sartorius stedim biotech

CERTOMAT® BS-1 Incubation Shaking Cabinet

Operating Manual

85030-520-51

Introductory Notes

This Operating Manual for the Incubator Shaking Cabinet CERTOMAT® BS-1 refers to the design and equipment features of this device at the date of print given with the Rev.No.. The information included in this Operating Manual has been carefully estimated and checked. However, no guarantee can be given with respect to completeness and correctness of this information. Sartorius Stedim Biotech GmbH reserves the right to modify the equipment and to change this operating manual without notice.

Due to the continuous development of the units it may be possible that different building components or their use are not described. There may be information which does not apply to your device. If you find missing, misleading or wrong information or if you should wish additional information about different components please send us a note

The CERTOMAT® BS-1 is just an example of laboratory equipment products from Sartorius Stedim Biotech GmbH.
Our range of equipment includes shakers and incubator shakers, homogenizers, centrifuges, ultrapure water systems, air samplers and fermenters/bioreactors.
You will find further information on our homepage www.sartorius-stedim.com.

Upon request, we will be pleased to inform you about our complete product range.

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EG-Statement of Conformity

With the Statement of Conformity, which is attached or which accompanies the equipment, Sartorius Stedim Biotech GmbH confirms the conformance of the CERTOMAT® BS-1 with the specified guidelines.

General Safety Notes

- Laboratory seniors or the persons responsible for the use of the equipment must inform the personnel about potential risks of operating the CERTOMAT® BS-1. Furthermore they have to guarantee that the relevant safety instructions are observed. The personnel must have the necessary qualification for the operation of the equipment and its handling.

- Please take special care regarding the operating information. Improper use of the unit can thus be avoided and you retain full claim for guarantee. Please contact us if you have any questions.

☞ Steps to be carried out with special care or special aspects or special issues to be considered are marked as this paragraph.

⚠ Important safety notes in this manual are marked with this symbol. Such instructions apply in addition to the other safety instructions for the field of application and for the working place.

- Do not use devices with the wrong power rating.

- Disregard of the safety instructions may for example result in damage to the equipment or may cause other material and eventually also person damage.

Guide through this manual

This Operating Manual is organized systematically. Depending on your knowledge of the device you can start from the beginning or go directly to the chapter of your interest.

- Section 1 gives an overview of design and functions of the BS-1.

- Section 2 describes the requirements for installation at the working place. Furthermore the installation and the connection of the unit are explained.

- Section 3 includes the operating information. If the equipment is installed ready for use or if you are used to the CERTOMAT® BS-1, respectively, you can go straight on to this section.

- Section 4 is a summary of all important technical data. Here you find ordering information of optional equipment and accessories for the shaker.

Contents

1 Design and Function

1.1 Design and Construction Features

The CERTOMAT® BS-1 is an easy to operate, efficient and durable incubator shaking cabinet for universal use in the various tasks of biological and chemical laboratories, for example.

The basic equipment of the BS-1 includes one tray support for shaking trays, carrying the drive unit, and the heater. The drive consists of a motor of external rotor type with brushless drive and a noiseless, robust Poly-V belt-drive. Shaking drives with different orbits are available. The orbit can be modified by our service on site. The different shaking speeds can be adjusted continuously. The shaker can be equipped with trays of different size and numerous clamps, holders as well as mounting systems of the CERTOMAT® - shaker program.

Two large doors made of Thermo pane glass facilitate the fixing and removing of the shaking containers or the changing of the tray and they allow the visual control. For incubations near and below room temperature a refrigerating set are optionally available. For more information concerning the equipment configurations see below, detailed information you will find in chapter 4 “Technical Data and Ordering Information”. With this information you can define the specifications of the shaking cabinet according to your specific demands.

The incubation chamber of the cabinet is made of stainless steel. The internal bottom is designed as a spill tray made of stainless steel. If containers get damaged during shaking operation this prevents spilled media from escaping unchecked. The spill tray can be easily removed from the incubation chamber and then cleaned. This design also facilitates the efficient cleaning of the shaking cabinet.

You can use the shaking cabinet on the floor or on the table and you can stack 2 – 3 shaking cabinets. For stacking 2 cabinets a support frame is available. That means optimal arrangement for operation.

1.2 Available Equipment and Accessories

1.2.1 Shaking Drives

The operating terminal and the control system are included in the panel on the right side of the cabinet. The shaking drive is mounted below the spill tray inside the cabinet. The drive is similar to the drive used for the bench top shaker CERTOMAT® RM. The drive specifications are as follows:

- Orbital motion Ø 25 mm and 50 mm (depending on the delivered device version; can be changed to alternate amplitude in-place at customer’s site by authorized service representatives of Sartorius AG).
- Shaking speeds: 40 ... 400 ^{1}/min.
- Rotation speed accuracy: max. ± 1% of final value.
- The drive has a patented, variable mass compensation.

1.2.2 Trays

Trays can be delivered with sets of fixed clamps for Erlenmeyer flasks of different sizes (type E, F), or they are available for individual mounting as universal trays type EU or FU.

- Dimensions:
  type E/EU: W x D about 420 x 420 mm [1)]
  tray type F/FU: W x D about 800 x 420 mm [1)]

  The universal trays can be equipped with clamps for Erlenmeyer flasks of different sizes, hinged test tube racks and universal mounting system. The universal mountings allow to use various vessels, such as beakers, bottles, or separation funnels.

1.2.3 Illumination Unit

- The BS-1 can be ordered with an optional illumination unit comprising 5 lamps of 18 W each. Each lamp can be switched off separately. The mounting of the illumination unit (see point 2.3.2) as well as its activation in the SETUP2-menu is described in point 3.3.6.

1.2.4 Grating insert

- To static incubation, e.g. in Petri dishes, a grating insert as an option available.
  The mounting of the grating insert is described in chapter 2.3.4.

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1 Trays of modified design for new locking; rebuilding of existing trays for this locking on request. Please contact the Sartorius customer service.

2 Delivery and Installation

2.1 Delivery and Checking of Completeness

The configuration and the extent of delivery of the incubation shaking cabinet depend on the individual order. The shaking drive, and if ordered, the option „refrigerator“ will be preinstalled in the factory prior to delivery according to the customer´s demands. Each CERTOMAT® BS-1 is delivered after a thorough functional test. For transport to the working place, and prior to the installation and start-up of the unit you should check the following:

1. A suitable transport route through the building and appropriate transportation means (lifting trucks, etc.) should be available. The floor, the doors and elevators must be large enough for safe transport.

2. The working place must be suited for the shaking cabinet. It must offer sufficient space for convenient placement and it must compensate the weight of the completely mounted shaking cabinet:

- Single cabinets or a stack of two cabinets can be placed on a support frame. This will ease operation of the controls.

  – Dimensions of the support frame:
    1150 x 200 x 710 mm (W x H x D)

- Up to three cabinets can be stacked. In this case the working place must be steady enough to carry the weight of all cabinets including all accessories and the load. Also the dimensions of the devices must be taken into consideration.

3. The working place must be able to compensate vibrations which are caused by the shaking operation. Make sure that surrounding equipment cannot be disturbed by the BS-1. Please observe the notes for the limitation of the shaking speeds in chapter 3.

☞ The action of the loaded trays causes vibrations, which will change with load and shaking speed. These vibrations cannot be fully compensated by the adjustable counter-balance weight. Especially at heavy loads (>10 kg) and high shaking speeds resonance effects may occur and vibrations may be transmitted to the working place.

4. The power supply of the laboratory must correspond to the technical specifications of your CERTOMAT® BS-1 see the labels on the unit.

5. The shaking cabinet is designed for normal laboratory conditions, see information about the environmental conditions in the supplement. Under special environmental conditions or when using aggressive media you have to test the suitability of all parts. Malfunction and damage, such as corrosion by aggressive media, are not subject to our guarantee.

⚠ If the working place is not suitable for the CERTOMAT® BS-1 and the unit does not correspond with your power rating, you must not start and operate it.

6. Please check the condition of your device and the accessories provided. All components specified in the order are premounted or are enclosed in the delivery. The delivery should be complete and all parts undamaged.

- If the CERTOMAT® BS-1 has the wrong mains specifications, in case of malfunction of the unit or if any parts are damaged or are missing inform your Sartorius Stedim Biotech GmbH representative as soon as possible.

2.2 Installation and Laboratory Connection

2.2.1 Placement at the Working Place

☞ You can stack the CERTOMAT® BS-1. Up to three devices can be placed on top of each other. As far as the information below refers to a shaking cabinet they apply also to your unit.

1. Place the CERTOMAT® BS-1 in such a way, that it is easily accessible and does **not** interfere with other devices. The right part of the machine should be positioned in an approx. distance of 50 cm from other devices or from the wall. So the side door is accessible and you will not have to reposition the BS-1, if you want, for instance, to open the side door. A minimum wall distance of 15 cm is necessary for sufficient ventilation.

- For placement of one or 2 cabinets in stack arrangement we recommend to place the (lower) cabinet onto the optional support frame. This makes the operation easier. Each unit can be operated separately.

2. To stack to 2 to 3 cabinets,

   – remove the plastic caps at the upper cover of the cabinet, which is to be placed below.

   – replace the feet of the intended upper cabinet by the locating pins included in the delivery.

   – if necessary, the eyelets provided can be screwed into the upper side of the top cabinet so that the cabinet can be easily lifted.

3. Place the cabinets carefully on top of each other. Take care of the weight of the cabinets. Only use suited lifting tools or devices. The locating pins should easily fit into their borings in the upper cover of the lower cabinet.

4. Carefully level the incubation shaker or the stacked units.

☞ Unbalanced placement of the cabinet can cause uneven rotation of the tray support. The drive can be subject to quick wear and tear or be damaged, respectively.

⚠ Especially at heavy loads of the shakers and with high shaking speeds, the stack arrangement of 2 ... 3 cabinets can start to wobble during operation.

2.2.2 Power Supply

- You will require or need to prepare a laboratory grounded socket offering 230 V, 50 Hz or 115 V, 60 Hz, depending on the country standard. Check on the type plate on the cabinet whether it has the correct power ratings. **Never connect the CERTOMAT® BS-1 to power supplies of wrong ratings.**

- If the plug at the power supply cable does not fit to your sockets, the service technician of Sartorius AG can attach a suitable plug.

2.3 Configuration of the CERTOMAT® BS-1 and Optional Equipment

2.3.1 Shaking Drive with Tray Support

- The shaking drive will be mounted in the factory prior to delivery in the shaking cabinet and will be ready for use after assembly of the tray and loading with shaking containers. Rebuilding to a different orbit must only be done by authorized and qualified service personnel. Please contact your service representative or the service department of Sartorius AG, if necessary.

2.3.2 Illumination Unit (option)

- Push the illumination unit in the prepared guiding bars. You have to release the 4 fastening screws of the pull bars first. Push the illumination unit into the device until the cross hole in the pull bars becomes visible. Insert the delivered screws in the cross holes and protect the illumination unit in this way from sliding out. Fasten the 4 fastening screws carefully again. Plug the plug for the mains supply in the prepared socket in the incubation chamber (refer to fig. 1). Secure the plug (refer fig. 2) by fastening the coupling ring in the socket (refer fig. 3). After activation of the option "LIGHT" in the manual menu (see point 3.3.6) the illumination unit is ready for operation.
  If required, individual lamps can be manually switched off to reduce the light intensity (refer fig. 4).

Abb. 1: Connecting box for the optional lighting unit

Abb. 2: Plug of the optional lighting unit

Abb. 3: Affiliated lighting unit

Abb. 4: Switch for fluorescent tubes

2.3.3 Connection of the Optional Cooling Devices

- If your CERTOMAT® BS-1 includes the optional refrigerator, no additional connections are required. Any condensate produced during cooling operation, will be evaporated inside the cabinet and the humid air be exhausted via the ventilation of the cabinet.

2.3.4 Installation of the grating insert (optionally)

Scope of delivery:

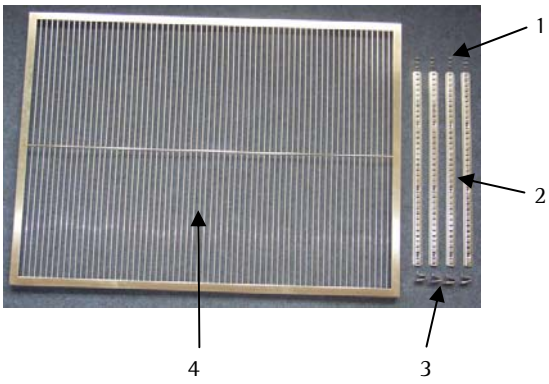


Figure 5: Grating insert with installation material

1.	Fastening screws	(12 pcs.)
2.	Mounting rails	(4 pcs.)
3.	Angle bracket	(4 pcs.)
4.	Grating insert	(1 pcs.)

2.3.4.1 Installation of the mounting rails (4 pieces)

1. Attach the first mounting rail with the upper screw in the provided position of the side wall (slightly tighten the screw).

☞ Care for the correct mounting position (see figure 6)

Figure 6: Mounting position of the mounting rail

2. Insert the remaining 2 screws into the screw holes and tighten them slightly.
3. Securely tighten all screws.
4. Install the remaining 3 mounting rails in the same order.

2.3.4.2 Installation of the angle bracket

1. First attach the upper hook of the angle bracket in the recess of the mounting rail at the desired height (see figure 7).

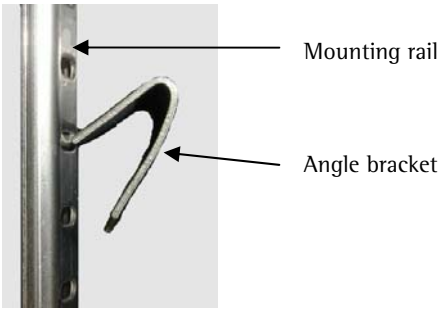


Figure 7: Installation of the angle bracket

2. Now press the angle bracket in such a way that the lower end of it snaps in the mounting rail – one recess notch under it (see figure 8).

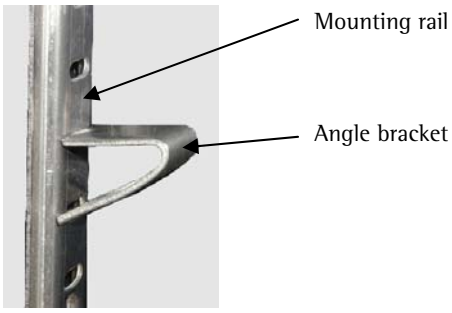


Figure 8: Assembled angle bracket

3. Install the remaining 3 angle brackets in the same order at the other mounting rails.

☞ Take care for the equal height of the angle brackets.

4. Insert the grating insert into the device.

⚠ The air flow of the device ventilator inside must not be blocked!

☞ Take care for the safe seat and the horizontal position of the grate.

5. If necessary:
   - remove the grating insert
   - remove the incorrectly positioned angle bracket by pressing it slightly
   - install the angle bracket in a new position again

3 Operating Information

3.1 Safety Notes

⚠ Media used with incubation shakers like the CERTOMAT® BS-1 can be hazardous. This is especially true for caustic, inflammable or infectious media, for instance. Since the risks and the correlated safety requirements depend on the media, they cannot be discussed herein. Your company must issue applicable safety guidelines, distribute them to the laboratory staff and ensure, that they are strictly followed.

☞ The following safety instructions must be observed:

⚠ When hazardous agents are to be used only authorized personnel should have access to the laboratory or to the working area, respectively, and be allowed to operate the CERTOMAT® BS-1. It must be guaranteed that unauthorized persons do not have access to the unit.

⚠ Operators should wear adequate working clothes and personal protection, such as gloves, protective goggles, or breath protection, for instance.

⚠ Only equipment and accessories must be used which Sartorius Stedim Biotech GmbH has released for the BS-1. Before starting operation all parts should be checked for damages, especially the glass parts. You must not use any damaged or defective equipment.

⚠ Do not start the shaking drive without a tray installed. Always switch-off the shaking drive before mounting or removing the tray or any of the containers to be incubated.

⚠ Properly fasten the tray and all mountings and holders to prevent that the containers can loosen during operation. When loading the tray, evenly distribute the containers on the tray (i.e. balanced arrangement) and ensure that they cannot hit against each other.

⚠ Reduce the shaking speed as far as necessary, if resonance effects occur and vibrations are transmitted to the working place or neighbouring equipment or if the stack arrangement becomes unstable.

⚠ Critical conditions are possible even during normal operation. At specific shaking speeds and depending on the load the action of the shaking drive can cause vibrations due to „self-resonance“ effects. Such vibrations cannot be fully compensated by the internal balance weights of the tray support and will be transmitted to the BS-1 and the working place.

