

# RAD-IN/OUT-4A-I

## Analog extension modules for the bidirectional wireless system

### INTERFACE

Data sheet  
102120\_en\_04



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## 1 Description

The RAD-ISM-...-SET-BD-BUS-ANT bidirectional wireless system comprises two transceiver modules. The transceivers can transmit and receive wireless signals. The transmit/receive function is managed automatically.

Extension modules can be connected to this system to adapt the number of signals to be transmitted (digital or analog) to the requirements. The bus foot connector is used to supply the extension modules and establish communication via an internal data bus.

With the **RAD-IN-4A-I** analog extension module, four analog signals (4 mA ... 20 mA) can be input and mapped via a corresponding RAD-OUT-4A-I analog output module.

With the **RAD-OUT-4A-I** analog extension module, four analog signals (4 mA ... 20 mA) can be mapped, which are input via a corresponding RAD-IN-4A-I analog input module.



Make sure you always use the latest documentation.  
It can be downloaded at [www.phoenixcontact.net/catalog](http://www.phoenixcontact.net/catalog).



This data sheet is valid for all products listed on the following page:

## 2 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Analog extension module with four analog inputs for acquiring signals	RAD-IN-4A-I	2867115	1
Analog extension module with four analog outputs for outputting signals	RAD-OUT-4A-I	2867128	1

## 3 Technical data

### Power supply

Supply voltage $U_B$ (via bus foot)	24 V DC
Tolerance	-50%/+25%
Protection against polarity reversal	Yes
Current consumption (at $U_B$ )	
Maximum	130 mA
Typical	100 mA ( $I_{OFF}$ ), 30 mA ( $I_{ON}$ )

### Analog input (RAD-IN-4A-I)

Number of inputs	4
Resolution	16 bits
Signal range (tolerance at 25°C)	4 mA ... 20 mA
Maximum	±0.225%
Typical	±0.075%
Overload capability range	10%
Underload capability range	5%
Input resistance	< 170 Ω
Temperature coefficient (-20°C ... +65°C)	0.007%/K
Supply for passive sensors	$U_B$

### Analog output (RAD-OUT-4A-I)

Number of outputs	4
Resolution	16 bits
Signal range (tolerance at 25°C)	4 mA ... 20 mA
Maximum	±0.225%
Typical	±0.075%
Overload capability range	10%
Underload capability range	5%
Maximum load resistance	$R_B = (U_B - 10 \text{ V})/20 \text{ mA}$
Temperature coefficient (-20°C ... +65°C)	0.004%/K


### Climatic data

Ambient temperature	
Operation (IEC 60068-1/UL 508)	-20°C ... +65°C
Storage	-40°C ... +85°C
Relative humidity	20% ... 85% (no condensation)

### Indicator

LED: Status	ON/OFF/flashing
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General data	
Housing material	Polyamide PA, non-reinforced
Degree of protection	IP20
Mounting	On TS35 DIN rail according to EN 60715
Mounting position	Any
Dimensions (W x H x D)	22.5 mm x 99 mm x 114.5 mm
Weight	145 g, approximately
Conductor cross-section	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>

Conformance/approvals	
Conformance	CE
UL	 <p><b>TELEMETERING EQUIPMENT FOR HAZARDOUS LOCATIONS</b>  <b>LISTED 9EXO</b>  <b>Class I Div 2 Groups A, B, C, D T5</b></p> <p>These devices must be wired in accordance with Class I, Division 2 wiring methods as described in the National Electrical Code, Article 501-4(b) or the authority having jurisdiction. Transmitter unit is to be used with a purely resistive antenna when installed in Class I, Division 2 areas.</p>

Conformance with EMC Directive 2004/108/EC	
Noise immunity	According to EN 61000-6-2
Noise emission	According to EN 61000-6-4

Conformance with ATEX Directive 94/9/EC		RAD-IN-4A-I	RAD-OUT-4A-I
ATEX		Ex II 3 G EEx nL IIC T5 ITS 06ATEX45167U	Ex II 3 G EEx nL IIC T5 ITS 06ATEX45199U
IECEX		Ex nL IIC T5 IECEX ITS 06.0002U	Ex nL IIC T5 IECEX ITS 06.0007U

