

# RAD-EE-2400-RS485 - Wireless module



1081818

<https://www.phoenixcontact.com/pc/products/1081818>

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2.4 GHz wireless transceiver with RS-485 interface, RSMA (female) antenna connection, point-to-point, star, and mesh networks up to 250 stations, range of up to 500 m (with a clear line of sight), for worldwide use

## Product Description

Due to high-frequency switching operations in PV systems, interference commonly occurs on communication cables. This means that interference-free monitoring of PV systems cannot always be ensured. Wireless communication in the 2.4 GHz band is immune to electromagnetic interference and is therefore ideal for use in PV systems. Using the new wireless modules, serial RS-485 cables can be easily and flexibly replaced with a secure, interference-free wireless connection.

## Your advantages

- Flexible networking of wireless modules as a point-to-point, star or mesh connection
- Parallel operation of multiple PV arrays, thanks to comprehensive coexistence mechanisms
- Reliable, interference-free communication even over long distances, thanks to Trusted Wireless technology
- Intuitive startup, thanks to user-friendly software wizard
- License-free 2.4 GHz frequency band
- Reasonably-priced version

## Commercial Data

Item number	1081818
Packing unit	1 pc
Minimum order quantity	50 pc
Product Key	DNC614
GTIN	4055626810065
Weight per Piece (including packing)	138.1 g
Weight per Piece (excluding packing)	110 g
Customs tariff number	85176200
Country of origin	DE

## Technical Data

### Notes

#### Utilization restriction

EMC note	EMC: class A product, see manufacturer's declaration in the download area
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### Product properties

Product type	Wireless module
Application	RS-485
Operating mode	Serial data (Activation and configuration via PSI-CONF software)
MTTF	778 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)
	358 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%)
	142 Years (SN 29500 standard, temperature 40°C, operating cycle 100%)

#### Insulation characteristics

Overvoltage category	II
Degree of pollution	2

### Electrical properties

Transient surge protection	Yes
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#### System limits

Designation	Wireless module
Number of supported devices	≤ 250 (Addressing via PSI-CONF software)

#### Supply

Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30.5 V DC
Max. current consumption	≤ 48 mA (at 24 V DC, at 25 °C)

### Connection data

Connection method	Screw connection
Stripping length	7 mm
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	14

### Interfaces

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## Wireless

Range	± 500 m (The range may be considerably above or below that stated, and depends on the environment, antenna technology, and the product used)
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## Serial: RS-485

Data rate	300 bps / 600 bps / 1.2 kbps / 2.4 kbps / 4.8 kbps / 9.6 kbps / 19.2 kbps / 38.4 kbps / 57.6 kbps / 93.75 kbps / 115.2 kbps
Connection method	COMBICON plug-in screw terminal block
Connection technology	2-conductor
Transmission length	≤ 1200 m
Termination resistor	390 Ω (switchable via DIP switches) 150 Ω (switchable via DIP switches) 390 Ω (switchable via DIP switches)

## Serial: Configuration interface

Connection method	S-PORT (socket)
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## Wireless

Interface description	Trusted Wireless
Direction	Bi-directional
Frequency	2400 MHz
Frequency range	2.4002 GHz ... 2.4785 GHz
Channel distance	1.3 MHz
Number of channel groups	8
Number of channels per group	55
Transmit capacity, minimum	0 dBm
Transmit capacity, maximum	≤ 18 dBm (can be set via software)
Data rate	16 kbps (adjustable) 125 kbps (Default setting, adjustable) 250 kbps (adjustable)
Minimum receiver sensitivity	-106 dBm (16 kbps) -96 dBm (125 kbps) -93 dBm (250 kbps)
Antenna connection method	RSMA (female)

## Functions

Wireless licenses	Europe, USA, Canada, additional countries in the e-shop
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## Wireless

Frequency band	2.4 GHz
Wireless standard	Trusted Wireless

## LED signaling

Status display	Green LED (supply voltage, PWR) LED yellow (reception quality, LINK) Green LED (receive data, RX)
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# RAD-EE-2400-RS485 - Wireless module

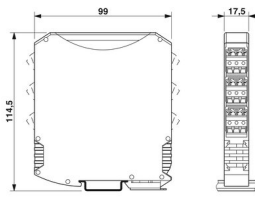


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Green LED (transmit data, TX)

## Dimensions

Dimensional drawing	
Width	17.5 mm
Height	116 mm
Depth	114.5 mm

## Material specifications

Material	PA 6.6-FR
Flammability rating according to UL 94	V0

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 70 °C -4 °F ... 158 °F
Ambient temperature (storage/transport)	-20 °C ... 70 °C -4 °F ... 158 °F
Altitude	2000 m
Permissible humidity (operation)	20 % ... 85 %
Permissible humidity (storage/transport)	20 % ... 85 %
Shock	16g, 11 ms
Vibration (operation)	in accordance with IEC 60068-2-6: 5g, 10 Hz ... 150 Hz

