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Technical information

iTEMP® Pt100 TMT127

Pt100 Temperature Transmitter for DIN rail mounting



Application

- Temperature transmitter with fixed measuring range for converting a Pt100 input signal into an analogue, scalable 4 to 20 mA output signal

Features and benefits

- Fixed measuring range for Pt100
- Two-wire technology, 4 to 20 mA analogue output
- High accuracy in complete ambient temperature range
- Failure information when sensor breaks or short-circuits as per NAMUR NE 43
- EMC as per NAMUR NE 21, CE
- Ex approval
  - ATEX EEx ia, nA
  - CSA IS, NI
  - CSA GP
  - FM IS, NI
- GL Germanische Lloyd / marine approval
- UL recognized component
- Galvanic isolation

TI095R/09/en
No. 51004790

Endress+Hauser
People for Process Automation

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Function and system design

Measuring principle

Electronic acquisition and conversion of input signals in industrial temperature measurement.

Measuring system

The iTEMP® Pt100 TMT127 DIN rail temperature transmitter is a 2-wire transmitter with analogue output, measuring input for Pt100 in 2, 3, or 4-wire connection.

Input values

Measured variable

Temperature

Measuring range

Depending on the application, different measuring ranges can be ordered (see 'Product structure').

Input type

Input	Designation	Measuring range limits	Min. span
Resistance thermometer (RTD)	Pt100 as per IEC 60751	-200 to 850 °C (-328 to 1562 °F)	10 K
	■ Type of connection: 2, 3 or 4-wire connection ■ Cable resistance: sensor cable resistance of max. 40 Ω per cable ■ Sensor current: ≤ 0.6 mA		

Output values

Output signal

Analogue 4 to 20 mA

Signal on alarm

- Undershooting measuring range:
  linear decrease to 3.8 mA
- Exceeding measuring range:
  linear increase to 20.5 mA
- Sensor break; Sensor short-circuit:
  ≥ 21.0 mA (failure signal is guaranteed > 21.5 mA)

Load

Max. ($V_{Power\ supply}$ - 12V) / 0.022 A (current output)

Linearisation/transmission behaviour

Temperature linear

Galvanic isolation

U = 2 kV AC (input/output)

Induced current requirement

≤ 3.5 mA

Current limitation

≤ 23 mA

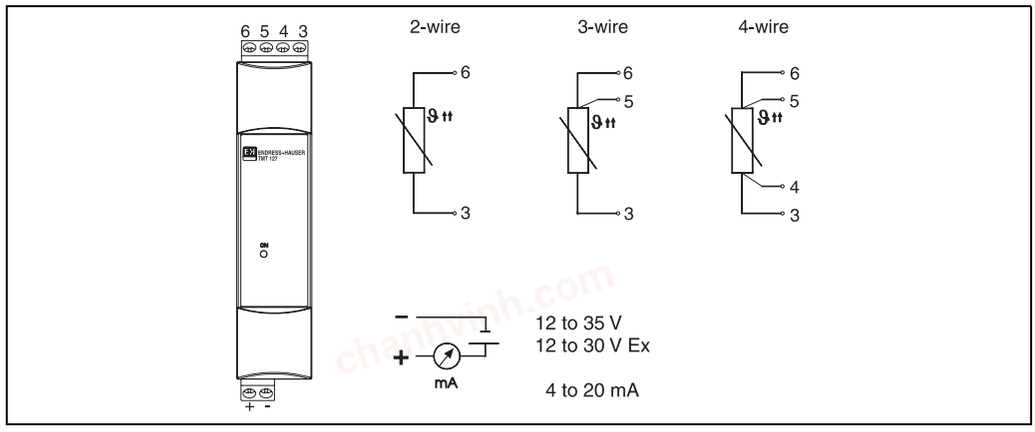
Switch-on delay

4 s (during switch-on procedure I_a = 3.8 mA)

