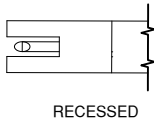


TC202 is Dual protection tube with a Silicon Carbide (SiC) protective tube is a high-temperature sensor designed for continuous monitoring of molten aluminum in holding furnaces, crucibles, and ladles. The SiC sheath provides excellent thermal shock resistance, corrosion protection, and mechanical strength, making it ideal for harsh foundry environments. Its comes in straight and L-shape thermocouples.

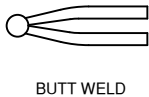
Key Feature:

- Available in different thermocouple types R,S,B,K & J
- Available in single junction, Duplex available with Mineral Insulated MGO-PAC style
- Available in 8 AWG, 14 AWG, 20 AW & 24 AWG*
- Outer Silicon Carbide (SiC) protective tube offers superior resistance to thermal shock, oxidation, and corrosion from molten aluminum.
- Inter protection Tube Mullite and Alumina, Custom option available
- Typically operates in the temperature range of 800°C to 1800°C (1470°F to 3272°F) depending on the thermocouple type
- Available in standard and special tolerances as per IEC 60584 and ANSI MC96.1.
- Support Flange and Plate with Gasket

Thermocouple Junction options for TC202



Recessed Junction: The thermocouple wires are placed end-to-end (butted against each other), and a precise welding process fuses them together. And then Insulated with Ceramic insulator. It protects the junction homogeneity from contamination



Butt Welded Junction: The thermocouple wires are placed end-to-end (butted against each other), and a precise welding process fuses them together.



Twisted Welded Junction: The thermocouple wires are twisted together placed end-to-end (butted against each other), and a precise welding process fuses them together. Twisted wires add mechanical strength to the junction and avoids premature cracking of thermocouple junction..



Suggested Maximum Temperature Limit

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.

- Type R (Platinum-Rhodium 13% / Platinum): Up to 1600°C (2912°F)
- Type S (Platinum-Rhodium 10% / Platinum): Up to 1600°C (2912°F)
- Type B (Platinum-Rhodium 30% / Platinum-Rhodium 6%): Up to 1700°C (3092°F)
- Type C (Tungsten5%Rehniium -Tungston26%Rehniium Alloy) Up to 2315°C (4200°F)

Temperature Accuracy & Tolerance

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

Thermocouple Type	Temperature Range	Accuracy Standard	Accuracy Special Limits
R	0°C to 1480°C	The greater of $\pm 1.5^\circ\text{C}$ or $\pm 0.25\%$	The greater of $\pm 0.6^\circ\text{C}$ or $\pm 0.1\%$
S	0°C to 1480°C	The greater of $\pm 1.5^\circ\text{C}$ or $\pm 0.25\%$	The greater of $\pm 0.6^\circ\text{C}$ or $\pm 0.1\%$
B	870°C to 1700°C	$\pm 0.50\%$	$\pm 0.25\%$
C	0°C to 2315°C	The greater of $\pm 1.5^\circ\text{C}$ or $\pm 1\%$	NA

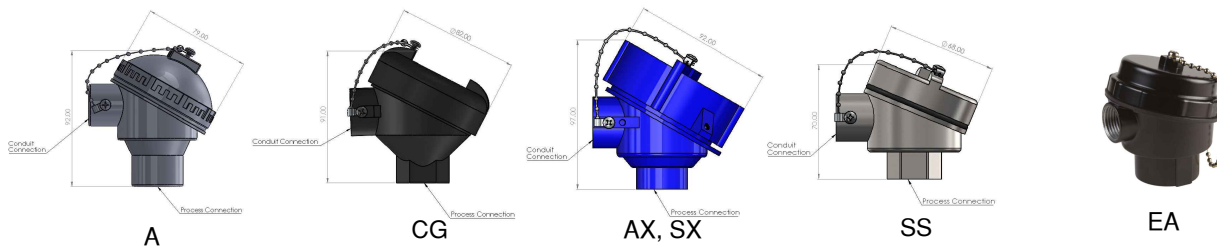
Notes:

- All the thermocouples meets the requirement of ASTM E230/E230M
- Calibration is available as per ASTM E220 on request

Common Applications

High-temperature monitoring plays a critical role in reactors and incinerators in power plants and refineries, where precise temperature control is essential for efficient operation. It is also widely used in steel and metal processing plants, furnaces, foundries, and molten metal applications, ensuring optimal conditions for manufacturing. In glass and ceramic manufacturing, accurate temperature measurement is vital for processes like kiln operation and glass melting. Additionally, high-temperature monitoring is crucial in industries such as heat treatment and aerospace, where extreme heat is present in controlled atmospheres. In semiconductor manufacturing, temperature monitoring and control are essential for chemical vapor deposition (CVD) and epitaxy processes, which are integral to wafer processing and crystal growth. Vacuum and controlled atmosphere furnaces also rely on temperature precision to ensure the effectiveness of metal hardening and coating processes. Similarly, high-temperature sintering and firing processes in tile and ceramic manufacturing depend on precise temperature control. The glass industry, too, benefits from temperature monitoring, especially for molten glass and other high-temperature processes, ensuring the quality and consistency of the final products.

