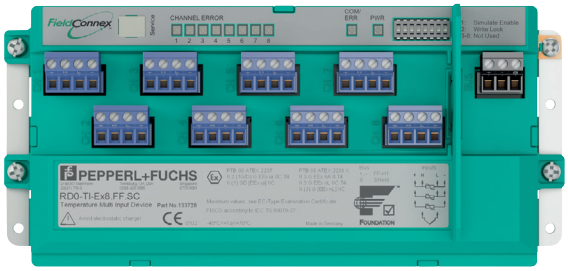
Features

- For eight temperature or analog sensors
- Installation in Zone 1...2/Div. 2, intrinsically safe
- Sensors in Zone 0/Div. 1
- Connection to fieldbus acc. to FISCO or Entity
- For FOUNDATION Fieldbus H1
- DCS integration via device description and function blocks
- Concentrator method for simplified configuration
- Monitors sensor condition
- For T/C, RTD 2-, 3-, 4-wire, voltage and resistance
- Cold junction compensation
- Removable terminals

Assembly



Function

The Temperature Multi-Input (TM-I) for DIN rail installation connects up to 8 analog inputs to the DCS via fieldbus. It is installed in a typically pre-wired field enclosure close to the sensors in the hazardous area. The TM-I is certified intrinsically safe and as associated apparatus: inputs are intrinsically safe even when the fieldbus connection is not. Analog inputs can be resistance temperature sensors with 2, 3, and 4 wires, measuring sensors, thermocouples, or millivolt signals.

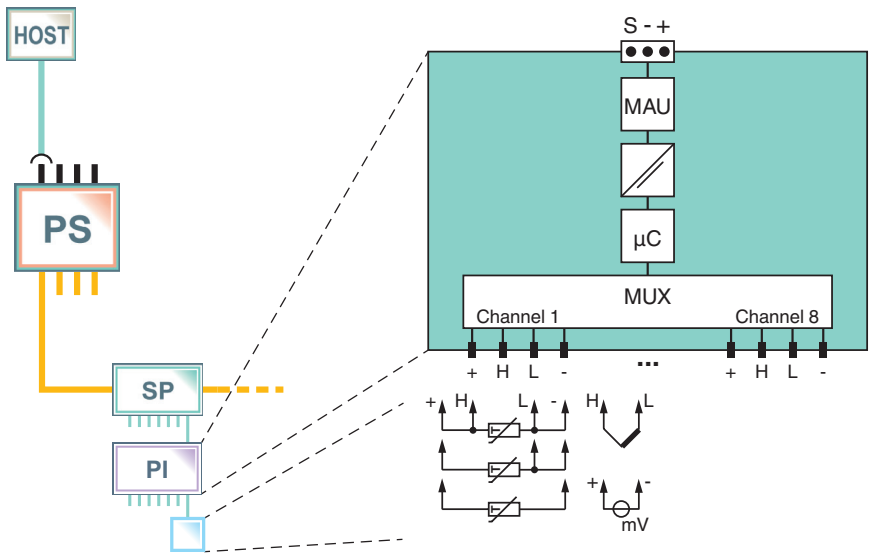
The TM-I communicates all data, configuration, and alarms via one fieldbus address and function blocks (8xAI or 1xMAI) to the DCS. For simplified configuration it supports the concentrator method: inputs can be configured all at once or individually. Fieldbus powers the sensors and the temperature interface itself, additional power or wiring is not required.

Cold junction compensation for thermocouples is integrated. The TM-I detects and reports lead breakage and short circuit conditions.

