



KombiTemp®

Types K110 / K120 / K122

/ K410 / K420 / K422 (straight)

Measuring ranges from -60 °C to +200 °C.



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0 About this operating manual

- The operating manual is aimed at specialists and semi-skilled personnel.
- Before each step, read through the relevant advice carefully and keep to the specified order.
- Thoroughly read and understand the information in the section "Safety instructions".
- The figures in the operating manual are examples and apply to all types of KombiTemp®.
- Sections or descriptions that do not apply to all types of KombiTemp® are marked accordingly.

If you have any problems or questions, please contact your supplier or contact us directly at:



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Hazard signs and other symbols used:



CAUTION! High temperature!

This sign indicates dangers resulting from high temperature that can lead to health defects or considerable damage to property.



WARNING! / CAUTION! Risk of injury!

This sign indicates dangers that cause personal injuries that can lead to health defects or cause considerable damage to property.



CAUTION! Material damage!

This sign indicates actions which could lead to possible damage to material or environmental damage.



Explosion protection!

This symbol marks information and measures related to explosion hazard areas.



NO DOMESTIC WASTE!

The device must not be disposed of together with domestic waste.



ADHERE TO OPERATING MANUAL!



NOTICE!

This symbol indicates important notices, tips or information.



Pay attention to and comply with information that is marked with this symbol.



Check the specified points or notices.



Follow the specified instructions and steps. Adhere to the given order.



Reference to another section, document or source.



Item.

1 Device description

The KombiTemp® combines the functions of a SIKA industrial thermometer and an electrical temperature sensor. It's used to display the local temperature and to remote monitoring of liquid and gaseous media in pipes, tanks, machines or plants.

The KombiTemp® has two independent measuring systems. They work according to different physical principles but only require one measuring point.

Assemblies:

The most important assemblies of the KombiTemp® are the connecting head, the industrial thermometer and the immersion tube.

Connection head:

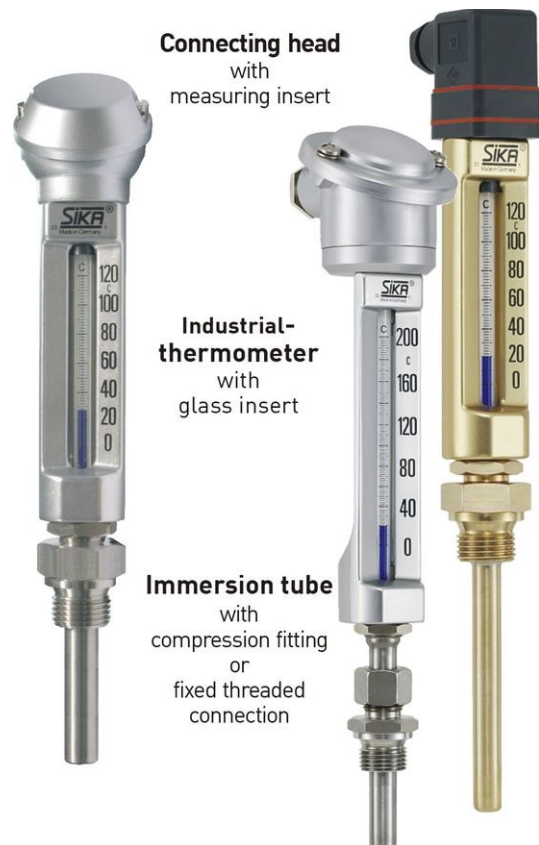
The connection head allows the connection of an electrical temperature sensor for remote monitoring. The measuring insert is to be found within it.

Industrial thermometer:

The industrial thermometer displays the local temperature at the metering point. No electrical energy is necessary for the temperature display.

Immersion tube:

The immersion tube is used to create the process connection to the installation or machine. It is installed in proximity to the measuring point. Use in particularly high-stress situations requires the fitting of protective tubes.



Measuring point:

The temperature measurement is carried out in the lower part of the immersion tube. There are the temperature-sensitive parts of the measuring insert (→ § 3 "Construction and function").

Versions*:

KombiTemp® types K110, K120, K122, K410, K420 and K422 differ in size, connection head and mechanical connection.

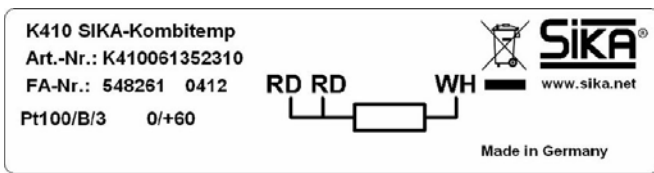
They are available in several measuring ranges from -60°C to +200°C and in various configurations (immersion tube length, mechanical connection, immersion tube material, electrical temperature sensor and transmitter).

See the [KombiTemp®-Data Sheet](#) for detailed information on the various KombiTemp® types and configurations.

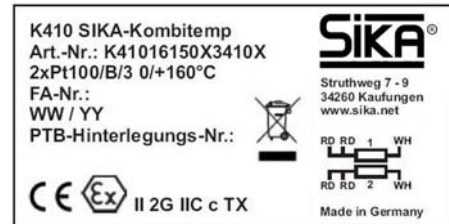
* Customised versions available on request.

Type plate:

The type plate contains the most important data and the connection diagram of the KombiTemp® supplied.



Type plate example



Type plate example explosion hazard areas

Scope of delivery and accessories:

Before installing the device, check the delivered items:

- 1x KombiTemp® as ordered.
- 1x Operating manual.
- Packaging or transport protection (if applicable).

Accessories:

Protective tubes certified according to DIN 43772:2000.

1.1 Intended use

The KombiTemp® may only be used to display or monitor the temperatures of liquid or gaseous media in pipes, tanks, machines or plants.

WARNING! No safety component!

The devices of the series KombiTemp® are not safety components in accordance with Directive 2006-42-EC (Machine Directive).

↳ Never use the KombiTemp® as a safety component.

The operational safety of the device supplied is only guaranteed by intended use. The specified limits (→ § 10 "Technical data") may under no circumstances be exceeded.

CAUTION! Risk of injury or material damage!

The KombiTemp® must not be subjected to mechanical stress and can become very hot when in operation.

↳ Never use the KombiTemp® as a carrying handle or tread.

Before installing the device, check that the wetted device's materials are suitable for the medium intended for use (→ § 10.2 "Materials table").

**The KombiTemp® is intended for use in areas with potentially explosive atmospheres.**

The explosion-proof devices are approved for use in Zones 1 and 2 in accordance with Directive 94/9/EC. The device interior and surroundings may be located in Zone 1 or Zone 2.

