Nickel Wire Mineral Insulated RTD

In continuation with its endeavour to provide products of best quality to clients, General has developed RTD with Nickel conductor in Mineral Insulated Construction for the first time in India.

The basic difference between the conventional & Nickel conductor is material of conductor. In conventional, it is copper as against Nickel in newly developed MI.

Advantages of Nickel conductor MI RTD

1. Most important advantage is that the RTD element is welded on to conductors and not brazed. As such same RTD can be used for much higher temperature of up to 600^{0}C. In conventional RTD with copper conductor, brazing does not allow use of RTD above 450^{0}C, after which brazing starts softening and RTD loses its contact with cable conductors. In Nickel conductors, as Nickel can be welded, contact is much more stronger even at higher temperature.
2. Nickel conductor cables are annealed at higher temperature than that of Copper. The cable therefore is much more softer. Hence RTDs made with nickel conductor are more pliable and easier to use.
3. Nickel has much more strength than copper. Hence, they can be directly terminated in the terminal block avoiding another connection of flexible leads. RTDs with Nickel conductors give steady readings and chances of loose connection of flexible leads to copper wires is avoided.
4. As Nickel conductors are welded to RTD element, it is a much more stable design than brazed RTD. This advantage is very important in applications where vibrations are present.
5. Copper can get easily oxidised causing fluctuations in readings. Nickel being much more inert chemically, is not so prone to oxidation and hence gives stable readings over a longer period of time.

Property	Copper	Nickel
Resistivity at room temp	1.694 x 10^{-8} Ohm - m	6.9 x 10^{-8} Ohm - m
Melting point	1085^{0}C	1455^{0}C
Density @ 20^{0}C	8.96 gm / cc	8.9 gm / cc
Young's Modulus	129.8 GPa	199.5 GPa
Poisson's Ratio	0.343	0.312

Mineral Insulated RTDs

Accurate temperature monitoring and control begins with a properly designed sensor. RTD - Resistance Temperature Detector used for temperature measurement (-) 200^{0}C to 500^{0}C (upto 800^{0}C on request), must have the physical configuration necessary for optimum thermal response to the process fluid it is sensing and the resistive element compatible with instrumentation.

The system accuracy begins with proper primary sensor selection. The integrity of any temperature measuring device depends upon proper traceability.

Our fully equipped measurement and testing laboratory maintains primary reference standard calibrated and duly certified to national standards. These are used for the calibration of all RTDs we manufacture.

Various considerations apply to the design of RTD assemblies. The element should be protected from shock and vibration, yet free of expansion stresses that may shift the reading. The element assembly needs to be isolated without obstructing heat flow. The outer sheath has to withstand pressure, erosion and vibration, yet it should be small enough for easy installation and rapid response to temperature changes.

Features

- State-of-the-art Laser Welding adopted to weld element to transducer case and bulb to sheath.
- High integrity construction.
- High accuracy, repeatability.
- High insulation resistance (>100 M ohm @ 500 VDC at 25^{0}C)
- Wide operating range i.e. (-) 200^{0}C to 800^{0}C
- Fast response
- Mineral insulated construction enables the sheath to be bent / routed to suit installation without affecting performance.
- Available in variety of sheath diameters.
- Two, three and four wire configuration
- Calibration in accordance with IEC 751
- Class A type or 1/3rd DIN with special limits of error optional#.
- Suitable for head mounted transmitters.

Refer our precision RTD section.

Laser Welding Machine

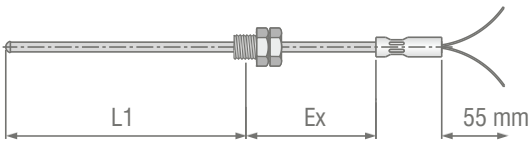
Mineral Insulated RTDs

Specifications

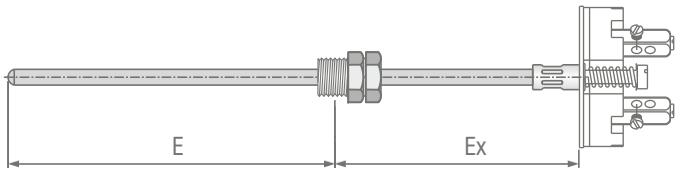
Element	:	1 Pt 100 or 2 Pt 100 - single or duplex (triplex on request)
Element OD	:	3.2 mm, 6 mm, 8 mm, for the elements portion of 60 mm, with leadout MI cable of 2.8 mm, 5 mm respectively Straight construction with continuous OD of 6 mm, 8 mm, 10 mm also available.
Sheath material	:	SS316
Insulation	:	Mineral, compact MgO (over 99% purity)
Calibration	:	In accordance with IEC-751 / DIN 43760 (class B or A)
Conductor	:	Copper (Nickel on request*)
Configuration	:	Two wire, three wire or four wire
Open end	:	Pot seal or quick connect-disconnect plug and jack or terminal block with PTFE insulated copper conductor flexible tails. (Terminal block- ceramic spring loaded 41mm OD, 33 PCD with two M4 screws, silver plated brass terminals).
Head	:	Diecast aluminium (LM6 Gr.) / SS304 / SS316, single or double entry with ¾" ET (F) cable entry as standard, ½" NPT (F) for well or nipple.
Protection	:	Weatherproof to IP-67 (IS :13947 Part I) : Flameproof to Gr. I, IIA IIB (equivalent to NEC class I Div II Gr. C & D) : Flameproof to IIC (equivalent to NEC class I Div II Gr. B, C & D) : Increased safety : ATEX certified : CE Marked
Extension	:	Nipple or Nipple - Union - Nipple standard 150 mm long, 1/2" sch. 40 /80 in A106 Gr. B, Cd plated or SS304 or SS316 or adjustable compression fitting.
Optional	:	a) Thermowell (refer - section on Thermowell) b) Head mounted temperature transmitter
Routine tests	:	a) Calibration b) Nitrogen leak test c) Dimensional check d) Insulation resistance (>100 M ohm @ 500VDC at 250C) e) Continuity
Type tests	:	a) Vibration test b) Drop / Shock test c) Self heating error test d) Response time test (In situ-water flowing @ 20 ltr. per second) e) Autoclave test f) Hot IR

