

# Temperature sensors with thread connection



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#### Thermistors with thread connection

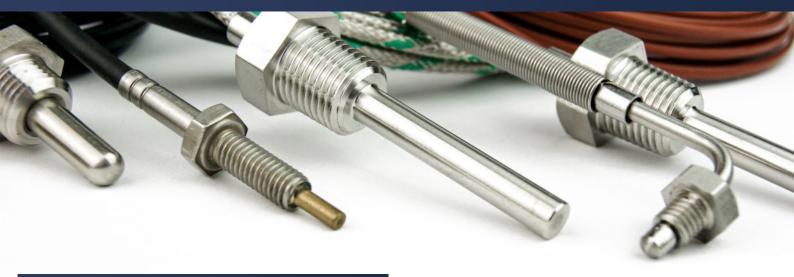
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### What are the characteristics of thermocouples with thread connection?

Thermocouples are widely used temperature measurement devices that rely on the principle of the Seebeck effect to generate a voltage proportional to the temperature difference between two different metals or alloys. These devices find applications across various industries, including manufacturing, automotive, aerospace, and research. One common variation of thermocouples is those equipped with thread connections, which offer unique characteristics and advantages for specific applications. Thermocouples with thread connections are designed with a threaded housing that allows them to be easily installed in a variety of environments. The threaded connection provides a secure and reliable method of attachment to surfaces, pipelines, equipment, and other components, ensuring accurate temperature sensing in challenging conditions.

#### **Key Characteristics**

thermocouples with thread connections is their ease of installation. The threaded housing allows these thermocouples to be quickly and securely screwed into place, reducing installation time and minimizing the need for complex mounting hardware.

Resistance to vibration and mechanical stress: Threaded connections provide a strong and stable attachment, making them particularly resistant to vibrations, mechanical stress, and other external forces. This characteristic is crucial in industrial settings where equipment might undergo frequent movements or vibrations.

**Ease of installation:** One of the most notable characteristics of

**Sealing and protection:** Many threaded thermocouples come with additional features such as integrated sealing elements or compression fittings. These features enhance the device's ability to provide accurate readings by preventing moisture, dust, or other contaminants from affecting the temperature measurement.

#### 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.

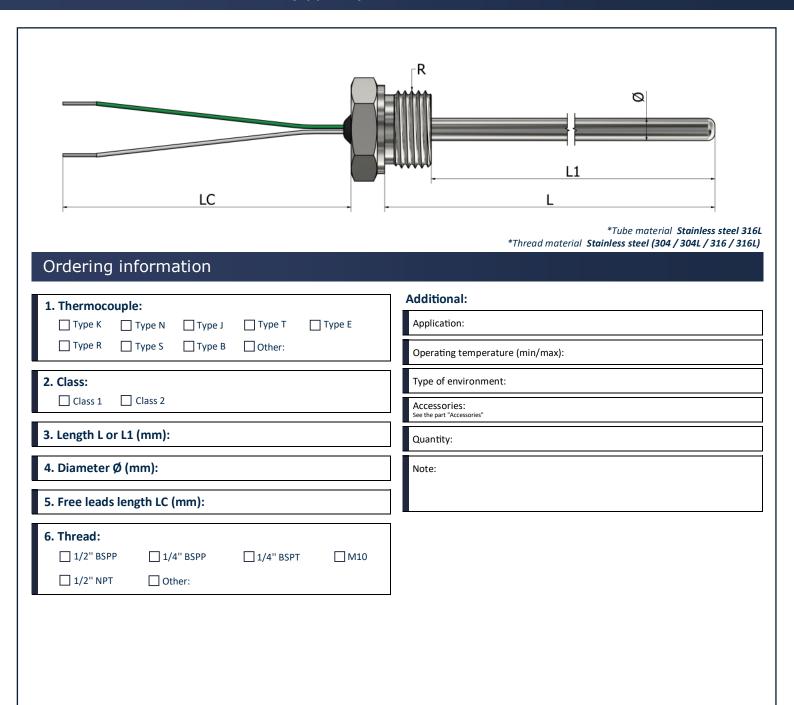


Note that connector colors vary by standard and country. Check the "International Color Codes applied to temperature measuring engineering".



### TR01 – Thermocouples with thread connection Fixed thread with free leads (type 1)





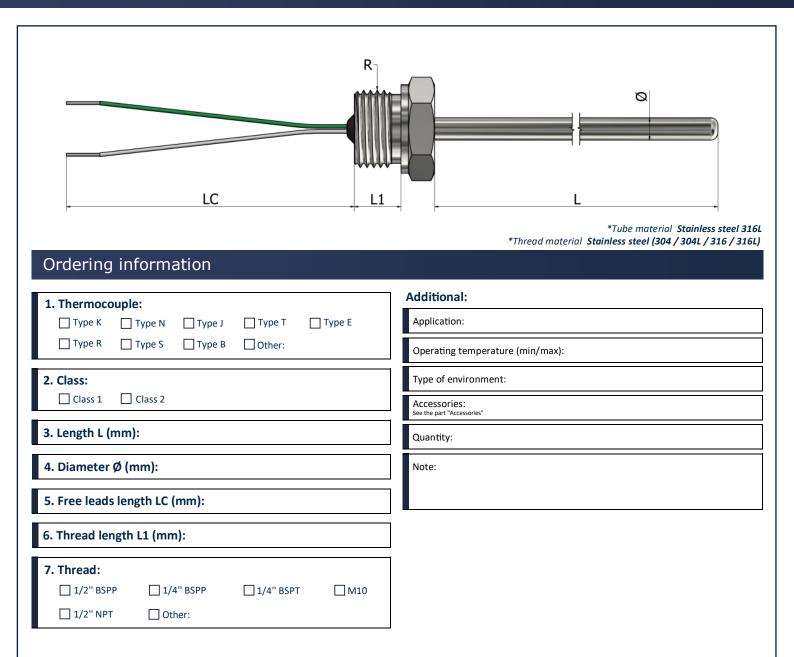
#### How to order?

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### TR02 – Thermocouples with thread connection Fixed thread with free leads (type 2)





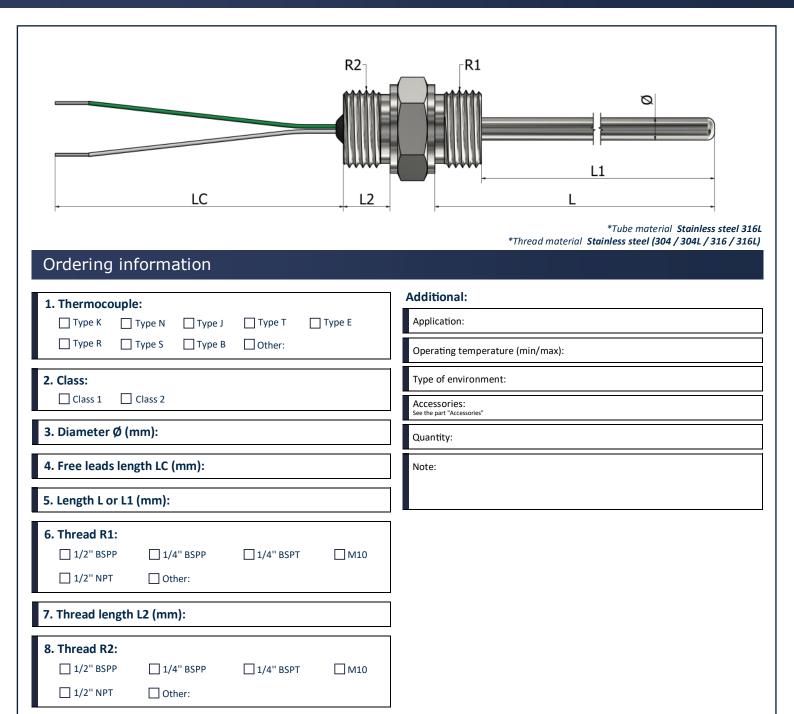
#### How to order?

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### TR03 – Thermocouples with thread connection Fixed thread with free leads (type 3)





#### How to order?

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### TR10 – Thermocouples with thread connection Fixed thread with cable prolongation



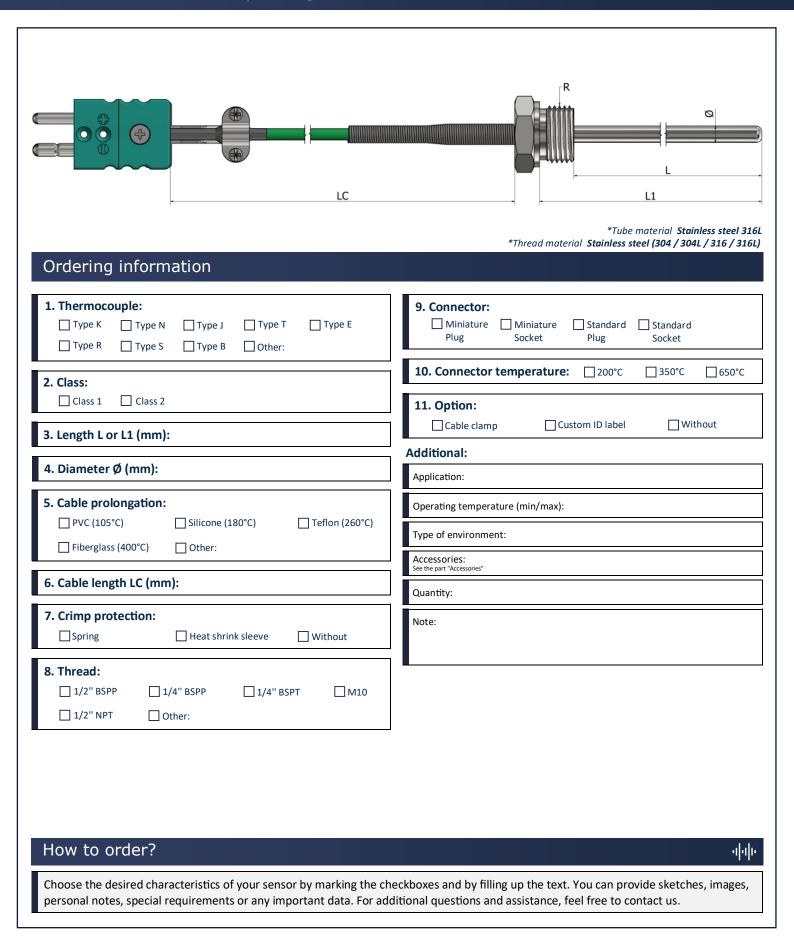
50 LC	*Tube material Stainless steel 3:
Ordering information	*Thread material Stainless steel (304 / 304L / 316 / 31
1. Thermocouple:	Additional:  Application:  Operating temperature (min/max):
2. Class:  Class 1 Class 2	Type of environment:  Accessories:
3. Length L or L1 (mm):	See the part "Accessories"  Quantity:
4. Diameter Ø (mm):	Note:
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. Thread:  1/2" BSPP	
	<del>-</del>

personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



### TR11 – Thermocouples with thread connection Fixed thread with cable prolongation and connector

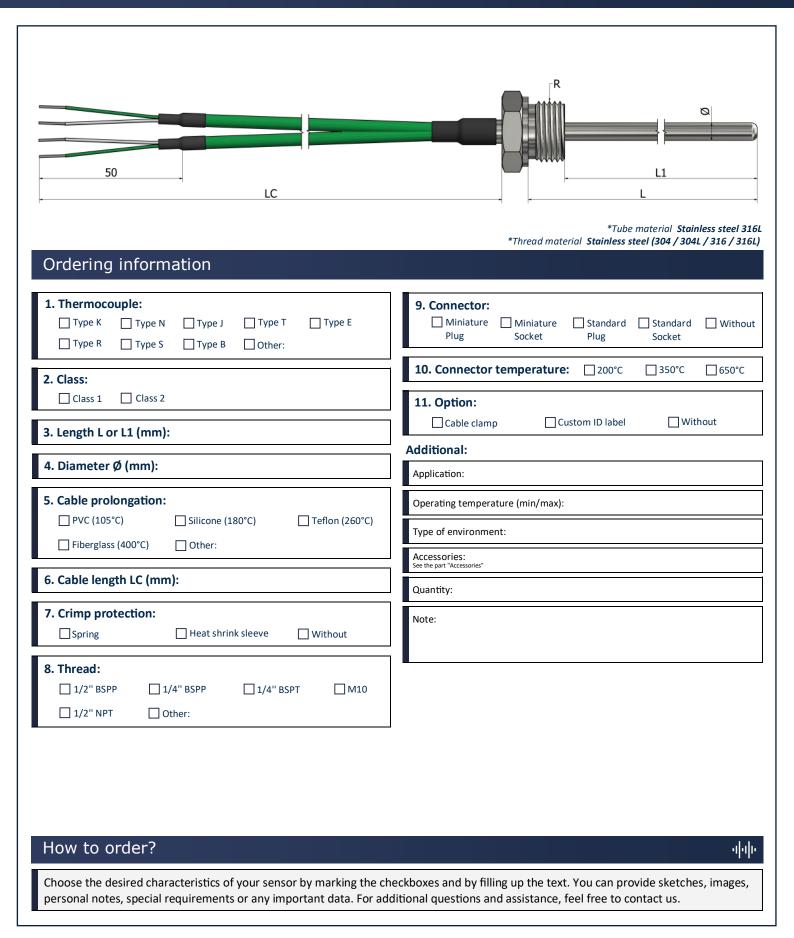






### TR12 – Thermocouples with thread connection Fixed thread with double cable prolongation







# TR13 – Thermocouples with thread connection Fixed thread (90° bend) (type 1)



LC *Tube materia	al Stainless steel 316L *Thread material Stainless steel (304/304L/316/316L)
Ordering information	
1. Thermocouple:  Type K Type N Type J Type T Type E  Type R Type S Type B Other:	10. Connector:    Miniature
2. Class:	11. Connector temperature: 200°C 350°C 650°C
☐ Class 1 ☐ Class 2	12. Option:  Cable clamp Custom ID label Without
3. Lengths (mm):	Additional:
L1 L2	Application:
4. Length L or L3 (mm):	Operating temperature (min/max):
5. Diameter Ø (mm):	Type of environment:
6. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	Accessories: See the part "Accessories"  Quantity:
	Note:
7. Cable length LC (mm):	
8. Crimp protection:  Spring Heat shrink sleeve Without	
9. Thread:  1/2" BSPP 1/4" BSPP 1/4" BSPT M10  1/2" NPT Other:	
How to order?	
How to order?	փի



# TR14 – Thermocouples with thread connection Fixed thread (90° bend) (type 2)



Ordering information  1. Thermocouple:	10. Connector:  Miniature Miniature Standard Standard Without
1. Thermocouple:	
☐ Type K ☐ Type N ☐ Type J ☐ Type T ☐ Type E ☐ Type R ☐ Type S ☐ Type B ☐ Other:	Plug Socket Plug Socket
2. Class:	11. Connector temperature: 200°C 350°C 650°C
☐ Class 1 ☐ Class 2	12. Option:
3. Lengths (mm):	☐ Cable clamp ☐ Custom ID label ☐ Without
<sup>11</sup>	Application:
4. Length L or L3 (mm):	Operating temperature (min/max):
5. Diameter Ø (mm):	Type of environment:
6. Cable prolongation:	Accessories: See the part "Accessories"
	Quantity:
☐ Fiberglass (400°C) ☐ Other:	Note:
7. Cable length LC (mm):	
8. Crimp protection:  Spring Heat shrink sleeve Without	
9. Thread:  1/2" BSPP 1/4" BSPP 1/4" BSPT M10  1/2" NPT Other:	
How to order?	ոիդի



### TR15 – Thermocouples with thread connection Fixed thread with 90° cable prolongation



LC *Tube mater	ial Stainless steel 316L *Thread material Stainless steel (304/304L/316/31)
Ordering information	
1. Thermocouple:           ☐ Type K         ☐ Type N         ☐ Type J         ☐ Type T         ☐ Type E           ☐ Type R         ☐ Type S         ☐ Type B         ☐ Other:	9. Connector:    Miniature   Miniature   Standard   Standard   Without   Plug   Socket   Sock
2. Class:	<b>10. Connector temperature:</b> □ 200°C □ 350°C □ 650°C
Class 1 Class 2	11. Option:
3. Length L or L1 (mm):	Cable clamp Custom ID label Without
4. Diameter Ø (mm):	Additional:  Application:
5. Cable prolongation:	Operating temperature (min/max):
☐ PVC (105°C) ☐ Silicone (180°C) ☐ Teflon (260°C)	Type of environment:
☐ Fiberglass (400°C) ☐ Other:	Accessories:
6. Cable length LC (mm):	See the part "Accessories"  Quantity:
7. Crimp protection:  Spring Heat shrink sleeve Without	Note:
8. Thread:	
How to order?	નુન



### TR20 – Thermocouples with thread connection Nozzle



50 LC	R ©
	*Nozzle and thread material Stainless steel (304/304L/316/316L)
Ordering information	
1. Thermocouple:           Type K         Type N         Type J         Type T         Type E           Type R         Type S         Type B         Other:	9. Connector:  Miniature Miniature Standard Standard Without Plug Socket Plug Socket
2. Class:	10. Connector temperature: 200°C 350°C 650°C
☐ Class 1 ☐ Class 2	11. Option:  Cable clamp Custom ID label Without
3. Length L (mm):	Additional:
4. Diameter Ø (mm):	Application:
5. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	Operating temperature (min/max):  Type of environment:
6. Cable length LC (mm):	Accessories: See the part "Accessories"
	Quantity:
7. Crimp protection:  Spring Heat shrink sleeve Without	Note:
8. Thread:    1/2" BSPP	
How to order?  Choose the desired characteristics of your sensor by marking the company of the c	ااً الله الله الله الله heckboxes 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.



# TR21 – Thermocouples with thread connection Nozzle (90° bend)



50 LC	
*Tube material Stainless s	*Nozzle and thread material Stainless steel (304 / 304L / 316 / 316L
1. Thermocouple:           ☐ Type K         ☐ Type N         ☐ Type J         ☐ Type T         ☐ Type E           ☐ Type R         ☐ Type S         ☐ Type B         ☐ Other:	10. Connector:    Miniature
2. Class:	11. Connector temperature: 200°C 350°C 650°C
Class 1 Class 2	12. Option:  Cable clamp Custom ID label Without
3. Lengths (mm):  L1 L2	Additional:
	Application:
4. Length L (mm):	Operating temperature (min/max):
5. Diameter Ø (mm):	Type of environment:
6. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	Accessories: See the part "Accessories"  Quantity:
7. Cable length LC (mm):	Note:
8. Crimp protection:  Spring Heat shrink sleeve Without	
9. Thread:  ☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10 ☐ 1/2" NPT ☐ Other:	
How to order?	ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا



### TR22 – Thermocouples with thread connection Bolt



50	
Ordering information	*Bolt material <b>Stainless steel (304 / 304L / 316 / 316</b>
1. Thermocouple:         ☐ Type K       ☐ Type N       ☐ Type J       ☐ Type T       ☐ Type E         ☐ Type R       ☐ Type S       ☐ Type B       ☐ Other:	8. Connector:  Miniature Miniature Standard Standard Withou Plug Socket
2. Class:  Class 1 Class 2	9. Connector temperature: 200°C 350°C 650°C  10. Option:
3. Length L (mm):	Cable clamp Custom ID label Without
4. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	Additional:  Application:  Operating temperature (min/max):
_	Type of environment:
5. Cable length LC (mm):	Accessories: See the part "Accessories"
6. Crimp protection:	Quantity:
Spring	Note:
How to order?	ग[ग]

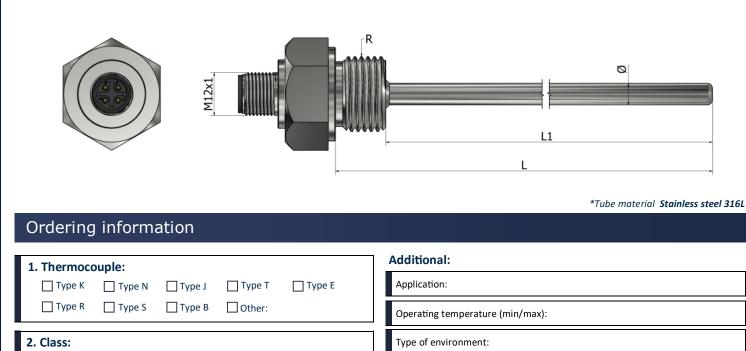
Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images,

personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



### TR30 – Thermocouples with thread connection Integrated M12 connector





3. Length L or L1 (mm):	
4. Diameter Ø (mm):	
5. Thread:	

☐ 1/4" BSPT

☐ M10

☐ 1/4" BSPP

Other:

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

#### How to order?

Class 1

☐ 1/2" BSPP

☐ 1/2" NPT

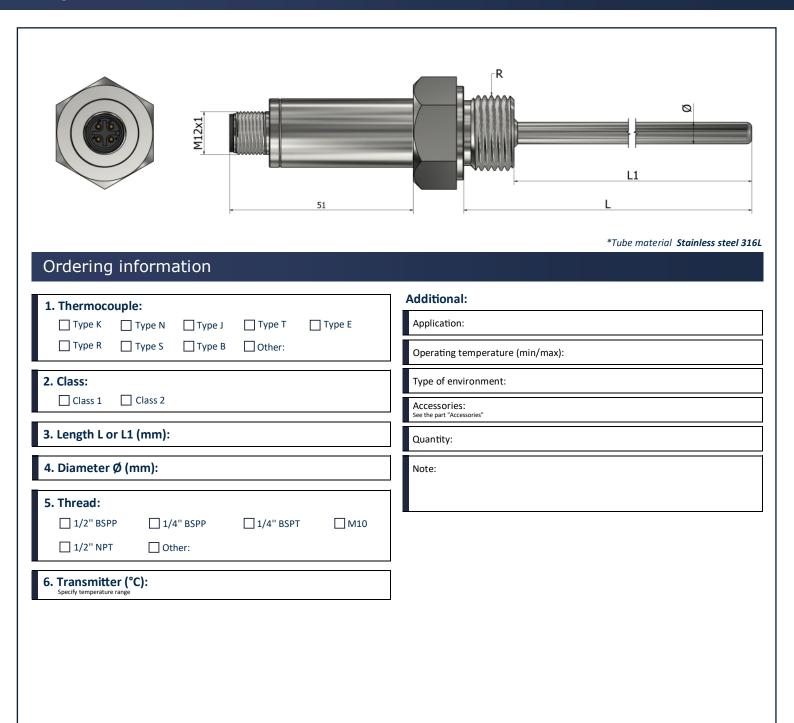
Class 2

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### TR31 – Thermocouples with thread connection Integrated M12 connector with transmitter





#### How to order?

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### TR40 – Thermocouples with thread connection Screw-on fixed thread



50 LC	R S L1
*Tube materi	ial Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316
1. Thermocouple:           ☐ Type K         ☐ Type N         ☐ Type J         ☐ Type T         ☐ Type E           ☐ Type R         ☐ Type S         ☐ Type B         ☐ Other:	9. Connector:    Miniature
2. Class:	10. Connector temperature: 200°C 350°C 650°C
Class 1 Class 2	11. Option:  ☐ Cable clamp ☐ Custom ID label ☐ Without
3. Lengths (mm):  L L1 L2	Additional:
	Application:
4. Diameters (mm):  Ø Ø <sub>1</sub>	Operating temperature (min/max):
ν ν1	Type of environment:
5. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)	Accessories: See the part "Accessories"
□ PVC (105°C)       □ Silicone (180°C)       □ Teflon (260°C)         □ Fiberglass (400°C)       □ Other:	Quantity:
6. Cable length LC (mm):	Note:
7. Crimp protection:  Spring Heat shrink sleeve Without	
8. Thread:    1/2" BSPP	
How to order?	वीवी



# TR50 – Thermocouples with thread connection Thread connection (spring loaded)

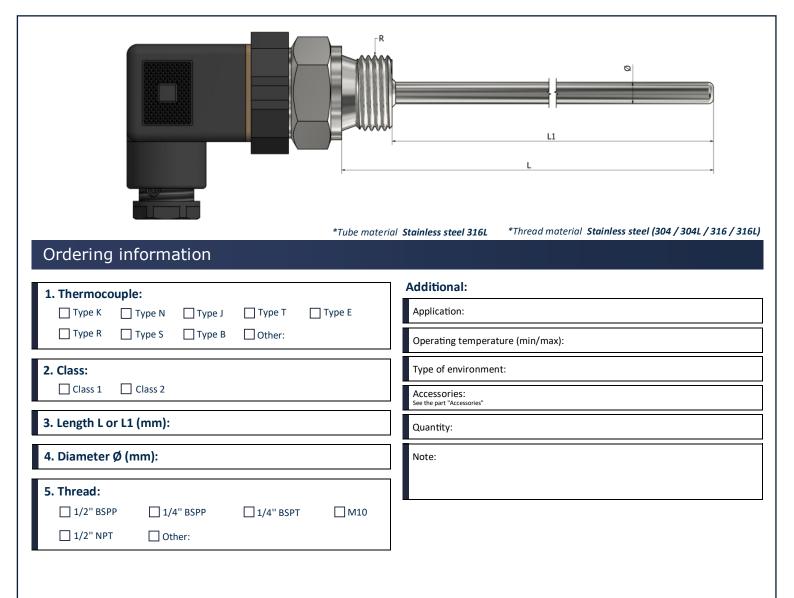


50 LC	L2 L1
*Tube materia Ordering information	Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 31
1. Thermocouple:           ☐ Type K         ☐ Type N         ☐ Type J         ☐ Type T         ☐ Type E           ☐ Type R         ☐ Type S         ☐ Type B         ☐ Other:	9. Connector:  Miniature Miniature Standard Standard Witho Plug Socket Plug Socket
2. Class:  Class 1 Class 2	10. Connector temperature: 200°C 350°C 650°C
3. Lengths (mm):	<b>11. Option:</b> ☐ Cable clamp ☐ Custom ID label ☐ Without
L L1 L2	Additional:
4. Diameter Ø (mm):	Application:
5. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	Operating temperature (min/max):  Type of environment:  Accessories: See the part "Accessories"
6. Cable length LC (mm):	Quantity:
7. Crimp protection:  Spring Heat shrink sleeve Without	Note:
8. Thread:    1/2" BSPP	



### TR60 – Thermocouples with thread connection DIN43650 connector





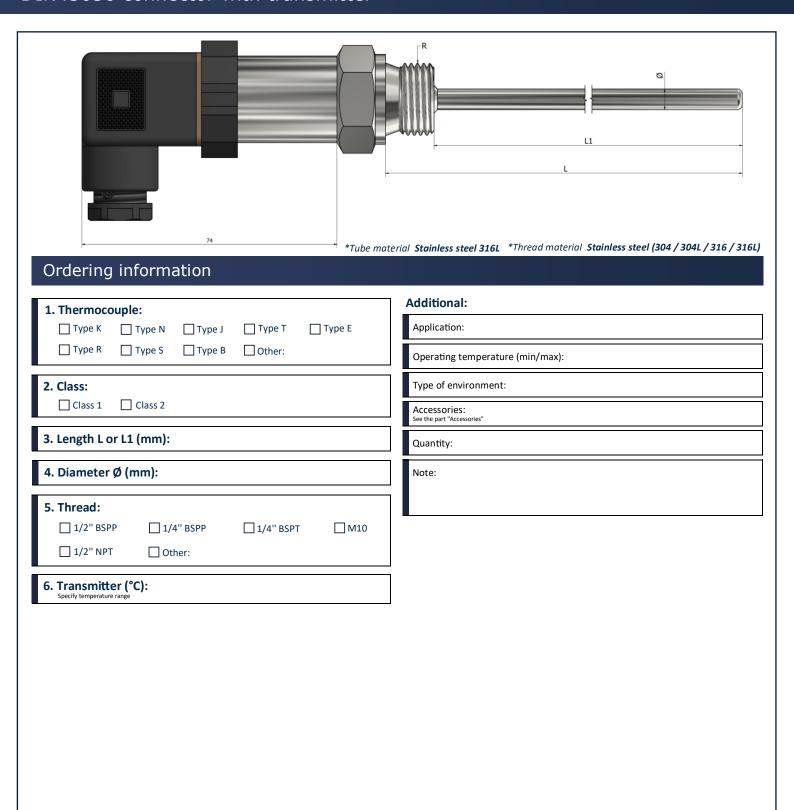
#### How to order?

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### TR61 – Thermocouples with thread connection DIN43650 connector with transmitter





#### How to order?

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### RTDs with thread connection - Technical information יויוי



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  $\Omega$  at 0°C, Pt500 sensor has a nominal resistance of 500  $\Omega$  at 0°C and Pt1000 sensor has a nominal resistance of 1000  $\Omega$  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.

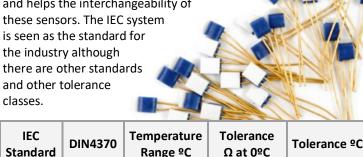


### RTDs with thread connection - Technical information

#### 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



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 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

#### 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

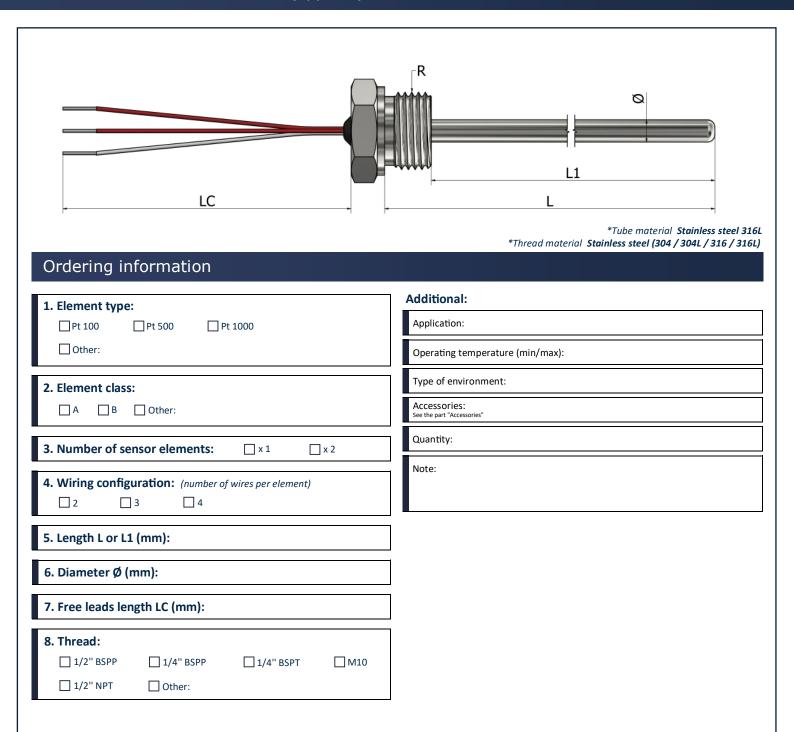
For more detailed information see "Accessories".