## Approval data

### CE

Certificate	CE-compliant
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### UL, USA/Canada

Identification	508 Listed
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### Wireless approval, Europe

Note	RED 2014/53/EU
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### Wireless approval USA, FCC

Certificate	YG3RAD2400A
Note	FCC directive, part 15.247

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## Wireless approval Australia, RCM

Certificate	-
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## Wireless approval Brazil, ANATEL

Certificate	06279-19-06497
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## Wireless approval India, WPC

Certificate	NER-ETA/314
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## Wireless approval Canada, IC

Certificate	4720B-RAD2400A
Note	ISC directive RSS 210

## Wireless approval Mexico, IFT

Certificate	RCPPHRA20-0068
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## KC approval for South Korea

Certificate	MSIP-CRI-PCK-2901541
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## EMC data

Electromagnetic compatibility	Conformance with RED Directive 2014/53/EU
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## Electrostatic discharge

Standards/regulations	EN 61000-4-2
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## Electrostatic discharge

Contact discharge	± 6 kV (Test Level 3)
Discharge in air	± 8 kV (Test Level 3)
Indirect discharge	± 6 kV
Comments	Criterion B

## Electromagnetic HF field

Standards/regulations	EN 61000-4-3
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## Electromagnetic HF field

Frequency range	26 MHz ... 3 GHz (Test Level 3)
Field intensity	10 V/m
Comments	Criterion A

## Fast transients (burst)

Standards/regulations	EN 61000-4-4
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## Fast transients (burst)

Input	± 2 kV (Test Level 3)
Signal	± 2 kV
Comments	Criterion B

## Surge current load (surge)

Standards/regulations	EN 61000-4-5
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## Surge current load (surge)

Input	± 0.5 kV (symmetrical)
	± 1 kV (asymmetrical)
Signal	± 1 kV (asymmetrical)
Comments	Criterion B

## Conducted interference

Standards/regulations	EN 61000-4-6
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## Conducted interference

Frequency range	0.15 MHz ... 80 MHz
Comments	Criterion A
Voltage	10 V

## Emitted interference

Emitted radio interference in acc. with EN 55011	EN 55016-2-3 Class A industrial applications
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## Criteria

Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.

## Standards and regulations

Standards/specifications	EN 300328
	EN 61000-6-4
	EN 61000-6-2
	EN 50371
	EN 60950-1

## Mounting

Mounting type	DIN rail mounting
Assembly instructions	on standard DIN rail NS 35 in accordance with EN 60715

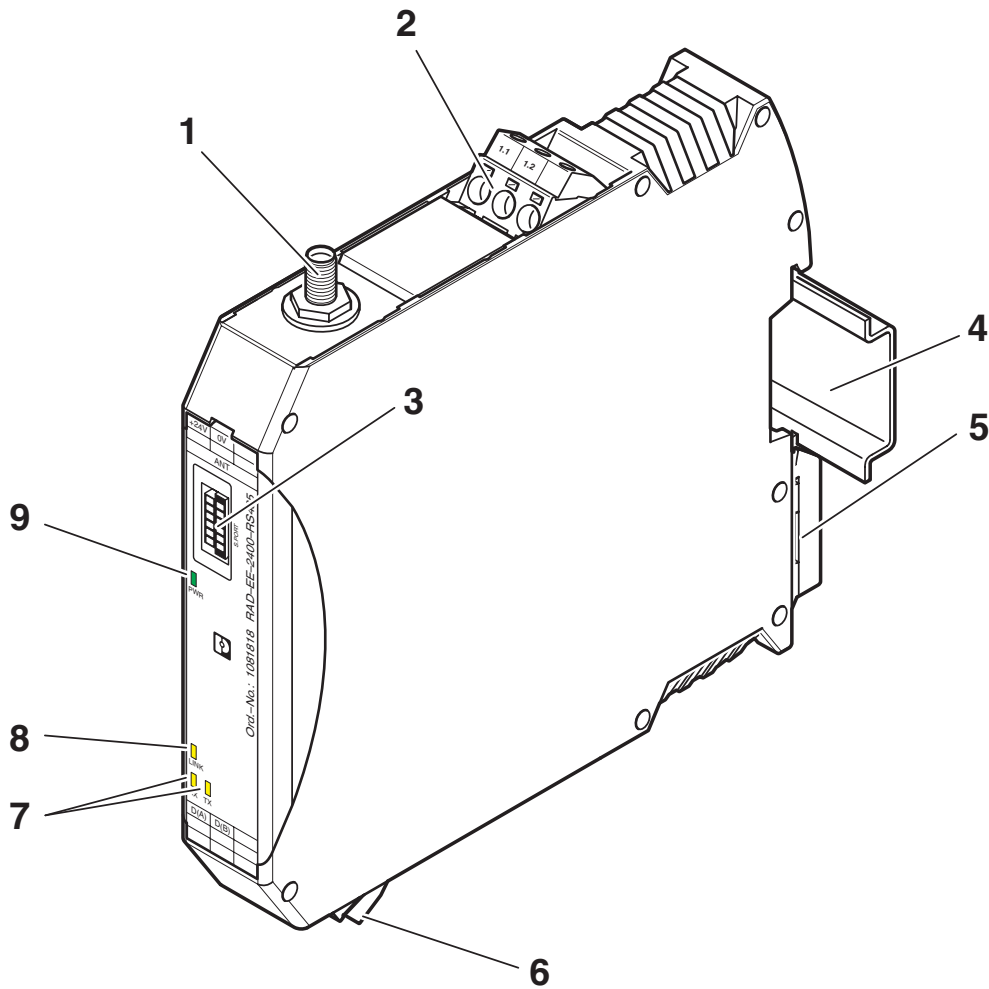
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## Drawings

