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Operation Manual (Original) Inert Loop B-295 SE
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1 About this document

This operation manual is applicable for all variants of the instrument.

Read this operation manual before operating the instrument and follow the instructions to ensure safe and trouble-free operation.

Keep this operation manual for later use and pass it on to any subsequent user or owner.

BÜCHI Labortechnik AG accepts no liability for damage, faults and malfunctions resulting from not following this operation manual.

If you have any questions after reading this operation manual:

▶ Contact BÜCHI Labortechnik AG Customer Service.

https://www.buchi.com/contact

1.1 Warning notices in this document

Warning notices warn you of dangers that can occur when handling the device. There are four danger levels, each identifiable by the signal word used.

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER</td>
<td>Indicates a danger with a high level of risk which could result in death or serious injury if not prevented.</td>
</tr>
<tr>
<td>WARNING</td>
<td>Indicates a danger with a medium level of risk which could result in death or serious injury if not prevented.</td>
</tr>
<tr>
<td>CAUTION</td>
<td>Indicates a danger with a low level of risk which could result in minor or medium-severity injury if not prevented.</td>
</tr>
<tr>
<td>NOTICE</td>
<td>Indicates a danger that could result in damage to property.</td>
</tr>
</tbody>
</table>

1.2 Symbols

The following symbols are displayed in this operation manual or on the device:

1.2.1 Warning symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="General warning" /></td>
<td>General warning</td>
</tr>
<tr>
<td><img src="image2" alt="Device damage" /></td>
<td>Device damage</td>
</tr>
<tr>
<td><img src="image3" alt="Health-harming or irritant substances" /></td>
<td>Health-harming or irritant substances</td>
</tr>
</tbody>
</table>

1.2.2 Mark-ups and symbols

![NOTE](image4)

This symbol draws attention to useful and important information.

☑ This character draws attention to a requirement that must be met before the instructions below are carried out.

▶ This character indicates an instruction that must be carried out by the user.
This character indicates the result of a correctly carried out instruction.

<table>
<thead>
<tr>
<th>Mark-up</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window</td>
<td>Software Windows are marked-up like this.</td>
</tr>
<tr>
<td>Tab</td>
<td>Tabs are marked-up like this.</td>
</tr>
<tr>
<td>Dialog</td>
<td>Dialogs are marked-up like this.</td>
</tr>
<tr>
<td>[Button]</td>
<td>Buttons are marked-up like this.</td>
</tr>
<tr>
<td>[Field names]</td>
<td>Field names are marked-up like this.</td>
</tr>
<tr>
<td>[Menu / Menu item]</td>
<td>Menus or menu items are marked-up like this.</td>
</tr>
<tr>
<td>Status</td>
<td>Status is marked-up like this.</td>
</tr>
<tr>
<td>Signal</td>
<td>Signals are marked-up like this.</td>
</tr>
</tbody>
</table>

1.3 Connected devices

In addition to these operating instructions, follow the instructions and specifications in the documentation for the connected devices.

1.4 Trademarks

Product names and registered or unregistered trademarks that are used in this document are used only for identification and remain the property of the owner in each case.
2 Safety

2.1 Proper use
The instrument is designed and built for laboratories.

The instrument can be used for the following tasks:
- Condense solvent vapors from the stream of drying gas coming from BUCHI Spray Drying Instruments in closed mode.
- Work under inert condition with BUCHI Spray Drying Instruments.
- Monitoring the O₂ level in closed mode.

2.2 Use other than intended
Use of any kind other than that described in Chapter 2.1 "Proper use", page 7 and any application that does not comply with the technical specifications (See Chapter 3.4 "Technical data", page 13) constitutes use other than that intended.

