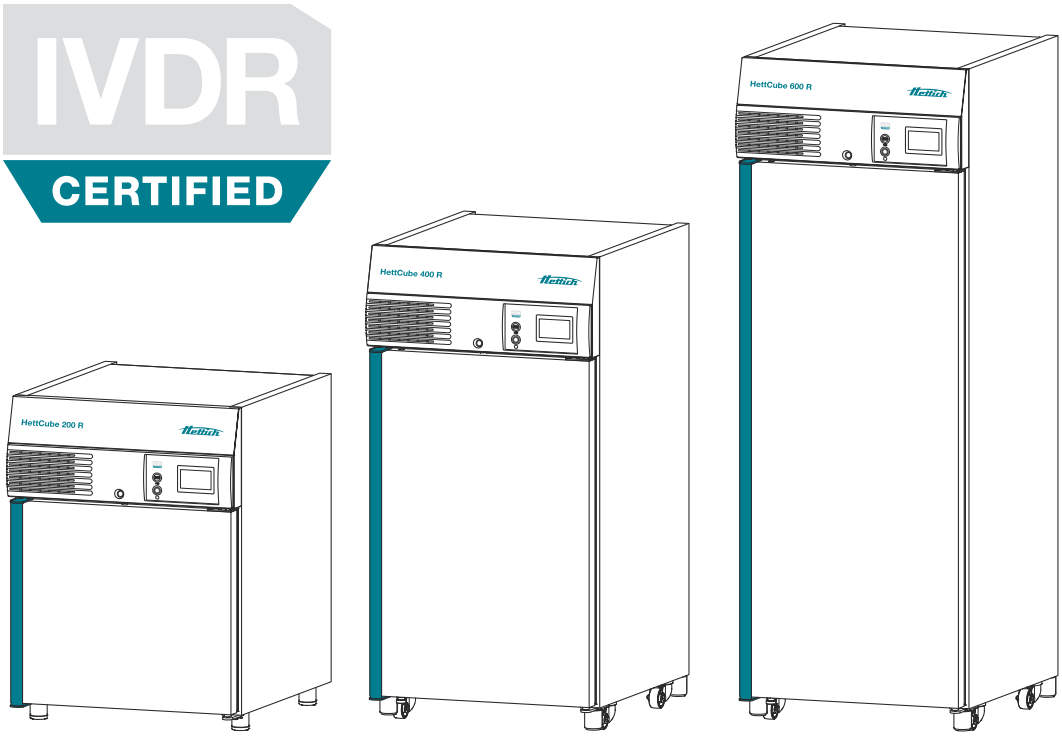
Operating manual

HettCube

200/200 R; 400/400 R; 600/600 R



Translation of the original operating manual

Andreas Hettich GmbH

Föhrenstraße 12

D-78532 Tuttlingen, Germany

SRN: DE-MF-000010680

Telephone: +49 (0)7461/705-0

Fax: +49 (0)7461/705-1125

Email: info@hettichlab.com, service@hettichlab.com

Internet: www.hettichlab.com

Table of contents

1 Introduction

1.1 Symbols

Signal words

Signal word	Meaning
DANGER	This combination of symbol and signal word indicates an immediate dangerous situation that will result in death or serious injury if it is not avoided.
WARNING	This combination of symbol and signal word indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.
CAUTION	This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided.
NOTICE	This combination of symbol and signal word indicates a possible dangerous situation that can result in material and environmental damage if it is not avoided.

Warning categories

Warning signs	Type of danger
	Warning – danger zone.
	Warning – biological hazard.
	Warning – high-voltage.
	Warning – falling objects.
	Warning – flammable substances.

General symbols

This listing symbol denotes descriptions of tasks that you must perform.

- This dot is for denoting lists.

Cross references are indicated as follows: ➥ *Chapter 1.1 'Symbols' on page 7*

Graphic symbols on the incubator

If warning signs/symbols on the incubator are no longer legible, the operator must replace them immediately.

The figures below indicate the locations of the warning signs and symbols displayed on the incubator.

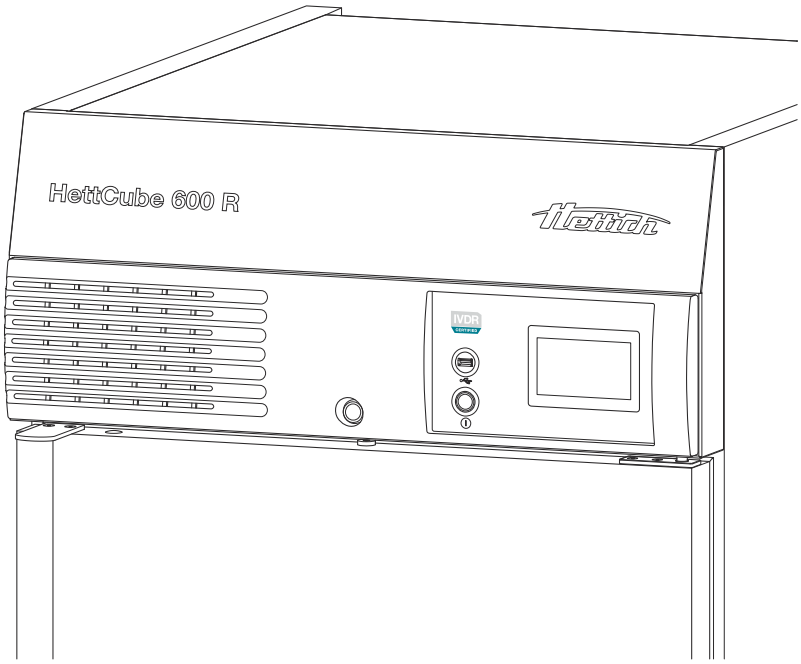


Fig. 1: Instructions on front of incubator, IVDR logo

IVDR-CERTIFIED

The device meets the requirements of the In Vitro Diagnostic Medical Devices Regulation 2017/746 (EU).

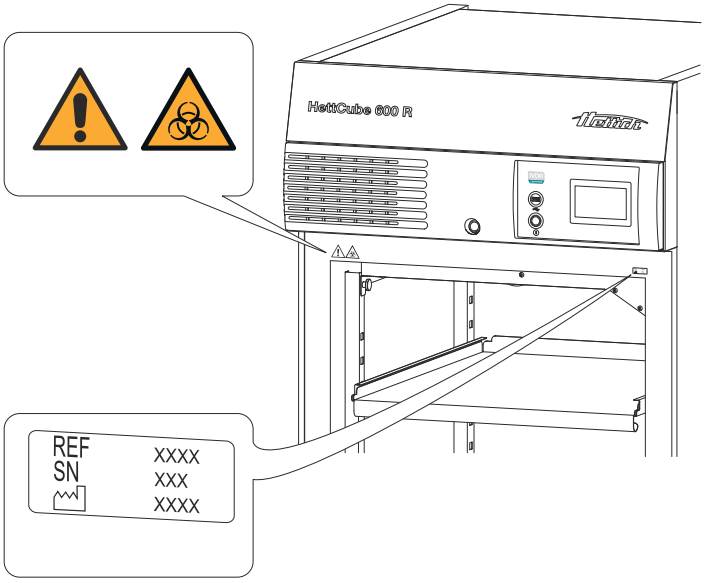


Fig. 2: Instructions on the front of the incubator

Warning, general danger point or zone

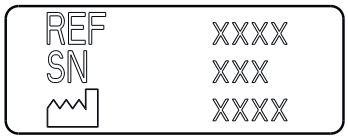
Failure to observe this warning may result in damage to property and/or personal injury.

Before using the incubator, operators must read the Operating Manual and ensure compliance with the safety instructions!

Caution, biohazard

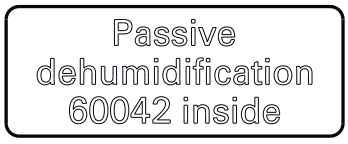
Failure to observe this warning may result in personal injury.

Before using the incubator, operators must read the Operating Manual and ensure compliance with the safety instructions!



Service information

The service information includes the data you need when talking to the service hotline. This includes the device order number, serial number and year of manufacture.



Passive dehumidification 60042 inside (optional)

This device comes equipped with the passive dehumidification option.

Continuous cooling (optional)

This device comes equipped with the continuous cooling option.

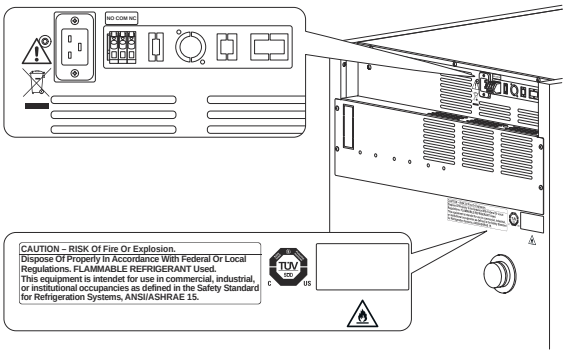


Fig. 3: Instructions on the rear side of the incubator

Accessories symbol (with switchboard option only)

This symbol indicates the maximum load of the connections for the accessory units (with switchboard option only).

Warning, general danger point or zone

Failure to observe this warning may result in damage to property and/or personal injury.

Before using the incubator, operators must read the Operating Manual and ensure compliance with the safety instructions!

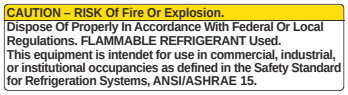
Caution, fire hazard

Failure to observe this warning may result in personal injury.

Before using the incubator, operators must read the Operating Manual and ensure compliance with the safety instructions!

Symbol indicating separate collection of electrical and electronic equipment

Symbol in accordance with Directive 2012/19/EU. Use in the European Union countries as well as Norway and Switzerland.



Warning: Risk of fire or explosion

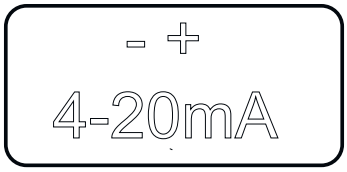
This warning indicates the risk of fire or explosion caused by refrigerants.

Symbol for potential-free alarm output

This symbol indicates the potential-free alarm output.

Symbol for fuse (with switchboard option only)

This symbol indicates the 6F1 fuse (with switchboard option only).



Symbol for analogue output for independent temperature measurement (optional)

This symbol indicates the 4-20 mA analogue output for independent temperature measurement.

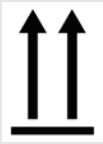
Seal of approval for device tested by the TÜV independent technical inspection association

The device safety requirements have been tested by TÜV.

Rating plate

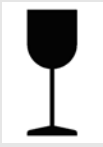
Rating plate displaying details of the device's technical data.

1.2 Important labels on the packaging



TOP

This is the correct upright position of the shipping container for transport and/or storage.

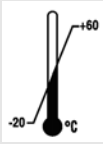


FRAGILE GOODS

The contents of the shipping container are fragile, so it must be handled with care.

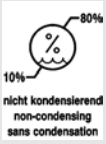
PROTECT FROM MOISTURE

The shipping container must not be exposed to rain and kept in a dry environment.



TEMPERATURE LIMITATION

The shipping container must be stored, transported and handled within the indicated temperature range (-20 °C to +60 °C).

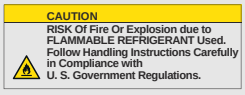


HUMIDITY LIMITATION

The shipping container must be stored, transported and handled within the indicated air humidity range (10 % to 80 %, non-condensing).

STACK LIMITATION BASED ON QUANTITY

Maximum number of identical packages that may be stacked on the lowest package, "n" standing for the number of packages allowed. The lowest package is not included in "n".



Warning of risk of fire and explosion due to flammable refrigerant

1.3 Personal protective equipment

The assessment of the personal protective equipment must take place on site according to the actual risks which are posed by the used substances, the procedures and the environmental conditions.

The operating company must create a hazard analysis according to the corresponding standards and directives and enact work instructions which ensure the safe handling of the incubator and accessories.

1.4 Personnel qualification

Repairs may only be carried out by persons authorised by the manufacturer.

Any intervention or modifications to incubators carried out by persons who have not been authorised to do so by Andreas Hettich GmbH are at their own risk, and will result in the loss of all warranty claims and all liability claims against Andreas Hettich GmbH.

Service technician

A service technician is anyone who has been trained and authorised by Andreas Hettich GmbH to service the incubator.

User

Before commissioning the incubator, the operating instructions are to be read and observed. Only those persons who have read and understood the operating instructions may work with the device. For the purpose of the Medical Device Directive, the operating company is responsible for making sure that personnel who work with the incubator are sufficiently qualified to do so.

1.5 Intended use

Intended use

- This unit is an in vitro diagnostic medical device in accordance with the In Vitro Diagnostic Medical Devices Regulation (EU) 2017/746.
- The device is used for cultivation of sample material of human origin (such as microbiological cultures) and is used in hospitals and clinical laboratories. The user can set the temperature for cultivating the sample material within the parameters defined by the device.
- The device may only be used by qualified personnel in closed laboratories.
- The device may only be operated in well-ventilated areas.
- This is the sole intended use of this incubator.
- Any other use or use beyond this scope is considered improper. Andreas Hettich GmbH shall not be liable for any damage arising from such non-compliant use.
- Intended use also includes observing all instructions in the Operating Manual and compliance with the required inspection and maintenance work.

Improper use

Any other use or use beyond the scope of intended use is improper use. Andreas Hettich GmbH will not be liable for any resulting damage or harm.

- Operation of the unit in an explosive, corrosive or radioactively contaminated atmosphere is not in accordance with the intended use.
- Loading the incubator with combustible or explosive materials or with materials that chemically react with one another in a highly exothermic manner.
- Tempering of corrosive material.
- Storage of food.
- The presence of persons or animals inside the incubator.
- Using the incubator or its accessories as a climbing aid.
- Operation outdoors.
- Use on moving platforms such as ships, rolling stock or aircraft.
- Stacking incubators of sizes impermissible for stacking, or stacking incubators without securing them in place (stacking of a total of two incubators of size 200/200 R is permitted).
- The incubator in its standard configuration is not intended for use in continuous cooling mode.

1.6 Replacement parts/consumable material

Only original spare parts and approved original accessories from the manufacturer may be used.

WARNING

If non-original spare parts or accessories are used, any warranty and liability claims against Andreas Hettich GmbH become null and void.

1.7 Scope of delivery

- 1 x incubator
- 1 x mains cable (power supply, design according to country)
- 1 x operating instructions
- 2 x keys
- 1 x plug for access port on the rear wall
- 1 x HTS* slide-in module with telescopic rails
- 1 x standard slide-in module (HettCube 200/200 R)
- 2 x standard slide-in modules (HettCube 400/400 R)
- 3 x standard slide-in modules (HettCube 600/600 R)

* HTS: Hettich Teleskop System

1.8 Return shipments

If it is necessary to send back the incubator or its accessories to Hettich,

- request the return documents necessary for this from Hettich or the responsible Hettich sales partner. These contain the return number as well as a clearance certificate form for the returned article.
- Due to the legal regulations and especially to protect the Hettich sales partner and Hettich employees, clean and disinfect the incubator and accessories and certify that it is harmless with your signature (clearance certificate).
- If the clearance certificate is missing, Hettich reserves the right to invoice the customer for the costs for cleaning and disinfection.

2 Safety information

≥4 m²

$$A_{min} > \frac{65\ g}{2{,}2\ m \times 7{,}6\ \frac{g}{m^3}}$$

WARNING

The R290 refrigerant contained in the cooling system is extremely flammable (safety class A3 according to ISO 817 and ASHRAE 34).

The room in which the incubator is operated or stored must be large enough to allow any refrigerant that may escape in the event of a malfunction to be heavily diluted in the ambient air. The minimum required room height is 2.2 m. The minimum room floor space required$_{Amin}$ is determined by the formula at left.

The minimum room floor space$_{Amin}$ for the incubator is 4 m². The device that requires the largest minimum floor space is the determining factor if there are multiple devices containing flammable refrigerants in a same room. The user must consider potential restrictions on the use of cooling systems containing flammable refrigerants at the location in question.

Reporting serious incidents and notifiable incidents

In the event of serious incidents or notifiable incidents involving the device or its accessories, these must be reported to the manufacturer and, where applicable, to the competent authority where the user and/or the patient is registered.

- The Operating Manual must be read and observed before commissioning the incubator. Only persons who have read and understood the Operating Manual may operate the incubator.
- In addition to the Operating Manual and the binding accident prevention regulations, the recognised technical rules of sound and safe work practice must also be observed. The Operating Manual shall be supplemented with further instructions for accident prevention and environmental protection based on the existing national regulations in the country of use.
- The incubator has been built to the state-of-the-art engineering standards and is safe to operate. However, it may pose a risk to the user or third parties if it is not operated by personnel familiar with the incubator or if it is used improperly or for non-intended purposes.
- Device operators must be thoroughly informed of possible health hazards that can arise from the sample material used and, if necessary, take appropriate precautions to rule out such hazards.
- The incubator may only be operated if it is set up correctly. If it is incorrectly installed, hazards to persons and sample material cannot be ruled out.
- The operator is solely responsible for operation of any other, external devices inside the incubator.
- The use of any other, external devices inside an incubator only makes good sense if it is possible to compensate for the additional heat output of said devices. See ➥ *Chapter 6.13 'Heat compensation' on page 118* for important information on this. The

limit specified there for the maximum permissible heat input into the incubator's interior must not be exceeded. If the incubator is turned off or malfunctions, any external devices inside the incubator must be turned off immediately to prevent damage to the incubator. It is therefore recommended that external devices be connected exclusively to the switchbox available as an option. This ensures that the external devices are also de-energised when the incubator is turned off or malfunctions, or when the temperature monitor is triggered.

- There is a risk of an uncontrolled increase in the utilised space temperature if devices with a heat load are operated in the uncooled incubator or if heat-generating reactions or processes continue to be carried out in the uncooled incubator.
- Continuous operation at < 5 °C may cause the evaporator to ice up. This will reduce cooling capacity. There is a risk of damage to the incubator fans if there is any heavy build-up of ice.
- Do not use the floor of the unit interior, its shelves, drawers or door as a surface to stand on or use as a support.
- The rate of drying of the culture media during incubation is influenced by various factors, such as:
  - ambient conditions (e.g. relative humidity of the surrounding environment);
  - handling and working methods (e.g. upstream processes, duration and frequency of times when the device door is open);
  - culture or incubation conditions (e.g. incubation time and temperature).

  These influences should be taken into account, especially with longer incubation durations.
- Sample material should not be placed outside the defined usable space ➦ *Chapter 9.7 'Definition of the utilized space' on page 146*. The specified temperature data apply to the defined usable space.
- Repairs may only be carried out by persons authorised by the manufacturer.
- Only genuine spare parts and approved genuine accessories from Andreas Hettich GmbH may be used.
- The safety and reliability of the incubator is only ensured if:
  - the incubator is operated in accordance with the Operating Manual;
  - the electrical installation at the place of installation of the incubator complies with the pertinent requirements of the EN/IEC standards.

The incubator is safe if used as intended and observing the descriptions and information given in this documentation.

3 Device description

3.1 Standard device

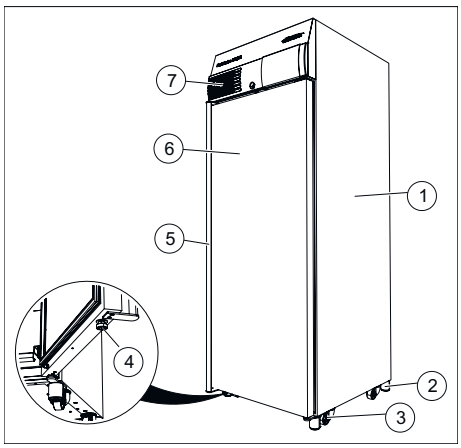


Fig. 4: Unit front side

1 Housing made from powder-coated steel sheet metal
2 Unit base ➦ *Chapter 5.2.1 'Installing the incubator' on page 32*
3 Transport roller ➦ *Chapter 5.2.1 'Installing the incubator' on page 32*
4 Adjustable foot, to prevent the incubator from tipping
5 Door handle
6 Door, self-closing with an opening angle of less than 90°
7 Front panel

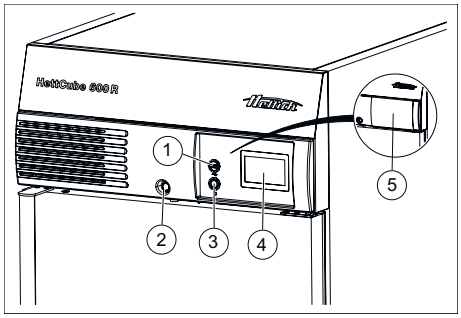


Fig. 5: Front panel

1 Service port (USB)
2 Door lock
3 Switch
4 Touchscreen
5 Sliding cover (optional)

Touchscreen including

- Class 3.1 temperature monitor, for class 3.1 and 3.2 cooled units. Individually adjustable ➦ *Chapter 6.12.5 'Temperature guard' on page 99*.
- Tolerance range asymmetrically adjustable ➦ *Chapter 6.12.4 'Tolerance band' on page 98*.
- Door alarm individually adjustable ➦ *Chapter 6.12.9 'Door' on page 107*.

The incubator is equipped with a temperature monitor of protection class 3.1 in accordance with DIN12880:2007-05. The temperature monitor is used to protect the incubator (device protection), its surroundings and the sample material (sample protection) against impermissible temperature overshoots.

Class 3.1:

Device protection and sample protection, (temperature overshoot).

Class 3.2:

Sample protection (failure to maintain the required temperature, for cooled incubators only).

If the electronic temperature control fails during operation, the temperature monitor takes over the control function.

Further information on the temperature monitor can be found in the Operating Manual ➦ *Chapter 6.12.5 'Temperature guard' on page 99*.

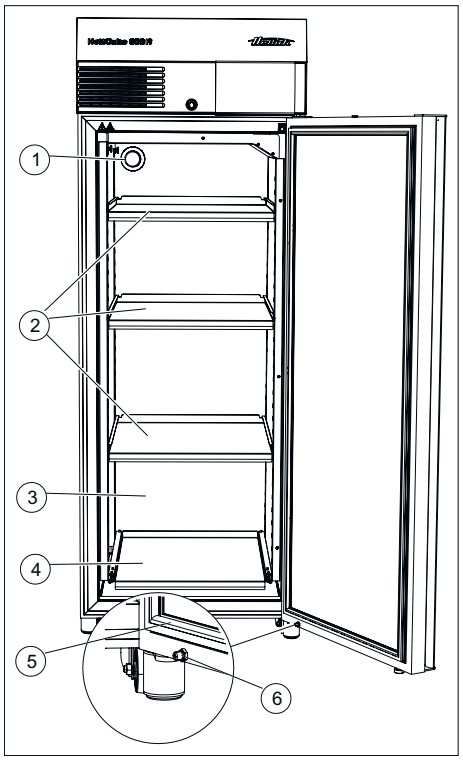


Fig. 6: Front of unit, door open

1 Access port Ø 42 (on the rear side of the device, as standard)
2 Inserting shelf
3 Interior made of high-quality stainless steel, 1.4301 (ASTM 304)
4 HTS inserting shelf with HTS fuse
5 Magnetic seal
6 Door damper

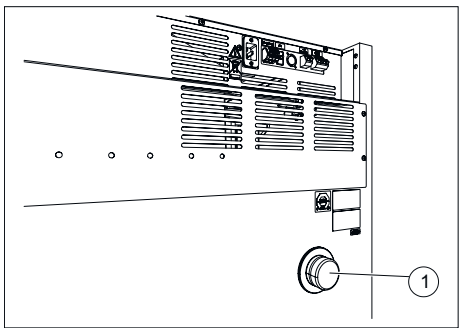


Fig. 7: Access port, rear side

1 Access port

The HTS fuse can be autoclaved up to 10 times. Frequent installation and removal of the HTS fuse may impair the holding force, and the HTS fuse should be replaced (see also the list of accessories).

For cable access ports, use the access port on the rear side of the device or the additional unit access port.

The rear side of the incubator is fitted with a Ø 42-mm access port.

Cables from external measuring systems can be fed into the interior through this opening.

After routing the cables through the opening, the access port must be sealed using the foam stopper supplied to prevent temperature deviations inside the incubator. If the access port is not used, it must be sealed with a screw closure.

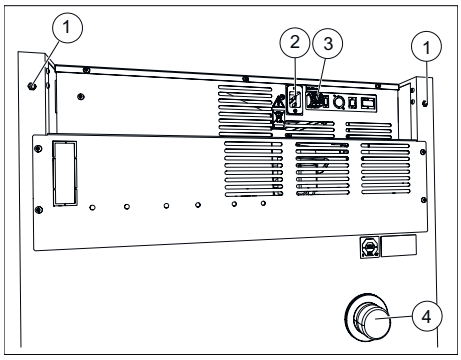


Fig. 8: Rear side of the device (size 200)

1 For unit size 200 only: M6 threaded insert for fixing kit 60012
2 Mains cable socket
3 Potential-free analogue output
4 Standard access port Ø 42 mm

3.2 Options

Options are articles which are permanently installed in the device.

3.2.1 Glass door

The glass door consists of several stacked glass panes. The outer pane of the door is made of safety glass (ESG glass).

Test runs can be influenced by the allowed incident light.

For incubators with a glass door, the temperature deviation values and the power consumption increase slightly.

Depending on the ambient temperature and the relative ambient humidity, there may be condensation on the inside and outside of the glass door. The following diagram illustrates the condensation of the glass door.

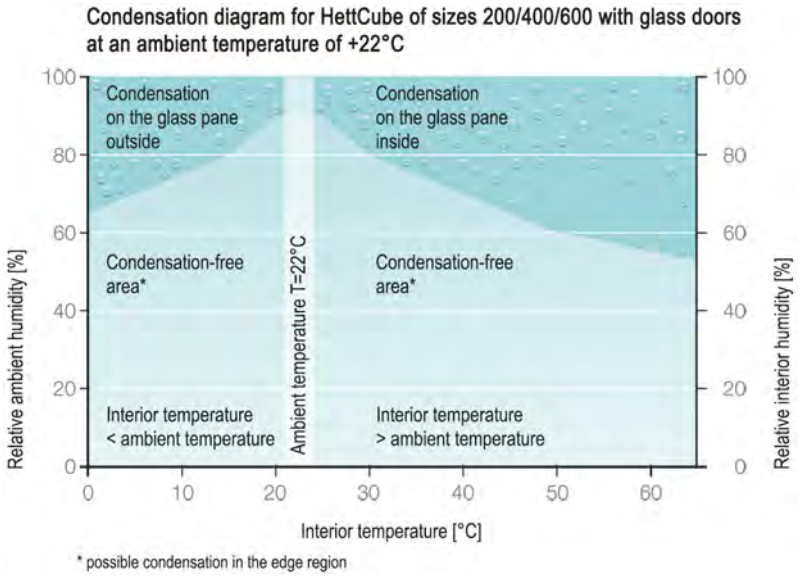


Fig. 9: Condensation diagram

3.2.2 Additional device access port

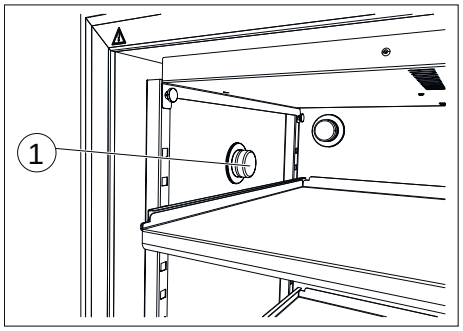


Fig. 10: Access port on the left side of the incubator (optional)

1 Lateral access port

Additional device access port (Ø 22, 42, 67 mm) centred on the left side of the device. Other positions possible after consultation.

In addition to the standard access port, it is possible to realize additional access ports.

The incubator can be provided with a access port on the left side of the incubator.

The access port is available with ∅ 22 mm, ∅ 42 mm or ∅ 67 mm and has a screw plug.

It is also possible to install the optional access port at the rear side of the incubator.

In such a case, contact a service technician of the manufacturer.

Every direct connection from the inside of the device to the outside can result in technical data deviations. When using an access port, this should be sealed from the outside with adhesive tape in addition to the foam plugs included in delivery.

3.2.3 Independent PR 100 temperature sensor with 4-20 mA analogue output

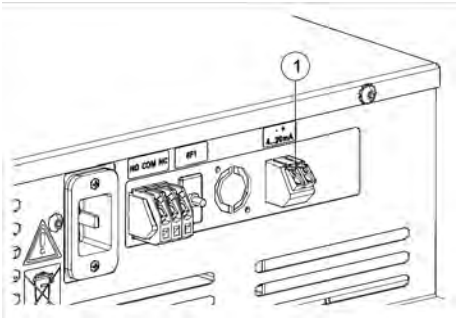


Fig. 11: 4-20 mA analogue output

1 4-20 mA analogue output for independent temperature measurement (option)

The device is equipped with an additional, independent PT 100 temperature sensor. The temperature values are output via a 4-20 mA analogue output on the rear side of the device.

3.2.4 Switchboard

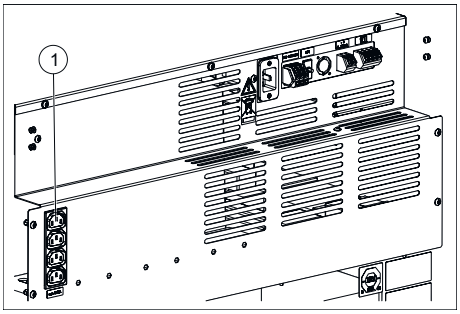


Fig. 12: Switchboard

1 Connections for additional devices (Switchboard option)

When the device switches off or fails, or when the class 3.1 temperature guard is triggered, all external devices are also de-energized.

The incubator has a socket strip arranged on the rear side of the device. This socket strip can be switched on and off individually or time-controlled via the touchscreen. It is operated via the control contact function ➦ *Chapter 6.12.6 'Control contact (option)' on page 103*. It is particularly meant for the operation of additional devices in the incubator.

The four sockets of the socket strip can only be switched on or off simultaneously.

Due to the heat that the additional devices bring into the incubator, it usually only makes sense to use the Switchboard option in a cooled incubator ➦ *Chapter 6.12.6.1 'Switchboard option' on page 103* and ➦ *Chapter 6.13 'Heat compensation' on page 118*.

The Switchboard option and passive dehumidification option are mutually exclusive. Therefore, it is only possible to realize either the Switchboard option ➦ *Chapter 6 'Operation' on page 44* or the passive dehumidification option ➦ *Chapter 6 'Operation' on page 44* on one incubator.

3.2.5 Continuous cooling (option)

For applications in continuous operation for which temperatures below 15 °C are required, Hettich offers an alternative operating mode in its cooled incubators.

After the long-term cooling phase has ended, perform the subsequent dehumidification process. Particularly when the device is temporarily put out of operation after long-term cooling.

Dehumidification process:

1. Open the standard feed-through at the rear and heat the device up to +60°C.
2. Maintain this temperature for at least 2 hours.
3. Switch off the device or begin a new application.

Icing can occur if there are constant cooling temperatures below +5°C (for longer than 5 days). Using program mode, the customer can create a suitable "defrosting" program. The device runs through a daily cycle in which the cooling unit is briefly heated, and then specifically cooled again afterwards. This prevents ice formation.

3.2.6 Passive dehumidification

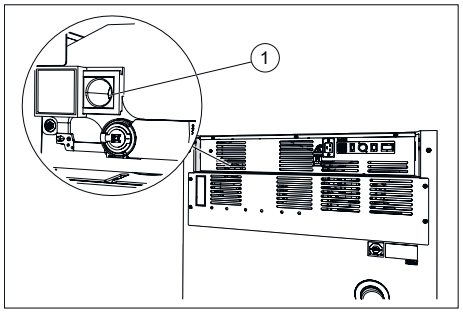


Fig. 13: Passive dehumidification ventilation opening

1 Ventilation opening for passive dehumidification

The device is equipped with a ventilation opening, which allows moisture to be released from the incubator. This ventilation opening can be opened and closed individually or time-controlled via the touchscreen. It is operated via the control contact function.

This option can specifically be used to

- prevent condensation from forming inside the incubator during a heating operation from cooling mode.
- accelerate the drying process of the interior.

NOTICE

Dehumidification is only possible if the moisture content of the air outside of the incubator is lower than that inside the incubator.

The ambient temperature should be at least 5°C lower than the temperature to which the incubator is to be heated.

The passive dehumidification option and Switchboard option are mutually exclusive. Therefore, it is only possible to realize either the passive dehumidification option ➥ *Chapter 6.12.6.2 'Passive dehumidification option' on page 105* or the Switchboard option ➥ *Chapter 6.12.6.1 'Switchboard option' on page 103* on one incubator.

