TEMPERATURE SENSORS

GRÄFF

TEMPERATURE SENSOR

we get to the point...

Gräff GmbH • Bonner Strasse 54 • D - 53842 Troisdorf • Tel: +49(0)2241-4907-0 • Fax: +49(0)2241-4907-77
Internet: http://www.graeff-gmbh.com E-Mail: info@graeff-gmbh.com

INTERESTING FACTS

Gräff GmbH

Competence and Know How

With an experience potential of by now 50 years in development and production of industrial temperature measurement technology, we have developed into one of the leading manufacturers of temperature, measurement and control technology. Today, with more than 80 employees and a product portfolio of more than 5,000 different temperature sensors, we produce more than 20,000 sensor variation possibilities for the whole world at our location in Troisdorf near Bonn. With our professional competence, our know-how and our determination, we meet all conceivable temperature recording tasks from almost all branches of industry.
On a daily basis we solve countless and highly-complex tasks from the sectors of temperature, measurement and control technology for the plastics, pharmaceutical, food, raw material refinement industry, metal processing, furnace construction, waste management, automobile industry, plant and machine engineering as well as the building, glass and textile industry

Experience and Organisation

Established in 1946 by Heinrich Gräff, the grandfather of today's managing partner Marion Hupperich, as artisanal small business in Troisdorf near Bonn, the business developed continuously and between 1962 to 1964 laid the foundation for today's product portfolio with the production of temperature sensors. On currently more than 2500m² Gräff GmbH manufactures high-quality, precise and sustainably designed temperature measurement technology with state-of-the-art production facilities. Today, thanks to continuous market observation, our product portfolio covers temperature ensors, control technology, automation technology, actuators, electric heating technology, insulation technology, and melt pressure technology. As one of the first manufacturers on the European market, our melt pressure sensors were type tested according to current standards and certified by the TÜV Rheinland.

Quality and Reliability

All Gräff products are manufactured exclusively of high-quality materials from renowned raw material manufacturers. We can therefore proudly call our products “MADE IN GERMANY”. Thanks to selected, controlled raw materials manufactured in Germany we can produce high-precision and long-lasting products which have special properties. Special manufacturing methods ensure maximum accuracy with a functional safety far beyond our warranty of 36 months. All product properties are controlled, tested and documented internally during the individual production steps and before dispatch. Continuously trained qualified personnel, state-of-the-art production technology and the processing of exclusively high-quality raw materials offer you a plus in your value-added chain.

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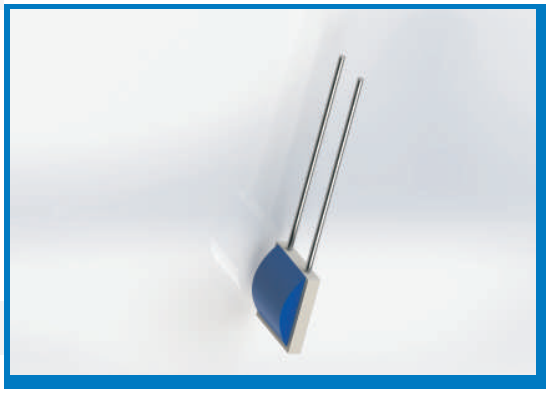
MEASURING PRINCIPLES

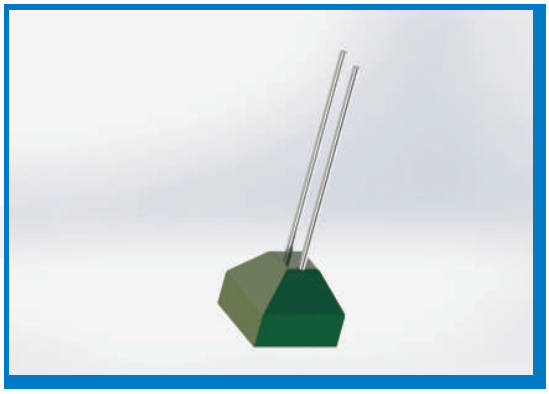
Resistance Thermometers

Platinum Resistance Thermometers



Platinum resistance thermometers have a high accuracy distributed across a broad temperature measurement range (from -200°C to +850°C). In their processing, pure platinum is contaminated on purpose to retain the properties of the pure metal and to make it more resistant against chemical pollution during the measurement process at the same time. In contrast to thermal elements it is not necessary to use special cables to be able to connect the sensor.

Measuring Principle



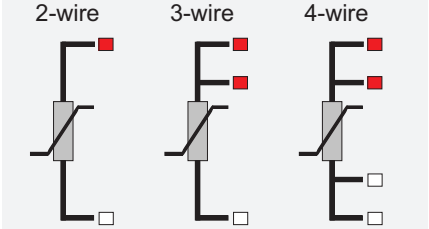
Resistance thermometers utilize the properties of an electrical conductor to change its electrical resistance with the temperature. The measuring principle of these sensors is to measure the resistance value of the platinum element. The most used type (Pt100) has a resistance value of 100 Ohm at 0°C and 138.4 Ohm at 100°C. Correspondingly, Pt25/Pt1000- sensors have a resistance value of 25 Ohm and 1000 Ohm at 0°C. Platinum resistance thermometers belong to the thermistors. In the case of a thermistor, the resistance increases with rising temperature.

Standardization and Tolerances

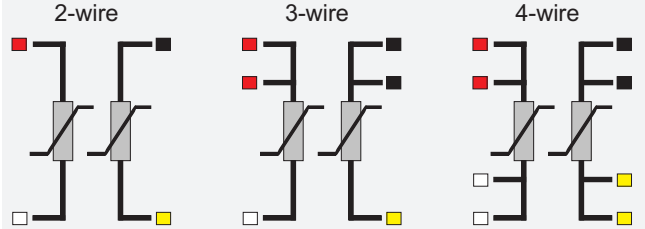
Gräff GmbH offers a series of platinum resistance thermometers, beginning with the tolerance class
B (DIN EN 60751:2008).:
These sensors have an accuracy of +/- 0.3°C at 0°C.
For more accurate measurements tolerance class A (+/- 0.15°C at 0°C) or 1/10 DIN class B sensors (+/- 0.03°C at 0°C).
Please note that these tolerance specifications refer only to the temperature sensor and possible errors in the complete measuring chain must be observed.
Equations for calculating the measuring resistance dependent on the temperature.
Polynomial 2nd degree is defined for the temperature range from 0 to 850 °C
$R(T) = R0 * (1 + A * T + B * T2)$
Polynomial 3rd degree is defined for the temperature range from -200 to 0 °C
$R(T) = R0 * (1 + A * T + B * T2 + C * (T - 100°C) * T3)$
According to the standard DIN EN 60751 the following coefficients apply:
A = 3.9083 * 10-3 °C-1
B = -5.775 * 10-7 °C-2
C = -4.183 * 10-12 °C-4

Colour coding according to DIN EN 60751

Singel system



Double system



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MEASURING PRINCIPLES

Thermocouples

Finctionality of Thermocouples

A thermocouple is a wire pair made of different materials which are connected at one end and part of a device which uses the thermo-electrical effect for temperature measurement. When heating up a metal, the electrons start wandering increasingly stronger dependent on the temperature. This creates a certain tension which increases in relation to the temperature increase. When using two different metals, the electrons in each material move at different speeds. As a result, one receives two different tensions. With the temperature measurement technology, only the difference tension of the two materials is measured and placed in relation to the temperature.
This relationship is not precisely linear and needs to be calculated differently mathematically depending on the thermocouple. The reference junction is the connection point of the thermocouple which lies at a known (reference junction) temperature and is compared with the measuring temperature.

“WELDED”

Thermoelectric Lead and Compensating Cable

Gräff GmbH generally produces all thermal elements from thermoelectric lead. Thermoelectric leads and compensating cables are used for the electrical connection between the open ends of a thermocouple and the reference junction in cases where the lines of the thermocouple are not directly connected with the reference junction. Thermoelectrical leads are produced with conductors which have the same nominal composition as the c orresponding thermocouple. Compensating cables are produced from conductors which have a different nominal composition as the corresponding thermocouple.

“ISOLATED”

Electrical Properties - Potential

Non-isolated / welded in:
A measuring point which is connected electrically with the outer sheath. This results in improved properties in the response time of the sensor.

