

Technical Information

Barrier RB223

One or two-channel 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 adjusters

Your benefits

- Compact side-by-side housing
- Space-saving one-channel and two-channel version
- No power supply necessary
- 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

Function and system design

Measuring principle

The passive barrier is used for galvanic isolation of active signal loops (0/4 to 20 mA) in three applications:

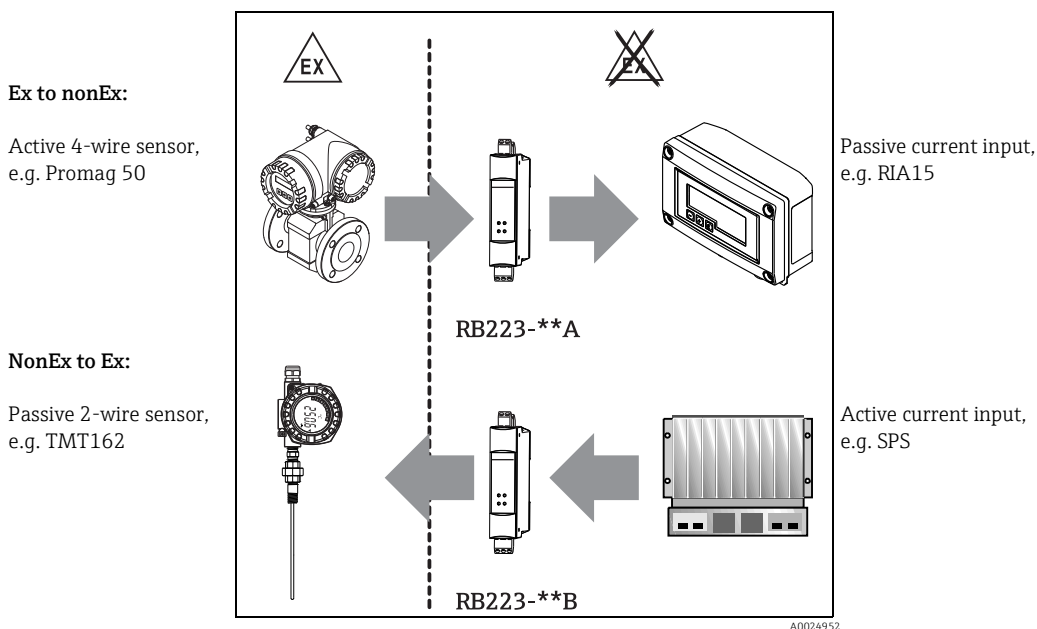
- Transmission from non-Ex-areas to Ex-areas, e.g. for active actuators, controllers or indicators
- Transmission from Ex-areas to non-Ex-areas for the linking of active, intrinsically safe loops in the Ex-area to a PLC
- Transmission of signals (0/4 to 20 mA) from the Ex-area to the non-Ex-area when an intrinsically safe transmitter in the Ex-area is supplied by a not 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. As an option the device is available as a 2-channel version. The barrier is used for intrinsically safe operation of sensors, valves and actuators.

The device is supplied from the current loop without a separate power supply.

Measuring system

The standard instrument has one analog input and one analog output. A two-channel instrument with two analog inputs and two analog outputs is available as an option.



Input

Direction of power
transmission nonEx → 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
- $R_i < 400 \Omega$ (without HART® resistor 232 Ω)

Direction of power
transmission Ex → nonEx

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

Output

Direction of power
transmission nonEx → Ex

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

Direction of power
transmission Ex → nonEx

- 0/4 to 22 mA (for specified accuracy)
- 0 to 40 mA operating range (max. current depends on the load)
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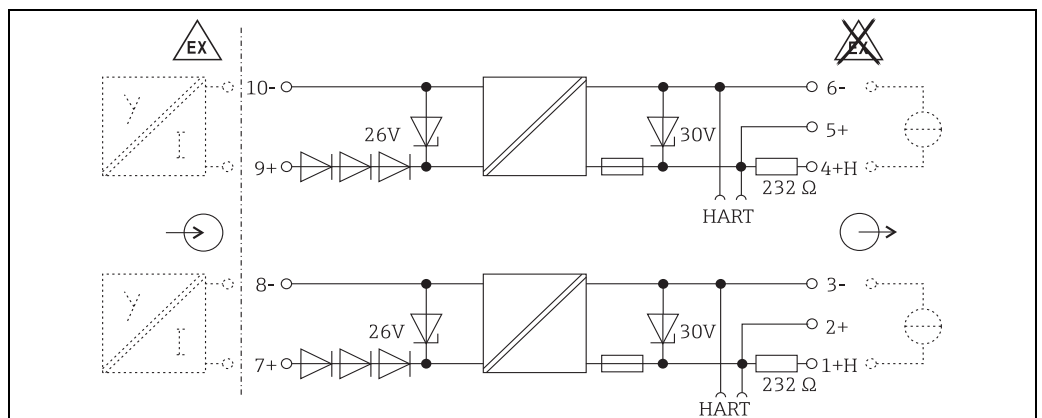
Galvanic isolation

