Imprint

Product Identification:
Operation Manual (Original) K-365 Kjel Line
11594238

Publication date: 11.2021

Version B

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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.

<table>
<thead>
<tr>
<th>Mark-up</th>
<th>Explanation</th>
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<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>

1.2 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.

1.3 Connected devices

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

2.1 Proper use

The instrument is designed for steam distillation.
The instrument can be used in laboratories for the following tasks:
• Distillation of steam-volatile substances.

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.

Specially the following uses are not permitted:
• Use of the instrument in areas which require explosion-safe instruments.
• Use of samples, which can explode or inflame (example: explosives, etc.) due to shock, friction, heat or spark formation.
• Use of the instrument with other than original BUCHI glassware.

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 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 device. There are four danger levels, each identifiable by the signal word used.

<table>
<thead>
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<th>Signal word</th>
<th>Meaning</th>
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<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>

2.6 Warning and directive symbols
The following warning and directive symbols are displayed in this operation manual or on the instrument.

<table>
<thead>
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<th>Meaning</th>
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<tr>
<td>![Symbol]</td>
<td>Hot surface</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Corrosive</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>General warning</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Device damage</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Dangerous electrical voltage</td>
</tr>
</tbody>
</table>
Symbol | Meaning
--- | ---
| Wear protective gloves
| Wear safety goggles

Fig. 1: Location of the warning and directive symbols

### 2.7 Protection devices

![Fig. 2: Protection devices](image)

1. Protection shield
2. Protection shield
3. Stop button

### 2.8 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.
2.8.1 **Hot surfaces**
The surfaces of the device can become very hot. If touched they can cause skin burns.
- Do not touch hot surfaces or else wear suitable protective gloves.

2.8.2 **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.

2.8.3 **Glass breakage**
Broken glass can cause severe cuts.
Minor damage to the ground joints impairs the sealing effect and may therefore diminish suction capacity.
- Handle the glass components carefully and do not drop them.
- Always place the glassware in a suitable holder when they are not in use.
- Always visually inspect glass components for damage every time they are to be used.
- Do not continue to use glass components that are damaged.
- Always wear protective gloves when disposing of broken glass.

2.8.4 **Not suitable titrators**
Not suitable titrators can lead to malfunction and wrong results.
- Use recommended titrators only.

2.8.5 **Dosing pump defect**
A defect dosing pump can spill hazardous liquids on the installation site.
- Set the On / Off master switch to Off.
- Disconnect the power supply.
- Use personal protective equipment to remove the liquid.
- Dispose of the remains of the liquid according to the local legal regulations.

2.9 **Modifications**
Unauthorized modifications can effect 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.
3 Product description

3.1 Description of function

The instrument is suitable for determining nitrogen using the Kjeldahl (TKN; Total Kjeldahl Nitrogen) and Devarda methods as well as for other distillations of steam-volatile substances (e.g. of alcohol).

- Steam is introduced into the sample solution to drive out volatile components (such as ammonia, alcohol, etc.).
- After condensation in the condenser the condensate is collected in a receiver solution in the receiving vessel.

3.2 Configuration

3.2.1 Front view

NOTE
The interface differs according to the configuration:

- ▶ Interface (Chapter 6 "Description of the interface", page 39)
  ➔ EasyKjel, BasicKjel (option)
- ▶ Interface Pro (Chapter 7 "Description of the interface pro", page 45)
  ➔ BasicKjel (option), MultiKjel, MultiKjel T
Fig. 3: Front view

1 Splash protector
2 Condenser
3 Ventilation slots
4 On/Off master switch
5 Ventilation slots
6 Receiving area
   See Chapter 3.2.3 "Receiving area", page 16
7 Sample tube
8 Handle
9 Interface
   (according to the instrument configuration)
3.2.2 Rear view

Fig. 4: Rear view

1 Communication connections
   See Chapter 3.2.4 "Communication connections", page 18
2 Ventilation slots
3 Ventilation slots
4 Dosing pumps window
5 Connections on the rear side
   See Chapter 3.2.5 "Connections on the rear side", page 20
6 Steam valve
7 Cooling water out
8 Drain connection
   (according to the instrument configuration)
9 Cooling water in
10 Ventilation slots
11 Rear cable duct
12 Power supply connection
13 Fuses
   (resettable)
14 Type plate
   See Chapter 3.4 "Type plate", page 24

3.2.3 Receiving area

The receiving area is different for each instrument configuration.
Receiving area

Fig. 5: Receiving area
1 Rear cable duct 
2 Cable duct reaction detection sensor 
3 Condenser outlet 
4 Receiving vessel area

Receiving area (MultiKjel T only)

Fig. 6: Receiving area
1 Cable duct reaction detection sensor 
2 Condenser outlet tubing 
3 Rear cable duct 
4 Tubing for boric acid aspiration 
5 Boric acid dosing 
6 Retainer stirrer 
7 Retainer dosing tip titration 
8 Receiving vessel 
9 Retainer titration sensor 
10 Retainer temperature sensor 
11 Retainer dosing tip back titration
3.2.4 Communication connections

Communication connection EasyKjel

Fig. 7: Communication connections

1. BUCHI standard communication port (COM) (marked COM)
2. BUCHI standard communication port (COM) (marked COM)
3. Level detection sensor port (marked Level Detection)
4. H₂O tank level sensor port (marked H₂O)
5. Communication port (marked RS-232)
6. Communication port (marked RS-232)
7. NaOH tank level sensor port (marked NaOH)
Communication connection BasicKjel

Fig. 8: Communication connection

1. LAN port (marked LAN)
2. BUCHI standard communication port (COM) (marked COM)
3. BUCHI standard communication port (COM) (marked COM)
4. Level detection sensor port (marked Level Detection)
5. H₂O tank level sensor port (marked H₂O)
6. Waste tank level sensor port (marked Sample Tube Waste)
7. Communication port (marked RS-232)
8. Communication port (marked RS-232)
9. Acid tank level sensor port (marked Acid)
10. NaOH tank level sensor port (marked NaOH)
11. USB port (marked USB)
**Communication connection MultiKjel**

![Communication connections diagram]

Fig. 9: Communication connections

1. LAN port  
   (marked LAN)
2. BUCHI standard communication port  
   (COM)  
   (marked COM)
3. BUCHI standard communication port  
   (COM)  
   (marked COM)
4. BUCHI standard communication port  
   (COM)  
   (marked COM)
5. Stirrer port  
   (marked Stirrer)
6. Level detection sensor port  
   (marked Level Detection)
7. H₂O tank level sensor port  
   (marked H₂O)
8. H₃BO₃ tank level sensor port  
   (marked H₃BO₃)
9. Waste tank level sensor port  
   (marked Sample Tube Waste)
10. Dispenser port  
    (marked Dosing Unit)
11. Titrator port  
    (marked Titrator)
12. Acid tank level sensor port  
    (marked Acid)
13. Waste tank level sensor port  
    (marked Receiver Waste)
14. NaOH tank level sensor port  
    (marked NaOH)
15. USB port  
    (marked USB)

**3.2.5 Connections on the rear side**

The connections on the rear side are depending on the version of the instrument.
Connections on the rear side EasyKjel
The connections are located at the rear side of the instrument. See Chapter 3.2.2 "Rear view", page 16

![Connections on the rear side EasyKjel](image)

Fig. 10: Connections on the rear side
1 Reserve 2 H₂O supply for steam generation
3 Reserve 4 Reserve
5 Reserve

Connections on the rear side BasicKjel (option)
The connections are located at the rear side of the instrument. See Chapter 3.2.2 "Rear view", page 16

![Connections on the rear side BasicKjel (option)](image)

Fig. 11: Connections on the rear side
1 H₂O supply for sample tube 2 H₂O supply for steam generation
3 Reserve 4 Acid supply for sample tube
5 Reserve
Connections on the rear side BasicKjel (option)
The connections are located at the rear side of the instrument. See Chapter 3.2.2 "Rear view", page 16

![Connections diagram](image)

Fig. 12: Connections on the rear side
1 Waste pump  2 H₂O supply for sample tube
3 H₂O supply for steam generation  4 Reserve
5 Acid supply for sample tube  6 Reserve

Connections on the rear side MultiKjel
The connections are located at the rear side of the instrument. See Chapter 3.2.2 "Rear view", page 16
Connections on the rear side MultiKjel T
The connections are located at the rear side of the instrument. See Chapter 3.2.2 "Rear view", page 16
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 Type plate

The type plate identifies the instrument. The type plate is located at the rear of the instrument.

Fig. 15: Type plate

1. Symbol for "electronics recycling"  
2. Initial product code  
3. Approvals  
4. Symbol for "Do not dispose of as household waste"  
5. Year of manufacture  
6. Power consumption maximum  
7. Frequency  
8. Input voltage range  
9. Serial number  
10. Instrument name  
11. Company name and address

3.5 Technical data

3.5.1 K-365 Kjel Line

<table>
<thead>
<tr>
<th></th>
<th>EasyKjel</th>
<th>BasicKjel</th>
<th>MultiKjel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x D x H)</td>
<td>320 x 400 x 730 mm</td>
<td>320 x 400 x 730 mm</td>
<td>320 x 400 x 730 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>23 kg</td>
<td>23 kg</td>
<td>23 kg</td>
</tr>
<tr>
<td>Connection voltage</td>
<td>220 - 240 ± 10 % VAC</td>
<td>220 - 240 ± 10 % VAC</td>
<td>220 - 240 ± 10 % VAC</td>
</tr>
<tr>
<td>Power consumption</td>
<td>2100 W</td>
<td>2100 W</td>
<td>2100 W</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 / 60 Hz</td>
<td>50 / 60 Hz</td>
<td>50 / 60 Hz</td>
</tr>
<tr>
<td>IP Code</td>
<td>IP20</td>
<td>IP20</td>
<td>IP20</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>II</td>
<td>II</td>
<td>II</td>
</tr>
</tbody>
</table>
### Tap water pressure
- **EasyKjel**: 1 - 10 bar
- **BasicKjel**: 1 - 10 bar
- **MultiKjel**: 1 - 10 bar

### Tap water condition
- **EasyKjel**: 1 - 25°C
- **BasicKjel**: 1 - 25°C
- **MultiKjel**: 1 - 25°C

(If the temperature is more than 25°C use a recirculating chiller)

### Tap water consumption
- **EasyKjel**: ~ 1.2 L/min
- **BasicKjel**: ~ 1.2 L/min
- **MultiKjel**: ~ 1.2 L/min

### Approvals
- **EasyKjel**, **BasicKjel**, **MultiKjel**: CE, CSA

### Analysis specifications

<table>
<thead>
<tr>
<th></th>
<th>EasyKjel</th>
<th>BasicKjel</th>
<th>MultiKjel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range N</td>
<td>0.02 – 220 mg</td>
<td>0.02 – 220 mg</td>
<td>0.02 – 220 mg</td>
</tr>
<tr>
<td>Analysis time for 30 mg N</td>
<td>-</td>
<td>-</td>
<td>3.5 min</td>
</tr>
<tr>
<td>(With Metrohm Eco Titrator without titrator preparation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis time for 200 mg N</td>
<td>-</td>
<td>-</td>
<td>5 min</td>
</tr>
<tr>
<td>(With Metrohm Eco Titrator without titrator preparation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovery</td>
<td>N: &gt;98% with digestion process</td>
<td>N: &gt;98% with digestion process</td>
<td>N: &gt;98% with digestion process</td>
</tr>
<tr>
<td></td>
<td>N: &gt;99.5% (direct distillation)</td>
<td>N: &gt;99.5% (direct distillation)</td>
<td>N: &gt;99.5% (direct distillation)</td>
</tr>
<tr>
<td>Measurement reproducibility</td>
<td>&lt; 0.8 %</td>
<td>&lt; 0.8 %</td>
<td>&lt; 0.8 %</td>
</tr>
<tr>
<td>(Direct distillation of 1 mg N absolute and 300 sec. distillation)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Instrument specifications