## 4 Block diagram

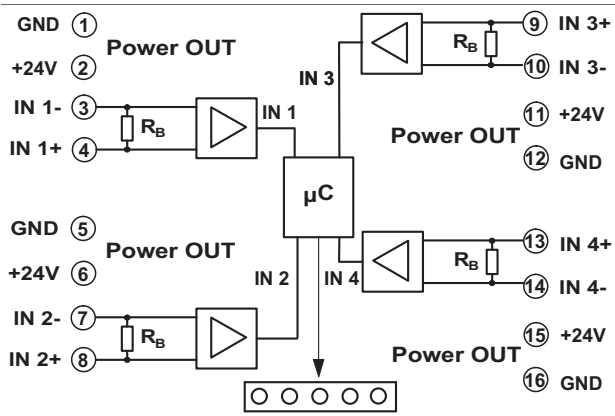


Figure 1 Block diagram for the RAD-IN-4A-I

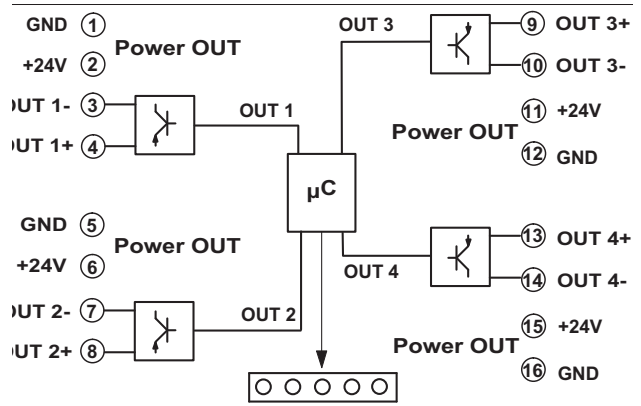


Figure 2 Block diagram for the RAD-OUT-4A-I

## 5 Safety regulations

### 5.1 Installation notes



#### **WARNING: Correct usage**

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations, must be observed. Observe the technical data in this data sheet and subsequent documentation ([www.phoenixcontact.com](http://www.phoenixcontact.com)).
- In order to protect the modules against electrostatic discharge when working on control cabinets, the operating personnel must remove electrostatic discharge before opening control boxes or control cabinets and before touching the modules.
- The modules are snapped onto a DIN rail within a control cabinet or control box. The control cabinet/box must meet the requirements of EN 60950-1:2001 in terms of fire protection shielding.
- The device must not be modified. Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 degree of protection (EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to any strain or load, which exceeds the limits described.
- In the electrical system of the building, a 2-pos. disconnecting device must be provided to isolate the equipment from the supply circuit.

### 5.2 Installation in the Ex area (zone 2)



The device is designed for installation in zone 2 potentially explosive areas according to Directive 94/9/EC.



#### **WARNING: Correct usage in potentially explosive areas**

- The device is not designed for use in atmospheres with a danger of dust explosions.
- Observe the specified conditions for use in potentially explosive areas.
- Install the device in housing (control or distributor box) that meets the requirements of EN 60079-15 and has at least IP54 protection (EN 60529).
- When installing and connecting the supply and signal circuits, observe the requirements of EN 60079-14. Only devices which are designed for operation in Ex zone 2 and are suitable for the conditions at the installation location may be connected to the circuits in zone 2.
- In potentially explosive areas, snap the device on or off the bus foot and connect or disconnect the cables only when the power is disconnected.
- The device must be stopped and immediately removed from the Ex area if it is damaged or was subject to an impermissible load or stored incorrectly or if it malfunctions.

## 6 Structure

### 6.1 RAD-IN-4A-I

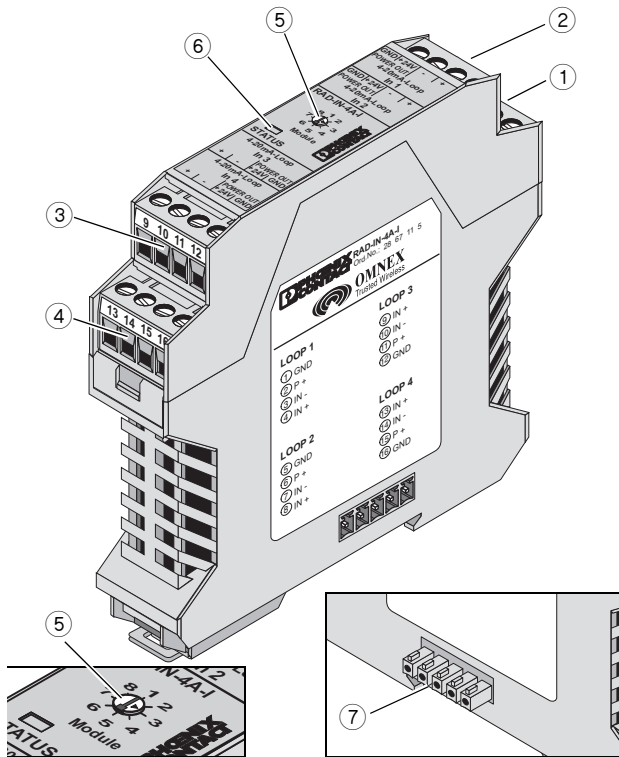


Figure 3 Structure of the RAD-IN-4A-I

- 1 Connector: Input 1 + GND + 24 V
- 2 Connector: Input 2 + GND + 24 V
- 3 Connector: Input 3 + GND + 24 V
- 4 Connector: Input 4 + GND + 24 V  
(IN 1 ... IN 4: 24 V = sensor supply)
- 5 Rotary switch with pos. 1 to 8
- 6 LED: Status
- 7 Bus foot connector

