ELIT

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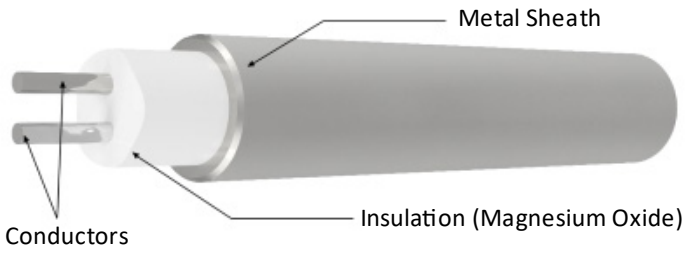
Mineral Insulated Thermocouples - Technical Information

What is a Mineral Insulated Probe?

Mineral insulated probes are made from mineral insulated cable. It has a metallic sheath and on the inside, the conductors are insulated with densely packed magnesium oxide (MgO).



This construction bears a lot of advantages for temperature sensors. Mineral insulated probes are often referred to as sheathed temperature sensors.

Characteristics of Sheathed thermocouples

A sheathed thermocouple has an extremely wide temperature range: from below -200 °C up to more than 1,600°C. Furthermore, sheathed thermocouples are resistant to vibration and scratches which proves their longevity.

At the same time, they are bendable.
Surprisingly, they are affordable as well: MI cable costs about the same as fiberglass cable.

We manufacture MI probes in diameters from 1mm up to 8mm. To ensure maximum water tightness, we make either a connector or a robust cable transition onto the probe.

Junction Types

Exposed Junction

This junction style provides the fastest possible response time but leaves the thermocouple wires unprotected against corrosive or mechanical damage.

Grounded Junction

The grounded junction is recommended in the presence of liquids, moisture, gas or high pressure. The wire is protected from corrosive or erosive conditions. Response time with this style approaches that of the exposed junction.

Ungrounded Junction

The ungrounded junction is excellent for applications where stray electric and magnetic fields (EMFs) would affect the reading and for frequent or rapid temperature cycling. Response time is longer than with the grounded junction.

Response time Diameter/Junction type

Sheath diameter [mm]	Isolated measuring junction	Grounded measuring junction
0.25	5 ms	2 ms
0.5	14 ms	8 ms
1.0	0.18 s	0.14 s
1.5	0.2 s	0.15 s
3.0	0.5 s	0.4 s
4.5	1.2 s	0.7 s
6.0	2.4 s	1.2 s
8.0	3.9 s	2.1 s

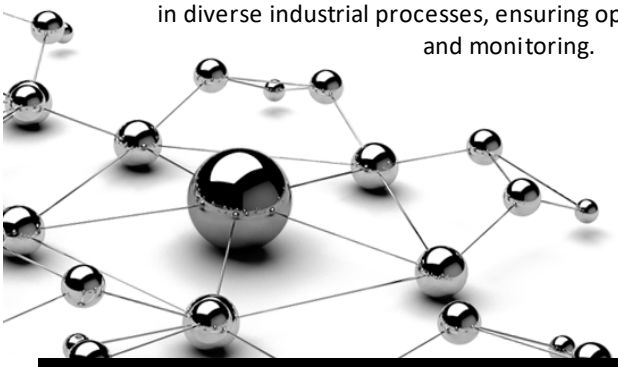
Sheath material types

When it comes to the production of mineral-insulated (MI) thermocouples, several materials are commonly used for the sheath and thermocouple wires. Let's explore four specific materials: *(see annex)*

- **AISI (American Iron and Steel Institute) Stainless Steel**
- **Inconel**
- **Nicrobell / Pyrosil**
- **Platinum-Rhodium (Pt-Rh) Alloy**

By utilizing these materials in the production of MI thermocouples, manufacturers can tailor the thermocouples to meet specific application requirements, considering factors such as temperature range, chemical exposure, mechanical stress, and accuracy needs.

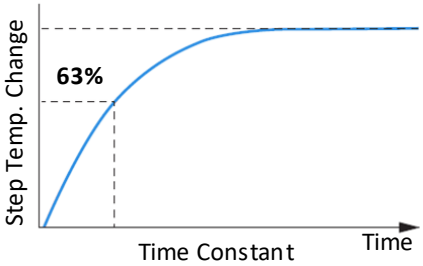
This allows for reliable and accurate temperature measurements in diverse industrial processes, ensuring optimal control and monitoring.



Response Time

Response is a function of the mass of the sensor and its efficiency in transferring heat from its outer surfaces to the wire sensing element. A rapid time response is essential for accuracy in a system with sharp temperature changes.
Time response varies with the probe's physical size and design. Response times indicated represent standard industrial probes.

Time Constant (Thermal Response Time)



The smaller the diameter, the faster the thermocouple responds. Grounding the junction also improves response time by approximately 50 percent based on the sensor achieving 63.2 percent of the final reading or to the first time constant. It takes approximately five time constants to obtain steady state readings.

Types of thermocouples

Thermocouples are adapted to specific applications depending on the temperature range to be measured, the accuracy required and the environment in which they will be used. They are differentiated by letters (Type K, J, N, T, etc....) which correspond to the presence of materials that can measure a certain temperature range.
The most commonly used is the Type K which is capable of measuring temperatures from -40 to +1200 °C. It is made from a chrome and an aluminum wire.

Note that connector colors vary by standard and country. Check the ***"International Color Codes applied to temperature measuring engineering".***

Thermocouple classes

Classes of thermocouples have certain tolerance values and temperature limits of validity. The most common classes are **class 1** and **class 2**.
With **class 1** you get more precise measurement values, while **class 2** provides a wider tolerance values.

Thermocouple accessories

Temperature sensor accessories are equipment used to improve the performance of temperature measuring devices.
It is important to choose quality sensor accessories to ensure optimal performance and long-term reliability.
Our accessories are made of strong and resistant materials to guarantee maximum durability.
Elit Instrument offers a wide selection of temperature sensor accessories to meet your specific needs.
Accessories include: thermocouple cables for reliable and accurate data transmission, compression fittings for easy installation, thermowells to protect sensors from mechanical damage, terminal heads for easy access to sensors, transmitters for networked data transmission, and ceramic terminal blocks for electrical isolation.

Terminal Heads

Many alternative types of terminal head are available to meet the requirements of various applications. Variations exist in size, material, accommodation, resistance to media, resistance to fire or even explosion and in other parameters. Common types are shown below but there are many special variants available to meet particular requirements.

Terminal block located in a “head” allow for the connection of extension wires. Various materials are used for screw or solder terminations including copper, plated brass and, for the best performance in the case of thermocouples, thermoelement alloys. The various head styles cater for a wide variety of probe diameters and cable entries.

Types of thermocouple cables

For additional information about thermocouple cables and RTD cables see ***“Accessories - Cables”.***

Types of connectors

Thermocouple connectors plugs and sockets are available in two sizes (miniature and standard).
Miniature thermocouple connectors are smaller and have flat pins, these are usually found on small diameter thermocouples or fitted to the end of cables for connection to hand held and panel instruments. Standard connectors have larger round pins and tend to be used for more industrial applications.

How to choose your accessory?

It is important to choose the right type of cable, fitting, thermowell, terminal head, connector and transmitter to ensure that your temperature sensor operates reliably and accurately.

The type of thermocouple cable must match the type of thermocouple you are using (e.g. type K, T, E, etc.).
The compression fittings must match the type of sensor you are using. It must also be compatible with the sensor diameter and location thread.
The thermowell protects the sensor from mechanical damage and high temperatures. It must be selected according to the operating temperature and the required mechanical strength.
The connection head must be compatible with the type of cable and the application. It must also be able to withstand the temperatures and environment in which it will be used.
The connector must be compatible with the type of cable and thermocouple used, as well as with the connection head. It must also be designed to withstand the temperatures and environment in which it will be used.
The thermocouple transmitter must be compatible with the type of sensor used and must be able to convert the signal to a standard electrical signal.
The ceramic terminal block is used to attach electrical cables to a control box. It must be compatible with the type of cable used and resistant to high temperatures.

Additional accessories

For more detailed information see ***“Accessories”.***

TM00 – Mineral Insulated Thermocouples
Stripped

Orderinformation

1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:
☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:
☐ 1 mm ☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm
☐ 6 mm ☐ 8 mm ☐ Other:

5. Sheath material:
☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:
☐ Ungrounded ☐ Grounded ☐ Exposed

7. Stripping length L1 (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

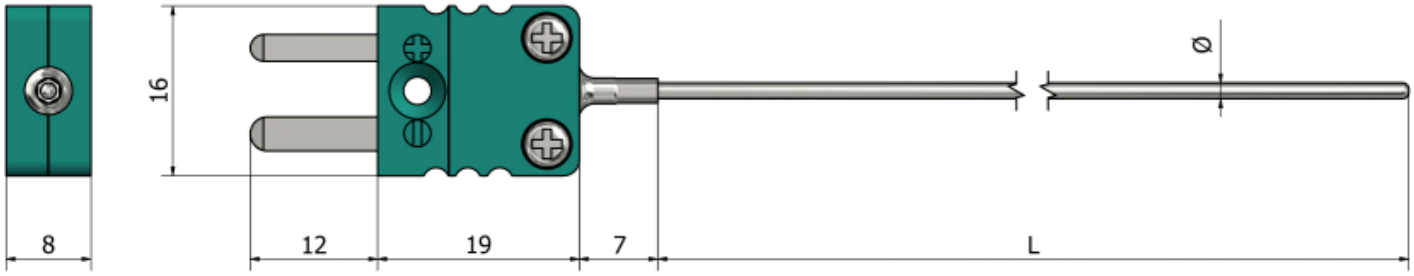
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TM10 – Mineral Insulated Thermocouples

Miniature connector termination



Orderinformation

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:

☐ 1 mm ☐ 1,5 mm ☐ 2 mm ☐ 3 mm
☐ Other:

5. Sheath material:

☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:

☐ Ungrounded ☐ Grounded ☐ Exposed

7. Miniature connector:

☐ Plug ☐ Socket

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

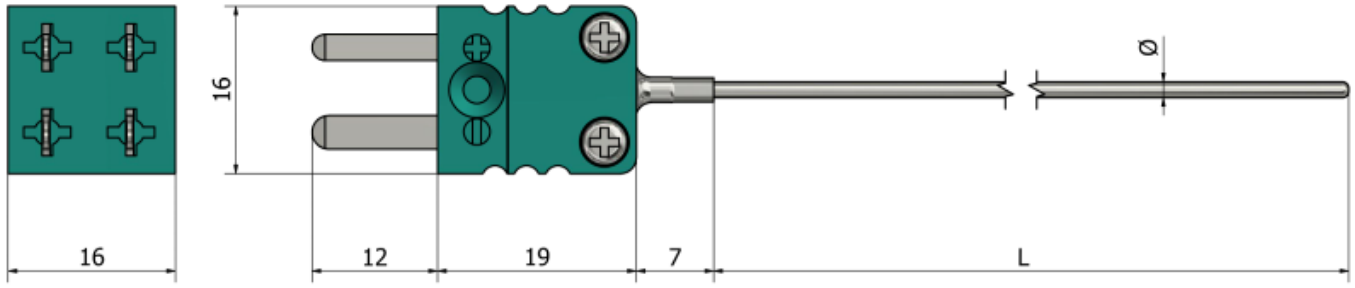
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TM11 – Mineral Insulated Thermocouples

Miniature connector termination (Duplex)



Orderinformation

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm
☐ Other:

5. Sheath material:

☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:

☐ Ungrounded ☐ Grounded ☐ Exposed

7. Duplex miniature connector:

☐ Plug ☐ Socket

8. Connector temperature: ☐ 200°C

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

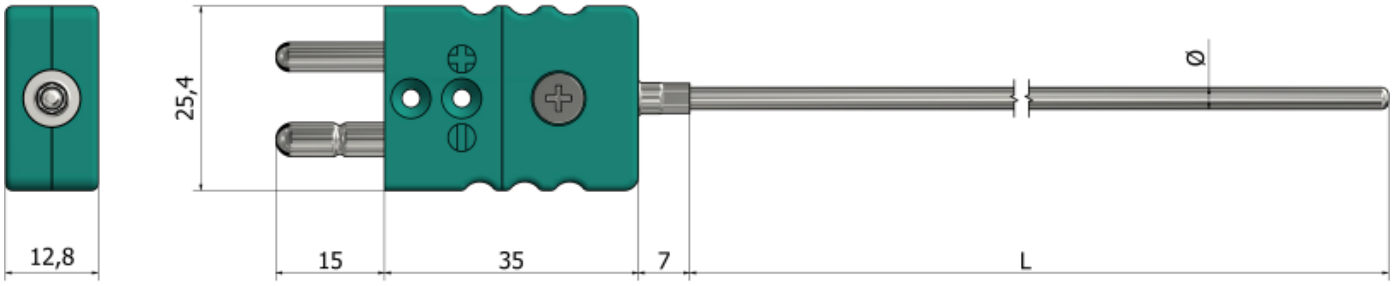
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TM12 – Mineral Insulated Thermocouple

Standard connector termination



Orderinformation

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:

☐ 1 mm ☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm
☐ 6 mm ☐ 8 mm ☐ Other:

5. Sheath material:

☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:

☐ Ungrounded ☐ Grounded ☐ Exposed

7. Standard connector:

☐ Plug ☐ Socket

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

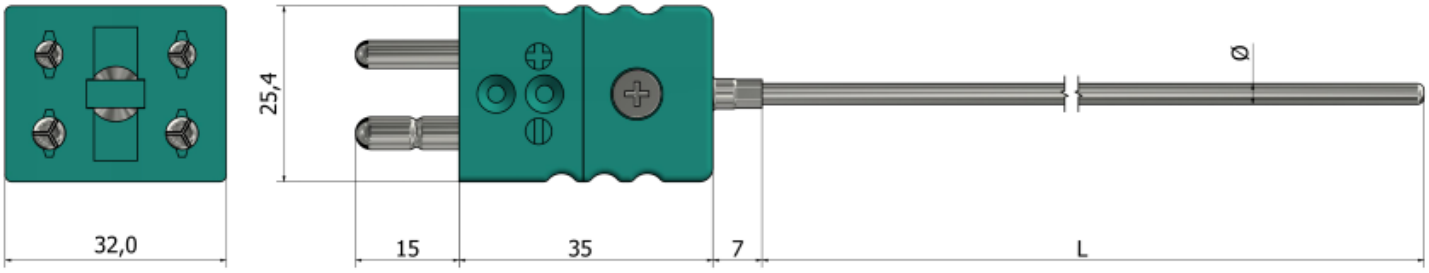
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TM13 – Mineral Insulated Thermocouples

Standard connector termination (Duplex)



Orderinformation

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm
☐ 6 mm ☐ 8 mm ☐ Other:

5. Sheath material:

☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:

☐ Ungrounded ☐ Grounded ☐ Exposed

7. Duplex standard connector:

☐ Plug ☐ Socket

8. Connector temperature: ☐ 200°C

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TM14 – Mineral Insulated Thermocouples

LEMO Connector

Orderinformation

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Sheath length L (mm):

4. Sheath diameter Ø:

☐ 1 mm ☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm
☐ 6 mm ☐ 8 mm ☐ Other:

5. Sheath material:

☐ Inconel 600 ☐ AISI 310 ☐ AISI316 ☐ AISI321 ☐ Pt10%Rh
☐ Nicrobell/Pyrosil ☐ Other:

6. Junction type:

☐ Ungrounded ☐ Grounded ☐ Exposed

7. LEMO connector type:

☐ Plug ☐ Socket

8. LEMO connector size (MI Thermocouples from Ø mm to Ø mm):

☐ S0 (1 mm) ☐ S1 (1,5 mm to 3 mm) ☐ S2 (4,5 mm to 6 mm)
☐ S3 (8mm) ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

Mineral Insulated RTDs - Technical Information

What is an RTD sensor?

An RTD (Resistance Temperature Detector) is a type of sensor used to measure temperature. It usually consists of a platinum material (PT100,PT500 or PT1000) which has a resistance that changes proportionally with temperature.
RTDs are used for accurate, stable and reliable temperature measurements in generally high temperature ranges.

RTDs advantages

RTDs have several advantages over other types of temperature sensors:

High precision

RTDs have high temperature sensitivity, typically in the range of 0.1 to 0.2% per °C, allowing for accurate temperature measurement.

Long term stability

RTDs have long-term stability and longer life than thermistors, making them more reliable for long-term applications.

Wide operating temperature range

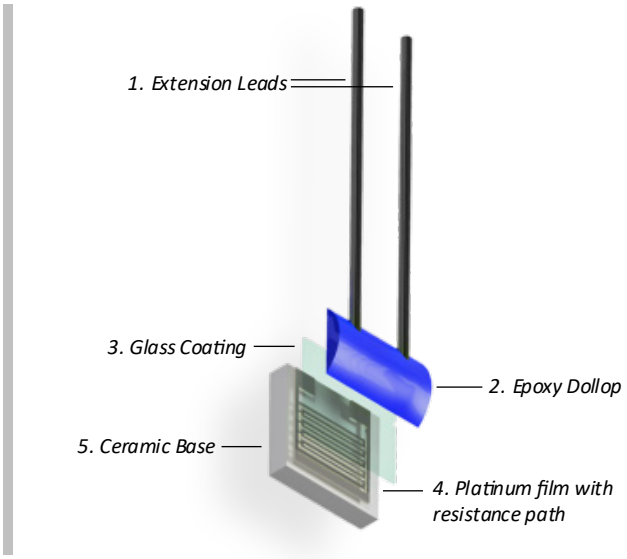
RTDs can operate in a temperature range of -200 to 850°C, making them suitable for many industrial applications.

Low ohmic resistance

RTDs have a low ohmic resistance compared to thermistors, which makes them easier to use with electronic circuits.

What is a PT probe?

A PT (Platinum Resistance Thermometer) is a type of temperature sensor that uses a temperature deflection resistor (RTD) to measure temperature.



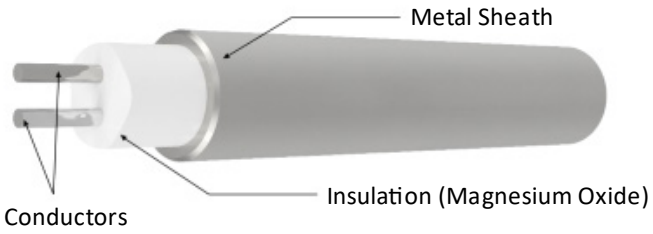
It is based on the principle that the electrical resistance of a conductive material increases when its temperature increases.

How does an RTD work?

An RTD (variable temperature resistor) is a sensor that measures temperature using the variation of the electrical resistance of a conductive material. RTDs are usually made from platinum, gold or nickel. The operating principle of RTDs is based on Ohm's law of electrical resistance, which establishes a relationship between the electrical resistance of a conductor and its temperature. According to this law, the electrical resistance of a conductor generally increases when its temperature increases.

What is a Mineral Insulated Probe?

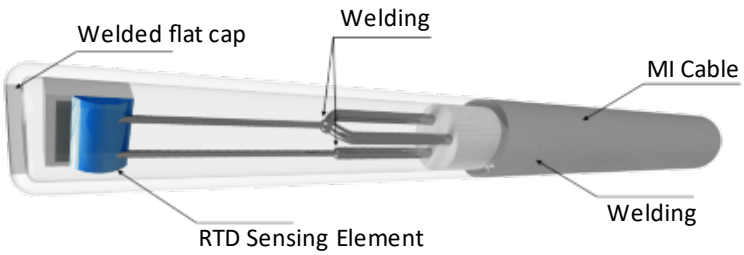
Mineral insulated probes are made from mineral insulated cable. It has a metallic sheath and on the inside, the conductors are insulated with densely packed magnesium oxide (MgO).



This construction bears a lot of advantages for temperature sensors. Mineral insulated probes are often referred to as sheathed temperature sensors.

Characteristics of Sheathed Probes

A sheathed RTD has an extremely wide temperature range: from below -200 °C up to more than 1,100 °C.
Furthermore, sheathed RTDs are resistant to vibration and scratches which proves their longevity. At the same time, they are bendable. Surprisingly, they are affordable as well: MI cable costs about the same as fiberglass cable.



We manufacture MI probes in diameters from 1.5 mm up to 8mm. To ensure maximum water tightness, we make either a connector or a robust cable transition onto the probe.

Sheath material types

When it comes to the production of mineral-insulated (MI) RTDs, two materials are commonly used for the sheath:

AISI 304L (up to 900°C)

18% Chrome 8% Nickel (Reduced carbon content)
- Reduced carbon content to improve weldability.

AISI 316L (up to 900°C)

16% Chrome 10% Nickel 2-3% Molybdenum (Reduced carbon content) - Reduced carbon content which improves corrosion resistance at low temperatures and better weldability.

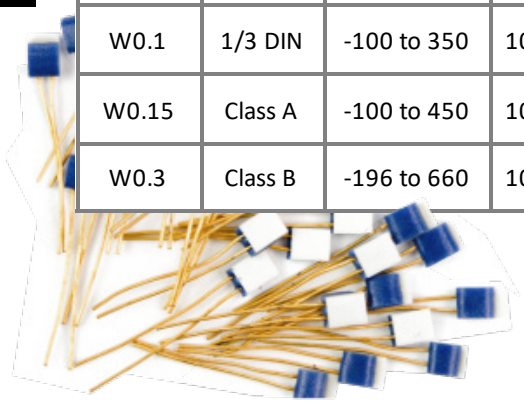
Understanding the naming of Pt100, PT500 and PT1000 sensors

First of all, "Pt" is the chemical symbol for platinum because platinum is the basic material for making the measuring element. The naming conventions of P100, PT500, and PT1000 sensors are closely tied to the nominal resistance values they exhibit at 0°C. P100 sensor has a nominal resistance of 100 Ω at 0°C, Pt500 sensor has a nominal resistance of 500 Ω at 0°C and Pt1000 sensor has a nominal resistance of 1000 Ω at 0°C.
Understanding the meaning behind these designations allows us to discern their specific characteristics and applications. Whether you require a standard PT100 sensor or a higher resistance variant like PT500 or PT1000, these RTD sensors provide reliable and accurate temperature measurements in a wide range of industries and applications.

Classes

Tolerances of RTD sensors can be tailored to customer specifics and thus manufactured to different tolerances. The higher the tolerance the smaller the margin of error relative to lower tolerances.
A system where these tolerances are classified is helpful for the end user and helps the interchangeability of these sensors. The IEC system is seen as the standard for the industry although there are other standards and other tolerance classes.

IEC	DIN4370	Temperature	Tolerance	Tolerance ºC
W0.03	1/10 DIN	-100 to 350	100±0.012 Ω	±0.03 °C
/	1/5 DIN	-100 to 350	100±0.024 Ω	±0.06 °C
W0.1	1/3 DIN	-100 to 350	100±0.04 Ω	±0.10 °C
W0.15	Class A	-100 to 450	100±0.06 Ω	±0.15 °C
W0.3	Class B	-196 to 660	100±0.12 Ω	±0.30 °C



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How to choose your accessory?

It is important to choose the right type of cable, fitting, thermowell, terminal head, connector and transmitter to ensure that your temperature sensor operates reliably and accurately.
The compression fitting must match the type of sensor you are using. It must also be compatible with the sensor diameter and location thread.
The thermowell protects the sensor from mechanical damage and high temperatures. It must be selected according to the operating temperature and the required mechanical strength.
The connection head must be compatible with the type of cable and the application. It must also be able to withstand the temperatures and environment in which it will be used.
The connector can be diverse, due to the non-standardization of RTD sensors. Our company can make all the connectors you need according to your request
The RTD transmitter must be compatible with the type of sensor used and must be able to convert the signal to a standard electrical signal.
The ceramic terminal block is used to attach electrical cables to a control box. It must be compatible with the type of cable used and resistant to high temperatures.

RTD connectors

Due to the lack of standardization in RTD connectors, our company takes pride in its ability to produce a wide range of RTD connectors.

We understand that different industries and applications have unique requirements when it comes to temperature measurement, and that includes the connectors used. With our expertise and advanced manufacturing capabilities, we have the flexibility to design and produce various types of RTD connectors.

Terminal Heads

Many alternative types of terminal head are available to meet the requirements of various applications. Variations exist in size, material, accommodation, resistance to media, resistance to fire or even explosion and in other parameters. Common types are shown below but there are many special variants available to meet particular requirements.

