Ecotron
Operating Manual



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Ecotron
Incubation Shaker

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V.03.01 - Original

This operating manual can also be found online at:
www.infors-ht.com/en/ecotron

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Table of Contents

1 General Information 5
1.1 About this Manual 5
1.2 Explanation of Special Notices 6
1.2.1 Warning Notices 6
1.2.2 Other Notices 6
1.3 Device Identification (Standard Identification Plate) 7
1.4 Declaration of Conformity 7
1.5 Customer Service and Services 7

2 Safety and Responsibility 8
2.1 Intended Use, Incorrect Use and Misuse 8
2.2 Cultivation Vessels to Be Used 9
2.3 Qualified Personnel 11
2.3.1 Provider 11
2.3.2 User 11
2.3.3 Operator 12
2.4 Unauthorised Persons 13
2.5 Responsibility of the Provider 13
2.6 General Hazards 13
2.6.1 Electrical Current 14
2.6.2 Danger due to Moving Parts 14
2.6.3 Unauthorised Spare Parts and Accessories 14
2.7 Particular Hazards 15
2.7.1 Danger due to Hot Surfaces 15
2.7.2 Dangerous Gases 15
2.7.3 Flammable or Explosive Substances 16
2.7.4 Corrosive or Toxic Substances 16
2.7.5 Pathogenic Organisms 16
2.8 Safety Features 16
2.9 Warning Symbols on the Device 17
2.10 Declaration of Decontamination 18

3 Setup and Function 19
3.1 Setup of the Basic Unit 19
3.2 Functions 21
3.2.1 Standard Function - Shaking 21
3.2.2 Standard Function – Temperature Control 22
3.2.3 Optional Cooling Function 23
3.3 Control Rack 24
3.4 Interior Lighting 25
3.5 Mains Connection 25

Table of Contents

3.6 Openings 26
3.6.1 Discharge Outlet 26
3.6.2 Air Vents 26

4 Accessories 27
4.1 Trays 27
4.1.1 Tray with Sticky Stuff 27
4.1.2 Tray with Pin Holders 30
4.1.3 Tray with Sliding Bars 32
4.2 Clamps and Other Holders 32
4.2.1 Clamps 32
4.2.2 Test Tube Holders 34
4.3 Box for Microtitre Plates 35

5 Transport and Storage 38
5.1 Symbols on the Packaging 38
5.2 Transport Inspection 38
5.3 Transporting the Device 39
5.4 Storing the Device 40

6 Installation 41
6.1 Requirements for the Installation Site 41
6.1.1 Operating Conditions at the Installation Location 41
6.1.2 Minimum Distances to the Device 42
6.2 Installing the Device 43
6.2.1 Setting up the Device 43
6.2.2 Stacking Devices 44
6.2.3 Establishing the Power Supply 46

7 Operation 47
7.1 Switching on the Device 47
7.2 Loading the Device 47
7.2.1 Loading and Unloading the Device 48
7.2.2 Fitting the Holders 49
7.2.3 Fitting the Tray 51
7.2.4 Fitting the Removable Shelf 51
7.2.5 Notices on Loading the Table 53
7.3 Overview of Display and Operating Elements 54
7.4 Adjusting, Activating and Deactivating Parameters 56
7.4.1 Overview of Parameters 56
7.4.2 Setting the Parameter Setpoint 57
7.4.3 Activating and Deactivating Parameters 58

Table of Contents

7.5 Switching on the Interior Lighting 59
7.6 Switching off the Device 59
7.7 Behaviour in Case of Interrupted Power Supply 60
7.8 Using the Device as a Tempering Cover 60

8 Rectifying Faults 62
8.1 Alarm Messages and their Meanings 62
8.2 Fault Tables 64
8.3 Returning for Repair 67

9 Maintenance and Cleaning 68
9.1 Maintenance 68
9.2 Cleaning and Disinfection 69
9.2.1 Cleaning 69
9.2.2 Disinfection 71

10 Spare Parts 72
10.1 Replacing Fuses 72
10.2 Replacing Control Rack 73
10.3 Replacing the Lighting Element of the Interior Lighting 74
10.4 Replacing the Drip Tray 75
10.5 Replacing the Liners on the Table 76

11 Disassembly and Disposal 77
11.1 Disassembly 77
11.2 Disposal 78

12 Technical Data and Specifications 79
12.1 Dimension Drawings 79
12.2 Specifications of the Basic Device 80
12.2.1 Weight and Dimensions 80
12.2.2 Electrical Connection and Performance Values 81
12.2.3 Interior Lighting 81
12.2.4 Materials 82
12.2.5 Emissions 82
12.2.6 Operating Conditions 82
12.2.7 Operating and Auxiliary Materials 83
12.3 Specifications of Parameters 83
12.3.1 Rotation Speed Parameter (Shaker Drive) 83
12.3.2 Temperature Parameter 84
12.4 Parameter Limits 84

Table of Contents

12.4.1 Maximum Permissible Setpoints for the Rotation Speed 84
12.4.2 Information on Temperatures that can Actually be Reached 86

13 EC-Declaration of Conformity 87

14 Index 88

1 General Information

1.1 About this Manual

This manual enables the safe and efficient handling of the device.

All the information and instructions in this operating manual comply with the current standards, legal regulations, the latest technological and scientific developments and the knowledge gained from the manufacturer's many years of experience in this field.



This operating manual is a component part of the device. It must be kept near to the device and must be accessible to the operators at all times.

The users must read the operating manual thoroughly and fully understand its contents before beginning any work.

Adhering to all the safety and operating instructions in this manual is essential to ensure that work is carried out safely.

The scope of delivery may differ from the explanations, descriptions and figures in this operating manual due to special designs, additional options specified on ordering and the latest technical/mechanical modifications.

This manual contains illustrations to aid general understanding. These may differ from the actual device as supplied.

1.2 Explanation of Special Notices

1.2.1 Warning Notices

Warning notices in this manual are indicated by a coloured bar and begin with a signal word that signifies the degree of the hazard.

DANGER

The signal word "DANGER" indicates a dangerous situation that will lead to severe or even fatal injuries if not avoided.

WARNING

The signal word "WARNING" indicates a potentially dangerous situation that may result in severe or even fatal injuries if not avoided.

CAUTION

The signal word "CAUTION" indicates a potentially dangerous situation that may result in minor injuries if not avoided.

1.2.2 Other Notices

ATTENTION

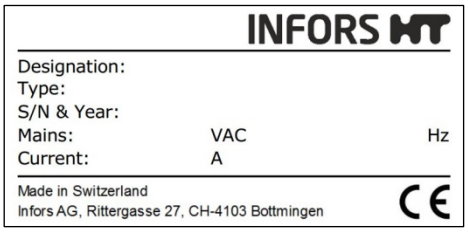
The word "ATTENTION" on a blue bar indicates a situation that may result in significant damage to property if not avoided.

INFORMATION

Texts located below a grey bar bearing the notice "INFORMATION" provide useful tips and recommendations for ensuring efficient, fault-free operation of the device.

1.3 Device Identification (Standard Identification Plate)

The identification plate is designed to allow clear identification of the device. It contains the following information:



- Manufacturer name
- Designation = Category of device
- Type = Device type (name)
- S/N = Serial number
- Year = Year of manufacture
- Mains = Nominal voltage and frequency
- Current = Current consumption
- Manufacturer address
- CE marking

1.4 Declaration of Conformity

The device is in compliance with the essential requirements of the following Directives:

- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU

The Declaration of Conformity according to EC Machinery Directive 2006/42/EC, annex II 1 A is attached to the operating manual (see chapter 13 "EC-Declaration of Conformity", page 87).

1.5 Customer Service and Services

Our Customer Service is at your disposal for technical advice and specialist enquiries. For contact information, see page 2.

Due to their familiarity with the potential applications of the device, the Customer Service team is able to provide information on whether the device can be used for a specific application or modified to handle the planned process.

Furthermore, our colleagues are always interested in new information and experiences resulting from user's applications for the device that may be valuable for the continued development of our products.

2 Safety and Responsibility

This section describes general considerations relating to user safety that must be taken into account when working with the device.

In the remaining sections, warning notices are used only to highlight particular hazards directly arising from the actions being described in the section in question.



It is essential to read the operating manual carefully – especially this section and the warning notices in the text – and to follow the instructions therein.

This section also refers to areas that are the responsibility of the provider due to certain risks arising from particular applications for which the device is used deliberately and with full awareness of the associated risks.

2.1 Intended Use, Incorrect Use and Misuse

Depending on its features, the device is designed to be used as an incubation shaker for cultivating microorganisms or cell cultures under the following conditions:

- **Cultivation of non-pathogenic microorganisms or cell cultures of risk category 1 in a biotechnology laboratory of biological protection level 1.**
- **Cultivation of pathogenic microorganisms or cell cultures of risk category 2 in a biotechnology laboratory of biological protection level 2.**

When using the device in protection level 2, users are responsible for taking appropriate protective measures to ensure that organisms cannot escape uncontrollably due to flask breakage, unintentional detaching of the sterile seal or similar.

⚠ WARNING

The device is designed and constructed exclusively for the intended use described above.

Each instance of non-conventional use is considered as misuse and may lead to dangerous situations.

Intended use also includes following all the instructions in this manual, especially those relating to:

- The installation site
- Use of suitable cultivation vessels
- User qualifications
- Permissible parameter setpoints
- Correct operation and maintenance

Any failure to observe the requirements specified in this manual shall be deemed incorrect use, in particular, use of inappropriate cultivation vessels and/or unsuitable holders at speeds that are too high.

Any use of the device outside the scope of the intended use as described above shall be deemed misuse. This also applies to applications for which the device is not designed, especially the following:

- The device is not protected against explosions. Use and manufacture of explosive gases as well as operating the device in the Ex area are therefore not permitted.
- The device is not designed to sufficiently protect its users if pathogenic organisms escape uncontrollably. Cultivation of pathogenic organisms of risk categories 3 and 4 is therefore not permitted.

To use the device for special applications not covered by conventional, intended use, the device must be modified and certified accordingly by the manufacturer.

Any use of the device outside of a biotechnology laboratory, i.e. in any environment in which the conditions required for the safety of users cannot be met or cannot be met to their full extent, shall also be deemed misuse.

2.2 Cultivation Vessels to Be Used

Significant forces are applied to cultivation vessels, in particular in case of large vessels and high speeds. Hence, the cultivation vessels used are particularly significant in relation to user safety.

ATTENTION

Use of unsuitable or defective cultivation vessels can lead to glass breakage and therefore damage to property.

Approved cultivation vessels

The device has been designed for use with the following vessels using the holders designed specifically for them:

- Erlenmeyer flasks up to 5,000 mL made of borosilicate glass (e.g. Schott Duran®) or high-grade plastic, such as polycarbonate (z. B. Corning®) etc.
- Fernbach flasks up to 3,000 mL made of borosilicate glass (e.g. Schott Duran®) or high-grade plastic, such as polycarbonate (z. B. Corning®) etc.
- Other vessels with the holders designed for them:
  - Test tubes
  - Centrifuge tubes
  - Microtitre plates
  - Deep well plates

To avoid the vessels coming out of the clamps at very high speeds, they might have to be secured using cable ties underneath the springs or some other suitable measure.

Cultivating organisms of risk category 2

When cultivating pathogenic organisms of risk category 2, special measures must be taken to stop the organisms from escaping. The user is responsible for this.

When using the device under protection category 2, stainless steel clamps of the correct size must be used to affix the flasks. Due to limited resistance to disinfectants as well as the risk of unintentional detaching of flasks, Sticky Stuff adhesive matting is not suitable for this purpose.

We further recommend using disposable plastic flasks with screw tops and filter membranes. We recommend using sticky tape to secure the lid against loosening unintentionally. Using glass flasks with cotton wool or paper plugs is not sufficiently safe.

Trays with Sticky Stuff

INFORMATION

For trays with Sticky Stuff, special provisions apply in relation to maximum permitted speeds. These must be observed to prevent cultivation vessels from detaching.

For detailed information see chapter 4.1.1 "Tray with Sticky Stuff", page 27.

2.3 Qualified Personnel

Due to the complexity of the device and the potential risks arising from its operation, the device may only be used by qualified, specialist personnel.

2.3.1 Provider

The term "provider" applies to all persons who are responsible for making the device and the necessary infrastructure available. These persons may also be included in the group of people known as "users", though this is not always the case.

Irrespective of whether a provider is a member of the company's board of management or a supervisor, they bear a special level of responsibility with regard to the processes and the qualification and safety of the users.

2.3.2 User

General

The term "user" applies to all persons who come into contact with the device in any way and perform work on or with it. This primarily applies to the following activities, which can be performed by the manufacturer's own specialists or a variety of other persons (it is not always possible to distinguish clearly between the different types of person):

- Assembly, installation and commissioning
- Definition and preparation of the process
- Operation
- Troubleshooting and remedying of faults
- Maintenance and cleaning (autoclaving, if necessary)
- Service work and repairs
- Disassembly, disposal and recycling

Qualified personnel

On account of their specific education, training and – in many cases – experience, the qualified personnel required for this work are able to recognise risks and respond accordingly to potential hazards.

The qualified personnel (either internal or external) who cannot be categorised under the separate "operators" group are made up of the following groups of persons:

- Electricians (electrical engineers)
- Decontamination specialists
- Repair specialists
- Specialists in disassembly and (environmentally friendly) disposal
- Recycling specialists

2.3.3 Operator

The "operators" are a specific sub-group of users distinguished by the fact that they work with the device. They are the true target audience for this operating manual.

Qualified technicians

Only technicians who have been trained for working in a biotechnology laboratory can be considered for the role of operator. These include:

- Process technicians in the fields of biotechnology and chemistry
- Biotechnologists (biotechnicians)
- Chemists with a specialisation in biochemistry; chemists in the field of organic chemistry or biochemistry
- Life scientists (biologists) with special education in cytology, bacteriology, molecular biology, genetics, etc.
- Lab assistants (lab technicians) from various fields

In order to be classed as a "sufficiently qualified technician" for the operation of the device, the persons in question must have received thorough training and have read and understood the operating manual.

The operator must be informed in a training session provided by the provider of the tasks delegated to the operator and the potential risks of improper conduct. Tasks that go beyond the scope of operation under normal conditions may only be performed by the operator if this is specified in the manual and the provider has explicitly entrusted said tasks to the operator.

Technicians in training

Persons in this group who are undergoing training or apprenticeships are only permitted to use the device under supervision and in accordance with the instructions of a trained and qualified technician.

2.4 Unauthorised Persons

The term "unauthorised persons" applies to all persons who can access the work area but are not qualified to use the device in accordance with the aforementioned requirements.

Unauthorised persons are not permitted to operate the device or use it in any other way.

2.5 Responsibility of the Provider

The device is used for industrial and scientific purposes. As such, the provider of the device is individually liable with regard to the legal requirements relating to occupational health and safety in a biotechnology laboratory. In particular:

- The provider is responsible for ensuring that the work and environmental regulations applicable in a biotechnology laboratory are observed.
- The provider must ensure that the device remains in safe and proper working condition throughout its entire term of use.
- The provider must ensure that all safety equipment is fully functional and is not disabled.
- The provider must ensure that the device is only worked on by qualified users, and that said users receive sufficient training.
- The provider must ensure that the protective equipment required for working with the device is provided and worn.
- The provider must ensure that this operating manual remains in the immediate vicinity of the device throughout its entire term of use.

2.6 General Hazards

This section covers general hazards and residual risks that are always present when using the device in accordance with normal, intended use.

The following notices are general in nature. As such, with a few exceptions they are not repeated in the remaining sections.

2.6.1 Electrical Current



The device is operated electronically. There is an immediate risk of fatal injury if contact is made with live parts.
The following points must be observed in order to avoid the risk of fatal injury:

- In case of damage to insulation, disconnect the device from the mains immediately and arrange for it to be repaired.
- Disconnect the device from the mains before commencing any work on the electrical system.
- Always use qualified electricians for any work on the electrical system.
- Disconnect the device from the mains before beginning any maintenance, cleaning or repair work.
- Do not bypass any fuses or take them out of operation.
- When replacing fuses, ensure they have the correct number of Amperes.
- If the power cable is defective, replace it with a power cable of the same type.
- Keep moisture away from live parts. It may lead to a short circuit.
- Never remove covers from the casing.

