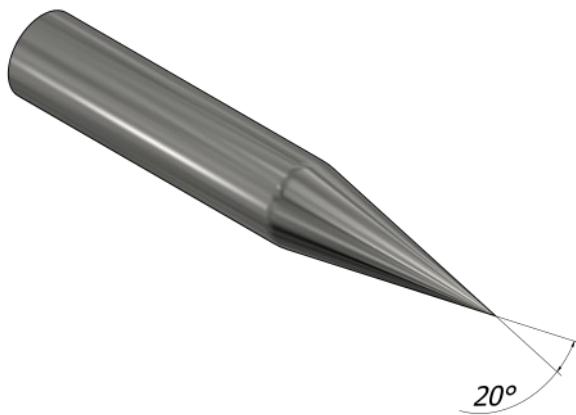


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## What are the characteristics of penetration RTDs ?

What sets penetration RTDs apart is their ability to measure the internal temperature of objects with pinpoint accuracy. Penetration probes are slender, pointed sensors designed for insertion into materials such as food, liquids, or even soil.



Here are some key applications where they prove invaluable:

**Food safety and culinary arts:** In the culinary world, achieving the perfect level of doneness and ensuring food safety go hand in hand. Penetration probes allow chefs and food inspectors to measure the core temperature of dishes, ensuring they are both delicious and safe to eat.

**Industrial processes:** From chemical reactions to metallurgical processes, knowing the temperature within materials or substances is crucial. Penetration probes provide real-time insights into the temperature profiles of these processes, aiding in quality control and optimization.

**Medical applications:** In the healthcare sector, penetration probes are used for patient monitoring, particularly during surgeries where monitoring body temperature accurately is vital for patient safety.

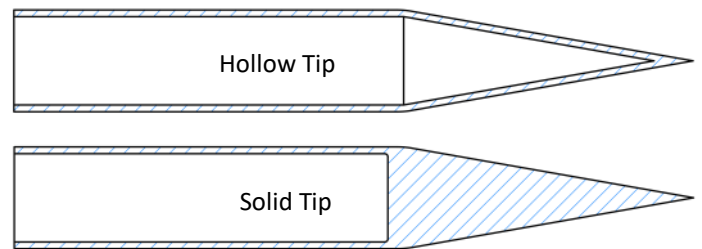
**Environmental research:** Environmental scientists utilize penetration probes to measure soil temperature accurately, helping them understand the impact of temperature variations on ecosystems.

## Curly cable

Due to the frequent movement of the cable while using penetration probes, there is a option to put a curly cable that will ensure a easier and more comfortable way of use.

## Types of penetration probes

There are two types of penetration probes with hollow tip and solid tip. Hollow tip probes provides a faster response while solid tip probe is used in places where it is required to break through harder materials



## 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 (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 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.

## RTD connectors

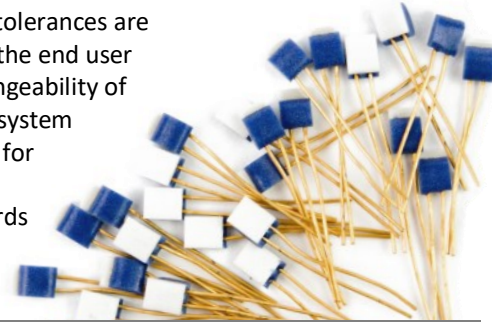
Due to the lack of standardization in RTD connectors, our company takes pride in its ability to produce a wide range of RTD connectors. We understand that different industries and applications have unique requirements when it comes to temperature measurement, and that includes the connectors used. With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



## Pt-s 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 Standard	DIN4370	Temperature Range °C	Tolerance Ω at 0°C	Tolerance °C
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 characteristics

	PVC	Silicone	Teflon	Fiberglass
<b>Abrasion resistance</b>	Very good	Fair	Good	Fair
<b>Chemical resistance</b>	Very good	Poor	Excellent	Good
<b>Moisture resistance</b>	Good	Good	Excellent	Poor
<b>Fire resistance</b>	Good	Good	Excellent	Excellent



