THE POWER BEHIND POWER.

Operating instructions MESSKO® combi well

8122419/01 EN

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1 Introduction

This technical file contains detailed descriptions on the safe and proper installation, connection, commissioning and monitoring of the product.

This technical document is intended solely for specially trained and authorized personnel.

1.1 Manufacturer

Maschinenfabrik Reinhausen GmbH
Falkensteinstrasse 8
93059 Regensburg
Germany

Tel.: +49 941 4090-0
E-mail: sales@reinhausen.com
Internet: www.reinhausen.com
MR Reinhausen customer portal: https://portal.reinhausen.com

Further information on the product and copies of this technical file are available from this address if required.

1.2 Safekeeping

Keep this technical file and all supporting documents ready at hand and accessible for future use at all times.

1.3 Notation conventions

This section contains an overview of the symbols and textual emphasis used.

1.3.1 Hazard communication system

Warnings in this technical file are displayed as follows.

1.3.1.1 Warning relating to section

Warnings relating to sections refer to entire chapters or sections, sub-sections or several paragraphs within this technical document. Warnings relating to sections have the following format:

⚠ WARNING

Type of danger!
Source of the danger and its consequences.

- Action
- Action

1.3.1.2 Embedded warning information

Embedded warnings refer to a particular part within a section. These warnings apply to smaller units of information than the warnings relating to sections. Embedded warnings use the following format:

⚠ DANGER! Instruction for avoiding a dangerous situation.

1.3.1.3 Signal words

Depending on the product, the following signal words are used:

Signal word	Meaning
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates measures to be taken to prevent damage to property.

Table 1: Signal words in warning notices

1.3.2 Information system

Information is designed to simplify and improve understanding of particular procedures. In this technical file it is laid out as follows:

Important information.

1.3.3 Instruction system

This technical file contains single-step and multi-step instructions.

Single-step instructions

Instructions which consist of only a single process step are structured as follows:

Aim of action
✓ Requirements (optional).
1. Step 1 of 1.
   » Result of step (optional).
» Result of action (optional).

Multi-step instructions

Instructions which consist of several process steps are structured as follows:

Aim of action
✓ Requirements (optional).
1. Step 1.
   » Result of step (optional).
2. Step 2.
   » Result of step (optional).
» Result of action (optional).

1.3.4 Typographic conventions

Typographic convention	Purpose	Example
UPPERCASE	Operating controls, switches	ON/OFF
[Brackets]	PC keyboard	[Ctrl] + [Alt]
Bold	Software operating controls	Press **Continue** button
...>...>...	Menu paths	Parameter > Control parameter

Typographic convention	Purpose	Example
Italics	System messages, error messages, signals	*Function monitoring* alarm triggered
[► Number of pages]	Cross reference	[► Page 41].
Dotted underscore	Glossary entry, abbreviations, definitions, etc.	Glossary entry

Table 2: Typographic conventions used in this technical file

2 Security

- Read this technical file through carefully to familiarize yourself with the product.
- This technical file is a part of the product.
- Read and observe the safety instructions provided in this chapter in particular.
- Observe the warnings in this technical file to avoid function-related dangers.
- The product is manufactured based on state-of-the-art technology. Nevertheless, danger to life and limb for the user or impairment of the product and other material assets may arise in the event of improper use.

2.1 Appropriate use

The combi well is used for the remote transmission of a measured temperature value and is used in combination with a pointer thermometer or an evaluation instrument.

The product is designed solely for use in stationary large-scale systems.

If used as intended and in compliance with the requirements and conditions specified in this technical file as well as the warning notices in this technical file and attached to the product, then the product does not present any danger to people, property or the environment. This applies throughout the service life of the product, from delivery, installation and operation to removal and disposal.

The following is considered intended use:
- Only use the product for transformers.
- Operate the product in accordance with this technical documentation, the agreed-upon delivery conditions and the technical data.
- Ensure that all necessary work is performed by qualified personnel only.
- Use the equipment and special tools supplied solely for the intended purpose and in accordance with the specifications of this technical file.

2.2 Fundamental safety instructions

To prevent accidents, malfunctions and damage as well as unacceptable adverse effects on the environment, those responsible for transport, installation, operation, maintenance and disposal of the product or parts of the product must ensure the following:

Personal protective equipment

Loosely worn or unsuitable clothing increases the danger of becoming trapped or caught up in rotating parts and the danger of getting caught on protruding parts. This results in danger to life and limb.

- All necessary devices and personal protective equipment required for the specific task, such as a hard hat, safety footwear, etc. must be worn. Observe the "Personal protective equipment" [▶Section 2.4, Page 13] section.
- Never wear damaged personal protective equipment.
- Never wear rings, necklaces or other jewelry.
- If you have long hair, wear a hairnet.

Work area

Untidy and poorly lit work areas can lead to accidents.

- Keep the work area clean and tidy.
- Make sure that the work area is well lit.
- Observe the applicable laws for accident prevention in the relevant country.

Explosion protection

Highly flammable or explosive gases, vapors and dusts can cause serious explosions and fire.

- Do not install or operate the product in areas where a risk of explosion is present.

Safety markings

Warning signs and safety information plates are safety markings on the product. They are an important aspect of the safety concept. Safety markings are depicted and described in the chapter "Product description".

- Observe all safety markings on the product.
- Make sure all safety markings on the product remain intact and legible.
- Replace safety markings that are damaged or missing.

