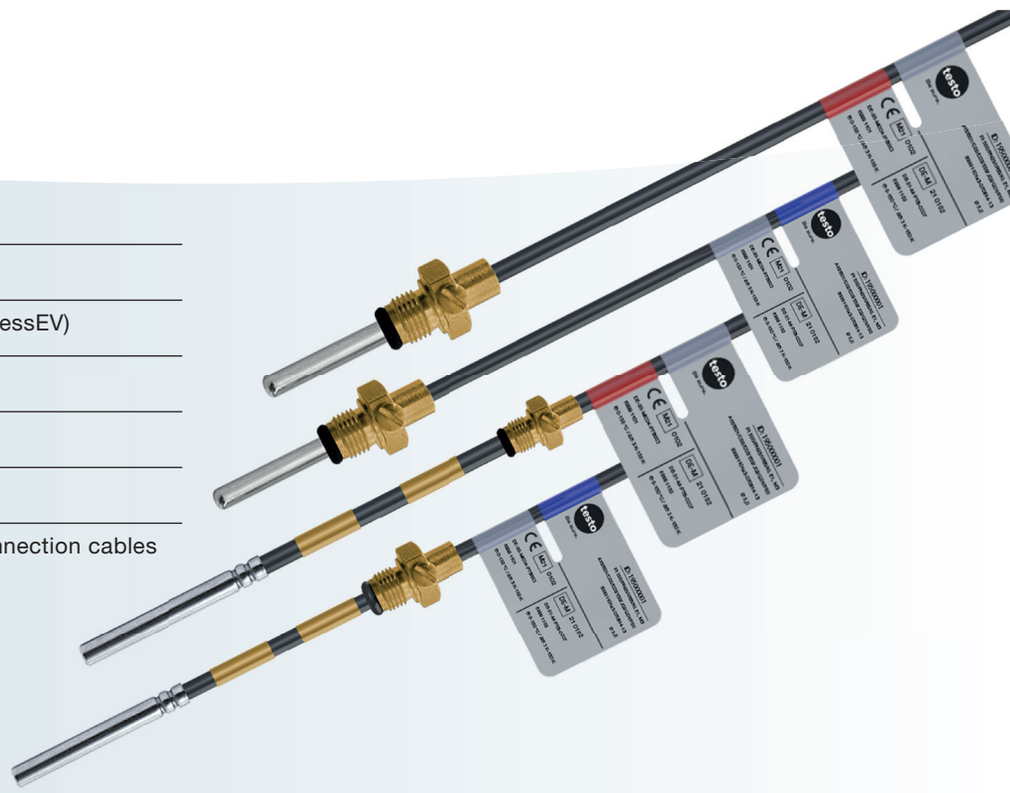
Be sure. testo

Temperature probes for heat and cold metering

Conforms to DIN EN 1434 / EN60751



- Approval for heat metering (MID)
- Approval for cold metering (according to MessEV)
- Compliant with DIN EN 1434
- Paired on request
- Fast response probe design
- Flexible configuration: various sensors, connection cables and sleeves available

Constantly rising energy costs and strict legal requirements demand highly accurate billing of the thermal energy used in heating or cooling systems.

An important component of the heat and cold meters used for this purpose are the precise temperature probes for determining the temperature difference at the flow and return of the
heating or cooling system.

The use of calibratable temperature probes is regulated in Europe in DIN EN1434.

