Operating manual

HettCube

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

Translation of the original operating manual

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.

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*

Symbols on the incubator

> Warning signs/symbols on the incubator that are no longer recognisable must be replaced immediately by the operator.
>
> The pictures shown below indicate the positions of the warning signs and symbols attached to the incubator.
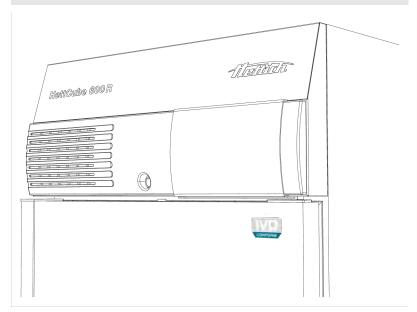
Fig. 1: Information on the front of the incubator, IVD logo

IVD-CONFORM

The device complies with the requirements of Regulation 2017/746 (EU).
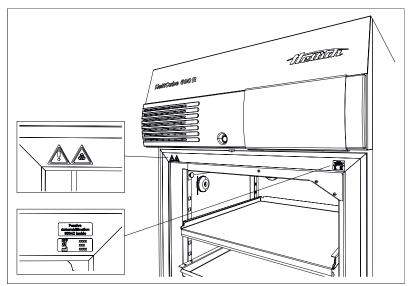
Fig. 2: Information on the front of the incubator

Attention, general danger area

Failure to observe this sign may result in injury and damage to property.

Ensure you read the operating instructions and follow the safety instructions before using the incubator.

Attention, biohazard

Failure to observe this sign may result in injury.

Ensure you read the operating instructions and follow the safety instructions before using the incubator.

REF   XXXX
SN   XXX
⬒   XXXX

Service information

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

Passive
dehumidification
60042 inside

Passive dehumidification 60042 inside (option)

The device is equipped with the passive dehumidification option.

Option 60526
included

Continuous cooling (option)

The device is equipped with the continuous cooling option.
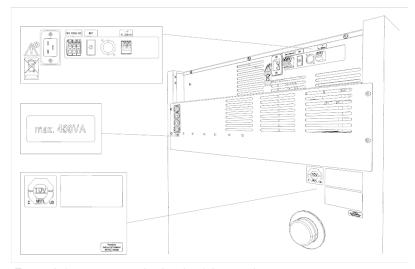
Fig. 3: Information on the back of the incubator

max. 400VA

Accessories symbol (only with switchboard option)

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

Attention, general danger area

Failure to observe this sign may result in injury and damage to property.

Ensure you read the operating instructions and follow the safety instructions before using the incubator.

Symbol	Description
	Symbol indicating separate collection of electrical and electronic equipment
	Symbol according to Directive 2012/19/EU. Use in European Union countries, as well as Norway and Switzerland.
NO COM NC	**Potential-free alarm output symbol**
	This symbol marks the potential-free alarm output.
6F1	**Fuse symbol (only with switchboard option)**
	This symbol indicates fuse 6F1 (only with switchboard option).
– + 4-20mA	**Symbol for analogue output for independent temperature measurement (option)**
	This symbol indicates the 4-20 mA analogue output for an independent temperature measurement.
TÜV SÜD	**TÜV-tested device symbol**
	The requirements for device safety have been TÜV-tested.
Rating plate	**Rating plate**
	Rating plate containing technical data specifications.
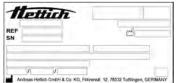
1.2   Important labels on the packaging

Symbol	Description
↑↑	**TOP** This is the correct upright position of the shipping container for transport and/or storage.
(glass symbol)	**FRAGILE GOODS** The contents of the shipping container are fragile, so it must be handled with care.
(umbrella symbol)	**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 humidity range (10% to 80%).

	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".

	Time, limit.
	Rotor expiration date.

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 performed by a person authorized by the manufacturer.

> *Interventions and modifications to incubators by persons not authorized by the company Andreas Hettich GmbH & Co. KG will be at one's own risk and result in the voiding of all warranty claims, as well as the voiding of liability claims against Andreas Hettich GmbH & Co. KG.*

Service technician

A service technician is someone who was trained and authorized by Andreas Hettich GmbH & Co. KG to perform service work on 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 incubator is a medical device (microbiological incubator) in accordance with the In Vitro Diagnostic Medical Devices Regulation (EU) 2017/746.
- It is used to cultivate microorganisms (e.g. bacteria, fungi) and is for use in microbiological laboratories.
- The combination of natural and forced circulating air results in low culture drying rates, high temperature stability and a precise temperature distribution. For this reason, the incubator is suitable for incubating human pathogens that
  - require a characteristic temperature optimum (Campylobacter jejuni or coli at 42 °C, e.g.: Clostridium difficile at 36 °C).
  - require long-term cultures (Mycobacterium tuberculosis at 36 °C/up to 8 weeks).
- Incubation applications for similar materials and samples with equally stringent requirements are also possible.
- The incubator is intended solely for this purpose.
- Any other use or use going beyond this is considered improper use. Andreas Hettich GmbH & Co. KG will not be liable for any damage resulting from such uses.
- The intended use also includes observing all the information in the operating instructions and compliance with inspection and maintenance work.

Improper use

Another use or a use going beyond the intended use is considered to be improper. The company Andreas Hettich GmbH & Co. KG is not liable for damage resulting from this.

- Operation in a potentially explosive, biologically, chemically or radioactively contaminated atmosphere.
- It is forbidden to put flammable or explosive materials or materials which chemically react together with high energy in the incubator.
- The presence of persons or animals inside the incubator.
- Using the incubator or its accessories as a climbing aid.
- Operation outdoors.
- Use on moving subsurfaces, e.g. ships, rail transport or airplanes.
- Stacks of impermissible incubator sizes and stacks without fixation (allowed is a stack of a total of two incubators of size 200/200 R.).
- The incubator in the standard configuration is not intended to be used in continuous cooling operation.

1.6 Replacement parts/consumable material

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

> ⚠️ **WARNING**
>
> If no original spare parts or original accessories are used, the warranty as well as liability claims against the company Andreas Hettich GmbH & Co. KG are 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

■ 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 operate the incubator.

■ In addition to the operating instructions and the binding regulations for accident prevention, the recognized professional rules for safe and proper work are to be observed. The operating instructions are to be supplemented with instructions based on the national regulations for accident prevention and environmental protection of the country where the device is used.

■ The incubator is built according to the state-of-the-art and is reliable. It could pose a danger to the user or third parties, however, if it is not operated by personnel familiar with the incubator or is used improperly or not as intended.

■ The operating company must inform itself about the potential health hazards which can be posed by the used sample material, and, if necessary, take appropriate measures to rule out such hazards.

■ The incubator may only be operated when it is set up correctly. If installation is not done correctly, hazards to personnel and sample material cannot be ruled out.

■ The use of external devices inside the incubator only makes sense if this additional heat output can be compensated. For important information concerning this, see ➙ *Chapter 6.14 'Heat compensation' on page 116*. The maximum heat input in the interior of the incubator named there must not be exceeded. If the incubator is switched off or fails, the external devices in the interior must be switched off immediately in order to not damage the incubator. It is therefore recommended to only connect external devices to the optionally available switchbox. This way, it is ensured that when the incubator switches off or fails or when the temperature guard is triggered, the external devices are also de-energized.

■ There is a danger of an uncontrolled increase in the utilized space temperature if devices with a heat load are operated in the uncooled incubator or if heat-developing reactions or processes are carried out.

■ Continuous operation at < 5°C can cause the evaporator to ice up. This will result in a reduction in the cooling capacity. If a lot of ice builds up, there is a danger that the incubator fan will be damaged.

■ Do not step or lean on the floor of the interior, the slide-in modules and drawers or the door.

■ The drying rate of the culture medium during incubation is influenced by various factors, such as

  – ambient conditions (e.g., relative humidity of the environment)

  – handling and working method (e.g., previous processes, duration, and frequency of doors opening)

  – culture or incubation conditions (e.g., incubation time and temperature).

These influences should be especially considered in the case of longer incubation times.

- The sample material should not be placed outside of the defined utilized space ➡ *Chapter 9.7 'Definition of the utilized space' on page 143*. The specified temperature data refer to the defined utilized space.

- Repairs may only be performed by a person authorized by the manufacturer.

- Only original spare parts and approved original accessories of the company Andreas Hettich GmbH & Co. KG may be used.

- The safety and reliability of the incubator are only guaranteed if:
  - the incubator is operated according to the operating instructions.
  - the electrical installation at the set-up site of the incubator meets the requirements of the EN/IEC regulations.

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
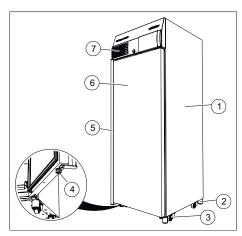
Fig. 4: Front side of device

1   Housing made of powder-coated steel sheet-metal
2   Device foot ➡ *Chapter 5.2.1 'Installing the incubator' on page 30*
3   Transport rollers ➡ *Chapter 5.2.1 'Installing the incubator' on page 30*
4   Adjustable foot to protect the incubator from tilting
5   Door handle
6   Door, self-closing at an opening angle less than 90°
7   Front panel
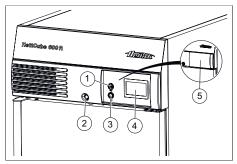
Fig. 5: Front panel

1   Service interface (USB)
2   Door lock
3   Switch
4   Touchscreen
5   Mechanical display protection ➡ *Chapter 6.4 'Fixing the mechanical display protection of the control panel' on page 46*

Touchscreen incl.

- Temperature guard, class 3.1, for cooled devices of classes 3.1 and 3.2. Individually adjustable ➡ *Chapter 6.13.5 'Temperature guard' on page 97*.
- Tolerance band asymmetrically adjustable ➡ *Chapter 6.13.4 'Tolerance band' on page 96*.
- Door alarm individually adjustable ➡ *Chapter 6.13.9 'Door' on page 105*.

The incubator is equipped with a temperature guard of protection class 3.1, in accordance 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:

Device protection and sample protection (excessive temperatures).

Class 3.2:

Sample protection (excessive temperatures, for cooled incubators only).

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

Further information about the temperature guard can be found in the operating instructions ➡ *Chapter 6.13.5 'Temperature guard' on page 97*.
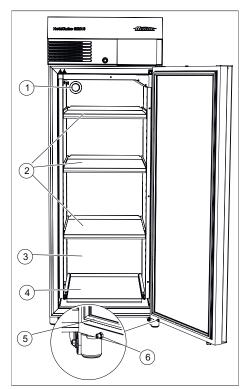
Fig. 6: Front side of device, door opened

1   Access port Ø 42 (standard on the rear side of device)
2   Shelf
3   Interior made of high-quality stainless steel 1.4301 (ASTM 304)
4   HTS shelf with HTS safeguard
5   Magnetic seal
6   Door damper
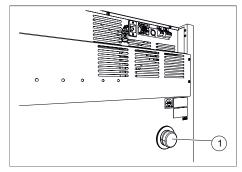
Fig. 7: Access port, rear side

1   Access port

The HTS safeguard can be autoclaved up to 10x. If the HTS safeguard is installed and removed more intensely, the holding force can diminish, and the HTS safeguard should be replaced (see also list of accessories).

For cable access ports, the access port on the rear side or the additional device access port is to be used.

The incubator has a access port with a Ø of 42 mm on the rear side.

Through this opening, cables from external measuring systems can be fed into the interior.

> *After feeding through the cable, the access port must be sealed with the foam plug included in delivery to prevent temperature deviations in the interior. If the access port is not used, this must be sealed with the screw plug.*
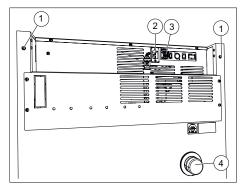
Fig. 8: Rear side of device (size 200)

1 For device size 200 only: Thread insert M6 for fixing kit 60012
2 Mains cable connection
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.

