



# **TAISUO**

## **Temperature Control Experts One stop shop service**

<http://www.taisuo.com>

### **ZheJiang Taisuo Technology Co., Ltd.**

- Temperature sensor
- Temperature transmitter
- Mineral insulated cable
- Sensor component

ISO 9001  RoHS

## Message from the President

In recent years, with the traditional energy and more nervous, the carbon emission control is more and more strict. People began to utilize various types of new energy. But Thermal energy is still the one from which mankind has derived great benefits in various forms.

Since its founding in 1992, our company has specialized in the manufacture of Temperature measurement field. Through all these years of hard work, our company has become a comprehensive enterprise group, has jurisdiction over six plants, including Controller, Temperature Sensors, Thermocouple Components, Mineral Insulated Cable, Industrial Design & Mold Manufacture and Plastic & Hardware.

At present, we mainly provide ancillary services for many famous companies in the field of global temperature measurement, such as OEM Sensor, Mineral Insulated Cable, Thermocouple Connector, Compensation Wire & Extension Wire Etc. Through the cooperation with them, our technology and service got a lot of ascension. In meantime, our production chain got effective integration.

Now we can proudly say we have mastered the core technology of the temperature measurement, can provide high quality, high precision products. As a manufacturer and supplier, we can provide one-stop service in temperature control for our customers.

With the rapid advance of industry, ever greater accuracy is required on such temperature sensors, and in order to meet kinds of the needs, we are making every effort to acquire expertise and technology in all the fields. We build a TaiSuo Temperature Laboratory for precise calibration to verify accuracy of temperature sensor and temperature controller.

We have introduced mechanization as far as practicable into the latest manufacturing processes so that uniformity in the quality at our factory may be ensured, and at the same time, we exercise strict quality control and assurance to ISO 9001. Thus, we furnish industry with high reliability products, and enjoy the full confidence of the users. I take pride in our excellent quality and new design.

We are determined to continue our efforts for research and development in the technology of temperature measurement for the new and better products, foreseeing exact needs of human life and industry.

Lu Jiong

President of TAISUO

A handwritten signature in black ink, consisting of stylized Chinese characters, positioned to the right of the printed name and title.



# COMPANY INTRODUCTION

## ZHEJIANG TAISUO TECHNOLOGY CO., LTD

### – A LEADER IN TEMPERATURE MEASUREMENT TECHNOLOGY

TaiSuo Technology Industries began as a manufacturer and supplier of quality thermal management products for a world of industrial automation control and process applications.

TaiSuo began in 1998 as temperature measurement. At first 10 years, we only produced TEMPERATURE CONTROLLER. Our Brand is BKC, TaiSuo and TST. The main market is European market. Also, our controllers have good reputation and good selling in China.

Since 2003, on customers' request, TaiSuo began to produce thermocouple components, such Sensor Connection Heads, blocks, Thermocouple Plug and Connectors, Stainless steel pipe and fittings. Now TaiSuo's Sensor Connection Heads and Thermocouple Connector have good reputation in European market.

In 2006, TaiSuo got technology of MI cable and thermocouple from National Laboratory for Materials Science, And Begun to manufacture mineral-insulated cable and temperature sensor. In past year, we've refined and improved that technology. Now TaiSuo is recognized as the industry leader of metal-sheathed and mineral-insulated cable. All our standard thermocouple cable is supplied with high-purity MgO (magnesium Oxide) insulation and accuracies per ASTM E-230 and IEC584 limits of error.

TaiSuo has main large inventories of finished cable and TaiSuo also be specializes in custom thermocouple, conductor and heater cables to meet virtually any application requirement of temperature, environment or process conditions. In fact TaiSuo takes great pride of our quality and Technology. Nonetheless, we are constantly exploring new technologies to meet the emerging markets.



# CAREFUL DETECTION



**SO FAR, TAISUO IS A UNIQUE MANUFACTURER  
OF SS446 SHEATH MI CABLE IN CHINA.**

**Our standard: IEC61515, IEC584, ASTM**

**Material of sheath: SS304, SS321, SS316, SS316L, SS310,  
Inconel 600, Inconel 800, SS446, Nicrobell etc.**

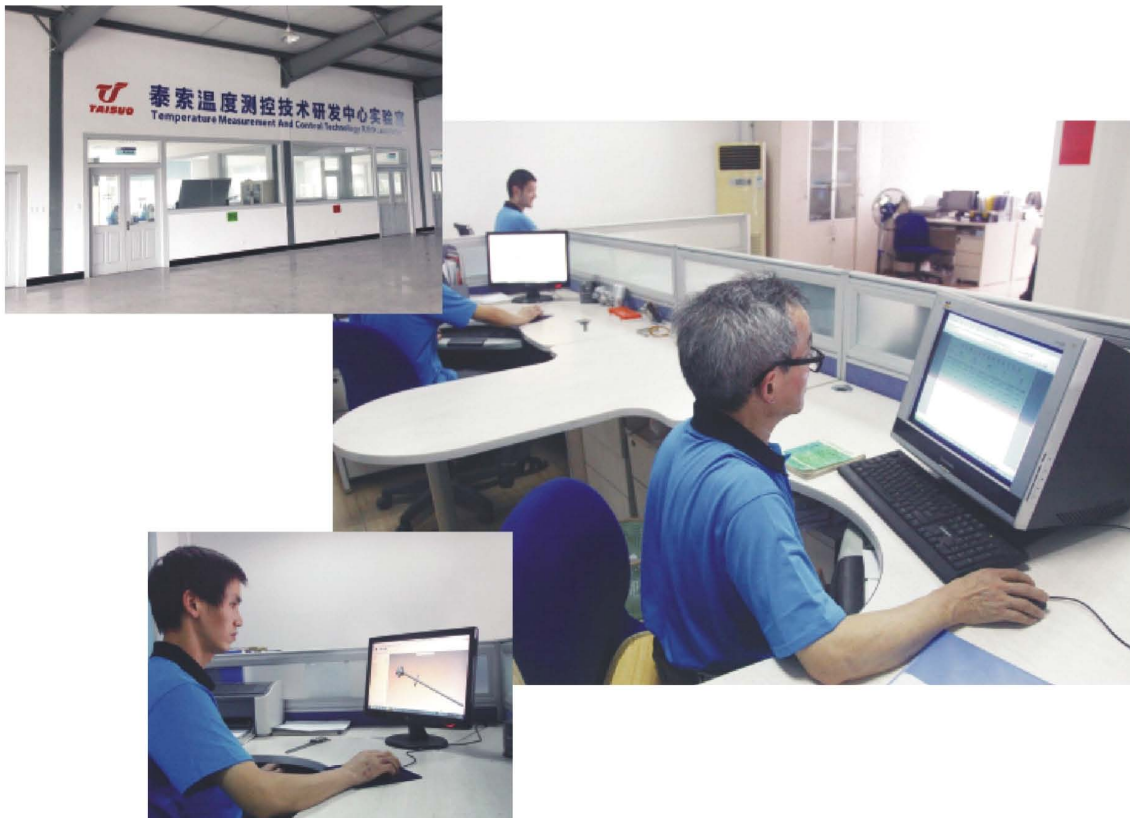
**MgO: All Mgo tested by SGS.**

**Purity:  $\geq 96\%$  and  $\geq 99.4\%$  for different customer**

*Each product has a Traceable number*

*Each product has a testing report*

*All testing records keep in our lab*

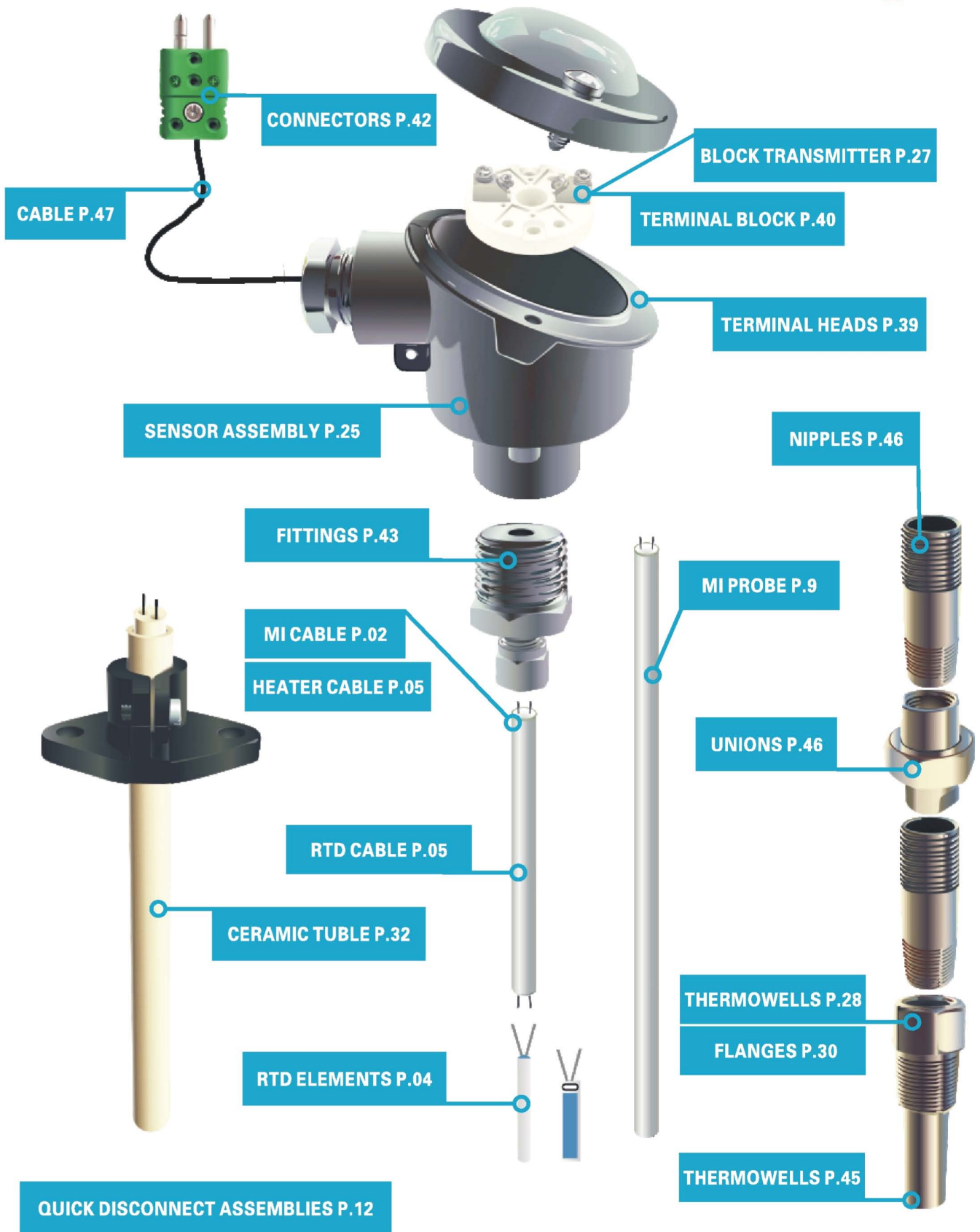




# Quality Management



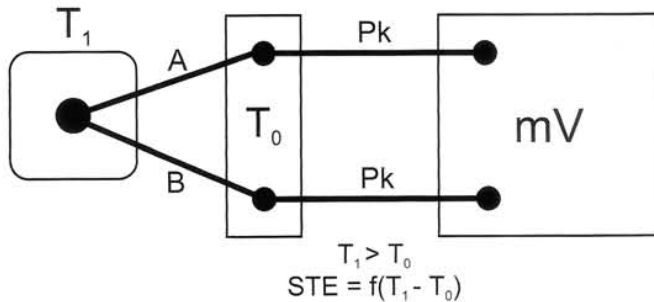
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## THEMOCOUPLER PROBES – GENERAL INFORMATION

THEMOCOUPLER – consist of two dissimilar conductors connected together at the measuring (or “hot”) junction, the other – reference (or “cold”) ends being connected either directly or by some suitable means, to a device for measuring the thermoelectromotive force (emf) generated in the circuit. The electromotive force (emf) generated by thermocouple is a function of the temperature



T1 – temperature of measuring junction  
T0 – temperature of reference junction  
A – thermoelectrode eg. “+”  
B – thermoelectrode eg. “-”  
Pk – compensating cables  
mV – measuring instrument(mV or indication)

### Most popular thermocouples used in industry are: (in compliance with standard PN-EN 60584-1: 1997):

Type:B-PtRh30-PtRh6; Type:R-PtRh13-Pt; Type:S-PtRh10-Pt; Type:J-Fe-CuNi; Type:T-Cu-CuNi;  
Type:K-NiCr-NiAl; Type:E-NiCr-CuNi; Type:N-NiCrSi-NiSi

#### Temperature range depending of thermoelectrode diameter

Thermocouple wires diameter mm	THERMOCOUPLER TYPES							
	“K”   “N”		“J”		“S”   “R”		“B”	
	c	k	c	k	c	k	c	k
	°C		°C		°C		°C	
0,35	-	-	-	-	Up to 1200	Up to 1500	Up to 1500	Up to 1600
0,5	Up to 600	Up to 800	Up to 400	Up to 600	Up to 1200	Up to 1600	Up to 1600	Up to 1700
1,0	Up to 800	Up to 1000	Up to 600	Up to 800	-	-	-	-
3,0	Up to 1000	Up to 1200	Up to 700	Up to 900	-	-	-	-

#### Temperature range depending of sheath diameter sheathed thermocouple probes

Sheath Diameter mm	THERMOCOUPLER TYPES							
	“K”   “N”		“J”		“S”   “R”		“B”	
	c	k	c	k	c	k	c	k
	°C		°C		°C		°C	
1,5	Up to 600	Up to 700	Up to 200	Up to 400	For special order only consult with TAISUO			
3,0	Up to 700	Up to 800	Up to 400	Up to 600				
4,5	Up to 800	Up to 1000	Up to 600	Up to 800				
6,0	Up to 900	Up to 1100	Up to 600	Up to 800				

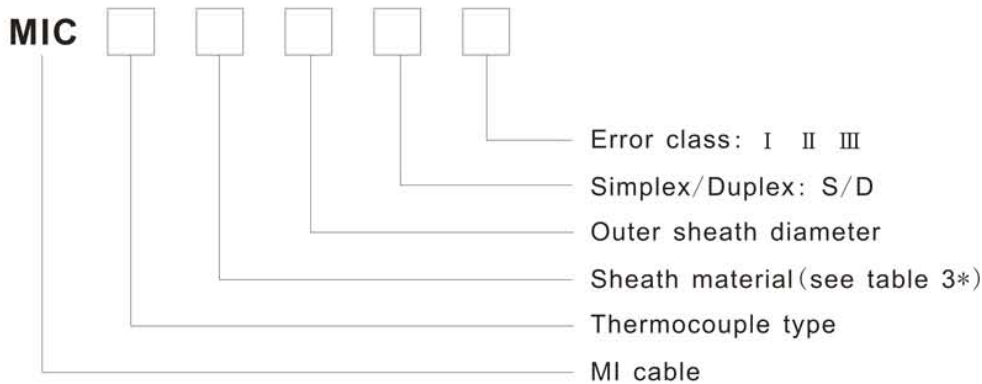


Conform to IEC61515

### MI Thermocouple Cable

- Mineral insulated cable is widely applied in industry, a proven choice for high temperature probe fabrication.
- High temperature resistance, anti-corrosion, anti-oxidation, long life time and rapid heat response.
- Sheath material can be selected to fit different applications.

#### Order code



Simplex



Duplex



#### Order code example

MIC-K INC600 - 6.0 D I

MI thermocouple cable, type K, sheath material INCONEL600, outer sheath diameter 6.0mm, duplex, class I

#### Error Class (Class I is always recommended)

Thermocouple type	Class I		Class II		Class III	
	Error (±)	Temperature Range (°C)	Error (±)	Temperature Range (°C)	Error (±)	Temperature Range (°C)
Ni Cr-Ni Si Ni Cr Si-Ni Si	1.5°C or 0.4%t	-40~1000	2.5°C or 0.75%t	-40~1000	2.5°C or 0.75%t	-200~40
Ni Cr-Costantan		-40~800		-40~800		-200~40
Fe-Costantan	0.5°C or 0.4%t	-40~750	1.0°C or 0.75%t	-40~750	1.0°C or 0.75%t	-200~40
Cu-Costantan		-40~350		-40~350		
Pt Rh 10-Pt	1.0°C	0~1600	1.5°C or 0.25%t	0~1600	---	---
Pt Rh 13-Pt		0~1600		0~1600		
Pt Rh 30-Pt Rh 6	---	---		600~1700	4.0°C or 1.5%t	600~1700

**Nominal dimension data (please define when you have special requests)**

Outer sheath dimension		Thermocouple wire (conductor) nominal diameter (mm)	
Outer diameter (mm)	Nominal wall thickness (mm)	K, N, E, J, T	S, R, B
0.5	≥ 0.05	≥ 0.08	---
1.0	≥ 0.10	≥ 0.15	---
1.5	≥ 0.15	≥ 0.23	---
1.6	≥ 0.16	≥ 0.24	---
2.0	≥ 0.20	≥ 0.30	0.20~0.30
3.0	≥ 0.30	≥ 0.45	0.25~0.40
3.2	≥ 0.32	≥ 0.48	0.25~0.40
4.0	≥ 0.40	≥ 0.60	0.30~0.40
4.8	≥ 0.48	≥ 0.72	0.30~0.45
5.0	≥ 0.50	≥ 0.75	0.30~0.45
6.0	≥ 0.60	≥ 0.90	0.40~0.50
6.4	≥ 0.64	≥ 0.96	0.40~0.50
8.0	≥ 0.80	≥ 1.20	0.40~0.50
12.7	≥ 1.27	≥ 1.90	---

**Choose the favourable variety for your application**

Thermocouple alloy	Thermocouple type	Sheath material	Outer diameter Φ mm	Temperature range applied °C
Ni Cr-Ni Si	<b>K</b>	SUS304 SUS316L	0.5~1.0 1.5~3.2 4.0~8.0	400 600 800
		SUS310S GH3030 GH3039 INCONEL600 INCOLOY800	0.5~1.0 1.5~3.2 4.0~6.4 8.0~12.7	500 800 900 1000
Ni Cr Si-Ni Si	<b>N</b>	SUS304 SUS316L	0.5~1.0 1.5~3.2 4.0~8.0	400 600 800
		SUS310S GH3030 GH339 INCONEL600 INCOLOY800	0.5~1.0 1.5~3.2 4.0~6.4 8.0~12.7	500 800 900 1000
Ni Cr- Costantan	<b>E</b>	SUS304 SUS316L	0.5~1.0 1.5~3.2 4.0~8.0	400 500 800
Fe-Costantan	<b>J</b>	SUS304 SUS316L	1.0 1.5~3.2 4.0~8.0	300 500 800
Cu-Costantan	<b>T</b>	SUS304 SUS316L	1.0 1.5~3.2 4.0~8.0	-200~100 100~200 100~350
Pt Rh 10-Pt Pt Rh 13-Pt	<b>S R</b>	GH3030 INCONEL600 GH3039 GH747 Pt Rh 6	2~4.8 5.0~6.4 8.0 2.0~6.4	1000 1050 1150 1200
		GH3030 INCONEL600 GH3039 GH747 Pt Rh 6	2~4.8 5.0~6.4 8.0 2.0~6.4	1000 1080 1180 1300

**Sheath thermocouple materials and the referential use temperature scope**

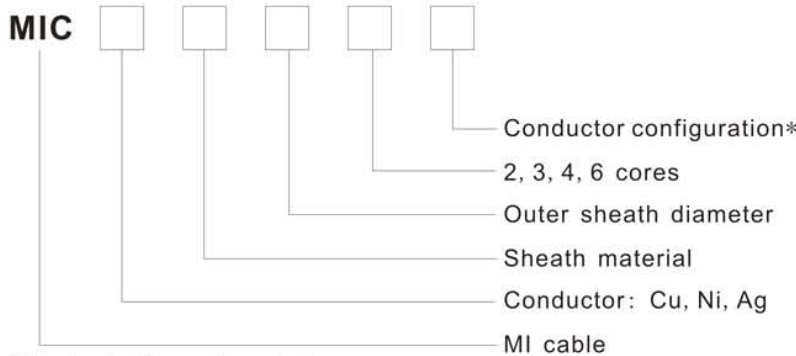
A comparison table for the commonly used domestic & foreign metal outer protection tube materials

No	Domestic materials trademark	Foreign materials trademark	Max. use temperature	Materials usage
1	0Cr18Ni9 0Cr18Ni10Ti	304 321	930℃	Austenitic stainless acid-proof steel (Anti-heat,anti-oxidation)
2	0Cr17Ni14Mo2 1Cr18Ni12Mo20Ti	316L 316	980℃	Austenitic stainless acid-proof steel(anti-heat,it resists corrosion from inorganic acid,organic acid,alkali,marine atmosphere.)
3	0Cr25Ni20	310s	1100℃	It belongs to Fe system high chrome stainless acid-proof steel(anti-heat,it highly resists the inter-crystalline corrosion under 800℃ air refrigeration conditions, it prevents from oxidation in 1000℃ and 1100℃.)
4	Gh3030	Inconc1600	1100℃	Nickel base hot-resistant anti-erosion alloy(high hot strength superior corrosiing & oxidation proot-ness.it strongly resists the corruption from various waste gas,alkali solution,most or ganic acid & compound)
5		Incoloy600	1100℃	Nickel base heat-proof andti-corrosive alloy(high hot strength fine & oxidation & carburization proof-ness,it resists the sulphur erosion;Inner P oxidation and delamination under various atmospheres.
6	Gh3039		1200℃	Nickel base deforming high temperature alloy (apart from superior anti-corrosion & oxidation-resistance,it has high calorific intensity,it remains excellent anti-oxidation performance under 1200℃.)
7	Gh747		1300℃	Nickel base deforming high-temperature alloy(apart from fine anti-corrosion,it also has sound high temperature oxidation resistance and hot strength,it may normally work under 1300℃ultra-temperature.)