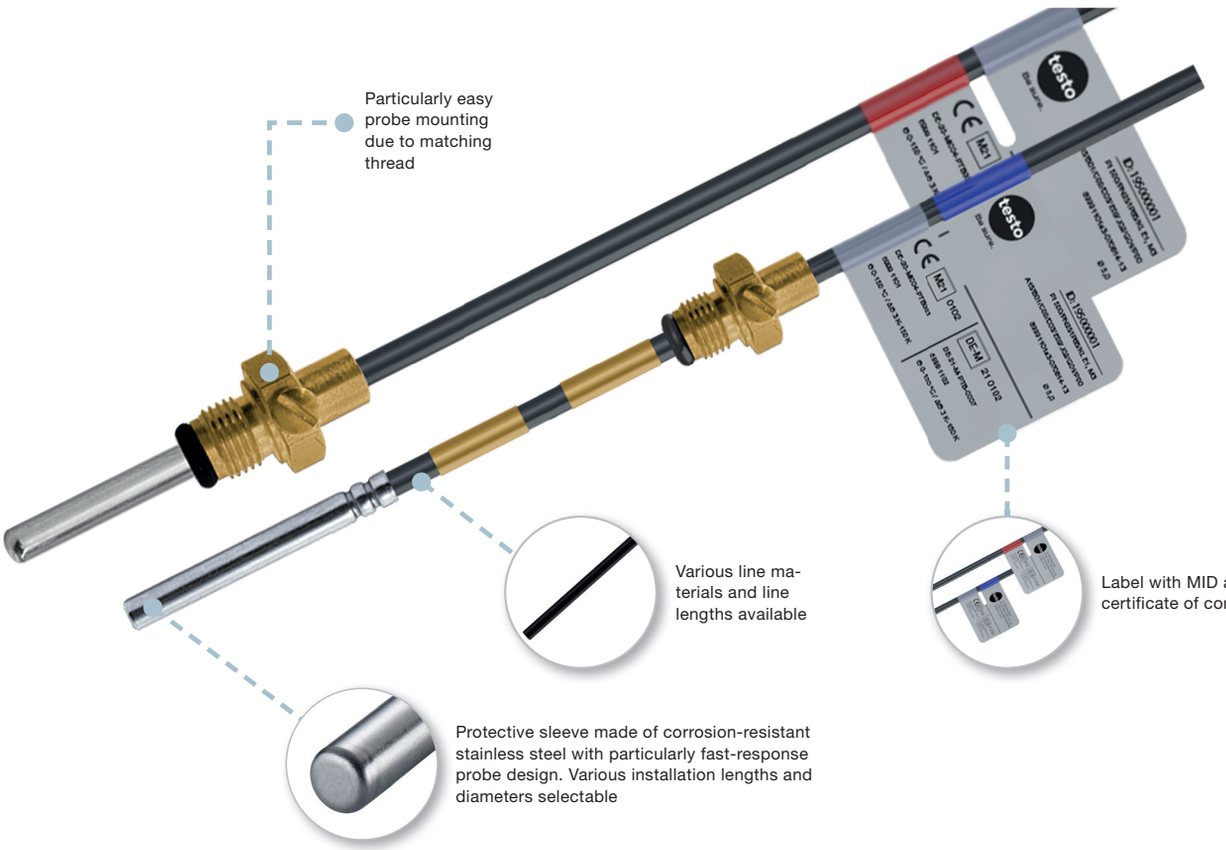
Only temperature probes that have been approved for demanding use in billing systems may be used.

Temperature sensors for measuring thermal energy, ready paired on request, are available from us.

Testo Sensor GmbH not only produces temperature probes for heat and cold meters according to your particular specification, but also keeps an eye on all standards and guidelines for proper approval.

www.testo-sensor.com

Design of temperature probes for heat / cold meter



Qualification and validation of the temperature sensors to prove permanent compliance with all technical data		
Long-term stable in any climate	Temperature sensors are exposed to changing temperatures and varying room humidity. They are designed to function reliably in the field for 15 years or more, always within their specification.	✔
Resistant to heat and moisture	Strongly fluctuating ambient conditions mean immense stress for the temperature sensor. The design must be correspondingly robust and qualified.	✔
Robust even under high vibration load	Depending on the application, compressors and fans cause strong vibrations that affect components and cables. The temperature sensors used must be sufficiently vibration-resistant.	✔
Safe in practice: high extraction force	The robust design ensures the necessary cable pull-out resistance, even under vibration and higher temperatures.	✔
Efficient due to short response time	Delay-free temperature measurement is elementary for accurate recording of thermal energy and thus enables accurate cost accounting.	✔
Paired according to DIN EN 1434	We pair temperature probes using a fully automatic pairing test bench, which enables the highest accuracy and process reliability.	✔

✔ Applicable to this sensor type

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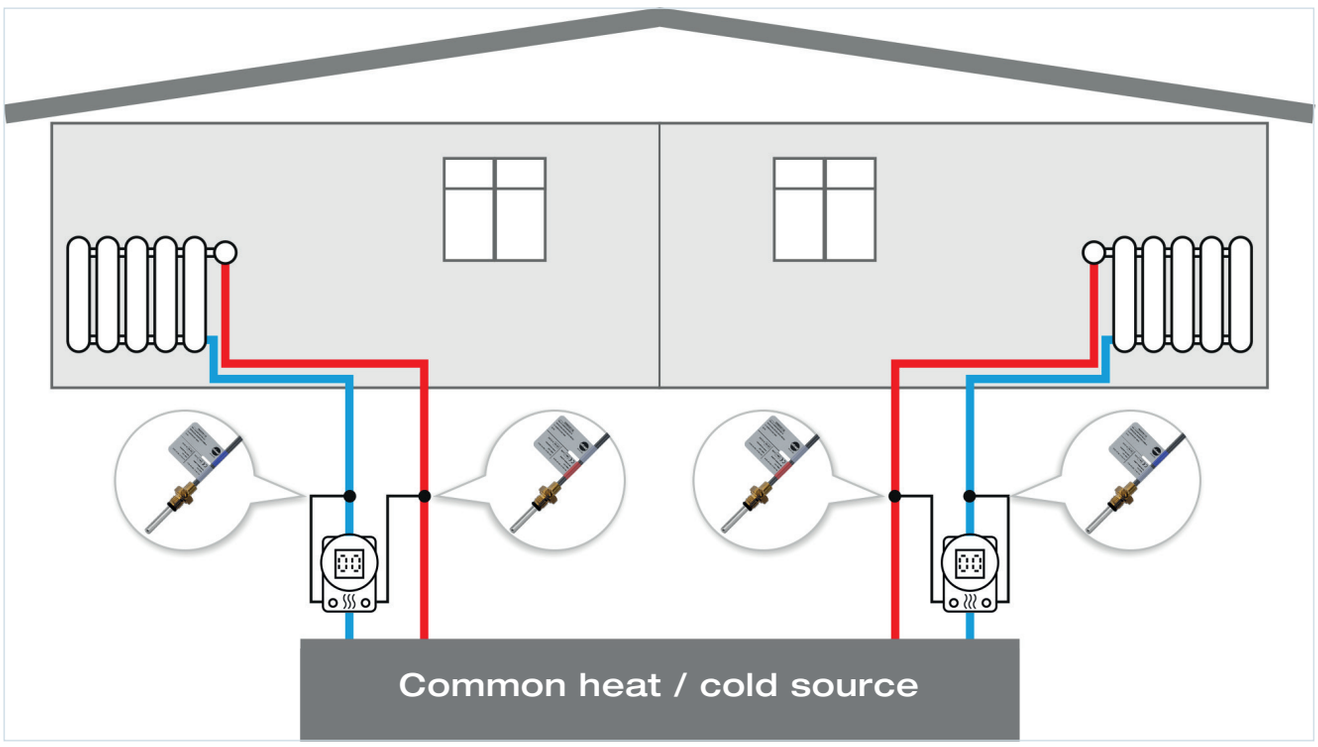
Application heat and cold metering



