



- 1-channel
- Input EEx ia IIC
- 2 switching points operate on 2 output relays
- High/low alarm can be selected for each switching point
- Mode of operation of the relay adjustable separately
- Lead breakage monitoring (can be deactivated)
- 3 1/2-digit LC-display for switching points and actual value
- All operating and indicator elements on the front side

**24 V DC; hysteresis 1 % ... 10 % of measuring range**

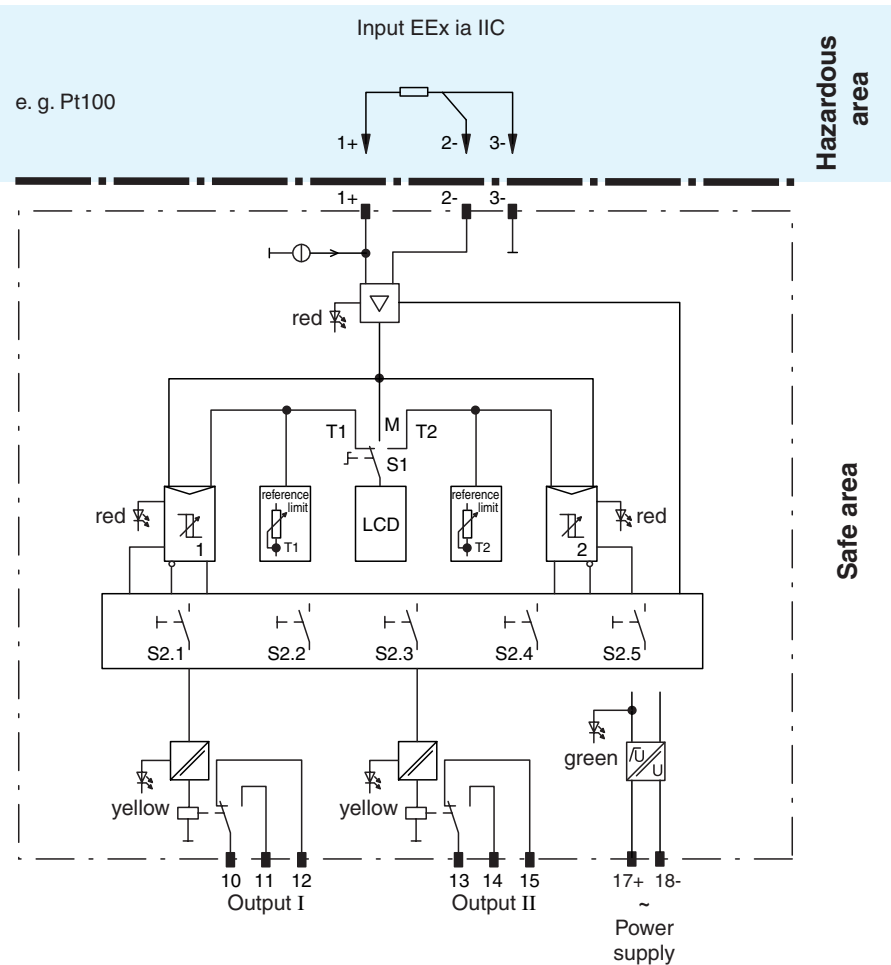
**KFD2-GR-Ex1**

Successor KFD2-GU-Ex1

**Function**

Trip amplifiers are installed with the Pt100 or Ni100 for temperature measurements. High alarm indicates that the alarm is activated when a limit is exceeded and is reset when another limit is not met. The hysteresis, which is the difference between these limits, is adjustable. Low alarm means that the alarm is tripped when a limit is not reached. The input is safely isolated from the outputs and power supply per DIN EN 50020.

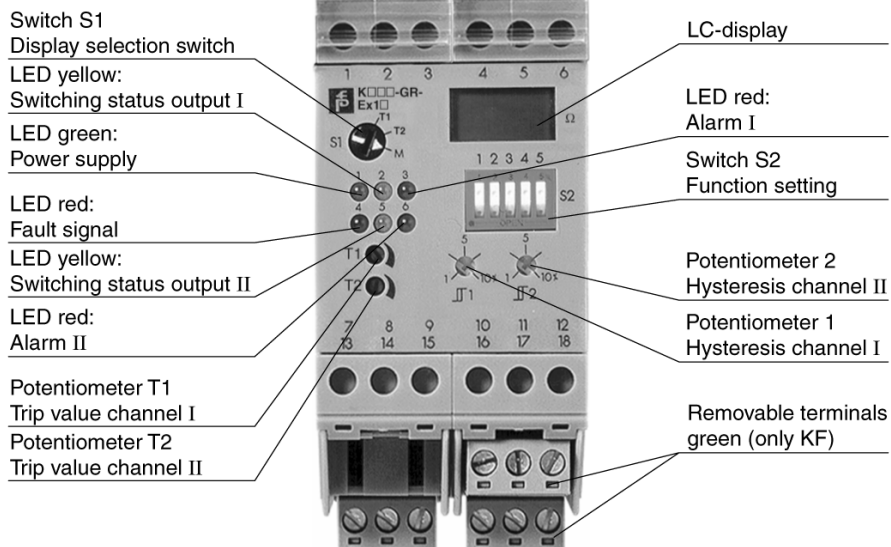
**Connection**



**Composition**

**Front View**

Housing type B4 = KFD2...  
Housing type E = KHA6...  
(see system description)



