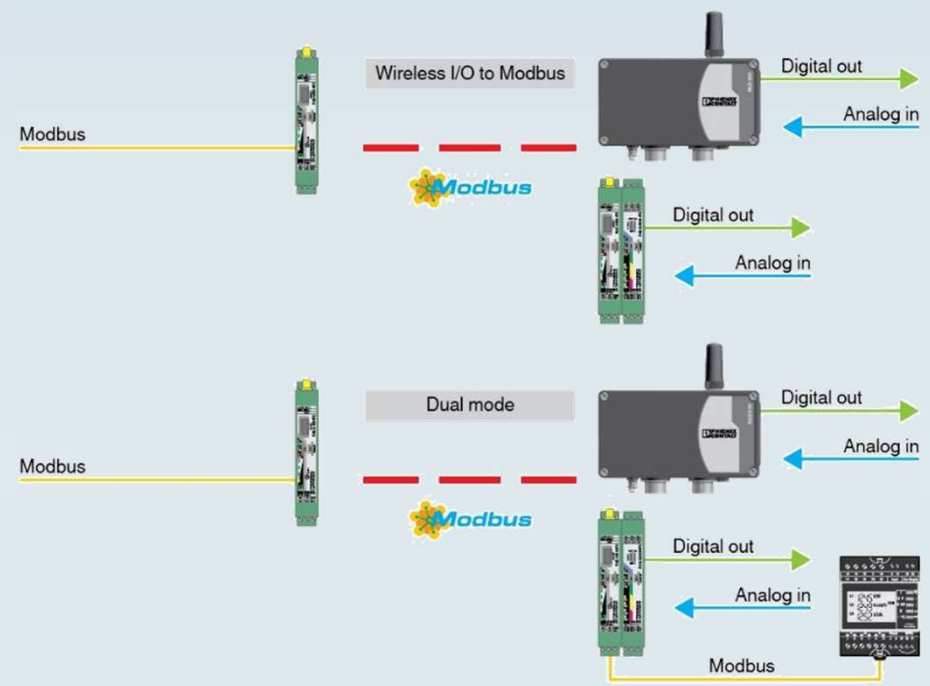
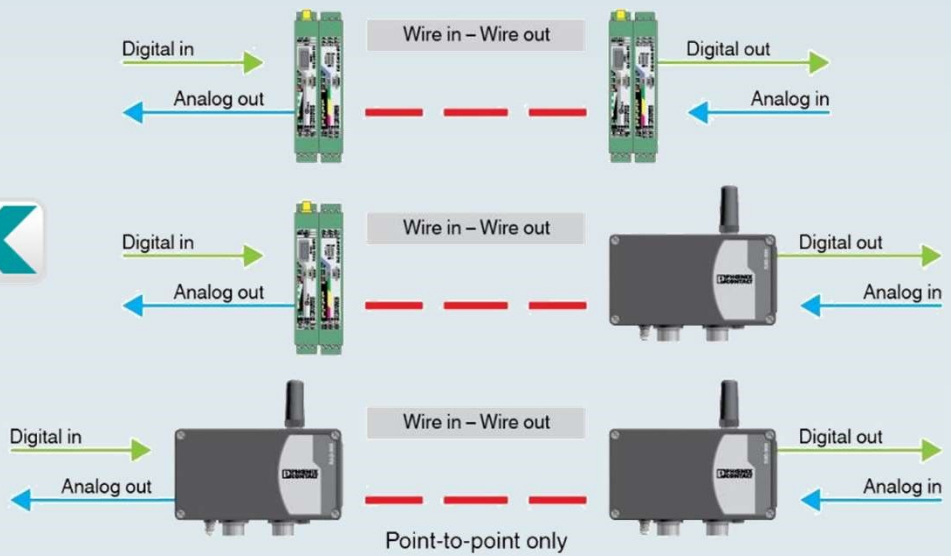


Product
overview



Radioline – RAD-900-DAIO6

Modes of operation



Product overview

Radioline – RAD-RUGGED-BOX-CONF

Outdoor box solution (configurable)

- Fully pre-wired control box with integrated 230V power supply, over-voltage protection, selectable radio module and up to three selectable IO extension modules
- Quick and easy connection of power supply and IO signals
- Outdoor use thanks to robust UV-resistant and impact-resistant IP-66 housing



For worldwide use

868 MHz 900 MHz 2,4 GHz
915 MHz



Product
overview



Radioline – RAD-RUGGED-BOX-CONF

Order key (example)

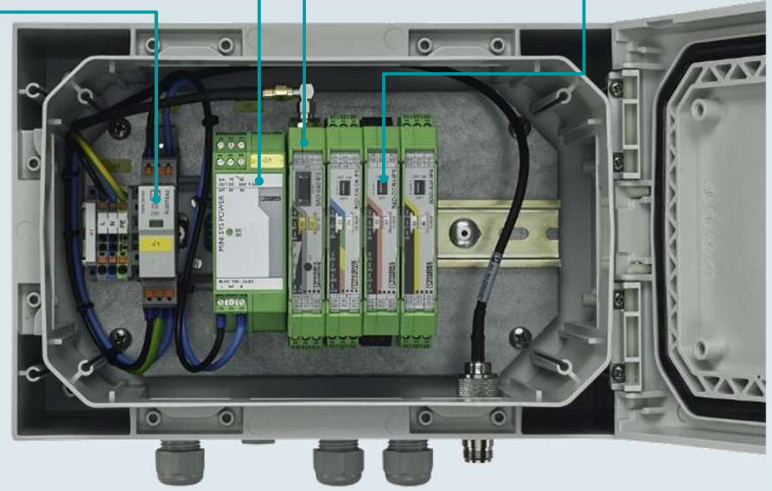
Order No. Wireless module I/O module (optional)

1091638 2400 1 2 3

DI4 AI4 DO8

	Selection	Order key
Frequency band	868 MHz 900 MHz 915 MHz 2,4 GHz	868 900 915 2400
Type of I/O extension module (optional, up to 3 units)	2 digital inputs/outputs and 1 x analog input/output 4 digital inputs 8 digital inputs 4 analog current inputs 4...20 mA 4 Pt 100 inputs 4 digital relay outputs 8 digital transistor outputs 4 analog current outputs 4...20 mA 4 analog voltage inputs 0...10 V 4 digital NAMUR inputs	DAIO6 DI4 DI8 AI4 PT100 DO4 DO8 AO4 AIU4 NAM4

Surge protection Power supply Wireless module I/O module (optional)



For worldwide use

- 868 MHz
- 900 MHz
- 2,4 GHz
- 915 MHz



Product overview



ESSENTIAL Wireless



Intuitive start-up

- Thanks to comfortable software wizards

Universal use

- Fully transparent cable replacement for serial RS-485 interfaces



Article information

- RAD-EE-2400-RS485
- Art-No. 1081818



Worldwide use

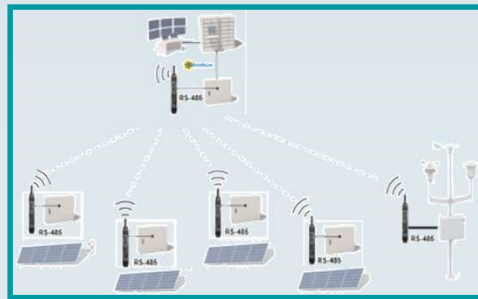
- Special radio module with reduced functionality for price-sensitive PV applications
- License- free 2,4-GHz band
- CE, FCC, UL approval
- Adjustable data rates
- Range up to 500 m

Reliable communication

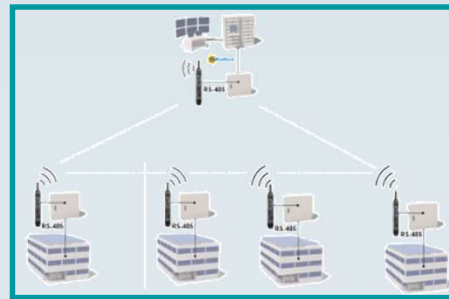
- Interference-free communication through automatic and manual coexistence mechanisms
- Immune to electromagnetic interference
- Mesh network with up to 250 nodes



ESSENTIAL Wireless – Application examples



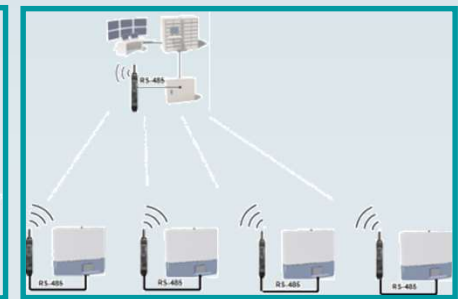
**Wireless string
monitoring in open
field installations**



**Wireless
monitoring of
rooftop systems**



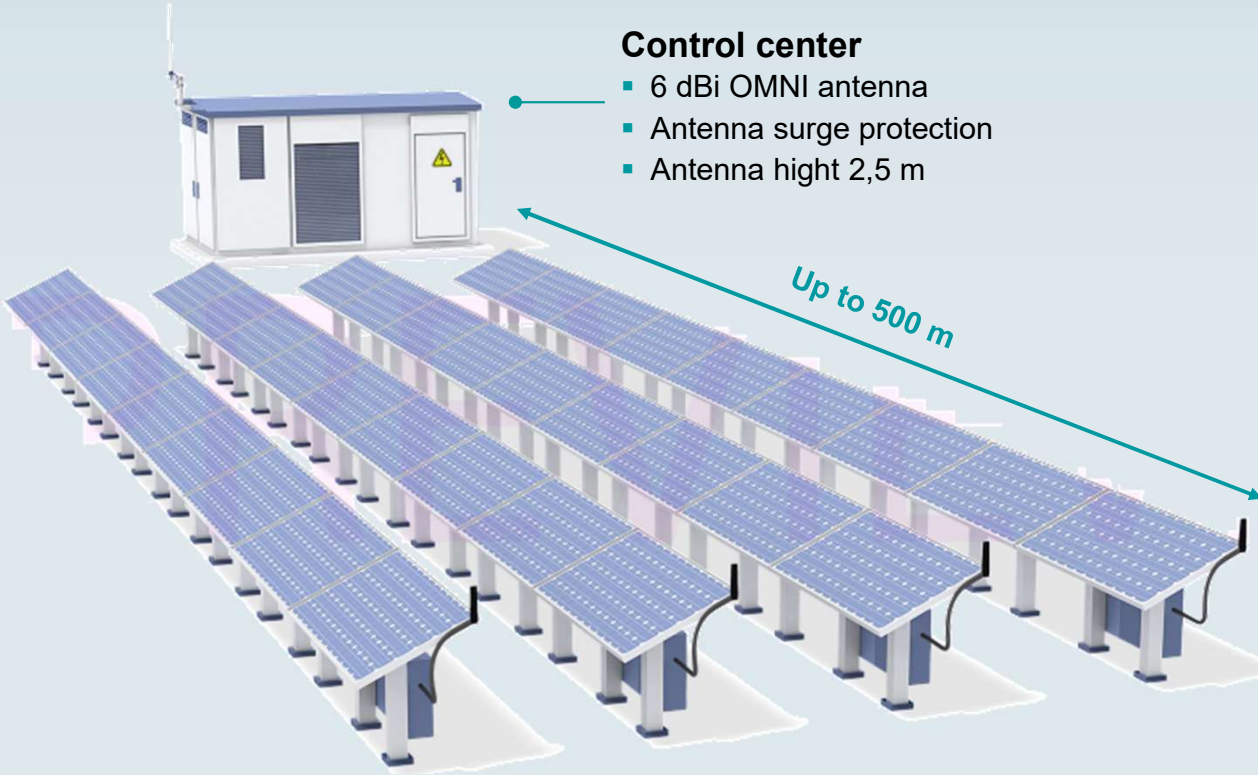
**Wireless
monitoring of
tracking
systems**



**Wireless
monitoring of
inverters**



ESSENTIAL Wireless - Application



- Control center**
- 6 dBi OMNI antenna
 - Antenna surge protection
 - Antenna hight 2,5 m



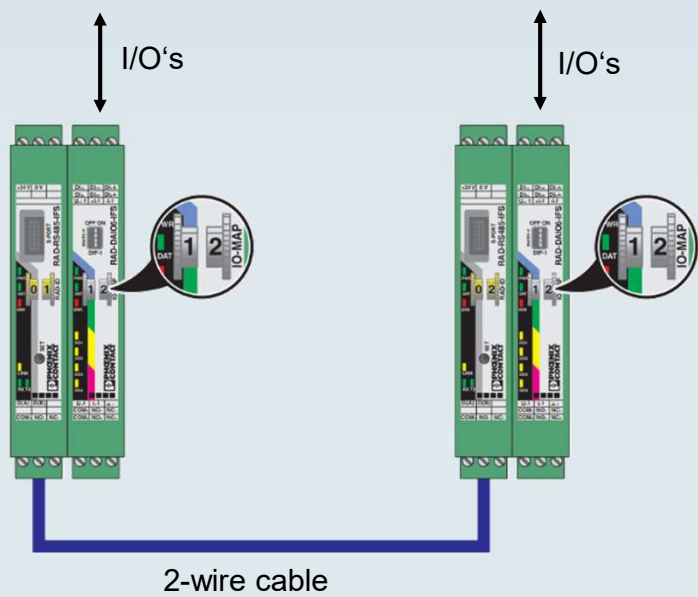
- String monitoring box**
- 2 dBi OMNI antenna
 - Can be sticked directly to control cabinet or PV module
 - Antenna hight 1,5 m