Why are heat and cold meters needed?

According to the Heating Costs Ordinance, the energy consumption of the individual consumers in buildings in which several consumers share a heating or cooling source must be accurately recorded for billing purposes.

This enables service charge billing according to the source, a fair distribution of costs and the identification of potential energy savings.

The use of highly accurate heat and cold meters for measuring the flow and return temperature of the heating water has been mandatory since 2014. The less accurate methods of calculating consumption used until then are no longer permitted.

Why is accurate measurement so important?

The smallest measurement uncertainties in determining the temperature difference lead to errors in cost accounting. These must be avoided at all costs. The temperature probes used are very tightly specified in their tolerances and must meet high legal requirements.

The temperature probes from Testo Sensor not only meet all legal requirements, but also exceed them in some points that are particularly important for the application, such as response time or long-term stability.

How is the heat consumption measured?

For precise measurement of the heat energy consumed in each case, two measured variables are decisive:

1. The flow measurement.

For this purpose, flow meters integrated in the heating and cooling circuits record the respective amount of water flowing through per time unit in a counter.

2. The temperature measurement.

For this purpose, a temperature probe is installed in the supply and return pipes of the heating water, which measures the temperature of the water in the respective pipe. The temperature difference results in the extracted heat energy, which can be assigned to the respective consumer.

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Regulations, approvals and quality

Ensuring that heating and cooling costs can be accurately allocated to consumers and producers, as well as establishing effective environmental management, requires very accurate temperature measurements. These must be carried out in accordance with strict legal requirements, as this is the only way to ensure a qualitative framework for reliable and comparable temperature measurement and thus also heat and cold quantity metering.

It is therefore essential for our probes to conform to the MID (Measuring Instruments Directive) of the EU, the European regulations for heat metering. There are currently no overriding European regulations in force for cold quantity metering; national regulations apply, e.g. according to the Measuring and Calibration Ordinance.

For both the European MID and the national approval, different „modules“ are used within the scope of the approval, which on the one hand describe the basic sensor design and the quality assurance system of production and pairing. Both modules form the basis for tests and acceptances by the manufacturer and the approval authority.

You can rely on the fact that the temperature probes from Testo Sensor GmbH optimally fulfil all requirements for operation in conjunction with heat and cold meters. For orientation, see the following list of individual regulations

Approval regulations for temperature probes for heat meters

European Directive 2014/32/EU (MID)

National Measurement and Calibration Act (MessEG)

Standards: DIN EN 1434 / EN60751

Module B Heat EU Type Examination Certificate according to Module B of Directive 2014/32/EU(MID) for heat meters

Module B Refrigeration Type Examination Certificate according to Module B of the Measuring and Calibration Ordinance (MessEV) of 11.12.2014 for Refrigeration Meters

Module D Heat
EU-recognised quality assurance systems for production according to Module D of Directive 2014/32/EU (MID) for heat meters

Module D Cold
Recognised quality assurance systems for production in accordance with Module D of the Measuring and Calibration Ordinance (MessEV) of 1.12.2014

Tolerated list
Suitability test according to DIN EN 1434 to comply with the tolerated list of existing upsetting sleeves

Testing and approval by national conformity assessment body, e.g. PTB (Physikalisch-Technische Bundesanstalt).

