TC-102 Base Metal Thermocouple with Metal Protection Tube

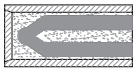
TEMPERATURE SENSOR

TC102-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,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.
- Available with Conical Tip for Anode Baking Application and Flue Wall for Aluminum processing.
- 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, Stainless Steel (304, 316, 310, 446), Inconel 600, Inconel 601 for high temp oxidation resistance heat resistance.

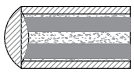
Thermocouple Junction options for TC102



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.

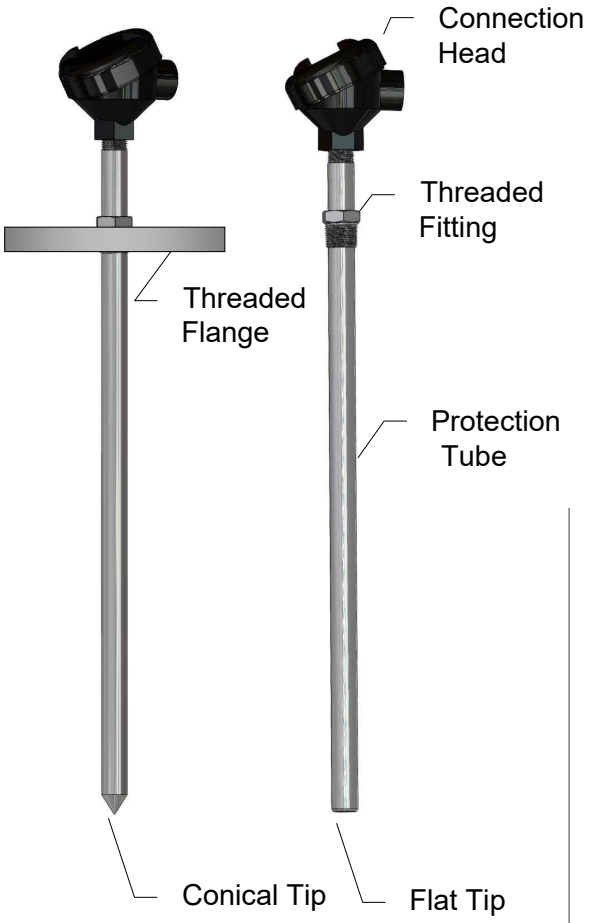
Key Benefits:

- 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
E	-200 °C to 0 °C	± 1.7 °C or 1.0% Whichever is greater	N/A
	0 °C to 900 °C	± 1.7 °C or .5% Whichever is greater	± 1 °C or 0.4% Whichever is greater
KORN	-200 °C to 0 °C	± 2.2 °C or 2.0 % Whichever is greater	N/A
	0 °C to 1250 °C	± 2.2 °C or .75% Whichever is greater	± 1.0 °C or 0.4% Whichever is greater

Notes:

-All the thermocouples are manufactured as ASTM E608/608M

-Calibration is available as per ASTM E220 on request

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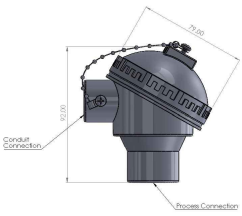
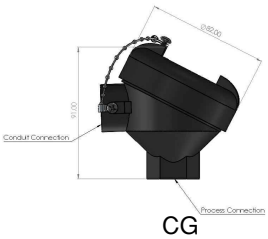
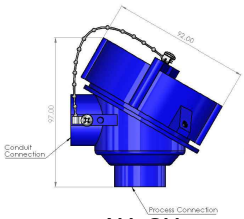
Connection Head Options



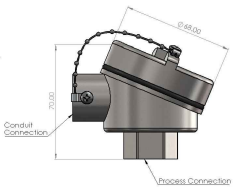
A



CG



AX, SX



SS

EA

Protection Tube Options

Protection Tube				
	Metal Protection Tube /Pipe Well Flat Tip	Metal Protection Tube /Pipe Well Sharp Tip	Metal Protection Tube /Pipe Well with Flange	Metal Protection Tube /Pipe Well no process connection
MODELS	PB	FL	FLT	PB
Material	316 SS,310 SS,446SS, I600,I601	316 SS,310 SS,446SS, I600,I601	316 SS,310 SS,446SS, I600,I601	316 SS,310 SS,446SS, I600,I601
Application	Furnace, High Temp Oven, Chemical, Oil & Gas, Aluminum Processing Incinteration, Gas Combustion	Furnace, High Temp Oven, Chemical, Oil & Gas, Aluminum Processing Incinteration, Gas Combustion	Furnace, High Temp Oven, Chemical, Oil & Gas, Aluminum Processing Incinteration, Gas Combustion	Furnace, High Temp Oven, Chemical, Oil & Gas, Aluminum Processing Incinteration, Gas Combustion

