EuroSensors

Wired temperature sensors

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Wired thermocouples

Wired thermocouples - Technical information

What are the characteristics of the wired thermocouples ?

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

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

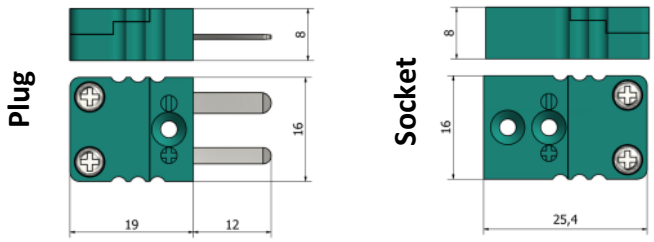
Types of connectors

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

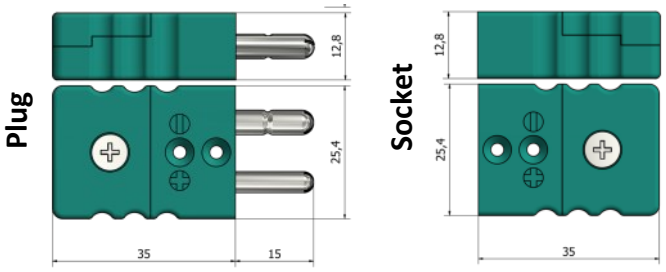
Miniature thermocouple connectors are smaller and have flat pins, these are usually found on small diameter thermocouples or fitted to the end of cables for connection to hand held and panel instruments.

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

Miniature connector



Standard connector

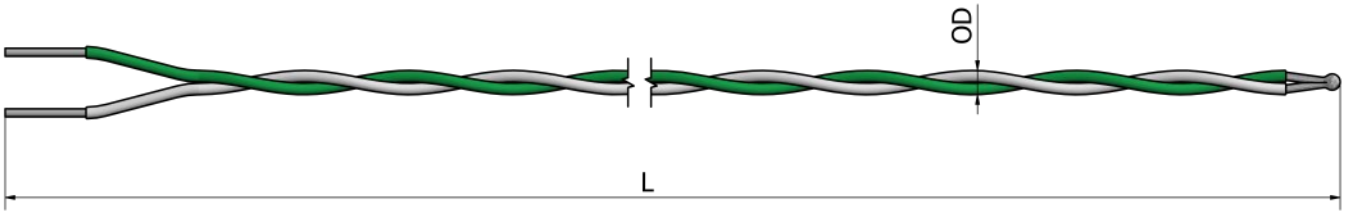


Global cable insulation characteristics

	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



Ordering information

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:

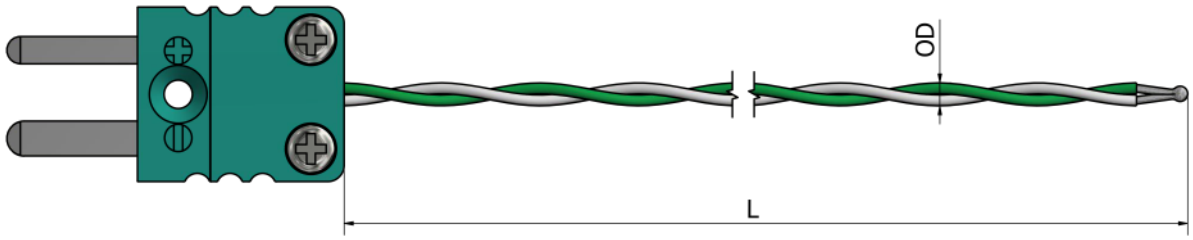
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC01 – Wired thermocouples
Twisted teflon with connector

-190°C / +260°C
Short term +280°C



Ordering information

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:

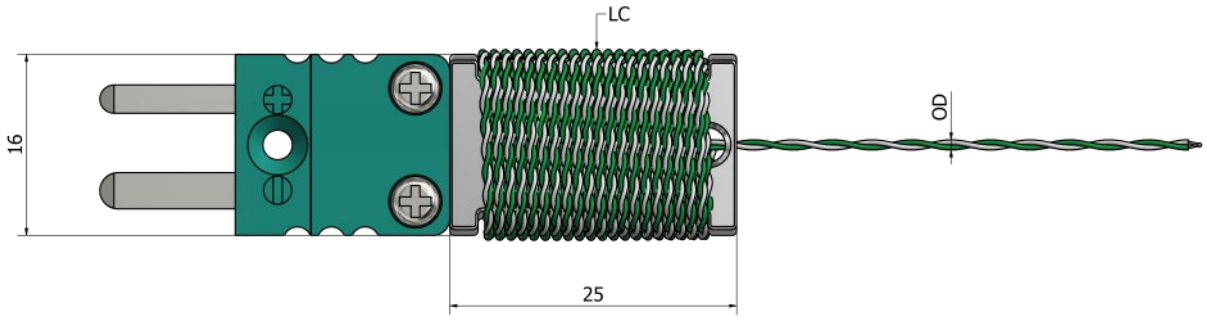
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC02 – Wired thermocouples
Handheld (aluminum)

-190°C / +260°C
Short term +280°C



Cable holder material* ***Aluminum*

Ordering information

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:

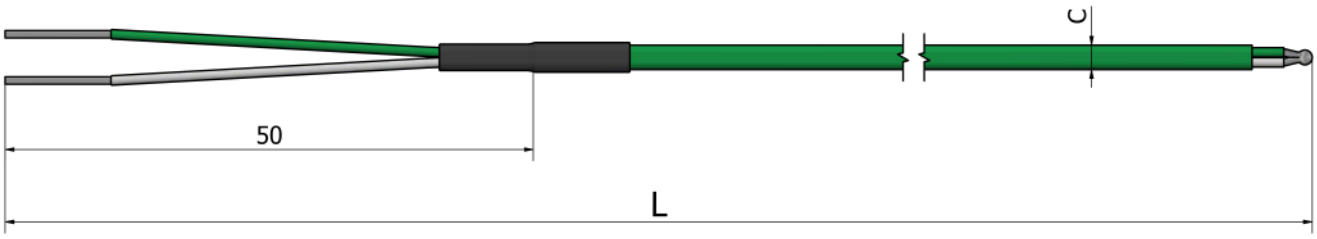
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC10 – Wired thermocouples
Flat teflon (teflon/teflon)