Our approvals

2020: Type approval (module B)

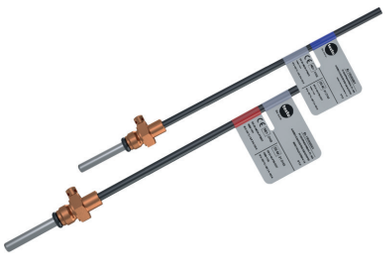
2021: Recognition of the quality assurance system (module D) Manufacturing and pairing process Type examination certificate (cold) MesEv (module B)

2022: Recognition of refrigeration approval in Austria and Switzerland
Inclusion of our portfolio in the tolerated list of used immersion sleeves

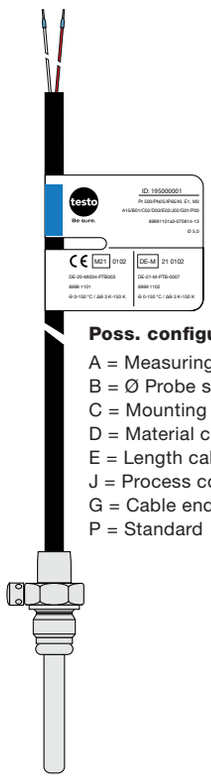
Temperature probe for direct installation (DS)

Order number: 8999 1101

The temperature probes from Testo Sensor GmbH for heat and cold meters offer the highest measurement accuracy, the fastest response behaviour and conformity to MID and MessEV. In addition, our approvals cover a wide range of configuration options for your probe. This allows you to configure it exactly to suit your heat or cold meter.



General informationen	
Measuring range (depending on sensor and connection cable)	±0 °C to +105 °C (PUR / PVC cable)
	±0 °C to +130 °C (TPE cable)
	±0 °C to +150 °C (Silicone cable)
Limit value temperature difference	3 K to 150 K
Response time	< 4s (depending on the design e.g. Ø 5.0 / 5.2 mm significantly faster)
Measurement stability	10 years (Please note recalibration cycles according to MID / MessEV)
Measuring elements and connection type	
Measuring elements	Please config (Pt100, Pt500 or Pt1000)
Tolerance	Class B according to EN60751
Connection type	Two-wire technology
Measuring principle	resistiv (resistance value)
Maximum measurement current (calculated from the maximum permissible power loss of of 0.5 mW)	Pt100: 1178 µA at 2,5 m and 0,0095 Ohm/m
	Pt500: 795 µA at 12,5 m and 0,0095 Ohm/m
	Pt1000: 562 µA at 255 m and 0,0095 Ohm/m
Installation	
Installation	direct, type DS according to DIN EN 1434
Minimum immersion depth	≥ 20 mm
Maximum pressure	P S 25 at flow velocity water 2 m/s
Cable lengths acc. to DIN EN 1434	Pt100 max 2,5 m | Pt500 max 12,5 m | Pt1000 max 25 m
Environmental conditions	
Protection class: IP 65 (according to DIN 40050) | Electrical: E1| Mechanical: M3 | Climatic: -25 °C to +70 °C	



Poss. configuration

A = Measuring elements
B = Ø Probe shaft
C = Mounting length
D = Material cable
E = Length cable
J = Process connection
G = Cable end
P = Standard

Please configure your temperature probe for heat and cold meters

A - Measuring element			**B - Ø Probe shaft**		**C - Mounting length**	
Code	**Meas.element**	**Genauigkeit**	**Code**	**Ø Probe shaft**	**Code**	**Mount. length**
A13	Pt100	Cl. B [1]	B01	5,0 mm	C01	26,0 mm
A15	Pt500	Cl. B [1]	B02	5,2 mm	C02	27,5 mm
A23	Pt1000	Cl. B [1]	B03	6,0 mm	C03	38,0 mm
[1] dT = ±(0,30 °C + 0,005 · T) acc. to IEC 751|EN 60751 |conn. type: 2-Wire					C04	60,0 mm

Other probe shaft Ø between 5.0 and 6.0 mm as well as other mounting lengths and customised screw connections are available on request.

J - Process connection		**D - Material connection cable**							
Code	**Standard**	**Code**	**Conn.**	**Color**	**from °C**	**to °C**	**Out**	**Color**	**Q mm²**
J00	without screw connection	D01	2-Wire	black	±0	+105	PVC	rd, wh	0,22
		D02	2-Wire	black	±0	+150	Silicone	rd, wh	0,22
J02	M10 x 1 incl. locking screw & sealing device	D03	2-Wire	black	±0	+130	TPE	rd, wh	0,22
		D04	2-Wire	black	±0	+105	PUR	rd, wh	0,22
		Further or customised screw fittings are available on request							

Certificates and approvals
EU type examination certificate according to module B of the guideline 2014/32/EU (MID) for heat meters
Type examination certificate according to module B of the Measuring and Calibration Ordinance (MessEV) of 11.12.2014 for cold meters
Recognised production quality assurance systems according to Module D of Directive 2014/32/EU (MID)
Recognised quality assurance systems for production in accordance with Module D of the Ordinance on Measurement and Verification (MessEV) of 1.12.2014
Suitability test according to the list of pronounced toleration of stockpile crushes
DIN EN 61326-1:2013 | DIN EN IEC 63000:2019-05

