



SMART Universal Barrier HiC2441

- 1-channel isolated barrier
- 24 V DC supply (bus powered)
- Analog input, digital input, analog output, digital output
- No configuration required, device is self-adapting
- HART transparency
- Low power dissipation
- 3-way isolation
- Up to SIL 2 acc. to IEC 61508



SIL 2



Function

This isolated barrier is used for intrinsic safety applications.

The device can transfer the following signals:

- as an analog input: 0/4 mA ... 20 mA
- as an analog output: 0/4 mA ... 20 mA
- as a digital input: signals from NAMUR sensors or dry contacts
- as a digital output: max. 45 mA

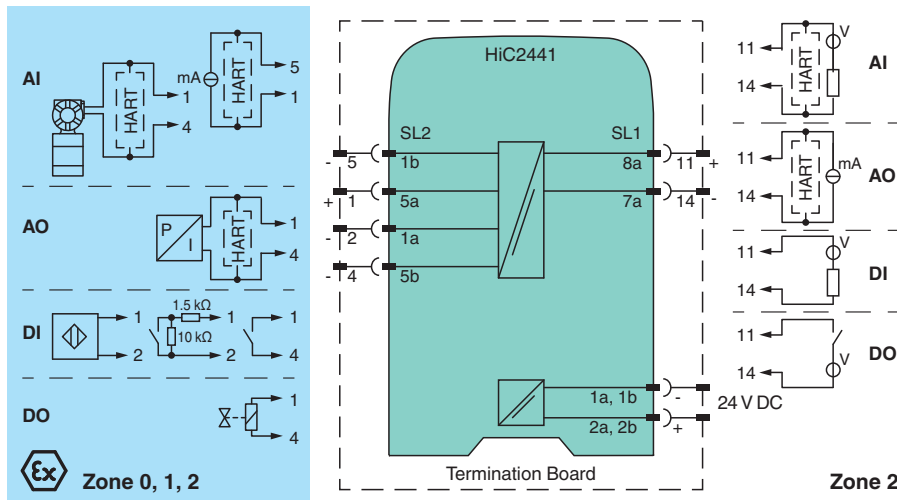
The device requires no configuration and adapts itself automatically to the function of the active input/output of the connected process control system.

The device permits the bi-directional pass-through of the HART communication.

The device is designed primarily for use with universal I/O cards (e. g. Honeywell Universal Process IO).

This device mounts on a HiC Termination Board.

Connection



Technical Data

General specifications	
Signal type	Universal
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 2
Supply	
Connection	SL1: 1a(-), 1b(-); 2a(+), 2b(+)
Rated voltage	U _r 19 ... 30 V DC via Termination Board

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Technical Data

Ripple		$\leq 10 \%$
Rated current	I_r	$\leq 30 \text{ mA}$
Power consumption		$\leq 700 \text{ mW}$
Analog input		
Suitable field devices		2-wire SMART transmitters, current sources
Signal		0/4 ... 20 mA , limited to approx. 40 mA (depends on control system) , reverse polarity protected
Field circuit		SL2: 5a(+), 5b(-) (2-wire SMART transmitter) SL2: 5a(+), 1b(-) (2-wire SMART transmitter with current source)
Voltage drop		approx. 4 V (current source)
Control circuit		SL1: 8a(+), 7a(-)
Supply voltage		min. 16 V at 20 mA (2-wire SMART transmitter)
Voltage		15 ... 30 V
Signal		0/4 ... 20 mA , sink mode , working voltage 15 ... 30 V
Ripple		20 mV _{rms}
Analog output		
Suitable field devices		I/P converters (positioner), on-site-displays
Signal		0/4 ... 20 mA
Field circuit		SL2: 5a(+), 5b(-)
Load		0 ... 650 Ω
Voltage		$\geq 13 \text{ V}$ at 20 mA
Ripple		20 mV _{rms}
Control circuit		SL1: 8a(+), 7a(-)
Voltage		12 ... 30 V
Signal		0/4 ... 20 mA
Line fault detection		$> 100 \text{ k}\Omega$ at max. 30 V, with field wiring open
Digital input		
Field circuit		SL2: 5a(+), 1a(-) (NAMUR sensor) SL2: 5a(+), 5b(-) (dry contact)
Suitable field devices		NAMUR sensors according to IEC/EN 60947-5-6, dry contacts
Signal		0.1 ... 9 mA , sink mode
Open loop voltage		approx. 10 V DC , 1 k Ω series resistance
Signal		0.1 ... 9 mA
Control circuit		SL1: 8a(+), 7a(-)
Voltage		13 ... 30 V
Digital output		
Field circuit		SL2: 5a(+), 5b(-)
Suitable field devices		solenoid valves, acoustic or visual alarms
Drive capability		12 V / 40 mA at 300 Ω load
Open loop voltage	U_s	approx. 22 V
Current limit	I_{max}	45 mA
Internal resistor	R_i	min. 240 Ω
Control circuit		SL1: 8a(+), 7a(-)
Voltage		1-signal: 19 ... 30 V DC 0-signal: 0 ... 5 V DC
Current		1-signal: 0 ... 45 mA, depending on the output load 0-signal: $< 0.1 \text{ mA}$, independent of the output load
Power dissipation		1.1 W at 24 V, 300 Ω load (digital output)
Transfer characteristics		
Deviation		at 20 °C (68 °F) $\leq \pm 20 \mu\text{A}$ incl. linearity, hysteresis and supply fluctuations at 4 ... 20 mA (analog input, analog output) $\leq \pm 60 \mu\text{A}$ incl. linearity, hysteresis and supply fluctuations at 0 ... 45 mA (digital output)
Influence of ambient temperature		$< 2 \mu\text{A/K}$ (0 ... 70 °C (32 ... 158 °F)) $< 3 \mu\text{A/K}$ (-40 ... 0 °C (-40 ... 32 °F))

