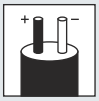
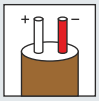
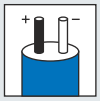
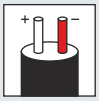
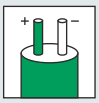
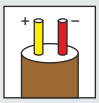
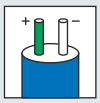
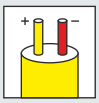
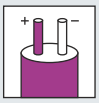
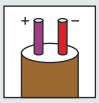
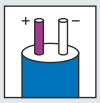
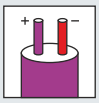
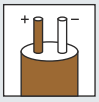
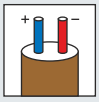
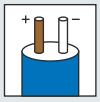
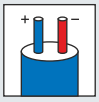
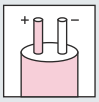
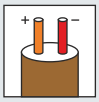
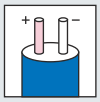
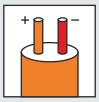
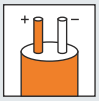
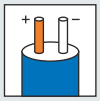
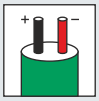
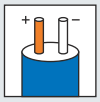
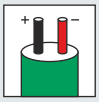
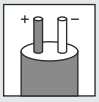
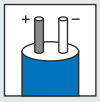
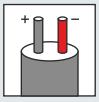
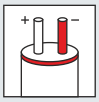
Mineral Insulated Thermocouples

General Mineral Insulated Thermocouple Assemblies consist of two, four or six thermocouple wires embedded in compact MgO - mineral insulation, enclosed in a metallic tube. The assembly is compact, flexible enough to route, has a high insulation resistance and high thermal conductivity. Mineral insulated thermocouple assemblies are robust in construction and offer good mechanical strength.

Beside the standard construction, complex, custom built designs are available. Our expert design team can assist you solve your temperature related problems to satisfaction.

Thermocouple Grade		T/C Type	Temp range	Sheath OD	Sheath Material*	Std limits of error	Spl limits of error	Extension Grade	
ICE 584 (+/-)	ANSI MC 96.1 (+/-)							ICE 584 (+/-)	ANSI MC 96.1 (+/-)
		J Iron Constantan	0-700°C	2 mm, 3 mm 4.5 mm, 6 mm 8 mm	SS316, SS321 Inconel 600®	±2.2°C or ±0.75%	±1.1°C or ±0.4%		
		K Chromel Alumel	(-) 200°C to 1150°C	1 mm, 1.5 mm 2 mm, 3 mm 4.5 mm, 6 mm 8 mm	SS316, SS321 Inconel 600®, SS310, SS446	±2.2°C or ±0.75%	±1.1°C or ±0.4%		
		E Chromel Constantan	(-) 200°C to 800°C	2 mm, 3 mm 4.5 mm, 6 mm 8 mm	SS316, SS321	±1.7°C or ±0.75%	±1.0°C or ±0.4%		
		T Copper Constantan	(-) 200°C to 300°C	2 mm, 3 mm 4.5 mm, 6 mm 8 mm	SS316, SS321	±1.0°C or ±0.75%	±0.5°C or ±0.4%		
		N Nicrosil Nisil	0 to 1280°C	2 mm, 3 mm 4.5 mm, 6 mm 8 mm	Inconel 600®, nicrobel/pyrosil	±2.2°C or ±0.75%	±1.1°C or ±0.4%		
	None Established	R Pt PtRh 13%	0 to 1400°C	3 mm, 4.5 mm 6 mm	Inconel® or ceramic	±1.5°C or ±0.25%	±0.6°C or ±0.1%		
	None Established	S Pt PtRh 10%	0 to 1400°C	3 mm, 4.5 mm 6 mm	Inconel® or ceramic	±1.5°C or ±0.25%	±0.6°C or ±0.1%		
	None Established	B PtRh 6% PtRh 30%	800°C to 1700°C	3 mm, 4.5 mm 6 mm	Inconel® or ceramic	±0.5%	None Established		
No Std. Use ANSI Colour Code	None Established	C (W5) Tungsten-5% Rhenium Tungsten-26% Rhenium	0-2320°C	3 mm, 4.5 mm 6 mm		±4.5% or ±1.0%	None Established	No Std. Use ANSI Colour Code	

Other sheath OD and sheath material available on request.