<table>
<thead>
<tr>
<th></th>
<th>EasyKjel</th>
<th>BasicKjel</th>
<th>MultiKjel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillation capacity (100%)</td>
<td>~ 40 mL/min</td>
<td>~ 40 mL/min</td>
<td>~ 40 mL/min</td>
</tr>
<tr>
<td>Distillation capacity (10%)</td>
<td>~ 12.5 mL/min</td>
<td>~ 12.5 mL/min</td>
<td>~ 12.5 mL/min</td>
</tr>
<tr>
<td>Adjustable distillation power</td>
<td>10 - 100%</td>
<td>10 - 100%</td>
<td>10 - 100%</td>
</tr>
<tr>
<td>MaxAccuracy Mode (Compensation of power grid fluctuations)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Distillate reproducibility (RSD) (At 300 seconds distillation time)</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>AutoDist Mode (Automatic detection of the condensation start)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>NaOH pump</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>H₂O pump</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Acid pump</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Feature</td>
<td>EasyKjel</td>
<td>BasicKjel</td>
<td>MultiKjel</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Boric acid pump</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Sample disposal</td>
<td>No</td>
<td>Optional</td>
<td>Yes</td>
</tr>
<tr>
<td>Receiver disposal</td>
<td>No</td>
<td>No</td>
<td>Optional</td>
</tr>
<tr>
<td>Safety sensors</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Titration vessel</td>
<td>No</td>
<td>No</td>
<td>Optional</td>
</tr>
<tr>
<td>Titrator connection</td>
<td>No</td>
<td>No</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**Interface specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>EasyDist, BasicDist</th>
<th>Interface pro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>LCD color, 4.3 in</td>
<td>LCD color, 7.0 in</td>
</tr>
<tr>
<td>Control elements</td>
<td>Buttons / control knob</td>
<td>Touch-screen / control knob</td>
</tr>
<tr>
<td>Max. number of methods</td>
<td>8</td>
<td>96</td>
</tr>
<tr>
<td>Max. number of determinations</td>
<td>36</td>
<td>512</td>
</tr>
<tr>
<td>Max. number of determinations per series</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Max. number of templates</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Max. number of users</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Max. number of determination results</td>
<td>40</td>
<td>256</td>
</tr>
<tr>
<td>Language</td>
<td>en, de, fr, it, es, pt, ja, zh, ru, pl, ko, id</td>
<td>en, de, fr, it, es, pt, ja, zh, ru, pl, ko, id</td>
</tr>
</tbody>
</table>

**3.5.2 Ambient conditions**

For indoor use only.

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

**3.5.3 Materials**

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Polyurethane</td>
</tr>
<tr>
<td>Housing electric</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Steam generator housing</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Housing stirrer</td>
<td>Glass fiber reinforced polypropylene</td>
</tr>
<tr>
<td>Rear cover</td>
<td>Polyvinyl chloride</td>
</tr>
<tr>
<td>Glass parts</td>
<td>Borosilicate 3.3</td>
</tr>
</tbody>
</table>
### 3.5.4 Installation site

- The installation site meets the safety requirements. See Chapter 2 "Safety", page 10
- The installation site has a firm, level and non-slip surface.
- The installation site has no obstacles (e.g. water taps, drains, etc.).
- The installation site has enough space that the canisters can be placed safely.
- The installation site has an own mains outlet socket for the instrument.
- The installation site allows that the power supply can be disconnected at any time in an emergency.
- 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 3.5 "Technical data", page 24

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic splash protector</td>
<td>Glass fiber reinforced polypropylene</td>
</tr>
<tr>
<td>Protective cover</td>
<td>PMMA</td>
</tr>
<tr>
<td>Sealing</td>
<td>CSM</td>
</tr>
<tr>
<td>NaOH hose</td>
<td>EPDM</td>
</tr>
<tr>
<td>Three-way valve</td>
<td>PP / PE</td>
</tr>
</tbody>
</table>
4 | Transport and storage

4.1 Transport

**NOTICE**

**Risk of breakage due to incorrect transportation**

Make sure that the instrument is fully dismantled.

Pack every instrument components properly to prevent breakage. Use the original packaging whenever possible.

Avoid sharp movements during transit.

▸ After transporting, check the instrument and all glass components for damage.
▸ Damage that has occurred in transit should be reported to the carrier.
▸ Keep packaging for future transportation.

4.2 Storage

▸ Make sure that the ambient conditions are complied with (see Chapter 3.5 "Technical data", page 24).
▸ Wherever possible, store the device in its original packaging.
▸ After storage, check the device, all glass components, seals and tubing for damage and replace if necessary.

4.3 Lifting the instrument

**NOTICE**

**Dragging the instrument can damage the feet of the instrument.**

▸ Lift the instrument when positioning or re-locating.

▸ Lift the instrument at the points indicated.
5 Installation

5.1 Before installation

NOTICE

Instrument damage due to switching it on too early.
Switching on the instrument too early after transportation can cause damage.
► Climatize the instrument after transportation.

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 3.5 "Technical data", page 24

► Connect the power supply cable to the connection on the instrument. See Chapter 3.2 "Configuration", page 14
► Connect the mains plug to an own mains outlet socket.

5.3 Securing against earthquakes

The instrument has an earthquake fixing point to protect the device against falling.

► Tie the lashing mount to a fixed point using strong cord or a wire.
5.4 Installing the cooling water supply

5.4.1 Installing a tap water supply (option)

Precondition:
- The tap water supply complies with the specified parameters. See Chapter 3.5 "Technical data", page 24
- Make sure that the instrument is not connected to the power supply.

➤ Install the inlet hose to the connection marked Cooling Water / Chiller IN.

➤ Install the drain hose to the connection marked OUT Cooling Water / Chiller.

➤ Put the other end of the hose in a sink.

5.4.2 Installing the recirculating chiller on the condenser (option)

NOTE
Place the hose in the rear cable duct.

Precondition:
- The water supply complies with the tap water specifications. See Chapter 3.5 "Technical data", page 24
- Make sure that the instrument is not connected to the power supply.
- Remove the connection at the condenser inlet.
- Attach the cooling water hose from the chiller to the condenser.
5.5 Installing the drain tubing (option)

- Install the drain hose to the connection marked **Drain**.
- Place the other end of the hose in an aqueous waste container located lower than the instrument.

5.6 Installing the waste pump connection (BasicKjel, MultiKjel, MultiKjel T only)

- Attach the waste hose onto the connection marked **Pump Receiving Vessel OUT**.
- Secure the hose in place with a hose clip.

- Put the other end of the hose in a suitable collection device.
5.7 Installing the sample waste pump connection (MultiKjel T only)

- Attach the waste hose to the connection marked Pump Sample Tube OUT.
- Secure the hose in place with a hose clip.

- Put the other end of the hose in a suitable collection device.

5.8 Installing the H₂O supply for steam generation

**NOTE**

MultiKjel only

The water supply comes from one canister.

Precondition:

- ✓ The water complies with the specified parameters. See Chapter 3.5 "Technical data", page 24
- ✓ Make sure that the instrument is not connected to the power supply.
- Install the inlet hose to the connection marked H₂O Steam Gen. IN.
- Attach the inlet hose in place with a hose clip.

- Moist the aspiration hose.
- Push the hoses together.

- Attach the hose grommet to the canister lid.
 Moist the hose.
 Insert the inlet hose through the opening of the cap nut and the screw cap of the water tank.
 Submerse the inlet hose into the water.

5.9 Installing NaOH supply (MultiKjel, MultiKjel T only)

 Install the inlet hose onto the connection marked NaOH Sample Tube IN.
 Attach the inlet hose in place with a hose clip.

 Moist the aspiration hose.
 Push the hoses together.

 Attach the hose grommet to the canister lid.

 Submerse the inlet hose into the NaOH.

5.10 Installing H₂BO₃ supply (MultiKjel, MultiKjel T only)

 Install the inlet hose to the connection marked H₂BO₃ Receiving Vessel IN.
 Attach the inlet hose in place with a hose clip.
5.11 Installing the H₂O supply for the sample tube (MultiKjel, MultiKjel T only)

**NOTE**
MultiKjel only

The water supply comes from one canister.

- Install the inlet hose to the connection marked \textit{H₂O Sample Tube IN}.
- Attach the inlet hose in place with a hose clip.

- Moist the aspiration hose.
- Push the hoses together.

- Attach the hose grommet to the canister lid.
5.12 Installing the level sensor on the canister (option)

**NOTE**
Do not expose the tank level sensor to an electromagnetic field in the frequency range of 2 to 10 MHz.

- Attach the hook-and-loop fastener sticker to the sensor.

- Attach the strap to the canister.

- Fix the sensor on the canister.

- Connect the sensor cable to the related connection on the instrument. See Chapter 3.2 "Configuration", page 14

5.13 Installing a titrator with LAN (MultiKjel T with Eco Titrator only)

**Settings**

**NOTE**
Make sure, that the IP on both instruments is 192.168.10.3
5.14 Installing a titrator with RS232 (MultiKjel only)

Precondition:
☑ The dosing unit is prepared. See related documentation
☑ Attach the plug onto the connection marked Titrator (RS-232).
☑ Secure the plug in place.

Specifications on the display:

Precondition:
☑ The titrator is prepared. See related manual
☑ The instrument is connected to the LAN network.
☑ Navigate to the specified submenu.
☑ Select the specified action.
☑ Tap the specified function on the function bar.
5.15 Installing a dispenser (MultiKjel T only)

Precondition:
☑ The dosing unit is prepared. See related Documentation

- Attach the plug onto the connection marked Dosing Unit.
- Secure the plug in place.

5.16 Installing the reaction detection sensor (MultiKjel T only)

- Attach the reaction detection sensor to the instrument.

- Connect the sensor cable to the related connection on the instrument. See Chapter 3.2 "Configuration", page 14

5.17 Installing a SD card (Interface pro only)

- Insert the SD card.
- Restart the instrument.

☑ The status bar shows the SD card symbol.

5.18 Installing the level detection sensor (option)

NOTE

Using the level detection sensor. See Chapter 8.11 "Preparing the level detection sensor (option)", page 74
5.19 Installing the stirrer (MultiKjel only)

- Attach the stirrer to the receiving vessel.
- Push the cable through the rear cable duct.
- Connect the sensor cable to the related connection on the instrument. See Chapter 3.2 "Configuration", page 14
6 Description of the interface

6.1 Layout of the interface

Fig. 16: Interface

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Status bar</td>
<td>Shows the determination name and status of the instrument.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Chapter 6.4 &quot;Status bar interface&quot;, page 43</td>
</tr>
<tr>
<td>2</td>
<td>Menu bar</td>
<td>Shows symbols representing the menus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Chapter 6.3 &quot;Menu bar interface&quot;, page 40</td>
</tr>
<tr>
<td>3</td>
<td>Content area</td>
<td>Shows current settings, submenus or actions depending on the current operation.</td>
</tr>
<tr>
<td>4</td>
<td>Function bar</td>
<td>Shows functions that can be performed according to the current operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Chapter 6.2 &quot;Function bar interface&quot;, page 40</td>
</tr>
<tr>
<td>5</td>
<td>Function buttons</td>
<td>Pressing a function button performs the assigned function on the function bar.</td>
</tr>
<tr>
<td>6</td>
<td>Stop button</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Navigation control</td>
<td>Used for navigating the user interface.</td>
</tr>
</tbody>
</table>

Using the navigation control

► Select an entry.