# PP01 – Penetration RTDs Standard



## Ordering information

### 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. Needle diameter $\varnothing$ : *(material Stainless steel 316L)*

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

### 6. Needle length L (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

### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

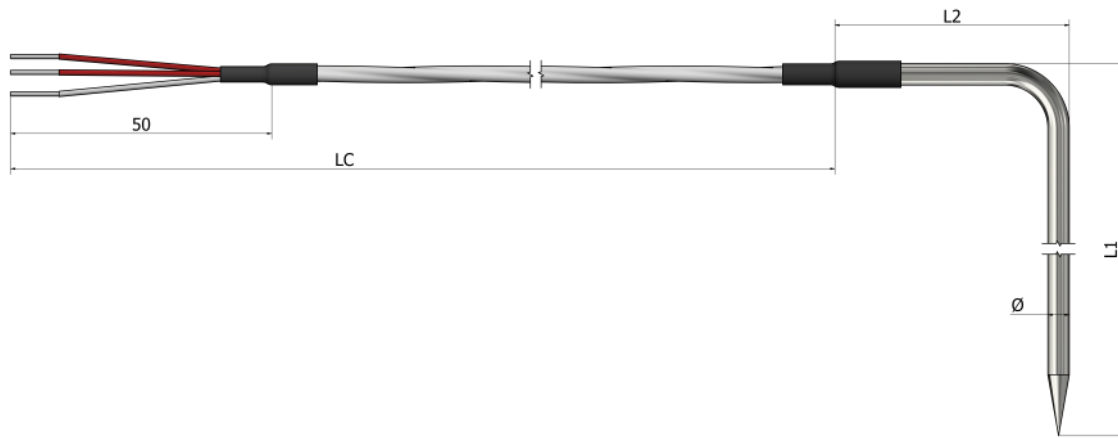
Quantity:

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.

# PP02 – Penetration RTDs Standard (90° bend)



## Ordering information

### 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. Needle diameter $\varnothing$ : *(material Stainless steel 316L)*

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

### 6. Needle lengths L (mm):

L1 \_\_\_\_\_ L2 \_\_\_\_\_

### 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

### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

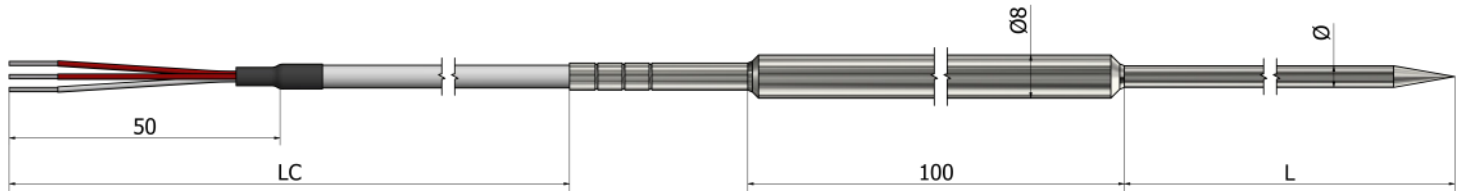
## How to order?

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.



# PP11 – Penetration RTDs

## Metal handle



\*Handle material **Stainless steel 316L**

### Ordering information

#### 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. Needle diameter $\varnothing$ : (material **Stainless steel 316L**)