3.2.7 Sliding cover and fixed front panel

Additional locking of the sliding cover is possible to prevent unauthorised operation of the incubator.

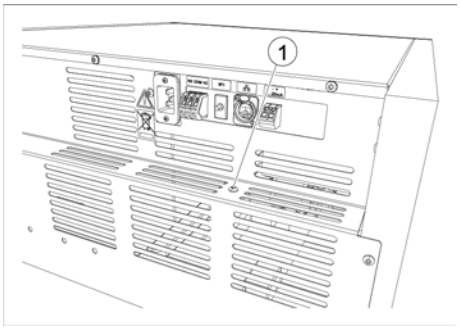


Fig. 14: Screw for separate locking of control panel

1 Screw

1. *When the incubator is delivered, there is a screw on the rear side of the incubator that can be used to lock the sliding cover.*

   Remove this screw.

2. Slide the sliding cover to the right.

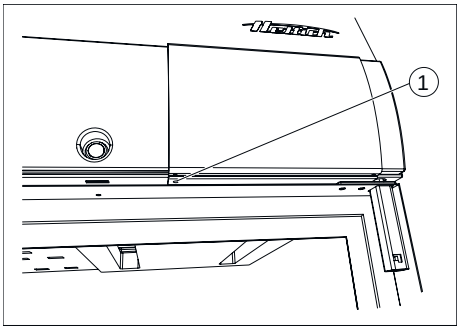


Fig. 15: Locking the control panel

1 Tapped hole for screw *[Locking the control panel]*

3. Screw the screw into the tapped hole *[Locking the control panel]*.

   ➡ The sliding cover is locked. The door can still be opened and closed.

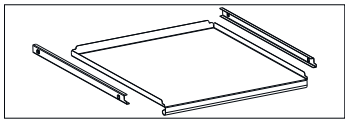
3.3 Accessories

Accessories

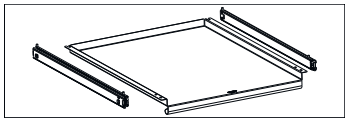
Only genuine spare parts and approved genuine accessories from Andreas Hettich GmbH may be used.

Brief description of accessories: Flexible equipment items with which the device can be retrofitted

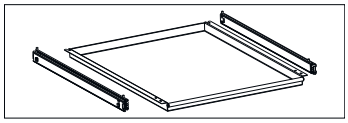
Please see the appendix ➥ *Appendix C 'Overview of accessories' on page 169* for more information on accessories.



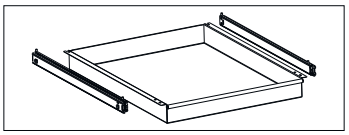
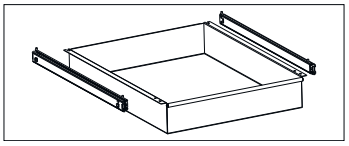
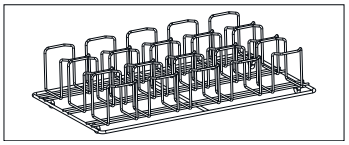
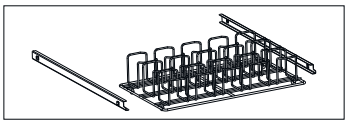
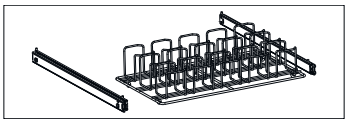
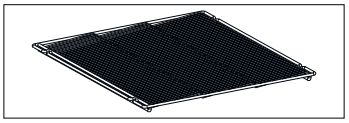
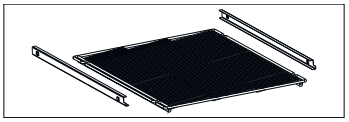
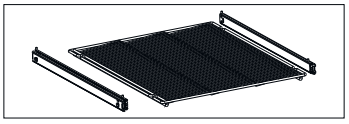
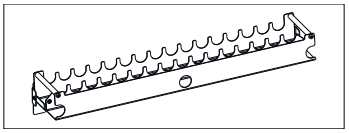
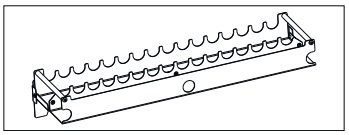
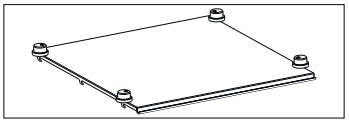
Inserting shelf (set) 60001



Inserting shelf (HTS set) 60031



Drawer (HTS set), height 30 mm 60024

	Drawer (HTS set), height 65 mm	60025
	Drawer (HTS set), height 105 mm	60026
	Rack	60040
	Rack (set)	60039
	Rack (HTS set)	60038
	Rack	60041
	Rack (set)	60037
	Rack (HTS set)	60036
	Frame L, 16 places	60027
	Frame XL, 16 places	60028
	Stacking kit	60009
	USB port lock (set) – for securing the USB-A interface. Set consisting of 10 securing clips and 1 USB key tool	60525

HTS fixing kit – for fixing inserting shelves and drawers with telescopic runners	60919

4 Transport and storage

Dimensions and weight with transport packaging

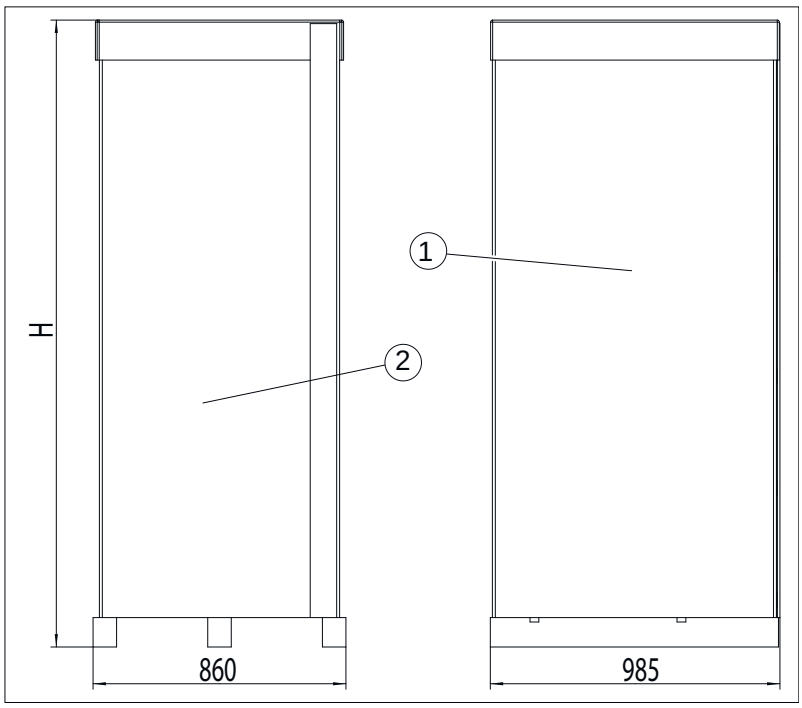


Fig. 16: Transport packaging dimensions

1 Side view (depth)
2 Front view (width)

The length and width of the pallet are identical for all incubators.

The incubator height can be found in the following table.

Incubator	Height
HettCube 200/200 R	1111
HettCube 400/400 R	1565
HettCube 600/600 R	2132

Tab. 1: Height with packaging

Order no.	Name	HettCube 200/200 R	HettCube 400/400 R	HettCube 600/600 R
	HettCube (kg), standard equipment	90/100	117/127	164/174
	Packaging (kg)	32.5	34	42
60030 / 60029 / 60013	Glass door option (kg)	6	10	14
60001	Shelf (set) (kg)	3.5	3.5	3.5
60031	Shelf (HTS set) (kg)	5.5	5.5	5.5
60024	Drawer (HTS set), height 30 mm (kg)	5.8	5.8	5.8

Order no.	Name	HettCube 200/200 R	HettCube 400/400 R	HettCube 600/600 R
60025	Drawer (HTS set), height 65 mm (kg)	6.5	6.5	6.5
60026	Drawer (HTS set), height 105 mm (kg)	7.2	7.2	7.2
60037	Rack (set) for inclined storage of cultures (Loewenstein) (kg)	3.8	3.8	3.8
60036	Rack (HTS set) for inclined storage of cultures (Loewenstein) (kg)	5.7	5.7	5.7
60041	Rack for inclined storage of cultures (Loewenstein) (kg)	3.3	3.3	3.3
60039	Rack (set) for Petri dishes (kg)	2.1	2.1	2.1
60038	Rack (HTS set) for Petri dishes (kg)	4.0	4.0	4.0
60040	Rack for Petri dishes (kg)	1.7	1.7	1.7
60027	Frame L for inclined storage of cultures (kg)	0.9	0.9	0.9
60028	Frame XL for inclined storage of cultures (kg)	1	1	1

Tab. 2: Weights

Storage conditions

⚠ DANGER

A danger is posed by penetrating liquids.

There is an electric shock hazard for personnel.

- If liquid has penetrated into the incubator, the incubator must not be put into operation.
- In such a case, contact a service technician of the manufacturer.

- The incubator can be stored in the original packaging.
- The incubator may only be stored in dry rooms.
- The same restriction regarding room size is applicable to storage as well as operation. ➥ *Chapter 2 'Safety information' on page 15*.
- The incubator may only be stored in an upright position.
- The storage temperature must be between -20 °C and +60 °C.
- The humidity must be of non-condensing nature and between 10 % and 80 %.

Transport

- Before transporting the incubator, make sure that all connection lines are removed.

DANGER

A danger is posed by penetrating liquids.

There is an electric shock hazard for personnel.

- If liquid has penetrated into the incubator, the incubator must not be put into operation.
- In such a case, contact a service technician of the manufacturer.

- The device may not be transported when it is loaded.
- During transport, note the weight of the incubator.
- When transporting with a transport aid (e.g. transport cart), this must be able to bear a weight at least 1.6 times the permissible transport weight of the incubator.
- Secure the incubator against tipping over and falling down during transport.
- The incubator may only be transported standing straight up.
- The incubator may only be transported with a pallet truck as long as it remains on the wooden pallet.
- The incubator must not be lifted and transported by the door handle or the door.

5 Commissioning

WARNING

Ventilation openings must not be covered or blocked.

- Prior to commissioning, check that the mains voltage is correct as stated on the rating plate and that the mains cable is connected correctly.
- Additional units and accessories can be fitted and/or connected as required.

Before each use of the incubator, ensure that

- the incubator is dry.

5.1 Unpacking the incubator

When lifting up the incubator, note the specified weight and only lift the incubator with a suitable number of helpers to avoid injuries.

Please check the device and outer packaging before unpacking. Any transport damage must be reported immediately.

1. Remove the packaging bands.
2. 

   The packaging can be easily removed, even if the room has a low ceiling. If handled carefully, the cardboard box can be reused.

   Remove the cardboard box and padding material.

The padding on the inside of the door serves as a transport safety device for the slide-in modules and drawers. This padding may be removed only at the installation site of the incubator.

Unloading from the pallet, HettCube 400/400 R and HettCube 600/600 R

WARNING

There is a tilting hazard when removing the incubator from the transport pallet.

There is the danger that the incubator will tilt if it is attempted to remove it from the transport pallet without the included auxiliary equipment. Personnel can also be injured by the tilting incubator.

- Remove the incubator from the transport pallet only with the help of the metal rails included in delivery.
- Observe the information in these instructions.

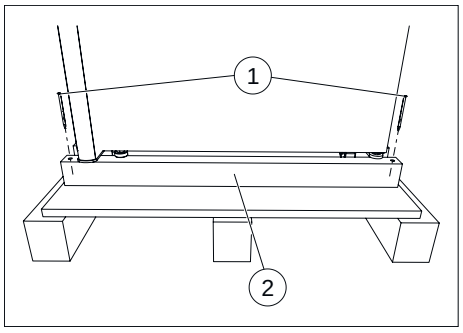


Fig. 17: Front wooden beam

1 Fastening screws
2 Front wooden beam

1. Remove the two fastening screws and remove the front wooden beam.

In the case of devices with the optional glass door, there are additional reinforcements attached to the wooden beam. These can be removed with the beam.

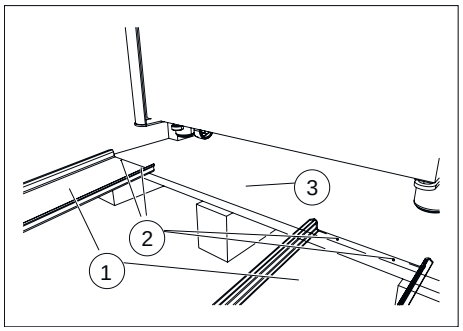


Fig. 18: Fastening metal rails

1 Metal rails
2 Nails
3 Wooden pallet

2. Fasten the two metal rails to the wooden pallet with two nails each.

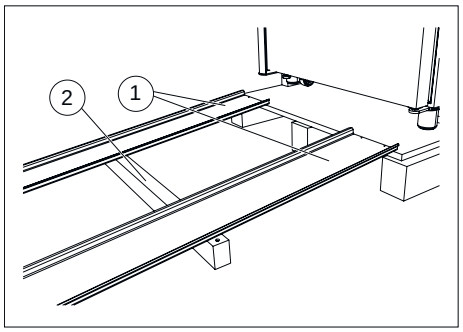


Fig. 19: Wooden beam under the metal rails

1 Metal rails
2 Front wooden beam

3. Push the front wooden beam under the metal rails to support these.

The angle between the metal rails and the floor must not be more than 6°.

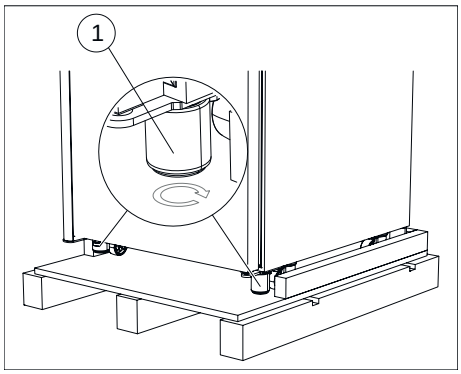


Fig. 20: Screwing in levelling elements

1 Device feet

4. Screw the front levelling elements completely into the device feet (upward).

NOTICE

The levelling elements have a height of 60 mm when screwed-in. Hereby, the inner part projects 3 mm with respect to the outer part.

The rear levelling elements are already screwed in ex works.

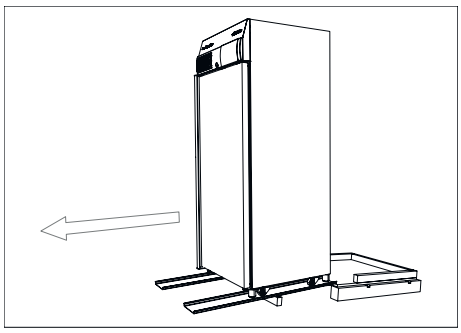


Fig. 21: Rolling the incubator down over metal rails

5. Roll the incubator carefully down from the wooden pallet using the metal rails.

Unloading from the pallet, HettCube 200/200 R

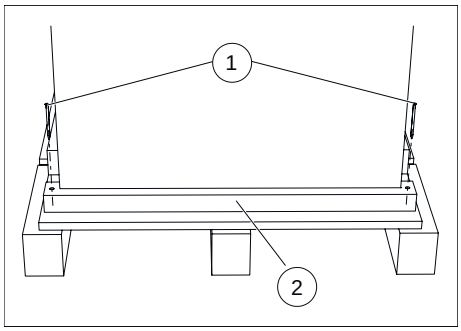


Fig. 22: Front beam

1 Fastening screws
2 Front beam

1. Remove the front wooden beam.

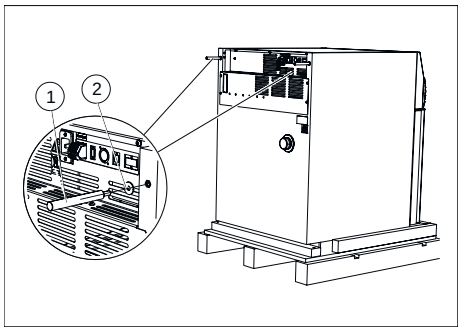


Fig. 23: Mounting metal rod

1 Metal rods
2 Washers

2. Stick the washers included in delivery onto the metal bars and screw the metal bars into the two holes on the rear panel.

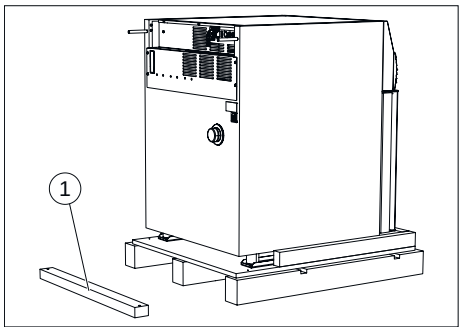


Fig. 24: Front wooden beam on the floor

1 Front wooden beam

3. Put the front wooden beam about 50 centimetres in front of the wooden pallet.

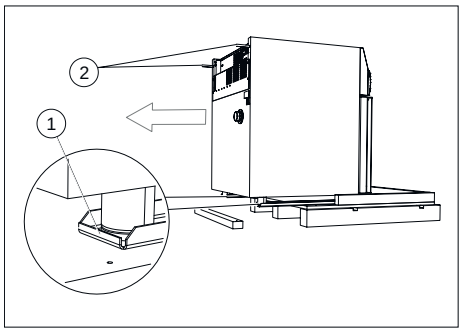


Fig. 25: Pulling incubator forward

1 Metal rails
2 Metal rods

4. Hold the two metal bars and carefully pull the incubator off the wooden pallet using the metal rails.

NOTICE

Do not lift the incubator with the metal bars, as otherwise the rear panel may be damaged.

5. Unscrew the metal bars from the rear panel of the incubator.
6. Successively lift the incubator on the left and right sides slightly and remove the two metal rails.

5.2 Setting up, connecting and switching on the incubator

5.2.1 Installing the incubator

If requested and agreed, the service technician working on site can fit the door hinge on the other side.

NOTICE

Allow the incubator to acclimatise at the installation site for at least three hours prior to commissioning in order to prevent short-circuiting due to condensation on electrical components.

- Please inspect the device for mechanical integrity, and ensure that all items in the delivery scope have been delivered by checking against your order.
- When choosing its place of installation, bear in mind the weight of the incubator when loaded, and its loading process; see ➦ *Chapter 9 'Technical data' on page 136*.
- The installation location must not be in an area of direct sunlight or near to any sources of heat.
- Ventilation openings must not be blocked. A clearance of 100 mm must be maintained from the ventilation slots and ventilation openings of the incubator.

- It is necessary to ensure that the unit is not exposed to the following influences at its site of installation:
  - naked flame
  - hot surfaces (> 370 °C)
  - sparks

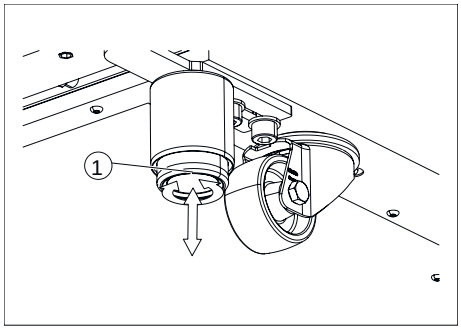


Fig. 26: Levelling the incubator

1 Adjustable unit base

1. Position and level the incubator on a flat, non-combustible surface in a stable position.

   For HettCube 400/400 R and HettCube 600/600 R incubators only:

   - Turn the levelling elements screwed into the unit feet downwards until they touch the floor and the rollers are no longer under load.
   - Align the incubator horizontally by turning the levelling elements.
   - Turn the adjustable foot on the door downwards until it is about 7 mm above the floor in order to secure the incubator and prevent it from tipping. Turn the hexagonal nut upwards and tighten it to secure the adjustable foot.

   For HettCube 200/200 R incubators only:

   - Align the incubator horizontally by turning the levelling elements screwed into the unit feet.
   - For incubators with glass doors only: Turn the adjustable foot on the door downwards until it is about 7 mm above the floor in order to secure the incubator and prevent it from tipping. Turn the hexagonal nut upwards and tighten it to secure the adjustable foot.

   CAUTION

   No additional load may be placed on the unit (except when stacking two identical units).

   The maximum permissible total load of the units must be observed when stacking so as to avoid overloading the lower unit.

   Only two HettCube 200/200 R incubators may be placed one on top of the other.

   The upper incubator must be securely affixed to the lower incubator using the stacking kit (order no. 60009), and additionally secured to prevent it from tipping. We recommend using the dedicated fixing kit (order no. 60012) to secure the upper incubator to the wall.

2. Adjust the height of the inserting shelves and drawers as needed, see ➦ *Chapter 5.3.1 'Standard slide-in modules' on page 40* and ➦ *Chapter 5.3.2 'Telescopic slide-in modules' on page 41*.

5.2.2 Incubator connection

Power supply connection

DANGER

A hazard is posed by a damaged mains supply line.

There is an electric shock hazard for personnel.

- Check the incubator and the mains supply line for damage. If damage is discovered, the incubator must not be operated.
- The incubator may only be operated at a socket with a personal protection switch.

DANGER

A danger is posed by penetrating liquids.

There is an electric shock hazard for personnel.

- If liquid has penetrated into the incubator, the incubator must not be put into operation.
- The incubator may only be operated at a socket with a personal protection switch.
- In such a case, contact a service technician of the manufacturer.

NOTICE

There is a danger of damaging the incubator due to an incorrect input voltage.

- Before connecting the incubator, check the mains voltage.

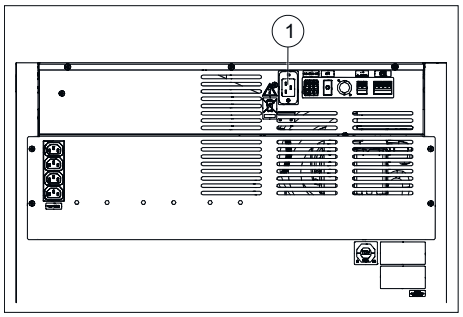


Fig. 27: Power supply connection

1 Mains cable connection

1. *Make sure the operating voltage is correct, as specified on the nameplate.*

Connect the mains cable included in delivery to the power supply connection on the rear side of the incubator.

2. Stick the other end in the socket.

The mains cable must be freely accessible at all times in order to be able to disconnect the incubator from the mains.

Other connections

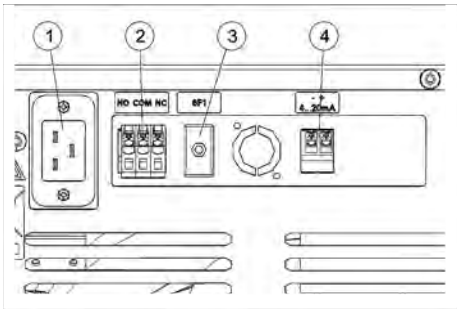


Fig. 28: Other connections

1 Mains cable connection
2 Potential-free alarm output
3 Automatic circuit breaker (for Switchboard option only)
4 4-20 mA analogue output for independent temperature measurement (option)

- If required, connect the potential-free alarm output ➦ *'Potential-free alarm output' on page 35*.
- If required, connect the 4-20 mA analogue output for independent temperature measurement (option) ➦ *'4-20 mA analogue output for independent temperature measurement (option)' on page 36*.

Potential-free alarm output

The connection may only be established by qualified, skilled personnel.

NOTICE

Material damage to the controller board due to high load.

Relays on the controller board can be damaged in the event of a high load, and will no longer switch.

- Do not exceed the specified load.
- Observe the symbol on the device.

An in-house alarm system can be connected to this floating alarm output.

The potential-free alarm output is marked with this symbol.

When operating external devices or another thermal load in the incubator, it is recommended to connect a signal transducer to the potential-free alarm output to monitor this.

The potential-free alarm output switches in the event of malfunctions and when the touchscreen fails. ➦ *Chapter 8.2 'Warnings and error messages' on page 128*.

4-20 mA analogue output for independent temperature measurement (option)

The connection may only be established by qualified, skilled personnel.

The 4-20 mA analogue output is marked with this symbol.

The incubator can be equipped with an additional temperature sensor (PT100) and a 4-20 mA analogue output for independent temperature measurement.

External display devices can be connected to this output.

Analogue output	4-20 mA DC
Temperature range	0-100°C
External voltage supply	7.5 ... 30 V DC

Connection of additional devices (Switchboard option)

NOTICE

An excessively high interior temperature can result in damage to the incubator.

External devices which are operated inside the incubator must not exceed the permitted power, since the uncontrolled temperature increase can result in damage to the incubator.

- If there is additional heat input in the cooled incubator, observe the maximum possible heat compensation.
- Monitor the temperature process flow of the incubator.
- Connect a signal transducer to the potential-free alarm contact in order to also be informed of fault conditions outside of the viewing range of the incubator.

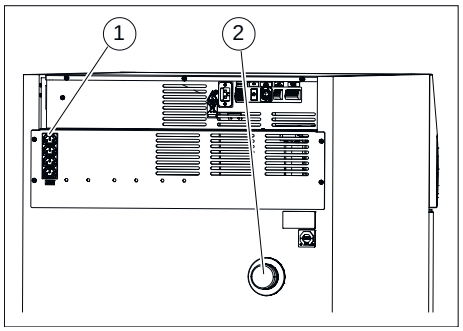


Fig. 29: Connections for additional devices

1 Connections for additional devices
2 Access port

Additional devices which are placed in the incubator, for example, can be connected here. The outputs can all be switched on and off together via the control contact ➥ *Chapter 6.12.6 'Control contact (option)' on page 103* of the incubator. The cables of the additional devices can be guided through the access port ➥ *Chapter 3.2.2 'Additional device access port' on page 20* into the interior of the incubator.

5.2.3 Initial commissioning

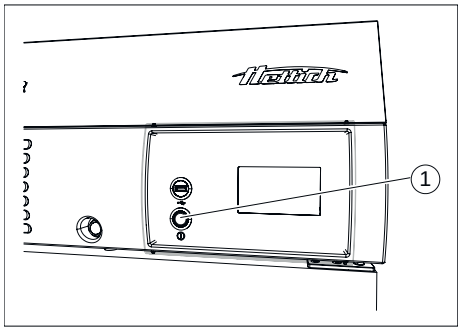


Fig. 30: Device switch

1 Device switch *[ON/OFF]*

1. Switch on the incubator at the device switch.

The incubator can be operated via the touchscreen. The touchscreen can also be operated with latex gloves.

➡ The illuminated ring around the device switch is lit up.

The control will start up.

Fig. 31: Initialization

Fig. 32: 'Language' selection

1 *'Language'* selection

2. Tap on the *'Language'* selection.

Fig. 33: 'Language' selection list

3. Tap on the corresponding language.

Fig. 34: 'Language' selection

1 *[Confirmation]* button
2 *'Selected language'* display

4. Tap the *[Confirmation]* button to confirm the language selection.

Date and time are already preset. If the preset information is correct, confirm this with the [Confirmation] button. The start screen (Fig. 40) appears and the configuration is completed.

If the date and time have to be changed, follow the instructions for next step.

Fig. 35: Setting the date and time

1 Time
2 *[Confirmation]* button

5. Tap the time.

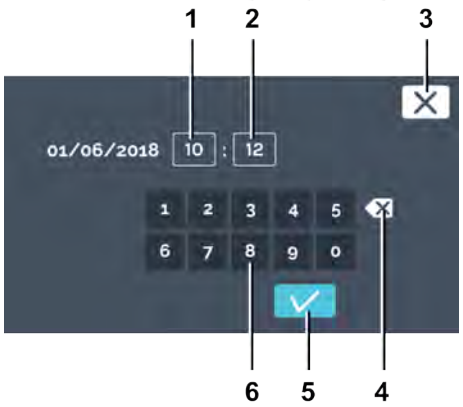


Fig. 36: Setting the time

1 Editing the time *'hours'*
2 Editing the time *'minute'*
3 *[Cancel]* button
4 *[Clear input]* button
5 *[Confirmation]* button
6 Keypad

6. Enter the current time in hours and minutes via the keypad. Confirm the entries with the *[Confirmation]* button.

Fig. 37: Setting the date and time

1 Date

7. Tap the date.

Fig. 38: Setting the date

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button

8. Select the current date. Confirm the entry with the *[Confirmation]* button.

Fig. 39: Confirming the date and time

1 *[Confirmation]* button

9. Confirm the entries for the date and time with the *[Confirmation]* button.

➡ The start screen appears and the configuration is completed.

Fig. 40: Start screen

These settings are only made once. When switched on again, the start screen appears. The description for operation can be found in ➦ *Chapter 6 'Operation' on page 44*.

5.3 Inserting and removing the slide-in modules

In the delivered condition, the slide-in modules and drawers are already inserted in the incubator.

If the rails of the slide-in modules are modified, the rails on the left and right side must be at the same height.

Only make modifications to the configuration of the interior when the device is switched off and is not filled.

5.3.1 Standard slide-in modules

Inserting

The standard slide-in modules are held by support rails.

The standard slide-in modules are not secured against falling out. Do not completely pull out the standard slide-in modules.

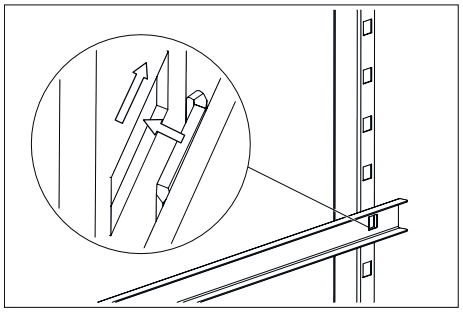


Fig. 41: Snapping in support rail at the rear

1. Push the support rail into the rear latching rail at the desired height.

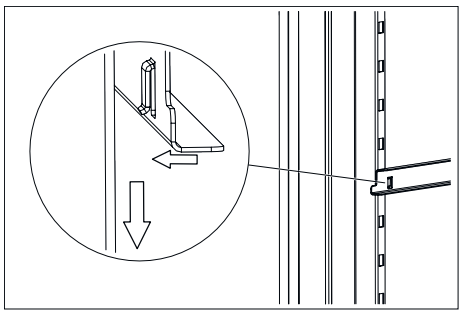


Fig. 42: Engaging front side

2. Engage the support rail in the front latching rail.

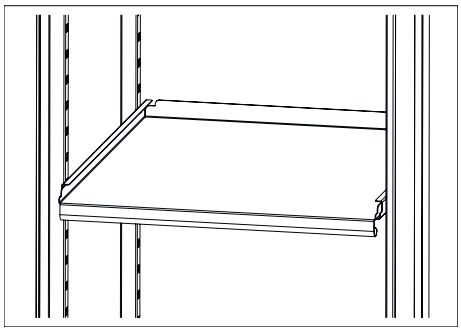


Fig. 43: Standard slide-in module

3. Insert the standard slide-in modules into the support rails.
4. The removal of the standard slide-in modules and support rails is done in the reverse order.

CAUTION

The slide-in modules are not secured with a stop and can fall down when completely pulled out. There is a risk of injury due to the falling slide-in module and due to the falling load.

removing

Do not reach deeply into the device to attempt to loosen the rail by force. This operation can be easily and safely ensured using lever force.

1. Disengage the support rail from the front latching rail with a vertical movement.
2. Move the latching rail slightly in the middle to remove the rail from the rear snap fitting.

5.3.2 Telescopic slide-in modules

Before inserting the slide-in modules and drawers, the telescope rails included in the delivery must be inserted.

The telescopic shelves and telescopic drawers can be secured using HTS safeguards.

These HTS safeguards can also be mounted later on for existing telescopic shelves and telescopic drawers.

