

# Temperature Probes

for Combined Cold/Heat Meters

Basic types 902454/10 and 902454/11

Basic type 902464/10



Operating Manual



90245400T90Z001K000

V1.00/EN/00731587/2020-01-27



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# 1 Safety information

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## General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

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The following standards and directives apply to the use of pairs of temperature probes for measuring the forward flow and reverse flow temperature in a heat exchanger system:

- Product standard DIN EN 1434
- Product standard DIN EN 60751:2009 / IEC 60751:2008
- Directive 2014/32/EU, Annex I and MI-004
- German Weights and Measures Act (MessEG)
- German Weights and Measures Directive (MessEV)

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Specifications for electrical installations must be observed.

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All installation and maintenance work must be performed by specialist staff trained for this task.

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All notes listed in the installation instructions must be observed.

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Identification markings and metrology-relevant safety markings/main stamps must not be damaged or removed – otherwise the temperature probes are no longer admissible for use!

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Route the measurement signal lines so that they are at least 50 mm away from other lines, such as grid supply lines and data transmission lines. We recommend installing lines and computer units 300 mm away from strong electromagnetic fields, e.g. from frequency-controlled pumps and high-voltage power lines.

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To protect against damage and pollutants, the temperature probes must not be removed from their packaging until immediately before installation.

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Do not wind, bend, extend, or shorten the temperature probe lines.

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When connecting to a computer unit, always connect the temperature probes first before connecting the volume measuring unit.

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## Warning symbols



### **WARNING!**

#### **Risk of burns!**

The installation process must be carried out by trained personnel.

When using water additives (corrosion protection, etc.), the operator must make sure there is sufficient corrosion resistance before installing the temperature probe.

With direct mounting, the temperature probe is immersed in the pipeline without any additional immersion sleeve. During dismounting, always make sure that hot medium does not escape from the pipeline.

- ▶ Drain the pipeline system or seal off the temperature probe's installation location to relieve pressure.
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# 1 Safety information

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### 2.1 Object of these instructions and purpose of application

The standard DIN EN 1434, as well as PTB Directive K7.2, describe the requirements for cold meters and combined cold/heat meters and their sub-components. When combining sub-components (flow sensor, pair of temperature probes, computer unit) to form a heat meter, the standard prescribes platinum RTD temperature probes according to the standard DIN EN 60751:2009 / IEC 60751:2008 because these probes have sufficient measurement stability, accuracy, and interchangeability.

These days, the latest cold meters use various nominal values on the computer unit side (resistance value at 0 °C). The nominal values are normally 100 Ω (Pt100), 500 Ω (Pt500), and 1000 Ω (Pt1000).

The RTD temperature probes in the type series 902454/10 and 902454/11 for direct mounting, and 902464/10 for installation in thermowells have national type approval for cold meters. When it comes to use on combined cold/heat meters, these temperature probes also have an EC type examination in accordance with EC Directive 2014/32/EU (MID) including Appendices I and MI-004. The paired temperature probes are suitable for being connected to a computer unit of a combined cold/heat meter and measure the difference between the forward flow and reverse flow temperature of a heat exchanger system.

The temperature probes are made up of a corrosion-resistant protection fitting.

In order to meet the metrological requirements of PTB Directive K7.2 and EC Directive 2014/32/EU (MID) and Annex MI-004, the temperature probes are calibrated at three temperatures and paired according to a special mathematical process in order to comply with the tolerance for the temperature difference. The lower limit for the temperature difference is 3 K.

### 2.2 Identification marking

Each temperature probe pair is equipped with a nameplate containing the following information:

- CE identification marking with ID codes for the notified bodies appointed to certify module D (production quality assurance)
- Metrology identification marking, including the two digits for the year in which the identification marking was created
- Logo for the owner of the type examination certificate
- Type examination certificate number
- Pair number/ID
- Manufacturing date (year/calendar week)
- Manufacturing location (in-house code)
- Type number
- Admissible measuring range (temperature, temperature difference)
- Maximum pressure stage
- Nominal value
- Manufacturer's address

The inflow and outflow probes are distinguished by colored identification markings on the temperature probe's cable (red: inflow, blue: outflow) or using an identification marking on the nameplate (V = inflow, R = outflow).

