

Technical Information

Barrier RB223

One or two-channel, loop-powered barrier for the safe separation of 4 to 20 mA standard signal circuits



Application

• Separation of active 0/4 to 20mA 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, TIIS, NEPSI
- Installation in Zone 2, Zone 22 permitted
- 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 device separates active 0/4 to 20mA signals from transmitters, valves and adjusters. It has one analog input and one intrinsically safe analog output, or one output and one intrinsically safe input. A two-channel version of the device is also optionally available. The barrier is used for the intrinsically safe operation of sensors, valves and adjusters.

Power is supplied to the device from the current loop. It does not have its own 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 Ω (without HART[®] resistor 232 Ω)
Direction of power transmission Ex → nonEx	 0/4 to 22 mA, (for specified accuracy) Intrinsically safe as per ATEX, FM, CSA, TIIS, GHOST, NEPSI 0 to 40 mA operating range Reverse polarity protection R_i < 120 Ω (without HART[®] resistor 232 Ω) Max. effective voltage < 26 V

Output

Direction of power transmission nonEx → Ex	 0/4 to 22mA, (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 as per ATEX, FM, CSA, TIIS, GHOST, NEPSI ATEX: II (1) GD [EEx ia] IIC/IIB, II (1) GD [EEx ib] IIC/IIB 	
Direction of power transmission Ex → nonEx	 0/4 to 22mA (for specified accuracy) 0 to 40 mA operating range (max. current depends on the load) Max. load (load resistance) = 0 to 600 Ω 	

Galvanic isolation

Testing voltage:	> 1.5 kV AC between input and output
	> 1.5 kV AC between the channels

Power supply



RB223 connection, Ex-nonEx two-channel



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 20mA current loop.
Starting current (intrinsic consumption)	< 50 μΑ
Voltage drop	< (1.9 V + 400 Ω x current loop) for nonEx \rightarrow Ex < (3.9 V + 120 Ω x current loop) for Ex \rightarrow 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

HART[®]protocol

Current transmission	$<\pm$ 10 μA + 0.15% of measured value
Load error	$\leq 0.02\%$ of measured value/100 Ω
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 600 Ω load

Performance characteristics

Transmission behavior

Bidirectional transmission possible

	Step-function response
Settling time (10% to 90% of full scale value)	< 0.5 ms for 500 Ω load for nonEx \rightarrow Ex < 0.3 ms for 500 Ω load for Ex \rightarrow nonEx

Frequency response

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

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)
Electromagnetic compatibility (EMC)	Interference immunity as per IEC 61326 (industry) and NAMUR NE21

Mechanical construction

Design, dimensions

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



Dimensions of RB223

Weight	Approx. 150 g (5.29 oz.)
Material	Housing: plastic PC, UL 940
Terminals	 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
	Note! Pay attention to voltage drop!

Certificates and approvals

CE mark	Directive 89/336/EEC and 73/23/EEC
Ex approval	 ATEX: II (1) GD [EEx ia] IIC/IIB II (1) GD [EEx ib] IIC/IIB II 3 G EEx nA II T4 (facilitates installation in Zone 2 with appropriate housing as per IEC 60079-15) FM, CSA TIIS, NEPSI and GHOST accordingly
SIL	Can be used up to SIL3

Ordering information

D 1 4 4 4				
Product structure	Passive Barrier RB223			
	0/4-20mA galvanic signal isolation. 1/2-channel			
	Intrinsically safe as an option, 1:1 transmission.			
	Bi-directional HART-communication. Housing 22.5mm, Mont. Rail 35mm, IP20.			
	Approval			
	A	Non-nazaro	lous area	
	В	ATEX II(1)	GD(EEx ia)IIC	
	C	FM AIS I,II	,III/1/ABCDEFG1	
	D	CSA (Ex ia)	I,II,III/1/ABCDEFG1	
	E	TIIS (EEx ia) IIC		
		Cnannei:		
		1 1 x		
		2 2 x		
	· · ·			
		Tran	smission direction:	
		A E	Ex-nonEx	
		B n	nonEx-Ex	
	RB223-	<	= Order code	

Accessories

Accessories

The following accessories are available:

Order code	Accessory		
51002468	Protective housing IP66 for field mounting		
51004148	Adhesive label, printed (max. 2x16 chars)		
51002393	Metal tag for tag number		

Documentation

- Operating Instructions RB223 (BA239R/09)
- ATEX Safety Instructions (XAxxxR/09)
- "System components" brochure (FA016K/09)
- SIL Safety Manual
- Additional Ex approvals

International Head Quarter

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