



# Operating instructions ECOTRAC® SMART BREATHER. Dehydrating breather

10944490/00 EN



© All rights reserved by Maschinenfabrik Reinhausen

Dissemination and reproduction of this document and use and disclosure of its content are strictly prohibited unless expressly permitted.

Infringements will result in liability for compensation. All rights reserved in the event of the granting of patents, utility models or designs.

The product may have been altered since this document was published.

We reserve the right to change the technical data, design and scope of supply.

Generally the information provided and agreements made when processing the individual quotations and orders are binding.

The product is delivered in accordance with MR's technical specifications, which are based on information provided by the customer. The customer has a duty of care to ensure the compatibility of the specified product with the customer's planned scope of application.

The original operating instructions were written in German.

# Table of contents

<b>1</b>	<b>Introduction .....</b>	<b>6</b>
1.1	Manufacturer .....	6
1.2	Completeness.....	6
1.3	Subject to change without notice.....	6
1.4	Safekeeping.....	7
1.5	Notation conventions .....	7
1.5.1	Hazard communication system .....	7
1.5.2	Information system .....	8
1.5.3	Instruction system.....	8
1.5.4	Typographic conventions.....	9
<b>2</b>	<b>Safety.....</b>	<b>10</b>
2.1	General safety information.....	10
2.2	Appropriate use .....	10
2.3	Fundamental safety instructions .....	11
2.4	Personnel qualification .....	13
2.5	Personal protective equipment.....	14
<b>3</b>	<b>Product description.....</b>	<b>15</b>
3.1	Scope of delivery .....	15
3.2	Design/versions.....	16
3.3	Function description .....	17
3.4	Terminal box .....	18
3.5	Controller for silica gel heating .....	19
3.6	Status LEDs.....	19
3.7	Self-monitoring function.....	20
3.8	Outputs .....	20
3.9	Filter heater (optional).....	21
3.10	Test button .....	21
3.11	Safety markings and nameplate .....	22
<b>4</b>	<b>Packaging, transport and storage .....</b>	<b>24</b>
4.1	Purpose .....	24
4.2	Suitability, structure and production .....	24
4.3	Markings.....	25
4.4	Transportation, receipt and handling of shipments .....	25

4.5	Storage of shipments .....	27
4.6	Further transport .....	27
4.7	Unpacking .....	28
<b>5</b>	<b>Mounting.....</b>	<b>30</b>
5.1	Installation recommendations .....	30
5.2	Checking the connecting flange on the transformer .....	33
5.3	Preparing the device .....	34
5.4	Mounting the device on the counterflange .....	37
5.4.1	Attaching the lifting gear .....	38
5.4.2	Inserting the flange gasket .....	40
5.4.3	Screwing on the flanges .....	41
5.4.4	Aligning the device .....	44
5.4.5	Tightening the double screw connection .....	44
5.4.6	Removing the lifting gear again .....	46
5.5	Removing the red protective cap .....	46
<b>6</b>	<b>Electrical connection .....</b>	<b>48</b>
6.1	Electromagnetic compatibility .....	48
6.1.1	Wiring requirement of installation site .....	49
6.1.2	Wiring requirement of operating site .....	49
6.2	Supply voltage .....	49
6.3	Cable recommendation .....	50
6.4	Routing and preparing the cable.....	51
6.5	Connecting the supply voltage .....	55
6.6	Connecting the regeneration signaling relay.....	57
6.7	Connecting the device error signaling relay .....	58
6.8	Connecting analog outputs.....	58
6.9	Connecting the RS485 interface and configuring Modbus .....	60
6.9.1	4-conductor full duplex.....	61
6.9.2	2-conductor half duplex.....	62
6.9.3	Notes on connecting to the MR sensor bus .....	63
6.9.4	ECOTRAC® SMART BREATHER.....	67
6.9.5	Modbus settings.....	69
6.10	Closing the terminal box.....	70
6.11	Additional device grounding .....	72
6.12	Dielectric test.....	73
6.13	Ground test .....	74

<b>7</b>	<b>Commissioning .....</b>	<b>76</b>
7.1	Device self test during commissioning .....	77
7.2	Adjusting Modbus settings.....	78
<b>8</b>	<b>Operation.....</b>	<b>79</b>
<b>9</b>	<b>Error messages and troubleshooting .....</b>	<b>82</b>
9.1	Error messages .....	84
9.2	Status messages.....	86
9.3	Fuse .....	86
9.4	Replacing the battery (CR2032) .....	89
9.5	Contaminated silica gel.....	90
<b>10</b>	<b>Maintenance, inspection and care.....</b>	<b>91</b>
10.1	Maintenance .....	91
10.2	Inspection.....	91
10.3	Test button .....	93
10.3.1	Quick test .....	95
10.3.2	Long test .....	98
10.4	Care.....	100
<b>11</b>	<b>Disposal .....</b>	<b>102</b>
11.1	SVHC information in accordance with the REACH regulation.....	102
<b>12</b>	<b>Technical data.....</b>	<b>103</b>
12.1	Technical data.....	103
12.2	Application table.....	108
<b>13</b>	<b>Drawings.....</b>	<b>110</b>
13.1	SED_10950498_000_00_4.pdf .....	111
13.2	SED_10950969_000_00_4.pdf.....	112
<b>14</b>	<b>Appendix.....</b>	<b>113</b>
14.1	Modbus RTU (optional).....	113
14.2	RS485 communication settings (optional) .....	114
	<b>Glossary .....</b>	<b>116</b>

# 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

Internet: [www.shop.reinhausen.com](http://www.shop.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 Completeness

This technical file is incomplete without the following document:

- Factory certificate

## 1.3 Subject to change without notice

The information contained in this technical file comprises the technical specifications approved at the time of printing. Significant modifications will be included in a new edition of the technical file.

The document number and version number of this technical file are shown in the footer.

## 1.4 Safekeeping

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

## 1.5 Notation conventions

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

### 1.5.1 Hazard communication system

Warnings in this technical file are displayed as follows.

#### 1.5.1.1 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

#### 1.5.1.2 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.

### 1.5.1.3 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

## 1.5.2 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.

## 1.5.3 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).

### 1.5.4 Typographic conventions

Typographic convention	Purpose	Example
UPPERCASE	Operating controls, switches	ON/OFF
[Brackets]	PC keyboard	[Ctrl] + [Alt]
<b>Bold</b>	Software operating controls	Press <b>Continue</b> button
...>...>...	Menu paths	Parameter > Control parameter
<i>Italics</i>	System messages, error messages, signals	<i>Function monitoring</i> alarm triggered
[▶ Number of pages]	Cross reference	[▶ Page 41].
<u>Dotted underscore</u> .....	Glossary entry, abbreviations, definitions, etc.	<u>Glossary entry</u> .....

Table 2: Typographic conventions used in this technical file

## 2 Safety

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

- Read this technical document through carefully to familiarize yourself with the product.
- This technical document is a part of the product.
- Read and observe the safety instructions provided in this chapter in particular.
- Observe the warnings in this technical document in order to avoid function-related dangers.
- The product is manufactured on the basis of state-of-the-art technology. Nevertheless, risks to life and limb of the user or impairment of the product and other material assets may occur during use due to function-related dangers.

### 2.1 General safety information

All persons responsible for the assembly and commissioning of the device must have sufficient specialist training.

Improper operation or misuse may lead to:

- Serious injury or death
- Damage to the device and other property of the user
- A reduction in the efficient functioning of the equipment

### 2.2 Appropriate use

The maintenance-free ECOTRAC® SMART BREATHER dehydrating breather is used in oil-insulated transformers, reactors and tap changers for dehydrating the air sucked into oil conservators.

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

If used as intended, in compliance with the requirements and conditions specified in this technical document and observing the warning notices in this technical document and attached to the product, the product does not pose a risk of injury or damage to 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:

- Operate the product in accordance with this technical document, the agreed-upon delivery conditions and the technical data.
- Ensure that all necessary work is performed by qualified personnel only.
- Only use the devices supplied for the intended purpose and in accordance with the specifications in this technical document.
- Observe the notices in this technical document regarding electromagnetic compatibility and the technical data.

## 2.3 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 2.5, Page 14] 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 the manufacturer.

## Spare parts

Spare parts not approved by the manufacturer may lead to physical injury and damage to the product.

- Only use spare parts approved by the manufacturer.
- Contact the manufacturer.

### **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.

## **2.4 Personnel qualification**

The person responsible for assembly, commissioning, operation and inspection must have the following qualifications.

### **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.

### **Technical Service**

We strongly recommend that you only have maintenance, repair and retrofitting work carried out by qualified Technical Service employees.

## 2.5 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.

<b>Protective clothing</b>	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.
<b>Safety shoes</b>	To protect against falling heavy objects and slipping on slippery surfaces.
<b>Safety glasses</b>	To protect the eyes from flying parts and splashing liquids.
<b>Visor</b>	To protect the face from flying parts and splashing liquids or other dangerous substances.
<b>Hard hat</b>	To protect against falling and flying parts and materials.
<b>Hearing protection</b>	To protect against hearing damage.
<b>Protective gloves</b>	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.

The dehydrating breather is mounted using a flange as standard on the pipe for venting and dehydrating the oil conservator.

### 3.1 Scope of delivery

The following items are included in the scope of delivery:

- Dehydrating breather
- Universal flange (compatible with DN42562 and with 4-hole circular flanges with bolt hole diameter 75...115 mm)
- Operating instructions

### 3.2 Design/versions

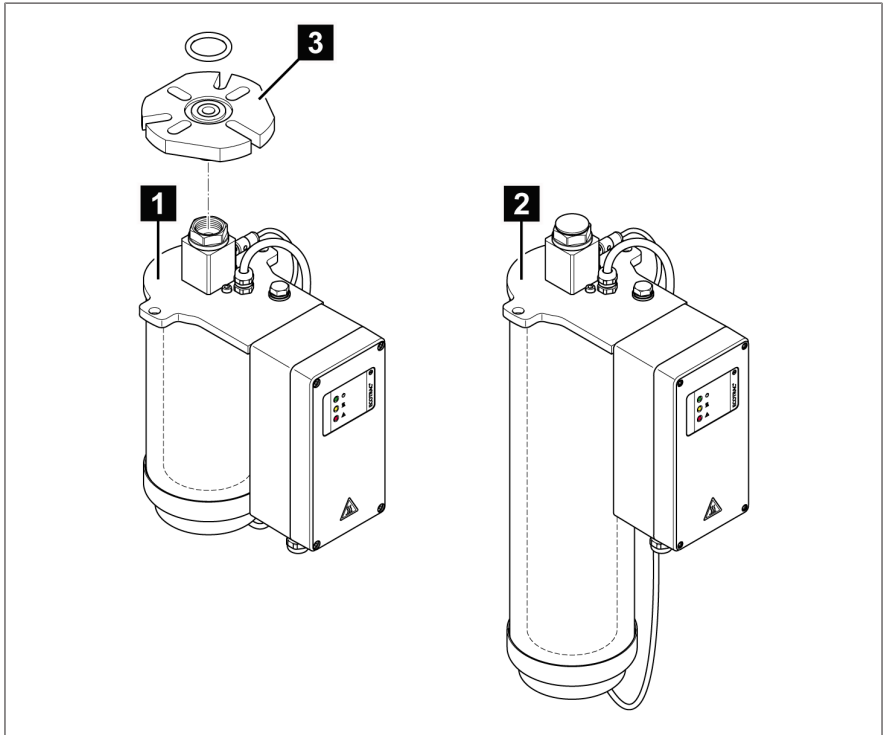


Figure 1: Design

1	Version S	2	Version M
3	Universal flange		

Version	Equipment
SL 120V, SL 230V	Without Modbus, without filter heater
SH 120V, SH 230V	With Modbus, with filter heater
ML 120V, ML 230V	Without Modbus, without filter heater
MH 120V, MH 230V	With Modbus, with filter heater

\*) For details, see chapter "Technical data" and "Drawings"



### 3.3 Function description

The dehydrating breather is used in oil-insulated transformers, reactors or tap changers for dehydrating the air sucked into oil conservators.

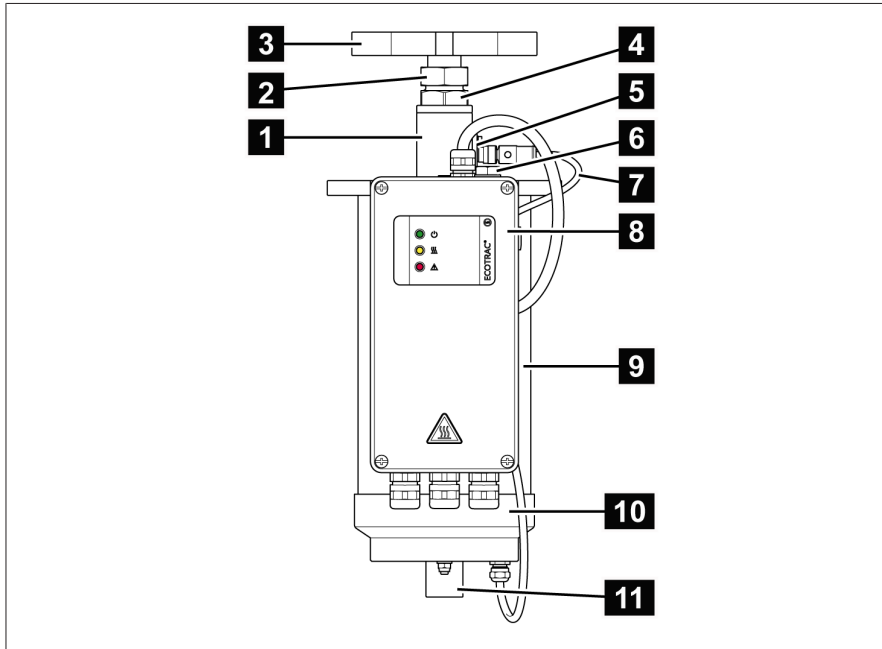


Figure 2: Overview

1	Upper air spout	2	Lock nut
3	Universal flange	4	Nut
5	Temperature and humidity sensor	6	Grounding screw
7	Sensor cable	8	Terminal box (RAL 7035 light gray)
9	Desiccant container	10	Lower metal flange
11	Dust protection tube and optional filter heater		

Refer to the chapter "Drawings" for illustrations of the various designs.

### 3.4 Terminal box

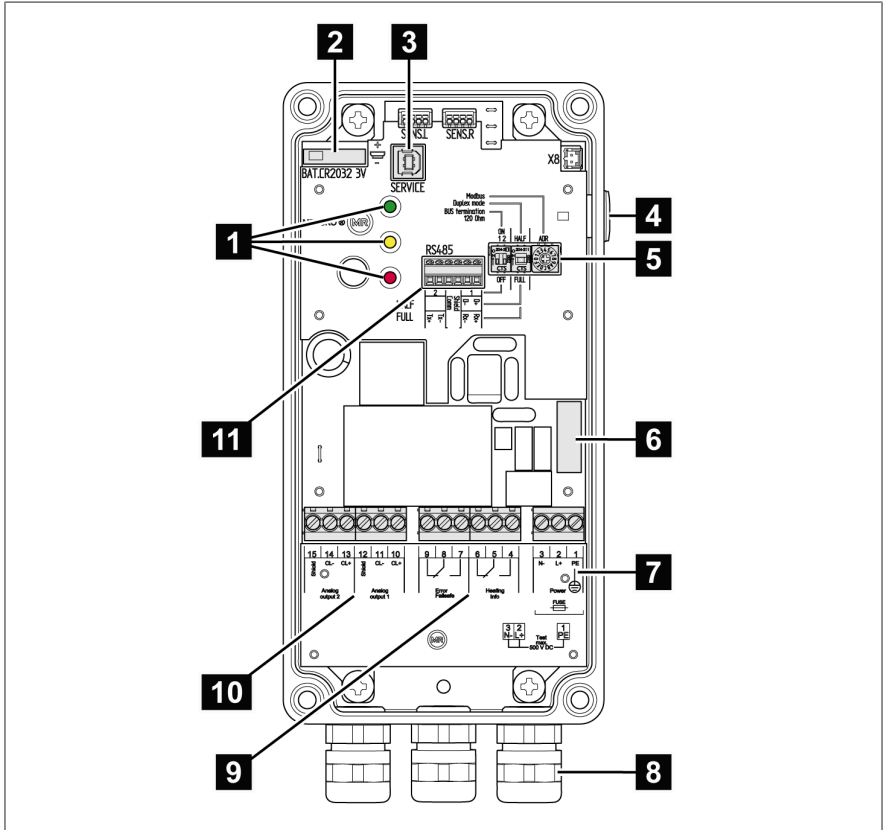


Figure 3: Terminal box

1	LEDs for status display	2	RTC buffer battery (type CR2032)
3	USB service interface (B socket)	4	Test button
5	Modbus settings (optional)	6	Fuse
7	Supply voltage 100...127 V DC/AC 50/60 Hz 200...240 V DC/AC 50/60 Hz	8	Cable gland 1/2" 14NPT (brass) with 100...127 V supply voltage M20x1.5 (brass) with 200...240 V supply voltage

9	Signaling relay	10	Analog output 1 (temperature), 4... 20 mA Analog output 2 (humidity), 4... 20 mA
11	RS485 interface (optional)		

### 3.5 Controller for silica gel heating

The dehydrating breather is delivered with a status-led controller.

Refer to the chapter "Application table" for the recommended application areas for the different versions of the dehydrating breather.

### 3.6 Status LEDs

There are 3 LEDs **1 2 3** on the front of the terminal box that indicate the status of the device.

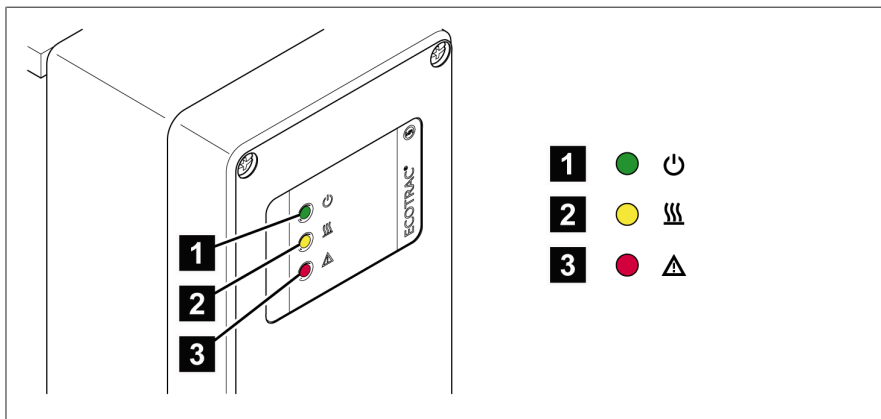


Figure 4: LEDs

1	Operating status – green LED	2	Regeneration heater – yellow LED
3	Device error – red LED		

An explanation of the various device status messages is given in the chapter "Status messages".

### 3.7 Self-monitoring function

The dehydrating breather has a self-monitoring function. If an error occurs in the device, this is indicated by the different lighting patterns of the LEDs **1** **2** **3** on the front of the terminal box, and also output via the signaling relay. The following errors are detected:

- Supply voltage failure
- Silica gel heating error
- Sensor unit fault
- Internal error

Also refer to the chapter "Error messages and troubleshooting".

### 3.8 Outputs

The dehydrating breather features two analog current outputs and two signaling relays for central data collection and further processing of its status.

#### Analog outputs (active):

Measurement of the temperature and humidity via sensors **5** on the upper air spout **1** (see the chapter "Function description")

Analog 1 (left)	Analog 2 (right)
Temperature	Humidity

#### Regeneration relay output (silica gel heating):

1x change-over contact, regeneration active/inactive

#### Device error relay output

1x change-over contact, failsafe

### 3.9 Filter heater (optional)

To ensure device functionality in low temperature environments, the stainless-steel filter is heated with the filter heater. Use of the filter heater is intended for applications in cold regions (ambient temperature is continuously below 0 °C for more than 20 days).

### 3.10 Test button

The test button can be used to force a device test to be performed (see the chapter "Test button").