1.2 Information on explosion-proof version



KombiTemp®- version for use in explosion hazard areas:

The protective measures for the specific hazards described below are employed in versions for use in explosion hazard areas.

Hazard	Protective measure
<ul style="list-style-type: none"> Glass capillary breakage: Ignition of petroleum by the hot inner wall of the immersion tube. 	<ul style="list-style-type: none"> Restriction of temperature measuring range to 160°C: The maximum surface temperature of the immersion tube inner wall is at least 50 K below the ignition temperature of petroleum.
<ul style="list-style-type: none"> Intermittent electrical connection. 	<ul style="list-style-type: none"> Connect the device to a certified intrinsically safe circuit.

Information on explosion-proof marking:

The explosion-proof marking on the type plate contains the following information:



CE Conformity mark

Ex Ex mark

II Equipment group (above ground)

2G Equipment category:
2 – Suitable for Zones 1 and 2
G – Gases/vapours

IIC Explosion group
Standard gap width < 0.5 mm
Minimum ignition current ratio < 0.45 (referenced to methane = 1)

c Type of ignition protection: "constructional safety"

TX The maximum surface temperature does not depend on the device itself, but rather primarily on the operating conditions.

1.3 Exclusion of liability

We accept no liability for any damage or malfunctions resulting from incorrect installation, in-appropriate use of the device or failure to follow the instructions in this operating manual.

2 Safety instructions



Before you install the KombiTemp®, read through this operating manual carefully. If the instructions contained within it are not followed, in particular the safety guidelines, this could result in danger for people, the environment, and the device and the system it is connected to.

The KombiTemp® correspond to the state-of-the-art technology. This concerns the accuracy, the operating mode and the safe operation of the device.

In order to guarantee that the device operates safely, the operator must act competently and be conscious of safety issues.

SIKA provides support for the use of its products either personally or via relevant literature. The customer verifies that our product is fit for purpose based on our technical information. The customer performs customer- and application-specific tests to ensure that the product is suitable for the intended use. With this verification all hazards and risks are transferred to our customers; our warranty is not valid.

Qualified personnel:

⚠ The personnel who are charged for the installation, operation and maintenance of the KombiTemp® must hold a relevant qualification. This can be based on training or relevant tuition.

The personnel must be aware of this operating manual and have access to it at all times.

⚠ The electrical connection should only be carried out by a fully qualified electrician.

General safety instructions:

⚠ In all work, the existing national regulations for accident prevention and safety in the workplace must be complied with. Any internal regulations of the operator must also be complied with, even if these are not mentioned in this manual.

⚠ Degree of protection according to EN 60529:

Ensure that the ambient conditions at the site of use does not exceed the requirements for the stated protection rating (→ § 10 "Technical data").

⚠ The KombiTemp® must not be subjected to mechanical stress. Never use it as a carrying handle or tread.

⚠ The KombiTemp®'s glass insert is fragile. Do not exert pressure on it with fingers.

⚠ Only use the KombiTemp® if it is in perfect condition. Damaged or faulty devices must be checked without delay and, if necessary, replaced.

⚠ When fitting, connecting and removing the KombiTemp® use only suitable appropriate tools.

⚠ Do not remove or obliterate type plates or other markings on the device, as otherwise the warranty is rendered null and void.

Special safety instructions:

Warnings that are specifically relevant to individual operating procedures or activities can be found at the beginning of the relevant sections of this operating manual.

Safety instructions for explosion hazard area:

Ex The following safety instructions must also be observed when KombiTemp® are used in explosion hazard areas!

- ⚠ All work involving an explosion hazard area must be performed by a suitably qualified electrician.
- ⚠ The KombiTemp® may only be used in combination with a certified intrinsically safe electrical circuit. Disconnecting the connection wires within the explosion hazard area is allowed due to the certified intrinsic safety.
- ⚠ Integrate the KombiTemp® in the potential equalisation system by installing it on a metallic pipe or a metallic tank.
- ⚠ The maximum measured temperature must not exceed the specified temperature measuring range.
- ⚠ Check the surface resistance of the KombiTemp® after making the electrical connection (→ § 5.4).
- ⚠ Check the KombiTemp® at regular intervals (every 3 months) for corrosion or signs of corrosion (→ § 7 "Maintenance, cleaning and problems").

3 Construction and function**Construction:**

Connecting head:

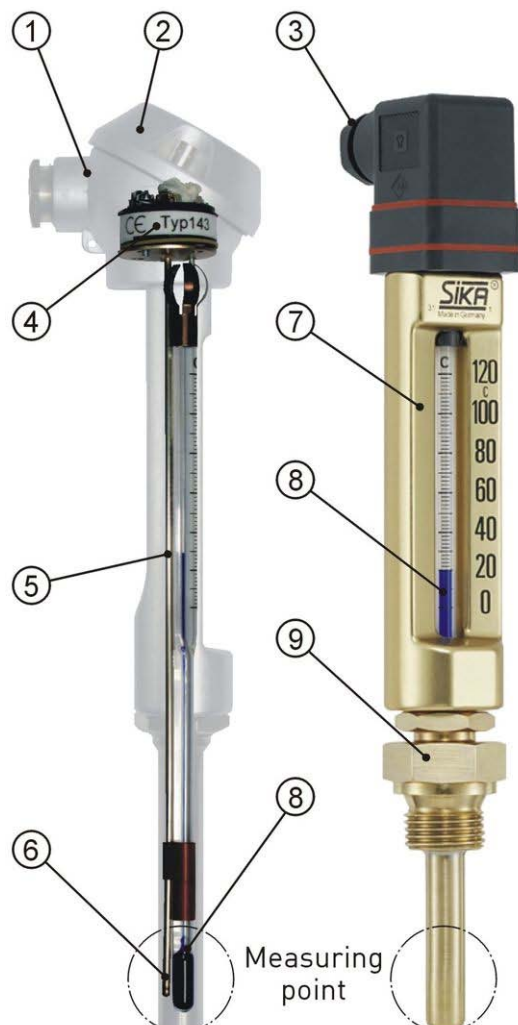
- ① Head housing / Cable socket (K122/422).
- ② Cap with gasket and screws / Connector (K122/422).
- ③ Cable fitting with gasket and compression ring.

Measuring insert:

- ④ Terminal socket or head transmitter / Only terminal socket without head transmitter possible (K122/422).
- ⑤ Sensor tube.
- ⑥ Temperature sensor.

Industrial thermometer:

- ⑦ Thermometer housing with measurement range and type plate (sticker at rear).
- ⑧ Glass insert with display fluid and scale.
- ⑨ Immersion tube with counter nut and process connection.