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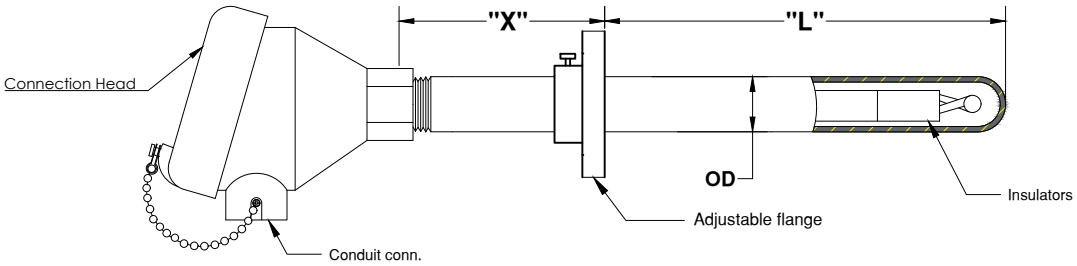
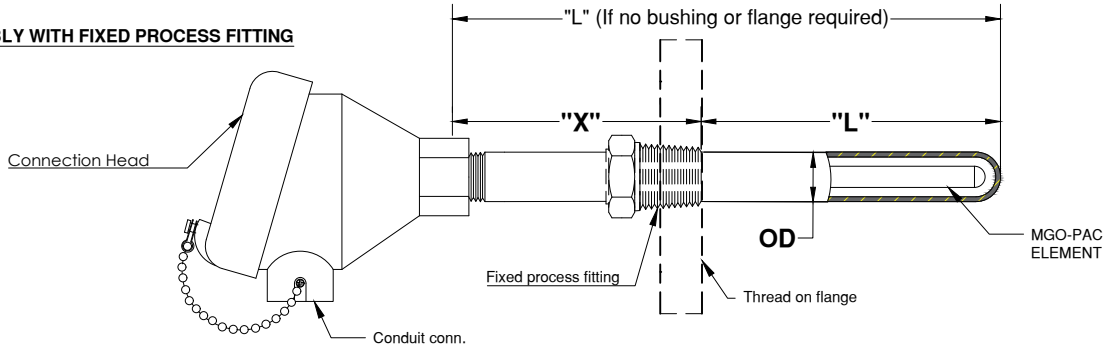
ASSEMBLY WITH ADJUSTABLE FLANGE



ASSEMBLY WITH FIXED PROCESS FITTING



	1	2	3	4	5	6	7	8	9	10	11	12	13
TC100													

For Example- TC100-K-S-G-4-0-12-80-11-01PB07-4i-CG-02-TB

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

2. MEASURING JUNCTION	
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

4-2. MGO-PAC ELEMENT OD		
4	1/4"	6.35 mm
5	5/16"	7.9mm
6	3/8"	9.5 mm
12	1/2"	12.7 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
12M	0.472"	12.0 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. PIPE SIZE (NPS)	
CODE	
38	3/8" (0.675" OD)
12	1/2" (0.840" OD)
34	3/4" (1.050 OD)
10	1" (1.315 OD)

7. PIPE SCHEDULE	
CODE	
40	40 IPS
80	80 IPS
160	160 IPS

8. PIPE MATERIAL	
CODE	
8	SS 316
4	SS 310
9	SS 304
3	INCONEL 600
5	SS 446
11	INCONEL 601
9	Specify if any other material

9. PROCESS CONNECTION		
CODE		
0	Not Required	
01	Required	
9.1 PROCESS CONNECTION STYLE		
PB	Process Bushing	
FL	Adjustable Flange	
FLT		
9.2 PROCESS CONNECTION SIZE (Bushing)		
	THREAD SIZE	FOR TUBE OD
05	1/2" MNPT	3/8"
07	3/4" MNPT	1/2" or smaller
10	1" MNPT	3/4" or smaller
12	1 1/4" MNPT	1" or smaller
15	1 1/2" MNPT	1" or smaller
9.3 PROCESS CONNECTION SIZE (Flange)		
30	1/2" X 150 lb	
31	3/4" X 150lb	
40	1/2" X 150 lb	
41	3/4" X 150lb	
09	Specify the flange size	

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10. EXTENSION LENGTH (X)	
0	Not required
Extension length - use "I" for inches and "M" for millimetre	

11. 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)

12. CONDUIT CONNECTION	
CODE	
01	½"
02	¾"

13. HEAD TERMINATION	
CODE	
TB	Ceramic Terminal Block