### PR01 – RTDs with thread connection Fixed thread with free leads (type 1)





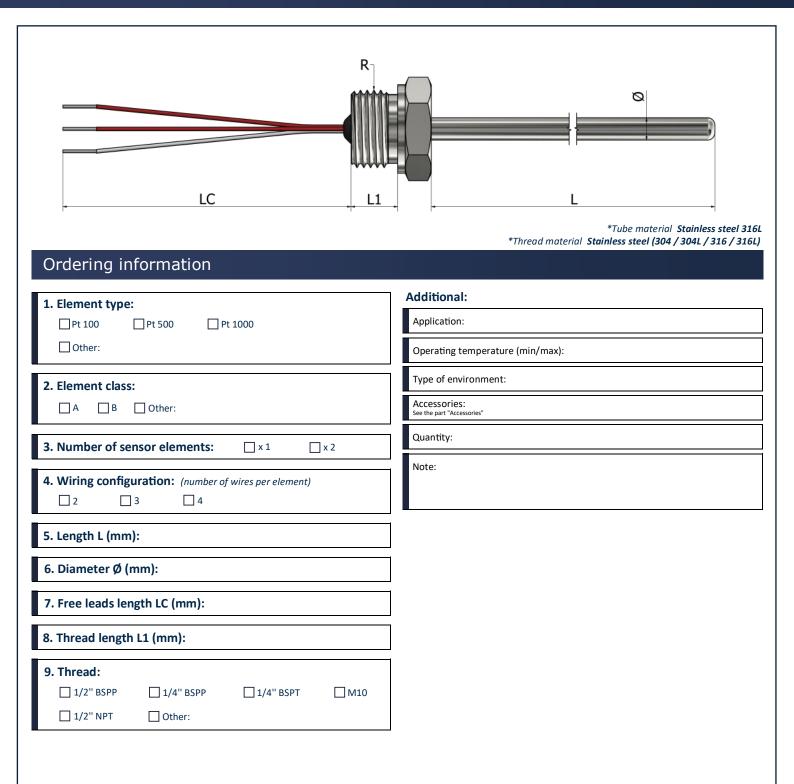
#### How to order?





### PR02 – RTDs with thread connection Fixed thread with free leads (type 2)





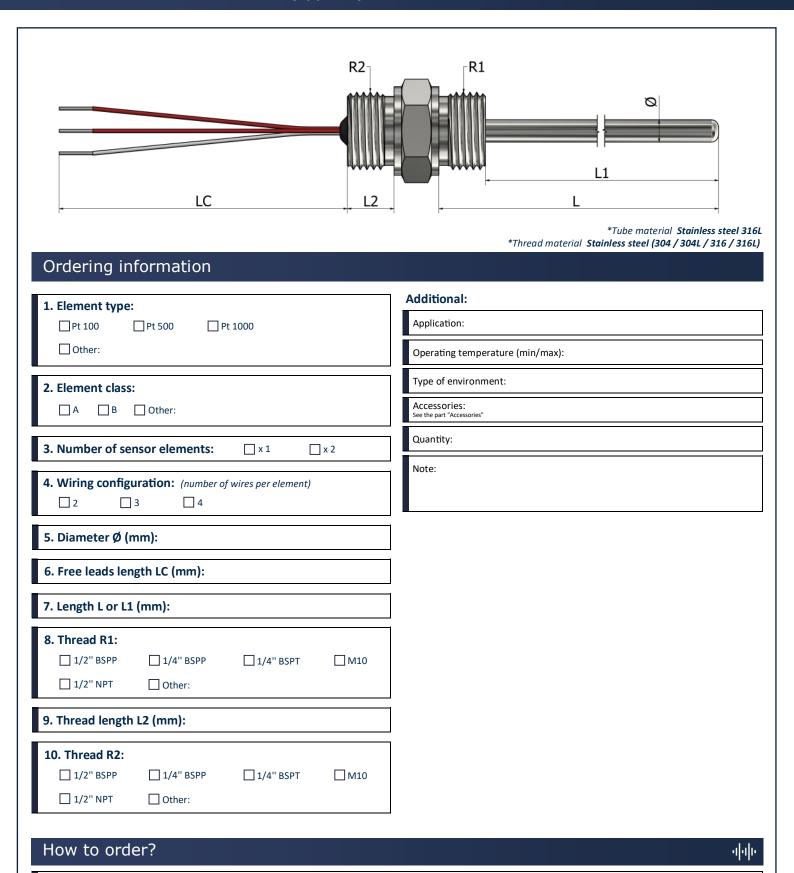
#### How to order?

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### PR03 – RTDs with thread connection Fixed thread with free leads (type 3)





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.



### PR10 – RTDs with thread connection Fixed thread with cable prolongation



50 LC	L1 L
	*Tube material <b>Stainless steel 3</b> : *Thread material <b>Stainless steel (304 / 304L / 316 / 31</b> 0
Ordering information	
1. Element type:  Pt 100 Pt 500 Pt 1000  Other:	10. Thread:  1/2" BSPP
2. Element class:	Additional:
☐ A ☐ B ☐ Other:	Application:
3. Number of sensor elements: $\square \times 1$ $\square \times 2$	Operating temperature (min/max):
4. Wiring configuration: (number of wires per element)	Type of environment:  Accessories: See the part "Accessories"
2 3 4	Quantity:
5. Length L or L1 (mm):	Note:
6. Diameter Ø (mm):	
7. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260  Fiberglass (400°C) Other:	)°C)
8. Cable length LC (mm):	
9. Crimp protection:  Spring Heat shrink sleeve Without	
How to order?	्रीय



# PR13 – RTDs with thread connection Fixed thread (90° bend) (type 1)

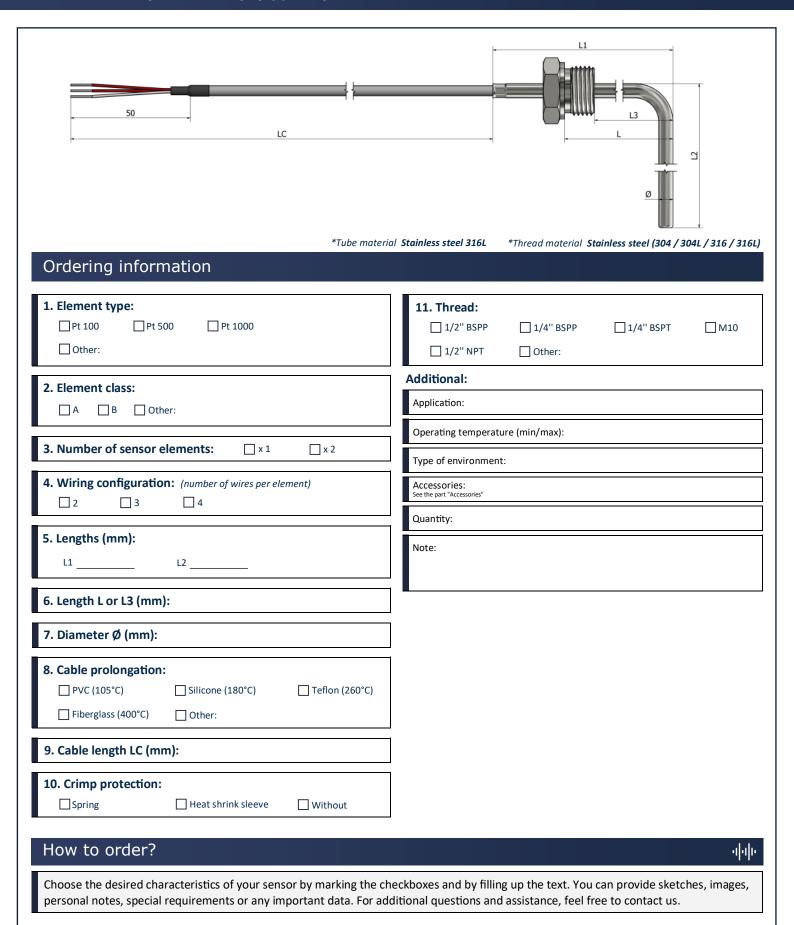


LC LC	
	material <b>Stainless steel 316L</b> *Thread material <b>Stainless steel (304 / 304L / 316 / 316</b>
Ordering information  1. Element type:  Pt 100 Pt 500 Pt 1000  Other:	11. Thread:  ☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10 ☐ 1/2" NPT ☐ Other:
2. Element class:	Additional:  Application:  Operating temperature (min/max):
3. Number of sensor elements:	Type of environment:
<b>4. Wiring configuration:</b> (number of wires per element)  ☐ 2 ☐ 3 ☐ 4	Accessories: See the part "Accessories"  Quantity:
5. Lengths (mm):  L1 L2	Note:
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:	°C)
9. Cable length LC (mm):	
10. Crimp protection:  Spring Heat shrink sleeve Without	
How to order?	व[व



### PR14 – RTDs with thread connection Fixed thread (90° bend) (type 2)







# PR15 – RTDs with thread connection Fixed thread with 90° cable prolongation



LC *Tube mater	ial Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316L
Ordering information	
1. Element type:    Pt 100	10. Thread:    1/2" BSPP
2. Element class:	Additional:
☐ A ☐ B ☐ Other:	Application:
3. Number of sensor elements:  \_ x1  \_ x2	Operating temperature (min/max):  Type of environment:
<b>4. Wiring configuration:</b> (number of wires per element)  ☐ 2 ☐ 3 ☐ 4	Accessories: See the part "Accessories"
5. Length L or L1 (mm):	Quantity:
6. Diameter Ø (mm):	Note:
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	
How to order?	վախ

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.



### PR20 – RTDs with thread connection Nozzle



50 LC	*Nozzle and thread material Stainless steel (304 / 304L / 316 / 316L)
Ordering information	
1. Element type:  Pt 100 Pt 500 Pt 1000  Other:	10. Thread:  ☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10 ☐ 1/2" NPT ☐ Other:
2. Element class:  A B Other:	Additional: Application:
3. Number of sensor elements:  \_ x1  \_ x2	Operating temperature (min/max):  Type of environment:
4. Wiring configuration: (number of wires per element)  □ 2 □ 3 □ 4	Accessories: See the part "Accessories"
5. Length L (mm):	Quantity:  Note:
6. Diameter Ø (mm):	Note.
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	
How to order?	गुन्

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.