Function of the industrial thermometer:

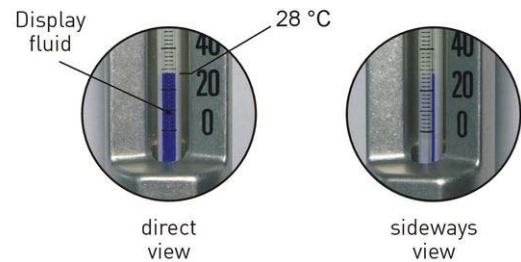
The industrial thermometer works according to the principle of volume change.

The visible column of display fluid in the glass insert rises or falls according to the temperature in the measuring location. The temperature at the measuring point can thus be read directly from the industrial thermometer.

Exact temperature readings are facilitated by the measurement range on the thermometer housing and the scale on the glass insert.



It is best to read the thermometer directly from the front because the display fluid is magnified when seen from this angle.

**Function of the measuring insert / head transmitter:**

The measurement insert utilises either the temperature coefficient of the electrical resistance or the Seebeck effect (thermoelectric effect) for temperature measurement, depending on the temperature sensor that is used.

The temperature recorded at the measuring point is converted by the temperature sensor into a corresponding electrical signal.

The temperature sensor is located at the bottom of the sensor tube. The sensor is connected to the terminal socket or transmitter in the head housing via a cable inside the sensor tube.

The electrical signal from the temperature sensor is directly applied to the terminal socket. In the case of the transmitter it is converted into an electrical signal of 4...20 mA. The current signal is applied to the transmitter clamps.

Transmitter in explosion hazard area

In an explosion hazard area, transmitters with their own approval may be installed in the KombiTemp®. The installed transmitter must be regarded as an independent device.

Approvals (PR electronics A/S):



Type 5333B (Zone 0, Zone1, Zone2):

II 1 GD, T80°C...T105°C
EEx ia IIC T6 / T4

Type 5335A (Zone 2):

II 3 GD Ex nA [nL] IIC
T6...T4 oder
II 3 GD Ex nL IIC
T6...T4 oder
II 3 GD Ex nA [ic] IIC
T6...T4 oder
II 3 GD Ex ic IIC
T6...T4

4 Installation of KombiTemp®



IMPORTANT! Potential equalisation!

The KombiTemp® must be installed on a metallic pipe or a metallic tank in order to connect it to the potential equalisation system.

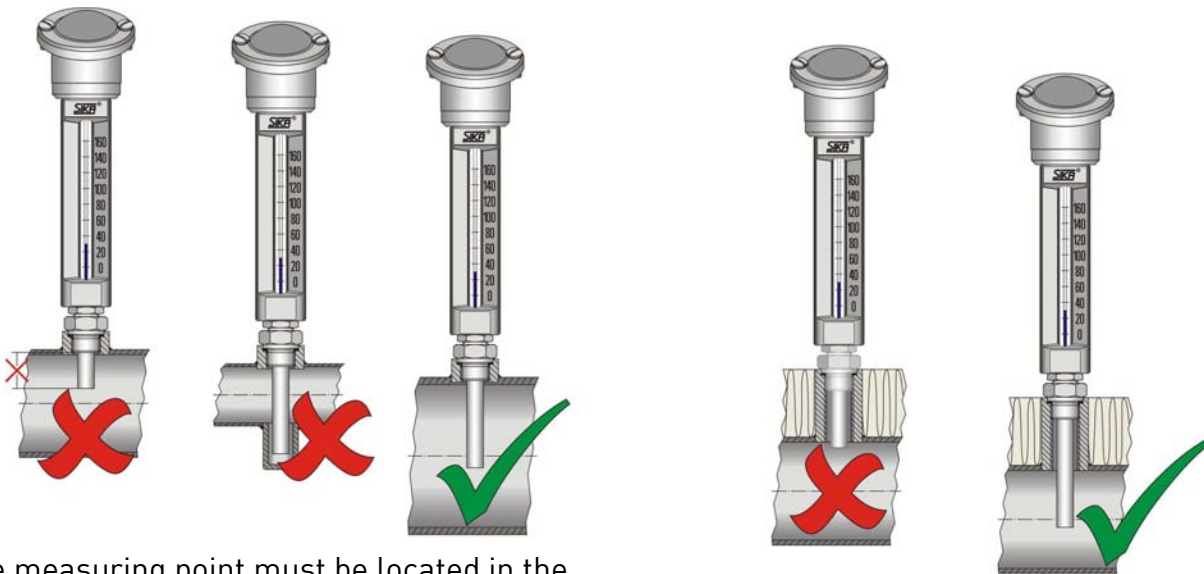
4.1 Installation instructions



MEASURING POINT LOCATION!

For accurate temperature measurement, the right measuring point location for the KombiTemp® should be selected at the installation site.

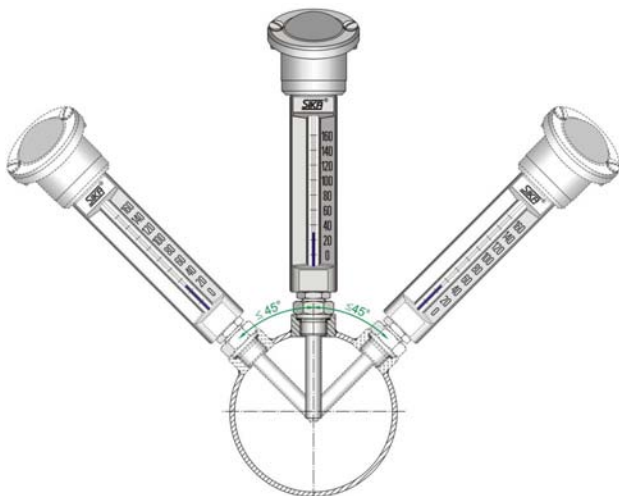
Please observe the following installation instructions:



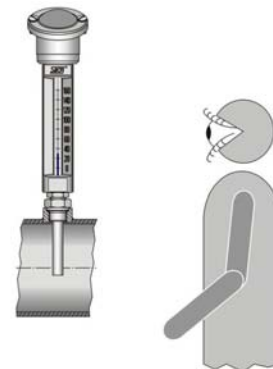
The measuring point must be located in the centre of the pipe.

If the immersion tube is too short or too long it will be impossible to gauge the temperature accurately.

If the pipe is lagged ensure that a long enough immersion tube is used.



The maximum allowable deviation of the KombiTemp® from the vertical installation position is $\pm 45^\circ$.



When selecting the installation location, ensure that the thermometer housing is at eye level.

4.2 Assembly



CAUTION! High temperature!

The surface of the KombiTemp® can become very hot when the device is operational!

↳ Never touch the hot KombiTemp®.



CAUTION! Risk of injury and material damage!