## 2 General information

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### 3 Technical data

Temperature range 902454/10 902454/11 902464/10	0 to 120 °C 0 to 120 °C 0 to 120 °C The maximum operating temperature of the thermowells must be observed.
Protection type	IP65 (as delivered condition)
Temperature difference Minimum Maximum	3 K 120 K
Maximum pressure 902454/10 902454/11 902464/10	PS25 for a water flow velocity of 2 m/s PS25 for a water flow velocity of 2 m/s With thermowells basic type 902440/47, 902440/48 and 902440/49 PS40 for a water flow velocity of 2 m/s
Electrical connection	2-wire circuit, 4-wire circuit
Maximum measuring current	The maximum measuring current is calculated using the maximum admissible power loss of 5 mW. Depending on the nominal values, this results in the following effective current values: Pt100: 1783 µA Pt500: 797 µA Pt1000: 564 µA
Response times 902454/10 902454/11 902464/10 without thermowell 902464/10 with thermowell 902440/47 902464/10 with thermowell 902440/48 902464/10 with thermowell 902440/49	$t_{0.5} = 5 \text{ s}; t_{0.63} = 7 \text{ s}; t_{0.9} = 12 \text{ s};$ $t_{0.5} = 5 \text{ s}; t_{0.63} = 7 \text{ s}; t_{0.9} = 12 \text{ s};$ $t_{0.5} = 5 \text{ s}; t_{0.63} = 7 \text{ s}; t_{0.9} = 12 \text{ s};$ $t_{0.5} = 10 \text{ s}; t_{0.63} = 14 \text{ s}; t_{0.9} = 27 \text{ s};$ $t_{0.5} = 11 \text{ s}; t_{0.63} = 15 \text{ s}; t_{0.9} = 28 \text{ s};$ $t_{0.5} = 12 \text{ s}; t_{0.63} = 16 \text{ s}; t_{0.9} = 32 \text{ s};$
Minimum immersion depth	30 mm
Nominal value	Pt100, Pt500, Pt1000 (see identification marking for temperature probes)
Tolerance	Class B according to DIN EN 60751:2009 / IEC 60751:2008; restricted tolerances optional When using two-wire technology, the display will be systematically higher due to the line resistance (see maximum connection length according to DIN EN 1434).

### 3 Technical data

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## 4 Installation

If the pair of temperature probes is connected to a computer unit, make sure that the probe's nominal value matches that of the processing computer unit.

Furthermore, make sure that the installation location is deep enough to prevent damage to the tip of the probe or thermowell when screwing in.

The temperature probe must be installed in the pipe so that a sufficient immersion depth is guaranteed which is greater than the minimum immersion depth in all cases.

To prevent an inductive effect, the connecting cable must not be wound.