Mineral Insulated Thermocouples

Specifications

Element	:	J, K, E, T, N, R, S, B type thermocouple, single, duplex (triplex on request)
Sheath OD	:	1 mm, 2 mm, 3 mm, 4.5 mm, 6 mm, 8 mm, 9.5 mm, 10 mm, 12.7 mm
Sheath material	:	SS316, SS321, Inconel 600 as standard. Other sheath on request
Insulation	:	Mineral, Compact MgO (over 99% purity)
Calibration	:	In accordance with ANSI MC 96.1/ IEC 584 (class 2) (class 1 as option)
Junction	:	Grounded, ungrounded, exposed
Cold end	:	a) Pot seal with PVC or PTFE insulated flexible tails b) Quick connect / disconnect plug and Jack c) Ceramic spring loaded terminal block with silver plated brass terminals d) Ceramic to metal seal e) Other termination on request
Head	:	Diecast aluminium LM6 grade / SS304 / SS316, single or double entry with ¾" ET (F) or ½" NPT (F) cable entry as standard, ½" NPT (F) for well or nipple. Other materials on request
Protection	:	Weatherproof to IP-68 (IS :13947 Part I) : Flameproof to Gr.I, IIA IIB (Equivalent to NEC. C1, I, Div 2 Gr. C & D) - CCOE Certified : Flameproof to IIC (Equivalent to NEC. C1, I, Div 2 Gr. B, C & D) - CCOE Certified : Increased safety : ATEX certified : CE certified
Extension	:	Provided in the form of Nipple or Nipple - Union - Nipple in Cd plated CS or SS. Other extension on request
Optional	:	a) Thermowell (refer section on Thermowell) b) Head mounted temperature transmitter c) Adjustable compression fitting or flange.
Note	:	Beaded thermocouples also can be offered on request. (Specify conductor diameter in such case)

Mineral Insulated Thermocouples

Tests*:

1) Calibration

2) Nitrogen leak test

3) Dimensional check

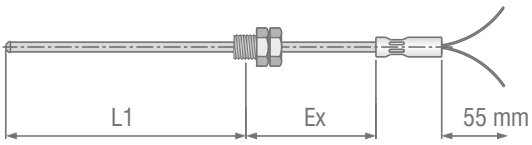
4) Insulation resistance (>100M Ohm @ 500 VDC at 25°C)

5) Hot IR test

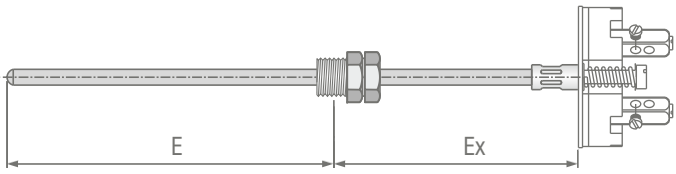
* Refer seperate sheet which mentions complete list of tests carried out.

Mineral Insulated Thermocouples

How to Order



TYPE : TC IA



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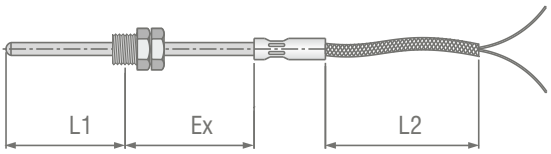

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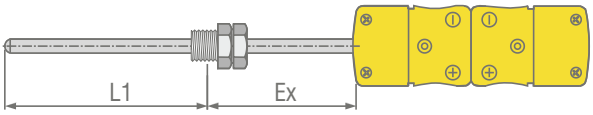


