

INFORS HT MULTITRON STANDARD OPERATING MANUAL



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Multitron Standard Operating Manual



Highest capacity for microorganisms

Multitron Standard

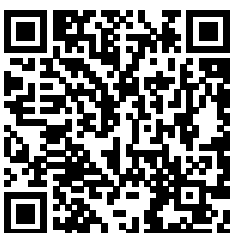
Incubation Shaker

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This operating manual can also be found online at:

<https://www.infors-ht.com/en/multitron-standard>



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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.

General Information

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.

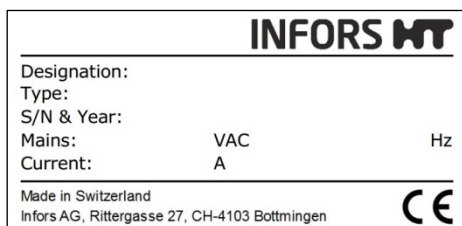


INFORMATION

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 12 "EC-Declaration of Conformity", page 109).

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.

Safety and Responsibility

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.

Safety and Responsibility

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.

Safety and Responsibility

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 4.1.3 "Tray with Sticky Stuff", page 38.

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:

Safety and Responsibility

- 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.

Safety and Responsibility

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.

Safety and Responsibility

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.

Safety and Responsibility

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.

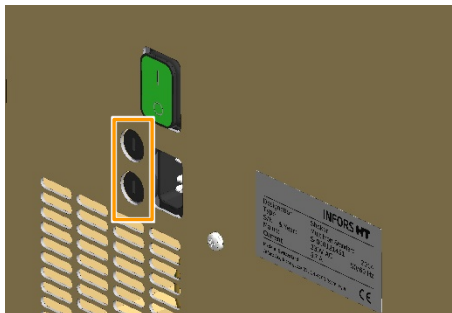
2.7.5 Pathogenic Organisms



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.

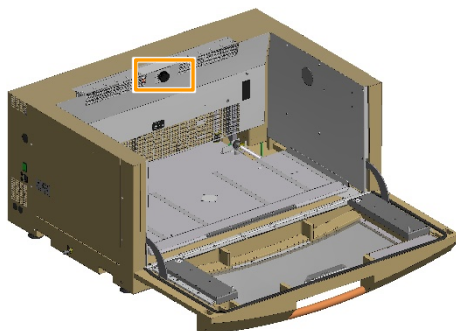
2.8 Safety Features

The device comes with the following safety features:



Fuses

The device is protected from impermissibly high power input by two fuses. The fuses are located right next to the mains connection on the left-hand side of the casing. For descriptions of which fuses to use for which device type, see chapter 11.2.2 "Electrical Connection and Performance Values", page 102.



Overheating shut-down

The device is equipped with two forms of protection against overheating:

- A capillary thermostat with a control knob (can be adjusted by the owner; factory setting: 70°C)
- A safety fuse (84°C)

Door monitoring

The position of the door is monitored electronically. If the door is opened, all dangerous movements (shaker drive and fan) are stopped immediately. As soon as the door is fully closed again, the shaker drive and fan restart automatically.

2.9 Warning Symbols on the Device

The following warning symbols (stickers) are attached to the device:

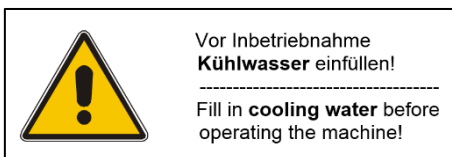


Position

On the left-hand side of the device casing.

Meaning

The device covers 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.



Position

On the left-hand side of the top cooling system, or on the front of the 31 mm base when using the base cooling system.

Meaning

If cooling systems with a cooling circuit (top and base cooling systems) are not filled with cooling liquid prior to commissioning, the device may run dry, thus damaging the pump.

The cooling liquid is filled up by the manufacturer's qualified personnel during initial commissioning.



WARNING

Illegible or missing warning symbols on the device will lead to the user being exposed to risks that the warning symbols in question were designed to make him or her aware of.

It is the provider's responsibility to ensure that all the stickers with warning symbols on the device are always intact.

Safety and Responsibility

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.

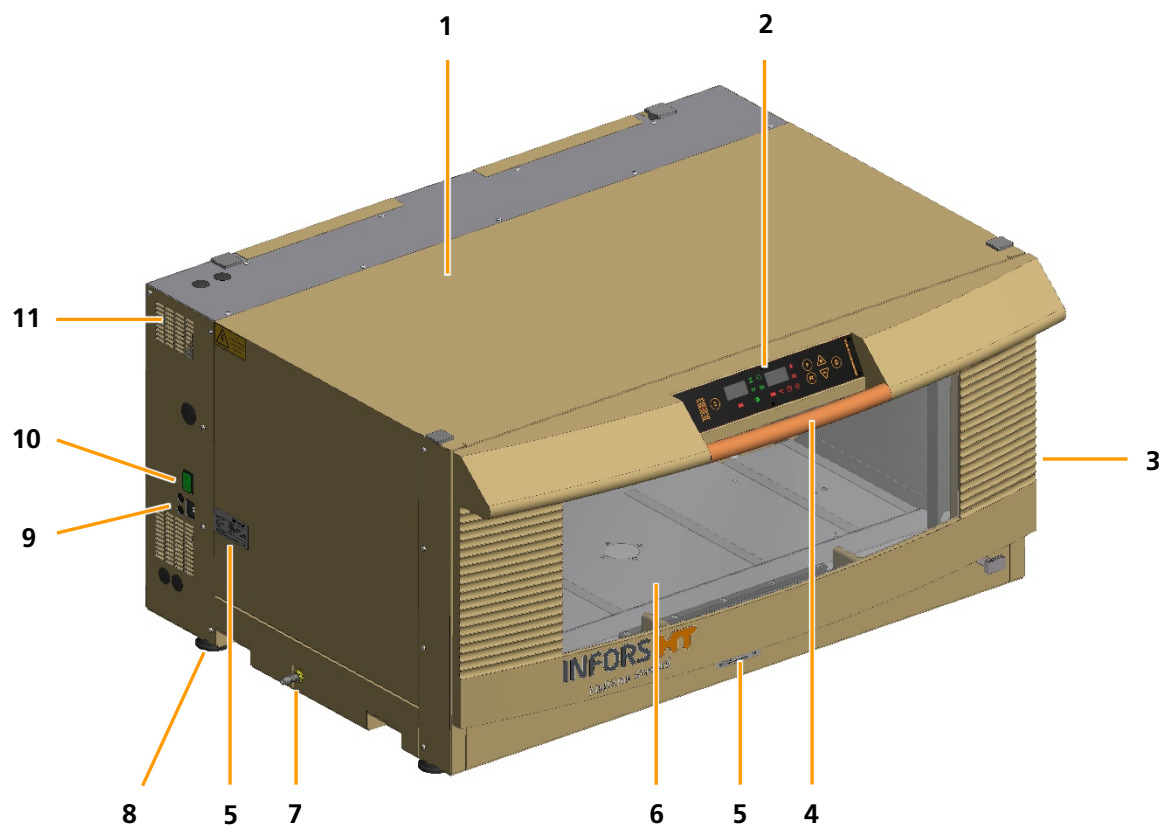
Important notice

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

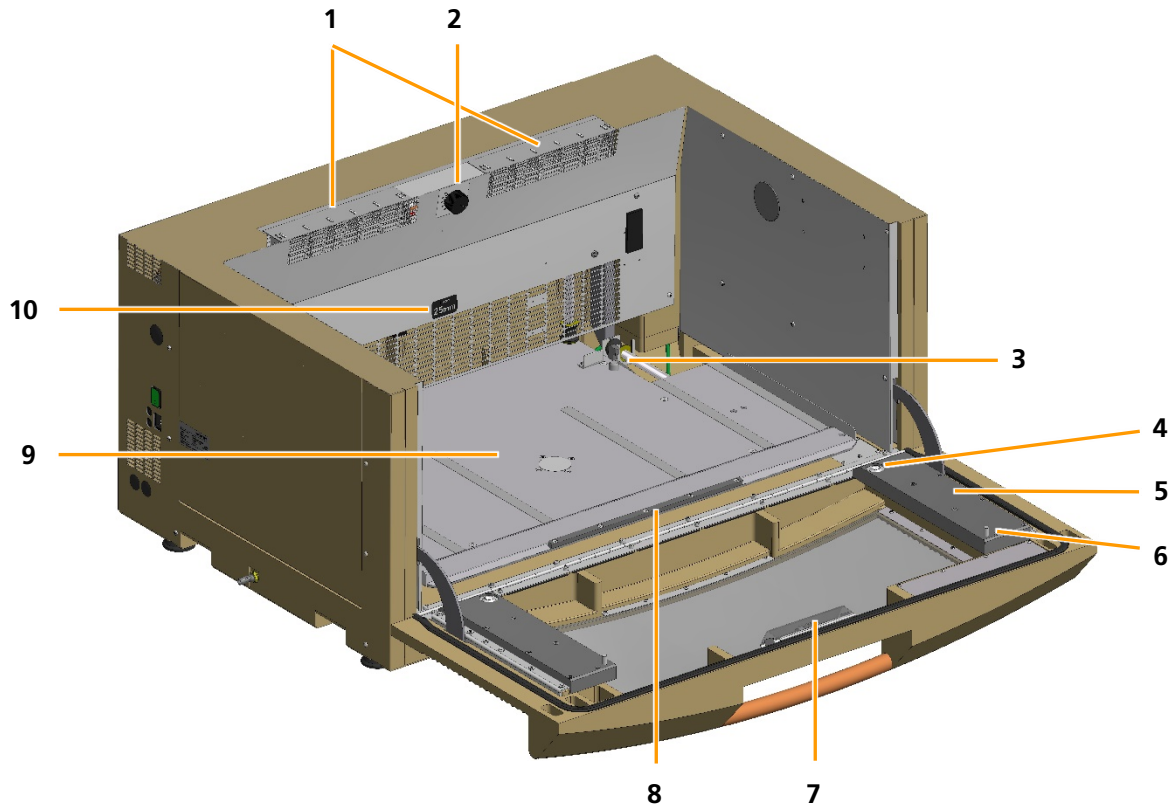
Outside



- | | |
|---|---|
| 1 Casing | 7 Discharge outlet |
| 2 Operating panel | 8 Rubber feet (7x) |
| 3 Serial interface (RS-232) (not visible) | 9 Mains connection incl. slot for fuses |
| 4 Door handle | 10 Power switch |
| 5 Identification plate (2x) | 11 Air vents |
| 6 Door with window (opens downwards) | |

Setup and Function

Inside



- | | | | |
|---|---|----|-----------------------------|
| 1 | Cross-flow fan | 6 | Screw-mounted pins |
| 2 | Capillary thermostat with temperature control | 7 | Interior lighting |
| 3 | Tray lock | 8 | Stop bar |
| 4 | Cylindrical ball caster | 9 | Table |
| 5 | Slide rail | 10 | Identification of the throw |

Brief Description

The Multitron Standard incubation shaker is used to cultivate micro-organisms in a laboratory environment. The basic version of the device is fitted with a shaker drive and a heater. Depending on the version of the device, it will come with either a 25 mm or a 50 mm throw.

The device can also be fitted with an optional cooling system. The cooling system can be mounted on the side of the device as well as on top or in the base of the device.

The device can be operated either locally, using the operating panel on the front of the device, or remotely, using a computer connected to the device via a serial interface.

3.2 Overview of Versions

The Multitron Standard is available in a number of pre-configured packages. Every version of the Multitron Standard is available with a throw of 25 or 50 mm and with or without a cooling system.

The tables below provide an overview of the configurations that are available as standard.

Individual Units

Individual unit with 25 or 50 mm throw without cooling; rubber feet



Individual unit with 25 or 50 mm throw with side cooling; rubber feet



Individual unit with 25 or 50 mm throw without cooling; base, 31 cm



Individual unit with 25 or 50 mm throw with cooling system in base; base, 31 cm



Setup and Function

Two units stacked

Two units stacked, with 25 or 50 mm throw with-
out cooling; base, 31 cm



Two units stacked, with 25 or 50 mm throw with
side cooling system; base, 31 cm



Three units stacked

Three units stacked, with 25 or 50 mm throw
without cooling; base, 13 cm



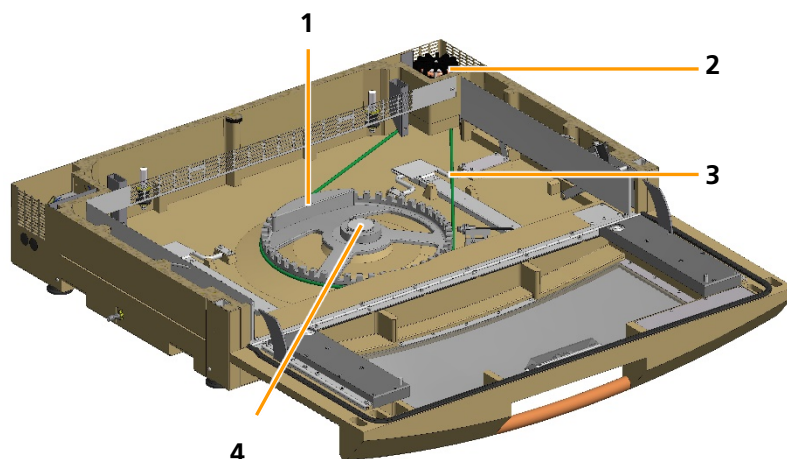
Three units stacked, with 25 or 50 mm throw
with top cooling system; base, 13 cm



3.3 Functions

3.3.1 Standard Function - Shaking

Mechanics



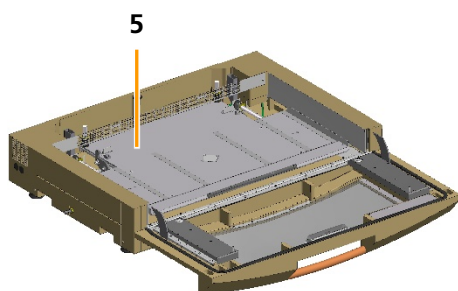
- | | | | |
|---|----------------|---|------------|
| 1 | Counterweight | 3 | Drive belt |
| 2 | Electric motor | 4 | Drive hub |

The table moves in circles at a speed of 20 to 400 min⁻¹. It is driven by an electric motor (2), which is connected to the counterweight (1) by a drive belt (3). In order to prevent injuries and facilitate easy handling of the cultivation flasks, the drive is switched off automatically as soon as the door is opened.

The counterweight used to balance the mass is fitted under the table. Depending on the design, the deflection of the circular movement is either 25 mm or 50 mm. The table moves in clockwise circles.

Table

The table (5) is connected to the drive hub (4) by 4 hexagonal socket screws. The table is used to hold the 85 x 47 cm (type M) tray, various versions of which are available.



When the base tray requires cleaning, the 4 hexagonal socket screws can be undone, then the table can be lifted 30° to allow access (see chapter 8.2.1 "Cleaning", page 93).

Setup and Function



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 on the bearings and joints.

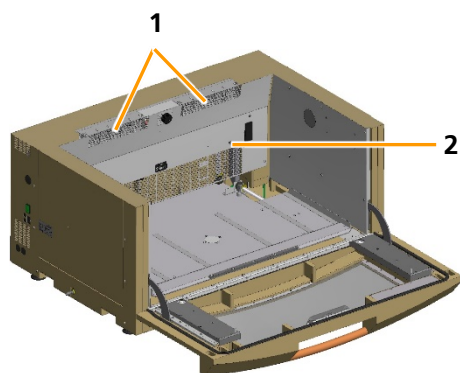
The permissible load weights depend on the position of the device in the stack, the throw and the shaking speed (see chapter 6.2.6 "Tips & Tricks for Loading the Tray", page 58).



Operation

The shaker drive is operated using the "Speed" parameter (*RPM*, Rotations Per Minute). For an exact description of how to set the parameters, see chapter 6.4 "Adjusting, Activating and Deactivating Parameters", page 65.

3.3.2 Standard Function – Temperature Control (Heating and Ventilation)

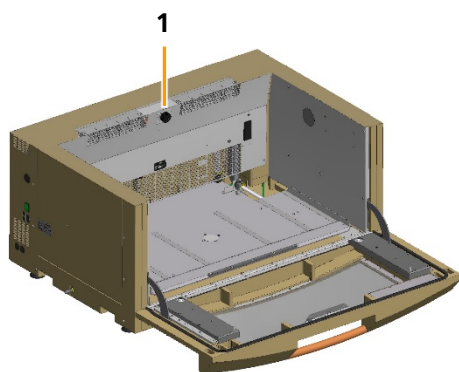


Function

Temperature is controlled by two cross-flow fans (1), each of which is connected to a downstream heating element. The cross-flow fans ensure constant air circulation, and keep 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 6°C above the ambient temperature. In order to achieve temperatures below the ambient temperature the device can be fitted with an optional cooling system (see chapter 3.3.3 "Optional Cooling Function", page 26).