2.6.2 Danger due to Moving Parts



There is a risk of injury from moving parts. Body parts can be pinched or scratched when one is not careful.

However, there is no danger that clothing or body parts can be pulled into the device due orbital movement of the table.
The danger that fingers are pinched has been minimised by means of a sufficient distance between the tray and the casing and a stop mechanism that stops the shaker drive when the door is opened. Nonetheless, the cultivation flasks must only be moved when the table has come to a complete standstill.

2.6.3 Unauthorised Spare Parts and Accessories



Incorrect or imitated spare parts and accessories as well as spare parts or accessories that have not been authorised by the manufacturer represent a significant safety risk. As such, we recommend procuring all spare parts and accessories from an authorised dealer or directly from the manufacturer. For the contact details of the manufacturer's representatives, see page 2.

2.7 Particular Hazards

This section covers particular hazards and residual risks that may arise when using the device for special applications in accordance with normal, intended use.

Since the use of the device for such applications is deliberate, it is the responsibility of the operators and the provider to ensure that all personnel are protected from potential damage to health. The provider is responsible for ensuring that the appropriate protective equipment for such applications is provided, and that the necessary infrastructure is in place.

2.7.1 Danger due to Hot Surfaces



For applications that are performed with temperatures over 55 °C, there is a danger of burns on hot surfaces in the interior or on the cultivation vessels.

- For applications with temperatures over 55 °C wear heat-resistant protective gloves.

2.7.2 Dangerous Gases



The use or production of dangerous gases i.e. toxic or asphyxiant gases entails a significant health risk, especially in enclosed spaces.

In order to prevent high emissions of dangerous gases, the following measures must be taken:

- The gas connections on the device must be checked before any cultivation processes using dangerous gases are initiated.
- The gaskets on the device must be checked at regular intervals and replaced if necessary.

2.7.3 Flammable or Explosive Substances



The use or production of flammable or explosive substances is not covered under “intended use” of the device, as the device is not explosion-proof.

If the provider intends to use the device for such purposes, he must check its suitability for the planned application with the responsible local authorities.

2.7.4 Corrosive or Toxic Substances



The use or production of corrosive or toxic substances entails a significant health risk. As such, special measures must be taken to protect the users for such applications.

Since the device is used deliberately for such applications, it is the responsibility of the users to ensure that they have sufficient protection.

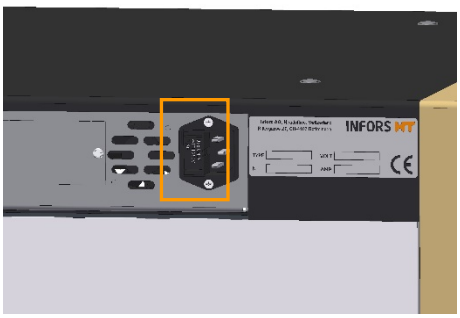
2.7.5 Pathogenic Organisms



The device is not approved for cultivation of pathogenic organisms of risk categories 3 and 4. In the context of intended use, it is nonetheless possible for pathogenic organisms and viruses to be cultivated. Contact with pathogenic organisms bears a significant health risk. Hence, users are responsible for ensuring adequate protection.

2.8 Safety Features

The device comes with the following safety features:



Fuses

Two fuses protect the device from impermissibly high power input. The fuses are located right next to the mains connection on rear of the device. For descriptions of which fuses to use for which device type, see chapter 12.2 "Specifications of the Basic Device", page 80.



Door monitoring
The position of the door is monitored using a permanent magnet. If the door is opened, all dangerous movements (shaker drive and fan) are stopped immediately. As soon as the door is closed again completely, the shaker drive and fan restart automatically.

Overheating shut-down
The device is protected against overheating by means of an overheating shut-down. If the maximum temperature of 105 °C is exceeded, the heating is deactivated automatically.

2.9 Warning Symbols on the Device

The following warning symbols (stickers) are placed on the device:



Position
On the casing of the control rack.

Meaning
The control rack may only be opened by qualified electricians. Turn off the device and pull out the power plug before commencing any work on the electrical system.

⚠ WARNING

Over time, stickers and signs can get dirty or become illegible for other reasons.

- Always ensure that all safety, warning and operating notes are easy to read.
- Immediately replace any damaged signs or stickers.

2.10 Declaration of Decontamination

When returning the device for repair, disassembly or disposal, it is required for the safety of all parties involved and because of legal provisions that a lawful declaration of decontamination is present.

The following must be observed if this is the case:

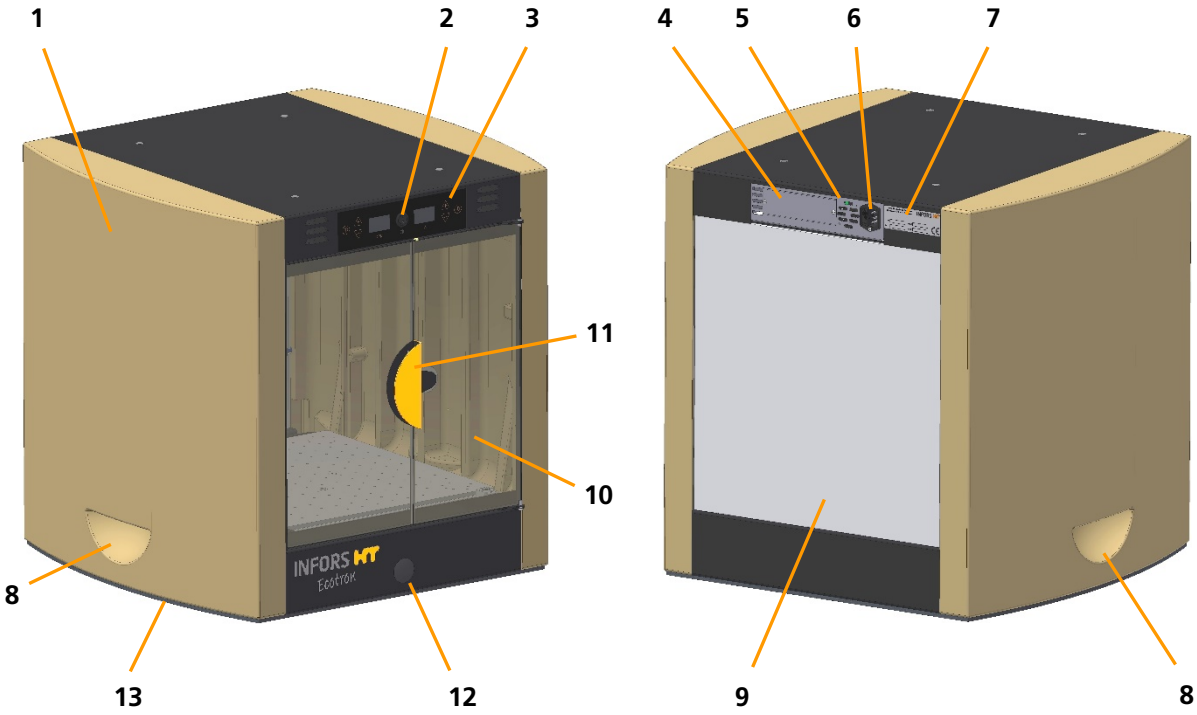
- The device, the component part or accessory must be entirely decontaminated before sending to the manufacturer
- The provider is therefore required to completely and truthfully fill out a declaration of decontamination, and have it signed by the person responsible.
- **The declaration of decontamination must be affixed on the outer packaging in which the device is sent back.**
- These forms can be obtained from the licensed dealer or the manufacturer. See address on page 2.

Important notice

If the return shipment is not accompanied by a signed and complete declaration of decontamination or it is not affixed to the outer packaging, the shipment will be returned unopened to the sender at their expense (see also T&C).

3 Setup and Function

3.1 Setup of the Basic Unit



1 Polyurethane casing
2 Power switch
3 Control rack with operating panel
4 Expansion slot
5 Air vents
6 Mains connection incl. slot for fuses
7 Identification plate
8 Handle
9 Back wall (cooling unit connection)
10 Door (plexiglass)
11 Door handle
12 Discharge outlet
13 Insulation mat

Setup and Function

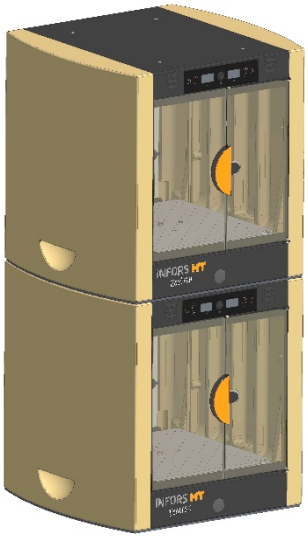
Brief description

The Ecotron incubation shaker is used to cultivate micro-organisms in a laboratory environment. The Ecotron has been designed as an incubation shaker but can optionally be used as an incubator without the shaker.

The basic version of the device is fitted with a shaker drive and a heater. The device can be optionally fitted with an integrated cooling system or connected to an external cooling system.

All the electronics and control electronics are located in the top of the casing and can be replaced easily if necessary. The device can be operated locally via the operating panel on the front.

Stacking devices

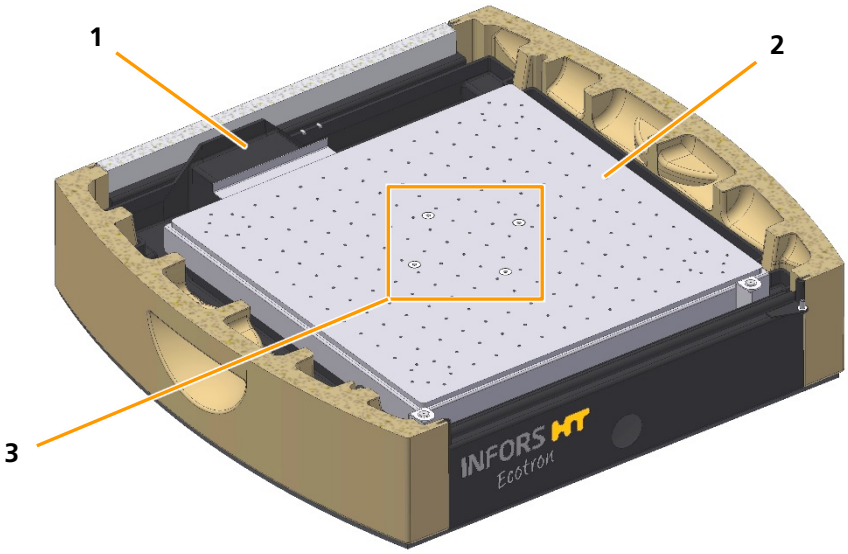


If necessary, two units can be stacked to save space. The optional stacking set is required to do so. This set includes all material required for securely affixing the top unit to the bottom unit. If two units are stacked, you have to keep in mind that the maximum permissible rotation speed is limited for the top unit in the stack.

For information on correctly stacking two units, see chapter 6.2.2 "Stacking Devices", page 44.

3.2 Functions

3.2.1 Standard Function - Shaking



Mechanics

The table (2) moves in circles speeds of 20 to 550 min^{-1}. The deflection of the circular movement is 25 mm. The table moves in clockwise circles.

It is driven by an electric motor, which is connected to the counterweight of the device for balancing by a drive belt. The eccentrically positioned bearing flange in the centre of the counterweight is used to secure the table. To prevent injuries and facilitate easy handling of the cultivation flasks, the drive is switched off automatically as soon as the door is opened.

Table

The table is connected to the bearing flange by means of four hexagonal socket screws (3). The table is guided at five points: in the centre and on the four corners. This ensures robust, reliable operation with minimal wear.

The table features threaded holes which make it possible to mount holders directly on the table. Alternatively, pre-fitted trays measuring 42 x 42 cm (type E) can be mounted on the table.

Drip tray

To collect any leaked liquids in case of a flask breakage, the device features a drip tray (1) underneath the table. To clean the drip tray, the four hexagonal socket screws of the table can be loosened and the table can be removed (see chapter 12.4.1 "Maximum Permissible Setpoints for the Rotation Speed", page 84).

Operation



The shaker drive is operated using the "Rotation speed" parameter (*RPM*, Rotations Per Minute). For an exact description of how to set the parameters see chapter 7.4 "Adjusting, Activating and Deactivating Parameters", page 56.

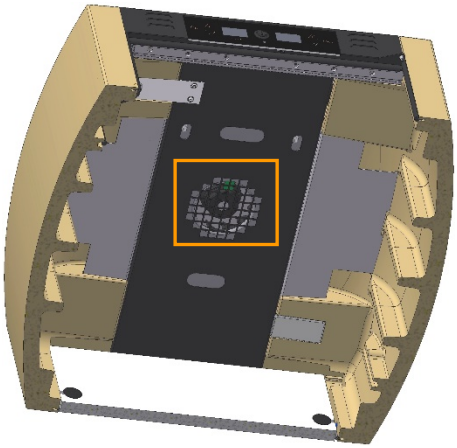
INFORMATION

The load weights must be within the permissible range. If the load is too light or too heavy, this will prevent the table from running smoothly, leading to increased wear.

The permissible load weights depend on the position of the device in the stack and the rotation speed (see chapter 7.2.5 "Notices on Loading the Table", page 53).

3.2.2 Standard Function – Temperature Control

Function



Temperature is controlled using a radial fan as well as a round heating element in the upper part of the device. The radial fan ensures constant air circulation and keeps the temperature distribution in the incubation chamber as constant and gradient-free as possible.

The maximum possible temperature in the incubation chamber is 65 °C, the minimum temperature is 5 °C above the ambient temperature. In order to reach temperatures below the ambient temperature, the device can be fitted with an optional cooling system (see chapter 3.2.3 "Optional Cooling Function", page 23),

A temperature sensor in the area of the radial fan measures the temperature and controls heating or cooling.



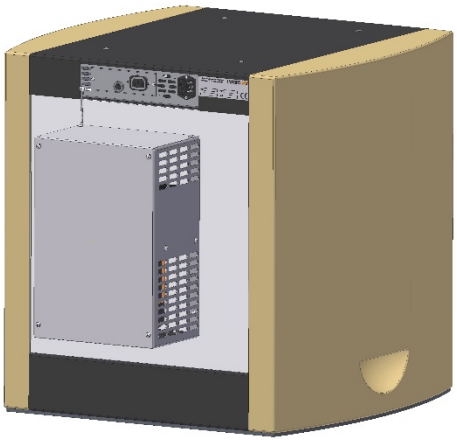
Operation

The heater is operated using the "Temperature" (*°C*) parameter. For an exact description of how to set the parameters see chapter 7.4 "Adjusting, Activating and Deactivating Parameters", page 56.

3.2.3 Optional Cooling Function

As the device is self-heating, an individual unit can be operated at a temperature of approx. 5°C above the ambient temperature without a cooling system. For processes that require temperatures significantly lower than this temperature, the device can be fitted with internal cooling or an optional external cooling system.

In both versions, the heat exchanger is on the back wall of the device. To retrofit the device with a cooling system, the back wall can be dismantled and replaced with a prefabricated back wall with a heat exchanger. To do this, contact INFORS HT (see contact details on page 2).

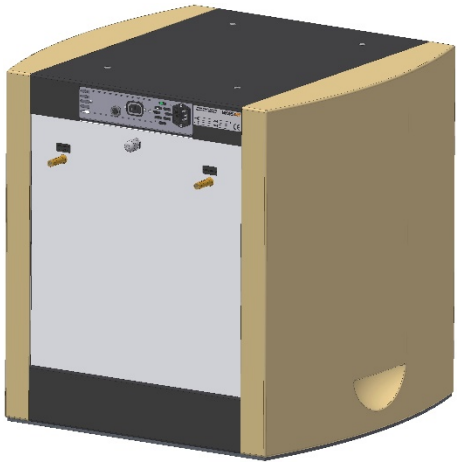


Internal cooling

On the "internal cooling" version, the cooling unit is installed in casing mounted on the back wall. The internal cooling unit is supplied with power directly via the device. The cooling liquid circulates in a closed circuit.

Cooling is activated automatically, if this is necessary to reach the entered setpoint for the temperature. To protect the compressor from overloading, it switches on with a time delay of up to three minutes in the following situations:

- After activating the "Temperature" parameter
- After the door was opened and closed again while cooling is active.
- After automatic reactivation after a power failure.