-190°C / +260°C
Short term +280°C



Ordering information

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:

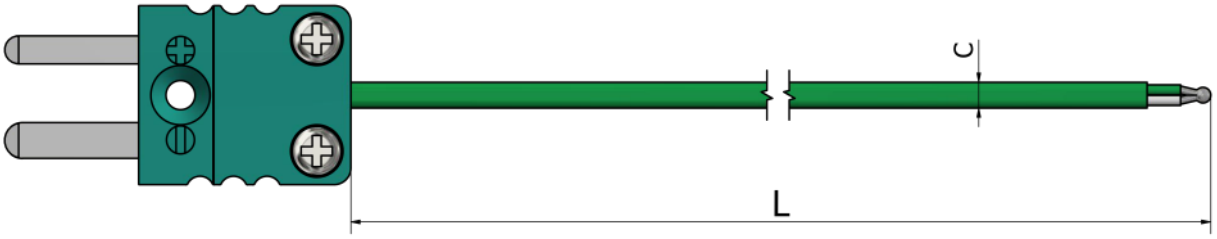
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC11 – Wired thermocouples
Flat teflon (teflon/teflon) with connector

-190°C / +260°C
Short term +280°C



Ordering information

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:

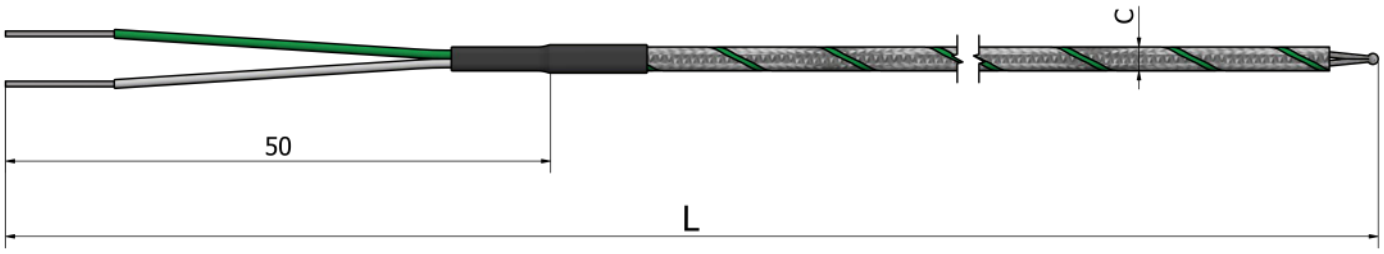
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC20 – Wired thermocouples
Flat fiberglass (fiberglass/fiberglass)

-60°C / +400°C
Short term +600°C



Ordering information

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:

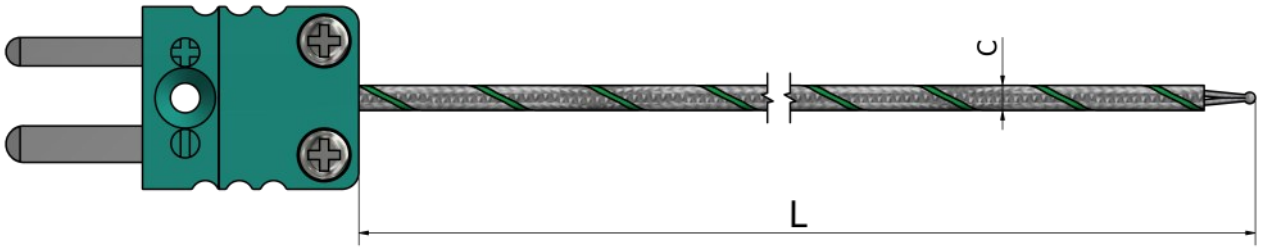
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC21 – Wired thermocouples
Flat fiberglass (fiberglass/fiberglass) with connector

-60°C / +400°C
Short term +600°C



Ordering information

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):

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:

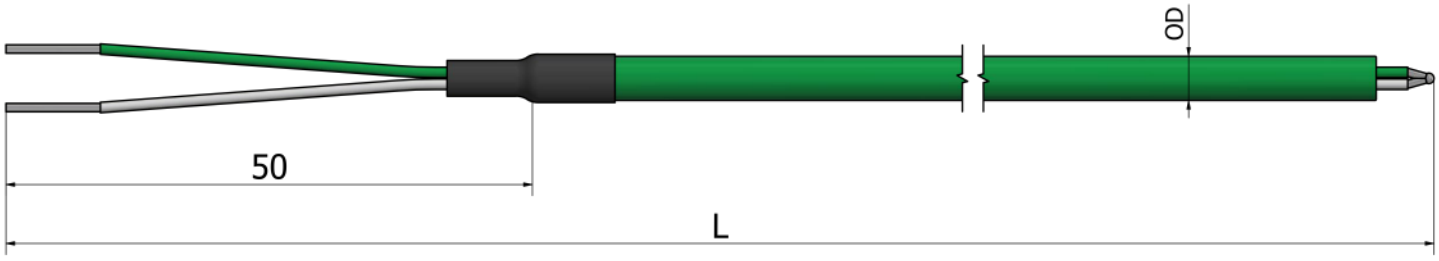
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC30 – Wired thermocouples
PVC (pvc/braid/pvc)

-30°C / +105°C
Short term +135°C



Ordering information

1. Thermocouple:

☐ Type K ☐ Type J ☐ Type N ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø4,0 mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

