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Wired thermistors



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Wired thermistors - Technical information

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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.



Resistance Ω

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.



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 (β). Beta is measured in degrees Kelvin (K) and is computed based on the formulation given below.

Where:

given range.

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



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

Types of thermistors

Туре	Resistance	Beta value	Temperature
РТС КТҮ81/121	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

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Types of thermistor cables

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



Thermistor 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.

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

HC00 – Wired thermistors Twisted teflon

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

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Ordering information	
1. Element type:	Additional:
□ PTC KTY 81/110 (-40°C / +150°C)	Application:
\square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
\square NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C)	Accessories:
Other: (NTC / PTC, T° (min / max), β value, tolerance)	See the part "Accessories"
	Quantity:
2. Wiring configuration: (number of wires)	Note:
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 Other: shrink sleeve	
6. Insulation method:	
To the measuring element	
Over the measuring element	

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

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

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Ordering information	Additional
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)	Operating temperature (min/max):
\square NTC 20kΩ at 25°C I84260 (-40°C / +125°C) \square NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Type of environment:
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. Wire and cable size:	
☐ 7 x 0,2 (0,22 mm²) OD ≈ Ø3,0 mm	
Other:	
4. Cable length L (mm):	
5. Insulation material:	
6. Insulation method:	
To the measuring element	
Over the measuring element	

How to order?

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HC60 – Wired thermistors Silicone (silicone/silicone)

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Thermistors with protection tube

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HT21 - Pot seal with reduced tip
HT25 - Open air
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Thermistors with protection tube - Technical information

What are the characteristics of RTDs with protection tube ?

Protection tubes play a crucial role by providing a robust shield for the RTD sensor, safeguarding it from potential mechanical damage, corrosive substances, high-pressure environments, and other adverse conditions that may compromise its accuracy or integrity. The primary purpose of the protection tube is to act as a physical barrier between the external environment and the delicate RTD sensor. It serves as a protective sheath, shielding the

sensor from impacts, vibrations, abrasion, and other mechanical stresses that can occur during

operation. This ensures the longevity and reliability of the sensors in rugged industrial settings. We have several sizes and types of tubes. See *"Technical data -*



Protection tube materials

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

Tube materials:

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

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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.

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Thermistors with protection tube - Technical information

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Wiring configurations

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



Thermistors with protection tube - Technical information



The β beta value

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Types of thermistors

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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)

HT00 - Thermistors with protection tube Free leads

LC Ordering information Additional: 1. Element type: Application: PTC KTY 81/110 (-40°C / +150°C) PTC KTY 81/121 (-40°C / +150°C) Operating temperature (min/max): NTC 10kΩ at 25°C β3977 (-40°C / +125°C) NTC 20kΩ at 25°C β4260 (-40°C / +125°C) Type of environment: NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C) Accessories: See the part "Accessories" Other: (NTC / PTC , T° (\min / \max) , ß value, tolerance) Quantity: 2. Wiring configuration: (number of wires) Note: 2 Other: 3. Tube dimensions (mm): (material Stainless steel 316L) L _ Ø _____ 4. Free leads length LC (mm): How to order?

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HT10 – Thermistors with protection tube Standard tube

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50 LC	
Ordering information 1. Element type:	Additional:
□ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C)	Application:
\square NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
$\square \text{ NTC } 20 \text{k}\Omega \text{ at } 25^{\circ}\text{C} \text{ B4260 } (-40^{\circ}\text{C} / +125^{\circ}\text{C})$	Type of environment:
$\square \text{ Other:}$	Accessories: See the part "Accessories"
(NTC / PTC , T* (min / max) , β value, tolerance)	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Tube dimensions: (material Stainless steel 316L)	
☐ Ø3 x 50 mm	
☐ Ø6 x 50 mm ☐ Other:	
4. Cable prolongation:	
□ PVC (105°C) □ Silicone (180°C) □ Teflon (260°C)	
☐ Fiberglass (400°C)	
5. Cable length LC (mm):	
6. Crimp protection:	

How to order?

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HT12 – Thermistors with protection tube Standard tube (90° bend)

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How to order?

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HT20 – Thermistors with protection tube Pot seal

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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 Other: 2 Other:		Additional: Application: Operating temperature Type of environment: Accessories: See the part "Accessories" Quantity: Note:	re (min/max):		
3. Tube dimensions (mm): (material Stainless steel 316L L Ø 4. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	L) eflon (260°C)				
5. Cable length LC (mm): 6. Crimp protection: Spring Heat shrink sleeve	/ithout				

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.

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HT21 – Thermistors with protection tube Pot seal with reduced tip

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50 LC			
Ordering information			
	Additional:		
□ PTC KTY 81/110 (-40 C / +150 C) □ PTC KTY 81/121 (-40°C / +150°C)	Operating temperature (min(may):		
$\square \text{ NTC } 10k\Omega \text{ at } 25^{\circ}\text{C } \text{B3977 } (-40^{\circ}\text{C } / +125^{\circ}\text{C})$			
NTC 20kΩ at 25 C is4260 (-40 C / +125 C) NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Type of environment:		
Other:	See the part "Accessories"		
	Quantity:		
2. Wiring configuration: (number of wires)	Note:		
3. Tube dimensions L and Ø (mm): (material Stainless steel 316L) L Ø 4. Tube dimensions L1 and Ø1 (mm): (material Stainless steel 316L) L1 Ø1			
E Cable prolongation			
$\square PVC (105^{\circ}C) \qquad \square Silicone (180^{\circ}C) \qquad \square Teflon (260^{\circ}C)$			
☐ Fiberglass (400°C) ☐ Other:			
6. Cable length LC (mm):			
7. Crimp protection: Spring Heat shrink sleeve Without			

How to order?

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HT25 – Thermistors with protection tube Open air

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50 LC				Q6,0
Ordering information				*Tube material Stainless steel 316
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):		
NTC 10kΩ at 25°C β3977 (-40°C / +125°C)				
□ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)		Type of environme	nt:	
NTC 3,3kΩ at 100°C k3970 (-40°C / +200°C)		Accessories: See the part "Accessories"		
(NTC / PTC , T° (min / max) , β value, tolerance)		Quantity:		
2 Wiring configuration: (number of wires)				
\square_2 Other:		Note:		
3. Tube length L (mm):				
4. Cable prolongation:]		
☐ PVC (105°C)	Teflon (260°C)			
☐ Fiberglass (400°C) ☐ Other:				
5. Cable length LC (mm):]		
]		
6. Crimp protection:				

How to order?