Radioline Multipoint Multiplexer



I/O-Mapping via 2-wire-cables



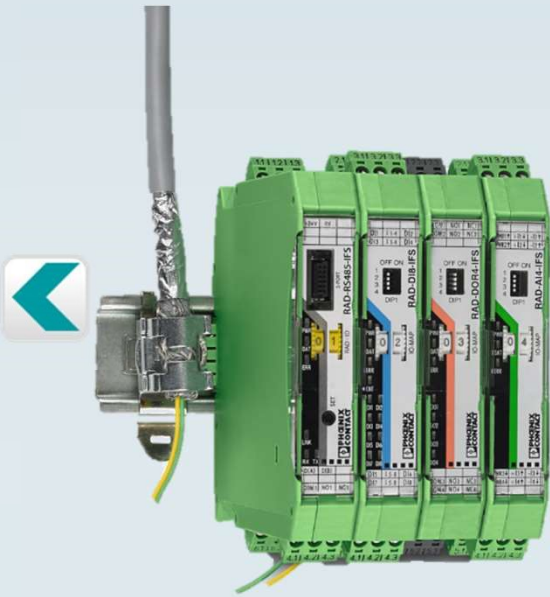
- i** Multipoint multiplexer (I/O to I/O)
- i** Multipoint multiplexer and Wireless
- i** Modbus RTU slave (I/O to serial)
- i** Modbus RTU slave and Wireless



[Product overview](#)

Radioline Multipoint Multiplexer

I/O-Mapping via 2-wire-cables



Stand-Alone as Modbus-Slave
Operation on any Modbus/RTU-Master

Multipoint-Multiplexer
Distribution of I/O signals via existing 2-wire-cables



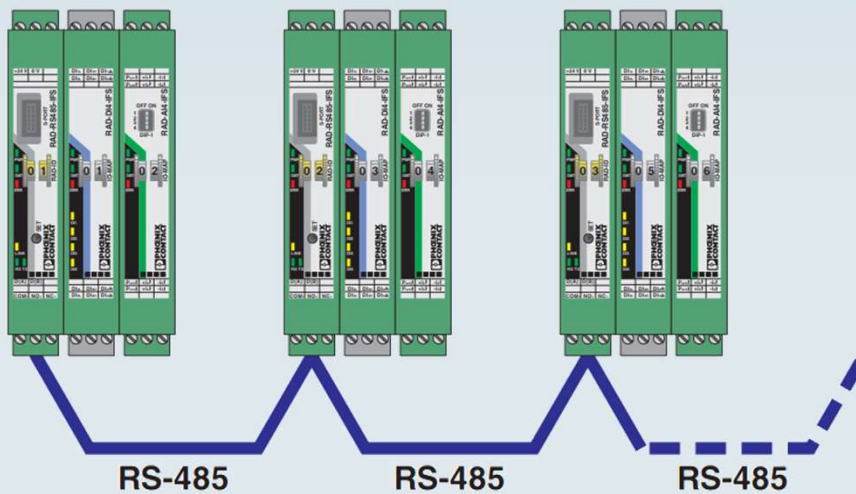
Intermedia communication
Wireless and wired modules form a combined system.



Product overview



Radioline Multipoint Multiplexer I/O to I/O

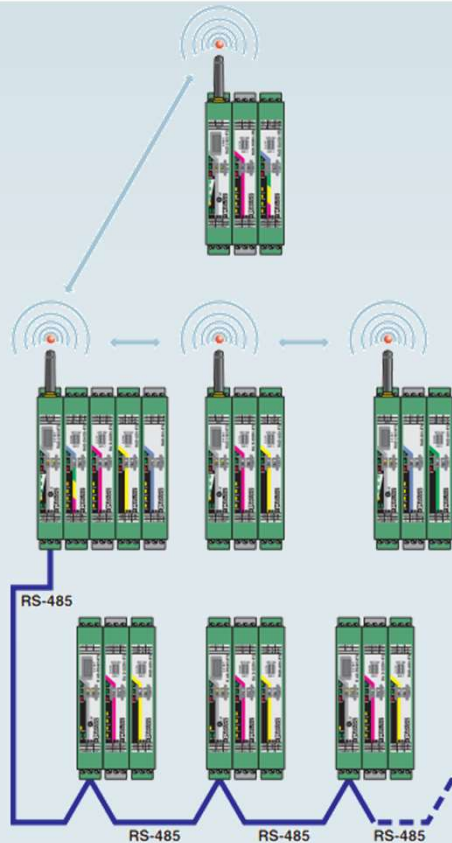


- Multipoint multiplexer – easy I/O distribution between multiple stations
- Up to 99 stations via RS-485
- Addressing using yellow thumbwheel
- Easy I/O mapping using white thumbwheel on the extension modules
- Fast startup via Plug and Play



Product
overview

Radioline Multipoint Multiplexer and Wireless

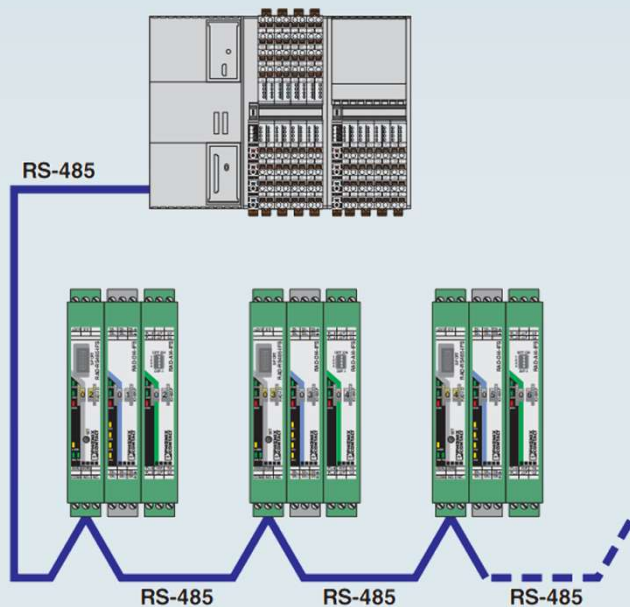


- Cross-media distribution of I/O signals
- Up to 250 stations in total:
 - 98 RS-485 stations and
 - 152 wireless stations
- Easy I/O mapping using white thumbwheel on the extension modules
- Fast startup via Plug and Play



Product
overview

Radioline Modbus RTU slave (I/O to serial)

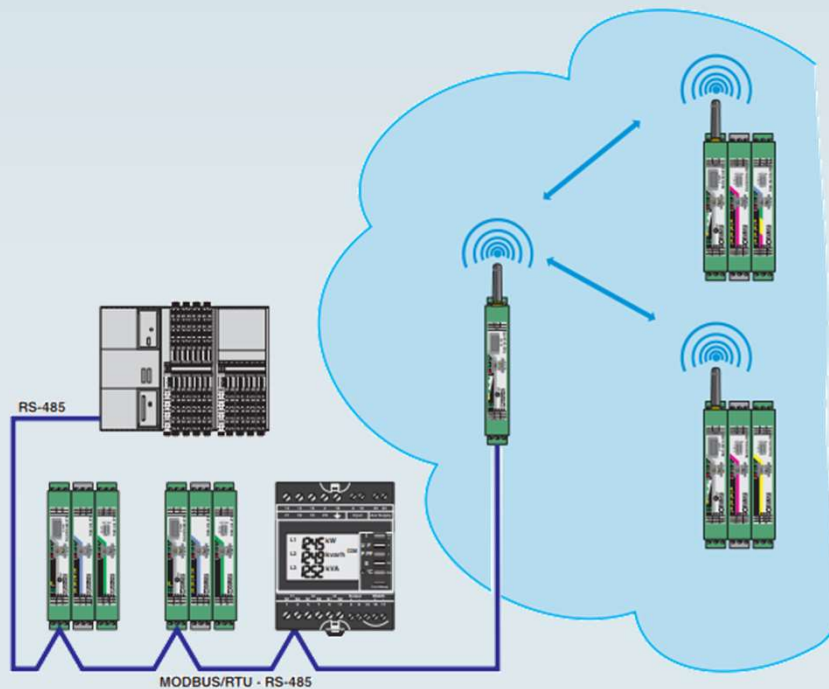


- Operation as a bus coupler for Modbus RTU with Radioline extension modules
- As a Modbus slave to any master
- Up to 98 stations per Modbus network
- Integration in existing Modbus networks
- Fast startup via Plug and Play
- Default setting of the RS-485 interface: 19.2/8/E/1



Product
overview

Radioline Modbus RTU slave (I/O to serial)



- Radioline wireless system and RS-485 stations at a Modbus master (I/O to serial)
- Support for all Radioline wireless systems (2,4 GHz, 868 MHz, 900 MHz)
- Up to 98 RS-485 stations and up to 250 wireless stations
- The wireless network acts like a single Modbus RTU slave
- All devices in the RS-485 network are standard Modbus RTU slaves
- Integration in existing Modbus networks



Product
overview

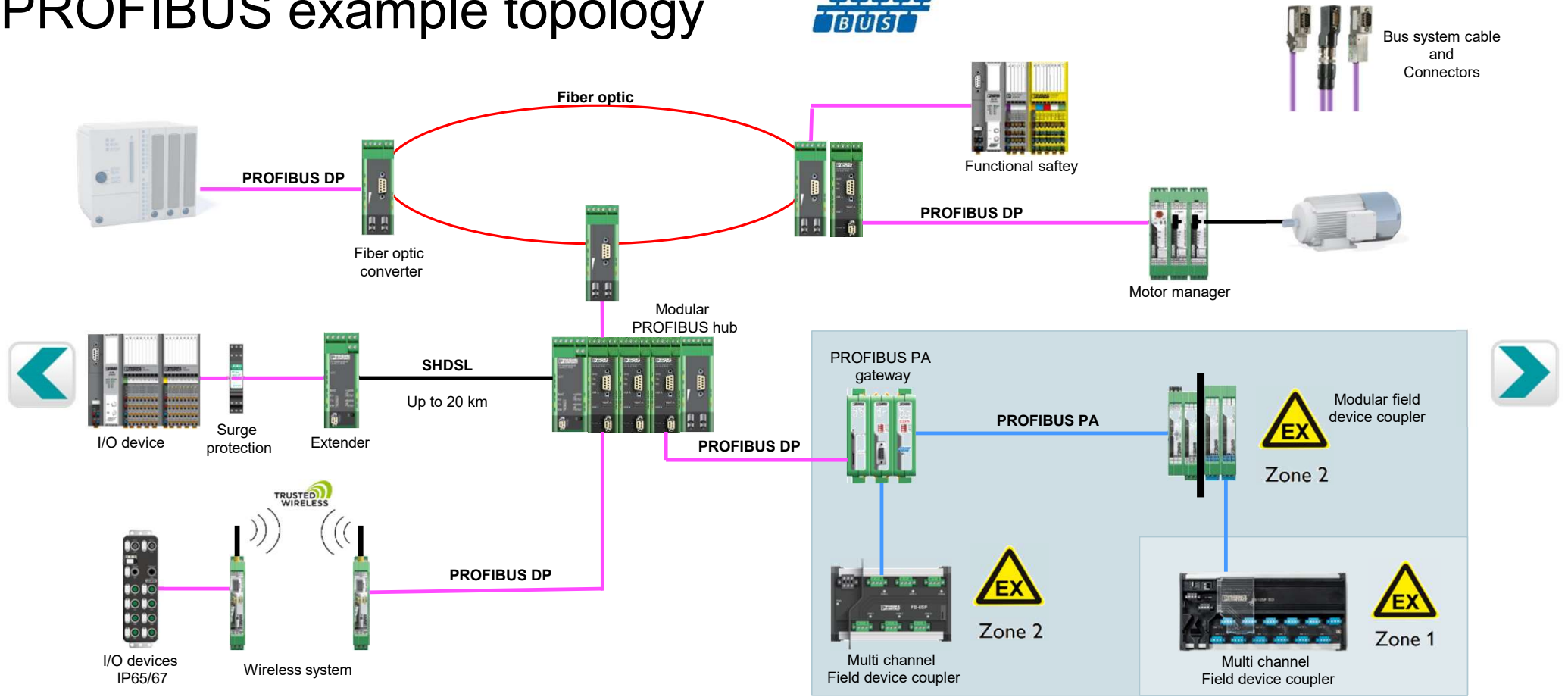
Radioline Multipoint Multiplexer – Extension modules