TYPE : TC-I-PJ

ELEMENT
1K, 2K, 1J, 2J, 1E, 2E, 1T, 2T, 1N, 2N
1R, 2R, 1S, 2S, 1B, 2B

SHEATH OD
2, 3, 3.2, 4.5, 6, 8, 9.5, 10, 12.7mm

SHEATH MATERIAL

S6 SS316	S3 SS310
S2 SS321	HC Hastelloy® C
I6 Inconel® 600	SH SS446
I8 Incoloy® 800	

L1
Specify in mm

Ex
Specify in mm

EXTENSION CABLE TYPE
1. PTFE insulated tails-55mm long
2. PTFE insulated, PTFE overall cable
3. PTFE insulated, overall PTFE & SS braided cable
4. FG insulated, overall FG cable
5. FG insulated, overall FG, SS braided cable

OPTION / SPECIAL
1. Adjustable compression fitting in SS316 (specify the size)
2. Spring loaded bayonet fitting
3. Lugs for tails
4. Special limits of error
5. Grounded junction
6. Calibration standard (specify other than IEC-584)
7. Triplex element
8. Bulk head connector
9. Thermowell
10. Any other requirement
11. Beaded Ceramics (Sheath Material - NA)
0. None

EXTENSION CABLE LENGTH
L_2 meter

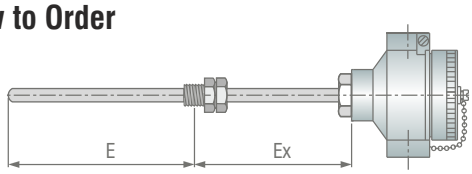
Standard Features : a - Reference standard IEC 584 Class 2
b - Ungrounded junction
c - Mineral (compact MgO) insulation

Typical Model No : TC-I-A-2J-3-S6-200-50-1-0-0

TC	IA	2J	3	S6	200	50	1	0	0
Thermocouple	Construction Type	Element Type	Sheath OD	Sheath Material	"L1" Length (mm)	"Ex" Length (mm)	Extension Cable Type	"L2" Extension Cable Length	Option / Special Requirement

Mineral Insulated Thermocouples

How to Order



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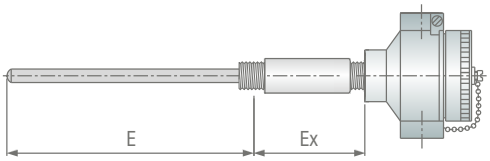

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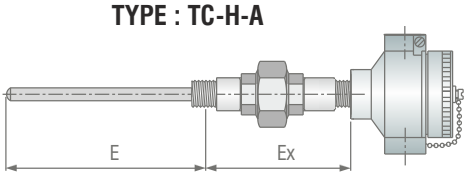
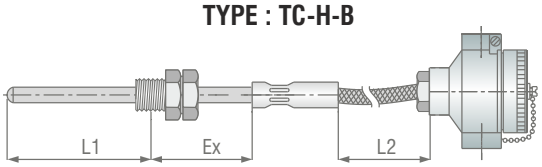


TYPE : TC-H-C



TYPE : TC-H-D

ELEMENT
1K, 2K, 1J, 2J, 1E, 2E, 1T, 2T, 1N, 2N
1R, 2R, 1S, 2S, 1B, 2B

ELEMENT OD
4.5, 6, 8, 9.5, 10, 12, 12.7mm

SHEATH MATERIAL

S6	SS316	I6	Inconel® 600
S2	SS321	I8	Incoloy® 800
S3	SS310	HC	Hastelloy® C
SH	SS446	NA	Not Applicable

HEAD

WAL	Aluminium (LM6 Gr.), Weatherproof (IP-66)
WS4	SS304, Weatherproof (IP-66)
WS6	SS316, Weatherproof (IP-66)
FLAL	Aluminium (LM6 Gr.), Flameproof (IIA, IIB)
FLS4	SS304, Flameproof (IIA, IIB)
FLS6	SS316, Flameproof (IIA, IIB)
FCAL	Aluminium (LM6 Gr.), Flameproof (IIC)
FCS4	SS304, Flameproof (IIC)
FCS6	SS316, Flameproof (IIC)
FCCAL	Aluminium (LM6 Gr.), Flameproof (IIC+CCOE)
ATAL	Aluminium (LM6 Gr.), ATEX certified
FMAL	Aluminium (LM6 Gr.), FM/UL certified