### 3.11 Safety markings and nameplate

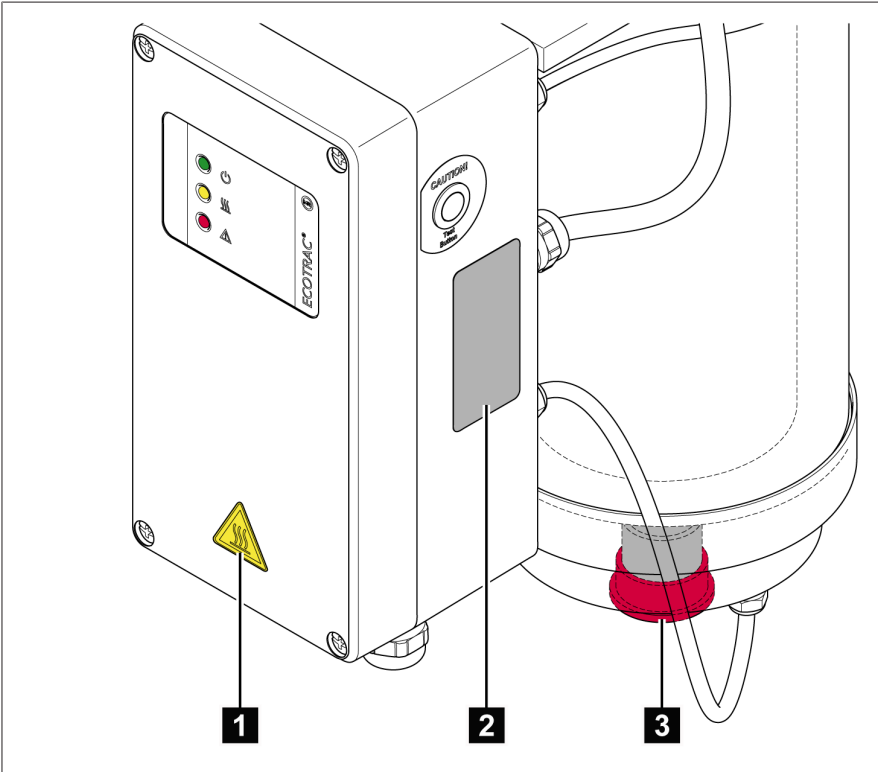





Figure 5: Safety markings

1		Risk of burns! See the chapter "Operation"
2		Warning symbol on the nameplate: Danger! Observe notices in the operating instructions regarding supply voltage; see nameplate in the chapter "Commissioning"
3	 <p data-bbox="285 523 380 587">Schutzkappe entfernen! Remove protective cap!</p>	Sticker on the dust protection tube: Remove the protective cap! See the chapter "Removing the red protective cap"

## 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.


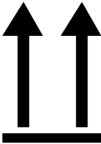



				
Protect against moisture	Top	Fragile	Attach lifting gear here	Center of mass

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.

## 4.6 Further transport

Use the original product packaging for further transport.

If you transport the product to the final installation site in a mounted state, observe the following information in order to protect the product against mechanical damage due to external influences.

### Transport packaging requirements

- Select packaging suitable for the duration of transport or storage, taking the climatic conditions into consideration.
- Ensure that the packaging protects the product against transport stress such as shaking, vibrations and impacts.
- Ensure that the packaging protects the product against moisture such as rain, snow and condensation.
- Ensure that the packaging allows for sufficient air circulation in order to prevent the formation of condensation.

## 4.7 Unpacking

To remove the dehydrating breather from the packaging, proceed as follows:

1. Remove the device from the packaging as shown in the image.
2. Place on an open, flat surface so that the glass cylinder of the desiccant container is exposed.

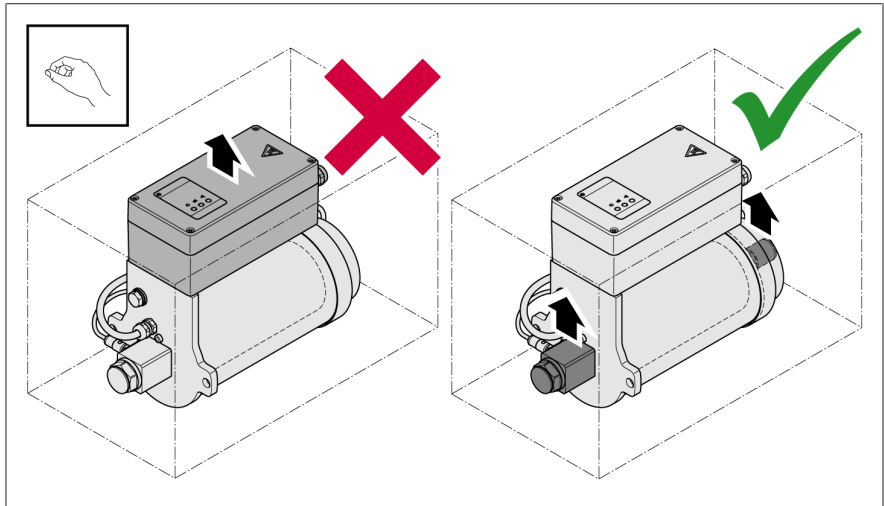


Figure 6: Removing the device from the packaging

### ⚠ CAUTION



#### Risk of injury!

Improper removal of the device from the shipping container can lead to injuries.

- > Use lifting gear with sufficient carrying capacity.

## NOTICE

### Damage to the dehydrating breather

The device can become damaged or fall if it is set down vertically on the air exhaust.

- Do not support or set the device down on the air exhaust.
- Always set the device down horizontally.
- Hold the device firmly and secure it against turning.

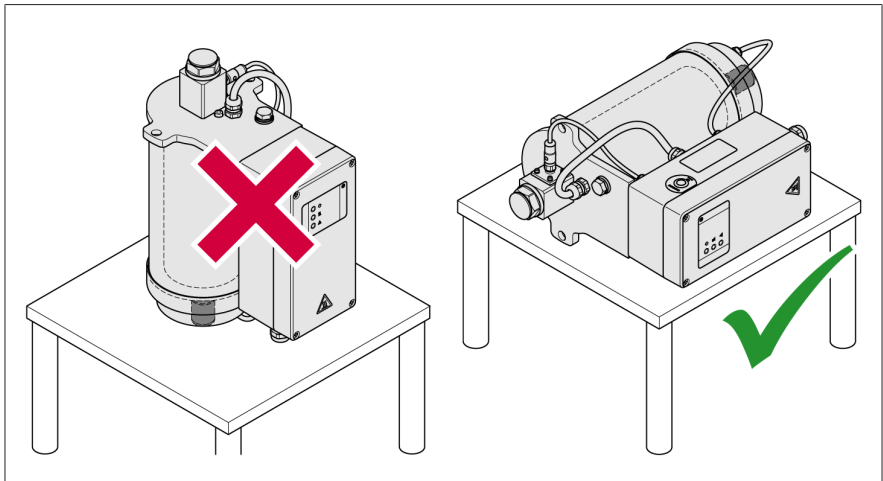


Figure 7: Setting the device

# 5 Mounting

This chapter describes how to correctly mount the device.

## ⚠ CAUTION



### Risk of injury!

Risk of injury due to shattered glass cylinder of the desiccant container as the result of mechanical tension or jolts!

- > Wear safety gloves during assembly in addition to the protective equipment that must always be worn.

The dimensions of the different device versions are listed in the chapter "Drawings."

## 5.1 Installation recommendations

- Install the dehydrating breather as close to the transformer as possible.
- Provide a pipe at least 1 m in length above the dehydrating breather.
- The total length of the pipe to the expansion tank should not be more than 20 m.
- Ensure that the pipes have an incline of at least 2%.

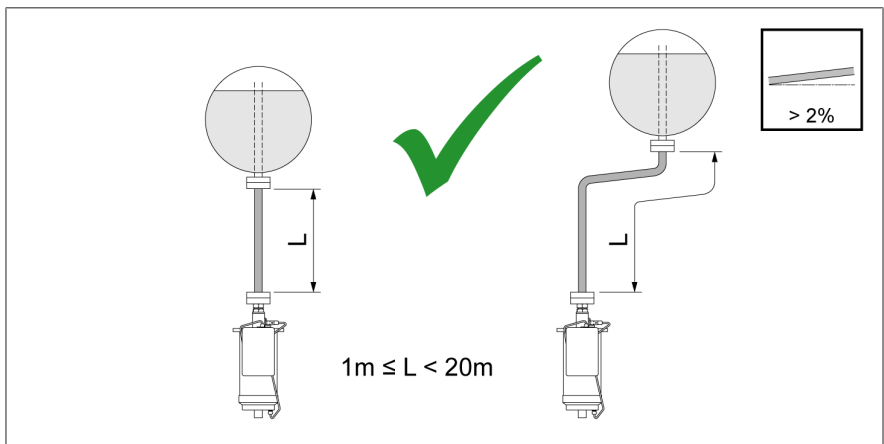


Figure 8: Pipe length

- Ensure that the pipes are not horizontal.
- Prevent the pipe from dipping between the dehydrating breather and the expansion tank.
- Prevent any sources of interference in the pipe between the dehydrating breather and the expansion tank (conventional dehydrating breather, non-return valves, etc.).

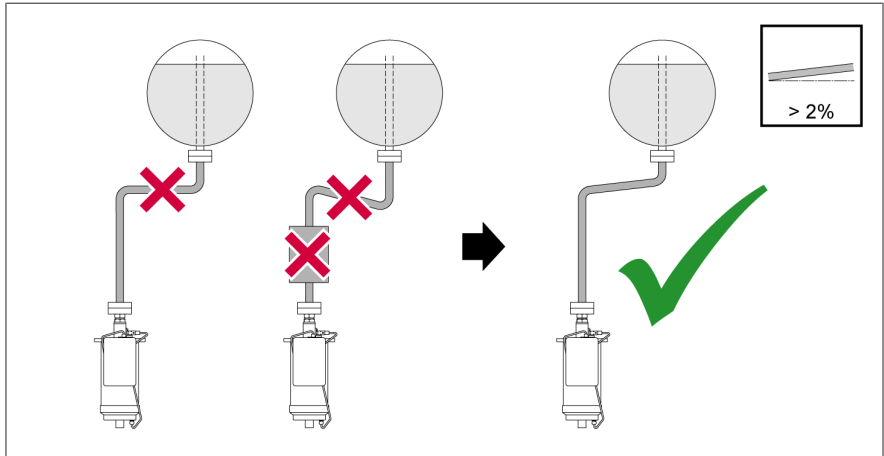


Figure 9: Pipe dips and interference sources

- Do not install several dehydrating breathers in parallel. Instead, use the next largest version.
- Please contact Maschinenfabrik Reinhausen GmbH if you need a version larger than version M.

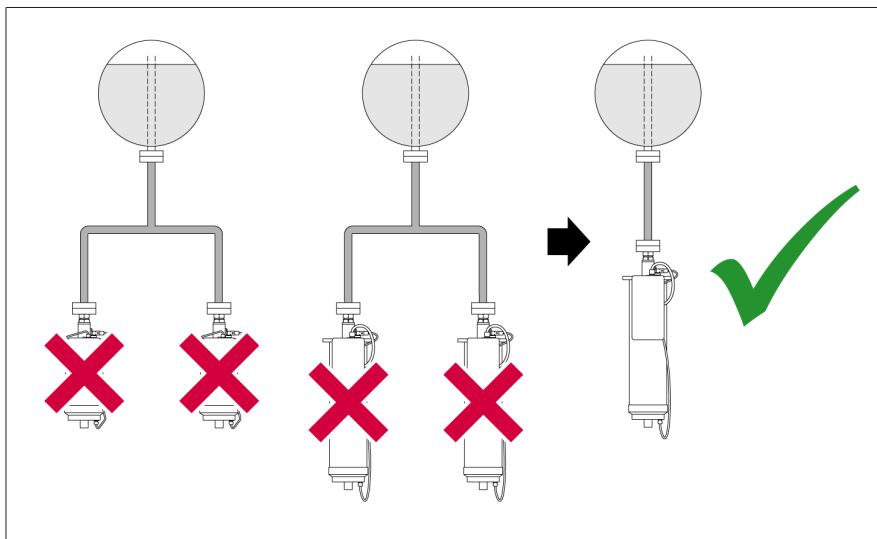


Figure 10: Parallel installation

- Do not install the dehydrating breather close to a sprinkler system that sprays upwards from below.
- Only place spray water nozzles to the side and above the condensate outlet.
- Do not clean the dehydrating breather with spray water from below.



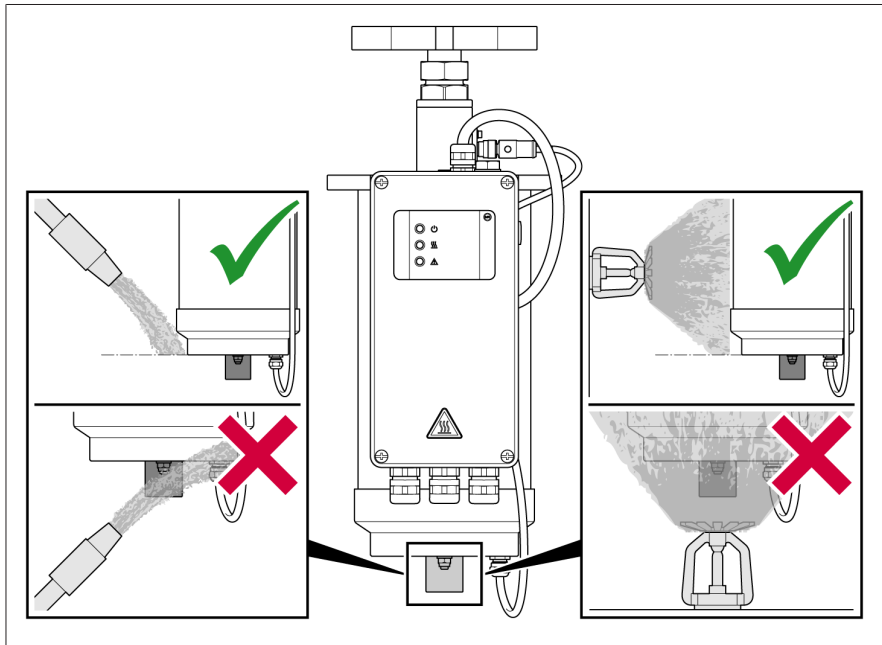


Figure 11: Sprinkler system and spray water

## 5.2 Checking the connecting flange on the transformer

1. Check the counterflange. It must be flush and even. Permitted evenness deviation  $\leq 0.2$  mm.
2. Check the sealing surface of the counterflange. It must be clean and undamaged, without any surface damage radiating out from the center. The surface quality of the sealing surface must be suitable for use of the gasket.

3. Use the gasket provided and only install it in a dry state. Do not oil or grease this gasket beforehand.

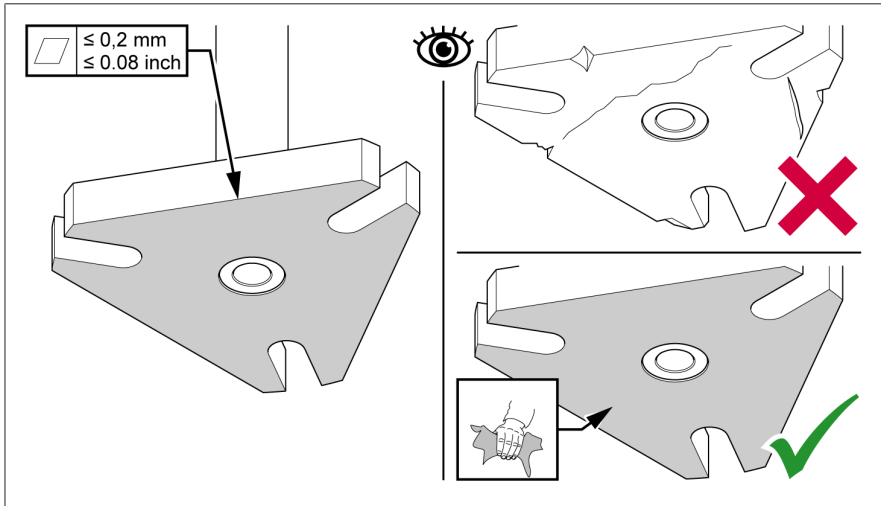


Figure 12: Counterflange

## 5.3 Preparing the device

### NOTICE

#### Damage to the dehydrating breather!

Impairment of seal-tightness on the dehydrating breather due to loosening of the nut on the upper air intake spout!

- Ensure that the upper screw connection is not loosened from the dehydrating breather.

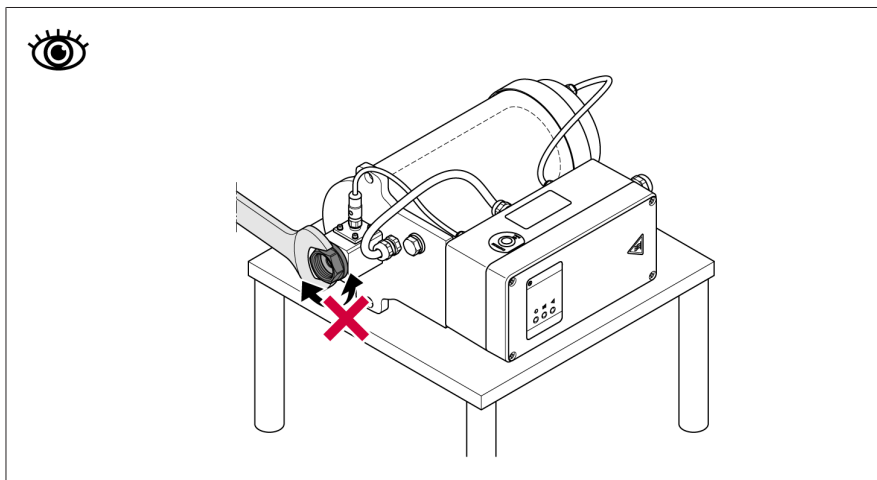


Figure 13: Nut on the upper air spout

To prepare the dehydrating breather for mounting, proceed as follows:

1. Remove the red protective cap from the upper air intake spout.
2. Check that there is a gasket in the air intake spout.

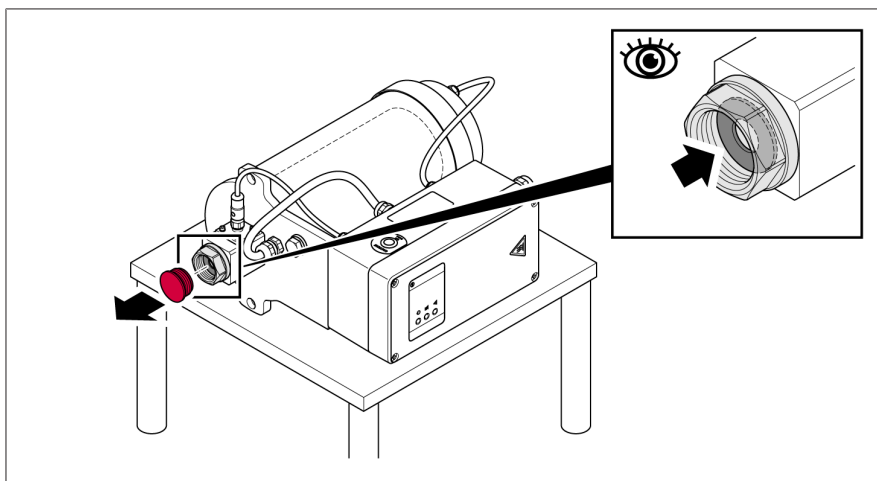


Figure 14: Protective cap and gasket

3. Insert the flange included with delivery into the upper air intake spout.

## NOTICE

### Danger of damage to property

If a flange is used that is unsuitable for the weight of the device, the flange may fail.

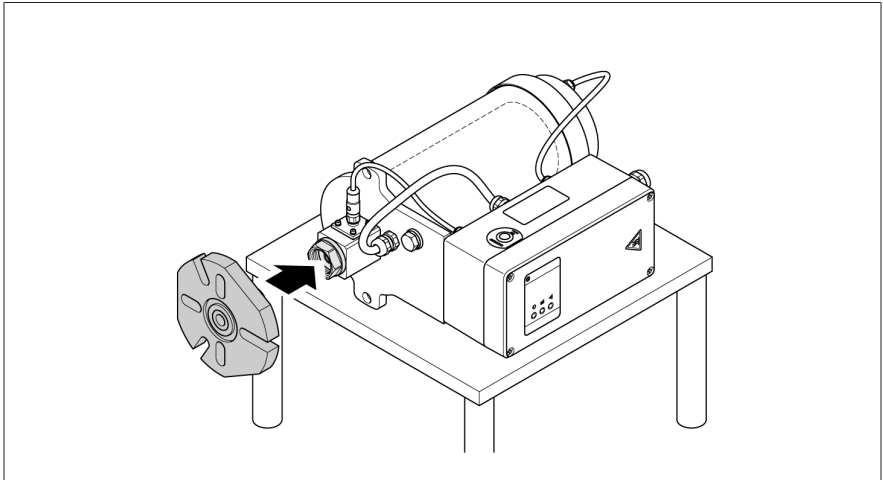


Figure 15: Inserting the flange

4. Screw the flange onto the dehydrating breather by hand (approx. 1 Nm).

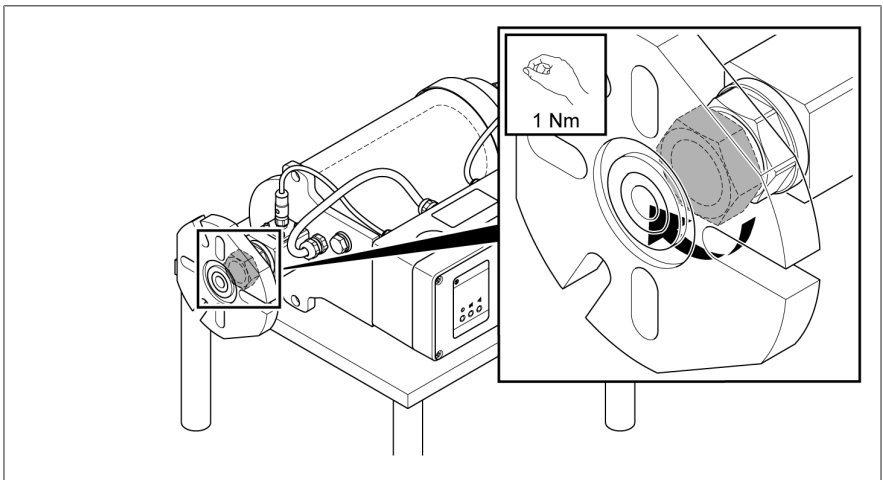


Figure 16: Screwing on the flange

5. For lifting the device, replace the grounding screw with a lifting eye bolt.

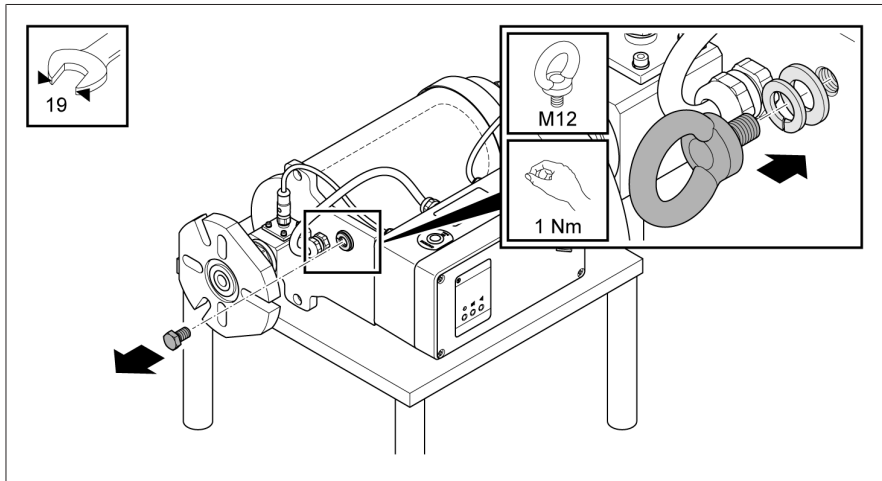


Figure 17: Inserting the lifting eye bolt

## 5.4 Mounting the device on the counterflange

### ▲ WARNING



**Danger of death and damage to property!**

Danger of death and damage to property due to falling load!

