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71536119
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Technical Information
RB223

One- or two-channel passive barrier



Loop-powered barrier for the safe separation of 4 to 20 mA standard signal circuits

Application

Separation of active 0/4 to 20 mA signals from transmitters, valves and actuators

Your benefits

- Compact side-by-side housing
- Space-saving 1-channel and 2-channel version
- No power supply required
- International Ex approvals: ATEX, FM, CSA
- Can be used up to SIL3
- Bidirectional HART® transmission
- Communication sockets for HART® + integrated HART® resistor for sensor configuration

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Function and system design

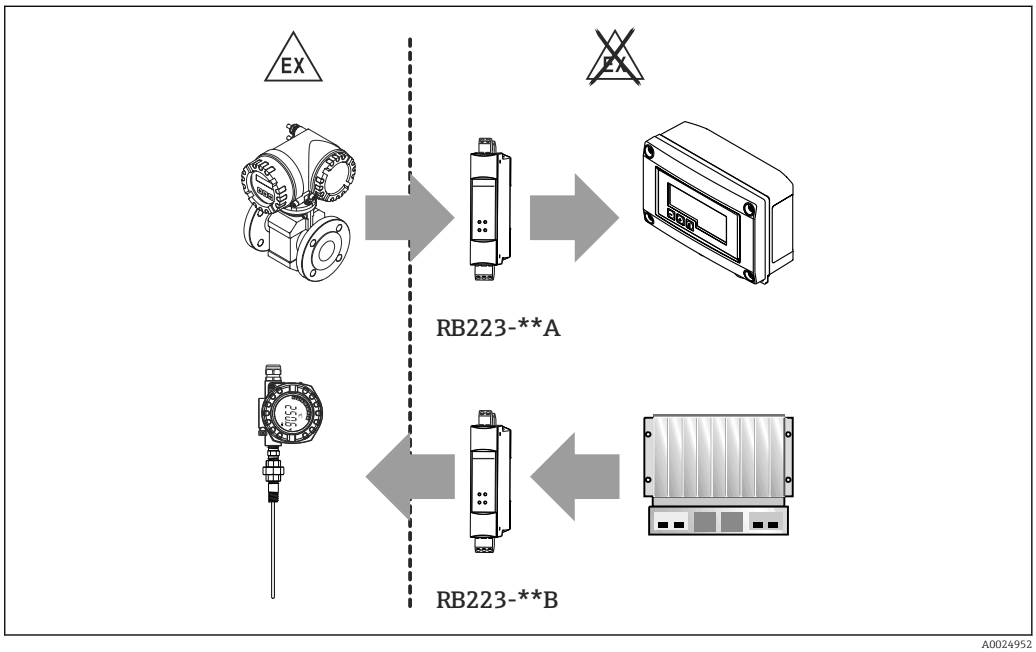
Measuring principle

The passive barrier is used for galvanic isolation of active signal circuits (0/4 to 20 mA) in three applications:
- Transmission from non-Ex areas to Ex areas, e.g. for active actuators, controllers or indicators
- Transmission from Ex areas to non-Ex areas for the linking of active, intrinsically safe circuits to the PLC
- Transmission of signals (0/4 to 20 mA) from the Ex area to the non-Ex area when intrinsically safe transmitters in the Ex area are supplied with a non-intrinsically safe loop power supply in the non-Ex area

The device has an analog input and an intrinsically safe analog output, or an output and an intrinsically safe input. The device is also optionally available as a two-channel version. The barrier is used for the intrinsically safe operation of sensors, valves and actuators.

Measuring system

The standard device has one analog input and one analog output. A two-channel device with two analog inputs and two analog outputs is optionally available.



A0024952

*RB223-**A Ex to non-Ex: active 4-wire sensor (e.g. Promag 50) -> RB223 -> passive current input (e.g. RIA15)*
*RB223-**B Non-Ex to Ex: passive 2-wire sensor (e.g. TMT162) -> RB223 -> active current input (e.g. PLC)*

Input

Direction of power transmission non-Ex → Ex

- 0/4 to 22 mA (for specified accuracy)
- 0 to 40 mA operating range
- Max. effective voltage < 26 V for specified accuracy
- I_{max} = 100 mA (short-circuit current of protective diode in event of overvoltage)
- U_{max} = 30 V (limiting voltage of protective diode)
- Reverse polarity protection
- R_i < 400 Ω (without HART® resistor 232 Ω)

Direction of power transmission Ex → non-Ex

- 0/4 to 22 mA (for specified accuracy)
- 0 to 40 mA operating range
- Max. effective voltage < 26 V
- Intrinsically safe [Ex ia] as per ATEX, FM and CSA
- Reverse polarity protection
- R_i < 120 Ω (without HART® resistor 232 Ω)