**RTD allowable error range**

RTD Type	Graduation mark	± ( °C ) Et value on various temperature spots												
		-200	-100	0	100	200	300	400	500	600	650			
Pt RTD	Grade A	Pt100	0.55	0.35	0.15	0.35	0.55	0.75	0.95	1.15	1.35	1.45	1.428 ± 0.005	
		Pt10												
	Grade B	Pt100	1.30	0.80	0.30	0.80	1.30	1.80	2.30	2.80	3.30	3.60		1.3850 ± 0.0012
		Pt10												
Cu RTD	/	Cu50	1.5	0.9	0.3	0.9	1.5	2.1	/	/	/	/	1.428 ± 0.002	
		Cu100												

### Mineral insulated RTD cable

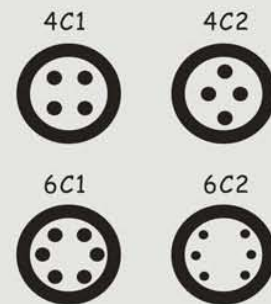


Order code example

**MIC- Ni 316L- 3.0 - 4 - 4C1**

MI RTD cable,  
pure Ni cores,  
sheath material SUS316L,  
outer sheath diameter 3.0mm,  
4 cores,  
conductor configuration 4C1

#### Conductor configuration\*



*Note: Other conductor configurations available on request.*

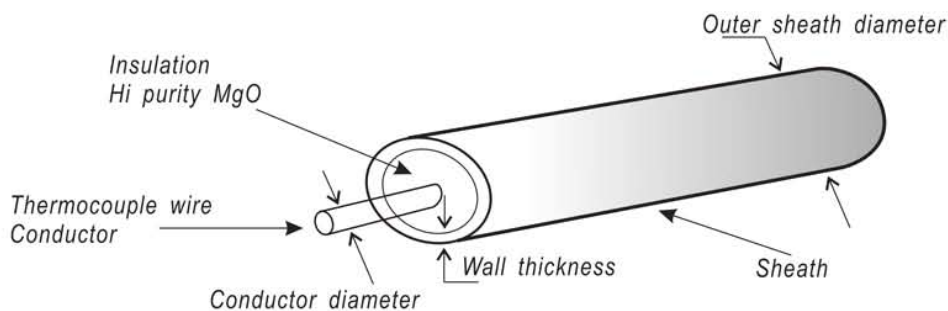
#### Nominal dimension data

Outer sheath dimension (mm)		Ni or Cu wire (conductor) nominal diameter (mm)
Outer diameter	Nominal wall thickness	
3.0	0.30~0.40	0.30~0.35
3.2	0.35~0.45	0.35~0.38
4.0	0.40~0.50	0.40~0.45
4.8	0.45~0.60	0.45~0.50
5.0	0.50~0.65	0.50~0.55
6.0	0.60~0.75	0.60~0.65
6.4	0.65~0.90	0.65~0.70
8.0	1.00~1.20	0.80~1.00

### MI Heater Cable

TaiSuo is a leading supplier of mineral-insulated heater assemblies and cable, as well. TST's heaters have yielding quick response and long use life in the most demanding applications. By using internally welded transitions between hot and cold sections, potential cold end failure is virtually eliminated. Our heaters are used throughout the semiconductor manufacturing process, as well as in furnace element production, aerospace and heat tracing applications. Our reputation for custom solutions to the most demanding heater challenges is known worldwide. Nonetheless, we are constantly exploring new technologies for heater thermodynamics and fabrication techniques, to meet the emerging markets we serve. This forward-thinking philosophy benefits our customers and it remains our commitment to them.

#### Outlook & Specification



**COMMON THERMOMETRY FIXED POINTS**

Fixed Points from the Practical International Temperature Scale ITS-90		
	°C	°F
Triple Point of Hydrogen	-259.35	-434.82
Boiling Point of Hydrogen	-256.15	-429.07
Triple Point of Neon	-248.59	-415.47
Triple Point of Oxygen	-218.79	-361.82
Triple Point of Argon	-189.34	-308.81
Triple Point of Mercury	-38.83	-37.90
Triple Point of Water	0.01	32.02
Melting Point of Gallium	29.76	85.57
Freezing Point of Indium	156.59	313.86
Freezing Point of Tin	231.93	449.47
Freezing Point of Zinc	419.53	787.15
Freezing Point of Aluminum	660.32	1220.58
Freezing Point of Silver	961.78	1763.20
Freezing Point of Gold	1064.18	1947.52
Freezing Point of Copper	1084.62	1984.32

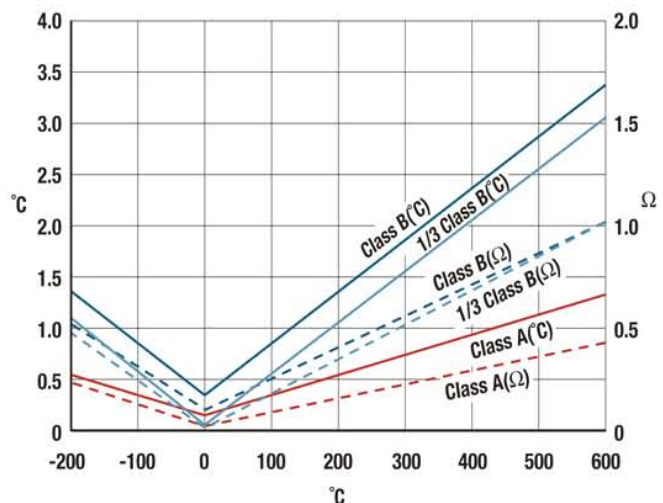
**AMERICAN WIRE GAUGE SIZE TO INCHES**

American Wire Gauge(AWG)	Size O.D Inches	American Wire Gauge(AWG)	Size O.D Inches
6/0	0.5800	23	0.0226
5/0	0.5165	24	0.0201
4/0	0.4600	25	0.0179
3/0	0.4096	26	0.0159
2/0	0.3648	27	0.0142
1/0	0.3249	28	0.0126
1	0.2893	29	0.0113
2	0.2576	30	0.0100
3	0.2294	31	0.00893
4	0.2043	32	0.00795
5	0.1819	33	0.00708
6	0.1620	34	0.00630
7	0.1443	35	0.00561
8	0.1285	36	0.00500
9	0.1144	37	0.00445
10	0.1019	38	0.00396
11	0.0907	39	0.00353
12	0.0808	40	0.00314
13	0.0720	41	0.00280
14	0.0641	42	0.00249
15	0.0571	43	0.00222
16	0.0508	44	0.00198
17	0.0453	45	0.00176
18	0.0403	46	0.00157
19	0.0359	47	0.00140
20	0.0320	48	0.00124
21	0.0285	49	0.00111
22	0.0253	50	0.00099

**TOLERANCES FOR A 100Ω PLATINUM RTD PER IEC 751-95**

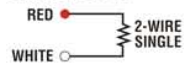
Temperature Deg (C)	Tolerance					
	Class B		1/3 Class B		Class A	
	(±C) <sup>(1)</sup>	(±0hm)	(±C)	(±0hm)	(±C) <sup>(2)</sup>	(±0hm)
-200	1.30	0.56	1.10	0.48	0.55	0.24
-100	0.80	0.32	0.60	0.24	0.35	0.14
0	0.30	0.12	0.10	0.04	0.15	0.06
100	0.80	0.30	0.60	0.23	0.35	0.13
200	1.30	0.48	1.10	0.40	0.55	0.20
300	1.80	0.64	1.60	0.57	0.75	0.27
400	2.30	0.79	2.10	0.72	0.95	0.33
500	2.80	0.93	2.60	0.87	1.15	0.38
600	3.30	1.06	3.10	1.00	1.35	0.43

Notes: (1) C=±(0.3+0.005\*[t]) • (2) C=±(0.15+0.002\*[t])



### SENSOR LEAD CONFIGURATION IDENTIFICATION

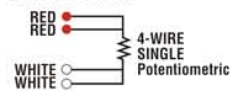
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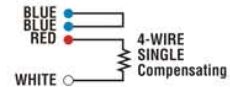
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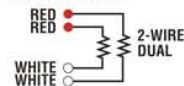
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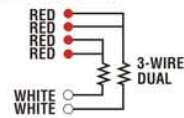
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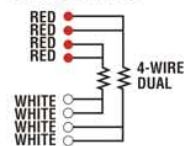
CATALOG TYPE 6



CATALOG TYPE 7



CATALOG TYPE 8



### TEMPERATURE VERSUS RESISTANCE

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	18.52										
-190	22.83	22.40	21.97	21.54	21.11	20.68	20.25	19.82	19.38	18.95	18.52
-180	27.10	26.67	26.24	25.82	25.39	24.97	24.54	24.11	23.68	23.25	22.83
-170	31.34	30.91	30.49	30.07	29.64	29.22	28.80	28.37	27.95	27.52	27.10
-160	35.54	35.12	34.70	34.28	33.86	33.44	33.02	32.60	32.18	31.76	31.34
-150	39.72	39.31	38.89	38.47	38.05	37.64	37.22	36.80	36.38	35.96	35.54
-140	43.88	43.46	43.05	42.63	42.22	41.80	41.39	40.97	40.56	40.14	39.72
-130	48.00	47.59	47.18	46.77	46.36	45.94	45.53	45.12	44.70	44.29	43.88
-120	52.11	51.70	51.29	50.88	50.47	50.06	49.65	49.24	48.83	48.42	48.00
-110	56.19	55.79	55.38	54.97	54.56	54.15	53.75	53.34	52.93	52.52	52.11
-100	60.26	59.85	59.44	59.04	58.63	58.23	57.82	57.41	57.01	56.60	56.19
-90	64.30	63.90	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66	60.26
-80	68.33	67.92	67.52	67.12	66.72	66.31	65.91	65.51	65.11	64.70	64.30
-70	72.33	71.93	71.53	71.13	70.73	70.33	69.93	69.53	69.13	68.73	68.33
-60	76.33	75.93	75.53	75.13	74.73	74.33	73.93	73.53	73.13	72.73	72.33
-50	80.31	79.91	79.51	79.11	78.72	78.32	77.92	77.52	77.12	76.73	76.33
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70	80.31
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67	84.27
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62	88.22
-10	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55	92.16
0	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48	96.09

°C	0	1	2	3	4	5	6	7	8	9	10
0	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51	103.90
10	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40	107.79
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29	111.67
30	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15	115.54
40	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01	119.40
50	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86	123.24
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69	127.08
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52	130.90
80	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33	134.71
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13	138.51
100	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91	142.29
110	142.29	142.67	143.05	143.43	143.80	144.18	144.56	144.94	145.31	145.69	146.07
120	146.07	146.44	146.82	147.20	147.57	147.95	148.33	148.70	149.08	149.46	149.83
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21	153.58
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.20	156.58	156.95	157.33
150	157.33	157.70	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68	161.05
160	161.05	161.43	161.80	162.17	162.54	162.91	163.29	163.66	164.03	164.40	164.77
170	164.77	165.14	165.51	165.89	166.26	166.63	167.00	167.37	167.74	168.11	168.48
180	168.48	168.85	169.22	169.59	169.96	170.33	170.70	171.07	171.43	171.80	172.17
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49	175.86
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16	179.53

-100Ω RTD $\alpha = 0.003850 \Omega / \Omega / ^\circ\text{C}$											
°C	0	1	2	3	4	5	6	7	8	9	10
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82	183.19
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47	186.84
230	186.84	187.20	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11	190.47
240	190.47	190.84	191.20	191.56	191.92	192.29	192.65	193.01	193.37	193.74	194.10
250	194.10	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35	197.71
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95	201.31
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55	204.90
280	204.90	205.26	205.62	205.98	206.34	206.70	207.05	207.41	207.77	208.13	208.48
290	208.48	208.84	209.20	209.56	209.91	210.27	210.63	210.98	211.34	211.70	212.05
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.90	215.25	215.61
310	215.61	215.96	216.32	216.67	217.03	217.38	217.74	218.09	218.44	218.80	219.15
320	219.15	219.51	219.86	220.21	220.57	220.92	221.27	221.63	221.98	222.33	222.68
330	222.68	223.04	223.39	223.74	224.09	224.45	224.80	225.15	225.50	225.85	226.21
340	226.21	226.56	226.91	227.26	227.61	227.96	228.31	228.66	229.02	229.37	229.72
350	229.72	230.07	230.42	230.77	231.12	231.47	231.82	232.17	232.52	232.87	233.21
360	233.21	233.56	233.91	234.26	234.61	234.96	235.31	235.66	236.00	236.35	236.70
370	236.70	237.05	237.40	237.74	238.09	238.44	238.79	239.13	239.48	239.83	240.18
380	240.18	240.52	240.87	241.22	241.56	241.91	242.26	242.60	242.95	243.29	243.64
390	243.64	243.99	244.33	244.68	245.02	245.37	245.71	246.06	246.40	246.75	247.09
400	247.09	247.44	247.78	248.13	248.47	248.81	249.16	249.50	249.85	250.19	250.53
410	250.53	250.88	251.22	251.56	251.91	252.25	252.59	252.93	253.28	253.62	253.96
420	253.96	254.30	254.65	254.99	255.33	255.67	256.01	256.35	256.70	257.04	257.38
430	257.38	257.72	258.06	258.40	258.74	259.08	259.42	259.76	260.10	260.44	260.78
440	260.78	261.12	261.46	261.80	262.14	262.48	262.82	263.16	263.50	263.84	264.18
450	264.18	264.52	264.86	265.20	265.53	265.87	266.21	266.55	266.89	267.22	267.56
460	267.56	267.90	268.24	268.57	268.91	269.25	269.59	269.92	270.26	270.60	270.93
470	270.93	271.27	271.61	271.94	272.28	272.61	272.95	273.29	273.62	273.96	274.29
480	274.29	274.63	274.96	275.30	275.63	275.97	276.30	276.64	276.97	277.31	277.64
490	277.64	277.98	278.31	278.64	278.98	279.31	279.64	279.98	280.31	280.64	280.98
500	280.98	281.31	281.64	281.98	282.31	282.64	282.97	283.31	283.64	283.97	284.30
510	284.30	284.63	284.97	285.30	285.63	285.96	286.29	286.62	286.95	287.29	287.62
520	287.62	287.95	288.28	288.61	288.94	289.27	289.60	289.93	290.26	290.59	290.92
530	290.92	291.25	291.58	291.91	292.24	292.56	292.89	293.22	293.55	293.88	294.21
540	294.21	294.54	294.86	295.19	295.52	295.85	296.18	296.50	296.83	297.16	297.49
550	297.49	297.81	298.14	298.47	298.80	299.12	299.45	299.78	300.10	300.43	300.75
560	300.75	301.08	301.41	301.73	302.06	302.38	302.71	303.03	303.36	303.69	304.01
570	304.01	304.34	304.66	304.98	305.31	305.63	305.96	306.28	306.61	306.93	307.25
580	307.25	307.58	307.90	308.23	308.55	308.87	309.20	309.52	309.84	310.16	310.49
590	310.49	310.81	311.13	311.45	311.78	312.10	312.42	312.74	313.06	313.39	313.71
600	313.71	314.03	314.35	314.67	314.99	315.31	315.64	315.96	316.28	316.60	316.92
610	316.92	317.24	317.56	317.88	318.20	318.52	318.84	319.16	319.48	319.80	320.12
620	320.12	320.43	320.75	321.07	321.39	321.71	322.03	322.35	322.67	322.98	323.30
630	323.30	323.62	323.94	324.26	324.57	324.89	325.21	325.53	325.84	326.16	326.48
640	326.48	326.79	327.11	327.43	327.74	328.06	328.38	328.69	329.01	329.32	329.64
650	329.64										



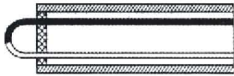



The composite material of the sheath thermocouple heat electrode

Code	Grade+	Grade-
NK	Ni Cr Si	Ni Si
KK	Ni Cr	Ni Si(Al)
EK	Ni Cr	Cu Ni(Konsdtantan)
JK	Fe	Cu Ni(Konsdtantan)
TK	Cu	Cu Ni(Konsdtantan)
SK	Pt Rh 10	Pt
RK	Pt Rh 13	Pt
BK	Pt Rh 30	Pt Rh 6

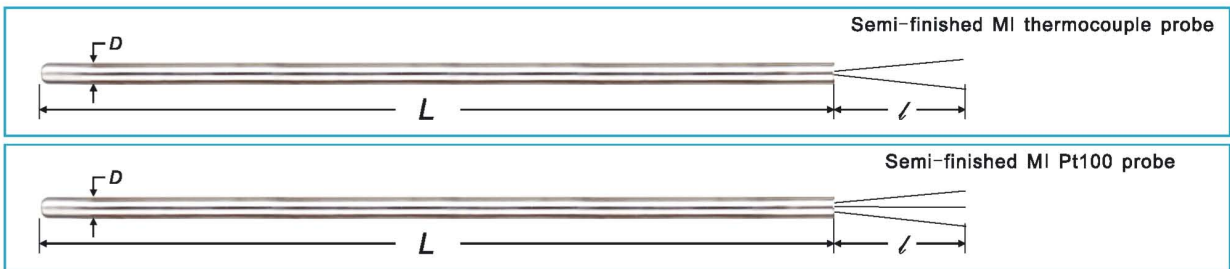
Thermal response time T 0.5S

Sleeve diam,E(mm)	Ground(S)	Unground(S)
2.0	0.4	0.5
3.0	0.6	1.2
4.0	0.8	2.5
5.0	1.2	4.0
6.0	2.0	6.0
8.0	4.0	8.0

The sheath thermocouple measured end pattern

Code	Modle	Structure	Features	Simplex	Duplex
1	Endexposed		Quick responsive speed It is fit for measuring the engine air exhaust temperature. Compared with other measuring structures, it is of weak measuring terminal strength.	$\Phi 1.0$ $\Phi \tilde{8.0}$	$\Phi 3.0$ $\Phi \tilde{8.0}$
2	Grounded		Fairly quick responsive speed Fine pressure-resistant performance. It may maximumly bear 350MPa pressure. It is unfit for occasions with electro-magnetic interference.	$\Phi 0.25$ $\Phi \tilde{8.0}$	$\Phi 3.0$ $\Phi \tilde{8.0}$
3	Ungrounded		The responsive speed is slower than the ground type. Long use life. Anti-electro-magnetic interference.	$\Phi 0.5$ $\Phi \tilde{8.0}$	$\Phi 3.0$ $\Phi \tilde{8.0}$
4	Separated Unground		It may avoid the signal interference between two thermocouples. Other features are the same as the unground type.		$\Phi 3.0$ $\Phi \tilde{8.0}$

## SEMI-FINISHED MI PROBE

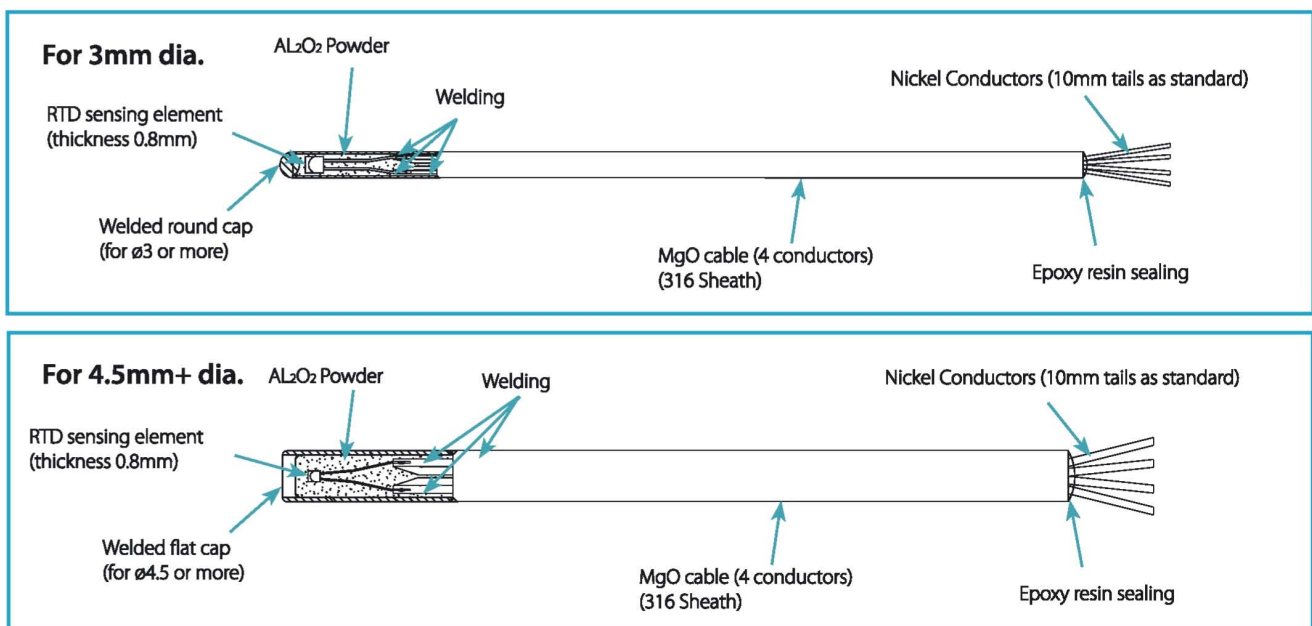


Probes can be supplied spring loaded or with a fixed mounted fittings. All fittings are 304 & 316 stainless steel With various thread for mounting into: walls, connector heads, or thermowells. The (SL - spring loaded) units allow up to 3/4 inch of travel.