In particular, the following applications are not permissible:
- Use of the instrument in rooms which require ex-protected instruments.
- Use of the instrument with non-BUCHI instruments.
- Use of the instrument for processing substances outside of research and development.
- Use of the instrument outside a fume hood.
- Use of the instrument with samples with unknown chemical composition.
- Use of the instrument with substances that react with the materials used. See Chapter 3.4 "Technical data", page 13
- Use of the instrument with toxic substances without appropriate safety measures.
- Use of the instrument with biohazardous materials such as viruses or bacteria.
- Use of the instrument with corrosive samples.
- Use of the instrument with solvents with boiling points which are less than 39 °C.
- Use of the instrument with solvents with melting points which are more than 6 °C.
- Use of the instrument without Dehumidifier with solvents containing more than 10 % water.
- Use of the instrument with solvents containing peroxides.
- Use of the instrument with samples, which can explode or inflame (example: explosives, etc.) due to shock, friction, heat or spark formation.

Damage or hazards attributable to use of the product other than as intended are entirely at the risk of the operator alone.

2.3 Staff qualification
Unqualified persons are unable to identify risks and are therefore exposed to greater dangers.

The device may only be operated by suitably qualified laboratory staff.

These operating instructions are aimed at the following target groups:
Users
Users are persons that meet the following criteria:

- They have been instructed in the use of the device.
- They are familiar with the contents of these operating instructions and the applicable safety regulations and apply them.
- They are able on the basis of their training or professional experience to assess the risks associated with the use of the device.

Operator
The operator (generally the laboratory manager) is responsible for the following aspects:

- The device must be correctly installed, commissioned, operated and serviced.
- Only suitably qualified staff may be assigned the task of performing the operations described in these operating instructions.
- The staff must comply with the local applicable requirements and regulations for safe and hazard-conscious working practices.
- Safety-related incidents that occur while using the device should be reported to the manufacturer (quality@buchi.com).

BUCHI service technicians
Service technicians authorized by BUCHI have attended special training courses and are authorized by BÜCHI Labortechnik AG to carry out special servicing and repair measures.

2.4 Residual risks
The device has been developed and manufactured using the latest technological advances. Nevertheless, risks to persons, property or the environment can arise if the device is used incorrectly.

Appropriate warnings in this manual serve to alert the user to these residual dangers.

2.4.1 Faults during operation
If a device is damaged, sharp edges, moving parts or exposed electrical wires can cause injuries.

- Regularly check device for visible damage.
- If faults occur, switch off the device immediately, unplug the power cord and inform the operator.
- Do not continue to use devices that are damaged.

2.5 Personal protective equipment
Depending on the application, hazards due to heat and/or corrosive chemicals may arise.

- Always wear appropriate personal protective equipment such as safety goggles, protective clothing and gloves.
- Make sure that the personal protective equipment meets the requirements of the safety data sheets for all chemicals used.

2.6 Modifications
Unauthorized modifications may impair safety and lead to accidents.

- Use only genuine BUCHI accessories, spare parts and consumables.
Technical modifications to the device or accessories should only be carried out with the prior written approval of BÜCHI Labortechnik AG and only by authorized BUCHI technicians.

BUCHI accepts no liability whatsoever for damage arising as a result of unauthorized modifications.
3 Product description

3.1 Description of function

The Inert Loop B-295 SE is an accessory for BUCHI Spray Drying Instruments, which enables the safe use of organic solvents in closed loop mode.

The spray drying process in closed loop mode generates an inert gas stream loaded with solvent vapors. The Inert Loop B-295 SE is used to condense these solvent vapors from the gas stream and to monitor its oxygen concentration.

The gas flow enters the Inert Loop B-295 SE and passes the preheat exchanger where it is cooled before entering the condenser. After solvent vapor condensation, the gas stream is reheated by the preheater before being returned to the spray drying process. The excess inert gas leaves the Inert Loop B-295 SE via the exhaust and the condensed solvent vapors are collected in a closed bottle.

