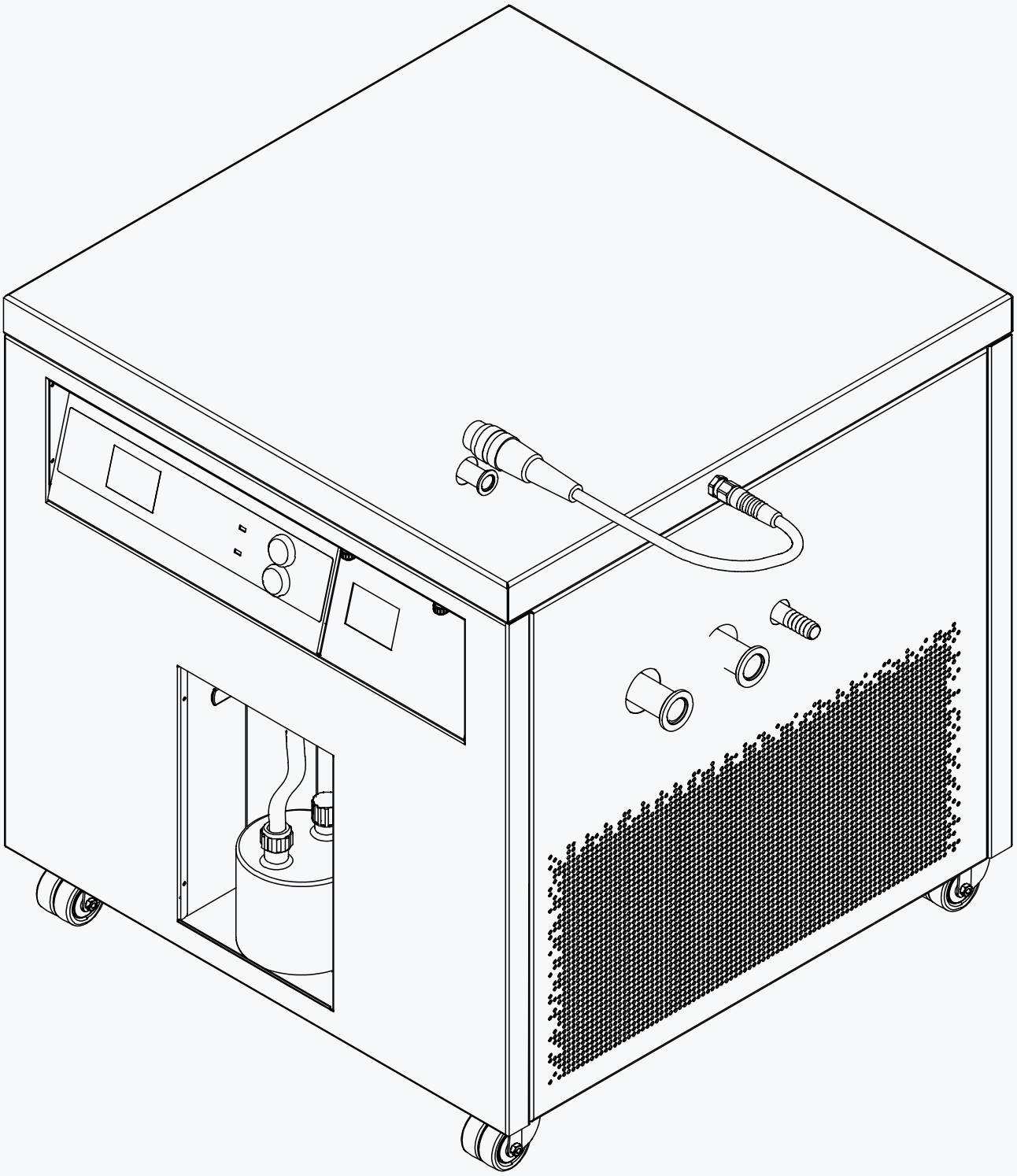

Operation Manual

Inert Loop S-395

BÜCHI

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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 Mark-ups and symbols

NOTE

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.

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

1.2 Connected instruments

In addition to this operation manual, follow the instructions and specifications in the documentation for the connected instruments.

1.3 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 organic solvent from the drying gas from BUCHI spray dryer.
- Condense organic solvent from the drying gas after the Dehumidifier S-396 took out the water, in case the spray dried solvent contains 20% of water or more.

2.2 Use other than that intended

The use of the instrument other than described in proper use and specified in technical data is use other than that intended.
The operator is responsible for damages or hazards that are caused by use other than that intended.
Especially the following uses are not permitted:

- Use of the instrument in areas which require explosion-safe instruments.
- Use the instrument with non-BUCHI instruments.
- Use of the instrument for processing substances outside of research and development.
- Use of the instrument with gases with unknown chemical composition.
- Use of the instrument with samples containing peroxides.
- Use of the instrument with samples that can form peroxides.
- Use of the instrument with samples which produce oxygen during the processing.
- 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 substances which might explode or ignite because of the processing.
- Use of the instrument with corrosive samples.
- Use of the instrument with water content higher than 20%.

2.3 Staff qualification

Unqualified persons are unable to identify risks and are therefore exposed to greater dangers.
The instrument 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 instrument.
- 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 instrument.

Operator

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

- The instrument 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 instrument 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 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.

2.5 Warning notices in this document

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

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

2.6 Residual risks

The instrument has been developed and manufactured using the latest technological advances. Nevertheless, risks to persons, property or the environment can arise if the instrument is used incorrectly.
Appropriate warnings in this manual serve to alert the user to these residual dangers.

2.6.1 Faults during operation

If an instrument is damaged, sharp edges, glass splinters, moving parts or exposed electrical wires can cause injuries.

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

2.6.2 Glass breakage

⚠ WARNING

In the rare case of an abrupt massive leakage like a glass breakage a deflagration can happen.