External cooling

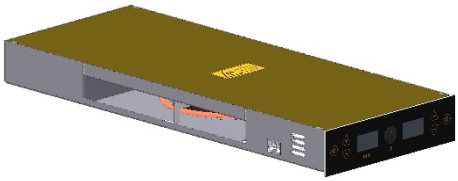
In the “external cooling” version, the cooling unit of an in-house cooling system is supplied with cooling liquid. To this end, the device has a cooling register with a controlled magnetic valve.
The magnetic valve opens as required and lets cooling liquid pass through the cooling register.

To let cooling liquid in and out, the back wall of the device features two plug-in sleeves for hoses with an exterior diameter of 10 mm. The connections are labelled “Cooling water in” (inlet) and “Cooling water out” (outlet). The connection pressure at the inlet of the cooling medium may be up to 0.7 bar, the outlet should be depressurised.

INFORMATION

For information on the technical data for the cooling system, see chapter 12.3.2 "Temperature Parameter", page 84.

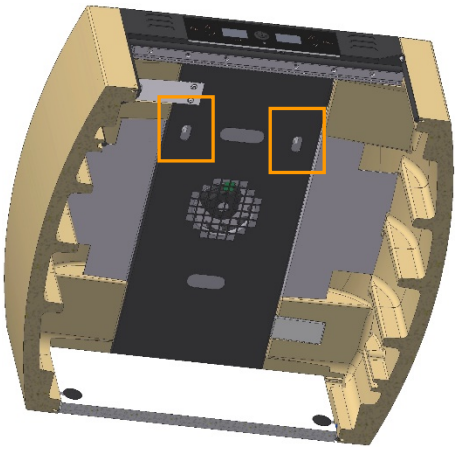
3.3 Control Rack



All of the electronics and control electronics of the device are located in the control rack in the top part of the device. When a flask breaks, the electrical components are thus ideally protected from liquid.

If the electronics fail (control of the shaker drive and tempering) or if there is a defect in the operating panel, power supply unit or fan, the control rack can simply be replaced as an entire unit.

3.4 Interior Lighting



The device features interior lighting. The interior lighting is switched on automatically as soon as any button is pushed or the door is opened. After 40 seconds without input, the lighting switches off again automatically.

The interior lighting comprises two halogen lamps, which are located in the control rack in the upper part of the device. In case of a defect, the halogen lamps can be replaced by the operator.

3.5 Mains Connection



The mains connection is located on the rear of the device. Two different versions of the device are available for different mains voltages:

- 230 V 50/60 Hz
- 115 V 60 Hz

Two fuses immediately adjacent to the power connection protect the device from impermissibly high power input.

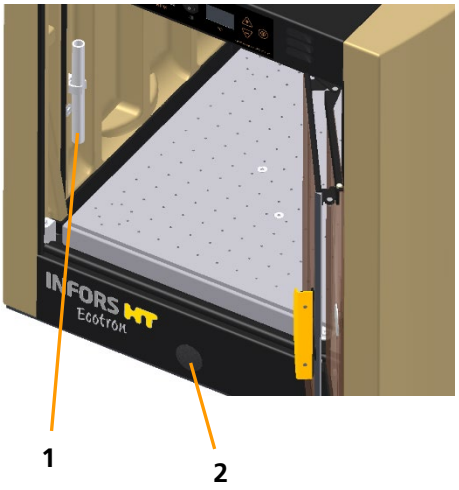
The country-specific power cable required for connecting the power is included in the device's scope of delivery.
If the power cable is defective, replace it with a power cable of the same type.

Prior to connecting the device, make sure that the voltage values of the device match those of the local power supply. The mains connection must be easily accessible at all times so that the device can be disconnected from the power supply quickly in case of an emergency.

For information on the electrical connection values, see chapter 12.2.2 "Electrical Connection and Performance Values", page 81.

3.6 Openings

3.6.1 Discharge Outlet



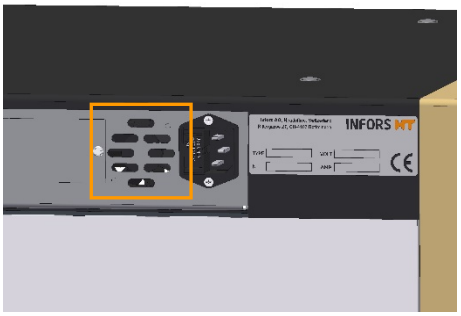
The opening for discharging leaked liquids, detergents or condensation that has collected is located near the centre underneath the door (2). The opening is sealed with a cover cap on delivery. The drain pipe for controlled drainage of liquids is located in a holder in the interior of the device (1).

INFORMATION

In case of a large fill volume, we recommend installing a drain hose in order to prevent the bearings from coming into contact with liquid if a flask breaks.

If safety requirements must be met, e.g. when working with genetically modified organisms, the discharge hose must lead to a suitable, sealed receptacle. One example of such a receptacle would be an empty chemical container sealed with foil.

3.6.2 Air Vents



The device has air vents on the rear of the casing. When setting up the device, you must ensure that these air vents remain unobstructed in order to ensure that the exhaust air can be extracted without obstruction and none of the components overheat.

4 Accessories

In the following section, the available accessories for the device are described. For special applications, please contact our customer service for advice (for contact information, see page 2).

4.1 Trays

The table features threaded holes which make it possible to mount holders directly on the table. In addition, various pre-fitted trays can be ordered for a wide range of different applications. These are affixed to the table with four screws and thus make is easy to quickly retool the device.

Pre-fitted trays are equipped with one clamp type each. They are used if only a single size of flask is to be used for certain tasks. Pre-fitted trays feature a capacity that is up to 20% higher than holders mounted directly on the table. Since no drill holes have to be taken into account in the grid, the clamps can be installed closer together.

The following versions are available:

- Tray with Sticky Stuff adhesive matting
- Tray with pin holders for microtitre and deep-well plates
- Tray with sliding bars

4.1.1 Tray with Sticky Stuff

ATTENTION

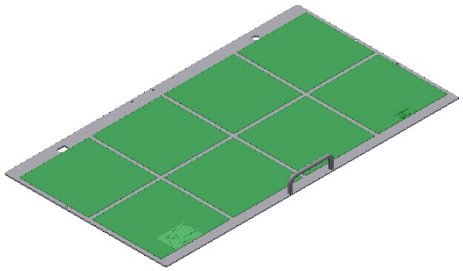
If condensate forms on the tray or on the cultivation vessels, the adhesiveness of the Sticky Stuff is no longer guaranteed. As a result, cultivation vessels can become detached from the Sticky Stuff and break.

Hence, consider the following when using Sticky Stuff:

– Ensure that no condensate forms on the tray or on the cultivation vessels. This is especially necessary if cultivation is started at low temperatures and the temperature then is increased.

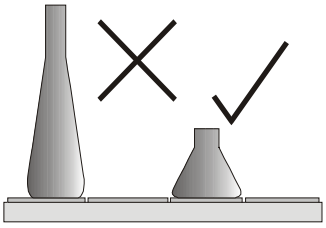
– Let cultivation vessels that were stored in the fridge warm up to ambient temperature first before placing them on the adhesive matting.

Accessories

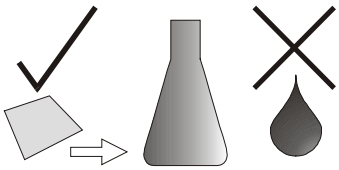


- If you are looking for a very flexible option for equipping the tray, Sticky Stuff offers an ideal alternative.
- However, you have to keep in mind that speeds are limited when using Sticky Stuff (for more information on this, refer to the table at the end of the chapter).

About using Sticky Stuff

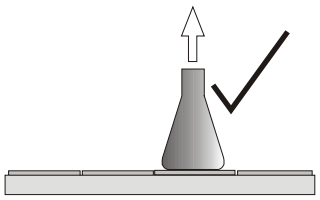


- Use only vessels with a broad flat base. Large Erlenmeyer flasks (e.g. 3000 mL) adhere more strongly than smaller ones (e.g. 500 mL).
- Ensure that the entire bases of the flasks are on the adhesive matting. They must not extend beyond the edge of the tray.

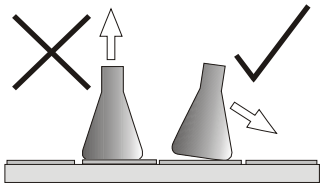


- Check vessels for damage prior to use and replace, if necessary.

  Never use damaged vessels!
- Prior to putting down any vessel, ensure that its base is dry, clean and grease-free.

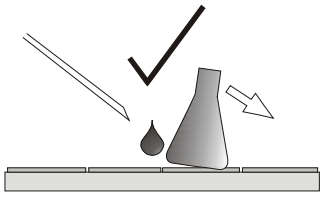


- Prior to the shaking process, gently pull on every vessel to ensure they are all stuck on firmly.
- If the humidity is too high or the temperatures are too low or if there are extreme jumps in temperature (e.g. when using the timer function), keep an eye on condensate. Condensate can result in vessels detaching from the adhesive matting.

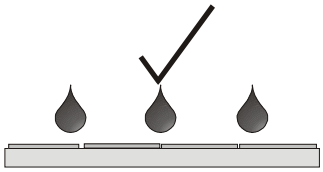


- To remove vessels, gently and evenly pull or push on the neck and wait a few seconds.

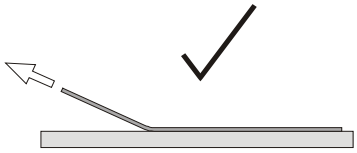
  Never use force!
- In case of large vessels, it can take 20 to 30 seconds until they detach from the adhesive matting.



- Vessels that are stuck can be removed from the adhesive matting by using a syringe to inject water under the flask.
- Due to their shape (wide base, short neck), Fernbach flasks in particular can be difficult to remove. If necessary, cover part of the adhesive matting with the protective foil provided.



- The adhesive power can deteriorate over time due to dust and dirt. To clean and restore full adhesive power, thoroughly wipe down the surfaces with a brush or a dish sponge and clear water with mild detergent (dishwashing liquid). Then let dry overnight.
- **Quaternary ammonium compounds are suitable for disinfection.**
- Consider application times and thoroughly rinse with water. If the adhesive matting is disinfected at regular intervals, it might need to be replaced sooner.



To replace the adhesive matting proceed as follows:

1. Thoroughly spray the tray with water
2. On one side, peel the adhesive matting off the tray and pull it up diagonally.
3. Use acetone to degrease the tray and apply new **wet** adhesive matting (according to separate installation instructions). Only peel off protective foil prior to use.

The removed adhesive matting can be reused and can be reapplied after regeneration in water.

Adhesive matting that is severely worn due to aging must be replaced. This also applies if a reduction in the adhesive force is detected.

INFORMATION

Due to limited resistance to disinfectants as well as the risk of unintentional detaching of flasks, Sticky Stuff is not suitable for cultivating pathogenic microorganisms.

Maximum rotation speeds with Sticky Stuff

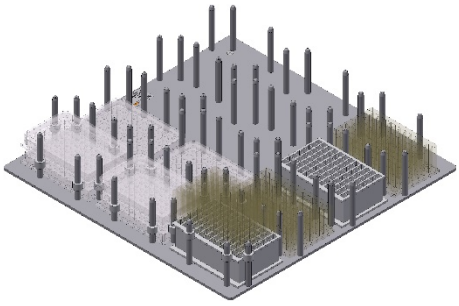
To ensure that the flasks do not detach from the adhesive matting, the maximum permissible rotation speed is limited when using adhesive matting.

INFORMATION

The following guidelines only apply to undamaged, completely dry adhesive matting free of grease. If old or dirty adhesive matting is used, there is a risk that flasks detach even at lower speeds.

Flask	Maximum permissible rotation speed	
	Bottom or individual unit	Top unit
25 x 300 ml	200 min^{-1}	200 min^{-1}
16 x 500 ml	200 min^{-1}	200 min^{-1}
9 x 1000 ml	250 min^{-1}	200 min^{-1}
4 x 2000 ml	200 min^{-1}	200 min^{-1}
2 x 5000 ml	200 min^{-1}	200 min^{-1}

4.1.2 Tray with Pin Holders



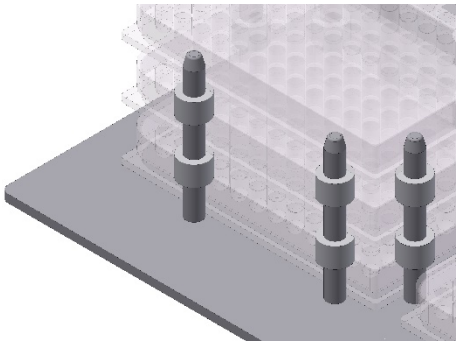
For applications in which large numbers of microtitre or deep well plates need to be incubated, various trays with pin holders are available. These enable loading with several layers of microtitre and deep well plates.

The plates can be stacked. This allows you to simultaneously incubate up to 24 deep well plates and up to 36 microtitre plates on one E tray.

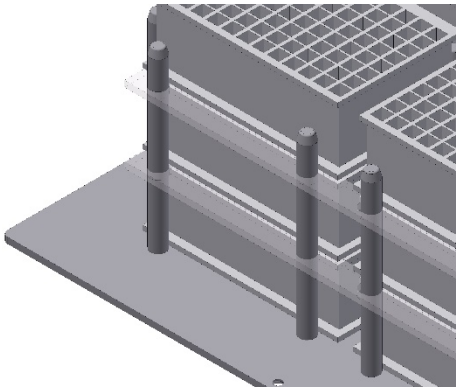
The trays are designed for plates with the dimensions 85.1 x 127 mm.

Accessories

To ensure the cultures receive the optimum oxygen supply, spacers can be placed between stacked plates. These are available in two variants:



- **Ring spacers** (10 mm high) are placed on the pins individually. Depending on the type of tray loading, this makes it possible to remove individual plates or stacks of plates.



- **Quickload spacers** are long plastic strips (4 mm high) that span across several plates, thus allowing you to save time while loading.

! ATTENTION

The spacers are made of plastic and therefore cannot be autoclaved.

Technical data for pin holders	
Description	**Value**
Material	Aluminium
Fastening screws	M5 x 12
Cleaning	Mild neutral cleaning agent
Disinfection	Commercially available disinfectant
Sterilisation in autoclaves	YES
External dimensions of the microtitre plates	85.1 x 127 mm
Height of the deep well plates	42 mm

4.1.3 Tray with Sliding Bars



Trays with sliding bars allow you to fix vessels of any shape. The sliding bars can be affixed to any point on the support bars. This also allows you to affix bottles with vertical walls and a curved base.

The bars are sheathed in a soft material and arranged on two different levels in order to securely hold bottles of different sizes.

The scope of delivery for the tray includes the fixed frame and 4 movable sliding bars.

Technical data for the sliding bars	
Description	**Value**
Material	Aluminium, plastic
Cellular rubber mat	EPDM cellular rubber
Cellular rubber cover	Armaflex
Cleaning	Mild neutral cleaning agent
Disinfection	Commercially available disinfectant
Max. operating temperature	65 °C
Sterilisation in autoclaves	NO

4.2 Clamps and Other Holders

Various clamps and holders are available for individually fitting the table.

ATTENTION

If the holders are mounted using screws that are too long or too short, the holders cannot be affixed correctly to the table. Incorrectly mounted holders can become loose during operation and result in damage to property.

– If you have to replace lost fastening screws, you must use screws that comply with the specification below.

4.2.1 Clamps

Clamps in various sizes are available for equipping a universal table tray. These can be ordered individually and mounted on the universal table tray.

