RAD-2400-IFS - Wireless module

2901541

https://www.phoenixcontact.com/us/products/2901541

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CRA-READY



Radioline - 2.4 GHz wireless transceiver with RS-232/RS-485 interface, can be extended with I/O modules, RSMA (female) antenna connection, point-to-point, star, and mesh networks up to 250 stations, range of up to 5 km (with a clear line of sight), for worldwide use. Product is being prepared for compliance with the Cyber Resilience Act (CRA).

Product description

Radioline is the new wireless system for large systems. Special features include extremely easy assignment of inputs and outputs by simply turning the thumbwheel - without any programming. Radioline transmits I/O signals (I/O mode) or serial data (serial mode) and is therefore very versatile. Alternatively, I/O signals can now also be connected to controllers directly using the Modbus protocol (PLC/Modbus RTU mode).
In addition, you can implement various network structures: from a simple point-to-point connection to complex mesh networks. Thanks to the latest Trusted Wireless technology, Radioline is the ideal choice for industrial use.

Your advantages

- License-free 2.4 GHz frequency band
- Range of several kilometers thanks to adjustable data rates for the wireless interface
- Quick and easy startup without programming
- High degree of reliability due to Trusted Wireless technology (AES encryption, frequency hopping method, and coexistence management)
- Mesh networks of up to 250 devices
- Integrated RS-232/RS-485 interface
- Modular extension with up to 32 I/O extension modules supported
- Extended temperature range of -40 °C … +70 °C
- Approved for use in zone 2
- International approvals

Commercial data

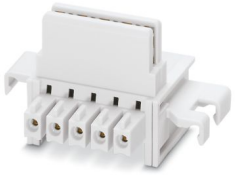
Item number	2901541
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	DN26
Product key	DNC614
GTIN	4046356610193
Weight per piece (including packing)	208 g
Weight per piece (excluding packing)	135.82 g
Customs tariff number	85176200
Country of origin	DE

Set consists of

ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY - DIN rail bus connector

2713645

https://www.phoenixcontact.com/us/products/2713645



DIN rail bus connector, color: light gray, nominal current: 8 A (parallel contacts), rated voltage (III/2): 125 V, number of positions: 5, product range: TBUS5-17,5.., pitch: 3.81 mm, mounting: DIN rail mounting, locking: without, mounting method: without, type of packaging: packed in cardboard, Item with gold-plated contacts, bus connectors for connecting with electronics housings, 5 parallel contacts

Technical data

Notes

Note on application

Note on application	Only for industrial use
Note on application	As things stand now, we are preparing the product so that, as of December 11, 2027, it will comply with the requirements of the EU Cyber Resilience Act (CRA) based on the information currently available regarding the CRA.

Product properties

Product type	Wireless module
Application	I/O
	RS-232
	RS-485
Operating mode	I/O data (Default setting, configuration via thumbwheel)
	Serial data (Activation and configuration via PSI-CONF software)
	PLC/Modbus RTU mode (Activation and configuration via PSI-CONF software)
	PLC / Modbus RTU dual mode (Activation and configuration via PSI-CONF software)
MTTF	733 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)
	340 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%)
	135 Years (SN 29500 standard, temperature 40°C, operating cycle 100%)

Insulation characteristics

Overvoltage category	II
Degree of pollution	2

Electrical properties

Rated insulation voltage	60 V (In accordance with EN/IEC 60079-7)
Maximum power dissipation for nominal condition	1.56 W
Transient surge protection	yes

System limits

Designation	Wireless module
Number of supported devices	≤ 250 (Addressing via PSI-CONF software)
	≤ 99 (Addressing via thumbwheel)
Number of possible extension modules	≤ 32 (per wireless module)

System limits

Designation	Wireless network
Number of supported devices	≤ 99 (I/O extension modules per wireless network, serial interfaces deactivated)

	0 (no I/O extension modules can be used)
	≤ 99 (I/O extension modules per wireless network, access to extension modules via Modbus RTU protocol)

Supply

Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30.5 V DC
Max. current consumption	≤ 65 mA (at 24 V DC, at 25 °C, stand-alone)
	≤ 6 A (at 24 V DC, with DIN rail connector at full capacity)

Output data

Digital

Output name	RF link relay output
Number of outputs	1
Contact switching type	Changeover contact
Contact material	PdRu, gold-plated
Maximum switching voltage	30 V AC/DC
	60 V DC
Max. switching current	500 mA (30 V AC/DC)
	300 mA (60 V DC)
Electrical service life	5x 10^5 switching cycles with 0.5 A at 30 V DC

Analog

Output name	RSSI voltage output
Number of outputs	1
Voltage output signal	0 V ... 3 V

Connection data

Connection method	Screw connection
Stripping length	7 mm
Conductor cross-section, rigid min.	0.2 mm²
Conductor cross-section, rigid max.	2.5 mm²
Conductor cross-section flexible min.	0.2 mm²
Conductor cross-section flexible max.	2.5 mm²
Conductor cross-section AWG min.	24
Conductor cross-section AWG max.	14
Tightening torque	0.5 Nm ... 0.6 Nm
	5 lb_f-in. ... 7 lb_f-in.