The following spray drying modes are available:

<table>
<thead>
<tr>
<th>Spray drying mode</th>
<th>Solvent composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open mode</td>
<td>up to 20 % organic solvent</td>
</tr>
<tr>
<td>Closed mode with B-295 (When using Ultrasonic Package accessory Inertgas adapter is necessary)</td>
<td>between 90 % - 100 % organic solvent</td>
</tr>
<tr>
<td>Closed mode with B-295 and B-296 (When using Ultrasonic Package accessory Inertgas adapter is necessary)</td>
<td>between 20 % - 80 % organic solvent</td>
</tr>
</tbody>
</table>
3.2 Configuration

3.2.1 Front view

Fig. 1: Front view

1 Control elements
   (See Chapter 3.2.3 "Control elements", page 12)
2 Oxygen analyzer
   (Front cover oxygen analyzer)
3 Side connections
   (See Chapter 3.2.2 "Side connections", page 12)
4 Ventilation slots
5 Castor brake
6 Solvent collection flask
3.2.2 Side connections

Fig. 2: Side connections

1  Process gas out (marked: OUT)  
2  Process gas in (marked: IN)  
3  Exhaust connection (marked: Exhaust)  
4  Type plate (See Chapter 3.2.4 "Type plate", page 12)  
5  Communication cable  
6  Power connection (marked: Power IN)

3.2.3 Control elements

Fig. 3: Control elements

1  Display  
2  Set temperature up  
3  Switch on  
4  Signal lamp oxygen  
5  Signal lamp pressure  
6  Signal lamp power  
7  Signal lamp operation  
8  Switch off  
9  Set temperature down

3.2.4 Type plate

The type plate identifies the instrument. The type plate is located at the left side of the instrument. See Chapter 3.2.2 "Side connections", page 12
3.3 Scope of delivery

NOTE
The scope of delivery depends on the configuration of the purchase order.
Accessories are delivered as per the purchase order, order confirmation, and delivery note.

3.4 Technical data

3.4.1 Inert Loop B-295 SE

<table>
<thead>
<tr>
<th>Inert Loop B-295 SE</th>
<th>Inert Loop B-295 SE</th>
<th>Inert Loop B-295 SE</th>
<th>Inert Loop B-295 SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>1600 VA</td>
<td>1910 VA</td>
<td>1650 VA</td>
</tr>
<tr>
<td>Connection voltage</td>
<td>220 ... 240 VAC</td>
<td>208 ... 220 VAC</td>
<td>200 VAC</td>
</tr>
<tr>
<td>Fuse (Characteristic)</td>
<td>10 A (T)</td>
<td>10 A (T)</td>
<td>10 A (T)</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
<td>60 Hz</td>
<td>50 Hz</td>
</tr>
</tbody>
</table>
### Ambient conditions