Output

Direction of power transmission non-Ex → Ex

- 0/4 to 22 mA (for specified accuracy)
- 0 to 40 mA Operating range (max. current depends on load)
- Max. load (load resistance) = 0 to 600 Ω
- Intrinsically safe [Ex ia] as per ATEX, FM and CSA

Direction of power transmission Ex → non-Ex

- 0/4 to 22 mA (for specified accuracy)
- 0 to 40 mA Operating range (max. current depends on load)
- Max. load (load resistance) = 0 to 600 Ω

Galvanic isolation

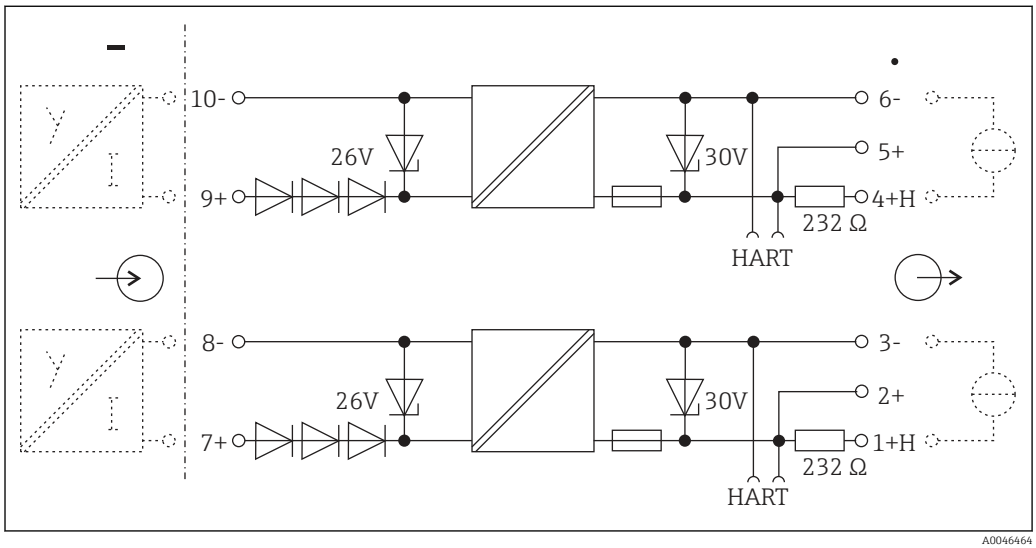
Test voltage

> 1.5 kV AC between input and output

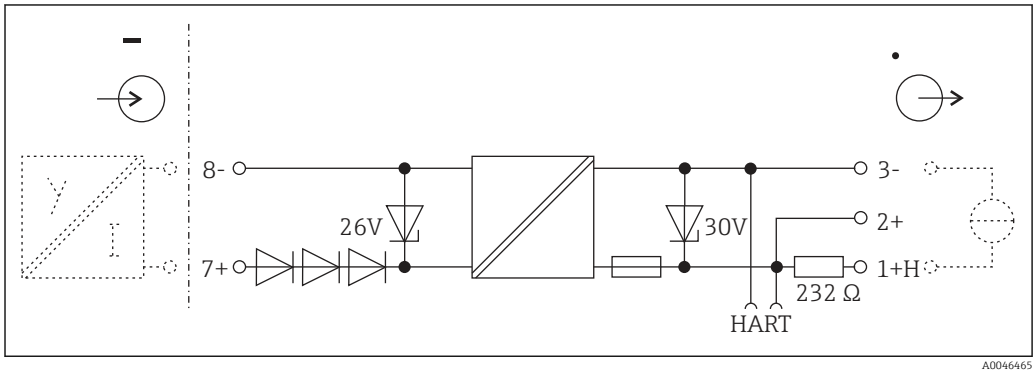
> 1.5 kV AC between the channels

Power supply

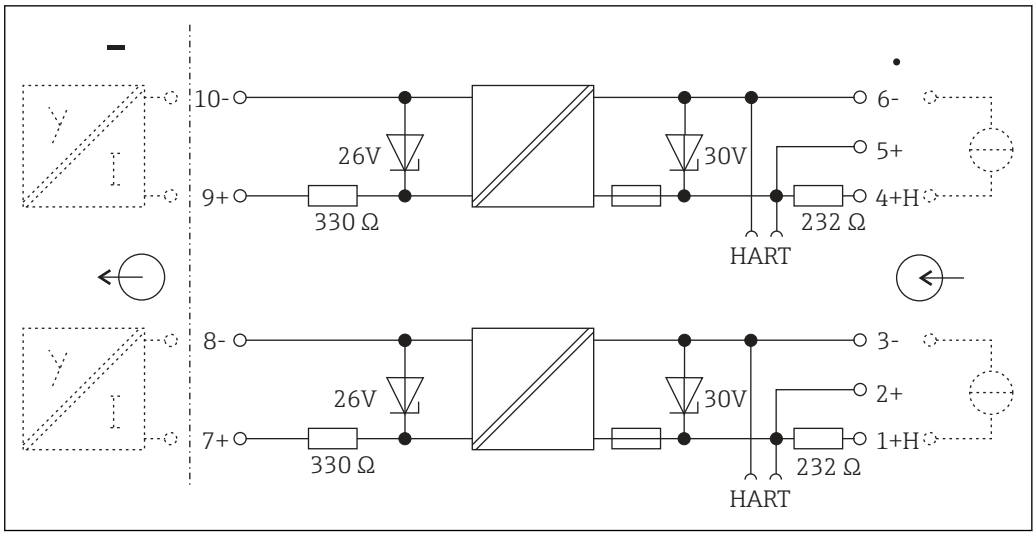
Electrical connection, terminal assignment



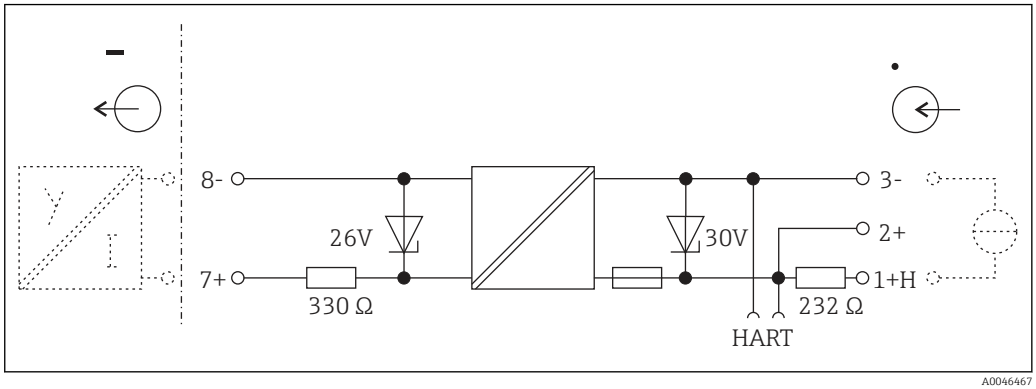
1 *Connection RB223-**A, Ex -> non-Ex, 2-channel*



2 *Connection RB223-**A, Ex -> non-Ex, 1-channel*



*3 Connection RB223-**B, non-Ex -> Ex, 2-channel*



*4 Connection RB223-**B, non-Ex -> Ex, 1-channel*

Supply voltage

The device is powered from the standard current loop 0/4 to 20 mA

Start-up current (intrinsic consumption)

< 50 mA

Voltage drop

< (1.9 V + 400 Ω x loop current) for non-Ex → Ex