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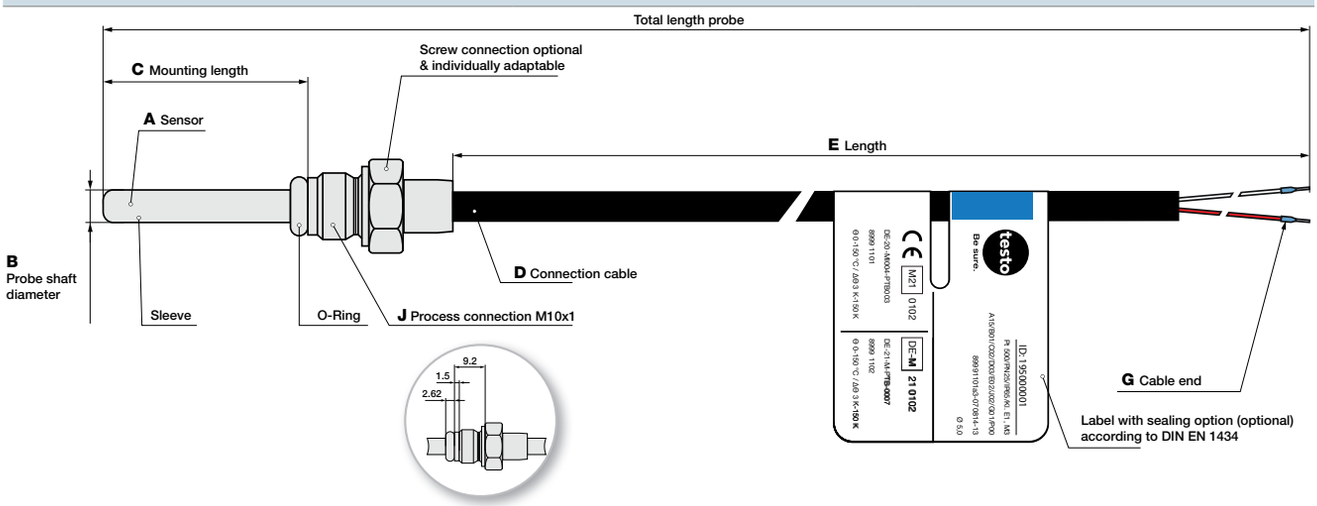
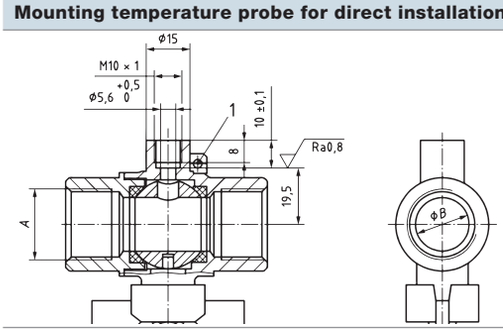
E - Length		G - End seleeves		P - Norm	
Code	**Length**	**Code**	**Standard**	**Code**	**Standard**
E01	1,5 m	G01	Wire end ferrules (standard)	P00	not paired
E02	2,5 m	G02	Tin-plated connection leads (only for probes permanently connected to the calculator)	P01	paired according to DIN EN 1434
				P02	paired according to DIN EN 1434 with conformity assessment / marking according to MID (heat)
				P04	paired according to DIN EN 1434 with conformity assessment / marking according to MessEG (cold Austria)

We offer other cable lengths between 0.3 m and 25 m in increments of 0.5 m. Please note the maximum lengths (depending on the sensor): Pt100 max 2.5 m | Pt500 max 12.5 m | Pt1000 max 25 m

Technical drawing



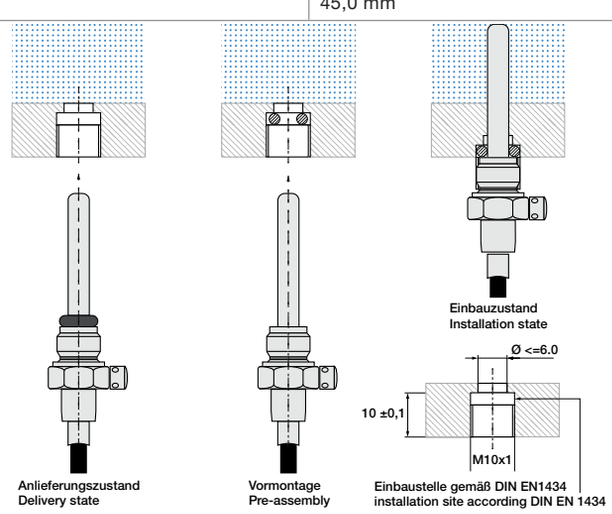
Mounting temperature probe for direct installation (DS)



The installation of temperature probes in pipelines (qp ≤ 6) must be carried out directly in new installations in Germany. Please carry out direct installation of temperature probes in accordance with DIN EN 1434-2 and the technical guideline TR-K8 (see following figure).

Thread size A	Thread size B
G ½ B	18,5 mm
G ¾ B	24,0 mm
G 1 B	30,5 mm
G 1¼ B	39,0 mm
G 1½ B	45,0 mm

- The following drawing shows the sensor installation according to DIN EN 1434.
- Proceed as follows for probe mounting: In case of replacement, the old temperature probe and the old O-ring must first be removed from the installation location without leaving any residue.
- Seals and sealing surfaces must be clean and free of damage.
- Strip the new O-ring from the probe and insert it into the installation location.
- Push the process thread of the temperature probe with open locking screw onto the temperature probe sleeve as far as it will go.
- Screw in the process connection as far as it will go (tightening torque: 4 Nm) and tighten the locking screw (tightening torque: 4 cNm).
- At the end of each installation, a leak test must be carried out.
- Seal the probe in accordance with DIN EN 1434, using the existing sealing points.



