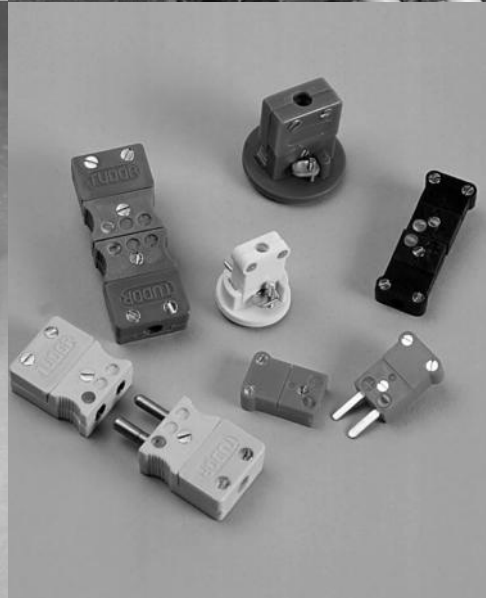
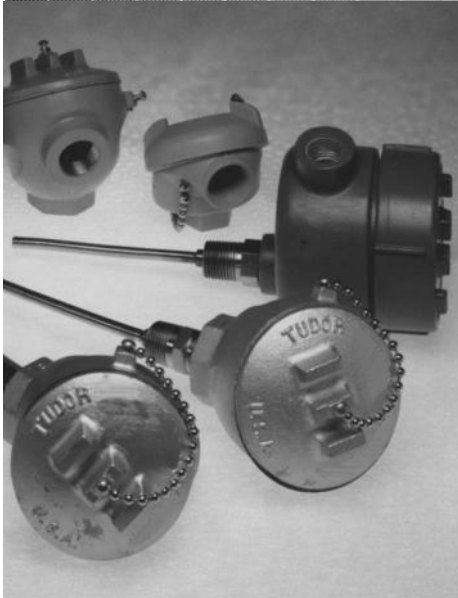


Tudor™

TEMPERATURE
SENSORS

athenacontrols.com



ATHENA CONTROLS, INC.
5145 Campus Drive
Plymouth Meeting, PA 19462-1129
U.S.A.

TUDOR™ TEMPERATURE SENSORS



When you have a technical problem or question about thermocouples, RTDs, or temperature measurement, give Athena a call. You'll speak with an experienced technician with a wide knowledge of the field. In addition to a complete line of Tudor brand temperature sensors, we build more "specials" and service a greater variety of industries than most any thermocouple manufacturer. In fact, chances are excellent we have already solved a problem similar to yours. We'll be happy to tell you about our experience and discuss possible solutions without obligation.

Many larger thermocouple manufacturers would rather not be bothered with "specials." They want large volume orders. So "specials" go to the bottom of the pile and delivery and communication with the customer are usually very poor.

Of course, we like large orders as much as the next company. But what sets us apart is our enthusiasm about solving problems for our customers, big and small. You can depend on Athena and Tudor brand temperature sensors to provide the temperature measurement and control solutions you need.

Tudor thermocouples and thermocouple wire meet accuracy standards as defined by the many technical societies and manufacturers. These accuracies are listed in the Engineering Data section of the Athena Reference Information publication, available on request and at our web site, www.athenacontrols.com. Special accuracy thermocouples and thermocouple wire are also defined and are detailed in this section.

Selected grade thermocouple wire can be supplied in instances where special or standard grade material does not provide the accuracy needed at specific temperatures. The availability of this grade depends on your specific requirements and stock levels.

Calibration of thermocouples or thermocouple wire is a laboratory test performed on a specific product or lot to determine its departure from a defined temperature — E.M.F. relationship. ASTM E 230 (ITS 90) describes the relationship for the various thermocouple types, portions of which can be found in Athena's Technical Reference Information booklet, available on request. Calibrations are conducted following the general guidelines of ASTM E 220. Test results are reported in certificate form indicating test temperatures, °F or °C corrections and standards traceable data.

Calibration is performed in accordance with MIL-C-45662, ANSI/NSCL Z540-1, and ISO 10012-1. Overall production satisfies the requirements of MIL-I-45208. Additionally, the product testing and certification requirements of AMS-2750-C and ASTM E 608 can be supplied.

Each product tested can be tagged with a test number, date and correction data. Pricing for calibration and testing is based on tests selected, quantity to be tested, and number of test temperatures. Test temperatures within the range of 0° C (32° F) to 1371° C (2500° F) are available at competitive pricing. Sub-zero checking and high temperature (above 1371° C) are available on special quotation only.

Report of Calibration					
Material Lot No: K82011		Cal Code: RTF		Athena Controls, Inc.	
Part Number: P2000L-S-INC		Cal Code: RTF		5145 Campus Drive	
Receiver Condition: New		19602		Plymouth Meeting, PA	
Cal Code: UT		19602		Report No:	
Current: N/A		19602		Customer: The Furnace Company	
Procedure: QI-10-05		19602		Customer Order: 123456	
<p>All temperatures in this report are based on the International Temperature Scale of 1990 (ITS-90), with reference junctions maintained at 0°C (32°F). The product or parts listed above were calibrated utilizing techniques consistent with the guidelines set forth in ANSI Z540-1, ASTM E 220 and E 608, AMS-2750, and are in compliance. It is certified that all technical, quality and performance requirements have been satisfied. Where a single report is issued for multiple T/C's, the Full Calibration method was used.</p>					
Nominal Value (Setpoint) (°F)	Actual Value (Reference) (°F)	UTY (Test Sensor) (°F)	Departure (Rec. - Test) (°F)	Measurement Uncertainty (°F)	
1000	995.34	998.56	-3.22	1.07	1.07
1200	1192.84	1197.29	-4.45	1.07	1.07
1400	1391.43	1395.77	-4.34	1.07	1.07
1600	1600.37	1604.46	-4.09	1.07	1.07
1800	1800.05	1804.21	-4.16	1.07	1.07
2000	2000.38	2001.88	-1.50	1.07	1.07
Model	Test Equipment				
2500					
9101					



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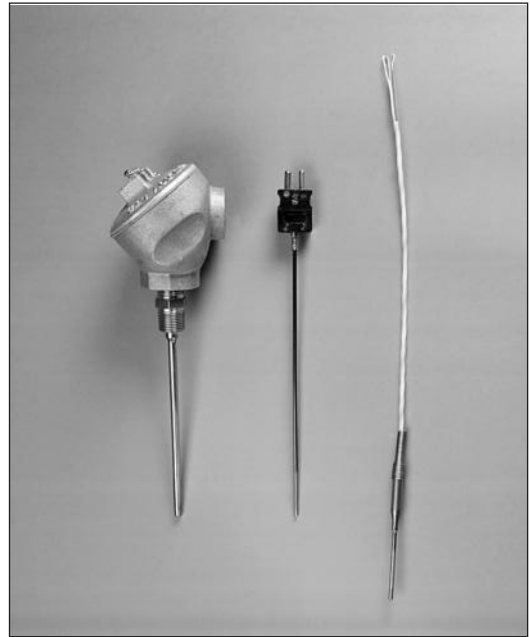
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TU-PAK® THERMOCOUPLE ASSEMBLIES

Tu-Pak® is Athena's trademark for metal-sheathed, mineral-insulated (MI) thermocouple material. It is a departure from the traditional assembly of tubes, wires and insulators. It has a unit-construction with no replacement parts. Tu-Pak has improved thermal response, greater flexibility and, size for size, it is longer lasting than traditional types.

Tu-Pak® Dimensions and Wire Sizes

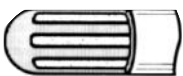
Sheath Outside Diameter	Outside Diameter Tolerance, ±in.	Nominal Wall Thickness, in.	Approximate Wire B&S gauge	Nom. Conductor Diameters, in.	
Diameter				2-wire	4-wire
0.062	0.002	0.010	29	0.011	0.006
0.125	0.002	0.018	24	0.022	0.011
0.188	0.003	0.025	18	0.032	0.022
0.250	0.003	0.032	17	0.040	0.032
0.313	0.003	0.040	16	0.051	0.040
0.375	0.003	0.049	14	0.064	0.051



Tu-Pak® Suggested Upper Temperature Limits for Sheathed Thermocouples (per ASTM E608)

Nom. Dia. (in)	0.062	0.125	0.188	0.250
Nom. Wall (in)	0.010	0.018	0.025	0.032
Type K/N (°F/°C)	1690/920	1960/1070	2100/1150	2100/1150
Type J (°F/°C)	825/440	970/520	1150/620	1330/720
Type E (°F/°C)	950/510	1200/650	1350/730	1510/820
Type T (°F/°C)	500/260	600/315	700/370	700/370

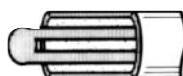
Measuring Junctions



Grounded Junction - The sheath and the thermocouple wires are welded together, forming a completely closed measuring junction. Recommended in the presence of liquids, moisture, gas, or high pressure. The thermocouple is protected from the environment. Response time approaches that of an exposed junction.



Ungrounded Junction - The thermocouple junction is insulated from the welded measuring junction closure. Recommended for applications where stray EMFs could affect the instrument reading and for frequent/rapid temperature cycling. Response time is slower than a grounded junction.



Exposed Junction - The thermocouple junction is not protected by a welded closure. Insulation is sealed against liquid or gas penetration. Provides fastest response time. Not recommended for applications that are corrosive.

TuPak Sheath Material Limitations

Recommended Limit

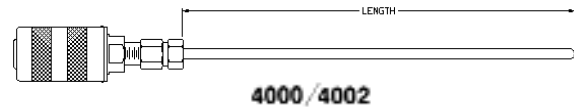
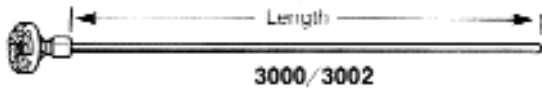
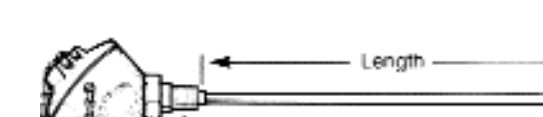
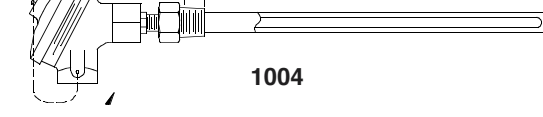
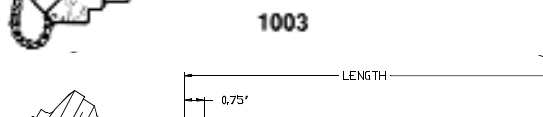
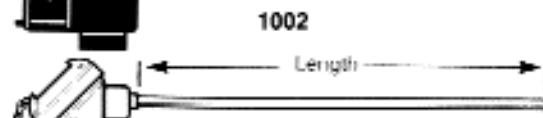
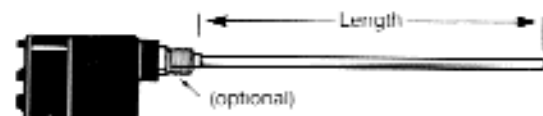
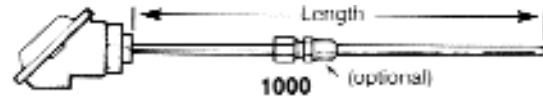
Materials	Melting Point, °F/°C	Maximum in Air, °F/°C	Recommended Operating Atmosphere	Continuous Maximum Temp., °F/°C
Stainless Steel:				
304	2560/1404	1920/1049	ORNV	1650/899
309	2560/1404	2000/1093	ORNV	2000/1093
310	2560/1404	2000/1093	ORNV	2100/1149
316	2500/1371	1650/899	ORNV	1700/927
321	2550/1399	1650/899	ORNV	1600/871
347	2600/1427	1680/916	ORNV	1600/871
430	2700/1482	1550/843	ORNV	1200/649
446	2700/1482	2000/1093	ORNV	2000/1093
Inconel	2550/1399	2000/1093	ONV†	2100/1149
Inconel X	2620/1438	1500/816	ONV†	2200/1204
Platinum	3217/1770	3000/1649	ON†	3000/1649
Pt-Rh 10%	3362/1850	3100/1704	ON	3100/1704

Symbols describing atmospheres are O = oxidizing; R = reducing; N = neutral; V = vacuum; † = Very sensitive to sulfur corrosion.

Terminations & Length Specifications

(Custom Head Type Terminations also available on request)

Part No.	Style
1000	General Purpose Cast Aluminum Head.
1002	Hazardous Location Cast Aluminum Head.
1003	Screw-Cover Thermoplastic Head.
1004	Screw-Cover Cast Iron Head.
2000	Screw-Cover Cast Aluminum Head.
2002	Screw-Cover Aluminum Head with 1/2" NPT SS spring loaded oil and vapor seal.
3000	300°F (149°C) max. Open Head.
3002	1000°F (538°C) max. Open Head – Simplex only.
4000	Screw Cover Mini-Head.
4002	Bayonet Cover Mini Head.



Ordering Information

Part Number Example:

2 0 0 0 J S A04 4 U 24 7S

Part Number

Length
Code
(Specify in inches)

<p>T/C Calibration</p> <p>Code</p> <p>J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan E = Chromel-Constantan N = Nicrosil-Nisil S = Pt 10% Rh-Pt R = Pt 13% Rh-Pt B = Pt 30% Rh-Pt 6% RH</p>	<p>T/C Form</p> <p>Code</p> <p>S = Simplex D = Duplex T** = Triplex</p> <p><small>**Available on 1000, 1002, 1003, 1004 and 2000 only.</small></p>	<p>Sheath Material</p> <p>Code</p> <p>A04 = 304SS A10 = 310SS A16 = 316SS A21 = 321SS F46 = 446SS INC = Inconel ILY = Incoloy PT10 = Pt 10% Rh</p>	<p>Sheath Diameter</p> <p>Code</p> <p>.040 = .040" 1 = .062" 2 = .125" 3 = .187" 4 = .250" 5 = .312" 6 = .375"</p>	<p>Measuring Junction</p> <p>Code</p> <p>G = Grounded U = Ungrounded E = Exposed</p>	<p>Optional Comp. Fitting - NPT</p> <p>Code</p> <p>1 = Brass - 1/8 2 = Brass - 1/4 3 = SS - 1/8 4 = SS - 1/4 5 = SS Adj. - 1/8 6 = SS Adj. - 1/4 *7C = 1/2 x 1/2 Carb. Steel *7S = 1/2 x 1/2 SS *7L = 1/2 x 1/2 SS Sp. Ld. 0 = None</p> <p><small>*Available on 1000, 1002, 1003, 1004, and 2000 only.</small></p>
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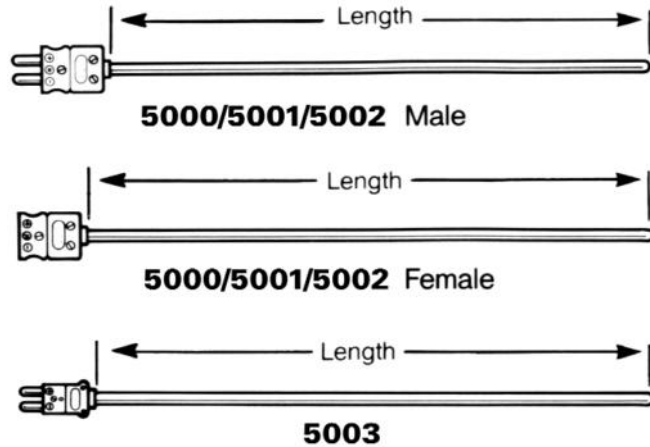
TU-PAK® CONNECTOR-TYPE THERMOCOUPLE ASSEMBLIES

Standard Terminations & Length Specifications

(Custom terminations also available on request)

Part No.	Style
5000	350°F (177°C) Max Standard Connector
5001	500°F (260°C) Max Standard Connector
5002	1000°F (538°C) Max Standard Connector
5003	350°F (177°C) Max Miniature Connector*

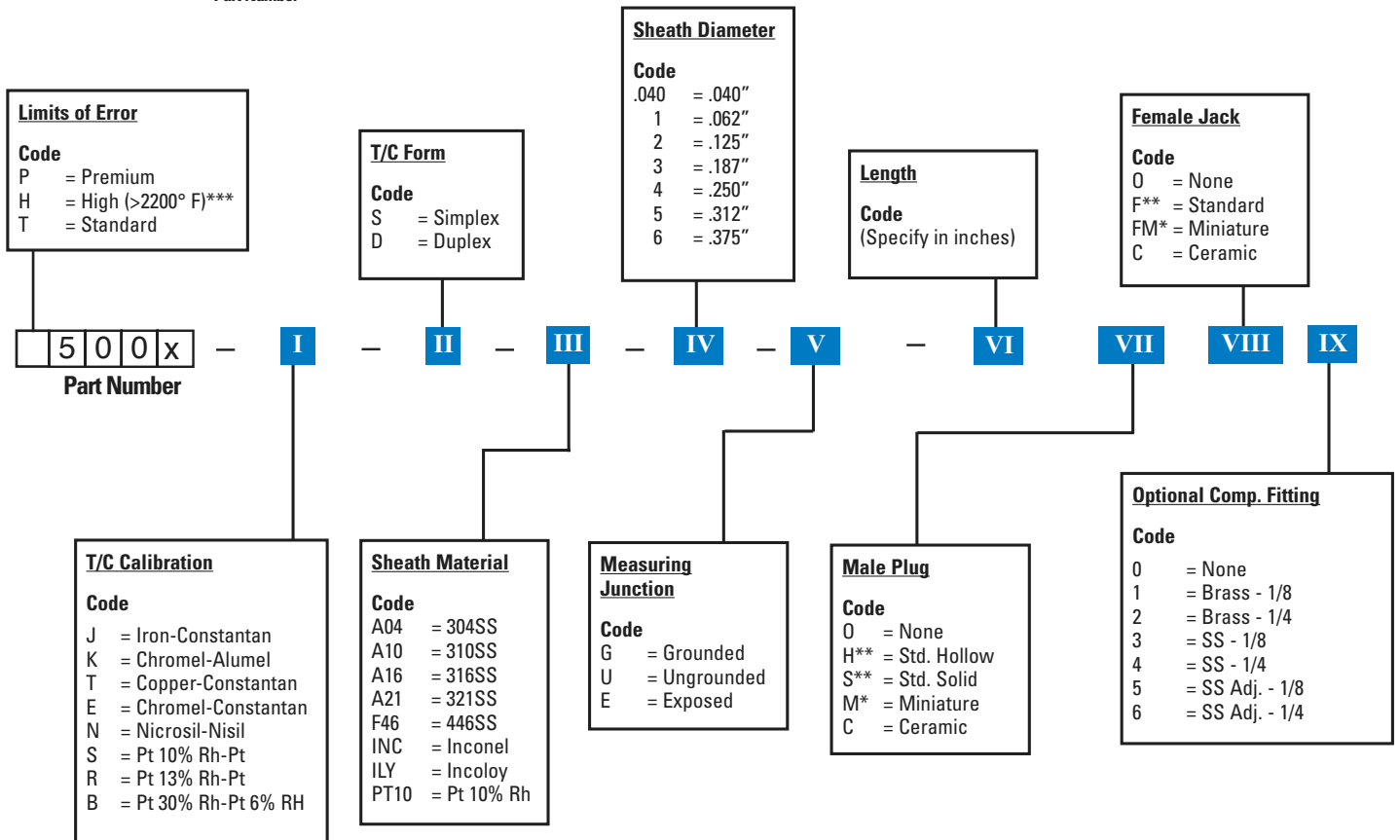
Temperatures are exposure ratings for connectors only.



Ordering Information

I II III IV V VI VII VIII IX

Part Number Example: P5001- J - S - A04 - 1 - U - 12 - H - F - 2
 Part Number



*Available in sizes .040 to 3/16" only.

**Not available with 5003.

***Available in selected wires/materials only.

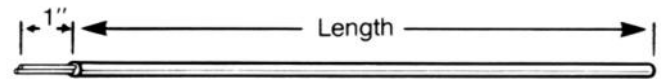
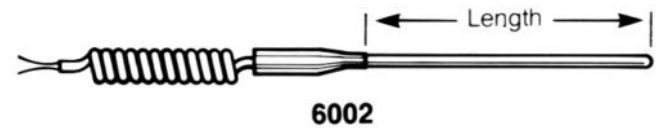
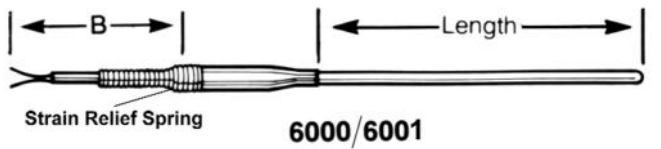
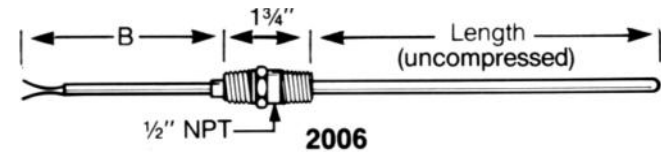
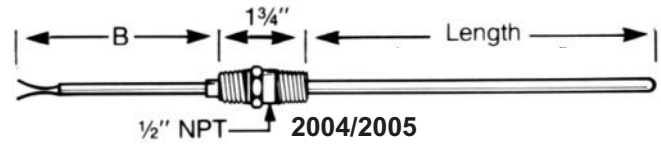
Standard Terminations & Length Specifications

(Custom terminations also available on request)

Part No.	Style/Description
2004	1/2" NPT x 1/2" NPT Carbon Steel Ftg.
2005	1/2" NPT x 1/2" NPT SS Fitting
2006	1/2" NPT x 1/2" NPT Spring Loaded Stainless Steel Fitting
6000	Transition Ftg. with Strain Relief Spring
6001	Transition Ftg. w/o Strain Relief Spring
6002*	Transition to Polyurethane Coiled Cord. Simplex only. Omit Tables VIII and IX. Not available in S, R, or B calibration.
7000	Stripped 1" Leads

Noble metal elements are not recommended for use in base metal sheaths.

*Available on 6002 only. Expands to approximately 5' per coiled foot.



7000

Ordering Information

I II III IV V VI VII VIII IX X XI

Part Number Example: P6001- J - S - A04 - 1 - U - 12 - GG - 8 - 0 - 1 - 0

Part Number

Limits of Error Code P = Premium H = High (>2200° F) T = Standard	T/C Form Code S = Simplex D = Duplex T = Triplex	Sheath Diameter Code 0 = .040" 1 = .062" 2 = .125" 3 = .187" 4 = .250" 5 = .312" 6 = .375"	Length Code (Specify in inches)	Lead Length Code B = If lead length is longer than 12", enter length over 12"	Optional Comp. Fitting Code 1 = Brass - 1/8 2 = Brass - 1/4 3 = SS - 1/8 4 = SS - 1/4 5 = SS Adj. - 1/8 6 = SS Adj. - 1/4 0 = None
Part Number X 0 0 X - I - II - III - IV - V - VI - VII - VIII - IX - X - XI					
T/C Calibration Code J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan E = Chromel-Constantan N = Nicrosil-Nisil S = Pt 10% Rh-Pt R = Pt 13% Rh-Pt B = Pt 30% Rh-Pt 6% RH	Sheath Material Code A04 = 304SS A10 = 310SS A16 = 316SS A21 = 321SS F46 = 446SS INC = Inconel ILY = Incoloy PT10 = Pt 10% Rh	Measuring Junction Code G = Grounded U = Ungrounded E = Exposed	Lead Wire Insulation Code GG = Fiberglass GS = Fiberglass/SS Overbraid PP = Polyvinyl PS = Polyvinyl/SS Overbraid TT = Teflon TS = Teflon/SS Overbraid CC1* = 1' Coiled Cord CC2* = 2' Coiled Cord CC3* = 3' Coiled Cord CC5* = 5' Coiled Cord SG = Stranded Glass ST = Stranded Teflon® GSS = Stranded, with SS Overbraid	Extension Cover Code 0 = None Flex SS = Flex Armor	Connectors Code 0 = None P = Std. Plug (350° F max.) J = Std. Jack (350° F max.) MP = Miniature Plug (350° F max.) MJ = Miniature Jack (350° F max.)