Condensation diagram for HettCube of sizes 200/400/600 with glass doors at an ambient temperature of +22°C

Condensation on the glass pane outside

Condensation on the glass pane inside

Condensation-free area*

Condensation-free area*

Interior temperature < ambient temperature

Interior temperature > ambient temperature

Ambient temperature T=22°C

Relative ambient humidity [%]

Relative interior humidity [%]

Interior temperature [°C]

* possible condensation in the edge region

Fig. 9: Condensation diagram

3.2.2 Additional device access port

Additional device access port (∅ 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.

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

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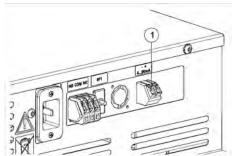
> *Every direct connection from the inside of the device to the outside can result in technical data deviations. When using an access port, this should be sealed from the outside with adhesive tape in addition to the foam plugs included in delivery.*

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 inde-
     pendent 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

> When the device switches off or fails, or when the class 3.1 temperature guard is triggered, all external devices are also de-energized.
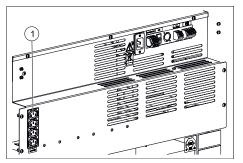
Fig. 12: Switchboard

1   Connections for additional devices
     (Switchboard option)

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 6.13.6 'Control contact (option)' on page 101*. 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 6.13.6.1 'Switchboard option' on page 101* and ➙ *Chapter 6.14 'Heat compensation' on page 116*.

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 42* or the passive dehumidification option ➙ *Chapter 6 'Operation' on page 42* 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
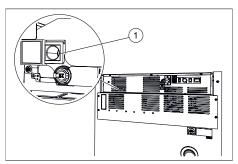
Fig. 13: Passive dehumidification ventilation opening

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 6.13.6.2 'Passive dehumidification option' on page 103* or the Switchboard option → *Chapter 6.13.6.1 'Switchboard option' on page 101* on one incubator.

3.3 Accessories

Accessories
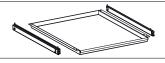
> *Only original spare parts and approved original accessories of the company Andreas Hettich GmbH & Co. KG may be used.*

Brief description of the accessories: Flexible equipment articles which the device can be equipped with later

Further information about the accessories can be found in the appendix ➜ *Appendix C 'Accessory overview' on page 167*.
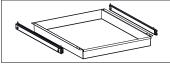
	Shelf (set)	60001
	Shelf (HTS set)	60031
	Drawer (HTS set), 30 mm high	60024
	Drawer (HTS set), 65 mm high	60025
	Drawer (HTS set), 105 mm high	60026
	Rack	60040
	Rack (set)	60039
	Rack (HTS set)	60038
	Rack	60041
	Rack (set)	60037
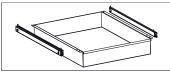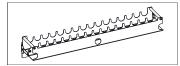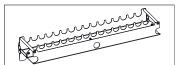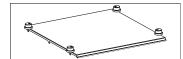
	Rack (HTS set)	60036
	Frame L, 16 places	60027
	Frame XL, 16 places	60028
	Stacking kit	60009
	USB port blocker (set) - For protecting the USB/A interface. Set consists of 10 locking clips and 1 USB key tool.	60525
	HTS fixing kit - For fixing shelves and drawers with telescopic rails	60919
	HTS safeguard (set, 10x) - For fixing shelves and drawers with telescopic rails	E4599-5
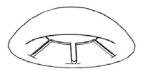
4 Transport and storage

Dimensions and weight with transport packaging
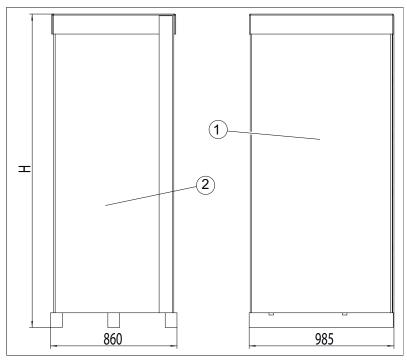
Fig. 14: Transport packaging dimensions

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	92/103	117/128	164/175
	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 storage temperature must be between -20 °C and +60 °C.
- The humidity must be non-condensing and must be 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

■ Ventilation openings may not be covered or blocked.

■ Before commissioning, check to make sure the mains voltage is correct according to the nameplate and that the mains cable is connected properly.

■ If necessary, additional devices and accessories can be mounted and/or connected.

Every time before using the incubator, make sure 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.
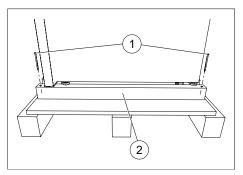
Fig. 15: Front wooden beam

1   Fastening screws
2   Front wooden beam

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

> (i) *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.*
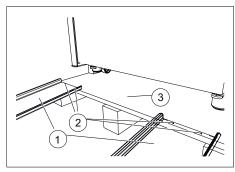
Fig. 16: Fastening metal rails

1   Metal rails
2   Nails
3   Wooden pallet

2. ▸ Fasten the two metal rails to the wooden pallet with two nails each.
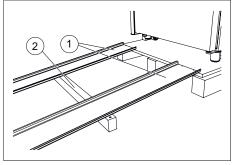
Fig. 17: Wooden beam under the metal rails

1   Metal rails
2   Front wooden beam

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

> (i) *The angle between the metal rails and the floor must not be more than 6°.*
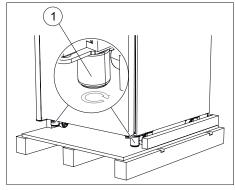
Fig. 18: Screwing in levelling elements

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.

> (i) *The rear levelling elements are already screwed in ex works.*
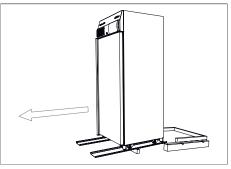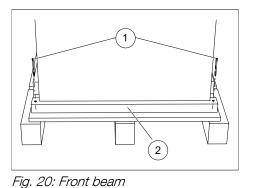
Fig. 19: Rolling the incubator down over metal rails

Unloading from the pallet, HettCube 200/200 R

Fig. 20: Front beam
1   Fastening screws
2   Front beam
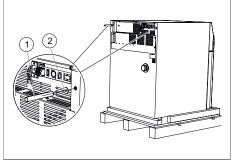
Fig. 21: Mounting metal rod
1   Metal rods
2   Washers
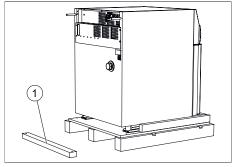
Fig. 22: Front wooden beam on the floor

1   Front wooden beam

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

1. ▸ Remove the front wooden beam.

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

3. ▸ Put the front wooden beam about 50 centimetres in front of the wooden pallet.
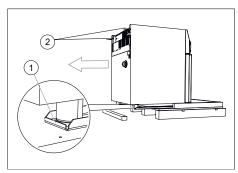
Fig. 23: Pulling incubator forward

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

> **i**
>
> *Upon consultation, the service technician can mount the door hinges on the other side on site.*

> **! NOTICE**
>
> **If there is a cold-to-warm temperature difference, there is a danger that condensate will form on the electrical components of the incubator.**
>
> The forming condensate can cause a short circuit.
>
> Allow the incubator to acclimate for at least three hours at the installation site before putting the device into operation.

- Please check the device for perfect mechanical condition and check the completeness of the delivered articles against your order.
- When choosing the installation site, take the weight of the device and its load into account. See ➡ *Chapter 9 'Technical data' on page 133*.
- The installation site must not be directly exposed to sunlight or be located near heat sources.
- Ventilation openings may not be blocked. A distance of 100 mm must be maintained from the ventilation slots and openings of the incubator.
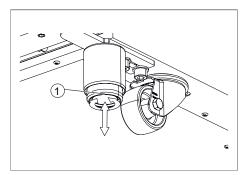
Fig. 24: Levelling the incubator
1   Adjustable device foot

1. ▸ Set up and level the incubator stably on a flat, non-flammable surface.

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

    ■ Screw the levelling elements (A) that are screwed into the device feet far enough downward that they touch the floor and the rollers are completely relieved.

    ■ Align the incubator horizontally by turning the levelling elements.

    ■ Screw the adjusting foot on the door downward until it is approx. 7 mm above the floor to keep the incubator from tipping. Screw the hexagon nuts upward and tighten to secure the adjusting foot.

    For HettCube 200/200 R incubator only:

    ■ Align the incubator horizontally by turning the levelling elements screwed into the device feet.

    ■ For incubator with glass door only: Screw the adjusting foot on the door downward until it is approx. 7 mm above the floor to keep the incubator from tipping. Screw the hexagon nuts upward and tighten to secure the adjusting foot.

    ■ Only for devices of size 400 and 600: Transport securing device

    ⚠ CAUTION

    Two incubators may only be stacked on top of each other in the case of HettCube 200/200 R.

    The upper incubator must be fixed to the lower incubator with the stack kit (order no. 60009) and additionally secured against tilting. We recommend the fixing kit (order no. 60012) to securely fasten the upper incubator to the wall.

2. ▸ If required, adjust the heights of the slide-in modules and drawers; see ➥ Chapter 5.3.1 'Standard slide-in modules' on page 38 and ➥ Chapter 5.3.2 'Telescopic slide-in modules' on page 39.

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.
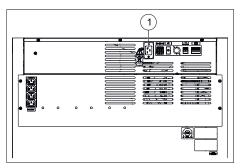
Fig. 25: Power supply connection

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
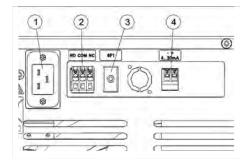
Fig. 26: Other connections

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 33*.
- 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 33*.

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.

NO COM NC

230V / 3A
NO COM NC

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

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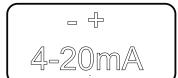
When operating external devices or another thermal load in the incubator, it is recommended to connect a signal transducer to the potential-free alarm output to monitor this.

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 125*.

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

– +
4-20mA

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)

Fig. 27: Connections for additional devices

1 Connections for additional devices
2 Access port

!

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.

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 6.13.6 'Control contact (option)' on page 101* 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 19* into the interior of the incubator.

5.2.3 Initial commissioning
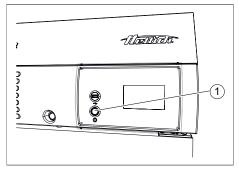
Fig. 28: Device switch

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. 29: Initialization

Fig. 30: 'Language' selection

1 *'Language'* selection

2. ▸ Tap on the *'Language'* selection.
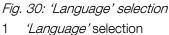
Fig. 31: 'Language' selection list

3. ▸ Tap on the corresponding language.

Fig. 32: '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. 38) appears and the configuration is completed.*
>
> *If the date and time have to be changed, follow the instructions for next step.*
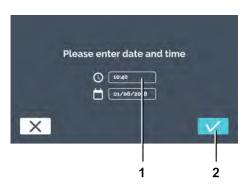
Fig. 33: Setting the date and time

1   Time
2   *[Confirmation]* button

5. ▸ Tap the time.
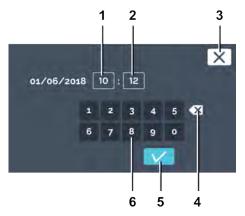
Fig. 34: Setting the time

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. 35: Setting the date and time

1   Date

Fig. 36: Setting the date

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

Fig. 37: Confirming the date and time

1   *[Confirmation]* button

Fig. 38: Start screen

7. ▸ Tap the date.

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

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

➡ The start screen appears and the configuration is completed.

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 42*.