Schematic diagram



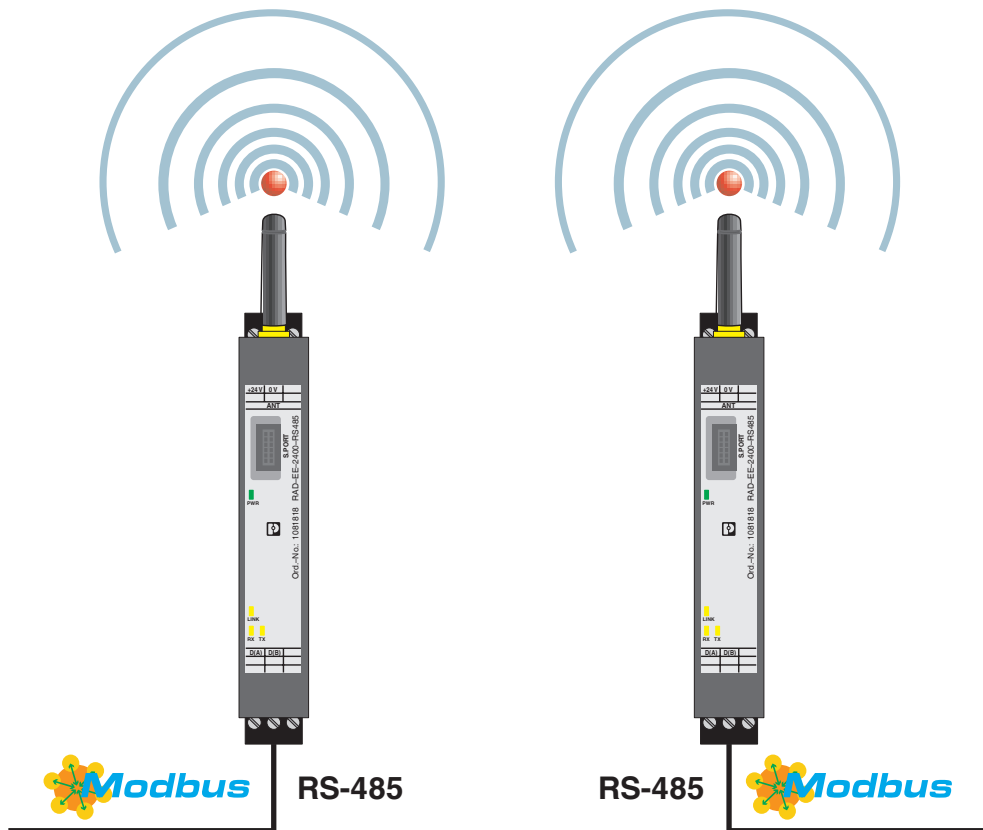
## Function elements

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## Application drawing



Point-to-point connection

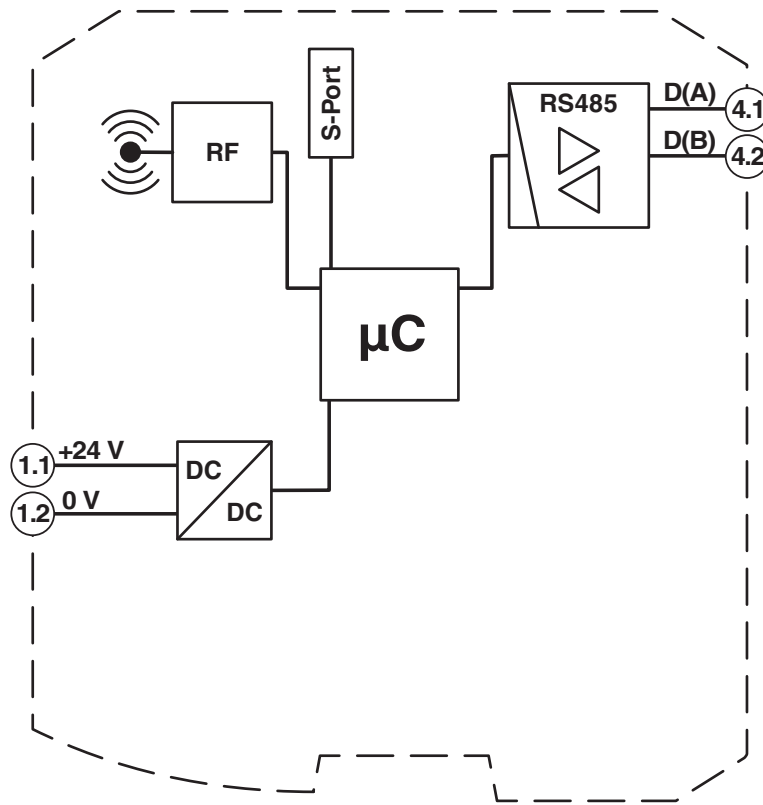