Ambient conditions

To ensure reliable and safe operation, the product must only be operated under the ambient conditions specified in the technical data.

- Observe the specified operating conditions and requirements for the installation location.

Modifications and conversions

Unauthorized or inappropriate changes to the product may lead to personal injury, material damage and operational faults.

- Only modify the product after consultation with Maschinenfabrik Reinhausen GmbH.

Spare parts

Spare parts not approved by Maschinenfabrik Reinhausen GmbH may lead to physical injury, damage to the product and malfunctions.

- Only use spare parts that have been approved by Maschinenfabrik Reinhausen GmbH.
- Contact Maschinenfabrik Reinhausen GmbH.

Working during operation

You must only operate the product when it is in a sound operational condition. Otherwise it poses a danger to life and limb.

- Regularly check the operational reliability of safety equipment.
- Perform the inspection tasks described in this technical document regularly.

2.3 Personnel qualification

The person responsible for assembly, commissioning, operation and inspection must ensure that personnel are sufficiently qualified.

Electrically skilled person

The electrically skilled person has a technical qualification and therefore has the required knowledge and experience, and is also conversant with the applicable standards and regulations. The electrically skilled person is also proficient in the following:

- Can identify potential dangers independently and is able to avoid them.
- Is able to perform work on electrical systems.
- Is specially trained for the working environment in which (s)he works.
- Must satisfy the requirements of the applicable statutory regulations for accident prevention.

Electrically trained persons

An electrically trained person receives instruction and guidance from an electrically skilled person in relation to the tasks undertaken and the potential dangers in the event of inappropriate handling as well as the protective devices and safety measures. The electrically trained person works exclusively under the guidance and supervision of an electrically skilled person.

Operator

The operator uses and operates the product in line with this technical file. The operating company provides the operator with instruction and training on the specific tasks and the associated dangers arising from improper handling.

Technical Service

We strongly recommend having repairs and retrofitting carried out by our Technical Service department. This ensures that all work is performed correctly. If repair work is not carried out by our Technical Service department, please ensure that the personnel who carry out the repairs are trained and authorized to do so by Maschinenfabrik Reinhausen GmbH.

Maschinenfabrik Reinhausen GmbH
Technical Service
P.O. Box 12 03 60
93025 Regensburg
Germany

Phone: +49 941 4090-0

E-mail: service@reinhausen.com
Internet: www.reinhausen.com

2.4 Personal protective equipment

Personal protective equipment must be worn during work to minimize risks to health.

- Always wear the personal protective equipment required for the job at hand.
- Never wear damaged personal protective equipment.
- Observe information about personal protective equipment provided in the work area.

Protective clothing	Close-fitting work clothing with a low tearing strength, with tight sleeves and with no protruding parts. It mainly serves to protect the wearer against being caught by moving machine parts.
Safety shoes	To protect against falling heavy objects and slipping on slippery surfaces.
Safety glasses	To protect the eyes from flying parts and splashing liquids.
Visor	To protect the face from flying parts and splashing liquids or other dangerous substances.

Hard hat	To protect against falling and flying parts and materials.
Hearing protection	To protect against hearing damage.
Protective gloves	To protect against mechanical, thermal and electrical hazards.

Table 3: Personal protective equipment

3 Product description

This chapter contains an overview of the design and function of the product.

3.1 Function description and design

The combi well is a mounting well with additional measurement resistor for oil pointer thermometers and is used for the remote transmission of measured temperature values. Depending on the device type, the electrical temperature measurement can be transmitted remotely as follows:

- Combi well (standard): Connection via the integrated Pt100 measurement resistor
- Combi TT: Connection via an analog 4...20 mA output

The terminal connections for the evaluation devices as well as a cable gland for the immersion pipe for the temperature sensor of the pointer thermometer are located in the connection head. The combi well can be combined with various pointer thermometers and evaluation instruments. Read the operating instructions for these.

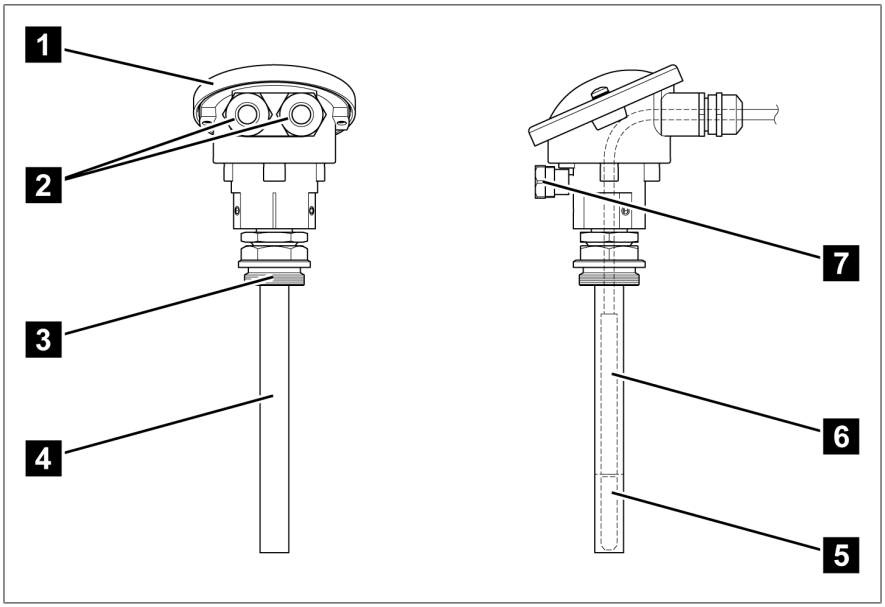


Figure 1: Combi well

1	Connection head	2	Cable gland
3	Double screw connection G1	4	Immersion pipe
5	Integrated Pt100 resistor	6	Temperature sensor
7	Pressure equalization element		

3.2 Nameplate

The nameplate is on the rear of the device.

