User manual

Resistance thermometer WTR 190

Version 2.2.1

Content

Resistance thermometer WTR 190

1. General

1.1 Brief description

The WTR 190 is a temperature sensor in a wall-mounted housing. This makes it the right choice for reliably detecting temperatures in rooms or in outdoor areas. Thanks to the robust polyamide housing, the WTR 190 can also be used without any problems in blast freezers, deep-freeze warehouses and in aggressive ambient conditions in industry. Optionally, the WTR 190 is available with KMU 100 or KMUS 100. The KMU100 has a 4..20mA and the KMUS 100 a 0..10V output. The WTR 190 is also available with DMU 50. The DMU has a 4..20mA output and a high resolution OLED display.

1.2 Overview presentation

WTR 190-C1-1A2/PT1000-DMU

OLED display
temperature sensor
wall-mounted housing
M16 cable gland

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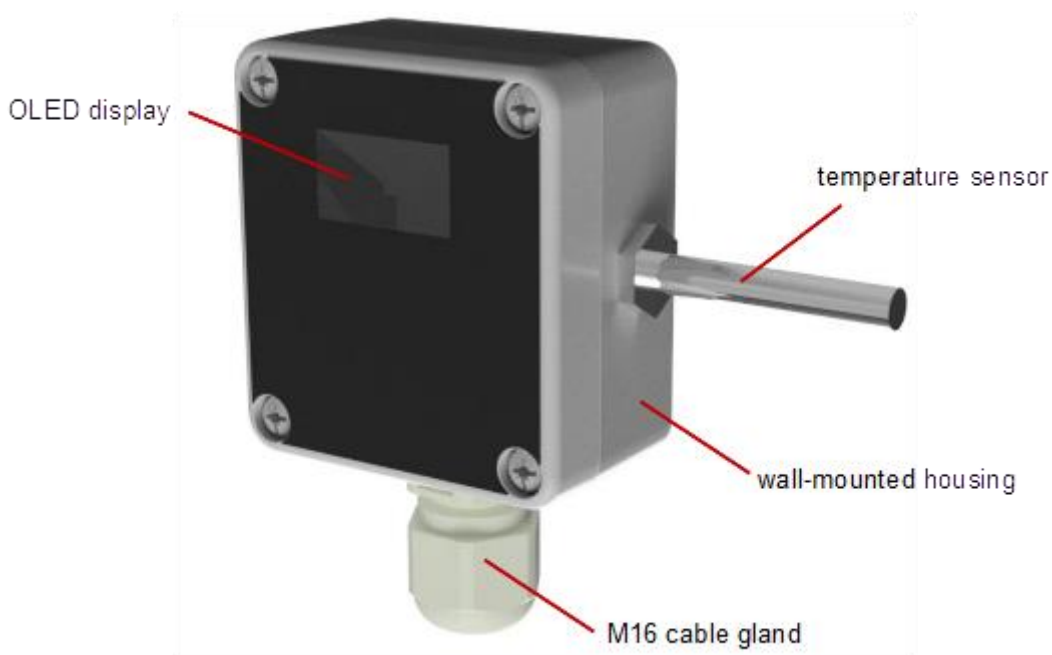
WTR 190-A1-1A3-KMU/ WTR 190-A1-1A3-KMUS
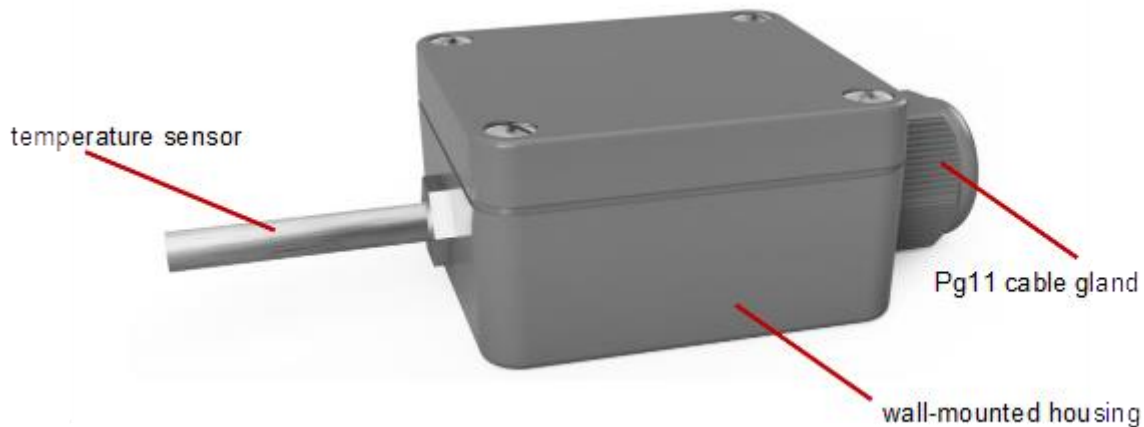
1.3 Drawings, shortcut

