

TC-100 Base Metal Industrial Thermocouple with Ceramic Protection Tube and Threaded Process Connection

**TEMPERATURE
SENSOR**

TC100-A Base Metal Industrial Thermocouple with Protection Tube is a durable temperature sensor engineered for high-temperature industrial applications. It features a base metal thermocouple element (Types J, K, T, E, or N) enclosed within a protective tube, providing enhanced durability and longevity in harsh operating conditions.

Key Feature:

- Available in type K,J thermocouple type.
- Depending on the thermocouple type and protection tube, can withstand temperatures up to 1260°C (2300°F).
- Available with Threaded or Flanged Process Connection for easy installation.
- Protection tubes available in different materials for high temp oxidation resistance, Ceramic (Alumina, Mullite, Silicon Carbide, Hoxoloy®) for Extreme heat resistance.

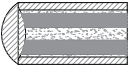
Thermocouple Junction options for TC100



Ungrounded Junction: Junction is similar to grounded junction except wire are fuse welded, which is then insulated with Mgo powder and formed cap by welding without incorporating thermocouple wires. Thus, the junction is called the ungrounded junction.

Key Benefits :

- Wires are protected from any mechanical damage
- Offers rugged construction, the same as the grounded junction.
- Strain due to differential expansion between wire and sheath is minimized with insulated wires.



Grounded Junction: In grounded junction thermocouple wires and sheath of the mineral insulated cable is welded together to form a junction. Thermocouple wires and sheath becomes an integral part of the junction. Thus, the wire is grounded to the sheath.

Key Benefits:

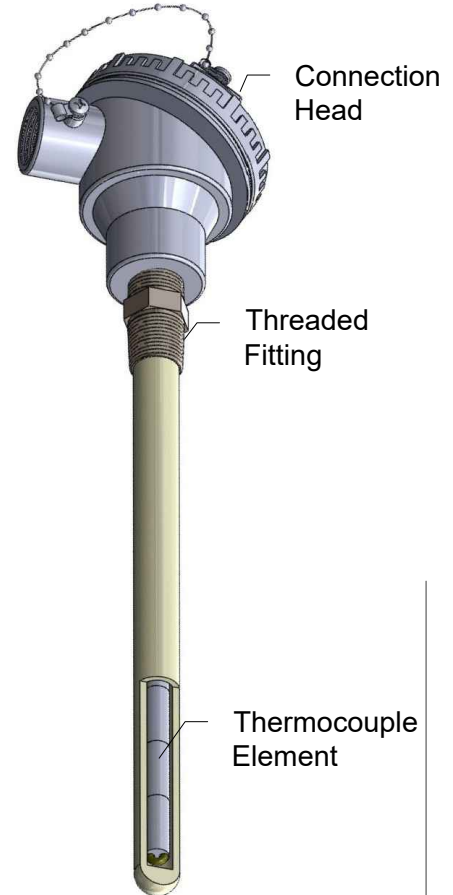
- Slower response than Exposed junction, but offers rugged construction.
- Can hold higher pressure than exposed junction and Ungrounded junction.



Bare Wire Junction: Beaded junction thermocouple elements are most inexpensive thermocouple type. Thermocouple wires fuse-welded to form a junction. It is not recommended to use in highly oxidizing environment.

Key Benefits:

- Fast response time due to the less mass.



Suggested Maximum Temperature Limit As per ASTM E608/608M

Thermocouple Type	°C (F)	°C (F)	°C (F)	°C (F)	°C (F)	°C (F)
OD	1/25"	1/16"	1/8"	3/16"	1/4"	3/8"
T	260(500)	260(500)	315(600)	370 (700)	370 (700)	370 (700)
J	260 (500)	440(825)	520 (970)	620(1150)	720 (1330)	720 (1330)
K	700(1290)	920 (1690)	1070 (1960)	1150 (2100)	1150 (2100)	1150 (2100)
E	300(570)	510(950)	650 (1200)	730 (1350)	820(1510)	820(1510)

The suggested maximum temperature limit is based on information available in the ASTM standard and test performed in our facility. The maximum temperature limit may change based on the type of process and material/ liquid it is going to be used in. These limits apply to protected thermocouples.