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HT30 – Thermistors with protection tube Plug-in (clamp)

50 LC	
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 20kΩ at 25 °C β4260 (-40 °C / +125 °C)	Type of environment:
NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Accessories:
$\bigcirc \text{Other:}$ (NTC / PTC, T [*] (min / max), ß value, tolerance)	See the part "Accessories"
	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Tube dimensions (mm): (material Stainless steel 316L)	
۲ Ø	
4. Cable prolongation:	
□ PVC (105°C) □ Silicone (180°C) □ Teflon (260°C)	
Fiberglass (400°C) Other:	
5. Cable length LC (mm):	
6. Crimp protection:	
Spring Heat shrink sleeve Without	

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.

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HT35 – Thermistors with protection tube Plug-in (miniature)

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50 LC 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 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 Other: 2 Other: 2 Other: 2	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
L Ø 4. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other: 5. Cable length LC (mm): 6. Crimp protection: Spring Heat shrink sleeve Without	

How to order?

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HT40 – Thermistors with protection tube Integrated M12 connector

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How to order?

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HT41 – Thermistors with protection tube Integrated M12 connector with transmitter

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How to order?

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HT50 – Thermistors with protection tube Armored cable prolongation

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50 LP LC	
Ordering information	*Armored cable material Stainless steel 3
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):
NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	
NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Accessories:
Other: (NTC / PTC , T° (min / max) , β value, tolerance)	Quantity
2. Wiring configuration: (number of wires)	Note:
3. Tube dimensions (mm): (material Stainless steel 316L)	
4. Cable prolongation:]
□ PVC (105°C) □ Silicone (180°C) □ Teflon (260°C)	
☐ Fiberglass (400°C) ☐ Other:	
5. Cable length LC (mm):]
6. Bare cable length LP (mm):	
7. Crimp protection:	

How to order?

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50 LC	
Ordering information	*Protection material PTF
 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 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)	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
2 Other: 3. Tube dimensions (mm): (material SS 316L with PTFE protection)	
4. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
5. Cable length LC (mm):	

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Penetration thermistors

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0° bend)	45
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Penetration thermistors - Technical information

What are the characteristics of penetration thermistors ?

What sets penetration thermistors 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

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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 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.

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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.



Resistance Ω

Thermistor wiring configurations

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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.

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

Penetration 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.



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 (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)

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

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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

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)



HP01 – Penetration thermistors Standard

50 LC	
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 Other: 0 ther: (NTC / PTC, T° (min / max), β value, tolerance)	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
☐ Ø6 mm ☐ Other:	
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection: Spring Heat shrink sleeve Without	

How to order?

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HP02 – Penetration thermistors Standard (90° bend)

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How to order?

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HP11 – Penetration thermistors Metal handle

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50 LC	
Ordering information	*Handle material Stainless steel 316L
1. Element type: \square PTC KTY 81/110 (-40°C / +150°C) \square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \square NTC 20k Ω at 25°C ß4260 (-40°C / +125°C) \square NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \square Other:	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories"
(NTC / PTC, T* (min / max), β value, tolerance) 2. Wiring configuration: (number of wires) 2 Other:	Quantity: Note:
 3. Needle diameter Ø: (material Stainless steel 316L) ☐ Ø3 mm ☐ Ø4 mm ☐ Ø5 mm ☐ Ø6 mm ☐ Other: 	
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection:	

How to order?

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HP12 – Penetration thermistors Metal handle (90° bend)

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How to order?

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HP13 – Penetration thermistors Plastic handle

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50 LC	to the second se
Ordering information	
1. Element type: \square PTC KTY 81/110 (-40°C / +150°C) \square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \square NTC 20k Ω at 25°C β4260 (-40°C / +125°C) \square NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \square Other: (NTC /PTC, T° (min / max), β value, tolerance) 2. Wiring configuration: (number of wires) 2 \square Other: 2 \square Other: \emptyset 3 mm \square Ø4 mm \square Ø5 mm \square Ø6 mm	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
4. Needle length L (mm): 5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Curly polyurethane (105°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection:	

How to order?

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HP20 – Penetration thermistors Ergonomic handle

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So LC	Image: state of the state
 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) 	Additional: Application: Operating temperature (min/max):
 NTC 20kΩ at 25°C I\$4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Other: (NTC / PTC, T° (min / max), β value, tolerance) 	Type of environment: Accessories: See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)	Note:
 3. Needle diameter Ø: (material Stainless steel 316L) Ø3 mm Ø4 mm Ø5 mm Ø6 mm Other: 	
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection: Spring Heat shrink sleeve Without	

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HP31 – Penetration thermistors Armored cable prolongation

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50 LP LC	*Handle material Stainless steel 316L *Armored cable material Stainless steel 304
1. Element type: \square PTC KTY 81/110 (-40°C / +150°C) \square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \square NTC 20k Ω at 25°C ß4260 (-40°C / +125°C) \square NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \square 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:
3. Needle diameter Ø: (material Stainless steel 316L) Ø3 mm Ø4 mm Ø6 mm Other: 4. Needle length L (mm): 5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	

How to order?

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HP32 – Penetration thermistors Armored cable prolongation

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	110 2000 2
Ordering information	
1. Element type: \square PTC KTY 81/110 (-40°C / +150°C) \square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \square NTC 20k Ω at 25°C ß4260 (-40°C / +125°C) \square NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \square Other: $(NTC / PTC, T^* (min / max), \beta value, tolerance)$ 2. Wiring configuration: (number of wires) 2 \square Other: \square Other: \square Other: \square Other: \square Other: \square Other:	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other: 6. Cable lengths (mm):	
LC LP	
7. Crimp protection:	

How to order?

alahe

HP40 – Penetration thermistors Reduced tip

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50 LC	
Ordering information	*Handle material Plastic
 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) 	8. Crimp protection: Spring Heat shrink sleeve Additional: Application: Operating temperature (min/max): Type of environment:
2. Wiring configuration: (number of wires) 2 Other:	Accessories: See the part "Accessories"
 3. Needle tip diameter Ø1: (material Stainless steel 316L) Ø3 mm Ø4 mm Ø5 mm Ø6 mm Other: 4. Needle diameter Ø (mm):	Note:
5. Needle lengths (mm):	
6. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C)	
7. Cable length LC (mm):	

How to order?