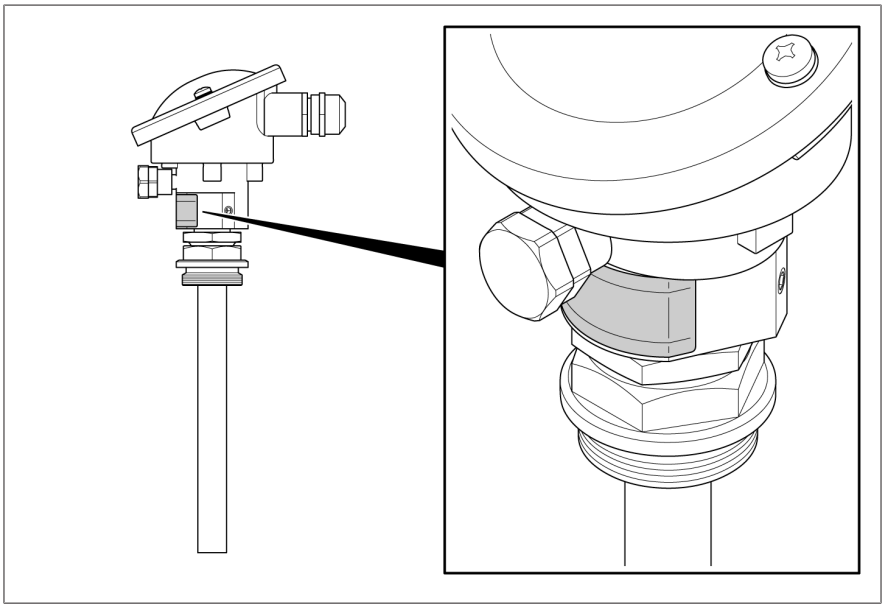


Figure 2: Nameplate

4 Packaging, transport and storage

4.1 Purpose

The packaging is designed to protect the packaged product during transport, loading, unloading and during periods of storage in such a way that no detrimental changes occur. The packaging must protect the goods against permitted transport stresses such as vibration, knocks and moisture (rain, snow, condensation).

The packaging also prevents the packaged goods from moving impermissibly within the packaging.

4.2 Suitability, structure and production

The goods are packaged in a sturdy cardboard box or solid wooden crate. These ensure that the shipment is secure when in the intended transportation position and that none of its parts touch the loading surface of the means of transport or touch the ground after unloading.

Inlays inside the box or crate stabilize the goods, preventing impermissible changes of position and protecting them from vibration.

4.3 Markings

The packaging bears a signature with instructions for safe transport and correct storage. The following symbols apply to the shipment of non-hazardous goods. Adherence to these symbols is mandatory.

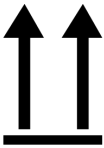
 Protect against moisture	 Top	 Fragile	 Attach lifting gear here	 Center of mass

Table 4: Shipping pictograms

4.4 Transportation, receipt and handling of shipments

In addition to vibrations, jolts must also be expected during transportation. To prevent possible damage, avoid dropping, tipping, knocking over and colliding with the product.

If the packaging tips over or falls, damage is to be expected regardless of the weight.

Every delivered shipment must be checked for the following by the recipient before acceptance (acknowledgment of receipt):
- Completeness based on the delivery slip
- External damage of any type.

The checks must take place after unloading when the cartons or transport container can be accessed from all sides.

Visible damage

If external transport damage is found upon receipt of the shipment, proceed as follows:

- Immediately record the transport damage found in the shipping documents and have this countersigned by the carrier.
- In the event of severe damage, total loss or high damage costs, immediately notify the sales department at Maschinenfabrik Reinhausen GmbH and the relevant insurance company.
- After identifying damage, do not modify the condition of the shipment further and retain the packaging material until an inspection decision has been made by the transport company or the insurance company.
- Record the details of the damage immediately on site together with the carrier involved. This is essential for any claim for damages.
- If possible, photograph damage to packaging and packaged goods. This also applies to signs of corrosion on the packaged goods due to moisture inside the packaging (rain, snow, condensation).
- Be absolutely sure to also check the sealed packaging.

Hidden damage

When damage is not determined until unpacking after receipt of the shipment (hidden damage), proceed as follows:

- Make the party responsible for the damage liable as soon as possible by telephone and in writing, and prepare a damage report.
- Observe the time periods applicable to such actions in the respective country. Inquire about these in good time.

With hidden damage, it is very hard to make the transportation company (or other responsible party) liable. Any insurance claims for such damage can only be successful if relevant provisions are expressly included in the insurance terms and conditions.