Risk of injury from flying glass splinters.

- ▶ Leave the instrument immediately.
- ▶ Stay in a safe distance for 1 minute.
- ▶ Do not switch off or unplug the instrument.
- ▶ Wait until the instrument changed independently into a safe state to get back.

2.7 Modifications

Unauthorized modifications can affect safety and lead to accidents.

- ▶ Use only genuine BUCHI accessories, spare parts and consumables.
- ▶ Carry out technical changes only with prior written approval from BUCHI.
- ▶ Only allow changes to be made by BUCHI service technicians.

BUCHI accepts no liability for damage, faults and malfunctions resulting from unauthorized modifications.

2.8 Oxygen sensor

The instrument is equipped with an oxygen measurement sensor to ensure a safe operation when spraying combustible solvent. The inertization of the instrument is continuously monitored. In case of an oxygen concentration above 6% the instrument is able to immediately stop the solvent spraying. A safe state will be reached with a time delay depending on the drying gas flow rate.
The used sensor is SIL capable.

3 Product description

3.1 Description of function

The instrument is an accessory for BUCHI Spray Drying Instruments. It 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 instrument is used to condense these solvent vapors from the gas stream and to monitor its oxygen concentration.
The gas flow enters the instrument and passes the pre-heat exchanger where it is cooled before entering the condenser. After solvent vapor condensation, the gas stream is reheated by the pre-heater before being returned to the spray drying process. The excess inert gas leaves the instrument via the exhaust and the condensed solvent vapors are collected in a closed bottle.
The following spray drying modes are available:

Spray drying mode	Solvent composition
Closed mode with Inert Loop (When using Ultrasonic Package accessory inert gas adapter is necessary)	between 90-100% organic solvent
Closed mode with Inert Loop and Dehumidifier (When using Ultrasonic Package accessory inert gas adapter is necessary)	between 20-90% organic solvent

