Temperature probes

for combined cold/heat meters

Basic types 902427/10 and 902427/11
Basic type 902437/10
Basic types 902454/10 and 902454/11
Basic type 902464/10

Operating Manual

90245400T90Z001K000

V2.00/EN/00731587/2024-12-17

Table of contents

1 Safety information

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!

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
- Directive 2014/32/EU, Annex I and MI-004
- TR-K7.1, TR-K7.2, TR-K8 and TR-K9
- German Weights and Measures Act (MessEG)
- German Weights and Measures Directive (MessEV)

Specifications for electrical installations must be observed.

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

All notes listed in the installation instructions must be observed.

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!

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.

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

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

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

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.

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 und 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 from the type series 902427/10 and 902427/11 for direct mounting and 902437/10 for installation in immersion sleeves 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).

3 Technical data

Temperature range	
902427/10	0 to 180 °C
902427/11	0 to 180 °C
902437/10	0 to 180 °C
902454/10	0 to 120 °C
902454/11	0 to 120 °C
902464/10	0 to 120 °C
	The maximum operating temperature of the thermowells must be observed.
Protection type	IP65 (as delivered condition)
Temperature difference	In the series 902427/10, 902427/11, and 902437/10, it must be ensured that the dew point is not reached or the temperature falls below this.
Minimum	
902427/10, 902427/11	3 K
902437/10	3 K
902454/10, 902454/11	3 K
902464/10	3 K
Maximum	
902427/10, 902427/11	180 K
902437/10	180 K
902454/10, 902454/11	120 K
902464/10	120 K
Maximum pressure	
902427/10, 902427/11	PS25 for a water flow velocity of 2 m/s
902454/10, 902454/11	PS25 for a water flow velocity of 2 m/s
902464/10, 902437/10	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	
Temperature probe, direct measurement	
902427/10	$t_{0.5} \leq 6$ s
902427/11	$t_{0.5} \leq 6$ s
902454/10	$t_{0.5} = 5$ s; $t_{0.63} = 7$ s; $t_{0.9} = 12$ s
902454/11	$t_{0.5} = 5$ s; $t_{0.63} = 7$ s; $t_{0.9} = 12$ s
Temperature probe, in thermowell	
902437/10	$t_{0.5} \leq 12$ s (installed in thermowell)
Temperature probe, without thermowell	
902464/10	$t_{0.5} = 5$ s; $t_{0.63} = 7$ s; $t_{0.9} = 12$ s
902464/10 with thermowell 902440/47	$t_{0.5} = 10$ s; $t_{0.63} = 14$ s; $t_{0.9} = 27$ s
902464/10 with thermowell 902440/48	$t_{0.5} = 11$ s; $t_{0.63} = 15$ s; $t_{0.9} = 28$ s
902464/10 with thermowell 902440/49	$t_{0.5} = 12$ s; $t_{0.63} = 16$ s; $t_{0.9} = 32$ s
Minimum immersion depth	30 mm
Nominal value	Pt100, Pt500, Pt1000 (see identification marking for temperature probes)
Tolerance sensor	Class F0.3 according to DIN EN 60751:2023 / IEC 60751:2022; restricted tolerances optional With the complete temperature sensor in two-wire technology, the display will be systematically higher due to the additional line resistance (see maximum connection length according to DIN EN 1434).

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.

During installation, the connection cable must not be shortened or extended as this would impair compliance with the tolerances (for two-wire technology).

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.

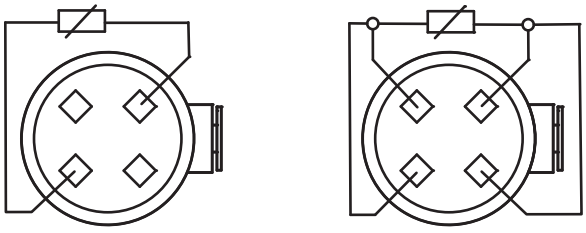
The installation point of the inflow and outflow probes must be identical (symmetrical installation), unless the non-symmetrical installation is approved by the meter manufacturer.

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^2	**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).