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HP41 – Penetration thermistors Miniature

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50 LC	
Ordering information	*Handle material Stainless steel 316L with rubber
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 20kΩ at 25°C β4260 (-40°C / +125°C)	Additional: Application: Operating temperature (min/max): Type of environment:
NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C) Other: (NTC / PTC, T° (min / max), β value, tolerance)	Accessories: See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)	Note:
 3. Needle diameter Ø: (material Stainless steel 316L) Ø1,5 mm Ø2 mm Other: 	
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection: Spring Heat shrink sleeve Without	

How to order?

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HP50 – Penetration thermistors T shape

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50 LC	90 90 6 7 7 8 8 8 90 6 7 8 8 90 90 90 90 90 90 90 90 90 90
Ordering information	
1. Element type: □ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C)	Additional: Application:
\square NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
\square NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Type of environment: Accessories:
Other: (NTC / PTC, T° (min / max), β value, tolerance)	See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)	Note:
 3. Needle diameter Ø: (material Stainless steel 316L) Ø3 mm Ø4 mm Ø5 mm Ø6 mm Other: 	
4. Needle length L (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection:	

How to order?

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HP51 – Penetration thermistors T shape with thread

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How to order?

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HP60 – Penetration thermistors T shape for compost

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How to order?

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HP61 – Penetration thermistors Robust T shape for compost

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Ordering information	*Handle material Stainless steel 316L with rubber hand
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):
□ NTC 10kΩ at 25°C ß3977 (-40°C / +125°C) —	
NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
$\square \text{ NTC 3,3} \text{K}\Omega \text{ at } 100^{\circ}\text{C K3970} (-40^{\circ}\text{C} / +200^{\circ}\text{C})$	Accessories: See the part "Accessories"
(NTC / PTC , T° (min / max) , β value, tolerance)	Quantity
	Quantity.
2. Wiring configuration: (number of wires)	Note:
3. Needle diameter Ø: (material Stainless steel 316L)	
☐ Ø3 mm	
☐ Ø6 mm ☐ Other:	
4. Needle length L (mm):	
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	

How to order?

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Thermistors with thread connection - Technical information .



What is an RTD sensor ?

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

RTDs advantages

RTDs have several advantages over other types of temperature sensors:

High precision

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

Long term stability

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

Wide operating temperature range

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

Low ohmic resistance

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

How does an RTD work ?

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

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

What is a 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.

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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.



Resistance Ω

Thermistors with thread connection - 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.



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 (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)



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.

Туре	Type Resistance Beta value		Temperature
РТС КТҮ81/121	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)

Types of thermistors

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)

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LC	R Image: Straight of Straightof Straight of Straight of S
Ordering information	*Thread material Stainless steel (304 / 304L / 316 / 316
 1. Element type: PTC KTY 81/110 (-40°C / +150°C) PTC KTY 81/121 (-40°C / +150°C) NTC 10kΩ at 25°C 83977 (-40°C / +125°C) NTC 20kΩ at 25°C 84260 (-40°C / +125°C) NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Other:	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
4. Diameter Ø (mm):	
5. Free leads length LC (mm): 6. Thread: 1/2" BSPP 1/4" BSPP 1/2" NPT Other:	
How to order?	

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

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LC L1	Fube material Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316L)
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)	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires) 2 Other:	Note:
3. Length L (mm): 4. Diameter Ø (mm): 5. Free leads length LC (mm): 6. Thread length L1 (mm): 7. Thread: □ 1/2" BSPP □ 1/4" BSPP □ 1/2" NPT □ Other:	

How to order?

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

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R2 LC LC Urdering information	Image: Relative state of the state of t
1. Element type:	Additional: Application:
☐ PTC KTY 81/121 (-40°C / +150°C)	Operating temperature (min/max):
MTC 10kΩ at 25°C β3977 (-40°C / +125°C) MTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Accessories:
Other: (NTC / PTC, T* (min / max), β value, tolerance)	See the part "Accessories"
 2. Wiring configuration: (number of wires) 2 Other: 3. Diameter Ø (mm): 	Note:
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: 1/2" BSPP 1/2" NPT Other:	

How to order?

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HR10 – Thermistors with thread connection Fixed thread with cable prolongation

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50 LC Ordering information	*Tube material Stainless steel 3161 *Thread material Stainless steel (304 / 304L / 316 / 316L)
 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), β value, tolerance) 	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity:
 2. Wiring configuration: (number of wires) 2 Other: 3. Length L or L1 (mm): 4. Diameter Ø (mm): 	Note:
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other: 6. Cable length LC (mm):	
7. Crimp protection: Spring Heat shrink sleeve Without 8. Thread: 1/2" BSPP 1/4" BSPP 1/2" NPT Other:	

How to order?

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

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Ordering information	LC + *Tube materi	al Stainless steel 316 L	*Thread material Stainless steel (304 / 304L / 316 / 316L)
1. Element type: \square PTC KTY 81/110 (-40°C / +150°C) \square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \square NTC 20k Ω at 25°C ß4260 (-40°C / +125°C) \square NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \square Other: $(NTC/PTC, T^{*}(min/max), \beta value, tolerance)$		9. Thread: 1/2" BSPP 1/2" NPT Additional: Application: Operating temperat	☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10 ☐ Other: ure (min/max):
2. Wiring configuration: (number of wires)		Type of environmen	t:
2 Other:		Accessories: See the part "Accessories"	
3. Lengths (mm):		Quantity:	
L1 L2 4. Length L or L3 (mm):		Note:	
5. Diameter Ø (mm): 6. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	Teflon (260°C)		
7. Cable length LC (mm):]	
8. Crimp protection:	Without	-	

How to order?