► Confirm the selected entry.
6.2 Function bar interface

The function bar shows available functions according to the current operation. The functions on the function bar are executed by tapping the relevant function buttons.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>←</td>
<td>[Back]</td>
<td>The display reverts to the previous view.</td>
</tr>
<tr>
<td>OK</td>
<td>[Confirm]</td>
<td>Confirms an entry.</td>
</tr>
<tr>
<td>START</td>
<td>[Start]</td>
<td>Starts an extraction process.</td>
</tr>
<tr>
<td>COPY</td>
<td>[Copy]</td>
<td>Copies the selected method.</td>
</tr>
<tr>
<td>EDIT</td>
<td>[Edit]</td>
<td>Allows the selected item to be edited.</td>
</tr>
<tr>
<td>READY</td>
<td>[Ready]</td>
<td>Steam generator is ready to distill.</td>
</tr>
<tr>
<td>PREP</td>
<td>[Preparation]</td>
<td>Carries out the method selected in the [Priming] submenu. See Chapter 8.2 &quot;Editing the priming function&quot;, page 52</td>
</tr>
<tr>
<td></td>
<td>[Template]</td>
<td>Saves the selected series as a template. Creates a series from the selected template.</td>
</tr>
<tr>
<td>DELETE</td>
<td>[Delete]</td>
<td>Deletes the selected entry.</td>
</tr>
<tr>
<td>DEL ALL</td>
<td>[Delete all]</td>
<td>Deletes all entries.</td>
</tr>
<tr>
<td>STANDBY</td>
<td>[Standby]</td>
<td>The steam generator changes to standby mode.</td>
</tr>
</tbody>
</table>

6.3 Menu bar interface

<table>
<thead>
<tr>
<th>Menu symbol</th>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Home menu</td>
<td>• Process control parameters</td>
</tr>
<tr>
<td></td>
<td>Manual control menu</td>
<td>• Start various processes manually</td>
</tr>
</tbody>
</table>
|             | Process menu | • Editing and saving:  
  ◦ Methods  
  ◦ Series  
  ◦ Templates  
  ◦ Determinations |
6.3.1 Home menu

6.3.2 Manual control menu

The manual control menu contains the following submenus:

<table>
<thead>
<tr>
<th>Submenu</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose manually</td>
<td>See Chapter 8.13 &quot;Dosing manually&quot;, page 74</td>
</tr>
<tr>
<td>Aspirate manually</td>
<td>See Chapter 8.14 &quot;Aspirating manually&quot;, page 75</td>
</tr>
<tr>
<td>[Preheating]</td>
<td>See Chapter 8.1 &quot;Editing the preheating function&quot;, page 52</td>
</tr>
<tr>
<td>[Priming]</td>
<td>See Chapter 8.2 &quot;Editing the priming function&quot;, page 52</td>
</tr>
<tr>
<td>[Cleaning]</td>
<td>See Chapter 10.3 &quot;Cleaning the glass components&quot;, page 83</td>
</tr>
<tr>
<td>[Stirring]</td>
<td>See Chapter 8.15 &quot;Changing the stirring speed manually&quot;, page 76</td>
</tr>
</tbody>
</table>

6.3.3 Method menu

The method menu contains the following submenus:

<table>
<thead>
<tr>
<th>Submenu</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Single Determination]</td>
<td>See Chapter 8.3 &quot;Editing the single determination&quot;, page 52</td>
</tr>
<tr>
<td>[Series]</td>
<td>See Chapter 8.4 &quot;Editing a series&quot;, page 55</td>
</tr>
<tr>
<td>[Templates]</td>
<td>See Chapter 8.5 &quot;Editing a template&quot;, page 59</td>
</tr>
<tr>
<td>[Methods]</td>
<td>See Chapter 8.6 &quot;Editing a method&quot;, page 60</td>
</tr>
</tbody>
</table>

6.3.4 Configuration menu

**Settings submenu**

<table>
<thead>
<tr>
<th>Action</th>
<th>Option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Language]</td>
<td>Choice of display language on the interface</td>
<td>The following languages are available: English/German/French/Italian/ Spanish/Japanese/Chinese/Russian/ Polish</td>
</tr>
<tr>
<td>[Current Date]</td>
<td>Date input</td>
<td>Enter in sequence: Day, month, year. Apply the settings by pressing [Save].</td>
</tr>
<tr>
<td>Action</td>
<td>Option</td>
<td>Explanation</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>[Current Time]</td>
<td>Time input</td>
<td>Enter in sequence: Minutes, hours. Apply the settings by pressing [Save].</td>
</tr>
<tr>
<td>Time zone</td>
<td>Choice of time zone</td>
<td>Select your time zone</td>
</tr>
<tr>
<td>[Keyboard Layout]</td>
<td>Choice of display keyboard on the interface</td>
<td>Select the keyboard layout</td>
</tr>
<tr>
<td>[Key Tones]</td>
<td>Off/On</td>
<td>Setting for audible signal in response to input controls.</td>
</tr>
<tr>
<td>[Beep on Finish]</td>
<td>Off/On</td>
<td>Setting for audible signal by the end of a determination.</td>
</tr>
<tr>
<td>[Beep on Error]</td>
<td>Off/On</td>
<td>Setting for audible signal by the end of a determination.</td>
</tr>
<tr>
<td>[Display Brightness]</td>
<td>Enter setting</td>
<td>Display illumination level in %: 0 - 100</td>
</tr>
<tr>
<td>[Zero Amount Warning]</td>
<td>On/Off</td>
<td>The instrument gives a warning when the entry for the weight is zero.</td>
</tr>
<tr>
<td>[Default Amount Unit]</td>
<td>Select value</td>
<td>The following values are selectable: g, mL</td>
</tr>
<tr>
<td>[Max Accuracy Mode]</td>
<td>On / Off</td>
<td>Compensation of the steam power caused by voltage fluctuations.</td>
</tr>
<tr>
<td>[AutoDist Mode]</td>
<td>On/Off</td>
<td>Conditioning and distillation are performed automatically.</td>
</tr>
<tr>
<td>[Level Detect. Max. Time]</td>
<td>Enter value</td>
<td>The time after which the distillation stops without level detection sensor triggering.</td>
</tr>
<tr>
<td>[Pump Maintenance Interval]</td>
<td>Select value</td>
<td>Selecting a frequency to carry out a pump rinsing. See Chapter 10.20 &quot;Rinsing a pump&quot;, page 90</td>
</tr>
<tr>
<td>[H₂O Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[Acid Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[NaOH Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[Aspiration Time Receiver]</td>
<td>Select value</td>
<td>Aspiration time for the related button.</td>
</tr>
<tr>
<td>[Aspiration Time Sample Tube]</td>
<td>Select value</td>
<td>Aspiration time for the related button.</td>
</tr>
<tr>
<td>[H₃BO₃ Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[Steam Generator Standby]</td>
<td>Enter value</td>
<td>Enter the time until the instrument turns automatically into standby.</td>
</tr>
</tbody>
</table>
### Peripherals submenu
Shows information about the connected peripherals.

### Users submenu
Creating and setting users. See Chapter 8.7 "Editing user setting", page 71

### Network submenu

<table>
<thead>
<tr>
<th>Action</th>
<th>Option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Network]</td>
<td>Enter value</td>
<td>The following parameters can be edited:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Device name/MAC address/DHCP/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>System IP address/Subnet mask/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gateway/DNS server/BUCHI Cloud/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Server IP address</td>
</tr>
</tbody>
</table>

### Service submenu

**NOTE**
Only super user can carry out changes in the [Service] submenu.

### System Information submenu
Technical information about the connected devices (e.g. serial number, firmware version).

### 6.3.5 Determination data menu
Shows the history of the determination data.

### 6.4 Status bar interface
The status bar shows actual information about the instrument.

<table>
<thead>
<tr>
<th>View</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>📊</td>
<td>The instrument is in standby mode.</td>
</tr>
<tr>
<td>⏰</td>
<td>Process is running.</td>
</tr>
<tr>
<td>🔥</td>
<td>The instrument is heating up.</td>
</tr>
<tr>
<td>📤</td>
<td>The BLE dongle is connected to the instrument.</td>
</tr>
<tr>
<td>📭</td>
<td>A level detection sensor is connected to the instrument.</td>
</tr>
<tr>
<td>🐫</td>
<td>Reaction detection sensor attached.</td>
</tr>
<tr>
<td>View</td>
<td>Status</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td><img src="image" alt="Tank level sensor" /></td>
<td>A tank level sensor is connected to the instrument.</td>
</tr>
<tr>
<td><img src="image" alt="Dosing unit attached" /></td>
<td>Dosing unit attached.</td>
</tr>
<tr>
<td><img src="image" alt="Titration unit attached" /></td>
<td>Titration unit attached.</td>
</tr>
</tbody>
</table>
| ![SD card](image) | White: A SD card is in the instrument.  
Red: The SD card in the instrument is in read only mode. |
| ![USB input device](image) | A USB input device is connected. |
| ![USB memory stick](image) | A USB memory stick is connected to the instrument. |
| ![Recirculating chiller](image) | A recirculating chiller is connected. |
7 Description of the interface pro

⚠️ CAUTION

Risk of injury from glass splinters

Sharp objects can damage the display.

- Keep sharp objects away from the display.

7.1 Layout of the interface pro

![Diagram of interface pro]

Fig. 17: Interface pro

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Status bar</td>
<td>Shows the determination name and status of the instrument.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Chapter 7.4 &quot;Status bar interface pro&quot;, page 50</td>
</tr>
<tr>
<td>2</td>
<td>Menu bar</td>
<td>Shows symbols representing the menus.</td>
</tr>
<tr>
<td>3</td>
<td>Content area</td>
<td>Shows current settings, submenus or actions depending on the current operation.</td>
</tr>
<tr>
<td>4</td>
<td>Function bar</td>
<td>Shows functions that can be performed according to the current operation.</td>
</tr>
<tr>
<td>5</td>
<td>Stop button</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Navigation control</td>
<td>Used for navigating the user interface.</td>
</tr>
</tbody>
</table>
Using the navigation control

► Select an entry.

► Confirm the selected entry.

7.2 Function bar interface pro

The function bar shows available functions according to the current operation. The functions on the function bar are executed by tapping the relevant function buttons.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Back]</td>
<td>[Back]</td>
<td>The display reverts to the previous view.</td>
</tr>
<tr>
<td>[Confirm]</td>
<td>[Confirm]</td>
<td>Confirms an entry.</td>
</tr>
<tr>
<td>[Start]</td>
<td>[Start]</td>
<td>Starts an extraction process.</td>
</tr>
<tr>
<td>[Copy]</td>
<td>[Copy]</td>
<td>Copies the selected method.</td>
</tr>
<tr>
<td>[Edit]</td>
<td>[Edit]</td>
<td>Allows the selected item to be edited.</td>
</tr>
<tr>
<td>[Ready]</td>
<td>[Ready]</td>
<td>Steam generator is ready to distill.</td>
</tr>
<tr>
<td>[Preparation]</td>
<td>[Preparation]</td>
<td>Carries out the method selected in the [Priming] submenu. See Chapter 8.2 &quot;Editing the priming function&quot;, page 52</td>
</tr>
<tr>
<td>[Template]</td>
<td>[Template]</td>
<td>Saves the selected series as a template. Creates a series from the selected template.</td>
</tr>
<tr>
<td>[Delete]</td>
<td>[Delete]</td>
<td>Deletes the selected entry.</td>
</tr>
<tr>
<td>[Delete all]</td>
<td>[Delete all]</td>
<td>Deletes all entries.</td>
</tr>
<tr>
<td>[Standby]</td>
<td>[Standby]</td>
<td>The steam generator changes to standby mode.</td>
</tr>
</tbody>
</table>
7.3 Menu bar interface pro

<table>
<thead>
<tr>
<th>Menu symbol</th>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Home menu</strong></td>
<td>• Process control parameters</td>
</tr>
<tr>
<td></td>
<td><strong>Manual control menu</strong></td>
<td>• Start various processes manually</td>
</tr>
<tr>
<td></td>
<td><strong>Process menu</strong></td>
<td>• Editing and saving:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Series</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Templates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Determinations</td>
</tr>
<tr>
<td></td>
<td><strong>Configuration menu</strong></td>
<td>• Change settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Service menu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• System information</td>
</tr>
<tr>
<td></td>
<td><strong>Determination data menu</strong></td>
<td>• View processed determinations</td>
</tr>
</tbody>
</table>

7.3.1 Home menu

![Fig. 18: Home menu during a determination](image)

1. Select and shows operation mode
2. Preview of next determination
3. Short-cut to determination data of the running determination
4. Status of the determination (incl. corresponding icons)
5. Remaining time

7.3.2 Manual control menu

The manual control menu contains the following submenus:

<table>
<thead>
<tr>
<th>Submenu</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose manually</td>
<td>See Chapter 8.13 &quot;Dosing manually&quot;, page 74</td>
</tr>
<tr>
<td>Aspirate manually</td>
<td>See Chapter 8.14 &quot;Aspirating manually&quot;, page 75</td>
</tr>
</tbody>
</table>
7.3.3 Method menu

The method menu contains the following submenus:

<table>
<thead>
<tr>
<th>Submenu</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Single Determination]</td>
<td>See Chapter 8.3 &quot;Editing the single determination&quot;, page 52</td>
</tr>
<tr>
<td>[Series]</td>
<td>See Chapter 8.4 &quot;Editing a series&quot;, page 55</td>
</tr>
<tr>
<td>[Templates]</td>
<td>See Chapter 8.5 &quot;Editing a template&quot;, page 59</td>
</tr>
<tr>
<td>[Methods]</td>
<td>See Chapter 8.6 &quot;Editing a method&quot;, page 60</td>
</tr>
</tbody>
</table>

