

Isolation amplifiers to Flender Works Standard F 5410 can be used with all mechanical monitoring equipment (e.g. pressure switches, temperature switches) with single and double contacts. They are mounted on a standard rail installed in the switch box.

General

An electrical circuit is intrinsically safe when, based on fixed test conditions, the electrical system (under normal operating and failure conditions) cannot ignite an explosive atmosphere.

Monitoring equipment installed in an explosion-hazard area can be intrinsically safely (EEx-i) controlled from outside the explosion-hazard area, using one of the isolation amplifiers listed below. This enables monitoring equipment not approved for use in explosion-hazard areas to be used in such areas.

The equipment must be identity-marked, e.g. by indication of its type designation on the nameplate.

Type	Size	Auxiliary voltage	Type
EEx1	24	24V DC	KFD2-SR2-Ex1.W
EEx1	115	115V AC	KFA5-SR2-Ex1.W
EEx1	230	230V AC	KFA6-SR2-Ex1.W
EEx2	24	24V DC	KFD2-SR2-Ex2.W
EEx2	115	115V AC	KFA5-SR2-Ex2.W
EEx2	230	230V AC	KFA6-SR2-Ex2.W

Diese technische Unterlage hat gesetzlichen Schutz (DIN 34)

- 1-channel
- control circuit EEx ia IIC
- reversible direction of action
- 1 signal output with 1 change-over contact
- EMV to NAMUR NE 21

DC 24 V:

KFD2-SR-Ex1.W

AC 115 V:

KFA5-SR2-Ex1.W

AC 230 V:

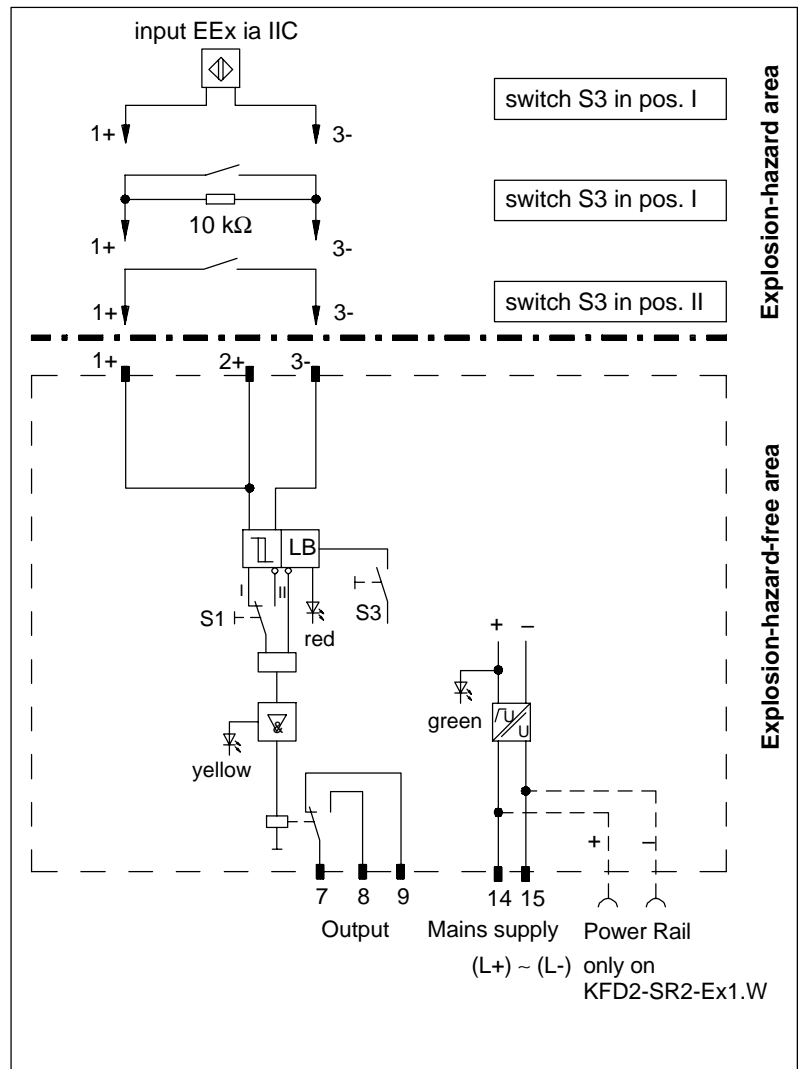
KFA6-SR2-Ex1.W

The isolation amplifier transmits digital signals from the explosion-hazard area. The signal transmitters may be sensors to DIN EN 50 227 (NAMUR) or mechanical contacts. The control circuit is monitored for line breaks (LB).