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Power supply

Electrical connection



Temperature transmitter terminal assignment

Supply voltage

U_b= 12 to 35 V, reverse polarity protection

Residual ripple

Permitted residual ripple $U_{ss} \leq 3$ V at $U_b \geq 15$ V, $f_{max.} = 1$ kHz

Accuracy

Response time

1 s

Reference operating conditions

Calibration temperature: +25 °C (77 °F) ± 5 K (9 °F)

Measuring error

	Designation	Accuracy[1]
Resistance thermometer RTD	Pt100	0.2 K (0.36 °F) or 0.08%

1) % refer to the set span. The highest value is valid.

Influence of supply voltage

- ≤ ±0.01%/V deviation from 24 V
  Percentages refer to the full scale value.

Influence of ambient temperature (temperature drift)

- Pt100 resistance thermometer:
  T_d= ±(15 ppm/K * (full scale value + 200) + 50 ppm/K * of set measuring range) * Δ ϑ

Δ ϑ = deviation of ambient temperature from the reference operating condition.

Influence of load

- ± 0.02%/100 Ω
  Values refer to the full scale value

Long term stability

- ≤ 0.1 K/year or ≤ 0.05%/year
  Values under reference operating conditions. % refer to the set span. The highest value is valid.

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Installation conditions

Installation instructions

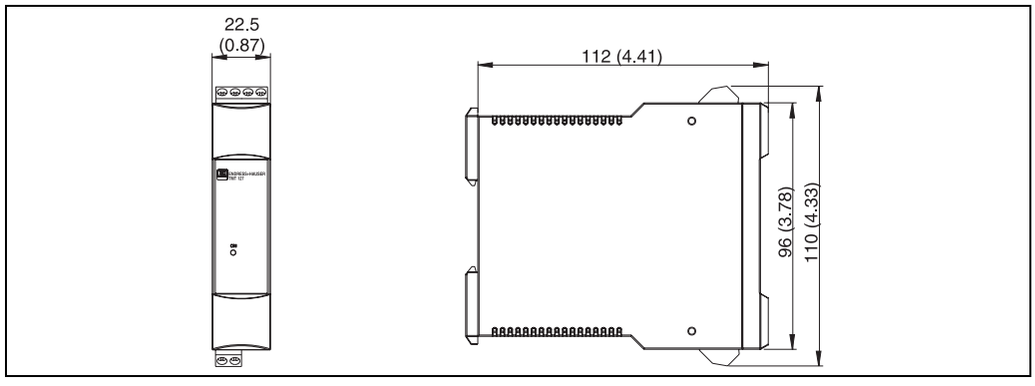
Installation location
No restrictions

Environmental conditions

Ambient temperature limits	-40 to +85 °C (-40 to 185 °F) for Ex-area, see Ex-certificate
Storage temperature	-40 to +100 °C (-40 to 212 °F)
Climate class	as per IEC 60654-1, class C
Ingress protection	IP 20
Shock resistance	4g / 2 to 150 Hz as per IEC 60068-2-6
Vibration resistance	see “Shock resistance“
Electromagnetic compatibility (EMC)	Shock resistance and interference emission as per EN 61326-1 (IEC 61326) and NAMUR NE 21
Condensation	permitted

Mechanical construction

Design, dimensions



Values in mm (inch)

Weight	approx. 90 g (3.18 oz)
Materials	Housing: PC/ABS, UL 94V0
Terminals	Pluggable screw terminal, max. 2.5 mm^2 (0.0039 in^2) solid, or strand with wire end sleeve

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Display and operating system

Display elements

Illuminated yellow LED (2 mm, 0.08 in) signals device operation.

Operating elements

There are no operating elements available on the device.

Certificates and approvals

CE-Mark

The device meets the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

Hazardous area approvals

For further details on the available Ex versions (ATEX, CSA, FM, etc.), please contact your nearest E+H sales organisation. All relevant data for hazardous areas can be found in separate Ex documentation. If required, please request copies from us or your E+H sales organisation.