### 6.2 RAD-OUT-4A-I

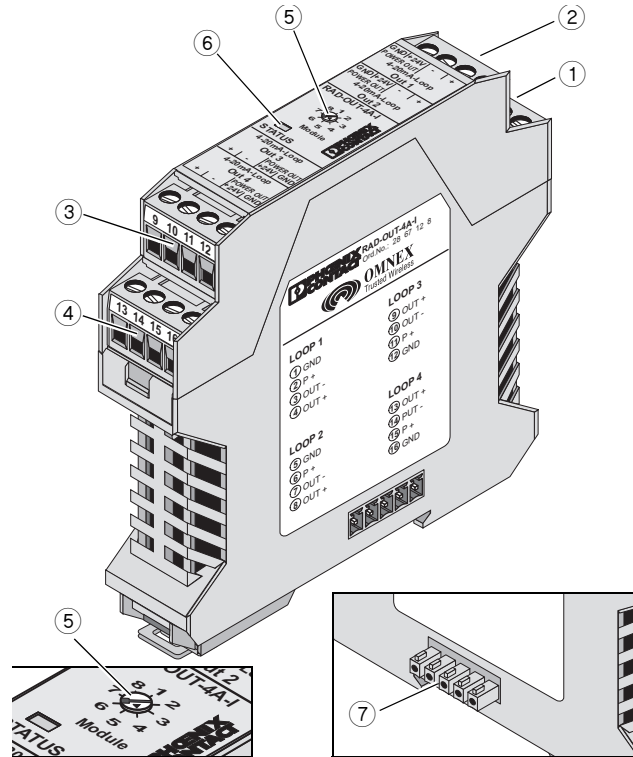


Figure 4 Structure of the RAD-OUT-4A-I

- 1 Connector: Output 1 + GND + 24 V
- 2 Connector: Output 2 + GND + 24 V
- 3 Connector: Output 3 + GND + 24 V
- 4 Connector: Output 4 + GND + 24 V  
(OUT 1 ... OUT 4: 24 V = sensor supply)
- 5 Rotary switch with pos. 1 to 8
- 6 LED: Status
- 7 Bus foot connector

### 6.3 Assignment of input and output modules

In order to enable the transmission of signals, it is necessary to provide and assign the input module with a corresponding output module. This is done via the rotary switch (5 in Figure 3 and Figure 4) with the corresponding coding of 1 to 8.

The input module must have the same coding as the assigned output module at the other end of the transmission system.



The number of extension modules is limited to eight extensions per system.

6.4 Display and diagnostic elements

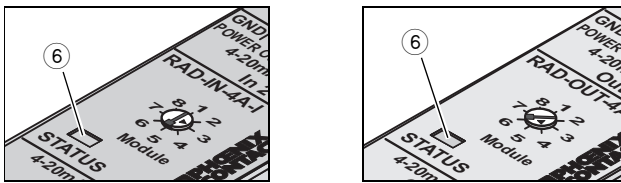


Figure 5 LED: Status

As soon as the wireless connection has been established between the transceiver devices and it is possible to transfer signals between the input module and the corresponding output module, this is indicated via the status LED (LED ON, see Figure 5).

**RAD-IN-4A-I:** If no corresponding output module is found (e.g., incorrect addressing), the status LED flashes.

**RAD-OUT-4A-I:** If no corresponding input module is found (e.g., coding not used on the partner), the status LED remains off (LED OFF).

If the LED flashes, this indicates an error (e.g., coding error: analog inputs to digital outputs).



A power up is required following any change to the coding in order for the configuration to be applied.

6.5 Analog inputs (RAD-IN-4A-I)

The four analog inputs of the extension module (1 to 4 in Figure 3) are not electrically isolated from one another. A supply voltage of 24 V DC is available at the connection terminal blocks for the use of passive sensors (for pin assignment, see Figure 1).

6.6 Analog outputs (RAD-OUT-4A-I)

The four analog outputs of the extension module (1 to 4 in Figure 4) are designed as passive outputs that are electrically isolated from one another. If you wish to electrically isolate the outputs, please ensure that the outputs are supplied from independent voltage sources. If isolation is not necessary, the internal supply at the terminal blocks can be used.

