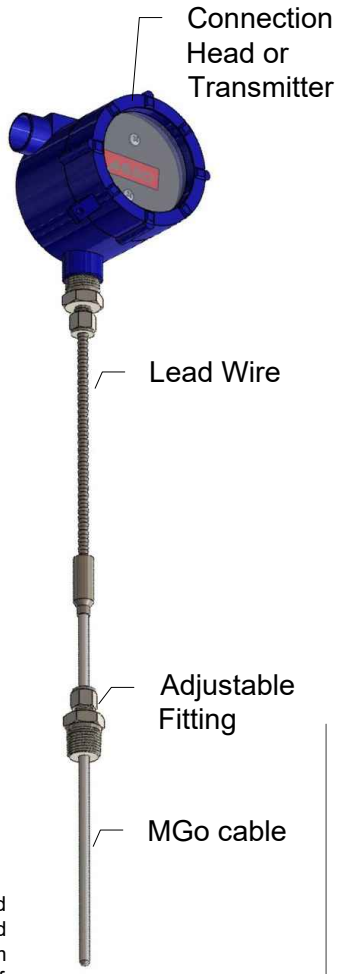
TC-90 MGO-PAC Remote Mount Industrial Thermocouple Assembly

TEMPERATURE SENSOR

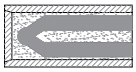
TC90-A Remote Mount Industrial Thermocouple is a temperature-sensing device designed for applications where the sensing element needs to be installed at a distance from the measuring or control system. It allows for flexible installation and helps protect sensitive electronics from harsh environments.

Key Feature:

- The sensor is connected to the measuring instrument via extension wires enclosed in SS armor or a transmitter, allowing installation away from extreme heat, vibration, or hazardous areas.
- Designed to be mounted remotely from control panels, PLCs, or monitoring stations.
- Available with fixed or adjustable process fittings, flange mounts, or thermowell compatibility.
- 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 0.375″.
- Grounded, Ungrounded and Exposed junction to suite application requirement.
- Available in IEC 60584 & ANSI MC 96.1 standard tolerances



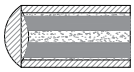
Thermocouple Junction options for TC90



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 :

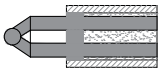
· Wires are protected from any mechanical damage
· Offers rugged construction, the same as the grounded junction.
· Strain due to differential expansion between wire and sheath is minimized with insulated wires.



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.



Exposed Junction: In expose junction, the sheath is removed, and thermocouple wires fuse-welded to form a junction.Tip of the MI cable is sealed with high temperature cement to protect MGO from contamination.

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.

Response Time

Thermocouple OD	Junction		
	Exposed	Grounded	Ungrounded
1/25"	0.005	0.1	0.3
1/16"	0.02	0.2	0.5
1/8"	0.03	0.7	1.3
3/16"	0.07	1.1	2.2
1/4"	0.1	2.2	4.5
3/8"	0.9	2.7	7.5

Response time is measured in liquid by inserting thermocouple into the temperature-controlled circulating bath. Time taken to reach 63.2% of a step temperature change is noted as the response time of thermocouple. For a fast response, the exposed tip is recommended, but the exposed junction is not as rugged as ungrounded and grounded junctions for industrial use.

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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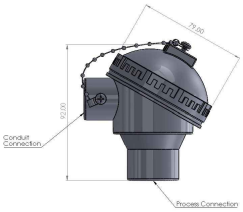
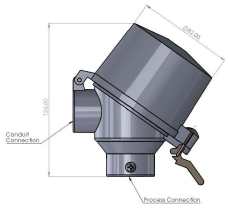
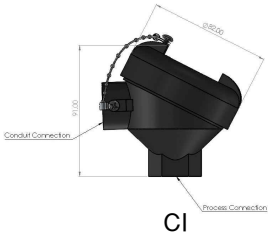
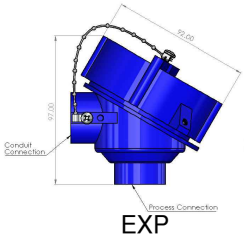
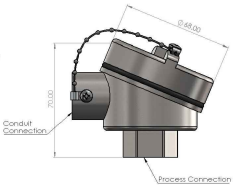
Connection Heads