- › Do not walk under the suspended load.
- › Use a means of transport and lifting gear with sufficient carrying capacity.

### NOTICE

#### **Malfunction!**

The connection may not be correctly sealed if there is grease on the flange contact surfaces.

- › Ensure that the flange contact surfaces are clean and free of grease when mounting.

## 5.4.1 Attaching the lifting gear

### NOTICE

#### Damage to the dehydrating breather

The device can become damaged or fall if it is set down vertically on the air exhaust.

- Do not support or set the device down on the air exhaust.

1. Lift and upright the device as shown in the image.

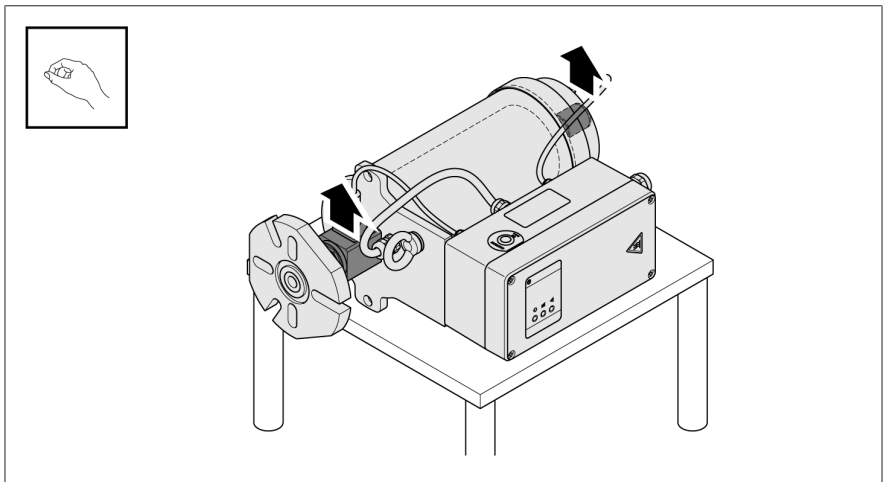


Figure 18: Lifting and uprighting the device

2. Attach the lifting gear to the lifting eye bolt.

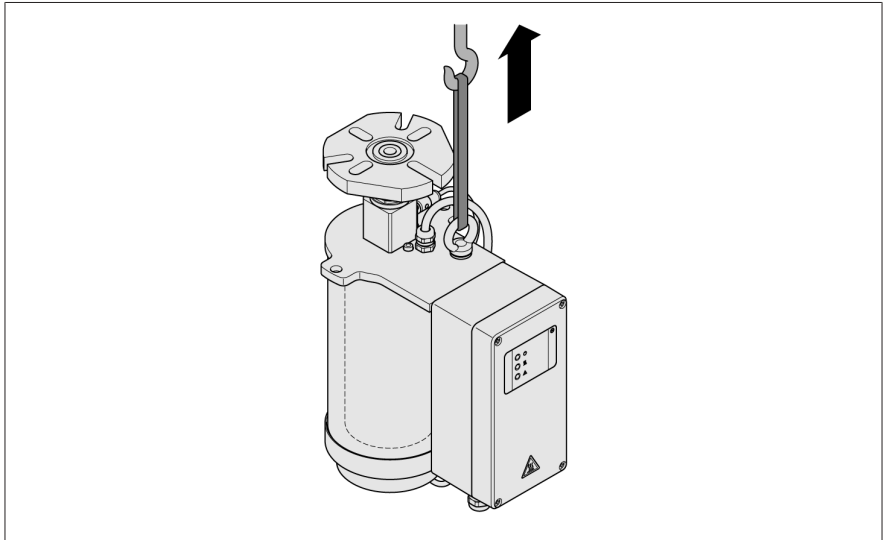


Figure 19: Lifting gear

## 5.4.2 Inserting the flange gasket

1. Insert the flange gasket.

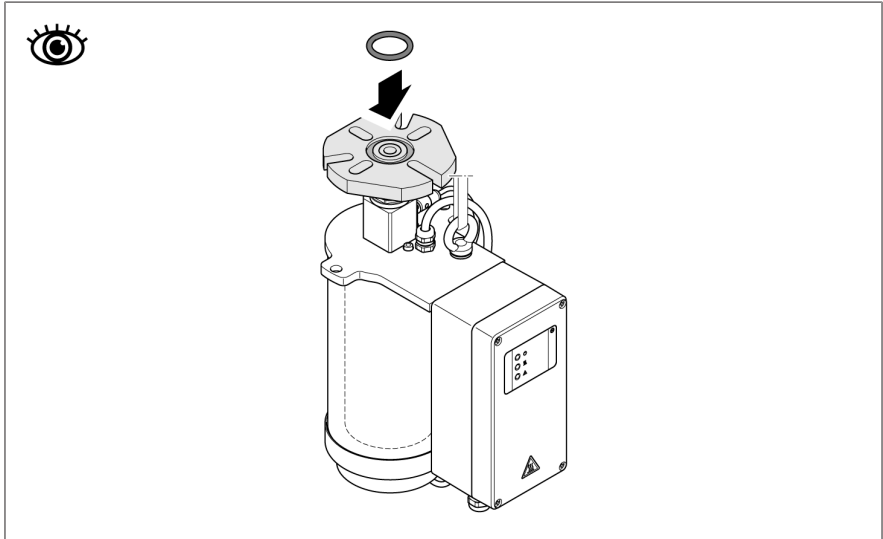


Figure 20: Flange gasket



### 5.4.3 Screwing on the flanges

#### DIN flange

1. Screw the dehydrating breather to the transformer counter-flange using the flange (mounting materials contained in the scope of delivery).

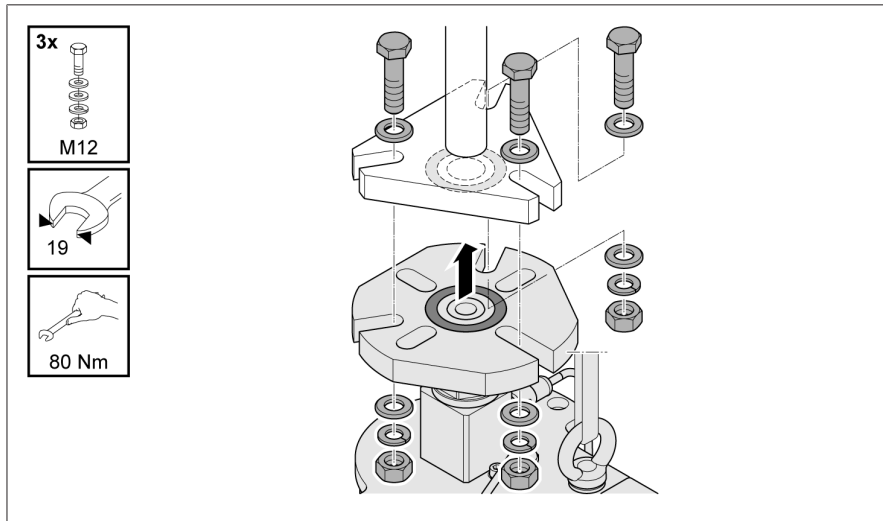


Figure 21: Screw connection

2. Tighten each screw in turn with approximately 24 Nm.
3. Tighten each screw in turn with approximately 48 Nm.
4. Tighten each screw in turn with approximately 80 Nm.
5. Wait 5 minutes.

6. Tighten each screw again with approximately 80 Nm.

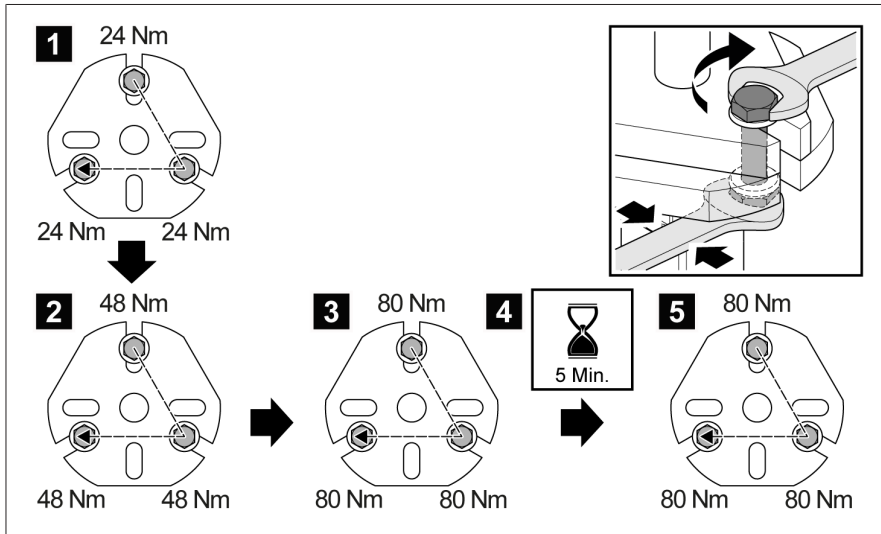


Figure 22: DIN flange screws

## 4-hole circular flange

1. Screw the dehydrating breather to the transformer counter-flange using the flange (mounting materials not included in the scope of delivery).

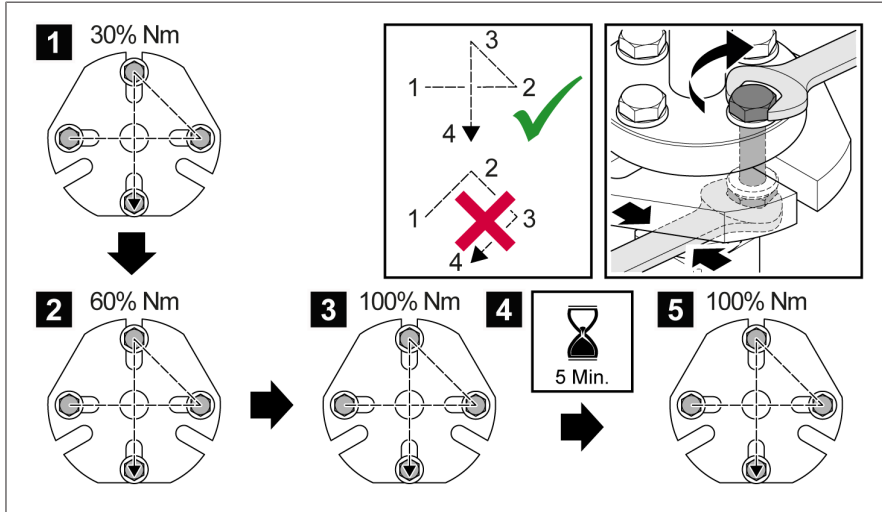


Figure 23: 4-hole circular flange screws

2. Tighten the screws crosswise with approx. 30% of the torque.
3. Tighten the screws crosswise with approx. 60% of the torque.
4. Tighten the screws crosswise with approx. 100% of the torque.
5. Wait 5 minutes.
6. Tighten the screws crosswise again with approx. 100% of the torque.

### 5.4.4 Aligning the device

Aligning the device:

1. Align the device as desired using the double screw connection after mounting.

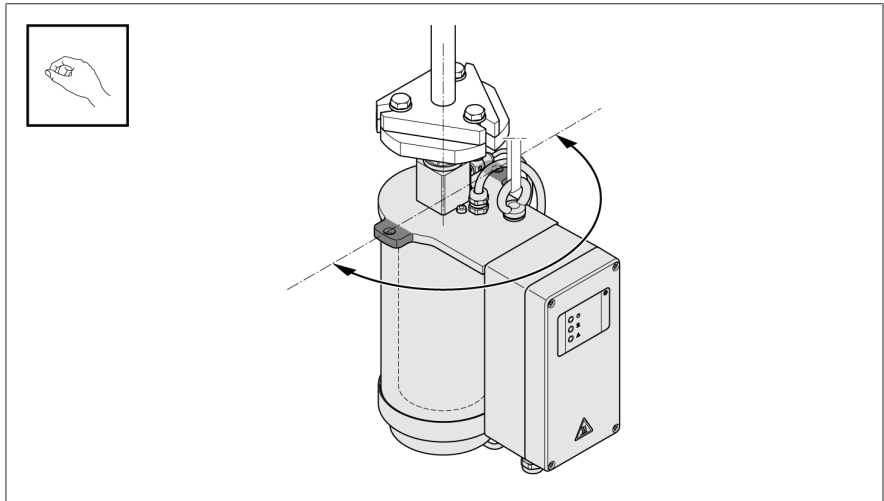


Figure 24: Alignment of dehydrating breather

### 5.4.5 Tightening the double screw connection

Tightening the double screw connection:

1. Hold the nut on the upper air spout and tighten the locknut on the flange with 250 Nm.
2. Make sure that the lower nut is not loosened from the device during assembly.
3. Wait 5 minutes.

4. Tighten the upper nut again with 250 Nm.

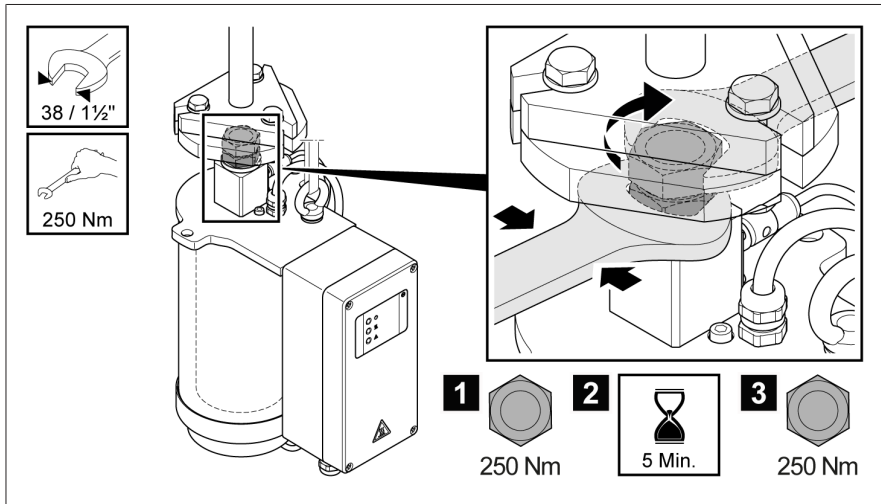


Figure 25: Double screw connection

### 5.4.6 Removing the lifting gear again

1. Remove the lifting gear again carefully and replace the lifting eye bolt with the grounding screw including washer.

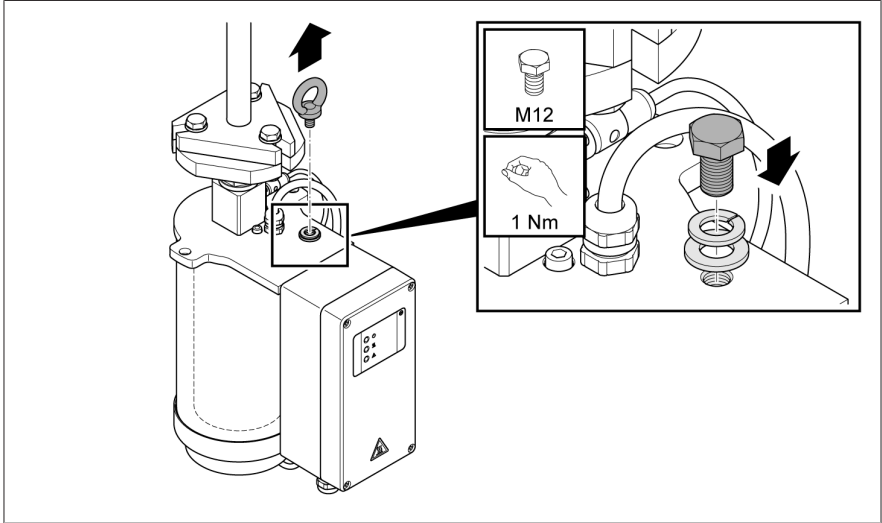


Figure 26: Grounding screw

### 5.5 Removing the red protective cap

#### NOTICE

#### Dehydrating breather malfunction!

The red protective cap blocks air exchange during operation of the dehydrating breather!

- > Make sure that the red protective cap is removed from the dust protection tube before commissioning.



Figure 27: Warning sticker on the dust protection tube

1. Remove the red protective cap from the dust protection tube on the bottom of the device.

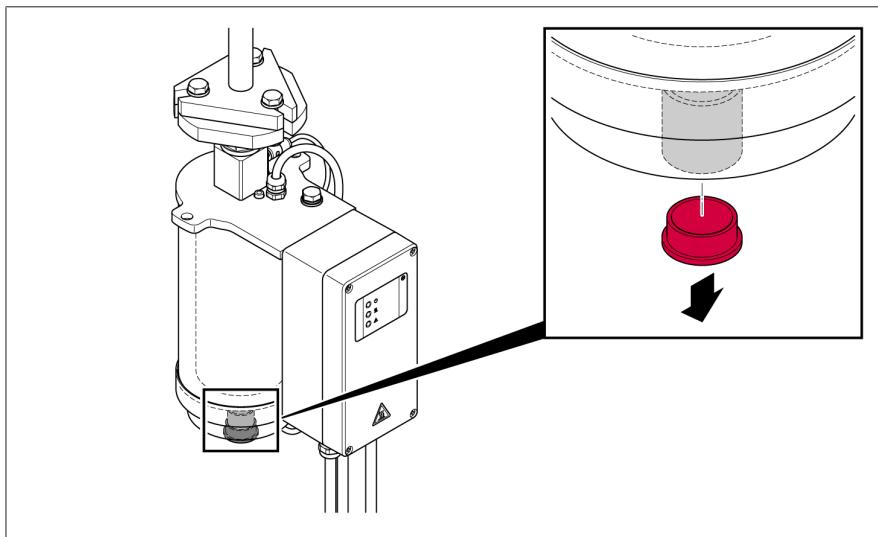


Figure 28: Red protective cap

## 6 Electrical connection

This chapter describes the correct electrical connection of the device. Observe the following hazard notices prior to opening the device:

### DANGER



#### **Electric shock!**

Risk of fatal injury due to electrical voltage. Always observe the following safety regulations when working in or on electrical equipment.

- > Disconnect the equipment.
- > Lock the equipment to prevent an unintentional restart.
- > Make sure all poles are de-energized.
- > Ground and short-circuit.
- > Cover or cordon off adjacent energized parts.

### NOTICE

#### **Damage to the device!**

Electrostatic discharge can lead to damage to the device.

- > Take precautionary measures to prevent the build-up of electrostatic charges on work surfaces and personnel.

## 6.1 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.



## 6.1.1 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.

## 6.1.2 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.
- Never connect the device with a multi-wire collective pipe.
- Use shielded cables for signal transmission.

## 6.2 Supply voltage

You may only connect the device to circuits with an external overcurrent protective device and an all-pole isolating device so that the equipment can be fully de-energized if required.

Suitable equipment includes isolating devices in accordance with IEC 60947-1 and IEC 60947-3 (e.g. circuit breakers). Note the properties of the relevant circuits (voltage, maximum currents) when selecting the circuit breaker type.

