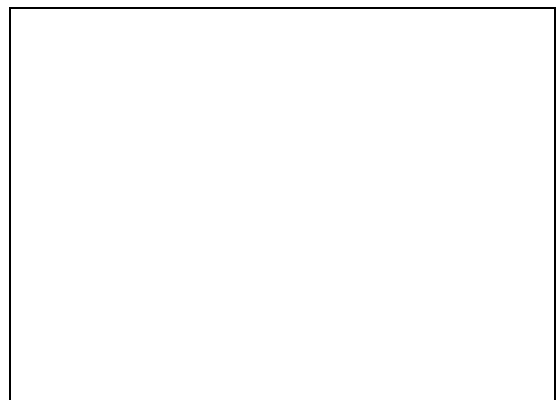


Operating instructions

ELEMENTRAC ONHp2



Translation

ELTRA[®]
ELEMENTAL ANALYZERS

Copyright

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1 Additional operating instructions

These operating instructions are a technical manual for the safe operation of the device. Please read these operating instructions carefully before installing, commissioning and operating the device. Reading and understanding these operating instructions is a prerequisite for the safe and proper use of the device.

This operating instructions do not include any repair instructions . If anything is unclear or if you have questions about these instructions or the device as well as in case of any defects or necessary repairs, please contact your supplier or directly the Eltra GmbH.


For more information about your device, please visit the device-specific pages at www.eltra.com.

Revisions status

The document revision 0005 of the operating instructions “ELMENTRAC ONH-p 2” has been prepared in accordance with the Machinery Directive 2006/42/EC.

1.1 Explanations of signs and symbols

The following signs and symbols are used in these operating instructions:

| Signs | Meaning |
|---|--|
|  <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Additional or further information is available here.. </div> | Further or additional information. |
| 1. First instruction. 2. Following instruction. Result. | Numbered paragraphs contain sequential instructions. An instruction may end with a result. |

Tab 1: Used signs and symbols

1.2 Disclaimer

These operating instructions have been prepared with the greatest care. Technical changes reserved. No liability is assumed for any personal injuries resulting from non-compliance with the safety instructions and warnings in this operation manual. No liability is assumed for any property damages resulting from non-compliance with the instructions in this operation manual.

1.3 Copyright

These operating instructions or parts thereof may not be reproduced, distributed, edited or copied in any form without prior written permission of Eltra GmbH. Any violation may result in claims for damages.

2 Safety

Safety officer

The operator himself must ensure that the commissioned individuals working on the device

- have taken note of and understood all safety regulations,
- are aware of all the instructions and regulations of the target group relevant to them before starting any work,
- have easy access to the operating instructions of this device at any time and without any problems and
- have been made familiar with the safe and intended use of the device before starting any work on the device, either through a verbal introduction by a competent person and/or through these operating instructions.

⚠ Improper operation may cause personal injury. The operator himself is responsible for his own safety as well as for the safety of his employees. The operator himself must ensure that no unauthorised person has access to the device.

Target group

All persons who operate, clean, work with or on the device.

This device is a modern, high-performance product of the Eltra GmbH and was developed according to the latest state of the art. Operational safety is ensured if this device is used in accordance with its intended purpose and if the operating instructions provided here are followed.

⚠ Persons who are under the influence of intoxicants (medication, drugs, alcohol) or who are overtired are not allowed to operate the device or work on it.

2.1 Explanations of the safety instructions

The following **warnings** in this operating instructions indicate potential hazards and damages:

| | |
|--|---------|
| ⚠ DANGER | D1.0000 |
| <p>Risk of fatal injuries Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and advices on how to avoid the hazard. | |

Failure to observe the warning “Danger” may result in **fatal or serious injuries**. There is a **very high risk** of a life-threatening accident or permanent injury. The signal word **⚠ DANGER** is additionally used in the running text or in the handling instructions.

| | |
|--|---------|
| ⚠ WARNING | W1.0000 |
| <p>Risk of life-threatening or serious injuries Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and advices on how to avoid the hazard. | |

Failure to observe the warning instruction “Warning” may result in **life-threatening or serious injuries**. There is an **increased risk** of a serious accident or potentially fatal injury. The signal word **⚠ WARNING** is additionally used in the running text or in the handling instructions.

| | |
|--|---------|
| ⚠ CAUTION | C1.0000 |
| <p>Risk of injury Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and advices on how to avoid the hazard. | |

Failure to observe the warning instruction “Caution” may result in **moderate of minor injuries**. There is a medium or low risk of accident or personal injury. The signal word **⚠ CAUTION** is additionally used in the running text or in the handling instructions.

| | |
|--|---------|
| NOTICE | N1.0000 |
| <p>Type of property damage Source of property damage</p> <ul style="list-style-type: none"> – Possible consequences if the notices are not observed. • Instructions and notices on how to prevent property damage. | |

Failure to observe the notice may result in **property damages**. The signal word **NOTICE** is additionally used in the running text or in the handling instructions.

2.2 General safety instructions

CAUTION

C2.002

Risk of injury

Ignorance of the operating instructions

- The operating instructions contain all safety-relevant information. Failure to observe the operating instructions may therefore cause injuries.
- **Please read these operating instructions carefully before operating the device.**



CAUTION

C3.0015

Risk of injury

Improper changes to the device

- Improper changes to the device may cause injuries.
- **Do not make any unauthorised changes to the device.**
- **Use exclusively spare parts and accessories which have been approved by the company Eltra GmbH!**

NOTICE

N2.0012

Changes to the device

Improper modifications

- The conformity to the European directives declared by Eltra GmbH shall lose its validity through improper modification. Any warranty claims shall become void.
- **Do not make any unauthorised modifications to the device.**
- **Use exclusively spare parts and accessories which have been approved by Eltra GmbH.**



2.3 Repairs

This operating instructions do not include any repair instructions. For safety reasons, repairs may only be carried out by Eltra GmbH or an authorised representative as well as by qualified service technicians.

In case of any repair, please contact...

- ...the representative of Eltra GmbH in your relevant country,
- ...your supplier, or
- ...directly the Eltra GmbH.

Service address:

Eltra GmbH
Retsch-Allee 1-5
42781 Haan
Germany



+49 2104 2333-444



service@eltra.com



www.eltra.com

2.4 Intended use

This device is used for the thermal digestion and subsequent determination of the element content of metallic samples. The device may only be used in the laboratory by appropriately trained and instructed personnel.

2.5 Improper use

Using the device in the private sector as well as for applications other than those mentioned in Section „[Intended use](#)“ is not permitted. Any repairs and modifications may only be carried out by the company **Eltra GmbH** or an authorised representative and by qualified service technicians.

2.6 Safety symbols on the device

Safety symbols on the ONH-p 2 device warn of potential hazards when operating the device.

The following safety symbols can be found on the analyser:

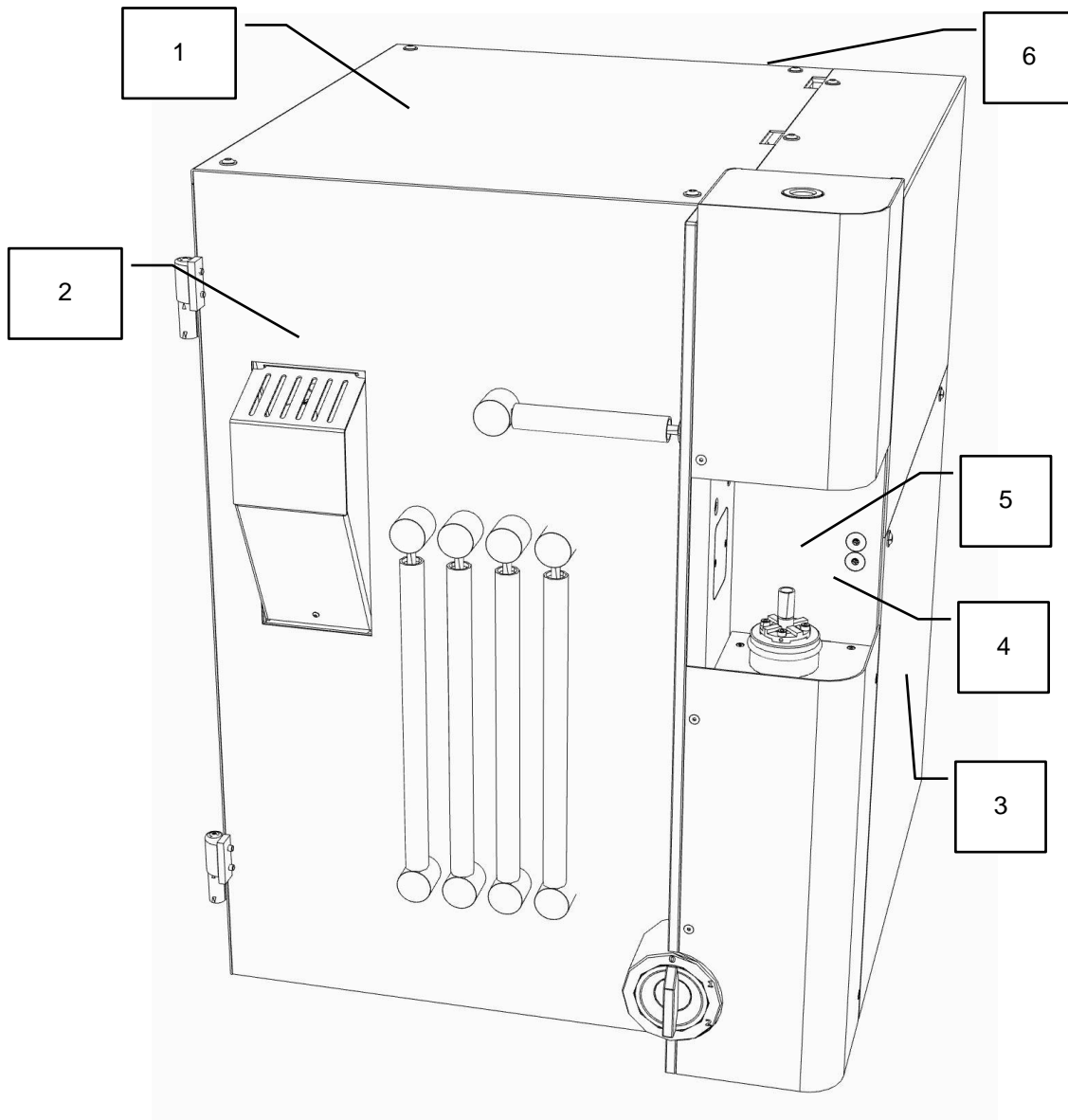






Figure 1: Safety symbols on the [analyser](#)

| Position | Component | Description |
|----------|---|--|
| 1,3,6 |  <p>Only to be opened by a qualified electrician</p> | <p>The warning symbols</p> <p>1: in the rear area of the cover plate</p> <p>3: in the upper, central area of the right side wall</p> <p>6: On the door at the rear side of the device</p> <p>there is a warning symbol attached which means that these covers may only be opened by qualified personnel.</p> |
| 2 |  | <p>This warning symbol in the area of the catalyst furnace warns of burns to fingers and hands.</p> |
| 4, 5 |   | <p>The warning symbols on the furnace opening warn of burns and the risk of crushing fingers or hands.</p> |

2.7 Emergency stop

The emergency stop is controlled via the main switch of the device.

In case of an emergency, the device can be switched off as follows:

1. Turn the main switch of the analyser to switch position 0.


2.8 Remaining safety hazards

DANGER

D2.0005

Danger to life from electric shock
Exposed electrical contacts – High voltage

- An electric shock can cause severe injuries in the form of burns, cardiac arrhythmias, respiratory arrest or cardiac arrest.
- **Any work on the device may only be carried out by qualified service personnel.**
- **Turn the power switch of the analyser to position 0 and pull the mains plug out of the socket.**




WARNING

W2.0015

Danger to life from electric shock
Connection to socket without protective conductor

- When connecting the device to sockets without a protective conductor, life-threatening injuries from electric shock may occur.
- **Operate the device exclusively on sockets with a protective conductor (PE).**



⚠ WARNING

W3.0002

Danger to life from electric shock

Damaged power cable

- Operating the device with a damaged power cable or plug can lead to life-threatening injuries from electric shock.
- **Before operating the device, check the power cable and plug for any damage.**
- **Never operate the device with a damaged power cable or plug!**

**⚠ WARNING**

W4.0017

Risk of injury

Hazardous chemicals

- When working on the device, hazardous chemicals can cause fatal poisoning or severe skin burns.
- **Please observe the safety data sheet in terms of the substances used.**
- **Please wear your personal protective equipment.**
- **Never eat or drink within the immediate vicinity of chemicals.**

⚠ WARNING

W5.0021

Fire hazard / Risk of burns

Hot parts (crucibles, reagents,...) can fall down

- Ignition of tables, floors or any other surface on which the hot parts can fall.
- Ignition of clothing and other materials.
- **Set up the device in a fire-proof environment. Please pay particular attention to the table, the floor and any other surface in the immediate vicinity of the device.**
- **Always wear suitable work clothing.**
- **Keep the work area free from any materials that could catch fire.**

⚠ WARNING

W6.0000

Danger of poisoning

Toxic combustion gases

- The samples are exposed to high temperatures during analysis. In this process, harmful gaseous fission products can be released or formed from reaction processes. These gases can escape from the gas outlet or the furnace and cause severe poisoning.
- **Connect the exhaust air outlet of the device to a suitable ventilation system.**
- **Please wear your personal protective equipment.**
- **Please observe the safety data sheets in terms of the substances used.**
- **Carry out a risk analysis regarding the hazard potential of your samples and implement relevant protective measures.**

⚠ WARNING

W7.0000

Risk of life-threatening injuries

Falling loads

- The device may only be transported or lifted with suitable aids, such forklift or crane. Loads can fall down and cause life-threatening injuries.
- **Lift and transport the device exclusively by means of suitable aids, such as forklift or crane.**
- **Secure the device during transport with suitable safety belts (supplied straps).**
- **Please observe the centre of gravity of the device (on the right side of the device).**
- **Keep a safe distance during transport.**
- **Never walk or stand under suspended loads.**

⚠ WARNING

W8.0003

Danger to life from electric shock

Cleaning of the device

- Any cleaning work with water on the device can lead to life-threatening injuries from electric shock, if the device is not disconnected from the power supply.
- **Only perform cleaning work with water on the device when the device is disconnected from the power supply.**



⚠ CAUTION

C4.0000

Risk of injury

Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
- **Never reach into the oven when it is closing.**
- **Use crucible tongs in order to place crucibles.**

**⚠ CAUTION**

C5.0000

Risk of injury

Moving parts

- The lock moves according to user input. Hands in the area of the upper furnace lock can be crushed when the lock closes.
- **Never reach into a moving lock.**

**⚠ CAUTION**

C6.0092

Falling device

Incorrect installation or insufficient workplace

- The weight of the device can cause personal injury if it falls down.
- **Only operate the device on a sufficiently large, sustainable, slip-resistant and stable workplace.**
- **Please ensure that all feet of the device have a secure footing.**

⚠ CAUTION

C7.0000

Cutting injuries

Broken glass

- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**

**⚠ CAUTION**

C8.0000

Risk of injury

Moving parts

- There are fans inside the left side of the analyser. Spinning fans can cause injuries to fingers.
- **Never reach into a rotating fan.**

⚠ CAUTION

C9.0000

Risk of burns

Hot equipment parts

- Parts of the device can become very hot and cause burns during the performance of any maintenance work if the waiting time for cooling is not observed.
- **Please wait until the furnace temperatures cooled down to < 40 °C before performing any maintenance work.**
- **Check the furnace temperatures in the ELEMENTS software.**



⚠ CAUTION

C10.0076

Risk of burns

Hot equipment parts

- Some parts of the device can become very hot and cause burns if they are touched without protective gloves.
- **Please wear heat-resistant protective gloves when handling with hot device parts.**
- **Never touch hot parts of the device without suitable protective gloves.**



⚠ CAUTION

C11.0093a

Risk of burns

Hot crucibles

- The crucible can be very hot after the analysis, and it can cause fires and thus personal injuries if it comes into contact with flammable surfaces.
- **Please only use suitable crucible tongs to transport used crucibles.**
- **Please make sure that there are no flammable materials below the furnace opening.**
- **Only open the furnace after a suitable waiting time has elapsed.**
- **If necessary, adjust the waiting time in the program in such a way that the sample carrier can cool down sufficiently.**

⚠ CAUTION

C12.0090

Risk for eye injuries

Chemicals

- When chemicals are replaced, small particles of the chemicals can float in the air and burn the eyes.
- **Please always wear protective goggles when working with chemicals.**
- **Please observe the safety data sheets in terms of the chemicals used.**



⚠ CAUTION

C13.0000

Risk of injury

Pressurised system

- The device is pressurised during operation. Removing reagent tubes during operation may lead to an explosive escape of chemicals or sample material and can cause injuries.
- **Never remove any reagent tubes during operation.**
- **Use the software in order to put the device into the mode “Replace reagents” before performing any work on the device.**

⚠ CAUTION

C14.0094

Risk of burns

Hot catalyst furnace

- The furnace temperature of the catalyst furnace can be up to 800°C during operation and cause severe burns.
- **Please wear heat-resistant protective gloves when handling with the catalyst furnace.**
- **Before any maintenance work can be performed, please wait until the furnace temperature is < 40 °C.**
- **Check the furnace temperatures in the ELEMENTS software.**
- **Replace the filling of the catalyst furnace only after a sufficiently long cooling time.**


⚠ Caution

C15.0107



Weight: 165 kg – The centre of gravity of the device is located on the right side.
 Dimensions (WxHxD): 56 x 78 x 64 cm

3 Description

The ELEMENTRAC ONH-p 2 device is an elemental analyser. By melting samples in a pulse furnace, the device is able to determine oxygen, nitrogen and hydrogen concentration in inorganic samples. The gaseous combustion products are measured by infrared and thermal conductivity cells.

3.1 Analyser ONH-p 2

3.1.1 Front side

The following figure shows the front side of the device:

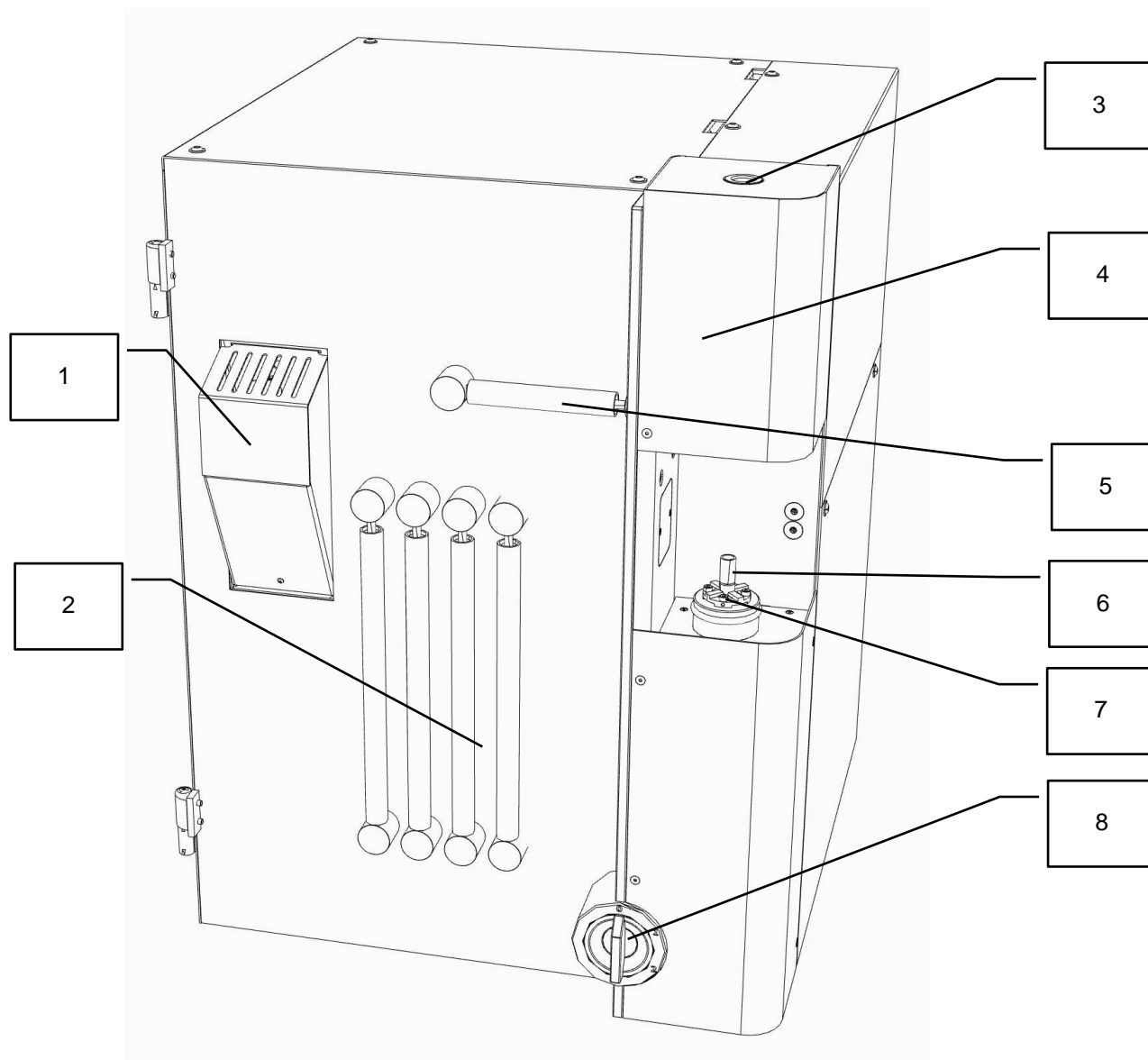


Figure 2: Front side of the ELEMENTRAC ONHp2

| Position | Component | Description |
|----------|------------------|---|
| 1 | Catalyst furnace | Is used for the processing of analysis gases |
| 2 | Reagents | Are used for the processing of analysis gases |
| 3 | Sample receipt | This is where the sample to be analysed is inserted. |
| 4 | Furnace cover | The impulse furnace is located behind the cover. |
| 5 | Dust filter | This filter removes particles from the gas flow. |
| 6 | Crucible | This is where a crucible must be placed before the analysis. |
| 7 | Crucible carrier | |
| 8 | Main switch | Position 0: Turns off the device Position 1: Preheats the device Position 2: Puts the device ready for analysis |