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.*
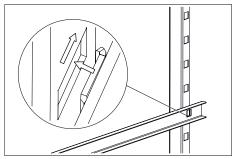
5.3.1   Standard slide-in modules

Inserting

The standard slide-in modules are held by support rails.
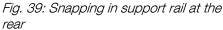
> *The standard slide-in modules are not secured against falling out. Do not completely pull out the standard slide-in modules.*

Fig. 39: Snapping in support rail at the rear

1. ▸ Push the support rail into the rear latching rail at the desired height.
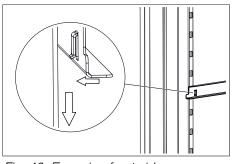
Fig. 40: Engaging front side

2. ▸ Engage the support rail in the front latching rail.
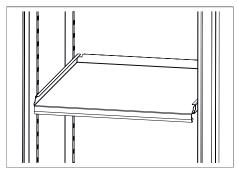
Fig. 41: Standard slide-in module

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
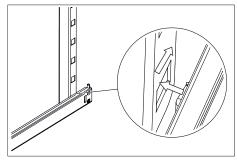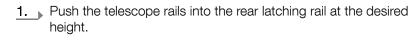
Fig. 42: Snapping telescopic rails in at the rear

1. ▸ Push the telescope rails into the rear latching rail at the desired height.
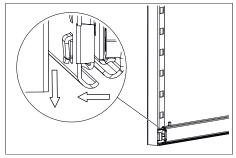
Fig. 43: Engaging front side

2. ▸ Engage the telescope rails in the front latching rail.
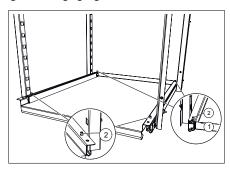
Fig. 44: Pushing in the slide-in module

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. 45: HTS safeguard

5. ▸ Secure the slide-in module or drawer as needed.
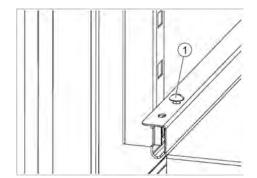
To do this, stick an HTS safeguard (1) on the pins on the right and left sides of the drawer.

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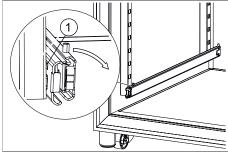
> *Do not reach deeply into the device to attempt to loosen the rail by force. This operation can be easily and safely ensured using lever force.*

Fig. 46: 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. 47: Turning the telescopic rail, front side

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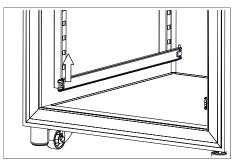
4. Hold the telescopic rails at the pulled-out part and slightly twist towards the centre of the incubator until the snap-in nose projects from the latching rail.

Fig. 48: Telescopic rail, front side

5. Pull the telescopic rails forward and upward, out of the latching rail.
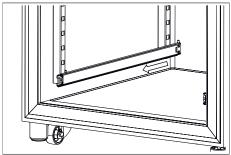
Fig. 49: Remove the telescopic rail from the rear latching rail

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**
>
> **There is a risk that the sample temperature control will be faulty.**
>
> There is a risk that the temperature control of micro-biological 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 122*.
> - 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 only possible if the permissible ambient temperature range is complied with.

> **i** *Fully complete commissioning prior to operation* ➥ *Chapter 5 'Commissioning' on page 27.*
>
> *After a malfunction (power failure, door open too long, etc.), the operator must assess whether the samples can still be used.*

> **i** *An automatic restart is carried out once a day.*
>
> *This does not affect the temperature control of the samples.*

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
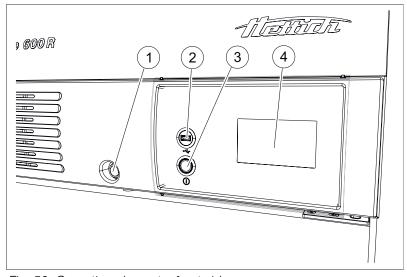
Fig. 50: Operating elements, front side

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 143*.

6.3 Door locking mechanism

To prevent unauthorized personnel from opening the door, the incubator can be locked. Individual cylinder locks are used. If the key is lost, a spare key can be ordered as a spare part by providing the lock number.

If the door is locked, the mechanical display protection is also blocked. This way, it is no longer possible to operate the incubator, since the control panel is only 30% accessible.

> *Before locking, make sure that no one is inside the incubator.*

1. Push the mechanical display protection to the right.
2. Stick the key in the lock.
3. Turn the key counter-clockwise to lock the incubator. If the incubator is locked, the red bolt will be visible.
4. Turn the key clockwise to unlock the incubator. The red bolt is no longer visible.
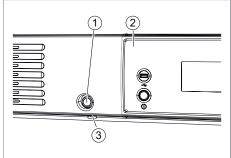
Fig. 51: Door lock
1 Lock
2 Mechanical display protection
3 Red lock bolt

6.4 Fixing the mechanical display protection of the control panel

To prevent the incubator from being operated by unauthorized personnel, the mechanical display protection can be additionally blocked.

Fig. 52: Screw for separate blocking of control panel

1 Screw

1. | *In the delivery condition, there is a screw on the rear side of the incubator, which can be used to block the mechanical display protection.*

Remove this screw.

2. Push the mechanical display protection to the right.

3. Screw the screw into the *[Control panel blocking]* bore.

➡ The mechanical display protection is blocked. The door can still be opened and closed.
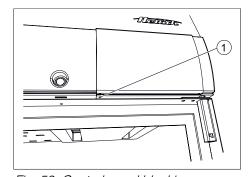
Fig. 53: Control panel blocking

1 Bore with thread, *[Control panel blocking]*

6.5 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.

6.6 Switching on the incubator
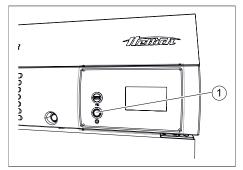
Fig. 54: Device switch

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

6.7 Initialization

> **ℹ** *Refer to the initial commissioning for the initialization description ➡ Chapter 5.2.3 'Initial commissioning' on page 35.*

6.8 Operating modes

The incubator offers the following operating modes:

- Standstill mode ➜ *Chapter 6.8.1 'Functional description of standstill mode' on page 48*

  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 6.8.2 'Functional description of manual mode' on page 49*

  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 6.8.3 'Functional description of program mode' on page 50*

  This operating mode allows different temperature profiles to be realized.

6.8.1 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.

6.8.2 Functional description of manual mode

In manual mode, an adjustable temperature is held constantly. With temperature drops ➡ *'Editing or deleting temperature drop' on page 62*, 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 144.*

When manual mode is activated, you can create, edit, delete or start programs for program mode ➡ *Chapter 6.12 'Program mode' on page 68*.

In manual mode, the control contact can be used ➡ *'Control contact (option)' on page 64*.

> *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.*

6.8.3 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
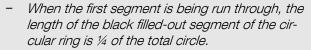
It can be read off from the rotating circular ring in which program segment the program is currently located. Firstly, the number of the currently run-through program segment is displayed in the middle of the circular ring. Secondly, the circular ring itself is subdivided into as many parts as there 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 6.13.6 'Control contact (option)' on page 101.*

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 85.*

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.

6.9 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. |
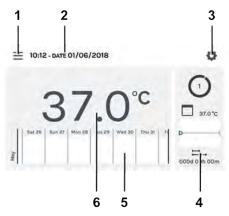
Fig. 58: Main screen

Item	Designation	Description/function
1	Operating modes ➡ *Chapter 6.11 'Manual mode' on page 54*, ➡ *Chapter 6.12 'Program mode' on page 68*	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 6.13 'Device settings' on page 92*	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 6.10 'Process flow information' on page 52*	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 6.10 'Process flow information' on page 52* Further information about the symbols: ➡ *Appendix A 'Software symbols' on page 156*
6	Display of *'Actual temperature'* in the interior	Shows the current temperature inside the incubator.

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

1   Temperature guard active display

The detailed screen switches to the main screen automatically.

The active temperature guard is indicated on the main screen.

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.

6.10   Process flow information
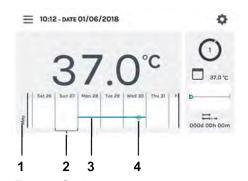
Fig. 60: Scale, main screen

1   Month
2   Scale, 1 day
3   Temperature process flow (example)
4   Symbol example ➥ *'Events' on page 54*

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

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.
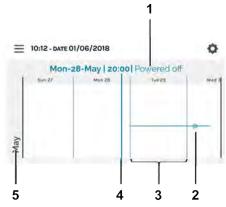
Fig. 61: Scale, level 1 (example)

1   Displayed values at the position of the display bar (4)
2   Symbol example ➥ 'Events' on page 54
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 6.13.16 'Logbook' on page 112*.
'Pause' symbol	Program was paused.
'Resume program' symbol	Program was continued.

6.11   Manual mode
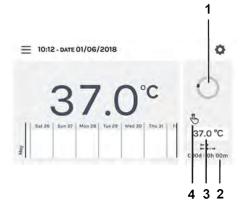
Fig. 62: 'Manual mode → Main screen'

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 6.12 'Program mode' on page 68*.

The settings for manual mode are made in the *'Manual mode settings'* menu ➝ *Chapter 6.11.1 'Manual mode settings' on page 54*.

> **!** 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 33*.

6.11.1   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 6.11 'Manual mode' on page 54*	Here, you can make settings for manual mode.
2	Start delay➡ *'Start delay' on page 56*	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 59*	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 63*	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 6.13.6.1 'Switchboard option' on page 101*or passive dehumidification option ➡ *Chapter 6.13.6.2 'Passive dehumidification option' on page 103* and the control contact is activated in the device settings ➡ *Chapter 6.13.6 'Control contact (option)' on page 101*.
8	Actual interior temperature	Indicates the current, unregulated actual temperature of the interior.
9	Set temperature➡ *'Set temperature' on page 65*	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 6.13.5 'Temperature guard' on page 97.*
>
> *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.
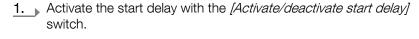
Fig. 68: 'Manual mode → Start delay
→ Start date'

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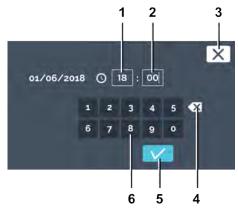
Fig. 71: 'Manual mode → Start delay → Start time → Time'

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

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

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

Temperature drop

> ℹ 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 54.

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.

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

> ℹ 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

Fig. 72: 'Manual mode → Temperature drop'

1   [Activate/deactivate temperature drop] switch

To create the temperature drop, proceed as follows:

1. ▹ Activate the temperature drop.

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

1   [Edit temperature drop] button

Fig. 74: 'Manual mode → Temperature drop → Editing → Settings'
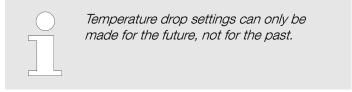
Fig. 75: 'Manual mode → Temperature drop → Editing → Settings → Date'

1   [Plus] button

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

➡ 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.

4. ▸ Tap on the [Plus] button.

> Examples for the temperature drop can be found in the appendix ➡ Appendix B 'Examples' on page 160.
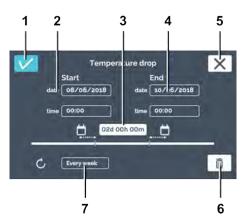
Fig. 76: 'Manual mode → Temperature drop → Editing window'

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

Fig. 79: 'Manual mode → Temperature drop → Editing → Settings'
1 *'List view'* symbol
2 *[Edit temperature drop]* editing icon

To delete a temperature drop, proceed as follows:

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

2. ▶ Tap on the *[Edit temperature drop]* editing icon for the temperature drop that you would like to edit or delete.
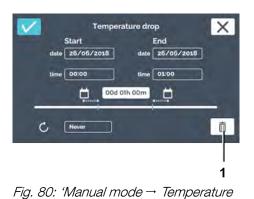
If you would like to delete all temperature drops, you can select this later.
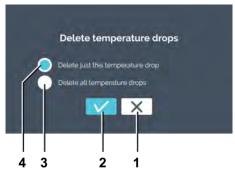
With the 'List view' symbol, you can have all temperature drops displayed in a list. The created temperature drops are displayed in a numbered list, starting with the start date. The list can be scrolled up and down. Only one temperature can be set for all drops. The last set temperature is used for all temperature drops.