In addition, observe the following:

- It must be easy for the operator to access the isolating device.
- The isolating device must be labeled for the device and circuits to be isolated.
- The isolating device may not be a part of the power line.
- The isolating device may not interrupt the main protective conductor.

### Miniature circuit breaker

You must fuse the power supply circuit with a miniature circuit breaker. The miniature circuit breaker must have the following properties:

- Rated current: 16 A or 20 A
- Triggering characteristic: C, K, Z

### Conductor cross-section

For the power supply circuit, use a conductor cross-section suitable for the miniature circuit breaker that you have selected, but at least 1.5 mm<sup>2</sup> (AWG 15).

## 6.3 Cable recommendation

Please note the following recommendation 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 connection cables used must have a temperature resistance of at least +90 °C (ambient temperature max. +70 °C plus intrinsic device heating of 20 K).
- 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.


Cable <sup>*)</sup>	Terminal	Cable type	Cross-section
Protective conductor connection	1  (PE)	Unshielded	>= cross-section of the voltage supply terminal 2 (L+) and terminal 3 (N-)
Voltage supply	2 (L/+), 3 (N/-)	Unshielded	1.5...4 mm <sup>2</sup> / AWG 11...15
Regeneration signaling relay, device error signaling relay	4, 5, 6, 7, 8, 9	Unshielded	1.5...4 mm <sup>2</sup> / AWG 11...15
Analog outputs: Analog output 1, Analog output 2	Terminals 10 to 15	Shielded	1.5...4 mm <sup>2</sup> / AWG 11...15
RS485		Shielded	0.14...1.5 mm <sup>2</sup> / AWG 15...26

Table 5: Recommendation for connection cable (standard connections)

<sup>\*)</sup> It must be possible to load all connection cables with a nominal voltage of 300 V;

Cable type solid or flexible


## 6.4 Routing and preparing the cable

**i**

The glass cylinder of the dehydrating breather can reach temperatures >90 °C during regeneration. When routing the cables, ensure that they do not touch the glass cylinder.

Consider the position of the connections when preparing the cable.

**i**

Ensure that the length of the protective conductor  (terminal 1) is at least 50 mm longer than the supply voltage conductors (terminals 2 and 3).

To prepare the cable correctly, proceed as follows:

1. Open the terminal box of the dehydrating breather. To do so, unscrew the 4 captive screws on the housing cover. The cover is held on the left-hand side by spring hinges and can be swung open to the left. The terminal box cover is grounded with a grounding cable.

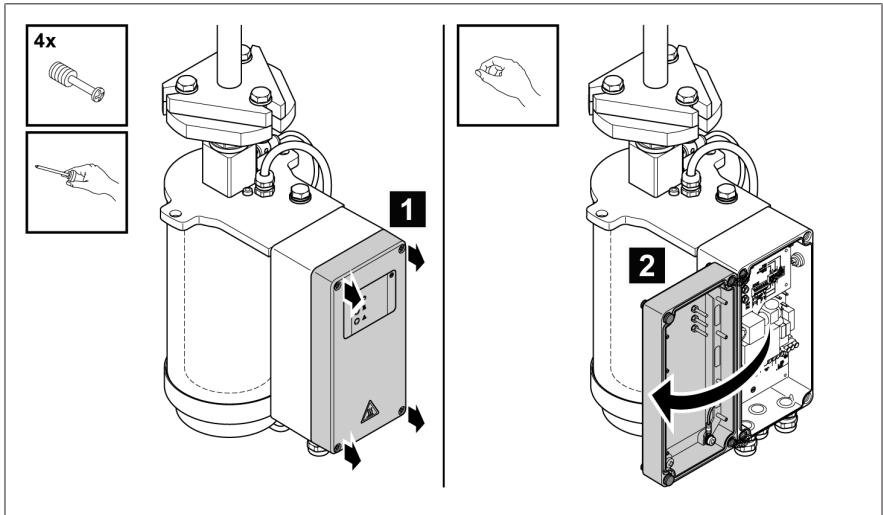


Figure 29: Removing the terminal box cover

2. Remove the supply voltage cable jacket and cut the cable so that the length of the PE wire is 50 mm longer than the wires for L and N. Strip 7 mm (1/4") of the insulation from the wires.

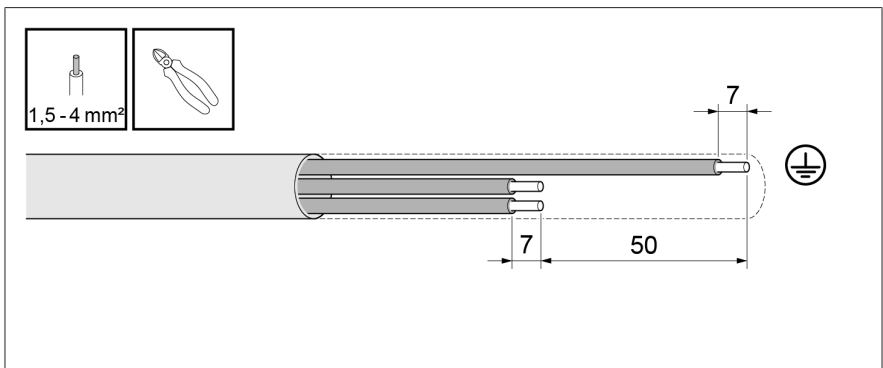


Figure 30: Preparing the cable

3. Remove the cable jacket from the relay and analog output cables and strip 7 mm (1/4") of insulation from the wires
4. Unscrew the leftmost of the three cable glands.

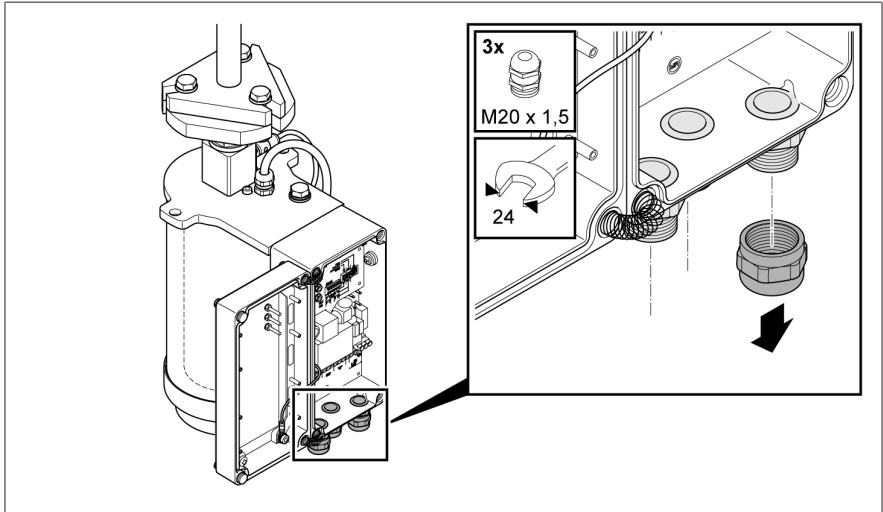


Figure 31: Unscrewing the cable gland

5. Insert a sufficient length of cable through the cable gland and rubber gasket and tighten the cable gland so that moisture from outside cannot penetrate the terminal box.

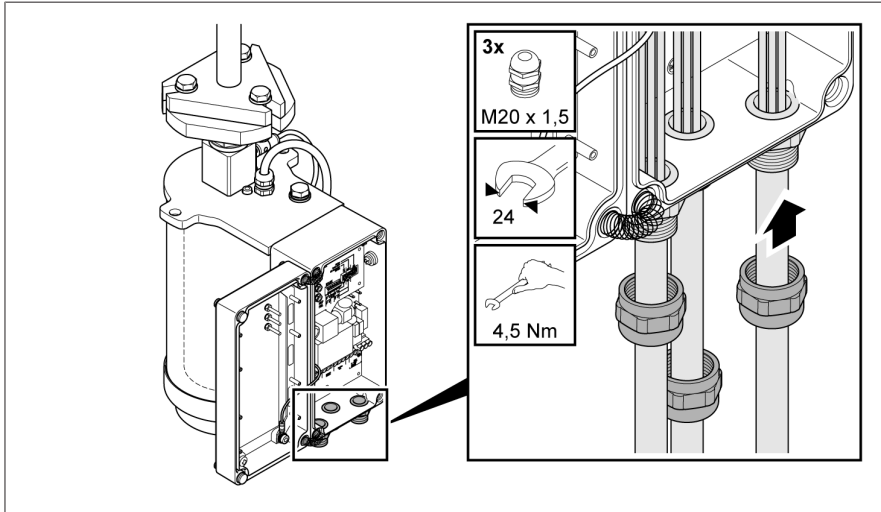


Figure 32: Closing the cable gland

## NOTICE

### Malfunction

Tightening the cable glands too tightly may result in line breaks and short circuits.

- Tighten the cable gland with a tightening torque of 4.5 Nm.

## NOTICE

### Malfunction

Unsealed or missing cable glands may result in dirt and moisture penetrating the device. This will lower or invalidate the protection class. Corrosion and malfunctions may occur.

- Remove transport dust-protection rings from unused cable glands and seal the cable glands using a dummy plug.
- Alternatively, replace the entire cable gland with a sealed locking screw.

## 6.5 Connecting the supply voltage

In order to connect the cable for the supply voltage, proceed as follows:

1. Insert the wire for the protective conductor into terminal 1 (PE) and tighten the screw terminal.
2. Insert the wire for the phase/plus into terminal 2 (L+) and tighten the screw terminal.
3. Insert the wire for the neutral conductor/minus into terminal 3 (N-) and tighten the screw terminal.

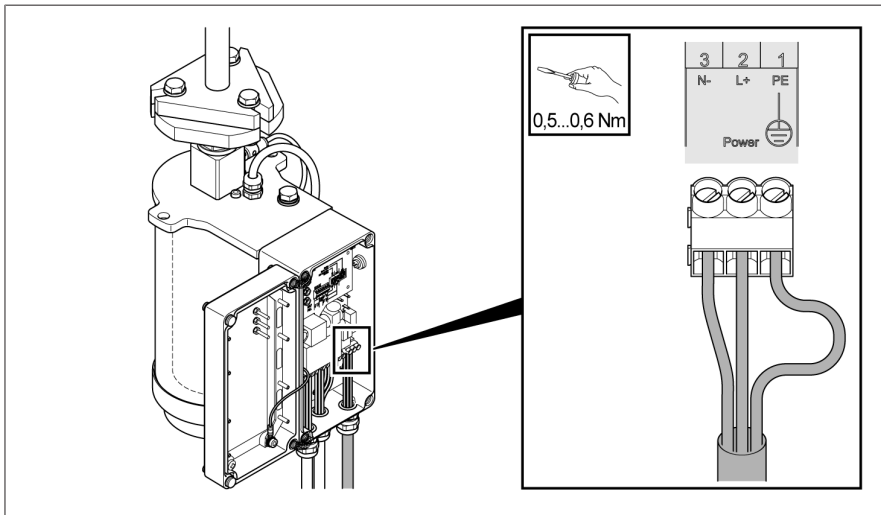


Figure 33: Connecting the supply voltage

Protective conductor class 1 specifies that PE, L and N must be connected to the device.

If there is no PE connection, the grounding screw must be used to ensure that the device is connected to ground. This connection must meet the requirements on a protective conductor. Refer to the chapter "2-conductor technology" below for connecting the grounding screw.

No further exceptions are possible, otherwise the safety of the device cannot be guaranteed.

The cable of the PE connection must be suitable for the cross-section of the power supply terminals 2 (L+) and 3 (N-).

An installation specialist must check the connection for conductivity with a meter.

### 2-conductor technology

If only power supply terminals 2 (L+) and 3 (N-) are to be connected, use a toothed washer between the housing and the lower O-ring. The material for establishing this additional ground connection is not included in the scope of delivery.

- Connect the grounding cable at the grounding point shown in the figure to the ground potential using an additional toothed washer.



Connection points, bolts and washers for grounding the device must not be lacquered.

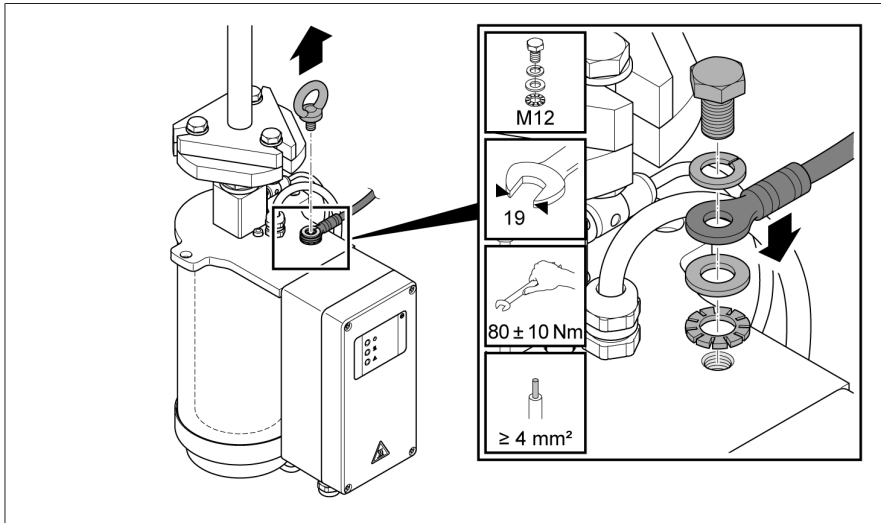


Figure 34: Device grounding with toothed washer



## 6.6 Connecting the regeneration signaling relay

### ⚠ WARNING



#### Electric shock!

The regeneration and device error signaling contacts may both be operated either with safety extra-low voltage (SELV) or with low voltage. For electrical safety reasons, mixed operation with both SELV and low voltage is not permitted.

In order to connect the cable for transmitting the regeneration signal (change-over contact), proceed as follows:

1. Insert the wires into terminals 5 and 6 (NC contact) or 4 and 5 (NO contact).
2. Tighten the screw terminals.

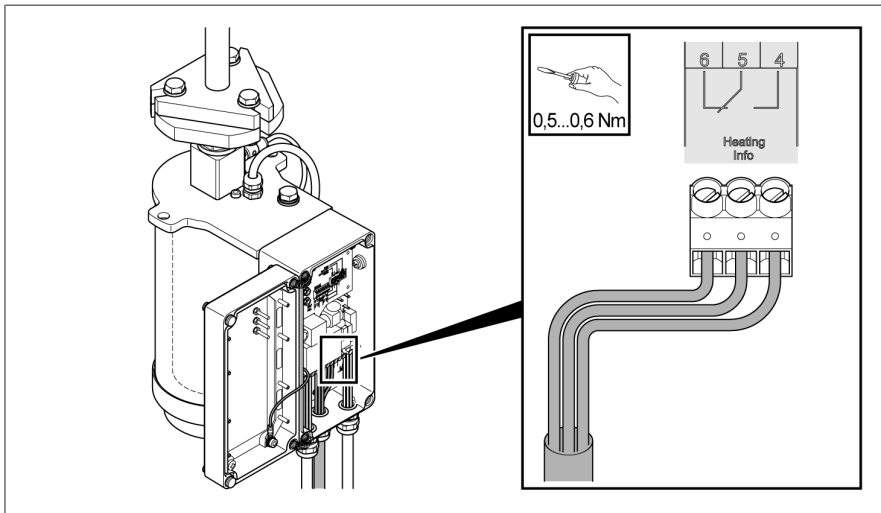


Figure 35: Regeneration signal cable

## 6.7 Connecting the device error signaling relay

### ⚠ WARNING



#### Electric shock!

The regeneration and device error signaling contacts may both be operated either with safety extra-low voltage (SELV) or with low voltage. For electrical safety reasons, mixed operation with both SELV and low voltage is not permitted.

In order to connect the cable for transmitting the device error signal (NC contact, failsafe), proceed as follows:

1. Insert the wires into terminals 7 and 8 (NO contact) or 8 and 9 (NC contact).
2. Tighten the screw terminals.

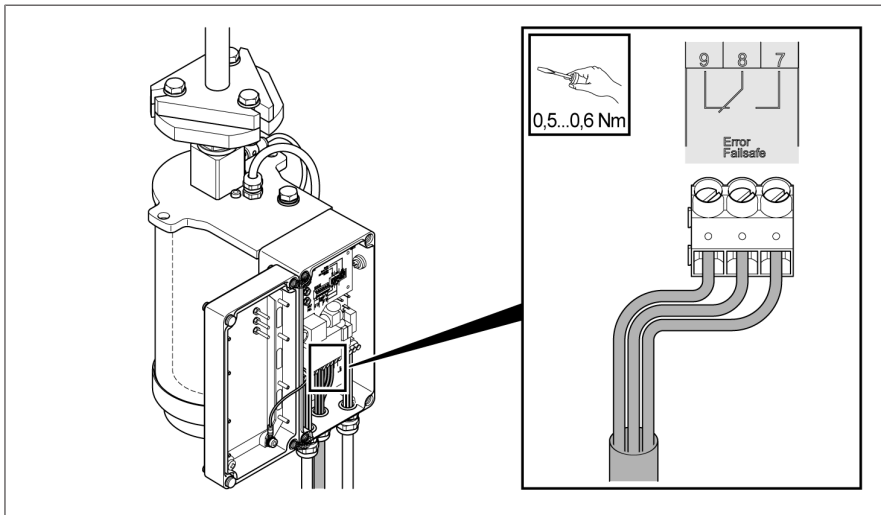


Figure 36: Device error signal cable

## 6.8 Connecting analog outputs

Analog 1 (left)	Analog 2 (right)
Temperature	Humidity

**i**

The analog outputs are active outputs. Observe the load resistance of 0...600  $\Omega$ .

To connect the cable for transmitting analog signal 1 for the temperature, proceed as follows:

1. Insert the wires into terminals 10(CL+) and 11(CL-).
2. Twist the shielding (if present) and insert it into terminal 12.
3. Tighten the screw terminals.

To connect the cable for transmitting analog signal 2 for the humidity, proceed as follows:

1. Insert the wires into terminals 13(CL+) and 14(CL-).
2. Twist the shielding (if present) and insert it into terminal 15.
3. Tighten the screw terminals.

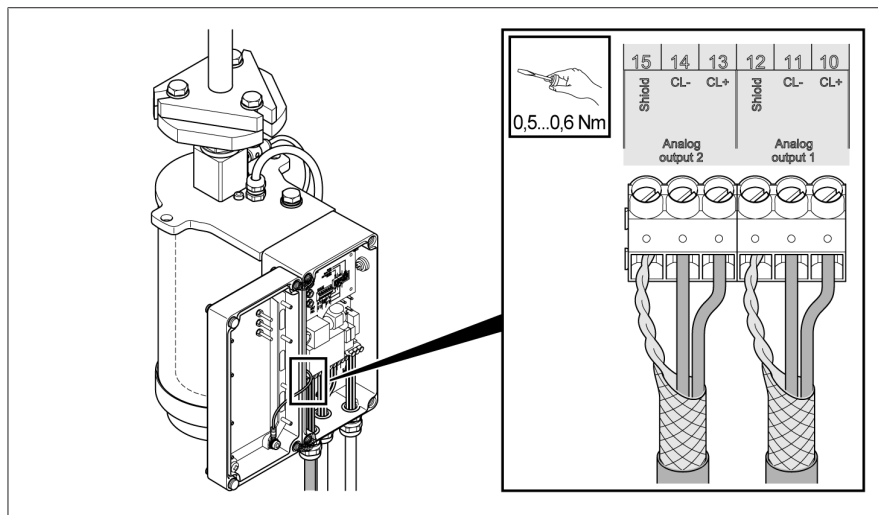


Figure 37: Analog outputs 1 and 2

**i**

The analog output signal is a 4...20 mA signal by default.

## 6.9 Connecting the RS485 interface and configuring Modbus

The dehydrating breather can be connected to a SCADA system via the RS485 interface. This is designed as a 4-conductor system (full duplex), but can also be integrated into a 2-conductor system (half duplex).

### RS485 interface assignment for Modbus RTU

PINs	4-conductor system	2-conductor system
1	Rx+	D+
1	Rx-	D-
2	Tx-	
2	Tx+	
	Shield	Shield
	Comm	Comm

## 6.9.1 4-conductor full duplex

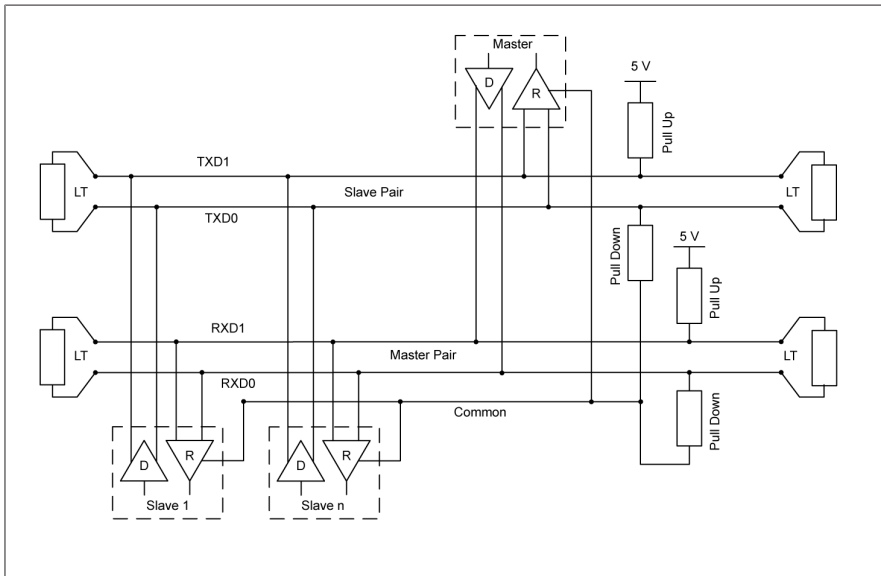


Figure 38: 4-conductor system

To connect the cables for integration into a 4-conductor system, proceed as follows:

1. Insert the wire for Rx+ into screw terminal "1 Rx+" and tighten.
2. Insert the wire for Rx- into screw terminal "1 Rx-" and tighten.
3. Insert the wire for Tx- into screw terminal "2 Tx-" and tighten.
4. Insert the wire for Tx+ into screw terminal "2 Tx+" and tighten.
5. Insert the wire for the ground potential into screw terminal "Comm" and tighten.