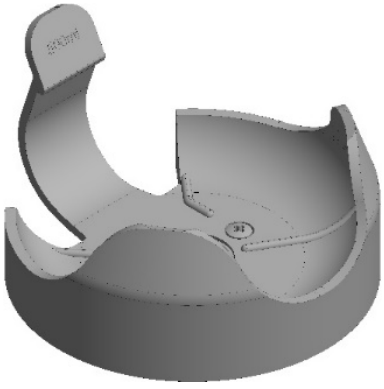


Stainless steel clamps

The following stainless steel clamps are available:

For flask type	Volume		
Erlenmeyer	25 mL	500 mL	4000 mL
	50 mL	1000 mL	5000 mL
	100 mL	2000 mL	
	250 mL	3000 mL	
Fernbach	1800 mL	2800 mL	

Technical data of the steel clamps	
Description	**Value**
Material	Stainless steel
Fastening screws	25 up to 50 ml: M4 x 6 100 up to 5000 ml: M4 x 8
Temperature range	95 °C
Cleaning	Mild neutral cleaning agent
Disinfection	Commercially available disinfectant
Sterilisation in autoclave	YES



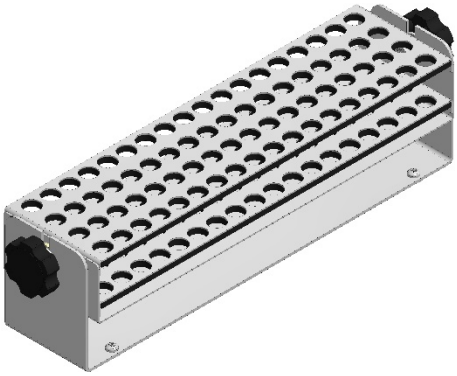
Plastic clamps

The following plastic clamps are available:

For flask type	Volume		
Erlenmeyer	100 mL	250 mL	500 mL

Technical data of the plastic clamps	
Description	**Value**
Material	POM Co polymer
Fastening screws	M4 x 6
Temperature range	65 °C
Cleaning	Mild neutral cleaning agent
Disinfection	Commercially available disinfectant
Sterilisation in autoclave	NO

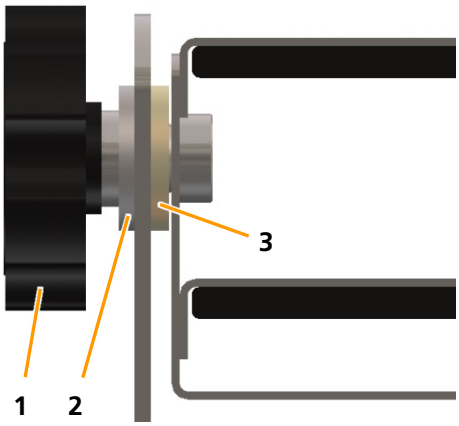
4.2.2 Test Tube Holders



Test tube holders are used to securely affix different sized test tubes. Test tube holders can be screwed onto a universal table tray or placed on Sticky Stuff adhesive matting.

The following test tube holders are available (details and special types on request):

- For long test tubes, Ø 8 bis 30 mm
- For short test tubes, Ø 12 bis 18 mm
- For plastic tubes with ventilation lid, Ø 16 and 30 mm
- Special holders, e.g. for 600 ml cultivation vessel



If necessary, the inserts with the tubes can be tilted by loosening the black nuts (1). The tilt can be set freely. Then tighten the nuts again.

The entire inner part with the holders for the tubes can be removed by loosening the black nuts, whereby the u-shaped holder remains on the tray.

When inserting the inner parts, ensure that the feet of the holder (part on the tray) on both sides rest between the rubber ring (3) and the Teflon washer (2).

Test tube holders can also be used on a tray with Sticky Stuff. To do this, the pre-installed screw must be removed from the base plate.

ATTENTION

The test tube holders adhere extremely strongly to the Sticky Stuff, so that water has to be sprayed underneath the edge of the holder with a syringe in order to remove them. This is done to prevent damage to the holder or the tray.

4.3 Box for Microtitre Plates

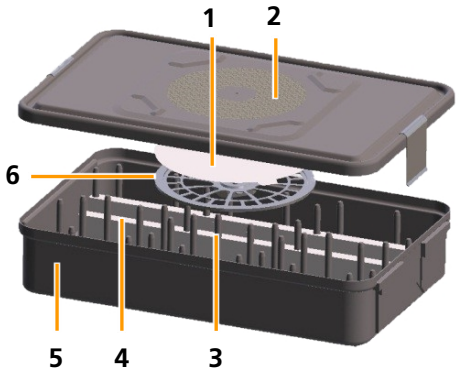


Overview

The box for microtitre plates is used for low-vapour cultivation of microtitre plates and deep well plates. It protects cultures from drafts in the incubation chamber and also offers a stable container in which cultures can be transported.

The box for microtitre plates consists of an aluminium container with a removable lid into which a replaceable paper filter is integrated. A microtitre insert with screw-mounted pins is used for mounting microtitre plates and deep well plates.

For shaking, the box for microtitre plates can be screwed onto a universal table tray or placed on the Sticky Stuff adhesive matting.



Structure

1 Filter
2 Top plate
3 Microtitre insert
4 Quickload spacers
5 Container
6 Filter washer



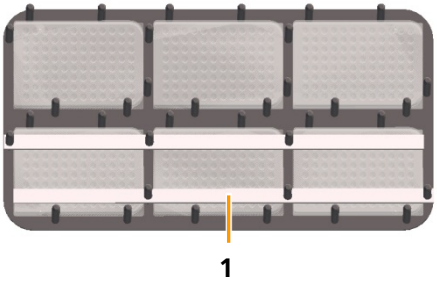
Mounting the box for microtitre plates

The box for microtitre plates is mounted on the table by means of four Phillips-head screws. When delivered, the fastening screws are covered with plastic cap nuts. These must be removed prior to installation.

Alternatively, the box for microtitre plates can be placed on the Sticky Stuff adhesive matting. In this case, all fastening screws must be removed to avoid damaging the adhesive matting.

During installation, ensure that the tray is always loaded evenly.

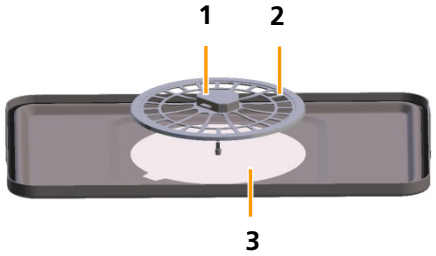
Accessories



Loading the box for microtitre plates

To improve transfer of oxygen to the cultures and facilitate the removal of the plates, spacers (Quickload spacers) (1) can be placed between the individual layers. Prior to loading, the Quickload spacers must be removed. Following that, microtitre or deep well plates can be inserted.

For cultivations with low oxygen requirements, Quickload spacers do not have to be used.



Inserting/replacing a filter

To insert or replace a sterile filter (3), the filter washer (2) must be removed first. To do so, press the locking button (1) on the filter washer and lift up the filter washer. Following that, the filter can be inserted and the filter washer can be put back in its place.

Sterilising the box for microtitre plates

The box for microtitre plates can be autoclaved (recommendation: 20 min at 120 °C). To do so, remove the Quickload spacers first and disinfect them using commercial disinfectant.

Rotation speed limits

When there are high agitation speeds or insufficient grip due to humidity or dirt, the box for microtitre plates can separate from the Sticky Stuff during agitation and cause damage to the incubation chamber. The maximum permissible agitation speed is therefore limited as follows:

Description	25 mm throw	50 mm throw
On universal table tray	350 min^{-1}	250 min^{-1}
On Sticky Stuff	150 min^{-1}	150 min^{-1}

INFORMATION

When working with maximum rotation speeds, it is strongly recommended to use a special tray with permanently mounted boxes. Details on request.

Technical data

Container with top plate and tray	
Description	**Value**
Dimension	465 x 280 mm
Weight	4.23 kg
Filter, paper, round, Ø	185 mm
Screws for microtitre tray	M4 x 8 hexalobular
Screws for microtitre box	M4 x 12 Phillips head
Material	Aluminium, autoclavable
Detergent	Mild dishwashing liquid or neutral cleaning agent

Quickload spacer	
Description	**Value**
Dimension	412 x 14 x 5 mm
Quantity	12 units
Material	Polyamide 6.6 can be sterilised
Detergent	Mild dishwashing liquid or neutral cleaning agent

Loading capacity	
Standard plate size 85.1 x 127 mm	**Value**
Microtitre plates	18 units
Deep well plates height 42 mm	12 units

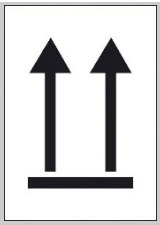
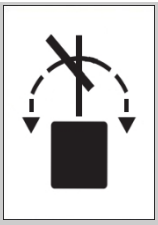
5 Transport and Storage

WARNING

Improper transport, use of incorrect auxiliary equipment and careless handling of the device may lead to injuries and significant damage to property.

- Never lift or transport the device alone.
- Never transport the device without using transportation safety devices (foam wedges).
- Never push the device as this could result in the feet being damaged or the base plate being dented.

5.1 Symbols on the Packaging

			
Fragile The content of the package is fragile. Do not drop the package and avoid impact.	**Top** Marks the top of the device. The package must be transported and stored in a way that ensures that the arrows always point up.	**Protect from humidity** Protect the package from humidity and keep it dry.	**Do not roll** The package must not be rolled.

5.2 Transport Inspection

When you receive the delivery, immediately inspect it for completeness and any potential damage sustained during transport.

If you can see damage from outside, proceed as follows:

- Do not accept the delivery or only under reserve.
- Make a note of the extent of the damage on the shipping documents or on the carrier's delivery note.
- Lodge a complaint.

INFORMATION

Lodge a complaint for each defect as soon as you detect it. Claims for compensation can only be asserted within the claim period in accordance with the general terms and conditions.

5.3 Transporting the Device

Transport when delivered (packaged device)

Depending on its features and destination, the device is either delivered on an oversized special pallet or in a sea crate. For transport to the assembly location or longer transports in general, we recommend transporting the device with a forklift or trolley. Observe the following:

- The device may only be transported using a forklift or trolley if the device is still on the original pallet.
- When lifted, the pallet must lay flat on the fork of the forklift or on the trolley.
- When unloading the device, make sure that the device is very carefully lowered vertically onto the ground. Avoid abrupt set down.
- Observe the symbols on the packaging for correct transport.

Transport within the laboratory (unpacked device)

When transporting an unpacked device, observe the following:

- Always work in pairs and use suitable auxiliary equipment when transporting the device (weight of the device without cooling and tray: 63 kg).
- The handles on the left and right of the device are only for lifting up the device and not suitable for transporting (risk of tipping).
- Prior to moving the device, transport fasteners (foam wedges) must be inserted to prevent uncontrolled movements of the table.

5.4 Storing the Device

- Decontaminate, thoroughly clean and dry the device every time before placing it in storage.
- Store the device clean, dry and protected against dust, dirt and liquids.
- Protect the device from aggressive media, direct sunlight and vibrations.
- Store the device in a cool place with low humidity but protected from frost.
  - Storage temperature: 10 °C to 35 °C.
  - Relative humidity, non-condensing: 10 % to 85 %.

6 Installation

6.1 Requirements for the Installation Site

6.1.1 Operating Conditions at the Installation Location

To achieve optimal and reproducible results, the device should be set up in stable ambient conditions without temperature or humidity fluctuations. Changes in ambient temperature or humidity can have a negative effect on the climate in the incubation chamber.

Operating conditions	
Temperature range	10 to 30 °C
Humidity	10 to 85 %
Restrictions	■ Do not expose to direct sunlight ■ Do not expose to dust ■ Do not expose to vibrations
The device may only be set up indoors.	

To achieve a stable climate in the incubation chamber and to be able to control the climate accurately, the following installation locations must be avoided:

- Poorly ventilated recesses or in the exhaust heat air stream of air conditioners or other sources of heat
- Directly underneath, next to or in the air stream of the air conditioners or other devices that generate strong air flows (e.g. circulation fans in clean rooms)
- Next to devices with strong heat radiation, such as heaters or autoclaves, or in their exhaust heat air stream
- Next to devices for refrigeration, such as ultra-low temperature freezers or refrigerated centrifuges, or in their exhaust heat air stream

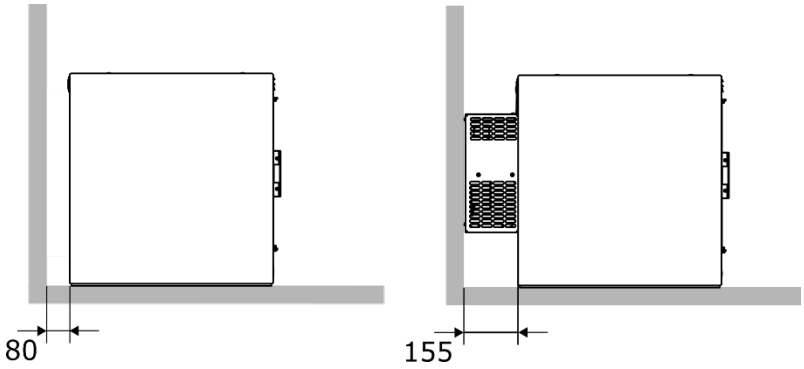
INFORMATION

In order to achieve the desired temperature in the incubation chamber, the ambient temperature directly at the device is decisive. This can be considerably higher than the temperature at other positions in the room due to waste heat from the device or other devices with strong heat radiation in the immediate vicinity!

6.1.2 Minimum Distances to the Device

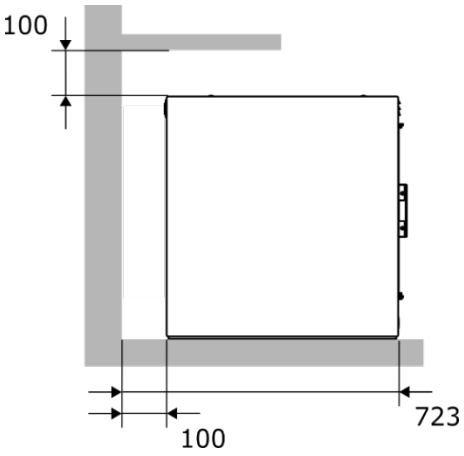
When setting up the device, the following minimum distances must be observed to ensure adequate ventilation and access to the most important connections:

Minimum distances to the basic unit



You must leave a ventilation gap of at least 80 mm between the device and rear wall to ensure heat produced by the device can escape. No minimum distances are required on the sides. However, when using cooling we recommend keeping a distance of approx. 80 mm to the sides to let exhaust heat escape. Otherwise cooling power can be limited due to trapped heat.

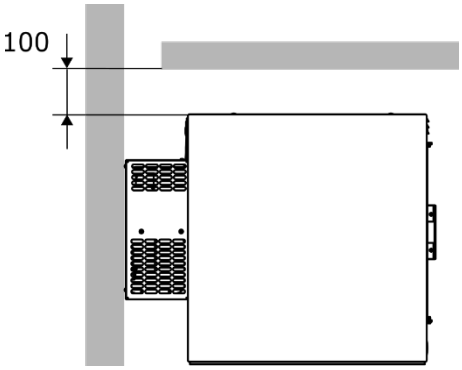
Placing the device on a bench



When placing the device on a bench, observe the following:

- To prevent the bench from vibrating, use a heavy bench with diagonal braces as the minimum (ideally, use a stable laboratory bench). Alternatively, the bench can be affixed to the wall.
- The minimum required depth for the bench is 723 mm.
- You must leave a ventilation gap of at least 100 mm between the device and rear wall of the bench.
- If shelves or cupboards are installed above the bench, you must leave a minimum distance of 100 mm.
- No gas outlets, shelves or cupboards must be in the way.

Placing device with cooling under a bench



When placing the device with cooling under a bench, observe the following:

- The minimum distance between the device and the underside of the bench top is 100 mm.
- When operating the device with installed cooling, heat can accumulate under a closed laboratory bench. This can reduce the temperature range of the device and result in increased power consumption. Hence, we recommend only installing the device under a laboratory bench with air vents.

ATTENTION

Failure to comply with the required minimum distances can result in components of the device overheating and the device being damaged. As such, please observe the following points:

– Never cover the air vents on the rear of the device.

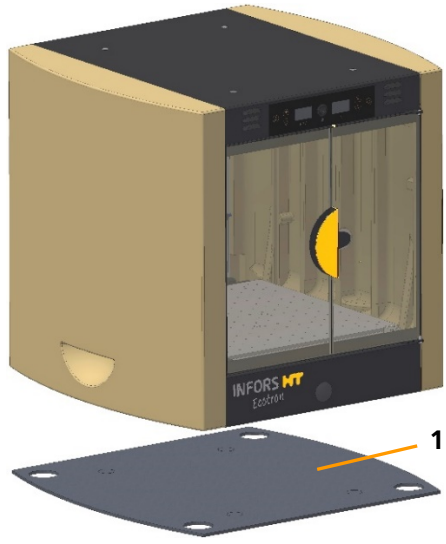
– Never position the device right up against a wall.

