

## CERAMIC PROTECTION TUBE THERMOCOUPLE

REOTEMP Ceramic Protection Tube Thermocouples are specifically designed for high temperature applications, and are offered with both noble and base metal thermocouples. Noble metal thermocouples are widely relied upon for their accuracy, durability and reliability in very high temperature (up to 3100°F) applications. Ceramic tube thermocouples are frequently used in devices such as kilns, furnaces, gas heaters and incinerators. Used for processes including heat treating, smelting and foundry.



Made in USA

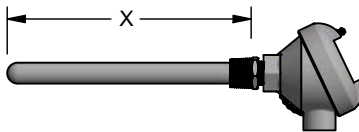


### FEATURES / BENEFITS

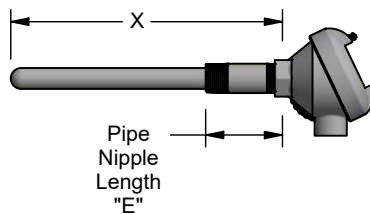
- For High Temperature Process Heating Applications
- Mullite, Hexoloy or Alumina
- Base Metal or Noble Metal Thermocouples

### SPECIFICATIONS

<b>Sensor Type</b>	J, K, R, S or B
<b>Tube Materials</b>	Mullite, Hexoloy, or Alumina
<b>Maximum Process Temperature</b>	Mullite: Up to 2700°F Hexoloy: Up to 3000°F in Air Alumina: Up to 3400°F



Standard Assembly with Hex Fitting



Assembly with Optional Nipple

## CERAMIC PROTECTION TUBE THERMOCOUPLE

THERMOCOUPLES

**BUILD YOUR PROTECTION TUBE:** Choose options to build a part number. For example: **CTAAK14A12B**

SERIES	HEAD TYPE/ CONNECTION	THERMOCOUPLE TYPE	WIRE GAUGE	TUBE MATERIAL	TUBE LENGTH "X"									
<b>CTA</b>	<b>A</b>	<b>K</b>	<b>14</b>	<b>A</b>	<b>12</b>									
<b>CTA</b> = Ceramic Tube Assembly	<b>A</b> = Cast Iron <b>B</b> = Cast Aluminum  See page 49 for additional head styles.	<i>Base Metal</i> <b>J</b> = Type J <b>K</b> = Type K <b>JJ</b> = Dual Type J <b>KK</b> = Dual Type K  <i>Noble Metal</i> <b>R</b> = Type R <b>S</b> = Type S <b>B</b> = Type B <b>RR</b> = Dual Type R <b>SS</b> = Dual Type S <b>BB</b> = Dual Type B  For thermocouple accuracy information see page 5.  For thermocouple temperature operating ranges see page 6.	<i>Base Metal</i> <b>8</b> = 8 AWG <b>14</b> = 14 AWG <b>20</b> = 20 AWG  <i>Noble Metal</i> <b>24</b> = 24 AWG	<table border="1"> <tr> <td><b>M</b></td> <td>Mullite</td> <td>Up to 2,700°F</td> </tr> <tr> <td><b>H</b></td> <td>Hexoloy</td> <td>Up to 3,000°F</td> </tr> <tr> <td><b>A</b></td> <td>Alumina</td> <td>Up to 3,400°F</td> </tr> </table>	<b>M</b>	Mullite	Up to 2,700°F	<b>H</b>	Hexoloy	Up to 3,000°F	<b>A</b>	Alumina	Up to 3,400°F	<b>12</b> = 12" <b>18</b> = 18" <b>24</b> = 24" <b>30</b> = 30" <b>36</b> = 36" ?? = Length in Inches
<b>M</b>	Mullite	Up to 2,700°F												
<b>H</b>	Hexoloy	Up to 3,000°F												
<b>A</b>	Alumina	Up to 3,400°F												

TUBE OD/ HEX FITTING PROCESS NPT	OPTIONS
<b>B</b>	

<b>A</b> = 3/8" OD x 1/2" NPT <b>B</b> = 11/16" OD x 3/4" NPT* <b>C</b> = 1" OD x 1-1/4" NPT <b>D</b> = 11/16" OD x 1" NPT* <b>E</b> = 11/16" OD x 1-1/4" NPT* <b>F</b> = 1/2" OD x 1/2" NPT* <b>G</b> = 3/4" OD x 3/4" NPT <b>H</b> = 3/4" OD x 1" NPT <b>J</b> = 5/8" OD x 3/4" NPT† <b>K</b> = 5/8" OD x 1" NPT† <b>L</b> = 5/8" OD x 1.25" NPT†  *Not available with Hexoloy. Choose 5/8" OD. †Hexoloy OD only.	Leave blank for standard steel hex fitting and round ceramic insulator style.  Process Connection = Steel Hex Fitting (Standard) <b>N??</b> = Pipe Nipple (Specify Length "E" in Inches) <b>F</b> = Malleable Iron Flange <b>S</b> = Stainless Fitting  Hot Junction Styles <b>I</b> = Insulated  Insulator Styles = Round Ceramic (Standard) <b>C</b> = Oval Ceramic <b>Q</b> = Other (Specify)
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For additional options see page 146.