Mineral Insulated RTDs

How to Order



TYPE : RTD IA



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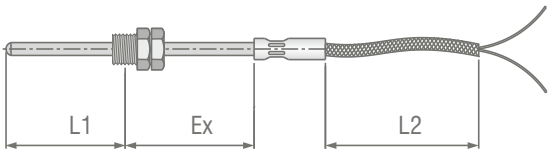

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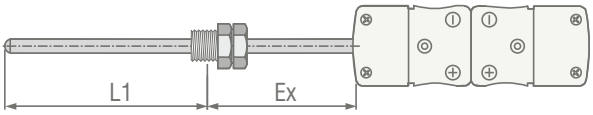


TYPE : RTD-I-PJ

ELEMENT
1Pt100, 2Pt100, 1Pt46, 2Pt46, 1Cu53, 2Cu53, 1Pt1000, 2Pt1000

SHEATH OD
3, 3.2, 4.5, 6, 8, 9, 10 mm

SHEATH MATERIAL
S6 : SS316, S2 : SS321

L1
Specify in mm

Ex
Specify in mm

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. Calibration standard (specify other than IEC-751)
6. Triplex element
7. Bulk Head Connector
8. Thermowell
0. None

EXTENSION CABLE LENGTH
(L_2) Specify in mtr

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

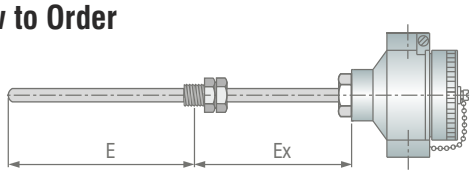
Standard Features : a - Mineral insulated (compact MgO) construction
b - 3 Wire System
c - Reference standard IEC 751 Class 2

Typical Model No : RTD-I-B-1Pt100-4.5-S6-200-50-3-5-1/2"BSP(M)

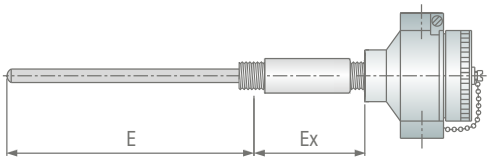
RTD	IA	1Pt100	4.5	S6	200	50	3	5	½" BSP(M)
RTD	Construction Type	Element Type	Sheath OD (mm)	Sheath Material	"L1" Length (mm)	"Ex" Length (mm)	Extension Cable Type	"L2" Extension Cable Length	Special Requirement (Adjustable compression fitting reqd.)

Mineral Insulated RTDs

How to Order



TYPE : RTD-H-A



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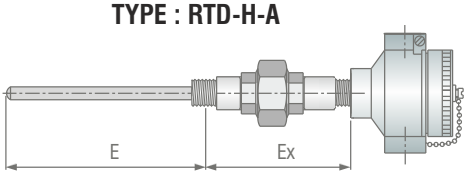

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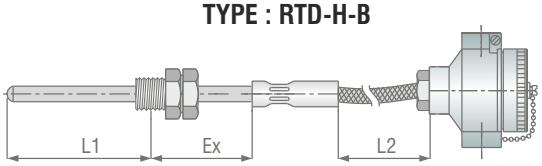

TYPE : RTD-H-D

ELEMENT
1Pt100, 2Pt100, 1Pt46, 2Pt46, 1Cu53, 2Cu53, 1Pt1000, 2Pt1000

SHEATH OD
4, 5, 6, 8, 9, 10 mm

SHEATH MATERIAL
S6 : SS316, S2 : SS321

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)

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. Special limits of error
8. Thermowell
0. None

Ex
Specify in mm

CONNECTION MATERIAL

C	Cd plated CS
S4	SS304
S6	SS316

E
Specify in mm

Standard Feature : a - Reference standard IEC 751 Class 2
b - Mineral insulated (compact MgO) construction
c - 1/2" NPT(M) connection
d - 3 Wire System

Typical Model No : RTD-H-B-2Pt100-8-S2-WS4-15N-250-C-75-2

RTD	H-B	2Pt100	8	S2	WS4	15N	250	C	75	2
RTD	Construction Type	Element Type	Sheath OD (mm)	Sheath Material	Head	Cable entry	"E" Length (mm)	Connection material	"Ex" Length (mm)	Special Requirement (2 Cable entries)