3.1.2 Rear side of the analyser

The following figure shows the rear side of the analyser:

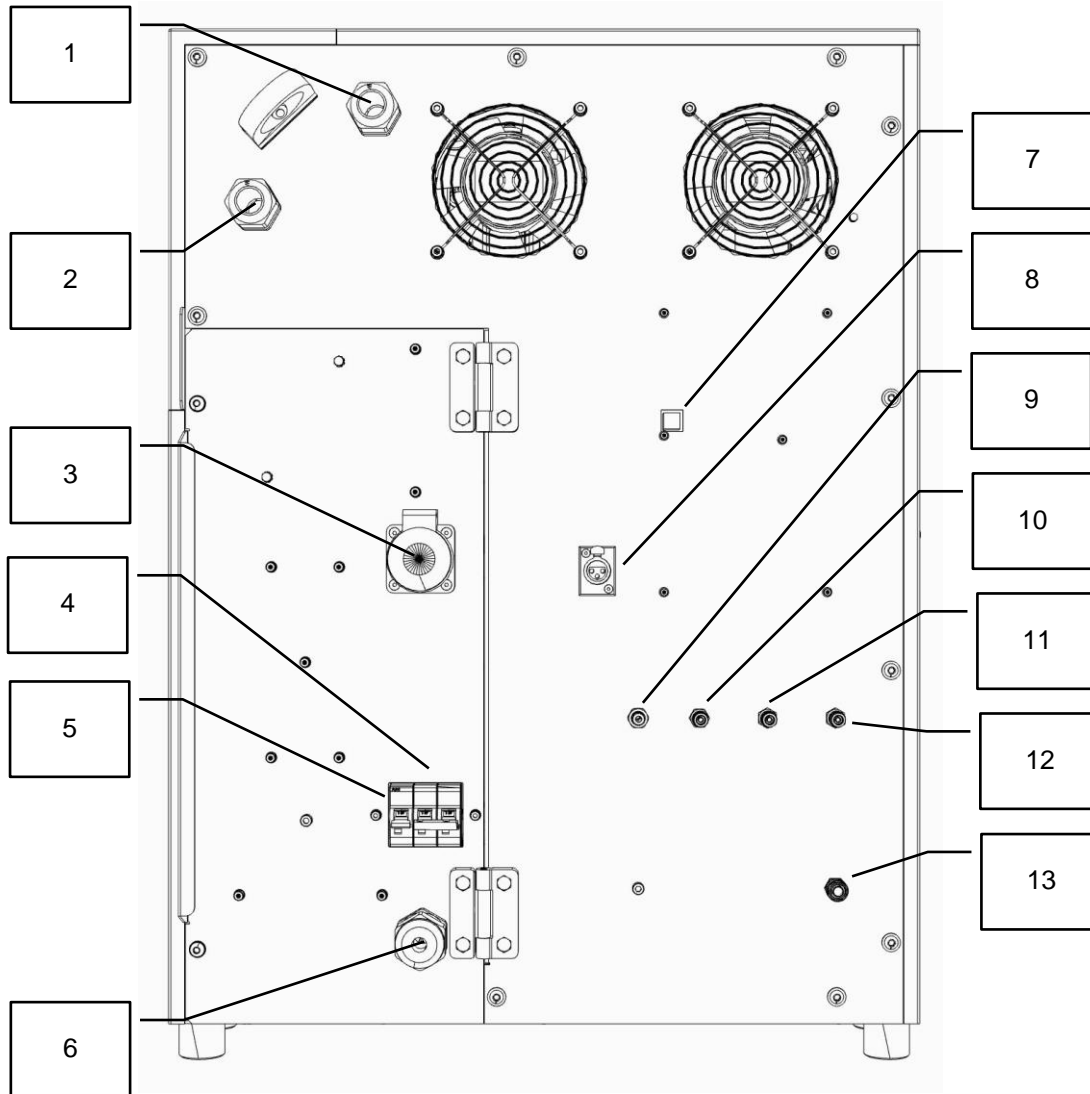


Fig. 1: side of the analyser

| Position | Component | Description |
|----------|---|---|
| 1 | Cooling water connection | This is the outlet. Heated water flows out of the device to the heat exchanger in order to be cooled down. |
| 2 | Cooling water connection | This is the inlet. Cooled water flows from the heat exchanger into the device in order to cool the furnace. |
| 3 | Vacuum cleaner connection | Provided that the device is equipped with a cleaner, this is where the vacuum cleaner shall be connected. |
| 4 | Device fuse, power section | The power section of the device is protected with this double fuse block. |
| 5 | Device fuse, control part | The control part of the device is protected with this single fuse block. |
| 6 | Power connection line | This is the power connection line of the device. |
| 7 | USB port | The USB port is used for the communication with the PC. |
| 8 | Supply connection of the heat exchanger | This is where the power supply for the Eltra heat exchanger is connected. |
| 9 | Connection of the compressed air | This is where the compressed air supply for the pneumatics is connected. |
| 10 | Connection of the helium carrier gas | This is where the helium carrier gas is connected (only ON-p and ONH-p). |
| 11 | Connection of the argon carrier gas | This is where the argon carrier gas is connected (only ON-p and ONH-p). |
| 12 | Connection of the nitrogen carrier gas | This is where the nitrogen carrier gas is connected (only ON-p and ONH-p). |
| 13 | Connection of the exhaust gas | This is where an extraction system should be connected in order to discharge the combustion gases in a safe manner. |

3.1.3 Auto cleaner

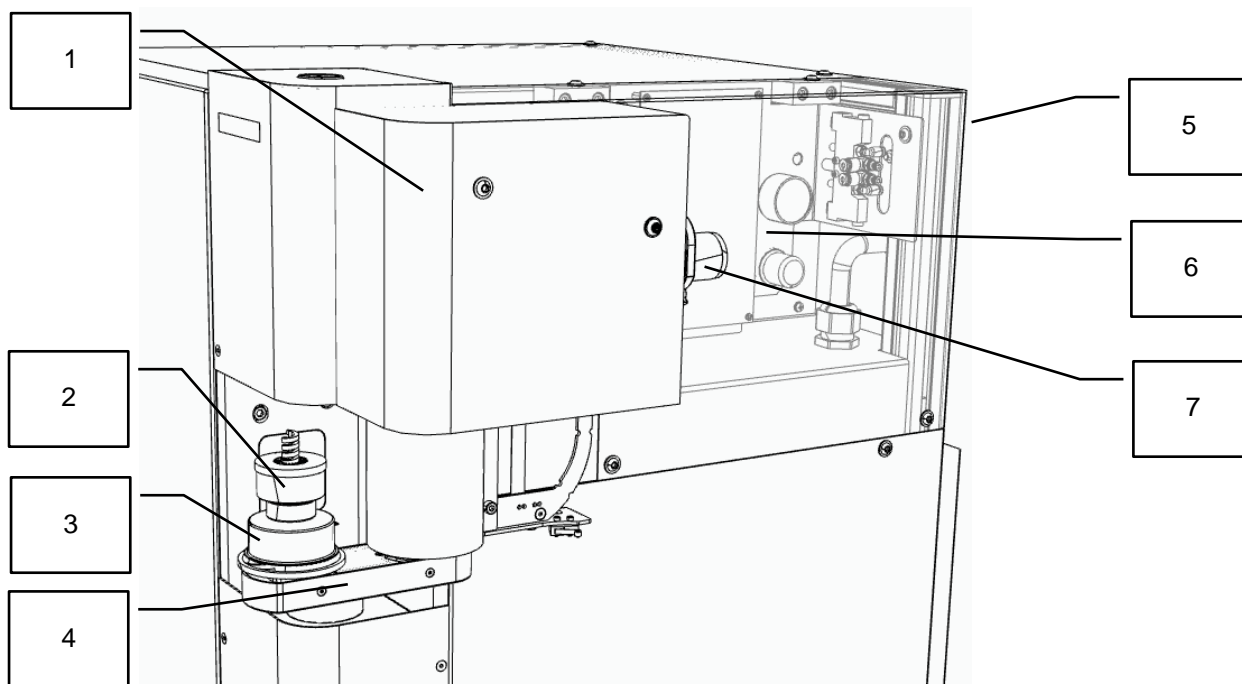


Fig 2: Auto cleaner

| Position | Component | Description |
|----------|--------------------------------------|---|
| 1 | Auto cleaner | Housing of the auto cleaner with integrated dust extraction. |
| 2 | Brush | Cleaning brush of the auto cleaner. |
| 3 | Dust catcher | Ensures that the dust produced during cleaning is not distributed throughout the room. The dust is vacuumed up in the housing of the auto cleaner at the end of the cleaning process. |
| 4 | Arm of the auto cleaner | Automatically moving arm of the auto cleaner. |
| 5 | Hose clip (rear side not visible) | The hose of the vacuum cleaner can be fitted to the analyser here. |
| 6 | Control assembly | Electro-pneumatic control assembly for the auto cleaner. |
| 7 | Vacuum cleaner connection | Connection for the vacuum cleaner hose. Vacuum cleaner is not part of the scope of delivery. |

4 Installation

4.1 Transport and unpacking

⚠ WARNING

W9.0000

Risk of life-threatening injuries

Falling loads

- The device may only be transported or lifted with suitable aids, such forklift or crane. Loads can fall down and cause life-threatening injuries.
- **Lift and transport the device exclusively by means of suitable aids, such as forklift or crane.**
- **Secure the device during transport with suitable safety belts (supplied straps).**
- **Please observe the centre of gravity of the device (on the right side of the device).**
- **Keep a safe distance during transport.**
- **Never walk or stand under suspended loads.**

⚠ Caution

C16.0107



Weight:165 kg – The centre of gravity of the device is located on the right side.
Dimensions (WxHxD):56 x 78 x 64 cm

⚠ CAUTION

C17.0092

Falling device

Incorrect installation or insufficient workplace

- The weight of the device can cause personal injury if it falls down.
- **Only operate the device on a sufficiently large, sustainable, slip-resistant and stable workplace.**
- **Please ensure that all feet of the device have a secure footing.**

The analyser is delivered in a solid cardboard box. The analyser itself is placed on a wooden pallet. The delivery includes 2 round slings which shall be used to lift the analyser out of the box.

- Open the cardboard box at the top.
- Remove the foam insert.
- Attach the two round slings to a suitable lifting device and lift the analyser out of the packaging.
- Place the analyser on the prepared, stable surface.

The device is unpacked.

4.2 Setting up

⚠ WARNING

W10.0000

Risk of life-threatening injuries

Falling loads

- The device may only be transported or lifted with suitable aids, such forklift or crane. Loads can fall down and cause life-threatening injuries.
- **Lift and transport the device exclusively by means of suitable aids, such as forklift or crane.**
- **Secure the device during transport with suitable safety belts (supplied straps).**
- **Please observe the centre of gravity of the device (on the right side of the device).**
- **Keep a safe distance during transport.**
- **Never walk or stand under suspended loads.**

⚠ Caution

C18.0107



Weight:165 kg – The centre of gravity of the device is located on the right side.
 Dimensions (WxHxD):56 x 78 x 64 cm

⚠ CAUTION

C19.0092

Falling device

Incorrect installation or insufficient workplace

- The weight of the device can cause personal injury if it falls down.
- **Only operate the device on a sufficiently large, sustainable, slip-resistant and stable workplace.**
- **Please ensure that all feet of the device have a secure footing.**

The space which is required to set up the device ELEMENTRAC ONHp2 ONH-p 2 with scale and PC is approx. 190 cm x 75 cm (width x depth) and approx. 100 cm x 75 cm without scale and PC. The required space with Autocleaner is identical.

The device table must safely withstand the weight of the device (please see „[Technical data](#)“). The mains plugs must be easily accessible at all times. The surface of the device table must be slip-resistant as well as fire-proof.

The device is set up as follows:

1. Place the device at the prepared location.
2. Please make sure that you position the device in such a way that the fans are not blocked.
3. Set up the PC, monitor, keyboard and scales in the desired location in such a way that the analyser can be easily seen.
4. Please make sure that the device is secure and stable.
5. Please ensure that the surface of the installation site is slip-resistant as well as fire-proof.
6. Please ensure that no crucibles can roll off the support.
7. Please make sure that there are no flammable objects or materials (working papers, files) in the vicinity of the analyser.

The device is set up.

4.3 Filling the reagent tubes

WARNING

W11.0017

Risk of injury

Hazardous chemicals

- When working on the device, hazardous chemicals can cause fatal poisoning or severe skin burns .
- **Please observe the safety data sheet in terms of the substances used.**
- **Please wear your personal protective equipment.**
- **Never eat or drink within the immediate vicinity of chemicals.**

CAUTION

C20.0000

Cutting injuries

Broken glass

- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**



CAUTION

C21.0090

Risk for eye injuries

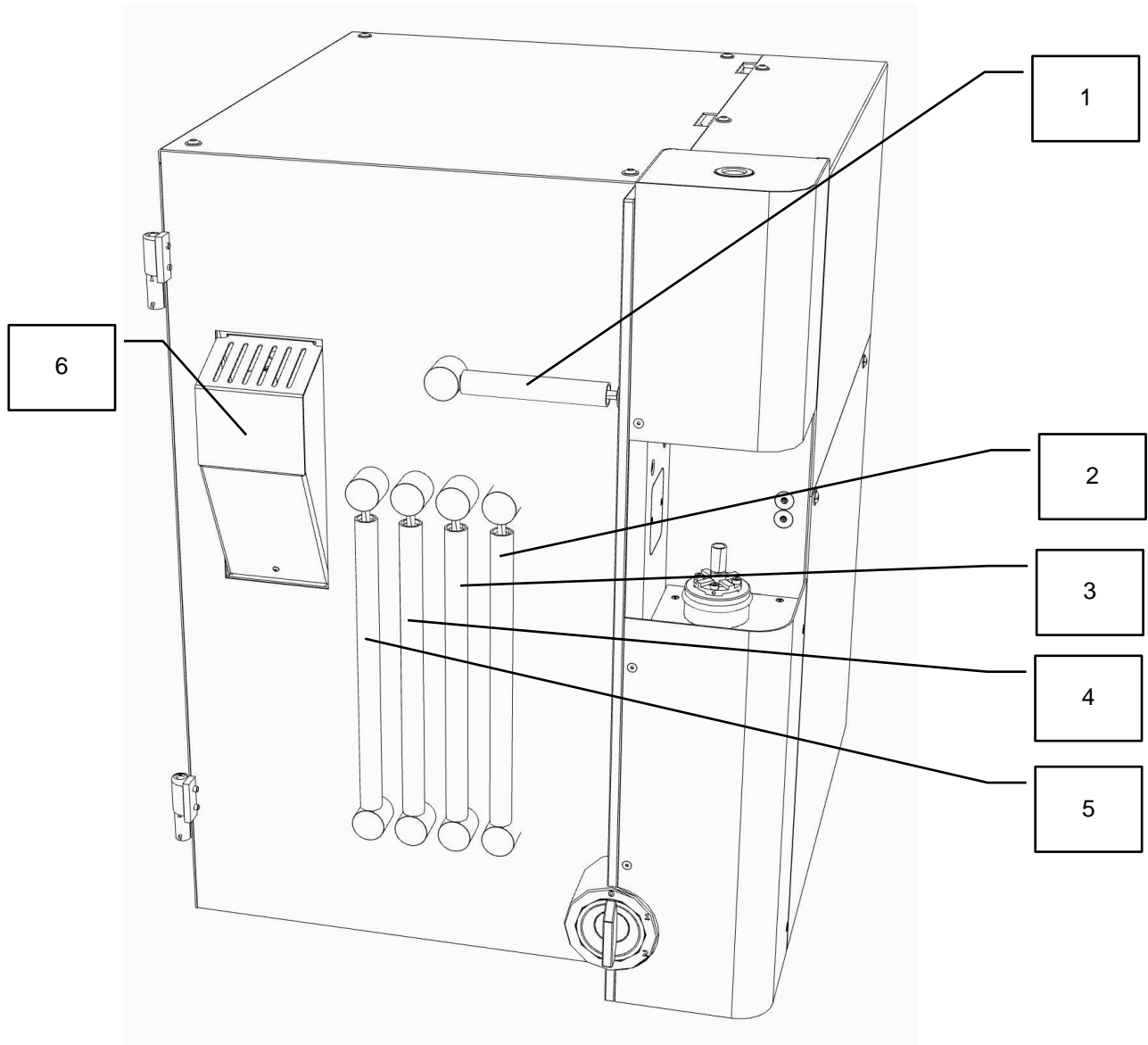
Chemicals

- When chemicals are replaced, small particles of the chemicals can float in the air and burn the eyes.
- **Please always wear protective goggles when working with chemicals.**
- **Please observe the safety data sheets in terms of the chemicals used.**



In order to fill the reagent tubes, please proceed as follows:

1. Fill the reagent tube of the dust trap.
2. Fill the reagent tube of the water trap.
3. Fill the reagent tube of the CO converter.
4. Fill the reagent tube for the gas processing of the carrier gas.
5. Fill the reagent tube of the gas processing for the thermal conductivity detector.
6. Fill the reagent tube of the catalyst furnace.



In order to fill the individual reagents properly, please see Section 10.5 Filling of reagent tubes

4.4 Providing the gas supply

CAUTION

C22.0000

Risk of injury

Pressurised system

- The device is pressurised during operation. Removing reagent tubes during operation may lead to an explosive escape of chemicals or sample material and can cause injuries.
- **Never remove any reagent tubes during operation.**
- **Use the software in order to put the device into the mode “Replace reagents” before performing any work on the device.**

When providing the gas supply for the device, please ensure to observe the relevant information on the gas inlet of the device. The permissible gases and pressures are clearly marked there.

Providing the gas supply for the device as follows:

1. Please make sure that the gas supply of the carrier gas is switched off.
2. Connect the carrier gas inlet on the analyser (please see „[Rear side of the analyser](#)“) with the operator’s carrier gas supply. Use the supplied hose for this purpose. Please observe the necessary purity and the pressure of the carrier gas (please see technical data).
3. Repeat this procedure for all of the carrier gases you are using.
4. Connect the exhaust air outlet on the device (please see „[Rear side of the analyser](#)“) to an appropriate ventilation system.
5. Connect the compressed air connection on the analyser (see „[Rear side of the analyser](#)“) to the operator's compressed air supply. Please observe the pressure of the compressed air (see technical data).



Please make sure that the gas and compressed air supply is properly connected. Due to the fact that the hot sample carriers pose a potential fire hazard, the hoses should not be laid directly on the laboratory table.

Die Gas supply is provided.

4.5 The cooling water supply is provided

The analyser must be cooled with water during operation. When establishing the water supply for the device, please observe the relevant instructions on the water connections of the device. The directions of the water flow are clearly marked there. There are two options for the cooling:

1. supplied heat exchanger or
2. a heat exchanger provided by a third party.

The following requirements are placed on the water supply:

- Drinking or industrial water
- Water temperature $\leq 15^{\circ}\text{C}$
- Water pressure 2...6 bar
- Flow rate 7-10 l/min.
- Inline filter ≤ 0.3 mm
- pH value 7-8.5
- No biological or chemical contamination. Any solids must be removed via an inline filter.

The water supply for the device is established as follows:

1. Please make sure that no water is able to flow (switch off cooling devices, switch off the device itself, close the water taps).
2. Connect the water connections of the device (please see „[Rear side of the analyser](#)“) with the selected heat exchange device. For details, please refer to the following two sections. Please observe the direction of the water flow at this point. This is clearly visible on the water connection of the device.
3. Select the heat exchanger in the software. For details, please see the software instructions.
4. Check all water connections for any leaks.

The cooling water supply is now established.

4.5.1 Connecting the supplied heat exchanger

1. Loosen the lid of the supplied heat exchanger and carefully put the lid to one side.
2. Fill the bucket with water to approx. 6cm below the edge.
3. Place the lid on the bucket and fix it in place



Fig. 2: Water tank



Fig. 3: Lid of the water tank with cooling coil

5. Connect the water hoses of the analyser to the heat exchanger:
 - a. Connect the water outlet of the analyser to connection 1 of the heat exchanger.

- b. Connect the water inlet of the analyser to connection 2 of the heat exchanger.
6. Connect the heat exchanger to the operator's water supply:
 - a. Connect the inflow of the water supply to connection 3 of the heat exchanger.
 - b. Connect the drain of the water supply to connection 2 of the heat exchanger.
7. Connect the control line of the heat exchanger to the connection for the heat exchanger on the rear side of the analyser.
8. Check all water connections for any leaks.

The connection of the supplied heat exchanger is now completed.

