

Operating Manual

SpeedMill PLUS Homogenizer



Manufacturer Analytik Jena GmbH+Co. KG
Konrad-Zuse-Straße 1
07745 Jena / Germany
Phone: +49 3641 77 70
Fax: +49 3641 77 9279
Email: info@analytik-jena.com

Technical Service Analytik Jena GmbH+Co. KG
Konrad-Zuse-Straße 1
07745 Jena / Germany
Phone: +49 3641 77 7407
Fax: +49 3641 77 9279
Email: service@analytik-jena.com



For a proper and safe use of this product follow the instructions. Keep the operating manual for future reference.

General Information <http://www.analytik-jena.com>

Documentation Number 10-3280-002-23

Edition D (08/2023)

Technical Documentation Analytik Jena GmbH+Co. KG

© Copyright 2023, Analytik Jena GmbH+Co. KG

Table of contents

1 Basic information	5
1.1 About this user manual	5
1.2 Intended use	5
2 Security	7
2.1 Safety labeling on the device	7
2.2 Requirements for the operating personnel.....	7
2.3 Safety instructions for transport and commissioning.....	7
2.4 Safety instructions: during operation	8
2.4.1 General.....	8
2.4.2 Safety instructions – protection against explosion and fire.....	8
2.4.3 Safety instructions – electrical equipment.....	8
2.4.4 Handling of auxiliary and operating materials and samples	9
2.4.5 Safety instructions – maintenance and repair	9
2.5 Behavior during emergencies	10
3 Function and design	11
3.1 Design, connections and control elements	11
4 Installation and commissioning	16
4.1 Installation conditions.....	16
4.2 Commissioning	17
5 Operation.....	19
5.1 Preparing the samples.....	19
5.2 Inserting samples in the sample holder	20
5.3 Removing samples.....	22
5.4 Homogenizing the samples.....	22
5.5 The three operating modes.....	22
5.5.1 Continuous mode.....	22
5.5.2 Interval mode.....	23
5.5.3 Quick mode	25
5.6 Operating mode presets.....	25
5.6.1 Continuous mode settings.....	25
5.6.2 Quick mode settings	26
5.7 Managing protocols.....	27
5.7.1 Saving protocols.....	27
5.7.2 Loading protocols	27
5.7.3 Starting protocols	28
5.7.4 Editing protocols.....	29
5.7.5 Deleting protocols.....	29
5.8 Preset protocols	30
6 Maintenance and care	31
6.1 Cleaning.....	31
6.2 Changing the fuse.....	31
6.3 Switching the operating voltage.....	32

7	Transport and storage	33
7.1	Preparing devices for transport	33
7.2	Transport.....	34
7.3	Storage	34
8	Disposal	35
9	Technical data	36

1 Basic information

1.1 About this user manual

Content	<p>This user manual describes the following homogenizer:</p> <ul style="list-style-type: none"> ▪ SpeedMill PLUS <p>The device is intended to be operated by qualified specialist personnel observing the operating manual.</p> <p>The operating manual provides information about the design and operation of the device and provides operating personnel the necessary know-how for the safe handling of the device and its components. The user manual also provides information on maintaining and caring for the unit.</p>
Conventions	<p>Instructions for actions occurring in chronological order are numbered and combined into action units.</p> <p>Warnings are indicated by a warning triangle and a signal word. The type, source and consequences of the hazard are stated together with notes on preventing the hazard.</p> <p>Elements of the control and analysis program are indicated as follows:</p> <ul style="list-style-type: none"> ▪ Program terms are in bold (e.g., the System menu). ▪ Menu items are separated by vertical lines (e.g., System Device).
Symbols and signal words used in this manual	<p>The user manual uses the following symbols and signal words to indicate hazards or instructions. These warnings are always placed before an action.</p>



WARNING

Indicates a potentially hazardous situation which can cause death or very serious (possibly permanent) injury.



CAUTION

Indicates a potentially hazardous situation which can cause slight or minor injuries.



NOTICE

Provides information on potential material or environmental damage.

1.2 Intended use

The SpeedMill PLUS homogenizer can mechanically reduce source material intended for subsequent isolation and purification of DNA, RNA or proteins. As the samples only heat up to a minimal degree, continuous operation is possible.

The device can reduce both hard and soft source material. Even very resistant source materials like bones, cartilage, chitinous exoskeleton of insects or ticks can be homogenized completely and reproducibly in a short period of time.

The homogenizer may only be used for the methods described in these operating instructions. Any other use is considered improper use.

Hazardous substances such as strong acids or alkaline solutions must not be handled by the device, as these can damage both the device and the reaction vessels. Combustible liquids or substances that can form explosive compounds must also not be handled by the device.

The homogenizer may only be loaded with plastic reaction vessels. Glass vessels may break.

2 Security

For your own safety and to ensure error-free and safe operation of the device, please read this chapter carefully before commissioning.



Observe all safety instructions listed in this user manual and all messages and information displayed on the monitor by the control and analysis software.

2.1 Safety labeling on the device

Warning and mandatory action labels have been attached to the device and must always be observed.

Damaged or missing warning and mandatory action labels can cause incorrect actions leading to personal injury or material damage. The labels must not be removed. Damaged warning and mandatory action labels must be replaced immediately!

The following warning and mandatory action labels have been attached to the device:

Mandatory action labels/information symbols	Meaning	Comment
	Disconnect the power supply before opening the device cover.	At the power switch/power inlet: Before opening the device cover, switch off the device and disconnect the power plug from the power socket.
	For People's Republic of China only	The device contains controlled substances. Analytik Jena GmbH+Co. KG warrants that these substances will not be released from the device within the next 25 years provided the device is employed as intended.

2.2 Requirements for the operating personnel

The device must only be operated by qualified specialist personnel instructed in the use of the device. This instruction also includes conveying the contents of these operating instructions.

In addition to the safety instructions in this user manual, the general applicable safety and accident prevention regulations of the respective country the device is operated in must be observed and adhered to. The operator must determine the latest version of these regulations.

The user manual must be accessible to the operating and service personnel.

2.3 Safety instructions for transport and commissioning

- Insufficiently secured components pose a risk of injury. During transport, secure the device components as specified in this operating manual.

- Risk of damage to health due to improper decontamination! Perform a professional and documented decontamination of the device before returning it to Analytik Jena. The decontamination report is available from Service when registering the return. Without a completed decontamination report, the acceptance of the device will be refused. The sender may be liable for damage caused by inadequate decontamination of the device.