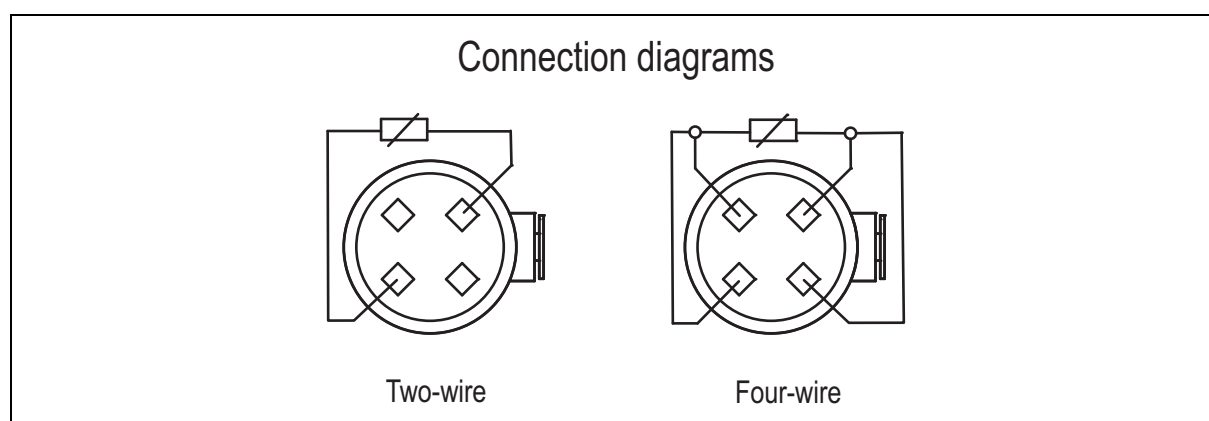
The connecting cable must not be laid alongside or wrapped around hot pipes because the line resistance and its temperature dependence are considered in the measurement result for temperature probes using two-wire technology.

Following successful mounting, the temperature probes must be secured against manipulation with a seal. The seal holes in the fastening screw, the cold barrier at the terminal head, or special sealing eyelets are provided for this. The sealing set is available as part no. 00650727.

The maximum length for connecting cables in two-wire technology depends on the conductor cross section and the nominal value according to DIN EN 1434-2. If the maximum admissible length, which may be connected to the computer unit, has a lower value, this value applies (to be taken from the type examination certificate).

Conductor cross section in mm <sup>2</sup>	Maximum length for Pt100 in m	Maximum length for Pt500 in m	Maximum length for Pt1000 in m
0.22	2.5	12.5	25.0
0.50	5.0	25.0	50.0
0.75	7.5	37.5	78.0
1.50	15.0	75.0	150.0

When choosing a connecting cable, make sure that the sheath material is sufficiently age resistant. The connecting cable's outer diameter should be chosen so that there can be a secure seal for the cable entry to the terminal head (terminal head shape J: outer diameter 4 to 9 mm; terminal head shape B: outer diameter 5 to 12.5 mm).



In order to reduce additional installation-related measurement errors to a minimum, the temperature probes in the forward flow and reverse flow must be installed the same. This applies to the pipe diameters and installation fittings used, and the choice of the same immersion depth, which must be greater than the minimum immersion depth, and the external thermal insulation. This is intended to ensure that the possible measurement deviations depending on the installation location are canceled out in the first approximation when determining the difference.

# 4 Installation

## 4.1 Installation notes

The cold barrier serves the thermal decoupling of the terminal head. This prevents condensation forming in the terminal head. Condensation forms on surfaces with a temperature below the dew point temperature of the surrounding ambient air. In a normal room environment of 20 °C and 50 % relative humidity, the dew point temperature is approx. 10 °C.

The temperature probes are suitable for systems with a pipe diameter from approx. DN 50 mm. In order to reduce additional installation-related measurement errors to a minimum, the temperature probes in the forward flow and reverse flow must be installed the same (symmetrically). This applies to the pipe diameters and installation fittings used, and the choice of the same immersion depth, which must be greater than the minimum immersion depth, and the external thermal insulation. This is intended to ensure that the possible measurement deviations depending on the installation location are canceled out in the first approximation when determining the difference.

The direct mounting temperature probe may only be tightened and loosened at the **hexagon of the stainless steel screw connection**. Non-compliance inevitably leads to destruction of the temperature probe.