Interfaces

Wireless

Range	≤ 5 km (The range may be considerably above or below that stated, and depends on the environment, antenna technology, and the product used)

Serial: RS-232

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	3-conductor
Transmission length	≤ 15 m

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 / 187.5 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)

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	≤ 20 dBm (100 mW, outside of Europe, adjustable via software)
	≤ 19 dBm (Europe, can be set via software, depends on the data rate)
	18 dBm (Default setting, adjustable)
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)
Security	128-bit data encryption

Functions

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

Wireless

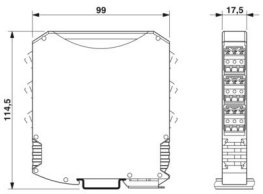
Frequency band	2.4 GHz

Wireless standard	Trusted Wireless

Signaling

Status display	LED supply voltage, PWR (green)
	Green LED (bus communication, DAT)
	LED periphery error, ERR (red)
	3x green, 1x yellow LED (LED bar graph receive quality, RSSI)
	Green LED (receive data, RX)
	Green LED (transmit data, TX)

Dimensions

Dimensional drawing	
Width	17.5 mm
Height	116 mm
Depth	114.5 mm

Material specifications

Color (Housing)	gray (RAL 7042)
Material (Housing)	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)	-40 °C ... 70 °C (>55°C derating, see technical documentation)
	-40 °F ... 158 °F (>131°F derating, see technical documentation)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
	-40 °F ... 185 °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

Approvals

CE

Certificate	CE-compliant

ATEX

Identification	Ⓔx II 3 G Ex ec nC IIC T4 Gc
Certificate	IBExU 15 ATEX B008 X
Note	Please follow the special installation instructions in the documentation!

IECEx

Identification	Ex ec nC IIC T4 Gc
Certificate	IECEx IBE 13.0019X

UL, USA/Canada

Identification	508 Listed
	Class I, Div. 2, Groups A, B, C, D T4A
	Class I, Zone 2, IIC T4

CCC / China-Ex

Identification	Ex ec nC IIC T4 Gc
Certificate	2022122310115624

Wireless approval, Europe

Note	RED 2014/53/EU

Wireless approval USA, FCC

Certificate	YG3RAD2400A
Note	FCC directive, part 15.247

Wireless approval for Argentina, RAMATEL

Certificate	C-27397

Wireless approval Australia, RCM

Certificate	-

Wireless approval Brazil, ANATEL

Certificate	06279-19-06497

Wireless approval India, WPC

Certificate	NER-ETA/314

Wireless approval Canada, IC

Certificate	4720B-RAD2400A
Note	ISC directive RSS 210

Wireless approval Morocco, ANRT

Certificate	MR 10464 ANRT 2015

Wireless approval Mexico, IFT

Certificate	IFT RCPPHRA17-1112

KC approval for South Korea

Certificate	MSIP-CRI-PCK-2901541

KC-s

Certificate	KTL 20-KA4BO-0146X

Wireless approval Taiwan, NCC

Certificate	CCAJ18LP1990T7

Wireless approval United Arab Emirates, TRA

Certificate	ER0126713

Wireless approval for Malaysia, SIRIM

Certificate	235821

Corrosive gas test

Identification	ISA-S71.04-1985 G3 Harsh Group A

EMC data

Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU

Electrostatic discharge

Standards/regulations	EN 61000-4-2

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

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

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

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

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

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

RED

Standard designation	2.4 GHz radio equipment, radio spectrum, RED
Standards/specifications	EN 300328

RED

Standard designation	EMC for 2.4 GHz radio equipment, RED
Standards/specifications	EN 301489-17

RED

Standard designation	HF personal exposure, RED
Standards/specifications	EN/IEC 62311

RED

Standard designation	Device safety and security for radio equipment, RED
Standards/specifications	EN/IEC 62368-1

EMC

Standard designation	EMC – Immunity for industrial areas
Standards/specifications	EN/IEC 61000-6-2

EMC

Standard designation	EMC for radio equipment, RED
Standards/specifications	EN 301489-1

EMC

Standard designation	EMC interference emissions for industrial environments
Standards/specifications	EN/IEC 61000-6-4

Explosive atmospheres

Standard designation	Ex areas, type of protection n
Standards/specifications	EN/IEC 60079-15

Explosive atmospheres

Standard designation	Ex areas, essential requirements
Standards/specifications	EN/IEC 60079-0

Explosive atmospheres

Standard designation	Ex areas, increased safety
Standards/specifications	EN IEC 60079-7