Warning!
A non-observance can cause injuries to persons and/or the demolition of the device. There can be a dangerous to life.

Attention!
A non-observance can cause a faulty operation of the device or lead to property damage.

Information!
A non-observance can have influence on the operation of the device or cause unintentional reactions of the device.

Danger!
When not observing the safety instructions, there is a risk of serious or fatal injuries caused by electrical power.

Warning!
Possibly a dangerous situation can occur, which results in burns because of hot surfaces or liquids, if not avoided.

2. Transport, Packaging, Storage

2.1 Transport

Check the instrument for any damage that may have been caused during transportation. If, report them immediately. The temperature during transportation and storage of the meter must be within the range of -10 °C to 50 °C.

2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending back).

2.3 Storage

For longer term storage avoid the following influences:
1. Direct sunlight or proximity to hot objects
2. Mechanical vibration, mechanical shock (putting it hard down)
3. Soot, vapour, dust and corrosive gases

If possible store the device in its original package or an equivalent one

3. Safety instructions

! More important safety instructions can be found in the individual chapters.

3.1 Intended use of the product

The sensor has been designed and built solely for the intended use described here and may only be used accordingly. The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be taken out of service immediately and an inspection by the manufacturer. When the instrument is transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise. The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

3.2 Stuff qualification

⚠ Warnung	Improper handling can result in considerable injury and damage to equipment. The activities described in these operating instructions may only be carried out by skilled stuff who have the qualifications described below. Keep unqualified stuff away from hazardous areas.

For installation and starting of the flow-meter the stuff has to be familiar with the relevant regulations and directives of the country and must have the qualification required. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can independently recognize potential hazards. Depending on the operation conditions of the application they have to have the corresponding knowledge, e.g. of aggressive media.

3.3   Special hazards

⚠ Warnung	For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed. **If you do not observe the appropriate regulation, serious injuries and/or damage can occur!**
⚠ Warnung	A protection from electrostatic discharge (ESD) is required. The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.
⚡ Gefahr	There is a danger of death caused by electric current. Upon contact with life parts, there is a direct danger of death. Electrical instruments may only be installed and connected by skilled electrical personnel. Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening voltages at the instrument.
⚠ Warnung	Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment. Take sufficient precautionary measures. Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the instrument can result in injury. Should a failure occur, aggressive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.

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4. Starting operation

4.1 Connection

WTR 190 passiv
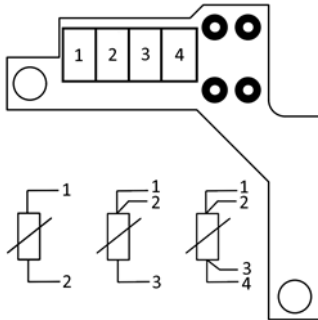
WTR 190 with DMU 50

WTR 190 with KMU 100

WTR 190 with KMUS 100
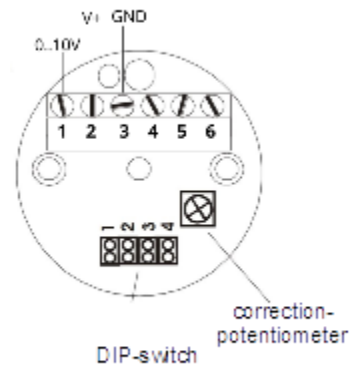
4.2 Mechanical assembly