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

1   *[Delete]* button

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

PIN protection

3. ▸ Tap on the *[Delete]* button.

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

> *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

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

1   [Confirmation] button
2   Keypad

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.

Control contact (option)

> ℹ️ The control contact is only available on incubators with the Switchboard option ➡ Chapter 6.13.6.1 'Switchboard option' on page 101 or passive dehumidification option ➡ Chapter 6.13.6.2 'Passive dehumidification option' on page 103.
>
> The control contact must be activated in the device settings ➡ Chapter 6.13.6 'Control contact (option)' on page 101.

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

Fig. 84: 'Manual mode → Control contact'

1   [Activate/deactivate control contact] switch

Set temperature

Fig. 85: 'Manual mode → Set temperature'

1 *[Plus]* button
2 Temperature
3 *[Minus]* button
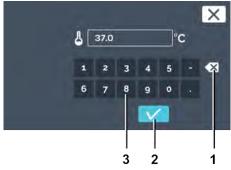
Fig. 86: 'Manual mode → Set temperature → Keypad entry'

1 *[Clear input]* button
2 Keypad

> **!** **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:

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.

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.

6.11.2 Starting manual mode

To start manual mode, proceed as follows:

1. ▷ Make all settings for manual mode ➡ *Chapter 6.11.1 'Manual mode settings' on page 54*.

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.

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

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

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

3. ▷ If a start delay was specified, a message indicating when manual mode will start will appear beforehand.
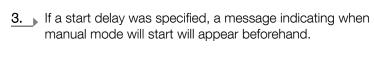
Fig. 90: 'Manual mode → Start → Start delay → Countdown'

1   Countdown

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

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

6.11.3 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:

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

Fig. 91: Manual mode active

1   HettCube activities area

Fig. 92: 'Manual mode → Settings'

2. Make the corresponding settings as described in the chapter → *Chapter 6.11.1 'Manual mode settings' on page 54* .
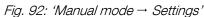
Fig. 93: Detailed manual mode screen

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.

6.12 Program mode

6.12.1 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.
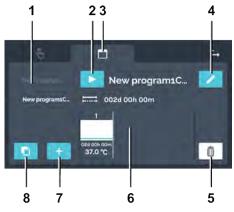
Fig. 95: Program mode settings

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 6.12 'Program mode' on page 68	Program mode tab
4	[Edit program] button ➡ Chapter 6.12.3 'Editing a program' on page 77	After tapping the [Edit program] button, the currently activated program can be edited.

Item	Designation	Description/function
5	*[Delete]* button ➜ *Chapter 6.12.4 'Copying and deleting a program' on page 80*	When this button is tapped, the currently activated program will be irrevocably deleted.
6	Program segments ➜ *'Editing a program segment' on page 70*	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 6.12.2 'Creating a program' on page 69*	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 81*	When this is tapped, the currently selected program is copied.

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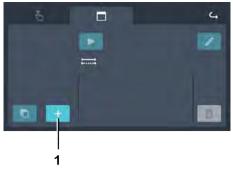
Fig. 96: *'Program mode → Creating a program'*

1   *[Create program]* button
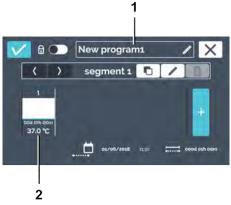
Fig. 97: *'Program mode → Creating a program → New program'*

1   Program name
2   Preconfigured standard program segment

Editing the program name

To create a program, proceed as follows:

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

➡ 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 77*.

To edit the program name, proceed as follows:
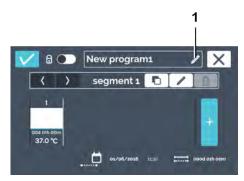
Fig. 98: 'Program mode → Creating a program → Editing the program name'

1   [Edit program name] button

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

Fig. 100: Program name edited

Editing a program segment

1. Tap the [Edit program name] button.

    ➡ The editing window will open.

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.

    ➡ The program has been renamed.

> The description for creating a new program segment can be found under → 'Creating a program segment' on page 76.

To edit a program segment, proceed as follows:
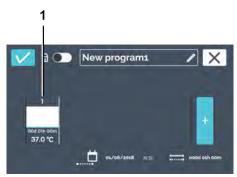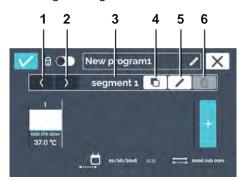
Fig. 101: Editing a program segment

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 78*	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 79*	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 84. If the program is started 24 hours later (i.e. Tuesday), however, the end time is also shifted by 24 hours.
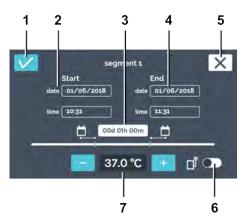
Fig. 103: Program segment settings

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 83*.
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 6.13.6 'Control contact (option)' on page 101.*

Item	Designation	Description/function
7	Set temperature➡ *'Set tempera-ture' on page 65*	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 6.8.1 'Functional description of standstill mode' on page 48.*

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 6.13.5 'Temperature guard' on page 97.

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

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 83.

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

1   Start date

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

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

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

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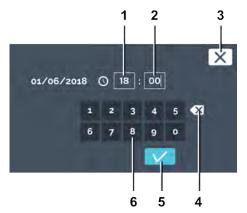
Fig. 107: 'Program segment settings
→ Start time → Input start time'

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

Fig. 108: 'Program segment settings
→ Duration'

1   Duration setting

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

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.

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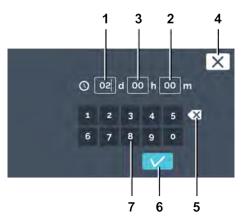
Fig. 109: 'Program segment settings → Duration → Input duration'

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

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

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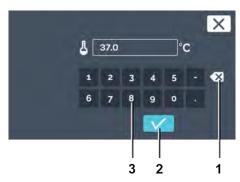
Fig. 111: 'Program segment settings → Input temperature setpoint'

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

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 6.13.5 'Temperature guard' on page 97*. 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.

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

Fig. 113: 'Program segment settings → Confirmation'

1   *[Confirmation]* button

Creating a program segment

Fig. 114: Adding a program segment

1   *[New program segment]* button

Saving a program

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.

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

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 70*.

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.

➡ The saved program is displayed in the program overview.

Fig. 117: Program overview

1 Program overview

6.12.3 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
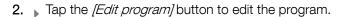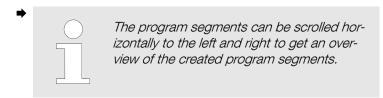
Fig. 119: 'Program mode → Program overview → Program segments'

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

Copying a program segment

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.

To copy a program segment, proceed as follows:

1. ▸ Tap on the program segment that you would like to copy.
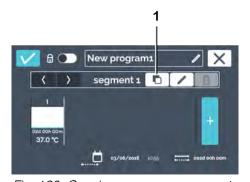
Fig. 120: Copying a program segment

1 *[Duplicate program segment]*
   button

Fig. 121: Copied segment

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

➡ 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 70*.

Deleting a program segment
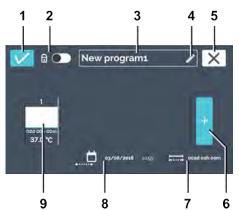
Fig. 122: Deleting a program segment

1 *[Delete program segment]* button
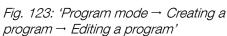
To delete a program segment, proceed as follows:

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 76*.

6.12.4 Copying and deleting a program

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

Change to the 'Program mode settings' menu ➡ Chapter 6.12.1 'Program mode settings' on page 68, 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 69.

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 84*	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 69*	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 70*	Shows a program segment. The program segments are run from left to right.

Copying a program

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

1 Program list
2 *[Copy program]* button

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

1 Program copy

Deleting a program

To copy a program, proceed as follows:
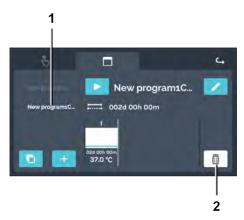
▸ Select the program to be copied and tap the *[Copy program]* button.

➡ The copy is created.

To delete a program, proceed as follows:

1

2

Fig. 126: 'Program mode → Delete'

1   Program list
2   *[Delete program]* button

1
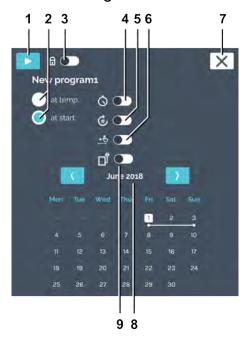
Fig. 127: 'Program mode → Delete dialogue'

1   *[Confirmation]* button

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

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

6.12.5 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 84*	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 85*	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 6.8.1 'Functional description of standstill mode' on page 48*.
6	*[Holding temperature]* switch➡ *'Holding temperature' on page 86*	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 87*	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 6.13.6.1 'Switchboard option' on page 101*or passive dehumidification option ➡ *Chapter 6.13.6.2 'Passive dehumidification option' on page 103* and the control contact is activated in the device settings ➡ *Chapter 6.13.6 'Control contact (option)' on page 101*.

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:
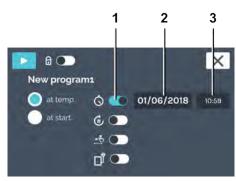
Fig. 130: Timer

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

Fig. 131: 'Timer → Date selection'

1 *[Confirmation]* button
2 Date selection
3 *[Cancel]* button
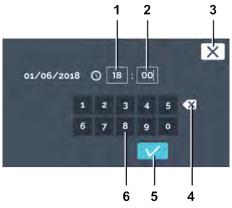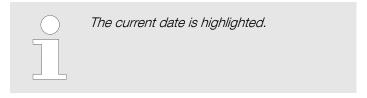
Fig. 132: 'Timer → Time input'

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

Program repetition

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.*

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

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.

To specify the program repetitions, proceed as follows:
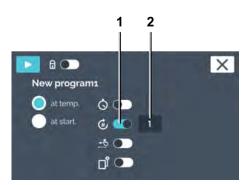
Fig. 133: Program repetitions

1 *[Program repetitions]* switch
2 *'Number of repetitions'* specification
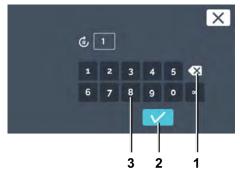
Fig. 134: *'Program repetitions → Input repetition(s)'*

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

Holding temperature

Fig. 135: Holding temperature

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

1. ▸ Activate the program repetition.

2. ▸ Tap on the number of repetitions to set this.
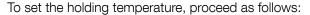
3. ▸ You can now either

- 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.

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:

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

Control contact (option)

Fig. 137: Start settings — Control
contact
1   [Control contact] switch

Program run-time overview

Fig. 138: Calender — Program run-
time overview

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.

The control contact button is only available on incubators with the Switchboard option ➡ Chapter 6.13.6.1 'Switchboard option' on page 101or passive dehumidification option ➡ Chapter 6.13.6.2 'Passive dehumidification option' on page 103.

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 6.13.6 'Control contact (option)' on page 101.

In the case of the passive dehumidification option ➡ Chapter 6.13.6.2 'Passive dehumidification option' on page 103 the ventilation opening is opened or closed by the control contact.