< (3.9 V+ 120 Ω x loop current) for Ex → non-Ex

Power loss

< 0.2 W for 20 mA (per channel) without HART® resistor

< 0.3 W for 20 mA (per channel) with HART® resistor

Terminals

- Coded, pluggable screw terminal, clamping area 1.5 mm^2 solid, or 1.0 mm^2 strand with ferrule
- Communication socket on the front via 2 mm jack plug

Performance characteristics

Accuracy

Current transmission	< ± (10 µA + 0.15 % of reading)
Load error	≤ ± 0.02 % of measured value/100 Ω
Temperature drift	≤ ± 0.01 %/10 K (0.0056 %/10 °F)
Residual ripple at output	< 30 mV_{eff} for 20 mA loop current and 600 Ω load

Transmission behavior	HART® protocol	Bidirectional transmission possible
Step response	Settling time (10 to 90 % of full scale value)	< 0.5 ms for 500 Ω load for non-Ex → Ex
		< 0.3 ms for 500 Ω load for Ex → non-Ex
Frequency response	Large signal limit frequency	650 Hz for 500 Ω load for non-Ex → Ex
		1 300 Hz for 500 Ω load for Ex → non-Ex

Installation

Mounting location	Mounting in a cabinet on a mounting rail TS 35 as per IEC 60715
Orientation	No restrictions
Installation instructions	Installation and setup conditions as per IEC 60715