INDUSTRIAL PROCESS/PRESSURE VESSEL THERMOCOUPLES

Athena Control's Tudor brand Industrial Process/ Pressure Vessel thermocouples are suitable for many applications. This style is most frequently applied in Power Generating Stations, Chemical Process Plants, Petrochemical Process Plants, and Petroleum Refining Plants.

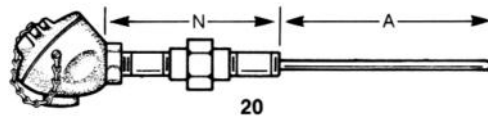
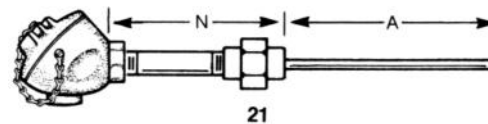
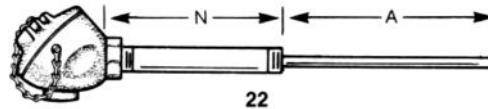
The ordering specifications and style offerings provide a most flexible method to describe the exact design required.

The thermocouples consist of four basic components

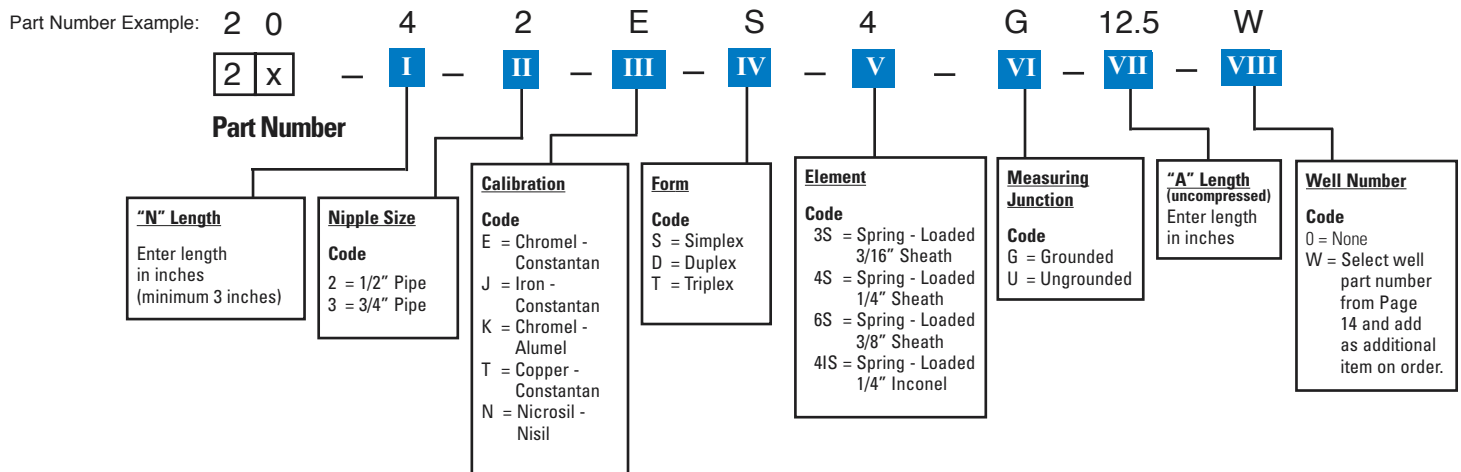
1. Connection Head - An aluminum heavy duty screw cover head with terminal block
2. Thermocouple Element - A spring-loaded MgO insulated metal sheathed element. Standard sheath material is 304SS - maximum compression is 1/2 inch.
3. Mounting Fittings - Carbon steel nipples
 - Female 150 lb steel unions
 - Nominal thread engagement is 1/2 inch
4. Drilled Thermowell - Standard and heavy duty type

Other materials and head assemblies are available upon request .

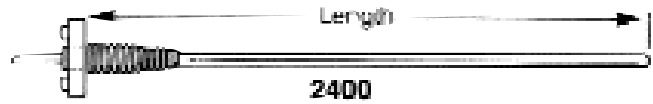
Part No.	Style
22	Aluminum heavy duty screw cover head with nipple and element.
21	Aluminum heavy duty screw cover head with nipple-union and element.
20	Aluminum heavy duty screw cover head with nipple-union-nipple and element.



Ordering Information

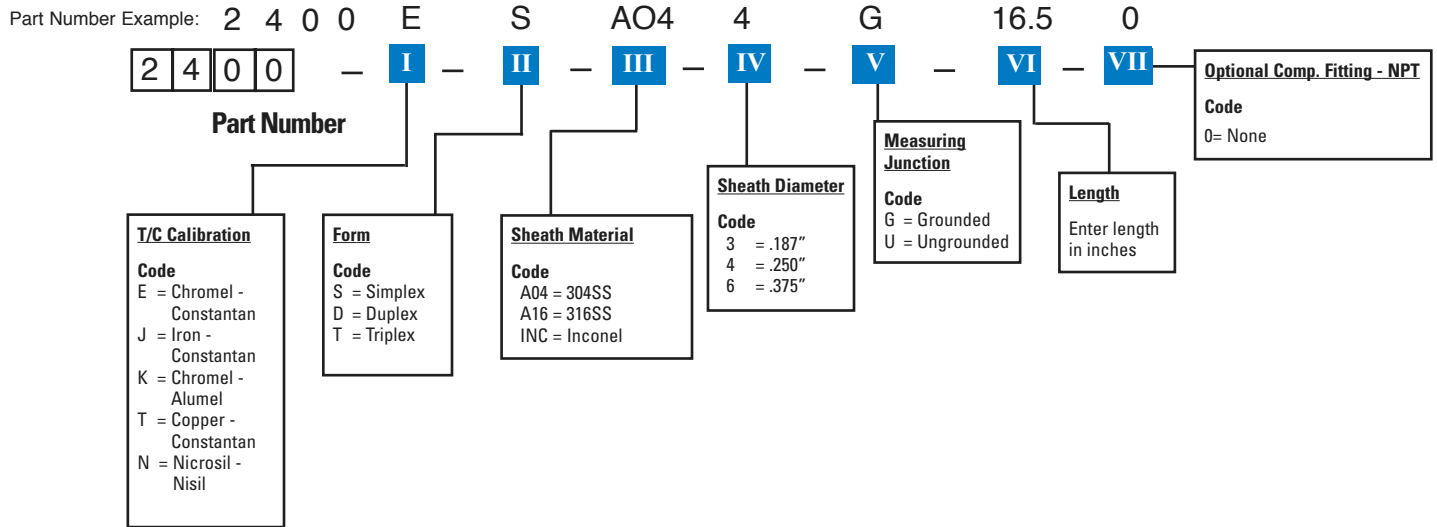


Replacement Element for 20/21/22 Series Assemblies



Tu-Pak Spring-Loaded Type
(Element Options 3S, 4S, 4IS, 6S)

Ordering Information



DRILLED THERMOWELLS

SELECTION OF THERMOWELLS

Material

Thermowell material chosen for an installation is governed by corrosive conditions. Occasionally, the material consideration is one of strength rather than a corrosive condition. Consult the pressure-temperature ratings given for each well type for proper selection.

Insertion Length "U"

The distance from the end of the well to the underside of the thread, or other connection means, (designated as "U" is the insertion length. For best accuracy, this length should be long enough to permit the entire temperature sensitive part of the thermocouple to project into the temperature medium being measured.

Bore Size

The bore size of wells shown in this catalog cover the most commonly used temperature sensing elements as follows:

- .260 Diameter Bore: Bi-metal Thermometers (1/4" stem.) Thermocouples (#20 gauge) or sheathed type up to .250 inch diameter. Liquid-in-glass Test Thermometers (unarmored). Other elements having .252 inch maximum diameter.
- .385 Diameter Bore: Bi-metal Thermometers (3/8" stem.) Thermocouples (#14 gauge) or sheathed type up to .375 inch diameter. Liquid-in-glass Test Thermometers (armored). Other elements having .377 inch maximum diameter.

Tapered or Straight Shank

Tapered shank wells provide greater stiffness for the same sensitivity. The higher strength-to-weight ratio gives these wells higher natural frequency than equivalent length straight shank wells, thus permitting operation at higher fluid velocity.

Velocity Ratings of Wells

Well failures in most cases are not due to the effect of pressure and temperature. The calculations necessary to

provide adequate strength under given conditions are familiar enough to permit proper choice of wall thickness and material.

Less familiar, and more dangerous, are the vibrational effects to which wells are subjected. Fluid flowing by the well forms a turbulent wake (called the Von Karman Trail) which has a definite frequency based on the diameter of the well and the velocity of the fluid. It is important that the well have sufficient stiffness so that the wake frequency will never equal the natural frequency of the well itself. If the natural frequency of the well were to coincide with the wake frequency, the well would vibrate to destruction and break off in the piping.

A recommended maximum velocity rating for typical well lengths and materials is listed in the accompanying tables. To reduce the complexity of presenting this information, the ratings given are based on operating temperatures of 1000°F for wells made of Carbon Steel (C-1018), A.I.S.I. 304 & A.I.S.I. 316. Values for brass wells are based on 350°F (177°C) operation. Limits for Monel wells are based on 900°F (482°C) service. Slightly higher velocity is possible at lower temperatures.

Where single values appear in the velocity tables, they may be considered safe for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. The values in parenthesis, therefore, represent safe values for water flow while the unbracketed value may be used for steam, air, gas and similar density fluids. The values given are conservative and intended as a guide. Wells are also safe if the resonant frequency is well below the wake frequency or if the fluid velocity is constantly fluctuating through the critical velocity point. Nevertheless, if the installation is not hampered by the use of a sufficiently stiff well, the values given should not be exceeded.





VELOCITY TEMPERATURE AND PRESSURE DATA

Maximum Fluid Velocity In Feet Per Second

Table No.	Material	Insertion Length "U"							
		2½	4½	7½	10½	13½	16½	19½	22½
V1	Brass	207 (59.3)	75.5 (32.2)	27.3 (19.7)	13.9	8.4	5.6	4.1	3.0
	Carbon Steel	290 (106)	105 (59)	38.2 (36.3)	19.4	11.8	7.8	5.7	4.2
	A.I.S.I. 304 & 316	300 (148)	109 (82.2)	39.5	20.1	12.2	8.1	5.9	4.4
	Monel	261 (118)	95 (65.5)	34.4	17.5	10.5	7.1	5.2	3.8
V2	Brass	207 (59.3)	89.1 (39.8)	32.2 (23.9)	16.4	9.9	6.6	4.8	3.6
	Carbon Steel	290 (106)	123 (71.2)	44.9 (42.7)	22.8	13.8	9.3	6.7	4.9
	A.I.S.I. 304 & 316	300 (148)	128 (99.3)	46.4	23.6	14.3	9.6	6.9	5.1
	Monel	261 (118)	112 (79.8)	40.6	20.7	12.4	8.3	6.1	4.5
V3	Brass	207 (59.3)	102 (47.6)	37.0 (28)	18.8	11.4	7.6	5.5	4.1
	Carbon Steel	290 (106)	143 (84.3)	51.6 (50.6)	26.2	15.9	10.6	7.6	5.7
	A.I.S.I. 304 & 316	300 (148)	148 (117)	53.5	27.2	16.5	11.0	7.9	5.9
	Monel	261 (118)	128 (93.3)	46.7	23.7	14.4	9.5	6.9	5.1
V4	Brass	305 (97.5)	93.8 (54.1)	33.9	17.1	10.5	7.0	5.0	3.7
	Carbon Steel	386 (175)	180 (97.2)	65.3 (58.3)	33.0	20.1	13.4	9.6	7.1
	A.I.S.I. 304 & 316	440 (243)	197 (135)	71.2	36.0	22.0	14.7	0.5	7.8
	Monel	354 (195)	155 (108)	56.1	28.4	17.3	11.6	7.5	5.6
V5	Brass	354 (161)	108 (89.5)	39.4	19.8	12.2	8.1	5.8	4.3
	Carbon Steel	448 (289)	209 (161)	75.7	38.4	23.3	15.5	11.1	8.2
	A.I.S.I. 304 & 316	490 (403)	228 (225)	82.5	41.8	25.5	17.1	12.2	9.1
	Monel	410 (322)	179 (178)	65.1	33.0	20.1	13.5	8.7	6.5
V6	Brass	321 (150)	129 (83.5)	46.8	23.6	14.5	9.6	6.9	5.1
	Carbon Steel	410 (270)	249 (150)	90.3	45.6	27.8	18.5	13.2	9.8
	A.I.S.I. 304 & 316	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7
	Monel	396 (300)	214 (167)	77.5	39.2	23.8	16.0	10.3	7.7
V7	Brass	290 (145)	150 (80)	54.1 (48)	27.6	16.7	11.1	8.0	6.0
	Carbon Steel	326 (260)	192 (144)	69.5	35.4	20.5	14.3	10.3	7.7
	A.I.S.I. 304 & 316	349 (360)	199	71.9	36.6	21.2	14.8	10.7	8.0
	Monel	316 (320)	189 (178)	68.1	34.8	20.8	14.0	10.0	7.5

Maximum Fluid Velocity In Feet Per Second

Table No.	Material	Insertion Length "U"						
		2	4	7	10	13	16	22
V8	Carbon Steel	404 (129)	184 (71.2)	67.0 (42.7)	34.0	20.6	13.7	7.4
	A.I.S.I. 304 & 316	430 (179)	192 (99.3)	69.7 (59.6)	35.4	21.5	14.3	7.7
	Monel	350 (143)	168 (79.8)	61 (47.7)	31.0	18.8	12.5	6.7
V9	Carbon Steel	410 (152)	248 (84.3)	91.3 (50.6)	45.7	27.6	18.5	10.0
	A.I.S.I. 304 & 316	444 (211)	258 (117)	95.2 (70.3)	47.6	28.8	19.3	10.4
	Monel	338 (168)	226 (93.3)	83.3 (56.0)	41.6	25.2	16.9	9.1

Pressure – Temperature Rating Lbs. Per Sq. Inch

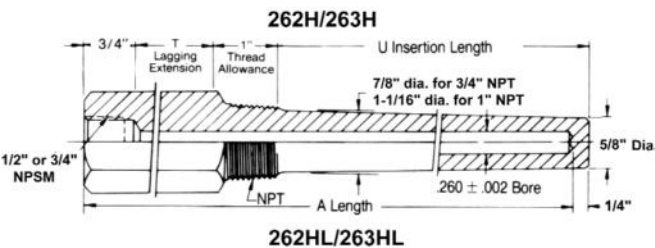
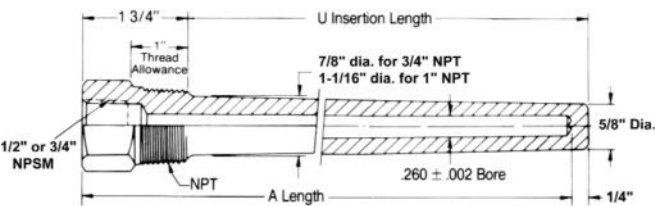
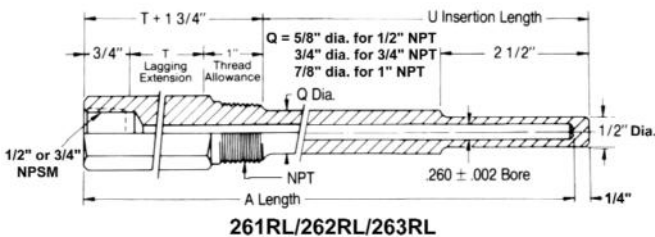
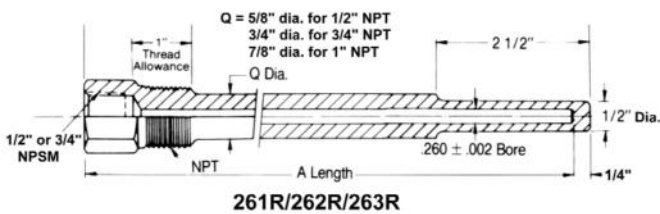
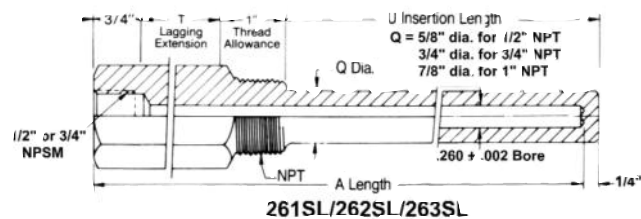
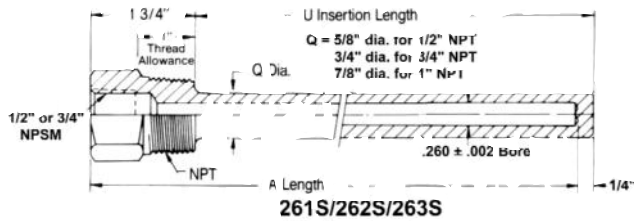
Table No.	Material	Temperature °F/°C						
		70°/22°	200°/94°	400°/205°	600°/316°	800°/427°	1000°/538°	1200°/649°
T1	Brass	5000	4200	1000	—	—	—	—
	Carbon Steel	5200	5000	4800	4600	3500	1500	—
	A.I.S.I. 304	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	7000	7000	6400	6200	6100	5100	2500
	Monel	6500	6000	5400	5300	5200	1500	—
T2	Brass	5300	4750	1100	—	—	—	—
	Carbon Steel	5950	5750	5450	5250	4000	1750	—
	A.I.S.I. 304	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	7800	7800	7250	7100	6950	5800	2720
Monel	7450	6850	6150	6100	5940	1750	—	

Maximum Flange Pressure – Temperature Rating Lbs. Per Sq. Inch

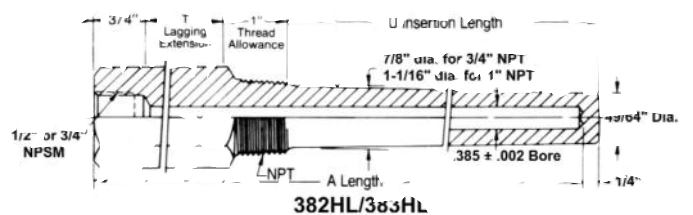
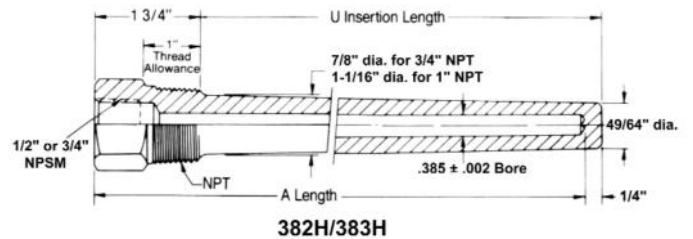
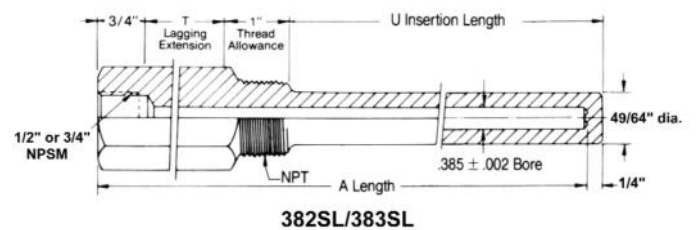
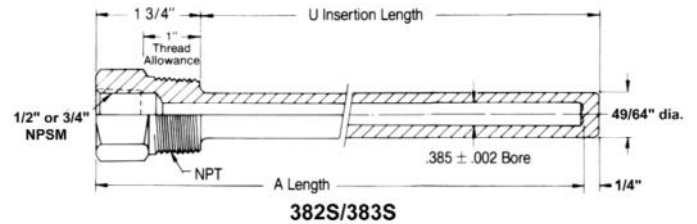
Material	Temperature °F/°C						
	0°/-18°	200°/94°	400°/205°	600°/316°	800°/427°	1000°/538°	1125°/608°
Carbon Steel	___ up to	___	___	___	___	___	2500#
A.I.S.I. — 304	___ up to	___	___	___	___	___	2500#
A.I.S.I. — 316	___ up to	___	___	___	___	___	2500#
Monel	___ up to	___	___	___	___	___	2500#

DRILLED THERMOWELLS

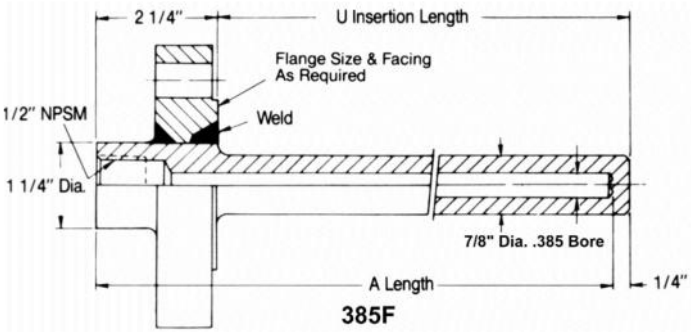
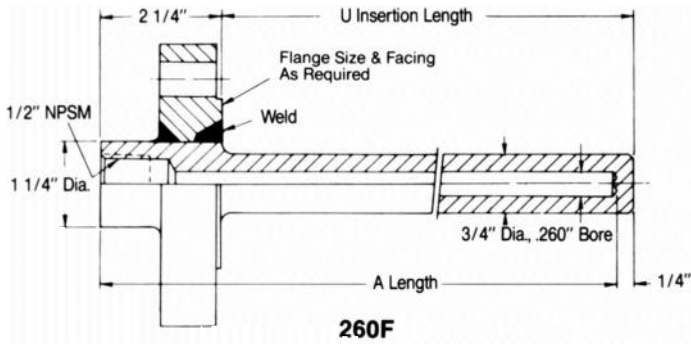
260 Series Thermowells



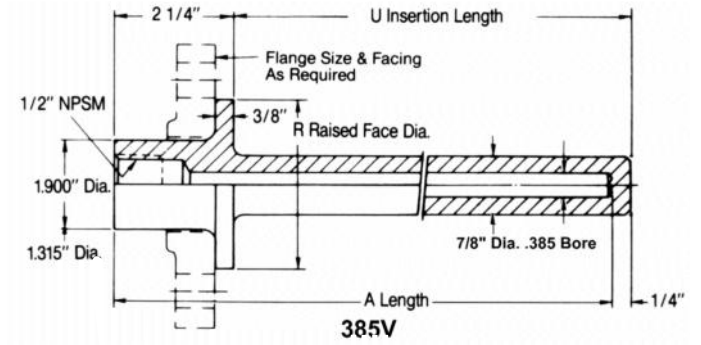
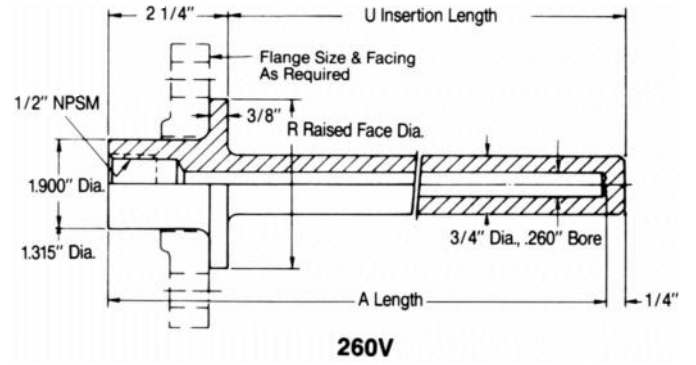
380 Series Thermowells



Flanged Thermowells



Van Stone Thermowells



DRILLED THERMOWELLS

Part No.	Style	Applicable Tables	
		Temperature	Velocity
261S	1/2" NPT Process Thread	T1	V1
262S	3/4" NPT Process Thread	T1	V2
263S	1" NPT Process Thread	T1	V3
261SL	1/2" NPT Process Thread with Lag	T1	V1
262SL	3/4" NPT Process Thread with Lag	T1	V2
263SL	1" NPT Process Thread with Lag	T1	V3
261R	1/2" NPT Process Thread	T1	V1
262R	3/4" NPT Process Thread	T1	V2
263R	1" NPT Process Thread	T1	V3
261RL	1/2" NPT Process Thread with Lag	T1	V1
262RL	3/4" NPT Process Thread with Lag	T1	V2
263RL	1" NPT Process Thread with Lag	T1	V3
262H	3/4" NPT Process Thread	T2	V4
263H	1" NPT Process Thread	T2	V5