3.2 Configuration

3.2.1 Front view

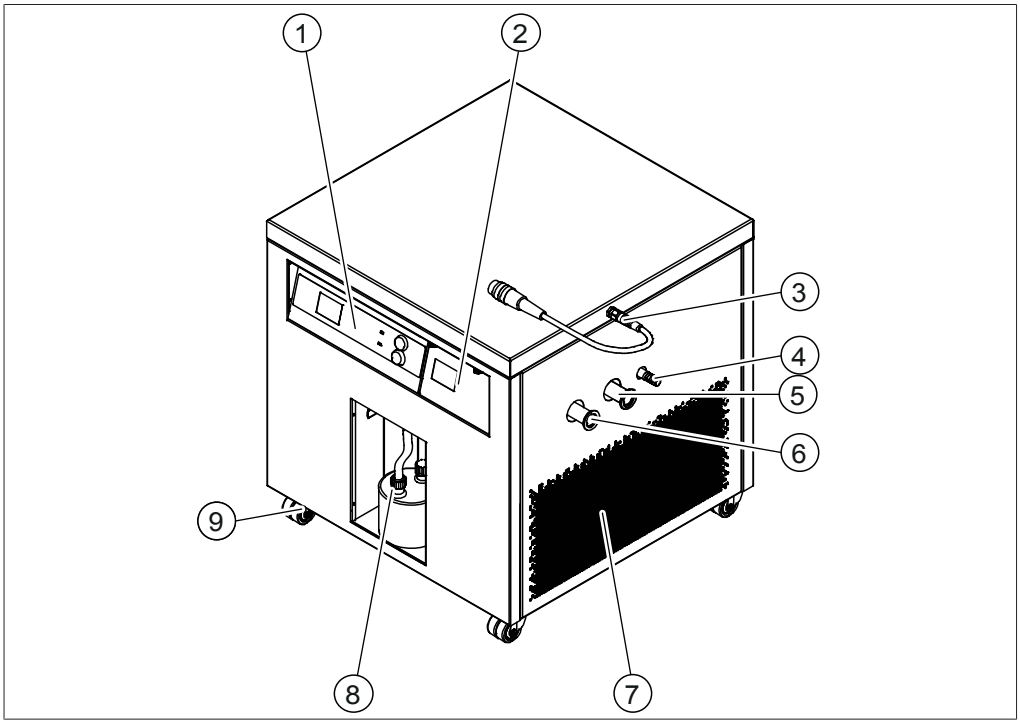


Fig. 1: Front view

1 Control elements
(See Control elements)

2 Oxygen analyzer
(Front cover oxygen analyzer)

3 Communication cable

4 Exhaust connection
(marked: *Exhaust*)

5 Process gas out
(marked: *OUT*)

6 Process gas in
(marked: *IN*)

7 Ventilation area

8 Woulff bottle

9 Castor wheels

3.2.2 Rear view

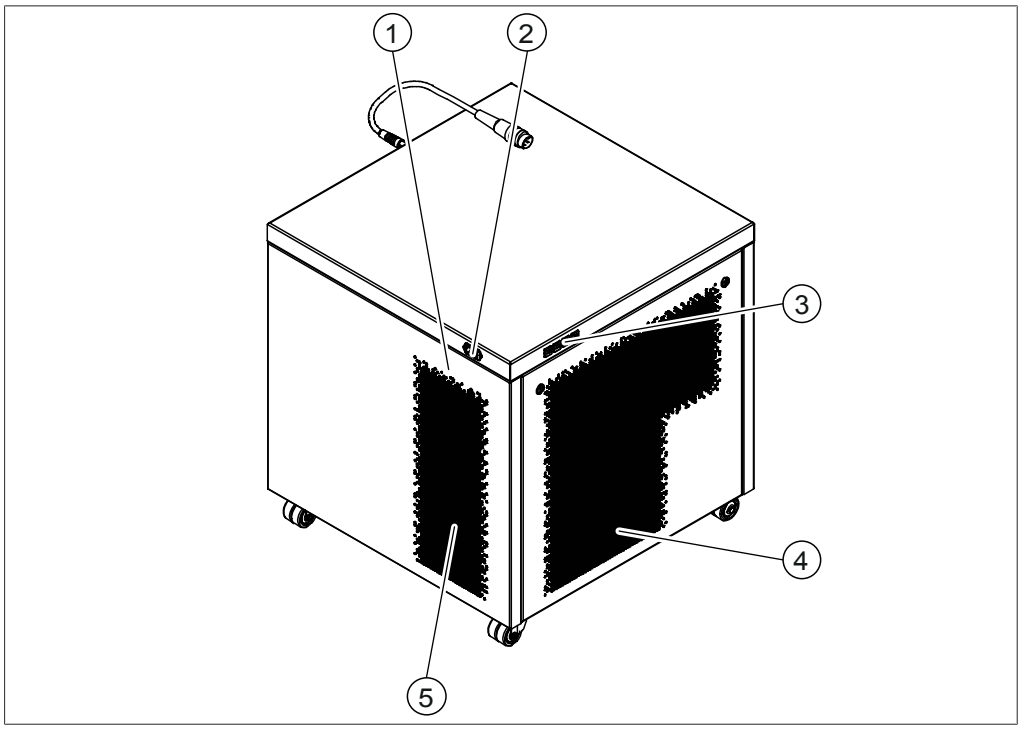


Fig. 2: Rear view

1 Type plate
2 Power connection
3 Fuses
4 Ventilation area
5 Ventilation area

3.2.3 Control elements

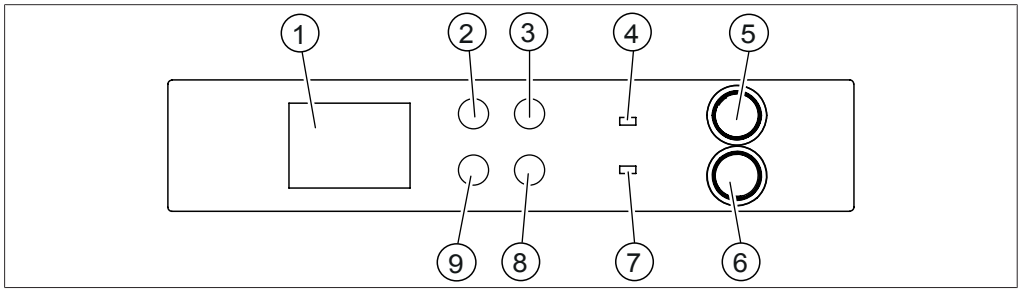


Fig. 3: Control elements

1 Display
2 Set temperature up
3 Switch on
4 Signal lamp power
5 Signal lamp pressure
6 Signal lamp oxygen
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 rear side of the instrument. See Side connections

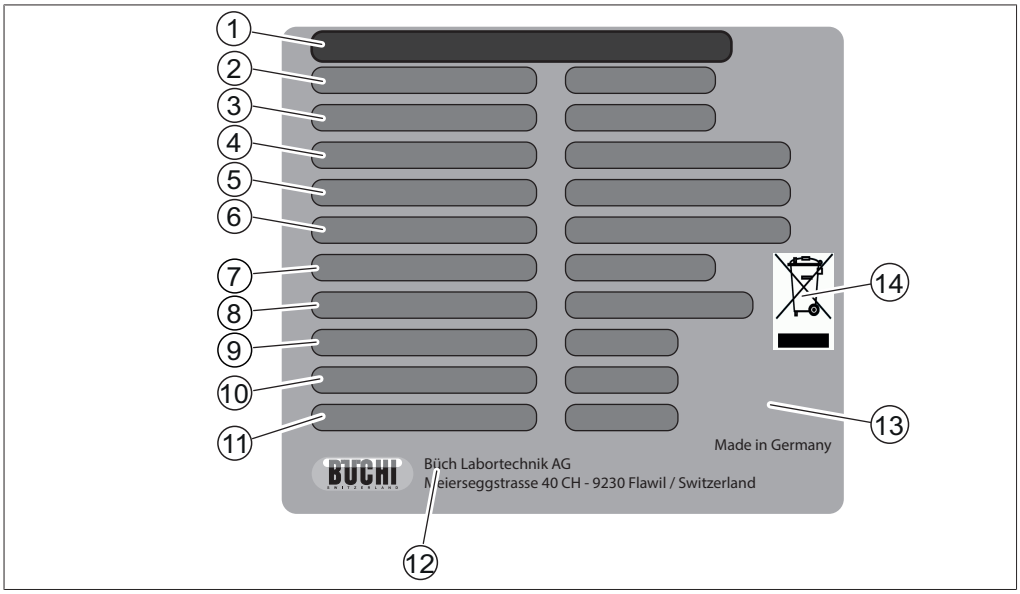


Fig. 4: Type plate

1	Instrument name	2	Serial number
3	Article number	4	Refrigerant details Filling capacity
5	Global warming potential	6	Input voltage range Frequency
7	Power consumption maximum	8	Fuse type
9	High-pressure system design pressure	10	Low-pressure system design pressure
11	Year of manufacture	12	Company name and address
13	Approvals	14	Symbol for "Do not dispose of as household waste"

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 S-395

Specification	Inert Loop S-395 200 V 50 Hz	Inert Loop S-395 220 - 240 V 50 Hz	Inert Loop S-395 200 V 60 Hz	Inert Loop S-395 240 V 60 Hz	Inert Loop S-395 220 V 60 Hz
Dimensions (W x D x H)	705 x 660 x 687 mm	705 x 660 x 687 mm	705 x 660 x 687 mm	705 x 660 x 687 mm	705 x 660 x 687 mm