A Pt100 temperature sensor behind the rear wall (2, not visible) measures and controls the temperature. Each of the two cross-flow fans is fitted with a thermostat that switches the heater off at 80°C in order to prevent overheating.



Protection

The incubation shaker has two forms of protection against overheating:

- A capillary thermostat with a control knob (1) (can be adjusted by the owner; factory setting: 70°C)
- A safety fuse (84°C)

Operation

The heater is operated using the "Temperature" (°C) parameter. For an exact description of how to set the parameters, see chapter 6.4 "Adjusting, Activating and Deactivating Parameters", page 65.



Setup and Function

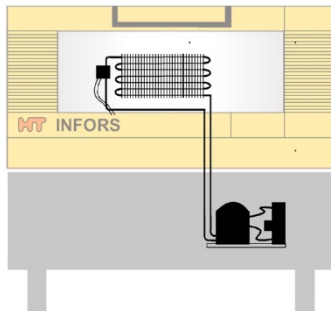
3.3.3 Optional Cooling Function

As the device is self-heating, an individual unit can be operated at a temperature of approx. 6 °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 an optional cooling system. The following cooling systems are available:

- Individual units: Cooling system in base
- Two units stacked: Side-mounted cooling system
- Three units stacked: Top cooling system

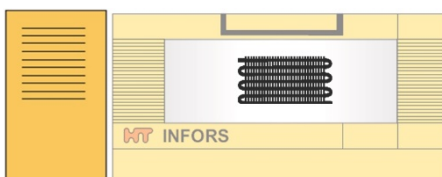
Depending on which version is chosen, the cooling unit may be installed at a different location. However, the heat exchanger is always installed behind the rear wall in the incubation chamber on all cooling systems.

Cooling system in base



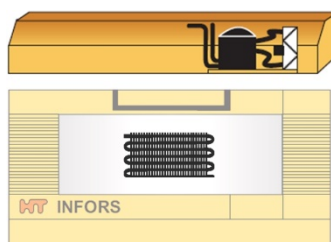
On individual units, the cooling unit is installed in the 31 mm base. The cooling unit is a 2-circuit system with a cooling liquid tank, which must be filled with cooling liquid by INFORS HT prior to commissioning.

Side-mounted cooling system



On the “side-mounted cooling system” version, the cooling unit is installed in a side-mounted casing. Each cooling unit cools one device in a stack. The side-mounted cooling unit is supplied with power directly via the device itself. As such, no additional mains connection is required for the cooling system. The cooling liquid circulates in a closed circuit.

Top cooling system



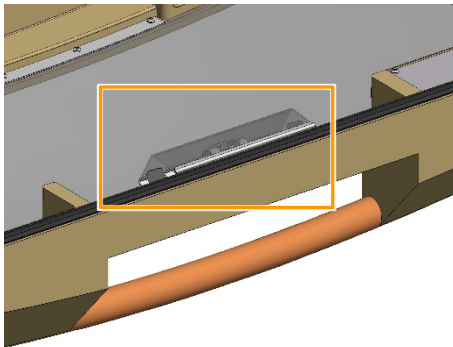
On the “top cooling system” version, the cooling unit is installed in a bracket mounted on the incubation shaker. The top cooling system cools all the devices in the stack. The top cooling system has its own power supply and mains switch. These are located on the left-hand side of the bracket. The cooling unit is a 2-circuit system with a cooling liquid tank, which must be filled with cooling liquid by INFORS HT prior to commissioning.



INFORMATION

For information on the technical data for the cooling system, see chapter 11.3.2 "Temperature Parameter", page 106.

3.4 Interior Lighting

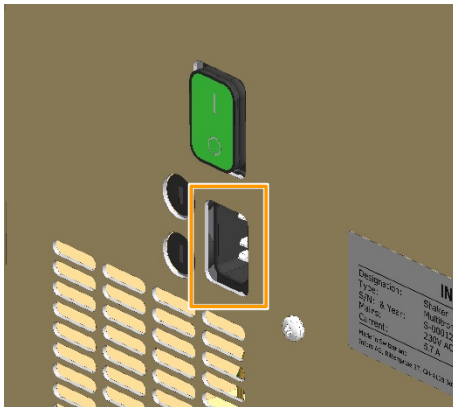


The device features interior lighting. The interior lighting is switched on automatically as soon as a button is pressed or the door is opened. After 60 seconds without input, the lighting switches off again immediately.

The interior lighting comprises two halogen lamps, which are located on the inside of the door, near the top. In case of a defect, the halogen lamps can be replaced by the owner.

3.5 Connections and Interfaces

3.5.1 Mains Connection



The mains connection is located on the left side of the device, towards the rear. 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.

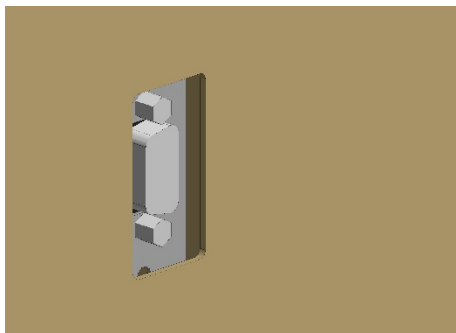
The country-specific power cable required for connecting the power is included in the device's scope of delivery. If the power cable is defective, replace it with a power cable of the same type.

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 11.2.2 "Electrical Connection and Performance Values", page 102.

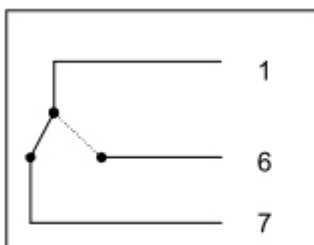
Setup and Function

3.5.2 Serial Interface



The device has a serial interface (RS-232, 9-pin). This is located on the right-hand side of the device casing. The serial interface is designed primarily to allow the device to be connected to an external computer in order to control it remotely or record data. The serial interface can also be used to transmit alarm messages.

An optional RS-232 Ethernet interface adapter is available if you wish to connect the device to a network. You will need this if you wish to operate the device using the eve® software, for example.

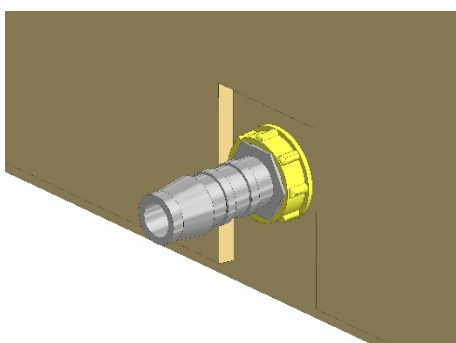


Pin Allocation

	1 + 6	Normal status	4	Reserve
	1 + 7	Alarm and power failure	5	GND
	2	RX (receiver)	8	Reserve
	3	TX (transmitter)	9	Reserve

3.6 Openings

3.6.1 Discharge Outlet



The opening for discharging leaked liquids, detergents or condensation that has collected is located at the bottom, on the left hand side of the casing, close to the centre.

The opening is sealed with a yellow plug on delivery. A hose nozzle (¼ inch) for connecting a hose (Ø 10 mm) is included in the scope of delivery.

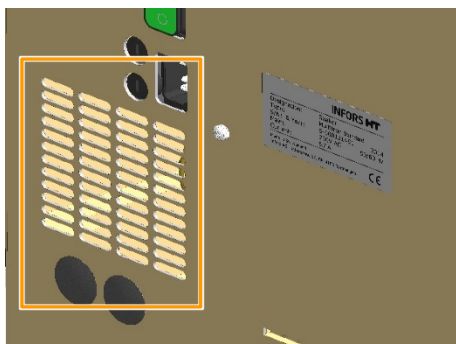


INFORMATION

When working with large fill volumes, we recommend installing the discharge hose to avoid the bearings 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

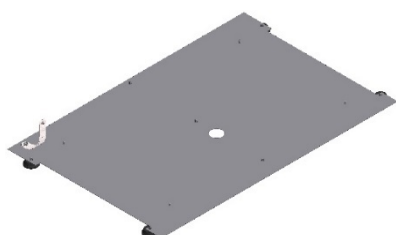


The device has air vents on both sides and the rear of the casing. When setting up the device, you must ensure that these air vents remain unobstructed in order to ensure that the exhaust air can be extracted without obstruction and none of the components overheat.

3.7 Substructure

Different versions of the incubation shaker are available with different substructures:

Rubber Feet, 3 cm



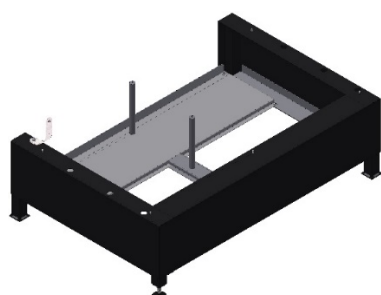
Individual units placed on a bench have a substructure comprising an earthing plate with 7 rubber feet. The rubber feet are bolted onto the earthing plate at a fixed height and cannot be adjusted. As such, benchtop models must always be placed on an even surface.

Base, 13 cm



Individual units and devices stacked in threes can be fitted with a 13 cm base. The base has an adjustable foot that can be used to level the device.

Base, 31 cm



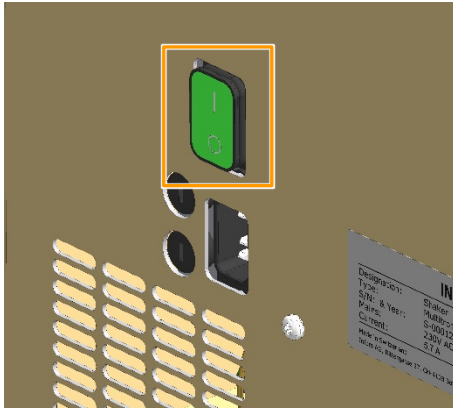
Individual units and devices stacked in pairs can be fitted with a 31 cm base. The base has an adjustable foot that can be used to level the device.

On individual units with a cooling system, the cooling unit is housed in the base.

Setup and Function

3.8 Operating and Indicating Elements

3.8.1 Power Switch



The power switch is located on the left side of the device, towards the rear. As soon as the device is switched on, the power switch lights up green. In addition to normal switching on and off, the power switch also works as an emergency switch.



INFORMATION

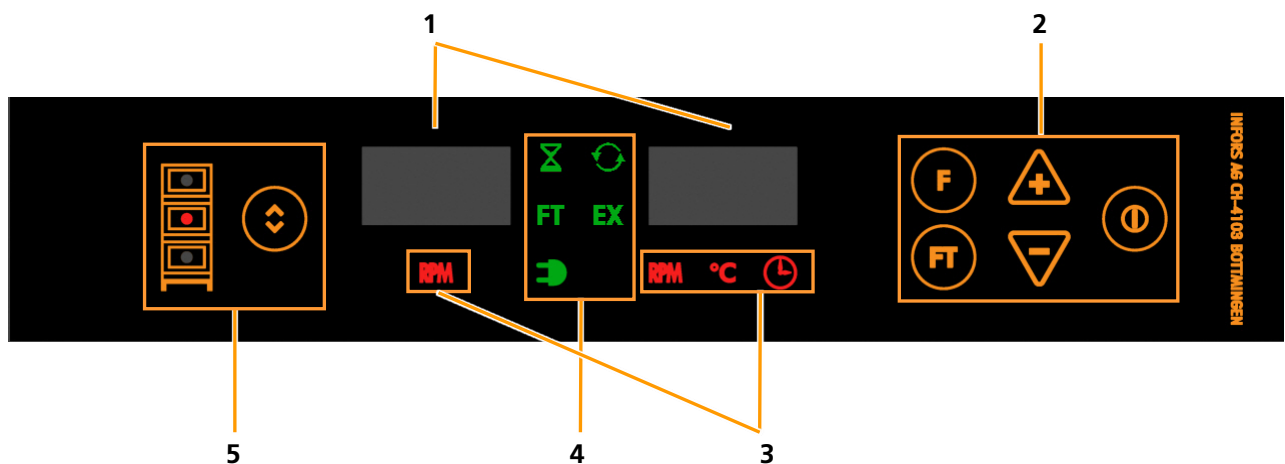
In case of an emergency shut down via the power switch, all parameter setpoints are stored and the device restarts immediately when it is switched on via the power switch.

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

3.8.2 Operating Panel

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

The operating panel comprises the following elements:

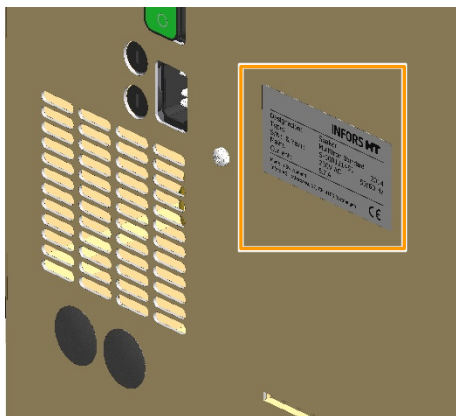


- | | | | |
|---|--|---|-------------------------------------|
| 1 | View boxes for actual values, setpoints, alarm messages and error messages | 3 | Parameter symbols (red) |
| 2 | Function buttons for entering parameter values (orange) | 4 | Function symbols (green) |
| | | 5 | Button and display without function |

For more information on the display and operating elements on the operating panel, see chapter 6.3 "Overview of Display and Operating Elements", page 60.

3.9 Markings on the Device

3.9.1 Identification Plate



The identification plate is located on the left-hand side of the device, next to the mains connection. A second identification plate is located at the bottom of the door.

For information on the data specified on the identification plate, see chapter 1.3 "Device Identification (Standard Identification Plate)", page 7.

3.9.2 Identification of the Throw



At the back of the incubation chamber, there is a sticker that identifies the throw of the device.

Accessories

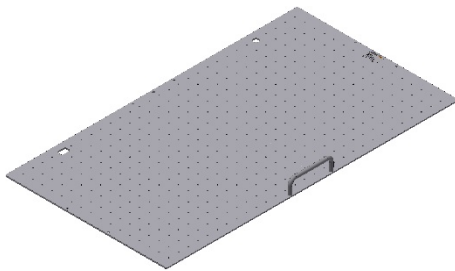
4 Accessories

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

Different trays are available for the device; these can be purchased individually or ordered with the device. In addition to the universal table tray, which can be equipped as desired, various trays with fixed features are available for different purposes.

4.1.1 Universal Table Tray



The M tray referred to as "universal table tray" with the dimensions 85 x 47 cm features drill holes on a grid so that it can be fitted as desired. For fitting, various clamps and test tube holders are available, that can be combined as desired (see chapter 4.2 "Clamps and Other Holders", page 41).

The universal table tray is made of anodised aluminium and can be sterilised in autoclaves if required.

The separately available Sticky Stuff adhesive matting (8 units of 20 x 20 cm) can also be stuck onto the universal table tray.

Technical Data for the universal table tray

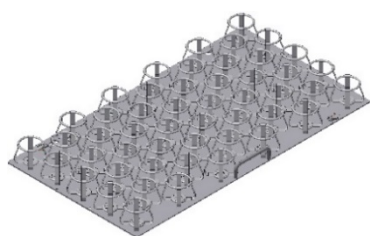
Description	Value
Material	Aluminium
Size	850 x 470 mm
Weight	4.5 kg
Threaded holes	M4
No. of threaded holes	462
Threaded hole grid	28.28 x 28.28 mm
Sterilisation in autoclave	YES

4.1.2 Pre-Fitted Trays

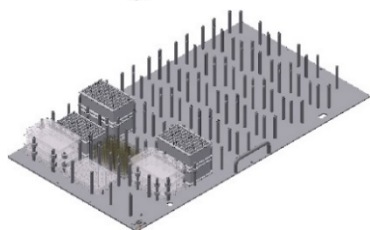
Pre-fitted trays are equipped with one clamp type each. They are used if only a single size of flask is to be used for certain tasks. Unlike the universal table tray, their holders cannot be changed.

Pre-fitted trays feature a capacity that is up to 20 % higher than an individually equipped universal table tray. Since no drill holes have to be taken into account in the grid, the clamps can be installed closer together.