4.5 Storage of shipments

When selecting and setting up the storage location, ensure the following:
- Store the product and accessories in the original packaging until installation.
- Protect stored goods against moisture (rain, flooding, water from melting snow and ice), dirt, pests such as rats, mice, termites etc. and against unauthorized access.
- Store crates and boxes on pallets, timber beams or planks as protection against ground moisture and for improved ventilation.
- Ensure that the foundation has sufficient load-bearing capacity.
- Keep entrance paths clear.
- Check the stored goods at regular intervals. Also take appropriate action after storms, heavy rain or snow etc.

5 Mounting

5.1 Electromagnetic compatibility

The device has been developed in accordance with the applicable EMC standards. The following points must be noted in order to maintain the EMC standards.

5.1.1 Wiring requirement of installation site

Note the following when selecting the installation site:

- The system's overvoltage protection must be effective.
- The system's ground connection must comply with all technical regulations.
- Separate system parts must be joined by a potential equalization.

5.1.2 Wiring requirement of operating site

Note the following when wiring the operating site:

- Do not route lines which cause interference (e.g. supply lines) and lines susceptible to interference (e.g. signal lines) in the same cable duct.
- Maintain a distance of more than 100 mm (3.94") between lines which cause interference and those which are susceptible to interference.

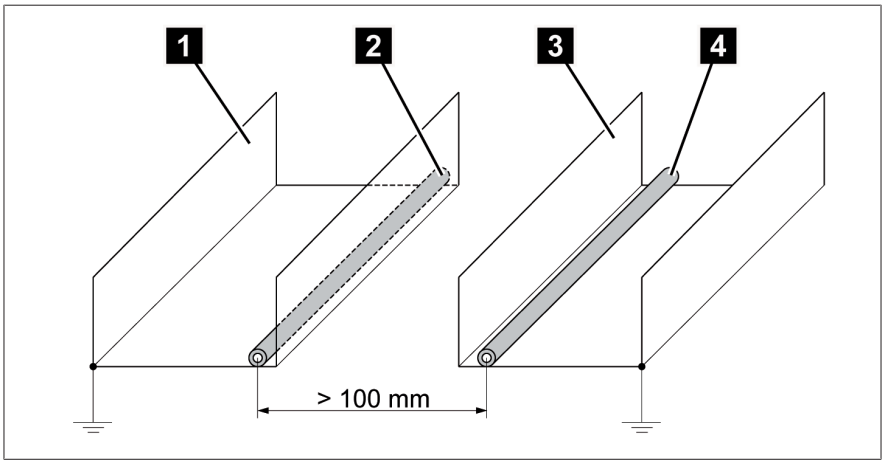


Figure 3: Recommended wiring

1	Cable duct for lines causing interference	3	Cable duct for lines susceptible to interference
2	Line causing interference (e.g. power line)	4	Line susceptible to interference (e.g. signal line)

- Never connect the device with a multi-wire collective pipe.
- Use a shielded cable for transmitting the output signal.

5.2 Cable recommendation

Please note the following recommendations from Maschinenfabrik Reinhausen GmbH when wiring the device:

- Excessive line capacitance can prevent the relay contacts from interrupting the contact current. In control circuits operated with alternating current, take into account the effect of the line capacitance of long control cables on the function of the relay contacts.
- The cables used must be flame-resistant in accordance with IEC 60332-1-2 or UL 2556 VW-1.
- If both low voltage and extra-low voltage are connected in the device, it must be ensured that the circuits for extra-low voltage and for low voltage in the connection area and in the cable are separated from each other with double insulation.

External diameter	6...13 mm
Cable type	Shielded
Conductor cross-section	0.75...4 mm^2
Conductor material	Copper

Table 5: Cable recommendation

5.3 Mounting and connecting the combi well

⚠ DANGER

Electric shock!
Danger of death due to electrical voltage when assembling/disassembling the device.

- Switch off transformer on high-voltage side and low-voltage side.
- Lock transformer to prevent unintentional restart.
- Make sure that everything is de-energized.
- Visibly connect all transformer terminals to ground (grounding leads, grounding disconnectors) and short circuit them.
- Cover or cordon off adjacent energized parts.

✓ Use a suitable thermometer pocket in accordance with IEC 60076-22-7 (corresponds to DIN EN 50216-4).

1. Fill 2/3 of the thermometer pocket with oil.
2. Unscrew the double screw connection G1 and screw into the thermometer pocket.