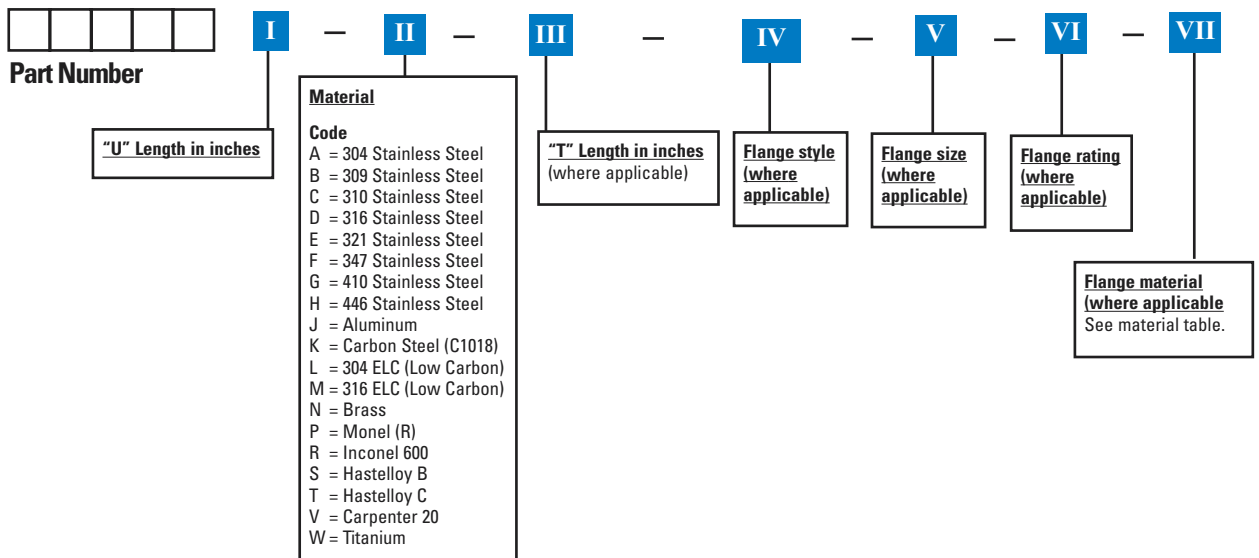
Part No.	Style	Applicable Tables	
		Temperature	Velocity
262HL	3/4" NPT Process Thread with Lag	T2	V4
263HL	1" NPT Process Thread with Lag	T2	V5
382S	3/4" NPT Process Thread	T1	V7
383S	1" NPT Process Thread	T1	V7
382SL	3/4" NPT Process Thread with Lag	T1	V7
383SL	1" NPT Process Thread with Lag	T1	V7
382H	3/4" NPT Process Thread	T1	V6
383H	1" NPT Process Thread	T1	V6
382HL	3/4" NPT Process Thread with Lag	T1	V6
383HL	1" NPT Process Thread with Lag	T1	V6
260F	.260 Bore with Flange	T3	V8
385F	.385 Bore with Flange	T3	V9
260V	.260 Bore, Van Stone Type	T3	V8
385V	.385 Bore, Van Stone Type	T3	V9

Ordering Information

Part Number Examples:

Thermowell: 2 6 2 S L 4.5 A 2 0 0 0 0

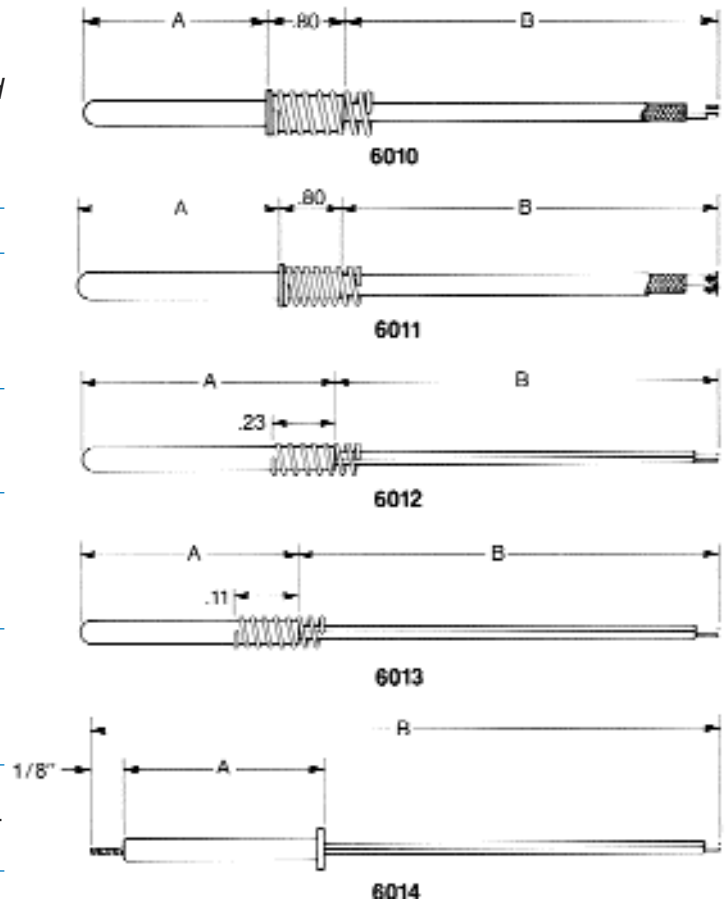
Flanged Thermowell: 2 6 0 F 10 A 0 RF 1.5 150 K



BEARING METAL THERMOCOUPLES

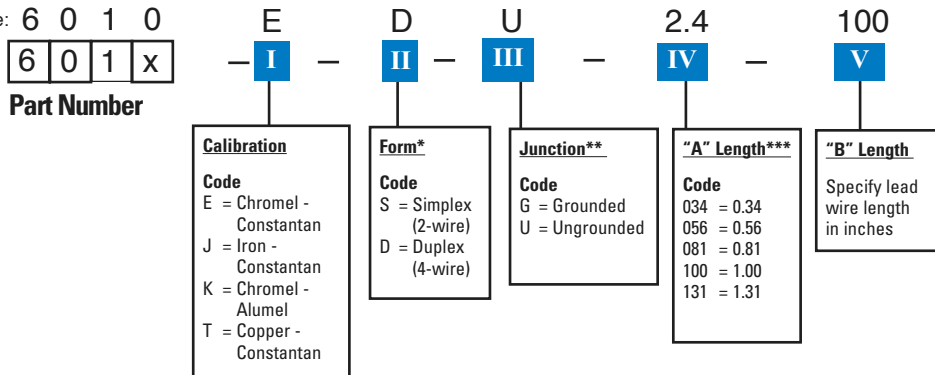
The sensors offered below are time-proven devices for measuring bearing temperatures on large rotating equipment found in generating stations. Their construction and materials meet rigid specifications and quality requirements of original equipment manufacturers.

Part No.	Style
6010	3/16" diameter sensor, spring loaded with twisted and shielded lead wire for simplex or duplex bearing metal thermocouple requirements.
6011	1/4" diameter sensor, spring loaded with twisted and shielded lead wire for triplex bearing metal thermocouple requirements.
6012	3/16" diameter sensor, spring loaded with rip-cord style lead wire for simplex or duplex thrust bearing thermocouple requirements (deep mount).
6013	3/16" diameter sensor, spring loaded with rip-cord style lead wire for simplex or duplex thrust bearing thermocouple requirements (shallow mount).
6014	3/16" diameter sensor, internally spring loaded with flange, twisted measuring junction, and rip-cord style simplex lead wire.



Ordering Information

Part Number Example: 6 0 1 0



*Omit selection for part number 6011.

**Omit selection for part number 6014.

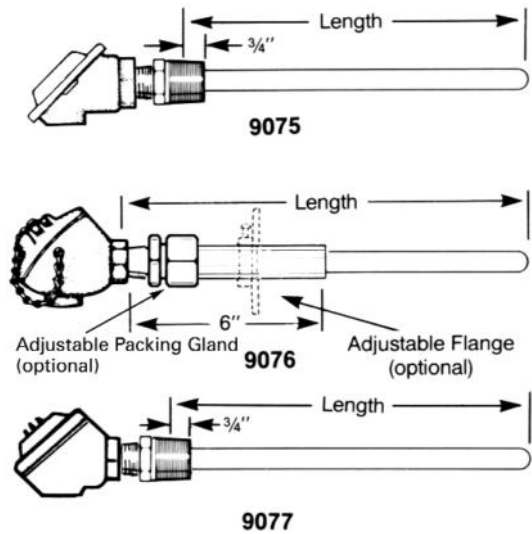
***These selections are only for part number 6014; otherwise, any number may be specified.

CERAMIC-TYPE PROTECTION TUBE ASSEMBLIES

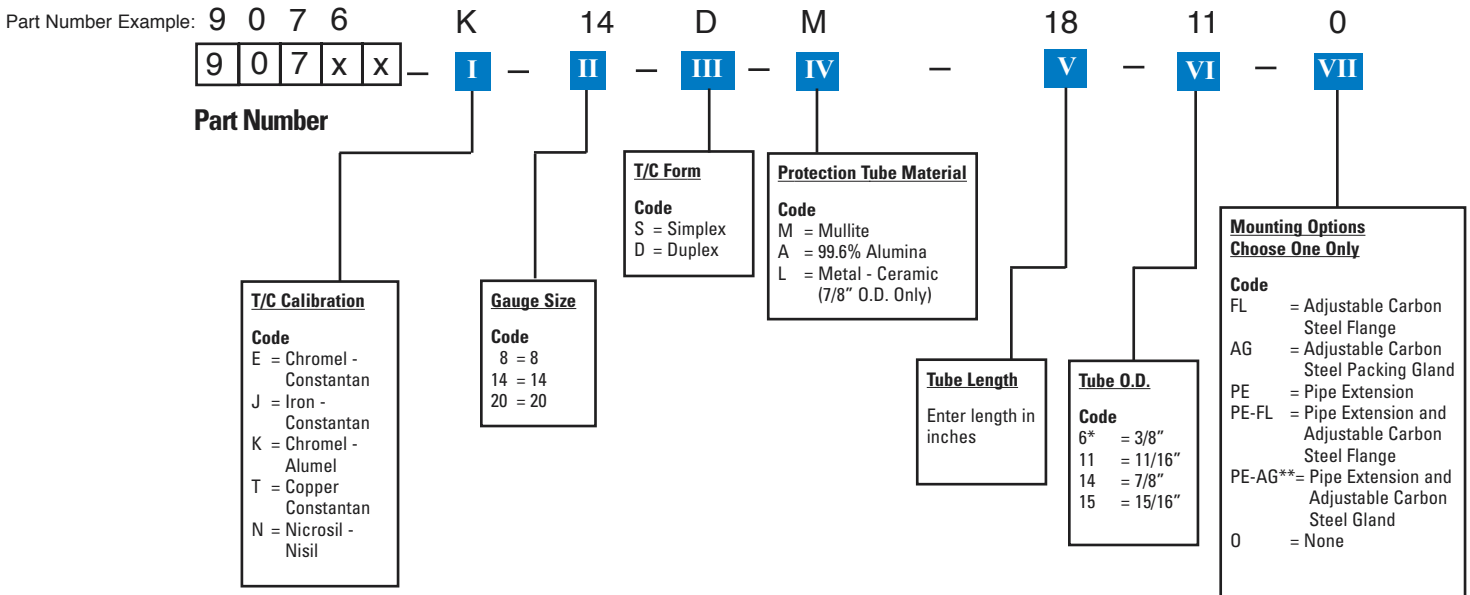
Ceramic protection tube assemblies are offered in a wide variety of aluminum connection heads and mounting options. Specifications and part numbers are detailed in the tables below to permit excellent flexibility in selecting the exact design required. Assemblies are shipped pre-tested and ready to install.

STRAIGHT – CERAMIC PROTECTION TUBE ASSEMBLIES

Part No.	Style
9075	General Purpose connection head.
9076	Heavy Duty Screw Cover connection head.
9077	Light Weight Screw Cover connection head.



Ordering Information



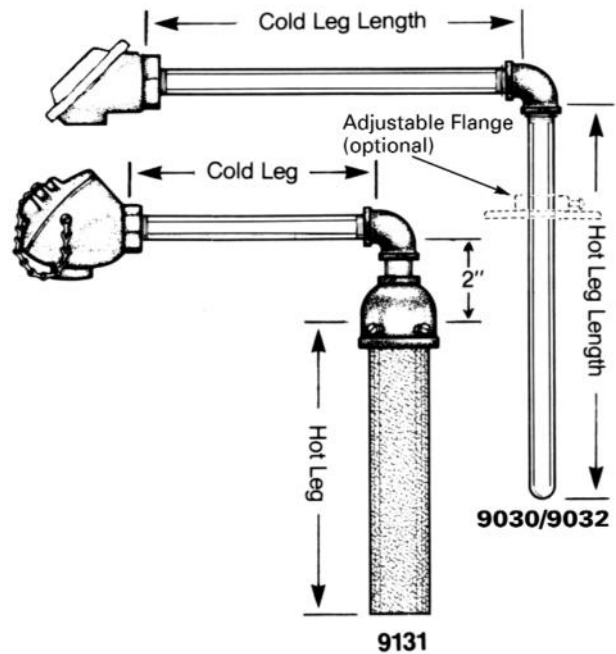
*Maximum wire size is 20 gauge.

**Minimum pipe extension length is four inches.

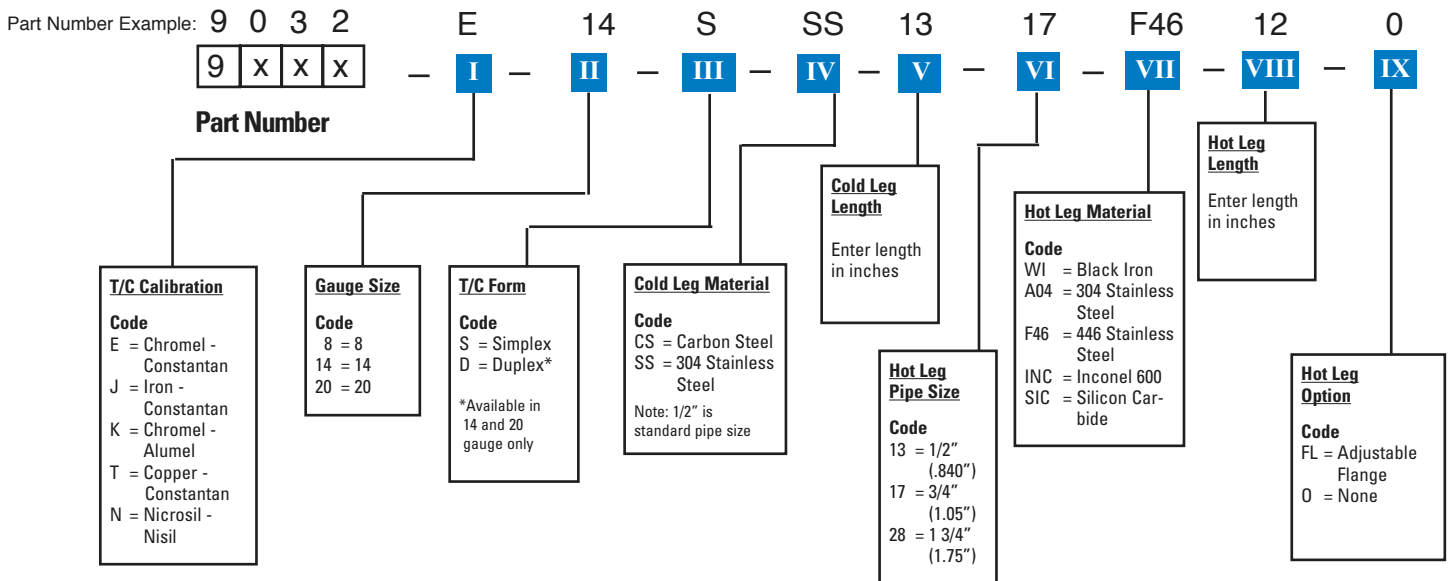
ANGLED-METAL PROTECTION TUBE ASSEMBLIES

ANGLED-METAL PROTECTION TUBE ASSEMBLIES

Part No.	Style
9030	Schedule 40 H.L. pipe with General Purpose connection head.
9032	Schedule 80 H.L. pipe with General Purpose connection head.
9130	Silicone carbide H.L. with General Purpose connection head.
9033	Schedule 80 H.L. pipe with Heavy Duty connection head.
9131	Silicone carbide H.L. with Heavy Duty connection head.

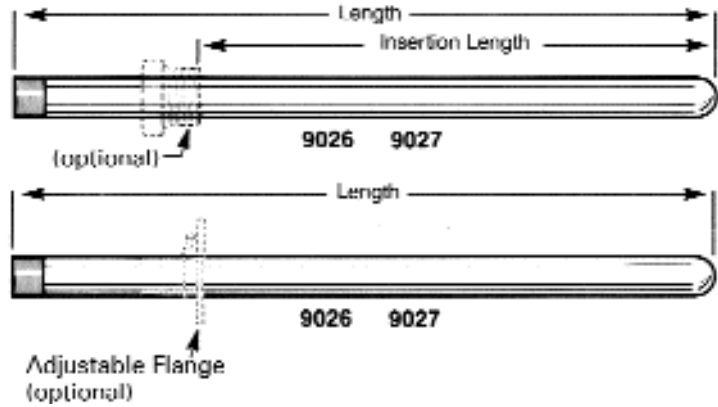


Ordering Information



Metal protection tubes offer environmental and mechanical protection for base metal thermocouples. Care should be exercised in selection of material and design in order to achieve optimum performance and economy. Athena personnel can assist you in making the best selection based on experience and the technical data presented in this catalog. The specification selection tables below, offer a variety of standard mounting options.

METAL PROTECTION TUBES



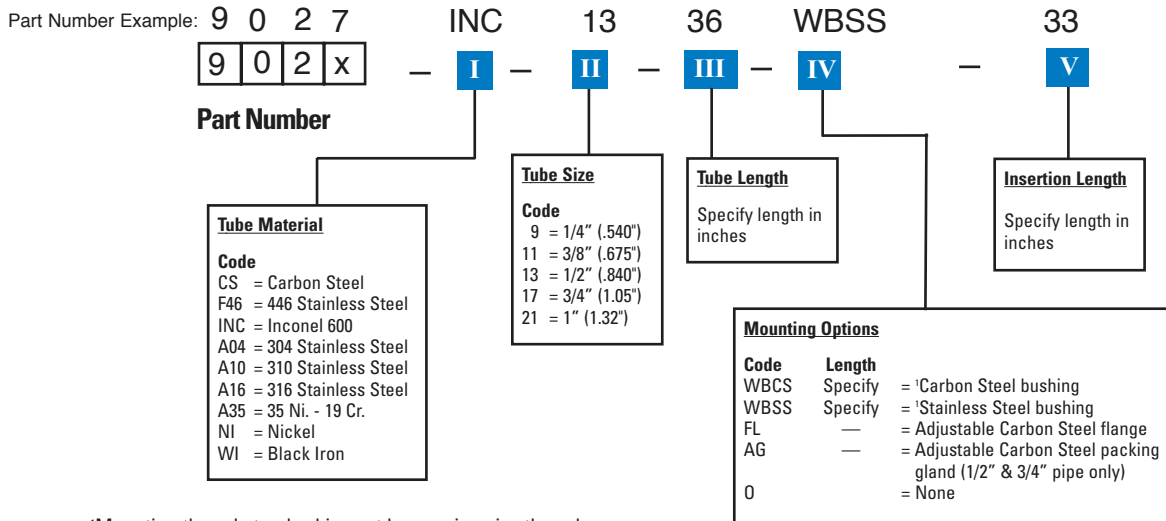
METAL PROTECTION TUBES

Part No.	Style
9026	Schedule 40 pipe
9027	Schedule 80 pipe

Nom. Size	Outside Diameter, in	Wall Thickness, inches	
		Sch. 40	Sch. 80
*1/8	0.405	.068	.095
1/4	0.540	.088	.119
3/8	0.675	.091	.126
1/2	0.840	.109	.147
3/4	1.050	.113	.154
1	1.315	.133	.179
*1-1/4	1.666	.140	.191
*1-1/2	1.900	.145	.200
*2	2.375	.154	.218

*Non-stock item. Available upon request.

Ordering Information



¹Mounting thread standard is next larger pipe size thread.

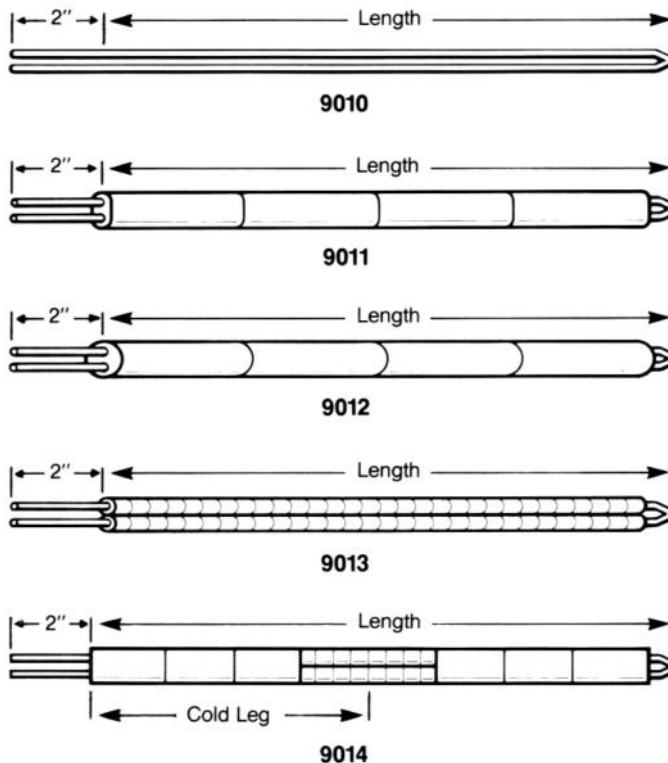
REPLACEMENT ELEMENTS - BASE METAL TYPE

A thermocouple element is the heart of all thermocouple assemblies. Prudent selection of gauge size, length and type of insulation is essential for optimum performance and economy. Tudor personnel can assist you in making the best selection based on the experience and the technical data present in this catalog.

BASE METAL REPLACEMENT ELEMENTS

Part No.	Style
9010	Bare wire without insulators.
9011	3" oval insulators. Not available in duplex.
9012	3" round insulators.
9013	Ball & socket insulators.
9014	Flexible section for angle type.