6.2 Installing the Device

6.2.1 Setting up the Device

To set up the device, proceed as follows:

Procedure



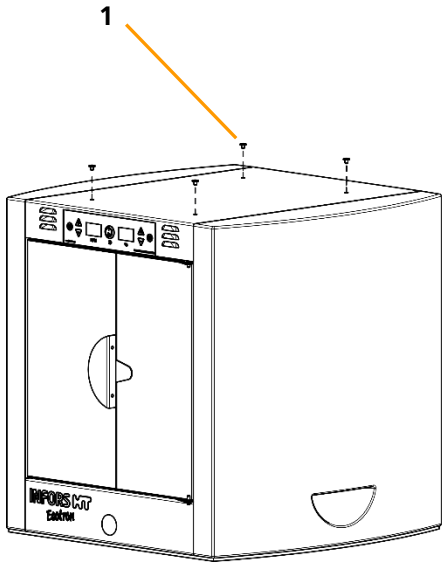
1. Position the device on a flat, non-slip surface, complying with the requirements for the installation location. In doing so, keep in mind that the insulation mat (1) between the device and the ground must not be removed.
2. Remove transport safety devices (foam wedges).
3. Store the foam wedges for further use. Insert the foam wedges whenever you change the position of the device.

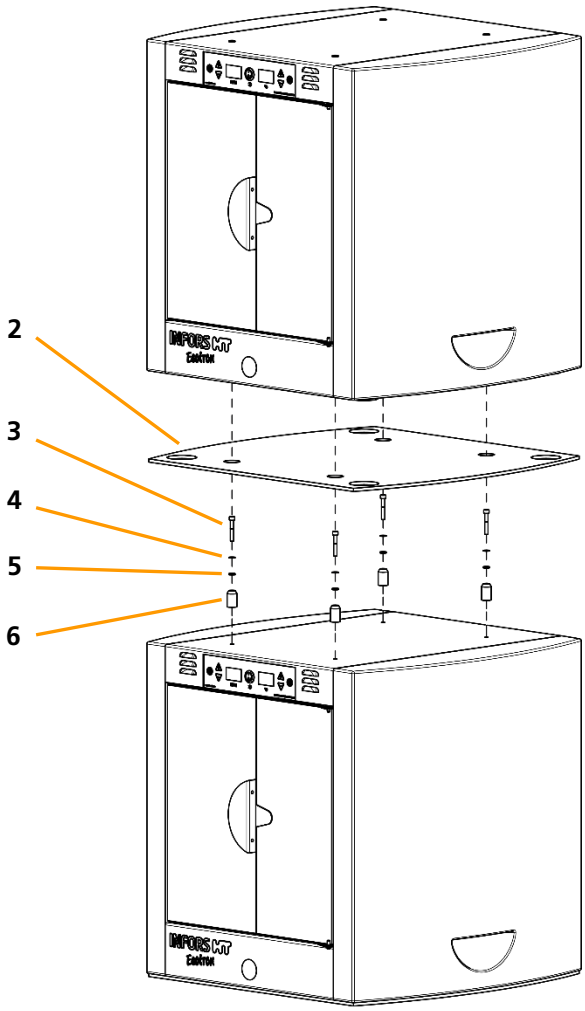
6.2.2 Stacking Devices

To save space, two units can be stacked on top of one another. The optional stacking set is required to do so.

ATTENTION

If you operate stacked devices without using the stacking set, you run the risk of the top unit moving due to vibrations and consequently falling down. You must therefore only stack units (no more than two units) with the stacking set.





1 Cover cap (4 x)
2 Insulation mat
3 Hexagon socket head screw M6x40 (4 x)
4 Spring washer M6x11x1.1mm (4 x)
5 Disc M6x12x1.6 mm (4 x)
6 Centring sleeve (4 x)

To stack two units, proceed as follows:

Procedure

1. Remove the four cover caps (1) on the top of the bottom unit from the threaded holes.
2. Screw the four hexagonal socket head screws (3) with one spring washer (4), disc (5) and centring sleeve (6) each into the threaded holes.
3. Place the insulation mat (2) of the top unit onto the bottom unit.
4. With another person, then lift the upper unit on the handles on the left and right side of the casing and place it flush on the bottom unit.
   The centring sleeves autonomously glide into the corresponding recesses in the frame of the upper unit.

INFORMATION

When operating stacked devices, the maximum permissible rotation speeds are limited. For information on this subject, see chapter 12.4.1 "Maximum Permissible Setpoints for the Rotation Speed", page 84.

If vibrations occur during operation, reduce the rotation speed or, alternatively, increase or decrease the load until the devices run smoothly.

6.2.3 Establishing the Power Supply

Two different versions of the device are available for different mains voltages:

- 230 V 50/60 Hz
- 115 V 60 Hz

Prior to connecting the power supply, check whether the voltage value on the identification plate matches the local mains voltage. If the specified voltage values differ, do not connect the device under any circumstances but contact the manufacturer immediately.

INFORMATION

The device may only be connected to a properly installed earthed socket (single phase, constant power supply).

Only use the power cable provided. If the power cable becomes defective, replace it with a power cable of the same type.

To establish the power supply of the device, proceed as follows:

Procedure

1. Ensure that the power switch of the device in position *0*.
2. Connect the power cable provided to the mains connection on the device.
3. Connect the power cable to the building's power supply.
4. Ensure that the mains connection is freely accessible at all times.

7 Operation

7.1 Switching on the Device

ATTENTION

The device can start up automatically if this option has not been deactivated correctly beforehand. Any objects flying around the incubation chamber can damage the device and the cultivation vessels if the device starts up automatically.

Procedure



1. Activate the power switch on the front.

   If the device has been correctly connected to the power, the *Power supply on/off* function symbol lights up after switching on. Once it has been switched on, the device will automatically run a self-test and the installed firmware version is displayed briefly. Following that, the device is ready for operation.

7.2 Loading the Device

CAUTION

If a vessel breaks at high rotation speed, glass splinters are slung around the incubation chamber. When the door is open, the device does not stop immediately. Therefore pieces of glass can be slung out.

To avoid injuries:

– Do not open the door in a panic if you notice that a vessel has broken.

– Switch off the device at the power switch and only open the door when the table stands still.

⚠ CAUTION

If the loading mass of the table is too high or too low or the load is distributed unevenly, high rotation speeds can cause vibrations. This can result in the device moving uncontrollably and potentially falling off the table. This can lead to property damage and injuries.

– Do not operate the device without tray and loading. Switch off the shaker drive when the device has been unloaded.

– In case of strong vibrations, reduce the rotation speed and check the loading weights or the distribution of the load.

7.2.1 Loading and Unloading the Device

The door can be opened while the device is running. As soon as the door is opened slightly, the table is decelerated slowly until it comes to a halt. To reduce energy costs, the fan, heating and cooling (if available) switch off automatically when the door is opened. As soon as the door is closed completely, the table and cooling restart automatically. Keep in mind that cooling switches on with a time delay of up to three minutes to protect the compressor from overloading.

⚠ CAUTION

If the door is opened while the shaker drive is running, the table can cause injury due to its significant momentum.

– As such, take care when opening the door while the shaker drive is running.

– Only load or unload the device when the table has come to a complete standstill.

Procedure

1. Temporarily stop the device by slightly opening the door.
2. Wait until the table has come to a standstill.
3. Open the device door all the way.
4. Load or unload the device.
5. Close the door again.

   The device restarts automatically.

7.2.2 Fitting the Holders

ATTENTION

The threaded holes of the table can be damaged if the fastening screws are not screwed straight into the thread:

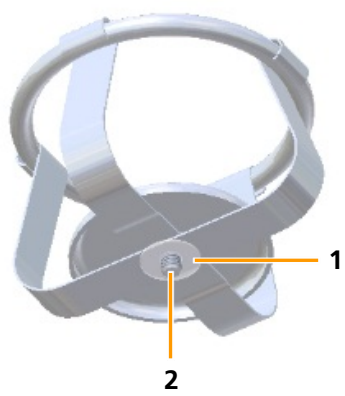
– Place the screws vertically on the drill holes.

– Ensure they can be tightened easily.

ATTENTION

All holders are supplied with pre-fitted screws. If a test tube holder or a box for microtiter plates is placed on the Sticky Stuff adhesive matting, there is a risk that the adhesive matting is damaged by protruding screws.

Remove the screws before you place test tube holders or boxes for microtiter plates on the Sticky Stuff adhesive matting.



Fitting a holder

Clamps, test tubes and boxes for microtiter plates are fixed to the table using screws. The device is delivered with pre-fitted screws (2). The screws are each secured with one flat gasket at the bottom (1) so that they cannot fall out. Only use the screws provided or screws of the same size for assembly.

To fit a holder, proceed as follows:

Procedure

1. Loosen flat gaskets.
2. Position the holder on the table.
3. Centre a screw on the threaded hole in the table and screw it in loosely. It must still be possible to turn the holder.
4. Align the holder so that all screws are vertical above the respective threaded hole in the table.
5. Insert screws loosely. Ensure that the screws are screwed in straight and do not tilt.
6. Evenly tighten all screws cross-wise.

Screw sizes

ATTENTION

If screws that are too long or too short are used to affix the holders, the holders cannot be mounted properly on the table. Not properly mounted holders can become loose during operation and therefore lead to property damage.

If you have to replace lost fastening screws, you must use screws that comply with the specification below.

Steel clamps		
Flask size	**Screw**	**Flat gasket**
25 – 50 mL	Flat head screw with Phillips head M4 x 6 A4	D = 3.2 x 12 x 0.5
100 – 5000 mL	Flat head screw with Phillips head M4 x 8 A4	D = 3.2 x 12 x 0.5

Plastic clamps		
Flask size	**Screw**	**Flat gasket**
100 – 500 mL	Flat head screw with Phillips head M4 x 6 A4	D = 3.2 x 12 x 0.5

Test tube holders		
Size	**Screw**	**Flat gasket**
Ø 8 – 30 mm	Oval head screw with Phillips head M4 x 6 A2	D = 3.2 x 12 x 0.5

Boxes for microtiter plates	
Screw	**Flat gasket**
Oval head screw with Phillips head M4 x 12 A2	D = 3.2 x 12 x 0.5

7.2.3 Fitting the Tray

The table features threaded holes which make it possible to mount holders and clamps directly on the table. Alternatively, trays with fixtures can be ordered from the manufacturer and fitted onto the table. To do so, proceed as follows:

Procedure

1. Place the tray on the table so that no edge sticks out.
2. Fix the tray to the table using the supplied Phillips-head screws. Evenly tighten the Phillips-head screws cross-wise.

ATTENTION

If the tray is not affixed securely to the table, the tray may damage the interior of the table when moving.

– Do not start up the device unless the tray has been inserted correctly and affixed.

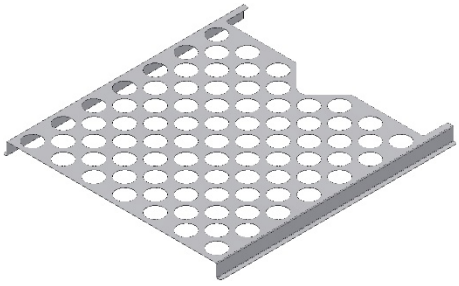
Screw sizes

Tray with pin holders: Philips-head M4x8

Tray with sliding bars: Philips-head M4x8

Tray with Sticky Stuff adhesive matting: Philips-head M4x6

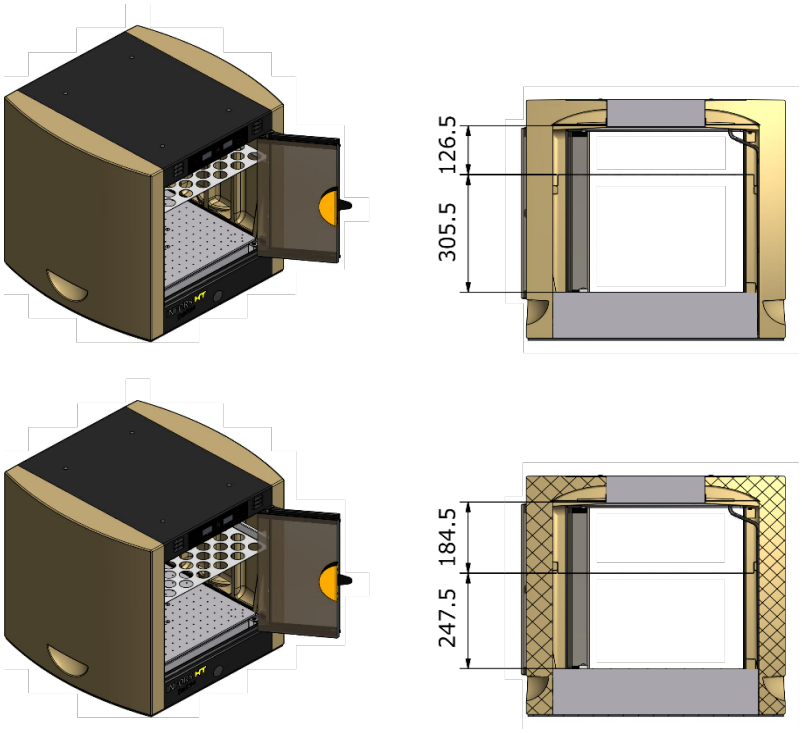
7.2.4 Fitting the Removable Shelf



A removable shelf for static incubation is available as an accessory. The maximum load of the removable shelf is 5 kg for point loads. To prevent longer lasting cultures from drying out, we recommend placing suitable sealing tape (e.g. parafilm) on the agar plates or placing the plates in an open plastic bag.

The removable shelf can be flipped over to be used at two different heights:

- Upper position (in the image at the top): Permitted incubation of Erlenmeyer flasks up to 2 L of volume on the shaker (depending on the height of the sealing plug).
- Lower position (in the image at the bottom): Permitted incubation of Erlenmeyer flasks up to 1 L of volume on the shaker (depending on the height of the sealing plug).



ATTENTION

The inserted removable shelf can change the climate conditions in the incubation chamber and lead to higher tolerances as it hinders air circulation. To prevent damage to cultures, the climate above and beneath the removable shelf should be checked frequently and, if necessary, monitored using mobile sensors.

To use the removable shelf, proceed as follows:

Procedure

1. Open the door to the incubation chamber.
2. Diagonally insert the removable shelf in its desired orientation into the incubation chamber and place it on the cams moulded into the sides of the incubation chamber.

7.2.5 Notices on Loading the Table

Observe the following notices when loading the table:

- Place the cultivation flasks symmetrically in the middle of the table.
- If any of the vessels protrude over the edge of the table, they could collide with the interior wall, resulting in the device being damaged or vessels breaking. Therefore, always position cultivation vessels on the table so that they do not protrude.
- If the table is only loaded lightly and is going to be run at high rotation speeds, place additional cultivation vessels filled with water on the tray. This will make the device run more smoothly. At rotation speeds of approx. 200 bis 250 min^{-1} (depending on the position of the unit in a stack), the load distribution plays only a minor role.

Optimum load weights

The optimum load falls into the range of 5 bis 9 kg (mass incl. tray, clamps, flasks and filling). This load ensures that the device is ideally balanced. Both higher and lower loads cause an imbalance, which results in strong vibrations at higher rotation speeds and can lead to flasks breaking. When the load on the tray is too light, the tray must thus be weighed down using flasks filled with water or weights until the optimum mass of approx. 5 bis 9 kg is reached. If the load is too high, reduce the speed, remove vessels or reduce the fill volume.

