eppendorf



DOMINIQUE DUTSCHER SAS

Incubator Shaker

New Brunswick S41i

Operating Manual

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1 About this manual

1.1 Notes on this manual

The dates in this manual correspond to the international date format as specified in the ISO 8601 standard. All dates are shown in the format YYYY-MM-DD or YYYY-MM.

1. Read this manual completely before using the product.
2. Please ensure that you have the manual available while using the product.

The current version of the manual can be found on the website www.eppendorf.com/manuals.
- Contact Eppendorf SE to obtain an another version of the manual.

1.2 Warning notice structure

HAZARD LEVEL! Type of danger

Source of danger
Consequences of disregarding the danger

– Measures to avoid the danger

Symbol	Hazard level	Type of danger	Meaning
	DANGER	Personal injury	Will lead to severe injuries or death.
	WARNING	Personal injury	May lead to severe injury or death.
	CAUTION	Personal injury	May lead to minor or moderate injuries.
	NOTE	Material damage	May lead to material damage.

1.3 Graphics

Depiction	Meaning
1. 2.	Work steps
•	Bullet point
Text	Display text
Key	Name for port, button, status lamp, or key
	Important information
	Hint

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1.4 Other applicable documents

The following documents supplement this manual:

- Manuals for accessories and consumables
- Information on performing a risk assessment for the operation of incubators with CO_2 and N_2
- Unpacking guide for New Brunswick S41i
- English installation guide for Stacking Stand S41i

1.5 Certificates

Declarations of conformity, certificates, Safety Data Sheets etc. on the product can be found on the respective product page at www.eppendorf.com.

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2 Safety

2.1 Intended use

The New Brunswick S41i incubator controls temperature and carbon dioxide levels to ensure the cultivation and shaking of samples and cells from biological laboratories in a stable and homogeneous atmosphere. This device is intended for general laboratory use and may only be operated by persons trained in laboratory techniques and procedures.

2.2 Residual risks when used as intended

If the product is not used as intended, the installed safety devices may not function correctly. To reduce the risk of personal injury and material damage and to avoid dangerous situations, please observe the general safety instructions.

2.2.1 Personal injury

2.2.1.1 Biological hazards

Pathogenic biological agents can harm your health and the environment.

- Observe the national regulations and the biosafety level of your laboratory.
- Wear suitable personal protective equipment.
- Observe the Safety Data Sheets and instructions for use for the accessories.
- For instructions regarding the handling of germs and biological material in risk group II or above, please refer to the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, check the most current edition).

If the device has come into contact with infectious liquids or pathogenic germs, people can become contaminated and their health can be harmed.

- Clean and decontaminate the device immediately.

2.2.1.2 Chemical hazards

Radioactive, toxic and aggressive fluids can cause serious damage to health.

- Wear suitable personal protective equipment.
- Observe any national regulations regarding the handling of such substances.
- Observe the manufacturers' safety data sheets and instructions for use.

2.2.1.3 Electrical hazards

If you touch parts that are under high voltage, you may receive an electric shock. A fatal electric shock causes cardiac arrhythmia and respiratory paralysis.

- Use only earth/grounded sockets with a PE conductor.
- Make sure that a residual current circuit breaker is present and accessible.
- Make sure that the housing and the mains/power cord are undamaged.
- Disconnect the device from the mains/power supply voltage in an emergency situation.
- Do not open or remove the housing.

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- Compare the technical information on the mains/power cord and mains/power plug with the technical information on the name plate, taking into account national laws and regulations. This also includes test seals if they are required by law. Use only approved mains/power cords with plugs.
- Make sure that the mains/power plug and earth/grounded socket match and that the electrical PE conductors of the device and the building installation are securely connected to each other.
- Clean and perform maintenance on the device only when it is disconnected from the mains/power line.
- Have the device regularly checked for electrical safety in accordance with national requirements.

2.2.1.4 Risks of burns

There is a risk of burns from hot components during high-temperature disinfection.

- Do not touch the device while a high-temperature disinfection cycle is running.
- Do not open the doors while the high-temperature disinfection cycle is running.
- Allow the device to cool down completely if a system crash or mains/power outage occurs during high-temperature disinfection.

2.2.1.5 Mechanical hazards

The device is very heavy. Transporting and lifting the device improperly can lead to serious injuries.

- Only transport and lift the device with a sufficient number of people and with suitable means.
- Use transport aids and load-carrying devices that are designed for the weight of the device.

The inner door is made of glass. Damage to the glass can lead to sharp glass splinters that can cause personal injury.

- First ensure that the shelves have been set fully inside the chamber and do not contact the inner door. Close the inner door after this.
- Do not lean against the inner door.
- Do not place any objects on the opened inner door.

There is a risk of crushing your hands and fingers when opening and closing the door.

- When opening and closing the door, do not reach into the space between the door and the device.
- Do not reach into the door locking mechanism.

2.2.1.6 Incorrect handling

Using gases that are not approved for use with the device can cause serious damage to health and fatal injuries.

- Only operate the device with gases that are approved for the device.
- Observe the material safety data sheets for the gases used.

If the device or technical equipment is not properly connected to the gas supply or is damaged, the CO_2 concentration in the breathing air may increase. As a result, persons may become unconscious and suffocate due to insufficient oxygen supply.

- Gas tubing may only be installed and connected by trained personnel.
- Observe the national guidelines for handling gases and setting up and operating laboratories.

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- Ensure that the CO_2 concentration in the breathing air does not exceed permitted levels when working in the laboratory.
- Use a CO_2/O_2 alarm system.
- Check the hose connection system for leak tightness.
- Read the "Information on performing a risk assessment for the operation of incubators with CO_2 and N_2" by Eppendorf SE.

Excessive pressure can cause the gas tubing or the in-line gas filter to burst or break.

- Make sure that the gas inlet pressure does not exceed 0.15 MPa (1.5 bar, 21.8 PSI).

2.2.2 Material damage

2.2.2.1 General hazards

Condensate may form in the device due to high humidity. Condensate can lead to corrosion and impair the correct function of the sensors.

- Empty the water tray when the application has finished.
- Empty the water tray when you start the high temperature decontamination cycle.
- Remove all condensate from the chamber of the device immediately. Wipe the area around the sensors carefully.
- To lower the humidity in the device, open the device door.

If the touch screen is damaged, the device may malfunction.

- Turn off the device and pull out the mains/power plug.
- Have the touch screen replaced by a service technician authorized by Eppendorf SE.

The use of accessories and spare parts other than those recommended by Eppendorf SE may impair the safety, functioning, and precision of the device. Eppendorf SE cannot be held liable or accept any liability for damage resulting from the use of accessories and spare parts other than those recommended.

- Only use the accessories and spare parts recommended by Eppendorf SE.
- Only use accessories and spare parts that are in perfect technical condition.

2.2.2.2 Electrical hazards

Connecting the device to devices that are not described in the manual may damage the electronics of the device.

- Only connect devices that are described in the manual.
- If you want to connect other devices, contact your Eppendorf partner.

Connecting the device to an incorrect mains/power supply will damage the device.

- Connect the device only to a mains/power supply that meets the requirements on the name plate.
- Use only earth/grounded sockets with a PE conductor.

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- Compare the technical information on the mains/power cord and mains/power plug with the technical information on the name plate, taking into account national laws and regulations. This also includes test seals if they are required by law. Use only approved mains/power cords with plugs.
- Make sure that the mains/power plug and earth/grounded socket match and that the electrical PE conductors of the device and the building installation are securely connected to each other.

Condensate may form in the device due to transport of the device from a cool environment to a warmer environment and cause a short-circuit.

- Wait for at least 4 h after setting up the device. Then, connect the device to the mains/power line.

2.2.2.3 Mechanical hazards

The inner door is made of glass. If the glass is damaged the inner door is defective.

- First ensure that the shelves have been set fully inside the chamber and do not contact the inner door. Close the inner door after this.
- Do not lean against the inner door.
- Do not place any objects on the opened inner door.

2.2.2.4 Incorrect handling

Using gases that are not approved for use with the device can lead to inaccuracies in measurements. The device may become damaged.

- Only operate the device with gases that are approved for the device.
- Observe the material safety data sheets for the gases used.

If additional weight is placed on the door, the door latch and hinge will become damaged.

- Do not lean on the door.
- Do not place objects on the door.

If you attempt to lift the device by the door, the device will become damaged.

- Use a transport aid to lift or transport the door.

Spraying cleaning agent or disinfectant into the chamber of the incubator can allow liquid to enter the sensor and damage it.

- Only carry out wipe disinfection on the inside of the device.
- Wipe the area around the sensors carefully.

Excessive pressure can cause the gas tubing or the in-line gas filter to burst or break.

- Make sure that the gas inlet pressure does not exceed 0.15 MPa (1.5 bar, 21.8 PSI).

2.3 Application limits

Due to its design, the product is not suitable for use in a potentially explosive atmosphere.

The product may only be used in a safe environment, such as a ventilated laboratory or under a fume hood. Substances which may potentially contribute to an explosive atmosphere may not be used.

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2.4 Target groups

This manual is intended for the following target groups, who have different qualifications and levels of knowledge.

Owner

The owner is any natural or legal person who operates or owns the device.

The owner provides the product and the necessary infrastructure. The owner has a special responsibility to ensure the safety of all persons working on the product.

User

The user operates the product and works with it. The user must be instructed in the use of the product. The user must have read and fully understood the manual.

Any tasks that go beyond operation may only be performed by the user if this is specified in this manual. The owner must explicitly assign these tasks to the user.

Technical personnel

The technical personnel supervises the building services and ensures the technical prerequisites for the operation of the product.

Authorized service technician

The authorized service technician is trained and certified by Eppendorf SE to service, maintain and repair the product.

2.5 Information for the owner

The owner must ensure the following:

- The product is in a safe operating condition.
- The safety devices are all available and functional.
- The product is serviced and cleaned according to the information in this manual.
- The product is disposed of in accordance with local regulations.
- All work on the product is carried out by users, technical personnel or authorized service technicians who are suitably qualified.
- Personal protective equipment is available and is worn.
- The manual is available during the use of the product.
- The manual is part of the product. The product will only be passed on to others with its manual.

2.6 Personal protective equipment

Personal protective equipment serves to ensure the safety and protection of the user when working with the product.

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Personal protective equipment must comply with country-specific regulations and the regulations of the laboratory.

Protective clothing for transport

The clothing protects against mechanical impacts.

Safety boots

The boots protect the wearer against injury from heavy loads and improve grip on slippery floors.

2.7 Information on product liability

The owner of the device will be held liable for personal and material damage in the following cases:

- The device is used outside of its intended use
- The device is not used in accordance with the operating manual
- Manipulation of safety devices
- The device has spare parts installed that are not authorized by Eppendorf SE
- The device is used with accessories or consumables that are not recommended by Eppendorf SE
- Cleaning agents are used that are not recommended by Eppendorf SE
- Chemicals are used that are not recommended by Eppendorf SE
- Shipment not in original packing or in improper substitute packing
- The device is maintained or repaired by persons not authorized by Eppendorf SE
- Unauthorized modifications

2.8 Information on the device

Information	Meaning	Location
	WARNING Risk of burns	Visible when the outer door is open on the upper left and upper right door panels

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3 Product description

3.1 Features

The device has the following features:

- Chamber with convection heating of all walls for gentle air circulation and uniform temperature distribution
- Temperature range from 4 °C above ambient temperature to 50 °C; ±0.2 °C temperature accuracy
- CO_2 concentration adjustment
- Two water trays to reduce sample evaporation
- High-performance drive with 3 eccentric drive shafts for an orbital movement of 2.5 cm (1 inch) and a shaking speed of 25 – 400 rpm (±1 rpm) (when devices are stacked, the upper device is limited to 250 rpm)
- Touch screen
- Integrated high-temperature decontamination
- Interfaces: USB, Ethernet, building management
- VisioNize connection possible via VisioNize box
- Double stackability