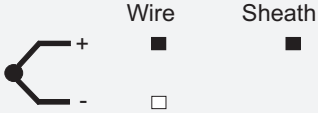
Potential-free / insulated:
A measuring point which is arranged insulated from the outer sheath. Penetrating moisture leads to changes of the insulation resistance and therefore to falsification of the measuring result. Our sensors are therefore generally sealed hermetically by a sealant. The measuring insert itself is also sealed to avoid penetration of moisture into the probe tube. Measuring inserts can be exchanged safely as they form a closed unit.

“VIBRATION RESISTANCE”

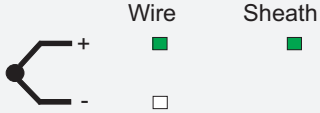
Colour coding according to DIN EN 60584

Fe-CuNi, Typ L (old DIN 43710)

Fe-CuNi, Typ J



NiCr-Ni, Typ K



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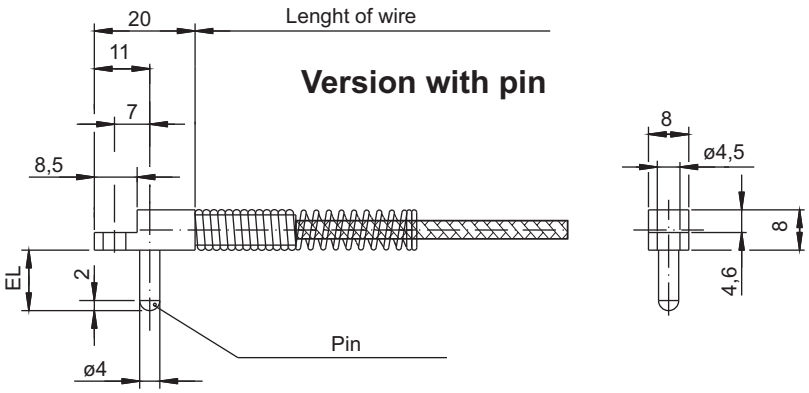
OVERVIEW SENSORS

Thermocouple “0”

General properties

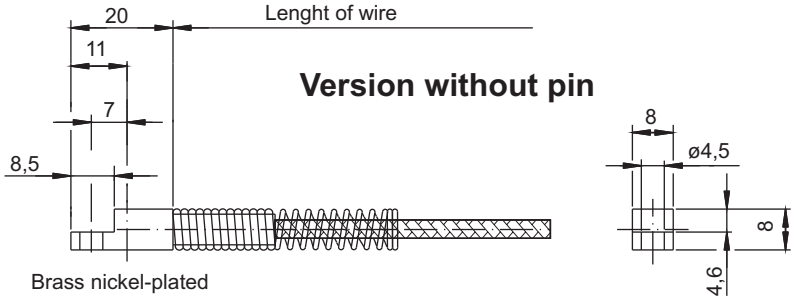
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7003 “Tool Sensors with pin”



- Material stainless steel or brass, or nickel-plated
- Version with pin ⌀4,0 mm

GF-7003/O “Surface-Screw-on Sensors”



- Material stainless steel or brass, nickel-plated
- Fast temperature recording

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7103 “Tool Sensors with pin”

- Mounting hole matching M4
- Version with or without anti-kink spring

GF-7103/O “Surface-Screw-on Sensors”

- Mounting hole matching M4
- Version with or without anti-kink spring

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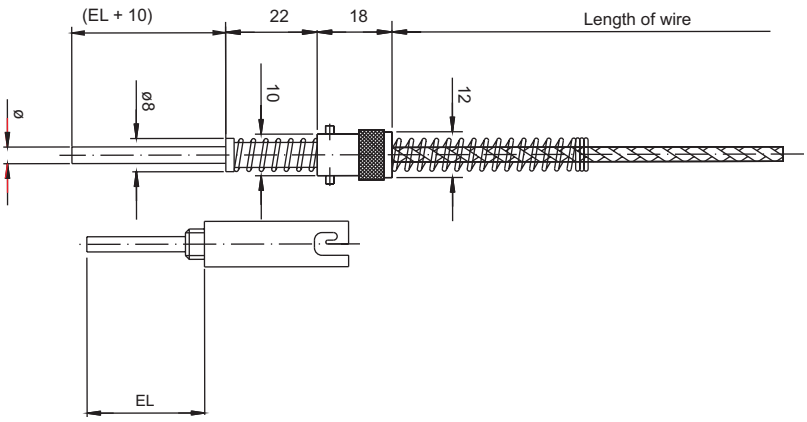
OVERVIEW SENSORS

Thermocouple “0”

General properties

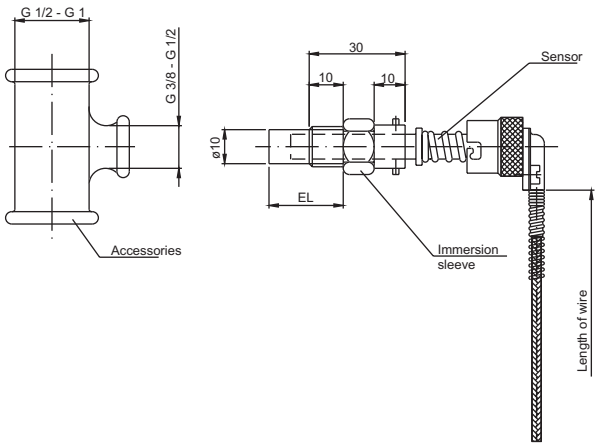
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7008 “Bayonet - Immersion Sensors”



- Measuring sleeve from ⌀1,0 mm to ⌀6,0 mm
- Fast change throug bayonet fitting

GF-7010 “Immersion sleeves - Bayonet”



- Closed immersion sleeve of stainless steel
- Fast change throug bayonet fitting

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7108 “Bayonet - Immersion Sensors”

- Bayonet fitting with outside pint
- Version with pressure spring

GF-7110 “Immersion sleeves - Bayonet”

- Cable direction 90°
- Version with pressure spring

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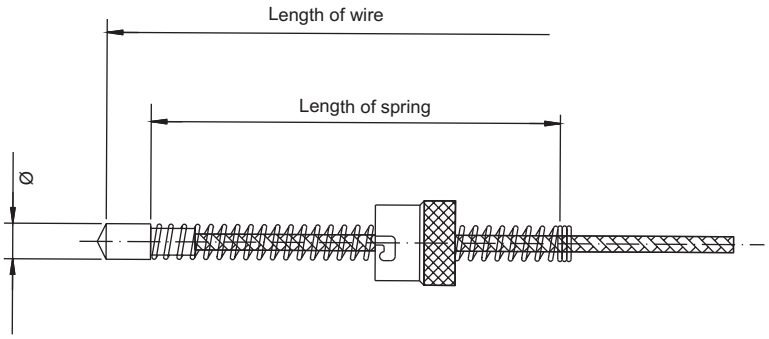
OVERVIEW SENSORS

Thermocouple “0”

General properties

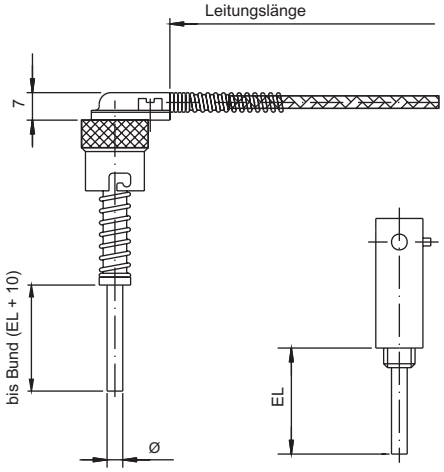
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7012 “Bayonet - Machine Sensor”



- Measuring sleeve from ⌀4,76 mm up to ⌀10,0 mm
- Measuring sleeve made of stainless steel or brass

GF-7018 “Bayonet-Angle immersion Sensor”



- Measuring sleeve from ⌀1,0 mm up to ⌀6,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7112 “Bayonet - Machine Sensor”

- Fast change through bayonet fitting
- Pressure spring / anti-kink spring up to 10000 mm

GF-7118 “Bayonat-Angle immersion Sensor”

- Fast change through bayonet fitting
- Cable outlet straight or angled 90°

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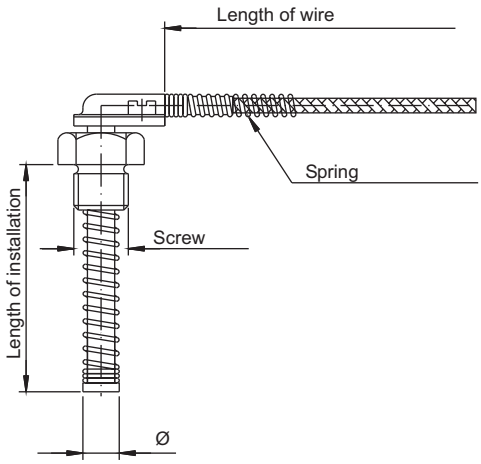
OVERVIEW SENSORS