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Block diagram



Basic circuit diagram

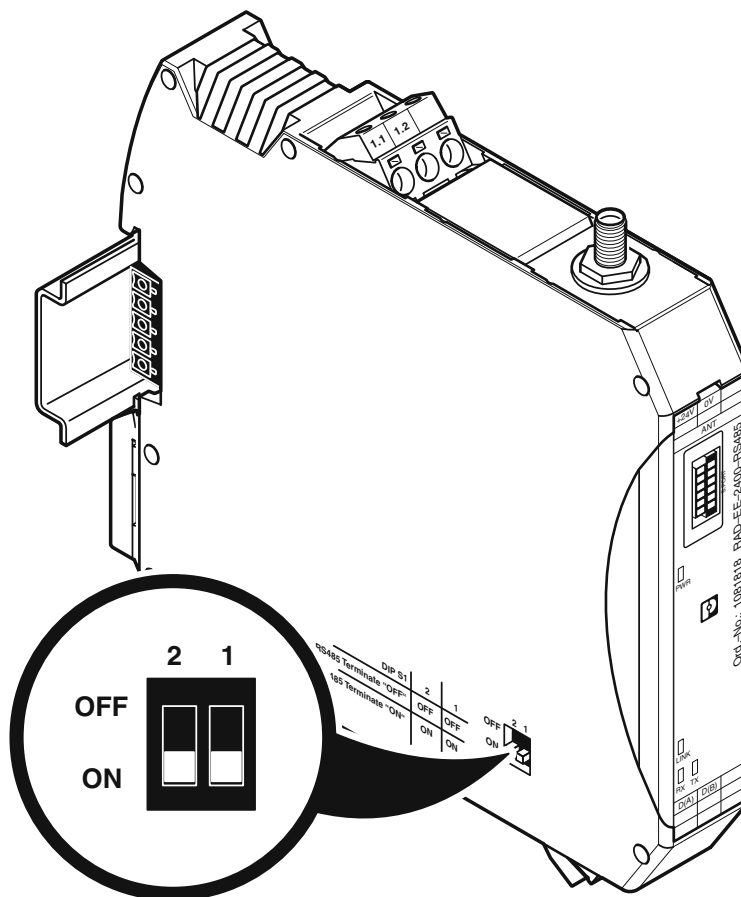
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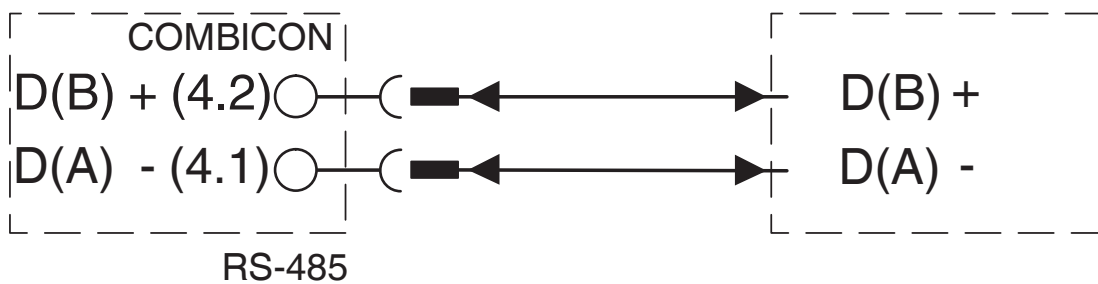
<https://www.phoenixcontact.com/pc/products/1081818>