BASE METAL ELEMENTS



Ordering Information

Part Number Example: 9 0 1 2 K 14 S 36

9 0 1 x

Part Number

K

I

14

II

S

III

36

IV

V

V

T/C Calibration

Code

E = Chromel - Constantan
 J = Iron - Constantan
 K = Chromel - Alumel
 N = Nicrosil - Nisil
 T = Copper - Constantan

Gauge Size

Code

8 = 8 ga
 14 = 14 ga
 20 = 20 ga
 30 = 30 ga

T/C Form

Code

S = Simplex
 D = Duplex

Length

Specify length in inches

Cold Leg Length

Specify length in inches (9014 only)

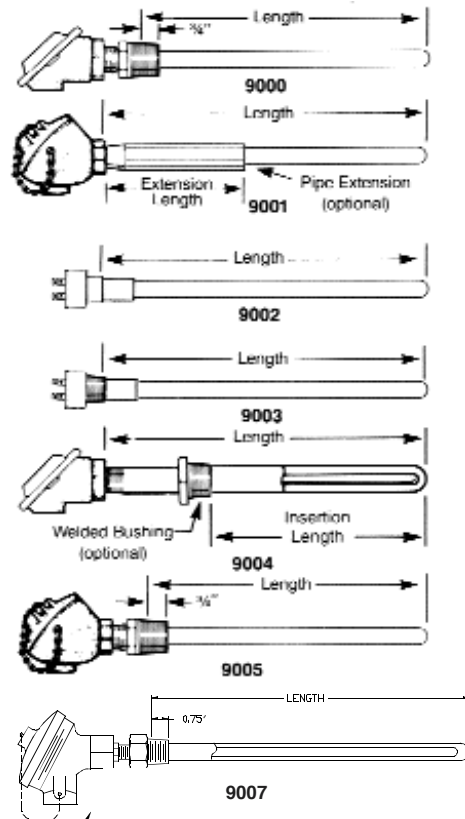


NOBLE METAL THERMOCOUPLE ASSEMBLIES

Noble metal thermocouple assemblies are for measurement of temperatures that range above that of base-metal couples, (to 3200°F/1760°C), or for more precise measurements at lower temperatures where the additional cost is justified. These assemblies come in a wide variety of ceramic primary protection tubes, and with ceramic or metal secondary protection tubes. **Thermocouple conductors are 24 gauge (0.020) unless otherwise specified.** All assemblies are pretested and ready to install.

NOBLE METAL ASSEMBLIES

Part No.	Style
9000	Noble metal assembly with General Purpose head.
9001	Noble metal assembly with Heavy Duty Screw Cover head.
9002	Noble metal assembly with Open Terminal head.
9003	Noble metal assembly with Open Terminal head and 1" NPT mounting thread.
9004	Noble metal assembly with General Purpose head and Ceramic Primary tube, Inconel 1/2" I.P.S. Secondary tube.
9005	Noble metal assembly with Heavy Duty Screw Cover head with Primary and Secondary ceramic tubes.
9007	Noble metal assembly with cast iron head.



Ordering Information

Part Number Example:

P 9 0 0 1 S D A11 24 PE 6

P 9 0 0 x

Part Number

Limits of Error

Code
T = Standard
P = Premium

T/C Calibration

24 gauge (.020)

Code
B = Plat. 30% Rh-Plat. 6% Rh
R = Plat. 13% Rh-Plat.
S = Plat. 10% Rh-Plat.

T/C Calibration

30 gauge (.010)

Code
B3 = Plat. 30% Rh-Plat. 6% Rh
R3 = Plat. 13% Rh-Plat.
S3 = Plat. 10% Rh-Plat.

T/C Form

Code
S = Simplex
D = Duplex**

Tube Material

Code
*A11 = 99.6% Alumina 7/16" x 11/16"
*M11 = Mullite 7/16" x 11/16"
***A6 = 99.6% Alumina 1/4" x 3/8"
***M6 = Mullite 1/4" x 3/8"

Tube Length

Specify length in inches

Pipe Extension Length (where applicable)
Specify length in inches

Mounting Options

Code Length
PE - Specify = Pipe Extension
PE-FL - Specify = Pipe Extension with Flange
VF** - — = Vented Fitting
O - — = N/A
WBSC - Specify = Carbon Steel Welded Bushing
WBSS - Specify = Stainless Steel Welded Bushing
TN - — = 3/4" NPT Process Connection

*Not available when ordering 9004.

**Not available when ordering 9002 and 9003.

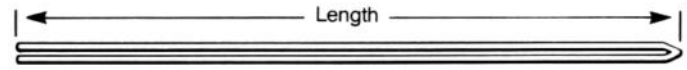
***Not available when ordering 9005.

THERMOCOUPLE REPLACEMENT ELEMENTS

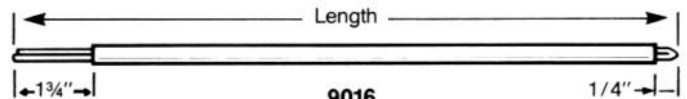
NOBLE METAL & REFRACTORY METAL REPLACEMENT ELEMENTS

Part No.	Style
9015	Bare wire without insulators.
9016	Full length insulators.
9017	Full length insulator & collar.
9017F	Flexible noble metal.

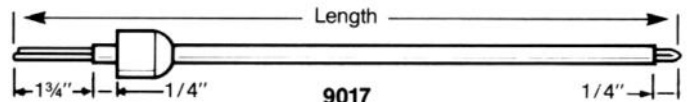
NOBLE AND REFRACTORY METAL ELEMENTS



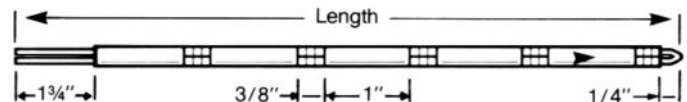
9015



9016



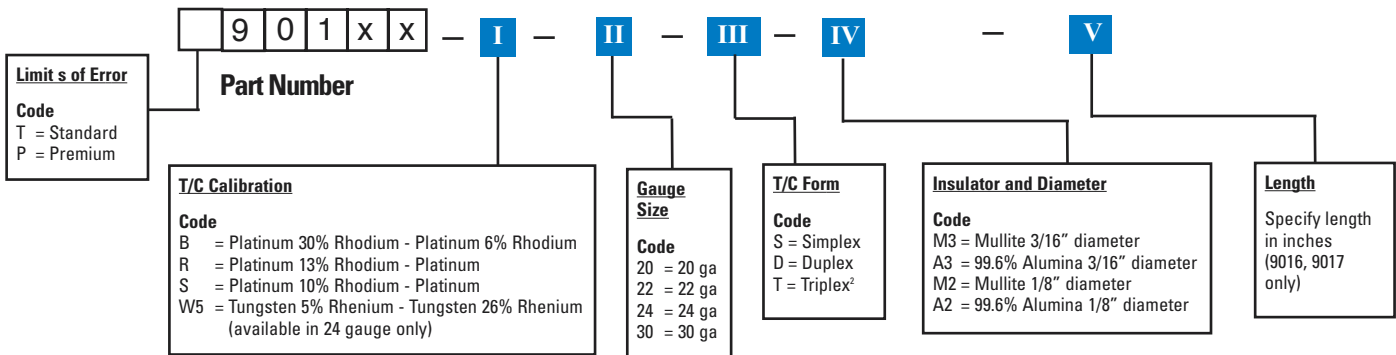
9017



9017F

Ordering Information

Part Number Example: T 9 0 1 6 B 24 S A3 18





CERAMIC AND NON-METALLIC PROTECTION TUBES

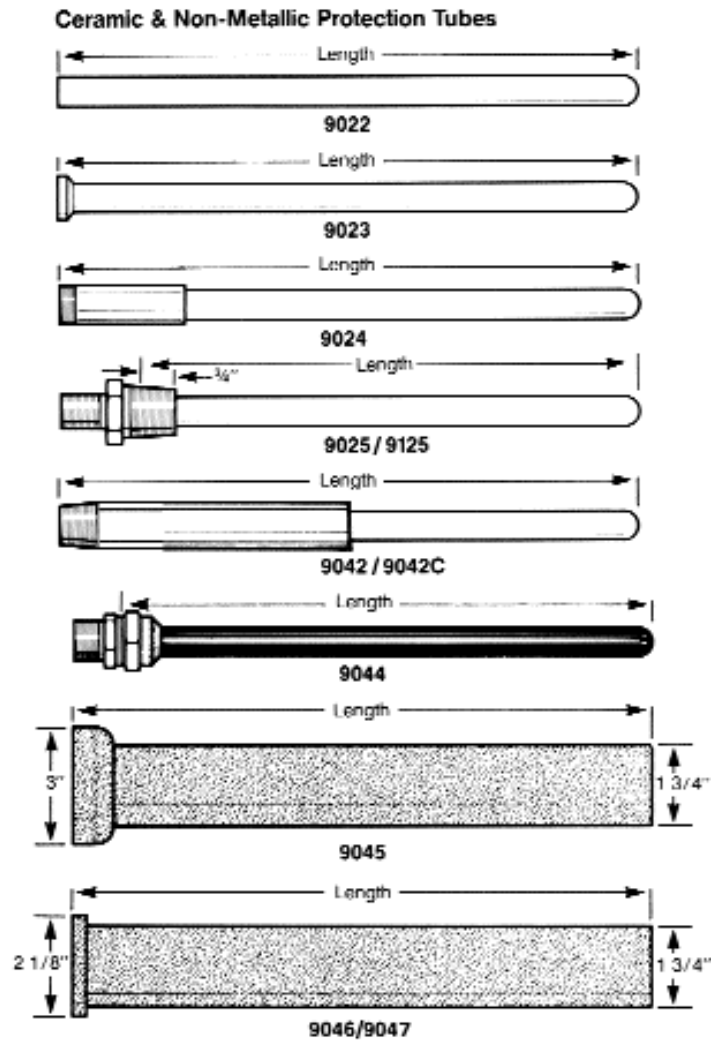
Ceramic protection tubes are hemispherically closed on one end, and are offered in mullite, hi-purity alumina, and high temperature materials. These tubes are superior to metallic tubes at high temperatures and provide a virtually gas-tight enclosure to protect against harsh environments.

CERAMIC AND NON-METALLIC PROTECTION TUBES

Part No.	Style
9022	Plain
9023	With collar.
9024	With 2" brass ferrule (7/8" — 27 thread)
9025	With fitting — 3/4" NPT thread ¹
9125	With fitting — 1 1/4" NPT thread
9042	With 6" stainless steel pipe extension
9042C	With 6" carbon steel pipe extension
9044 ²	Metal-Ceramic — 7/8" O.D. — 3/4 NPT conduit connection
9045 ²	Silicon-Carbide with 3" collar — 1" I.D.
9046 ²	Silicon-Carbide with 2 1/8" collar — 1" I.D.
9047 ²	Silicon-Carbide plain — 1" I.D.

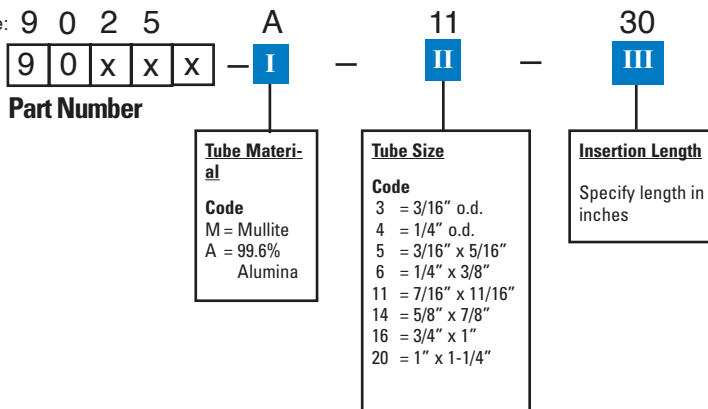
¹Maximum tube size is 11/16" O.D.

²Omit selection from **Tube Material** and **Tube Size**.



Ordering Information

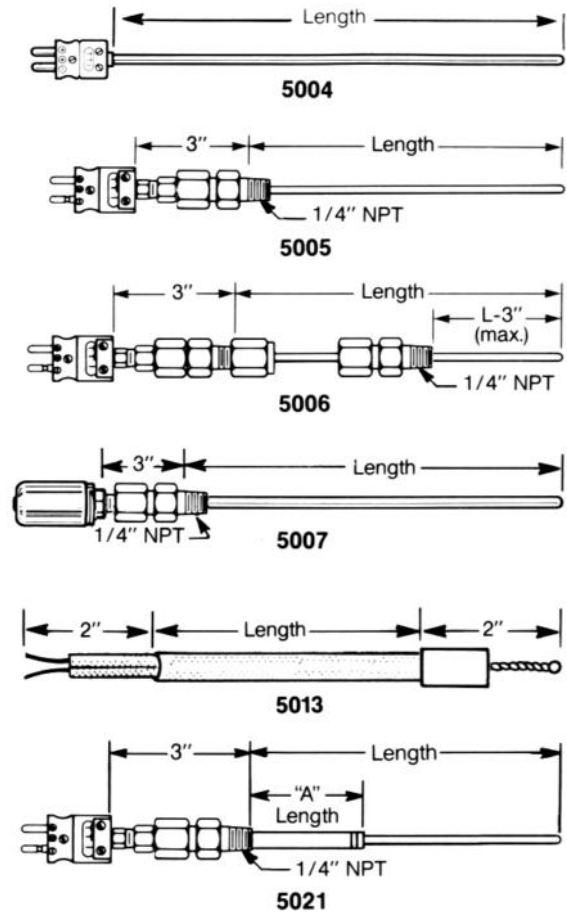
Part Number Example: 9 0 2 5



VACUUM FURNACE THERMOCOUPLES

Athena's vacuum furnace thermocouples offer high reliability and time-proven performance. Made of the highest quality materials, some of these thermocouple assemblies feature vacuum tight seals and threaded process connections as standard features. Other quality accessory products and factory replacement parts are also listed to complete the temperature measurement system. **Other sheath materials are available - consult factory.**

Part No.	Style
5004	Quick connect plug with molybdenum sheath and potted end seal.
5005	Quick connect plug with molybdenum sheath and vacuum gland end seal.
5006	Same as 5005 with a vacuum type variable immersion fitting.
5007	Miniature lightweight head with molybdenum sheath and vacuum gland end seal.
5008	Same as 5007 with a vacuum type variable immersion fitting.
5013	Work-survey chromel-alumel (Type "K") T/C. High temperature glass insulation, 20 gauge. Maximum measuring temperature 2000° F (1093° C).
5014	Same as 5013 except ceramic fiber insulation. Maximum measuring temperature 2300° F (1260° C).
5021	Quick connect plug with 1/4" OD high purity alumina tube, inconel sleeve and vacuum gland end seal.



Ordering Information

Part Number Example:

T 5 0 0 5

X 5 0 X X

Part Number

K

I

S

II

9

III

IV

IV

V

V

VI

VI

Limits of Error

Code
T = Standard
P = Premium

T/C Calibration

Code
K = Chromel - Alumel
N = Nicrosil - Nilil
B = Platinum
R = Platinum 13% Rhodium - Platinum
S = Platinum 10% Rhodium - Platinum
W5 = Tungsten 5% Rhenium - Tungsten
26% Rhenium (not available for 5004)

T/C Form

Code
S = Simplex
D = Duplex

Length

Code
Enter Length in Inches

"A" Inconel Sleeve (5021)

Code
Enter Length in Inches

Mounting Options (5004 and 5021 only)

Code
1 = 1/4" NPT Adjustable Mounting Fitting
0 = None

Tube O.D. (5004 to 5008)

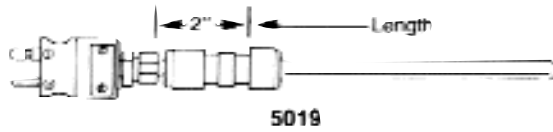
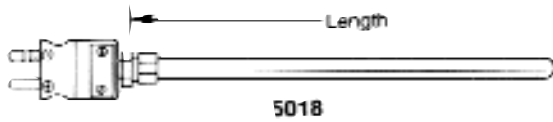
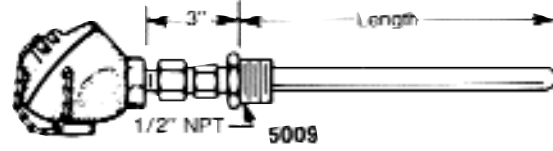
Code
2 = 1/8" outside tube diameter
3 = 3/16" outside tube diameter
4 = 1/4" outside tube diameter

For work survey thermocouples, refer to Tu-Pak 5000 Series on page 6 or spooled, insulated types on page 48.



VACUUM FURNACE THERMOCOUPLES

Part No.	Style
5009	Recrystallized alumina tube assembly with Screw Cover head and vacuum gland seal end.
5018	Recrystallized alumina tube assembly with Quick Connect plug and potted seal end.
5019	Recrystallized alumina tube assembly with Quick Connect plug and vacuum gland seal end.



Ordering Information

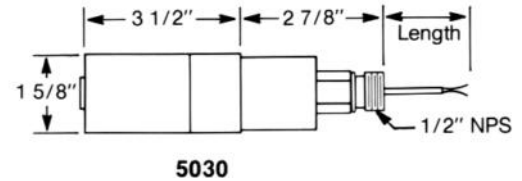
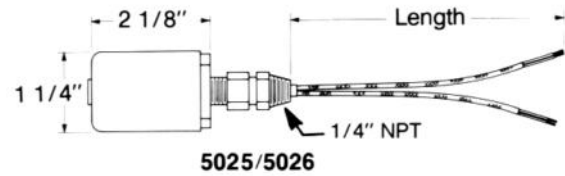
Part Number Example: 5 0 1 8

5	0	X	X	-	I	-	II	-	III	-	IV	-	V
Part Number													
T/C Calibration Code K = Chromel - Alumel N = Nicrosil - Nilil B = Platinum R = Platinum 13% Rhodium - Platinum S = Platinum 10% Rhodium - Platinum W5 = Tungsten 5% Rhenium - Tungsten 26% Rhenium (Not available in 5018 assembly)							T/C Form Code S = Simplex D = Duplex		Tube Length Code Enter Length in Inches		Tube O.D. Code 3F = 3/16" outside tube diameter 4 = 1/4" outside tube diameter 5 = 5/16" outside tube diameter 6 = 3/8" outside tube diameter		Mounting Options Code 0 = None 1 = Adjustable 1/2" NPT Mounting Adapter 2 = Adjustable 1/4" NPT SS Compression Fitting

VACUUM FURNACE THERMOCOUPLES

Part No.	Style
5025	Cold wall simplex vacuum feed through assembly with miniature closed head.
5026	Cold wall duplex vacuum feed through assembly with miniature closed head.
5030	Cold wall multiple conductor vacuum feed through assembly with compensated terminals. Four circuits maximum.

Omit selections from Number of Circuits when ordering 5025 and 5026.



Ordering Information

Part Number Example: 5 0 2 5 K 0 GG 24

5 0 x x
Part Number

T/C Calibration

Code

K = Chromel - Alumel
 N = Nicrosil - Nisil
 R = Platinum 13% Rhodium - Platinum
 S = Platinum 10% Rhodium - Platinum
 W5 = Tungsten 5% Rhenium - Tungsten 26% Rhenium

Number of Circuits

(For 5030 only)

Code
 Indicate number of circuits

Cold End Terminators

Code

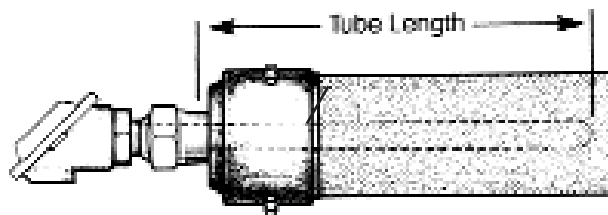
GG = Glass/Glass (600°F max.)
 ALL = Refrasil/Refrasil (2000°F max.)

Length

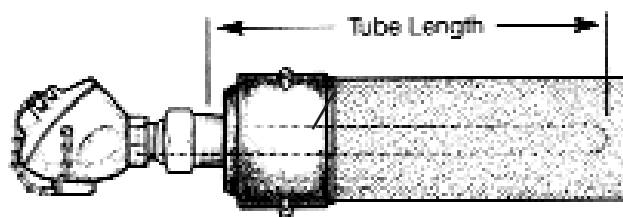
Code
 Enter Length in Inches

DOUBLE-TUBE ASSEMBLIES

Double tube assemblies are resistant to thermal shock and contaminating environments. They provide greater resistance to deterioration by combining the temperature and chemical resistance properties of both primary and secondary protection tubes. All assemblies are pretested and ready to install.



9038 9040



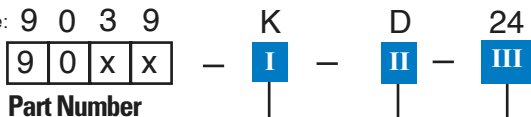
9039 9041

DOUBLE TUBE ASSEMBLIES

Part No.	Style
9038	General Purpose Head with Silicon Carbide and Mullite Tubes.
9040	General Purpose Head with Silicon Carbide and 99.6% Alumina Tubes.
9039	Heavy Duty Head with Silicon Carbide and Mullite Tubes.
9041	Heavy Duty Head with Silicon Carbide and 99.6% Alumina Tubes.

Ordering Information

Part Number Example: 9 0 3 9



T/C Calibration
Code
B = Plat. 30% Rh-Plat. 6% Rh
E = Chromel - Constantan
J = Iron - Constantan
K = Chromel - Alumel
N = Nicrosil - Nisil
R = Plat. 13% Rh-Plat.
S = Plat. 10% Rh-Plat.

T/C Form
Code
S = Simplex
D = Duplex

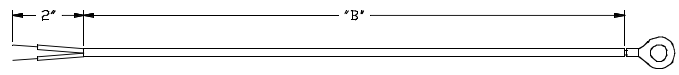
Tube Length
Code
12 = 12 Inches
18 = 18 Inches
24 = 24 Inches
30 = 30 Inches
36 = 36 Inches
42 = 42 Inches
48 = 48 Inches

WIRE-TYPE THERMOCOUPLES

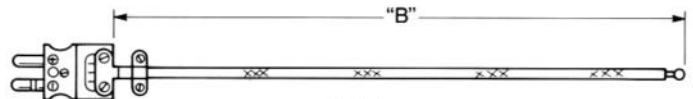
The Wire Type is a basic thermocouple which can be used for a variety of applications. The Washer Type can be easily mounted on any existing surface with a screw or a bolt. The insulated Wire Type and the Tube End Type are intended for general applications which require a basic, yet durable thermocouple for temperature measurement.

WIRE-TYPE THERMOCOUPLES

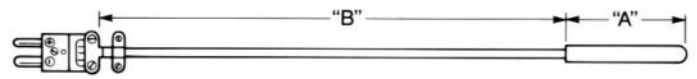
Part No.	Style
9108	Washer-Type assembly.
9109	Insulated Wire-Type assembly.
9110	Tube End-Type assembly, 3/16" OD tube.



9108



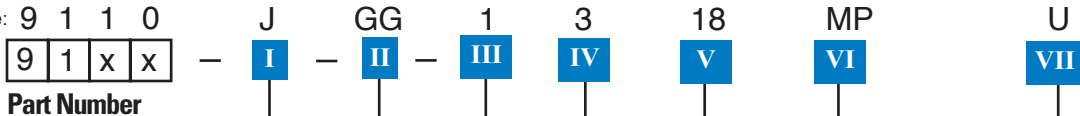
9109



9110

Ordering Information

Part Number Example: 9 1 1 0



T/C Calibration

Code
 E = Chromel - Constantan
 J = Iron - Constantan
 K = Chromel - Alumel
 T = Copper - Constantan

Wire Insulation

Code
 GG = Glass
 GGS = Glass with SS
 TT = Teflon
 TTS = Teflon with SS

"A" Length¹

Code
 Enter Length in Inches

"X" Washer² (for 9108)

Code
 1 = # 6 (.145")
 2 = # 8 (.170")
 3 = # 10 (.195")
 4 = 1/4 (.260")

"X" Diameter² (for 9110)

Code
 2 = 1/8"
 3 = 3/16"
 4 = 1/4"

"B" Length

Code
 Enter Length in Inches

Cold End Terminations

Code
 S = Stripped Leads
 P = Male Plug (300°F/149°C max.)
 MP = Mini Plug (300°F/149°C max.)
 J = Female Jack (300°F/149°C max.)
 MJ = Mini Jack (300°F max.)

Measuring Junction

Code
 G = Grounded (9108/9110)
 U = Ungrounded (9108/9110)
 E = Exposed (9108/9109)

¹Omit on part numbers 9108 and 9109.

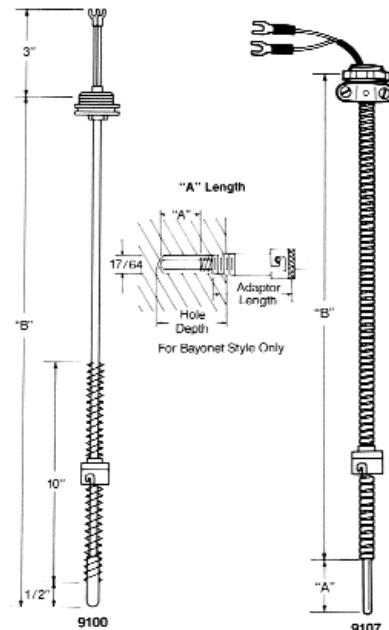
²Omit on part numbers 9109.