RoHS

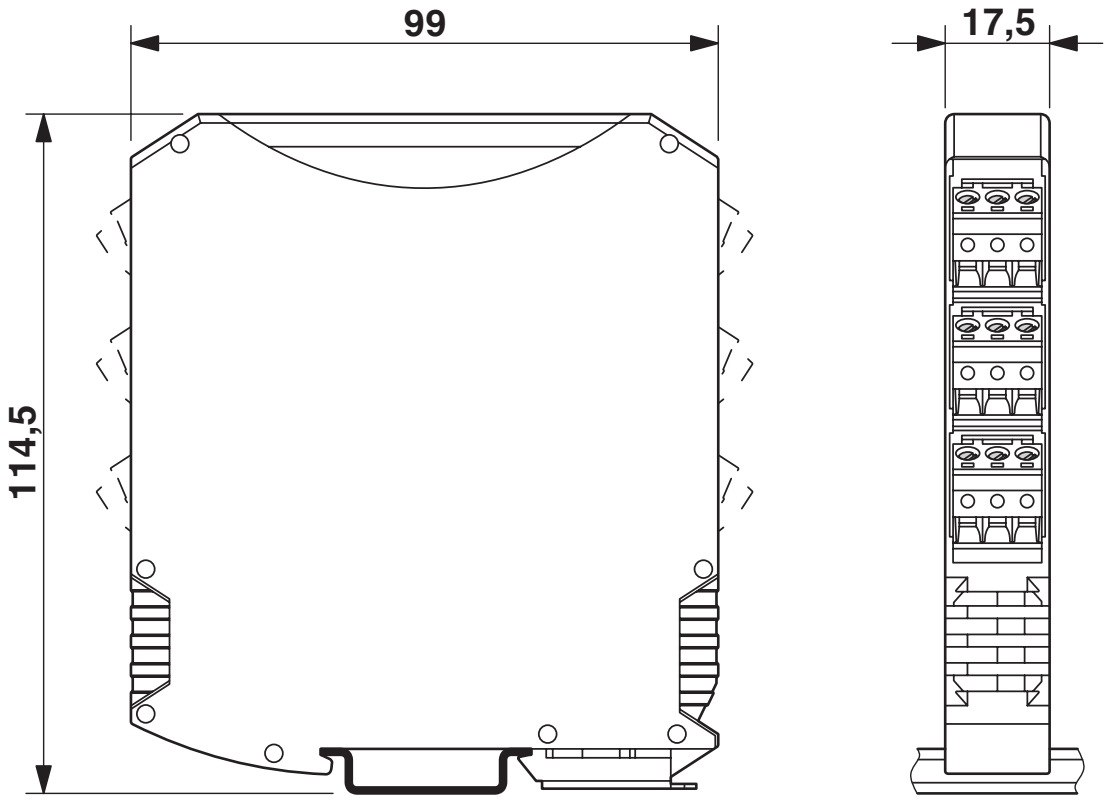
Standard designation	Technical documentation on substance restriction, RoHS
Standards/specifications	EN/IEC 63000

Mounting

Mounting type	DIN rail mounting
Assembly note	on standard DIN rail NS 35 in accordance with EN 60715
Mounting position	any
Useable DIN rail type	DIN rail: 35 mm