For indoor use only.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Inert Loop B-295 SE 230 V / 50 Hz</th>
<th>Inert Loop B-295 SE 220 V / 60 Hz</th>
<th>Inert Loop B-295 SE 200 V / 50 Hz</th>
<th>Inert Loop B-295 SE 200 V / 60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overvoltage category</td>
<td>II</td>
<td>II</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>II</td>
<td>II</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>657 x 653 x 680 mm</td>
<td>657 x 653 x 680 mm</td>
<td>657 x 653 x 680 mm</td>
<td>657 x 653 x 680 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>98 kg</td>
<td>98 kg</td>
<td>99 kg</td>
<td>99 kg</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R449A, CFC free</td>
<td>R449A, CFC free</td>
<td>R449A, CFC free</td>
<td>R449A, CFC free</td>
</tr>
<tr>
<td>Filling amount of refrigerant</td>
<td>0.98 kg</td>
<td>0.98 kg</td>
<td>0.98 kg</td>
<td>0.98 kg</td>
</tr>
<tr>
<td>CO₂-equivalent</td>
<td>1369.06 kg CO₂</td>
<td>1369.06 kg CO₂</td>
<td>1369.06 kg CO₂</td>
<td>1369.06 kg CO₂</td>
</tr>
<tr>
<td>Safety Group Refrigerants (ASHRAE)</td>
<td>A1 (lower toxicity, no flame propa-</td>
<td>A1 (lower toxicity, no flame propa-</td>
<td>A1 (lower toxicity, no flame propa-</td>
<td>A1 (lower toxicity, no flame propa-</td>
</tr>
<tr>
<td></td>
<td>gation)</td>
<td>gation)</td>
<td>gation)</td>
<td>gation)</td>
</tr>
<tr>
<td>Maximum allowable pressure (PS) [low pressure side]</td>
<td>22 bar</td>
<td>22 bar</td>
<td>22 bar</td>
<td>22 bar</td>
</tr>
<tr>
<td>Maximum allowable pressure (PS) [high pressure side]</td>
<td>26 bar</td>
<td>26 bar</td>
<td>26 bar</td>
<td>26 bar</td>
</tr>
<tr>
<td>Cooling capacity at the process gas (at -23 °C)</td>
<td>800 W</td>
<td>920 W</td>
<td>800 W</td>
<td>920 W</td>
</tr>
<tr>
<td>Compressor cooling capacity (according to EN12900, at -15 °C)</td>
<td>1334 W</td>
<td>1925 W</td>
<td>1334 W</td>
<td>1925 W</td>
</tr>
<tr>
<td>Control range process gas temperature</td>
<td>min -30 to 8 °C</td>
<td>min -30 to 8 °C</td>
<td>min -30 to 8 °C</td>
<td>min -30 to 8 °C</td>
</tr>
<tr>
<td>Minimum distance to all sides</td>
<td>300 mm</td>
<td>300 mm</td>
<td>300 mm</td>
<td>300 mm</td>
</tr>
<tr>
<td>EMC to EN 61326-1 Emmission</td>
<td>Class B</td>
<td>Class B</td>
<td>Class B</td>
<td>Class B</td>
</tr>
<tr>
<td>EMC to EN 61326-1 Immision</td>
<td>Industry</td>
<td>Industry</td>
<td>Industry</td>
<td>Industry</td>
</tr>
</tbody>
</table>

#### 3.4.2 Ambient conditions

- Max. altitude above sea level: 2000 m
- Ambient temperature: 5–40 °C
- Maximum relative humidity: 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C
- Storage temperature: max. 40 °C
### 3.4.3 Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose connections, tubing, weld-on nipple</td>
<td>Stainless steel 1.4571</td>
</tr>
<tr>
<td>Pre-heat exchanger, condensate separator</td>
<td>Stainless steel 1.4301</td>
</tr>
<tr>
<td>Plate heat exchanger</td>
<td>Stainless steel 1.4401</td>
</tr>
<tr>
<td>Screw connections, Ball valve</td>
<td>Stainless steel 1.4408</td>
</tr>
<tr>
<td>Sealing ball valve</td>
<td>PTFE</td>
</tr>
<tr>
<td>Pipe elbow</td>
<td>Stainless steel 1.4307</td>
</tr>
<tr>
<td>Pressure switch</td>
<td>PVDF, Viton, NBR/aramid fiber composite</td>
</tr>
<tr>
<td>Oxygen sensor</td>
<td>PA, PPS, PTFE, stainless steel</td>
</tr>
<tr>
<td>Black hoses</td>
<td>EPDM</td>
</tr>
<tr>
<td>Drain tube</td>
<td>PVC</td>
</tr>
<tr>
<td>Woulff bottle</td>
<td>Glass</td>
</tr>
<tr>
<td>Plate heat exchanger</td>
<td>Stainless steel solder</td>
</tr>
</tbody>
</table>
4 Transport and storage

4.1 Transport

**NOTICE**

Risk of breakage due to incorrect transportation

- Make sure that all parts of the device are safely packed in such a way as to prevent breakage, ideally in the original box.
- Avoid sharp movements during transit.
- After transportation, check the device for damage.
- Damage that has occurred in transit should be reported to the carrier.
- Keep packing for future transportation.

4.2 Storage

- Make sure that the ambient conditions are complied with (see Chapter 3.4 "Technical data", page 13).
- Wherever possible, store the device in its original packaging.
- After storage, check the device, all seals and tubing for damage and replace if necessary.

4.3 Lifting the instrument

**WARNING**

Danger due to incorrect transportation

The possible consequences are crushing injuries, cuts and breakages.