FOUNDATION

FieldConnex®

Connection



Zone 1

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Fieldbus interface	
Fieldbus type	FOUNDATION Fieldbus
Physical layer profile	profile type 511 (FISCO), profile type 111 (Entity)
ITK version	4.51
Implementation	resource block1x RS function block8x AI, 1x MAI transducer block8x sensor TB, 1x concentrator TB
Execution time	AI, MAI 40 ms max.
Macro cycle	typical for one device 8xAI or 1xMAI ≤ 500 ms
Firmware update	via separate plug connection
FDE (Fault Disconnect Equipment)	6.7 mA
Polarity	not polarity sensitive
Rated voltage	9 ... 32 V
Rated current	≤ 23 mA
Indicators/operating means	
LED PWR	green: on, bus voltage existent
LED COM ERR	red: continuous lightning: hardware error; 2 Hz flashing: no bus activities or bus fault; off: no error
LED CHANNEL ERROR	red: 2 Hz flashing: lead breakage, overrange; off: no error
Input	
Number	8
Sensor types	see table 1
Grounding	grounding of thermoelements possible
Error detection	lead breakage, wiring error, hardware device error
Common mode voltage	Input to Input 600 V_{peak}
Transfer characteristics	
Deviation	
Cold junction compensation	± 0.5 °C (32.9 °F)
Resolution/accuracy	see table 2
Linearization	T/C input 0.1°C RTD input 0.03°C
Internal measurement cycle	for all sensor types ≤ 1 s
Electrical isolation	
Fieldbus/inputs	safe galvanic isolation acc. to EN 60079-11, voltage peak value 375 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Fieldbus standard	IEC 61158-2
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F) hazardous area -40 ... 85 °C (-40 ... 185 °F) safe area
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g
Vibration resistance	5 g , 10 ... 150 Hz
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug-in terminals
Core cross-section	
Bus	up to 2.5 mm^2
Inputs	up to 2.5 mm^2
Housing material	Polycarbonate
Protection degree	IP20
Mass	360 g
Mounting	mounting on DIN rail in cabinet
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 03 ATEX 2237
Group, category, type of protection, temperature class	⟨Ex⟩ II 2(1G/D) G Ex ia IIC T4 , ⟨Ex⟩ II (1)GD [Ex ia] IIC
Bus	FISCO see EC-Type Examination Certificate

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Inputs	see EC-Type Examination Certificate
Statement of conformity	PTB 03 ATEX 2238 X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex nA II T4 , Ⓔx II 3G Ex nL IIC T4 , Ⓔx II (3)G [Ex nL] IIC
Electrical isolation	
Bus	see Statement of Conformity
Input	see EC-Type Examination Certificate
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006 , EN 60079-11:2007 , EN 60079-15:2005 , EN 60079-27:2006
General information	
Supplementary information	EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com.

Type code/order designation

Type Code	Description
RD0-TI-Ex8.FF.ST	Fieldbus temperature interface with 8 inputs with screw terminals without field housing for mounting on DIN rail in cabinet
RD0-TI-Ex8.FF.SC	Fieldbus temperature interface with 8 inputs with spring terminals without field housing for mounting on DIN rail in cabinet