# PR21 – RTDs with thread connection Nozzle (90° bend)



50 LC	
*Tube material <b>Stain</b> Ordering information	less steel 316L *Nozzle and thread material Stainless steel (304 / 304L / 316 / 316
1. Element type:    Pt 100	11. Thread:    1/2" BSPP
2. Element class:  A B Other:	Additional:  Application:
3. Number of sensor elements:  \_x1 \_x2	Operating temperature (min/max):  Type of environment:
<b>4. Wiring configuration:</b> (number of wires per element)  ☐ 2  ☐ 3  ☐ 4	Accessories: See the part "Accessories"  Quantity:
5. Lengths (mm):  L1 L2	Note:
6. Length L (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	
How to order?	ग्री



### PR22 – RTDs with thread connection Bolt

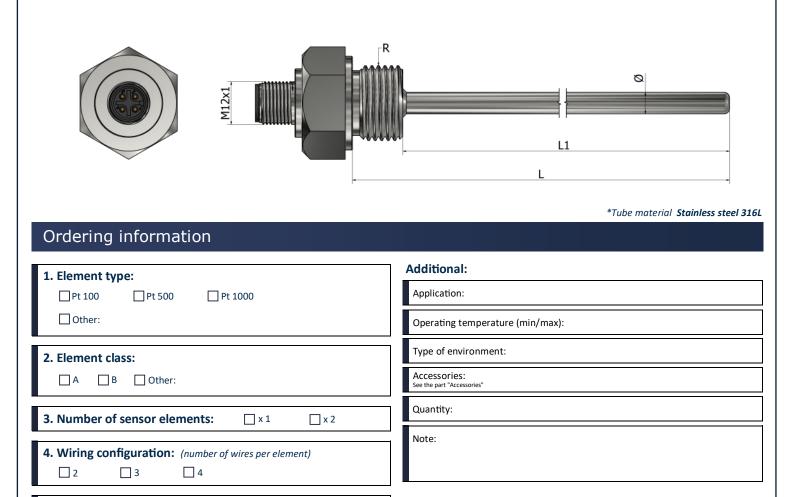


50 LC	
	*Bolt material Stainless steel (304 / 304L / 316 / 31
Ordering information	
1. Element type:  □ Pt 100 □ Pt 500 □ Pt 1000	Additional:  Application:
☐ Other:	Operating temperature (min/max):
2. Element class:	Type of environment:
☐ A ☐ B ☐ Other:	Accessories: See the part "Accessories"
3. Number of sensor elements: $\square \times 1$ $\square \times 2$	Quantity:
<b>4. Wiring configuration:</b> (number of wires per element)  ☐ 2 ☐ 3 ☐ 4	Note:
5. Length L (mm):	
6. Cable prolongation:  PVC (105°C) Silicone (180°C) Teflon (260°C)  Fiberglass (400°C) Other:	
7. Cable length LC (mm):	
8. Crimp protection:  Spring Heat shrink sleeve Without	
9. Thread:  1/2" BSPP	



### PR30 – RTDs with thread connection Integrated M12 connector





#### How to order?

5. Length L or L1 (mm):

6. Diameter Ø (mm):

☐ 1/4" BSPP

Other:

☐ 1/4" BSPT

☐ M10

**7. Thread:**1/2" BSPP

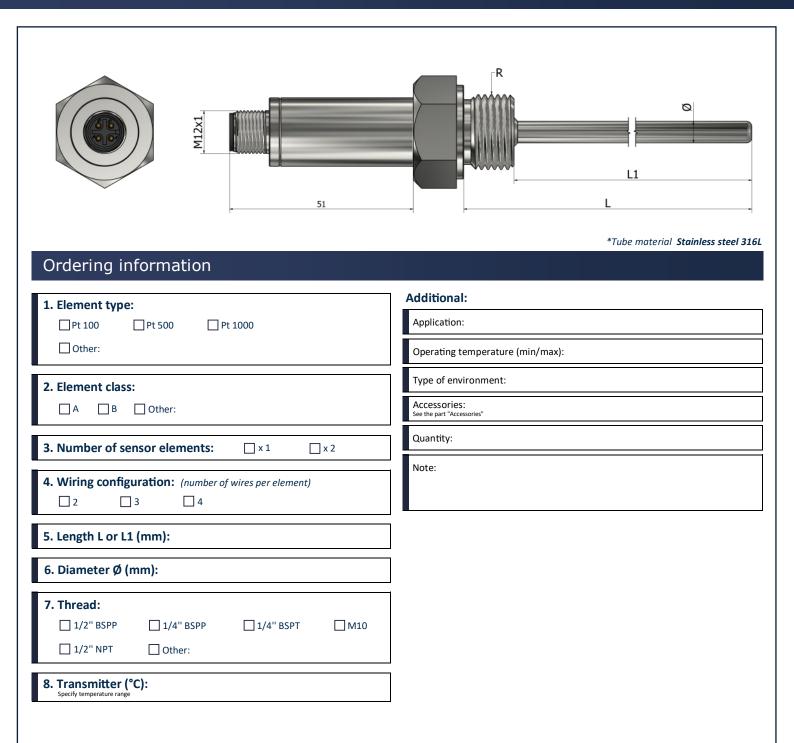
☐ 1/2" NPT

444



# PR31 – RTDs with thread connection Integrated M12 connector with transmitter





#### How to order?

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# PR40 – RTDs with thread connection Screw-on fixed thread



50		LC		R		L1
O.d		*Tube mater	ial <b>Stainless steel 316L</b>	*Thread material S	tainless steel (304 / 3	04L / 316 / 31
1. Element type:    Pt 100			10. Thread:  1/2" BSPP  1/2" NPT	☐ 1/4" BSPP☐ Other:	☐ 1/4" BSPT	□M10
2. Element class:	er:		Additional:  Application:			
3. Number of sensor e	elements:	□ x 2	Operating temperat			
4. Wiring configuratio  ☐ 2 ☐ 3	n: (number of wires per e	lement)	Accessories: See the part "Accessories"			
5. Lengths (mm):	L1	L2	Quantity: Note:			
6. Diameters (mm):	Ø1					
7. Cable prolongation:  PVC (105°C)  Fiberglass (400°C)	: Silicone (180°C)	☐ Teflon (260°C)				
8. Cable length LC (mr	m):		]			
9. Crimp protection:	☐ Heat shrink sleeve	Without				



# PR50 – RTDs with thread connection Thread connection (spring loaded)



*Tube mater	rial <b>Stainless steel 316L</b> *Thread material <b>Stainless steel (304 / 304L / 316 / 3</b> :
1. Element type:  ☐ Pt 100 ☐ Pt 500 ☐ Pt 1000 ☐ Other:	10. Thread:  ☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10 ☐ 1/2" NPT ☐ Other:
2. Element class:  A B Other:	Additional:  Application:
3. Number of sensor elements:  \[ \times x 1 \] \[ \times x 2	Operating temperature (min/max):  Type of environment:
4. Wiring configuration: (number of wires per element)	Accessories: See the part "Accessories"
5. Lengths (mm):  L L1 L2	Quantity:  Note:
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	

personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



### PR60 – RTDs with thread connection DIN43650 connector





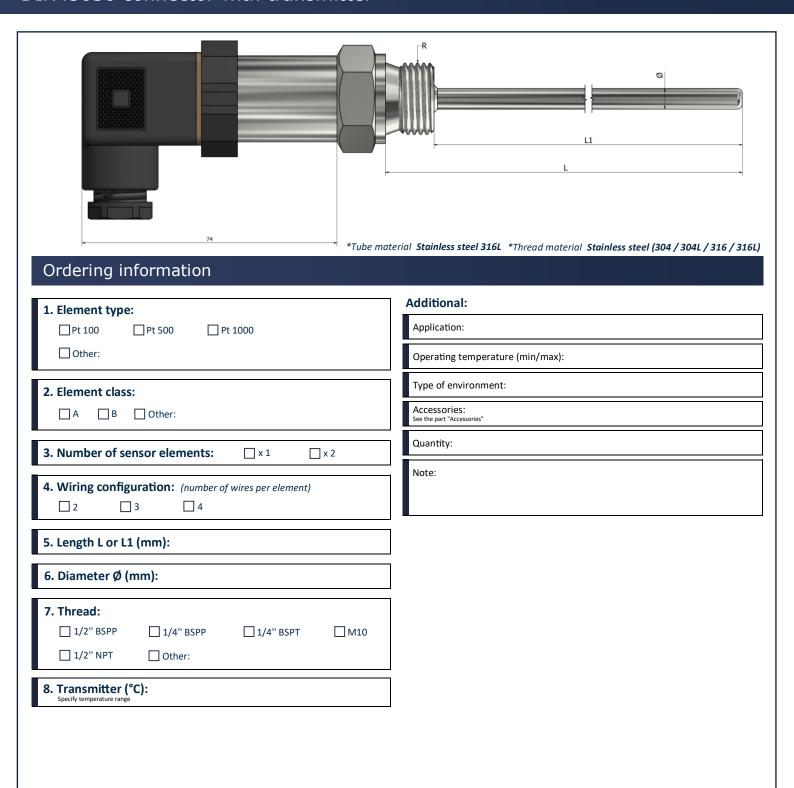
#### How to order?

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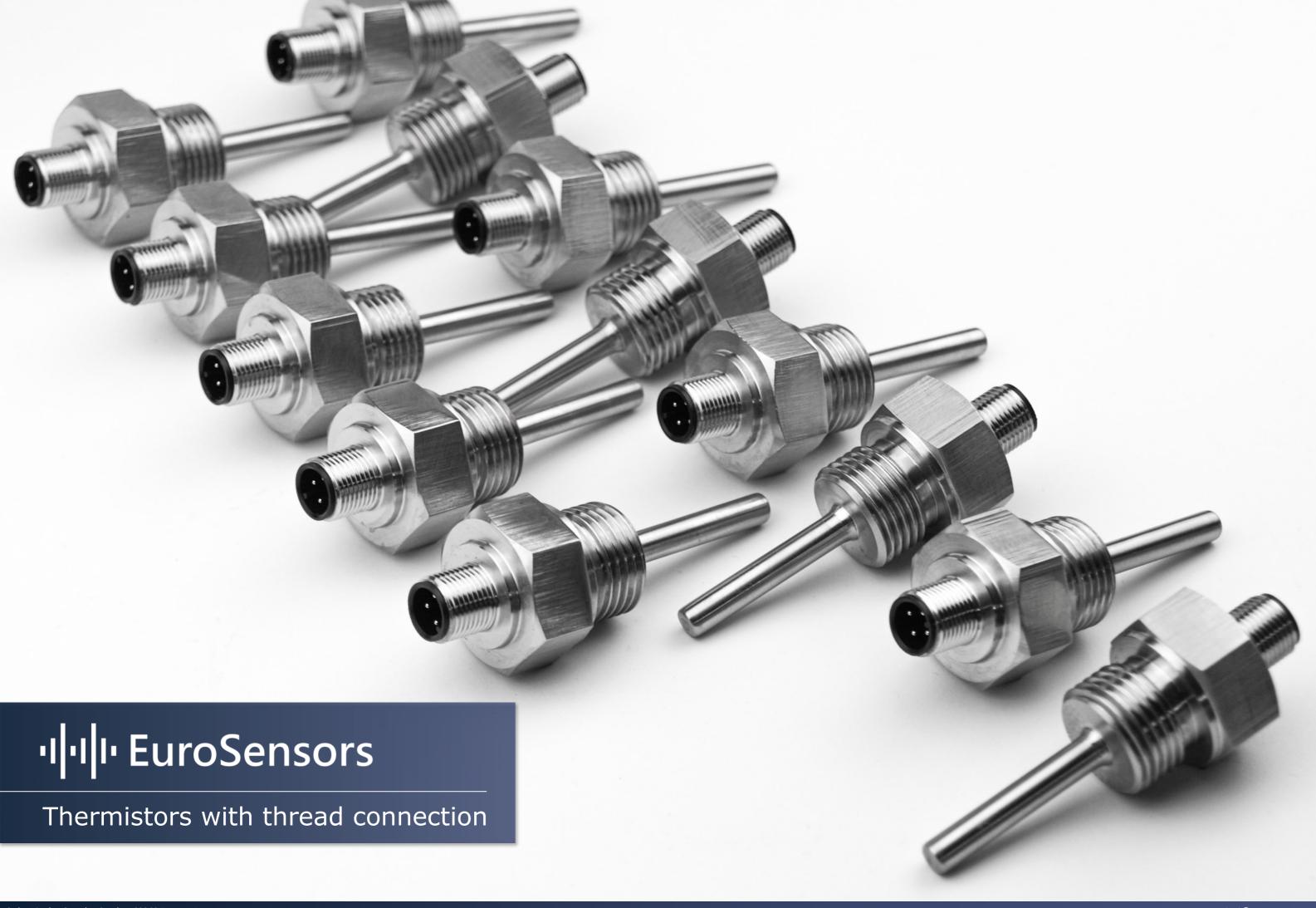
### PR61 – RTDs with thread connection DIN43650 connector with transmitter