Inserting the telescope rails

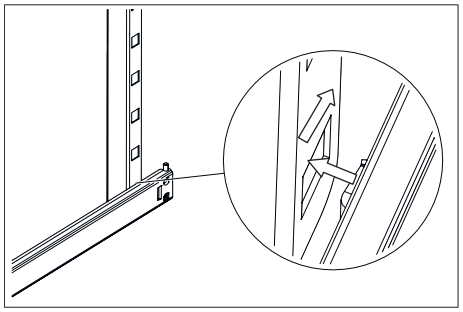


Fig. 44: Snapping telescopic rails in at the rear

1. Push the telescope rails into the rear latching rail at the desired height.

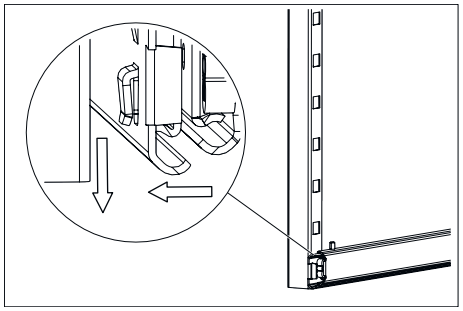


Fig. 45: Engaging front side

2. Engage the telescope rails in the front latching rail.

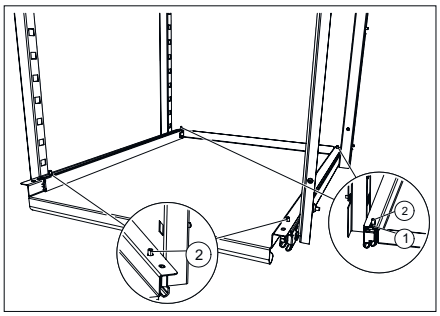


Fig. 46: Pushing in the slide-in module

1 Recesses at the rear on the slide-in module
2 Pins of telescopic rails

3. Place the slide-in module or the drawer on the telescope rails and slide it back until the two notches located in the rear of the slide-in module or the drawer are in the pins of the two telescope rails.
4. Put the slide-in module or the drawer at the front on the telescope rails and engage it in the pins of the two telescope rails.

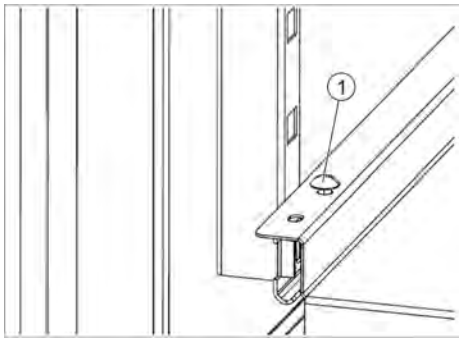


Fig. 47: HTS safeguard

5. Secure the slide-in module or drawer as needed.

   To do this, stick an HTS safeguard (1) on the pins on the right and left sides of the drawer.

Removing the telescopic rails

Do not reach deeply into the device to attempt to loosen the rail by force. This operation can be easily and safely ensured using lever force.

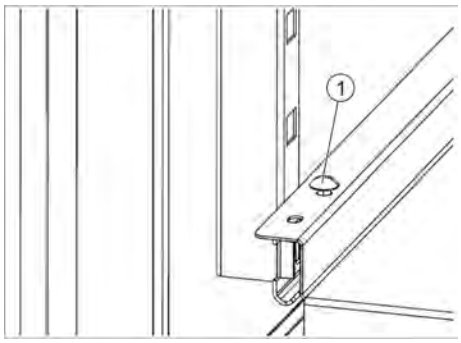


Fig. 48: HTS safeguard

1. As needed: Pull off the HTS safeguard (1) upward on the left and right sides of the slide-in module or drawer.
2. Lift the slide-in module or the drawer, unhook it from the telescope rails and remove it.
3. Pull the telescope rails out a little.

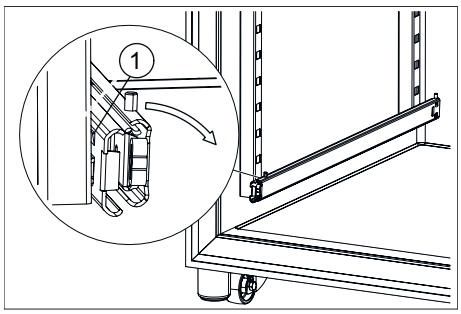


Fig. 49: Turning the telescopic rail, front side

1 Snap-in nose

4. Hold the telescopic rails at the pulled-out part and slightly twist towards the centre of the incubator until the snap-in nose projects from the latching rail.

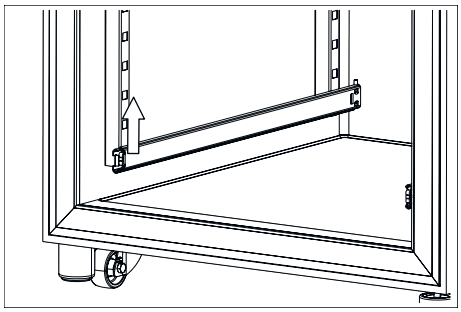


Fig. 50: Telescopic rail, front side

5. Pull the telescopic rails forward and upward, out of the latching rail.

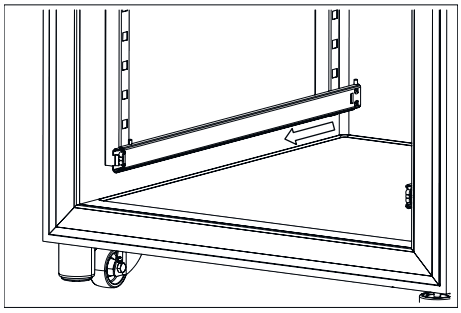


Fig. 51: Remove the telescopic rail from the rear latching rail

6. Pull the telescope rails forward and out from the rear latching rail and remove.

6 Operation

DANGER

A danger is posed by penetrating liquids.

There is an electric shock hazard for personnel.

- If liquid has penetrated the incubator during operation, do not touch the incubator and switch it off on the building side (e.g. via the fuse).
- In such a case, contact a service technician of the manufacturer.

CAUTION

There is a danger due to vibrations.

A danger is posed by unsecured, vibrating devices on the slide-in modules.

- During the operation of a vibrating device (e.g., a shaker), the slide-in module on which the vibrating device is standing must be secured against falling out. Hettich recommends the drawer with the telescopic rail (60024) in combination with the fixing kit (60919).
- When operating a vibrating device (e.g., a shaker), the operating company must make sure that this cannot move away on the slide-in module. Hettich accepts no responsibility for damage caused by the use of external devices.
- When operating a vibrating device, the incubator must be monitored. It might be necessary to restrict the speed range of the shaker, for example.
- Observe the technical requirements, such as dimensions, weight, swing-out radius, speed and number of devices. Position this device/these devices on the bottom-most support.

WARNING

Units with too high a surface temperature present a risk, as do sparks or flames.

No devices with a surface temperature of > 370 °C may be operated inside the incubator.

No devices that could emit sparks or flames may be operated inside the incubator.

WARNING

There is a risk associated with the use of tools for defrosting.

No tools may be used to speed up the defrosting process.

WARNING

There is a risk of damage to the cooling circuit.

The cooling circuit must not be damaged.

WARNING

There is a risk that the sample temperature control will be faulty.

There is a risk that the temperature control of microbiological samples is not correct, which could result in a misinterpretation of the test results or the destruction of the samples.

- Have the incubator maintained and calibrated ➦ *Chapter 7.5 'Maintenance' on page 125*.
- Observe the information in these instructions concerning the effect of the heat generation of additional devices which are operated in the incubator.
- Monitor the temperature process flow.
- A closed slide-in module must always be inserted at the bottommost position.
- Connect a signal transducer to the potential-free alarm contact in order to also be informed of fault conditions outside of the viewing range of the incubator.
- Do not place any microbiological samples at the bottom of the incubator. Use the slide-in modules.
- Place the microbiological sample material within the defined utilized space.
- Observe the permissible ambient conditions.
- Make sure the incubator is not exposed to direct sunlight.
- Keep the incubator door shut when you are not inserting or removing samples.
- Check the samples after a power failure to make sure they are still usable.

CAUTION

A hazard is posed due to the improper pulling-out or pushing-in of the various slide-in modules or drawers. Avoid strong acceleration.

- Carefully pull out or push in slide-in modules, drawers or applications.

NOTICE

There is a risk of the interior overheating in the event of a power failure.

If the external devices are operated on a power circuit other than the incubator, these can heat up the interior uncontrollably.

– Switch off the devices set up in the incubator in the event of a power failure, if these are still switched on.

NOTICE

Temperature control as described in the technical data is possible only if the permissible ambient temperature range is maintained.

Complete the commissioning procedure in full before operating the unit ➥ Chapter 5 'Commissioning' on page 29.

The operator must assess whether the samples are still usable following any malfunction or disturbance (power outage, door open too long, etc.).

Automatic restarting takes place once a day.

This has no impact on sample temperature control.

Automatic panel restart

To increase the stability of the data, the display restarts automatically every day between 22:00 and 03:00.

This automatic restart is indicated by dimming of the display, and the display is locked for a short time. This routine only affects the display and has no effect on the temperature control of the device.

6.1 Operating elements

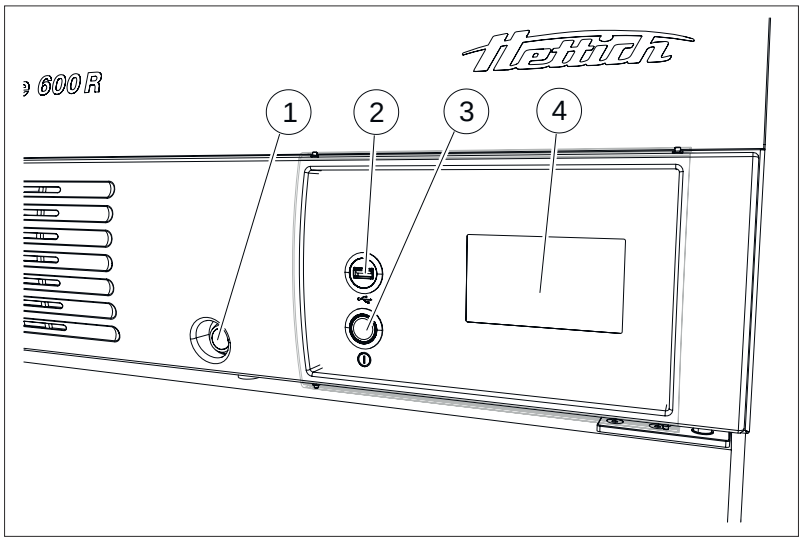


Fig. 52: Operating elements, front side

1 Door lock
2 Service interface (USB)
3 *[Incubator On/Off]* switch
4 Touchscreen

6.2 Loading

The maximum load per standard slide-in module is 50 kg.

The maximum load per slide-in module or drawer with telescopic rails is 40 kg.

Always load the respective level evenly.

Load the incubator so that the sample material is only within the utilized space and make sure there is sufficient air circulation inside the incubator ➥ *Chapter 9.7 'Definition of the utilized space' on page 146*.

6.3 Door locking mechanism

The incubator can be locked to prevent unauthorised persons from opening the door. Individual locking cylinders are used. If the keys are lost, replacement keys can be ordered as spare parts by specifying the lock number.

The sliding cover is also locked when the door is locked. This means that operating the incubator is no longer possible, as only 30 % of the control panel can be accessed.

Before locking, ensure you are completely certain that there are no persons inside the incubator.

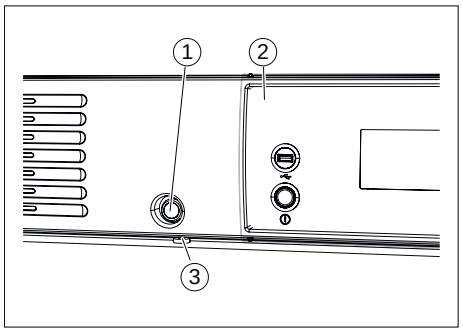


Fig. 53: Door lock

1 Lock
2 Sliding cover (optional)
3 Red bolt lock

1. Slide the sliding cover to the right.
2. Insert the key in the lock.
3. Turn the key to the left to lock the incubator. Once the incubator is locked, the red bolt is visible.
4. Turn the key to the right to unlock the incubator. The red bolt is then no longer visible.

6.4 Standard check before every use

Every time before using the incubator, make sure that

- The mains voltage agrees with the specification on the name plate.
- The incubator is standing flat on its feet.
- There is at least one slide-in module in the incubator.
- The door closes tightly.
- No alarm or error messages are pending.
- The ventilation slots of the incubator are free.
- The incubator has no obvious damage.
  - This applies to the incubator itself as well as to all accessories and all options.

6.5 Switching on the incubator

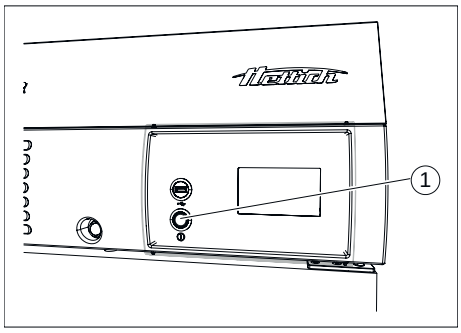


Fig. 54: Device switch

1 Device switch *[ON/OFF]*

→ Switch on the incubator at the device switch.

NOTICE

When switched on, the ring lighting of the device switch is active.

➡ The illuminated ring around the device switch is lit up.

The control will start up.

The start screen is displayed.

Fig. 55: 'Starting up → Progress bar'

Fig. 56: Start screen

6.6 Initialization

Refer to the initial commissioning for the initialization description ➦ Chapter 5.2.3 'Initial commissioning' on page 37.

6.7 Operating modes

The incubator offers the following operating modes:

- Standstill mode ➦ *Chapter 6.7.1 'Functional description of standstill mode' on page 50*

  In this operating mode, only the current interior temperature is displayed. The interior temperature is not regulated. Individual settings on the temperature guard as well as timer-controlled starting times for manual or program operation are displayed.
- Manual mode (with and without temperature drop) ➦ *Chapter 6.7.2 'Functional description of manual mode' on page 51*

  In this operating mode, the incubator is regulated at a constant temperature.

  In the case of cooled incubators, in manual mode there is also the option of simply regulating to another temperature setpoint for a defined time period using the temperature drop function.
- Program mode ➦ *Chapter 6.7.3 'Functional description of program mode' on page 52*

  This operating mode allows different temperature profiles to be realized.

6.7.1 Functional description of standstill mode

In standstill mode, neither manual mode nor program mode is active. The interior temperature is not regulated. The current interior temperature is displayed on the touchscreen.

6.7.2 Functional description of manual mode

In manual mode, an adjustable temperature is held constantly. With temperature drops ➦ *'Editing or deleting temperature drop' on page 64*, you can raise or lower the temperature setpoint to a definable value at certain times. Manual mode can be started with a time delay.

The temperature drop in manual mode is only available on incubators with a cooling unit.

- *By the addendum "R" in the type designation on the front of the incubator (R = Refrigeration).*
- *By the sales number, last digit 6 = cooled incubator.*
- *On the nameplate, by items 7 to 9 ➦ Chapter 9.8 'Type plate' on page 147.*

When manual mode is activated, you can create, edit, delete or start programs for program mode ➦ *Chapter 6.11 'Program mode' on page 70*.

In manual mode, the control contact can be used ➦ *'Control contact (option)' on page 66*.

If a program is started while manual mode is active, manual mode is ended.

In manual mode, multiple temperature drops can be created. Additions and changes to the temperature drop can also be made during incubator operation.

If the incubator is switched off while manual or program mode is running, when the incubator is switched on, it indicates that a power failure was registered.

6.7.3 Functional description of program mode

Via program mode, you can combine complex sequences of temperatures and durations to form one program.

A program is composed of program segments. A program segment can also be defined as a standstill segment (incubator in standstill without regulation).

Each program segment consists of a temperature and a duration. The duration is calculated via the start time and end time or the end time is calculated from the start time and duration.

Fig. 57: Program mode

It can be read off from the rotating circular ring in which program segment the program is currently located. Firstly, the number of the currently run-through program segment is displayed in the middle of the circular ring. Secondly, the circular ring itself is subdivided into as many parts as there are program segments. The number of circular ring segments shown in black corresponds to the number of the program segment that is currently being run.

Example:

The program consists of 4 segments.

- *When the first segment is being run through, the length of the black filled-out segment of the circular ring is ¼ of the total circle.*
- *When the second segment is being run through, the length is ½ of the total circle, etc.*
- *When the last segment is being run through, the rotating circular ring is filled out completely in black, as shown on the screen above.*

In the case of cooled incubators, each program segment can additionally control the control contact (On/Off) ➥ *Chapter 6.12.6 'Control contact (option)' on page 103*.

By saving the program, only the temperatures and durations of the program segments are saved. During the planning, a start date and start time can be defined. This way, a daily routine or a specification can be simply programmed.

The following additional functions can be activated by starting a program:

- Program *'at temp.'*, program *'at start.'*
- After the program runs, specify a hold temperature.
- Activate the control contact (for cooled incubators).
- Time-delayed start of program mode.
- Repeat program.

If the incubator is switched off while manual or program mode is running, when the incubator is switched on, it indicates that a power failure was registered.

If program repetitions were defined in the start settings, these are executed ➥ *'Program repetition' on page 87*.

After the execution of program mode, the incubator either changes to standstill or regulates to the holding temperature when this was defined at the program start.

6.8 Main screen

Operating concept

Category 1	Light background (light grey)	The incubator is either in standstill mode in manual mode or program mode.
Category 2	Dark background (dark grey)	The dark background points out settings and planning settings.

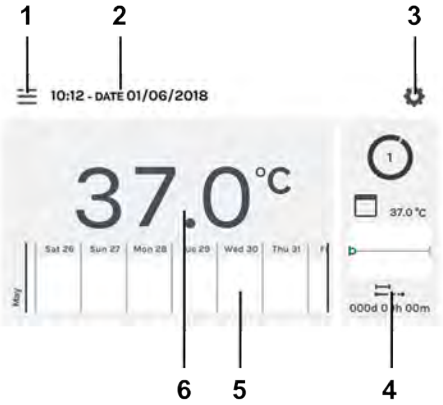


Fig. 58: Main screen

Item	Designation	Description/function
1	Operating modes ➦ *Chapter 6.10 'Manual mode' on page 56*, ➦ *Chapter 6.11 'Program mode' on page 70*	Call of manual and program mode.
2	*'Date'* and *'Time'* display	Shows the current date and time. These can be changed in the settings (3).
3	Device settings ➦ *Chapter 6.12 'Device settings' on page 94*	Calls up the device settings.
4	HettCube activities	Shows the current incubator activities. Program mode is active in the figure (*Fig. 58*).
5	Process flow information ➦ *Chapter 6.9 'Process flow information' on page 54*	Zoomable temperature process flow in three levels. Events, such as breaks, continuations, open door, power failure, etc. are marked on the temperature process flow curve with various symbols. ➦ *Chapter 6.9 'Process flow information' on page 54* Further information about the symbols: ➦ *Appendix A 'Software symbols' on page 158*
6	Display of *'Actual temperature'* in the interior	Shows the current temperature inside the incubator.

The detailed screen switches to the main screen automatically.

The active temperature guard is indicated on the main screen.

Fig. 59: Main screen, standstill mode, temperature guard active

1 Temperature guard active display

Automatic panel restart

To increase the stability of the data, the display restarts automatically every day between 22:00 and 03:00.

This automatic restart is indicated by dimming of the display, and the display is locked for a short time. This routine only affects the display and has no effect on the temperature control of the device.

6.9 Process flow information

In the process flow information, you can enlarge the process flow in three different levels.

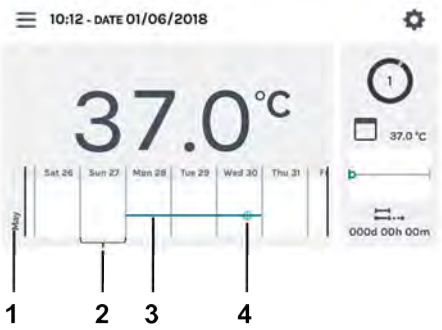
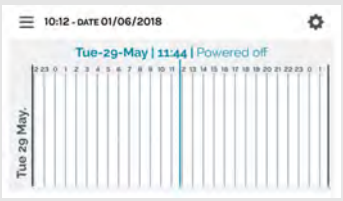
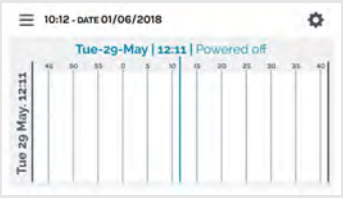


Fig. 60: Scale, main screen

1 Month
2 Scale, 1 day
3 Temperature process flow (example)
4 Symbol example ➦ *'Events' on page 56*

Level (type number)	Scale	Displayed time period
Level 0 (main screen) 	Entire day	One week
Level 1 (type 1x) 	Entire day	3 days are displayed. One can scroll over four weeks.
Level 2 (type 2x) 	One hour	24 hours are displayed. One can scroll over seven days.
Level 3 (type 3x) 	Five minutes	60 seconds are displayed. One can scroll over twelve hours.

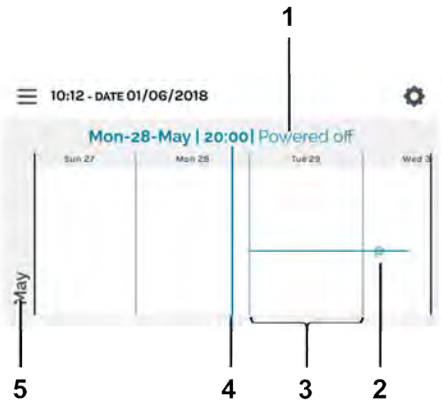


Fig. 61: Scale, level 1 (example)

1 Displayed values at the position of the display bar (4)
2 Symbol example ➦ *'Events' on page 56*
3 Scale, 1 day
4 Display bar, current display values (1).
5 Month

The display can be scrolled horizontally to the left and right. The dot on the display bar (4) shows the current position on the scale. Date, time and temperature of this time are displayed (1).

If the display bar hits an event, the event is displayed in the display values (1) in plain text.

Events

Symbol	Meaning
Black dot	Door was opened or closed.
Red dot	An error occurred. The errors can be found in ➦ *Chapter 6.12.16 'Logbook' on page 114*.
'Pause' symbol	Program was paused.
'Resume program' symbol	Program was continued.

6.10 Manual mode

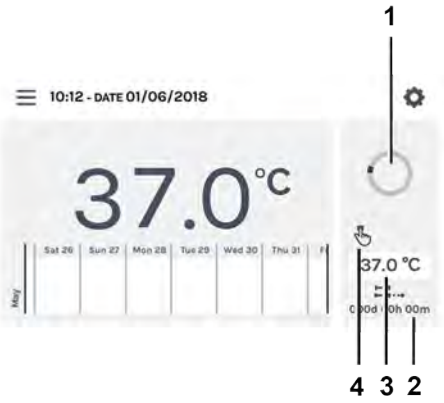


Fig. 62: 'Manual mode → Main screen'

1 Rotating circle symbol
2 Manual mode duration
3 Setpoint
4 Display, manual mode active

In manual mode, a specified temperature (temperature setpoint) is held.

On the main screen, the rotating circle symbol, together with the symbol for manual mode, are displayed to indicate that temperature control is active.

In the case of cooled incubators, temperature drops can be activated in manual mode. While manual mode is active, you can create, edit, delete or start a program in parallel ➦ *Chapter 6.11 'Program mode' on page 70*.

The settings for manual mode are made in the *'Manual mode settings'* menu ➦ *Chapter 6.10.1 'Manual mode settings' on page 56*.

NOTICE

A potential touchscreen failure is indicated by the standstill of the rotating circle symbol. The output of an alarm is possible by connecting a warning device to the potential-free alarm output ➦ *'Potential-free alarm output' on page 35*.

6.10.1 Manual mode settings

Fig. 63: 'Main screen → Settings'

1 *[Operating modes]* button
2 HettCube activities area

The settings for manual mode can be reached via the *[Operating modes]* button or the HettCube activities area.

In the HettCube activities, while manual mode is running, it is indicated whether there is a temperature drop and whether it is currently active/inactive.

*Fig. 64: Main screen, temperature drop exists, but is **inactive***

1 Temperature drop exists, but it is currently **inactive** (symbol greyed-out)

*Fig. 65: Main screen, temperature drop exists and **active***

1 Temperature drop exists and is currently **active** (black symbol)

Fig. 66: 'Manual mode → Settings'

Item	Designation	Description/function
1	*'Manual mode'* tab➥ *Chapter 6.10 'Manual mode' on page 56*	Here, you can make settings for manual mode.
2	Start delay➥ *'Start delay' on page 58*	Here, you can define the date and time for the starting point of manual mode. If the start delay is deactivated, manual mode is started without a time delay, directly after activating manual mode.

Item	Designation	Description/function
3	Temperature drop (for incubators with a cooling unit only)➞ *'Creating a temperature drop' on page 61*	Temperature drops can be activated, deactivated or set.
4	*[Go back]* button	You can return to the main screen via the *[Go back]* button.
5	*[Start]* button	By pressing the *[Start]* button, manual mode is activated with the corresponding settings, taking the start delay into account.
6	PIN protection➞ *'PIN protection' on page 65*	To protect the settings from being changed, you can activate/deactivate the PIN protection here. After starting manual mode, the *'Admin PIN'* must be entered first before changes are possible.
7	Control contact	Here, you can activate/deactivate the control contact. This option is only available if the incubator is equipped with the Switchboard option ➞ *Chapter 6.12.6.1 'Switchboard option' on page 103*or passive dehumidification option ➞ *Chapter 6.12.6.2 'Passive dehumidification option' on page 105* and the control contact is activated in the device settings ➞ *Chapter 6.12.6 'Control contact (option)' on page 103*.
8	Actual interior temperature	Indicates the current, unregulated actual temperature of the interior.
9	Set temperature➞ *'Set temperature' on page 67*	You can change the temperature setpoint in steps of 0.1 with the *[Plus]* and *[Minus]* buttons. By tapping the temperature display, you can make inputs via a keypad on the screen.

When manual mode is started, just like when program mode is started, the setting of the temperature guard is checked ➞ Chapter 6.12.5 'Temperature guard' on page 99.

If the temperature setpoint set for manual mode does not agree with the temperature guard setting, a warning message will appear. If the warning message is confirmed, manual mode starts despite the contradiction. Check and correct the values of the temperature guard and/or the temperature setpoint.

Start delay

To set the start delay, proceed as follows:

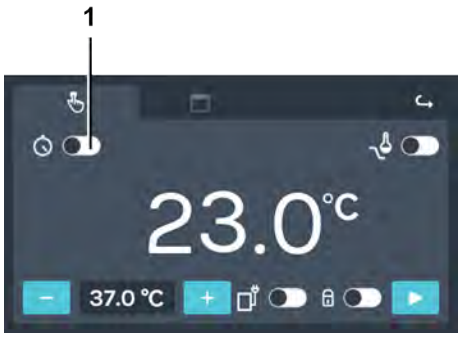


Fig. 67: 'Manual mode → Start delay'

1 *[Activate/deactivate start delay]* switch

1. Activate the start delay with the *[Activate/deactivate start delay]* switch.

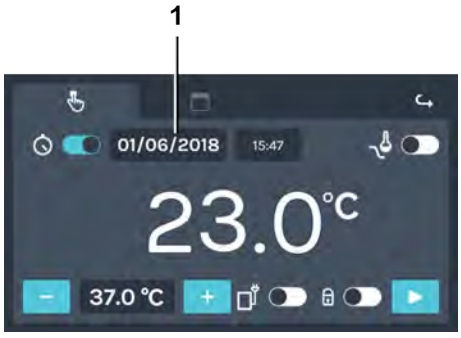


Fig. 68: 'Manual mode → Start delay → Start date'

1 Start date

2. By tapping on the start date, you will get to the date selection.

Fig. 69: 'Manual mode → Start delay → Start date → Date'

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button

3. Tap on the desired start date. Confirm the selection of the start date with the *[Confirmation]* button.

Fig. 70: 'Manual mode → Start delay → Start time'

1 Start time

4. By tapping on the start time, you will get to the time input.

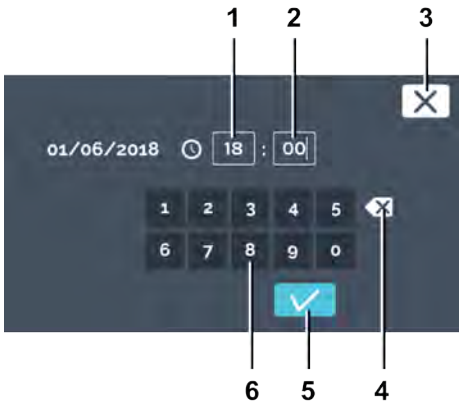


Fig. 71: 'Manual mode → Start delay → Start time → Time'

1 Edit *'Hour'*
2 Edit *'Minute'*
3 *[Cancel]* button
4 *[Clear input]* button
5 *[Confirmation]* button
6 Keypad

5. Enter the time. Confirm the input of the start time with the *[Confirmation]* button.

Temperature drop

The temperature drop is only available in manual mode on incubators with a cooling unit.

If the current manual mode contains a temperature drop, this is indicated in the HettCube activities
➦ *Further information on page 56.*

Multiple temperature drops can be created. Additions and changes to the temperature drop can also be made during incubator operation.

The temperature drop offers the following options

- Temperature drops can also be used on holidays or individual dates.
- Definition of repetitions, such as recurring weekly programs.

All set temperature drops have the same dropped temperature. The dropped temperature can also be higher than the temperature setpoint of manual mode.

In the case of a time-delayed start of manual mode, pay attention to the starting time. Under certain circumstances, this could lie at a temperature drop. This would result in starting operation with a temperature drop. Check to make sure this is desired.

Creating a temperature drop

To create the temperature drop, proceed as follows:

1. Activate the temperature drop.

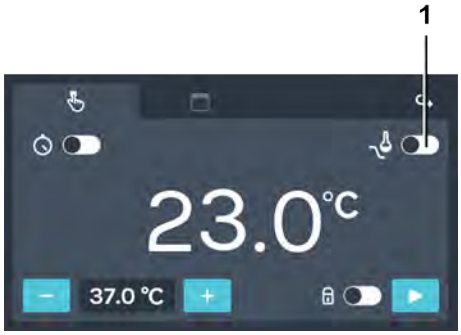


Fig. 72: 'Manual mode → Temperature drop'

1 *[Activate/deactivate temperature drop]* switch

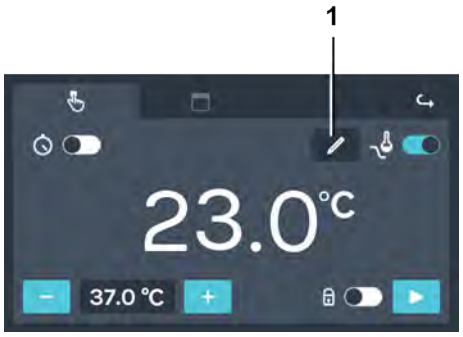


Fig. 73: 'Manual mode → Temperature drop → Editing'

1 *[Edit temperature drop]* button

2. Tap on the *[Edit temperature drop]* button.

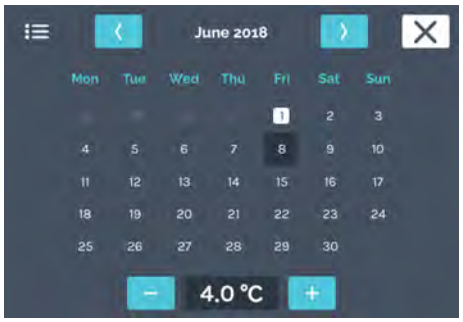


Fig. 74: 'Manual mode → Temperature drop → Editing → Settings'

➡ A calendar will be displayed.

> *Temperature drop settings can only be made for the future, not for the past.*

3. Tap twice on the desired start date of the temperature drop.

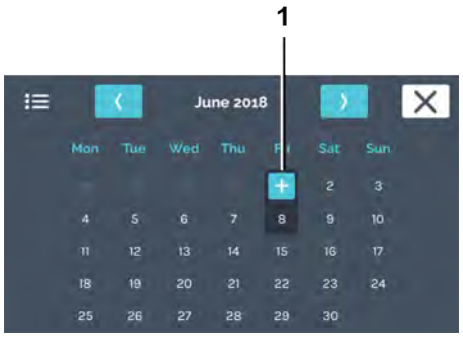


Fig. 75: 'Manual mode → Temperature drop → Editing → Settings → Date'

1 *[Plus]* button

4. Tap on the *[Plus]* button.

Examples for the temperature drop can be found in the appendix ➦ Appendix B 'Examples' on page 162.

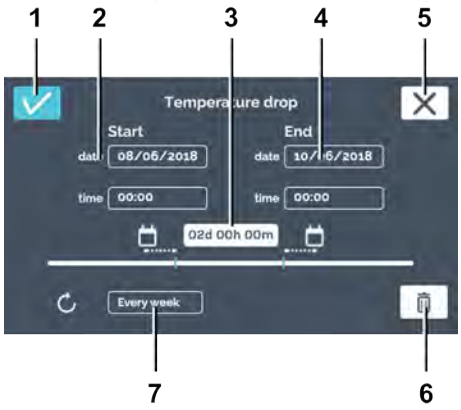


Fig. 76: 'Manual mode → Temperature drop → Editing window'

Item	Designation	Description/function
1	*[Confirmation]* button	After you have made all settings, you can confirm this with this button.
2	Starting time	Enter the starting time (date and time).
3	Duration	You can define the temperature drop via a start and end time or via the start time and specifying the duration of the temperature drop here. The end time is then calculated automatically.
4	End time	Specify the end time of the temperature drop. The duration is then adjusted accordingly.
5	*[Cancel]* button	If the *[Cancel]* button is pressed, the dialogue is closed and you will go back to the previous dialogue. All changes will be discarded.
6	Button *[Delete]*	You can delete the temperature drop by pressing the *[Delete]* button.
7	Interval repetition	Specify the repetition interval of the temperature drop.