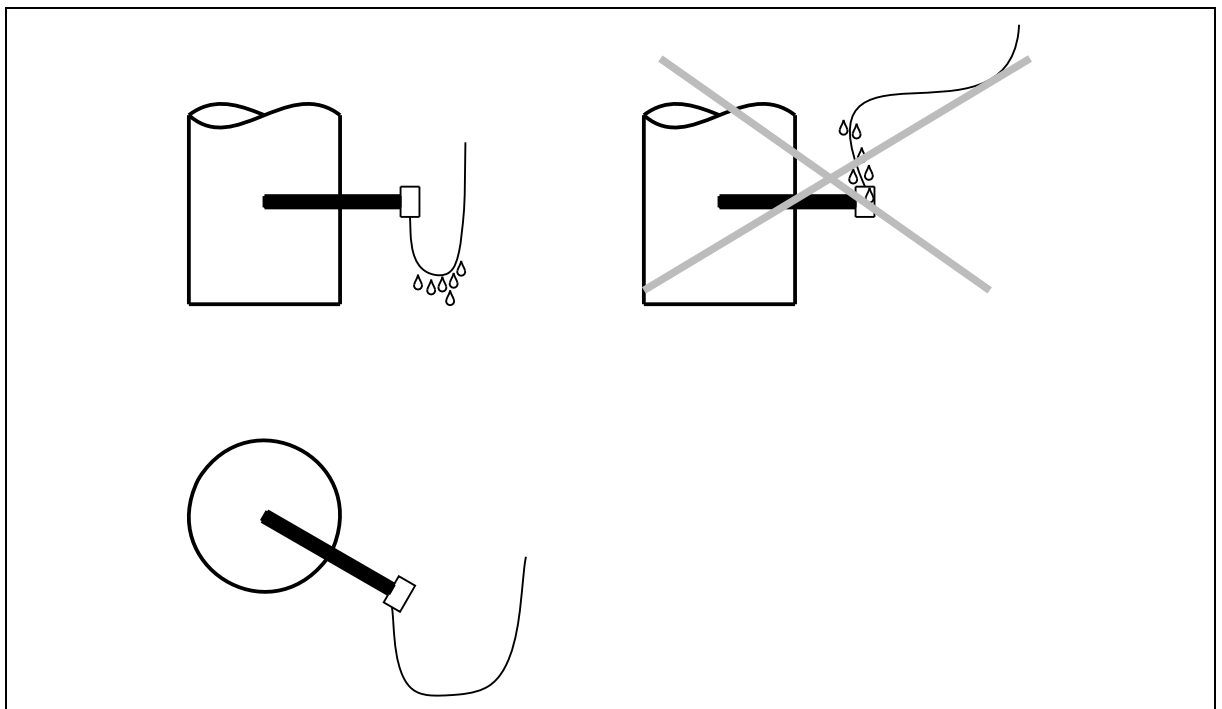
The installation location should be selected so that there is sufficient space for replacement.