6. Twist the shielding, insert it into the "Shield" terminal and tighten.

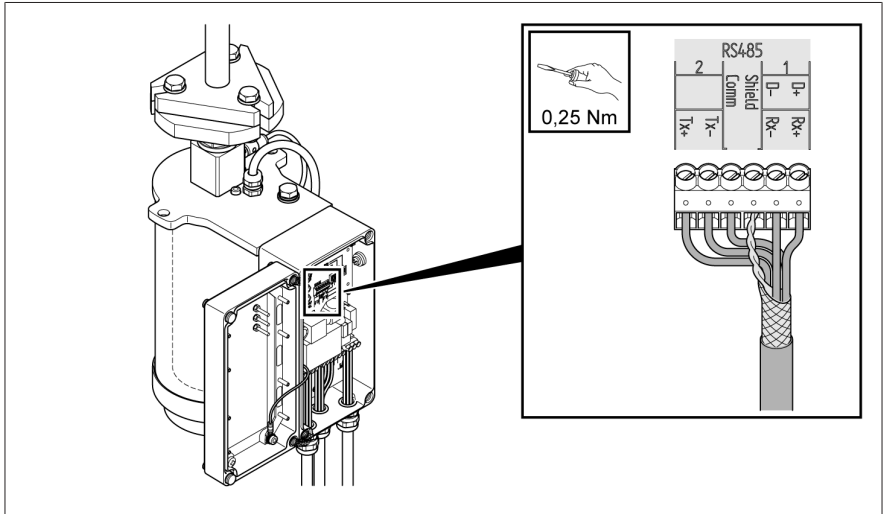


Figure 39: Connecting the full-duplex cable

### 6.9.2 2-conductor half duplex

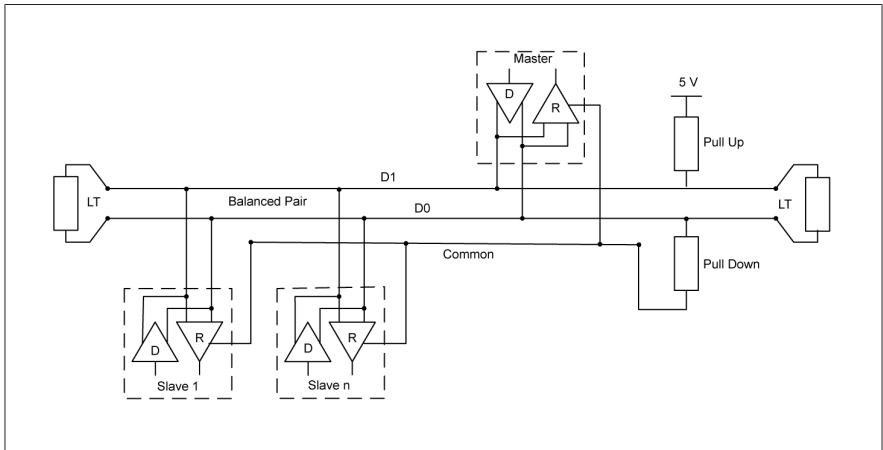


Figure 40: 2-conductor system

To connect the cables for integration into a 2-conductor system, proceed as follows:

1. Insert the wire for D+ into screw terminal "1 D+" and tighten.
2. Insert the wire for D- into screw terminal "1 D-" and tighten.
3. Insert the wire for the ground potential into screw terminal "Comm" and tighten.
4. Twist the shielding, insert it into the "Shield" terminal and tighten.

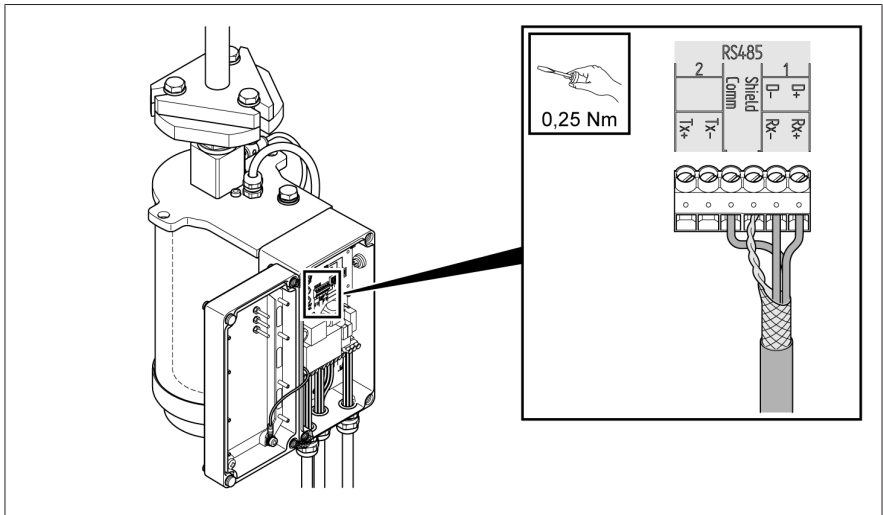


Figure 41: Connecting the half-duplex cable

### 6.9.3 Notes on connecting to the MR sensor bus

The optionally available MR sensor bus function lets you connect digital and analog sensors to the device over Modbus RTU. The MR sensor bus supports the connection of up to 31 sensors (Modbus server). The ISM<sup>®</sup> device operates as a Modbus client.

**i**

Ensure that no other Modbus client is connected over the MR sensor bus. Assign a unique Modbus address to each sensor you are connecting over MR sensor bus. The MR sensor bus may experience errors if multiple sensors are using the same Modbus address.

Observe the following notes for connecting the sensors:

- **NOTICE!** Damage to the device or sensor. Connect all of the sensors to a potential equalization rail to avoid circulating currents over the MR sensor bus.
- The MR sensor bus uses Modbus in a 2-wire configuration (2W). The 4-wire configuration (4W) is not supported.
- You must connect the sensors via a shielded line with 3 conductors (D0, D1, Common). The data lines (D0, D1) must be in twisted pairs. Note the cable recommendation.
- Stub lines from the bus node to the respective device must be shorter than 20 m.
- You may connect the sensors directly to the CPU assembly or via an optional transfer module.
- The CPU assembly contains a terminating resistor (120  $\Omega$ ) at the COM2 interface. Install another terminating resistor (120  $\Omega$ , 0.5 W) at the other end of the bus.
- The CPU assembly contains a pull-up resistor and a pull-down resistor (each of 680  $\Omega$  in accordance with the Modbus specification). No additional pull-up/pull-down resistors are needed.



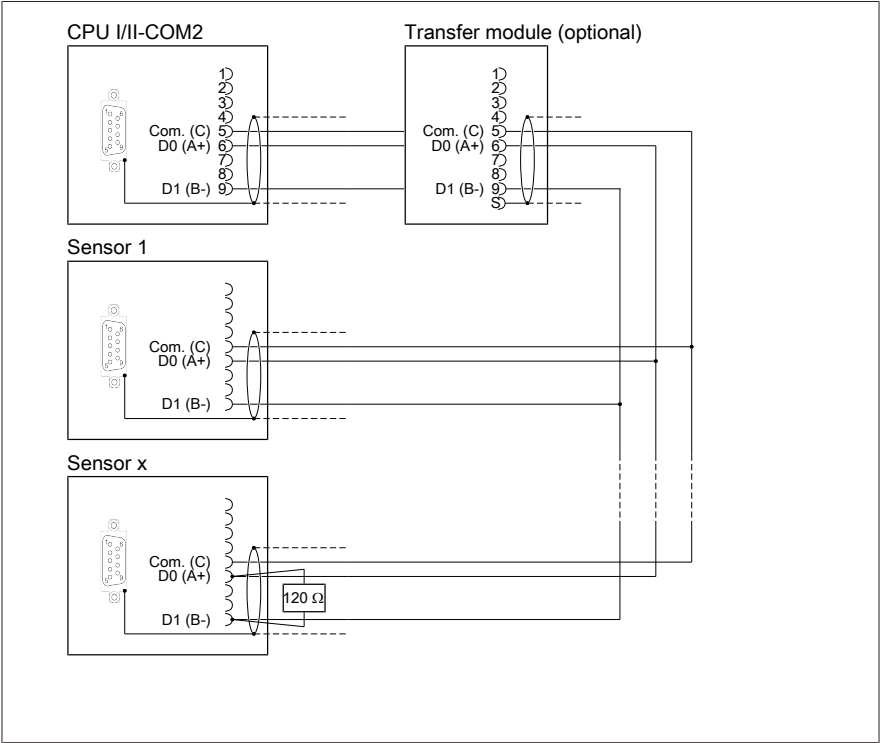


Figure 42: Connection example MR sensor bus to CPU I/II-COM2 with optional transfer module

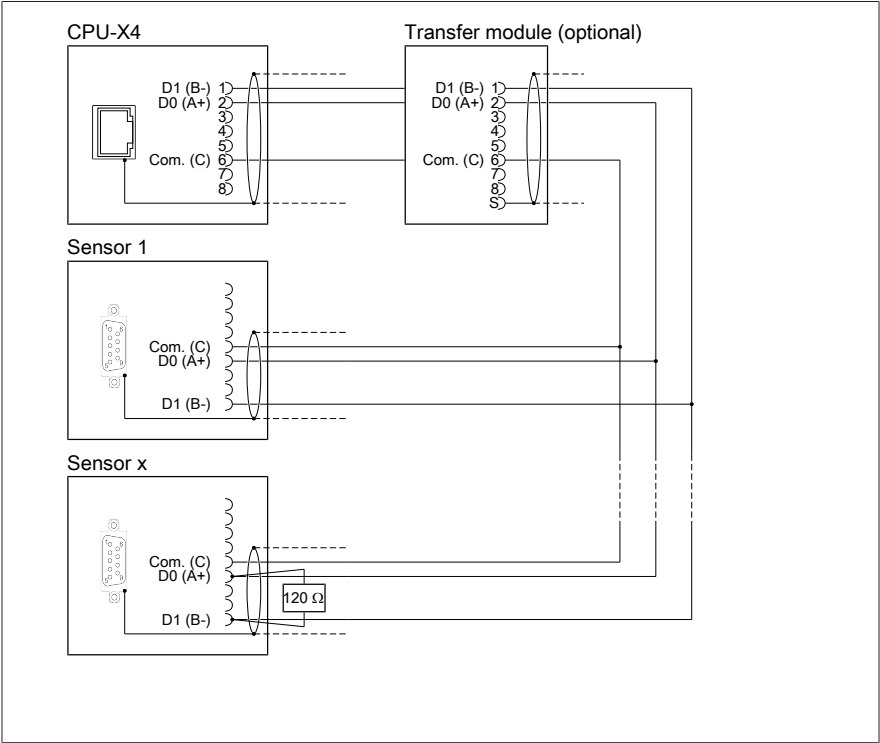


Figure 43: Connection example MR sensor bus to CPU-X4 with optional transfer module

## 6.9.4 ECOTRAC® SMART BREATHER

If you would like to use an ECOTRAC® SMART BREATHER sensor, you must connect the sensor to the RS485 plug terminals on the sensor bus.

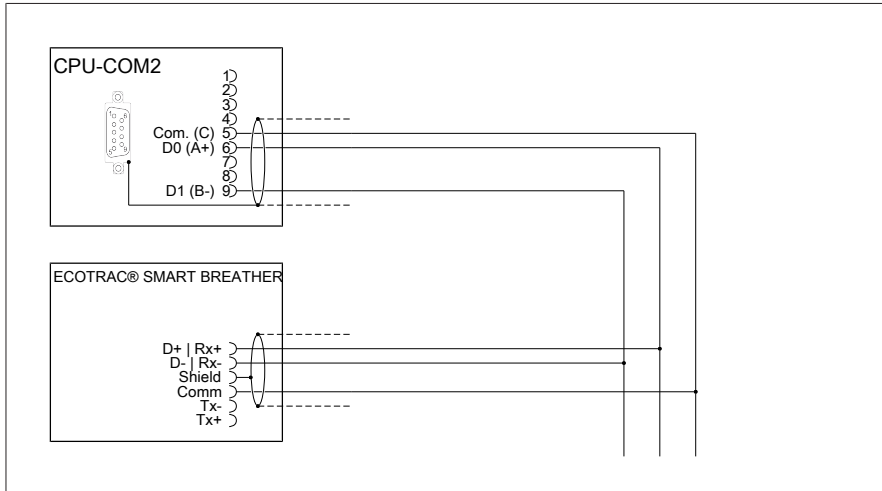


Figure 44: Connection example ECOTRAC® SMART BREATHER (terminal RS485)

You must enable the half-duplex operating mode on the sensor by switching the "Duplex mode" switch to the "HALF" setting. If the ECOTRAC® SMART BREATHER sensor is the only bus device or the last bus device, you must activate the sensor terminating resistor by switching the "BUS termination 120 ohms" switch to the position "1 = ON" and "2 = OFF".

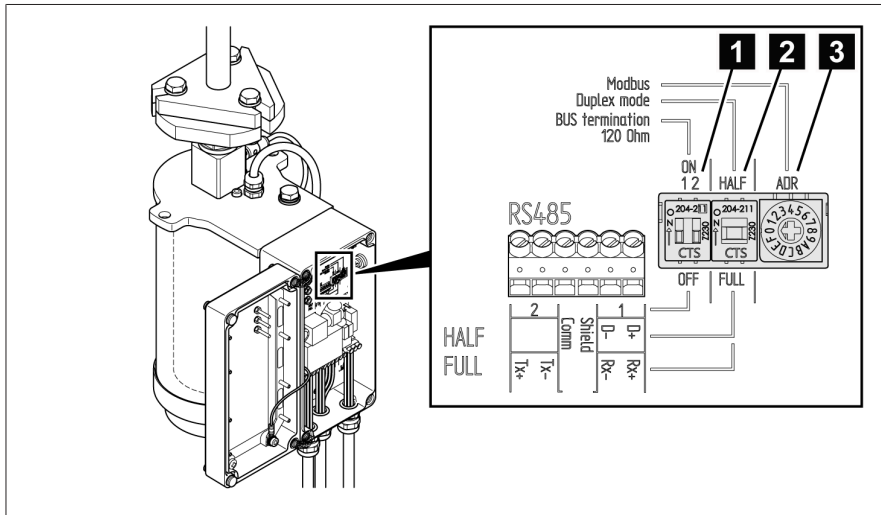


Figure 45: Modbus configuration

1	Terminating resistor: in half duplex mode: 1 = ON, 2 = OFF; in full duplex mode: 1 = ON, 2 = ON	2	Operating mode: HALF = half duplex, FULL = full duplex
3	Modbus address		

## 6.9.5 Modbus settings

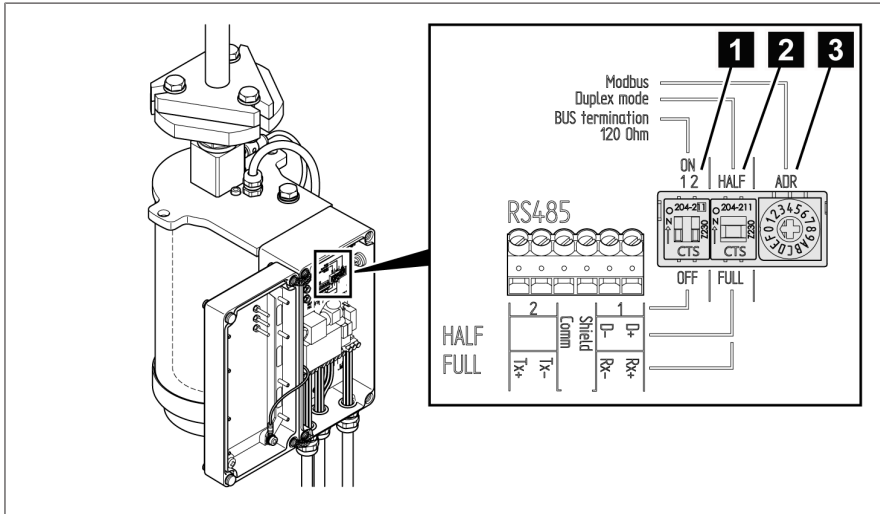


Figure 46: RS485 settings

### Half-duplex or full-duplex operation

To set the dehydrating breather for half-duplex operation, proceed as follows:

- Set the "Duplex mode" switch **2** to the "HALF" position.

To set the dehydrating breather for full-duplex operation, proceed as follows:

- Set the "Duplex mode" switch **2** to the "FULL" position.

### Half-duplex operation terminating resistor

If the dehydrating breather set to half-duplex operation is the last device in the bus system, the device is to be terminated with a 120-ohm resistor. To do so, proceed as follows:

- Set the left-hand switch on "BUS termination 120 Ohm" **1** to the "ON" position.

### Full-duplex operation terminating resistors

If the dehydrating breather set to full-duplex operation is the last device in the bus system, the device is to be terminated with two 120-ohm resistors. To do so, proceed as follows:

- Set both switches on "BUS termination 120 Ohm" **1** to the "ON" position.

## Changing the Modbus address of the device

The Modbus address of the device is set to 3 (ADR switch position 3) as standard. In this setting, the transmission speed is 19,200 baud and the parity is "EVEN". The Modbus address of the device can be changed via the "ADR" switch **3** (see the chapter "RS485 communication settings").

## 6.10 Closing the terminal box

To close the terminal box again, proceed as follows:

1. Check the grounding cable in the terminal box.

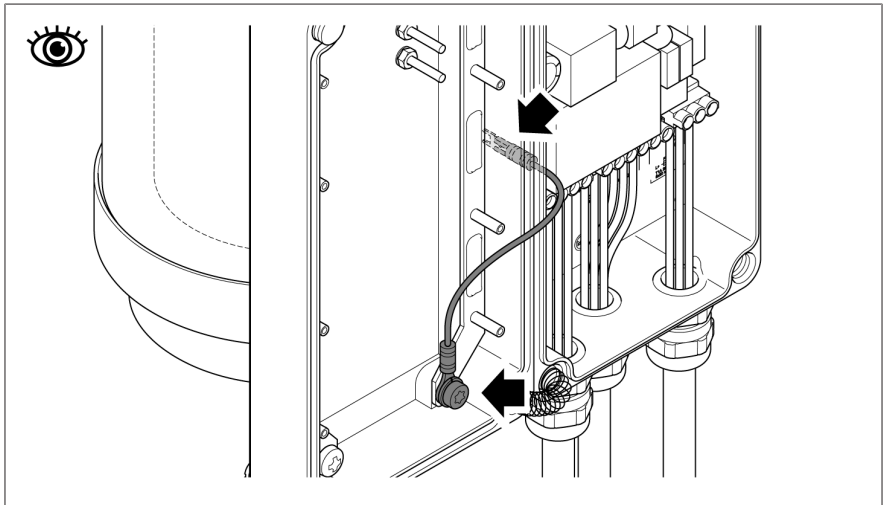


Figure 47: Terminal box grounding cable

2. Ensure that the grounding cable to the housing cover is not damaged when closing the terminal box.

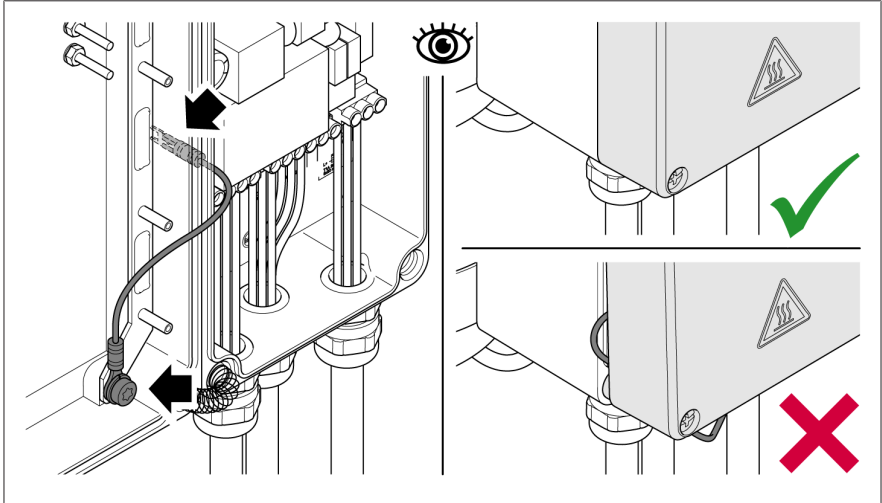


Figure 48: Visual inspection

3. Set the cover of the terminal box properly on the bottom of the housing. If necessary, grease the four housing screws (e.g. with Autol TOP 2000) and then tighten them.