\* High quality semi-finished MI probe is on offer. Nice endings, high accuracy conforms to IEC584, grounded & ungrounded, minimum outer sheath diameter 0.5mm for MI thermocouple probe ungrounded, professional packing condition for protecting bare wires.

We have a large quantity of MI cable in stock in various types, diameters, and sheath materials, which ensures the quickest delivery time.

## RTD SEMI-FINISHED MI PROBE



## Reduced Tip MI Thermocouples

TaiSuo can offer thermocouple drawdown units to your specifications. Drawdown units (a.k.a. shoulder reduced thermocouples) are available in a variety of sheath materials, insulation powders, conductor (t/c type).

Sheath materials: Inconel (Alloy 600), SS310, SS321, SS316L

Thermocouple types: K, N – other conductor types are available

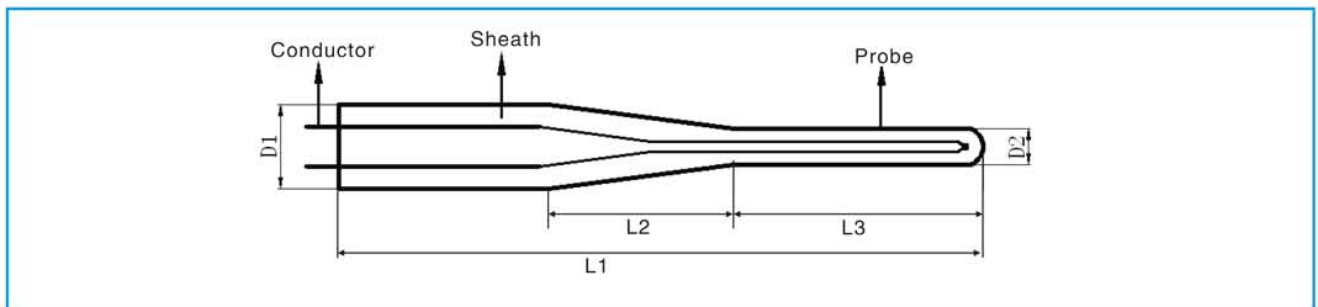
Sizes: Metric (mm) – (start/finish) – 4.0mm to 2.0mm, 4.0mm to 1.0mm, 6.0mm to 2.0mm, ect.

Please contact us for other sizes

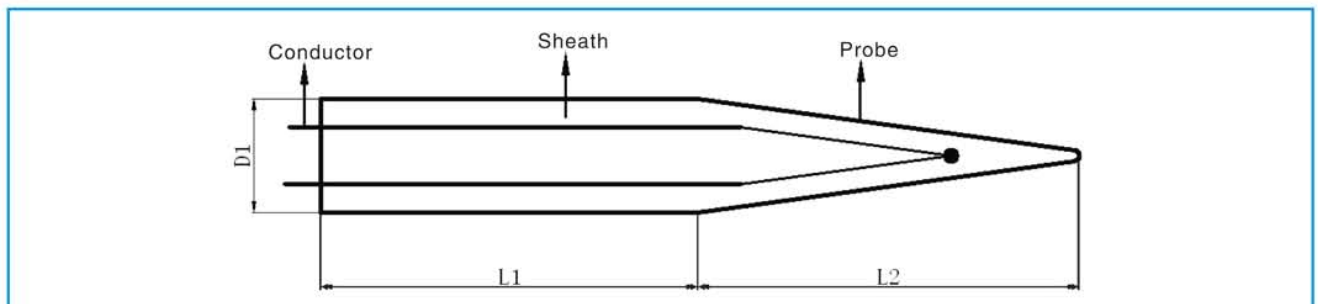
Calibration on site to: IEC584- Tolerance classes 1 & 2, special limits, ½ tolerance

To specify an MI thermocouple drawdown unit please make sure to have the following information in hand:

### STYLE1



### STYLE2



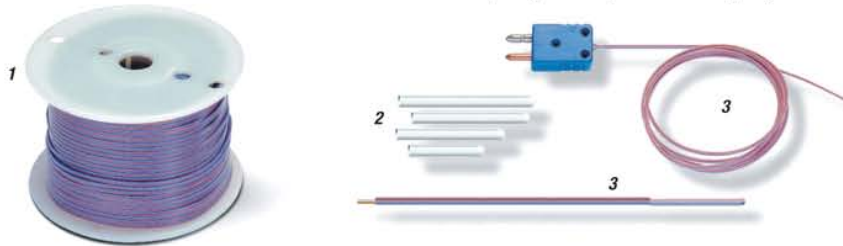
- Sheath Material
- Thermocouple Conductor Type
- Conductor Number: Simplex, Duplex
- Junction Type (Exposed, Insulated, Grounded Or Separated Insulated)
- Accuracy (Class 1, Class 2)
- Reduced Diameter And Length: L1, L2 And L3
- Cold Seal Arrangement
- Flexible Lead Length/Connector Style

**THERMOCOUPLE WIRE ASSEMBLIES**

1. TAISUO stocks spools thermocouple grade wire, solid and stranded, special limits of error, Teflon insulated jacket, operating temperatures to 204°C .

2. Clear Teflon tips for thermocouple wire are available. Operating temperature to 300° F (149° C).

3. Completed wire assemblies include thermocouple wire, hot junction, leads and tipping if desired.



**QUICK DISCONNECT ASSEMBLIES**

TAISUO polarized plug and jack assemblies are made of molded, glass-filled thermoset compounds with

contacts of RTD or Type T thermocouple alloys. Available in single or dual constructions.



**MULTIPLE CONNECTOR FEEDTHROUGHS**

1. High Density (HD) Mechanically Sealed Feedthrough Assemblies consist of a stainless steel tube over 12, 24, 40 or 60 bundled Teflon®-coated thermocouple wires, with or without junctions, and/or copper wires, providing continuous wire feedthrough.

2. Other gland types are available to allow passage of electrodes, conductors/wires and temperature sensor probes.



## ITEM:TS 01 SERIES/TS 02 SERIES



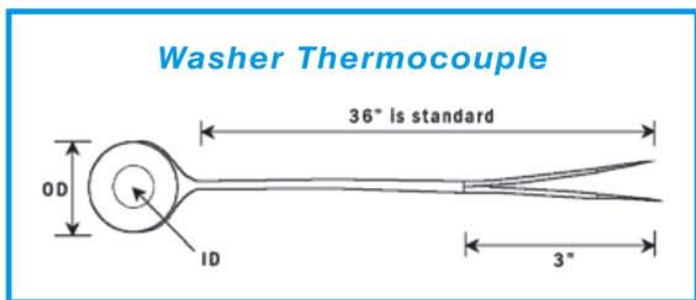
The TS 02 series bolt-down thermocouple uses #20 gage (0.032") solid conductors and is available with various insulation materials: fiberglass or Teflon. Four standard eyelet sizes are available: #6 (0.146 hole), #8 (0.170), #10 (0.195 hole) and 1/4 inch (0.260 hole). In addition to bolting the thermocouple to a wall, it can also be hooked to a traveling conveyor or hung from a ceiling.

Available in thermocouple calibrations - Types J, T, K, and E. Length of the TS 02 series unit is 36 inches, longer in length as well as, stainless steel over braid and various terminations are also available to suit your particular requirement. The TS 01 series washer thermocouples are designed to measure true average temperature of the washer. Conduction errors are eliminated by welding elements at 180 degrees.

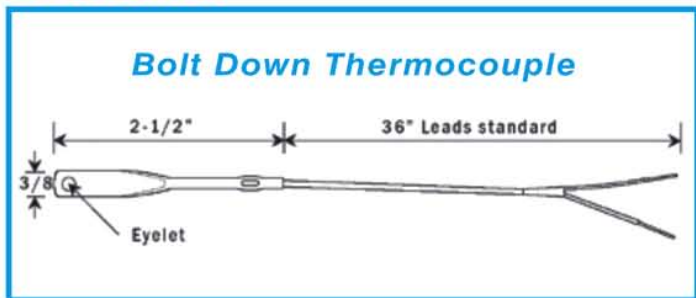
### NOTES:

- If lead lengths longer than 36 inches are desired, specify length required.
- Standard wire insulation is fiberglass, which is good to 700 degrees Fahrenheit operation.
- For other insulation consult factory.
- When ordering specify part number by selecting code from each column A through F, then add length in inches.  
*Example: TS 02-2-1-2-2-3-D-120 specifies a type K Teflon insulated, stainless steel over braid, ungrounded, spade lug unit with a 1/4 inch clearance hole, 120 inches long.*
- Nextel insulation available for type K only.

### TS 01 Series



### TS 02 Series



### TS 01 Series

Specifications							
Part No.	TC Type	Washer		Part No.	TC Type	Washer	
		ID (in)	OD (in)			ID (in)	OD (in)
TS 01-1	J	1/8	5/16	TS 01-11	K	1/8	5/16
TS 01-2	J	3/16	7/16	TS 01-12	K	3/16	7/16
TS 01-3	J	1/4	5/8	TS 01-13	K	1/4	5/8
TS 01-4	J	3/8	7/8	TS 01-14	K	3/8	7/8
TS 01-5	J	1/2	1 1/4	TS 01-15	K	1/2	1 1/4
TS 01-6	T	1/8	5/16	TS 01-16	E	1/8	5/16
TS 01-7	T	3/16	7/16	TS 01-17	E	3/16	7/16
TS 01-8	T	1/4	5/8	TS 01-18	E	1/4	5/8
TS 01-9	T	3/8	7/8	TS 01-19	E	3/8	7/8
TS 01-10	T	1/2	1 1/4	TS 01-20	E	1/2	1 1/4

### TS 02 Series

Choose One Option From Each Column

A	B	C	D	E	F
Thermocouple	Insulation	Stainless Steel Over Braid	Junction	Termination	Eyelet Size
1=J	1=Fiberglass	1=No	1=Grounded	1=Bare Leads	A=#6 (.145")
2=K	2=Teflon	2=Yes	1=Ungrounded	2=Standard Plug	B=#8 (.170")
3=T	3=Nextel			3=Spade Lugs	C=#10 (.195")
4=E				4=Mini Plug	D=1/4 (.260")

## ITEM:TS 03 SERIES

Our line of hose clamp thermocouples consists of three basic styles which vary by the addition of a stem and/or stainless steel overbraid.

**Style 1** has an 1/8 inch O.D. by six inches long stainless steel sheath. The thermocouple wires inside the sheath are insulated with a high temperature mineral oxide insulation. Standard units have a grounded junction which is brazed to the stainless steel pipe clamp. Two versions of the attachment are available: tangential and perpendicular. Unless otherwise specified, we will furnish the tangential style. The style 1 units have five feet of fiberglass insulated extension wire connected to the stainless steel sheath.



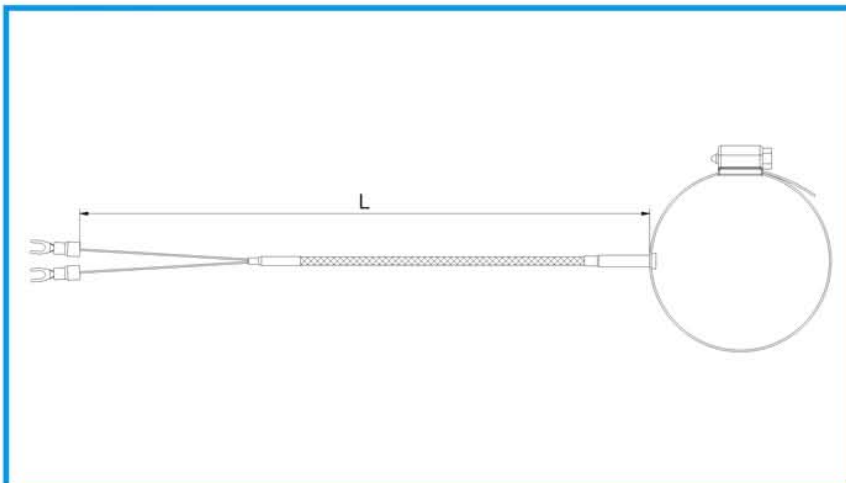
**Style 2** the same as Style 1, except that the stainless steel sheath is deleted. The fiberglass insulated thermocouple wires are welded directly to the stainless steel pipe clamp.

**Style 3** the same as style 2, except that the fiberglass insulated thermocouple wires have a stainless steel overbraid which reduces stray, unwanted electromagnetic pickup and increases lead wire durability.

**NOTES:**

- All units come with five feet of fiberglass insulated extension leads other materials are also available.
- All thermocouples are mounted in a tangential style as shown above, unless a perpendicular style is specified.
- All thermocouples are grounded to hose clamp for fast response.
- All units are available in thermocouple types T, E, J, K, N and PT100
- Various terminations are available, contact factory.
- When ordering, specify part number and thermocouple type  
*Example.:* TS03-5-J
- To specify (U - ungrounded) junction add the suffix U to the part number.
- To specify (P - perpendicular) style versus tangential add suffix P to part number.

### D6 Series

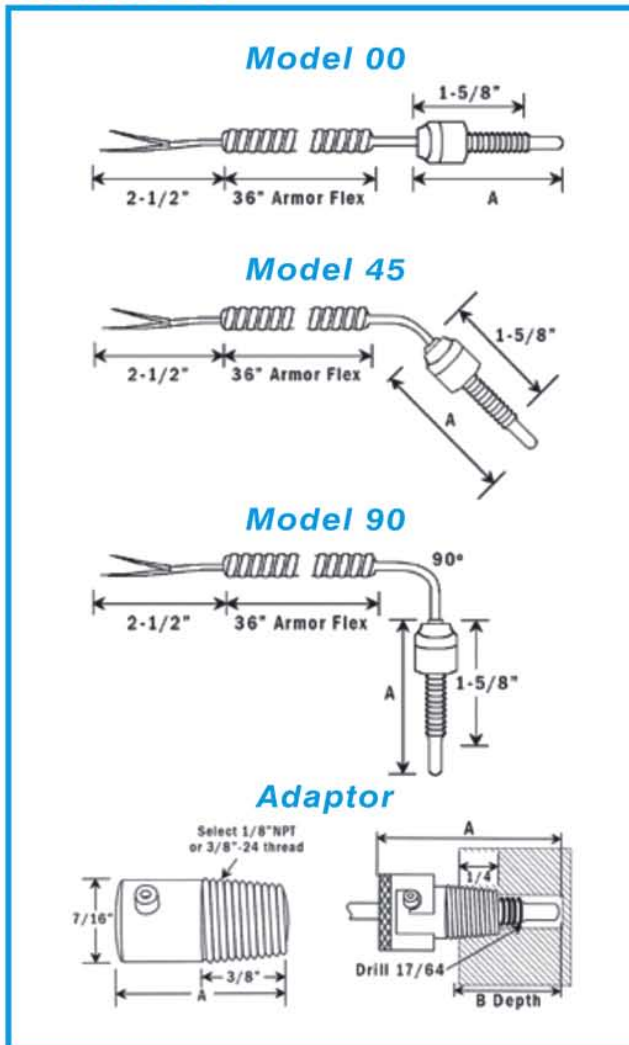


Specifications			
Pipe OD (in.)	Style 1	Style 2	Style 3
	Part No.	Part No.	Part No.
7/32 → 5/8	TS03-5	TS03-52	TS03-53
3/8 → 1/2	TS03-6	TS03-62	TS03-63
3/8 → 5/8	TS03-8	TS03-82	TS03-83
1/2 → 5/8	TS03-10	TS03-102	TS03-103
5/8 → 3/4	TS03-12	TS03-122	TS03-123
3/4 → 1	TS03-16	TS03-162	TS03-163
1 → 1-1/4	TS03-20	TS03-202	TS03-203
1-1/4 → 1-1/2	TS03-24	TS03-242	TS03-243
1-1/4 → 1-3/4	TS03-28	TS03-282	TS03-283
1-1/2 → 2	TS03-32	TS03-322	TS03-323
1-3/4 → 2-1/4	TS03-36	TS03-362	TS03-363
2-1/16 → 3	TS03-40	TS03-402	TS03-403
2-5/16 → 3-1/4	TS03-44	TS03-442	TS03-443
3 → 3-1/4	TS03-52	TS03-522	TS03-523
3-1/4 → 3-1/2	TS03-60	TS03-602	TS03-603
4 → 4-1/2	TS03-68	TS03-682	TS03-683
4-1/6 → 5	TS03-72	TS03-722	TS03-723
4-5/8 → 5-1/2	TS03-80	TS03-802	TS03-803
5-1/8 → 6	TS03-88	TS03-882	TS03-883
5-7/8 → 6-3/4	TS03-104	TS03-1042	TS03-1043

# ITEM:TS 04 SERIES



**TS 04 Series**



**NOTES:**

- Types: J, K, E, T, N
- Specify thermocouple calibration as follows.  
*Example: TS04-1-K*
- All standard units have grounded junctions. If ungrounded junctions are desired, add (U) to part number.
- All standard units have 36 inches armored extension leads.
- All bayonet thermocouples are supplied without adaptors and connectors.

Specifications		
Part No.	Model	Length "A"
TS04-1	00	2
TS04-2		2-1/2
TS04-3		3
TS04-4		3-1/2
TS04-5		4
TS04-6		4-1/2
TS04-7		5
TS04-8		5-1/2
TS04-9		6
TS04-10	45	2
TS04-11		2-1/2
TS04-12		3
TS04-13		3-1/2
TS04-14		4
TS04-15		4-1/2
TS04-16		5
TS04-17		5-1/2
TS04-18	6	
TS04-19	90	2
TS04-20		2-1/2
TS04-21		3
TS04-22		3-1/2
TS04-23		4
TS04-24		4-1/2
TS04-25		5
TS04-26		5-1/2
TS04-27		6
Mounting Adaptors		
TS04-28	1/8 NPT	7/8
TS04-29		1-3/8
TS04-30		2-1/2
TS04-31	3/8-24 NF	7/8
TS04-32		1-3/8
TS04-33		2-1/2

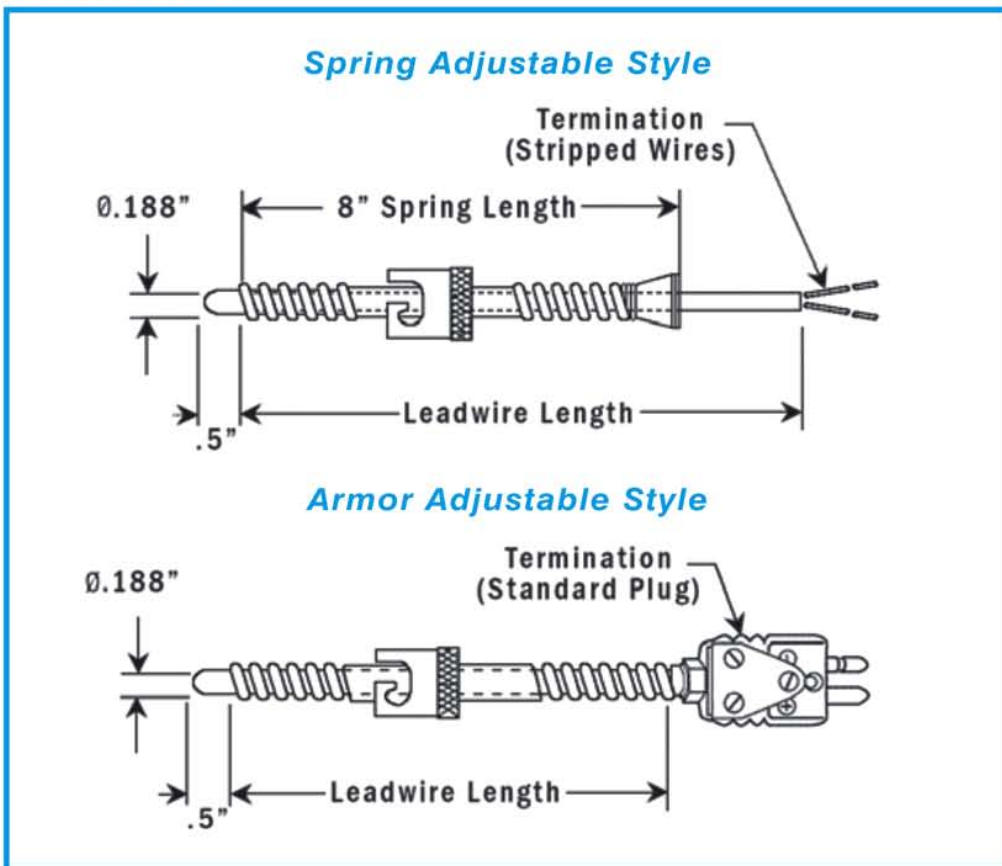
Instructions for Hole Depths and Adaptors			
Depth "B" (in.)	Length "A"		
	7/8" long adaptor	1 3/8" long adaptor	2 1/2" long adaptor
1/2 to 1	2	2-1/2	3-5/8
1 to 1 1/2	2-1/2	3	4-1/8
1 1/2 to 2	3	3-1/2	4-5/8
2 to 2 1/2	3-1/2	4	5-1/8
2 1/2 to 3	4	4-1/2	5-5/8
3 to 3 1/2	4-1/2	5	6-1/8
3 1/2 to 4	5	5-1/2	6-5/8
4 to 4 1/2	5-1/2	6	7-1/8
4 1/2 to 5	6	6-1/2	3-5/8

ITEM:TS 05 SERIES

The TS 05 SERIES bayonet thermocouple allows simple, rapid adjustment of the immersion length to each application. The thermocouple can be specified with a bayonet cap on either an eight inch spring to allow for up to seven inches of adjustable immersion, or on the flexible armor to allow for full "B" length adjustable immersion.