2.4 Safety instructions: during operation

2.4.1 General

The operator must make sure that the device and its safety equipment is in sound condition each time before starting up the device. This applies in particular after each modification or extension of the device or its repair.

Observe the following:

- The device may only be operated if all items of protective equipment (e.g. covers in front of electronic components) are in place, properly installed and fully operational.
- The sound condition of the protection and safety equipment must be checked regularly. Any defects must be corrected as soon as they occur.
- Protective and safety equipment must never be removed, modified or switched off during operation.
- Keep all combustible materials away from the device.
- Ensure that no liquid enters the interior of the device, for example at cable connections. There is a danger of electric shock.
- The ventilation equipment on the device must be in good working condition. Covered ventilation grilles or slots etc. may cause the device to break down or may cause damage to it.
- Modifications, conversions and extensions to the device are only permitted after consultation with Analytik Jena. Unauthorized modifications can jeopardize the device's operational safety and may lead to limitations regarding the warranty and access to customer service.
- Hazardous substances such as strong acids or alkaline solutions and combustible liquids or substances that can form explosive compounds must also not be handled by the device. These can damage the device and cause injury to the operating personnel.
- Only plastic reaction vessels may be used in the homogenizer. Glass vessels may break and lead to injuries.

2.4.2 Safety instructions – protection against explosion and fire

The device may not be operated in an explosive environment.


Smoking or handling open flames are prohibited in the room in which the device is operated!

2.4.3 Safety instructions – electrical equipment

Lethal voltages may occur in the device! Contact with live components may cause death, serious injury or painful electrical shock.

- The power plug must be connected to a proper power outlet to ensure that the device meets protection class I (ground connector). The device may only be connected to power sources whose nominal voltage is the same as that on the rating

plate of the equipment. Do not replace the removable power cable of the device with a power cable that does not meet the specifications (with no protective ground conductor). Extensions of the supply cable are not permitted!

- Work on the electronics may only be carried out by the customer service of Analytik Jena and specially authorized technicians.
- Before opening the device, the device must be switched off via the main switch and the power plug must be disconnected from the power outlet!
- Only use fuses of the specified type.
- Ensure that the device is set to the correct operating voltage (→ "Switching the operating voltage"  32).

2.4.4 Handling of auxiliary and operating materials and samples

The operator is responsible for the selection of substances used in the process as well as for their safe handling. This is particularly important for radioactive, infectious, poisonous, corrosive, combustible, explosive and otherwise dangerous substances.

When handling hazardous substances, the locally applicable safety instructions and instructions in the safety data sheets from the manufacturers of the auxiliary and operating materials must be complied with.

Observe the following:

- The operator is responsible for carrying out suitable decontamination should the device become contaminated externally or internally with dangerous substances.
- Splashes, drops or larger liquid spillages should be removed using an absorbent material such as cotton wool, laboratory wipes or cellulose.
- For biological contamination, wipe the affected area with a suitable disinfectant, such as an Incidin Plus solution. Then wipe the cleaned areas so that they are dry.
- The only suitable cleaning method for the housing is wipe disinfection. If the disinfectant has a spray nozzle, apply disinfectant to a suitable cloth before using it on the device.

Work particularly carefully and cleanly with infectious material because the device cannot be decontaminated as a whole.

- Before using a cleaning or decontamination procedure other than that prescribed by the manufacturer, the user is required to check with the manufacturer that the intended procedure will not damage the device. Safety labels attached to the device must not have methanol applied.

As a possible disinfectant, Analytik Jena recommends:

- Descosept Spezial (for spray disinfection) from Dr. Schuhmacher GmbH
- Meliseptol HBV disinfectant wipes from B. Braun

2.4.5 Safety instructions – maintenance and repair

The device is generally maintained by the customer service department of Analytik Jena or specialist personnel trained and authorized by them.

Unauthorized maintenance can damage the device. For this reason, only the activities described in the user manual in the "Maintenance and care" chapter may be performed by the operator.

- All maintenance and repair work on the device must only be carried out when the device is switched off (unless specified otherwise).
- Before replacing device fuses or changing the operating voltage, disconnect the power cord from the power supply.
- Use only original spare parts, wear parts and consumables. These have been tested and ensure safe operation.

2.5 Behavior during emergencies

- If there is no immediate risk of injury, switch off the device and the connected system components immediately in hazardous situations or in the event of an accident and/or disconnect the power plugs from the power outlets.

3 Function and design

The SpeedMill PLUS homogenizer can mechanically reduce source material intended for subsequent isolation and purification of DNA, RNA or proteins. As the samples only heat up to a minimal degree, continuous operation is possible.

The device can reduce both hard and soft source material. Even very resistant source materials like bones, cartilage, chitinous exoskeleton of insects or ticks can be homogenized completely and reproducibly in a short period of time.

The handling of the device, as well the attachment and removal of the sample holder, is very easy. Tools are not required.

The sample holder can be stored at temperatures as low as $-80\text{ }^{\circ}\text{C}$. This passively cools the samples.

IST Innuscreen GmbH, close Analytik Jena cooperation partner, provides reaction vessels with volumes of 0.5 ml and 2.0 ml for homogenization. The reaction vessels, provided under the name innuSPEED Lysis Tubes, are filled with beads. There are various beads for hard and for soft materials.

Beads are small balls that differ in material, hardness and ball size. The beads are accelerated during homogenization, thus grinding down the source material.

After the samples have been mechanically reduced in the homogenizer, nucleic acid extraction follows. During this, lysis, DNA/RNA binding, washing and elution take place. Devices for automatic nucleic acid extraction can be found in the Analytik Jena portfolio.

3.1 Design, connections and control elements

Front view



Fig. 1 Front view

- 1 Lid
- 3 Keyboard

- 2 Display
- 4 Touch sensor with LED status display



Fig. 2 Interior view (with sample holder)

1 Lid

2 Sample holder

The homogenizer is a standalone device. No PC with control and monitoring software is required.

Sample holder

The sample holder has three components. The three components are inserted in sequence in the sample chamber. The sample holder can be removed completely to clean the sample chamber.

The sample holder provides space for 20 reaction vessels.

The user loads the source material into the reaction vessels and then places the reaction vessels in the sample holder. The closure seals the reaction vessel in the sample holder.

