EuroSensors

Wired RTDs

Contents

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".***

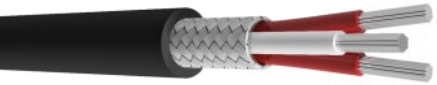
Fiberglass

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

Teflon braided

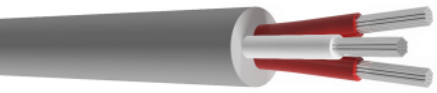
Description: teflon/braid/teflon
Operating T°: -190°C / +260°C
Cross section shape: round

PVC braided



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

Silicone

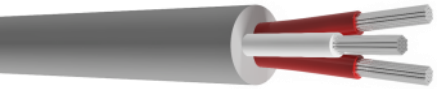


Description: silicone/silicone
Operating T°: -60°C / +180°C
Cross section shape: round

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

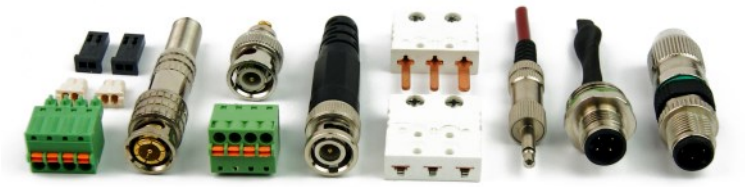
Description: PVC/PVC
Operating T°: -30°C / +105°C
Cross section shape: round

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.

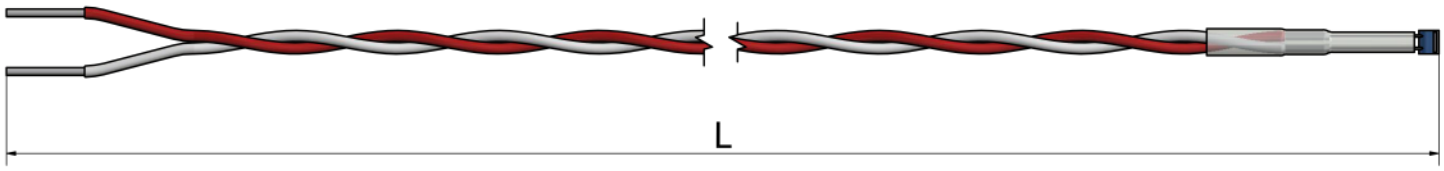


Global cable insulation characteristics

	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:

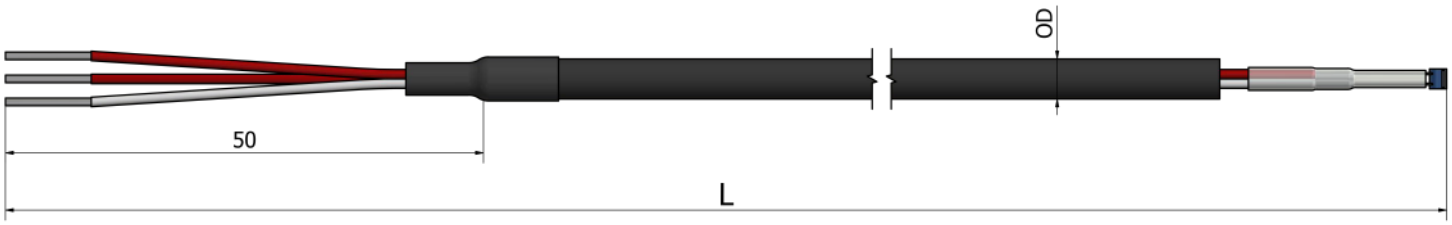
Note:

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:

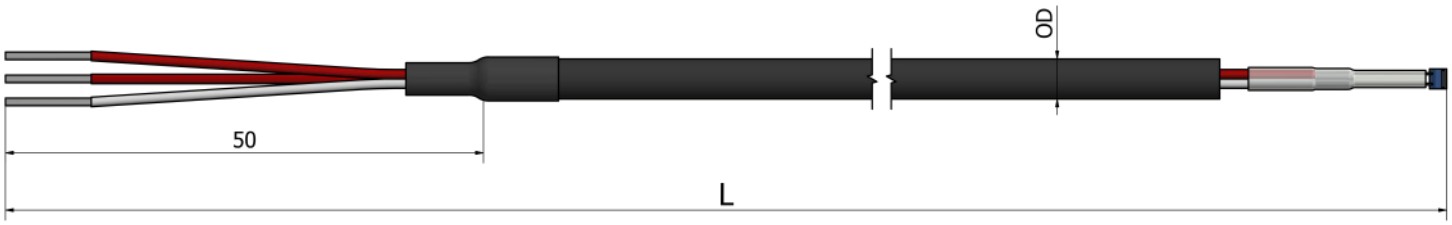
Note:

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:

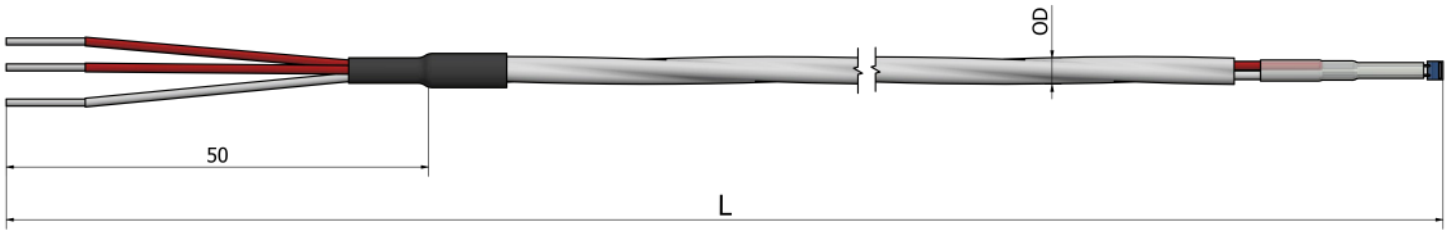
Note:

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:

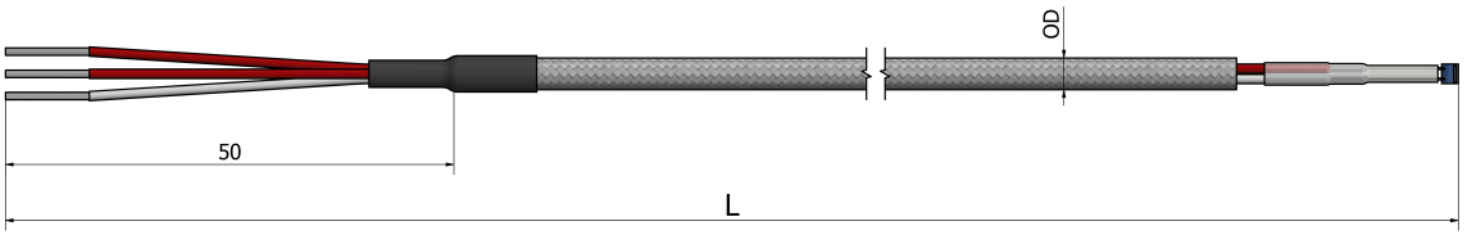
Note:

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:

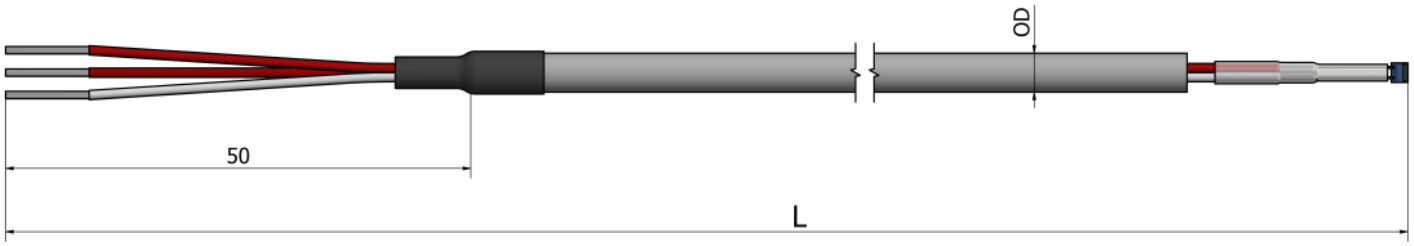
Note:

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.