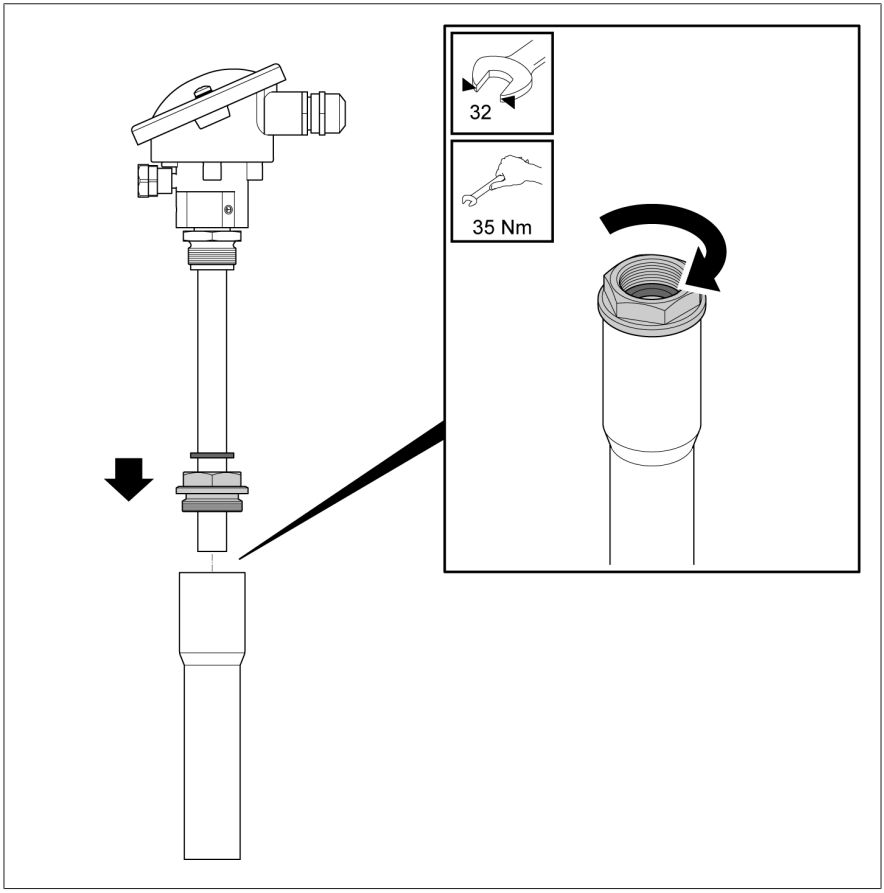


Figure 4: Double screw connection G1 and thermometer pocket

3. *NOTICE!* Damage to the device! Ensure that the counter nut is free before aligning or turning the combi well. Insert the combi well into the thermometer pocket, align it and screw tight with the counter nut.