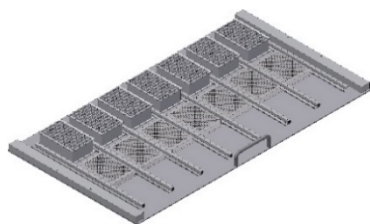
The following versions are available:



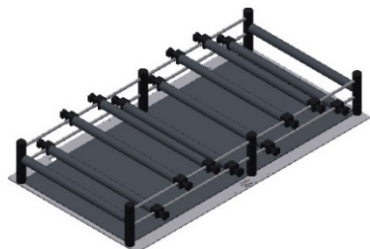
- Tray with steel clamps



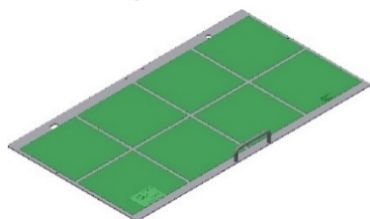
- Tray with pin holders for microtitre and deep-well plates



- Tray with clamps for microtitre and deep-well plates



- Tray with sliding bars

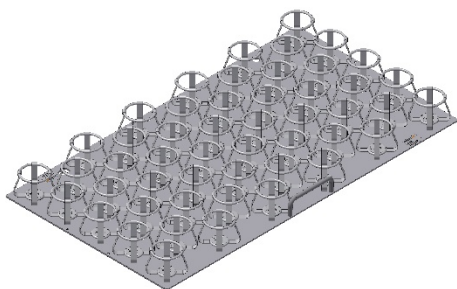


- Tray with Sticky Stuff

Accessories

Tray with steel clamps

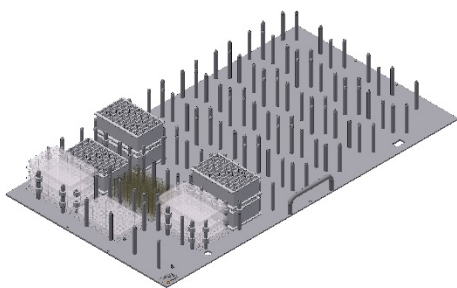
Fitting identical clamps on the entire tray results in the following capacities:



Flask Size		Number of Flasks per M Tray
25	ml	197
50	ml	131
100	ml	91
250	ml	48
300	ml	43
500	ml	31
1000	ml	19
2000	ml	13
3000	ml	9
4000	ml	8
5000	ml	6

Tray with pin holders

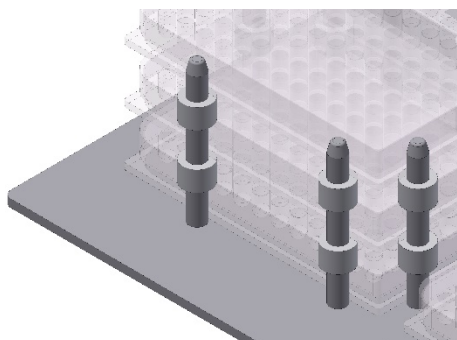
For applications in which large numbers of microtitre or deep-well plates need to be incubated, various trays with pin holders are available. These enable loading with several layers of microtitre and deep-well plates.



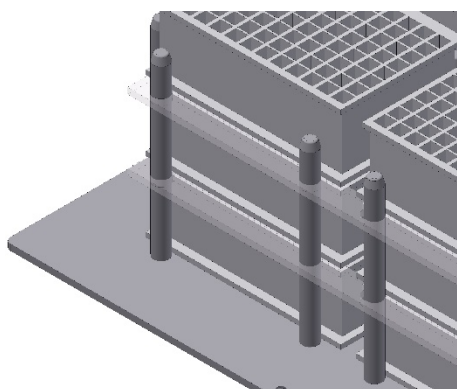
The plates can be stacked. This allows you to simultaneously incubate up to 72 deep-well plates and up to 144 microtitre plates on one M tray.

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

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.

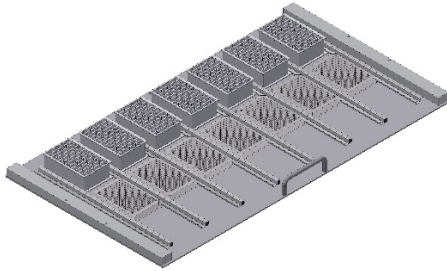
Technical data for pin holders

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

Accessories

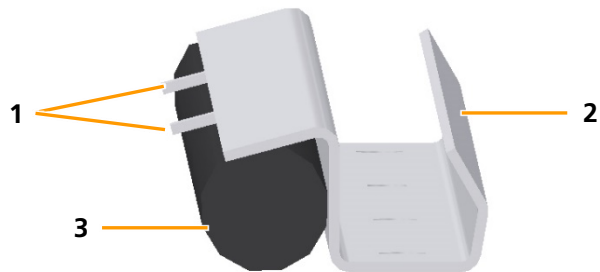
Tray with clamping assembly

There is a quick clamping assembly for affixing microtitre and deep-well plates. Two versions of this clamping assembly are available:



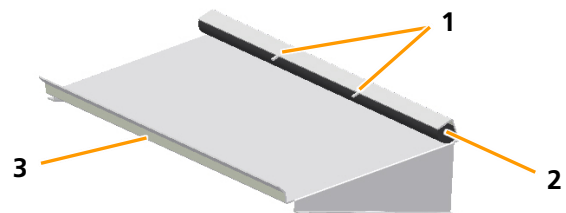
Tray with flat clamping assembly (horizontal incubation):

The flat clamping assembly is a profile made of sheet metal that is equipped with an angled strip (2). On the other side, there is an edge featuring a foam rubber strip (3). There are two spacers on the edge (1) for positioning microtitre plates or deep-well plates.



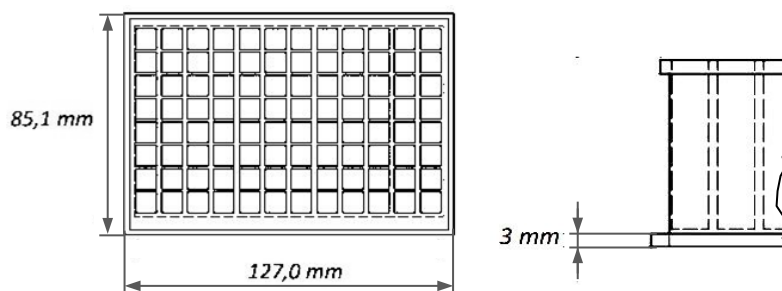
Tray with clamping assemblies tilted at an angle of 20° (angled incubation):

The tilted clamping assembly is a wedge-shaped metal sheet with two profiles. The lower profile is an angled bar (3). The upper profile is a U profile into which the cellular rubber string (2) is inserted. There are two spacers on the upper edge (1) for positioning the microtitre plates or deep-well plates.



The trays with clamping assemblies are designed for microtitre and deep-well plates with dimensions 85.1 mm x 127 mm. To ensure sufficient clamping force can be achieved, plates with a web height of at least 3 mm must be used.

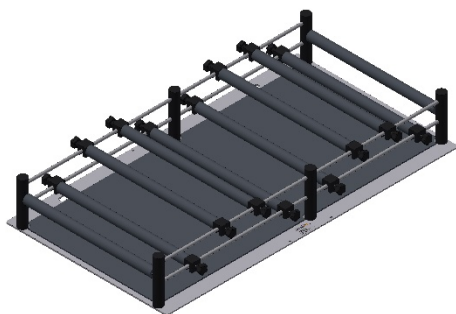
Accessories



Technical data for clamping assemblies

Description	Value
Rail material	Aluminium
Foam rubber material	CR rubber
Temperature range	$\leq 80^{\circ}\text{C}$
Cleaning	Mild neutral cleaning agent
Disinfection	Commercially available disinfectant
Sterilisation	NO
Size of microtitre and deep-well plates	85.1 x 127 mm

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 8 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

Accessories

4.1.3 Tray with Sticky Stuff

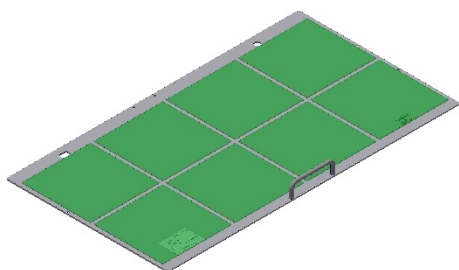


ATTENTION

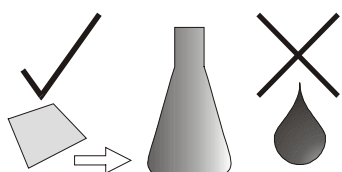
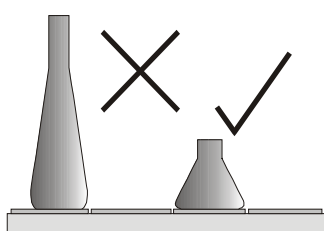
If condensate forms on the tray or on the cultivation vessels, the adhesiveness of the Sticky Stuff is no longer guaranteed. As a result, cultivation vessels can become detached from the Sticky Stuff and break.

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.



- 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).



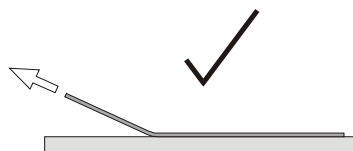
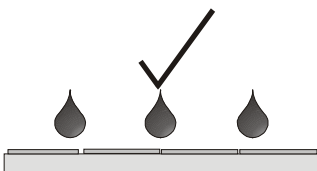
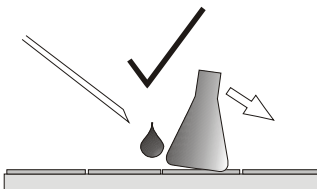
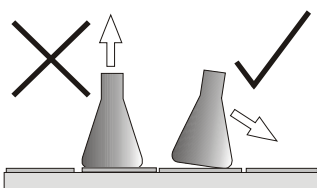
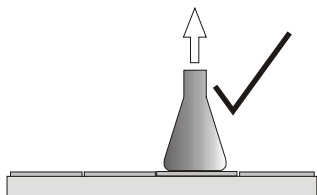
About using Sticky Stuff

- 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.

Accessories

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 speed with Sticky Stuff

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



INFORMATION

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

Schott Duran® glass Erlenmeyer flask	Filling	Maximum permissible speed	
		25 mm throw	50 mm throw
25 to 750 mL	20 %	250 min ⁻¹	200 min ⁻¹
1000 mL	20 %	300 min ⁻¹	250 min ⁻¹
2000 mL	20 %	300 min ⁻¹	250 min ⁻¹
3000 mL	20 %	350 min ⁻¹	300 min ⁻¹
5000 mL	20 %	300 min ⁻¹	250 min ⁻¹

Corning plastic Erlenmeyer flask	Filling	Maximum permissible speed	
		25 mm throw	50 mm throw
125 to 3000 mL	20 %	300 min ⁻¹	200 min ⁻¹

Corning plastic Fernbach flask	Filling	Maximum permissible speed	
		25 mm throw	50 mm throw
3000 mL	20 %	300 min ⁻¹	250 min ⁻¹

4.2 Clamps and Other Holders

For individual fitting of the universal table tray, various clamps and holders are available.

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:

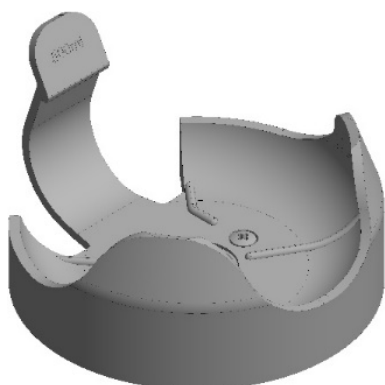


For flask type	Volume		
Erlenmeyer	25 mL	500 mL	4000 mL
	50 mL	1000 mL	5000 mL
	100 mL	2000 mL	
	250 mL	3000 mL	
Fernbach	1800 mL	2800 mL	

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

Accessories



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

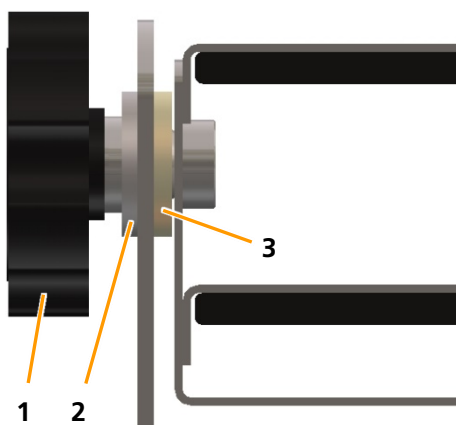
4.2.2 Test Tube Holders



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

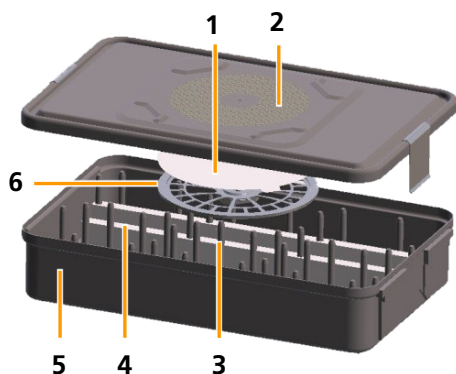


Overview

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



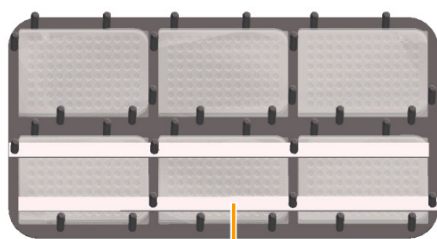
Mounting the box for microtitre plates

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.

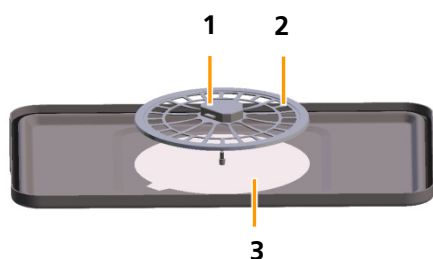
Alternatively, the box for microtitre plates can be placed on the Sticky Stuff adhesive matting. In this case, all fastening screws must be removed to avoid damaging the adhesive matting.

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

Accessories



1



1

2

3

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.

Accessories

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

Accessories

4.4 eve®



eve® is a platform software for planning, controlling and analysing bioprocesses. Among other features, eve® enables bioprocess data to be recorded and stored in a centrally managed database. The software offers workflows for simple bioprocesses up to the planning and execution of complex strategies with different process phases.

eve® offers the possibility to generate and store bioprocess knowledge. For example, different libraries are available for storing information about organisms or culture media. Thanks to soft sensors, additional knowledge can be generated.

In addition to INFORS HT products, biotech equipment and analysis devices from third-party manufacturers can also be integrated. In this way, bioprocesses can be controlled, monitored and evaluated entirely via one software.

eve® is installed on a centralised server. Access takes place via a browser, no client-side installation is required. Bioprocess data is thus directly available via the browser and is independent of the operating system.

The software is available in different packages. This allows the software to be perfectly adapted to the individual needs and requirements of the users. eve® (in the Premium version) is also suitable for working in a validated environment in accordance with FDA CFR 21 Part 11.

Our customer service is at your disposal for detailed information. For contact information, see page 2.

5 Installation

Only the manufacturer's qualified expert personnel or persons authorised by the manufacturer may install and initially commission the device. Hence, the following section only lists the requirements for the installation location to be observed by the provider.



WARNING

Installation and initial commissioning require trained expert personnel with sufficient experience. Errors during installation may lead to dangerous situations or significant damage to property.

- Only the manufacturer's expert personnel or person's authorised by the manufacturer may install and initially commission the device.
- The manufacturer must also be consulted if the device is subsequently moved.

5.1 Operating Conditions at the Installation Location

To achieve optimal and reproducible results, the device should be set up in stable ambient conditions without strong temperature or humidity fluctuations. Changes in ambient temperature or humidity (even short-term) 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.

Installation

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!

5.2 Requirements for the Mains Connection

To avoid dangers due to electrical current, the in-house mains connection must meet the following requirements:

- Single-phase, constant power supply
- In the building, the power supply must be protected using a fault current protection switch (RCD – Residual Current Device).

