

## Voltage Repeater KFD2-VR4-Ex1.26

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Voltage input 0 V ... -20 V
- Vibration sensor inputs
- Voltage/current field supply
- Voltage output 0 V ... -20 V
- Up to SIL 2 acc. to IEC/EN 61508



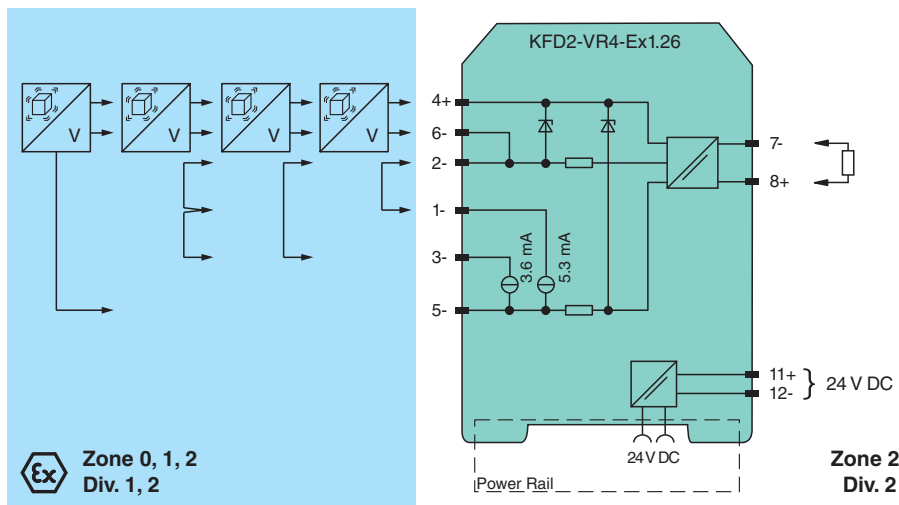
**SIL 2**



### Function

This isolated barrier is used for intrinsic safety applications. It provides a floating output to power a vibration sensor (e. g., Bently Nevada) or accelerometer in a hazardous area and transfers the voltage signal from that sensor to the safe area. The device is designed to provide a voltage or current supply to the vibration sensor. Depending on connection the barrier provides 3.6 mA, 5.3 mA, or 8.9 mA supply current for 2-wire sensors, or 18 V at 20 mA for 3-wire sensors.

### Connection



### Technical Data

#### General specifications

Signal type Analog input

#### Functional safety related parameters

Safety Integrity Level (SIL) SIL 2

#### Supply

Connection Power Rail or terminals 11+, 12-

Rated voltage  $U_r$  19 ... 30 V DC

Ripple within the supply tolerance

Power dissipation  $\leq 1.2$  W

Power consumption  $\leq 1.6$  W

#### Input

Connection side field side

## Technical Data

Connection	terminals 4 (common), 1, 3 and 5 (supply -), 2 and 6 (signal -)	
Input resistance	10 kΩ terminals 4 (common), 6-/2-	
Output rated operating current	terminals 4 (common), 5-: > 10 mA at -21 V or > 20 mA at -18 V terminals 4 (common), 1-: 5.3 mA ±0.4 mA at -10 V terminals 4 (common), 3-: 3.6 mA ±0.7 mA at -10 V, 20 °C (68 °F)	
Transmission range	-20 ... 0 V	
Output		
Connection side	control side	
Connection	terminals 7-, 8+	
Voltage	-20 ... 0 V	
Load	≥ 9 kΩ (3-wire sensor), ≥ 2 kΩ (2-wire sensor)	
Output resistance	24 Ω typ., 27 Ω maximum Since this is much less than the end-to-end resistance of a zener barrier, it may be necessary to specify a monitor intended for use without a barrier. Please follow the advice of the monitor manufacturer.	
Transfer characteristics		
Cut-off frequency	10 kHz (-0,1 dB) 20 kHz (-1 dB)	
Deviation	DC transfer error (with 10 kΩ load) < 10mV	
After calibration	additional error with AC superimposed is ±5 mV at 20 °C (68 °F) at any point within the span, provided that the alternating component of the input voltage is not excessive, e. g. - square waves (0 ... 20 kHz): 5 V <sub>pp</sub> - sine waves (0 ... 20 kHz): the full span of 20 V <sub>pp</sub> (= 100 g peak acceleration at 100 mV/g) is acceptable.	
Influence of ambient temperature	(< 100 ppm of span)/K at any point within the span	
Time delay relative to input	7.1 ±0.3 μs	
Ripple	in 200 kHz bandwidth < 20 mV <sub>rms</sub> in 20 kHz bandwidth < 3 mV <sub>rms</sub>	
Galvanic isolation		
Output/power supply	functional insulation, rated insulation voltage 50 V AC	
Indicators/settings		
Display elements	LED	
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 IEC 61326-3-2:2018	
Degree of protection	IEC 60529	
Protection against electrical shock	UL 61010-1	
Ambient conditions		
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	
Mechanical specifications		
Degree of protection	IP20	
Connection	screw terminals	
Mass	approx. 125 g	
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) (W x H x D) , 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 02 ATEX 7206	
Marking	Ⓔ II (1)G [Ex ia Ga] IIC , Ⓔ II (1)D [Ex ia Da] IIIC	
Input	Ex ia Ga, Ex ia Da	
Voltage	U <sub>o</sub>	-26.4 V
Current	I <sub>o</sub>	90 mA
Power	P <sub>o</sub>	570 mW
Supply		

