Configuration Code TM01
T31 Programmable
RTD Temperature Transmitter

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
- For use in ordinary locations for US and Canada meets 61010-1
- 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:

		1-0	2-0	3-0		4-0	5-0
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 (α = 0.003 85 ºC^{-1})
92	100 ohm platinum (α = 0.003 92 ºC^{-1})
95	1000 ohm platinum (α = 0.003 85 ºC^{-1})

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

3-0

CODE	DESCRIPTION
U	Upscale Burnout ≥ 21.0 mA
D	Downscale Burnout ≤ 3.6 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/aspx or scan QR code

Resistance Thermometer Input (RTD)

AS PER STANDARD	DESIGNATION	MEASURING RANGE LIMITS	MIN. SPAN
IEC 60751	Pt100 (α = 0.003 85 °C^{-1}) Pt1000 (α = 0.003 85 °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
	• Type of connection: 2-wire, 3-wire or 4-wire connection, sensor current: ≤ 0.3 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: ≤ 3.6 mA ("Low") or ≥ 21 mA ("High"), can be selected
Switch-on delay	≤ 5 s, until the first valid measured value singal is present at the current output. While switch-on delay = I_a ≤ 3.8 mA

Power Supply

Supply Voltage	Values for non-hazardous areas, protected against polarity reversal: 10 V ≤ Vcc ≤ 36 V (standard)
Current Consumption	3.5 to 22.5 mA

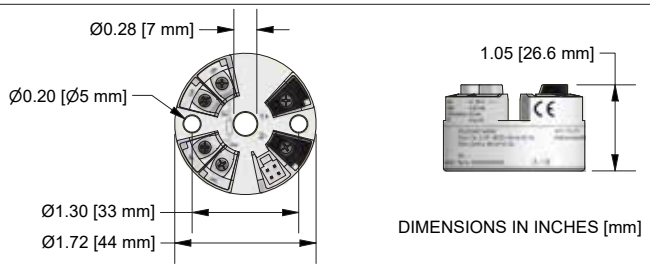
Performance Characteristics

Response Time	≤ 0.5 s			
Reference operating conditions	Calibration temperature: 25 °C ±3 °C (77 °F ±5.4 °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 ±2 σ (Gaussian distribution). The data include non-linearities and repeatability. MV = measured value			
Transmitter measured error	±0.015 °C or 0.07% of span (whichever is higher) The measured error data correspond to 2 σ (Gaussian distribution)			
Operating Influences	**DESIGNATION**	**STANDARD**	**AMBIENT TEMPERATURE INFLUENCE (±) PER 1 °C (1.8 °F) CHANGE**	**SUPPLY VOLTAGE INFLUENCE (±) 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
Long Term Drift (±) (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 maxinum measured error of the analog value (current output): √(Measured error^2 + Influence of ambient temperature^2 + Influence of supply voltage^2 + 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	
Weight	Approximately 44 g
Materials	Housing: Polycarbonate • Potting: Polyurethane
Terminals	16 AWG (maximum)

Terminal Connections

Power supply and current output