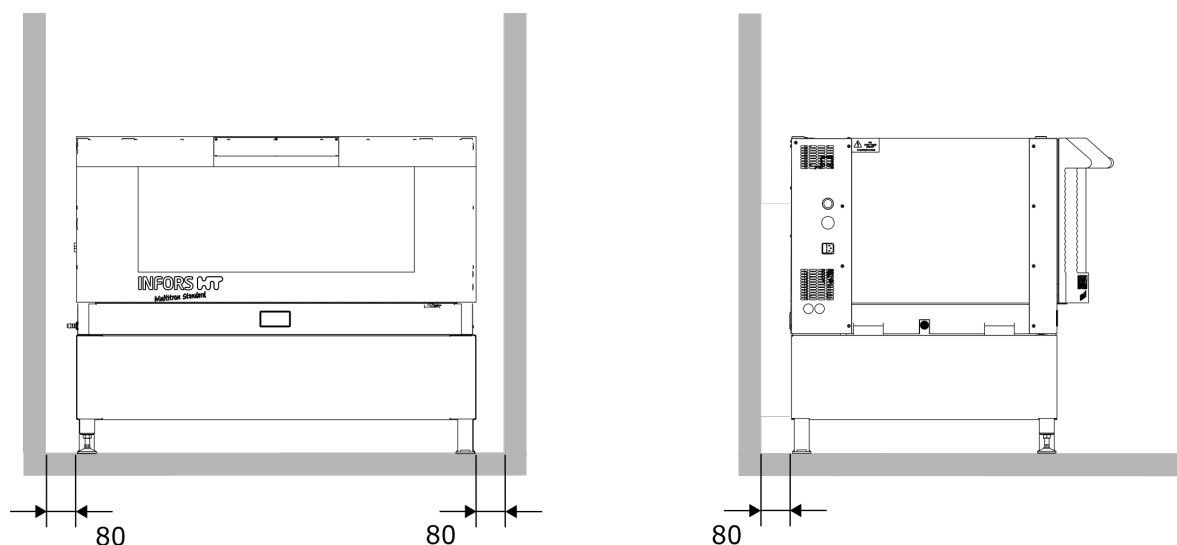
In addition to that, the following requirements must be met:

- Make sure that the voltage values of the device match those of the local power supply. Note the description on the identification plate.
- Only use the power cable provided. If the power cable becomes defective, replace it with a power cable of the same type.
- Ensure that the mains connection is accessible at all times.

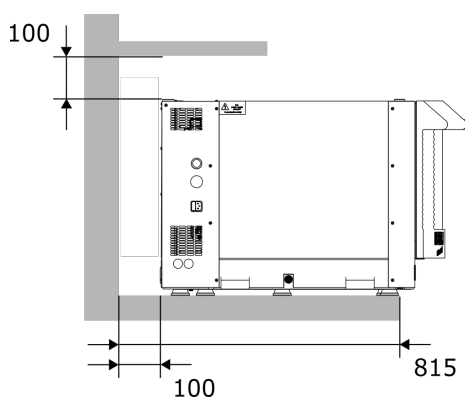
5.3 Minimum Distances to the Device

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 device



Placing the device on a bench

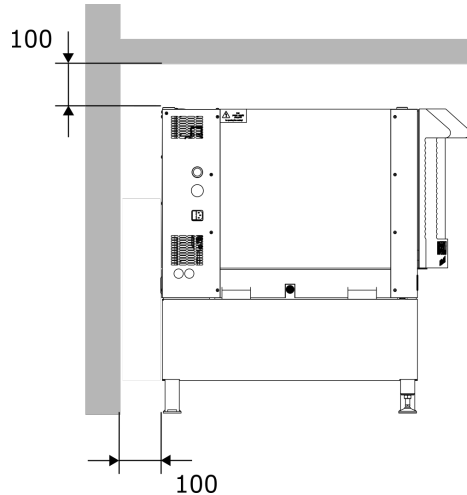


When placing the device on a bench, observe the following points:

- 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 815 mm.
- You must leave a ventilation gap of at least 100 mm between the device and rear wall.
- 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.

Installation

Placing the device under a bench



When placing the device under a bench, observe the following points:

- You must leave a ventilation gap of at least 100 mm between the device and rear wall of the bench to ensure that heat produced by the device can escape.
- The minimum distance between the device and the underside of the bench top is 100 mm.



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 right-hand side or those on the rear of the device.
- Never position the device right up against a wall.

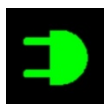
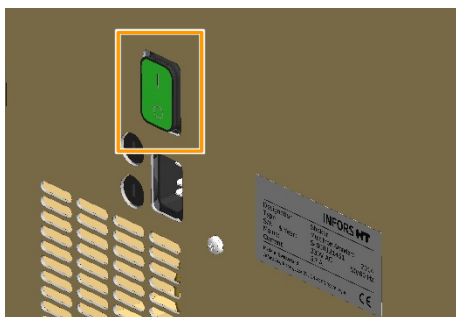
6 Operation

6.1 Switching on the Device



ATTENTION

The shaker drive can start automatically if the device has not been switched off correctly beforehand. Loose objects in the incubation room can damage the device and the cultivation vessels.



1. Press the power switch on the left-hand side of the casing.
The power switch lights up in green after switching on. Once the device has been switched on, it will automatically run a self-test. The letters "INI" (initialisation) will appear in the view box on the right and light up briefly.

Once the initialisation process is complete, the *Power supply on/off* function symbol will light up. The device is ready for operation.

6.2 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.

Operation



CAUTION

If you put a load of more than 20 kg on the door, there is a risk that the device might fall down. This can lead to property damage and injuries.

- Do not lean on the door.
- Do not put a load of more than 20 kg on the door.

6.2.1 Opening the Door

The door can be opened when the device is running. The table will come to a stop as soon as the door is opened more than 30°. It is not possible to open the door fully until the table has come to a full stop. The table will start up again automatically as soon as the door is closed more than 45°.



CAUTION

If the door is opened when 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, and wait until the table has come to a complete standstill.



ATTENTION

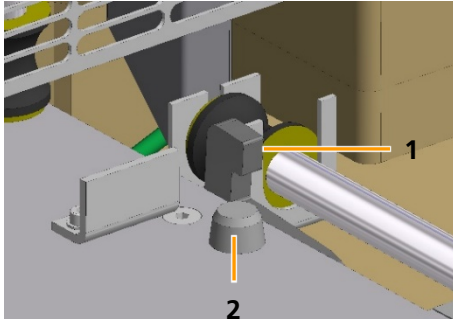
The door can only be opened fully when the device is switched on at the power switch and there is no load on the half-open door. If the door is pushed down violently, this can damage the door mechanism.

In order to open the door while the shaker drive is running, proceed as follows:

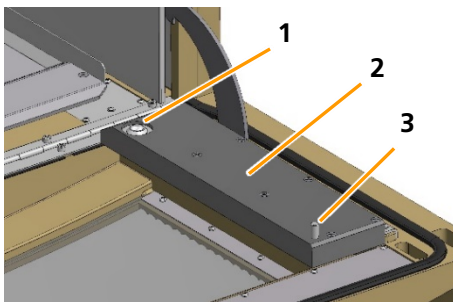
Procedure

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. If the door does not unlock straight away, do not lean on it; instead, lift it up slightly to take the load off the locking mechanism.

6.2.2 Removing the Tray



The device is fitted with a tray lock to hold the tray securely in place on the table. When the door is opened fully, the lock hooks (1) on the table release the tray. The ejection levers under the table lift the tray out of the table's lock cones (2). The tray is now free and can be pulled out of the incubation chamber by hand.

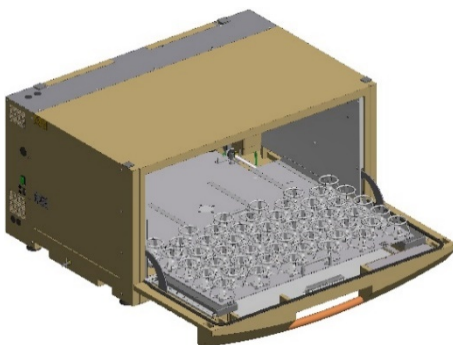


The tray is removed from the incubation chamber using slide rails (2) and the cylindrical ball casters inside them (1), which are located on the inside of the door. Two screw-mounted pins (3) in the slide rails limit how far the tray can be pulled out. When pulled out all the way, the tray lies partially on the door and partially on the table.

To remove the tray, proceed as follows:

Procedure

1. Open the device door all the way.
The safety mechanism unlocks the lock hooks automatically when the door is opened, and lifts the tray out of the rear cones.
2. Lift the tray up by its handle.
3. Pull the tray over the front stop bar and onto the open door.



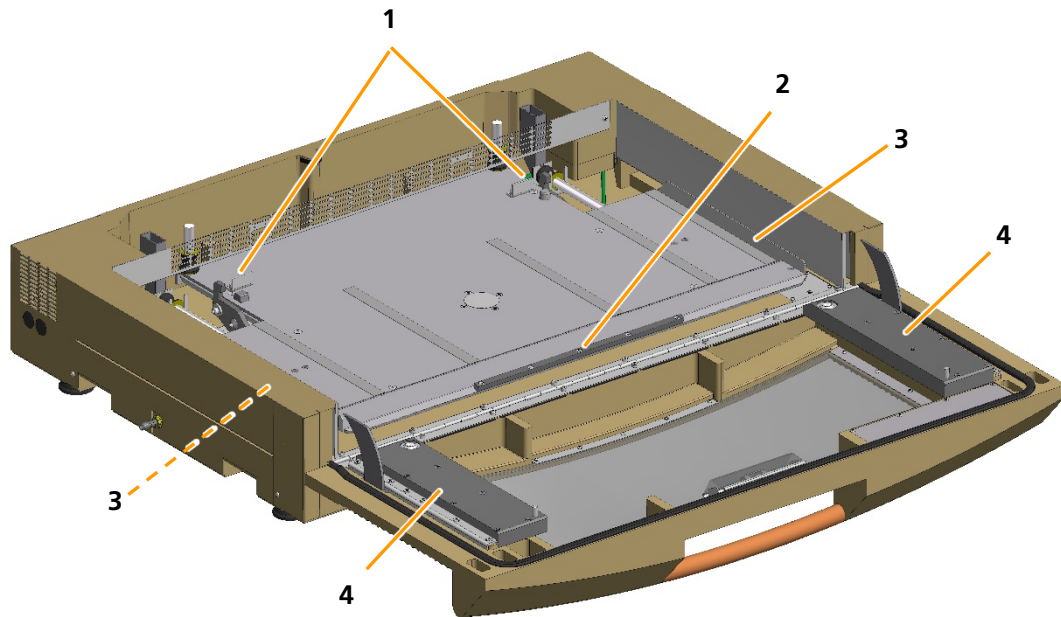
INFORMATION

If you cannot pull the tray out, check whether the door is open all the way. Push the door down as far as it will go.

Operation

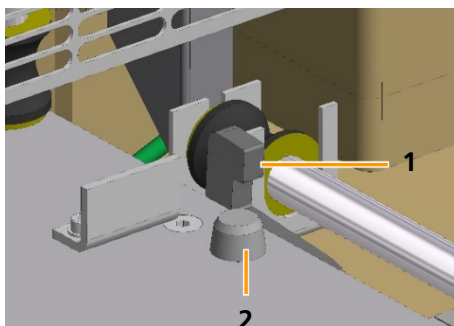
6.2.3 Inserting the Tray

The position of the table is irrelevant when inserting the tray. Proceed as follows:



Procedure

1. Open the device door all the way.
2. Place the tray on the door slide rails (4).
3. Load the tray/handle the cultivation flasks.
4. Push the tray between the guide rails (3), over the front stop bar (2) and up to the stop (1) in the incubation chamber, keeping it straight. The tray must audibly click into place behind the front stop bar.
5. Check whether the tray is seated properly behind the front stop bar (2).
6. Close the device door.



When the door closes, the ejection levers lower and the tray is lowered into the two cones (2). At the same time, the lock hooks (1) move forwards to hold the tray in place on the table.

7. Check whether the lock hooks hold the tray in place securely when closing the door.

**ATTENTION**

If the tray is not held in place securely on the table, the tray may be damaged by the movement of the table inside the machine.

- Do not start up the device unless the tray has been inserted correctly and is held in place securely by the lock hooks.

**INFORMATION**

If you are unable to insert the tray properly, or the system does not lock it in place securely, perform the following checks:

- Remove the tray and check it is not twisted or bent.
- Check the incubation chamber for foreign matter and other objects.
- If it is still not possible to insert the tray correctly, contact your nearest INFORS HT representative.

6.2.4 Handling Cultivation Flasks without Removing the Tray

The cultivation flasks can also be handled without removing the tray. To do so, proceed as follows:

**CAUTION**

If the door is opened when 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, and wait until 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 max. 80°. If the door is opened more than 80°, the tray will be released.
4. Handle the cultivation flasks.
5. Close the door again.
The device restarts automatically.

Operation

6.2.5 Fitting the Holders



ATTENTION

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

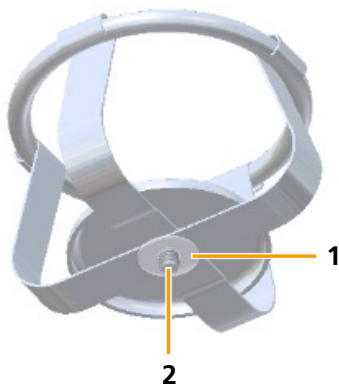
- Place the screws vertically on the drill holes.
- Ensure they can be tightened easily.



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 tray 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:

1. Loosen flat gaskets.
2. Position the holder on the tray.
3. Centre a screw on the threaded hole in the tray 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 tray.
5. Insert screws loosely. Ensure that the screws are screwed in straight and do not tilt.
6. Evenly tighten all screws cross-wise.

Procedure

Screw sizes

**ATTENTION**

If screws that are too long are used to affix the holders, these will stick out at the bottom of the tray. This has the effect that the tray can no longer be inserted and affixed correctly.

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 up to 50 mL	Flat head screw with Phillips head M4 x 6 A4	D = 3.2 x 12 x 0.5
100 up to 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 up to 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 up to 30 mm	Oval head screw with Phillips head M4 x 6 A2	D = 3.2 x 12 x 0.5

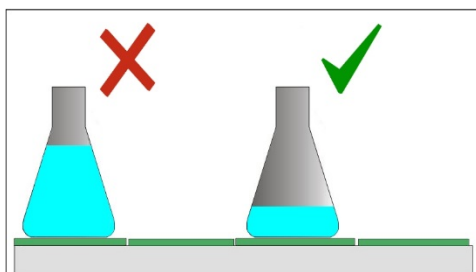
Boxes for microtiter plates

Screw	Flat gasket
Oval head screw with Phillips head M4 x 12 A2	D = 3.2 x 12 x 0.5

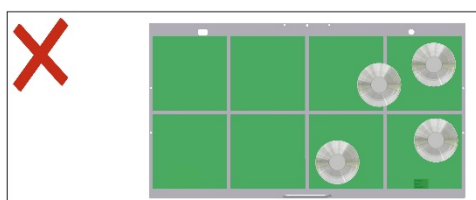
Operation

6.2.6 Tips & Tricks for Loading the Tray

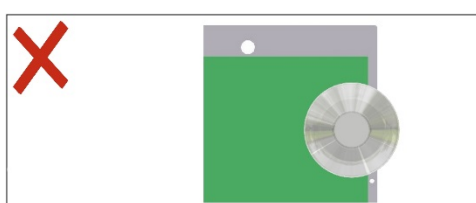
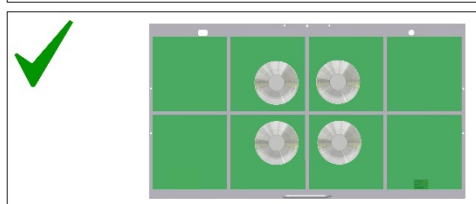
Observe the following notices when loading the tray:



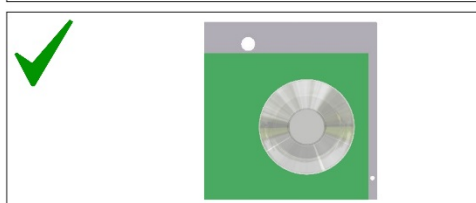
- The working volume should not exceed 1/3 of the total volume of the vessel.



- To ensure a smooth movement, place the cultivation vessels symmetrically and in the middle of the tray. Do not place any heavy vessels at the edge of the tray.



- If any of the vessels protrude over the edge of the tray, they could collide with the inner wall, resulting in the device being damaged or vessels breaking. As such, always ensure that the cultivation vessels do not protrude when positioning them on the tray.



- If the tray is only loaded lightly and is going to be run at high speeds, place additional cultivation vessels filled with water on the tray. This will ensure that the device runs more smoothly. At shaker speeds of approx. 200 up to 250 min⁻¹ (depending on the throw and the position of stacked units), the load distribution plays only a minor role.