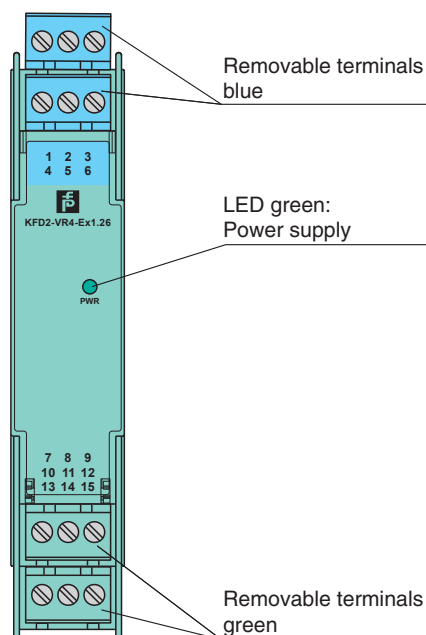
Release date: 2022-10-28 Date of issue: 2022-10-28 Filename: 70107327\_eng.pdf

## Technical Data

Maximum safe voltage	U <sub>m</sub>	253 V (Attention! The rated voltage can be lower.)
Output		
Maximum safe voltage	U <sub>m</sub>	253 V (Attention! The rated voltage is lower.)
EU-type examination certificate		DMT 01 ATEX E 133
Marking		Ⓔ I (M1) [Ex ia] I
Certificate		TÜV 99 ATEX 1499 X
Marking		Ⓔ II 3G Ex nA II T4
Galvanic isolation		
Input/Output		safe galvanic isolation acc. to IEC 60079-11, voltage peak value 375 V
Input/power supply		safe galvanic isolation acc. to IEC 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010 , EN 50303:2000
<b>International approvals</b>		
UL approval		
Control drawing		116-0316 (cULus)
IECEX approval		
IECEX certificate		IECEX BAS 05.0078 IECEX BAS 10.0085X
IECEX marking		[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I Ex nA II T4 Gc
<b>General information</b>		
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> .

## Assembly






Front view






## Matching System Components

	<b>KFD2-EB2</b>	Power Feed Module
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## Matching System Components