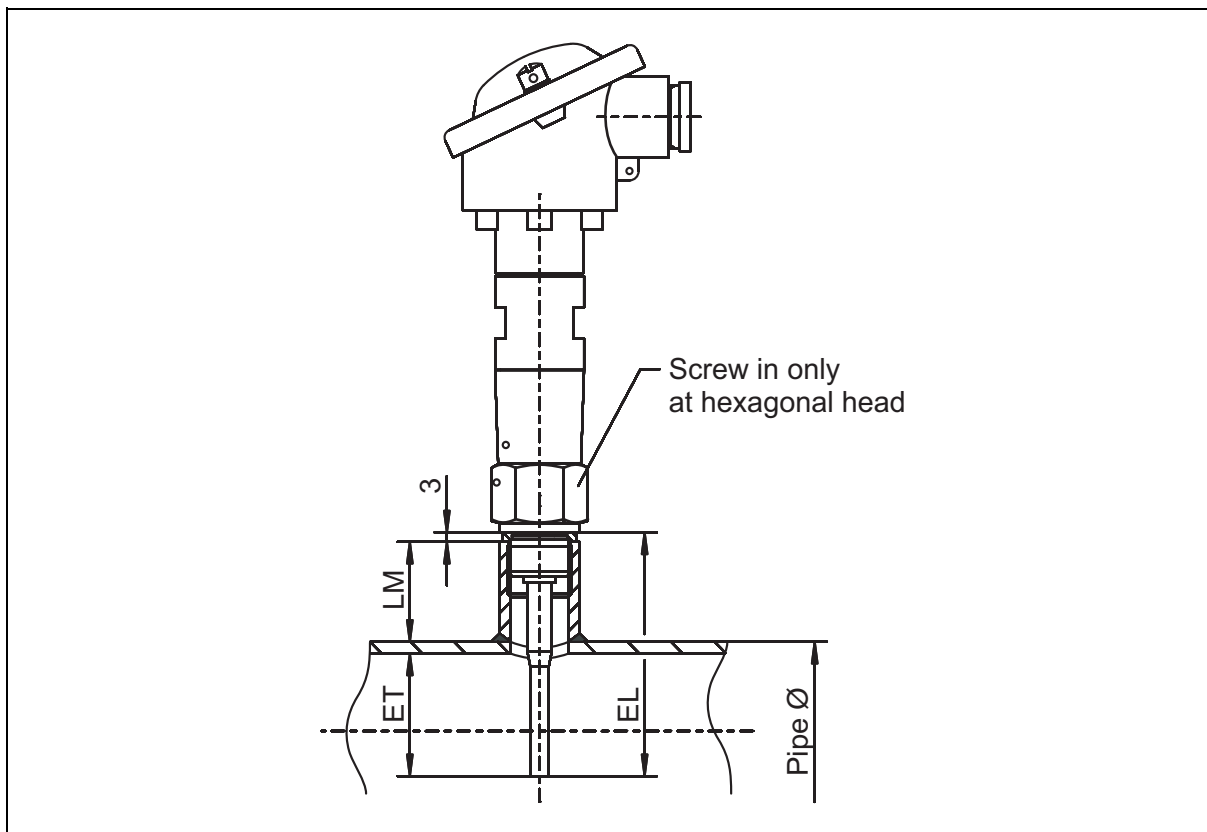
### NOTE!

Once installed, the difference between direct mounting and immersion sleeve mounting can only be identified from the label on the nameplate.

To avoid permanent condensation at the transition location between the terminal head and line, applicable installation positions should be selected.



## 4.2 Temperature probes for direct mounting (902454/10 and 902454/11)



Direct mounting				
DN	Pipe Ø	EL	ET	LM
50 mm	60.3 mm	85 mm	-39 mm	40 mm
65 mm	76.1 mm	120 mm	-54 mm	60 mm
80 mm	88.9 mm	120 mm	-64 mm	50 mm
100 mm	114.3 mm	120 mm	-63 mm	50 mm
150 mm	168.3 mm	120 mm	-73 mm	40 mm