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Technical Data

Switching frequency		≤ 500 Hz with 50 % duty cycle (digital input, NAMUR sensor) ≤ 5 Hz (digital input, dry contact) ≤ 20 Hz (digital output)
Frequency range		HART: bandwidth by 0.5 V _{pp} signal and/or 1 mA _{pp} signal 950 ... 2500 Hz (analog input, analog output)
Settling time		≤ 20 ms (analog input, analog output) ≤ 1 ms (digital input, NAMUR sensor)
Reaction time		≤ 5 ms , turn-on/turn-off time (digital output)
Galvanic isolation		
Control/power supply		basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V _{eff}
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Conformity		
Electromagnetic compatibility		NE 21:2006 For further information see system description.
Degree of protection		IEC 60529:2001
Protection against electrical shock		IEC 61010-1:2010
Input		EN 60947-5-6:2000
Ambient conditions		
Ambient temperature		-40 ... 70 °C (-40 ... 158 °F) Observe the temperature range limited by derating, see section derating.
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		95 % non-condensing
Mechanical specifications		
Degree of protection		IP20
Mass		approx. 100 g
Dimensions		12.5 x 128 x 106 mm (0.5 x 5.1 x 4.2 inch)
Mounting		on Termination Board
Coding		pin 1 and 4 trimmed For further information see system description.
Data for application in connection with hazardous areas		
EU-type examination certificate		TÜV 14 ATEX 153522 X
Marking		⊕ II (1)G [Ex ia Ga] IIC ⊕ II (1)D [Ex ia Da] IIIC ⊕ I (M1) [Ex ia Ma] I
Supply		
Maximum safe voltage	U _m	250 V (Attention! The rated voltage can be lower.)
Equipment		
Equipment		SL2: 5a(+), 5b(-)
Voltage U _o		25.2 V
Current I _o		110 mA
Power P _o		693 mW
Internal capacitance C _i		5.7 nF
Internal inductance L _i		0 mH
Equipment		
Equipment		SL2: 5a(+), 1b(-)
Voltage U _i		< 28 V
Current I _i		< 115 mA
Voltage U _o		7.2 V
Current I _o		0 mA
Power P _o		0 mW
Internal capacitance C _i		5.7 nF
Internal inductance L _i		0 mH
Equipment		
Equipment		SL2: 5a(+), 1a(-)
Voltage U _o		12.6 V
Current I _o		13 mA
Power P _o		41 mW

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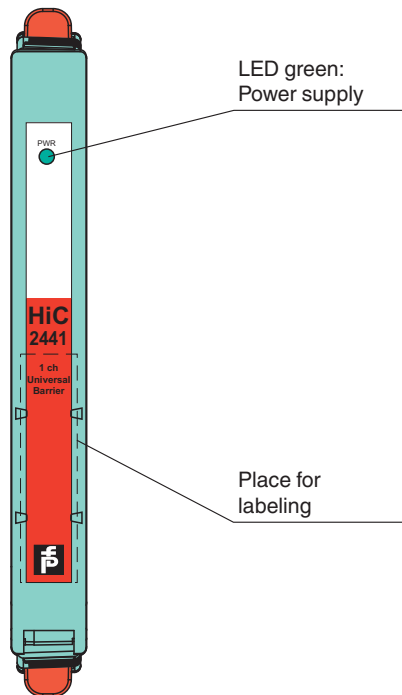
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Technical Data