⚠ If media are incubated in open containers you should lower the shaking speed as far as possible, to avoid unintended spillage of the media. If the media are released unintentionally, i.e. due to breaking of glass vessels, for instance, you should clean the spill tray and incubation chamber. Remove broken glass and any foreign bodies as soon as possible and prevent those parts from entering the gap between the tray support and the spill tray or from being introduced into the drive unit. Further information is given in chapter 3.6.

3.2 Equipment, Mounting and Loading of a Tray

Sartorius Stedim Biotech GmbH offers trays for the CERTOMAT® BS-1 fixed with sets of universal clamps for Erlenmeyer flasks of different sizes, or trays without assemblies. On delivery or after the first set-up of the BS-1 the tray can be premounted ready for operation. If this includes all clamps and mountings required for first use, you can insert the containers and start operation, as shown in section 3.3. If you need to change the tray or its equipment for your application or if you want to insert another tray please read the following information.

3.2.1 Equipping the Tray

- We recommend to mount all clamps and mounting sets for your containers on the tray before you place the tray in the BS-1. So they can be handled easier. However, the flasks, bottles, etc. with the media (especially heavy containers) should be placed on the tray after it has been attached to the tray support.

- Take care of the dimensions of the incubation chamber, about 890 x 495 x 650 mm (W x H x D)

⚠ Mind the weight of the fully equipped tray. It may be very heavy. The shaking containers may hinder the handling. You can hit with the tray and damage the containers placed on the tray. Media may be released unintentionally and may cause personnel hazards.

1. For a universal tray without clamps, etc., place and screw tight the holders and mountings required. In order to change an existing tray setup, first release all parts which are not needed.

- Clamps for Erlenmeyer flasks are available in different sizes which can be individually combined. For test tubes, bottles, beakers or separation funnels, mounting systems, such as test tube racks or universal mounting sets, are available. Detailed information about the available container holders and mounting systems you will find in section 3.4.

2. When assembling clamps and other devices on the tray, make sure to distribute them evenly. This will avoid uneven loads and ensure that the containers can be safely fixed on the tray / in the clamps.

3.2.2 Adjustment of the Counter Weight to the Intended Load

Upon delivery the CERTOMAT® BS-1 is preadjusted for a load of 10 kg. If the intended load is different from this, the counter weight has to be readjusted correspondingly. Thus the vibrations which may occur during operation, can be minimized.

1. Weigh the completely equipped tray with all shaking containers attached.
2. Switch off the BS-1 at the main switch.
3. To adjust the counter weight with the variable tool for the load open the front flap under the glass doors downwards. The front flap is fixed with magnets. Behind these flap you will find the variable tool.
4. Please turn the shaking table by hand to rearmost position.
5. Block the drive of the shaking table by putting the delivered hexagon socket screw key through the boring of the shaking table (Fig. 10, pos. 4). Carefully turn the shaking table until the drive has totally blocked.

Fig. 9: Adjustment of the counter weight corresponding to the load

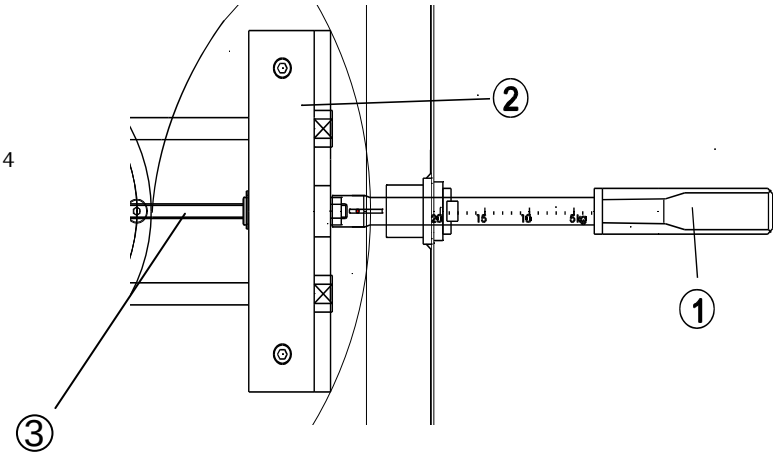
6. Put the variable tool (1) through the opening under the front flap in the housing and guide it on the axis of the counter weight (2);
7. Please turn the counter weight with the variable tool in the clockwise direction (for load <10 kg) or turn it out anticlockwise (load >10kg).

- The adjustment of the counter weight which is necessary for a certain load is marked on the variable tool.

8. Please remove the hexagon socket screw key and the variable tool and close the front flap.
9. Mount the loaded tray.
10. Switch on the BS-1.

The CERTOMAT® BS-1 starts only if both doors are closed.

11. Test for the silent operation at your intended shaking speed.
12. If a re-adjustment is necessary, stop the shaker (key STOP), switch off the BS-1, remove the tray and repeat steps 3 – 11.



1. Variable tool
2. Counter weight
3. Axis
4. Hexagon socket screw key

3.2.3 Mounting and Dismounting a Tray

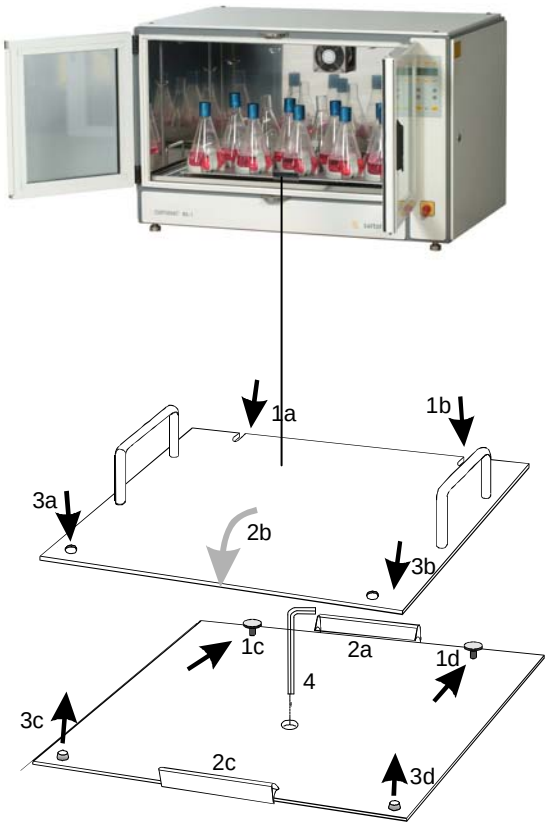


Fig. 10 Mounting of the tray on the shaking table (tray shown without mounting systems and containers)

1. Place the tray onto the shaking table. Push it with the indents (1a/1b) against the rear knurled screws (1c/1d) and the clamp (2a) of the shaking table.

☞ Please mind the weight of the tray if you have already loaded it with shaking containers.

2. Push down (2b) the front edge of the tray so that it properly fits into the front clamp (2c).

3. The borings (3a/3b) will precisely fit onto the locating pins of the tray support (3c/3d) and locate the tray.

☞ Please take care that the locating pins (3c/3d) are placed evenly in the tray. Only then the tray is situated correctly on the shaking table.

☞ If necessary, you can adjust the locating pins as follows:

1. Release the screws of the locating pins (3c/3d) with the hexagon socket screw key.

2. If necessary, move the tray slightly. The locating pins (3c/3d) position themselves in the centre of the borings (3a/3b) of the tray

3. Tighten the screws of the locating pins (3c/3d) carefully again after the tolerance balancing.

4. In order to improve the safe position of the tray – especially at high loads in connection with high speed – the provided flat headed screws M5 x 8 must be screwed in the prepared borings.

3.3 Commissioning

3.3.1 Mounting and Set-ups

1. If you have changed the mounting place (e. g. cooling room <-> laboratory) please wait until the device has warmed up to room temperature before you start it. Otherwise the air humidity may condensate in the device leading to functional disturbances.

☞ Following the transport of a CERTOMAT® BS-1 with integrated cooling unit, the device may only be put into operation after a waiting period of an hour.
This avoids danger to the cooling unit.

2. Connect the CERTOMAT® BS-1 with the mains cable to a suited socket.

3. By turning the mains switch (1) the electronics are supplied with line voltage.

☞ After the switching on the device initializes. After approx. 5 sec. the background illumination of the display as well as the green operating LED light. The manual menu "MAN" is active. The device is now ready for operation.

☞ By pressing the ESC-key you change from the manual menu to the main menu.

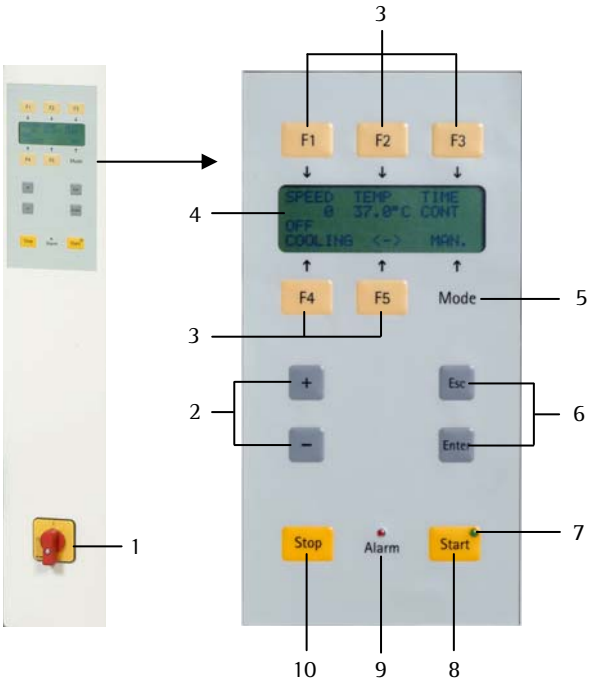


Fig. 11: Frontpanel with key pad
1. mains switch
2. [+/-] -key for setting of process values (temperature, speed)
3. function field [F1-F5]
4. alphanumeric display
5. display field MODE
6. [ESC] -key for menu jump back
   [ENTER] -key for confirmation of inputs / changes
7. Operation-LED (green)
8. [START] -key
9. ALARM-LED (red)
10. [STOP] -key

Checking the door contact switch

☞ Only for devices with serial number to: 00499/05

☞ Whenever you start to operate the CERTOMAT® BS-1, you have to check the proper function of the door contact switch!

☞ To check the function of the switch, proceed as follows:

☞ After turning on the CERTOMAT® BS-1 and initialisation, the unit is in the Manual-Menu „MAN".

- In the manual mode „MAN" enter these values via the keypad: (see also chapter 3.3.3)

  F1 speed [¹/min.]: 50

  F3 time [h:min]: 00:10

- Press the START-key to start the shaker.

⚠ Open the right door of the CERTOMAT® BS-1. The BS-1 must stop.

⚠ Once the preset time has expired (see chapter 3.3.5), the alarm LED on the front panel lights up. If activated, an alarm signal is generated in addition.

- Press ENTER to acknowledge the alarm.

- Close the door of the CERTOMAT® BS-1. The shaker re-starts.

⚠ If the shaker continues to run in spite of the opened right door, the unit is defective.
In this case the BS-1 must not be started!

Repairs can be carried out by the Sartorius AG service representative or by authorized personnel of a customer-owned workshop. Please inform your local Sartorius AG sales representative or contact:

Sartorius AG
Servicezentrum Nord
Weender Landstraße 94-108
37075 Göttingen, Germany
Telephone +49.551.308.3729 / 3740 / 3741
Telefax +49.551.308.3730

3.3.2 Menu overview

In the menu overview you will find the menu points which are available in the main menu. In the chapters described in the following you will find the set-ups of the respectively selected menu item.

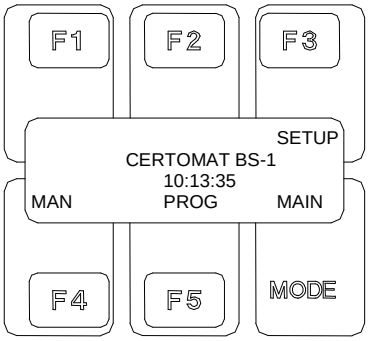


Fig. 12 Main menu (menu overview)

Operating keys

F3: SETUP-Menus: see chap. 3.3.5/3.3.6

F4: MAN manual menu: see chap. 3.3.3

F5: PROG program menu: see chap. 3.3.4

Display field:
above the MODE-field the respective „active“ menu is indicated. Here: “MAIN“ for main menu.

3.3.3 Manual menu “MAN“

- In activating the key [F4] “MAN“ in the main menu the „manual menu“ is activated.
- Back jump from the „manual menu“ to the main menu with [ESC]

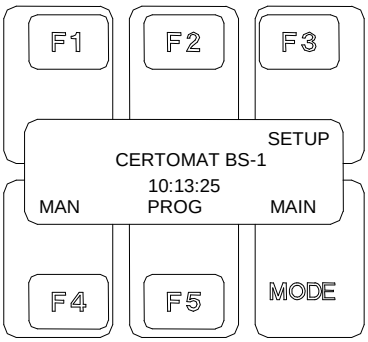


Fig. 13: main menu

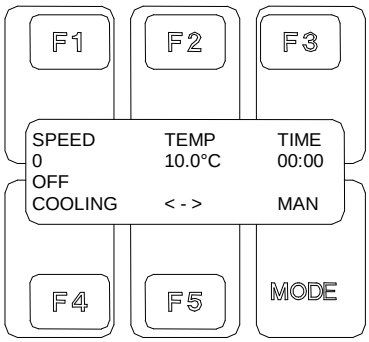


Fig. 14: MAN: manual menu

The following set-ups in the “main menu“ (fig. 10) can be carried out:

F1 **SPEED** **Set-up of speed**

- After pressing of [F1] the input field “SPEED“ in speed/min. flashes.
- In pressing the [+/-] -keys the speed is adjusted
- Please confirm input with [ENTER]

F2 **TEMP:** **Set-up of the temperature**

- After pressing of [F2] the input field “TEMPERATURE“ flashes in °C
- In pressing the [+/-] -keys the temperature is adjusted.

Confirm input with [ENTER].

F3 **TIME:** **Set-up of the TIMER**

- After pressing of [F3] the “TIMER“ [TIME] can be adjusted
- In pressing the keys [+/-] the desired operating time in [h : min] is adjusted
- Confirm input with [ENTER]
- The operating time can be set between 00h:01min and 99h:59min as well as “CONT.“ (Continuous operation).

F4 **COOLING:** **Switching the cooling on and off (only at “UHK version “)**

- After pressing of [F4] the cooling is switched on / off.

☞ Switching the cooling on is only possible at temperature set values < 38.5°C!
If a higher temperature value is entered and confirmed by pressing [ENTER] while the refrigerator is on,
a brief signal sounds and the refrigerator will be switched off.

MODE **MODE:** **Display field**

- The respective „active“ menu is indicated, here: “MAN“ for manual menu

- With the [F5] key you can mutually change to another display field in order to indicate all values to be set (only at option “illumination“).

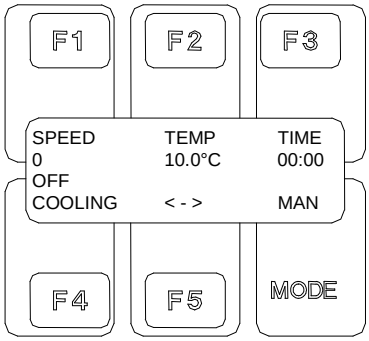


Fig. 15: adjustable parameters

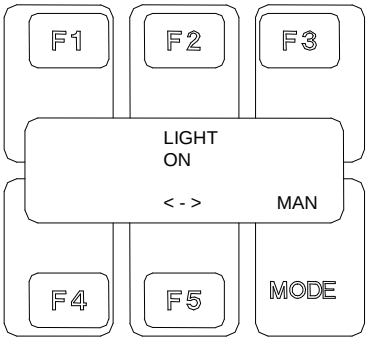


Fig. 16: further set-up possibilities

F2	**LIGHT:**	**Switching the illumination on and off (only at option “illumination”)**

- After pressing of [F2] the illumination is switched on / off.

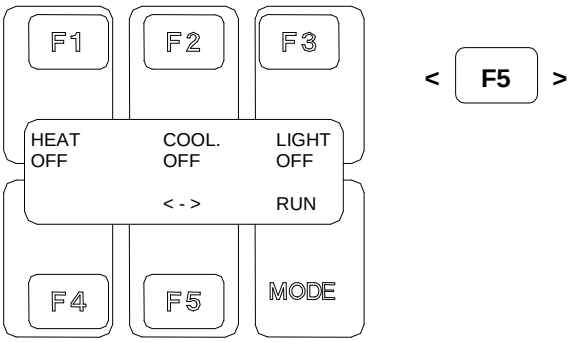
MODE	**MODE:**	**Display field**

- The respective “active” menu is indicated, here “MAN“ for manual menu.
- In pressing the key [START] you change to the operating mode “RUN“.
- The previously adjusted values for:

Speed	:	SPEED
Temperature	:	TEMP
Lighting	:	LIGHT
Cooling	:	COOLING
Timer	:	TIME

are activated now.

