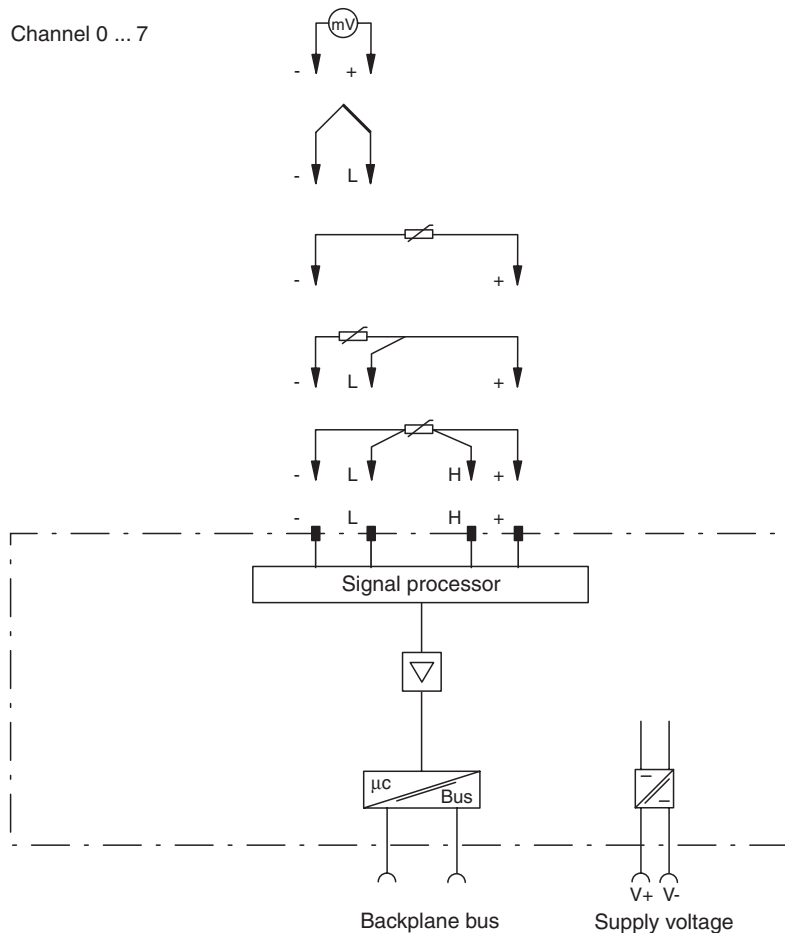CE   Ex

- 8-channel
- Inputs EEx ia IIC
- Device installation in zone 1, zone 2 or zone 22
- Module can be exchanged under voltage in Zone 1 (hot swap)
- Connection of resistance thermometers Pt100 or Ni100 in 2-, 3- or 4-wire connection
- Connection of thermocouples, type B, E, J, K, L, N, R, S or T
- Connection of other resistive sensors, mV sources or thermocouples possible. Linearization adjustable via software
- Lead breakage (LB) monitoring for each field circuit
- Filter cut-off frequency can be programmed from 0.2 Hz to 600 Hz
- EMC acc. to NAMUR NE 21

Function

The RSD-TI-Ex8 transfers up to eight signals from RTDs and resistors in the range of 0 Ω ... 500 Ω, thermocouples and mV signals in the range of -40 mV ... +100 mV from the hazardous area via the fieldbus into the safe area. RTDs can be connected in 2-, 3- or 4-wire mode. The signal of the temperature sensor is linearised. The internal cold junction compensation can be selected for thermocouples. Cold junction compensation is also possible externally. The input filter cut-off frequency can be adjusted up to 600 Hz.
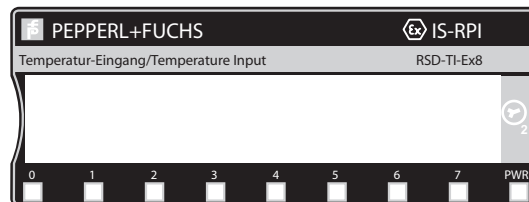
Messages concerning lead breaks of sensor circuits are transferred via the bus. The inputs are galvanically isolated from the bus and the power supply.