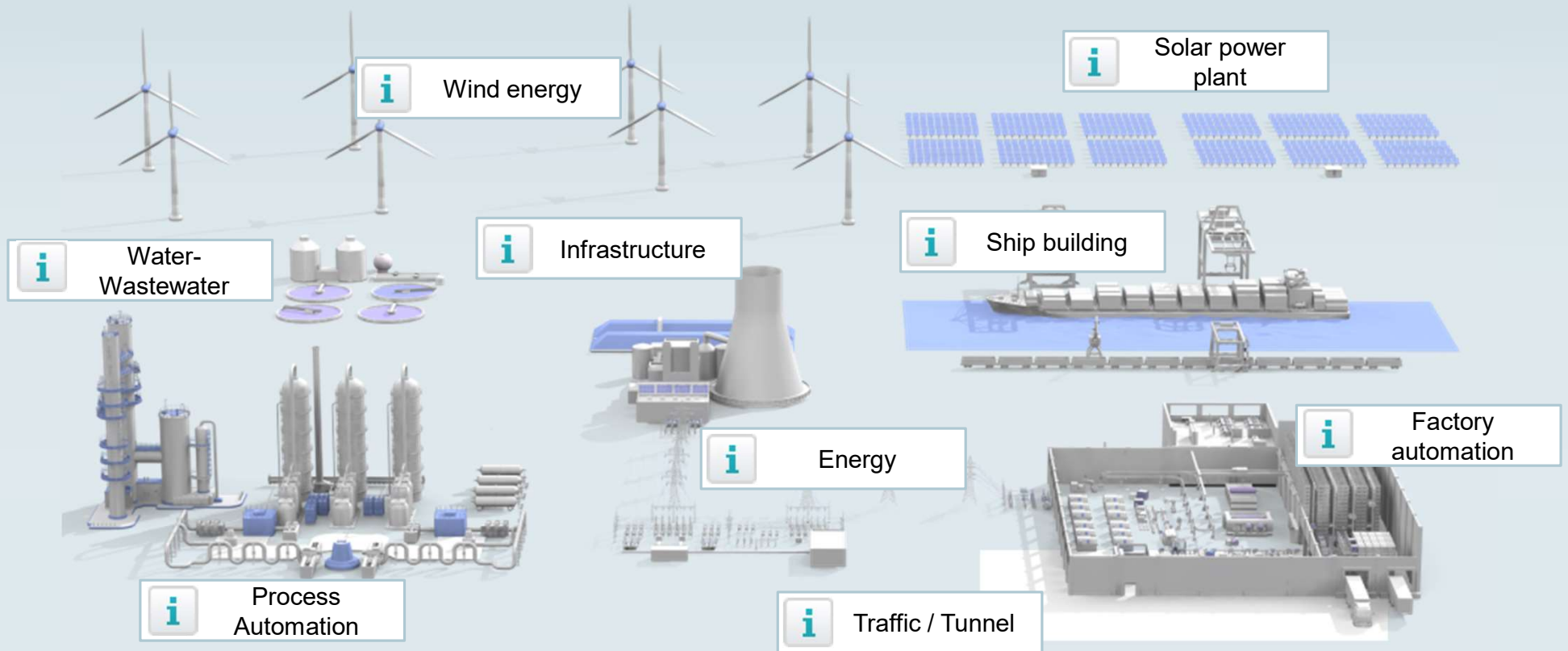
	Communication module	Digital In 4 channel	Digital Out 4 channel	Digital In 8 channel	Digital Out 8 channel	Analog In 4 channel	Analog Out 4 channel	Analog / digital	PT 100 4 channel
Type	RAD-RS485-IFS	RAD-DI4-IFS (Input)	RAD-DOR4-IFS (Output)	RAD-DI8-IFS (Input)	RAD-DO8-IFS (Output)	RAD-AI4-IFS (Input)	RAD-AO4-IFS (Output)	RAD-DAIO6-IFS (Input / output)	RAD-PT100-4-IFS
Description	RS-485 multipoint multiplexer, can be extended with I/O modules	4 digital wide range inputs 0...250V AC/DC	4 digital relay outputs 24 V DC / 250 V AC / 5 A	8 digital inputs 0...30,5 V DC	8 digital transistor outputs 30,5 V DC / 200 mA	4 analog input 0/4...20 mA	4 analog outputs Alternatively 0/4...20 mA or 0...10 V DC	1 analog input/output 0/4...20 mA 2 digital wide range inputs/outputs 0...250 V AC/DC	4 Pt100 inputs Temperature measuring range: -50°C...+250°C
Order number	2702184	2901535	2901536	2901539	2902811	2901537	2901538	2901533	2904035



PROFIBUS example topology



Application references




Infrastructure applications

 Click on image!

Radioline

Leakage monitoring of pipeline networks



Application examples

- Monitoring of pipelines for energy, data, heating and gas
- Real-time monitoring stations for leakage, stress, water meters, gas meters, etc. & messages
- Communication lines to the remote local network centers are super-robust

Advantages of wireless systems

- Simple and fast installation and commissioning
- Simple cost-effective networks
- Simple integration of additional measurement points
- Simple network up to 240 nodes/stations

Leakage monitoring „Albstadtwerke“



Application examples

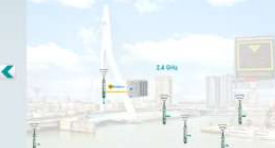
- These intergrated cables could not be used for other wireless systems due to the high temperature and the high humidity in the plant, which we need to be able to use! Moreover, in the case of a fault, there is no 70 km/hour train.

Solution

To ensure that the system, required for the energy supply, reached full and error-free service, the cables must be continuously monitored.

By using Radioline, all measurements can now be recorded continuously and detection can be precise!

Bridge control



Application examples

- The network, because it is light, is mounted on the control room and is completely independent of the power supply.
- Communication is possible with the bridge.
- Communication is possible with the bridge.

Advantages of wireless systems

- Easy integration of existing and new systems in the control system
- Simple and fast installation, in remote areas
- High availability and backup of the network with wireless

Canal light control



Application examples


- For the control of lighting, lighting is necessary in all areas of the canal network.
- The network is distributed in 3 segments with 12 lighting stations in the center of the lighting area, in the center of the lighting area.
- Simple and fast installation and commissioning
- Simple and fast installation and commissioning
- Simple and fast installation and commissioning

Advantages of wireless systems

- Easy integration of existing and new systems in the control system
- Simple and fast installation, in remote areas
- High availability and backup of the network with wireless

Media Converter

Infrastructure – Media converter



Application

- While the passengers enter the electrically driven bus, the bus is charged.
- Every 3 to 5 bus stations the bus is fully charged for 15 seconds.

Requirements

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

Solution

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

PSI-MOS Profibus

Infrastructure



Application

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

Requirements

- robust transmission of data
- Long distance between flood barriers and control room
- Adversely conditions

Solution

- Communication via fiber optic cable from the barrier to the control room
- Simple combination of copper and fiber within our modular Profibus-Plus


Reasons to decide for our product

- Short install duration of the system
- Simple and easy combination of copper and fiber within our modular Profibus-Plus

Company

ABB helped to develop a storm tide protection in Venice.

Infrastructure - RS-485 fiber optic converter



Application

- Communication between the control room, PLC's and drive control in remote sites (over 2000 m)

Requirements

- Safe communication
- Cable installation due to different ground potentials between the segments

Solution

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

Reasons to decide for our product

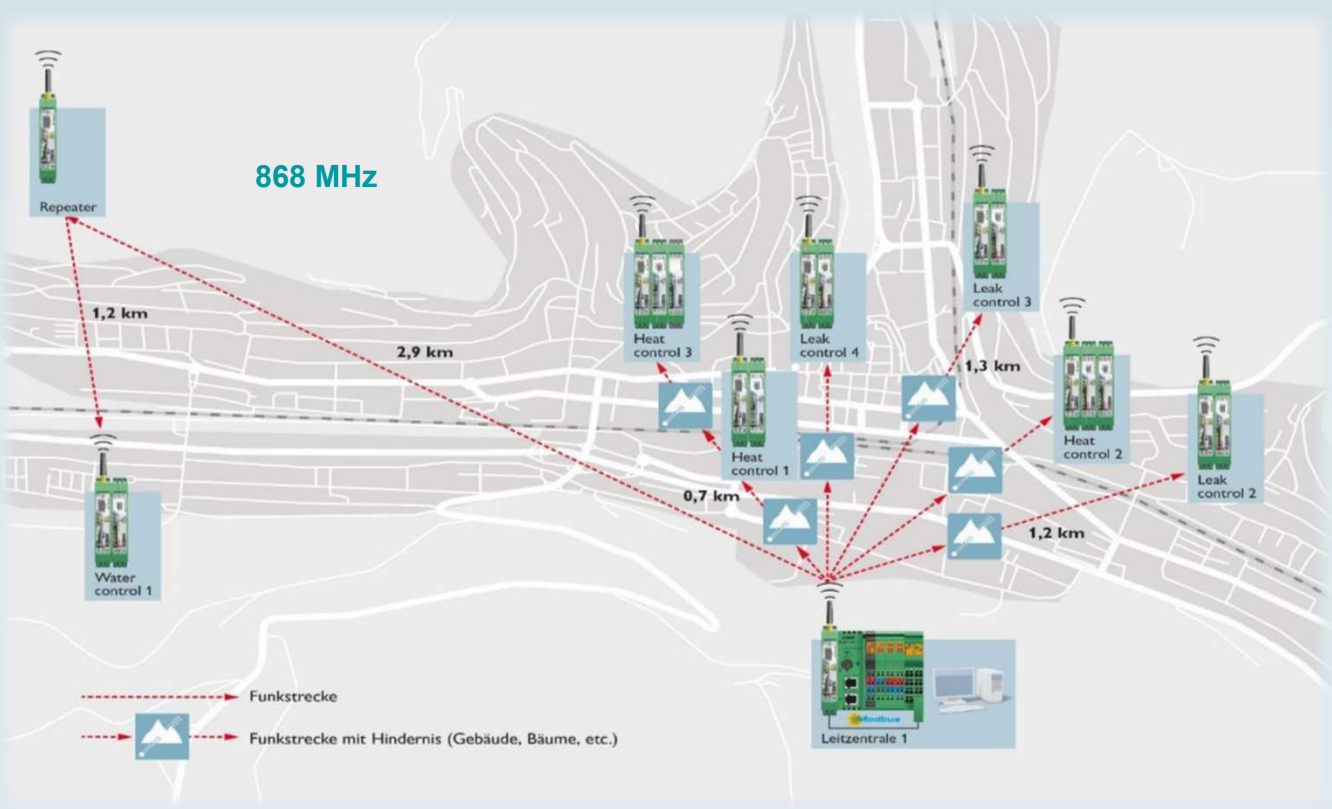
- Simple installation

Company

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



Leakage monitoring of pipeline networks



Application examples

- Monitoring of pipelines for energy, district heating and gas
- Several measuring stations for leakage control, water meters, gas meters, fault messages
- Communication lines to the remote local network stations are largely unavailable

Advantages of wireless systems

- ✓ Bridging of big distances and obstacles
- ✓ Saving cost- intensive earthworks
- ✓ Simple integration of additional measurement points
- ✓ Mesh network up to 249 repeater/slaves



Leakage monitoring „Albstadtwerke“



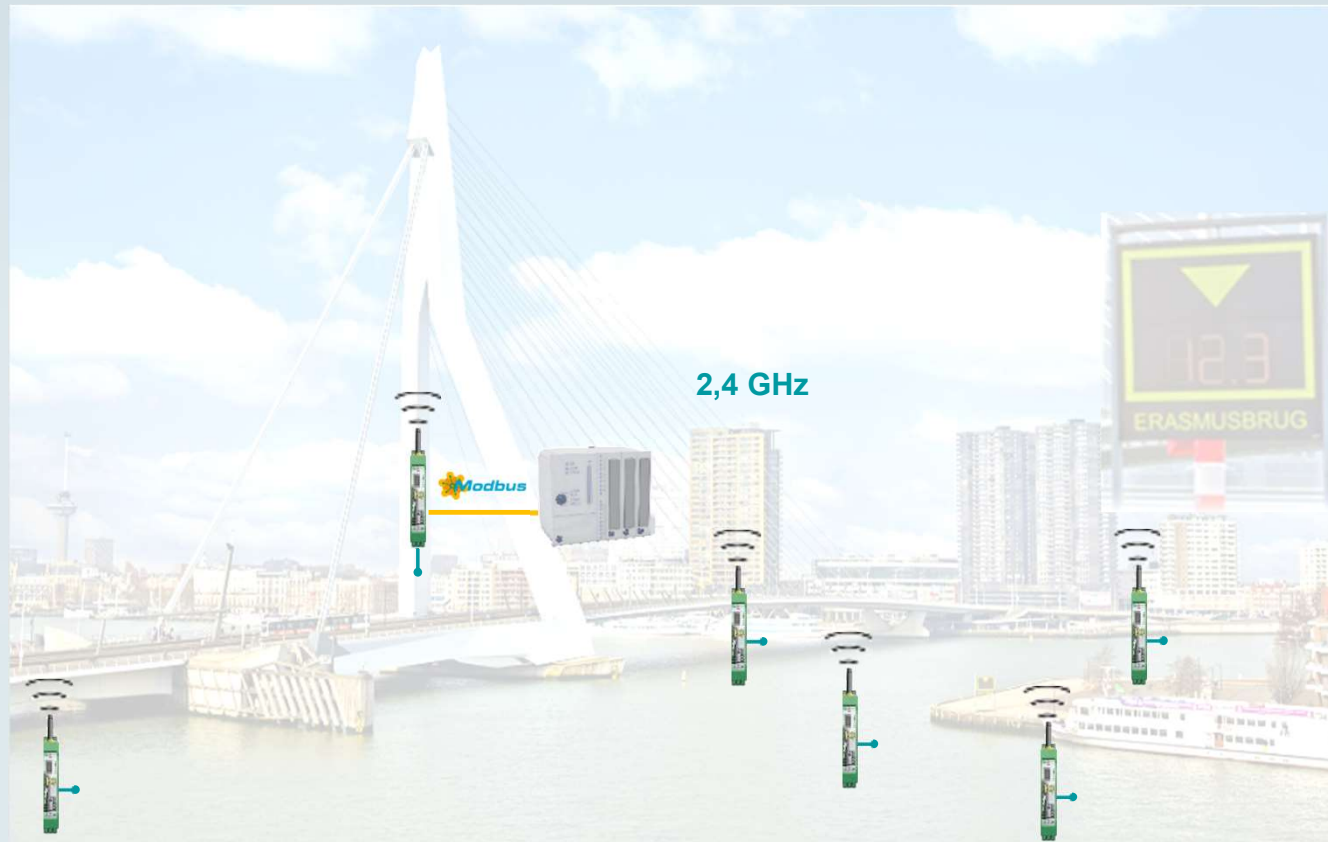
"New underground cables could not be laid due to the available budget and local conditions. A mobile communication solution was also out of the question, since we need to be able to exert influence in the event of a fault", sums up Thomas Haas.