7.3.4 Configuration menu

**Settings submenu**

<table>
<thead>
<tr>
<th>Action</th>
<th>Option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Language]</td>
<td>Choice of display language on the interface</td>
<td>The following languages are available: English/German/French/Italian/Spanish/Japanese/Chinese/Russian/Polish</td>
</tr>
<tr>
<td>[Current Date]</td>
<td>Date input</td>
<td>Enter in sequence: Day, month, year. Apply the settings by pressing [Save].</td>
</tr>
<tr>
<td>[Current Time]</td>
<td>Time input</td>
<td>Enter in sequence: Minutes, hours. Apply the settings by pressing [Save].</td>
</tr>
<tr>
<td>Time zone</td>
<td>Choice of time zone</td>
<td>Select your time zone</td>
</tr>
<tr>
<td>[Keyboard Layout]</td>
<td>Choice of display keyboard on the interface</td>
<td>Select the keyboard layout</td>
</tr>
<tr>
<td>[Key Tones]</td>
<td>Off/On</td>
<td>Setting for audible signal in response to input controls.</td>
</tr>
<tr>
<td>[Beep on Finish]</td>
<td>Off/On</td>
<td>Setting for audible signal by the end of a determination.</td>
</tr>
<tr>
<td>[Beep on Error]</td>
<td>Off/On</td>
<td>Setting for audible signal by the end of a determination.</td>
</tr>
<tr>
<td>[Display Brightness]</td>
<td>Enter setting</td>
<td>Display illumination level in %: 0 - 100</td>
</tr>
<tr>
<td>[Zero Amount Warning]</td>
<td>On/Off</td>
<td>The instrument gives a warning when the entry for the weight is zero.</td>
</tr>
</tbody>
</table>
### Description of the interface pro

<table>
<thead>
<tr>
<th>Action</th>
<th>Option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Default Amount Unit]</td>
<td>Select value</td>
<td>The following values are selectable: g, mL</td>
</tr>
<tr>
<td>[MaxAccuracy Mode]</td>
<td>On / Off</td>
<td>Compensation of the steam power caused by voltage fluctuations.</td>
</tr>
<tr>
<td>[AutoDist Mode]</td>
<td>On/Off</td>
<td>Conditioning and distillation are performed automatically.</td>
</tr>
<tr>
<td>[Level Detect. Max. Time]</td>
<td>Enter value</td>
<td>The time after which the distillation stops without level detection sensor triggering.</td>
</tr>
<tr>
<td>[Pump Maintenance Interval]</td>
<td>Select value</td>
<td>Selecting a frequency to carry out a pump rinsing.</td>
</tr>
<tr>
<td>[H₂O Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[NaOH Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[Acid Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[H₃BO₃ Dosage per Keypress]</td>
<td>Enter value</td>
<td>Dosage volume which is applied by pressing the related button.</td>
</tr>
<tr>
<td>[Aspiration Time Receiver]</td>
<td>Select value</td>
<td>Aspiration time for the related button.</td>
</tr>
<tr>
<td>[Aspiration Time Sample Tube]</td>
<td>Select value</td>
<td>Aspiration time for the related button.</td>
</tr>
<tr>
<td>[Steam Generator Standby]</td>
<td>Enter value</td>
<td>Enter the time until the instrument turns automatically into standby.</td>
</tr>
<tr>
<td>[Demo Mode]</td>
<td>On/Off</td>
<td>Simulate a distillation.</td>
</tr>
<tr>
<td>[Service Data Logger]</td>
<td>On/Off</td>
<td>Saves all data on the instrument for 14 months.</td>
</tr>
<tr>
<td>[Export Device]</td>
<td>Select value</td>
<td>Select between the following data export devices: USB stick/SD card</td>
</tr>
</tbody>
</table>

#### Peripherals submenu
Shows information about the connected peripherals.

#### User administration submenu
Creating and setting users. See Chapter 8.7 "Editing user setting", page 71
Network submenu

<table>
<thead>
<tr>
<th>Action</th>
<th>Option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Network]</td>
<td>Enter value</td>
<td>The following parameters can be edited: Device name/DHCP/MAC address/ System IP address/Subnet mask/ Gateway</td>
</tr>
</tbody>
</table>

Service submenu

**NOTE**

Only super user can carry out changes in the [Service] submenu.

System Information submenu

Technical information about the connected devices (e.g. serial number, firmware version).

### 7.3.5 Determination data menu

Shows the history of the determination data.

### 7.4 Status bar interface pro

The status bar shows actual information about the instrument.

<table>
<thead>
<tr>
<th>View</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄</td>
<td>The instrument is in standby mode.</td>
</tr>
<tr>
<td>⌛</td>
<td>Process is running.</td>
</tr>
<tr>
<td>🌡️</td>
<td>The instrument is heating up.</td>
</tr>
<tr>
<td>📦</td>
<td>The BLE dongle is connected to the instrument.</td>
</tr>
<tr>
<td>🛠️</td>
<td>A level detection sensor is connected to the instrument.</td>
</tr>
<tr>
<td>🔥</td>
<td>Reaction detection sensor attached.</td>
</tr>
<tr>
<td>🛠️</td>
<td>A tank level sensor is connected to the instrument.</td>
</tr>
<tr>
<td>🏷️</td>
<td>Dosing unit attached.</td>
</tr>
<tr>
<td>🛠️</td>
<td>Titration unit attached.</td>
</tr>
<tr>
<td>🔄</td>
<td>White: A SD card is in the instrument.</td>
</tr>
<tr>
<td>🔄</td>
<td>Red: The SD card in the instrument is in read only mode.</td>
</tr>
<tr>
<td>🔄️</td>
<td>A USB input device is connected.</td>
</tr>
<tr>
<td>🔄️</td>
<td>A USB memory stick is connected to the instrument.</td>
</tr>
<tr>
<td>View</td>
<td>Status</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>🔄️</td>
<td>A recirculating chiller is connected.</td>
</tr>
</tbody>
</table>
8 Preparations for a determination

8.1 Editing the preheating function

The preheating function defines how long the instrument parts are conditioned with steam.

Specifications on the display:

- Navigate to the specified submenu.
- Select the preheating function for which you want to change the preheating time.
- Tap the specified function on the function bar.
- Enter the preheating time in seconds.
- Tap the specified function on the function bar.

The time is saved.

8.2 Editing the priming function

NOTE

The method selected in this submenu is used for preparation.

Specifications on the display:

- Navigate to the specified submenu.
- Select the method you wish to use.

The priming method is selected.

8.3 Editing the single determination

8.3.1 Changing the name of the single determination

NOTE

The name of the single determination is displayed in the \[Determination data\] menu.

Specifications on the display:
8.3.2 Selecting the determination type for a single determination

The following determination types are selectable:

<table>
<thead>
<tr>
<th>Determination type</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Blank]</td>
<td>For determinations without sample.</td>
</tr>
<tr>
<td>[Reference Substance]</td>
<td>For determinations with a defined reference sub-</td>
</tr>
<tr>
<td>[Sample]</td>
<td>For determinations with unknown sample.</td>
</tr>
</tbody>
</table>

8.3.3 Selecting the method for a single determination

Specifications on the display:

- Navigate to the specified submenu.
- Select the specified action.
- Tap the specified function on the function bar.
- Select the method you wish to use.
- Tap the specified function on the function bar.
- Select the method you wish to use.
  - The method is selected.
8.3.4 Changing the sample quantity for single determination

Specifications on the display:

- Tap the specified function on the function bar. **SAVE**

### Precondition:
- The determination type is set to [Sample]. See Chapter 8.3.2 "Selecting the determination type for a single determination", page 53

- Navigate to the specified submenu.

- Select the specified action.

- Tap the specified function on the function bar. **EDIT**

- Enter a value for the sample weight.

- Tap the specified function on the function bar. **SAVE**

The sample weight is saved.

8.3.5 Changing the unit for a single determination

The following units are available:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[g]</td>
<td>Enter the weight for the determination in gram.</td>
</tr>
<tr>
<td>[ml]</td>
<td>Enter the weight for the determination in mL.</td>
</tr>
</tbody>
</table>

Specifications on the display:

- The determination type is set to [Sample] or [Reference Substance]. See Chapter 8.3.2 "Selecting the determination type for a single determination", page 53

- Navigate to the specified submenu.

- Select the specified action. **Unit**

- Tap the specified function on the function bar. **EDIT**

- Select the unit you wish to use.

- The unit is saved.

- Tap the specified function on the function bar. **SAVE**
8.4 Editing a series

8.4.1 Creating a new series

There are two possibilities to create new series:
- Chapter "Creating a new series", page 55
- Chapter "Creating a new series from a template", page 55

Creating a new series

Specifications on the display:

- Navigate to the specified submenu.
- Tap the specified function on the function bar.
  ⇒ The new series is created.

Creating a new series from a template

Specifications on the display:

- Navigate to the specified submenu.
- Select the template from which you want to create a series.
- Tap the specified function on the function bar.
  ⇒ The series is created.

8.4.2 Changing the name of a series

Specifications on the display:

- Navigate to the specified submenu.
- Select the name of the series that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter a name for the series.
- Tap the specified function on the function bar.
  ⇒ The name is saved.
8.4.3 Adding a determination to a series

Add the first determination to a series

Specifications on the display:

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Tap the specified function on the function bar.
  ⇒ The determination is created.

Add more determinations to a series by copy existing

Specifications on the display:

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Select the determination you wish to copy.
- Tap the specified function on the function bar.
  ⇒ The determination is created.

8.4.4 Deleting a determination from a series

Specifications on the display:

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Select the determination you wish to delete.
- Tap the specified function on the function bar.
  ⇒ The determination is deleted.

8.4.5 Changing the determination name for a series

Specifications on the display:

- Navigate to the specified submenu.
Specifications on the display:

► Select the series you wish to edit. 
► Select the determination you wish to edit. 
► Select the specified action. 
► Tap the specified function on the function bar. 
► Enter the name for the single determination. 
► Tap the specified function on the function bar. 

The name for the determination is saved. 

8.4.6 Selecting the determination type within a series

The following determination types are selectable:

<table>
<thead>
<tr>
<th>Determination type</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Blank]</td>
<td>For determinations without sample.</td>
</tr>
<tr>
<td>[Reference Substance]</td>
<td>For determinations with a defined reference substance.</td>
</tr>
<tr>
<td>[Sample]</td>
<td>For determinations with unknown sample.</td>
</tr>
</tbody>
</table>

Specifications on the display:

► Navigate to the specified submenu. 
► Select the series you wish to edit. 
► Select the determination you wish to edit. 
► Select the specified action. 
► Tap the specified function on the function bar. 
► Select the determination type you wish to use. 

The determination type is selected. 

► Tap the specified function on the function bar. 

The name for the determination is saved.
8.4.7 Selecting the method for a determination within a series

Specifications on the display:

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Select the determination you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Select the determination type you wish to use.
- Tap the specified function on the function bar.

8.4.8 Changing the sample quantity for determination within a series

Specifications on the display:

Precondition:
- The determination type is set to [Sample] or [Reference Substance]. See Chapter 8.4.6 "Selecting the determination type within a series", page 57

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Select the determination you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter a value for the sample weight.
- Tap the specified function on the function bar.

8.4.9 Changing the amount unit for a determination within a series

The following units are available:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[g]</td>
<td>Enter the weight for the determination in gram. Chapter 8.3.4 &quot;Changing the sample quantity for single determination&quot;, page 54</td>
</tr>
</tbody>
</table>
Unit | Explanation
---|---
[ml] | Enter the weight for the determination in mL. See Chapter 8.3.4 "Changing the sample quantity for single determination", page 54

Specifications on the display:

Precondition:

- The determination type is set to [Sample] or [Reference Substance]. See Chapter 8.4.6 "Selecting the determination type within a series", page 57

- Navigate to the specified submenu.
- Select the series you wish to edit.
- Select the determination you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Select the determination type you wish to use.

The determination type is selected.

- Tap the specified function on the function bar.

8.5 Editing a template

8.5.1 Creating a new template

There are two possibilities to create a template:

- Chapter "Creating a new template", page 60
- Chapter "Creating a new template from an existing series", page 59

Creating a new template from an existing series

Specifications on the display:

- Navigate to the specified submenu.
- Select the series from which you want to create a template.
- Tap the specified function on the function bar.

The template is created.
8 | Preparations for a determination

Creating a new template

Specifications on the display:

- Navigate to the specified submenu.
  - Templates
- Tap the specified function on the function bar.
  - NEW

8.5.2 Changing the name of a template

Specifications on the display:

- Navigate to the specified submenu.
  - Templates
- Select the name of the template that you wish to edit.
- Select the specified action.
  - Template Name
- Tap the specified function on the function bar.
  - EDIT
- Enter a name for the template.
- Tap the specified function on the function bar.
  - SAVE

The template name is saved.