Thermocouple “0”

General properties

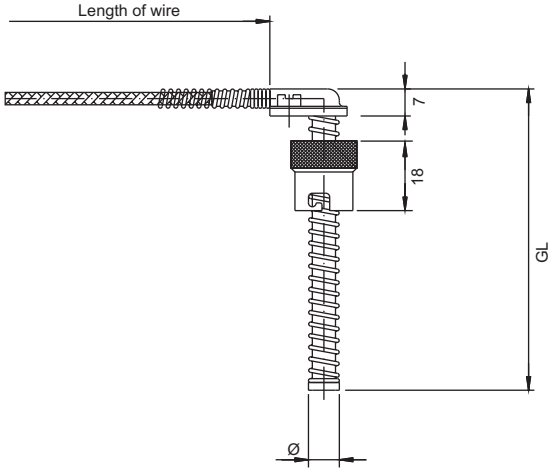
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7020/W “Angle-Screw-in Sensor”



- Measuring sleeve from ⌀4,0 mm up to ⌀8,0 mm
- Sensor entirely of stainless steel

GF-7021 “Angle-Bayonet Sensor”



- Measuring sleeve from ⌀4,76 mm up to ⌀10,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

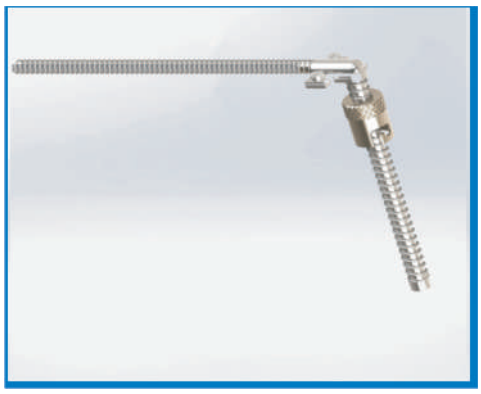
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7120/W “Angle-Screw-in Sensor”

- Fast change through screw fitting
- Cable outlet angled 90°

GF-7121 “Angle-Bayonet Sensor”



- Fast change through bayonat fitting
- Cable outlet angled 90°

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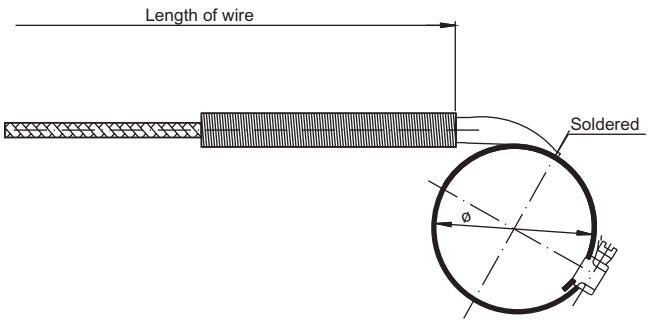
OVERVIEW SENSORS

Thermocouple “0”

General properties

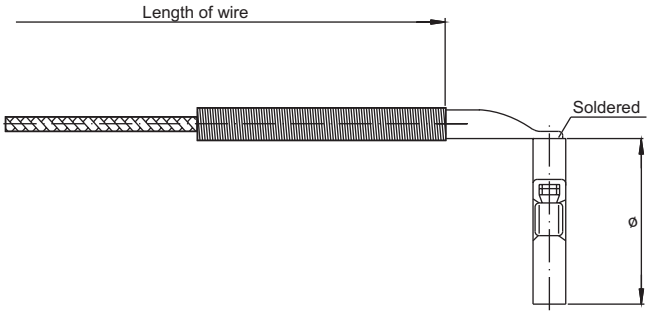
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7022 “Pipeline/Clip Sensor”



- Pipe clip from ⌀16 mm up to ⌀1000 mm
- Sensor entirely of stainless steel

GF-7022/A “Pipeline/Clip Sensor”



- Pipe clip from ⌀16 mm up to ⌀1000 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

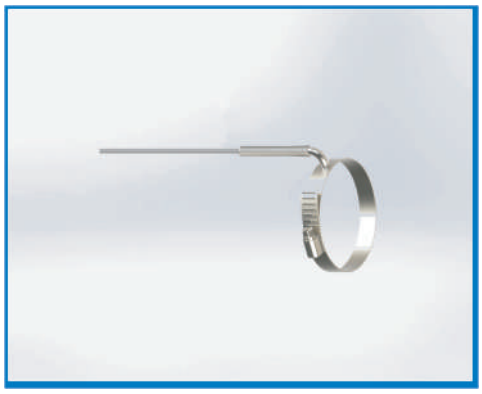
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7122 “Pipeline/Clip Sensor”

- Simple mounting by means of clip closure
- Cable outlet “radial”

GF-7122/A “Pipeline/Clip Sensor”



- Simple mounting by means of clip closure
- Cable outlet “axial”

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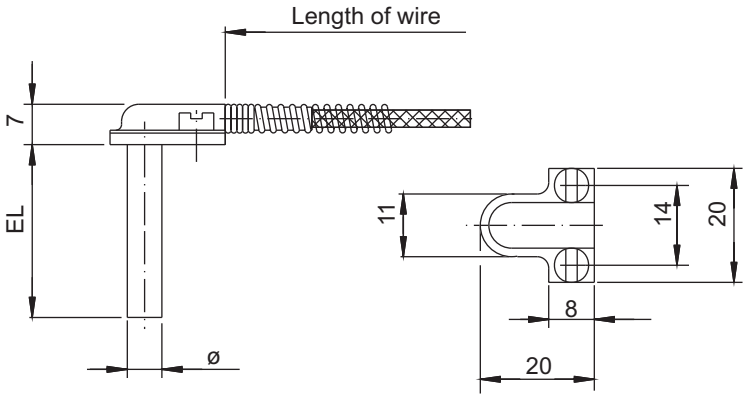
OVERVIEW SENSORS

Thermocouple “0”

General properties

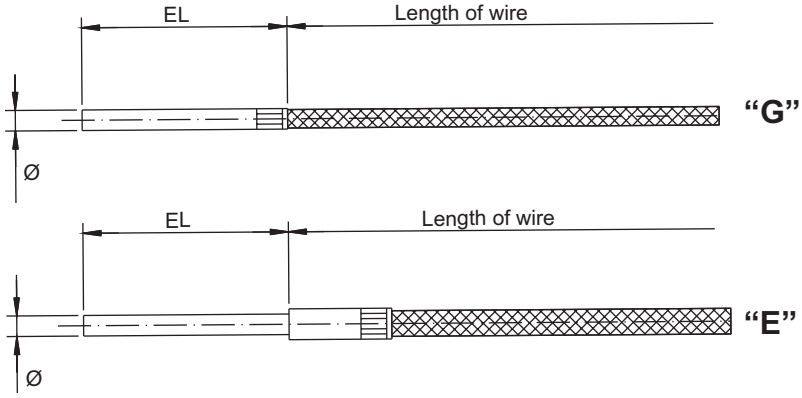
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7023 “Installation - Angle Sensor”



- Sensor diameter from ⌀3,0 mm up to ⌀8,0 mm
- Sensor entirely of stainless steel

GF-7024 “Installation - Cable Sensor”



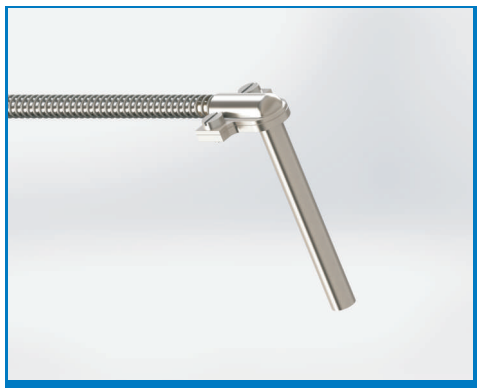
- Sensor diameter from ⌀1,87 mm up to ⌀10,0 mm
- Sensor entirely of stainless steel or brass

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7123 “Installation - Angle Sensor”



- Version with Angle head
- Cable outlet angled 90°

GF-7124 “Installation - Cable Sensor”