The WTR 190 is designed as a wall-mounted sensor. Use the holes provided in the housing for mounting. Use suitable screws that do not destroy the housing. Only by this we can assure you an optimal measuring point incl. the protection class.
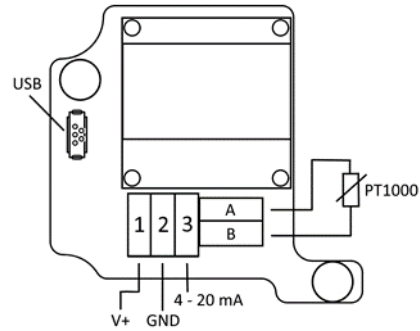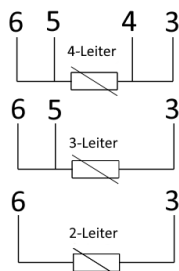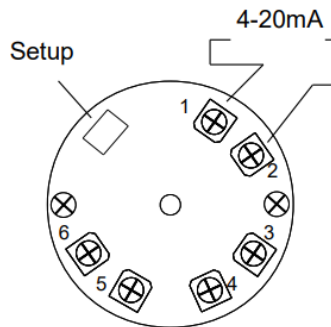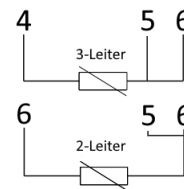After mounting the sensor, check the tightness of the housing and after installing the connection cable, check the tightness of the screw connection (cable entry).

Please read the safety instructions on page 11 before assembly and keep these instructions for future reference.
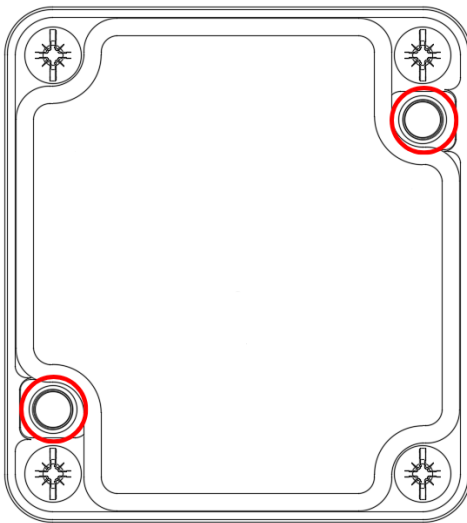
1. Loosen the screws of the device cover and remove the cover.
2. Fasten the device to the wall using suitable screws through the holes provided in the housing.
1. Screw the device cover back on.

Provided holes for mounting

4.3 Electrical assembly

! The electrical installation must be carried out in a de-energized state.

- Insert the connection cable into the cable entry (gland). Make sure not to damage the seal of the cable gland.
- Connect the connecting cables according to your task.
- If a transmitter is used, it can be configured via the respective interfaces.
- Close the housing and switch on the voltage.

5. Putting into operation

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> **!** Before switching on the device, it should be checked whether the sensor has been correctly installed and wired.

5.1 Configuration DMU 50

If the WTR 190 is used with a DMU 50, the settings of the DMU can be read out, graphically displayed and changed via the Windows software "pmtKonfigTool". In the following the configuration of the DMU with the "pmtKonfigTool" software is explained.

5.1.1 Windows Software „pmtKonfigTool"

The current settings of the DMU can be read out and changed via the "pmtKonfigTool" software. The installation file of the application can be downloaded from the website www.promesstec.de

The configuration options include the display orientation, the scaling of the current output and the overflow and underflow behavior of the measuring range. In addition, the status, the measured value and the current value are read out in real time.

5.1.2 pmtKonfigTool - Connection between WTR190-DMU and PC

Loosen the cover of the WTR 190 to access the USB C interface of the DMU. Connect the transmitter to the PC via a commercially available USB C cable. ATTENTION: WTR 190 restarts after connection via USB! Now start the Windows software "pmtKonfigTool".
To access the display, the first thing to do is to select the correct COM port. All COM ports are listed in the "Port" drop-down list. The button   updates the drop-down list. As soon as a connection could be established successfully, the status changes to "Connected" and the name of the connected device is displayed.

5.1.3 pmtKonfigTool – read

As soon as a connection with the DMU has been established, the settings are read out and displayed in the software. The status, the temperature and the current value are continuously updated. In addition, it is possible to press the "Read out" button to read out and display all settings again.

5.1.4 pmtKonfigTool – write

To change the settings of the DMU, the desired values must be entered in the Windows software and the corresponding options selected. However, the settings are not applied until the "Write" button has been pressed. If the write operation cannot be performed successfully, the old settings of the DMU are displayed again.

5.1.5 pmtKonfigTool - Factory settings

By pressing the "Factory settings" button, all parameters and settings are reset to the delivery state.