AC versions of equipment produce less heat due to the generation of peak voltages.

The input is isolated from the output and mains supply to DIN EN 50 020.

Output and mains supply are isolated from each other to DIN EN 50 178.


Fig. 1:

Circuit diagram and front view of 1-channel isolation amplifier

Front view

housing type C

 LED yellow:
relay output

 LED red:
LB

 switch S2
(no function)

 detachable terminal
clamp

 LED green:
Mains supply

 switch S1
(direction of action)

 switch S3
(LB recognition)

 detachable terminal
clamp

Diese technische Unterlage hat gesetzlichen Schutz (DIN 34)

Technical data	KFD2-SR2-Ex1.W	KFA5-SR2-Ex1.W	KFA6-SR2-Ex1.W
Mains supply	Terminals 14 (L+), 15 (L-)	Terminals 14, 15	Terminals 14, 15
Rated voltage	DC 20 V ... 30 V	AC 103.5 V ... 126 V, 45 Hz ... 65 Hz	AC 207 V ... 253 V, 45 Hz ... 65 Hz
Maximum safe voltage U_m	DC 40 V	DC 126.5 V	DC 253 V
Ripple	< 10 %	-	-
Rated current	20 mA ... 23 mA	-	-
Power requirement	-	≤ 1 W	≤ 1 W
Input (intrinsically safe)	Terminals 1+, 3-		
Rated data	to DIN EN 50 227 or NAMUR		
No-load voltage / short-circuit current	≈ DC 8 V / ≈ 8 mA		
Switch point / overlap	1.2 mA ... 2.1 mA / ≈ 0.2 mA		
Input pulse length / Input pulse interval	≥ 20 ms / ≥ 20 ms		
Line monitoring	Break J ≤ 0.1 mA		
Maximum values according to Certificate of Conformity	PTB No. Ex-94.C.2086		
Voltage U_0	10.5 V	10.6 V	10.6 V
Current I_0	13 mA	19 mA	19 mA
Power P_0	34 mW	51 mW	51 mW
Permissible connection values			
Type of protection, category	[EEx ia]		
Explosion group	IIB / IIC	IIB / IIC	IIB / IIC
external capacitance	2.1 μF / 0.62 μF	2.1 μF / 0.59 μF	2.1 μF / 0.59 μF
external inductance	7 mH / 3 mH	5 mH / 3 mH	5 mH / 3 mH
Type of protection, category	[EEx ib]		
Explosion group	IIB / IIC	IIB / IIC	IIB / IIC
external capacitance	22 μF / 3 μF	20 μF / 2.9 μF	20 μF / 2.9 μF
external inductance	740 mH / 200 mH	360 mH / 100 mH	360 mH / 100 mH
Output (not intrinsically safe)			
Output:	Terminals 7, 8, 9		
Contact load	AC: 253 V / 2 A / cos φ > 0.7; DC: 40 V / 2 A ohmic load		
Mechanical service life	10 ⁷ switch operations		
Pick-up / drop-out delay	≈ 20 ms / ≈ 20 ms		
Transmission characteristics			
Switching frequency	< 10 Hz		
Electrical isolation			
Input / output	safe electrical isolation to EN 50 020, peak voltage value 375 V		
Input / mains supply	safe electrical isolation to EN 50 020, peak voltage value 375 V		
Output / mains supply	safe isolation to DIN VDE 0106, rating insulation voltage 253 V _{eff}		
Conformity to standard			
Input	to DIN EN 50 227 (NAMUR)		
Insulation coordination	to DIN EN 50 178		
Electrical isolation	to DIN EN 50 178		
Climatic conditions	to DIN IEC 721		
Electromagnetic compatibility	to EN 50 081-2 / EN 50 082-2, NAMUR NE 21		
Weight	≈ 150 g		
Ambient temperature	-20 °C ... +60 °C (253 K ... 333 K)		