Connection diagrams



Two-wire Four-wire

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 of the type series 902454/10, 90254/11 and 902464/10 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.

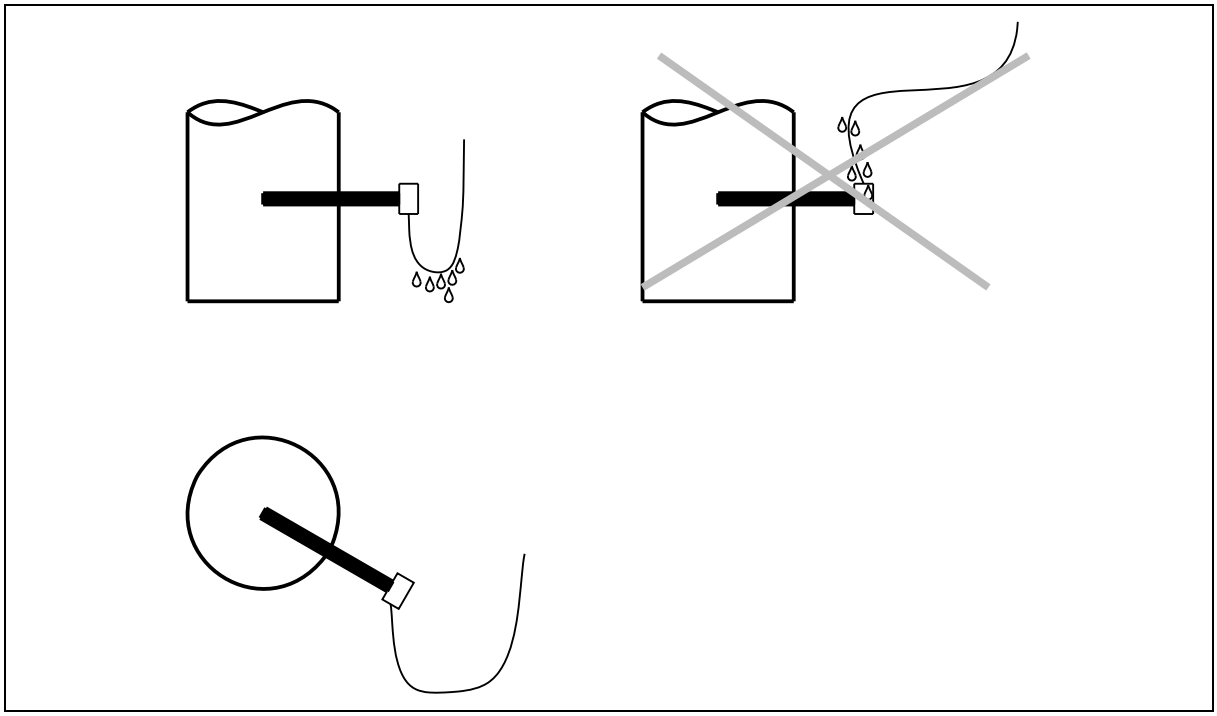
The direct mounting temperature probe may only be tightened and loosened at the **hexagon of the stainless steel screw connection**. Non-compliance inevitably leads to destruction of the temperature probe.

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

NOTE!