TS 05 Series



NOTES:

- Spring or armor adjustable provide wide versatility
- 0 - 900 degrees Fahrenheit measurement offers a wide range of measurements
- Five foot standard application requirements.
- Fiberglass insulated element offers protection to the wire.
- Larger lengths also available.
- When ordering, specify style & type.  
*Example: TS05-10-J, for type J*

Specifications			
Part No.	Style	Leadwire	Terminations
TS 05-10	Bayonet cap on 8" spring	60" length	Stripped wires 3" long
TS 05-05	Bayonet cap on flexible armor	60" length	Standard male thermocouple connector



## ITEM:TS 06 SERIES

Thermocouples and extension leads with end preparations offer rapid solutions to many temperature measurement applications at economical costs. They all contain one pair of solid conductors and are insulated with fiberglass over each leg and overall. Thermocouple color codes and premium grade elements are used throughout. Thermocouple types include J, K, E, T, and N.

### NOTES:

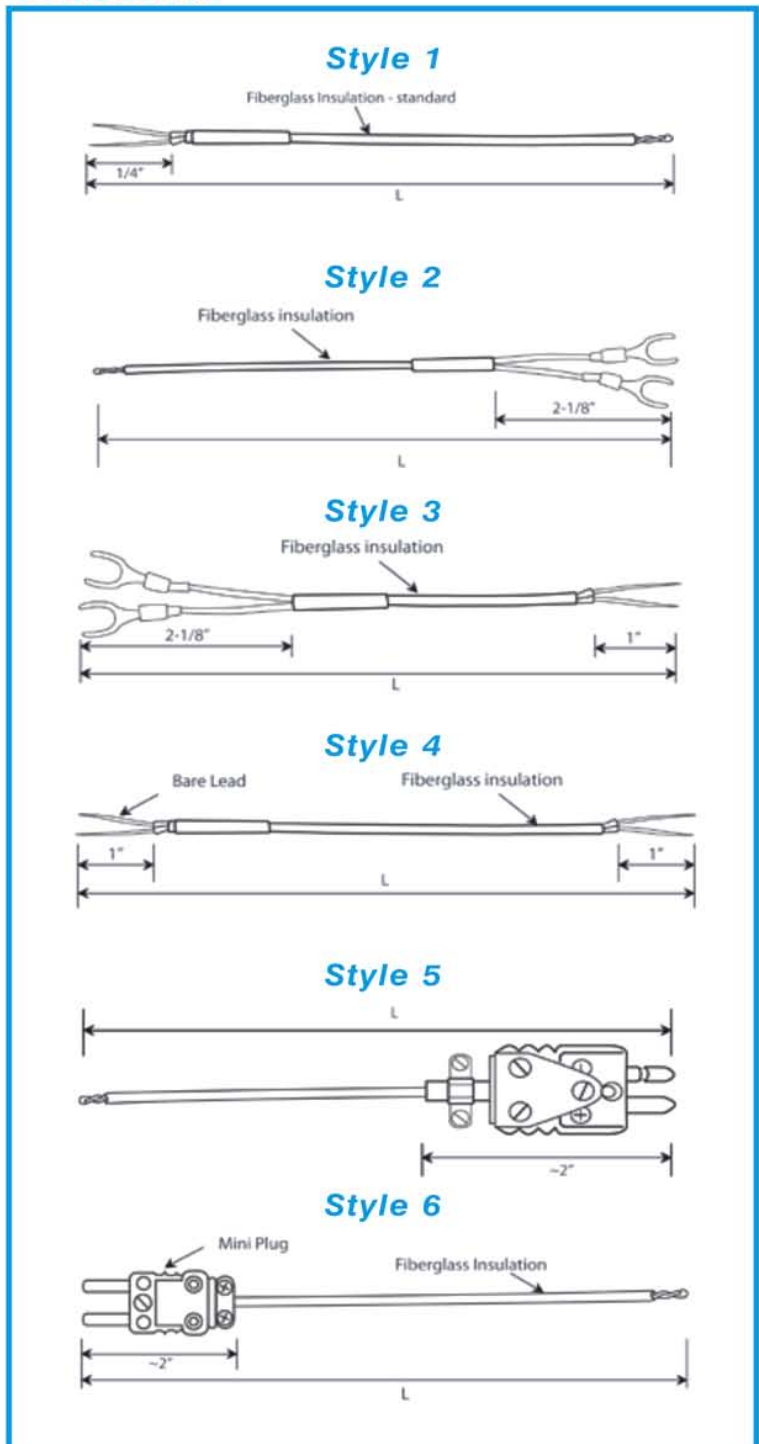
- When ordering, specify part number and fill in the four letter blocks  
*Example: TS06-2-K-20-36 specifies a Style 2 thermocouple with spade lugs on cold end, Type K, Gage #20 and an overall length of 36 inches.*
- For (SS - stainless steel) overbraid add suffix SS to part number.

Style	End Preparation
Style 1	Twisted and welded hot junction with leads stripped at cold end
Style 2	Twisted and welded hot junction with compensated lugs at cold end
Style 3	Stripped one end, compensated lugs on the other end
Style 4	Stripped both ends
Style 5	Twisted and welded hot junction with standard plug at cold end
Style 6	Twisted and welded hot junction with miniature plug at cold end

### Choose One Option From Each Column

A	B	C	D
Style	Calibration	Wire Gage	Length
1	J	16	inches
2	K	20	
3	E	24	
4	T		
5	N		
6			

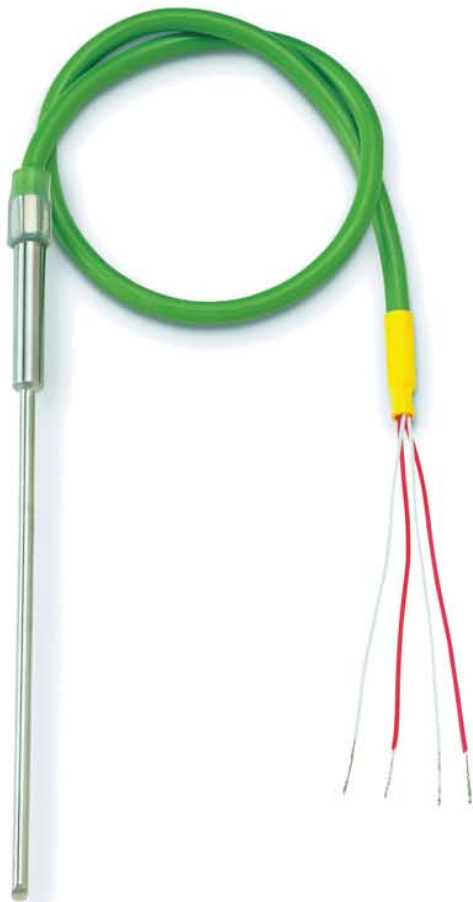
### TS 06 Series



## ITEM:TS 07 SERIES

## Autoclave Chamber/Load Sensor

Thermocouple or RTD, 100  $\Omega$ @0°C, .00385 $\Omega$ / $\Omega$ /°C calibrations are available, sensor lengths and diameters are configured to meet application requirements.

**Mechanical****Sensor Diameter:**

- 3.0mm, 3.18mm (.125"), 4.76mm (.187"), 6.0mm, 6.35 (.250")

**Sensor Length:**

- 75mm (3") minimum, 305mm (12") maximum

**Sheath Material:**

- 316 Stainless Steel

**Leadwire/Jacket Length:**

- 900mm (36") length minimum

**RTD****Element:**

- Single or dual PT 100 with 3 or 4 wire connection, Class 'B', and 'A' tolerance meeting BS EN 60751:1996. Fractional 1/10 tolerance available.

**Leadwire/Jacket:**

- PTFE insulated 26AWG stranded conductors with thick walled extruded silicone rubber jacket

**Operating Range:**

- -50°C to +150°C (-58°F to +302°F)
- Vacuum to 3.5 BAR (50 PSIG)

Note: Multiple detector configurations are determined by the sensor diameter.

**Thermocouple****Type:**

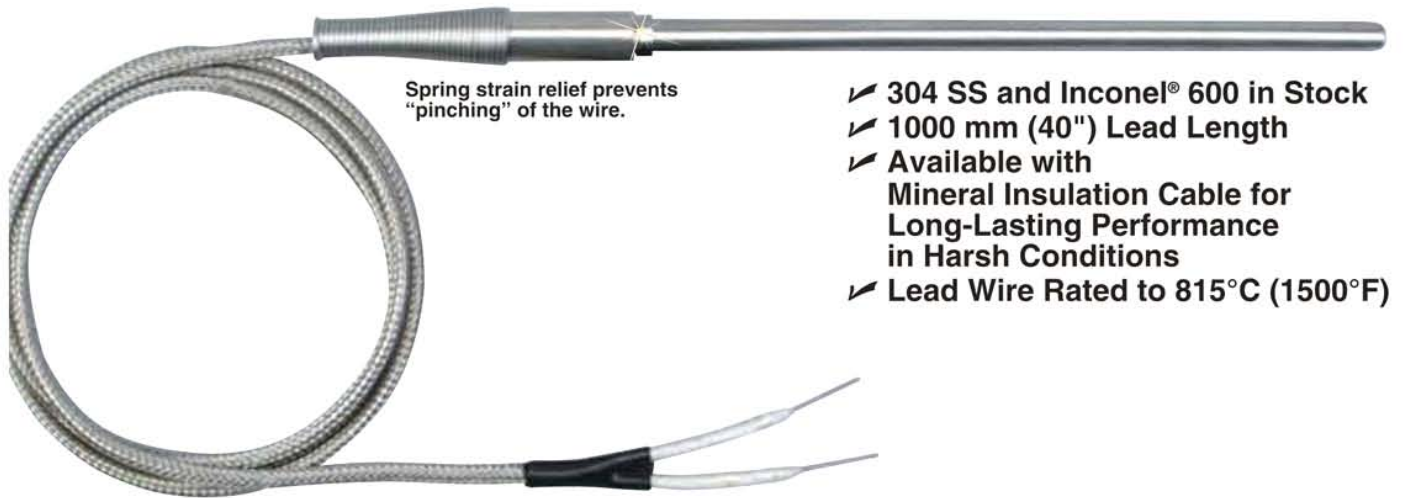
- Type T,J,K,N,E:Single or Dual

**Leadwire/Jacket:**

- PTFE insulated 24AWG stranded conductors with thick walled extruded silicone rubber jacket

## ITEM:TS 08 SERIES

### MI CABLE Thermocouple Assemblies with Leadwire Termination



Spring strain relief prevents "pinching" of the wire.

- ✓ 304 SS and Inconel® 600 in Stock
- ✓ 1000 mm (40") Lead Length
- ✓ Available with Mineral Insulation Cable for Long-Lasting Performance in Harsh Conditions
- ✓ Lead Wire Rated to 815°C (1500°F)

## ITEM:TS 09 SERIES



Spring strain relief prevents "pinching" of the wire.

- ✓ Stainless Steel Overbraid—Resists Abrasions and Cuts yet Remains Flexible
- ✓ 304 SS and Inconel® 600 in Stock

- ✓ 1 m (40") Lead Length
- ✓ Manufactured with Mineral Insulation Cable for Long-Lasting Performance in Harsh Conditions!

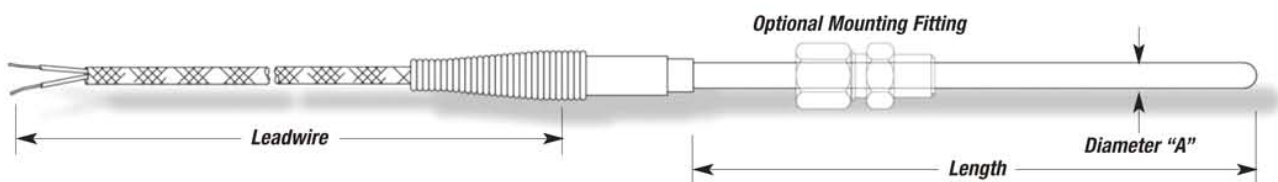
Miniature male connector with cable clamp attachment designed for durability.

**ITEM: TS 10, TS 10S SERIES**

**High Temperature**

**Operating Temperatures Up to 4200°F (2315°C)**

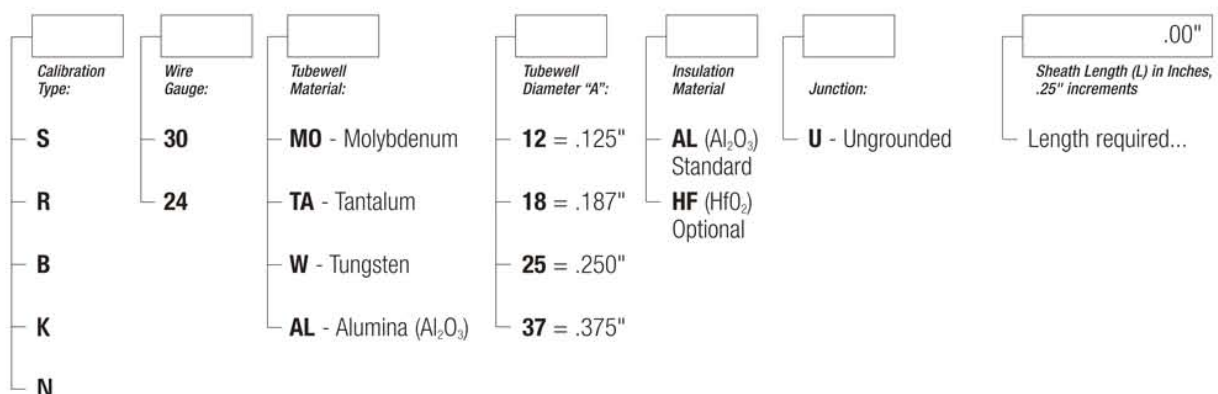
**Thermocouple Assemblies with Leadwire Termination**



**TS10 Assembly**

This exclusive **TAISUO**’ S design provides a practically unbreakable connection between the leadwire and probe lead. The TS 10 epoxy-filled transition is supplied with Teflon-insulated extension wire as standard; silicone-impregnated fiberglass insulation is also available. Standard extension end leads are 24" long (longer leads available on request). When the progressive description specifies 24 gauge probe wire, 20 gauge extension wire is standard. When the progressive description specifies 30 gauge probe wire, 24 gauge extension wire is standard. TS 10 termination provides a stainless steel overbraid for maximum flexibility and abrasion resistance. Available in all sheath materials and wire types. Both termination types function to 300° F (150° C) continuous temperature.

**Progressive Description Example: TS10-R24-AL18-AL-U-18.00"**



Notes:

- .125" diameter sheath is available with 30 gauge wire only.
- Alumina sheath is not available in .125" diameter.
- Molybdenum, Tantalum and Tungsten are not available in .375" diameter.
- Extension grade leadwire.

For longer lead length specify, example: 36" leadwire requested - (36")

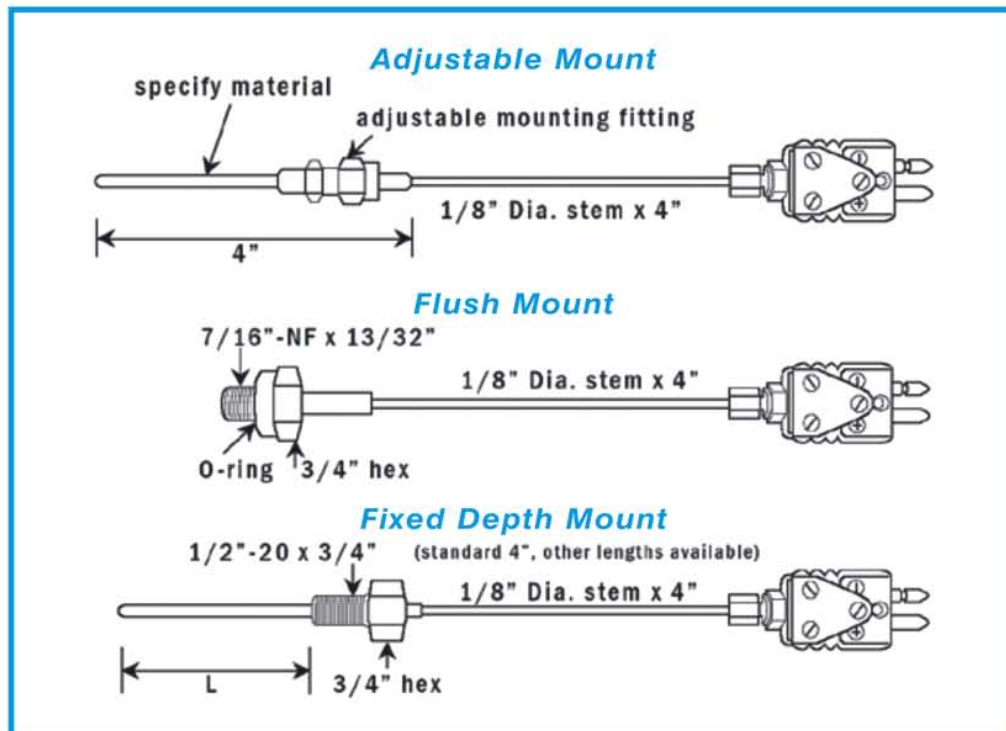
## ITEM:TS 11 SERIES

The adjustable probe unit includes an adjustable compression fitting with pipe threads. The probe may be from 3/16 inch OD and up, though standard sizes are 1/4 and 3/8 inch. Lengths can be from two inch to as much as 24 inches long, with a standard length of four inches. Probe may be made from most any metal. This style is ideally suited for gas and liquid surface and immersion applications.

The surface mounted unit contains the right angle thermocouple on the end of the threaded thermowell. The thermowell is of stainless steel with straight threads (7/16-20NF-2 by 13/32 inch long). It also contains an O-ring seal, the O-ring is good to 450 degrees Fahrenheit maximum. At higher temperatures, the O-ring must be removed and replaced by a copper washer. This flush mounted unit is ideal for applications requiring gas or liquid temperatures at the inner surface of a container wall.

The fixed probe unit contains a 1/4 inch OD stainless steel probe on the end of a straight thread mounting bushing (size of threads 1/2-20NF x 3/4 inch length). The fixed probe unit is ideal for measuring gas or liquid temperatures inside a container under high pressures.

### TS 11 Series



## ITEM:TS 12 SERIES

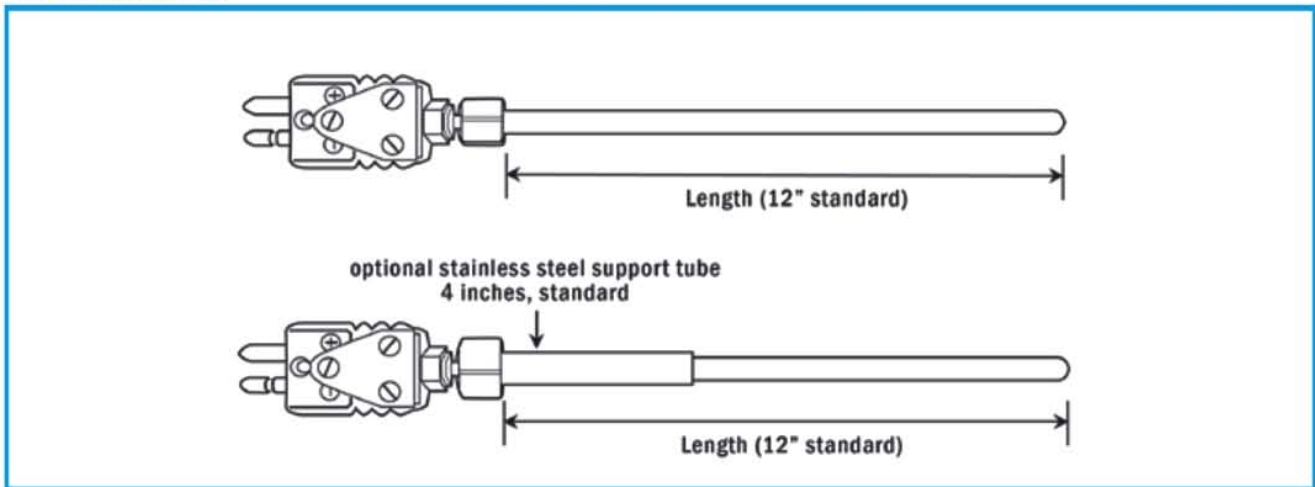


Up to 4200 °F

Our standard high temperature thermocouple probe consists of an ungrounded thermal junction within a closed end sheath. It includes a set of standard matching plug and jack connectors with the male connector attached and the female connector (not shown) furnished with a cable clamp.

Maximum service temperature of connector is 450 degrees Fahrenheit. The standard high temperature thermocouple is also available with a thick wall, four inch long support tube (ST) attached to the connector end. The support tube eliminates any damage to the refractory sheath caused by the mounting bushing. The support tube is an 1/8 inch larger in diameter than the thermocouple sheath.