3.2 Product overview

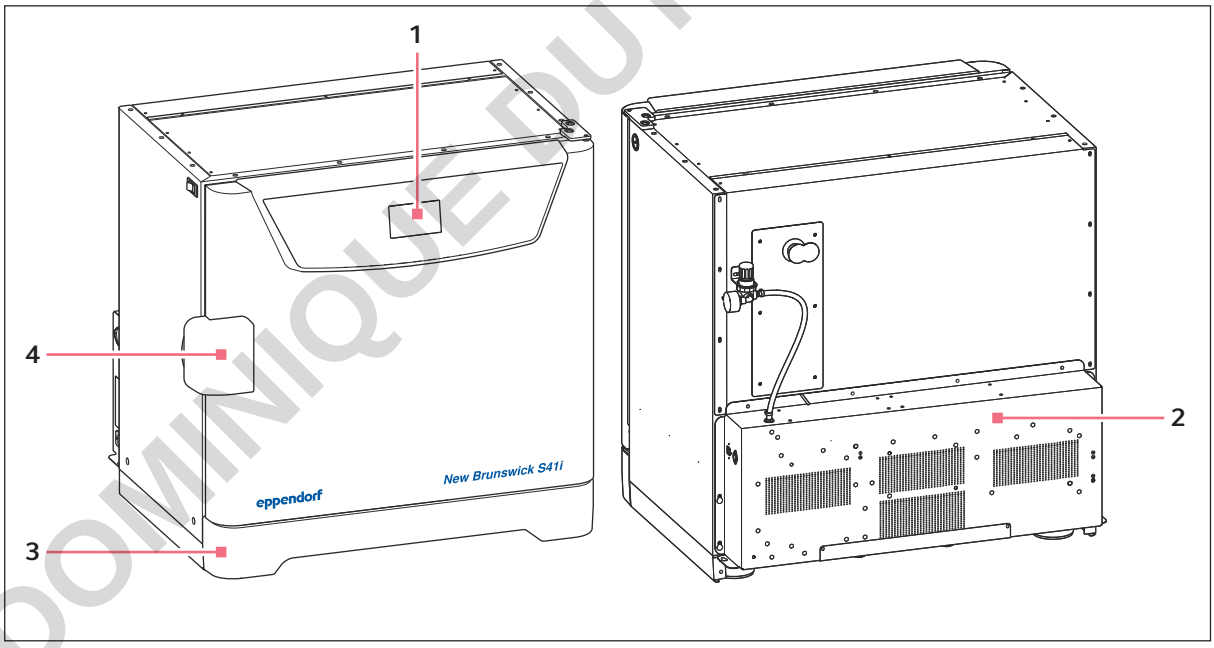


Fig. 3-1: Front and rear view

1 Touch screen
2 Control box
3 Foot shield
4 Door handle

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Rear view

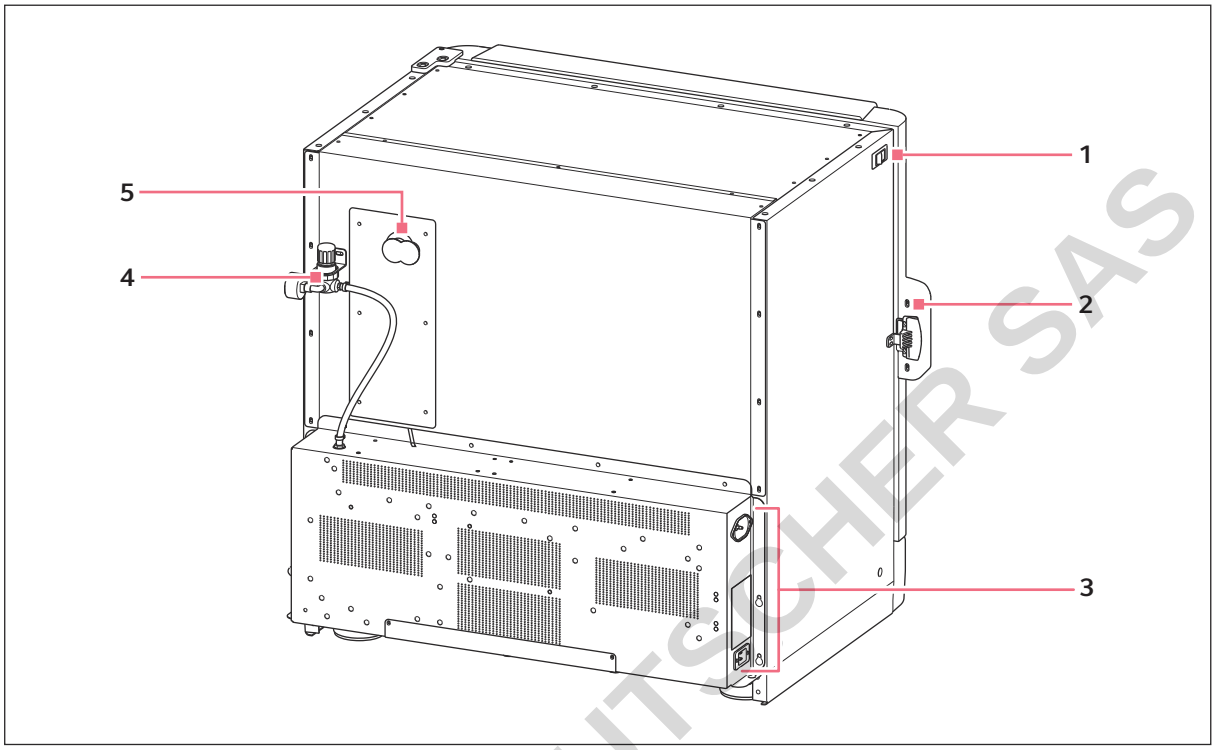


Fig. 3-2: Rear view, rear panel removed

1 On/off power switch
2 Door handle
3 Control box (right side)
4 In-line gas regulator
5 Access port

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Control box

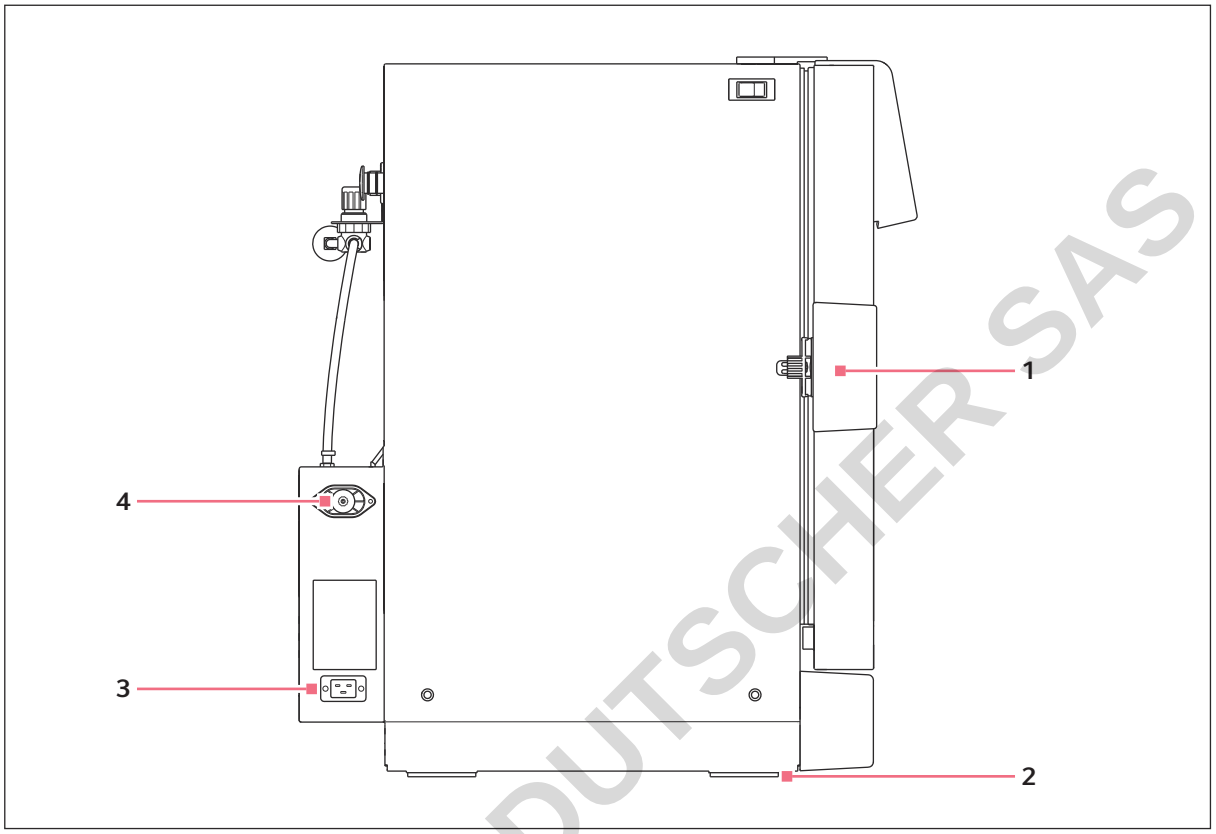


Fig. 3-3: Control box, right side

1 Door handle
2 Adjustable foot (shown with side shield)
3 Mains/power cord socket
4 Auto-zero filter socket

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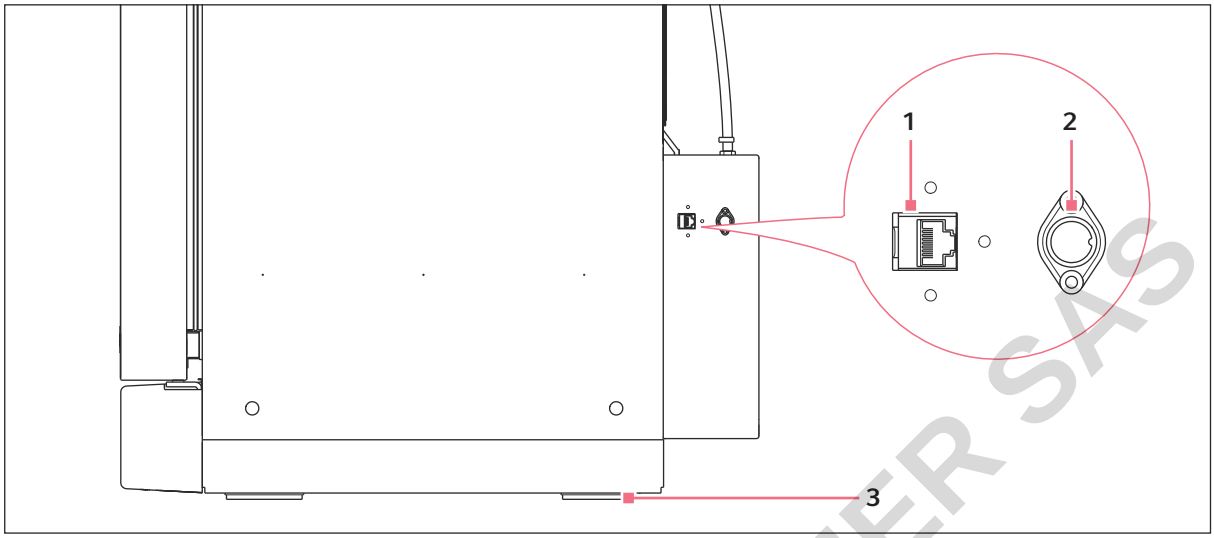
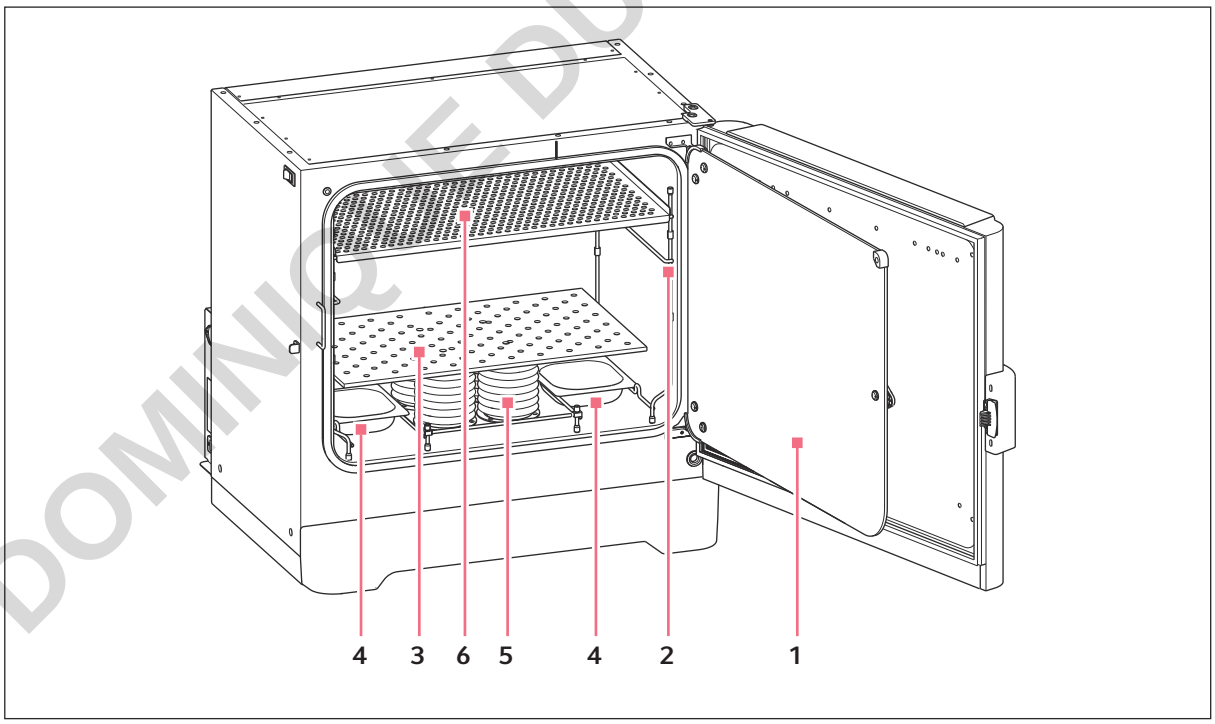


Fig. 3-4: Control box, left side

1 Ethernet connection
2 BMS relay contact alarm socket
3 Adjustable foot (shown with side shield)

Internal view



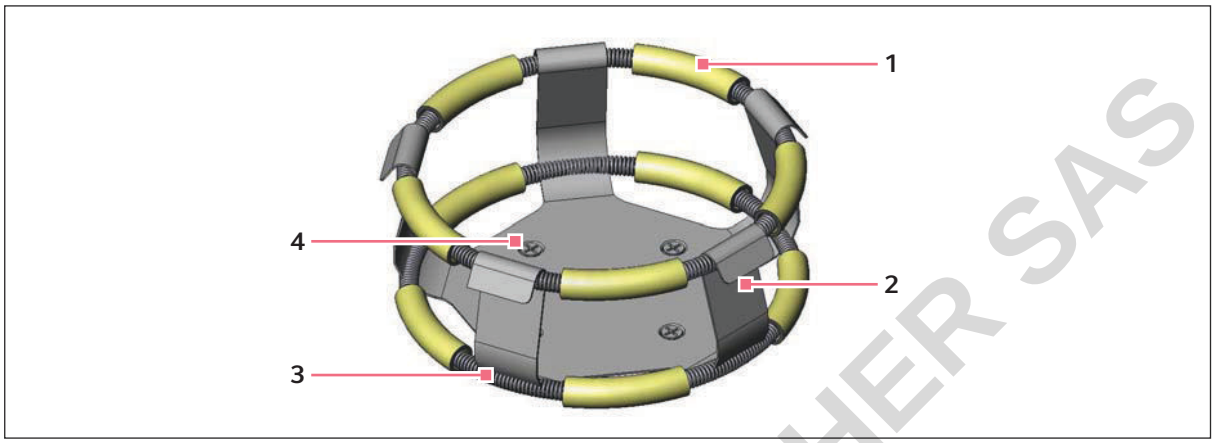
1 Glass inner door
2 Shelf rack
4 Water trays
5 Bearing housing

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3 Sample platform

6 Upper shelf

Flask clamp



1 Upper girdle with girdle tubes

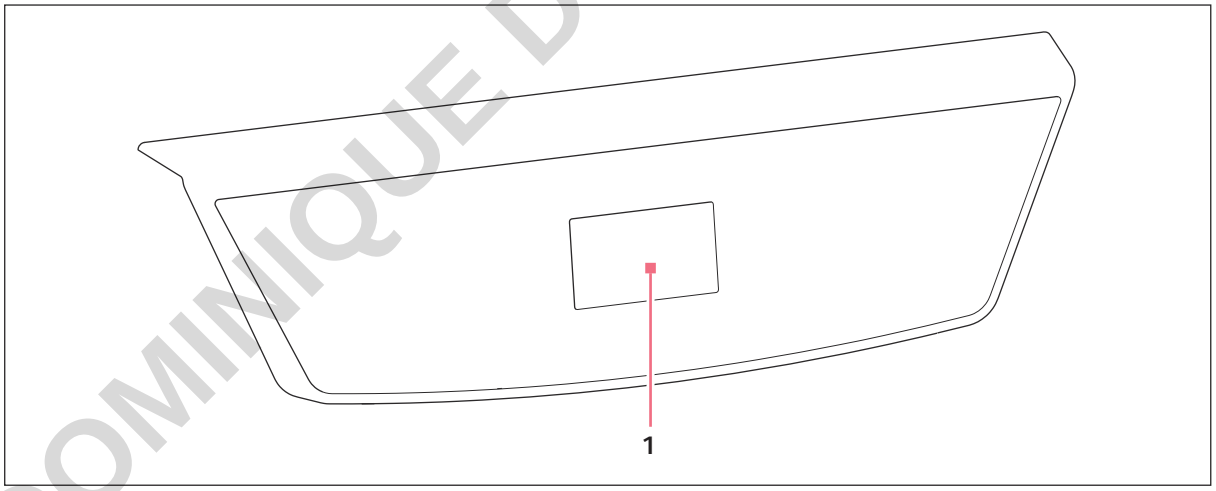
2 Clamp base (arms and foot)

3 Lower girdle with girdle tubes

4 Flask clamp mounting holes (quantity: 5)

3.3 Control panel

Control panel



1 Touch screen

A USB port is located below the screen cover.

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3.3.1 Screens

3.3.1.1 Start screen

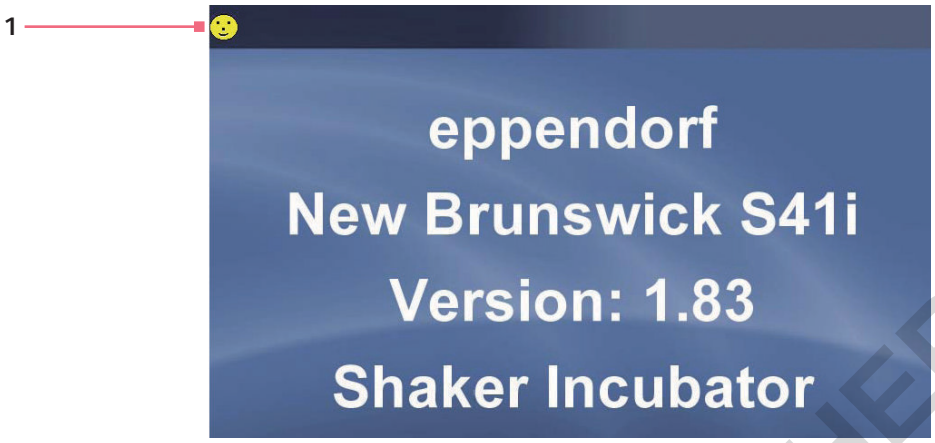


Fig. 3-5: Start screen (example display, version number may vary)

1 Smiley

Symbol	Description
Smiley	The yellow smiling smiley indicates that the software is working properly. A red sad smiley indicates that there is a software problem that needs to be fixed.

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3.3.1.2 *STATUS* screen

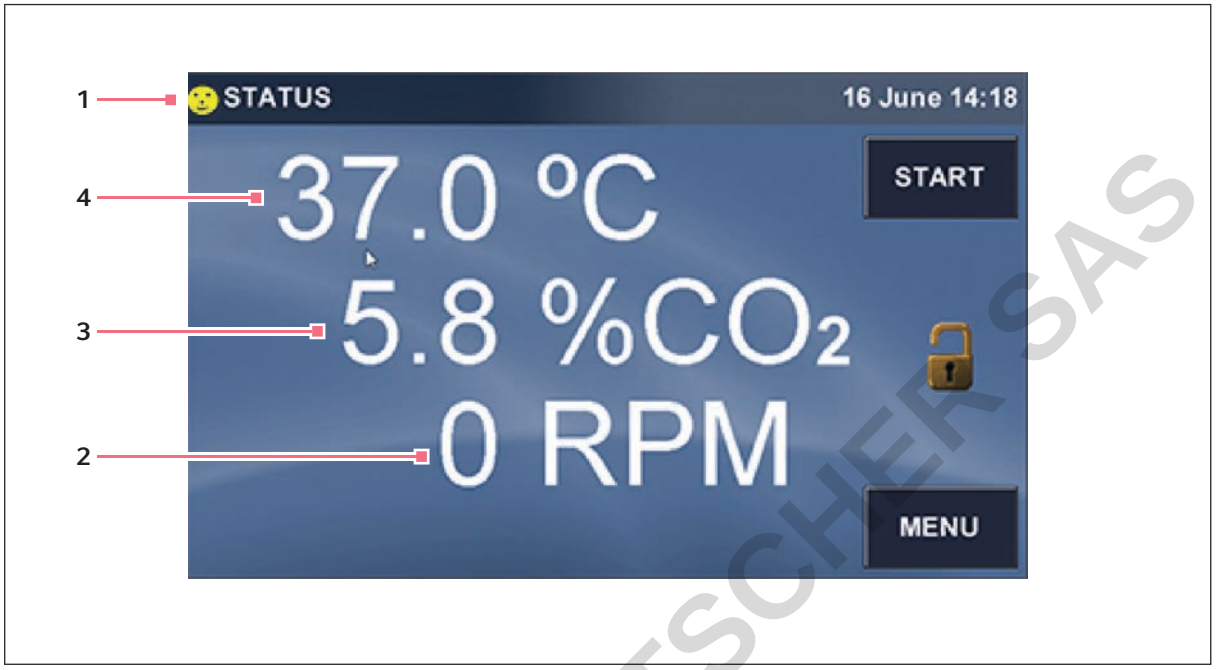


Fig. 3-6: *STATUS* screen

1 Status display
2 Shaking speed setpoint
3 CO_2 concentration setpoint
4 Temperature setpoint

3.3.1.3 MENU 1



Fig. 3-7: *MENU 1* screen

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Symbol	Description
Status View	Return to the STATUS screen.
Event Log	Call up the event log.
Alarms	Make alarm settings.
Summary View	Summary of current values and the setpoint.
Event Graph	Call up the event graph.
Calibrate	Perform calibration.
General Settings	Make general settings.
Users	Open user management.
Communications	Open the communication screen.

3.3.1.4 MENU 2



Fig. 3-8: *MENU 2* screen

Symbol	Description
Service	The service area is reserved for authorized service personnel.
Diagnostics	System diagnostic information
Maintenance	Perform updates and call up and clear diagnostic trends.
Options	Call up options available on the device.

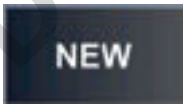
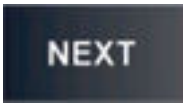
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Symbol	Description
CO2 Autozero	Set CO_2 auto-zero calibration.
Disinfection	Perform disinfection.

3.3.2 Operating controls

Operating control	Description
START	Start a platform shaker run or run a program.
STOP	Stop a platform shaker run or cancel a program or process.
MENU	Open the *MENU 1* screen window.
HELP	Call up additional information about the screen window.
DONE	Return to the main display, the *STATUS* window or the *SUMMARY* window. Acknowledge a message or stop an audible alarm.
CANCEL	Cancel a program or process.
BACK	Return to the *MENU* screen window or the main display.
OK	Save or activate a value or selection. Return to the *MENU* screen window or the number pad.
YES	Confirm a message or process.

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Operating control	Description
	Cancel a process.
	Navigate up in a list.
	Navigate down in a list.
	Navigate to the next screen window.
	Navigate to the previous screen window.
	Clear a value or entry.
	Delete a value or entry.
	Edit an entry.
	Save or export data to a USB storage medium.
	Add a new entry/new user.
	Continue to run a program or process.

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Operating control	Description
REDO	Restart a program or process.
REDO AZ	Restart a program or process.
RUN AZ	Start a CO2 auto-zero calibration.
TEST	Perform an alarm test.

3.3.3 Symbols

Symbol	Description
	ALARM symbol The device is in an alarm state. To acknowledge and resolve the alarm, call up the alarm settings.
	UNLOCK symbol The screen is unlocked so that the user can make changes. Changes can be made with administrator rights.
	STOPWATCH symbol A run time is activated. The STOPWATCH symbol appears next to RPM in the *SUMMARY* and *STATUS* windows.

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4 Functional description

4.1 Temperature management

The temperature in the incubator chamber can be adjusted between 0 °C and 50 °C. The ambient temperature of the device should be 15 °C – 28 °C. The device is designed to operate at least 4 °C above the ambient temperature. If the setpoint is below 4 °C of the ambient temperature, the device will attempt to adjust the device temperature.

4.2 Water trays

The humidity level in the incubator chamber cannot be adjusted. Therefore, the water in the trays creates a relative humidity of between 85 % and 95 % at 37 °C (depending on the ambient humidity) in the chamber.

The incubator is equipped with 2 water trays with a maximum volume of 250 mL each.

4.3 CO_2 sensor

The CO_2 sensor measures the carbon dioxide concentration in the incubator in the range of 0.2 % to 20 %.

The CO_2 sensor is calibrated at the factory to control exactly at 5 % CO_2.

It is possible to deactivate CO_2 control and work with temperature control only.

The CO_2 sensor works independently of humidity. The device has a programmable, fully automatic zero point adjustment.

4.4 CO_2 auto-zero calibration

The CO_2 auto-zero calibration function tests the CO_2 sensor by pumping outside air (atmosphere) into the measuring area of the CO_2 sensor in order to displace the chamber air at this point. This process only takes a few minutes. The sensor is re-referenced to the CO_2 content of the atmosphere before the chamber air mixes with the air from the atmosphere and normal CO_2 control is resumed.

4.5 Shaker run

The shaking mechanism is driven by 3 eccentric drive shafts connected to the motor shaft of the device via a belt. The generated orbital movement of the sample platform has a diameter of 2.5 cm and a shaking speed of 25–400 rpm (±1 rpm).

The shaker can only be operated with one sample platform.

4.6 Flask clamps

Flask clamps hold flasks and test tubes of different sizes in position on the sample platform during the shaker run. Flask clamps can be installed on different sample platforms.

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The flask clamps for 2.8 L Fernbach flasks and 2 L – 4 L Erlenmeyer flasks are supplied with an additional girdle. The girdle is an assembly of springs and sections of girdle tubes. One girdle is already in place on the flask clamp. The other girdle must be installed.

Flask clamps for flask sizes 1 L and larger are installed with 5 screws.

4.7 Messaging concept

The device can issue the following message types:

- **Alarm**
  An alarm is triggered when a safety-relevant situation occurs that could cause personal injury. The user must immediately eliminate the cause of the alarm.
- **Warning**
  A warning is triggered if a safety-relevant situation can occur. The user must monitor the device.
- **Message**
  The device issues a message when the deadline for a recurring task has been reached.
- **Error message**
  The device issues an error message if the software detects an error.

The following status displays indicate the corresponding message type:

- Red sad smiley: alarm, warning, message, error message
- Yellow smiling smiley: the device is working properly.

