

The T31 programmable RTD temperature transmitter is a 2-wire transmitter with an analog output. It has measurement input for Pt100 and Pt1000 resistance thermometers (RTD) in 2-, 3- or 4-wire connections. Setting up of the transmitter is done using the communication cable. These transmitters can be mounted in Pyromation connection heads or they can be surface mounted by using a 35 mm DIN-rail mounting clip.

TEMPERATURE HEAD TRANSMITTER

Universal head transmitter for Pt100 and Pt1000 resistance thermometers (RTD), programmable using a PC, for installation in a sensor head.



Features and Benefits

- PC programmable temperature head transmitter for converting the resistance input signal into a scalable (4 to 20) mA analog output signal
- Platinum resistance thermometer (RTD)
- Online configuration using PC with communication cable
- Universally PC programmable for Pt100 and Pt1000 signals
- 2-wire technology, (4 to 20) mA analog output
- High accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit
- **CE** mark meets EMC Directive
- **UL** For use in ordinary locations for US and Canada meets 61010-1
- **Ex** For use in hazardous locations Ex ec IIC Gc Class I, Zone 2, AEx ec IIC Gc Class I, Division 2, Groups A, B, C, D
- All materials are RoHS compliant

ORDER CODES

Unconfigured Order Number: T31-00^[1]

Example Configured Order Number: **T 3 1** - **3 85 U** - **S (50-300) F**

1-0

CODE	DESCRIPTION
2	RTD (2-wire)
3	RTD (3-wire)
4	RTD (4-wire)

2-0

CODE	DESCRIPTION
85	100 ohm platinum ($\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$)
92	100 ohm platinum ($\alpha = 0.00392 \text{ } ^\circ\text{C}^{-1}$)
95	1000 ohm platinum ($\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$)

[1] Default setting for unconfigured transmitter is 4-wire Pt100 (0 -100) °C.



3-0

CODE	DESCRIPTION
U	Upscale Burnout $\geq 21.0 \text{ mA}$
D	Downscale Burnout $\leq 3.6 \text{ mA}$

4-0

RANGE
S (lower limit – upper limit)

5-0

CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

Accessories

CODE	DESCRIPTION
10303	Communication Cable
10307	35 mm DIN-rail mounting clip

Complete Specifications are listed in the T31 Manual available at www.pyromation.com/TechInfo/Docs/aspix or scan QR code



Resistance Thermometer Input (RTD)

AS PER STANDARD	DESIGNATION	MEASURING RANGE LIMITS	MIN. SPAN
IEC 60751	Pt100 ($\alpha = 0.00385 \text{ }^\circ\text{C}^{-1}$) Pt1000 ($\alpha = 0.00385 \text{ }^\circ\text{C}^{-1}$)	(-200 to 850) °C [-328 to 1562] °F (-200 to 250) °C [-328 to 482] °F	(10) °C [18] °F
JIS C1604:1984	Pt100	(-200 to 510) °C [-328 to 950] °F	(10) °C [18] °F
	Pt100 (Callendar van Dusen)	The measuring range limits are specified by entering the limit values that depend on the coefficients A to C and R0.	(10) °C [18] °F
<ul style="list-style-type: none"> Type of connection: 2-wire, 3-wire or 4-wire connection, sensor current: $\leq 0.3 \text{ mA}$ With 2-wire circuit, compensation of wire resistance possible (0 to 30 Ω) With 3-wire and 4-wire connection, sensor wire resistance up to max. 50 Ω per wire 			

Output

Analog Output Signal	4 to 20 mA, 20 to 4 mA (can be inverted)
Failure Information (per NAMUR NE43)	Failure information is created if the measuring information is missing or not valid. The error with the highest priority is displayed. Underranging: Linear drop from 4.0 to 3.8 mA OVERRANGING: Linear increase from 20.0 to 20.5 mA Failure e.g. sensor failure; sensor short circuit: $\leq 3.6 \text{ mA}$ ("Low") or $\geq 21 \text{ mA}$ ("High"), can be selected
Switch-on delay	$\leq 5 \text{ s}$, until the first valid measured value signal is present at the current output. While switch-on delay = $I_a \leq 3.8 \text{ mA}$

Power Supply

Supply Voltage	Values for non-hazardous areas, protected against polarity reversal: $10 \text{ V} \leq V_{cc} \leq 36 \text{ V}$ (standard)
Current Consumption	3.5 to 22.5 mA