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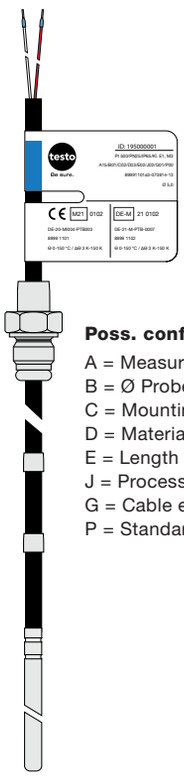
Temperature probes for universal use (DS / PS)

Order number: 8999 1111

The temperature probes from Testo Sensor GmbH for heat and cold meters offer the highest measurement accuracy, the fastest response behaviour and conformity to MID and MessEV. In addition, our approvals cover a wide range of configuration options for your probe. This allows you to configure it exactly to suit your heat or cold meter.

General informationen	
Measuring range (depending on sensor and connection cable)	±0 °C to +105 °C (PUR / PVC cable)
	±0 °C to +130 °C (TPE cable)
	±0 °C to +150 °C (Silicone cable)
Limit value temperature difference	3 K to 150 K
Response time	< 4s (depending on the design e.g. Ø 5.0 / 5.2 mm significantly faster)
Measurement stability	10 years (Please note recalibration cycles according to MID / MessEV)
Measuring elements and connection type	
Measuring elements	Please config (Pt100, Pt500 or Pt1000)
Tolerance	Class B according to EN60751
Connection type	Two-wire technology
Measuring principle	resistiv (resistance value)
Maximum measurement current (calculated from the maximum permissible power loss of of 0.5 mW)	Pt100: 1178 µA at 2,5 m and 0,0095 Ohm/m
	Pt500: 795 µA at 12,5 m and 0,0095 Ohm/m
	Pt1000: 562 µA at 255 m and 0,0095 Ohm/m
Installation	
Installation	Direct installation according to DIN EN 1434 or installation in immersion sleeves according to tolerance list
Minimum immersion depth	≥ 20 mm
Maximum pressure	P S 25 at flow velocity water 2 m/s
Cable lengths acc. to DIN EN 1434	Pt100 max 2,5 m | Pt500 max 12,5 m | Pt1000 max 25 m
Environmental conditions	
Protection class: IP 65 (according to DIN 40050) | Electrical: E1| Mechanical: M3 | Climatic: -25 °C to +70 °C	



Poss. configuration

A = Measuring elements
B = Ø Probe shaft
C = Mounting length
D = Material cable
E = Length cable
J = Process connection
G = Cable end
P = Standard

Please configure your temperature probe for heat and cold meters

A - Measuring element			B - Ø Probe shaft		C - Mounting length	
Code	**Meas.element**	**Genauigkeit**	**Code**	**Ø Probe shaft**	**Code**	**Mount. length**
A13	Pt100	Cl. B [1]	B01	5,0 mm	C01	26,0 mm
A15	Pt500	Cl. B [1]	B02	5,2 mm	C02	27,5 mm
A23	Pt1000	Cl. B [1]	B03	6,0 mm	C03	38,0 mm
[1] dT = ±(0,30 °C + 0,005 · T) acc. to IEC 751|EN 60751 |conn. type: 2-Wire					C04	60,0 mm

Other probe shaft Ø between 5.0 and 6.0 mm as well as other mounting lengths and customised screw connections are available on request.