Connection Head Options

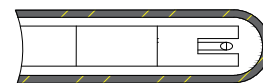
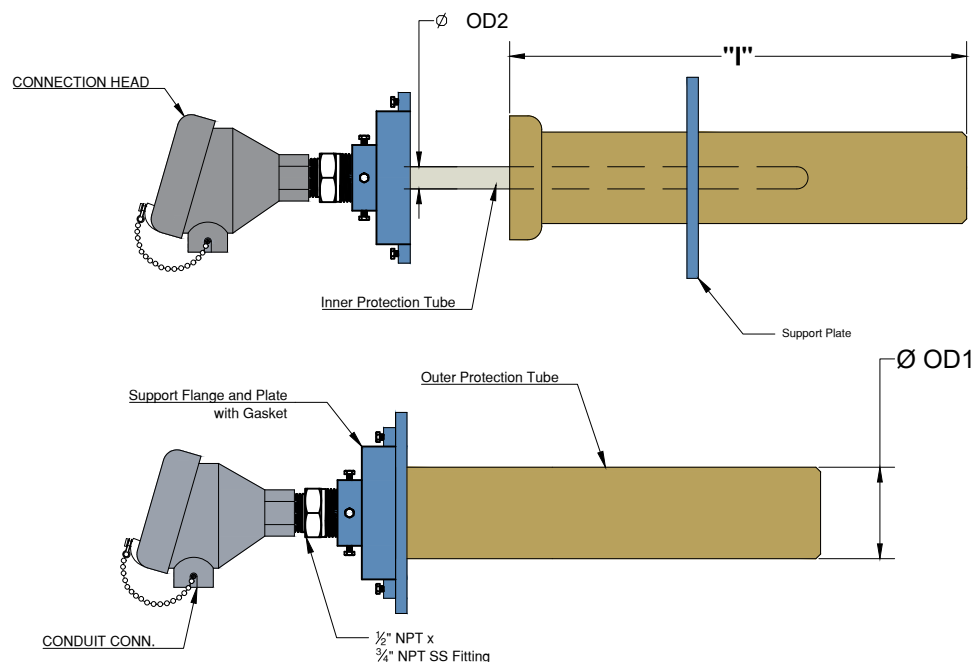


Protection Tube Options

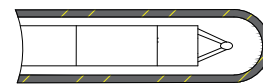
Protection Tube				
	Alumina	Mullite	Hoxoloy®	Silicone Nitride
MODELS	11M, 6M	11A, 6A	SA72, SA75, SA105	SN01, SN02
MAX TEMP. RATING	1900°C (3450°F)	1590°C (2900°F)	1650°C (3000°F)	1250°C (2282°F)
Application	High Temperature Furnace/Oven with Base metal and noble metal thermocouples	High Temperature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

TC-202 Thermocouple with Silicon Carbide Protection Tube and Flange

TEMPERATURE SENSOR



RECESSED JUNCTION



EXPOSED JUNCTION

	1	2	3	4	5	6	7	8	9	10
TC202										

For Example- TC202-R-S-R-24-M-24i-CG-01-34-TB

1. THERMOCOUPLE TYPE

CODE	
R	Platinum 13 % Rhodium (+) Platinum (-)
S	Platinum 10 % Rhodium (+) Platinum (-)
B	Platinum 30 % Rhodium (+) Platinum 6% Rhodium (-)
K	Chromel(+) vs Alumel(-)
J	Iron(+) vs Constantan(-)
C	Tungsten-5%Rhenium (+) Tungsten-26%Rhenium (-)
NOTE:- ADD "S" FOR SPECIAL LIMITS	

2. MEASURING JUNCTION

CODE	
S	Single
D	Duplex

3. JUNCTION TYPE

CODE	
E	Exposed
R	Recessed (only for Noble Metal)

4. ELEMENT SIZE

CODE	
4.1.WIRE GAUGE SIZE FOR NOBLE METAL	
24	24 Awg
26	26 Awg
30	30 Awg
4.2.WIRE GAUGE SIZE FOR BASE METAL	
8	8 AWG
14	14 AWG
20	20 AWG

5. PROTECTION TUBE

	INNER TUBE (OD2)		OUTER TUBE (OD1)	
CODE	MATERIAL	OD	MATERIAL	OD
M	Mullite	1 1/16"	Silicon carbide	1 3/4"
A	Alumina	1 1/16"	Silicon carbide	1 3/4"

6. PROTECTION TUBE LENGTH (I)

CODE	
12	12.0"
18	18.0"
24	24.0"
30	30.0"
36	36.0"
09	Specify any other length - use "I" for inches and "M" for millimetre

7. CONNECTION HEAD

CODE	
A	ALLUMINIUM GEN PURPOSE
AX	Aluminium explosion proof (CSA,FM,ATEX,IECEX approved)
CG	CAST IRON

8. PROCESS CONNECTION

CODE	
01	Support Flange and Plate with Gasket

9. CONDUIT CONNECTION

CODE	
12	1/2" NPT
34	3/4" NPT

10. HEAD TERMINATION

CODE	
TB	Ceramic Terminal Block