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

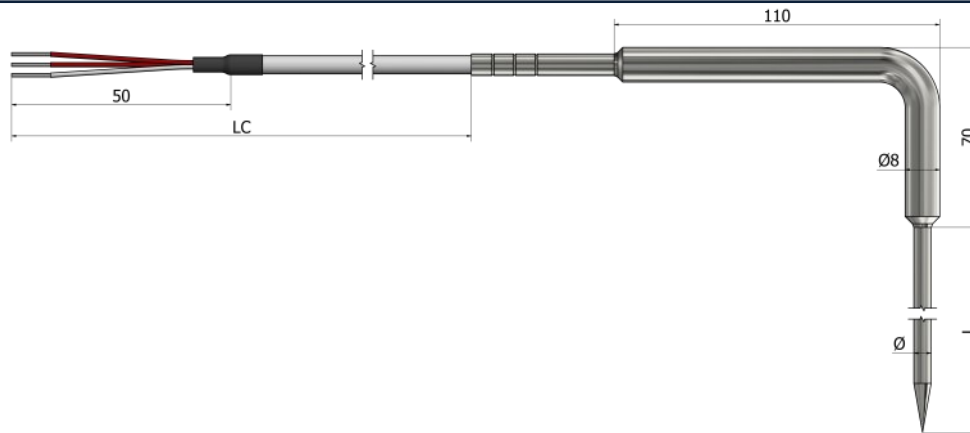
Note:

### 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.



## PP12 – Penetration RTDs Metal handle (90° bend)



\*Handle material *Stainless steel 316L*

### Ordering information

#### 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. Needle diameter Ø: (material *Stainless steel 316L*)

- Ø3 mm     Ø4 mm     Ø5 mm  
 Ø6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

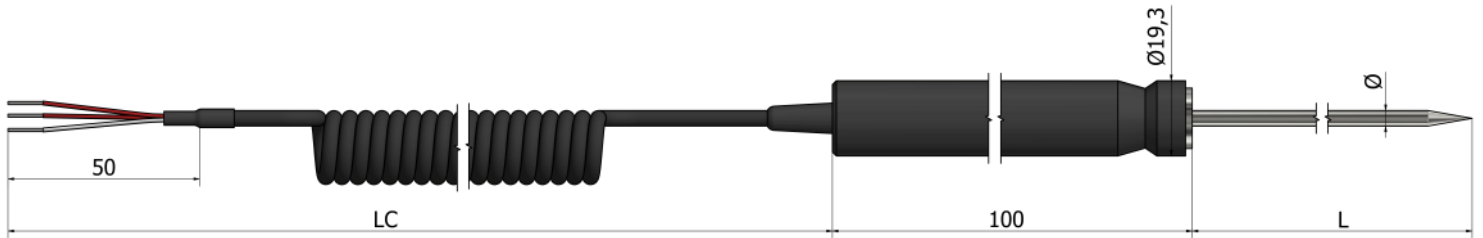
### How to order?

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.



# PP13 – Penetration RTDs

## Plastic handle



\*Handle material **Plastic**

### Ordering information

#### 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. Needle diameter $\varnothing$ : *(material Stainless steel 316L)*

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (mm):

#### 7. Cable prolongation:

- PVC (105°C)     Silicone (180°C)     Teflon (260°C)  
 Fiberglass (400°C)     Curly polyurethane (105°C)  
 Other:

#### 8. Cable length LC (mm):

#### 9. Crimp protection:

- Spring     Heat shrink sleeve     Without

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

### How to order?

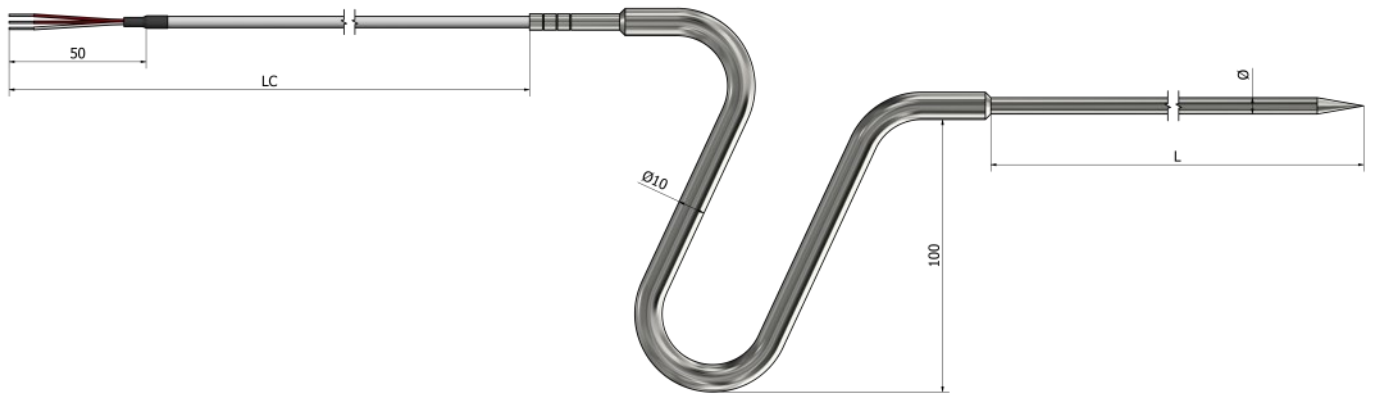
Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.