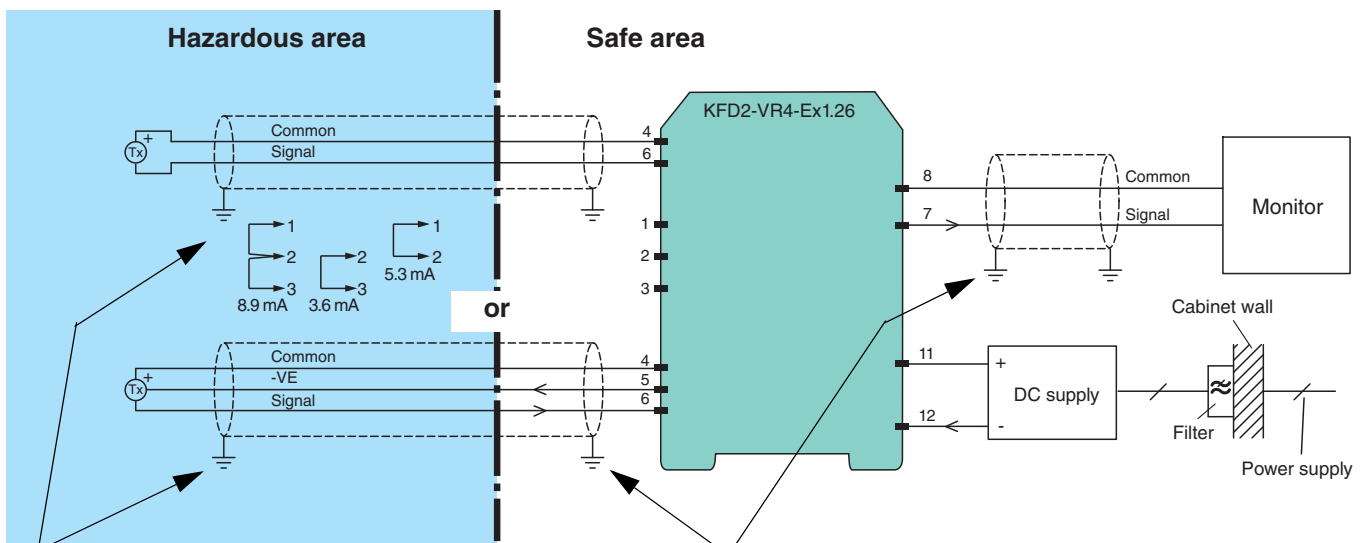
	<b>UPR-03</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	<b>UPR-03-M</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	<b>UPR-03-S</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	<b>K-DUCT-BU</b>	Profile rail, wiring comb field side, blue
	<b>K-DUCT-BU-UPR-03</b>	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

## Accessories

	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

## Additional Information

### Installation



If the transducer and probe are isolated from ground, the cable screen may be left unconnected at this end but must be securely insulated. If the transducer circuitry is connected or decoupled to ground the screen must be securely grounded.

In general, please follow the recommendations of the transducer makers.

Cable screens should normally be grounded in the gland where the cable enters the barrier cabinet. If the cabinet doors are likely to be left open while transceivers are in use nearby, it is permissible to ground the cable screens to the DIN rail on which the barriers are mounted, but note that this may affect the R.F.I. immunity of other apparatus in the cabinet.

### Function

#### Vibration monitoring sensors with 2-wire connection:

2-wire accelerometers and velocity indication devices are supplied with a fixed current and indicate what they are sensing by varying their own supply voltage - often by  $\pm 5$  V about a quiescent level of about 10 V. Those sensors are connected to terminals 4 and 6 with a link between terminals 2 and 1 (5.3 mA) or terminals 2 and 3 (3.6 mA) or terminals 2 and both 1 and 3 (8.9 mA).

The terminal 5 circuit has 2 constant sources of current connected to it which are brought out on terminals 1 at 5.3 mA and 3 at 3.6 mA. That means that a 1 k $\Omega$  resistor, for example, connected between terminals 4 and 1 would have 5.3 mA flowing in it, connected between terminals 4 and 3 would have 3.6 mA flowing in it and connected between terminals 4 and both 1 and 3 would have 8.9 mA flowing in it.

Example:

As an example, a 2-wire accelerometer requiring a minimum of 4 mA supply current and changing its own supply voltage by 100 mV for each "g" that it experiences would be connected between terminals 4 and 6 with a link between terminals 2 and 1. In that condition there may be around 10 V between terminals 4 and 6 under quiescent conditions. If it were capable of indication up to 50 g in each direction then the voltage between terminals 4 and 6 would vary between 5 V (indicating +50 g) and 15 V (indicating -50 g).

#### Vibration monitoring sensors with 3-wire connection:

Commonly 3-wire analogue proximity sensors are used to indicate shaft position and can "see" movements due to vibration which they indicate as a varying voltage level on the 3<sup>rd</sup> wire. Those sensors are connected to terminals 4, 5 and 6 with power supplied through terminals 4 and 5 and the signal connected to terminal 6. For a 3-wire sensor taking 10 mA, terminal 5 would be at approximately -21 V with respect to the common terminal 4 and the signal on the 3<sup>rd</sup> wire, connected to terminal 6, would be able to vary over the 0 to -19 V, or so, with respect to the common.

Terminal 4, the most positive terminal on the field side, is regarded as "common". There is an open circuit voltage of about 24 V DC between terminals 4 and 5 but terminal 5 has a resistance of about 300  $\Omega$  in series with it so the voltage falls to about 21 V at 10 mA and about 18 V at 20 mA. DC voltages at terminals 6 and 2 (referred to the "common") are repeated at terminal 7 using terminal 8 as the "common" on the safe side of the unit.