Factory settings:	Display:	0°
	Fault current:	activates
	MeasuringRangeMin.:	-30,0 °C
	MeasuringRangeMax.:	+70,0°C

5.1.6 Status

In total, the DMU can assume four different statuses, which provide information about the current loop and the measurement of the current.
Ok: The DMU works flawlessly.
Cable break: There is a cable break in the connected PT 1000.
Underflow: The measured temperature is smaller than the smallest value which can be can be transmitted with the 4..20mA interface.

Overflow:	The measured temperature is greater than the largest value that can be transmitted with the can be transmitted with the 4..20mA interface.
Error evaluation:	There is an error in the evaluation of the PT 1000.

5.1.7 Temperature

Under the "Temperature" tab, the currently measured temperature is displayed in real time.

5.1.8 Display

Under Alignment, the orientation of the display can be rotated by 180°. Thus, the WTR 190-DMU can also be mounted overhead (cable outlet upwards).

5.1.9 Fault current

Through the check box "Underflow/Overflow", which can be found under "Fault current", the overflow and underflow function can be activated or deactivated. If the function is activated, the DMU will output a current of 20.5mA if the measured temperature exceeds the maximum temperature of the 4..20mA loop and 3.5mA if the measured temperature falls below the minimum temperature of the 4..20mA loop. If the function is disabled, a current of 20mA and 4mA will flow in case of exceeding and falling below. Regardless of the overflow and underflow function, a current of 21mA always flows if there is a cable break in the temperature sensor (PT 1000).

5.1.10 4..20mA Current output

Under the tab "4..20mA current output" on the one hand the current of the current loop is displayed in real time and on the other hand the scaling of the loop is configured. For this purpose, the minimum temperature value for 4mA and the maximum temperature value for 20mA must be specified.

5.2 Configuration KMU 100

If the WTR 190 is used with a KMU 100, the settings of the KMU can be read out and changed via the Windows software "PXU01". The parameterization software kit PXU01 is required for this. This contains the Windows software "PXU01" on CD, an interface converter (USB adapter) and a plug adapter for the KMU. The configuration of the KMU with the "PXU01" software is explained below.

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5.2.1 Windows Software „PXU01"

The current settings of the KMU can be read out and changed via the "PXU01" software. The installation file of the application is provided via a CD or optionally via a download link. To obtain the link, contact promesstec GmbH.
The configuration options include scaling of the current output. In addition, the measured value is read out in real time.

5.2.2 „PXU01" - Connection between WTR 190-KMU and PC

Loosen the cover of the WTR 190 to access the programming interface of the KMU. Connect the KMU to the PC via the plug adapter included in the PXU01 parameterization software kit and the interface converter.

To access the device, a connection must first be established in the application. The settings of the KMU can then be read out and changed.

5.3 Configuration KMUS 100

The KMUS 100 is configured via a potentiometer and four DIP-switches. Configuration on the PC is not necessary.
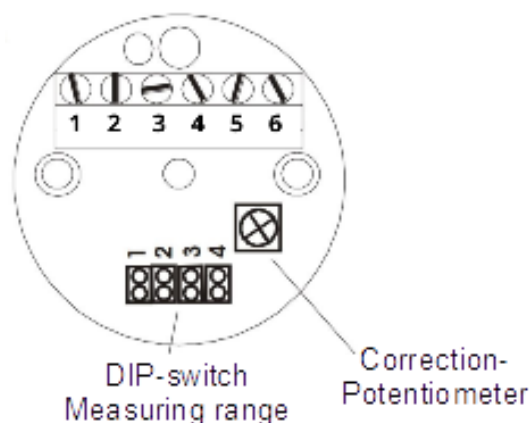
5.3.1 Measuring range selection by DIP-switch

Four DIP-switches can be used to set 12 different measuring ranges. These are listed in the table below.

The query for the measuring range is permanent. Thus, the voltage supply does not have to be interrupted after a change of the measuring range. The recognition of the sensor (Pt 100/Pt 1000) is also done automatically during operation.

Attention: For Pt 1000 only the ranges 1..5 are available.