## REFERENCE INFORMATION

THERMOCOUPLE WIRE COLOR CODES (U.S.A. ANSI)					
Thermocouple Grade	Extension Grade	Plug/Jack	Thermocouple Grade	Extension Grade	Plug/Jack
<b>K</b>		Yellow	<b>N</b>		Orange
<b>J</b>		Black	<b>S</b>		Green
<b>T</b>		Blue	<b>R</b>		Green
<b>E</b>		Purple	<b>B</b>		White

### THERMOCOUPLE & RTD ACCURACIES

	Type K	Type J	Type T	Type E	Type N	Type S	Type R	Type B	RTD Class B	RTD Class A
-328°F	*	—	*	*	—	—	—	—	± 2.34°F	± 2.34°F
-148°F	*	—	*	*	—	—	—	—	± 1.44°F	± 1.44°F
32°F	± 3.96°F	± 3.96°F	± 1.8°F	± 3.06°F	± 3.96°F	± 2.7°F	± 2.7°F	—	± 0.54°F	± 0.27°F
392°F	± 3.96°F	± 3.96°F	± 2.7°F	± 3.06°F	± 3.96°F	± 2.7°F	± 2.7°F	—	± 2.34°F	± 0.99°F
752°F	± 5.4°F	± 5.4°F	—	± 3.6°F	± 5.4°F	± 2.7°F	± 2.7°F	—	± 4.14°F	± 4.14°F
1112°F	± 8.1°F	± 8.1°F	—	± 5.4°F	± 8.1°F	± 2.7°F	± 2.7°F	—	± 5.94°F	± 5.94°F
1472°F	± 10.8°F	—	—	± 7.2°F	± 10.8°F	± 3.6°F	± 3.6°F	—	—	—
1832°F	± 13.5°F	—	—	—	± 13.5°F	± 4.5°F	± 4.5°F	± 9°F	—	—
2192°F	± 16.2°F	—	—	—	± 16.2°F	± 5.4°F	± 5.4°F	± 10.8°F	—	—
2552°F	—	—	—	—	—	± 6.3°F	± 6.3°F	± 12.6°F	—	—
2912°F	—	—	—	—	—	—	—	± 14.4°F	—	—

Note: The accuracies in the above table are estimates given at fixed points, they do not apply to temperature ranges and are intended only as examples to give a general idea of what can be expected. Consult Reotemp if a specific accuracy is required or to confirm accuracies at any points not listed in the above table.

\*Thermocouples are normally supplied to meet the tolerances specified in the table for temperatures above 32°F. The same materials, however, may not fall within the tolerances for temperatures below 32°F. If materials are required to meet the tolerances stated for temperatures below 32°F, contact Reotemp sales.

Looking for better accuracy?



Reotemp offers **RTDs** up to 5x more accurate than Class B RTDs with the Hi-Accuracy™ option.

**Thermocouples** up to 2x more accurate with the Special Limits of Error option.

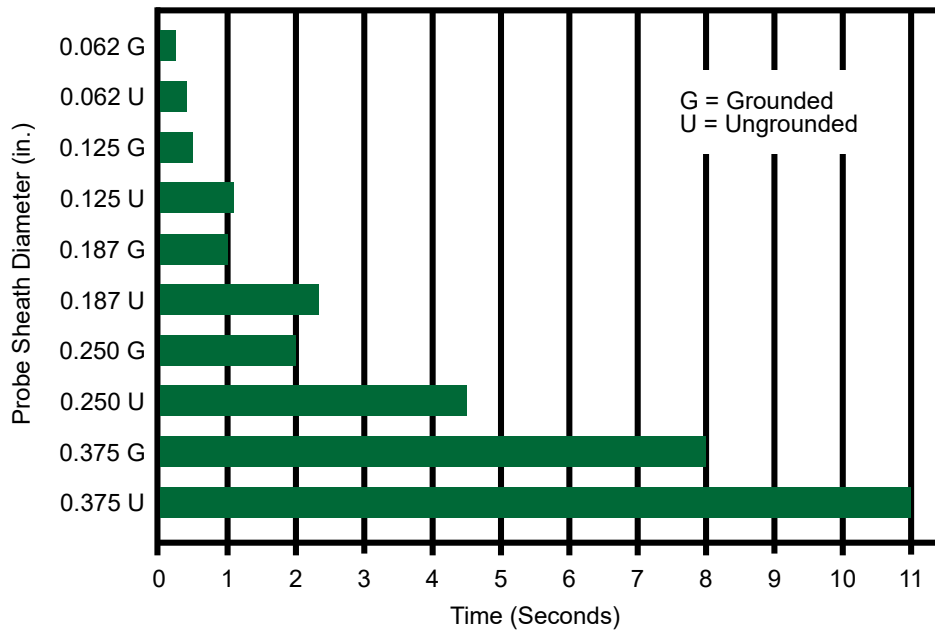
## REFERENCE INFORMATION

### THERMOCOUPLE TEMPERATURE OPERATING RANGES

Type	Minimum Temp. °F	Maximum Temp. °F
K	-328	2300
J	32	1400
T	-328	700
E	-328	1600
N	32	2300
S	32	2700
R	32	2700
B	1600	3100

