

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.



Explosion Proof and Weather Proof Connection Heads

FM Approved Explosion Proof Head

	Material	Part Number	Compliances
	Enamel Painted Cast Aluminum	1739-1	CSA / ATEX / FM Approved Explosion Proof Head meets NEC Class I Div I Groups B, C, D Class II Div I, Groups E, F, G NEMA 4X, 7, 9, II2G, Ex d, IIC, Gb, II2 D, Ex tb, IIC Db, IECEx
	316 S.S	1740-1	

3/4" Conduit

*DIN mounting holes to accept transmitter

Terminal Block

4 Pole Part Number : 1835-4

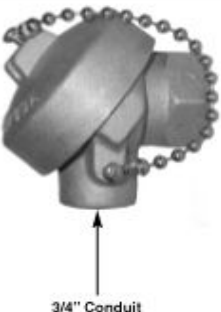
6 Pole Part Number : 1835-6

Cast Iron Industrial Screw Cover Head

 3/4" Conduit	Material	Part Number
	Epoxy Coated Cast Iron	1750-1
*DIN mounting holes to accept transmitter		

Terminal Blocks	
 2 Pole	 4 Pole
Part No. 1840	Part No. 1850
Options	
1/2" NPT Conduit	

Cast Aluminum Industrial Screw Cover Head

 3/4" Conduit	Material	Instrument Connection	Part Number	Terminal Blocks	
	Cast Aluminum	1/2" NPT	1720-1	 Single	 Dual
		3/4" NPT	1720-2	Part No. 1810A	Part No. 1820
		1" NPT	1720-3	Options	
				1/2" NPT Conduit	-A

Aluminum General Purpose Screw Cover Head

 3/4" Conduit	Instrument Connection		Part Number	Terminal Blocks		
	1/2" NPT		1755-1	 2 Pole	 4 Pole	 6 Pole
				Part No. 1829	Part No. 1831	Part No. 1832
				Options		
				1/2" NPT Conduit		-A

Nylon Screw Cover Head

 1/2" Conduit	Instrument Connection		Part Number	Terminal Blocks	
	1/2" NPT		1790-1	 4 Pole	 6 Pole
				Part Number : 1835-4	Part No. 1835-6

Compression Fittings

Compression Fittings - Brass

Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	
2022-B1	1/8"	1/8" NPT	2022-B2	1/8"	1/4" NPT	2023-B4	3/16"	1/2" NPT	
2023-B1	3/16"		2023-B2	3/16"		2024-B4	1/4"		
2024-B1	1/4"		2024-B2	1/4"		2025-B4	5/16"		
			2025-B2	5/16"		2026-B4	3/8"		

Compression Fittings - Stainless Steel

Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	
2021-S1	1/16"	NPT 1/8"	2022-S2	1/8"	NPT 1/4"	2023-S4	3/16"	NPT 1/2"	1/8" NPT - Metal Collet - 304 S.S.  1/4" NPT & 1/2" NPT - Metal Collet - 316 S.S.
2022-S1	1/8"		2023-S2	3/16"		2024-S4	1/4"		
2023-S1	3/16"		2024-S2	1/4"		2025-S4	5/16"		
2024-S1	1/4"		2025-S2	5/16"		2026-S4	3/8"		

Compression Fittings - Stainless Steel - Re-adjustable (*Max. Temperature 350°F/176°C)

Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	Part Number	Sheath O.D.	Male Thread	
2121-S1	1/16"	NPT 1/8"	2122-S2	1/8"	NPT 1/4"	2123-S4	3/16"	NPT 1/2"	1/8" NPT - Teflon Sealant - 304 S.S.
2122-S1	1/8"		2123-S2	3/16"		2124-S4	1/4"		
2123-S1	3/16"		2124-S2	1/4"		2125-S4	5/16"		
2124-S1	1/4"		2125-S2	5/16"		2126-S4	3/8"		
									
									1/4" NPT & 1/2" NPT - Teflon Sealant - 316 S.S.

*For higher temperature service (up to 1000°F/538°C) lava sealants are available for the 1/8" NPT fittings. Sealant must be replaced at each tightening. To Specify: Select desired Part Number and add Suffix "-L". Example: 2122-S1-L.

Male/Female Connectors



- Miniature plugs and jacks provide dependable, quick connections and easy installation of fine thermocouple wire and sheath. Accepts wire from .001" diameter to 20 gauge.
- Polarized pins make it virtually impossible to mismatch. Large Double wipe jack inserts assure tight grip and low signal loss. Due to exclusive isolated screw design, contact is all thermocouple alloy from wire entrance to wire exit. ANSI calibration symbol and polarity symbol are molded on connector face.
- Alloys of prongs and inserts match ANSI calibrations to maintain sensing accuracy. Alloy and polarity are identified by symbols molded into body.