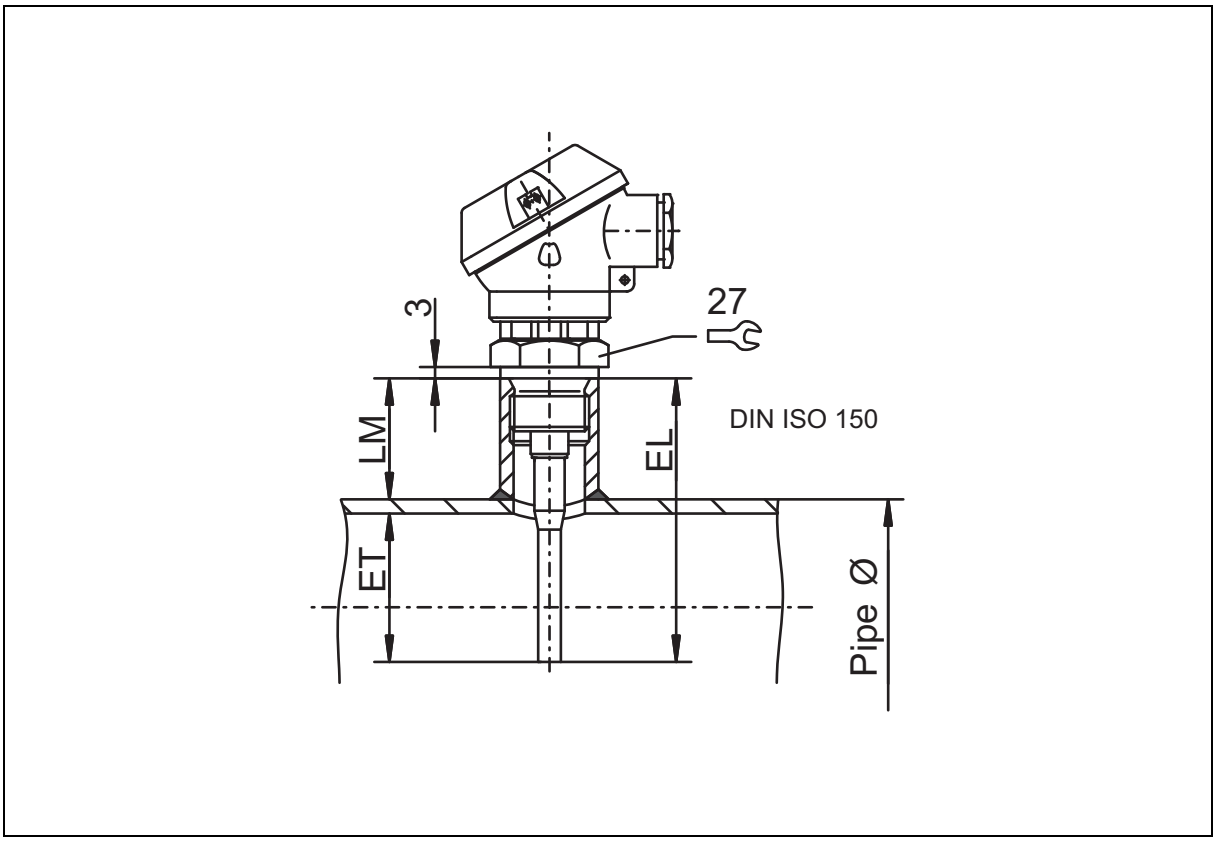
Once installed, the difference between direct mounting and immersion sleeve mounting can only be identified from the label on the nameplate.