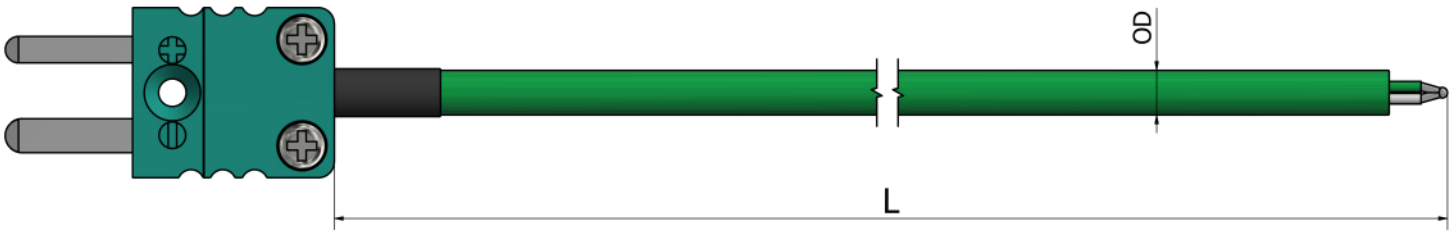
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC31 – Wired thermocouples
PVC (pvc/braid/pvc) with connector

-30°C / +105°C
Short term +135°C



Ordering information

1. Thermocouple:
☐ Type K ☐ Type J ☐ Type N ☐ Type T
☐ Other:

2. Class:
☐ Class 1 ☐ Class 2

3. Wire and cable size:
☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø4,0 mm
☐ 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:

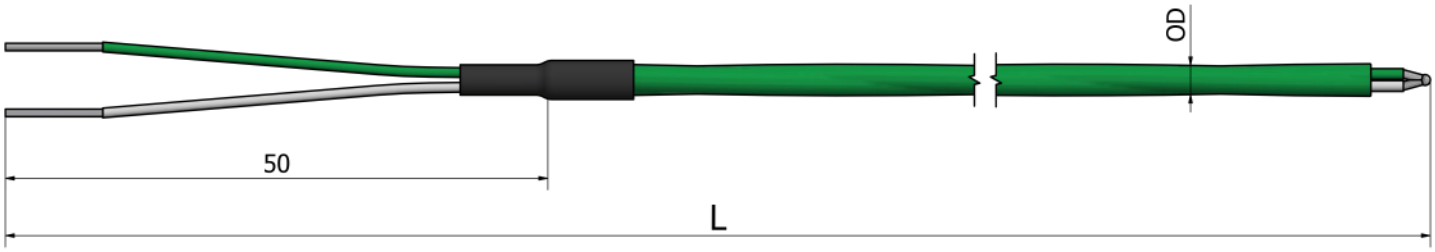
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC40 – Wired thermocouples
Teflon (teflon/braid/teflon)

-190°C / +260°C
Short term +280°C



Ordering information

1. Thermocouple:

☐ Type K ☐ Type J ☐ Type N ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

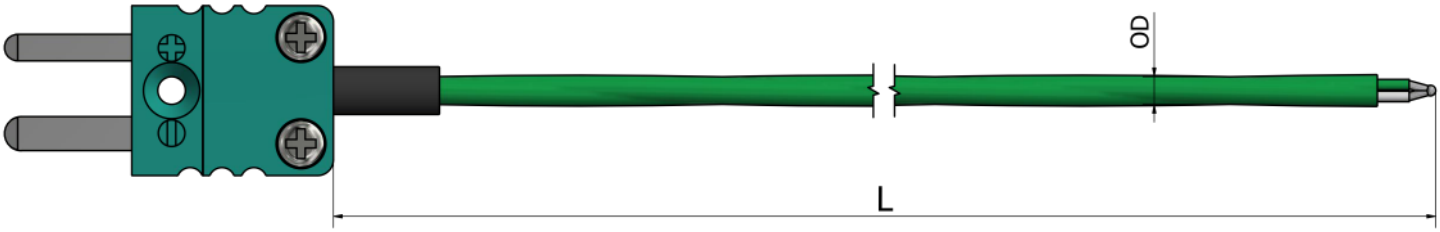
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC41 – Wired thermocouples
Teflon (teflon/braid/teflon) with connector

-190°C / +260°C
Short term +280°C



Ordering information

1. Thermocouple:
☐ Type K ☐ Type J ☐ Type N ☐ Type T
☐ Other:

2. Class:
☐ Class 1 ☐ Class 2

3. Wire and cable size:
☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm
☐ 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:

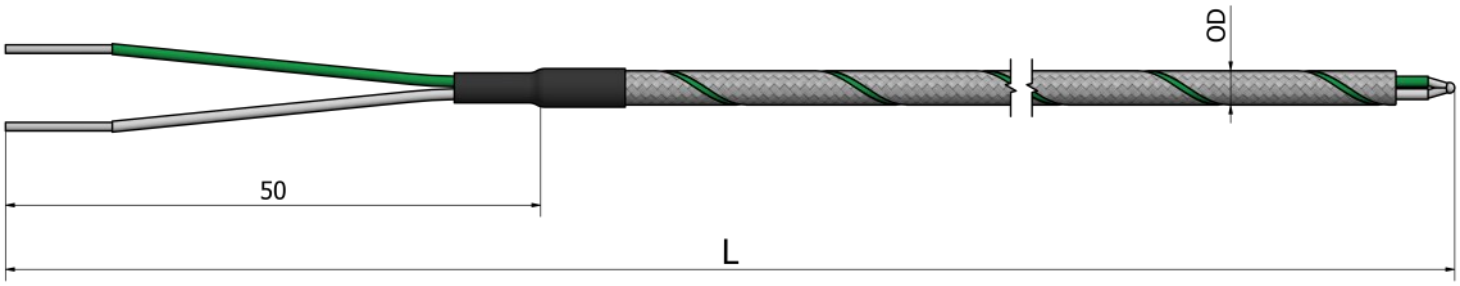
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC50 – Wired thermocouples
Fiberglass (fiberglass/fiberglass/braid)

-60°C / +400°C
Short term +600°C



Ordering information

1. Thermocouple:

☐ Type K ☐ Type J ☐ Type N ☐ Type T

☐ Other:

2. Class:

☐ Class 1 ☐ Class 2

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm

☐ Other:

4. Cable length L (mm):

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

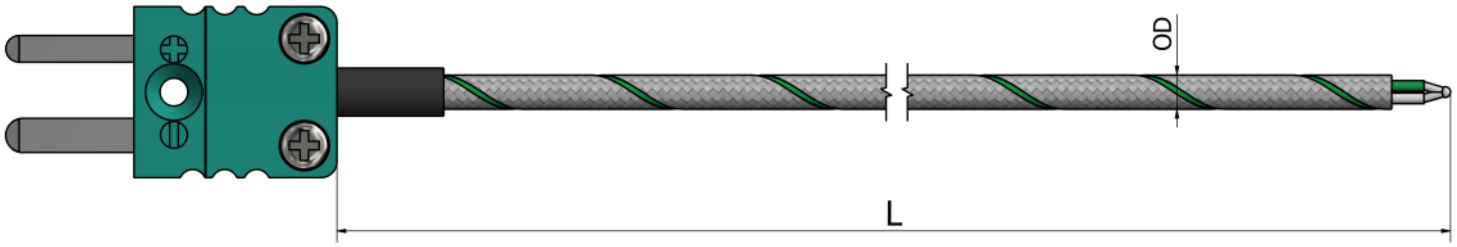
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

TC51 – Wired thermocouples
Fiberglass with connector (fiberglass/fiberglass/braid)

-60°C / +400°C
Short term +600°C



Ordering information

1. Thermocouple:
☐ Type K ☐ Type J ☐ Type N ☐ Type T
☐ Other:

2. Class:
☐ Class 1 ☐ Class 2

3. Wire and cable size:
☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm
☐ 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:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

EuroSensors

Wired RTDs

Wired RTDs - 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 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

Wired RTDs - Technical information

Types of RTDs cables

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

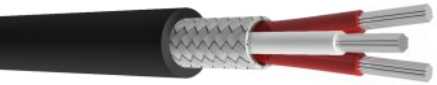
Fiberglass

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

Teflon braided

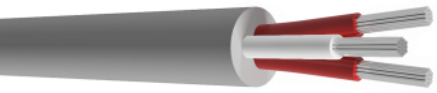
Description: teflon/braid/teflon
Operating T°: -190°C / +260°C
Cross section shape: round

PVC braided



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

Silicone

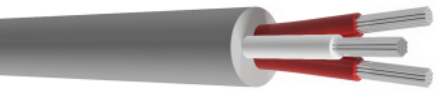


Description: silicone/silicone
Operating T°: -60°C / +180°C
Cross section shape: round

Teflon

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

Teflon/Silicone



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

PVC

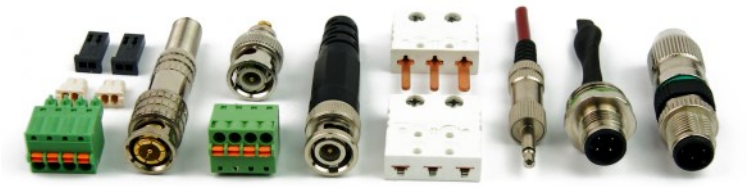
Description: PVC/PVC
Operating T°: -30°C / +105°C
Cross section shape: round

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.

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.

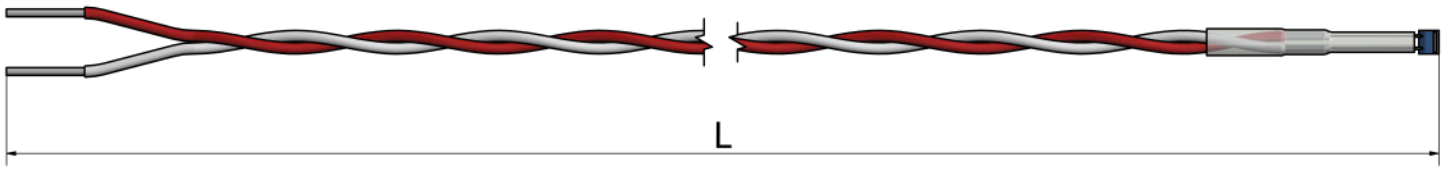


Global cable insulation characteristics

	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

PC00 – Wired RTDs
Twisted teflon

-190°C / +260°C
Short term +280°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²)

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

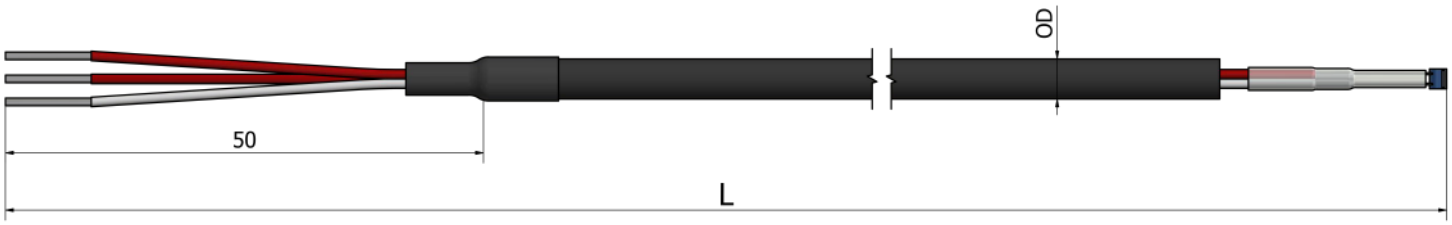
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

PC30 – Wired RTDs
PVC braided (pvc/braid/pvc)

-30°C / +105°C
Short term +135°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø4,2mm

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Polyolefin heat shrink sleeve ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