- With the key [F5] you can alternately change to another display field in order to indicate all actual values.



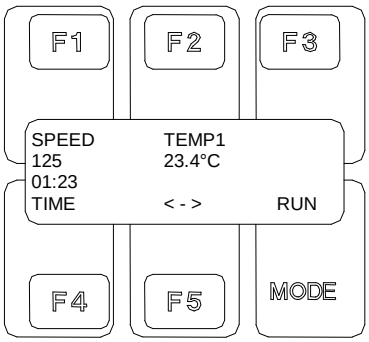


Fig. 17: Operating mode RUN

Fig. 18: Operating mode RUN

- The “TIMER“ runs. The operating time remaining is indicated.

☞ In the operating mode the ACTUAL values are indicated.
Set values cannot be changed here!

- In pressing the function keys [SPEED], [TEMP], [COOLING] and [LIGHT] a little bit longer the parameter flashes and the SET-value is indicated. After the release of the function keys the ACTUAL-values are indicated again.
- The ACTUAL value display of the temperature refers to the air temperature in the incubation room.
- In pressing the key [STOP] you jump back to the manual menu „MAN“.
- Heating, cooling, light and shaker are switched off.
- A new set-up can be effected.
- After the adjusted operating time is finished, you automatically jump back to the manual menu “MAN“.

☞ Once key [STOP] has been pressed, the refrigerator will continue to operate for up to 3 minutes. The refrigerator can only be restarted after 3 minutes.

3.3.4 Program menu „PROG“

- In activating the key [F5] “PROG“ the “program menu“ is activated.
  ”PROG1“ flashes!

- Jump back to the main menu with [ESC]

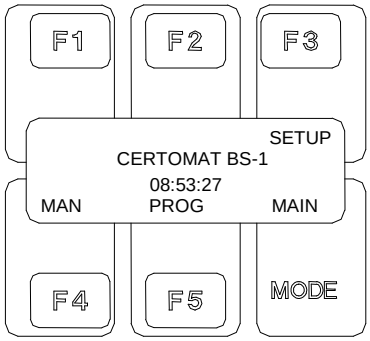
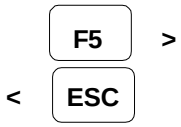


Fig. 19: main menu



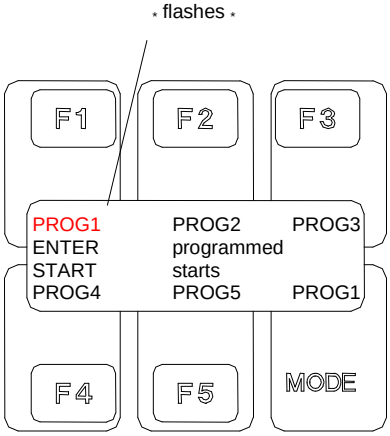


Fig. 20: PROG1-4: program menu

- With [F1] ... [F5] the respective program is selected. After the selection the selected program flashes in the display.

- In the “MODE“-field the setup program appears automatically, here “PROG1“

- The programming according to an example is explained in point 3.3.4.2 “Example for programming“.

3.3.4.1 Program definition

- After pressing of the [ENTER] key (alternately press the flashing function key for approx. 2 sec.) you change to the program definitions „PRSTEP . .STEP1 . .STEP4“.
- In this menu the different “STEPS“ can be selected within the program „PROG1 ... PROG4“.
- For programs protected by passwords the respective password must be entered for the editing/modification of present programs.

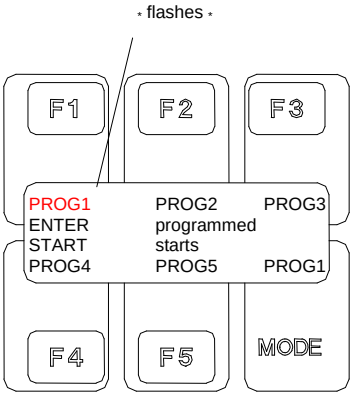


Fig. 21: PROG1-4: program menu

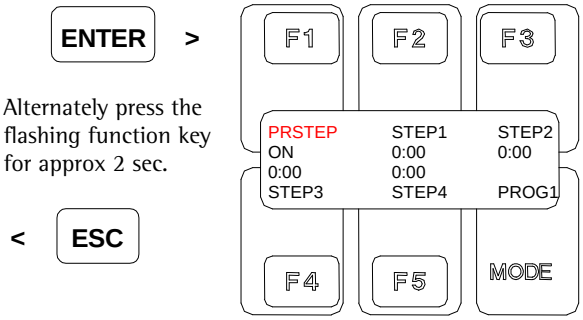


Fig. 22: program definition

- In fig. 18 (program definition) is indicated, whether the PRSTEP is “ON” or “OFF”. Furthermore the step duration is indicated.

  Selection of the different “STEPS“ (fig. 18):

  F1 **for:** **PRSTEP**

- After pressing of [F1] the set-ups for “PRSTEP“ can be effected.

  F2 **for:** **STEP1**

- After pressing of [F2] the set-ups for “STEP1“ can be effected.

  F3 **for:** **STEP2**

- After pressing of [F3] the set-ups for “STEP2“ can be effected.

  F4 **for:** **STEP3**

- After pressing of [F4] the set-ups for “STEP3“ can be effected.

  F5 **for:** **STEP4**

- After pressing of [F5] the set-ups for “STEP4“ can be effected.

  MODE **MODE:** **Anzeigefeld**

- The respective “active” PROG is indicated, here „PROG1.

With the keys [F1 to F5] the adjustable parameters of the steps can be selected.

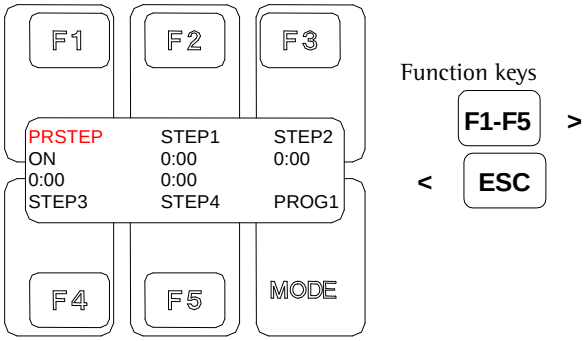


Fig. 23: program definition

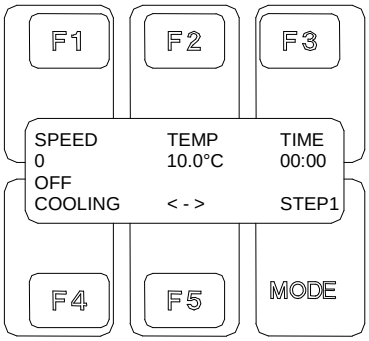


Fig. 24: adjustable parameters

For each "STEP" the following parameters can be adjusted (fig. 20):

F1 **SPEED:** **Set-up of the speed**

- After pressing of [F1] the input field "SPEED" in speed/min. flashes
- In pressing the keys [+/-] the speed is adjusted
- Confirm input with [ENTER]

F2 **TEMP:** **Set-up of the temperature**

- After pressing of [F2] the input field "TEMPERATURE" in °C flashes
- After pressing of the keys [+/-] the temperature is adjusted
- Confirm input with [ENTER]

F3 **TIME:** **Set-up of the STEP-duration [h : min]**

- After pressing of [F3] the input field "TIME" flashes
- In pressing the keys [+/-] the time interval (duration) is adjusted
- Confirm input with [ENTER]
- At the STEP duration values between 00h:01min (immediate change to the next step) and 99h:59min as well as "CONT." (continuous operation until the manual break with STOP) can be adjusted

☞ You cannot determine a firm operating time for the PRSTEP. It can only be switched „ON" or „OFF"!

- PRSTEP in operating mode: the conditions selected in the PRSTEP from the pressing of the [START] key up to the actual program start [STEP1] are activated.
- PRSTEP not operating: the shaker, tempering, cooling and light are deactivated until the program start [STEP1].

F4 **COOLING:** **Switching the cooling on and off (only at "UHK version")**

- After pressing of [F4] the cooling is switched on / off.

☞ Switching the cooling on is only possible at temperature set values <38.5 °C!
If a higher temperature value is entered and confirmed by pressing [ENTER] while the refrigerator is on, a brief signal sounds and the refrigerator will be switched off.

MODE **MODE:** **Display field**

- The respective "active" STEP is indicated

- With the [F5] key you can alternately change to another display field in order to set up further parameters (only at option "illumination").

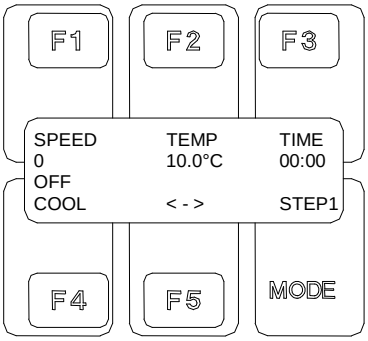


Fig. 25: adjustable parameters

< **F5** >

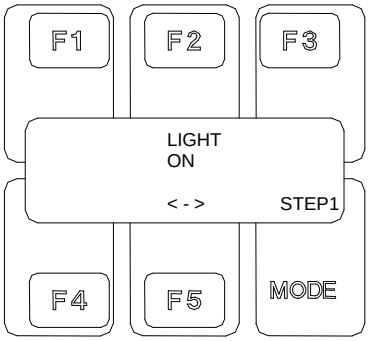


Fig. 26: further set-up possibilities

F2 **LIGHT:** **Switching the illumination on and off (only at option "illumination")**

- After pressing of [F2] the illumination is switched on / off.

MODE **MODE:** **Display field**

- The respective "active" STEP is indicated, here "STEP1"

- In pressing the key [ESC] you jump back to the previous menus (until the main menu)

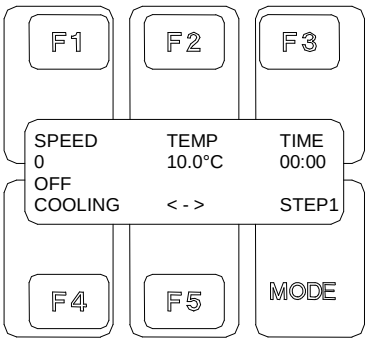


Fig. 27: set-up possibilities with in a „STEP“

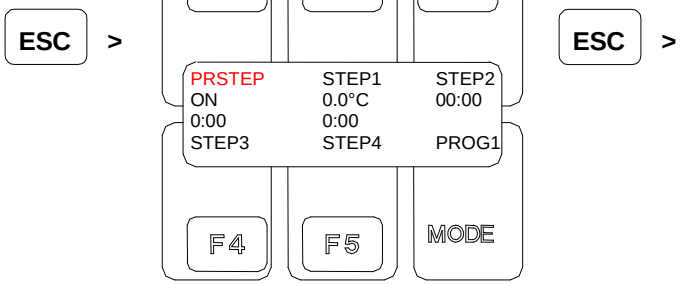


Fig. 28: program definition

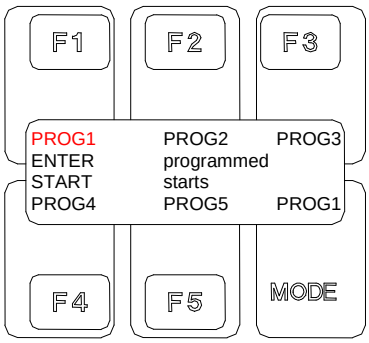


Fig. 29: program menu

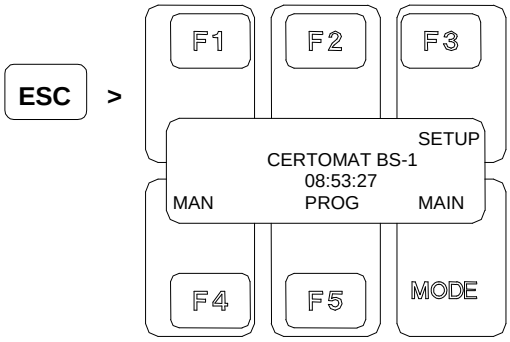


Fig. 30: main menu

3.3.4.2 Example for programming

- Altogether five different programs can be memorized in the device. Each program consists of one “PRSTEP“ and four further steps which can be processed one after the other. For each step the values for cooling, light, speed and temperature can be set independently from one another. Each step has a defined duration time.

- If only one or two steps are required the remaining steps can be defined with a duration time 00:00 so that the program is directly stopped afterwards. A repeat function for endless loops is available.

- The “PRSTEP“ can only be switched on or off (no operating time). It defines the conditions (cooling, light, speed and temperature) from the pressing of the key [START] until the program start (STEP1).
- At “PRSTEP“ switched off, the cooling, light, speed and temperature are switched off until the program start.

- The main purpose of use for the “PRSTEP“ is the date/time exactness for the provision of cultures, e. g. after the weekend or the next morning.

Advantages:

- You have to define the program only once with operating times and you can start it afterwards at any time. The time of the program end remains always the same.

- Comfortable start of night or weekend programs during the day or before the weekend

- Conditions are reproducible before the start of the program because these are held by the device according to the settings in the ”PRSTEP”.

- Automatic program start without the personnel being present

Example:
On Monday morning at 9:00 o’clock any cultures have to be ready. The program (STEP1...STEP4) for the production of these cultures needs altogether 36 h. So the program must be started manually without use of the “PRSTEP“ on Saturday evening at 7:00 o’clock.

The “PRSTEP“ makes it possible to choose any time for the start and to keep the material cooled under the desired conditions..

PROG1: PRSTEP: ON at 20 °C, speed 0, light off, cooling on

Step 1: 7 h at 30 °C, speed 200, light on, cooling off

Step 2: 10 h at 40 °C, speed 100, light off, cooling off

Step 3: 20 h at 10 °C, speed 60, light on, cooling on

Step 4: 1 h at 10 °C, speed 200, light on, cooling on

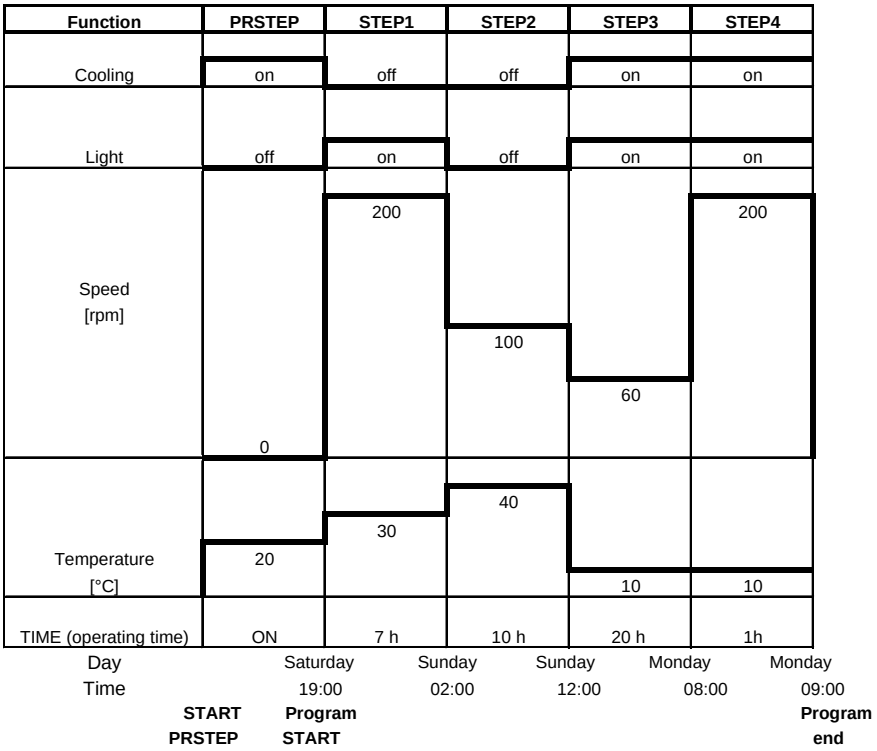


Fig. 31: Example for programming

3.3.4.3 Password protection for programs

- The “password protection“ (code) for programs serves to protect programs, which have once been established, when against unauthorized access. The content of the program cannot be modified without knowledge of the password. If required also the “starting“ and “stopping“ of the programs can be protected by this password.
- After pressing of the [ENTER] key you change to the menu where you enter the “password“ (code) for the active program.
- For safety reasons the “password“ must be entered twice when the password is determined.