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

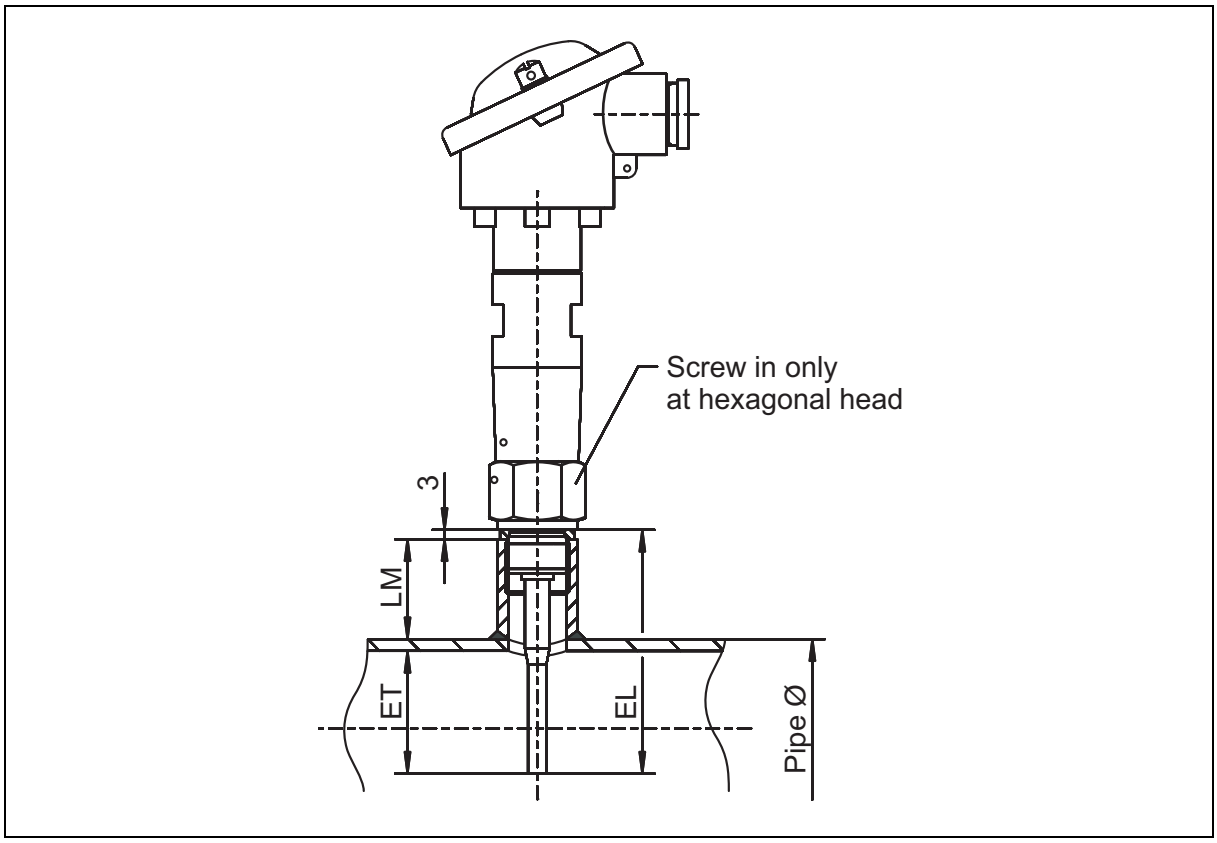
902427/10, 902427/11



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

4 Installation

902454/10, 902454/11



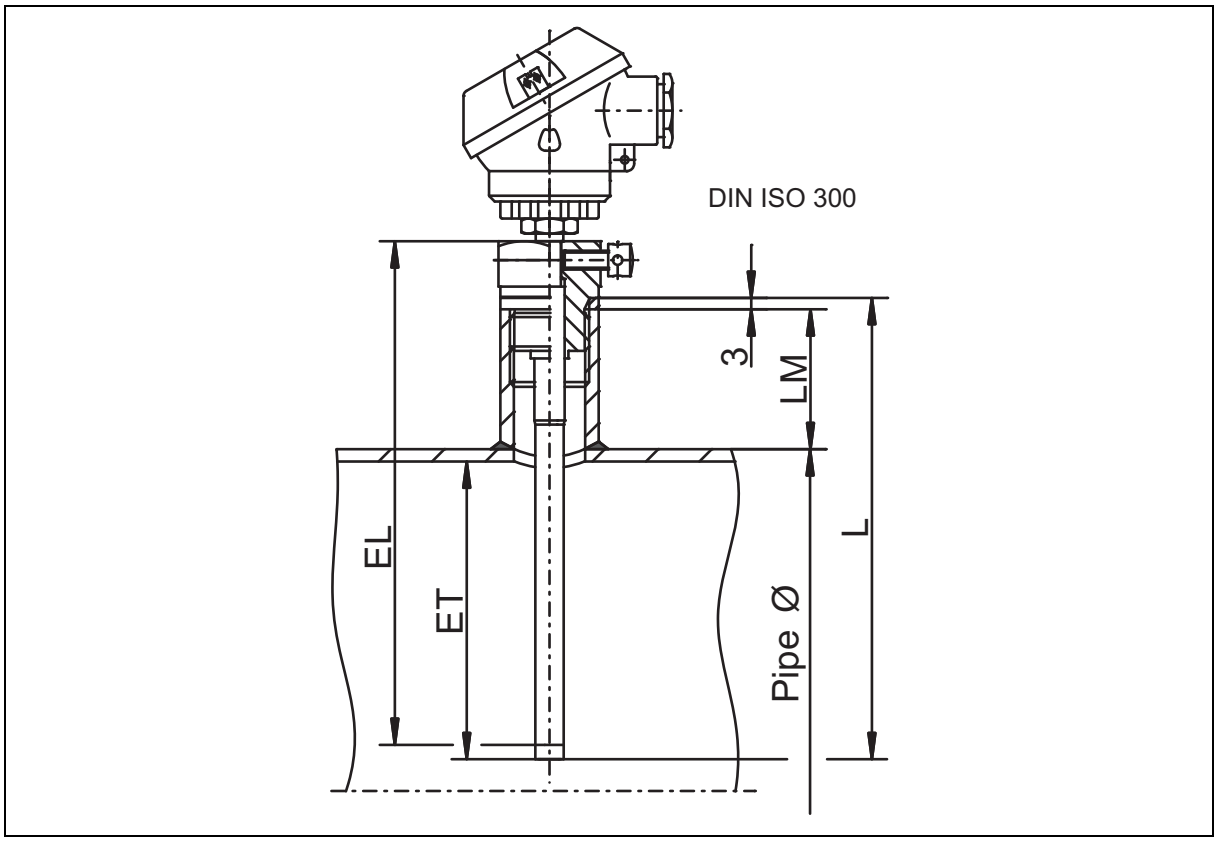
Direct mounting				
DN	**Pipe Ø**	**EL**	**ET**	**LM**
50 mm	60.3 mm	85 mm	-39 mm	40 mm
65 mm	76.1 mm	120 mm	-54 mm	60 mm
80 mm	88.9 mm	120 mm	-64 mm	50 mm
100 mm	114.3 mm	120 mm	-63 mm	50 mm
150 mm	168.3 mm	120 mm	-73 mm	40 mm

