

## MGO Thermocouples

Thermo Sensors MGO thermocouple insulation materials feature Cerampak. These MGO thermocouples are recommended where the thermocouple is immersed in liquids, high moisture, corrosive gases, or high pressures.

Cerampak is a densely compacted ceramic which is very versatile. This weldable and flexible material can withstand temperatures from cryogenic to 2300°F as well as pressures from vacuum to 60,000 psi.

A wide variety of design, sheath material and diameter selections are available to suit application conditions. A variety of heads, connectors or flexible leads can be specified for the termination.



**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.**

### Introduction to MGO Thermocouples

Cerampak is a densely compacted ceramic insulated metal sheathed thermocouple material manufactured to exacting standards to assure unquestioned quality. These standards coupled with the latest fabrication techniques and equipment assure the customer of thermocouples of the highest quality. The versatility of this material is virtually unlimited - temperatures from cryogenic to 2300° F - pressures from vacuum to 60,000 psi.

The sheath wall thickness, diameter and installation directly determines the time response of the sensor. Proper selection of sheath material to withstand the temperature and other process governmental perimeters is imperative to provide maximum life of the sensor.

Cerampak is weldable, flexible - can be bent on a radius 2 times its diameter - and moisture free when fabricated.

Selection of various order code options from the tables on this and the following pages enables the customer to custom build a Cerampak assembly to satisfy his individual requirement.

Personnel to provide technical design assistance and application suggestions are available.

\*Other materials for higher temperatures in special atmospheres are available.

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## Cerampak Selection/Hot Junction Selections/Length of Sensor





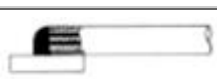
Table 1

Sheath Diameter	Order Code	ANSI Calibration	Order Code		Sheath Material	Order Code
			Single	Dual		
020"	020	Chromel/Constantan	E	2E	304 St. St.	34
025"	025				310 St. St.	30
032"	032	Iron/ Constantan	J	2J	316 St. St.	36
040"	040				410 St. St.	40
3/32"	093	Chromel/Alumel	K	2K	446 St. St.	46
1/16"	1				Inconel 600	60
1/8"	2	Nicrosil/Nisil	N	2N	Inconel 601	61
3/16"	3				Incoloy 800	80
1/4"	4	Copper/Constantan	T	2T	Tantalum	99
5/16"	5				Platinum	97
3/8"	6	Plat 10% RH/Plat	S	2S	Monel	96
1/2"	8	Plat 13% RH/Plat	R	2R	Hastelloy "X"	95
		Plat 30% RH/PT 6% RH	B	2B	Hastelloy "C"	94
					Hastelloy "B"	93
					Nickel	92
					H2300	23

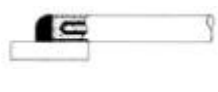



**Notes:**

1. For Premium Grade (Special Limits of Error) material; add "PG" to the calibration code.  
 Example: 4KPG60

Table 2

Hot Junctions		Order Code
	Grounded	G
	Exposed	E
	Ungrounded	U
	Ungrounded and Isolated (Dual - 4 Wire T/C only)	UI
	Welding Pad* Horizontal Grounded	P

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	Welding Pad* Horizontal Ungrounded	UP
	Welding Pad* Ungrounded and isolated (Dual T/C only)	UIP
	Welding Pad* Vertical Grounded	VP
	Welding Pad* Vertical Ungrounded	VU
	Welding Pad* Vertical Ungrounded and Isolated (Dual T/C only)	UVI

\* 1" x 1" x 1/8" pad furnished. Stainless steel hold-down clips to secure the pad thermocouple horizontally to the process tube are available. (Fits 3/16" & 1/4" O.D. Sensor). Specify Part Number 101-4.

**Table 3**

Sensor Length	
Refer to your selection of a Cold Junction Termination from <a href="#">Table 4</a> and specify required Length ("L").	
Order Code:	Specify "L" in Inches and Decimal Increments

**Table 4**


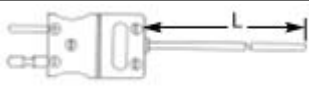
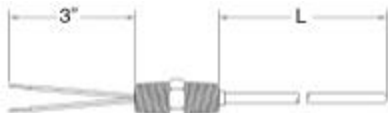
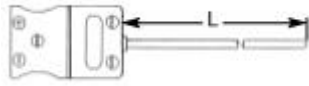
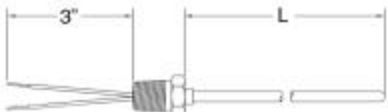
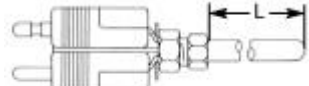