Specification	Inert Loop S-395 200 V 50 Hz	Inert Loop S-395 220 - 240 V 50 Hz	Inert Loop S-395 200 V 60 Hz	Inert Loop S-395 240 V 60 Hz	Inert Loop S-395 220 V 60 Hz
Weight	96.7 kg	91.0 kg	96.7 kg	96.7 kg	91.0 kg
Power consumption	max. 1700 VA	max. 1700 VA	max. 2000 VA	max. 2000 VA	max. 2000 VA
Frequency	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz
Connection voltage	200 V ± 10 %	220 - 240 V ± 10 %	200 V ± 10 %	240 V ± 10 %	220 V ± 10 %
Primary fuse	10 A	10 A	14 A	14 A	12 A
Secondary fuse	10 A	-	12 A	12 A	-
IP Code	IP20	IP20	IP20	IP20	IP20
Overvoltage category	II	II	II	II	II
Pollution degree	2	2	2	2	2
Rate of cooling	800 W at 0 °C	800 W at 0 °C	920 W at 0 °C	920 W at 0 °C	920 W at 0 °C
Refrigerant	R449A	R449A	R449A	R449A	R449A
CO-equivalent	1.369 t	1.369 t	1.369 t	1.369 t	1.369 t
Filling amount of refrigerant	0.98 kg	0.98 kg	0.98 kg	0.98 kg	0.98 kg
Safety Group Refrigerants (ASHRAE)	A1 (lower toxicity, no flame propagation)	A1 (lower toxicity, no flame propagation)	A1 (lower toxicity, no flame propagation)	A1 (lower toxicity, no flame propagation)	A1 (lower toxicity, no flame propagation)
Maximum allowable pressure (PS) [Low pressure side]	22 bar	22 bar	22 bar	22 bar	22 bar
Maximum allowable pressure (PS) [High pressure side]	26 bar	26 bar	26 bar	26 bar	26 bar
Min. process gas temperature	-30 °C	-30 °C	-30 °C	-30 °C	-30 °C
Max. process gas temperature	8 °C	8 °C	8 °C	8 °C	8 °C

Specification	Inert Loop S-395 200 V 50 Hz	Inert Loop S-395 220 - 240 V 50 Hz	Inert Loop S-395 200 V 60 Hz	Inert Loop S-395 240 V 60 Hz	Inert Loop S-395 220 V 60 Hz
Minimum clearance on all sides	300 mm	300 mm	300 mm	300 mm	300 mm

3.4.2 Ambient conditions

For indoor use only.

Max. altitude above sea level	2000 m
Ambient temperature	5 – 35 °C
Maximum relative humidity	80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 35 °C
Storage temperature	max. 40 °C

3.4.3 Materials

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

3.4.4 Installation site

- The installation site meets the safety requirements. See Chapter 2 “Safety”, page 6
- The installation site has a firm, level and nonslip surface.
- The installation site has no obstacles (e.g. water taps, drains, etc.).
- The installation site has an own mains outlet socket for the instrument.
- The installation site is not exposed to external thermal loads, such as direct solar radiation.
- The installation site has enough space that cables / tubes can be routed safely.
- The installation site meets the requirements for the connected devices. See related documentation
- The installation site meets the specifications according to the technical data (e.g. weight, dimension, etc.). See Chapter 3.4 “Technical data”, page 12
- The installation site allows that the power supply can be disconnected at any time in an emergency.
- The installation site fits basic electromagnetic environment / Emission Class B.
- 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 directly on the floor, do not use a pad.
- Make sure the castor brakes are locked.
- Place only BUCHI spray dryer on the instrument.
- Do not place the instrument near vibration-sensitive devices.

3.4.5 Cooling performance

NOTICE

Actual temperature may be lower than the set temperature.

Due to the design of the cooling circuit, the actual temperature may be up to 5°C lower than the set temperature. This can occur, when there is more than 5% undervoltage and the set temperature is above 0°.

4 Transport and storage

4.1 Transport

NOTICE

Risk of breakage due to incorrect transportation

- ▶ Make sure that all parts of the instrument are safely packed in such a way as to prevent breakage, ideally in the original box.
- ▶ Avoid sharp movements during transit.

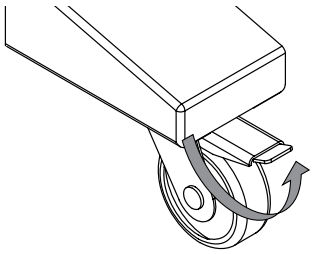
- ▶ After transportation, check the instrument for damage.
- ▶ Damage that has occurred in transit should be reported to the carrier.
- ▶ Keep packing for future transportation.

4.2 Storage

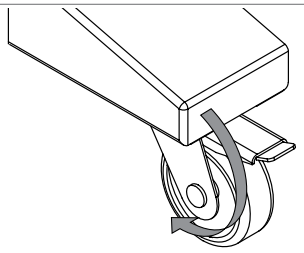
- ▶ Make sure that the ambient conditions are complied with (see Chapter 3.4 “Technical data”, page 12).
- ▶ Wherever possible, store the instrument in its original packaging.
- ▶ After storage, check the instrument, all seals and tubing for damage and replace if necessary.

4.3 Moving the instrument

- ▶ Release the castor breaks.
- ▶ Move the instrument to the designated place.



- ▶ Lock the castor breaks.



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 Establishing electrical connections

NOTICE

Risk of instrument damage because of not suitable power supply cables.

Not suitable power supply cables can cause bad performance or an instrument damage

▶ Use only BUCHI power supply cables.

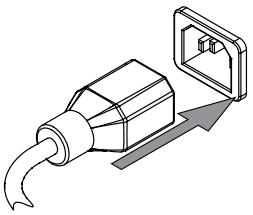
Precondition:

☑ The electrical installation is as specified on the type plate.

☑ The electrical installation is equipped with a proper grounding system.

☑ The electrical installation is equipped with suitable fuses and electrical safety features.