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

> 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 6.13.5 'Temperature guard' on page 97.

➡ The program is run.

2. During program mode, tap on *'HettCube activities'* to get to the program mode overview screen.
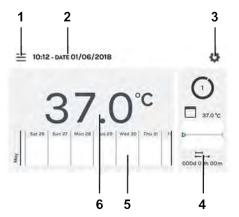
Fig. 140: Running program
1   *'HettCube activity'*

6.12.6 Program mode overview

Fig. 141: Main screen

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

Item	Designation	Description/function
1	Program settings ➡ *Chapter 6.11 'Manual mode' on page 54*, ➡ *Chapter 6.12 'Program mode' on page 68*	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 6.13 'Device settings' on page 92*	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 6.10 'Process flow information' on page 52* Further information about the symbols: ➡ *Appendix A 'Software symbols' on page 156*
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 6.12.1 'Program mode settings' on page 68*.

> **!**   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 124*.

> **i**   *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.*
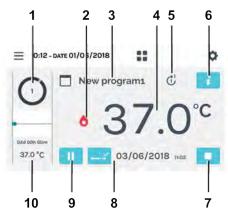
Fig. 143: Detailed program screen

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:
		Planned program end. (Only in *'at start'* mode)
		Program time elapsed so far.
		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.

6.13 Device settings

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

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

Fig. 144: Main screen

1 *[Device settings]* button

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.*

6.13.1 About

Fig. 146: 'About' menu

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

6.13.2 Date & time

> ℹ *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 6.13.7 'Language' on page 104.*

> ℹ *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.*

To set the date, proceed as follows:

Fig. 147: 'Date & time' menu

1. ▸

> ℹ *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
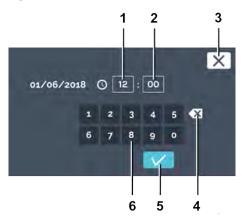
Fig. 150: Setting the time

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

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.

6.13.3   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 6.13.4 'Tolerance band' on page 96 and*

– *temperature guard classes 3.1 and 3.2. ➡ 'Class 3.1' on page 98 and ➡ 'Class 3.2' on page 99 .*

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.

6.13.4 Tolerance band

> The settings for the tolerance band alarm are defined in this menu.
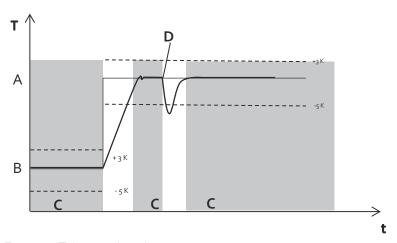
Fig. 152: Tolerance band

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.*

6.13.5 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
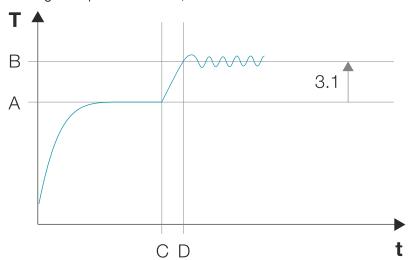
Fig. 155: Diagram of 'Temperature guard', class 3.1

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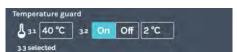
Fig. 157: 'Temperature guard' menu, [On], class 3.3

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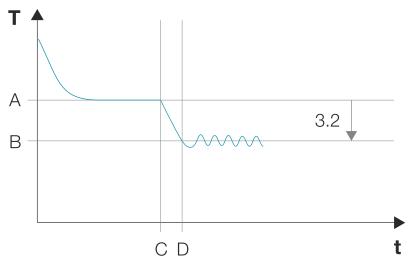
Fig. 158: Diagram of 'Temperature guard', class 3.2

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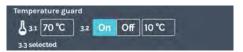
Fig. 159: 'Temperature guard' menu, [On], class 3.3

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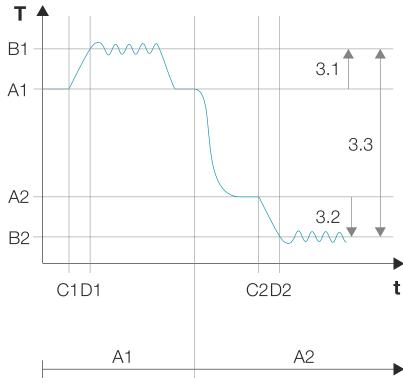
Fig. 160: Diagram of 'Temperature guard', class 3.3

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.

6.13.6 Control contact (option)

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

6.13.6.1 Switchboard option
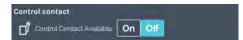
Fig. 161: 'Control contact' menu

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 102.*

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 54*.
- 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 70*.
- it can be used in the start settings for an existing program ➡ *'Control contact (option)' on page 87*.

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:

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.

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

The lowest temperature that can still be reached can be found in the heat compensation diagram ➡ *Chapter 6.14 'Heat compensation' on page 116* .

> 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.

6.13.6.2 Passive dehumidification option
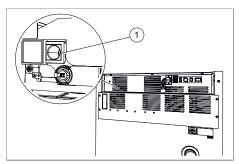
Fig. 164: Passive dehumidification ventilation opening

1 Ventilation opening for passive dehumidification
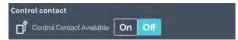
Fig. 165: Control contact

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 54*.
- 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 70*.
- The control contact can be used in the start settings for an existing program ➡ *'Control contact (option)' on page 87*.

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.

6.13.7 Language
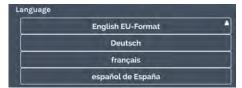
Fig. 166: 'Language' menu

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.

6.13.8 Sound
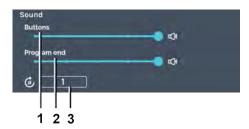
Fig. 167: 'Sound' menu
1. *[Buttons]* controller
2. *[Program end]* controller
3. Input of *'Number of reproduced signal sounds'*

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).

6.13.9   Door
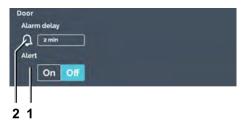
Fig. 168: Door

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.

6.13.10   Screen

> *In this menu, you can make settings on the screen.*
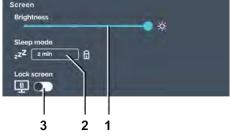
Fig. 169: 'Screen' menu

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

Screen lock

Fig. 171: 'Screen' menu, 'Screen lock'
'Admin PIN' input
1   *[Confirmation]* button

Activating the screen

Fig. 172: Bit key
1   *[Bit key]* button

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'.

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.

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 6.13.18 'Admin access' on page 113*.

6.13.11 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'*
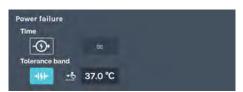
Fig. 174: 'Power failure scenario' menu — Selection 'Tolerance band'

If voltage is applied again after the power failure, the incubator checks whether the tolerance band ➡ *Chapter 6.13.4 'Tolerance band' on page 96* 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.

6.13.12 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).

6.13.13 Export

Fig. 176: 'Export' menu

> ℹ️ *You can export programs, temperature drops, user instructions and log files to a USB stick via the export function.*
>
> *The exported programs and temperature drops can be transferred directly to other HettCube incubators.*

> ❗ **NOTICE**
>
> If the USB stick is plugged in upside-down, this can result in the incubator being switched off.

To export data, proceed as follows:

1. Stick a USB stick into the service interface (USB port) on the front side of the incubator.

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

Fig. 177: Refreshing the USB stick

1 *[Refresh]* button

➡ The partition on the USB stick is displayed.

> ℹ️ *If there are multiple partitions on your USB stick, you can select the partition to which data should be exported via 'Partition on USB stick'.*
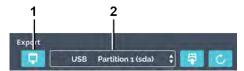
Fig. 178: USB stick export

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

Fig. 179: Directory selection

3. Select where the data to be exported should be saved and confirm the selection with the *[Confirmation]* button.

Device directory	In the root directory of the USB stick, a folder is automatically created during the export which has the incubator serial number as its name. If you have multiple incubators in use, you can easily keep the exported data separate. If there is already a folder with this name on the USB stick, the data located there is overwritten
Root directory	When selecting the root directory, the export package is stored directly in the root directory (without subfolders).
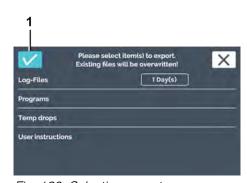
Fig. 180: Selecting export

1   *[Confirmation]* button

Fig. 181: Export started

Fig. 182: Export finished

1   *[Confirmation]* button

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	When *'Programs'* is selected, all programs are exported. The exported programs can be imported onto another incubator. When transferring data to another incubator, note that the data must lie directly in the root directory in order to be able to import it.
Temperature drops	If *'Temp drops'* is selected, all temperature drops are exported. The exported temperature drops can be imported onto another incubator. When transferring data to another incubator, note that the data must lie directly in the root directory in order to be able to import it.
User instructions	Under this item, you have the option of exporting documents stored ex works, e.g. the operating instructions, and transferring them to a PC.

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

➡ A message appears saying the export operation has been started.

> **!** **NOTICE**
>
> During the export operation, the USB stick must not be removed, since this can damage it.

The user is notified that the export was successful.

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

➡ You will go back to the Export menu.

Fig. 183: Eject USB stick

1   *[Eject USB stick]* button

Fig. 184: USB stick ejection message

6.13.14   Import

Fig. 185: 'Import' menu
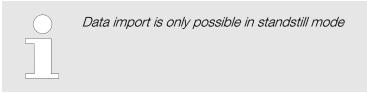
7. ▸ You can tap the *[Eject USB stick]* button in order to be able to remove the USB stick.

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

> ℹ️   *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
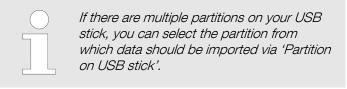
1   *[Refresh]* button

Fig. 187: USB stick import

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

➡ The partition on the USB stick is displayed.

> ℹ️   *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.
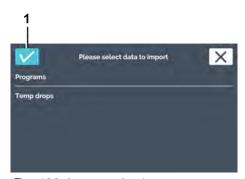
Fig. 188: Import selection

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.
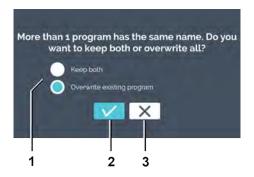
Fig. 189: Imported program exists

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.

6.13.15 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.

6.13.16 Logbook
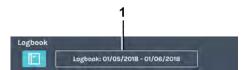
Fig. 194: 'Logbook' menu

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.

> ℹ️ *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.

6.13.17 System information

Fig. 196: 'System information' menu

> ℹ️ *In this menu, the system information is displayed to you.*

The system information contains information about the version numbers of the device components.

In addition, the serial numbers and contact data of Andreas Hettich GmbH & Co.KG are displayed.

6.13.18 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:

Fig. 201: Reset PIN

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. 202: Confirming entry of PUK
1   *[Confirmation]* button

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

Fig. 203: PUK entry
1   Keypad
2   *[Confirmation]* button

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

Fig. 204: Incorrect PUK input

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

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

Fig. 205: PUK

Fig. 206: PUK confirmation

1   [Confirmation] button

6.13.19   Service dashboard

Fig. 207: 'Service dashboard' menu

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 113.

Personnel:

- Service technician

> ⓘ *This menu is only accessible to service technicians and is password-protected.*

The service dashboard is how service technicians access your incubator. On the service dashboard, additional settings can be parametrized, software updates can be installed or the incubator can be reset to the factory settings.

6.14   Heat compensation

The heat output of external devices in the interior of a cooled incubator will be compensated.