No.	measuring range	Dip-swi. 1 2 3 4
MB1:	- 20°C .. +150°C	1-1-1-1
MB2:	0°C .. + 50°C	0-1-1-1
MB3:	0°C .. +100°C	1-0-1-1
MB4:	0°C .. +200°C	0-0-1-1
MB5:	0°C .. +300°C	1-1-0-1
MB6:	0°C .. +400°C	0-1-0-1
MB7:	0°C .. +500°C	1-0-0-1
MB8:	0°C .. +600°C	0-0-0-1
MB9:	- 50°C .. + 50°C	1-1-1-0
MB10:	-100°C .. +100°C	0-1-1-0
MB11:	- 30°C .. + 70°C	1-0-1-0
MB12:	- 40°C .. + 60°C	0-0-1-0

Jumper = 1: plugged
Jumper = 0: not plugged

5.3.2 Fine adjustment by correction potentiometer

As can be seen in the picture above, the correction potentiometer is located on the top of the KMUS. This can be used for fine adjustment of the output voltage. A seal secures the potentiometer against accidental adjustment.

6. Technical specifications

material protective fitting: stainless steel 1.4571 (V4A)
length of sensor: 45 mm other lengths on request
connecting box: plastic polyamide
dimensions: 58 x 64 x 34 mm
protection class: IP 65 according to DIN 60529
operating temperature: -50 °C bis +130 °C
    (deviation when using a transmitter)

6.1 Technical data DMU 50

operating temperature:	-30 °C bis +70 °C
operating voltage:	UB = 10..35 V DC
electricity demand:	7,3 mA (UB=24V) + 4..20mA output
input:	PT1000 2-wire
measuring range max.:	-100°C bis +650°C
measuring span min.:	10K
accuracy:	<+-0,1% from final value
output:	4..20mA 3-wire active (underflow 3,5mA,overflow 20,5mA)
sensor break:	21mA
standard configuration:	4mA = -50°C, 20mA = 70°C (more temperature range parameterizable)
max. permissible load:	Rmax=[(UB – 6V) / 0,021 A] Ω
display:	high-resolution OLED display 0,96 Zoll
alignment display:	0° oder 180°
display-digits:	4-digits
displayrange:	-99,9 bis +999,9°C
electrical connection:	5x terminal connection 1,5 mm²
configuration:	commercial USB Typ C cable (no programming adapter necessary) windows application for configuration („pmtKonfig-Tool")

6.2 Technical data KMU 100

|	
operating temperature:	-40 °C bis +85 °C
operating voltage:	UB = 10..35 V DC
electricity demand:	4..20mA output
input:	PT100 2-, 3-, 4- wire
measuring range max.:	-200°C bis +650°C
Measuring span min.:	10K
accuracy:	<+-0,1% from final value
output:	4..20mA 2-wire passive (underflow 3,5mA, overflow 21mA)
sensor break:	22mA
standard configuration:	4mA = -50°C, 20mA = 150°C (more temperature range parameterizable)
electrical connection:	6x screw terminal 1,5mm²
configuration:	programming adapter PXU01 windows application for configuration („PXU01")

6.3 Technical data KMUS 100

|	
operating temperature:	-40 °C bis +85 °C

operating voltage:	UB = 15..35 V DC
electricity demand:	max. 10mA
input:	PT100/PT1000 2-, 3-, 4-wire
measuring range:	12 measuring ranges, see page 3
accuracy:	<+-0,3% from measuring range
output:	0..10V 3-wire
sensor break:	>10V
standard configuration:	0V = -20°C, 10V = 150°C
electrical connection:	6x screw terminal 1,5mm²
configuration:	DIP-switch (12 different measuring ranges)