To ensure that the pipelines required for the energy supply (district heat and water) always function perfectly, they must be continuously monitored.

By using Radioline, all measurements can now be recorded continuously and obstacles can be passed.



Bridge control



Application examples

- The maximum clearance height dependent on the current water level is visualized to the ship's crews on 6 displays with Modbus-RTU interface
- Communication between displays and central plc

Advantages of wireless systems

- ✓ Easy integration of existing and new signals in the control system
- ✓ License-free wireless solution, no running costs
- ✓ High availability and bridging of big distances with obstacles



Erasmus Bridge Rotterdam



Due to the tides of the North Sea, not every ship can pass under the Erasmus Bridge in Rotterdam at any time.

To prevent damage to the ships and the bridge, six scoreboards visualize the current maximum headroom.

The corresponding analog values are obtained by the display boards of a small AXC 1050 controller via the Radioline wireless system.



Canal light control



Application examples

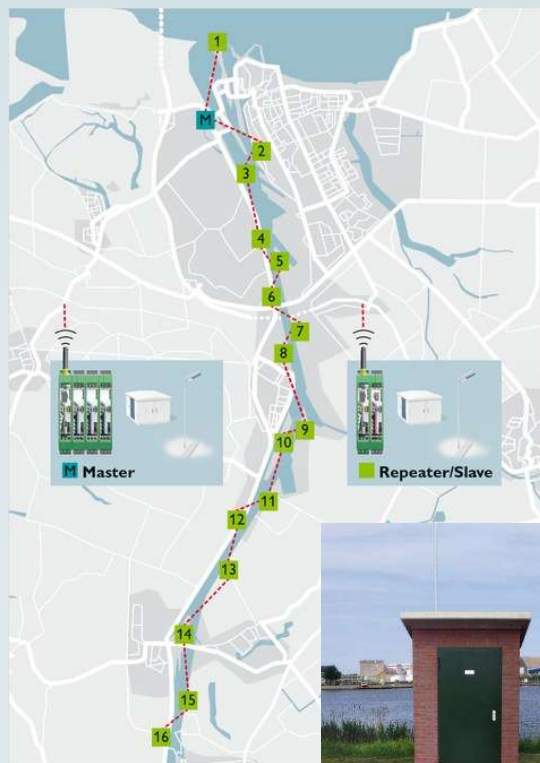
- For the conduct of shipping, lighting is available on 300 masts on both sides of the canal
- The network is divided into 3 sections with 17 switching stations, so that part of the lighting can also be switched by bridge keepers or from the central traffic control center

Advantages of wireless systems

- ✓ Easy integration of existing and new signals in the control system
- ✓ Time and cost savings compared to the cable laying
- ✓ High availability and coverage of large distances



Lighting Gent-Terneuzen canal



The lighting of the Dutch section of the canal Gent-Terneuzen should be switched centralized and decentralized.

Along the canal are a total of 17 control boxes for switching the lighting.

To transmit the control commands, each control box includes a Radioline 868 MHz module and an I/O extension module.



Traffic / Tunnel applications

 Click on image!

Radioline

Traffic control



Application examples

- Control of sign boards for traffic jam avoidance
- Queue dissipation in parallel during highway works
- Priority lanes via solar system
- Distance between sign boards with 500 - 1000m

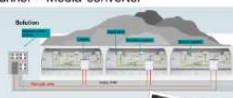
Advantages of wireless systems

- Easy installation of existing and new objects in the control system
- Easy and cost-effective extension in the case of change
- Large geographic area coverage of large infrastructures
- Weatherproof along highway route



Media Converter

Tunnel - Media converter



Application


- 2 lane Highway tunnels (tunnel circuit) 1000m and below (100m for the highway)
- Distance monitoring of the entire infrastructure
- About 4000 I/Os per tunnel

Requirements

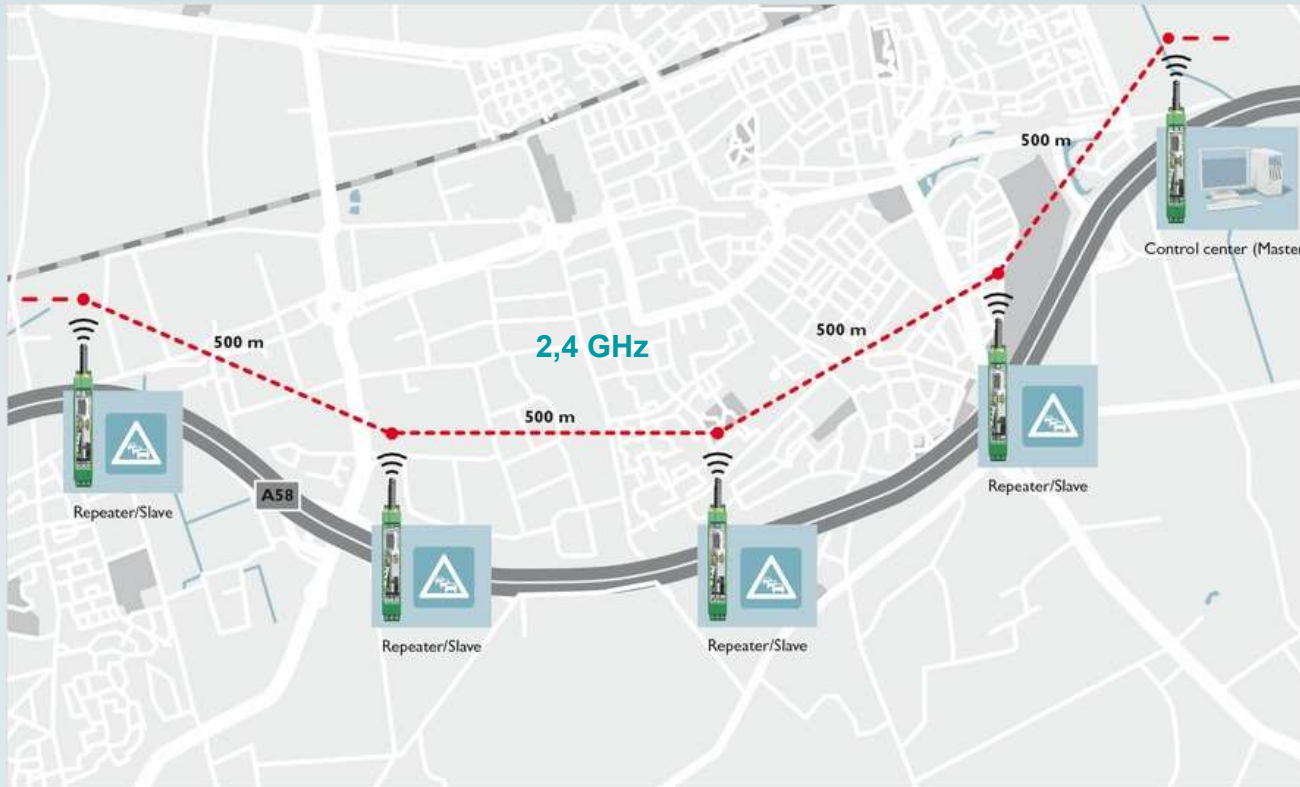
- Plug and play
- Interference-free communication over long distances
- Redundant PROFIBET ring

Reasons to decide for our products

- Centralised I/O from one supplier
- Reliability of the products
- Pricing



Traffic control



Application examples


- Control of sign boards for traffic jam information
- Cable installation impossible during highway traffic
- Power supply via solar system
- Distance between sign boards, each 500 – 1000 m

Advantages of wireless systems

- ✓ Easy integration of existing and new signals in the control system
- ✓ Time and cost savings compared to the cable laying
- ✓ High availability and coverage of large distances
- ✓ Installation during highway traffic

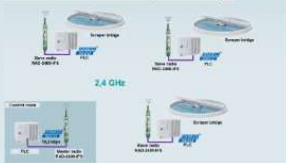


Water & Wastewater applications

 Click on image!


Radioline

Wastewater Treatment (PROFIBUS)



2,4 GHz

- Single level monitoring
- Data transmission of operating data and alert signals via profibus protocol
- Replacement of expensive cabling costs to which need to be replaced several times a year (cost ratio > 30 %)
- Distances up to 14 km
- Data rate up to 12.5 Mbps



Water Supply „Zweckverband Seebachgebiet“



„We have saved a lot of time and money by using the Radioline wireless system“, says Matthias Jäger, technician from the waterworks. „Our own water supply system ‘Zweckverband Seebachgebiet’ uses an industrial wireless solution based on the Radioline system from Phoenix Contact for communication between the remote substations.“



Water Supply „Stadtwerke Obermörlen“



„The radio links are stable and have not even failed since the first day“, says Matthias König, head of the waterworks, who is controlled by a large new network whose cables have been damaged over the years. This is why the Radioline wireless system now reliably links the distant online structures to the control system.“



Central wastewater plant Wilhelmshaven



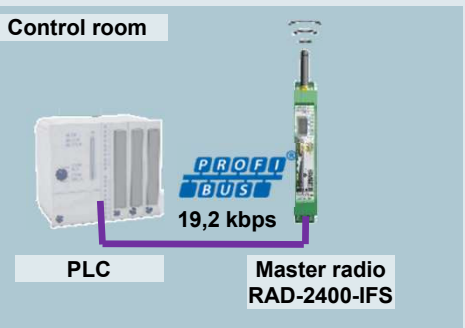
„By using the wireless solutions, we have solved numerous challenges, such as the requirement of extra power cables, pipes, and saved a lot of money“, says GJ Frank, chief. As part of the modernization of the wastewater treatment plant, the municipality and industrial plants, such as the controlling stations and separate houses, were equipped with a Phoenix Contact wireless system.“




Wastewater Treatment (PROFIBUS)



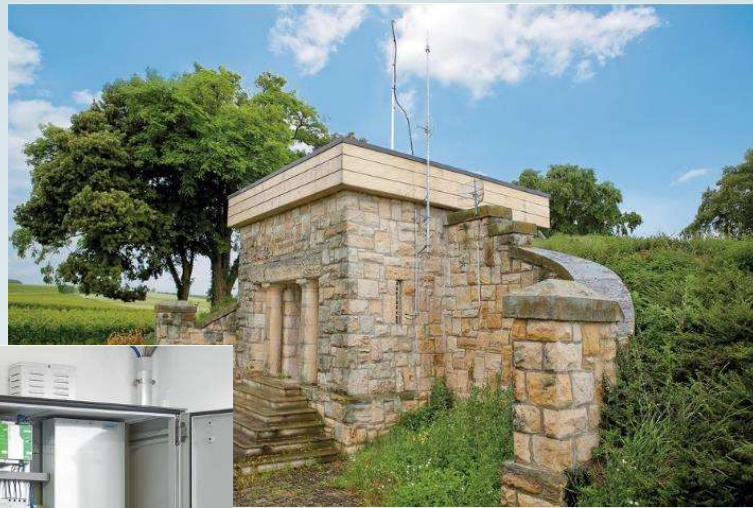
2,4 GHz



- ✓ Sludge level monitoring
- ✓ Data transmission of operating data and alert signals via profibus protocol
- ✓ Replacement of expensive sliding contacts which need to be replaced several times a year (fault rate > 30 %)
- ✓ Star network
- ✓ Up to 14 slaves
- ✓ Datarate up to 93,75 kbps



Water Supply „Zweckverband Seebachgebiet“

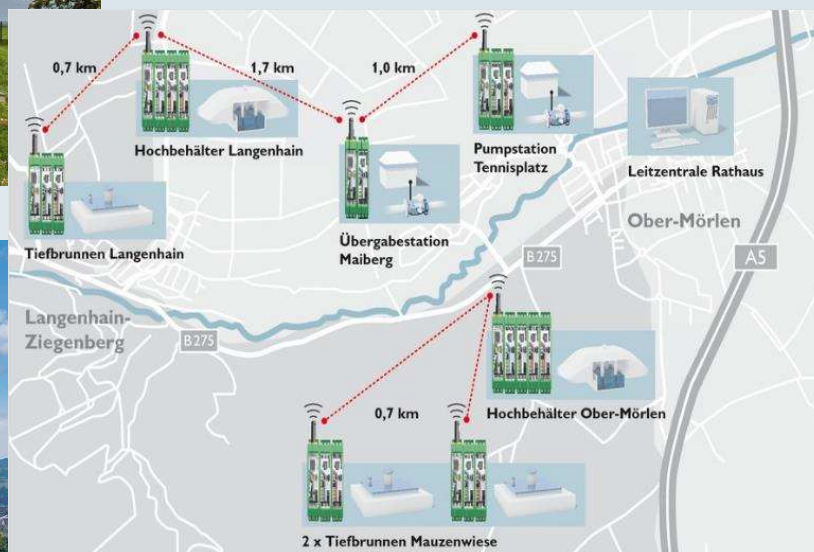


„We have saved a lot of time and money by using the Radioline wireless system“, says Hermann-Josef Hofmeister from the waterworks Osthofen.