BAYONET-STYLE THERMOCOUPLES

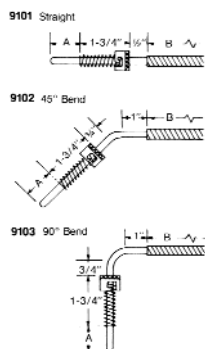
Tudor brand bayonet-style thermocouples are available in a wide selection of types, terminations, and accessories, including variable immersion to assure versatility. All bayonet thermocouples are shipped ready to install.

Part No.	Style
9100	Variable immersion bayonet assembly.
9101	Straight bayonet assembly.
9102	45° Bend bayonet assembly.
9103	90° Bend bayonet assembly.
9104	Straight immersion bayonet assembly.
9105	45° Bend immersion bayonet assembly.
9106	90° Bend immersion bayonet assembly.
9107	Variable immersion bayonet assembly with flex armor.

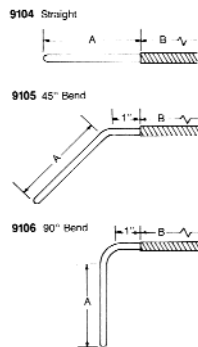
All tube diameters are 3/16" OD standard.



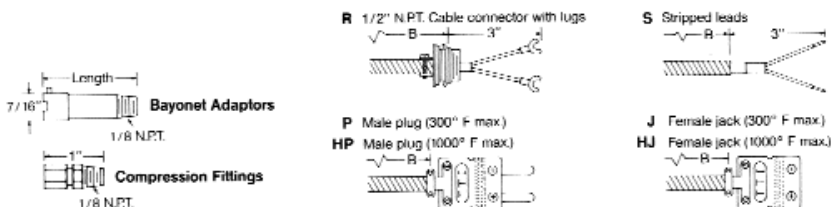
Bayonet Type



Immersion Type



Terminations & Accessories



Ordering Information

Part Number Example: 9 1 0 1 E 6 12 R 1

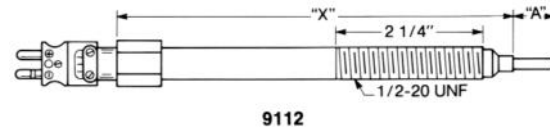
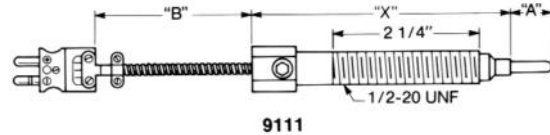
Part Number	T/C Calibration	"A" Length	"B" Length	Cold End Terminators	Bayonet Accessories
9 1 0 X	Code E = Chromel - Constantan J = Iron - Constantan K = Chromel - Alumel T = Copper - Constantan R = 100 ohm, 2-wire RI = 100 ohm, 3-wire	Code Enter length in inches (Omit on 9100)	Code Enter length in inches	Code R = 1/2" NPT cable connector with lugs P = Male plug (300°F max) HP = Male plug (1000°F max) S = Stripped leads J = Female jack (300°F max.) HJ = Female jack (1000°F max.)	Code 1 = 7/8" Bayonet adapter (nickel-plated brass) 2 = 1-1/2" Bayonet adapter (nickel-plated brass) 3 = 2-1/2" Bayonet adapter (nickel-plated brass) 4 = Brass (one time adjustable) compression fitting 5 = Stainless steel (one time adjustable) compression fitting 6 = Stainless steel (readjustable) compression fitting 0 = Enter 0 if no accessories are required

MELT-BOLT THERMOCOUPLES

Athena's Tudor brand Melt Bolt thermocouples are a reliable, quality product manufactured for a variety of uses in the plastics and packaging industries. Made of the finest materials, they meet rigid quality control and inspection standards. They feature easy installation with fast response to provide accurate control. All Melt Bolt thermocouples are shipped ready to install.

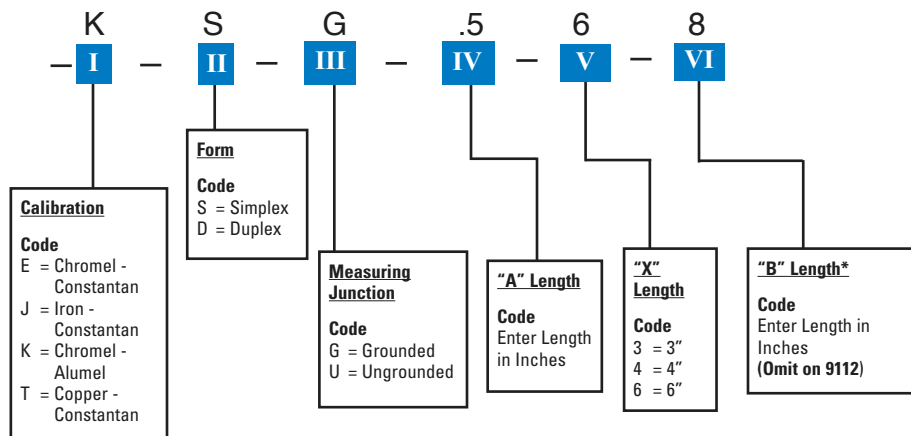
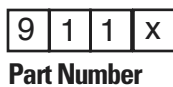
WIRE TYPE THERMOCOUPLES

Part No.	Style
9111	Melt Bolt Thermocouple with flex armor extension and male plug.
9112	Melt Bolt Thermocouple with male plug.

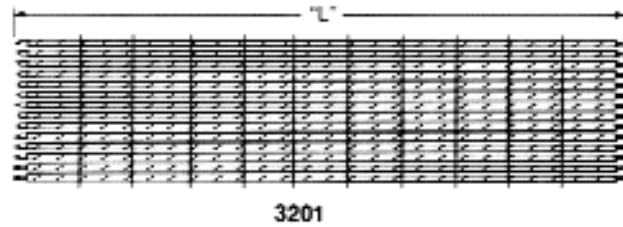


Ordering Information

Part Number Example: 9 1 1 1



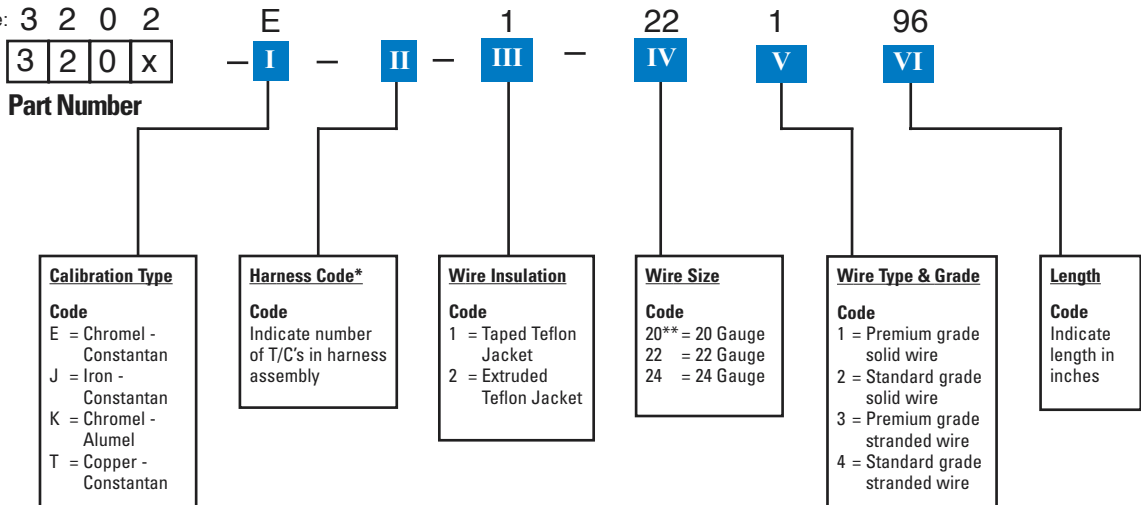
Athena's Tudor brand pharmaceutical thermocouples are designed especially for use in processing vaccines and other medications where very accurate temperature measurement is critical. Typical applications include steam sterilizers, autoclaves, steam and liquid pipe lines, tanks, etc. The units provide accurate temperature signals, fast response and can be supplied with calibration certificates for validation studies.



Part No.	Style
3201	Wire harness assembly (multiple thermocouple bundle).
3202	1/8" diameter stainless steel sheath probe.
3203	Replacement T/C element for P/N 3202.

Ordering Information

Part Number Example: 3 2 0 2



*Omit selection when ordering part numbers 3202 and 3203.

**Not available in part numbers 3202 and 3203.

RESISTANCE TEMPERATURE DETECTORS (RTDs)

Lead Wire Configurations



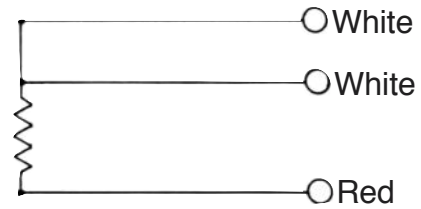
2-Wire RTD

Provides one connection to each end of the sensor. This configuration is suitable when the resistance of the lead wire can be considered an additive constant in the circuit and when changes in lead resistance, due to ambient temperature changes may be ignored.



4-Wire RTD Connected

Provides connections to each end of the sensor. Used for measurements requiring highest precision.



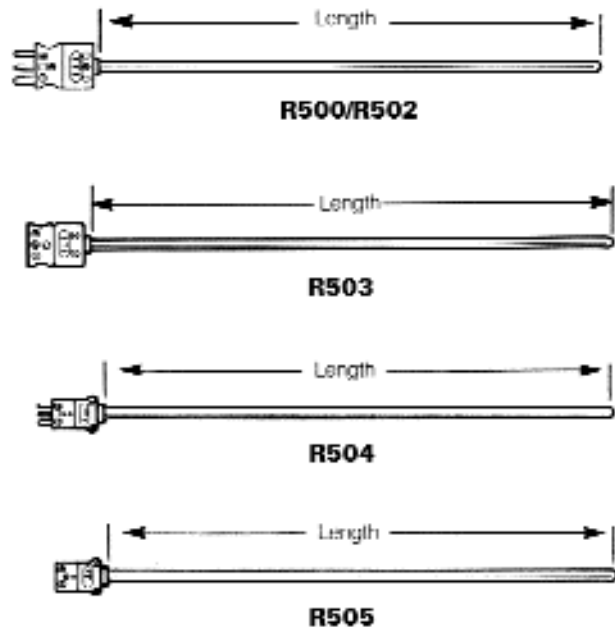
3-Wire RTD Compensated

This is the most commonly used configuration. It provides one connection to one end of the sensor and two to the other end. When connected to an instrument designed to accept a three wire input, compensation is achieved for lead resistance and temperature change in lead resistance.

RTDS - CONNECTOR-TYPE

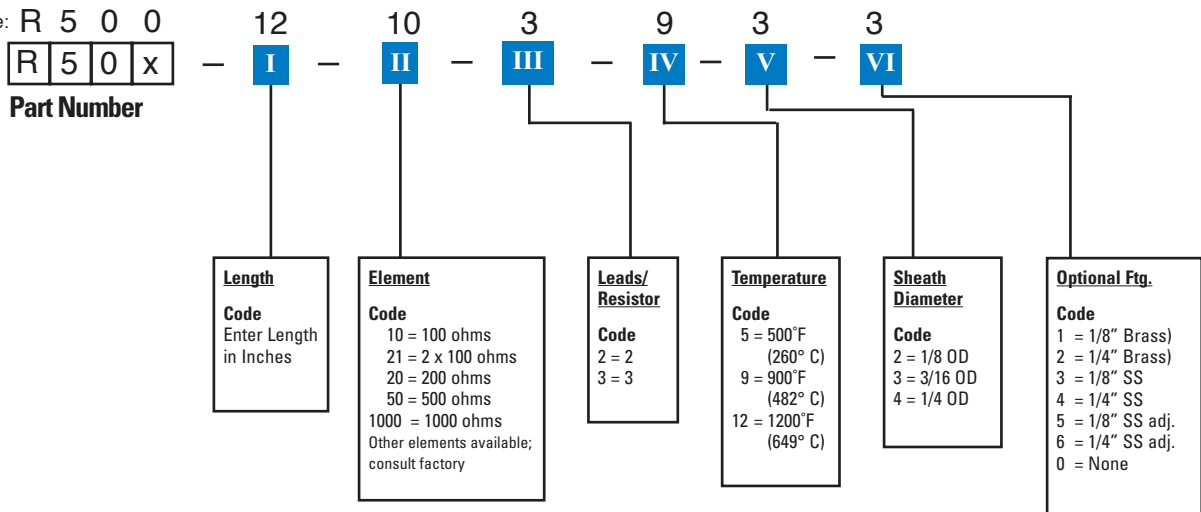
RTD Assemblies

Part No.	Style
R500	350°F (177°C) max. Standard Male Connector.
R501	350°F (177°C) max. Standard Female Connector.
R502	1000°F (538°C) max. Standard Male Connector.
R503	1000°F (538°C) max. Standard Female Connector.
R504	350°F (177°C) max. Miniature Male Connector, available in 1/8 and 3/16 sheath diameter only.
R505	350°F (177°C) max. Miniature Female Connector, available in 1/8 and 3/16 sheath diameter only.



Ordering Information

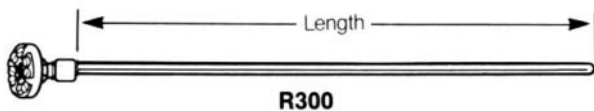
Part Number Example: R 5 0 0



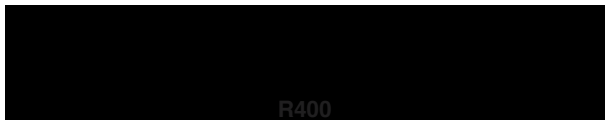
RTDs - HEAD-TYPE

RTD ASSEMBLIES

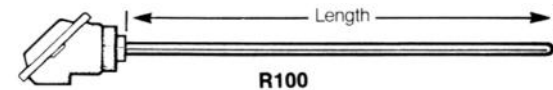
Part No.	Style
R100	Gen. Purpose Cast Aluminum Head (4 wires max.)
R102	Hazardous Location Cast Aluminum Head.
R103	Screw Cover Thermoplastic Head.
R104	Screw Cover Cast Iron Head.
R200	Screw Cover Cast Aluminum Head.
R202	Screw Cover Cast Aluminum Head with 1/2" NPT SS spring loaded oil and vapor seal.
R204	Screw Cover Cast Aluminum Head with 1/2" NPT nipple spring loaded.
R205	Screw Cover Cast Aluminum Head with 1/2" NPT nipples and union, spring loaded.
R300	300°F (149°C) max. Open Head (4 wires max.)
R400	Bayonet Cover Mini-Head (4 wires max.)



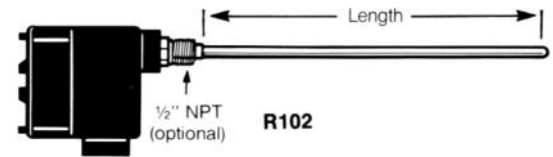
R300



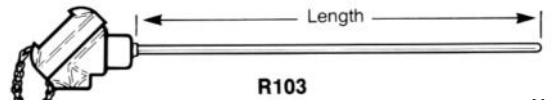
R400



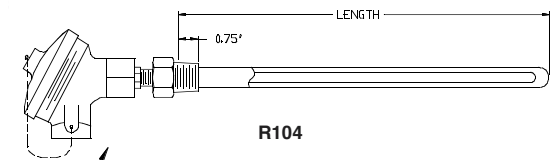
R100



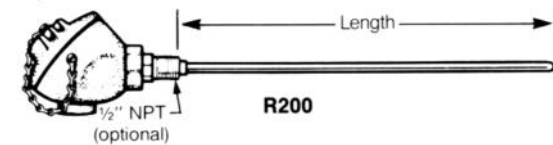
R102



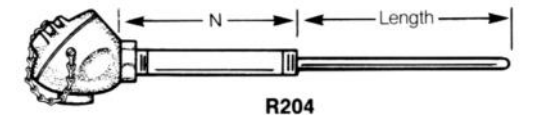
R103



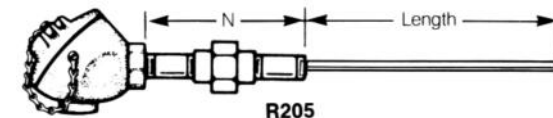
R104



R200



R204



R205

Ordering Information

Part Number Example:

R 1 0 3

8

21

3

5

4

7S

R x 0 x

I

II

III

IV

V

VI

VII

Part Number

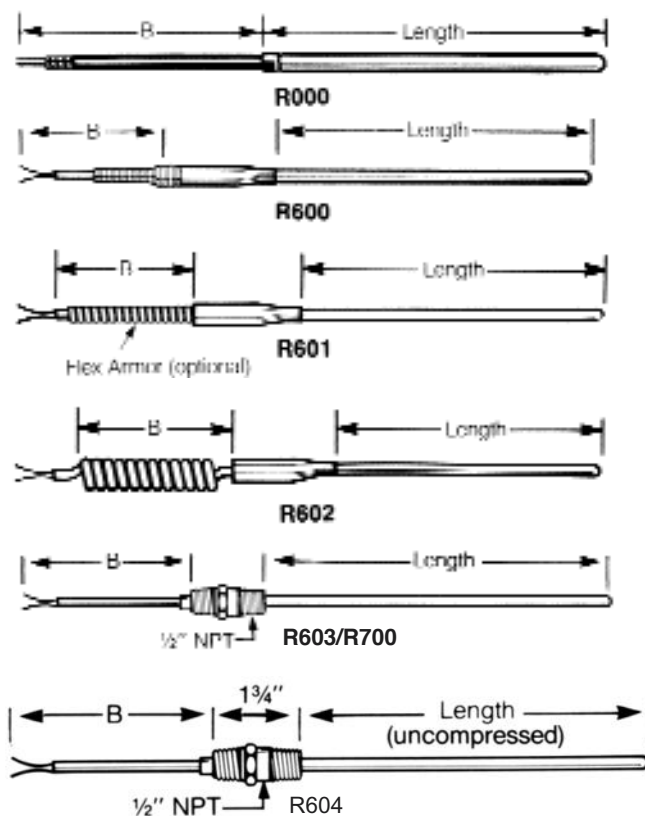
Length	"N" Length	Element	Leads/Resistor	Temperature	Sheath Diameter	Optional Ftg.
Code Enter Length in Inches	Code Enter Length in Inches. Enter "N" dimension in Part Numbers R204 and R205 only.	Code 10 = 100 ohms 21 = 2 x 100 ohms 20 = 200 ohms 50 = 500 ohms 1000 = 1000 ohms Other elements available; consult factory	Code 2 = 2 3 = 3 4 = 4	Code 5 = 500°F (260°C) 9 = 900°F (482°C) 12 = 1200°F (649°C)	Code 2 = 1/8 OD 3 = 3/16 OD 4 = 1/4 OD	Code 1 = 1/8" Brass 2 = 1/4" Brass 3 = 1/8" SS 4 = 1/4" SS 5 = 1/8" SS adj. 6 = 1/4" SS adj. 7C* = 1/2 x 1/2 CS 7S* = 1/2 x 1/2 SS 7SL* = 1/2 x 1/2 SS Spring loaded 0 = None

*Only available on **R100**, **R102**, **R103**, **R104** and **R200** in 1/4" and 3/16" diameter.

RTDs - LEAD WIRE-TYPE

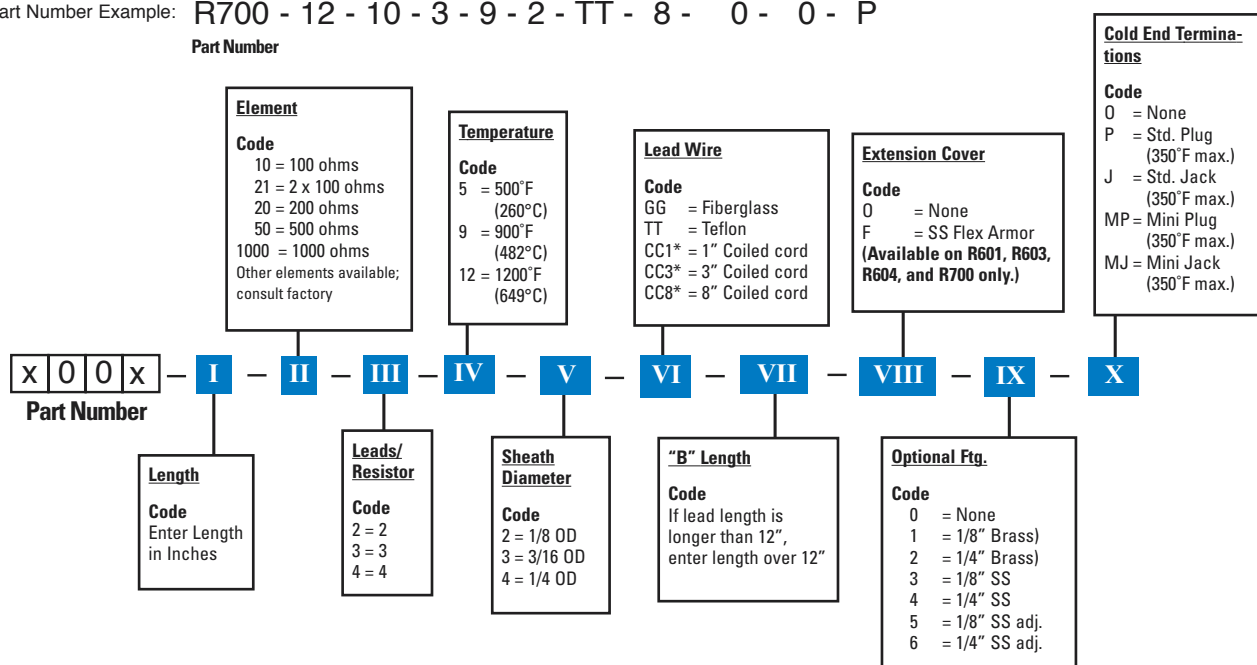
RTD ASSEMBLIES

Part No.	Style
R000	Tube assembly with lead wires
R600	Transition to lead wires with strain relief spring.
R601	Transition to lead wires w/o strain relief spring.
R602	Transition to polyurethane coiled cord. (3 wire only) Omit "B" length and extension cover blocks.
R603	1/2" NPT x 1/2" NPT stainless steel ftg. with lead wires.
R604	1/2" NPT x 1/2" NPT spring loaded SS ftg. with lead wires (1/4 & 3/16 dia. only).
R700	1/2" NPT x 1/2" NPT carbon steel fitting with lead wires.



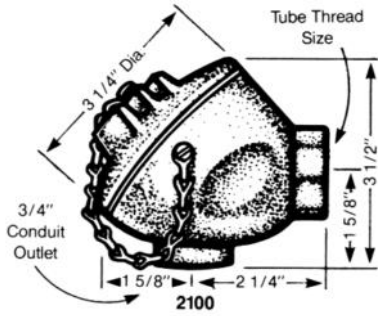
Ordering Information

Part Number Example: **I** **II** **III** **IV** **V** **VI** **VII** **VIII** **IX** **X**
 R700 - 12 - 10 - 3 - 9 - 2 - TT - 8 - 0 - 0 - P
 Part Number

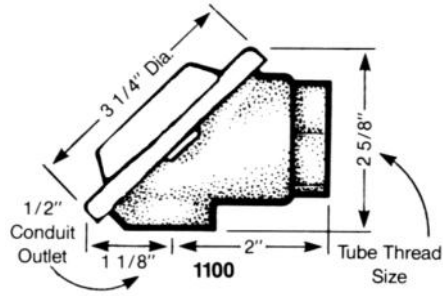


*Available on **R602** only (Expands to approximately 5' per coiled foot).