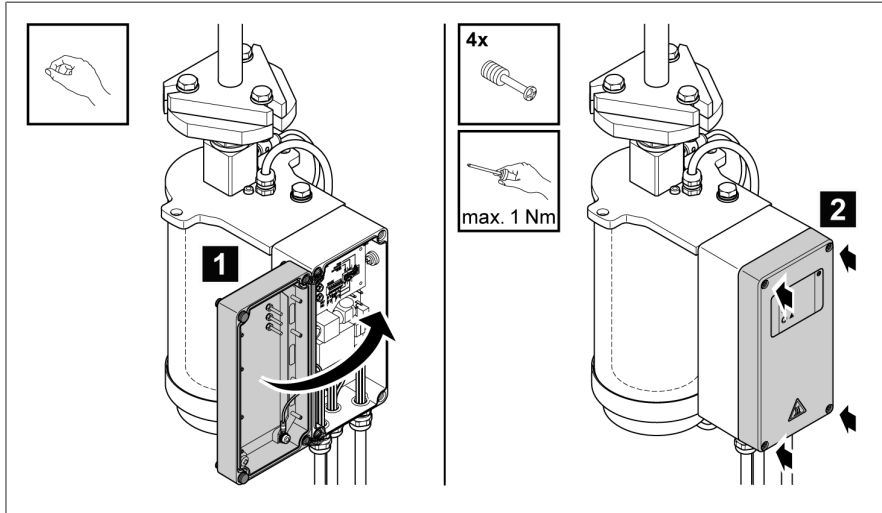


Figure 49: Closing the terminal box cover



If necessary, also grease the four socket screws on the sensor unit (e.g. with Autol TOP 2000).

## 6.11 Additional device grounding

The device has an additional grounding point which, if required, can be connected to the ground potential. The material for establishing this additional ground connection is not included in the scope of delivery.

- Connect the grounding cable at the grounding point shown in the figure to the ground potential.



Connection points, bolts and washers for grounding the device must not be lacquered.



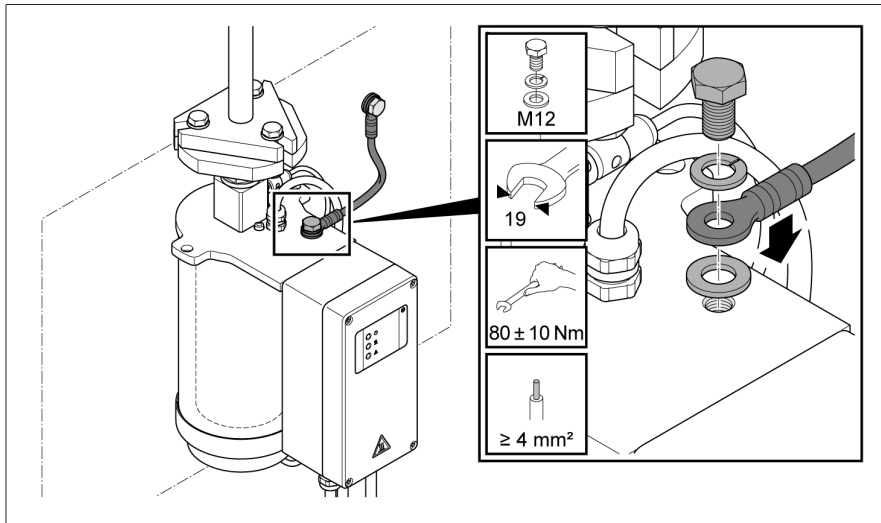


Figure 50: Additional grounding point

## 6.12 Dielectric test

### NOTICE

#### Damage to the device!

Incorrect test voltage can cause damage to the device.

➤ Carry out dielectric testing with a maximum of 500 V DC.

- ✓ Prepare the test device.
- ✓ De-energize the dehydrating breather.

1. Conduct a test between the protective conductor (PE) at terminal 1 and neutral conductor (N-) at terminal 3.
2. Conduct a test between the protective conductor (PE) at terminal 1 and phase (L+) at terminal 2.

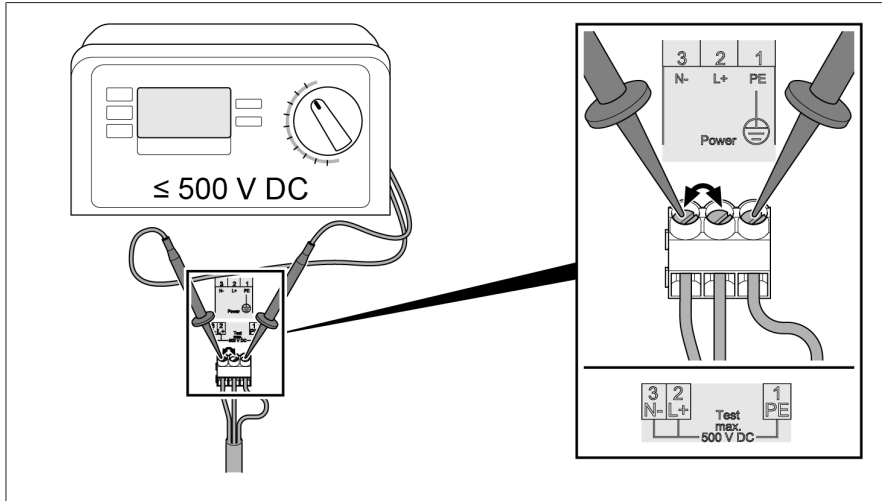


Figure 51: Dielectric test



If the device is not operated in the European Community, the national regulations for conducting the dielectric test in the respective country of use must be observed.

## 6.13 Ground test

Before commissioning, perform a grounding test (test of the impedance of the protective bonding) in accordance with IEC 61010-1/AMD1. Observe the following information when testing:

- Test current: 2 times the rated current of the overcurrent protection device in the supply line.
- Test duration: 1 minute for each measurement point.
- The measured voltage between the measurement point and the protective conductor must be less than 10 V.

To carry out the ground test, proceed as follows:

1. Feed the test current in at the fixing screw of the grounding cable using a constant current source and measure the voltage between the measurement point and the protective conductor connection at terminal 1.
  - » The measured voltage must remain less than 10 V for a period of 1 minute.

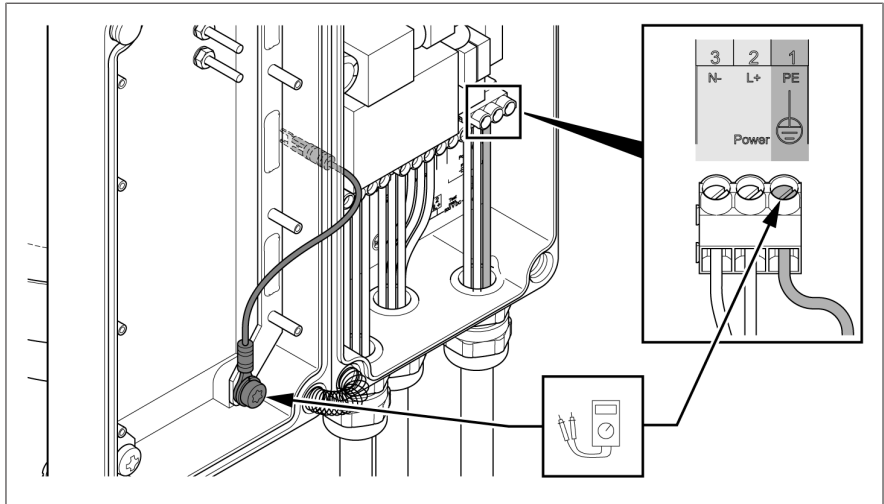


Figure 52: Protective bonding test

# 7 Commissioning

## NOTICE

### Damage to the device!

Damage to the electronics of the dehydrating breather due to incorrect supply voltage!

- ✓ Make sure that the correct supply voltage in accordance with the nameplate is present on the energized miniature circuit breaker.
- > Switch on the supply voltage using an external isolating device.

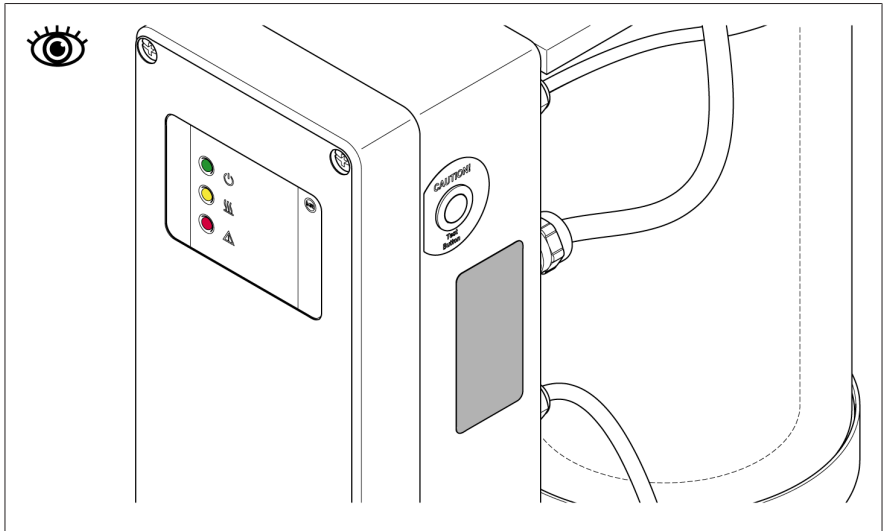


Figure 53: Nameplate

## 7.1 Device self test during commissioning

The dehydrating breather LED signaling during commissioning is explained in the following. Observe the following legend for the respective LED state.



Figure 54: LED legend

1	LED lights up
2	LED flashing
3	LED off

The device performs a device self-test independently after the supply voltage is applied. During the entire self-test, the outer LEDs flash successively.

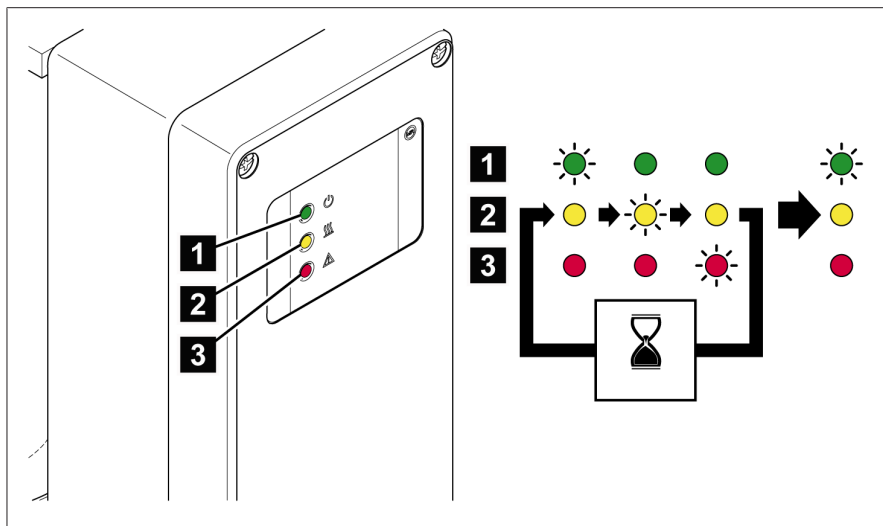


Figure 55: LED signaling during commissioning

After concluding the self-test, the green power LED remains constantly lit. If an error was detected, this is displayed via the LEDs (see the chapter "Error messages and troubleshooting").

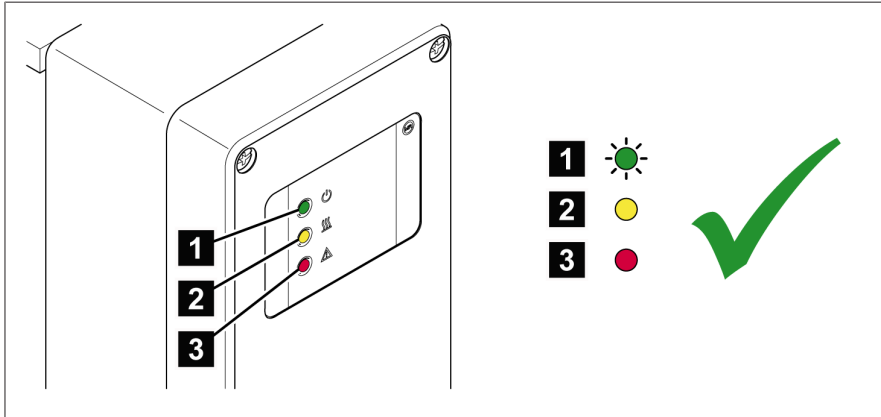


Figure 56: Error-free operation

An extended test triggered by the user can be started using the test button (see the chapter "Test button").

## 7.2 Adjusting Modbus settings

For information on adjusting or testing the Modbus settings (see the chapter "Modbus settings").

## 8 Operation

During error-free operation, the green power LED is constantly lit and the red error LED is off.

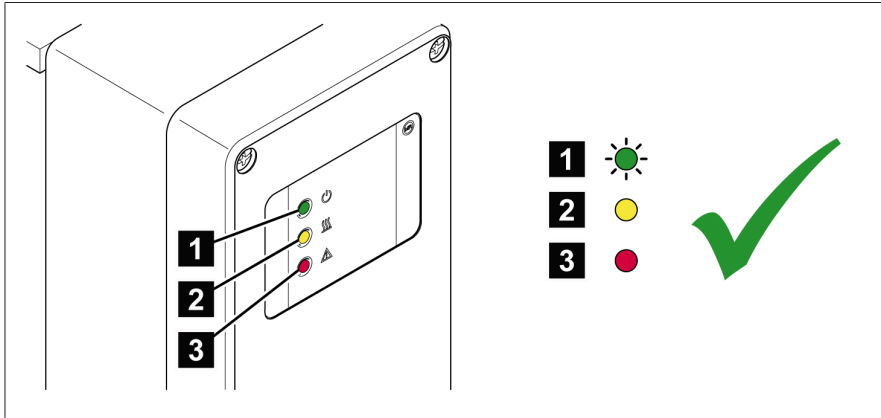


Figure 57: Error-free operation

If the LED **1** and/or LED **2** issues a lit and flashing signal and the device malfunction LED **3** is off, observe the information in the chapter "Status messages".

If the silica gel is heat-dried during error-free operation, the yellow LED **1** then lights up continuously in addition to the green LED **2**. This state can be transmitted over the "Regeneration" signaling relay for central data collection and further processing of the dehydrating breather status.

### ⚠ CAUTION



#### Risk of burns!

Danger of bodily injuries due to heat!

- > During regeneration (yellow LED **2** lights up continuously), do not touch the glass cylinder of the desiccant container.

## ⚠ CAUTION



**Slipping hazard!**  
Danger to health!

- > In case of temperatures at or below freezing, any escaping condensation can lead to icy ground beneath the device. In this case, do not step under the device.

## NOTICE

### Malfunction due to contaminated silica gel

Prevent the silica gel becoming contaminated due to direct contact with the insulating fluid.

In the event of the silica gel being contaminated with insulating fluid, refer to the notes in the chapter "Error messages and troubleshooting (Contaminated silica gel)".

If a device error LED **3** lights up or flashes, please observe the error table in the chapter Error messages and troubleshooting.

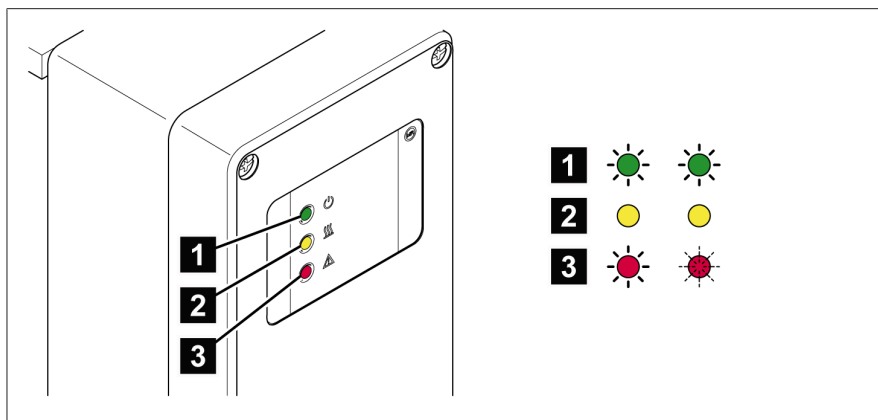


Figure 58: Signaling device errors

This also applies if an error is signaled via the "device error" relay.



i

If the fuse fails, it can be easily replaced (see the chapter "Fuse").

If this continues to happen, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>

## 9 Error messages and troubleshooting

Before opening the terminal box or when checking the cables and sensors, always observe the following safety information:

### ▲ WARNING



#### Electric shock

Risk of fatal injury due to electrical voltage.

- De-energize the device and system peripherals and take measures to ensure that they cannot be switched back on.

### NOTICE

#### Damage to the device!

Electrostatic discharge may cause damage to the device.

- Take precautionary measures to prevent the build-up of electrostatic charges on work surfaces and personnel.

In terms of device functionality, a distinction must be made between air dehydration and automatic regeneration.

Air is dehydrated fully mechanically via the silica gel, and this function does not depend on a supply of electricity. The device searches for a suitable time window for regenerating the silica gel. To make this happen, the device must always be supplied with voltage, with an exception during maintenance work on the transformer, for example.

The electronics monitor and regulate automatic regeneration, thus ensuring that the dehydrating breather can be operated without maintenance. The electronics have no effect on the dehydrating performance of the device. Any error messages arising relate solely to the automatic regeneration, and therefore do not require an immediate response. Error messages do not indicate a danger to the transformer or tap changer.

We recommend that the device be checked over within a week of an error message arising.

i

If you would like to acknowledge an error that is no longer present, press the test button on the side of the terminal box. If several errors were present, they must be acknowledged individually one after the other. The LED signaling will then be reset, and the signaling relay for device malfunctions (failsafe) will pick up again after all errors have been acknowledged.

If an error occurs that you cannot remedy yourself, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>

Using the self-monitoring function, the device identifies internal errors and signals them by illuminating and flashing LEDs **1** **2** **3** in different ways. In addition, an error is signaled via the device error relay (failsafe).

i

The device error relay is energized in normal operation and drops out after a delay (> 7 seconds) after switching off the supply voltage so as to avoid generating an error message during short interruptions of the supply voltage.

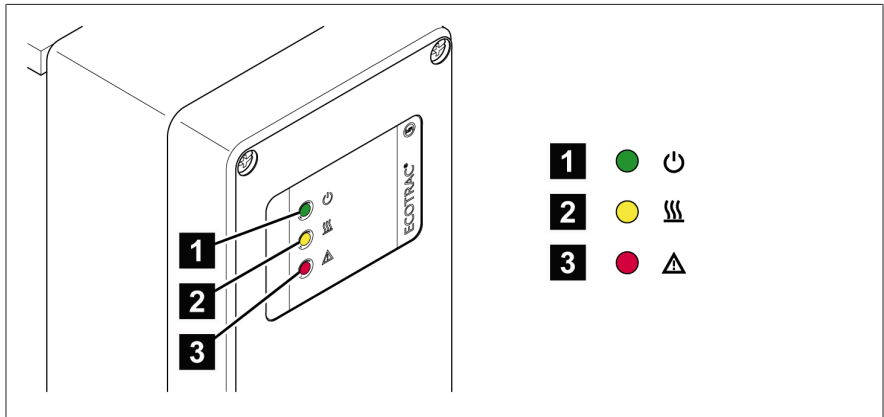


Figure 59: LEDs

1	LED green	2	LED yellow
3	LED red		

## 9.1 Error messages

The individual errors and possible corrective actions are listed in the following table. If a suitable corrective action cannot be found in this table, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>













LED green	LED yellow	LED red	Error	Measure
			Dehydrating breather not working	<p>Check whether the isolating device for the voltage supply is switched on.</p> <p>Check whether the supply voltage is connected correctly.</p> <p>Check that the supply voltage is in accordance with the nameplate.</p> <p>Check the fuse and replace if necessary.</p>
			Sensor failure on the desiccant container	<p>Check the cable connection of the sensor <b>5</b> and tighten by hand if necessary (1 Nm +/- 0.2 Nm).</p> <p>Check the sensor cable <b>6</b> for damage.</p> <p>Check the sensor contacts and sensor cable socket <b>4</b> for corrosion.</p> <p>The sensor may be soiled or defective.</p>
			Error when heat-drying the desiccant container	<p>Check the wiring of the supply voltage; retighten terminals if necessary.</p> <p>Check that the supply voltage is in accordance with the nameplate.</p> <p>Check the cable for silica gel heating <b>3</b> for damage.</p> <p>The silica gel heating may be defective.</p>
			Internal error	General device error

Table 6: Error messages

○ = LED OFF

☀ = LED ON

☀ (with dots) = LED FLASHING

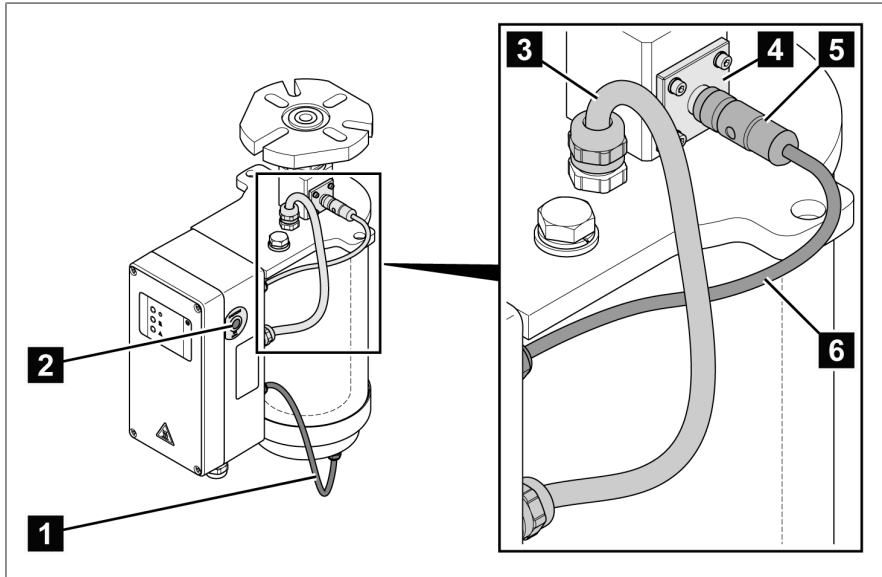


Figure 60: Tests

1	Filter-heater supply cable	2	Test button
3	Silica-gel heating supply cable	4	Sensor cable socket
5	Sensor cable gland	6	Sensor cable

## 9.2 Status messages

The individual status messages that do not have an error as the cause are listed in the following table.