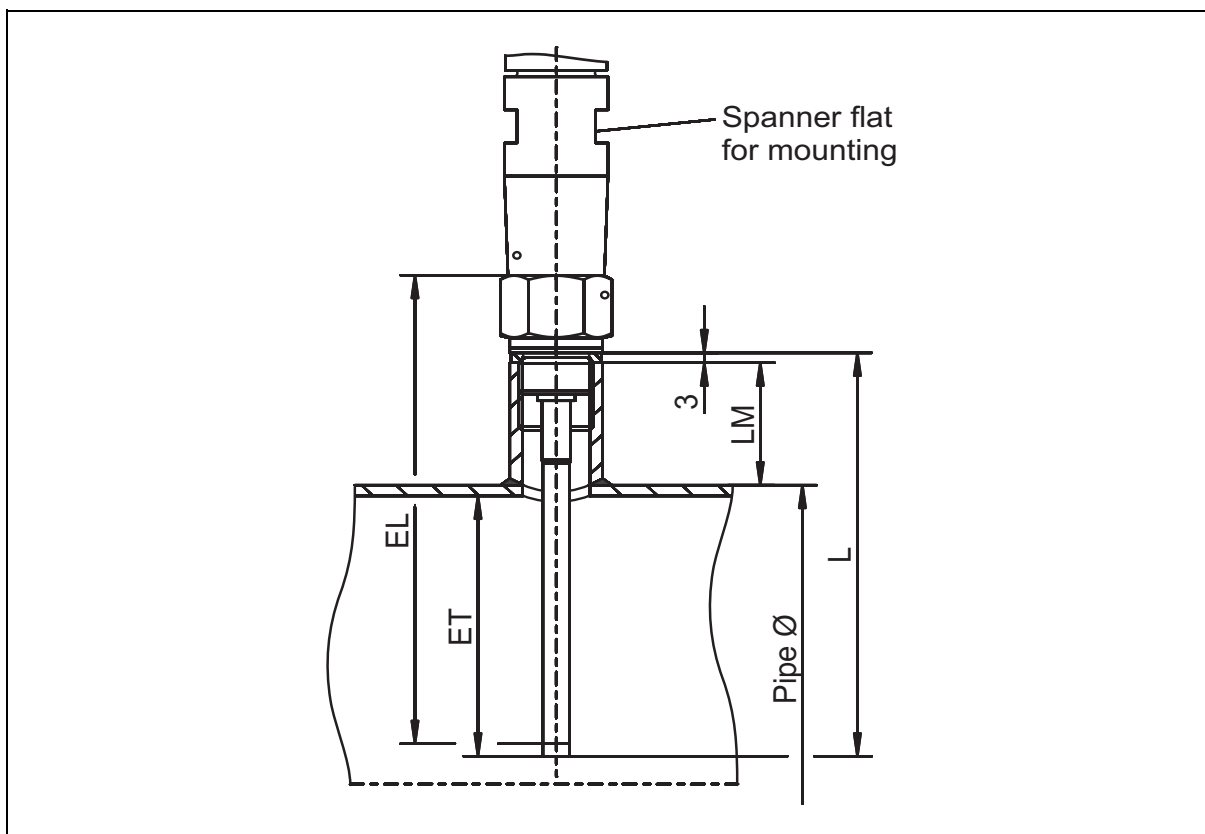


**NOTE!**

Only install the temperature probe using the hexagon wrench flat.

## 4 Installation

### 4.3 Temperature probes in thermowells (902464/10)



#### Installation in thermowell

DN	Pipe Ø	EL	ET	LM	L
150 mm	168.3 mm	140 mm	-73 mm	40 mm	120 mm
200 mm	219.1 mm	220 mm	-131 mm	70 mm	210 mm
250 mm	273.0 mm	220 mm	-131 mm	70 mm	210 mm
300 mm	323.9 mm	220 mm	-130 mm	70 mm	210 mm



#### NOTE!

We recommend consulting DIN EN 1434-2 for an installation location. Make sure that the seal and sealing surface in the installation location are undamaged, clean, and dry.



#### NOTE!

Only install the temperature probe using the wrench flat at the cold barrier.