### TS 12 Series



**NOTES:**

- All of the above thermocouples use #24 gage (0.020") size elements.
- All platinum assemblies use high purity alumina insulation. All tungsten assemblies use magnesia insulation; hafnia insulation also available.
- Duplex and multiple units also available.
- When ordering, specify part number (L - length) and thermocouple type.  
Example: TS12-1-12-R

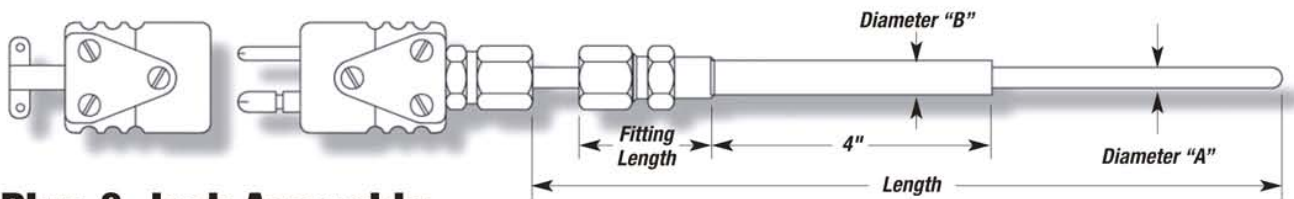
Specifications			
Part No.	Sheath Diameter	Sheath Material	Thermocouple Types
TS12-1	.125	Molybdenum	S,R,B,K,N
TS12-2	.187		
TS12-3	.250		
TS12-5	.125	Tantalum	
TS12-6	.187		
TS12-7	.250		
TS12-10	.187	Alumina	
TS12-11	.250		
TS12-12	.375		
TS12-14	.250	Zirconia	
TS12-15	.375		
TS12-16	.188	Quartz	
TS12-17	.250		
TS12-18	.375		

# ITEM:TS 13 SERIES

High Temperature

Operating Temperatures Up to 4200°F (2315°C)

## Thermocouple Assemblies with Plug/Jack Termination and Support Tube



### Plug & Jack Assembly

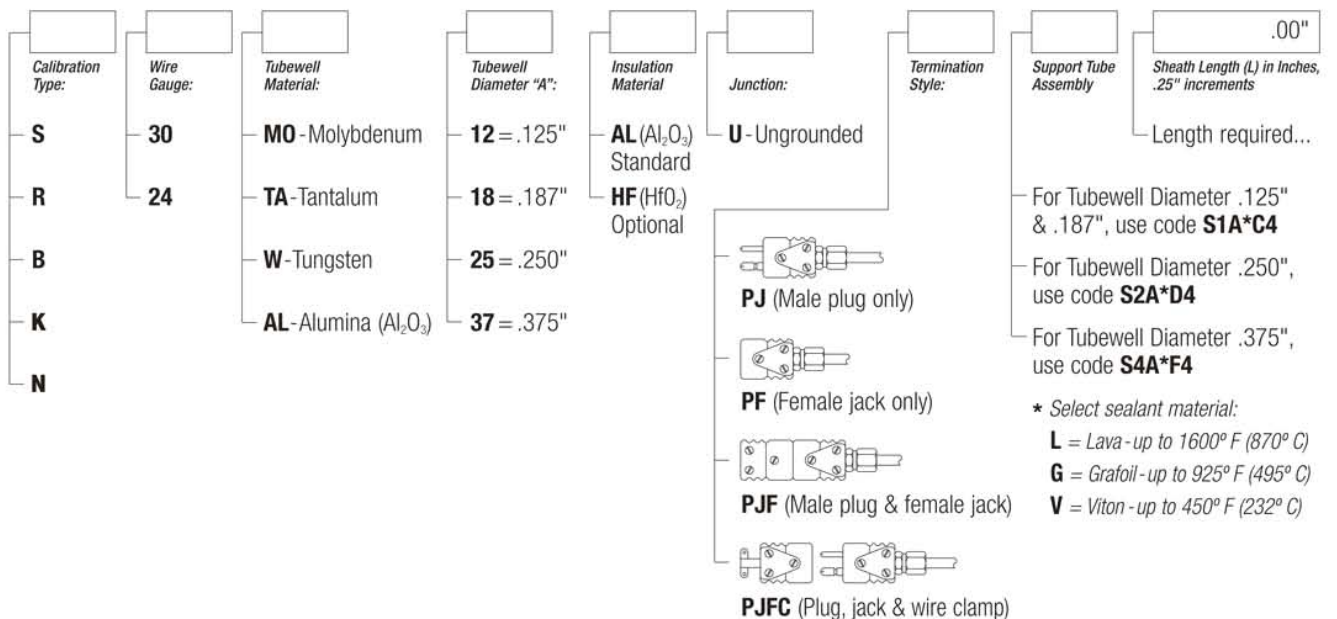
An adjustable support tube offers flexibility for immersion adjustment while protecting the sheath from potential damage during installation. The rigid, thick wall offers additional support when penetrating the vessel/furnace wall.

Standard polarized plug and jack termination for use with all calibration types. Plug and jack assemblies are made from molded glass filled thermoset compounds and are designed to operate in temperatures to 428° F (220° C). Polarity identification marks are molded in the bodies for installation assistance.

#### SUPPORT TUBE DATA

Thermocouple Diameter "A"	Support Tube Diameter "B"	Code	Fitting Length
.125"	.312"	<b>C</b>	1.12"
.187"	.312"	<b>C</b>	1.12"
.250"	.375"	<b>D</b>	1.50"
.375"	.500"	<b>F</b>	2.00"

Progressive Description Example: **TS13-S24-M018-AL-U-PJFC - S 1 A V C 4 - 12.50"**

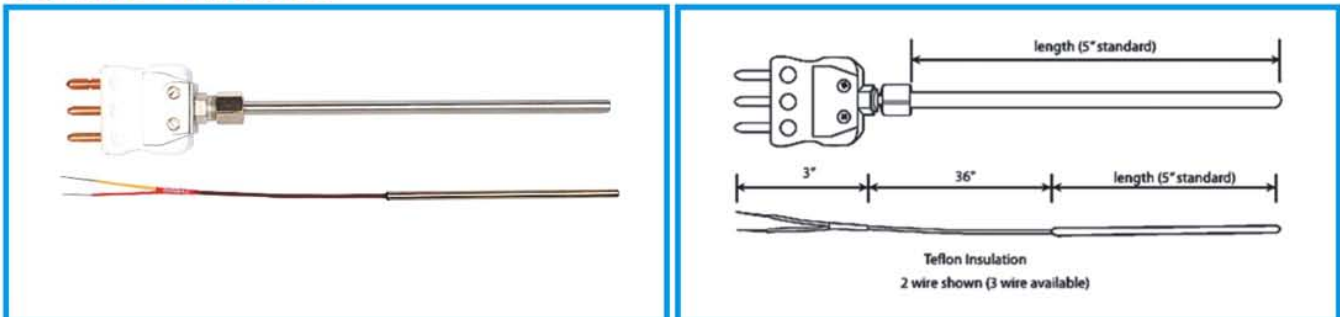


## ITEM:TS-RTD-14 SERIES

The standard RTD probe uses Pt100 elements with Alpha-0.00385. Sheath material is Stainless Steel Units are available with a standard size plug or Teflon insulated lead wire. When ordered with a plug it will come with a three prong plug. Units with lead wire can be either two , three and four conductors and are available with stainless steel overbraid for added durability.

*Pt1000 also available*

### TS-RTD-14 Series



#### NOTES:

- Various size mounting bushings are available for these units.
- Longer sheath or lead wires lengths, 4-wire units, various sheath materials are available.
- A variety of termination styles are available for these units.
- Typical construction does not allow for bending, contact factory if your requirement involves bending.

### TERMINATION HEAD ASSEMBLIES

1. FDA-compliant RTD and thermocouple termination heads for sanitary applications meet NEMA 4 requirements and provide good resistance to most acid and alkaline solutions. Styles include screw top and flip top covers for terminal access. Head style accommodates a hockey-puck style transmitter.

2. Stainless steel, NEMA 4 rated termination head is highly versatile and rugged. Accommodates a "hockey-puck" style transmitter.

3. Sanitary Flanges facilitate easy change outs. Available in diameter sizes ranging from 0.75-inch to 3-inch.

4. Stainless steel thermowells and tubewells provide stiffness, thermal conductivity and ease of sensor installation in pressurized and controlled environments. Available in sanitary flange or thread mount style.



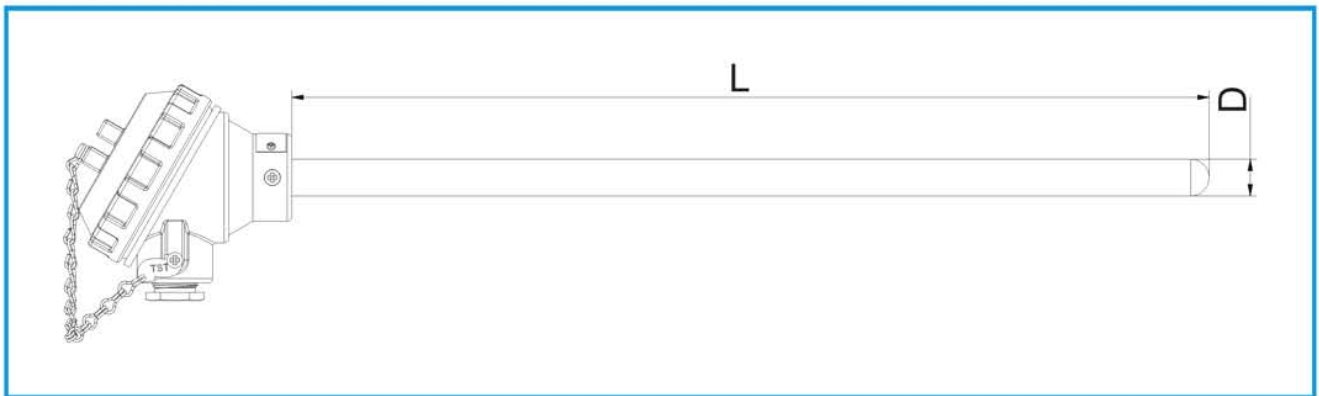


## Thermocouple ASSEMBLY

Standard assembly consists of the metal alloy protection tube with a general purpose aluminum connector head attached. The connector head has a 1/2 inch NPT outlet port. This unit is assembled with a #14 heavy gage ungrounded thermocouple with ceramic insulators and is connected to a two-wire terminal block in the connector head. This unit can be combined with cold leg extension assembly if necessary. For special designs or requirements contact us.



### TS15 Series



#### NOTES:

- Available in types J, K, E, T, N and S,R,B. Other types are available
- All units use ungrounded junctions, for grounded or exposed junctions consult us.
- Duplex junctions are available, consult us.
- Specify part number, length, and calibration when ordering.  
*Example: Ts15-21-24-K*
- Contact us for mounting hardware, or for any special design requirements.

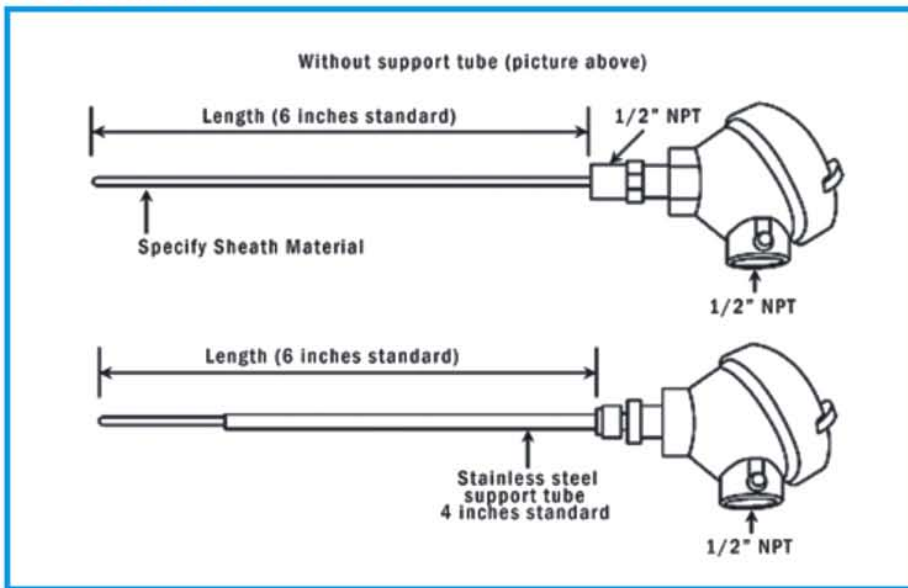
Specifications				
Part No.	Sheath Material	Max Sheath Length	Sheath ODxID (inches)	Pipe Size
TS15-10	Inco 600	60"	.540 x .364	3/8"
TS15-11			.840 x .622	1/2"
TS15-12			1.050 x .824	3/4"
TS15-13			1.315 x 1.049	1"
TS15-14	SS 304	60"	.540 x .364	3/8"
TS15-15			.840 x .622	1/2"
TS15-16			1.050 x .824	3/4"
TS15-17			1.315 x 1.049	1"
TS15-18	SS 446	60"	.540 x .364	3/8"
TS15-19			.840 x .622	1/2"
TS15-20			1.050 x .824	3/4"
TS15-21			1.315 x 1.049	1"
TS15-22	Carbon Steel	60"	.540 x .364	3/8"
TS15-23			.840 x .622	1/2"
TS15-24			1.050 x .824	3/4"
TS15-25			1.315 x 1.049	1"
TS15-26	Hastelloy C	60"	.540 x .364	3/8"
TS15-27			.840 x .622	1/2"
TS15-28			1.050 x .824	3/4"
TS15-29			1.315 x 1.049	1"

## RTD ASSEMBLY

The standard probe contains an RTD assembly with a general purpose Aluminum Head. A terminal block is mounted on the interior of the general purpose head. The general purpose head has various threads where the probe is mounted and a 1/2 inch NPT conduit outlet for the wire connections. This RTD assembly is also available with a four inch long stainless steel support tube for use with ceramic sheaths and adjustable mounting fittings.



### TS16 Series

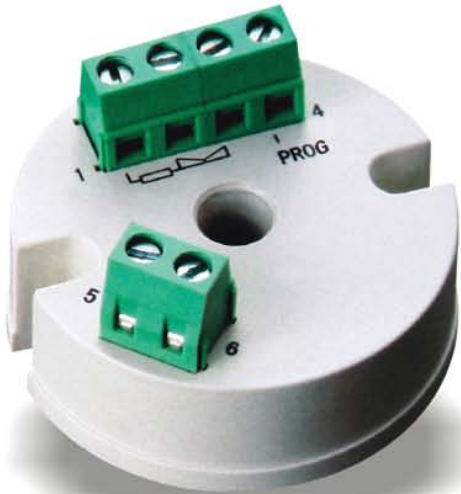


Standard with Pt100, Pt1000 also available

Specifications		
Part No.	Sheath Diameter	Sheath Material
TS16-1	.062	SS 304
TS16-2	.125	
TS16-3	.187	
TS16-4	.250	
TS16-5	.062	Inco 600
TS16-6	.125	
TS16-7	.187	
TS16-8	.250	
TS16-9	.187	Quartz
TS16-10	.250	
TS16-11	.375	
TS16-12	.187	Al <sub>2</sub> O <sub>3</sub> -99.5%
TS16-13	.250	
TS16-14	.375	

#### NOTES:

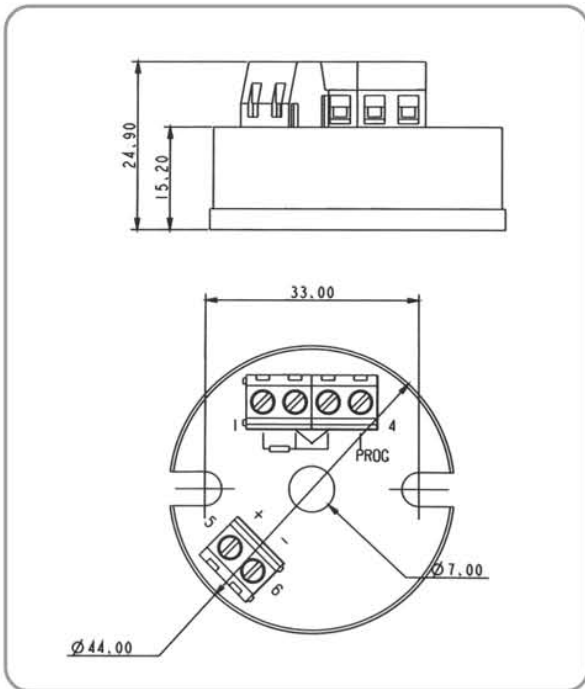
- Types available: Pt100, Pt1000, 100 ohm N, 120 ohm Ni.
- Typical construction does not allow for bending, contact us if your requirement involves bending.
- All sensors use two wire leads, three or four wire assemblies are also available.
- When ordering with support tube.
- Standard support tube is four inches long, support tube can be made to most any length required. Contact us with any special requirement.
- Contact us for mounting hardware, or for any special design requirements.



## TMT-181 MiniBlock Temperature Transmitters

TMT-181 MiniBlock is a cost-effective programmable temperature transmitter for head mounting.

This transmitter is especially convenient for being mounted in sensor connection heads.

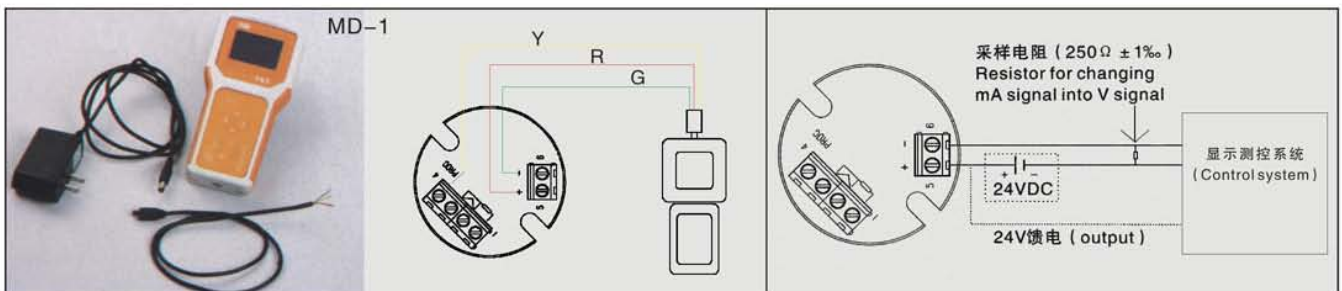


### Product Details

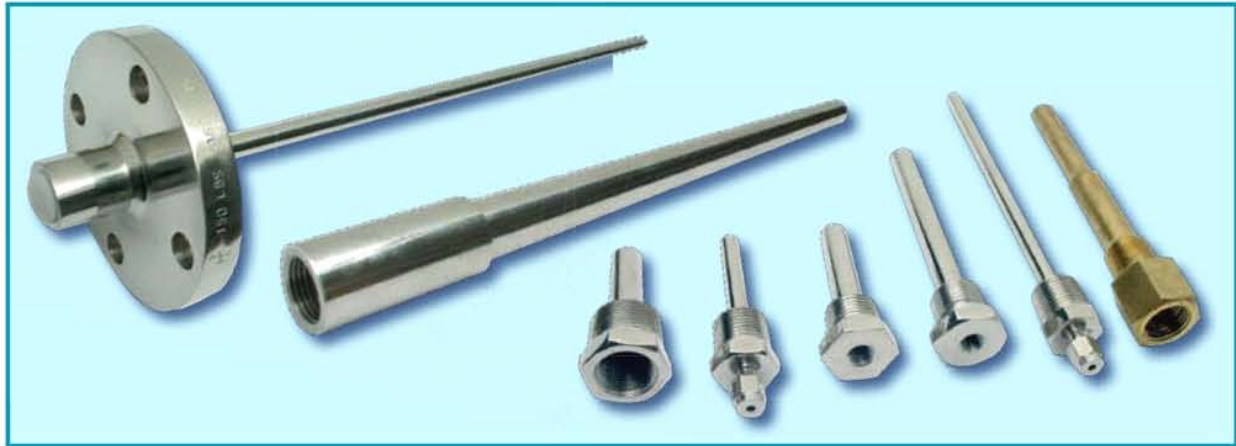
TMT-181 MULTI-INPUT MiniBlock for is part of a family of head mount 4-20mA temperature transmitters for the most common temperature applications.

One single model can be configured to accept several measuring ranges.

- Input: Multi-Input
- Measurement Range: Program With Handhold Instrument
- Maximun range: Whole Range
- Two-wire loop powered 4-20 mA output
- 2 or 3-wire Pt100 with linearization
- All types of thermocouple
- Power supply: 10 to 30 Vdc
- Accuracy (Tamb 25 ° C):  $\pm 0.2\%$  of span
- Temperature effect: 0.003% SPAN/° C
- Operating temperature: -20 to +50 ° C
- Dimensions: 44 mm (Diam.) x 24 mm (H, including bornes)



## Thermowells



Our Thermowells are available in a variety of materials and sizes that may not be listed. Please contact us with your requirements.

Thermowells are provided to protect the basic sensor from mechanical damage and corrosion. Materials available are brass, SS304, SS316, SS316L, SS310, SS446 Inconel 600, Incoloy 800, Monel, and Hastelloy.

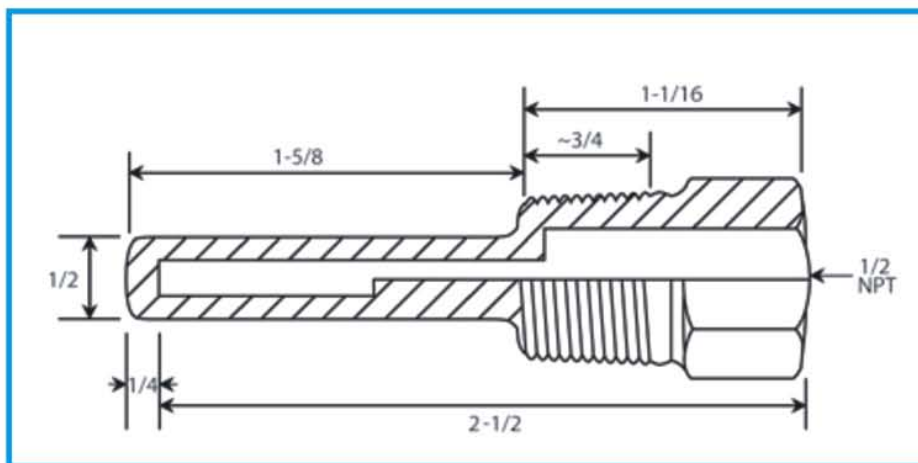
- a) Bar Stock Threaded (Process threads NPT, BSP or Metric)
- b) Bar Stock Flanged (Flanges as per ANSI, BS or DIN)
- c) Bar Stock Weld In
- d) Fabricated Threaded
- e) Fabricated Flanged

Welding (tig welding) the Thermowell is performed by professional welders following practice laid down in the ASME code

Bore concentricity within 10% of wall thickness can be checked by radiography. Special material tests such as ultrasonic test for flaw detection are also available. For steam/ feed water service.