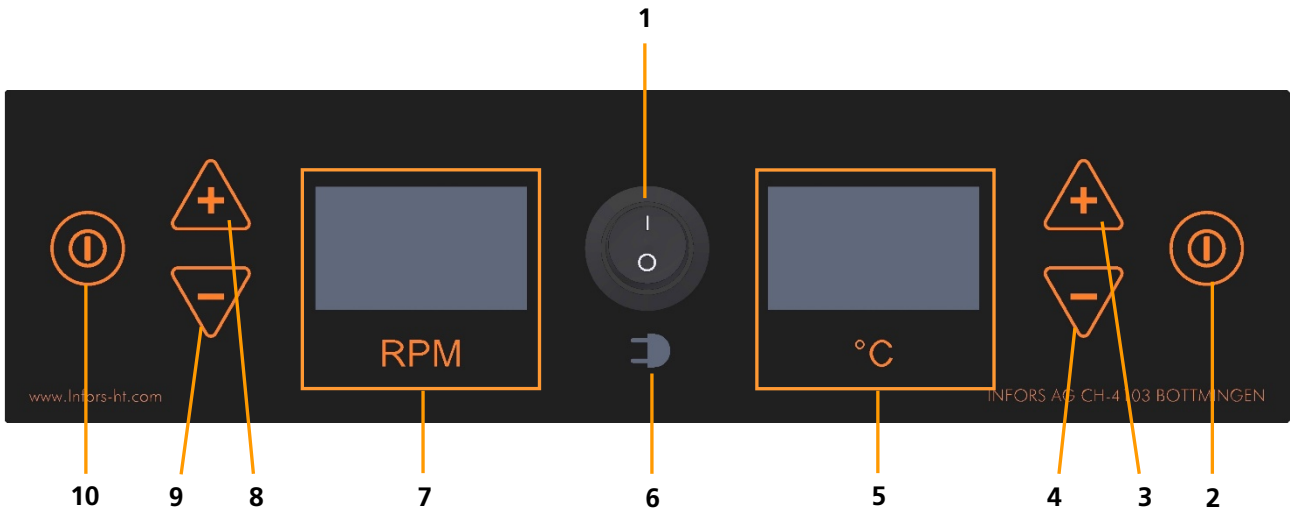
INFORMATION

If load weights that are too high or too low are constantly selected, this can lead to increased wear on the device. However, short-term deviations in load weights, be they higher or lower, do not lead to increased wear.

7.3 Overview of Display and Operating Elements

All functions can be controlled directly via the operating panel on the front of the device.

The operating panel comprises the following elements:



1 Power switch
2 **Temperature control On/Off** button
3 **Raise temperature** button
4 **Lower temperature** button
5 View box for "Temperature" parameter (actual values, setpoints, alarm and error messages)
6 *Power supply on/off* function symbol
7 View box for "Rotation speed" parameter (actual values, setpoints, alarm and error messages)
8 **Increase rotation speed** button
9 **Decrease rotation speed** button
10 **Shaker drive control On/Off** button

INFORMATION

In addition to normal switching on and off, the power switch also works as an emergency switch, if the device has to be switched off in an emergency.

In case of an emergency shut down via the power switch, all parameter setpoints are stored and the device restarts immediately when it is switched back on via the power switch.

When the device is switched off using the power switch, the parameter setpoints are stored for approx. one month.

View boxes

The current actual values, setpoints, alarm messages and error messages are displayed on one or both of the LED displays using three-letter abbreviations.

- During normal operation, the current actual value for the "Rotation speed" (RPM) parameter is displayed in the left view box whenever this parameter is active. Otherwise, the display alternates between the entered setpoint and the *OFF* message.
- During normal operation, the current actual value for the "Temperature" (°C) parameter is displayed in the right view box whenever this parameter is active. Otherwise, the display alternates between the entered setpoint and the *OFF* message.

In addition to the actual values/setpoints or the *ON* and *OFF* messages, the following messages can be displayed:



Current actual value of the temperature is too low compared to setpoint (deviation of -1.5°C).



Current actual value of the temperature is too high compared to setpoint (deviation of +1.5°C).



The door is open.

7.4 Adjusting, Activating and Deactivating Parameters

7.4.1 Overview of Parameters



Rotation speed (*RPM*)

During set-up, the rotation speed entered as a setpoint in min^{-1} is displayed as a whole number. The settings that can be made range from 20 to 550 min^{-1}.

The maximum permissible rotation speed depends on the throw, the position of the device in a stack and the load on the tray (mass) (see chapter 12.4.1 "Maximum Permissible Setpoints for the Rotation Speed", page 84).



Temperature (°C)

During set-up, the set temperature setpoint in degrees Celsius is displayed to one decimal point. The setting range is between 0 and 65 °C.

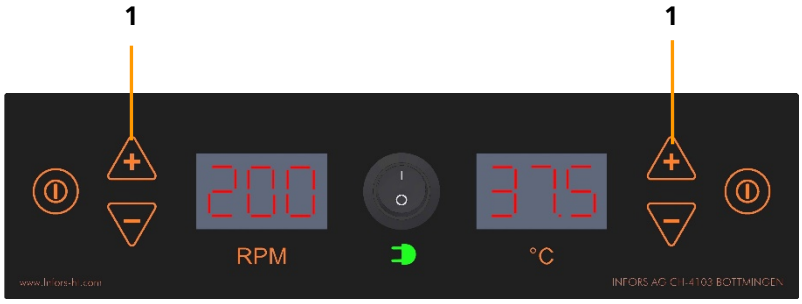
The temperatures that can actually be achieved depend on a variety of factors, such as the ambient temperature in the vicinity of the device, the ventilation and the temperature of the other device in the stack (see chapter 12.4.2 "Information on Temperatures that can Actually be Reached", page 86).

INFORMATION

To protect the compressor from overloading, cooling switches on with a time delay of up to three minutes in certain situations.

7.4.2 Setting the Parameter Setpoint

To set the setpoint for a parameter, proceed as follows:



Procedure

1. Press the **Plus** or **Minus** button (1) to set the setpoint you want to use for the selected parameter (rotation speed on the left, temperature on the right).
   - Pressing the **Plus** or **Minus** button once increases or decreases the setpoint by one unit (10 min^{1}/1.0 °C).
   - Pressing and holding down the **Plus** or **Minus** button has the effect that the display runs up or down through the specified value range.

   The display shows the set setpoint of the parameter. If you make no entry for more than 2 seconds, the display alternates between the set setpoint and the message *OFF* (if the parameter is deactivated) or the current actual value (if the parameter is activated).

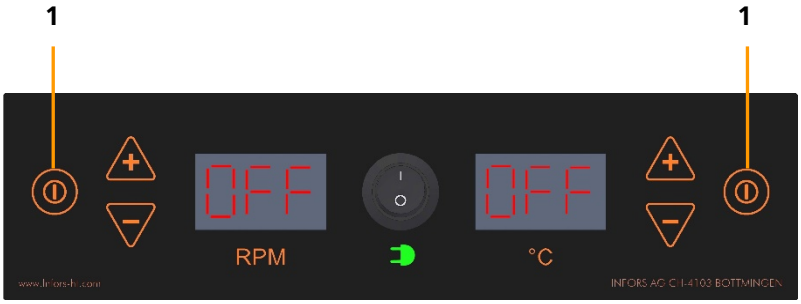
INFORMATION

The entered value is saved automatically. A separate confirmation is not necessary. If the parameter is already activated, the changes take effect immediately.

7.4.3 Activating and Deactivating Parameters

Activating parameters

To activate a parameter, proceed as follows:



Procedure

1. Press the **On/Off** button (1) to activate the desired parameter (rotation speed on the left, temperature on the right).

   The parameter is activated immediately. The display briefly shows the message *ON* and then the current actual value of the parameter.

When the "Rotation speed" (RPM) parameter is activated, the shaking procedure starts up immediately. As such, we recommend activating this parameter last. When starting up the shaker drive, use the time until the setpoint is reached to check whether the cultivation flasks are secured on the tray.

INFORMATION

The parameters need a little time to reach their set setpoints. Until they have done so, the notice *Hi* or *Lo* is displayed, depending on whether the actual value is higher or lower than the setpoint.

Deactivating parameters

The parameters are deactivated using the **On/Off** button in the same way as for activation. When a parameter is deactivated, the view box alternates between the set setpoint and the message *OFF*.

7.5 Switching on the Interior Lighting

The interior lighting is switched on automatically in the following situations:

- When the device is switched on using the power switch
- When the door is opened or closed
- When any of the buttons on the operating panel are pushed

The interior lighting remains switched on for approx. 40 seconds, then it is switched off automatically.

7.6 Switching off the Device

ATTENTION

If the parameters are not deactivated before the device is switched off, all activated parameters are stored and are automatically activated when the device is switched back on. This enables the device to start up automatically when it is switched back on. This can damage the device and the cultivation vessels.

– Deactivate all active parameters before switching off the device.

– Do not leave any objects in the incubation chamber when the device is switched off.

ATTENTION

Switching the device on and off frequently places strain on the electronic components. As such, only switch off the device prior to longer breaks in use (> 1 day). When interrupting operation for short periods of time, simply deactivate the parameters.

INFORMATION

The parameter setpoints are stored for approx. one month.

To switch off the device, proceed as follows:

Procedure

1. Deactivate all active parameters.
2. Actuate the power switch on the operating panel.
3. If the device is not going to be used for an extended period of time, unplug the power plug.

7.7 Behaviour in Case of Interrupted Power Supply

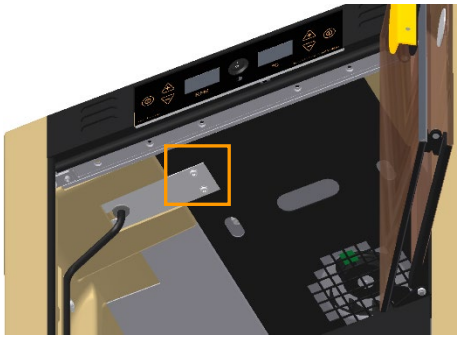
If the power supply to the device is interrupted during a running cultivation process (e.g. by flicking the power switch or in case of a power failure), all parameter setpoints are stored. If the power supply is restored, the device automatically restarts with the last stored setpoints.

7.8 Using the Device as a Tempering Cover

If you dismantle the shaker, the device can be used as a pure tempering cover. To do so, proceed as follows:

Procedure

1. Turn off the device and pull out the plug.
2. Open the door to the incubation chamber.
3. Remove the table incl. any mounted tray, drip tray and drip pan (see chapter 10.4 "Replacing the Drip Tray", page 75).



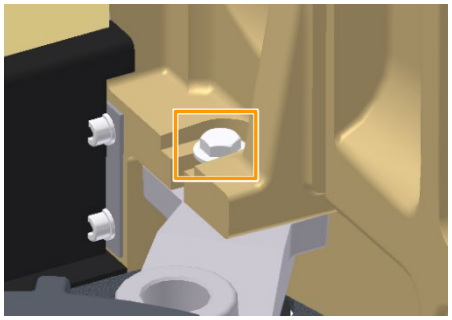
4. Remove the deflector plate on the ceiling of the incubation chamber by loosening the two Phillips-head screws (M4x10).



5. Loosen the two Phillips-head screws (M4x10) that affix the cable to the side wall.



6. Detach the cable from the shaker to the control rack and pull it out of the cable duct. To detach the plug, you have to push the release lever at the bottom of the plug.



7. Loosen the four hexagon bolts (M8x25) that affix the casing to the X-frame of the shaker.



8. Lift the casing on the two side handles and completely lift it off the shaker.
The casing can now be used as standalone tempering cover. To re-assemble the shaker, proceed in reverse order.

8 Rectifying Faults

The following section describes possible reasons for faults and how to resolve them.

If you encounter a fault that cannot be resolved by following the instructions below, please contact your nearest INFORS HT representative. For service contact details, see page 2.

8.1 Alarm Messages and their Meanings

An alarm is triggered whenever a parameter fails to reach its setpoint within a defined period of time. Alarms are indicated visually and acoustically.

If a parameter-related alarm occurs, the text *Hi* or *Lo* will be displayed in alternation with the actual value of the parameter. Alarms are reset automatically as soon as the actual value moves back into the target range.

> **INFORMATION**
>
> An alarm is only triggered if the value of the parameter does not change for a certain period of time. If there is a fluctuation, the counter for triggering the alarm is reset.

The following alarm messages may occur:

Alarm message	**Meaning**	
	Temperature is too low (actual value < setpoint - 1.5°C).	
Possible cause	**Measures**	**Personnel**
The parameter has recently been changed, and the required setpoint has not yet been reached.	No action required. The alarm message will disappear as soon as the setpoint is reached.	
The door is not fully closed.	Close door completely.	Operator
The ambient temperature does not meet the requirements.	Check the ambient temperature on the device and adjust if necessary.	Operator

Cooling fins dusty.	Clean the cooling fins.	Operator
Error during temperature measurement.	Check the function of the temperature sensor. In case of a defect, contact your local INFORS HT representative.	Operator
Heater fan not working.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator

Alarm message	**Meaning**	
	Temperature too high (actual value > setpoint + 1.5°C).	
Possible cause	**Measures**	**Personnel**
The parameter has recently been changed, and the required setpoint has not been reached yet.	No action required. The alarm message will disappear as soon as the setpoint is reached.	
The ambient temperature does not meet the requirements.	Check the ambient temperature on the device and adjust if necessary.	Operator
Error during temperature measurement.	Check the function of the temperature sensor. In case of a defect, contact your local INFORS HT representative.	Operator
Heater fan not working.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator

Alarm message	**Meaning**	
	Rotation speed too low.	
Possible cause	**Measures**	**Personnel**
The load is too heavy, making the drive too weak or causing it to overheat.	Reduce the load. If the drive has overheated, the process can be continued after it has cooled down.	Operator
The drive belt is torn.	Contact your local INFORS HT representative and have the drive belt replaced.	INFORS HT service technician or licensed dealer
The motor is defective.	Contact your local INFORS HT representative and have the motor replaced.	INFORS HT service technician or licensed dealer

Alarm message	**Meaning**

	The rotation speed is too high.

Possible cause	Measures	Personnel
Error when measuring the rotation speed.	Switch the device off and then on again.	Operator
The drive control system is defective.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator
The motor is defective.	Contact your local INFORS HT representative and have the motor replaced.	INFORS HT service technician or licensed dealer

Alarm message	Meaning
	The device door is open.

8.2 Fault Tables

The tables below describe potential faults that do not usually trigger an error message on the display or – with a few exceptions – an alarm signal. In many cases, operators can resolve these faults themselves.

General faults

Fault		
After activating the power switch, the view boxes do not light up.		
Possible cause	**Measures**	**Personnel**
Power supply to the device interrupted.	■ Check if the plugs are plugged in correctly. ■ Check the mains connection.	Operator
The fuse is defective.	Replace the fuse (see chapter 10.1, page 72).	Operator

Fault		
The interior lighting does not work.		
Possible cause	**Measures**	**Personnel**
The lighting element of the interior lighting is defective.	Replace the lighting element (see chapter 10.3 "Replacing the Lighting Element of the Interior Lighting", page 74).	Operator

Faults related to the "Rotation speed" parameter

Fault		
The table does not move.		
Possible cause	**Measures**	**Personnel**
The "Rotation speed" parameter is not activated.	Activate the parameter.	Operator
The table is blocked by foreign objects.	Dismantle table and remove foreign objects.	Operator
The load is too heavy, making the drive too weak or causing it to overheat.	Reduce the load. If the drive has overheated, the process can be continued after it has cooled down.	Operator
The drive has heated up too much, and has been turned off automatically.	Let the device cool down. Ensure that the air vents on the side are unobstructed.	Operator
The cable from the shaker to the control rack has been unplugged.	Plug in the cable.	Operator
The drive control system is defective.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator
The drive belt is torn.	Contact your local INFORS HT representative and have the drive belt replaced.	INFORS HT service technician or licensed dealer
The motor is defective.	Contact your local INFORS HT representative and have the motor replaced.	INFORS HT service technician or licensed dealer

Fault		
Strong vibrations occur.		
Possible cause	**Measures**	**Personnel**
The load is too heavy, so the device is no longer balanced.	Reduce the load to the prescribed value.	Operator
The load is too light, so the device is no longer balanced.	Increase the load to the prescribed value.	Operator
The load is distributed unevenly.	Load the tray in the centre. If possible, do not place any heavy weights in the corners of the tray.	Operator
The rotation speed is too high.	Reduce the rotation speed.	Operator
The device is not standing straight.	Place the device on a flat surface.	Operator
The substructure (table) is too weak.	Place the device on a stable table or the floor.	Operator
The liners of the table are worn.	Contact your local INFORS HT representative and replace the liners (see chapter 10.5, page 76).	Operator

Rectifying Faults

Fault		
The shaker drive accelerates too quickly or runs too fast.		
Possible cause	**Measures**	**Personnel**
Error when measuring the rotation speed.	Switch the device off and then on again.	Operator
The drive control system is defective.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator

Faults related to the “Temperature” parameter

Fault		
The temperature fails to reach the desired setpoint.		
Possible cause	**Measures**	**Personnel**
The heating is not switched on.	Activate the “Temperature” parameter.	Operator
The setpoint is set too low.	Raise setpoint.	Operator
The ambient temperature does not meet the requirements.	Check the ambient temperature and correct if necessary (see chapter 6.1.1, page 41	Operator
Door not closed completely.	Close door completely.	Operator
Cooling fins dusty.	Clean the cooling fins.	Operator
Error during temperature measurement.	Check the function of the temperature sensor. In case of a defect, contact your local INFORS HT representative.	Operator
Heater fan not working.	Contact your local INFORS HT representative and replace the control rack (see chapter 10.2, page 73).	Operator

INFORMATION

Re-measuring the temperature only provides reliable information when using calibrated measuring tools, and only if they are used at points specified by INFORS HT. Measurements taken at undefined points in the casing will not produce any usable data.