Schematic diagram



DIP switches

Connection diagram



RS-485 connection

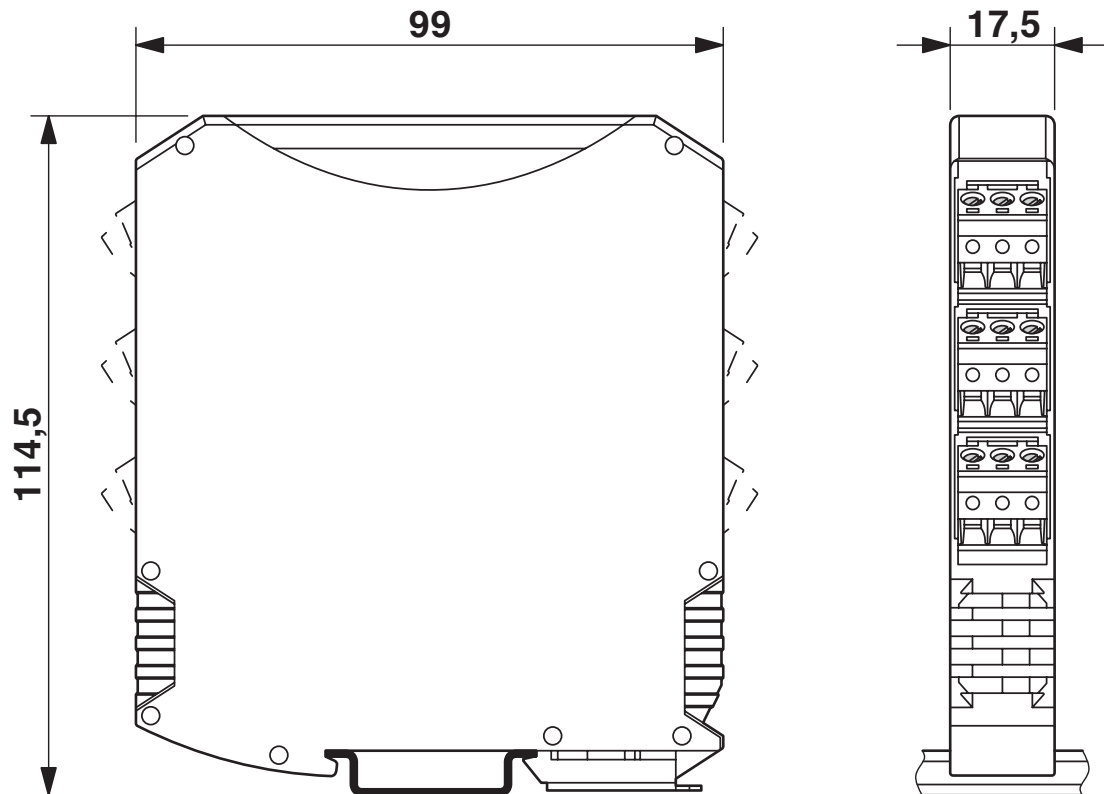
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Dimensional drawing



Slim design

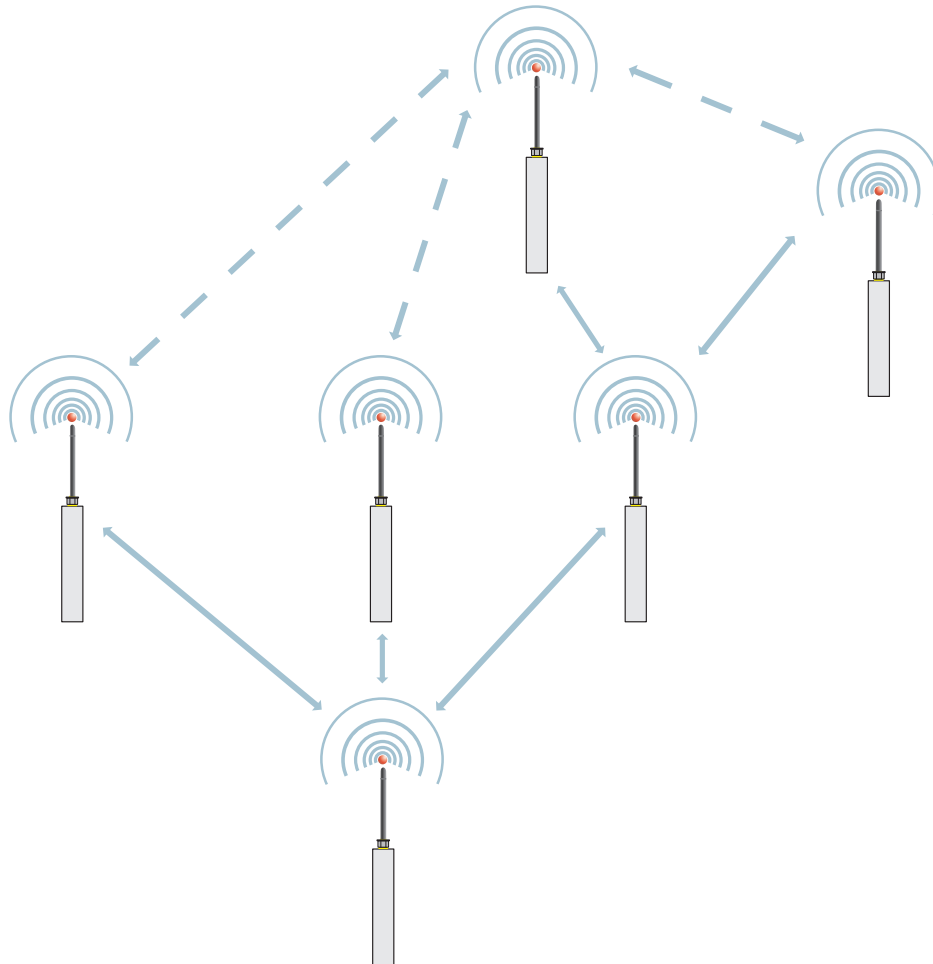
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Application drawing