Fig. 77: 'Manual mode → Temperature drop'

The lines in the calendar mark the temperature drops. The dots at the beginning and end of the line mark the start and end days of the drop.

> *Temperature drop settings can only be made for the future, not for the past.*

Editing or deleting temperature drop

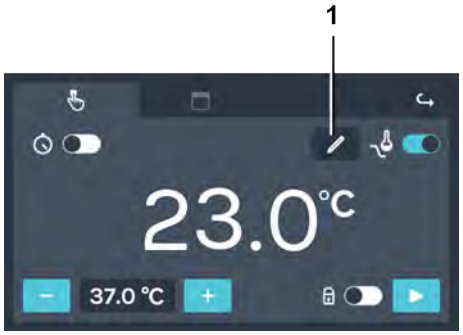


Fig. 78: 'Manual mode → Temperature drop → Editing'

1 *[Edit temperature drop]* button

To delete a temperature drop, proceed as follows:

1. Tap on the *[Edit temperature drop]* button.

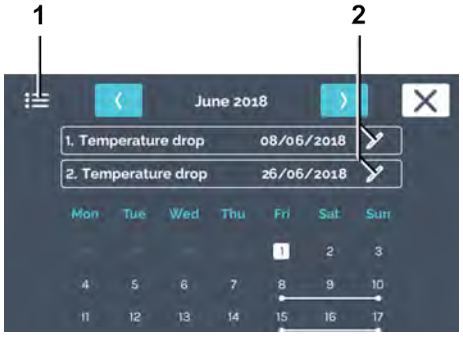


Fig. 79: 'Manual mode → Temperature drop → Editing → Settings'

1 *'List view'* symbol
2 *[Edit temperature drop]* editing icon

2. Tap on the *[Edit temperature drop]* editing icon for the temperature drop that you would like to edit or delete.

> *If you would like to delete all temperature drops, you can select this later.*

> *With the 'List view' symbol, you can have all temperature drops displayed in a list. The created temperature drops are displayed in a numbered list, starting with the start date. The list can be scrolled up and down. Only one temperature can be set for all drops. The last set temperature is used for all temperature drops.*

Fig. 80: 'Manual mode → Temperature drop → Editing → Settings → Delete'

1 *[Delete]* button

3. Tap on the *[Delete]* button.

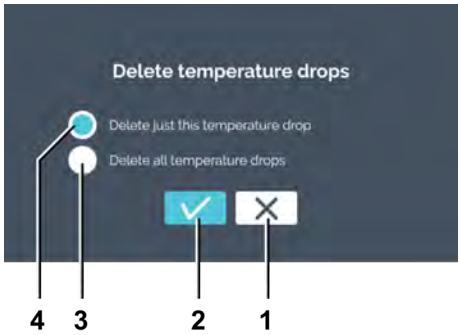


Fig. 81: 'Manual mode → Temperature drop → Editing → Settings → Delete → Selection'

1 *[Cancel]* button
2 *[Confirmation]* button
3 *[Delete all temperature drops]* selection
4 *[Delete just this temperature drop]* selection

4. Select whether you would like to delete only the current temperature drop or all temperature drops. Confirm the selection with the *[Confirmation]* button.

PIN protection

If no 'Admin PIN' was assigned, you will still be asked for the 'Admin PIN' when activating the PIN protection.

To activate the PIN protection, you will need the 'Admin PIN'.

To set the PIN protection, proceed as follows:

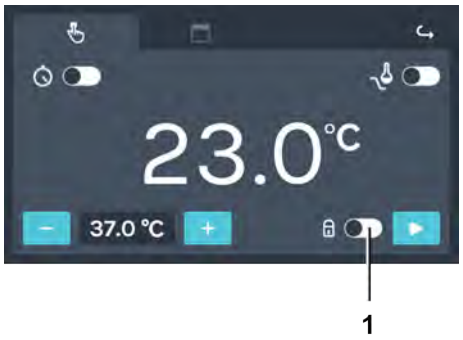


Fig. 82: 'Manual mode → PIN protection'

1 *[PIN protection]* switch

1. Activate the *[PIN protection]* switch.

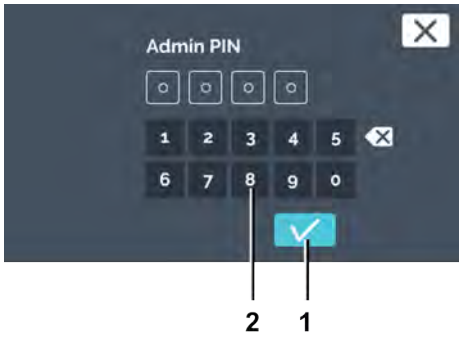


Fig. 83: 'Manual mode → PIN protection → Admin PIN'

1 *[Confirmation]* button
2 Keypad

2. Enter the *'Admin PIN'* via the keypad and confirm the input with the *[Confirmation]* button.

   ➡ PIN protection is active.

Control contact (option)

The control contact is only available on incubators with the Switchboard option ➦ Chapter 6.12.6.1 'Switchboard option' on page 103 or passive dehumidification option ➦ Chapter 6.12.6.2 'Passive dehumidification option' on page 105.

The control contact must be activated in the device settings ➦ Chapter 6.12.6 'Control contact (option)' on page 103.

Fig. 84: 'Manual mode → Control contact'

1 *[Activate/deactivate control contact]* switch

You can activate or deactivate the control contact for manual mode via the *[Activate/deactivate control contact]* switch.

Set temperature

NOTICE

If the incubator is operated at a temperature set below 4°C, the evaporator can ice up.

This would lead to a reduction in the cooling performance.

In this case, defrost the incubator regularly.

To defrost, set the temperature to 60°C and remove the access port cover.

To set the temperature setpoint, proceed as follows:

Fig. 85: 'Manual mode → Set temperature'

1 *[Plus]* button
2 Temperature
3 *[Minus]* button

1. You have the following setting options:
   - Tap the *[Plus]* or *[Minus]* button to change the value of the temperature setpoint in steps of 0.1°. By continuously pressing the icon, the setpoint specification can be changed at increasing speed.
   - By tapping on the temperature, a dialogue opens, via which you can enter the temperature setpoint directly.

Fig. 86: 'Manual mode → Set temperature → Keypad entry'

1 *[Clear input]* button
2 Keypad

2. You can now either
   - select the existing value by tapping it and entering a new value via the keypad or
   - delete the existing value with the *[Delete entry]* button and entering a new value via the keypad.

   Confirm the entry with the *[Confirmation]* button.

6.10.2 Starting manual mode

To start manual mode, proceed as follows:

1. Make all settings for manual mode ➥ *Chapter 6.10.1 'Manual mode settings' on page 56*.

2. Start manual mode with the *[Start manual mode]* button.

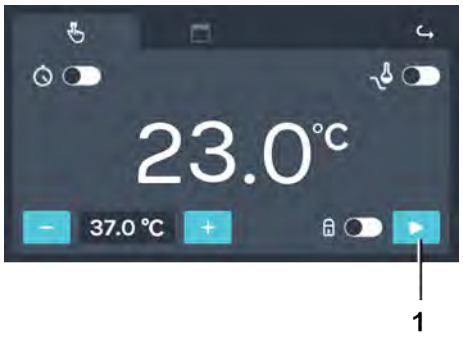


Fig. 87: 'Manual mode → Start'

1 *[Start manual mode]* button

> **NOTICE**
>
> A temperature guard is always activated and cannot be switched off. If the temperature set-point lies outside of the temperature range of set temperature guards, an error message is displayed when manual mode is started.

➥ If no start delay for manual mode was selected, you will go to the main screen.

Fig. 88: 'Manual mode → Start → Main screen'

3. If a start delay was specified, a message indicating when manual mode will start will appear beforehand.

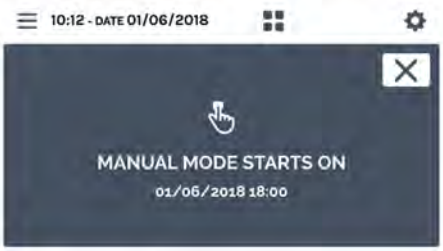


Fig. 89: 'Manual mode → Start → Start delay'

4. After a few seconds, the display will switch to the main screen. There, a countdown is displayed until the start of manual mode.

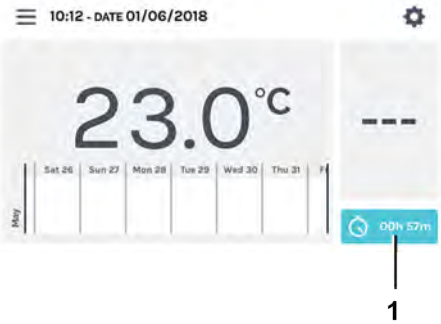


Fig. 90: 'Manual mode → Start → Start delay → Countdown'

1 Countdown

> **NOTICE**
>
> When the countdown is running, it is not possible to change the manual mode settings. To start a program, first stop the countdown.

6.10.3 Manual mode changes during running operation

You can make the following changes while manual mode is running:

- Edit the temperature setpoint in the interior
- Activate/deactivate and edit the temperature drop
- Activate/deactivate PIN protection
- Activate/deactivate control contact

To make changes while manual mode is running, proceed as follows:

Fig. 91: Manual mode active

1 HettCube activities area

1. Tap the main screen in the HettCube activities area.

Fig. 92: 'Manual mode → Settings'

2. Make the corresponding settings as described in the chapter ➥ *Chapter 6.10.1 'Manual mode settings' on page 56* .

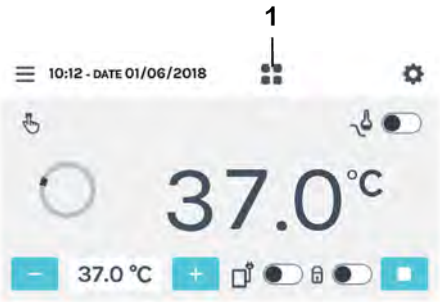


Fig. 93: Detailed manual mode screen

1 *[Go back to the main screen]* button

3. You can return to the main screen via the *[Go back to the main screen]* button.

6.11 Program mode

6.11.1 Program mode settings

Fig. 94: 'Main screen → Settings'

1 *[Operating modes]* button
2 HettCube activities area

The settings for program mode can be reached via the *[Operating modes]* button or the HettCube activities area.

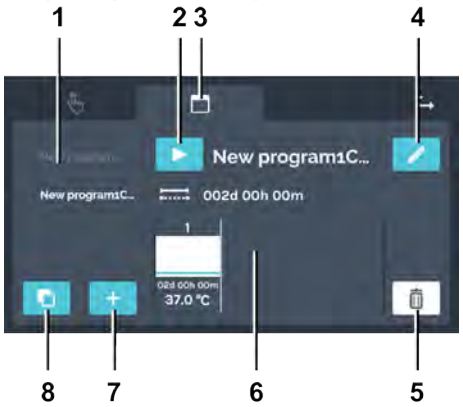


Fig. 95: Program mode settings

Item	Designation	Description/function
1	Program list	List of all available programs. The list can be scrolled up and down. The active program is highlighted in white.
2	*[Start]* button	The currently activated program is applied to the start settings.
3	*'Program mode'* tab ➦ *Chapter 6.11 'Program mode' on page 70*	Program mode tab
4	*[Edit program]* button ➦ *Chapter 6.11.3 'Editing a program' on page 79*	After tapping the *[Edit program]* button, the currently activated program can be edited.

Item	Designation	Description/function
5	*[Delete]* button ➦ *Chapter 6.11.4 'Copying and deleting a program' on page 82*	When this button is tapped, the currently activated program will be irrevocably deleted.
6	Program segments ➦ *'Editing a program segment' on page 72*	The program segments can be scrolled horizontally to the left and right to get an overview of the temperature setpoint as well as the program segment duration, the control contact and the standstill segments.
7	*[Create program]* button ➦ *Chapter 6.11.2 'Creating a program' on page 71*	A new program is created by tapping this. The new program is created with a preconfigured program segment with 37°C and one hour run-time.
8	*[Copy]* button ➦ *'Copying a program' on page 83*	When this is tapped, the currently selected program is copied.

6.11.2 Creating a program

Fig. 96: 'Program mode → Creating a program'

1 *[Create program]* button

To create a program, proceed as follows:

1. Tap the *[Create program]* button.

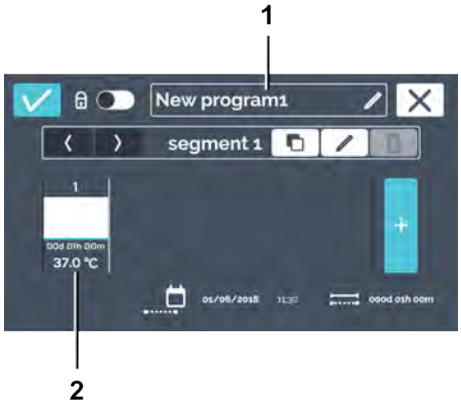


Fig. 97: 'Program mode → Creating a program → New program'

1 Program name
2 Preconfigured standard program segment

➡ A new program is created. The program is given the name *'New programx'*. A preconfigured standard program segment is created with 37°C and one hour run-time.

2. The created program can now be edited ➦ *'Editing a program' on page 79*.

Editing the program name

To edit the program name, proceed as follows:

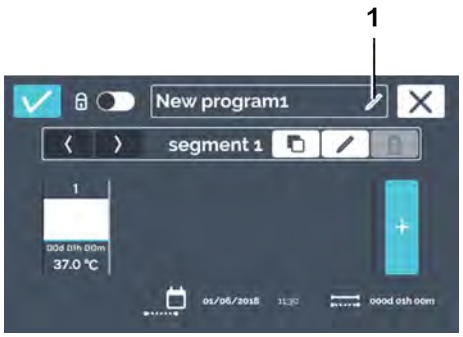


Fig. 98: 'Program mode → Creating a program → Editing the program name'

1 *[Edit program name]* button

1. Tap the *[Edit program name]* button.
   ➡ The editing window will open.

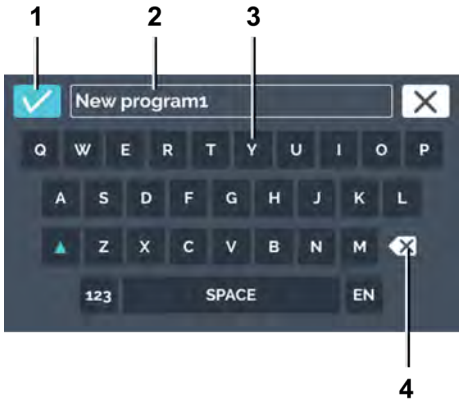


Fig. 99: 'Program mode → Creating a program → Editing the program name → Assign program name'

1 *[Confirmation]* button
2 Program name
3 Keypad
4 *[Clear input]* button

2. You can now either
   - select the existing program name by tapping it and entering a new program name via the keypad or
   - delete the program name with the *[Delete entry]* button and entering a new program name via the keypad.

   Confirm the entry with the *[Confirmation]* button.

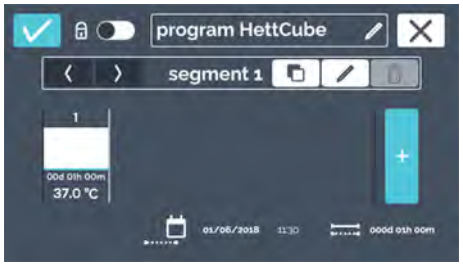


Fig. 100: Program name edited

➡ The program has been renamed.

Editing a program segment

The description for creating a new program segment can be found under ➦ 'Creating a program segment' on page 78.

To edit a program segment, proceed as follows:

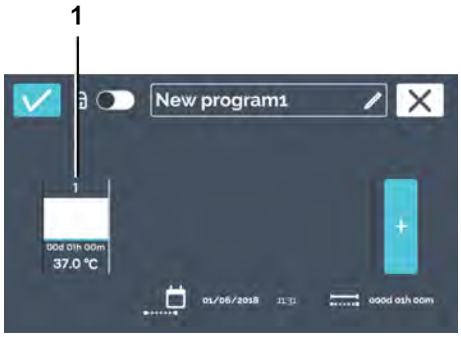


Fig. 101: Editing a program segment

1 Program segment

1. Tap on the program segment to be edited.

   ➡ By tapping on the program segment to be edited, the selected program segment is highlighted in white in the program segment list. All other program segments are shown in grey.

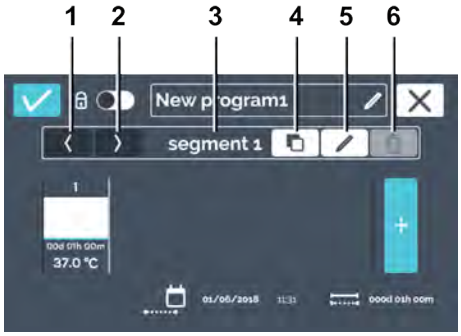


Fig. 102: Editing a program segment

2. Edit the program segment by tapping the *[Edit program segment]* button.

Item	Designation	Description/function
1	*[Move the program segment to the left]* button	With this button, you can move the currently selected program segment to the left.
2	*[Move the program segment to the right]* button	With this button, you can move the currently selected program segment to the right.
3	Program segment number	Shows the designation of the program segment.
4	*[Copy program segment]* button ➦ *'Copying a program segment' on page 80*	With this button, you can duplicate the current program segment with all settings. The duplicate is always appended to the end of the program segment (right).
5	*[Edit program segment]* button	When this button is tapped, the program segment is opened for editing (*Fig. 103*).
6	*[Delete program segment]* button ➦ *'Deleting a program segment' on page 81*	When this button is tapped, the currently selected program segment is deleted. No confirmation dialogue will appear.

The calendar in the program settings only serves as an aid for calculating the duration of the individual program segments. If you create a program, for example, which should last from Monday through Friday, the start of the program is defined via the start time in the start settings ➦ 'Timer' on page 86. If the program is started 24 hours later (i.e. Tuesday), however, the end time is also shifted by 24 hours.

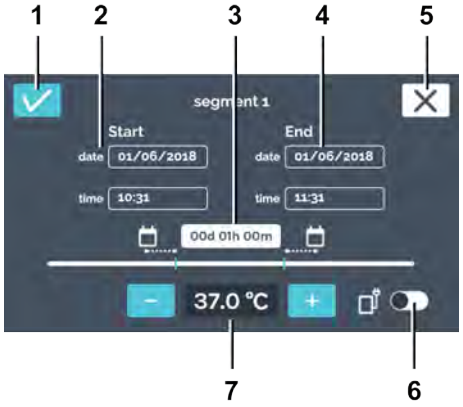


Fig. 103: Program segment settings

Item	Designation	Description/function
1	*[Confirmation]* button	After you have made all settings, you can confirm this with this button.
2	Starting time	Enter the starting time (date and time). The start time can only be defined for the first segment. Starting from the second segment, the start time is the end time of the previous segment. The start time specified her is only for calculating the duration. The actual start time results from the immediate start after creating the program, or when the timer is activated ➥ *Further information on page 85*.
3	Duration	You can define the program segment duration via a start and end time or via the start time and specifying the duration of the program segment here. The end time is then calculated automatically. Starting from the second segment, the start time is the end time of the previous segment.
4	End time	Specify the end time of the program segment. The duration is then adjusted accordingly. Starting from the second segment, the end time of the segment is defined via the end time or duration.
5	*[Cancel]* button	If the *[Cancel]* button is pressed, the dialogue is closed and you will go back to the previous dialogue. All changes will be discarded.
6	*[Activate/deactivate control contact]* switch	Here, you can activate/deactivate the control contact for the current program segment. This option only exists if the control contact is activated in the device settings ➥ *Chapter 6.12.6 'Control contact (option)' on page 103*.

Item	Designation	Description/function
7	Set temperature➥ *'Set temperature' on page 67*	You can change the temperature setpoint for this program segment in steps of 0.1 with the *[Plus]* and *[Minus]* buttons. By tapping on the temperature, a dialogue opens, via which you can enter the temperature setpoint directly. If a *'-'* is given for the temperature setpoint, the incubator is at a standstill during this time. A standstill segment is indicated with a *'-'* in the segment overview. A standstill segment makes sense for a program repetition. ➥ *Chapter 6.7.1 'Functional description of standstill mode' on page 50*.

The temperatures can also be input outside the limits of the temperature guard. This is not checked. Please note that at the start of the program, the input temperatures are compared with the temperature guard limits. If these were exceeded, a warning message will be output ➥ Chapter 6.12.5 'Temperature guard' on page 99.

To input a start time (can only be set for the first segment), proceed as follows:

Fig. 104: 'Program segment settings → Start date'

1 Start date

1. Tap on the start date.

The start time specified her is only for calculating the duration. The actual start time results from the start of the created program or by the activation of the timer ➥ Further information on page 85.

Fig. 105: 'Program segment settings → Start date → Date selection'

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button

2. Tap on the desired date and confirm the selection with the *[Confirmation]* button.

➥ You will go back to the *'Program segment settings'* menu.

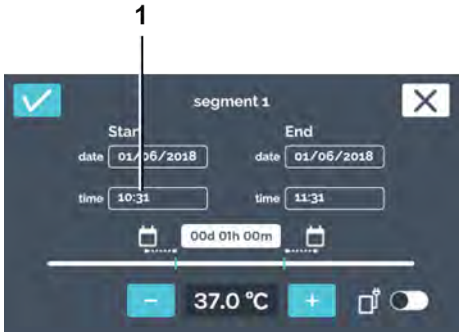


Fig. 106: 'Program segment settings → Start time'

1 *'Start time'*

3. Tap on the start time (can only be set for the first segment).

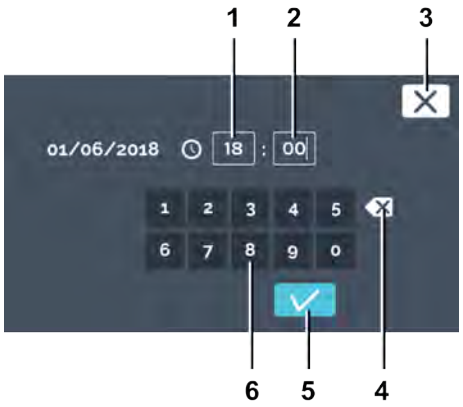


Fig. 107: 'Program segment settings → Start time → Input start time'

1 Editing the time *'hours'*
2 Editing the time *'minute'*
3 *[Cancel]* button
4 *[Clear input]* button
5 *[Confirmation]* button
6 Keypad

4. You can now either

- select the existing values by tapping them and entering new values via the keypad or
- delete the existing values with the *[Delete entry]* button and entering new values via the keypad.

Confirm the entries with the *[Confirmation]* button.

➡ You will go back to the *'Program segment settings'* menu.

5. If you would like to specify the end time via the date and time specification, select the end date and the end time the same way you did for the start date and start time. In this case, skip steps 6 and 7.

Fig. 108: 'Program segment settings → Duration'

1 Duration setting

6. If you would like to set the end time via the duration and not via the end date and end time, tap the duration.

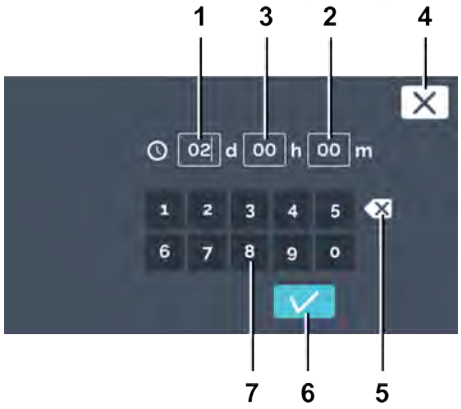


Fig. 109: 'Program segment settings → Duration → Input duration'

1 Duration in *'days'*
2 Duration in *'hours'*
3 Duration in *'minutes'*
4 *[Cancel]* button
5 *[Clear input]* button
6 *[Confirmation]* button
7 Keypad

7. You can now either

- select the existing values by tapping them and entering new values via the keypad or
- delete the existing values with the *[Delete entry]* button and entering new values via the keypad.

Enter the value in days, hours and minutes. Confirm the entries with the *[Confirmation]* button.

➡ You will go back to the *'Program segment settings'* menu.

Fig. 110: 'Program segment settings → Set temperature'

1 Temperature

8. Set the temperature of the program segment. You can change the temperature in steps of 0.1 with the *[Plus]* and *[Minus]* buttons. When the temperature is tapped, the dialogue opens for direct temperature input.

NOTICE

When entering the target temperature, also check the temperature guard settings ➦ *Chapter 6.12.5 'Temperature guard' on page 99*. Only once the program starts is it checked whether there is a contradiction between a target temperature defined in the program and the setting of the temperature guard. If this is the case, a warning message is output. No check is performed when entering the temperature setpoint.

Fig. 111: 'Program segment settings → Input temperature setpoint'

1 *[Clear input]* button
2 *[Confirmation]* button
3 Keypad

9. You can now either

- select the existing value by tapping it and entering a new value via the keypad or
- delete the existing value with the *[Delete entry]* button and entering a new value via the keypad.

Confirm the entries with the *[Confirmation]* button.

➡ You will go back to the *'Program segment settings'* menu.

Fig. 112: Activating the control contact

1 *[Activate/deactivate control contact]* button

10. If an additional device is to be switched on in the interior or the ventilation opening is to be opened during the program segment, you can activate the control contact for it here.

Fig. 113: 'Program segment settings → Confirmation'

1 *[Confirmation]* button

11. Confirm the settings of the program segment by tapping on the *[Confirmation]* button.

Creating a program segment

To create a program segment, proceed as follows:

1. Tap on the *[New program segment]* button.

   ➡ A new preconfigured program segment is created.

2. Edit the program segment to adapt the settings ➦ *'Editing a program segment' on page 72*.

Fig. 114: Adding a program segment

1 *[New program segment]* button

Saving a program

To save a program, proceed as follows:

Fig. 115: Saving a program

1 *[Confirmation]* button
2 *[Cancel]* button

1. Tap the *[Confirmation]* button to save the program.

Fig. 116: 'Saving a program → Confirmation'

1 *[Confirmation]* button

2. Confirm saving with the *[Confirmation]* button.

Fig. 117: Program overview

1 Program overview

➡ The saved program is displayed in the program overview.

6.11.3 Editing a program

Editing a program

To edit a program, proceed as follows:

Fig. 118: 'Program mode → Program overview'

1 Program list
2 *[Edit program]* button

1. Select the program to be edited from the program list.
   ➡ The selected program is highlighted in white in the list.

2. Tap the *[Edit program]* button to edit the program.
   ➡

> *The program segments can be scrolled horizontally to the left and right to get an overview of the created program segments.*

The program is open and can be edited.

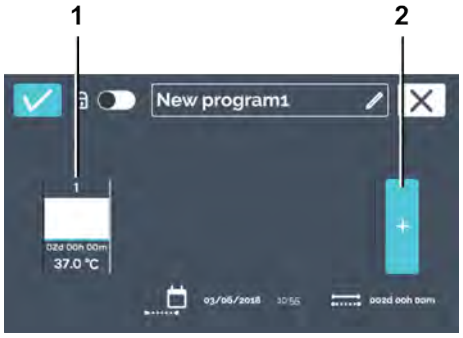


Fig. 119: 'Program mode → Program overview → Program segments'

1 Program segment
2 *[Add program segment]* button

Copying a program segment

To copy a program segment, proceed as follows:

1. Tap on the program segment that you would like to copy.

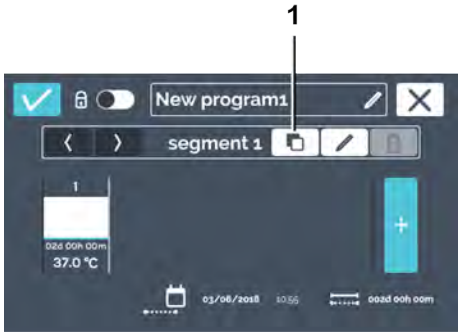


Fig. 120: Copying a program segment

1 *[Duplicate program segment]* button

2. Tap on the *[Duplicate program segment]* button.

Fig. 121: Copied segment

➡ A duplicate is appended to the end of the program segment list. The copy is marked. The description for editing a program segment can be found under ➦ *'Editing a program segment' on page 72*.

Deleting a program segment

To delete a program segment, proceed as follows:

1. Select the program segment to be deleted.
2. Tap on the *[Delete program segment]* button.

   ➡ The program segment is deleted.
3. To apply the changes to the program, save the program ➦ *'Saving a program' on page 78*.

Fig. 122: Deleting a program segment

1 *[Delete program segment]* button

6.11.4 Copying and deleting a program

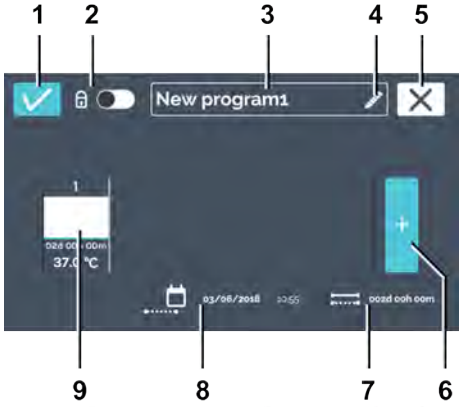


Fig. 123: 'Program mode → Creating a program → Editing a program'

Change to the 'Program mode settings' menu ➦ Chapter 6.11.1 'Program mode settings' on page 70, select the program to be edited from the program list and press the [Edit program] button.

If you are already in the 'Edit program' menu, you can continue with editing the program name ➦ 'Editing the program name' on page 71.

Item	Designation	Description/function
1	*[Confirmation]* button	After you have made all settings, you can confirm this with this button.
2	PIN protection ➦ *'PIN protection' on page 86*	To protect the program from being changed, you can activate/deactivate the PIN protection here.
3	Program name	Indicates the currently assigned program name.
4	*[Edit program name]* button ➦ *'Editing the program name' on page 71*	After pressing the button, you can edit the program name.
5	*[Cancel]* button	If the *[Cancel]* button is pressed, the dialogue is closed and you will go back to the previous dialogue. All changes will be discarded.
6	*[Add new program segment]* button	A new program segment is created by tapping this. The new program segment is created with 37°C and one hour run-time.
7	*'Total run-time'* display	Shows the run-time for the entire program.
8	*'Date and time of program end'* display	Shows the date and time of the end of the program.
9	Program segment ➦ *'Editing a program segment' on page 72*	Shows a program segment. The program segments are run from left to right.

Copying a program

To copy a program, proceed as follows:

→ Select the program to be copied and tap the *[Copy program]* button.

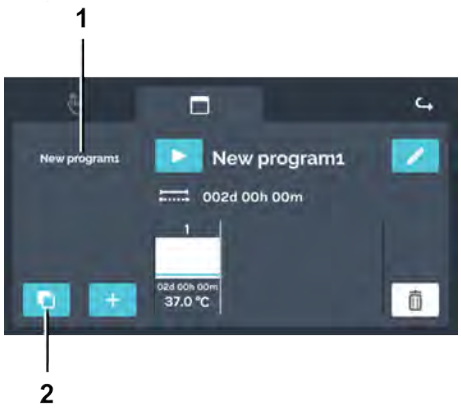


Fig. 124: 'Program mode → Copying a program'

1 Program list
2 *[Copy program]* button

➡ The copy is created.

Fig. 125: 'Program mode → Copying a program → Copy'

1 Program copy

Deleting a program

To delete a program, proceed as follows:

Fig. 126: 'Program mode → Delete'

1 Program list
2 *[Delete program]* button

→ Select the program to be deleted from the program list and delete it by tapping the *[Delete program]* button.

Fig. 127: 'Program mode → Delete dialogue'

1 *[Confirmation]* button

➡ Confirm the deletion with the *[Confirmation]* button.

6.11.5 Program mode — Start settings

Fig. 128: 'Program mode → Start settings'

Before starting program mode, you can change the start settings.