8.6 Editing a method

8.6.1 Creating a new method

Specifications on the display:

- Navigate to the specified submenu.
  - Methods
- Select a method you wish to copy.
- Tap the [Copy] function on the function bar.
  - COPY

A new method is created.

8.6.2 Deleting a method

NOTE
Default methods [Priming Method] and [Standard Method] cannot be deleted.
8.6.3 Changing the name of a method

Specifications on the display:

- Navigate to the specified submenu.

- Select the method that you wish to edit.

- Select the specified action.

- Tap the specified function on the function bar.

- Enter a name for the method.

- Tap the specified function on the function bar.

The name is saved.

8.6.4 Changing the reaction detection for a method (option for MultiKjel only)

The reaction detection sensor monitors the alkalization and doses the NaOH accordingly. The instrument switches automatically off when the alkalization is completed.

<table>
<thead>
<tr>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>Automatic alkalization during the determination.</td>
</tr>
<tr>
<td>Off</td>
<td>Enter the parameters for the alkalization manually.</td>
</tr>
</tbody>
</table>

Specifications on the display:

- Navigate to the specified submenu.
8.6.5 Changing the H₂O volume for a method (MultiKjel only)

**NOTE**

The [Reaction Detection] action is set to Off. See Chapter 8.6.4 "Changing the reaction detection for a method (option for MultiKjel only)", page 61

Manually entering the quantity of H₂O to dilute the sample.
The input values can be found in the corresponding “Application note”.

**Specifications on the display:**

- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
  - The status is changed.
- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
  - The status is changed.
- Enter the volume quantity.
- Tap the specified function on the function bar.
  - The quantity for the dosing is saved.

8.6.6 Changing the H₂SO₄ volume for a method (MultiKjel only)

**NOTE**

The [Reaction Detection] action is set to On. See Chapter 8.6.4 "Changing the reaction detection for a method (option for MultiKjel only)", page 61

Enter manually the quantity of sulfuric acid.
The value is known from the previous digestion process.

**Specifications on the display:**

- Navigate to the specified submenu.
- Select the method that you wish to edit.
Specifications on the display:

- Select the specified action.
- Tap the specified function on the function bar.
- Enter the quantity of the sulfuric acid.
- Tap the specified function on the function bar.

8.6.7 Changing the NaOH volume for a method (MultiKjel only)

NOTE
The [Reaction Detection] action is set to Off. See Chapter 8.6.4 "Changing the reaction detection for a method (option for MultiKjel only)", page 61

Enter manually the quantity of NaOH for alkalizing the sample.
For the correct quantity check related "Application note" or use the KjelOptimizer App.

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the quantity for the dosing.
- Tap the specified function on the function bar.

8.6.8 Changing the acid volume for a method (BasicKjel, MultiKjel only)

Enter manually the quantity of reagent to be dosed.

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
Specifications on the display:

- Select the specified action. [Acid Volume]

- Tap the specified function on the function bar. [EDIT]

- Enter the quantity for the dosing.

- Tap the specified function on the function bar. [SAVE]

  ⇒ The quantity for the dosing is saved.

### 8.6.9 Changing the reaction time for a method (BasicKjel, MultiKjel only)

**NOTE**
The [Reaction Detection] action is set to Off. See Chapter 8.6.4 "Changing the reaction detection for a method (option for MultiKjel only)", page 61

Specifications on the display:

- Navigate to the specified submenu. [Methods]

- Select the method that you wish to edit.

- Select the specified action. [Reaction Time]

- Tap the specified function on the function bar. [EDIT]

- Enter a value for the reaction time.

- Tap the specified function on the function bar. [SAVE]

  ⇒ The reaction time is saved.

### 8.6.10 Changing the number of steam steps for a method

Select steps to get the steam power gradually.

<table>
<thead>
<tr>
<th>Selection</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[None]</td>
<td>Steam power in % selectable. See Chapter 8.6.12 &quot;Changing the steam power for a method&quot;, page 66</td>
</tr>
</tbody>
</table>
| [2]       | Steam power in % selectable. See Chapter 8.6.12 "Changing the steam power for a method", page 66  
Duration time of the steam step selectable. See Chapter 8.6.11 "Changing the time a steam step is carried out for a method", page 65 |
Selection  Explanation

[3]  Steam power in % selectable. See Chapter 8.6.12 "Changing the steam power for a method", page 66 and

Duration time of the steam step selectable. See Chapter 8.6.11 "Changing the time a steam step is carried out for a method", page 65

Specifications on the display:

- Navigate to the specified submenu.
  - Methods
- Select the method that you wish to edit.
  - Steam Steps
- Select the specified action.
- Tap the specified function on the function bar.
  - EDIT
- Select the number of steps you wish to use.
  - SAVE

8.6.11 Changing the time a steam step is carried out for a method

NOTE
Calculating the starting time for a steam step

- Make sure that the distillation time is set longer than the calculated time for the steam steps. See Chapter 8.6.14 "Changing the distillation time for a method", page 67
- Starting time for steam step two:
  - The duration time of the first steam step.
- Starting time for steam step three:
  - The duration time of the first steam step.
  - The duration time of the second steam step.

Specifications on the display:

Precondition:
- More than one steam step is selected. See Chapter 8.6.10 "Changing the number of steam steps for a method", page 64
- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
8.6.12 Changing the steam power for a method
The steam power in % during a steam step.

Specifications on the display:
▶ Navigate to the specified submenu.
  
  Methods

▶ Select the method that you wish to edit.

▶ Select the specified action.
  Steam Power

▶ Tap the specified function on the function bar.
  EDIT

▶ Enter the level for the steam power.

▶ Tap the specified function on the function bar.
  SAVE
  ⇒ The level for the steam power is saved.

8.6.13 Changing the level detection sensor settings (option) for a method
The level detection stops the distillation when a defined distillate volume is reached.

**NOTE**
The maximum level detection time can be changed in the Settings submenu.

<table>
<thead>
<tr>
<th>Selection</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>The level detection sensor is active.</td>
</tr>
<tr>
<td>Off</td>
<td>The level detection sensor is off.</td>
</tr>
</tbody>
</table>

Specifications on the display:
▶ Navigate to the specified submenu.

  Methods

▶ Select the method that you wish to edit.
Specifications on the display:

- Select the specified action.
- Tap the specified function on the function bar. The status changed.

8.6.14 Changing the distillation time for a method

Enter manually the time for the determination.

Specifications on the display:

Precondition:
- The [Level Detection] action is set to Off. See Chapter 8.6.13 "Changing the level detection sensor settings (option) for a method", page 66

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter a value for the distillation time.
- Tap the specified function on the function bar. The distillation time is saved.

8.6.15 Changing the distillation stirring speed for a method (MultiKjel T only)

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the stirring speed.
- Tap the specified function on the function bar. The stirring speed is saved.
8.6.16 Changing the titration type for a method (MultiKjel T only)

<table>
<thead>
<tr>
<th>Titration type</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[None]</td>
<td>No titration</td>
</tr>
<tr>
<td>[Boric Acid Titration]</td>
<td>Titration</td>
</tr>
<tr>
<td>[Back Titration]</td>
<td>Back titration</td>
</tr>
</tbody>
</table>

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Select the titration type you wish to use.
- Tap the specified function on the function bar.

8.6.17 Changing the H₃BO₃ volume for a method (MultiKjel only)

NOTE

The availability depends on the selected titration type.

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the quantity for the volume.
- Tap the specified function on the function bar.

⇒ The volume is saved.
8.6.18 Changing the dosing unit volume for a method (MultiKjel T only)

**NOTE**
The availability depends on the selected titration type.

Specifications on the display:
- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the quantity for the volume.
- Tap the specified function on the function bar.

The volume is saved.

8.6.19 Changing the titration stirring speed for a method (MultiKjel T only)

**NOTE**
The availability depends on the selected titration type.

Specifications on the display:
- Precondition:
  - A titration type is activated. See
- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the stirring speed.
- Tap the specified function on the function bar.

The stirring speed is saved.

8.6.20 Changing the titration start time for a method (MultiKjel T only)

**NOTE**
The availability depends on the selected titration type.
Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter a value for the titration start time.
- Tap the specified function on the function bar.

The start time is saved.

8.6.21 Changing the aspiration time for the sample tube for a method (BasicKjel, MultiKjel, MultiKjel T only)

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter a value for the aspiration time.
- Tap the specified function on the function bar.

The aspiration time is saved.

8.6.22 Changing the aspiration time for the receiving vessel for a method (MultiKjel T only)

Specifications on the display:

- Navigate to the specified submenu.
- Select the method that you wish to edit.
- Select the specified action.
8.7 Editing user setting

**NOTE**
The user [Service User] is a default user and password protected.

### 8.7.1 Creating a new user

**Specifications on the display:**

- Tap the specified function on the function bar. [EDIT]

- Enter a value for the aspiration time.

- Tap the specified function on the function bar. [SAVE]

- The aspiration time is saved.

### 8.7.2 Deleting a user

**Specifications on the display:**

- Navigate to the specified submenu. [User Administration]

- Tap the specified function on the function bar. [NEW]

- Enter a name for the user.

- Tap the specified function on the function bar. [SAVE]

- The user is deleted.
8.7.3 Changing the name of a user

Specifications on the display:

- Navigate to the specified submenu.

- Select the user that you wish to edit.

- Tap the specified function on the function bar.

- Enter a new name for the user.

- Tap the specified function on the function bar.
  - The new name is saved.

8.7.4 Selecting a user

Specifications on the display:

- Navigate to the specified submenu.

- Select the user you wish to use.

- Tap the specified function on the function bar.
  - The user is active.
  - The user is marked up green.

8.8 Installing the sample tube

NOTE
Removing is done in reverse sequence.

Precondition:
- Make sure, that the end stop is in the correct position for the sample tube in use. See Chapter 8.10 "Preparing the end stop for the sample tube size", page 73
- Hold the sample tube with the tongs.
8.9 **Installing a receiving vessel**
- Insert the sample receiving vessel to the instrument.

8.10 **Preparing the end stop for the sample tube size**
- Pull the end stop.
- Twist the end stop.
8.11 Preparing the level detection sensor (option)

Precondition:
☑ The installations for the level sensor are completed. See Chapter 5.18 "Installing the level detection sensor (option)", page 37
▶ Attach the magnetic level sensor to the metal plate.

▶ Adjust the sensor near the sample receiving vessel.

8.12 Selecting the operation mode

Select one of the following operation modes:

<table>
<thead>
<tr>
<th>Operation mode</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Single Determination]</td>
<td>For carrying out one determination. Editing settings see Chapter 8.3 &quot;Editing the single determination&quot;, page 52</td>
</tr>
<tr>
<td>[Series]</td>
<td>For planning and carrying out a series of determinations. Editing settings see Chapter 8.4 &quot;Editing a series&quot;, page 55</td>
</tr>
</tbody>
</table>

Specifications on the display:

▶ Navigate to the specified menu.

▶ Select the specified action.

▶ Tap the specified function on the function bar.

▶ Select the operation mode according to your requirements.

▶ Tap the specified function on the function bar.

8.13 Dosing manually

8.13.1 Dosing H₂O manually

NOTE
The quantity of liquid per keystroke can be changed in the [Settings] submenu.
Precondition:
A sample tube is installed. See Chapter 8.8 "Installing the sample tube", page 72

▶ Navigate to the specified menu.

▶ Tap the specified button.

The pump applies a defined quantity of H₂O.

8.13.2 Dosing NaOH manually

NOTE
The quantity of liquid per keystroke can be changed in the [Settings] submenu.

Specifications on the display:

Precondition:
A sample tube is installed. See Chapter 8.8 "Installing the sample tube", page 72

▶ Navigate to the specified menu.

▶ Tap the specified button.

The pump applies a defined quantity of NaOH.

8.13.3 Dosing H₃BO₃ manually

NOTE
The quantity of liquid per keystroke can be changed in the [Settings] submenu.

Specifications on the display:

Precondition:
A receiving vessel is installed. See Chapter 8.9 "Installing a receiving vessel", page 73

▶ Navigate to the specified menu.

▶ Tap the specified button.

The pump applies a defined quantity of H₃BO₃.

8.14 Aspirating manually

8.14.1 Aspirating the sample tube manually

NOTE
The aspiration time per keystroke can be changed in the Settings submenu.
8.14.2 Aspirating the receiving vessel manually

**NOTE**
The aspiration time per keystroke can be changed in the *Settings* submenu.

Specifications on the display:
- Tap the specified button.
- The pump aspirates liquid from the receiving vessel.

