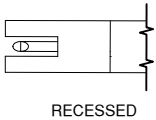


TC200- A Noble Metal Industrial Thermocouple with Protection Tube is a highly accurate temperature sensor engineered for extreme heat and demanding industrial conditions. It features noble metal thermocouple elements (Types R, S, B and C) enclosed within a protective tube, providing exceptional durability and longevity in high-temperature applications. These thermocouples are widely used in industries that require precise temperature control, stability, and resistance to oxidation and corrosion.

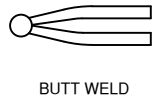
Key Feature:

- Available in different thermocouple types & Temperature Ranges upto 2315°C (4200°F)
- Noble metal thermocouples provide superior stability and minimal drift over time.
- Available in different protection tube materials like Ceramic (Alumina, Mullite, Silicon Carbide) for High-temperature and corrosion resistance and Metallic (Platinum, Inconel, or Stainless Steel) for added mechanical strength and oxidation resistance.
- Protection tubes shield the sensing element from aggressive environments, molten metals, and gases

Thermocouple Junction options for TC200



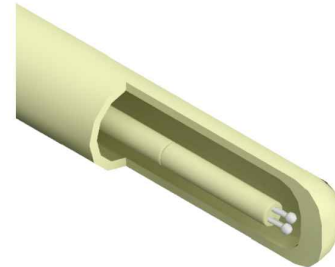
Recessed Junction: The thermocouple wires are placed end-to-end (butted against each other), and a precise welding process fuses them together. And then Insulated with Ceramic insulator. It protects the junction homogeneity from contamination



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

- 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)

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.

Continous temperature rating for wire gauge smaller than 26 Awg. is lower due to the less mass. Please check with factory for more information.

Temperature Accuracy & Tolerance

Thermocouple Type	Temperature Range	Accuracy Standard	Accuracy SpecialLimits
	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 $\pm 0.1\%$
	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	$\pm 0.50\%$	$\pm 0.25\%$
	0°C to 2315°C	The greater of $\pm 1.5^{\circ}\text{C}$ or $\pm 1\%$	NA

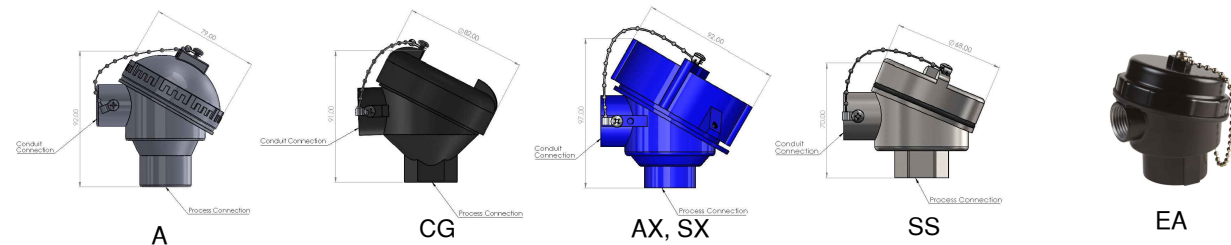
Notes:

- 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



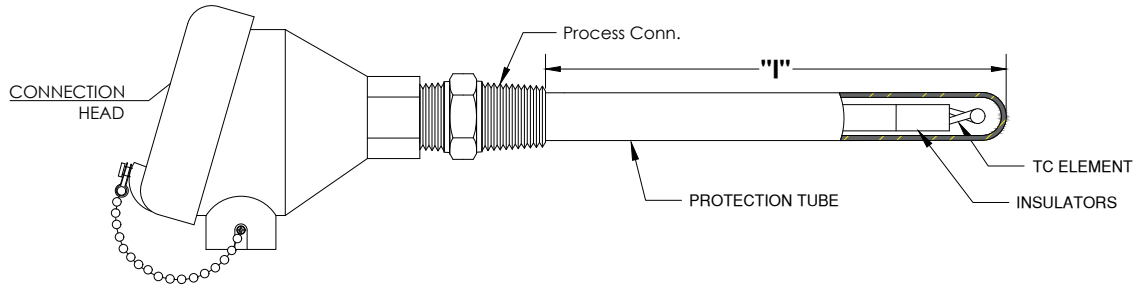
Protection Tube Options

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

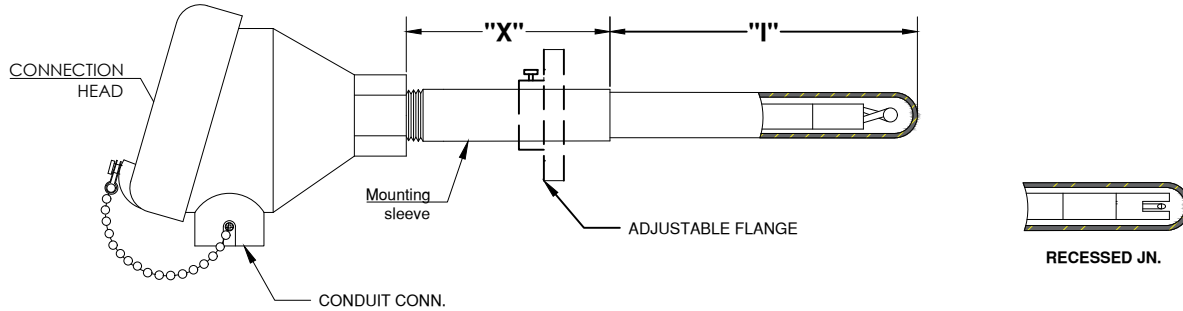
TC-200 Noble Metal Thermocouple Assembly with Protection Tube

**TEMPERATURE
SENSOR**

ASSEMBLY WITH PROCESS BUSHING



ASSEMBLY WITH MOUNTING SLEEVE



	1	2	3	4	5	6	7	8	9	10	11
TC200											

For Example- TC200-R-S-R-24-SN01-18i-PB07-0-A-02-TB

1. THERMOCOUPLE TYPE	
CODE	
R	Platinum 13 % Rhodium (+) Platinum (-)
S	Platinum 10 % Rhodium (+) Platinum (-)
B	Platinum 30 % Rhodium (+) Platinum 6% Rhodium (-)
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

4. ELEMENT WIRE SIZE	
CODE	
20	20 Awg
24	24 Awg
26	26 Awg
30	30 Awg

5. CERAMIC PROTECTION TUBE SIZE		
CODE	MATERIAL	SIZE(OD)
6M	Mullite	3/8" (9.5mm)
7M	Mullite	1/2" (13mm)
8M	Mullite	1 1/16" (17mm)
9M	Mullite	3/4" (19mm)
6A	99.5% Pure Alumina	3/8" (9.5mm)
7A	99.5% Pure Alumina	1/2" (13mm)
8A	99.5% Pure Alumina	1 1/16" (17mm)
9A	99.5% Pure Alumina	3/4" (19mm)
SN01	Silicon Nitride	5/8" (16mm)
SN02	Silicon Nitride	1.1" (28mm)
SA72	Hexolloy®	1/2" (13mm)
SA75	Hexolloy®	3/4" (19mm)
SA100	Hexolloy®	1.0" (25 MM)

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

7. PROCESS CONNECTION	
CODE	
7.1 PROCESS CONNECTION STYLE	
PB	Process Bushing
MS	Mounting Sleeve

7. PROCESS CONNECTION		
7.2 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
7.3 PROCESS CONNECTION FOR MOUNTING SLEEVE (FLANGE)		
	THREAD SIZE	FOR TUBE OD
0	Not Required	
05	1/2" MNPT	3/8"
07	3/4" MNPT	11/16" 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
FLANGE SIZE		
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	

8. MOUNTING SLEEVE LENGTH (X)	
0	When ordering with Process bushing
Mounting Sleeve length - use "I" for inches and "M" for millimetre	

9. 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)

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

11. HEAD TERMINATION	
CODE	
TB	Ceramic Terminal Block