7 Behavior in the event of interrupted wireless connection (RAD-OUT-4A-I)

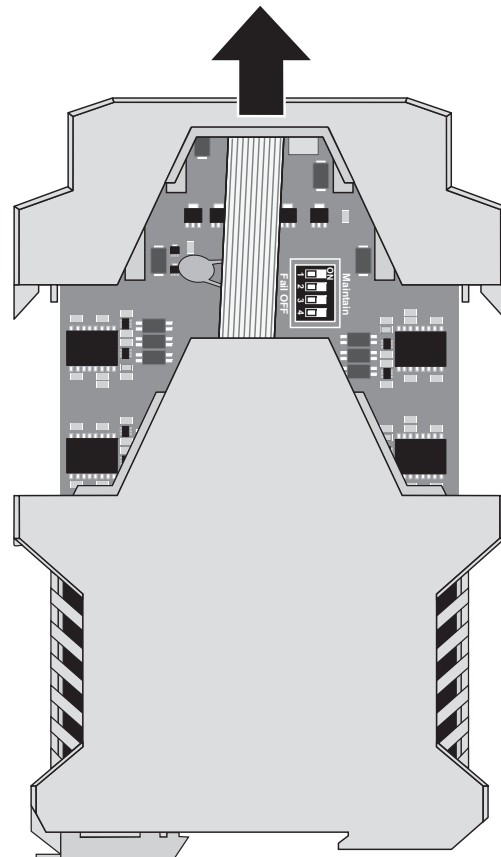


Figure 6 DIP switches

DIP switches can be used for each output (1 to 4) to select between reset behavior (output value falls below 4 mA = "Fail OFF") or maintaining the last value ("Maintain").

## 8 Connection examples

### 8.1 RAD-IN-4A-I

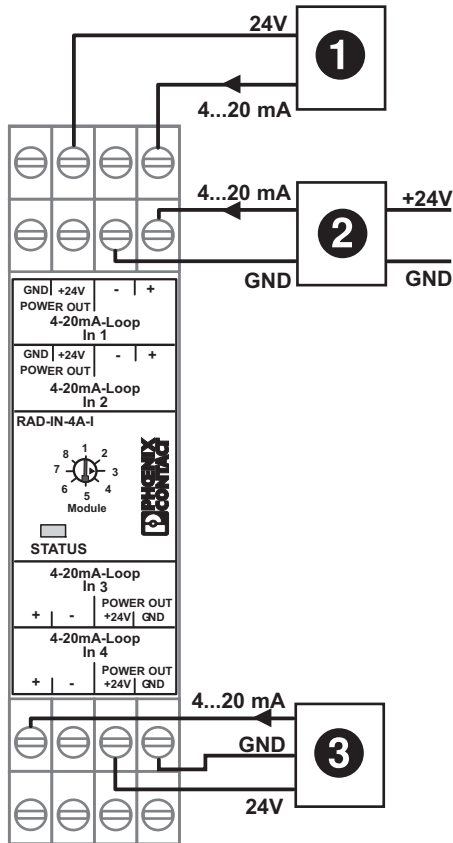


Figure 7 Connection example for the RAD-IN-4A-I

- 1 Passive sensor with 2-wire connection
- 2 Active sensor
- 3 Passive sensor with 3-wire connection

### 8.2 RAD-OUT-4A-I

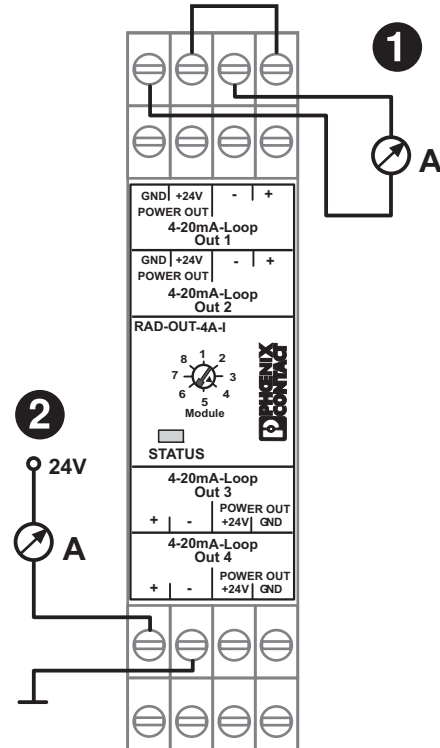


Figure 8 Connection example for the RAD-OUT-4A-I

- 1 Using the internal power supply
- 2 External supply of the actuator