

MI-CABLE

conductor calibration

Chart III Select calibration providing highest sensitivity for your temperature range, or that matches your instrumentation

Ordering symbol	Temp. range °F	Sensitivity (average change per °F in μV)	Limits of error		Conductor identification	
			standard	special*	Positive (+)	Negative (-)
J	32 to 530	30	± 4 °F	± 2 °F	magnetic	non magnetic
	530 to 1400	32	$\pm 3/4\%$	$\pm _ \%$		
T	-300 to -75	14	$\pm 2\%$	$\pm 1\%$	copper colour non magnetic	non magnetic
	-150 to -75	17	$\pm 1-1/2$ °F	$\pm 1\%$		
	-75 to +200	22	$\pm 3/4\%$	$\pm 3/4$ °F		
	200 to +700	30		$\pm _ \%$		
K	32 to 530	23	± 4 °F	± 2 °F	non magnetic	magnetic
	530 to 2300	22	$\pm 3/4\%$	$\pm _ \%$		
E	32 to 600	39	± 3 °F	$\pm 2 1/4$ °F	non magnetic	silver colour non magnetic
	600 to 1600	44	$\pm 1/2\%$	$\pm _ \%$		
S, R	32 to 1000	5	$\pm 2,5$ °F			softer than positive conductor
	1000 to 2700	7	$\pm 1/4\%$			

LIMITS of error per ASA C96.1-1969 / IEC 584 Percentages refer to the temperature being measured.

* To specify special limits of error, use a double calibration symbol, e.g.: JJ

Type J, Iron(+)-Constantan(-), is the most commonly used calibration. If **unprotected**:

1. The wires will function in a vacuum, inert, oxidizing or reducing atmosphere.
2. There iron wire may be attacked by ammonia, nitrogen and hydrogen atmospheres.
3. In sub-zero temperatures the iron wire may rust or become brittle.

Type T, Copper(+)-Constantan(-), is commonly used for sub-zero to 700 °F temperatures. preferred to type J for sub-zero applications because of copper's high moisture resistance, as compared to iron. If **unprotected**, it will still function in a vacuum, inert, oxidizing or reducing atmosphere.

Type K, Chromel(+)-Alumel*(-), is generally used to measure high temperature to 2300 °F. It should not be used for accurate temperature measurements below 900 °F after prolonged exposure above 1400 °F. If **unprotected**, it can be used only in inert or oxidizing atmosphere. It has a short life in alternately oxidizing and reducing atmospheres, and in reducing atmospheres, particularly in the 1500 to 1850 °F range.

Type E, Chromel*(+)-Constantan(-), has the highest emf output of any standardized metallic thermocouple. If used **unprotected**, type E wires are not subject to corrosion at sub-zero temperatures. They can be used in inert, oxidizing or reducing atmospheres. Because they cover a wide temperature range with a single calibration curve, type E thermocouples are preferred for computer applications.

Type S, Platinum-10% Rhodium(+) vs. Platinum(-).

Type R, Platinum-13% Rhodium(+) vs. Platinum(-). These thermo elements should always be protected from contamination by reduced oxides, metallic vapours or other oxides at high temperatures. Platinum protective sheaths are used at temperatures which preclude the use of base metal sheath. Insulation should be silica free to prevent contamination. Type S is frequently used for calibration and checking. Type R has a slightly greater sensitivity and consequently is used more frequently in industrial applications.

Suggested Upper Temperature Limit* for protected Mi-cable

Calibration	OD						
	1/25"	1/16"	1/8"	3/16"	1/4"	5/16"	7/16"
J	900 °F	1000 °F	1000 °F	1200 °F	1200 °F	1200 °F	1200 °F
T	300 °F	400 °F	400 °F	700 °F	700 °F	700 °F	700 °F
K	1400 °F	1800 °F	1800 °F	2000 °F	2000 °F	2000 °F	2100 °F
E	800 °F	1000 °F	1000 °F	1000 °F	1100 °F	1200 °F	1300 °F

The ratings specified above are the maximum service temperatures at which a thermocouple will yield a satisfactory life. Since the field of thermocouple applications is extremely diverse, there are cases in which thermocouples may be used above suggested limits, and on the contrary, those in which satisfactory life will not be obtained at the suggested upper limit.

*Temperature limitations are a function of sheath diameter. See chart II.



Thermo Electric
P.O. Box 179
2740 AD Waddinxveen
The Netherlands

Tel. : +31 (0)182 – 302 850
 Fax : +31 (0)182 – 302 777
 E-mail : info@thermo-electric.nl
 Internet : http://www.thermo-electric.nl

N/003
Rev.00 08/03