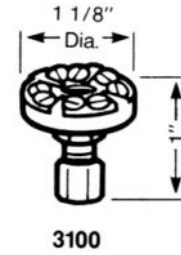
CONNECTION HEADS



2100 heavy-duty cast aluminum screw cover **1.4 lbs.**



1100 General purpose cast aluminum with pressed steel cover. **0.9 lbs.**



3100

3100 Molded single or dual circuit open terminal (400°F max.). **0.2 lbs**

3101 Ceramic single circuit open terminal (1000°F max.). Duplex is not available **0.2 lbs.**

2	1	0	0	-	I	-	II
---	---	---	---	---	----------	---	-----------

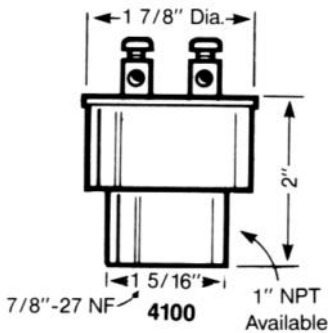
Terminal Block	Tube Thread Size
Code S = Simplex D = Duplex T = Triplex O = None	Code 9 = 1/4" NPT thread 13 = 1/2" NPT thread 17 = 3/4" NPT thread 21 = 1" NPT thread

1	1	0	0	-	I	-	II
---	---	---	---	---	----------	---	-----------

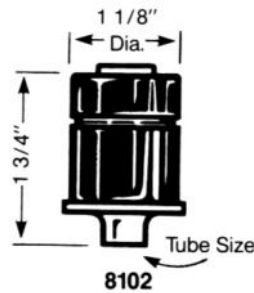
Terminal Block	Tube Thread Size
Code S = Simplex D = Duplex O = None	Code 9 = 1/4" NPT thread 13 = 1/2" NPT thread 17 = 3/4" NPT thread 21 = 1" NPT thread

3	1	0	x	-	I	-	II
---	---	---	---	---	----------	---	-----------

Terminal Block	Tube Thread Size
Code S = Simplex D = Duplex	Code 1 = 1/16" diameter 2 = 1/8" diameter 3 = 3/16" diameter 4 = 1/4" diameter



4100 Lightweight, "O" ring sealed single or dual circuit. **0.3 lbs.**



8102 Diesel engine type single circuit snap-can. **0.3 lbs.**

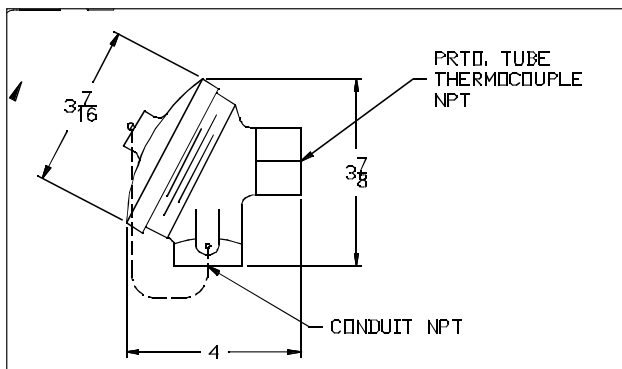
4	1	0	0	-	I
---	---	---	---	---	----------

Terminal Block
Code I = 7/8" - 27" Internal E = 1" NPT thread

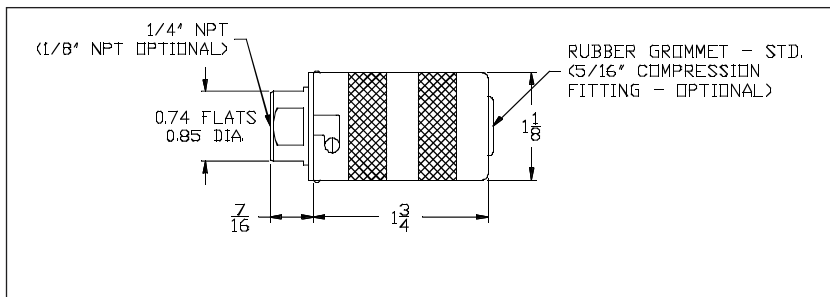
8	1	0	2	-	I	-	II
---	---	---	---	---	----------	---	-----------

Terminal Block	Tube Thread Size
Code 0 = No thread 13 = 1/2" NPT thread	Code 4 = .25 diameter 6 = .38 diameter

CONNECTION HEADS



1104 Cast iron head. **2.6 lbs.**



4101 Screw cover mini-head. **0.3 lbs.**

1 1 0 4

Part Number

I - II

Terminal Block
Code
S = Simplex
D = Duplex
0 = None

Tube Thread Size
Code
13 = 1/2" NPT
thread
17 = 3/4" NPT
Thread

4 1 0 1

Part Number

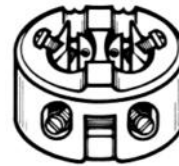
I - II

Terminal Block
Code
S = Simplex
D = Duplex
0 = None

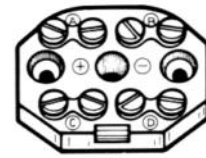
Tube Thread Size
Code
2 = 1/8" NPT
thread
4 = 1/4" NPT
thread

TERMINAL BLOCKS

Part No.	Style	Description
100B	Single-circuit	Floating brass terminals in pressed ceramic materials, suitable for use in 2100 and 1100 heads. Accepts up to 8 gauge wire. No specification selection is required.
101B	Multi-circuit	Rigid, plated brass terminals, pressed ceramic material, accepts up to 14 gauge wire, suitable for spring loading and use in 2100 heads for T/C or RTD.
104B	Multi-circuit	Rigid brass terminals in pressed ceramic material for use in 2100 and 1100 heads. Accepts up to 14 gauge wire.
105B	Single-circuit	Floating brass terminals in pressed ceramic material. Accepts up to 8 gauge wire. No specification selection required.

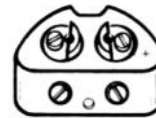


100B



101B

Available in
Triplex



105B



104B

Ordering Information

Part Number Example: 1 0 1 B D



Calibration Type

Code

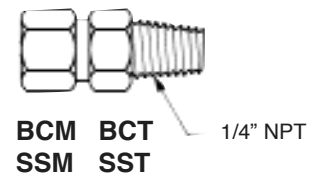
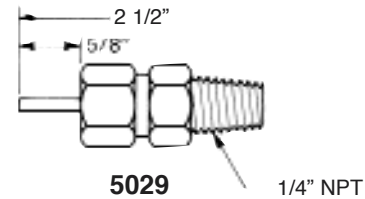
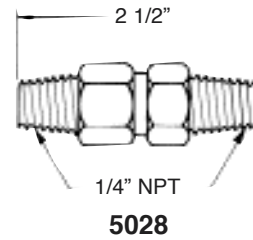
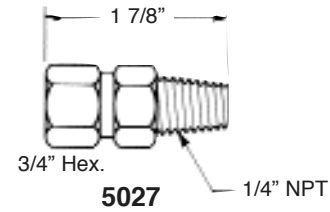
- S = Single circuit
- D = Double circuit
- T = Triple circuit

Features

- Stainless Steel Material
- Reusable Sealing Insert for Tubing or Bare Wire
- Temperature Range from -40°F to +200°F
- 3 Optional End Terminators

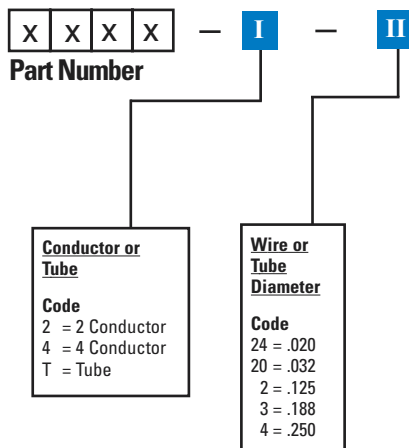
Part No.	Style
5027	1/4" NPT thread one end. For open lead wire extension.
5028	1/4" NPT thread two end. For connection head mounting.
5029	1/4" NPT one end. 1/4" diameter tube extension other end. for polarized connector compression type mounting.
BCM	Brass Compression*
BCT	Brass Compression Readjustable*
SSM	Stainless Steel Compression*
SST	Stainless Steel Compression Readjustable*

*To order specify Part No., thread size and tube size.



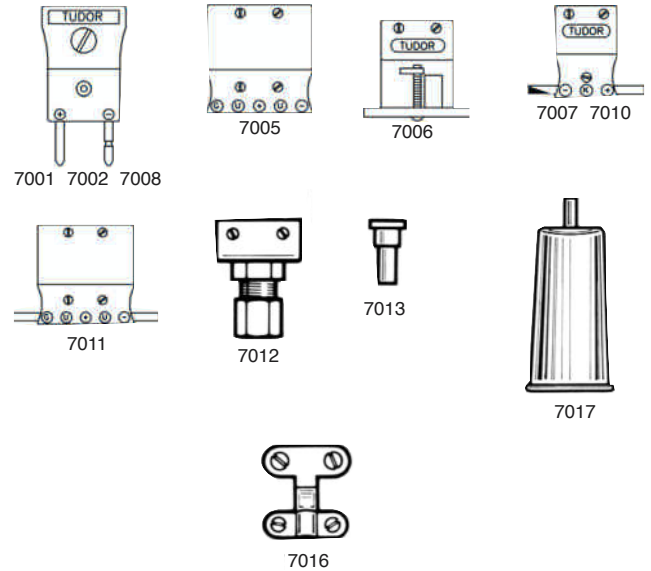
Ordering Information

Part Number Example: 5 0 2 9 - 4 - 24



CONVENIENCE CONNECTORS *STANDARD SIZE*

Part No.	Style
7001	Male convenience connector with protected terminal connections, solid pins. Selections from Table 1 & 2.
7002	Male convenience connector with protected terminal connections, hollow pins. Selections from Table 1 & 2.
7003	Female convenience connector with protected terminal connections. Selection from Table 1 & Table 2. (not shown)
7004	Male convenience connector with protected terminals and ground wire pin. Selection from Table 1. (not shown)
7005	Female convenience connector with protected terminals and ground wire socket. Selection from Table 1.
7006	Female circular convenience connector with protected terminals for panel mounting in 1 1/8" diameter knockout. Selections from Table 1 & 2.
7007	Female convenience connector with protected terminals for panel mounting in 1" x 9/16" knockout. Selections from Table 1 & 2.
7008	Male convenience connector with external access terminals and solid pins. Selection from Table 1.
7009	Female convenience connector with external access terminals. Selection from Table 1. (not shown)
7010	Female convenience connector with external access terminals for panel mounting in 1" x 9/16" knockout. Selection from Table 1.
7011	Female convenience connector with protected terminals and ground socket panel mounting in 1 1/2" x 9/16" knockout. Selection from Table 1.

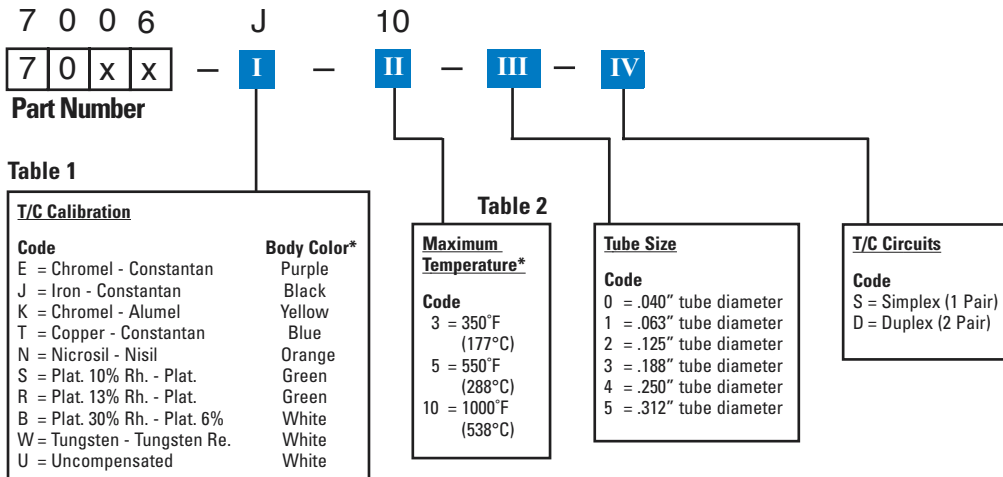


Standard Size Accessories

Part No.	Style
7012	Compression type tube adapter. Selections from Tables 3 & 4.
7013	Crimping type tube adapter. Selection from Table 3.
7016	Insulated-wire clamp. Selection from Table 4.
7017	Weather proof rubber boot (pair). Omit Table selection.

Ordering Information

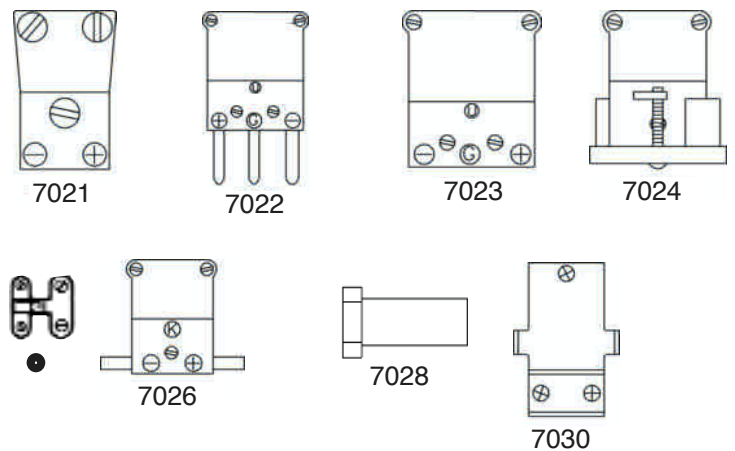
Part Number Example: 7 0 0 6



*Body color for **Maximum Temperature** selection code 5 is black. Body color for **Maximum Temperature** selection code 10 is rust.

MINIATURE SIZE CONNECTORS

Part No.	Style
7020	Male convenience connector. Selections from Table 1.
7021	Female convenience connector. Selections from Table 1.
7022	Male convenience connector with ground pin. Selections from Table 1.
7023	Female convenience connector with ground socket. Selections from Table 1.
7024	Female circular convenience connector panel mounting in 7/8" diameter knockout. Selections from Table 1.
7025	Female circular convenience connector panel mounting in 1-1/16" diameter knockout, with ground socket. Selections from Table 1.
7026	Female convenience connector panel mounting in 5/8" x 3/8" knockout. Selection from Table 1.
7027	Female convenience connector panel mounting in 1" x 3/8" knockout with ground socket. Selection from Table 1.

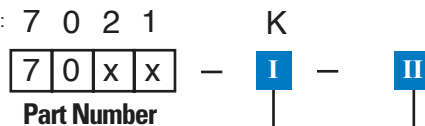


Miniature Size Accessories

Part No.	Style
7028	Adapter type insert. Select from Table 2.
7030	Insulated-wire clamp. Omit table selection.
7031	Neoprene grommet. Omit table selection.

Ordering Information

Part Number Example: 7 0 2 1



T/C Calibration

Code

E = Chromel - Constantan
 J = Iron - Constantan
 K = Chromel - Alumel
 T = Copper - Constantan
 N = Nicrosil - Nisil
 P = Plat. 10% Rh. - Plat
 P = Plat. 13% Rh. - Plat
 B = Plat. 30% Rh. - Plat
 W = Tungsten - Tungsten Re.
 U = Uncompensated

Tube Size

(for 7028 and 7029 only)

Code

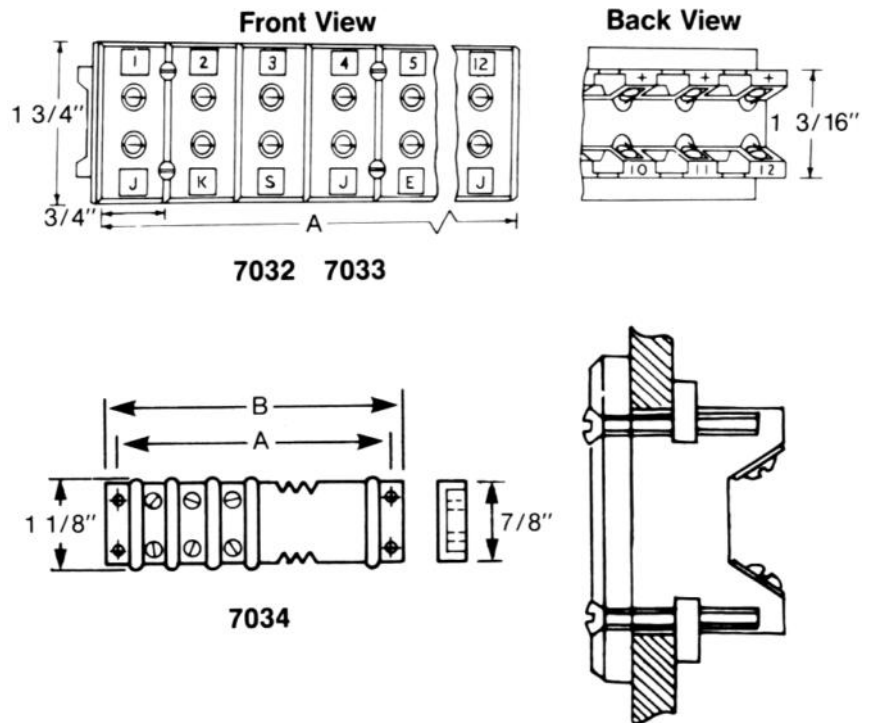
0 = .040" tube diameter
 1 = .063" tube diameter
 2 = .125" tube diameter
 3 = .187" tube diameter

CONVENIENCE CONNECTORS *STRIP PANELS AND TERMINAL BLOCKS*

Strip panels can be wired and installed completely from the front. A self-contained fastening device is permanently attached which simplifies mounting and holds tight. Alloys of inserts match ANSI thermocouple grade calibrations to maintain sensing accuracy. Alloy and circuit numbers are marked on face of strip panel with corresponding circuit numbers and polarity identification on the back. Collet type spring loaded inserts have low mass, eliminate temperature gradients and spurious e.m.f. Negative inserts are larger than positives to avoid polarity mix-ups. Large head brass terminal screws facilitate tight connections without deforming or stressing the finest wire. Molded of high impact and shock resistant compound.

Strip Panel & Terminal Block Connectors

Part No.	Style
7032	Polarized strip panel, maximum temperature 300° F (149° C), two to twelve circuits. Selection from Table 1.
7033	Polarized strip panel, maximum temperature 1000° F (538° C), two to twelve circuits. Selection from Table 1.
7034	Barrier type terminal strip, two to ten circuits. Selection from Table 1.

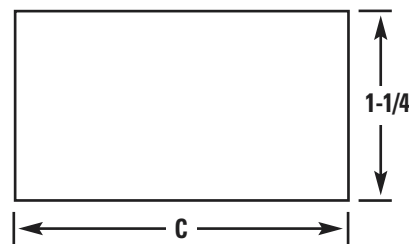


Ordering Information

Table 1

T/C Calibration
Code
E = Chromel - Constantan
J = Iron - Constantan
K = Chromel - Alumel
T = Copper - Constantan
N = Nicrosil - Nisil
P = Plat. 10% Rh. - Plat
P = Plat. 13% Rh. - Plat
B = Plat. 30% Rh. - Plat
W = Tungsten - Tungsten Re.
U = Uncompensated

Strip Panel Mounting Cutout Dimensions



Dimensions	Number of Circuits										
	2	3	4	5	6	7	8	9	10	11	12
"A"	1 1/2"	2 1/4"	3"	3 3/4"	4 1/2"	5 1/4"	6"	6 3/4"	7 1/2"	8 1/4"	9"
"B"	1 5/16"	2 1/16"	2 13/16"	3 9/16"	4 5/16"	5 1/16"	5 13/16"	6 9/16"	7 5/16"	8 1/16"	8 13/16"

How to Order

To order 7032 or 7033:

1. Give part number.
2. Specify number of circuits.
3. Name calibration code (specify each circuit if mixed). **Table 1**
4. Indicate vertical mounting position if other than horizontal as illustrated.
5. Specify number sequence if other than series beginning with 1.

Example: 7032 - 12 - 6K - 6J - HOR - 1 to 12

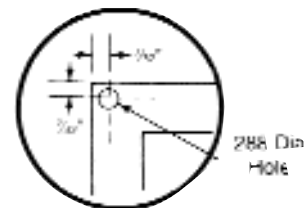
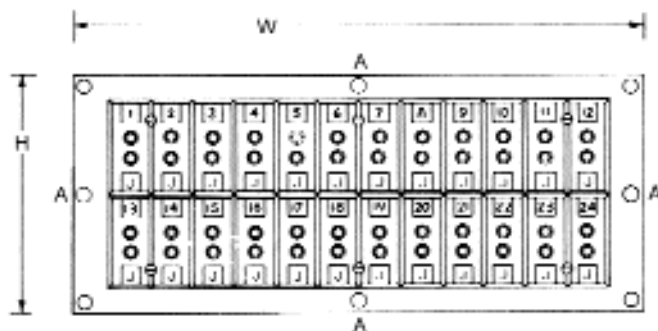
To order 7034:

1. Give part number.
2. Specify number of circuits.
3. Name calibration code (specify each circuit if mixed). **Table 1**

Example: 7034 - 10- E

An assembly of strip panel modules can be combined to accommodate any number of connections. A one-piece mounting frame made of 3/32" thick rigid steel, with dull black finish, holds strip panel modules (shown on previous page).

Part No.
7035



Strip Panel Frame Detail For Mounting Holes In Panel.

Mounting holes "A" are used only when "H" and "W" dimensions each exceed 13 1/2".

DIMENSIONS FOR PANEL ASSEMBLY

H₀ And W₀ Are Mounting Cutout Dimensions

		Circuits Per Row																							
		W = 2 3/8" W ₀ = 1 1/2"	W = 3 1/2" W ₀ = 2 1/4"	W = 4 1/8" W ₀ = 3"	W = 5" W ₀ = 3 3/4"	W = 5 3/4" W ₀ = 4 1/2"	W = 6 1/2" W ₀ = 5 1/4"	W = 7 1/4" W ₀ = 6"	W = 8" W ₀ = 6 3/4"	W = 8 3/4" W ₀ = 7 1/2"	W = 9 1/2" W ₀ = 8 1/4"	W = 10 1/4" W ₀ = 9"	W = 11" W ₀ = 9 3/4"	W = 11 3/4" W ₀ = 10 1/2"	W = 12 1/2" W ₀ = 11 1/4"	W = 13 1/4" W ₀ = 12"	W = 14" W ₀ = 12 3/4"	W = 14 3/4" W ₀ = 13 1/2"	W = 15 1/2" W ₀ = 14 1/4"	W = 16 1/4" W ₀ = 15"	W = 17" W ₀ = 15 3/4"	W = 17 3/4" W ₀ = 16 1/2"	W = 18 1/2" W ₀ = 17 1/4"	W = 19 1/4" W ₀ = 18"	
Number of Row	H = 2 5/8" H ₀ = 1 1/2"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	H = 4 3/8" H ₀ = 3 1/4"	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
	H = 6 1/8" H ₀ = 5"	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72
	H = 7 7/8" H ₀ = 6 3/4"	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96
	H = 9 5/8" H ₀ = 8 1/2"	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	H = 11 5/8" H ₀ = 10 1/4"	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144
	H = 13 1/8" H ₀ = 12"	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168
	H = 14 7/8" H ₀ = 13 3/4"	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192
	H = 16 5/8" H ₀ = 15 1/2"	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216
	H = 18 3/8" H ₀ = 17 1/4"	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

How to Order

1. Give catalog number.
2. Specify number of rows and circuits per row.
3. Name calibration s, use strip panel table on opposite page (specify each circuit if mixed).
4. Indicate vertical mounting position if other than horizontal as illustrated.
5. Specify numbering sequence if other than series beginning with 1.