- Waterpoof version possible
- Version for food possible

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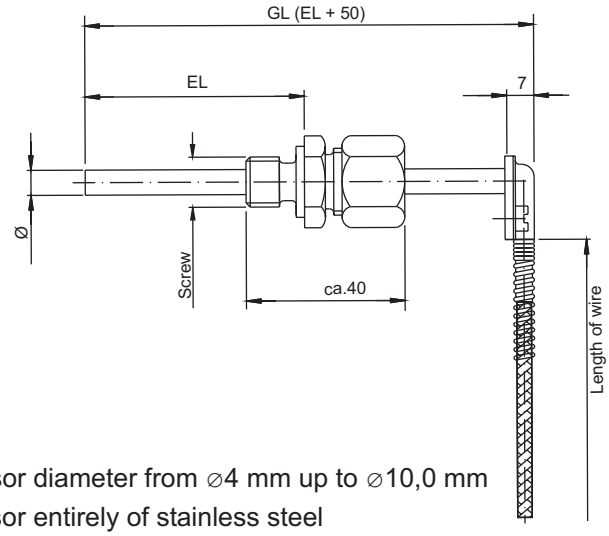
OVERVIEW SENSORS

Thermocouple “0”

General properties

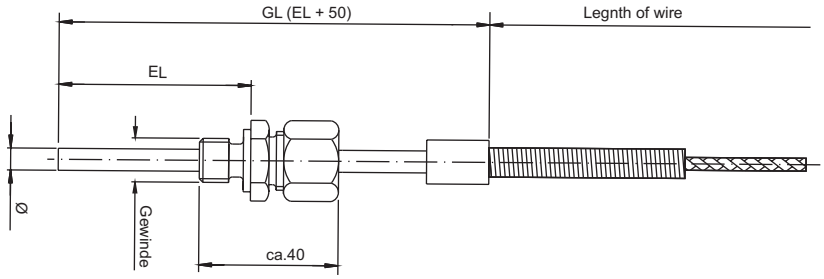
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7026 “Angle Sensor-clamp connection”



- Sensor diameter from ⌀4 mm up to ⌀10,0 mm
- Sensor entirely of stainless steel

GF-7027 “Sensor with clamp connection”



- Sensor diameter from ⌀1,0m up to ⌀6,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7126 “Angle Sensor-clamp connection”

- Version with clamp connection
- Cable output angled 90°

GF-7127 “Sensor with clamp connection”

- Version with screw connection
- Version with cable output

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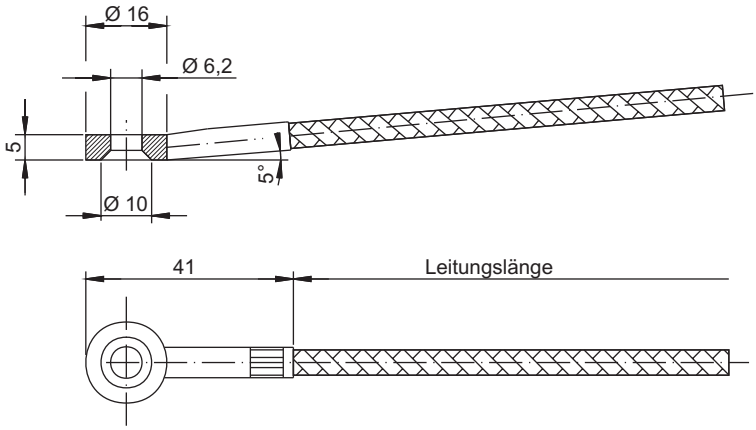
OVERVIEW SENSORS

Thermocouple “0”

General properties

- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7029 “Contact-Cylindrical Sensor”



- Standardversion ⌀16 x 5 mm, further versions possible
- Sensor entirely of stainless steel

GF-7030/MA “Magnetic Sensor”

- Cable output straight
- Magnetic sensor self-adhesive

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7129 “Contact-Cyndrical Sensor”

- Simple assembly by means of M6 screw
- Cable output angled 5°

GF-7130/MA “Magnetic Sensor”

- Measung system spring stored
- Version with kink protection spring

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OVERVIEW SENSORS

Thermocouple “0”

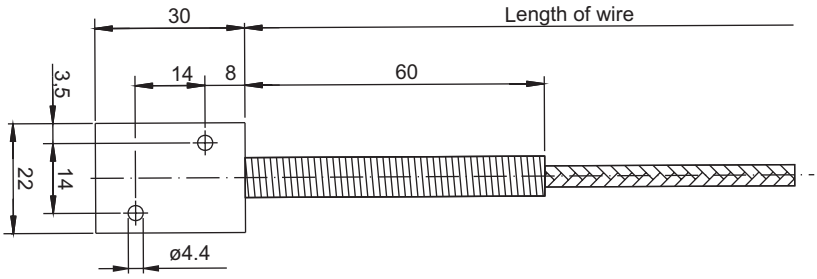
General properties

- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7030/MA/W “Magnetic-Angle Sensor”

- Cable output angled 90°
- Mangnetic sensor self-adhesive

GF-7031 “Contacting-Segment Sensor”



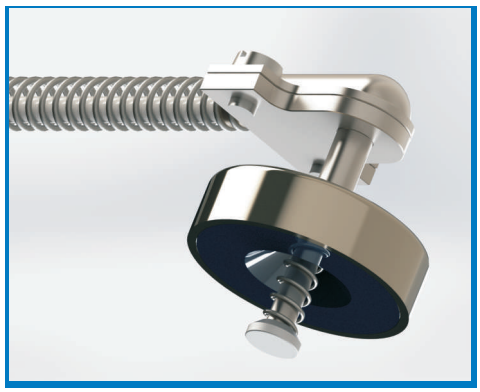
- Standard version 22 x 30 mm
- Sensor entirely made of brass nickel-plated

Resistance Thermometer “1”

General properties

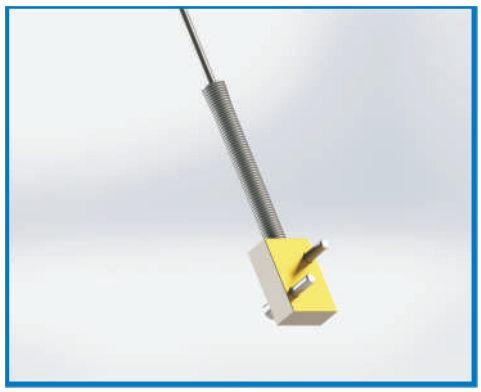
- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7130/MA/W “Magnetic-Angle Sensors”



- Measuring system spring stored
- Version with kink protection spring

GF-7131 “Contacting-Segment Sensor”



- Simple mounting, M4 screw, enclosed
- Measuring surface brass polished blank

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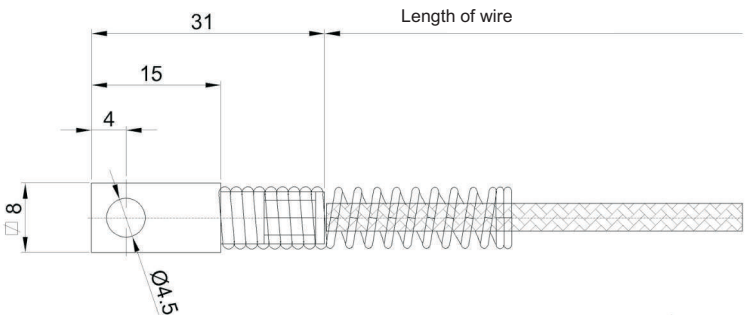
OVERVIEW SENSORS

Thermocouple “0”

General properties

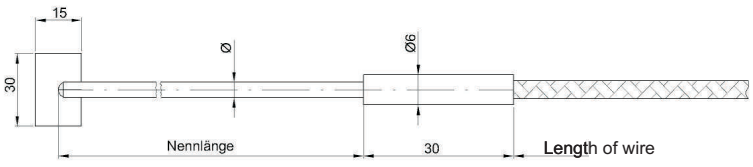
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7031/Q “Contacting-Rectangular Sensor”



- Standardversion 8x8x15 mm
- Sensor entirely of stainless steel

GF-7031/F “Contacting-Surface Sensor”



- Standardversion 30x15x0,3 mm
- Sensor entirely of stainless steel and brass

Resistance Thermometer “1”

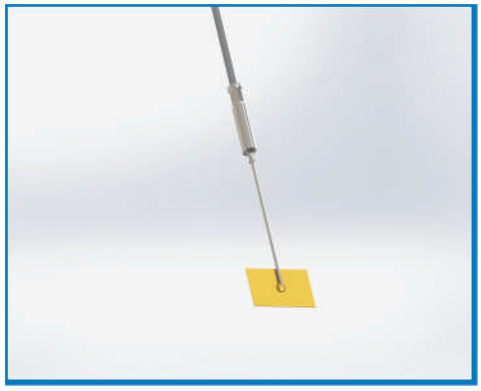
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7131/Q “Contacting-rectangular Sensor”