> ⓘ *The use of external devices inside the incubator only makes sense for incubators with cooling units, since these can compensate for the additional heat output.*
>
> *If such applications or external devices are used in incubators without cooling units, excessive heat can quickly develop which the incubator cannot compensate for. The sample material might be negatively influenced by the excessive temperature. Long-term excessive temperatures can damage the incubator.*
>
> *When using external devices in the interior (e.g., via the access port), make sure that the technical values relating to the heat compensation are observed (max. 400 Watt at an ambient temperature of 22 °C, or 300 W at an ambient temperature of 35 °C). The specified compensation power only refers to incubators with cooling units. If the incubator is switched off or fails, the external devices in the interior must be switched off immediately in order not to damage the incubator.*

> ⓘ When using external devices in the interior, the Switchboard option is recommended for reasons of operational safety.

> ❗ NOTICE
>
> When operating a thermal load in the interior, a suitable signal transducer for monitoring the incubator must be connected to the potential-free alarm contact.
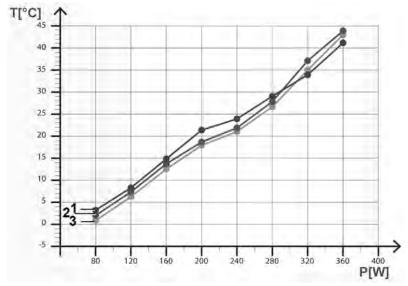
Fig. 208: Heat compensation at an ambient temperature of 22 °C

T [°C]   Temperature in °C
P [W]   Power in Watts
1   Lowest reachable temperature, HettCube 600 R (0 °C to +65 °C)
2   Lowest reachable temperature, HettCube 400 R (0 °C to +65 °C)
3   Lowest reachable temperature, HettCube 200 R (0 °C to +65 °C)

The lowest reachable temperature values when using external devices with different heat outputs in the interior of the incubator.

> ⓘ The data refers 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 during cleaning and disinfection:

- The incubator must **not** be cleaned in cleaning machines.
- The incubator may **not** be cleaned under running water, in water baths or with compressed air.
- It may only be cleaned by hand and disinfected with liquids.
- To avoid signs of corrosion due to cleaning agents and disinfectants, it is imperative that the special instructions for use from the manufacturer of the cleaning agent and disinfectant be observed.
- The water temperature must be 20-25°C.
- Only detergents/disinfectants may be used which
  - have a pH between 5-8,
  - do not contain caustic alkalis, peroxides, chlorine compounds, acids and alkaline solutions.

The housing of the incubator has an exterior powder coating. The interior of the incubator is made of stainless steel 1.430.1.

Before cleaning, disconnect the mains plug.

For easier cleaning of the interior, the rails and sheets can be removed from the interior.

Before a cleaning or decontamination method is applied other than the one recommended by the manufacturer, the operating company must make sure (by asking the manufacturer) that the intended method will not damage the incubator.

Observe chapter ➡ Chapter 6.5 'Standard check before every use' on page 46.

> *In the event of strong contamination, the filter mat must be exchanged. A service technician must do the exchanging.*
>
> *For incubators with cooling, we recommend that the filter mat be exchanged 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:

1. Remove the slide-in modules and drawers.
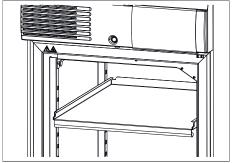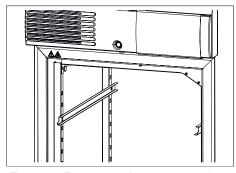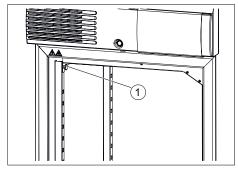
Fig. 209: Removing the slide-in module

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.
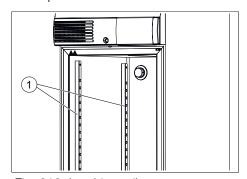
Fig. 213: Latching rails

1   Latching rails

6. ▸ Disengage the two latching rails upward and then remove toward the front.
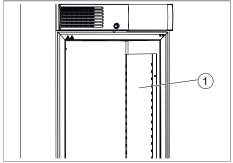
Fig. 214: Right baffle sheet

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.
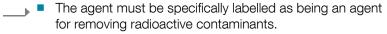
> ⚠ **WARNING**
>
> **Risk due to insufficient disinfection after contamination!**
>
> There is a risk of infection for the user. Observe your laboratory rules (hygiene plan, etc.) for handling biological agents.

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 micro-biological 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.

In order to ensure the longevity and error-free running of the incubator, the incubator should be maintained at regular intervals by the manufacturer or personnel authorized by the manufacturer.

The manufacturer offers maintenance contracts for this purpose. The operating company is obligated to make sure that the maintenance is carried out by an authorized service technician.

Interval	Maintenance work	Personnel
Before every use	Before every use, make sure that the incubator is in perfect technical condition and no restrictions are to be expected according to the desired application.	User
Annual maintenance	Check by a service technician from the manufacturer.	Service technician
	Check by a service technician from the manufacturer. The information can be closed with the *[Close]* button.	Service technician
	Check the software versions. If required and after consultation, update the software version.	Service technician
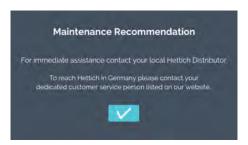
Fig. 215: Maintenance Recommendation

After 2 years, a message appears automatically with a notice about the incubator being maintained by a service technician from the manufacturer. The user can make the message disappear; afterwards, the message appears again at yearly intervals. Once maintenance is performed by the service technician, the time period until the message appears again is set to 2 years.

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.*
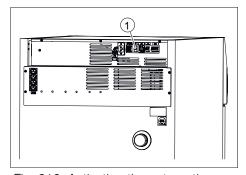
Fig. 216: Activating the automatic circuit breaker

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 start not possible.	A program is already running, or a program start is scheduled.	Stop the running program.
The control contact is not active once program operation had started, although it has been activated in the program segment.	The control contact was not activated in the start conditions.	Activate the control contact ➡ *'Control contact (option)' on page 87* when starting the program.
Date and time are incorrectly displayed.	Summer/winter time must be corrected manually.	Set the date and time in the device settings ➡ *Chapter 6.13.2 'Date & time' on page 94*.
Recorded data is no longer shown in the display.	The date or time was changed or called up twice in succession and the entry confirmed by pressing the *[Confirmation]* button.	Restart the device.

Fault description	Cause	Remedy
HMI hangs, shows no reaction, audible alarm	HMI overloaded, software hangs	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.

No.	Fault description	Cause	Remedy
2	Error 2	RAM is full.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
3	Error 3	Sensor reading below the valid measuring range.	Call Service; inform them of the device type, serial number and error number.
4	Error 4	Sensor reading above the valid measuring range.	Call Service; inform them of the device type, serial number and error number.
5	Error 5	No reading from the sensor.	Call Service; inform them of the device type, serial number and error number.
6	Error 6	Calculation error	Call Service; inform them of the device type, serial number and error number.
7	Error 7	Calculation error	Call Service; inform them of the device type, serial number and error number.
10	Error 10	Connection to the temperature sensor is interrupted or sensor is defective.	Call Service; inform them of the device type, serial number and error number.
12	Error 12	Error value according to standard IEEE-754.	Call Service; inform them of the device type, serial number and error number.
13	Error 13	Error value according to standard IEEE-754.	Call Service; inform them of the device type, serial number and error number.
14	Error 14	Error value according to standard IEEE-754.	Call Service; inform them of the device type, serial number and error number.
15	Error 15	Controller reports a µC error.	Call Service; inform them of the device type, serial number and error number.

No.	Fault description	Cause	Remedy
16	Error 16	Memory error	Call Service; inform them of the device type, serial number and error number.
17	Error 17	Memory error	Call Service; inform them of the device type, serial number and error number.
18	Error 18	Memory error	Call Service; inform them of the device type, serial number and error number.
19	Error 19	Memory error	Call Service; inform them of the device type, serial number and error number.
20	Error 20	Memory error	Call Service; inform them of the device type, serial number and error number.
21	Error 21	Memory error	Call Service; inform them of the device type, serial number and error number.
22	Error 22	Controller: Runtime error detected.	Call Service; inform them of the device type, serial number and error number.
23	Error 23	Controller: Error while executing a function.	Call Service; inform them of the device type, serial number and error number.
24	Error 24	Controller: The controller software has performed a reset.	Restart system. Check whether further operation is possible. Call Service; inform them of the device type, serial number and error number.
25	Error 25	Controller: Internal data access denied.	Call Service; inform them of the device type, serial number and error number.
26	Error 26	Flash memory full.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
27	Error 27	Internal RS485 bus communication has been lost.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.

No.	Fault description	Cause	Remedy
28	Error 28	The application has detected an internal error.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
29	Error 29	This is not an error rather a message indicating that the power failure lasted longer than set in the user settings (power failure/time). The program/manual operation has been interrupted.	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples.
30	Error 30	This is not an error rather a message to the user indicating that a power failure has occurred. The program/manual operation continues, based on the user settings (tolerance band and power failure/tolerance band).	Please acknowledge the message by pressing [X]; set operation continues.
31	Error 31	This is not an error rather a message to the user indicating that a power failure has occurred. The program/manual operation has been interrupted based on the user settings (tolerance band and power failure/tolerance band). The system maintains the holding temperature.	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples.
32	Error 32	This is not an error rather a message to the user indicating that the indoor temperature has exceeded/fallen below the tolerance band range (user settings Tolerance band). It also occurs when the setpoint temperature has not been reached after a given time	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples. Please check the tolerance band settings. Check whether the setpoint has been reached within 10h; if necessary, increase the value in the maintenance area subject to consultation. Check whether error 51 was previously present; proceed according to error 51 if necessary.
33	Error 33	Door alarm. The door was open longer than set in the user settings (door/alarm delay).	Please close the door and acknowledge the message by pressing [X]; door alarm can be changed in settings

No.	Fault description	Cause	Remedy
35	Error 35	The temperature set in the temperature monitor 3.1 has been exceeded. The setpoint temperature set is higher than the set class 3.1 temperature.	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples. The temperature monitor settings must be adjusted ➥ *Chapter 6.13.5 'Temperature guard' on page 97.* The audible alarm cannot be acknowledged if an error is still pending.
		The temperature set in the temperature monitor 3.1 has been exceeded. Additional energy input due to use of external devices cannot be compensated for	Take account of the heat compensation ➥ *Chapter 6.14 'Heat compensation' on page 116.*
		The temperature set in the temperature monitor 3.1 has been exceeded. The door was open for a long time and the actual temperature is different from the setpoint temperature.	Wait until the actual temperature has adjusted to the setpoint temperature. Check whether error 51 has previously been displayed. Proceed according to error 51 if necessary.
37	Error 37	The temperature set in the temperature monitor 3.2 has been exceeded. The setpoint temperature that has been set is higher than the set class 3.2 temperature.	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples. The temperature monitor settings must be adjusted ➥ *Chapter 6.13.5 'Temperature guard' on page 97.* The audible alarm cannot be acknowledged if an error is still pending.
		The temperature set in the temperature monitor 3.2 has not been reached. The setpoint temperature that has been set is lower than the set class 3.2 temperature.	Please acknowledge the message by pressing [X]; customer decides how to proceed after checking the samples. The temperature monitor settings must be adjusted ➥ *Chapter 6.13.5 'Temperature guard' on page 97.*
		The temperature set in the temperature monitor 3.2 has not been reached. The door was open for a long time and the actual temperature is different from the setpoint temperature.	
38	Error 38	Door is open.	Please close the door.