Testing voltage:

- > 1.5 kV AC between input and output
- > 1.5 kV AC between the channels

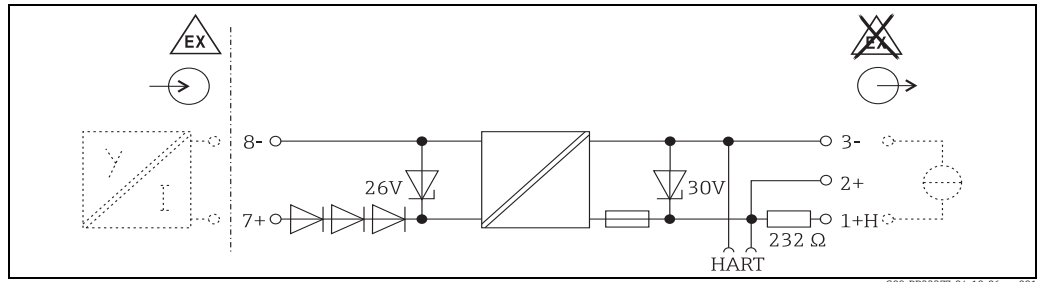
Power supply

Electrical connection

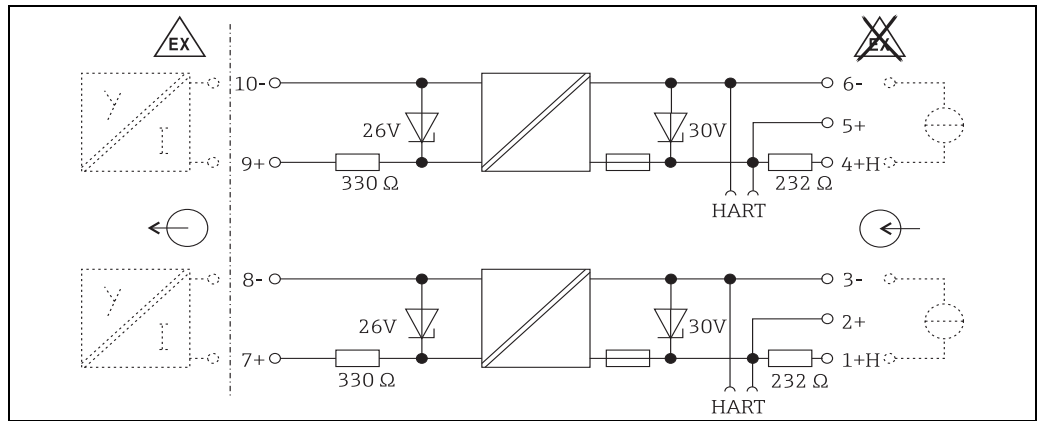


RB223 connection, Ex-nonEx two-channel

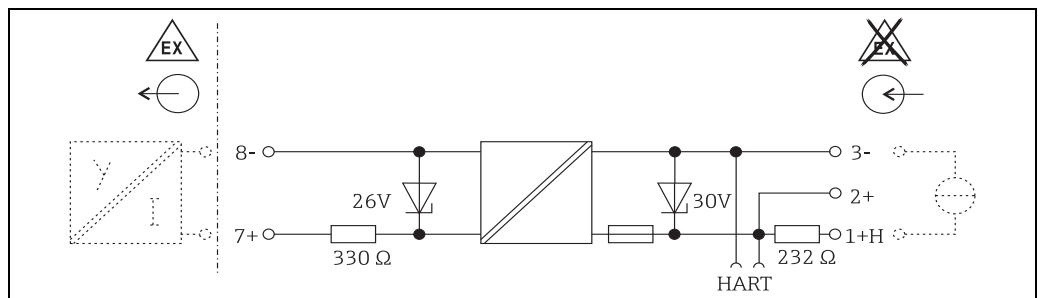
G09-RB223ZZ-04-10-06-xx-000



RB223 connection, Ex-nonEx one-channel



RB223 connection, nonEx-Ex two-channel



RB223 connection, nonEx-Ex one-channel

Supply voltage	The device is powered from the standard 0/4 to 20 mA current loop.
Starting current (intrinsic consumption)	< 50 μA
Voltage drop	< (1.9 V + 400 Ω x current loop) for nonEx → Ex < (3.9 V + 120 Ω x current loop) for Ex → nonEx
Power loss	< 0.2 W for 20 mA (per channel) without HART® resistor < 0.3 W for 20 mA (per channel) with HART® resistor

