

Robust analog temperature transmitter

Characteristics (standard)



Input: RTD Pt100 (2-, 3-wire) / thermocouple type T, J, K, S
 Output: current loop 4...20 mA
 Measuring deviation: $\pm 0,5\%$ of measuring span
 Linearity error: $\pm 0,1\%$ of measuring span
 Supply: 10...30 V (out of current loop)
 Measuring ranges: selectable with solder bridges
 Adjustment: with potentiometer
 Mounting: B head / top hat rail with adaptor

Characteristics (EEx)



Certificate: II 1G EEx ia IIB / ii C T4 / T5 / T6
 Input: RTD Pt100 (2-, 3-wire)
 Output: current loop 4...20 mA
 Measuring deviation: $\pm 0,2\%$ of measuring span
 Linearity error: $\pm 0,1\%$ of measuring span
 Supply: 10...30 V (out of current loop)
 Measuring ranges: configurable with Windows PC
 Mounting: B-head / enclosure with degree of protection IP20 or better

Technical data

Input

Ranges selectable: with solder bridges / TR7...: with Windows PC
 Resistance thermometer (DIN EN 60751)
 TR1...: RTD Pt100 (2- / 3-wire) -50...+200 °C
 Ranges: -50...+50 / 0...50 / ...100 / ...120 / ...150 / ...200 °C
 TR2...: RTD Pt100 (2- / 3-wire) -50...+400 °C
 Ranges: -50...+200 / 0...200 / ...250 / ...300 / ...350 / ...400 °C
 TR7...: RTD Pt100 (2- / 3-wire) -150...+850 °C maximum (EEx)
 Thermocouple (DIN EN 60584)
 TR3...: type T (-100...+400 °C)
 Ranges: -100...+200 / ...+300 / 0...400 °C
 TR4...: type J (0...700 °C) Ranges: 0...350 / ...550 / ...700 °C
 TR5...: type K (0...1200 °C) Ranges: 0...300 / ...600 / ...1200 °C
 TR6...: type S (0...1500 °C)
 Other ranges TR1... - TR6...: on request (not configurable)
 Adjustment range:
 Zero potentiometer: TR1...: approx. $\pm 10^\circ\text{C}$ / TR2...: $\pm 25^\circ\text{C}$
 TR3... - TR6...: approx. $\pm 40^\circ\text{C}$
 Span potentiometer: TR1... - TR6...: approx. 10%
 Measuring span TR7...: minimum 20 K
 Start of measuring range TR7...: -150...+150 °C (configurable)
 End of measuring range TR7...: see page 2 (configurable)
 Sensor current: TR1... / TR2...: approx. 0,8 mA
 TR7...: approx. 0,5 mA
 Cold junction compensation for TR3... - TR6...
 Maximum lead resistance:
 TR1... / TR2... / TR7...: 30 ohms each lead, 3-lead symmetric
 TR3... - TR6...: 500 ohms total resistance
 Effect connection leads: TR1... - TR6...: $\pm 0,2\text{K} / 10$ ohms
 For TR1... / TR2...: with 3-wire lead connection only, for 2-wire lead connection lead resistance counts fully towards error.
 For TR7...: additional compensation up to 20 ohms total lead resistance with 2-wire circuit.

Output:

Analogue: 4...20 mA (2-wire design)
 Measuring deviation: TR1... - TR6...: $\pm 0,5\%$ / TR7...: $\pm 0,2\%$
 For TR1... - TR6...: with factory configured measuring range
 For TR7...: measuring span <50 K: additional 0,1 K
 measuring span >50 K: additional 0,1%
 Values are valid at 23 °C ± 5 K (according DIN EN 60770)
 Linearization: temperature according DIN EN 60751
 TC: proportional to voltage
 $\pm 0,1\%$ (RTD)
 Linearity error: TR1... - TR6...: $\pm 0,15\%$ for range 0...50 / ...300 / .. 350 °C
 TR7...: $\pm 0,2\%$ when start of measuring range <0 °C
 $\pm 0,2\%$ for measuring span >800 K
 Amplification error: $\pm 0,1\%$ (TC)
 Temperature coefficient zero:
 TR1..., TR2...: $\pm 0,1\%$ / 10K, $\pm 0,2\text{K} / 10\text{K}$
 TR7...: $\pm 0,1\%$ / 10K, $\pm 0,15\text{K} / 10\text{K}$
 TR3... - TR6...: $\pm 0,1\%$ / 10K, $\pm 25\mu\text{V} / 10\text{K}$
 Greater value is valid.
 Temperature coefficient gain:
 TR1... - TR6...: $\pm 0,2\%$ / 10K TR7...: $\pm 0,15\%$ / 10K
 Error effect of cold junction compensation:
 TR3... - TR6...: at Ta -20...+60 °C: $\pm 1,0\text{K}$
 at Ta -40...+85 °C: $\pm 2,0\text{K}$
 Rising time t90: <1ms
 Switch-on delay: <10ms (electric)
 Signalling with sensor burnout
 TR1... / TR2...: down scale <3 mA
 up scale, in case only lead no.1 open
 TR3... - TR6...: up scale, >23,5 mA
 TR7...: NAMUR down scale <3,6 mA
 NAMUR up scale >23,5 mA

Applications

The transmitter is for use in plant engineering, power engineering and heating-, cooling-, ventilating-, air conditioning technics. With the possibility of programming a matching to the requirements is possible.