- Simple mounting with M4 screw
- Version with anti-kink spring

GF-7131/F “Contacting-Sureface Sensor”



- Simple mounting below heating tape or sureface
- Measuring area variably adaptable

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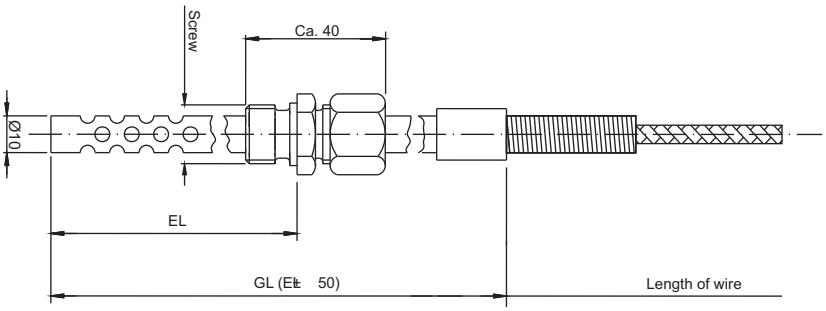
OVERVIEW SENSORS

Thermocouple “0”

General properties

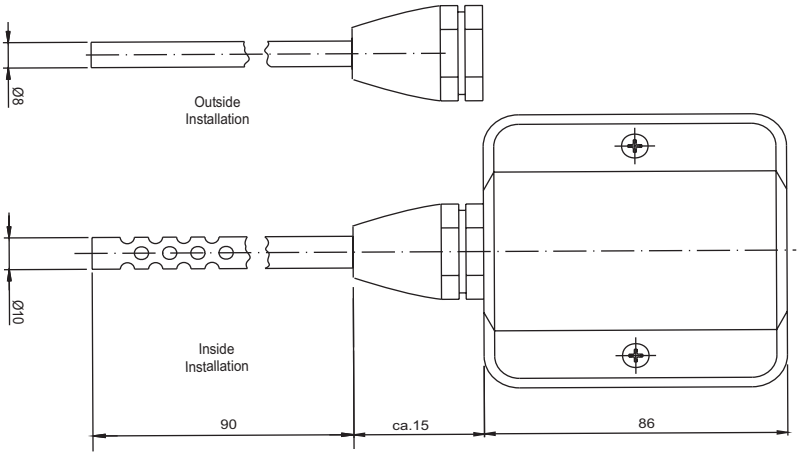
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7032 “Built-in Air Sensor perforated”



- Protective tube perforated
- Sensor entirely of stainless steel

GF-7033/R “Room Sensor”



- Protective tube perforated
- Measuring tube entirely of stainless steel

Resistance Thermometer “1”

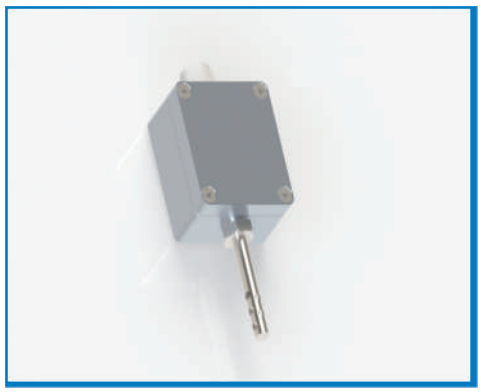
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7132 “Built-in Air Sensor perforated”

- Mounting by means of screw connection
- Version with lead or connection head

GF-7133/R “Room Sensor”



- Simple wall mounting
- Version with aluminium or plastic housing

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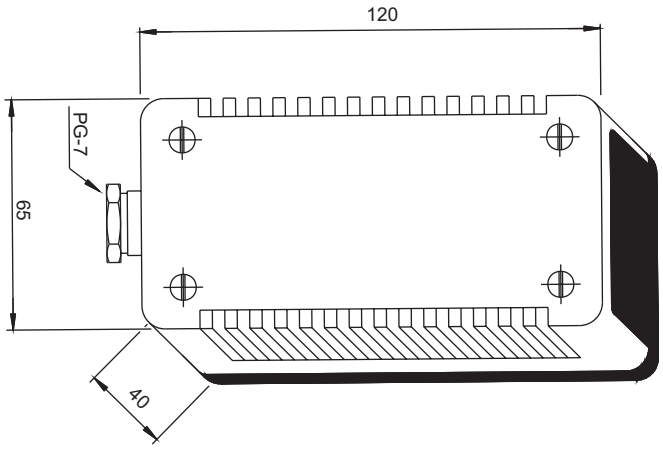
OVERVIEW SENSORS

Thermocouple “0”

General properties

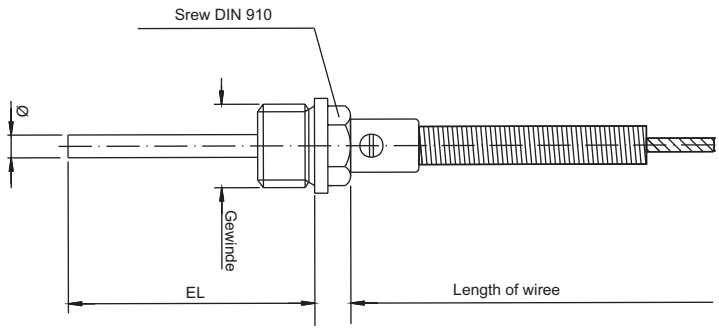
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7033/A “Dry room Sensor”



- Plastic housing 120 x 65 mm
- Line connection by means of PG or M srew connection

GF-7038 “Built-in sensor with fixed thread”



- Sensor diameter from ⌀2,0 mm up to ⌀10,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7133/A “Dry room Sensor”

- Simple wall mounting
- Version can also be delivered with transducer

GF-7138 “Built-in sensor with fixed thread”

- Simple mounting DIN 910 fixed thread
- Version with lead or connecting head(PK/KP)

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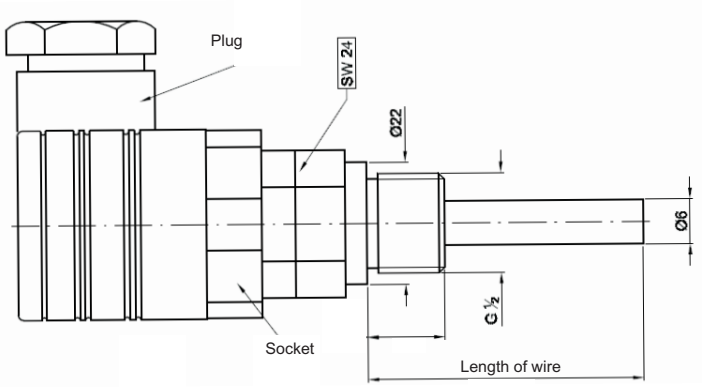
OVERVIEW SENSORS

Thermocouple “0”

General properties

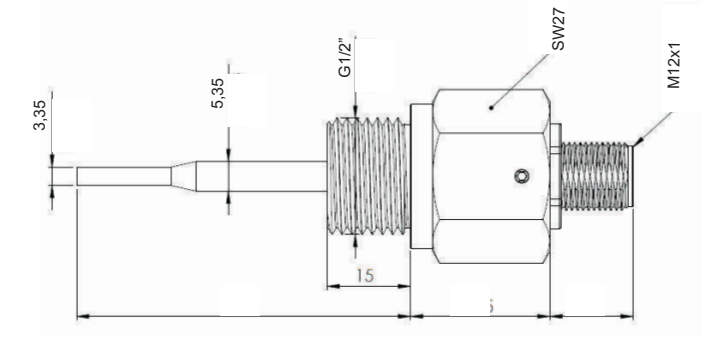
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7038/GSA “Screw-in Sensor GSA”



- Standard diameter from ⌀1,87 mm up to ⌀8,0 mm
- Sensor entirely of stainless steel

GF-7038/S “Screw-in Sensor DST-M12x1”



- Standard diameterfrom ⌀1,87 mm up to ⌀8,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