The use of unsuitable sealants can lead to the escape of hot medium. There is a risk of injury as well as of damage to the plant and environmental pollution.

↳ Be sure only to use suitable sealants.

Before installation:

Before installing the KombiTemp®, check that

- the equipment is switched off and is in a safe and de-energised state.
- the equipment is depressurised and has cooled down.
- a screw-in fitting is available at a suitable location (measuring point) on the installation or the machine.
- a suitable sealant is used.



SUITABLE TOOLS:

Use only suitable tools of the correct size.

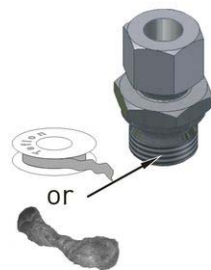
4.2.1 Assembly with compression fitting

↳ 1. Sealing

1a Flat gasket



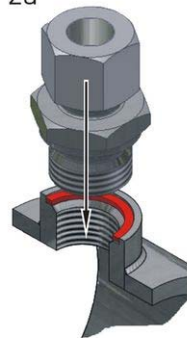
1b



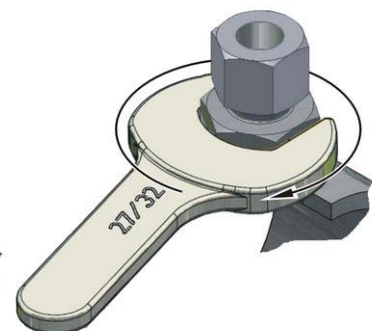
1b Sealant
(e.g. Teflon, hemp, ...)

↳ 2. Insert compression fitting and fully tighten

2a

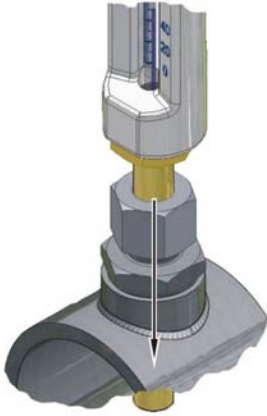


2b

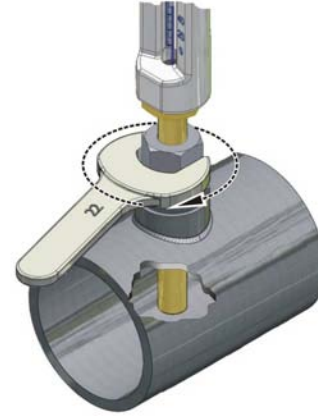


Tightening torque: (→ § 10.3)

↪ 3. Insert KombiTemp®

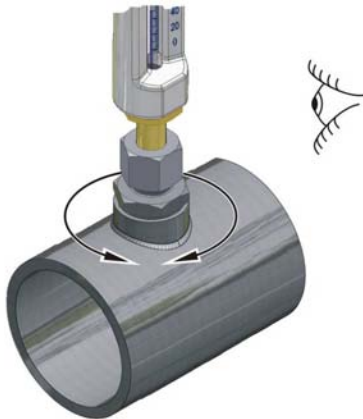


↪ 4. Adjust immersion depth

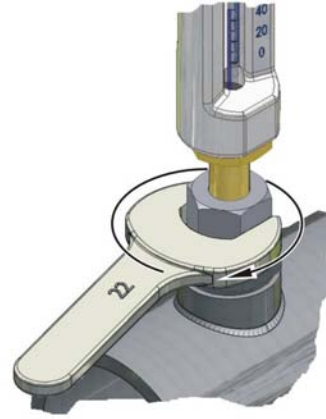


Insert the immersion tube to the desired depth and tighten the counter nut lightly until the cutting ring grasps the tube.

↪ 5. Align



↪ 6. Fully tighten counter nut



Tightening torque: (→ § 10.3)

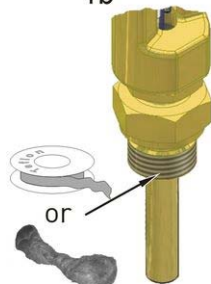
4.2.2 Assembly with threaded connection

↪ 1. Sealing

1a Flat gasket

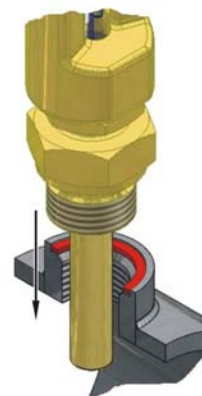


1b

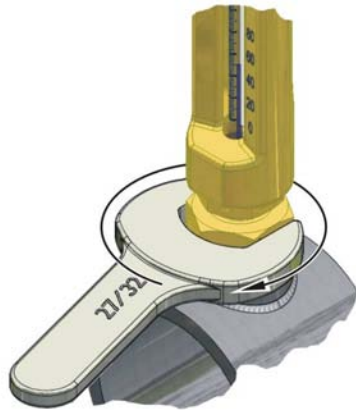


1b Sealant
(e.g. Teflon, hemp, ...)

↪ 2. Insert

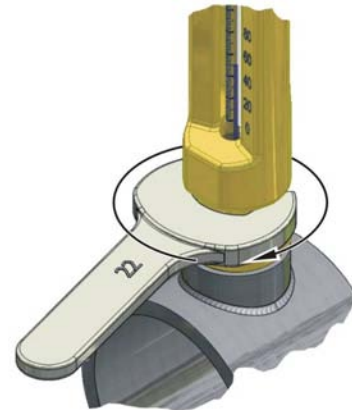


↪ **3. Fully tighten immersion tube**

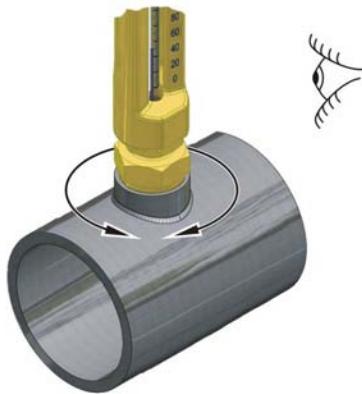


Tightening torque (→ § 10.3)

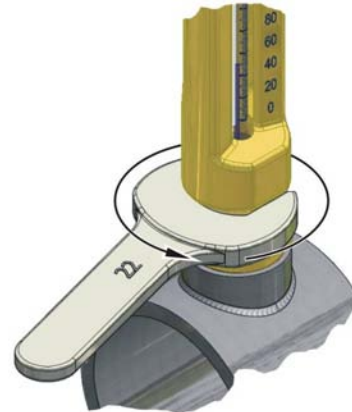
↪ **4. Loosen counter nut**



↪ **5. Align**



↪ **6. Fully tighten counter nut**



Tightening torque (→ § 10.3)

5 Electrical connection

CAUTION! Electric current!



