



- Control circuit EEx ia IIC
- 24 V DC nominal supply voltage
- Reversible mode of operation
- Lead monitoring (short circuit LK and interruption LB) with LED indicator (red flashing), switching output and signal on Power Rail
- 50 % less wiring 2 : 1
- 2 relay outputs, 1 NO contact per channel, grouped into single-pole pairs
- EMC acc. to NAMUR NE 21

4-channel

KFD2-SRA-Ex4

2-channel

KFD2-SRA-Ex2

Function

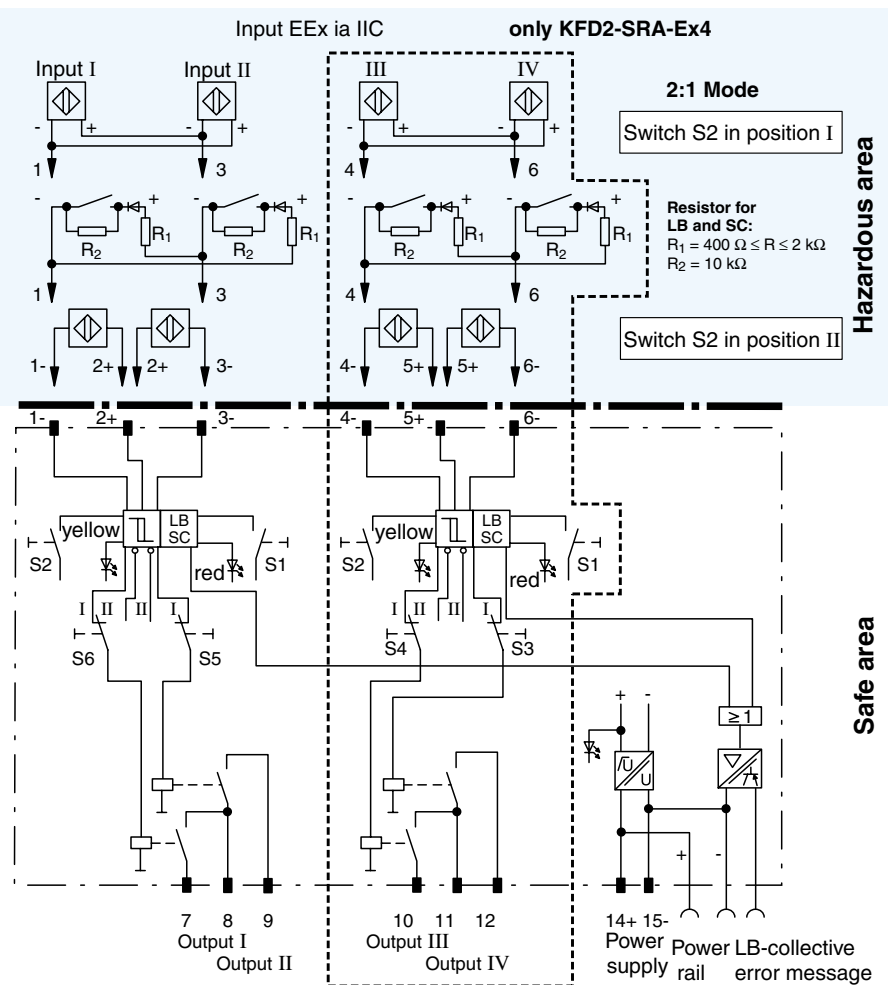
The transformer isolated barrier transfers digital signals from the hazardous area. The inputs are designed for the connection of NAMUR sensors per DIN EN 60947-5-6 or a mechanical contact.

The input, output and power supply are galvanically isolated from each other. The relay output and the power supply are galvanically isolated from each other per DIN EN 50178 with a design isolation voltage of AC 50 V.

Application

Min/Max manometer, valve positioners, magnetic immersion probes with 2 switch points.

Two signals can be monitored through one dual lead in the 2:1 mode of operation (AC), reducing wiring by fifty per cent.



Aufbau

Front View

Housing type C
(see system description)

LED yellow/red
yellow: Relay output
red: LB/SC

LED yellow/red: Channel I

LED yellow/red: Channel II

LED yellow/red: Channel III
(only KFD2-SRA-Ex4)

LED yellow/red: Channel IV
(only KFD2-SRA-Ex4)

Removable terminals
blue

LED green:
Power supply

Switch S4
(mode of operation channel III)
(only KFD2-SRA-Ex4)

Switch S5
(mode of operation channel II)

Switch S6
(mode of operation channel I)

Switch S3
(mode of operation channel IV)
(only KFD2-SRA-Ex4)

Switch S2
(2:1 AC or not AC)

Switch S1
(LB-monitoring)