# PP20 – Penetration RTDs

## Ergonomic handle



\*Handle material **Stainless steel 316L**

### Ordering information

#### 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. Needle diameter $\varnothing$ : (material **Stainless steel 316L**)

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

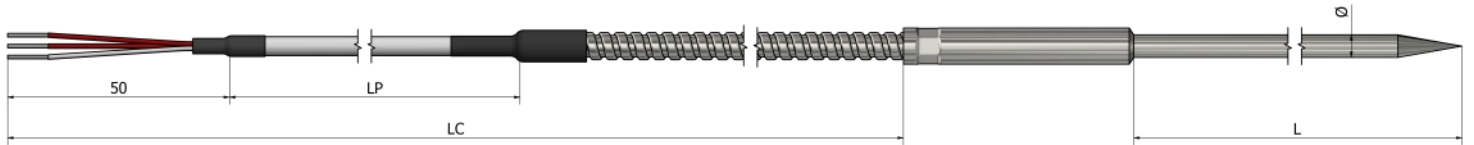
Note:

### 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.



## PP31 – Penetration RTDs Armored cable prolongation



\*Handle material **Stainless steel 316L**  
\*Armored cable material **Stainless steel 304**

### Ordering information

#### 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. Needle diameter $\varnothing$ : (material **Stainless steel 316L**)

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (mm):

#### 7. Cable prolongation:

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

#### 8. Cable lengths (mm):

LC \_\_\_\_\_ LP \_\_\_\_\_

#### 9. Crimp protection:

- Spring     Heat shrink sleeve     Without

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

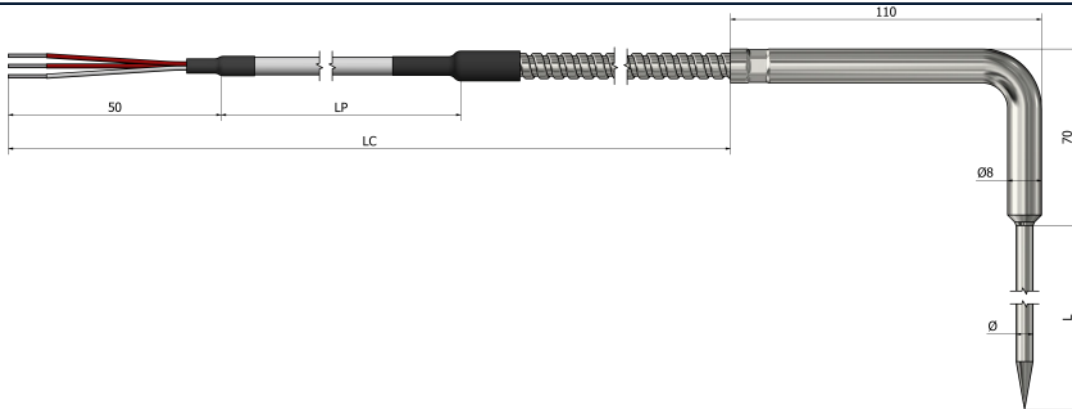
Note:

### 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.

# PP32 – Penetration RTDs

## Armored cable prolongation (90° bend)



\*Handle material **Stainless steel 316L**  
 \*Armored cable material **Stainless steel 304**