LED green	LED yellow	LED red	Status messages	Measure
			Device is active	
			Device is sending data logger data	Optional software for output via USB is necessary.
			Device is in regeneration mode	
			RTC battery voltage too low	Replace battery (CR2032).

Table 7: Signaling state

 = LED OFF

 = LED ON

 = LED FLASHING

## 9.3 Fuse



If the fuse fails again, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>

A fine-wire fuse is installed on the circuit board in the terminal box to protect the control electronics. This can be replaced by a replacement fuse if needed.

To replace the fuse, proceed as follows:

1. De-energize the dehydrating breather.
2. Open the terminal box of the dehydrating breather. To do so, unscrew the 4 captive screws on the housing cover. Open the cover of the terminal box.

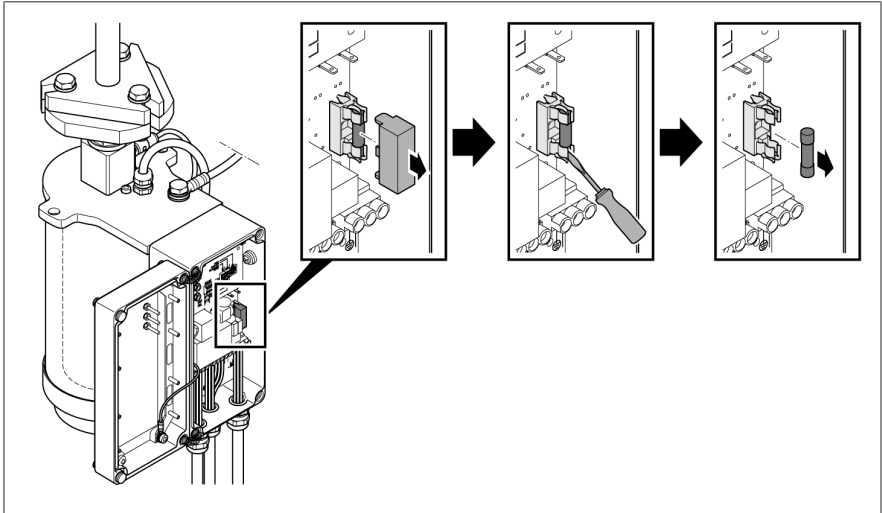


Figure 61: Removing the fine-wire fuse

3. Remove the safety cover.
4. Using a screwdriver, carefully move under one end of the fuse and lift it out of the holder.
5. Remove the fuse.
6. Position the new fuse (5x20 mm; T2A; 250 V) with both ends on the holder and carefully press down until it snaps in place.

7. Refit the safety cover.

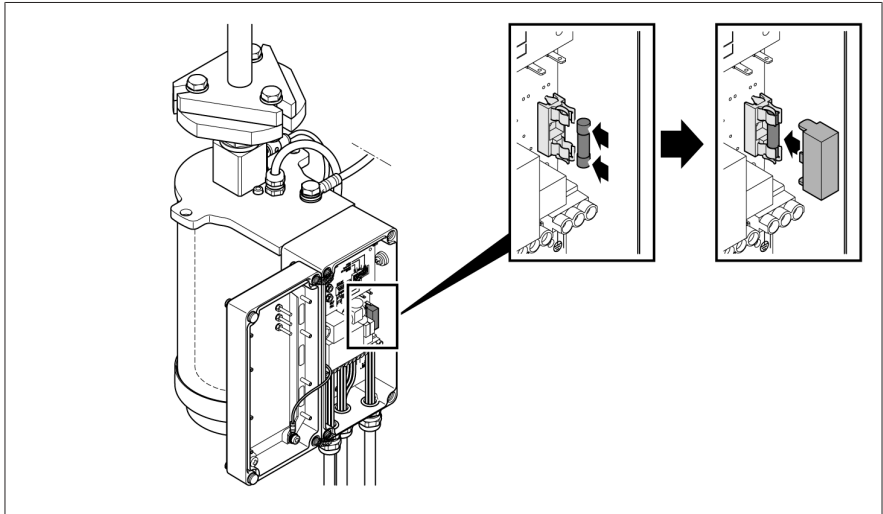


Figure 62: Inserting the fine-wire fuse

8. Close the terminal box again.



## 9.4 Replacing the battery (CR2032)

If the following LED signaling arises, the CR2032 battery in the device needs to be replaced.

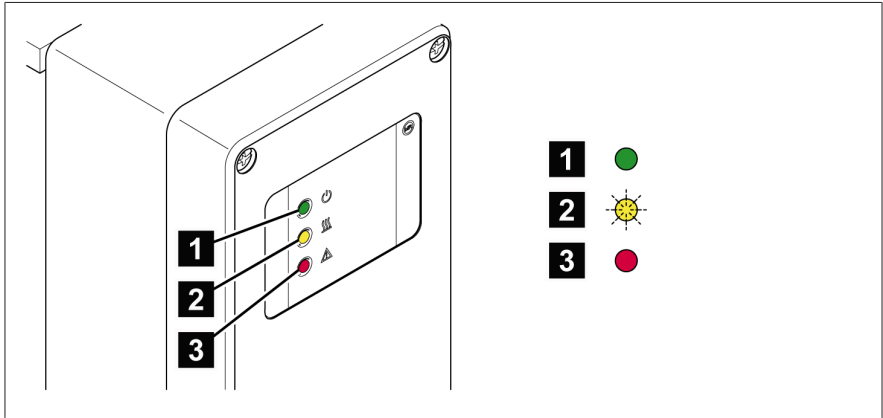


Figure 63: Battery exhausted

To replace the CR2032 battery in the device, proceed as follows:

- ✓ New battery is available.
  - ✓ The device and system peripherals have been de-energized and measures have been taken to ensure that they cannot be switched back on.
1. Open the terminal box of the dehydrating breather. To do so, unscrew the 4 captive screws on the housing cover. The cover is held on the left-hand side by spring hinges and can be swung open to the left.
  2. Remove the exhausted CR2032 battery from the battery holder.

3. Insert the new battery quickly and do not allow several minutes to pass, because otherwise the internal time will no longer match the current time. When doing so, ensure the polarity is correct.

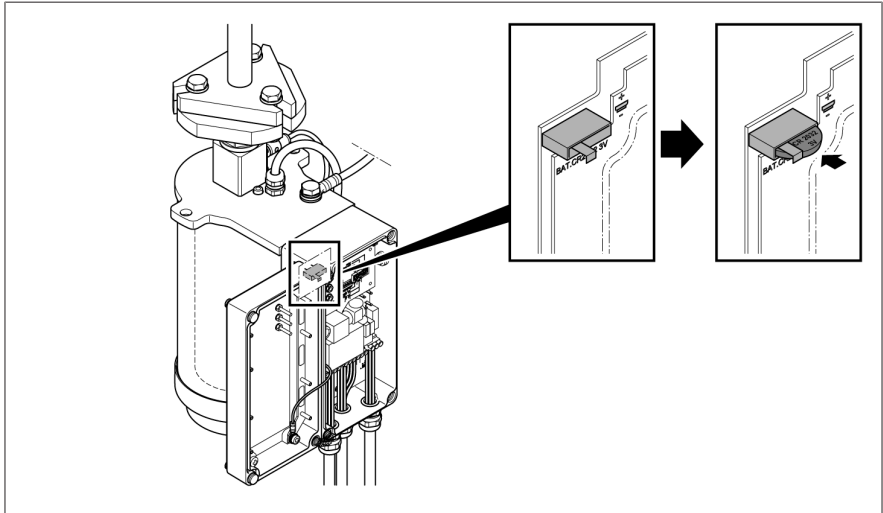


Figure 64: Replacing the CR2032 battery

4. Close the terminal box again (see chapter "Terminal box").
5. Recommission the device (see chapter "Commissioning").

## 9.5 Contaminated silica gel

The silica gel must not come into direct contact with the insulating fluid. In the event of the dehydrating breather being inadvertently flooded with insulating fluid, it must be thoroughly cleaned, the silica gel replaced completely and the correct function tested.

In the event of the device flooding, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>

# 10 Maintenance, inspection and care

## ⚠ CAUTION



### Risk of burns!

Danger of bodily injuries due to heat!

- > During regeneration (yellow LED **2** lights up continuously), do not touch the glass cylinder of the desiccant container.

## 10.1 Maintenance

The dehydrating breather does not require maintenance.

## 10.2 Inspection

Depending on the conditions of use of the device and the national specifications in the respective country of use, the transformer manufacturers can specify different inspection intervals.

1. Observe the inspection intervals defined in CIGRE Publication No. 445, "Guide for Transformer Maintenance", or observe the inspection intervals specified by the transformer manufacturer.
- 2.

Carry out the following inspections within the specified intervals:

Interval	Measure	Detail
During <b>each</b> transformer inspection	Visual inspection	Check the external condition of the device for contamination, damage and corrosion.
During <b>each</b> transformer inspection	Dust protection tube check	Carefully clear contamination from the dust protection tube. Do not use any sharp-edged or pointed tools. Also refer to the chapter "Function description".
During <b>each</b> transformer inspection	LED check	Check the display of the LEDs.
During <b>each</b> transformer inspection	Flange connection check	The flange and counter flange must be parallel to each other. Also refer to the chapter "Installation".
During <b>each</b> transformer inspection	Sensor plug connector check	Check the cable gland of the temperature and humidity sensor and tighten by hand if necessary (1 Nm +/- 0.2 Nm). Also refer to the chapter "Error messages".
During <b>each</b> transformer inspection	Silica gel check	Only use clean and colorless silica gel. The container must be full.
During <b>each</b> transformer inspection	Terminal box check	Check the terminal box for odors, signs of overheating, contamination and moisture.

Interval	Measure	Detail
During <b>each</b> transformer inspection	Housing screws and hexagon socket screws check	<ul style="list-style-type: none"> <li>– If the device is opened for inspection purposes (e.g. for repeated insulation or ground testing or for reading off log data), the housing screws need to be inspected for corrosion and, if necessary, re-greased (e.g. with Autol TOP 2000).</li> <li>– If necessary, also grease the four socket screws on the sensor unit if the air is aggressive (e.g., increased salinity or sulfur content).</li> </ul>
During <b>each</b> transformer inspection	Wiring check	Check the state of the wiring: no bare ends, no pinching, no loose wires.
During <b>each</b> transformer inspection	Signaling path check	Use the test button to check the signaling paths (see the next chapter).

Table 8: Inspection plan

In the event of questions or discrepancies, please contact the MR Reinhausen customer portal: <https://portal.reinhausen.com>

### 10.3 Test button



If there was an error on the dehydrating breather, this must be acknowledged prior to conducting a function test. If several errors were present, they must be acknowledged individually one after the other. If an error remains present, it is not possible to conduct a function test at this time.

i

It is also not possible to conduct a function test if the device is heat-drying (yellow LED **2** is lit). If the test button is actuated in this case, all LEDs will flash simultaneously 10 times.

The test button can be used to force a function test to be performed.

### Quick test

If the test button is held down briefly ( $\leq 3$  seconds), the humidity level in the upper air spout will be displayed for 30 seconds.

### Long test

If the test button is held down for a longer period ( $> 3$  seconds) and then released, the following tests will be performed:

- Heating test
- Analog output test
- Failsafe relay test

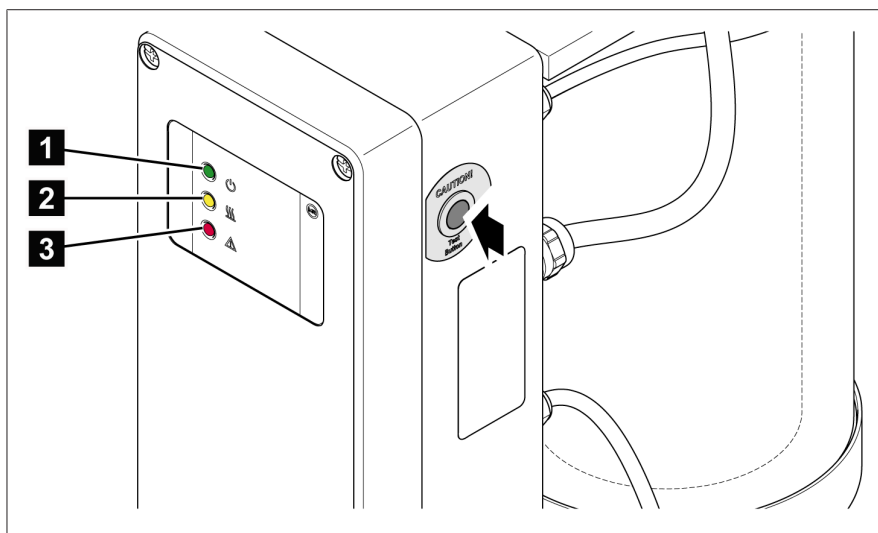
































Figure 65: Test button

### 10.3.1 Quick test

LED green <b>1</b>	LED yellow <b>2</b>	LED red <b>3</b>	Humidity level	Measure
			≤10% R.H.	Humidity OK.
			≤10% R.H.	Humidity OK. Regeneration imminent.
			≤10% R.H.	Humidity OK. Regeneration performed within the last 7 days.
			>10% and <20% R.H.	Humidity OK.
			>10% and <20% R.H.	Humidity OK. Regeneration imminent.
			>10% and <20% R.H.	Humidity OK. Regeneration performed within the last 7 days.
			20% R.H.	Regeneration imminent.

LED green <b>1</b>	LED yellow <b>2</b>	LED red <b>3</b>	Humidity level	Measure
			>20% R.H.	Humidity increased, even though regeneration has been performed within the last 7 days. The device may be inadequately dimensioned or the silica gel may be contaminated. Check the installation situation. Are all transition points of the piping still sealed tightly?
			>40% R.H.	<b>WARNING!</b> The humidity is too high. Regeneration imminent. The device may be inadequately dimensioned or the silica gel may be contaminated. Check the installation situation. Are all transition points of the piping still sealed tightly?
			>40% R.H.	<b>WARNING!</b> Humidity is too high, even though regeneration has been performed within the last 7 days. Check the installation situation. Are all transition points of the piping still sealed tightly?

 = LED OFF

 = LED ON

 = LED FLASHING



### Starting a quick test in normal operation

- ✓ Device is not in the regeneration process (the silica gel is not being heat-dried; the yellow LED **2** is off).
- 1. Briefly press the test button (hold down for  $\leq 3$  seconds).
  - » The start of the quick test is signaled by an LED sequence (see the following figure).
  - » The code for the device humidity will be displayed via the LEDs (see table) for 30 seconds.
- 2. If necessary, make a note of the code for the humidity.
  - » The end of the quick test is signaled by an LED sequence (see the following figure). After this, the power LED **1** alone is permanently lit in error-free operation.

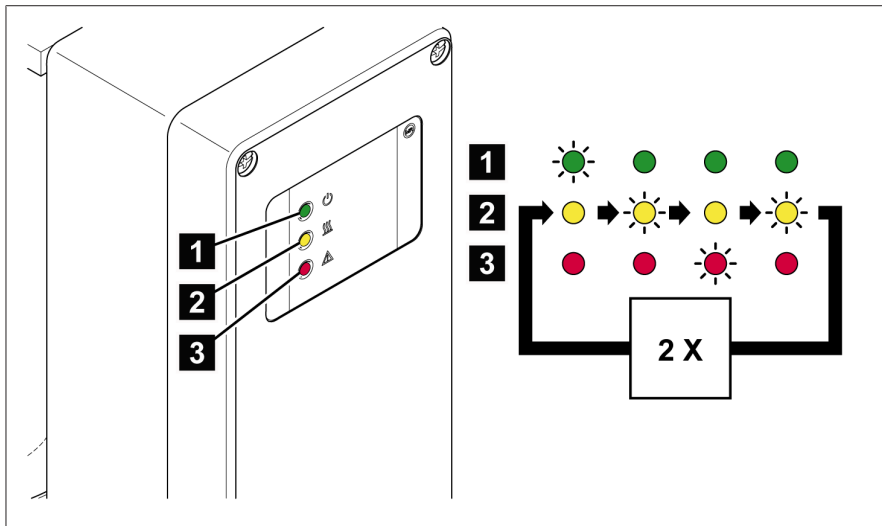


Figure 66: LED signal sequence at the beginning and end of the quick test

If the LEDs signal again or if an error is signaled over the device error signaling relay, observe the chapter Error messages and troubleshooting.

### 10.3.2 Long test

#### NOTICE

##### Incorrect messaging!

When performing the long test, the failsafe relay will be activated for test purposes.

- > Inform the control room that the failsafe relay will be activated.

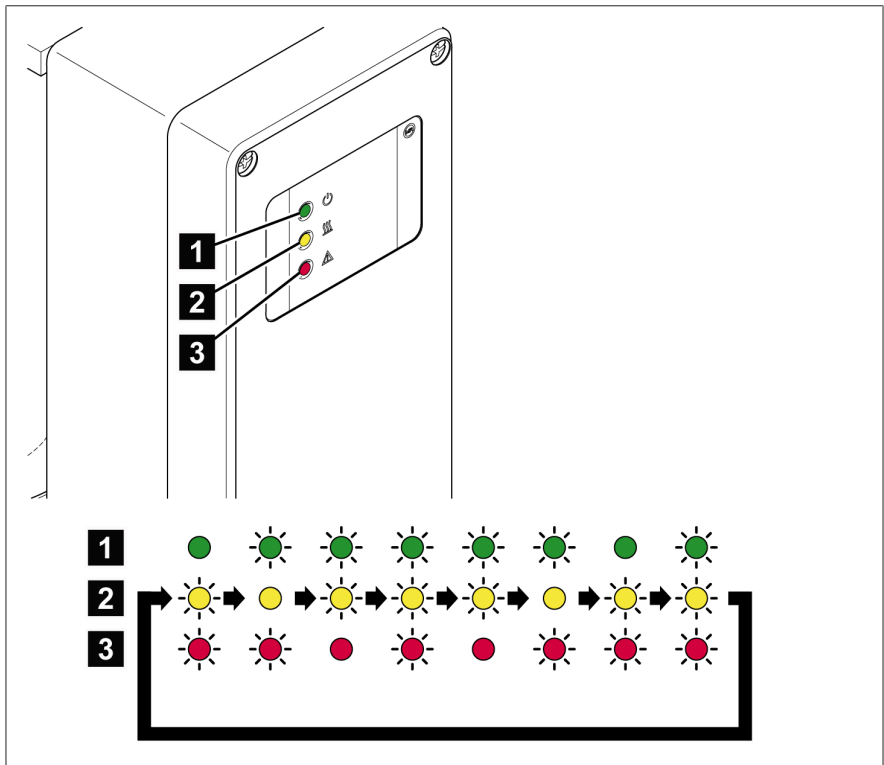


Figure 67: LED signaling during the long test

### Starting a long test in normal operation

- ✓ Device is not in the regeneration process (the silica gel is not being heat-dried; the yellow LED **2** is off).
- 1. Press the test button for a longer period and then release (hold down for > 3 seconds).
- 2. The long test can only be interrupted within the first minute of starting the long test by pressing the key for at least 5 seconds. In this case, the interruption will be signaled by a flashing green LED and the device will be reset to its original status.
  - » The long test will be signaled by the LEDs for the duration of the test (approx. 10 minutes) as shown in the figure above.
  - » A heating test will be performed. In addition, the heating signaling relay will be activated.
  - » A 4...20 mA signal will be issued cyclically at the analog outputs for the duration of the test.
- 3. In the control room, check whether the heating signaling relay is energized.
- 4. Check whether the heat-drying process starts on the device.
- 5. Using a measuring device in the control room, check whether the signal at the analog outputs rises from 4 mA to 20 mA and then drops to 4 mA again within one minute.