**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.

Optimum load weights

The optimum load for a tray falls into the following ranges (mass incl. tray, clamps, flasks and filling):

Throw	Speed [min ⁻¹]			
	Up to 250	250 or higher	Up to 350	350 or higher
25 mm	9 – 19 kg	12 – 16 kg	--	--
50 mm	--	--	9 – 19 kg	12 – 16 kg

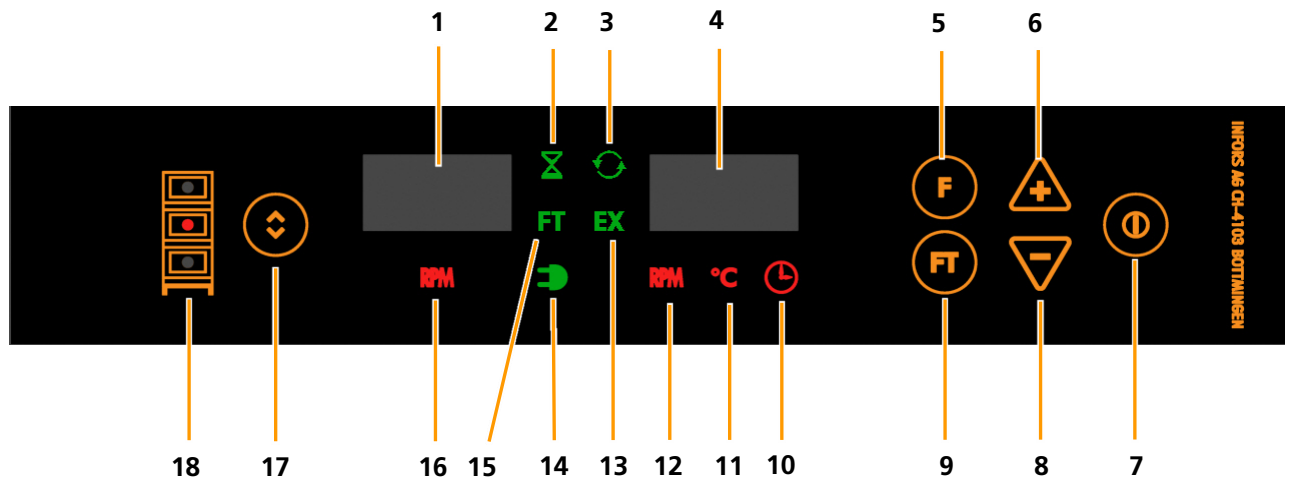
The loads listed above ensure that the device is ideally balanced. Both higher and lower loads cause an imbalance, which results in strong vibrations at higher speeds and can lead to flasks breaking. When the load on the tray is too light, the tray must thus be weighed down using flasks filled with water or weights until the optimum mass is reached. If the load is too high, reduce the speed, remove vessels or reduce the fill volume.

**ATTENTION**

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

Operation

6.3 Overview of Display and Operating Elements



- | | |
|--|---|
| 1 View box, left | 10 <i>Timer</i> parameter symbol |
| 2 <i>Timer active</i> function symbol | 11 <i>Temperature</i> parameter symbol |
| 3 <i>Cycle active</i> function symbol | 12 <i>Setpoint speed</i> parameter symbol |
| 4 View box, right | 13 <i>External (EX)</i> function symbol |
| 5 F (function) button | 14 <i>Power supply on/off</i> function symbol |
| 6 Plus button | 15 <i>Next phase (FT)</i> function symbol |
| 7 On/Off button | 16 <i>Actual speed</i> parameter symbol |
| 8 Minus button | 17 Button without function |
| 9 FT (time-delay function) button | 18 Display without function |

6.3.1 Operating Elements

Operating element	Designation	Function
	On/Off button	The On/Off button is used to control the following functions: ■ Switching the device from stand-by mode to active mode. ■ Activating/deactivating the selected parameter.
	F button	The F button can be used to select the device's parameters one after the other so that they can be adjusted and activated as necessary.
	FT button	The FT button can be used to select the device's parameters one after the other so that they can be adjusted for the next phase. The FT button is only ever used in conjunction with the timer function.
	Plus button	The Plus button increases the values of the parameter setpoints or the time of the timer function. When the button is keeping pushed, the display runs up the specified value range in increasingly large intervals.
	Minus button	The Minus button decreases the values of the parameter setpoints or the time of the timer function. When the button is keeping pushed, the display runs down the specified value range in increasingly large intervals.

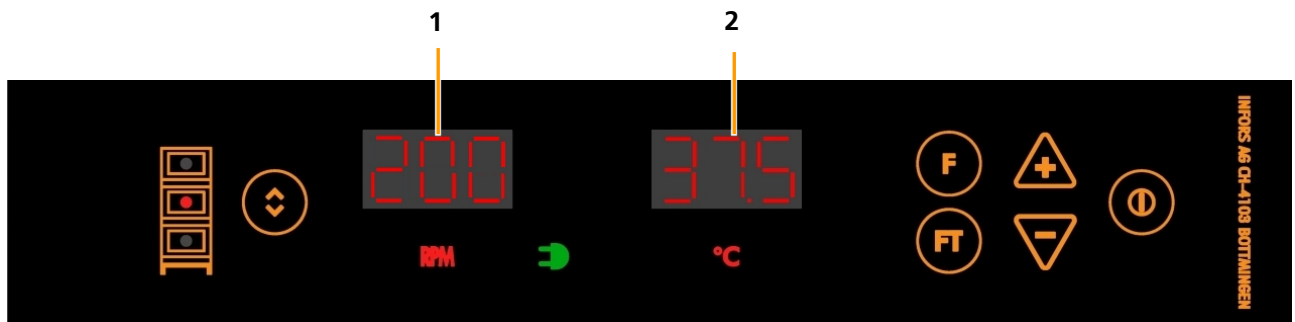
Operation

6.3.2 Display Elements

Symbol	Designation	Meaning
	<i>Speed</i>	Indicates that the speed (setpoint or actual) is being displayed in the corresponding view box. This symbol also indicates that the "Speed" parameter can be adjusted.
	<i>Temperature</i>	Indicates that the temperature (setpoint or actual) is being displayed in the right-hand view box. This symbol also indicates that the "Temperature" parameter can be adjusted.
	<i>Timer</i>	Indicates that the timer function (length of time unit) can be adjusted.
	<i>External (EX)</i>	Indicates that the device is being accessed by an external device. This applies when the device is being controlled using the operating panel of another unit in the stack, for example. This symbol also lights up if external software (e.g. eve®) is being used to access the device.
	<i>Cycle active</i>	Indicates that the cycle function (constant switching between Phases 1 and 2) is active.
	<i>Next phase (FT)</i>	Indicates that the parameters for the second phase (FT) can be adjusted.
	<i>Timer active</i>	Indicates that a time factor has been assigned to a function (F or FT).
	<i>Power supply on/off</i>	Indicates that the device is switched on and the initialisation procedure is complete.

6.3.3 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.



Left-hand view box (1)

Among other factors, the left-hand view box provides information on the speed (actual value or setpoint), error and alarm messages, and operating hours.

During normal operation, the current actual value for the "Speed" (RPM) parameter is displayed whenever this parameter is active. Otherwise, the display will alternate between the set setpoint and the message *OFF*.

Right-hand view box (2)

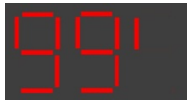
Among other factors, the right-hand view box displays the setpoints and actual values for the parameters, and provides information on the timer function, error and alarm messages, and operating hours.

During normal operation, the current actual value for the "Temperature" (°C) parameter is displayed whenever this parameter is active. Otherwise, the display will alternate between the set setpoint and the message *OFF*.

Operation

Time information displays

Time information is displayed as follows in the view boxes:



- From 0 to 99 minutes:
The time is displayed in minutes (').
Example: 99 minutes
- From 1 hour, 40 minutes to 9 hours, 50 minutes:
The time is displayed in the following format: *hours(h) minutes x10*.
Example: 9 hours, 50 minutes
- From 10 to 95 hours:
The time is displayed in hours (h).
Example: 95 hours
- From 4 days, 00 hours to 9 days, 23 hours:
The time is displayed in the following format: *days.hours*
Example: 9 days, 23 hours

Fault displays

For information on the alarms and error messages displayed in the view boxes, see chapter 7.1 "Messages in the View Boxes", page 82.

6.4 Adjusting, Activating and Deactivating Parameters

6.4.1 Overview of Parameters



Rotation speed (RPM)

During adjustment, the set rotation speed setpoint in min^{-1} is displayed as a whole number. The adjustment range depends on the position of the device in the stack. The adjustment range for individual units is between 20 and 400 min^{-1} .



INFORMATION

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 11.4.1 "Maximum Permissible Rotation Speed Setpoints", page 107).



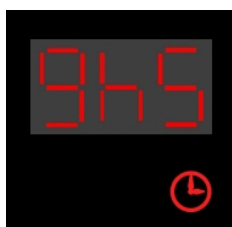
Temperature (°C)

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



INFORMATION

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 devices in the stack (see chapter 11.4.2 "Information on Temperatures that can Actually be Achieved", page 108).



Timer

The timer function allows you to make timed changes to the parameters. You can do this by defining two phases with different setpoints. You can program the following modes:

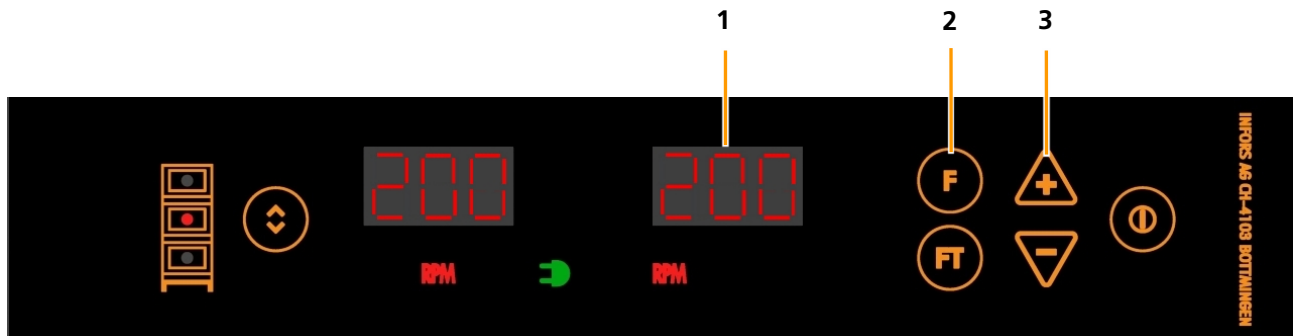
- One-time change from phase 1 to 2 (e.g. if you want to reduce the temperature after a certain amount of time)
- Cyclical changing between phases 1 and 2 (e.g. for simulating day and night)

For detailed information on how to use the timer, see chapter 6.5 "Timer Function", page 69.

Operation

6.4.2 Setting the Parameter Setpoint

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



Procedure

1. Press the **F** button (2) to select the parameter in question.
The right-hand display (1) will show the set setpoint for the parameter. If you do not input anything within 2 seconds, the display will alternate between the set setpoint and the messages *ON* and *OFF*.
2. Press the **Plus** or **Minus** button to set the setpoint you want to use for the selected parameter. You can speed up this procedure by holding the **Plus** or **Minus** button down.



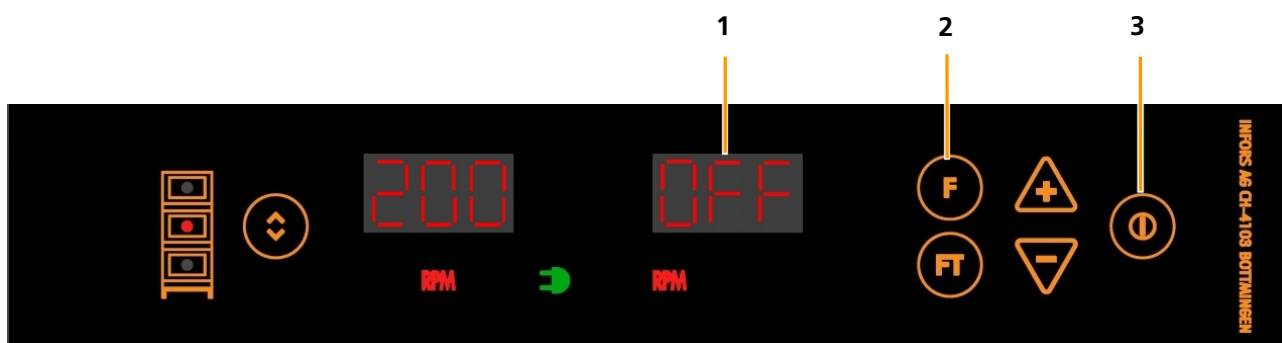
INFORMATION

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

6.4.3 Activating and Deactivating Parameters

Activating Parameters

To activate a parameter, proceed as follows:



Procedure

1. Press the **F** button (2) to select the parameter in question.
The right-hand display (1) will show the set setpoint for the parameter. If you do not input anything within 2 seconds, the display will alternate between the set setpoint and the message *OFF*.
2. Press the **On/Off** button (3) to activate the parameter.
The parameter will be activated immediately. The right-hand display will alternate between the current actual value for the parameter and the message *ON*.



INFORMATION

When the "Speed" (*RPM*) parameter is activated, the shaking procedure will start up immediately. As such, we recommend activating this parameter last of all.



INFORMATION

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

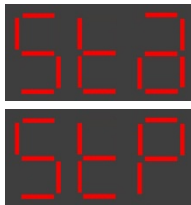
Operation

Deactivating Parameters

The parameters are deactivated using the same procedure as for activation. Select the parameter you wish to deactivate using the **F** button, then press the **On/Off** button to deactivate it. When a parameter is deactivated, the right-hand view box will alternate between the set setpoint and the message *OFF*.

Activating and Deactivating the "Speed" Parameter

When the "Speed" (*RPM*) parameter is activated or deactivated, the following messages will appear in the right-hand view box:



- The *Sta* ("Start") message appears when the shaker drive is switched on and goes out when the speed reaches 20 min¹.
- The *StP* ("Stop") message appears when the shaker drive is switched off and goes out as soon as the table comes to a standstill.

The operating panel remains locked for as long as the messages are displayed. It is not possible to input any commands or information during this time.



INFORMATION

When starting up the shaker drive, use the time until the setpoint has been reached to check whether the cultivation flasks are seated securely on the tray.

6.5 Timer Function



ATTENTION

If cultivation is started at low temperatures and the temperature is then increased (e.g. when using the timer), condensation can form on the flasks because these are heated up slower than the ambient air. When using the device in conjunction with the Sticky Stuff adhesive matting, this can lead to the flasks coming off the adhesive matting.



INFORMATION

If the timer function is not activated, the device runs until it is stopped by manually deactivating the parameters.

6.5.1 Overview

The timer function can be used to set defined sequences. Two different programming modes are available:

- One-time change from phase 1 to 2
- Cyclical changing between phases 1 and 2



When the timer function is active, the *Timer active* function symbol is displayed.

The following rules are important for understanding the timer function:

- a) The **F** button is always used to set the current parameters.
- b) The **FT** button is always used to set the parameters that will apply for the next phase.
- c) The device is always in phase "F". The "FT" values simply define what will happen at the next change.

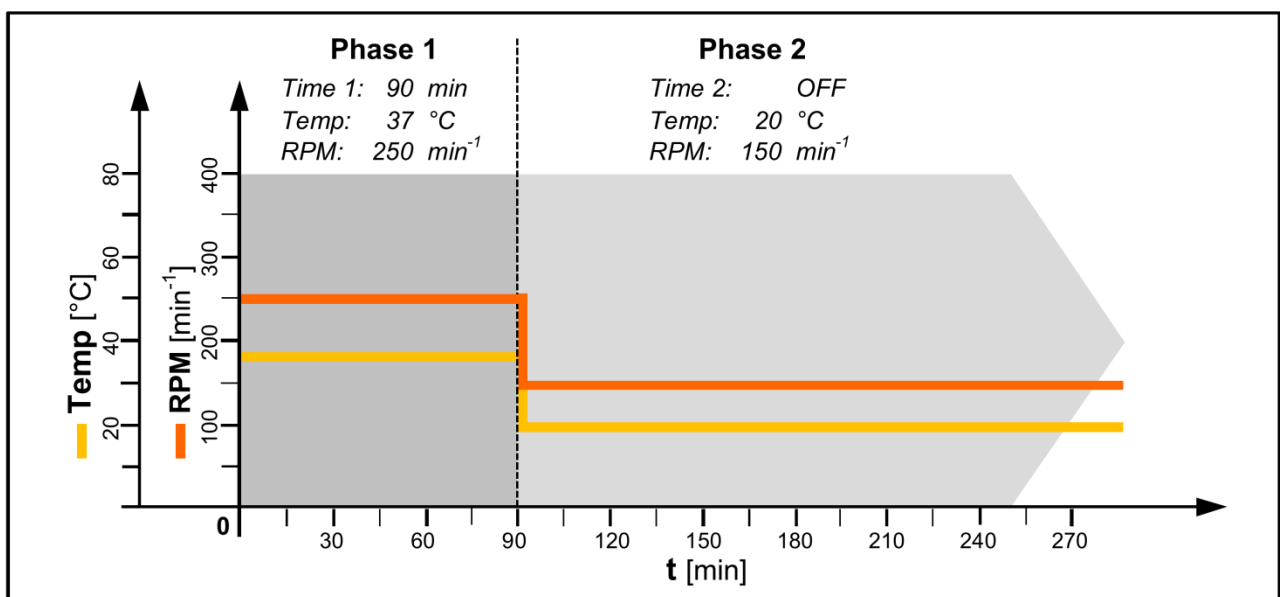
Operation

One-time change from phase 1 to 2

If the device is programmed using this method, the setpoint settings for the cultivation process parameters will change when the specified time expires. The device will then keep running using the setpoints specified for the second phase until the device is stopped by deactivating the parameters.