### THERMOCOUPLE TYPICAL RESPONSE TIMES

63.2% Temperature Change in an Agitated Water Bath



### TEMP. LIMITS OF WIRE JACKETS

Jacket	Temp. Limit
PVC	221°F
Teflon	400°F
Fiberglass	900°F

## THERMOCOUPLE & RTD OPTIONS

		Thermocouple	RTD	Digital Thermometers	Handheld Digital
<b>CERTIFICATION OPTIONS</b>					
<b>-R1</b>	1 Point Calibration Certification, Reotemp Chooses	✓	✓	✓	✓
<b>-R3</b>	3 Point Calibration Certification, Reotemp Chooses	✓	✓	✓	✓
<b>-C1</b>	1 Point Calibration Certification, Customer Chooses	✓	✓	✓	✓
<b>-C3</b>	3 Point Calibration Certification, Customer Chooses	✓	✓	✓	✓
<b>-CC</b>	Certificate of Conformance	✓	✓	✓	✓
<b>-CS</b>	NIST Calibration Sticker (No Logged Points)	✓	✓	✓	✓
<b>OTHER OPTIONS</b>					
<b>-VB</b>	Hi-Vibration	N/A	✓	✓	✓
<b>-AC</b>	Hi-Accuracy	N/A	✓	N/A	N/A
<b>-PS</b>	Pointed Stem	✓	✓	✓	✓
<b>-TF</b>	Teflon Coating	✓	✓	✓	✓
<b>-SS</b>	316 SS stem	N/A	STD	✓	✓
<b>-NL</b>	No Logo	✓	✓	✓	✓
<b>-HT</b>	Heat Transfer Compound (2 oz)	✓	✓	✓	N/A
<b>-GL</b>	Plain Glass Lens	N/A	N/A	✓	✓
<b>-CL</b>	Custom Logo Dial	N/A	N/A	✓	✓
<b>-BP</b>	Replacement Battery Pack	N/A	N/A	✓	✓
<b>-WD</b>	White Dial	N/A	N/A	✓	✓
<b>-AS</b>	Allows to Fit 1-1/4-18 Industrial Thermowell	✓	✓	✓	N/A
<b>TAG OPTION</b>					
<b>-TS</b>	Stainless Steel Tag (1-10 Characters)			✓	
<b>-TM</b>	Stainless Steel Tag (11-80 Characters)			✓	
<b>-TP</b>	Paper Tag			✓	

✓	Indicates that the option is available with this model.
N/A	Indicates the option is not available with this model.
STD	Indicates standard options with no additional cost.

## HEAD STYLES

All head styles are IP65 or greater. Additional head styles available, contact customer service for more information.

Head	Code	Description	NEMA Rating	IP Rating				Display	STD Conduit	Material
	A	Cast Iron Black	4	65					3/4"	Cast Iron
	B	Cast Aluminum	4X	68					3/4"	Cast Aluminium
	E	Explosion Proof Aluminum	4X	68	✓	✓			3/4"	Cast Aluminium
	I	Blue Epoxy Aluminum	4X	68					3/4"	Cast Aluminium
	S	Polypropylene White	4	65					3/4"	Polypropylene
	W	Explosion Proof Field HART Transmitter	4X	68	✓	✓	✓	✓	1/2"	Cast Aluminium
	Z	Z-Temp™ Explosion Proof Aluminum	4X	66	✓	✓	✓	✓	1/2"	Cast Aluminium
	C	Polypropylene Black	4	65					3/4"	Polypropylene
	G	316SS	4X	65					3/4"	316SS
	H	Aluminum Flip Top	4	65					3/4"	Cast Aluminium
	J	Explosion Proof 316SS	4X	65	✓	✓			3/4"	316SS
	T	ATEX Explosion Proof Aluminum	4X	68	✓	✓	✓		1/2"	Cast Aluminium
	L	Explosion Proof Epoxy Coated Aluminium	4X	68	✓	✓			3/4"	Cast Aluminium
	D	Mini Cast Aluminum	4	65					3/4"	Cast Aluminium
	K	Polished 316SS Knurl	4X	65					1/2"	316SS
	P	DIN Black Polypropylene	4	65					3/4"	Polypropylene
	U	Hi-dome Aluminum Fliptop	4	65					3/4"	Cast Aluminium
	V	Ball-dome Aluminum Fliptop	4	65					3/4"	Cast Aluminium