Mesh network

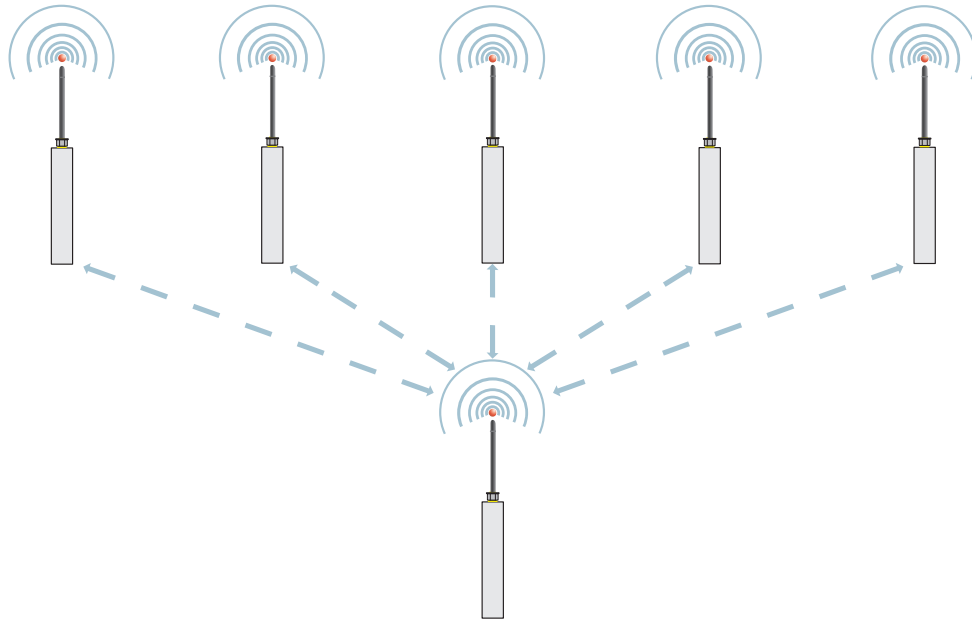
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Application drawing