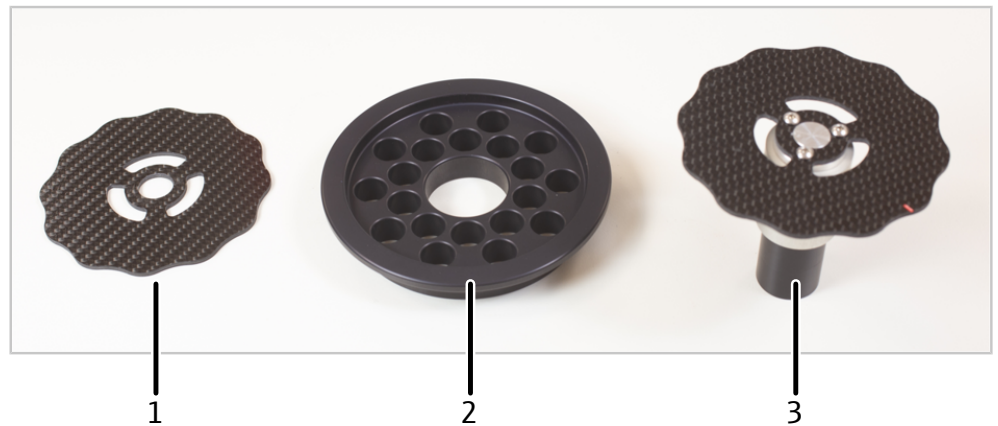


Fig. 3 Sample holder, disassembled

- 1 Base plate
- 2 Holder for reaction vessels
- 3 Closure and upper cover

Analytik Jena provides special tube fasteners as optional accessories for reaction vessels with mandrels (such as innuSPEED Lysis Tube Q). The tube fasteners replace the standard sample holder. The tube fasteners ensure optimized energy input during oscillation.



Fig. 4 Tube fasteners with innuSPEED Lysis Tube Q (with mandrels)

Terminals and switches on the rear of the device

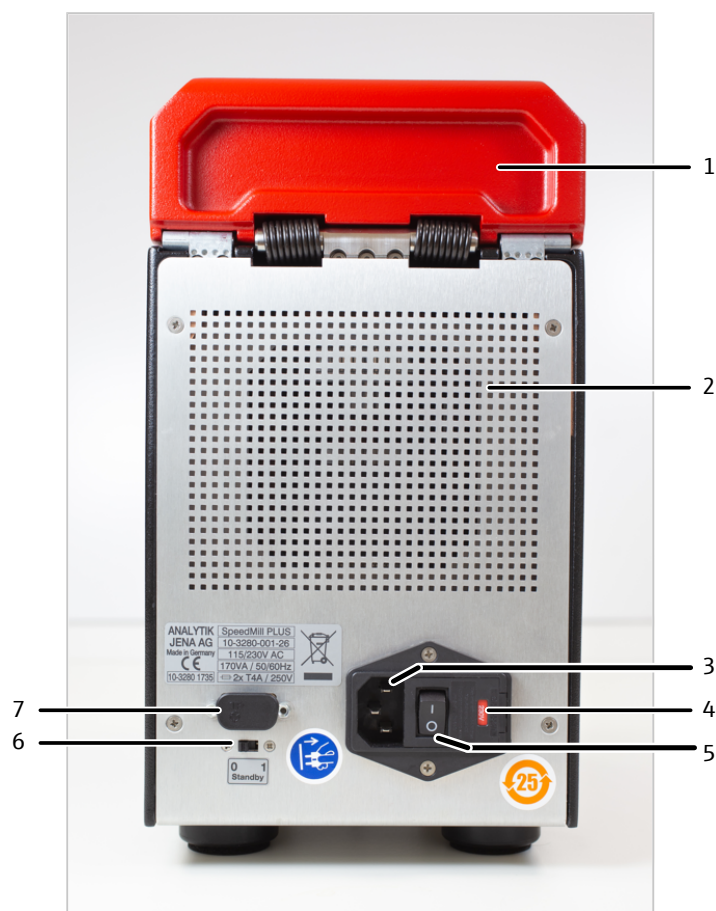


Fig. 5 Terminals and switches on the rear

- | | |
|-------------------------------|-----------------------|
| 1 Lid | 2 Ventilation opening |
| 3 Power connection | 4 Mains fuse |
| 5 Power switch | 6 Touch sensor switch |
| 7 COM interface (for service) | |

The switch on the rear of the device can be used to active/deactivate the touch sensor.

Type plate

The type plate is attached to the rear of the device. The type plate contains the following information:

- Manufacturer
- Trade name
- Serial number
- Electrical connection data
- WEEE marking
- CE marking

Control elements

The keyboard, the display and the touch sensor are located on the front side of the homogenizer.



Fig. 6 Control elements

- | | | | |
|---|---|---|----------|
| 1 | Screen | 2 | Keyboard |
| 3 | Touch sensor
with LED status display | | |

The keys have the following functions:

▲▼▶	Direction keys for moving the cursor, parameter setting
[enter]	Confirm a set/selected parameter Start the homogenization process
[esc]	Return to the last menu Interrupt/cancel an ongoing homogenization process

The homogenizer can be set to Sleep mode with the touch sensor. The LED displays the operating state of the device.

4 Installation and commissioning

4.1 Installation conditions

Ambient conditions

- This laboratory device is designed for inside use.
- Do not use the device in wet and damp environments. Keep the device surface clean and dry.
- The installation site must be free of drafts, dust and caustic fumes.
- Do not locate the device near sources of electromagnetic interference.
- Avoid mechanical shocks and vibrations.
- Avoid direct sunlight and radiation from heaters onto the device. If necessary, provide air conditioning.
- Do not use the device in explosion-hazard environments.
- Keep the ventilation slits free and do not obstruct them with other devices.
- The device can interfere with the operation of magnetic storage devices and sensitive electronics. Install the device at a distance to such devices.

Climate requirements for installation and storage locations:

Operating temperature	+5 to +40 °C
Humidity	Max. 80 % at +30 °C
Storage temperature	-40 to +70 °C
Humidity during storage	≤80 %

Power supply



WARNING

Danger due to electrical voltage

- Only connect the device to a properly grounded socket which complies with the voltage indicated on the device's rating plate.
- Do not use an adapter in the feeder.

The device operates on single-phase alternating current.

The installation of the electrical equipment in the laboratory must comply with the DIN VDE 0100 standard. At the connection point, an electrical current in accordance with the standard IEC 60038 must be available.

Spatial requirements

Device with closed lid (W x H x D)	155 x 260 x 305 mm
Device with open lid (W x H x D)	155 x 310 x 420 mm

The sample holder has to be removed from the device from above.

On the rear of the device, a distance of 50 cm must be maintained to adjacent devices to ensure proper airflow between the device and the ambient surroundings. Do not position the device on a soft surface.