Environment

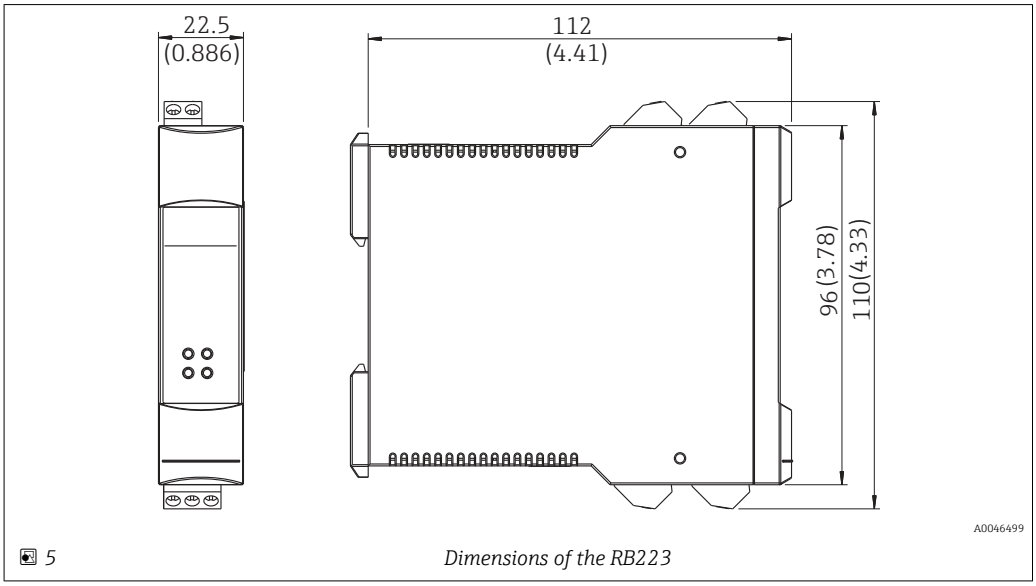
Ambient temperature range	–20 to 60 °C (–4 to 140 °F)
Storage temperature	–20 to 80 °C (–4 to 176 °F)
Degree of protection	IP 20
Climate class	As per IEC 60654-1 Class B2
Relative humidity	< 95 % without condensation
Installation height	As per IEC 61010-1: < 3 000 m (9 843 ft)above MSL
Electromagnetic compatibility (EMC)	Interference immunity as per IEC 61326 (industry) and NAMUR NE21
Electrical safety	Class III equipment, pollution degree 2, overvoltage category II

Mechanical construction

Design, dimensions

Dimensions in mm (in)

Housing for DIN rail as per IEC 60715 TH35:



5 *Dimensions of the RB223*

Weight

Approx. 150 g (5.29 oz)

Materials

Housing: plastic PC, UL 940

Human interface

Remote operation

- HART® communication:
  Communication signals are transmitted bidirectionally
- Communication resistor:
  Resistor for HART® communication 232 Ω installed
- Communication sockets:
  Access for HART® communicator

Pay attention to voltage drop!

Local operation

Hardware settings / configuration

No manual hardware settings are required at the device for commissioning.

Ordering information

Detailed ordering information is available for your nearest sales organization www.addresses.endress.com or in the Product Configurator under www.endress.com :

1. Click Corporate
2. Select the country
3. Click Products
4. Select the product using the filters and search field
5. Open the product page

The Configuration button to the right of the product image opens the Product Configurator.

Product Configurator - the tool for individual product configuration
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Device-specific accessories

Type	Order code
Protective housing IP66 for field mounting	51002468

Service-specific accessories

Accessories	Description
Configurator	Product Configurator - the tool for individual product configuration ▪ Up-to-the-minute configuration data ▪ Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language ▪ Automatic verification of exclusion criteria ▪ Automatic creation of the order code and its breakdown in PDF or Excel output format ▪ Ability to order directly in the Endress+Hauser Online Shop The Configurator is available on the Endress+Hauser website at: www.endress.com -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.

Accessories	Description
W@M	Life cycle management for your plant W@M offers assistance with a wide range of software applications over the entire process: from planning and procurement to the installation, commissioning and operation of the measuring devices. All the relevant information is available for every measuring device over the entire life cycle, such as the device status, device-specific documentation, spare parts etc. The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records. W@M is available: Via the Internet: www.endress.com/lifecyclemanagement

Certificates and approvals

For the approvals available, see the Configurator on the specific product page: www.endress.com → (search for device name)

CE mark

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE-mark.

SIL

Can be used up to SIL3

Supplementary documentation

The following types of documentation are available in the Download Area of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

Brief Operating Instructions (KA)	**Guide that takes you quickly to the 1st measured value** The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	**Your reference guide** These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Safety Instructions (XA)	Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions. The nameplate indicates the Safety Instructions (XA) that are relevant to the device.
Supplementary device-dependent documentation	Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.



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