Removable terminals
green

	KFD2-SRA-Ex4	KFD2-SRA-Ex2
Power supply		
Connection type	Power Rail or terminals 14+, 15-	
Rated operational voltage U _e	20 ... 30 V DC	
Safety maximum voltage U _m	40 V DC	
Ripple	≤ 10 %	
Rated operational current	45 ... 70 mA	
Power loss	approx. 1.26 W	
Input (intrinsically safe)		
Connection type	terminals 1-, 2+, 3-; 4-, 5+, 6-	terminals 1-, 2+, 3-
Nominal data	in accordance with IEC 60947-5-6 (NAMUR, DIN 19234); see system description for electrical data	in accordance with IEC 60947-5-6 (NAMUR, DIN 19234); see system description for electrical data
Input pulse length/Input pulse interval	≥ 20 ms /≥ 20 ms	≥ 20 ms /≥ 20 ms
Lead monitoring	breakage J ≤ 0.15 mA	breakage J ≤ 0.15 mA
Details of certificate of conformity		
Certification number	ZELM 99 ATEX 0009	
Group, category, ignition protection method	Ⓔ II (1) G [EEx ia] IIC	
Voltage U _o	10 V	
Current I _o	14 mA	
Power P _o	35 mW (linear characteristic)	
Allowable circuit values		
Ignition protection class, category [EEx ia]		
Explosion group	IIC	
External capacitance	3 µF	
External inductance	180 mH	
Output (not intrinsically safe)		
Connection type	output I: terminals 7, 8; output II: terminals 8, 9; output III: terminals 10, 11; output IV: terminals 11, 12	output I: terminals 7, 8; output II: terminals 8, 9
Output I and II	Signal I/II; relay	
Output I up to IV	Signal I ... Signal IV; relay	
Contact loading	253 V AC / 2 A / cos φ > 0.7; 40 V DC / 1 A resistive load	253 V AC / 2 A / cos φ > 0.7; 40 V DC / 1 A resistive load
Mechanical life	5 x 10 ⁶ switchings	5 x 10 ⁶ switchings
Energized/De-energized delay	approx. 20 ms / approx. 20 ms	approx. 20 ms / approx. 20 ms
Collective error message	Power Rail	Power Rail
Transfer characteristics		
Switching frequency	≤ 10 Hz (non-AC operation) ≤ 3 Hz (AC operation)	
Galvanic isolation		
Input/Output	safe galvanic isolation acc. to EN 50020, voltage peak value 375 V	safe galvanic isolation acc. to EN 50020, voltage peak value 375 V
Input/Power supply	safe galvanic isolation acc. to EN 50020, voltage peak value 375 V	safe galvanic isolation acc. to EN 50020, voltage peak value 375 V
Output/Power supply	safe isolation acc. to DIN VDE 0106, design isolation voltage 253 V _{eff}	basic isolation acc. to EN 50178, design isolation voltage 50 V _{eff} AC
Ambient conditions		
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	
Standard conformity		
Input	in accordance with IEC 60947-5-6 (NAMUR, DIN 19234); see system description for electrical data	
Coordination of insulation	accord. to DIN EN 50178	
Galvanic isolation	accord. to DIN EN 50178	
Climatic conditions	accord. to DIN IEC 721	
Electromagnetic compatibility	accord. to EN 50081-2 / EN 50082-2	
Mechanical specifications		
Mass	approx. 150 g	

Notes**Accessories**

Power Rail	UPR-05
Power feed module 24 V DC	KFD2-EB ...

Lead breakage monitoring

In the case of an error a fault signal is activated across the Power Rail (UPR-05). The power feed module evaluates and passes on the fault signal by means of a potentially free contact (see system description).

Mode of operation with 2:1 transfer method

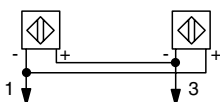
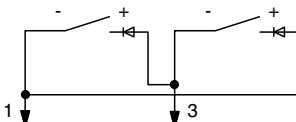
The transformer isolated barrier transfers binary signals from the hazardous area by means of the patented new 2:1-transfer method which allows for the transmission of two independent binary signals by means of a single pair of conductors. This allows wiring to be reduced by 50 %. The 2:1 transfer method is well suited for the transmission of 2 signals that are within close proximity such as Min-Max-manometers, valve positioners and magnetic immersion probes with two switch points.

Conditions

When using sensors they have to be provided with a reverse polarity protected diode.

Pepperl+Fuchs offers suitable sensors for alternating polarity (see table).

When using mechanical contacts in the 2:1 mode, the blocking diode must be connected near the switch.

Connection of:**Sensors****Mechanical switches**

Refer to the connection diagrams for lead breakage and short circuit monitoring.

Comments:

When installing a serial diode, it must be assured that the reverse polarity current is < 0.15 mA, in order to enable the lead monitoring.

For all types NJ, RC/RJ and SJ an adjustment by means of a serial diode is necessary.