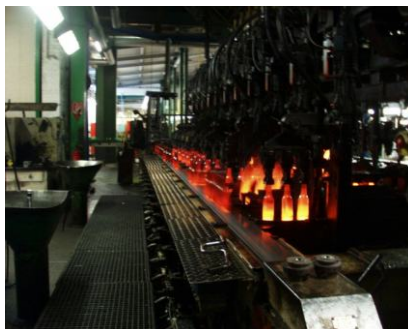


photo: www.pixelquelle.de

Ordering code

T	R	X	X	X	X	X	X	-	X	X	X
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Input:	RTD Pt100 (range -50...+200°C)	1									
	RTD Pt100 (range -50...+400°C)	2									
	TC type T	3									
	TC type J	4									
	TC type K	5									
	TC type S	6									
	RTD Pt100 (-150...+850 °C) EEx model*	7									
Output:	4...20 mA (current loop)		1								
Supply:	10...30 VDC (out of current loop)									1	
Linearity error:	0,1% of measuring span										1
Enclosure:	standard enclosure head mounting										1
	standard enclosure with adaptor foe top hat rail										2
EEx certificate:	without										1
	II 1G Eex ia IIB / IIC T4 / T5 / T6										2
Adjustment of range:	adjusted (please indicate)**										1
	not adjusted (factory-set)***										2
Other / accessories:	special model (please indicate)										0

*Ranges: -150...+380 up to +850 / -100...+180 up to +850 / -50...-20 up to +850 / -40...-20 up to +850 / 0...+20 up to +850 / +10...+30 up to +850 / +20...+50 up to +850 / +50...+230 up to +850 / +100...+530 up to +850 / +150...+830 up to +850

**the possibilities of the technical data can be selected. In case of not given values the details of factory-set are used.

***TR1... - TR6...: without adjustment / TR7...: 3-wire, 0...150 °C, signalling down scale <3,6 mA

Technical data (continued)

Output (continued)

Signalling with sensor short circuit
 TR1... / TR2...: down scale, <3 mA
 TR7...: NAMUR down scale <3,6 mA (typical 3 mA)
 Temperature value in case of short circuit between leads no.2 and no.3 (operation of Pt100 in 2-lead connection)
 Load: TR1... - TR6...: $R_a < (U_B - 10 \text{ V}) / 0,02 \text{ A}$
 TR7...: $R_a < (U_B - 10 \text{ V}) / 0,022 \text{ A}$
 Load effect: $\pm 0,05\% / 100 \text{ ohms}$
 Power supply effect: $\pm 0,025\% / \text{V}$

Ambient conditions

Operating temperature: -40...+85°C
 Storage temperature: -40...+85°C
 Climate class: Cx (-40...+85°C, 5% up to 95% relative humidity) DIN EN 60654-1
 Humidity maximum: TR1...-TR6...: 95% rF noncondensing
 TR7...: 100% rF condensing allowed
 Vibration: TR1...-TR6...: 10...2000 Hz 5g DIN IEC 68-2-6
 TR7...: 10...2000 Hz 10g DIN EN 60068-2-6
 Shock: DIN IEC 68-2-27 (TR7...: DIN EN 60 068-2-27)
 Salty mist (TR7...): DIN EN 60 068-2-11
 EMV: according DIN EN 61326-1
 TR7...: according 89/336/EWG DIN EN 61 326:2002

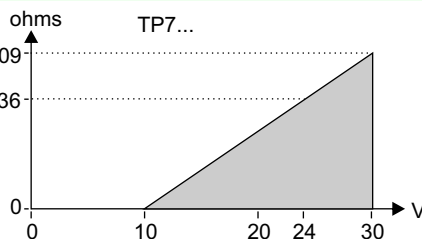
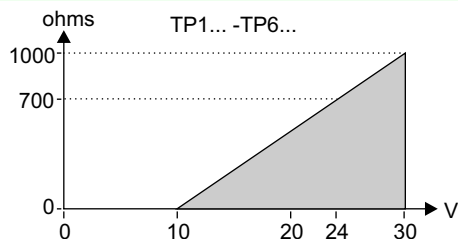
Supply

Voltage: 10...30 VDC out of current loop 4...20 mA
 Reverse polarity: existing
 Residual ripple (TR7...): 10% maximum at 24 V / load 300 Ohm

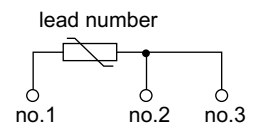
Mechanics

Enclosure: for head mounting
 Material: polyamide, glass fibre reinforced
 TR7...: Kunststoff PTB, glass fibre reinforced
 Protection: TR1...-TR6...: enclosure IP40 (IEC 529 / EN 60 529)
 terminals IP00 (IEC 529 / EN 60 529)
 TR7...: enclosure IP66/67 (IEC 529 / EN 60 529)
 terminas IP00 (IEC 529 / EN 60 529)
 Cross section of terminals: 0,14...1,5 mm²
 Weight: TR1...-TR6...: approx. 30 g
 TR7...: approx. 40 g
 Dimensions: $\varnothing 43 \times 20/21 \text{ mm}$

Load diagram, Legend of lead number



The permissible load is dependent upon the loop power supply voltage



Connection, dimensions (in mm)