The electrical connection of the KombiTemp® should only be carried out by a fully qualified electrician.

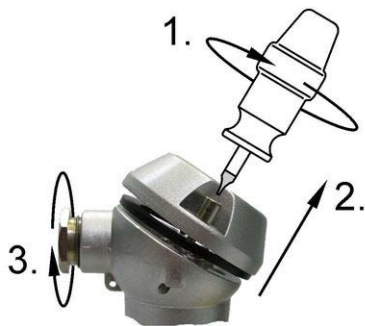
☞ De-energize the electrical system before connecting the KombiTemp®.



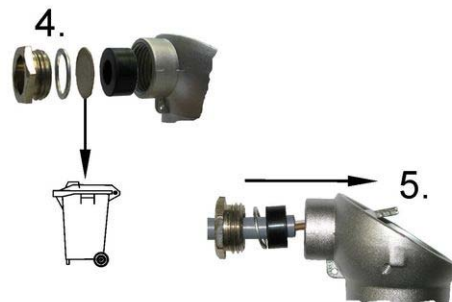
☞ The KombiTemp® may only be operated in combination with a certified intrinsically safe electrical circuit. Disconnecting the connection wires within the explosion hazard area is allowed due to the certified intrinsic safety.

5.1 KombiTemp® with connecting head

The measuring insert is connected inside the connection head of the KombiTemp®. The connecting cable is connected with the terminal socket or the transmitter of the measuring insert.



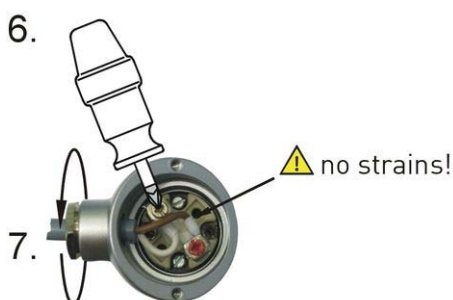
- ☞ 1. Loosen the cover screws.
- ☞ 2. Remove the cover complete with screws and gasket from the head housing.
- ☞ 3. Loosen the cable connector.



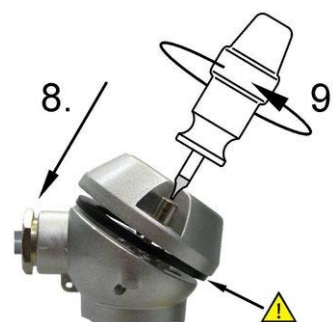
- ☞ 4. Remove the transport protection (cardboard disc).
- ☞ 5. Guide the connecting cable into the head housing through the cable connector, pressure ring and gasket.



Follow the connection diagram on the KombiTemp® type plate.



- ☞ 6. Connect the cable according to the instructions on the connection diagram. (→ § 5.3 "Connection types").
- ☞ 7. Fully tighten the cable connection.
 - ⚠ Ensure that the connecting cables are not under strain!



- ☞ 8. Place the cap with gasket on the head housing.
 - ⚠ Ensure that the cap gasket is correctly positioned.
- ☞ 9. Fully tighten the screws

5.2 KombiTemp® with angle plug

- ↪ Loosen the central screw ⑥ M3x35 and disconnect the cable socket ② from the connector ① (→ Fig. 5.2.1). Pull the central screw ⑥ out of the cable socket ②.
- ↪ Open the core ⑧ of the cable socket ② with a screwdriver or similar tool (→ Fig. 5.2.2).
- ↪ Loosen the screwed cable gland ⑤ M16x1,5 (→ Fig. 5.2.3).

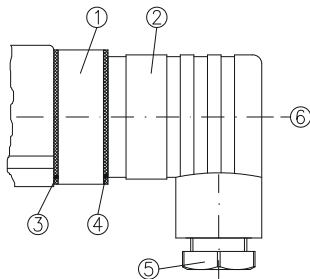


Fig. 5.2.1

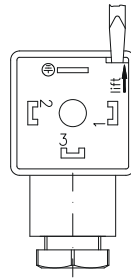


Fig. 5.2.2

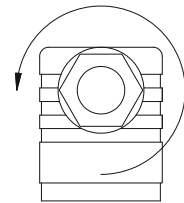


Fig. 5.2.3

- ↪ Insert the supply cable through the screwed cable gland ⑤, the pressure ring ⑩ and the rubber insert ⑨ into the cable socket ② (→ Fig. 5.2.4).
- ↪ Connect the wires according to § 5.3 "Connection types".
- ↪ Press the core ⑧ into the cable socket ② until it locks into place.
- ↪ Put the central screw ⑥ in the cable socket ② and tighten the screwed cable gland ⑤ (→ Fig. 5.2.5).
- ↪ Plug the cable socket ② on the connector ① and tighten the central screw ⑥ (→ Fig. 5.2.6).

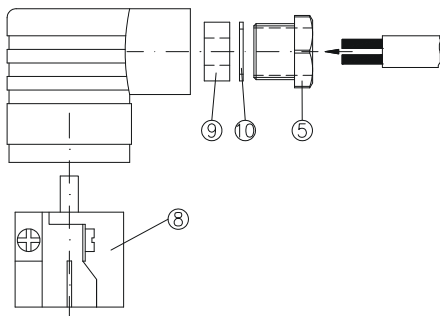


Fig. 5.2.4

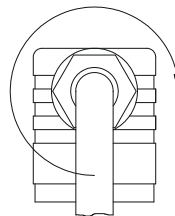


Fig. 5.2.5

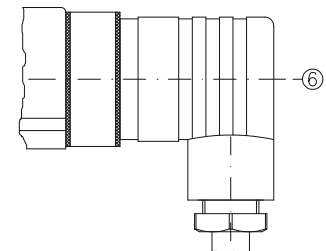


Fig. 5.2.6

- ↪ To guarantee the degree of protection IP 65 according to EN 60529, the connecting cable has to have a sheathing diameter of between 4.5 and 10 mm.
- ↪ Furthermore, ensure that all seals ③, ④ and ⑨ at the plug connector are inserted correctly.

5.3 Connection types

The temperature sensor of the measuring insert is connected to the terminal socket or the transmitter. Connection takes place at the terminal socket or transmitter.



COLOUR CODING:

The terminal sockets are colour coded. If a particular terminal clamp is not colour coded, this is labelled "white" on the connection diagram.

➤ Connect the connecting cable to the terminal socket or transmitter in accordance with the connection diagram on your KombiTemp®.