Performance Characteristics

Response Time	$\leq 0.5 \text{ s}$																			
Reference operating conditions	Calibration temperature: $25 \text{ }^\circ\text{C} \pm 3 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F} \pm 5.4 \text{ }^\circ\text{F}$) • Supply voltage: 24 V DC • 4-wire circuit for resistance adjustment																			
Maximum measured error	In accordance with DIN EN 60770 and the reference conditions specified above. The measured error data correspond to $\pm 2 \sigma$ (Gaussian distribution). The data include non-linearities and repeatability. MV = measured value																			
Transmitter measured error	$\pm 0.015 \text{ }^\circ\text{C}$ or 0.07% of span (whichever is higher) The measured error data correspond to 2σ (Gaussian distribution)																			
Operating Influences	<table border="1"> <thead> <tr> <th>DESIGNATION</th> <th>STANDARD</th> <th>AMBIENT TEMPERATURE INFLUENCE (\pm) PER 1 °C (1.8 °F) CHANGE</th> <th>SUPPLY VOLTAGE INFLUENCE (\pm) PER V CHANGE</th> </tr> </thead> <tbody> <tr> <td>Pt100</td> <td rowspan="2">IEC 60751:2008</td> <td>(0.04) °C [0.07] °F</td> <td>(0.02) °C [0.04] °F</td> </tr> <tr> <td>Pt1000</td> <td>(0.02) °C [0.03] °F</td> <td>(0.01) °C [0.02] °F</td> </tr> <tr> <td>Pt100</td> <td>JIS C1604:1984</td> <td>(0.03) °C [0.05] °F</td> <td>(0.02) °C [0.03] °F</td> </tr> <tr> <td>Pt100</td> <td>GOST 6651-94</td> <td>(0.04) °C [0.07] °F</td> <td>(0.02) °C [0.04] °F</td> </tr> </tbody> </table>	DESIGNATION	STANDARD	AMBIENT TEMPERATURE INFLUENCE (\pm) PER 1 °C (1.8 °F) CHANGE	SUPPLY VOLTAGE INFLUENCE (\pm) PER V CHANGE	Pt100	IEC 60751:2008	(0.04) °C [0.07] °F	(0.02) °C [0.04] °F	Pt1000	(0.02) °C [0.03] °F	(0.01) °C [0.02] °F	Pt100	JIS C1604:1984	(0.03) °C [0.05] °F	(0.02) °C [0.03] °F	Pt100	GOST 6651-94	(0.04) °C [0.07] °F	(0.02) °C [0.04] °F
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Pt100	GOST 6651-94	(0.04) °C [0.07] °F	(0.02) °C [0.04] °F																	
Long Term Drift (\pm) (based on measured value, whichever is higher)	After 1 year	(0.05) °C or 0.03% of span																		
	After 3 years	(0.06) °C or 0.04% of span																		
	After 5 years	(0.07) °C or 0.05% of span																		
Calculation of the maximum measured error of the analog value (current output): $\sqrt{(\text{Measured error}^2 + \text{Influence of ambient temperature}^2 + \text{Influence of supply voltage}^2 + \text{Long Term Drift}^2)}$																				

Environment

Ambient temperature	(-40 to 85) °C [-40 to 185] °F
Storage temperature	(-50 to 100) °C [-58 to 212] °F
Climatic class	C1 according to IEC 60654-1
Humidity	Condensation Permitted • Max. rel. humidity: 95% as per IEC 60068-2-30
Shock and Vibration resistance	Vibration resistance as per DNVGL-CG-0339 : 2015 and DIN EN 60068-2-27 8.6 to 150 Hz at 3g Shock resistance as per KTA 3505
Electromagnetic Compatibility (EMC)	CE conformity Electromagnetic compatibility in accordance with all the relevant requirements of the IEC/EN 61326 series and NAMUR Recommendation EMC (NE21) Maximum measured error <1% of measuring range Interference immunity as per IEC/EN 61326 series, industrial requirements Interference emission as per IEC/EN 61326 series (CISPR 11), Class B, group 1 equipment

Mechanical Construction

Dimensions	<p>Top view dimensions: $\varnothing 0.28$ [7 mm], $\varnothing 0.20$ [$\varnothing 5$ mm], $\varnothing 1.30$ [33 mm], $\varnothing 1.72$ [44 mm]. Side view dimension: 1.05 [26.6 mm]. DIMENSIONS IN INCHES [mm]</p>
Weight	Approximately 44 g
Materials	Housing: Polycarbonate • Potting: Polyurethane
Terminals	16 AWG (maximum)

Terminal Connections

<p>Power supply and current output</p> <p>1 + (10 to 36) V dc 2 - (4 to 20) mA</p> <p>2-Wire: RED (6), WHITE (4)</p> <p>3-Wire: RED (6), RED (5), WHITE (4)</p> <p>4-Wire: RED (6), RED (5), WHITE (4), WHITE (3)</p>	<p>1+ 2- 3w 4w 5 6 SETUP SOCKET</p>
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