#### How to order?

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### Thermistors with thread connection - Technical information



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.

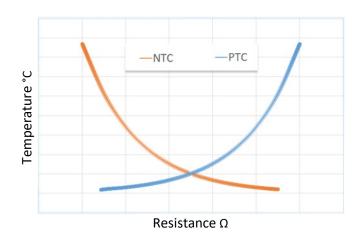
However, there is a major difference between these two types of thermistors:

#### **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.



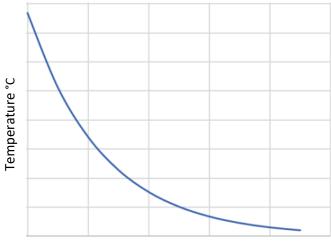


### Thermistors with thread connection - Technical information

### The β beta value

A thermistor's " $\beta$ " 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.



Resistance Ω

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 ( $\beta$ ). 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

The beta value of an NTC Thermistor is calculated using

T1 = Temperature 1 (K)

T2= Temperature 2 in (K)

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

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

Туре	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)

### Thermistor 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.



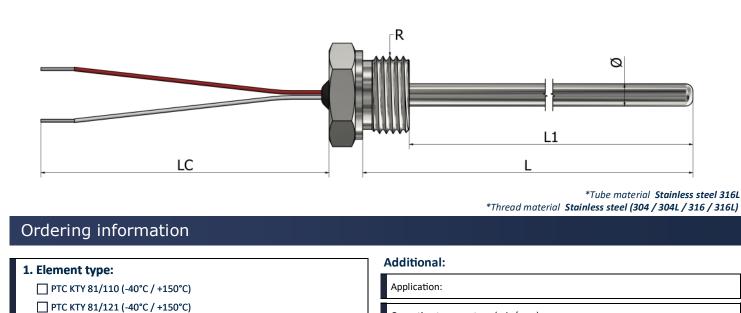
### Global cable insulation characteristics

	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



# HR01 – Thermistors with thread connection Fixed thread with free leads (type 1)





1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C)	Operating temperature (min/max):
$\square$ NTC 10k $\Omega$ at 25°C β3977 (-40°C / +125°C)	Operating temperature (miny max).
☐ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)	Type of environment:
☐ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Accessories:
Other:	See the part "Accessories"
( NTC / PTC , T° ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)	Note:
2 Other:	
3. Length L or L1 (mm):	
4. Diameter Ø (mm):	
5. Free leads length LC (mm):	

☐ M10

How	1		
H O W	тΩ	$\alpha$ r $\alpha$	or,
	LU	OIU	CI:

6. Thread:

☐ 1/2" NPT



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.

☐ 1/4" BSPP

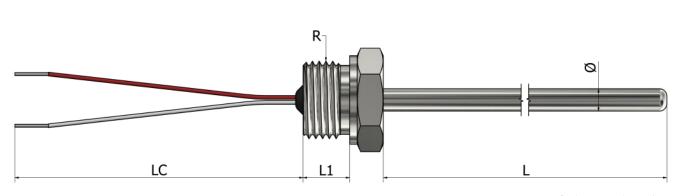
Other:

☐ 1/4" BSPT



# HR02 – Thermistors with thread connection Fixed thread with free leads (type 2)





\*Tube material Stainless steel 316L \*Thread material Stainless steel (304 / 304L / 316 / 316L)

### Ordering information

1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C) ☐ NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
☐ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
<ul><li>NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)</li><li>Other:</li></ul>	Accessories: See the part "Accessories"
( NTC / PTC , T° ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L (mm):	
4. Diameter Ø (mm):	
5. Free leads length LC (mm):	

### How to order?

6. Thread length L1 (mm):

☐ 1/4" BSPP

Other:

☐ 1/4" BSPT

☐ M10

**7. Thread:**\_\_\_ 1/2" BSPP

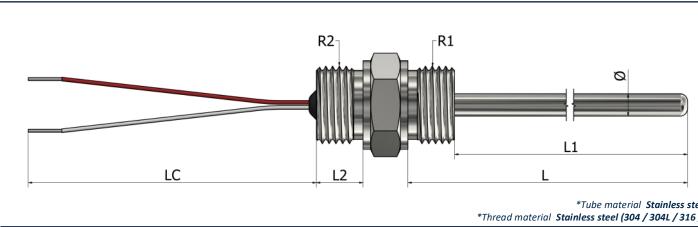
☐ 1/2" NPT

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### HR03 - Thermistors with thread connection Fixed thread with free leads (type 3)





\*Tube material Stainless steel 316L \*Thread material Stainless steel (304 / 304L / 316 / 316L)

Ordering information	
1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C) ☐ NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
☐ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
☐ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) ☐ Other:	Accessories: See the part "Accessories"
( NTC / PTC , T° ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)  2  Other:	Note:
3. Diameter Ø (mm):	
4. Free leads length LC (mm):	
5. Length L or L1 (mm):	
6. Thread R1:	
☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10	
☐ 1/2" NPT ☐ Other:	
7. Thread length L2 (mm):	
8. Thread R2:	

☐ M10

How to order?

☐ 1/2" BSPP

☐ 1/2" NPT

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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.

☐ 1/4" BSPP

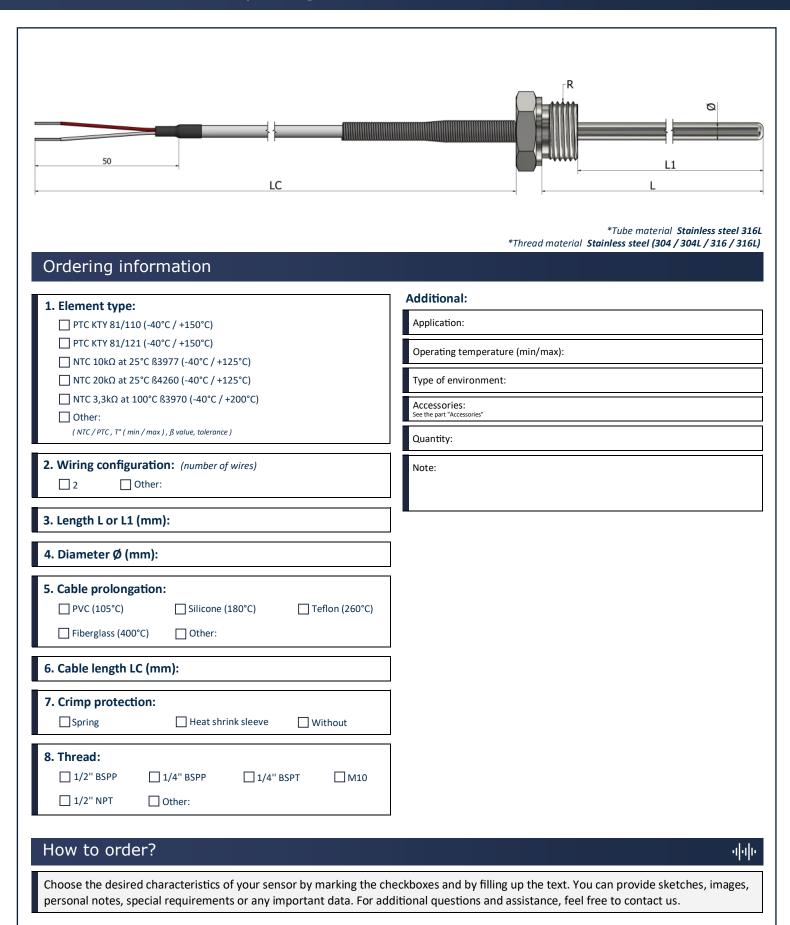
Other:

☐ 1/4" BSPT



### HR10 – Thermistors with thread connection Fixed thread with cable prolongation

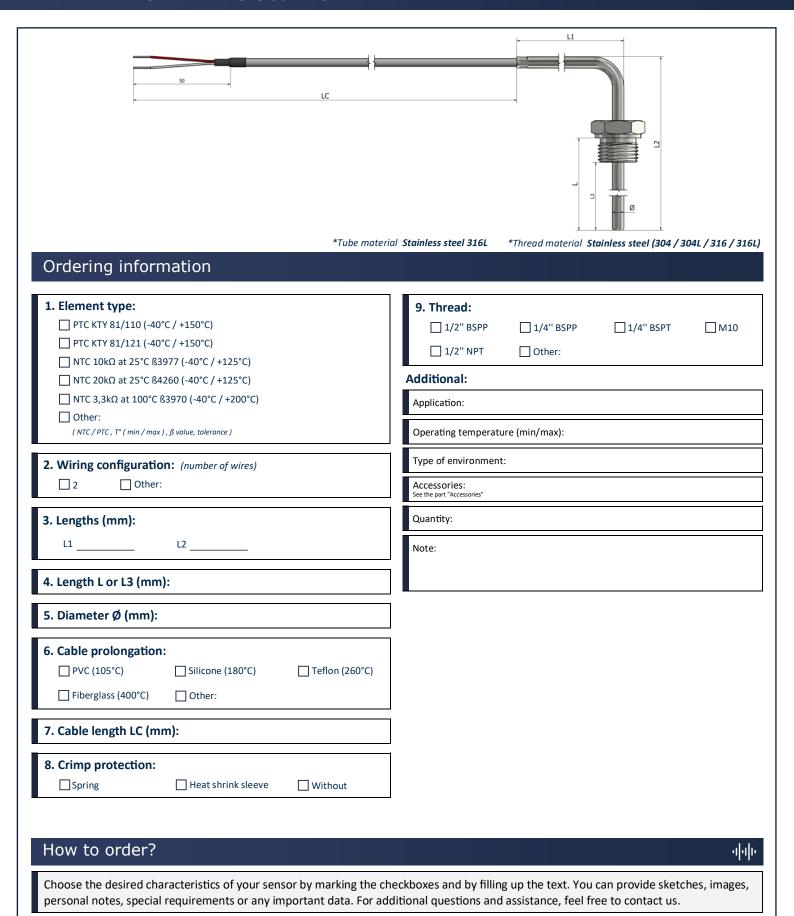






### HR13 – Thermistors with thread connection Fixed thread (90° bend) (type 1)

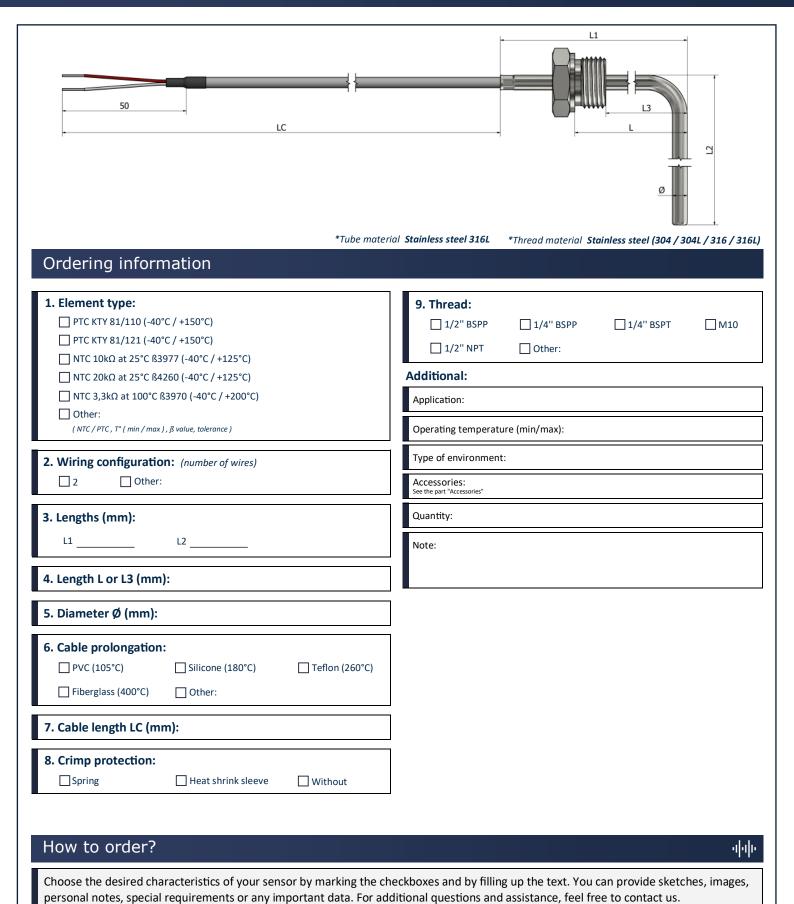






# HR14 – Thermistors with thread connection Fixed thread (90° bend) (type 2)

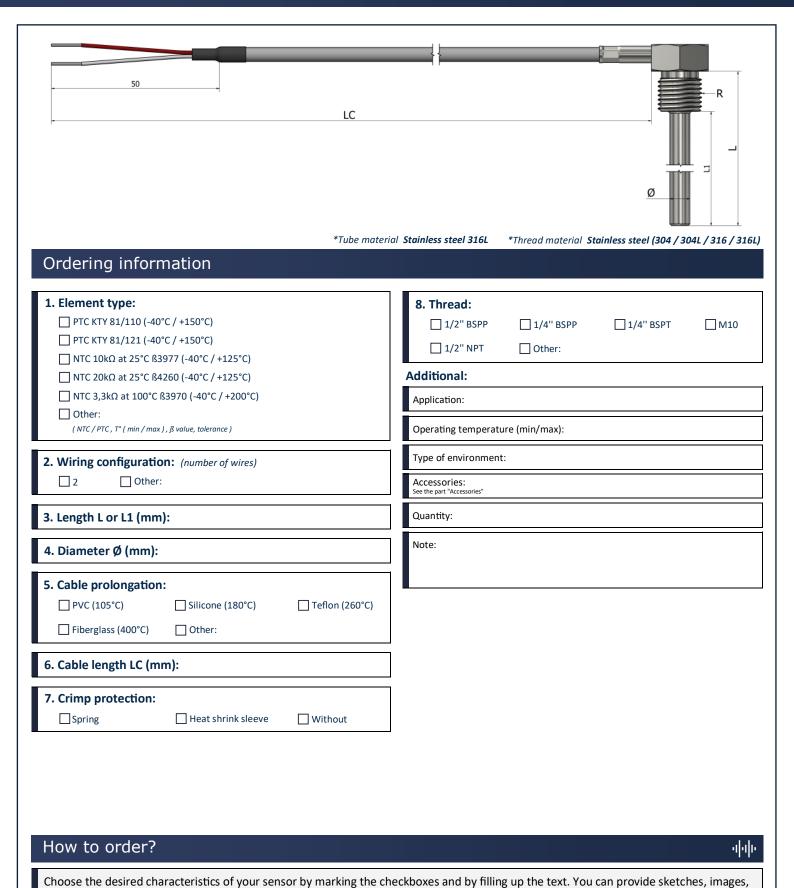






# HR15 – Thermistors with thread connection Fixed thread with 90° cable prolongation





personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



# HR20 – Thermistors with thread connection Nozzle



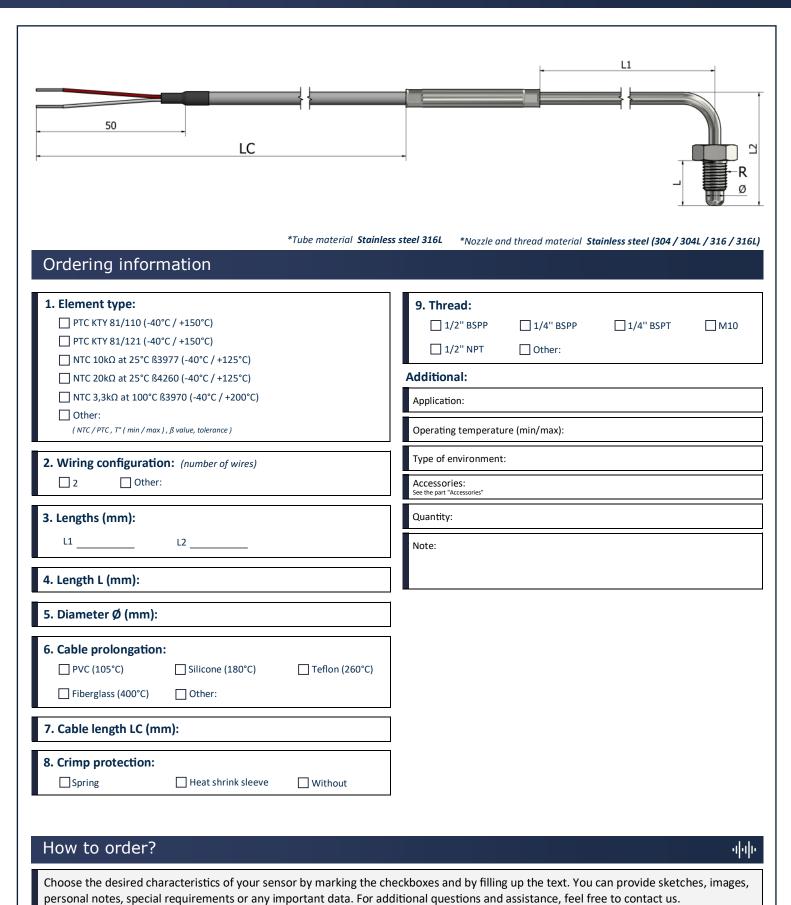
50	LC	*Nozzle ar	nd thread material <b>S</b>	tainless steel (304 / 3	R ©
Ordering information					
1. Element type:  □ PTC KTY 81/110 (-40°C / +150°C)  □ PTC KTY 81/121 (-40°C / +150°C)  □ NTC 10kΩ at 25°C β3977 (-40°C / +125°C)		8. Thread: ☐ 1/2" BSPP ☐ 1/2" NPT	☐ 1/4" BSPP	☐ 1/4" BSPT	□ M10
NTC 20kΩ at 25°C β4260 (-40°C / +125°C)		Additional:			
$\square$ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) $\square$ Other:		Application:			
( NTC / PTC , T° ( min / max ) , β value, tolerance )		Operating temperatu			
2. Wiring configuration: (number of wires)		Type of environment	:		
2 Other:		Accessories: See the part "Accessories"			
3. Length L (mm):		Quantity:			
4. Diameter Ø (mm):		Note:			
5. Cable prolongation:  PVC (105°C) Silicone (180°C)  Fiberglass (400°C) Other:	☐ Teflon (260°C)				
6. Cable length LC (mm):					
7. Crimp protection:  Spring Heat shrink sleeve	☐ Without				

personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



## HR21 – Thermistors with thread connection Nozzle (90° bend)







### HR22 – Thermistors with thread connection Bolt



50	
	*Bolt material <b>Stainless steel (304 / 304L / 316 / 3</b>
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 β3977 (-40°C / +125°C)   NTC 20kΩ at 25°C β4260 (-40°C / +125°C)   NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)   Other:   (NTC / PTC, T* (min / max), β value, tolerance)  2. Wiring configuration: (number of wires)   2	Additional:  Application:  Operating temperature (min/max):  Type of environment:  Accessories: See the part "Accessories"  Quantity:  Note:
Fiberglass (400°C) Other:  5. Cable length LC (mm):	
6. Crimp protection:  Spring Heat shrink sleeve Without	
7. Thread:  1/2" BSPP 1/4" BSPP 1/4" BSPT M10  1/2" NPT Other:	

8 chemin des Grandes Combes 69360 Ternay, France +33 472 669 234

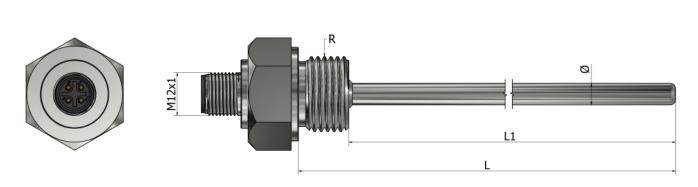
Choose the desired characteristics of your sensor by marking the checkboxes and by filling up the text. You can provide sketches, images,

personal notes, special requirements or any important data. For additional questions and assistance, feel free to contact us.