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

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50 LC *Tube mater	tial Stainless steel 316L *Thread material Stainless steel (304/304L/316/316L)
1. Element type:	9. Thread:
□ PTC KTY 81/110 (-40°C / +150°C)	□ 1/2" BSPP □ 1/4" BSPP □ 1/4" BSPT □ M10
\square PTC KTY 81/121 (-40°C / +150°C) \square NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	1/2" NPT Other:
 NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Additional:
□ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Application:
Other: (NTC / PTC , T* (min / max) , β value, tolerance)	Operating temperature (min/max):
2. Wiring configuration: (number of wires)	Type of environment:
2 Other:	Accessories: See the part "Accessories"
3. Lengths (mm):	Quantity:
L1 L2	Note:
4. Length L or L3 (mm):	
5. Diameter Ø (mm):	
6. Cable prolongation:	
□ PVC (105°C) □ Silicone (180°C) □ Teflon (260°C)	
☐ Fiberglass (400°C)	
7. Cable length LC (mm):]
8. Crimp protection:	

How to order?

alale.

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

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Tube mate Ordering information	rial Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316L)
 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) 	8. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application: Operating temperature (min/max):
 2. Wiring configuration: (number of wires) 2 Other: 3. Length L or L1 (mm): 	Type of environment: Accessories: See the part "Accessories" Quantity:
4. Diameter Ø (mm):	Note:
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):]
7. Crimp protection: Spring Heat shrink sleeve Without	
How to order?	սիփ

HR20 – Thermistors with thread connection Nozzle

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50	LC	
Ordering information		*Nozzle and thread material Stainless steel (304 / 304L / 316 / 3
 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 β4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Other: 		8. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application:
(NTC/PTC, T* (min/max), β value, tolerance) 2. Wiring configuration: (number of wires)		Operating temperature (min/max): Type of environment:
2 Other:		Accessories: See the part "Accessories"
3. Length L (mm):		Quantity:
4. Diameter Ø (mm):		
5. Cable prolongation: PVC (105°C) Fiberglass (400°C)	Teflon (260°C)	
6. Cable length LC (mm):]
7. Crimp protection:	ve 🗌 Without	

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

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50 LC	
*Tube material Stainles Ordering information	is steel 316L *Nozzle and thread material Stainless steel (304 / 304L / 316 / 316L)
 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 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) 	9. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application: Operating temperature (min/max):
2. Wiring configuration: (number of wires)	Type of environment: Accessories: See the part "Accessories"
3. Lengths (mm): L1 L2 4. Length L (mm):	Quantity: Note:
5. Diameter Ø (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:	

How to order?

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HR22 – Thermistors with thread connection Bolt

R 50 LC L *Bolt material Stainless steel (304 / 304L / 316 / 316L) Ordering information Additional: 1. Element type: Application: PTC KTY 81/110 (-40°C / +150°C) PTC KTY 81/121 (-40°C / +150°C) Operating temperature (min/max): NTC 10kΩ at 25°C β3977 (-40°C / +125°C) NTC 20kΩ at 25°C β4260 (-40°C / +125°C) Type of environment: NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Accessories: See the part "Access Other: (NTC / PTC , T° (\min / \max) , ß value, tolerance) Quantity: 2. Wiring configuration: (number of wires) Note: Other: 2 3. Length L (mm): 4. Cable prolongation: Silicone (180°C) □ PVC (105°C) Teflon (260°C) 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:

How to order?

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HR30 – Thermistors with thread connection Integrated M12 connector

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HR31 – Thermistors with thread connection Integrated M12 connector with transmitter

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How to order?

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HR40 – Thermistors with thread connection Screw-on fixed thread

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50 LC	
*Tube materi	al Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316L)
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 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)	8. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application: Operating temperature (min/max):
2. Wiring configuration: (number of wires)	Accessories: See the part "Accessories"
3. Lengths (mm): L L1 L L2 4. Diameters (mm):	Quantity: Note:
Ø Ø1	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):]
7. Crimp protection: Spring Heat shrink sleeve Without	

How to order?

alale.

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

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50 LC *Tube materi Ordering information	al Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316L)
 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 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) 	8. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application: Operating temperature (min/max):
2. Wiring configuration: (number of wires)	Type of environment: Accessories: See the part "Accessories"
3. Lengths (mm):	Quantity:
4. Diameter Ø (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):]
7. Crimp protection: Spring Heat shrink sleeve Without	

How to order?

alale.

HR60 – Thermistors with thread connection DIN43650 connector

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The material Ordering information	L1 L al Stainless steel 316L *Thread material Stainless steel (304 / 304L/316 / 316
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):
$\prod \text{NTC 10k} \Omega \text{ at 25°C β3977 (-40°C / +125°C)}$	
$\square \text{ NTC } 3,3\text{k}\Omega \text{ at } 100^{\circ}\text{C } \text{B3970 } (-40^{\circ}\text{C } / +220^{\circ}\text{C})$	
Other:	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: 1/2" BSPP 1/2" BSPP 1/2" NPT Other:	
How to order?	باله ــــــــــــــــــــــــــــــــــــ

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HR61 – Thermistors with thread connection DIN43650 connector with transmitter

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- 74	*Tube material Stainless steel 316L *Thread material Stainless steel (304 / 304L / 316 / 316
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 ß3970 (-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)	Note:
3. Length L or L1 (mm):	
4. Diameter Ø (mm):	
5. Thread: 1/2" BSPP 1/2" NPT Other:	□ M10
6. Transmitter (°C): Specify temperature range	
How to order?	սիլ

IIII EuroSensors

Thermistors with terminal head



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Thermistors with terminal head - 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.

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.

Types of terminal heads

Many alternative types of terminal head are available to meet the requirements of various applications. Variations exist in size, material, accommodation, resistance to media, resistance to fire or even explosion and in other parameters.

Common types are shown below but there are many special variants available to meet particular requirements.

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

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

Inside terminal head



Thermistors with terminal head - Technical information

RTDs advantages

RTDs have several advantages over other types of temperature sensors:

High precision

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

Long term stability

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

Wide operating temperature range

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

Low ohmic resistance

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

What is a 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.



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Thermistors with terminal head - 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.



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 (β). Beta is measured in degrees Kelvin (K) and is computed based on the formulation given below.

Where:

given range.

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



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

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)

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Thermistors with terminal head - Technical information

Terminal head component breakdown



What is a terminal block ?

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

Terminal blocks provide a secure and organized way to terminate multiple wires. The wires are inserted into a clamping mechanism

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



What is a temperature transmitter ?