4.8 Device-specific messages

Device-specific messages are triggered by the following conditions:

- **Temperature alarm**
  Triggered if the internal temperature exceeds the alarm limit of ± 0.5 °C.
- **CO_2 alarm**
  Triggered if the CO_2 concentration exceeds the alarm limit of ± 0.5 %.
- **Door alarm**
  Triggered if the outer door is left open for too long. A warning is issued after 30 seconds and an alarm is triggered after 5 minutes.

4.9 Ethernet interface

The device is equipped with an Ethernet interface. This allows the device to be connected to the VisioNize box and the VisioNize Lab Suite.

For further technical information, contact your local Eppendorf partner.

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5 Installation

5.1 Checking connection requirements

All prerequisites must be met before the device can be installed and put into operation.

Checking the electrical connection

1. Check whether the electrical connection meets the following requirements:
    - The mains/power connection matches the details on the name plate.
    - An earth/grounded socket with a PE conductor is available.
    - The earth/grounded socket is always freely accessible.
    - A residual current circuit breaker is available and accessible.

5.2 Checking the location

1. Check that the location meets the following conditions:
    - The ambient conditions correspond to the information in *Chapter 13 "Technical data" on page 97*
    - Minimum distance to other devices and walls:
        - 10 cm on all sides
        - 5 cm on top
        - 3 cm at the rear
    - The footprint is resonance-free, horizontal, level and non-slip
    - The footprint is designed for the weight of the device
    - The mains/power switch and the disconnecting device of the power system circuit are accessible
    - The footprint is **not** on the laboratory floor
    - Good ventilation
    - Sufficient air volume
    - Non-explosive environment
2. Check that the location is protected from the following influences:
    - Heat sources
    - Cold sources
    - Sparks
    - Open fire
    - Direct sunlight
    - Air currents
    - UV radiation
    - Strong electromagnetic radiation
    - Humidity

All prerequisites must be met before the device can be installed and put into operation.

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If the conditions under which the device is used differ significantly from the operating conditions, software calibration adjustments will be required to optimize incubator performance. This will also affect the performance specifications.

For information on calibration adjustments and the relevant performance specifications, contact your local Eppendorf partner.

5.3 Checking the delivery and packing

1. Check whether the packages indicated on the delivery note match the packages actually delivered.
2. Check the packing for transport damage.
3. Report any visible damage to your Eppendorf partner.

5.4 Unpacking the device

Unpack the device as described in the unpacking guide.

5.5 Checking the delivery package

1. Check that the supplied components match the specifications of the delivery package.
2. If any parts are missing, contact your Eppendorf partner.

Delivery package

Quantity	Description
1	Device
1	Operating manual
1	Stainless steel perforated shelf
1	Stainless steel shelf rack
2	Stainless steel water tray
1	White porous CO_2 sensor cover
1	Colored protective cover
1	Front foot shield
2	Side foot shield
1	Mains/power cord
1	Tubing with a 10 mm outer diameter and a 6.5 mm inner diameter with an in-line gas filter, length 3 m
2	Hose clip
3	Rack spacer

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Quantity	Description
3	Rack foot
1	Auto-zero filter (HEPA filter)
1	Building management plug
2	Additional white porous CO_2 sensor cover

5.6 Setting up the device

Transporting the device to its location



WARNING! Personal injury

The device is heavy. Improper lifting and moving of the device can lead to serious injuries.

- Use a suitable transport aid to transport the device.
- Move the device only with a sufficient number of transport helpers..
- Keep the door closed when the device is on the transport aid.



- Follow the unpacking guide.
- The device has built-in castors. The device can be moved on the casters over short distances. This may require the device feet to be raised by screwing them in so that the incubator stands on the casters.

Leveling the device



NOTICE! Sample loss

If the device is not level, sample loss may occur as not all cells are evenly covered with medium.

- Level the device by adjusting the device feet.
- Make sure that the device is stable.

Tool:

- Spirit level
- Wrench

1. Place the spirit level on the shelf so that the ends of the spirit level point to the left and right.
2. Loosen the fixing nuts on the device feet using the wrench.
3. Adjust the height of the device feet using the wrench.

   The device is level and stable.
4. Place the spirit level on the shelf so that the ends of the spirit level point to the front and back.
5. Adjust the height of the device feet using the wrench.

   The device is level and stable.

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6. Check that the incubator is correctly leveled by placing the spirit level on another shelf. Correct the height of the device feet if necessary.
7. Tighten the fixing nuts on the device feet using the wrench.

5.7 Connecting the device to the mains/power supply



DANGER! Electric shock

If you touch any parts which are under voltage, you may experience an electric shock. Electric shocks cause heart injury and respiratory paralysis.

– Switch off the device and disconnect the mains/power plug before commencing work on the device.



DANGER! Electric shock

If the PE conductor connection is missing, you may receive an electric shock. An electric shock causes cardiac injuries and respiratory paralysis.

– Make sure that the mains/power plug and earth/grounded socket match and that the electrical PE conductors of the device and the building installation are securely connected to each other.



WARNING! Magnetic field

Magnetic fields can impair the functioning of pacemakers and defibrillators. Pacemakers may be reset.

– Keep a distance of at least 20 cm from the magnet.
– Warn people with a pacemaker about the strong magnetic field.

Prerequisites:

- The device has been set up in accordance with the manual.
- The voltage requirements correspond to the information on the name plate.
- The mains/power cord has been selected according to the mains/power supply voltage.
- The device has been acclimatized for at least 12 h.

1.
   - Devices with 100 V – 127 V: connect only one device to a fuse.
   - Devices with 220 V – 240 V: connect a maximum of 2 devices to one fuse.
2. Connect the mains/power cord to the correct mains/power supply voltage.
3. Plug the mains/power plug into the earth/grounded socket.

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5.8 Connecting the device to the gas supply

WARNING! Personal injury

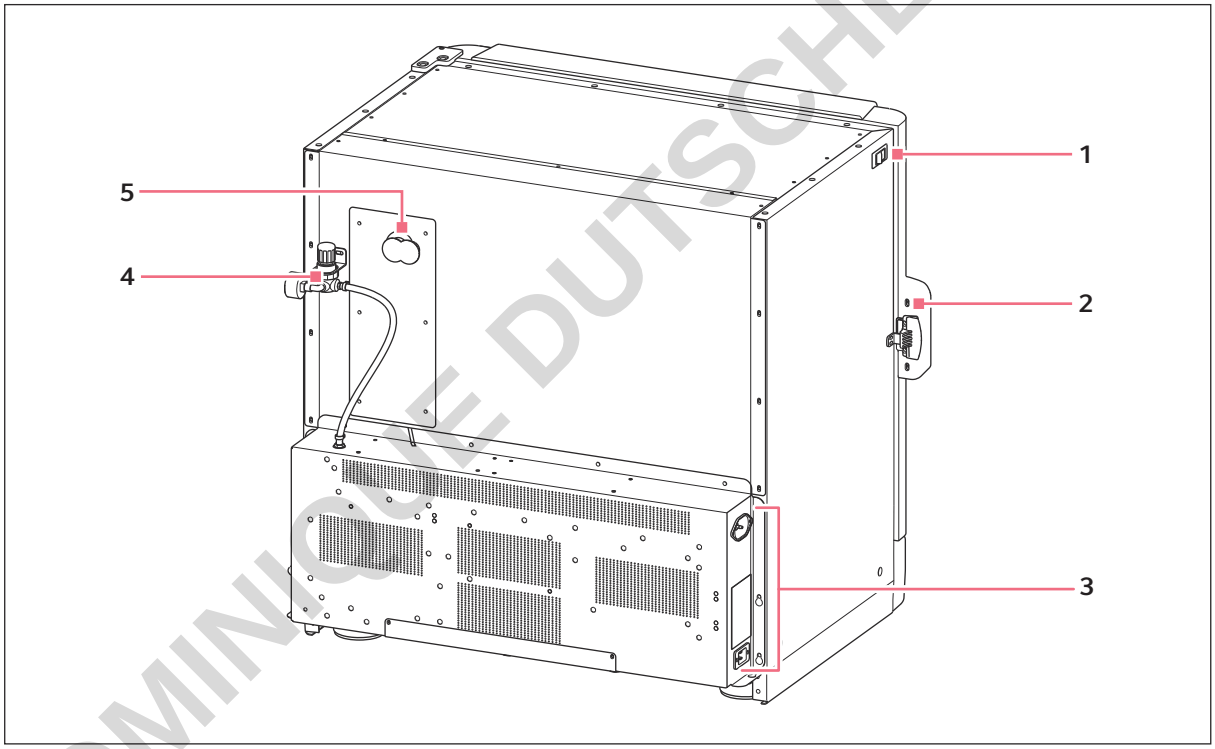
If the device is not connected correctly to the gas supply, increased levels of CO_2 can occur in the breathing air. This poses a risk of poisoning and suffocation.

– Make sure that gas tubing is only installed and connected by trained personnel.
– Ensure that the CO_2 concentration in the breathing air does not exceed permitted levels when working in the laboratory.

Use only dry gas.

Do not bend the gas tubing.

The main gas valve must be accessible during installation.



4 In-line gas regulator (accessible from the side)

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Connecting the CO_2 supply

Prerequisites:

- Large CO_2-cylinder with vapor recovery to control the primary gas pressure
- A 2-stage CO_2 pressure reducer is installed.

1. Attach the longer part of the supplied gas tubing to the pressure reducer outlet.
2. Make sure that the gas supply is connected to the INLET side of the in-line gas filter.
3. Attach the shorter part of the supplied gas tubing to the barb on the in-line gas regulator.
4. Secure the gas tubing to the barb with a tube clip.
5. Adjust the gas pressure.

   Default setting 0.05 mPa (0.5 bar or 7.2 PSI)

Disconnecting the gas tubing

1. Switch off the gas pressure.
2. Loosen the tube clip from the barb on the gas tubing.
3. Pull off the tube.

5.9 Using the Ethernet interface

You can connect the device to the VisioNize box via an Ethernet interface.

Use a CAT 5 STP network cable with a shielded RJ45 plug. Connect the cable to a grounded RJ45 socket.

Only connect devices that meet the safety requirements according to IEC 60950-1.

5.10 Connecting the device to the building management system

Integrating the device into the building management system (BMS) allows the device to be monitored centrally. The alarm sources cannot be changed.

An alarm is forwarded to the building management system in the following cases:

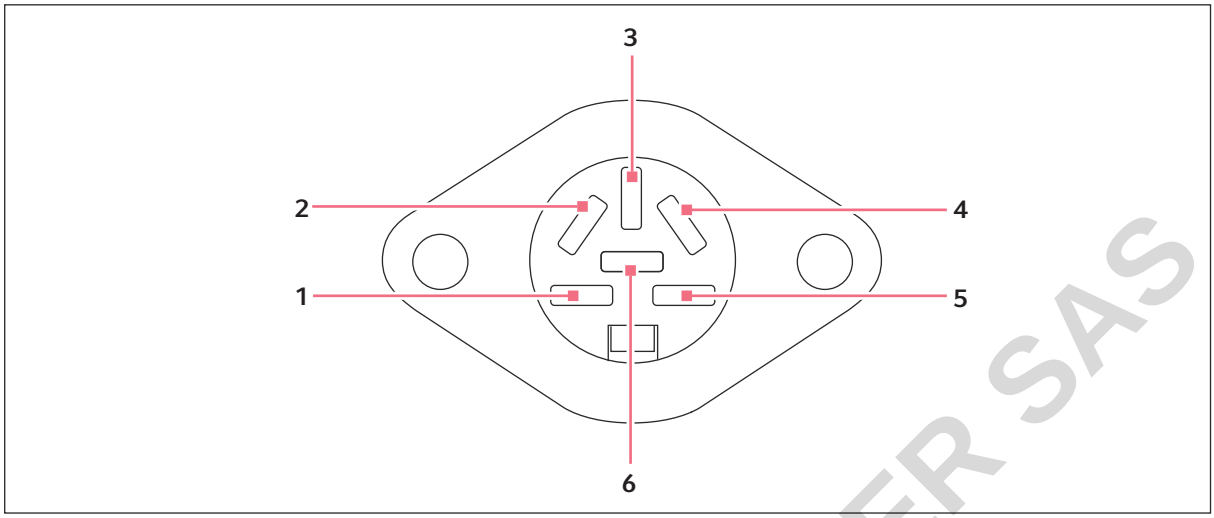
- The interior temperature is too high
- The interior temperature is too low
- In the event of a mains/power outage
- The CO_2 concentration is too high or too low

The mains/power outage alarm cannot be switched off. If the device is switched off or the mains/power supply voltage fails, all relays will switch to alarm: common contacts and NO contacts are connected.

With an integrated option, the alarm can be programmed to indicate when the power fails (due to an electrical fault) or is switched off. When the power failure warning is active, the relay contacts are reversed (NC pin 4 closes and NO pin 6 opens).

The building management system is connected via a 6-pin port on the rear of the device. The appropriate plug is included in the delivery package of the device.

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13	Not connected	5	Common
4	Normally open	6	Normally closed

The default setting for the alarm system is "ON".

The owner is responsible for connecting the plug to the building management system.

5.11 Assembling the foot shield

Start assembly with the right foot shield.

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Tools

Tool:

- Screwdriver
- M4 screw

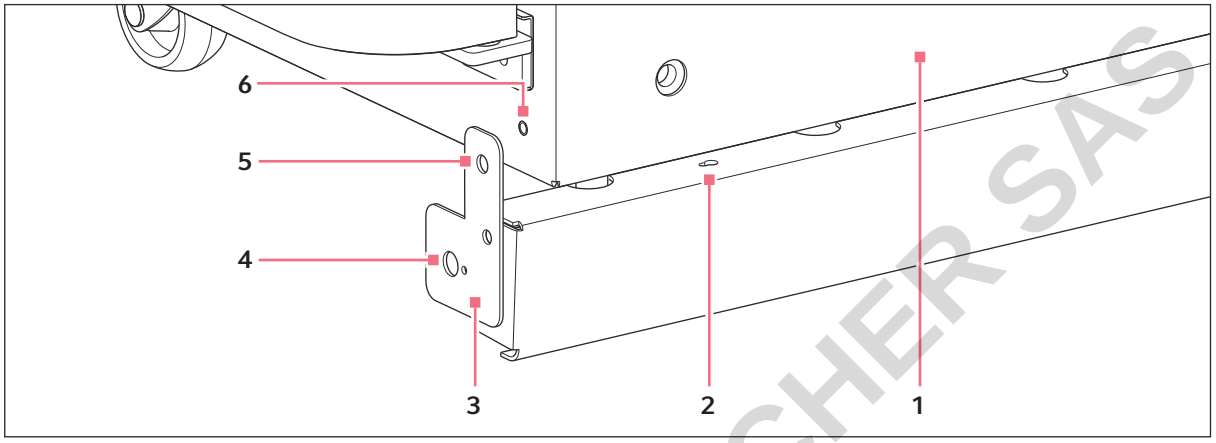
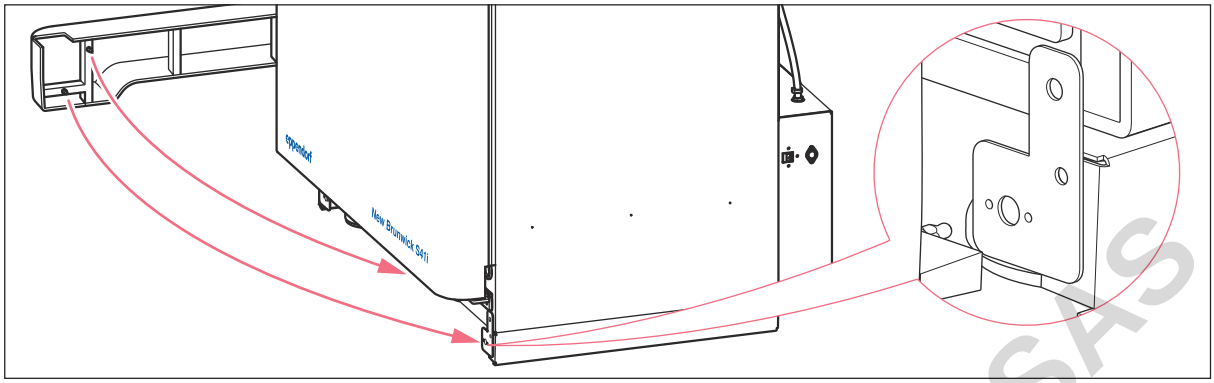


Fig. 5-1: Assembling the foot shield

1	Right side panel of the device	4	Hole for the ball catch on the front foot shield
2	Oblong hole in the right foot shield	5	Hole for the M4 screw in the bracket
3	Bracket	6	Hole for the M4 screw in the incubator

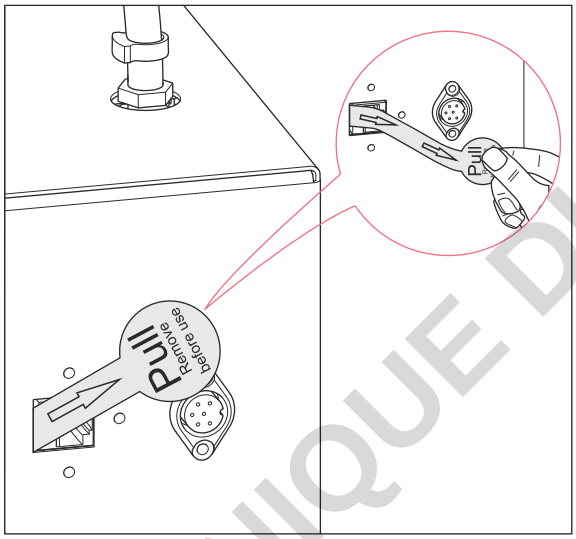
1. Align the 2 oblong holes in the right foot shield with the 2 mounting pins on the right bottom of the device.
2. Allow the right foot shield to snap into place.
3. Slide the right foot shield towards the rear of the device so that the foot shield is flush with the front of the device.
4. Mount the bracket to the device and the right foot shield using the M4 screws.
5. Repeat steps 1-4 for the left foot shield.

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6. Align the ball catch on the front foot shield with the bracket on the front bottom of the device.
7. Slide the front foot shield into the bracket until the ball catch snaps into place.

5.12 Removing the battery insulating strip



To activate the backup battery, carefully pull the battery insulating strip out of the Ethernet port.

The backup battery can be used to retain the time and date, e.g., in the event of a mains/power outage.

5.13 Installing the sample platform

Before using the device, install a sample platform.

The shelf rack and the shelf are installed in the chamber on delivery.

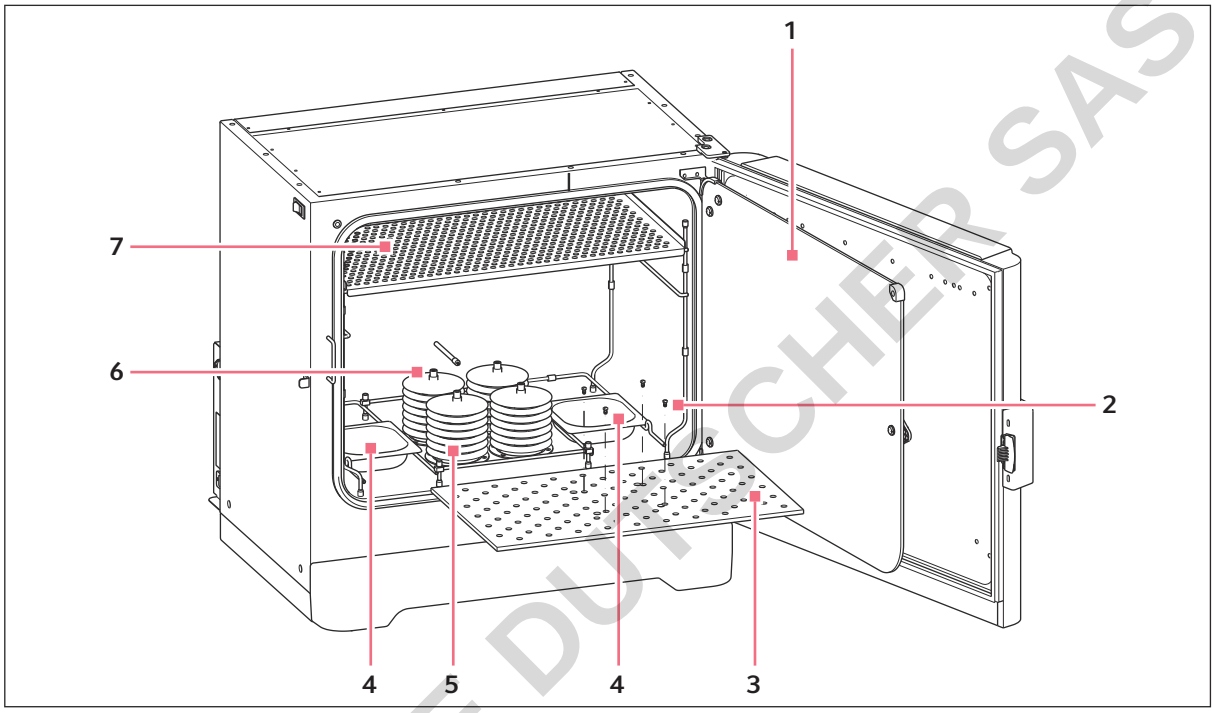
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Tool:

- Hexagon socket screwdriver
- Hexagon socket screws

Prerequisites:

- You have switched off the device and disconnected it from the mains/power line.