Connection

Channel 0 ... 7

Signal processor

Backplane bus   Supply voltage

Composition

Front View

PEPPERL+FUCHS   Ex IS-RPI
Temperatur-Eingang/Temperature Input   RSD-TI-Ex8

0 1 2 3 4 5 6 7 PWR

LED PWR   green: Power-ON
               module is operating

LED 0 ... 7   channels 0 ... 7
               flashing red: lead breakage

LED 0   red: internal fault (module) or Power-ON test

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Supply	
Connection	terminals 34, 50 V+; 35, 51 V-
Rated voltage	8.88 ... 9.5 V
Power loss	1.6 W
Power consumption	1.6 W
Internal bus	
Connection	backplane bus
Interface	manufacturer specific bus
Cycle time	1.6 ms
Input	
Connection	terminals 0+, 1H, 2L, 3-; 4+, 5H, 6L, 7-; 8+, 9H, 10L, 11-; 12+, 13H, 14L, 15-; 17+, 18H, 19L, 20-; 21+, 22H, 23L, 24-; 25+, 26H, 27L, 28-; 29+, 30H, 31L, 32-
Input signal	suitable for: Pt100, Pt200, Ni100, Ni200, Ni120 Minco, Cu10 Minco thermocouples type B, E, J, K, N, R, S, T and mV sources
Line resistance	$\leq$ 10 Ω for each connection
Lead monitoring	lead monitoring for all lines and CJC
Transfer characteristics	
Resolution	16 Bit
Step response	17 ms (0 ... 90 % of the measured value by smallest filter setting)
Deviation	
Influence of ambient temperature	see table
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Explosion protection	
Directive 94/9/EC	EN 60079-0: 2006, EN 60079-11: 2007, EN 60079-26: 2007, EN 61241-0: 2006, EN 61241-11: 2006
Standard conformity	
Insulation coordination	EN 50178
Electrical isolation	EN 60079-11:2007
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Ambient conditions	
Classification	3K3
Ambient temperature	-20 ... 70 °C (253 ... 343 K)
Storage temperature	-20 ... 100 °C (253 ... 373 K)
Relative humidity	95 % non-condensing
Shock resistance	15 g peak, 11 ms period
Vibration resistance	2 g , 10 ... 500 Hz according to IEC 60068-2-6
Damaging gas	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	terminals
Core cross-section	$\leq$ 2.5 mm^2
Protection degree	IP20, for in-situ installation a separate housing is required with a minimum of IP54
Mass	approx. 245 g
Mounting	DIN rail mounting
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	DMT 98 ATEX E 015 X , for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1)2G EEx ia/ib IIB/IIC II (1D)(2D)
Temperature class	T4
Supply	only in connection with the power units RSD2-PSD2-Ex4.34, RSA6-PSD-Ex4.34
Input	
Voltage U_o	9 V
Current I_o	38 mA
Power P_o	86 mW
External capacitance C_o	4.9 µF
External inductance L_o	20 mH
L/R ratio	0.4 mH/Ω
Internal bus	customer specific
Statement of conformity	
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3D IP54 T 90°C

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Electrical isolation	
Input/input	no electrical isolation
Input/power supply	safe electrical isolation acc. to EN 60079-11: 2007, voltage peak value 60 V
Input/Internal bus	safe electrical isolation acc. to EN 60079-11: 2007, voltage peak value 60 V
Internal bus/power supply	safe electrical isolation acc. to EN 60079-11: 2007, voltage peak value 60 V

Electrical connection

Terminal base assignment
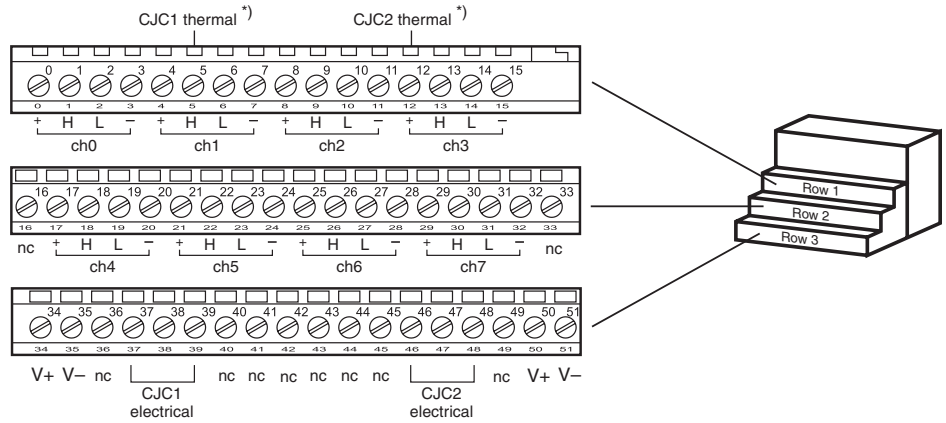
*) Included in scope of delivery.
  For detailed connection see also additional information.

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. For information see www.pepperl-fuchs.com.