Item	Designation	Description/function
1	*[Start]* button	The currently selected program is started.
2	Program behaviour	The program behaviour indicates whether the times of the program segments start once the temperature of the program segment has been reached or after the specified time. **At temp:** The start time of a program segment does not begin until the temperature setpoint of this program segment has been reached. **At start:** The defined time periods of the program segments are run through in succession without caring whether the temperature setpoint has been reached.
3	PIN protection➥ *'PIN protection' on page 86*	To protect the program from being changed, you can activate/deactivate the PIN protection here.
4	*[Timer]* switch	The start date and start time of the program can be entered here.

Item	Designation	Description/function
5	*[Program repetition]* switch➥ *'Program repetition' on page 87*	The number of program repetitions can be entered here. This function is for repeating the entire program. It is not possible to repeat individual program segments. In the case of program repetitions, it might make sense to integrate a standstill segment at the end of a program. During this time, the incubator runs in standstill mode ➥ *Chapter 6.7.1 'Functional description of standstill mode' on page 50*.
6	*[Holding temperature]* switch➥ *'Holding temperature' on page 88*	The holding temperature can be entered here.
7	*[Cancel]* button	The program start abort is initiated when this button is tapped.
8	Program run-time overview➥ *'Program run-time overview' on page 89*	Shows the planned program (only when *'at start'* is selected).
9	Control contact	If the activation/deactivation of the control contact is to be taken into consideration for the program run, this must be activated here. If this switch is deactivated, the control contact settings of the individual segments are not taken into consideration. This option is only available if the incubator is equipped with the Switchboard option ➥ *Chapter 6.12.6.1 'Switchboard option' on page 103*or passive dehumidification option ➥ *Chapter 6.12.6.2 'Passive dehumidification option' on page 105* and the control contact is activated in the device settings ➥ *Chapter 6.12.6 'Control contact (option)' on page 103*.

PIN protection

To set the PIN protection, proceed as follows:

1. Activate the *[PIN protection]* switch
2. Enter the *'Admin PIN'* via the keypad and confirm the input with the *[Confirmation]* button.

   ➧ PIN protection is active.

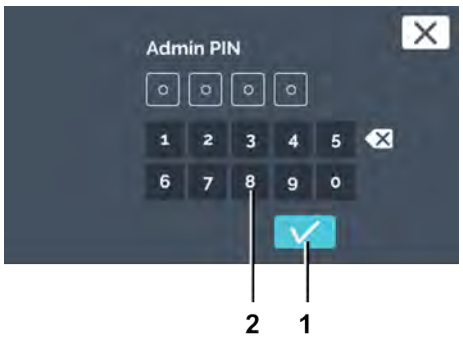


Fig. 129: 'Admin PIN'

1 *[Confirmation]* button
2 Keypad

Timer

To specify the starting point of the program, proceed as follows:

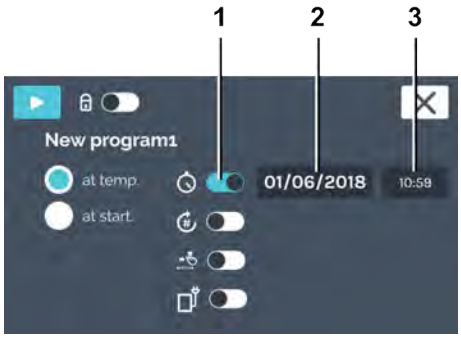


Fig. 130: Timer

1 *[Timer]* switch
2 Date field
3 Time field

1. Activate the timer.
   ➡ The date and time for the program start can be specified.
2. Tap on the date field.
   ➡ The calendar will open.

> *The current date is highlighted.*

Fig. 131: 'Timer → Date selection'

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button

3. Select the start date and confirm the selection with the *[Confirmation]* button.

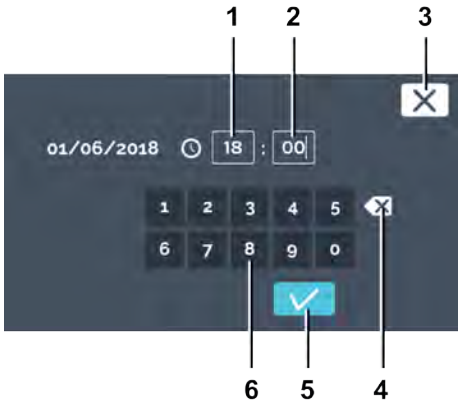


Fig. 132: 'Timer → Time input'

1 Editing the time *'hours'*
2 Editing the time *'minute'*
3 *[Cancel]* button
4 *[Clear input]* button
5 *[Confirmation]* button
6 Keypad

4. Tap on the time field.
   ➡ The editor will open.
5. Enter the time for the program start and confirm the inputs with the *[Confirmation]* button.

Program repetition

To specify the program repetitions, proceed as follows:

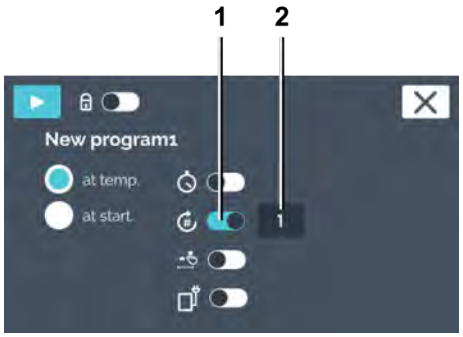


Fig. 133: Program repetitions

1 *[Program repetitions]* switch
2 *'Number of repetitions'* specification

1. Activate the program repetition.
2. Tap on the number of repetitions to set this.

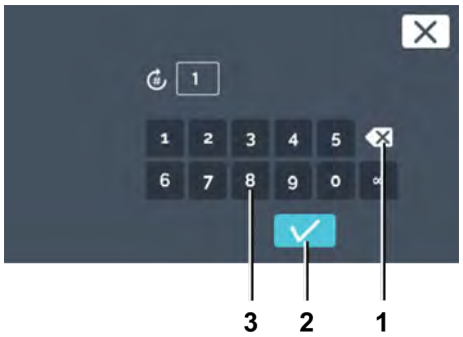


Fig. 134: 'Program repetitions → Input repetition(s)'

1 *[Clear input]* button
2 *[Confirmation]* button
3 Keypad

3. You can now either
   - select the existing value by tapping it and entering a new value via the keypad or
   - delete the existing value with the *[Delete entry]* button and entering a new value via the keypad.

   Specify how many times the program should be executed. The maximum input is 99 repetitions. If '∞' is entered, the program is repeated an infinite number of times. Confirm the entry with the *[Confirmation]* button.

Holding temperature

If the holding temperature is not activated, the incubator will go into standstill mode after the end of the program.

To set the holding temperature, proceed as follows:

Fig. 135: Holding temperature

1 *[Holding temperature]* switch
2 *'Holding temperature'* specification

1. Activate the holding temperature.
2. Tap on the temperature display.

Fig. 136: 'Holding temperature → Program temperature setpoint input'

1 *[Clear input]* button
2 *[Confirmation]* button
3 Keypad

3. You can now either
   - select the existing value by tapping it and entering a new value via the keypad or
   - delete the existing value with the *[Delete entry]* button and entering a new value via the keypad.

   Confirm the entry with the *[Confirmation]* button.

Control contact (option)

The control contact button is only available on incubators with the Switchboard option ➥ Chapter 6.12.6.1 'Switchboard option' on page 103or passive dehumidification option ➥ Chapter 6.12.6.2 'Passive dehumidification option' on page 105.

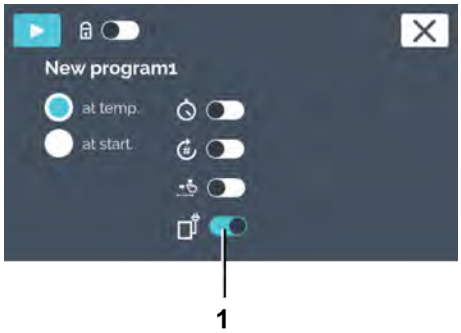


Fig. 137: Start settings — Control contact

1 *[Control contact]* switch

The control contact can be activated or deactivated in every program segment. The control contact switches devices on/off which are connected to the Switchboard (option). In the case of the passive dehumidification option, the ventilation opening is opened or closed by the control contact.

If the control contact should be switched during the program run, the *[Control contact]* switch must be activated here. If it is deactivated, the program is run without consideration of the control contact. The *'Control contact'* symbol is only displayed if the control contact is activated in the device settings ➥ *Chapter 6.12.6 'Control contact (option)' on page 103*.

In the case of the passive dehumidification option ➥ *Chapter 6.12.6.2 'Passive dehumidification option' on page 105* the ventilation opening is opened or closed by the control contact.

Program run-time overview

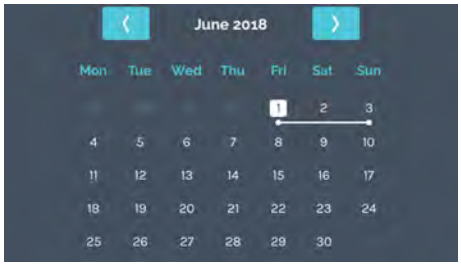


Fig. 138: Calender — Program run-time overview

The calendar is only displayed if the starting point *'at start'* is activated. The planned program run is depicted as a white line in the calendar.

When 'at temperature' is set, the incubator cannot calculate the required time for this in advance. The temperature depends on many process-dependent variables, such as the load type, amount and placement of the load, door openings, ambient conditions, etc.

Program start

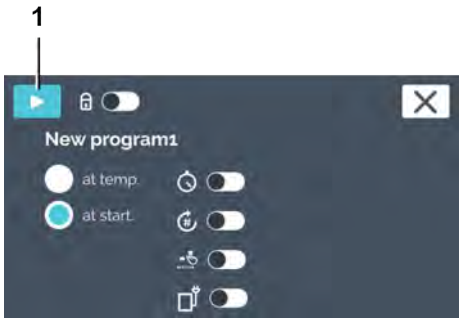


Fig. 139: Program start

1 *[Start]* button

Fig. 140: Running program

1 *'HettCube activity'*

The program cannot be started if another one is already being run. Starting a program ends manual mode.

To start the program, proceed as follows:

1. After the settings have been made, you can now start the program with the *[Start]* button.

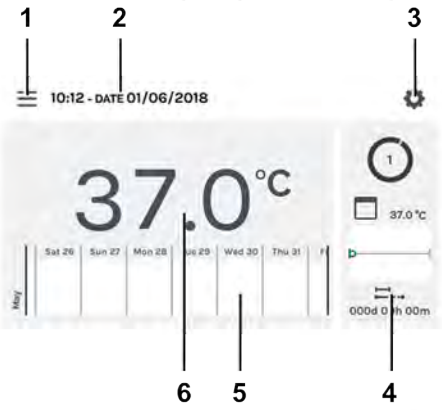
   If a start delay is assigned, the program is only run at the specified time.

   The temperatures can also be input outside the limits of the temperature guard. This is not checked. Please note that at the start of the program, the input temperatures are compared with the temperature guard limits. If these were exceeded, a warning message will be output ➥ *Chapter 6.12.5 'Temperature guard' on page 99.*

   ➡ The program is run.

2. During program mode, tap on *'HettCube activities'* to get to the program mode overview screen.

6.11.6 Program mode overview



In program mode, the temperature profile defined by you is run with the specified times.

Fig. 141: Main screen

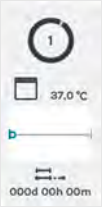
Item	Designation	Description/function
1	Program settings ➦ *Chapter 6.10 'Manual mode' on page 56*, ➦ *Chapter 6.11 'Program mode' on page 70*	Call of manual and program mode.
2	Date and time	Shows the current date and time. These can be changed in the settings (3).
3	Settings ➦ *Chapter 6.12 'Device settings' on page 94*	Calls up the device settings.
4	HettCube activities	 Shows the current incubator activities.
5	Process flow information	Zoomable temperature process flow in three levels. Events, such as breaks, continuations, open door, power failure, etc. are marked on the temperature process flow curve with various symbols. Additional process flow information: ➦ *Chapter 6.9 'Process flow information' on page 54* Further information about the symbols: ➦ *Appendix A 'Software symbols' on page 158*
6	Actual interior temperature	Shows the current temperature inside the incubator.

Fig. 142: Main screen active

1 Rotating circle symbol

A defined program runs in program mode.

On the main screen, the rotating circle symbol, together with the symbol for manual mode, are displayed to indicate that temperature control is active. The number in the circle is the currently running program segment number of the program.

While program mode is active, you can create, edit, or delete a program in parallel.

NOTICE

No other program can be run in parallel with program mode.

The settings for program mode are made in the *'Program mode settings'* menu ➦ *Chapter 6.11.1 'Program mode settings' on page 70*.

NOTICE

A potential touchscreen failure is indicated by the standstill of the rotating circle symbol. In this case, a second acoustic alarm is activated. See ➦ *Chapter 8 'Troubleshooting' on page 127*.

If the incubator is switched off while manual or program mode is running, when the incubator is switched on, it indicates that a power failure was registered.

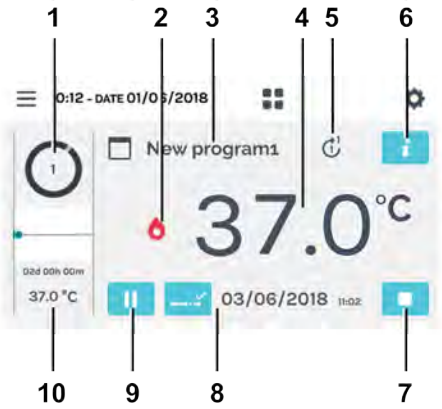


Fig. 143: Detailed program screen

Item	Designation	Description/function
1	Currently run program segment	The number in the circle is the currently running program segment number of the program.
2	Controller status	Indicates the current controller status (heating or cooling).
3	Program	Currently running program.
4	Actual temperature	Indicates the current interior temperature of the incubator.
5	Number of program runs	The number inside the circle indicates the current program run. The number at the tip of the arrow indicates the number of program runs.
6	*[Program details]* button	Shows all details of the program. 
7	*[Abort program]* button	The current program is stopped if this button is tapped.
8	Program progress	The following are displayed when this symbol is tapped:
		03/06/2018 11:02 — Planned program end. (Only in *'at start'* mode)
		000d 00h 00m — Program time elapsed so far.
		002d 00h 00m — Duration of program still to be run. (Only in *'at start'* mode)
9	*[Pause]* button	The temporal run of the current segment is stopped. The run-time of the program is prolonged by the pause time. During the program pause, the incubator continues to regulate to the temperature setpoint.

Item	Designation	Description/function
10	Program segment information	Indicates the temperature setpoint as well as the duration of the current program segment. The blue dot indicates the progress.

6.12 Device settings

You can make basic incubator settings in the device settings. You can get to the device settings via the main screen.

Fig. 144: Main screen

1 *[Device settings]* button

→ Tap on the *[Device settings]* button on the main screen.

Fig. 145: 'Device settings' menu

➧ The *'Device settings'* menu will open. The individual menus are described in the following chapters.

If the incubator is in manual or program mode, not all setting options can be operated during the run; these are then greyed-out, such as the date and time. To use all setting options, the incubator must be in standstill mode.

6.12.1 About

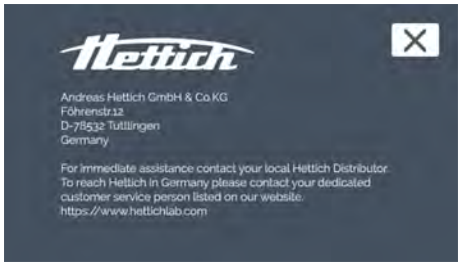


Fig. 146: 'About' menu

In this menu, the contact data is displayed to you.

6.12.2 Date & time

In this menu, you can change the date and time of the control. Date and time are preset ex works and are changed during the initial installation if required. A switch from daylight savings time to standard time or vice versa can be done manually here.

For the language setting 'English US', note that another format is shown on the display.➥ Chapter 6.12.7 'Language' on page 106.

If the date or time is changed or called up twice in a row and the input confirmed with the [Confirm] button, it could happen that the recorded data is no longer shown on the display.

The data is still stored on the SD card.

The data is shown on the display again when the device is restarted.

Fig. 147: 'Date & time' menu

To set the date, proceed as follows:

1. *Manual and program mode are time-controlled sequences. Therefore, it is neither possible to change the date or time during active manual or program mode, nor when manual or program mode are already planned via the time delay function. The date and time can only be changed in standstill mode.*

   Tap the displayed date.

   ➥ The dialogue opens for editing the date.

2. Select the date.
3. Confirm the entry with the *[Confirmation]* button. You can undo changes with the *[Cancel]* button and go back to the previous display.

To set the time, proceed as follows:

Fig. 148: Setting the date

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button

Fig. 149: 'Date & time' menu

1. Tap on the displayed time.

➡ The dialogue opens for editing the time.

2. You can now either

- select the existing values by tapping them and entering new values via the keypad or
- delete the existing values with the *[Delete entry]* button and entering new values via the keypad.

Confirm the entry with the *[Confirmation]* button.

You can undo the change with the *[Cancel]* button and go back to the previous display.

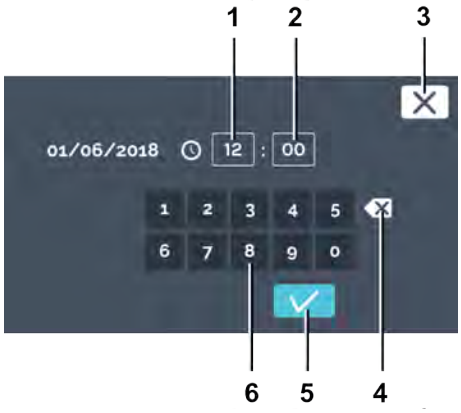


Fig. 150: Setting the time

1 *'Hour'* input
2 *'Minute'* input
3 *[Cancel]* button
4 *[Clear input]* button
5 *[Confirmation]* button
6 Keypad

6.12.3 Temperature

In this menu, you can change the unit of temperature. The incubator can be switched between °C and °F on the temperature display. If these units are changed, the settings must be reset for

- *tolerance band ➦ Chapter 6.12.4 'Tolerance band' on page 98 and*
- *temperature guard classes 3.1 and 3.2. ➦ 'Class 3.1' on page 100 and ➦ 'Class 3.2' on page 101 .*

It is not possible to change the temperature unit when manual or program mode is active.

Fig. 151: 'Temperature' menu

1 *[°C]* button
2 *[°F]* button

To set the temperature unit, tap on the *[°C]* or *[°F]* button.

6.12.4 Tolerance band

The settings for the tolerance band alarm are defined in this menu.

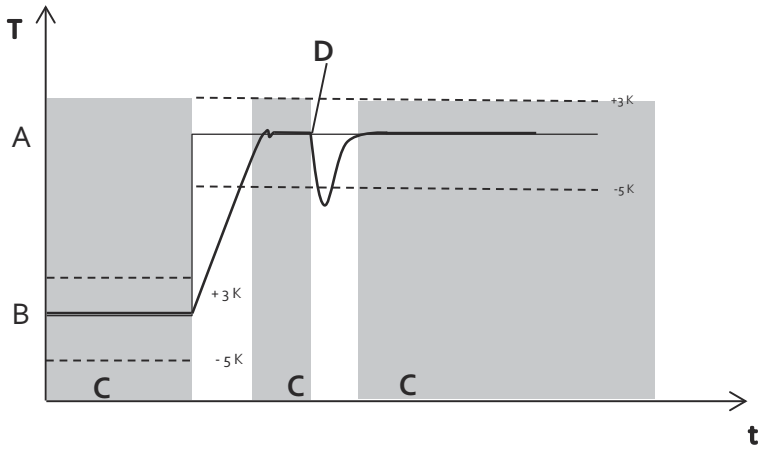


Fig. 152: Tolerance band

A Temperature 2
B Temperature 1
C Alarm active (grey background in the diagram)
D Door opening
- - - Temperature limit
—— Temperature setpoint
▬▬ Actual temperature

The tolerance band is defined by the upper and lower temperature limit settings. Monitoring is performed to determine whether the ACTUAL temperature is within the tolerance band.

The tolerance band limits can be set symmetrically or asymmetrically on either side of the setpoint temperature. They are factory set to ±1 °C or ± 2 °F.

The tolerance band limits can be set in 1 °C or 1 °F increments between 1 °C and 30 °C or 2 °F and 54 °F.

A combined visual and audible alarm is emitted if the actual temperature exceeds one of the tolerance band limits. The potential-free alarm output is switched.

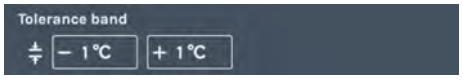


Fig. 153: Menu 'Tolerance band'

Breaches of the tolerance ban are logged and can be viewed and evaluated at any time.

Example of an asymmetrical setting of the tolerance band:

- The current setpoint temperature is 37 °C.
- The upper tolerance band is set to +3 °C.
- The lower tolerance band is set to -5 °C.

- The tolerance band, i.e. actual temperature monitoring, now only has an effect if the temperature exceeds 40 °C or falls below 32 °C.
- If the temperature is above or below the tolerance band, visual and audible signals are output and the potential-free alarm output is switched.

  The tolerance band only becomes active once the incubator has reached a temperature within the tolerance band.

  The tolerance band alarm is also triggered if the setpoint temperature is not reached after a period of 10 h (can be changed by Service).
- The user must actively confirm/terminate this signal.
- Tolerance band monitoring becomes active again once the actual temperature is again within the tolerance band.

In program mode, the tolerance band adjusts automatically to the setpoint temperature with changing temperatures. Monitoring starts as soon as the actual temperature is within the tolerance band. This is also true when the temperature changes.

A tolerance band alarm is displayed during normal operation as soon as the temperature increases above or falls below the tolerance band.

Monitoring is only deactivated after the door is opened/closed - for a period of at least 15 minutes. Subsequently, it remains active as long as the temperature is within the tolerance band. This setting prevents the tolerance band alarm from being triggered when loading/unloading the system.

The time setting is factory set to 600 minutes (after closing the door) and can be adjusted by a service technician to match your requirements.

6.12.5 Temperature guard

The incubator is equipped with a temperature guard in acc. with DIN12880:2007-05. The temperature guard is for protecting the incubator (device protection), its surroundings and the sample material (sample protection) against impermissible, excessive temperatures.

Class 3.1	Factory setting at +70 °C (device protection), individually adjustable temperature (sample protection)
Class 3.2	Factory setting at -10 °C (deactivated), individually adjustable temperature (sample protection)
Class 3.3	If both class 3.1 (overtemperature protection) as well as class 3.2 (undertemperature protection) are activated, this is said to be class 3.3.
Incubators with cooling	Classes 3.1 and 3.2

Incubators without cooling	Class 3.1

If the electronic temperature regulation fails during operation, the temperature guard takes over the regulating function.

If a temperature violation of class 3.1 or 3.2 was detected, the incubator regulates according to these set temperature limits by switching the heating (class 3.1, overtemperature protection) or the cooling (class 3.2, undertemperature protection) on or off. If the overtemperature protection of class 3.1 is violated, the heating is switched off; for class 3.2, the cooling. As soon as the actual temperature is back within the limits, the incubator will continue to regulate. The temperature guards serve as device protection and sample protection. The temperature limits can limit the standard temperature range.

In the "Temperature guard" settings, temperatures for classes 3.1 and 3.2 can be input.

For 3.1, up to +70 °C

For 3.2, from -10 °C up to +70 °C

If classes 3.1 and 3.2 are set, they must lie at least 4°C / 8°F apart.

Class 3.1

It is only sensible to use a temperature guard of class 3.1 in heating mode with monitoring temperatures which lie above room temperature.

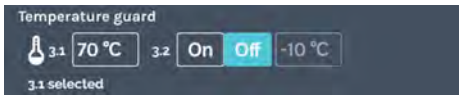


Fig. 154: 'Temperature guard' menu, class 3.1

The temperature specification value can be changed by tapping it. The setting ex works is +70 °C. This temperature lies outside of the temperature range of the incubator. Class 3.1 here acts like device protection, but is not indicated as being active on the main screen. If the setting is changed, the class 3.1 is indicated as being active on the main screen.

Triggering example, class 3.1

- Target temperature +37 °C, class 3.1 at +40 °C

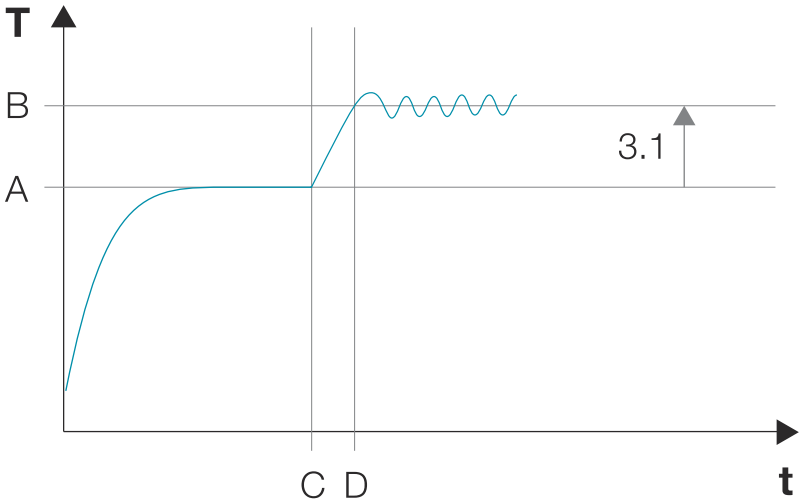


Fig. 155: Diagram of 'Temperature guard', class 3.1

A Set temperature
B Temperature specification, class 3.1

C Deviation from the target temperature starting from time C
D Class 3.1 active starting from time D

Class 3.2

It is only sensible to use a temperature guard of class 3.2 in cooling mode with monitoring temperatures which lie below room temperature.

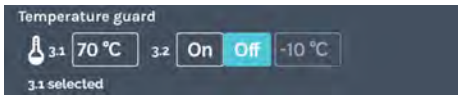


Fig. 156: 'Temperature guard' menu, class 3.2

The setting ex works is: OFF and -10 °C. This temperature lies outside of the temperature range of the incubator. The temperature specification value can be changed by tapping it.

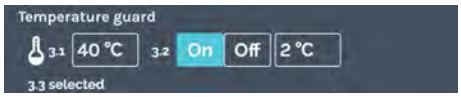


Fig. 157: 'Temperature guard' menu, [On], class 3.3

If the *[On]* button is activated for 3.2, class 3.3 (class 3.1 and class 3.2) is activated automatically. Class 3.2 is indicated as being active on the main screen.

Triggering example, class 3.2

- Target temperature +18 °C, class 3.2 at +10 °C

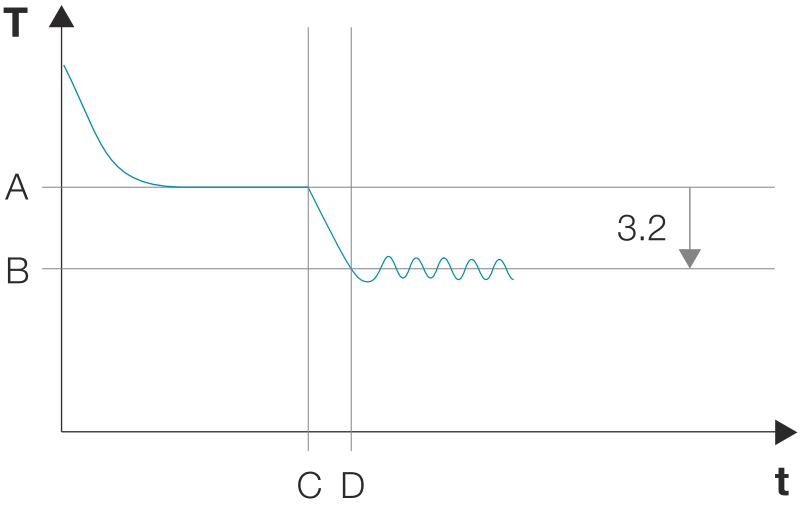


Fig. 158: Diagram of 'Temperature guard', class 3.2

A Set temperature
B Temperature specification, class 3.2
C Deviation from the target temperature starting from time C
D Class 3.2 active starting from time D

Class 3.3

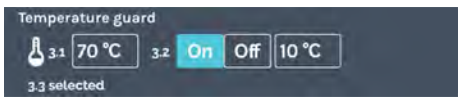


Fig. 159: 'Temperature guard' menu, [On], class 3.3

Triggering example, class 3.3

The incubator is operated with a temperature drop during the weekend.

- Target temperature 1 +37 °C
- Target temperature 2 +4 °C
- Class 3.1 at +40 °C
- Class 3.2 at +2 °C

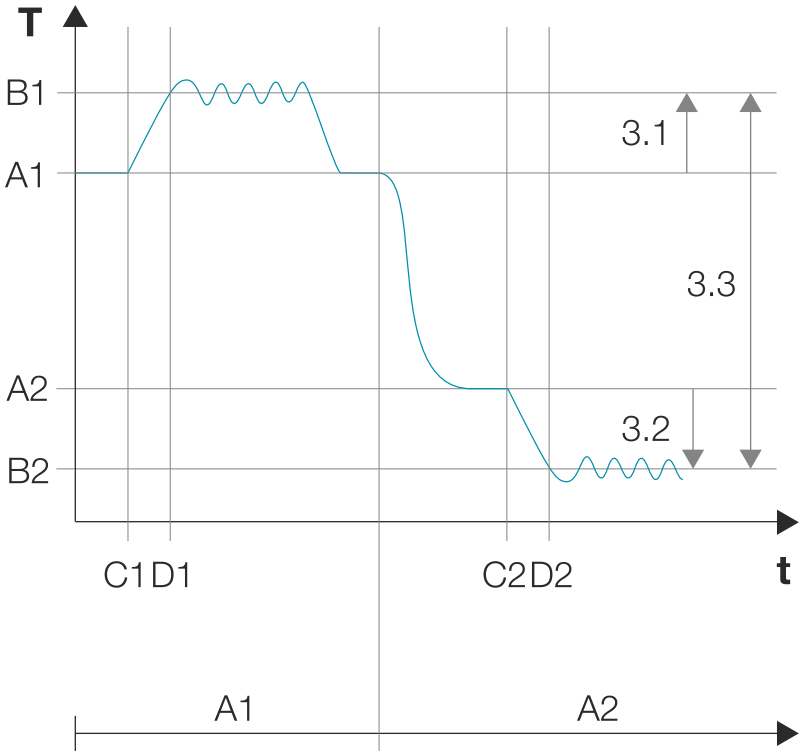


Fig. 160: Diagram of 'Temperature guard', class 3.3

A1 Target temperature 1
B1 Temperature specification, class 3.1
C1 Deviation from the target temperature starting from time C1
D1 Class 3.1 active starting from time D1
A2 Target temperature 2
B2 Temperature specification, class 3.2
C2 Deviation from the target temperature starting from time C2
D2 Class 3.2 active starting from time D2

Contradiction between the temperature setpoint and temperature guard setting

Manual mode: Manual mode can be started even if there is a contradiction between the temperature setpoint and the guard temperature. A warning message appears.

Program mode: After the program starts, a warning message appears: 'The programmed temperature is higher than the set limit value of the temperature guard ...'. After confirming this message, it leads you back to the program start settings.

6.12.6 Control contact (option)

The *[Control contact]* button is only available for incubators with either the Switchboard option or the passive dehumidification option.

6.12.6.1 Switchboard option

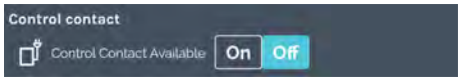


Fig. 161: 'Control contact' menu

The Switchboard option can be switched on/off with the control contact. "On" means that the Switchboard (external socket strip) is live.

If the control contact is activated here, it can be used in manual and program mode.

The mains cable of the brought-in device is conducted outward via the standard access port (Ø 42mm) on the rear side of the incubator.

Setup

In the interior, there is an external device or a light cartridge, for example. The mains cable is routed from inside the incubator outward via the standard access port and must be sealed. The plug in the access port can be used as a support for this. Using an adapter (included in the scope of delivery), the equipment can be connected directly to the external sockets.

Please observe the country-specific design of the adapter; different country sets are available.

Procedure

The external socket can now be supplied with voltage via the "Control contact" function inside the control panel. This way, the equipment inside the cabinet can be switched on or off.

There is the option of briefly supplying voltage to the external socket strip, e.g. to configure the external device ➦ *'Control contact test' on page 104.*

Switching the control contact on and off, and thereby the power supply of the socket, can be done both in manual mode and program mode.

If the electrical device generates light in the interior, these settings can be used to run a classical "Day/night" program (e.g., 12 hours light ON at temperature X; 12 hours light OFF at temperature Y).

