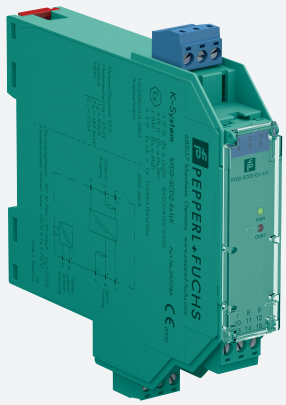


SMART Current Driver

KFD2-SCD2-Ex1.LK

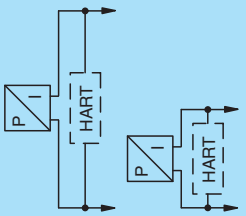
SIL 2

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Current output up to 650 Ω load
- HART I/P and valve positioner
- Line fault detection (LFD)
- Accuracy 0.1 %
- Up to SIL 2 acc. to IEC 61508

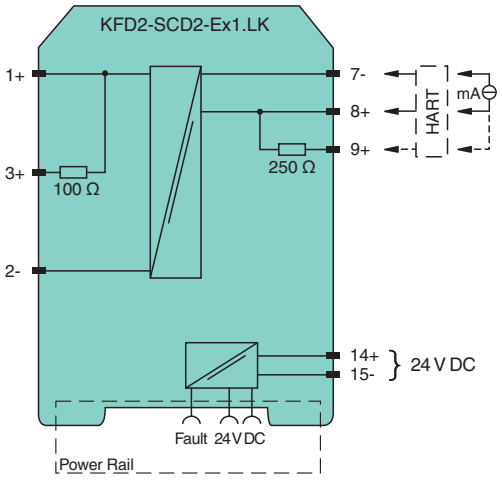
Function

This isolated barrier is used for intrinsic safety applications.
The device drives SMART I/P converters, electrical valves, and positioners in hazardous areas.
Digital signals are superimposed on the analog values at the field side or control side and are transferred bi-directionally.
Current transferred across the DC/DC converter is repeated at terminals 1 and 2. Terminals 2 and 3 are used when no short circuit detection is required.
An open or short field circuit presents a high impedance to the control side to allow alarm conditions to be monitored by the control system.
If the HART communication resistance in the loop is too low, the internal resistance can be used.
Test sockets for the connection of HART communicators are integrated into the terminals of the device.
A fault is signalized by LEDs and a separate collective error message output.

Connection



Zone 0, 1, 2
Div. 1, 2



Technical Data

General specifications		
Signal type		Analog output
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 2
Supply		
Connection		Power Rail or terminals 14+, 15-
Rated voltage	U_r	19 ... 30 V DC
Ripple		≤ 10 %
Rated current	I_r	≤ 30 mA at 24 V

Release date: 2020-10-21 Date of issue: 2020-10-21 Filename: 295086_eng.pdf

Technical Data

Power dissipation	≤ 600 mW at 20 mA and 500 Ω load
Power consumption	≤ 700 mW
Input	
Connection side	control side
Connection	terminals 7-, 8+, (9+)
Input signal	4 ... 20 mA , limited to approx. 30 mA
Input voltage	open loop voltage of the control system ≤ 30 V
Voltage drop	approx. 6 V at 20 mA
Input resistance	field wiring open circuit : > 100 kΩ field wiring < 50 Ω : > 100 kΩ when using terminals 1 and 2
Output	
Connection side	field side
Connection	terminals 1+, 2- terminals 3+, 2- (no short circuit detection)
Voltage	≥ 13 V at 20 mA
Current	4 ... 20 mA
Load	100 ... 650 Ω , for terminals 1, 2 0 ... 550 Ω , for terminals 2, 3
Ripple	20 mV rms
Line fault detection	breakage, load > 100 kΩ, short-circuit, load < 50 Ω
Fault indication output	
Output type	open collector transistor (internal fault bus)
Transfer characteristics	
Accuracy	0.1 %
Deviation	at 20 °C (68 °F), 4 ... 20 mA < 0.1 % of full scale, incl. non-linearity and hysteresis
Influence of ambient temperature	< 2 µA/K (-20 ... 70 °C (-4 ... 158 °F)); < 4 µA/K (-40 ... -20 °C (-40 ... -4 °F))
Frequency range	field side into the control side: bandwidth with 0.5 V_{pp} signal 0 ... 3 kHz (-3 dB) control side into the field side: bandwidth with 0.5 V_{pp} signal 0 ... 3 kHz (-3 dB)
Rise time	10 to 90 % ≤ 10 ms
Galvanic isolation	
Input/Output	basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Input/power supply	basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Indicators/settings	
Display elements	LEDs
Labeling	space for labeling at the front
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013 (industrial locations)
Conformity	
Electromagnetic compatibility	NE 21:2017 EN 61326-3-2:2018
Degree of protection	IEC 60529
Protection against electrical shock	UL 61010-1:2012
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications	
Degree of protection	IP20
Connection	screw terminals
Mass	approx. 115 g
Dimensions	20 x 124 x 115 mm (0.8 x 4.9 x 4.5 inch) , housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas	
EU-type examination certificate	BAS 00 ATEX 7240 X

