THERMO SENSOR

The sensor makes the difference!

Ex DEKRA IEC IECEx

Thermocouples

Resistance Thermometers

Thermocouple Connectors

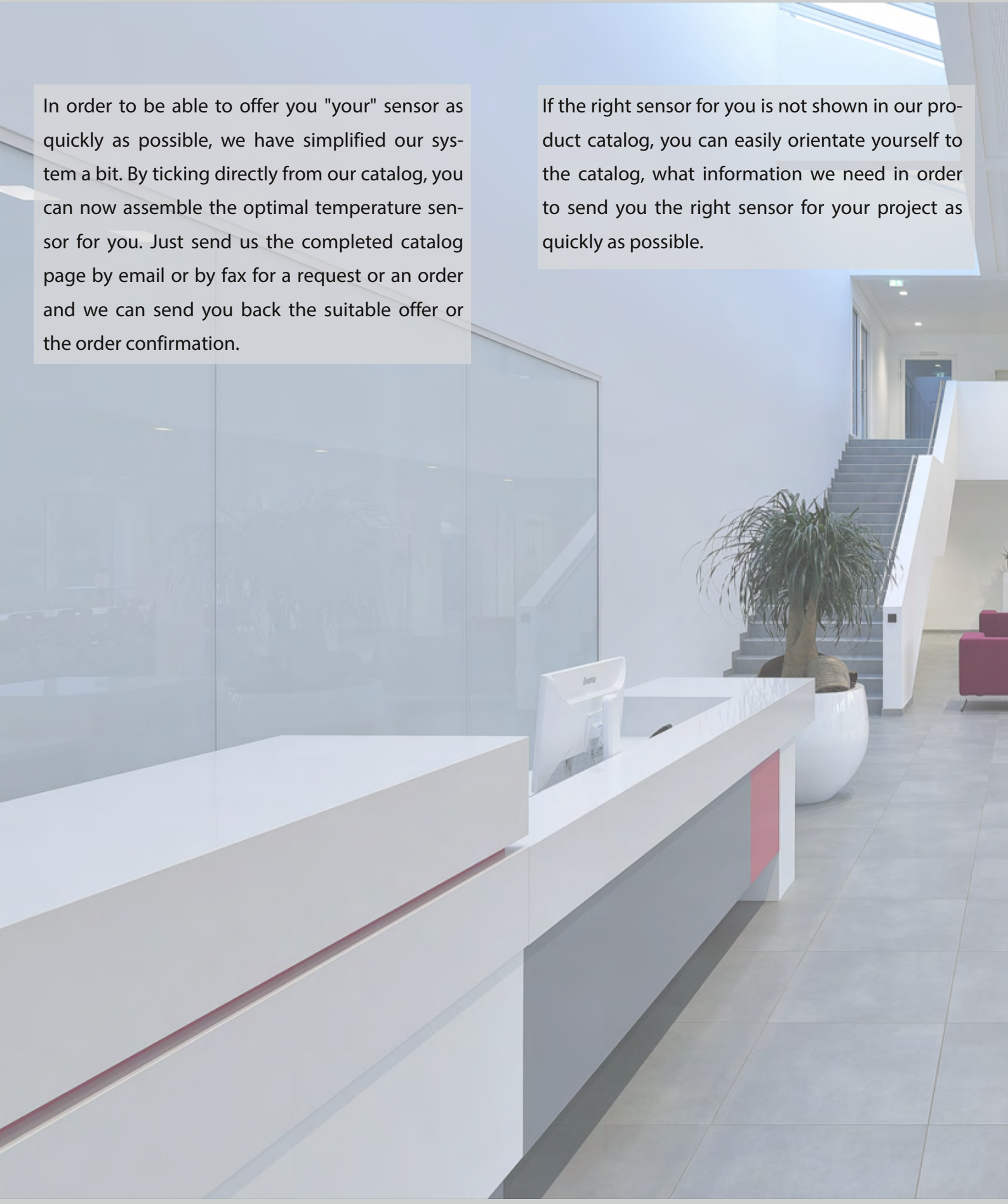
Calibration Laboratory

TEMPERATURE MEASURING TECHNOLOGY

measuring controlling calibrating recording testing

In order to be able to offer you "your" sensor as quickly as possible, we have simplified our system a bit. By ticking directly from our catalog, you can now assemble the optimal temperature sensor for you. Just send us the completed catalog page by email or by fax for a request or an order and we can send you back the suitable offer or the order confirmation.

If the right sensor for you is not shown in our product catalog, you can easily orientate yourself to the catalog, what information we need in order to send you the right sensor for your project as quickly as possible.



Content

Reliability - Precision - Flexibility
these are our Strengths

For more than 20 years, our name has stood for high-quality products for all areas of temperature, measurement and control technology. At our location in Germany we also develop and produce connectors, cables and wires as well as turned parts in standard, special and explosion-protected designs, which are used on all continents.

Our recipe for success is based on a clear, strategic concept and a high level of innovation - only possible thanks to the expertise of our employees.
Our core competence lies above all in the development of individual solutions that meet the requirements of the respective measuring task.

This demands one thing from a company in particular: flexibility.

Our broad product portfolio, the extensive stock of raw parts and the efficient organisational structure have a great influence on our flexibility: short delivery times and demand-oriented, customer-specific production are no problem for us. A delivery within 5 days is no exception - it is standard!
Due to our in-house development and production, we can therefore guarantee a high, consistent quality standard as well as the necessary flexibility.

Quality can be measured!

Since 1996 Thermo Sensor has been certified according to the respective valid quality management standard; currently according to ISO 9001:2015.

All sensors are tested with the most modern methods and equipment before they leave our premises. We attach particular importance to the accuracy of the sensors we manufacture. This is guaranteed not only by the quality of our materials but also by the results of the calibration tests.

These are measured by our trained laboratory staff in our in-house DAkkS-accredited calibration laboratory.

In addition to our high product quality, we distinguish ourselves primarily through our customer service - from the analysis to the selection, to the realization and maintenance of the optimal solution for the respective measuring task, we are at your side. This not only ensures the satisfaction of our customers, but also creates a basis of trust for the future.

Our extensive range of accessories for thermocouple and connection cables, such as connection heads, flanges, compression fittings, protection tubes made of ceramic and stainless steel, transmitters, measuring instruments, sensors, connectors and many other products leaves nothing to be desired.

No matter how complex your measuring task seems to be - make your problem our challenge!

In case of any questions, please do not hesitate to contact us! We will be happy to assist you.

Physical Principles of Temperature Measurement

In many processes the recording of temperature is of great importance. For example in the melting process, in chemical reactions, in food processing, power generation or air conditioning. The requirements for temperature measurement and the technical design differ depending on the area of application and the individual measuring task.

Thermocouples and resistance thermometers are used on measuring objects where direct contact is possible to measure the temperature. They are often used for measurements in liquids, gases, melts or on solids.

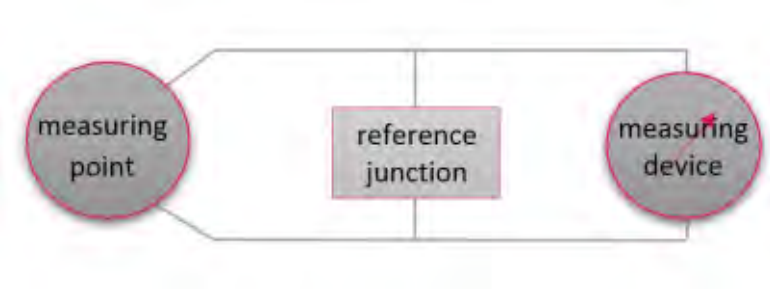
The type of thermocouple or resistance thermometer used depends on the respective requirements for accuracy, response, temperature range and chemical properties of the measuring task.

One advantage of thermocouples over resistance thermometers is the higher upper temperature limit of up to several thousand degrees Celsius. In contrast, however, they have poorer long-term stability and lower measuring accuracy.

Temperature Measurement with Thermocouples

The measurement of temperature using thermocouples is based on the thermoelectric effect discovered by Seebeck in 1821. Here it is assumed that a voltage can be measured at the free ends of two wires made of different materials that are connected together, if the temperature at the junction of the wires is different from that at the free ends.

The temperature difference between the temperature at the measuring point and the temperature at the connections of the measuring instrument is always decisive for the measurement.



The temperature at the measuring point can be determined by the measured thermoelectric emf. More detailed information can be found in the standard DIN EN 60584-1 "Thermoelectric voltages and limiting deviations", which lists the basic value series of thermocouples.

Temperature Measurement with Resistance Thermometers

Temperature measurement with a resistance thermometer uses the linear relationship between the temperature and the electrical resistance of metal wires.

Resistance materials are preferably pure metals, as they show a stronger change in resistance than alloys. The material most frequently used for this purpose is platinum.

The graph of DIN EN 60751 can be used to draw an exact conclusion about the ambient temperature from the measured electrical resistance value. You will find the characteristic curves of Pt100 and Pt1000 under the heading "Resistance Thermometers" or in the appendix.

The designation of the resistance thermometers is derived from the electrical resistance at 0 °C present in each case. A resistance which has an electrical resistance of 100 Ohm at 0 °C is referred to as Pt100. Similarly, a resistor with the designation Pt500 has an electrical resistance of 500 Ohm at 0 °C, and a Pt1000 has an electrical resistance of 1000 Ohm at 0 °C. The resistance of a Pt1000 at 0 °C is called Pt100.

Thermocouples

International colour coding

Code letter	Material + -	DIN EN 60584	ASI 96.1	Temperature Range
Type K	NiCr - NiAl			-40 °C ... 1.000°C
Type J	Fe - CuNi			-40 °C ... 750 °C
Type N	NiCrSi - NiSi			-40 °C ... 1.000°C
Type T	Cu - CuNi			-40 °C ... 350°C
Type E	NiCr - CuNi			-40 °C ... 800°C
Type R	Pt13%Rh - Pt			0 °C ... 1.600°C
Type S	Pt10%Rh - Pt			0 °C ... 1.600°C
Type B	Pt30%Rh - Pt6%Rh			600 °C ... 1.700°C

Advantages of thermocouples

Our thermocouples have been used successfully in temperature measurement for more than 20 years, and because of their accuracy and fast response times, they are highly trusted by our customers. Their easy handling guarantees fast results.

All our thermocouples are made of class 1 material - of course we can also supply thermocouples made of an even more accurate reading.

We set special standards by producing sensors with a diameter of 0.15 mm and above in the area of fast-responding sheath thermocouples.

Depending on the material chosen, our thermocouples offer a number of advantages:

- high precision
- slight flexibility
- special vibration resistance
- wide temperature range
- fast response times
- variety of variations for each individual case

If the thermocouple you are looking for cannot be found in this catalogue, we will be pleased to plan it individually with you - tailored to your specific measuring task!

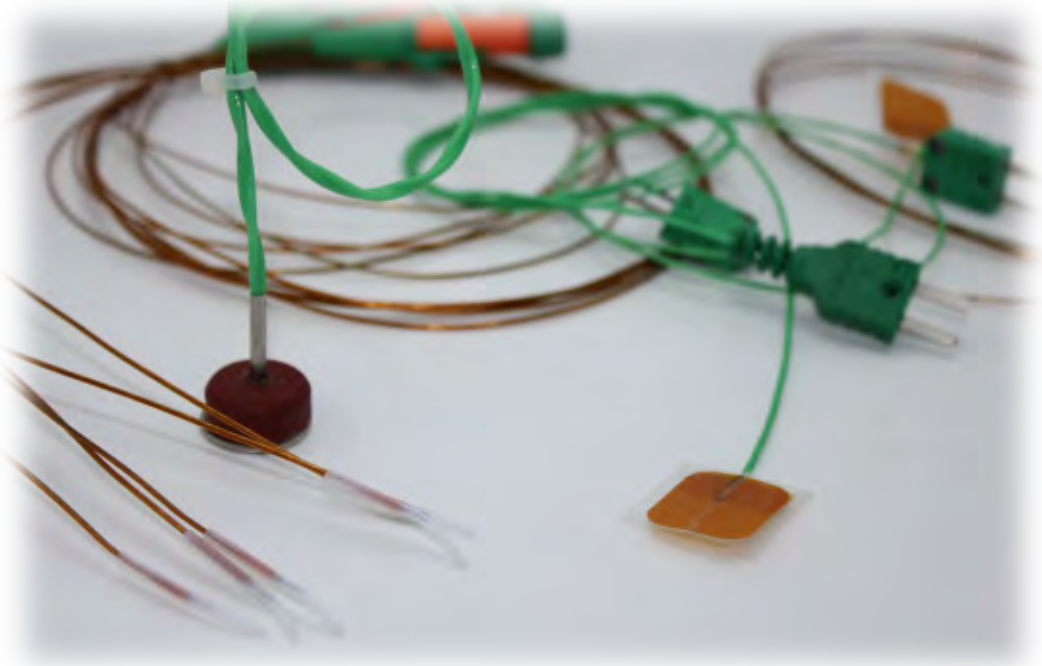
Wire Thermocouples

Our flexible wire thermocouples are available in a variety of designs - depending on the application, we can supply you with a sensor that is tailored to the measuring task. Typical areas of application are surface temperature determination, the detection of component temperatures, the measurement by drag elements in industrial furnaces or the control in the heating, cooling and ventilation technology.

Often, a thermocouple connector is connected to the wire. In this version, the sensor can be easily connected to the evaluation unit.

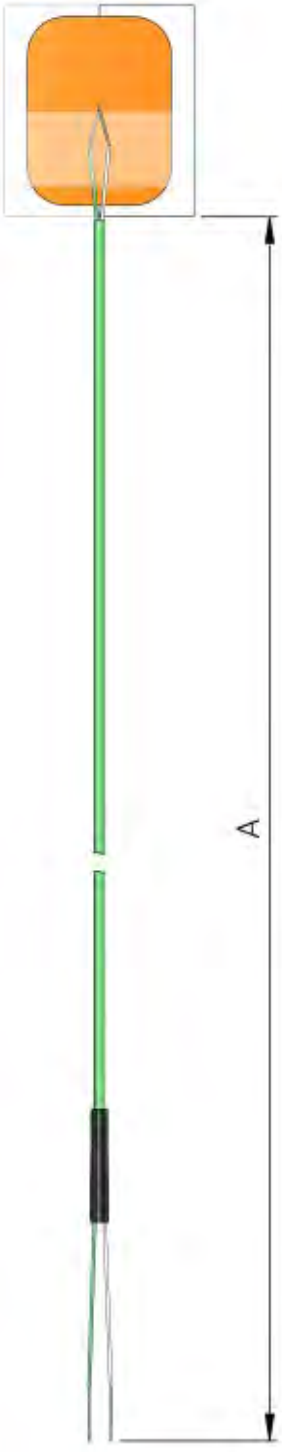
The probes are available in various lengths and diameters in many different designs, for example with adhesive pad, magnet, bayonet cap or as a pipe clamp probe.

Due to their low mass, wire thermocouples offer the advantage that they have a particularly fast response time. They are flexible and available in a variety of design options.



Surface Mount Thermocouple

detail view: glass silk foil



Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ others _____

Tolerance: class 1 according to DIN EN 60584

Hot Junction:
☐ protected with glass silk foil (19.0 x 25.0 mm)
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ kapton, Ø < 1.0 mm (285 °C, for a short time to 400 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm

Termination:
☐ standard plug
☐ standard jack
☐ miniature plug
☐ Quick Wiring miniature plug
☐ miniature jack
☐ micro plug
☐ micro jack
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature miniature plug
☐ high-temperature miniature jack
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Flexible Wire Thermocouple

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Tolerance: class 1 according to DIN EN 60584

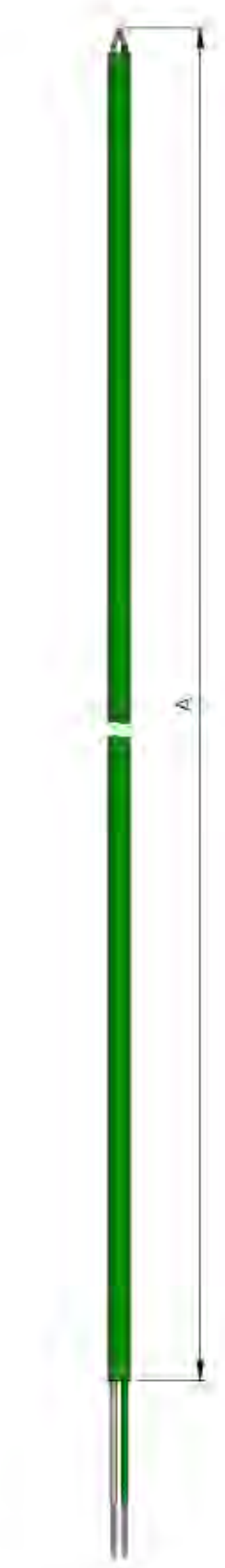
Hot Junction: ☐ exposed ☐ inside
☐ protected with shrinking tube

Lead Wire: flexible thermocouple cable, individually and overall insulated with

☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1,45 mm
(-100 °C - 205 °C, for a short time to 230 °C)
☐ kapton, Ø < 1.0 mm (285 °C, for a short time to 400 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm
(400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm



examples of termination

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature miniature plug
- ☐ high-temperature miniature jack
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Pipe Clamp Thermocouple

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ others _____

Tolerance: class 1 according to DIN EN 60584

Probe Diameter: ☐ 0.75 mm ☐ 1.0 mm ☐ 1.5 mm ☐ 3.0 mm
☐ 4.0 mm ☐ 6.0 mm ☐ others _____

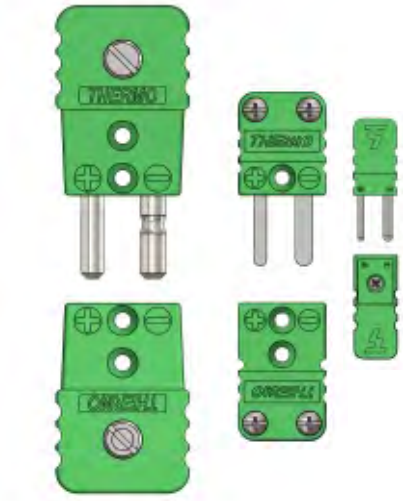
Probe Length "A": please specify _____ mm

Pipe Clamp: ☐ stainless steel; 12.0 mm wide, span diam.: 16.0 - 25.0 mm
☐ stainless steel; 12.0 mm wide, span diam.: 90.0 - 110.0 mm
☐ others _____

Sheath Material: Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Transition Sleeve: stainless steel; diameter, length: 5.0 x 25.0 mm
☐ others _____

detail view: pipe clamp



example of termination

Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time too 230 °C)
- ☐ kapton, Ø < 1.0 mm (285 °C, for a short time to 400 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others_____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ bare ends
- ☐ ohers _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Bayonet Thermocouple

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Tolerance: class 1 according to DIN EN 60584

Hot Junction:
☐ galvanically connected with protective sleeve
☐ welded in isolation

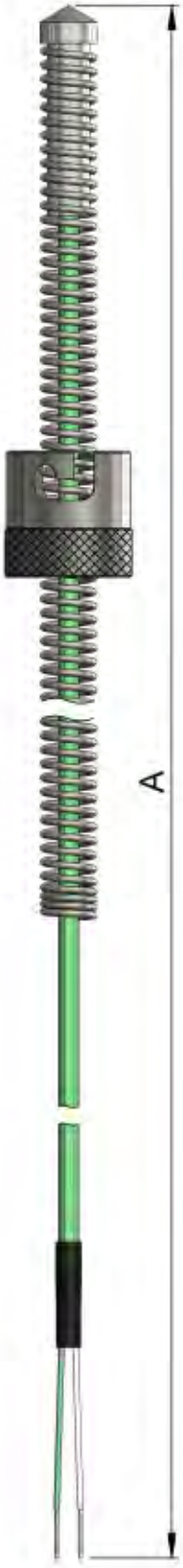
Measuring Point: ☐ plan ☐ sharpened 118 °C

Probe Diameter: ☐ 6.0 mm ☐ 8.0 mm
☐ others _____

Protective Spring:
☐ stainless steel, Ø like probe, length approx. 200.0 mm
☐ others _____

Process Connection: adjustable bayonet cap
☐ Ø 14.0 mm, for springs Ø 6.0 mm
☐ Ø 12.5 mm, for springs Ø 8.0 mm
☐ others _____

Stud Bolt:
☐ thread M12x1
☐ thread M14x1
☐ others _____



Example of a stud bolt

Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
- ☐ kapton, Ø < 1.0 mm (285 °C, for a short time to 400 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others_____

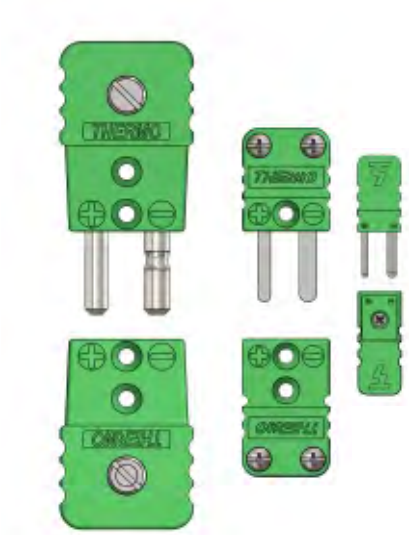
Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.



examples of termination

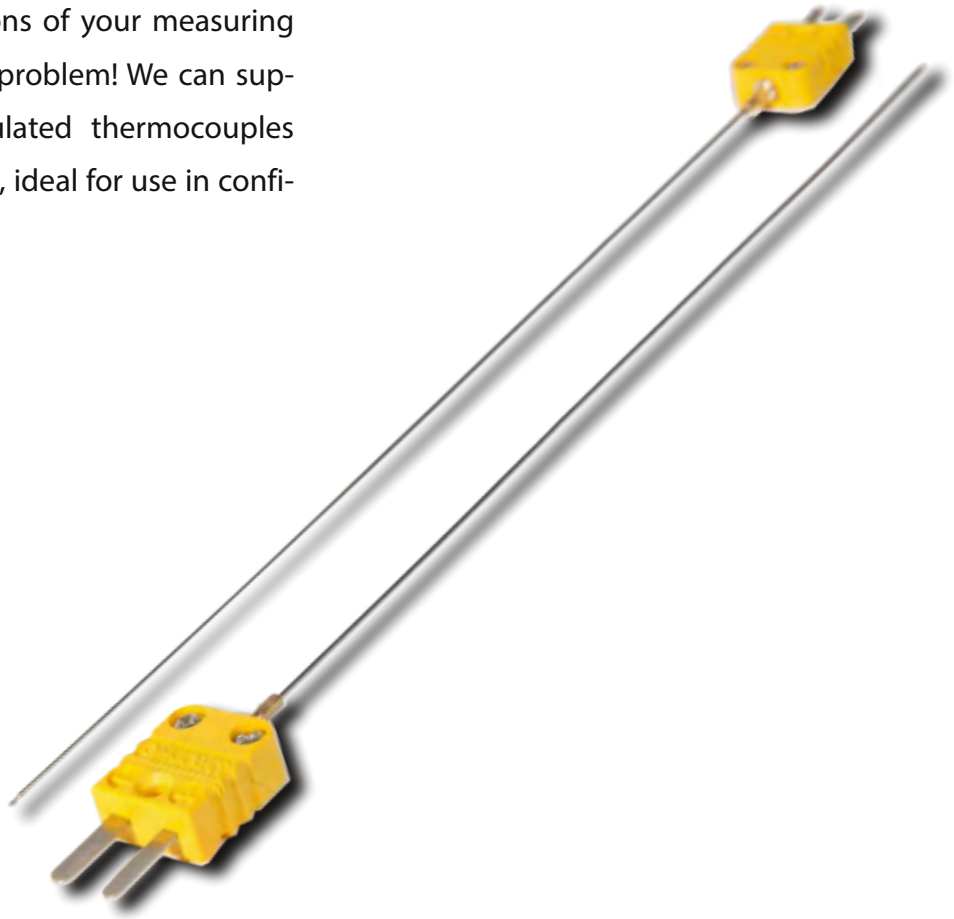
Quantity: _____ piece(s)

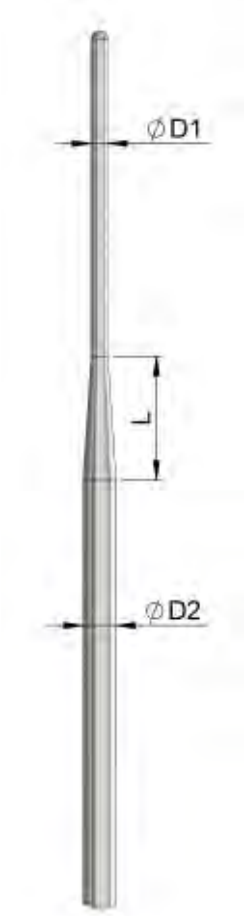
Mineral-Insulated Thermocouple

Due to their mechanical insensitivity, easy handling and vibration resistance, mineral-insulated thermocouples are used throughout industry, especially in mechanical engineering, steel and aluminium processing, in power stations, on test benches or in furnace and boiler construction.

They have fast response times and a special internal design that allows them to be used with high pressures and vibrations. Their wide temperature range makes them extremely heat-resistant and allows measurement in both liquid and gaseous media.
Should the spatial conditions of your measuring task be more difficult - no problem! We can supply you with mineral-insulated thermocouples from a diameter of 0.15mm, ideal for use in confined spaces.

All our mineral-insulated thermocouples can be supplied completely assembled with thermocouple wire or thermocouple plug on request.





We can also supply almost any of our mineral-insulated thermocouples with a swaged measuring tip. Swaged thermocouples combine two characteristics - they are extremely robust and yet retain their fast response time.

In the swaged version, the thermocouple is reduced in diameter from approximately 20 to 25 mm at the end of the measuring tip by a cone of length L. The entire thermocouple remains in the same shape. This means that the entire thermocouple remains extremely stable overall due to the swaged part, but can be ideally inserted into bores and threads using welding sleeves or through-bolts.
By reducing the measuring tip, the response time of the sensor is also reduced.

The extent of the possible taper depends mainly on the initial diameter D2 and the desired final diameter D1. A reduction to half of the initial diameter of up to 0.25 mm is generally possible without any problems.

If a swaged mineral-insulated thermocouple is interesting for your application, please contact us so that we can check its feasibility.