Dimensions

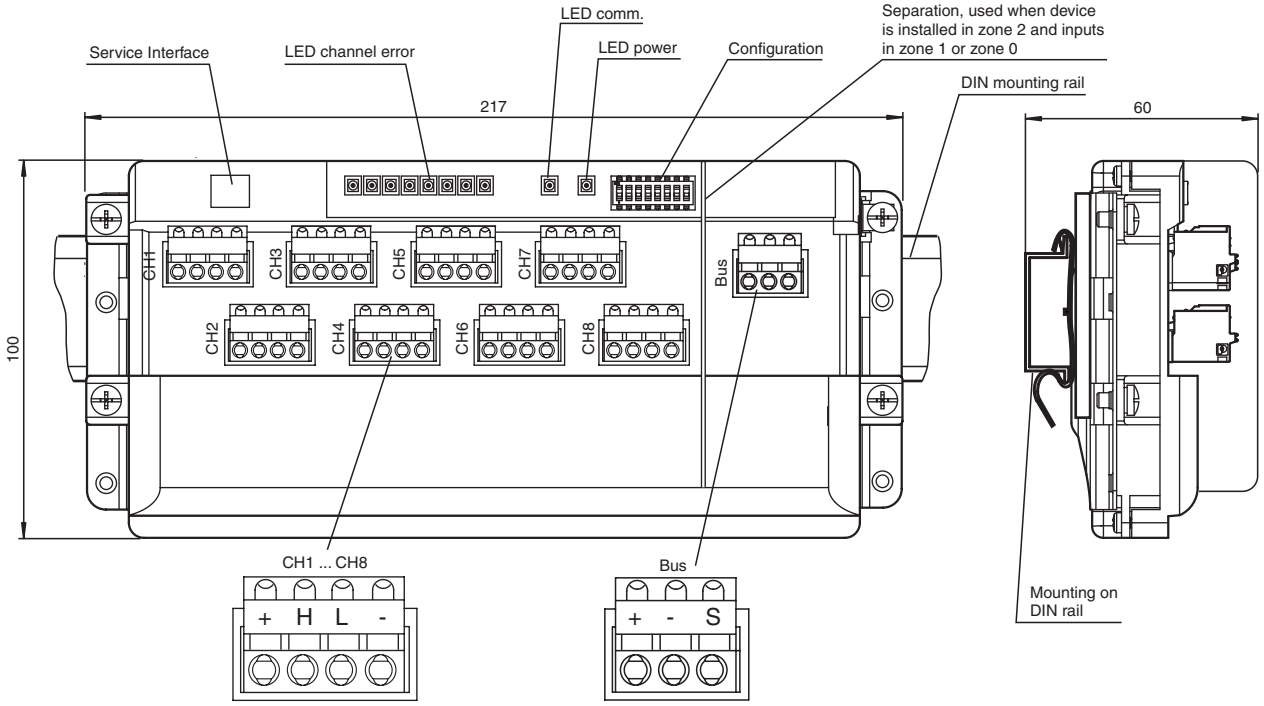

Figure 1: RD0-TI-Ex8.FF.SC

Installation note

see manual

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Additional information

Table 1: Sensor types

Thermocouple			
Type	**Standard**	**Range (°C)**	**Range (°F)**
B	EN 60584-1	300 ... 1800	572 ... 3272
E	EN 60584-1	-200 ... 1000	-328 ... 1832
J	EN 60584-1	-200 ... 1000	-328 ... 1832
K	EN 60584-1	-200 ... 1372	-328 ... 2502
N	EN 60584-1	-200 ... 1300	-328 ... 2372
R	EN 60584-1	0 ... 1768	-32 ... 3214
S	EN 60584-1	0 ... 1768	-32 ... 3214
T	EN 60584-1	-200 ... 400	-328 ... 752
W5Re/ W26Re	ASTM 988-96	0 ... 2000	-32 ... 3632

Input voltage	
Type	**Range (mV)**
Range 1	-100 ... 150

RTD			
Type	**Standard**	**Range (°C)**	**Range (°F)**
Pt50	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt100	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt100	JIS C 1604-1989	-200 ... 630	-328 ... 1166
Pt200	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt500	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt1000	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Ni100	DIN 43760-1987	-60 ... 250	-76 ... 482
Ni120	Minco standard	-80 ... 320	-112 ... 608
Ni200	DIN 43760-1987	-60 ... 250	-76 ... 482
Cu10	SAMA RC21-4-1966	-70 ... 150	-94 ... 302

Resistance input	
Type	**Range (Ohm)**
Range 1	0 ... 650
Range 2	0 ... 1300
Range 3	0 ... 2600
Range 4	0 ... 5200