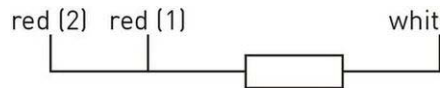
Pt 100 / Pt 1000:

2- wire

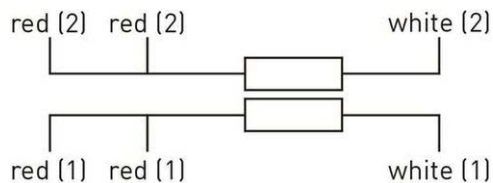


3- wire

- 1x Pt100



- 2x Pt100



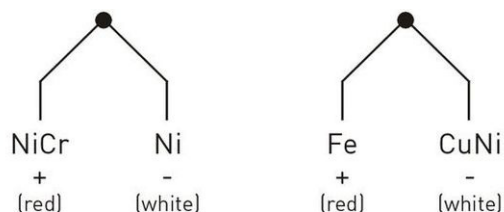
4- wire



Thermocouples:

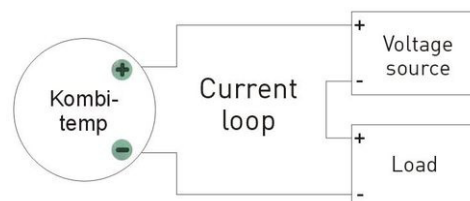
NiCr-Ni (Type K)

Fe-CuNi (Type J)



Transmitter:


The transmitter is wired in a current loop.



5.4 Checking the surface resistance (Explosion-proof version)

Ex After the electrical connection is made, the surface resistance of the KombiTemp® must be checked by a suitably qualified electrician.

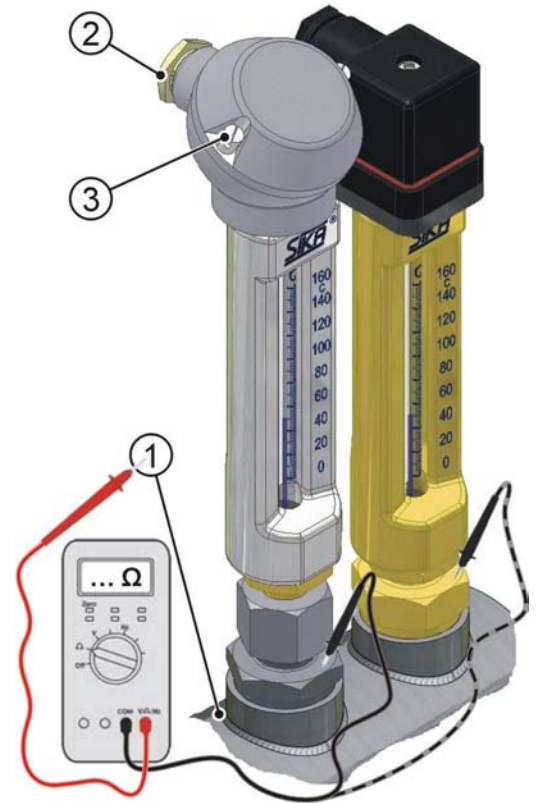
To do this, use a multimeter to measure the resistance between the marked components. The surface resistance between the test points should ideally be 1 Ω .

 According to EN 13463-1:2009, the surface resistance may not exceed $10^9 \Omega$ at $23 \pm 2 \text{ }^\circ\text{C}$ with $50 \pm 5\%$ relative humidity.

↪ Check the resistance between the following test points:

- ① Immersion tube hex flats \Leftrightarrow Pipe or tank
- ② Immersion tube hex flats \Leftrightarrow Cable gland (except K122, K422)
- ③ Immersion tube hex flats \Leftrightarrow Cover screw (except K122, K422)

If the value specified by the standard is exceeded, the installation of the KombiTemp® must be checked for contact problems. Do not put the device into service!



6 Commissioning

After installation, check that

- the KombiTemp® has been installed correctly and that all screw connections are sealed.
- the electrical wiring has been connected properly.

7 Maintenance, cleaning and problems

Maintenance:

The KombiTemp® is maintenance-free. The individual components are in some cases fully potted (transmitter); they thus contain no sub-assemblies which can be repaired or replaced by the user.

In case of a defect, the device must be replaced or returned to the manufacturer for repair

Explosion-proof version maintenance:

Ex Visually inspect the KombiTemp® at regular intervals (3 months) for corrosion (aluminium oxidation).

- ↪ Use a suitable cleaning product (e.g. aluminium cleaner) to remove any oxidation build-up at the measuring points.
- ↪ Check the surface resistance of the KombiTemp® (→ § 5.4).

If the surface resistance is lower than the standard value, the KombiTemp® may continue to be used until the next maintenance event.

Otherwise the installation of the KombiTemp® must be checked for contact problems.

If the standard value is still exceeded, the KombiTemp® must be replaced.

Cleaning:



CAUTION! Material damage!

Water must not be allowed to penetrate the immersion tube. At temperatures of below 0° C the presence of water can lead to damage to the glass insert or the immersion tubes.

↪ Never use a water jet to clean the KombiTemp®! Never immerse it in water!

↪ Clean the KombiTemp® using a dry or damp antistatic cloth.

↪ Never use sharp objects or aggressive cleaning agents to clean the device.

Problems:

The following table details what problems you can solve yourself and how to solve them.

Problem	Possible cause	Remedy
Industrial-thermometer :		
No display fluid	Broken glass insert.	Submit device for repair.
Non-functional display	Broken glass insert.	Submit device for repair.
	Vibration or shock from improper transport.	Consult SIKA.
Measuring insert :		
No output signal	Open-circuit connection.	Check electrical connection.
	Faulty measuring insert.	Submit device for repair.
Temperature deviations Industrial thermometer / Measuring insert.	Improper installation.	Check installation situation.
Transmitter:		
No output signal	Open-circuit connection. Reverse polarity in current loop.	Check electrical connection.
	No supply voltage.	Check supply voltage
	Faulty display device.	Check display
	Cable break in current loop.	Check current loop
	Faulty measuring module. Faulty transmitter.	Submit device for repair.
Output signal < 4 mA	Short-circuit in temperature sensor.	Submit device for repair.
Output signal > 20 mA	Break in temperature sensor.	Submit device for repair.

If you are unable to remedy a particular problem, please send the device for repair with a brief description of the fault, the environmental conditions and the length of time the device was operational before the problem occurred.

8 Disassembly and disposal



CAUTION! Risk of injury!

- Never remove the KombiTemp® from a plant in operation.
- ↳ Make sure that the plant is shut down professionally.

Before disassembly:

Prior to disassembly, ensure that

- the equipment is switched off and is in a safe and de-energised state.
- the equipment is depressurised and has cooled down.

Disassembly:

- ↳ Remove the electrical connectors.
- ↳ Remove the KombiTemp® using suitable tools.