Mineral-Insulated Thermocouple

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type T (Cu-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Hot Junction: ☐ insulated ☐ not insulated ☐ exposed

Measuring Point: ☐ insulated ☐ sheathed

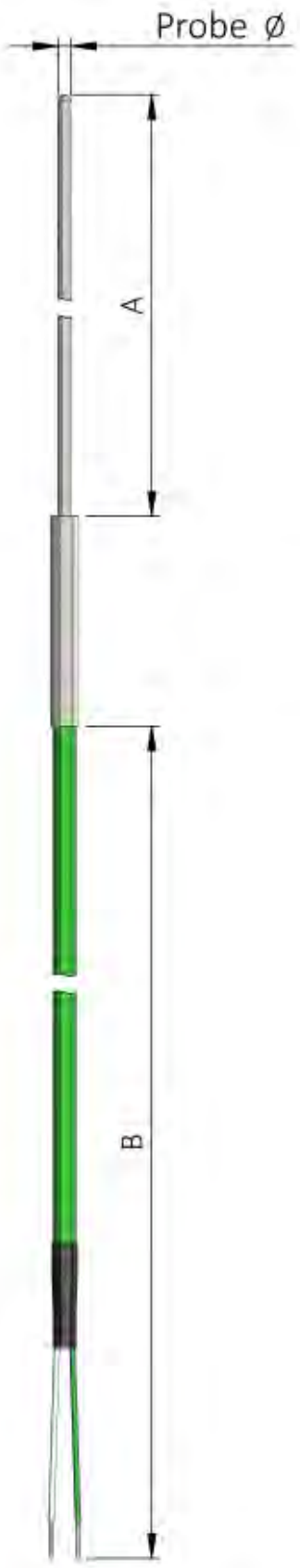
Probe Diameter:
☐ 1.0 mm ☐ 1.5 mm ☐ 1.6 mm
☐ 2.0 mm ☐ 3.0 mm ☐ 3.2 mm
☐ 4.8 mm ☐ 6.0 mm ☐ 6.4 mm
☐ others _____
☐ swaged construction (only possible for certain diameters)
please specify
Ø D1 _____ mm Ø D2 _____ mm
L _____ mm

Probe Length "A": please specify _____ mm

Sheath Material:
☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Transition Sleeve: stainless steel; diameter, length: 5.1 x 40.0 mm
☐ others _____

Bend Protection:
☐ tension spring made of stainless steel, cable end protruding 45.0 mm, sensor end protruding 25.0 mm
☐ without
☐ others _____



Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
- ☐ kapton, Ø < 1.0 mm (285 °C, for a short time to 400 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

examples of termination

Accessories:

- ☐ compression fitting please specify
  - thread type _____
  - thread length _____
- ☐ cable strain relief

Quantity: _____ piece(s)

Miniature Mineral-Insulated Thermocouple

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type T (Cu-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single

Hot Junction: ☐ insulated ☐ not insulated ☐ exposed

Measuring Point: ☐ insulated ☐ sheathed

Probe Diameter:
☐ 0.15 mm (only Type K)
☐ 0.25 mm (only Type K)
☐ 0.5 mm
☐ swaged from 1.0 mm to 0.5 mm
☐ others _____

Probe Length "A": please specify _____ mm

Sheath Material:
☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Transition Sleeve: stainless steel; diameter, length: 5.1 x 40.0 mm
☐ others _____

Bend Protection:
☐ tension spring made of stainless steel, cable end protruding 45.0 mm, sensor end protruding 25.0 mm
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.6 mm (-100 °C - 205 °C, for a short time to 230 °C)
- ☐ kapton, Ø 0.75 x 1.0 mm (-265 °C - 285 °C, for a short time to 400 °C)
- ☐ fiberglass, Ø approx. 1.1 mm x 1.6 mm (400 °C, for a short time to 500 °C)
- ☐ others _____

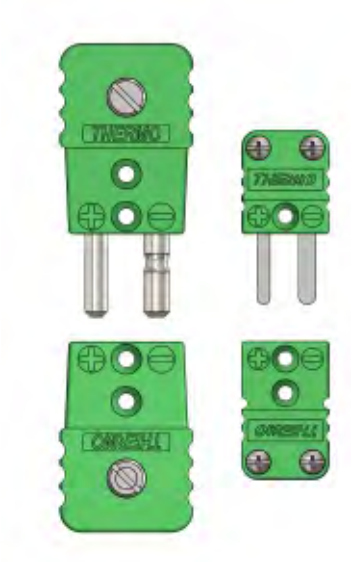
Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ please specify size _____
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.



examples of termination

Accessories:

- ☐ compression fitting please specify
  - thread type _____
  - thread length _____
- ☐ cable strain relief

Quantity: _____ piece(s)

Screw-in Thermocouple

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type T (Cu-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Measuring Point: insulated by default

Probe Diameter:
☐ 0.5 mm ☐ 1.0 mm ☐ 1.5 mm
☐ 2.0 mm ☐ 3.0 mm ☐ 3.2 mm
☐ others _____

Probe Length "A": please specify _____ mm

Sheath Material:
☐ stainless steel (mat.-no.: 1.4571)
☐ stainless steel (mat.-no.: 1.4541) Type J and T
☐ Inconel 600 (mat.-no. 2.4816) Type K and N
☐ others _____

Process Connection: please specify thread
thread type _____
thread length _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others _____

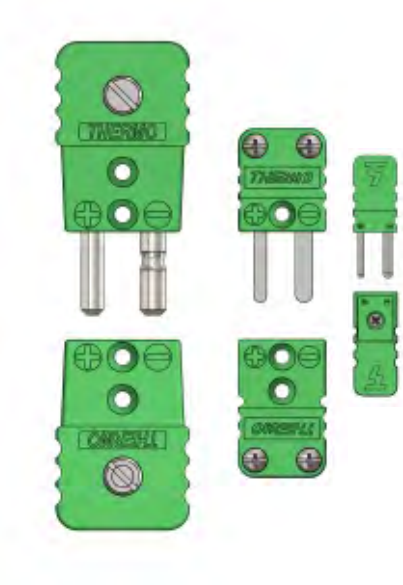
Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.



examples of termination

Quantity: _____ piece(s)

Brake Fluid Thermocouple

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type T (Cu-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

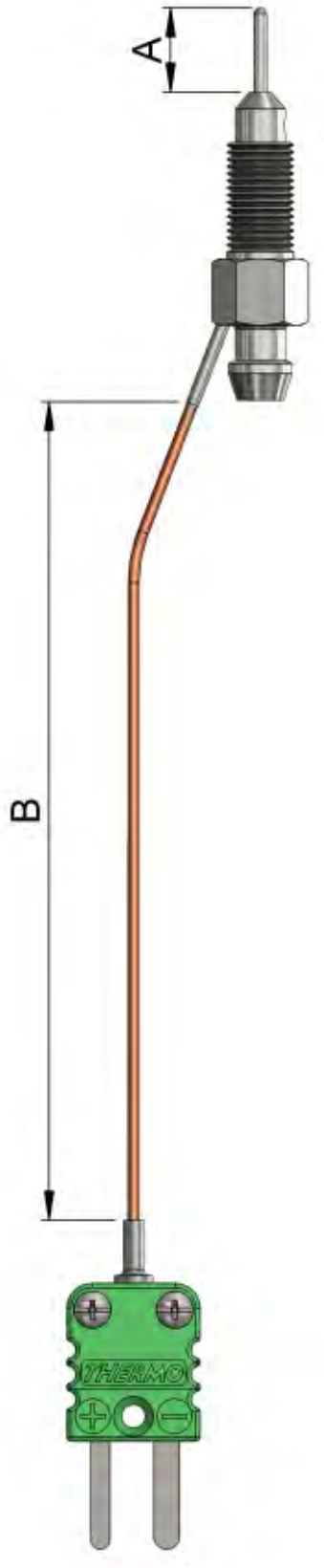
Hot Junction:
☐ welded in isolation
☐ connected with outer sheath

Probe Diamter:
☐ 1.5 mm ☐ 1.6 mm ☐ 2.0 mm
☐ 3.0 mm ☐ 3.2 mm
☐ others _____

Probe Length "A":
please specify _____ mm

Sheath Material:
☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Process Connection:
☐ thread M7x1, thread length 15.0 mm
☐ others please specify
thread type _____
thread length _____



example of termination

detail view of probe

Lead Wire: flexible thermocouple cable, individually and overall insulated with

☐ kapton, Ø approx. 0.75 mm x 1.0 mm (-265 °C - 285 °C, for a short time to 400 °C)

☐ others _____

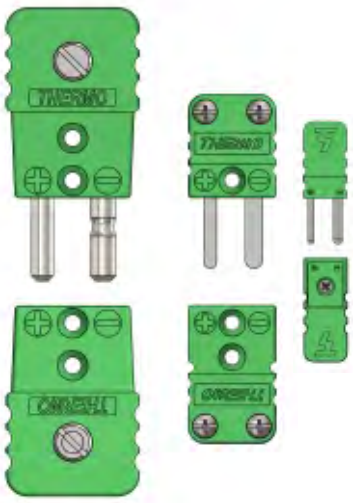
Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm

Termination:

☐ standard plug
☐ standard jack
☐ miniature plug
☐ Quick Wiring miniature plug
☐ miniature jack
☐ micro plug
☐ micro jack
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature minature plug
☐ high-temperature miniature jack
☐ Lemo plug ☐ Lemo jack
  ☐ size 0 (max. probe diameter 3.2 mm)
  ☐ size 1 (max. probe diameter 6.0 mm)
  ☐ size 2 (max. probe diameter 6.4 mm)
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.



examples of termination

Quantity: _____ piece(s)

Penetration Thermocouple with cannula

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Probe Diameter: ☐ 0.9 mm (sheath thermocouple in cannula, bent)
☐ others _____

Probe Length "A": please specify _____ mm (max. 35 mm)

Transition Sleeve: stainless steel; diameter, length: 4.0 x 40.0 mm with mounting plate 25.0 x 12.0 x 0.5 mm
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with
☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm

Termination:
☐ standard plug
☐ standard jack
☐ miniature plug
☐ Quick Wiring miniature plug
☐ miniature jack
☐ micro plug
☐ micro jack
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature minature plug
☐ high-temperature miniature jack
☐ Lemo plug ☐ Lemo jack
☐ size 0 (max. probe diameter 3.2 mm)
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

detail view of cannula

examples of termination

Penetration Thermocouple with holding plate for fixation

detail view of holding plate

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Numbers of Thermocouples: ☐ single ☐ double

Probe Diameter: ☐ 1.5 mm (sanded measuring tip)
☐ others _____

Installation Length "A1": please specify _____ mm

Probe Length "A2": please specify _____ mm

Process Connection: holding plate, stainless steel, 20.0 x 13.2 x 5.0 mm

Transition Sleeve: stainless steel; diameter, length: 6.0 x 40.0 mm
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with

☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm

Termination:

☐ standard plug
☐ standard jack
☐ miniature plug
☐ Quick Wiring miniature plug
☐ miniature jack
☐ micro plug
☐ micro jack
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature miniature plug
☐ high-temperature miniature jack
☐ Lemo plug ☐ Lemo jack
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Mineral-Insulated Thermocouple with thermowell and process connection

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Probe Diameter:
☐ 0.5 mm
please specify immersion depth _____ mm
(of which 5 mm without protective tube)
☐ 1.5 mm
please specify immersion depth _____ mm
(of which 15 mm without protective tube)
☐ others _____

Probe Length "A": please specify _____ mm

Sheath Material:
☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Protective Tube:
☐ Ø 3.0 mm (material: Inconel 600, mat.-no.: 2.4816)
☐ others _____

Process Connection: nut, thread M10x1 with sealing cone
☐ movable
☐ fixed between sealing cone and transition sleeve
☐ others _____

Transition Sleeve: stainless steel; diameter, length: 5.1 x 40.0 mm
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with
☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

example: version with probe diamter 1.5 mm

example: version with bend protection

Wire Length "B": please specify _____ mm

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature miniature plug
- ☐ high-temperature miniature jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Accessories: ☐ bend protection (tension spring made of stainless steel, 1,000.0 x 6.0 x 0.5 mm)

Quantity: _____ piece(s)

Brake Grinding Thermocouple

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ 1 x Type T (Cu-CuNi)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Hot Junction:
☐ nickel measuring tip, mounted on ceramic carrier
☐ nickel measuring tip, mounted on stainless steel support, ceramic insulated

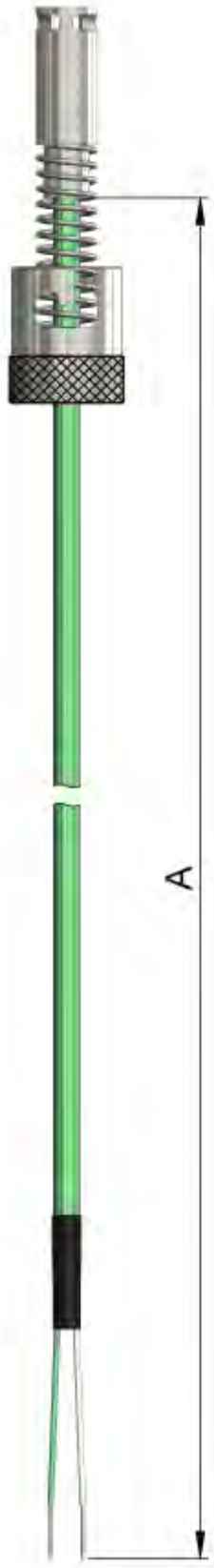
Probe Diameter: ☐ 7.0 mm ☐ 8.0 mm
☐ others _____

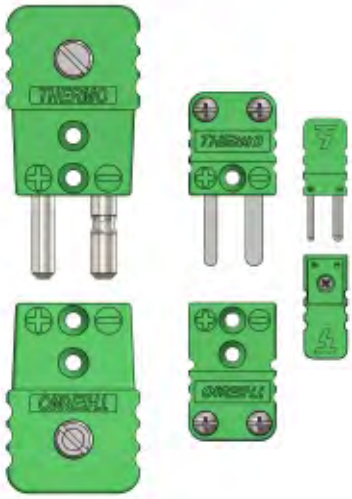
Process Connection: bayonet cap
☐ Ø 14.0 mm B5.2 thread
☐ Ø 12.5 mm B8 thread
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with
☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "A": please specify _____ mm





examples of termination

example of a stud bolt

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature minature plug
- ☐ high-temperature miniature jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Accessories:

- ☐ stud bold please specify
  thread type _____
  thread length _____

Quantity: _____ piece(s)

Brake Thermocouple

Thermocouple:
according to DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Hot Junction: galvanically connected

Probe Diameter:
☐ 3.0 mm
☐ others _____

Probe Length "A": please specify _____ mm

Lead Wire: flexible thermocouple cable, individually and overall insulated with

☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

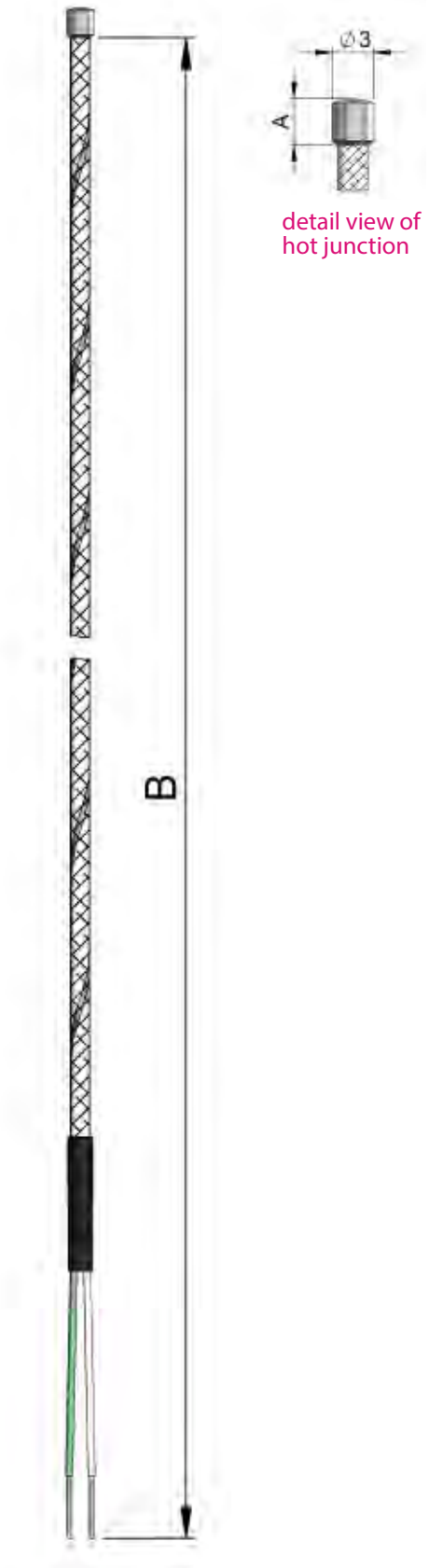
Wire Length "A": please specify _____ mm

Termination:

☐ standard plug
☐ standard jack
☐ miniature plug
☐ Quick Wiring miniature plug
☐ miniature jack
☐ micro plug
☐ micro jack
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature miniature plug
☐ high-temperature standard jack
☐ Lemo plug ☐ Lemo jack
  ☐ size 0 (max. probe diameter 3.2 mm)
  ☐ size 1 (max. probe diameter 6.0 mm)
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)



detail view of hot junction

Moulded Thermocouple

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type J (Fe-CuNi)

☐ others _____

Tolerance: class 1 according to DIN EN 60584

Housing Material: PVC

Termination: connector style similar to miniature plug

Quantity: _____ piece(s)

Screw-in Thermocouple with hollow screw

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Hot Junction: insulated welded as standard

Probe Diameter: ☐ 0.5 mm ☐ 0.75 mm ☐ 1.5 mm
☐ 1.0 mm ☐ 3.0 mm
☐ others _____

Insertion Length: please specify _____ mm

ProbeLength "A": please specify _____ mm

Sheath Material: ☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Process Connection: ☐ hollow screw: stainless steel (mat.-no.: 1.4571);
thread type, length: M8x1.15 mm
☐ others
thread type _____
thread length _____

Support Tube Diameter: 3.0 mm

Transition Sleeve: stainless steel; diameter, length: 4.0 x 30.0 mm
☐ others _____

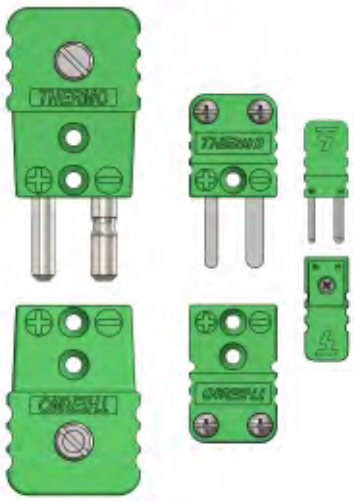
example hollow screw thread

Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm



examples of termination

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature miniature plug
- ☐ high-temperature standard jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Mineral-Insulated Thermocouple with weld-on plate

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Probe Diameter: ☐ 0.5 mm ☐ 0.75 mm ☐ 1.0 mm
☐ 1.5 mm ☐ 3.0 mm
☐ others _____

Probe Length "A": please specify _____ mm

Sheath Material: ☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

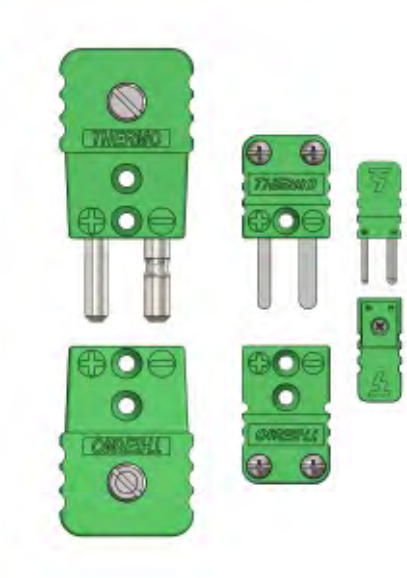
Weld-on Plate: 1. sheet metal at sensor tip (25.0 x 10.0 x 0.5 mm)
2. sheet metal loosely pushed on (25.0 x 12.0 x 0.5 mm)

Transition Sleeve: stainless steel; diameter, length: 4.0 x 30.0 mm
☐ others _____

Lead Wire: flexible thermocouple cable, individually and overall insulated with
☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
☐ teflon, Ø approx. 2.35 mm x 1.45 mm
(-100 °C - 205 °C, for a short time to 230 °C)
☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C,
for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm



examples of termination

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniature plug
- ☐ Quick Wiring miniature plug
- ☐ miniature jack
- ☐ micro plug
- ☐ micro jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature miniature plug
- ☐ high-temperature standard jack
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Quantity: _____ piece(s)

Industrial Thermocouples

Our thermocouples for industrial applications are characterized above all by their enormous resistance. They are mainly used for measuring high temperatures in liquid, gaseous and plastic environments.

The respective properties of the sensors depend largely on the materials used, for example various ceramics or heat-resistant steels.

Typical areas of application for thermocouples for industrial applications include heat treatment, steel and aluminum processing, mechanical engineering and industrial furnace construction.

On the following pages you will find application areas for straight thermocouples consisting of standardised parts (connection head, thermowell and thermocouple(s)). The extracts are taken from DIN EN 50446:2007-04 of the DKE German Commission for Electrical, Electronic & Information Technologies in DIN and VDE and represent only a non-binding recommendation.

Even small variations of the process parameters can have a considerable influence on the resistance and must therefore always be checked individually from application to application.

Please do not hesitate to contact us if your field of application is "special"!

Material for use in molten metals

Application area		Material No.
Aluminium	up to 700 °C	1.4841
Magnesium		1.1003
Aluminium containing magnesium		
Bearing metal	up to 600 °C	1.0305
Lead	up to 700 °C	1.0305
		1.4841
		2.4867
Zinc	up to 480 °C	1.0305
		1.4749
		1.4762
	up to 600 °C	1.1003
Tin	up to 650 °C	1.0305
Copper	up to 1,250 °C	1.4762
Copper-zinc alloy	up to 900 °C	1.4841

acc. to DIN EN 50446:2007-04

Resistance of metal protection tubes to contact with gases

Material-Nr.	Use in air up to °C	Resistance to			carburisation	field of application
		Gases containing sulphur		Nitrogen-containing, low-oxygen gases		
		oxidizing	reducing			
1.0305	550	low	low	medium	low	Tempering furnaces
1.4571	800	low	low	medium	medium	Chemically corrosive vapours, excluding hydrochloric acid and sulphur dioxide vapours
1.4762	1,200	very high	very high	low	medium	Annealing or hardening furnaces with gases containing sulphur and carbon
1.4749	1,150	very high	very high	low	medium	
1.4841	1,150	very low	very low	high	low	Ovens with nitrogen-containing, low-oxygen gases
1.4876	1,100	low	low	high	very high	

acc. to DIN EN 50446:2007-04

Operating conditions and materials of ceramic protection tubes

Protection tube material	Temperature change resistance	Tightness	Permissible continuous temperature in °C	Operating conditions
C530	very good	porous	1,500	Contact with gases of any kind, if gas-tight ceramic inner tubes are used
C610	medium to good	gas-tight	1,500	
C799	medium to good	gas-tigh	1,600	Contact with alkali vapours (glass melting and stoneware kilns)
SiC recrystallized	very good	porous	1,600	Waste and residual material incineration
RSiC reaction bound	very good	gas-thight	1,350	Fluidized-bed combustion

acc. to DIN EN 50446:2007-04

Materials for special applications

Materials	max. operating temperature in °C	Properties / application	Remark
Titan	600	Hardening baths	
Pure iron	900	Saltpetre-, chloride-, cyanide-containing salt baths	
Steel, enamelled	600	Zinc melts	
1.4749	1,100	Lead and tin melts	
1.4772	1,250	Copper and brass melts	
1.4821	1,350	Saltpetre-, chloride-, cyanide-containing salt baths	
Grey iron (GG22)	700	Bearing metal, lead, aluminium, zinc melts	
GI with ceramic coating	800	Aluminium and zinc melts	
Chromium-alumina Cr Al_2O_3 77/23	1,200	Gas-tight, oxidation-resistant, resistant to thermal shock, copper, tin, zinc, Magnesium, lead melting, cement kilns, SO2-, SO3-gas H2SO4-acid	Not suitable for aluminium and Galvanic melts, salt baths
Molybdenum riskide $MoSi_2$	1,700	Abrasion-resistant, impact-resistant, very resistant to thermal shock, glazed on the surface, chemically resistant, Waste incineration, fluidized bed combustion	Brittle at low temperature, from approx. 1,400 °C tough
Aluminium oxide Al_2O_3 (99,7 % fine-grained)	1,950	Finer-grained than C799, highest purity, strength and gas tightness at high temperatures, hydrofluoric acid, alkali and metal oxide vapours, glass troughs	
Aluminium oxide Al_2O_3 (99,7 % porous)	1,950	Porous, thermal shock resistant, high strength at high temperatures, waste incineration, fluidized-bed combustion	
Silicione carbide SiC, recrystallized	1,600	Very porous thermal shock resistant, <0.1 % free silicone, can be used under inert gas / vacuum up to 2,000 °C	Middle thermal shock resistance
Silicione carbide SiC, reaction-bound	1,350	Gas-tight, mechanically highly loadable, high thermal conductivity, 8 - 12 % free silicone, high breaking strength at high temperatures	Not for Al-, Cu-, Ni-, Fe-Melting, medium thermal shock resistance
Silicione nitride Si_3N_4	1,000	Thermal shock resistant, copper-, aluminium smelting	Sensitive to impact
Silicione nitride / Aluminium oxide $Si_3N_4 + Al_2O_3$	1,300	Oxygen-free copper, brass, aluminium smelting	
Graphite	1,250	Gas-tight, aluminium melts	High oxidation in air
Aluminium titan Al_2TiO_5	1,100	Monocrystalline aluminium oxide, gas-tight	
Sapphir Al_2O_3	1,800	Special waste incineration, semiconductor production	Very sensitive to impact and scratches

acc. to DIN EN 50446:2007-04

Mineral-Insulated Thermocouple in flexible design

Thermocouple:
according to
DIN EN 60584

☐ Type K (NiCr-Ni)

☐ Type J (Fe-CuNi)

☐ Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Connection Head:
☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

Transmitter:
☐ without transmitter
☐ with Transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head mounting
  - ☐ ceiling installation

Please specify temperature range _____

Flange:
☐ without
☐ with

Sheath Material:
Type J: stainless steel
☐ mat.-no. 1.4571 ☐ mat.-no.: 1.4541
Type K, N: Inconel 600 (mat.-no.: 2.4816)
☐ others _____

example Connection Heads

Probe Diameter:
- ☐ 3.0 mm ☐ 3.2 mm ☐ 4.8 mm
- ☐ 6.0 mm ☐ 6.4 mm
- ☐ others _____
- ☐ swaged version (only possible for certain diameters)

please specify

Ø D1 _____ mm Ø D2 _____ mm

L _____ mm

Probe Length "A": please specify _____ mm

Termination: ceramic terminal block

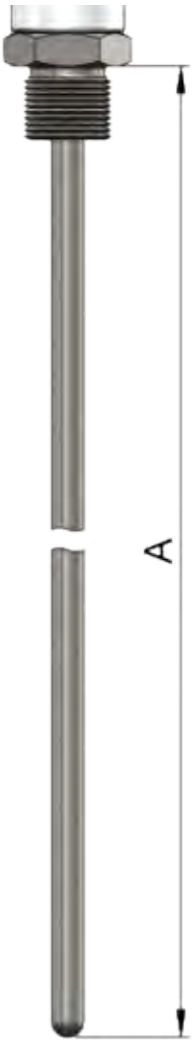
Process Connection:
- ☐ without
- ☐ M18x1.5
- ☐ M24x1.5
- ☐ others _____

Accessories:
- ☐ please specify compression fitting

threat type _____

threat length _____

Quantity: _____ piece(s)



example process connection

example swaged version

Thermocouple in tubular design

Thermocouple:
according to
DIN EN 60584

☐ Type K (NiCr-Ni)

☐ Type J (Fe-CuNi)

☐ Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Connection Head:
☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

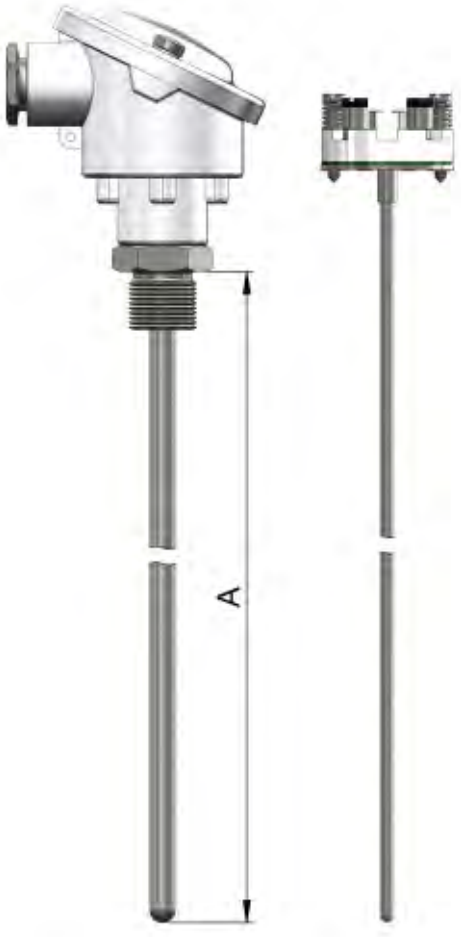
Transmitter:
☐ without transmitter
☐ with Transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head mounting
  - ☐ ceiling installation

Please specify temperature range _____

Flange:
☐ without
☐ with

exapmple of transmitter TP-TC

Probe Diameter:	☐ 3.0 mm	☐ 3.2 mm	☐ 4.8 mm
	☐ 6.0 mm	☐ 6.4 mm	☐ 8.0 mm
	☐ others _____		
Probe Length "A":	please specify _____ mm		
Material Protective Tube:	☐ stainless steel (mat.-no.: 1.4571)		
	☐ stainless steel (mat.-no.: 1.5415)		
	☐ others _____		
Termination:	ceramic pedestal with sheath terminals		
Process Connection:	☐ without		
	☐ M18x1.5		
	☐ M24x1.5		
	☐ others _____		
Accessories:	☐ please specify compression fitting		
	thread type _____		
	thread length _____		
Quantity:	_____ piece(s)		



example process connection with thread

thermocouple insert

Straight Thermocouple with metallic outer protective tube

Thermocouple :
according to
DIN EN 60584

☐ Type K (NiCr-Ni)

☐ Type J (Fe-CuNi)

☐ Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples:

☐ single ☐ double ☐ triple

Thermocouple Insert:

☐ sheath thermocouple insert (diameter results from sensor /protective tube diameter)

☐ thermocouple wire

☐ 0.35 mm ☐ 0.5 mm

☐ 1.5 mm ☐ 3.0 mm

Connection Head:

☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH

☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH

☐ MA

☐ others _____

You can find more information about our connection heads on page 142.