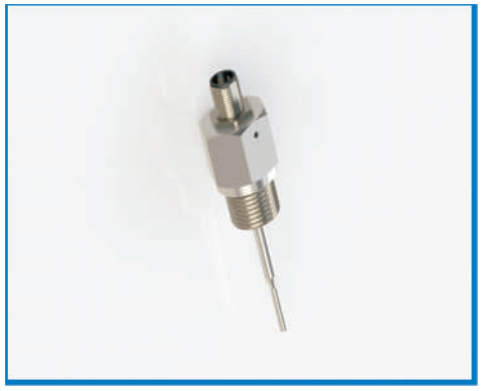
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7138 “Screw-in Sensor GSA”

- Simple mounting via fixed thread
- Wire connector pluggable by means of “valve connector”

GF-7138/S “Screw-in Sensor DST-M12x1”



- Simple mounting via fixed thread
- Wire connector pluggable by means of “M12x1 plug”

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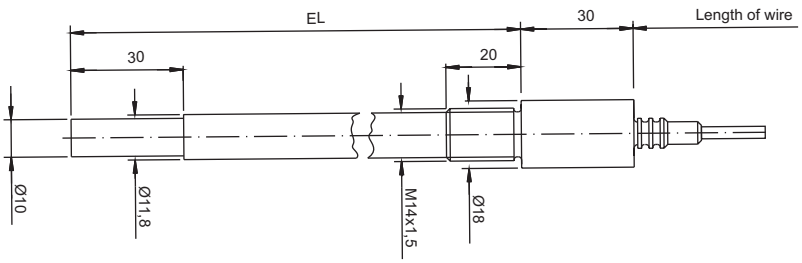
OVERVIEW SENSORS

Thermocouple “0”

General properties

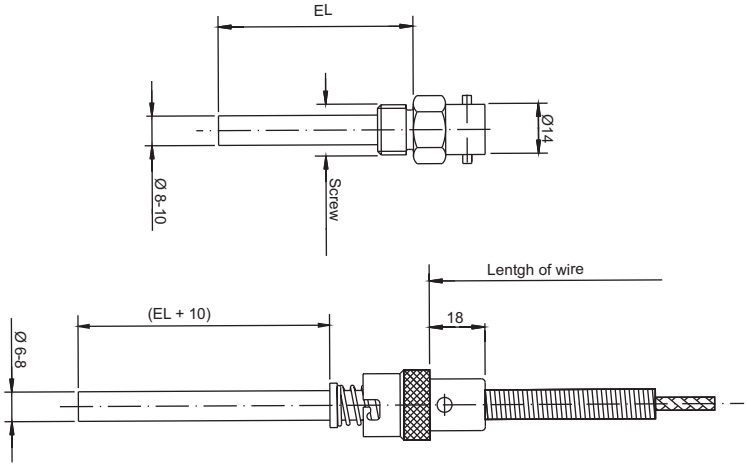
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7039 “Acid / Lye Sensor”



- Length of Installation up to 300 mm
- Acid and lye resistant

GF-7040 “Built-in Sensor-immersion sleeve”



- Standard diameter from ⌀6,0 mm up to ⌀10,0 mm
- Sensor entirely of stainless steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7139 “Acid / Lye Sensor”

- Simple mounting via fixed thread
- Sensor entirely of PTFE

GF-7140 “Built-in Sensor-immersion sleeve”

- Version with closed immersion sleeve
- Version with line or connection head

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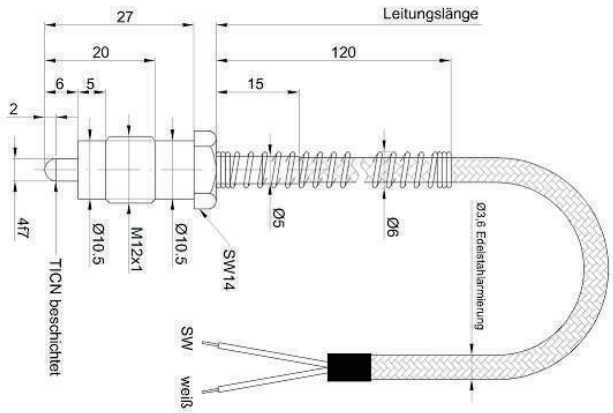
OVERVIEW SENSORS

Thermocouple “0”

General properties

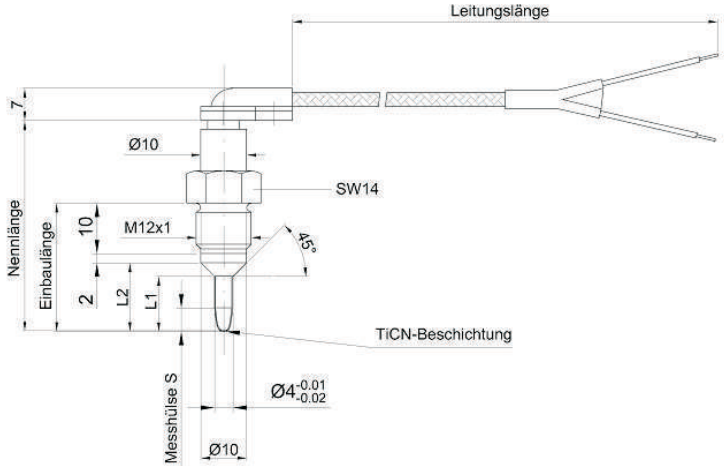
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7042/G “Special - Injection moulding”



- Special Sensor for Injetion moulding
- Sensor entirely of stainless steel

GF-7042/W “Injection moulding-Angle”



- Special Sensor for Injection moulding
- Sensor entirely of special stainless steel, coated

Resistance Thermometer “1”

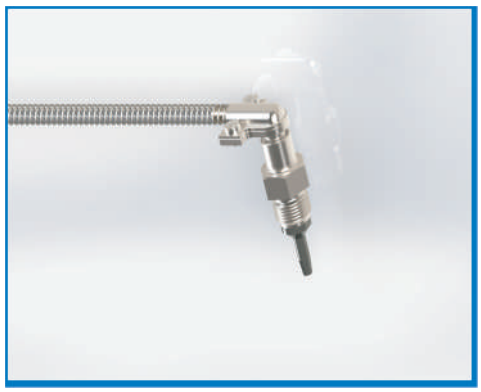
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7142/G “Special - Injection moulding”

- Sensor with special oil-hardened
- Sensor with special coating

GF-7142/W “Injection moulding-Angle”



- Version as single or double system
- Cable outlet angled 90°

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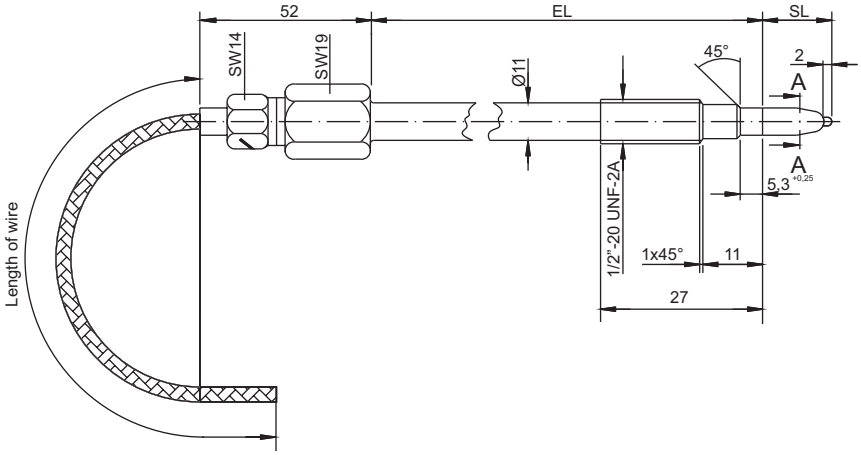
OVERVIEW SENSORS

Thermocouple “0”

General properties

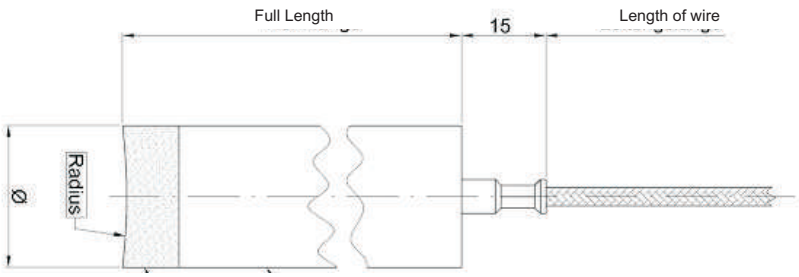
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7043 “Melt temperature Sensor”



- Different measuring tips
- Sensor entirely of stainless steel or special steel

GF-7044 “Drum Sensor”