8.15 Changing the stirring speed manually

Specifications on the display:
- Navigate to the specified submenu.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the stirring speed.
- Tap the specified function on the function bar.

⇒ The stirring speed is saved.
9 Carrying out a determination

9.1 Preparing the instrument

Navigation path

Precondition:
- All commissioning operations have been completed. See Chapter 5 "Installation", page 29
- Set the On/Off master switch to On.
  - The instrument is starting up.
- Make sure that no defective sealings or glass parts are used.
- Navigate to the Home menu according the navigation path.
- Tap the [READY] button on the function bar.
  - The instrument is heating up.
- Install a receiving vessel (EasyKjel and BasicKjel only). See Chapter 8.9 "Installing a receiving vessel", page 73
- Install the sample tube. See Chapter 8.8 "Installing the sample tube", page 72
- Close the protection shield.
- Flush the tubing. See Chapter 8.13 "Dosing manually", page 74
- Aspirate the receiving and the sample vessels. See Chapter 8.14 "Aspirating manually", page 75

9.2 Starting a determination

Navigation path

Precondition:
- The instrument is prepared. See Chapter 9.1 "Preparing the instrument", page 78
- The sample is prepared.
- The connected instruments are prepared (MultiKjel only). See related documentation.
- Navigate to the Home menu according the navigation path.
- Press the [PREP] button on the function bar.
  - Wait until the status bar shows the status READY.
- Select the operation mode. See Chapter 8.12 "Selecting the operation mode", page 74
- Tap the [START] button on the function bar.
9.3 Ending a determination

**Navigation path**

Precondition:
- The display shows the *Finished* dialog.
- Confirm the message on the dialog.

9.4 Shutting down the instrument

Precondition:
- The extraction process has ended.
- Shut down the connected instruments (MultiKjel only). See related documentation.
- Clean the instrument. See Chapter 10.3 "Cleaning the glass components", page 83
- Install an empty sample tube. See Chapter 8.8 "Installing the sample tube", page 72
- Install an empty receiving vessel (EasyKjel and BasicKjel only). See Chapter 8.9 "Installing a receiving vessel", page 73
- Set the On/Off master switch to Off.

9.5 Filtering determination data

**Specifications on the display:**

- Navigate to the specified menu.
- Select the specified action.
- Select the filter you wish to use.

9.6 Showing determination data

- Navigate to the specified submenu.
- Select the determination you wish to view.
- The display shows the data of the determination.

9.7 Deleting determination data

9.7.1 Deleting one determination

**Specifications on the display:**

- Navigate to the specified menu.
- Select the determination you wish to delete.
9.7.2 Deleting all determination data

<table>
<thead>
<tr>
<th>Specifications on the display:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Tap the specified function on the function bar. <strong>DELETE</strong></td>
</tr>
<tr>
<td>▶ Confirm the secure question. ⇒ The determination data is deleted.</td>
</tr>
</tbody>
</table>

9.8 Exporting determination data (Interface pro only)

9.8.1 Exporting one determination (Interface pro only)

<table>
<thead>
<tr>
<th>Specifications on the display:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precondition: A storage medium is available. See Chapter &quot;Settings submenu&quot;, page 48</td>
</tr>
<tr>
<td>▶ Navigate to the specified menu.</td>
</tr>
<tr>
<td>▶ Select the determination you wish to export.</td>
</tr>
<tr>
<td>▶ Tap the specified function on the function bar. <strong>EXPORT</strong></td>
</tr>
</tbody>
</table>

9.8.2 Exporting all determination data (Interface pro only)

<table>
<thead>
<tr>
<th>Specifications on the display:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Navigate to the specified menu.</td>
</tr>
<tr>
<td>▶ Tap the specified function on the function bar. <strong>EXPORT ALL</strong></td>
</tr>
</tbody>
</table>
10 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.
## 10.1 Regular maintenance work

<table>
<thead>
<tr>
<th>Action</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Yearly</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Carry out this action before every instrument use.</td>
</tr>
<tr>
<td>10.3</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Carry out this action after every instrument use.</td>
</tr>
<tr>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Replace the sample tube seal twice per year</td>
</tr>
<tr>
<td>10.6</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Replace the glass splash protector after ~ 3500 distillations (twice per year). Replace the plastic splash protector once in 2 years.</td>
</tr>
<tr>
<td>10.7</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Replace the tube once per year.</td>
</tr>
<tr>
<td>10.8</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.10</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Replace the bridge once per year.</td>
</tr>
<tr>
<td>10.11</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Replace the NaOH pump once per year</td>
</tr>
<tr>
<td>10.12</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.13</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.14.1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.14.2</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.14.3</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.14.4</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.15</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

1 - User; 2 - Operator

### 10.2 Cleaning and servicing the sample tube

- Before using, check the sample tube for defects (cracks/splintering).
- Prevent temperature shocks on the sample tubes.
  - Temperature shocks may lead to breakage.
Cleaning
If cleaning with a dishwashing machine:
- Make sure, that there is no contact with other glassware.

Storage (e.g. drawer)
- Prevent rolling and small hits.
  ⇒ This can cause hair cracks which may lead to breakages.

10.3 Cleaning the glass components
The following values for the cleaning can be adjusted (the list differs according to the instrument configuration):
- [H₂O Volume]
- [Steam Power]
- [Distillation Time]
- [Sample Tube Aspiration]
- [Receiver Aspiration]

Specifications on the display:

Precondition:
- A sample tube is installed. See Chapter 8.8 "Installing the sample tube", page 72
- A sample receiving vessel is installed. See Chapter 8.9 "Installing a receiving vessel", page 73

- Navigate to the specified submenu.
- Adjust the values according to your needs.
- Confirm the entries with the specified function in the function bar.
- Tap the specified function on the function bar.

10.4 Cleaning and servicing the hoses and hose connections
- Check the hoses and hose connections for defects (cracks, brittle areas).
- If defective, replace the hoses.

10.5 Cleaning and servicing the sample tube seal
- Check the seal for the following damage that may cause leakage:
  - Deterioration (surface roughness)
  - Deformation (rubber shape)
  - Residues (dirt, white crystals)
- Rinse the seal with water.
10.6 Cleaning and servicing the splash protector
▶ Check for leaks on the connectors.
▶ Check for residues inside the splash protector.
▶ Check the glass wall of the main body and the connectors.
⇒ If the part is dirty, clean it with detergents.
⇒ If the glass part is showing deterioration (transparency loss/rems in the glass wall) or leakages (white residues), replace it.

10.7 Cleaning and servicing the steam inlet and condenser outlet tube
▶ Check the tubes concerning dirt or residues.
▶ Clean and replace periodically depending on the use.

10.8 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.

10.9 Cleaning and servicing the warning and directive symbols
▶ Check that the warning symbols on the instrument are legible.
▶ If they are dirty, clean them.

10.10 Cleaning and servicing the bridge splash protector to condenser
▶ Check if it is tight.
▶ Check for residues inside the tube.
▶ If necessary, clean it with a brush and water.

10.11 Cleaning and servicing the dosing pumps
▶ Check the pump connectors in the dosing pump window for:
  • Leakages
  • Crystallization
▶ If necessary, contact BUCHI customer service.

10.12 Cleaning and servicing the condenser

Decalcification solution:
160 g citric acid or 80 g amidosulfuric acid dissolved in 0.8 L water.
▶ Check if the cooling media of the condenser is transparent.
Check if the inside of the coil is showing condensation droplets.

- If droplets appear:
  - Flush the condenser coil through the condensate expansion vessel with an 1% hydrochloric acid.
  - Flush the condenser coil through the condensate expansion vessel with water and water/ethanol mixture.
- Clean the condenser on the outside of the coil (water connectors) with decalcification solution to remove chalk, algae, and rust.

### 10.13 Cleaning and servicing the steam generator

- Check the distillation volume.

- If the condensate amount is less than 160 mL water/per 5 minutes distillation (after preheating), decalcify the instrument. See Chapter 10.15 "Decalcifying the instrument", page 87

### 10.14 Calibrating the pumps

#### 10.14.1 Calibrating the H₂O pump

<table>
<thead>
<tr>
<th>Specifications on the display:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifications on the display:</td>
</tr>
<tr>
<td>Precondition:</td>
</tr>
<tr>
<td>- A sample tube is installed. See Chapter 8.8 &quot;Installing the sample tube&quot;, page 72</td>
</tr>
<tr>
<td>- Navigate to the specified submenu.</td>
</tr>
<tr>
<td>Select the specified action.</td>
</tr>
<tr>
<td>- Pump Calibration</td>
</tr>
<tr>
<td>- H₂O</td>
</tr>
<tr>
<td>Tap the specified function on the function bar.</td>
</tr>
<tr>
<td>Edit</td>
</tr>
<tr>
<td>Enter the calibration volume you wish to use.</td>
</tr>
<tr>
<td>- Nominal Volume</td>
</tr>
<tr>
<td>Tap the specified function on the function bar.</td>
</tr>
<tr>
<td>Start</td>
</tr>
<tr>
<td>Wait until the display shows a numeric dialog.</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>Remove the sample tube.</td>
</tr>
<tr>
<td>Measure the volume in the sample tube.</td>
</tr>
<tr>
<td>Enter the value in the numeric dialog.</td>
</tr>
<tr>
<td>Tap the specified function on the function bar.</td>
</tr>
<tr>
<td>Save</td>
</tr>
</tbody>
</table>
10.14. **Calibrating the acid pump**

2

Specifications on the display:

Precondition:
- A sample tube is installed. See Chapter 8.9 "Installing a receiving vessel", page 73
- Navigate to the specified submenu.
- Select the specified action.
- Tap the specified function on the function bar.
- Wait until the display shows a numeric dialog.
- Remove the sample tube.
- Measure the volume in the sample tube.
- Enter the value in the numeric dialog.
- Tap the specified function on the function bar.

10.14. **Calibrating the NaOH pump**

3

Specifications on the display:

Precondition:
- A sample tube is installed. See Chapter 8.9 "Installing a receiving vessel", page 73
- Navigate to the specified submenu.
- Select the specified action.
- Tap the specified function on the function bar.
- Enter the calibration volume you wish to use.
- Wait until the display shows a numeric dialog.
- Remove the sample tube.
- Measure the volume in the sample tube.
- Enter the value in the numeric dialog.
- Tap the specified function on the function bar.
10.14. **Calibrating the H₃BO₃ Pump**

**Specifications on the display:**

- Precondition:
  - A receiving vessel is installed. See Chapter 8.9 "Installing a receiving vessel", page 73
  - Navigate to the specified submenu.

- Select the specified action.

- Tap the specified function on the function bar.

- Enter the calibration volume you wish to use.

- Tap the specified function on the function bar.

- Wait until the display shows a numeric dialog.

- Remove the sample receiving vessel.

- Measure the volume in the sample receiving vessel.

- Enter the measured volume.

- Tap the specified function on the function bar.

10.15 **Decalcifying the instrument**

**Time required:** approximately 2.5 hours

**Decalcification solution:**

160 g citric acid or 80 g amidosulfuric acid dissolved in 0.8 L water.

- Precondition:
  - The instrument temperature is the same as the ambient temperature.

- Remove the water from the instrument. See Chapter 12.4 "Removing water from the steam generator", page 98

- Prepare the decalcification solution.

- Install a suitable hose to the H₂O supply for steam generation.

- Put the other end of the hose in the decalcification solution.

- Set the On/Off master switch to On.

- Press the [READY] button on the function bar.

- Wait until the pumps stop working.

- Set the On/Off master switch to Off.

- Wait 30 minutes.
Remove the decalcification solution from the instrument. See Chapter 12.4 "Removing water from the steam generator", page 98
Do steps (5) thru (10) again.
Install the H₂O supply for steam generation.
Set the On/Off master switch to On.
Press the [READY] button on the function bar.
Wait until the pumps stop working.
Set the On/Off master switch to Off.
Remove the water from the instrument. See Chapter 12.4 "Removing water from the steam generator", page 98
Do steps (11) thru (16) five times.

10.16Replacing the splash protector

NOTE
Installing is done in reverse sequence.

Remove the protection shield. See Chapter 10.18 "Attaching and removing the protection shield", page 89
Loosen the cap nut at the splash protector.

Open the splash protector nut.

Remove the splash protector.

Remove the steam connection.
Remove the NaOH/acid connection (according to the instrument configuration).
10.17 Replacing the condenser

**NOTE**
Installing is done in reverse sequence.

- Remove the protection shield. See Chapter 10.18 "Attaching and removing the protection shield", page 89
- Loosen the cap nut at the condenser.
- Remove the cooling water hoses.
- Remove the rubber band.