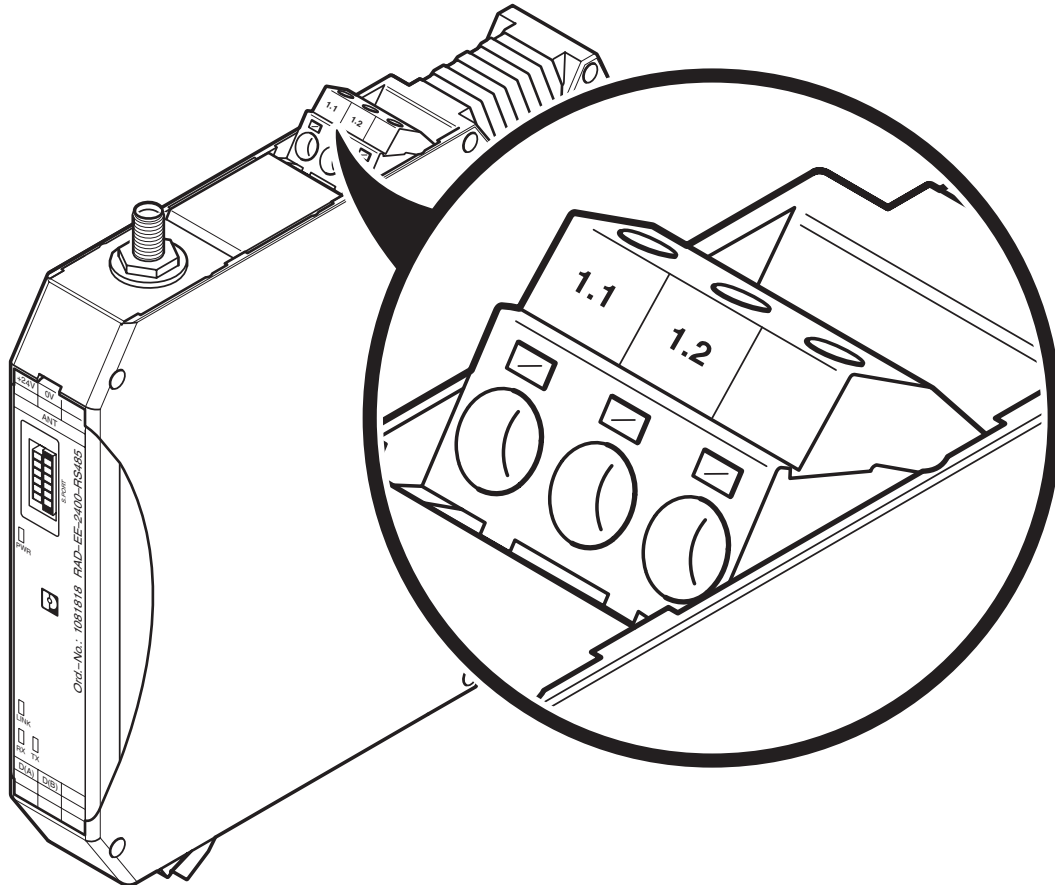
Star structure

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Schematic diagram



Power supply

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## Approvals



**UL Listed**

Approval ID: FILE E 238705



**cUL Listed**

Approval ID: FILE E 238705



**KC**

Approval ID: MSIP-CRI-PCK-2901541



**cUL Listed**

Approval ID: FILE E 238705



**UL Listed**

Approval ID: FILE E 238705

**ANATEL**

Approval ID: 06279-19-06497

**cULus Listed**

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## Classifications

### ECLASS

ECLASS-9.0	19179290
ECLASS-10.0.1	19179290
ECLASS-11.0	19179090
ECLASS-12.0	19179090
ECLASS-13.0	19179090

### ETIM

ETIM 8.0	EC002608
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### UNSPSC

UNSPSC 21.0	43222600
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## Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For information on hazardous substances, refer to the manufacturer's declaration available under "Downloads"

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## Accessories

### RAD-CABLE-USB - Cable for programming

2903447

<https://www.phoenixcontact.com/pc/products/2903447>



Radioline - USB data cable for communication between the PC and Radioline devices, energy supply for diagnostics and configuration via the USB port of the PC, cable length: 2 m / 6.5 ft

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### SCC 10-NS35 - Shield connection clamp

1019440

<https://www.phoenixcontact.com/pc/products/1019440>



Shield connection clamp, connection method: Spring-cage connection, mounting type: NS 35/7,5, NS 35/15, color: black

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## FL COMSERVER UNI 232/422/485 - Interface converters

2313452

<https://www.phoenixcontact.com/pc/products/2313452>



**Second generation** FL COMSERVER UNI..., serial device server for converting a serial 232/422/485 interface to Ethernet, supports TCP, UDP, Modbus gateway, and PPP applications, incl. COM port redirector software and user documentation

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## ANT-OMNI-2459-04 - Antenna

1284780

<https://www.phoenixcontact.com/pc/products/1284780>



Multiband omnidirectional antenna for freely mobile applications, compact design, frequency band: 2.4 GHz / 5 GHz / 6 GHz, gain: 2.0 dBi / 2.5 dBi / 3.0 dBi, degree of protection: IP68/IP69K, shock- and vibration-resistant, connection: N (male)

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## RAD-ISM-2400-ANT-OMNI-2-1-RSMA - Antenna

2701362

<https://www.phoenixcontact.com/pc/products/2701362>



Omnidirectional antenna for wall mounting, frequency band: 2.4 GHz, gain: 2 dBi, degree of protection: IP65, connection: RSMA (male), incl. 1.5 m connecting cable, mounting bracket, and mounting material

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## ANT-OMNI-0671-02 - Antenna

1396318

<https://www.phoenixcontact.com/pc/products/1396318>



Multiband omnidirectional antenna with protection against vandalism for control cabinet mounting, frequency band: 0.6 GHz ... 7.1 GHz, gain: 2 dBi ... 4 dBi, degree of protection: IP67, shockproof: IK10, seawater-resistant, connection: N (female)

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## ANT-OMNI-0671-01 - Antenna

1396316

<https://www.phoenixcontact.com/pc/products/1396316>



Multiband omnidirectional antenna for wall or mast mounting, 0.6 GHz ... 7.1 GHz, gain: 1 dBi ... 3 dBi, degree of protection: IP67, seawater-resistant, connection: N (female), incl. mounting bracket and mast clamps

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## RAD-ISM-2400-ANT-OMNI-6-0 - Antenna

2885919

<https://www.phoenixcontact.com/pc/products/2885919>



Omnidirectional antenna for wall or mast mounting, 2.4 GHz, gain: 6 dBi, degree of protection: IP67, saltwater-resistant, shock- and vibration-resistant, connection: N (female), incl. mounting bracket and mast clamps, ATEX and IECEx approval

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## RAD-PIG-EF316-N-RSMA - Antenna cable

2701402

<https://www.phoenixcontact.com/pc/products/2701402>

Antenna cable for control cabinet feed-through, outside diameter: 3.2 mm (0.126 in.), inner conductor: stranded, attenuation: 0.6 / 0.9 / 1.4 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (female) -> RSMA (male), cable length: 0.5 m (1.6 ft.)