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

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

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



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HH00 – Thermistors with terminal head Standard

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	*Tube material Strinless steel 316		
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 β3977 (-40°C / +125°C)			
\square NTC 3.3k Ω at 100°C β3970 (-40°C / +125°C)	Type of environment:		
☐ Other:	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. Connection head: (see the part "Accessories")	1		
Type B Type DAN Type M Type N			
Type Ex Type NS Other:			
6 Mounting	7		
Wires Terminal block Transmitter (°C):			
Specify temperature range			
How to order?	իրիներություն		
How to order?	heckboxes and by filling up the text. You can provide skatches, ima		

HH01 – Thermistors with terminal head Standard (90° bend)

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How to order?

alale.
HH10 – Thermistors with terminal head Standard with fixed thread

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	LI LI LI L *Tube and thread material Stainless steel 31
Ordering information 1. Element type: PTC KTY 81/110 (-40°C / +150°C) PTC KTY 81/121 (-40°C / +150°C) DTC 10k0 at 25°C 82077 (40°C (+125°C)	6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:
 NTC 10KΩ at 25°C IS3977 (-40 C / +125 C) NTC 20kΩ at 25°C IS4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C IS3970 (-40°C / +200°C) Other: (NTC / PTC, T* (min / max), β value, tolerance) 	7. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range Additional:
2. Wiring configuration: (number of wires)	Application: Operating temperature (min/max):
3. Length L or L1 (mm): L	Type of environment: Accessories: See the part "Accessories"
4. Diameter Ø (mm):	Quantity:
5. Thread: 1/2" BSPP 1/2" NPT Other:	Note:
How to order?	- du

HH11 – Thermistors with terminal head Standard with fixed thread (90° bend) (type 1)

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HH12 – Thermistors with terminal head Standard with fixed thread (90° bend) (type 2)

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HH13 – Thermistors with terminal head Standard with fixed thread (offset)

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	*Tube and thread material Stainless steel 31
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) 	6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:
 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) 	7. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range Additional:
2. Wiring configuration: (number of wires)	Application:
2 Uther:	Operating temperature (min/max):
Lengths L and L1 or L2 (mm): L L1 L2	Type of environment: Accessories: See the part "Accessories"
4. Diameter Ø (mm):	Quantity:
5. Thread: 1/2" BSPP 1/2" NPT Other:	Note:
How to order?	ոիս

HH20 – Thermistors with terminal head Reduced tip

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How to order?

alale.

HH21 – Thermistors with terminal head Pointed tip

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Ordering information	*Tube material Stainless steel 31
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):
NTC 10kΩ at 25°C β3977 (-40°C / +125°C) NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment
\square NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Accessories:
$\bigcirc \text{Other:}$	See the part "Accessories"
	Quantity:
2. Wiring configuration: (number of wires) 2 Other:	Note:
3. Length L (mm):	
4. Diameter Ø (mm):	
5. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	rpe N
6. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	
How to order?	ղ

HH22 – Thermistors with terminal head Open air

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HH23 – Thermistors with terminal head Open air with fixed thread

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	R N L N L L *Tube and thread material Stainless steel 316L
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 β3977 (-40°C / +125°C)	
$\square \text{ NTC } 20KG \text{ at } 25 \text{ C } \text{ is4260 } (-40 \text{ C } / +125 \text{ C })$ $\square \text{ NTC } 3 \text{ 3kO } \text{at } 100^{\circ}\text{C } \text{ R}3970 (-40^{\circ}\text{C } / +200^{\circ}\text{C })$	Type of environment:
☐ 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. Length L or L1 (mm):	
4. Diameter Ø (mm):	
5. Thread:	
□ 1/2" BSPP □ 1/4" BSPP □ 1/4" BSPT □ M:	10
□ 1/2" NPT □ Other:	
Connection heads to star with the star	
	ne N
7. Mounting:	
Wires Terminal block Transmitter (°C):	
-	

How to order?

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HH24 – Thermistors with terminal head Open air with reduced tip

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How to order?

alale.

HH25 – Thermistors with terminal head Contact block (surface mount)

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Ordering information	*Tube material Stainless steel 316L
 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 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) 	7. Contact block material: Brass Aluminum Other: 8. Contact block shape:
2. Wiring configuration: (number of wires) 2 Other:	Additional:
3. Lengths L1 and L2 (mm): L1 L2	Application: Operating temperature (min/max):
4. Diameter Ø (mm):	Type of environment:
5. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	See the part "Accessories" Quantity: Note:
6. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	

How to order?

alahe

HH30 – Thermistors with terminal head Flange sanitary mounting

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Ordering information	F F Tube material Stainless steel 316L
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 β4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C) Other: (NTC /PTC, T° (min / max), β value, tolerance) 2 Other: 2 Other: 0	7. Flange sanitary mounting: DIN2527 (DN10 - PN6) Other: Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Guantity:
3. Dimensions L and L1 (mm): L L L1	Note:
5. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS 6. Mounting: Wires Terminal block	

How to order?

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HH31 – Thermistors with terminal head Tri-clamp sanitary mounting

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Ordering information	*Tube material Stainless steel 316L
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 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 Other: 1	7. Flange sanitary mounting: DIN2527 (DN10 - PN6) Other: Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
L L1	
5. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	
6. Mounting:	

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.

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HH32 – Thermistors with terminal head Disc DIN11851 (screw-on) sanitary mounting

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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 83977 (-40°C / +125°C) □ NTC 20kΩ at 25°C 84260 (-40°C / +125°C) □ NTC 3,3kΩ at 100°C 83970 (-40°C / +200°C) □ Other: (NTC / PTC, T° (min / max), β value, tolerance) 2. Wiring configuration: (number of wires)	erial Stainless steel 316L
PTC KTY 81/121 (-40°C / +150°C) Additional: NTC 10kΩ at 25°C ß3977 (-40°C / +125°C) Application: NTC 20kΩ at 25°C β4260 (-40°C / +125°C) Application: NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Operating temperature (min/max): Other: Type of environment: (NTC /PTC, T° (min / max), β value, tolerance) Accessories: See the part "Accessories" See the part "Accessories"	
NTC 20kΩ at 25°C β4260 (-40°C / +125°C) Application: NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C) Operating temperature (min/max): Other: Type of environment: (NTC / PTC, T° (min / max), β value, tolerance) Accessories: See the part "Accessories" See the part "Accessories"	
Operating temperature (min/max): Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories"	
2. Wiring configuration: (number of wires) Accessories: See the part "Accessories"	
2. Wiring configuration: (number of wires) See the part "Accessories"	
2 Other:	
3. Dimensions L and L1 (mm): Note:	
4. Diameter Ø (mm):	
5. Connection head: (see the part "Accessories") Type B Type DAN Type M Type Ex Type NS Other:	
6. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	

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HH40 – Thermistors with terminal head Exchangeable insert

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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.