Internal capacitance C_i	5.7 nF
Internal inductance L_i	0 mH
Certificate	TÜV 14 ATEX 153523 X
Marking	Ⓜ II 3G Ex ec IIC T4 Gc
Galvanic isolation	
Input/Other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity	
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-7:2015
International approvals	
UL approval	E106378
Control drawing	116-0408 (cULus)
IECEX approval	
IECEX certificate	IECEX TUN 15.0004X
IECEX marking	[Ex ia Ga] IIC , [Ex ia Da] IIIC , [Ex ia Ma] I Ex ec IIC T4 Gc
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com .

Assembly

Front view



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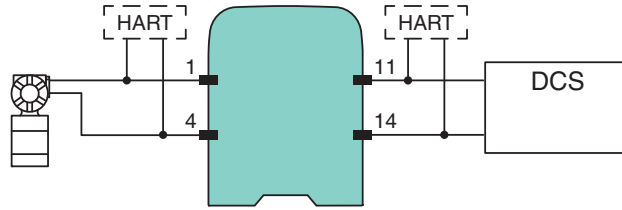
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Application

Examples

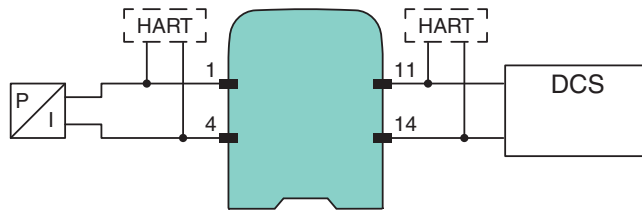
Analog input

The control system must be parameterized to an active current input.



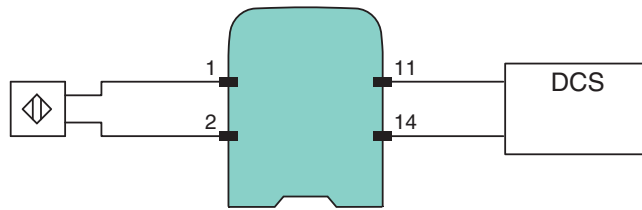
Analog output

The control system must be parameterized to a current output.



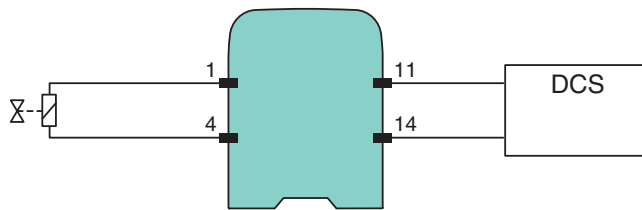
Digital input

The digital input of the control system must evaluate the level of a current signal.



Digital output

The digital output of the control system must be parameterized in a way that the digital output powers actively a valve. The current which is provided by the control system is transferred directly to the valve.

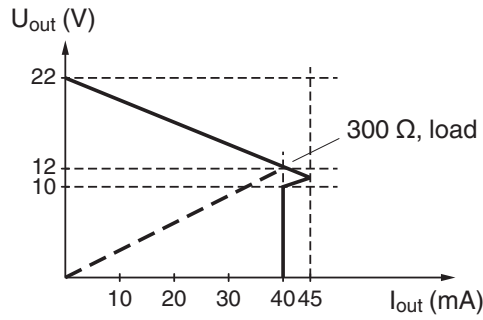


This section does not show all connection options. For further connection options see "Connection" section.

Characteristic Curve

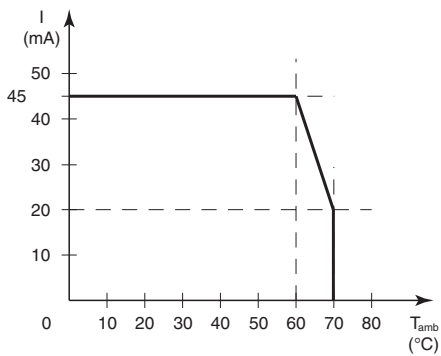
Fallback characteristic for digital output

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Characteristic Curve

Derating



Application

The device is designed as intrinsically safe interface for Universal Process IO (or Universal Safety IO) by Honeywell.

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