Transmitter:

☐ without transmitter

☐ with transmitter

☐ 4-20 mA

☐ 0-10 V

☐ head installation

☐ cover installation

Please specify temperature range _____

Flange:

☐ without

☐ with

example of flange system

example of transmitter TP-TC

example of connection head forms

Inner Tube:	☐ ceramic C610 ☐ 15.0 x 11.0 mm ☐ 10.0 x 7.0 mm ☐ ceramic C799 ☐ 15.0 x 10.0 mm ☐ 10.0 x 6.0 mm ☐ others _____
Outer Tube:	☐ steel ☐ mat.-no.: 1.0305 ☐ mat.-no.: 1.4571 ☐ heat-resistant steel ☐ mat.-no.: 1.4749 ☐ mat.-no.: 1.4762 ☐ mat.-no.: 1.4841 ☐ mat.-no.: 2.4816
Outer Tube Dimensions:	☐ 15.0 x 2.0 mm ☐ 22.0 x 2.0 mm ☐ others _____
Nominal Length "L1":	please specify _____ mm
Termination:	ceramic pedestal with sheath terminals
Accessories:	☐ vacuum flange KF ☐ gas-tight threaded sleeve ☐ thermocouple insert vacuum-sealed
Quantity:	_____ piece(s)

Straight Thermocouple with ceramic outer protective tube

Thermocouple:
according to
DIN EN 60584

☐ Type K (NiCr-Ni)

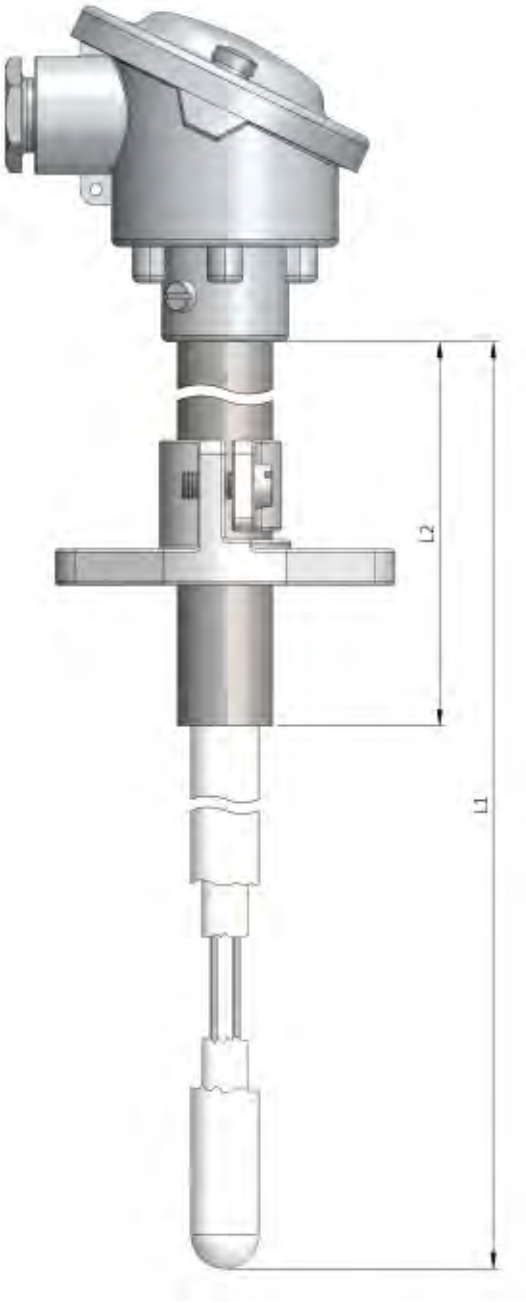
☐ Type J (Fe-CuNi)

☐ Type N (NiCrSi-NiSi)

☐ 1 x Type S (Pt10Rh-Pt)

☐ 1 x Type B (Pt30Rh-Pt6Rh)

☐ others _____



Number of Thermocouples: ☐ single ☐ double ☐ triple

Wire Strength: ☐ 0.35 mm ☐ 0.5 mm ☐ 1.5 mm ☐ 3.0 mm

Connection Head: ☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH ☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH ☐ MA ☐ others _____

You can find more information about our connection heads on page 142.

Transmitter: ☐ without transmitter ☐ with transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

Please specify temperature range _____

examples of connection head forms

example of gas-tight threaded sleeve

Flange: ☐ without ☐ with

Insolation Rod: ☐ standard ☐ testable

Holding Tube: ☐ steel
☐ mat.-no.: 1.0305 ☐ mat.-no.: 1.4571
☐ mat.-no.: 1.4841 ☐ mat.-no.: 1.4749

Holding Tube Dim.: ☐ 15.0 x 2.0 mm ☐ 22.0 x 2.0 mm ☐ 32.0 x 2.0 mm
☐ others _____

Holding Tube Length "L2": please specify _____ mm

Protective Tube: ☐ ceramic C530
☐ ceramic C610
☐ ceramic C799
☐ others _____

Protective Tube Dimensions: ☐ 10.0 x 1.5 mm ☐ 10.0 x 2.0 mm
☐ 15.0 x 2.0 mm ☐ 15.0 x 2.5 mm
☐ 24.0 x 2.5 mm ☐ 24.0 x 3.0 mm
☐ others _____

Nominal Length "L1": please specify _____ mm

Accessories: ☐ vacuum flange KF
☐ gas-tight threaded sleeve
☐ thermocouple insert vacuum-sealed

Quantity: _____ piece(s)

Thermocouple with process connection

Thermocouple :

according to
DIN EN 60584

☐ Type K (NiCr-Ni)

☐ Type J (Fe-CuNi)

☐ Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples:

☐ single ☐ double ☐ triple

Thermocouple Insert:

☐ 1.5 mm ☐ 1.6 mm ☐ 2.0 mm
☐ 3.0 mm ☐ 3.2 mm ☐ 4.8 mm
☐ 6.0 mm ☐ 8.0 mm
☐ others _____

Connection Head:

☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

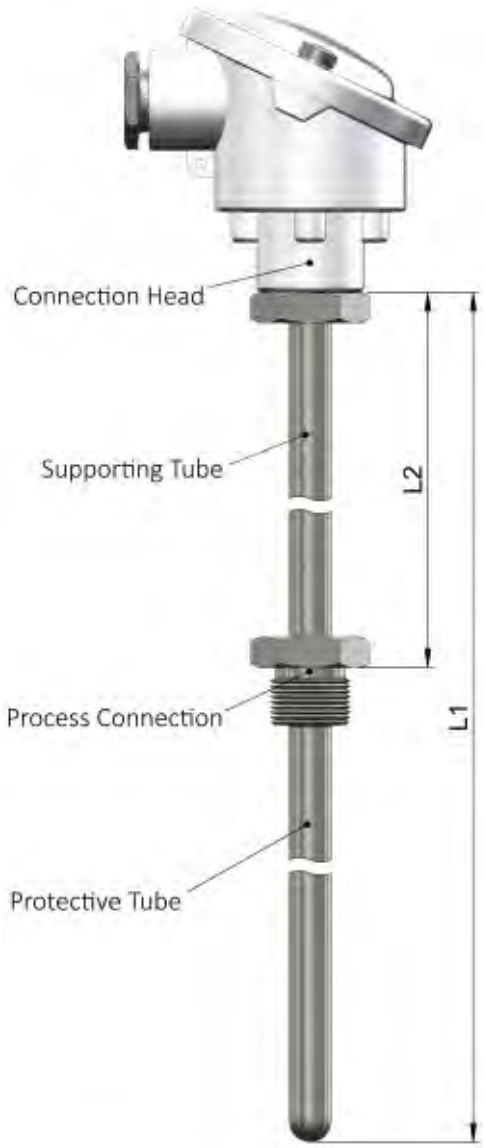
Transmitter:

☐ without transmitter
☐ with transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

Please specify temperature range _____

Flange:

☐ without
☐ with



example of process neck thread

exapmple of transmitter TP-TC

example of thermocouple insert

Probe Diameter:
☐ 3.0 mm ☐ 3.2 mm ☐ 4.8 mm
☐ 6.0 mm ☐ 6.4 mm ☐ 8.0 mm
☐ others _____
☐ swaged form (only for certain diameters)
please specify
Ø D1 _____ mm Ø D2 _____ mm
L _____ mm

Supp. Tube Length "L2":
☐ steel
☐ mat.-no.: 1.0305 ☐ mat.-no.: 1.4571
please specify _____ mm

Protective Tube:
☐ without (outer sheath: Type J: stainless steel (mat.-no.: 1.4571 / 1.4541), Type K, N: Inconel 600 (mat.-no. :2.4816))
☐ with
☐ steel
☐ mat.-no.: 1.0305 ☐ mat.-no.: 1.4571
☐ heat resistant steel
☐ mat.-no.: 1.4749 ☐ mat.-no.: 1.4762
☐ mat.-no.: 1.4841 ☐ mat.-no.: 2.4816

Protective Tube Dim.:
☐ 9.0 x 1.0 mm ☐ 11.0 x 1.0 mm
☐ 11.0 x 2.0 mm ☐ 15.0 x 2.0 mm
☐ 22.0 x 2.0 mm
☐ others _____

Nominal Length "L1": please specify _____ mm

Termination: ceramic pedestal with sheath terminals

Process Connection:
please specify thread type _____
please specify thread length _____
☐ head connection
please specify probe length "A"
_____ mm
☐ neck connection
please specify nominal length "L1"
_____ mm
please specify neck tube length "L2"
_____ mm

Quantity: _____ piece(s)

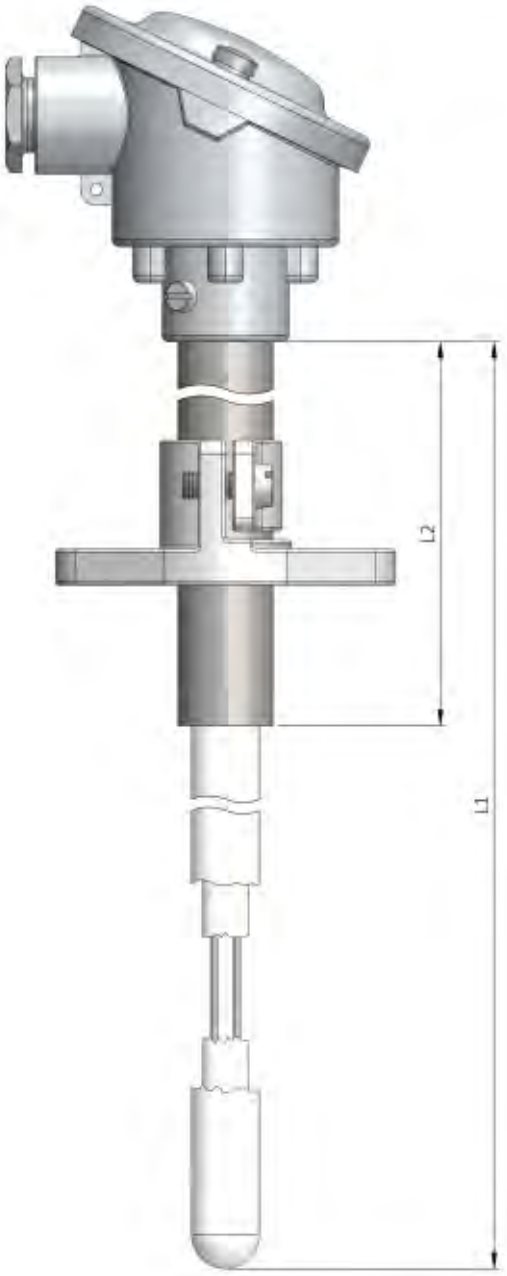
High-temperature Sensors

High temperature sensors are particularly suitable for use in extremely high temperature ranges. The platinum thermocouples type R, S, B and C and the manufactured materials withstand temperatures up to 1,800 ° C, depending on the wire thickness of the thermocouple.
The double protective tubes made of ceramic or metal provide the necessary heat resistance.

For example, our high-temperature sensors are reliable in temperature measurements in hot gas environments in the glass, ceramics and metal industries as well as in heat treatment and combustion processes, due to their temperature resistance.

When calculating our high-temperature sensors, we are heavily dependent on the prices of precious metals. The prices can fluctuate therefore strongly, since we are bound in the order case to the precious metal prices valid on the day of the order.

Straight Thermocouple vacuum-sealed



Thermocouple :
according to
DIN EN 60584

☐ Type S (Pt10Rh-Pt)

☐ Type R (Pt13Rh-Pt)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Wire Strength: ☐ 0.35 mm ☐ 0.5 mm

Connection Head:
☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

Flange: ☐ without ☐ with

Supporting Tube:
☐ steel
☐ mat.-no.: 1.457 ☐ mat.-no.: 1.0305
☐ heat-resistant steel
☐ mat.-no.: 1.4749 ☐ mat.-no.: 1.4762
☐ mat.-no.: 1.4841 ☐ mat.-no.: 2.4816

Supp. Tube Length: please specify _____ mm

Protective Tube:
☐ ceramic C610
☐ ceramic C799

Insolation Rod: ☐ standard ☐ testable

Installation Length: please specify _____ mm

Temperature Range: in gaseous media:
wire thickness 0.35 mm to 1,350 °C, 0.5 mm to 1,600 °C

Quantity: _____ piece(s)

Straight Thermocouple with ceramic outer protection tube

Thermocouple :
according to
DIN EN 60584

☐ Type S (Pt10Rh-Pt)

☐ Type R (Pt13Rh-Pt)

☐ Type B (Pt30Rh-Pt6Rh)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Wire Strength: ☐ 0.35 mm ☐ 0.5 mm

Connection Head:
☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

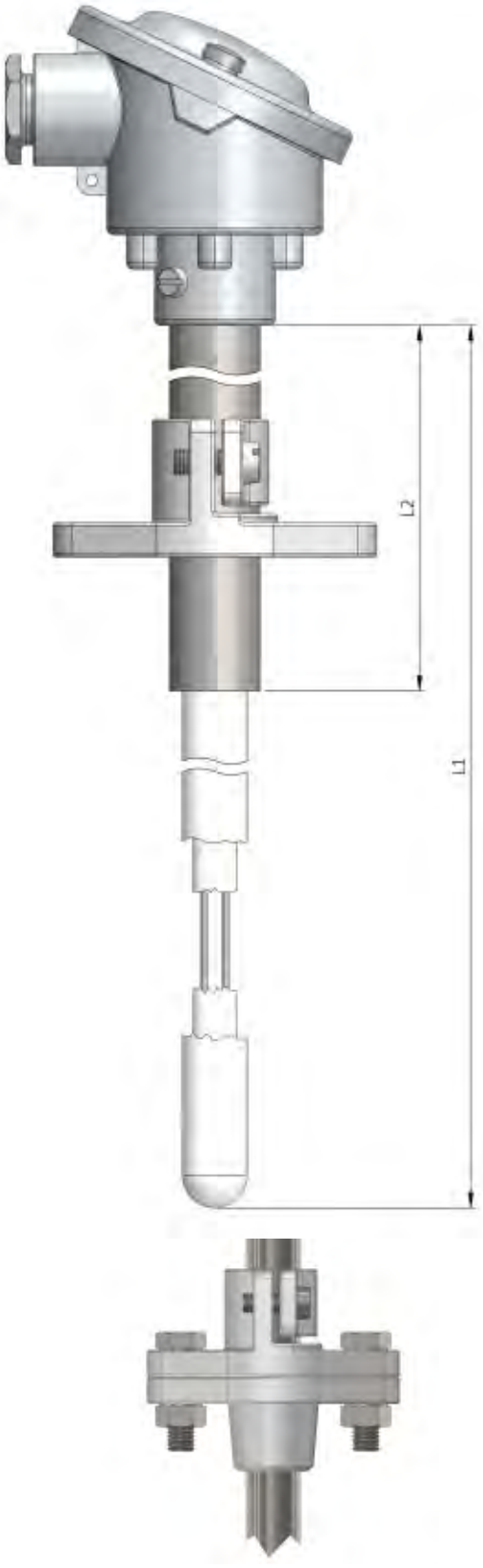
Flange: ☐ without ☐ with

Holding Tube:
☐ steel
☐ mat.-no.: 1.4571 ☐ mat.-no.: 1.0305
☐ heat resistant steel
☐ mat.-no.: 1.4749 ☐ mat.-no.: 1.4762
☐ mat.-no.: 1.4841 ☐ mat.-no.: 2.4816

Holding Tube Dim.: ☐ 15.0 x 2.0 mm ☐ 22.0 x 2.0 mm ☐ 32.0 x 2.0 mm ☐ others _____

Holding Tube Length "L2": please specify _____ mm

Insolation Rod: ☐ standard ☐ testable



example of flange system

examples of connection head forms

Inner Protective Tube:	☐ ceramic C610 ☐ ceramic C799 ☐ without
Protective Tube:	☐ ceramic C530 ☐ ceramic C610 ☐ ceramic C799
Protective Tube Dimensions:	☐ 10.0 x 7.0 mm ☐ 10.0 x 6.0 mm ☐ 15.0 x 11.0 mm ☐ 15.0 x 10.0 mm ☐ 24.0 x 19.0 mm ☐ 24.0 x 18.0 mm special dimensions on request
Nominal Length "L1":	please specify_____ mm
Accessories:	☐ gas-tight threaded sleeve ☐ vacuum flange KF ☐ thermocouple insert, vacuum-sealed
Temperature Range:	in gaseous media: Type S, R Wire thickness 0.35 mm up to 1,350 °C, 0.5 mm up to 1,600 °C; type B wire st. 0,35 mm up to 1,600 °C, 0.5 mm to 1,800° C
Quantity:	_____ piece(s)

Straight Thermocouple with metallic outer protection tube

Thermocouple :
according to
DIN EN 60584

☐ Type S (Pt10Rh-Pt)

☐ Type R (Pt13Rh-Pt)

☐ Type B (Pt30Rh-Pt6Rh)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Wire Strength: ☐ 0.35 mm ☐ 0.5 mm ☐ 0.8 mm ☐ 1.50 mm ☐ 3.0 mm

Connection Head: ☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH ☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH ☐ MA ☐ others _____

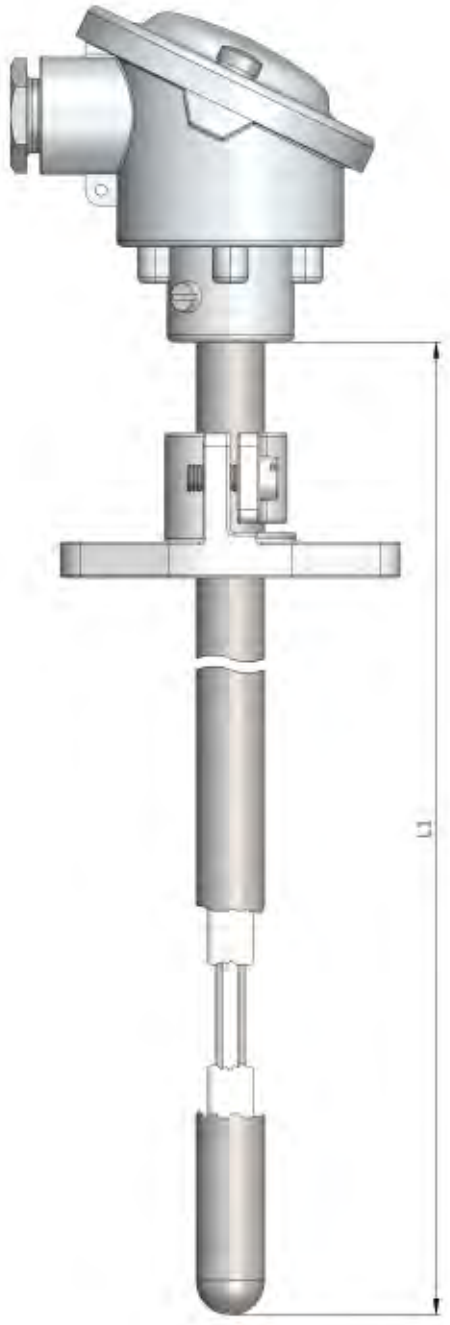
You can find more information about our connection heads on page 142.

Transmitter: ☐ without transmitter ☐ with transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

Please specify temperature range _____

Note: please note that this is an electronic component, which, depending on the model, is exposed to certain temperature limits.

Flange: ☐ without ☐ with



example of Transmitter TP-TC

examples of connection head forms

Insolation Rod:	☐ standard	☐ testable
Inner Protective Tube:	☐ ceramic C ☐ ceramic C799 ☐ without	
Protective Tube:	☐ steel ☐ mat.-no.: 1.4571 ☐ heat-resistant steel ☐ mat.-no.: 1.4749 ☐ mat.-no.: 1.4841	☐ mat.-no.: 1.0305 ☐ mat.-no.: 1.4762 ☐ mat.-no.: 2.4816
Protective Tube Dimensions:	☐ 15.0 x 2.0 mm ☐ 22.0 x 2.0 mm special dimensions on request	
Nominal Length "L1":	please specify_____ mm	
Accessories:	☐ gas-tight threaded sleeve	
Temperature Range:	in liquid, gaseous or plastic media: Type S, R Wire thickness 0.35 mm up to 1,350 °C, 0.5 mm up to 1,600 °C; type B wire st. 0,35 mm up to 1,600 °C, 0.5 mm to 1,800° C	
Quantity:	_____ piece(s)	

Straight Thermocouple with ceramic protection tube and platinum sleeve

Thermocouple:
according to DIN EN 60584

☐ Type S (Pt10Rh-Pt)

☐ Type R (Pt13Rh-Pt)

☐ Type B (Pt30Rh-Pt6Rh)

☐ others _____

Number of Thermocouples: ☐ single ☐ double ☐ triple

Wire Strength: ☐ 0.35 mm ☐ 0.5 mm ☐ 0.8 mm
☐ others _____

Connection Head: ☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

You can find more information about our connection heads on page 142.

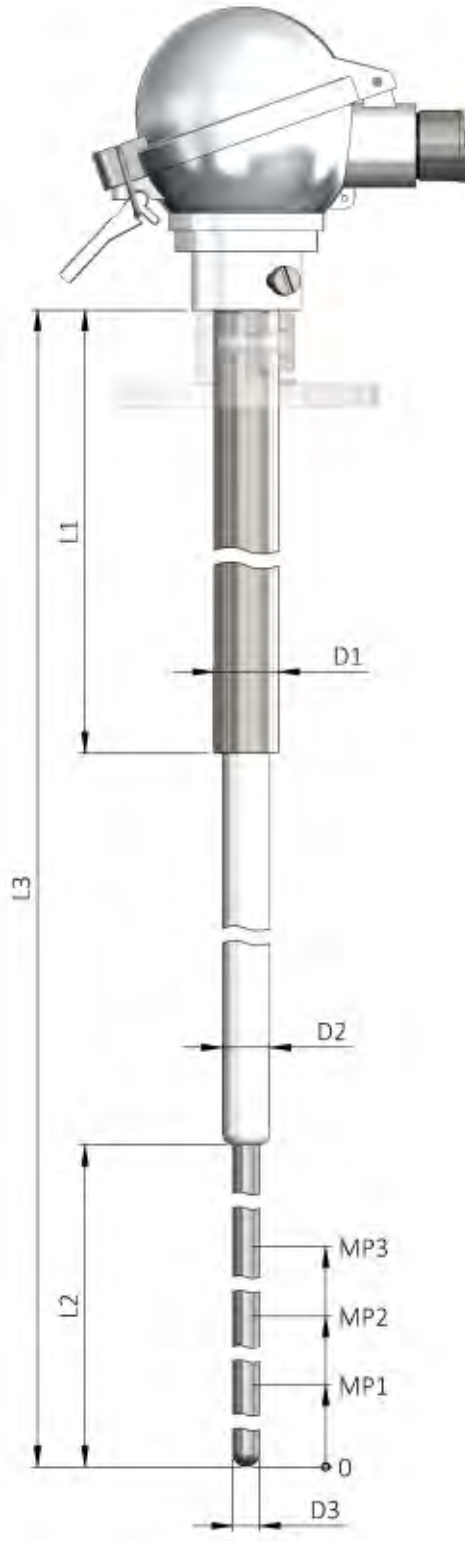
Flange: ☐ without ☐ with

Retaining Tube: ☐ steel ☐ mat.-no. 1.4841 ☐ mat.-no. 1.4893
☐ others _____

Retaining Tube Dimension "D1": ☐ 15.0 x 2.,0 mm ☐ 22.0 x 2.0 mm
☐ 32.0 x 2.0 mm ☐ 26.67 x 2.87 mm
☐ others _____

Retaining Tube length "L1": please specify _____ mm

Protective Tube: ☐ C610 ☐ C799 ☐ SSIC
☐ others _____



Protective Tube Dimensions "D2":
☐ 15.0 x 10.0 mm ☐ 16.0 x 12.0 mm
☐ 18.0 x 13.0 mm ☐ 20.0 x 15.0 mm
☐ 24.0 x 18.0 mm
Special dimensions on request

Insolation Rod: ☐ standard ☐ testable

Inner Tube: ☐ C610 ☐ C799 ☐ C530 ☐ without

Platinum Sleeve: ☐ PtRh90/10 ☐ Pt-DPH ☐ PtRh90/10 DPH

Platinum Sleeve Dimensions:
Outer Diameter "D3" _____ mm
Wall thickness _____ mm
Length "L2" _____ mm visible

Nominal Length "L3": please specify_____ mm

Connection Wire:
☐ without
☐ E-Fibreglass silk, Ø approx. 2.0 x 1.5 mm² (400 °C, for a short time to 500 °C)
☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "L4": please specify_____ mm

Termination:
☐ standard plug
☐ high-temperature standard plug
☐ ceramic standard plug

Accessories:
☐ bend protection
☐ jack

Measuring Point:
From the measuring tip
MP1 _____ mm
MP2 _____ mm
MP3 _____ mm

Quantity: _____ piece(s)

examples of connection head forms

High-temperature Sensor, not flexible

Thermocouple :
according to
DIN EN 60584

☐ Type C (W5Rh-W26Rh)

☐ Type D (W3Rh-W25Rh)

Probe Diamter: ☐ 3.2 mm ☐ 6.4 mm
☐ others _____

Probe Length "A": please specify _____ mm

Outer Sheath:
☐ molybdenum (up to 2,200 °C)
☐ tantal (up to 2,300 °C)

Connection Length: please specify _____ mm

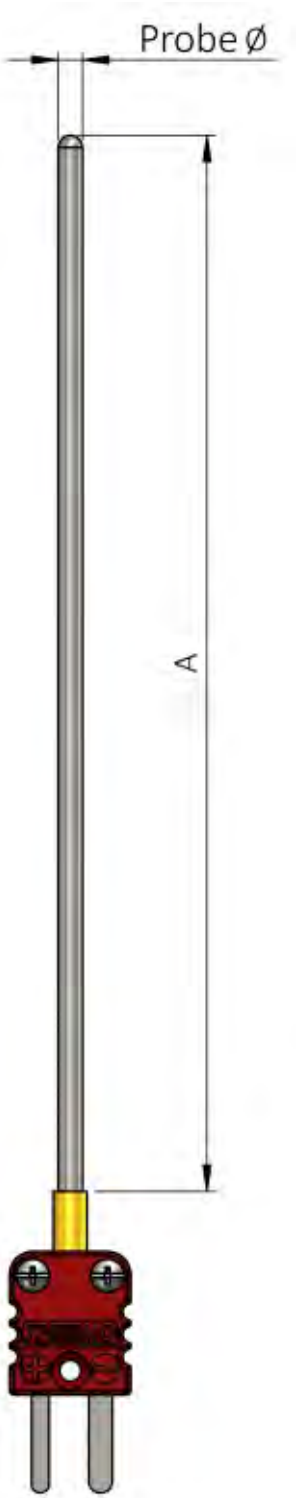
Termination:
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature standard plug in ceramic construction
☐ high-temperature standard jack in ceramic construction
☐ high-temperature miniature plug
☐ high-temperature miniature jack
☐ high-temperature miniature plug in ceramic construction
☐ high-temperature miniature jack in ceramic construction
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

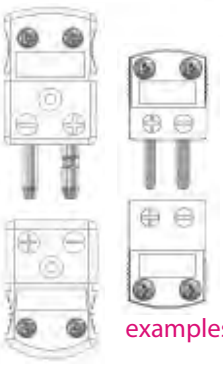
Accessories:
☐ please specify compression fitting
thread type _____
thread length _____
☐ stain relief

Temperature Range: up to 2,300 °C, can only be used in vacuum or highly pure noble gas atmosphere (helium, argon)

Quantity: _____ piece(s)



Platinum coated two-part Sheath Thermocouple



examples of termination

Thermocouple :
according to
DIN EN 60584

☐ 1 x Type S (Pt10Rh-Pt)

☐ 1 x Type B (Pt30Rh-Pt6Rh)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Probe Diameter:
☐ 1.5 mm
☐ others _____

Probe Length:
please specify front area _____ mm
please specify total length _____ mm

Sheath Material:
front area: platinum (Type S or Type B)
back area: ☐ Inconel 600 (mat.-no.: 2.4816)
☐ others _____

Transition Sleeve:
Inconel 600, diameter, length: 4.0 x 25.0 mm
☐ others _____

Termination:
☐ high-temperature standard plug
☐ high-temperature standard jack
☐ high-temperature standard plug in ceramic construction
☐ high-temperature standard jack in ceramic construction
☐ high-temperature miniature plug
☐ high-temperature miniature jack
☐ high-temperature miniature plug in ceramic construction
☐ high-temperature miniature jack in ceramic construction
☐ Lemo plug ☐ Lemo jack
☐ size 0 (max. probe diameter 3.2 mm)
☐ size 1 (max. probe diameter 6.0 mm)
☐ size 2 (max. probe diameter 6.4 mm)
☐ bare ends
☐ others _____

Further information about our connectors can be found starting on page 94.