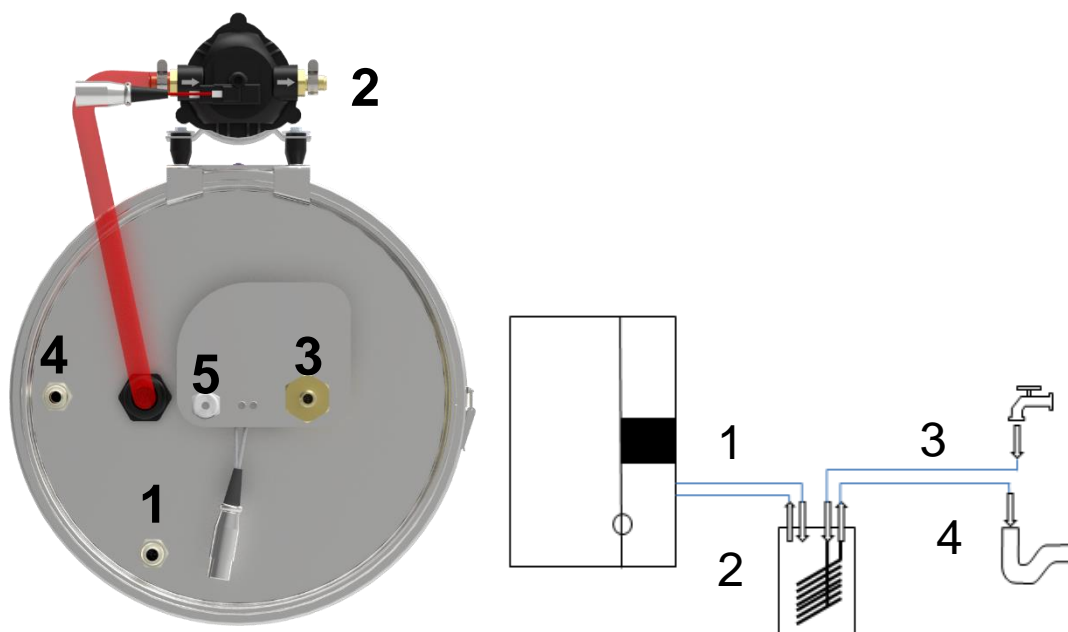


Fig. 4: Water tank connection

| | |
|---|--|
| 1 | Connection for the water outlet |
| 2 | Connection for the water inlet |
| 3 | Connection for the operator's water supply |
| 4 | Connection for the operator's water disposal |
| 5 | Control line to the analyser |

4.5.2 Connection of a third-party heat exchanger

When connecting and operating the heat exchanger, please observe the manufacturer's operating instructions.

1. Fill the heat exchanger with water.
2. Connect the water hoses of the analyser to the heat exchanger:
 - a. Connect the water outlet of the analyser to the corresponding connection of the heat exchanger.

- b. Connect the water inlet of the analyser to the corresponding connection of the heat exchanger.
3. Check all water connections for any leaks.



4.6 Connect the device to the PC



The connection of the device to the PC is carried out as follows:

1. Connect the USB port on the analyser (please see „[Rear side of the analyser](#)“) to the corresponding interface on the PC. Use the supplied cable.


The device is now connected to the PC.

4.7 Provide power supply

| | |
|--|----------|
|  WARNING | W12.0015 |
| <p>Danger to life from electric shock Connection to socket without protective conductor</p> <ul style="list-style-type: none"> – When connecting the device to sockets without a protective conductor, life-threatening injuries from electric shock may occur. • Operate the device exclusively on sockets with a protective conductor (PE). | |
|  | |

| | |
|---|----------|
|  WARNING | W13.0002 |
| <p>Danger to life from electric shock Damaged power cable</p> <ul style="list-style-type: none"> – Operating the device with a damaged power cable or plug can lead to life-threatening injuries from electric shock. • Before operating the device, check the power cable and plug for any damage. • Never operate the device with a damaged power cable or plug. | |
|  | |

The power supply takes place via the supplied mains plug.

| | |
|---|--|
|  | <p>The operator's network connections have to meet the performance requirements of the device.</p> |
|---|--|

The power supply is provided as follows:

1. Make sure that the device is set up, please see „[Setting up](#)“.
2. Connect the mains plug from the rear side of the analyser (please see „[Rear side of the analyser](#)“) to the operator's power supply.

The device is now connected to the power supply.

4.8 Installing the auto cleaner (optional)

The following conditions must be met before installing the auto cleaner:

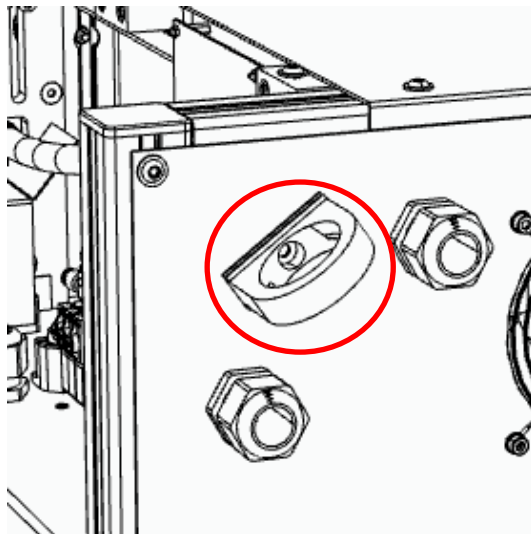
- The device is set up; see “Setting up“.
- The reagent tubes are filled; see “Filling reagent tube“.
- The device is connected to the PC; see “Connecting device with PC“.
- The gas supply has been created; see “Creating gas supply“.
- The power supply has been created; see “Creating power supply“.

The following tools are required to assemble the auto cleaner:

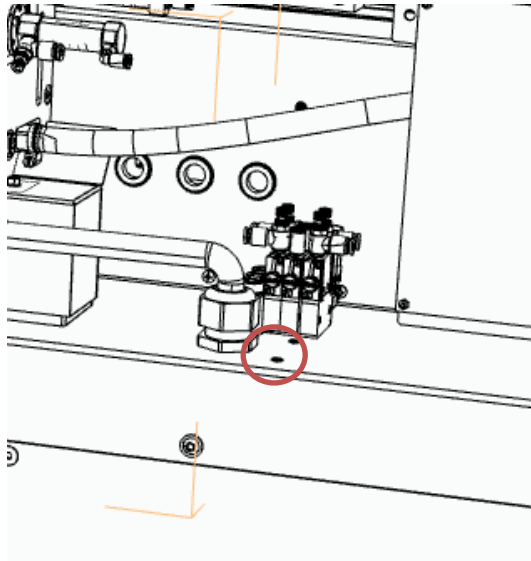
- Hexagon screwdriver 2.5 mm
- Hexagon screwdriver 4 mm
- Hexagon screwdriver 5 mm
- Open-end spanner 8 mm

Assemble the auto cleaner as follows:

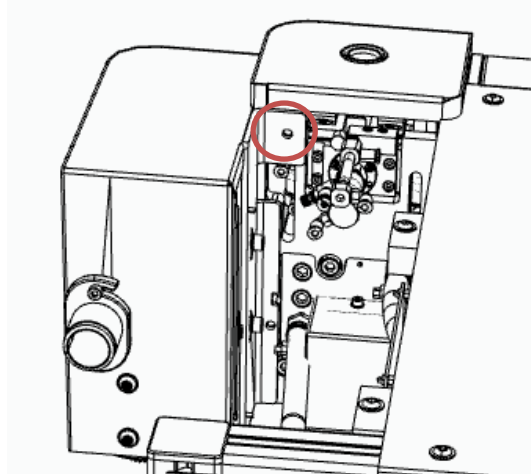
1. Disconnect compressed air supply and power supply.
2. Dismantle the top right service cover of the analyser.
3. Fix the pipe clip for the vacuum cleaner line to the rear side of the analyser and secure it with an M5x10 and nut.



4. Assemble the cable clip and secure it with an M20+ U washer.

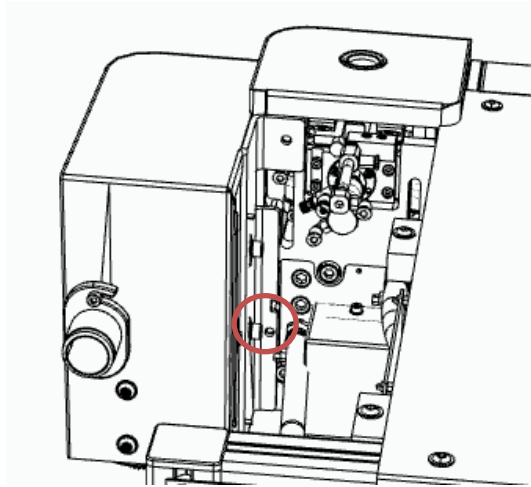


5. Remove the compressed air line P4 from the valve unit.
6. Assemble the auto cleaner and secure it initially only with the top screw M6x20.



7. Move the lines of the auto cleaner in the service area:
 - a. Please route the cables with compressed air lines behind the already installed valve unit for the oven.
 - b. Lay the control lines through the cable clip and fix the line loosely with a cable tie.

8. Secure the auto cleaner with the lower screw M6x20 and tighten both screws.



9. Disconnect the 24VDC, oven sensor and CAN bus line in the analyser and let it hang down to the side outside the device.
10. Take the control assembly of the auto cleaner and connect the compressed air line P4 with the control assembly.
11. Connect the compressed air line P4A with the valve unit of the analyser's oven.
12. Insert the control assembly. Ensure that no lines get caught or cut off. The compressed air line P4 should be routed below the pressure reducer.
13. Secure the control assembly to the aluminium profile with the pre-assembled screws and sliding blocks.
14. Connect the electrical connections of the auto cleaner to the control assembly, paying attention to the colour coding.
15. Secure the cable with the already fitted cable tie.
16. Connect the 24VDC supply line to the control assembly.
17. Connect the CAN bus line to the control assembly.
18. Remove the tape from the auto cleaner and carefully slide the auto cleaner down.
19. Turn the arm of the auto loader by hand into the open oven area of the analyser.
20. Carefully loosen the two screws slightly (do not unscrew completely).

21. Push the auto cleaner up into the oven and hold it there.
22. Carefully retighten the two previously loosened screws completely.
23. Release the auto cleaner.
24. Connect the two compressed air lines of the auto cleaner to the control assembly (blue to blue, black to black).
25. Reconnect the analyser to the compressed air and power supply.
26. Set a pressure of 1 bar on the control assembly.
27. Fit the service cover supplied.
28. Connect the vacuum cleaner to the adapter. Secure the hose to the adapter with the hose clip.
29. Insert the adapter and secure it turning.
30. Plug the vacuum cleaner into the socket on the back of the analyser. The auto cleaner is installed and aligned.

5 Commissioning

5.1 Commissioning and setting up the ELEMENTRAC ONH-p 2

CAUTION

C23.0000

Risk of injury

Pressurised system

- The device is pressurised during operation. Removing the reagent tube during operation leads to the explosive escape of chemicals or sample material and may cause injuries.
- **Never remove any reagent tubes during operation.**
- **Use the software in order to put the device into the mode “Replace reagents” before performing any work on the device.**

The following requirements must be met before commissioning:

- The device must be set up; please see „[Setting up](#)“.
- The reagent tubes must be filled; please see „[Fill reagent tube](#)“.
- The device must be connected to the PC; please see „[Connect device to the PC](#)“.
- The gas supply is provided; please see „[Provide gas supply](#)“.
- The power supply is provided; please see „[Provide power supply](#)“.

The device is commissioned as follows:

1. Turn on the PC and start the ELEMENTS software.
2. (A current version of the “ELEMENTS software” is included in the scope of delivery in the form of a USB stick or has already been pre-installed on your PC)
3. Turn on the carrier gas.
4. Turn on the compressed air supply.
5. Switch the device on the main switch to switch position 1, please see „[Front side](#)“.
6. Wait until the device has reached the operating temperature.

The device is in operation.



The device is ready for analysis after approx. 30 to 45 minutes, as soon as the cells are thermostated (stable baselines) and the catalyst furnace has reached its operating temperature.

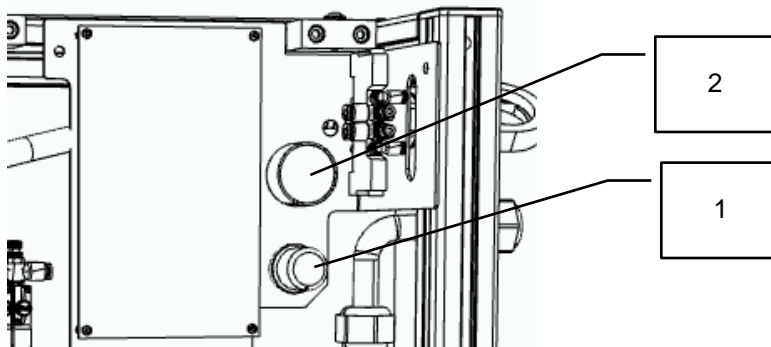
5.2 Commissioning and setting up the auto cleaner (optional)

The following requirements must be met before commissioning:

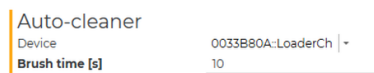
- The device is set up; see “Setting up”.
- The reagent tubes are filled; see “Filling reagent tubes”.
- The device is connected to the PC; see “Connecting device to PC”.
- The gas supply has been created; see “Creating gas supply”.
- The power supply has been created; see “Creating power supply”.
- The auto cleaner is installed; see “Installing auto cleaner”.
- The Elements software has been installed and the profile with auto cleaner has already been created; see “Software instructions”.
- You will need the service administrator password.








Put the device into operation as follows:

1. Switch on the PC and start the ELEMENTS software.
2. Switch on the carrier gas.
3. Switch on the compressed air supply.
4. Turn the main switch to position 1; see “Front panel”.
5. Set a pressure of approx. 1 bar on the pressure reducer (1) on the control assembly for the auto cleaner. You can read the pressure on the manometer (2).



6. Start Elements software (min. administrator rights necessary) and open the settings window:



7. Select the device “LoaderChild”.
8. Save the change and reactivate the settings.
9. Open the service window to align the autoloader.
10. Actuate the  key. The autoloader moves to the adjustment position.
11. Actuate the   or   keys to align the auto cleaner. The lower motor axis must be positioned centrally over the crucible tip.
12. Actuate the  key to complete the adjustment.
13. Actuate the  key to check correct operation. If, when moving into the oven, the auto cleaner collides with the side wall, please repeat steps 9 to 12 to optimally set align the auto cleaner.
14. Move to the application window of the Elements software.

15. Select an application and work through the application-specific parameters for the auto cleaner. You can set the frequency of automatic cleaning in the application parameters (cleaning interval):

| | |
|-------------------|----|
| Postwaiting | |
| Time [s] | 11 |
| Cleaning interval | 10 |

1 = after every analysis; 10 = after every 10th analysis.

16. You can similarly set the cleaning duration in seconds.
17. Save the changes.
18. Fit the top right service cover using the cover supplied.

The device has been aligned and put into operation.



The device is ready for analysis after approx. 30 to 45 minutes once the cells have been thermostated (base lines stable) and the catalysis oven has reached operating temperature.

6 Operation of the device

WARNING

W14.0021

Fire hazard / Risk of burns

Hot parts (crucibles, reagents,...) can fall down

- Ignition of tables, floors or any other surface on which the hot parts can fall.
- Ignition of clothing and other materials.
- **Set up the device in a fire-proof environment. Please pay particular attention to the table, the floor and any other surface in the immediate vicinity of the device.**
- **Always wear suitable work clothing.**
- **Keep the work area free from any materials that could catch fire.**

WARNING

W15.0000

Danger of poisoning

Toxic combustion gases

- The samples are exposed to high temperatures during analysis. In this process, harmful gaseous fission products can be released or formed from reaction processes. These gases can escape from the gas outlet or the furnace and cause severe poisoning.
- **Connect the exhaust air outlet of the device to a suitable ventilation system.**
- **Please wear your personal protective equipment.**
- **Please observe the safety data sheets in terms of the substances used.**
- **Carry out a risk analysis regarding the hazard potential of your samples and implement relevant protective measures.**

⚠ CAUTION

C24.0000

Risk of injury

Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
- **Never reach into the oven when it is closing.**
- **Use crucible tongs in order to place crucibles.**



⚠ CAUTION

C25.0076

Risk of burns

Hot equipment parts

- Some parts of the device can become very hot and cause burns if they are touched without protective gloves.
- **Please wear heat-resistant protective gloves when handling with hot device parts.**
- **Never touch hot parts of the device without suitable protective gloves.**



⚠ CAUTION

C26.0093a

Risk of burns

Hot sample carriers

- The sample carrier can be very hot after the analysis and it can cause fires and physical injuries, if it comes into contact with flammable surfaces.
- **Use only suitable crucible tongs for transporting used crucibles and shuttles.**
- **Please make sure that there are no flammable materials below the furnace opening.**
- **Only open the furnace after a suitable waiting time has elapsed.**
- **If necessary, adjust the waiting time in the program in such a way that the sample carrier can cool down sufficiently.**

The device is operated via the ELEMENTS software. The program is supplied on a USB stick or is already installed on the PC if it has been ordered.

The following requirements must be met **before** operating the device to perform any analyse samples:

- The device has been commissioned; please see „[Commissioning](#)“.



For any details of the ELEMENTS software, please see the operating instructions of the program.

In order to perform any analyses, please carry out the following:

1. Please make sure that the PC is switched on and the ELEMENTS software has been started (please see „[Commissioning](#)“).
2. Please make sure that the main switch of the analyser has been turned to position 2 and that the device is heated up.
3. Open the “Analyses and Results” window. Create a new analysis and select a suitable application.(please see Elements software “Application”)
4. Prepare the sample material.
5. Use the automatic transfer of the sample weight from the balance to the PC (F4 key) or enter the sample weight manually.
6. Enter a name for the sample in the “Id” field.
7. Place a crucible in the crucible holder by using crucible tongs (please see „[Front side](#)“).Please only use crucibles from the company .
8. Place the sample in the sample inlet on the upper side of the device.
9. In order to start the analysis, please make sure that the desired analysis is highlighted, then press the F5 key and click the green arrow in the ELEMENTS software.

The analysis is carried out.

7 Technical data

7.1 Technical data ELEMENTRAC ONH-p 2

The following table lists the technical data for the device in 3-phase configuration:

| Definition | Description | Value |
|-----------------------|-----------------------|---|
| Dimensions and weight | Width | 56 cm |
| | Depth | 64 cm |
| | Height | 78 cm |
| | Weight | approx. 165 kg |
| Electrical data | Power supply | 400 V AC \pm 10 %, 3 phases, ground and neutral conductor. |
| | Frequency | 50/60 Hz |
| | Power consumption | L1=32A, L2=30A, L3=0A |
| | Mains connection | Three-phase plug (3L+N+PE, 6h 32A according to IEC 60309) |
| Safety | Protection class | I |
| | Overvoltage category | II |
| | Degree of pollution | 2 |
| | Type of environment | Inside |
| | Max. ambient altitude | 2000 m |
| | Ambient temperature | +5 to +35°C |
| | Ambient humidity | < 80 % at 31°C non-condensing |
| | Protection class | IP20 |
| Carrier gas | Type | Nitrogen |
| | Purity | Min. 99,995 % |
| | Pressure | 2 to 4 bar (30 to 60 psi) |
| | Connection | Polyamide hose 6/4 mm (adapter with G¼" internal thread, included in the scope of delivery) |
| Carrier gas | Type | Helium |
| | Purity | Min. 99,995 % |
| | Pressure | 2 to 4 bar (30 to 60 psi) |
| | Connection | Polyamide hose 6/4 mm (adapter with G¼" internal thread, included in the scope of delivery) |
| Carrier gas | Type | Argon |
| | Purity | Min. 99,995 % |
| | Pressure | 2 to 4 bar (30 to 60 psi) |

| Definition | Description | Value |
|----------------|-----------------------------|---|
| | Connection | Polyamide hose 6/4 mm (adapter with G¼" internal thread, included in the scope of delivery) |
| Compressed air | Type | Water and oil free |
| | Pressure | 4 to 6 bar (60 to 90 psi) |
| | Connection | Polyamide hose 4/2 mm (adapter with G¼" internal thread, included in the scope of delivery) |
| Volume | Maximum noise level | 50 db(A) |
| Cooling water | minimum cooling temperature | Room temperature + 5°C |
| | Max. water pressure | 6 bar |

Table 1: Technical data analyser, 3-phase version

The following table lists the deviating technical data for the device in 1-phase configuration:

| Definition | Description | Value |
|-----------------|-------------------|---|
| Electrical data | Power supply | 208 V AC +10/-5 %, 1 phase, ground and neutral conductor. |
| | Frequency | 50/60 Hz |
| | Power consumption | L1=63A |
| | Mains connection | AC power plug (L+N+PE, 6h 63A according to IEC 60309) |

Table 2: Technical data analyser, 1-phase version

The following table lists the different data for the device with auto cleaner:

| Defintion | Description | Value |
|-----------------------|-------------|----------------|
| Dimensions and weight | Width | 70 cm |
| | Depth | 64 cm |
| | Height | 78 cam |
| | Weight | approx. 168 kg |

Table 3: Technical data for analyser with auto cleaner

7.2 Name plate ELEMENTRAC ONH-p 2

The following figure shows an example of the nameplate on the device:

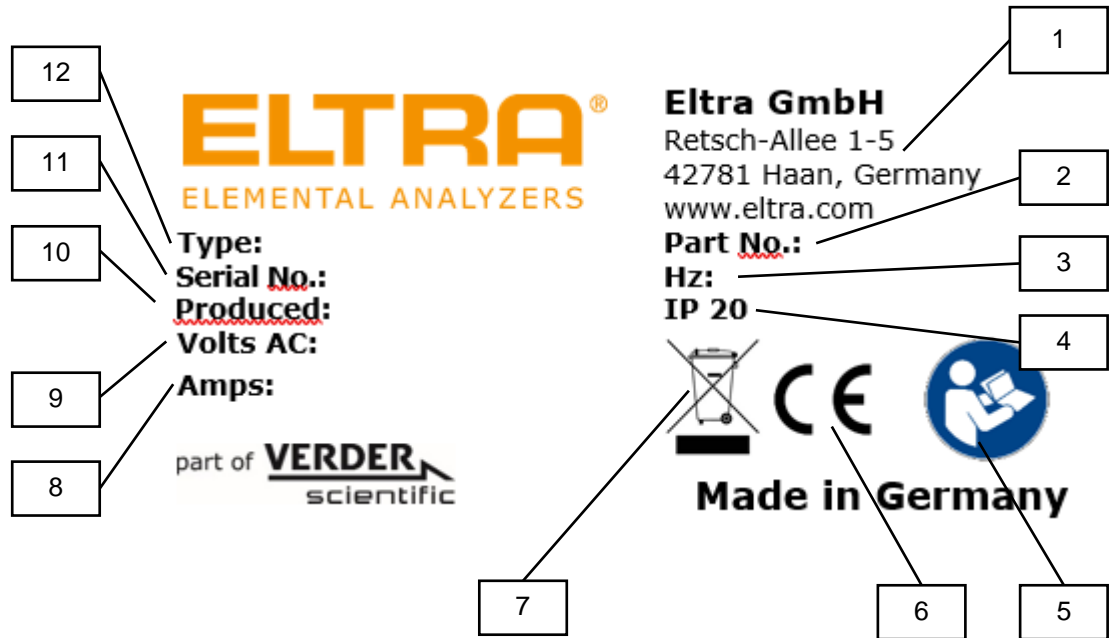


Figure 3: Name plate

| Position | Component |
|----------|---------------------------------|
| 1 | Manufacturer address |
| 2 | Item number |
| 3 | Mains frequency |
| 4 | Protection class |
| 5 | Read the operating instructions |
| 6 | CE label |
| 7 | Disposal label |
| 8 | Current |
| 9 | Voltage |
| 10 | Year of manufacture |
| 11 | Serial number |
| 12 | Equipment designation |

7.3 List of standards

The following standards for inorganic materials are observed:

| Standard | Elements | Materials | Devices |
|---------------------------|----------|-----------------------------------|-----------------------|
| ASTM E 1019:2018 | N, O | Steel, iron, nickel/cobalt alloys | ON-p OH-p ONH-p |
| ASTM E 1409:2013 | N, O | Titanium and titanium alloys | ON-p OH-p ONH-p |
| ASTM E 1447:2009 | H | Titanium and titanium alloys | OH-p ONH-p |
| ASTM E2575 - 19 | O | Copper | ONH-p series |
| ASTM C 1854-17 | H | Uranium oxide | ONH series |
| ASTM E 2792-13 | H | Aluminium | ONH-p OH-p |
| ISO 22963 | O | Titanium | ONH-p series |
| ISO 17053 | O | Steel and iron | ONH-p series |
| DIN EN ISO 15351 | N | Steel | ONH-p ON-p |
| DIN EN ISO 21068-3 (2008) | N, O | Silicon carbide | ONH-p series |
| DIN EN ISO 10720_2007-6 | N | Steel | ONH-p ON-p |
| DIN EN 3976 | H | Titanium and titanium alloys | ONH-p series |
| ASTM C 1494-13(18) | N, O | Silicon nitride | ONH-p ON-p |
| ASTM C 1457-18 | H | Uranium oxide | ONH-p OH-p |
| DIN EN ISO 4491-4:2019 | O | Metal powder | ONH-p ON-p |
| DIN 54387-3:2016 | O, N | Boron carbide Boron nitride | ONH-p ON-p |

8 Troubleshooting on the ELEMENTRAC ONH-p 2

1. Use the ELEMENTS software in order to determine which fault has occurred on the analyser and correct it in accordance with the error message of the ELEMENTS software
2. If you are not able to fix the error yourself, please contact the customer service.



In order to contact the customer service, please see „[Repairs](#)“.

9 Cleaning

9.1 Exterior cleaning

WARNING

W16.0003

Danger to life from electric shock
Cleaning with water on current-carrying parts

- Any cleaning work with water on the device can lead to life-threatening injuries from electric shock, if the device is not disconnected from the power supply.
- **Only perform cleaning work with water on the device when the device is disconnected from the power supply.**

NOTICE

Housing damage
Use of organic solvents

- Organic solvents can damage the lacquer.
- **The use of organic solvents to clean the housing is not permitted.**

N3.0077

The outside of the device ELEMENTRAC ONHp2 must be cleaned on a regular basis.

In order to clean the outside of the device, please proceed as follows:

1. Pull the power plug on the device.
2. Please wait until the device has cooled down sufficiently.
3. Moisten a suitable cloth until it is slightly damp.
4. Clean the outside surfaces of the device with the slightly damp cloth.
5. Please wait until the device is completely dry.
6. Plug the power plug back in again.

The outside of the device has been cleaned.

9.2 Cleaning the dust trap

⚠ CAUTION

Cutting injuries

Broken glass

- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**

C27.0000



The dust trap is a glass tube which is only filled with glass wool and a sinter filter in order to reduce the dust pollution for the analyser.



Fig. 5: Dust filter with sinter filter

If the glass wool is coloured black over a length of 2/3 of the filling, it must be replaced. Further information on removing the glass tube can be found in the Section [„Removing and installing of reagent tubes“](#) and [„Filling of reagent tubes“](#)

Remove the discoloured glass wool with tweezers and refill a suitable amount of fresh glass wool.

In the case that the entire pipe and the sinter filter are coloured black, remove the sinter filter for cleaning (please see Section 9.7.1) and add new glass wool.

NOTICE

It is not necessary to let the pressure out of the system when removing the dust trap.

9.2.1 Cleaning the sinter filter

The sinter filter may be cleaned as soon as the dust trap has been removed. The cleaning of the filter is carried out in two steps:

- Wipe the removed filter with a paper towel in order to remove any particles which are not bound in the filter and clean the O-rings of the filter.
- Clean the prepared filter in the ultrasonic bath.

NOTICE

After taking the filter out of the bath, let it dry completely. For this purpose, use a drying cabinet or put it in a warm place. Installing a sinter filter, which is still damp, affects the analysis results and shortens the service life of the analyser reagents. ELTRA recommends having an additional, cleaned and dried sinter filter available to ensure that this dust filter can be cleaned quickly.

9.3 Cleaning the furnace area

⚠ CAUTION

C28.0000

Risk of burns

Hot equipment parts

- Parts of the device can become very hot and cause burns during the performance of any maintenance work if the waiting time for cooling is not observed.
- **Before any maintenance work can be performed, please wait until the furnace temperature is < 40 °C.**
- **Check the furnace temperature in the ELEMENTS software.**



⚠ CAUTION

C29.0000

Risk of injury

Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
- **Never reach into the oven when it is closing.**
- **Use crucible tongs in order to place crucibles.**



The outside of the furnace area of the ELEMENTRAC ONHp2 must be cleaned on a regular basis in order to ensure that reliable and reproducible measurement results can be achieved.

In order to clean the surface area, please proceed as follows:

1. Turn the main switch of the analyser to position 1 or 0.
2. Please wait until the analyser has cooled down.
3. Press the button “furnace cleaning” on the software tab “status analyser”.
4. Remove the dust trap.
5. Clean the connection between dust trap and furnace with the supplied pipe cleaner.
6. Use the supplied bottle brush in order to brush the inner area of the sample fall channel from above through the sample inlet into the furnace chamber.
7. Brush the top electrode with the supplied electrode brush.
8. Clean the inside surface of the furnace with the slightly damp cloth.
9. Brush the lower electrode with the supplied brass brush.
10. Remove the accumulated dust with a vacuum cleaner or a slightly damp cloth.
11. Close the window in the Elements software.
12. Turn the main switch of the analyser to position 2.

The cleaning of the furnace has been completed.

10 Maintenance

10.1 Overview of the maintenance work

The following maintenance instructions refer to standard steel analyses with the ONH-p 2 for 25 to 50 samples per day and 99.995% pure carrier gas. Depending on the application, the maintenance cycle must be intensified in order to maintain the precision of the analysis results.

The following table lists the maintenance work to be carried out. The maintenance work must be carried out on a regular basis at the specified maintenance interval or as soon as the number of possible analyses has been reached:

| Component | Number of analyses | Maintenance interval | Maintenance instructions | See Section |
|--|--------------------|----------------------|--|---|
| Inlet gas cleaning system | 1000 | Monthly | If clumping is evident, it must be replaced earlier. | „Fill the reagent tube for the inlet gas cleaning system“ |
| Magnesium perchlorate (Filter by catalyst furnace) | 1000 | Monthly | If clumping is evident, it must be replaced earlier. | „ |
| Catalyst | 10000 | Semi-annually | Replace, if oxygen levels drop and nitrogen levels rise at the same time | „Fill the reagent tube of the catalyst furnace“ |
| Glass wool (dust filter behind the furnace) | 250 | Weekly | Replace glass wool | |
| Metal filter behind glass wool | 1000 | Monthly | Replace and clean in an ultrasonic bath | |
| Connection of glass wool filter, furnace area | 250 | Weekly | Remove dust from the connection with a brush/pipe cleaner | |
| Anhydron / NaOH filter in front of the TC cell | 150 | Weekly | Replace chemicals | |
| Contactors reagent | 250 | Monthly | Replace chemicals | |
| Replacing of graphite tip | 500 | Monthly | Replacing | |
| Removal/cleaning of the upper electrode | 500 | Monthly | Removal and cleaning | |
| Replacing of upper electrode | 5000 | Semi-annually | Replacing of upper electrode | Replace upper electrode |

- **After 50 analyses or at least 2 times a day**
 - Clean furnace and electrodes. Further information can be found in Section [„Furnace cleaning“](#).
- **After 500 analyses**
 - Replace all chemicals (except copper oxide). Further information can be found in Section [„Removing and installing of reagent tubes“](#) and [„Filling of reagent tubes“](#).
- **After 1000 analyses or by request**
 - Replacing the crucible base made of graphite after 1000 analyses, or if the contact surface between the crucible and the crucible base has significantly reduced due to wear. [„Replacing of electrodes“](#).
- **After 2000 analyses**
 - Replace the copper oxide in the catalyst furnace. [„Replacing the copper oxide in the catalyst furnace“](#).
 - Take the electrodes out of the furnace and clean them with a brush. Further information can be found in Section [„Replacing the electrodes“](#).

NOTICE

The aforementioned maintenance recommendations are based on steel analysis and 99.995% pure helium.

Depending on the application, these can differ significantly from the above recommendations. For example, cleaning the furnace when analysing refractory metals (titanium) is recommended after a maximum of 10 analyses. The service life of the copper oxide is also reduced the higher the certain oxygen concentrations are (e.g. oxides, slags).

NOTICE

Set up a “counter” in the software. Please read the Section “Analyser Status” in the software manual.

10.2 Removing and installing of reagent tubes

WARNING

W17.0017

Risk of injury

Hazardous chemicals

- When working on the device, hazardous chemicals can cause fatal poisoning or severe skin burns .
- **Please observe the safety data sheet in terms of the substances used.**
- **Please wear your personal protective equipment.**
- **Never eat or drink within the immediate vicinity of chemicals.**

CAUTION

C30.0000

Risk of injury

Pressurised system

- The device is pressurised during operation. Removing reagent tubes during operation may lead to an explosive escape of chemicals or sample material and can cause injuries.
- **Never remove any reagent tubes during operation.**
- **Use the software in order to put the device into the mode “Replace reagents” before performing any work on the device.**

CAUTION

C31.0000

Risk of burns

Hot equipment parts

- Parts of the device can become very hot and cause burns during the performance of any maintenance work if the waiting time for cooling is not observed.
- **Turn the main switch to position 1.**
- **Before any maintenance work can be performed, please wait until the furnace temperature is < 40 °C.**
- **Check the furnace temperature in the ELEMENTS software.**



CAUTION

C32.0000

Cutting injuries

Broken glass

- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**



⚠ CAUTION

C33.0090

Risk for eye injuries

Chemicals

- When chemicals are replaced, small particles of the chemicals can float in the air and burn the eyes.
- **Please always wear protective goggles when working with chemicals.**
- **Please observe the safety data sheets in terms of the chemicals used.**



The procedure described in this section applies to the filters on the front side of the analyser behind the device door. The reagent tubes of these filters must also be removed in the same way for filling or replacement.



The reagent tubes of the analyser must not be removed during operation.

In order to remove a reagent tube on the front of the analyser, please proceed as follows:

1. Turn the main switch of the analyser to switch position 1.
2. In order to release the pressure, press the “Reagent Change” button on the “Status Analyser” page in the ELEMENTS software.
3. Slide the reagent tube upwards.
4. Swivel the reagent tube slightly to the side or forwards.
5. Pull the reagent tube downwards and out. If the reagent tube is difficult to be moved, turn it slightly while pulling it out.

The reagent tube on the front side of the analyser has been removed.

The following figure shows an example of how to remove a reagent tube on the front side of the analyser:

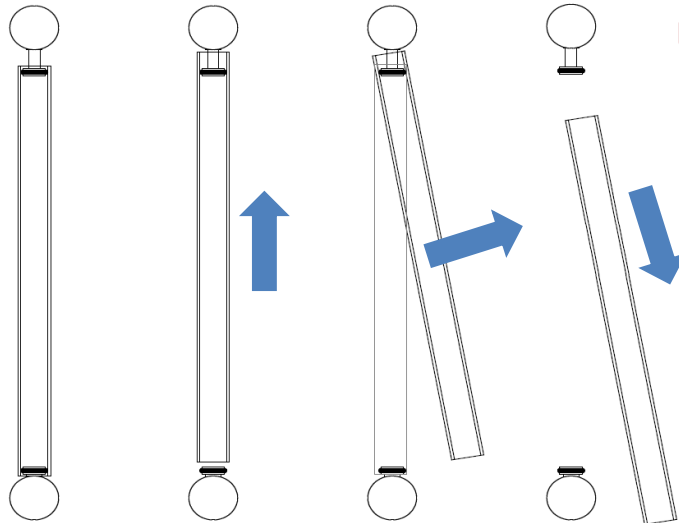


Figure 4: Remove the reagent tube on the front side of the analyser.

In order to insert the reagent tubes on the front side of the analyser, please proceed as follows:

1. Please make sure that the main switch of the analyser is set to switch position 1.
2. Please make sure that the "Reagent change" button in the ELEMENTS software is pressed in order to release the pressure.
Please only confirm this message **after** the respective filter has been reinserted.
3. Please make sure that the reagent tube is filled in accordance with the specifications (please see Section „[Filling of reagent tubes](#)“).
4. Clean the connections for the reagent tube on the analyser.
5. Slightly lubricate the inner ends of the reagent tube and the O-rings with high vacuum silicone grease (Item number 92610).

The following figure shows an example of how to insert a reagent tube on the front side of the analyser:

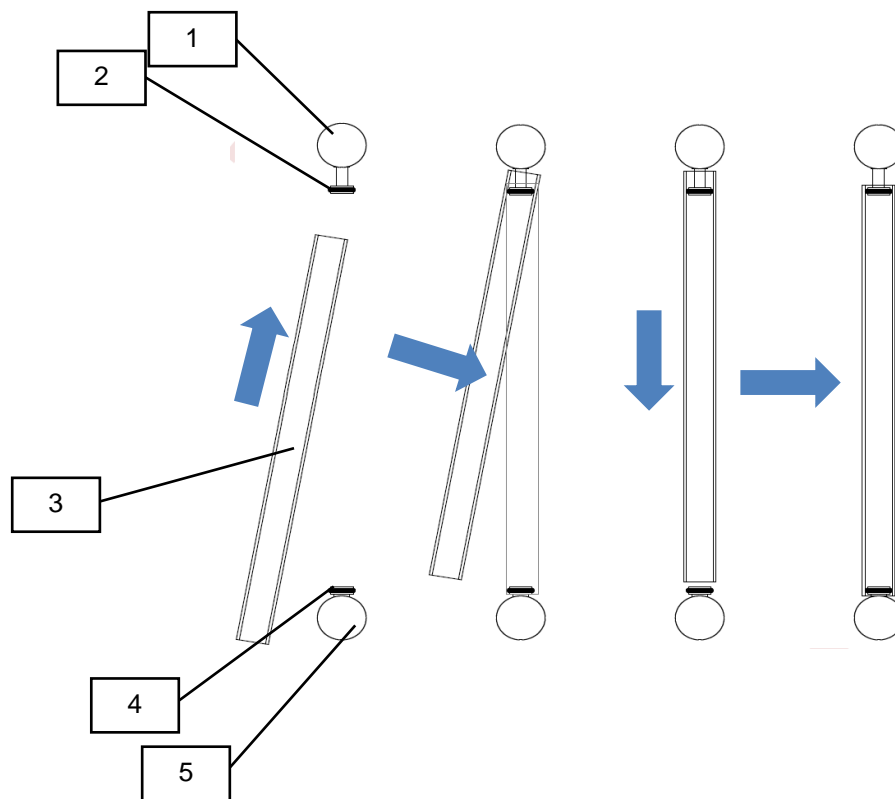


Fig. 6: Inserting a reagent tube on the front side of the analyser

6. Hold the filled reagent tube (3) at a slight angle.
7. Guide the filled reagent tube over the upper O-ring (2) onto the upper holder (1).
8. Align the filled reagent tube vertically over the lower O-ring (4)
9. Press the reagent tube down slightly until the reagent tube is seated on the holder below (5). Turn the reagent tube slightly, if it sits too tight
10. Please verify whether the O-rings form an even impression of approx. 2mm all around on the reagent tube and that there is no leakage through the glass wool on the O-ring.

11. Confirm the message from the ELEMENTS software so that the pressure can be built up again.

The reagent tube on the front of the analyser has been inserted.

10.3 Reagents

The fillings of the reagent tubes are replaced when they are saturated.

The following chemicals are used:

| | |
|--------------------------------------|------------------------------------|
| Magnesium perchlorate (anhydrous) | as a moisture absorbent |
| Sodium hydroxide | as CO ₂ absorbent |
| Copper oxide, contactors reagent | as oxidant (CO → CO ₂) |

NOTICE

Set up a “counter” in the software. Please refer to the software manual in the Section “Analyser status”.

- Magnesium perchlorate is saturated when its particles no longer move after lightly tapping against the glass tube. It is very important to replace the absorbent before it becomes lumpy. Therefore, it is necessary to check it every 100 to 200 analyses and replace it, if necessary.
- It is not possible to dry and reuse the magnesium perchlorate as it has chemically changed itself after reacting with moisture.
- The saturation of the sodium hydroxide leads to a color change; it becomes light grey.
- Contactors reagent changes its colour when saturated from yellow to pink to brown to black.
- Copper oxide is chemically reduced and turns reddish in colour.

Magnesium perchlorate and contactors reagent are oxidising!

Please observe the notes in the safety data sheets in terms of the chemicals.

10.4 Replacing the reagent tube of the catalyst furnace

WARNING

W18.0017

Risk of injury

Hazardous chemicals

- When working on the device, hazardous chemicals can cause fatal poisoning or severe skin burns .
- **Please observe the safety data sheet in terms of the substances used.**
- **Please wear your personal protective equipment.**
- **Never eat or drink within the immediate vicinity of chemicals.**

CAUTION

C34.0094

Risk of burns

Hot catalyst furnace

- The furnace temperature of the catalyst furnace can be up to 800°C during operation and cause severe burns.
- **Please wear heat-resistant protective gloves when handling with the catalyst furnace.**
- **Before any maintenance work can be performed, please wait until the furnace temperature is < 40 °C.**
- **Check the furnace temperatures in the ELEMENTS software.**
- **Replace the filling of the catalyst furnace only after a sufficiently long cooling time.**



CAUTION

C35.0090

Risk for eye injuries

Chemicals

- When chemicals are replaced, small particles of the chemicals can float in the air and burn the eyes.
- **Please always wear protective goggles when working with chemicals.**
- **Please observe the safety data sheets in terms of the chemicals used.**



CAUTION

C36.0000

Risk of injury

Pressurised system

- The device is pressurised during operation. Removing reagent tubes during operation may lead to an explosive escape of chemicals or sample material and can cause injuries.
- **Never remove any reagent tubes during operation.**
- **Use the software in order to put the device into the mode “Replace reagents” before performing any work on the device.**

⚠ CAUTION

C37.0000

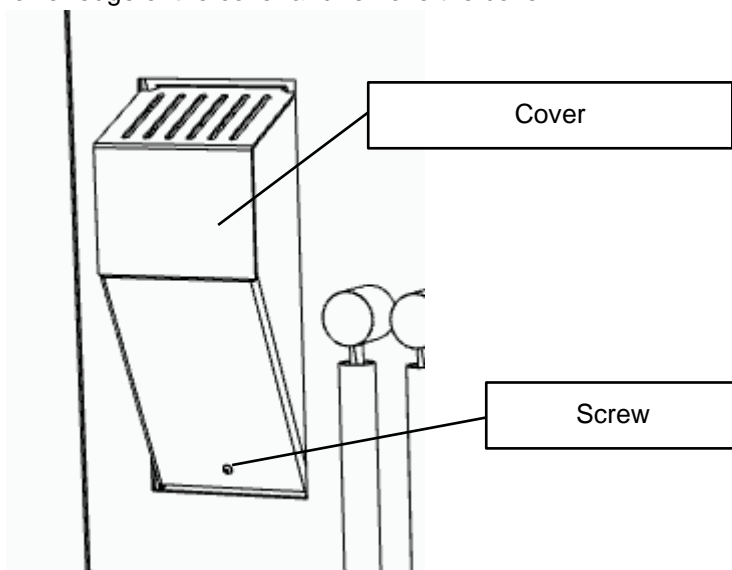
Cutting injuries

Broken glass

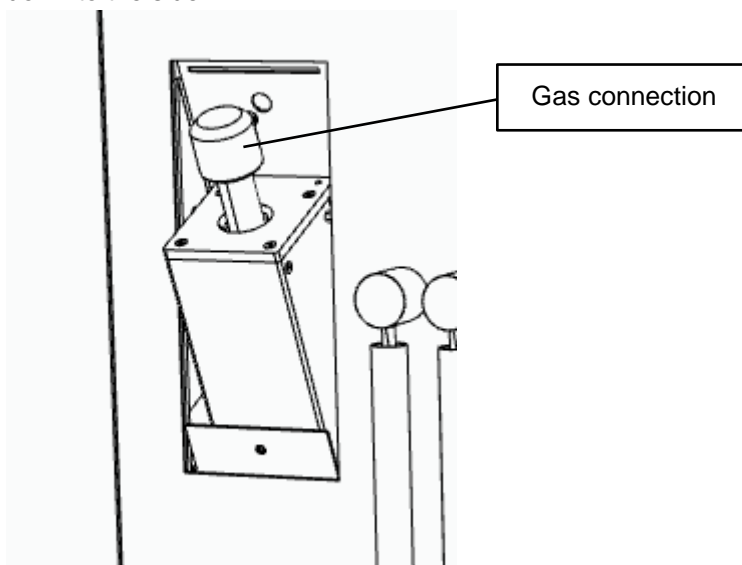
- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**



- Activate the application for cooling down the catalyst furnace (Setting: Catalyst furnace temperature = 0°C)
- Open the front door of the analyser
- Please wait until the catalyst furnace has cooled down.
- Remove the cover of the catalyst furnace. For this purpose, loosen the screw on the lower edge of the cover and remove the cover.