Please note that you may connect max. 400 W (only in the case of a cooled incubator). If multiple sockets/pieces of equipment are used in the interior, the max. power is distributed over the number sockets.

Device at one socket	== 400 W total
Devices at four sockets	*'400 Watt/E → 400 W/4 pc. = 100 W per device '*

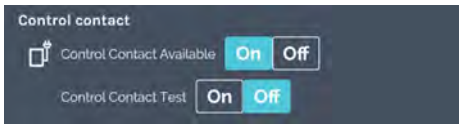


Fig. 162: 'Control contact' menu [On]

For safety reasons, the incubator must be in operation (manual or program mode) before the external device is started. This way, the external device is prevented from being switched on and energy (heat) prevented from being generated within the utilized space without the incubator being able to compensate for this.

Please take these interrelationships into consideration, even if you do not work with the switchboard and connect an external device directly into the in-house power grid.

If the control contact was activated in the device settings,

- an additional symbol appears on the main screen in manual mode, via which the control contact can be switched on or off at any time ➦ *Further information on page 56*.
- there is an additional function available, "Control contact On/Off", in program mode for creating programs in the editing view of the program segments ➦ *'Editing a program segment' on page 72*.
- it can be used in the start settings for an existing program ➦ *'Control contact (option)' on page 89*.

There is the option of running a program either with the control contact activated or deactivated. For this, the control contact must be activated in the device settings. At the program start, there is then the option of activating the control contact for the respective program in the program start settings or to leave it deactivated.

Control contact test

The control contact test function offers the option of briefly switching on the external socket strip, e.g. to make and test settings on the external device.

This way, the short-term presetting of an external device, e.g. a light cartridge, is possible.

To do this, activate *'Control Contact Test'*. This way, the control contact is activated for 10 minutes (voltage applied) and deactivated again automatically after this time. The contact remains switched on when the incubator is started in manual mode or program mode with an activated control contact during this time.

Procedure:

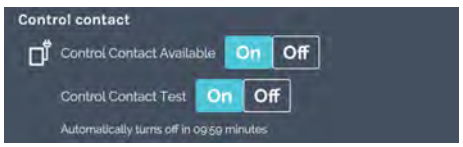


Fig. 163: 'Control contact' menu, 'Control contact' [On]

1. Activate the setting "Control Contact Available".
2. Activate the setting "Control Contact Test".

Inside the incubator:

You put an electrical device inside the incubator. Please take the additional energy released in the interior into account. This results in the incubator requiring more energy to compensate for this additionally brought-in heat energy. Only a cooled incubator can compensate for this energy. As a result, depending on the amount of brought-in energy, low temperatures might no longer be able to be reached.

The lowest temperature that can still be reached can be found in the heat compensation diagram ➦ *Chapter 6.13 'Heat compensation' on page 118* .

Configure the external device such that it starts when the supply voltage is switched on. It is important that the external device starts when the supply voltage is switched on.

6.12.6.2 Passive dehumidification option

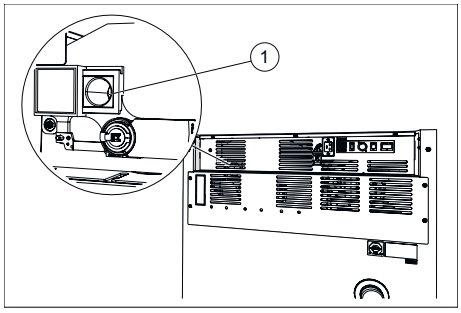


Fig. 164: Passive dehumidification ventilation opening

1 Ventilation opening for passive dehumidification

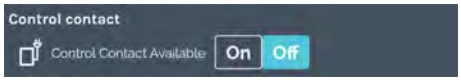


Fig. 165: Control contact

Devices with the passive dehumidification option are equipped with a ventilation opening, which can be opened and closed via the control contact.

NOTICE

Dehumidification is only possible if the moisture content of the air outside of the incubator is lower than that inside the incubator.

The ambient temperature should be at least 5 °C lower than the temperature to which the incubator is to be heated.

If the control contact is activated here, the function is available in manual and program mode. This means:

- In manual mode, an additional symbol appears on the main screen, via which the control contact can be switched on or off at any time ➦ *Further information on page 56*.
- In program mode, there is an additional function available, *'Control contact On/Off'*, for creating programs in the editing view of the program segments ➦ *'Editing a program segment' on page 72*.
- The control contact can be used in the start settings for an existing program ➦ *'Control contact (option)' on page 89*.

If the control contact is activated in manual or program mode, the ventilation opening is opened. If the control contact is deactivated in manual or program mode, the ventilation opening is closed. An effective method of using the passive dehumidification option is to open the ventilation opening during the heating-up phase. It is recommended to plan at least 5 h Es for a heating-up phase from 4 °C to 37 °C.

NOTICE

- If the ventilation opening is opened during cooling mode, there is a danger of moisture from the environment getting into the incubator.
- At target temperatures below 10 °C, the ventilation opening must be kept closed. Otherwise, there is a danger the evaporator will ice up.
- If the ventilation opening is open
  - the spatial temperature deviation will increase by ± 0.1 °C as compared to the value specified in the technical data.
  - the current consumption specified in the technical data will increase, depending on the ambient temperature, by approx. 0.016 kW/h.
- In heating mode, when the ventilation opening is open continuously, there is a risk of the biological sample material drying out.

6.12.7 Language

Fig. 166: 'Language' menu

In this menu, you can select the display language.

The display language is set during commissioning. If another language is desired for the displays, these can be selected from a list. The displayed language changes directly after selecting a new language setting.

To select the desired language, tap it.

6.12.8 Sound

Fig. 167: 'Sound' menu

1 *[Buttons]* controller
2 *[Program end]* controller
3 Input of *'Number of reproduced signal sounds'*

The volume for the keypad feedback can be set in 4 levels or muted with the *[Buttons]* controller.

The volume can be set in 4 levels or switched off for the signal sound after the end of the program via the *[Program end]* controller.

Via the input *'Number of reproduced signal sounds'*, it can be specified how often a signal sound should repeat itself (1 to 10000 and infinitely).

6.12.9 Door

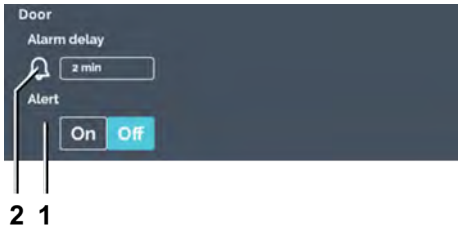


Fig. 168: Door

1 Acoustical warning
2 Door alarm

If the door is opened, an information banner immediately appears indicating the duration the door is opened. The duration of the door being opened is updated in real time. The incubator calls attention to the fact that the temperature is changing in the incubator due to the open door; toward the ambient temperature.

You can switch the acoustical alarm on/off via the *[Acoustical warning]* button.

It can be set after what time a "Door open" warning changes to a door alarm with the door alarm setting (Alarm delay). The triggering of the door alarm can be set between 1 minute and 9 minutes. The setting ex works is 2 minutes. The door alarm is indicated to you optically and acoustically.

6.12.10 Screen

In this menu, you can make settings on the screen.

Fig. 169: 'Screen' menu

1 Brightness
2 Sleep mode (in standstill mode only)
3 *[Activate/deactivate screen lock]* switch (screen lock only possible in combination with sleep mode)

Under the screen setting, the following can be set/activated:

- the screen brightness can be adjusted in 6 levels;
- the time up to the activation of sleep mode (make screen darker) can be set;
- the screen lock can be activated. If the lock is activated, first the *'Admin PIN'* must be input to exit sleep mode. The *'Admin PIN'* must also be entered to activate the screen lock.

  The screen lock makes it possible to protect the incubator from unauthorized startup. For this, the screen lock must be activated together with sleep mode. (Sleep mode can only be active if the incubator is in standstill mode.)

Screen brightness

The brightness of the display must be adjusted at the setup site. The light conditions can be adjusted individually using these settings.

To adjust the screen brightness, proceed as follows:

→ Push the controller to the desired value in stages to set the screen brightness.

Sleep mode

Fig. 170: Sleep mode

1 *[Clear input]* button
2 *[Confirmation]* button
3 Keypad

To set sleep mode, proceed as follows:

1. Tap on the sleep mode value.
2. You can now either
   - select the existing value by tapping it and entering a new value via the keypad or
   - delete the existing value with the *[Delete entry]* button and entering a new value via the keypad.

   Confirm the entry with the *[Confirmation]* button.

The sleep mode function is inactive with the setting '0 Min'.

Screen lock

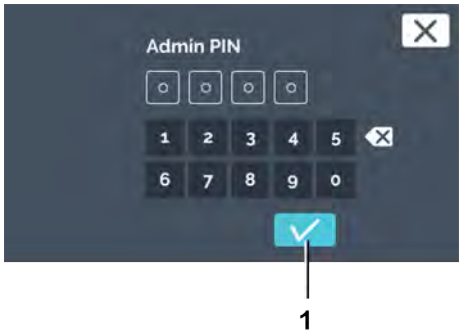


Fig. 171: 'Screen' menu, 'Screen lock' 'Admin PIN' input

1 *[Confirmation]* button

To activate/deactivate the screen lock, proceed as follows:

1. Tap on the *[Activate/deactivate screen lock]* switch to activate/deactivate the screen lock.
2. Enter the *'Admin PIN'* and confirm the input with the *[Confirmation]* button.

   ➥ The screen lock is active/inactive.

Activating the screen

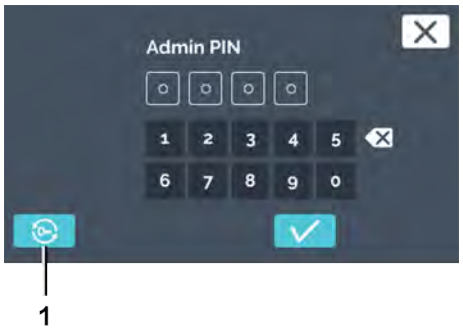


Fig. 172: Bit key

1 *[Bit key]* button

To activate the screen, proceed as follows:

1. Tap on the screen to reactivate this.
2. You will be prompted to enter the Admin PIN.
3. If you have forgotten your PIN in this state, you can reset the PIN by tapping on the *[Bit key]* button ➥ *Chapter 6.12.18 'Admin access' on page 115*.

6.12.11 Power failure

If the incubator is switched off while manual or program mode is running, when the incubator is switched on, it indicates that a power failure was registered.

- Power failure scenario *'According to time'*.
- Power failure scenario *'According to tolerance band violation'*.

Power failure scenario *'According to time'*

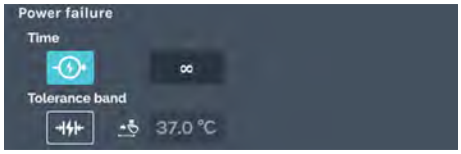


Fig. 173: 'Power failure scenario' menu — Selection 'Time'

The time can be set from 1 to 90 minutes or ∞.

- The power failure was shorter than the specified time:

  The program/manual mode is continued as it was active before the power failure.
- The power failure was longer than the specified time:

  The incubator goes into standstill mode; the program/manual mode is aborted.
- Ex works, the power failure *'According to time'* is preset with the time duration *'∞'*.

Power failure scenario *'According to tolerance band violation'*

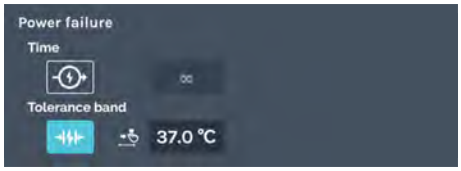


Fig. 174: 'Power failure scenario' menu — Selection 'Tolerance band'

If voltage is applied again after the power failure, the incubator checks whether the tolerance band ➦ *Chapter 6.12.4 'Tolerance band' on page 98* was violated.

- If the tolerance band was not violated, the program/manual mode is continued as it was active before the power failure.
- If the tolerance band was violated, the program that was active at the time of the power failure is not continued. The incubator regulates to the configured holding temperature. This is preset to 37 °C ex works.

6.12.12 Failure alarm

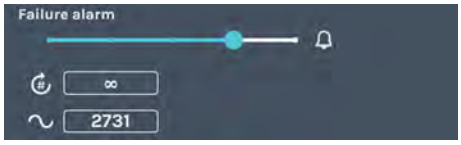


Fig. 175: 'Failure alarm' menu

You can configure the alarm sound with this setting. The volume, frequency and duration are adjustable. The volume of the failure alarm can be adjusted in stages.

Via the input *'Number of reproduced signal sounds'*, it can be specified how often a signal sound should repeat itself (1 to 10000 and infinitely).

6.12.13 Export

Fig. 176: Menu 'Export'

The export function can be used to export programs, data on temperature reductions, user instructions and log files to a USB flash drive.

This allows the exported programs and data on temperature reductions to be transferred directly to other HettCube incubators.

To export data, proceed as follows:

1. Insert a USB flash drive into the service port (USB) on the front of the incubator.
2. Tap the *[update]* button.

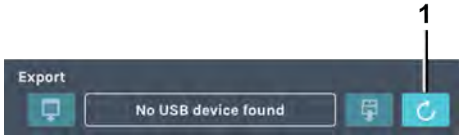


Fig. 177: Update the USB flash drive

1 Button *[update]*

➡ The partition on the USB flash drive is displayed.

Fig. 178: USB flash drive export

1 Button *[Export]*
2 Partition on USB flash drive

If there are multiple partitions on your USB flash drive, you can select the partition to be exported to using 'Partition on USB flash drive'.

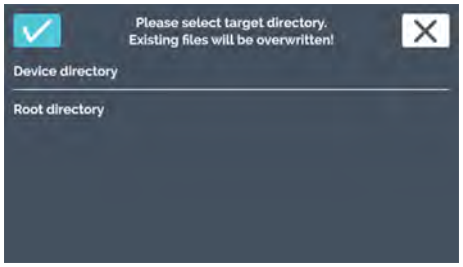


Fig. 179: Directory selection

3. Select where the data to be exported should be saved, then confirm your selection by pressing the *[Confirmation]* button.

Unit folder	A folder is created automatically in the main directory on the USB flash drive during export.This folder is named after the serial number of the incubator. This enables you to easily keep all exported data separate and identifiable if you are using multiple incubators. The data in the folder will be overwritten if the flash drive already has a folder with that name.
Main directory	If the main directory is selected, the export package is saved directly to the main directory (without subfolders).

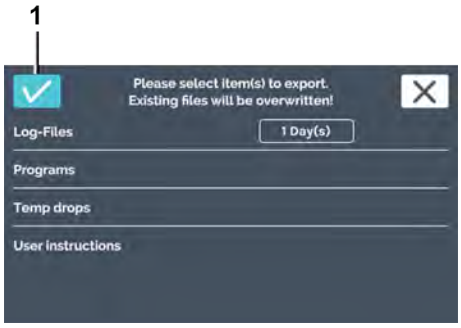


Fig. 180: Select export

1 Button *[Confirmation]*

4. Select the data to be exported.

   The following data can be exported:

Log files	The log files can be exported as text files
Programs	Selecting *'Programs'* exports all programs. The exported programs can be imported to another incubator. When transferring the data to another incubator, please bear in mind that the data must be located directly in the main directory in order to be able to import it.
Temperature reductions	Selecting *'Temperature reductions'* exports all temperature reductions. The exported data on temperature reductions can be imported to another incubator. When transferring the data to another incubator, please bear in mind that the data must be located directly in the main directory in order to be able to import it.
User instructions	This allows you to export documents preloaded at the manufacturing plant, such as the Operating Manual, and transfer them to a PC.

5. Confirm your selection by pressing the *[Confirmation]* button.

   ➡ A message is displayed to indicate that the data export has begun.

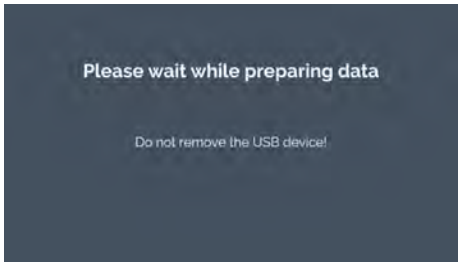


Fig. 181: Export started

> **NOTICE**
>
> The USB flash drive must not be removed while data are being exported, as this could damage the flash drive.

Successful completion of the export is displayed.

Fig. 182: Export completed

1 Button *[Confirmation]*

6. Confirm the message by pressing the *[Confirmation]* button.

   ➡ You will then be taken back to the Export menu.

Fig. 183: Eject the USB flash drive

1 Button *[Remove the USB flash drive]*

7. You can tap the *[Remove the USB flash drive]* button to remove the USB flash drive.

Fig. 184: Eject USB flash drive message

8. Confirm the message by pressing the *[Confirmation]* button and remove the USB flash drive.

6.12.14 Import

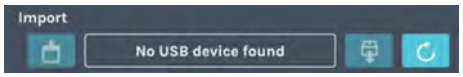


Fig. 185: 'Import' menu

Data import is only possible in standstill mode

Via the import function, you can import the HettCube programs and HettCube temperature drops from a USB stick.

For service technicians, additional import and export functions are available.

To import data, proceed as follows:

1. Stick a USB stick into the service interface (USB port) on the front side of the incubator. The import files must be in the root directory. Data in subdirectories is not recognized.

2. Tap on the *[Refresh]* button.

Fig. 186: Refreshing the USB stick

1 *[Refresh]* button

➡ The partition on the USB stick is displayed.

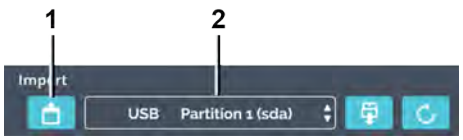


Fig. 187: USB stick import

1 *[Import]* button
2 Partition on USB stick

If there are multiple partitions on your USB stick, you can select the partition from which data should be imported via 'Partition on USB stick'.

3. Then tap on the *[Import]* button.

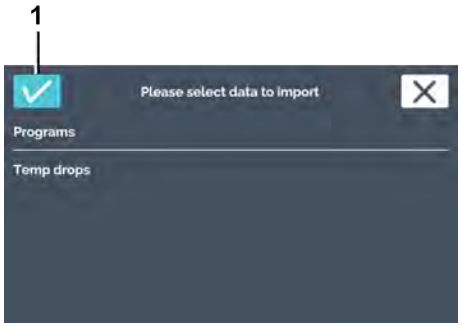


Fig. 188: Import selection

1 *[Confirmation]* button

4. Select what you would like to import and confirm the selection with the *[Confirmation]* button.

> *If you import a program and there is already one with an identical name, a message will appear. You can keep both programs or overwrite the existing program.*

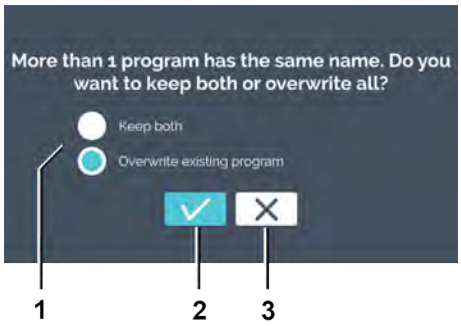


Fig. 189: Imported program exists

1 Program selection exists
2 *[Confirmation]* button
3 *[Cancel]* button

5. If a program with the same name already exists, you can select how you would like to further proceed.

   If there is no program with an identical name, continue with the next step.

   Select one of the two options

Keep both	A copy is made of the imported program. The program name contains the addendum *'Copy 1'*.
Overwrite existing program	The existing program is overwritten.

6. Confirm the selection with the *[Confirmation]* button.

   ➡ The user is notified that the import was successful.

7. Confirm the message with the *[Confirmation]* button.

   ➡ You will go back to the Import menu.

Fig. 190: Import finished

1 *[Confirmation]* button

Fig. 191: Eject USB stick

1 *[Eject USB stick]* button

8. You can tap the *[Eject USB stick]* button in order to be able to remove the USB stick.

Fig. 192: USB stick ejection message

9. Confirm the message with the *[Confirmation]* button and remove the USB stick.

6.12.15 Hours of operation

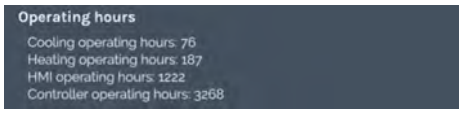


Fig. 193: 'Operating hours' menu

In this menu, the individual operating hours are displayed to you.

The operating hours of the individual assemblies/functions are displayed.

6.12.16 Logbook

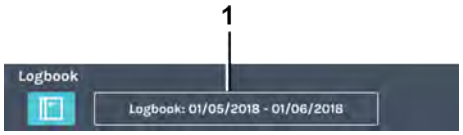


Fig. 194: 'Logbook' menu

1 Logbook time period

There are the following options for calling up the logbook:

- *Device settings*
- *With the "Logbook" button in an alarm banner*
- *With the "Logbook" button from an event overview (blue banner)*

The "Logbook" tab is divided into

- Overview
  - Details of the last manual mode
  - Details of the last program mode

  Always in this order
- List of error messages. The displayed logbook time period refers only to the list of error messages.

Manual and program mode

In the logbook, the information about the running and last executed program and manual mode are displayed.

Every time the door is opened represents a disturbance. If a door is left open for a longer period of time, this can be reconstructed based on the logbook.

The following information and events are added up and shown in a list.

- Number of door openings and their total duration.
- Start/End of the program/manual mode.
- Pauses and continuations in program mode.

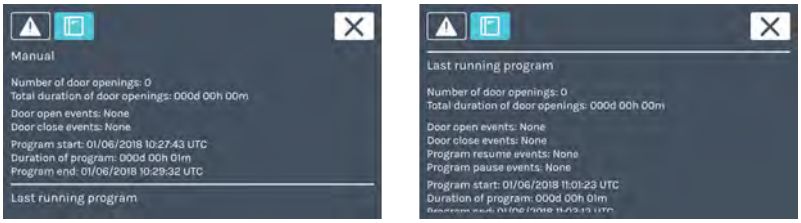


Fig. 195: Logbook

Alarms

By touching this symbol, an event list opens sorted according to date. In the list, the error numbers are displayed with the time they occurred. You only get the detailed information after touching the entry.

6.12.17 System information

Fig. 196: Menu 'Querying'

System information is displayed in this menu.

System information provides information about the version numbers of the unit components.

The serial number and contact details for Andreas Hettich GmbH are also displayed.

6.12.18 Admin access

Fig. 197: Admin access

Change admin PIN	By tapping on the *[Change admin PIN]* symbol, the dialogue for changing the admin PIN is called up.
Reset admin PIN	By tapping on the *[Reset admin PIN]* symbol, the dialogue for resetting the admin PIN is called up.

Change admin PIN

To change the admin PIN, proceed as follows:

1. Tap the *[Change admin PIN]* symbol in the device settings.

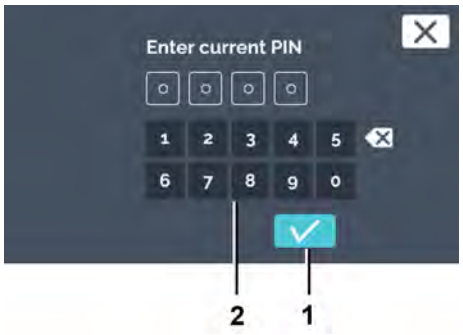


Fig. 198: Specify current PIN

1 *[Confirmation]* button
2 Keypad

2. Enter the current admin PIN via the keypad and confirm the input with the *[Confirmation]* button.

The ex works PIN is '0000'.

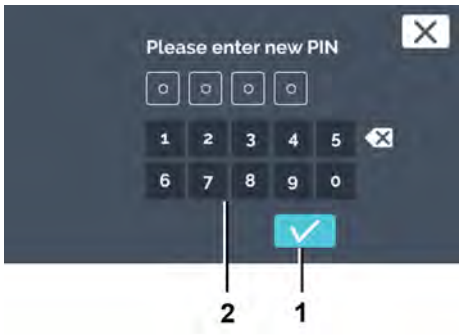


Fig. 199: Entering a new PIN

1 *[Confirmation]* button
2 Keypad

3. Enter the new admin PIN via the keypad and confirm the input with the *[Confirmation]* button.

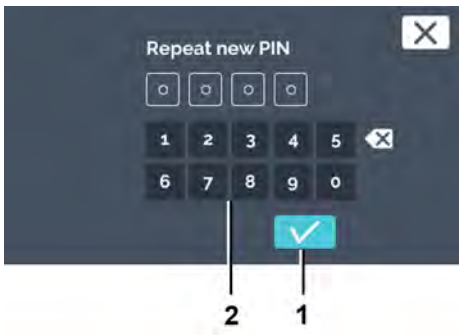


Fig. 200: Enter the PIN again

1 *[Confirmation]* button
2 Keypad

4. Enter the new admin PIN again via the keypad and confirm the input with the *[Confirmation]* button.

➡ The admin PIN has been changed.

Reset admin PIN

The admin PIN can be reset with the help of Customer Service. For this, Customer Service will give you a 4-digit PUK.

To reset the admin PIN, proceed as follows:

1. Tap the *[Reset admin PIN]* symbol in the device settings.
   ➡ A reset PIN is displayed to you.
2. Call your Customer Service.
   ➡ Customer Service will give you a 4-digit PUK. Write this down.

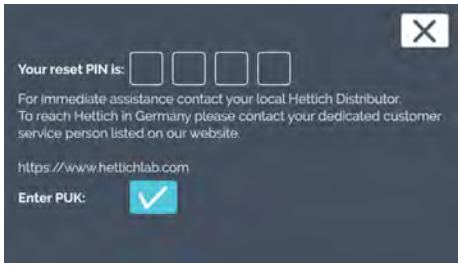


Fig. 201: Reset PIN

3. Confirm that you would like to enter the PUK by tapping on the *[Confirmation]* button.

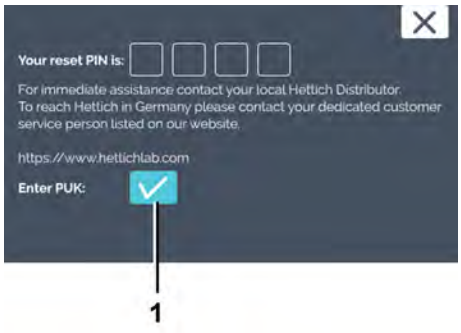


Fig. 202: Confirming entry of PUK

1 *[Confirmation]* button

4. Enter the 4-digit PUK via the keypad and confirm the input with the *[Confirmation]* button.

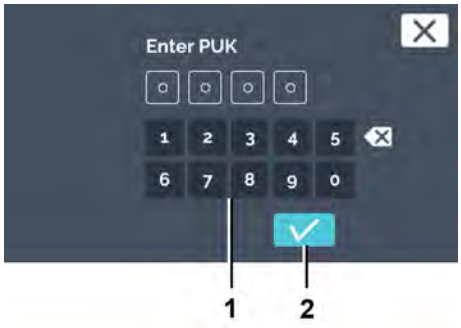


Fig. 203: PUK entry

1 Keypad
2 *[Confirmation]* button

➡ If the wrong PUK is input, a message is displayed.

If the PUK entry is correct, the confirmation window is displayed.

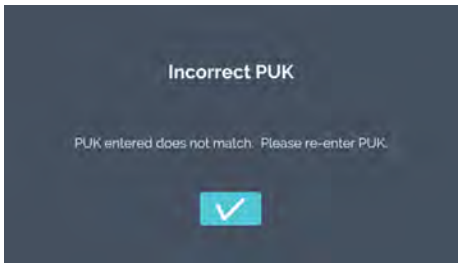


Fig. 204: Incorrect PUK input

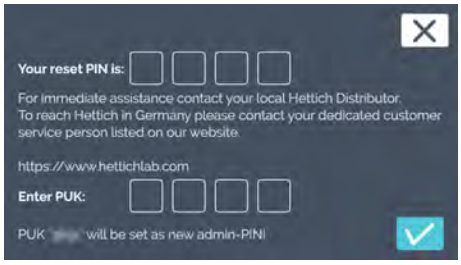


Fig. 205: PUK

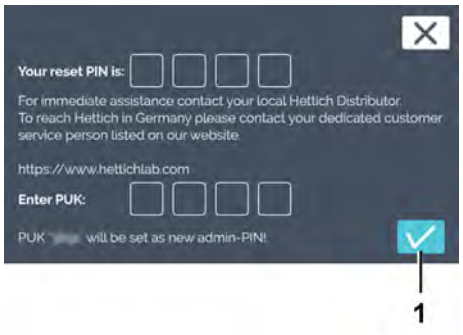


Fig. 206: PUK confirmation

1 *[Confirmation]* button

5. Tap the *[Confirmation]* button to accept the PUK as the new admin PIN. The admin PIN can be changed ➦ *'Change admin PIN' on page 115*.

6.12.19 Service dashboard

Fig. 207: Menu 'Maintenance summary'

Personnel:

- Service technician

This menu can only be accessed by service technicians, and is password-protected.

The maintenance summary provides the service technician with access to your incubator. In the maintenance summary, additional settings can be parameterised, software updates can be installed or the incubator can be reset to factory settings.

6.13 Heat compensation

The heat output of other, external devices placed inside a cooled incubator is compensated for.

The use of any other, external devices inside a cooled incubator only makes good sense if it is possible to compensate for the additional heat output of said devices.

If such applications or external devices are used in incubators without cooling, overheating can quickly occur which the incubator cannot compensate for. The over-temperature can result in sample material being negatively affected. Long-term over-temperatures can damage the incubator.

When using other, external devices inside the incubator (via the access port, for example), it is necessary to ensure that the technical values with respect to heat compensation are observed (max. 400 W at an ambient temperature of 22 °C or 300 W at an ambient temperature of 35 °C). The stated compensation performance relates exclusively to incubators with cooling. If the incubator is turned off or malfunctions, any external devices inside the incubator must be turned off immediately to prevent damage to the incubator.

The switchboard option is recommended for operational safety reasons when using external devices inside the incubator.

NOTICE

An appropriate signal transmitter for monitoring the incubator must be connected to the potential-free alarm contact when operating a thermal load inside the incubator.

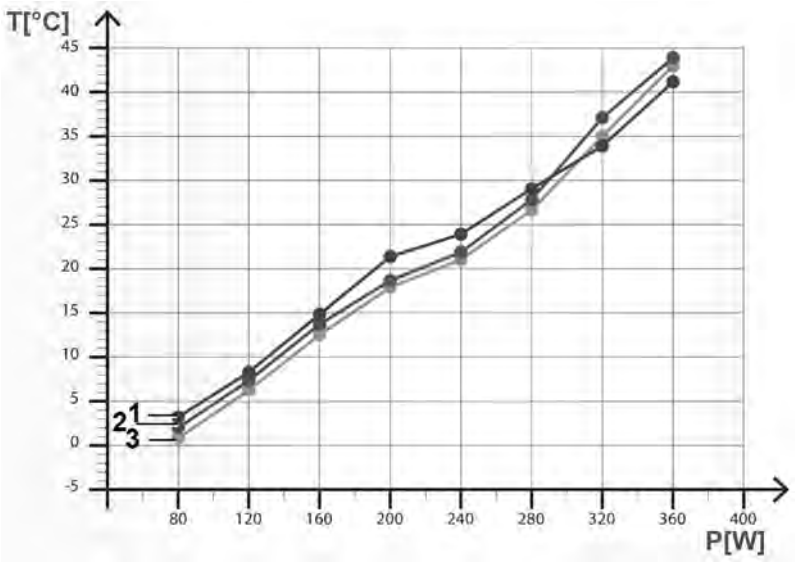


Fig. 208: Heat compensation at an ambient temperature of 22 °C

T [°C] Temperature, °C
P [W] Output in watts

1 Lowest achievable temperature, HettCube 600 R (0 °C to +65 °C)
2 Lowest achievable temperature, HettCube 400 R (0 °C to +65 °C)
3 Lowest achievable temperature, HettCube 200 R (0 °C to +65 °C)

Lowest achievable temperature values when using external units with different heat outputs inside the incubator.

The data refer to incubators with standard equipment.

7 Cleaning, disinfection and maintenance

DANGER

A danger is posed by penetrating liquids.

There is an electric shock hazard for personnel.

WARNING

There is a risk of contamination of the microbiological sample material.

If cleaning and/or disinfection are not sufficient after contamination, there is a risk that microbiological sample material will be contaminated with foreign germs.

- Be conscientious and thorough when cleaning and disinfecting.
- Follow the instructions of the cleaning agent and disinfectant manufacturers.
- Observe the range of effects of the used agent.