The water supplier “Zweckverband Seebachgebiet” uses an industrial wireless solution based on the Radioline system from Phoenix Contact for communication between the various substations.



Water Supply „Stadtwerke Obermörlen“



„The radio links are stable and have not even failed since the first day”, says Karlheinz König.

Most of the substations are controlled by a telephone network whose cables have decayed over the years.

This is why the Radioline wireless system now reliably links the distant outdoor structures to the control system.



Central wastewater plant Wilhelmshaven



"By using the wireless solutions, we have solved numerous challenges, such as the replacement of wear-prone slip rings, and saved a lot of money," sums up Frank Jakobs.

As part of the modernization of the wastewater treatment plant, four secondary sedimentation tanks, sand traps and pumping stations and digestion towers were equipped with a Phoenix Contact wireless system.

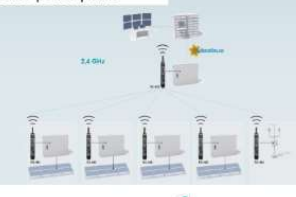


Solar applications

 Click on image!

Radioline

Solar power plants



2.4 GHz


Wireless

Application examples


- 1. Long monitoring of open field systems, rooftop systems, tracking systems and more
- 2. Continuous monitoring of the plant data on the DC and AC side with respect to solar irradiation
- 3. The distributed sensors use a wireless (ZigBee, 433 MHz) network and can be also dynamically networked with the central data logger
- 4. Distance remote located meters

Advantages of wireless systems

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




Wireless networking of PV inverters



Wireless Green operations in the technical operation of renewable energy producers.

The number of photovoltaic systems installed on the rooftops of buildings and in the open air has risen steadily in recent years. In order for the operators to achieve the highest possible return, remote plant monitoring plays an important role.

With the Radioline system, remote access to PV systems can be combined to form a network and transfer the collected RTU control data to a data management system.



Solar power plants

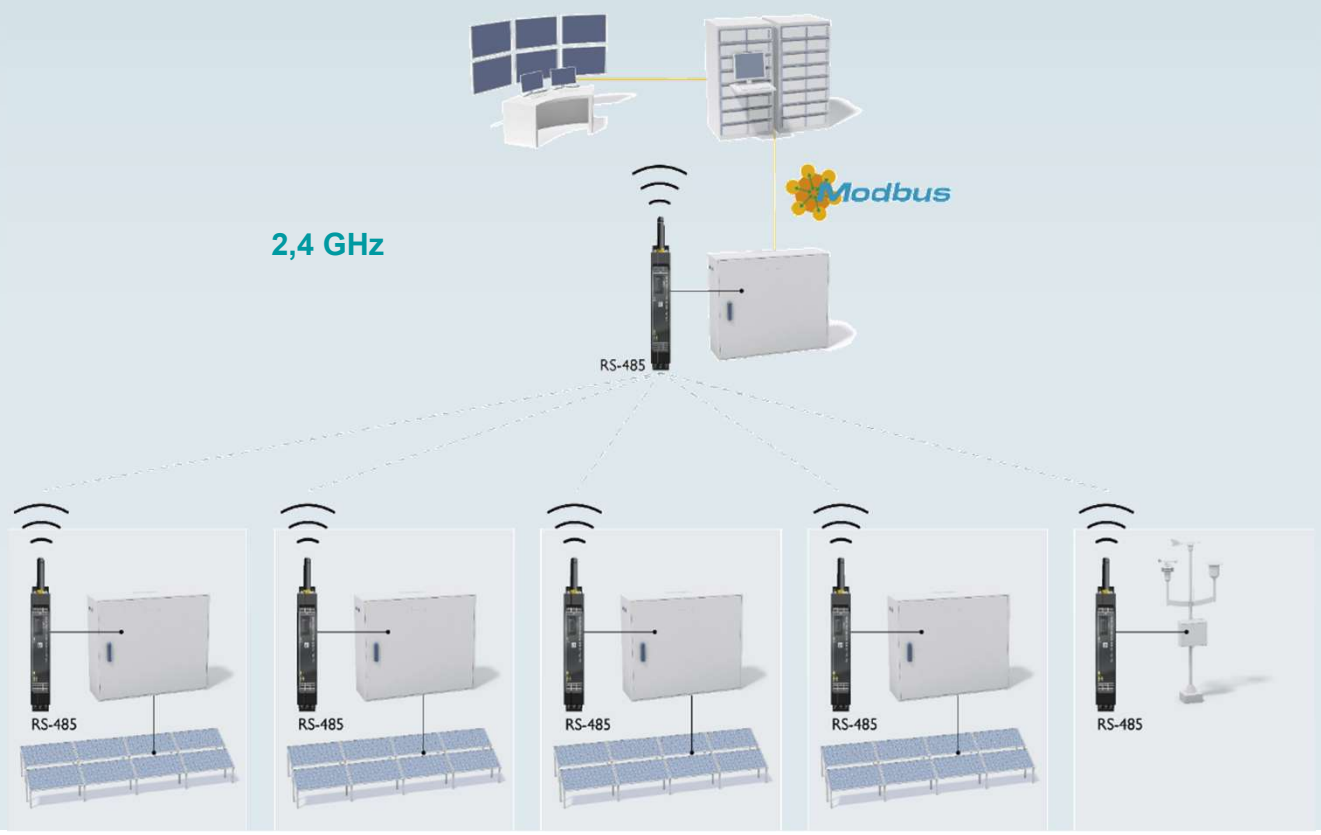
Wireless

Application examples

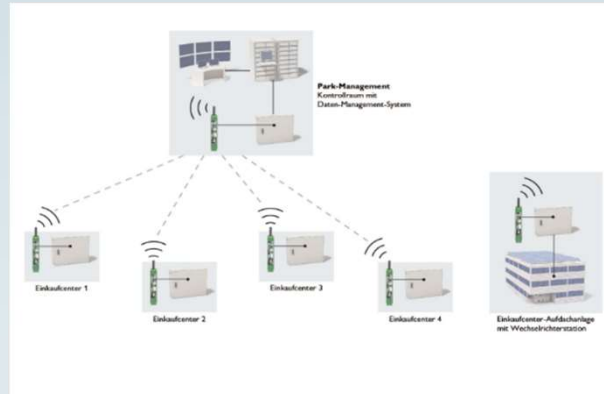
- String monitoring of open field systems, rooftop systems, tracking systems and inverters
- Continuous monitoring of the yield data on the DC and AC side with respect to solar irradiation
- The distributed inverters use a Modbus RTU interface and must be able to communicate wirelessly with the central datalogger
- Distance several hundred meters

Advantages of wireless systems

- ✓ Easy integration of existing and new signals into the control system
- ✓ Immune to electromagnetic interference
- ✓ Flexible customization and extension



Wireless networking of PV inverters



ValloSol GmbH specializes in the technical operation of renewable energy producers.

The number of photovoltaic systems installed on the rooftops of buildings and in the open air has risen steadily in recent years. In order for the operators to achieve the highest possible return, central plant monitoring plays an important role

With the Radioline system, various remote rooftop systems can be combined to form a network and transmit the Modbus-RTU coded data to a data management system.



Energy applications

 Click on image!

Radioline

Wastewater plant RWE Power Neurath



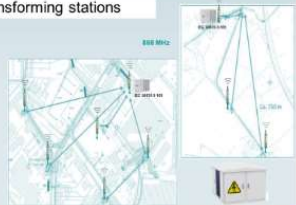
"The commissioning of the Radioline modules has proved to be really easy," sums up Stefan Schaefer from RWE.

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

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



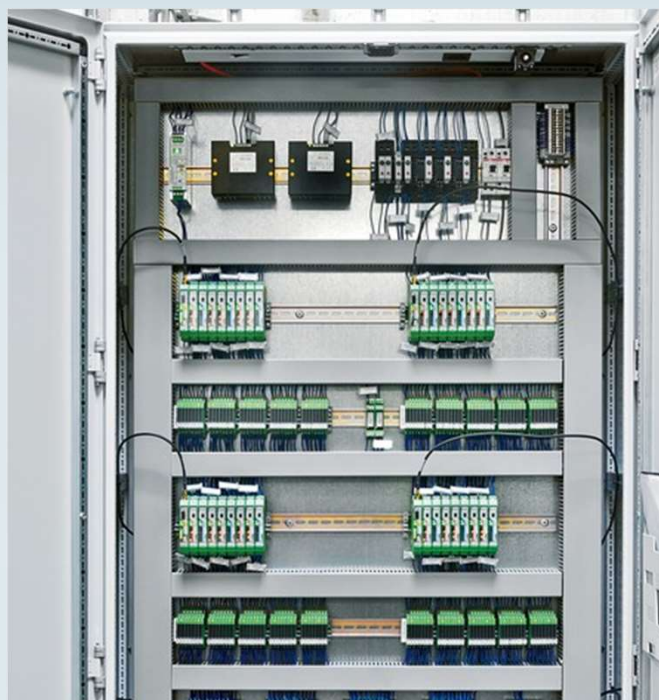
Transforming stations



- Application examples**
- Monitoring of decentralized distributed local network systems
 - Transmission of status, fault and alarm messages
 - Communication: Even in the absence of local network stations, a signal can be sent
 - The mobile broadband coverage in the area is 100% free
- Advantages of wireless systems**
- Bridging big distances and obstacles
 - Easy setup
 - Strong cost-effective solutions
 - Simple integration of additional extensions



Wastewater plant RWE Power Neurath



"The commissioning of the Radioline modules has proven to be really easy", sums up Stefan Strasser from RWE.

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

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



RWE power plant Westfalen



In extensive infrastructure facilities, data often has to be transmitted from remote outstations to the control center.

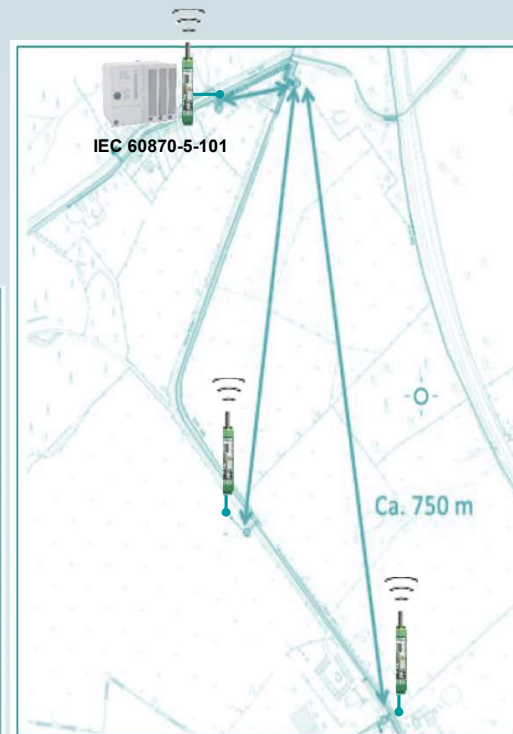
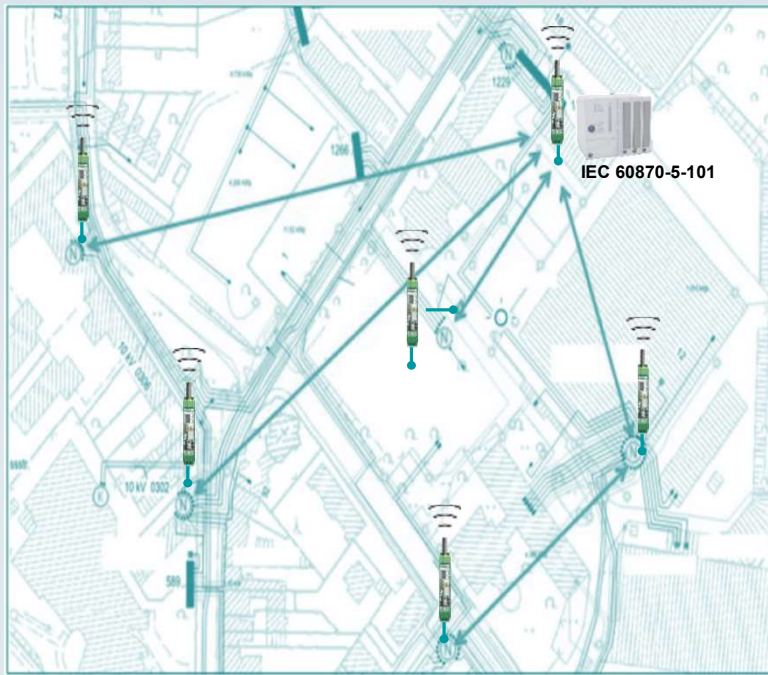
In this way, the measured values recorded for documentation can be easily and economically transferred to the control system.

For this purpose, RWE uses the industrial wireless system Radioline from Phoenix Contact.



Transforming stations

868 MHz



Application examples

- Monitoring of decentralized automated local network stations
- Transmission of status, fault and alarm messages
- Communications lines to the decentral local network stations are largely not available
- The mobile broadband coverage in the area isn't stain-free

Advantages of wireless systems

- ✓ Bridging big distances and obstacles
- ✓ Easy startup
- ✓ Saving cost-intensive earthworks
- ✓ Simple integration of additional substations




Wind applications

 Click on image!