1	Glass inner door	5	Bearing housing
2	4 hexagon socket screws	6	Bearing housing support
3	Sample platform	7	Upper shelf (installed on delivery)
4	Evaporation trays		

1. Unscrew the 4 hexagon socket screws from the 4 corresponding bearing housing supports.
2. Place the sample platform on the bearing housing supports.
3. Screw the sample platform onto the bearing housing supports using the 4 hexagon socket screws.

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5.14 Installing the flask clamps

Material:

- Cross-head screwdriver
- Flat cross-head screwdriver 10-24 × 5/16 inch (7.9 mm)

1. Place the flask clamp on the sample platform so that the mounting holes align with the holes in the sample platform.
2. Mount the flask clamp using the countersunk screws.
3. Place an empty flask in the flask clamp. The first girdle of the flask clamp is located at the top of the clamp base.
4. Check that the tubing sections are located between the clamp fingers.
5. Roll the first girdle down the clamp fingers as far as possible.

   The tubing sections rest on the sample platform and the springs are located under the clamp base.
6. Pull the second girdle over the clamp base from above.
7. Check that the spring sections of the second girdle are in contact with the clamp fingers and that the girdle tubing sections are sitting on the flask between the clamp fingers.

To avoid glass breakage, check that the flask clamps are firmly in place.

The upper girdle holds the flask in the flask clamp. The lower girdle prevents the flask from rotating.

If a shelf is installed, Erlenmeyer flasks larger than 1 L will be too high for the chamber. To use 2 L – 4 L Erlenmeyer flasks, remove the shelf.

5.15 Disassembling the shelf rack

Prerequisites:

- You have disconnected the device from the mains/power line.
- The device has cooled down.
- You have removed the water trays from the chamber.
- Wear your personal protective equipment.

1. Remove the shelf from the device starting from the bottom.
2. Remove the front and rear tie rods on the lower shelf rods.
3. Remove the 2 shelf rack parts from the incubator.

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5.16 Assembling the shelf rack

Prerequisites:

- You have disconnected the device from the mains/power line.
- The device has cooled down.
- Wear your personal protective equipment.

1. Insert the 2 shelf rack parts into the chamber so that the spacers fit precisely on the side panels of the chamber.
2. Connect the 2 shelf rack parts by attaching the two tie rods at the front and rear to the lower shelf rods.
3. Slide the shelf onto the top of the shelf rack.

   The shelf rack is stable.

5.17 Using a water tray

Use only warm, distilled, sterile water in the water tray. The use of other types of water, including deionized water, can cause corrosion in the device.

To reduce the risk of contamination, empty the water tray every 7 to 14 days. Clean the water tray, and then refill it with warm, distilled, sterile water.

Material:

- Distilled water

1. Fill the 2 water trays with 250 mL of warm, distilled, sterile water each.
2. Slide the water trays onto the lowest support of the shelf rack in the device.

   The water trays are fully inserted.

5.18 Using the access port

Access ports can be used to insert components, such as sensors, into the chamber.

Prerequisites:

- The access ports are closed with blind plugs.
- The component is not larger than the inner diameter of the access port of 25 mm.

1. Remove the blind plug.
2. Pull the component cable through the open access port.
3. To ensure optimum gas tightness, cut into the cover of the blind plug.
4. Guide the component cable through the blind plug.
5. Check that the access port is clean and dry before inserting the blind plug.

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6. Reinsert the blind plug.

   Close the blind plug firmly and flush with the rear panel.

7. Guide the end of the cable up onto the device.

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6 Preparing the device for use

6.1 Switching on the device

Prerequisites:

- Set up the device in accordance with the operating manual.
- Connect the device in accordance with the operating manual.
- The device has been acclimatized for at least 12 h.
- Fill the water trays with 250 mL of lukewarm, sterile, distilled water each.

1. Switch on the device using the mains/power switch.

   The display lights up.

   The device heats up to the pre-programmed setpoints of 37 °C and 5 % CO_2 concentration in the chamber.

   The CO_2 sensor is initialized. It can take up to 30 min for the setpoint to appear on the display.

2. Switch on the CO_2 supply with the pressure reducer.

   To ensure a sufficient volume flow, open the stop valve completely. The default setting is 0.05 mPa (0.5 bar or 7.2 PSI).

3. Especially if more than one device is connected to the CO_2-supply, check that the gas pressure and the volumetric gas flow rate are sufficient.

4. To allow conditions to stabilize, leave the device switched on for at least 2 h.

If the mains/power supply to the device is interrupted long enough for the temperature to drop below the setpoint, the CO_2 valve will be deactivated until the temperature setpoint is reached again.

Deactivating the CO_2 valve is intended to prevent the CO_2 measured values from being falsified.

Changing the temperature or CO_2 setpoints leads to deviations in measurement accuracy.

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6.2 Making device settings

1. Tap the *MENU* button.

   The *MENU 1* window opens.



2. Select the device settings that you want to edit.

6.2.1 Calling up the event log

1. To call up the event log, tap on the *MENU 1* button in *Event Log*.

   The *EVENT LOG* window opens.



2. To view event details, tap on a listed event.

   The *EVENT DETAIL SCREEN* window opens.

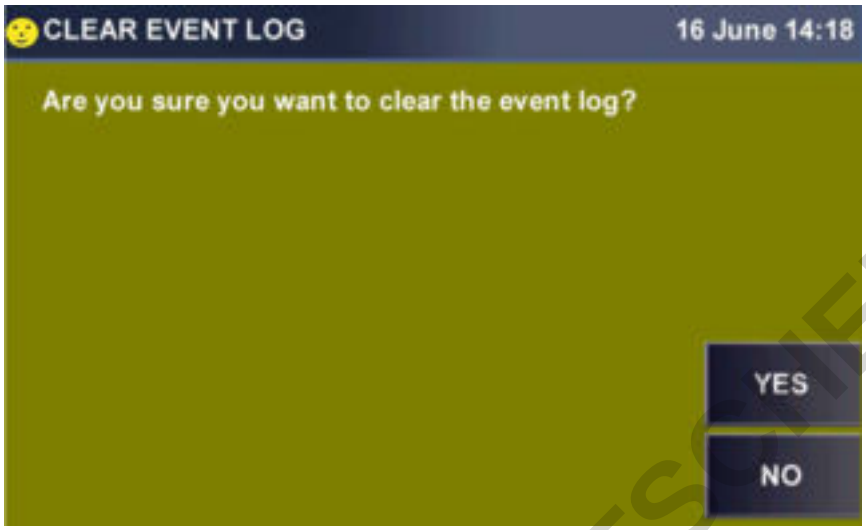
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3. To return to the *EVENT LOG* window, tap on the *DONE* button.

Clearing the event log

4. To clear the events listed in the *EVENT LOG* window, tap on the *CLEAR* button.

   The *CLEAR EVENT LOG* window opens.

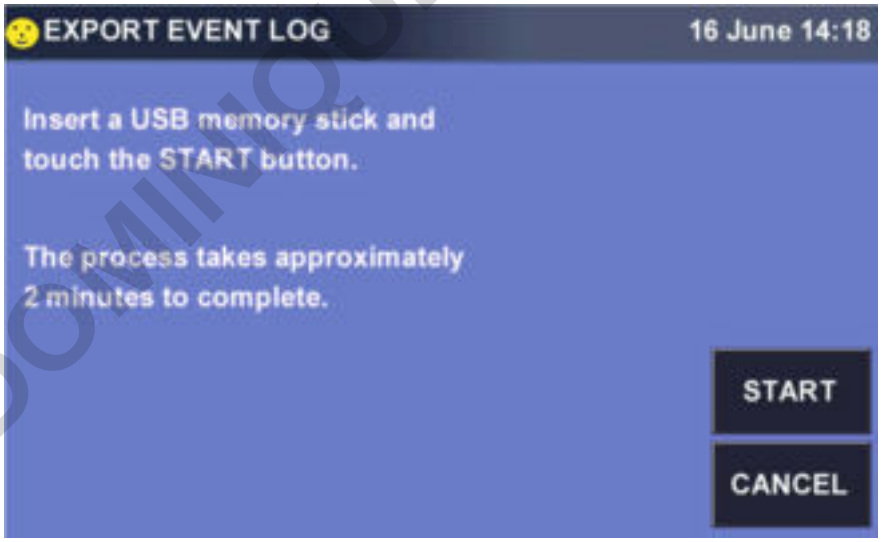


5. To clear the event log, tap on the *YES* button. To return to the *EVENT LOG* window without clearing it, tap on the *NO* button.

Exporting the event log

6. To save the event log to a USB storage medium, tap on the *EXPORT* button.

   The *EXPORT EVENT LOG* window opens.



7. Insert the USB storage medium into the USB port under the touch screen.
8. To start the transfer, tap on the *START* button. To cancel the transfer, tap on the *CANCEL* button.

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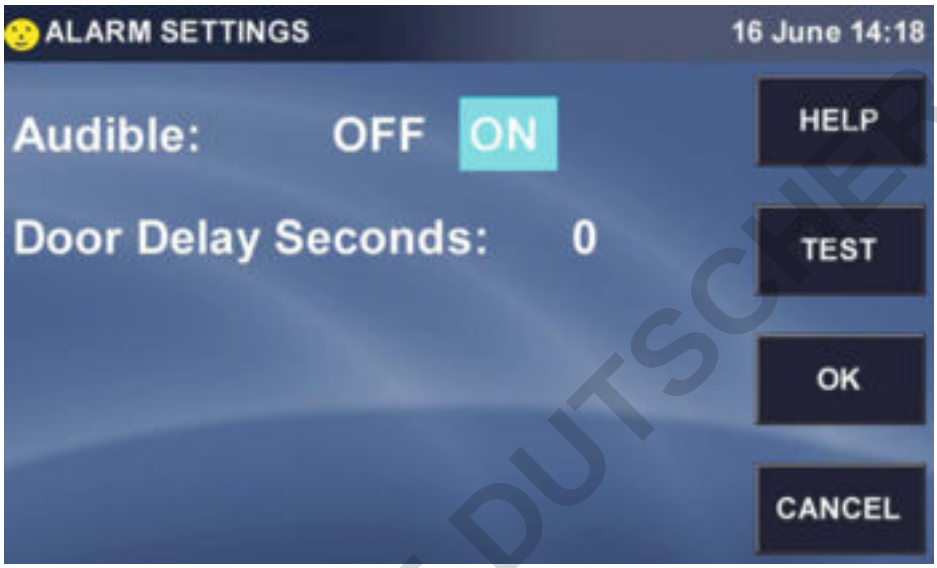
9. After the transfer is complete, remove the USB storage medium from the USB port.
10. To return to the *MENU 1* window, tap on the *DONE* button.

6.2.2 Adjusting the signal tone

Activating the audible alarm

1. To call up the alarm settings, tap on the *Alarms* button on the *MENU 1* screen.

   The *ALARM SETTINGS* window opens.



2. To activate the *Audible* alarm, tap on the *ON* button.

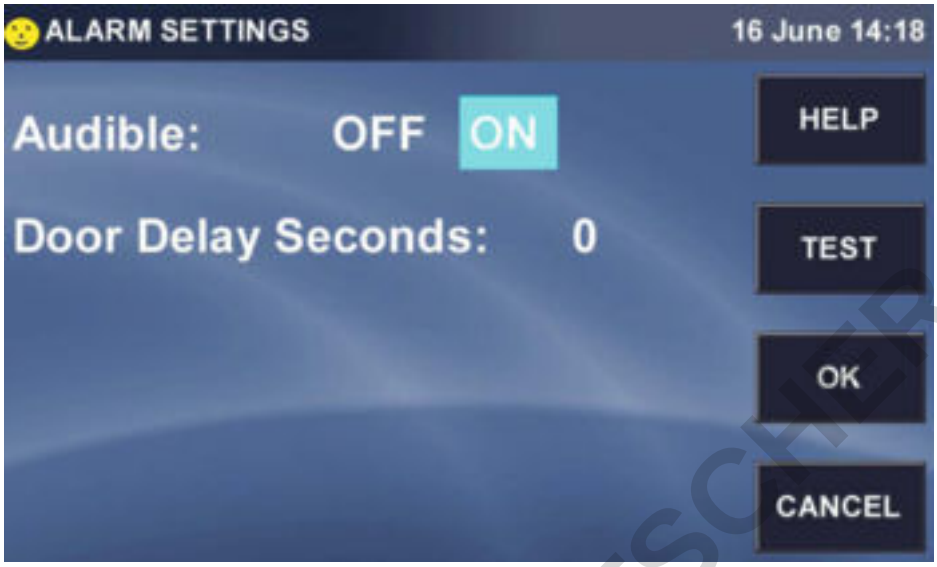
   The status of the alarm is highlighted in blue.

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Deactivating the audible alarm

1. To call up the alarm settings, tap on the *Alarms* button on the *MENU 1* screen.

   The *ALARM SETTINGS* window opens.



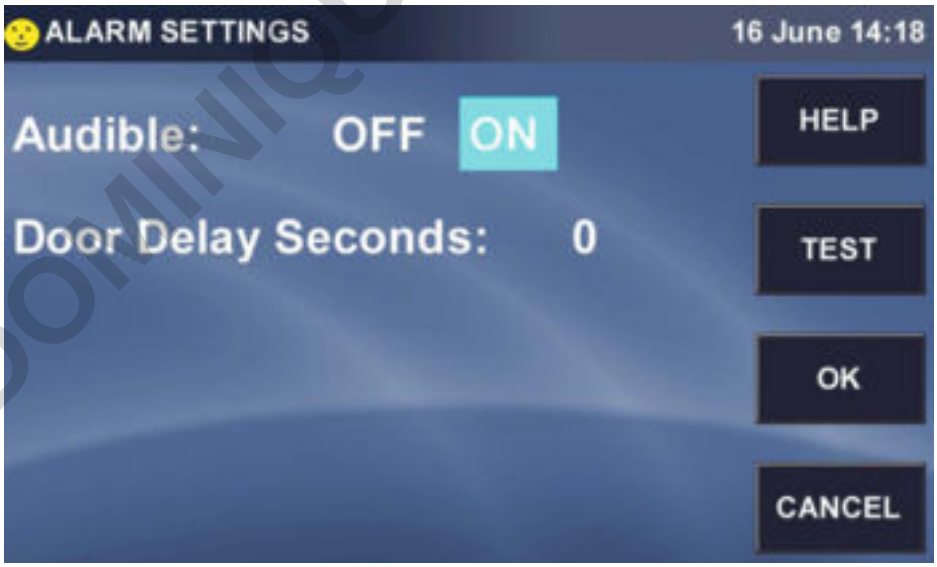
2. To deactivate the audible alarm, tap on the *OFF* button.

   The status of the alarm is highlighted in blue.

Adjusting the audible alarm

1. To call up the alarm settings, tap on the *Alarms* button on the *MENU 1* screen.

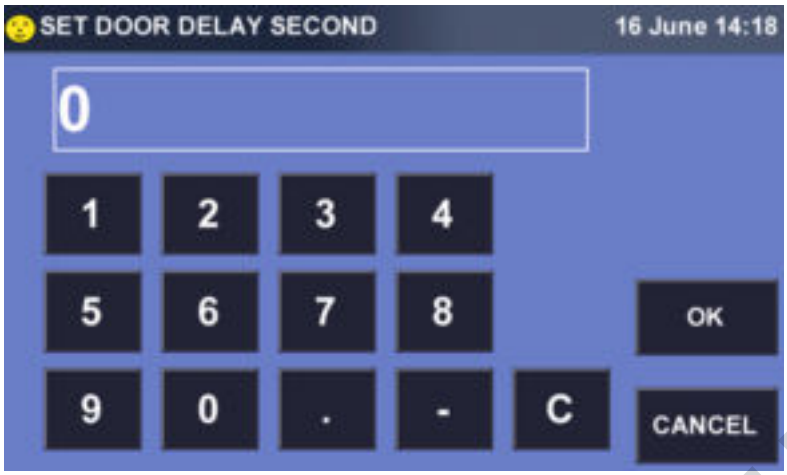
   The *ALARM SETTINGS* window opens.



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2. To delay the alarm being triggered when the door is opened, tap on the *Door Delay Seconds* line.

   The *SET DOOR DELAY SECONDS* window containing a number pad opens.



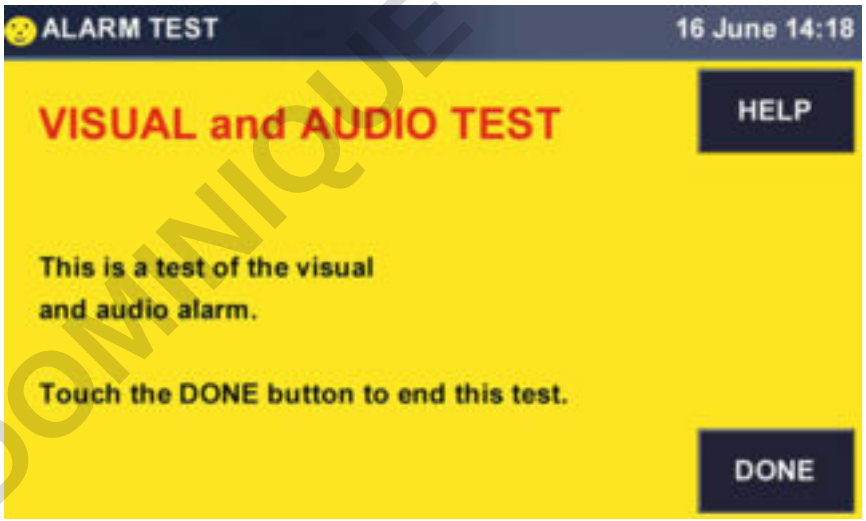
3. Enter the desired value in seconds.
4. To save the value, tap on the *OK* button.

   You automatically return to the *ALARM SETTINGS* screen.

Testing the audible alarm

1. Tap on the *TEST* button in the *ALARM SETTINGS* window.

   The *ALARM TEST* window opens.



   The test starts automatically and an audible alarm sounds.

2. To acknowledge the test and stop the audible alarm, tap on the *DONE* button.

   You automatically return to the *ALARM SETTINGS* screen.

