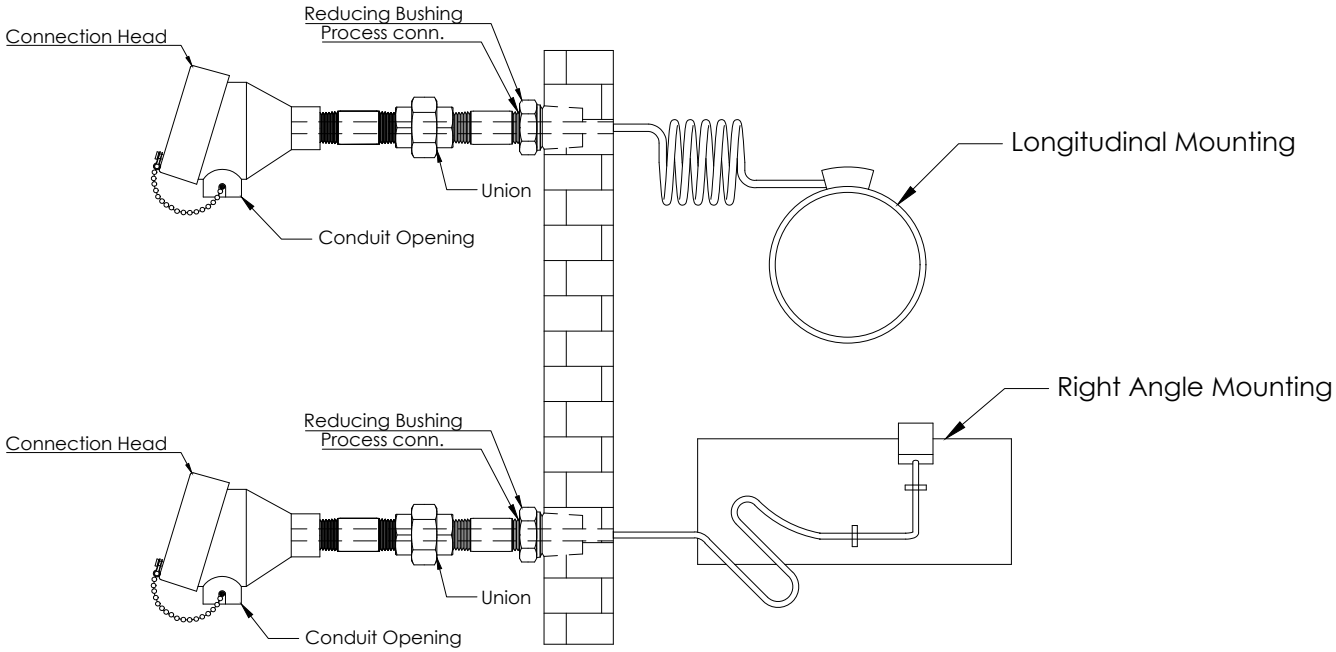
TC-60-1 MGO-PAC Tube Skin Weld Pad Thermocouple with head and NUN Extension

TEMPERATURE SENSOR

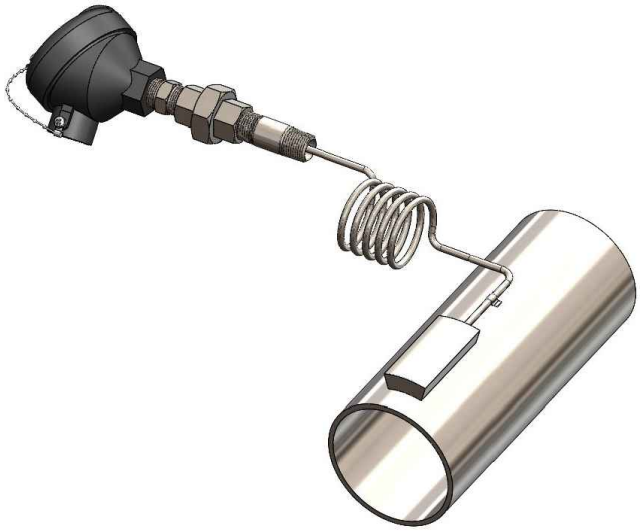
TC60-1 Tube skin sensors manufactured by Tempotech Controls are precision-engineered devices specifically designed to y measure accurate temperature of tube walls in the chemical power and petroleum industries. These thermocouples play a critical role in monitoring boiler and superheater, heat exchanger operations within power plants, Boilers, Chemical processing where precise temperature readings are essential for assessing thermal fatigue and the integrity of tube materials under high-pressure conditions.