- Carefully pull the gas connection upwards with a slight rotating motion and let it hang down to the side.



- Carefully pull the reagent tube upwards with a slight rotating motion.
- Replace the copper oxide as described in Section 10.5.2.
- Subsequently, put the reagent tube back in reverse order and mount the cover of the catalyst furnace.

The reagent of the catalyst furnace has been replaced.

The ELEMENTRAC OH-p does not have a heated catalyst furnace.

10.5 Filling of reagent tubes

WARNING

W19.0017

Risk of injury

Hazardous chemicals

- When working on the device, hazardous chemicals can cause fatal poisoning or severe skin burns .
- **Please observe the safety data sheet in terms of the substances used.**
- **Please wear your personal protective equipment.**
- **Never eat or drink within the immediate vicinity of chemicals.**

CAUTION

C38.0000

Risk of burns

Hot equipment parts

- Parts of the device can become very hot and cause burns during the performance of any maintenance work if the waiting time for cooling is not observed.
- **Turn the main switch to position 1.**
- **Before any maintenance work can be performed, please wait until the furnace temperature is < 40 °C.**
- **Check the furnace temperature in the ELEMENTS software.**



CAUTION

C39.0000

Cutting injuries

Broken glass

- Sample tubes and reagent tubes are made of glass and can break. Broken glass can cause cutting injuries.
- **Please check reagent tubes and sample tubes for any damage before use.**
- **Please wear protective gloves and goggles when handling with reagent tubes and sample tubes.**
- **Replace damaged reagent tubes and sample tubes.**
- **Do not touch broken glass with unprotected hands.**



CAUTION

C40.0090

Risk for eye injuries

Chemicals

- When chemicals are replaced, small particles of the chemicals can float in the air and burn the eyes.
- **Please always wear protective goggles when working with chemicals.**
- **Please observe the safety data sheets in terms of the chemicals used.**



10.5.1 Overview of the reagent tubes

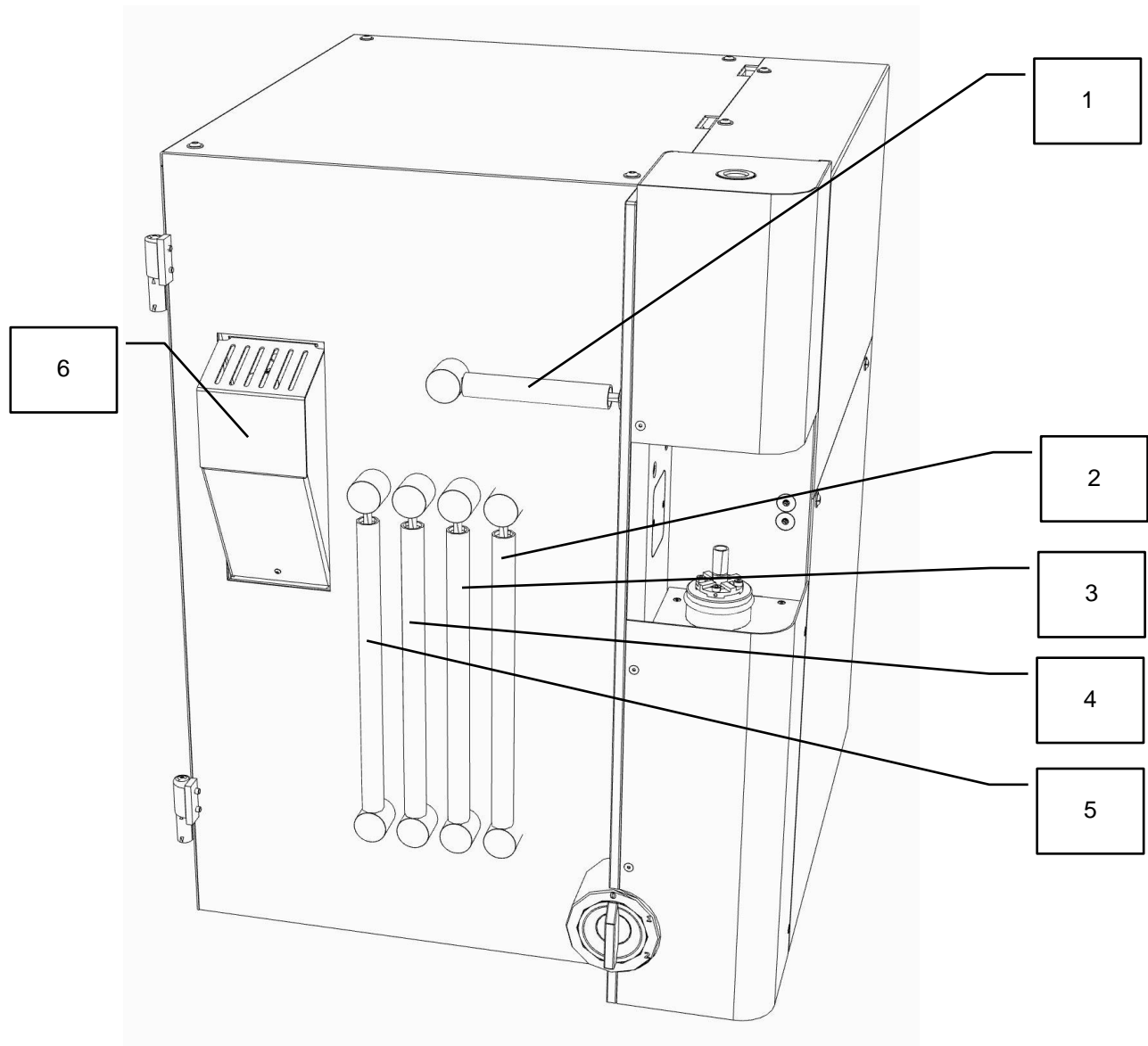


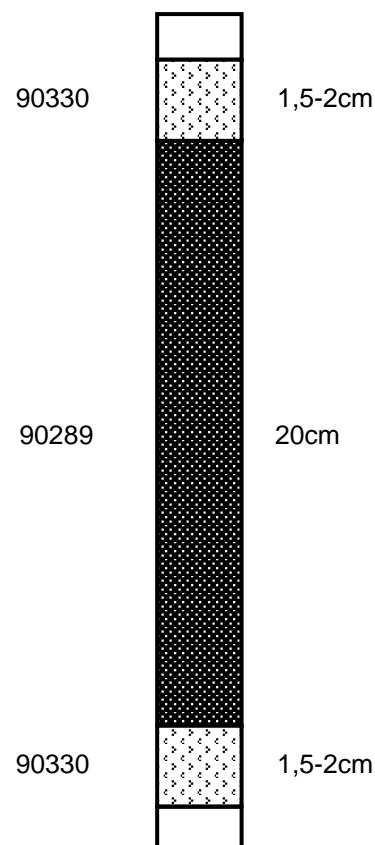
Figure 5: Front side of the analyser with the device door open

| Position | Component |
|----------|---|
| 1 | Dust trap, sinter filter |
| 2 | Water trap after the catalyst furnace, anhydron |
| 3 | CO converter, contactors reagent |
| 4 | Gas processing for the carrier gas, anhydron / sodium hydroxide |
| 5 | Gas processing for the thermal conductivity cell, anhydron / sodium hydroxide |
| 6 | Catalyst, copper oxide |

10.5.2 Fill the reagent tube of the catalyst

In order to replace the filling of the catalyst (see Section (1) in „10.5 Filling of reagent tubes“) and proceed as follows:

1. Turn the main switch of the analyser to switch position 1.
2. Before removing the reagent tube, please see [Removing and installing of reagent tubes](#)„“.
3. Remove the used filling from the reagent tube.
4. Clean the reagent tube.
5. Dispose of the material in accordance with local rules and regulations.
6. Please make sure that the reagent tube is undamaged.
7. In the event that it is damaged or too much contaminated, use a new reagent tube (Item number 11064-3002).
8. Fill the reagent tube with 1.5-2 cm quartz wool (Item number 90330).
9. Fill the reagent tube with 20 cm copper oxide (Item number 90289).
10. Fill the reagent tube with 1.5-2 cm quartz wool (Item number 90330).
11. Before inserting the filled reagent tube, please see [„Removing and installing reagent tubes“](#).



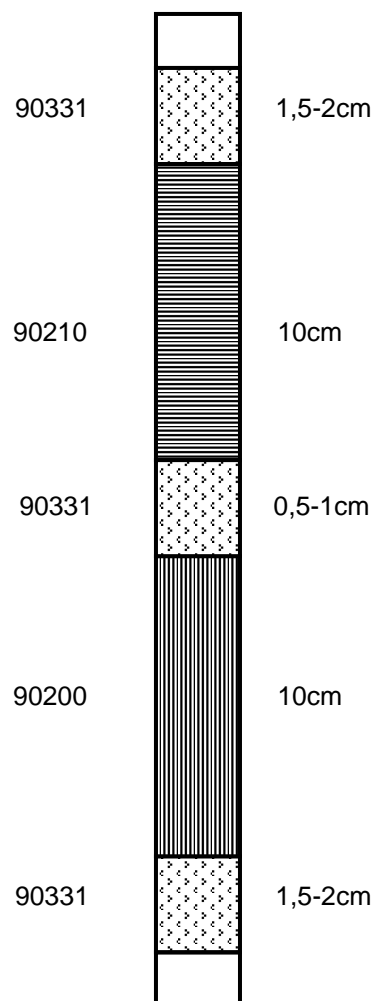
The filling of the reagent tube has now been replaced.

The Elementrac OH-p does not have a heated catalyst.

10.5.3 Fill the reagent tube of the gas processing (thermal conductivity cell, carrier gas)

Before replacing the filling of the gas processing, please see items (2 and 3) in Fehler! Verweisquelle konnte nicht gefunden werden.) and proceed as follows:

1. Turn the main switch of the analyser to switch position 1.
2. Before removing the reagent tube, please see [„Removing and installing of reagent tubes“](#).
3. Remove the used filling from the reagent tube.
4. Clean the reagent tube.
5. Dispose of the material in accordance with local rules and regulations.
6. Please make sure that the reagent tube is undamaged.
7. In the event that it is damaged or too much contaminated, use a new reagent tube (Item number 88400-0006).
8. Fill the reagent tube with 1.5 to 2 cm glass wool (Item number 90331).
9. Pour approx. 10 cm of magnesium perchlorate (Item number 90200) onto the glass wool.
10. Pour 0.5 to 1 cm of glass wool onto the magnesium perchlorate (Item number 90331).
11. Pour approx. 10 cm of sodium hydroxide (Item number 90210) onto the glass wool.
12. Pour 1.5 to 2 cm of glass wool onto the sodium hydroxide (Item number 90331).
13. Before inserting the filled reagent tube, please see [„Removing and installing reagent tubes“](#).



The filling of the reagent tube has now been replaced.

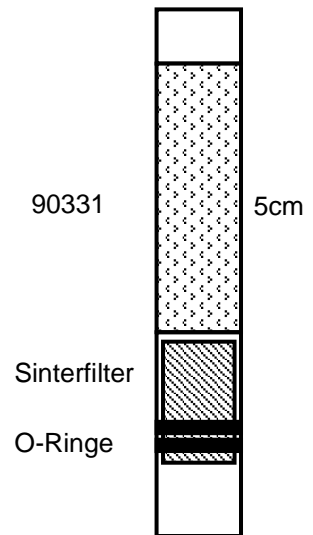
10.5.4 Fill the dust trap of the reagent tube

Before replacing the filling of the dust trap, please see Section (4) in „10.5 Filling of reagent tubes“) and proceed as follows:

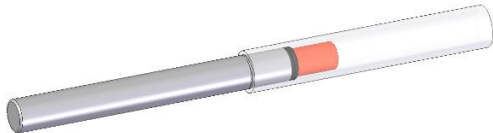
1. Turn the main switch of the analyser to switch position 1.
2. Before removing the reagent tube, please see [„Removing and installing of reagent tubes“](#).
3. Remove the contaminated glass wool from the reagent tube by means of a tweezer.
4. Dispose of the material in accordance with local rules and regulations.
5. Remove the sinter filter by means of the assembly tool (Item number 27000-3158)



6. Pre-clean the sinter filter with a paper towel and then place it in an ultrasonic bath.
7. Make sure the sinter filter is completely dry or replace it with a dry one.
8. Use a cloth in order to clean the reagent tube from dirt and grease residues.
9. Please make sure that the reagent tube is undamaged.
10. In the event that it is damaged or too much contaminated, use a new reagent tube (Item number 11064-3001).
11. Fill the reagent tube with 5 cm glass wool (Item number 90331).
12. Push the cleaned and dried sinter filter with the hollow side up to the stop on the mandrel of the assembly tool.
13. Put the two O-rings over the sinter filter and push them also up to the stop against the assembly tool



14. Push the sinter filter into the reagent tube up to the marking



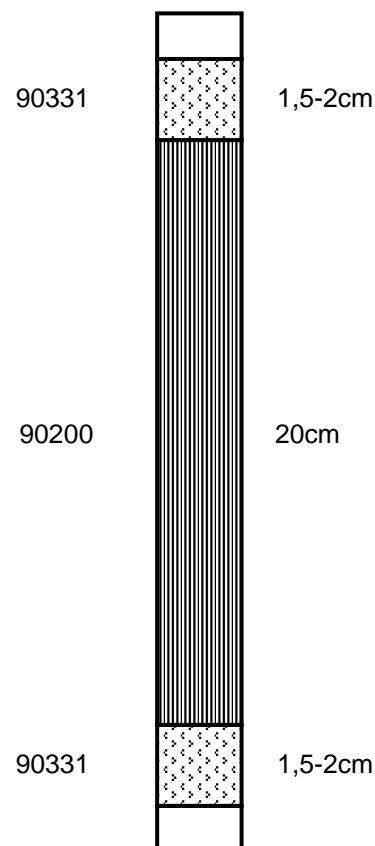
15. Insert the filled reagent tube in such a way that the glass wool points towards the furnace (please see [„Removing and installing of reagent tubes“](#)).

The filling of the reagent tube has now been replaced.

10.5.5 Filling the reagent tube of the water trap

In order to replace the filling of the catalyst (see Section (5) in „10.5 Filling of reagent tubes“) and proceed as follows:

1. Turn the main switch of the analyser to switch position 1.
2. Before removing the reagent tube, please see [„Removing and installing of reagent tubes“](#).
3. Remove the used filling from the reagent tube.
4. Clean the reagent tube.
5. Dispose of the material in accordance with local rules and regulations.
6. Please make sure that the reagent tube is undamaged.
7. In the event that it is damaged or too much contaminated, use a new reagent tube (Item number 11064-3002).
8. Fill the reagent tube with 1.5-2 cm glass wool (Item number 90331).
9. Fill the reagent tube with 20 cm magnesium perchlorate (Item number 90200).
10. Fill the reagent tube with 1.5-2 cm glass wool (Item number 90331).
11. Before inserting the filled reagent tube, please see [„Removing and installing reagent tubes“](#).

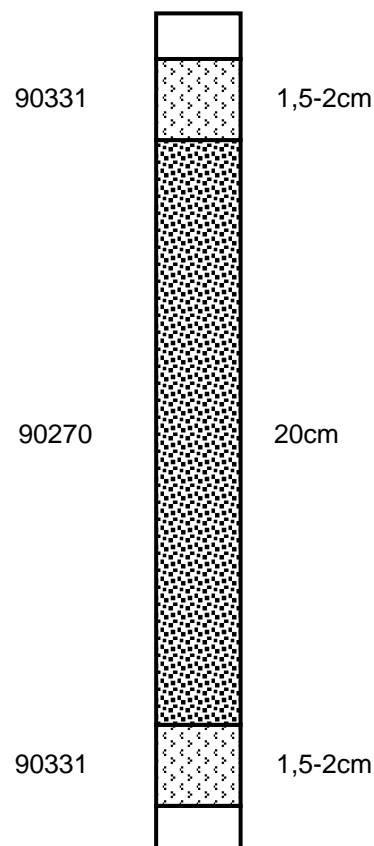


The filling of the reagent tube has now been replaced.

10.5.6 Filling the reagent tube of the CO converter

In order to replace the filling of the catalyst (see Section (6) in „10.5 Filling of reagent tubes“) and proceed as follows:

1. Turn the main switch of the analyser to switch position 1.
2. Before removing the reagent tube, please see [„Removing and installing of reagent tubes.“](#)
3. Remove the used filling from the reagent tube.
4. Clean the reagent tube.
5. Dispose of the material in accordance with local rules and regulations.
6. Please make sure that the reagent tube is undamaged.
7. In the event that it is damaged or too much contaminated, use a new reagent tube (Item number 11064-3002).
8. Fill the reagent tube with 1.5-2 cm glass wool (Item number 90331).
9. Fill the reagent tube with 20 cm contactors reagent (Item number 90270).
10. Fill the reagent tube with 1.5-2 cm glass wool (Item number 90331).
11. Before inserting the filled reagent tube, please see [„Removing and installing reagent tubes“](#).



The filling of the reagent tube has now been replaced.

10.6 Replacing the O-rings

The O-rings are only replaced during maintenance or due to obvious wear. The O-rings, which need to be replaced, are listed in Section [Spare parts](#).

10.7 Maintenance in the furnace area

10.7.1 Changing the seal of the upper furnace closure

⚠ CAUTION

C41.0000

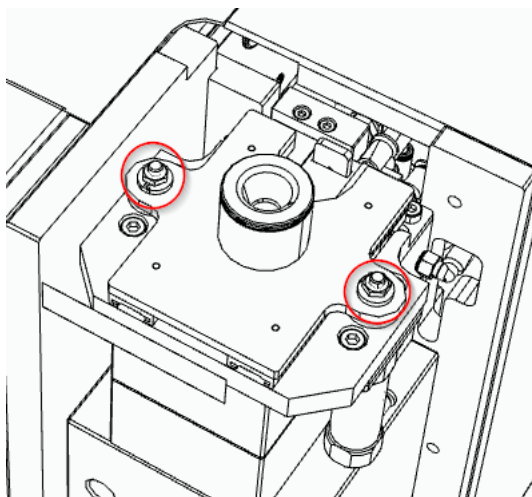
Risk of injury

Moving parts

- The lock moves according to user input. Hands in the area of the upper furnace lock can be crushed when the lock closes.
- **Never reach into a moving lock.**

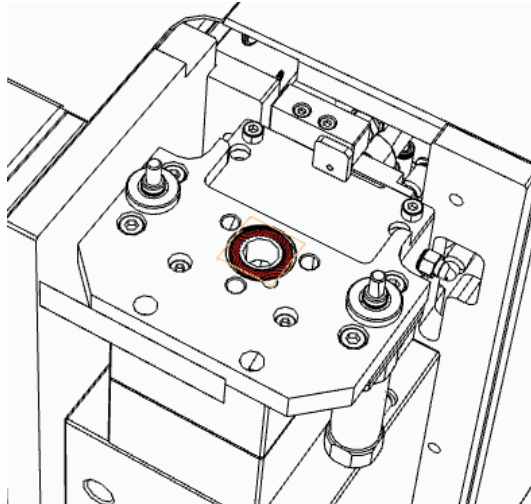


- Turn the main switch of the analyser to position 1 or 0.
- Press the button “furnace cleaning” on the tab “Analyser status” of the software.
- Loosen the fastening screws of the upper furnace cover and remove it upwards.
- Loosen the two nuts on the furnace lock assembly

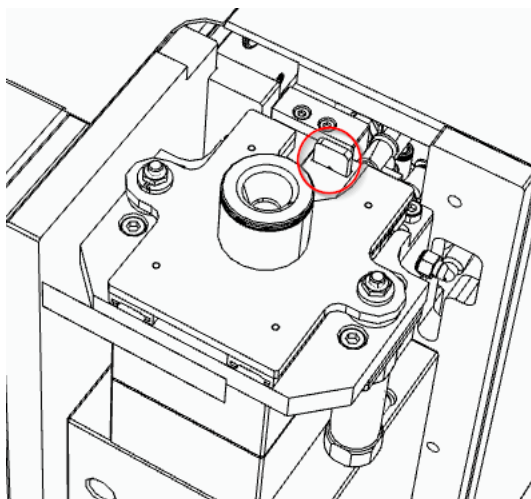


- Carefully remove the furnace lock assembly upwards and place the assembly backwards on the analyser.
Please pay attention to the slidingly mounted locking element.