☑ The installation site is as specified in the technical date. See Chapter 3.4 “Technical data”, page 12.



▶ Connect the power supply cable to the connection on the instrument. See Chapter 3.2 “Configuration”, page 10.

▶ Connect the mains plug to an own mains outlet socket.

5.3 Installing the exhaust gas hose

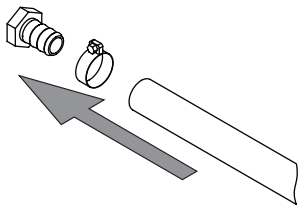
⚠ CAUTION

Risk of overpressure due to clogged exhaust.

Overpressure can damage the instrument or impact the safety of the user.

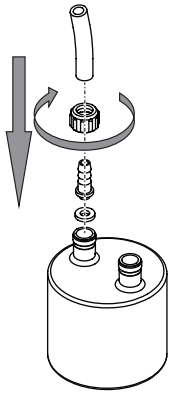
▶ Do not bend, fold or squeeze tubes that are connected to the exhaust.

- ▶ 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.

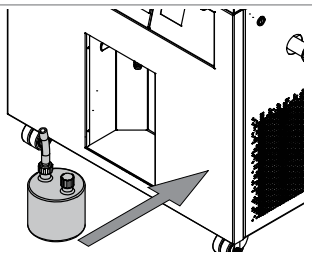


5.4 Installing the woulff bottle

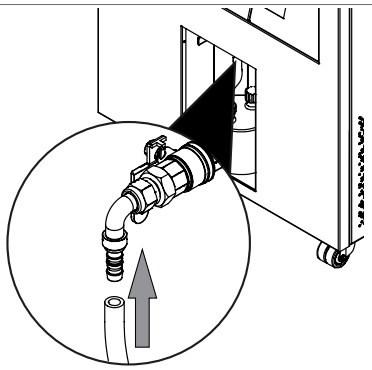
- ▶ Put the PTFE hose connection on the bottle.



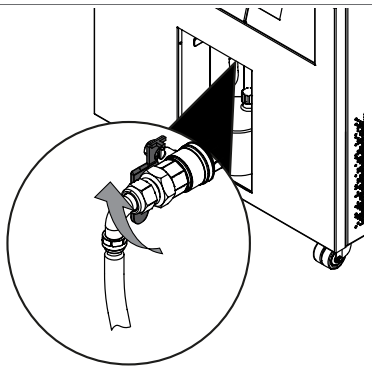
- ▶ Put the woulff bottle in place.



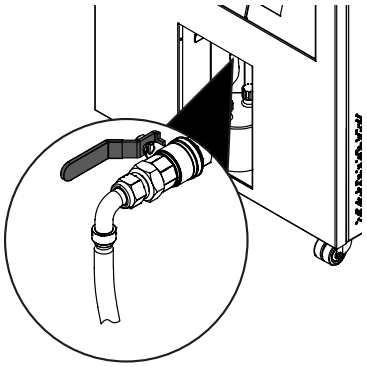
- ▶ Install the PTFE hose onto the condensate drain valve.



- ▶ Open the condensate drain valve.



▶ Make sure that the lever of the condensate drain valve is in the position indicated.



5.5 Installing the oxygen sensor for the first time

Precondition:
☑ The O2 Sensor socked must be sealed.

▶ Remove the seal and place the O2 Sensor on the socked.

The primary installation of the oxygen sensor for a new instrument will be guided by a BUCHI service technician. For further information see Chapter 7.7 “Changing the oxygen sensor”, page 27.

5.6 Installations for a spray drying mode

The installations for a spray drying mode, see separate installation manuals.

- *Mini Spray Dryer S-300 in closed mode with Dehumidifier and Inert Loop*
- *Mini Spray Dryer S-300 in closed mode with Inert Loop*
- *Mini Spray Dryer S-300 in open pressure mode*
- *Mini Spray Dryer S-300 in open suction mode*

6 Operation

6.1 Preparing the instrument

Precondition:

☑ All commissioning operations have been completed. See Chapter 5 “Installation”, page 17

▶ 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. See Chapter 7.5 “Calibrating the oxygen analyzer”, page 23

⇨ If a calibration of at least 20.5 % can not be reached replace the sensor. See Chapter 7.7 “Changing the oxygen sensor”, page 27.

Precondition:

☑ The instrument is prepared. See Chapter 6.1 “Preparing the instrument”, page 20.

☑ Make sure that the woulff bottle is empty. See Chapter 7.2 “Empty the woulff bottle”, page 22.

▶ Connect the communication cable.

▶ 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. See Chapter 3.2.1 “Front view”, page 10.

▶ Set condenser temperature. See Chapter 6.6 “Setting condenser temperature”, page 21.

▶ Press the *Switch on* button. See Chapter 3.2.3 “Control elements”, page 11.

▶ 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 woulff bottle.

⇨ If necessary empty it. See Chapter 7.2 “Empty the woulff bottle”, page 22

▶ Check the temperature.

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 woulff bottle. See Chapter 7.2 “Empty the woulff bottle”, page 22.

6.5 Switching off the instrument

Precondition:
☑ The instrument is shut down. See Shutting down the instrument

▶ Press the *Switch off* button. See Chapter 3.2.3 “Control elements”, page 11.
▶ Disconnect the communication cable.
▶ Disconnect the power cable.

6.6 Setting condenser temperature

NOTICE

Damage to the instrument due to water in the system.

Organic solvents mixed with water can damage the system at very low temperatures. This might occur if the water content is higher tan 20%.

▶ Do not use temperatures below -20°C in case of water in the system.
▶ Use a Dehumidifier S-396 prior to the inert loop to avoid hazard or destroying if the water content is higher than 20% in the solvent mixture.

Increase temperature

▶ Press the button ***Set temperature UP***. See Chapter 3.2.3 “Control elements”, page 11.