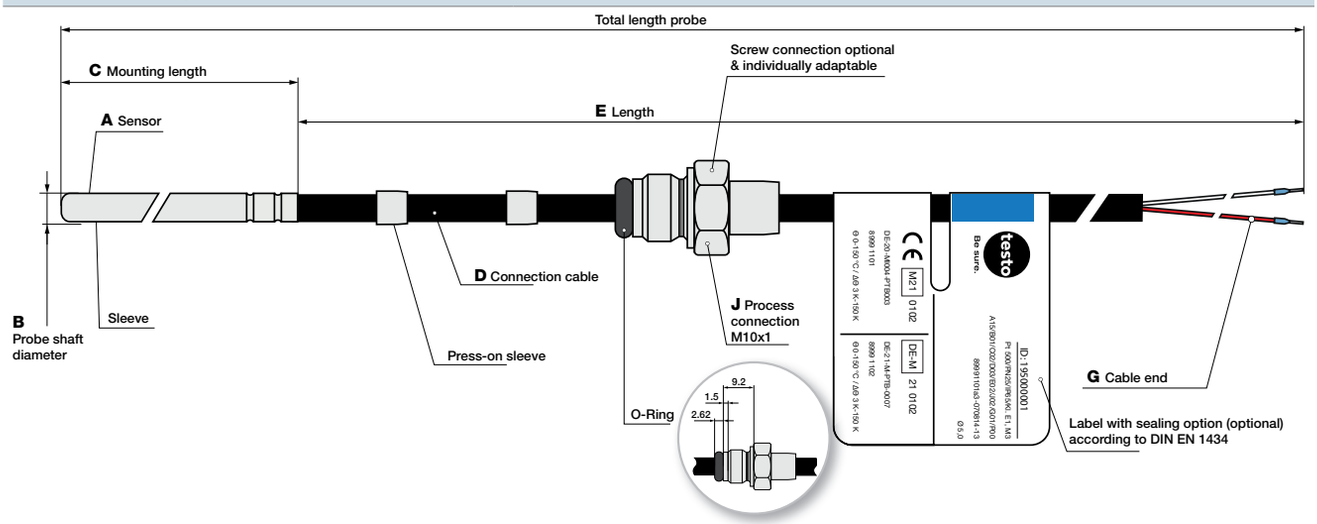
J - Process connection		D - Material connection cable							
Code	**Standard**	**Code**	**Conn.**	**Color**	**from °C**	**to °C**	**Out**	**Color**	**Q mm²**
J00	without screw connection	D01	2-Wire	black	±0	+105	PVC	rd, wh	0,22
		D02	2-Wire	black	±0	+150	Silicone	rd, wh	0,22
J02	M10 x 1 incl. locking screw & sealing device	D03	2-Wire	black	±0	+130	TPE	rd, wh	0,22
		D04	2-Wire	black	±0	+105	PUR	rd, wh	0,22
		Further or customised screw fittings are available on request							

Certificates and approvals
EU type examination certificate according to module B of the guideline 2014/32/EU (MID) for heat meters
Type examination certificate according to module B of the Measuring and Calibration Ordinance (MessEV) of 11.12.2014 for cold meters
Recognised production quality assurance systems according to Module D of Directive 2014/32/EU (MID)
Recognised quality assurance systems for production in accordance with Module D of the Ordinance on Measurement and Verification (MessEV) of 1.12.2014
Suitability test according to the list of pronounced toleration of stockpile crushes
DIN EN 61326-1:2013 | DIN EN IEC 63000:2019-05

E - Length		G - End seleeves		P - Norm	
Code	**Length**	**Code**	**Standard**	**Code**	**Standard**
E01	1,5 m	G01	Wire end ferrules (standard)	P00	not paired
E02	2,5 m	G02	Tin-plated connection leads (only for probes permanently connected to the calculator)	P01	paired according to DIN EN 1434
				P02	paired according to DIN EN 1434 with conformity assessment / marking according to MID (heat)
				P04	paired according to DIN EN 1434 with conformity assessment / marking according to MessEG (cold Austria)

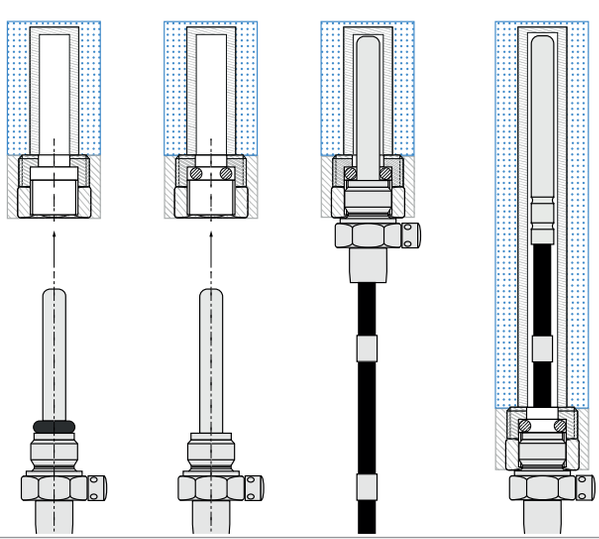
We offer other cable lengths between 0.3 m and 25 m in increments of 0.5 m. Please note the maximum lengths (depending on the sensor): Pt100 max 2.5 m | Pt500 max 12.5 m | Pt1000 max 25 m

Technical drawing



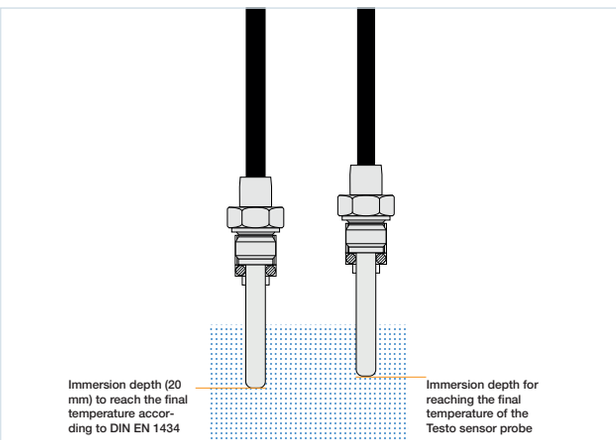
Mounting temperature probes for universal use (DS / PS)