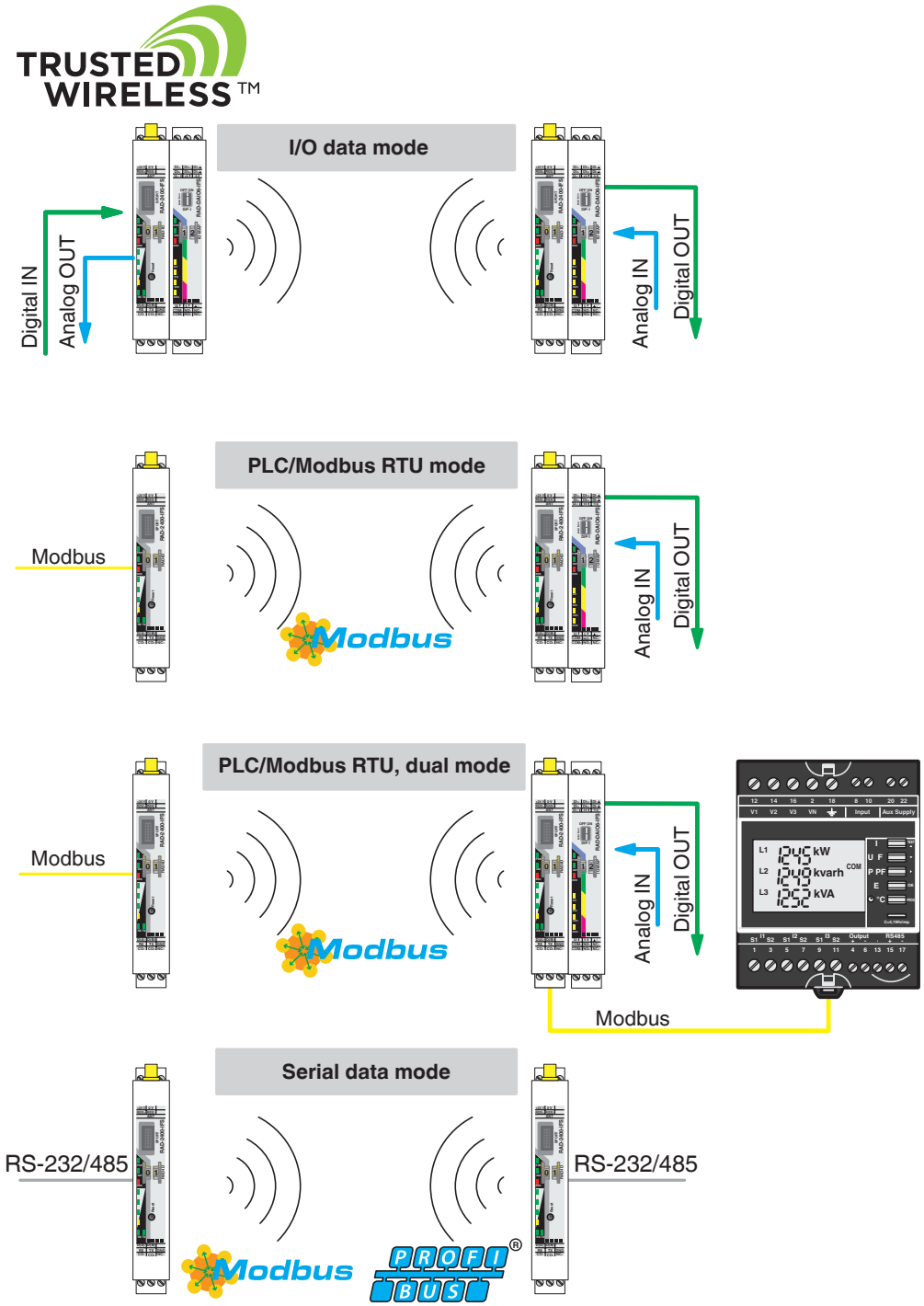
Drawings

Dimensional drawing



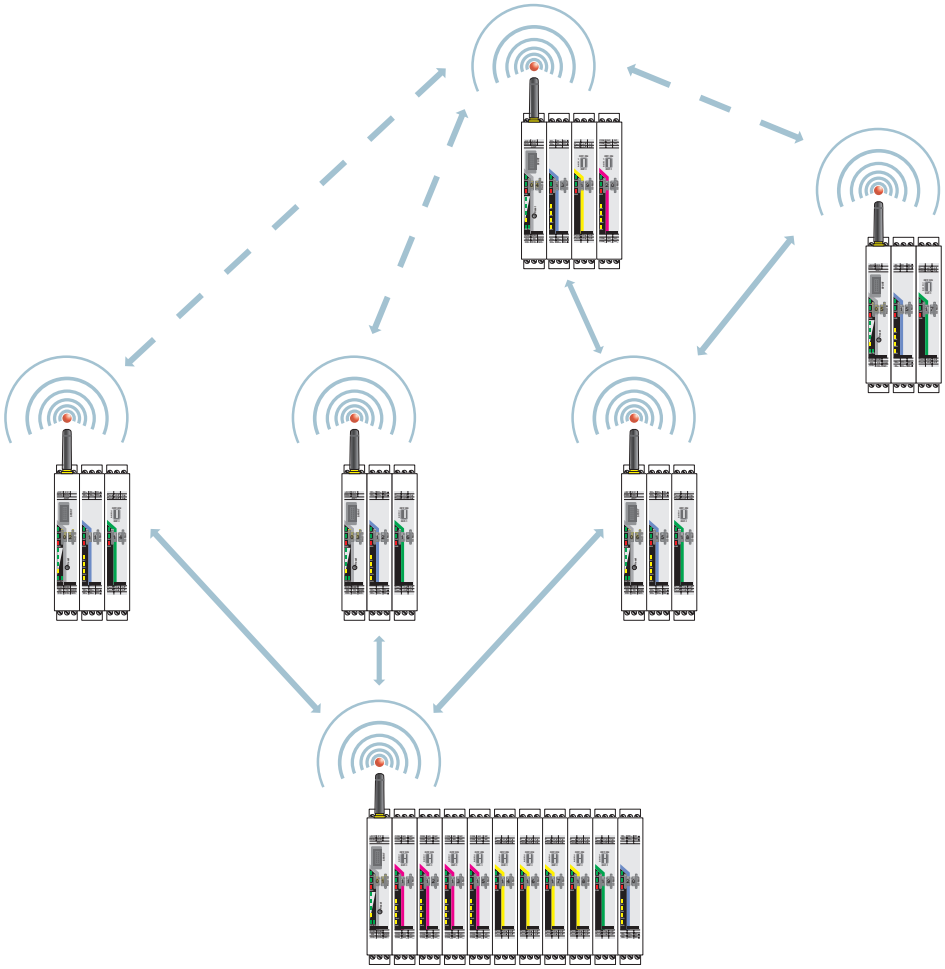
Slim design

Application drawing



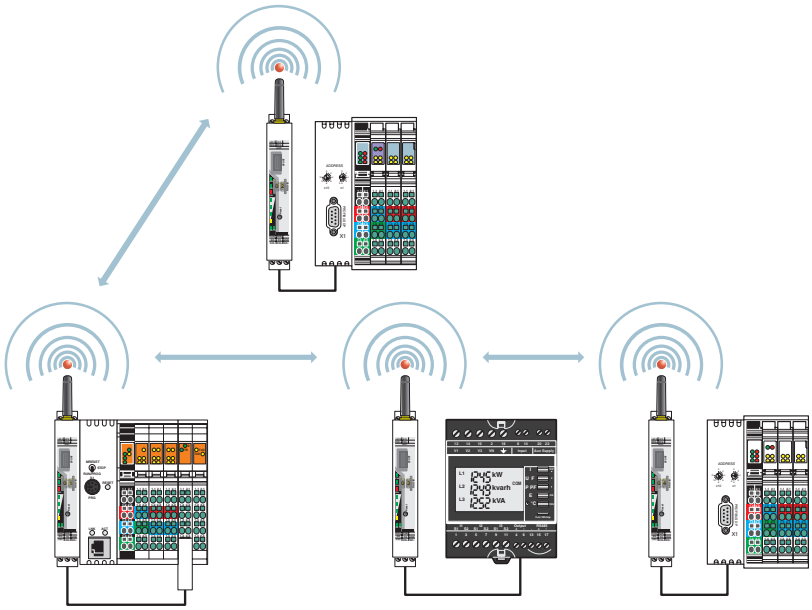
Operating modes

Application drawing



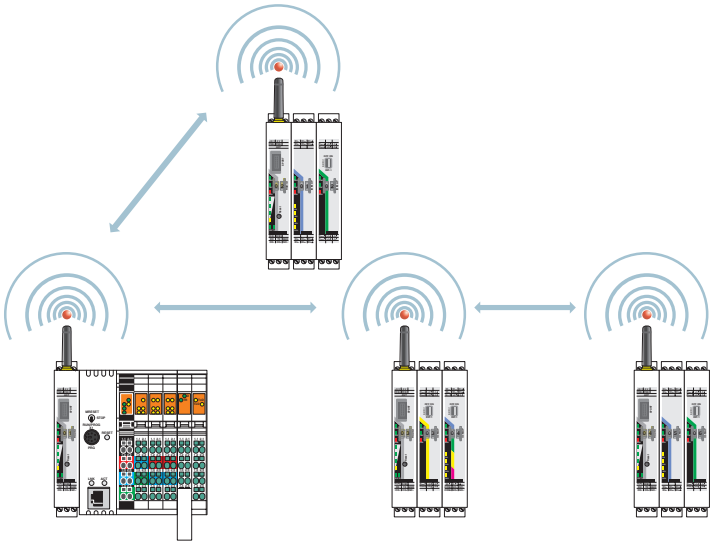
Wireless module in I/O data mode

Application drawing



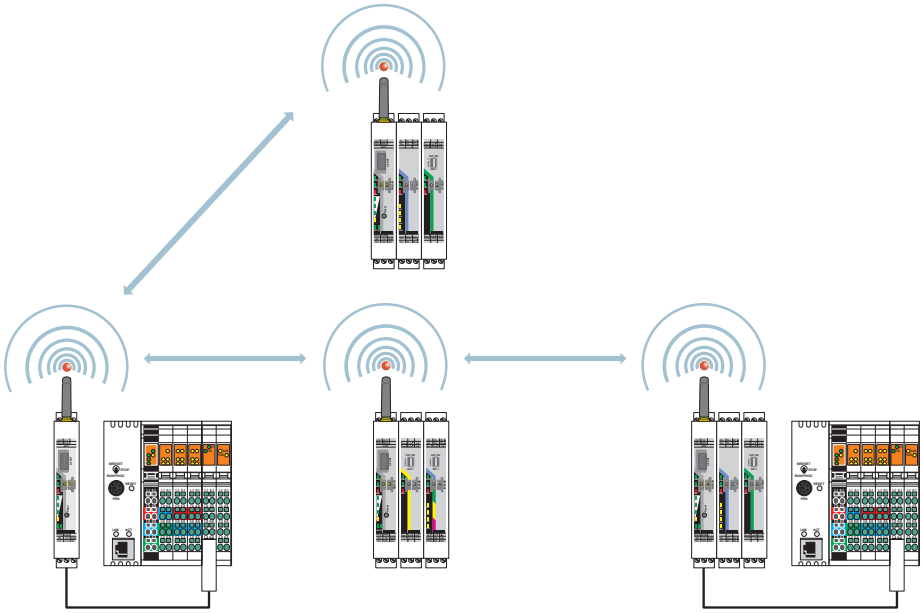
Serial data mode

Application drawing



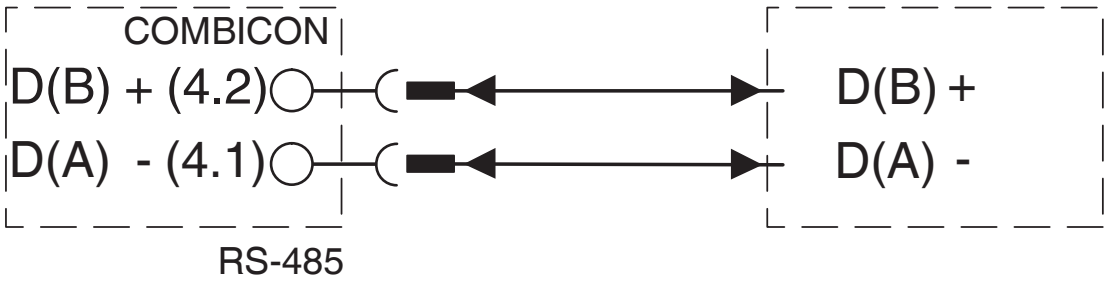