- Variabler Variable drum diameter
- Sensor entirely of stanless steel and PTFE

Resistance Thermometer “1”

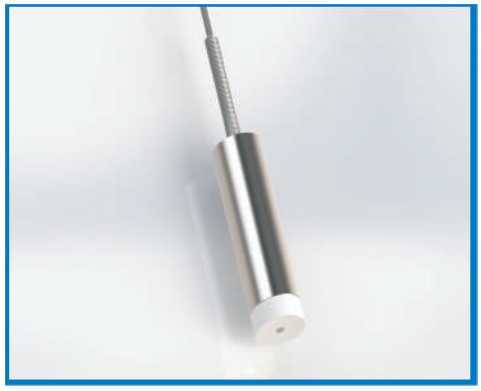
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7143 “Melt temperatur Sensor”

- Screw-in hexagonal loosely rotatable
- Version with lead and/or plug connection

GF-7144 “Drum Sensor”



- Simple mounting by way of mounting flange
- Recording of radiant heat, contacless

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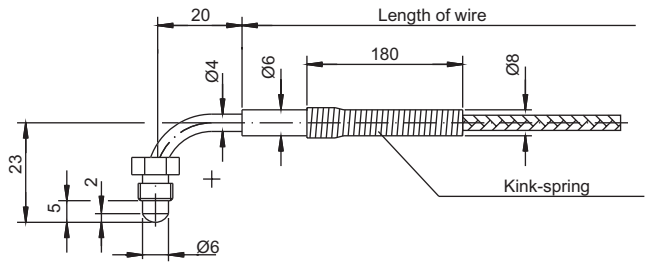
OVERVIEW SENSORS

Thermocouple “0”

General properties

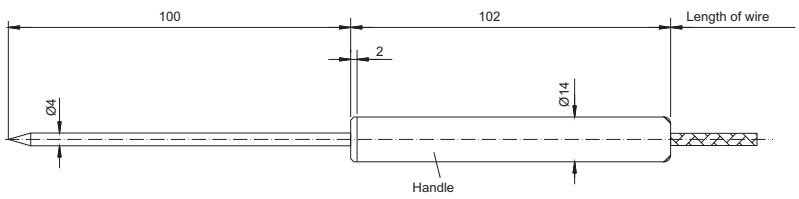
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7045 “Screw-in Sensor M8”



- Sensor diameter 6 mm
- Sensor entirely of stainless steel

GF-7048 “Food - Insertion Sensor”



- Sensor food / pharma suitable
- Variable sensor design

Resistance Thermometer “1”

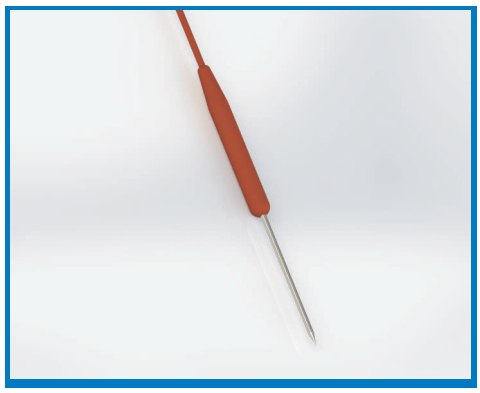
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7145 “Screw-in Sensor M8”

- Simple mounting with M8 screw
- Cable outlet straight or angled 90°

GF-7148 “Food - Insertion Sensor”



- Lead version PTFE or silicone
- Handle PTFE or stanless steel

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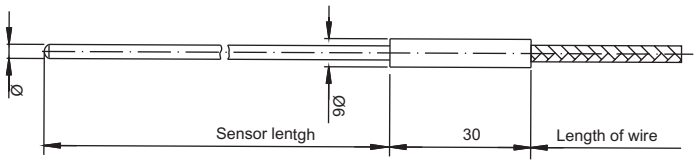
OVERVIEW SENSORS

Thermocouple “0”

General properties

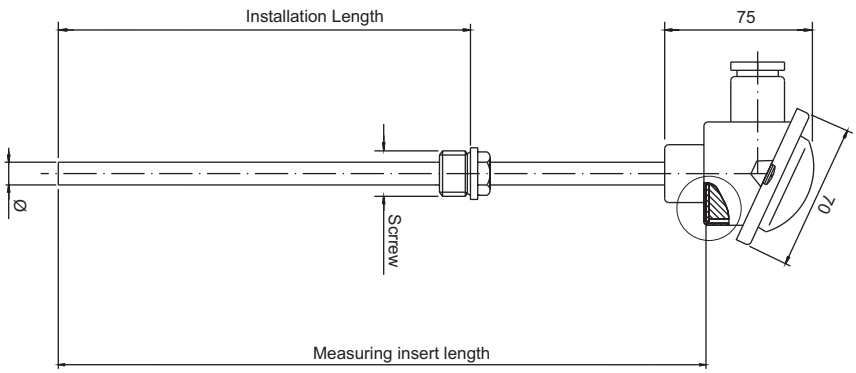
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-7050 “Sheath Sensor small”



- Standard diameter from ⌀0,5 mm up to ⌀6,0 mm
- Sensor entirely of stainless steel or Inconel

GF-8000 “Screw-in Sensor with head”



- Standard diameter from ⌀2,0 mm up to ⌀12,0 mm
- Sensor protection tube of stainless steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-7150 “Sheath Sensor small”

- Simple mounting by way of clamp connection
- Version with cable or connection

GF-8100 “Screw-in Sensor with head”

- Version with different connection heads
- Simple mounting by way of clamp / srew connection

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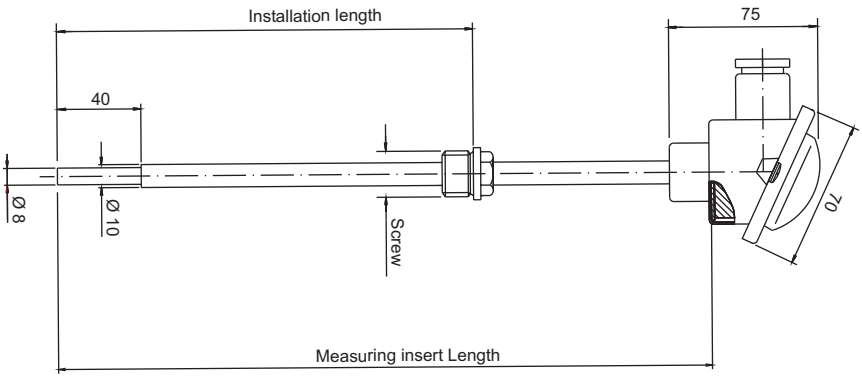
OVERVIEW SENSORS

Thermocouple “0”

General properties

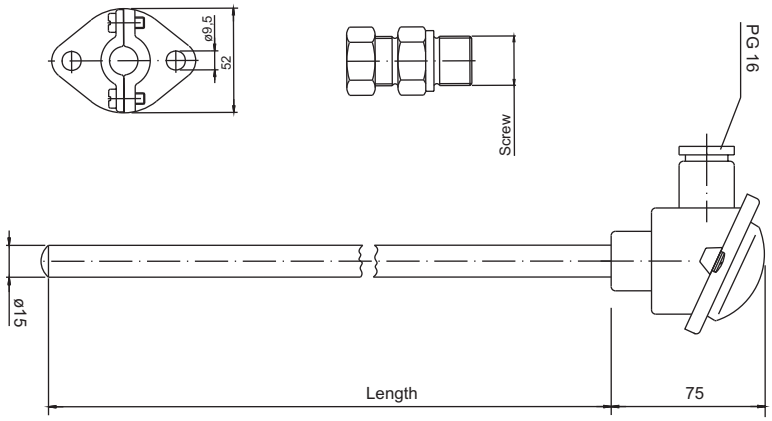
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-8001 “Fast-response Sensor”



- Sensor with mounting tube, fast response
- Sensor protective tube of stainless steel

GF-8002 “Immersion Sensor 15 mm”



- Standard diameter ⌀15,0 mm
- Protective tube of stanless steel or high temperature steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-8101 “fast-response Sensor”

- Version with different connection heads
- Simple mounting via clamp / srew connection

GF-8102 “Immersion Sensor 15 mm”

- Simple mounting via clamp / screw connection
- Version with difference connection head