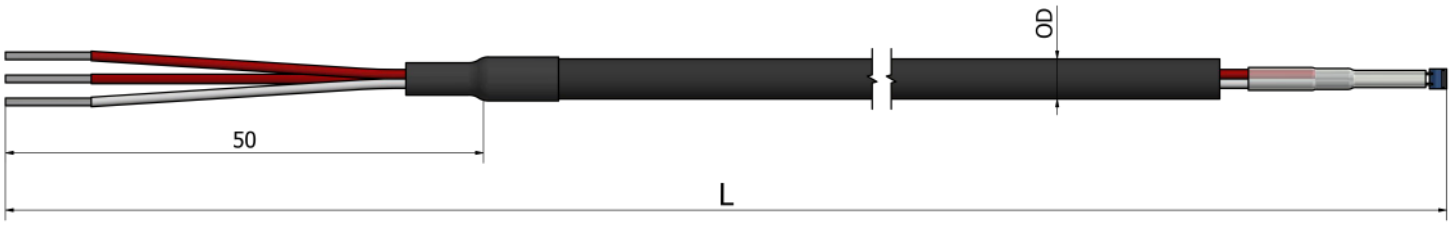
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

PC35 – Wired RTDs
PVC (pvc/pvc)

-30°C / +105°C
Short term +135°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²)
OD ≈ Ø3,4mm

☐ 21 x 0,2 (0,60 mm²)
OD ≈ Ø4,9mm

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Polyolefin heat shrink sleeve ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

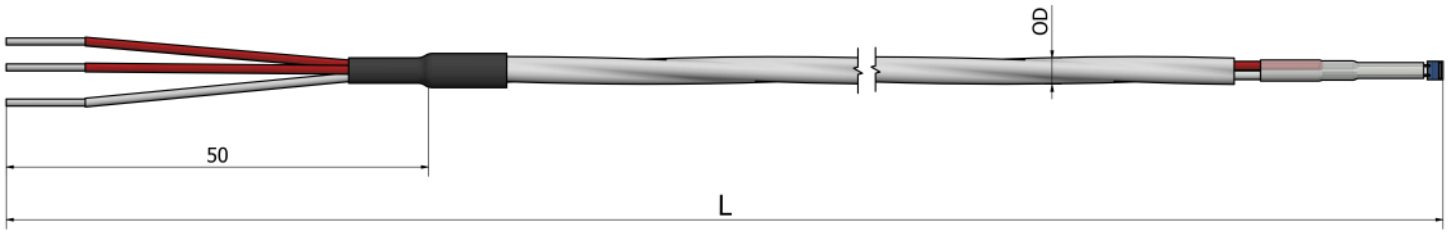
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

PC40 – Wired RTDs
Teflon (teflon/braid/teflon)

-190°C / +260°C
Short term +280°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,4mm

☐ 7 x 0,1 (0,05 mm²) OD ≈ Ø2,6mm

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

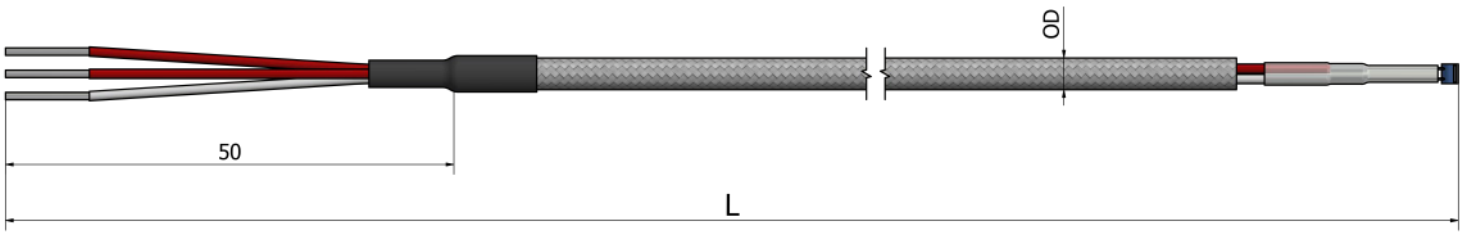
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

PC50 – Wired RTDs
Fiberglass (fiberglass/fiberglass/braid)

-60°C / +400°C
Short term +600°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0mm

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

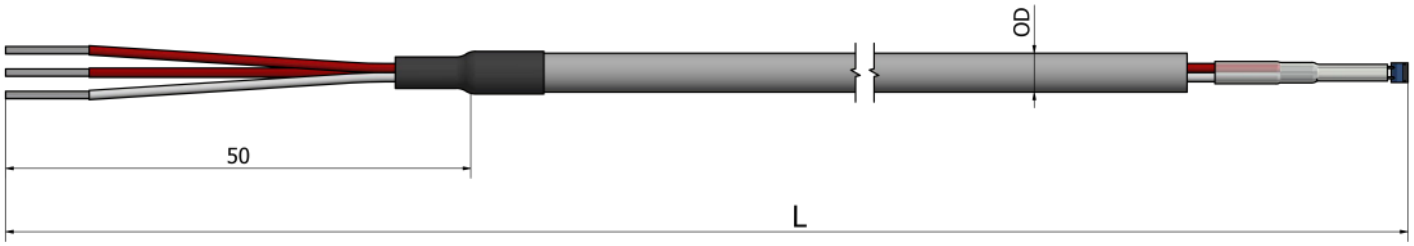
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

PC60 – Wired RTDs
Silicone (silicone/silicone)

-60°C / +180°C
Short term +230°C



Ordering information

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. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø5,0mm

☐ Other:

5. Cable length L (mm):

6. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

7. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

EuroSensors

Wired thermistors

EuroSensors

Wired thermistors - 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 thermistor ?

A thermistor is an electrical component that changes its resistance according to temperature. It consists of a conductive material that is wrapped in an insulating material. As the temperature increases, the resistance of the conductive material decreases (NTC), or increases (PTC), which can be detected and measured.

What are the two types of thermistor ?

NTC (*Negative Temperature Coefficient*) are made of a conductive material based on transition metals and are used to measure temperatures up to 300 °C.

PTC (*Positive Temperature Coefficient*) are made of a conductive material based on polymer or ceramic and are used to measure temperatures up to 200 °C.

What is the difference between an NTC and a PTC ?

NTCs and PTCs are both thermistors, i.e. temperature sensors that change resistance depending on the temperature.