For information about temperature measuring, contact your local INFORS HT representative or request a quote for calibrating the parameters.

8.3 Returning for Repair

The provider must return the device or the faulty component part(s) to the manufacturer if, after consulting the service department of the local dealer or the manufacturer, on-site diagnosis and/or repair is not possible.

INFORMATION

When returning the device, the component part or accessory for repair, it is required for the safety of all parties involved and because of legal provisions that a lawful declaration of decontamination is present. Refer to main chapter "Safety and Responsibility", chapter "Declaration of Contamination" for details.

9 Maintenance and Cleaning

⚠ WARNING

To prevent life-threatening electric shocks, always switch off the device and disconnect it from the power supply before carrying out any maintenance or cleaning.

9.1 Maintenance

The device requires hardly any maintenance. This reduces the running costs to certain regular checks and cleaning. The following table describes the maintenance work that is required to ensure optimum, fault-free operation.

If increased wear is detected during the regular checks, the required maintenance intervals must be reduced to suit with the actual signs of wear. Keep in mind that various media or gases will have more or less corrosive effects on the metal parts. When using particularly aggressive substances, more frequent checks are required in order to maintain smooth device operation.

Contact the manufacturer if you have any questions regarding maintenance work or intervals; see Service contact details on page 2.

Interval	Maintenance work	To be carried out by
Prior to each use	Check all seals on the device, especially on the door, and replace if necessary.	Qualified technicians
	Check whether the interior lighting works; have lamps replaced if necessary.	Qualified technicians
After each use	Clean the device; if necessary, disinfect thoroughly.	Operator
Annually	Have sensors calibrated at least once per year to ensure that the measuring results remain accurate.	Qualified technicians

9.2 Cleaning and Disinfection

If substances, in particular hazardous substances, are spilled in or on the device, the device has to be cleaned and disinfected thoroughly. Furthermore, the device should be cleaned and disinfected on a regular basis to ensure proper operation.

If there are doubts concerning the compatibility of cleaning and disinfection agents, contact your local INFORS HT representative (see service contact details on page 2).

ATTENTION

Insufficient cleaning and disinfection can lead to damage to cultures due to contamination.

9.2.1 Cleaning

Detergent

Mild detergents, e.g. dishwashing liquid or neutral cleaning agents, are suitable for all surfaces:

- Exterior surfaces of the casing
- Front window
- Interior surfaces of the casing (incl. base tray)
- Steel plate covers
- Table
- Trays (incl. clamps and other holders)

ATTENTION

Aggressive cleaning agents, solvents and abrasive cleaning utensils (hard sponges, brushes) can scratch surfaces, damage the device and impair its function.

Notices on cleaning

To clean the surfaces, use a soft cloth, ideally lint-free. This applies in particular to the front window. Disinfect using commercially available disinfectant if necessary. In order to allow cleaning of the device in case of glass breakages or soiling caused by culture liquids, the table can be dismantled. After cleaning, use a cloth to dry the device, especially the interior and the drip tray.

Maintenance and Cleaning

Dust

Over time, dust can collect on the vents and other exposed parts (e.g. heat exchangers). It can be removed carefully with a vacuum cleaner.

Clean drip tray

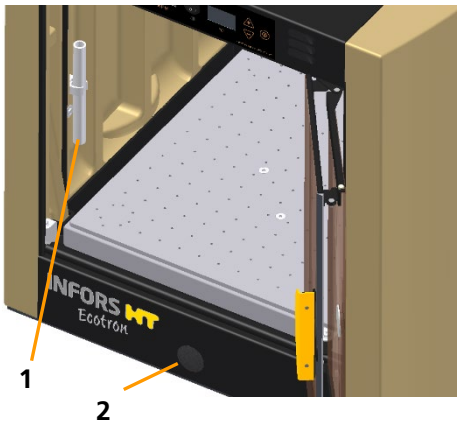
You can clean the drip tray using water (max. 2 L) and mild detergent. We recommend flushing the drip tray with hot water to remove all nutrient residue after a flask has broken. The cleaning water can be drained via the drain pipe on the front of the casing. To do so, proceed as follows:

ATTENTION

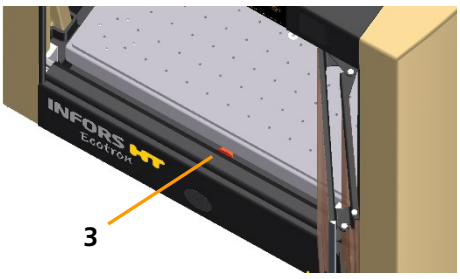
Water that splashes into the bearings and electronics in the top cover can damage the device.

As such, cleaning must be performed carefully and using as little liquid as possible.

Procedure



1. Remove the cover cap on the front of the casing underneath the door (2).
2. Remove the drain pipe (1) from the holder in the interior and place it into the nozzle on the drip tray.
3. Place a suitable vessel underneath the drain pipe.



4. Pull the red plug (3) from the drain nozzle.
5. Drain and flush the drip tray.
6. Insert the plug back into the drain nozzle.
7. Pull out the drain pipe and place it in the holder.
8. Place the cover cap on the opening.

INFORMATION

The drip tray is not suitable for steam sterilisation in the autoclave. If it gets severely contaminated it can be disposed of and replaced at low cost.

9.2.2 Disinfection

Only use quaternary ammonium compounds for wipe-down disinfection. As a tried as tested disinfectant, we recommend Fermacidal D2.

ATTENTION

Heat (temperatures above 80 °C), aggressive disinfectants such as chlorine bleach and UVC radiation can damage the device and significantly limit the function and useful life of the machine.

We recommend against using UV lamps for disinfection of the device because the UV rays can massively damage the plastic casing in case of multiple applications.

For information about the procedure for disinfection underneath the table, in particular removing and mounting the table, see chapter 9.2.1 "Cleaning", page 69.

10 Spare Parts

Replacing the most common spare parts is very easy and can be performed by the provider. To do this, follow the instructions in the next chapters.

You can source spare parts from a licensed dealer or manufacturer (on this subject, see the addresses on page 2). If you have any question, please specify the type and serial number of the affected device. They are located on the identification plate of the device.

WARNING

Incorrect or faulty spare parts can impact on safety and lead to damage, malfunctions or total failure of the device.

- Only source spare parts from a licensed dealer or directly from the manufacturer.
- The only spare parts you can replace yourself are listed below. In all other cases, contact the manufacturer.

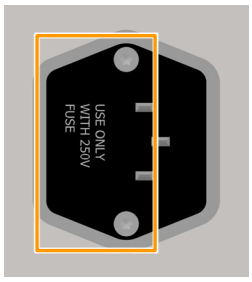
10.1 Replacing Fuses

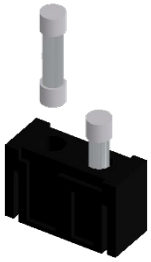
INFORMATION

The fuses may only be replaced by fuses of the same rating. For information concerning the requirements for the fuses see chapter 12.1 "Dimension Drawings", page 79.

To replace a defective fuse, proceed as follows:

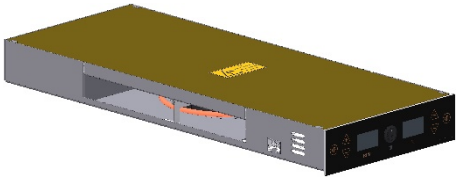
Procedure





1. Turn off the device and pull out the mains plug.
2. Unlock the plug for the fuses by pressing together the two flaps and pull out the plug at the same time.
3. Remove the defective fuse.
4. Insert a new fuse with the correct number of Amperes.
5. Push the plug as far back in the opening as possible until it snaps in.
6. Re-establish the power supply to the device.

10.2 Replacing Control Rack



If the electronics fail (control of the shaker drive and tempering) or if there is a defect in the operating panel, power supply unit or fan, only one component has to be replaced, the control rack. To do so, proceed as follows:

⚠ CAUTION

The round heating element as well as the lighting element in the control rack can heat up significantly during operation. Hence, you could get burnt if you touch the round heating element or lighting elements.

– Before removing the control rack, let the round heating element and the lighting elements cool down to ambient temperature.

Procedure

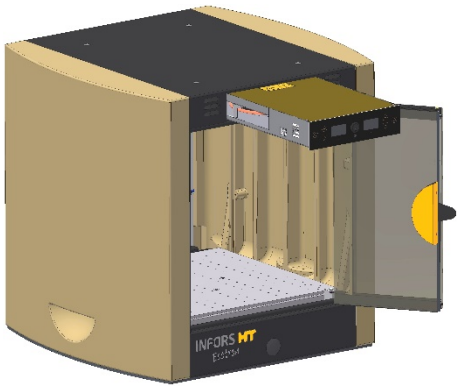
1. Turn off the device and pull out the plug.
2. Open the door to the incubation chamber.



3. Remove the deflector plate on the ceiling of the incubation chamber by loosening the two Phillips-head screws (M4x10).



4. Detach the cable from the shaker to the control rack and pull it out of the cable duct. To detach the plug, you have to push the release lever at the bottom of the plug.



5. Never cover the air vents on the rear of the device.
6. Completely pull out the control rack from the front of the device.
7. To re-mount the control rack, proceed in reverse order.

10.3 Replacing the Lighting Element of the Interior Lighting

To replace a defective lighting element, proceed as follows:

CAUTION

The round heating element as well as the lighting element in the control rack can heat up significantly during operation. Hence, you could get burnt if you touch the round heating element or lighting elements.

– Before removing the control rack, let the round heating element and the lighting elements cool down to ambient temperature.

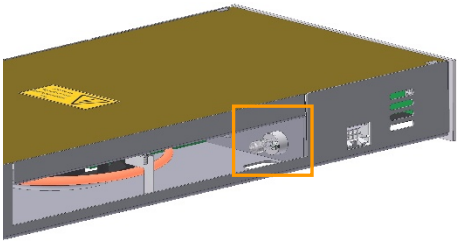
INFORMATION

The lighting elements are serialised, i.e. if one lighting element becomes defective, the second one no longer lights up either.

For information on the lighting element specifications, see chapter 12.2.3 "Interior Lighting", page 81.

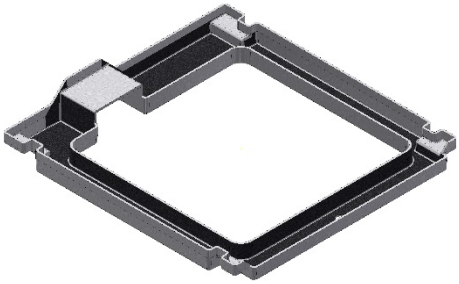
Procedure

1. Turn off the device and pull out the plug.
2. Remove the control rack (see chapter 10.2 "Replacing Control Rack", page 73).



3. Unscrew the defective lighting element from its fixture and remove it through the ventilation slot on the side of the control rack.
4. Screw a new lighting element into the fixture. Do not touch the lighting element with bare hands as this significantly reduces the useful life of the lighting element.
5. Re-install the control rack.

10.4 Replacing the Drip Tray



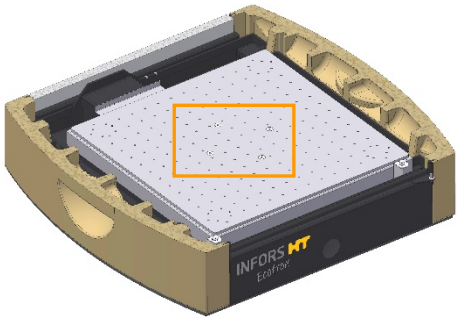
If the drip tray gets very dirty or damaged, it can be removed and replaced. To do so, proceed as follows:

INFORMATION

The drip tray is not suitable for steam sterilisation in the autoclave. If it gets severely contaminated it can be disposed of and replaced at low cost.

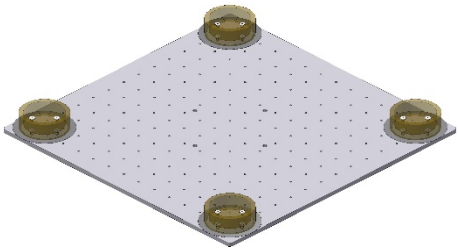
Procedure

1. Turn off the device and pull out the plug.
2. Open the door to the incubation chamber.
3. If a tray is installed, remove it by loosening the four Phillips-head screws (M4x6).



4. Remove the table by loosening the four hexagonal socket screws (M6x12).
5. Drain any possible liquid from the drip tray.
6. First, lift the drip tray diagonally up to 45°, then lift the front until the tray can be moved back via the guide bearings.
7. Insert the new drip tray and install the table in reverse order.

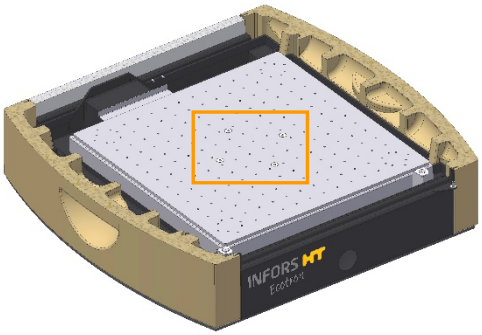
10.5 Replacing the Liners on the Table



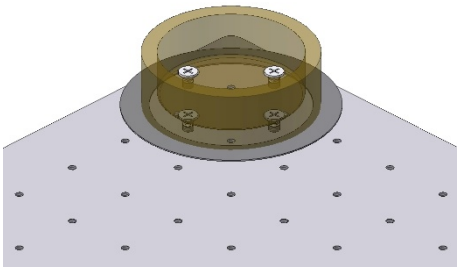
The liners on the bottom of the table hold and guide the table. Dirty or damaged liners can result in the device not running smoothly and cause vibrations. Dirty or damaged liners are easy to replace. To do so, proceed as follows:

Procedure

1. Turn off the device and pull out the plug.
2. Open the door to the incubation chamber.
3. If a tray is installed, remove it by loosening the four Phillips-head screws (M4x6).



4. Remove the table by loosening the four hexagonal socket screws (M6x12).



5. Turn the table 180° and remove the defective liners by loosening the Phillips-head screws (M4x10).
6. Install new liner and reinstall the table.

11 Disassembly and Disposal

The device must be disassembled and disposed of in an environmentally friendly manner if it is no longer in use.

INFORMATION

When returning the device for disassembly or disposal, it is required for the safety of all parties involved and because of legal provisions that a lawful declaration of decontamination is present. Refer to main chapter "Safety and Responsibility", chapter "Declaration of Contamination" for details.

11.1 Disassembly

Prior to disassembly:

- Switch off the device and lock any isolation switch in the 'off' position.
- Physically disconnect the main energy supply from the device and wait for components to fully discharge.
- Remove and dispose of all additional consumable items, auxiliary components and/or spent processing material in an environmentally acceptable manner.

Clean and disassemble component parts professionally with regard to any local regulations concerning employment and environmental protection. If possible, separate materials.

11.2 Disposal

Recycle disassembled components if no agreement is made concerning reclaim or disposal.

- Send metals for scrap.
- Send plastic components for recycling.
- Sort and dispose of the remaining components according their material composition.

WARNING

Electronic waste, electronic components, lubricants or other auxiliary materials/supplies are subject to hazardous waste regulations and may only be disposed of by registered specialist disposal firms.