Radioline

Wind energy plant



Application examples

- Regulation of the interest of network operator and
- Installation of all new line
- Monitoring of the plant systems
- Temporary installation for recording
- Advantages of wireless systems
- Easy service
- Flexible construction and extension
- Risk for local operators because
- Power is used before or every
- Ready solution



Generation plants certification - MOE



"By using the advanced wireless measuring device, we have a lot of changing time using traditional" says Dr. Christian Traut, Senior-Project-Manager Engineering Center.

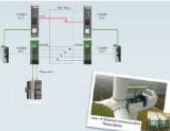
In this, three measuring teams will be placed around the wind turbine. A data is stored on the mobile terminal, the data is sent to the mobile terminal via radio link or the industrialized solution.

Measurements are recorded data wireless to their remote stations in the parked vehicle, which they transfer to the computer. There, the data is processed and processed.



Media Converter / SHDSL

Wind power energy




Application
Ethernet communication to rotating cable via slip ring, for cable adjustment or need radio

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

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


Product

PL-MC-SP-1024-887	200000
PL-MC-SP-1024-811	200000



Media Converter / PSI MOS

Wind power energy



Application

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

Problem


- EtherCAT real-time communication for high-frequency measurements
- Communication via fiber optic cables over distances of more than 100 m

Solution

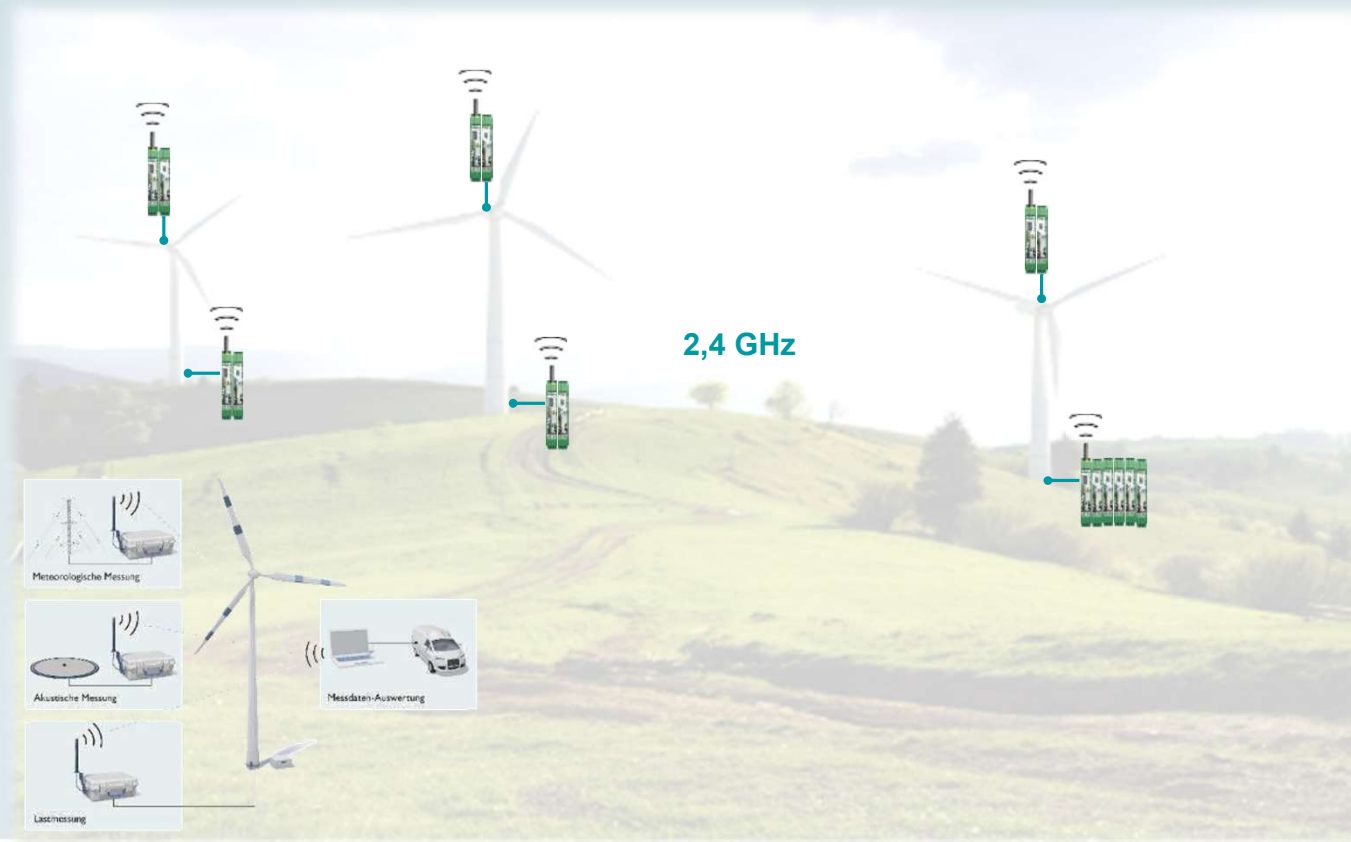
- PL-MC-2000T-SC with short latency for time-critical applications (EtherCAT)
- 800 m in peak-through mode
- PROFINET/NET CABLE SYSTEM for CAN communication over long distances and high EMI interferences

Product

PL-MC-2000T-SC	200000
PL-MC-2000T-CA-PSI-800M	200000




Wind energy plant



Application examples

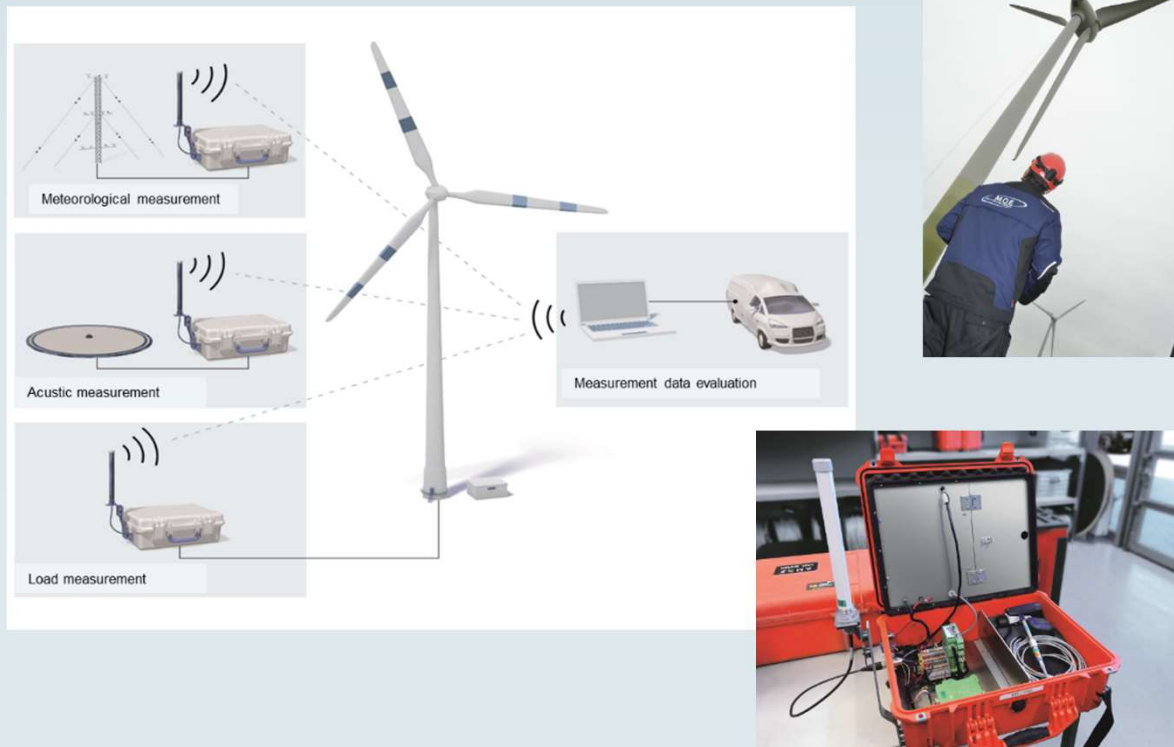
- Regulation of the intensity of obstacle lighting and synchronization of all wind farm installations
- Retrofitting of fire alarm systems
- Temporary installation for recording acoustic, meteorological and other plant data for plant certification

Advantages of wireless systems

- ✓ Easy startup
- ✓ Flexible customization and extension
- ✓ Relief for test engineers because there is no need to tow or unroll heavy cables



Generation plants certification - MOE



"By using the autonomous wireless measuring boxes, we save a lot of wiring time during installation", sums up Christoph Thiel from Moeller Operating Engineering GmbH.

In total, three measuring boxes will be placed around the wind turbine. A box is placed on the acoustic sensor, one near the plant control and the last finally on the meteorological sensor mast.

Radioline pass the recorded data wirelessly to their remote stations in the parked vehicle, which they transfer to the computer. There, the data is archived and processed.




Process applications

 Click on image!

Radioline

Pipeline monitoring



Application examples

- Substation and field data are monitored using a radio link
- Real time monitoring of equipment
- Data collection and transfer for back-to-back monitoring

Advantages of wireless systems

- Reducing labor (data collection)
- Cheap, rugged and efficient
- Complete solution from low to high end
- Mobile, portable and wireless



Tank farms



Application examples

- Use of a wireless monitoring system for remote tanks
- Automatic monitoring of tank levels and transfer to the control system
- Real time data monitoring and transfer to the control system

Advantages of wireless systems

- No need to install the wireless components on or within the tanks
- The high quality and security of wireless communication
- Remote services and monitoring
- Complete solution from single station



Oil refinery Petronor




A refinery, which handles of thousands of barrels of oil every day. Behind the finished process steps, liquids and gases are produced, stored and conveyed back and forth between the process units and storage tanks on premises.

At the Petronor refinery in Ecuador, Spain, the radio line wireless system provides wireless monitoring of the process pump, oil and other products.



Comserver

Process - COMSERVER



Application

- Communication with several compressors in the field via Modbus/RTU

Requirements


- Conversion of serial data into Ethernet
- Bridging long distances to the data center

Reasons to decide for our product

- Complete device and files for the sector
- Better relationship with our customer


Company description

- The Dow Company is making chemicals that without which there would be no modern civilization: chemical, plastics and biological products. Dow Chemicals produces and supplies a wide range of chemicals from drinking water, food and medicines to plastics, packaging materials, personal hygiene and health products.



PSI-MOS Profibus

Process - PROFIBUS fiber optic converters



Application

- Conversion to fully controlled a complex and extend PROFIBUS network

Problems

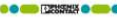
- Bad errors in the PROFIBUS network due to short circuits

Solution

- Segmentation of the PROFIBUS network using repeaters and fiber optic converters
- Short time of production and galvanic isolation of each segment

Reasons to decide for our product

- Technical features
- Lower price
- Fiber optic signal monitoring for better diagnostics
- Conversion to the CAN bus communication for less wiring effort
- Good relationship




Pipeline monitoring



Application examples

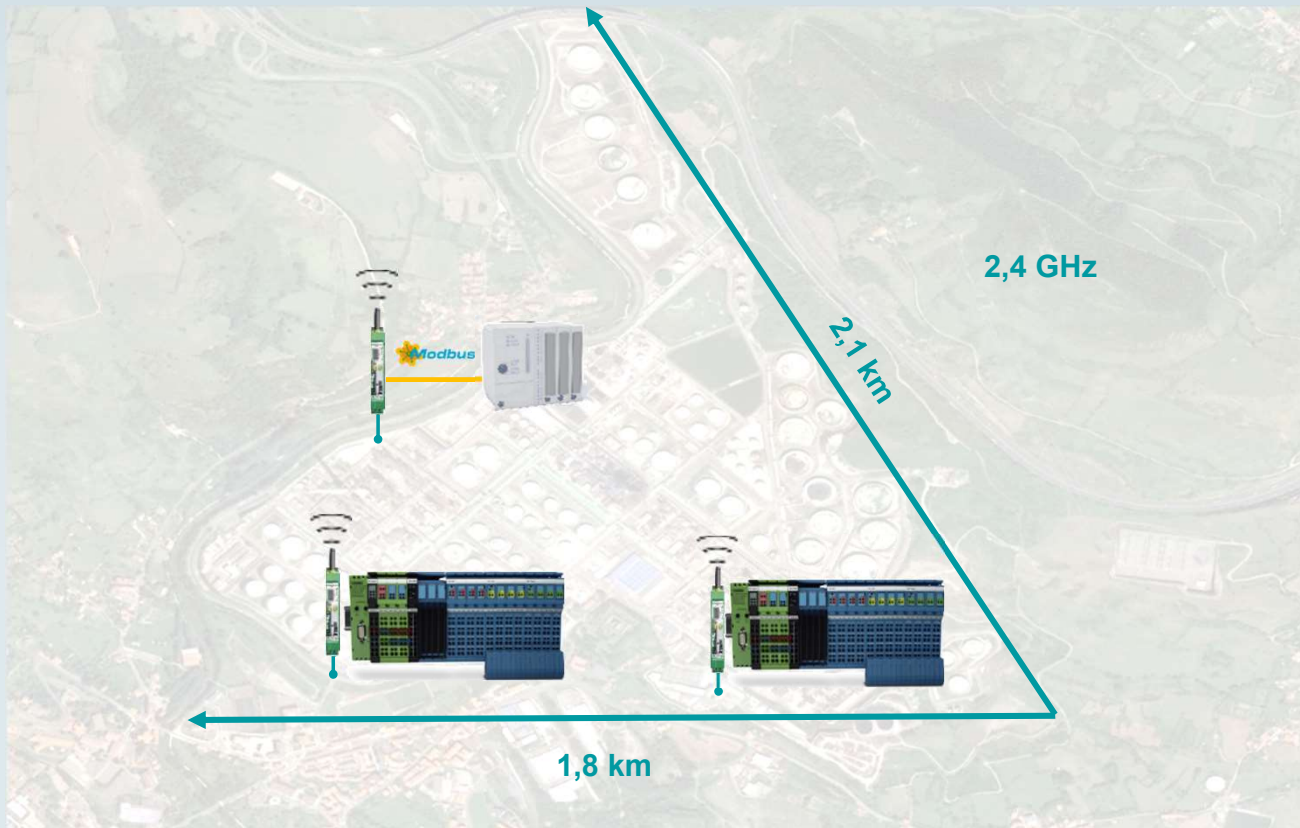
- To detect leaks, pressure, temperature and flow must be determined along a pipeline
- Early detection of system errors
- Secure communication solution for transferring data to the control center

