thermo sensors corporation

Address: P.O. Box 461947 Garland, TX 75046
Phone: 972-494-1566 **Toll Free:** 1-800-889-5478
Website: www.thermosensors.com

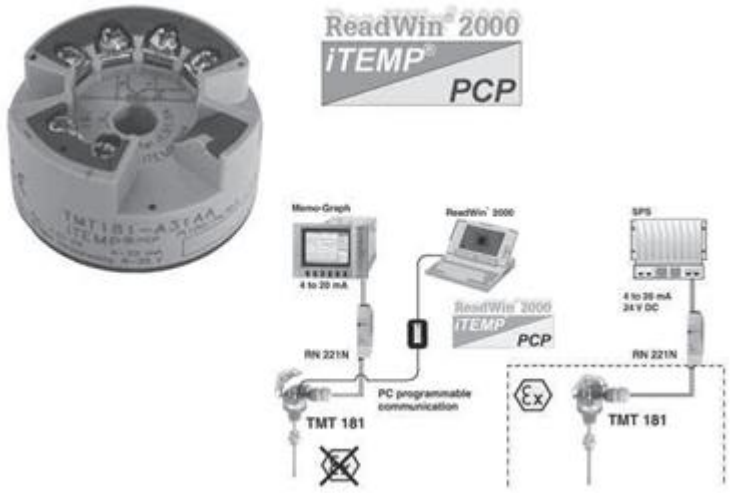
A Leading Manufacturer of Quality Thermocouple and RTD Assemblies Since 1972

Thermo Sensors Accessories

Thermo Sensors accessories include everything to complete the assembly and protect the terminals and wire from the often hostile environments in which they function. These accessories include the explosion and weatherproof caps to compression fittings and terminal blocks.

Please refer to our order guide to assist in determining your needs. We can also provide technical design assistance and application suggestions. Give us a call.

Temperature Head Transmitters

iTEMP PCP TMT 181	Application:
	• Economical and technical alternative to direct wiring to DCS or PLC • PC programmable (PCP) temperature head transmitter for converting various input signals into a scalable 4 to 20 mA analog output signal • Suitable for RTD thermometers, thermocouples TC, Ohm and mV inputs • 2-wire transmitter for a linear temperature proportional analog output

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Features and benefits	and also:
• Operation, visualization and maintenance with PC, using ReadWin ® 2000 freeware • High accuracy: 0.08% of span • Breakdown information in event of sensor break or short-circuit, enables a quick maintenance intervention • Outstanding 3.75 kV AC galvanic isolation from the sensor input to the output • Online configuration during measurement using configuration kit for an easy setup • Output simulation for a quick and easy check of the loop • Customized measuring range setup or expanded SETUP, see questionnaire page 6	• Long term stability: <0.05% • Electromagnetic compatibility to IEC 61326 for use in noisy environments • Fully potted electronics and gold plated terminals allow humidity • Captive screws for ease of connection • Customer specific linearization • Linearization curve match improves accuracy • Approvals: FM, CSA and ATEX for high safety standards • UL recognized component to UL 3111-1 • GL German Lloyd marine approval

Operation and system construction	
Measurement principle	Electronic monitoring and conversion of input signals in industrial temperature measurement.
Measurement system	The iTEMP PCP TMT 181 temperature head transmitter is a two wire transmitter with an analog output. It has measurement input for resistance thermometers (RTD) in 2-, 3- or 4-wire connection, thermocouples and voltage transmitters. Setting up of the TMT 181 is done using the TMT 181A configuration kit.

Input - Resistance thermometer (RTD)			
Input	Designation	Measurement range limits	min. span
to IEC 751 (a = 0.00385)	Pt100 Pt500 Pt1000	-328 to 1562 °F (-200 to 850 °C) -328 to 482 °F (-200 to 250 °C) -328 to 482 °F (-200 to 250 °C)	18 °F (10 °C) 18 °F (10 °C) 18 °F (10 °C)
to DIN 43760 (a = 0.00618)	Ni100 Ni500 Ni1000	-76 to 356 °F (-60 to 180 °C) -76 to 302 °F (-60 to 150 °C) -76 to 302 °F (-60 to 150 °C)	18 °F (10 °C) 18 °F (10 °C) 18 °F (10 °C)
	Connection type	2-, 3- or 4-wire connection cable resistance compensation possible in the 2 wire system (0 to 20 Ω)	
	Sensor cable resistance	max. 11 Ω per cable	
	Sensor current	£ 0.6 mA	

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Input - Resistance transmitter (Ω)		
Designation	Measurement range limits	min. measurem. range
Resistance (Ω)	10 to 400 Ω 10 to 2000 Ω	10 Ω 100 Ω