Application

- Temperature control via RTD and thermocouples
- Detection of positions via low ohmic potentiometric recorders
- Detection of mV signals

Additional information

8 input channels with a common power supply

- Deactivation of lead break monitoring for each of the 4 channels via the bus

RTD

- 3- and 4-lead connection
- 2-lead connection: compensation for lead resistances can be programmed
- Lead break monitoring via the internal bus to the control system and red flashing fault LEDs for each channel
- Input filter cut-off frequency can be set by parameter up to 600 Hz

Thermocouples

- Types B, E, J, K, L[*], N, R, S, T   * russian standard
- Internal Cold Junction Compensation (CJC)
- External reference element
- 0 °C compensation
- Differential cold junction compensation channel 0 to 1 and channel 2 to 3
- Lead break monitoring via the internal bus to the control system and red flashing fault LEDs for each channel
- Input filter cut-off frequency can be set by parameter up to 600 Hz

Thermal connections of the CJC thermistors

Configuration	Thermal connection with the following terminals	
	CJC1	CJC2
only channels 0 ... 3	5	12
only channels 4 ... 7	21	29
all channels 0 ... 7	5	29

mV measurement

- -40 mV ... +100 V difference measurements
- Lead break monitoring via the internal bus to the control system and red flashing fault LEDs for each channel
- Input filter cut-off frequency can be set by parameter up to 600 Hz
  - 1 power supply channel for 5 modules
  - The module must be powered via the intrinsically safe power supplies RSD2-PSD2-Ex4.34 or RSA6-PSD-Ex4.34

In order to achieve the EMC protection class, screened power lines and screens for the individual channels must be used. The electric strength of the wire insulation must be $\geq$ 500 V.

Measuring ranges

Temperature sensor

Sensor type	T_{min} [°C]	T_{max} [°C]
Pt100-E	-200	870
Pt200-E	-200	400
Pt100-A	-200	630
Pt200-A	-200	400
Ni100	-60	250
Ni200	-60	200
N120	-80	320
Cu10	-200	260

Thermocouples

Sensor type	T_{min} [°C]	T_{max} [°C]
B	300	1800
E	-250	1000
J	-210	1200
K	-250	1372
L	-200	800
N	-250	1300
R	-50	1768
S	-50	1768
T	-250	400

mV signal

Sensor type	U_{min} [mV]	U_{max} [mV]
mV	-40	100

Resistance

Sensor type	R_{min} [Ω]	R_{max} [Ω]
Ω	0	500

Transfer characteristics, accuracy and temperature

Type thermocouple	Accuracy in the specified range			Temperature drift in the specified range			
	Range [°C]		Accuracy [% of range] at T_u = 23 °C	Range I [°C]	Drift [ppm/°C]	Range II [°C]	Drift [ppm/°C]
Type B (without LB)	300 ... 1800		0.1	900 ... 1800	100	300 ... 899	300
Type B (with LB)	600 ... 1800	1)	0.2	900 ... 1800	100	300 ... 899	300
Type E	-270 ... 1000		0.1	-200 ... 1000	100	-250 ... -201	250
Type J	-210 ... 1200		0.1	-210 ... 1200	100	-	
Type K	-220 ... 1372	1)	0.1	-170 ... 1372	100	-250 ... -171	250
Type L	-200 ... 800		0.1	-180 ... 800	100	-200 ... -181	150
Type N	-220 ... 1300	1)	0.1	-180 ... 1300	100	-250 ... -181	350
Type R	-50 ... 1768		0.1	0 ... 1768	100	-50 ... -1	150
Type S	-50 ... 1768		0.1	0 ... 1768	100	-50 ... -1	150
Type T	-240 ... 400	1)	0.1	-170 ... 400	100	-250 ... -171	600

1) Values from the rest of the range on request

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Type RTD	Accuracy in the specified range		Temperature drift in the specified range	
	Range [°C]	Accuracy [% of range] at T_u = 23 °C	Range I [°C]	Drift [ppm/°C]
Pt100 IEC	-200 ... 870	0.1	-200 ... 870	100
Pt200 IEC	-200 ... 400	0.1	-200 ... 400	100
Pt100 JIS	-200 ... 630	0.1	-200 ... 630	100
Pt200 JIS	-200 ... 400	0.1	-200 ... 400	100
Ni100	-60 ... 250	0.1	-60 ... 250	100
Ni200	-60 ... 200	0.1	-60 ... 200	100
Ni120	-80 ... 320	0.1	-80 ... 320	100
Cu10	-200 ... 260	0.2	-200 ... 260	400

Type other	Accuracy in the specified range		Temperature drift in the specified range	
	Range [°C]	Accuracy [% of range] at T_u = 23 °C	Range I [°C]	Drift [ppm/°C]
mV	-40 ... 100 mV	0.1	-40 ... 100 mV	100
Ω	0 ... 500 Ω	0.2	0 ... 500 Ω	100

Status and configuration

Alarm for measuring overrange	1 status bit for each channel
Lead break alarm	1 status bit for each channel
Error handling	Individually for each channel (incl. exceeding measurement range + lead break)
Measurement mode: RTD, thermocouples, mV, Ohm	Common for groups of 4 channels (ch0 ... ch3, ch4 ... ch7)
Sensor type (thermocouples type B, E, J ... or RTD with 2-, 3- or 4-lead connection	Common for groups of 4 channels (ch0 ... ch3, ch4 ... ch7)
External reference element (thermocouple)	Common for all thermocouple channels (select from 0 °C, 20 °C, 25 °C, 30 °C, 40 °C, 50 °C, 60 °C, 70 °C)