- The instrument should be transported by four persons at the same time.
- Lift the instrument at the points indicated.
Fig. 5: Lifting the instrument

- Lift the instrument by the base plate next to the castors.
5 | Installation

5.1 Before installation

NOTICE

Instrument damaged if switched on too early.

After transporting, wait twelve hours before switching on the instrument. The fluid in the cooling system requires twelve hours to collect in the refrigerant compressor.

5.2 Installation site

The installation site must meet the following requirements:

- Firm, nonslip and level surface
- Take into account the maximum product dimensions and weight. See Chapter 3.4 "Technical data", page 13
- Do not expose the instrument to any external thermal loads, such as direct solar radiation.
- Clearance on all sides of the instrument must be at least 300 mm.
- Make sure there is free flow of air to the side of the instrument.
- Do not place loose papers or cloths below or to the sides of the instrument, as these could impede the air circulation if drawn in.
- Put the instrument on the castors.
- Make sure that cables / tubes are safe routed.
- Make sure the castor brakes are locked.
- Place only BUCHI spray dryer on the instrument.
- Do not place the instrument near vibration-sensitive devices.

NOTE
Make sure that the power supply can be disconnected at any time in an emergency.

5.3 Establishing electrical connections

NOTE

Observe the legal requirements when connecting the instrument to the power supply.

- Use additional electrical safety features (e.g., residual-current circuit breakers) to comply with local laws and regulations.

The power supply must fulfil the following conditions:

1. Provide the mains voltage and frequency specified on the type plate of the instrument.
2. Be designed for the load imposed by the instruments connected.
3. Be equipped with suitable fuses and electrical safety features.
4. Be equipped with proper earthing.
NOTICE

Risk of property damage and diminished performance due to use of unsuitable power cables.

The power supply cables supplied with the product by BUCHI precisely match the requirements of the device. If other power cables that do not meet those requirements are used, the device may be damaged and/or its performance diminished.

- Use only the power supply cables supplied with the product or ordered separately from BUCHI.
- If using any other power supply cables, make sure that they match the specifications on the type plate.

- Make sure that all connected devices are earthed.
- Plug the power cable into the connection on the instrument. See Chapter 3.2 "Configuration", page 11
- Plug the mains plug into the mains outlet socket.

5.4 Installing the oxygen sensor

- Open the front cover oxygen sensor.

- Remove the grounding cable from the front cover oxygen sensor.

- Remove the screw plug.
5. Remove the foil from the oxygen sensor.
6. Install the new oxygen sensor.

- Connect the sensor cable.

- Calibrate the sensor. See Chapter 8.1 "Calibrating the oxygen analyzer", page 29

- Install the grounding cable.

- Install the front cover

### 5.5 Connecting the Inert Loop B-295 SE with a spray drying system

- Connect the communication cable to the spray dryer.

Connection at the spray dryer see related operation manual.
Install the process gas tube with gas from BUCHI instrument onto the connection marked **IN**.
Attach the tube in place with a hose clamp.

Install the process gas tube with direction to the BUCHI instrument onto the connection marked **OUT**.
Attach the tube in place with a hose clamp.

### 5.6 Installing the exhaust gas hose

- Install the exhaust tube onto the exhaust connection.
- Attach the tube in place with a hose clamp.
- Place the other end of the tubing to a fume hood.

### 5.7 Installing the solvent receiving vessel

- Put the PTFE hose connection on the bottle.
- Put the solvent receiving vessel in place.
- Install the PTFE hose onto the condensate drain valve.

- Open the condensate drain valve.

- Make sure that the lever of the condensate drain valve is in the position indicated.
6 Operation

6.1 Preparing the instrument
Precondition:
☑ All commissioning operations have been completed. See Chapter 5 "Installation", page 18

► Press the button Switch off.

6.2 Starting the instrument

NOTICE
Too frequent switching on the instrument
Too frequent switching on the instrument can cause an instrument damage.

► Wait 10 minutes before restarting the instrument.