Temperature Accuracy As per ASTM E608/608M/ IEC 60584 & ANSI MC 96.1 standard tolerances

Type	Temperature	Standard Limit	Special Limit
T	-200 °C to 0 °C	± 1 °C or 1.5% Whichever is greater	N/A
	0 °C to 350 °C	± 1 °C or .75% Whichever is greater	± 0.5 °C or 0.4% Whichever is greater
J	0 °C to 750 °C	± 2.2 °C or .75% Whichever is greater	± 1.1 °C or 0.4% Whichever is greater
	-200 °C to 0 °C	± 1.7 °C or 1.0% Whichever is greater	N/A
E	0 °C to 900 °C	± 1.7 °C or .5% Whichever is greater	± 1 °C or 0.4% Whichever is greater
	-200 °C to 0 °C	± 2.2 °C or 2.0 % Whichever is greater	N/A
KORN	0 °C to 1250 °C	± 2.2 °C or .75% Whichever is greater	± 1.0 °C or 0.4% Whichever is greater
	-200 °C to 0 °C	± 2.2 °C or 2.0 % Whichever is greater	N/A

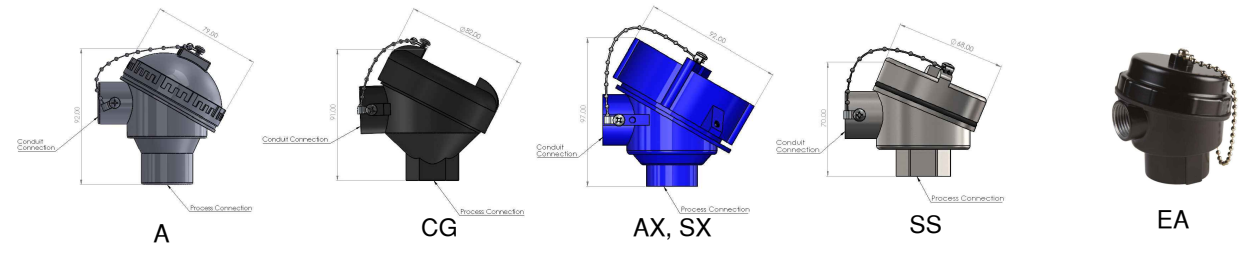
Notes:

- All the thermocouples are manufactured as ASTM E608/608M
- Calibration is available as per ASTM E220 on request