CABLE ENTRY

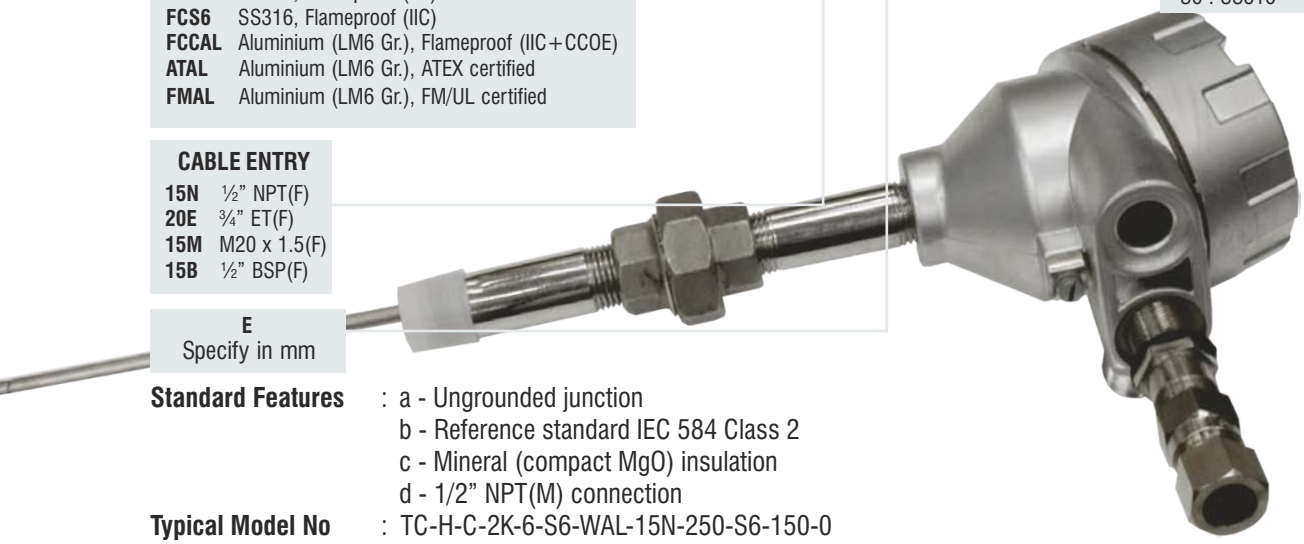
15N	½" NPT(F)
20E	¾" ET(F)
15M	M20 x 1.5(F)
15B	½" BSP(F)

E
Specify in mm

OPTION / SPECIAL
1. Cable gland (specify material)
2. Two cable entries
3. Head mounted transmitter
4. Plug for cable entry (specify material)
5. Connection(other than specified)
6. FG/FG, SS braided cable (specify length e.g. 6(3) i.e. 3 Mtr cable)
7. Grounded junction
8. Thermowell
9. Special limits of error
10. Triplex element
11. Beaded Ceramics (Sheath Material - NA)
0. None

Ex
Specify in mm

CONNECTION MATERIAL
C : Cd plated CS
S4 : SS304
S6 : SS316



Standard Features : a - Ungrounded junction
b - Reference standard IEC 584 Class 2
c - Mineral (compact MgO) insulation
d - 1/2" NPT(M) connection

Typical Model No : TC-H-C-2K-6-S6-WAL-15N-250-S6-150-0

TC	H-C	2K	6	S6	WAL	15N	250	S6	150	0
Thermocouple	Construction Type	Element Type	Sheath OD (mm)	Sheath Material	Head	Cable Entry	"E" Length (mm)	Connection Material	"Ex" Length (mm)	Option / Special Requirement