Observe the following rules when cleaning and disinfecting the unit:

- The incubator must **not** be cleaned in any equipment cleaning machines.
- The incubator must **not** be cleaned under running water, in water baths, or using compressed air.
- The units may only be cleaned manually and using liquid disinfection agents.
- To prevent any corrosion due to use of detergents and disinfectants, it is essential to follow the special application instructions provided by the manufacturers of the detergent and disinfectant.
- The water temperature must be between 20 and 25 °C.
- Only detergents and disinfectants may be used that
  - are in the pH range 5-8,
  - do not contain caustic alkalis, peroxides, chlorine compounds, acids or alkalis.

The outside surface of the incubator housing is powder-coated. The interior of the incubator is made of 1.4301 stainless steel.

Disconnect the mains power plug before cleaning.

The rails and shelves can be removed from the unit's interior to facilitate cleaning.

The operator must check with the manufacturer that the intended procedure will not damage the incubator before using any cleaning or decontamination procedures other than those recommended by the manufacturer.

Note Section ➥ Chapter 6.4 'Standard check before every use' on page 48.

The filter mat must be replaced if it is heavily contaminated. The mat must be replaced by a service technician.

For incubators with cooling, we recommend replacing the filter mat once a year.

7.1 Cleaning

Surface cleaning and care

WARNING

The incubator might be contaminated.

There is a risk of contamination by bacteria, viruses or other pathogens. Based on its own hazard analysis, the operating company must define whether and how personal protective equipment is to be worn.

- Clean the housing and the interior of the incubator regularly and, if necessary, clean with soap or a mild detergent and a moist cloth. This is for hygienic purposes and also prevents corrosion due to adhering contaminants.
- Ingredients of suitable detergents: soap, anionic tensides, non-ionic tensides.
- After using cleaning agents, remove any cleaning agent residue by wiping with a damp cloth.
- The surfaces must be dried immediately after cleaning.
- The interior is to be checked for damage once a year.

Slide-in modules and drawers in the interior

For easier cleaning of the interior, the slide-in modules and drawers can be removed from the interior.

Removal:

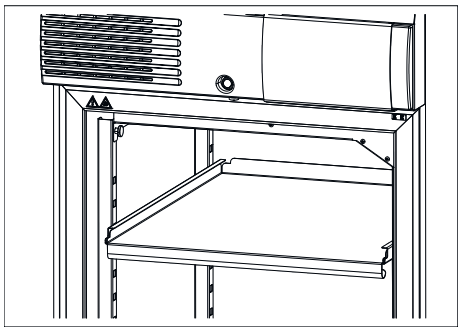


Fig. 209: Removing the slide-in module

1. Remove the slide-in modules and drawers.

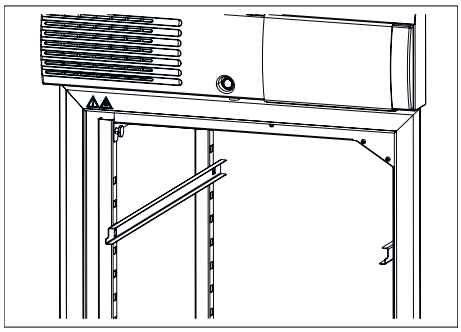


Fig. 210: Removing the support rails

2. Disengage the support rails upward and out of the front latching rail and then pull out toward the front from the rear latching rail.

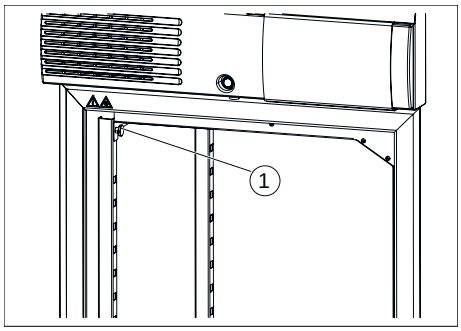


Fig. 211: Knurled screws

1 Knurled screws

3. Hold onto the baffle sheet and screw out both knurled screws.

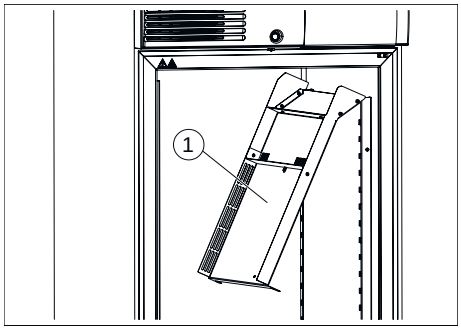


Fig. 212: Top baffle sheet

1 Top baffle sheet

4. Flip the top baffle sheet down.
5. Remove the baffle sheet toward the front.

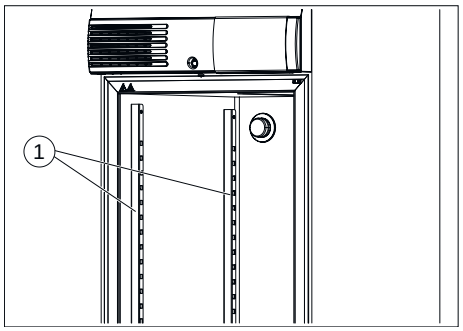


Fig. 213: Latching rails

1 Latching rails

6. Disengage the two latching rails upward and then remove toward the front.

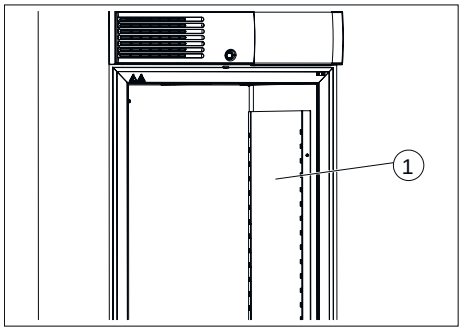


Fig. 214: Right baffle sheet

1 Right baffle sheet

7. Disengage the right baffle sheet upward and then remove toward the front.

Installation is done in the opposite order.

When installing the upper baffle sheet, push this upward and fasten with the two knurled screws. It must be flush with the ceiling of the interior.

7.2 Disinfection

- If infectious material gets into the interior, disinfect it immediately.
- Ingredients of suitable disinfectants: Ethanol, n-propanol, isopropyl alcohol, ethyl hexanol, corrosion inhibitors.
- After using disinfectants, remove the disinfectant residue by wiping with a damp cloth.
- The surfaces must be dried immediately after disinfecting.

WARNING

Risk due to insufficient disinfection after contamination!

There is a risk of infection for the user. Observe your laboratory rules (hygiene plan, etc.) for handling biological agents.

7.3 Removal of radioactive contaminants

- The agent must be specifically labelled as being an agent for removing radioactive contaminants.
- Ingredients of suitable agents for removing radioactive contaminants: anionic tensides, non-ionic tensides.
- After removing the radioactive contaminants, remove the agent residue by wiping with a damp cloth.
- The surfaces must be dried directly after removing the radioactive contaminants.

7.4 Autoclaving

Autoclaving accelerates the ageing process of plastics. In addition, it can cause discolourations in plastics.

The slide-in modules, drawers, support rails, telescope rails, latching rails and plates in the interior can be autoclaved at 121°C / 250°F (20 Min).

Before autoclaving, these parts must be removed from the interior. Nothing definitive can be said about the degree of sterility.

The lock washers for securing the telescopic slide-in modules may be autoclaved a maximum of 10x. The lock washers are wear parts. Depending on use, it is recommended to replace these with new ones.

7.5 Maintenance

WARNING

There is a risk that the sample temperature control will be faulty.

There is a risk that the temperature control of microbiological samples is not correct, which could result in a misinterpretation of the test results or the destruction of the samples.

- Have maintenance and calibration done.

To ensure a long service life and error-free operation of the incubator, the incubator should be serviced at regular intervals by the manufacturer or by personnel authorised by the manufacturer.

The manufacturer offers maintenance agreements for this purpose. The operator is obliged to ensure that maintenance is carried out by an authorised service technician.

Interval	Maintenance work	Personnel
Before each use	Before each use, ensure that the incubator is in proper technical condition and that no restrictions are to be expected dependent on the desired application.	User
Annual maintenance	Inspection by one of the manufacturer's service technicians.	Service technician
	Inspection by one of the manufacturer's service technicians. The notification can be closed by pressing the *[Close]* button.	Service technician
	Checking the status of software Update the software version as needed and in consultation.	Service technician

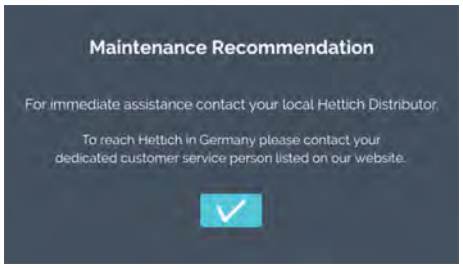


Fig. 215: Recommended maintenance

After 2 years, a message is displayed automatically to indicate that the incubator needs to be serviced by a service technician provided by the manufacturer. The user can dismiss the message, after which it will reappear annually. If maintenance is performed by the service technician, the duration until the message reappears will be reset to 2 years.

ISO 22712 is required as proof of expertise for service technicians / Hettich employees.

8 Troubleshooting

If the error cannot be remedied using the trouble-shooting table, notify the service technician. Please specify the type of device and the serial number. Both numbers can be found on the name plate of the incubator.

If a malfunction occurs, there is an optical and acoustic alarm.

After a malfunction (power failure, door open too long, etc.), the operating company must assess whether the samples are still usable. He must therefore have the corresponding qualification.

8.1 Activating the automatic circuit breaker

For the Switchboard option (external socket strip) only.

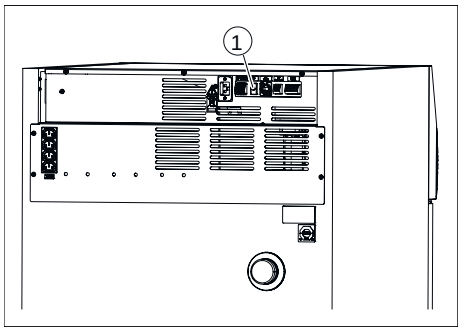


Fig. 216: Activating the automatic circuit breaker

1. Switch off the mains switch and disconnect the incubator from the mains!
2. Press the plastic pin (1) of the automatic circuit breaker.
3. Reconnect the incubator to the mains.

8.2 Warnings and error messages

When a malfunction occurs, there is an optical and acoustic alarm and the potential-free alarm contact switches.

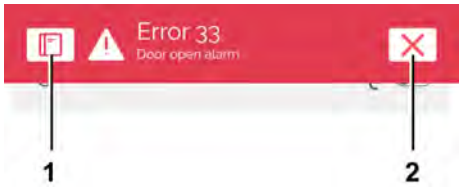
Additional signal encoder for monitoring the controller unit:

Alarms, which are sent from the operating unit or controller unit, are placed at the potential-free alarm output and can be connected to external signalling equipment (acoustic or visual) by the customer.

In the event of alarms, the operating unit as well as the controller unit outputs an acoustical signal.

This is adjustable on the operating unit. If the operating unit fails, only the controller unit beeps. If the controller unit fails, the operating unit beeps.

The corresponding error code will appear on the touchscreen. This additional beep also occurs in the event of a door alarm.



1 *[Logbook]* button
2 *[Close]* button

The error can be queried via the *[Logbook]* button. As long as the error message is not actively closed, it remains in the upper section of the screen.

The alarms are shown graphically in the run-time diagram, so that an error message which was actively clicked away is still comprehensible. In addition, the alarms and events can be called via *'Settings → Logbook'*

If the closing of the alarm is prevented by a PIN prompt, please contact a service technician.

When you contact the Service department, please report the error number that is displayed.

Fault description	Cause	Remedy
Program cannot be started.	A program is already running, or a program start is scheduled.	Stop the program that is running.
The control contact is not active when program mode is started, even though it was activated in the program segment.	The control contact was not activated in the start conditions.	Activate the control contact ➦ *'Control contact (option)' on page 89* when starting the program.
The date and time are not displayed correctly.	Summer/winter time must be corrected manually.	Set the date and time in the unit settings ➦ *Chapter 6.12.2 'Date & time' on page 96*.
Recorded data are no longer shown in the display.	The date or time indication was changed or called up twice in succession, and	Restart the unit.

Fault description	Cause	Remedy
Recorded data are no longer shown in the display.	the entry was confirmed by pressing the *[Confirmation]* button.	
The HMI is unresponsive, shows no reaction, and an acoustic alarm has sounded.	HMI overloaded, software unresponsive	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.

No.	Fault description	Cause	Remedy
2	Error 2	RAM is full.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
3	Error 3	Sensor measured value below valid measuring range.	call Service; state the unit type, serial number and error code.
4	Error 4	Sensor measured value above valid measuring range.	call Service; state the unit type, serial number and error code.
5	Error 5	No measured value from sensor.	call Service; state the unit type, serial number and error code.
6	Error 6	Calculation error	call Service; state the unit type, serial number and error code.
7	Error 7	Calculation error	call Service; state the unit type, serial number and error code.
10	Error 10	Connection to temperature sensor is interrupted or sensor is defective.	call Service; state the unit type, serial number and error code.
12	Error 12	Error value according to standard IEEE-754.	call Service; state the unit type, serial number and error code.
13	Error 13	Error value according to standard IEEE-754.	call Service; state the unit type, serial number and error code.
14	Error 14	Error value according to standard IEEE-754.	call Service; state the unit type, serial number and error code.
15	Error 15	Controller reports a µC error.	call Service; state the unit type, serial number and error code.
16	Error 16	Memory error	call Service; state the unit type, serial number and error code.
17	Error 17	Memory error	call Service; state the unit type, serial number and error code.

No.	Fault description	Cause	Remedy
18	Error 18	Memory error	call Service; state the unit type, serial number and error code.
19	Error 19	Memory error	call Service; state the unit type, serial number and error code.
20	Error 20	Memory error	call Service; state the unit type, serial number and error code.
21	Error 21	Memory error	call Service; state the unit type, serial number and error code.
22	Error 22	Controller: Runtime error detected.	call Service; state the unit type, serial number and error code.
23	Error 23	Controller: Error when executing a function.	call Service; state the unit type, serial number and error code.
24	Error 24	Controller: The controller software has performed a reset.	Restart the system. Check whether further operation is possible. call Service; state the unit type, serial number and error code.
25	Error 25	Controller: Internal data access denied.	call Service; state the unit type, serial number and error code.
26	Error 26	Flash memory is full.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
27	Error 27	Internal RS485 bus communication is interrupted.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
28	Error 28	Application has detected an internal error.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
29	Error 29	This is not an error, but rather a notification that the power outage lasted longer than the time set in the user settings (power outage/time). Program/manual operation was interrupted.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples.
30	Error 30	This is not an error, but rather a notification that a power outage has occurred. Program/manual mode is continued on the basis	Please acknowledge the notification by pressing *[X]*; set operation continues.

No.	Fault description	Cause	Remedy
30	Error 30	of the user settings (tolerance band and power outage/tolerance band).	
31	Error 31	This is not an error, but rather a notification that a power outage has occurred. Program/manual mode was interrupted on the basis of the user settings (tolerance band and power outage/ tolerance band). The system maintains the holding temperature.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples.
32	Error 32	This is not an error, but rather a notification to the user that the interior temperature has exceeded/dropped below the tolerance band range (tolerance band user settings). This also occurs if the target temperature has not been reached after a certain time	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples. Please check the tolerance band settings. Check whether the setpoint has been reached within 10 hours, and if necessary increase the value in the maintenance area following consultation. Check whether error 51 was previously present; if necessary, proceed as described for error 51.
33	Error 33	Door alarm. The door was open for longer than the time duration set in the user settings (door/ alarm delay).	Please close the door and acknowledge the notification by pressing *[X]*; door alarm can be changed in the settings
35	Error 35	The temperature set in temperature monitor 3.1 has been exceeded. The set target temperature is higher than the set temperature for class 3.1.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples. The temperature monitor settings have to be adjusted ➦ *Chapter 6.12.5 'Temperature guard' on page 99*. The acoustic alarm cannot be acknowledged if an error is still pending.
		The temperature set in temperature monitor 3.1 has been exceeded. It is not possible to compensate for the additional energy input from the use of external devices	Note heat compensation ➦ *Chapter 6.13 'Heat compensation' on page 118*.
		The temperature set in temperature monitor 3.1 has been exceeded. The door has been	Wait until the actual temperature has adjusted to the target temperature.

No.	Fault description	Cause	Remedy
35	Error 35	open for a long time and the actual temperature deviates from the target temperature.	Check whether error 51 was displayed previously. If necessary, proceed as described for error 51.
37	Error 37	The temperature set in temperature monitor 3.2 has been exceeded. The set target temperature is higher than the set temperature for class 3.2.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples. The temperature monitor settings have to be adjusted ➦ *Chapter 6.12.5 'Temperature guard' on page 99*. The acoustic alarm cannot be acknowledged if an error is still pending.
		The temperature set in temperature monitor 3.2 has not been reached. The set target temperature is lower than the set temperature for class 3.2.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples. The temperature monitor settings have to be adjusted ➦ *Chapter 6.12.5 'Temperature guard' on page 99*.
		The temperature set in temperature monitor 3.2 has not been reached. The door has been open for a long time and the actual temperature deviates from the target temperature.	
38	Error 38	Door is open.	Please close the door.
39	Error 39	Door has been closed.	The notification *'No. 38'* continues to be displayed for three seconds and then disappears. The notification can be cleared more quickly by confirming by pressing *[X]*.
40	Error 40	The current program has been paused.	The program will continue if the *[Start]* button is pressed.
42	Error 42	This is not an error, but rather a notification that a power outage has occurred. The program will be continued on the basis of the user settings (power outage/time).	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples.
44	Error 44	No SD card recognised.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.

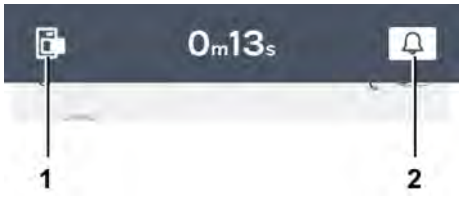
No.	Fault description	Cause	Remedy
45	Error 45	Communication between the touchscreen and controller is interrupted.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
50	Error 50	The temperature difference between the two independent temperature sensors was too great. This may also be a subsequent error from error code no. 51.	Please acknowledge the notification by pressing *[X]*; the customer shall decide how to proceed after checking the samples. Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.
51	Error 51	The system has detected that I2C bus communication to the temperature sensor has failed while the system is active.	Restart the system. Check whether further operation is possible. If the error appears repeatedly: call Service; state the unit type, serial number and error code.
52	Error 52	Battery is discharged.	call Service; state the unit type, serial number and error code. Check and correct the set date and time as needed.
54	Error 54	This is not an error, but rather user information. Date and/or time have been changed.	
55	Error 55	Problems have been incurred with data logging.	Restart the system. Check whether further operation is possible. If the error reappears: call Service; state the unit type, serial number and error code.

8.2.1 Door warning

An optical warning appears when the door is opened. Depending on the setting, there can be an additional acoustic warning.

A banner is shown which indicates in real time how long the door has been open.

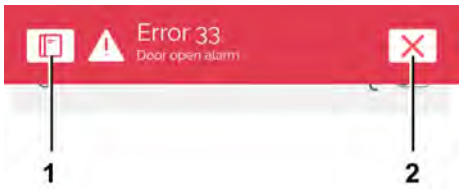
The acoustical warning stops when the *[Door warning]* button is tapped.



1 *'Door opened'* display
2 *[Door warning]* button

If the door remains open, an alarm is triggered after a set time.

If the error is confirmed via the *[Close]* button, the alarm stops sounding and the error display is exited. In this case, the warning of the open door does not automatically disappear. Close the door and tap on the *[Close]* button to close the message.



1 *[Logbook]* button
2 *[Close]* button

8.2.2 Event overview

1 *[Logbook]* button
2 *[Close]* button

The events which have occurred while the program/manual mode were running are shown collectively in a blue *'Status information'* bar.

If you tap on the *[Logbook]* button, an overview of the events, such as the door opening/closing, program pause, program continuation, are displayed with the start time and duration.

If this field is closed, there is the option of opening the event overview via 'Device settings → Logbook'
➥ *Chapter 6.12.16 'Logbook' on page 114*

If you tap on the *[Close]* button, the event overview disappears automatically. The door openings and events are divided into program mode and manual mode.

After a preset time, the event overview disappears automatically.

8.2.3 Tolerance band alarm

If the actual temperature exceeds or falls short of the temperature setpoint by the set values, an alarm sounds.

The values can be set under *'Settings → Tolerance band.'*, see
➥ *Chapter 6.12.4 'Tolerance band' on page 98*.

8.2.4 Temperature protection, class 3.1 / 3.2

An alarm is triggered when the temperature of the class 3.1. temperature guard is exceeded or the temperature of the class 3.2. temperature guard is fallen short of. The values are adjustable; see ➦ *Chapter 6.12.5 'Temperature guard' on page 99*.

9 Technical data

9.1 HettCube 200

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 200	
Basic UDI-DI	04050674090001CA	
Type	62000	62000-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2)]	500 VA/900 VA[2)]
Energy consumption at 37 °C	0.038 kWh/h	
Internal volume	150 l	

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2
Device protection class	I
Noise level	≤41 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	1 K above ambient temperature up to 65 °C
Temperature setting accuracy	0.1 °C
Temporal temperature deviation at 37 °C	± 0.1 K

Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 3 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 420 mm	
External dimensions		
W x D[1)] x H	710 x 825[1] x 970 mm	
Weight	approx. 90 kg [3)]	
Maximum load per standard inserting shelf	50 kg	
Maximum total load	80 kg	

[1)] Without door handle and access port (Ø 42 mm).

[2)] With switchboard option (external socket strip)

[3)] With glass door +6 kg.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.2 HettCube 200 R

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 200 R	
Basic UDI-DI	04050674090001CA	
Type	62005	62005-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2)]	500 VA/900 VA[2)]
Energy consumption at 37 °C	0.038 kWh/h	
Refrigerant	R290	
Refrigerant volume	65 g	

Global warming potential (GWP)	0,02
Internal volume	150 l

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2
Device protection class	I
Noise level	≤44 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	0 °C to 65 °C [4)]
Temperature setting accuracy	0.1 °C
Temporal temperature deviation at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 3 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 420 mm	
External dimensions		

W x D[1] x H	710 x 825[1] x 970 mm
Weight	approx. 100 kg [3]
Maximum load per standard inserting shelf	50 kg
Maximum total load	80 kg

[1] Without door handle and access port (Ø 42 mm).

[2] With switchboard option (external socket strip)

[3] With glass door +6 kg.

[4] Minimum adjustable temperature -5 °C. However, reaching a temperature of < 0 °C is dependent on the ambient conditions.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.3 HettCube 400

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 400	
Basic UDI-DI	04050674090001CA	
Type	64000	64000-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37 °C	0.046 kWh/h	
Internal volume	310 l	

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2
Device protection class	I

Noise level	≤41 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	1 K above ambient temperature up to 65 °C
Temperature setting accuracy	0.1 °C
Temporal temperature deviation at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 4.5 min

Dimensions	
Interior dimensions	
W x D x H	535 x 690 x 850 mm
External dimensions	
W x D[1)] x H	710 x 825[1] x 1425 mm
Weight	approx. 117 kg [3)]
Maximum load per standard inserting shelf	50 kg
Maximum total load	100 kg

[1)] Without door handle and access port (Ø 42 mm).

[2)] With switchboard option (external socket strip)

[3)] With glass door +10 kg.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.4 HettCube 400 R

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 400 R	
Basic UDI-DI	04050674090001CA	
Type	64005	64005-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2)]	500 VA/900 VA[2)]
Energy consumption at 37 °C	0.046 kWh/h	
Refrigerant	R290	
Refrigerant volume	65 g	
Global warming potential (GWP)	0,02	
Internal volume	310 l	

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2
Device protection class	I
Noise level	≤44 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	0 °C to 65 °C [4)]
Temperature setting accuracy	0.1 °C

Temporal temperature deviation at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 4.5 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 850 mm	
External dimensions		
W x D[1)] x H	710 x 825[1] x 1425 mm	
Weight	approx. 127 kg [3)]	
Maximum load per standard inserting shelf	50 kg	
Maximum total load	100 kg	

[1)] Without door handle and access port (Ø 42 mm).

[2)] With switchboard option (external socket strip)

[3)] With glass door +10 kg.

[4)] Minimum adjustable temperature -5 °C. However, reaching a temperature of < 0 °C is dependent on the ambient conditions.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.5 HettCube 600

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 600	
Basic UDI-DI	04050674090001CA	
Type	66000	66000-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2)]	500 VA/900 VA[2)]

Energy consumption at 37 °C	0.056 kWh/h
Internal volume	520 l

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2
Device protection class	I
Noise level	≤41 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	1 K above ambient temperature up to 65 °C
Temperature setting accuracy	0.1 °C
Temporal temperature deviation at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 5.5 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 1415 mm	
External dimensions		

W x D[1] x H	710 x 825[1] x 1990 mm
Weight	approx. 164 kg [3]
Maximum load per standard inserting shelf	50 kg
Maximum total load	120 kg

[1] Without door handle and access port (Ø 42 mm).

[2] With switchboard option (external socket strip)

[3] With glass door +14 kg.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.6 HettCube 600 R

Manufacturer	Andreas Hettich GmbH, D-78532 Tuttlingen, Germany	
Model	HettCube 600 R	
Basic UDI-DI	04050674090001CA	
Type	66005	66005-01
Mains voltage (± 10 %)	220-240 V 1~	100-120 V 1~
Mains frequency	50-60 Hz	
power consumption	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37 °C	0.056 kWh/h	
Refrigerant	R290	
Refrigerant volume	65 g	
Global warming potential (GWP)	0,02	
Internal volume	520 l	

Ambient conditions (EN/IEC 61010-1)	
Installation site	indoors only
Altitude	up to 2000 m above sea level
Ambient temperature	16 °C to 35 °C
Humidity	Maximum relative air humidity 75 %, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Pollution level	2

Device protection class	I
Noise level	≤44 dB(A)
Not suitable for use in potentially explosive atmospheres.	

EMC	
Emitted interference, interference immunity	EN / IEC 61326-2-6, Class B;
IP rating (EN 60529)	IP 20

Temperatures	
Temperature range	0 °C to 65 °C [4]
Temperature setting accuracy	0.1 °C
Temporal temperature deviation at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Temporal temperature deviation at 25 °C	± 0.1 K
Recovery time (door open after 30 s) at target temperature of 37 °C	≤ 5.5 min

Dimensions	
Interior dimensions	
W x D x H	535 x 690 x 1415 mm
External dimensions	
W x D[1] x H	710 x 825[1] x 1990 mm
Weight	approx. 174 kg [3]
Maximum load per standard inserting shelf	50 kg
Maximum total load	120 kg

[1] Without door handle and access port (Ø 42 mm).

[2] With switchboard option (external socket strip)

[3] With glass door +14 kg.

[4] Minimum adjustable temperature -5 °C. However, reaching a temperature of < 0 °C is dependent on the ambient conditions.

All temperature data were determined at an ambient temperature of 22 °C and in accordance with DIN 12880:2007-05. The data are valid for incubators with standard equipment.

9.7 Definition of the utilized space

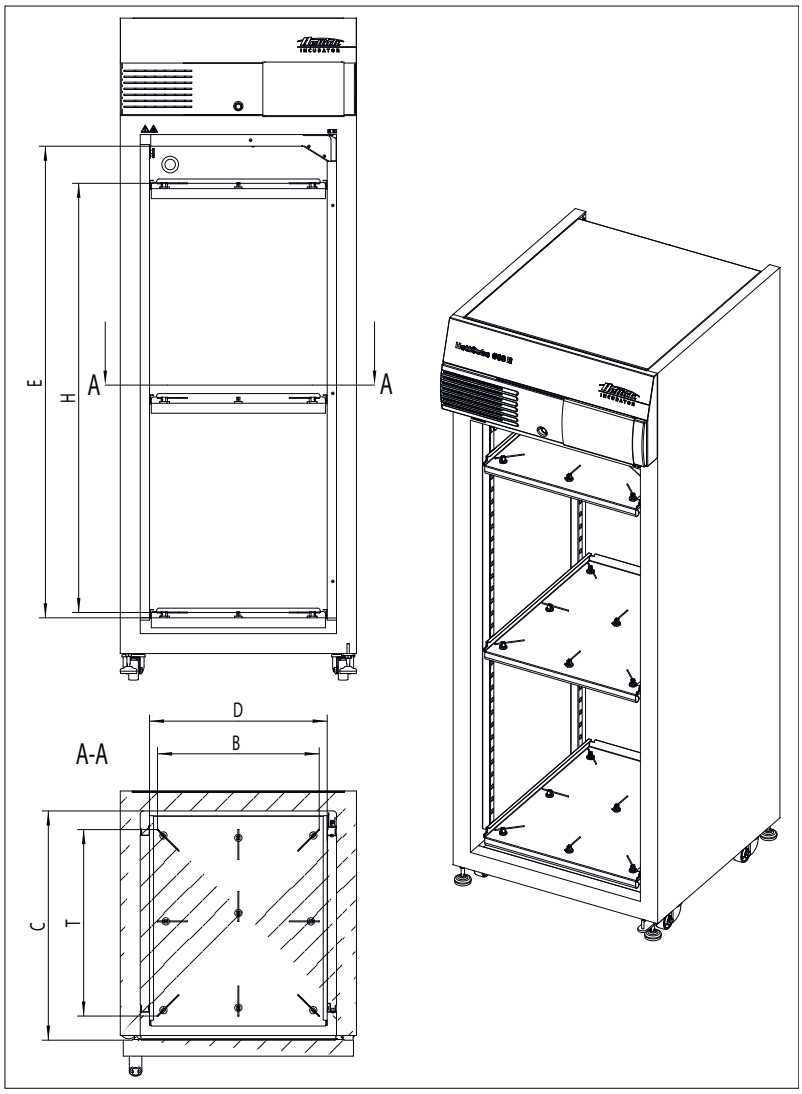


Fig. 217: Utilized space

Interior	600/600 R	400/400 R	200/200 R
C (in mm)	690	690	690
D (in mm)	535	535	535
E (in mm)	1415	850	420
Interior, rounded (in litres)	520	310	150

Tab. 3: Interior

Utilized space position above sensor	600/600 R	400/400 R	200/200 R
W (in mm)	486	486	486
D (in mm)	560	560	560
H (in mm)	1290	731	301

Utilized space position above sensor	600/600 R	400/400 R	200/200 R
Utilized space (in litres)	351	199	82

Tab. 4: Utilized space in acc. with DIN 12880:2007-05

9.8 Type plate

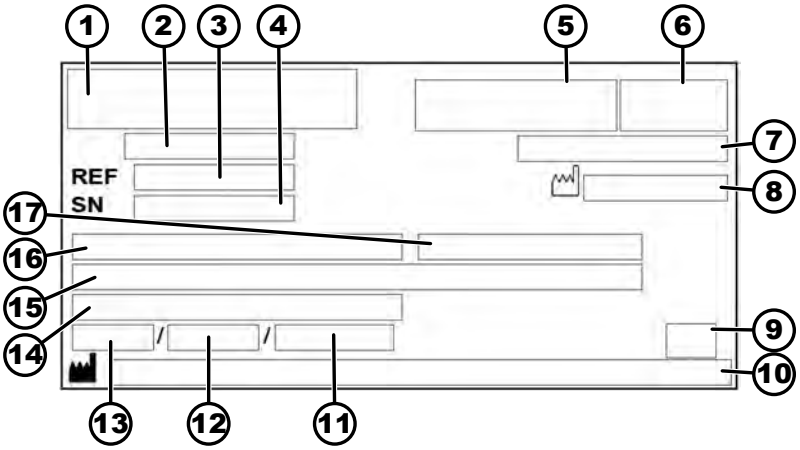


Fig. 218: Rating plate

1 Manufacturer's logo
2 Product designation
3 Type number
4 Serial number
5 IVD mark, where applicable
6 EAC mark, CE mark, where applicable
7 Country of manufacture
8 Year of manufacture
9 Symbol: Observe the Operating Manual.
10 Manufacturer's address
11 max. pressure PS of the refrigerant circuit (for cooled incubators only)
12 Refrigerant charge volume (for cooled incubators only)
13 Refrigerant type (for cooled incubators only)
14 Temperature range / nominal temperature
15 Performance values
16 Voltage range
17 Mains frequency