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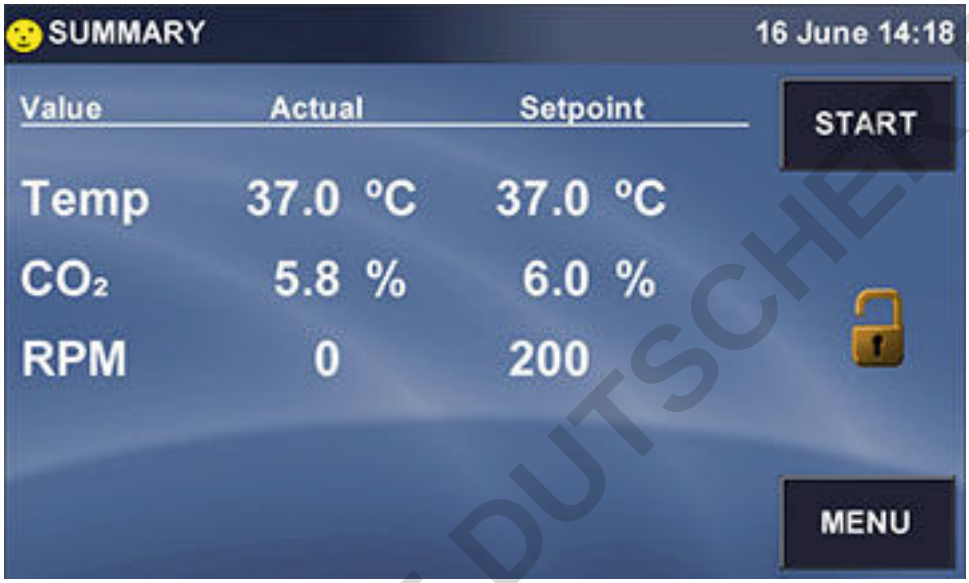
6.2.3 Calling up the summary

Prerequisites:

- The user screen is unlocked.
- You have administration rights.

1. To call up the summary of current values and setpoints, tap on the *Summary View* button on the *MENU 1* screen.

   The *Summary* window opens.



2. Tap on the setpoint of the parameter that you want to change or reset.

   An additional window containing a number pad opens.

3. Set the desired setpoint for the parameter.

4. To return to the SUMMARY window, tap on the *Menu* button.

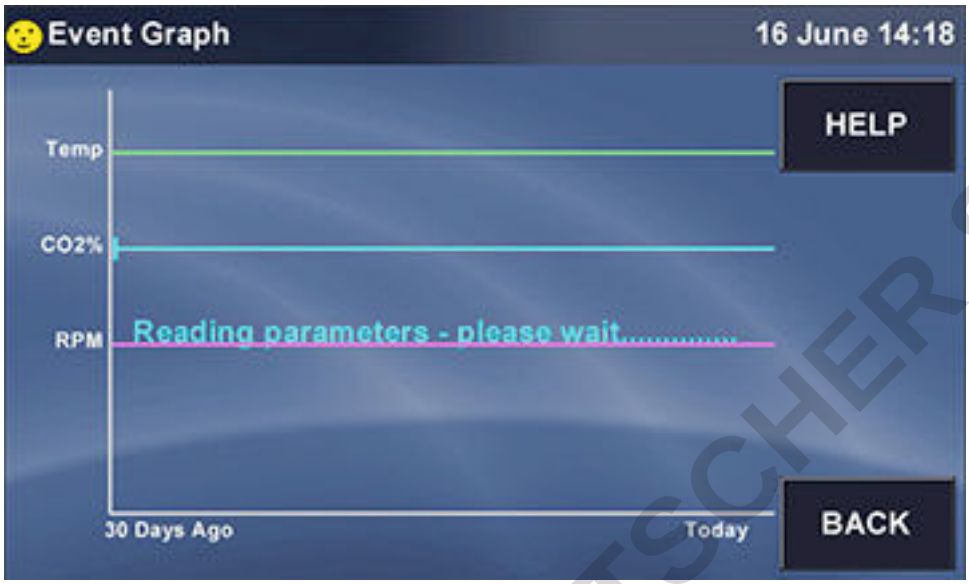
   If you activate a run time for the device, a STOPWATCH symbol appears in the *SUMMARY* window next to RPM.

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6.2.4 Calling up the event graph

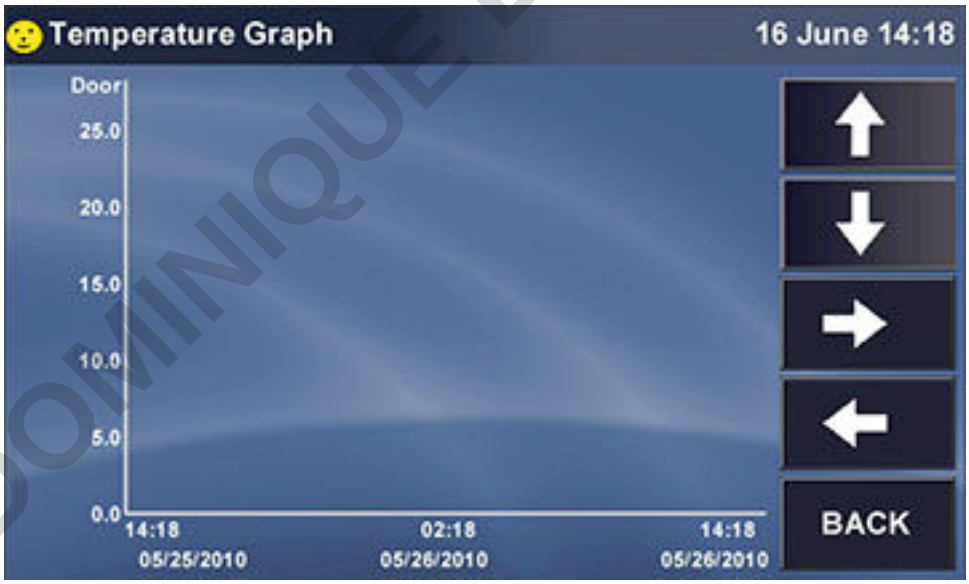
1. To call up the event graph, tap on the *Event Graph* button on the *MENU 1* screen.

   The *Event Graph* window opens.



2. To open the detailed graph for a parameter (in the example: temperature), tap on the line for the parameter.

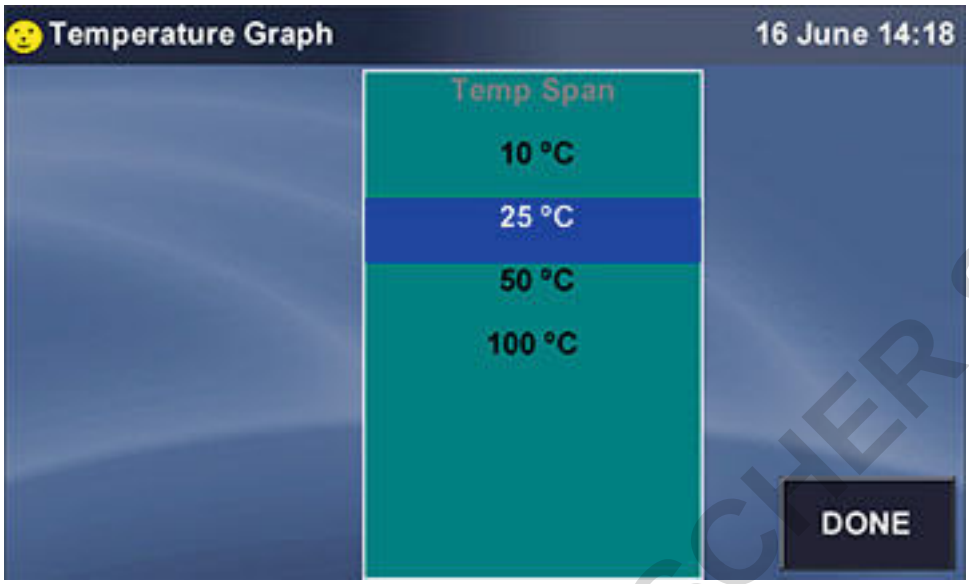
   The *Temperature Graph* window opens.



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3. To change the axis scale, tap anywhere on the y-axis.

   The *Temperature Graph* window for adjusting the *Temp Span* opens.



4. Tap on the desired temperature span for the y-axis.
5. To save your selection, tap on the *Done* button.

   You return to the *Temperature Graph* window.

   The y-axis shows the temperature span, in the example: from 0.0 °C to 25.0 °C.
6. To change the axis scale, tap anywhere on the x-axis.

   The *Temperature Graph* window for adjusting the *Time Span* opens.



7. Tap on the desired time span for the x-axis.
8. To save your selection, tap on the *Done* button.

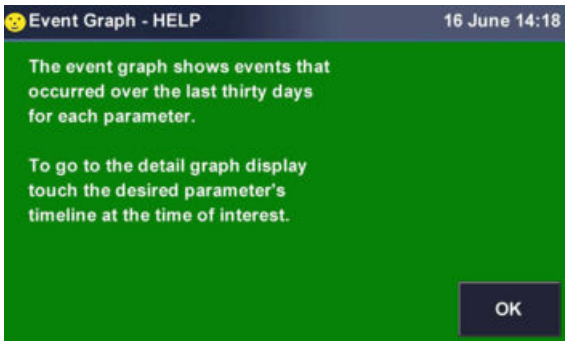
   You return to the *Temperature Graph* window.

   The x-axis shows the time span, in the example: 24 hours.
9. You can scroll through the parameter values using the *UP* and *DOWN* arrow keys and through the time axis using the *LEFT* and *RIGHT* arrow keys at any time.

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10. To call up additional information on the screen, tap on the *HELP* button.

    The *Event Graph - HELP* window opens.



11. To return to the *Event Graph* window, tap on the *OK* button.
12. To return to the *MENU 1* screen, tap on the *BACK* button in the *Event Graph* window.

6.2.5 Calibration

Calibrating the speed

Calibrate the speed of the device if the actual speed of the device shaker differs from the nominal speed displayed in the *STATUS* or *SUMMARY* window.

1. To set the calibration, tap on the *Calibrate* button on the *MENU 1* screen.

   The *SET CALIBRATION* window opens.



2. Allow the device to run up to the desired shaking speed.
3. Note the speed shown on the display.
4. Use a tachometer to measure the actual speed and record this as the actual speed.

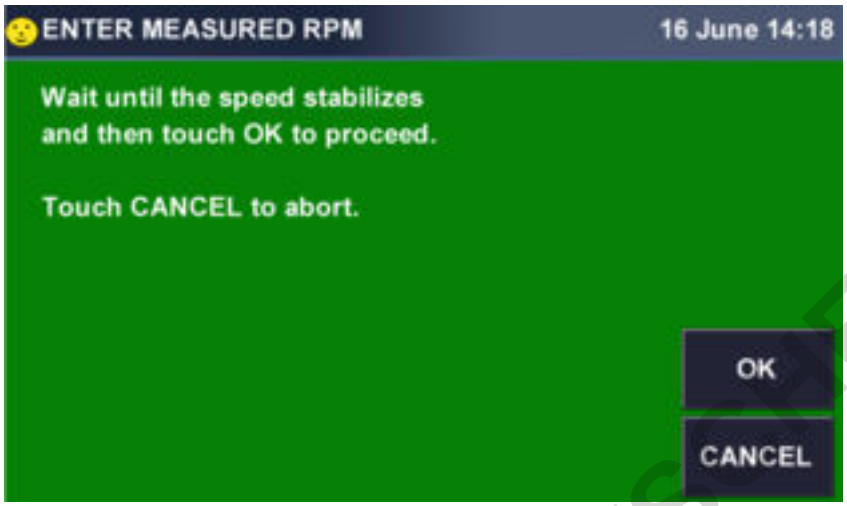
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5. Calculate the speed correction value using the following formula:

   actual speed – indicated speed = agitation gain value.

6. Tap on the *Agitation Gain* line in the *SET CALIBRATION* window.

   The *ENTER MEASURED RPM* window opens.



7. When the speed has stabilized, tap on the *OK* button.

   The *ENTER MEASURED RPM* window containing a number pad opens.

8. Enter the measured value rpm using the number pad.
9. To save the value, tap on the *OK* button.

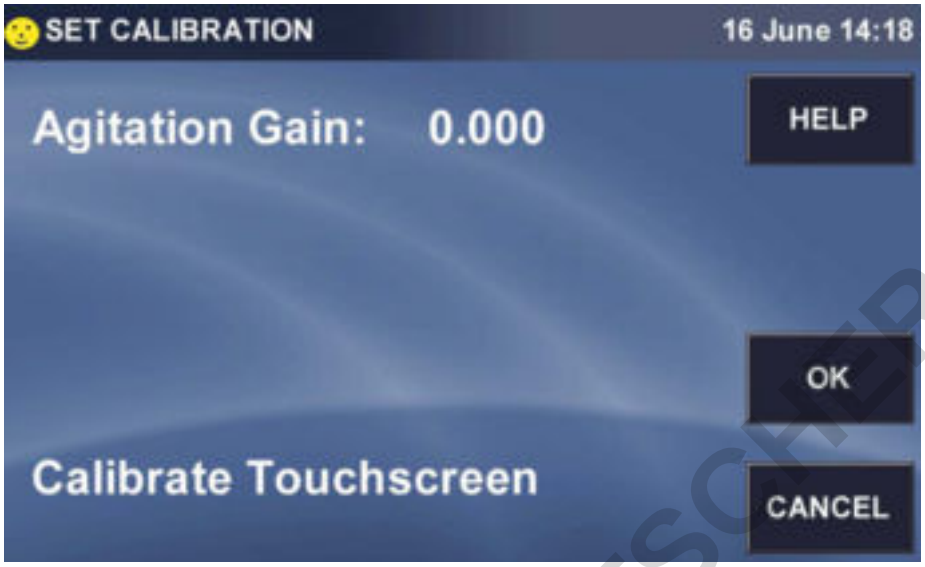
You cannot enter a setpoint or agitation gain below 100 rpm or above 400 rpm.

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Calibrating the touch screen

1. To set the calibration, tap on the *Calibrate* button on the *MENU 1* screen.

   The *SET CALIBRATION* window opens.



2. Tap on the *Calibrate Touchscreen* line in the *SET CALIBRATION* window.

   A dialog window opens.

3. Touch the touch screen at various points according to the instructions on the screen.

6.2.6 Setting the screen brightness

The *Power Save Brightness* setting controls how much the touch screen backlight is dimmed when the display switches to power-saving mode.

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1. On the MENU 1 screen, tap on the *General Settings* button.

   The *GENERAL SETTINGS* window opens.

2. Tap on the slider in the *Power Save Brightness* line and select a dimming level.
3. To return to the *MENU 1* screen, tap on the *DONE* button.

6.2.7 Power Saver Timeout

The *Power Saver Timeout* setting specifies the time after which the touch screen dims if it has not been touched before.

1. On the *MENU 1* screen, tap on the *General Settings* button.

   The *GENERAL SETTINGS* window opens.

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2. Tap on *POWER SAVER TIMEOUT*.

   The *SET POWER SAVER MINUTES* window containing a number pad opens.



3. Enter the desired number of minutes.
4. To return to the *POWER SAVER TIMEOUT* window, tap on the *OK* button.

6.2.8 Setting security

Enabling security

You can only enable the *Security Enabled* setting with administration rights. If the setting is enabled, users can only call up the *SUMMARY* and *STATUS* windows. The UNLOCK symbol is closed in these windows.

To unlock the system, the user must log in with administration rights.

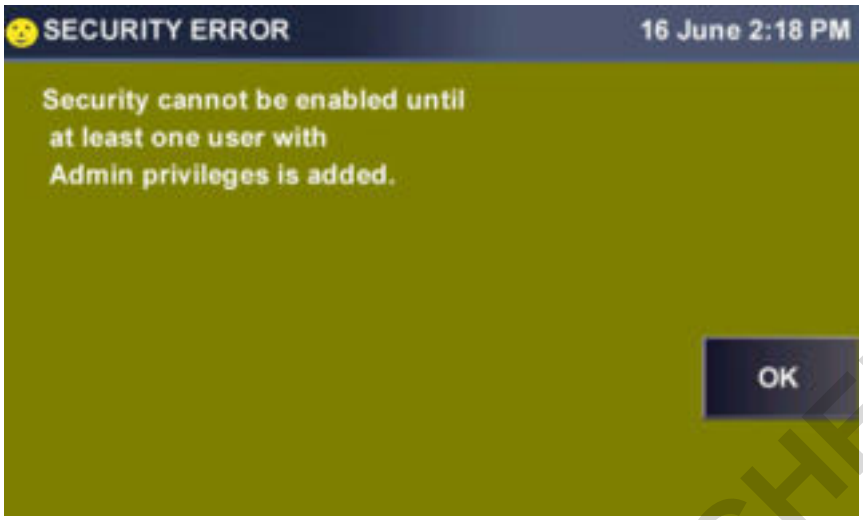
1. On the *MENU 1* screen, tap on the *General Settings* button.

   The *GENERAL SETTINGS* window opens.

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2. To enable the setting, tap on *Security Enabeld* or on the checkbox in the *GENERAL SETTINGS* window.

   If you do not have administration rights, an additional window will open.



3. To acknowledge the message and return to the *GENERAL SETTINGS* window, tap on the *OK* button.

Setting security

The *Lock Timeout* setting specifies the time after which the system locks when *Security Enabeled* is enabled and the touch screen is idle. The UNLOCK symbol changes from open to closed.

To unlock the system, log in with administration rights.

1. On the *MENU 1* screen, tap on the *General Settings* button.

   The *GENERAL SETTINGS* window opens.

2. Tap on *Security Timeout* in the *GENERAL SETTINGS* window.

   The *SET LOCK TIME MINUTES* window containing a number pad opens.

3. Enter the desired value in minutes.

4. To return to the *GENERAL SETTINGS* window, tap on the *OK* button.

6.2.9 Date and time

Setting the time

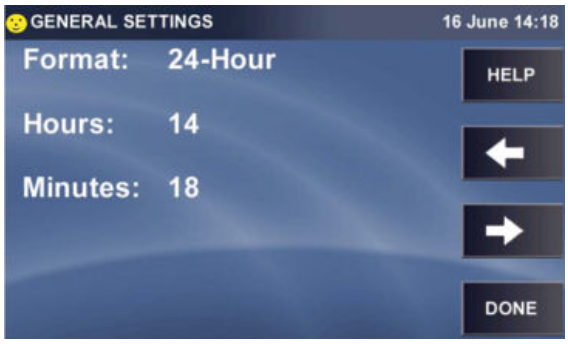
1. On the *MENU 1* screen, tap on the *General Settings* button.

   The *GENERAL SETTINGS* window opens.

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2. Tap on the *Right arrow* button in the *GENERAL SETTINGS* window.

   The additional *GENERAL SETTINGS* window opens.



3. Tap on the *Format* line and select a time display between *24-Hour* or *12-Hour*.
4. Tap on *Hours* or on the hours display.

   An additional window containing a number pad opens.
5. Enter the current number of hours.
6. To save the entry, tap on the *OK* button.
7. For a *12-Hour* time display, select between *PM* (post meridiem) and *AM* (ante meridiem).
8. Tap on *Minutes* or on the minutes display.

   An additional window containing a number pad opens.
9. Enter the current number of minutes.
10. To save the entry, tap on the *OK* button.

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Setting the date

1. Press the *Right arrow* button.

   The next *GENERAL SETTINGS* window opens.



2. Tap on *Day*, *Month* or *Year*.

   An additional window containing a number pad opens.

3. Enter the current date.
4. To save the entry, tap on the *OK* button.
5. Tap on the *Format* line or the date display.

   The *SET FORMAT* window opens.