Advantages of wireless systems

- ✓ Bridging large distances and obstacles
- ✓ Cheap diagnosis and efficient monitoring
- ✓ Complete solution from one source
- ✓ Flexible customization and extension



Tank farms



Application examples

- VPI is a valve position detection system for manual valves
- Automatic recognition of the valve position and message to the control system
- To keep costs down, management was looking for alternatives to cable laying

Advantages of wireless systems

- ✓ Thanks to Radioline, the process components can be networked at drastically reduced costs
- ✓ The high flexibility and reliability of Radioline and the excellent experience of users from other industrial sectors were convincing
- ✓ Complete solution from a single source



Oil refinery Petronor



A refinery utilizes hundreds of thousands of barrels of oil every day. Between the individual process steps, liquids and gases are produced, which are constantly pumped back and forth between the process plants and storage tanks via pipelines.

At the Petronor refinery in Muskiz, Spain, the Radioline wireless system provides remote monitoring of valve positions, pump status and system pressures.



Factory automation applications

 Click on image!

Wireless MUX

Foundry MPG Mendener Präzisionsrohr



To using the wireless solutions, we can solve to replace the intercom-problem, cable chains and avoid a lot of money" came up Thomas Voss from Design Systems Engineering.

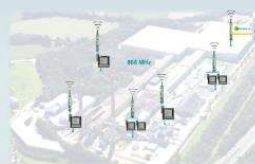
At MPG, the reality to be realized also correspond to the surface via charging bodies.

With the Wireless MUX, the signals are sent from the charging body to the control rack in the control room.



Radioline

Energy management




Application examples

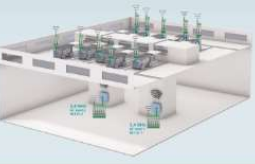
- To control the amount of energy, water, etc. directly in the work cell, the data transfer has been realized.
- Due to the high demands, no power supply for the sensors and the energy management system by cable.
- The long data lines are sent through power lines, cable and other devices.

Advantages of wireless systems

- Simple installation and operation
- Simple expansion of further measuring points



Glass production




Application examples

- From the control room in the plant, the data is sent to the control room in the control room.
- A lot of data of the production process has to be sent to the control room.
- Transmission of sensor data between the working cells and the control room in the basement.


Advantages of wireless systems

- Easy installation and operation
- Simple expansion of further measuring points
- Transmission also through high-temperature concrete walls



Comserver

Factory automation



Application

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

Requirement


- Conversion of Ethernet into serial data
- Different serial interfaces (RS 232/422/485)

Reasons to decide for our product

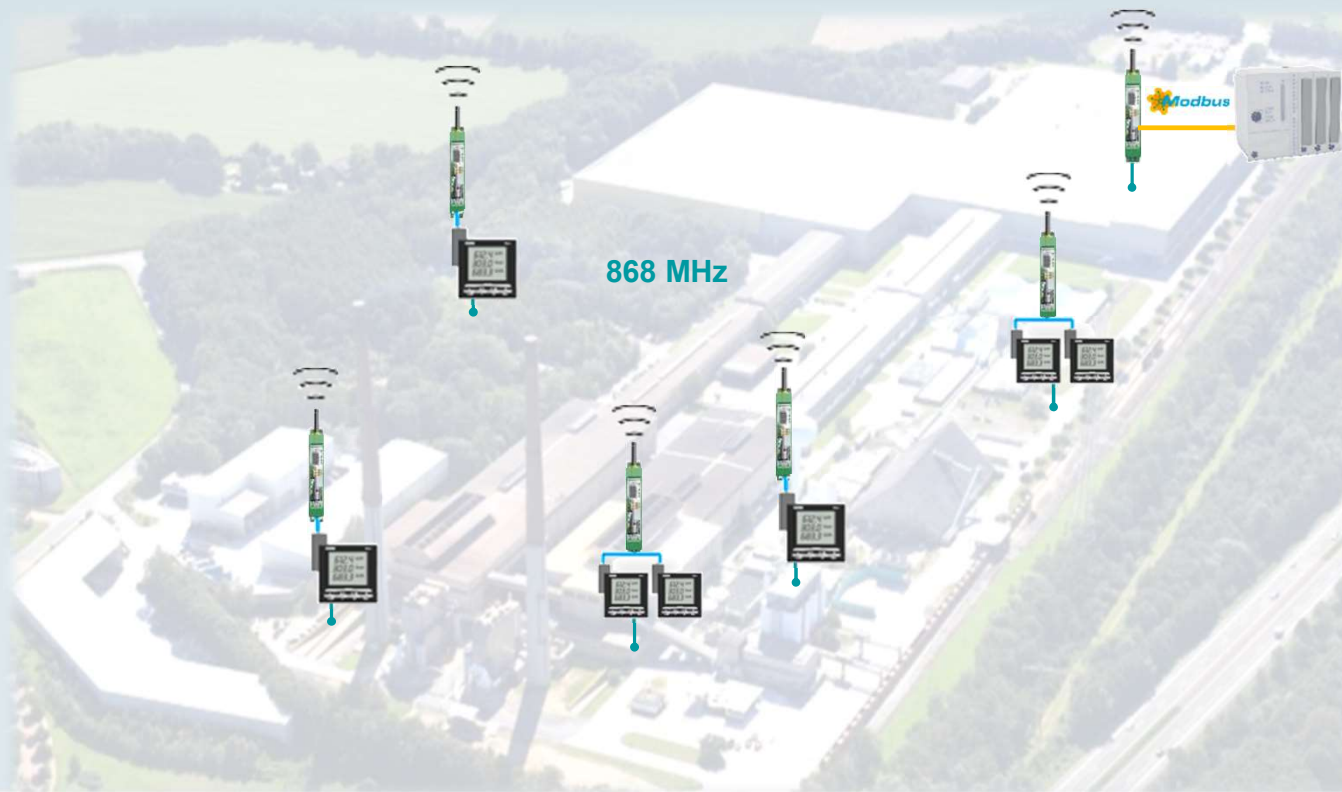
- Customer saves the Comserver for many systems worldwide

Company description

- For more than 20 years, BHS Computed has been working with the construction of Comservers and the manufacture of computer systems. Thanks to years of experience BHS Computed is the world's largest provider of solutions for the Corrugated Industry.




Energy management



Application examples

- To collect the relevant energy values, new electricity meters with Modbus interface have been installed
- Due to the long distances, we were unable to integrate all the meters into the energy management system by cable
- The energy data must be sent through several halls, walls and other obstacles

Advantages of wireless systems

- ✓ Bridging big distances with many obstacles
- ✓ Easy installation and operation
- ✓ Simple integration of further measuring points



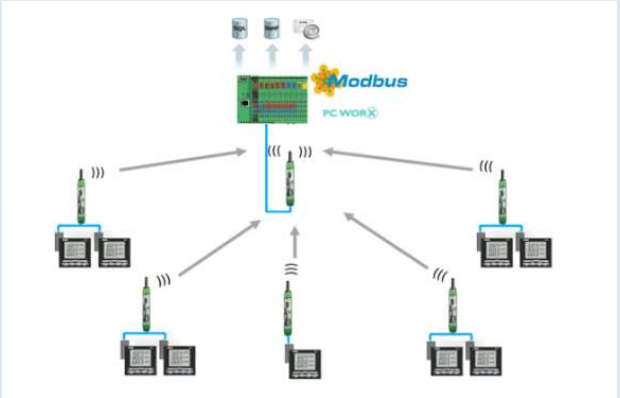
Metal production Walter Mester



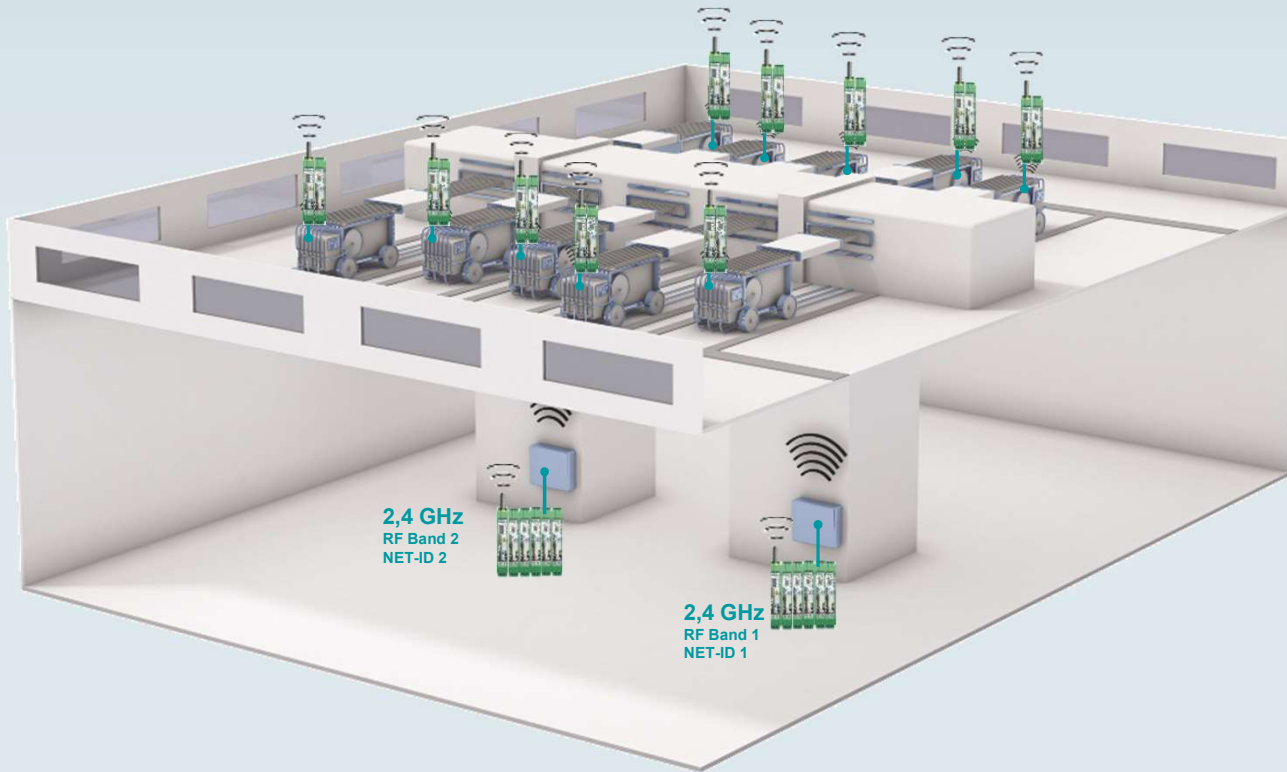
"We were not sure that wireless communication always works reliably in the harsh environment of a forge. But after the implementation of a similar application in another forge, all doubts are dispelled", sums up Thomas Besbes from Isertech GmbH.

In order to benefit from tax deductions for energy-intensive businesses, energy consumption must be recorded transparently.

The implemented solution shows how the energy consumption can be determined transparently by means of measuring devices systematically installed at the energy focal points in combination with a reliable Radioline wireless transmission.