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HH41 – Thermistors with terminal head Exchangeable insert with fixed thread

Ordening information	*Tube and thread material Stainless steel 316L
 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), β value, tolerance) 2. Wiring configuration: (number of wires) 	7. Type of exchangeable insert:
2 Other:	Additional:
3. Length L or L1 (mm):	Application:
L L1	Operating temperature (min/max):
4. Diameter Ø (mm):	Type of environment:
	Accessories: See the part "Accessories"
	Quantity:
☐ 1/2" NPT ☐ Other:	Note:
6. Connection head: (see the part "Accessories")	
Type B Type DAN Type M Type N Type Ex Type NS Other:	

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HH42 – Thermistors with terminal head Exchangeable insert with fixed thread (offset)

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Junction 1. Element type: PTC KTY 81/121 (40°C / +150°C) PTC KTY 81/121 (40°C / +125°C) PTC KTY 81/121 (40°C / +125°C) PTC KTY 81/21 (40°C / +150°C) PTC KTY 81/21 (40°C / +150°C)		
1. Element type:	Ordering information	*Tube and thread material Stainless steel 316L
2. Wiring configuration: (number of wires)	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), β value, tolerance)	7. Type of exchangeable insert: Image: Second se
3. Lengths L, L1, L2 (mm):	2. Wiring configuration: (number of wires) 2 Other:	Additional:
4. Diameter Ø (mm): Type of environment: 5. Thread:	3. Lengths L, L1, L2 (mm): L L1	Application: Operating temperature (min/max):
4. Drameter 9 (mm). 5. Thread: 1/2" BSPP 1/4" BSPP 1/2" NPT Other: 6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS	A Diameter Ø (mm):	Type of environment:
5. Thread:		Accessories: See the part "Accessories"
Image: 1/2" NPT Other: Note: Image: Note: Note: Note: Note: Image: Note: Image: Note: Note: Image: Note: Image	5. Thread: □ 1/2" BSPP □ 1/4" BSPP □ 1/4" BSPT □ M10	Quantity:
6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	1/2" NPT Other:	Note:
	6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	

How to order?

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HH50 – Thermistors with terminal head For aggressive environments

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	*Fitting material PTFE (260°C) *Tube material Stainless steel 316L with PTFE protection
Ordering information	
1. Element type:	Additional:
□ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C)	Application:
NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
INTC 20kΩ at 25°C β4260 (-40°C / +125°C) INTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Type of environment:
Other:	ACCESSOTIES: See the part "Accessories"
	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L (mm):	
4. Diameter Ø (mm):	
5. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:	
6. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	
How to order?	սիփ

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

HH51 – Thermistors with terminal head For aggressive environments with fixed thread

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Ordering information	L1 L *Thread material PTFE (260°C) *Tube material Stainless steel 316L with PTFE protection
 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 β4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C) Other:	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
. Length L or L1 (mm): L L1 4. Diameter Ø (mm): 5. Thread: 1/2" BSPP 1/4" BSPP 1/2" NPT Other:	
6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other: 7. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	

How to order?

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HH60 – Thermistors with terminal head Spring loaded

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Ordering information	*Tube and thread material Stainless steel 31
1. Element type: □ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C) □ NTC 10kQ at 25°C β3977 (-40°C / +125°C)	6. Connection head: (see the part "Accessories") Type B Type DAN Type Ex Type NS Other:
$ NTC 20k\Omega at 25°C B4260 (-40°C / +125°C) NTC 3,3k\Omega at 100°C B3970 (-40°C / +200°C) Other: (NTC / PTC T° (min (max)) B value tolerance)$	7. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range
2. Wiring configuration: (number of wires)	Application:
2 Other:	Operating temperature (min/max):
3. Lengths L1, L2, L3 (mm):	Type of environment:
L1 L2 L3	Accessories: See the part "Accessories"
4. Diameter Ø (mm):	Quantity:
5. Thread: 1/2" BSPP 1/4" BSPP 1/4" BSPT M10 1/2" NPT Other:	Note:
How to order?	qa

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

HI00 – Thermistors with terminal head Disc plate insert

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How to order?

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HI01 – Thermistors with terminal head Insert with terminal block (spring loaded)

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How to order?

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HI02 – Thermistors with terminal head Insert with transmitter block (spring loaded)

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How to order?

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Surface thermistors

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Surface thermistors - Technical information

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What are the characteristics of surface thermistors ?

Surface thermistors detect surface temperature. The most important issue in surface temperature measurement is to keep measurement errors as small as possible. This is achieved by an appropriate design of the measuring head, so that only very little heat is extracted from the measuring point and the measurement error is negligible.

The perfectly adapted geometry increases the contact surface. At the same time, the low thermal mass of the measuring head ensures that comparatively fast response times can be achieved when measuring the surface temperature.

Different types of surface thermistors

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

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

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

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

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

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

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

Material conductivity

Material	Thermal conductivity W/(m.K)	
Air	≈ 0,25	
Stainless steel	≈ 14	
Brass	≈ 109	k
Aluminum	≈ 205	14
Copper	≈ 385	
Silver	≈ 406	9

Surface thermistors - Technical information

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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.



Resistance Ω

Surface thermistors - Technical information

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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.



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 (β). Beta is measured in degrees Kelvin (K) and is computed based on the formulation given below.

Where:

given range.

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



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

Туре	Resistance	Beta value	Temperature
РТС КТҮ81/121	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)

Types of thermistors

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

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HS00 – Surface thermistors Adhesive tape

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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.

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HS01 – Surface thermistors Washer mount

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HS02 – Surface thermistors Reinforced washer mount

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50	LC	
Ordering information		*Washer mount material Stainless steel 316
 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) 		Additional: Application: Operating temperature (min/max):
 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) 		Type of environment: Accessories: See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)		Note:
3. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	☐ Teflon (260°C)	
4. Cable length LC (mm):		
5. Hole diameter Ø (mm):		

How to order?