NOTE!

Only install the temperature probe using the hexagon wrench flat.

4.3 Temperature probes in immersion sleeves

902437/10



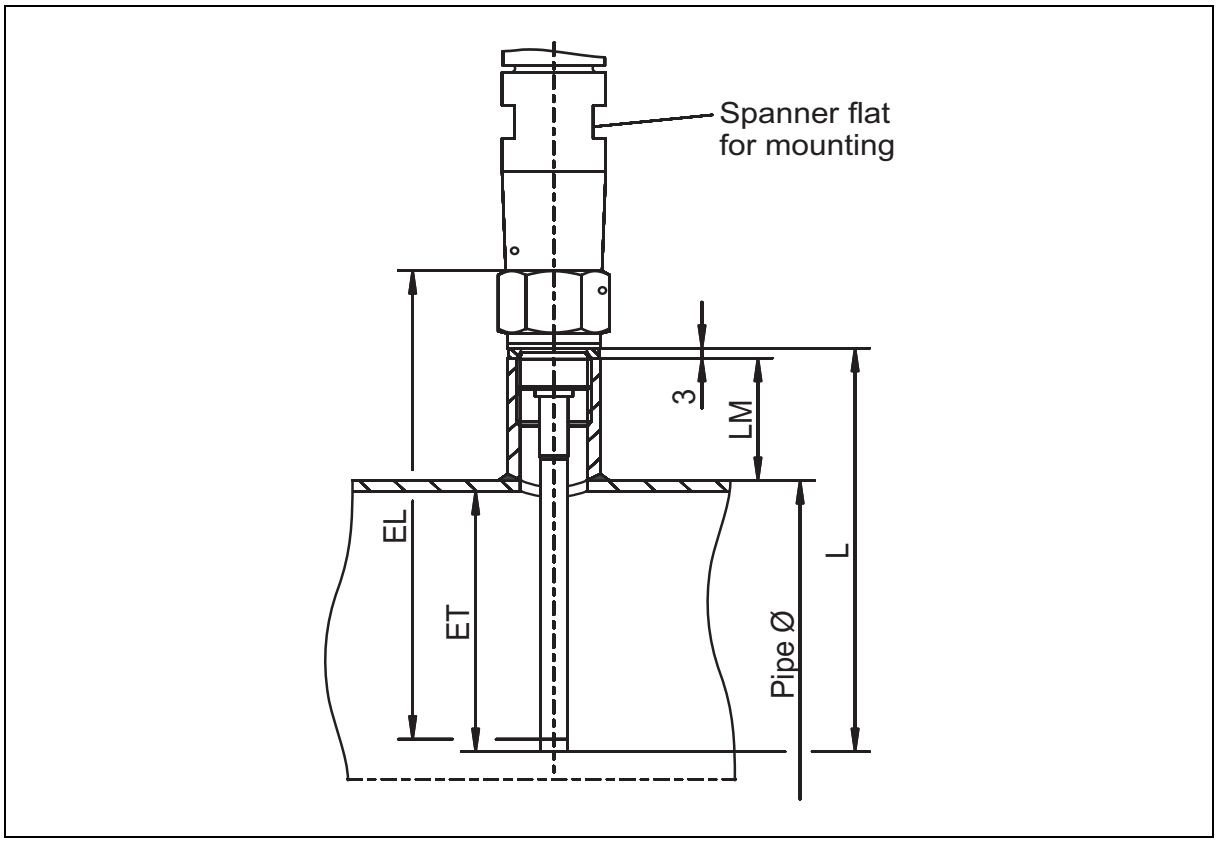
Installation in immersion sleeve					
DN	**Pipe Ø**	**EL**	**ET**	**LM**	**L**
150 mm	168.3 mm	140 mm	-73 mm	40 mm	120 mm
200 mm	219.1 mm	220 mm	-131 mm	70 mm	210 mm
250 mm	273.0 mm	220 mm	-131 mm	70 mm	210 mm
300 mm	323.9 mm	220 mm	-130 mm	70 mm	210 mm