6. Choose between four format displays.

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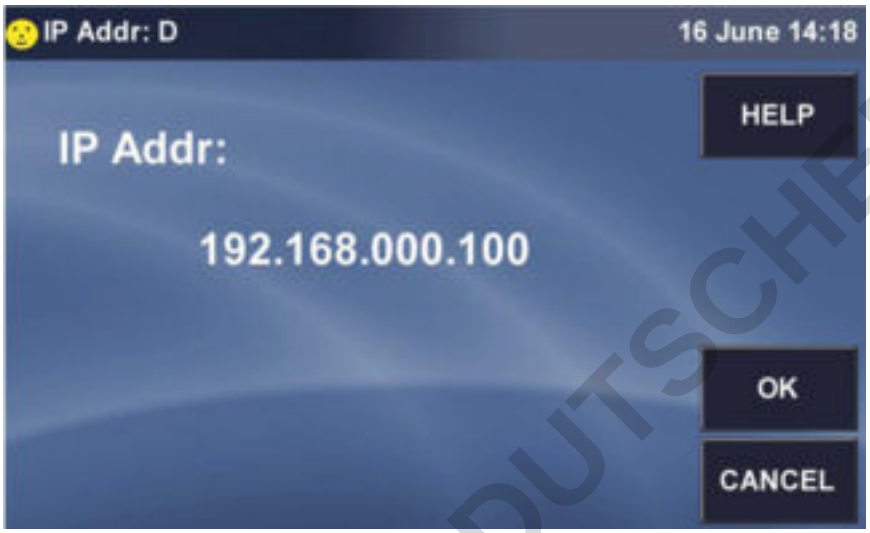
7. To save the entry, tap on the *OK* button.
8. To return to the *MENU 1* screen after all entries have been made, tap on the *DONE* button.

6.2.10 Calling up the IP address

Calling up the IP address

1. To call up the IP address, tap on the *Communications* button on the *MENU 1* screen.

   The *IP Addr: D* window opens.

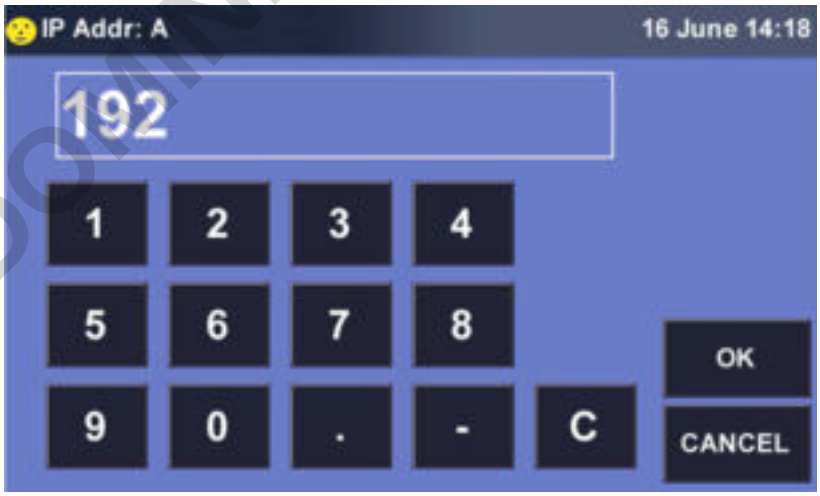


Ethernet is the default mode. Therefore, the IP address *IP Addr* is displayed.

Changing the IP address

1. Tap on the *IP-Adresse* line.

   The *IP Addr: A* window containing a number pad opens.



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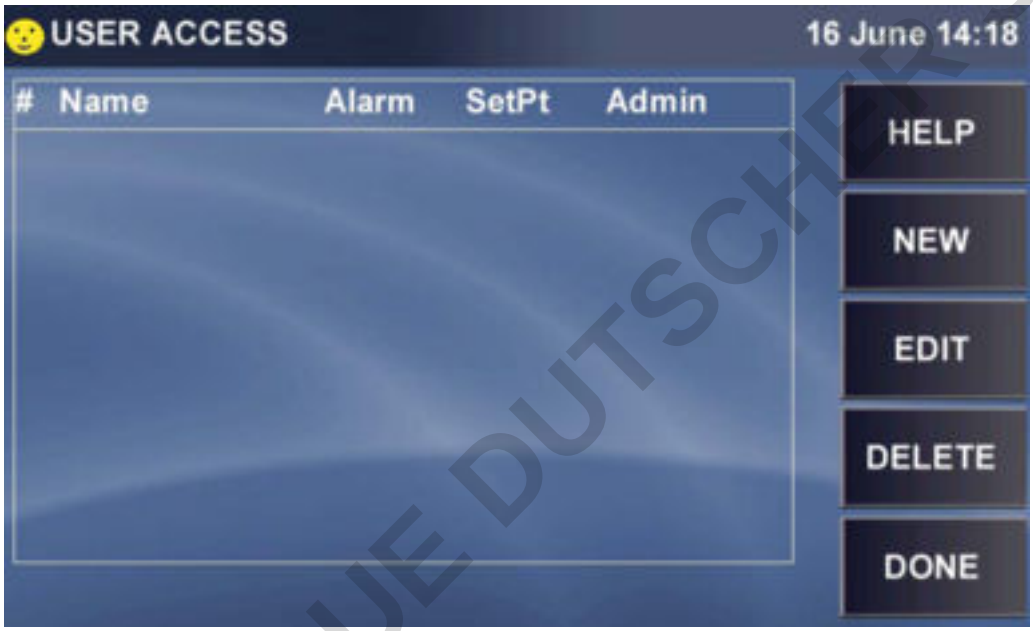
2. To reset each of the 4 number blocks or to change the blocks individually as needed, tap on the *OK* button.
3. To return to the *MENU 1* screen, tap on the *CANCEL* button in the *SET COMMUNICATIONS* window.

6.3 User management

6.3.1 Creating a user account

1. Tap on the *Users* button.

   The *USER ACCESS* window opens.



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2. To create a new user account, tap on the *NEW* button.

   The *NEW USER NAME* window containing a letter and number pad opens.



3. Enter the user name using the letter and number pad.

   The user name can be up to 8 characters long.

4. To save the name, tap on the *NEXT* button.

   The *NEW PASSWORD* window containing a letter and number pad opens.



5. Enter the password using the letter and number pad.
6. If the password is unsuitable, the *ILLEGAL PASSWORD* window will appear asking you to correct it.

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7. Tap on the *OK* button.

   You return to the *NEW PASSWORD* window containing the letter and number pad.

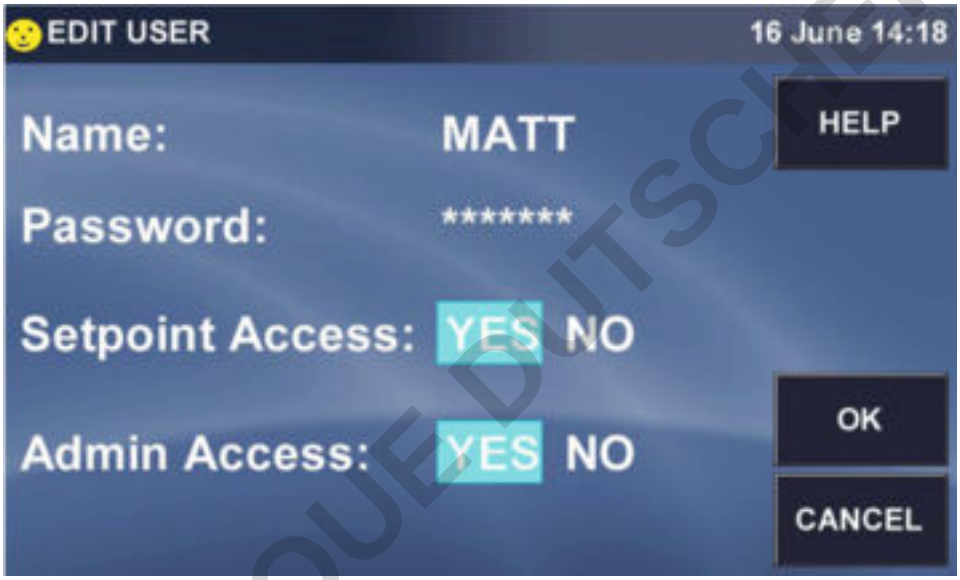
8. Enter a suitable password using the letter and number pad.
9. To save the user account, tap on the *OK* button.

   You return to the *USER ACCESS* window.

6.3.2 Editing a user account

1. In the *USER ACCESS* window, tap on the user account that you want to edit.
2. Tap on the *EDIT* button.

   The *EDIT USER* window opens.



3. To change the entries, tap on the corresponding field.

   You can change the entries in the following fields:
   - *Name*
   - *Password*
   - *Setpoint Access*: the user has access to the setpoints in order to edit them.
   - *Admin Access*: the user has access to all device settings and system settings.

4. Tap on the *OK* button.

   The *USER ACCESS* window opens.

   Edit other user accounts as described in steps 1 to 4.

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6.3.3 Deleting a user account

1. In the *USER ACCESS* window, tap on the user account that you want to delete.
2. Tap on the *DELETE* button and then on the *OK* button.

   The *DELETE USER* window opens.
3. To delete the user account, tap on the *YES* button. To cancel the process, tap on the *NO* button.

   You return to the *USER ACCESS* window.
4. To return to the *MENU 1* screen, tap on the *DONE* button.

6.4 Making system settings

1. Tap on the *MENU* button.

   The *MENU 1* screen opens.
2. On the *MENU 1* screen, tap on the *Right arrow* button.

   The MENU 2 screen opens.



3. Select the system settings that you want to edit.

The service setting is reserved for authorized service technicians and is password-protected. Users do not have access to this function.

6.4.1 Calling up system diagnostics

The authorized service technician needs the information from the system diagnostics.

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1. On the *MENU 2* screen, tap on the *DIAGNOSIS* button.

   The *DIAG - Page 1 of 11* window opens.



2. To navigate through pages 1 to 11, tap on the *Right arrow* button.
3. To return to the *MENU 2* screen, tap on the *DONE* button.

6.4.2 Calling up system maintenance

6.4.2.1 Update Display Firmware

Prerequisites:

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- The USB device must use a FAT32 file system.
- The firmware update is available on the Eppendorf website.

1. On the *MENU 2* screen, tap on the *Maintenance* button.

   The *MAINTENANCE* window opens.



2. Tap on the *Update Display Firmware* line in the MAINTENANCE window.
3. Tap on the *NEXT* button.

   The *UPDATE DISPLAY FM* dialog window opens.



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4. To download the binary update files to the device, follow the instructions in the dialog window.
5. To cancel the process, tap on the *CANCEL* button. To return to the *MAINTENANCE* window, tap on the *DONE* button.

6.4.2.2 Update Controller Firmware

Prerequisites:

- The USB device must use a FAT32 file system.
- The firmware update is available on the Eppendorf website.

1. On the *MENU 2* screen, tap on the *Maintenance* button.

   The *MAINTENANCE* window opens.



2. Tap on the *Update Controller Firmware* line in the *MAINTENANCE* window.

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3. Tap on the *NEXT* button.

   The *UPDATE CONTROLLER FM* dialog window opens.



4. To download the update, follow the instructions in the dialog window.
5. To cancel the process, tap on the *CANCEL* button. To return to the *MAINTENANCE* window, tap on the *DONE* button.

6.4.2.3 Calling up sensor trends

The *View Sensor Trends* window displays the sensor data from up to 72 hours in the past. If a sensor error occurs, you can call up the data, export it via the USB storage medium and send it to Eppendorf SE for evaluation.

Prerequisites:

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- The USB device must use a FAT32 file system.

1. On the *MENU 2* screen, tap on the *Maintenance* button.

   The *MAINTENANCE* window opens.



2. In the *MAINTENANCE* window, tap on the *View Sensor Trends* line.

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3. Tap on the *NEXT* button.

   The first of 5 *DIAGNOSTIC TRENDS* windows opens.



Fig. 6-1: Example window without data recording

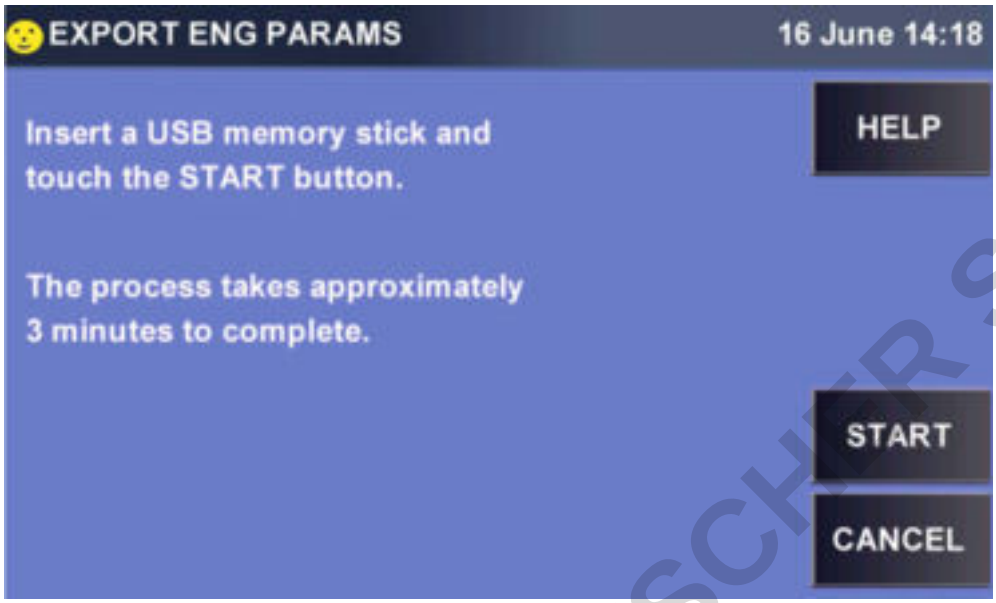
You can identify the trends in the graph using the colors of the sensor parameters.

4. To call up the information in the next pages, tap on the *Right arrow* button.
5. To return to the previous page, tap on the *Left arrow* button.
6. To change the display parameters of the trends, tap on the x-axis or y-axis.

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7. To save the diagnostic data on a USB storage medium, tap on the *EXPORT* button.

   The *EXPORT ENG PARAMS* window opens.



8. Follow the instructions on the window and tap on the *START* button.

   The *EXPORT ENG PARAMS* window containing a progress bar opens.



9. To cancel the process, tap on the *STOP* button. To return to the *MAINTENANCE* window after the download, tap on the *DONE* button.

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6.4.2.4 Clearing sensor trends

Prerequisites:

- The USB device must use a FAT32 file system.

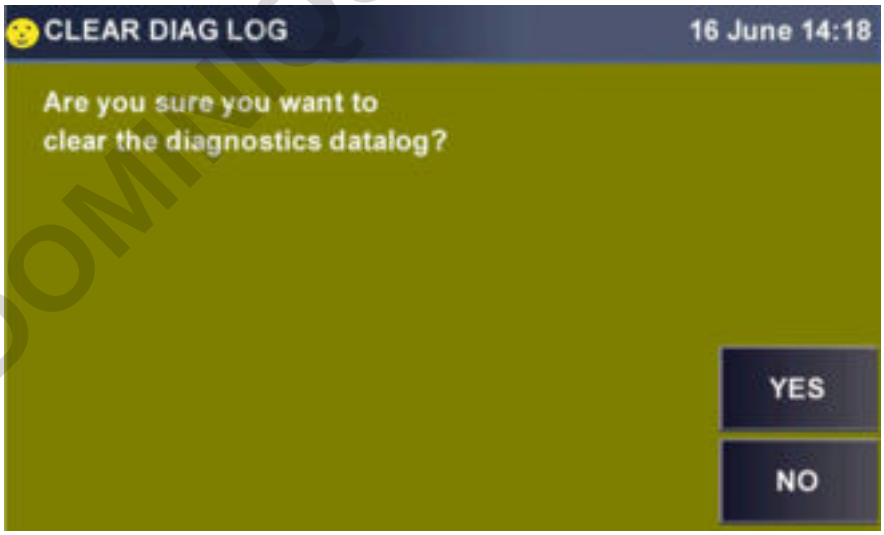
1. On the *MENU 2* screen, tap on the *Maintenance* button.

   The *MAINTENANCE* window opens.



2. In the *MAINTENANCE* window, tap on the *Clear Sensor Trends* line.
3. Tap on the *NEXT* button.

   The *CLEAR DIAG LOG* dialog window opens.



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4. Follow the instructions on the display.
5. To cancel the process, tap on the *NO* button. To clear the data, tap on the *YES* button.

   You return to the *MAINTENANCE* window.

6.4.3 Calling up options

The *INSTALLED OPTIONS* window lists all the options available for your device.

1. In the *MAINTENANCE* window, tap on the *Options* button.

   The *INSTALLED OPTIONS* window opens.



2. To enable an option, tap on *ON*. To disable the option, tap on *OFF*.
3. To save your entry, tap on the *OK* button.
4. To return to the *MENU 2* screen, tap on the *OK* button.

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6.4.4 Calibration

Setting recurring CO_2 auto-zero calibration

1. On the *MENU 2* screen, tap on the *CO2 Autozero* button.

   The *SET CO2 AUTOZERO* window opens.



2. To set the CO_2 auto-zero calibration interval, tap on the *Frequency* line. Choose between: *Daily*, *Weekly*, *Bi-Weekly* and *Monthly* or disable the run interval using the *OFF* button.

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3. To set the start time of the run interval, tap on the *Start Time* line.

   The *SET Time* window opens.



4. Tap on the *Hours* line.

   The *SET HOUR* window containing a number pad opens.



5. Set the hour for the start time.
6. To save the entry, tap on the *OK* button.
7. To set the minutes, repeat the process.
8. In the *SET TIME* window, tap on the *OK* button.

   You return to the *SET CO2 AUTOZERO* window.

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Starting manual CO_2 auto-zero calibration

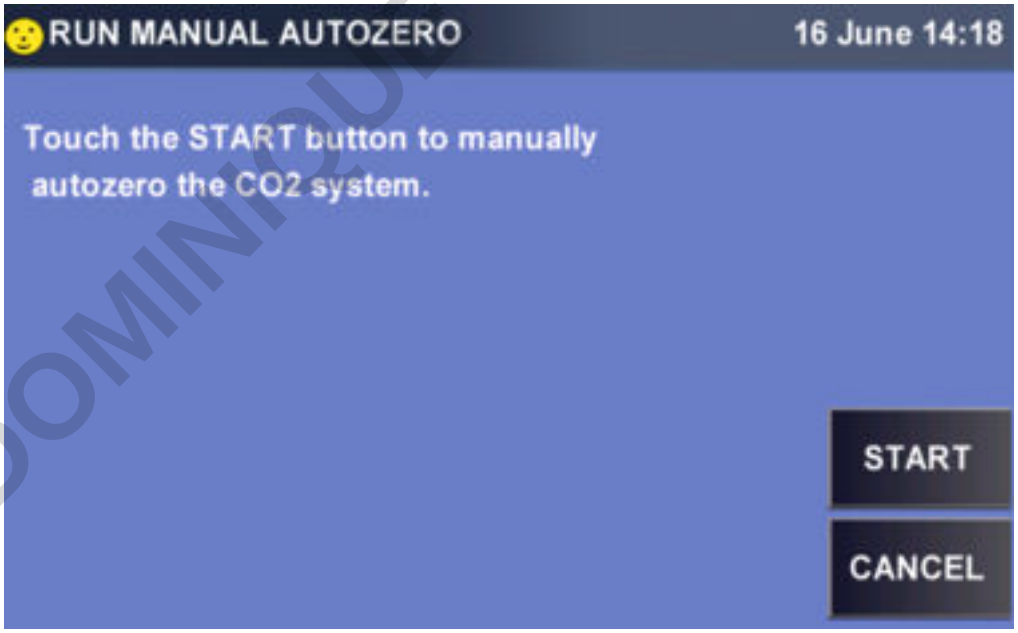
1. On the *MENU 2* screen, tap on the *CO2 Autozero* button.

   The *SET CO2 AUTOZERO* window opens.



2. In the *SET CO2 AUTOZERO* window, tap on the *RUN AZ* button.

   The *RUN MANUAL AUTOZERO* window opens.