Wireless module in PLC/Modbus RTU mode

Application drawing



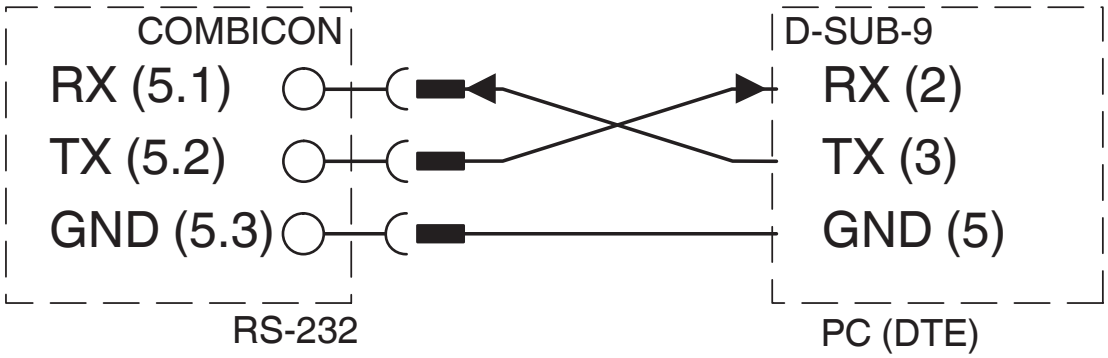
PLC / Modbus/RTU dual mode

Connection diagram



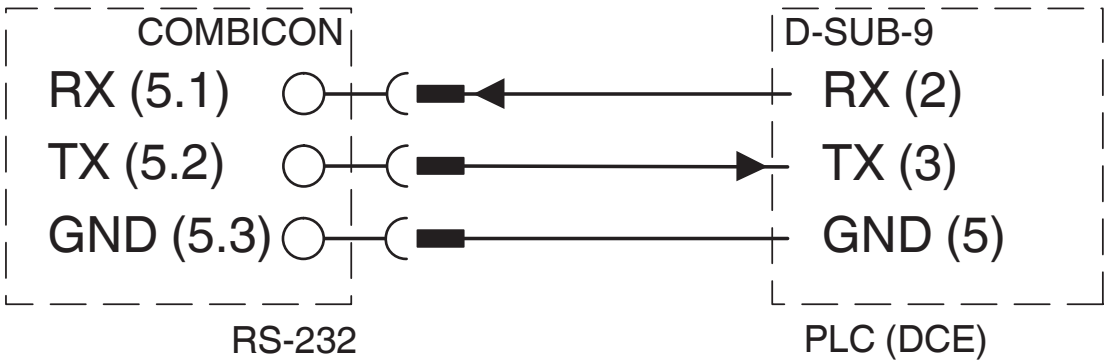
RS-485 connection

Connection diagram



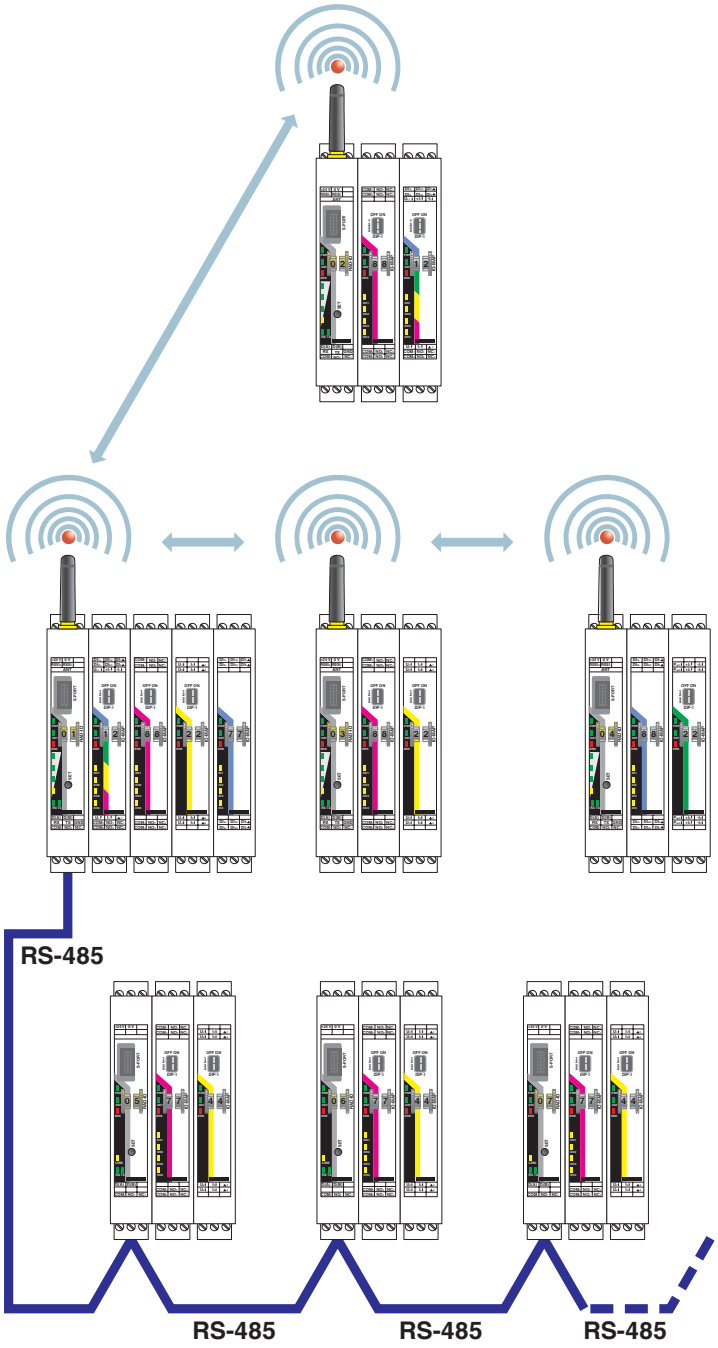
RS-232 connection

Connection diagram



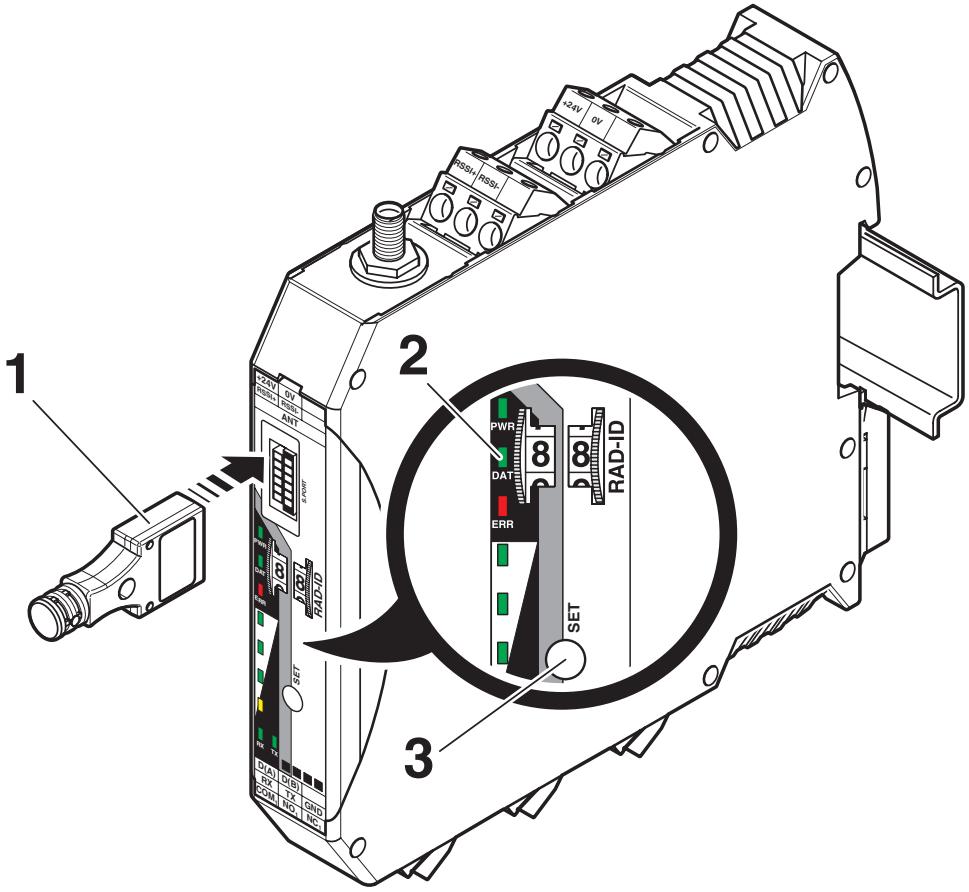
RS-232 connection

Functional drawing



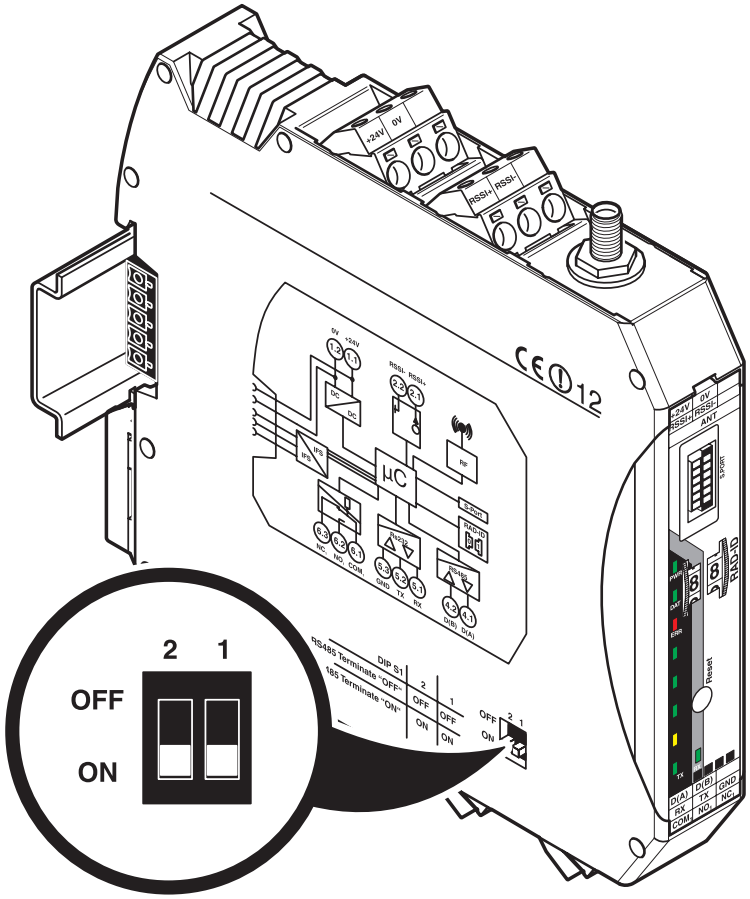