### Ordering information

#### 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. Needle diameter Ø: (material **Stainless steel 316L**)

- Ø3 mm     Ø4 mm     Ø5 mm  
 Ø6 mm     Other:

#### 6. Needle length L (mm):

#### 7. Cable prolongation:

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

#### 8. Cable lengths (mm):

LC \_\_\_\_\_ LP \_\_\_\_\_

#### 9. Crimp protection:

- Spring     Heat shrink sleeve     Without

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

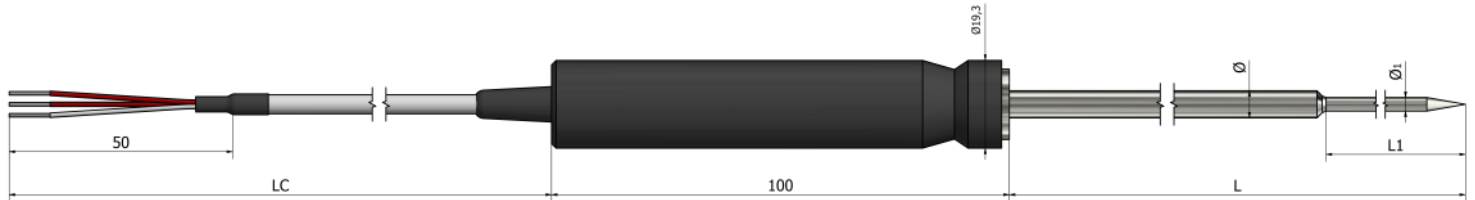
Accessories:  
 See the part "Accessories"

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.



\*Handle material **Plastic**

### Ordering information

#### 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. Needle tip diameter $\varnothing 1$ : *(material Stainless steel 316L)*

- $\varnothing 3$  mm   
   $\varnothing 4$  mm   
   $\varnothing 5$  mm  
  $\varnothing 6$  mm   
  Other:

#### 6. Needle diameter $\varnothing$ (mm):

#### 7. Needle lengths (mm):

L \_\_\_\_\_ L1 \_\_\_\_\_

#### 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:

### How to order?

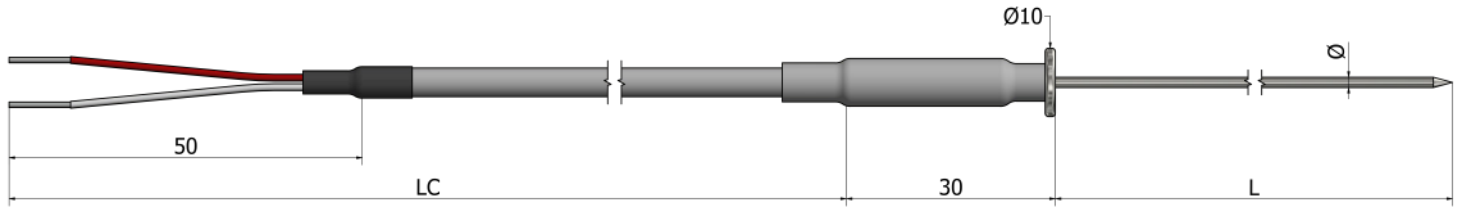
Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images, personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.





# PP41 – Penetration RTDs

## Miniature



*\*Handle material Stainless steel 316L with rubber cover*

### Ordering information

#### 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. Needle diameter $\varnothing$ : *(material Stainless steel 316L)*

- $\varnothing$ 1,5 mm      $\varnothing$ 2 mm  
 Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