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<b>Supply</b>	
Connection	Power Rail or terminals 17+, 18-
Rated voltage	18 ... 32 V DC
Power consumption	approx. 2 W
<b>Input</b>	
Connection	terminals 1+, 2+, 3-
Measurement range	<u>Pt100</u> : 10 ... 390 Ω
Measuring current	approx. 2 mA
<b>Output</b>	
Output I	limit value 1: terminals 10, 11, 12
Output II	limit value 2: terminals 13, 14, 15
Contact loading	253 V AC, 2 A, cos φ > 0.6
Mechanical life	2 x 10 <sup>7</sup> switching cycles
<b>Transfer characteristics</b>	
Deviation	LC-display, ± 0.5 % of measuring value + 1 digit
Influence of ambient temperature	<u>switching point</u> : 0.015 % / K of measuring range <u>display</u> : 0.01 % / K of measuring range
Influence of supply voltage	not measurable
Repeat accuracy	≤ 0,2 %
Input delay	≤ 150 ms (rise time and energising delay of relay)
<b>Electrical isolation</b>	
Input/Output	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Output/power supply	safe isolation acc. to DIN VDE 0106, rated insulation voltage 253 V <sub>eff</sub>
Output/Output	safe isolation acc. to DIN VDE 0106, rated insulation voltage 253 V <sub>eff</sub>
<b>Directive conformity</b>	
Electromagnetic compatibility	standards
Directive 89/336/EC	on request
<b>Standard conformity</b>	
Insulation coordination	acc. to DIN EN 50178
Electrical isolation	acc. to DIN EN 50178
Electromagnetic compatibility	acc. to EN 50081-2 / EN 50082-2
Climatic conditions	acc. to DIN IEC 721
<b>Ambient conditions</b>	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
<b>Mechanical specifications</b>	
Protection degree	IP20
Mass	approx. 250 g
<b>Data for application in conjunction with hazardous areas</b>	
EC-Type Examination Certificate	PTB No. Ex-93.C.2071 ; for additional certificates refer to the approval list
Voltage U <sub>0</sub>	22 V DC
Current I <sub>0</sub>	9,8 mA
Power P <sub>0</sub>	38 mW
<b>Supply</b>	
Safety maximum voltage U <sub>m</sub>	40 V DC
<b>Type of protection [EEx ia]</b>	
Explosion group	IIB IIC
External capacitance	0,425 μF 0,068 μF
External inductance	25 mH 5 mH
<b>Type of protection [EEx ib]</b>	
Explosion group	IIB IIC
External capacitance	0,766 μF 0,126 μF
External inductance	1000 mH 330 mH
<b>Electrical isolation</b>	
Input/Output	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
<b>Directive conformity</b>	
Directive 94/9 EC	on request

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**Notes****Function description**

The trip amplifier sends a measurement current of about 2 mA from terminal 1 to terminal 3 through the resistance thermometer. The input is designed for 3-wire mode in which terminal 2 serves as lead compensation. The LCD displays the resistance of the Pt100 directly in Ohms. By means of the Pt100-value table you can conclude to the corresponding measurement temperature. A comparator checks the measurement values against the two selected reference limits. The hysteresis, the operating mode and the alarm type (high or low alarm) may be selected for each switch point. The output relays transfer the potential isolated switching status to output terminals 10, 11, 12 and 13, 14, 15. Lead breakage in the input circuit causes the output relays to be deactivated.

**LC-display**

Reference or actual values are displayed in Ohm. From the Pt100- or Ni100-value table (see last page) the corresponding measurement temperature can be concluded.

**LC-display selector switch**

With switch S1 it is possible to select, which value (actual or reference value) is indicated on the LC-display.

S1 in Pos. T1: Switch point 1 (reference value or limit value 1)

S1 in Pos. T2: Switch point 2 (reference value or limit value 2)

S1 in Pos. M: Actual value

**Potentiometer T1, T2**

By means of the potentiometers T1 or T2 the switch points or limit values are set.

T1: Adjustment of switch point 1 (reference value or limit value 1)

T2: Adjustment of switch point 2 (reference value or limit value 2)

**Potentiometer J1 and J2**

The potentiometers J1 and J2 serve for the hysteresis adjustment of the individual switch points in a range of 1 % ... 10 % (KFD2-GR-Ex1) or 0.1 % ... 1 % (KFD2-GR-Ex1.RH) related to the measurement value.