Temperature Range: Type S up to 1,600 °C, Type B 800 up to 1,700 °C

Quantity: _____ piece(s)

Sheath Thermocouple in flexible design

Thermocouple :
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type S (Pt10Rh-Pt)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

Number of Thermocouples: ☐ single ☐ double

Probe: ☐ exposed ☐ internally

Hot Junction: ☐ welded in isolation
☐ connected with outer sheath

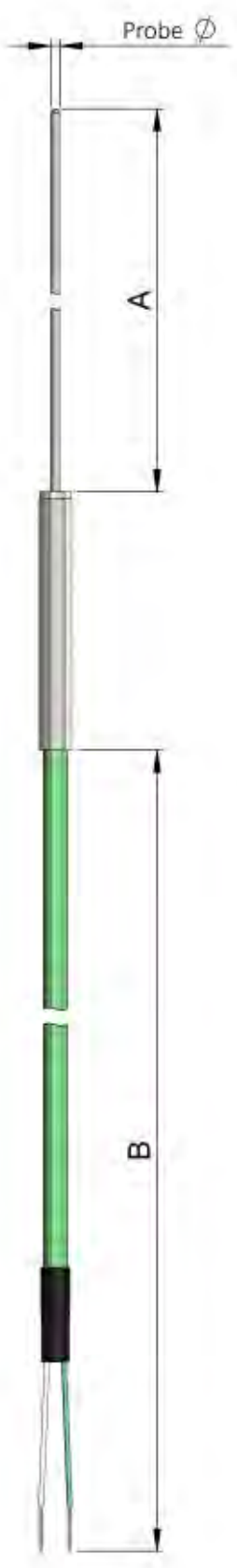
Probe Diameter: ☐ 1.0 mm ☐ 1.5 mm ☐ 2.0 mm
☐ 3.0 mm ☐ 4.5 mm

Probe Length "A": please specify _____ mm

Sheath Material: ☐ Inconel 600 (mat.-no.: 2.4816) ☐ platinum
☐ heat resistant steel (mat.-no.: 1.4841) ☐ nimonic
☐ Inconel 116
☐ others _____

Transition Sleeve: stainless steel; diameter, length: 5.1 x 40.0 mm
☐ others _____

Design: ☐ without lead wire
☐ with lead wire



Lead Wire: flexible thermocouple cable, individually and overall insulated with

- ☐ silicone, Ø approx. 3.8 mm (-50 °C - 180 °C)
- ☐ teflon, Ø approx. 2.35 mm x 1,45 mm (-100 °C- 205 °C, for a short time to 230 °C)
- ☐ fiberglass, Ø approx. 2.1 mm x 1.3 mm (400 °C, for a short time to 500 °C)
- ☐ others _____

Further possibilities and more information about our wire range can be found starting on page 122.

Wire Length "B": please specify _____ mm

examples of termination

Termination:

- ☐ standard plug
- ☐ standard jack
- ☐ miniatur plug
- ☐ miniatur jack
- ☐ high-temperature standard plug
- ☐ high-temperature standard jack
- ☐ high-temperature standard plug in ceramic construction
- ☐ high-temperature standard jack in ceramic construction
- ☐ high-temperature miniature plug
- ☐ high-temperature miniature jack
- ☐ high-temperature miniature plug in ceramic construction
- ☐ high-temperature miniature jack in ceramic construction
- ☐ Lemo plug ☐ Lemo jack
  - ☐ size 0 (max. probe diameter 3.2 mm)
  - ☐ size 1 (max. probe diameter 6.0 mm)
  - ☐ size 2 (max. probe diameter 6.4 mm)
- ☐ bare ends
- ☐ others _____

Further information about our connectors can be found starting on page 94.

Temperature Range: up to 1,100 °C, with platinum-rhodium sheath up to max. 1,300°C

Quantity: _____ piece(s)

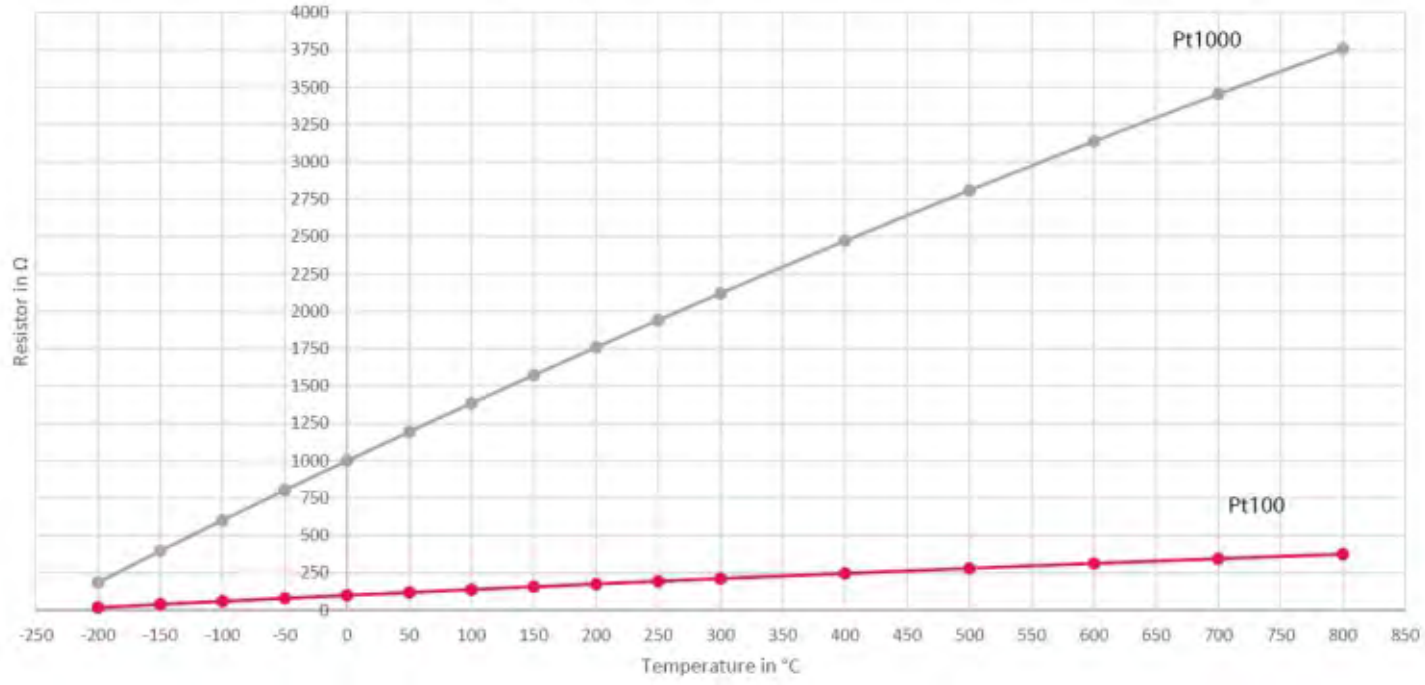
Resistance Thermometer

Basic value series resistance thermometer

DIN EN 60751 defines the relationship between temperature in °C and resistance in ohms for a platinum resistance thermometer with a resistance of 100 ohms or 1,000 ohms at 0 °C. The following tables show the basic value series and the characteristic curves of the resistance thermometers Pt100 and Pt1000.

In the following tables you will find these basic value series as well as the characteristic curves of the resistance thermometers Pt100 and Pt1000.

Temp. in [°C]	Pt100 in [Ω]	Pt1000 in [Ω]	Temp. in [°C]	Pt100 in [Ω]	Pt1000 in [Ω]
-200	18.5	185.2	300	212.1	2,120.5
-100	60.3	602.6	400	247.1	2,470.9
0	100.0	1,000.0	500	280.9	2,809.8
100	138.5	1,385.1	600	313.7	3,137.1
200	175.8	1,758.6	700	345.3	3,452.8



Advantages of Resistance Thermometers

For more than 20 years, resistance sensors from Thermo Sensor have been successfully used for temperature measurements, especially in industrial processes, in the laboratory, in mechanical and plant engineering or in the chemical industry. The temperature dependence of the electrical resistance of metals, semiconductors and ceramics is used as a measuring effect for resistance sensors. The temperature-dependent resistance of the test object is measured by measuring the voltage drop.

Our resistance sensors are characterized especially all by their high accuracy and extreme robustness. They are largely insensitive to electrical interference and can therefore be used in the vicinity of high voltages and even hazardous areas (according to ATEX and IECEx). Depending on the version, our probes cover temperature ranges from -200 °C to 800 °C.

You can get our resistance sensors in many different versions and different sensor types, for example Pt100, Pt1000, NTCs or PTCs.

Our resistance sensors offer you the following advantages:

- almost linear characteristic curve
- high precision
- easy interchangeability
- high long-term stability

Of course, we can also plan your resistance sensor individually with you and adapt it to your measuring task.

Resistance Thermometer

Resistance thermometers in sheath or tube construction are particularly suitable for temperature measurement in hard-to-reach places thanks to their small dimensions. Despite their dimensions, they still offer maximum flexibility.

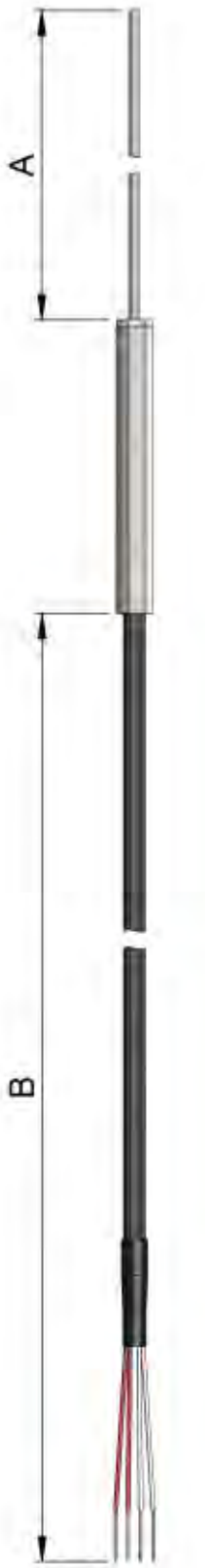
Due to their short response times, they are ideal for the exact measurement of temperature fluctuations and can also be used without an additional protective fitting due to their closed design.

Resistance thermometers are suitable for a wide range of applications.
For example, they are used in laboratories because of their accuracy and fast response time.

Resistance thermometers with thermowells are frequently used in the packaging industry, for injection moulding machines or in transformer construction. There are many possible combinations here with regard to the process connection, the installation length or the wire types - always exactly fitting for each of your applications.

Sensors with bayonet caps are a particularly robust version of the resistance thermometers and are therefore suitable for high temperature ranges up to 400 °C. They can be quickly installed and removed from the test object without tools and are therefore versatile in use. Bayonet thermometers are mainly used in plastics processing and injection moulding machines or in pipelines and containers.

Resistance Thermometer with lead wire



examples of termination

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 1.5 mm ☐ 3.0 mm ☐ 6.0 mm
☐ 1.0 mm (limited temperature range!)
☐ others _____

Construction:
☐ stainless steel-tubing (mat.-no.: 1.4571)
☐ stainless steel sheath construction

Probe Length ("A"):
please specify _____ mm

Transition Sleeve:
stainless steel; diameter, length: 4.0 x 30.0 mm
☐ others _____

Lead Wire:
flexible lead wire, insulated with
☐ silicone (-50 °C up to 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C to 105 °C, for a short time to 125 °C)
☐ others _____
Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Accessories:
☐ please specify compression fitting
thread type _____
thread length _____

Quantity:
_____ piece(s)

Resistance Thermometer without lead wire

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 1.5 mm ☐ 3.0 mm ☐ 6.0 mm
☐ 1.0 mm (limited temperature range!)
☐ others _____

Construction:
☐ stainless steel-tubing (mat.-no.: 1.4571)
☐ stainless steel jacket construction (flexible)

Probe Length ("A"):
please specify_____ mm

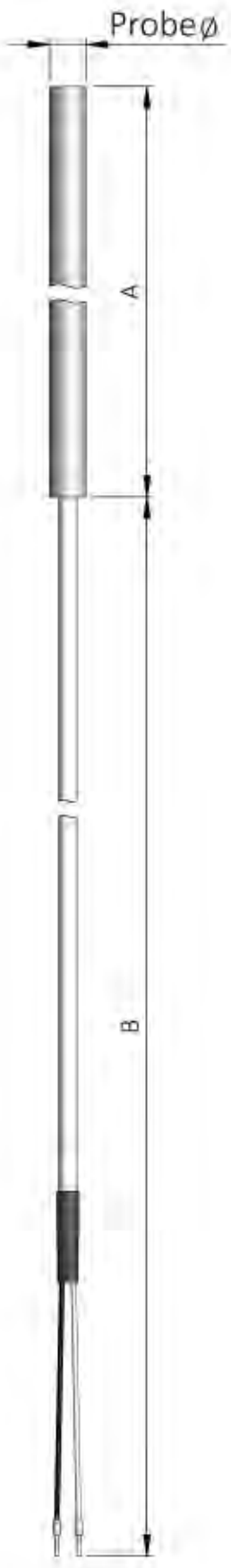
Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Accessories:
☐ please specify compression fitting
thread type _____
thread length _____

Quantity:
_____ piece(s)

Resistance Thermometer with sleeve, shrink tubing and lead wire



Sensor: according to DIN EN 60751	☐ Pt100 ☐ Pt1000 ☐ others _____
Tolerance:	☐ class B ☐ class A
Circuits:	☐ 2-wire ☐ 3-wire ☐ 4-wire
Construction:	sensor tip covered with shrink tubing
Lead Wire:	flexible lead wire, insulated with ☐ silicone (-50 °C to 180 °C) ☐ fiberglass (400 °C, for a short time to 500 °C) ☐ PVC (-25 °C to 105 °C, for a short time to 125 °C) ☐ others _____ Further possibilities and information on our cable and wire range can be found on page 122.
Wire length "B":	please specify _____ mm
Termination:	☐ plug ☐ jack ☐ Lemo: please specify size _____ ☐ Tuchel: please specify size _____ ☐ Binder: please specify size _____ ☐ Fischer: please specify size _____ ☐ bare ends ☐ others _____ Further information on our connector range can be found on page 94.
Quantity:	_____ piece(s)

Recess-Resistance Thermometer in tube construction

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 1.5 mm (measuring tip grounded)
☐ others _____

Probe Length ("A"): please specify_____ mm

Sheath Material:
☐ stainless steel (mat.-no.: 1.4571)
☐ others _____

Handle: peek; diameter, length: 12.0 x 50.0 mm
☐ others _____

Lead Wire: flexible lead wire, insulated with
☐ silicone (-50 °C to 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C to 105 °C, for a short time 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

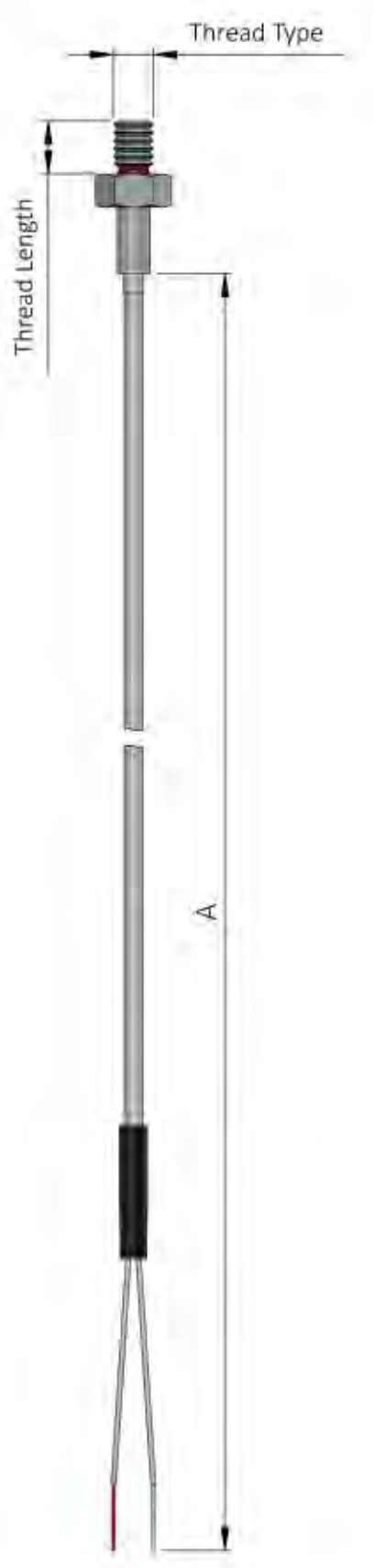
Wire Length "B": please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity: _____ piece(s)

Screw-in-Resistance Thermometer



Sensor:
according to DIN EN 60751

☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:

☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:

☐ 2-wire ☐ 3-wire
☐ 4-wire

Process Connection:

please specify thread
thread type _____
thread length _____

Lead Wire:

flexible lead wire, insulated with
☐ silicone (-50 °C to 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C to 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":

please specify _____ mm

Termination:

☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ Bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:

_____ piece(s)

Bayonet Resistance Thermometer

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Measuring Tip:
☐ flat ☐ sharpened 118 °C

Probe Diameter:
☐ 6.0 mm ☐ 8.0 mm
☐ others _____

Anti-Kink Spring:
☐ stainless steel, Ø as sensor, length approx. 200.0 mm
☐ others _____

Process Connection:
adjustable bayonet cap
☐ Ø 14.0 mm B5.2 thread
☐ Ø 12.5 mm B8 thread
☐ others _____

Probe Length ("A"):
please specify_____ mm

Lead Wire:
flexible lead wire, insulated with
☐ silicone (-50 °C to 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C to 105 °C, for a short time to 125 °C)
☐ others _____
Further possibilities and information on our cable and wire range can be found on page 122.

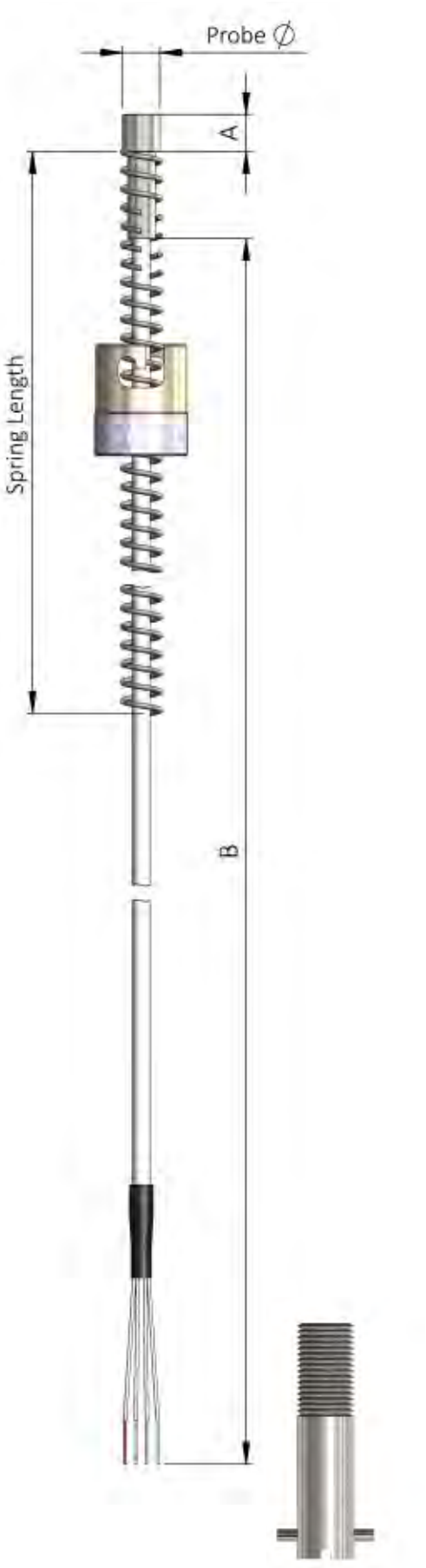
Wire length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Accessories:
☐ please specify stud bold
thread type _____
thread length _____

Quantity:
_____ piece(s)



example of a stud bolt

Screw-in Resistance Thermometer with protective tube

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 8.0 mm ☐ others _____

Insertion Length "A":
please specify_____ mm

Process Connection:
☐ M16x1.5, SW24, thread length 13.0 mm
☐ others _____

Protection Tube:
☐ 8.0 mm, stainless steel (mat.-no.: 1.4571)
☐ others _____

Lead Wire:
flexible lead wire, insulated with
☐ silicone (-50 °C to 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C to 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

Screw-in Resistance Thermometer with M8-plug

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 4.0 mm
☐ others _____

Probe Length ("A"): please specify _____ mm

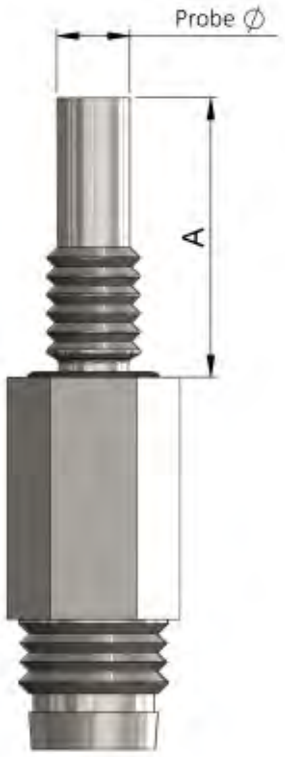
Process Connection:
☐ M5, SW8, with groove for o-ring
☐ others _____

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Accessories:
☐ O-ring 8x1 mm

Quantity: _____ piece(s)



Resistance Thermometer in tube construction

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 1.5 mm (without tension spring) ☐ 4.0 mm ☐ 6.0 mm
☐ others _____

Construction:
☐ sensor sleeve, stainless steel (m.-no.: 1.4571)
☐ tube, stainless steel (mat.-no.: 1.4301)
☐ tip, stainless steel (mat.-no.: 1.4404)
☐ others _____

Hot Junction:
☐ flat ☐ crowned
☐ others _____

Probe Length ("A"):
please specify_____ mm

Bend Protection:
☐ without
☐ stainless steel (mat.-no.: 1.4571); length, Ø outside 60.0 x 8.0 mm, wire strength: approx 1.0 mm
☐ others _____

Lead Wire:
flexible lead wire, insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C bis 105 °C, for a short time to 125 °C)
☐ others _____
Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size_____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

Surface Resistance Thermometers

Due to their special mounting options, surface thermoemeters are particularly suitable for measurement on pipelines or vessel walls.

The resistance thermometer constantly and reliably measures the temperature of the surface. It can be fixed quickly and easily to the surfaces at the place of use by means of the various fastenings.