Release date: 2020-10-21 Date of issue: 2020-10-21 Filename: 295086_eng.pdf

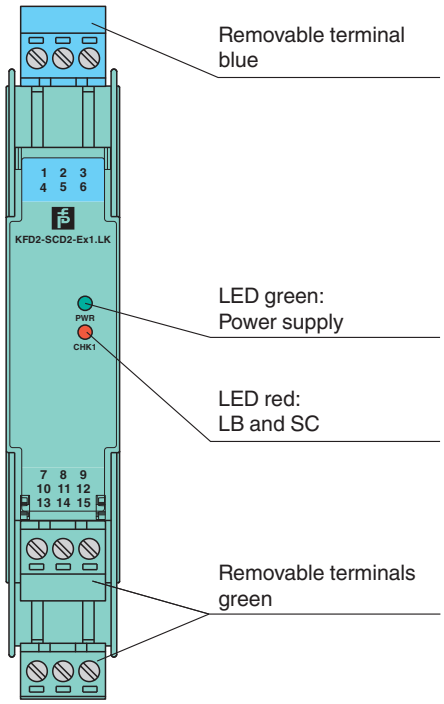
Technical Data

Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Output		Ex ia, Ex iaD
Voltage	U_o	25.2 V
Current	I_o	93 mA
Power	P_o	585.3 mW
Internal capacitance	C_i	1.05 nF
Internal inductance	L_i	0
Supply		
Maximum safe voltage	U_m	250 V $_{rms}$ (Attention! The rated voltage can be lower.)
Input		
Maximum safe voltage	U_m	250 V $_{rms}$ (Attention! The rated voltage can be lower.)
Certificate		TÜV 99 ATEX 1499 X
Marking		⟨Ex⟩ II 3G Ex nA II T4
Galvanic isolation		
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Output/power supply		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN 60079-0:2018 , EN 60079-11:2012 , EN 60079-15:2005
International approvals		
UL approval		E106378
Control drawing		116-0345 (cULus)
IECEx approval		
IECEx certificate		IECEx BAS 04.0014X
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.
Accessories		
Optional accessories		- power feed module KFD2-EB2(.R4A.B)(.SP) - universal power rail UPR-03(-M)(-S) - profile rail K-DUCT-BU(-UPR-03)

Release date: 2020-10-21 Date of issue: 2020-10-21 Filename: 295086_eng.pdf

Assembly

Front view



Accessories

	**KFD2-EB2**	Power Feed Module
	**KFD2-EB2.R4A.B**	Power feed module, redundant supply
	**KFD2-EB2.R4A.B.SP**	Power feed module with spring terminals, redundant supply
	**KFD2-EB2.SP**	Power feed module with spring terminals
	**UPR-03**	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	**UPR-03-M**	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	**UPR-03-S**	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	**K-DUCT-BU**	
	**K-DUCT-BU-UPR-03**	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side blue

Release date: 2020-10-21 Date of issue: 2020-10-21 Filename: 295086_eng.pdf

Operation

Lead monitoring, input characteristics

During lead breakage (> 16 V) in the field the input resistance is > 100 kΩ, the field current is < 1 mA and the red LED is flashing.

During short circuit (< 50 Ω) in the field the input resistance is approx. 100 kΩ, the input current and the field current are approx. 1 mA and the red LED is flashing.

The voltage drop at the current input (terminals 7-, 8+) is lower than 4 V. Thus, it corresponds to an input resistance of 200 Ω at 20 mA. The AC input impedance corresponds to the load impedance of the unit.

Release date: 2020-10-21 Date of issue: 2020-10-21 Filename: 295086_eng.pdf