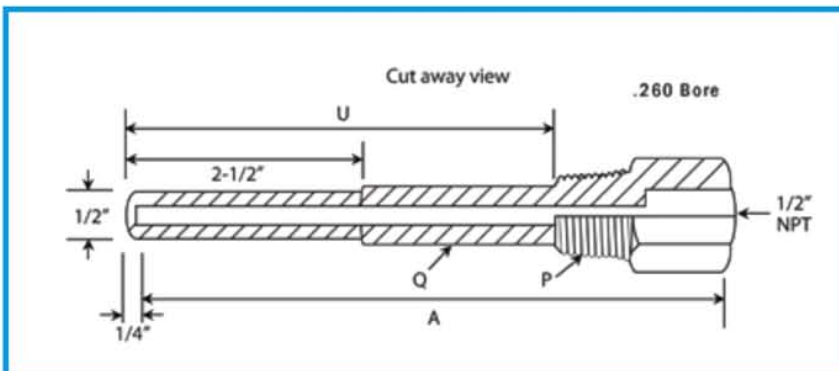
These thermowells are used where short insertion lengths are required, as in short legs of tees, etc. Available in Stainless Steel SS 304, SS 316.





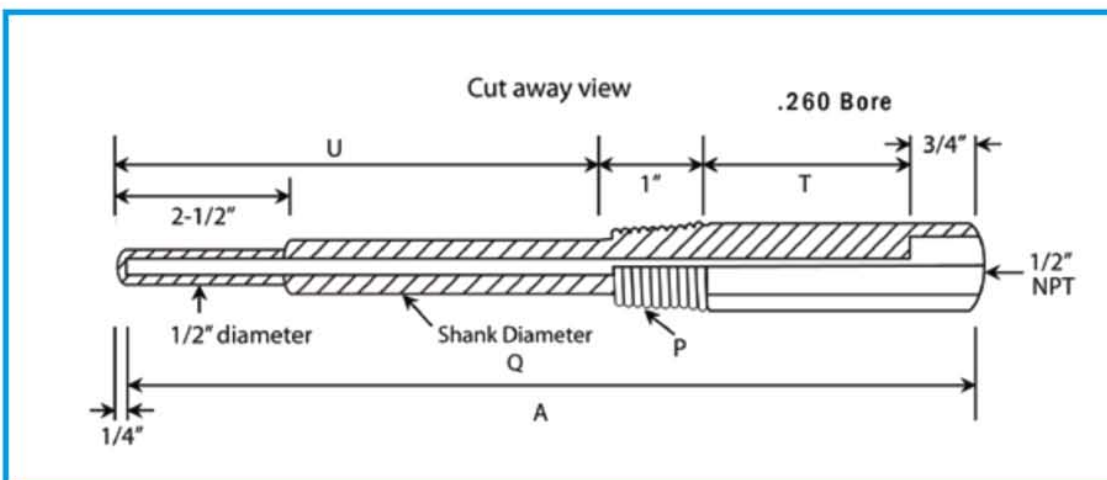
Typical Pressure-Temperature Rating - PSI

Material	Temperature - °F						
	70°	200°	400°	600°	800°	1000°	1200°
Brass	5000	4200	1000				
Carbon Steel	5200	5000	4800	4600	3500	1500	
SS 304	7000	6200	5600	5400	5200	4500	1650
SS 316	7000	7000	6400	6200	6100	5100	2500
Monel	6500	6000	5400	5300	5200	1500	



**NOTES:**

Stainless steel or brass compression fittings are available for mounting probes into these thermowells.



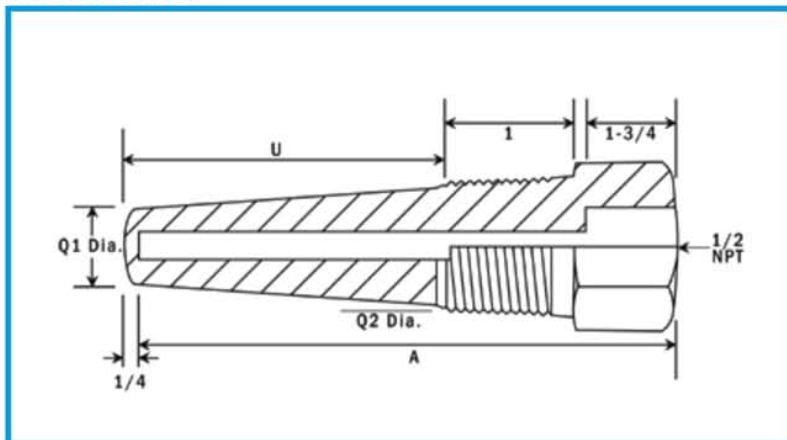
Pressure-Temperature Ratings - lbs. per sq. in.							
For 1/4" Diameter Probes							
Material	Temperature - °F						
	70°	200°	400°	600°	800°	1000°	1200°
Brass	5300	4750	1100	-	-	-	-
Carbon Steel	5950	5750	5450	5250	4000	1750	-
SS 304	7800	7050	6400	6150	6000	5190	1875
SS 316	7800	7800	7250	7100	6950	5800	2720
Monel	7450	6850	6150	6100	5940	1750	-

For 3/8" Diameter Probes							
Material	Temperature - °F						
	70°	200°	400°	600°	800°	1000°	1200°
Brass	5000	4200	1000	-	-	-	-
Carbon Steel	5200	5000	5800	4600	3500	1500	-
SS 304	7000	6200	5600	5400	5200	4500	1650
SS 316	7000	7000	6400	6200	6100	5100	2500
Monel	6500	6000	5400	5360	5200	1500	-



**A25 Series**

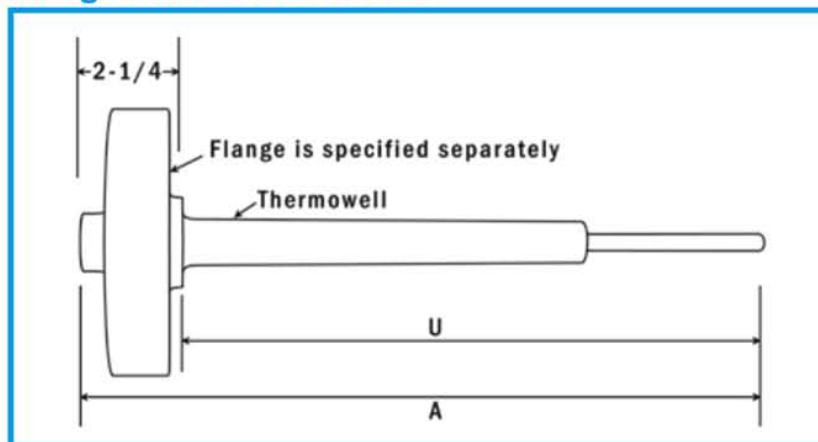


**NOTES:**

Stainless steel or brass compression fittings are available for mounting probes into these thermowells.

Flanges are available in 304 and 316 series stainless steel. Monel and other materials upon request.

**Flange with Thermowell**



*Contact us for any assistance*

**NOTES:**

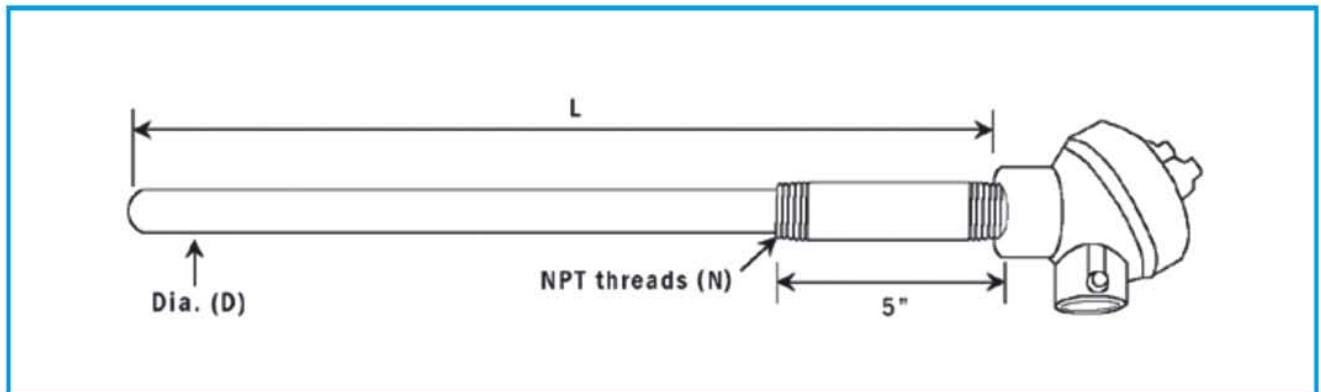
- (RF - raised face) Standard ASA Serrated
- (FF - flat face) (RTF - ring type flange)

## ITEM:TS 17 SERIES

The TS 17 protection tube is a dense, sintered ceramic especially designed for use in many molten non-ferrous metals and corrosive chemicals. It is very strong, thermally shock resistant and dimensionally stable. Additionally TS 17 is vacuum-tight and it has high electrical resistance. Mechanical strength is retained at extremely high temperatures (over 1000 degrees Celsius in air). Together, these features with very low wear resistance, make TS 17 an ideal thermocouple protection tube not necessary because TS 17 has very low thermal expansion coefficient. The TS 17 protection tubes are also recommended for use in oxidizing environments to 2200 degrees Fahrenheit. Most acids, such as hydrochloric, nitric, sulfuric, and phosphoric do not attack TS 17. This material is also resistant to hydrogen gas. It is not recommended for use with caustic solutions and hydrofluoric acid.



### TS 17 Series



Typical Test Results of TaiSuo Resistance to Molten Metals				
Material	°F	°C	Holding Time in Hours	Remarks
Aluminum	1800	987	3,000	No Attack
Lead	752	400	144	No Attack
Tin	872	300	144	No Attack
Zinc	1022	850	500	No Attack
Magnesium	1382	750	20	Slightly Attacked
Copper	2120	1150	7	Badly Attacked

#### NOTES:

- Standard units come with thermocouple type K installed.
- For duplex units or other calibrations, contact us.
- Standard support tube is five inches long of stainless steel.
- This support tube is of universal design. It comes in either one inch or 1-1/4 inch NPT pipe threads (depending on diameter of protection tube).
- Complete with wrench flats for easy installation and it can accept flanges.
- Longer length support tubes are available, contact us.

We stock a broad line of insulators for use with all types and sizes of thermocouple wire. Mullite insulators are recommended for use with base metal thermocouple wire and element types: E, J, K, N, and T up to 2000 degrees Fahrenheit. High purity alumina oxide is recommended for use with noble or refractory thermocouple wire and element types: B, C, D, R, and S. Re-crystallized alumina is suitable for up to 3600 degrees Fahrenheit.

**Hi-temp. ceramic protection tube and ceramic insulator**



- Ceramic tube and insulator are used in thermocouple assembly which applied for high temperature measuring.
- Al<sub>2</sub>O<sub>3</sub> content determines the measuring temperature level. Al<sub>2</sub>O<sub>3</sub> content higher, temperature is higher.

Al <sub>2</sub> O <sub>3</sub> content	92%	95%	99%	99.7%
Measuring temp.	1390℃	1480℃	1600℃	1700℃

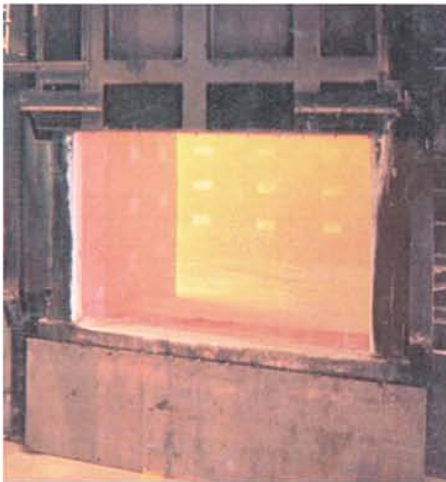
- Ceramic protection tube dimensions:  
Length max. 2500mm;  
Outer diameter from 3mm to 25mm;  
Wall thickness from 0.5mm to 4.0mm
- Ceramic insulator dimensions:  
Length max. 2500mm;  
Outer diameter from 1.0mm to 8.0mm;  
Insulating holes min. diameter 0.5mm
- Users should choose a suitable material and dimension for the application.

**PLEASE NOTE:** If necessary we can maintain tighter tolerances than this however this must be expressed at time of order.



**SILICON NITRIDE TUBES  
AVAILABLE ON REQUEST**





## CAST IRON

### Cast Iron

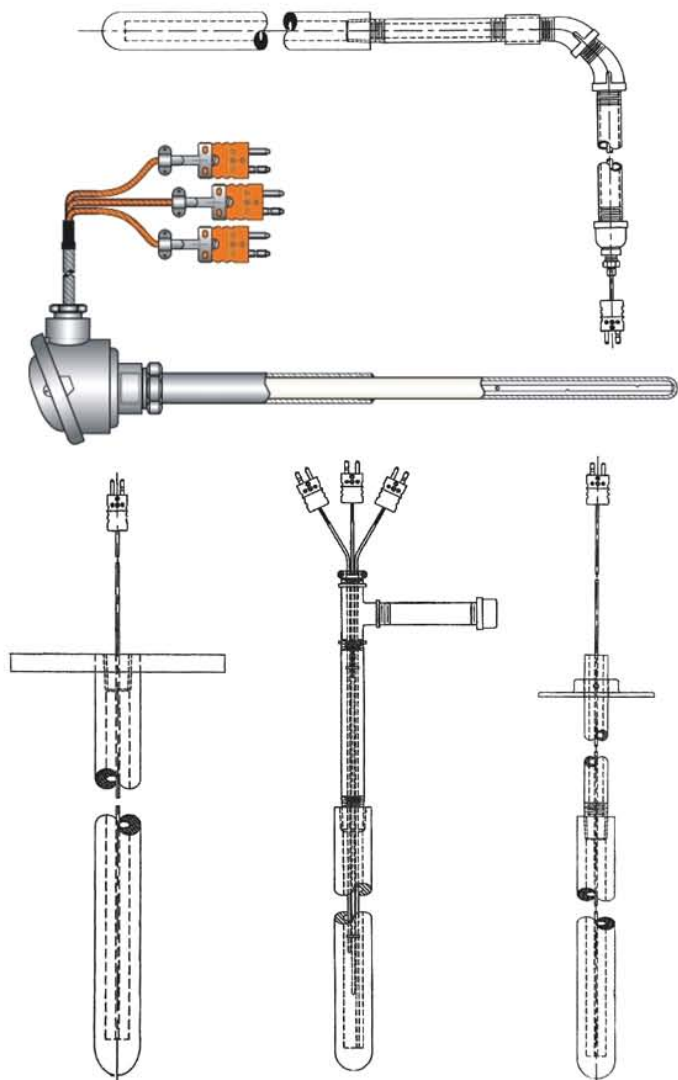
Thermocouple Protection Tube Assemblies

The rugged design of ceramic-coated cast iron makes it suitable for aluminum melting and holding furnaces where strength and durability are required to withstand the rigors of furnace environments.

## Benefits

*of Furnace Ready TPT Assemblies*

- Field proven ceramic coating for enhanced life-in-use
- Excellent physical strength for cast house handling
- Suitable to withstand rigors of furnace environment
- Uniformity of life in use in the furnace
- Cost effective assemblies go from the box to the furnace
- Available in lengths up to 108"
- Handle recycling programs available





SYALON

## Syalon

Thermocouple Protection Tube Assemblies

TaiSuo introduced and still offers the industry's only warranted thermocouple sheath for molten aluminum. Syalon holds up well against thermal shock, thermal cycling, high metal flow and aggressive alloys with excellent strength and non-wetting

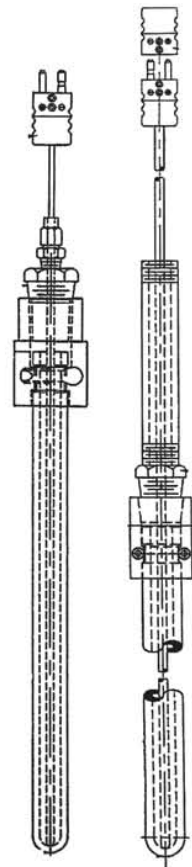
One Year Warranty

**Degassing Boxes**–Syalon's unique set of properties make it ideal for high volume and high flow degassing boxes. The premier product for the rigors of degas stations processing high volume molten aluminum.

**Filter Boxes**–Heated or non-heated, filter box applications are tough for any immersed product and Syalon can handle the flow.

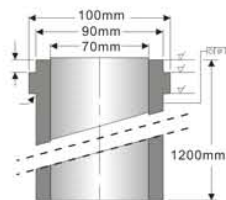
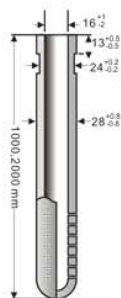
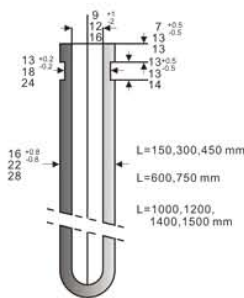
**Troughs, Launderers and Casting Stations**–Compact "pencil" version Syalon TPTs are used widely in the casthouse for continuous monitoring of temperatures in molten aluminum transfer applications.

*Syalon thermocouple protection tubes are available in lengths from 6" (150mm) to 79" (2000mm). Warranty information drawings available upon request.*



**Outside & Inside**

	Diameters (MM)	Length (IN)	Length (MM)
28 Series (Standart)	28 X 16	6" - 47"	52 - 1193 mm
22 Series (Medium)	22 X 12	6" - 42"	52 - 1066 mm
16 Series (Pencil)	16 X 9	6" - 36"	52 - 914 mm





## ACCUTIP

### ACCUTIP

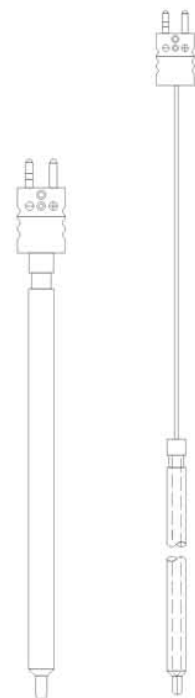
Molten Metal Temperature Sensor

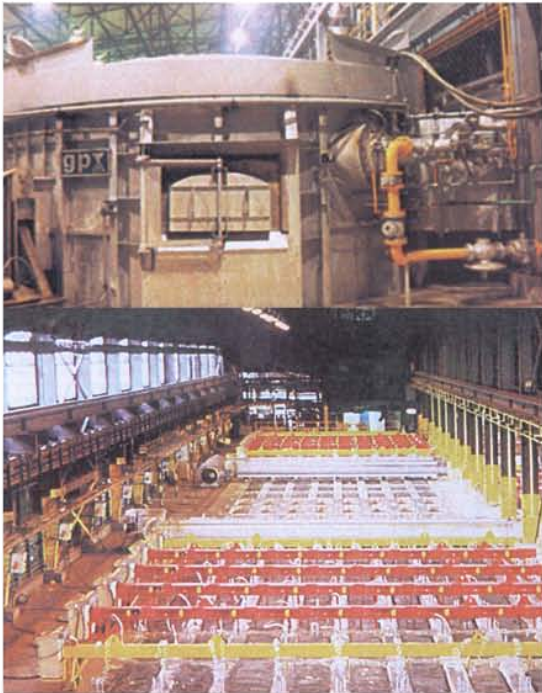
TaiSuo developed the Accutip to offer a compact, molten aluminum capable thermocouple assembly for a variety of applications in reduction, carbon bake and the casthouse. Built with Class 1 thermocouples the desired properties of accuracy, fast response, dependability and traceability are inherent in every Accutip.

**Reduction Cells**-Utilized for scheduled temperature checks on the potline, Accutip's customized ceramic coating offers long and repeatable life in cryolite. The quick response time, accuracy, and lack of drift makes Accutip perfect for reduction cells.

**Carbon Bake**-The compact design of Accutip makes it useful and easy to use device for carbon bake facilities for spot and continual temperature monitoring.

**Casthouse**-Accutips are used throughout the casthouse for applications such as transfer troughs and launders, casting tables, head boxes, filter boxes and general spot checks. Accutip's compact and lightweight design makes it a multi-purpose casthouse tool.





**Protectorite**  
 Thermocouple Protection Tube  
 Assemblies

Protectorite is a temperature sensor sheath designed for high temperature, extreme molten aluminum processing conditions.



**PIP**-thermal stable fused silica cateble refractory reinforced with stainless steel cut wire. Designed for tough moltem aluminum processing applications mechanical where breakage is a problem

**RSC**-reinforced silica carbide refractory composite thermocuple protection tube. Excellent-long wearing refractory material with excellent thermal cycling and thermal shock capabilities.

Protectorite products have been used successfully to replace less robust products to reduce operating costs in applications.