### NOTE!

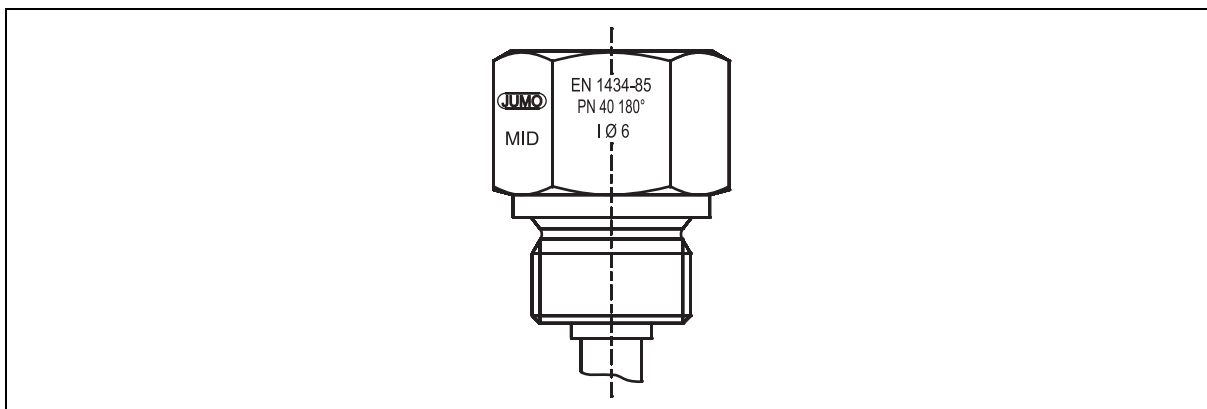
When installing temperature probes in thermowells, it must be ensured that the admissible degree of tolerance between the temperature probe's outer diameter and the internal diameter of the thermowell is adhered to. The temperature probe's outer diameter is  $(6 - 0.03/-0.14)$  mm.

There are two possible versions of thermowell:

#### Version 1

Thermowell internal diameter:  $(6 + 0.08/-0.00)$  mm

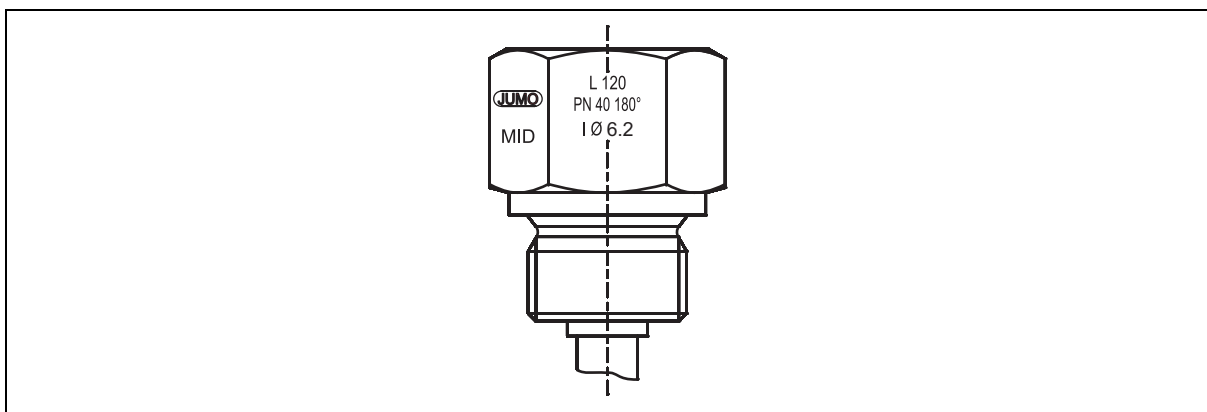
This version complies with the DIN EN 1434-2 standard and is preferred. The thermowell is marked by an appropriate DIN EN 1434 standard reference and the insertion length, as well as pressure stage, internal diameter, maximum operating temperature, and JUMO company logo.



#### Version 2

Thermowell internal diameter:  $(6.2 + 0.00/-0.05)$  mm

This version does not comply with specifications from standards, but has the right metrological properties nonetheless. Compared with version 1, the marking makes no reference to DIN EN 1434.



## 4 Installation

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## 5 Maintenance

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In order to maintain measurement stability, a metrological inspection must be carried out when the calibration period/the metrological identification marking has elapsed to check that the maximum permissible error (MPE) is observed.

At the same time, to maintain leak-tightness, at least every 5 years the seal on the cable entry and the terminal head lid must be replaced. This can be ordered as a complete seal set with part no. 00576391.