- Remove the old O-ring and clean the surfaces.



- Insert the new O-ring free of grease.
- Reinstall the furnace lock assembly. Please make sure that the locking element engages into the guiding element of the pneumatic cylinder.



- Insert the two nuts and tighten them.
- Put the upper furnace cover on from above and fasten it with the screw.
- Close the window in the Elements software.
- Turn the main switch of the analyser to position 2.
- Perform a leak test in the software.

The seal of the upper furnace lock has been replaced.

10.7.2 Changing the seal of the lower furnace lock

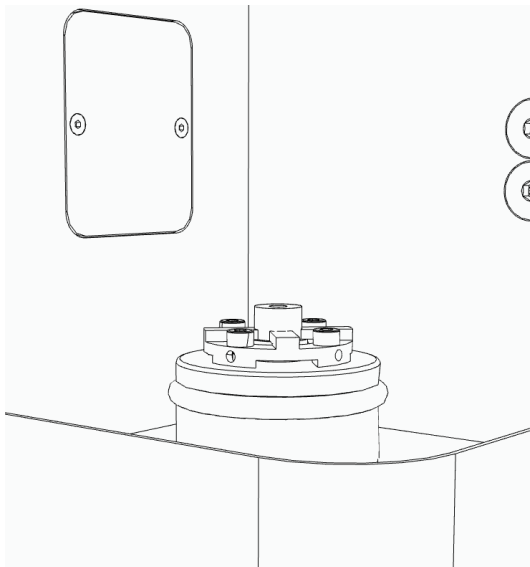
⚠ CAUTION

C42.0000

Risk of injury

Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
 - **Never reach into the oven when it is closing.**
 - **Use crucible tongs in order to place crucibles.**
-
- Turn the main switch of the analyser to position 1 or 0.



- Remove the old O-ring.
- Clean the surfaces.
- Insert the new O-ring.
- Lubricate the new O-ring with high vacuum grease (Item number 92610).
- Turn the main switch of the analyser to position 2.
- Perform a leak test in the software.

The seal of the lower furnace lock has been replaced.

10.7.3 Replacing the upper electrode

CAUTION

C43.0000

Risk of injury

Moving parts

- The lock moves according to user input. Hands in the area of the upper furnace lock can be crushed when the lock closes.
- **Never reach into a moving lock.**



CAUTION

C44.0000

Risk of injury

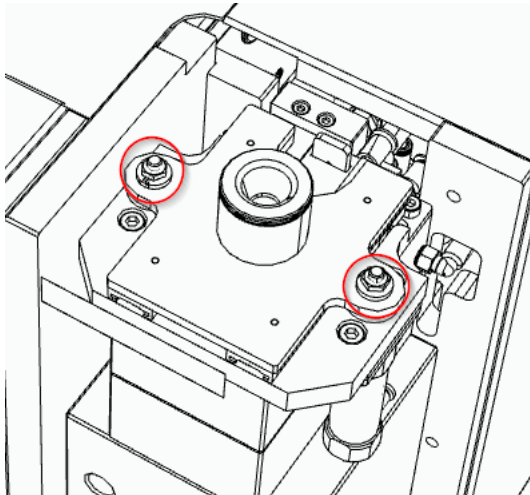
Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
- **Never reach into the oven when it is closing.**
- **Use crucible tongs in order to place crucibles.**

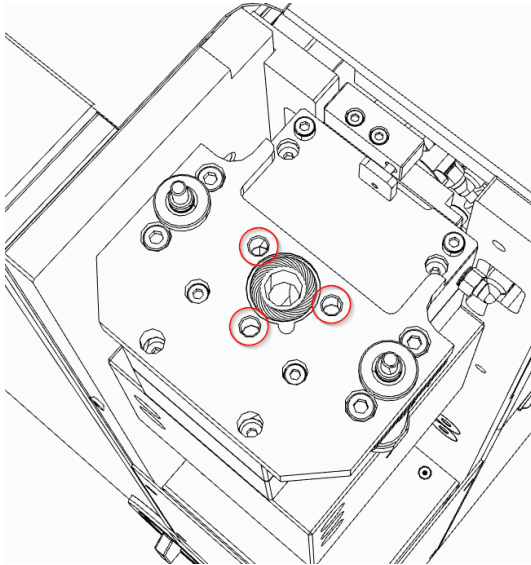


10.7.3.1 Replacing an electrode

- Turn the main switch of the analyser to position 1 or 0.
- Press the button “furnace cleaning” on the tab “Analyser status” of the software.
- Loosen the fastening screws of the upper furnace cover and remove it upwards.
- Loosen the two nuts on the furnace lock assembly.



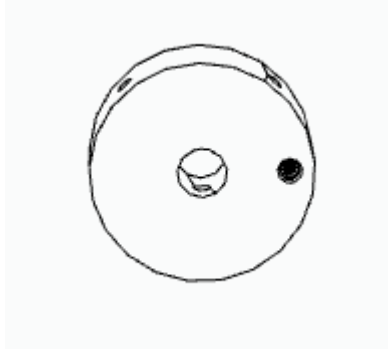
- Carefully remove the furnace lock assembly upwards and place the assembly backwards on the analyser.
Please pay attention to the slidingly mounted locking element.
- Loosen the three screws which hold the electrode in place. Use the supplied Torx[®] screwdriver for this purpose. The screws remain in the furnace assembly. Hold the electrode while performing this task



NOTICE

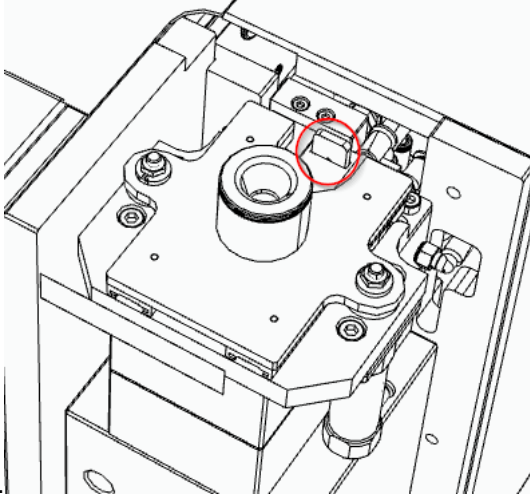
Do not use a Torx® screwdriver with a ball head. The screws may be very tight and the ball head could thereby tear off and damage the screw.

- Remove the electrode of the furnace from below.
- Clean the inside of the furnace with a dry cloth.
- Insert the new electrode into the furnace from the bottom up. The electrode has a coding to enable a better orientation. This must point to the right.



- Fasten the electrode with the three screws

- Reinstall the furnace lock assembly. Please make sure that the locking element engages into the guiding element of the pneumatic cylinder

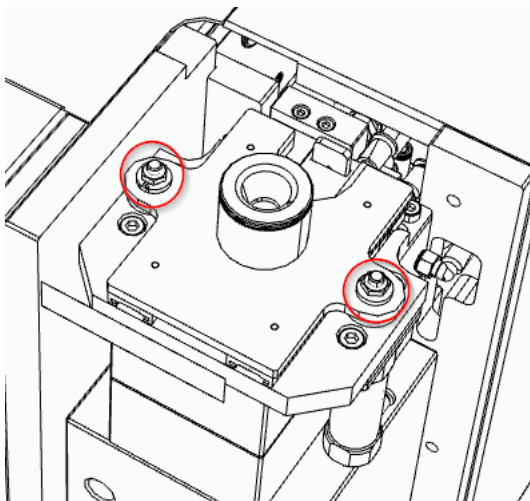


- Insert the two nuts and tighten them.
- Put the upper furnace cover on from above and fasten it with the screw.
- Close the window in the Elements software.
- Turn the main switch of the analyser to position 2.
- Perform a leak test in the software.

The upper electrode has been replaced.

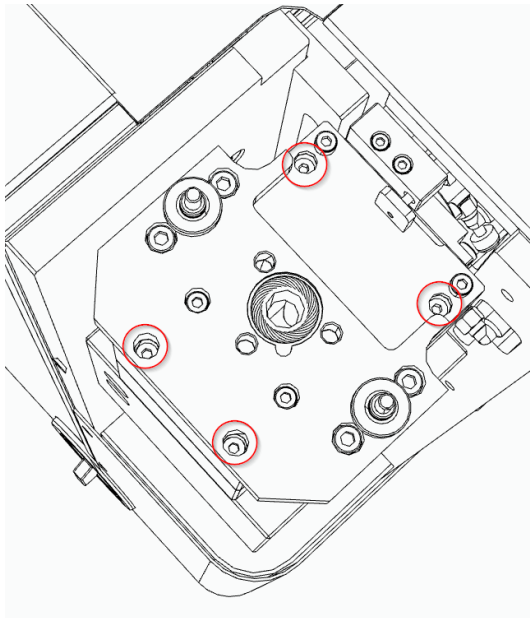
10.7.3.2 complete electrode replacement, including screws

- Turn the main switch of the analyser to position 1 or 0.
- Press the button “furnace cleaning” on the tab “Analyser status” of the software.
- Loosen the fastening screws of the upper furnace cover and remove it upwards.
- Open the upper maintenance flap on the right side.
- Loosen the two nuts on the furnace lock assembly

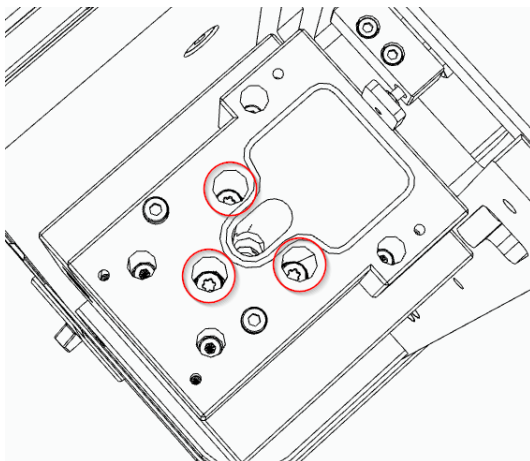


- Carefully remove the furnace lock assembly upwards and place the assembly backwards on the analyser.
Please pay attention to the slidingly mounted locking element.

- Loosen the four fastening screws of the upper part of the furnace and carefully remove the furnace part.



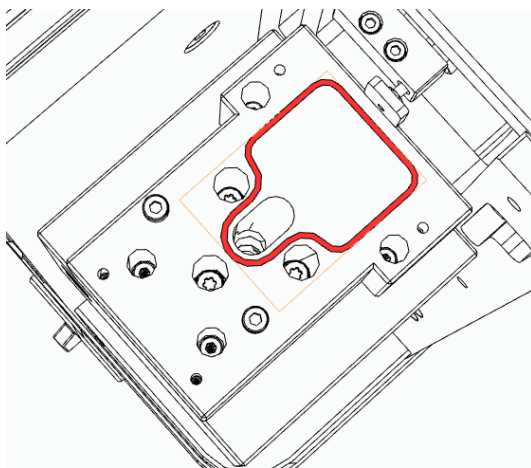
- Remove the compressed air hoses from the two vertical pneumatic cylinders.
- Loosen the three screws which hold the electrode in place. Use the supplied Torx[®] screwdriver for this purpose. Hold the electrode while performing this task.



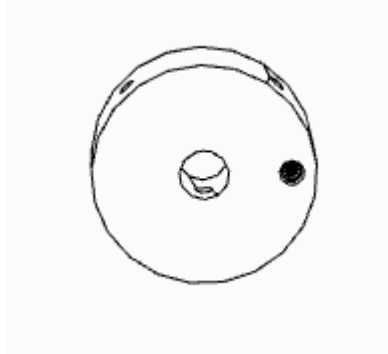
NOTICE

Do not use a Torx[®] screwdriver with a ball head! The screws may be very tight and the ball head could thereby tear off and damage the screw.

- Remove the electrode of the furnace from below.
- Remove the three screws with the sealing washers.
- Remove the flat seal.

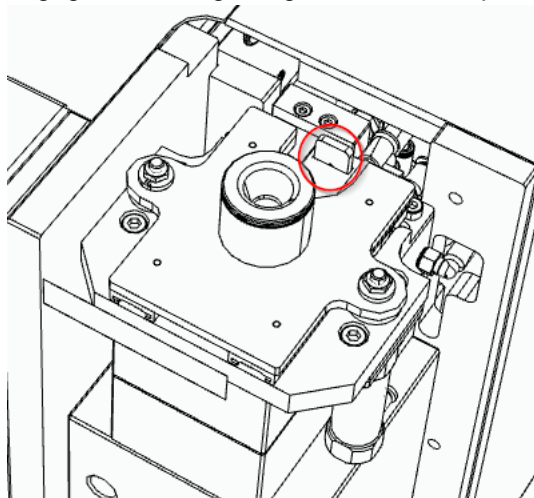


- Clean the seat of the flat seal.
- Clean the inside of the oven with a dry cloth.
- Insert the new electrode into the furnace from the bottom up. The electrode has a coding to enable a better orientation. This must point to the right.



- Fasten the electrode with three new sealing washers and screws.
- Insert the new flat seal free of grease.
- Connect the compressed air hoses from the two vertical pneumatic cylinders. Please make sure that the connection is correct: blue at the top; black on the bottom.
- Put the upper part of the furnace back on.
- Fasten the upper part of the furnace with the 4 screws.

- Reinstall the furnace lock assembly. Please make sure that the locking element engages into the guiding element of the pneumatic cylinder.



- Insert the two nuts and tighten them.
- Put the upper furnace cover on from above and fasten it with the screw.
- Close the window in the Elements software.
- Turn the main switch of the analyser to position 2.
- Perform a leak test in the software.

The upper electrode has been replaced.

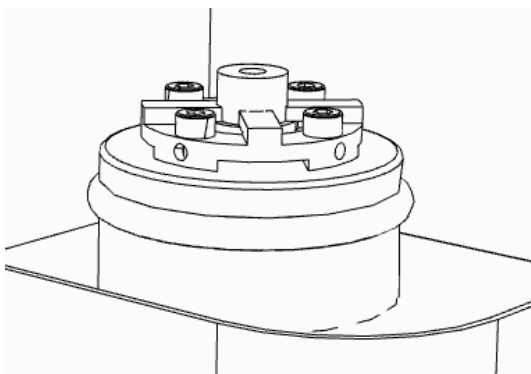
10.7.4 Replace lower electrode (graphite tip)

⚠ CAUTION

C45.0000

Risk of injury
Moving parts

- The furnace closes after user input. Hands in the area of the opening can be crushed when the furnace closes.
- **Never reach into the oven when it is closing.**
- **Use crucible tongs in order to place crucibles.**

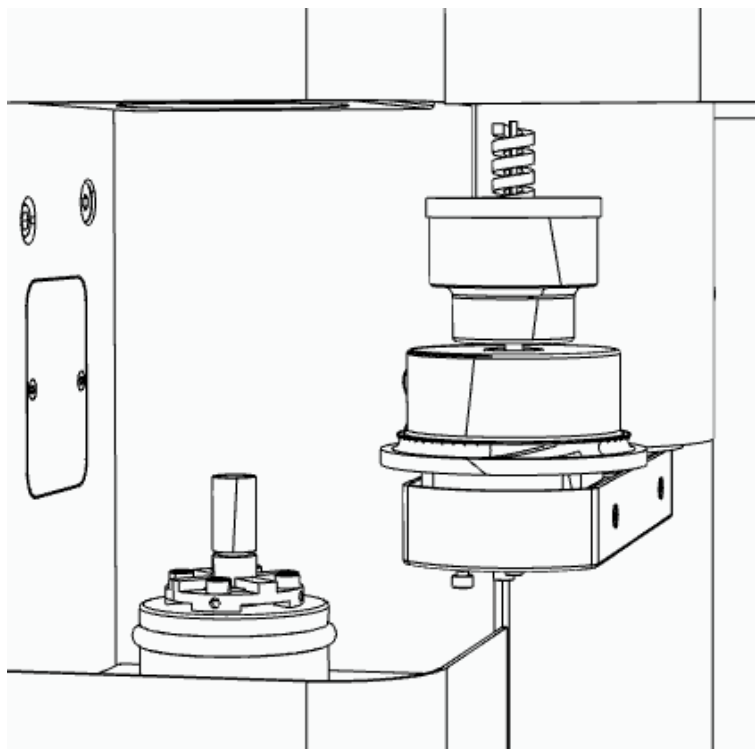





- Turn the main switch of the analyser to position 1 or 0.
- Loosen the 4 screws on the lower electrode.
- Remove fitting and electrode.
- Clean the surface and the fitting.

- Check the fitting for any possible damages and replace it, if necessary.
- Insert the new lower electrode (graphite tip) into the fitting.
- Secure the fitting and the lower electrode with the 4 screws.
- Turn the main switch of the analyser to position 2.

The lower electrode (graphite tip) has been replaced.

10.8 Replacing the brush of the auto cleaner



1. Open the service menu in the Elements software (min. administrator rights necessary).
 2. Confirm the  key. The auto cleaner moves to the service position.
 3. Turn the main switch of the analyser to position 0.
 4. Loosen the grub screw on the side of the brush.
 5. Pull the worn brush upwards off the motor shaft.
 6. Place the new brush on the motor shaft from above. Ensure that the brush is pushed through the hole in the dust trap and that the dust trap can still move freely afterwards.
 7. Tighten the grub screw on the side of the brush.
 8. Turn the main switch of the analyser to position 2.
 9. Actuate the  key to move the auto cleaner to the park position.
 10. Actuate the  key to perform cleaning and check correct function.
- The brush of the auto cleaner is replaced.

11 Spare parts

11.1 Spare parts Analyser

11.1.1 Front side of the device

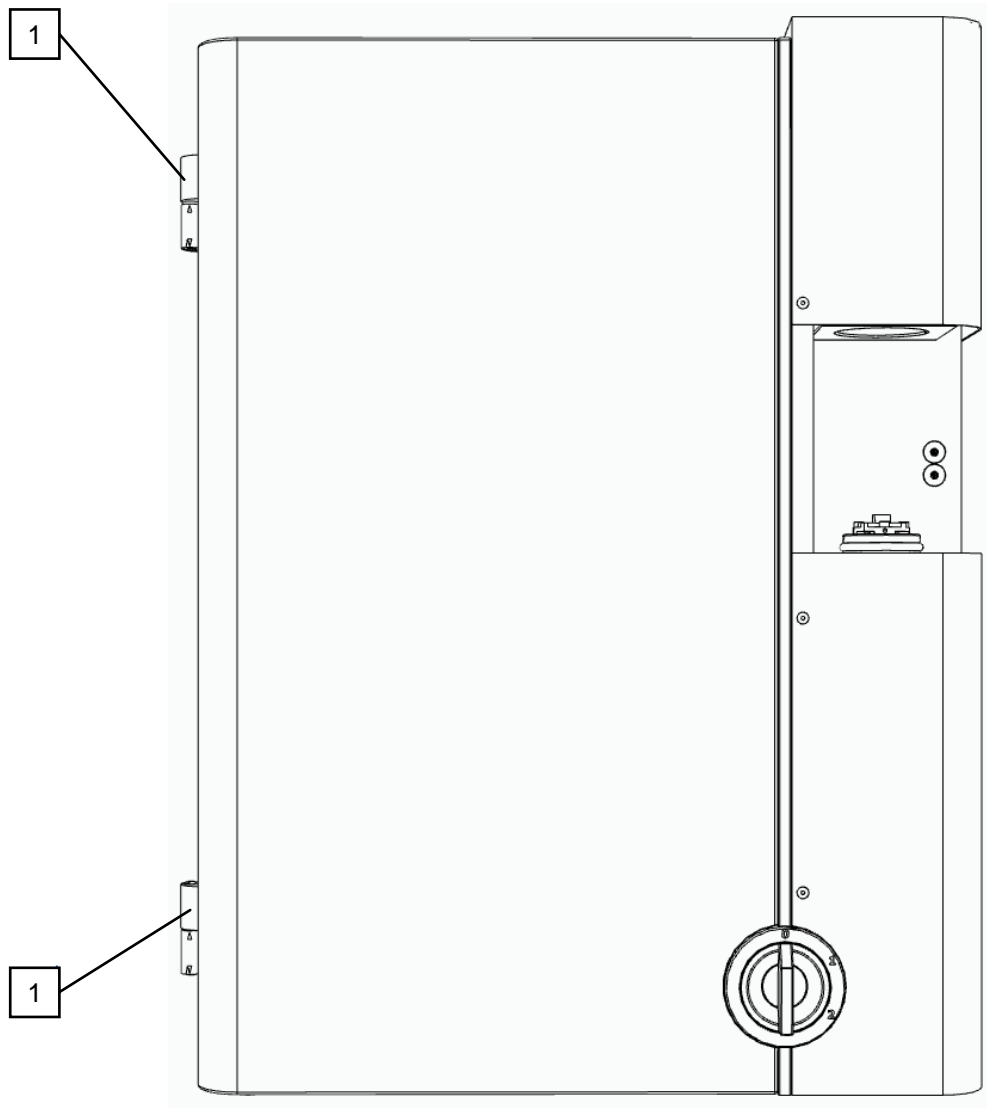


Fig. 7: Figure: The front side is closed

| Position | Name | Item number | Quantity |
|----------|--------------------------|-------------|----------|
| 1 | Hinge with eccentric pin | 88400-0288 | 2 |