# HR30 – Thermistors with thread connection Integrated M12 connector





\*Tube material Stainless steel 316L

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1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C)	Operating temperature (min/max):
$\Box$ NTC 10kΩ at 25°C β3977 (-40°C / +125°C) $\Box$ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
<ul><li>NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)</li><li>Other:</li></ul>	Accessories: See the part "Accessories"
( NTC / PTC , T° ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)  2  Other:	Note:
3. Length L or L1 (mm):	
4. Diameter Ø (mm):	

☐ M10

### How to order?

**5. Thread:**☐ 1/2" BSPP

☐ 1/2" NPT

446

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.

☐ 1/4" BSPP

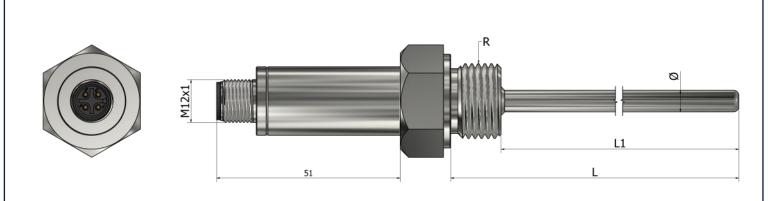
Other:

☐ 1/4" BSPT



# HR31 – Thermistors with thread connection Integrated M12 connector with transmitter





\*Tube material Stainless steel 316L

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1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C) ☐ NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
□ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
<ul><li>NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)</li><li>Other:</li></ul>	Accessories: See the part "Accessories"
( NTC / PTC , T* ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L or L1 (mm):	
4. Diameter Ø (mm):	
5. Thread:	

☐ M10

### How to order?

☐ 1/2" BSPP

☐ 1/2" NPT

6. Transmitter (°C):

Specify temperature range

☐ 1/4" BSPP

Other:

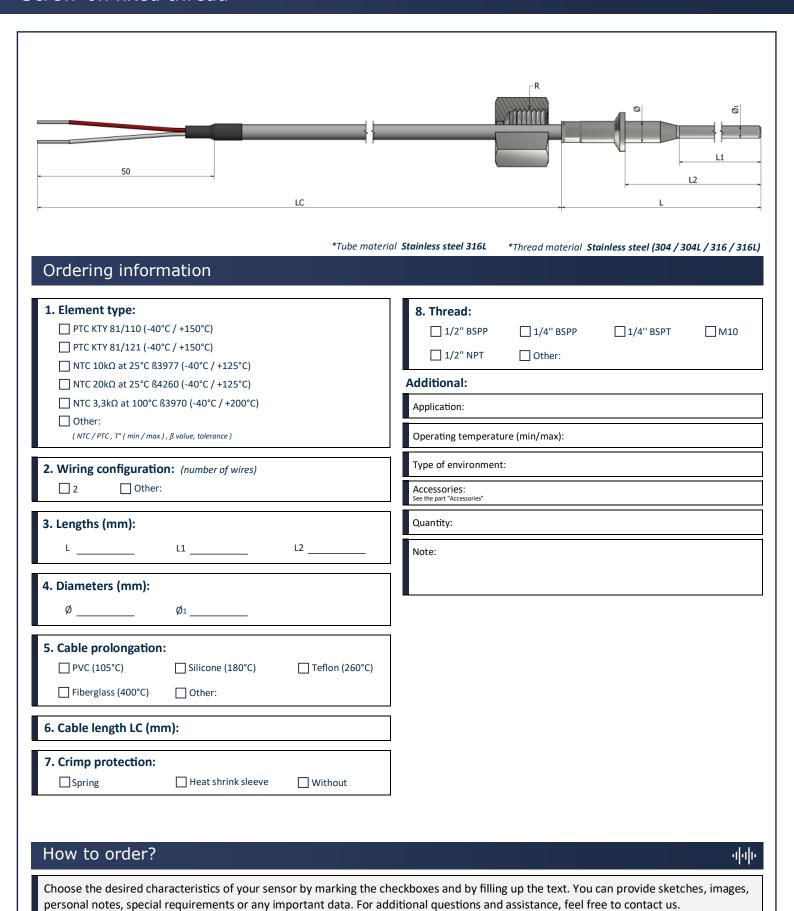
☐ 1/4" BSPT

446



### HR40 – Thermistors with thread connection Screw-on fixed thread

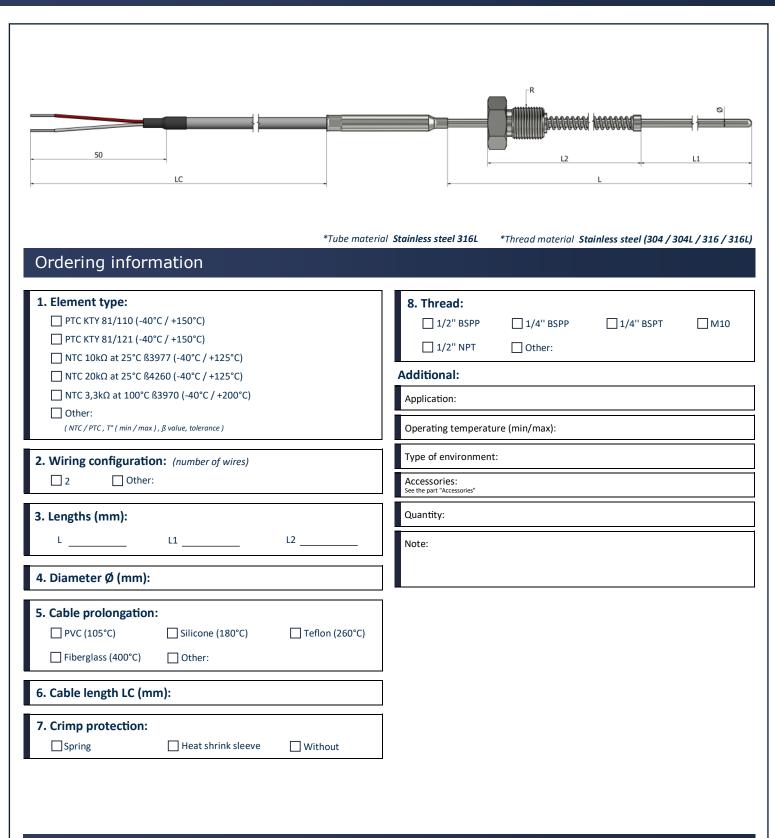






### HR50 – Thermistors with thread connection Thread connection (spring loaded)





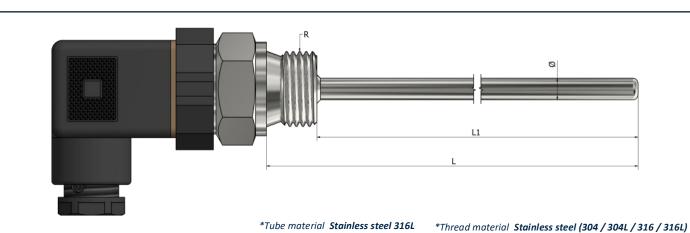
#### How to order?

444



# HR60 – Thermistors with thread connection <a href="https://doi.org/10.1007/journal.com/">DIN43650 connector</a>





Ordering information

1. Element type:	Additional:
☐ PTC KTY 81/110 (-40°C / +150°C)	Application:
☐ PTC KTY 81/121 (-40°C / +150°C)	Operating temperature (min/max):
$\square$ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C) $\square$ NTC 20kΩ at 25°C ß4260 (-40°C / +125°C)	Type of environment:
<ul><li>NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)</li><li>Other:</li></ul>	Accessories: See the part "Accessories"
( NTC / PTC , T* ( min / max ) , β value, tolerance )	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L or L1 (mm):	
4. Diameter Ø (mm):	

☐ M10

### How to order?

5. Thread:

☐ 1/2" NPT

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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.

☐ 1/4" BSPP

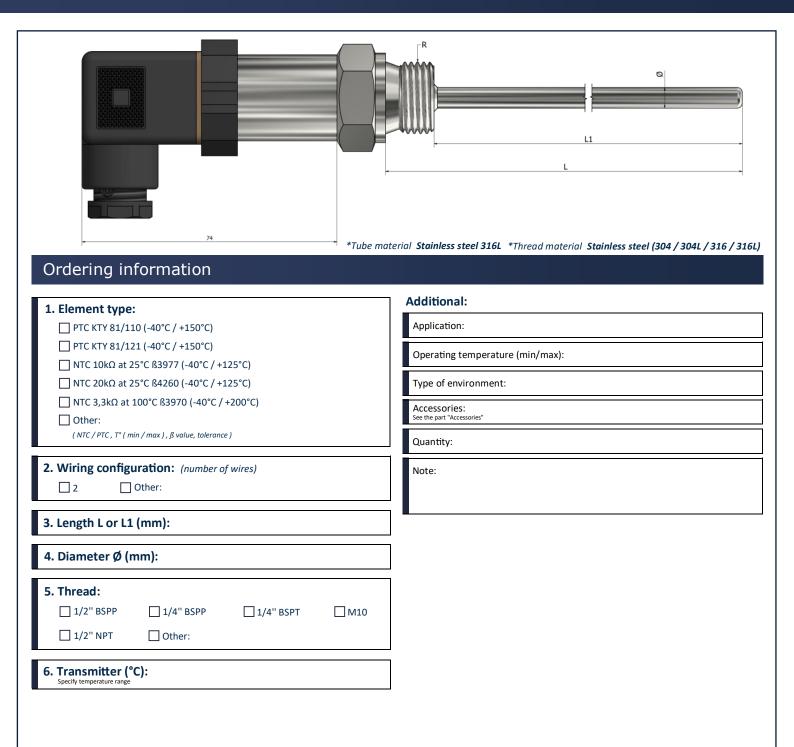
Other:

☐ 1/4" BSPT



### HR61 – Thermistors with thread connection DIN43650 connector with transmitter





#### How to order?