NOTE!

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

4 Installation

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.

902437/10, 902464/10

NOTE!

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

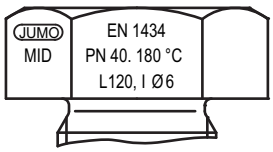
NOTE!

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.

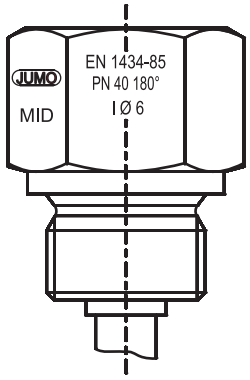
There are two possible versions of thermowell:

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.



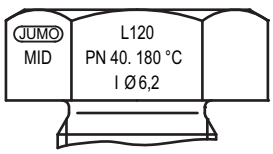
902437/10



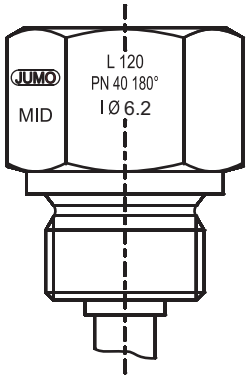
902464/10

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.



902437/10



902464/10

5 Maintenance

NOTE!

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

At the same time, to maintain leak-tightness, at least every 6 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.

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Konformitätserklärung

Dokument Nr.: DE-016

Hersteller: JUMO GmbH & Co. KG

Anschrift: Moritz-Juchheim-Straße 1, 36039 Fulda, Germany

Produkt :

Beschreibung	Temperaturfühler für Kältezähler
Typ/ Serie	902454/10; 902454/11; 902464/10
Typenblatt-Nr.	902454; 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

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

Angewendete Regelwerke:

Ermittelter Regeln und Erkenntnisse des Regelermittlungsausschusses nach § 46 des Mess- und Eichgesetzes	Ausgabe: 2022

Baumusterprüfbescheinigung (Bauartzulassung):

DE-15-M-PTB-0051	Aussteller: 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, 2024-05-03

Rechtsverbindliche Unterschriften:

BL Globaler Vertrieb
Markus Belmer

Qualitätsbeauftragter und Leiter Qualitätswesen
i. V. Matthias Raab

6 Declaration of conformity

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EU-Konformitätserklärung

EU declaration of conformity / Déclaration UE de conformité

Dokument-Nr. *Document No. / Document n°.*	CE 450
Hersteller *Manufacturer / Etabli par*	JUMO GmbH & Co. KG
Anschrift *Address / Adresse*	Moritz-Juchheim-Straße 1, 36039 Fulda, Germany