Example applications:

- Starting the cultivation process on a time delay
- Induction of a protein expression
- Stopping or slowing down a cultivation process after a defined period of time

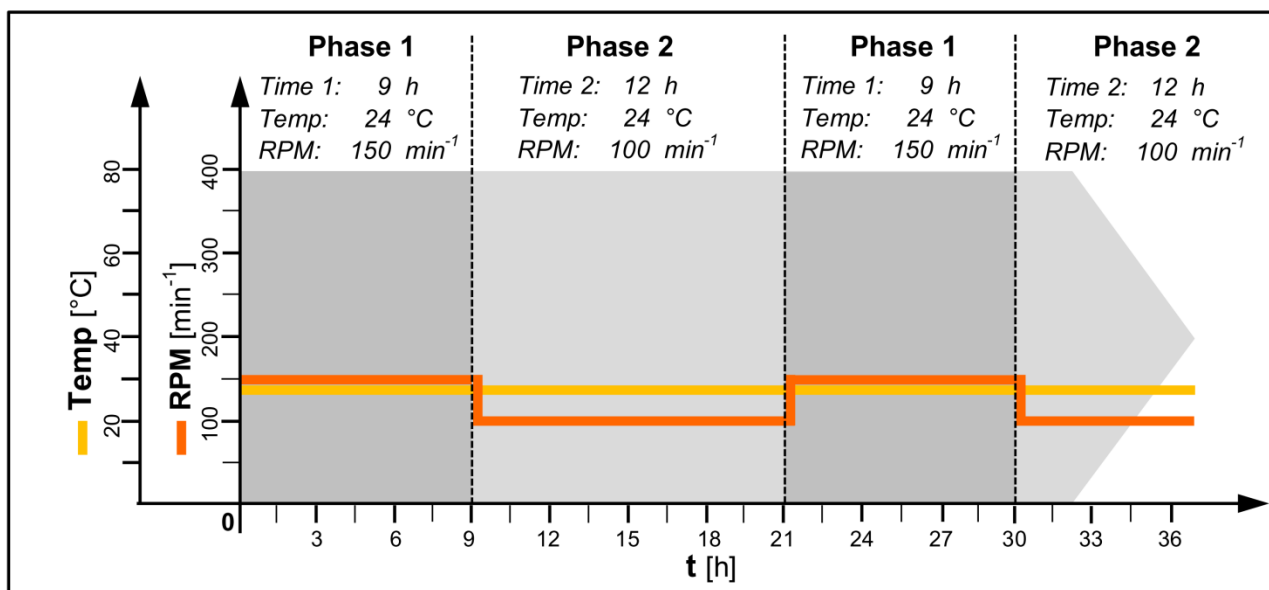


Cyclical changing between phases 1 and 2

If the device is programmed using this method, two different parameter settings will be repeated on an endless, precisely timed cycle. The two intervals (phase 1 and phase 2) alternate until the cultivation process is stopped manually by deactivating the parameters.

Example application:

- Simulation of daytime and night time



Operation

6.5.2 Programming a One-Time Change

Programming the timer for a one-time change is a multi-step procedure:

- Set the setpoints (RPM and/or °C) for the first phase using the **F** button and activate the parameters.
- Set the setpoints (RPM and/or °C) for the second phase using the **FT** button and activate the parameters.
- Set and activate the timer using the **F** button.

Setting the Setpoints for Phase 1 (F Button)



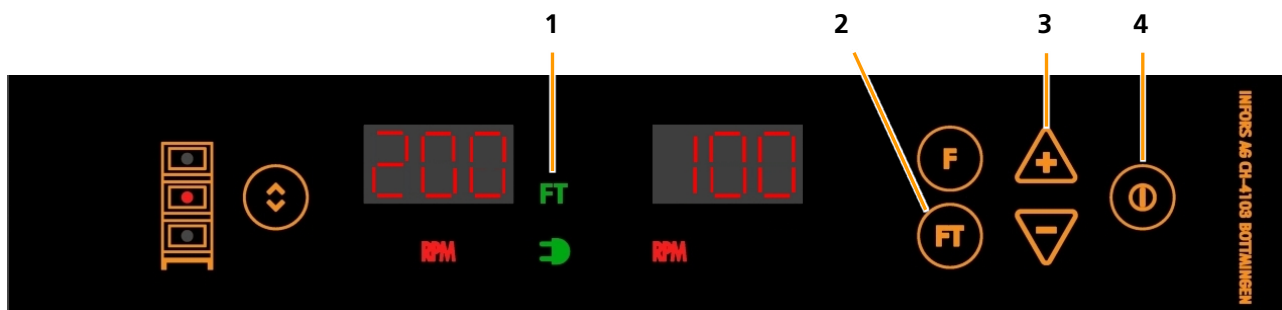
Procedure

- Press the **F** button (1) to select the parameter in question (RPM or °C).
- Press the **Plus** or **Minus** button (2) to set the setpoint you want to use for the selected parameter.
- Press the **On/Off** button (3) to activate the parameter.
- Repeat steps 1 – 3 as necessary for the other parameters.

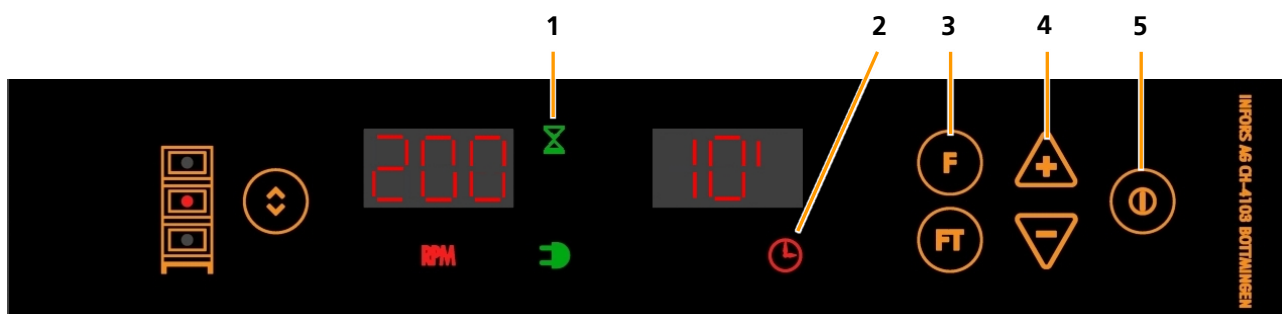


INFORMATION

For details of how to set the parameters, see chapter 6.4 "Adjusting, Activating and Deactivating Parameters", page 65.

Setting the Setpoints for Phase 2 (FT Button)


5. Press the **FT** button (2) to select the parameter in question (RPM or °C).
The *Next phase (FT)* function symbol (1) will light up.
6. Press the **Plus** or **Minus** button (3) to set the setpoint you want to use for the selected parameter.
7. Press the **On/Off** button (4) to activate the parameter.
8. Repeat steps 5 – 7 as necessary for the other parameters.

Setting the Timer (F Button)


9. Select the timer function using the **F** button (3).
The *Timer* parameter symbol (2) will light up.
10. Use the **Plus** or **Minus** button (4) to set the required time.
11. Activate the timer using the **On/Off** button (5).
The *Timer active* function symbol (1) will flash.

Operation



INFORMATION

Do not set the timer to *ON* in the "FT" phase. This will activate cyclical operation.

The device will now run using the setpoints set for the first phase until the set time elapses. The *Timer active* function symbol will flash for the duration.

As soon as the set time has expired, the system will change to the second phase. The *Timer active* function symbol will go out. The device will now run with the setpoints set for the second phase until it is switched off manually or the setpoints are modified.



INFORMATION

The timer function can be deactivated at any time by switching off the timer. The device will then continue running with the last active parameter settings.

6.5.3 Programming a Cyclical Change

Programming the timer for a cyclical change is a multi-step procedure:

- a) Set the setpoints (RPM and/or °C) for the first phase using the **F** button and activate the parameters.
- b) Set and activate the timer for the first phase using the **F** button.
- c) Set the setpoints (RPM and/or °C) for the second phase using the **FT** button and activate the parameters.
- d) Set and activate the timer for the second phase using the **FT** button.

Setting the Setpoints for Phase 1 (F Button)



Procedure

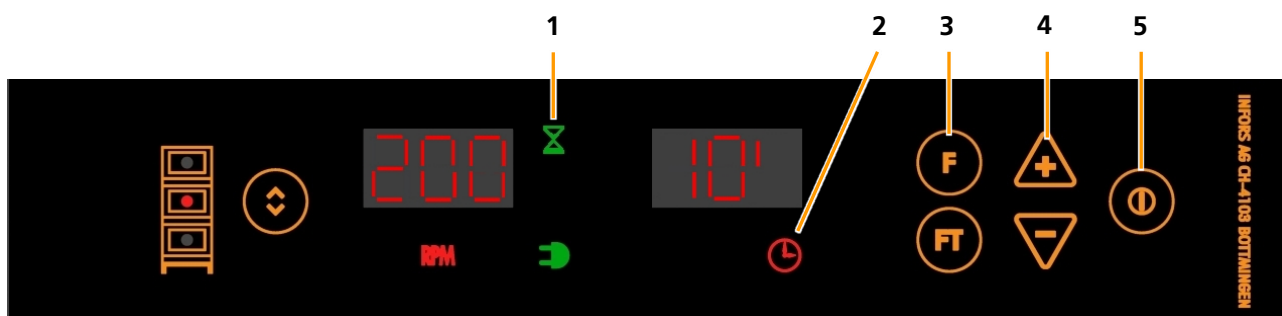
1. Press the **F** button (1) to select the parameter in question (RPM or °C).
2. Press the **Plus** or **Minus** button (2) to set the setpoint you want to use for the selected parameter.
3. Press the **On/Off** button (3) to activate the parameter.
4. Repeat steps 1 – 3 as necessary for the other parameters.



INFORMATION

For details of how to set the parameters, see chapter 6.4 "Adjusting, Activating and Deactivating Parameters", page 65.

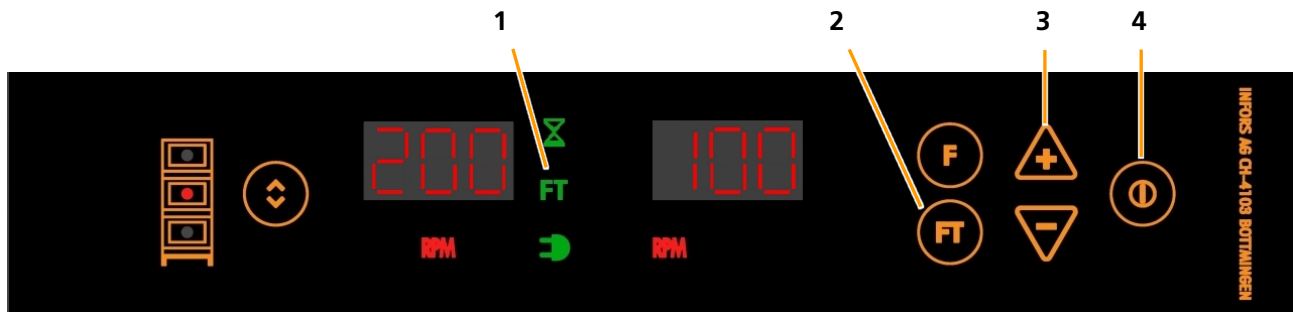
Setting the Timer for Phase 1 (F Button)



5. Select the timer function using the **F** button (3).
The *Timer* parameter symbol (2) will light up.
6. Use the **Plus** or **Minus** button (4) to set the required time.
7. Activate the timer using the **On/Off** button (5).
The *Timer active* function symbol (1) will flash.

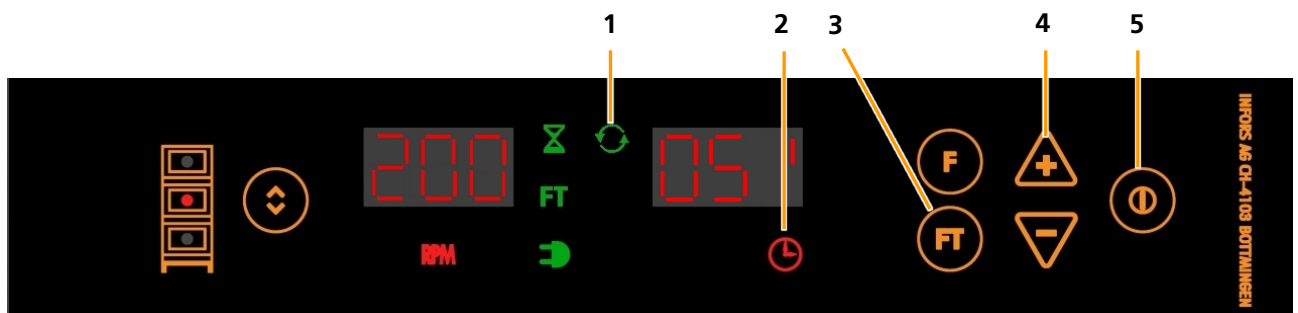
Operation

Setting the Setpoints for Phase 2 (FT Button)



8. Press the **FT** button (2) to select the parameter in question (RPM or °C).
The *Next phase (FT)* function symbol (1) will light up.
9. Press the **Plus** or **Minus** button (3) to set the setpoint you want to use for the selected parameter.
10. Press the **On/Off** button (4) to activate the parameter.
11. Repeat steps 8 – 10 as necessary for the other parameters.

Setting the Timer for Phase 2 (FT Button)



12. Select the timer function using the **FT** button (3).
The *Timer* parameter symbol (2) will light up.
13. Use the **Plus** or **Minus** button (4) to set the required time.
14. Activate the timer using the **On/Off** button (5).
The *Cycle active* function symbol (1) will light up.

The device will now keep running and alternating between the set-points for the first and second phases until it is switched off manually or the setpoints are modified. The *Timer active* and *Cycle active* function symbols will flash for the duration.

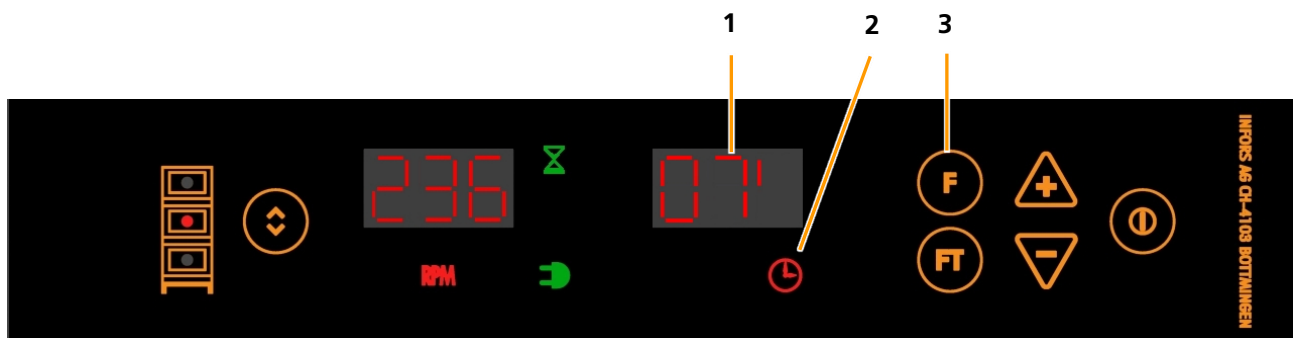


INFORMATION

The timer function can be deactivated at any time by switching off the timer. The device will then continue running with the last active parameter settings.