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Additional accessories

For more detailed information see ***“Accessories”.***

PM00 – Mineral Insulated RTDs

Stripped

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Sheath length L (mm):

6. Sheath diameter Ø: *(Ø 1,5mm and Ø 2mm only for one element **x1**)*

☐ 1,5 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm ☐ 8 mm

☐ Other:

7. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

8. Stripping length L1 (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

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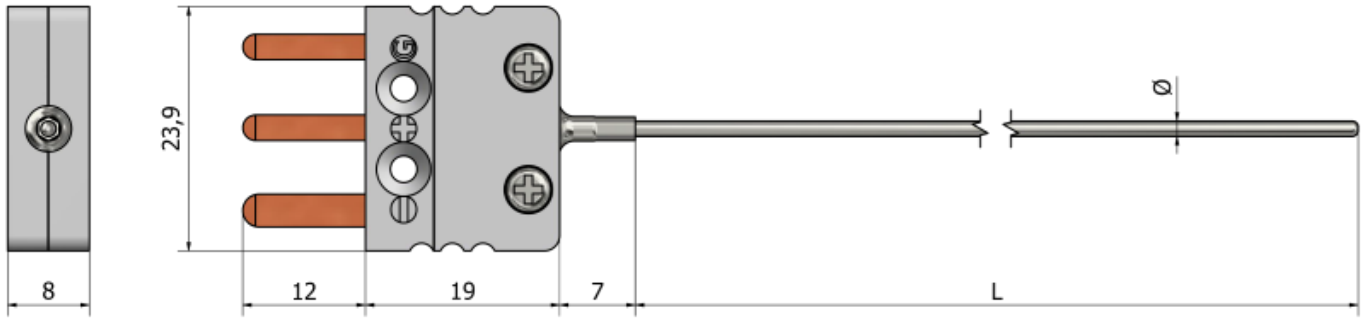
PM10 – Mineral Insulated RTDs

Miniature connector termination



1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Wiring configuration: *(number of wires)*

☐ 2 ☐ 3

4. Sheath length L (mm):

5. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm

☐ Other:

6. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

7. Miniature connector 200°C:

☐ Plug ☐ Socket

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

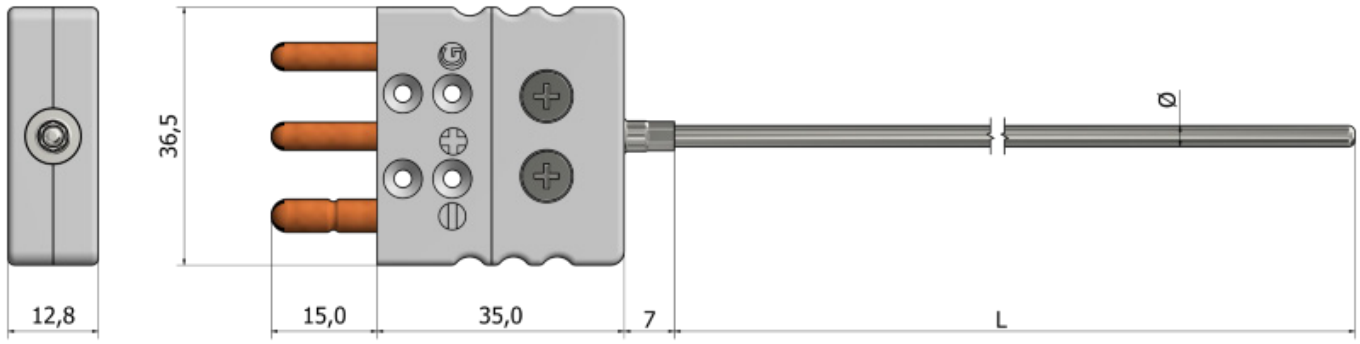
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PM12 – Mineral Insulated RTDs

Standard connector termination



1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Wiring configuration: *(number of wires)*

☐ 2 ☐ 3

4. Sheath length L (mm):

5. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm

☐ Other:

6. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

7. Standard connector 200°C:

☐ Plug ☐ Socket

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PM14 – Mineral Insulated RTDs

LEMO connector

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Wiring configuration: *(number of wires)*

☐ 2 ☐ 3 ☐ 4

4. Sheath length L (mm):

5. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm

☐ Other:

6. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

7. LEMO connector type:

☐ Plug ☐ Socket

8. LEMO connector size ***(MI RTDs from Ø mm to Ø mm)*** **:**

☐ S1 (1,5 mm to 3 mm) ☐ S2 (4,5 mm to 6 mm)

☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PM20 – Mineral Insulated RTDs

Cable prolongation

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Sheath length L (mm):

6. Sheath diameter Ø: *(Ø 1,5mm and Ø 2mm only for one element **x1**)*

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm

☐ Other:

7. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

8. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)

☐ Fiberglass (400°C) ☐ Other:

9. Cable length LC (mm):

10. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PM21 – Mineral Insulated RTDs

Cable prolongation with connector

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Wiring configuration: *(number of wires)*

☐ 2 ☐ 3

4. Sheath length L (mm):

5. Sheath diameter Ø:

☐ 1,5 mm ☐ 2 mm ☐ 3 mm ☐ 4,5 mm ☐ 6 mm

☐ Other:

6. Sheath material:

☐ AISI304L ☐ AISI316L ☐ Other:

7. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)

☐ Fiberglass (400°C) ☐ Other:

8. Cable length LC (mm):

9. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

10. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket

☐ Other:

11. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

Wired Thermocouples - Technical Information

What are the characteristics of the wire thermocouple?

Wire thermocouples are simple and inexpensive temperature sensors. Some of the common features of wire thermocouples include:

Simplicity: wire thermocouples are very simple temperature sensors made of bare metal wires that are soldered together at one end.
Low cost: wire thermocouples are generally less expensive to manufacture than jacketed thermocouples because of their simple design.
Accuracy: Wire thermocouples are generally more accurate than jacketed thermocouples because they do not have a protective coating that could affect their accuracy.
Flexibility: Wire thermocouples are more flexible than jacketed thermocouples, making them easier to install in confined spaces or in hard-to-reach positions.
Fragility: wire thermocouples are more fragile than jacketed thermocouples and can be damaged by mechanical impacts, high temperatures and chemical agents.

Thermocouple classes

Classes of thermocouples have certain tolerance values and temperature limits of validity. The most common classes are **class 1** and **class 2**.

With **class 1** you get more precise measurement values while **class 2** provides a wider tolerance values.

Types of thermocouples

Thermocouples are adapted to specific applications depending on the temperature range to be measured, the accuracy required and the environment in which they will be used. They are differentiated by letters (Type K, J, N, T, etc....) which correspond to the presence of materials that can measure a certain temperature range.

The most commonly used is the Type K which is capable of measuring temperatures from –40°C to +1200°C. It is made from a chrome and an aluminum wire.

Note that connector colors vary by standard and country. Check the ***"International Color Codes applied to temperature measuring engineering".***

Wired Thermocouples - Technical Information

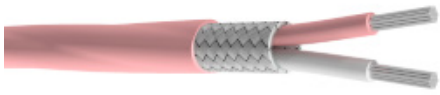
Types of thermocouple cables

For additional information about thermocouple cables see ***"Accessories - Cables".***

Fiberglass

Description: fiberglass/fiberglass/braid
Operating T°: -60°C/+400°C
Cross section shape: round

Shielded Teflon



Description: teflon/shield/teflon
Operating T°: -190°C / +260°C
Cross section shape: round

Shielded PVC

Description: PVC/shield/PVC
Operating T°: -30°C / +105°C
Cross section shape: round

Silicone

Description: silicone/silicone
Operating T°: -60°C / +180°C
Cross section shape: round

Twisted Teflon

Description: twisted teflon
Operating T°: -190°C / +260°C
Cross section shape: twisted

Flat Teflon

Description: teflon/teflon
Operating T°: -190°C / +260°C
Cross section shape: flat

Flat Fiberglass

Description: fiberglass/fiberglass
Operating T°: -60°C / +400°C
Cross section shape: flat

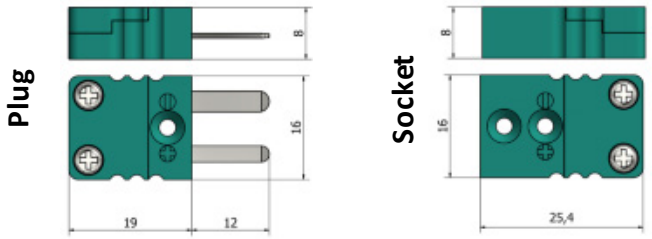
Types of connectors

Thermocouple connectors plugs and sockets are available in two sizes (miniature and standard).

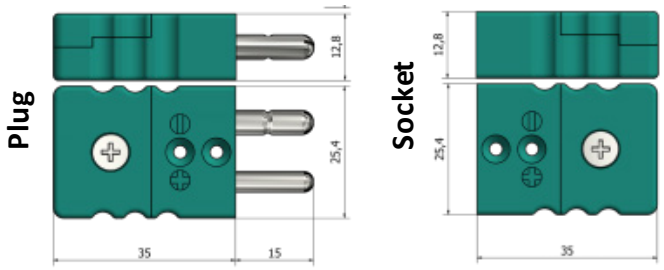
Miniature thermocouple connectors are smaller and have flat pins, these are usually found on small diameter thermocouples or fitted to the end of cables for connection to hand held and panel instruments.

Standard connectors have larger round pins and tend to be used for more industrial applications.

Miniature connector



Standard connector



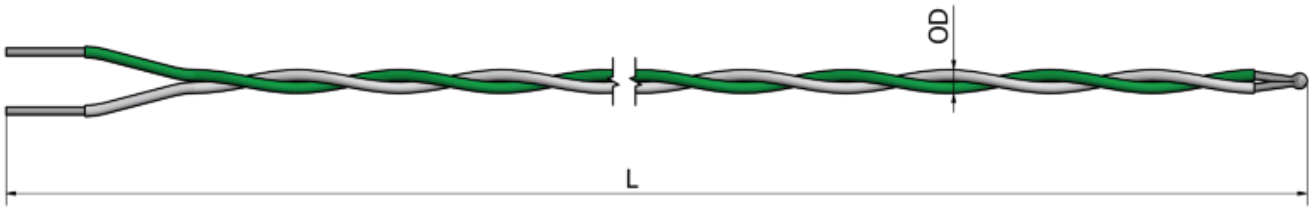
Global cable insulation characteristic

	PVC	Silicone	Teflon	Fiberglass
Abrasion resistance	Very good	Fair	Good	Fair
Chemical resistance	Very good	Poor	Excellent	Good
Moisture resistance	Good	Good	Excellent	Poor
Fire resistance	Good	Good	Excellent	Excellent

TC00 – Wired Thermocouples

Twisted teflon

-190 °C / +260 °C
Short term +280 °C



1. Thermocouple:

☐ Type K ☐ Type J ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,2 (0,03 mm²) OD ≈ 1mm ☐ 7 x 0,2 (0,22 mm²) OD ≈ 2mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

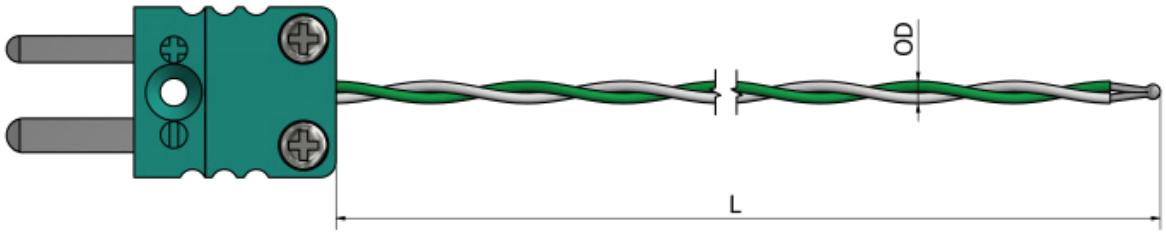
Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TC01 – Wired Thermocouples

Twisted teflon with connector

-190°C / +260°C
Short term +280°C



1. Thermocouple:

☐ Type K ☐ Type J ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,2 (0,03 mm²) OD ≈ 1mm ☐ 7 x 0,2 (0,22 mm²) OD ≈ 2mm

☐ Other:

4. Cable length L (mm):

5. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket

6. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

7. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

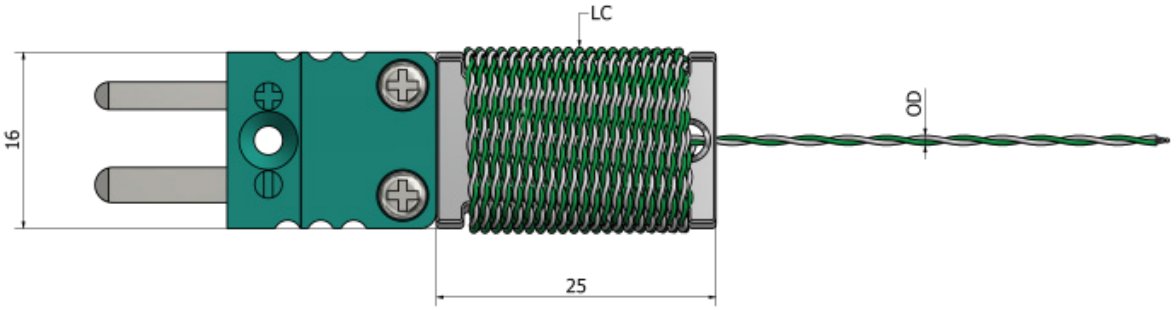
Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TC02 – Wired Thermocouples

Handheld (Aluminum)

-190°C / +260°C
Short term +280°C



Cable holder material **Aluminum*

1. Thermocouple:

☐ Type K ☐ Type J ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,2 (0,03 mm²) OD ≈ 1mm ☐ 7 x 0,2 (0,22 mm²) OD ≈ 2mm

☐ Other:

4. Cable length LC (mm):

5. Miniature connector:

☐ Plug ☐ Socket

6. Connector temperature: ☐ 200°C

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

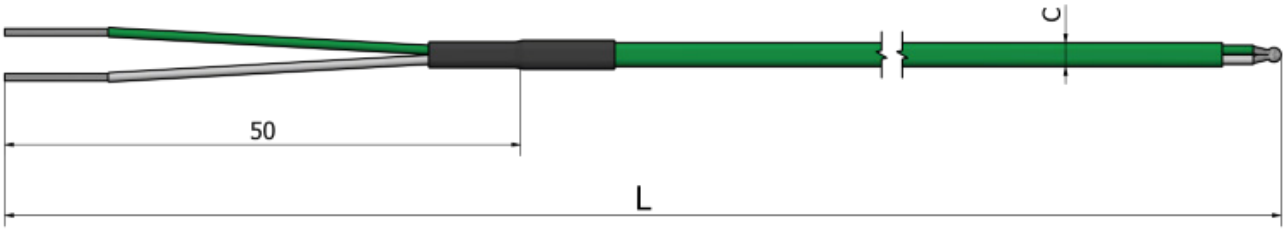
Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TC10 – Wired Thermocouples