Input - Thermocouples (TC)			
Input	Designation	Measurement range limits	min. measurement range
to NIST Monograph 175, IEC 584	Type B (PtRh30-PtRh6) [1] Type E (NiCr-CuNi) Type J (Fe-CuNi) Type K (NiCr-Ni) Type N (NiCrSi-NiSi) Type R (PtRh13-Pt) Type S (PtRh10-Pt) Type T (Cu-CuNi)	32 to 3308 °F (0 to +1820 °C) -328 to 1679 °F (-200 to + 915 °C) -328 to 2192 °F (-200 to +1200 °C) -328 to 2501 °F (-200 to +1372 °C) -454 to 2372 °F (-270 to +1300 °C) 32 to 3214 °F (0 to +1768 °C) 32 to 3214 °F (0 to +1768 °C) -328 to 752 °F (-200 to + 400 °C)	900 °F (500 °C) 90 °F (50 °C) 90 °F (50 °C) 90 °F (50 °C) 90 °F (50 °C) 900 °F (500 °C) 900 °F (500 °C) 90 °F (50 °C)
to ASTM E988	Type C (W5Re-W26Re) Type D (W3Re-W25Re)	32 to 4208 °F (0 to +2320 °C) 32 to 4523 °F (0 to +2495 °C)	900 °F (500 °C) 900 °F (500 °C)
to DIN 43710	Type L (Fe-CuNi) Type U (Cu-CuNi)	-328 to 1652 °F (-200 to + 900 °C) -328 to 1112 °F (-200 to + 600 °C)	90 °F (50 °C) 90 °F (50 °C)
	Cold junction	internal (Pt100) or external , 32 to 176 °F (0 to 80 °C)	
	Accuracy of cold junction	± 1.8 °F (± 1 °C)	
	Sensor current	30 nA	

Input - Voltage transmitters (mV)		
Designation	Measurement range limits	min. measurem. range
Millivolt transmitter (mV)	-10 to 100 mV	5 mV

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Output - Output (analogue)	
Output (analogue) Output signal	4 to 20 mA, 20 to 4 mA
Transmission behavior	temperature linear, resistance linear, voltage linear
Source impedance	$V_{power\ supply}$ - 8 V) / 0.025 A (current output) e. g. (24 V - 8 V)/0.025 A = 640 Ω
Digital Filter 1st degree	0 to 8 s
Input current required	≤ 3.5 mA
Current limit	≤ 25 mA
Switch on delay	4 s (during power up I_a = 3.8 mA)
Reply time	1 s

Breakdown information to NAMUR NE 43

Breakdown information is created when the measuring information is invalid or not present anymore and gives a complete listing of all errors occurring in the measuring system.

		Signal (mA)
Under ranging	Standard	3.8
Over ranging	Standard	20.5
Sensor break; sensor short circuit low	To NAMUR NE 43	≤ 3.6
Sensor break; sensor short circuit high	To NAMUR NE 43	≤ 21.5

Electrical connection	
Power supply	U_b = 8 to 35 V DC, polarity protected
Galvanic isolation (In/out)	Û = 3.75 kV AC
Allowable ripple	U_{ss} ≤ 5 V at U_b ≥ 13 V, $f_{max.}$ = 1 kHz

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Accuracy	
Reference conditions	Calibration temperature 73.4 °F ± 9 °F (23 °C ± 5 °C)

Accuracy - Resistance thermometer (RTD)	
Type	Measurement accuracy [1]
Pt100, Ni100 Pt500, Ni500 Pt1000, Ni1000	0.36 °F (0.2 °C) or 0.08% 0.9 °F (0.5 °C) or 0.20% 0.54 °F (0.3 °C) or 0.12%

Accuracy - Resistance transmitter (Ω)		
Type	Measurement accuracy [1]	Measurement range
Resistance (Ω)	± 0.1 Ω or 0.08%	10 to 400 Ω
	± 1.5 Ω or 0.12%	10 to 2000 Ω

Accuracy - Thermocouples (TC)	
Type	Measurement accuracy [1]
K, J, T, E, L, U N, C, D S, B, R MoRe5-MoRe41	typ. 0.9 °F (0.5 °C) or 0.08% typ. 1.8 °F (1.0 °C) or 0.08% typ. 3.6 °F (2.0 °C) or 0.08%
Influence of the internal reference junction	Pt100 DIN IEC 751 Cl. B

Accuracy - Voltage transmitters (mV)		
Type	Measurement accuracy [1]	Measurement range
Millivolt transmitter (mV)	± 20 uV or 0.08%	-10 to 100 mV
Influence of power supply	≤ ±0.01%/V deviation from 24 V [2]	
Load influence	≤ ±0.02%/100 Ω [2]	

[1] % is related to the adjusted measurement range (the value to be applied is the greater)
[2] Values refer to the full scale value

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Temperature drift	Resistive thermometer (RTD): T_d = ± (8.3 ppm/°F * max. meas. range + 27.8 ppm/°F * preset meas. range) * Δθ Resistive thermometer Pt100: T_d= ±(8.3 ppm/°F * (range end value + 200) + 27.8 ppm/°F * preset meas. range) * Δθ Thermocouple (TC): T_d= ±(27.8 ppm/°F * max. meas. range + 27.8 ppm/°F * preset meas. range) * Δθ Δθ = Deviation of the ambient temperature accord. to the reference condition (73.4 ° F ± 9 °F)
Long term stability	≤ 0.18 °F/Year (≤ 0.1 °C/Year) [1] or ≤ 0.05%/Year [1][2]