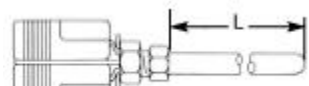

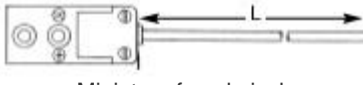
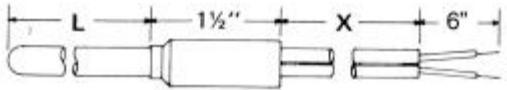
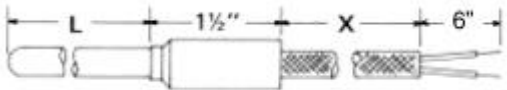
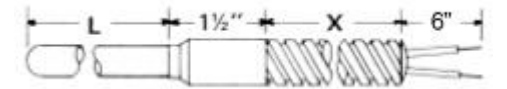
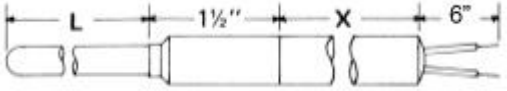
Connectors / Fittings	Order Code	Connectors	Order Code
 <p>*For longer lengths; replace "3" with desired length.</p>	B3*	 <p>Standard male plug.</p>	M (400 F) HM (800 F)
 <p>1/2" npt x 1/2" npt SS Double threaded bushing brazed to the sheath.</p>	SB	 <p>Standard female jack.</p>	F (400 F) HF (800 F)
 <p>1/2" NPT SS threaded bushing brazed to sheath.</p>	FS4	 <p>Dual male plug.</p>	DM (400 F) HDM (800 F)
 <p>1/2" NPT x 1/2" NPT SS Double threaded bushing spring-loaded to sheath</p>	SBS	 <p>Dual female jack.</p>	DF (400 F) HDF (800 F)
		 <p>Miniature male plug. (for sheath diameters 1/8" maximum)</p>	TM (400 F) HTM (800 F)
		 <p>Miniature female jack. (for sheath diameter 1/8" maximum)</p>	TF (400 F) HTF (800 F)

Table 4 continued

Extended Leads / Lead Terminations		Order Code
 <p>20 AWG Wire Extension**</p>	Fiberglass Insulation	TG(X)*
	Polyvinyl Insulation	TP(X)*
	Teflon Insulation	TT(X)*
	Kapton Insulation	TK(X)*
	Polyvinyl Insulation, Twisted, Alum-Mylar Sheilded w/ Drainwire Grounded to the sheath.	TPZD(X)*
 <p>20 AWG Wire Extension Inside Stainless Steel Overbraid**</p>	Fiberglass Insulation	TGS(X)*
	Polyvinyl Insulation	TPS(X)*
	Teflon Insulation	TTS(X)*
	Kapton Insulation	TKS(X)*
 <p>20 AWG Wire Extension inside stainless steel flexible tubing armor.**</p>	Fiberglass Insulation	TGA(X)*
	Polyvinyl Insulation	TPA(X)*
	Teflon Insulation	TTA(X)*
	Kapton Insulation	TKA(X)*
 <p>20 AWG Wire Extension inside polyvinyl covered stainless steel flexible tubing armor.**</p>	Fiberglass Insulation	TGP(X)*
	Polyvinyl Insulation	TPP(X)*
	Teflon Insulation	TTP(X)*
	Kapton Insulation	TKP(X)*

\* Replace (X) with desired length in inches.

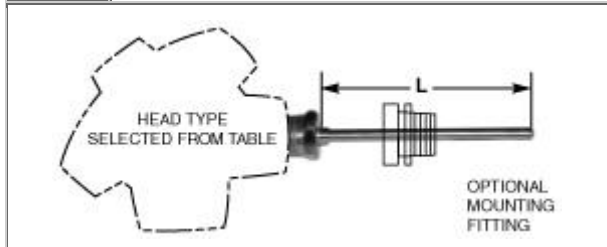
\*\* Standard conductors are solid. For stranded conductors - Specify by placing "F" in the order code before length. Example: TGSF36. (Not available for "TPZD" option).

\*\*\* "DRIP loop" style T/C's are available in armored lead options. Choose head option in the hardware section and add head order code as a suffix to the complete part number.