9.9 Dimensions

Standard dimensions

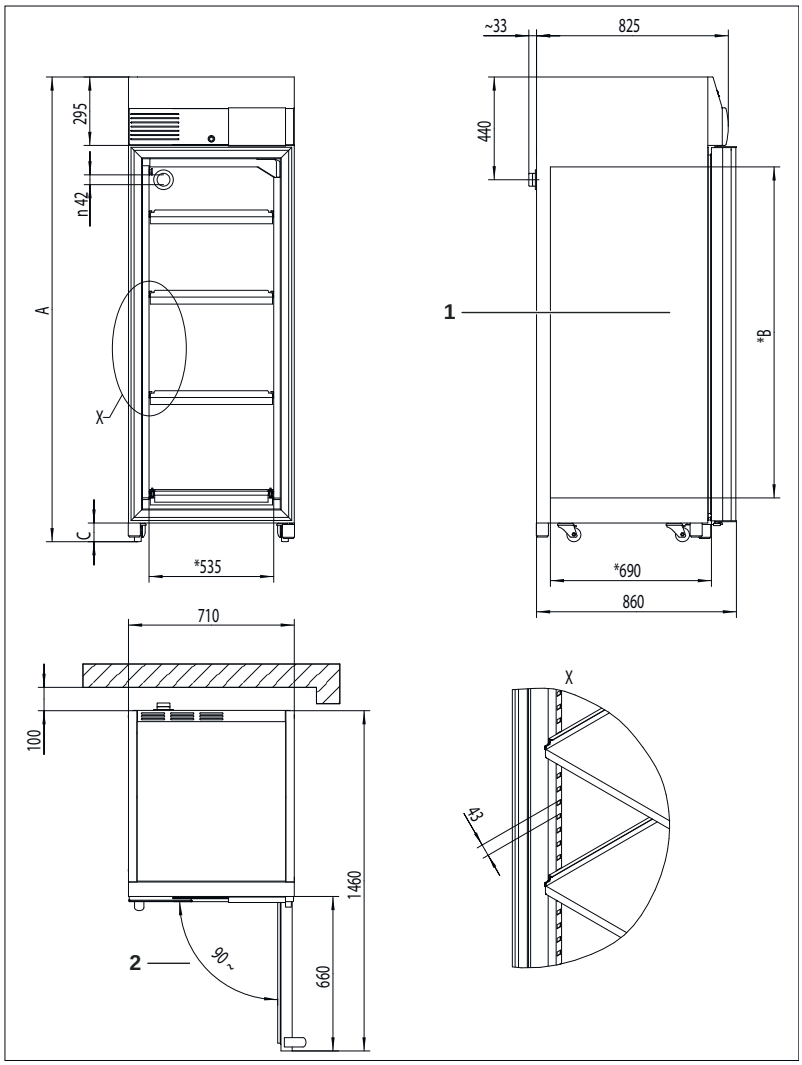


Fig. 219: Dimensions

1 Interior
2 Door opening ≤ 90°, self-closing

	HettCube 200 / 200 R	HettCube 400 / 400 R	HettCube 600 / 600 R
A	min. 970 mm	min. 1425 mm	min. 1990 mm
*B	420 mm	850 mm	1415 mm
C	min. 56 mm	min. 80 mm	min. 80 mm

Dimension for option *'Lateral access port'*

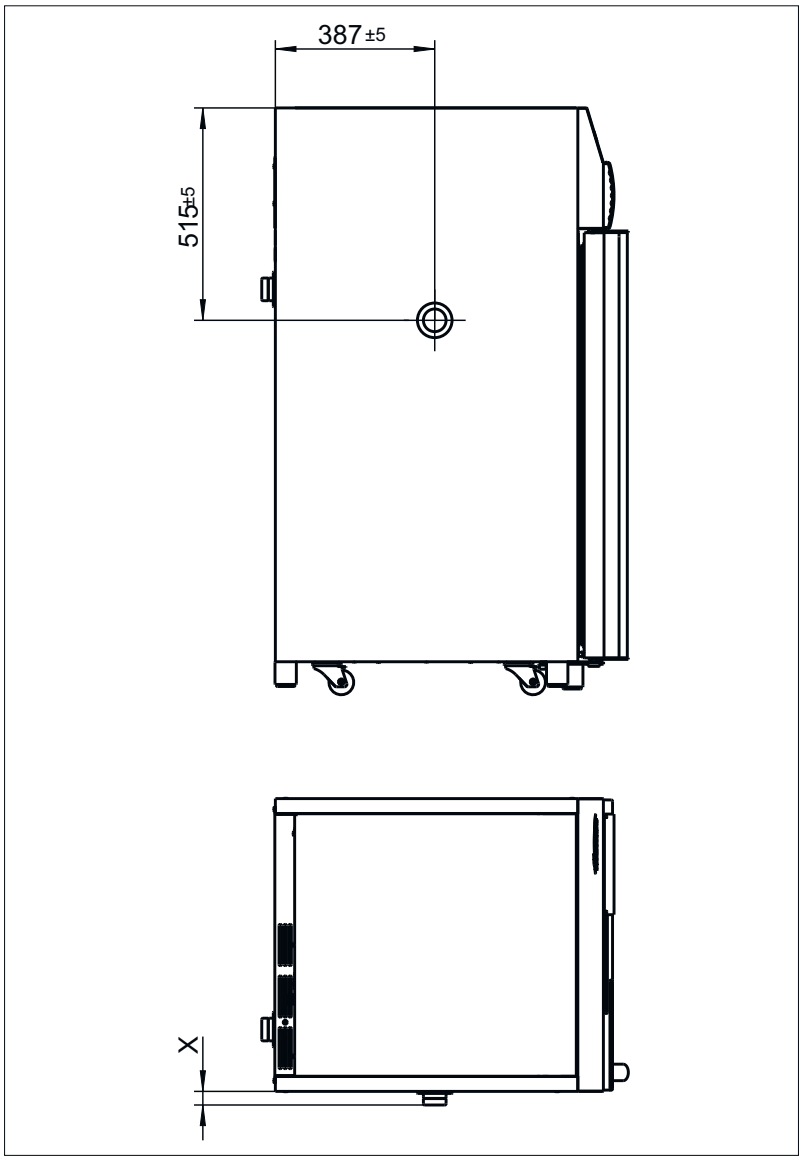


Fig. 220: 'Lateral access port' dimension

	∅22 mm	∅42 mm	∅67 mm
X ±5	26 mm	33 mm	40 mm

10 Disposal

The device can be disposed of via the manufacturer.

A Return Material Authorisation (RMA) form must always be requested for a return.

If necessary, contact the Technical Service Department of the manufacturer:

- *Andreas Hettich GmbH*
- *Föhrenstraße 12*
- *78532 Tuttlingen, Germany*
- *Phone: +49 7461 705 1400*
- *E-Mail: service@hettichlab.com*

WARNING

Risk of pollution and contamination for people and the environment.

When disposing of incubators, people and/or the environment may be impacted by pollution or contamination due to incorrect or improper disposal.

- Removal and disposal may be carried out only by a trained and authorised service personnel.

The device is intended for the commercial sector ("Business to Business" - B2B).

According to Directive 2012/19/EU, the devices may no longer be disposed of with household waste.

The devices are assigned to the following groups according to the Stiftung Elektro-Altgeräte Register (EAR (German foundation under civil law)):

- Incubators with cooling function
  Group 1 (heat exchangers)
- Incubators without cooling function
  Group 4 (large devices)

The crossed-out wheelie bin symbol indicates that the device must not be disposed of with household waste. Regulations governing disposal of such devices may differ in individual countries. If necessary, contact the supplier.

Fig. 221: Household waste ban

11 Free and Open Source Software

See the enclosed DVD "HettCube Licenses and Sourcecode" for the the applicable license texts, the source code, copyright notices for the individual components, any disclaimers, permission notes and other information about the individual components. The DVD contains the following folders:

File	Content
File u-boot-*.*	Folders with the license text of the uboot bootloader components
gelin2-19.10-imx6-x86_64.tar.*	Complete Linux packet (GELin BSP) incl. license info and source code
HettCube-GELin_KernelV5.4.53_Lizenzinformationen.txt	Links to the license info of the Linux Kernel V5.4.53
hettcube-gelin2-19.10_BoM.csv	List of all GELin components with detailed information to the licenses
hettcube-gelin2-19.10_license-information.*	License text files (txt and HTML)
Release.Kernel.linux-5.4.53-ge-20.08.for.exceet_imx6dl_ts_hmi-hettich.zip	Linux Kernel V5.4.33 (adapted for the use with the HMI electronic board)

Please note: Use of free and open source software components listed on the DVD files mentioned in the table above are governed by the terms of the licenses of the respective copyright holder as described in the folders on the DVD. Some of the licenses contain liability and warranty disclaimers and are provided "as is" without warranty of any kind. For more details and additional conditions for using the software, please read the attached licenses.

License Terms and Conditions regarding LGPL components:

For those parts of the HETTICH software that are licenses under

- the "GNU Library General Public License" or the "GNU Lesser General Public License" (LGPL) version 2.1 and earlier ("work") the customer is expressly allowed to make modifications of the work for the customer's own use and to reverse engineer for debugging such modifications;
- the "GNU Lesser General Public License" (LGPL) version 3 and later ("work") it is expressly allowed to make modifications of the portions of the Library contained in the work and reverse engineer for debugging such modifications.

Further rights of the customer under applicable copyright law are not restricted. Please note, that those parts of the software which are under free and open source licenses are distributed free of charge.

Installation Information for modified components:

Modified software components, esp. those under the GNU Lesser General Public License version (LGPL), can be installed by copying the new software component to the storage device contained within the product.

CAUTION

CHANGING THE SOFTWARE OF THE PRODUCT MAY RESULT IN INJURY TO LIFE, LIMB, OR HEALTH! ALSO IT CAN IMPACT THE CERTIFICATION OF THE PRODUCT AND RESULT IN A NON-LEGAL USE OF THE DEVICE. CHANGES CAN ALSO AFFECT THE WARRANTY.

Special License Information

The enclosed DVD "HettCube Licenses and Sourcecode" is part of the present documentation. We would like to point out the following separately:

OpenSSL

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http:/www.openssl.org).

Eric Young

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

Fontconfig

This product includes software under the fontconfig license.

- Copyright © 2000,2001,2002,2003,2004,2006,2007 Keith Packard
- Copyright © 2005 Patrick Lam
- Copyright © 2009 Roozbeh Pournader
- Copyright © 2008,2009 Red Hat, Inc.
- Copyright © 2008 Danilo Šegan
- Copyright © 2012 Google, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the author(s) not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The authors make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE AUTHOR(S) DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE AUTHOR(S) BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

The FreeType Project License

This product includes software based in part of the work of the FreeType Team (https://freetype.org/).

For further information (including license texts and copyright notices) see the enclosed DVD.

12 Index

13 Appendix

A Software symbols

Designation	Icon
After power failure, continue program.	
After power failure, hold holding temperature.	
Upper temperature guard limit (3.1)	
Lower temperature guard limit (3.2)	
Cancel	
Alarm muted	
Editing	
Starts on	
Required time until end	
Calculated program end	
Screen lock in sleep mode	
Date	
Settings	
Ends on	
Triangle symbol (error)	
Activity indicator	
Total run-time	
Locked	
Manual mode	
Heating	

Designation	Icon
Brightness	
Logbook	
Up/down	
Information	
Interior temperature	
Copy	
Cooling	
Volume	
List view	
Delete	
Minus	
To the left…	
To the right…	
OK/Accept	
Pause	
Pause	
Resume program	
Plus	
Program mode	
Program repetition counter	

Designation	Icon
Operating modes	
Delete input	
Switchpoint	
Control contact (external contact) active	
Close	
Sleep mode	
Service settings	
Holding temperature at end of process	
Start	
Stop	
Increase temperature	
Decrease temperature	
Temperature drop	
Set timer time	
Timer value	
Tolerance band.	
Sound switched off	
Door warning	
Door opened	
Clock	
Time elapsed since start	

Designation	Icon
Toggle switch	
Next	
Go back	
Go back to the main screen	
Reset admin PIN	

B Examples

Customer examples and practical wishes

In manual mode: Temperature drop

- During the entire weekend (Friday afternoon to Monday morning)
- Over one day (Sunday)
- With holiday function (using Wednesday as example)
- Over the weekend with start delay

In program mode

- External devices are integrated in program mode, e.g. DAY/ NIGHT simulation.
- Combination of standstill mode with incubation mode (energy-saving mode)
- Incubator is always cleaned on Wednesdays due to the laboratory routine (SOP) (standstill mode)

B.1 Temperature drop during the entire weekend (Friday afternoon to Monday morning)

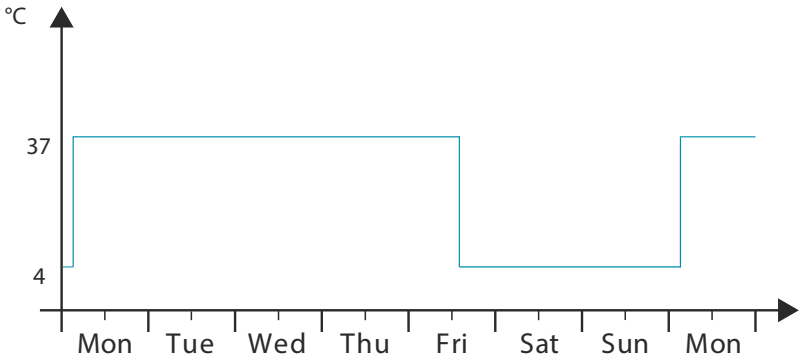


Fig. 222: Diagram 'Temperature drop during the entire weekend (Friday afternoon to Monday morning)'

Operating mode:

Manual mode; Temperature drop via real-time calendar

Procedure:

1. In manual mode, set the temperature drop to 4°C from Friday afternoon at 2:00 p.m. to Monday morning at 3:00 a.m. and set the repetition interval to *'weekly'* ➥ *'Creating a temperature drop' on page 61*.
2. Set the target temperature to 37°C ➥ *'Set temperature' on page 67*.
3. Start manual mode ➥ *Chapter 6.10.2 'Starting manual mode' on page 68*.

B.2 Temperature drop over one day (Sunday)

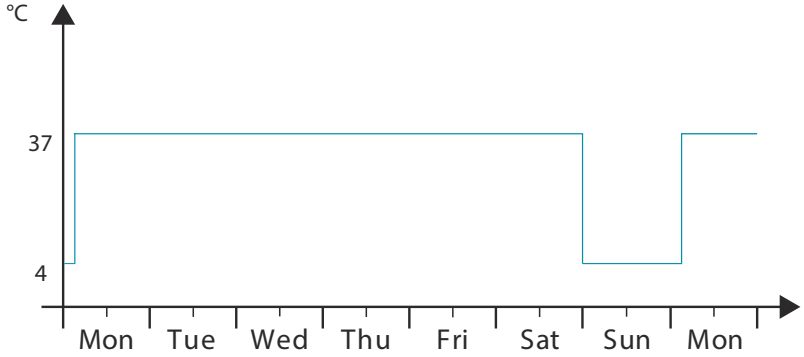


Fig. 223: Diagram 'Temperature drop over one day (Sunday)'

Operating mode:

Manual mode; Temperature drop via real-time calendar

Procedure:

1. In manual mode, set the temperature drop to 4°C from Saturday night at midnight to Monday morning at 3:00 a.m. and set the repetition interval to *'weekly'* ➦ *'Creating a temperature drop' on page 61*.
2. Set the target temperature to 37°C ➦ *'Set temperature' on page 67*.
3. Start manual mode ➦ *Chapter 6.10.2 'Starting manual mode' on page 68*.

B.3 Temperature drop with holiday function (using Wednesday as an example)

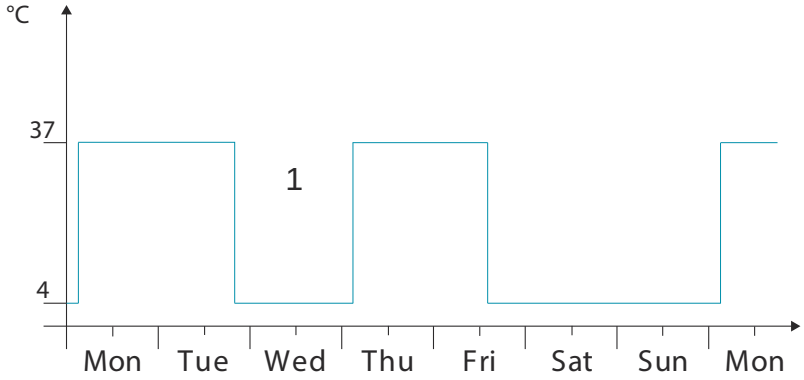


Fig. 224: Diagram 'Temperature drop with holiday function (using Wednesday as an example)'

1 Holiday

Operating mode:

Manual mode; Temperature drop via real-time calendar and holiday function

Procedure:

Fig. 225: Temperature drops

1. In manual mode, set the temperature drop to 4°C from Friday afternoon at 2:00 p.m. to Monday morning at 3:00 a.m. and set the repetition interval to *'weekly'* ➦ *'Creating a temperature drop' on page 61*.
2. Set another temperature drop from Tuesday evening at 20:00 p.m. to Thursday morning at 03:00 a.m. without a repetition.
3. Set the target temperature to 37°C ➦ *'Set temperature' on page 67*.
4. Start manual mode ➦ *Chapter 6.10.2 'Starting manual mode' on page 68*.

B.4 Temperature drop on the weekend with start delay

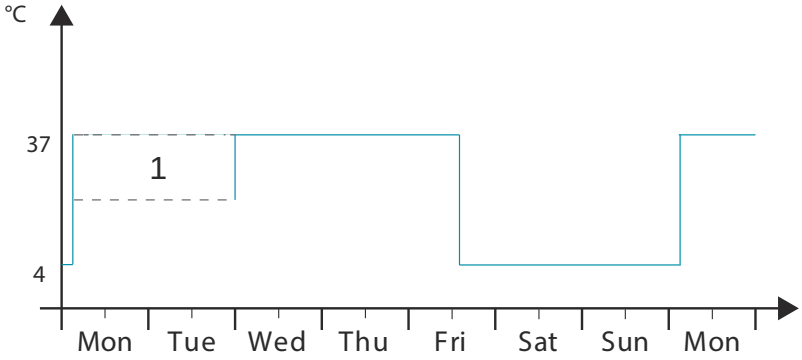


Fig. 226: Diagram 'Temperature drop on the weekend with start delay'

1 Start delay

Operating mode:

Manual mode; Start delay and temperature drop (both are activated at the same time)

Procedure:

1. In manual mode, set the temperature drop to 4°C from Friday afternoon at 2:00 p.m. to Monday morning at 3:00 a.m. and set the repetition interval to *'weekly'* ➦ *'Creating a temperature drop' on page 61*.
2. Set the target temperature to 37°C ➦ *'Set temperature' on page 67*.
3. Set the starting date in the start delay ➦ *'Start delay' on page 58*.

Until manual mode is started, the incubator remains unregulated.

B.5 Temperature drop on the weekend including the passive dehumidification option

Description:

The incubator is operated at a temperature of 37 °C during the workweek. Starting on Saturday 12:00 p.m., the temperature drops to 4 °C. On the following Monday, the sample material is taken out at approx. 8:00 a.m. at a temperature of 37 °C. The beginning of the heating phase is defined with a lead time of 5 h on Monday at 3:00 a.m. During these 5 h, the ventilation opening should be open. This way, moisture can escape from the incubator during the heat-up phase.

Operating mode:

Program mode, programming with external contact.

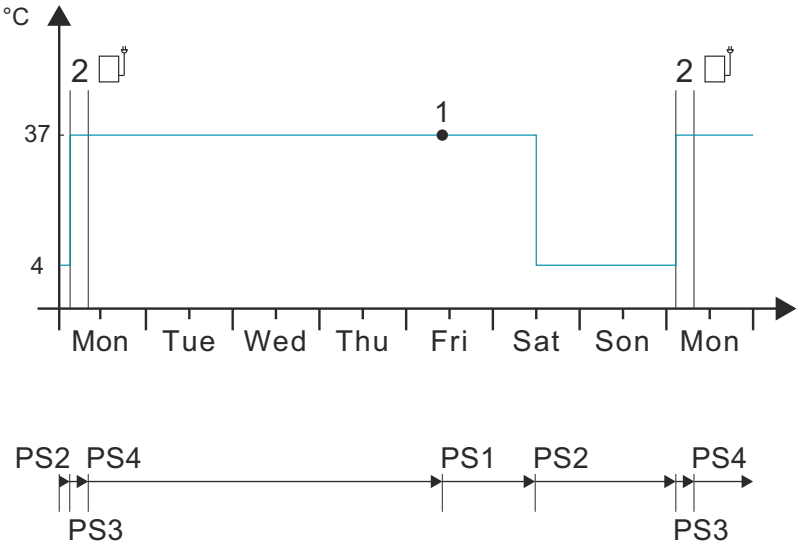


Fig. 227: Diagram 'Using the passive dehumidification option, example of temperature drop during weekend'

1 Starting time (Friday 10:00 a.m.)
2 Ventilation opening open
PS Program segment

NOTICE

The device must be equipped with the passive dehumidification option ➦ *Chapter 6.12.6.2 'Passive dehumidification option' on page 105*.

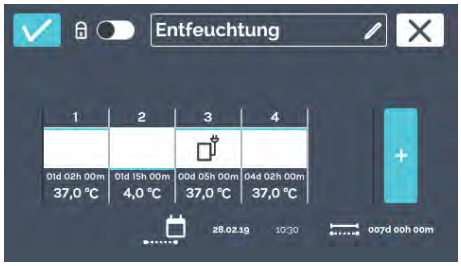


Fig. 228: 'Dehumidification' program

Set the program as shown; see ➦ Chapter 6.11.2 'Creating a program' on page 71. The ventilation opening is opened as long as the control contact is active.

Please take the starting time into account; see ➦ 'Timer' on page 86.

B.6 External devices are integrated in program mode, e.g. DAY/NIGHT simulation.

Customer wish/description: Customer would like to simulate the ambient conditions (light and temperature) for its organisms (e.g. plants) daily.

The samples should be charged as follows:

- The day is simulated with +22 °C and 16 "daylight hours".
- The night is simulated with +18 °C and 8 "night hours".
- The incubator is operated 24/7, even over the weekend.

Operating mode:

Program mode; Programming with external contact

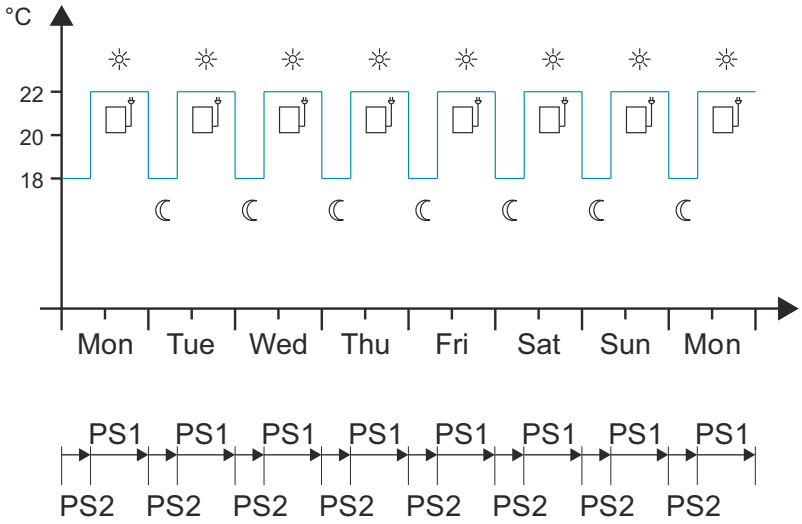


Fig. 229: Diagram 'External devices are integrated in program mode, e.g. DAY/NIGHT simulation.'

PS Program segment

Note:

The example describes a classical DAY/NIGHT program.

The customer also requires the following items in addition to the standard equipment:

- The device must be equipped with the Switchboard option (external socket strip).
- There must be a separate light source (e.g. light slide-in module) which can be used to simulate DAY (light). The customer integrates this slide-in module into the incubator and connects it with the Switchboard.

Observe the heat compensation curve ➦ *Chapter 6.13 'Heat compensation' on page 118*.

This example shows how the external contact can be used. In this case, this is a light slide-in module, but other external devices (e.g. shaker) can also be integrated into a program this way.

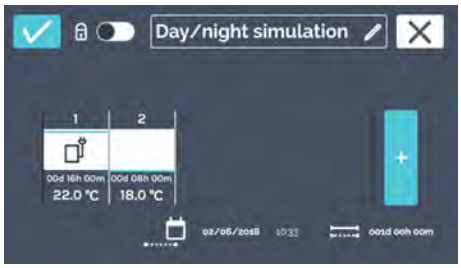


Fig. 230: 'Day/night simulation 'program

Set the program as shown ➥ Chapter 6.11.2 'Creating a program' on page 71.

Please take the starting time into account ➥ 'Timer' on page 86.

B.7 Combination of standstill mode with incubation mode (energy-saving mode)

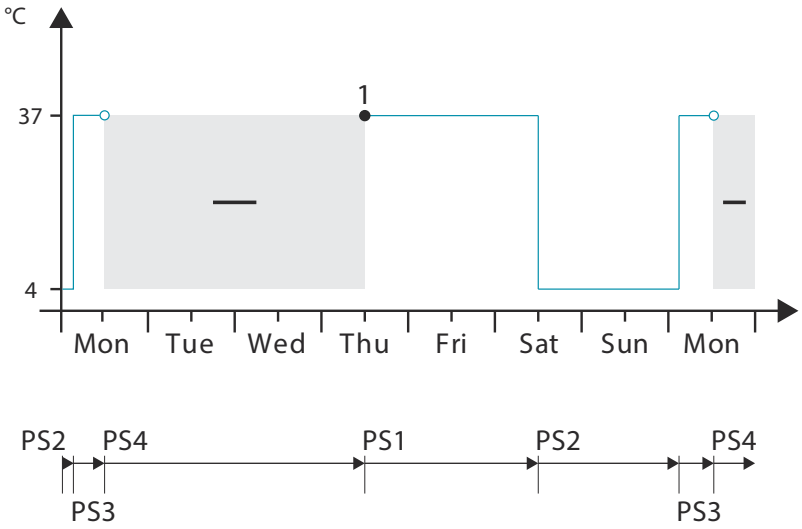


Fig. 231: Diagram 'Combination of standstill mode with incubation mode (energy-saving mode)'

1 Starting time (Thursday, 12:00 p.m.)
PS Program segment

Operating mode:

Program mode; Temperature profile with standstill segment

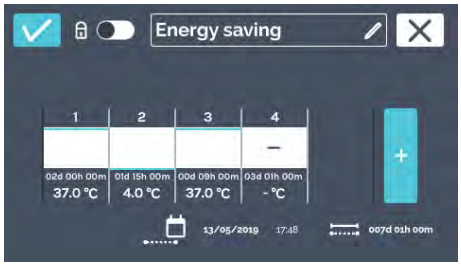


Fig. 232: 'Energy-saving mode' program

Set the program as shown ➥ Chapter 6.11.2 'Creating a program' on page 71.

During standstill mode, the incubator is not regulated, but the current interior temperature is displayed.

Please take the starting time setting into account ➥ 'Timer' on page 86.

B.8 Incubator is always cleaned on Wednesdays due to the laboratory routine (SOP) (standstill mode)

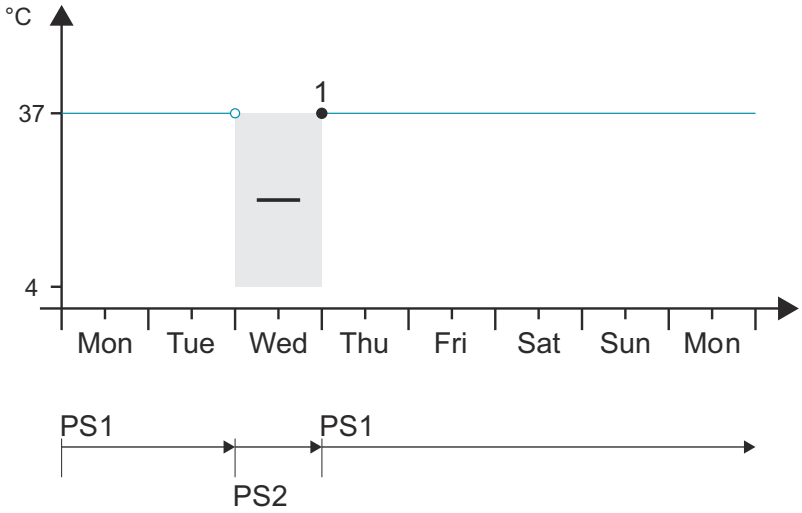


Fig. 233: Diagram 'Incubator is always cleaned on Wednesdays due to the laboratory routine (SOP) (standstill mode)'

1 Starting time (Thursday, 12:00 a.m.)
PS Program segment

Operating mode:

Program mode; Always an incubation temperature and one-time standstill segment in every week

Fig. 234: 'Cleaning mode' program

Set the program as shown ➥ Chapter 6.11.2 'Creating a program' on page 71.

During standstill mode, the incubator is not regulated, but the current interior temperature is displayed.

Please take the starting time into account ➥ 'Timer' on page 86.

C Overview of accessories

Only genuine spare parts and approved genuine accessories from Andreas Hettich GmbH may be used.

Please see the general catalogue or the product guide for technical data.

Order no.	Article
	Incubators, HettCube series cooled incubators Options and accessories
60001	**Inserting shelf (set)** Made of stainless steel, with standard rails, max. load (kg): 50
60031	**Inserting shelf (HTS set)** Made of stainless steel, with telescopic rails, pull out up to 70 %, max. load (kg): 40
60024	**Drawer (HTS set), height 30 mm** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60025	**Drawer (HTS set), height 65 mm** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60026	**Drawer (HTS set), height 105 mm** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60038	**Rack (HTS set)** For Petri dishes, stainless steel, with telescopic rails, pull out up to 70 %, Petri dishes ∅ (mm): 90, max. load (pcs): 90
60039	**Rack (set)** For Petri dishes, stainless steel, with standard rails, Petri dishes ∅ (mm): 90, max. load (pcs): 90
60040	**Rack** For Petri dishes, stainless steel, Petri dishes ∅ (mm): 90, max. load (pcs): 90
60036	**Rack (HTS set)** For inclined storage of cultures (Loewenstein), stainless steel, with telescopic rails, pull out up to 70 %, inclination angle: 5°, tube ∅ (mm): 15-20, max. load (pcs): 81 tubes

Order no.	Article
60037	**Rack (set)** For inclined storage of cultures (Loewenstein), stainless steel, with standard rails, inclination angle: 5°, tube ∅ (mm): 15-20, max. load (pcs): 81 tubes
60041	**Rack** For inclined storage of cultures (Loewenstein), stainless steel, inclination angle: 5°, tube ∅ (mm): 15-20, max. load (pcs): 81 tubes
60027	**Frame L, 16 places** Made of stainless steel, for inclined storage of cultures, tube ∅ (mm): 15-20, tube length (mm): 100-125, inclination angle 5° or 20°
60028	**Frame XL, 16 places** Made of stainless steel, for inclined storage of cultures, tube ∅ (mm): 15-20, tube length (mm): 126-170, inclination angle 5° or 20°
60521	**Switchboard** 4-gang socket strip, as a unit controllable via touchscreen, on the rear side of the device
60503	**Independent PT 100 sensor** For independent temperature measurement, four-wire system, temperature values output with analogue output 4-20 mA on the rear side of the device
60042	**Passive dehumidification** Enables individual or timer-controlled operation of a ventilation opening in the incubator via the touchscreen.
60043	**Service** Installation of HettCube 200 | 200 R stacking kit
60044	**Service** Changing the door swing
60013	**Glass door** All-glass outer door, for HettCube 600 | 600 R
60029	**Glass door** All-glass outer door, for HettCube 400 | 400 R
60030	**Glass door** All-glass exterior door,
60006	**Access port** ∅ (mm): 22, foam stopper
60007	**Access port** ∅ (mm): 42, foam stopper

Order no.	Article
60008	**Access port** ∅ (mm): 67, foam stopper
60009	**Stacking kit** For safe stacking of two HettCubes 200 | 200 R
60012	**Fixing kit** For securing the upper incubator to the wall when stacking two HettCube 200 | 200 R units on top of one another
60010	**Rolling cabinet** Lockable, with one drawer, including swivel castors and two brakes, W x D x H (mm): 770 x 500 x 550, for HettCube 200 | 200 R
60525	**USB port blocker** For closing the service port (USB). Protection against unauthorised access.
60526	**Parameter for continuous cooling operation** For storing samples below 15 °C for more than 2 weeks
60919	**HTS fixing kit** For fixing of inserting shelves and drawers with telescopic rails, polyamide
60058	**Sliding cover and fixed front panel** For protecting and locking the display