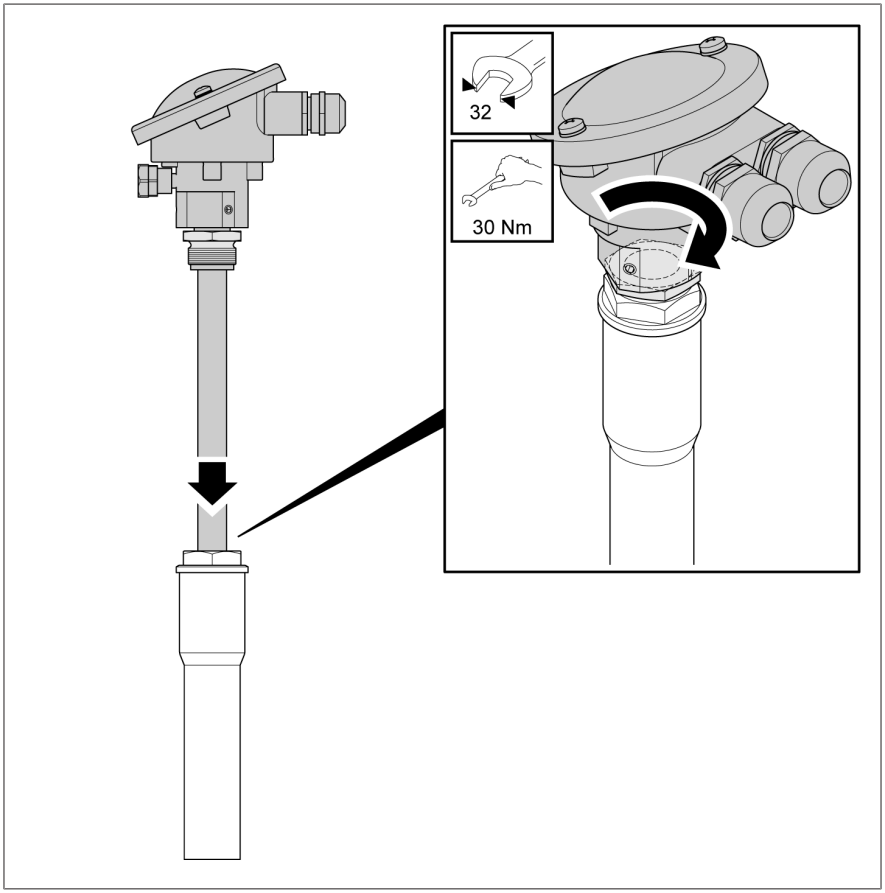


Figure 5: Inserting the combi well into the thermometer pocket

4. Unscrew the cover of the connection head.

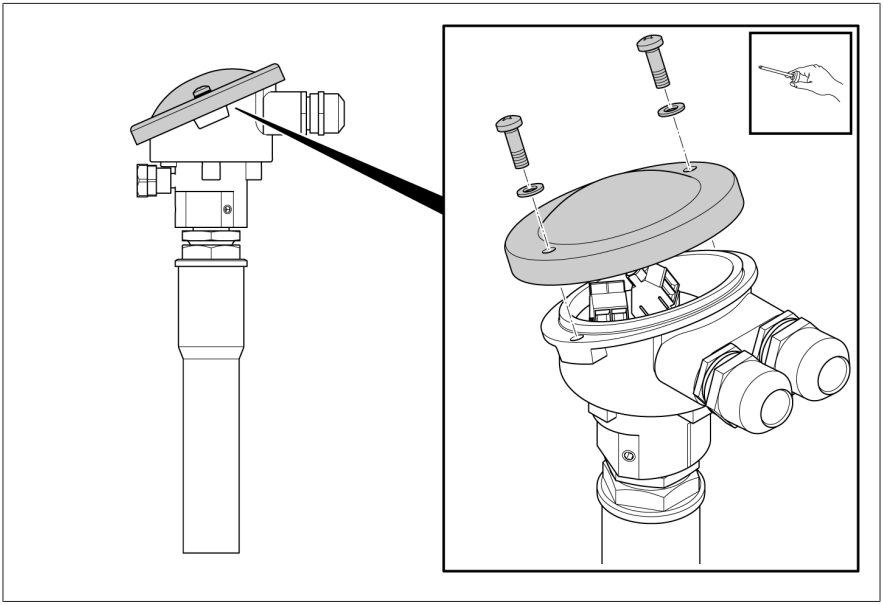


Figure 6: Unscrewing the cover

5. Unscrew and open the cable gland for the temperature sensor on the combi well.
6. *NOTICE!* Damage to the capillary line! The shield contact on the cable gland can make it difficult to withdraw the capillary line or damage the capillary line when it is withdrawn. Remove the shield contact from the cable gland for the temperature sensor.
7. Feed in the pointer thermometer temperature sensor and feed approximately 50 cm (19.69 in) through.

8. Push the temperature sensor up to the stop in the combi well (approx. 210 mm/8.27 in deep).

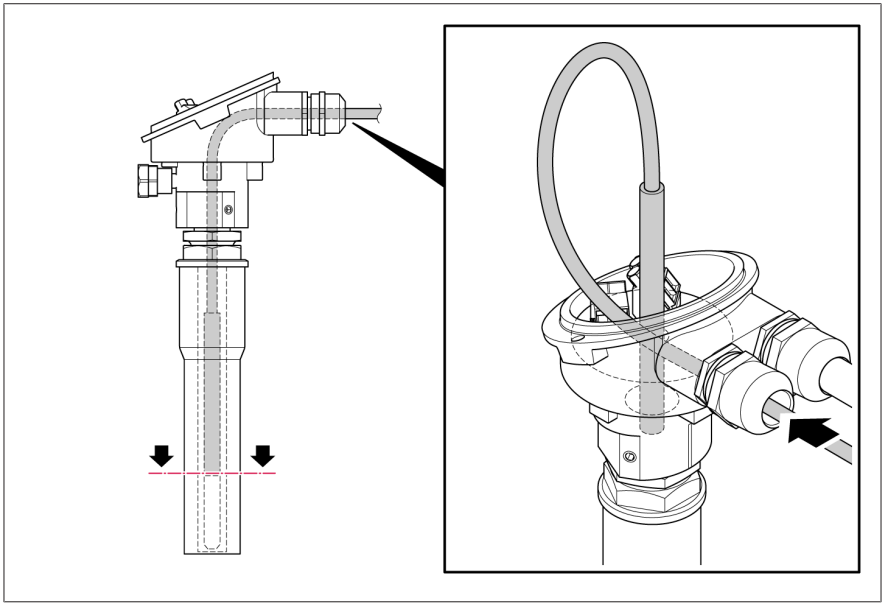


Figure 7: Inserting the temperature sensor

9. Pull back the capillary line and tighten the cable gland on the combi well with 8 Nm. Tighten the pressure nut on the cable gland with 8 Nm.

10. Prepare the cable in accordance with the figure. Strip 6...10 mm from the end of each wire and, if using stranded wires, crimp a ferrule on. Remove approx. 5 mm of the braided shield for contacting the cable shield with the cable gland.

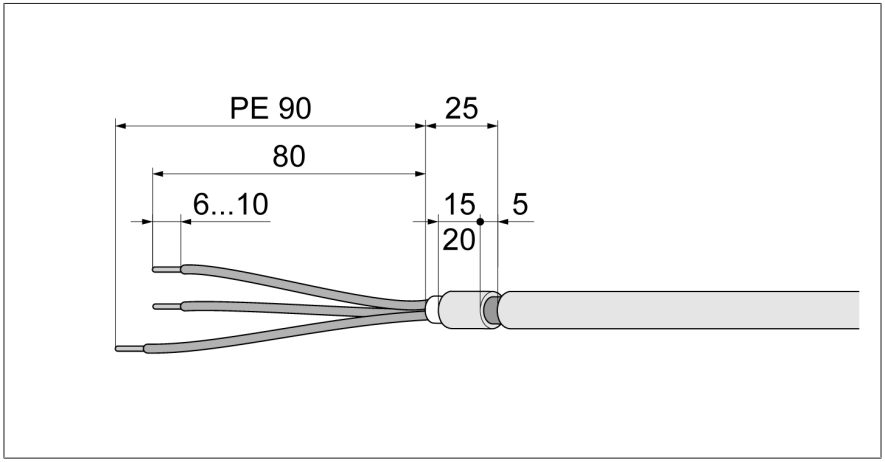


Figure 8: Preparing the cable

11. Open the other cable gland and feed the connection cable through. When doing so, ensure contact between the shield contact and cable shield.