How To Order:

Select the desired connector and replace the(*) with calibration code.

Example: 6002K

Standard - Miniature

Part Number	Description
6002(*)	Female Plug
6008(*)	Female Jack

High -Temp- Miniature

Part Number	Description
6032H(*)	Female Plug
6038H(*)	Female Jack



- 2-Pole Connector plugs and jacks are made to exacting specifications to provide rapid, dependable connections between thermocouples and extension wires.
- Alloys of prongs and inserts match ANSI calibrations to maintain sensing accuracy. Alloy and polarity are identified by symbols molded into body.
- Inserts are spring loaded collet type to assure positive full contact with the negative insert larger making it virtually impossible to mismatch.
- Connector bodies molded of glass filled thermoset compounds (will not melt) for high strength and dependability. The color coded connectors will withstand ambient temperatures to 400° F (205° C) continuous and 500° F (260° C) intermittent. High- Temperature connectors will withstand ambient temperatures to 800° F (425° C) continuous and 1000° F (540° C) intermittent. (All Hi-Temp are color coded rust).

How To Order:

Select desired connector and specify the Part Number followed by Calibration Code.

Example: 6000J

Standard - 2-Pole

Part Number	Description
6000 (Calib.)	Std. Male Plug
6001 (Calib.)	Solid Pin Plug
6005 (Calib.)	Female Jack

High-Temperature - 2-Pole

Part Number	Description
6020 (Calib.)	Std. Male Plug
6021 (Calib.)	Solid Pin Plug
6025 (Calib.)	Female

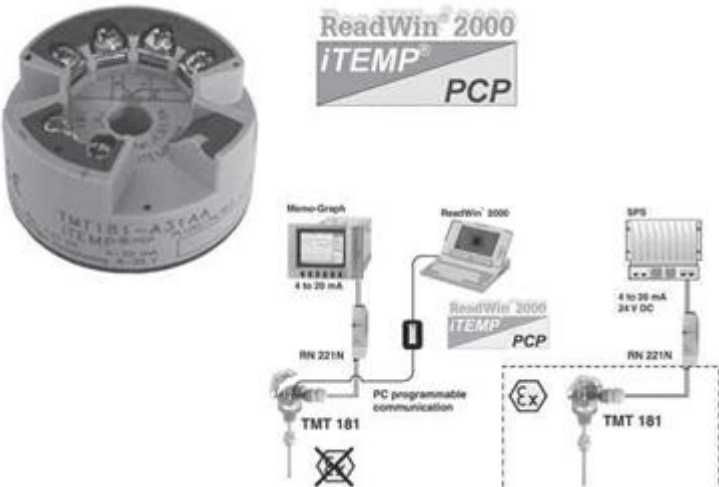
Single Panel Jacks



Single circuit jacks designed for mounting into control panel or instrument case can be wired and installed completely from the front. Fits in standard 3/4" knockout (1 1/8" diameter). Permanently attached self-fastening device simplifies mounting, holds tight.

Style	Description	Part Number
1	Standard 2-Pole Jack w/Nickel Plated Steel Fram Fits 3/4" Knock-Out	6007M (x)
2	Standard 2-Pole Jack- Molded Polypropylene Body Fits Knock-Out 3/4" Max. Temp: 300 O F	6007P (x)
3	Miniature 2-Pole Jack w/Nickel Plated Steel Fits 3/4" Knock-Out	6052 (x)
x Specify Calibration Code: J, T, K, N, R, S, E, WR, W5, CU, Note: CU = Copper/Copper		Example: 6007MK

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

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	

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]	32 to 3308 °F (0 to +1820 °C)	900 °F (500 °C)
	Type E (NiCr-CuNi)	-328 to 1679 °F (-200 to + 915 °C)	90 °F (50 °C)
	Type J (Fe-CuNi)	-328 to 2192 °F (-200 to +1200 °C)	90 °F (50 °C)
	Type K (NiCr-Ni)	-328 to 2501 °F (-200 to +1372 °C)	90 °F (50 °C)
	Type N (NiCrSi-NiSi)	-454 to 2372 °F (-270 to +1300 °C)	90 °F (50 °C)
	Type R (PtRh13-Pt)	32 to 3214 °F (0 to +1768 °C)	900 °F (500 °C)
	Type S (PtRh10-Pt)	32 to 3214 °F (0 to +1768 °C)	900 °F (500 °C)
	Type T (Cu-CuNi)	-328 to 752 °F (-200 to + 400 °C)	90 °F (50 °C)
to ASTM E988	Type C (W5Re-W26Re)	32 to 4208 °F (0 to +2320 °C)	900 °F (500 °C)
	Type D (W3Re-W25Re)	32 to 4523 °F (0 to +2495 °C)	900 °F (500 °C)
to DIN 43710	Type L (Fe-CuNi)	-328 to 1652 °F (-200 to + 900 °C)	90 °F (50 °C)
	Type U (Cu-CuNi)	-328 to 1112 °F (-200 to + 600 °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