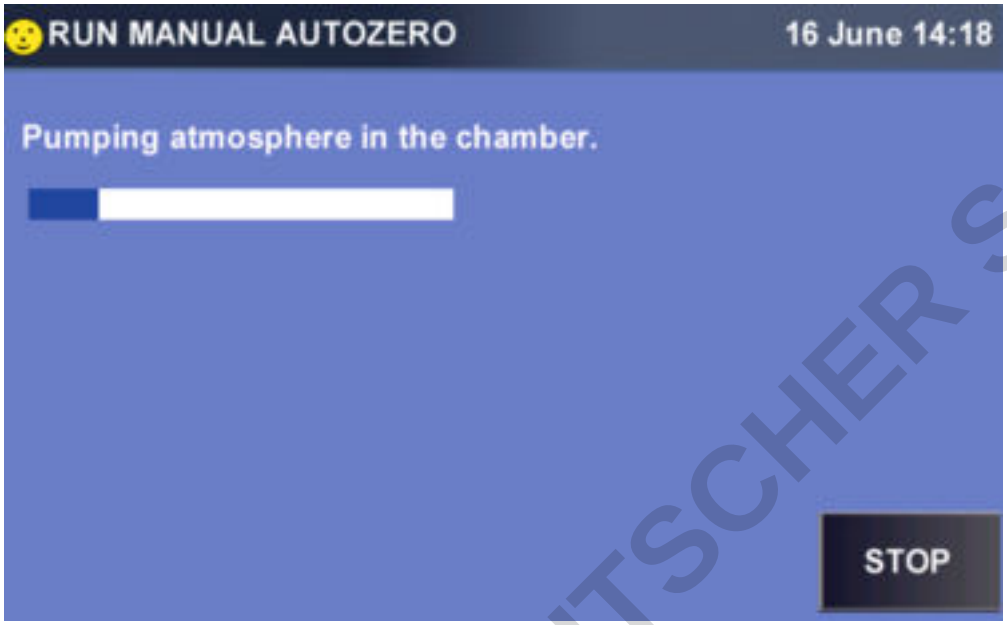


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3. Tap on the *START* button.

   Manual CO_2 auto-zero calibration starts.

   The *RUN MANUAL AUTOZERO* window containing a progress bar opens.



4. Wait until the white progress bar is completely filled in blue, the pumping of air from the atmosphere is complete and the screen displays *CO2 Autozero is complete. Result: Completed OK.*

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Canceling manual CO_2 auto-zero calibration

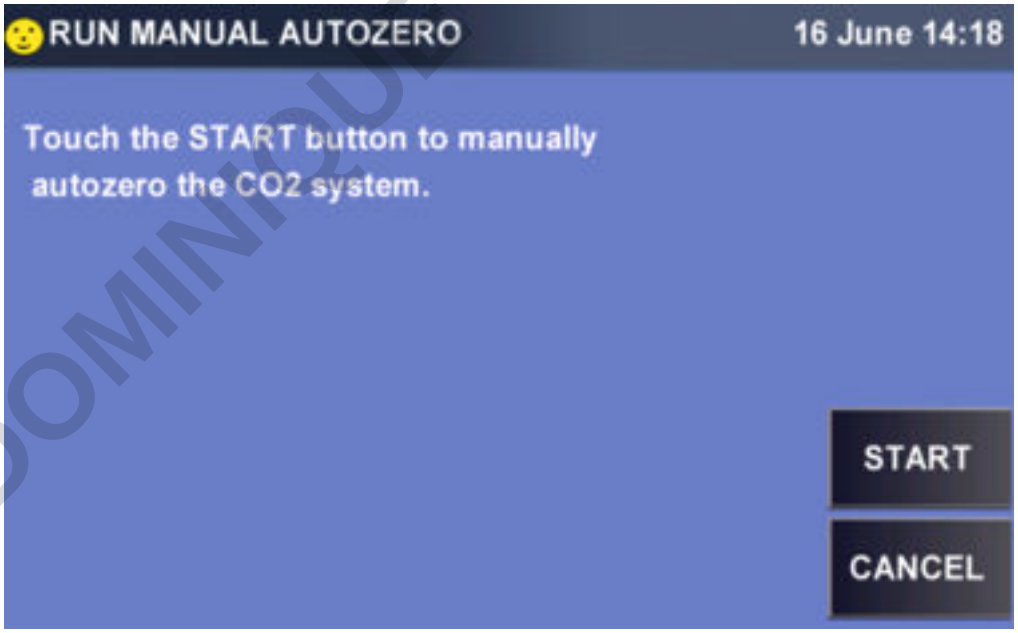
1. On the *MENU 2* screen, tap on the *CO2 Autozero* button.

   The *SET CO2 AUTOZERO* window opens.



2. In the *SET CO2 AUTOZERO* window, tap on the *RUN AZ* button.

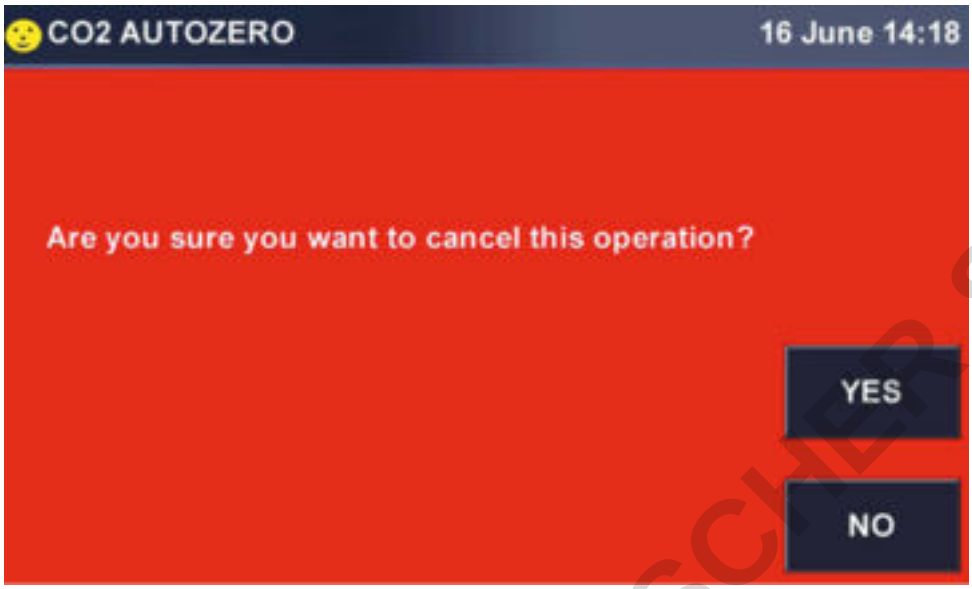
   The *RUN MANUAL AUTOZERO* window opens.



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3. To cancel the process, tap on the *STOP* button in the *RUN MANUAL AUTOZERO* window.

   The *CO2 AUTOZERO* window opens.



4. To continue the CO_2 auto-zero calibration, tap on the *NO* button. To confirm cancelation, tap on the *YES* button.

   The CO2 AUTOZERO window opens.



5. To restart the CO_2 auto-zero calibration, tap on the *REDO AZ* button.
6. Tap on the *DONE* button.

   You return to the *SET CO2 AUTOZERO* window.

7. To return to the *MENU 2* screen, tap on the *OK* button.

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6.5 Checking the device functions

Prerequisites:

- The device has been set up and installed in accordance with this operating manual.
- The device is not loaded with samples.
- The device is switched on.

1. Check whether the touch screen lights up.
2. Check whether the temperature in the device drops.
3. Check whether the signal tone is activated.
4. To check whether an alarm is triggered, open the door and leave it open for 1 min.
5. To check whether an alarm is triggered, unplug the device without switching it off.

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7 Operation

7.1 Opening and closing doors

Opening the outer door and inner doors

To ensure stable conditions in the chamber, do not leave the door open longer than necessary. When opening the door, wipe off any condensate that may have formed completely to avoid condensation.

1. Pull the outer door handle.
2. Turn the inner door latch upwards by 90°.
3. Pull the inner door latch.

Closing the outer door and inner doors

An incorrectly closed door can cause condensation.

1. Close the inner door.
2. Turn the inner door latch 90° to the side until it is held by the magnet.

   The inner door is closed correctly when the inner door latch is horizontal.
3. Close the outer door until it is held by the magnet.

7.2 Loading the device

CAUTION! Personal injury

Improperly secured sample tubes on the sample platform can cause injuries or material damage.

– Before operating the device, make sure that the sample tubes (particularly those made from glass) are properly secured and do not protrude beyond the edge of the sample platform.
– Make sure that the sample platform is locked before closing the door. The handle must be folded up.

Load the platform evenly.

Prerequisites:

- The platform is installed on the bearing housing.

1. Load the platform.
2. Secure the vessels with the flask clamps.

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If a shelf is installed, the maximum flask size that can be used is 1 L for Erlenmeyer flasks and 2.8 L for Fernbach flasks. Without a shelf, Erlenmeyer flasks up to 4 L fit into the device.

7.3 Switching on the device

Prerequisites:

- Set up the device in accordance with the operating manual.
- Connect the device in accordance with the operating manual.
- The device has been acclimatized for at least 12 h.
- Fill the water trays with 250 mL of lukewarm, sterile, distilled water each.

1. Switch on the device using the mains/power switch.

   The display lights up.

   The device heats up to the pre-programmed setpoints of 37 °C and 5 % CO_2 concentration in the chamber.

   The CO_2 sensor is initialized. It can take up to 30 min for the setpoint to appear on the display.

2. Switch on the CO_2 supply with the pressure reducer.

   To ensure a sufficient volume flow, open the stop valve completely. The default setting is 0.05 mPa (0.5 bar or 7.2 PSI).

3. Especially if more than one device is connected to the CO_2-supply, check that the gas pressure and the volumetric gas flow rate are sufficient.

4. To allow conditions to stabilize, leave the device switched on for at least 2 h.

If the mains/power supply to the device is interrupted long enough for the temperature to drop below the setpoint, the CO_2 valve will be deactivated until the temperature setpoint is reached again.

Deactivating the CO_2 valve is intended to prevent the CO_2 measured values from being falsified.

Changing the temperature or CO_2 setpoints leads to deviations in measurement accuracy.

7.4 Using the shaker

Starting the shaker

1. In the STATUS or SUMMARY window, tap on the *START* button.

   The STATUS or SUMMARY subwindow opens.

2. To start shaker operation, tap on the *YES* button.

   In the STATUS or SUMMARY window, the *YES* button changes to *STOP*.

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Stopping the shaker

1. In the STATUS or SUMMARY window, tap on the *STOP* button.

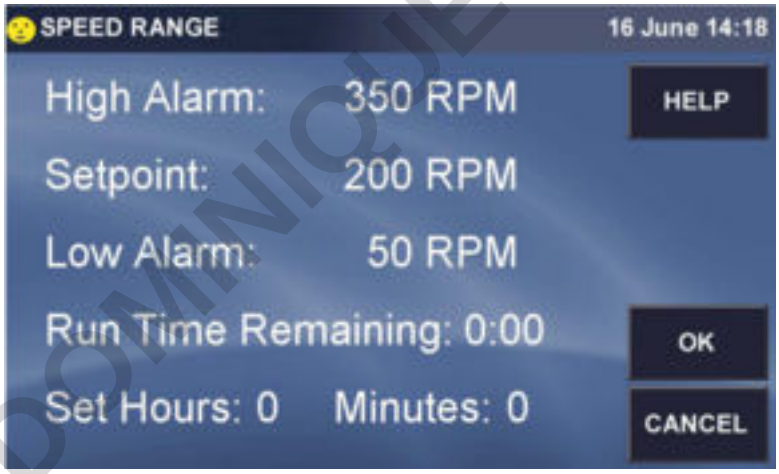
   The STATUS or SUMMARY subwindow opens.



2. To stop shaker operation, tap on the *YES* button.

Setting the shaking speed

You can set the shaking speed and the shaker run time at any time.



Parameter	Description
High Alarm	Alarm when the speed increases sharply
Low Alarm	Alarm when the speed decreases sharply

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Parameter	Description
Setpoint	Set the shaking speed setpoint
Set Hours *Set Hours*	Set the hours and minutes for how long the shaker will run. If a shaker run time is activated, the STOPWATCH symbol will appear next to RPM in the SUMMARY window.

1. Tap on the *RPM* line in the STATUS window.

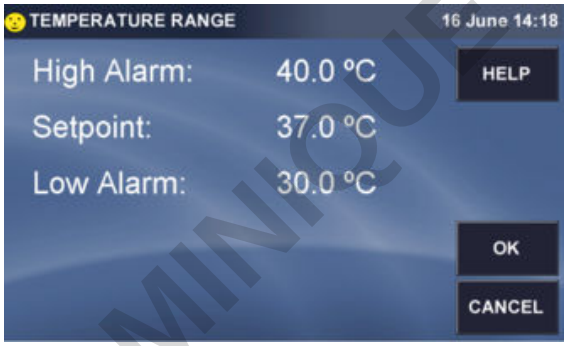
   The SPEED RANGE window opens.
2. Tap on the parameter that you want to set or reset.

   An additional window containing a number pad opens.
3. Set the desired value for the parameter.
4. To save your setting, tap on the *OK* button.

   You return to the SPEED RANGE window.
5. Repeat steps 2 to 4 for the parameters that you want to set or reset.
6. To return to the STATUS window, tap on the *OK* button in the SPEED RANGE window.

7.5 Setting the temperature

You can set the temperature in the device chamber at any time.



Parameter	Description
High Alarm	Alarm when the temperature rises sharply
Setpoint	Set the temperature setpoint
Low Alarm	Alarm when the temperature drops sharply

1. In the STATUS window, tap on the *°C* line.

   The TEMPERATUR RANGE window opens.

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2. Tap on the parameter that you want to set or reset.

   An additional window containing a number pad opens.

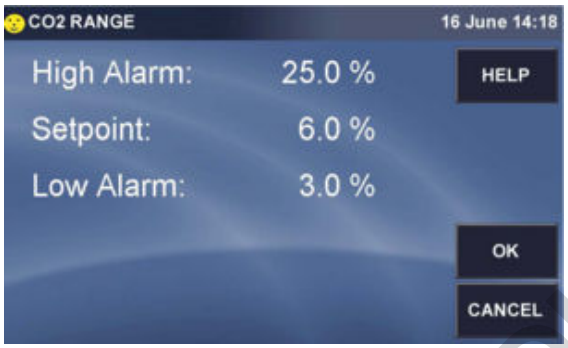
3. Set the desired value for the parameter.
4. To save your setting, tap on the *OK* button.

   You return to the TEMPERATUR RANGE window.

5. Repeat steps 2 to 4 for the parameters that you want to set or reset.
6. To return to the STATUS window, tap on the *OK* button in the TEMPERATUR RANGE window.

7.6 Setting the CO_2 concentration

You can set the CO_2 concentration in the device chamber at any time.



Parameter	Description
High Alarm	Alarm when the CO_2 concentration rises sharply
Setpoint	Set the CO_2 concentration setpoint
Low Alarm	Alarm when the CO_2 concentration drops sharply

1. In the *STATUS* window, tap on the *CO_2-Konzentration* line.

   The CO2 RANGE window opens.

2. Tap on the parameter that you want to set or reset.

   An additional window containing a number pad opens.

3. Set the desired value for the parameter.
4. To save your setting, tap on the *Button* button.

   You return to the CO2 RANGE window.

5. Repeat steps 2 to 4 for the parameters that you want to set or reset.
6. To return to the STATUS window, tap on the *OK* button in the CO2 RANGE window.

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7.7 Muting the audible alarm

In rare cases, an audible alarm may sound when the device starts up and a yellow ALARM window may open.

Prerequisites:

- You have administrator rights to acknowledge the alarm message.

Users without administrator rights can mute the alarm, but cannot acknowledge it.

1. Tap on the *Mute* button in the ALARM window.

   The audible alarm is muted.

2. To acknowledge the alarm, follow the instructions on the screen.
3. Check whether there are any other alarms by tapping on the *Left arrow* and *Right arrow* buttons.
4. When you have acknowledged all the alarms, investigate the cause of the alarm and eliminate it.

7.8 Switching off the device

If the application was not stopped before the device was switched off, the drive starts again when the device is switched on.

Prerequisites:

- The device is not loaded.
- The application has been stopped.

1. Switch off the device at the mains/power switch.

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8 Maintenance

8.1 Maintenance plan

Interval	Maintenance work
As required	*Chapter 8.3.1 "Cleaning the device on the outside" on page 85*
	Chapter 8.3.4 "Disinfecting the device" on page 86
Daily	*Chapter 8.2.1 "Checking the gas supply" on page 84*

8.2 Maintenance

Eppendorf SE recommends having your device inspected and maintained at regular intervals by trained and skilled personnel.

Eppendorf SE offers customized service solutions for preventive maintenance, qualification and calibration of your device. For information, offers and contact options, visit our website www.eppendorf.com/epservices.

8.2.1 Checking the gas supply

Checking the primary gas supply

When full, the gas pressure is 50 bar (725 PSI). If the cylinder pressure drops significantly, the CO_2 cylinder is almost empty and must be replaced.

1. Check the reserve pressure in the CO_2 cylinder.
2. Make sure that the connections to the CO_2 cylinder are not leaking.

Checking the secondary gas supply

1. Check the secondary pressure via the building's supply.

   The secondary pressure is set to approx. 1 bar (14.5 PSI).

8.3 Cleaning

For any questions regarding cleaning and decontamination, or the cleaning agents used, please contact your local Eppendorf partner.

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8.3.1 Cleaning the device on the outside



DANGER! Electric shock

If liquids get inside the device, users may suffer an electric shock. A fatal electric shock causes cardiac arrhythmia and respiratory paralysis.

- Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
- Do not allow any liquids to enter the inside of the housing.
- Do not spray the device.
- Do not connect the device to the mains/power line unless both the inside and outside of the device are completely dry.



DANGER! Electric shock

If the door cable is damaged when cleaning the device, you are at risk of receiving an electric shock. Electric shocks cause heart injury and respiratory paralysis.

- Take care not to pull or bend the door cable when cleaning the device.



NOTICE! Damage to the device and accessories

The use of unsuitable cleaning agents or sharp objects may damage the device and its accessories.

- Do not use any aggressive cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Do not clean the device with acetone or organic solvents with a similar effect.
- Do not use any sharp or pointed objects to clean the device.

Material:

- Water
- pH-neutral soap
- Cloth

Prerequisites:

- The device is disconnected from the mains/power line.

1. Moisten a lint-free cloth with water and soap.
2. Use the cloth to clean the outer surfaces.
3. Clean the outer surfaces again with a rinsed lint-free cloth.

8.3.2 Disassembling the shelf rack

Prerequisites:

- You have disconnected the device from the mains/power line.
- The device has cooled down.

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- You have removed the water trays from the chamber.
- Wear your personal protective equipment.

1. Remove the shelf from the device starting from the bottom.
2. Remove the front and rear tie rods on the lower shelf rods.
3. Remove the 2 shelf rack parts from the incubator.

8.3.3 Assembling the shelf rack

Prerequisites:

- You have disconnected the device from the mains/power line.
- The device has cooled down.
- Wear your personal protective equipment.

1. Insert the 2 shelf rack parts into the chamber so that the spacers fit precisely on the side panels of the chamber.
2. Connect the 2 shelf rack parts by attaching the two tie rods at the front and rear to the lower shelf rods.
3. Slide the shelf onto the top of the shelf rack.

   The shelf rack is stable.

8.3.4 Disinfecting the device



DANGER! Electric shock

If you touch any parts which are under voltage, you may experience an electric shock. Electric shocks cause heart injury and respiratory paralysis.

– Switch off the device and disconnect the mains/power plug before commencing work on the device.

Preparing disinfection

A solution of 70 % isopropanol or ethanol and 30 % sterile, distilled water is recommended for disinfecting the device.

Disinfecting external surfaces



NOTICE! Damage to components

If disinfectant gets inside the device, it can cause electronic components to corrode. This will impair the function of the device.

– Only spray disinfectant onto a cloth.