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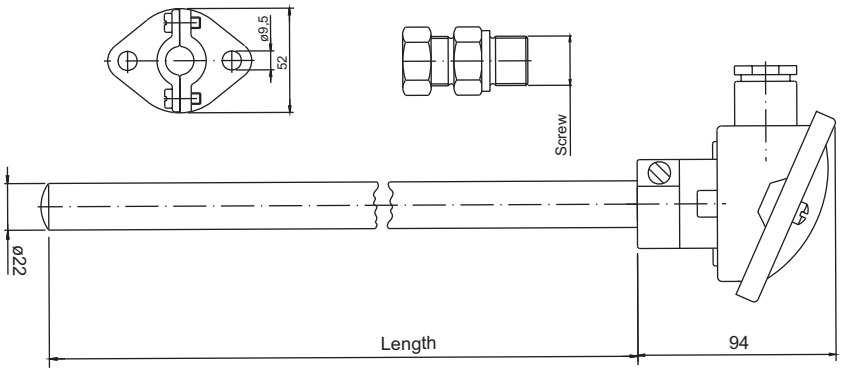
OVERVIEW SENSORS

Thermocouple “0”

General properties

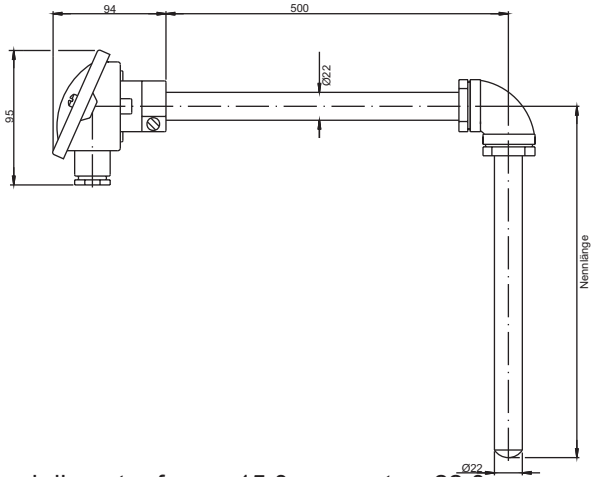
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-8003 “Immersion Sensor 22 mm ”



- Standard diameter ⌀15,0 mm
- Protective tube of stainless steel or high temperature steel

GF-8005 “Angle-immersion Sensor”



- Standard diameter from ⌀15,0 mm up to ⌀22,0 mm
- Protective tube of stainless steel or higher temperature steel

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-8103 “Immersion Sensor 22 mm”

- Simple mounting via screw connection or flange
- Version with difference connection head

GF-8105 “Angle-immersion Sensor”

- Version bent or with elbow gland
- Version with difference connection head

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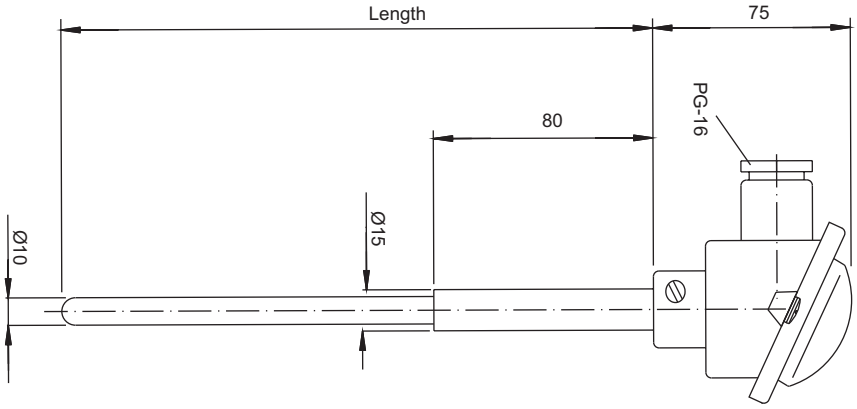
OVERVIEW SENSORS

Thermocouple “0”

General properties

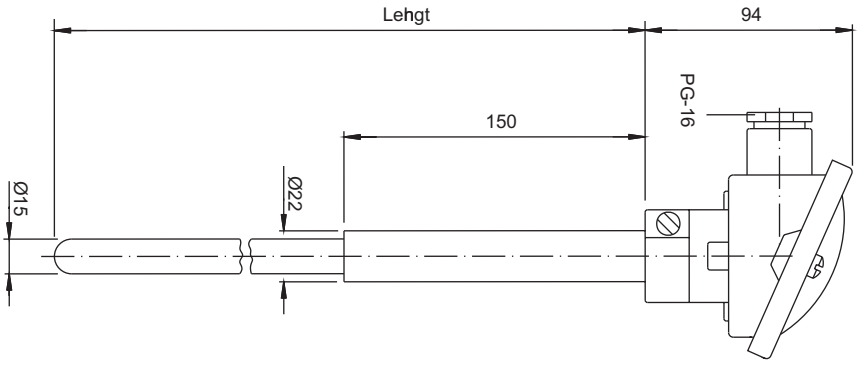
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-8006 “Ceramic-immersion Sensor 10 mm”



- Ceramic tube diameter ⌀10,0 mm
- Version with metal support tube (neck tube)

GF-8007 “Ceramic-immersion Sensor 15 mm”



- Ceramic tube diameter ⌀15,0 mm
- Version with metal tube support tube (neck tube)

Resistance Thermometer “1”

General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-8106 “Ceramic-immersion Sensor10 mm”

- Simple mounting via screw or flange connection
- Installation length up to 1000 mm

GF-8107 “Ceramic-immersion Sensor 15 mm”

- Simple mounting via screw or flange connection
- Installation length up to 1000 mm

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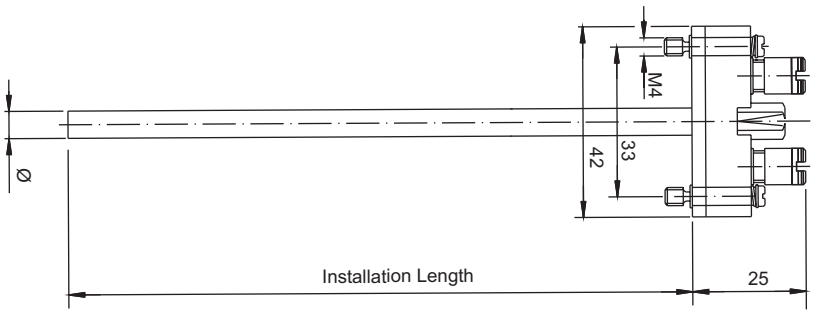
OVERVIEW SENSORS

Thermocouple “0”

General properties

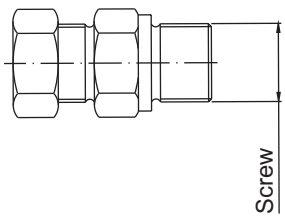
- Thermal elements according to DIN EN 60584
- Fe-CuNi/L, Fe-CuNi/J, NiCr-Ni/K
- Accuracy better than 1,5K
- Welded or potential-free
- Temperature range up to +1200°C
- Single- / or double elements
- High-quality thermo-electical lead

GF-9000 “Exchangeable Measuring insert”



- Standard diameter from ⌀4,0 mm up to ⌀6,5 mm
- Sensor entirely of stainless steel

Accessories clamp connection



- Thread version from M6 up to G2”
- Material stainless steel, brass or steel (+1200°C)

Resistance Thermometer “1”

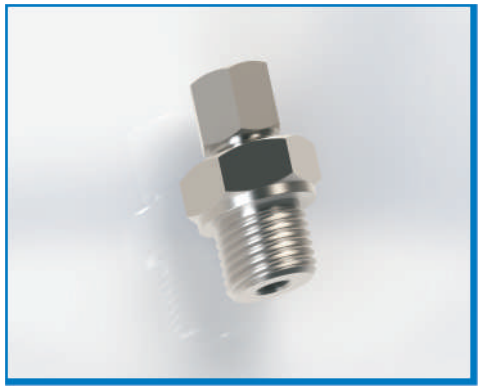
General properties

- Resistance thermometer according to DIN EN 60751
- Pt50 / Pt100 / Pt500 / Pt1000 / KTY / NTC / PTC
- 2- / 3- / 4- wire circuit
- Vibration / shake-proof version
- Temperature range up to +600°C
- Single- / or multiple systems
- High-quality copper / or nickle leads

GF-9100 “Exchangeable Measuring insert”

- Simple spring fixed, screw M4
- Pulg-in Ceramic socket

Accessories clamp connection



- Cutting rings of steel, brass or teflon
- Suitable for all KLV-Sensor versions

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Note

TEMPERATURE SENSORS

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- Insulations
- Temperature control
- Electric heating
- Temperature technology
- Elektronic

Presented by:

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