Flat teflon (teflon/teflon)

-190°C / +260°C
Short term +280°C



1. Thermocouple:

☐ Type K ☐ Type J ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,08 (0,005 mm²)
C ≈ 0,9mm x 1,3mm

☐ 7 x 0,2 (0,22 mm²)
C ≈ 1,5mm x 2,4mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TC11 – Wired Thermocouples

Flat teflon (teflon/teflon) with connector

-190°C / +260°C
Short term +280°C

1. Thermocouple:

☐ Type K ☐ Type J ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,08 (0,005 mm²)
C ≈ 0,9mm x 1,3mm

☐ 7 x 0,2 (0,22 mm²)
C ≈ 1,5mm x 2,4mm

☐ Other:

4. Cable length L (mm):

5. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket

6. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

7. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

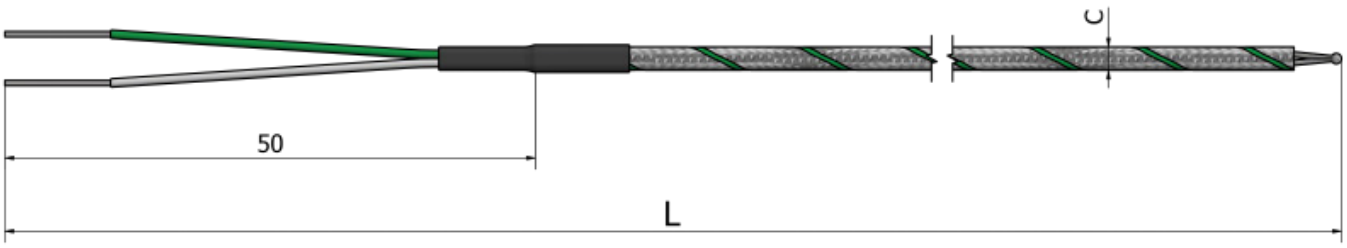
Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TC20 – Wired Thermocouples

Flat fiberglass (fiberglass/fiberglass)

-60°C / +400°C
Short term +600°C



1. Thermocouple:

☐ Type K ☐ Type J

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 1 x 0,5 (0,20 mm²)
C ≈ 1,3mm x 1,8mm

☐ 1 x 0,3 (0,07 mm²)
C ≈ 1,4mm x 2,2mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

Thermocouples with terminal head - Technical Information

Types of thermocouples

Thermocouples are adapted to specific applications depending on the temperature range to be measured, the accuracy required and the environment in which they will be used. They are differentiated by letters (Type K, J, N, T, etc....) which correspond to the presence of materials that can measure a certain temperature range.

Type K NiCr-NiAl (NiCr-Ni)

Type J Fe-CuNi

Type N NiCrSi-NiSi

Type T Cu-Cuni

The most commonly used is the Type K which is capable of measuring temperatures from - 40°C to + 1200°C. It is made from a chrome and an aluminum wire.

Thermocouple classes

Classes of thermocouples have certain tolerance values and temperature limits of validity. The most common classes are **class 1** and **class 2**.
With **class 1** you get more precise measurement values while **class 2** provides a wider tolerance values.

Types of terminal heads

Many alternative types of terminal head are available to meet the requirements of various applications. Variations exist in size, material, accommodation, resistance to media, resistance to fire or even explosion and in other parameters.
Common types are shown below but there are many special variants available to meet particular requirements.

What Are Terminal Heads?

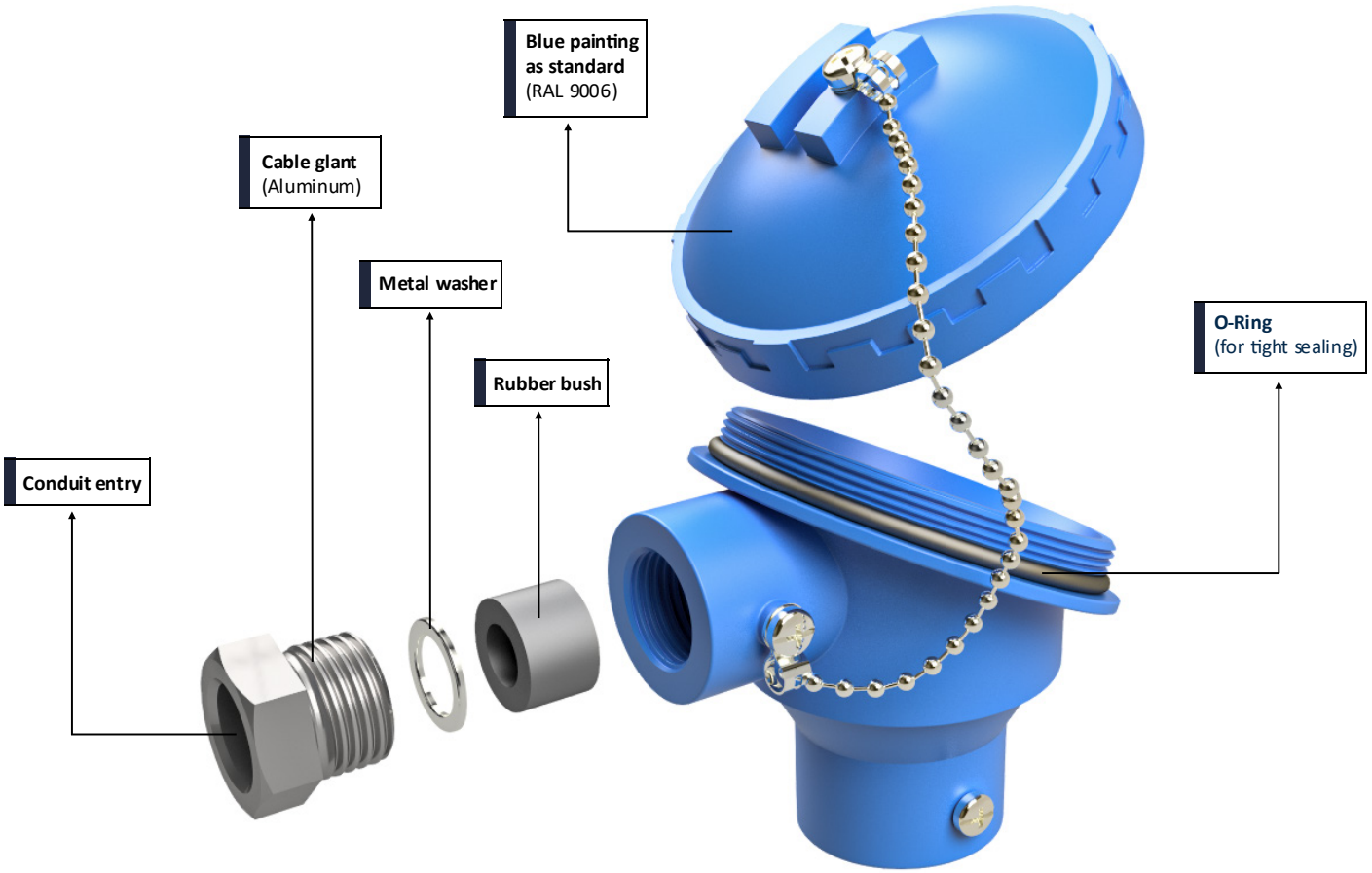
Terminal Heads are a type of cold end termination which are common on industrial type temperature sensors. A temperature sensor will be encased in a ceramic or metal sheath which will be terminated at the cold end with a terminal head. Inside the head, terminal blocks or temperature transmitters are placed to carry the sensor signal to instrumentation.

These are protected from the external environment as terminal heads often provide good ingress protection (IP) and temperature protection. Most commonly terminal heads are made from aluminum but can be stainless steel, cast iron or plastic depending on the application. There are many standardized designs of head, the most common being KNE, ALA and BUZ.

Inside terminal head

Thermocouples with terminal head - Technical Information

Terminal head component breakdown:



What is a terminal block?

Terminal block located in a "head" allow for the connection of extension wires. Various materials are used for screw or solder terminations including copper, plated brass and, for the best performance in the case of thermocouples, thermoelement alloys. The various head styles cater for a wide variety of probe diameters and cable entries.

Terminal blocks provide a secure and organized way to terminate multiple wires. The wires are inserted into a clamping mechanism that holds them in place, making it easier to manage and connect different wires within a circuit. Terminal blocks provide a convenient and secure way to connect thermocouple wires to the measuring instrument or control system when using thermocouples. Terminal blocks are available in 2, 3, 4, and 6 poles with center hole (spring loading).

What is a temperature transmitter?

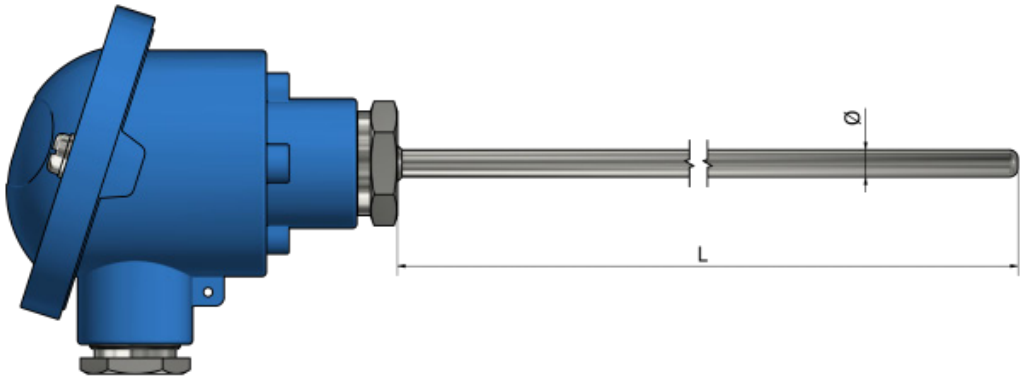
A Temperature Transmitter is a device that converts the signal produced by a temperature sensor into a standard instrumentation signal representing a process variable temperature being measured and controlled. The most common transmitter instrumentation output signal is 4 to 20 mA. The signal from the Temperature Transmitter is sent to a Controller that determines what action is required and generates an appropriate output signal.

Controllers are either a PLC or a DCS in process control today.

More on temperature transmitters and terminal blocks. See in the part *"Accessories"*.

TH00 – Thermocouples with terminal head

Standard



Tube material **SS 316L*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Length L (mm):

5. Diameter Ø (mm):

6. Junction type:

☐ Ungrounded ☐ Grounded

7. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

8. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

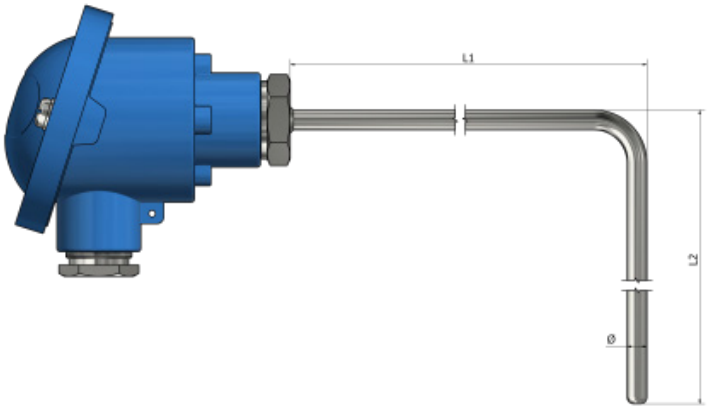
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TH01 – Thermocouples with terminal head

Standard (90° bend)



*Tube material **SS 316L***

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Lengths L1 and L2 (mm):

L1 _____ L2 _____

5. Diameter Ø (mm):

6. Junction type:

☐ Ungrounded ☐ Grounded

7. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

8. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

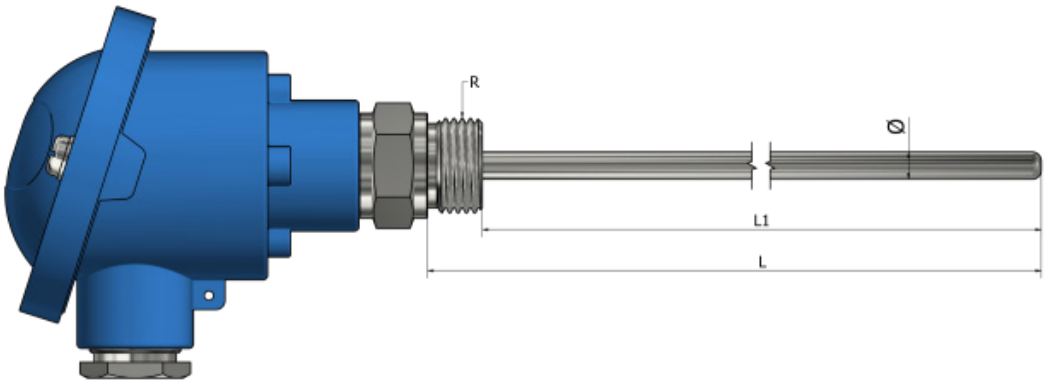
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TH10 – Thermocouples with terminal head