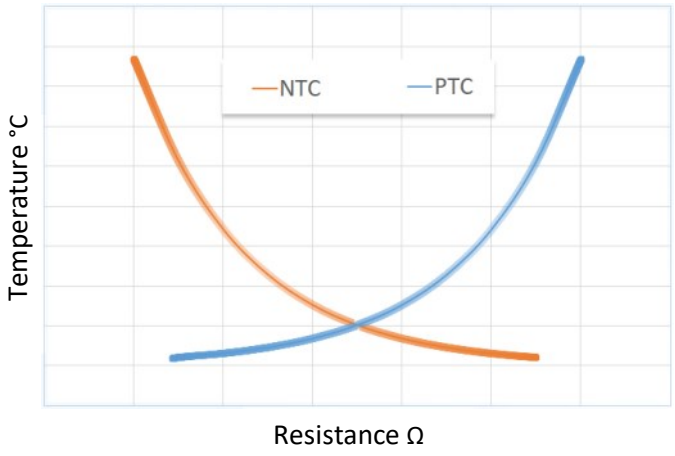
However, there is a major difference between these two types of thermistors:

NTC thermistors

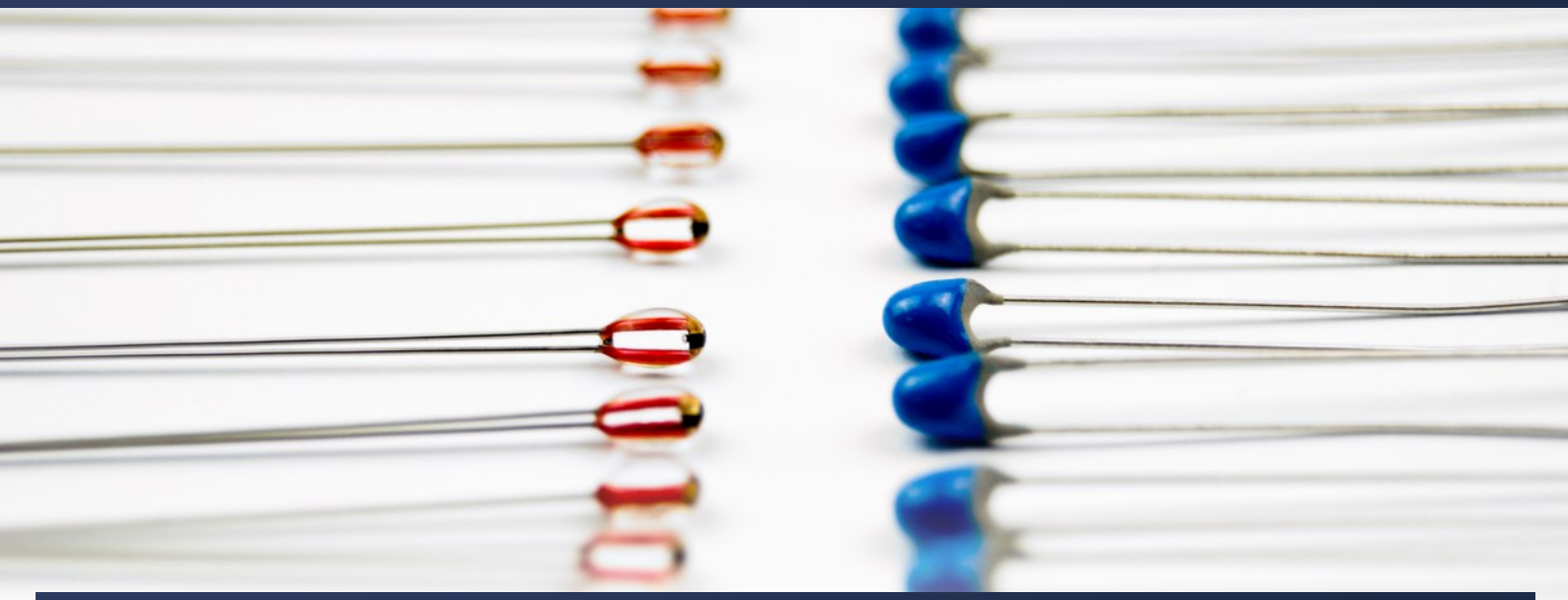
NTCs have a resistance that decreases as the temperature increases. They are commonly used in thermostats and temperature control devices to measure room temperature.

PTC thermistors

PTCs have a resistance that increases as the temperature rises. They are commonly used in thermostatic fuses and overcurrent protection devices to shut off power in the event of overheating.

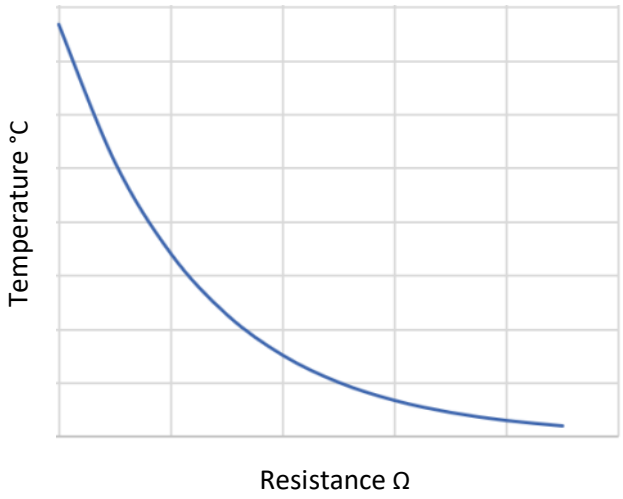


Wired thermistors - Technical information



The β beta value

A thermistor's "β" value, or beta value, is an indication of the shape of the curve representing the relationship between resistance and temperature of an NTC thermistor. Calculating the beta value is a vital step in the component selection process as it gives the characteristic at a given temperature vs the resistance for a specific application.