Decrease the temperature

▶ Press the button ***Set temperature DOWN***. See Chapter 3.2.3 “Control elements”, page 11.

7 Cleaning and servicing

NOTE

- ▶ Carry out only the service and cleaning operations described in this section.
- ▶ Do not carry out any servicing and cleaning operations that involve opening the housing.
- ▶ Use only genuine BUCHI spare parts in order to ensure correct operation and preserve the warranty.
- ▶ Carry out the service and cleaning operations described in this section to extend the lifetime of the instrument.

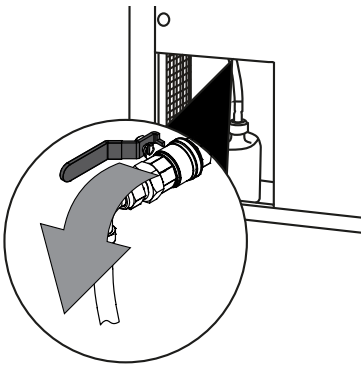
7.1 Regular maintenance work

Action		Weekly	Monthly	Yearly	Every two years	Additional information
7.2	Empty the woulff bottle	1				
7.3	Cleaning the housing	1				
7.4	Cleaning the ventilation slots		1			
7.5	Calibrating the oxygen analyzer		1			
7.6	Checking the controller of the oxygen analyzer			1		
7.7	Changing the oxygen sensor				1	Operational life of sensor is 2 years

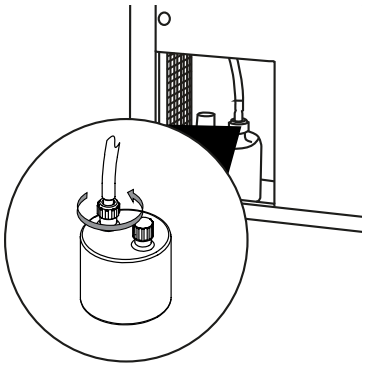
1 - Operator

7.2 Empty the woulff bottle

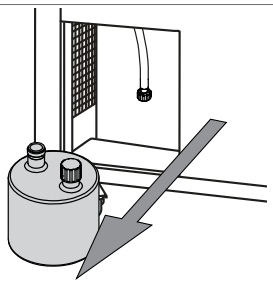
- ▶ Close the condensate drain valve.



▶ Disconnect the woulff bottle.



▶ Remove the woulff bottle from the instrument.



▶ Empty the woulff bottle.

▶ Install the woulff bottle in revers order.

7.3 Cleaning the housing

- ▶ Wipe down the housing with a damp cloth.
- ▶ If heavily soiled, use ethanol or a mild detergent.
- ▶ Wipe down the display with a damp cloth.

7.4 Cleaning the ventilation slots

- ▶ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner.

7.5 Calibrating the oxygen analyzer

NOTE

The calibration should only be performed after the sensor is removed.

To avoid calibration errors, clean ambient air or certified 20.9% level oxygen should be applied to the sensor.

- ▶ If an ambient air calibration is performed, it is recommended that the oxygen level is confirmed by a portable oxygen meter.

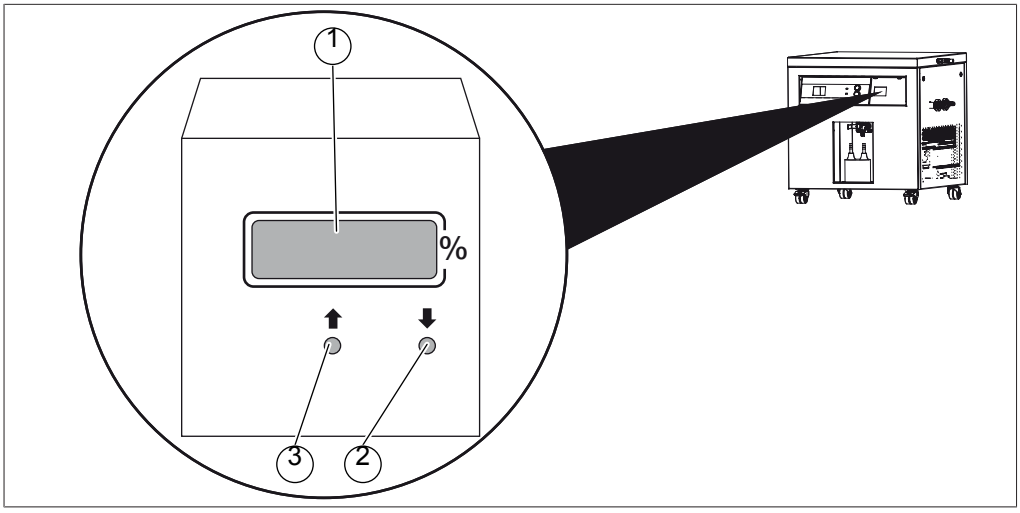
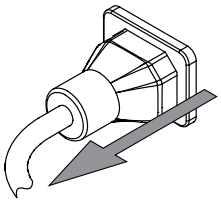


Fig. 5: Control elements oxygen sensor

1 Display
2 DECREMENT
3 INCREMENT

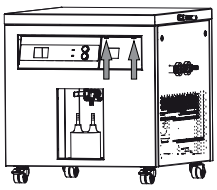
Precondition:
☑ The correct oxygen value is between 20 - 21 %.
▶ If this value is not reached the sensor needs to be calibrated.

▶ Disconnect the power cable.

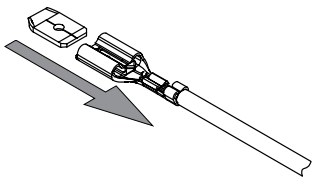


▶ Disconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.