Installation conditions	
Installation angle	No limit
Installation area	Connection head accord. to DIN 43 729 Form B; TAF 10 field housing

Application conditions - Ambient conditions	
Ambient temperature	-40 to 185 °F (-40 to +85 °C), for Ex-areas see Ex-certification or control drawing
Storage temperature	-40 to 212 °F (-40 to +100 °C)
Climatic class	As per IEC 60 654-1, Class C
Moisture condensation	Allowed
Ingress protection	IP 00 / NEMA 4 (IP66) installed in TAF 10 field housing
Vibration protection	4g / 2 to 150 Hz according to IEC 60 068-2-6

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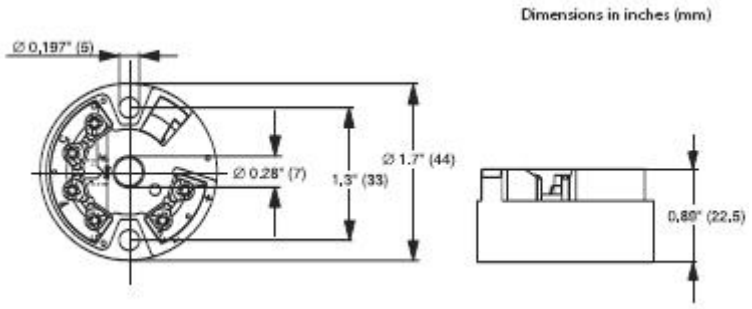
EMC immunity - CE Electromagnetic Compatibility Compliance		
The device meets all requirements listed under IEC 61326 Amendment 1, 1998 and NAMUR NE 21. This recommendation is an uniform and practical way of determining whether the devices used in laboratory and process control are immune to interference with an objective to increase its functional safety.		
Discharge of static electricity	IEC 61000-4-2	6 kV cont., 8 kV air
Electromagnetic fields	IEC 61000-4-3	80 to 1000 Hz, 10 V/m
Burst (signal)	IEC 61000-4-4	1 kV; 2 kV (B)[3]
Transient voltage	IEC 61000-4-5	1 kV unsym./0.5 kV sym.
HF coupling	IEC 61000-4-6	0.15 to 80 Mhz, 10 V

Mechanical construction	
Dimensions	
Weight	approx. 1.4 oz (40 g)
Materials	Housing: PC Potting: PUR
Terminals	Cable up to max. 16 AWG, secure screws

[1] Values under reference operating conditions
[2] % refer to the set span. The highest value is valid
[3] self-recovery.

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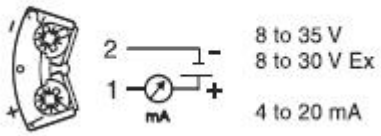
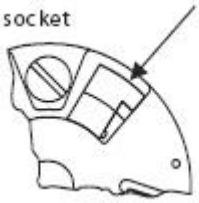
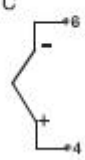
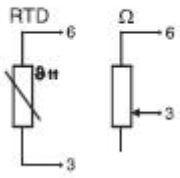
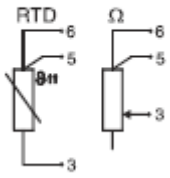
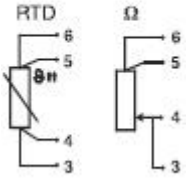
Mechanical construction				
Power supply and current output 			SETUP socket 	
Sensor connection 	TC 	2-wire 	3-wire 	4-wire 

Display and operating system - Remote operation	
Configuration set	Configuration kit TMT 181A-VP
Configuration	Using PC program (ReadWin ® 2000)
Interface	PC interface connection cable TTL -/- RS 232 with plug
Configurable parameters	Sensor type and connection type, engineering units (°C/°F), measurement range, internal/external cold junction compensation, cable resistance compensation on 2 wire connection, fault conditioning, output signal (4 to 20 / 20 to 4 mA), digital filter (damping), offset, measurement point identification (8 characters), output simulation

Certification	
CE mark	This unit complies with the legal requirements laid out within the EU regulations.
GL	Ship building approval (Germanischer Lloyd)
UL	Recognized component to UL 3111-1

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Hazardous area approvals	FM IS, Class I, Div 1+2, Group A, B, C, D CSA IS, Class I, Div 1+2, Group A, B, C, D ATEX II 1G EEx ia IIC T6/5/4 ATEX II 3G EEx nA IIC T4/T5/T6 ATEX II 3D in compliance with EN 50281-1
Other standards and guidelines	IEC 60529: Degrees of protection by housing (IP-Code) IEC 61010: Safety requirements for electrical measurement, control and laboratory instrumentation IEC 61326: Electromagnetic compatibility (EMC requirements) NAMUR: Standardization association for measurement and control in chemical and pharmaceutical industries. (www.namur.de) NEMA: Standardization association for the electrical industry