Example: 7035 - 4 rows - 12C per row - Hor - 1 to 48

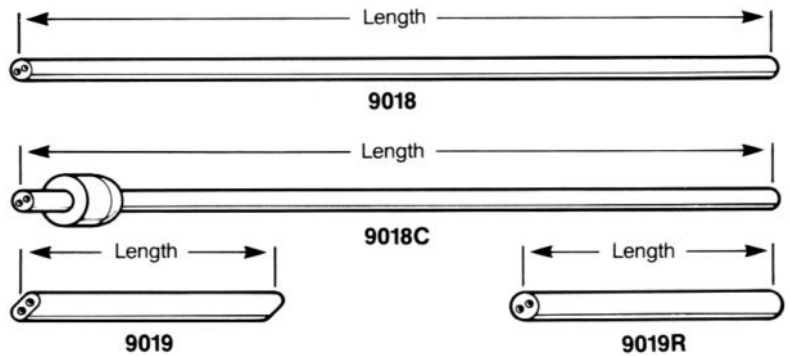
INSULATORS

Our thermocouple insulators are fully vitrified, impervious and uniform. They are of the highest quality and have excellent mechanical strength as well as high thermal shock resistance. The beads, oval and round insulators listed are normally for base metal thermocouples. Noble metal and other high-temperature thermocouples should utilize the one-piece round construction insulators.

INSULATOR TYPES

Part No.	Style
9018	Round full length.
9018C	Round full length with collar.
9019	Oval.
9019R	Round.

INSULATORS



Ordering Information

Part Number Example:



Insulator Material

Code
M* = Mullite
A* = 99.6% Alumina
C = Ceramic

*Not available in oval.

Insulator Form

Code
S = 2 Bore simplex
D* = 4 Bore duplex

Insulator Size

Code (for 9018 and 9018C)
2* = 1/8" diameter x .040 bore
3* = 3/16" diameter x .060 bore
4* = 1/4" diameter x .090 bore

Code (for 9019 and 9019R)
8 = For 8 gauge element
14 = For 14 gauge element
20 = For 20 gauge element
24 = For 24 gauge element

Insulator Length

Code
1 = 1 inch long
3 = 3 inches long
(or any other length in inches)



RETRACTABLE CORD SETS FOR THERMOCOUPLES AND RESISTANCE THERMOMETERS

Retractable cords offer flexible and neat methods of connecting thermocouples and resistance thermometers. The cord insulation is resistant to moisture, oil and many chemicals in environments not exceeding 220° F (105° C). Each one (1) foot of retracted cord extends approximately five (5) feet.

GENERAL SPECIFICATIONS

Insulation: Teflon on primaries with TPR (thermoplastic rubber) for the main cable body (not recommended for use above 220°F).

Conductors: 26 Awg stranded conductors composed of 7 strands of 36 gauge wire.

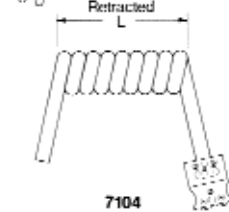
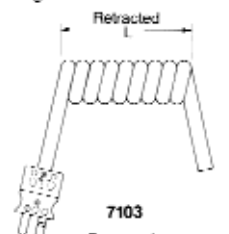
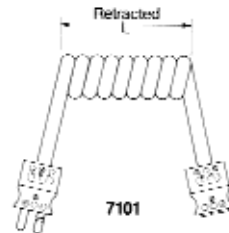
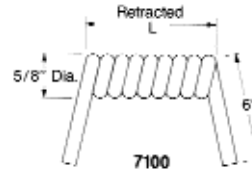
ANSI Limits: Standard limits of error for the thermocouple's extension wire.

Nominal Cable Diameter: Thermocouple .170" diameter round.

Retracted Cord Length Tolerance: ± 10%.

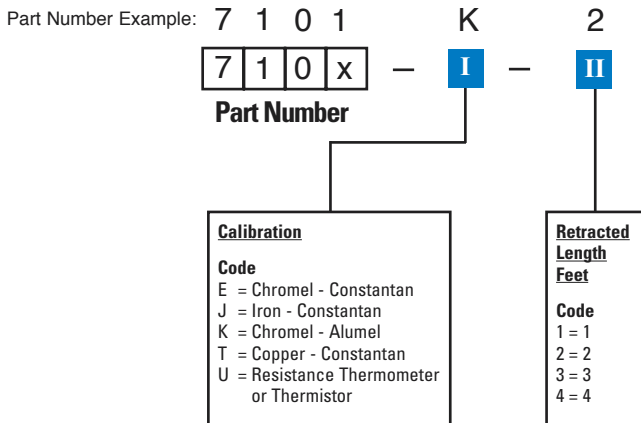
Retracted Coil Diameter: Approximately 5/8" diameter.

Extended Length: Approximately 5 ft. per foot of retracted coil.



Part No.	Style
7100	Cord with 6" straight length.
7101	Cord with standard size convenience male and female connectors.
7102	Cord with miniature size convenience male and female connectors.
7103	Cord with standard size convenience male connector on one end only.
7104	Cord with standard size convenience female connector on one end only.
7105	Cord with miniature size convenience male connector on one end only.
7106	Cord with miniature size convenience female connector on one end only.

Ordering Information



COLOR CODING: INDUSTRY STANDARD

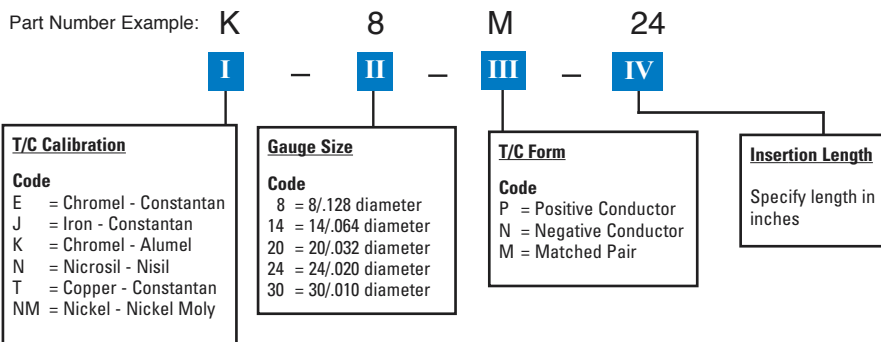
Type	Jacket	Positive	Negative
K	yellow	yellow	red
J	black	white	red
T	blue	blue	red
E	purple	purple	red
U	white	2 black	1 red

BARE THERMOCOUPLE WIRE

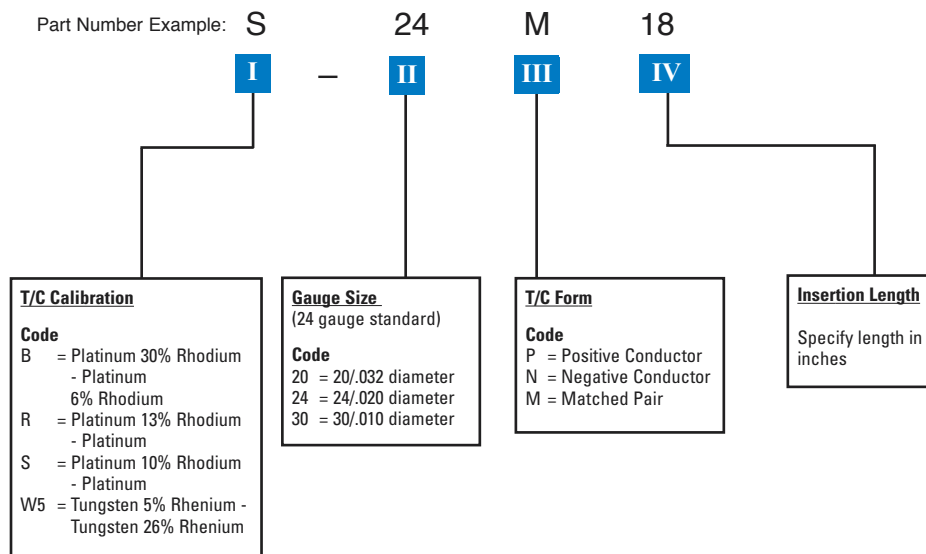
Close control of composition is very necessary as far as the properties of thermocouple material alloys are concerned. We insist that constant adherence to established high standards of accuracy are maintained by special processing and quality control techniques at the primary source. Final check and calibration of all bare and insulated thermocouple materials are done in our own laboratory by the most modern and efficient test instruments and calibration procedures.

Ordering Information

BASE METAL THERMOCOUPLE WIRE



NOBLE AND REFRACTORY METAL THERMOCOUPLE WIRE





INSULATED THERMOCOUPLE AND EXTENSION WIRE

Tudor brand thermocouple wire and thermocouple extension wire are known for premium performance and reliability. Careful selection of materials, plus the latest type of special machinery and quality control, assure superior wire uniformity.

Quality Control

Quality control of all Tudor brand thermocouple wire and thermocouple extension wire provides testing in accordance with NBS Circular 590 and are traceable to NIST.

Shipping

All Tudor brand duplex insulated thermocouple and extension wires are normally packaged in 1000-foot reels. This length is plus or minus 10% on each reel. However, each reel and the container in which it is shipped, each reel and the container in which it is shipped, is marked with the exact length. On any order for either standard or special wire, we reserve the right to ship plus or minus 10% of the total amount ordered.

Calibrating, Checking and Tagging

Thermocouple wire and extension wire are available calibrated, when so specified, at an extra charge. Wires of this classification are within the Standard Limits of Error but, most important, their specific departure temperatures specified is known and can be taken into account. Each thermocouple, coil, reel, or spool of wire is checked and tagged to show the departure from the curve. Refer to the Engineering Data section of the Reference Information publication (available on request) for limits of error applicable to your particular thermocouple wire or extension wire.

Color Coding

Standard ANSI color coding is used on all insulated thermocouple wire and extension wire when type of insulation permits. In color coding, a tracer may be used to distinguish the calibration.

ANSI Type	Magnetic		ANSI Color Code			
	Yes	No	Single	Overall Extension Wire	Overall T/C Wire	
T		X	Blue			
		X	Red	Blue	Brown	
J	X		White			
		X	Red	Black	Brown	
E		X	Purple			
		X	Red	Purple	Brown	
K		X	Yellow			
		X	Red	Yellow	Brown	
R, S		X	Black			
		X	Red	Green	—	
B		X	Grey			
		X	Red	Grey	—	
N		X	Orange			
	X		Red	Orange	Brown	

ANSI Letter Designations

Thermocouple and extension wires are specified by ANSI letter designations for calibration. Positive and negative legs are identified by the appropriate letter suffixes P and N, respectively.

ANSI Letter	Description	Popular Generic & Trade Names*
T	TP	Copper
	TN	Constantan, Cupron, Advanced
J	JP	Iron
	JN	Constantan, Cupron, Advanced
E	EP	Chromel, Tophel, T ₁
	EN	Constantan, Cupron, Advanced
K	KP	Chromel, Tophel, T ₁ , Thermokanthal KP
	KN	Alumel, Nial, T ₂ , Thermokanthal KN
R	RP	Platinum 13% Rhodium
	RN	Pure Platinum
S	SP	Platinum 10% Rhodium
	SN	Pure Platinum
B	BP	Platinum 30% Rhodium
	BN	Platinum 6% Rhodium
N	NP	Nicrosil
	NN	Nisil

*Trade Names: Cupron, Nial and Tophel — AMAX; Advance, T₁, and T₂ — Driver-Harris Co.; Chromel and Alumel — Hoskins Mfg. Co.; Thermokanthal KP and Thermokanthal KN — Kanthal Co.

Solid and Stranded Conductors

Thermocouple wire and extension wire are usually solid conductors. When greater flexibility is required, stranded construction is available. The accompanying table gives the stranding combinations used.

Stranding Combinations

Conductor Gauge	ANSI Type	No. of Strands	Stranding Gauge
14	All	7	22
16	All	7	24
18	All	7	26
20	All	7	28
22	All	7	30
24	All	7	32

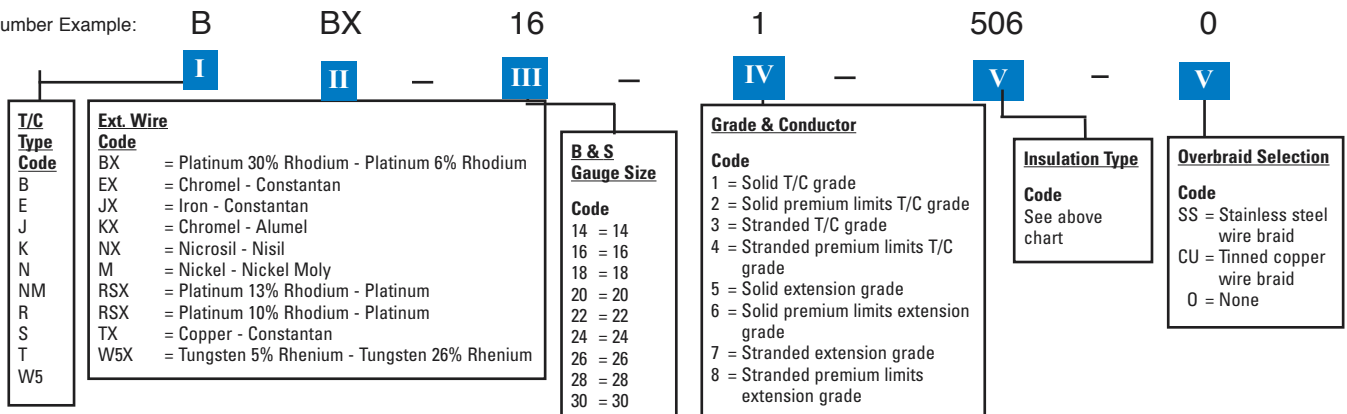
Not all combinations are standard and may require a minimum purchase quantity.

INSULATED THERMOCOUPLE & EXTENSION WIRE

Insulation Type

Code	Single Conductor		Duplex Conductors		Temperature Rating		ANSI Color Coded	Physical Properties		Notes
	Insulation	Impregnation	Insulation	Impregnation	Continuous	Single Reading		Abrasion Resistance	Moisture Resistance	
301	Amorphous Silica Fiber .015"	None	Amorphous Silica Fiber .020"	None	871°C 1600°F	1093°C 2000°F	No	Fair	Fair	
302	Double Glass Braid .012" Wall	Silicone Modified Resin	Glass Braid .006"	Silicone Modified Resin	482°C 900°F	538°C 1000°F	Yes	Good	Good	Impregnation retained to 204°C (400°F)
304	Glass Braid .006"	Silicone Modified Resin	Glass Braid .006"	Silicone Modified Resin	482°C 900°F	538°C 1000°F	Yes	Fair	Good	Impregnation retained to 204°C (400°F)
305	Double Glass Wrap .005"	High Temp. Varnish	Glass Braid .006"	Silicone Modified Resin	482°C 900°F	538°C 1000°F	Yes	Fair	Good	Impregnation retained to 204°C (400°F)
321	Hi-Temp Glass Braid .012"	Hi-Temp Varnish	Hi-Temp Glass Braid .012"	Hi-Temp Varnish	704°C 1300°F	871°C 1600°F	Yes	Good	Good	Impregnation retained to 204°C (400°F)
350	Polycrystalline Braid .012" Wall	None Modified Resin	Polycrystalline .006"	None Modified Resin	1430°C 2600°F	1430°C 2600°F	No	Good	Fair	
502	Polyvinyl .013" to #20 .014" to #16 .016" to #14	—	Polyvinyl .016"	—	-29 to +105°C -20 to +221°F	105°C 221°F	Yes	Good	Excellent	
504	Nylon .010"	—	Nylon .008" - .010"	—	150°C 300°F	150°C 300°F	Yes	Excellent	Fair	Over-all jacket is clear
505	Polyvinyl .012" - .014"	—	Ripcord	—	-29 to +105°C -20 to +221°F	105°C 221°F	Yes	Good	Excellent	
506	Teflon TFE Tape fused .005"	—	Teflon TFE Tape fused .0075"	—	204°C 400°F	316°C 600°F	Yes	Very Good	Excellent	Aluminum/Kapton Foil Shield with #20 Nickel plated copper Drain Wire
507	Teflon FEP Extr. .008"	—	Teflon FEP Extr. .010"	—	204°C 400°F	316°C 600°F	Yes	Very Good	Excellent	
508	Teflon TFE Tape fused .005"	—	Teflon TFE Tape fused .0075"	—	260°C 500°F	316°C 600°F	Yes	Good	Excellent	
509	Teflon FEP Extr. .009"	—	Teflon FEP Extr. .010", twisted	—	204°C 400°F	316°C 600°F	Yes	Very Good	Excellent	Aluminum/Mylar shield w/ #20 drain wire
510	Polyvinyl .015"	—	Polyvinyl .020" Twisted	—	-29 to +80°C -20 to +176°F	80°C 176°F	Yes	Good	Excellent	Aluminum/Mylar shield w/ #20 drain wire
511	Fused Kapton Tape .004"	—	None Twisted	—	316°C 600°F	427°C 800°F	Both legs have tracer	Excellent	Excellent	FEP binder melts at approximately 260°C (500°F)
513	Fused Kapton Tape .006"	—	Fused Kapton .004"	—	316°C 600°F	427°C 800°F	Yes	Excellent	Excellent	FEP binder melts at approximately 260°C (500°F)
516	Extruded PFA .008"	—	Extruded PFA .010"	—	260°C 500°F	316°C 600°F	Yes	Good	Excellent	

Part Number Example:



PART NUMBER INDEX

PART NO.	PAGE NO.	DESCRIPTION
BCM	39	BRASS COMPRESSION FITTING
BCT	39	BRASS COMPRESSION FITTING (ADJ)
SSM	39	SS COMPRESSION FITTING
SST	39	SS COMPRESSION FITTING (ADJ)
20	8	AL HD SC HEAD W/NIPPLE-UNION NIPPLE & ELEMENT
21	8	AL HD SC HEAD W/NIPPLE-UNION & ELEMENT
22	8	AL HD SC HEAD W/NIPPLE & ELEMENT
100B	38	SINGLE CIRCUIT TERMINAL BLOCK –ACCEPTS 8GA WIRE
101B	38	MULTI CIRCUIT TERMINAL BLOCK –ACCEPTS 14GA WIRE
104B	38	MULTI CIRCUIT TERMINAL BLOCK – ACCEPTS 14GA WIRE
105B	38	SINGLE CIRCUIT TERMINAL BLOCK – ACCEPTS 8GA WIRE
261SL	12-14	REDUCED TIP THERMOWELL W/LAG 0.260 BORE 1/2 NPT
261R	12-14	REDUCED TIP THERMOWELL 0.260 BORE 1/2 NPT
261S	12-14	STRAIGHT THERMOWELL 0.260 BORE 1/2 NPT
262SL	12-14	REDUCED TIP THERMOWELL W/LAG 0.260 BORE 3/4 NPT
262R	12-14	REDUCED TIP THERMOWELL 0.260 BORE 3/4 NPT
262S	12-14	STRAIGHT THERMOWELL 0.260 BORE 3/4 NPT
263SL	12-14	REDUCED TIP THERMOWELL W/LAG 0.260 BORE 1 NPT
263R	12-14	REDUCED TIP THERMOWELL 0.260 BORE 1 NPT
263S	12-14	STRAIGHT THERMOWELL 0.260 BORE 1 NPT
262H	12-14	TAPERED THERMOWELL 0.260 BORE 3/4 NPT
262HL	12-14	TAPERED THERMOWELL W/LAG 0.260 BORE 3/4 NPT
263H	12-14	TAPERED THERMOWELL 0.260 BORE 1 NPT
263HL	12-14	TAPERED THERMOWELL 0.260 BORE 1 NPT
382H	12-14	TAPERED THERMOWELL 0.385 BORE 3/4 NPT
382HL	12-14	TAPERED THERMOWELL W/LAG 0.385 BORE 1 NPT
382S	12-14	STRAIGHT THERMOWELL 0.385 BORE 3/4 NPT
382SL	12-14	STRAIGHT THERMOWELL W/LAG 0.385 BORE 3/4 NPT
383H	12-14	TAPERED THERMOWELL 0.385 BORE 1 NPT
383HL	12-14	TAPERED THERMOWELL W/LAG 0.385 BORE 1 NPT
383S	12-14	STRAIGHT THERMOWELL 0.385 BORE 1 NPT
383SL	12-14	STRAIGHT THERMOWELL W/LAG 0.385 BORE 1 NPT
1000	5	TU-PAK TC ASSEMBLY W/GP CAST ALUMINUM HEAD
1002	5	TU-PAK TC ASSEMBLY W/HAZARDOUS CAST ALUM. HEAD
1003	5	TU-PAK TC ASSEMBLY W/SCREW COVER PLASTIC HEAD
1004	5	TU-PAK TC ASSEMBLY W/SCREW COVER CAST IRON HEAD
1100	36	GP CAST ALUMINUM HEAD WITH PRESSED STEEL COVER
1104	37	CAST IRON HEAD

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<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
2000	5	TU-PAK TC ASSEMBLIES W/SCREW COVER CAST ALUM HEAD
2002	5	TU-PAK TC ASSEMBLY W/SCREW COVER ALUMINUM HEAD WITH _ NPT SS SPRING LOADED OIL AND VAPOR SEAL
2004	7	TU-PAK LEAD WIRE TC ASSEMBLY 1/2 X 1/2 NPT CS FITTING
2005	7	TU-PAK LEAD WIRE TC ASSEMBLY 1/2 X 1/2 NPT SS FITTING
2006	7	TU-PAK LEAD WIRE TC ASSEMBLY 1/2 X 1/2 NPT SPRING LOADED SS FITTING
2100	36	HEAVY DUTY CAST ALUMINUM HEAD WITH SCREW COVER
2400	9	SPRING LOADED REPLACEMENT ELEMENT FOR INDUSTRIAL PROCESS TYPE ASSEMBLIES
3000	5	TU-PAK TC ASSEMBLY WITH 300°F OPEN TYPE HEAD
3002	5	TU-PAK TC ASSEMBLY WITH 1000°F OPEN TYPE HEAD
3100	36	MOLDED SINGLE/DUAL CIRCUIT OPEN TERMINAL HEAD 400°F
3101	36	CERAMIC SINGLE CIRCUIT OPEN TERMINAL HEAD 1000°F
3201	31	PHARMACEUTICAL TC WIRE HARNESS (MULTIPLE TC BUNDLE)
3202	31	PHARMACEUTICAL TC 1/8 DIA. SS SHEATH PROBE
3203	31	PHARMACEUTICAL TC REPLACEMENT ELEMENT FOR 3202
4000	5	TU-PAK TC ASSEMBLY SCREW COVER MINI HEAD
4002	5	TU-PAK TC ASSEMBLY BAYONET COVER MINI HEAD
4100	36	BRASS HEAD-OPEN TERMINALS
4101	37	MINIATURE HEAD O RING SEALED
5000	6	TU-PAK STANDARD CONNECTOR TC ASSEMBLY (350°F)
5001	6	TU-PAK STANDARD CONNECTOR TC ASSEMBLY (500°F)
5002	6	TU-PAK STANDARD CONNECTOR TC ASSEMBLY (1000°F)
5003	6	TU-PAK MINIATURE CONNECTOR TC ASSEMBLY (350°F)
5004	24	VACUUM FURNACE TC QUICK CONNECT PLUG WITH MOLYBDENUM SHEATH AND POTTED END SEAL.
5005	24	VACUUM FURNACE TC QUICK CONNNECT PLUG WITH MOLYBDENUM SHEATH AND VACUUM GLAND END SEAL
5006	24	VACUUM FURNACE TC SAME AS 5005 WITH A VACUUM TYPE VARIABLE IMMERSION FITTING
5007	24	VACUUM FURNACE TC MINIATURE LIGHTWEIGHT HEAD WITH REFRACTORY SHEATH AND VACUUM GLAND END SEAL.
5008	24	VACUUM FURNACE TC SAME AS 5007 WITH A VACUUM TYPE VARIABLE IMMERSION FITTING

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PART NO.	PAGE NO.	DESCRIPTION
5009	25	VACUUM FURNACE TC ALUMINA TUBE WITH SCREW COVER HEAD AND VACUUM GLAND SEAL END.
5013	24	VACUUM FURNACE TC WORK SURVEY CHROMEL ALUMEL (TYPE K) TC. HIGH TEMPERATURE GLASS INSULATION, 20 GAUGE MAXIMUM MEASURING TEMPERATURE 2000°F (1093°C).
5014	24	VACUUM FURNACE TC SAME AS 5013 EXCEPT CERAMIC FIBER INSULATION. MAXIMUM MEASURING TEMPERATURE 2300°F (1260°C)
5018	25	VACUUM FURNACE TC RECRYSTALLIZED ALUMINA TUBE ASSEMBLY WITH QUICK CONNECT PLUG AND POTTED SEAL END.
5019	25	VACUUM FURNACE TC RECRYSTALLIZED ALUMINA TUBE WITH QUICK CONNECT PLUG AND VACUUM GLAND SEAL END.
5021	24	VACUUM FURNACE TC QUICK CONNECT PLUG WITH 1/4 OD HIGH PURITY ALUMINA TUBE, INCONEL SLEEVE AND VACUUM GLAND END SEAL.
5025	26	VACUUM FURNACE TC COLD WALL SIMPLEX VACUUM FEED THROUGH ASSEMBLY WITH MINIATURE CLOSED HEAD.
5026	26	VACUUM FURNACE TC COLD WALL DUPLEX VACUUM FEED THROUGH ASSEMBLY WITH MINIATURE CLOSED HEAD.
5027	39	VACUUM SEALING FITTING – 1/4 NPT THREAD ONE END. FOR OPEN LEAD WIRE EXTENSION.
5028	39	VACUUM SEALING FITTING – 1/4 NPT THREAD TWO END. FOR CONNECTION HEAD MOUNTING.
5029	39	VACUUM SEALING FITTING – 1/4_ NPT ONE END. 1/4 DIAMETER TUBE EXTENSION OTHER END. FOR POLARIZED CONNECTOR COMPRESSION TYPE MOUNTING.
5030	26	VACUUM FURNACE TC COLD WALL MULTIPLE CONDUCTOR VACUUM FEED THROUGH ASSEMBLY WITH COMPENSATED TERMINALS.
6000	7	TU-PAK LEAD WIRE TC ASSEMBLY W/TRANSITION FITTING WITH STRAIN RELIEF SPRING.
6001	7	TU-PAK LEAD WIRE TC ASSEMBLY W/TRANSITION FITTING W/O STRAIN RELIEF SPRING.
6002	7	TU-PAK LEAD WIRE TC ASSEMBLY WITH TRANSITION TO POLY-URETHANE COILED CORD. SIMPLEX ONLY.
6010	15	BEARING METAL TC – 3/16 DIA. SENSOR, SPRING LOADED WITH TWISTED AND SHIELDED LEAD WIRE FOR SIMPLEX OR DUPLEX BEARING METAL TC REQUIREMENTS.
6011	15	BEARING METAL TC – 1/4 DIA. SENSOR, SPRING LOADED WITH TWISTED AND SHIELDED LEAD WIRE FOR TRIPLEX BEARING METAL TC REQUIREMENTS.