NOTE
The correct oxygen value is between 20 - 21 %.
If this value is not reached.

► Calibrate the oxygen sensor.
► Replace the oxygen sensor.

Precondition:
☑ The instrument is prepared. See Chapter 6.1 "Preparing the instrument", page 23
☑ Make sure that the solvent receiving vessel is empty. See Chapter 7.3 "Empty the solvent receiving vessel", page 28

► Switch on the connected spray dryer. See Operation manual of the connected spray dry.

⇒ The signal lamp oxygen is on.
⇒ The signal lamp pressure is on.

► Check the oxygen value.
► Set condenser temperature. See Chapter 6.6 "Setting condenser temperature", page 24
► Press the button Start.
► Make sure, that the compressor is working.
► Switch on the aspirator. See Operation manual of the connected spray dryer.

⇒ The signal lamp pressure is off.

► Switch on the spray gas.
► Wait until the oxygen level is less than 6 %.

⇒ The signal lamp oxygen is off.

► All following functions of the instrument are controlled by the spray drying system.

6.3 Tasks during spray drying

► Check the filling level of the solvent receiving vessel.

⇒ If necessary empty it. See Chapter 7.3 "Empty the solvent receiving vessel", page 28
6.4 **Shutting down the instrument**

**Precondition:**
- The spray drying process is finished. See operation manual of the connected spray dryer.
- Switch off the spray gas. See operation manual of the connected spray dryer.
- The signal lamp oxygen is on.
- Switch off temperature. See operation manual of the connected spray dryer.
- Wait until the temperature is less than 70 °C.
- Switch off the aspirator. See operation manual of the connected spray dryer.
- The signal lamp pressure is on.
- Empty the solvent receiving vessel. See Chapter 7.3 "Empty the solvent receiving vessel", page 28

6.5 **Switching off the instrument**

**Precondition:**
- The instrument is shut down. See Chapter 6.4 "Shutting down the instrument", page 24
- Press the button **Stop**.
- Disconnect the communication cable.
- Disconnect the power cable.

6.6 **Setting condenser temperature**

**Increase temperature**
- Press the button **UP**.

**Decrease the temperature**
- Press the button **DOWN**.
7 Cleaning and servicing

NOTE

Users may only carry out the servicing and cleaning operations described in this section.

Any servicing and repair work which involves opening up the casing may only be carried out by BUCHI service technicians.

- Use only genuine BUCHI consumables and spare parts in order to ensure correct operation of the device and preserve the warranty.

7.1 Regular maintenance work

<table>
<thead>
<tr>
<th>Component</th>
<th>Action</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Checking seals</td>
<td>➤ Check for damages and wear</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td>➤ Replace the seals if necessary</td>
<td></td>
</tr>
<tr>
<td>Quick connectors</td>
<td>➤ Check the seals for damages and wear</td>
<td>Weekly</td>
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<tr>
<td></td>
<td>➤ Replace the seals if necessary</td>
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</tr>
<tr>
<td>Solvent recovery vessel</td>
<td>➤ Check the solvent recovery vessel for defects</td>
<td>Weekly</td>
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<tr>
<td></td>
<td>➤ If defective, replace the solvent recovery vessel</td>
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</tr>
<tr>
<td></td>
<td>➤ Check the seals for damages and wear</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➤ Replace the seals if necessary</td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td>➤ Wipe down the casing with a damp cloth.</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td>➤ If heavily soiled, use ethanol or a mild detergent.</td>
<td></td>
</tr>
<tr>
<td>Ventilation slots</td>
<td>➤ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner</td>
<td>Monthly</td>
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<tr>
<td>Oxygen Sensor</td>
<td>➤ Calibrate the oxygen analyzer. See Chapter 8.1 “Calibrating the oxygen analyzer”, page 29</td>
<td>Yearly</td>
</tr>
</tbody>
</table>

7.2 Cleaning the instrument

- Disconnect the power cable.
Close the condensate drain valve.