6.5.4 Displaying the Remaining Time

To display the remaining time for the current phase, proceed as follows:



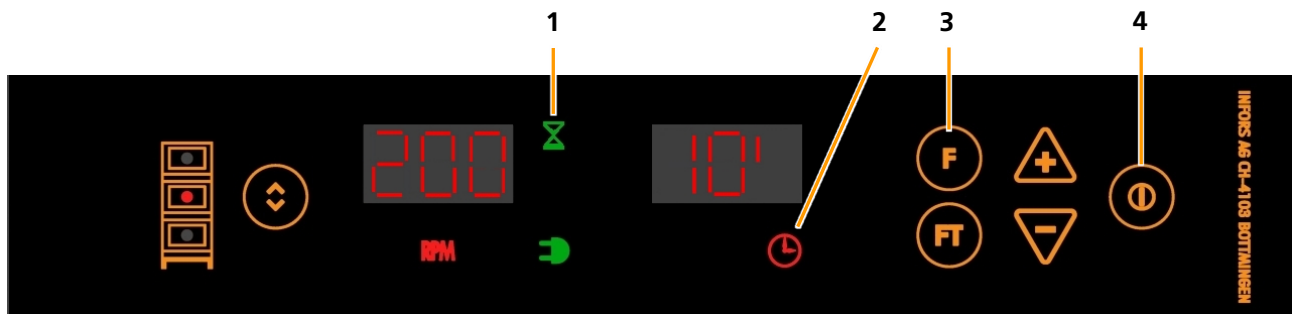
Procedure

1. Select the timer function using the **F** button (3).
The *Timer* parameter symbol (2) will light up.
The right-hand view box (1) will display the total running time for the timer, then the time remaining.

Operation

6.5.5 Aborting the Timer Function

The timer function can be aborted at any time. To do so, proceed as follows:



Procedure

1. Select the timer function using the **F** button (3).
The *Timer* parameter symbol (2) will light up. The remaining time will be displayed in the right-hand view box.
2. Deactivate the timer using the **On/Off** button (4).
The *Timer active* function symbol (1) will go out.
The device will now run with the set setpoints until it is switched off manually or the setpoints are modified.



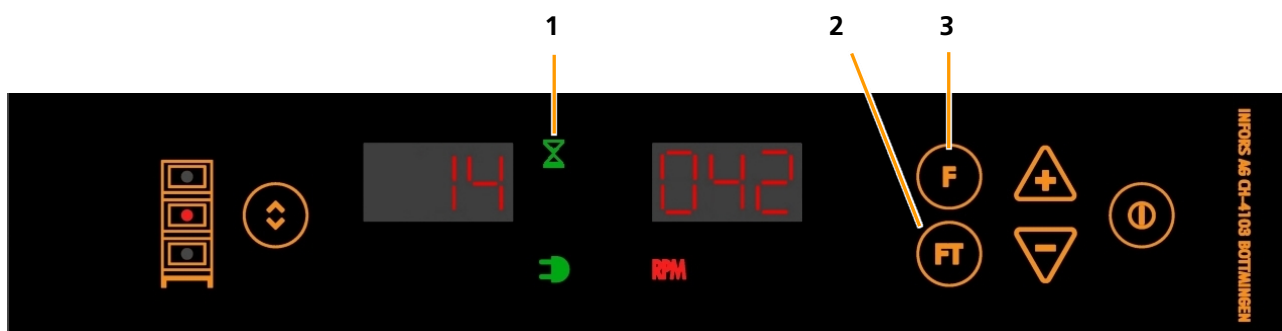
INFORMATION

If both timers are active, you will only need to deactivate the first timer (**F** button); the second timer (**FT** button) will then be deactivated automatically.

6.6 Operating the Operating Hours Counter

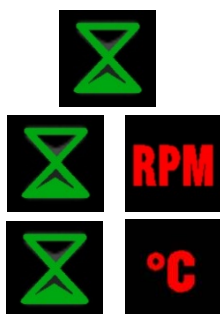
The operating hours counter indicates how long a component of the device has been in operation. The left-hand view box displays the hours in thousands; the right-hand view box displays hours 0 to 999.

To activate the operating hours display, proceed as follows:



Procedure

1. Press and hold the **F** and **FT** buttons (2 and 3) at the same time. The *Timer active* function symbol (1) will light up. The operating hours for the individual components will be displayed one after the other:



- Operating hours – power supply on
- Operating hours – motor controller
- Operating hours – temperature controller

Top example: Operating hours for motor controller = 14042 hours

Operation

6.7 Switching on the Interior Lighting

Automatically 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 pressed

The interior lighting remains switched on for a minute, then is switched off automatically.

Switching on the interior lighting with the door open

The interior lighting can also be activated manually while the door is open in order to visually check the cultivation flasks. To do this, press and hold the **F** button. When the **F** button is released, the lighting will switch off again.

6.8 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. Press the power switch on the top left of the casing.
3. If the device is not going to be used for a longer period of time, unplug it from the mains.

6.9 Behaviour in Case of Interrupted Power Supply

If the power supply to the device is interrupted during a cultivation process (e.g. by flicking the power switch or in case of a power failure), all the parameters and timer setpoints will be stored, together with the time remaining on the last active timer phase.

If the power supply is restored, the device will automatically restart with the last stored setpoints. If a timer was active prior to the interruption to the power supply, the device will restart with the time remaining on the last active phase and the setpoints stored for this phase.



The alarm message *P.FAIL* will appear in the view boxes as a warning. The alarm message can be confirmed by pressing any button; it will then disappear.

Rectifying Faults

7 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.

7.1 Messages in the View Boxes

Faults in the device are divided into two categories:

- **Alarms** refer to errors in the process, e.g. if the actual parameter values deviate from the setpoints. Alarms do not directly affect the process; the device can continue running without any restrictions.
- **Error messages** relate to technical faults in the device. Depending on the type of the error in question, either the device or individual components will be brought to an immediate stop. In such cases, it will not be possible to put the device back into operation until the error has been resolved.

7.1.1 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 cleared automatically as soon as the actual value moves back into the setpoint range.



INFORMATION

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

Rectifying Faults

The following alarm messages may occur:

Alarm message	Meaning	
	Temperature too low (actual value < setpoint - 1°C).	
Possible cause	Measures	Personnel
The parameter has recently been altered, and the required setpoint has not yet been reached.	No action required. The alarm message will disappear as soon as the setpoint is reached.	
Door not fully closed.	Close the door completely.	Operator
Capillary thermostat set too low.	Set the capillary thermostat higher.	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 whether the Pt100 sensor is working properly. In case of a defect, contact your INFORS HT representative.	Operator
Heater fan not working.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Alarm message	Meaning	
	Temperature too high (actual value > setpoint + 1°C).	
Possible cause	Measures	Personnel
The parameter has recently been altered, 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 ambient temperature does not meet the requirements.	Check the ambient temperature on the device and adjust if necessary.	Operator
Error during temperature measurement	Check whether the Pt100 sensor is working properly. In case of a defect, contact your INFORS HT representative.	Operator
Heater fan not working.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Rectifying Faults

Alarm message	Meaning	
	Speed too low (actual value < setpoint - 10 min ¹).	
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
Wear on drive belt or motor malfunction.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Alarm message	Meaning	
	Speed too high (actual value > setpoint + 10 min ¹).	
Possible cause	Measures	Personnel
Error when measuring the speed.	Switch the device off and then on again.	Operator
Control system defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Alarm message	Meaning	
	The power supply to the device was briefly interrupted.	
Possible cause	Measures	Personnel
Power failure The device was switched off while some of the parameters were still activated.	No action required. In case of power failure, all the setpoints are stored and the device automatically returns to its normal operating status. This message can be cleared by pressing any button.	Operator

Alarm message	Meaning	
	An attempt has been made to control a device in a stack that is not available.	
Possible cause	Measures	Personnel
A device that is not available has been selected.	Select the correct device using the Device selection button.	Operator

Rectifying Faults

Alarm message	Meaning
	The device door is open.

7.1.2 Error Messages and their Meanings

Error messages are generated when the device develops a fault, e.g. if a component is defective or the table is jammed. Error messages are indicated both acoustically and visually.

If an error occurs, the text *Err*, *Err1* or *Err2* will be displayed in alternation with the actual value of the parameter. Error messages can be confirmed by pressing the **F** button.

The following error messages may occur:

Shaker drive faults

Error message	Meaning	
	The table is not moving.	
Possible cause	Measures	Personnel
See Faults Related to the "Speed" Parameter.		

Error message	Meaning	
	The shaker drive is accelerating or running too quickly.	
Possible cause	Measures	Personnel
See Faults Related to the “Speed” Parameter.		

Rectifying Faults

Temperature control faults

Error message	Meaning	
	Temperature in incubation chamber too high (> 65°C).	
Possible cause	Measures	Personnel
Measurement electronics defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Error message	Meaning	
	Temperature in incubation chamber too low (< 0°C).	
Possible cause	Measures	Personnel
Measurement electronics defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Error message	Meaning	
	No value shown on temperature display.	
Possible cause	Measures	Personnel
Pt100 sensor or sensor cable defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Error message	Meaning	
	No value shown on temperature display.	
Possible cause	Measures	Personnel
Pt100 sensor or sensor cable defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

7.2 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.

Rectifying Faults

General faults

Fault		
After activating the power switch, the display and 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 device fuse is defective.	Change the fuse (see chapter 7.3.1 "Replacing Fuses", page 90).	Operator

Fault		
Door does not open fully.		
Possible cause	Measures	Personnel
The device is switched off.	Switch on the device.	Operator
The door is under pressure.	Close the door completely and then open it again.	Operator
Door mechanism defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Fault		
The tray is not released when the door is opened.		
Possible cause	Measures	Personnel
The door is not fully open.	Push the door down to its bottom position.	Operator

Fault		
The tray cannot be locked.		
Possible cause	Measures	Personnel
There is a foreign object jamming the locking mechanism.	Remove the foreign object.	Operator
The tray is jammed due to foreign objects under the table.	Detach the table from its axis, tip it up and remove the foreign bodies.	Operator
The tray is bent.	Replace the tray.	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.	Qualified technicians

Rectifying Faults

Faults related to the *Rotation speed* parameter

Fault		
The table is not moving.		
Possible cause	Measures	Personnel
The table is blocked by foreign objects.	Remove the foreign object. Detach the table from its axis, tip it up and remove the foreign bodies.	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 drive belt is torn.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer
The motor is defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer
The drive control system is defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer

Fault		
Strong vibrations occur.		
Possible cause	Measures	Personnel
The load is too <u>heavy</u> , so the device is no longer balanced.	Reduce the load to the prescribed value.	Operator
The load is too <u>light</u> , 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 speed is too high.	Reduce the speed.	Operator
The device is not standing straight.	Level the table or the device (adjustable foot on the base).	Operator
The substructure (table) is too weak.	Place the device on a stable table or the floor.	Operator

Fault		
The shaker drive is accelerating or running too quickly.		
Possible cause	Measures	Personnel
The motor control system is defective.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer
Error when measuring the speed.	Switch the device off and then on again.	Operator

Rectifying Faults

Faults related to the *Temperature* parameter

Fault		
Temperature too high compared to setpoint.		
Possible cause	Measures	Personnel
Error during temperature measurement	Check whether the Pt100 sensor is working properly. In case of a defect, contact your INFORS HT representative.	Operator

Fault		
The temperature fails to reach the desired setpoint.		
Possible cause	Measures	Personnel
The heater is not switched on.	Activate the "Temperature" parameter.	Operator
The setpoint is set too low.	Increase the setpoint.	Operator
The ambient temperature does not meet the requirements.	Check the ambient temperature and correct if necessary (see chapter 5.1 "Operating Conditions at the Installation Location", page 47	Operator
Door not fully closed.	Close the door completely.	Operator
Cooling fins dusty.	Clean the cooling fins.	Operator
Capillary thermostat set too low (must be at least 10°C above setpoint).	Set the capillary thermostat higher.	Operator
Heater fan not working.	Contact your local INFORS HT representative.	INFORS HT service technician or licensed dealer



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.

Rectifying Faults

7.3 Rectifying Faults

7.3.1 Replacing Fuses

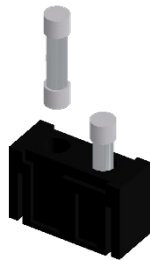
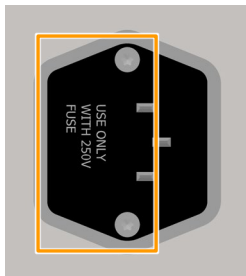


INFORMATION

The fuses may only be replaced by fuses of the same rating. For information concerning the requirements for the fuses see chapter 7.3.1 "Replacing Fuses", page 90.

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.

7.3.2 Replacing the Lighting Element for the Interior Lighting

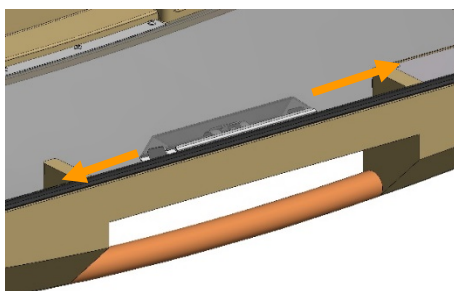
To replace a defective lighting element, proceed as follows:



INFORMATION

For information on the lighting specifications, see chapter 11.2.3 "Interior Lighting", page 103.

Procedure



1. Open the device door all the way.
2. Turn off the power switch and pull out the plug.
3. Slide the interior lighting cover to the side.
4. Remove the defective lighting element from the fixture.
5. Plug a new lighting element into the fixture.
6. Slide the cover back over the interior lighting.

7.4 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.

Maintenance and Cleaning

8 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.

8.1 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
Every 3 years	If using the cooling option, have the coolant replaced. To do this, contact INFORS HT.	INFORS HT service technician or licensed dealer

Maintenance and Cleaning

8.2 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.

8.2.1 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.

Maintenance and Cleaning

Splashing water

Always use a wet cloth when cleaning the base tray; never pour water into the tray. Make sure that no water splashes into the bearings. After cleaning the device, especially the interior and the base tray, dry it with a cloth.

Dust

Over time, dust can collect in the vents and on other exposed parts. It can be removed carefully using a vacuum cleaner.

Installing/uninstalling the table

In order to allow cleaning of the base tray in case of glass breakages or soiling caused by culture liquids, the table can be detached from the counterweight and folded up. To do so, proceed as follows:

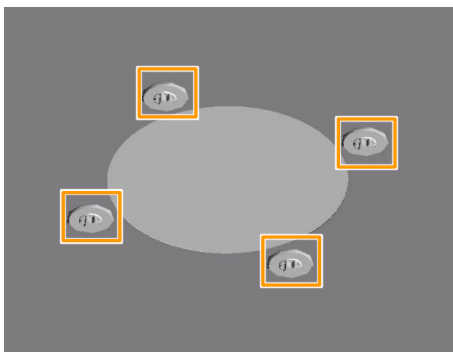


ATTENTION

After being folded up, the table must be held in position by hand. If the table is not secured properly, there is a risk of it folding back down again. This can cause injuries.

- If possible, have a second person hold the table in place once it has been folded up. Alternatively, you can place an object under the table to stop it from folding back down.
- Proceed with caution when folding the table back down.

Procedure



1. Open the device door all the way.
2. Remove the tray.
3. Turn off the power switch and pull out the plug.
4. Undo the hexagonal socket screws (4 M5x16) on the table's drive hub using the supplied Allen key and remove them.



ATTENTION

No screws must be removed other than the four mounting screws.

5. Tip the table up by a maximum of 30°.
6. Hold the table in its folded-up position (or, ideally, get a second person to do so), or use a suitable object to hold it there.

Maintenance and Cleaning

7. Remove any foreign bodies and coarse soiling from the base tray by hand.
8. Dry the base tray completely using paper towels.
9. Carefully place the table on its rotary axis. When doing so, align the rotary axis so that the threaded holes on the table are positioned directly over the holes on the rotary axis.
10. Insert the hexagonal socket screws and tighten them crosswise using the Allen key.



INFORMATION

If any of the hexagonal socket screws are lost or damaged, make sure that they are always replaced using original screws (M5x16, hexagonal socket).

8.2.2 Disinfection

Only use quaternary ammonium compounds for wipe-down disinfection. As a tried and 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 8.2.1 "Cleaning", page 93.

Transport and Storage

9 Transport and Storage

The inbound delivery and transport to the assembly location are performed only by INFORS HT employees or by persons authorised by INFORS HT.

Nonetheless it is possible that the provider's personnel is entrusted with transport tasks in the context of on-site transport. In this case, observe the following notes.