No.	Fault description	Cause	Remedy
39	Error 39	Door has been closed.	The message *'No 38'* remains for three seconds and then disappears. The message can be cleared more quickly by pressing *[X]* to acknowledge it.
40	Error 40	The current program is paused.	The program will continue if the *[Start]* button is pressed.
42	Error 42	This is not an error rather a message to the user indicating that a power failure has occurred. The program will continue, based on the user settings (power failure/time).	Please acknowledge the message by pressing *[X]*; customer decides how to proceed after checking the samples.
44	Error 44	No SD card has been detected.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
45	Error 45	Communication between the touchscreen and the controller has been interrupted.	Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
50	Error 50	The temperature difference between the two independent temperature sensors was too great. This error may also result from an error of type similar to error no. 51.	Please acknowledge the message by pressing *[X]*; customer decides how to proceed after checking the samples. Restart system. Check whether further operation is possible. If the error appears again: Call Service; inform them of the device type, serial number and error number.
51	Error 51	The system has detected that I2C bus communication to the temperature sensor failed with the system still active.	Restart system. Check whether further operation is possible. If the error appears more frequently: Call Service; inform them of the device type, serial number and error number.
52	Error 52	Battery discharged.	Call Service; inform them of the device type, serial number and error number. If necessary, check and correct the set date and time.

No.	Fault description	Cause	Remedy
54	Error 54	Not an error, rather information for the user. Date and/or time have been changed.	

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

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.

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

> *If this field is closed, there is the option of opening the event overview via 'Device settings → Logbook' → Chapter 6.13.16 'Logbook' on page 112*

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 6.13.4 'Tolerance band' on page 96*.

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 6.13.5 'Temperature guard' on page 97*.

9 Technical data

9.1 HettCube 200

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37°C	0.038 kWh/h	
Inner volume	150 l	

Ambient conditions (EN / IEC 61010-1)	
Set-up site	Indoors only
Height	Up to 2000 m above sea level
Ambient temperature	16°C to 35°C
Humidity	Maximum relative humidity 75%, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Degree of contamination	2
Device protection class	I
Noise level	≤ 41 dB(A)

Not suitable for use in explosion-endangered areas.

EMC	
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B
Type of protection (EN 60529)	IP 20

Temperatures	
Temperature range	1 K above the ambient temperature up to 65 °C
Temperature setting precision	0.1°C
Temperature deviation over time at 37 °C	± 0.1 K

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

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 420 mm	
Exterior dimensions		
W x D[1] x H	710 x 825[1] x 970 mm	
Weight	approx. 92 kg [3]	
Maximum load per standard feed	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 was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.2   HettCube 200 R

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37°C	0.038 kWh/h	
Cooling medium	R 513 a (Contains fluorinated greenhouse gases documented by the Kyoto Protocol)	

Amount of refrigerant	200 g
Global-warming potential (GWP)	631
Inner volume	150 l

Ambient conditions (EN / IEC 61010-1)	
Set-up site	Indoors only
Height	Up to 2000 m above sea level
Ambient temperature	16°C to 35°C
Humidity	Maximum relative humidity 75%, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Degree of contamination	2
Device protection class	I
Noise level	≤ 44 dB(A)
Not suitable for use in explosion-endangered areas.	

EMC	
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B
Type of protection (EN 60529)	IP 20

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

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

Exterior dimensions		
W x D[1] x H	710 x 825[1] x 970 mm	
Weight	approx. 103 kg [3]	
Maximum load per standard feed	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] Lowest settable temperature -5 °C. Reaching a temperature < 0°C depends on the ambient conditions, however.

All temperature data was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.3   HettCube 400

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37°C	0.046 kWh/h	
Inner volume	310 l	

Ambient conditions (EN / IEC 61010-1)	
Set-up site	Indoors only
Height	Up to 2000 m above sea level
Ambient temperature	16°C to 35°C
Humidity	Maximum relative humidity 75%, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Degree of contamination	2
Device protection class	I

Noise level	≤ 41 dB(A)
Not suitable for use in explosion-endangered areas.	

EMC	
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B
Type of protection (EN 60529)	IP 20

Temperatures	
Temperature range	1 K above the ambient temperature up to 65 °C
Temperature setting precision	0.1°C
Temperature deviation over time at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Spatial temperature deviation at 25 °C	± 0.1 K
Recovery time (after door open for 30 s) at temperature setpoint 37 °C	≤ 4.5 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 850 mm	
Exterior dimensions		
W x D[1] x H	710 x 825[1] x 1425 mm	
Weight	approx. 117 kg [3]	
Maximum load per standard feed	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 was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.4 HettCube 400 R

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2]	500 VA/900 VA[2]
Energy consumption at 37°C	0.046 kWh/h	
Cooling medium	R 513 a (Contains fluorinated greenhouse gases documented by the Kyoto Protocol)	
Amount of refrigerant	200 g	
Global-warming potential (GWP)	631	
Inner volume	150 l	

Ambient conditions (EN / IEC 61010-1)		
Set-up site	Indoors only	
Height	Up to 2000 m above sea level	
Ambient temperature	16°C to 35°C	
Humidity	Maximum relative humidity 75%, non-condensing.	
Overvoltage category (IEC 60364-4-443)	II	
Degree of contamination	2	
Device protection class	I	
Noise level	≤ 44 dB(A)	
Not suitable for use in explosion-endangered areas.		

EMC		
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B	
Type of protection (EN 60529)	IP 20	

Temperatures	
Temperature range	0 °C to 65 °C [4]
Temperature setting precision	0.1°C
Temperature deviation over time at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Spatial temperature deviation at 25 °C	± 0.1 K
Recovery time (after door open for 30 s) at temperature setpoint 37 °C	≤ 4.5 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 850 mm	
Exterior dimensions		
W x D[1] x H	710 x 825[1] x 1425 mm	
Weight	approx. 128 kg [3]	
Maximum load per standard feed	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] Lowest settable temperature -5 °C. Reaching a temperature < 0°C depends on the ambient conditions, however.

All temperature data was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.5   HettCube 600

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2)	500 VA/900 VA[2)
Energy consumption at 37°C	0.056 kWh/h	
Inner volume	520 l	

Ambient conditions (EN / IEC 61010-1)		
Set-up site	Indoors only	
Height	Up to 2000 m above sea level	
Ambient temperature	16°C to 35°C	
Humidity	Maximum relative humidity 75%, non-condensing.	
Overvoltage category (IEC 60364-4-443)	II	
Degree of contamination	2	
Device protection class	I	
Noise level	≤ 41 dB(A)	
Not suitable for use in explosion-endangered areas.		

EMC		
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B	
Type of protection (EN 60529)	IP 20	

Temperatures		
Temperature range	1 K above the ambient temperature up to 65 °C	
Temperature setting precision	0.1°C	
Temperature deviation over time at 37 °C	± 0.1 K	
Spatial temperature deviation at 37 °C	± 0.2 K	
Spatial temperature deviation at 25 °C	± 0.1 K	
Recovery time (after door open for 30 s) at temperature setpoint 37 °C	≤ 5.5 min	

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 1415 mm	
Exterior dimensions		
W x D[1) x H	710 x 825[1] x 1990 mm	
Weight	approx. 164 kg [3)	
Maximum load per standard feed	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 was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.6   HettCube 600 R

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
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	
Connected load	450 VA/850 VA[2)	500 VA/900 VA[2)
Energy consumption at 37°C	0.056 kWh/h	
Cooling medium	R 513 a (Contains fluorinated greenhouse gases documented by the Kyoto Protocol)	
Amount of refrigerant	200 g	
Global-warming potential (GWP)	631	
Inner volume	520 l	

Ambient conditions (EN / IEC 61010-1)	
Set-up site	Indoors only
Height	Up to 2000 m above sea level

Ambient temperature	16°C to 35°C
Humidity	Maximum relative humidity 75%, non-condensing.
Overvoltage category (IEC 60364-4-443)	II
Degree of contamination	2
Device protection class	I
Noise level	≤ 44 dB(A)
Not suitable for use in explosion-endangered areas.	

EMC	
Emitted interference, immunity to interference	EN/IEC 61326-2-6, Class B
Type of protection (EN 60529)	IP 20

Temperatures	
Temperature range	0 °C to 65 °C [4]
Temperature setting precision	0.1°C
Temperature deviation over time at 37 °C	± 0.1 K
Spatial temperature deviation at 37 °C	± 0.2 K
Spatial temperature deviation at 25 °C	± 0.1 K
Recovery time (after door open for 30 s) at temperature setpoint 37 °C	≤ 5.5 min

Dimensions		
Interior dimensions		
W x D x H	535 x 690 x 1415 mm	
Exterior dimensions		
W x D[1] x H	710 x 825[1] x 1990 mm	
Weight	approx. 175 kg [3]	
Maximum load per standard feed	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] Lowest settable temperature -5 °C. Reaching a temperature < 0°C depends on the ambient conditions, however.

All temperature data was measured at an ambient temperature of 22°C and in acc. with DIN 12880:2007-05. The data applies to incubators with standard equipment.

9.7 Definition of the utilized space
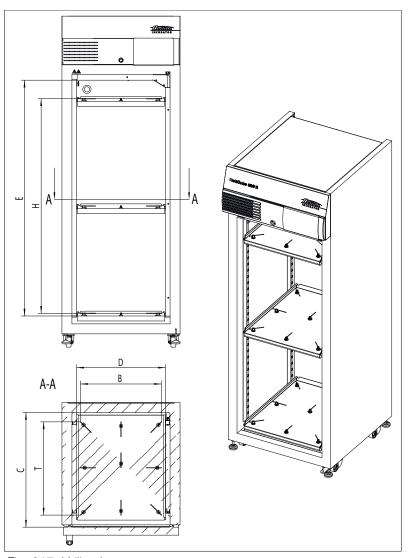
Fig. 217: Utilized space

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	600/600 R	400/400 R	200/200 R
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 (in litres)	351	199	82

Tab. 4: Utilized space in acc. with DIN 12880:2007-05

9.8 Type plate
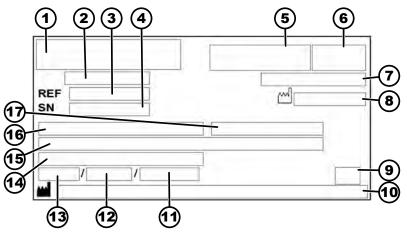
Fig. 218: Type plate

1 Manufacturer logo
2 Product designation
3 Type number
4 Serial number
5 possibly IVD symbol
6 possibly EAC marking, CE marking
7 Country of manufacture
8 Year of manufacture
9 Symbol: Observe the operating instructions.
10 Manufacturer address
11 possibly coolant circuit pressure (for cooled incubators)
12 possibly coolant filling volume (for cooled incubators)
13 possibly coolant type (for cooled incubators)
14 Temperature range / nominal temperature
15 Power values
16 Voltage range
17 Mains frequency

9.9   Dimensions

Standard dimensions
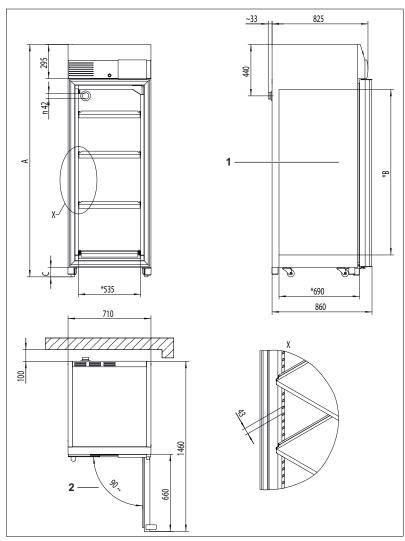
Fig. 219: Dimensions

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'*
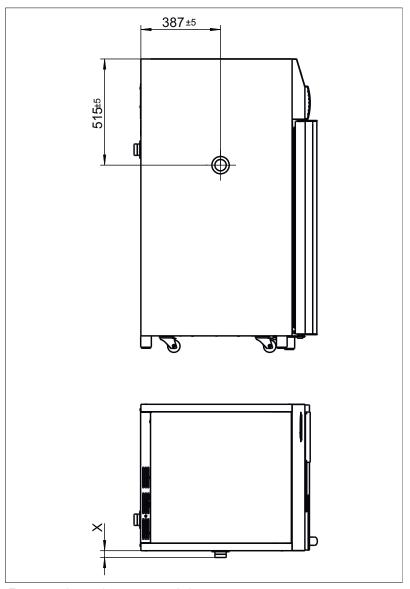
Fig. 220: 'Lateral access port' dimension

	Ø22 mm	Ø42 mm	Ø67 mm
X ±5	26 mm	33 mm	40 mm

10   Disposal

Before disposal, the incubator must be decontaminated and cleaned to protect personnel, the environment and property.