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HS03 – Surface thermistors Ring mount

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50 LC	
Ordering information	
1. Element type: ☐ PTC KTY 81/110 (-40°C / +150°C)	Additional: Application:
PTC KTY 81/121 (-40°C / +150°C) NTC 10kΩ at 25°C β3977 (-40°C / +125°C)	Operating temperature (min/max):
\square NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
 NTC 3,3kΩ at 100°C ß3970 (-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)	Note:
4. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
5. Cable length LC (mm):]
6. Ring material:	
7. Ring size: □ M5 □ M6 □ Other:	
8. Crimp protection:	

How to order?

alahe

HS05 – Surface thermistors Contact block

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50 LC	
Ordering information	*Contact block material Brass or aluminum
 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 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) 	7. Crimp protection: Spring Heat shrink sleeve Additional: Application: Operating temperature (min/max): Type of environment:
2. Wiring configuration: (number of wires) 2 Other:	Accessories: See the part "Accessories"
3. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	Note:
5. Contact block material: Brass Aluminum Other:	
6. Contact block shape:	

How to order?

alahe

HS10 – Surface thermistors

Weld pad

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50 LC	
Ordering information	*Weld pad and tube material Stainless steel 316L
<pre> 1. Element type:</pre>	9. Crimp protection: Spring Heat shrink sleeve Additional: Application: Operating temperature (min/max): Type of environment:
2. Wiring configuration: (number of wires) 2 Other:	Accessories: See the part "Accessories" Quantity:
3. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	Note:
4. Cable length LC (mm):	
5. Tube length L (mm):	
6. Pad material: AISI 316L Other:	
7. Pad dimensions A x B (mm): 15 x 10 25 x 10 30 x 10 Other: 30 x 10	
8. Pad thickness h (mm): 0,5 Other:	

How to order?

alahe

HS11 – Surface thermistors Weld pad (45° angle)

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50 LC	
Ordering information	*Weld pad and tube material Stainless steel 316L
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)	9. Crimp protection: Spring Heat shrink sleeve Without Additional:
 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) 	Application: Operating temperature (min/max): Type of environment:
2. Wiring configuration: (number of wires)	Accessories: See the part "Accessories" Quantity:
3. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	Note:
4. Cable length LC (mm):	
5. Tube length L (mm):	
6. Pad material: AISI 316L Other:	
7. Pad dimensions A x B (mm): 15 x 10 25 x 10 30 x 10 Other:	
8. Pad thickness h (mm): 0,5 Other:	

How to order?

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HS12 – Surface thermistors Weld pad (plug-in)

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50 LC	Image: Stainless steel 316L
Ordering information 1. Element type: PTC KTY 81/110 (-40°C / +150°C) PTC KTY 81/121 (-40°C / +150°C)	9. Insertion diameter Ø (mm): ☐ 4 ☐ 5 ☐ 6 ☐ Other:
$ \square \text{ NTC } 10 \text{ k}\Omega \text{ at } 25^{\circ}\text{C } $	10. Insertion depth L (mm): 11. Crimp protection: Spring Heat shrink sleeve Additional:
2. Wiring configuration: (number of wires)	Application:
3. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	Type of environment: Accessories: See the part "Accessories"
4. Cable length LC (mm):	Quantity: Note:
5. Pad infaterial:	

How to order?

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HS20 – Surface thermistors Angle / plug-in

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How to order?

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HS21 – Surface thermistors Angle / plug-in (clamp)

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Ordering information	*Clamp material Stainless steel 316L *Tube material Stainless steel 316L
1. Element type: \Box PTC KTY 81/110 (-40°C / +150°C) \Box PTC KTY 81/121 (-40°C / +150°C) \Box NTC 10k Ω at 25°C ß3977 (-40°C / +125°C) \Box NTC 20k Ω at 25°C ß4260 (-40°C / +125°C) \Box NTC 3,3k Ω at 100°C ß3970 (-40°C / +200°C) \Box Other:	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories"
 (NTC / PTC, T* (min / max), β value, tolerance) Wiring configuration: (number of wires) 	Quantity:
3. Cable prolongation: PVC (105°C) Fiberglass (400°C)	☐ Teflon (260°C)
4. Cable length LC (mm):	
5. Insertion diameter Ø (mm):	
6. Insertion depth L (mm):	
7. Crimp protection:	Without

How to order?

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HS30 - Surface thermistors Bayonet

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HS31 – Surface thermistors Bayonet with reduced tip

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How to order?

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HS33 – Surface thermistors Bayonet (reverse)

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HS34 – Surface thermistors Bayonet with clamp (90° angle)

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	LS
LC	
Ordering information	
1. Element type: ☐ PTC KTY 81/110 (-40°C / +150°C)	8. Bayonet cap Øid (mm): (material Nickel-plated brass) 10,5 12,5 14,5 Other:
□ PTC KTY 81/121 (-40°C / +150°C)	0. Carrier Leasth LC (sum)
\square NTC 10kΩ at 25°C k3977 (-40°C / +125°C) \square NTC 20kΩ at 25°C k4260 (-40°C / +125°C)	9. spring length LS (mm):
□ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	Additional:
	Application:
(NIC/PIC, I ⁺ (min / max), js value, tolerance)	Operating temperature (min/max):
2. Wiring configuration: (number of wires)	Type of environment: Accessories:
3 Cable prolongation:	See the part "Accessories"
☐ Fiberglass (400°C) ☐ Other:	Quantity:
4. Cable length LC (mm):	Note:
5. Cable length L (mm):	
6. Dimensions Ø x L1 (mm): □ 5 x 12 □ 6 x 10 □ 8 x 10 □ Other:	
7. Sheath tip: (material Stainless steel 316L)	
Round Conical Flat	

How to order?

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HS41 – Surface thermistors Pipe-Clamp (type 1)

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HS42 – Surface thermistors Pipe-Clamp (type 2)

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50 LC	
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 β3977 (-40°C / +125°C) \square NTC 20kO at 25°C β4260 (-40°C / +125°C)	
□ NTC 3,3kΩ at 100°C β3970 (-40°C / +200°C)	
Other:	See the part "Accessories"
(NTC / PTC , T° (min / max) , β value, tolerance)	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Cable prolongation:	
☐ Fiberglass (400°C) ☐ Other:	
4. Cable length LC (mm):	
5. Clamp size Ø (mm):	
6. Crimp protection:	

How to order?