Mode of operation without 2:1 transfer method

Set switch S2 to position II.

Functioning switch

Switch	Position	Function
S1	I	Lead breakage monitoring on
	II	Lead breakage monitoring off
S2	I	AC-mode (2:1 transfer method)
	II	not an AC-mode
S3	I	Reverse mode of operation output IV inactive
	II	Reverse mode of operation output IV active
S4	I	Reverse mode of operation output III inactive
	II	Reverse mode of operation output III active
S5	I	Reverse mode of operation output II inactive
	II	Reverse mode of operation output II active
S6	I	Reverse mode of operation output I inactive
	II	Reverse mode of operation output I active

Pepperl+Fuchs sensors for alternating polarity

Model number	External diode necessary	Operating temperature T _u /°C	Model number	External diode necessary	Operating temperature T _u /°C
Cylindrical proximity switch	no	-25 °C ... 70 °C	NJ 2-12GM-N (-V1)	yes	-25 °C ... 100 °C
NCB1,5-6,5M25-N0 (V1)	no	-25 °C ... 70 °C	NJ 4-12GK-N	yes	-25 °C ... 100 °C
NCB1,5-8GM25-N0 (V1)	no	-25 °C ... 70 °C	NJ 4-12GK-SN	yes	-25 °C ... 100 °C
NCB2-12GM35-N0 (V1)	no	-25 °C ... 70 °C	NJ 4-12GM-N (-V1)	yes	-25 °C ... 100 °C
NCNCB5-18GM40-N0 (-V1)	no	-25 °C ... 70 °C	NJ 4-30GM-N-200	yes	-25 °C ... 100 °C
NCN8-18GM40-N0 (-V1)	no	-25 °C ... 70 °C	NJ 5-10-11-N	yes	-25 °C ... 100 °C
NCB10-30GM40-N0 (-V1)	no	-25 °C ... 70 °C	NJ 5-11-N	yes	-25 °C ... 100 °C
NCN15-30GM40-N0 (-V1)	yes	-25 °C ... 100 °C	NJ 5-11-N-G	yes	-25 °C ... 100 °C
NJ 0,2-10GM-N	yes	-25 °C ... 100 °C	NJ 5-18GK-N	yes	-25 °C ... 100 °C
NJ 0,8-4,5-N	yes	-25 °C ... 100 °C	NJ 5-18GK-N-150	yes	-25 °C ... 100 °C
NJ 0,8-5GM-N	yes	-25 °C ... 100 °C	NJ 5-18GK-SN	yes	-25 °C ... 100 °C
NJ 1,5-18GM-N-D (-V1)	yes	-25 °C ... 100 °C	NJ 3-18GK-S1N	yes	-25 °C ... 100 °C
NJ 1,5-6,5-N	yes	-25 °C ... 100 °C	NJ 5-18GM-N (-V1)	yes	-25 °C ... 100 °C
NJ 1,5-8GM-N (-V1)	yes	-25 °C ... 100 °C	NJ 8-18GK-N	yes	-25 °C ... 100 °C
NJ 2-11-N	yes	-25 °C ... 100 °C	NJ 8-18GK-N-150	yes	-25 °C ... 100 °C
NJ 2-11-N-G	yes	-25 °C ... 100 °C	NJ 8-18GK-SN	yes	-25 °C ... 100 °C
NJ 2-11-SN	yes	-25 °C ... 100 °C	NJ 8-18GM-N (-V1)	yes	-25 °C ... 100 °C
NJ 2-11-SN-G	yes	-25 °C ... 100 °C	NJ 6-22-N	yes	-25 °C ... 100 °C
NJ 2-12GK-N	yes	-25 °C ... 100 °C	NJ 6-22-N-G	yes	-25 °C ... 100 °C
NJ 2-12GK-SN	yes	-25 °C ... 100 °C	NJ 6-22-SN	yes	-25 °C ... 100 °C