4.2 Commissioning



DANGER

Risk of electric shock

The device is intended for use at 115/230 V. Operating the device with incorrect voltage can result in electric shocks and destruction of the device.

- ⇒ The operating voltage can be set via the fuse holder. The operating voltage is indicated in the viewing window of the fuse holder.
 - Check that the operating voltage settings on the fuse holder match the mains voltage.
 - Change the operating voltage as necessary.



NOTICE

Damage to the electronics due to condensation

Significant temperature differences can lead to the formation of condensation which can damage the device's electronics.

- After long-term storage or transport in a colder environment, allow the device to acclimatize at room temperature for at least one hour before switching it on.

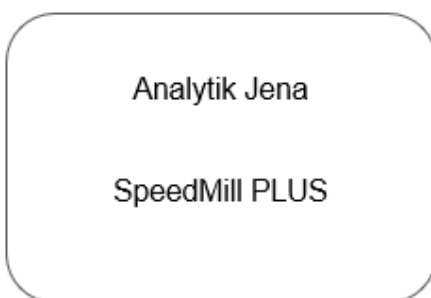


Fig. 7 Start screen

- ▶ Remove the device from the packaging.
- ▶ Check if the set operating voltage matches the mains voltage in the viewing window of the fuse holder.
- ▶ Connect the power cable to the power connection on the rear of the device. Connect the cable to the power supply.
- ▶ Switch on the device via the power switch on the rear of the device.
- ▶ The start screen appears on the display. Press **[enter]** to go to the main menu.
 - ✓ The device is ready for operation.

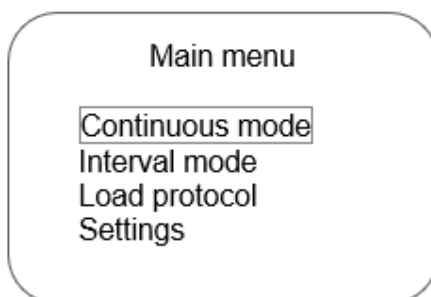


Fig. 8 Main menu

Switching the device off

- ▶ When the homogenization process has finished, the device can be switched off via the power switch.
- ▶ Only switch off the device after the cooling period (at least 30 s) has elapsed. The device may overheat otherwise.
 - ✓ The device is switched off.

Alternatively: You can put the device into **Sleep mode** via the touch sensor. The device is not completely switched off in Sleep mode. It continues to consume power.

- ▶ Touch the touch sensor for approximately 3 s until it lights up in red.
 - ✓ The device is in Sleep mode: The touch sensor is lit in red. The display goes out. The fans switch off.

Deactivating the touch sensor

A switch for activating and deactivating the touch sensor can be found on the rear of the device.

- ▶ Set the switch on the rear of the device to "0".
 - ✓ The touch sensor LED goes out. The device can only be switched on and off via the power switch.

5 Operation

5.1 Preparing the samples

Observe the following instructions when preparing the samples and operating the homogenizer:

- Hazardous substances such as strong acids or alkaline solutions must not be handled by the device, as these can damage both the device and the reaction vessels. Combustible liquids or substances that can form explosive compounds must also not be handled by the device.
- The homogenizer may only be loaded with plastic reaction vessels. Glass vessels may break.
- If the lid is opened during homogenization, the device immediately stops operation.

Open system

Various consumables can be used with the homogenizer:

- The innuSPEED Kit or Lysis Tubes from IST Innuscreen GmbH, for example
- Plastic reaction vessels from other manufacturers

The use of reaction vessels from IST Innuscreen GmbH (innuSPEED) for homogenization of the source materials is also recommended for other applications than isolation of nucleic acid.

Sample preparation with innuSPEED Kits or innuSPEED Lysis Tubes

(from IST Innuscreen GmbH)

Optimum sample sizes

Material	Optimum sample size (approx.)
Plant matter	
<ul style="list-style-type: none"> ▪ Soft plant matter such as soft leaves, fruit 	5 x 5 mm
<ul style="list-style-type: none"> ▪ Material of medium hardness such as conifers 	2.5 x 2.5 mm
<ul style="list-style-type: none"> ▪ Very hard material such as conifers or very thick and hard leaves 	1 to 1.5 x 1 to 1.5 mm
Tissue	
<ul style="list-style-type: none"> ▪ Soft tissue such as lung, kidney, brain, spleen or liver tissue 	5 x 5 mm
<ul style="list-style-type: none"> ▪ Very hard tissue such as rodent tails or cartilage 	1 x 1 mm

- ▶ Prepare as buffers and solutions as described in the kit manual. Observe all information on the preparation of various source materials.
- ▶ Load the Lysis Tubes with the source material.
- ▶ Follow the instructions in the kit manual and add Lysis Solution or water to the samples in the Lysis Tubes.
- ▶ Set the homogenization time indicates in the kit manual.

Preparing samples with other reaction vessels



CAUTION

Risk of injury from broken glass

Glass vessel can break during homogenization.

- Only use plastic reaction vessels.

Observe the following when selecting reaction vessels:

- Use plastic reaction vessels with screw-on caps.
- The reaction vessels can have the following volumes: 0.5 ml, 1.5 ml or 2.0 ml.
- The reaction vessels must be filled with beads. Beads are small balls that break down the cell walls during homogenization.
- Analytik Jena cannot ensure proper homogenization results when reaction vessels from other manufacturers are used.

Wet or dry homogenization can be used for samples.

Observe the following homogenization times:

Material	Recommended homogenization time (approx.)
Plant matter	
▪ Soft plant matter such as soft leaves, fruit	1 min
▪ Material of medium hardness such as conifers	2 min
▪ Very hard material such as conifers or very thick and hard leaves	3 min
Tissue	
▪ Soft tissue such as lung, kidney, brain, spleen or liver tissue	0.5 to 1 min
▪ Very hard tissue such as rodent tails or cartilage, and	2 x 2 min
▪ other tissue such as insects and ticks	

5.2 Inserting samples in the sample holder

Observe the following when inserting reaction vessels in the sample holder:

- Load the sample holder with at least two reaction vessels before homogenization.
- Do not start the device without the sample holder and samples!
- Load the sample holder so that the sample are balanced.



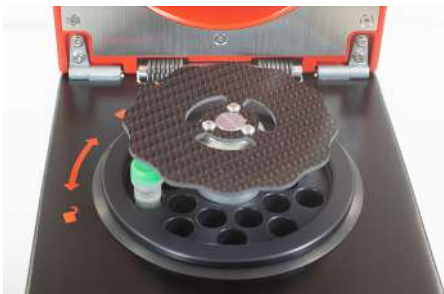
- ▶ Place the base plate of the sample holder on the pin in the sample chamber.