Do not spray disinfectant into the interior of the device as this may damage the sensors. Do not allow liquid to come into contact with the white, porous CO_2 sensor cover as this may damage the sensors.

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If cleaning and disinfection is part of the software-controlled high-temperature-decontamination process, the device does not need to be switched off and disconnected from the mains/power supply.

Material:
- Disinfectant with at least 70 % ethanol
- Cloth

Prerequisites:
- The device has been disconnected from the mains/power line.
- The device has cooled down.
- Wear your personal protective equipment.
- Wear respiratory protection if aerosol formation is suspected.

1. Dampen a lint-free cloth with disinfectant.
2. Wipe all the external surfaces of the device with the cloth.

Disinfecting the interior

Do not spray disinfectant into the interior of the device as this may damage the sensors. Do not allow liquid to come into contact with the white, porous CO_2 sensor cover as this may damage the sensors.

If cleaning and disinfection is part of the software-controlled high-temperature-decontamination process, the device does not need to be switched off and disconnected from the mains/power supply.

Material:
- Distilled water
- Disinfectant with at least 70 % ethanol
- Cloth

Prerequisites:
- The device has been disconnected from the mains/power line.
- The device has cooled down.
- The water trays and the shelf rack have been removed from the chamber.
- Wear your personal protective equipment.
- Wear respiratory protection if aerosol formation is suspected.

1. Wipe the interior of the chamber with the alcohol solution.

   Wipe the area around the sensors carefully.

2. Allow the chamber to dry completely.
3. Wipe the shelf rack twice with the alcohol solution.

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4. Remove excess liquid from the shelf rack and dry it completely.
5. Wipe the inner door seal with the alcohol solution.
6. Wipe the inner door seal with sterile water and allow it to dry.
7. Install the shelf rack.

Disinfecting the water tray

8. Rinse out the water tray with sterile water.
9. Wipe the water tray with the alcohol solution.
10. Rinse the water tray again with sterile water.
11. Allow the water tray to dry completely.
12. Fill the water tray with 1.5 L – 2.5 L of lukewarm, distilled, sterile water.
13. Slide the water tray onto the lowest support of the shelf rack.

8.4 Decontamination

8.4.1 Decontaminating the device



WARNING! Burns

There is a risk of burns from hot components during high-temperature disinfection.

- Do not touch the device while a high-temperature disinfection cycle is running.
- Do not open the doors while a high-temperature disinfection cycle is running.
- Allow the device to cool down completely if a system crash or mains/power outage occurs during high-temperature disinfection.



NOTICE! Damage to components

If you do **not** remove the sensor covers of the CO_2 sensor during high-temperature disinfection, the sensor will be damaged.

- Before starting high-temperature disinfection, remove the sensor covers of the CO_2 sensor.
- Put the sensor covers into the holder for safe storage.

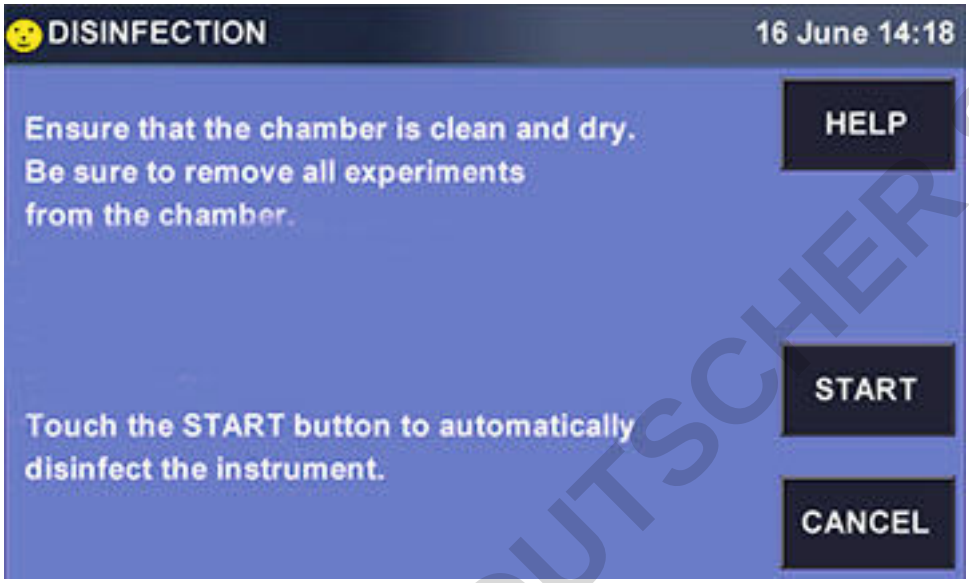
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Prerequisites:

- You have removed the accessories that are **not** high temperature resistant: Eppendorf test tube racks, Eppendorf clamps with girdle tubes (2 L and larger clamps) and sticky pads.
- You have placed the protective covers included in the delivery package on all sensors.

1. In the MENU 2 window, tap on the *Disinfection* button.

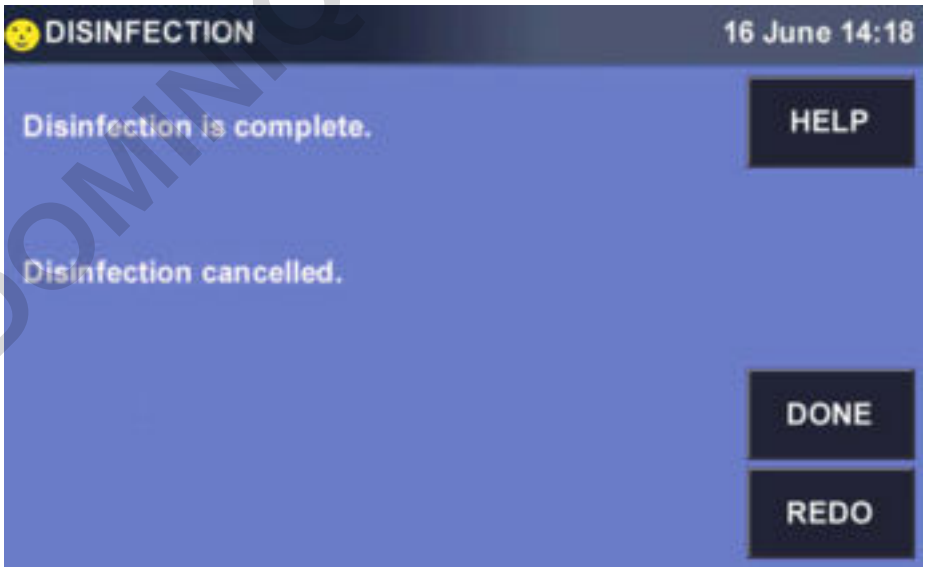
   The DISINFECTION window opens.



2. Follow the instructions in the dialog window. If everything is not yet ready for decontamination or if you do not want to carry out the process, tap on the *CANCEL* button. To start the high-temperature decontamination program, tap on the *START* button.

   The DESINFECTION window containing the progress bar opens.

3. To cancel the process, tap on the *STOP* button.



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4. To restart high-temperature disinfection, tap on the *REDO* button.
5. Tap on the *DONE* button.

   You return to the DISINFECTION window.
6. To return to the MENU 2 window, tap on the *CANCEL* button.

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9 Troubleshooting

9.1 Mains/power failure and fault interruption

The device is equipped with an automatic restart function in the event of a mains/power outage. All stored information is retained in the device's non-volatile memory.

If the device was operating before the mains/power supply was interrupted, it will resume operation with the last setpoints entered. To indicate that an automatic restart has occurred, the smiley symbol will appear green until the screen is touched. The symbol then turns yellow.

In the unlikely event that operation is interrupted due to a fault in the shaking mechanism, an alarm will flash on the device's display and the user will be informed by an acoustic signal that an alarm has occurred. The shaking function does not restart automatically in the event of such an interruption due to a fault.

The device will only resume the shaker run with the last setpoints entered after the alarm has been muted and acknowledged and the shaker run has been manually restarted via the touch screen.

9.2 General error message

Error description	Cause	Solution
Technical errors	Technical errors can be caused by faults, such as a mains/power failure or mains/power fluctuations.	It is therefore usually sufficient to switch the device off briefly and then switch it back on again after about 10 seconds. Check the cable connections if necessary. If the error occurs again, contact Eppendorf Service.

9.3 Error message due to the CO_2 concentration

Error description	Cause	Solution
The CO_2 pressure is below the alarm level	The CO_2 cylinder is empty or not connected.	Check the CO_2 supply. Replace the CO_2 cylinder and adjust the gas supply on the in-line gas regulator to 0.05 mPa (0.5 bar or 7.2 PSI). Check if the gas connection is disconnected or leaking, e.g., in-line gas filter, gas connection. Check the flow direction of the in-line gas filter: the gas supply must be connected to the INLET side of the in-line gas filter. Ventilate the room if necessary.

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10 Shut down

10.1 Switching off the device

If the application was not stopped before the device was switched off, the drive starts again when the device is switched on.

Prerequisites:

- The device is not loaded.
- The application has been stopped.

1. Switch off the device at the mains/power switch.

10.2 Disconnecting the device from the mains/power supply

Prerequisites:

- The device is switched off.

1. Unplug the mains/power plug from the earth/grounded socket.
2. Disconnect the mains/power cord from the device.

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11 Transport

11.1 Preparing the device for transport

Material:

- Transport protection

Prerequisites:

- The device has been taken out of operation.
- Stacked devices must be separated from each other beforehand.

1. Attach transport protection around the control panel.

Decontamination before shipment

If the device has to be sent to an authorized Technical Service Center for repairs or to an authorized dealer for disposal, the following must be observed:

- Observe the notes on the decontamination certificate. You can find it as a PDF file on our website https://www.eppendorf.com/decontamination.
- Decontaminate all the parts you would like to dispatch.
- Include the fully completed decontamination certificate in the package.

11.2 Transporting the device



WARNING! Personal injury

The device is heavy. Improper lifting and moving of the device can lead to serious injuries.

– Transport the device only with a sufficient number of transport helpers.
– Use a suitable transport aid to move the device.
– Keep the door closed when the device is on the transport aid.

Protective equipment:

- Protective clothing for transport
- Safety boots

Material:

- Packing
- Transport aid

Prerequisites:

- At least 3 transport aids

1. Transport the device in an upright position.
2. Use a transport aid to lift or transport the door.

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11.3 Shipping the device

Use the original packing to transport the device. If the original packing is no longer available, please ensure that the device is sufficiently protected by replacement packing during storage and further transport. Eppendorf SE is not liable for damage caused by improper replacement packing.

WARNING! Contamination

Shipping or storing a contaminated device or contaminated accessories may lead to contamination of persons or cause damage to health.

– Decontaminate the device and accessories before shipping or putting them into storage.

Material:

- Packing

Prerequisites:

- The device has been taken out of operation.
- The device has been decontaminated.

1. Download the decontamination certificate for returned goods from the website www.eppendorf.com.
2. Fill out the decontamination certificate.
3. Pack the device.
4. Attach the decontamination certificate securely to the outside of the packing.
5. Ship the device.

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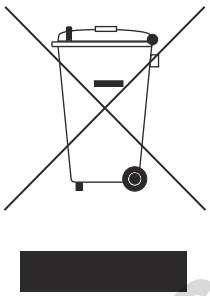
12 Disposal

12.1 Legal regulations

EU countries

Electrical and electronic equipment must be disposed of in EU member states in accordance with Directive 2012/19/EU. This directive has been transposed into national law by all EU member states.

Electrical and electronic equipment which has been put on the market after August 13, 2005 must be marked in a special way. According to the European standard , the following symbol can be used to mark this equipment:



Batteries and rechargeable batteries must be disposed of in EU member states in accordance with Directive 2006/66/EC. This directive has been transposed into national law by all EU member states.

Non-EU countries

Non-EU countries have country-specific standards for the disposal of waste electrical and electronic equipment and the disposal of batteries and rechargeable batteries.

12.2 Preparing for disposal

Preparing disposal according to legal regulations

For information on the legal regulations that apply in your country, contact your local authority and your Eppendorf partner.

Dispose of non-decontaminable devices as hazardous waste.

1. Check which legal regulations apply to disposal in your country.
2. Choose a certified waste disposal company or contact your Eppendorf partner.

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Creating a decontamination certificate

Prerequisites:

- The device has been decontaminated.

1. Download a decontamination certificate from our webpage www.eppendorf.com.
2. Complete the decontamination certificate.

12.3 Handing over the device to the disposal company

1. Inform the disposal company of any hazards posed by the device, e.g., locking devices, flammable substances.
2. Hand over the device and the decontamination certificate to the certified disposal company.

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13 Technical data

13.1 Dimensions

Device dimensions

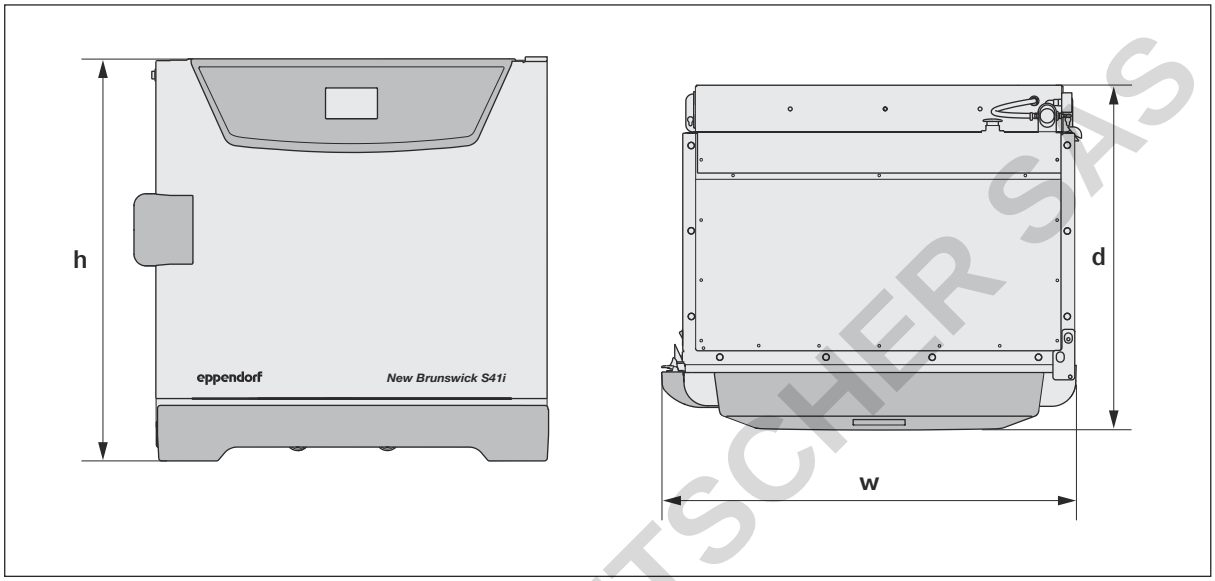


Fig. 13-1: External dimensions

Width (w)	87.5 cm
Height (h)	85.0 cm
Depth (d)	73.0 cm

Internal dimensions

Width	69.3 cm
Height	540 cm
Depth	44.4 cm

Packing dimensions

Width	100.0 cm
Height	118.5 cm
Depth	87.5 cm

Shelf

Polished stainless steel, perforated

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Width	67.2 cm
Depth	42.6 cm
Thickness	1.2 mm
Flatness tolerance	1.3 mm

Platform

Width	61.2 cm
Depth	35.6 cm
Thickness	7.9 mm

Footprint

Width	89.3 cm
Depth	74.7 cm
Height	86.6 cm

13.2 Weight

Device	154 kg, with standard functions
Device with packing	192 kg

13.3 Capacity and load

Applicable flask sizes in combination with number of shelves:

Number of shelves in device	Flask type	Max. size of containable flask
0	Erlenmeyer	up to 4 L
1	Erlenmeyer	up to 1 L
1	Fernbach	up to 2.8 L
2	Erlenmeyer	up to 250 mL

13.4 Mains/power supply

Mains/power supply voltage	100 V – 127 V ± 10 % 220 V – 240 V ± 10 %
Mains/power frequency	50 Hz – 60 Hz
Power consumption	< 1800 W
Overvoltage category	II (IEC 61010-1)

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Protection class	I
Specifications for mains/power cords in Europe with E/F mains/power plugs	Cable type AC 250 V / 16 A 3G 1.5 mm^2 with double insulation Mains/power plug according to IECEE CEE-7 / IEC 60884-1 and C19 coupler according to IEC 60320-1
Specifications for mains/power cords in Europe with other mains/power plugs	Use the mains/power cord in accordance with national regulations Cable type AC 250 V / 16 A 3G 1.5 mm^2 with C19 coupler according to IEC 60320-1 and with mains/power plug according to national regulations and IEC 60884-1
Specifications for mains/power cords in Canada and the USA	Cable type AC 125 V / 15 A SJT 3x14 AWG with double insulation Mains/power plug NEMA 5-15 according to ANSI/NEMA WD-6 and C19 coupler according to UL/IEC 60320-1
Specifications for mains/power cords outside Europe, Canada and the USA	Use the mains/power cord in accordance with national regulations

13.5 Ambient conditions

Operation

Environment	For indoor use only No humid environment
Ambient temperature	15 °C – 28 °C
Relative humidity	20 – 80 %, non-condensing
Pollution degree	2
Atmospheric pressure	79.5 – 106 kPa
Max. altitude above sea level	2000 m

Transport

Air temperature	-20 °C – 60 °C
Relative humidity	10 % – 75 %
Atmospheric pressure	30 kPa – 106 kPa

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Storage

Air temperature	-25 °C – 55 °C
Relative humidity	10 % – 95 %
Atmospheric pressure	70 kPa – 106 kPa

13.6 Electromagnetic compatibility

Electromagnetic compatibility	IEC 61326-1, Class B ICES-001, Class B Class B is the basic electromagnetic environment (environment at locations which are directly supplied with low voltage from the public supply network) FCC Part 15, Class B

13.7 Interfaces

BMS relays	4
BMS max. current	2 A
BMS max. voltage	30 V DC/AC
Ethernet	1
Auto-zero filter	1

13.8 Application parameters

Speed

Speed (with orbit 2.54 cm (1 inch))	25 – 400 rpm
Speed (with two devices stacked)	25 – 250 rpm
Control accuracy	±1 % over the entire measuring range

Temperature control

Range	4 °C above ambient temperature up to 50 °C
Control steps	0.1 °C
Accuracy	± 0.2 °C
Stability	±0.1 °C at 37 °C
Uniformity	±0.6 °C at an ambient temperature of 20 – 25 °C
Uniformity in flask media	± 0.25 °C

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CO_2 control

Range	0.2 – 20 %
Control steps	0.1 %
Stability	±0.2 % at 5 % CO_2
Uniformity	± 0.1 %
Gas connections	Inner diameter 6.5 mm and outer diameter 10 mm
Required gas pressure	0.05 mPa (0.5 bar/7.2 PSI)

Relative humidity

Water tray capacity	2 × 250 mL
Humidity control	95 % at 37 °C

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14 Glossary

CE
Conformité Européenne – The CE marking indicates that a product has been assessed before reaching the market and is deemed to meet EU safety, health and/or environmental protection requirements.

Precision
Spread of the measured values around the set value. A small spread corresponds to a high level of precision. A large spread corresponds to a low level of precision.

Procedure
A sequence of commands that are executed one after the other. Part of an application.

Residual current circuit breaker
Protective device that disconnects the voltage when there is a dangerously high rated residual current flowing to ground. Residual current circuit breakers protect persons from electric shock.

rpm
revolutions per minute – Mechanical unit of rotational speed, which gives the number of complete revolutions during a period of 60 s.

Status display
Word or symbol in the graphical user interface showing the status of a device or a connected module or component.

Status lamp
The current status of the device is indicated by the color and function of an LED.

Vessel
Micro test tube or individual well in a plate.

VisioNize
System for laboratory monitoring offered by Eppendorf SE, providing services related to Eppendorf devices.

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