Standard with fixed thread



Tube and thread material **SS 316L*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Lengths L or L1 (mm):

L _____ L1 _____

5. Diameter Ø (mm):

6. Junction type:

☐ Ungrounded ☐ Grounded

7. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

8. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

9. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

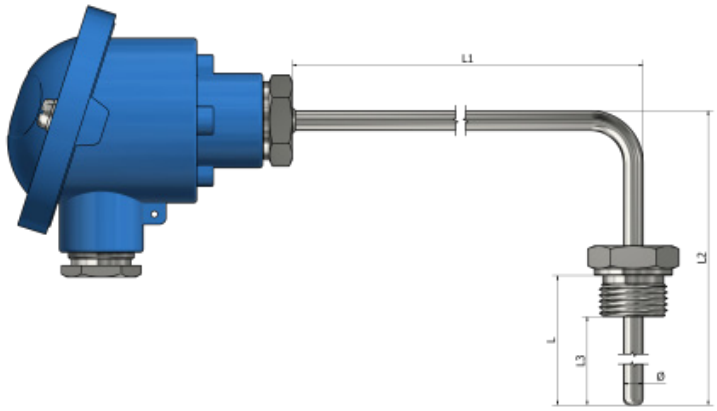
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TH11 – Thermocouples with terminal head

Standard with fixed thread (90° bend) (Type 1)



Tube and thread material **SS 316L*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Lengths L1 and L2 (mm):

L1 _____ L2 _____

5. Lengths L or L3 (mm):

L _____ L3 _____

6. Diameter Ø (mm):

7. Junction type:

☐ Ungrounded ☐ Grounded

8. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

9. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

10. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

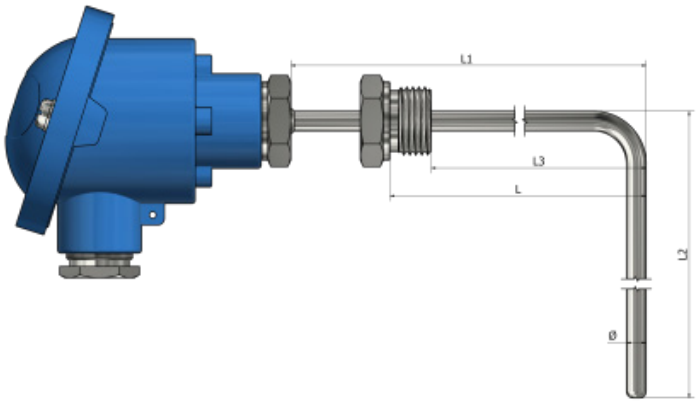
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TH12 – Thermocouples with terminal head

Standard with fixed thread (90° bend) (Type 2)



Tube and thread material **SS 316L*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Lengths L1 and L2 (mm):

L1 _____ L2 _____

5. Lengths L or L3 (mm):

L _____ L3 _____

6. Diameter Ø (mm):

7. Junction type:

☐ Ungrounded ☐ Grounded

8. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

9. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

10. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

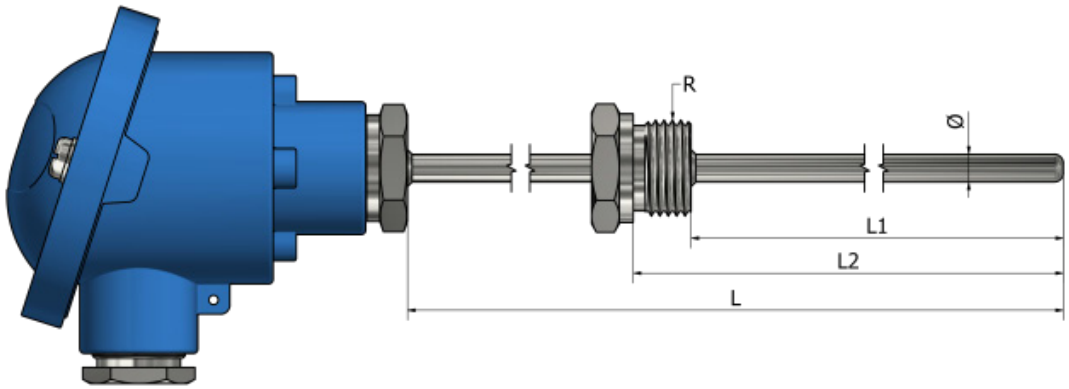
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TH13 – Thermocouples with terminal head

Standard with fixed thread (Offset)



Tube and thread material **SS 316L*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Lengths L and L1 or L2 (mm):

L _____ L1 _____ L2 _____

5. Diameter Ø (mm):

6. Junction type:

☐ Ungrounded ☐ Grounded

7. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

8. Connection head: *(see the part "Accessories")*

☐ Type B ☐ Type DAN ☐ Type M ☐ Type N
☐ Type Ex ☐ Type NS ☐ Other:

9. Mounting:

☐ Wires ☐ Terminal block ☐ Transmitter (°C):
Specify temperature range

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

Thermocouples with protection tube - Technical Information

What are the characteristics of thermocouples with protection tube?

Protection tubes play a crucial role by providing a robust shield for the thermocouple sensor, safeguarding it from potential mechanical damage, corrosive substances, high-pressure environments, and other adverse conditions that may compromise its accuracy or integrity.

The primary purpose of the protection tube is to act as a physical barrier between the external environment and the delicate thermocouple sensor. It serves as a protective sheath, shielding the sensor from impacts, vibrations, abrasion, and other mechanical stresses that can occur during operation. This ensures the longevity and reliability of the thermocouple in rugged industrial settings.

See ***"Technical data - Protection tube"***.

Protection tube materials

For the production of tubes, stainless steel, copper and brass are often used. Due to its good characteristics such as corrosion resistance, strength (abrasion resistance) and good thermal conductivity, stainless steel (SS316) stands out as the most common material from which tubes are produced.

Tube materials:

- Stainless steel (SS316)
- Stainless steel (SS316L)
- Stainless steel (SS316Ti)
- Brass
- Aluminum
- Copper

Thermocouple classes

Classes of thermocouples have certain tolerance values and temperature limits of validity. The most common classes are **class 1** and **class 2**.
With **class 1** you get more precise measurement values while **class 2** provides a wider tolerance values.

Types of thermocouples

Thermocouples are adapted to specific applications depending on the temperature range to be measured, the accuracy required and the environment in which they will be used. They are differentiated by letters (Type K, J, N, T, etc....) which correspond to the presence of materials that can measure a certain temperature range.
The most commonly used is the Type K which is capable of measuring temperatures from -40°C to +1200°C. It is made from a chrome and an aluminum wire.

Note that connector colors vary by standard and country. Check the ***"International Color Codes applied to temperature measuring engineering"***.

Thermocouples with protection tube - Technical Information

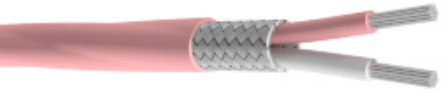
Types of thermocouple cables

For additional information about thermocouple cables see ***"Accessories - Cables".***

Fiberglass

Description: fiberglass/fiberglass/braid
Operating T°: -60°C/+400°C
Cross section shape: round

Shielded Teflon



Description: teflon/shield/teflon
Operating T°: -190°C / +260°C
Cross section shape: round

Shielded PVC

Description: PVC/shield/PVC
Operating T°: -30°C / +105°C
Cross section shape: round

Silicone

Description: silicone/silicone
Operating T°: -60°C / +180°C
Cross section shape: round

Twisted Teflon

Description: twisted teflon
Operating T°: -190°C / +260°C
Cross section shape: twisted

Flat Teflon

Description: teflon/teflon
Operating T°: -190°C / +260°C
Cross section shape: flat

Flat Fiberglass

Description: fiberglass/fiberglass
Operating T°: -60°C / +400°C
Cross section shape: flat

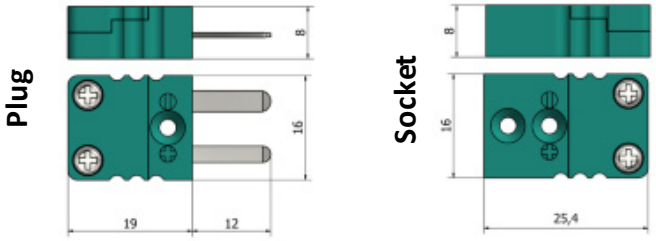
Types of connectors

Thermocouple connectors plugs and sockets are available in two sizes (miniature and standard).

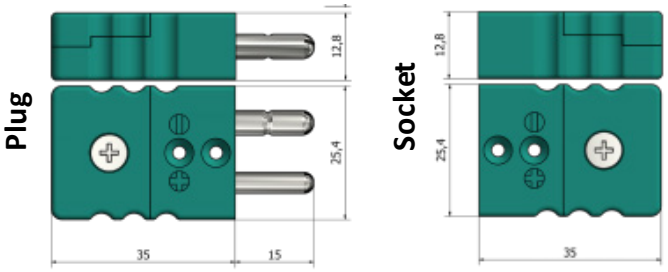
Miniature thermocouple connectors are smaller and have flat pins, these are usually found on small diameter thermocouples or fitted to the end of cables for connection to hand held and panel instruments.

Standard connectors have larger round pins and tend to be used for more industrial applications.

Miniature connector



Standard connector

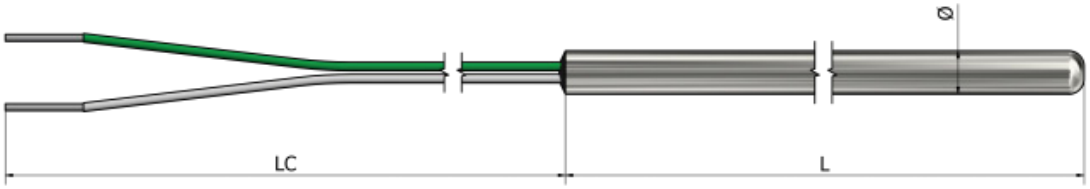


Global cable insulation characteristic

	PVC	Silicone	Teflon	Fiberglass
Abrasion resistance	Very good	Fair	Good	Fair
Chemical resistance	Very good	Poor	Excellent	Good
Moisture resistance	Good	Good	Excellent	Poor
Fire resistance	Good	Good	Excellent	Excellent

TT00 – Thermocouples with protection tube

Free leads



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimension (mm): *(Material **SS 316L**)*

L _____ Ø _____

4. Free leads length LC (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

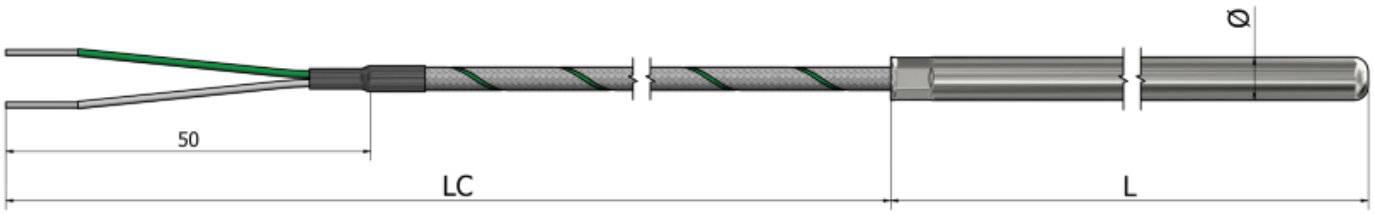
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TT10 – Thermocouples with protection tube

Standard tube



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimensions: *(Material **SS 316L**)*

☐ Ø3 x 50 mm ☐ Ø4 x 40 mm ☐ Ø5 x 50 mm
☐ Ø6 x 50 mm ☐ Other:

4. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

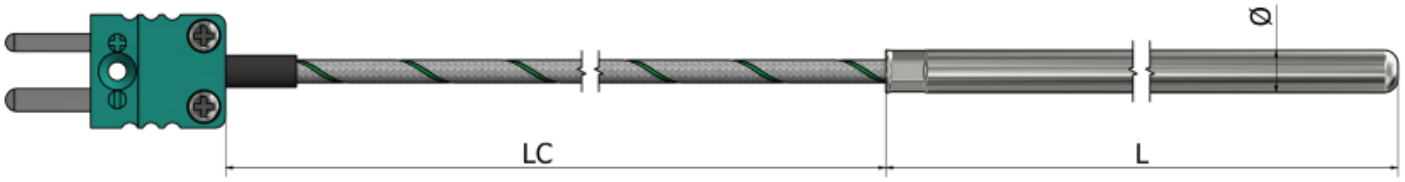
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TT11 – Thermocouples with protection tube

Standard tube with connector



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimensions: *(Material **SS 316L**)*

☐ Ø3 x50 mm ☐ Ø4 x40 mm ☐ Ø5 x50 mm
☐ Ø6 x50 mm ☐ Other:

4. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

7. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

9. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

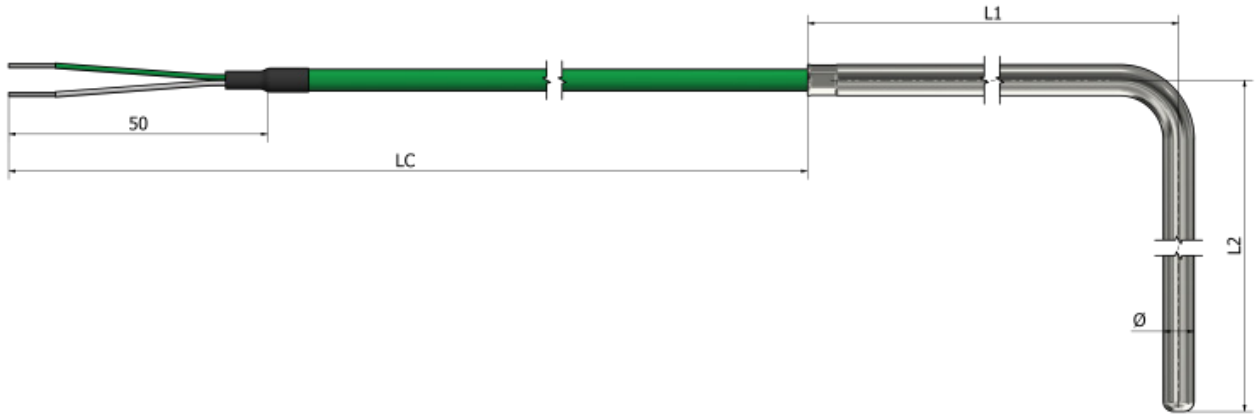
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TT12 – Thermocouples with protection tube

Standard tube (90° bend)



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimension (mm): *(Material **SS 316L**)*

L1 _____ L2 _____ Ø _____

4. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

7. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

9. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "*Accessories*"

Quantity:

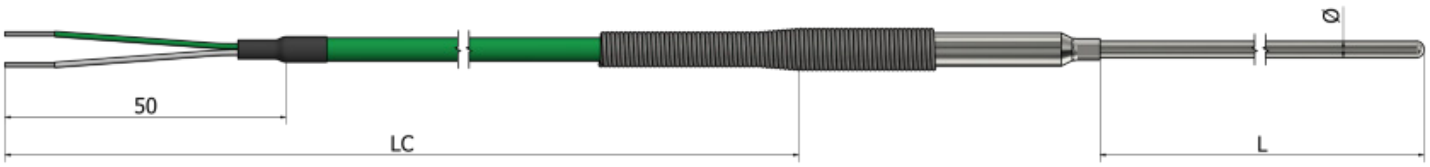
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TT20 – Thermocouples with protection tube

Pot seal



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimension (mm): *(Material **SS 316L**)*

L _____ Ø _____

4. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

7. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

9. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

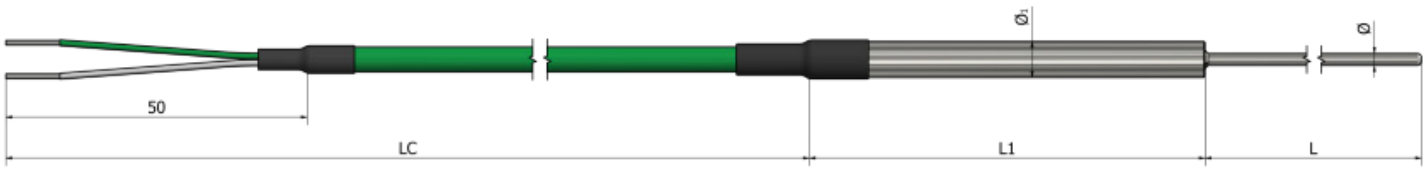
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TT21 – Thermocouples with protection tube

Pot seal with reduced tip



1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Tube dimension L and Ø (mm): *(Material **SS 316L**)*

L _____ Ø _____

4. Tube dimension L1 and Ø1 (mm): *(Material **SS 316L**)*

L1 _____ Ø1 _____

5. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

6. Cable length LC (mm):

7. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

8. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

9. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

10. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

Surface thermocouples - Technical Information

Types of thermocouples

Thermocouples are adapted to specific applications depending on the temperature range to be measured, the accuracy required and the environment in which they will be used. They are differentiated by letters (Type K, J, N, T, etc....) which correspond to the presence of materials that can measure a certain temperature range.
The most commonly used is the Type K which is capable of measuring temperatures from –40 °C to +1200 °C. It is made from a chrome and an aluminum wire.
Note that connector colors vary by standard and country. Check the "International Color Codes applied to temperature measuring engineering"

Thermocouple classes

Classes of thermocouples have certain tolerance values and temperature limits of validity. The most common classes are **class 1** and **class 2**.
With **class 1** you get more precise measurement values while **class 2** provides a wider tolerance values.

Material conductivity

Material	Thermal conductivity W/(m K)
Air	≈ 0,25
Stainless steel	≈ 14
Brass	≈ 109
Aluminum	≈ 205
Copper	≈ 385
Silver	≈ 406

What are the characteristics of surface thermocouples?

Surface temperature probes detect surface temperature.
The most important issue in surface temperature measurement is to keep measurement errors as small as possible.
This is achieved by an appropriate design of the measuring head, so that only very little heat is extracted from the measuring point and the measurement error is negligible.
The perfectly adapted geometry increases the contact surface.
At the same time, the low thermal mass of the measuring head ensures that comparatively fast response times can be achieved when measuring the surface temperature.

Different types of surface thermocouples

Attaching a thermocouple to a surface for an accurate reading can be difficult. The sensor must respond quickly to avoid heat dissipation and remain attached under vibration or other stress.

We offer a number of constructions to suit every surface application.

Washer and Ring thermocouples can be attached to a stud welded to the surface or to an existing bolt on a section of machinery.

Bayonets are simply inserted through a drilled opening to a desired depth of a surface. The opening is then tapped to accept a number of mounting adapters. These adapters feature a locking pin allowing the thermocouple cap to be installed with a twist.

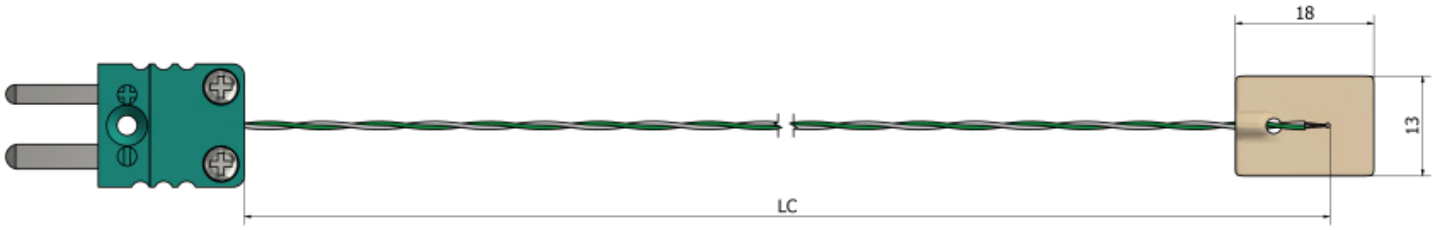
Weld pad thermocouples which need not require the more rugged industrial construction can be tig welded or soldered and held with a number of clamping devices.

Pipe-clamp thermocouples is ideal for temperature measurements on pipes in laboratories and industrial applications.

Magnet thermocouples are ideal for a temporary measurement to a magnetic surface or magnetic surface which doesn't allow any

TS00 – Surface thermocouples

Adhesive tape



Adhesive tape material **Fiberglass/PTFE*

1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:
☐ Class 1 ☐ Class 2

4. Cable prolongation:
☐ Teflon (260°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type: Exposed

7. Connector:
☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

8. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

9. Option:
☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

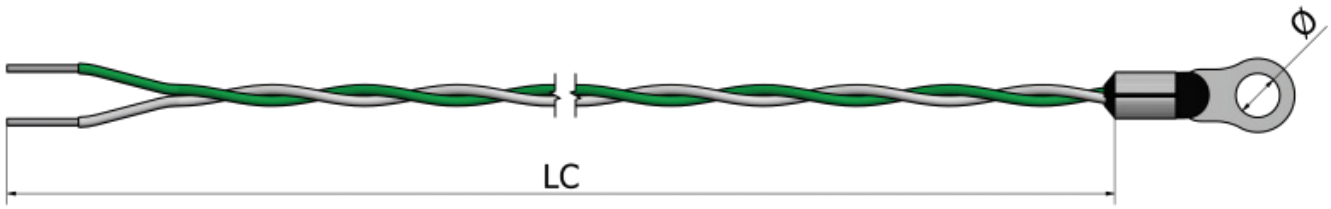
Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TS01 – Surface thermocouples
Washer mount



Washer mount material **Tinned copper*

1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:
☐ Class 1 ☐ Class 2

4. Cable prolongation:
☐ Teflon (260°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type:
☐ Ungrounded ☐ Grounded

7. Hole size Ø (mm):

8. Connector:
☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

9. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

10. Option:
☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

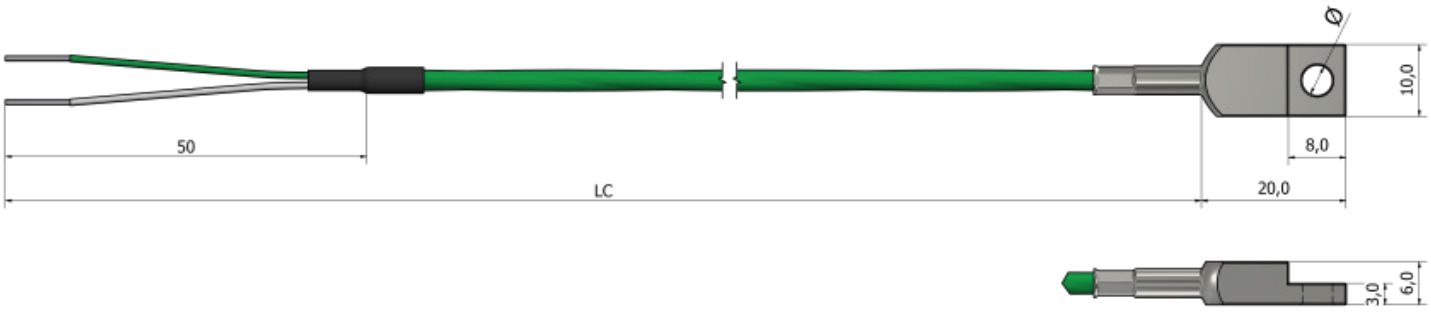
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TS02 – Surface thermocouples

Reinforced washer mount



Washer mount material **SS 316L*

1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:
☐ Class 1 ☐ Class 2

4. Cable prolongation:
☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type:
☐ Ungrounded ☐ Grounded

7. Hole diameter Ø (mm):

8. Crimp protection:
☐ Spring ☐ Heat shrink sleeve ☐ Without

9. Connector:
☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

10. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

11. Option:
☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

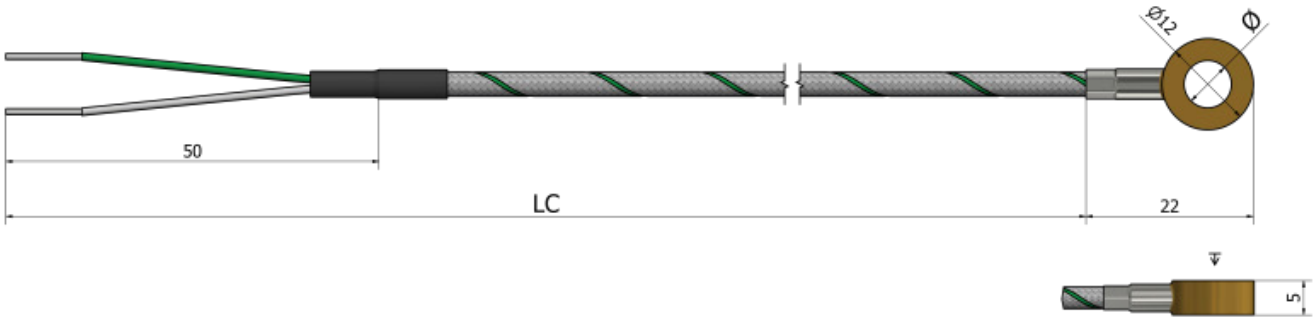
Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TS03 – Surface thermocouples
Ring mount



1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:
☐ Class 1 ☐ Class 2

4. Cable prolongation:
☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type:
☐ Ungrounded ☐ Grounded

7. Ring material:
☐ Brass ☐ AISI 316L ☐ Other:

8. Ring size:
☐ M5 ☐ M6 ☐ Other:

9. Crimp protection:
☐ Spring ☐ Heat shrink sleeve ☐ Without

10. Connector:
☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

11. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

12. Option:
☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

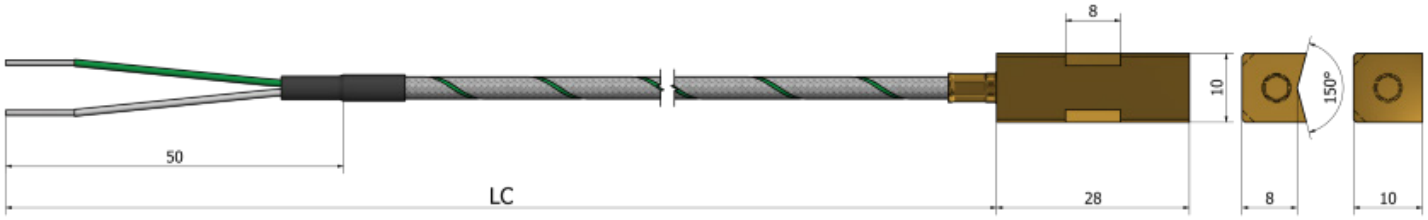
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TS05 – Surface thermocouples