## Multi Thermocouple Assemblies



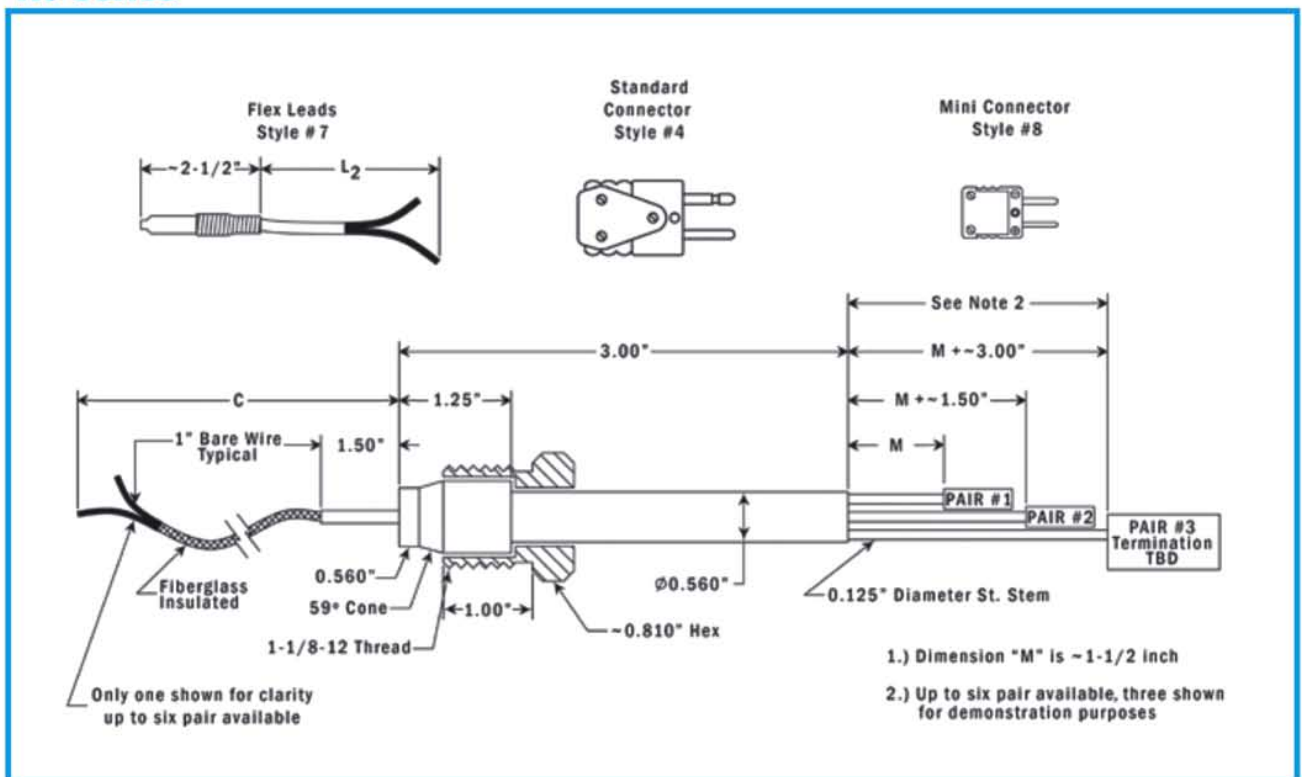
Insulated electrical feedthroughs provide a ready to use package, from 2 to 12 insulated electrical wires per unit. Having flexible insulated leads on the pressure side (dimension C-only one pair shown for clarity) and 1 inch of bare wire on the ambient side. These electrical sealing glands can also be used to carry electrical current up to 0.8 amperes if desired. A wide choice of instrumentation feedthrough glands are available for a variety of applications: including various thermocouple calibrations, various termination styles and configurations for the ambient side (lead wire, connectors, etc.).

Units are made with stainless steel glands and have either (OR series - O-ring), (A series - pipe thread) or conical (HP series - metal-to-metal) seals. They can be rated for use from low vacuum to 20,000 PSI and temperatures to 500 degrees Fahrenheit. All standard glands contain #24 gage AWG (0.020") solid copper conductors inside a 1/8 inch diameter stainless steel tube. These copper conductors are insulated from each other and the tube wall by a high temperature ceramic. The 1/8 inch stainless steel tubes containing the copper conductors are flexible and can be bent to most any desired angle in a radius as small as 1/2 inch. The stainless steel tube provides excellent shielding for each pair of conductors against unwanted electromagnetic noise or stray voltage pickup.

**NOTE:**

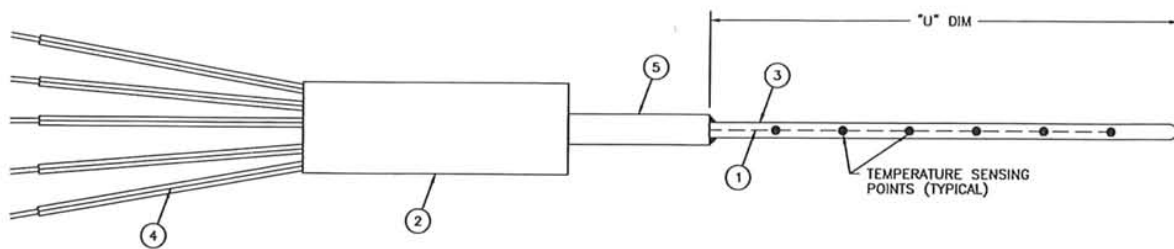
- One thermocouple requires two wires.

### K6 Series



## MINIMULTIPOINT THERMOCOUPLE ASSEMBLY

Minimultipoint thermocouple assemblies are generally small diameter, individual sensing probes which measure temperature at different positions or elevations. Each individual probe is protected with a stainless steel (or other alloy) sheath. These probes may then be contained in a protective tube. These assemblies are used when a temperature profile is desired and mass, or size, of the probe is a limitation. These assemblies can be constructed in a wide variety of configurations.



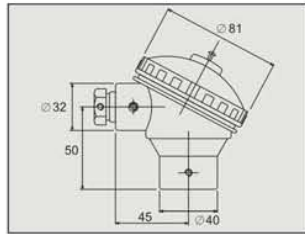
ITEM	QTY	DESCRIPTION
TS19	N/A	TEMPERATURE SENSORS (THERMOCOUPLES)
TS20	N/A	COMMON HOUSING
TS21	N/A	PROTECTIVE TUBING
TS22	N/A	FLEXIBLE LEADWIRE
TS23	N/A	STABILIZING TUBE

APPLICATIONS: Minimultipoint thermocouple assemblies are used in a number of different applications. Some of the more common uses are:

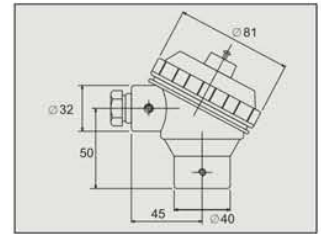
- Tube Sheet Reactors
- Pilot Plant Temperature Measurement
- Food Preparation

In addition, it is possible in some applications to add a traversing ability to the temperature measurement assembly. This allows for continuous data to be collected over the distance of the traverse stroke. This feature can help gather important information relating to catalyst or process activity. These traversing units can be electrically driven with precise feedback on position.

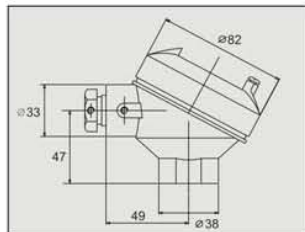
## SENSOR CONNECTION HEAD



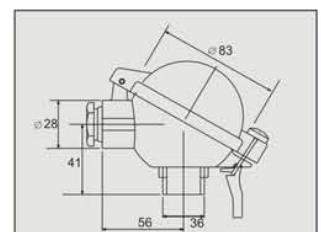
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2" NPT3/4" G1/2" G3/4"	
Probe entry	M24x1.5 M33x1 NPT1/2" NPT3/4" G1/2" G3/4"	



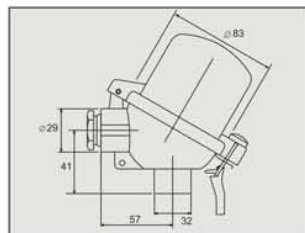
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2" NPT3/4" G1/2" G3/4"	
Probe entry	M24x1.5 M33x1 NPT1/2" NPT3/4" G1/2" G3/4"	



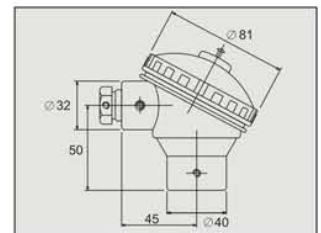
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2" G1/2"	
Probe entry	M24x1.5 M33x1 NPT1/2" NPT3/4" G1/2" G3/4"	



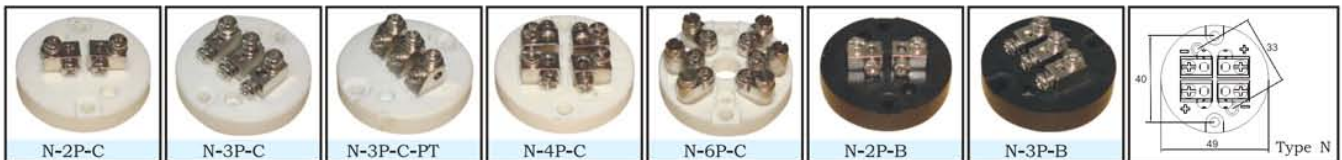
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2" G1/2"	
Probe entry	M24x1.5 M16x1 NPT1/2" G1/2"	



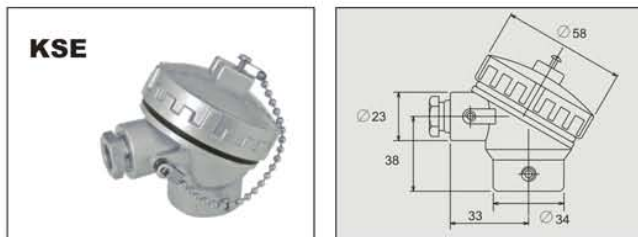
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2" G1/2"	
Probe entry	M24x1.5 G3/4" NPT1/2" NPT3/4" G1/2"	



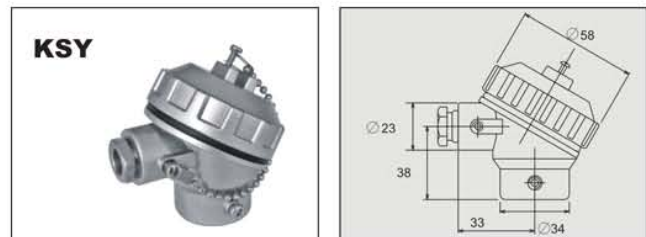
<b>Material:</b> Bakelite	<b>Colour:</b> Black
Wire entry	G1/2"
Probe entry	G1/2"



SENSOR CONNECTION HEAD



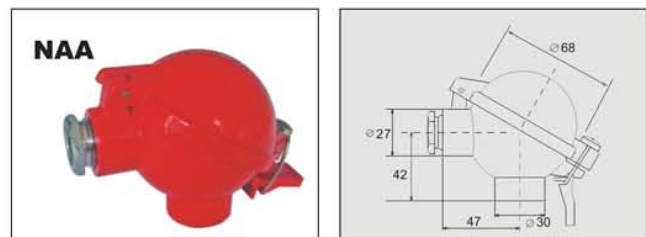
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M16*1.5 NPT3/8"	G3/8"
Probe entry	M12x1 M16x1	NPT1/2" G1/2"



<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M16*1.5 NPT3/8"	G3/8"
Probe entry	M12x1 M16x1	NPT1/2" G1/2"



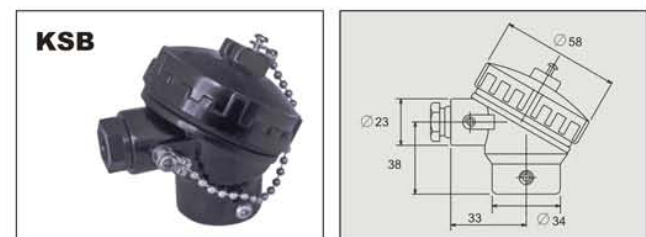
<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5 NPT1/2"	G1/2" Pg16
Probe entry	M24x1.5 M16x1	NPT1/2" G1/2"



<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M20*1.5	
Probe entry	M12x1 M16x1	NPT1/2" G1/2"



<b>Material:</b> Aluminium ADC12	<b>Painting:</b> lacquer painting polyester powder coating	<b>Colour:</b> Silver RAL colour code
Wire entry	M16x1.5	
Probe entry	M10x1 M12x1	G1/8"



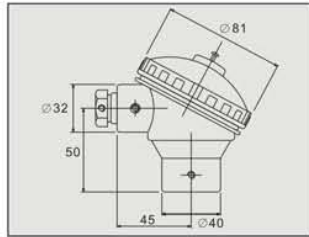
<b>Material:</b> Bakelite	<b>Colour:</b> Black
Wire entry	G3/8"
Probe entry	G1/4"



## SENSOR CONNECTION HEAD



**KNE-SS**

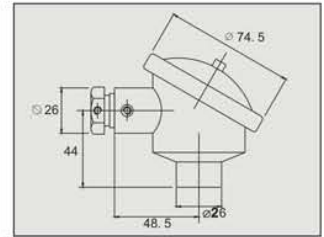


**Material:**  
Stainless steel 304, 316

Wire entry	M20*1.5	NPT1/2"	NPT3/4"	G1/2"	G3/4"	
Probe entry	M24x1.5	M33x1	NPT1/2"	NPT3/4"	G1/2"	G3/4"



**KC-SS**

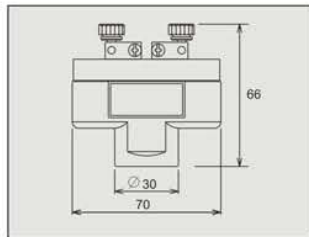


**Material:**  
Stainless steel 304, 316

Wire entry	M20x1.5		
Probe entry	M20x1	M12x1	M16x1



**TL**

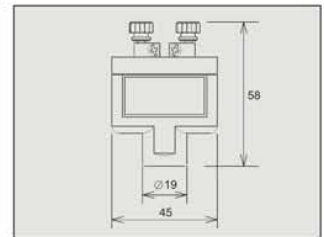


**Material:** Aluminium ADC12  
**Painting:** lacquer painting  
polyester powder coating  
**Colour:** Silver  
RAL colour code

Wire entry		
Probe entry	M22x1	G1/2"



**TS**



**Material:** Aluminium ADC12  
**Painting:** lacquer painting  
polyester powder coating  
**Colour:** Silver  
RAL colour code

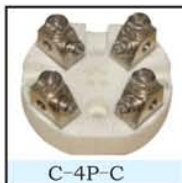
Wire entry		
Probe entry	M12x1	G1/4"



C-2P-C



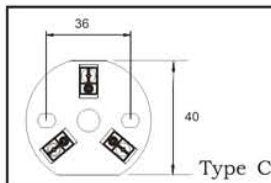
C-3P-C



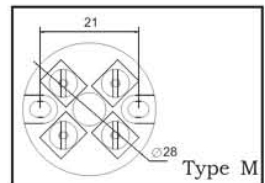
C-4P-C



M-4P-C



Type C

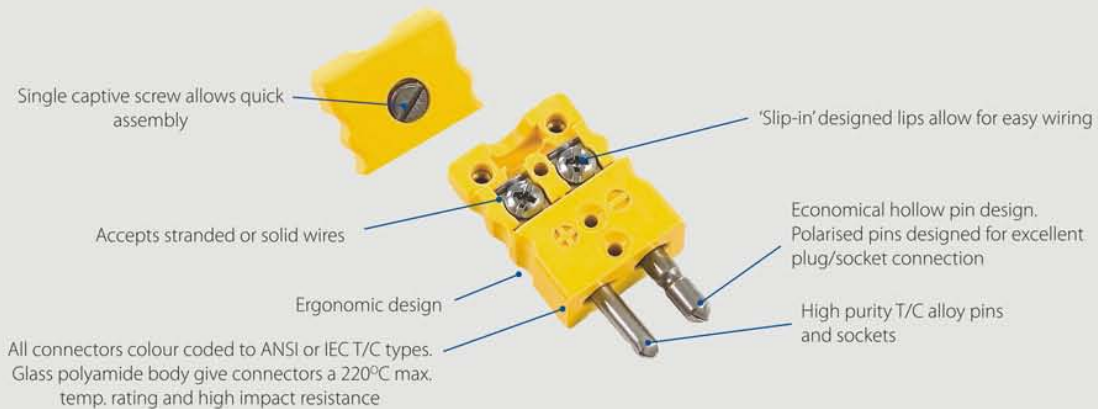


Type M

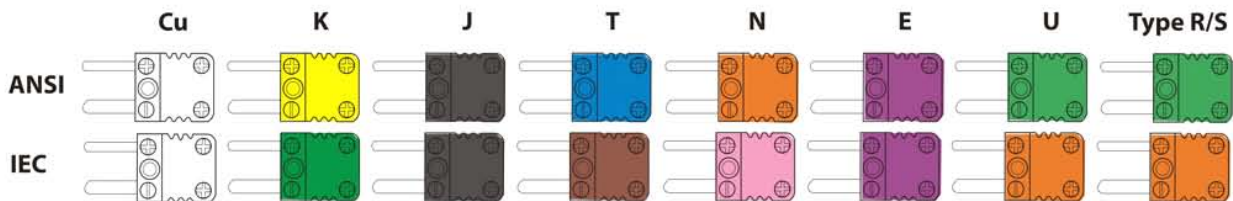
- As a variety of reasons, too many products can not list here.
- Any special design requirements you may have, please feel free to contact us.

# THERMOCOUPLE CONNECTOR

**PLEASE NOTE** - Our TTL connector range offers you a low-cost, high quality alternative:



### ANSI colour code



### Application

Connector is widely used in thermocouple and RTD circuits, best solution for quick and good contact. Different models are on offer for different applications.

### Order code

P&J	K	S	H	P	yel
①	②	③	④	⑤	⑥

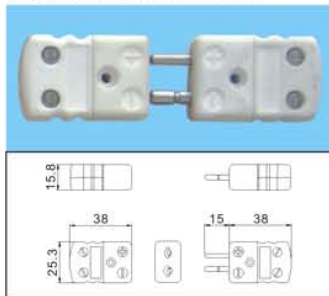
### Code instruction

- ① Description  
P&J: plug and jack  
P: plug only (male part)  
J: jack only (female part)
- ② Thermocouple types  
K, J, E, T, N
- ③ Dimensions:  
S: standard type  
M: mini type
- ④ Pins type  
H: hollow pins  
S: solid pins
- ⑤ Body material  
P: thermoplastic body  
C: ceramic body
- ⑥ Colour code  
yel, blk, vil, blu, org

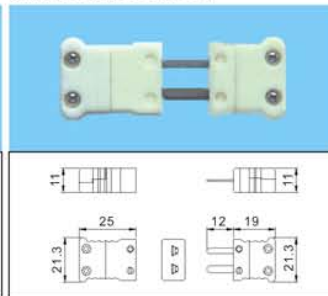
### Features

- Thermoplastic body and ceramic material body are both available.
- Original thermocouple alloy material pins, and spring loaded inserts.
- Pins are polarized.
- Solid pins and hollow pins are both available, offer good contact and competitive price.
- Well designed body ensures good insulation inside, and well designed pins construct ensures good contact.
- Maximum ambient temperature for thermoplastic body continuous usage is 200 degrees celsius.
- Available in all colour code standards.  
ANSI colour code standard will be the one if the customer do not have special requirements.

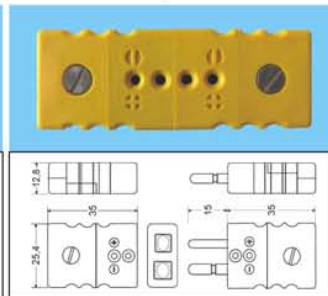
Standard ceramic connector



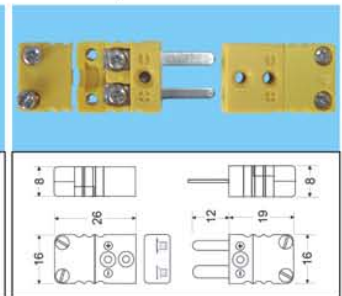
Mini ceramic connector



Standard thermoplastic connector



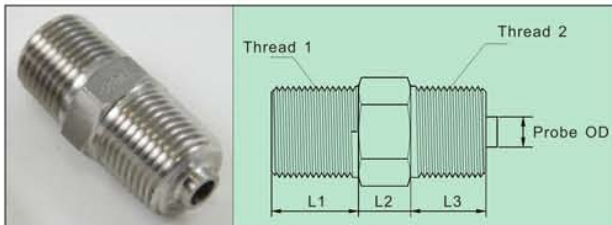
Mini thermoplastic connector



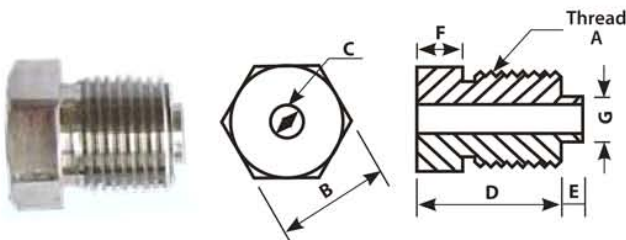
### Cable Clamps



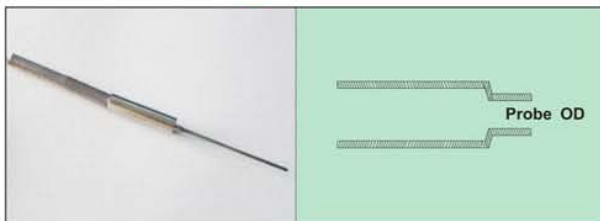
### Hex fittings



- Material: SS316, SS304, Brass
- Threads:  
NPT1/2, NPT1/4, NPT1/8, G1/2, M24x1.5, etc.
- To suit probe OD:  
3mm, 5mm, 6mm, 1/4", 1/8", 3/16", etc.
- Please also specify the length as described in the drawing, and the thread types.  
Specials available upon request.