- Remove the oxygen sensor. See Chapter 8.2.1 "Removing the oxygen sensor", page 31
- Insert the screw plug.
- Disconnect the process gas tubes at the connected spray dryer.
- Place the end of the process gas tubes in a top position.
- Place the end of the exhaust gas tube in a top position.
- Fill in about 2 liter cleaning liquid (e.g. ethanol) into the process gas tube connected to the connection marked IN until the liquid reaches the exhaust connection.
- Wait 5 minutes.
NOTICE! Check the filling level of the solvent receiving vessel during the draining process. If necessary empty it. See Chapter 7.3 "Empty the solvent receiving vessel", page 28

- Drain the cleaning liquid through the condensate drain valve and the process gas tube connected to the connection marked **OUT**.

- Repeat the cleaning procedure until the washing solution is free from particles or chemicals.

- Install the inlet tube to the connected spray dryer. See Chapter 5.5 "Connecting the Inert Loop B-295 SE with a spray drying system", page 20

- Place the end of the exhaust gas tube to a fume hood.

- Place the end of the outlet tube to a fume hood.

- Connect the power supply.

- Press the button **Switch off**.

- Establish a cold dry stream of drying gas to dry the instrument.

- Dry the instrument for 10 Minutes.

- Remove the screw plug.

- Install the oxygen sensor. See Chapter 8.2.2 "Installing the oxygen sensor", page 32
### 7.3 Empty the solvent receiving vessel

- Close the condensate drain valve.

- Disconnect the solvent receiving vessel.

- Remove the solvent receiving vessel from the instrument.

- Empty the solvent receiving vessel.

- Install the solvent receiving vessel in reverse order.
8 Help with faults

8.1 Calibrating the oxygen analyzer

NOTE

The correct oxygen value is between 20 - 21 %.

If this value is not reached.

- Calibrate the oxygen sensor.
- Replace the oxygen sensor.

Fig. 6: Control elements oxygen sensor

1 Display  2 DECREMENT
3 INCREMENT  4 ENTER
5 MENU

NOTE

To abort the calibration process press the button \textit{MENU}.

- Open the front cover oxygen sensor.

- Remove the grounding cable from the front cover oxygen sensor.
• Remove the connected oxygen sensor.

• Connect the power cable.

• Press the button **MENU**.
  → The display shows `[PASS]`.

• Press the following sequence of buttons without interruption.

• Press the button **MENU**.
  → The display shows `[E:1]`

• Press the button **ENTER**.

• Press the button **INCREMENT** or **DECREMENT** to set calibration gas level (Air: 20.9 % \( \text{O}_2 \))

• Press button **ENTER** to span the sensor.
  → The display shows `[- - - -]`.

• Press the button **MENU**.
  → The span value will be displayed on exit as % of the initial calibration value.
  → The calibration is passed when the value is between 20 and 21.
  → The calibration is finished.
8.2 Changing the oxygen sensor

8.2.1 Removing the oxygen sensor

- Open the front cover oxygen sensor.
- Remove the grounding cable from the front cover oxygen sensor.
8.2.2 Installing the oxygen sensor

Precondition:
- The oxygen sensor is removed. See Chapter 8.2.1 "Removing the oxygen sensor", page 31

- Remove the foil from the oxygen sensor.
- Install the new oxygen sensor.

- Reconnect the sensor cable.

- Calibrate the sensor. See Chapter 8.1 "Calibrating the oxygen analyzer", page 29
8.3 Error messages

**NOTICE**

Too frequent switching on the instrument

Too frequent switching on the instrument can cause an instrument damage.

- Wait 10 minutes before restarting the instrument.