Magnetic-Resistance Thermometer

detail view: magnet

Sensor:
according to DIN EN 60751

☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:

☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:

☐ 2-wire ☐ 3-wire
☐ 4-wire

Process Connection:

☐ magnetic probe; Ø: 25.0 mm, compression spring: length, Ø outside 30.0 x 5.0 mm, wire strength: approx. 0.6 mm
☐ others _____

Lead Wire:

flexible lead wire insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C - 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "A":

please specify _____ mm

Termination:

☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:

_____ piece(s)

Pipe Clamp Sensor

Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 3.0 mm ☐ 6.0 mm ☐ 8.0 mm
☐ others _____

Construction:
☐ stainless steel sensor sleeve (mat.-no.: 1.4571);
Ø like probe diameter
☐ others _____

Probe Length "A":
please specify _____ mm

Pipe Clamp:
☐ stainless st.; 11.0 mm wide, span diam.: 15.0 - 35.0 mm
☐ stainless st.; 12.0 mm wide, span diam.: 50.0 - 70.0 mm
☐ stainless st.; 12.0 mm wide, span diam.: 90.0 - 110.0 mm
☐ others _____

Lead Wire:
flexible lead wire, insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C - 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

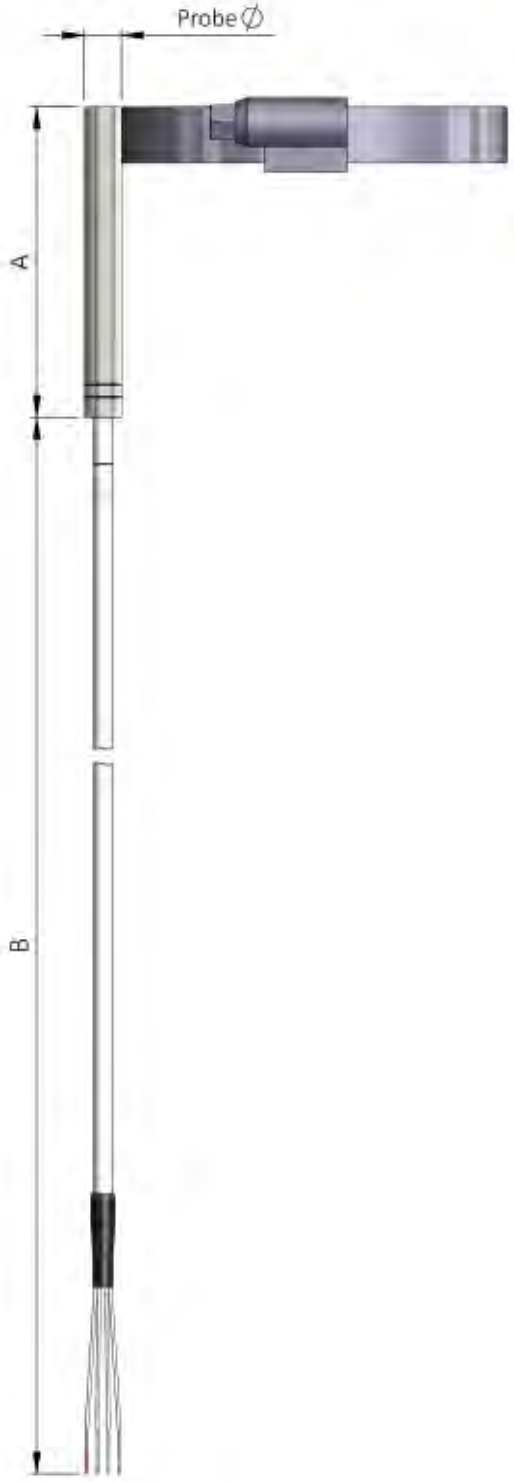
Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

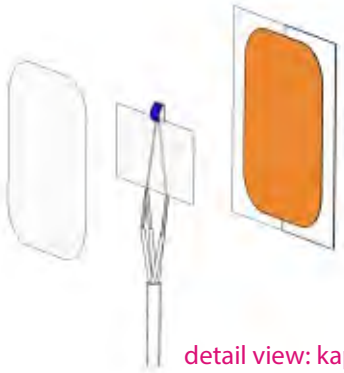
Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

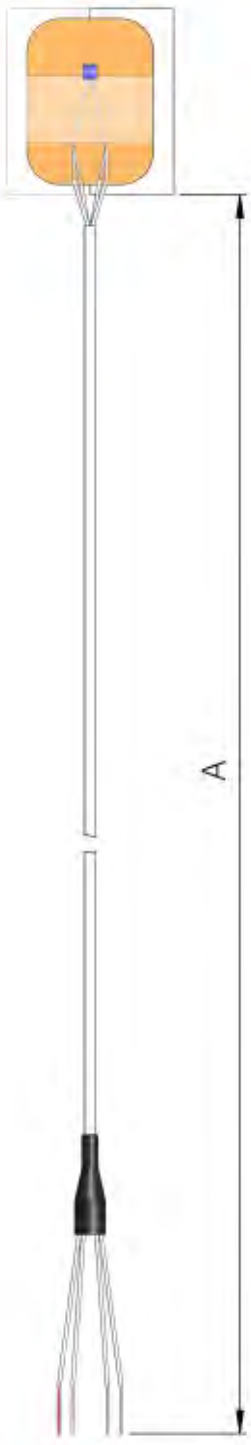
detail view: pipe clamp



Surface Mount Resistance Thermometer with Kapton-Foil



detail view: kapton foil



Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Hot Junction:
☐ protected with fiberglass film (19.0 x 25.0 mm)
☐ others _____

Lead Wire:
flexible lead wire insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C bis 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

Industrial Resistance Thermometers

Resistance thermometers for industrial applications are used for temperature ranges from -200 °C to 800 °C due to their heat resistance, depending on the material used. Commonly used materials are platinum, various ceramics or heat-resistant steels.

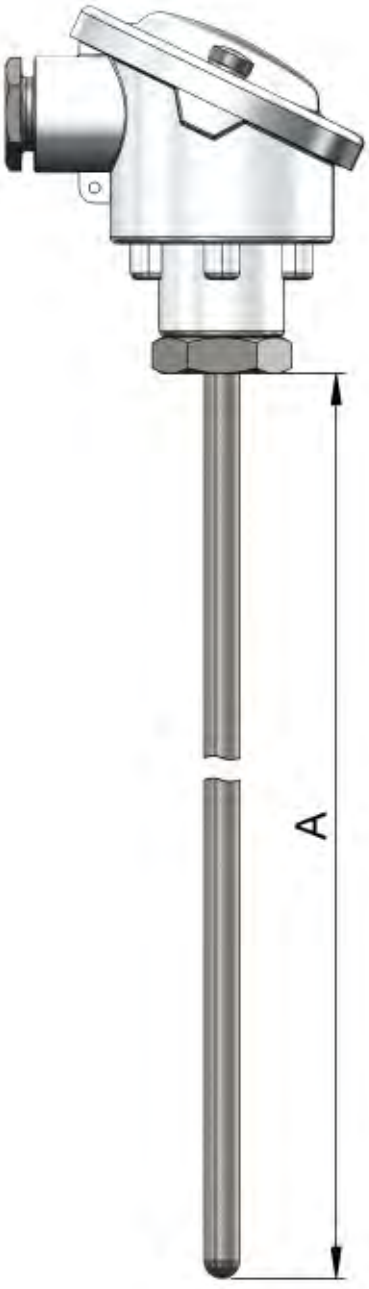
They are versatile because they are extremely robust against external influences such as flue gases or aggressive liquids. Typical applications include resistance thermometers in heat treatment, the automotive industry, steel and aluminum processing or in industrial furnace construction.

With our industrial resistance thermometers you have a variety of possible combinations with regard to the connection heads, the installation and neck length or the connections to the protection tube.

All our resistance thermoemeters are also available on request in accordance with class A, 1/3 B or 1/10 B tolerances.

Resistance Thermometers in stainless steel tube construction

examples of connection head forms



Sensor: according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuits:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Connection Head:
☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

Further information on our connection heads can be found on page 142.

Transmitter:
☐ without transmitter
☐ witht transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

Please specify temperature range _____

Flange:
☐ without
☐ with

Process Connection:
☐ without
☐ M18x1.5
☐ M24x1.5
☐ others _____

Probe Diameter:
☐ 1.5 mm ☐ 3.0 mm ☐ 6.0 mm
☐ others _____

Probe Length ("A"): please specify _____ mm

Construction: stainless steel sheath construction, flexible (mat.-no.: 1.4571)
Termination: ceramic pedestal with sheath terminals

Accessories:
☐ please specify compression fitting
thread type _____
thread length _____

Quantity: _____ piece(s)

Flexible Sheath Resistance Thermometer

Sensor:
according to DIN EN 60751

☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:

☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuit:

☐ 2-wire ☐ 3-wire
☐ 4-wire

Connection Head:

☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

Further information on our connection heads can be found on page 142.

Transmitter:

☐ without transmitter
☐ with transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

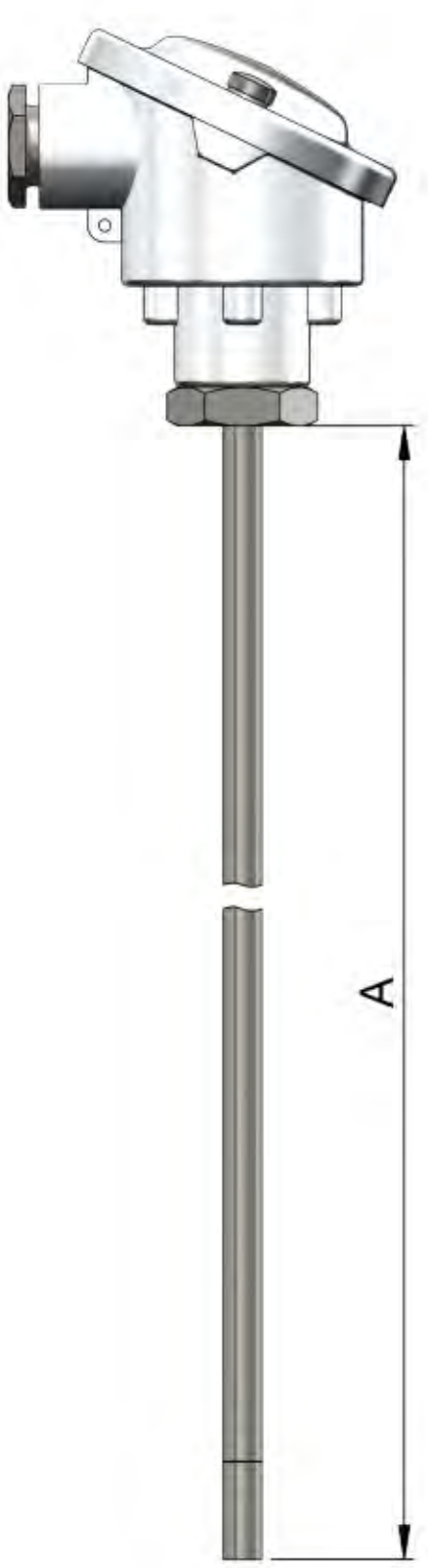
Please specify temperature range _____

Flange:

☐ without
☐ with

Process connection:

☐ without
☐ M18x1.5
☐ M24x1.5
☐ others _____



example of flange system

example of transmitter DTW / TGS2

Probe Diameter:	☐ 1.5 mm ☐ 3.0 mm ☐ 6.0 mm ☐ others _____
Probe Length ("A"):	please specify _____ mm
Construction:	stainless steel sheath construction, flexible (mat.-no.: 1.4571)
Termination:	ceramic pedestal with sheath terminals
Accessories:	☐ please specify compression fitting thread type _____ thread length _____
Quantity:	_____ piece(s)

examples of connection head forms

example of process connection

Resistance Thermometer for screwing-in

Sensor:
according to DIN EN 60751

☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:

☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuit:

☐ 2-wire ☐ 3-wire
☐ 4-wire

Connection Head:

☐ A ☐ AUS ☐ AUZ ☐ AUSH ☐ AUZH
☐ B ☐ BUS ☐ BUZ ☐ BUSH ☐ BUZH
☐ MA
☐ others _____

Further information on our connection heads can be found on page 142.

Transmitter:

☐ without transmitter
☐ with transmitter
- ☐ 4-20 mA
- ☐ 0-10 V
  - ☐ head installation
  - ☐ cover installation

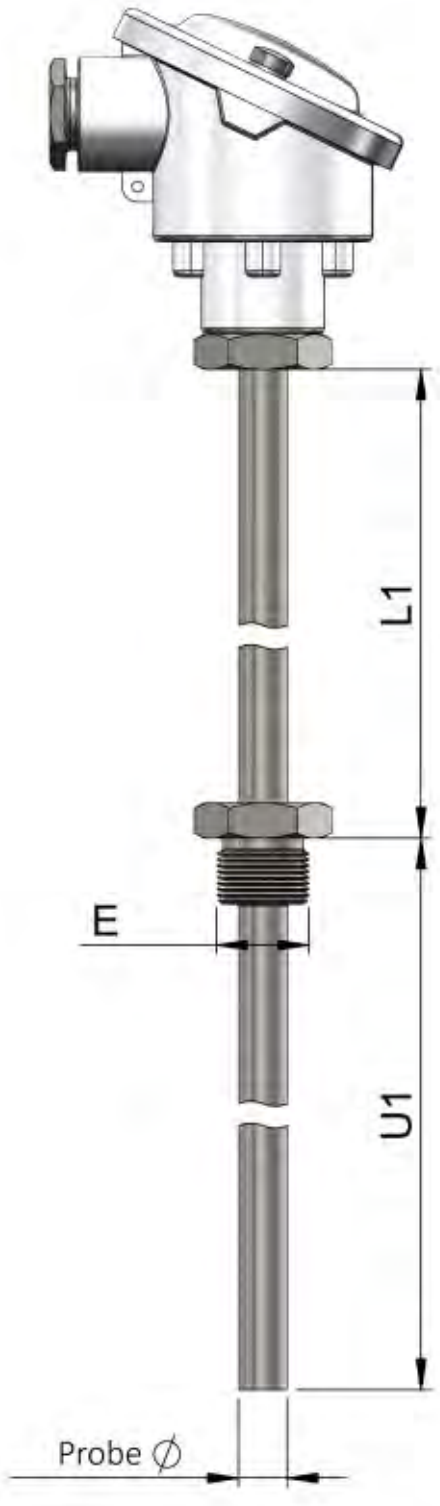
Please specify temperature range _____

Flange:

☐ without
☐ with

Process connection:

☐ without
☐ G1/2"
☐ M24x1.5
☐ others _____



examples of connection head forms

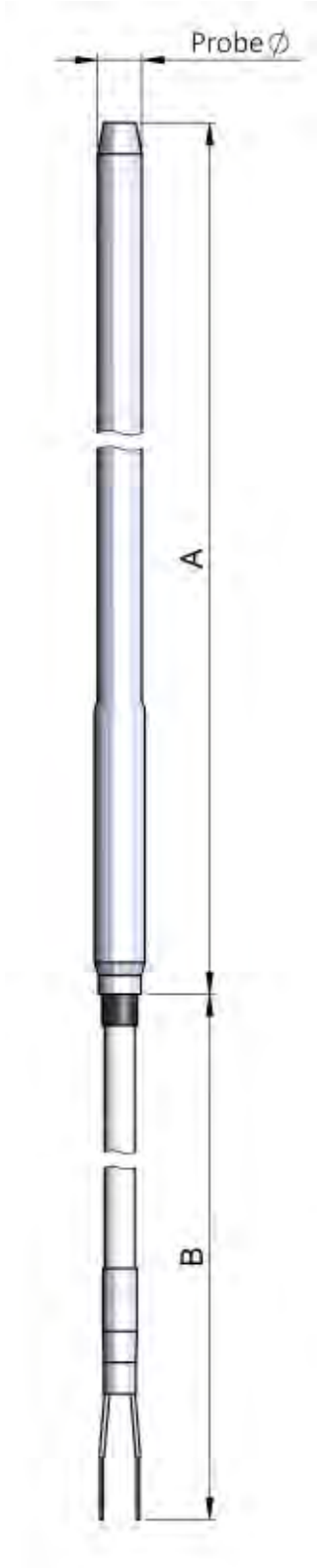
example of thermocouple insert

Probe diameter:	☐ 9.0 mm ☐ 11.0 mm ☐ others _____
Thermocouple Insert:	☐ 6.0 mm ☐ 8.0 mm ☐ others _____
Installation Length ("U1"):	please specify _____ mm
Supporting Tube Length ("L1"):	please specify _____ mm
Construction:	stainl. steel sheath construciton, flexible (mat.-no.: 1.4571)
Termination:	ceramic pedestal with sheath terminals
Accessories:	☐ please specify compression fitting thread type _____ thread length _____
Quantity:	_____ piece(s)

Special Designs

Of course, we also offer our resistance thermometers with a wide range of special designs, such as acid-resistant thermometers or resistance thermometers with oil barrier.

Battery acid resistant Resistance Thermometer



Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuit:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 7.5 mm
☐ others _____

Protective Tube:
☐ stainless steel (mat.-no.: 1.4571)
☐ others _____

Probe Length "A":
please specify _____ mm,
total probe length with PVC-sheath acid proof shrinked

Lead Wire:
flexible lead wire insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C - 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify _____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size_____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

Resistance Thermometer with oil barrier

Sensor:
according to DIN EN 60751

☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:

☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuit:

☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:

☐ 3.0 mm ☐ 3.2 mm ☐ 4.0 mm ☐ 6.0 mm
☐ others _____

Probe Length "A": please specify _____ mm

Lead Wire:

flexible lead wire insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C - 105 °C, for a short time to 125 °C)
☐ others_____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B": please specify _____ mm

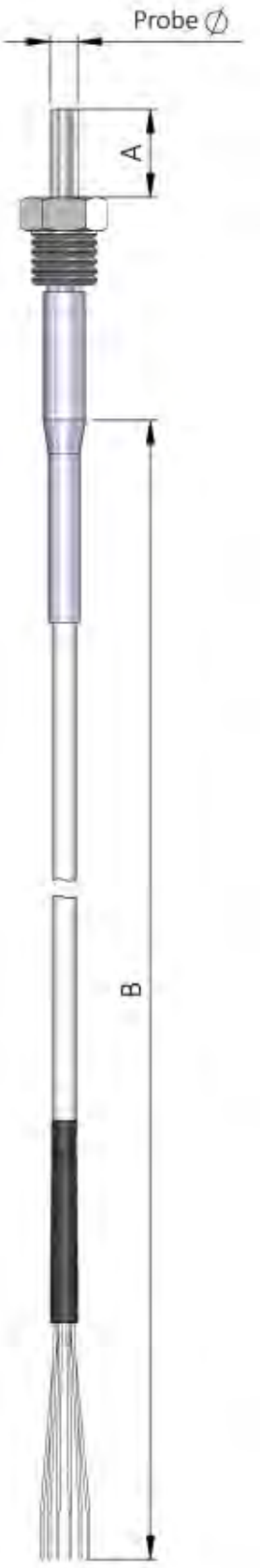
Termination:

☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 94.

Quantity: _____ piece(s)

Waterproof Resistance Thermometer



Sensor:
according to DIN EN 60751
☐ Pt100 ☐ Pt1000
☐ others _____

Tolerance:
☐ class B ☐ class 1/3 B
☐ class 1/10 B ☐ class A

Circuit:
☐ 2-wire ☐ 3-wire
☐ 4-wire

Probe Diameter:
☐ 4.0 mm
☐ others _____

Probe Length "A":
please specify _____ mm

Process Connection:
☐ tip; Ø, length: 4.0 x 36.0 mm, thread: R1/8"
☐ others _____

Lead Wire:
flexible thermocouple cable insulated with
☐ silicone (-50 °C - 180 °C)
☐ fiberglass (400 °C, for a short time to 500 °C)
☐ PVC (-25 °C - 105 °C, for a short time to 125 °C)
☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

Wire Length "B":
please specify_____ mm

Termination:
☐ plug ☐ jack
☐ Lemo: please specify size _____
☐ Tuchel: please specify size _____
☐ Binder: please specify size _____
☐ Fischer: please specify size _____
☐ others _____

Further information on our connector range can be found on page 94.

Quantity:
_____ piece(s)

High-Voltage and Waterproof System

Thermo Sensor has developed thermocouple connector systems that are mainly used in extreme situations. On one hand for applications in which splashing water can cause problems, on the other hand a system for the special requirements of high voltage applications.

Both systems consist of a built-in coupling and the corresponding connector, which is firmly moulded onto a thermocouple wire.
Due to the special system design, all components, when plugged in or with dummy plugs, offer protection class IP65. The high voltage thermocouple connector system offers the user additional protection against high voltage of up to 6 kV.

In both systems, of course, contacts or conductor material made of class 1 thermocouple material are installed in all components.

The correct polarity of the connectors is ensured by a corresponding guide in the plug and coupling. A fuse additionally guarantees that the connection between plug and coupling can not be unintentionally released.

Two insulated thermo wires, which can be connected to the evaluation electronics, are inserted in the panel socket as standard.

The plug is supplied with a molded thermocouple, usually as a wire sensor design. The thermocouples are available in various diameters and isolations, depending on the required dielectric strength.
The waterproof thermocouple connector system is available as moulded sheath thermocouple with a diameter of up to 3.2 mm.
The high-voltage thermocouple connector system is possible with a diameter of up to 3.0 mm, whereby restrictions with regard to dielectric strength must be taken into account.

Thermocouple Sensor System for High-Voltage-Applications

Thermocouple:
according to DIN EN 60584

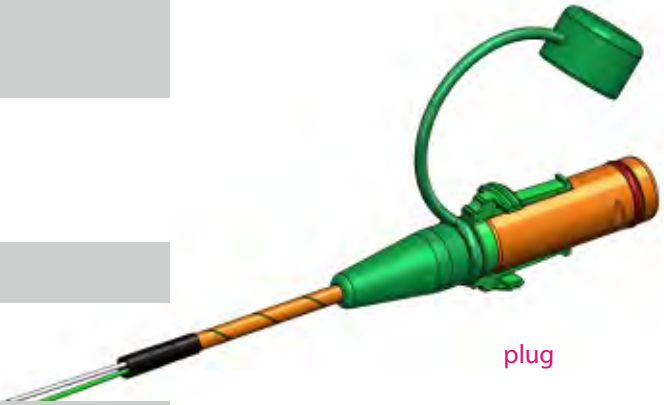
☐ Type K (NiCr-Ni)

☐ others _____

Withstand Voltage: working voltage: 1.5 kV, max. add. transient over voltage depending on the cable

Connector length: 63.0 mm

Connector diameter: 11.5 mm

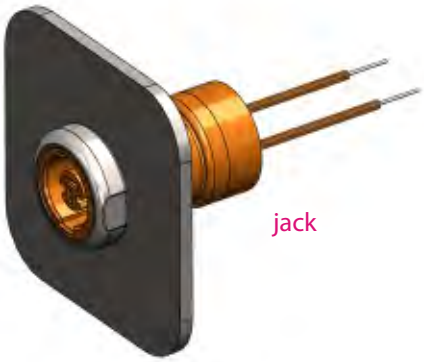


plug

Operating Temp.: -50 °C - 150 °C

Protection Class: IP65 (only in mated condition or with dummy plug)

Hole Diameter Mounting Jack: 16.0 mm



jack

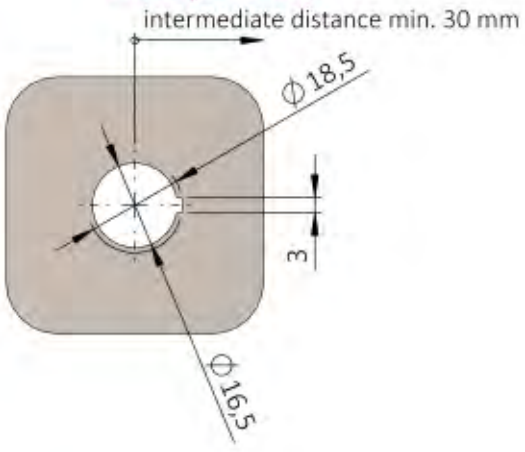
Mounting Screw Thread of Jack: M16x1

Lead Wire: flexible thermocouple, individually or overall insulated with

- ☐ teflon, add. insulated with teflon (max. working voltage 6 kV, -100 °C - 205 °C, for a short time to 230 °C)
- ☐ teflon, parallel (max. working voltage 2.8 kV, -100 °C - 205 °C, for a short time to 230 °C)
- ☐ negative conductor banded with kapton, overall banded with kapton (max. working voltage 1 kV, -190 °C - 200 °C, for a short time to 400 °C)
- ☐ others _____

Further possibilities and information on our cable and wire range can be found on page 122.

hole pattern:



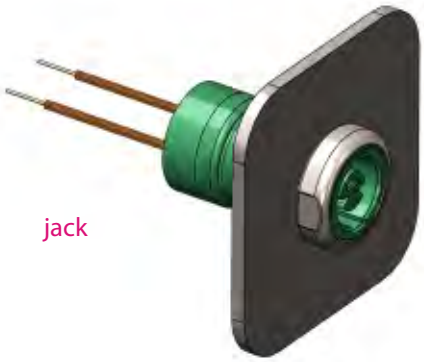
Wire Length: please specify _____ mm

Accessories: ☐ blind plug

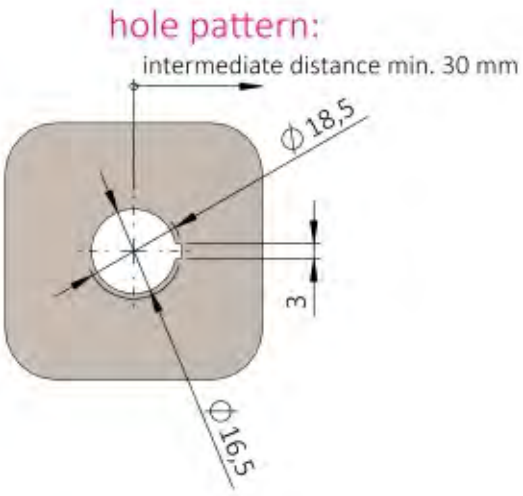
Quantity: _____ piece(s)

Thermocouple Sensor System for Waterproof-Applications

plug



jack



Thermocouple: according to DIN EN 60584	 ☐ Type K (NiCr-Ni) ☐ others _____
Connector Length:	63.0 mm (including bend protection)
Connector Diameter:	11.5 mm
Operating Temperature:	-50 °C - 150 °C
Protection Class:	IP65 (only in mated condition or with dummy plug)
Hole Diameter Mounting Jack:	16.0 mm
Mounting Screw Thread of Jack:	M16x1
Lead Wire:	flexible thermocouple cable, individually and overall insulated with ☐ teflon, with internal copper braid, Ø approx. 3.3 mm (-100 °C - 205 °C, for a short time to 230 °C) ☐ teflon, Ø approx. 2.35 mm x 1.45 mm (-100 °C - 205 °C, for a short time to 230 °C) Further possibilities and information on our cable and wire range can be found on page 122.
Wire Length:	please specify _____ mm
Accessories:	☐ blind plug
Quantity:	_____ piece(s)

Connectors

Thermocouple connectors provide a convenient and secure way to connect components to thermocouple material. They are used wherever thermocouples are connected, extended or replaced.

For a pure transmission of the thermocouple signals, it is important that only thermocouple material of class 1 is used in the entire measuring chain, starting with the measuring tip up to the evaluation unit - both for the wires used for the extension and for the connection and crossing points.

As the safest method for the connection, thermocouple connectors have been found which are basically made with contacts made of original thermocouple material. This means that the contacts are made of the same material from which the actual thermocouple is made. A distortion of the measurement signal can be excluded.

The connectors are characterized by the color of the housing, analogous to the color coding of the different national and international standards. Available are all common standards, such as IEC, DIN and ANSI. In addition, all housings are marked with a polarity indicator. This, in combination with the reverse polarity protection of the contacts, guarantees a safe and correct connection.

Depending on the operating temperature, you will receive connectors made of different materials. Our connector range includes connectors for temperatures up to 220 °C, high-temperature versions up to 320 °C and ceramic versions for use in temperatures up to 450 °C.

Basically, we offer our connectors in three designs.
All our connectors have solid contacts in different widths to prevent reverse polarity and spring-loaded sockets for a secure contact.

Miniature connectors are universally applicable and therefore the most commonly used design.

Standard connectors are easy to operate even with gloves. Their special feature lies in the captive cover screws.

An in-house development of Thermo Sensor are connectors in micro design. They can be used to save space, even in the smallest of installation spaces.

Of course, we offer a wide range of accessories for our connectors, which includes, for example, components for strain relief, for kink protection or for securing and fixing the connectors.