The sensors are fabricated using high-quality sheath material that ensures exceptional thermal insulation while accommodating necessary expansion loops. This feature facilitates seamless installation and optimizes the sensors' functionality across various applications, thereby enhancing their longevity and reliability. The weld pads are designed to align with a wide range of tube materials such as Inconel, Monel, Pyrosil, Molybdenum etc and can withstand extreme temperatures of up to 2100°F. Extreme temperature rated material makes them suitable for demanding high-temperature environments where durability is crucial.



Key Feature:

- Available in type J, K, E, N, T .
- A wide selection of sheath material to suit application requirement, 304ss, 316ss, 321ss, Inconel® 600, Incolloy 800, Monel, Pyrosil D etc.
- Sheath diameter is available from 0.125″ to 0.500″.
- Available with Explosion proof enclosure CSA, ATEX, FM etc.
- Grounded, and Ungrounded junction to meet application requirement.
- Available with low temp and high temp connectors.
- Available in IEC 60584 & ANSI MC 96.1 standard tolerances



Standard weld pad are 1" x 1" x 1/8" thickness, providing a robust foundation for effective thermal conduction. Additionally, retractable weld pads are available with custom dimensions and thickness, thereby offering flexibility for diverse applications. The pads can also be formed to fit the specific radius of pipes, ensuring an optimal fit for tube surface. To guarantee maximum thermal performance, it is strongly recommended that the weld pads be securely affixed to a stable surface with welding and using mounting clamps, while also avoiding areas with turbulent flow or stagnant conditions in the process, as these may impair measurement accuracy.

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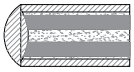
Thermocouple Junction for TC60-1

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.

Suggested Maximum Temperature Limit As per ASTM E608/608M

Thermocouple Type	°C (F)	°C (F)	°C (F)	°C (F)	°C (F)
OD	1/8"	3/16"	1/4"	3/8"	1/2"
T	315(600)	370 (700)	370 (700)	370 (700)	370 (700)
J	520 (970)	620(1150)	720 (1330)	720 (1330)	720 (1330)
K	1070 (1960)	1150 (2100)	1150 (2100)	1150 (2100)	1150 (2100)
E	650 (1200)	730 (1350)	820(1510)	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:

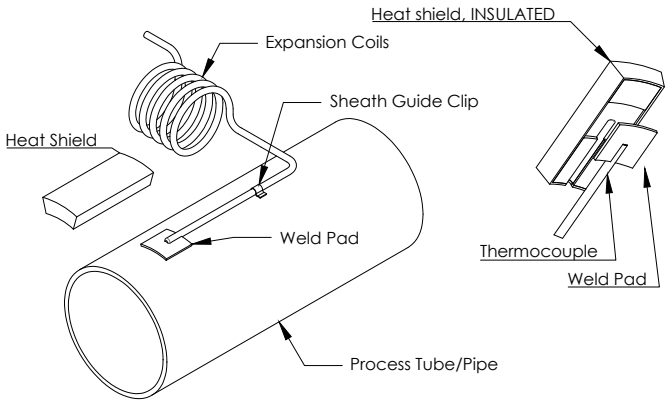
-All the thermocouples are manufactured as ASTM E608/608M
-Calibration is available as per ASTM E220 on request

Installation:

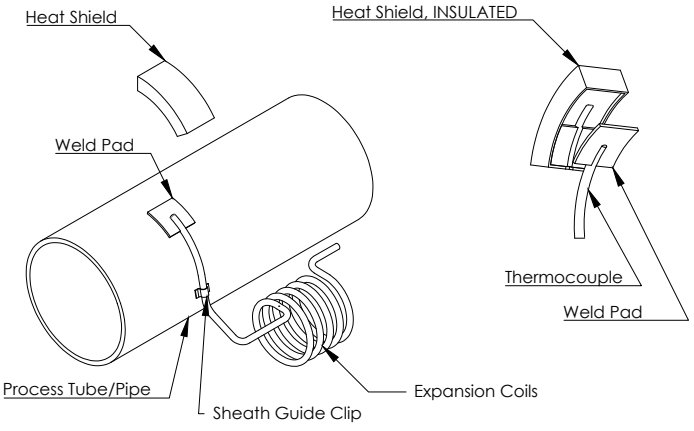
The installation of the tube skin thermocouple through a furnace wall is a straightforward procedure. The temperature probe must be inserted through the wall and secured using a compression fitting designed for high-temperature applications. A second compression fitting should then be attached to the probe to ensure a secure connection at the cold end. Should this mounting approach be necessary for your system, it is important to order an additional compression fitting as an accessory. Each unit will be shipped with the head disassembled to facilitate easy transport and installation.

Moreover, Tempotech Controls acknowledges the necessity for operational flexibility in various industrial contexts. As such, alternative mounting configurations can be customized to meet specific requirements, whether through detailed drawings or by including specifications in the part number description. We invite you to explore our comprehensive range of fitting options, listed in the accompanying ordering symbols, to understand how Tempotech Controls can enhance your industrial processes through our superior tube skin sensors and expertise

LONGITUDINAL MOUNTING



RIGHT ANGLE MOUNTING



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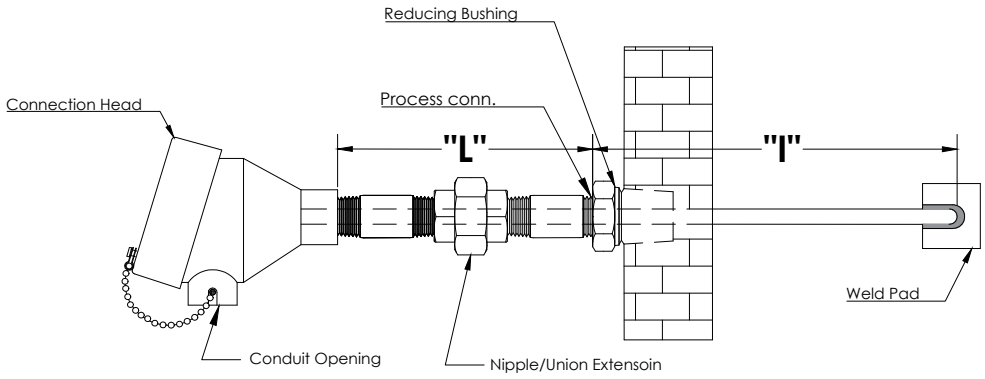
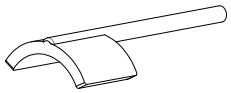
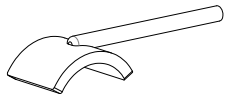


WELD PAD AND MEASURING JUCTION



Bend Direction (RIGHT ANGLE)



Bend Direction (LONGITUDINAL)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TC44																

For Example- TC60-1-K-G-4-8-3i-SS-72i-WF-8-L-11-07-0-TB-0-0

1. THERMOCOUPLE TYPE	
CODE	
J	Iron(+) vs Constantan(-)
K	Chromel(+) vs Alumel(-)
T	Copper(+) vs Constantan(-)
E	Chromel(+) vs Constantan(-)
N	Nicrosil(+) vs Nisil(-)
Use "S" for Special limit of Error	

2. MEASURING JUNCTION	
CODE	
G	Simplex/Grounded
UG	Simplex/Ungrounded
DG	Duplex/Grounded
DUG	Duplex/Ungrounded

3. SHEATH OD		
CODE	IMPERIAL SIZE	METRIC SIZE
2	1/8"	3.2mm
3	3/16"	4.76 mm
4	1/4"	6.35 mm
6	3/8"	9.5 mm
09	SPECIFY IF ANY OTHER SIZE	