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HS43 – Surface thermistors Pipe-Clamp (type 3)

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50 LC	
Ordering information	*Clamp material Stainless steel 316L *Tube material Stainless steel 316L
1. Element type: □ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C)	Additional: Application:
 NTC 10kΩ at 25°C ß3977 (-40°C / +125°C) NTC 20kΩ at 25°C β4260 (-40°C / +125°C) NTC 3,3kΩ at 100°C ß3970 (-40°C / +200°C) 	Operating temperature (min/max): Type of environment: Accessories:
Other: (NTC / PTC, T° (min / max), β value, tolerance)	See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Cable prolongation: PVC (105°C) Silicone (180°C) Teflon (260°C) Fiberglass (400°C) Other:	
4. Cable length LC (mm):	
5. Clamp size Ø (mm):	
6. Insertion diameter Ø1 (mm): □ 4 □ 5 □ 6 □ Other:	
7. Insertion depth L1 (mm):	
8. Crimp protection:	

How to order?

alahe

HS50 – Surface thermistors Handheld

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HS60 – Surface thermistors Spring loaded magnet

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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.

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HH25 – Surface thermistors

Contact block (surface mount) with therminal head

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Ordering information	28 8 9 10 *Tube material Stainless steel 316L
I. 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 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)	7. Contact block material: Brass Aluminum Other: 8. Contact block shape:
2. Wiring configuration: (number of wires) 2 Other:	□ V-shape □ Flat Additional:
3. Lengths L1 and L2 (mm):	Application: Operating temperature (min/max): Type of environment:
4. Diameter Ø (mm):	Accessories:
5. Connection head: (see the part "Accessories") Type B Type DAN Type M Type N Type Ex Type NS Other:	Quantity: Note:
6. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	

How to order?

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50 LC	*Nozzle and thread material Stainless steel (304 / 304L / 316 / 316L)
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 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) 	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L (mm):	
4. Diameter Ø (mm):	
5. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
6. Cable length LC (mm):	
7. Crimp protection:	
8. Thread: 1/2" BSPP 1/2" NPT Other:	

How to order?

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HR21 – Surface thermistors Nozzle (90° bend)

alalle

50 LC *Tube material Stainless st	teel 316L *Nozzle and thread material Stainless steel (304 / 304L / 316 / 316L)
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:	10. Thread: 1/2" BSPP 1/2" NPT Other: Additional: Application: Operating temperature (min/max): Type of environment:
3. Lengths (mm): L1	Accessories: See the part "Accessories" Quantity: Note:
4. Length L (mm):	
5. Diameter Ø (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:	

How to order?

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HR22 – Surface thermistors Bolt

alalle

50 LC	*Bolt material Stainless steel (304 / 304L / 316 / 316L)
Ordering information	
1. Element type: □ PTC KTY 81/110 (-40°C / +150°C) □ PTC KTY 81/121 (-40°C / +150°C)	Additional: Application: Operating temperature (min/max):
□ NTC 10kΩ at 25°C β3977 (-40°C / +125°C) □ NTC 20kΩ at 25°C β4260 (-40°C / +125°C)	Type of environment:
☐ NTC 3,3kΩ at 100°C ß3970 (-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)	Note:
3. Length L (mm):	
4. Cable prolongation: PVC (105°C) Silicone (180°C) Teflon (260°C) Fiberglass (400°C) Other:	
5. Cable length LC (mm):	
6. Crimp protection:	
7. Thread: 1/2" BSPP 1/2" NPT Other:	
How to order?	վոր

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Ambient thermistors

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HH23 - Open air with fixed thread . .

HH24 - Open air with reduced tip . .



Ambient 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.

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 are the characteristics of ambient thermistors ?

Our ambient thermistors are designed for ambient temperature measurement inside and outside residential, office and industrial spaces.

There is a possibility of assembling a programmable temperature transmitter with a 4...20 mA output signal into the housing. The protection tube with perforation allows for quick and precise temperature measurement, thanks to direct contact of the thermistor sensing element with ambient temperature. **Application areas:**

- Ambient temperature measurement in rooms and outside
- Warehouses and cold stores
- Offices
- Air-conditioning and ventilation installations

Inside housing

We have four types of housing for ambient sensors. Made of plastic or aluminum and in many different sizes. Inside the ambient temperature sensor can be a programmable temperature transmitter or serial terminals.

Serial terminals



Transmitter



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.

Ambient thermistors - Technical information

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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.

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.



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 (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)



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

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)

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.



Resistance Ω

HA01 – Ambient thermistors Miniature plastic housing

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How to order?

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HA02 – Ambient thermistors Standard plastic housing

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How to order?

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HA11 – Ambient thermistors Round aluminum housing

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HA12 – Ambient thermistors Square aluminum housing

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How to order?

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HT25 – Ambient thermistors Open air (protection tube)

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Ordering information	*Tube material Stainless steel 316L
 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)	Additional: Application: Operating temperature (min/max): Type of environment: Accessories: See the part "Accessories" Quantity: Note:
2 Other:	Note.
3. Tube length L (mm):	
4. Cable prolongation: PVC (105°C) Silicone (180°C) Fiberglass (400°C) Other:	
5. Cable length LC (mm):	
6. Crimp protection: Spring Heat shrink sleeve Without	

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.

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HH22 – Ambient thermistors Open air (terminal head)

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HH23 – Ambient thermistors Open air with fixed thread

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Ordering information	L1 L1 *Tube and thread material Stainless steel 316L
	Additional:
1. Element type: \Box 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)	Accessories:
$\bigcup \text{ Other:}$ (<i>NTC</i> / <i>PTC</i> , <i>T</i> °(<i>min</i> / <i>max</i>), <i>β</i> value, tolerance)	see the part Accessones
	Quantity:
2. Wiring configuration: (number of wires)	Note:
3. Length L or L1 (mm):	
L L1	
4. Diameter Ø (mm):	
5. Thread:	
☐ 1/2" BSPP ☐ 1/4" BSPP ☐ 1/4" BSPT ☐ M10	
☐ 1/2" NPT ☐ Other:	
6 Connection head: (see the part "Accorrection")	
Type B Type DAN Type M Type N	
□ Type Ex □ Type NS □ Other:	
7. Mounting: Wires Terminal block Transmitter (°C): Specify temperature range	

How to order?

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HH24 – Ambient thermistors Open air with reduced tip

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