When disposing of the incubator, the respective legal regulations must be observed.

According to the directive 2012/19/EU , devices may no longer be disposed of in the household waste.

Incubators without a cooling function belong to group 4 (large devices) and are classified in the business-to-business area.

Incubators with a cooling function belong to group 1 (heat exchangers) and are classified in the business-to-business area.

The symbol with the crossed-out trash can indicates that the incubator must not be disposed of in the household waste.

The disposal regulations of the individual countries might vary. In case this is required, please contact your supplier.

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

W

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)
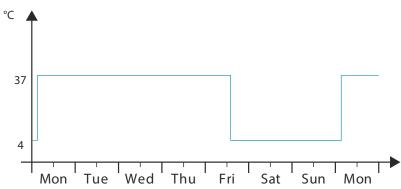
Fig. 221: Diagram 'Temperature drop during the entire weekend (Friday afternoon to Monday morning)'

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 59*.

2. ▸ Set the target temperature to 37°C ➡ *'Set temperature' on page 65*.

3. ▸ Start manual mode ➡ *Chapter 6.11.2 'Starting manual mode' on page 66*.

B.2 Temperature drop over one day (Sunday)
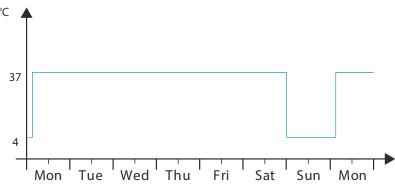
Fig. 222: Diagram 'Temperature drop over one day (Sunday)'

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 59*.

2. ▸ Set the target temperature to 37°C ➡ *'Set temperature' on page 65*.

3. ▸ Start manual mode ➡ *Chapter 6.11.2 'Starting manual mode' on page 66*.

B.3 Temperature drop with holiday function (using Wednesday as an example)
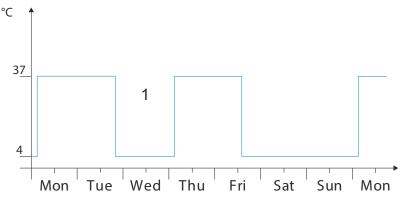
Fig. 223: Diagram 'Temperature drop with holiday function (using Wednesday as an example)'

1   Holiday

Operating mode:

Manual mode; Temperature drop via real-time calendar and holiday function

Procedure:

Fig. 224: 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 59*.

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 65*.

4. Start manual mode ➡ *Chapter 6.11.2 'Starting manual mode' on page 66*.

B.4 Temperature drop on the weekend with start delay
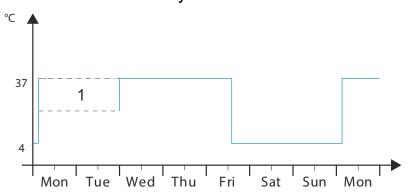

Fig. 225: Diagram 'Temperature drop on the weekend with start delay'

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 59*.

2. Set the target temperature to 37°C ➡ *'Set temperature' on page 65*.

3. Set the starting date in the start delay ➡ *'Start delay' on page 56*.

> *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.
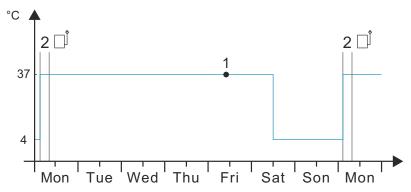
Fig. 226: Diagram 'Using the passive dehumidification option, example of temperature drop during weekend'

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 6.13.6.2 'Passive dehumidification option' on page 103*.

Set the program as shown; see ➡ Chapter 6.12.2 'Creating a program' on page 69. The ventilation opening is opened as long as the control contact is active.

Please take the starting time into account; see ➡ 'Timer' on page 84.

Fig. 227: 'Dehumidification' program

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:
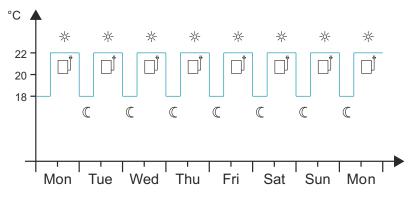
Program mode; Programming with external contact
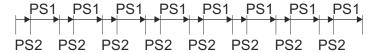
Fig. 228: Diagram 'External devices are integrated in program mode, e.g. DAY/NIGHT simulation.'

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 6.14 'Heat compensation' on page 116.*

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. 229: 'Day/night simulation 'program

> Set the program as shown ➡ Chapter 6.12.2 'Creating a program' on page 69.
>
> Please take the starting time into account ➡ 'Timer' on page 84.

B.7 Combination of standstill mode with incubation mode (energy-saving mode)
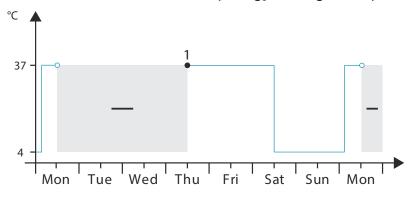
Fig. 230: Diagram 'Combination of standstill mode with incubation mode (energy-saving mode)'

1 Starting time (Thursday, 12:00 p.m.)
PS Program segment

Operating mode:

Program mode; Temperature profile with standstill segment

Fig. 231: 'Energy-saving mode' program

> Set the program as shown ➡ Chapter 6.12.2 'Creating a program' on page 69.
>
> 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 84.

B.8 Incubator is always cleaned on Wednesdays due to the laboratory routine (SOP) (standstill mode)
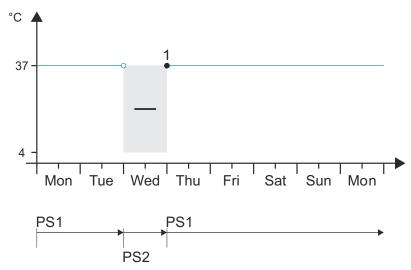
Fig. 232: Diagram 'Incubator is always cleaned on Wednesdays due to the laboratory routine (SOP) (standstill mode)'

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. 233: 'Cleaning mode' program

Set the program as shown ➡ Chapter 6.12.2 'Creating a program' on page 69.

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 84.

C   Accessory overview

	Only original spare parts and approved original accessories of the company Andreas Hettich GmbH & Co. KG may be used.
	Details concerning the specification of the technical data can be found in the complete catalogue or the Product Guide.

Order No.	Article
	Incubator, cooling incubator of the HettCube series Options and accessories
60503	**Independent PT 100 sensor** For independent temperature measurement, four-wire system, temperature values output with analogue output 4-20 mA on the back of the device
60521	**Switchboard** 4-fold socket strip, as a unit controllable via touchscreen, on the back of the device
60042	**Passive dehumidification** Allows the individual or time-controlled actuation of a ventilation opening in the incubator via the touchscreen.
60526	**Parameters for continuous cooling operation** For storing the samples for longer than 2 weeks below 15°C
60525	**USB port blocker** To lock the service interface (USB). Protect against unauthorized access.
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 outer door, for HettCube 200 | 200 R
60001	**Shelf (set)** Made of stainless steel, with standard rails, max. load (kg): 50
60031	**Shelf (HTS set)** Made of stainless steel, with telescopic rails, pull out up to 70 %, max. load (kg): 40

Order No.	Article
60024	**Drawer (HTS set), 30 mm high** AB66005en Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60025	**Drawer (HTS set), 65 mm high** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60026	**Drawer (HTS set), 105 mm high** 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 (pc): 90
60039	**Rack (set)** For Petri dishes, stainless steel, with standard rails, Petri dishes ⌀ (mm): 90, max. load (pc): 90
60040	**Rack** For Petri dishes, stainless steel, Petri dishes ⌀ (mm): 90, max. load (pc): 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 (pc): 81 tubes
60037	**Rack (set)** For inclined storage of cultures (Loewenstein), stainless steel, with standard rails, inclination angle: 5°, tube ⌀ (mm): 15-20, max. load (pc): 81 tubes
60041	**Rack** For inclined storage of cultures (Loewenstein), stainless steel, inclination angle: 5°, tube ⌀ (mm): 15-20, max. load (pc): 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°
60006	**Access port** ⌀ (mm): 22, foam stoppers
60007	**Access port** ⌀ (mm): 42, foam stoppers

Order No.	Article
60008	**Access port** ∅ (mm): 67, foam stoppers
60009	**Stacking kit** For safe stacking of two HettCube 200 | 200 Rs
60010	**Rolling cabinet** Lockable, with one drawer, incl. lockable castors, W x D x H (mm): 770 x 500 x 550, for HettCube 200 | 200 R
60919	**HTS fixing kit** For fixing of shelves and drawers with telescopic rails, made of polyamide

Order No.	Article
	Incubator, cooling incubator of the HettCube series Options and accessories
60001	**Shelf (set)** Made of stainless steel, with standard rails, max. load (kg): 50
60031	**Shelf (HTS set)** Made of stainless steel, with telescopic rails, pull out up to 70 %, max. load (kg): 40
60024	**Drawer (HTS set), 30 mm high** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60025	**Drawer (HTS set), 65 mm high** Made of stainless steel, with telescopic rails, pull out up to 70 %, tightly welded, max. load (kg): 40
60026	**Drawer (HTS set), 105 mm high** 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 (pc): 90
60039	**Rack (set)** For Petri dishes, stainless steel, with standard rails, Petri dishes ∅ (mm): 90, max. load (pc): 90
60040	**Rack** For Petri dishes, stainless steel, Petri dishes ∅ (mm): 90, max. load (pc): 90

Order No.	Article
60036	**Rack (HTS set)** AB66005en 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 (pc): 81 tubes
60037	**Rack (set)** For inclined storage of cultures (Loewenstein), stainless steel, with standard rails, inclination angle: 5°, tube ⌀ (mm): 15-20, max. load (pc): 81 tubes
60041	**Rack** For inclined storage of cultures (Loewenstein), stainless steel, inclination angle: 5°, tube ⌀ (mm): 15-20, max. load (pc): 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-fold socket strip, as a unit controllable via touchscreen, on the back 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 back of the device
60042	**Passive dehumidification** Allows the individual or time-controlled actuation of a ventilation opening in the incubator via the touchscreen.
60043	**Service** Assembly of the stacking kit for HettCube 200 | 200 R
60044	**Service** Replacement of door stop
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 outer door,
60006	**Access port** ⌀ (mm): 22, foam stoppers

Order No.	Article
60007	**Access port** ∅ (mm): 42, foam stoppers
60008	**Access port** ∅ (mm): 67, foam stoppers
60009	**Stacking kit** For safe stacking of two HettCube 200 | 200 Rs
60010	**Rolling cabinet** Lockable, with one drawer, incl. lockable castors, W x D x H (mm): 770 x 500 x 550, for HettCube 200 | 200 R
60525	**USB port blocker** To lock the service interface (USB). Protect against unauthorized access.
60526	**Parameters for continuous cooling operation** For storing the samples for longer than 2 weeks below 15°C
60919	**HTS fixing kit** For fixing of shelves and drawers with telescopic rails, made of polyamide
E4599-5	**HTS safeguard** Packaging unit 10x