- ▶ Insert the holder. Press the holder down until its edge lies flush with the edge of the sample chamber.



- ▶ Load the holder with reaction vessels. Balance the reaction vessels.



- ▶ Place the closure on the pin.



- ▶ Close the sample holder.
 - To do this, press the closure down as far as possible.
 - Turn the closure clockwise approximately 90°. The closure is properly applied when it cannot be easily pulled off toward the top.

When using reaction vessels such as innuSPEED Lysis Tube Q with mandrels:

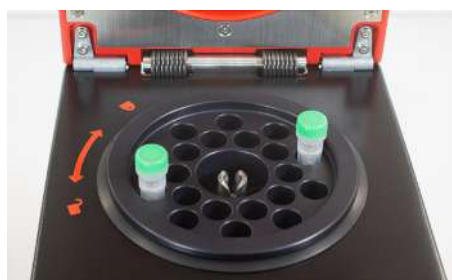


- ▶ Use the tube fasteners instead of the sample holder (optional accessories).
- ▶ Insert the reaction vessels in the tube fasteners so that they are balanced.

5.3 Removing samples



- ▶ Press the closure down and turn the closure counterclockwise by 90°.
 - i** NOTICE! Do not attempt to pull the closure off toward the top before unlocking.
- ▶ Remove the closure.



- ▶ Remove the reaction vessels with the samples.

5.4 Homogenizing the samples

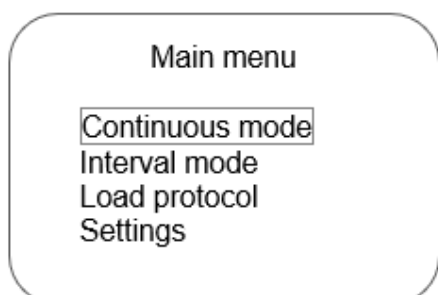
- ▶ Cool the sample holder down to the desired temperature.
- ▶ Prepare the samples.
- ▶ Open the device lid and insert the samples in the sample holder.
- ▶ Start homogenization in one of the three operating modes, or load and start a saved protocol.
- ▶ After homogenization: Open the lid and remove the samples from the sample holder.

5.5 The three operating modes

5.5.1 Continuous mode

In Continuous mode, homogenization is carried out for a preset duration (**Prep time**). The maximum time is 4 min 59 s.

A cooling phase follows homogenization. The cooling phase takes as long as homogenization. The device must cool for at least 30 s.



- ▶ Select the **Continuous mode** option in the main menu with the arrow keys.
- ▶ Press **[enter]**.

Continuous mode
 Prep time: 0:00
 Use Arrow keys to adjust time. Use ENTER to start

- ▶ Enter the **Prep time** duration as "Minutes:Seconds".
 - Switch from minutes to seconds with the ◀▶ arrow keys.
 - Enter the time in increments with the ▲▼ arrow keys.

Continuous mode
 Prep time: 0:10
 Press ESC to stop

- ▶ Start homogenization with **[enter]**.
 - ✓ The time is displayed running backwards. The following text appears: **Press esc to stop**. The cooling phase follows automatically.
- ▶ After the cooling phase, the screen for setting the duration appears again.
- ▶ Start the next homogenization with **[enter]**, or exit this mode with **[esc]** and return to the main menu.

5.5.2 Interval mode

Samples are homogenized in intervals in Interval mode. The user sets a duration (**Prep time**) and the number of cycles (**Cycles**) for each interval. The user can repeat intervals multiple times. The created homogenization protocols can be saved.

Main menu
 Continuous mode
 Interval mode
 Load protocol
 Settings

- ▶ Select the **Interval mode** option in the main menu with the arrow keys.
- ▶ Press **[enter]**.

Create protocol
 Interval step: 1
 Prep time: 0:00
 Cycles: 01

- ▶ Enter the **Prep time** duration as "Minutes:Seconds".
 - Switch from minutes to seconds with the ◀▶ arrow keys.
 - Select the time in increments with the ▲▼ arrow keys. The maximum duration is 4 min 59 s.
- ▶ Press **[enter]**. The cursor switches to the **Cycles** input.
- ▶ Set the number of cycles with the arrow keys.
- ▶ Press **[enter]**.
- ▶ Select one of the following two options with the arrow keys:
 - Accept the protocol with **Accept**. Then skip the next work step.
 - Add another interval step with **Next**.

Create protocol

Interval step: 2
 Prep time: 0:00
 Cycles: 01
 Back


- ▶ Enter the next interval step.
- ▶ After entering the interval step: Select one of the following options with the arrow keys:
 - Go back to the previous interval step with **Back**.
 - Accept the protocol with **Accept**.
 - Add another interval step with **Next**.
 Repeat these work steps until all interval steps have been set.

Created protocol
 Total time: 3:39

Start protocol

 Edit protocol
 Save protocol

After completing the protocol via **Accept**, the screen displayed adjacent appears. The screen displays the total time **Total time** (for the homogenization intervals + cooling).

- ▶ Select one of the following options with the arrow keys:
 - Start homogenization with **Start protocol**.
 - Edit the protocol with **Edit protocol**.
 - Save the protocol with **Save protocol** (→ "Managing protocols"  27).

Running protocol

Name
 Total time: 3:39
 Remaining 2:59

running

- ▶ Confirm your selection with **[enter]**.
- ▶ Select **Start protocol**. Confirm your selection with **[enter]**.
 - ✓ Homogenization starts.

The following data is displayed on the screen:

- Total time (for homogenization intervals + cooling)
- Remaining runtime

Note: You can exit a running protocol with **[ESC]**.

Running protocol

Total time: 3:39

program finished

After homogenization is finished, **Program finished** is displayed.

- ▶ Remove the homogenized samples.
- ▶ Press **[enter]**.

Running protocol

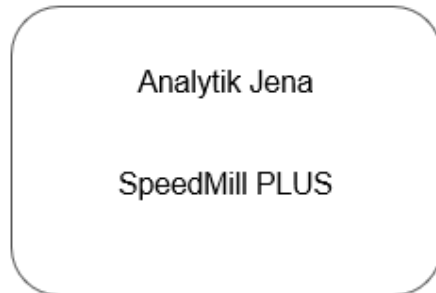
Total time: 3:39

Start again with ENTER
 End program with ESC

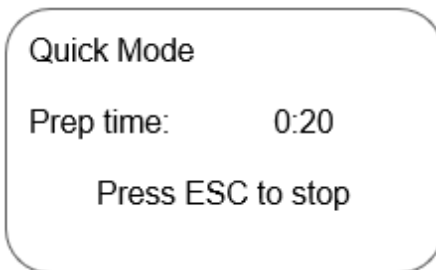
- ▶ Press **[enter]** to start the protocol once more.
- ▶ **Or:** Press **[esc]** to go to the main menu.