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<tr>
<th>Fault code</th>
<th>Fault</th>
<th>Remedy</th>
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<tr>
<td>E01</td>
<td>Temperature sensor defective</td>
<td>▶ Switch off the instrument.</td>
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<tr>
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<td>▶ Wait until the instrument is in ambient temperature.</td>
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<tr>
<td>E02</td>
<td>Temperature error</td>
<td>▶ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner.</td>
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<tr>
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<td>▶ Switch on the instrument.</td>
</tr>
<tr>
<td></td>
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<td>▶ Contact BUCHI Customer Service.</td>
</tr>
<tr>
<td>E04</td>
<td>Compressor pressure fault</td>
<td>▶ Switch off the instrument.</td>
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<td>▶ Wait until the instrument is in ambient temperature.</td>
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<td>▶ Switch on the instrument.</td>
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<td>▶ Contact BUCHI Customer Service.</td>
</tr>
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<td>E05</td>
<td>Data error</td>
<td>▶ Switch off the instrument.</td>
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<td></td>
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<td>▶ Switch on the instrument.</td>
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<tr>
<td></td>
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<td>▶ Contact BUCHI Customer Service.</td>
</tr>
<tr>
<td>E06</td>
<td>Electronic circuitry overheated</td>
<td>▶ Switch off the instrument.</td>
</tr>
<tr>
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<td>▶ Wait until the instrument is in ambient temperature.</td>
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<tr>
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<td>▶ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner.</td>
</tr>
<tr>
<td></td>
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<td>▶ Switch on the instrument.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Contact BUCHI Customer Service.</td>
</tr>
</tbody>
</table>
9 Taking out of service and disposal

9.1 Taking out of service

- Switch off the instrument and disconnect it from the mains power supply.
- Remove all tubing and communication cables from the device.

9.2 Refrigerant

⚠️ CAUTION

Potential environmental hazard.

The instrument uses refrigerant. See Chapter 3.4 "Technical data", page 13
- Dispose of the appliance properly, if necessary using a professional disposal service.

9.3 Disposal

The operator is responsible for proper disposal of the instrument.
- When disposing of equipment observe the local regulations and statutory requirements regarding waste disposal.
- When disposing, observe the disposal regulations of the materials used. Materials used see Chapter 3.4 "Technical data", page 13

9.4 Returning the instrument

Before returning the instrument, contact the BÜCHI Labortechnik AG Service Department.

https://www.buchi.com/contact
10 Appendix

10.1 Spare parts and accessories
Use only genuine BUCHI consumables and spare parts in order to ensure correct, safe and reliable operation of the system.

**NOTE**
Any modifications of spare parts or assemblies are only allowed with the prior written permission of BUCHI.

10.1.1 Spare parts

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<td>Quick hose coupling</td>
<td>045656</td>
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<td>PTFE tube to receiving vessel</td>
<td>004105</td>
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<td>Seal PTFE</td>
<td>005155</td>
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<td>PTFE hose connection SVL 22</td>
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<tr>
<td>Hose clamps</td>
<td>004236</td>
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<td>Sealing FKM for hose coupling</td>
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<td>Woulf Bottle</td>
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<td>Screw cap SVL 22</td>
<td>003577</td>
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<td>Screw cap SVL 22</td>
<td>005222</td>
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<td>Oxygen sensor</td>
<td>046348</td>
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<td>Oxygen sensor plug</td>
<td>11070257</td>
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<tr>
<td>Receiving vessel for solvent</td>
<td>Order no.</td>
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<td>-----------------------------</td>
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## BUCHI Affiliates:

### Europe

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<td>Switzerland/Austria</td>
<td></td>
<td>BÜCHI Labortechnik AG</td>
<td>CH – 9230 Flawil</td>
<td>+41 71 394 63 63</td>
<td><a href="mailto:buchi@buchi.com">buchi@buchi.com</a></td>
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<td>BUCHI Labortechnik GmbH</td>
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## America

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<td>BUCHI Brasil Ltda.</td>
<td>BR – Vairinhos SP 13271-200</td>
<td>T +55 19 3849 1201</td>
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<td>T +1 877 692 8244 (Toll Free)</td>
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<td>BUCHI Singapore Pte. Ltd.</td>
<td>SG – Singapore 609919</td>
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<td>TH – Bangkok 10600</td>
<td>T +66 2 862 06 51</td>
<td><a href="mailto:thailand@buchi.com">thailand@buchi.com</a></td>
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