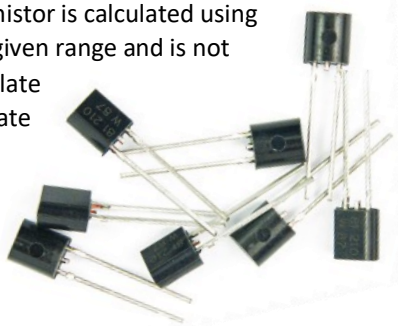
NTC thermistors are non-linear resistors that alter their resistance characteristics with temperature. Simply put, as temperature increases the thermistor's resistance decreases.

The manner in which the resistance of a thermistor decreases is related to a constant known in the thermistor industry as beta (β). Beta is measured in degrees Kelvin (K) and is computed based on the formulation given below.

Where:
Rt1 = Resistance at Temperature 1
Rt2 = Resistance at Temperature 2
T1 = Temperature 1 (K)
T2= Temperature 2 in (K)

$$\beta = \frac{\ln(\frac{R_{T1}}{R_{T2}})}{(\frac{1}{T_1} - \frac{1}{T_2})}$$

The beta value of an NTC thermistor is calculated using only two temperatures over a given range and is not the most accurate way to calculate the R vs. T curve. A more accurate method is to use the Steinhart and Hart method, which uses three temperatures over a given range.



Types of thermistors

Type	Resistance	Beta value	Temperature
PTC KTY81/121	990Ω at 25°C	/	T° (-55/+150°C)
NTC	3,3kΩ at 100°C	β=3970	T° (-40/+200°C)
NTC	10kΩ at 25°C	β=3977	T° (-40/+125°C)
NTC	10kΩ at 25°C	β=3435	T° (-40/+150°C)
NTC	20kΩ at 25°C	β=4260	T° (-40/+125°C)

Wired thermistors - Technical information

Types of thermistor cables

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

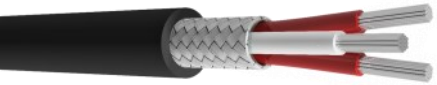
Fiberglass

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

Teflon braided

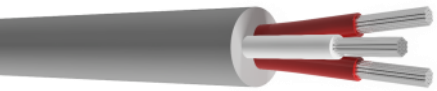
Description: teflon/braid/teflon
Operating T°: -190°C / +260°C
Cross section shape: round

PVC braided



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

Silicone

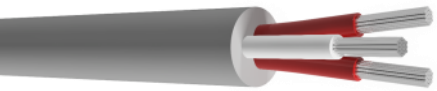


Description: silicone/silicone
Operating T°: -60°C / +180°C
Cross section shape: round

Teflon

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

Teflon/Silicone



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

PVC

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

Thermistor wiring configurations

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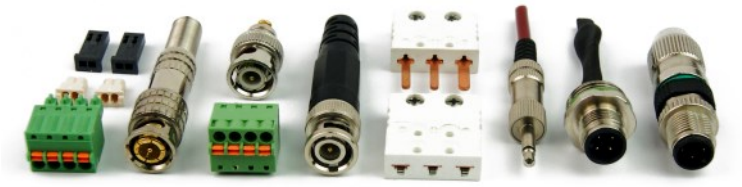
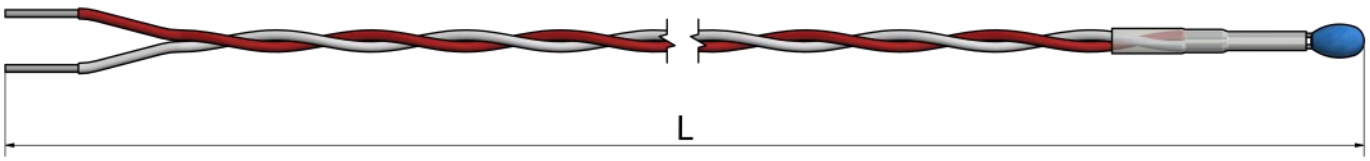


Global cable insulation characteristics

	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

HC00 – Wired thermistors
Twisted teflon



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²)

☐ Other:

4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

6. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

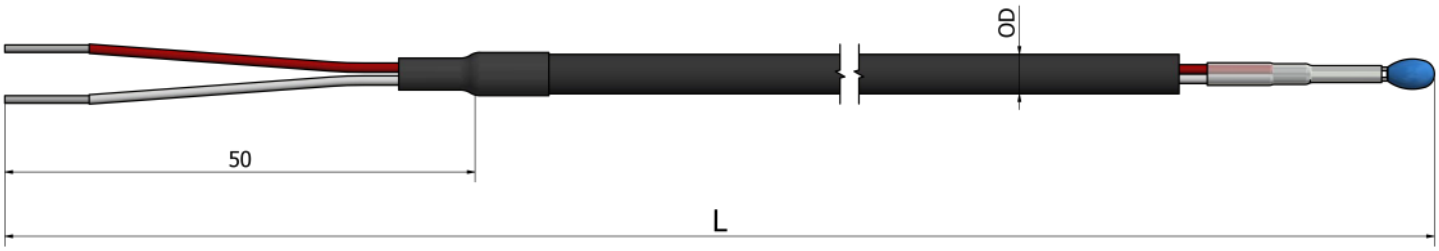
Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

HC30 – Wired thermistors
PVC braided (pvc/braid/pvc)



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø4,2 mm

☐ Other:

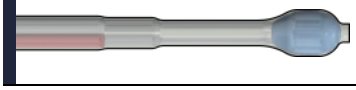
4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Polyolefin heat shrink sleeve ☐ Other:

6. Insulation method:

☐ To the measuring element



☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

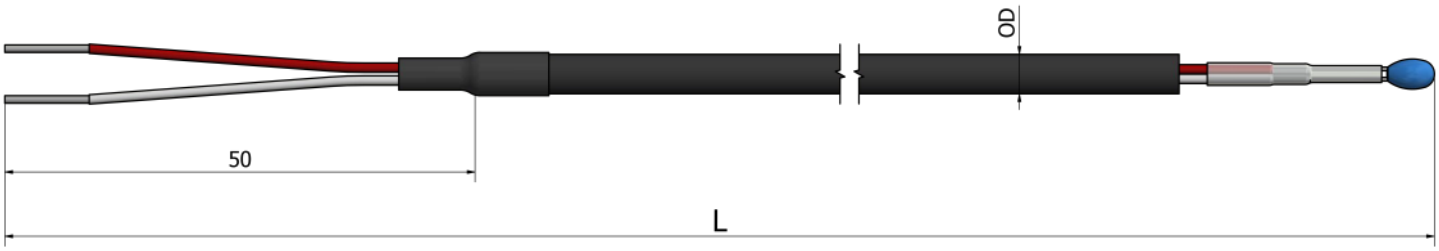
Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

HC35 – Wired thermistors
PVC (pvc/pvc)



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,2 mm

☐ 21 x 0,2 (0,60 mm²) OD ≈ Ø4,9 mm

☐ Other:

4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Polyolefin heat shrink sleeve ☐ Other:

6. Insulation method:

☐ To the measuring element

☐ Over the measuring element

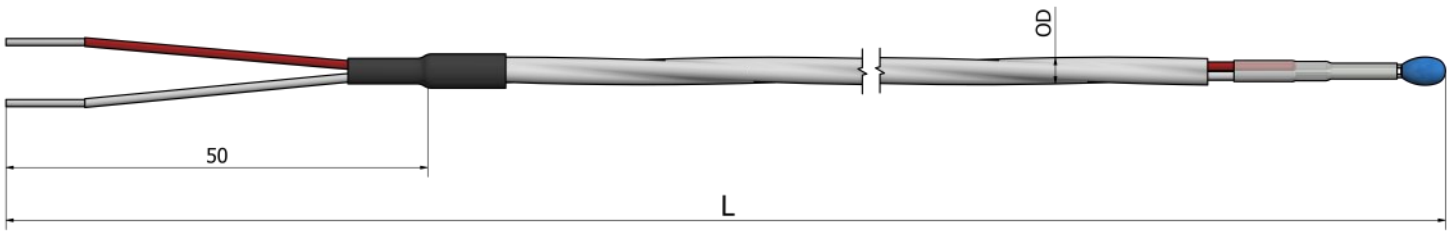
Additional:

Application:
Operating temperature (min/max):
Type of environment:
Accessories: See the part "Accessories"
Quantity:
Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

HC40 – Wired thermistors
Teflon (teflon/braid/teflon)



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,2 mm ☐ 7 x 0,1 (0,05 mm²) OD ≈ Ø2,6 mm

☐ Other:

4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

6. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

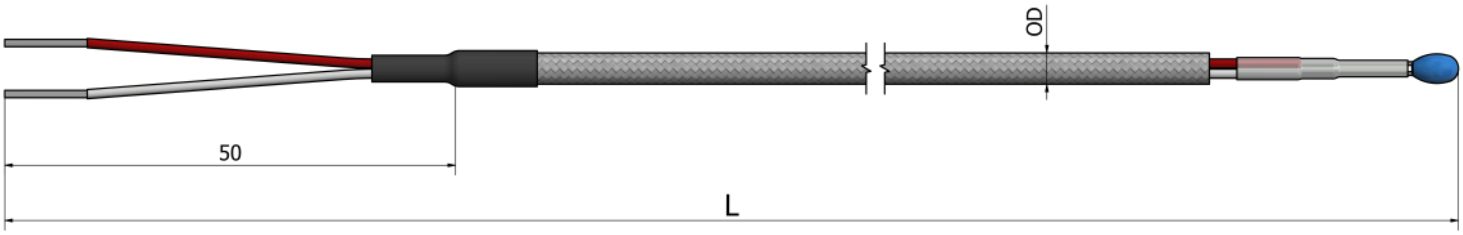
Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

HC50 – Wired thermistors
Fiberglass (fiberglass/fiberglass/braid)



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm

☐ Other:

4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Other:

6. Insulation method:

☐ To the measuring element

☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

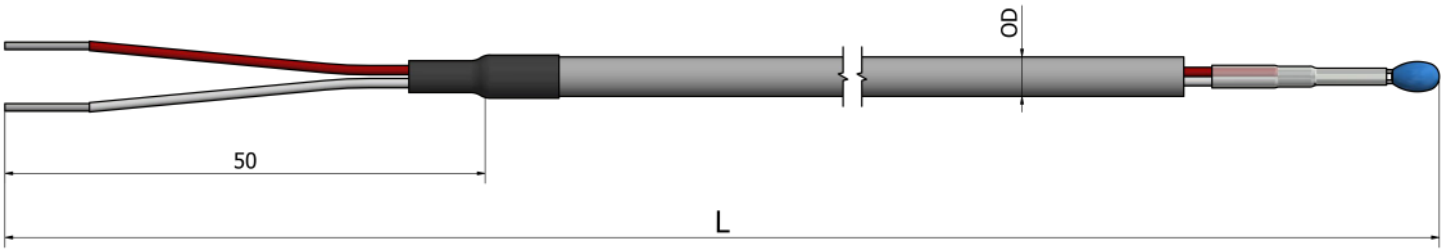
Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.

HC60 – Wired thermistors
Silicone (silicone/silicone)



Ordering information

1. Element type:

- ☐ PTC KTY 81/110 (-40°C / +150°C)
- ☐ PTC KTY 81/121 (-40°C / +150°C)
- ☐ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C)
- ☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)
- ☐ NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)
- ☐ Other:

(NTC / PTC , T° (min / max) , ß value, tolerance)

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

☐ 2 ☐ Other:

3. Wire and cable size:

☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø5 mm

☐ Other:

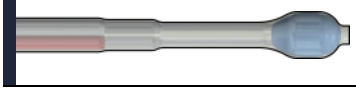
4. Cable length L (mm):

5. Insulation material:

☐ Fiberglass ☐ Teflon heat shrink sleeve ☐ Other:

6. Insulation method:

☐ To the measuring element



☐ Over the measuring element

Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:
See the part "Accessories"

Quantity:

Note:

How to order?

Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.