I/O-to-I/O, wireless, and RS-485

Schematic diagram



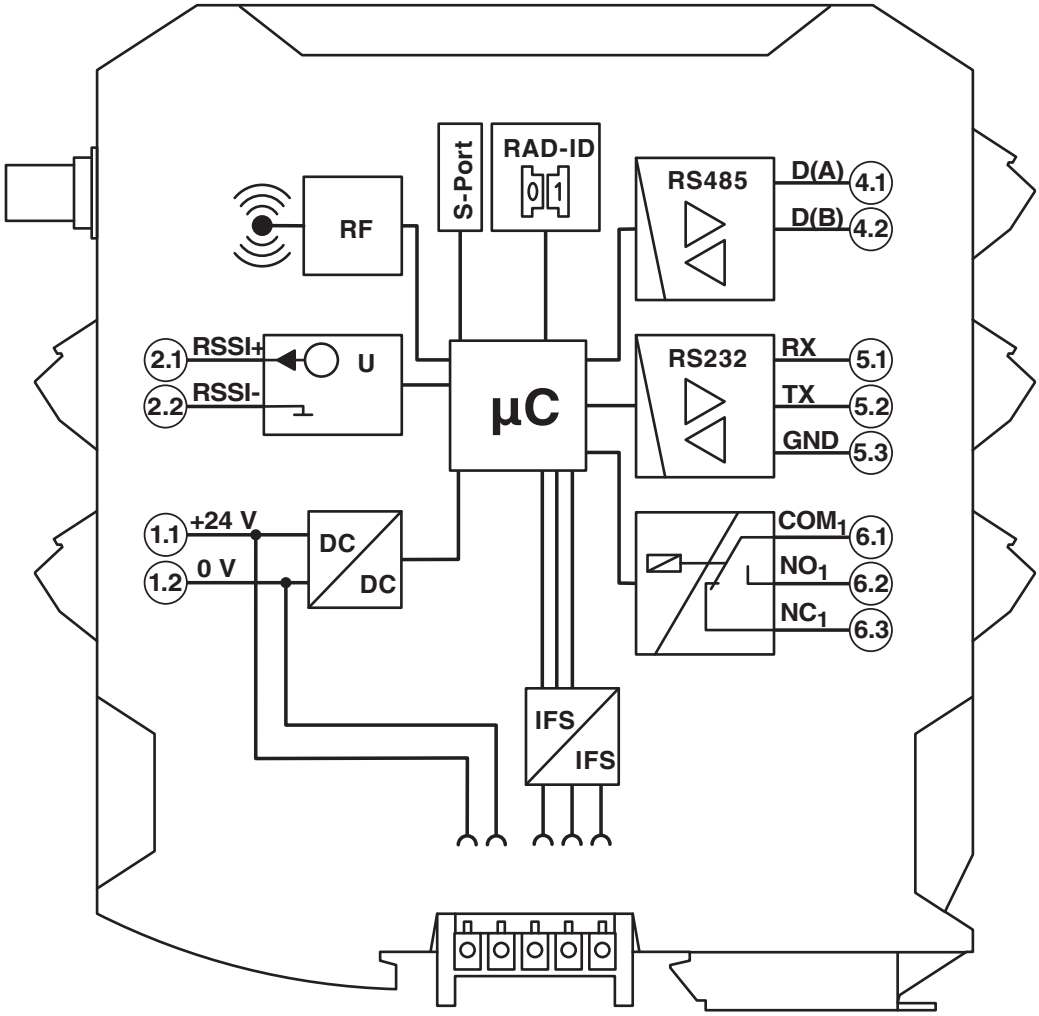
Configuration via CONFSTICK

Schematic diagram



DIP switches

Circuit diagram



Basic circuit diagram

Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/2901541

UL Listed
Approval ID: E238705

cUL Listed
Approval ID: E238705

KC
Approval ID: MSIP-CRI-PCK-2901541

NOM
Approval ID: RCPPHRA17-1112

ANATEL
Approval ID: 06279-19-06497

NCC
Approval ID: CCAJ18LP1990T7

SIRIM
Approval ID: 235821

IECEx
Approval ID: IECEx IBE 13.0019X

cUL Listed
Approval ID: E196811

UL Listed
Approval ID: E196811

ATEX
Approval ID: IBExU15ATEXB008 X

KC-s
Approval ID: 20-KA4BO-0146X

CCC
Approval ID: 2022122310115624

Classifications

ECLASS

ECLASS-13.0	19170501
ECLASS-15.0	19170501

ETIM

ETIM 10.0	EC000816

UNSPSC

UNSPSC 21.0	43222604

Environmental product compliance

EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	6(c), 7(a), 7(c)-I

China RoHS

Environment friendly use period (EFUP)	EFUP-50
	An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required.

EU REACH SVHC

REACH candidate substance (CAS No.)	Lead(CAS: 7439-92-1)
	6,6'-di-tert-butyl-2,2'-methylenedi-p-cresol(CAS: 119-47-1)
SCIP	7a3fc1fe-77ae-42b1-97a7-36d6ad5e3fd7

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