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Connection Heads

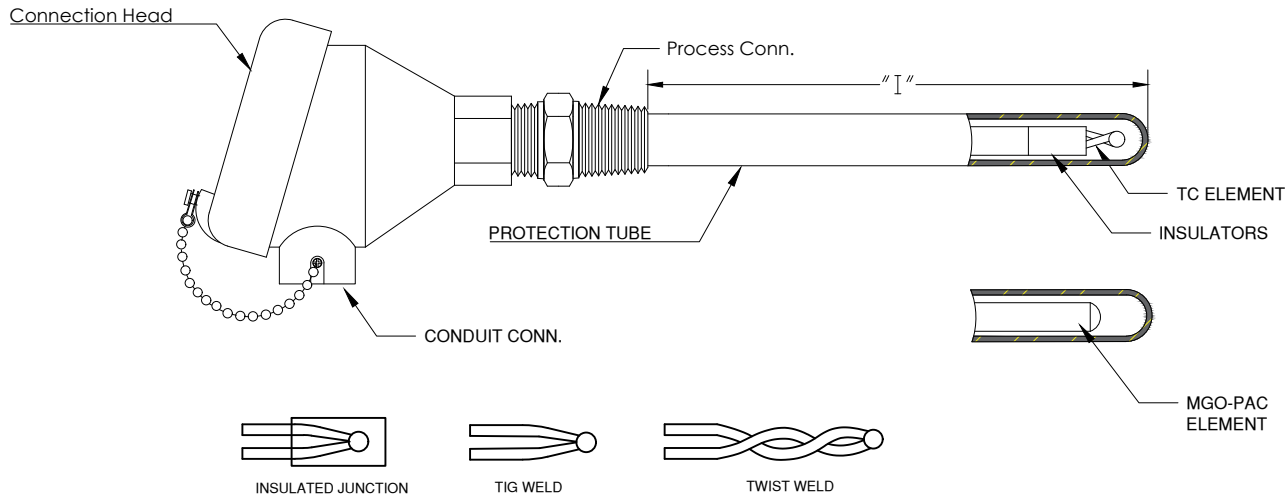


Protection Tube Options

Protection Tube					
	Silicone Carbide Nitride Bonded	Alumina	Mullite	Hoxoloy®	Silicone Nitride
MODELS	5C3	11M, 6M	11A, 6A	SA72, SA75, SA105	SN01,SN02
MAX TEMP. RATING	1550° C (2800° F)	1900° C (3450° F)	1590° C (2900° F)	1650° C (3000° F)	1250° C (2282° F)
Application	Molten Aluminum, other Non Ferrous Molten metal	High Temperature Furnace/Oven with Base metal and noble metal thermocouples	High Temperature Furnace /Oven with Base Metal thermocouple	High Temperature Furnace/Oven with Base metal and noble metal thermocouples	Molten Aluminum, other Non Ferrous Molten metal
Thermal Shock	Fair	Fair	Fair	Excellent	Excellent
Non Wetting Properties	Fair	Fair	Fair	Excellent	Excellent
Oxidation and Reducing Resistance	Fair	Good	Fair	Excellent	Excellent

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	1	2	3	4	5	6	7	8	9	10	11	12
TC100												

For Example- TC100-K-S-UG-4-0-8-6A-32i-34-CG-34-TB

1. THERMOCOUPLE TYPE	
CODE	
K	Chromel(+) vs Alumel(-)
J	Iron(+) vs Constantan(-)
NOTE:- ADD "S" FOR SPECIAL LIMITS	

2. MEASURING JN	
CODE	
S	Single
D	Duplex

3. JUNCTION TYPE	
CODE	
Beaded thermocouple	
1	Twist and Tig weld (Only available in single element)
2	Insulated hot junction
3	Standard Tig Weld
MGO-PAC thermocouple	
G	Grounded Junction
UG	Ungrounded Junction

4-1. WIRE SIZE FOR BEADED ELEMENT	
CODE	
8	8 AWG
14	14 AWG
16	16 AWG
20	20 AWG

4-2. MGO-PAC ELEMENT OD		
CODE	IMPERIAL SIZE	METRIC SIZE
2	1/8"	3.2 mm
3	3/16"	4.76 mm
4	1/4"	6.35 mm
5	5/16"	7.9mm

4-2. MGO-PAC ELEMENT OD		
6	3/8"	9.5 mm
7	0.215"	5.46 mm
2M	0.079	3.0mm
3M	0.197"	5.0mm
4M	0.236"	6.0 mm
5M	0.315"	8.0mm
6M	0.354"	9.0 mm
7M	0.394"	10.0 mm

5. ELEMENT INSULATION	
CODE	
0	When ordering with MGO-PAC
C	Ceramic insulators (Oval)
R	Ceramic insulators (Round)
Note: All Duplex Tc Elements will come with Round Ceramic insulators	

6. SHEATH MAT. FOR MGO-PAC	
CODE	
0	When ordering beaded thermocouple
8	SS 316
4	SS 310
9	SS 304
6	SS 321
3	INCONEL 600

7. CERAMIC PROTECTION TUBE SIZE		
CODE	MATERIAL	SIZE(OD)
11M	Mullite	1 1/16" (17mm)
6M	Mullite	3/8" (9.5mm)
11A	99.5% Pure Alumina	1 1/16" (17mm)
6A	99.5% Pure Alumina	3/8" (9.5mm)
5C3	Silicon Carbide	1.0" (25mm)
SN01	Silicon Nitride	1.1" (28mm)

7. CERAMIC PROTECTION TUBE SIZE		
SN02	Silicon Nitride	1.0" (25mm)
SA72	Hexolloy®	1/2" (13mm)
SA75	Hexolloy®	3/4" (19mm)
SA105	Hexolloy®	1"(25.4mm)

8. IMMERSION LENGTH (L)	
Immersion length - use "I" for inches and "M" for millimetre	

9. PROCESS FITTING		
CODE	THREAD SIZE	FOR TUBE OD
12	1/2" NPT MALE	3/8", 1/2" ONLY
34	3/4" NPT MALE	3/8", 1/2", 5/16", 11/16" or Smaller
1	1" NPT MALE	3/8", 1/2", 5/16", 11/16", 3/4" or Smaller
114	1 1/4" NPT MALE	3/8", 1/2", 5/16", 11/16", 3/4", 1-1/4" or Smaller

10. CONNECTION HEAD	
CODE	
A	Gen purpose Aluminum head IP68
EA	Economical Aluminum gen purpose head(non-rated)
S	SS general purpose
CG	Cast iron
SX	SS Explosion proof
AX	Aluminum explosion proof (CSA,FM,ATEX,IECE'x approved)
10	Aluminum connection head (CCOE approved)

11. CONDUIT CONNECTION	
CODE	
01	1/2"
02	3/4"

12. HEAD TERMINATION	
CODE	
TB	Ceramic Terminal Block