5.5.3 Quick mode

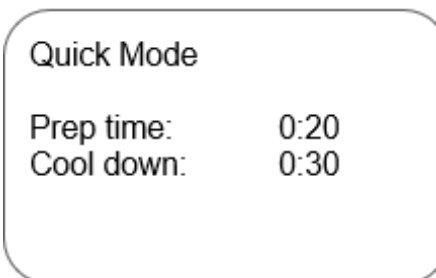
Quick mode lets you start homogenization immediately without making any settings. You can set the homogenization time for Quick mode in the **Settings** menu (→ "Operating mode presets" 25). If no settings are made, Quick mode uses the time from the last homogenization.



- ▶ Switch on the device.
 - ✓ The start screen is displayed.
- ▶ Start homogenization with the ◀ arrow key.



- ▶ Homogenization starts automatically. The elapsed homogenization time is displayed on the screen.

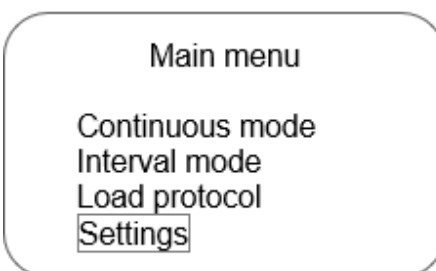


- ▶ Allow the homogenization time to elapse. **Or:** Exit homogenization with [esc].
 - ✓ Homogenization is carried out. After this, the device cools for a period.

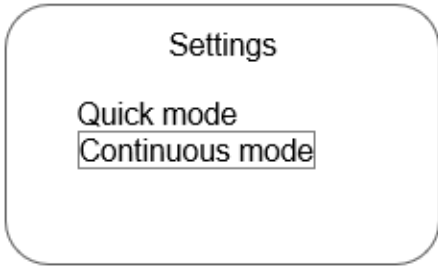
5.6 Operating mode presets

You can preset the Continuous and Quick modes in the **Settings** menu.

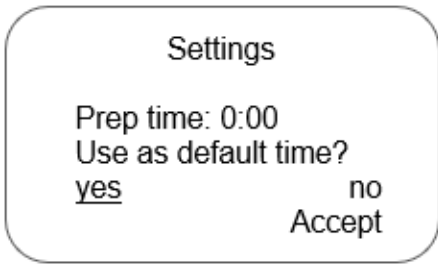
5.6.1 Continuous mode settings



- ▶ Select the **Settings** option in the main menu with the arrow keys. Confirm via [enter].



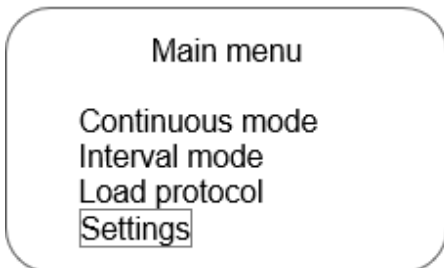
- ▶ Select **Continuous mode** and confirm via **[enter]**



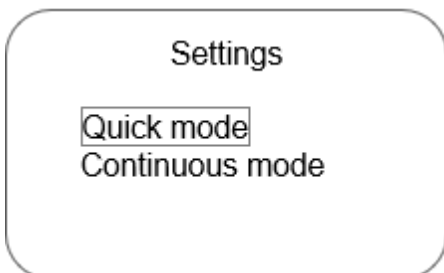
- ▶ Set the homogenization time **Prep time** with the arrow keys and confirm via **[enter]**.
- ▶ Answer the question **Use as default time?**. Move the cursor to the **yes** option with the arrow keys for this. Confirm via **[enter]**.
- ▶ Continue to **Accept** and confirm via **[enter]**.

5.6.2 Quick mode settings

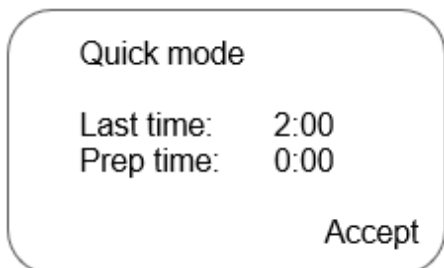
A homogenization time **Prep time** can be preset for Quick mode. If no time is set, Quick mode uses the last homogenization time (**Last time**).



- ▶ Select the **Settings** option in the main menu with the arrow keys. Confirm via **[enter]**.



- ▶ Select **Quick mode**. Confirm via **[enter]**.



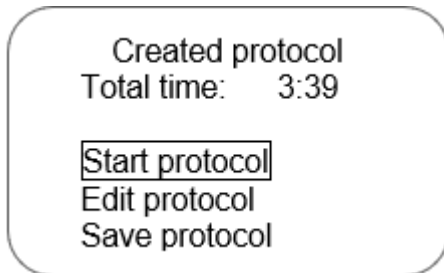
- ▶ Set a homogenization time **Prep time** with the arrow keys. **Last time** cannot be changed, but is set automatically.
- ▶ Go to **Accept** and confirm via **[enter]**.

5.7 Managing protocols

Protocols are homogenization processes in Interval mode. These can contain one or more intervals that are repeated multiple times.

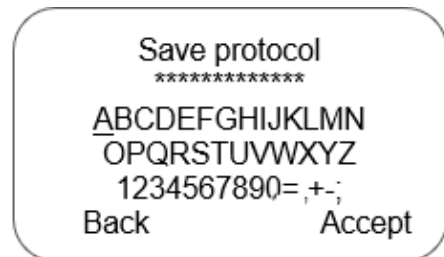
- The user can create their own protocols.
- The device is supplied with a selection of preset protocols.

5.7.1 Saving protocols

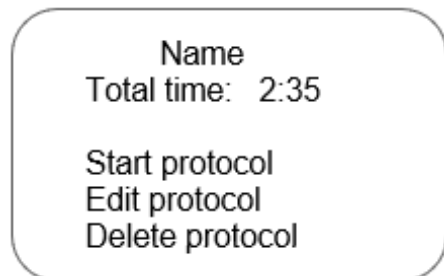


After entering the protocol in Interval mode, the adjacent screen appears.