4. SHEATH MAT.	
CODE	
8	SS 316
4	SS 310
9	SS 304
6	SS 321
3	INCONEL 600

5. EXTENSION LENGTH (L)
Extension length - use "I" for inches and "M" for millimetre

6. EXTENSION MATERIAL	
CODE	
PS	Plated Steel
MS	Mild Steel
SS	Stainless Steel

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

8. WELD PAD STYLE	
CODE	
WF	Flat
WR-xxx	With Bend Radius
	SPECIFY RADIUS (For eg. WR-045 = 4.5")

9. WELD PAD MATERIAL	
CODE	
8	SS 316
4	SS 310
9	SS 304
6	SS 321
3	INCONEL 600

10. BEND DIRECTION	
CODE	
R	Right Angle
L	Longitudinal

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
PG	Polypropylene
SX	SS Explosion proof
AX	Aluminum explosion proof (CSA,FM,ATEX,IECE'x approved)
06	"Fieldmount Temp Transmitter w/ Display Aluminum"
07	"Fieldmount Temp Transmitter w/ Display SS"
06X	"Exd Fieldmount Temp Transmitter w/ Display Aluminum"
07X	"Exd Fieldmount Temp Transmitter w/ Display SS"
09	General Purpose Transmitter w/ Loop Powered Indicator
10	Aluminum connection head (CCOE approved)
11	Wall mount Aluminum explosion proof head (CSA,FM,ATEX approved)
DA	Dual entry gen purpose Aluminum head
D-XD	Dual entry Aluminum explosion proof (CSA,FM,ATEX,IECE'x approved)

CONTINUE ON NEXT PAGE

12. CONDUIT CONNECTION	
CODE	
05	½" NPT
07	¾" NPT
2M	M20 X 1.5

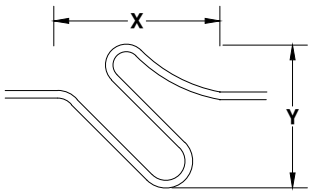
13. PROCESS FITTING	
CODE	
0	Not Required
13-1. MATERIAL	
S	Stainless Steel
B	Brass
M	Mild Steel
13-2. SIZE	
2	⅛"
4	¼"
6	⅜"
8	½"
18	M18 X 1.5
20	M20 X 1.5
13-3. THREAD TYPE	
N	NPT
B	BSP
Leave blank for metric thread	
13-4. FERRULE MATERIAL	
	Leave Blank for SS
T	Teflon
L	Lava

14. HEAD TERMINATION	
CODE	
OO	Blank Head Ready to Install Transmitter
TB	Ceramic Terminal Block
TRM	Standard 4-20 mA Transmitter
TRM-H	Standard 4-20 mA Transmitter w/ Hart

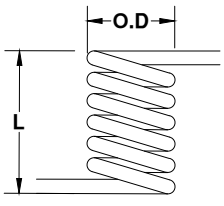
15. HEAT SHIELD	
CODE	
0	No Heat Shield required
HS	Heat Shield required
13-1. HEAT SHIELD MATERIAL	
8	SS 316
4	SS 310
9	SS 304
6	SS 321
3	INCONEL 600

16. EXPANSION LOOP STYLE	
CODE	
0	Not Required
S	S Loop
MC	Multiple coil
SC	Single coil
16-1. EXPANSION LOOP DIMENSIONS	
S-x-x	S for S loop, x for X, x for Y
MC-x-x	MC for Multiple coil, x for OD, x for L
SC-x	SC for Single coil, x for OD
For eg. MC-045-3 = MC is Multiple Coil, 045 is 4.5" OD, 3 is 3" length of coil	
See Expansion loop styles on next page	

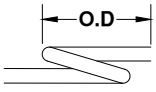
EXPANSION LOOP STYLE



S- LOOP



MULTIPLE COIL



SINGLE COIL