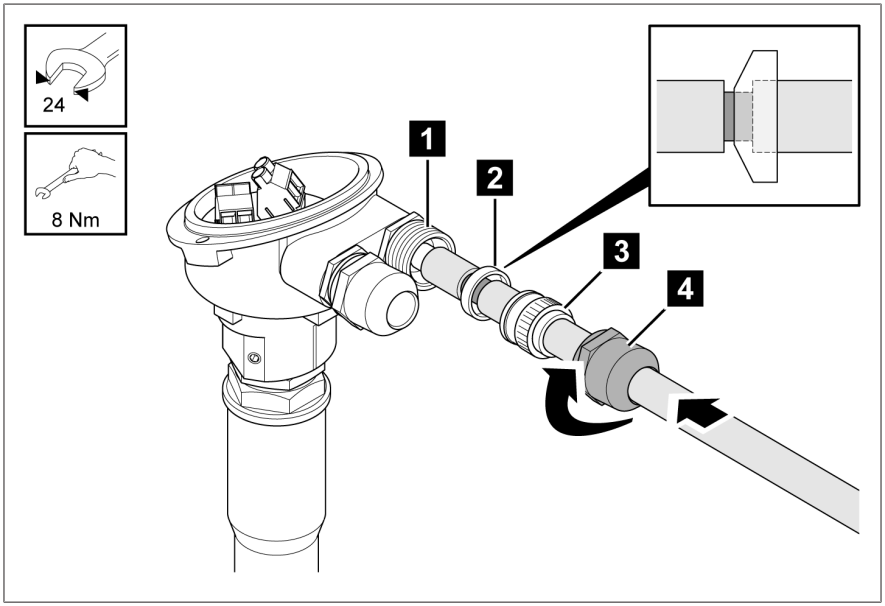


Figure 9: Feeding the cable through the cable gland

1	Lower part of the cable gland	2	Shield contact
3	Seal insert	4	Pressure nut

12. Tighten the pressure nut onto the lower part with a torque of 8 Nm.

13. Connect the individual conductors in accordance with the corresponding connection diagram with a torque of 0.6 Nm.

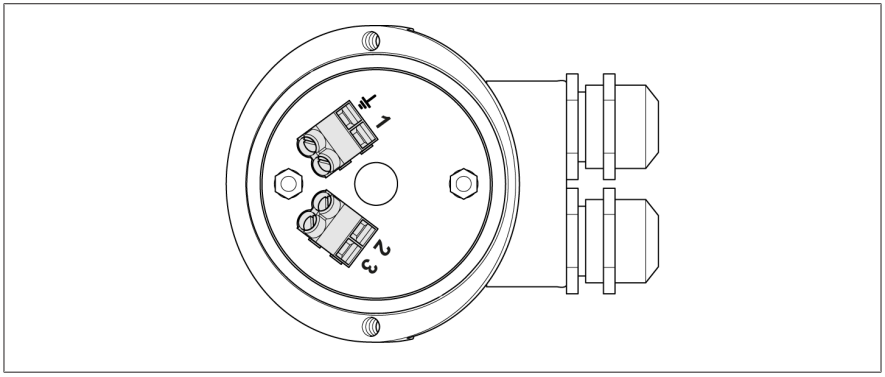


Figure 10: Pt100 connection diagram

⏚	PE conductor	1	Measurement conductor
2	Measurement conductor	3	Compensating line (3-conductor technology)

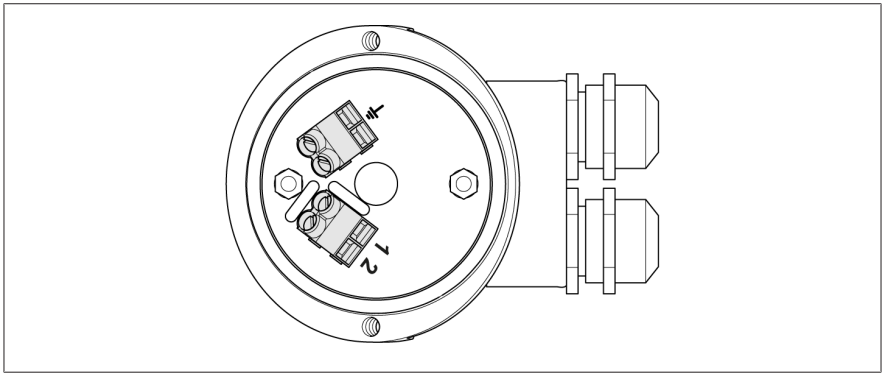


Figure 11: 4...20 mA connection diagram

⏚	PE conductor	1	"+" connecting conductor 4...20 mA
2	"-" connecting conductor 4...20 mA		

14. Place the cable shield on the opposite side

15. Close the cover of the connection head and tighten the 2 screws with 1 Nm.

6 Commissioning

6.1 Performing a dielectric test

You must short-circuit the connection terminals for the 4...20 mA or RTD remote indicator prior to the dielectric test. You must increase the test voltage of maximum 500 V AC step-by-step.

6.2 Performing comparison measurements

✓ Only perform comparison measurements after a warm-up time of 30 minutes.
› Compare the pointer thermometer display with the electronic display.
» The displays of both devices should be within the tolerance range of ±2% of the end value.

7 Maintenance, inspection and care

Maintenance

The device is maintenance-free.

Inspection

› During any visual inspections of the transformer, inspect the external state of the device for damage.

Care

› Only use a damp towel and mild cleaning agent to clean the housing of the device when needed.

8 Disposal

Observe the national disposal regulations in the country of use.