Glass production



Application examples

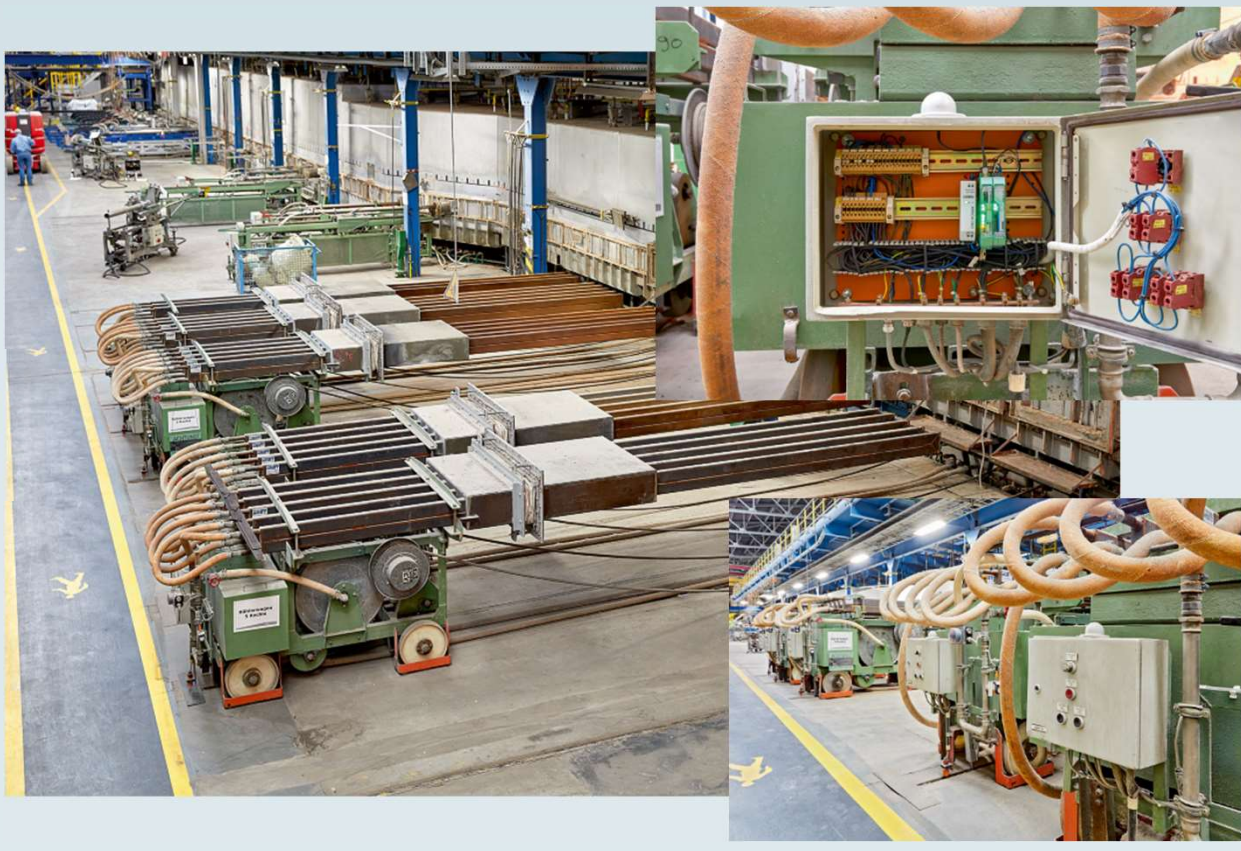
- There are cooling rods on the movable units, which cool the liquid glass transported on the tin bath
- In order to pass on the additional sensor data for flow and temperature monitoring, there were no free wires in the cable drums
- Transmission of sensor data between the cooling units and the controller in the basement

Advantages of wireless systems

- ✓ Easy installation and operation
- ✓ Simple integration of further measuring points
- ✓ Transmission also through thick reinforced concrete walls



Glas production Saint-Gobain



"We could hardly believe that Radioline could transmit data even through the rather thick reinforced concrete ceiling. The setup was a child's play, with just one turn on the wheel, the inputs and outputs are assigned to each other", explains Wilfried Brepols.

The windows installed in cars are heated to more than 600° C in the furnace during their production and then tempered by mobile refrigeration units due to the rapid cooling.

The Radioline system transmits the signals from the cooling units through a ceiling to the controller in the building basement.



Service & Support



- ✓ **Professional path study**
Give us the coordinates of the stations to be networked, we check the feasibility for you
- ✓ **Configuration and start-up**
We help you put your network into operation and show you how to increase performance
- ✓ **Maintenance and support**
We assist you with troubleshooting and provide assistance and recommendations
- ✓ **Trainings and workshops**
We offer individually tailored training courses



Contact Germany

Contact International



Planning

Wireless Tool Software

WNP Wireless Network Planner



Wireless Configuration and Diagnostic Tool

PSI-CONF



The advertisement features a row of five green Phoenix Contact terminal blocks with antennas, set against a background of a globe and a grid pattern. The text 'PSI-CONF Configuration Software' is prominently displayed. Below this, the copyright information and website are provided. The Phoenix Contact logo is at the bottom right of the ad, with a decorative bar of green and blue circles above it.

PSI-CONF
Configuration
Software

Copyright
PHOENIX CONTACT GmbH & Co. KG
32823 Blomberg, Germany

For the latest software version
and updates visit
www.phoenixcontact.com

PHOENIX CONTACT

Youtube 11 Radioline Videos

Radioline



Radioline Software-free configuration - Phoenix Contact
Phoenix Contact USA · 20,070 vistas · hace 7 años
<http://www.phoenixcontact.com/radioline> Configure the Radioline wireless system for simple I/O to I/O communication without the use of software. The Radioline wireless system distributes...

This is Radioline
Phoenix Contact USA · 4,119 vistas · hace 1 año
<https://www.phoenixcontact.com/radioline> Radioline is the wireless communication system for large industrial arrangements. In this video, we explore this exciting solution, including its unique...
Subtítulos

Radioline
Phoenix Contact USA
This is Radioline · 4:13
Trusted Wireless 2.0 Technology Overview - Phoenix Contact · 2:17
VER LISTA DE REPRODUCCIÓN COMPLETA

Radioline 4-channel NAMUR digital I/O extension module
Phoenix Contact USA · 151 vistas · hace 2 años
https://www.phoenixcontact.com/online/portal/us/pxc/content_pages/lut/p/z1/xVRdb4IwFP0tPvhi-sGnj4hG5-...

Youtube Radioline Phoenix Contact USA Tool for learning

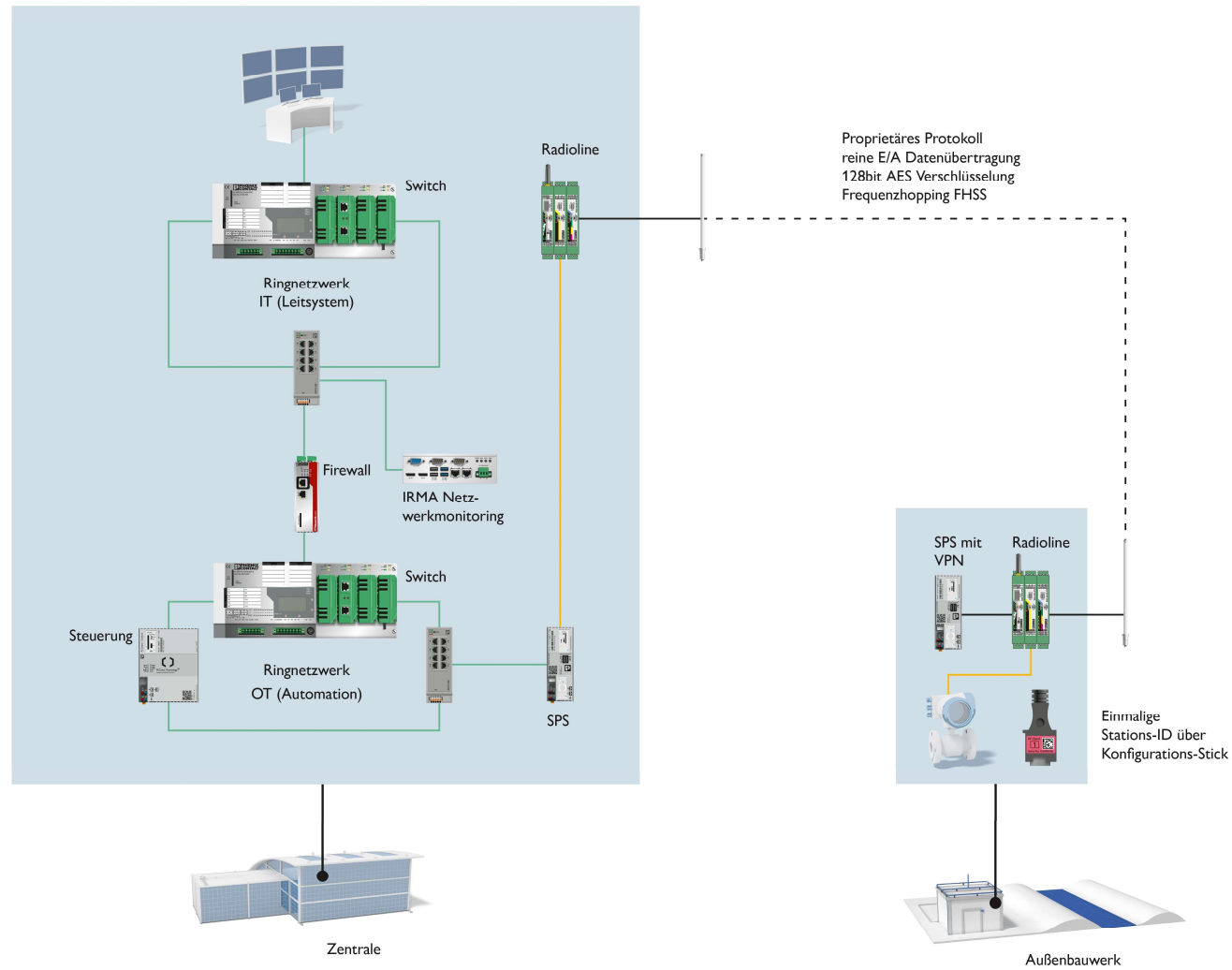


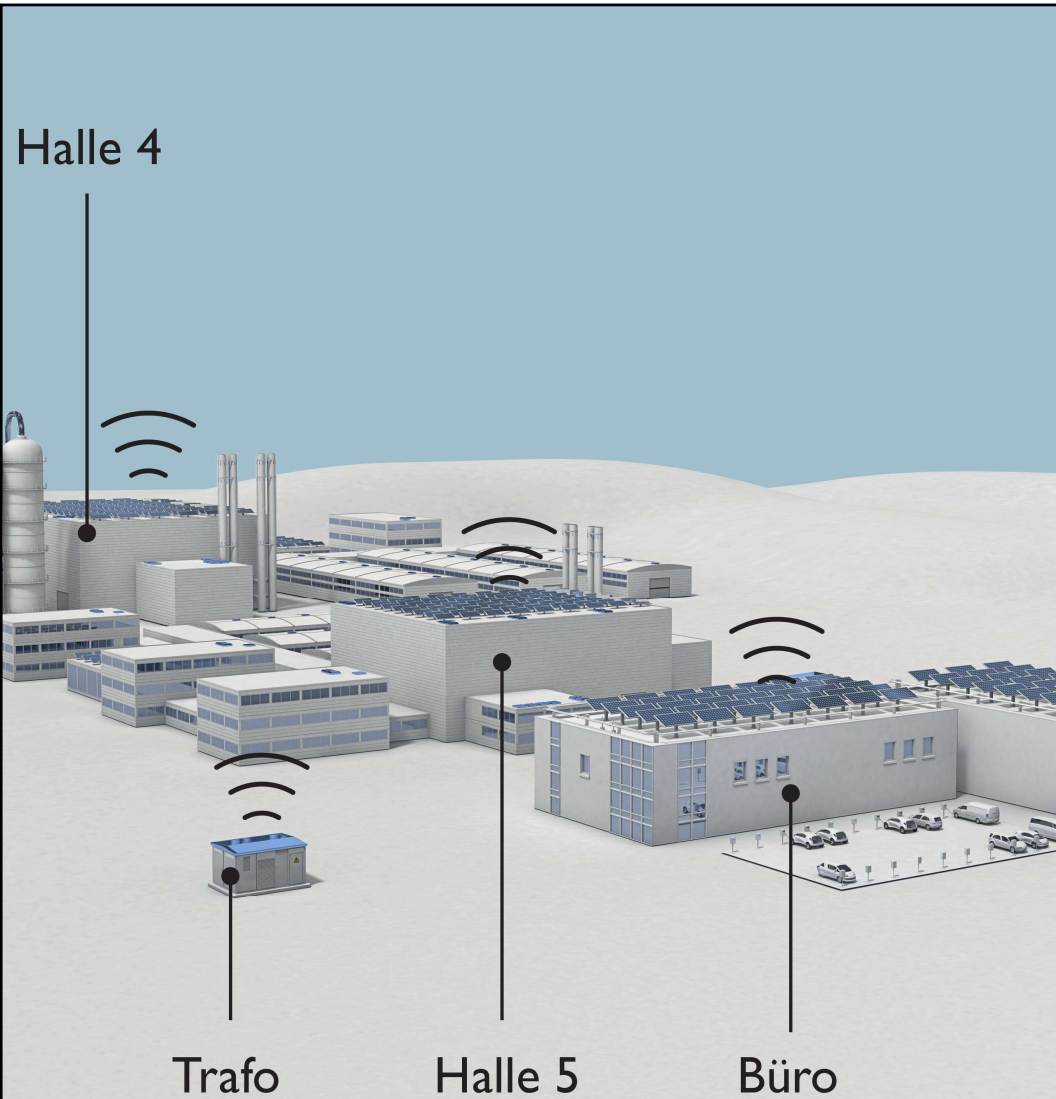
Wastewater treatment plant
PHOENIX CONTACT

Radioline application

Radioline

Typical application





Thank you

Basic Wireless Radioline

Antonio Gordillo / Marketing Phoenix Contact Infraestructura y Sistemas de Automatización / agordillo@phoenixcontact.com.mx / 55 3233 6518