Contact block



Contact block material* ***Brass or Aluminum*

1. Thermocouple:

☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:

☐ Class 1 ☐ Class 2

4. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type:

☐ Ungrounded ☐ Grounded

7. Contact block material:

☐ Brass ☐ Aluminum ☐ Other:

8. Contact block shape:

☐ V-shape ☐ Flat

9. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

10. Connector:

☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

11. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

12. Option:

☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

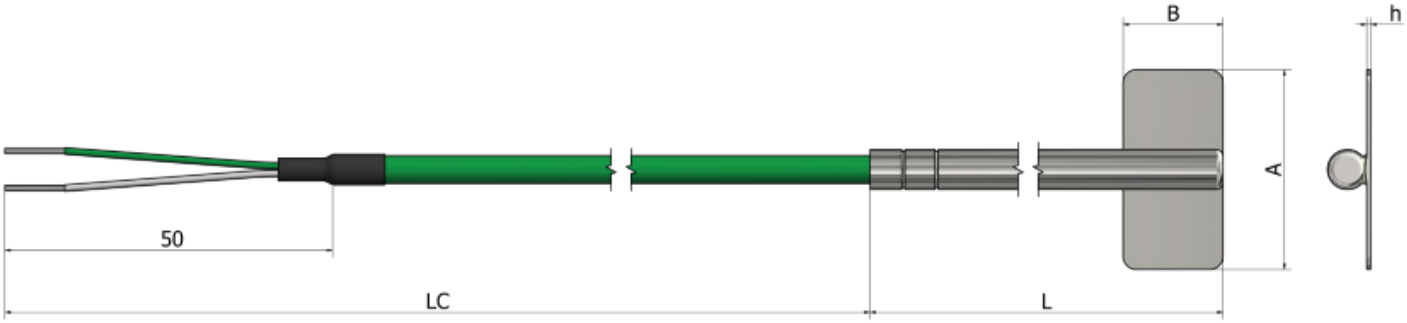
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

TS10 – Surface thermocouples

Weld pad



Weld pad and tube material **SS 316L*

1. Thermocouple:
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E
☐ Type R ☐ Type S ☐ Type B ☐ Other:

2. Number of thermocouples: ☐ x 1 ☐ x 2

3. Class:
☐ Class 1 ☐ Class 2

4. Cable prolongation:
☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

5. Cable length LC (mm):

6. Junction type:
☐ Ungrounded ☐ Grounded

7. Tube length L (mm):

8. Pad material: ☐ AISI 316L ☐ Other:

9. Pad dimensions A x B (mm):
☐ 15 x 10 ☐ 25 x 10 ☐ 30 x 10
☐ Other:

10. Pad thickness h (mm): ☐ 0,5 ☐ Other:

11. Crimp protection:
☐ Spring ☐ Heat shrink sleeve ☐ Without

12. Connector:
☐ Miniature Plug ☐ Miniature Socket ☐ Standard Plug ☐ Standard Socket ☐ Without

13. Connector temperature: ☐ 200°C ☐ 350°C ☐ 650°C

14. Option:
☐ Cable clamp ☐ Custom ID label ☐ Without

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

RTDs with thread connection - Technical Information

What is an RTD sensor?

An RTD (Resistance Temperature Detector) is a type of sensor used to measure temperature. RTDs are used for accurate, stable and reliable temperature measurements in generally high temperature ranges.

RTDs advantages

RTDs have several advantages over other types of temperature sensors:

High precision

RTDs have high temperature sensitivity, typically in the range of 0.1 to 0.2% per °C, allowing for accurate temperature measurement.

Long term stability

RTDs have long-term stability and longer life than thermistors, making them more reliable for long-term applications.

Wide operating temperature range

RTDs can operate in a temperature range of -200 to 850°C, making them suitable for many industrial applications.

Low ohmic resistance

RTDs have a low ohmic resistance compared to thermistors, which makes them easier to use with electronic circuits.

How does an RTD work?

An RTD is a sensor that measures temperature using the variation of the electrical resistance of a conductive material. RTDs are usually made from platinum, gold or nickel. The operating principle of RTDs is based on Ohm's law of electrical resistance, which establishes a relationship between the electrical resistance of a conductor and its temperature.

According to this law, the electrical resistance of a conductor generally increases when its temperature increases.

What is a PT probe?

A PT (Platinum Resistance Thermometer) is a type of temperature sensor that uses a temperature deflection resistor (RTD) to measure temperature. It is based on the principle that the electrical resistance of a conductive material increases when its temperature increases.

Understanding the naming of Pt100, PT500 and PT1000 sensors

First of all, "Pt" is the chemical symbol for platinum because platinum is the basic material for making the measuring element.

The naming conventions of P100, PT500, and PT1000 sensors are closely tied to the nominal resistance values they exhibit at 0°C. P100 sensor has a nominal resistance of 100 Ω at 0°C, Pt500 sensor has a nominal resistance of 500 Ω at 0°C and Pt1000 sensor has a nominal resistance of 1000 Ω at 0°C. Understanding the meaning behind these designations allows us to discern their specific characteristics and applications.

Whether you require a standard PT100 sensor or a higher resistance variant like PT500 or PT1000, these RTD sensors provide reliable and accurate temperature measurements in a wide range of industries and applications.

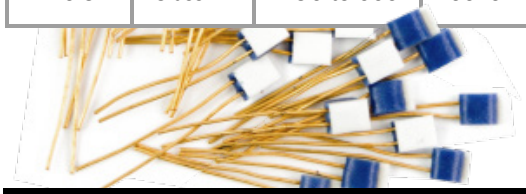
Pt-s wiring configurations

The cable has certain resistance which adds to the RTD resistance. Thus, the total resistance is the sum of the RTD resistance and the lead wire resistance. This causes more voltage drop across the RTD measurement system and as a result causes inaccuracy in measurement. This is the reason why we use 2 wire, 3 wire, and 4 wire RTD configurations.

Pt-s classes

Tolerances of Pt-s sensors can be tailored to customer specifics and thus manufactured to different tolerances. The higher the tolerance the smaller the margin of error relative to lower tolerances.
A system where these tolerances are classified is helpful for the end user and helps the interchangeability of these sensors. The IEC system is seen as the standard for the industry although there are other standards and other tolerance classes.

IEC Standard	DIN4370	Temperature Range ºC	Tolerance Ω at 0ºC	Tolerance ºC
W0.03	1/10 DIN	-100 to 350	100±0.012 Ω	±0.03 °C
/	1/5 DIN	-100 to 350	100±0.024 Ω	±0.06 °C
W0.1	1/3 DIN	-100 to 350	100±0.04 Ω	±0.10 °C
W0.15	Class A	-100 to 450	100±0.06 Ω	±0.15 °C
W0.3	Class B	-196 to 660	100±0.12 Ω	±0.30 °C

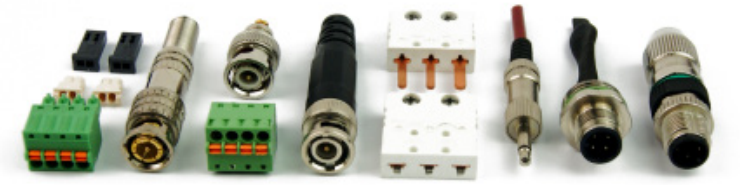


Global cable insulation characteristic

	PVC	Silicone	Teflon	Fiberglass
Abrasion resistance	Very good	Fair	Good	Fair
Chemical resistance	Very good	Poor	Excellent	Good
Moisture resistance	Good	Good	Excellent	Poor
Fire resistance	Good	Good	Excellent	Excellent

RTD connectors

Due to the lack of standardization in RTD connectors, our company takes pride in its ability to produce a wide range of RTD connectors. We understand that different industries and applications have unique requirements when it comes to temperature measurement, and that includes the connectors used. With our expertise and advanced manufacturing capabilities, we have the flexibility to design and produce various types of RTD connectors.



RTDs accessories

Temperature sensor accessories are equipment used to improve the performance of temperature measuring devices.
It is important to choose quality sensor accessories to ensure optimal performance and long-term reliability.
Our accessories are made of strong and resistant materials to guarantee maximum durability.
Eurosensors offers a wide selection of temperature sensor accessories to meet your specific needs.
Accessories include: thermocouple cables for reliable and accurate data transmission, compression fittings for easy installation, thermowells to protect sensors from mechanical damage, terminal heads for easy access to sensors, transmitters for networked data transmission, and ceramic terminal blocks for electrical isolation.

Additional accessories

For more detailed information see ***"Accessories".***

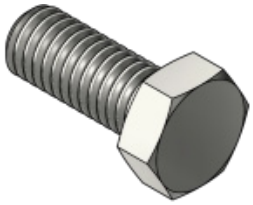
Basic of threads

1. Gender

Every matched pair of threads, external and internal, can be described as male and female. For example, a screw has male thread, while the matching hole has female thread.

Internal thread
(Female)

External thread
(Male)



2. Handedness

The helix of a thread can twist in two possible directions. Most threads are oriented so that the threaded item when seen from a point of view on the axis through the center of the helix, moves away from the viewer when it is turned in a clockwise direction, and moves towards the viewer when it is turned counter clockwise.

Left hand

Right hand

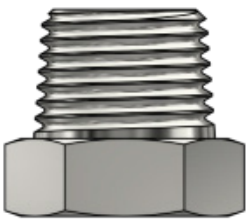
By common convention, right-handedness is the default handedness for screw threads. Therefore, most threaded parts and fasteners have right-handed threads.

3. Design

The type of thread can be identified by the following characteristics.

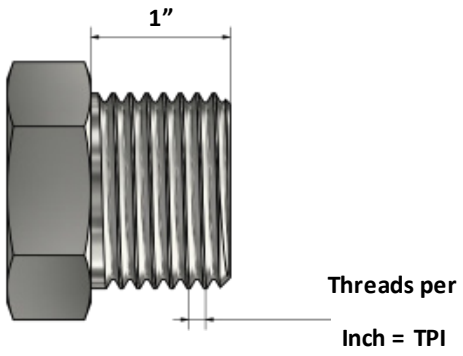
Parallel

Tapered



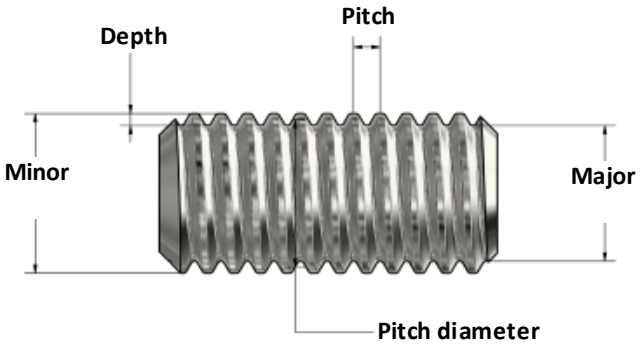
4. Pitch / TPI

The pitch is the distance from the crest of one thread to the next in mm. TPI (Threads per inch) is used by inch thread.



5. Diameter

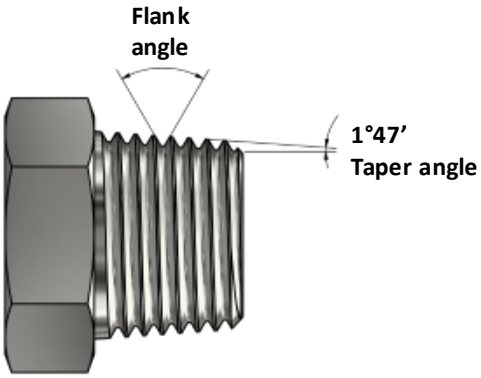
The major diameter is determined by the thread tips.
The minor diameter is determined by the groove of the thread.



The pitch diameter is the distance of two opposite flanks or the distance of the centerline of the profile.

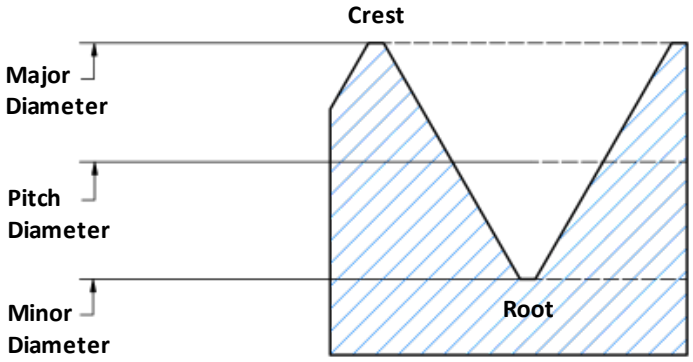
6. Angle

The flank angle is the angle between the flank of a screw thread and the perpendicular to the axis of the screw. Tapered threads have a taper angle. This is the angle between the taper and the center axis of the pipe.