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PART NO.	PAGE NO.	DESCRIPTION
6012	15	BEARING METAL TC – 3/16 DIA. SENSOR, SPRING LOADED WITH RIP CORD STYLE LEAD WIRE FOR SIMPLEX OR DUPLEX THRUST BEARING TC REQUIREMENTS (DEEP MOUNT)
6013	15	BEARING METAL TC – 3/16 DIA. SENSOR, SPRING LOADED WITH RIP-CORD STYLE LEAD WIRE FOR SIMPLEX OR DUPLEX THRUST BEARING TC REQUIREMENTS. (SHALLOW MOUNT)
6014	15	BEARING METAL TC – 3/16 DIA. SENSOR, INTERNALLY SPRING LOADED WITH FLANGE, TWISTED MEASURING JUNCTION, AND RIP CORD STYLE SIMPLEX LEAD WIRE.
7000	7	TU-PAK LEAD WIRE TC ASSEMBLY STRIPPED 1 INCH LEADS
7001	40	MALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINAL CONNECTIONS – SOLID PINS.
7002	40	MALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINAL CONNECTIONS – HOLLOW PINS.
7003	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINAL CONNECTIONS.
7004	40	MALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINALS AND GROUND WIRE PIN.
7005	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINALS AND GROUND WIRE SOCKET.
7006	40	FEMALE CIRCULAR CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINALS FOR PANEL MOUNTING IN 1-1/8 DIAMETER KNOCKDOWN.
7007	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINALS FOR PANEL MOUNTING IN 1 X 9/16 KNOCKOUT.
7008	40	MALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH EXTERNAL ACCESS TERMINALS AND SOLID PINS.
7009	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH EXTERNAL ACCESS TERMINALS.
7010	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH EXTERNAL ACCESS TERMINALS FOR PANEL MOUNTING IN 1 X 9/16 KNOCKOUT.
7011	40	FEMALE CONVENIENCE CONNECTOR UNIVERSAL SIZE WITH PROTECTED TERMINALS AND GROUND SOCKET PANEL MOUNTED IN 1-1/2 X 9/16 KNOCKOUT.
7012	40	COMPRESSION TYPE TUBE ADAPTER UNIVERSAL SIZE
7013	40	CRIMPING TYPE TUBE ADAPTER
7016	40	INSULATED WIRE CLAMP
7017	40	WEATHERPROOF RUBBER BOOT (PAIR)
7020	41	MALE CONVENIENCE CONNECTOR MINIATURE SIZE

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<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
7021	41	FEMALE CONVENIENCE CONNECTOR MINIATURE SIZE
7022	41	MALE CONVENIENCE CONNECTOR MINIATURE SIZE WITH GROUND PIN.
7023	41	FEMALE CONVENIENCE CONNECTOR MINIATURE SIZE WITH GROUND SOCKET
7024	41	FEMALE CIRCULAR CONVENIENCE CONNECTOR MINIATURE SIZE FOR PANEL MOUNTING IN 7/8 DIAMETER KNOCKOUT.
7025	41	FEMALE CIRCULAR CONVENIENCE CONNECTOR MINIATURE SIZE FOR PANEL MOUNTING IN 1-1/16 DIAMETER KNOCKOUT WITH GROUND SOCKET.
7026	41	FEMALE CONVENIENCE CONNECTOR MINIATURE SIZE FOR PANEL MOUNTING IN 5/8 X 3/8 KNOCKOUT.
7027	41	FEMALE CONVENIENCE CONNECTOR MINIATURE SIZE FOR PANEL MOUNTING IN 1 X 3/8 KNOCKOUT WITH GROUND SOCKET.
7028	41	ADAPTER TYPE INSERT
7030	41	INSULATED CLAMP
7031	41	NEOPRENE GROMMET
7032	42	POLARIZED STRIP PANEL – MAXIMUM TEMPERATURE 300°F (149°C) TWO TO TWELVE CIRCUITS.
7033	42	POLARIZED STRIP PANEL – MAXIMUM TEMPERATURE 1000°F (538°C) TWO TO TWELVE CIRCUITS.
7034	42	BARRIER TYPE TERMINAL STRIP TWO TO TEN CIRCUITS.
7035	43	STRIP PANELS WITH MOUNTING FRAME.
7100	45	RETRACTABLE CORD WITH 6 INCH LENGTH.
7101	45	RETRACTABLE CORD WITH STANDARD SIZE CONVENIENCE MALE AND FEMALE CONNECTORS
7102	45	RETRACTABLE CORD WITH MINIATURE SIZE CONVENIENCE MALE AND FEMALE CONNECTORS
7103	45	RETRACTABLE CORD WITH STANDARD SIZE CONVENIENCE MALE CONNECTOR ON ONE END ONLY.
7104	45	RETRACTABLE CORD WITH STANDARD SIZE CONVENIENCE FEMALE CONNECTOR ON ONE END ONLY.
7105	45	RETRACTABLE CORD WITH MINIATURE SIZE CONVENIENCE MALE CONNECTOR ON ONE END ONLY.
7106	45	RETRACTABLE CORD WITH MINIATURE SIZE CONVENIENCE FEMALE CONNECTOR ON ONE END ONLY.
8102	36	CONNECTION HEAD DIESEL ENGINE TYPE SINGLE CIRCUIT SNAP-CAN.

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<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
9000	21	NOBLE METAL TC ASSEMBLY WITH GENERAL PURPOSE HEAD
9001	21	NOBLE METAL TC ASSEMBLY WITH HEAVY DUTY SCREW COVER HEAD.
9002	21	NOBLE METAL TC ASSEMBLY WITH OPEN TERMINAL HEAD
9003	21	NOBLE METAL TC ASSEMBLY WITH OPEN TERMINAL HEAD AND 1 INCH NPT MOUNTING THREAD.
9004	21	NOBLE METAL TC ASSEMBLY WITH GP HEAD AND CERAMIC PRIMARY TUBE INCONEL _ INCH NPT, SECONDARY TUBE.
9005	21	NOBLE METAL TC ASSEMBLY WITH HEAVY DUTY SCREW COVER HEAD WITH PRIMARY AND SECONDARY CERAMIC TUBES.
9007	21	NOBLE METAL TC ASSEMBLY WITH CAST IRON HEAD
9010	20	BASE METAL REPLACEMENT ELEMENTS – BARE WIRE WITHOUT INSULATORS.
9011	20	BASE METAL REPLACEMENT ELEMENTS WITH 3 INCH OVAL INSULATORS
9012	20	BASE METAL REPLACEMENT ELEMENTS WITH 3 INCH ROUND INSULATORS.
9013	20	BASE METAL REPLACEMENT ELEMENTS WITH BALL AND SOCKET INSULATORS
9014	20	BASE METAL REPLACEMENT ELEMENTS WITH FLEXIBLE SECTION FOR ANGLE TYPE.
9015	22	NOBLE & REFRACTORY METAL REPLACEMENT ELEMENTS BARE WIRE WITHOUT INSULATORS.
9016	22	NOBLE & REFRACTORY METAL REPLACEMENT ELEMENTS WITH FULL LENGTH INSULATORS
9017	22	NOBLE & REFRACTORY METAL REPLACEMENT ELEMENTS WITH FULL LENGTH INSULATOR & COLLAR.
9017F	22	NOBLE & REFRACTORY METAL REPLACEMENT ELEMENTS WITH FLEXIBLE SECTIONS.
9018	44	INSULATOR – ROUND FULL LENGTH
9018C	44	INSULATOR – ROUND FULL LENGTH WITH COLLAR
9019	44	INSULATOR – OVAL
9019R	44	INSULATOR – ROUND
9022	23	CERAMIC & NON-METALLIC PROTECTION TUBES – PLAIN
9023	23	CERAMIC & NON-METALLIC PROTECTION TUBES – WITH COLLAR.
9024	23	CERAMIC & NON-METALLIC PROTECTION TUBES – WITH 2 INCH BRASS FERRULE (7/8 –27 THREAD)
9025	23	CERAMIC & NON-METALLIC PROTECTION TUBES – WITH FITTING 3/4 NPT THREAD

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<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
9026	19	METAL PROTECTION TUBE SCHEDULE 40
9027	19	METAL PROTECTION TUBE SCHEDULE 80
9030	18	BASE METAL TC ASSEMBLIES ANGLE TYPE – SCHEDULE 40 HOT LEG PIPE WITH GP CONNECTION HEAD.
9032	18	BASE METAL TC ASSEMBLIES ANGLE TYPE – SCHEDULE 80 HOT LEG PIPE WITH GP CONNECTION HEAD.
9033	18	BASE METAL TC ASSEMBLIES ANGLE TYPE – SCHEDULE 80 HOT LEG PIPE WITH HEAVY DUTY CONNECTION HEAD.
9034	17	BASE METAL TC ASSEMBLIES STRAIGHT TYPE – SCHEDULE 40 PIPE WITH GP CONNECTION HEAD.
9035	17	BASE METAL TC ASSEMBLIES STRAIGHT TYPE – SCHEDULE 40 PIPE WITH WEATHERPROOF HEAVY DUTY CONNECTION HEAD.
9036	17	BASE METAL TC ASSEMBLIES STRAIGHT TYPE – SCHEDULE 80 PIPE WITH GP CONNECTION HEAD.
9037	17	BASE METAL TC ASSEMBLIES STRAIGHT TYPE – SCHEDULE 80 PIPE WITH WEATHERPROOF HEAVY DUTY CONNECTION HEAD.
9038	27	DOUBLE TUBE ASSEMBLIES – GP HEAD WITH SILICON CARBIDE AND MULLITE TUBES.
9039	27	DOUBLE TUBE ASSEMBLIES – HEAVY DUTY HEAD WITH SILICON CARBIDE AND MULLITE TUBES.
9040	27	DOUBLE TUBE ASSEMBLIES – GP HEAD WITH SILICON CARBIDE AND 99.6% ALUMINA TUBES.
9041	27	DOUBLE TUBE ASSEMBLIES – HEAVY DUTY HEAD WITH SILICON CARBIDE AND 99.6% ALUMINA TUBES.
9044	23	CERAMIC & NON-METALLIC PROTECTION TUBES METAL-CERAMIC 7/8 OD
9045	23	CERAMIC & NON-METALLIC PROTECTION TUBES – SILICON CARBIDE WITH 3 INCH COLLAR – 1 INCH ID.
9046	23	CERAMIC & NON-METALLIC PROTECTION TUBES – SILICON CARBIDE WITH 2-1/8 INCH COLLAR – 1 INCH ID.
9047	23	CERAMIC & NON-METALLIC PROTECTION TUBES – SILICON CARBIDE PLAIN – 1 INCH ID.
9075	16	CERAMIC TUBE BASE METAL TC ASSEMBLIES – GP CONNECTION HEAD,
9076	16	CERAMIC TUBE BASE METAL TC ASSEMBLIES – HEAVY DUTY SCREW COVER CONNECTION HEAD.
9077	16	CERAMIC TUBE BASE METAL TC ASSEMBLIES – LIGHT WEIGHT SCREW COVER CONNECTION HEAD.

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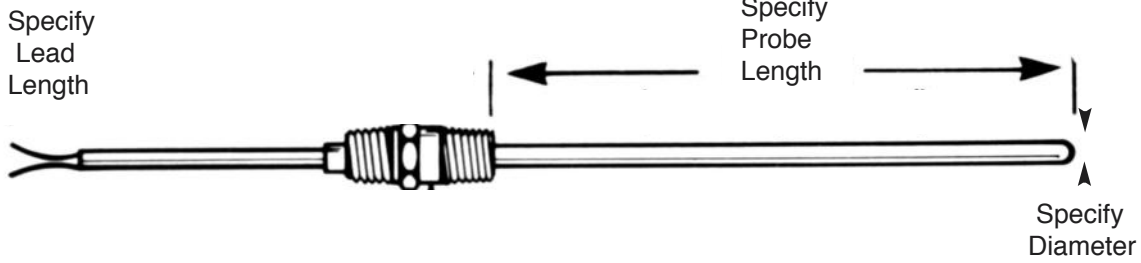
<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
9100	29	BAYONET STYLE TC ASSEMBLIES – VARIABLE IMMERSION
9101	29	BAYONET STYLE TC ASSEMBLIES – STRAIGHT WITH BAYONET LOCK CAP.
9102	29	BAYONET STYLE TC ASSEMBLIES – 45 DEGREE BEND WITH BAYONET LOCK CAP.
9103	29	BAYONET STYLE TC ASSEMBLIES – 90 DEGREE BEND WITH BAYONET LOCK CAP.
9104	29	BAYONET STYLE TC ASSEMBLIES – STRAIGHT IMMERSION.
9105	29	BAYONET STYLE TC ASSEMBLIES – 45 DEGREE BEND IMMERSION
9106	29	BAYONET STYLE TC ASSEMBLIES – 90 DEGREE BEND IMMERSION
9107	29	BAYONET STYLE TC ASSEMBLIES – VARIABLE IMMERSION WITH FLEX ARMOR.
9108	28	WIRE TYPE TC ASSEMBLY – WASHER TYPE.
9109	28	WIRE TYPE TC ASSEMBLY – INSULATED WIRE TYPE WITH MALE OR FEMALE CONNECTOR.
9110	28	WIRE TYPE TC ASSEMBLY – TUBE END TYPE – 3/16 OD TUBE.
9111	30	MELT BOLT TC ASSEMBLY – WITH FLEX ARMOR EXTENSION AND MALE PLUG.
9112	30	MELT BOLT TC ASSEMBLY – WITH MALE PLUG.
9125	23	CERAMIC & NON-METALLIC PROTECTION TUBES – WITH FITTING 1-1/4 NPT THREAD.
9130	18	BASE METAL TC ASSEMBLIES – ANGLE TYPE WITH SILICON CARBIDE HOT LEG AND GP CONNECTION HEAD.
9131	18	BASE METAL TC ASSEMBLIES – ANGLE TYPE WITH SILICON CARBIDE HOT LEG AND HEAVY DUTY CONNECTION HEAD.
R000	35	RTD LEAD WIRE TYPE – TUBE ASSEMBLY WITH LEAD WIRES.
R100	34	RTD HEAD TYPE – GP CAST ALUMINUM HEAD (4 WIRES MAX.)
R102	34	RTD HEAD TYPE – HAZARDOUS LOCATION CAST ALUMINUM HEAD
R103	34	RTD HEAD TYPE – SCREW COVER THERMOPLASTIC HEAD.
R104	34	RTD HEAD TYPE – SCREW COVER CAST IRON HEAD.
R200	34	RTD HEAD TYPE – SCREW COVER CAST ALUMINUM HEAD.
R202	34	RTD HEAD TYPE – SCREW COVER CAST ALUMINUM HEAD WITH 1/2 NPT SS SPRING LOADED OIL AND VAPOR SEAL.
R204	34	RTD HEAD TYPE – SCREW COVER CAST ALUMINUM HEAD WITH 1/2 NPT NIPPLE SPRING LOADED.
R205	34	RTD HEAD TYPE – SCREW COVER CAST ALUMINUM HEAD WITH 1/2 NPT NIPPLES AND UNION – SPRING LOADED.
R300	34	RTD HEAD TYPE – 300°F (149°C) MAXIMUM. OPEN TERMINAL HEAD (4 WIRES MAXIMUM)

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<u>PART NO.</u>	<u>PAGE NO.</u>	<u>DESCRIPTION</u>
R400	34	RTD HEAD TYPE – BAYONET COVER MINI HEAD (4 WIRES MAXIMUM)
R500	33	RTD CONNECTOR TYPE – 350°F (177°C) MAXIMUM STANDARD MALE CONNECTOR.
R501	33	RTD CONNECTOR TYPE – 350°F (177°C) MAXIMUM STANDARD FEMALE CONNECTOR.
R502	33	RTD CONNECTOR TYPE – 1000°F (538°C) MAXIMUM STANDARD MALE CONNECTOR.
R503	33	RTD CONNECTOR TYPE – 1000°F (538°C) MAXIMUM STANDARD FEMALE CONNECTOR.
R504	33	RTD CONNECTOR TYPE – 350°F (177°C) MAXIMUM MINIATURE MALE CONNECTOR.
R505	33	RTD CONNECTOR TYPE – 350°F (177°C) MAXIMUM MINIATURE FEMALE CONNECTOR.
R600	35	RTD LEAD WIRE TYPE – TRANSITION TO LEAD WIRES WITH STRAIN RELIEF
R601	35	RTD LEAD WIRE TYPE – TRANSITION TO LEAD WIRES WITHOUT STRAIN RELIEF.
R602	35	RTD LEAD WIRE TYPE – TRANSITION TO POLYURETHANE COILED CORD (3 WIRE ONLY)
R603	35	RTD LEAD WIRE TYPE – 1/2 NPT X 1/2 NPT SS FITTING WITH LEAD WIRES
R604	35	RTD LEAD WIRE TYPE - 1/2 NPT X 1/2 NPT SPRING LOADED SS FITTING WITH LEAD WIRES (1/4 & 3/16 DIA. ONLY)
R700	35	RTD LEAD WIRE TYPE – 1/2 NPT X 1/2 NPT CARBON STEEL FITTING WITH LEAD WIRES.



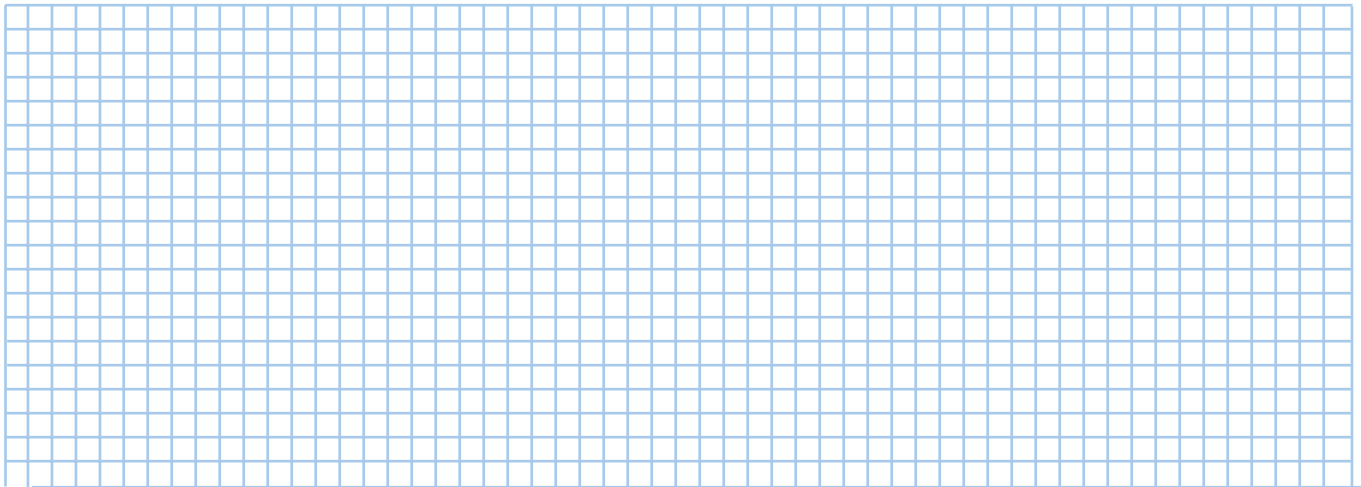
CUSTOM PROBE QUOTE FORM



For a quick quotation on your special temperature probe requirements, draw the type of thermocouple or RTD profile desired below and fax a copy of this page to Athena Controls at (610) 828-0635.

Name: _____
 Title: _____
 Company: _____
 Address: _____
 City, State, Zip: _____
 Tel: _____
 Fax: _____

Date: _____
 RFQ #: _____



- Specify:
- Probe Length: _____
 - Lead Length: _____
 - Probe Diameter: _____
 - Probe Material: _____
 - Termination: _____
 - Max. Temperature: _____
 - Atmosphere: _____
 - Thermocouple Type: _____
 - RTD: _____

Additional Comments or Requirements:

NOTES

ALSO FROM ATHENA CONTROLS...

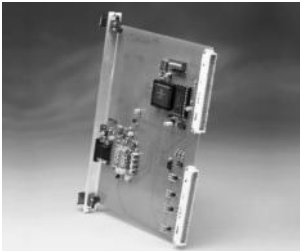
Universal Digital Controllers



Power Controls



Custom Control Solutions



Power Handlers



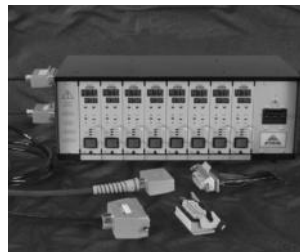
Analog Controllers



Vintage Controllers



Hot Runner Controllers



Athena Controls, Inc. • 5145 Campus Drive • Plymouth Meeting, PA 19462 • Toll-Free in U.S.: 800.782.6776
Tel: 610.828.2490 • Fax: 610.828.7084 • E-mail: sales@athenacontrols.com • Internet: athenacontrols.com