## 5 Maintenance

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# 6 Declaration of conformity

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More than sensors + automation

## Konformitätserklärung

**Dokument-Nr.** DE-016  
**Hersteller** JUMO GmbH & Co. KG  
**Anschrift** Moritz-Juchheim-Straße 1, 36039 Fulda  
**Produkt**  
Beschreibung Temperaturfühler für Kältezähler  
Typ/ Serie 902454/10; 902454/11 und 902464/10  
Typenblatt-Nr. 902454 und 902464

Der Hersteller bestätigt, dass der oben beschriebene Gegenstand der Erklärung das Mess- und Eichgesetz und die darauf gestützten Rechtsverordnungen einhält.

### Angewandte Gesetze

MessEG [Mess- und Eichgesetz]

Ausgabe 2013

### Datum der Erstanbringung des Konformitätskennzeichens auf dem Produkt

2015

### Angewendete Normen

DIN EN 1434-1 Ausgabe: 2019  
DIN EN 1434-2 Ausgabe: 2019  
DIN EN 1434-4 Ausgabe: 2019  
DIN EN 1434-5 Ausgabe: 2019

DIN EN 60751 Ausgabe: 2009

### Baumusterprüfbescheinigung (Bauartzulassung)

DE-15-M-PTB-0051  
Ausgestellt von: PTB Berlin

### Anerkannte Qualitätssicherungssysteme der Produktion

Anlage 4 Teil B Modul D der Mess- und Eichverordnung vom 11.12.2014 (BGBl. I S. 2010), Abs. 3.2 u. 3.3  
Physikalisch-Technische Bundesanstalt Braunschweig, Nr. der Stelle: 0102  
Konformitätsbewertungsstelle - QM-Systembewertungen von Messgeräteherstellern  
Zertifikatsnummer: DE-M-AQ-PTB002

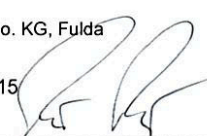
**Aussteller:**

Firma  
JUMO GmbH & Co. KG, Fulda

**Ort, Datum:**

Fulda, 2020-01-15

Rechtsverbindliche Unterschrift  
*Legally binding signature*  
*Signature juridiquement valable*

  
Bereichsleiter Globaler Vertrieb  
ppa. Reiner Riedl



Kommanditgesellschaft, Sitz: 36039 Fulda, Amtsgericht Fulda, HRA 302 USt-Id.-Nr. DE 112411234, Persönlich haftende Gesellschafterin: M. K. JUCHHEIM GmbH,  
Sitz: 36039 Fulda, Amtsgericht Fulda, HRB 17; Geschäftsführer: Dipl.-Ing. Bernhard Juchheim, Dipl.-Kfm. Michael Juchheim

## 6 Declaration of conformity

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	 More than <span style="background-color: #ff9900; padding: 2px;">sensors</span> + automation					
产品组别 Product group: 902454/10 902454/11	<b>产品中有害物质的名称及含量</b> <b>China EEP Hazardous Substances Information</b>					
部件名称 Component Name	铅 ( Pb )	汞 ( Hg )	镉 ( Cd )	六价铬 ( Cr(VI) )	多溴联苯 ( PBB )	多溴二苯醚 ( PBDE )
外壳 Housing (Gehäuse)	X	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	X	○	○	○	○	○
<p>本表格依据SJ/T 11364的规定编制。                  This table is prepared in accordance with the provisions SJ/T 11364.                  ○ : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。                  Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.</p> <p>× : 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。                  Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.</p>						

# 7 China RoHS

	 <small>More than sensors + automation</small>					
产品组别 Product group: 902464	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
部件名称 Component Name						
	铅 ( Pb )	汞 ( Hg )	镉 ( Cd )	六价铬 ( Cr(VI) )	多溴联苯 ( PBB )	多溴二苯醚 ( PBDE )
外壳 Housing (Gehäuse)	X	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	X	○	○	○	○	○
本表格依据SJ/T 11364的规定编制。 This table is prepared in accordance with the provisions SJ/T 11364. ○ : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。 Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.  × : 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。 Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.						





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