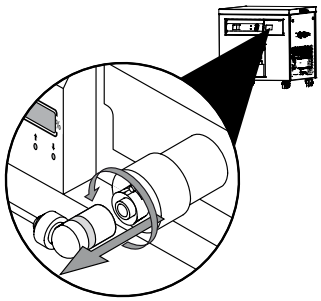
▶ Remove the screws at the indicated positions.
▶ Open the front cover oxygen sensor.



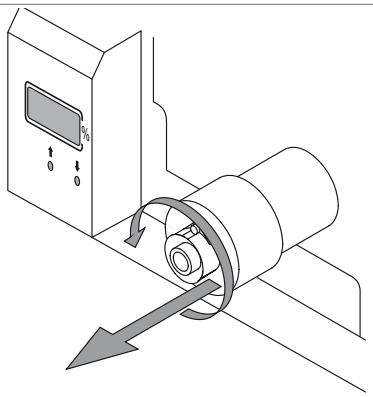
▶ Remove the grounding cable from the front cover oxygen sensor.



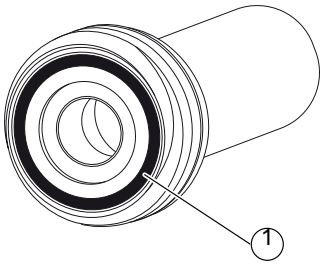
▶ Disconnect the sensor cable by rotating the securing ring of the cable plug.
▶ Pull off the plug from the sensor.



▶ Remove the oxygen sensor.

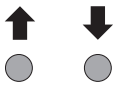


▶ Make sure the O-ring (1) stays in its position.



▶ Reconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.
▶ Reconnect the sensor cable.
▶ Wait 15 minutes for the electronics to warm up.

▶ Press the button ***INCREMENT*** or ***DECREMENT*** to set calibration gas level.



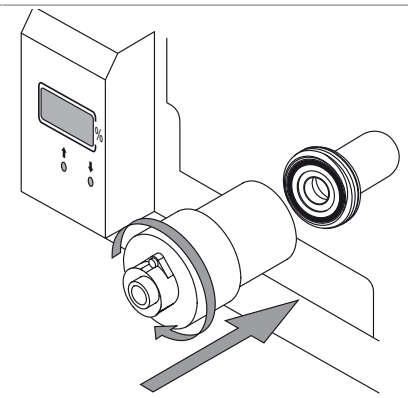
▶ For fine adjustment press one of the buttons short.
▶ For accelerated adjustment press one of the buttons constantly.
▶ Do not press both buttons together.
⇨ When the display reads 20.9%, the calibration is completed.

⇨ If a calibration of at least 20.5% can not be reached replace the sensor. See Chapter 7.7 “Changing the oxygen sensor”, page 27.

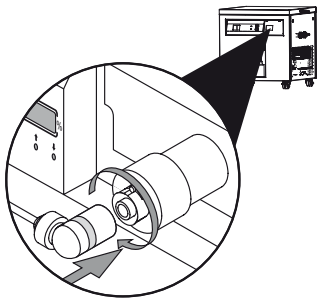
▶ Disconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.
▶ Disconnect the sensor cable.

Precondition:
☑ The O-ring stays in its position.

▶ Install the oxygen sensor.
⇨ Screwing force was chosen that sensor is clearly fixed, but not excessively hard.

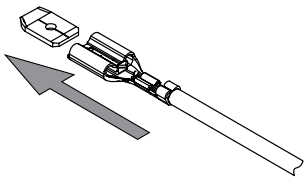


▶ Connect the cable plug on the sensor.
▶ Connect the sensor cable by rotating the securing ring of the cable plug.

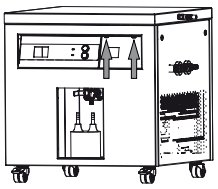


▶ Reconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.

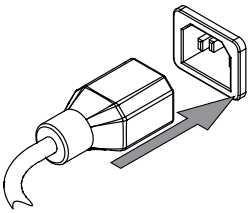
▶ Install the grounding cable.



▶ Install the front cover.
▶ Place the screws at the indicated positions.



▶ Connect the power cable.



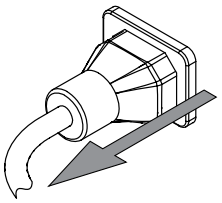
7.6 Checking the controller of the oxygen analyzer

▶ Check the correct function of the controller for the oxygen analyzer.
▶ For further information check the oxygen analyzer documentation from the manufacturer.

7.7 Changing the oxygen sensor

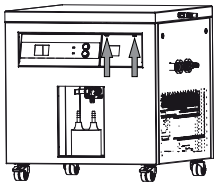
7.7.1 Removing the oxygen sensor

▶ Disconnect the power cable.

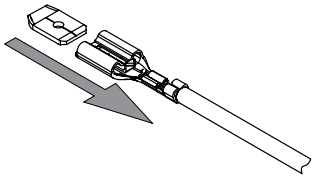


▶ Disconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.

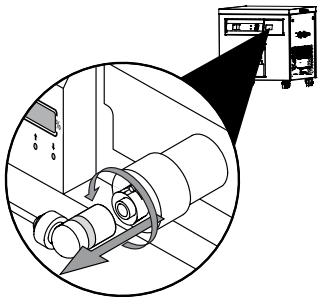
▶ Remove the screws at the indicated positions.
▶ Open the front cover oxygen sensor.



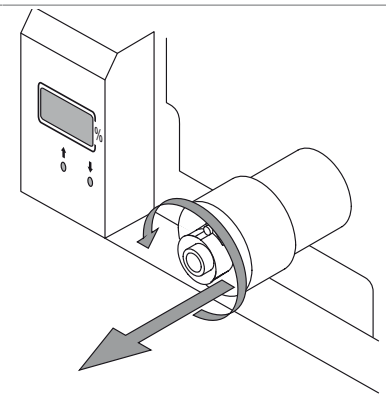
▶ Remove the grounding cable from the front cover oxygen sensor.