9 Technical data

9.1 Basic materials

Housing	Aluminum, cast
Well/cable glands	Brass, bare
EMSKV 20X1,5 EMV-S cable gland	Brass, nickel plated

9.2 Pt100 output

Pt100 output	Measuring resistor, Class B in accordance with IEC 751 (100 Ω at 0°C)

9.3 Current output (combi TT)

Supply voltage	DC: 12...30 V unregulated, max. 10% residual ripple, protected against polarity reversal
Output signal	4...20 mA
Max. load resistance	750 Ω e.g. U_B=24 V DC
Error deviation	±2% from end value

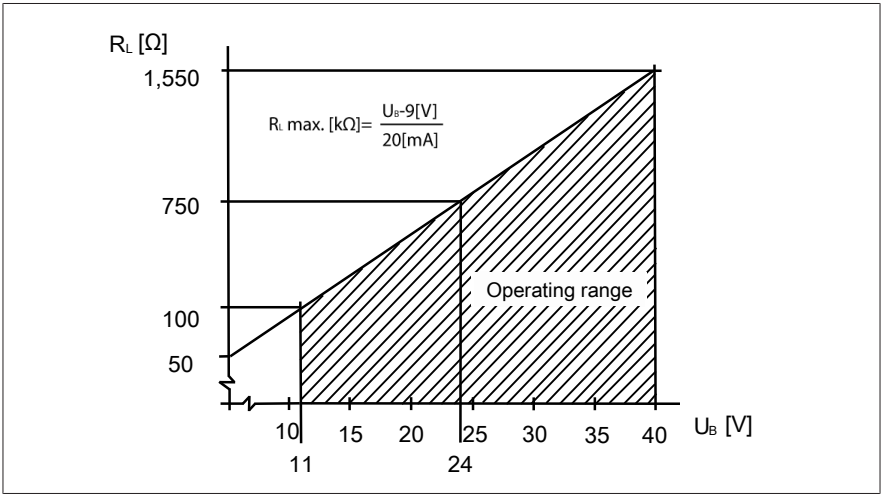


Figure 12: Load resistance

9.4 Operating conditions and ambient conditions

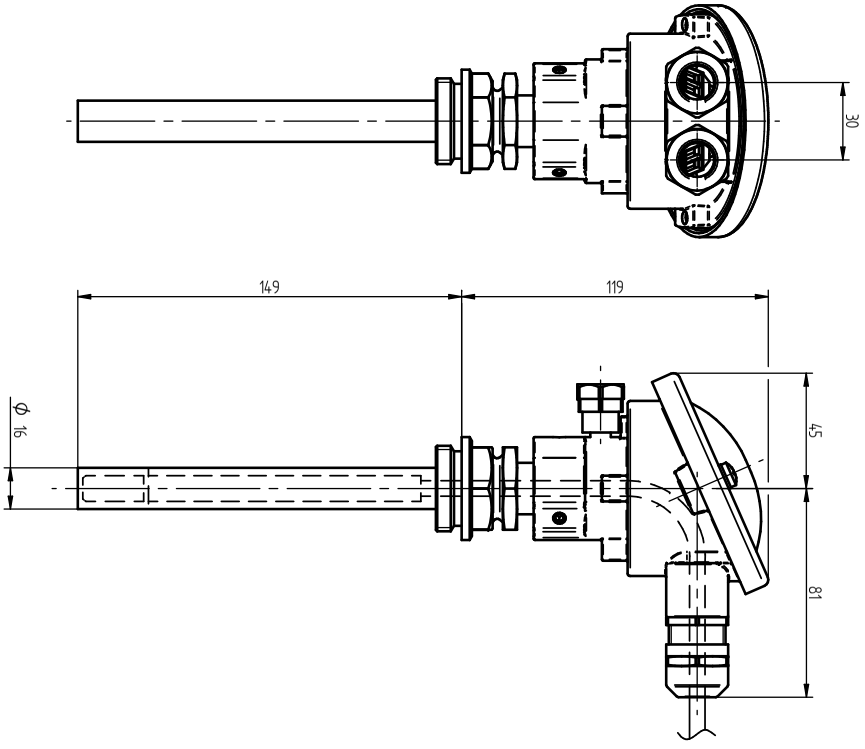
Operating temperature	-40...+80 °C
Storage temperature	-50...+80 °C
Degree of protection	IP66 in accordance with EN 60529
Setup	Indoors and outdoors

10 Drawings

	DATE	NAME	DOCUMENT NO.	
DFTR.	03.05.2023	THIELEK	SED 10149547 000 01	
CHKD.	04.05.2023	REHNELT	CHANGE NO.	SCALE
STAND.	05.05.2023	WANNINGER	1122118	1:2

DIMENSION IN mm EXCEPT AS NOTED

Zubehör Transformator / ACC
Kombihülse/COMBI WELL 1x Pt100
Maßzeichnung/DIMENSION DRAWING



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Glossary

EMC
Electromagnetic compatibility

Operating temperature
Permissible temperature in the immediate surroundings of the device during operation taking ambient influences, for example due to the equipment and installation location, into consideration.

Storage temperature
Permissible temperature for storing the device in an unmounted state or in a mounted state so long as the device is not in operation.

Maschinenfabrik Reinhausen GmbH
Falkensteinstrasse 8
93059 Regensburg
Germany
+49 941 4090-0
info@reinhausen.com
reinhausen.com

MESSKO® combi well Operating instructions - 05/23 - 8122419/01 EN - F0400101

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