11.1.2 Front side (Interior view)

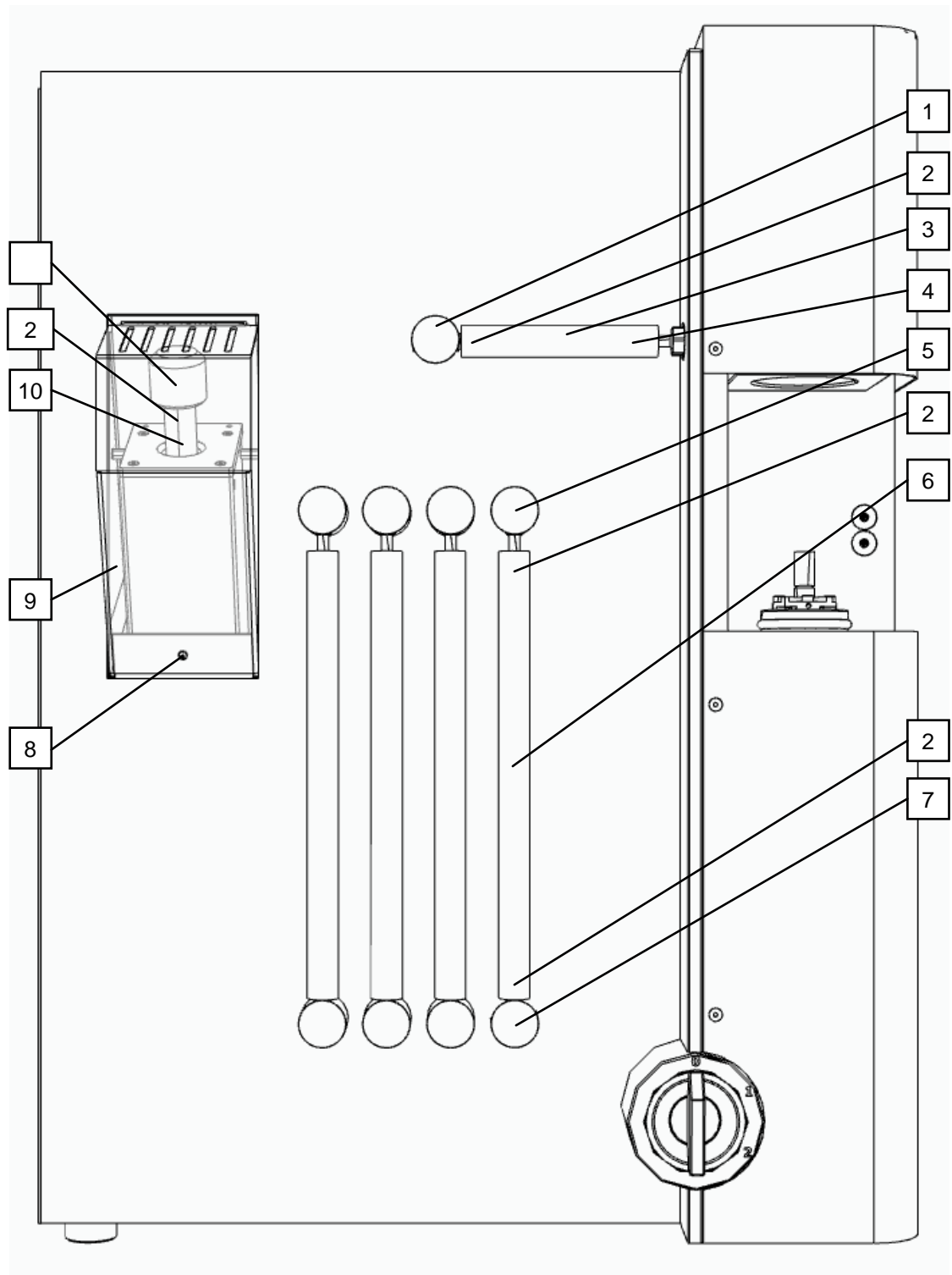
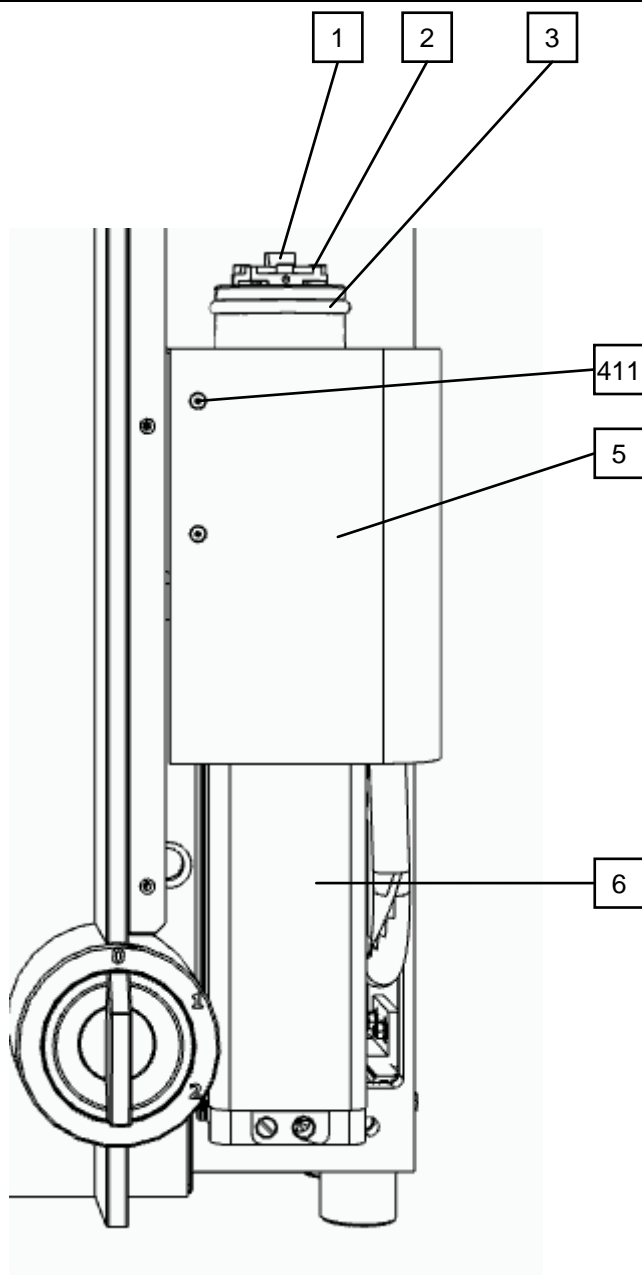


Fig. 8: Figure: Interior view of the front side

| Position | Name | Item number | Quantity |
|----------|--|-------------|----------|
| 1 | Filter connection bracket, dust filter | 11045 | 1 |
| 2 | O-ring 9x3 | 70230 | 12 |
| 3 | Sinter filter with O-ring | 27000-2040 | 1 |
| 4 | Reagent tube dust filter | 11064-3001 | 1 |
| 5 | Upper reagent tube holder | 11042 | 4 |
| 6 | Reagent tube | 88400-0006 | 4 |
| 7 | Lower reagent tube holder | 11045 | 4 |
| 8 | Oval-head screw M6x10 | 08.401.0050 | 1 |
| 9 | Catalyst furnace cover | 20100-3205 | 1 |
| 10 | Reagent tube catalyst furnace | 11064-3002 | 1 |
| 11 | Connection of catalyst furnace | 27000-2073 | 1 |

11.1.3 Lower furnace



| Position | Name | Item number | Quantity |
|----------|------------------------------------|-------------|----------|
| 1 | Lower electrode, graphite tip | 31360 | 1 |
| 2 | Lower electrode holder with screws | 31365-8000 | 1 |
| 3 | O-ring 47,2x5,7 | 70405 | 1 |
| | High vacuum grease | 92610 | 1 |
| 4 | Countersunk screw M3x12 | 08.643.0185 | 4 |
| 5 | Lower furnace cover | 27000-3220 | 1 |
| 6 | Pneumatic cylinder furnace | 66200-0184 | 1 |

Fig. 9: Furnace, Front view 1

11.1.4 Upper furnace

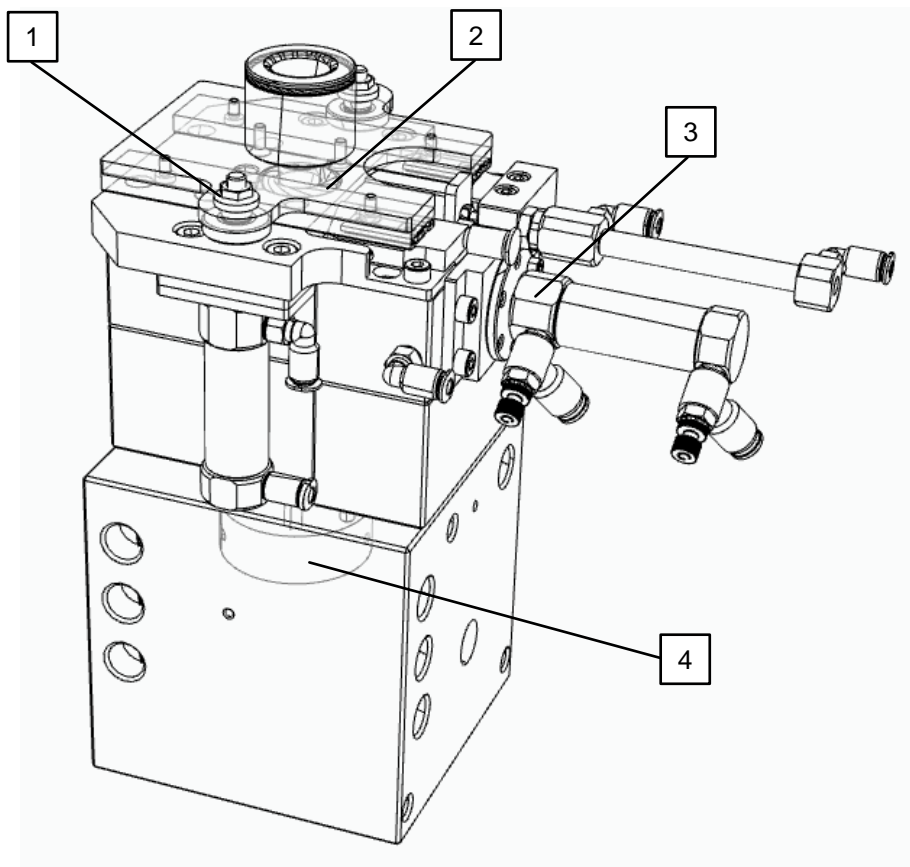


Fig. 10: Furnace cleaning mechanism

| Position | Name | Item number | Quantity |
|-----------------|--|-------------|----------|
| 1 | Locking nut M5 | 08.642.0053 | 2 |
| 2 | O-ring 15x3,5 | 66200-0212 | 1 |
| not illustrated | Seal kit of upper furnace (contains all relevant seals) | 27000-8007 | 1 |
| 3 | Sample lock drive | 27000-2089 | 1 |
| 4 | Upper electrode, complete (including screws and seals) | 27000-8006 | 1 |

11.1.5 Rear side of the device

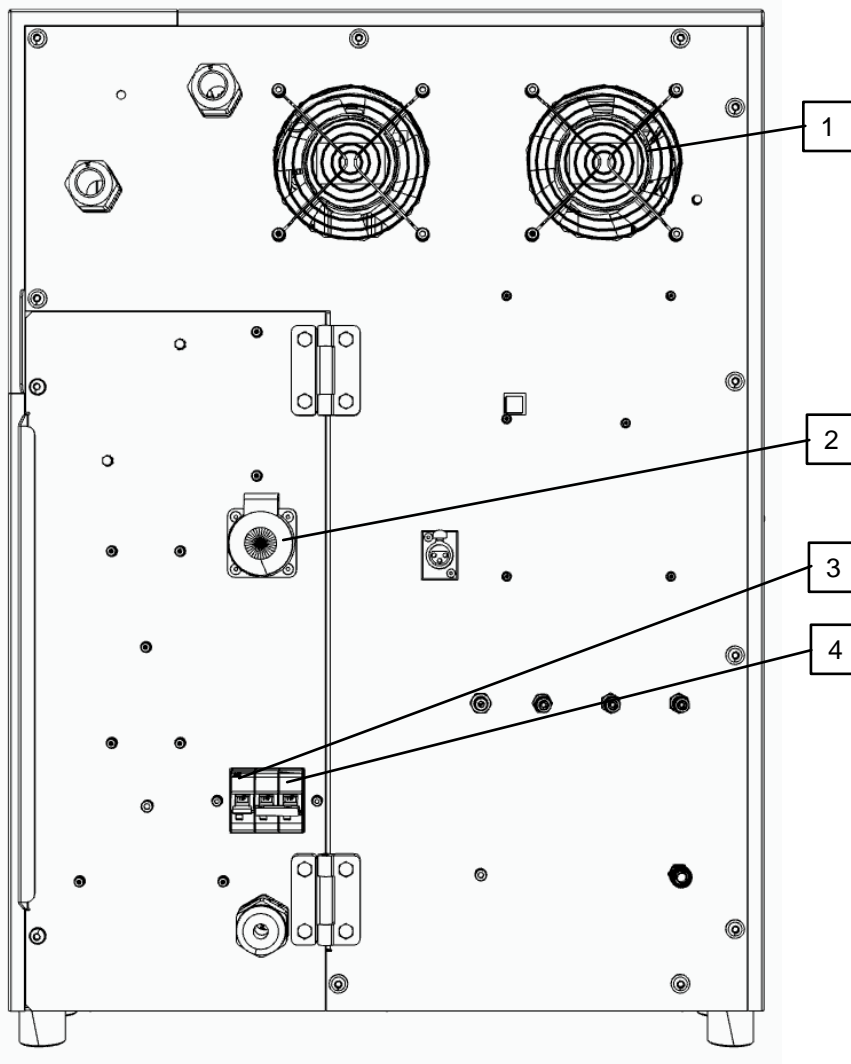


Fig. 11: Rear side

| Position | Name | Item number | Quantity |
|----------|--|-------------|----------|
| 1 | Fan 24V | 66027-6225 | 2 |
| 2 | Socket outlet SCHUKO | 88400-0413 | 1 |
| 3 | Circuit breaker 1P 10A | 66400-0627 | 1 |
| 4 | Circuit breaker 2P 32A @ 3-phase device | 77033 | 1 |
| | Circuit breaker 2P 63A @ 1-phase device | 77034 | |

11.1.6 Left side of the device

⚠ CAUTION

C46.0000

Risk of injury
Moving parts

- There are fans inside the left side of the analyser. Spinning fans can cause injuries to fingers.
- **Never reach into a rotating fan.**

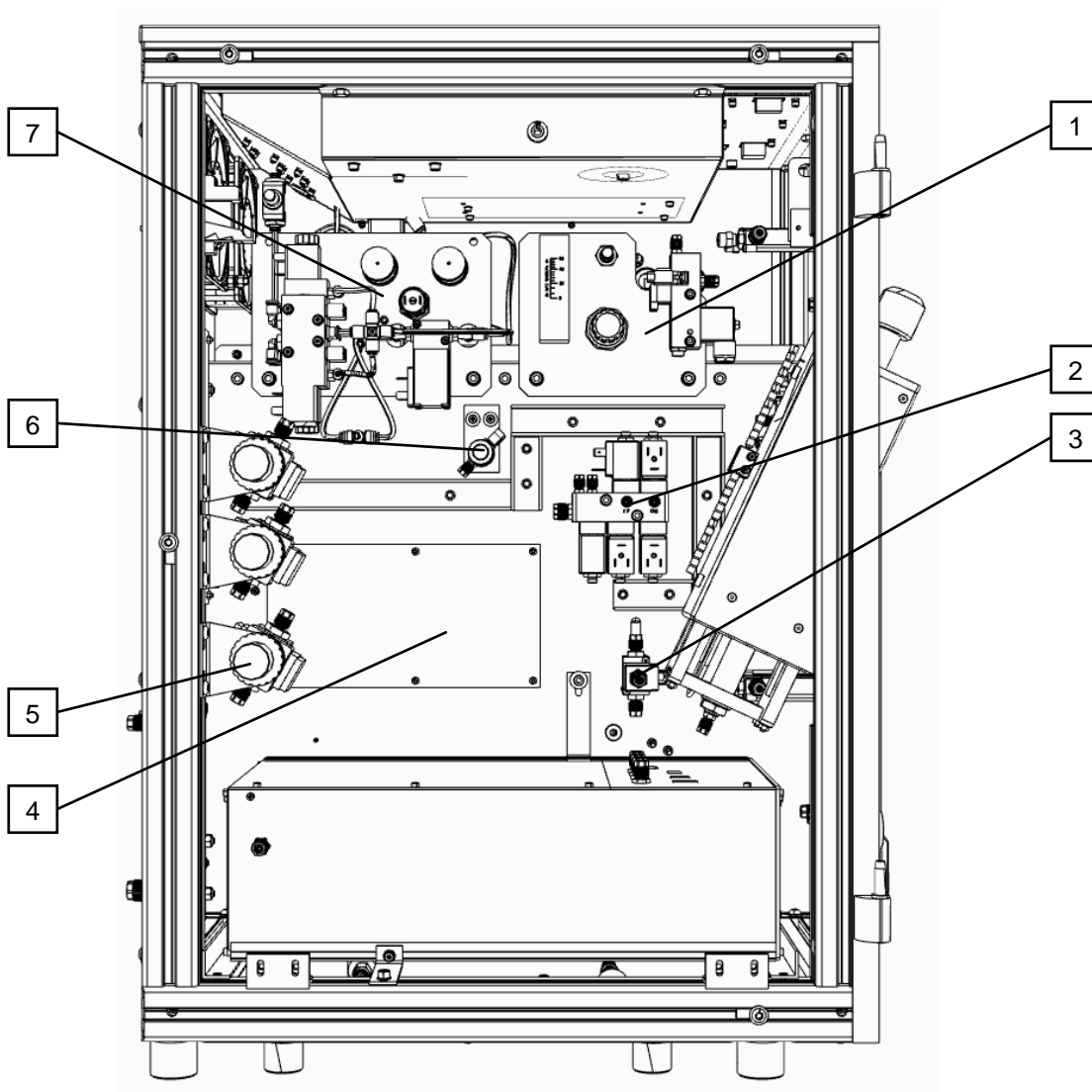


Fig. 12: Left side

| Position | Name | Item number | Quantity |
|----------|---------------------------------|-------------|----------|
| 1 | Gas calibration unit (optional) | 27000-2021 | 1 |
| 2 | Valve block, complete | 27000-2057 | 1 |
| 3 | Gas valve, complete | 11440-2001 | 1 |
| 4 | I/O circuit board | 27000-5102 | 1 |
| 5 | Pressure regulator, complete | 11492-2001 | 3 |
| 6 | Proportional valve | 11000-2001 | 1 |
| 7 | Valve block analytics, complete | 27000-2024 | 1 |

11.1.6.1 Left side, DevGate

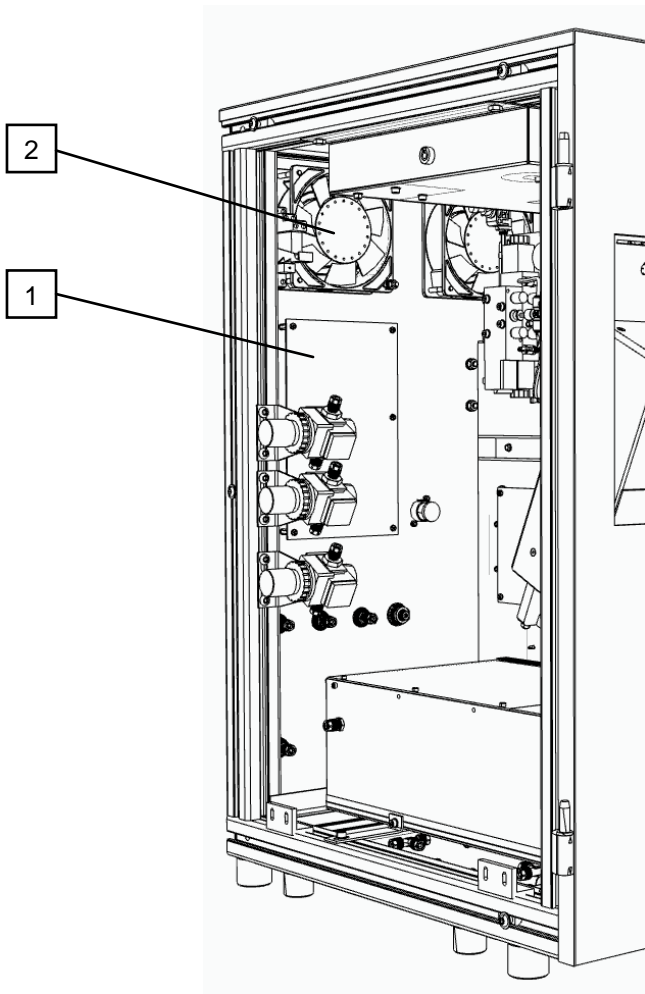
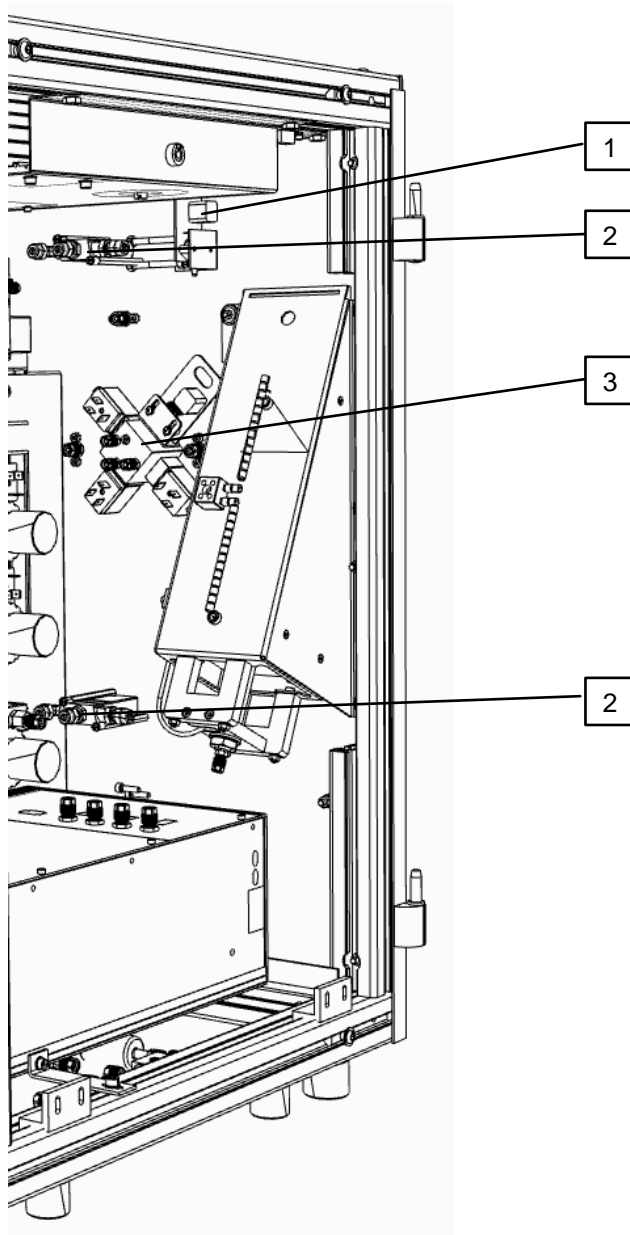