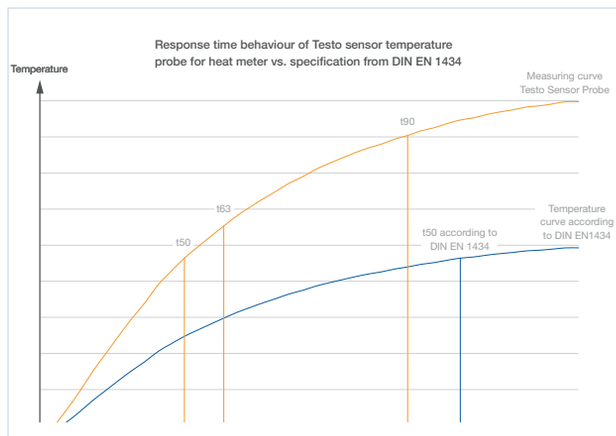
- The following drawing shows the sensor installation according to DIN EN 1434.
- Proceed as follows for probe mounting: In case of replacement, the old temperature probe and the old O-ring must first be removed from the installation location without leaving any residue.
- Seals and sealing surfaces must be clean and free of damage.
- Strip the new O-ring from the probe and insert it into the installation location.
- Push the process thread of the temperature probe with open locking screw onto the temperature probe sleeve as far as it will go.
- Screw in the process connection as far as it will go (tightening torque: 4 Nm) and tighten the locking screw (tightening torque: 4 cNm).
- At the end of each installation, a leak test must be carried out.
- Seal the probe in accordance with DIN EN 1434, using the existing sealing points.



Benefits of the Testo Sensor temperature probe

The DIN EN 1434 standard defines clear and demanding minimum requirements for temperature probes for heat and cold meters. Among other things, a great deal of attention is paid to the response time and the immersion depth, both of which have a decisive influence on the measurement result and thus on cost billing.





To ensure that the probe can measure the medium temperature correctly, it must be inserted into the pipeline to its minimum immersion depth. Otherwise the measurement result will be distorted by the influence of the ambient temperature. DIN EN 1434 stipulates that temperature probes for use in heat and cold meters must already indicate the correct result at an immersion depth of only 20 mm.

The temperature probes from Testo Sensor GmbH require a smaller minimum immersion depth. This creates more safety during installation and measurement errors are avoided.

If the temperature of the medium to be measured changes, the temperature probe must indicate this change as quickly as possible. This is the only way to measure the correct energy consumption by the consumer.

The rule is: the faster the probe, the more accurate the billing. DIN EN 1434 therefore requires that the temperature probe must have reached 50% of the final temperature after only 4 seconds. The temperature probes from Testo Sensor GmbH clearly exceed these strict specifications and ensure that you have the highest accuracy in the measurement process.

Our service: own pairing testing bench

- We offer our temperature probes fully paired on request.
- Therefore we set up production lines and a fully automated pairing test stand developed in-house.
- Our pairing test bench is certified through the PTB approval and obtained the necessary type tests and cold approvals.
- We are a member of EMATEM and the standards committee.
- Our temperature probes are on the tolerated list of inventory immersion sleeves.

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Testo Sensor GmbH

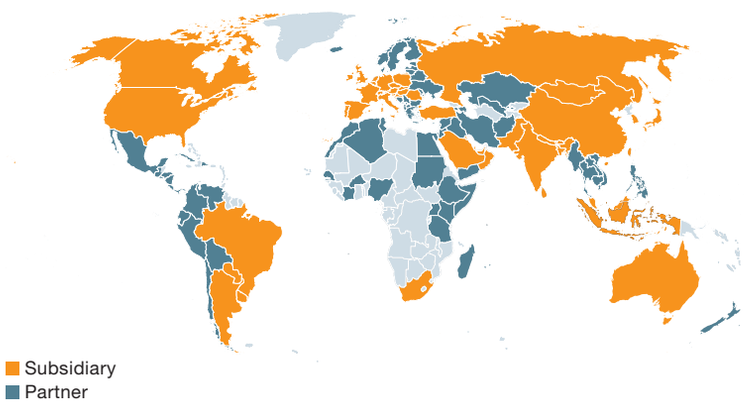
Testo Sensor GmbH was spun off in 2010 as a subsidiary of Testo SE & Co. KGaA. As a specialist in temperature probes and measurement technology, we focus on the development, manufacture and sale of application-specific temperature probes for industrial customers.

As a competence partner and OEM (Original Equipment Manufacturer) for our customers, we deliver the complete package: the technical solution, the required zero-defect quality, the appropriate supply logistics and the performance-based price.

We are active in these industries:

- Heating, Air Condition & Refrigeration
- Machinery & Apparatus engineering
- White goods (prof. coffee machines)
- Probes for Heat & Cold metering

Part of the strong Testo Group



- Testo is one of the leading manufacturers of measuring instruments in the energy management, heating/air conditioning/ventilation, food and pharmaceutical industries.
- 3.000 employees in more than 34 subsidiaries spread over 25 countries worldwide, > 80 sales & service partners on all continents
- Average annual growth of over 10% since its foundation in 1957 and a current turnover of over current turnover of over 400 million euros

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