KNE

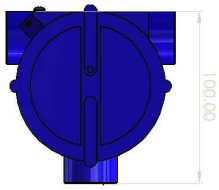

DANA


CI


EXP


SS


FL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Transmitters and Displays

Model	TT-167	TT-267	TT-367	TT-467	TT-567
Transmitter					
Output					
4-20 mA	X	X	X	X	X
HART®Protocol		X	X	X	X
Input					
Thermocouple	K,J,R,S,T N,E,B, Pt100, Pt1000	K,J,R,S,T N,E,B, Pt100, Pt1000	K,J,R,S,T N,E,B, Pt100, Pt1000	K,J,R,S,T N,E,B, Pt100, Pt1000	K,J,R,S,T N,E,B, Pt100, Pt1000
Approval					
Electrical		CE, CSA	CE, CSA	CE, CSA	CE, CSA
HazLoc		OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
Integaral Display			X	X	X
Field Programable		X	X	X	X

Thermowell Options (refer to thermowell order code when order thermowell with thermocouple assembly

Thermowell					
	Flanged Helical Thermowell	Flanged Thermowell	Socket Weld Thermowell	Threaded Thermowell	Metal Protection Tubes
MODELS	TF, TF-H	TF	SWT01, SWT02, SWT03	TWS01, TWS02, TWS03	PT
					
	Vanstone Thermowell	Weld in Themowell	Tri-Clamp Thermowell		
MODELS	TWV-02,TWV-03	TWT-W	TCT-01, TCT-02, TCT-03, TCT-04		

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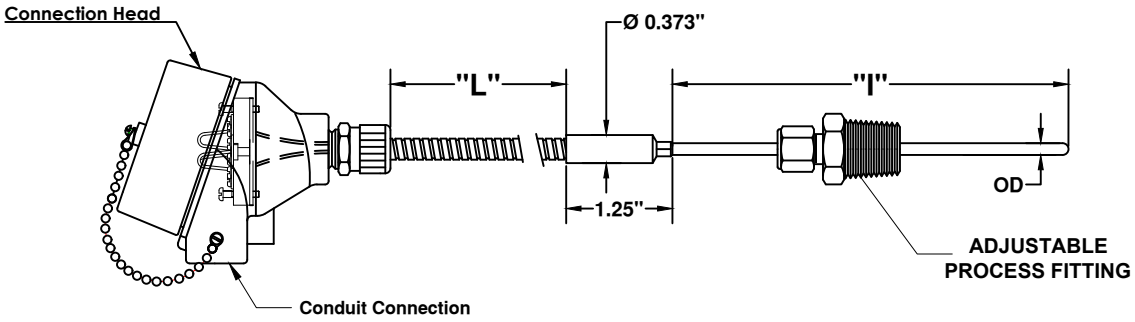

	1	2	3	4	5	6	7	8	9	10	11
TC90											

For Example- TC90-K-UG-4-8-12i-72i-11-57-S8N-2Z-TB

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
E	Simplex/Exposed
DG	Duplex/Grounded
DUG	Duplex/Ungrounded
DE	Duplex/Exposed

3. SHEATH 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
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

4. SHEATH MAT.	
CODE	
8	SS 316
4	SS 310
9	SS 304
6	SS 321
3	INCONEL 600
5	SS 446
10	INCONEL 800

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

6. LEAD LEMGTH (L)
Lead length - use "I" for inches and "M" for millimetre

7. 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)
12	Wall mount SS 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)

8. INSTRUMENT X CONDUIT CONN.	
CODE	
55	1/2" NPT X 1/2" NPT
57	1/2"NPT X 3/4" NPT
77	3/4" NPT X 3/4" NPT
5M	1/2" NPT x M20 X1.5
7M	3/4" NPT x M20 X1.5

9. PROCESS FITTING	
CODE	
0	Not Required
9-1. MATERIAL	
S	Stainless Steel
B	Brass
M	Mild Steel
9-2. SIZE	
2	1/8"
4	1/4"
6	3/8"
8	1/2"
18	M18 X 1.5
20	M20 X 1.5
9-3. THREAD TYPE	
N	NPT
B	BSP
Leave blank for metric thread	
9-4. FERRULE MATERIAL	
	Leave Blank for SS
T	Teflon

10. WIRE TYPE	
CODE	
1	PVC (105° C)
2	Teflon (200° C)
3	Fibre glass (480° C)
4	High Temp Fiberglass (600° C)
5	PFA /PTFE (260° C)
NOTE:- Add "O" for no jacketing, "X" for SS braiding, "Z" for Armour, "S" for Shielded. Shielded only available in type 1,2&5 and rated upto 300V.	

11. 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