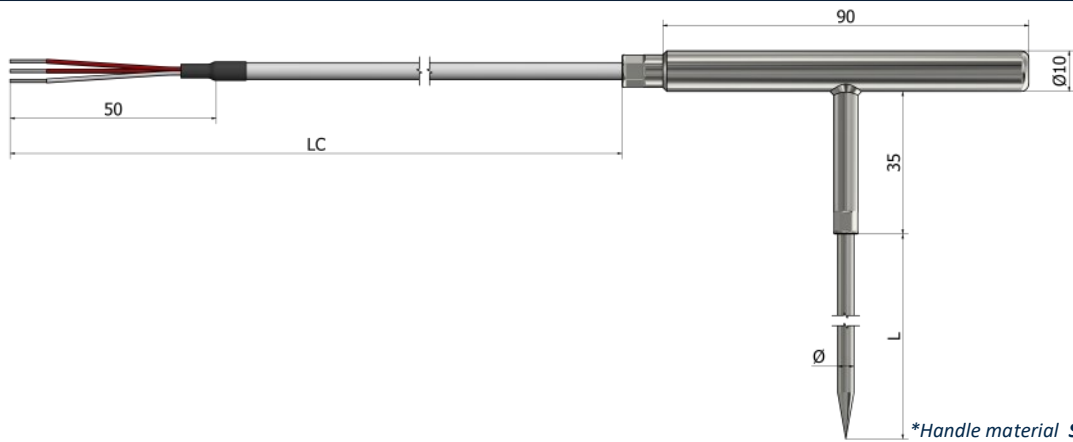
### How to order?

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.



# PP50 – Penetration RTDs

## T shape



\*Handle material **Stainless steel 316L**

### Ordering information

#### 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. Needle diameter Ø: (material **Stainless steel 316L**)

- Ø3 mm     Ø4 mm     Ø5 mm  
 Ø6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

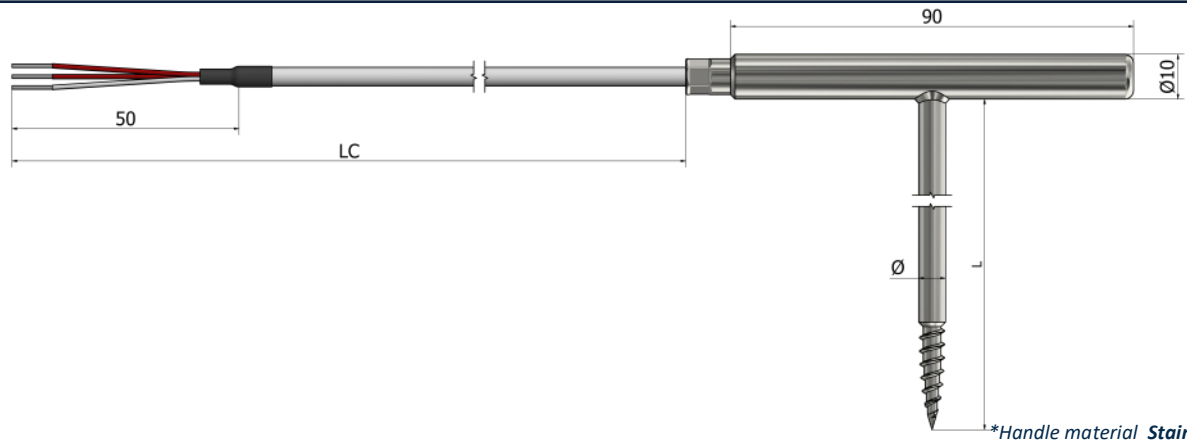
### How to order?

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.





## PP51 – Penetration RTDs T shape with thread



\*Handle material **Stainless steel 316L**

### Ordering information

#### 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. Needle diameter $\varnothing$ : (material **Stainless steel 316L**)

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

Note:

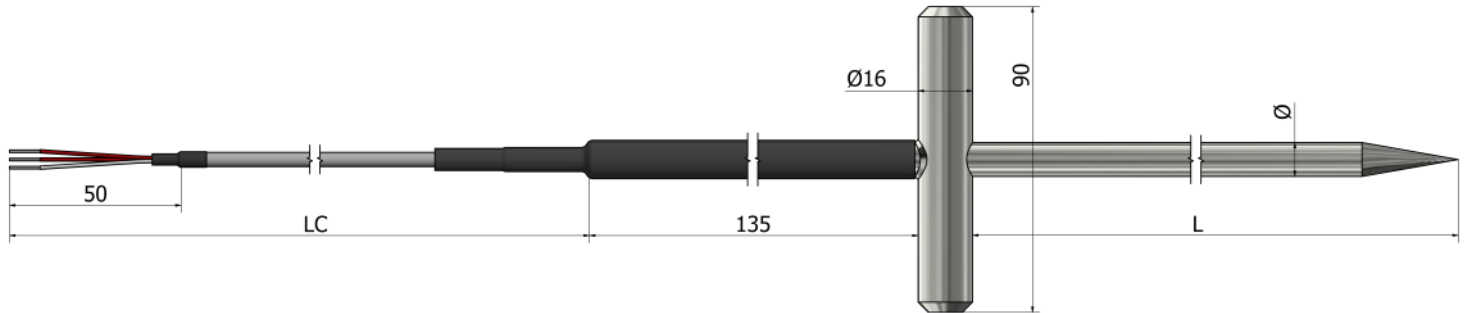
### How to order?

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.



# PP60 – Penetration RTDs

## T shape for compost



\*Handle material **Stainless steel 316L with rubber**

### Ordering information

#### 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. Needle diameter Ø: (material **Stainless steel 316L**)

- Ø3 mm     Ø4 mm     Ø5 mm  
 Ø6 mm     Other:

#### 6. Needle length L (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

#### Additional:

Application:

Operating temperature (min/max):

Type of environment:

Accessories:  
See the part "Accessories"

Quantity:

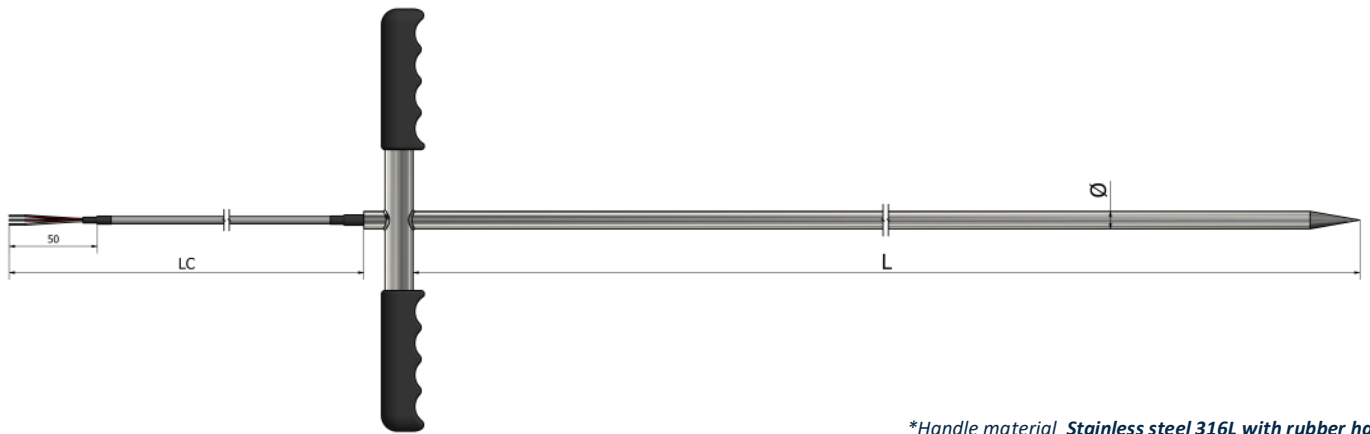
Note:

### 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.



## PP61 – Penetration RTDs Robust T shape for compost



\*Handle material **Stainless steel 316L with rubber hand**

### Ordering information

#### 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. Needle diameter $\varnothing$ : (material **Stainless steel 316L**)

- $\varnothing$ 3 mm      $\varnothing$ 4 mm      $\varnothing$ 5 mm  
  $\varnothing$ 6 mm     Other:

#### 6. Needle length L (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

#### 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.