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	$V_{\text{power supply}} - 8 \text{ V} / 0.025 \text{ A}$ (current output) e. g. $(24 \text{ V} - 8 \text{ V}) / 0.025 \text{ A} = 640 \Omega$
Digital Filter 1st degree	0 to 8 s
Input current required	$\leq 3.5 \text{ mA}$
Current limit	$\leq 25 \text{ mA}$
Switch on delay	4 s (during power up $I_a = 3.8 \text{ mA}$)
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	$U_b = 8 \text{ to } 35 \text{ V DC}$, polarity protected
Galvanic isolation (In/out)	$\hat{U} = 3.75 \text{ kV AC}$
Allowable ripple	$U_{ss} \leq 5 \text{ V}$ at $U_b \geq 13 \text{ V}$, $f_{\max.} = 1 \text{ kHz}$

Accuracy	
Reference conditions	Calibration temperature $73.4 \text{ }^{\circ}\text{F} \pm 9 \text{ }^{\circ}\text{F}$ ($23 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$)

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

Accuracy - Resistance transmitter (Ω)		
Type	Measurement accuracy ^[1]	Measurement range
Resistance (Ω)	$\pm 0.1 \Omega$ or 0.08%	10 to 400 Ω
	$\pm 1.5 \Omega$ 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 $^{\circ}\text{F}$ (0.5 $^{\circ}\text{C}$) or 0.08% typ. 1.8 $^{\circ}\text{F}$ (1.0 $^{\circ}\text{C}$) or 0.08% typ. 3.6 $^{\circ}\text{F}$ (2.0 $^{\circ}\text{C}$) 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)

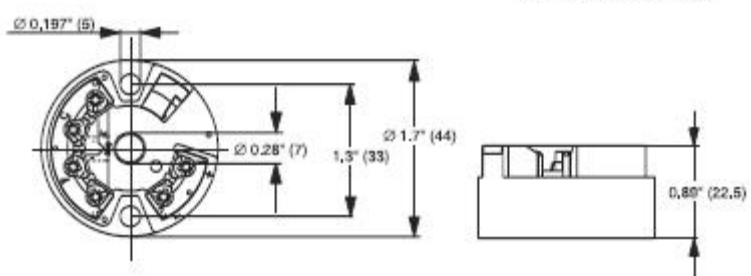
^[2] Values refer to the full scale value

Temperature drift	Resistive thermometer (RTD): $T_d = \pm (8.3 \text{ ppm/}^\circ\text{F} * \text{max. meas. range} + 27.8 \text{ ppm/}^\circ\text{F} * \text{preset meas. range}) * \Delta\theta$ Resistive thermometer Pt100: $T_d = \pm (8.3 \text{ ppm/}^\circ\text{F} * (\text{range end value} + 200) + 27.8 \text{ ppm/}^\circ\text{F} * \text{preset meas. range}) * \Delta\theta$ Thermocouple (TC): $T_d = \pm (27.8 \text{ ppm/}^\circ\text{F} * \text{max. meas. range} + 27.8 \text{ ppm/}^\circ\text{F} * \text{preset meas. range}) * \Delta\theta$ $\Delta\theta$ = 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]}

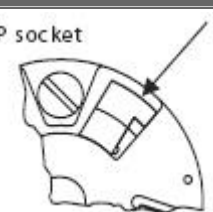
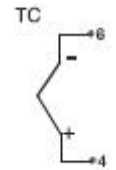
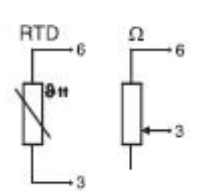
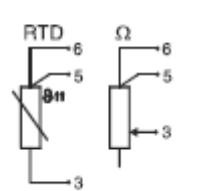
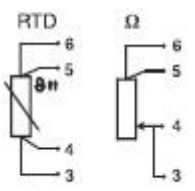
Installation conditions	
Installation angle	No limit
Installation area	Connection head accord. to DIN 43 729 Form B; TAF 10 field housing

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

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	 Dimensions in inches (mm) Top view dimensions: $\varnothing 0.197"$ (5), $\varnothing 0.28"$ (7), $1.3"$ (33), $\varnothing 1.7"$ (44) Side view dimension: $0.86"$ (22.5)
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.

Mechanical construction				
Power supply and current output  8 to 35 V 8 to 30 V Ex 4 to 20 mA		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
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