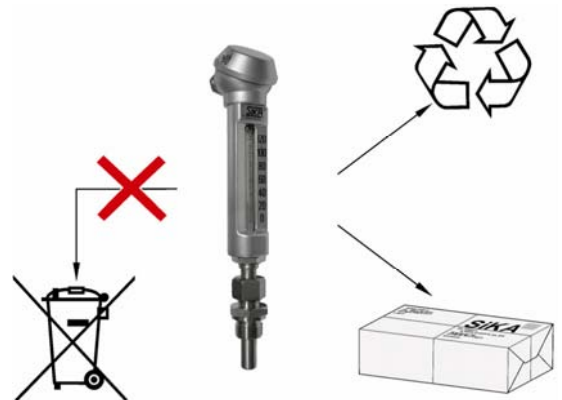
Disposal:



NO HOUSEHOLD WASTE!

The KombiTemp® consists of various different materials. It must not be disposed of with household waste.

- ↳ Take the KombiTemp® to your local recycling plant
- or
- ↳ send the KombiTemp® back to your supplier or to SIKA.



9 Protective tube

If the device is to be used for high-stress applications, then an additional protective tube certified according to DIN 43772:2000 is required.

High-stress situations arise due to the following

- high pressure and / or temperature in the application.
- high medium flow speeds.
- corrosive and / or abrasive medium properties.

If protective tubes are used, it is possible to install and remove industrial thermometers during machine operation. The installation can thus remain pressurised, and it is unnecessary to empty the pipes.

10 Technical data

Information on explosion-proof version:



- Temperature measuring range restricted to 160 °C
The maximum surface temperature of the immersion tube inner wall is therefore at least 50 K below the ignition temperature of petroleum.
- The effective internal inductances and capacitances are negligibly small.
- It withstands a test voltage of 500 V relative to earth (EN 60079-11:2007, § 10.3).

The technical data of customised versions may differ from the data in these instructions. Please observe the informations specified on the type plate.

10.1 Characteristics KombiTemp®

Type	K110	K120	K122	K410	K420	K422
Industrial thermometer characteristics						
Measuring ranges *1)	-60...40 °C *2) / -30...50 °C / 0...60 °C / 0...100 °C 0...120 °C / 0...160 °C / 0...200 °C					
Accuracy	according to DIN 16195					
Housing:						
- Length / width	110 mm / 30 mm			150 mm / 36 mm		
- Material	Hot extruded aluminium part					
- Anodising colour	silver coloured	gold coloured		silver coloured	gold coloured	
Glass insert:						
- Material / scale	Special prismatic glass / scale tick marks fired in black					
- Diameter	~ 6 mm					
- Indicator liquid	blue (-30...200 °C) red (-60...40 °C)					
Measuring insert characteristics						
Temperature sensor						
- Measuring resistor (Class B)	Pt100 / 3-wire ; 2x Pt100 / 3-wire *2) Pt1000 / 2-wire					
- Thermocouple *3) (Class 2)	NiCr-Ni (Type K) Fe-CuNi (Type J)					
Explosion-proof version:						
Measuring resistor						
- maximum current	I _{iPt100} = 20 mA ; I _{iPt1000} = 6 mA					
- maximum voltage	U _i = 30 V _{DC}					
Transmitter characteristics (4...20 mA) *3) *4)						
Loop voltage	10...35 V _{DC} ; reverse polarity protected					
Output current / wiring	4...20 mA / current loop					
Short-circuit signal current	< 4 mA					
Sensor break signal current	> 20 mA					
Explosion-proof version:						
The type 5333B and 5335A transmitter units (PR Electronics A/S) may be connected to an explosion-proof device.						

*1) others measuring ranges on request.

*2) only K410, K420. *3) not K122, K422. *4) not Explosion-proof version.

Type	K110	K120	K122	K410	K420	K422
Process variables						
Electrical connection	K110, K120: Type J connecting head (DIN 43729) K410, K420: Type B connecting head (DIN 43729) K122, K422: Angel connection (DIN EN 175301-803)					
Immersion tube *1):						
- Diameter	12 x 1 mm		10 x 1 mm	12 x 1 mm		10 x 1 mm
- Length	63 mm 100 mm		63 mm 100 mm		63 mm 100 mm	
	135 mm 160 mm	160 mm		135 mm 160 mm	160 mm	
- Material / nominal pressure	brass 2.0321 / PN 16 stainless steel 1.4571 / PN 40					
Medium	Must be cleared for compatibility with immersion tube material, see also 9."Protective tube"					
Medium temperature	see measuring range					
Ambient temperature	0...60°C					
Process connection *1)						
- Clamping ring G 1/2 A	x	-		x	-	-
- Thread G 1/2 A	-	x		-	x	x
- Thread G 3/4 A	-	-		-	x	-
- Thread M20x1,5	-	x		-	x	x
- Thread M27x1,5	-	-		-	x	-

*1) others immersion tube dimensions, materials and threaded connections on request.