- ▶ Select the **Save protocol** option with the arrow keys. Confirm your selection with **[enter]**.

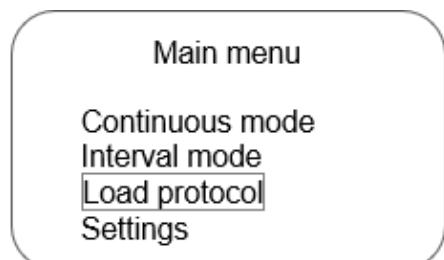


- ▶ Give the protocol a name. Select letters, numbers and symbols with the arrows keys for this. Confirm each selection with **[enter]**. The asterisks are overwritten one by one.
- ▶ Define the name with **Accept**. Confirm via **[enter]**.
 - ✓ The protocol is saved in the **user-defined** folder.

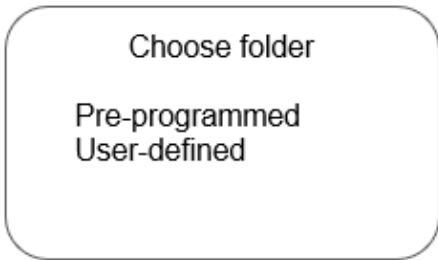


- ▶ Press **[esc]** and return to the main menu.
- ▶ **Or:** Select one of the following options:
 - Start the current protocol with **Start protocol**.
 - Edit the current protocol with **Edit protocol**.
 - Delete the current protocol with **Delete protocol**.

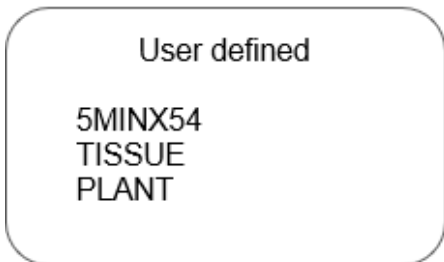
5.7.2 Loading protocols



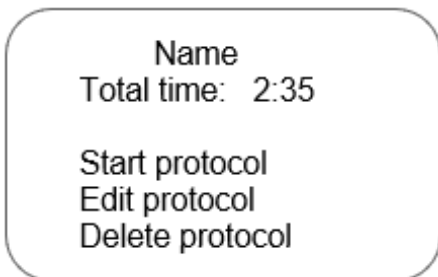
- ▶ Select the **Load protocol** option in the main menu with the arrow keys. Confirm via **[enter]**.



- ▶ Select one of the following two folders with the arrow keys:
 - **pre-programmed**: Folder with preinstalled protocols
 - **user-defined**: Folder with user-defined protocols
- ▶ Confirm your selection with **[enter]**.
 - ✓ The list of saved protocols appears.

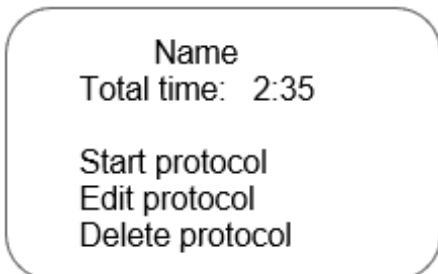


- ▶ Select a protocol. Confirm via **[enter]**.

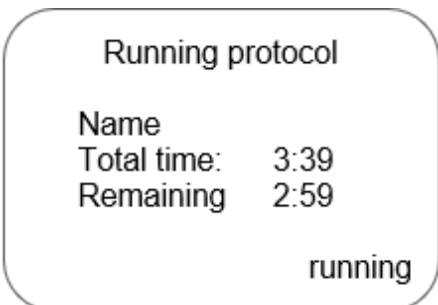


- ▶ Select one of the following options:
 - Start the protocol with **Start protocol**.
 - Edit the protocol with **Edit protocol**.
 - Delete the protocol with **Delete protocol**.
- ▶ Confirm your selection with **[enter]**.

5.7.3 Starting protocols



- ▶ Load the desired protocol.
- ▶ Start the protocol with **Start protocol**. Confirm via **[enter]**.
 - ✓ The homogenization starts immediately.



- The following information is displayed on the screen:
- Total time (homogenization times + cooling times)
 - Remaining runtime
- Note: You can exit a running protocol with **[esc]**.

```

Running protocol
Total time: 3:39
program finished

```

- After the protocol has finished, **Program finished** is displayed.
- ▶ Confirm via **[enter]**.

```

Running protocol
Total time: 3:39
Start again with ENTER
End program with ESC

```

- ▶ Press **[enter]**, to start the protocol once more.
- ▶ **Or:** Press **[esc]** to return to the main menu.

5.7.4 Editing protocols

The user can only change their own protocols. Preset protocols saved in the **pre-programmed** folder cannot be edited by the user.

```

Name
Total time: 2:35

Start protocol
Edit protocol
Delete protocol

```

- ▶ Load the protocol.
- ▶ Select the Edit protocol option. Confirm via **[enter]**.
 - ✓ The screen for editing the protocol appears.

```

Edit protocol
PROTOCOL-NAME
Interval step: 1
Prep time: 0:00
Cycles: 01
Accept      Next

```

- ▶ Edit the settings as described (→ "Interval mode"  23).

5.7.5 Deleting protocols

The user can delete their own protocols.

```

Name
Total time: 2:35

Start protocol
Edit protocol
Delete protocol

```

- ▶ Load the desired protocol from the **user-defined** folder.
- ▶ Select the **Delete protocol** option. Confirm via **[enter]**.

Delete protocol
Name

Are you sure?
press ESC to abort
or ENTER to delete

- ▶ Confirm the security query via **[enter]**.
 - ✓ The protocol is deleted.

5.8 Preset protocols

The device is supplied with preset protocols. Various source materials can be optimally homogenized with the aid of these protocols.

The protocol names have been selected in accordance with the source materials and the hardness (MH: medium hard, VH: very hard).

Preset protocol	Total duration
Bacteria	12 min
Plant-Soft	2 min
Plant-MH	4 min
Plant-VH	6 min
Soil-DNA	8 min
Tissue-Soft1	1 min
Tissue-Soft2	2 min
Tissue-VH	8 min

6 Maintenance and care



WARNING

Risk of electric shock

- Always switch off the device and disconnect the power plug before performing maintenance work.
Power to the device is only disconnected by disconnecting the power plug. After the device is switched off, some parts are still live.
- Only leave the device and the software on as the maintenance instructions explicitly demand.

The operator may not undertake any service or maintenance work to this device and its components other than that specified in these instructions.