Fig. 13: DevGate

| Position | Name | Item number | Quantity |
|----------|-----------------------|-------------|----------|
| 1 | Fan 24VDC | 66027-6225 | 2 |
| 2 | Circuit board DevGate | 88600-5100 | 1 |

11.1.6.2 Left side, inlet valves



| Position | Name | Item number | Quantity |
|----------|---------------------------------|-------------|----------|
| 1 | Circuit board pressure sensor | 11492 | 1 |
| 2 | Switch valve | 25196 | 2 |
| 3 | Valve block gas inlet, complete | 27000-2018 | 1 |

11.1.6.3 Valve block, compressed air control

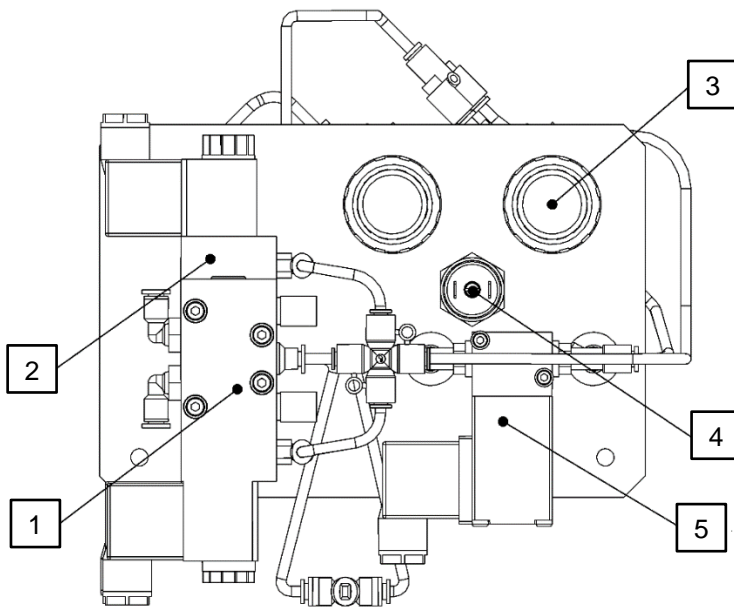


Fig. 14: Valve block, compressed air control 27000-2024

| | Name | Item number | Quantity |
|---|--------------------|-------------|----------|
| 1 | Valve, 5/2-ways | 66200-0140 | 1 |
| 2 | Valve, 5/3-ways | 66200-0139 | 1 |
| 3 | Pressure regulator | 60236 | 2 |
| 4 | Pressure switch | 66300-0158 | 1 |
| 5 | Valve, 2/2-ways | 66200-0141 | 1 |

11.1.7 Right side of the device

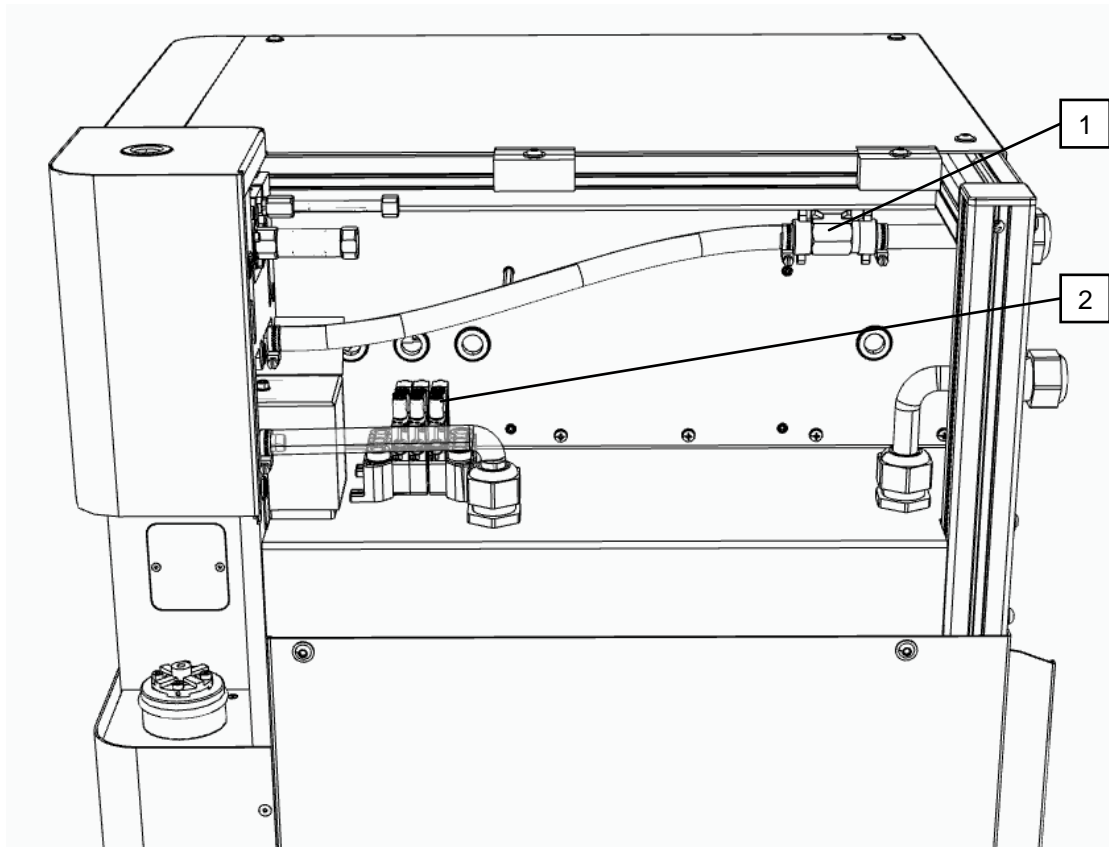


Fig. 15: Right side

| Position | Name | Item number | Quantity |
|----------|-------------------------------------|-------------|----------|
| 1 | Water flow sensor | 66027-6024 | 1 |
| 2 | Valve block upper furnace, complete | 66200-3333 | 1 |

11.1.8 Upper mounting plate

⚠ DANGER D3.0005

Danger to life from electric shock
Exposed electrical contacts – High voltage

- An electric shock can cause severe injuries in the form of burns, cardiac arrhythmias, respiratory arrest or cardiac arrest.
- **Any work on the device may only be carried out by qualified service personnel.**
- **Turn the power switch of the analyser to position 0 and pull the mains plug out of the socket.**

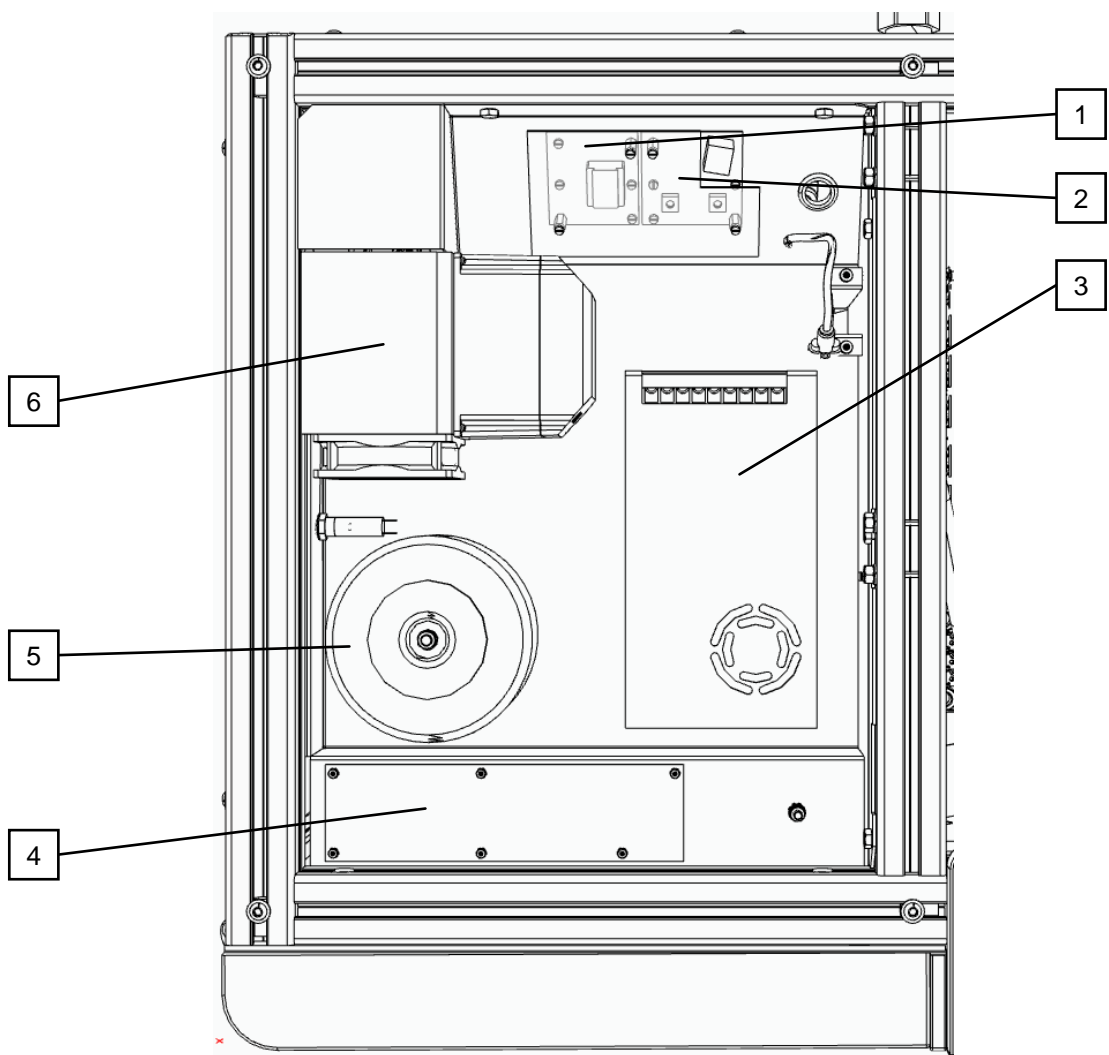



Fig. 16: Upper mounting plate

| Position | Name | Item number | Quantity |
|----------|---------------------------------------|-------------|----------|
| 1 | Circuit board voltage sensor | 27000-5007 | 1 |
| 2 | Circuit board current sensor | 27000-5002 | 1 |
| 3 | Power supply | 66300-0477 | 1 |
| 4 | Circuit board catalyst furnace | 27000-5001 | 1 |
| 5 | Toroidal transformer catalyst furnace | 66400-0061 | 1 |
| 6 | Power controller Maxthermo | 88400-0394 | 1 |

11.2 Auto cleaner spare parts

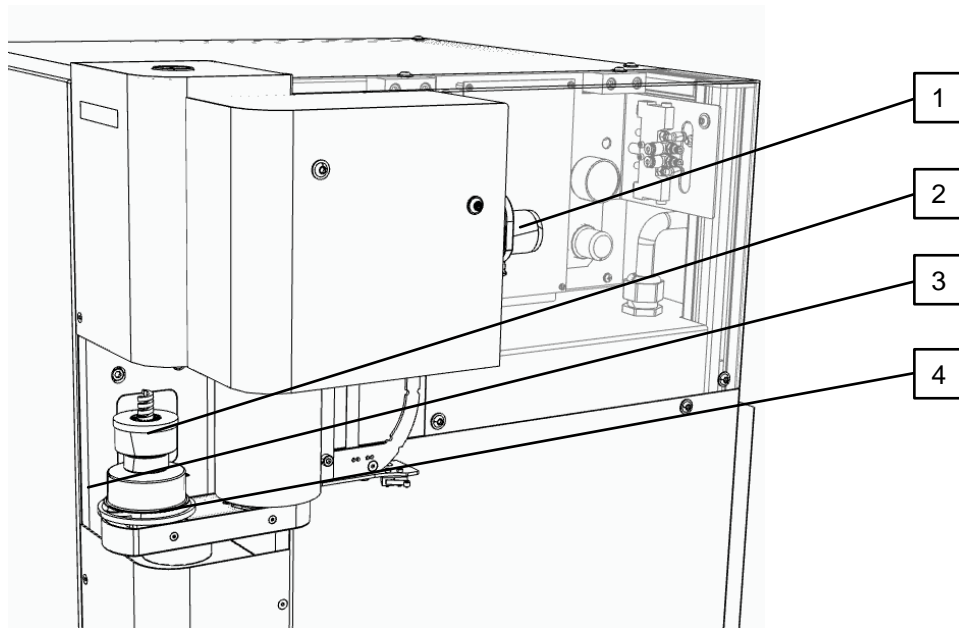


Fig. 18: Auto cleaner

| Position | Name | Article number | Quantity |
|----------|----------------------------|----------------|----------|
| 1 | Adapter for vacuum cleaner | 27100-3609 | 1 |
| 2 | Brush | 27100-4999 | 1 |
| 3 | Dust trap complete | 27100-8001 | 1 |
| 4 | O ring 60x4 | 05.114.0004 | 1 |

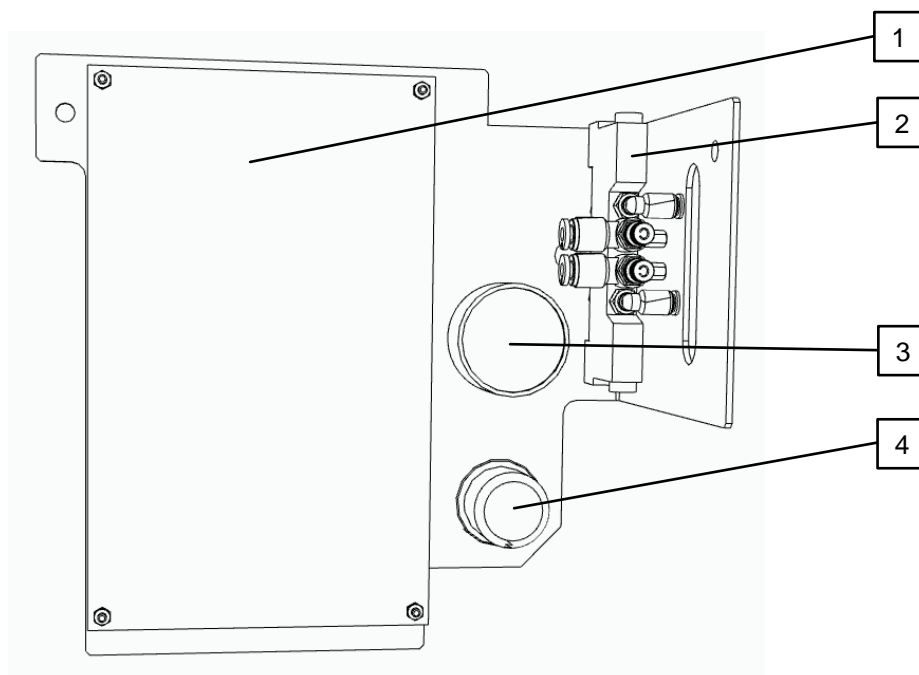


Fig. 17: Control assembly for auto cleaner

| Position | Name | Article number | Quantity |
|----------|------------------|----------------|----------|
| 1 | Autoloader Child | 27100-5001 | 1 |
| 2 | Valve assembly | 27100-2042 | 1 |
| 3 | Manomer | 27000-5019 | 1 |
| 4 | Pressure reducer | 27100-5021 | 1 |

11.3 Fuses

| Item number | Name | Quantity |
|-------------|---|----------|
| 66300-0376 | Fuse T8A for 27000-5100 DevGate 2 Circuit board | 1 |
| 66300-0410 | Fuse 3.15A for upper mounting plate | 1 |
| 66300-0372 | T5A IO circuit board, pump cable and IRC board cable | 3 |
| 66300-0369 | T6.3A 27000-5001 PCB furnace power controller | 1 |
| 66400-0681 | T4A Catalyst furnace fuse | 1 |
| 66300-0460 | M1.6A WLD cable | 1 |

11.4 Consumables

| Item number | Name | Quantity |
|-------------|--|----------|
| 90190 | Graphite crucibles | 400 pcs. |
| 90180 | Inner graphite crucibles | 100 pcs. |
| 90185 | Outer graphite crucibles | 50 pcs. |
| 31360 | Lower electrode Graphite tip | 1 pcs. |
| 90257 | Nickel capsules 3.2x7 mm | 100 pcs. |
| 90256 | Nickel capsules 4,5x10 mm | 250 pcs. |
| 88400-0066 | Nickel capsules, pressed 5x 12.5 mm | 100 pcs. |
| 90252 | Tin capsules 5x18 mm | 100 pcs. |
| 90200 | Anhydron | 454g |
| 90210 | Sodium hydroxide | 500g |
| 90270 | Contactors reagent | 100g |
| 90289 | Copper II oxide | 100g |
| 90330 | Quartz wool | 50g |
| 90332 | Glass wool | 50g |

11.5 Consumables for auto cleaner

| Article number | Name | Quantity |
|----------------|------------------------------|----------|
| 27100-4999 | Brush | 1 |
| 27100-8000 | Service kit for auto cleaner | 1 |

12 Decommissioning

The device can be taken out of operation as follows:

1. Please ensure that the device is turned off and cooled down.
2. Unplug the analyser from the mains.
3. Please make sure that the gas supply of the carrier gas is switched off.
4. Dismantle the gas hoses from the analyser to the operator's gas connection.
5. Dismantle the exhaust hose on the analyser to the ventilation system.
6. Remove the reagent tube from the analyser, see „[Removing and installing reagent tubes](#)“.
7. Remove the used chemicals mechanically and dispose of them in accordance with the local regulations.
8. Check the reagent tube for any damages.

In the event of any damages, such as cracks or recrystallisation, dispose of the reagent tube in accordance with the local regulations, since proper use is no longer possible.

9. Empty the reagent tubes on the front of the analyser and reinsert the empty reagent tubes (see „[Removing and installing reagent tubes](#)“).

In this way, it is ensured that the reagent tubes are not damaged during the non-operating time.

The device has been taken out of service.

13 Storage

The following storage conditions apply to the storage of the ONH-p 2 device:

- Indoors
- Ambient temperature +5 to +35°C
- Ambient humidity < 80 % at +31°C, non-condensing

The device shall be stored as follows:

1. In order to take the device out of operation, please refer to Section „[Decommissioning](#)“.
2. Store the device in accordance with the specified storage conditions.
The device is properly stored.

14 Disposal

In the event of disposal, the respective statutory regulations must be observed. Information on the disposal of electrical and electronic devices within the European Community is listed below.

Within the European Community, disposal of electrically operated devices is specified by national regulations which are based on the EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

According to this, all devices that have been delivered after 13th August 2005 in the business-to-business area, in which this product is classified, may no longer be disposed of with municipal waste or household waste. In order to document this, the devices are equipped with the disposal label.

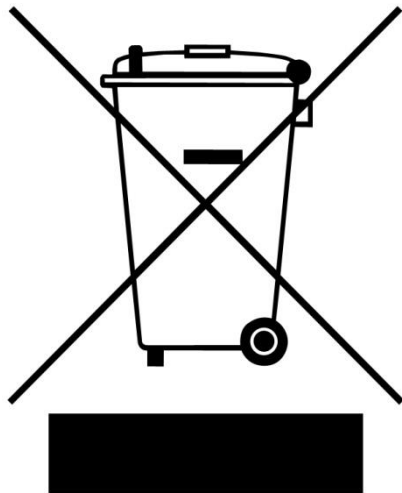


Fig. 18: Disposal label

Due to the fact that the disposal regulations worldwide and also within the EU may differ from country to country, the supplier of the device should be contacted directly if necessary.

In Germany, this labeling requirement applies as of 23rd March 2006. As of this date, the manufacturer has to offer a reasonable possibility to return any devices which have been delivered after 13th August 2005. The user is responsible for the proper disposal of all devices which have been delivered before 13th August 2005.

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ELEMENTAL ANALYZERS

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