

## MPTC-01 Miniature Multipoint Thermocouple with Lead Wire

## TEMPERATURE SENSOR

Temperature is a critical parameter in all systems, regardless of the process. In every heating or cooling system, variations occur throughout the medium—temperature gradients always exist. In many applications, measuring temperature at a single point is sufficient, as minor variations often have little impact. However, in certain applications, uniform temperature measurement is essential to ensure product quality.

TempoTech Multipoint temperature sensors provide accurate measurements at multiple points along a single sensor. They are widely used in complex processes where precise temperature control is necessary. These sensors are specifically designed for applications that require high-precision temperature monitoring across a wide temperature range.

Multipoint sensors are constructed using MGO-PAC thermocouples housed within protective tubes, with sensing elements placed at different points inside the tube. TempoTech offers multipoint sensors in a variety of materials to meet diverse process requirements.

### Key Feature:

- Available in Type K, J, T, N,
- Wide range for diameter from 1/8" to 3/8".
- A wide selection of sheath material to suit application requirement, 304ss, 316ss, 321ss, Inconel® 600, Incolloy 800, Monel, Pyrosil D etc.
- Grounded and Ungrounded junction to suite application requirement.
- Available with low temp and high temp connectors.
- Available in IEC 60584 & ANSI MC 96.1 standard tolerances

### Temperature Accuracy As per

ASTM E608/608M/ IEC 60584 & ANSI MC 96.1 standard tolerances

Standard Limits and Special Limits of Errors

Class 2 and Class 1

### Thermocouple Junction options for MPTC-01



**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.



**Ungrounded Junction:** Junction is similar to grounded junction except wires 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.

### 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 For thermocouples inside the protection tube

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

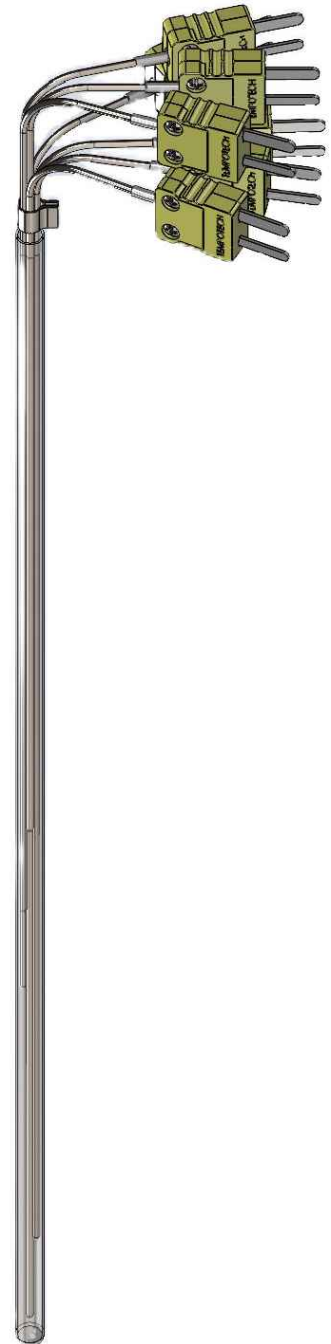
Response time is measured in liquid by inserting thermocouple into the temperature-controlled circulating bath. Time taken to reach 63.2% of a step temperature change is noted as the response time of thermocouple. For a fast response, the exposed tip is recommended, but the exposed junction is not as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



1	2	3	4	5	6	7	8	9	10	11
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MPTC 01										
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EXAMPLE: MPTC-K-G-2-8-10-48I-S2NT-2-120I-MP-MJ

**1. THERMOCOUPLE TYPE**

CODE	
J	Iron(+) vs Constantan(-)
K	Chromel(+) vs Alumel(-)
N	Nicrosil(+) vs Nisil(-)
Use "S" for Special limit of Error	

**2. MEASURING JUNCTION**

CODE	
G	Simplex / Grounded Junction
UG	Simplex / Un- Grounded Junction

**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
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 /316L
3	INCONEL 600

**5. NO. OF POINTS**

CODE	
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**6. IMMERSION LENGTH ("I")**

Immersion length - use "I" for inches and "M" for millimetre

**7. PROCESS FITTING**

CODE	
0	Not Required
7-1. MATERIAL	
S	Stainless Steel
B	Brass
M	Mild Steel
7-2. SIZE	
2	1/8"
4	1/4"
6	3/8"
8	1/2"
18	M18 X 1.5
20	M20 X 1.5

**7. PROCESS FITTING**

7-3. THREAD TYPE	
N	NPT
B	BSP
Leave blank for metric thread	
7-4. FERRULE MATERIAL	
	Leave Blank for SS
T	Teflon

**8. WIRE TYPE**

CODE	
2	TEFLON (200° C)
3	FIBRE GLASS (480° C)
NOTE:- Add "O" for no jacketing. Add "X" for SS braiding	

**9. LEAD LENGTH ("L")**

Lead length - use "I" for inches and "M" for millimetre

**10. CODES FOR TERMINATION**

CODE	
Z	Bare ends
STP	Standard Plug
MP	Miniature Plug
HTP	High Temperature Plug
UTP	Ultra Temperature Plug
SCP	Standard Ceramic Plug

**11. CODES FOR TERMINATION (JACK)**

CODE	
Leave blank if not required	
STJ	Standard Jack
MJ	Miniature Jack
HTJ	High Temperature Jack
UTJ	Ultra Temperature Jack
SCJ	Standard Ceramic Jack

**12. DISTANCE FROM TIP FOR EACH SENSOR**

CODE	
ENTER DISTANCE FROM TIP FOR EACH SENSOR. USE "I" FOR IMPERIAL AND "M" FOR METRIC	

**MAX NO. OF SENSOR FOR TUBE SIZE**

TUBE SIZE	MAX NO. OF SENSOR
1/8"	10
3/16"	20
1/4"	30
5/16"	40
3/8"	40

**Notes:**

1. Transition OD varies based on no. of sensing points.
2. Max no. of points are based on smallest thermocouple od.
3. Wire gauge size varies based on no. sensing points.
4. Custom options available.