Observe the information in the "Safety instructions" section for all maintenance work. Compliance with the safety instructions is a prerequisite for the error-free operation of the device. Always observe all warnings and instructions that are displayed on the device itself or indicated by the control software.

To ensure faultless and safe functioning, Analytik Jena recommends an annual inspection and servicing by its Service department.

6.1 Cleaning

Observe the following:

- The operator is responsible for carrying out suitable decontamination should the device become contaminated externally or internally with dangerous substances.
- Splashes, drops or larger liquid spillages should be removed using an absorbent material such as cotton wool, laboratory wipes or cellulose.
- For biological contamination, wipe the affected area with a suitable disinfectant, such as an Incidin Plus solution. Then wipe the cleaned areas so that they are dry.
- The only suitable cleaning method for the housing is wipe disinfection. If the disinfectant has a spray nozzle, apply disinfectant to a suitable cloth before using it on the device.

Work particularly carefully and cleanly with infectious material because the device cannot be decontaminated as a whole.

- Before using a cleaning or decontamination procedure other than that prescribed by the manufacturer, the user is required to check with the manufacturer that the intended procedure will not damage the device. Safety labels attached to the device must not have methanol applied.

As a possible disinfectant, Analytik Jena recommends:

- Descosept Spezial (for spray disinfection) from Dr. Schuhmacher GmbH
- Meliseptol HBV disinfectant wipes from B. Braun

6.2 Changing the fuse

- ▶ Switch off the device and disconnect the power plug from its socket.
- ▶ Open the fuse holder on the rear of the device. Carefully pry open the fuse holder with a screwdriver.

- ▶ Pull out the fuse block.
- ▶ Replace the faulty mains fuse. Use the following fuses: 2 x T 4 A / 250 V.
- ▶ Reinsert the fuse holder.
 - ⚠ WARNING! Insert the fuse block in the correct direction. The marking for the desired operating voltage must point to the right.
- ▶ Close the fuse holder. Check that the correct operating voltage can be seen in the viewing window (see arrow).
- ▶ Connect the device to power again and switch it on.



Fig. 9 Mains connection and fuse holder

6.3 Switching the operating voltage

The operating voltage can be switched on the fuse holder. The set operating voltage is indicated in the viewing window of the fuse holder.

- ▶ Switch off the device via the power switch and disconnect the mains connector from the socket.
- ▶ Open the fuse holder. Carefully pry open the fuse holder with a screwdriver for this.
- ▶ Pull out the fuse block.
- ▶ Turn the fuse block around 180° and reinsert it. The marking for the desired operating voltage must point to the right (see arrow).
- ▶ Close the fuse holder lid. Check that the correct operating voltage can be seen in the viewing window.

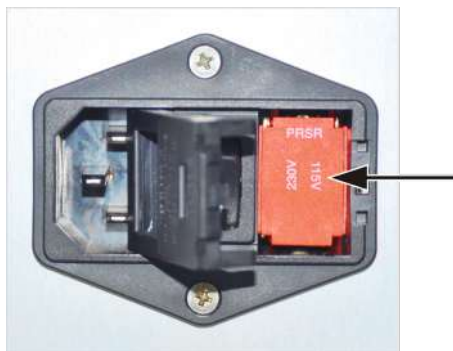


Fig. 10 Switching the operating voltage

7 Transport and storage

7.1 Preparing devices for transport



NOTICE

Risk of device damage due to unsuitable packaging material

- Only transport the device and its components in the original packaging.
- Empty the device completely and attach all transport locks before transporting the device.
- Add a suitable desiccant to the packaging to prevent damage from moisture.



- ▶ Switch off the device and disconnect the power plug from its socket on the device.
- ▶ Remove all reaction vessels from the device.
- ▶ Insert the sample holder.



- ▶ Place a foam frame on the bottom of the packaging box.



- ▶ Wrap the device in a plastic bag to protect it from scratches. Place the device in the box.
- ▶ Place the second foam frame on the device.
- ▶ Place the power cable in the packaging. Close the box.

7.2 Transport

When transporting the device, observe the safety instructions in the "Safety instructions" section.

Avoid the following during transport:

- Impact and vibration
Risk of damage due to shock, impact or vibration!
- Large temperature fluctuations
Risk of condensation!

7.3 Storage



NOTICE

Risk of device damage due to environmental conditions

Environmental influences and condensation can destroy individual components of the device.

- Only store the device in air-conditioned rooms.
- Ensure that the atmosphere is free of dust and corrosive vapors.

If the device is not installed immediately after delivery or not required for longer periods, it should be stored in its original packaging. A suitable desiccant should be added to the equipment to prevent damage from moisture.

The requirements for the climatic conditions of the storage location can be found in the specifications.

8 Disposal

The operator is responsible for correct disposal of biological samples in accordance with statutory regulations.

At the end of its service life, the device and its electronic components must be disposed of as electronic waste in accordance with the applicable regulations.

9 Technical data

System parameters	Homogenization time	30 s to 4 min (dependent on source material type)
	Oscillation speed	50 Hz
	Acceleration time	none
	Deceleration time	none
	Volume (max.)	74 dB
Application parameters	Sample capacity	Parallel processing of up to 20 samples
	Sample cooling	Passively cooled sample holder, storage until -80 °C
Program parameters	Homogenization time	1 s to 4 min 59 s
	Minimum time adjustment range	1 s
	Pre-programmed protocols	8
	Memory capacity for user-defined protocols	20
	Number of cycles	1 to 99
	Number of protocol steps	1 to 6
Other technical data	Dimensions (W x H x D)	155 x 260 x 305 mm
	Dimensions (W x H x D) with open lid	155 x 310 x 420 mm
	Weight	12 kg
	Power supply	115/230 V AC, 50/60 Hz, switchable
	Power consumption (max.)	170 VA
	Device fuses	2 x T 4 A / 250 V
	Protection class of the housing	IP 20
Ambient conditions	Operating temperature	+5 to +40 °C
	Humidity	Max. 80 % at +30 °C
	Storage temperature	-40 to +70 °C
	Humidity during storage	≤80 %

Table of figures

Fig. 1	Front view.....	11
Fig. 2	Interior view (with sample holder)	12
Fig. 3	Sample holder, disassembled	13
Fig. 4	Tube fasteners with innuSPEED Lysis Tube Q (with mandrels)	13
Fig. 5	Terminals and switches on the rear	14
Fig. 6	Control elements.....	15
Fig. 7	Start screen.....	17
Fig. 8	Main menu	17
Fig. 9	Mains connection and fuse holder.....	32
Fig. 10	Switching the operating voltage	32