10.2 Materials table

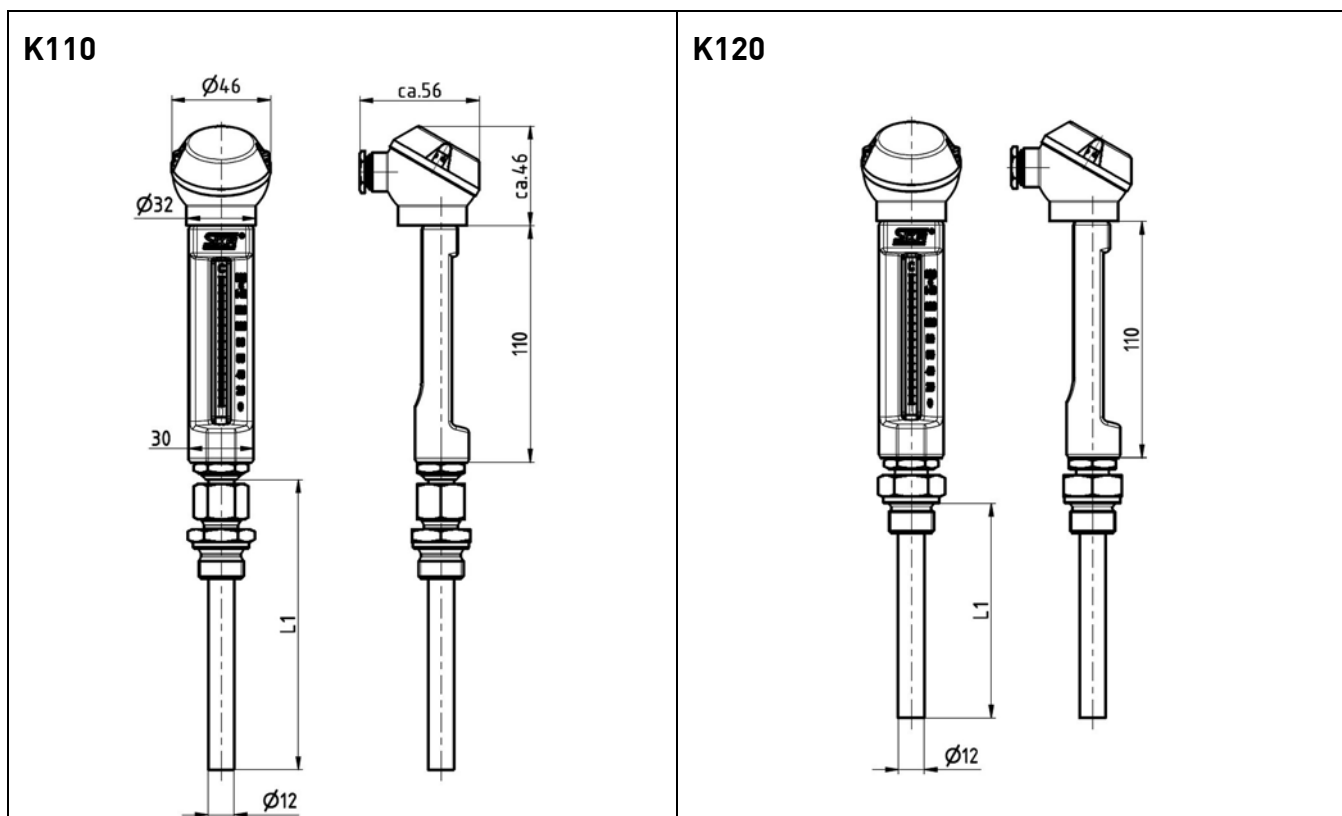
Component	Material	Component-wetted
Head housing	Aluminium die casting	
Cover	Aluminium die casting	
Gasket	NBR	
Cover screw (Tooth lock washer)		
Counter nut	Brass 2.0401	
Industrial thermometer	Aluminium die casting	
Glass insert	Glass	
Immersion tube	Stainless steel 1.4571	X
Compression fitting:		
- Union nut	Stainless steel 1.4571	
- Cutting ring	PTFE	X
- Threaded nipple	Stainless steel 1.4571	X
Cable gland:		
- Union nut	Brass nickel-plated	
- Clamping insert	Polyamide	
- O-ring	CR / NBR	
- Threaded nipple	Brass nickel-plated	

10.3 Tightening torques

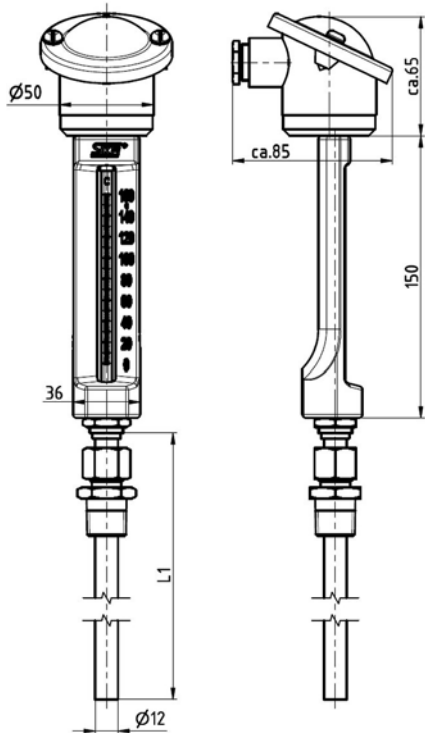
The following tightening torques are recommended for KombiTemp® installation.

Component	Tightening torque
Compression fitting: - Nipple G ½ A - Union nut	55 + 5 Nm
Immersion tube with threaded connection: - Thread G ½ A - Thread G ¾ A - Thread M20x1,5	55 + 5 Nm
Counter nut:	55 + 5 Nm

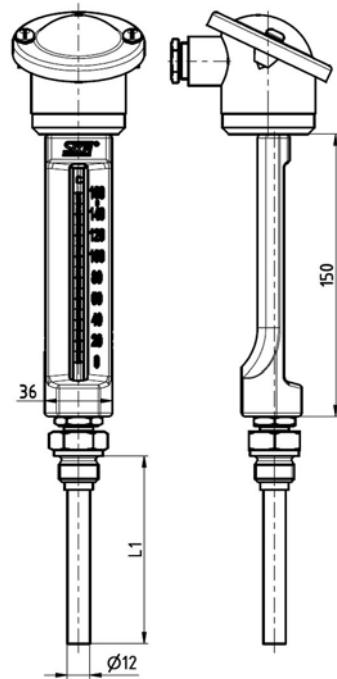
11 Dimension



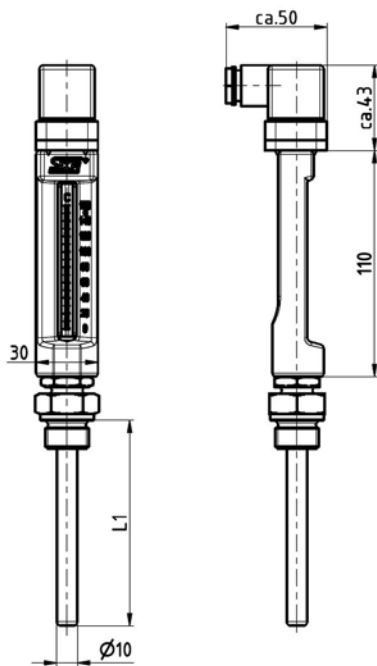
K410



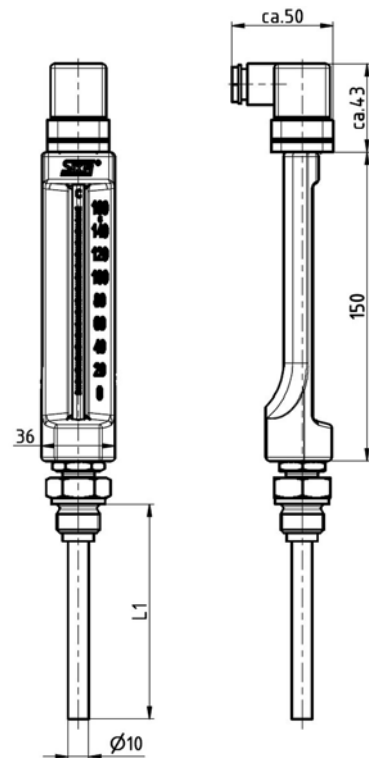
K420



K122



K422





Mechanical measuring instruments




Flow measuring instruments





Electronic measuring- & calibration instruments



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