Table 2: Accuracy

Thermocouple				
Type	**Range (°C)**	**Range (°F)**	**Accuracy**	
			(°C)	**(°F)**
B	300 ... 600 600 ... 1200 1200 ... 1800	572 ... 1112 1112 ... 2192 2192 ... 3272	± 3.32 ± 1.77 ± 1.08	± 5.98 ± 3.19 ± 1.94
E	-200 ... -50 -50 ... 1000	-328 ... -58 -58 ... 1832	± 0.42 ± 0.31	± 0.76 ± 0.56
J	-200 ... 0 0 ... 1000	-328 ... 32 32 ... 1832	± 0.48 ± 0.31	± 0.86 ± 0.56
K	-200 ... 0 0 ... 1372	-328 ... 32 32 ... 2502	± 0.68 ± 0.43	± 1.22 ± 0.77
N	-200 ... -100 -100 ... 500 500 ... 1300	-328 ... -148 -148 ... 932 932 ... 2372	± 1.03 ± 0.54 ± 0.39	± 1.85 ± 0.97 ± 0.70
R	0 ... 350 350 ... 1768	32 ... 662 662 ... 3214	± 1.93 ± 1.16	± 3.47 ± 2.09

Table 2: Accuracy

Thermocouple				
Type	**Range (°C)**	**Range (°F)**	**Accuracy**	
			(°C)	**(°F)**
Pt200	± 0.33		± 0.59	
Pt500	± 0.31		± 0.56	
Pt1000	± 0.31		± 0.56	
Ni100	± 0.18		± 0.32	
Ni120	± 0.18		± 0.32	
Ni200	± 0.18		± 0.32	
Cu10	± 2.99		± 5.38	

Resistance input	
Type	**Accuracy (mOhm)**
Range 1	± 115
Range 2	± 230
Range 3	± 460
Range 4	± 920

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Table 3: Temperature influence

Thermocouple			
Type	**Range (°C)**	**Range (°F)**	**Deviation (°C/K)**
B	300 ... 600 600 ... 1200 1200 ... 1800	572 ... 1112 1112 ... 2192 2192 ... 3272	± 0.0060 ± 0.0131 ± 0.0242
E	-200 ... -50 -50 ... 200 200 ... 1000	-328 ... -58 -58 ... 392 392 ... 1832	± 0.0070 ± 0.0036 ± 0.0203
J	-200 ... 0 0 ... 200 200 ... 1000	-328 ... 32 32 ... 392 392 ... 1832	± 0.0072 ± 0.0039 ± 0.0243
K	-200 ... 0 0 ... 500 500 ... 1372	-328 ... 32 32 ... 932 932 ... 2502	± 0.0077 ± 0.0097 ± 0.0323
N	-200 ... -100 -100 ... 500 500 ... 1300	-328 ... -148 -148 ... 932 932 ... 2372	± 0.0080 ± 0.0088 ± 0.0264
R	0 ... 350 350 ... 800 800 ... 1768	32 ... 662 662 ... 1472 1472 ... 3214	± 0.0057 ± 0.0129 ± 0.0338
S	0 ... 550 550 ... 800 800 ... 1768	32 ... 1022 1022 ... 1472 1472 ... 3214	± 0.0094 ± 0.0135 ± 0.0355
T	-200 ... -50 -50 ... 200 200 ... 400	-328 ... -58 -58 ... 392 392 ... 752	± 0.0071 ± 0.0035 ± 0.0067
W5Re/ W26Re	0 ... 800 800 ... 2000	-32 ... 1472 1472 ... 3632	± 0.0151 ± 0.0552

Input voltage	
Type	**Deviation (µV/K)**
Range 1	± 2

RTD	
Type	**Deviation (°C/K)**
Pt50	± 0.010
Pt100	± 0.010
Pt100 JIS	± 0.010
Pt200	± 0.010
Pt500	± 0.010
Pt1000	± 0.010
Ni100	± 0.010
Ni120	± 0.010
Ni200	± 0.010
Cu10	± 0.010

Resistance input	
Type	**Deviation (mOhm/K)**
Range 1	± 6
Range 2	± 6
Range 3	± 13
Range 4	± 26

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