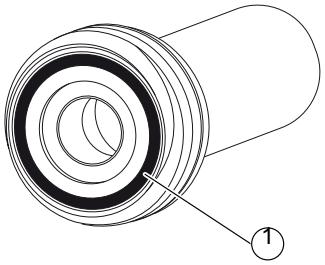
▶ Disconnect the sensor cable by rotating the securing ring of the cable plug.
▶ Pull off the plug from the sensor.



▶ Remove the oxygen sensor.



▶ Remove the O-ring (1).



Precondition:
☑ In case the instrument is not used for a long time:

▶ Store the oxygen sensor wrapped in alumina foil.

⇨ This will protect the sensor and reduces corrosion.

⇨ Better re-use conditions of the sensor.

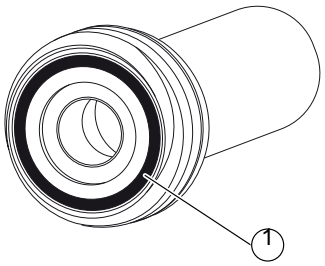
7.7.2 Installing the oxygen sensor

Precondition:
☑ There is no oxygen sensor installed. See Chapter 7.7.1 “Removing the oxygen sensor”, page 27.

☑ The power cable is disconnected.

▶ Install a new O-ring (1).

⇨ The O-ring is seated properly and cannot fall out accidentally.

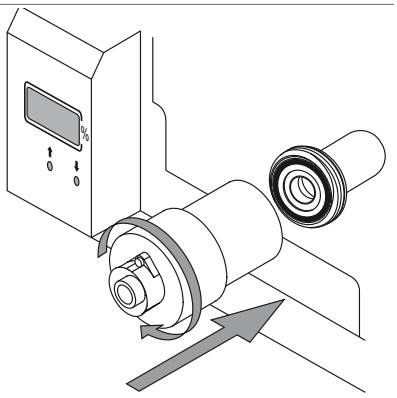


Precondition:
☑ The sensor has been calibrated, in case it is a new sensor. See Chapter 7.5 “Calibrating the oxygen analyzer”, page 23.

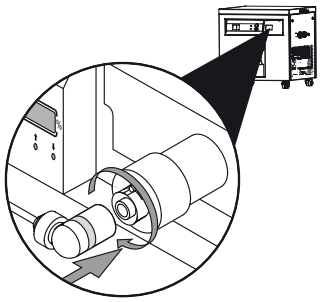
☑ The communication cable is disconnected.

▶ Install the oxygen sensor.

⇨ Screwing force was chosen that sensor is clearly fixed, but not excessively hard.

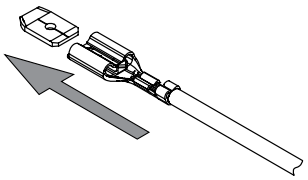


▶ Fit the cable plug on the sensor.
▶ Connect the sensor cable by rotating the securing ring of the cable plug.

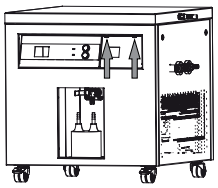


▶ Reconnect the communication cable, see Chapter 3.2.1 “Front view”, page 10.

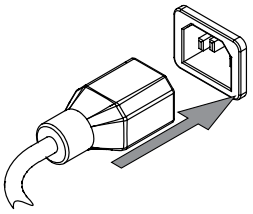
▶ Install the grounding cable.



▶ Install the front cover.
▶ Place the screws at the indicated positions.



▶ Connect the power cable.



8 Help with faults

8.1 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.

Fault code	Fault	Remedy
E01	Temperature sensor defective	▶ Switch off the instrument. ▶ Wait until the instrument is in ambient temperature. ▶ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner. ▶ Switch on the instrument. ▶ Contact BUCHI Customer Service.
E02	Temperature error	
E04	Compressor pressure fault	▶ Switch off the instrument. ▶ Wait until the instrument is in ambient temperature. ▶ Switch on the instrument. ▶ Contact BUCHI Customer Service.
E05	Data error	▶ Switch off the instrument. ▶ Switch on the instrument. ▶ Contact BUCHI Customer Service.
E06	Electronic circuitry overheated	▶ Switch off the instrument. ▶ Wait until the instrument is in ambient temperature. ▶ Remove dust and foreign objects from the ventilation slots using compressed air or a vacuum cleaner. ▶ Switch on the instrument. ▶ Contact BUCHI Customer Service.

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 instrument.

9.2 Refrigerant

⚠ CAUTION

Potential environmental hazard.

The instrument uses refrigerant. See Chapter 3.4 “Technical data”, page 12

- ▶ 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.

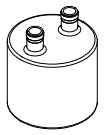
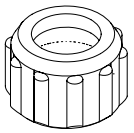
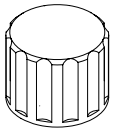
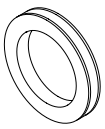
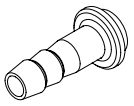
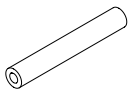
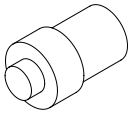
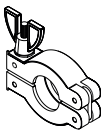
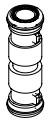
- ▶ When disposing the equipment observe the local regulations and statutory requirements regarding waste disposal.
- ▶ When disposing, observe the disposal regulations of the materials used. Materials used see Chapter 3.4 “Technical data”, page 12.

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

	Order no.	Image
Woulff bottle	041875	
Cap nut SVL 22	003577	
Screw cap SVL 22	005222	
Seal PTFE	005155	
PTFE hose connection SVL 22	027338	
Silicone hose 10x2.0x80 V0	11075249	
Hose PVC Ø 14x18 L=3m	042824	
Oxygen Sensor S-395 Shelf life max. 1 year	11075130	
Vacuum clamp KF 25	11063662	
Hose Inert Loop TPR conf.	11071076	

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