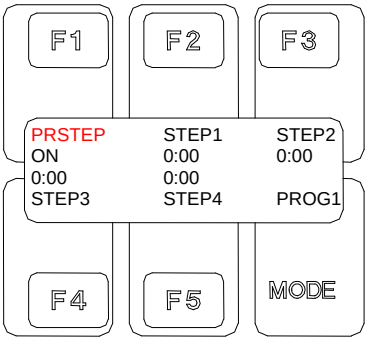


Fig. 32: program definition of PROG1

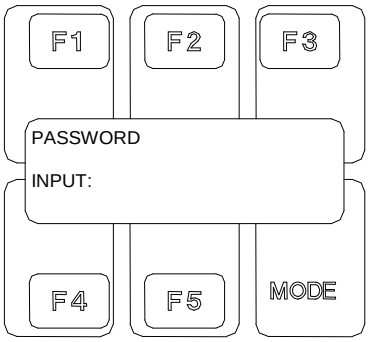


Fig. 33: determination of password for PROG1

- In pressing the function keys [F1] ... [F5], [+], [-], [START] or [STOP] as admissible signs the “password“ (code) (visible “*“ on the display) is entered.
- The “password“ (code) must have at least 4 and at most 7 places.
- After the input of the password the “password“ (code) must be confirmed with the [ENTER] key. Then you change automatically to the confirmation of the password which has been entered.
- After the repeated input of the password the “password“ (Code) must be confirmed once again with the [ENTER] key in order to secure the “password input”. At the same time the back jump to the “program definition menu” is effected.
- In pressing the [ESC] key the “password determination“ can be stopped. All “password inputs“ which have been effected until this time become invalid.

3.3.4.4 Cancelling of a program password

- Select in the program definition menu the program in which you want to cancel the password (password knowledge is necessary).
- In pressing the [ENTER] key you change from the program definition menu to the menu for password determination.

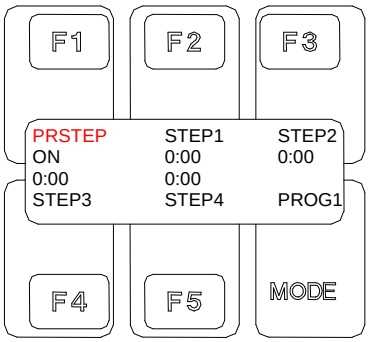


Fig. 34: program definition of PROG1

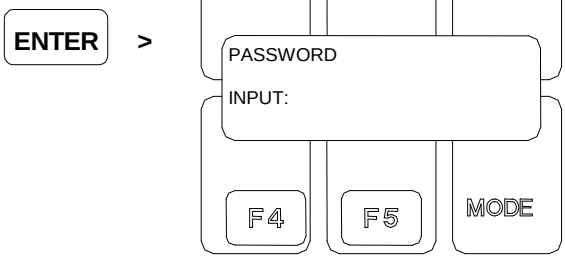


Fig. 35: determination of password for PROG1

- Deleting / deactivating of the “password” (code) is carried out with the [ENTER] key as first password sign. You change then to the confirmation of the deletion / deactivation.
- The repeated input of [ENTER] causes the deletion of the existing “password” (code) and the automatic back jump to the program definition menu is effected.
- In pressing the [ESC] key the deletion / deactivation of the “password“ (code) can be stopped.

3.3.4.5 Starting a program

- In pressing the [START] key afterwards you change to the setup mode of the program selected before, here program 1 “PROG1“.

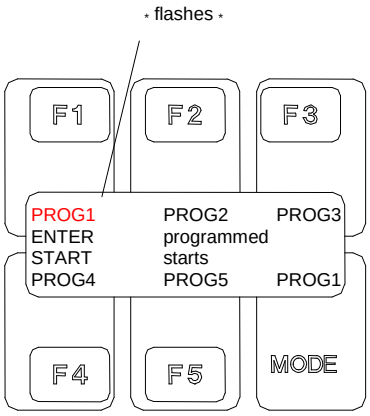


Fig. 36: PROG1-4: program menu

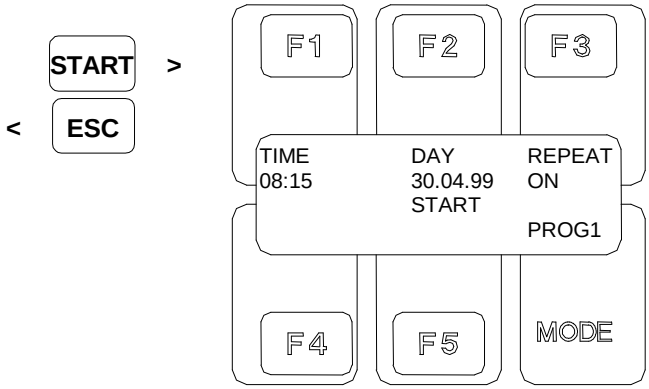


Fig. 37: start menu

The following parameters in the start menu (fig. 33) can be adjusted:

F1	**TIME:**	**Set-up of the time (start time of the program)**

- After pressing of [F1] the input field “TIME“ flashes
- In pressing the [+/-]-key the time is adjusted
- Confirm input with [ENTER]

F2	**DAY:**	**Set-up of the date (start date of the program)**

- After pressing of [F2] the input field “DAY“ flashes
- After pressing of the [+/-] keys the date is adjusted
- The current date and the current time are respectively preadjusted
- Confirm input with [ENTER]

F3	**REPEAT:**	**Set-up of repeat**

- After pressing of [F3] the automatic program repeat is activated / deactivated
- At activated program repeat the “STEP 1“ to “STEP 5“ of the program is processed in an endless loop
- The “PRSTEP“ is cycled only at the first time.

F4	F5	inactive
MODE	MODE	Display field

- The respective “active” program is indicated, here “PROG1“
- In pressing the [START] key afterwards you change to the operating mode “RUN“. The program activated before is processed.
- With the [F5] key you can alternately change to another display field in order to indicate all actual values!

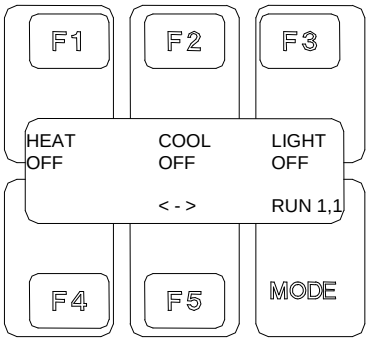


Fig. 38: RUN: operating mode

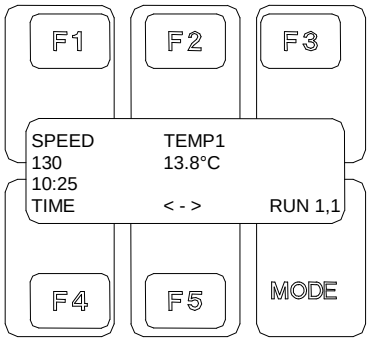
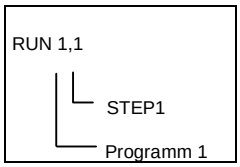
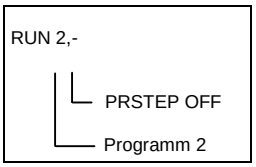


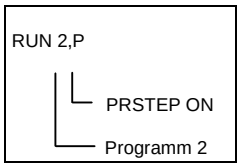
Fig. 39: RUN: operating mode

- At the TIME-display the rest operating time of a “STEP“ is indicated. During the “PRSTEP“ processing no time is indicated (display “PRSTEP“)
- In the operating mode the ACTUAL VALUES are indicated and the started program runs automatically.
- In pressing the respective function keys the SET VALUE is indicated.
- After having released the function key the ACTUAL VALUES are indicated again.
- In pressing the [STOP] key you jump back to the program menu “PROG“. Heating, cooling, light and shaking drive are switched off. The program processing is stopped.

  It is indicated during the program processing which program and which “STEP“ are being processed at the moment, e. g.:







- For the programs “PROG2-PROG5“ the set-ups are used analogously to the description for program 1 “PROG1“.

3.3.5 Setup menu „SETUP1“

- In pressing the [F3] key you change to the “setup1 menu“.
- All set-ups and modifications are memorized internally and remain active also after voltage loss or switching off and on!

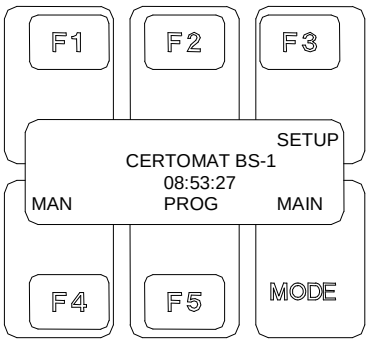


Fig. 40: main menu

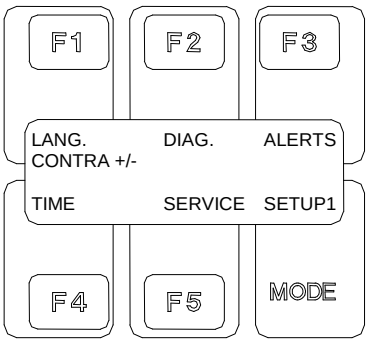


Fig. 41: setup1 menu

Display contrast

- Can be modified in pressing the keys [+] and [-].

Attention:

☞ In pressing the key [-] the contrast is so much reduced that no information is visible at the display!

The following parameters in the “setup-menu1“ (fig. 37) can be adjusted:

F1	LANG.:	Set-up of the menu language

- After pressing of the [F1] key you come to the menu in which you adjust the menu language (German, English, French).
- An arrow marks the respectively active language.
- In pressing the keys [+] / [-] the arrow can be moved.
- In pressing the [ENTER] key the respectively adjusted language is confirmed.
- In pressing the [ESC] key you change again to the “setup1-menu“. The language set-up before is now shown in the menus.

F2 **DIAG:** **Diagnosis of the alarm messages which occured**

The alarms which occurred are indicated on a list. The following information is separately made for disposal for each error type:

Error type	e. g. speed or temperature alarm
Error counter	Number of the alarms which occurred since the last acknowledgment
Date / time / alarm start	Date and time of the alarm start (only of the alarms which occurred last)
Date / time / alarm end	Date and time of the alarm end (only of the alarms which occurred last)

- An arrow marks the respective active list entry.
- In pressing the keys [+/-] the arrow can be moved.
- In pressing the [ENTER] key the respectively active list entry is cancelled. Afterwards the alarm information for this kind of error is not available any more.
- If no alarm occurred or if all list entries were cancelled ["....<ESC>...."] appears on the display.
  The diagnosis menu can only be quit with [ESC].

F3 **ALERTS:** **Alarm definition**

In a list the alarm parameters for temperature, speed, door contact and voltage loss can be adjusted.

- An arrow marks the respectively active parameter
- In pressing the keys [+/-] the arrow can be displaced
- In pressing the [ENTER] key the YES / NO definitions are directly changed or the numeric values can be released for modification (value flashes).
- In pressing the keys [+/-] the respectively flashing value can be set.
- In pressing the [ENTER] key the adjusted value is confirmed.
- In pressing the [ESC]-key you jump back to the SETUP1-menu.

These alarm parameters can be adjusted:

Temperature 1	ON	The temperature alarm is active
	OFF	The temperature alarm is inactive
Signal	ON	Acoustic signal active in case of an alarm
	OFF	Acoustic signal inactive in case of an alarm
Time OK	40 [s]	Duration of time, during which the set temperature must have been at least reached after a temperature error, before the next error can be registered (here 40 seconds).
Time ERR	40 [s]	Duration of time, during which the temperature error must at least occur, before the error is indicated (here 40 seconds).
min.	3,0 [°C]	Permitted temperature deviation downwards, where no error is indicated (here 3,0 °C)
max.	3,0 [°C]	Permitted temperature deviation upwards, where no error is indicated (here 3,0 °C)
Door contact	ON	The door contact alarm is active
	OFF	The door contact alarm is inactive
Signal	ON	Acoustic signal is active if the alarm occurs
	OFF	Acoustic signal is inactive if the alarm occurs
Time OK	5 [s]	Duration of time, during which the plexiglass cover must be at least closed, before the error is registered again (here 5 seconds)
Time ERR	2 [s]	Duration of time, during which the plexiglass cover must be at least opened, before the error is indicated (here 2 seconds)
Speed	ON	The speed alarm is active
	OFF	The speed alarm is inactive
Signal	ON	Acoustic signal active at alarm message
	OFF	Acoustic signal inactive at alarm message
Time OK	20 [s]	Duration of time, during which the set speed after a speed error must have been at least reached again, before the next error can be registered (here 20 seconds)
Time ERR	20 [s]	Duration of time, during which the speed error must at least occur, before the error is indicated (here 20 seconds)
min.	10 [U/min]	Permitted speed deviation downwards, where no error is indicated (here 10 U/min.)
max.	10 [U/min]	Permitted speed deviation upwards, where no error is indicated (here 10 U/min.)
Power failure	ON	The power failure alarm is active
	OFF	The power failure alarm is inactive
Signal	ON	Acoustic signal is active if the alarm occurs
	OFF	Acoustic signal is inactive if the alarm occurs

- In case of an alarm there is an optical display via alarm-LED or an acoustic message via buzzer (if active). At the same time the alarm is taken over in the diagnosis and can be read-out after the program end in the menu SETUP / DIAG.

- A message to an outside alarm center can be sent over a contact without potential via the SUB-D socket (see point 3.4.3).

- In pressing the [ENTER] key the optical and acoustic messages are acknowledged and the contact without potential is set back.

- In opening the doors the shaking drive is stopped and the heating is switched off, independent of the fact, if the door contact alarm is ON or OFF. As soon as the doors are closed again, the shaking drive and the heating will automatically operate again.

☞ The CERTOMAT® BS-1 starts only if both doors are closed.

- In the case of power loss during the program processing or in the operation mode “RUN“ the time which has already been processed is saved. Once the power supply is resumed, the device starts automatically. The remaining time of the program is processed. This happens independent of the fact whether the power loss alarm is active or not.

- The alarm definition for the power loss serves only for the activation of the optical/acoustic alarm message or the entry in the diagnosis after the voltage has returned.

F4 **TIME:** **Set-up of time and date**

- In pressing the key [F4] you can change to the display field “set-up of time/date“

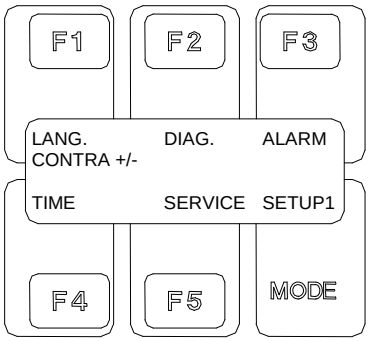


Fig. 42: setup menu

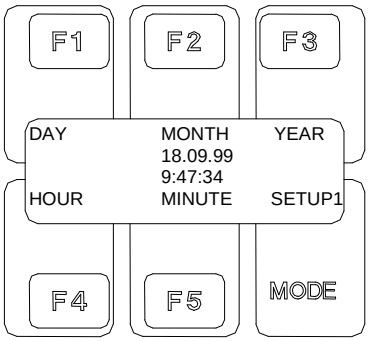


Fig. 43: set- up time/date

The following parameters for the set-up of “time and date” (fig. 39) can be adjusted:

F1 **DAY:** **Set-up of the week day**

- After pressing of [F1] the input field “DAY“ flashes
- In pressing the keys [+/-] the desired week day can be set up
- Confirm input with [ENTER]

F2 **MONTH:** **Set-up of the month**

- After pressing of [F2] the input field “MONTH“ flashes
- In pressing the keys [+/-] the desired month can be set up
- Confirm input with [ENTER]

F3 **YEAR:** **Set-up of the year**

- After pressing of [F3] the input field “YEAR“ flashes“
- In pressing the keys [+/-] the desired year can be set up
- Confirm input with [ENTER]

F4	**HOUR:**	**Set-up of hours**

- After pressing of [F4] the input field “HOUR“ flashes
- In pressing the keys [+/-] the desired hour can be set up
- Confirm input with [ENTER]

F5	**MINUTE:**	**Set- up of the minutes**

- After pressing of [F5] the input field “MINUTE“ flashes
- In pressing the keys [+/-] the desired minute can be set up
- Confirm input with [ENTER]

MODE	**MODE:**	**Display field**

- The respective “active“ menu is indicated, here “SETUP1“

3.3.6 Set-up menu „SETUP2“

- In pressing the [F5] key you change to the “SETUP2-menu“ for the input of the device parameters.
- All set-ups and modifications are memorized internally and remain active also after voltage loss or switching off and on!