- 2-channel
- control circuit EEx ia IIC
- reversible direction of action
- 1 signal output with 1 change-over contact per channel
- EMV to NAMUR NE 21

DC 24 V:

KFD2-SR-Ex2.W

AC 115 V:

KFA5-SR2-Ex2.W

AC 230 V:

KFA6-SR2-Ex2.W

The isolation amplifier transmits digital signals from the explosion-hazard area. The signal transmitters may be sensors to DIN EN 50 227 (NAMUR) or mechanical contacts. The control circuit is monitored for line breaks (LB).

AC versions of equipment produce less heat due to the generation of peak voltages.

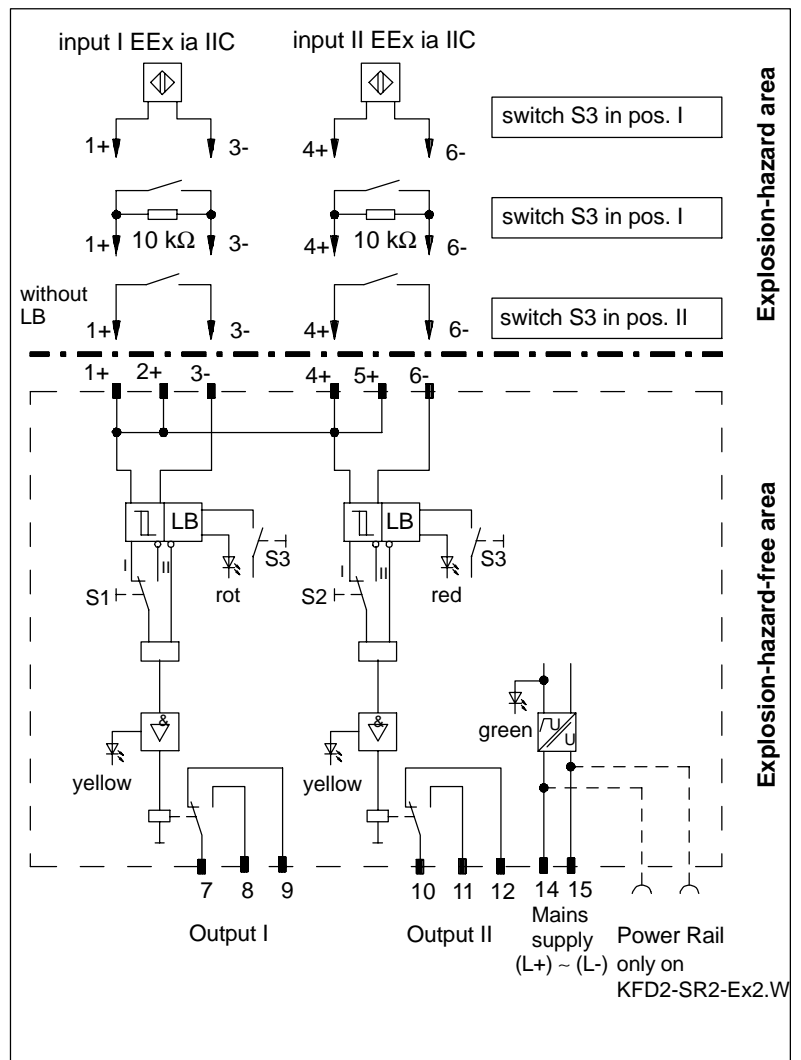
The input is isolated from the output and mains supply to DIN EN 50 020.

Output and mains supply are securely isolated from each other to DIN VDE 0106 Part 101.

Output and mains supply are electrically isolated to DIN EN 50 178 for a rating insulation voltage of AC 253 V.