GL

Ship building approval (Germanischer Lloyd)

Other standards and guidelines

- IEC 60529:
  Degree of protection provided by housing (IP-Code)
- IEC 61010:
  Safety requirements for electrical measurement, control and laboratory use.
- IEC 61326:
  Electromagnetic compatibility (EMC requirements)
- NAMUR
  Standards working group for measurement and control technology in the chemical industry. (www.namur.de)

UL

Recognized component to UL 3111-1

Ordering information

Product structure

TMT127	iTEMP Pt100 TMT127
	for temperature measurement with Pt100; Analog output 4 to 20 mA, 2-wire techn.; Galv. isol., fail. mode to NAMUR NE 43; 22.5 mm wide, for 35 mm top hat DIN rail according to IEC 60715; UL recognized, ship building approval GL

	Approval
A	Non hazardous areas
B	ATEX II2(1)G EEx ia IIC T4/T5/T6
C	FM IS, NI, Class I, Div. 1+2, Group ABCD
D	CSA IS, NI, Class I, Div. 1+2, Group ABCD
E	ATEX II3G EEx nA IIC T4/T5/T6
I	FM+CSA IS, NI, Class I, Div. 1+2, Group ABCD
J	CSA General Purpose

	Terminal Type
2	RTD 2-wire
3	RTD 3-wire
4	RTD 4-wire

	Temperature sensor
1	Pt100 (-200 to 850 °C, -328 to 1562 °F, min. span 10 K)

	Measuring Range
BA	-50 to 100 °C (-58 to 212 °F)
CA	-40 to 60 °C (-40 to 140 °F)
DA	-30 to 60 °C (-22 to 140 °F)
DB	-30 to 150 °C (-22 to 302 °F)
DC	-30 to 70 °C (-22 to 158 °F)
DE	-10 to 200 °C (14 to 392 °F)
EA	-20 to 20 °C (-4 to 68 °F)
EB	-20 to 60 °C (-4 to 140 °F)

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				Measuring Range		
				EC	-20 to 70 °C (-4 to 158 °F)	
				ED	-20 to 80 °C (-4 to 176 °F)	
				EN	-10 to 40 °C (14 to 104 °F)	
				FC	0 to 50 °C (32 to 122 °F)	
				FE	0 to 100 °C (32 to 212 °F)	
				FG	0 to 150 °C (32 to 302 °F)	
				FH	0 to 200 °C (32 to 392 °F)	
				FI	0 to 250 °C (32 to 482 °F)	
				FJ	0 to 300 °C (32 to 575 °F)	
				FK	0 to 400 °C (32 to 752 °F)	
				FL	0 to 500 °C (32 to 932 °F)	
				FN	0 to 600 °C (32 to 1112 °F)	
				FO	0 to 160 °C (32 to 320 °F)	
				LA	-40 to 140 °F	
				LB	-40 to 200 °F	
				MA	-20 to 400 °F	
				NA	0 to 100 °F	
				NB	0 to 200 °F	
				NC	0 to 300 °F	
				ND	0 to 500 °F	
				NE	0 to 750 °F	
				NF	0 to 900 °F	
				NH	0 to 1200 °F	
				OA	40 to 90 °C (104 to 194 °F)	

					Additional Option	
					A	Basic version
					B	Works calibration certificate (6 test points)
					K	Standard model, North American region
TMT127			1			⇒ Order code (complete)

Accessories

No accessories are required for this device.

Documentation

- ❑ Brochure 'Temperature measurement' (FA006T/09/en)
- ❑ Short operating manual "iTEMP® RTD/TC DIN rail TMT 127/128" (KA140R/09/a3)
- ❑ ATEX Safety instructions II2(1)G (XA013R/09/a3) and II3G (XA018R/09/a3)

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