J1 hysteresis switch point 1 (reference value or limit value 1)

J2 hysteresis switch point 2 (reference value or limit value 2)

**DIP switch S2**

Switch	Position	Function
S2.1	OPEN	High alarm output I
	-	Low alarm output I
S2.2	OPEN	Relays closed on alarm state
	-	Relays open in alarm state
S2.3	OPEN	Lead breakage monitoring off
	-	Lead breakage monitoring on
S2.4	OPEN	High alarm output II
	-	Low alarm output II
S2.5	OPEN	Relays closed on alarm state
	-	Relays open in alarm state

**1. Basic values in Ohm from 5 degrees to 5 degrees for temperature sensors with heating resistor material platinum (Pt).**

°C	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
-200	18.53	16.43	14.36	12.35	10.41	-	-	-	-	-	-
-100	60.20	58.17	56.13	54.09	52.04	49.99	47.93	45.87	43.80	41.73	39.65
0	100.00	98.04	96.07	94.10	92.13	90.15	88.17	86.19	84.21	82.23	80.25

°C	-55	-60	-65	-70	-75	-80	-85	-90	-95	-100	W/grd <sup>1)</sup>
-200	-	-	-	-	-	-	-	-	-	-	-
-100	37.57	35.48	33.38	31.28	29.17	27.05	24.92	22.78	20.65	18.53	0.42
0	78.27	76.28	74.29	72.29	70.29	68.28	66.27	64.25	62.23	60.20	0.40

°C	0	5	10	15	20	25	30	35	40	45	50
0	100.00	101.95	103.90	105.85	107.79	109.73	111.67	113.61	115.54	117.47	119.40
100	138.50	140.39	142.28	144.18	146.06	147.94	149.82	151.70	153.57	155.45	157.32
200	175.84	177.68	179.51	181.34	183.17	185.00	186.82	188.64	190.46	192.27	194.08
300	212.03	213.81	215.58	217.36	219.13	220.90	222.66	224.42	226.18	227.94	229.69
400	247.06	248.78	250.50	252.21	253.93	255.64	257.34	259.05	260.75	262.45	264.14
500	280.93	282.60	284.26	285.91	287.57	289.22	290.87	292.51	294.16	295.80	297.43
600	313.65	315.25	316.86	318.46	320.05	321.65	323.24	324.83	326.41	327.99	329.57
700	345.21	346.76	348.30	349.84	351.38	352.92	354.45	355.98	357.51	359.03	360.55
800	375.61	377.10	378.59	380.07	381.55	383.03	384.50	385.98	387.45	388.91	390.38

°C	55	60	65	70	75	80	85	90	95	100	W/grd <sup>1)</sup>
0	121.32	123.24	125.16	127.07	128.98	130.89	132.80	134.70	136.60	138.50	0.38
100	159.18	161.04	162.90	164.76	166.62	168.47	170.32	172.16	174.00	175.84	0.37
200	195.89	197.70	199.50	201.30	203.09	204.88	206.68	208.46	210.25	212.03	0.36
300	231.44	233.19	234.93	236.67	238.41	240.15	241.88	243.61	245.34	247.06	0.35
400	265.83	267.52	269.21	270.89	272.57	274.25	275.92	277.60	279.27	280.93	0.34
500	299.07	300.70	302.33	303.95	305.58	307.20	308.81	310.43	312.04	313.65	0.33
600	331.15	332.72	334.29	335.86	337.43	338.99	340.55	342.10	343.66	345.21	0.32
700	362.07	363.59	365.10	366.61	368.12	369.62	371.12	372.62	374.12	375.61	0.30
800	-	-	-	-	-	-	-	-	-	-	0.29

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2. Basic values in Ohm from 5 degrees to 5 degrees for temperature sensors with heating resistor material Nickel (Ni)

°C	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
0	100.0	97.3	94.6	91.9	89.3	86.7	84.1	81.6	79.1	76.6	74.2
°C	-55	-60	-65	-70	-75	-80	-85	-90	-95	-100	W/grd <sup>1)</sup>
0	71.8	69.5	-	-	-	-	-	-	-	-	0.51
°C	0	5	10	15	20	25	30	35	40	45	50
0	100.0	102.8	105.6	108.4	111.3	114.2	117.1	120.0	123.0	126.0	129.1
100	161.7	165.2	168.7	172.3	175.9	179.6	183.3	187.1	190.9	194.8	198.7
°C	55	60	65	70	75	80	85	90	95	100	W/grd <sup>1)</sup>
0	132.2	135.3	138.5	141.7	144.9	148.2	151.5	154.9	158.3	161.7	0.62
100	202.7	206.7	210.8	214.9	219.0	223.1	-	-	-	-	0.77

1) Mean value, of the 100 degree-ranges