7. Pitch / TPI

The outermost part of the thread is called crest, the inner-most part of the thread is called root.



Most common threads

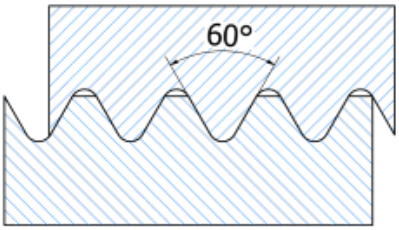
M-ISO Thread (Metric)
M Coarse thread ISO 724 (DIN 13-1)
M Fine thread ISO 724 (DIN 13-2 to 11)

NPT - Pipe thread
NPT ANSI B1.20.1
NPTF ANSI B1.20.3

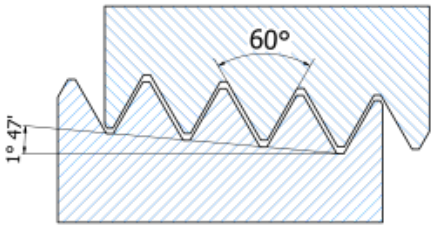
G/T/RP - Whitworth thread (BSPP/BSPT)
G = BSPP ISO 228(DIN 259)
R/Rp/Rc = BSPT ISO 7 (DIN 2999 replaced by EN10226)

UNC/UNF - Unified national thread
UNC ANSI B1.1
UNF ASNI B1.1

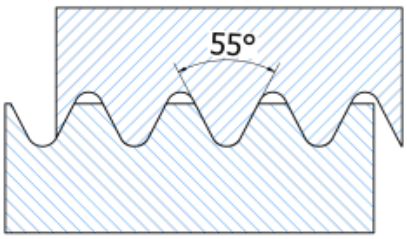
M-ISO Thread (Metric)



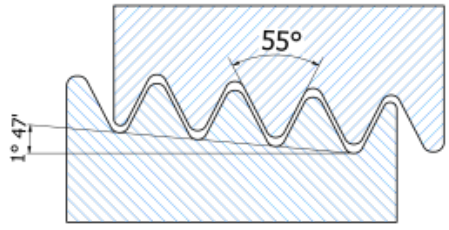
NPT - Pipe thread



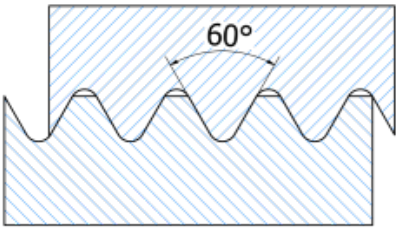
G/T/RP - Whitworth thread - BSPP



G/T/RP - Whitworth thread - BSPT

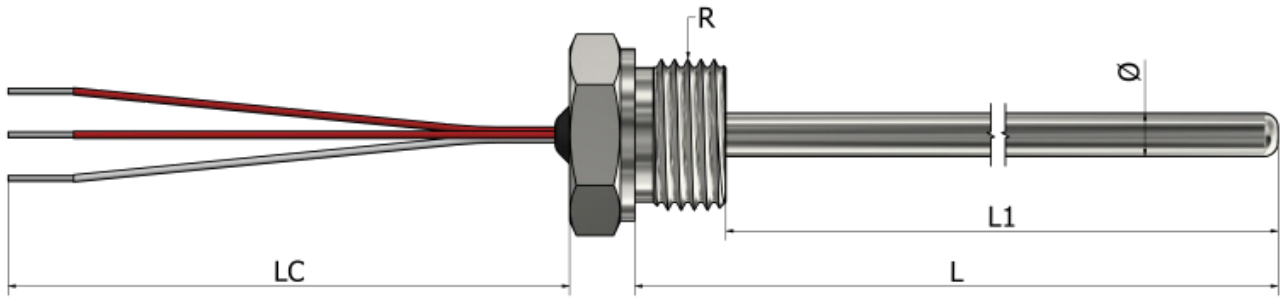


UNC/UNF - Unified national thread



PR01 – RTDs with thread connection

Fixed thread with free leads (Type 1)



Tube material **SS 316L*
Thread material **SS (304 / 304L / 316 / 316L)*

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Length L or L1 (mm):

6. Diameter Ø (mm):

7. Free leads length LC (mm):

8. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10

☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

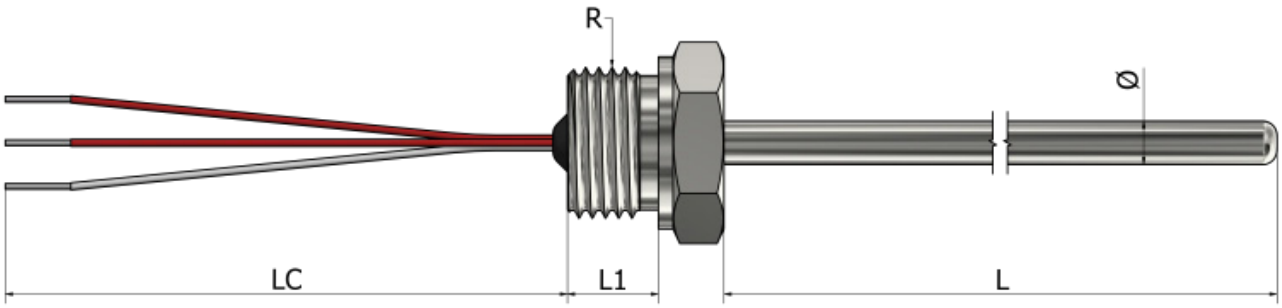
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PR02 – RTDs with thread connection

Fixed thread with free leads (Type 2)



Tube material **SS 316L*
Thread material **SS (304 / 304L / 316 / 316L)*

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Length L (mm):

6. Diameter Ø (mm):

7. Free leads length LC (mm):

8. Thread length L1 (mm):

9. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10

☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

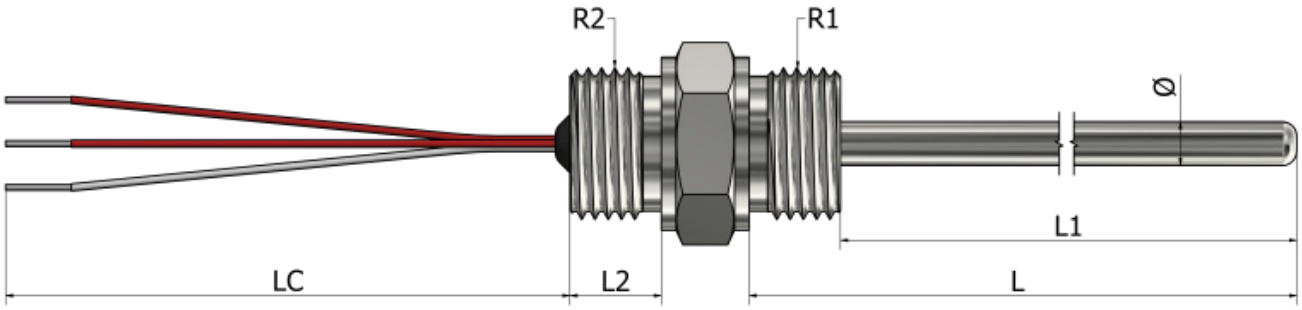
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PR03 – RTDs with thread connection

Fixed thread with free leads (Type 3)



Tube material **SS 316L*
Threads material **SS (304 / 304L / 316 / 316L)*

1. Element type:
☐ Pt 100 ☐ Pt 500 ☐ Pt 1000
☐ Other:

2. Element class:
☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*
☐ 2 ☐ 3 ☐ 4

5. Diameter Ø (mm):

6. Free leads length LC (mm):

7. Length L or L1 (mm):

8. Thread R1:
☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

9. Thread length L2 (mm):

10. Thread R2:
☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PR10 – RTDs with thread connection

Fixed thread with cable prolongation

Tube material **SS 316L*
Thread material **SS (304 / 304L / 316 / 316L)*

1. Element type:
☐ Pt 100 ☐ Pt 500 ☐ Pt 1000
☐ Other:

2. Element class:
☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*
☐ 2 ☐ 3 ☐ 4

5. Length L or L1 (mm):

6. Diameter Ø (mm):

7. Cable prolongation:
☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)
☐ Fiberglass (400°C) ☐ Other:

8. Cable length LC (mm):

9. Crimp protection:
☐ Spring ☐ Heat shrink sleeve ☐ Without

10. Thread:
☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10
☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

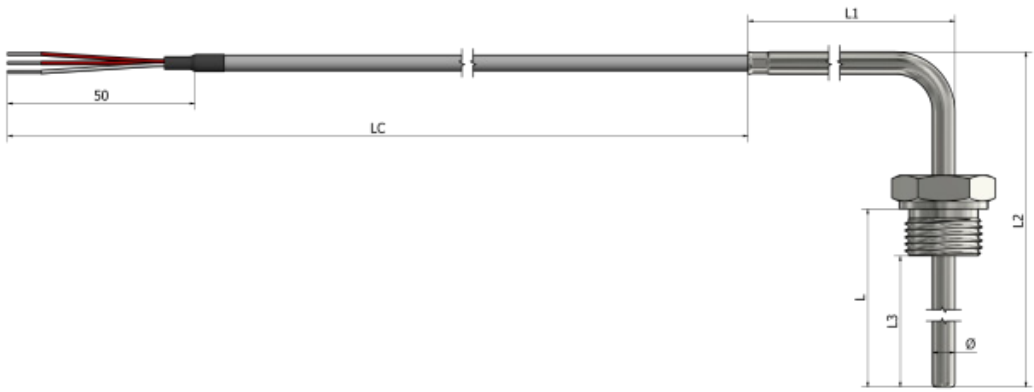
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PR13 – RTDs with thread connection

Fixed thread (90° bend) (Type 1)



Tube material **SS 316L *Thread material **SS (304 / 304L / 316 / 316L)***

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Lengths (mm):

L1 _____ L2 _____

6. Length L or L3 (mm):

7. Diameter Ø (mm):

8. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)

☐ Fiberglass (400°C) ☐ Other:

9. Cable length LC (mm):

10. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

11. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10

☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

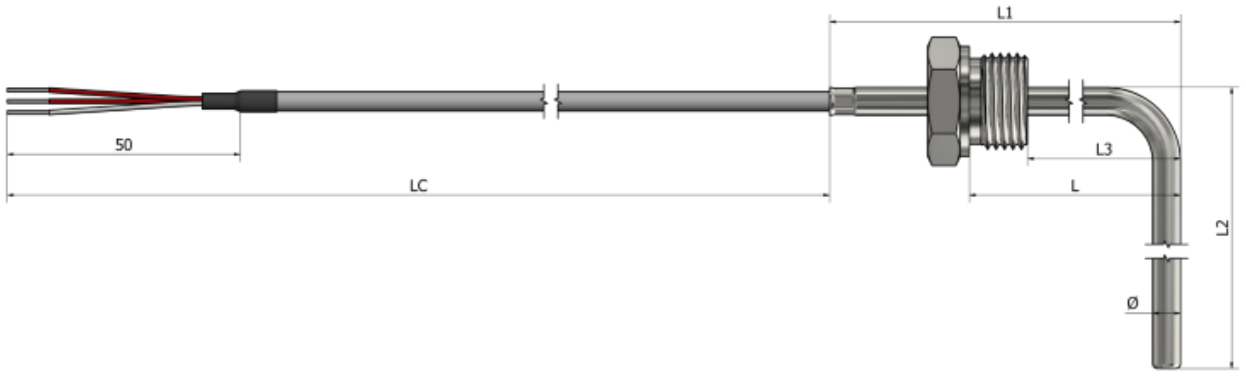
Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!

PR14 – RTDs with thread connection

Fixed thread (90° bend) (Type 2)



Tube material **SS 316L *Thread material **SS (304 / 304L / 316 / 316L)***

1. Element type:

☐ Pt 100 ☐ Pt 500 ☐ Pt 1000

☐ Other:

2. Element class:

☐ A ☐ B ☐ Other:

3. Number of sensor elements: ☐ x 1 ☐ x 2

4. Wiring configuration: *(number of wires per element)*

☐ 2 ☐ 3 ☐ 4

5. Lengths (mm):

L1 _____ L2 _____

6. Length L or L3 (mm):

7. Diameter Ø (mm):

8. Cable prolongation:

☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)

☐ Fiberglass (400°C) ☐ Other:

9. Cable length LC (mm):

10. Crimp protection:

☐ Spring ☐ Heat shrink sleeve ☐ Without

11. Thread:

☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10

☐ 1/2" NPT ☐ Other:

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part *"Accessories"*

Quantity:

Note:

Hur beställer man?

Välj önskade egenskaper för din givare genom att kryssa i rutorna och fyll på med text. Du kan tillhandahålla skisser, bilder, anteckningar, speciella krav eller andra viktiga uppgifter. För ytterligare frågor och hjälp, kontakta oss gärna!