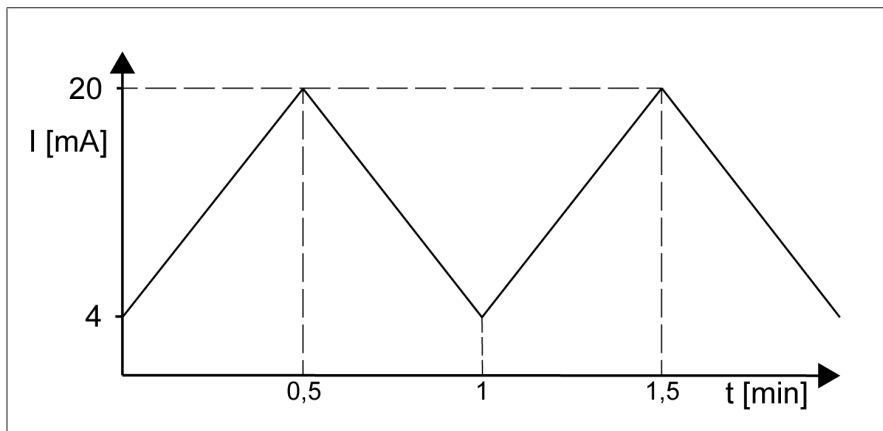


Figure 68: Analog signal

6. In the control room, check whether the device error signaling relay is deenergized and then energized again.

- » Once the long test has been completed, the power LED **1** is permanently lit in error-free operation.

If the LEDs signal again or if an error is signaled over the device error signaling relay, observe the chapter Error messages and troubleshooting.

## 10.4 Care

### ▲ WARNING



#### **Electric shock!**

Risk of fatal injury due to electrical voltage.

- > De-energize the device and system peripherals and take measures to ensure that they cannot be switched back on.

### NOTICE

#### **Damage to the dehydrating breather!**

Impairment to function due to the ingress of splash water via the dust protection tube.

- > Spray water may only be applied from above. Do not clean the dehydrating breather from below with spray water.

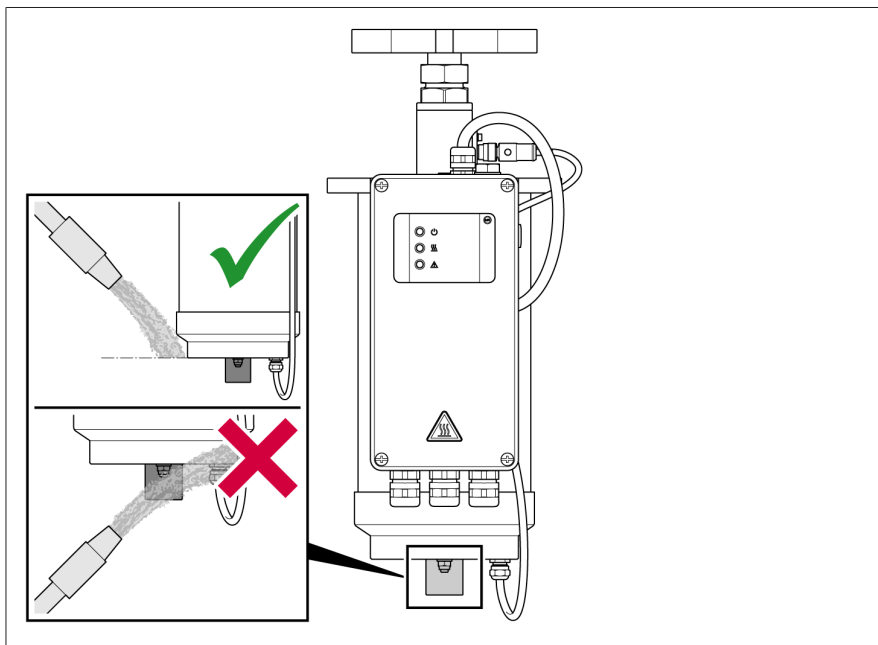


Figure 69: Spray water

Only use a damp cloth and mild cleaning agent to clean the device when needed.

# 11 Disposal

Observe the national disposal regulations in the country of use.

## 11.1 SVHC information in accordance with the REACH regulation

This product complies with the provisions of European Regulation 1907/2006/EC dated December 18, 2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

The following components of the product contain > 0.1% [w/w] of the SVHC substance lead (CAS no. 7439-92-1):

- Aluminum alloy
- Brass alloy
- Standard parts with a low property class

# 12 Technical data

## 12.1 Technical data



The technical data applies to the standard design and may vary depending on the design delivered. Subject to change without prior notice.

Operating conditions	
Location of use	Indoors and outdoors
Pollution degree (terminal box)	4
Relative humidity (operation and storage)	Inside the terminal box: 5...95% (non-condensing)
Ambient air temperature	SL/ML: 0...+70 °C (+32...+158 °F) SH/MH: -50...+70 °C (-58...+158 °F) Version with filter heater for applications in cold regions, i.e. ambient temperature is continuously below 0 °C over a time period of 20 days.
Storage temperature	-50 °C...+70 °C (-58...+158 °F)
Operating temperature	SL/ML: 0...+70 °C (+32...+158 °F) SH/MH: -40...+70 °C (-40...+158 °F) Version with filter heater for applications in cold regions, i.e. ambient temperature is continuously below 0 °C over a time period of 20 days.
Degree of protection in accordance with IEC 60529	<ul style="list-style-type: none"> <li>- Entire device: IPx6 with limitation, application of spray water only from above or from the sides</li> <li>- Terminal box only: IP66 and IP67</li> </ul>
Overvoltage category	III
Protection class	I
Installation altitude	Max. 4,000 m above sea level (max. 13,000 ft)

Design types	
Materials	All external parts are resistant to weathering and UV radiation
Color	Flange and metal parts: anodized (aluminum) Terminal box: Powder-coated (C4H in accordance with DIN EN ISO 12944-9) RAL 7035 (light gray)
Weight (without flange)	Version S: approx. 8.6 kg (19.0 lbs) Version M: approx. 12.6 kg (27.8 lbs)
Dimensions	See "Drawings" chapter
Flange connection	Universal flange, see "Drawings" chapter
Desiccant	Only use special colorless, non-toxic silica gel (silicon dioxide) sold by Maschinenfabrik Reinhausen GmbH; Refer to the "Application table" for volume

Power supply	
Nominal voltage	200 ...240 V AC, 50/60 Hz, 200...240 V DC Pmax. 2,500 W or 100...127 V AC, 50/60 Hz, 100...127 V DC Pmax. 2,500 W
Power consumption	Max. 100 mA (in normal operation); Increased power consumption during regeneration; refer to the heating current values in the "Application table" chapter
Heating current	Current during heating process (approx. 1–2 minutes after activating the heating): Refer to the heating current values in the "Application table" chapter



Power supply	
External fuse protection	Miniature circuit breaker characteristic C, K, Z with nominal current of 16 A or 20 A
Rated insulation voltage	500 V DC (in accordance with IEC 61010-1) L against protective conductor  N against protective conductor 
RTC buffer battery	CR2032 (recommendation CR2032 from Renata or CR2032W from Murata Electronics)

Terminal box	
Pressure equalization element	Ventilated to prevent water condensation
Cable glands	M20x1.5, nickel-plated brass or 1/2" 14NPT, nickel-plated brass
Connection terminals	Supply connection, relay, analog outputs: 1.5...4 mm <sup>2</sup> , AWG11–15 (solid or flexible), tightening torque 0.5...0.6 Nm (4.4...5.3 lbf-in) RS485 interface: 0.14...1.5 mm <sup>2</sup> , AWG15–26 (solid or flexible), tightening torque 0.25 Nm (2.2 lbf-in)
Status display	3 LEDs (green – operation indicator, yellow – regeneration heating, red – device malfunction) visible from the outside; refer to the "Status messages" chapter for the status
Test button	For the device function test
Fuse	5x20 mm; T2A; 250 V (e.g. Littelfuse 477 series 477002)

Signaling contacts	
Contact type	1x change-over contact, silica gel regeneration signaling relay;
	1x change-over contact, device error signaling relay (failsafe)

Signaling contacts	
Contact material	Gold-plated contacts for applications with low switching currents Minimum load: $\geq 1$ mV/1 mA
Dielectric strength	Between circuits and ground: $\geq 2$ kV, 50 Hz, duration 1 minute; Between contacts in the open position: $\geq 1$ kV, 50 Hz, duration 1 minute; Impulse voltage withstand strength between contacts: $\geq 3$ kV, 1.2/50 $\mu$ s
Reliable switching capacity	240 V AC, 8 A (IEC 61810, 100,000 switching cycles); 240 V AC, 10 A, 2,000 VA (UL 508, 30,000 switching cycles); 30 V DC, 8 A, 240 W; 240 V DC, 300 mA
Maximum switching capacity	In accordance with IEC 60076-22-7, 1,000 switching cycles: 230 V AC, 1,840 VA / $\cos \phi > 0.5$ 250 V AC, 2,500 W / resistive load 24 V DC, 192 W / resistive load

Analog outputs (active)	
Analog 1 output	Temperature: $-40 \dots +80$ °C ( $-40 \dots 176$ °F) 4...20 mA: 7.5 K/mA (13.5 °F/mA) Measuring error: 4...20 mA: $\pm 2.3$ K/mA (4.1 °F/mA)
Analog 2 output	Humidity: 0...100% 4...20 mA: 6.25% R.H./mA Measuring error: 4...20 mA: $\pm 1.9$ % R.H.
Error signal in the event of sensor failure	$< 3.6$ mA
Load resistance	0...600 $\Omega$

Options	
Filter heater	SH and MH versions: With heated stainless-steel filter; recommended for cold regions with an ambient temperature that is continuously below 0 °C for more than 20 days in order to guarantee proper function. Switching point < 5 °C (switch on)
RS485 interface	For connection to a SCADA system

## Standards and directives

Electrical safety	
IEC 61010-1 UL 61010-1 CAN/CSA-C22.2 No. 61010-1	Safety requirements for electrical measurement and control and regulation equipment and laboratory instruments <ul style="list-style-type: none"> <li>- Protection class I</li> <li>- Overvoltage category III</li> <li>- Contamination level 2</li> </ul>
Electromagnetic compatibility	
IEC 61000-6-5, IEC/KC 61000-6-2, IEC/KC 61000-6-4, FCC 47 CFR Part 15B, ICES-003	
Environmental durability tests	
IEC 60529	<ul style="list-style-type: none"> <li>- Entire device: IPx6 with limitation, application of spray water only from above or from the sides</li> <li>- Terminal box only: IP66 and IP67</li> </ul>
IEC 60068-2-1	Dry cold -25 °C (-13 °F)/ 96 hours
IEC 60068-2-2	Dry heat +70 °C (+158 F)/ 96 hours

Power transformer and reactor accessories	
IEC 60076-22-7	Accessories and fittings
IEC 60076-22-7 Chapter 6.6.5.2.3	Duration test at least 100 regenerations passed
IEC 60076-22-8	<i>Power transformer and reactor fittings – Devices suitable for use in communication networks</i>

## 12.2 Application table

Application		Device model	Silica gel	
Tap changer		Version S	1.1 kg (2.4 lbs)	
Arc suppression coil (Petersen coil)		Version S	1.1 kg (2.4 lbs)	
Traction transformers		Version S	1.1 kg (2.4 lbs)	
Network transformers $\leq 40$ MVA		Version S	1.1 kg (2.4 lbs)	
Network transformers and step-up transformers $> 40$ MVA $\leq 200$ MVA		Version M	2.2 kg (4.8 lbs)	
Phase shifters $\leq 40$ MVA		Version S	1.1 kg (2.4 lbs)	
Phase shifters $> 40$ MVA $\leq 200$ MVA		Version M	2.2 kg (4.8 lbs)	
Reactors $\leq 40$ MVA		Version S	1.1 kg (2.4 lbs)	
Reactors $> 40$ MVA $\leq 200$ MVA		Version M	2.2 kg (4.8 lbs)	
Device model	Heating current <sup>1)</sup>		Silica gel	Control <sup>2)</sup>
	$U_V = 120$ V	$U_V = 230$ V		
Version S	1.2 A	0.6 A	1.1 kg (2.4 lbs)	Status-led controller
Version M	2.3 A	1.2 A	2.2 kg (4.8 lbs)	Status-led controller

1) Heating current during the heating process (approx. 1–2 min. after heating activation).

2) **Status-led controller:** Self-learning system with status-dependent control of the heat-drying procedure through humidity monitoring and temperature-dependent determination of the most advantageous time to perform heat-drying.

## 13 Drawings

The product may have been altered since this document was published.

MASCHINENFABRIK REINHAUSEN GMBH COPYRIGHT RESERVED  
 THE REPRODUCTION, DISTRIBUTION AND UTILIZATION OF THIS DOCUMENT AS WELL AS THE COMMUNICATION OF ITS CONTENTS TO OTHERS WITHOUT EXPRESS AUTHORIZATION IS  
 PROHIBITED. OFFENDERS WILL BE HELD LIABLE FOR THE PAYMENT OF DAMAGES. ALL RIGHTS RESERVED IN THE EVENT OF THE GRANT OF A PATENT, UTILITY MODEL OR DESIGN.

DATE	NAME	DOCUMENT NO.
05.03.2024	SCHAEFERB	SED 10950498 000 00
05.03.2024	KISTNERM	CHANGE NO.
06.03.2024	KLEYN	1127734
		SCALE
		1:2

DIMENSION  
 IN mm  
 EXCEPT AS  
 NOTED

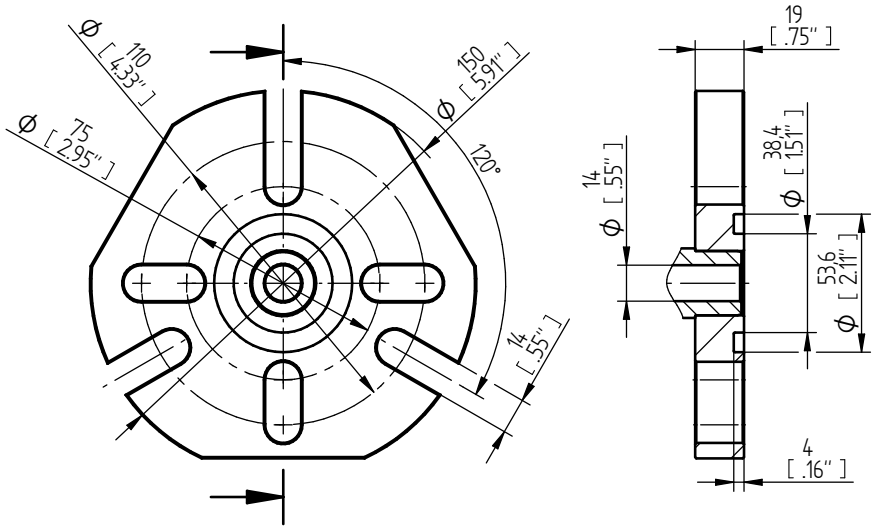


ECOTRAC® Universalflansch  
 ECOTRAC® UNIVERSAL FLANGE  
 Maßzeichnung / DIMENSION DRAWING

SERIAL NUMBER

MATERIAL NUMBER  
 101814300M

SHEET  
 1 / 1



MASCHINENFABRIK REINHARDSEN GMBH COPYRIGHT RESERVED  
 THE REPRODUCTION, DISTRIBUTION AND UTILIZATION OF THIS DOCUMENT AS WELL AS THE COMMUNICATION OF ITS CONTENTS TO OTHERS WITHOUT EXPRESS AUTHORIZATION IS PROHIBITED. OFFENDERS WILL BE HELD LIABLE FOR THE PAYMENT OF DAMAGES. ALL RIGHTS RESERVED IN THE EVENT OF A PATENT, UTILITY MODEL OR DESIGN.

DATE	NAME	DOCUMENT NO.
DFTR 29.02.2024	ET/AQIO	SED 10950969 000 00
CHKD 04.03.2024	SCHAEFERB	CHANGE NO.
STAND 05.03.2024	KLEYN	1127734
		SCALE
		1:4

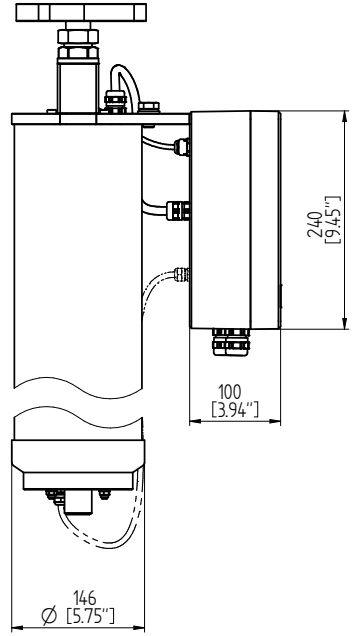
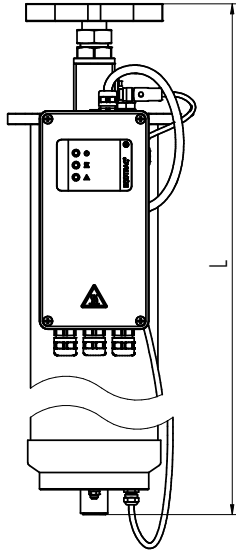
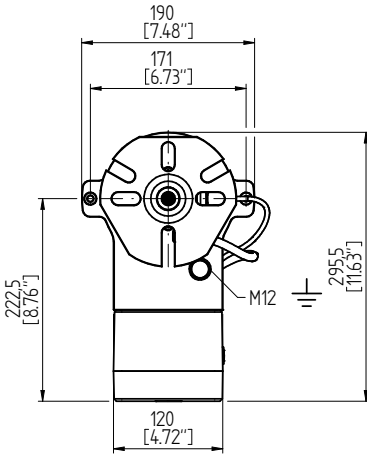
DIMENSION  
 IN mm  
 EXCEPT AS  
 NOTED



ECOTRAC® Smart Breather S/M  
 ECOTRAC® SMART BREATHER S/M  
 Maßzeichnung / DIMENSION DRAWING

SERIAL NUMBER

MATERIAL NUMBER	SHEET
101814310M	1 / 1



ECOTRAC-Abmessung mit Flansch / ECOTRAC DIMENSIONS WITH FLANGE	ECOTRAC S L	ECOTRAC M L
Universalflansch / UNIVERSAL FLANGE	454,5 [17.89"]	684,5 [27.11"]



# 14 Appendix

## 14.1 Modbus RTU (optional)

### Status information

Function code "02" to read the information

No.	Value	Designation
0	On/Off	Error present
1	On/Off	Error SiO <sub>2</sub> heating
2	On/Off	Internal data point
3	On/Off	Voltage supply error
4	On/Off	Sensor error
5	On/Off	Internal data point
6	On/Off	Internal data point
7	On/Off	Internal data point
8	On/Off	RTC battery low
9	On/Off	Analog output 1 open
10	On/Off	Analog output 2 open
11	On/Off	Internal data point
12	On/Off	Internal data point
13	On/Off	Internal data point
14	On/Off	Internal data point
15	On/Off	Internal data point
16	On/Off	Internal data point
17	On/Off	Regeneration
18	On/Off	Internal data point
19	On/Off	Sensor status
20	On/Off	Internal data point

### Analog values (input register)

Function code "04" to read the information

No.	MSW/LSW*	Value	Designation
0	MSW	float32	Humidity sensor
1	LSW		
2	MSW	float32	Temperature sensor
3	LSW		

\*) MSW = most significant word; LSW = least significant word

### Analog values (input register)

Function code "04" to read the information

No.	Value	Designation
16	sint16 / factor 10	Humidity sensor
17	sint16 / factor 10	Temperature sensor

## 14.2 RS485 communication settings (optional)

ADR position	Address	Baud rate	Parity	Description
0	247	9,600	EVEN	Address, baud rate and parity cannot be changed
1 - D	1 - 13	19,200	EVEN	The address 1 - 13 can be set via HEX rotary switch 1 - D; baud rate and parity cannot be changed
F	None	115,200	NONE	For service purposes

## Factory settings

ADR position	Address	Baud rate	Parity	Description
3	3	19,200	EVEN	Delivery status

Duplex mode: HALF

BUS termination 120 ohms: OFF

# Glossary

## **Ambient air temperature**

Permissible temperature of the air in the surroundings of the equipment in operation on which the device is installed.

## **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**

**Please note:**

The data in our publications may differ from the data of the devices delivered. We reserve the right to make changes without notice.

10944490/00 EN - ECOTRAC<sup>®</sup> SMART BREATHER Operating

instructions -

04/24

Maschinenfabrik Reinhausen GmbH 2024



THE POWER BEHIND POWER.