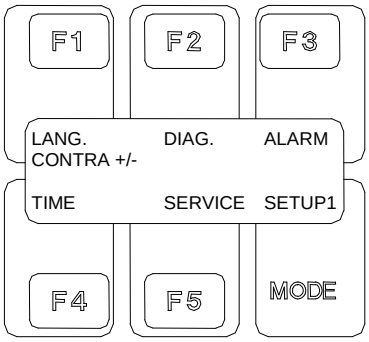
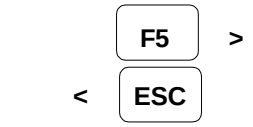


Fig. 44: setup1-menu



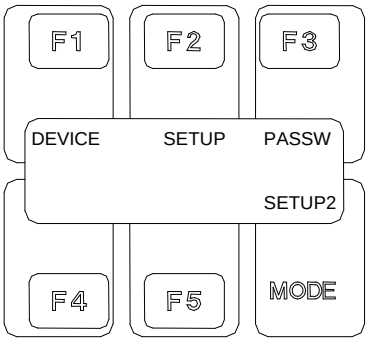


Fig. 45: setup2-menu

The following “device parameters“ (fig. 41) can be adjusted:

F1 **DEVICE:** **Activation of different device options**

Device options can be activated or deactivated in a list as well as device information can be called.

- An arrow marks the respectively activated parameter
- In pressing the keys [+/-] the arrow can be moved
- In pressing the [ENTER] key the YES / NO-definitions are directly modified or numeric values are released for modification (value flashes).
- In pressing the keys [+/-] the respectively flashing value can be adjusted.
- In pressing the key [ENTER] the adjusted value is confirmed.
- In pressing the [ESC] key you jump back to the SETUP2 menu.

Temp.Offset	0,0	Actual value correction for the 1.PT100 (for temperature regulation). Calibrating values can be adjusted. The digit sign can be modified by pressing the [F1 ... F5] keys.
Light	Yes	Ilumination active
	No	Ilumination inactive
2. PT100	ON	Referencethermometer activ
	OFF	Referencethermometer inactiv
August 2002	111	Software version
Ser No.	39	Hardware serial number (here no. 39)

F2 SETUP

F3 PASSW

Set-up of internal parameters

- In pressing the [F2 und F3] keys you change to menus where you input internal parameters.

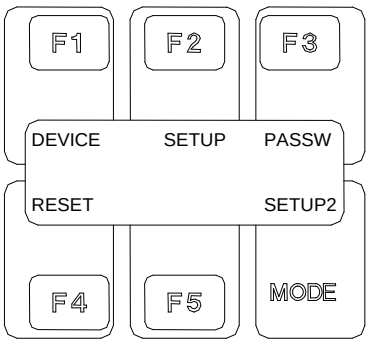
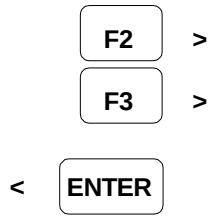


Fig. 46: setup2 menu



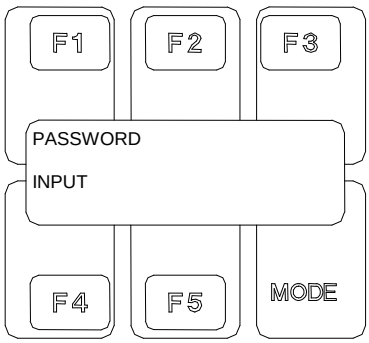


Fig. 47: password entry menu

⚠ These menus are reserved for service purposes and are protected by passwords.

⚠ Modifications of these parameters can only be carried out by authorized personnel.

⚠ Improper modifications may destroy the unit.

F4 RESET

- In pressing the [F4] key a little bit longer the device is reset.

⚠ All set-ups, programs, passwords etc. will definitely get lost!

3.3.7 Operation of the Optional Internal Refrigerator

- If the CERTOMAT® BS-1 is equipped with the optional refrigerator, you need not care for condensate produced during cooling operation. Existing condensate will be evaporated internally in the cabinet.

- To avoid damages of the refrigerator an integrated overheat protection permanently switches off the unit if the temperature in the incubation room exceeds +38.5 C.

3.4 Connection of External Equipment

At the rear side of the device the CERTOMAT® BS-1 has two Sub-D sockets with 9 poles for analog signal exits, RS 232 interface, as well as a collective alarm contact.

3.4.1 Analog Exits (ANALOG OUT)

- For the external registration of speeds and temperatures, e. g. with a recorder, the CERTOMAT® BS-1 has analog signal exits (0 ... 10 V).

The conditions are as follows:

- Speed: 0 V corresponds to 0 U/min.
  10 V corresponds to 400 U/min.
- Temperature: 0 V corresponds to 0 °C
  10 V corresponds to 100 °C

☞ The moving load at the voltage entries must not be lower than 10 kΩ.

- Current signals (0 ... 20 mA) or (4 ... 20 mA) can optionally made for disposal.

☞ The moving load at the current entries must not be higher than 500 kΩ.

3.4.2 RS 232 Interface

- The Sub-D socket with 9 poles “RS 232“ is currently a Sartorius AG service interface.

3.4.3 Collective alarm

- A contact without potential is made available on PIN 4/9 via a Sub-D-Socket “ANALOG OUT“. Alarm situations can be reported externally by help of this contact.

☞ From serial no. 00500/05
The relay contact is closed during normal operations. In case of an alarm, the relay contact opens and generates an error message via the voltage-free collective alarm output.

Contact loading capacity: 230 V AC / 0.5 A (Ohm load)

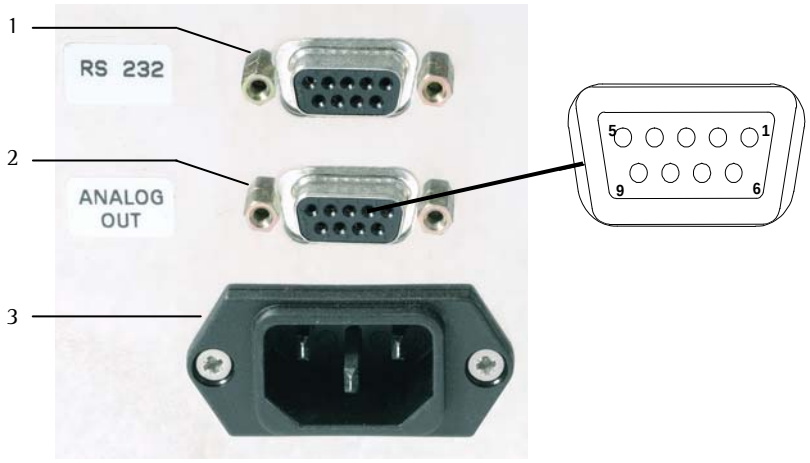


Fig. 48: Device rear side
1. RS232 interface
2. Socket “Analog out” with 9 poles for recorder connection etc.,
– Pin 1 = signal + /temperature
– Pin 2 = Gnd / temperature
– Pin 6 = Signal + / speed
– Pin 7 = Gnd / speed
– Pin 4 = collective alarm
– Pin 9 = collective alarm
3. Supply entry socket with supply main and shock-proof plug

3.5 Mounting of Trays and Mounting Sets

3.5.1 Assembly and Loading of Finally Equipped Sets of Trays

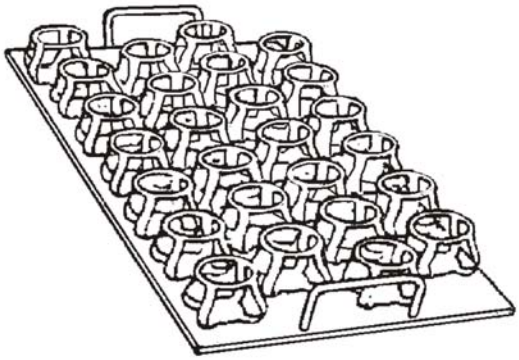


Fig. 49: Tray type F with clamps for Erlenmeyer flasks

The trays type E and F are available as completely equipped trays. Detailled information you will find in the “Ordering Information“ in the supplement.

1. Place the tray in the BS-1 and fasten it as explained in point 3.2.3 (Mounting and dismounting a tray).

2. Insert the Erlenmeyer flasks in the clamps (you can also use bottles, beakers etc. which fit in the clamps).

☞ Please take care of the distribution of the loads and distribute them evenly starting from the centre of the tray outward.

☞ Before starting the shaker check the proper seat of all containers. They must not get loose and flung off during operation of the shaker.

3.5.2 Mounting of Test Tube Racks

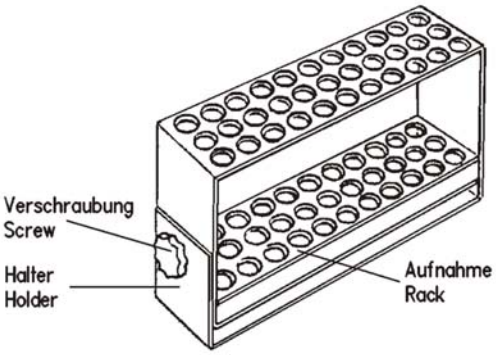


Fig. 50: Test tube rack assembly

1. Loosen the clamping screw of the test tube rack and turn the test tube holder, until the screw-holes for attachment of the rack to the tray are accessible. If necessary, you may completely remove the holder from the rack.

2. Place the test tube rack onto the universal tray and tighten with the mounting screws. Consider the number of racks required for your application and distribute the racks evenly on the tray starting from the centre of the tray outward.

3. As far as being disassembled, mount again the test tube holders to their racks. Turn the holders into their working position (usually vertical). Locate with their clamping screw.

3.5.3 Mounting of the Universal Mounting System

The universal mounting set is available for the trays of size EU and FU. Enclosed you will find further information about the component parts. Basic parts are two side frames which are adapted to the corresponding tray and the rods for connection of the side frames:

- Set of side parts type B-2, art. no. 8854238, for tray EU
- Set of side parts type B-3, art. no. 8854243, for tray FU

Universal clamping rods and mounting sets for separation funnels serve as mounting systems

- Universal clamping rods type U, art.-no. 8854254, for side part set B-2 / B-3
- Mounting set type S-1 for separating funnels 50 and 100 ml, art. no. 8854262, with clamps and retaining springs and 1 universal clamping rod type U
- Mounting set type S-1 for separating funnels 250, 500 and 1000 ml, art. no. 8854270, with clamps and retaining springs and 1 universal clamping rod type U

1. Place the side parts (1) onto the tray and screw them onto the tray with the mounting screws as shown at pos. (1a). For each side part 4 screws are supplied to provide proper tightening. Then mount connecting rods as shown at pos. (1b).

2. For a mounting system with universal clamping rods attach the clamping rods at the side frame rods as shown at pos. 3. You'll need at least two rods and you can add as many as required for placement of your vessels.

3. Place the shaking containers between the clamping rods. Distribute the containers evenly on the tray, starting from the centre outward. You can loosen the clamping screws 3a/3b of the rods to readjust the rod and properly locate the flasks, vessels and beakers, etc. Then carefully tighten the clamping screws (3a/3b) so that the containers do not loosen during operation.

4. For the mounting set for separation funnels attach one universal clamping rod as shown above. It will serve as support. Then mount the retaining springs (2a) to the clamping rod for separation funnels (2). Depending on the size of the separation funnels you can mount up to 5 retaining springs to the clamping rod (pos. 2a).

5. Place the separation funnels onto the mounting set. You can readjust the clamping rods as required using their clamping screws attached.

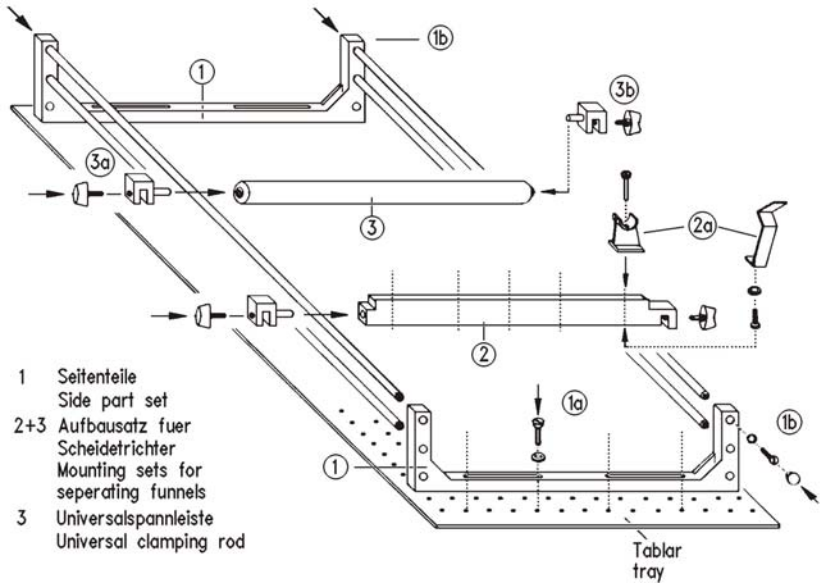


Fig. 51: Assembly of universal rods and mounting sets for separating funnels

3.6 Maintenance and Trouble-Shooting

3.6.1 Maintenance and Cleaning

Except for necessary cleaning, the replacement of defective fuses and checking of the shaking drive belt the CERTOMAT® BS-1 is maintenance-free. If the optional illumination unit is installed, you can replace defective lamps. All bearings of the shaking drive are lubricated for their lifetime. The drive motor is a service-free brushless motor of external rotor type.

⚠ Disconnect the mains cable from laboratory grounded socket before cleaning and/or maintenance and service. Unintended starting of the shaking drive during cleaning and maintenance can cause personnel hazards.

- Maintenance and service of the shaking drive, such as the replacement of the drive belt, service of the electrical and electronic equipment or of the optional cooling devices must only be done by qualified and authorized service personnel.

3.6.1.1 Cleaning

1. The interior incubation chamber consists of stainless steel. For cleaning, we recommend usual household cleaning agents or alcohol. Do not use aggressive cleaning agents. Chlorous (hypochlorite) agents, for instance, can cause corrosion.

2. Cleaning the spill tray:
   Switch off the BS-1 and pull mains plug.
   Take out the tray.
   Loosen the 4 screws of the shaking table.
   Take off the shaking table.
   The spill tray is now fully accessibly and can be taken out for thorough cleaning.

3. Put the clean spill tray back in place.
   Mount the shaking table and fix it with 4 screws.
   Insert the tray. Reconnect the BS-1 to mains.

4. After incubation of living microorganisms and cells the CERTOMAT® BS-1 may need to be disinfected. For disinfection we recommend disinfectants based on alcohols, such as B. Braun Medical AG's Meliseptol®. After cleaning and disinfection with such agents you should thoroughly dry and ventilate the incubation room.

☞ You should remove broken glass, spilled liquids and other impurities immediately after they occur. Please take care that impurities do not dry.

5. Take care that no foreign bodies can enter the air-circulation system. Regularly remove dust from the outer covering grids of the built-in ventilator and of the refrigerator regularly.

3.6.1.2 Maintenance of the Illumination Unit

- Maintenance is confined to the checking for and replacement of defective fluorescent lamps and device fuses. If other malfunctions occur, please contact your service representative of Sartorius AG.

1. Switch-off the illumination unit and disconnect from its mains supply.

2. Pull the defective fluorescent tube out of its holder. Insert the new tube. On delivery commercially available fluorescent tubes "L18W/77 (Fluora)", or fluorescent tubes according to the customer's specifications are installed.

3. Replace defective fuses, if necessary. The fuses are placed in a fuse assembly behind the door at the right hand side panel. Note to use the same type/size for replacement, as delivered from factory side.

3.6.2 Correction of malfunctions

3.6.2.1 Electrical Malfunctions

- If the BS-1 does not start, check the mains supply. The mains cable should be properly connected and the laboratory mains be operative. If other devices in the laboratory are malfunctioning at this time, a mains failure (such as voltage fluctuations) can be the cause.

⚠ Check the fuses. They are located in an insert inside the cabinet, behind the right side panel. Disconnect the unit from mains before you open the side doors. A burned-off body or a melted wire will indicate a defective fuse. For replacement note the correct voltage/current of the fuses.

- If the BS-1 cannot be started although the mains supply is operative and the fuses are in good condition, contact your service representative of Sartorius AG. You will find the telephone number on the next page.

3.6.2.2 Malfunctions of the Shaking Drive

- If the shaking drive runs noisy or irregularly the belt can be dirty. If the tray support does not turn although the shaking drive is working (you can hear the motor run), the drive belt may be damaged. If the motor is inoperative although the power supply and all necessary adjustments are available, the motor may be damaged.

1. For checking the belt drive, the tray and shaking table must be disassembled. Unscrew the 4 mounting screws in the centre of the shaking table and remove it. You can check the belt through the opening in the cover of the drive.

2. For the mounting of the shaking table carefully tighten the screws crosswise.

- If the drive belt is damaged (torn) or the motor is suspected to be defective, please contact your service representative of Sartorius AG.

3.6.2.3 Malfunctions of the Optional Refrigerator

- The compressor of the refrigerator includes an internal winding protection for overheat detection. This device cuts off the power supply at overheating of the winding. The refrigerator will automatically be enabled for restart after cooling down of the winding. This may last up to 1 hour.

- If the overheat protection cuts-off the refrigerator often or repeatedly, you should contact your service representative of Sartorius AG.