Model number	External diode necessary	Operating temperature $T_{U/°C}$	Model number	External diode necessary	Operating temperature $T_{U/°C}$
NJ 6-22-SN-GNJ 10-22-N	yes	-25 °C ... 100 °C	NJ 20+U1+N	yes	-25 °C ... 100 °C
NJ 10-22-N-G	yes	-25 °C ... 100 °C	NJ 20S+U1+N	yes	-25 °C ... 100 °C
NJ 10-30GK-N	yes	-25 °C ... 100 °C	NJ 30+U1+N	yes	-25 °C ... 100 °C
NJ 5-30GK-S1N	yes	-25 °C ... 100 °C	NJ 30P+U1+1N	yes	-25 °C ... 100 °C
NJ 10-30GKK-N	yes	-25 °C ... 100 °C	NJ 40+U1+N	yes	-25 °C ... 100 °C
NJ 10-30GM-N (-V1)	yes	-25 °C ... 100 °C	NJ 6S1+U1+N1	yes	-25 °C ... 100 °C
NJ 10-30GK-SN	yes	-25 °C ... 100 °C	FJ 6-110-N	yes	-25 °C ... 100 °C
NJ 15-30GK-N	yes	-25 °C ... 100 °C	FJ 7-N	yes	-25 °C ... 100 °C
NJ 15-30GK-N-150	yes	-25 °C ... 100 °C	Sensors on carrier circuit boards		
NJ 15-30GK-SN	yes	-25 °C ... 100 °C	PL1-F25-N4-...	no	-25 °C ... 70 °C
NJ 15-30GKK-N	yes	-25 °C ... 100 °C	PL2-F25-N4-...	no	-25 °C ... 70 °C
NJ 15-30GM-N	yes	-25 °C ... 100 °C	PL3-F25-N4-...	no	-25 °C ... 70 °C
NJ 20-40-N	yes	-25 °C ... 100 °C	PL4-F25-N4-...	no	-25 °C ... 70 °C
NJ 25-50-N	yes	-25 °C ... 100 °C	Ring type proximity switches		
Rectangular type proximity switch			RJ 10-14-N	yes	-25 °C ... 100 °C
NCB2-F1-N0	no	-25 °C ... 70 °C	RJ 10-N	yes	-25 °C ... 100 °C
NCN4-M3K-N4	no	-25 °C ... 70 °C	RJ 15-14-N	yes	-25 °C ... 100 °C
NCN15-M1K-N0	no	-25 °C ... 70 °C	RJ 15-N	yes	-25 °C ... 100 °C
NCB15+U1+N0	no	-25 °C ... 70 °C	RJ 21-N	yes	-25 °C ... 100 °C
NCN20+U1+N0	no	-25 °C ... 70 °C	RJ 43-N	yes	-25 °C ... 100 °C
NCN30+U1+N0	no	-25 °C ... 70 °C	Slot type proximity switches		
NCN40+U1+N0	no	-25 °C ... 70 °C	SC2-N0	no	-25 °C ... 100 °C
NCN3-F24L-N4	no	-25 °C ... 70 °C	SC3,5-G-N0	yes	-25 °C ... 100 °C
NCN3-F24R-N4	no	-25 °C ... 70 °C	SC3,5-N0	no	-25 °C ... 100 °C
NCN3-F25-N4 (-...)	no	-25 °C ... 70 °C	SC3,5-SN	yes	-25 °C ... 100 °C
NCN3-F25-SN4 (-...)	no	-25 °C ... 70 °C	SC3,5-S1N	yes	-25 °C ... 100 °C
NCN3-F25F-N4-V1	no	-25 °C ... 70 °C	SJ 2,2-N	yes	-25 °C ... 100 °C
NCN3-F36-N4	yes	-25 °C ... 100 °C	SJ 2-N	yes	-25 °C ... 100 °C
NCN3-F31-N4-...	no	-25 °C ... 70 °C	SJ 2-S1N	yes	-25 °C ... 100 °C
NJ 0,8-F-N	yes	-25 °C ... 100 °C	SJ 2-SN	yes	-25 °C ... 100 °C
NJ 1,5-F-N	yes	-25 °C ... 100 °C	SJ 3,5-G-N	yes	-25 °C ... 100 °C
NJ 2,5-F-N	yes	-25 °C ... 100 °C	SJ 3,5-H	yes	-25 °C ... 100 °C
NJ 2-F1-N	yes	-25 °C ... 100 °C	SJ 3,5-N	yes	-25 °C ... 100 °C
NJ 2-V3-N	yes	-25 °C ... 100 °C	SJ 3,5-N LED	yes	-25 °C ... 100 °C
NJ 2-V3-N-V5	yes	-25 °C ... 100 °C	SJ 3,5-S1N	yes	-25 °C ... 100 °C
NJ 4-F-N	yes	-25 °C ... 100 °C	SJ 3,5-SN	yes	-25 °C ... 100 °C
NJ 6-F-N	yes	-25 °C ... 100 °C	SJ 5-G-N	yes	-25 °C ... 100 °C
NJ 10-F-N	yes	-25 °C ... 100 °C	SJ 5-K-N	yes	-25 °C ... 100 °C
NJ 15-M1-N (-V)	yes	-25 °C ... 100 °C	SJ 5-N	yes	-25 °C ... 100 °C
NJ 15-M1K-N	yes	-25 °C ... 100 °C	SJ 10-N	yes	-25 °C ... 100 °C
NJ 15+U1+N	yes	-25 °C ... 100 °C	SJ 15-N	yes	-25 °C ... 100 °C
NJ 15S+U1+N	yes	-25 °C ... 100 °C			