10.18 Attaching and removing the protection shield

10.18. Removing the protection shield

1. Pull the protection shield from the instrument.
10.18. Attaching the protection shield

Attach the protection shield onto the instrument.

10.19. Cleaning the drip tray

Pull the drip tray.
Rinse the drip tray with water.

10.20. Rinsing a pump

Precondition:
A sample tube is installed. See Chapter 8.8 "Installing the sample tube", page 72
Put the side of the hose in distilled water.
Apply 100 mL with the manual functions. See Chapter 8.13 "Dosing manually", page 74

10.21. Replacing the sample tube seal

NOTE
Installing is done in reverse sequence.

NOTE
Make the seal moist with water before installation.

Remove the protection shield. See Chapter 10.18.1 "Removing the protection shield", page 89
Loosen the cap nut.
- Open the splash protector nut.

- Remove the splash protector.

- Remove the seal.
# 11 Help with faults

## 11.1 Troubleshooting digestion

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystallization after digestion</td>
<td>False ratio of $\text{H}_2\text{SO}_4$ to catalyst.</td>
<td>▶ Use KjelOptimizer software to optimize the digestion (download available on BUCHI website).</td>
</tr>
<tr>
<td>Digestion time too long.</td>
<td></td>
<td>▶ Decrease digestion time. ▶ Compare to conditions to similar applications.</td>
</tr>
<tr>
<td>Suction capacity of scrubber too strong.</td>
<td></td>
<td>▶ Lower the suction capacity on the scrubber. See &quot;Scrubber&quot; operation manual</td>
</tr>
<tr>
<td>Samples do not get clear</td>
<td>No or not enough catalyst used.</td>
<td>▶ Use KjelOptimizer software to optimize the digestion (download available on BUCHI website).</td>
</tr>
<tr>
<td>Digestion temperature is too low.</td>
<td></td>
<td>▶ Decrease digestion time. ▶ Compare to conditions to similar applications.</td>
</tr>
<tr>
<td>Temperature is too high.</td>
<td></td>
<td>▶ Decrease digestion temperature.</td>
</tr>
<tr>
<td>Sealing material was flushed into the sample.</td>
<td></td>
<td>▶ Check the sealing.</td>
</tr>
<tr>
<td>Fume leakage</td>
<td>The seals are defective.</td>
<td>▶ Replace the seals.</td>
</tr>
<tr>
<td>Suction capacity of scrubber is too weak.</td>
<td></td>
<td>▶ Carry out the scrubber maintenance. See &quot;Scrubber&quot; operation manual</td>
</tr>
<tr>
<td>Leakage in the system, e.g. hose connector not tight.</td>
<td></td>
<td>▶ Check connections between digester and scrubber.</td>
</tr>
<tr>
<td>Blocked hoses.</td>
<td></td>
<td>▶ Clean the hoses.</td>
</tr>
<tr>
<td>Reduced suction on the bypass valve.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiling retardation/bumping/foaming</td>
<td>Missing digestion rods or boiling stones.</td>
<td>▶ Add boiling rods during digestion.</td>
</tr>
<tr>
<td></td>
<td>Missing antifoam tablet or other anti-foaming agent.</td>
<td>▶ Add antifoam tablet.</td>
</tr>
</tbody>
</table>
### 11.2 Troubleshooting distillation

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples do not get dark blue/brown after addition of NaOH</td>
<td>Air in NaOH hose.</td>
<td>▶ Flush the system. See Chapter 8.13 &quot;Dosing manually&quot;, page 74</td>
</tr>
<tr>
<td>No catalyst used for digestion (only H₂O₂ or Kjeldahl tablets ECO).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splashing during distillation or addition of chemicals</td>
<td>The sample tube is too small.</td>
<td>▶ Select a bigger sample tube.</td>
</tr>
<tr>
<td></td>
<td>Sample volume too high.</td>
<td>▶ Lower sample volume.</td>
</tr>
<tr>
<td></td>
<td>Amount of water used for dilution is too low.</td>
<td>▶ Increase dilution volume.</td>
</tr>
<tr>
<td>Measured nitrogen content is too high</td>
<td>Air in titration system, burette or tubes.</td>
<td>▶ Tighten the connections. ▶ Flush the tubing with titrant. ▶ Refill burette.</td>
</tr>
<tr>
<td></td>
<td>Carry over during distillation.</td>
<td>▶ Insert less sample. ▶ Avoid big concentration differences in measurement series.</td>
</tr>
<tr>
<td></td>
<td>Titrant concentration too high.</td>
<td>▶ Lower the titrant concentration.</td>
</tr>
<tr>
<td></td>
<td>Error in calculation.</td>
<td>▶ Check calculation. ▶ Check titration parameters. ▶ Check the titer for the titrant in use.</td>
</tr>
<tr>
<td></td>
<td>pH electrode is defective.</td>
<td>▶ Maintain electrode. See related documentation ▶ If necessary, replace it.</td>
</tr>
<tr>
<td></td>
<td>The glassware is dirty.</td>
<td>▶ Clean the glassware. See Chapter 10.2 &quot;Cleaning and servicing the sample tube&quot;, page 82</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Measured nitrogen content is too low</td>
<td>Incomplete digestion.</td>
<td>▶ Increase digestion time. ▶ Use different Kjeldahl tablet.</td>
</tr>
<tr>
<td></td>
<td>The H₂SO₄ volume is too low.</td>
<td>▶ Use KjelOptimizer software to optimize the digestion (download available on BUCHI website).</td>
</tr>
<tr>
<td></td>
<td>Kjeldahl Tablets and H₂SO₄ in wrong ratio.</td>
<td>▶ Correct ratio of Kjeldahl Tablets and H₂SO₄. ▶ Use KjelOptimizer software to optimize the digestion (download available on BUCHI website).</td>
</tr>
<tr>
<td></td>
<td>Nitrogen content per sample tube is too high.</td>
<td>▶ Not apply more than 200 mg Nitrogen per sample tube. ▶ Use KjelOptimizer software to optimize the digestion (download available on BUCHI website).</td>
</tr>
<tr>
<td></td>
<td>Not enough NaOH or incorrect concentration of NaOH used (required is 32 %)</td>
<td>▶ Correct volume for complete alkalization of the digested sample.</td>
</tr>
<tr>
<td></td>
<td>Leakage during distillation.</td>
<td>▶ Check connection between condenser and splash protector. ▶ Tighten the connection. ▶ If necessary, replace it.</td>
</tr>
<tr>
<td></td>
<td>Titrant solution</td>
<td>▶ Check titer of titrant.</td>
</tr>
<tr>
<td></td>
<td>pH electrode is defective.</td>
<td>▶ Maintain electrode. See related documentation ▶ If necessary, replace it.</td>
</tr>
<tr>
<td></td>
<td>The glassware is dirty.</td>
<td>▶ Clean the glassware. See Chapter 10.2 &quot;Cleaning and servicing the sample tube&quot;, page 82</td>
</tr>
<tr>
<td></td>
<td>Incorrect weighing.</td>
<td>▶ Use weighing boats (easy sample transfer from balance to sample tube). ▶ Use anti-static equipment. ▶ Use larger sample sizes.</td>
</tr>
</tbody>
</table>
# 11.3 Troubleshooting instrument

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The instrument does not work</td>
<td>The installation site has no power supply.</td>
<td>▶ Check the power supply of the installation site.</td>
</tr>
<tr>
<td></td>
<td>The instrument is not connected to the power supply.</td>
<td>▶ Connect the instrument to the power supply. See Chapter 5.2 &quot;Establishing electrical connections&quot;, page 29</td>
</tr>
<tr>
<td></td>
<td>The power supply cable is defect.</td>
<td>▶ Replace the power supply cable.</td>
</tr>
<tr>
<td></td>
<td>The fuse was triggered.</td>
<td>▶ Reset the fuse</td>
</tr>
<tr>
<td></td>
<td>The switch is defect.</td>
<td>▶ Contact BUCHI Customer Service.</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor repeatability</td>
<td>Air bubbles in titration system, burette, tubes.</td>
<td>▶ Tighten the connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Flush the tubing with titrant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Refill burette.</td>
</tr>
<tr>
<td>Aspiration not working properly</td>
<td></td>
<td>▶ Check for leaks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Tighten the connections.</td>
</tr>
<tr>
<td>Sample is inhomogeneous</td>
<td></td>
<td>▶ Homogenize the sample.</td>
</tr>
<tr>
<td>Sample weighing problems.</td>
<td></td>
<td>▶ Use weighing boats (easy sample transfer from balance to sample tube).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Use anti-static equipment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ To decrease the degree of error, keep the weighed sample portion as high as possible.</td>
</tr>
<tr>
<td>Incomplete digestion, digestion time too short</td>
<td></td>
<td>▶ Choose digestion time accordingly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check color of samples during digestion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⇒ Solution should be transparent by the end of the digestion.</td>
</tr>
<tr>
<td>Stirrer is defective.</td>
<td></td>
<td>▶ Clean the stirrer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ If necessary, replace the stirrer.</td>
</tr>
<tr>
<td>Loose contact of the sensor cables</td>
<td></td>
<td>▶ Check the sensor cables.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Steam generator is not reaching the status <strong>Ready</strong></td>
<td>Not enough water in the steam generator.</td>
<td>▶ Make sure, that the installation H₂O supply for steam generation is correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Make sure, that there is enough water in the canister.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Make sure, that the hose is submerged in the water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check for leaks between instrument and canister.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check water level status in the steam generator.</td>
</tr>
<tr>
<td>Display is black</td>
<td>The connection between instrument and display is interrupted.</td>
<td>▶ Check the connection cable from the instrument to the display.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Contact BUCHI Customer Service.</td>
</tr>
<tr>
<td>No cooling water flow</td>
<td>The cooling water supply is blocked.</td>
<td>▶ Make sure, that the hoses are not bend.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check for leaks between instrument and cooling water source.</td>
</tr>
<tr>
<td></td>
<td>Water flow sensor blocked.</td>
<td>▶ Clean the hoses.</td>
</tr>
<tr>
<td>Dosing pump is not feeding</td>
<td>Not enough liquid for feeding.</td>
<td>▶ Make sure, that the installation is correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Make sure, that there is enough liquid in the canister.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Make sure, that the hose is submerged in the liquid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check for leaks between instrument and canister.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Make sure that liquid is inside the pump.</td>
</tr>
<tr>
<td>Aspiration is not working</td>
<td>Leaks</td>
<td>▶ Check the hoses connected with the pump for leaks and deterioration.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Check if the wheel inside the pump is turning.</td>
</tr>
<tr>
<td></td>
<td>The aspiration pump is defect.</td>
<td>▶ Contact BUCHI Customer Service.</td>
</tr>
</tbody>
</table>
11.4 Turning the splash protector nut

Turn the splash protector nut.
12 Taking out of service and disposal

12.1 Taking out of service

▲ Rinse all pumps. See Chapter 10.20 "Rinsing a pump", page 90
▲ Remove the water from the steam generator. See Chapter 12.4 "Removing water from the steam generator", page 98
▲ Remove all reagents and coolants.
▲ Clean the instrument.
▲ Set the On/Off master switch to Off.
▲ Disconnect the power supply.
▲ Remove all tubing and cables from the instrument.

12.2 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 3.5 "Technical data", page 24

12.3 Returning the instrument

Before returning the instrument, contact the BÜCHI Labortechnik AG Service Department.
https://www.buchi.com/contact

12.4 Removing water from the steam generator

Precondition:
☑ The On / Off master switch is set to Off.
▲ Install a drain hose to the connection marked Steam Generator OUT.
▲ Put the other end of the hose in a sink.