3.7 Warranty Regulations and Service

The Sartorius Stedim Biotech GmbH warrants its products according to the terms specified in the "General Terms and Conditions of Business" and unless other terms were agreed upon in writing. Date of reference is the date of delivery.

- The guarantee includes defects and malfunctioning due to construction, production and material faults, however it does not include defects due to wrong operation and improper treatment and use. Furthermore it does not apply for parts which became damaged due to normal wear and also not for consumer materials.

- The guarantee will lapse if the user or unauthorized third persons modify the device technically or if they use equipment, components and accessories, which have not been passed by Sartorius Stedim Biotech GmbH for the application in connection with the shaking cabinet CERTOMAT® BS-1.

Repairs can be carried out by the Sartorius AG service representative or by authorized personnel of a customer-owned workshop. Please inform your local Sartorius AG sales representative or contact:

Sartorius AG
Service-Zentrum Nord
Weender Landstraße 94-108
37075 Göttingen, Germany
Telephone +49.551.308.3729 / 3740 / 3741
Telefax +49.551.308.3730

- Only spare parts passed by Sartorius Stedim Biotech GmbH must be used.

- Defective units can be returned to Sartorius AG.

☞ Any units to be sent to us for repair have to be in perfect hygienic condition, clean and well packed. If parts were polluted by media and media components, they have to be cleaned, decontaminated, disinfected or sterilised, according to the valid safety rules of this particular application, e.g. for chemical or biological safety.

☞ The sender has to prove that all safety guidelines have been observed. For this purpose you have to fill in the enclosed decontamination declaration and attach it to the apparatus. No apparatus will be repaired without declaration of decontamination or description of the measures taken.

☞ Transport damages or subsequent cleaning or disinfection, if required, will be borne by the sender.

4 Technical Data, Ordering Information

4.1 Technical Data

4.1.1 Mechanical Design

Shaking cabinet	outside housing 1150 x 720 x 770 mm (W x H x D); incubation room 890 x 495 x 650 mm (W x H x D)
Weight (with equipment)	about 230 kg
Tray support	440 x 420 mm (W x D)
Materials	outside cabinet : sheet steel case with acidproof varnish; incubation room inside: stainless steel case
Trays, type/size	Type E/EU (420 x 420 mm)[1]; type F/FU : (800 x 420 mm)
Load	depending on tray and mounting system of the Sartorius Stedim Biotech GmbH accessory program

4.1.2 Mains Supply

Laboratory connector	laboratory grounded socket (specific connectors on request)
Mains specifications	230 V (±5 %) 50 Hz or 115 V (±5 %) 60 Hz
Power consumption	about 1.2 kW (including refrigeration)
Ilumination	about 90 W (5 x 18 W)
Fuses	T6,3A for 230 V, T10A for 115 V
Radio interfer. suppression	according to EN 55011 and EN 55014

4.1.3 Operating Data

Orbital motion	Ø 25 mm or Ø 50 mm, depending shaker drive	
Shaking speed	40 ... 400 min^{-1}	
Rotation speed accuracy	max. ±1% (of final value)	
Incubation temperature	heating version	RT +8 °C ... +70 °C
	heating and cooling version	RT –10 °C .. +70 °C
Ambient temperature	+10 ... +60 °C (+10 ... + 30 °C at UHK version)	
Ambient humidity	10 ... 60 %; Incubation room 10 ... 80 %, not condensing	

4.1.4 Analog Out

Socket, 9-poles Sub-D	0 ... 10 V (min. moving load = 10 kΩ) (Pin configuration see point 3.4, fig. 37) 0 ... 20 mA or 4 ... 20 mA (optionally) (max. moving load = 500 Ω)
Exactness	± 0,3 V

4.1.5 Collective alarm

Collective alarm	Contact without potential (closer), max. 230 VAC (0.5 A Ohm load) via SUB-D-socket „analog out“ Pin 4/9.

4.1.6 Option refrigerator

Refrigerant	R 134a
Filling	270g

RT = room temperature
(We reserve the right to carry out dimensional and construction modifications)

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[1] Trays of modified design for new locking; rebuilding of existing trays for this locking on request. Please contact the Sartorius AG customer service.

4.2 Ordering Information

4.2.1 Configuration of the Shaking Cabinets

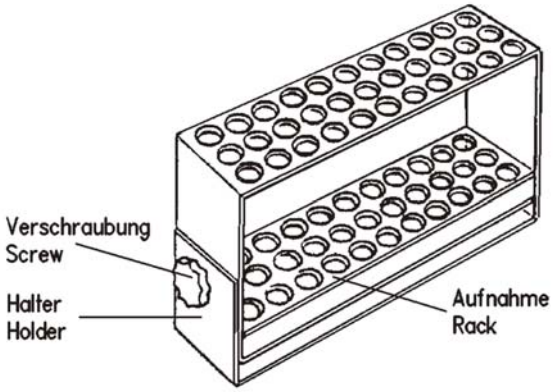
Cat.-no.	Features and Specifications
	Incubation shaker CERTOMAT® BS-1 / 25 mm Version 230 V / 50 Hz
8865027	Heating version (UH)
8865221	Heating and cooling version (UHK)
	Incubation shaker CERTOMAT® BS-1 / 50 mm Version 230 V / 50 Hz
8865124	Heating version (UH)
8865329	Heating and cooling version (UHK)

4.2.2 Optional Equipment

Cat.-no.	Features and Specifications
	Support frame
8864489	welded metal sectional-frame construction for up to two CERTOMAT® BS-1 shock-resistant stove enamel finish dimensions: 1150 x 220 x 700 mm (W x H x D) 4 height adjustable stands
	Illumination unit for CERTOMAT® BS-1 consisting of five fluorescent lamps, à 18 W, can be switched off separately, programmable
8861455	Version 230 V / 50 Hz – in connection with cooling UHK
On request	Version 115 V / 60 Hz – can be integrated afterwards
	Grid for petri dishes
8861471	Stainless steel 640 x 880 mm For Petri dishes, height adjustable

4.2.3 Accessories

Cat.-no.	Features and Specifications
	Trays with fixed clamps (with clamps for Erlenmeyer flasks)
	Tray E 420 x 420 mm – clamps made of stainless steel
8853533	Tray incl. 39 clamps for Erlenmeyer flasks 100 ml
8853568	Tray incl. 20 clamps for Erlenmeyer flasks 250 ml
8853584	Tray incl. 14 clamps for Erlenmeyer flasks 500 ml
8853606	Tray incl. 9 clamps for Erlenmeyer flasks 1.000 ml
	Tray E 420 x 420 mm – plastic clamps
8853688	Tray incl. 39 plastic clamps for Erlenmeyer flasks 100 ml.
8853666	Tray incl. 19 plastic clamps for Erlenmeyer flasks 250 ml.
8853677	Tray incl. 14 plastic clamps for Erlenmeyer flasks 500 ml.
	Tray F 800 x 420 mm – clamps made of stainless steel
8853738	Tray incl. 74 clamps for Erlenmeyer flasks 100 ml
8853762	Tray incl. 40 clamps for Erlenmeyer flasks 250 ml
8853789	Tray incl. 26 clamps for Erlenmeyer flasks 500 ml
885 3800	Tray incl. 15 clamps for Erlenmeyer flasks 1.000 ml
	Universal - Trays
8853002	type EU (420 x 420 mm)
8853037	type FU (800 x 420 mm)
	Sticky tape for universal trays
8860416	Sticky tape “Premium” for universal trays, 30 x 1 mm, roll of 10 m, durable quality
8864497	Sticky tape for universal trays, size 30 x 1 mm, roll of 50 m for fixing of Erlenmeyer flasks, beakers, etc., only for use at low shaking speeds
	Anti-skid layer for universal trays
8864470	Anti-skid layer size 380 x 420 mm for placement of Erlenmeyer flasks, beakers, etc., only for use at low shaking speeds and temperatures up to 50 °C

Cat.-no.	Features and Specifications
	Test Tube Racks
Fig. 52: Test tube rack	
8853134	Test tube rack for 64 test tubes Ø 14 mm
8853142	Test tube rack for 42 test tubes Ø 16 mm
8853150	Test tube rack for 36 test tubes Ø 18 mm
8853169	Test tube rack for 33 test tubes Ø 20 mm
8853185	Test tube rack for 18 test tubes Ø 25 mm
8853177	Test tube rack for 12 test tubes Ø 30 mm
	Racks for centrifuge tubes, with screw cap
8853088	Rack for 42 centrifuge tubes Ø 16 mm
8853096	Rack for 36 centrifuge tubes Ø 18 mm
8853193	Rack for 33 centrifuge tubes Ø 20 mm
8853240	Rack for 12 centrifuge tubes Ø 30 mm
	Clamps for Erlenmeyer flasks **(for optional mounting onto the universal trays)**
8854505	Clamps for Erlenmeyer flasks 25 ml required / possible max. number of clamps for tray type EU - max. 49 pcs. for tray type FU - max. 98 pcs.
8854513	Clamps for Erlenmeyer flasks 50 ml required / possible max. number of clamps for tray type EU - max. 48 pcs. for tray type FU - max. 96 pcs.
8854521	Clamps for Erlenmeyer-flasks 100 ml required / possible max. number of clamps for tray type EU - max. 24 pcs. for tray type FU - max. 48 pcs.
8854556	Clamps for Erlenmeyer flasks 250 ml required / possible max. number of clamps for tray type EU - max. 17 pcs. for tray type FU - max. 39 pcs.

Cat.-no.	Features and Specifications
8854572	Clamps for Erlenmeyer flasks 500 ml required / possible max. number of clamps for tray type EU - max. 12 pcs. for tray type FU - max. 26 pcs.
8854599	Clamps for Erlenmeyer flasks 1.000 ml required / possible max. number of clamps for tray type EU - max. 8 pcs. for tray type FU - max. 17 pcs.
8854610	Clamps for Erlenmeyer flasks 2.000 ml required / possible max. number of clamps for tray type EU - max. 4 pcs. for tray type FU - max. 9 pcs.
8854629	Clamps for Erlenmeyer flasks 3.000 ml, required / possible max. number of clamps for tray type EU - max. 4 pcs. for tray type FU - max. 8 pcs.
8854637	Clamps for Erlenmeyer flasks 5.000 ml required / possible max. number of clamps for tray type EU - max. 2 pcs. for tray type FU - max. 6 pcs.
	Clamps for Fernbach flasks **(optional equipment of the universal trays)**
8854564	Clamps for Fernbach flasks 450 ml required / possible max. number of clamps for tray type EU - max. 6 pcs. for tray type FU - max. 15 pcs.
8854600	Clamps for Fernbach flasks 1.800 ml required / possible max. number of clamps for tray type EU - max. 1 pc. for tray type FU – max. 6 pcs.
8854640	Clamps for Fernbach flasks 2.800 ml required / possible max. number of clamps for tray type EU – max. 1 pc. for tray type FU – max. 6 pcs.

Cat.-no.	Features and Specifications
	Plastic clamps for Erlenmeyer flasks (optional equipment of the universal trays)
8854700	Plastic clamps for Erlenmeyer flasks 100 ml required / possible max. number of clamps for tray type EU - max. 20 pcs. for tray type FU - max. 58 pcs.
8854711	Plastic clamps for Erlenmeyer flasks 250 ml required / possible max. number of clamps for tray type EU - max. 20 pcs. for tray type FU - max. 40 pcs.
8854722	Plastic clamps for Erlenmeyer flasks 500 ml required / possible max. number of clamps for tray type EU - max. 16 pcs. for tray type FU - max. 26 pcs.
8854733	Plastic clamps for Erlenmeyer flasks 1.000 ml required / possible max. number of clamps for tray type EU - max. 9 pcs. for tray type FU - max. 15 pcs.
Note:	**Plastic clamps are ideal for use with Erlenmeyer flasks with tubing connection. See below!**
	Shaking flask GL Erlenmeyer type, with baffles for increased turbulence

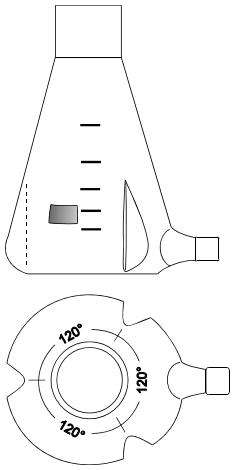


Fig. 53:
Shaking flask Erlenmeyer type; with baffles in the concave side-wall section and connector GL14 for tubing connection

	shaking flask made of DURAN®-glass, Erlenmeyer-type; straight neckpiece for metal caps; neckpiece of Ø = 38 mm; flask body with three baffles at Δ 120deg with GL 14 - connector incl. plastic cap and hose connectors for tubings of size 4 x 7 mm
8861064	size 300 ml, max. Ø = 87 mm, H = 161 mm; set of 10 pcs.
8861072	size 500 ml, max. Ø = 105 mm, H = 183 mm; set of 10 pcs.
8861080	size 1.000 ml, max. Ø = 131 mm, H = 232 mm; set of 10 pcs
	Accessories for baffles shaking flasks
8861099	cap made of aluminium, set of 10 pcs.
8861102	stainless steel cap, set of 10 pcs.

Cat.-no.	Features and Specifications

Shaking flask Erlenmeyer type,
with baffles for increased turbulence

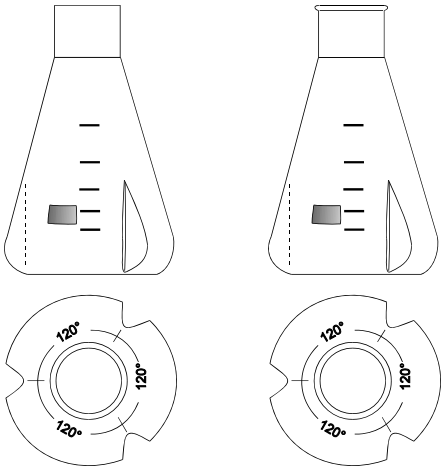


Fig. 54:
Shaking flask Erlenmeyer type;
with baffles in the concave side-wall section

shaking flask made of DURAN®-glass, Erlenmeyer-type;
straight neckpiece for metal caps; neckpiece of Ø = 38 mm or version with cellucotton stoppers
flask body with three baffles at Δ 120deg

8861005	size 300 ml, max. Ø = 87 mm, H = 161 mm; set of 10 pcs.
8861013	size 500 ml, max. Ø = 105 mm, H = 183 mm; set of 10 pcs.
8861021	size 1.000 ml, max. Ø = 131 mm, H = 232 mm; set of 10 pcs.
8861022	size 2.000 ml, max Ø = 166 mm, H = 305 mm; set of 10 pcs.
8860998	size 500 ml, version for cellucotton stoppers, etc. max Ø = 105 mm, H = 180 mm; set of 10 pcs. Other versions on request

Universal Mounting Set

Basic element type B,
each consisting of 2 side frames and 4 rods

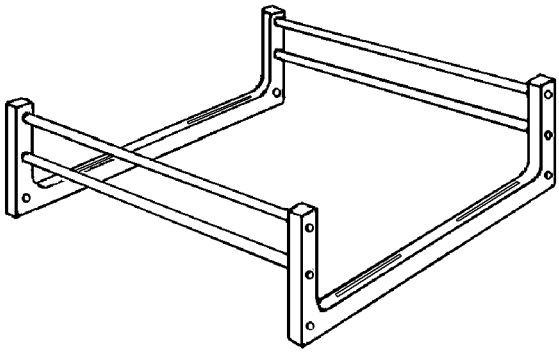
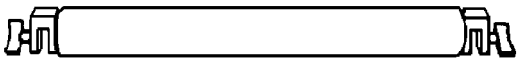
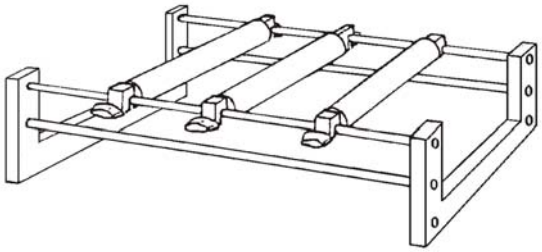
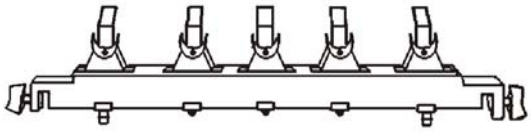


Fig. 55:
Basic element type B of universal mounting set

8854238	type B-2 for trays EU
8854246	type B-3 for tray FU

Cat.-no.	Features and Specifications
	Universal clamping rod type U
Fig. 56: Universal clamping rod	
8854254	type U for basic elements B-2 and B-3
Fig. 57: Mounting system with universal clamping rods	
	Mounting set for separating funnels type S
Fig. 58: Mounting set for separating funnels type S	
8854262	type S-1 for 5 pcs. separating funnels 50 or 100 ml; set includes clamps, retaining springs and a universal clamping rod U-2
8854270	type S-2 for 3 pcs. separating funnels 250, 500 or 1.000 ml; set includes clamps, retaining springs and a universal clamping rod U-2
	Max. number of mounting sets for tray type is 1 mounting set S 1 or S 2 for tray type EU with set B-2 2 sets of mountings S 1 or S 2 for tray type FU with set B-3

4.3 Safety Instructions Laboratory Shakers and Incubation Shaking Cabinets

(Safety Instructions Laboratory Shakers and Incubation Shaking Cabinets see appendix)

4.4 EG Declaration of Conformity

(EG Declaration of Conformity see appendix)

4.5 Declaration of Decontamination

(Declaration of Decontamination see appendix)

4.6 Information and Instructions on Disposal and Repairs

(Information and Instructions on Disposal and Repairs see appendix)

4.7 Dimension sheet CERTOMAT® BS-1

(Dimension sheet see appendix)

4.8 Prospectus CERTOMAT® BS-1

(Prospectus CERTOMAT® BS-1 see appendix)

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Safety Instructions

Laboratory Shakers and Incubation Shaking Cabinets

85030-520-67

Content

1 Introduction

These Safety Instructions contain our recommendations for precautions in handling CERTOMAT® laboratory shakers and incubation shaking cabinets from the product program of the company Sartorius Stedim Biotech GmbH, especially for

- transport and installation
- equipping and initial startup
- operation
- cleaning, maintenance, and service

These safety instructions are non-transferable and meant exclusively for the equipment delivered. They are not valid for other equipment. Additional, specific safety regulations (i.e., legally or otherwise mandatory rules) are not dealt with by these instructions. Please consult your local authorities for further information.

