USEFUL OPERATING RANGE

	Operating Range	Special Limits of Error	Each Conductor	ANSI Color Coding Extension Wire	T/C Wire
E	0 - 900 °C (32 - 1650 °F) -200 - 0 °C (-200 - 32 °F)	± 1.0 °C or ± .4% of Reading ± 1.7 °C or ± .1% of Reading	Pos. Purple Neg. Red	Purple	Brown
J	0 - 750 °C (32 - 1380 °F)	± 1.1 °C or ± .4% of Reading	Pos. White Neg. Red	Purple	Brown
K	0 - 1250 °C (32 - 2280 °F) -200 - 0 °C (-325 - 32 °F)	± 1.1 °C or ± .4% of Reading ± 2.2 °C or ± .2% of Reading	Pos. Yellow Neg. Red	Yellow	Brown
T	0 - 350 °C (32 - 660 °F) -200 - 0 °C (-325 - 32 °F)	± .5 °C or ± .4% of Reading ± 1.0 °C or ± 1.5% of Reading	Pos. Blue Neg. Red	Blue	Brown

INTERNATIONAL COLOR CODES

Compared to ANSI Standards

	T/C TYPE	ANSI T/C	ANSI EXTENSION	UK BS1843	Germany DIN 43714	Japan JIS C1610-1981	IEC 584-3
E	Overall EP+ EN+	Brown Purple Red	Purple Purple Red	Brown Brown Blue	Black Red Black	Purple Red White	Violet Violet White
J	Overall JP+ JN+	Brown White Red	Black White Red	Black Yellow Blue	Blue Red Blue	Yellow Red White	Black Black White
K	Overall KP+ KN+	Brown Yellow Red	Yellow Yellow Red	Red Brown Blue	Green Red Green	Blue Red White	Green Green White
T	Overall TP+ TN+	Brown Blue Red	Blue Blue Red	Blue White Blue	Brown Red Brown	Brown Red White	Brown Brown White

NOMINAL THERMOCOUPLE RESISTANCE

Ohms Per Double Foot @ 20 °C

Wire GA. B & S	Diameter	E	J	K	T
14	.064	.176	.089	.147	.074
18	.040	.450	.229	.377	.109
20	.032	.702	.357	.588	.297
22	.025	1.129	.584	.937	.483
24	.020	1.795	.928	1.490	.768
26	.016	2.853	1.476	2.369	1.221
28	.013	4.537	2.347	3.767	1.942
30	.010	7.214	3.731	5.990	3.088
34	.006	18.239	9.434	15.145	7.808
36	.005	29.000	15.000	24.080	12.415
20 Stranded	.038	.648	.335	.538	.277
22 Stranded	.030	1.031	.533	.856	.441
24 Stranded	.024	1.639	.848	1.361	.701

AVAILABLE THERMOCOUPLE CALIBRATIONS

High temperature connectors available upon request.

Compacted MgO Thermocouples

All Temprel MgO insulated thermocouples are made using the highest purity MgO for temperatures up to 2300 °F (1260 °C). The thermo-elements are all ANSI special limits of error to give your measurements the best possible results. The various sheath materials are dependent on the application and the following will help you make the best selection.

304 SS Maximum temperature of 1650 °F (900 °C) and is the most widely used low temperature sheath material. It offers good corrosion resistance but is subject to carbide precipitation in the 900 °F to 1600 °F (480 to 870 °C) range.

310 SS Maximum temperature of 2100 °F (1150 °C) and offers good mechanical and corrosion resistance similar to 304 SS. Very good heat resistance. Not as ductile as 304 SS.

316 SS Maximum temperature of 1650 °F (900 °C) and has the best corrosion resistance of the austenitic stainless steels. Subject to carbide precipitation in the 900 °F to 1600 °F (480 to 870 °C) range.

Inconel® Maximum temperature 2150 °F (1175 °C) and is the most widely used thermocouple sheath material. Good high temperature strength, corrosion resistance and is resistant to chloride-ion stress corrosion, cracking and oxidation. Do not use in sulfur bearing environments.

Hastelloy X® Maximum temperature 2200 °F (1205 °C) widely used in aerospace applications. Resistant to oxidizing, reducing and neutral atmospheric conditions. Excellent high temperature strength.

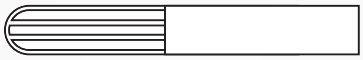
Standard Probe Diameters	Suggested Upper Temperature Limits
.032” + .001 - .0005”	1290 °F (700 °C)
.040” + .001 - .0005”	1290 °F (700 °C)
.063” ± .001”	1690 °F (920 °C)
.090” ± .001”	1830 °F (1000 °C)
.125” + .002 - .001”	1960 °F (1070 °C)
.188” + .002 - .001”	2100 °F (1150 °C)
.250” + .003 - .001”	2100 °F (1150 °C)

All MgO compacted thermocouples can be bent on a radius of twice the probe diameter.

Inconel® is the registered trademark of INCO Alloys International.
Hastelloy X® is the registered trademark of Haynes International.

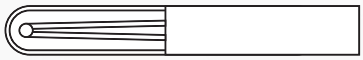
Measuring Junctions

Grounded Junctions



The thermo-elements are welded into the end cap using the same weld rod as the sheath material. Fast time response. Recommended for high-pressure applications.

Ungrounded Junctions

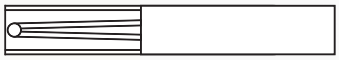


The thermo-elements are welded together and are electrically isolated from the sheath. Recommended for applications where stray EMF's would affect the reading.

Exposed Junctions

The thermo-elements are welded together outside of the sheath. This provides the fastest time response but exposes the elements to contamination. Electrically isolated from the sheath.

Semi Sheield Junctions



The thermo-elements are welded together outside of the sheath. This provides the fastest time response but exposes the elements to contamination. Electrically isolated from the sheath.

Approximate Response Time in Seconds

Values are for 2/3 of total temperature change from 0 to 100% as measured in water.
20-AWG bare wire junction measured in gas.

OUTSIDE DIAMETER	APPROXIMATE WIRE GAUGE	APPROXIMATE WALL THICKNESS	GROUNDED JUNCTION	UNGROUNDED JUNCTION
.020	38	.003	.02	.03
.032	34	.004	.02	.07
.040	32	.006	.04	.13
.062	28	.009	.22	.40
.090	25	.012	.33	.68
.125	22	.017	.50	1.10
.188	19	.025	1.00	2.30
.250	16	.033	2.20	4.10
20 AWG bare wire junction				.45