▲ Open the valve.
## 13 Appendix

### 13.1 Spare parts and accessories

#### 13.1.1 Accessories

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction detection sensor</td>
<td>11072666</td>
<td><img src="image1.png" alt="Reaction Detection Sensor" /></td>
</tr>
<tr>
<td>OnLevel sensor</td>
<td>11070270</td>
<td><img src="image2.png" alt="OnLevel Sensor" /></td>
</tr>
<tr>
<td>Tank level sensor kit</td>
<td>11072294</td>
<td><img src="image3.png" alt="Tank Level Sensor Kit" /></td>
</tr>
<tr>
<td>Eco Titrator</td>
<td>11072748</td>
<td><img src="image4.png" alt="Eco Titrator" /></td>
</tr>
<tr>
<td>StatusLight cpl., incl. communication cable</td>
<td>11068959</td>
<td><img src="image5.png" alt="StatusLight" /></td>
</tr>
<tr>
<td>Indicates the status of the instrument (instrument is ready to use, has an error or is in operation).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUCHI Bluetooth® Dongle, connects instrument to smartphone via Bluetooth®</td>
<td>11067770</td>
<td><img src="image6.png" alt="BUCHI Bluetooth® Dongle" /></td>
</tr>
<tr>
<td>Adapter for 3rd party sample tubes</td>
<td>11072398</td>
<td><img src="image7.png" alt="Adapter for 3rd party sample tubes" /></td>
</tr>
<tr>
<td>Sample tube holder (4x 500 mL tubes)</td>
<td>016951</td>
<td><img src="image8.png" alt="Sample Tube Holder (4x 500 mL tubes)" /></td>
</tr>
<tr>
<td>Sample tube holder (6 x 300 mL tubes)</td>
<td>043039</td>
<td><img src="image9.png" alt="Sample Tube Holder (6 x 300 mL tubes)" /></td>
</tr>
<tr>
<td>Sample tube holder (12 x 300 mL tubes)</td>
<td>043041</td>
<td><img src="image10.png" alt="Sample Tube Holder (12 x 300 mL tubes)" /></td>
</tr>
<tr>
<td>SO₂ absorption glass set</td>
<td>11073599</td>
<td><img src="image11.png" alt="SO₂ Absorption Glass Set" /></td>
</tr>
<tr>
<td><strong>Cyanide caps</strong></td>
<td>11067871</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Caps for hermetical closing of all types of Kjeldahl sample tubes during sample preparation for cyanide in food</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Communication cable RJ45, 2 m</strong></th>
<th>044989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection between vacuum controller/interface and recirculating chiller, vacuum controller/interface and vacuum pump or steam distillation unit and Eco titrator.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Dispenser unit Titronic 300</strong></th>
<th>11062956</th>
</tr>
</thead>
</table>

### 13.1.2 Splash protector spare parts

<table>
<thead>
<tr>
<th><strong>Order no.</strong></th>
<th><strong>Image</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glass splash protector</strong></td>
<td>11071013</td>
</tr>
<tr>
<td><strong>Plastic splash protector</strong></td>
<td>11070670</td>
</tr>
<tr>
<td><strong>Devarda splash protector</strong></td>
<td>11071014</td>
</tr>
<tr>
<td><strong>Sealing sample tube to splash protector</strong></td>
<td>043068</td>
</tr>
<tr>
<td><strong>Steam inlet tubing to sample tube</strong></td>
<td>043424</td>
</tr>
<tr>
<td><strong>Steam inlet tubing to sample tube (750 mL)</strong></td>
<td>043119</td>
</tr>
<tr>
<td><strong>Connecting piece</strong></td>
<td>019002</td>
</tr>
<tr>
<td><strong>Bridge splash protector to condenser</strong></td>
<td>11070620</td>
</tr>
</tbody>
</table>
### 13.1.3 Tank spare parts

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap Set, 10 L tank</td>
<td>11072173</td>
</tr>
<tr>
<td>Canister 10L thin walled</td>
<td>043410</td>
</tr>
<tr>
<td>Cap Set, 20 L tank</td>
<td>11072174</td>
</tr>
<tr>
<td>Canister 20L</td>
<td>043408</td>
</tr>
<tr>
<td>Tank labels</td>
<td>043434</td>
</tr>
</tbody>
</table>

### 13.1.4 Condenser spare parts

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condenser with check valve</td>
<td>11072183</td>
</tr>
<tr>
<td>Clamp for condenser</td>
<td>11066868</td>
</tr>
<tr>
<td>Rubber band</td>
<td>11070669</td>
</tr>
<tr>
<td>Check valve</td>
<td>11071740</td>
</tr>
</tbody>
</table>
### 13.1.5 Titration spare parts

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dist. Outlet PTFE L=300</td>
<td>11071940</td>
<td><img src="image1" alt="Dist. Outlet PTFE L=300" /></td>
</tr>
<tr>
<td>Receiving vessel</td>
<td>043390</td>
<td><img src="image2" alt="Receiving vessel" /></td>
</tr>
<tr>
<td>Stirrer cpl.</td>
<td>11070246</td>
<td><img src="image3" alt="Stirrer cpl." /></td>
</tr>
<tr>
<td>pH electrode (refillable electrolyte)</td>
<td>11065834</td>
<td><img src="image4" alt="pH electrode" /></td>
</tr>
<tr>
<td>pH Electrode</td>
<td>11056842</td>
<td><img src="image5" alt="pH Electrode" /></td>
</tr>
<tr>
<td>Clamp cone pH-electrode</td>
<td>11069793</td>
<td><img src="image6" alt="Clamp cone pH-electrode" /></td>
</tr>
<tr>
<td>Hose Tygon Ø 8.0 x 4.8</td>
<td>043364</td>
<td><img src="image7" alt="Hose Tygon Ø 8.0 x 4.8" /></td>
</tr>
<tr>
<td>Receiving support</td>
<td>11071003</td>
<td><img src="image8" alt="Receiving support" /></td>
</tr>
<tr>
<td>Dist. Outlet PTFE L=212</td>
<td>11071941</td>
<td><img src="image9" alt="Dist. Outlet PTFE L=212" /></td>
</tr>
<tr>
<td>Aspiration tubing receiving vessel</td>
<td>11072589</td>
<td><img src="image10" alt="Aspiration tubing receiving vessel" /></td>
</tr>
<tr>
<td>H₃BO₃ tubing receiving vessel</td>
<td>11072637</td>
<td><img src="image11" alt="H₃BO₃ tubing receiving vessel" /></td>
</tr>
</tbody>
</table>
### 13.1.6 Sample tubes

<table>
<thead>
<tr>
<th>Description</th>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample tubes micro (100 mL)</td>
<td>11057442</td>
<td><img src="sample_tube_micro.png" alt="Image" /></td>
</tr>
<tr>
<td>Sample tubes 300 mL</td>
<td>11059690</td>
<td><img src="sample_tube_300ml.png" alt="Image" /></td>
</tr>
<tr>
<td>Sample tubes 300 mL</td>
<td>037377</td>
<td><img src="sample_tube_300ml.png" alt="Image" /></td>
</tr>
<tr>
<td>For sample volumes up to 200 mL or 5 g in weight</td>
<td>4 pcs.</td>
<td></td>
</tr>
<tr>
<td>Sample tubes graduated 300 mL</td>
<td>043049</td>
<td><img src="sample_tube_graduated.png" alt="Image" /></td>
</tr>
<tr>
<td>Sample tube 500 mL</td>
<td>026128</td>
<td><img src="sample_tube_500ml.png" alt="Image" /></td>
</tr>
<tr>
<td>Sample tubes 500 mL</td>
<td>043982</td>
<td><img src="sample_tube_500ml.png" alt="Image" /></td>
</tr>
<tr>
<td>Sample tube 750 mL including suction tube</td>
<td>11058999</td>
<td><img src="sample_tube_750ml.png" alt="Image" /></td>
</tr>
</tbody>
</table>

### 13.1.7 Cable and tubing

<table>
<thead>
<tr>
<th>Description</th>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose peristaltic pump out (2.5 m)</td>
<td>11071630</td>
<td><img src="hose_peristaltic.png" alt="Image" /></td>
</tr>
<tr>
<td>Hose clips peristaltic pump hose</td>
<td>043586</td>
<td><img src="hose_clips.png" alt="Image" /></td>
</tr>
<tr>
<td>Hose to NaOH/ H₂O/H₃BO₃ pumps or drain (2 m)</td>
<td>11072687</td>
<td><img src="hose_to_drain.png" alt="Image" /></td>
</tr>
<tr>
<td>Hose clip to NaOH/H₂O/ H₃BO₃ pumps or drain</td>
<td>043841</td>
<td><img src="hose_clip.png" alt="Image" /></td>
</tr>
<tr>
<td>Suction to tube tank (0.58 m)</td>
<td>043407</td>
<td><img src="suction_tube.png" alt="Image" /></td>
</tr>
<tr>
<td>Tap water hose cpl.</td>
<td>037780</td>
<td><img src="tap_water_hose.png" alt="Image" /></td>
</tr>
<tr>
<td>Cable to Metrohm Titrino Plus 877/848 titrator</td>
<td>11055333</td>
<td><img src="cable_to_titrino.png" alt="Image" /></td>
</tr>
<tr>
<td>Set of sealings tap water hose</td>
<td>040043</td>
<td><img src="set_of_sealings.png" alt="Image" /></td>
</tr>
<tr>
<td>Cable to SI-Analytics TitroLine Easy and TitroLine 5000 titrator</td>
<td>043618</td>
<td><img src="cable_to_titroline.png" alt="Image" /></td>
</tr>
</tbody>
</table>
### 13.1.8 Other spare parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap RJ-45 cap</td>
<td>11055949</td>
<td><img src="image1.png" alt="Cap RJ-45 cap" /></td>
</tr>
<tr>
<td>USB cover</td>
<td>11069375</td>
<td><img src="image2.png" alt="USB cover" /></td>
</tr>
<tr>
<td>Level sensor capacitive</td>
<td>11065245</td>
<td><img src="image3.png" alt="Level sensor capacitive" /></td>
</tr>
<tr>
<td>Tank level sensor (Velcro point)</td>
<td>11070517</td>
<td><img src="image4.png" alt="Tank level sensor (Velcro point)" /></td>
</tr>
<tr>
<td>Tank level sensor (Velcro strap)</td>
<td>11070516</td>
<td><img src="image5.png" alt="Tank level sensor (Velcro strap)" /></td>
</tr>
<tr>
<td>Silicone hose D6/9 L=3 m</td>
<td>048355</td>
<td><img src="image6.png" alt="Silicone hose D6/9 L=3 m" /></td>
</tr>
<tr>
<td>Collecting pan</td>
<td>11066465</td>
<td><img src="image7.png" alt="Collecting pan" /></td>
</tr>
<tr>
<td>Pair of glass tongs</td>
<td>002004</td>
<td><img src="image8.png" alt="Pair of glass tongs" /></td>
</tr>
</tbody>
</table>

### 13.1.9 Consumables

<table>
<thead>
<tr>
<th>Item</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L</td>
<td>11064972</td>
</tr>
<tr>
<td>4% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L</td>
<td>11064973</td>
</tr>
<tr>
<td>4% boric acid pH 4.65 +/- 0.15 with bromocresol green / methyl red mixed indicator, 5 L</td>
<td>11064976</td>
</tr>
<tr>
<td>Sher indicator 100 mL</td>
<td>003512</td>
</tr>
<tr>
<td>Ammonium phosphate monobasic, 25 g</td>
<td>045527</td>
</tr>
</tbody>
</table>

### 13.1.10 Maintenance kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Kit for Kjel Line</td>
<td>11073024</td>
</tr>
</tbody>
</table>

### 13.1.11 Upgrade kits

<table>
<thead>
<tr>
<th>Item</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade Basic base unit with aspiration pump</td>
<td>11CSN12157</td>
</tr>
<tr>
<td>Upgrade Basic base unit and aspiration pump with I-300 Pro</td>
<td>11CSN12158</td>
</tr>
<tr>
<td>Upgrade Basic base unit with aspiration pump and I-300 Pro</td>
<td>11CSN12159</td>
</tr>
</tbody>
</table>
### 13.1.1 Documentation

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade Multi base unit with titration vessel</td>
<td>11CSN12160</td>
</tr>
<tr>
<td>Upgrade MultiKjel to MultiDist</td>
<td>11CSN12161</td>
</tr>
<tr>
<td>IQ/OQ Kit Kjel Line</td>
<td>11073604</td>
</tr>
<tr>
<td>Repeating OQ Kjel Line</td>
<td>11073605</td>
</tr>
<tr>
<td>Kjeldahl Knowledge Base (EN)</td>
<td>11595478</td>
</tr>
<tr>
<td>Comprehensive guide covering all aspects of the theoretical and practical know-how.</td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Practice Guide (EN)</td>
<td>11592548</td>
</tr>
<tr>
<td>Provides theoretical background information, useful hints and calculation tables for daily routine work</td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Practice Guide (DE)</td>
<td>11592547</td>
</tr>
<tr>
<td>Kjeldahl Practice Guide (CN)</td>
<td>11592549</td>
</tr>
</tbody>
</table>
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