9.1 Transport



WARNING

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

When transporting the device, observe the following:

- Prior to moving the device, transport fasteners (rubber wedges) must be inserted to prevent uncontrolled movements of the table.
- Always work in pairs and use suitable auxiliary equipment when transporting the unit.
- Especially when using auxiliary tools, it is important to keep in mind that the device's centre of gravity is not in the middle.

9.2 Storage

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

10 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.

10.1 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.

Disassembly and Disposal

10.2 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.

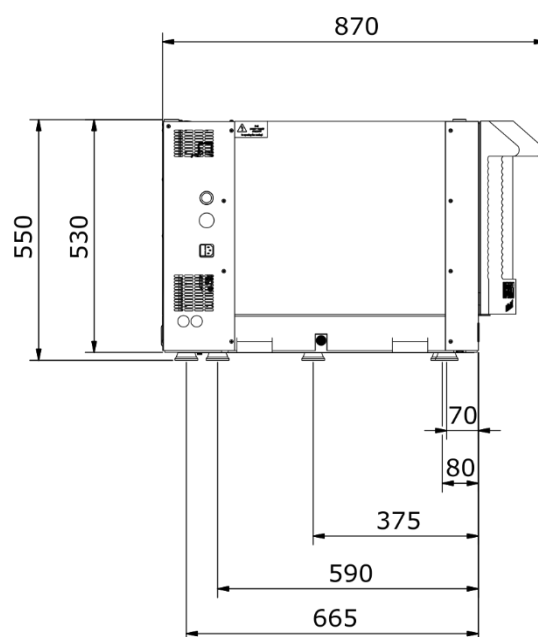
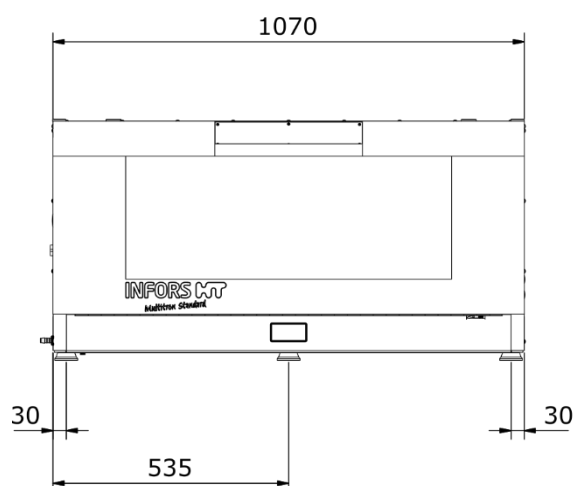
Local authorities or specialist disposal firms can provide information regarding environmentally acceptable disposal.

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.

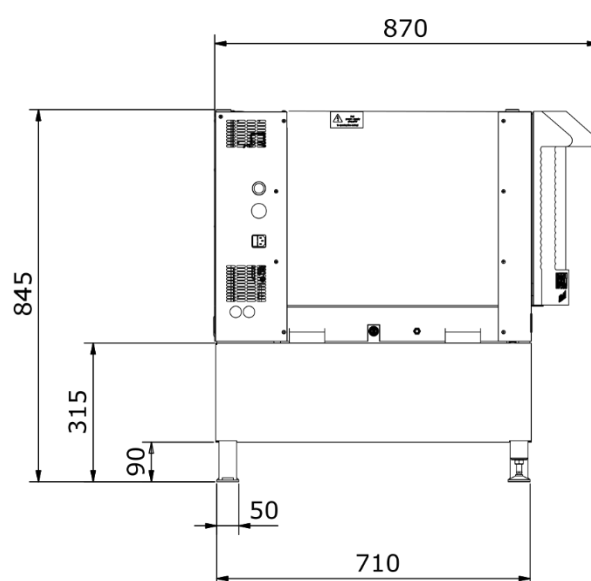
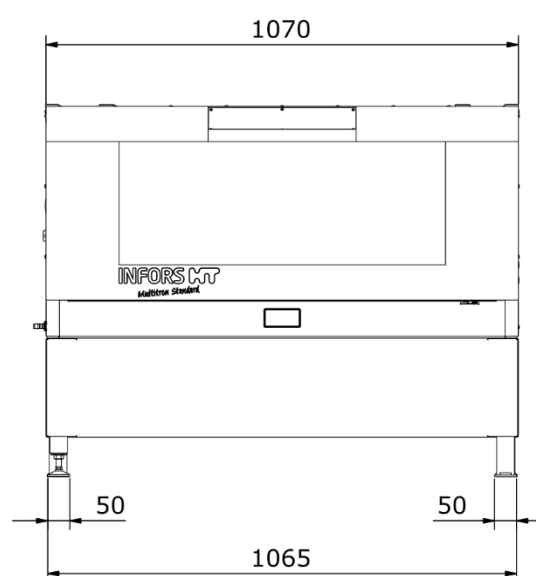
11 Technical Data and Specifications

11.1 Dimension Drawings

Individual unit with table feet

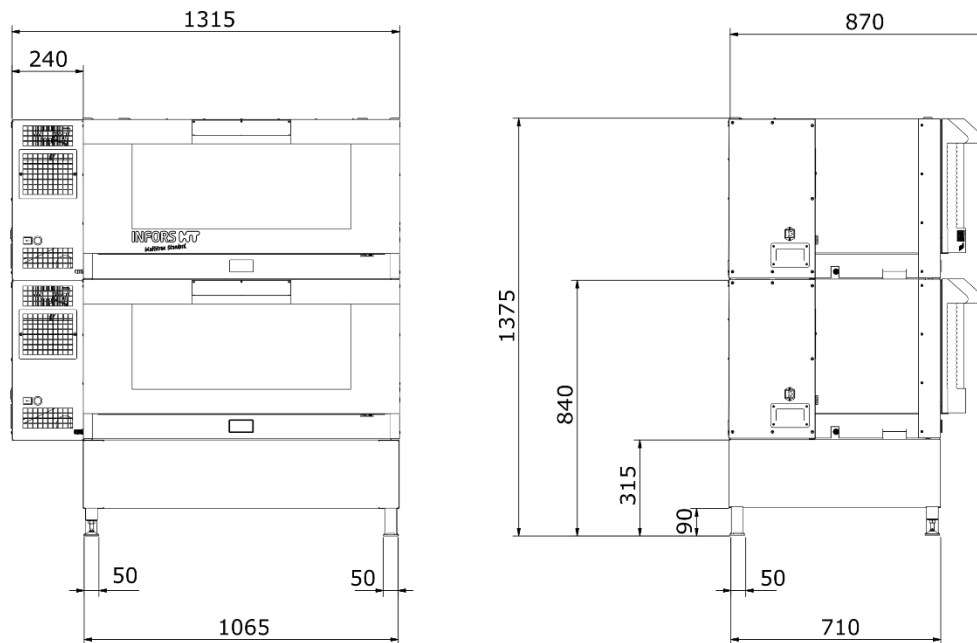


Individual unit with 31 cm base

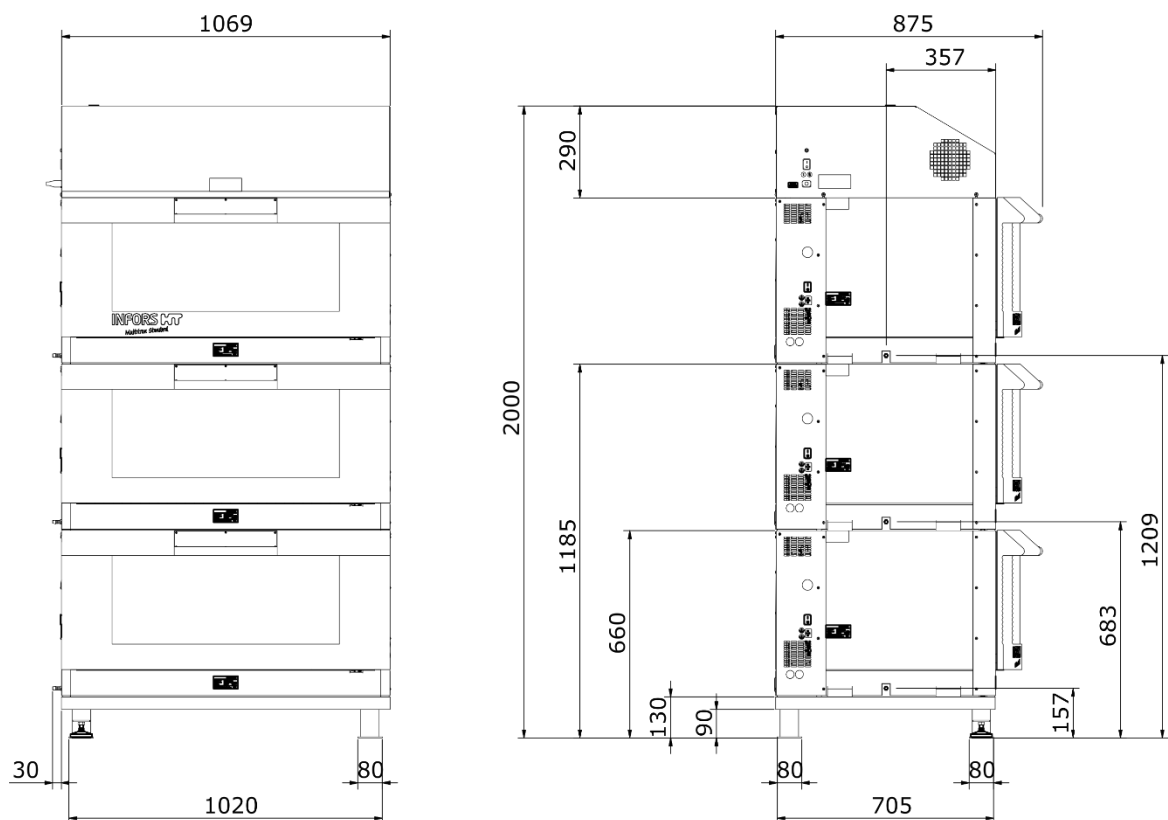


Technical Data and Specifications

Two units stacked with 31 cm base and side-mounted cooling system



Three units stacked with 13 cm base and top cooling system



Technical Data and Specifications

11.2 Specifications of the Basic Device

11.2.1 Weight and Dimensions

Mass base unit		
Description	Value	Unit
Individual unit with 25 mm throw	106	kg
Individual unit with 50 mm throw	114	kg

Exterior dimensions for individual unit		
Description	Value	Unit
Width	1070	mm
Depth (door closed)	870	mm
Depth (with door open)	1160	mm
Height	530	mm
Height (with rubber feet)	550	mm
Height (with 13 cm base)	665	mm
Height (with 31 cm base)	845	mm

Exterior dimensions for two units stacked		
Description	Value	Unit
Width (without side-mounted cooling system)	1070	mm
Width (with side-mounted cooling system)	1315	mm
Depth	870	mm
Height (with 31 cm base)	1375	mm

Exterior dimensions for three units stacked		
Description	Value	Unit
Width	1070	mm
Depth	870	mm
Height (without top cooling system, with 13 cm base)	1760	mm
Height (with top cooling system, with 13 cm base)	2000	mm

Technical Data and Specifications

Interior dimensions (incubation chamber)		
Description	Value	Unit
Width	925	mm
Depth	550	mm
Height	390	mm

11.2.2 Electrical Connection and Performance Values

Basic device

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

Electrical performance values			
Description	Type 230 V	Type 115 V	Unit
	Value		
Power (max.)	880	880	W
Power consumption	3,8	7,7	A
Consumption in stand-by	6	6	W
Fuses Two 5 x 20 mm fuses, time lag	10	16	A

900 W top cooling system

Electrical data				
Description	Value			Unit
Grid Type	230 V/ 50 Hz	230 V/ 60 Hz	115 V/ 60 Hz	
Power (max.)	540	690	570	W
Power consumption	4.2	4.6	7.5	A
Fuses Two 5 x 20 mm fuses, time lag	10	10	16	A

Technical Data and Specifications

380 W side-mounted cooling system

Electrical data				
Description	Value			Unit
Grid Type	230 V/ 50 Hz	230 V/ 60 Hz	115 V/ 60 Hz	
Power (max.)	220	220	200	W
Power consumption	1.2	1.2	2.6	A
Fuses Two 5 x 20 mm fuses, time lag	10	10	16	A

11.2.3 Interior Lighting

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

11.2.4 Materials

Component	Material
Casing	Polyurethane
Interior	Stainless steel
Table	Aluminium, anodised

11.2.5 Emissions

Description	Value	Unit
Sound pressure	< 70	dB(C)

Technical Data and Specifications

11.2.6 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	
Min. distance from walls, ceilings and other devices	100	mm



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.

11.2.7 Protection Type

Description	Value
Protection class	IP20 (as per DIN 60529)

Technical Data and Specifications

11.2.8 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

11.3 Specifications of Parameters

11.3.1 Rotation Speed Parameter (Shaker Drive)

Description	Value	Unit
Drive	External rotor motor	
Direction of rotation	Clockwise	
Power	75	W
Power consumption 230 V, 50/60 Hz	0.63	A
Power consumption 115 V, 60 Hz	1.15	A
RPM range ¹	20 – 400	min ⁻¹
Increment	1	min ⁻¹
Accuracy at maximum speed	± 1	%
Throw	25 or 50	mm

¹⁾ The actual 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)

Technical Data and Specifications

11.3.2 Temperature Parameter

Description	Value	Unit
Ventilation	2 heated cross-flow fans	
Power consumption	750	W
Air circulation	360	m³/h
Lowest temperature (via ambient temperature, without optional cooling)	6	°C
Highest temperature	65	°C
Control precision 4 – 50°C	± 0.3	°C
Control precision > 50°C	± 0.5	°C
Control system	Electronic PID control system	
Sensor type	Pt100	
Measurement range of the sensor	4 – 80	°C
Capillary thermostat control precision	± 2.5	°C
Default thermo switch setting for capillary thermostat	70	°C
Bi-metallic heating switch	approx. 80	°C
Overheating protection (safety fuse)	84	°C
Coolant for optional cooling system	R134a (non-CFC)	

11.4 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.

Technical Data and Specifications

11.4.1 Maximum Permissible Rotation Speed Setpoints



INFORMATION

The following information is based on an ideal tray load of 14 kg made up of standard Erlenmeyer flasks with no baffles, and a fill level of 30 %. For information on the optimum load weight depending on the speed, see chapter 6.2.6 "Tips & Tricks for Loading the Tray", page 58.

The following guidelines for the maximum rotation speeds are specified to avoid damage. As such, they must be observed, though other restrictions (e.g. tray with Sticky Stuff adhesive matting) must also be taken into account.

Due to the lever effect, the maximum permissible speeds for the top device units in stacks are lower than for single units.

Individual units

Throw	Value
25 mm	20 to 400 min ⁻¹
50 mm	20 to 350 min ⁻¹

Two units stacked

Device	25 mm throw	50 mm throw
Bottom unit	20 to 400 min ⁻¹	20 to 350 min ⁻¹
Top unit	20 to 250 min ⁻¹	20 to 250 min ⁻¹

Three units stacked

Device	25 mm throw	50 mm throw
Bottom unit	20 to 400 min ⁻¹	20 to 350 min ⁻¹
Middle unit	20 to 400 min ⁻¹	20 to 300 min ⁻¹
Top unit	20 to 350 min ⁻¹	20 to 250 min ⁻¹

All this information is intended solely as a guideline (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 reduce the load until the device runs smoothly.

Technical Data and Specifications

Maximum rotation speed with Sticky Stuff adhesive matting

For a detailed description of the maximum permissible rotation speed when using the Sticky Stuff adhesive matting, see chapter 4.1.3 "Tray with Sticky Stuff", page 38.

11.4.2 Information on Temperatures that can Actually be Achieved

The temperatures that can actually be achieved depend on a variety of factors, such as the ambient temperature, the ventilation and the temperature of the other devices 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: 6°C above ambient temperature Max: 65°C
Individual unit with side-mounted cooling system	Min: 13°C below ambient temperature Max: 65°C
Individual unit with top cooling system	Min: 12°C below ambient temperature Max: 65°C

EG-Konformitätserklärung

EC-Declaration of conformity

Déclaration CE de conformité

INFORS HT

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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

Multitron Standard

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
EMV-Richtlinie 2014/30/EU

Directive on machinery 2006/42/EC
EMC directive 2014/30/EU

Directive relative aux machines 2006/42/CE
Directive CEM 2014/30/UE

Aussteller

Issuer
Editeur

Bevollmächtigter für die technische Dokumentation
Person authorised to compile the technical file
Person autorisée à constituer le dossier technique



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Representative for conformity
Responsable de la conformité



M. Heuschkel
Chief Technology Officer

Bottmingen, 21. Aug. 2020

Ort, Datum
Place, date
Lieu, date

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