Miniature Connector

☐ plug ☐ jack

		IEC	ANSI
Thermocouple/ Colour Coding: according to DIN EN 60584	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ Type J (Fe-CuNi)	☐ black	☐ black
	☐ Type T (Cu-CuNi)	☐ brown	☐ blue
	☐ Type B (Cu-Cu)	☐ grey	☐ grey
	☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
	☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
	☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
	☐ others _____		

Body Material: break- and hitproof plastic

Operating Temp.: permanent 220 °C, temporarily up to 250 °C

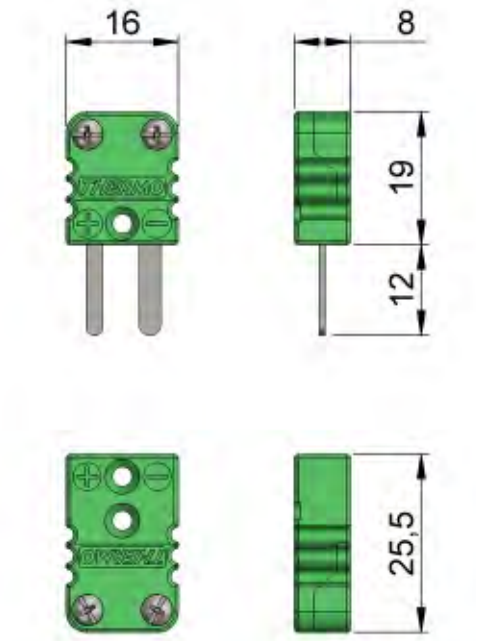
Contacts: thermocouple material class 1, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

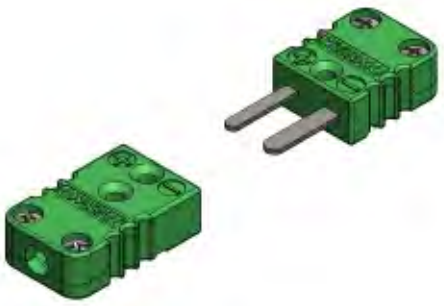
Connection: captive stainless steel screws and plates

Identification: large polarity markings on the housing

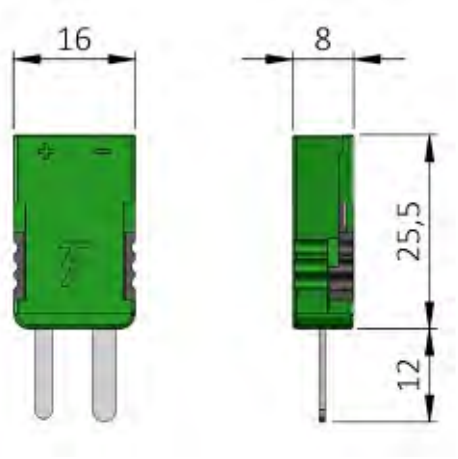
Accessories:
☐ wire clamp bracket
☐ bend protection
☐ neoprene grommet
☐ crimp bushing
☐ safety clip

Quantity: _____ piece(s)

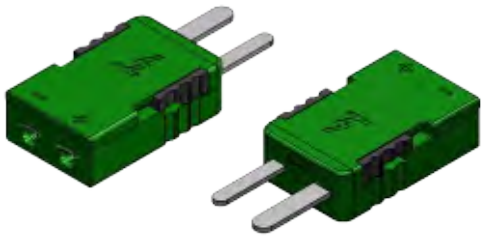




Quick Wiring Miniature Plug

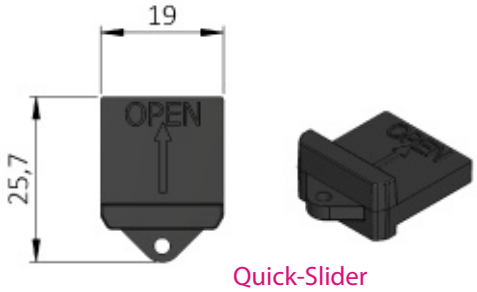


	☐ plug
Thermocouple/ Colour Coding: according to DIN EN 60584	☐ Type K (NiCr-Ni) **IEC** ☐ green
Body Material:	break- and hitproof plastic
Operating Temp.:	permanent 220 °C, temporarily up to 250 °C
Contacts:	thermocouple material class 1, reverse polarity protected; with solid and coded flat contacts
Connection:	Quick Wiring double slider
Identification:	large polarity markings on the housing
Accessories:	☐ strain relief ☐ Quick-Slider ☐ if necessary stripping pliers
Quantity:	_____ piece(s)



Traction

Conductor cross section		Extraction force
flexible	0,22 mm²	27 N
	0,35 mm²	42 N
	0,50 mm²	58 N
massiv	0,22 mm²	28 N
	0,35 mm²	51 N
	0,50 mm²	40 N



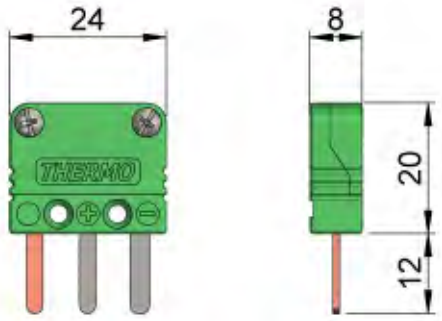
Quick-Slider

3-Pin Miniature Connector

☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		



Body Material: break- and hitproof plastic

Operating Temp.: permanent 220 °C, temporarily up to 250 °C

Contacts: thermocouple material, earth terminal copper, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

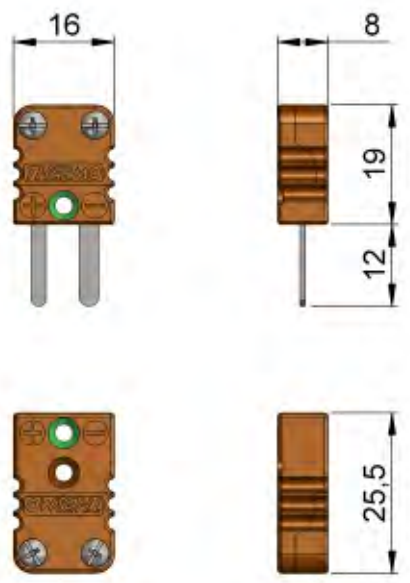
Identification: large polarity markings on the housing

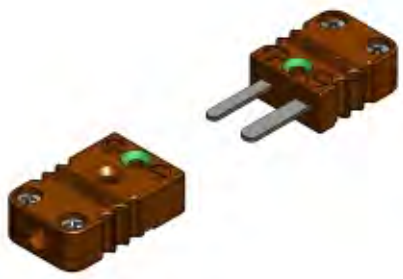
Accessories:

☐ bend protection
☐ neoprene grommet
☐ crimp bushing

Quantity: _____ piece(s)

High-Temperature-Miniature Connector





☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

body brown, marked with coloured dot:

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Body Material: epoxy

Operating Temp.: permanent 320 °C

Contacts: thermocouple material class 1, protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

Identification: large polarity markings on the housing

Accessories:
☐ wire clamp bracket
☐ crimp bushing
☐ safety clip

Quantity: _____ piece(s)

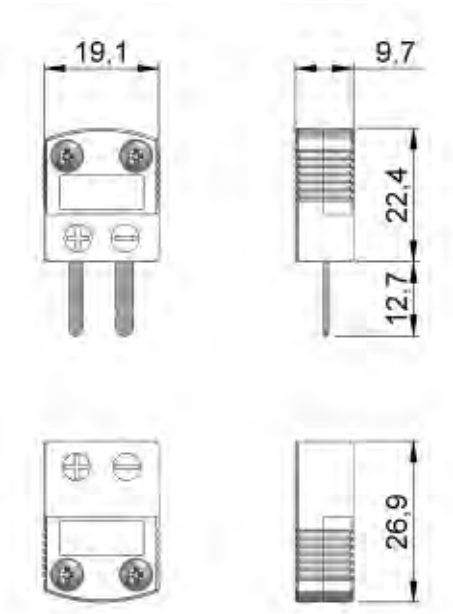
High-Temperature-Miniature Connector in Ceramic Construction

☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

body white, marked with coloured dot:

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		



Body Material: ceramic

Operating Temp.: max. 650 °C

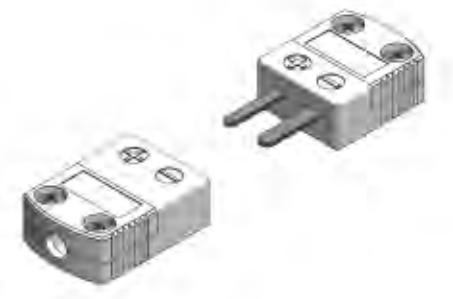
Contacts: thermocouple material class 1, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

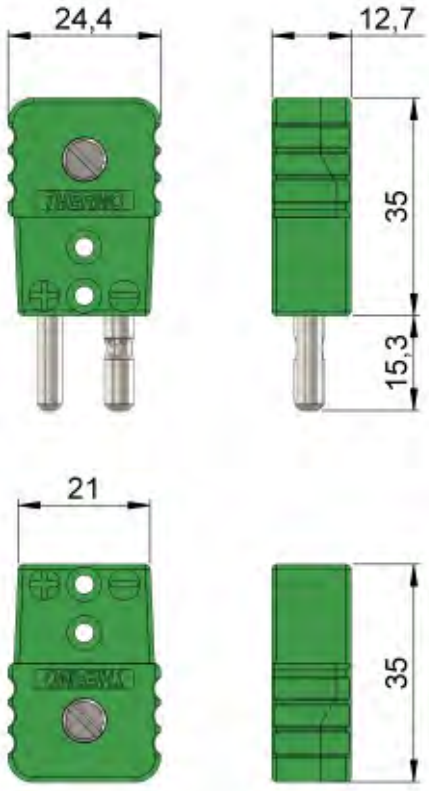
Identification: large polarity markings on the housing

Accessories:
☐ wire clamp bracket
☐ crimp bushing

Quantity: _____ piece(s)



Standard Connector



☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Body Material: break- and hitproof thermoplastic compound

Operating Temp.: permanent 200 °C, temporarily up to 250 °C

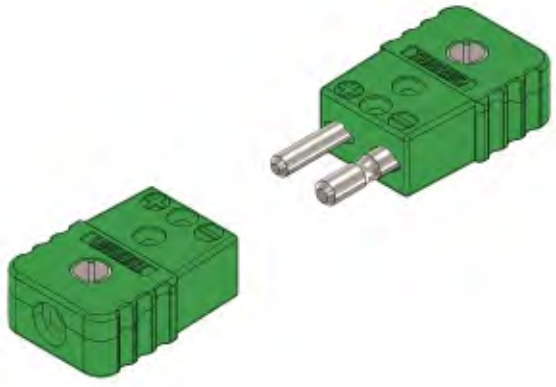
Contacts: thermocouple material class 1, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

Identification: large polarity markings on the housing

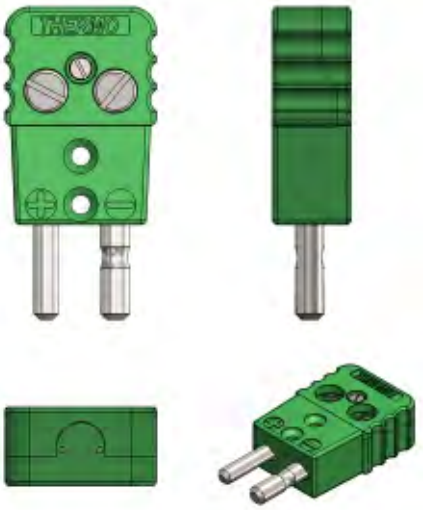
Accessories:
☐ wire clamp bracket
☐ bend protection
☐ neoprene grommet
☐ crimp bushing

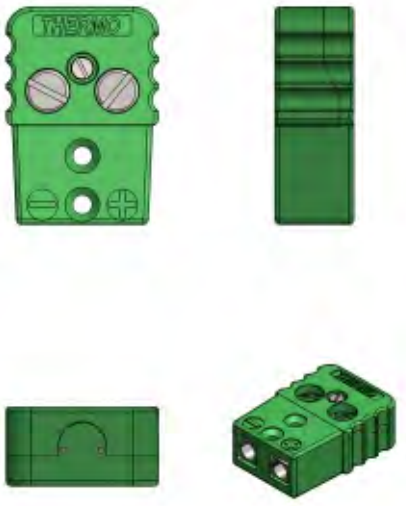
Quantity: _____ piece(s)



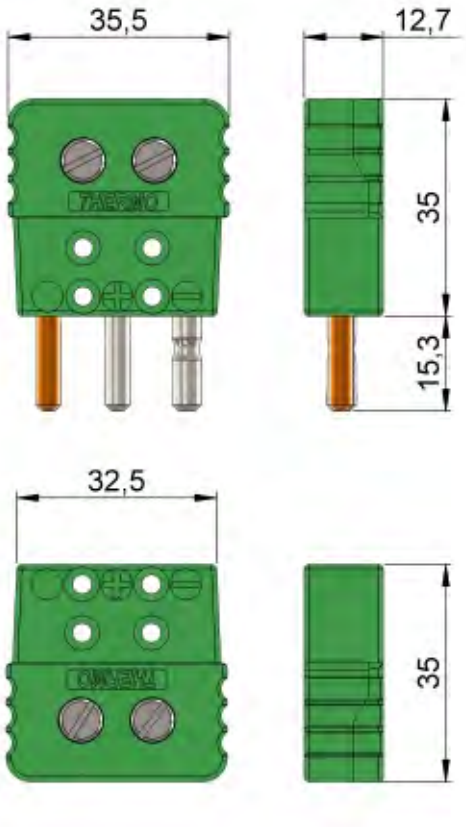
Standard Connector for Quick Wiring

	☐ plug	☐ jack	
Thermocouple/ Colour Coding: according to DIN EN 60584		**IEC**	**ANSI**
	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ Type J (Fe-CuNi)	☐ black	☐ black
	☐ Type T (Cu-CuNi)	☐ brown	☐ blue
	☐ Type B (Cu-Cu)	☐ grey	☐ grey
	☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
	☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
	☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
	☐ others _____		
Body Material:	break- and hitproof thermoplastic compound		
Operating Temp.:	permanent 200 °C, temporarily up to 250 °C		
Contacts:	thermocouple material class 1, reverse polarity protected; plugs with solid and coded flat contacts; jacks with spring-loaded contacts		
Connection:	captive stainless steel screws and plates		
Identification:	large polarity markings on the housing		
Accessories:	☐ wire clamp bracket		
Quantity:	_____ piece(s)		





3-Pin Standard Connector



☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Body Material: break- and hitproof thermoplastic compound

Operating Temp.: permanent 200 °C, temporarily up to 250 °C

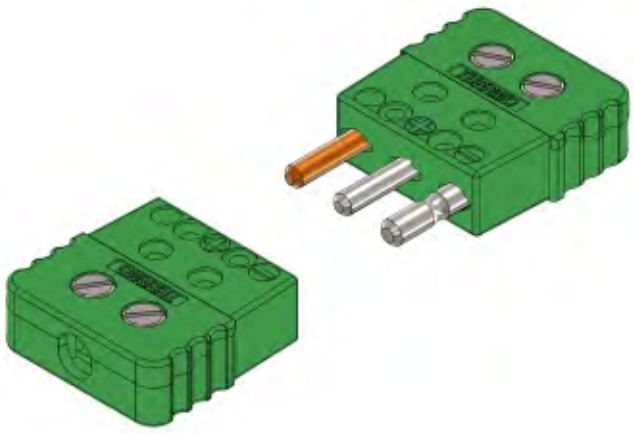
Contacts: thermocouple material, earth terminal Copper, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

Identification: large polarity markings on the housing

Accessories:
☐ wire clamp bracket
☐ bend protection
☐ neoprene grommet
☐ crimp bushing

Quantity: _____ piece(s)



High-Temperature-Standard Connector

☐ plug ☐ jack

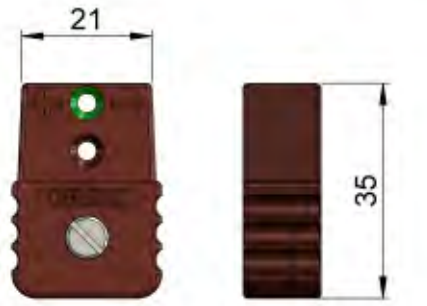
Thermocouple/ Colour Coding:
according to DIN EN 60584

body brown, marked with coloured dot:

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Body Material: epoxy

Operating Temp.: permanent 320 °C



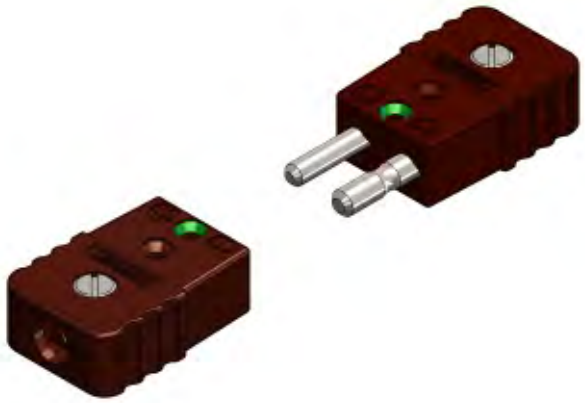
Contacts: thermocouple material class 1, protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

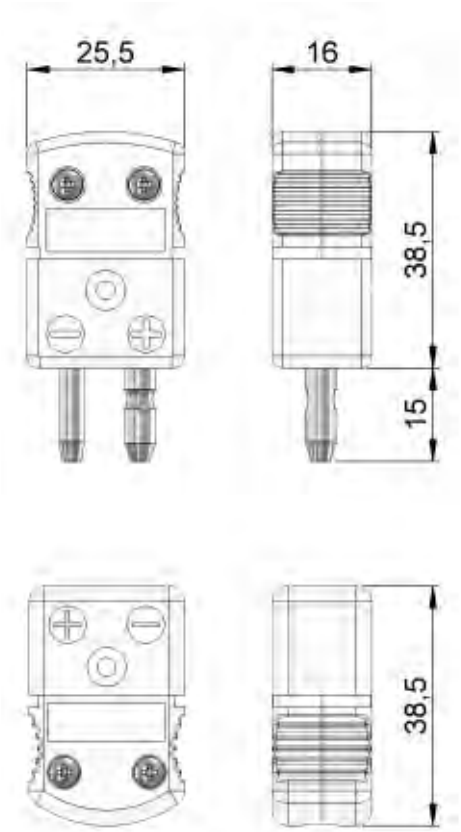
Identification: large polarity markings on the housing

Accessories:
☐ wire clamp bracket
☐ crimp bushing

Quantity: _____ piece(s)



High-Temperature-Standard Connector in Ceramic Construction



☐ plug ☐ jack

Thermocouple/ Colour Coding:
according to DIN EN 60584

body white, marked with coloured dot:

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Body Material: ceramic

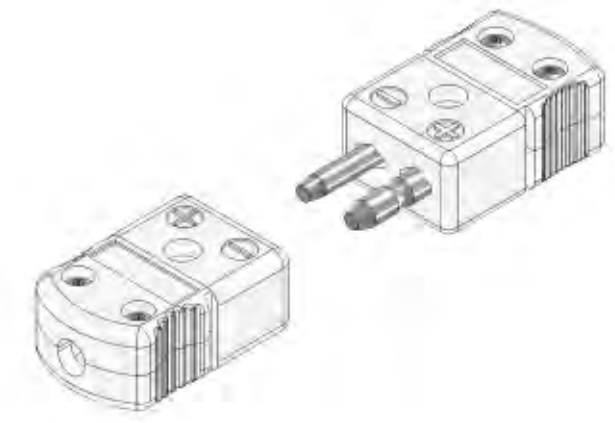
Operating Temp.: max. 650 °C

Contacts: thermocouple material class 1, reverse polarity protected;
plugs with solid and coded flat contacts;
jacks with spring-loaded contacts

Connection: captive stainless steel screws and plates

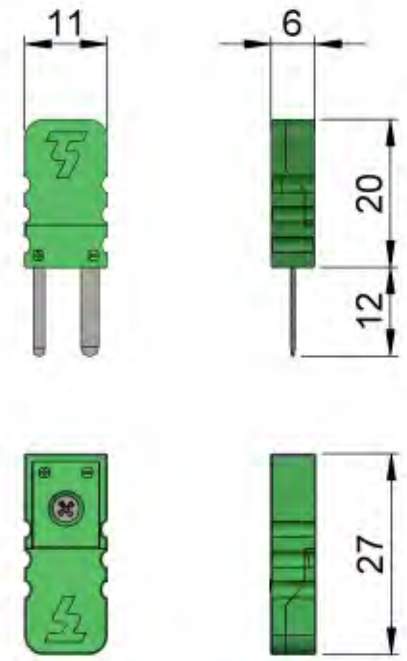
Identification: large polarity markings on the housing

Quantity: _____ piece(s)



Micro-Connector

	☐ plug	☐ jack	
Thermocouple/ Colour Coding: according to DIN EN 60584		**IEC**	**ANSI**
	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ others _____		
Body Material:	break- and hitproof thermoplastic compound		
Operating Temp.:	permanent 200 °C, temporarily up to 250 °C		
Contacts:	thermocouple material class 1, reverse polarity protected; plugs with solid and coded flat contacts; jacks with spring-loaded contacts		
Connection:	captive stainless steel screws and plates		
Identification:	large polarity markings on the housing		
Quantity:	_____ piece(s)		



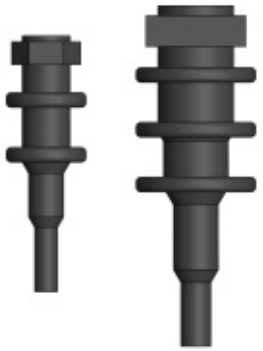
Accessories

Thermo Sensor offers a wide range of accessories for each connector type.
These include, for example, wire clamp brackets, bend protections, neoprene grommets and crimp bushings to protect and relieve the load on connecting cables or safety clips to secure the connection of two connectors.

The silicone bend protections tightly enclose the connectors and the wire, thus protecting them from dirt and splash water. The protective sleeves are covered by a 3.0 - 4.0 mm strip of cloth over the plug connectors, which also prevents the plug connection from sliding apart in the event of high vibration.

Bend Protection

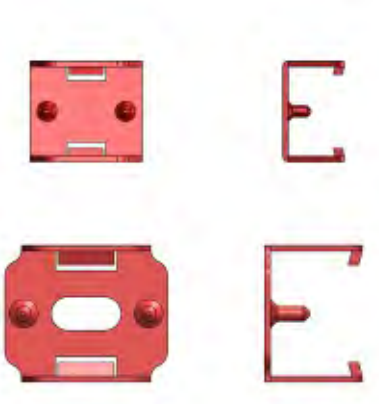
Type:	☐ miniature ☐ standard
Material:	TPE
Operating Temp.:	max 90 °C
Inner Diameter:	by cutting the Bend Protection are the following internal diameters feasible: miniature: 3.5 mm, 2.2 mm, 1.0 mm standard: 5.0 mm, 4.5 mm, 3.0 mm, 1.5 mm
Quantity:	_____ piece(s)



example of bend protection for miniature- and standard-connector

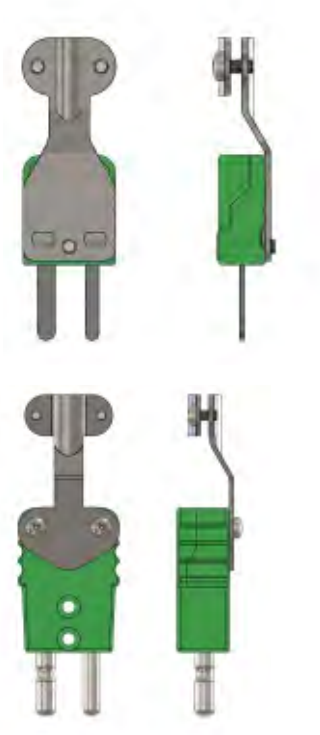
Safety Clip

Type:	☐ miniature ☐ standard
Material:	break- and hitproof thermoplastic compound
Quantity:	_____ piece(s)



example of safety clip for miniature- and standard-connector

Wire Clamp Bracket



example of wire clamp bracket for miniature- and standard-connector

Type:	☐ miniature ☐ standard
Material:	stainless steel
	projection after assembly measured from rear edge of connector: miniature: 16.0 mm standard: 27.0 mm
	screws for assembly are contained within delivery.
Quantity:	_____ piece(s)

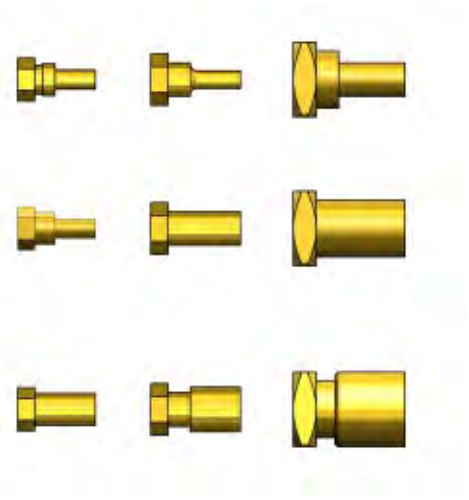
Quick-Slider

example of Quick-Slider for Quick Wiring Miniature Plug

Type:	for Quick Wiring Miniature Plug
Material:	break- and hitproof thermoplastic compound
Quantity:	_____ piece(s)

Crimp Bushing

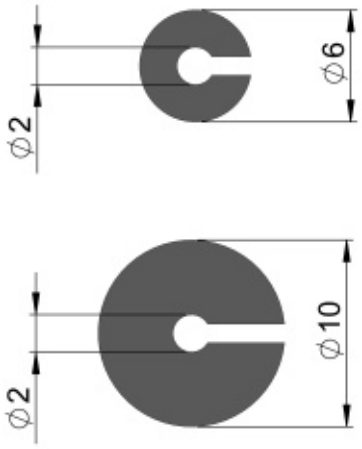
Type:	☐ miniature ☐ standard ☐ micro
Material:	brass, MS 58
Operating Temp.:	approx. 90 °C
Typical Diameters:	☐ 1.1 mm ☐ 1.7 mm ☐ 2.1 mm ☐ 3.1 mm ☐ 3.3 mm ☐ 3.5 mm ☐ 4.0 mm ☐ 5.2 mm ☐ others _____
Miniature-Hexagon:	6.0 mm
Standard-Square:	10.0 mm
Micro-Hexagon:	6.0 mm
Accessories:	☐ crimping tool
Quantity:	_____ piece(s)



example of crimp bushing for micro-, miniature- and standard-connector

Neoprene-Grommet

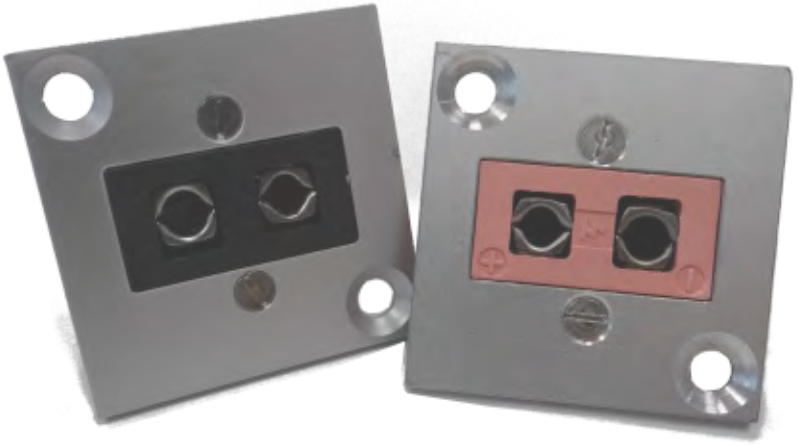
Type:	☐ miniature ☐ standard
Material:	neoprene
Quantity:	_____ piece(s)

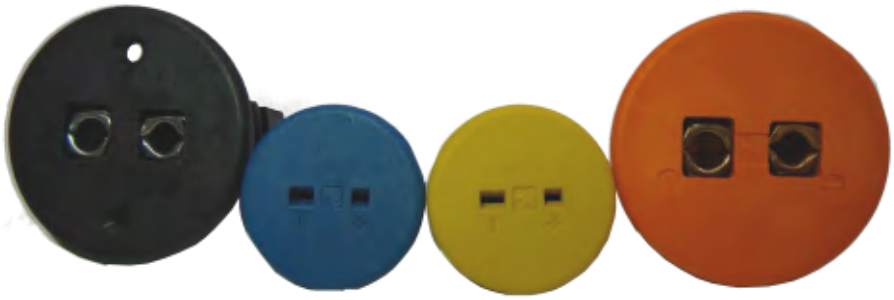


example of neoprene-grommet for miniature- and standard-connector

Panels

In addition to the "normal" connectors, Thermo Sensor also manufactures connectors in all designs for installation in panels or housings. These are available in the familiar designs and mounting options. In addition to individual inserts, individually assembled and fully assembled multiple panels are also available.