Performance characteristics

Current transmission	$< \pm 10 \mu\text{A} + 0.15\%$ of measured value
Load error	$\leq 0.02 \%$ of measured value/ 100Ω
Temperature drift	$\leq \pm 0.01 \%$ /10 K (0.0056%/10 °F)
Residual ripple at output	$< 30\text{mV}_{\text{eff}}$ for 20 mA loop current and 600Ω load

Transmission behavior

HART[®] protocol	Bidirectional transmission possible
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Step-function response

Settling time (10% to 90% of full scale value)	$< 0.5 \text{ ms}$ for 500Ω load for nonEx \rightarrow Ex $< 0.3 \text{ ms}$ for 500Ω load for Ex \rightarrow nonEx
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Frequency response

Large signal limit frequency	650 Hz for 500Ω load for nonEx \rightarrow Ex 1300 Hz for 500Ω load for Ex \rightarrow nonEx
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Installation

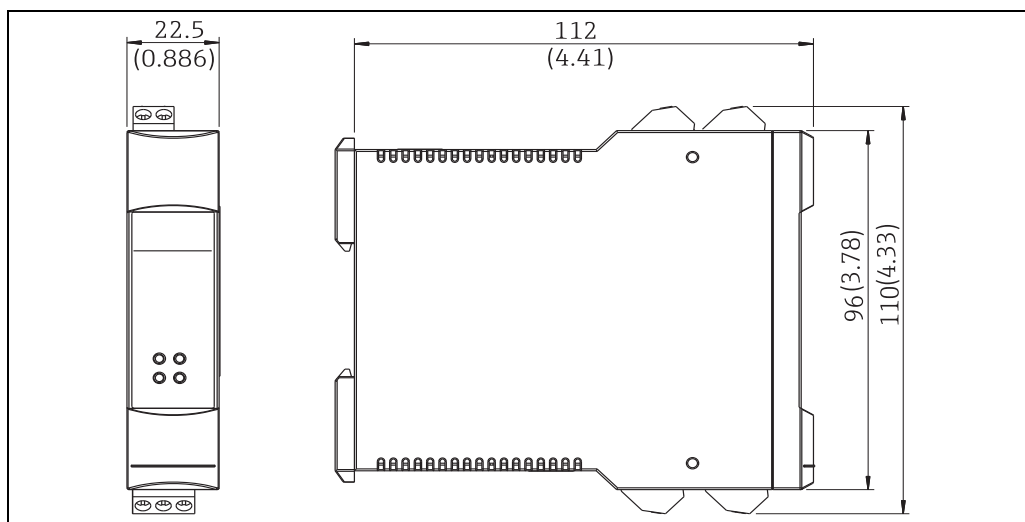
Mounting	Mounting in a cabinet on a mounting rail TS 35 as per IEC 60715.
Orientation	No restrictions
Installation instructions	Installation and setup conditions as per IEC 60715.

Environment

Ambient temperature range	-20 to +60 °C (-4 to +140 °F)
Storage temperature	-20 to +80 °C (-4 to 176 °F)
Installation height	As per IEC 61010-1: < 3000 m above MSL
Climate class	As per IEC 60654-1 Class B2
Degree of protection	IP 20
Relative humidity	< 95 % (without condensation)
Electrical safety	Protection class III, pollution degree 2, overvoltage protection category II
Electromagnetic compatibility (EMC)	Interference immunity as per EN 61326 - series (industry) and NAMUR NE21

Mechanical construction

Design, dimensions Housing for top-hat rail as per IEC 60715 TH35:



Dimensions of RB223 in mm (in)

Weight	Approx. 150 g (5.29 oz.)
Material	Housing: plastic PC, UL 940
Terminals	<ul style="list-style-type: none"> ▪ Coded, pluggable screw terminal, core size 1.5 mm² solid, or 1.0 mm² strand with ferrule ▪ Communication socket on the front via 2 mm jack plug

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, e.g. DXR-275



Pay attention to voltage drop!

Certificates and approvals

CE mark

Directive 2004/108/EC and 2006/95/EC

Ex approval

ATEX, FM and CSA approved associated apparatus

SIL

Can be used up to SIL3

Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser web site: www.endress.com → Choose your country → Products → Select measuring technology, software or components → Select product (picklists: measurement method, product family etc.) → Device support (right-hand column): Configure the selected product → The Product Configurator for the selected product is opened.
- From your Endress+Hauser Sales Center: www.addresses.endress.com



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

Accessories

The following accessories are available:

Order code	Accessory
51002468	Protective housing IP66 for field mounting

Documentation

- Operating Instructions RB223 (BA00239R/09)
- ATEX Safety Instructions (XA00068R/09)
- Brochure "System Components and Data Managers" (FA00016K/09)
- SIL Safety Manual (SD00022R/00)
- Additional Ex approvals, FM/CSA Control Drawings

www.addresses.endress.com