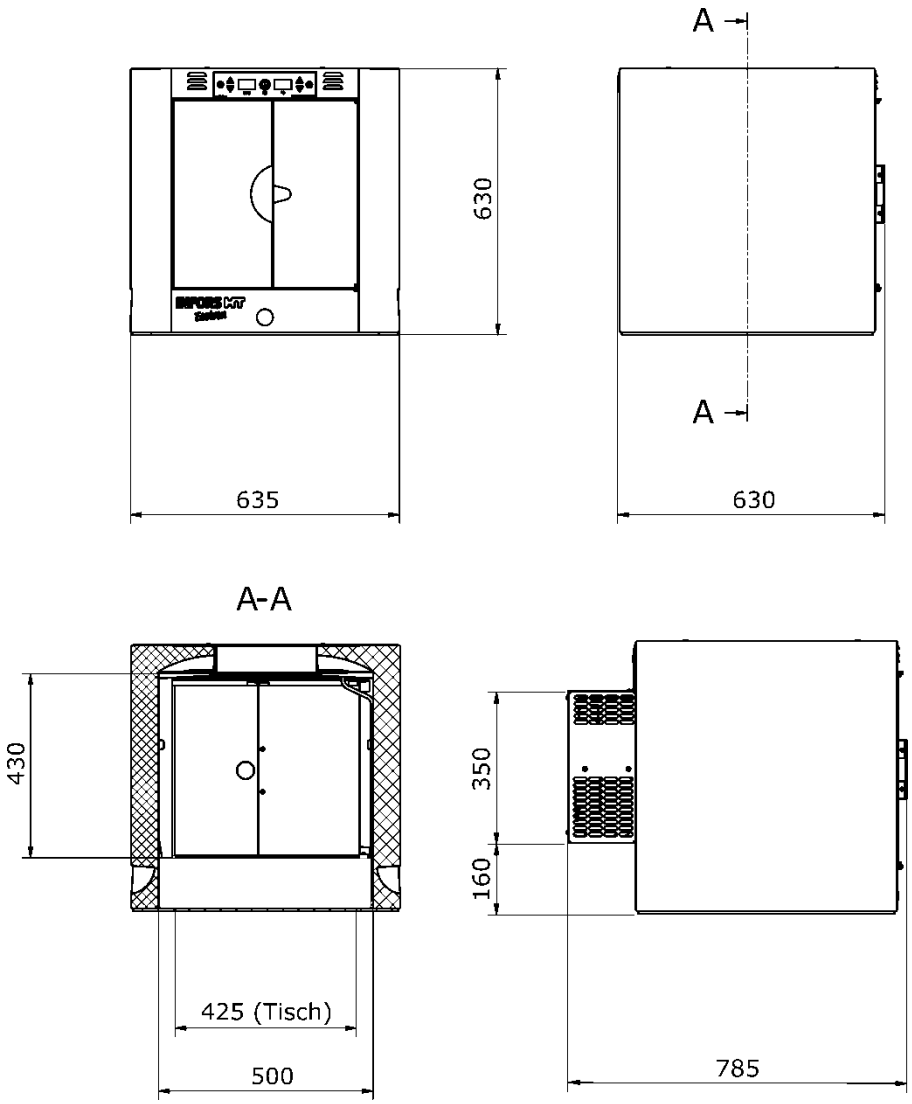
For disposal, the system units are to be disassembled and dismantled into individual material groups. These materials are to be disposed of according to the applicable national and local legislation.

Local authorities or specialist disposal firms can provide information regarding environmentally acceptable disposal.

If no special arrangements have been made for return, INFORS HT units with the required declaration of decontamination can be sent back to the manufacturer for disposal.

12 Technical Data and Specifications

12.1 Dimension Drawings



12.2 Specifications of the Basic Device

12.2.1 Weight and Dimensions

Mass		
Description	**Value**	**Unit**
Individual unit without cooling	63	kg
Individual unit with internal cooling	78	kg
Individual unit with external cooling	65	kg

Exterior dimensions of individual unit without cooling		
Description	**Value**	**Unit**
Width	635	mm
Height	630	mm
Depth (door closed)	630	mm
Depth (door open)	830	mm

Exterior dimensions of individual unit with cooling system		
Description	**Value**	**Unit**
Depth (internal cooling, door closed)	785	mm
Depth (internal cooling, door open)	985	mm
Depth (external cooling, door closed)	665	mm
Depth (external cooling, door open)	870	mm

Exterior dimensions of two units stacked		
Description	**Value**	**Unit**
Height	1260	mm

Interior dimensions (incubation chamber)		
Description	**Value**	**Unit**
Width	500	mm
Height	430	mm
Depth	580	mm
Volume	120	L

Table dimensions		
Description	**Value**	**Unit**
Width	425	mm
Depth	425	mm

12.2.2 Electrical Connection and Performance Values

Electrical connection values			
Description	**Type 230 V**	**Type 115 V**	**Unit**
	Value		
Voltage	230	115	VAC
Frequency range	50/60	60	Hz

Electrical power values			
Description	**Type 230 V**	**Type 115 V**	**Unit**
	Value		
Max. power input (without cooling)	750	750	W
Max. power input (with cooling)	1305	1305	W
Max. power consumption	3.5	7	A
Consumption in stand-by	6	6	W
Fuses	5	8	A

12.2.3 Interior Lighting

Description	**Value**	**Unit**
Type	2 halogen lamps with G4 pin base	
Voltage	12	V
Power	10	W
Length	33	mm

12.2.4 Materials

Component	Material
Casing	PUR – IHS, Zinkor
Incubation chamber	PUR – IHS, Zinkor, aluminium (anodised), stainless steel, PMMA, PVC
Table	Aluminium (anodised)

12.2.5 Emissions

Description	Value	Unit
Sound pressure	< 70	dB(C)

12.2.6 Operating Conditions

Description	Value	Unit
Temperature range	10 to 30	°C
Relative humidity, non-condensing	10 to 85	%
Altitude operating location	max. 2000	m.a.s.l
Pollution degree, according to EN 61010-1	2	

INFORMATION

The specified temperature range refers to the temperature directly on the device. In case of heat build-up due to insufficient ventilation, the temperatures on the device can be significantly higher than the room temperature.

12.2.7 Operating and Auxiliary Materials

ATTENTION

Using the wrong auxiliary materials can result in significant damage to property.

Only use the auxiliary materials in accordance with the table below.

Description	Permitted/used Products
Cooling liquid (secondary cooling circuit of internal cooling)	■ Based on 1,2-propanediol with inhibitor (must be suitable for copper) ■ Approved for the food and pharmaceutical sectors ■ Example: Antifrogen L
General detergent	Mild neutral cleaning agent
Detergent for adhesive matting	Mild neutral cleaning agent Dishwashing detergent
Disinfectant	Quaternary ammonium compounds

12.3 Specifications of Parameters

12.3.1 Rotation Speed Parameter (Shaker Drive)

Description	Value	Unit
Drive	Brushless direct current motor	
Direction of rotation	Clockwise	
Rotation speed range [1]	20 to 550	min^{-1}
Increment	10	min^{-1}
Control precision at maximum rotation speed	± 1	%
Throw	25	mm

1 The actual rotation speed that can be achieved depends on a variety of factors, such as loading, vessel type (e.g. flasks with baffles) and the fixtures used (e.g. clamps or Sticky Stuff adhesive matting)

12.3.2 Temperature Parameter

Description	Value	Unit
Ventilation	Radial fan with round heating element	
Power	400	W
Air circulation	110	m^3/h
Lowest temperature (above ambient temperature, without optional cooling)	5	°C
Lowest temperature (below ambient temperature, with optional cooling)	10	°C
Highest temperature	65	°C
Control precision	± 2	°C
Control	Electronic proportional controller with thermal sensor	
Temperature monitor	95	°C
Coolant for optional cooling system	R134a (non-CFC)	

12.4 Parameter Limits

Depending on the options installed, the laws of physics may limit the parameter setpoints in terms of what can actually be achieved.

All this information is non-binding and merely provided as an overview; the values that can be achieved in practice depend on many factors, which cannot all be taken into account here.

12.4.1 Maximum Permissible Setpoints for the Rotation Speed

The following guidelines for maximum rotation speeds are specified to prevent damage. Hence, they must be observed though further restrictions (e.g. tray with Sticky Stuff adhesive matting) must be taken into account.

The information below is based on an ideal and even load for the tray. The specified rotation speeds apply to glass Erlenmeyer flasks without baffles, 30 % filled.

Due to the lever effect, the maximum permissible rotation speeds for the top unit in a stack are lower.

Flask	Rotation speed	
	Bottom unit in a stack or individual unit	Top unit
25 x 300 mL	300 min^{-1}	200 min^{-1}
16 x 500 mL	300 min^{-1}	200 min^{-1}
9 x 1000 mL	250 min^{-1}	200 min^{-1}
4 x 2000 mL	200 min^{-1}	200 min^{-1}
2 x 5000 mL	200 min^{-1}	200 min^{-1}

All these values are intended solely as guidelines (not guaranteed). Depending on the load, higher rotation speeds are possible; in this case, the rotation speed should be increased slowly. In such cases, the user is responsible for determining the maximum possible rotation speed based on the vibrations and the vessel holders (the clamps may need to be secured) and communicating them. If vibrations occur, reduce the rotation speed until the device runs smoothly. Alternatively, increase or decrease the load until the device runs smoothly.

Maximum rotation speeds with Sticky Stuff

For a detailed description of the maximum permissible rotation speeds when using the with Sticky Stuff adhesive matting, see chapter 4.1.1 "Tray with Sticky Stuff", page 27.

12.4.2 Information on Temperatures that can Actually be Reached

The temperatures that can actually be reached depend on a variety of factors, such as the ambient temperature, the ventilation and the temperature of the other device in the stack. As such, the following guideline values only apply to individual units (no guarantees). In order to reach these guideline values, the device must be free-standing and the heat it generates must be able to dissipate unobstructed.

INFORMATION

The specified ambient temperature refers to the temperature directly at the device. In case of heat build-up due to insufficient ventilation, the temperatures on the device can be significantly higher than the room temperature.

Configuration	Temperature
Individual unit without cooling	Min: 5 °C above ambient temperature Max: 65 °C
Individual unit with internal cooling	Min: 10 °C below ambient temperature Max: 65 °C
Individual unit with external cooling	Depends on the operator's cooling cycle

EG-Konformitätserklärung

EC-Declaration of conformity

Déclaration CE de conformité

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Rittergasse 27, CH-4103 Bottmingen
T +41 (0)61 425 77 00
info@infors-ht.com, www.infors-ht.com

Gemäss der EG-Maschinen-Richtlinie 2006/42/EG, Anhang II 1 A

In accordance with directive on machinery 2006/42/EC, appendix II 1 A

D´après la directive relative aux machines 2006/42/CE 2006, annexe II 1 A

Hersteller *Manufacturer* *Fabricant*	Infors AG Rittergasse 27 CH-4103 Bottmingen
Bezeichnung *Designation* *Désignation*	Inkubationsschüttler Incubation shaker Incubateur agité
Typ *Type* *Type*	Ecotron
Ab Release *From release* *A partir du version*	alle Releases all releases toutes les versions
Ab Seriennummer *From serial number* *A partir du numéro de série*	S-000127197

Dieses Gerät entspricht den grundlegenden Anforderungen der Richtlinien

This device is in compliance with the essential requirements of directives

Cet appareil est conforme aux exigences essentielles des directives

Maschinenrichtlinie 2006/42/EG	*Directive on machinery 2006/42/EC*	*Directive relative aux machines 2006/42/CE*
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14 Index

A

Accessories 27
- clamps 32
- microtitre box 35
- Sticky Stuff 27
- test tube holders 34
- tray with pin holders 30
- tray with sliding bars 32

Adhesive matting Sticky Stuff 27

Air vents 26

Alarm messages 62

Ambient conditions
- installation location 41
- storage 40

Approved cultivation vessels 9

Auxiliary materials 83

B

Buttons 54

C

CE declaration of conformity 7

Clamps
- plastic 33
- stainless steel 33

Cleaning
- drip tray 70
- Sticky Stuff 29

Conditions
- at the installation location 41
- at the storing location 40

Connection values electrical 81

Control rack
- overview 24
- replace 73

Coolant 83

Cooling
- functional description 23
- refrigerant 83
- versions 23

Cross-flow fan 22

Cultivation process
- starting 58
- stopping 60

Cultivation vessels 9

D

Danger symbols on the device 17

Declaration of conformity 7

Decommissioning 60

Detergents 69, 83

Device
- cleaning 69
- disinfecting 71
- loading 53
- maintenance 68
- positioning 42, 43
- stacking 44
- storing 40
- switching off 60
- switching on 47
- transporting 39

Device fuses
- position 16
- replace 72

Dimensions 80

Discharge outlet
- position 26
- specification 81

Disinfectant 83

Disinfection 71

Distances 42

Door monitoring 17

Drip tray

Index

clean 70
replace 75
E
Electrical connection values 81
Electrical power values 81
Emergency switching off 54
Emissions 82
Environmental conditions
installation location 41, 82
storage 40
Erlenmeyer flasks, requirements 9
Establish power supply 46
Exterior dimensions 80
External cooling 24
F
Fan 22
Faults 62
general faults 64
shaker drive 65
temperature control 66
Fernbach flasks, requirements 9
Fitting
removable shelf 51
tray 51
Fitting the removable shelf 51
Fitting the tray 51
Flasks 9
Functional description
cooling 23
shaking 21
temperature control 22
Fuses
position 16
replace 72
G
Guidelines 7
H
Halogen lamp
position 25
specification 81
Heating 84
Hi 62
Holders
fit 49
overview 32
screw sizes 50
I
Identification plate
content 7
Installation location 41
Insulation mat 43
Intended use 8
Interfaces 81
Interior dimensions 80
Interior lighting
position 25
replacing lighting element 74
specification 81
switching on 59
Internal cooling 23
Interrupted power supply 60
L
Lighting
position 25
replacing lighting element 74
specification 81
switching on 59
Lo 62
Loading 53
Loading, optimum 53
M
Mains connection 25, 46
Maintenance 68
Maintenance schedule 68
Mass 80
Materials 82
Maximum rotation speed
with microtitre box 36

Index

with Sticky Stuff 30
Messages
Hi 62
Lo 62
Microtitre box
fit 49
overview 35
Minimum distances 42
Misuse 8
Motor 83

O

Opening the door 48
Operating conditions 41, 82
Operating elements 54
Operating panel 54
Operation
activating parameters 58
deactivating parameters 58
setting the parameter setpoint 57
switching off the device 60
switching on the device 47
Over-temperature switch off 17
Overview
accessories 27
parameters 56

P

Packaging 38
Parameters
activating 58
deactivating 58
Rotation speed (RPM) 56
setting the setpoint 57
Temperature (°C) 56
Payload 53
Permitted cultivation vessels 9
Placing the device
on a bench 42
under a bench 43
Power supply
establish 46
mains connection 25
specification 81
Power switch 54
Power values electrical 81
Protection classes 8
Pt100 84
Purpose 8

Q

Quickload spacer 31

R

Refrigerant 83
Replacement
control rack 73
drip tray 75
lighting element 74
liners on the table 76
Ring spacer 31
Risk category 8
Room temperature 82
Rotation speed
with microtitre box 36
with Sticky Stuff 30

S

Screw sizes
holders 50
tray 70
Servicing 68
Setpoint
maximum, rotation speed 84
reachable, temperature 86
setting 57
Shaker drive
faults 65
functional description 21
specification 83
Shaker throw 83
Sound pressure 82
Specification
basic device 80
cultivation vessels 9

Index

heating 84
throw 83
ventilation 84
Stacked devices
assembly 44
maximum rotation speed 84
Stacking set 44
Sticky Stuff
maximum rotation speed 30
overview 27
Storage 40
Switching off 60
Switching on 47
Symbols
on the device 17
on the packaging 38
T
Table
fit holders 49
loading 53
overview 21
stopping automatically 48
Temperature control
faults 66
functional description 22
reachable temperatures 86
securing 17
specification 84
Test tube holder
fit 49
overview 34
Throw 83
Transport 39
Transport inspection 38
Transport safety devices 43
Tray 27
with pin holders 30
with sliding bars 32
with Sticky Stuff 27
V
Ventilation 84
Versions with cooling 23
Vibrations 65
W
Warning symbols on the device 17
Weight 80

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