Miniature Panel Multiple Measuring Circuits

Operating Temp.:
- ☐ standard (permanently 220 °C, temporarily up to 250 °C)
- ☐ high-temperature (max. 320 °C)

Thermocouple/ Colour Coding: according to DIN EN 60584

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Dimensions:
- ☐ 1-circuit Panel (38.0 x 38.0 mm)
- ☐ 6-circuit Panel (111.0 x 38.0 mm)
- ☐ 12-circuit Panel (206.0 x 38.0 mm)
- ☐ 18-circuit Panel (302.0 x 38.0 mm)
- ☐ 24-circuit Panel (206.0 x 76.0 mm)
- ☐ others _____

Alignment:
- ☐ horizontal
- ☐ vertical

Disposition: please specify _____

Body Material: break- and hitproof thermoplastic compound

Panel Material: aluminium, anodized, thickness 2.5 mm

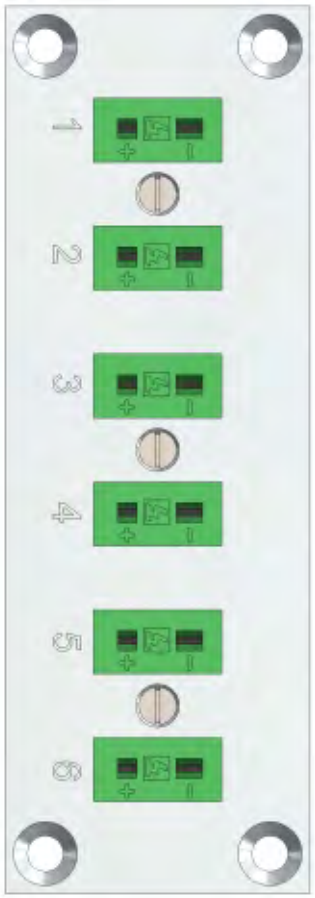
Contacts: thermocouple material, reverse polarity protected, with springloaded contacts

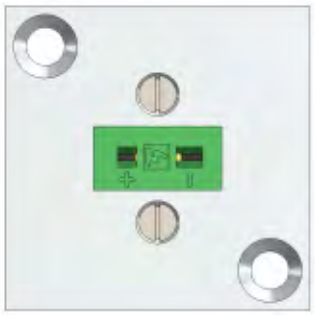
Connection: stainless steel screws and plates

Identification: large polarity markings on the housing

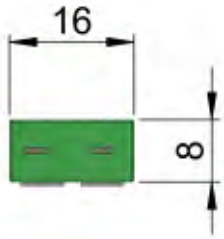
Type: according to EN 50212

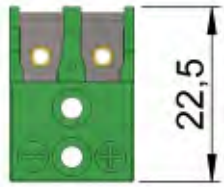
Quantity: _____ piece(s)

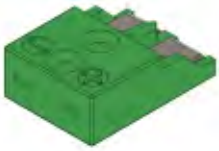


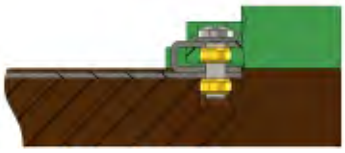


Miniature-Thermocouple Connector for Board Mounting





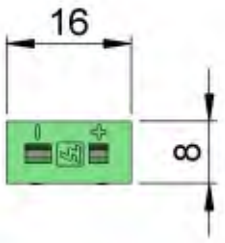


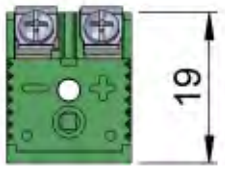


Thermocouple/ Colour Coding: according to DIN EN 60584		**IEC**	**ANSI**
	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ Cu-Cu	☐ grey	☐ grey
	☐ others _____		
Body Material:	break- and hitproof thermoplastic compound		
Operating Temp.:	permanently 200 °C, temporarily up to 250 °C		
Contacts:	thermocouple material, reverse polarity protected, with springloaded contacts, designed for safe contact with the conductor board		
Identification:	large polarity markings on the housing		
Type:	according to EN 50212		
Connection:	stainless steel screws		
Accessories:	☐ stainless steel screws and plates		
Quantity:	_____ piece(s)		

Miniature-Thermocouple Panel Insert for Board Mounting

Thermocouple/ Colour Coding: according to DIN EN 60584		IEC	ANSI
	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ Type J (Fe-CuNi)	☐ black	☐ black
	☐ Type T (Cu-CuNi)	☐ brown	☐ blue
	☐ Type B (Cu-Cu)	☐ grey	☐ grey
	☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
	☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
	☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
	☐ others _____		



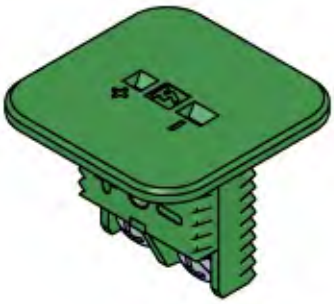


Type:	☐ basic insert ☐ with round front panel ☐ optional: with mounting holes ☐ with sqaure front panel ☐ optional: with mounting holes ☐ with rectangular front panel ☐ with collar ☐ with lug
Body Material:	break- and hitproof thermoplastic compound
Operating Temp.:	permanently 200 °C, temporarily up to 250 °C
Contacts:	thermocouple material, reverse polarity protected, with springloaded contacts
Connection:	stainless steel screws and plates
Identification:	large polarity markings on the housing
Type:	according to EN 50212
Accessories:	☐ assembly set ☐ brass nut ☐ spring set
Quantity:	_____ piece(s)

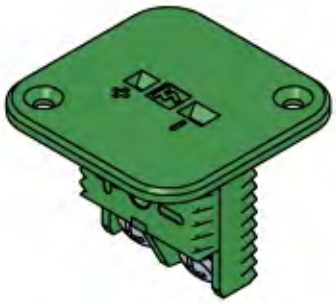
basic insert, backside mounting with assembly set

with round front panel, backside mounting with brass nut and spring set

with with round front panel, frontside mounting with screws



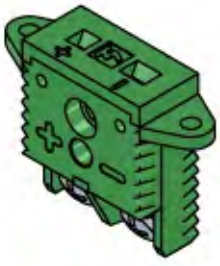
with square front panel, backside mounting with brass nut and spring set



with square front panel and mounting holes, frontside mounting with screws

with rectangular front panel, backside mounting with brass nut and spring set

with collar, backside mounting with assembly set



with lug, frontside mounting with screws

Brass Nut for Backside Mounting

Material: brass

Thread: M18x1.5

Steel Sheet Thickness: variabel, please specify _____

Quantity: _____ piece(s)

Assembly Set for fastening Panel Inserts

Usage: for fastening miniature panels inserts

	Blocks	Rods
☐ 1-circuit panel	2 pcs	1 pc (30.0 mm)
☐ 6-circuit panel	3 pcs	1 pc (95.0 mm)
☐ 12-circuit panel	6 pcs	1 pc (190.0 mm)
☐ 18-circuit panel	9 pcs	1 pc (285.0 mm)
☐ 24-circuit panel	12 pcs	2 pcs (each 190.0 mm)
☐ others _____		

Material: brass, stainless steel

Steel Sheet Thickness: 2.5 mm

Quantity: _____ piece(s)

Spring Set for Backside Mounting

Material: brass

Steel Sheet Thickness: 2.5 mm

Quantity: _____ piece(s)

Standard Panel Multiple Measuring Circuits

Operating Temp.:
- ☐ standard (permanently 220 °C, temporarily up to 250 °C)
- ☐ high-temperature (max. 320 °C)

Thermocouple/ Colour Coding:
according to DIN EN 60584

	IEC	ANSI
☐ Type K (NiCr-Ni)	☐ green	☐ yellow
☐ Type J (Fe-CuNi)	☐ black	☐ black
☐ Type T (Cu-CuNi)	☐ brown	☐ blue
☐ Type B (Cu-Cu)	☐ grey	☐ grey
☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
☐ others _____		

Dimensions:
- ☐ 1-circuit panel (38.0 x 38.0 mm)
- ☐ 6-circuit panel (146.0 x 67.0 mm)
- ☐ 12-circuit panel (260.0 x 67.0 mm)
- ☐ 24-circuit panel (260.0 x 115.0 mm)
- ☐ 30-circuit panel (375.0 x 115.0 mm)
- ☐ others _____

Alignment:
- ☐ horizontal
- ☐ vertical

Disposition: please specify _____

Body Material: break- and hitproof thermoplastic compound

Panel Material: aluminium, anodized, thickness 2.5 mm

Contacts: thermocouple material, reverse polarity protected, with springloaded contacts

Connection: stainless steel screws and plates

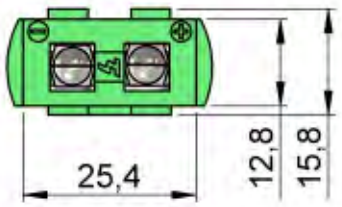
Identification: large polarity markings on the housing

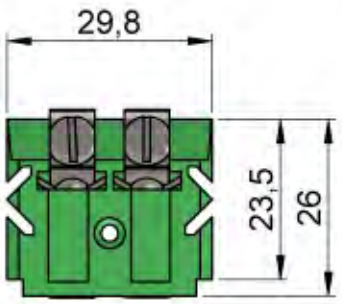
Type: according to EN 50212

Quantity: _____ piece(s)

Standard-Thermocouple Panel Insert for Board Mounting

Thermocouple/ Colour Coding: according to DIN EN 60584		IEC	ANSI
	☐ Type K (NiCr-Ni)	☐ green	☐ yellow
	☐ Type J (Fe-CuNi)	☐ black	☐ black
	☐ Type T (Cu-CuNi)	☐ brown	☐ blue
	☐ Type B (Cu-Cu)	☐ grey	☐ grey
	☐ Type R/S (Cu-Cu11)	☐ orange	☐ green
	☐ Type E (NiCr-CuNi)	☐ purple	☐ purple
	☐ Type N (NiCrSi-NiSi)	☐ pink	☐ orange
	☐ others _____		



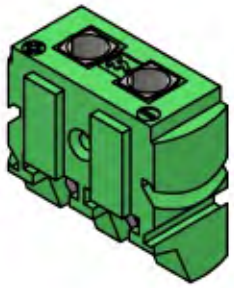


Type:
- ☐ basic insert
- ☐ with round front panel
- ☐ optional: with mounting holes
- ☐ with sqaure front panel
- ☐ optional: with mounting holes
- ☐ with rectangular front panel
- ☐ with collar
- ☐ with lug

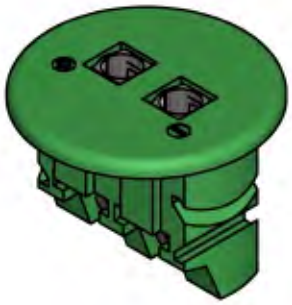
Body Material:	break- and hitproof thermoplastic compound
Operating Temp.:	permanently 200 °C, temporarily up to 250 °C
Contacts:	thermocouple material, reverse polarity protected, with springloaded contacts
Connection:	stainless steel screws and plates
Identification:	large polarity markings on the housing
Type:	according to EN 50212

Accessories:
- ☐ assembly set
- ☐ spring set

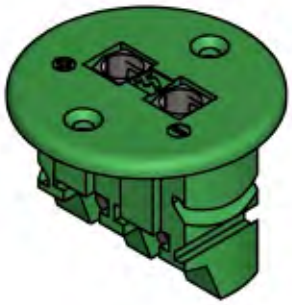
Quantity: _____ piece(s)



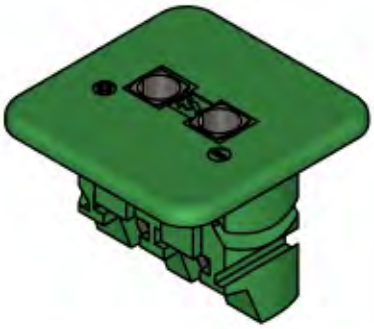
basic insert, backside mounting with assembly set



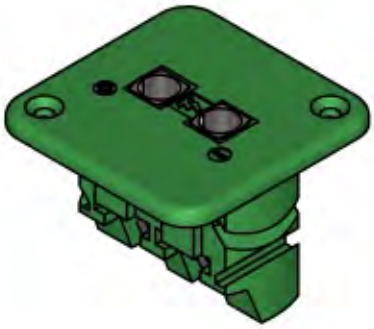
with round front panel, backside mounting with brass nut and spring set



with with round front panel and mounting holes, frontside mounting with screws

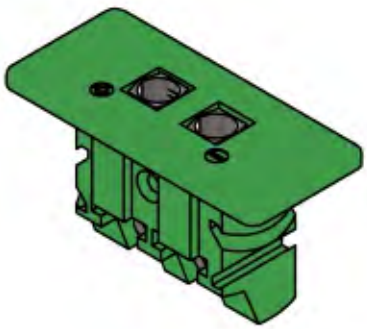


with square front panel, backside mounting with brass nut and spring set

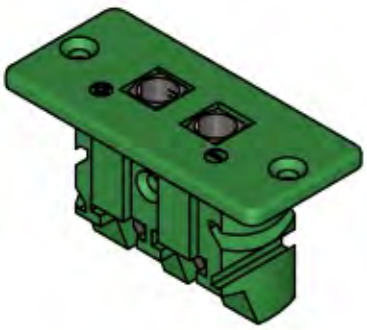


with square front panel and mounting holes, frontside mounting with screws

with rectangular front panel (short), mounting with assembly set or spring set



with rectangular front panel (long), mounting with assembly set or spring clip



with rectangular front panel (long) and mounting holes, frontside mounting with screws

Accessories Standard Panels

Assembly Set

Body Material: break- and hitproof thermoplastic compound

Steel Sheet Thickness: variabel, please specify _____

Quantity: _____ piece(s)

Spring Clip for Backside Mounting

Material: stainless steel

Steel Sheet Thickness: 2.5 mm

Quantity: _____ piece(s)

Assembly Set for fastening Panel Inserts

Usage: for fastening miniature panels inserts

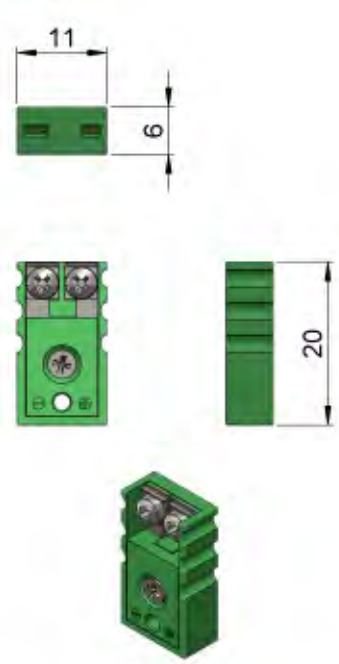
	Blocks	Rods
☐ 1-circuit panel	2 pcs	1 pc (30.0 mm)
☐ 6-circuit panel	3 pcs	1 pc (115.0 mm)
☐ 12-circuit panel	6 pcs	1 pc (225.0 mm)
☐ 24-circuit panel	12 pcs	2 pc (each 225.0 mm)
☐ 30-circuit panel	12 pcs	2 pcs (each 285.0 mm)

Material: brass, stainless steel

Steel Sheet Thickness: 2.5 mm

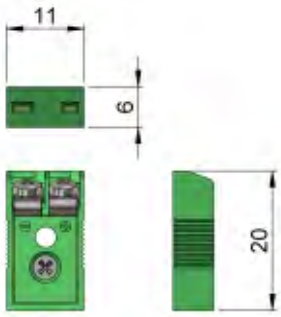
Quantity: _____ piece(s)

Micro-Thermocouple Connector for Board Mounting

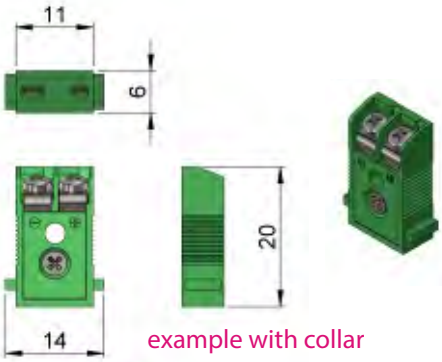


Thermocouple/ Colour Coding: according to DIN EN 60584	☐ Type K (NiCr-Ni)	**IEC** ☐ green	**ANSI** ☐ yellow
	☐ others _____		
Body Material:	break- and hitproof thermoplastic compound		
Operating Temp.:	permanently 200 °C, temporarily up to 250 °C		
Contacts:	thermocouple material, reverse polarity protected, with springloaded contacts, designed for safe contact with the conductor board		
Connection:	stainless steel screws and plates		
Identification:	large polarity markings on the housing		
Quantity:	_____ piece(s)		

Micro-Thermocouple Panel Insert for Board Mounting



example of basic insert



example with collar

Thermocouple/ Colour Coding: according to DIN EN 60584	☐ Type K (NiCr-Ni)	**IEC** ☐ green	**ANSI** ☐ yellow
	☐ others _____		
Type:	☐ basic insert ☐ with collar		
Body Material:	break- and hitproof thermoplastic compound		
Operating Temp.:	permanently 200 °C, temporarily up to 250 °C		
Contacts:	thermocouple material, reverse polarity protected, with springloaded contacts		
Connection:	stainless steel screws and plates		
Identification:	large polarity markings on the housing		
Quantity:	_____ piece(s)		

Cables and Wires

Our many years of experience and cooperation with specialists in sensor and cable technology enable us to find the optimal solution for your application and provide it directly to you or to develop it for you. A large selection of our materials are available from stock, so we can supply you at short notice and without a minimum order quantity.

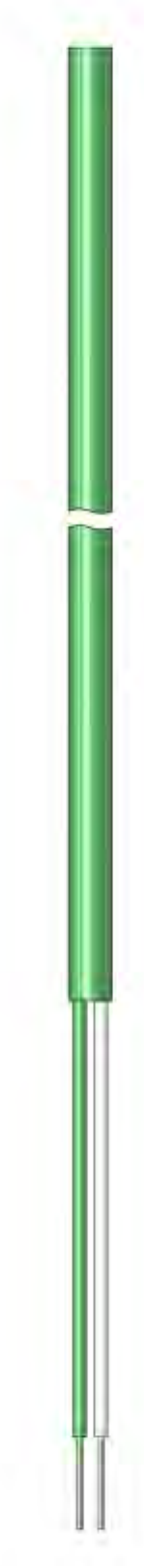
In addition to cable assembly, our product range also includes thermocouple and compensating cables, temperature-resistant cables up to 1,565 °C, coaxial cables, hybrid cables, sensor cables, single and multi-core cables as well as customer-specific solutions. Our cables and wires are used in aerospace, plant and mechanical engineering, renewable energies, traffic engineering, the automotive industry and many other areas.

Thermocouple and compensating leads form a connection between the measuring instrument and the temperature sensor. Their maximum operating temperature is determined by the insulating material. Depending on the field of application, we can put together the optimum combination of insulation material, core cross section, shielding and cable sheath from the different versions.

The inner conductors of the thermocouple cables are made of original thermocouple material. They are labeled with the code letter of the thermocouple and an "X". The table below shows the color coding for thermowires.

	EN 60584	DIN 43714	ANSI MC96.1
KX (NiCr-Ni)			
JX (Fe-CuNi)			
EX (NiCr-CuNi)			
NX (NiCrSi-NiSi)			
TX (Cu-CuNi)			

Thermocouple Wire insulated with silicone



example of 1 x Type K

Conductor:	flexible
Insulation:	silicone
Construction:	parallel
Sheath Material:	silicone
Temperature Range:	-40 °C to 200 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm², OD approx. 3.8 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0,5 mm², OD approx. 5.5 mm ☐ 2 x Type K (NiCr-Ni), braid 4x0.22 mm², OD approx. 3.8 mm ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.22 mm², OD approx. 3.8 mm ☐ 1 x Type T (Cu-CuNi), braid 2x0.22 mm², OD approx. 3.8 mm ☐ others _____
Length:	_____ mm

example of Type K

Thermocouple Wire insulated with silicone
individually insulated with teflon

Conductor:	flexible
Insulation:	teflon (FEP)
Construction:	twisted
Sheath Material:	silicone
Temperature Range:	-40 °C to 205 °C

Norm:

- ☐ DIN EN 60584 by default
- ☐ others _____

Construction:

- ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD approx. 3.8 mm
- ☐ 1 x Type K (NiCr-Ni), braid 2x1.31 mm^2, OD approx. 8.5 mm
- ☐ 1 x Type K (NiCr-Ni), braid 2x3.31 mm^2, OD approx. 8.5 mm
- ☐ 2 x Type K (NiCr-Ni), braid 4x0.22 mm^2, OD approx. 4.4 mm
- ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm^2, OD approx. 3.7 mm
- ☐ others _____

Length: _____ mm

example of 1 x Type K

Thermocouple Wire insulated with teflon

example of 1 x Type K

Conductor:	flexible
Insulation:	teflon (FEP)
Construction:	twisted
Sheath Material:	teflon (FEP)
Temperature Range:	-60 °C to 205 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.2 mm², OD approx. 1.4 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.2 mm², OD approx. 3.1 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm², OD approx. 2.6 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm², OD approx. 2.8 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.3 mm², OD approx. 1.6 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.12 mm², parallel, OD flat oval, 2.0x1.25 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.12 mm², parallel, OD flat oval, 2.35x1.45 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.3 mm², parallel, OD flat oval, 2.0x1.4 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.2 mm², OD approx. 1.7 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm², OD approx. 2.8 mm ☐ 1 x Type T (Cu-CuNi), braid 2x0.3 mm², OD approx. 2.2 mm ☐ others _____
Length:	_____ mm

example of Type K, oval

Thermocouple Wire insulated with teflon
with copper braid

Conductor:	flexible
Insulation:	teflon (FEP), with internal copper braid
Construction:	twisted
Sheath Material:	teflon (FEP)
Temperature Range:	-40 °C to 205 °C

Norm:

- ☐ DIN EN 60584 by default
- ☐ others _____

Construction:

- ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD 2.5 mm
- ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD 3.3 mm
- ☐ 1 x Type K (NiCr-Ni), braid 2x0.5 mm^2, OD 4.0 mm
- ☐ 1 x Type K (NiCr-Ni), braid 2x1 mm^2, OD 2.5 mm
- ☐ 2 x Type K (NiCr-Ni), braid 4x0.22 mm^2, OD 3.7 mm
- ☐ 3 x Type K (NiCr-Ni), braid 3x2x0.22 mm^2, OD 5.0 mm
- ☐ 3 x Type K (NiCr-Ni), braid 3x2x0.8 mm^2, OD 5.5 mm
- ☐ 4 x Type K (NiCr-Ni), braid 4x2x0.22 mm^2, OD 5.0 mm
- ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm^2, OD approx. 3.2 mm
- ☐ 4 x Type J (Fe-CuNi), braid 4x2x0.22 mm^2, OD approx. 5.0 mm
- ☐ 1 x Type E (NiCr-CuNi), braid 2x0.22 mm^2, OD approx. 3.3 mm
- ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.22 mm^2, OD approx. 3.3 mm
- ☐ 2 x Type N (NiCrSi-NiSi), braid 4x0.22 mm^2, OD 3.6 mm
- ☐ 1 x Type T (Cu-CuNi), braid 2x0.22 mm^2, OD approx. 3.3 mm
- ☐ others _____

Length: _____ mm

example of 1 x Type K

example of 2 x Type K

example of 1 x Type K

Thermocouple insulated with teflon
with stainless steel braid

example of 1 x Type K

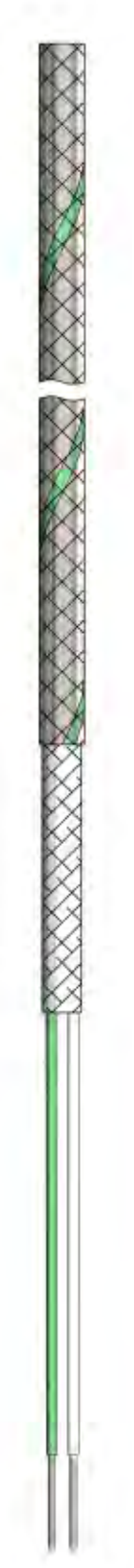
Conductor:	flexible
Insulation:	teflon (PTFE), with internal stainless steel braid
Construction:	twisted
Sheath Material:	teflon (PTFE)
Temperature Range:	-40 °C to 205 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD approx. 4.0 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm^2, OD approx. 3.8 mm ☐ others _____
Length:	_____ mm

Thermocouple insulated with fiberglass

Conductor:	massiv
Insulation:	braided with fiberglass
Construction:	parallel
Sheath Material:	fiberglass
Temperature Range:	up to 400 °C, temporarily 500 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD approx. 2.0 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.2 mm^2, OD approx. 1.1x1.6 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.5 mm^2, OD approx. 2.1x1.3 mm ☐ 1 x Type K (NiCr-Ni), braid 2x1.0 mm^2 ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.5 mm^2, OD approx. 2.1x1.3 mm ☐ 1 x Type T (Cu-CuNi), braid 2x0.5 mm^2 ☐ others _____
Length:	_____ mm

example of 1 x Type K

Thermocouple Wire insulated with fiberglass
with stainless steel braid



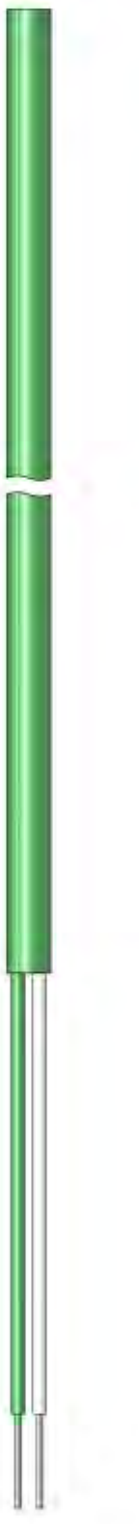
example of 1 x Type K

Conductor:	flexible
Insulation:	individually and overall insulated with fiberglass
Construction:	twisted
Sheath material:	stainless steel braiding
Temperature Range:	up to 400 °C, temporarily 500 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm², OD approx. 2.9 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm², OD approx. 3.2 mm ☐ 2 x Type K (NiCr-Ni), braid 4x0.22 mm², OD approx. 3.3 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm², OD approx. 2.9 mm ☐ 2 x Type J (Fe-CuNi), braid 4x0.22 mm², OD approx. 3.6 mm ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.22 mm², OD approx. 3.1 mm ☐ 2 x Type N (NiCrSi-NiSi), braid 4x0.22 mm², OD approx. 3.3 mm ☐ others _____
Length:	_____ mm

example of 1 x Type K

Thermocouple insulated with PVC

Conductor:	flexible
Insulation:	PVC
Construction:	twisted
Sheath Material:	PVC
Temperature Range:	-15 °C to 105 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.22 mm^2, OD approx. 3.7 mm ☐ 2 x Type K (NiCr-Ni), braid 4x0.22 mm^2, OD approx. 5.0 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.22 mm^2, OD approx. 3.9 mm ☐ others _____
Length:	_____ mm



example of 1 x Type K

Thermocouple insulated with kapton

example of 1 x Type K

Conductor:	solid
Insulation:	negative wire wrapped with kapton
Construction:	parallel
Sheath Material:	kapton
Temperature Range	-265 °C to 285 °C, temporarily 400 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 1 x Type K (NiCr-Ni), braid 2x0.2 mm^2, OD approx. 0.9x0,7 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.2 mm^2, OD approx. 0.85x1.3 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.25 mm^2, OD approx. 0.7x1.0 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.25 mm^2, OD approx. 1.0x1.3 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.3 mm^2, OD approx. 1.38x0.8 mm ☐ 1 x Type K (NiCr-Ni), braid 2x0.5 mm^2, OD approx. 1.0x1.6 mm ☐ 1 x Type J (Fe-CuNi), braid 2x0.25 mm^2 ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.2 mm^2, OD approx. 0.7x1.0 mm ☐ 1 x Type N (NiCrSi-NiSi), braid 2x0.2 mm^2, OD approx. 0.8x0.9 mm ☐ others _____
Length:	_____ mm

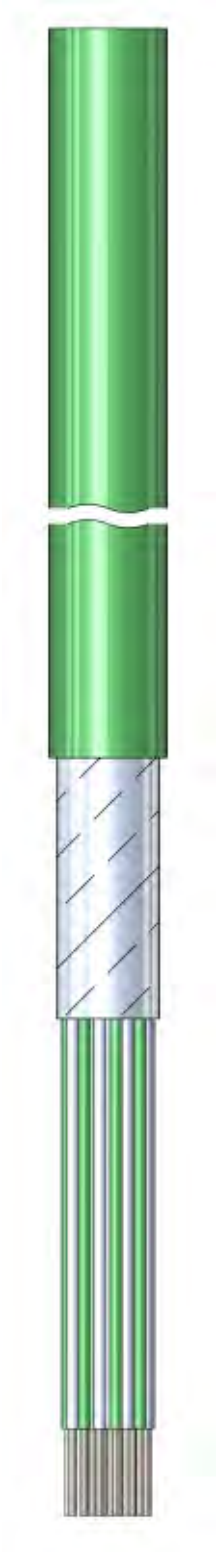
Thermocouple insulated with teflon
8-fold

Conductor:	flexible
Insulation:	teflon (FEP)
Construction:	twisted
Sheath Material:	teflon (FEP), with internal aluminium screen
Temperature Range:	-60 °C to 205 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construction:	☐ 8 x Type K (Fe-CuNi), braid 8x2x0.22 mm^2, OD approx. 6.5 mm ☐ 8 x Type N (NiCrSi-NiSi), braid 8x2x0.22 mm^2, OD approx. 6.5 mm ☐ others _____
Length:	_____ mm

example of 8 x Type K

example of Type K

Thermocouple insulated with teflon
16-fold



example of Type K

Conductor:	flexible
Insulation:	teflon (FEP)
Construction:	twisted
Sheath Material:	teflon (FEP), with internal aluminium screen
Temperature Range:	-60 °C to 205 °C
Norm:	☐ DIN EN 60584 by default ☐ others _____
Construcion:	☐ 16 x Type K (NiCr-Ni), braid 16x2x0.22 mm^2, OD approx. 9.5 mm ☐ 16 x Type N (NiCrSi-NiSi), braid 16x2x0.22 mm^2, OD approx. 9.5 mm ☐ others _____
Length:	_____ mm

Copper - Lead Wire
insulated with teflon

Conductor:	☐ flexible, silvered, 2x0.22 mm², OD approx. 2.2 mm ☐ flexible, 2x0.22 mm², OD approx. 2.8 mm ☐ flexible, nickel-plated, 4x0.22 mm², OD approx. 2.8 mm ☐ others _____
Conductor Material:	copper
Insulation:	teflon (PFA)
Sheath Material:	teflon (PFA)
Temperature Range:	-40°C to 260°C
Colour Coding:	red - white, sheath white
Length:	_____ mm

Copper - Lead Wire
insulated with teflon

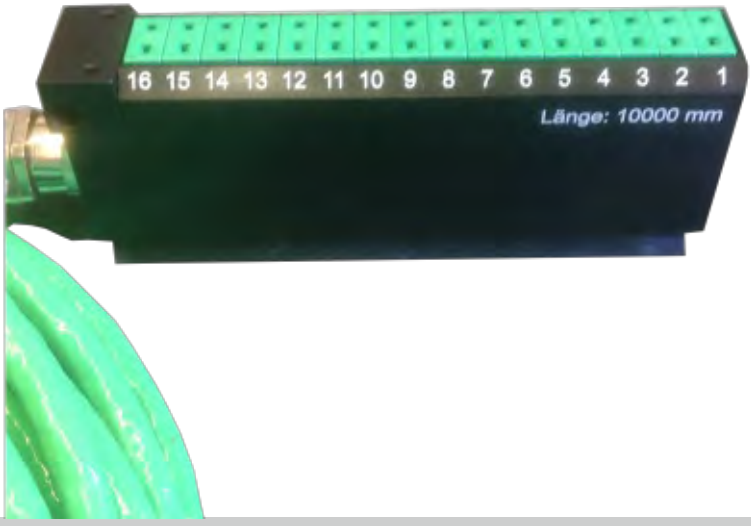
Conductor:	☐ flexible, tinned, 4x0.22 mm² ☐ others _____
Conductor Material:	copper
Insulation:	teflon (FEP)
Sheath Material:	teflon (FEP)
Diameter:	approx. 3.0 mm
Temperature Range:	-40 °C to 205 °C
Colour Coding:	2 x red, 2 x white, sheath black
Length:	_____ mm

Accessories

Our product portfolio includes not only temperature sensors, such as thermocouples or resistance sensors, but extends far beyond that. We see ourselves as a complete supplier and also produce a wide range of accessories in our in-house machinery.