Possible risks and dangers are marked with this symbol and highlighted like this paragraph. Ignoring these warnings may cause damage to the instrument or lead to other material or personal damage.

Steps to be carried out with special care or special aspects or issues to be considered are marked with safety instructions formatted as this paragraph.

[→ ..] Identifies references to contents of these instructions or other documents. Labels of illustrations, sections, or documents are in parentheses.

2 Transport and Installation

2.1 Transporting Equipment

The shakers and especially the incubation shaking cabinets are heavy. Use only suitable transportation and lifting tools when moving or setting up units.

Make sure clearances are sufficient along the transport route and that the combined weight of lifting and transportation tools does not exceed the maximum load permitted for the floor or ground.

Use only qualified personnel to transport the equipment. Make sure personnel is protected from injury during transport.

Do not remove any transport protection before the equipment has been transported to the site of installation.

2.2 Requirements at the site of installation

1. The floor or the laboratory bench where the equipment is to be installed must be able to support the weight of the fully equipped units and systems.
2. The installation place should be sufficiently dimensioned and feature a non-slip surface.
3. The equipment has to be easily accessible for operation, maintenance, and service tasks.
4. The shakers and the incubation shaking cabinets may transmit vibrations to the installation surface especially when carrying a heavy load. For this reason, install the shakers so that surrounding equipment is not affected.
5. The power supply must match the rating indicated on the type plate and must be grounded correctly.

Use a level to align the equipment after setting it up!

Before stacking equipment (max. 3 units), make sure that the bottom most device is properly aligned horizontally!

3 Operating Instructions

1. Make sure, that only authorized people have access to the working area.

2. Personnel has to be instructed about applicable safety instructions and other legally or otherwise compulsory regulations.

3.1 Working with Media

The utilized media and substances can be hazardous and may pose dangers that are specific to the substances and the processes and thus cannot be described here in detail. Your company should issue corresponding safety regulations and carefully instruct the operating personnel.

Recommended basic protection equipment includes such items as suitable working clothes, gloves, goggles, and respiratory equipment, if necessary.

3.2 Initial Startup and Normal Operation

1. Use only units, equipment, accessories, and spare parts released by the company Sartorius Stedim Biotech GmbH for use with the shaker.

2. Check all components for damage, especially glass components such as jars. Any damaged components must not be used.

3. Never use the shaker without the tray. Switch the unit off before installing/uninstalling trays, mounting sets, or additional accessories.

4. When mounting the trays, leave enough space between the unit and other objects, especially in case of trays extending over or beyond the shaker table or bench. Make sure that trays are properly installed and fastened.

5. Fasten the tray mountings and accessories properly. Distribute loads evenly on the tray when loading the shaker with the shaking vessels (Erlenmeyer flasks, bottles, etc.).

6. In case of incubation shaking cabinets, make sure the tray is firmly positioned; close the doors before starting the shaking process.

7. Before starting the shaker and during normal operation, check that the vessels are firmly positioned in their holders. The vessels must not become loose, rattle, or touch one another or the walls of the shaker. Switch the unit off immediately if vessels become loose in their holders.

8. Operate the equipment only within the permitted range of operating parameters. Comply with the equipment instructions and the technical data.

Head the lateral movement of the trays and the resulting impact or crushing hazards, especially with large trays, in case of low clearances to other equipment or objects or large amplitudes and heavy loads.

Never put fingers between tray support and frame when the unit is active. The space between these components is narrow due to constructional constraints. Risk of injury!

9. After switching off the shaker, wait until the shaker support has come to a completel standstill before removing or adding vessels.

4 Cleaning, Maintenance, and Service

Regular cleaning and maintenance ensures the equipment's functionality and safety.

☞ Comply with the legal safety regulations applicable to the field of application concerning the handling of microbial material and contaminated equipment.

☞ Prior to any cleaning or maintenance work, disinfect or sterilize any biologically contaminated components according to the safety regulations.

☞ Prior to any cleaning or maintenance work, switch the unit off and pull the power cable to disconnect the unit from the mains power supply. Make sure that the unit cannot be restarted or activated accidentally.

Servicing and repairing drive systems, replacing drive belts, or working on electrical/electronic equipment should only be performed by qualified service personnel.

4.1 Cleaning

1. Clean the surfaces of the units with standard laboratory cleaners. Do not use corrosive agents (e.g., chlorous agents).

2. Broken glass or spilled liquids should be removed as quickly as possible.

3. For incubator shakers special hints are given in the operating manual.

4.2 Maintenance and Service

Maintenance and troubleshooting by the user should be restricted to the following tasks:

- Checking the voltage supply in the lab and the equipment connections.

- Checking and replacing defective fuses.

- For incubation shaking cabinets: Replacing defective light fittings.

If problems or malfunctions cannot be solved or remedied, please contact your Sartorius AG representative or contact us directly:

Sartorius AG
Servicezentrum Nord
Weender Landstraße 94-108
37075 Göttingen, Germany
Telephone +49.551.308.3729 / 3740 / 3741
Fax +49.551.308.3730

A written cleaning and decontamination certificate has to be provided when requesting service technicians of the company Sartorius AG to perform maintenance tasks.

4.3 Returning Defective Units

Defective units or components can be returned to the responsible Sartorius AG representative or directly to Sartorius AG.

1. The equipment has to be clean, hygienically flawless, and carefully packaged.

2. Contaminated parts have to be cleaned, disinfected, or sterilized according to the respective and applicable safety guidelines. Compliance with the guidelines has to be documented with a cleaning and decontamination certificate to be enclosed with the shipment.

3. Negotiate the return shipment with the Service Dept. before shipping any equipment.

4.4 Relocating equipment

1. Comply with the described cleaning and maintenance measures described to avoid biological or chemical hazards.

2. Disconnect the equipment from the mains power supply. Remove vessels and additional equipment or components inside of the unit or connected to the unit.

3. If applicable, reinsert the transport protection. Read and comply with the additional notes under "Transporting Equipment" (2.1).

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Sartorius Stedim Biotech GmbH
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changes to the technology,
features, specifications, and
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without notice.

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Publication No.: SB6043az08022
Order No.: 85030-520-67

sartorius stedim biotech

Declaration of Conformity

CE

according to EU Machinery Directive 89/392/EU, Appendix II A

Company	**Sartorius Stedim Biotech GmbH**
Address	August-Spindler-Strasse 11, 37079 Goettingen; Germany Phone +49.551.308.0, Fax +49.551.308.32 89 www.sartorius-stedim.com
	We herewith declare that the device described below fulfills the relevant fundamental safety requirements and health regulations specified by the appropriate EU-Directive, with respect to its design and construction and to the version as commercialized. This declaration becomes legally invalid if modifications are performed on the device which have not been certified by Sartorius Stedim Biotech GmbH.
Designation of the device	CERTOMAT® BS-1
Model, version	Incubation Shaking Cabinet
Cat.-No.	8865027, 8865035, 8865124, 8865132, 8865221, 8865230, 8865329, 8865337
Relevant directives of the EC	EU Machinery Directive (89/392/EU) in version 93/44/EU EU Directive on Electromagnetic Compatibility (89/336/EU) in version 92/31/EU EU Low-Voltage Equipment Directive (73/23/EU)
Applied harmonized standards	EN 292-1, EN 292-2 EN 50081-1, EN 50082-1, EN 55011 EN 61010-1
Applied national standards and technical specifications	
Date and Signature	11.01.08
Function of the Signatory	V. Niebel Managing Director
	i.V. Dr. Susanne Gerighausen Quality Management Representative

Declaration about decontamination and cleaning of equipment and components

When returning equipment or components, please describe on page 2 of this form the problem(s) or fault(s) you have found. Please also indicate the remedial actions you require.

To protect our personnel, we require all equipment or components be free of biological, chemical, or radioisotopic contaminants. We will only accept such equipment or components when:

- the equipment or components have been adequately cleaned and decontaminated.
- this declaring document has been completed, signed and returned by an authorized person.

Please help us in assuring a safe, hazard-free work environment.

A. Description of the Equipment or Component(s)

Description / Cat. No.	
Serial no.	
No. of invoice/delivery note	
Date of delivery	

B. Contamination / Cleaning

Attention: Please specify exactly the biological, chemical, or radioisotopic contaminant	Attention: Please describe the cleaning and decontamination procedure/method
The equipment was contaminated with	and it has been cleaned and decontaminated by

C. Legally binding declaration

I (we) certify that all information given in this form is correct and complete.
The equipment and components have been adequately decontaminated and cleaned according to the legal requirements.
No chemical or biological or radioisotopic risks remain that can endanger exposed persons' safety or health.

Company / Institute	
Address / Country	
Tel. / Fax (with area code)	
Name of the authorized person	
Position	
Signature / Date	

D. Reason for return

❑ wrong delivery ❑ exchange ❑ repair ❑ modification ❑ disposal ❑ other

E. Please describe the problem(s) or fault(s) you have found (for repair) and/or indicate the remedial actions you require

F. Reserved for Sartorius-Service Center

Notes

Please pack the unit properly and send it freight paid to your local service supplier or directly to Sartorius AG Servicezentrum Nord, Germany.	Sartorius AG Servicezentrum Nord Weender Landstraße 94-108 37075 Göttingen, Germany Telephone +49.551.308.3729 / 3740 / 3741 Fax +49.551.308.3730

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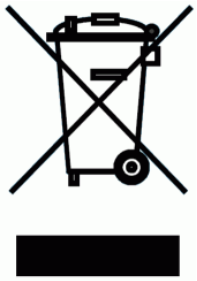
Information and Instructions on Disposal and Repairs

Packaging that is no longer required must be disposed of at the local waste disposal facility. The packaging is made of environmentally friendly materials that can be used as secondary raw materials.



The equipment, including accessories and batteries, does not belong in your regular household waste. The EU legislation requires its Member States to collect electrical and electronic equipment and disposed of it separately from other unsorted municipal waste with the aim of recycling it.

In Germany and many other countries, Sartorius AG takes care of the return and legally compliant disposal of its electrical and electronic equipment on its own. These products may not be placed with the household waste or brought to collection centers run by local public disposal operations – not even by small commercial operators.

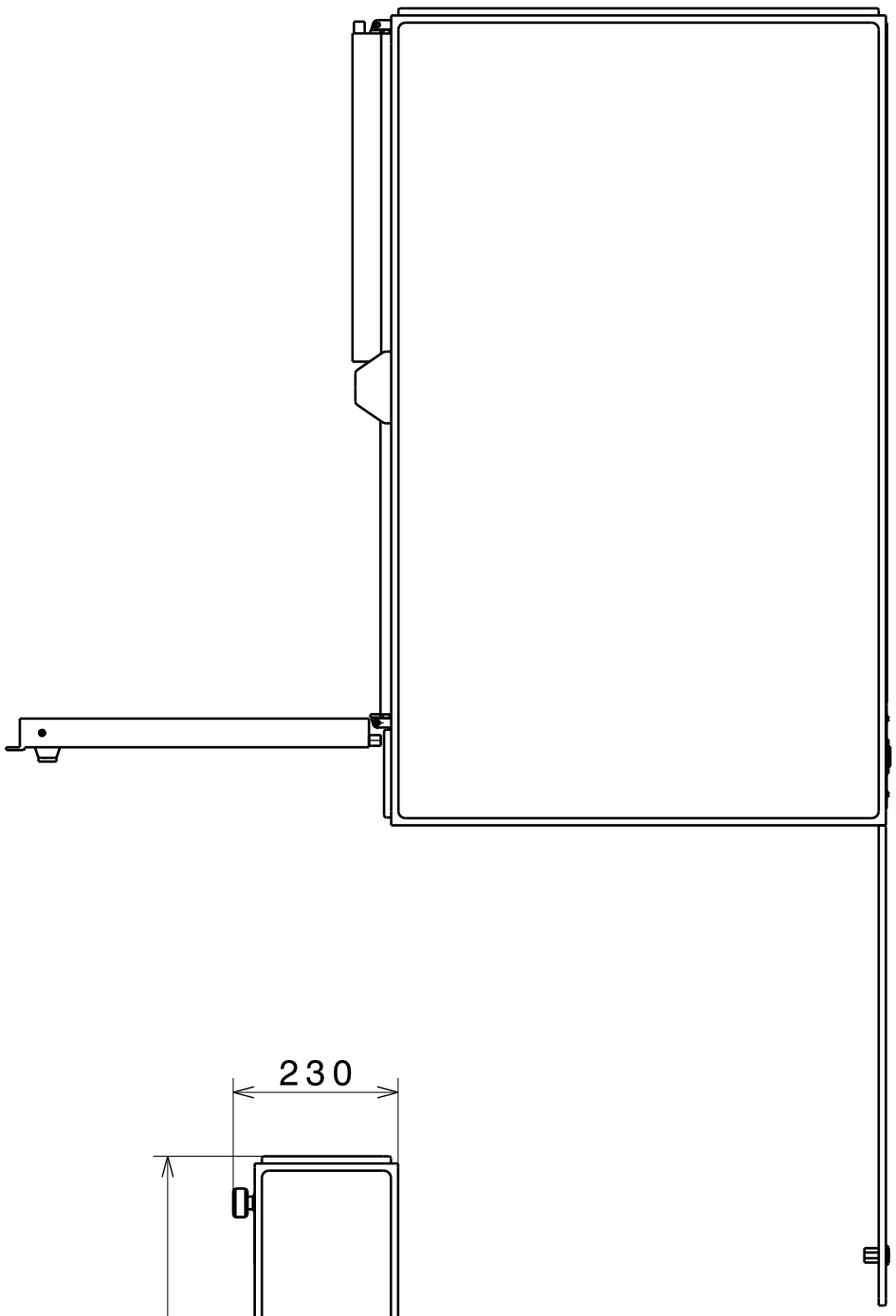
For disposal in Germany and in the other Member States of the European Economic Area (EEA), please contact our service technicians on location or our Service Center in Goettingen, Germany:

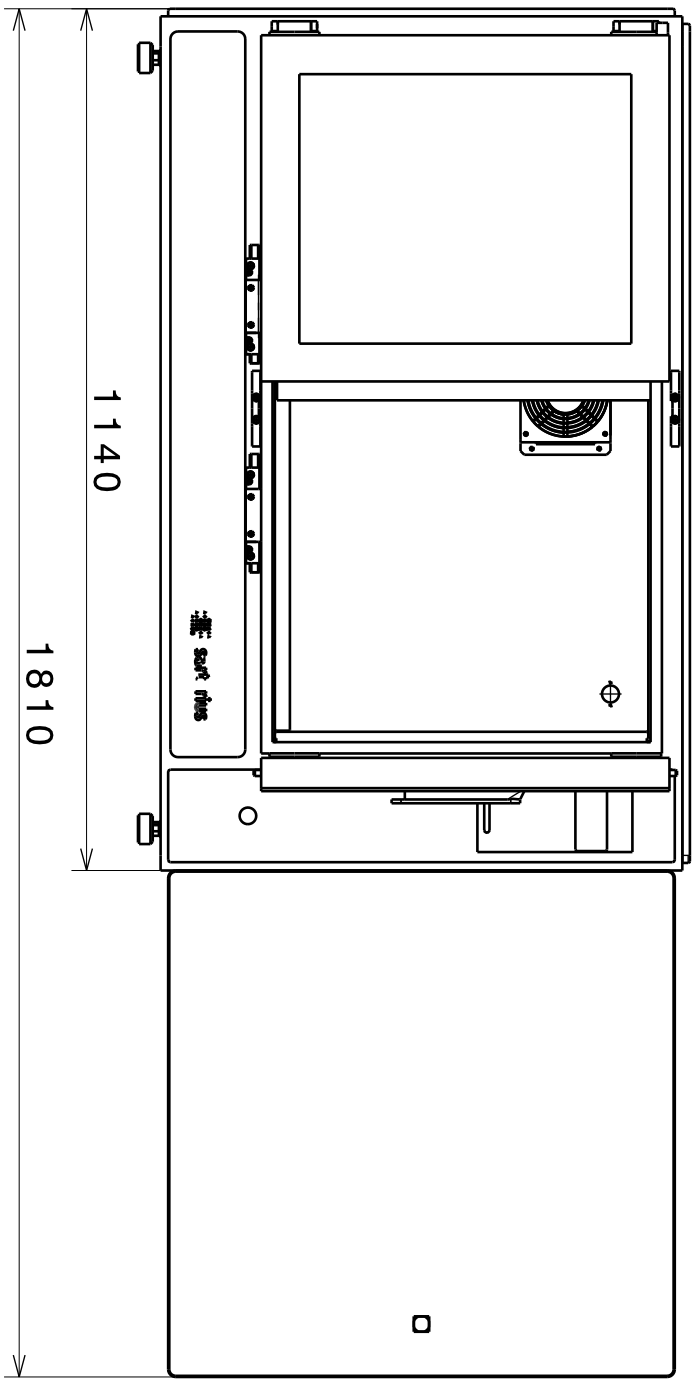
Sartorius AG
Service Center
Weender Landstrasse 94-108
37075 Goettingen, Germany

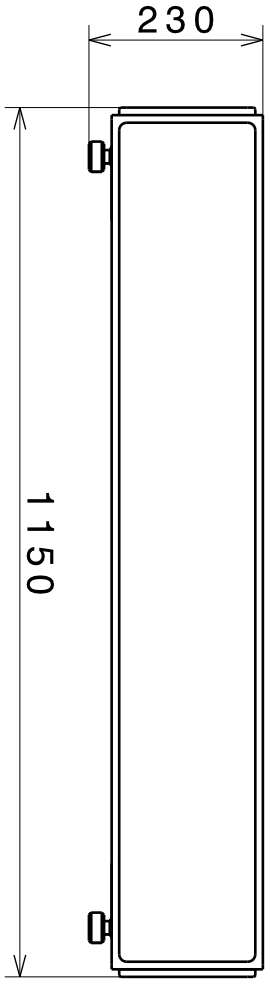
In countries that are not members of the European Economic Area (EEA) or where no Sartorius affiliates, subsidiaries, dealers or distributors are located, please contact your local authorities or a commercial disposal operator.

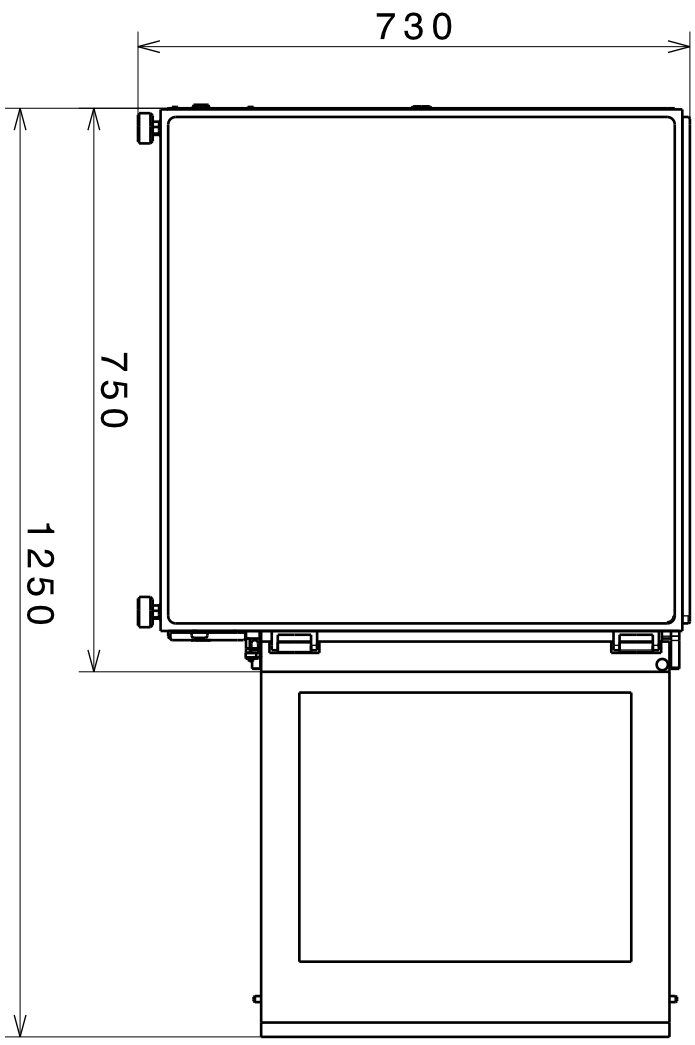
Prior to disposal and/or scrapping of the equipment, any batteries should be removed and disposed of in local collection boxes.

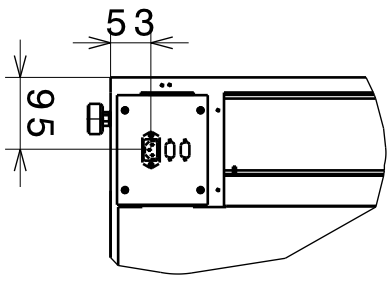
Sartorius AG, its affiliates, subsidiaries, dealers and distributors will not take back equipment contaminated with hazardous materials (ABC contamination) – either for repair or disposal. Please refer to the accompanying leaflet/manual or visit our Internet website (www.sartorius.com) for comprehensive information that includes our service addresses to contact if you plan to send your equipment in for repairs or proper disposal.









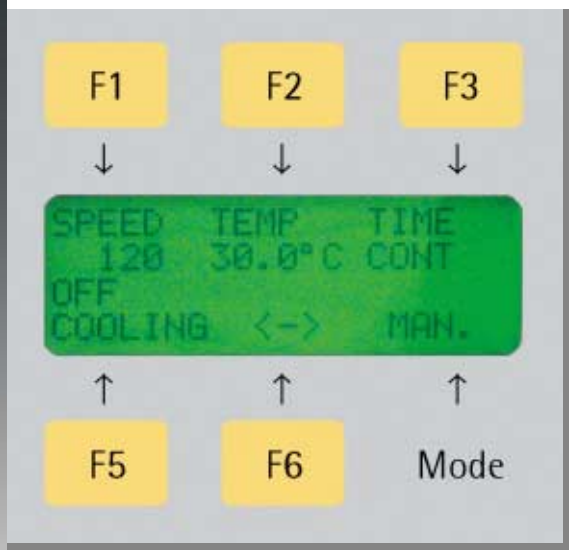


Untergestell

sartorius
MT-Göttingen

- A3

sartorius



CERTOMAT® BS-1

Programmable incubation shaking cabinet

CERTOMAT® BS-1
Programmable incubation shaking cabinet

The CERTOMAT® BS-1 offers large space on a small footprint for all labs in microbiology, molecular biology, biochemistry as well as plant physiology and others.

The innovative programming of temperature, shaking speed and light is done via membrane key pad in real time. Up to 5 programms with 5 steps each can be stored password protected.

All actual values are shown on a 4 line 20 character alphanumeric LCD display.

Safety even in case of power failure: time and length are recorded and shown as alert on the display. The memory function stores the last set points and re-installs them after power failure.

Continuous recording for documentation of all parameters by analog output is possible.

Two shaking amplitudes of 25 mm and 50 mm are convertible.

The patented adjustable mass compensation enables high speed with high load and stands for a quiet run.

The interior is made of polished stainless steel (1.4301) and thus can easily be kept in hygienic clean conditions.

A standard stainless steel spill tray collects spilled liquid. The clip-in tray fixation is done in one motion and needs no further action.

The built-in optional cooling unit enables incubation temperatures below ambient. An optional illumination unit allows the cultivation of phototrophic organisms.

The innovative programming allows individual run of temperature, shaking speed and light. Start of the incubation program after a period of delay with cooling can be realized.

Additional shaking capacity is created by stacking the units. Without any additional equipment, up to three units can be stacked and run individually.

Benefits

Stackable up to three units

Individual programming of all parameters

Reproducible process safety

Reliable drive with adjustable mass compensation

Power failure is indicated with length and time

Continuous recording for documentation is standard

Adjustable mass compensation for high speed at maximum load

Stainless steel spill tray for more safety

Fast and easy tray fixation

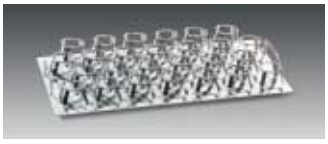
Built-in cooling unit optional

Orbit 25 mm and 50 mm, can be converted later

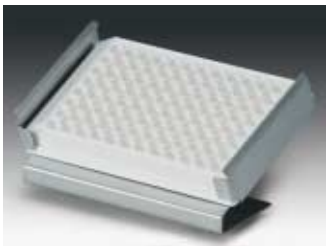
Illumination unit optional

Accepts 5 liter flasks

Accessories



Reference	Description
886 1455	Illumination unit for CERTOMAT® BS-1, 5×18 W, individually activated, programmable, only in combination with cooling
886 4489	Support frame (for CERTOMAT® BS-T or two CERTOMAT® BS-1), welded sectional frame construction, height-adjustable feet
886 1471	Grid for Petri dishes, stainless steel, adjustable height, for use in CERTOMAT® BS-1
885 4416	Installation set for reference thermometer (Pt100), for CERTOMAT® BS-1 and CERTOMAT® BS-T
	Tray type F (800×420 mm) equipped with stainless steel clamps
885 3738	74 clamps inox for flasks 100 ml
885 3762	40 clamps inox for flasks 250 ml
885 3789	26 clamps inox for flasks 500 ml
885 3800	15 clamps inox for flasks 1,000 ml
	Universal tray to be completed with clamps, racks or mounting system
885 3037	Type FU (800×420 mm)
	Stainless steel clamps, capacity for tray type FU
885 4505	for Erlenmeyer flasks 25 ml (max. 98)
885 4513	for Erlenmeyer flasks 50 ml (max. 96)
885 4521	for Erlenmeyer flasks 100 ml (max. 48)
885 4556	for Erlenmeyer flasks 250 ml (max. 39)
885 4572	for Erlenmeyer flasks 500 ml (max. 26)
885 4599	for Erlenmeyer flasks 1,000 ml (max. 17)
885 4610	for Erlenmeyer flasks 2,000 ml (max. 9)
885 4629	for Erlenmeyer flasks 3,000 ml (max. 8)
885 4637	for Erlenmeyer flasks 5,000 ml (max. 6)
885 4564	for Fernbach flasks of 450 ml (max. 15)
885 4600	for Fernbach flasks of 1,800 ml (max. 6)
885 4640	for Fernbach flasks of 2,800 ml (max. 6)
	Plastic clamps reinforced with glass fibre
885 4700	for Erlenmeyer flasks 100 ml (max. 48)
885 4711	for Erlenmeyer flasks 250 ml (max. 39)
885 4722	for Erlenmeyer flasks 500 ml (max. 26)
885 4733	for Erlenmeyer flasks 1,000 ml (max. 17)
	Hinged racks for test tubes (8 racks max.)
885 3134	for 64 tubes ∅ 14 mm
885 3142	for 42 tubes ∅ 16 mm
885 3150	for 36 tubes ∅ 18 mm
885 3169	for 33 tubes ∅ 20 mm
885 3185	for 18 tubes ∅ 25 mm
885 3177	for 16 tubes ∅ 30 mm
	Hinged racks for centrifugation tubes (8 racks max.)
885 3088	for 42 tubes ∅ 16 mm
885 3096	for 36 tubes ∅ 18 mm
885 3193	for 33 tubes ∅ 20 mm
885 3240	for 16 tubes ∅ 30 mm



Reference	Description
	Holders for microtiter plates, stainless steel
885 0321	for 1 standard 96-well plate or deepwell plate standard plates: max. 12 holders on EU tray, 21 holders on FU tray deepwell plates: max. 9 holders on EU tray, 18 holders on FU tray

	Sticky tape for universal trays
886 4497	Standard, roll of 50 m, 30 × 1 mm
886 0416	Premium, roll of 10 m, 30 × 1 mm, repeated use
886 4470	Anti-skid layer, 380 × 450 mm, for individual cut

	Universal mounting system
885 4246	Basic element B-3 for tray FU
885 4254	Clamping rod, type U for mounting systems B-2 and B-3

	Mounting system for separation funnels (for use with type FU, in combination with type B-3 basic element)
885 4262	Type S-1 for 5 separatory funnels 50 and 100 ml
885 4270	Type S-2 for 3 separatory funnels 250, 500 and 1,000 ml

	Shaking flasks, DURAN, Erlenmeyer type, 3 baffles at 120°, straight rim
886 1005	Erlenmeyer flasks 300 ml, pack of 10
886 1013	Erlenmeyer flasks 500 ml, pack of 10
886 1021	Erlenmeyer flasks 1,000 ml, pack of 10
886 1022	Erlenmeyer flasks 2,000 ml, pack of 10

	Shaking flasks, DURAN, Erlenmeyer type, 3 baffles at 120°, straight rim, connector GL 14
886 1064	Erlenmeyer flasks 300 ml, pack of 10
886 1072	Erlenmeyer flasks 500 ml, pack of 10
886 1080	Erlenmeyer flasks 1,000 ml, pack of 10
	Caps for Erlenmeyer flasks, straight rim
886 1099	Cap Aluminium, pack of 10
886 1102	Cap Stainless steel, pack of 10

	Shaking flasks, DURAN, Erlenmeyer type, 3 baffles at 120°, narrow neck for plug
886 0998	Erlenmeyer flasks 500 ml, pack of 10

Technical Data

Ordering information

CERTOMAT® BS-1 version with circulation/heating (UH)		
230 V/50 Hz	886 5027	CERTOMAT® BS-1/25 mm
230 V/50 Hz	886 5124	CERTOMAT® BS-1/50 mm
115 V/60 Hz	886 5035	CERTOMAT® BS-1/25 mm
115 V/60 Hz	886 5132	CERTOMAT® BS-1/50 mm
CERTOMAT® BS-1 version with circulation/heating/cooling (UHK)		
230 V/50 Hz	886 5221	CERTOMAT® BS-1/25 mm
230 V/50 Hz	886 5329	CERTOMAT® BS-1/50 mm
115 V/60 Hz	886 5230	CERTOMAT® BS-1/25 mm
115 V/60 Hz	886 5337	CERTOMAT® BS-1/50 mm

Technical data

Mechanical	Shaking speed:	40 to 400 rpm
	Accuracy:	±1% of max. value
	Mode:	orbital
	Amplitude:	25 mm or 50 mm
	Motor:	brushless motor
	Drive:	triple eccentric bearing, variable mass compensation
	Control:	via microprocessor
	Stackable:	up to three units without speed reduction
Temperature	Temperature range:	ambient +8 °C to +70 °C
	Version with cooling:	ambient –10 °C to +70 °C
	Air circulation:	ca. 180 m^3/h
Trays	Recommended trays:	Type F/FU (420 × 800 mm)
	Maximal load:	All trays with accessories out of Sartorius-program
	Tray fixation:	Spring-clip snap mechanism
Programming	Parameters:	Speed, temperature, illumination (option)
	Timing:	date, hour, minute
	Programs:	up to 5 programs, with cycling
	Indication:	LCD, alphanumeric, 4 lines, 20 characters
Safety	Memory:	Restart after power failure
	Alarms:	acoustic and shown on LCD
	Safety class:	IP 21
Environmental conditions	Admissible temperature:	from +10 °C to +45 °C up to +32 °C with cooling mode
	Relative humidity:	from 10% to 90%, not condensing
Documentation	Analog out:	for speed and temperature 0–10 V, optional 0/4–20 mA
	Digital out:	RS232
Electric	Power supply:	230 V/50 Hz
	Heating capacity:	650 W
	Cooling capacity:	500 W
Dimensions	External (W × H × D):	1150 × 720 × 770 mm
	Internal (W × H × D):	890 × 495 × 650 mm
	Weight (without tray):	195 kg

All models are delivered without tray and other accessories.

For incubating cells or mixing liquids a tray is needed together with additional accessories to hold shaking flasks, separation funnels or tubes.

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