Produkt
Product / Produit

Name *Name / Nom*	**Typ** *Type / Type*	**Typenblatt-Nr.** *Data sheet no. / N° Document d'identification*
JUMO HEATtemp - Screw-In RTD - Types DL	902427/10	902427
JUMO HEATtemp - Screw-In RTD - Types DL	902427/11	902427
JUMO HEATtemp - Screw-In RTD - Types DL	902427/12	902427
JUMO HEATtemp - Push-In RTD - Types PL	902437/10	902437
JUMO HEATtemp - Push-In RTD - Types PL	902437/12	902437

Wir erklären in alleiniger Verantwortung, dass das bezeichnete Produkt die Anforderungen der Europäischen Richtlinien erfüllt.

We hereby declare in sole responsibility that the designated product fulfills the requirements of the European Directives.

Nous déclare sous notre seule responsabilité que le produit remplit les Directives Européennes.

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1. Richtlinie
Directive / Directive

Name *Name / Nom*	MID
Fundstelle *Reference / Référence*	2014/32/EU
Bemerkung *Comment / Remarque*	Mod. B+D
Datum der Erstanbringung des CE-Zeichens auf dem Produkt *Date of first application of the CE mark to the product / Date de 1ère application du sigle sur le produit*	2008

Gültig für Typ
Valid for Type / Valable pour le type

902427/10
902427/11
902427/12
902437/10
902437/12

1.1 EU-Baumusterprüfbescheinigung
EU type examination certificate / Certificat d'examen de type UE

Fundstelle *Reference / Référence*	DE-06-MI004-PTB015
Notifizierte Stelle *Notified Body / Organisme notifié*	Physikalisch-Technische-Bundesanstalt (PTB)
Kennnummer *Identification no. / N° d'identification*	0102

6 Declaration of conformity

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Angewendete Normen/Spezifikationen
Standards/Specifications applied / Normes/Spécifications appliquées

Fundstelle *Reference / Référence*	**Ausgabe** *Edition / Édition*	**Bemerkung** *Comment / Remarque*
EN 1434-1	2015+A1:2018	The edition 2007 is meet for presumtion of conformity
EN 1434-2	2015+A1:2018	The edition 2007 is meet for presumtion of conformity
EN 1434-4	2015+A1:2018	The edition 2007 is meet for presumtion of conformity
EN 1434-5	2015+A1:2019	The edition 2007 is meet for presumtion of conformity
EN 60751	2008	

Anerkannte Qualitätssicherungssysteme der Produktion
Recognized quality assurance systems of production / Systèmes de qualité reconnus de production

Notifizierte Stelle *Notified Body / Organisme notifié*	**Kennnummer** *Identification no. / N° d'identification*
Physikalisch-Technische-Bundesanstalt (PTB)	0102

Allgemeine Bemerkungen
General remarks / Observations générales

Annex II Module D of Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on measuring instruments (ABl. EG Nr. L 180)
Physikalisch-Technische Bundesanstalt Braunschweig, Body No.: 0102
Conformity assessment body, Assessment of QM-Systems of manufacturers of measuring instruments
Certificate No.: DE-M-AQ-PTB002

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Aussteller
Issued by / Etabli par

JUMO GmbH & Co. KG

Ort, Datum
Place, date / Lieu, date

Fulda, 2020-01-21

Rechtsverbindliche Unterschriften
Legally binding signatures /
Signatures juridiquement valable

Bereichsleiter Globaler Vertrieb
ppa. Reiner Riedl

Qualitätsbeauftragter und Leiter Qualitätswesen
i. V. Harald Gienger

7 China RoHS

	
产品组别 Product group: 902427	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.

产品组别 Product group: 902437 部件名称 Component Name	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
	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	○	○	○	○	○

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产品组别 Product group: 902454/10 902454/11	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	○	○	○	○	○

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产品组别 Product group: 902464 部件名称 Component Name	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
	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	○	○	○	○	○

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