Our extensive accessories range from assembled cables and turned parts, such as compression fittings, stud bolts or crimp sleeves, through connection heads and flanges to protective tubes made of ceramic and stainless steel, transmitters, measuring instruments and, and, and...

Of course, everything is individually tailored to your needs and projects.



Multiplex Thermocouple Extension 8 or 16 Measure Circuits
with Aluminium Housing

Version: ☐ standard ☐ high-voltage ☐ water proof

Thermocouple:
according to
DIN EN 60584

☐ 1 x Type K (NiCr-Ni)

☐ 1 x Type N (NiCrSi-NiSi)

☐ others _____

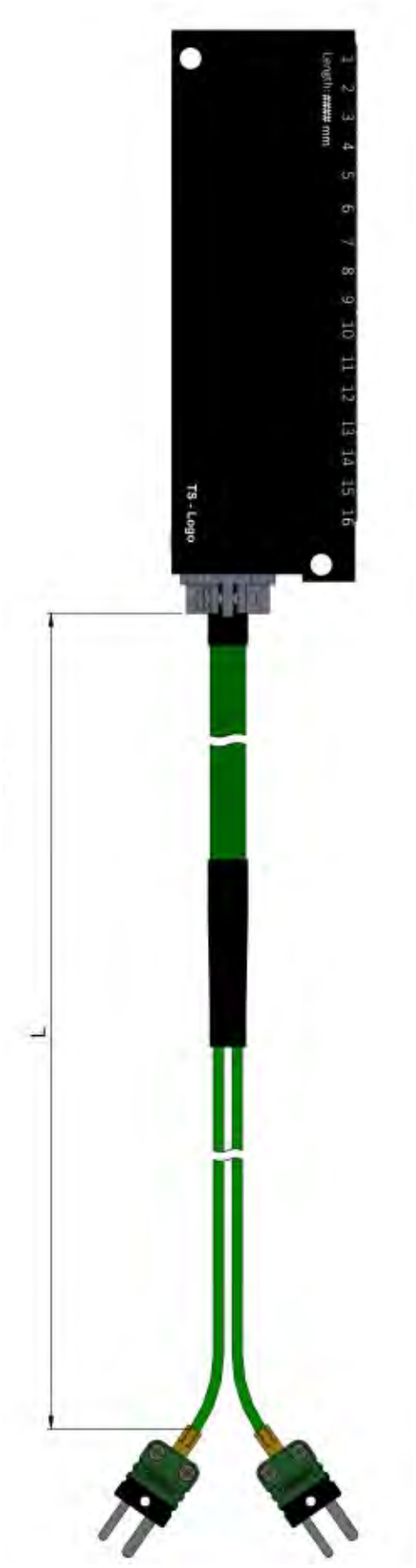
Measure Circuits: ☐ 8-fold ☐ 16-fold
☐ others _____

Aluminium Housing: anodized, with 45° chamfer for marking

Disposition: ☐ single-breasted
☐ double-breasted

Dimensions: standard / miniature:
8-fold: A: 36.0 mm - B: 80.0 mm - C: 20.0 mm
16-fold: A: 49.0 mm - B: 14,5 mm - C: 29.0 mm

micro:
8-fold: A: 36.0 mm - B: 62.0 mm - C: 14.0 mm
16-fold: A: 36.0 mm - B: 64.5 mm - C: 26.0 mm



Lead Wire: flexible thermocouple wire, individually and overall insulated with teflon (FEP), with internal braided shielding
Ø approx. 6.5 mm / 9.5 mm
☐ others _____

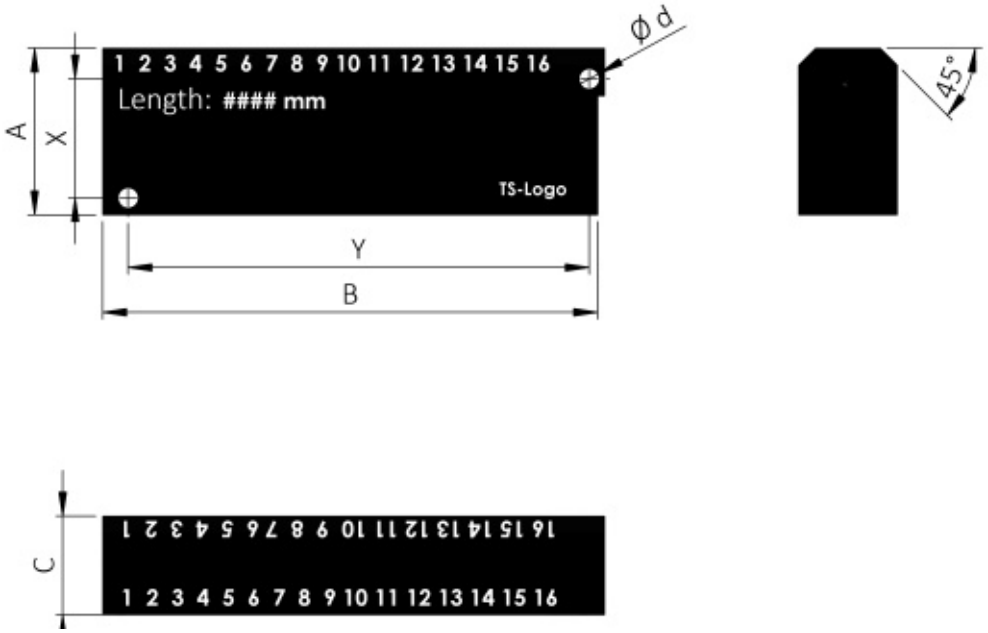
Further possibilities and information on our cable and wire range can be found on page 124.

Wire Length "L": please specify _____ mm

Termination:
☐ standard plug
☐ standard jack
☐ miniature plug
☐ miniature jack
☐ micro-plug
☐ micro-jack
☐ Lemo plug: please specify size _____
☐ bare ends
☐ others _____

Further information on our connector range can be found on page 90.

Quantity: _____ piece(s)



Stud Bolt

For mounting springloaded thermocouples and resistance thermometers with bayonet cap

type "R"

type "S"

Model:	☐ type "R" ☐ type "S"
Material:	stainless steel
Process Connection:	please specify thread _____
Height:	please specify for type "R" _____ mm
Bore Diameter:	please specify _____ mm
Quantity:	_____ piece(s)

Flange System

For mounting springloaded thermocouples and resistance thermometers

Material:	cast iron
Nominal Width:	☐ 15.0 mm ☐ 22.0 mm ☐ 24.0 mm ☐ 32.0 mm
Type:	☐ flange ☐ counterflange
Quantity:	_____ piece(s)

Gas-Tight Threaded Sleeve

For mounting springloaded thermocouples and resistance thermometers

Material: steel 1.0718

Connection Thread: ☐ G1" ☐ G1¼ " ☐ G1½"

Probe Diameter: ☐ 22.0 mm ☐ 26.0 mm ☐ 32.0 mm

Quantity: _____ piece(s)

Compression Fitting

For mounting springloaded thermocouples and resistance thermometers

Body Material: stainless steel

Process Connection: please specify thread _____

Thread Runout:
☐ undercut
☐ conical

Bore Diameter: please specify _____

Ferrule Material:
☐ stainless steel
☐ teflon
☐ ceramic

Ferrule Type:

	Form	Bore Diameter
☐	 V1	☐ 0.6 mm ☐ 1.1 mm ☐ 1.6 mm
☐	 V2	☐ 0.6 mm ☐ 1.1 mm ☐ 1.6 mm ☐ 2.1 mm ☐ 3.1 mm ☐ 3.3 mm ☐ 3.4 mm ☐ 3.6 mm ☐ 4.1 mm ☐ 4.6 mm
☐	 V3	☐ 3.3 mm ☐ 4.1 mm ☐ 4.6 mm ☐ 4.9 mm ☐ 5.1 mm ☐ 6.1 mm

☐ others _____

Quantity: _____ piece(s)

Connection Heads

Version:
according to DIN 43729

- ☐ Form A - large bevelled head with attached loose cover(screwed)
- ☐ Form AUS / AUZ - ball head with hinged cover and cylinder screw / quick lock
- ☐ Form AUSH / AUZH - raised hinged cover for the installation of a transmitter with cylinder screw / quick lock

Material: die-cast aluminium

Cable Entry: cable screw PG 16

Protection Class: IP43

Process Conneciton: ☐ 22.5 mm ☐ 32.5 mm

Quantity: _____ piece(s)

Form A

Version:
according to DIN 43729

- ☐ Form B - small bevelled head with attached loose cover (screwed)
- ☐ Form BUS / BUZ - ball head with hinged cover and cylinder screw / quick lock
- ☐ Form BUSH / BUZH - raised hinged cover for the installation of a transmitter with cylinder screw / quick lock

Material: die-cast aluminium

Cable Entry: cable screw PG 16

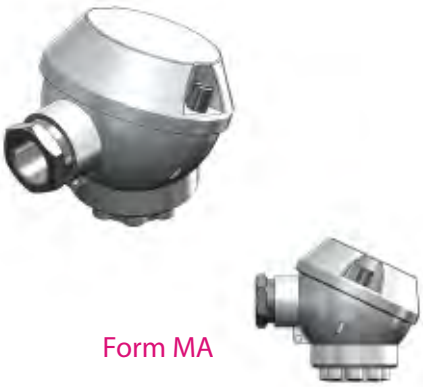
Protection Class: IP43

Process Connection: ☐ 15.5 mm ☐ M24x1.5

Quantity: _____ piece(s)

Form B

Version: according to DIN 43729	☐ Form MA - small head with attached loose cover (screwed)
Material:	die-cast aluminium
Cable entry:	cable screw PG 9
Protection class:	IP43
Process connection:	M10x1
Quantity:	_____ piece(s)



Form MA

example of Form AUZ/BUZ

example of Form AUS/BUS

example of Form AUZH/BUZH

example of Form AUSH/BUSH

Kapton Tape, stamping

Length:	25.0 mm
Width:	19.0 mm
Strength:	0.1 mm
Carrier Material:	polyimid
Limit Temperature:	180 °C, for a short time to 350 °C
Quantity:	_____ piece(s)

Glass Fabric Tape

Length:	55.0 mm
Width:	19.0 mm
Strength:	0.17 mm
Carrier Material:	glass fabric
Glue:	silicone, white
Limit Temperature:	230 °C, for a short time to 290 °C
Length:	_____ piece(s)

Heat-Conducting Paste

Structure:	silicone based
Condition:	pasty
Colour:	white
Application:	for better and more stable transmission of high temperatures
Operating Temp.:	up to 300 °C
Quantity:	_____ gram

Measuring Device - Digital Thermometer TM 100 Typ K

Description:	The TM 100 is a measuring instrument used to determine temperatures in the range of -200 ° C to +1,350 ° C. The housing is made of robust aluminum re-casting, which makes it suitable for any application. Various temperature sensors can be connected via a connection socket on the head of the device.
Battery:	The supplied battery of the meter has a working life of about 40 hours. It can be re-charged by connecting the supplied chargers at the bottom of the meter. At a battery level of about 10% the meter switches off again about six seconds after turning on.
Probe connection:	The various temperature sensors can be connected via the plinth at the top of the device. If no sensor or a defective sensor is connected the indication "OPEN" appears on the display.
Safety instructions:	The sensor must not get in touch with materials under voltage. During operation of the meter please take care that the device is not influenced by high-frequency electromagnetic waves. Otherwise the measurement result could be falsified or the device could be damaged. In order to maintain functionality please do not expose the device temperatures below the freezing point (e.g. freezer), otherwise the electronics could be damaged.

Technical Data:

Temperature Range:	-200 °C - 1,350 °C
Response Time:	about 0,5 s
Accuracy:	± 0.1 °C
Resolution:	0.1 °C
Working Temp.:	5 °C - 45 °C
Dimensions:	approx. 175.0 x 80.0 x 40.0 mm
Voltage Supply:	battery, power adapter

Quantity: _____ piece(s)

Calibration Service

Our calibration laboratory is according to DIN EN ISO / IEC 17025 and is accredited by the national accreditation body of the Federal Republic of Germany (DAkkS). The accreditation of our laboratory applies to the scope of accreditation listed in the certificate system D-K18093-01-00.

During calibration, the possible deviation between the displayed actual temperature and the setpoint value is determined. A change of the sensor is not made during or after the calibration.

Numerous benchmark cells, such as tin, zinc, aluminium, copper, mercury, gallium and H2O (water triplicate), block calibrators, calibration tube furnaces, liquid baths, high accuracy meters and calibration standards make our laboratory a state of the art calibration laboratory.
One highlight of our calibration laboratory are the full range calibrations at fixed points from -38.8 °C to 660.3 °C.

Our experienced and well-trained staff will gladly advise you on all measurement tasks and perform both DAkkS and factory calibrations precisely, quickly and according to your wishes. A calibration of probes from a depth of 300 mm is no problem for us - and that within two working days.

Plant operators who require the temperature sensors for SAT or TUS measurements according to AMS 2750E or CQI-9 3rd. edition, receive both the elements and the associated certificates of traceable calibration with the corresponding certificates of conformity.

On request, we can produce calibration standards that you can use in your own laboratories. We can carry out factory calibrations from -196 °C to 1,600 °C for you, which convince with the highest degree of precision with measurement uncertainties of at most 5 mK to 25 mK.

Our highlights at a glance:

- factory calibrations from -196 °C up to 1,600 °C
- DAkkS-calibrations from -40 °C up to 1,600 °C
- highest precision with measuring uncertainties from 5mK - 25mK
- full Range calibration at temperature fixed-points from -38.8 °C up to 660.3 °C
- execution of calibrations within 2 working days
- professional aging methods improve sensor stability

DAkkS
Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the calibration laboratory

Thermo Sensor GmbH
Carl-Zeiss-Straße 1, 59368 Werne

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out calibrations in the following fields:

Thermodynamic quantities
Temperature quantities
- **Resistance thermometers**
- **Thermocouples**
- **Directreading thermometers**

The accreditation certificate shall only apply in connection with the notice of accreditation of 09.09.2019 with the accreditation number D-K-18093-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the certificate: **D-K-18093-01-00**

Appendix

On the following pages you will find our most important certificates, as well as other interesting information.

For a comprehensive selection of our products in the area of explosion protection, we have certificates according to ATEX and IECEx. Since 2017, we offer have offered sensors for certain applications approved in accordance with "e" (increased safety) and "ec" (protection level).
We can also provide a wide range of sensors with the ignition protection types Ex t (dust) and Ex ia (intrinsic safety) as well as metrological certificates, which are particularly interesting for the foreign market, for example Russia.

In addition, you will find an overview of the international colour coding of thermocouples, as well as the basic value series and characteristic of resistance thermometers, which you are welcome to cut out and therefore always have.

If you have any questions about the certificates or other information, you can always contact us - we will be happy to help you!

(1) TYPE EXAMINATION CERTIFICATE

(2) Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU

(3) Type Examination Certificate Number

TÜV 16 ATEX 7954 X Issue: 00

(4) Equipment: Resistance thermometer and thermocouples type Xn-3000-^^^^

(5) Manufacturer: Thermo Sensor GmbH
(6) Address: Siemensstraße 38, 59199 Bönen, Germany

(7) This product and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The certification body for explosion protection of TÜV Rheinland Industrie Service GmbH, Notified Body No. 0035 in accordance with Article 21 of the Council Directive 2014/34/EU of 26th February 2014, certifies this product which has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report 557 / Ex 7954.00 / 16.

(9) Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule of this certificate, has been assessed by reference to:

EN 60079-0: 2012+A11:2013 EN 60079-15: 2010

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This Type Examination Certificate relates only to the design and specification for construction of the equipment or protective system. It does not cover the process for actual manufacture or supply of the equipment or protective system, for which further requirements of the directive are applicable.

II 3G Ex nA IIC T6 Gc

TÜV Rheinland certification body for explosion protection Cologne, 2017-05-24

Dipl.-Ing. Geoffrey Carlyon

TÜVRheinland®
Precisely Right.

ATEX Certificate "nA"

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

Certificate No: IECEx TUR 17.0033X Issue No: 0

Status: Current

Date of Issue: 2017-05-12

Applicant: Thermo Sensor GmbH
Siemensstraße 38,
59199 Bönen
Germany

Equipment: Resistance thermometer and thermocouples type Xn-3000-^^^^

Optional accessory:

Type of Protection: Ex nA

Marking: Ex nA IIC T6

Approved for issue on behalf of the IECEx Certification Body: Dipl.-Ing. Geoffrey Carlyon

Position: Assigned Certifier

Signature: (for printed version) Steinbel

Date: 24.05.2017

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein
51105 Cologne
Germany

TÜVRheinland®

IECEx Certificate

1st Supplement
acc. to directive 94/9/EC, Appendix III, No 5
to the EC-Type Examination Certificate
TÜV 10 ATEX 7882 X

Device: Thermocouple Type XI-3000-^^^^

Manufacturer: Thermo Sensor GmbH

Address: Siemensstraße 38, D-59199 Bönen, Germany

Description of supplements and modifications

The temperature probe Type XI-3000-^^^^ comprises mainly coil of a probe mounted inside a protection tube. This tube is connected to a connection head with a terminal block installed inside.

(10) The following modifications are valid for this 1st supplement

Temperature Probe Type XI-3000-^^^^

Type of Sensor:
1 – Thermocouple
2 – Resistance thermometer

Type of external connection:
0 – with terminal block
(marking II 1 G Ex ia IIC T*) (according to table below)
T – with installed transmitter
(marking according to installed transmitter)

Identification of transmitter installed
Factory internal product code

Type of connection head
Factory internal product code

TÜVRheinland®
Precisely Right.

ATEX Certificate"Ex ia"

ISSeP
Institut scientifique de service public

Siège social et site de Liège :
Rue du Chéra, 200
B-4000 Liège
Tél : +32(0)4.229.83.11
Fax : +32(0)4.252.44.85

Site de Colfontaine :
Zoning A. Schweitzer,
rue de la Platinerie
B-7340 Colfontaine
Tél : +32(0)65.61.39.11
Fax : +32(0)65.61.39.08

e-mail : direction@issep.be
site web : http://www.issep.be

EG-BAUMUSTERPRÜFBESCHEINIGUNG

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen Richtlinie 94/9/EG

(3) EG-Baumusterprüfbescheinigungsnummer : ISSeP04ATEX035X

(4) Gerät oder Schutzsystem :
- Temperaturfühler type XID-3106.

(5) Antragsteller - Hersteller
Thermo Sensor GmbH

(6) Anschrift : Siemensstrasse, 38
59199 Bönen
Deutschland

(7) Die Bauart dieses Gerätes oder Schutzsystems sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Erfüllt, insoweit Stelle Nr 492 nach Artikel 9 der Richtlinie 94/9/EG des Rates vom 23. März 1994 beurteilt, daß dieses Gerät oder dieses Schutzsystem die in Anhang II der Richtlinie festgelegten grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau des Gerätes und des Schutzsystems zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen erfüllt.
Die Prüfergebnisse sind in dem vertraulichen Prüfbericht n° 06009 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit :
CEI 61241 - 0 : 2004 prEN 61241-0 : 2004 / prAA : 2005
CEI 61241 - 1 : 2004

(10) Falls das Zeichen "X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes oder Schutzsystems in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-BAUMUSTERPRÜFBESCHEINIGUNG bezieht sich nur auf die Konstruktion, Überprüfung und Tests des spezifizierten Gerätes oder Schutzsystems in Übereinstimmung mit Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie können für den Herstellungsverfahren und die Lieferung dieses Gerätes oder Schutzsystems gelten. Diese sind von vorliegender Bescheinigung nicht abgedeckt.

(12) Die Kennzeichnung des Gerätes oder Schutzsystems muß die folgenden Angaben enthalten :
II 1 D / Ex tD A 1D IP6X T80°C

Colfontaine, den 31-10-06

INSTITUT SCIENTIFIQUE DE SERVICE PUBLIC
Zoning A. Schweitzer,
rue de la Platinerie
B-7340 COLFONTAINE (Wasmes)
Tél : ++ 32 65 61/39.11 -
Fax : ++ 32 65 61/39.08

Marcel Lambert
Directeur

Diese Bescheinigung darf nur vollständig, ohne Änderungen und mit der Anlage veröffentlicht werden.

1/2

REGION WALLONNE

ATEX Certificate "Ex t"

ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СВИДЕТЕЛЬСТВО

об утверждении типа средств измерений

DE.C.32.001.A № 36232

Срок действия до 12 ноября 2019 г.

НАИМЕНОВАНИЕ ТИПА СРЕДСТВ ИЗМЕРЕНИЙ
Преобразователи термоэлектрические серии ТС с термопарами типа B, R, S, K, N, J, T, E

ИЗГОТОВИТЕЛЬ
Фирма "Thermo Sensor GmbH", Германия

РЕГИСТРАЦИОННЫЙ № 41277-09

ДОКУМЕНТ НА ПОВЕРКУ
ГОСТ 8.338-2002

ИНТЕРВАЛ МЕЖДУ ПОВЕРКАМИ 2 года

Свидетельство об утверждении типа продлено приказом Федерального агентства по техническому регулированию и метрологии от 12 ноября 2014 г. № 1809

Описание типа средств измерений является обязательным приложением к настоящему свидетельству.

Заместитель Руководителя
Федерального агентства Ф.В.Булыгин

2014 г.

Серия СИ № 017680

Metrological Certificate
Thermocouples

ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СВИДЕТЕЛЬСТВО

об утверждении типа средств измерений

DE.C.32.001.A № 36233

Срок действия до 12 ноября 2019 г.

НАИМЕНОВАНИЕ ТИПА СРЕДСТВ ИЗМЕРЕНИЙ
Термометры сопротивления серии RTD

ИЗГОТОВИТЕЛЬ
Фирма "Thermo Sensor GmbH", Германия

РЕГИСТРАЦИОННЫЙ № 41276-09

ДОКУМЕНТ НА ПОВЕРКУ
ГОСТ 8.461-2009

ИНТЕРВАЛ МЕЖДУ ПОВЕРКАМИ 2 года

Свидетельство об утверждении типа продлено приказом Федерального агентства по техническому регулированию и метрологии от 12 ноября 2014 г. № 1802

Описание типа средств измерений является обязательным приложением к настоящему свидетельству.

Заместитель Руководителя
Федерального агентства Ф.В.Булыгин

2014 г.

Серия СИ № 017587

Metrological Certificate
Resistance Thermometers

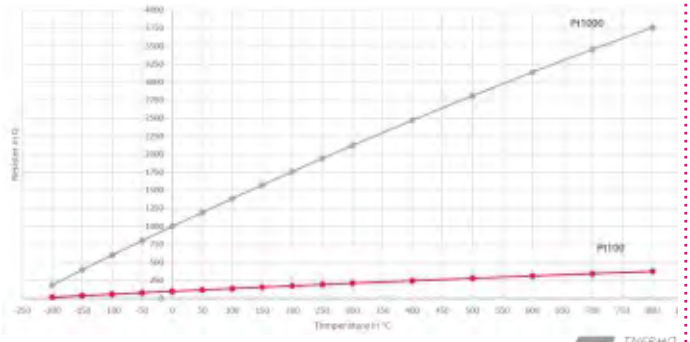
International Colour Coding

Code letter	Material + -	DIN 43722
Type J	Fe - CuNi	
Type K	NiCr - NiAl	
Type N	NiCrSi - NiSi	
Type T	Cu - CuNi	
Type E	NiCr - CuNi	
Type R	Pt13%Rh - Pt	
Type S	Pt10%Rh - Pt	
Type B	Pt30%Rh - Pt6%Rh	

Thermo Sensor GmbH | Carl-Zeiss-Straße 1 | 59368 Werne | Germany
info@thermo-sensor.de | www.thermo-sensor.de

Basic Value Series Resistance Thermometer

Temp. in [°C]	Pt100 in [Ω]	Pt1000 in [Ω]	Temp. in [°C]	Pt100 in [Ω]	Pt1000 in [Ω]
-200	18.5	185.2	200	175.8	1758.6
-150	39.7	397.2	250	194.1	1940.9
-100	60.3	602.6	300	212.1	2120.5
-50	80.3	803.1	400	247.1	2470.9
0	100.0	1000.0	500	280.9	2809.8
50	119.4	1193.9	600	313.7	3137.1
100	138.5	1385.1	700	345.3	3452.8
150	157.3	1573.3	800	375.7	3757.0



Thermo Sensor GmbH

customer oriented • innovative • flexible

Please feel free to contact us.

We will be happy to assist you.

Looking forward to hearing from you!

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59368 Werne, Germany
Tel.: +49 2389 40200-0
Fax: +49 2389 40200-99
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THERMO SENSOR