### Transition fittings



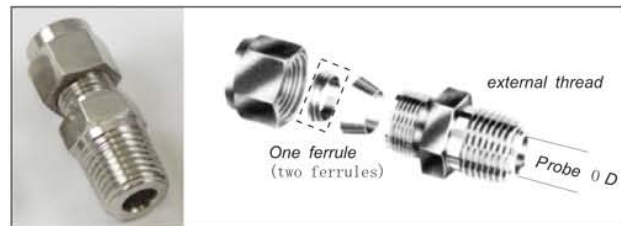
- Material: SS316, SS304
- To suit probe OD:  
2mm, 3mm, 5mm, 6mm, 1/4", 1/8", 3/16", etc.
- Please specify the technical data if you have other requirements.  
Specials available upon request.

### Standard and Minr Brass/SS Inserts

To suit connector

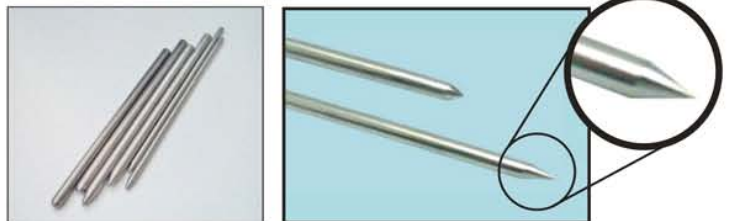


### Compression fittings



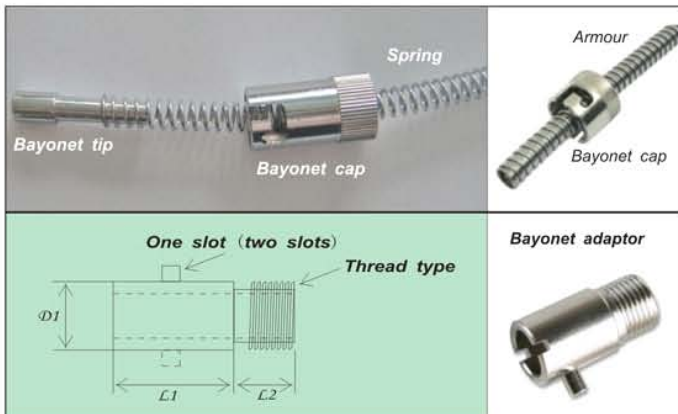
- Material: SS316, SS304, Brass
- Single or double ferrules
- External threads:  
NPT1/2, NPT1/4, NPT1/8, G1/2, M24x1.5, etc.
- To suit probe OD:  
3mm, 5mm, 6mm, 1/4", 1/8", 3/16", etc.
- Please specify above 4 aspects at order.  
Specials available upon request.

### Stainless steel tubes



- Material: SS316, SS304
- Round ending or tapered ending
- Outer diameter from 3.0mm to 12.0mm, specials available upon request.
- Polished shining surface
- Competitive price&best quality

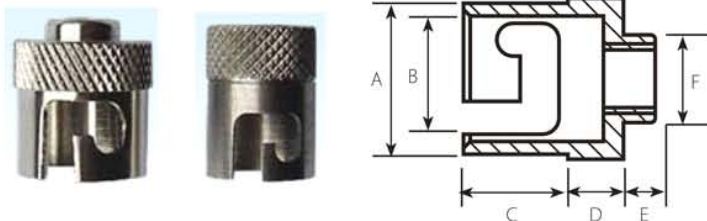
Bayonet fittings



Tell us following technical data on the bayonet fittings, we will offer you the goods with the best quality and the most competitive price:

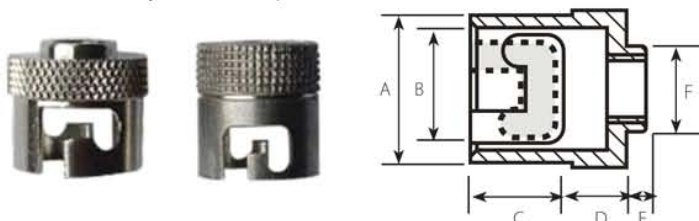
- Bayonet cap is to fit spring or armour?
- Length of the bayonet cap? From 15mm to 30mm.
- Bayonet cap material?
- Bayonet adaptor material?
- Bayonet adaptor length? From 15mm to 80mm.
- One slot or two slots?
- Dimensions described in the drawing.
- What's the external thread type for adaptor?

1 Slot Bayonet Caps

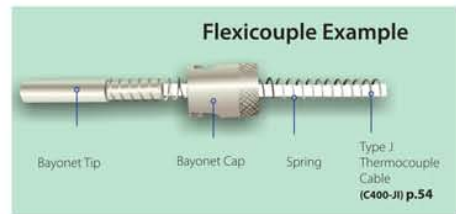


N.B. Untapped caps have 4.2mm bore

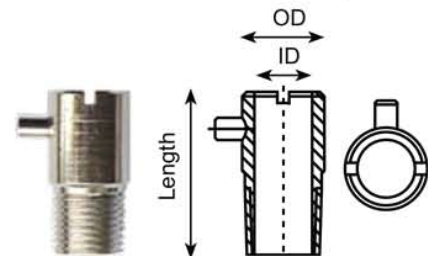
2 Slot Bayonet Caps



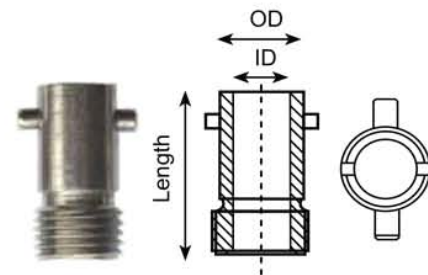
N.B. Untapped caps have 4.2mm bore



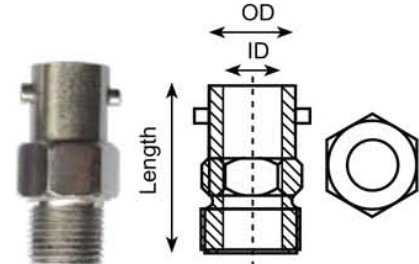
1 Pin Bayonet Adaptors



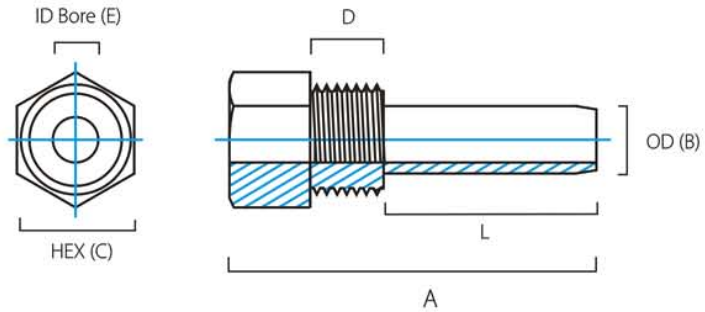
2 Pin Adaptors – No Hex.



2 Pin Adaptors – with Hex.

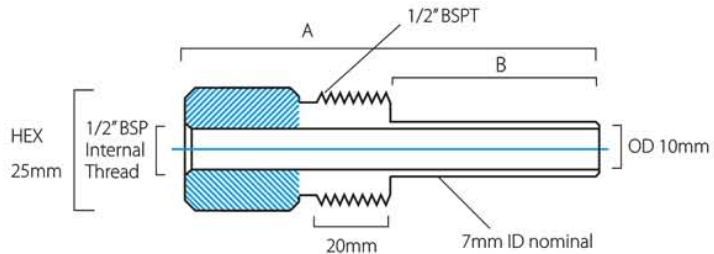


# THERMOWELLS

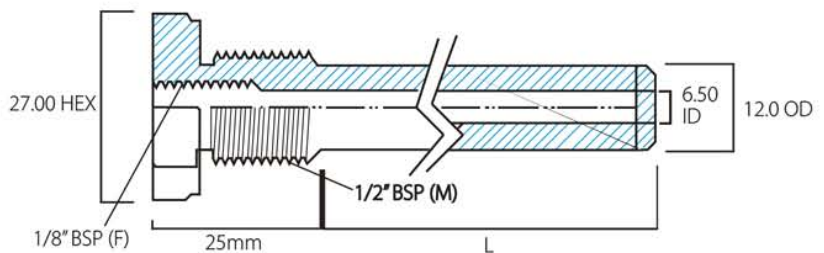


Part No.	Material	Overall Length (A)	OD (B)	HEX (C)	External Process thread (D)	ID (E)	Immersion Length (L)
TS-38-P-25	SS304,SS316	52.5mm	9.5mm	19mm	3/8"BSPP	7.5mm	25mm
TS-S-65*	SS304,SS316	66.5mm	9.5mm	25.4mm	1/2"BSPP	8.3mm	65mm
TS-S-125*	SS304,SS316	125mm	11mm	25.4mm	1/2"BSPP	8.3mm	125mm
TS-B-65*	Brass	66.5mm	9.5mm	25.4mm	1/2"BSPP	8.3mm	65mm
TS-B-125*	Brass	125mm	11mm	25.4mm	1/2"BSPP	8.3mm	125mm

\*Counter bored & earth stud on Hex.

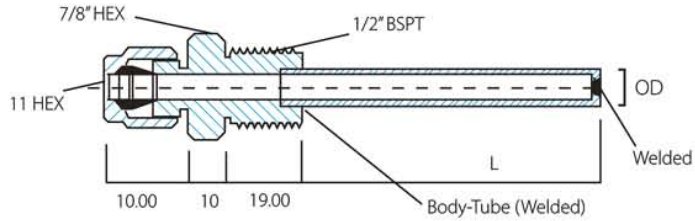


Part No.	Material	Overall Length (A)	External Process thread	Internal thread/ Tube Size	Immersion Length (B)
TS-12P-12T-103	SS304,SS316	148mm	1/2"BSPT	1/2"BSPP	103mm



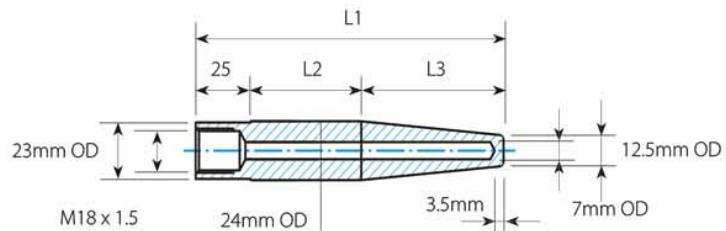
Part No.	Material	Internal thread	External Process thread	Length (L)
TS-18P-12P-50	SS304,SS316	1/8" BSPP	1/2" BSPP	50mm
TS-18P-12P-100	SS304,SS316	1/8" BSPP	1/2" BSPP	100mm
TS-18P-12P-150	SS304,SS316	1/8" BSPP	1/2" BSPP	150mm

Thermowells with welded compression fitting



Part No.	Material	OD	ID	Length (L)
TSF-12-T-3-50	SS316	8mm	3.2mm	50mm
TSF-12-T-3-100	SS316	8mm	3.2mm	100mm
TSF-12-T-3-150	SS316	8mm	3.2mm	150mm
TSF-12-T-3-200	SS316	8mm	3.2mm	200mm
TSF-12-T-3-250	SS316	8mm	3.2mm	250mm
TSF-12-T-6-50	SS316	11mm	6.1mm	50mm
TSF-12-T-6-100	SS316	11mm	6.1mm	100mm
TSF-12-T-6-150	SS316	11mm	6.1mm	150mm
TSF-12-T-6-200	SS316	11mm	6.1mm	200mm
TSF-12-T-6-250	SS316	11mm	6.1mm	250mm

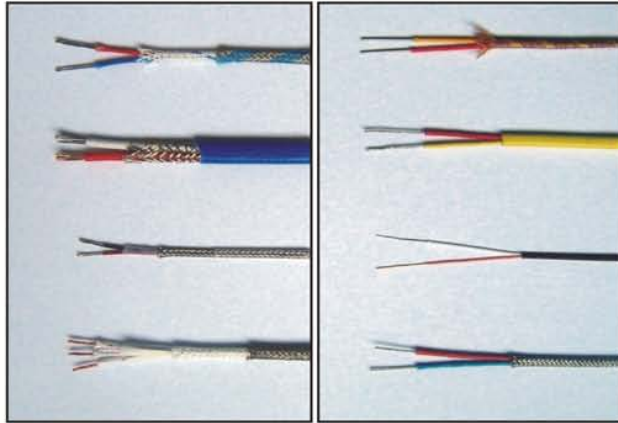
'D' Type Thermowells



Unions and nipples



## Thermocouple cable



### Features introduction

- Cable construction
  - Conductor: original thermocouple alloy material, is made up of solid wires or strand wires.
  - Insulation layer
    - There are 4 kinds of material for insulation:
      - fiberglass (ambient temperature range 0-300°C)
      - PVC (ambient temperature range 0-105°C)
      - teflon (ambient temperature range 0-350°C)
      - silicone rubber (ambient temperature range 0-180°C)
  - Jacket layer material: *fiberglass, PVC, teflon, silicone rubber.* outer shape could be round or flat.
  - Galvanized layer
    - braided galvanize material: stainless steel, tinned brass.
- Fiberglass will be spinned and overbraided when it's served as insulation material, to ensure superb insulation.
- Conforms to IEC584 standard
- Cables with special material or special dimensions or special artworks, welcome to contact our sales for further discussion.

### Order code

<b>J</b>	<b>2x7/0.3</b>	<b>FB</b>	<b>FB</b>	<b>SS</b>	<b>DIN</b>
①	②	③	④	⑤	⑥

① Thermocouple: K, J, E, T, N, S  
RTD: Cu, Ni

② Conductor dimension  
2x7/0.3 means there are 2 cores, each core is made up of 7 strands wire which diameter is 0.3mm of each wire.  
More examples:  
2x7/0.2; 2x4/0.65; 2x1/0.3; 3x16/0.15 etc.

You also can use other two different ways to symbol the conductor dimensions:  
-conductor square meter: 0.25mm<sup>2</sup>; 0.5mm<sup>2</sup>; 2.0mm<sup>2</sup>; etc.  
-AWG standard (see \*Table 1)

③ Insulation layer material  
FB: fiberglass  
PVC: PVC  
TF: teflon  
SR: silicone rubber

⑤ Galvanized layer material  
SS: stainless steel  
TB: tinned brass  
\* : no galvanized layer

④ Jacket layer material  
FB: fiberglass  
PVC: PVC  
TF: teflon  
SR: silicone rubber  
\* : no jacket layer

⑥ Colour standard  
ANSI: American standard  
DIN: Germany standard  
BS: Britain standard  
NFC: France standard  
JIS: Japanese standard  
IEC: IEC standard  
(see \*table 2)

\*Table 1 comparison between AWG standard and metric standard

AWG code	Diameter in mm	AWG code	Diameter in mm
0	8.25	23	0.574
1	7.35	24	0.511
2	6.54	25	0.455
3	5.83	26	0.404
4	5.19	27	0.361
5	4.62	28	0.320
6	4.11	29	0.287
7	3.67	30	0.254
8	3.26	31	0.226
9	2.91	32	0.203
10	2.59	33	0.180
11	2.30	34	0.160
12	2.05	35	0.142
13	1.83	36	0.127
14	1.63	37	0.114
15	1.45	38	0.102
16	1.29	39	0.089
17	1.15	40	0.079
18	1.02	41	0.071
19	0.912	42	0.064
20	0.813	43	0.056
21	0.724	44	0.051
22	0.643		

\*Table 2 Thermocouple cable colour code standard

Thermocouple type	Colour code standard					
	ANSI	DIN	BS	NFC	JIS	IEC
<b>K</b> +NICRO -NIAL						
<b>J</b> +IRON -CONSTANTAN						
<b>E</b> +NICRO -CONSTANTAN						
<b>T</b> +COPPER -CONSTANTAN						
<b>N</b> +NICROSIL -NISIL		--		--	--	
<b>S</b> +COPPER -CUPRONIC						

TOLERANCE OF THERMOCOUPLES

ANSI/ASTM	°C			°F		
	Temperature Range	Standard	Special	Temperature Range	Standard	Special
<b>T</b>	-200° to -67°	± 1.5% T	± 0.8% T*	-328° to -88°	± 1.5% (T - 32)	± 0.8% (T - 32)*
	-67° to -62°	± 1°	± 0.8% T*	-88° to -80°	± 1.8°	± 0.8% (T - 32)*
	-62° to 125°	± 1°	± 0.5°	-80° to 257°	± 1.8°	± 0.9° *
	125° to 133°	± 1°	± 0.4% T	257° to 272°	± 1.8°	± 0.4% (T - 32)
	133° to 370°	± 0.75% T	± 0.4% T	272° to 700°	± 0.75% (T - 32)	± 0.4% (T - 32)
<b>J</b>	0° to 275°	± 2.2°	± 1.1°	32° to 527°	± 3.96°	± 1.98°
	275° to 293°	± 2.2°	± 0.4% T	527° to 560°	± 3.96°	± 0.4% (T - 32)
	293° to 760°	± 0.75% T	± 0.4% T	560° to 1400°	± 0.75% (T - 32)	± 0.4% (T - 32)
<b>E</b>	-200° to -170°	± 1% T	± 1°*	-328° to -274°	± 1% (T - 32)	± 1.8°*
	-170° to 250°	± 1.7°	± 1°*	-274° to 482°	± 3.06°	± 1.8°*
	250° to 340°	± 1.7°	± 0.4% T	482° to 644°	± 3.06°	± 0.4% (T - 32)
	340° to 870°	± 0.5% T	± 0.4% T	644° to 1600°	± 0.5% (T - 32)	± 0.4% (T - 32)
<b>K</b>	-200° to -110°	± 2% T	—	-328° to -166°	± 2% (T - 32)	—
	-100° to 0°	± 2.2°	—	-166° to 32°	± 3.96°	—
	0° to 275°	± 2.2°	± 1.1°	32° to 527°	± 3.96°	± 1.98°
	275° to 293°	± 2.2°	± 0.4% T	527° to 560°	± 3.96°	± 0.4% (T - 32)
	293° to 1260°	± 0.75% T	± 0.4% T	560° to 2300°	± 0.75% (T - 32)	± 0.4% (T - 32)
<b>N</b>	0° to 275°	± 2.2°	± 1.1°	32° to 527°	± 3.96°	± 1.98°
	275° to 293°	± 2.2°	± 0.4% T	527° to 560°	± 3.96°	± 0.4% (T - 32)
	293° to 1250°	± 0.75% T	± 0.4% T	560° to 2300°	± 0.75% (T - 32)	± 0.4% (T - 32)
<b>R or S</b>	0° to 1260°	± 1.5°	± 0.6°	32° to 1112°	± 2.7°	± 1.08°
	1260° to 1480°	± 0.25% T	± 0.1% T	1112° to 2700°	± 0.25% (T - 32)	± 0.1% (T - 32)
<b>B</b>	870° to 1700°	± 0.5% T	± 0.25%	1600° to 3100°	± 0.5% (T - 32)	± 0.25% (T - 32)
<b>C**</b>	0° to 426°	± 4.4°	—	32° to 800°	± 8°	—
	426° to 2315°	± 1% T	—	800° to 4200°	± 1% (T - 32)	—

THERMOCOUPLE WIRE SIZE AND RESISTANCE TABLE

AWG No.	Diameter Inches	IEC Type K Chromel/ Alumel	IEC Type J Iron/ Constantan	IEC Type T Copper/ Constantan	IEC Type E Chromel/ Constantan	IEC Type N Nicrosil/ Nisil	IEC Type S PT/PT 10% RH	IEC Type R PT/PT 13% RH
8	0.1285	0.0365	0.2185	0.0186	0.0437	0.0485	0.011	0.011
12	0.0808	0.0916	0.0533	0.0455	0.1099	0.1225	0.028	0.029
14	0.0641	0.1466	0.085	0.0735	0.1752	0.1947	0.045	0.047
16	0.0508	0.2331	0.136	0.117	0.2775	0.3100	0.071	0.073
18	0.0403	0.3706	0.218	0.1874	0.4454	0.4926	0.116	0.119
20	0.0320	0.5894	0.349	0.2991	0.7030	0.7812	0.185	0.190
22	0.0253	0.9368	0.544	0.4751	1.1206	1.2498		
24	0.0201	1.4901	0.878	0.7526	1.78	1.980	0.464	0.478
26	0.0159	2.3811	1.405	1.204	2.836	3.164	0.740	0.760
28	0.0126	3.768	2.235	1.9159	4.512	5.039		
30	0.0100	5.984	3.551	3.0431	7.169	8.000	1.85	1.91

Resistance in Ohms per Double Foot at 68° F. For explanation of How to Use this Table, see Example:

**EXAMPLE:** What is the external resistance to my instrument if I use a 20 gauge Chromel/Alumel thermocouple 3 feet long and 14 gauge Chromel/Alumel lead wire 20 feet in length?

**ANSWER:** 3 x .5894 = 1.7682 ohms  
20 x .1466 = 2.932 ohms  
Total 4.7002 ohms

**NOTE:** Type S and R utilize extension lead wire type Copper/Copper 11. Type B utilizes extension lead wire type Copper/Copper.





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