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## RAD-PIG-RSMA/N-0.5 - Antenna cable

2903263

<https://www.phoenixcontact.com/pc/products/2903263>

Antenna cable, outside diameter: 5 mm (0.2 in.), inner conductor: solid, attenuation: 0.4 / 0.5 / 0.6 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (male) -> RSMA (male), cable length: 0.5 m (1.6 ft.)



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## RAD-PIG-RSMA/N-1 - Antenna cable

2903264

<https://www.phoenixcontact.com/pc/products/2903264>



Antenna cable, outside diameter: 5 mm (0.2 in.), inner conductor: solid, attenuation: 0.5 / 0.8 / 1.1 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (male) -> RSMA (male), cable length: 1 m (3.3 ft.)

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## RAD-PIG-RSMA/N-2 - Antenna cable

2903265

<https://www.phoenixcontact.com/pc/products/2903265>



Antenna cable, outside diameter: 5 mm (0.2 in.), inner conductor: solid, attenuation: 0.9 / 1.3 / 2.0 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (male) -> RSMA (male), cable length: 2 m (6.5 ft.)

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## RAD-PIG-RSMA/N-3 - Antenna cable

2903266

<https://www.phoenixcontact.com/pc/products/2903266>

Antenna cable, outside diameter: 5 mm (0.2 in.), inner conductor: solid, attenuation: 1.2 / 2.0 / 3.0 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (male) -> RSMA (male), cable length: 3 m (10 ft.)



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## RAD-PIG-RSMA/N-5 - Antenna cable

2702140

<https://www.phoenixcontact.com/pc/products/2702140>

Antenna cable, outside diameter: 5 mm (0.2 in.), inner conductor: solid, attenuation: 2.0 / 3.3 / 4.8 dB at 0.9 / 2.4 / 5.8 GHz, connection: N (male) -> RSMA (male), cable length: 5 m (16 ft.)





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## RAD-CAB-EF393- 3M - Antenna cable

2867649

<https://www.phoenixcontact.com/pc/products/2867649>



Antenna cable, outside diameter: 10 mm (0.4 in.), inner conductor: stranded, attenuation: 1.0 / 1.8 / 3.1 dB at 0.9 / 2.4 / 5.8 GHz, connection: 2 x N (male), cable length: 3 m (10 ft.)

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## RAD-CAB-EF393- 5M - Antenna cable

2867652

<https://www.phoenixcontact.com/pc/products/2867652>



Antenna cable, outside diameter: 10 mm (0.4 in.), inner conductor: stranded, attenuation: 1.6 / 2.9 / 5.0 dB at 0.9 / 2.4 / 5.8 GHz, connection: 2 x N (male), cable length: 5 m (16 ft.)

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## RAD-CAB-EF393-10M - Antenna cable

2867665

<https://www.phoenixcontact.com/pc/products/2867665>



Antenna cable, outside diameter: 10 mm (0.4 in.), inner conductor: stranded, attenuation: 2.9 / 5.6 / 9.9 dB at 0.9 / 2.4 / 5.8 GHz, connection: 2 x N (male), cable length: 10 m (32 ft.)

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## RAD-CAB-EF393-15M - Antenna cable

2885634

<https://www.phoenixcontact.com/pc/products/2885634>



Antenna cable, outside diameter: 10 mm (0.4 in.), inner conductor: stranded, attenuation: 4.3 / 8.3 / 14.8 dB at 0.9 / 2.4 / 5.8 GHz, connection: 2 x N (male), cable length: 15 m (50 ft.)

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## CN-LAMBDA/4-5.9-BB - Surge protection device

2838490

<https://www.phoenixcontact.com/pc/products/2838490>



Attachment plug with Lambda/4 technology as surge protection for coaxial signal interfaces. Connection: N connectors socket-socket

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## RAD-ADP-N/F-N/F - Adapter

2867843

<https://www.phoenixcontact.com/pc/products/2867843>



Antenna adapter for control cabinet feed-through, frequency range: 0.3 GHz ... 6 GHz, degree of protection: IP65, connection: 2 x N (female)

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## RAD-ADP-RSMA/M-RSMA/F-90 - Adapter

2904790

<https://www.phoenixcontact.com/pc/products/2904790>



Antenna adapter, frequency range: 0.3 GHz ... 6 GHz, connection: RSMA (male)  
-> RSMA (female), 90° angled

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## RAD-TAPE-SV-19-3 - Weather protection tape

2903182

<https://www.phoenixcontact.com/pc/products/2903182>



Vulcanizing sealing tape for external protection of adapters, cable connections,  
etc. against the effects of weather, roll length: 3 m

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