Fig. 2:

Circuit diagram and front view of 2-channel isolation amplifier


Front view

housing type C

 LED yellow:
relay output I

 LED red:
LB channel I

 LED yellow:
relay output II

 LED red:
LB channel II

 detachable terminal
clamps

 LED green:
Mains supply

 switch S1
(direction of action
channel I)

 switch S2
(direction of action
channel II)

 switch S3
(LB recognition)

 detachable terminal
clamps

Diese technische Unterlage hat gesetzlichen Schutz (DIN 34)

Technical data	KFD2-SR2-Ex2.W	KFA5-SR2-Ex2.W	KFA6-SR2-Ex2.W
Mains supply	Terminals 14 (L+), 15 (L-)	Terminals 14, 15	Terminals 14, 15
Rated voltage	DC 20 V ... 30 V	AC 103.5 V ... 126 V, 45 Hz ... 65 Hz	AC 207 V ... 253 V, 45 Hz ... 65 Hz
Maximum safe voltage U_m	DC 40 V	DC 126.5 V	DC 253 V
Ripple	$\leq 10 \%$	-	-
Rated current	$\leq 50 \text{ mA}$	-	-
Power requirement	-	$\leq 1.3 \text{ W}$	$\leq 1.3 \text{ W}$
Input (intrinsically safe)	Terminals 1+, 3-; 4+, 6-		
Rated data	to DIN EN 50 227 or NAMUR		
No-load voltage / short-circuit current	$\approx \text{DC } 8 \text{ V} / \approx 8 \text{ mA}$		
Switch point / overlap	1.2 mA ... 2.1 mA / $\approx 0.2 \text{ mA}$		
Input pulse length / Input pulse interval	$\geq 20 \text{ ms} / \geq 20 \text{ ms}$		
Line monitoring	Break J $\leq 0.1 \text{ mA}$		
Maximum values according to Certificate of Conformity	PTB No. Ex-94.C.2086		
Voltage U_0	10.5 V	10.6 V	10.6 V
Current I_0	13 mA	19 mA	19 mA
Power P_0	34 mW	51 mW	51 mW
Permissible connection values			
Type of protection, category	[EEx ia]		
Explosion group	IIB / IIC	IIB / IIC	IIB / IIC
external capacitance	2.1 μF / 0.6 μF	2.1 μF / 0.59 μF	2.1 μF / 0.59 μF
external inductance	7 mH / 3 mH	5 mH / 3 mH	5 mH / 3 mH
Type of protection, category	[EEx ib]		
Explosion group	IIB / IIC	IIB / IIC	IIB / IIC
external capacitance	22 μF / 3 μF	20 μF / 2.9 μF	20 μF / 2.9 μF
external inductance	740 mH / 200 mH	360 mH / 100 mH	360 mH / 100 mH
Output (not intrinsically safe)			
Output I:	Terminals 7, 8, 9		
Output II:	Terminals 10, 11, 12		
Contact load	AC: 253 V / 2 A / $\cos \varphi > 0.7$; DC: 40 V / 2 A ohmic load		
Mechanical service life	10^7 switch operations		
Pick-up / drop-out delay	$\approx 20 \text{ ms} / \approx 20 \text{ ms}$		
Transmission characteristics			
Switching frequency	$\leq 10 \text{ Hz}$		
Electrical isolation			
Input / output	safe electrical isolation to EN 50 020, peak voltage value 375 V		
Input / mains supply	safe electrical isolation to EN 50 020, peak voltage value 375 V		
Output / mains supply V_{eff}	safe isolation to DIN VDE 0106, rating insulation voltage 253 V_{eff}		
Output / output V_{eff}	Base insulation to DIN EN 50 178, rating insulation voltage 253 V_{eff}		
Conformity to standard			
Input	to DIN EN 50 227 (NAMUR)		
Insulation coordination	to DIN EN 50 178		
Electrical isolation	to DIN EN 50 178		
Climatic conditions	to DIN IEC 721		
Electromagnetic compatibility	to EN 50 081-2 / EN 50 082-2, NAMUR NE 21		
Weight	$\approx 150 \text{ g}$		
Ambient temperature	$-20 \text{ }^\circ\text{C} \dots +60 \text{ }^\circ\text{C}$ (253 K ... 333 K)		