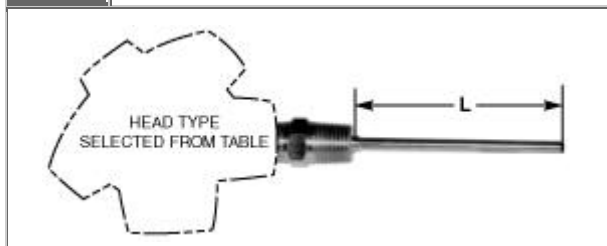
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**Table 4 continued**  
**Terminal Heads**

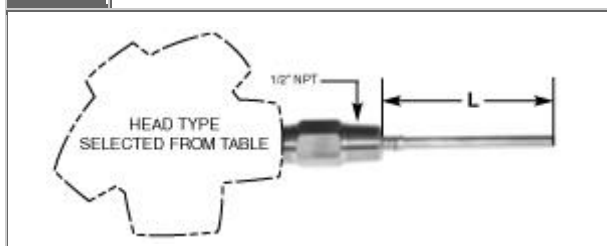
**Figure 1** T/C Assembly Without Process Fitting



**Figure 2** T/C Assembly w/ 1/2" NPT Process Fitting



**Figure 3** T/C Assembly w/ 1/2" NPT Spring Loaded Fitting





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Table 4 continued

Type of Head	Head Material	Basic Order Code					
		Figure 1	Figure 2	Figure 3	Figure 4	Figure 5	Figure 6
 <p>Industrial Weatherproof Screw Cover Head</p>	Cast Aluminum	100	200	300	400	500	600
 <p>3/4" Conduit Epoxy Coated Weatherproof Screw Cover Head</p>	Cast Iron	102	202	302	402	502	602
 <p>General Purpose Weatherproof Screw Cover Head For Flip Top Style, add suffix "F" to basic order code</p>	Cast Aluminum	104	204	304	404	504	604
 <p>1/2" Conduit Corrosion Resistant Weatherproof Screw Cover Head For Flip Top Style, add suffix "F" to basic order code</p>	Nylon	106	206	306	406	506	606
 <p>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, I2G, Ex d, IIC, Gb, II2 D, Ex tb, IIIC Db, IECEx</p>	Cast Aluminum	108	208	308	408	508	608
	316 Stainless Steel	110	210	310	410	510	610

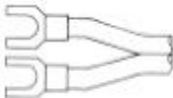

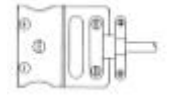
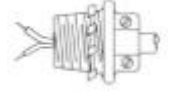
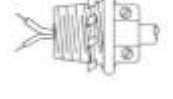
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Table 5

Stainless Steel Adjustable Mounting Fittings			
Compression Type (One time adjustable)		Compression Type (Readjustable)	
 npt Metal Collets		 npt Teflon Collets	
Mounting NPT	Order Code	Mounting NPT	Order Code
1/8" NPT	1AS	1/8" NPT	1RS
1/4" NPT	2AS	1/4" NPT	2RS
3/8" NPT	3AS	3/8" NPT	3RS
1/2" NPT	4AS	1/2" NPT	4RS
*3/4" NPT	6AS	*3/4" NPT	6RS



\*3/4" npt compression type fittings are supplied as smaller npt fittings bushed to 3/4" npt.

Note: Fittings furnished may not have the same physical appearance as illustrated above, but will be functionally equal.

Extended Leads / Lead Terminations		Order Code
	Spade lugs for No. 8 screw.	L
	Male plug.	M (400 F) HM (800 F)
	Female jack.	F (400 F) HF (800 F)
	1/2" npt "BX" connector (not watertight).	BX
	Water tight connector for conduit installation. (Neopren sealant).	1/2" npt W1
		3/4" npt W3



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Miscellaneous Options		
<p><b>A) Bends:</b>            To specify a 90 bend along the "L" length;            Add "- 90 B (Length from Tip)            Example: 90 B8 for a 90° bend 8" from tip.</p>		
<p><b>B) High Temp Potting:</b>            To specify a higher temperature than the 300° F. rated material in the transition,            Add the following suffix:            For 400° F Epoxy: -EII            For 1000° F Cement: -HTC</p>		
C) Adjustable spring "FP-275"	<b>Order Code</b>	FP 275
		
D) Adjustable spring loaded fitting	<b>Order Code</b>	SSL
		
E) Adjustable spring-loaded fitting	<b>Order Code</b>	FP 240