6.4 Technical drawing

WTR 190 mit DMU 50
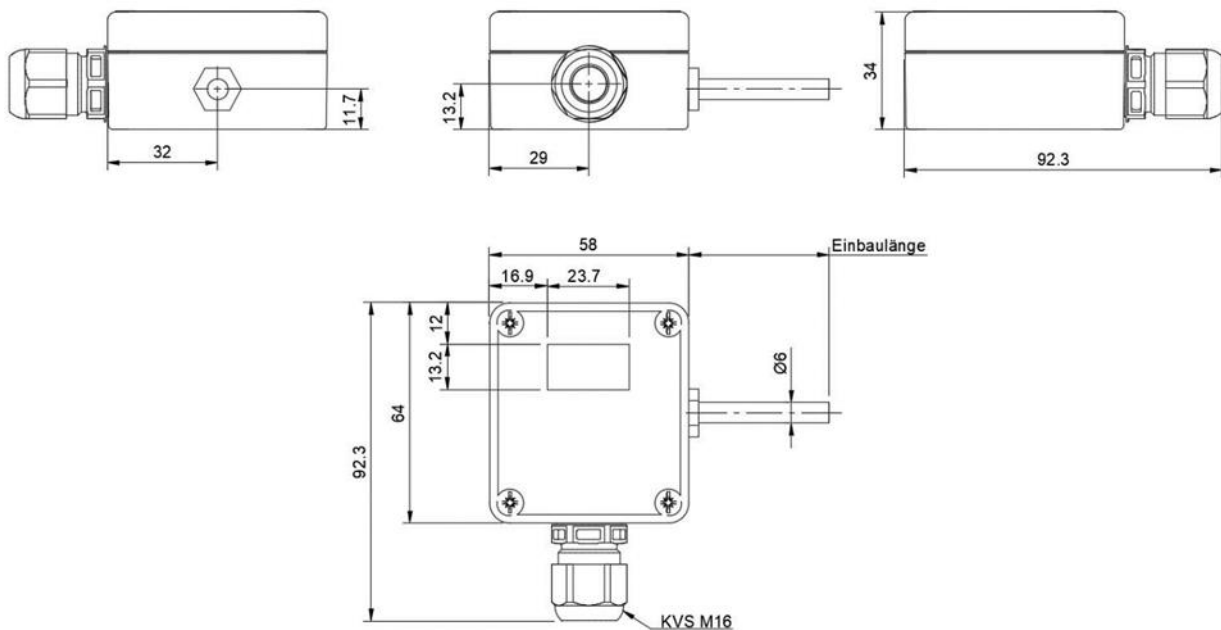
WTR 190 passiv/ WTR 190 with KMU 100 / WTR 190 with KMUS 100
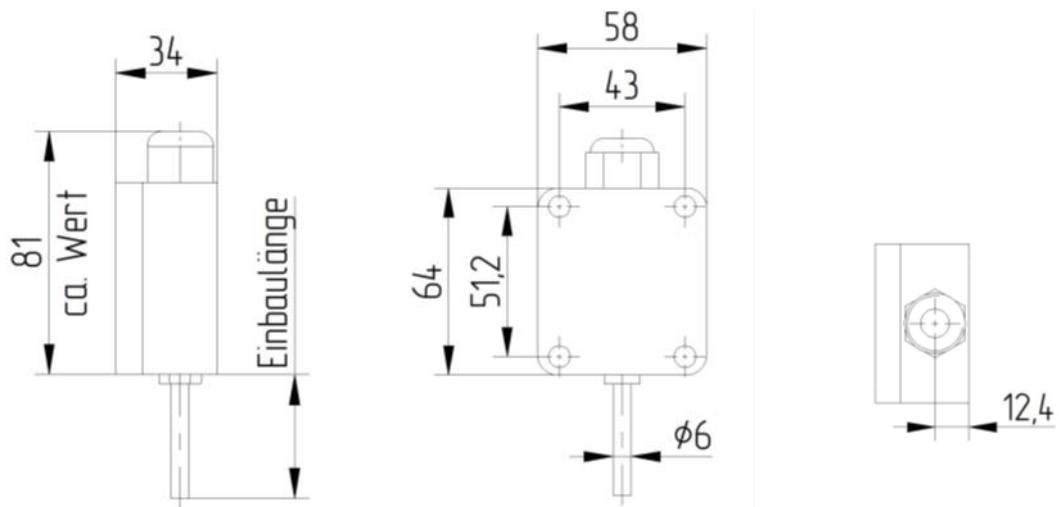
7. Dismounting, Return, Cleaning, Disposal

7.1 Dismounting

Residual media in dismounted instruments can result in a risk of personnel, the environment and equipment. Take sufficient precautionary measures.

There is a risk of burns. Let the instrument cool down sufficiently before dismounting. During dismounting there is a risk of dangerously hot pressure media escaping.
Only disconnect the resistance thermometer once the system has been depressurised.

7.2 Return

When returning the instrument, use the original packaging or a suitable package.
To avoid a damage, use for example antistatic plastic film, shock-absorbent material, a marking as highly sensitive measuring instrument.

7.3 Cleaning

Before cleaning the instrument disconnect the electrical connection. Clean the instrument with a moist cloth. Electrical connections must not come into contact with moisture. Wash or clean the dismounted instrument before returning it in order to protect personnel and the environment from exposure to residual media.
Residual media in dismounted instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

7.4 Disposal

Dispose instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the sensor is supplied.